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INTERNATIONAL TELECOMMUNICATION UNION

# CCITT

THE INTERNATIONAL  
TELEGRAPH AND TELEPHONE  
CONSULTATIVE COMMITTEE

**BLUE BOOK**

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**VOLUME VII – FASCICLE VII.7**

**TERMINAL EQUIPMENT AND PROTOCOLS  
FOR TELEMATIC SERVICES**

**RECOMMENDATIONS T.431-T.564**

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**IXTH PLENARY ASSEMBLY**  
MELBOURNE, 14-25 NOVEMBER 1988

Geneva 1989



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#### REMARK

The terminology on Document Architecture has evolved during the elaboration of Recommendations during the study period 1985-1988.

- In order to prevent the readers from misinterpretations, *Document Architecture Transfer and Manipulation (DATAM)* is the general name of the T.400 Series,
- *Document Transfer and Manipulation (DTAM)* is relevant to the T.430 Series.

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#### PRELIMINARY NOTE

In this Fascicle, the expression "Administration" is used for shortness to indicate both a telecommunication Administration and a recognized operating agency.

**FASCICLE VII.7**

**Recommendations T.431 to T.564**

**TERMINAL EQUIPMENT AND PROTOCOLS  
FOR TELEMATIC SERVICES**

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## DOCUMENT TRANSFER AND MANIPULATION (DTAM) - SERVICES AND PROTOCOLS - INTRODUCTION AND GENERAL PRINCIPLES

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8.1	Service classes
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0	<i>Introduction</i>

Recommendation T.431 is one of a set of T.400 Series Recommendations to facilitate the interconnection of telematic systems and terminals. It is related to other CCITT Recommendations in the set as defined by the Reference model for open systems interconnection (X.200). The Reference model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

The T.430 Series of Recommendations define a document transfer and manipulation (DTAM) service and specify a DTAM protocol available within the application layer of the reference model. The DTAM defined in this series of Recommendations is one of the application service elements (ASE), which is specifically designed for document handling. It is concerned with identifiable bodies of information which can be treated as documents, and which may be stored within open systems or accessed, transferred and manipulated between application processes.

Recommendations T.431, T.432 and T.433 define general principles and application rules, basic DTAM service, and protocol, respectively. They provide sufficient facilities to support DTAM and establish a framework for DTAM management.

## 1 Scope and field of application

This Recommendation defines in an abstract way application rules of the DTAM service. Applications defined using this series of Recommendations are specified in terms of service classes. A service class consists of a combination of functional units and communication support functions. The combination of functional units and communication support functions are:

### 1) Functional units provided by DTAM:

- association use control unit (kernel);
- capability unit;
- document transfer unit;
- document unconfirmed manipulation unit;
- document confirmed manipulation unit;
- typed data transfer unit;
- remote document management unit (see Note);
- remote document access unit (see Note);
- token control unit;
- reliable transfer management unit;
- exception report unit.

*Note* - The use of these functional units is left for further study.

### 2) Communication support functions:

- association control service element (ACSE) and presentation layer service;
- reliable transfer service element (RTSE) (see Note);
- remote operation service element (ROSE) (see Note);
- session service (Recommendation X.215) according to the rule of Recommendation T.62 *bis*;
- message handling system service element (STM-SE) (see Note).

*Note* - The use of these communication support functions is left for further study.

## 2 References

- Rec. T.62 *bis*: Control procedures for Teletex and Group 4 facsimile service based on Recommendations X.215/X.225.
- Rec. T.400: Introduction to document architecture, transfer and manipulation.
- Rec. T.411: Open document architecture (ODA) and interchange format - Introduction and general principles.
- Rec. T.412: Open document architecture (ODA) and interchange format - Document structures.
- Rec. T.414: Open document architecture (ODA) and interchange format - Document profile.
- Rec. T.415: Open document architecture (ODA) and interchange format - Open document interchange format (ODIF).
- Rec. T.416: Open document architecture (ODA) and interchange format - Character content architectures.
- Rec. T.417: Open document architecture (ODA) and interchange format - Raster graphics content architectures.

- Rec. T.418: Open document architecture (ODA) and interchange format - Geometric graphics content architectures.
- Rec. T.432: Document transfer and manipulation (DTAM) - Services and protocols - Service definition.
- Rec. T.433: Document transfer and manipulation (DTAM) - Services and protocols - Protocol specification.
- Rec. X.200: Reference model of open systems interconnection for CCITT applications.
- Rec. X.208: Specification of abstract syntax notation one (ASN.1).
- Rec. X.209: Specification of basic encoding rules for abstract syntax notation one (ASN.1).
- Rec. X.210: Open systems interconnection (OSI) layer service definition convention.
- Rec. X.215: Session service definition for open systems interconnection for CCITT applications.
- Rec. X.216: Presentation service definition for open systems interconnection for CCITT applications.
- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications.
- Rec. X.218: Reliable transfer: Model and service definition.
- Rec. X.219: Remote operations: Model, notation and service definition.
- Rec. X.225: Session protocol specification for open systems interconnection for CCITT applications.
- Rec. X.227: Association control protocol specification for open systems interconnection for CCITT applications.
- Rec. X.400: Message handling systems: System and service overview.

### 3 Definitions

Unless explicitly indicated, all terms apply to the view of a system presented for the purpose of open systems interconnection. This implies that the terms relate to a DTAM rather than to any real documents in local system.

The definitions are grouped into major categories, and ordered alphabetically within each category.

For the purpose of T.430 Series Recommendations, the following definitions apply:

#### 3.1 *DTAM service and protocol definitions*

The following definitions are applied to Recommendations T.431 to T.433, in addition to the definitions defined in other T.400 Series Recommendations:

##### 3.1.1 **document bulk transfer**

Bulk transmission of a document as a whole.

##### 3.1.2 **document bulk transfer and manipulation**

An arbitrary combination of document bulk transfer and document manipulation.

##### 3.1.3 **document manipulation**

Creation, deletion or modification of one or more constituents or substructures of a document.

##### 3.1.4 **DTAM user**

That portion of the application entity which conceptually invokes the DTAM service.

### 3.1.5 remote document access

Document selection and access rights via communication.

### 3.1.6 remote document management

Document creation or deletion via communication.

### 3.1.7 service element

A unit of standardization specifying a complete group of functions.

### 3.1.8 service primitive

The smallest defined interaction between the user and the provider of a communication service.

## 3.2 Reference model definitions

T.430 Series Recommendations are based on the concept developed in Recommendation X.200 and make use of the following terms defined in it:

- a) application-entity;
- b) application-process;
- c) application service element;
- d) (N)-connection;
- e) open system;
- f) (N)-protocol;
- g) (N)-protocol-control-information;
- h) (N)-protocol-data-unit;
- i) (N)-service;
- j) (N)-service-access-point;
- k) (N)-service-access-point-address;
- l) (N)-service-data-unit;
- m) (N)-user-data;
- n) user element.

## 3.3 Service convention definitions

T.430 Series Recommendations make use of the following terms defined in Recommendation X.210 as they apply to the DTAM service:

- a) confirm;
- b) indication;
- c) primitive;
- d) request;
- e) response;
- f) service provider;
- g) service user.

## 4 Abbreviations

Abbreviations defined in other Recommendations of T.400 Series apply also to this Recommendation. T.430 Series Recommendations also use the following abbreviations:

ACSE	association control service element
APDU	application protocol data unit

ASE	application service element
DB	document bulk transfer class
DM	document manipulation class
DBM	document bulk transfer and manipulation class
OSI	open systems interconnection
PSAP	presentation service access point
RTSE	reliable transfer service element
ROSE	remote operation service element
MHS-SE	message handling system service element
TPA	telematic protocol architecture
M	mandatory
O	optional
*	At least one selection
-	Not permitted

## 5 DTAM for telematic application - General concepts

### 5.1 *The approach to the integrated telematic application*

Recommendations T.400 Series specify the integrated approach for the telematic application by defining the document transfer and manipulation (DTAM) which is the common communication function for telematic services located in the OSI application layer.

DTAM provides document handling facilities in order to realize document bulk transfer, document manipulation, document access and document management for various telematic applications such as G4 facsimile, mixed mode, processable mode Videotex and so on.

### 5.2 *General communication functions*

DTAM provides the following general communication functions.

#### 5.2.1 *Document bulk transfer*

The communication function is subdivided into two functionalities. One is direct document transfer, the other is indirect document bulk transfer as follows:

##### 1) *Direct document bulk transfer*

In the direct document bulk transfer applications, a document generated at one system is transmitted to another system such as Group 4 facsimile and mixed mode communications. In order to provide for efficient general document transfer, CCITT defines a standard document architecture as the T.410 Series of Recommendations.

*Note* - Direct transfer using IPM function is left for further study.

##### 2) *Indirect document bulk transfer*

Indirect transfer using MHS X.400 Series of Recommendations is described in Annex E to Recommendation T.411.

#### 5.2.2 *Remote document manipulations*

An operation can be applied to one or more constituents or a bus-structure of document and/or the application defined structures such as the operational structure. Operations applying to more than one constituent or sub-structure are performed by applying the operation to each of the constituents or the sub-structures. The operations used by the application have to obey certain rules. Detail specification of the operational structure is described in Recommendation T.441.

##### 5.2.2.1 *Operations for manipulations*

###### 1) *Create operation*

The create operation effects the addition of a constituent to the document or to the application defined structure.

The create operation may carry the constituents, including the values applicable to the created constituent. If attributes are not set by the operation, they are set to their default values (if defined) or remain undefined otherwise. The relationship attributes of the superior are not implicitly modified by the create operation.

2) *Delete operation*

The delete operation provokes the deletion of the identified constituent and all subordinates. The relationship attributes of the superior constituents are not implicitly modified by the delete operation.

*Note* - If content portions are deleted as subordinates of wither layout or logical structure, it is the responsibility of the application to ensure that they also deleted for the complementary structure.

3) *Modify operation*

For the identified constituent, the modify operation assigns new values to the mentioned attributes. Attributes not mentioned in a modify operation remain unchanged. Identification attributes are used in a modify operation to identify the concerned constituent. They are set at the time of the creation of the object or content portion and remain unchanged by modify operations. Other invariable attributes must not occur in this operation.

Whenever applying one of the concerned operations, it is the responsibility of the application to ensure consistency of the document.

4) *Call operation*

The call operation is used to read an object of the operational structure which contains a sequence of DTAM protocol data unit which is applicable to the existing document.

5) *Rebuild operation*

The rebuild operation is for further study.

5.2.3 *Remote document access*

For further study.

5.2.4 *Remote document management*

For further study.

5.3 *Communication support functions*

DTAM makes use of the following services as a communication support function to exchange protocol elements between telematic DTAM protocol machines (DTAM-PM):

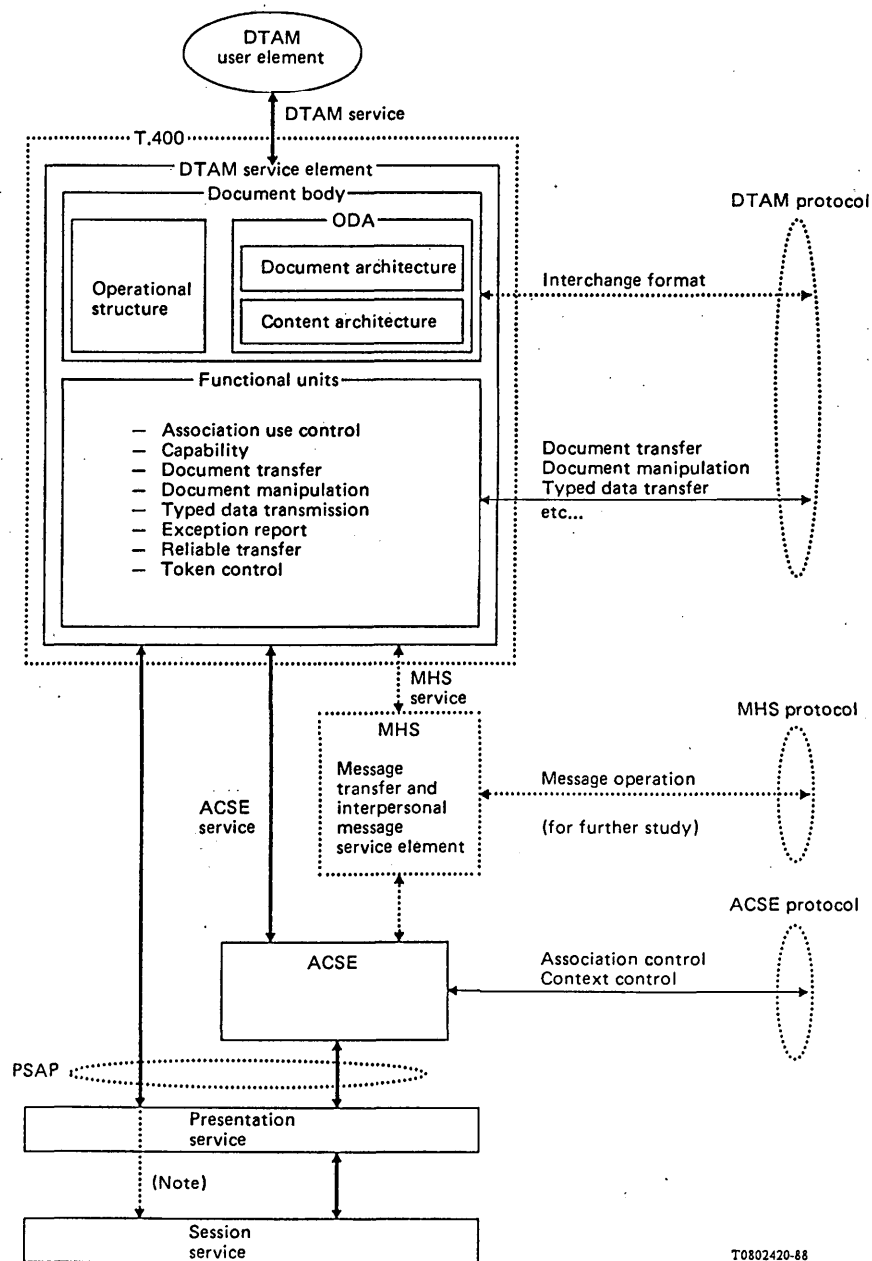
- a) the service of session layer defined in Recommendation X.215 according to the rule of Recommendation T.62 *bis*.
- b) the service of ACSE (association control service element) and the service of presentation layer.

*Note* - The use of RTSE (reliable transfer service element), ROSE (remote operation service element) and MHS-SE (message handling system service element) is left for further study.

5.4 *Telematic protocol architecture (TPA) model*

The DTAM operates between two telematic DTAM protocol machines (DTAM-PMs) in the application layer of OSI model. Protocol elements are exchanged between DTAM-PMs, using the service of session layer as defined in Recommendation X.215, or the services of ACSE (association control service element) and presentation layer services as defined in Recommendation X.216. Telematic protocol architecture (TPA) model is shown in Figure 1/T.431. The application layer protocol architecture illustrated in this figure is composed of ACSE, DTAM application service element, and DTAM user elements.

Inclusion of MHS, RST and ROS elements in TPA is left for further study.



*Note* - In some applications, APDUs defined in DTAM are directly mapped to session service defined in Recommendation X.215.

FIGURE 1/T.431

A basic telematic protocol architecture (TPA) model

## 6 Overview of Recommendations T.431 to T.433

### 6.1 *Recommendation T.431 - Introduction and general principles*

Recommendation T.431 provides information about T.430 Series of Recommendations as a whole by way of an introductory description of the DTAM service and protocol, an overview of each of the Recommendations and a description of their interdependencies. References necessary for all T.430 Series of Recommendations are given, and terms used throughout all T.430 Series of Recommendations are defined. Conformance to T.430 Series of Recommendations is specified and rules for defining communication application profiles are given.

### 6.2 *Recommendation T.432 - DTAM service definition*

Recommendation T.432 defines in an abstract way the services provided by an application-service-element, the document transfer and manipulation service element (DTAM) to support applications in a distributed telematic systems environment.

### 6.3 *Recommendation T.433 - DTAM protocol specification*

Recommendation T.433 specifies the protocol for the services provided by an application-service-element, the document transfer and manipulation service element (DTAM) to support applications in a distributed telematic systems environment.

## 7 Application rules for communication application profiles

Specific communication application profiles may be defined using this T.430 Series of Recommendations according to the rules defined in this section. Definition procedure of a communication application profile is summarized in Figure A-1/T.431.

### 7.1 *General principle*

Tables 1/T.431 and 2/T.431 define permissible combinations of a service class, communication support functions and functional units that may be used to define a communication application profile during the lifetime of association.

A communication application profile must specify:

- 1) a service class;
- 2) functional units;
- 3) communication support functions,

that are conforming to this Recommendation.



TABLE 1/T.431

## Services associated with functional units

Functional unit		DTAM service	Service classes			Reference
			DB	DM	DBM	
U1	Association use control unit	Association use start	M	M	M	
		Association use termination	M	M	M	
		Association use forced termination	M	M	M	
U2	Capability unit	Capability	O	O	O	
U3	Document bulk transfer unit	Document bulk transfer	M	-	M	
U4	Document manipulation unit (unconfirmed)	Document unconfirmed manipulation CREATE, DELETE, MODIFY, CALL, Others FS	-	M	M	
U5	Document manipulation unit (confirmed)	Document confirmed manipulation CREATE, DELETE, MODIFY, CALL, Others FS	FS			
U6	Typed data transmission unit	Typed data transfer	-	O	O	
U7	Token control unit	Token control	O	O	O	
U8	Exception report unit	Exception reporting	O	-	O	
U9	Reliable transfer support unit	Activity control and synchronization/resynchronization control	O	-	O	
U10	Remote document management unit	FS	FS			
U11	Remote document access unit	FS	FS			

FS Further study

*Service class abbreviations:*

DB Document bulk transfer class

DM Document manipulation class

DBM Document bulk transfer and manipulation class

The following abbreviations are applied within the service class columns:

M Mandatory

O Optional

\* At least one functional unit

- Not permitted

TABLE 2/T.431

## Summary of service classes

Service classes	DTAM communication support functions	
Document bulk transfer (direct)	DB <sub>0</sub>	Direct mapping to session service
	DB <sub>1</sub>	ACSE and presentation service
	DB <sub>2</sub>	ACSE and RTSE and presentation service (Note)
Document manipulation	DM <sub>1</sub>	ACSE and presentation service
Document bulk transfer and manipulation	DBM <sub>1</sub>	ACSE and presentation service (Note)
	DBM <sub>2</sub>	ACSE and RTSE and presentation service (Note)
Document bulk transfer (Note)	IDB <sub>1</sub>	MHS-SE (Note)
Remote document access (Note)	RDA	
Remote document management (Note)	RDM	

DB, DM, DBM, IDB, RDA and RDM are used to classify DTAM protocol architecture depending on the combination of communication support functions.

*Note* - These service classes are left for further study.

## 7.2 Service class

Recommendation T.431 defines three service classes (Note), that are general communication functions provided by DTAM:

- 1) document bulk transfer (direct);
- 2) document manipulation;
- 3) document bulk transfer and manipulation.

Recommendations T.432 and T.433 define all DTAM services and procedures as application protocol that may be used in defining each service class. The application profile must specify the required service class depending on the DTAM application profile requirement.

*Note* - There may be other service classes such as document bulk transfer (indirect), remote document access and remote document management. These service classes are left for further study.

## 7.3 Functional units

Table 1/T.431 defines combinations of a service class and functional units. Functional units are used to simplify the procedure as well as the application protocol. Recommendations T.432 and T.433 define DTAM service and protocol that may be used in an application profile. This section defines the rules for using functional units within an application profile, as follows:

- 1) The communication application profile must specify all functional units conforming to a service class.
- 2) The communication application profile must specify all DTAM service primitives that are associated with functional units.
- 3) The communication application profile must specify all parameter sets that are associated with a DTAM service; these service primitives must include parameters that are classified as mandatory in the Recommendation T.432.
- 4) The communication application profile may specify or exclude the use of any DTAM service primitives that is classified as a user option in Recommendation T.432.
- 5) The communication application profile may specify as mandatory the use of any DTAM service primitives that is classified as a user option in Recommendation T.432.
- 6) The communication application profile must specify value and default value of DTAM protocol data handled by a functional unit.

#### 7.4 *Communication support functions*

Table 2/T.431 defines permissible combinations of a service class and communication support functions. Recommendation T.433 defines DTAM protocol in conjunction with the association control service element (ACSE) and presentation service or session service (X.215) according to the rule of Recommendation T.62 *bis*. This section defines the rules for using communication support functions within an application profile, as follows:

- the application profile must specify all communication support functions conforming to a service class.

#### 7.5 *Use of communication application profile*

A single communication application profile is used for one association. The use of more than one communication application profile during the lifetime of association is for further study.

### 8 **Service classes, functional units and communication support functions**

Functional units and service classes are logical groupings of related DTAM services defined in Recommendation T.432.

#### 8.1 *Service classes*

Recommendations T.432 and T.433 define all DTAM services and procedures as application protocol that may be used in defining each service class. Which functional units are mandatory and which are optional in each service class; document bulk transfer, document manipulation, and document transfer and manipulation are shown in Table 1/T.431.

##### 8.1.1 *Document bulk transfer class*

In terminal-to-terminal communications, there exist bulk document transfer application transmitting documents as a whole, such as G4 facsimile and mixed-mode communications. In this document bulk transfer applications, a document generated at one system (terminal) is transmitted to another system (terminal).

The document bulk transfer class consists of:

- a) association use control functional unit;
- b) optionally, capability functional unit;
- c) document bulk transfer functional unit;
- d) optionally, exception report functional unit;
- e) optionally, token control functional unit;
- f) optionally, reliable transfer support functional unit.

### 8.1.2 *Document manipulation class*

In telematic document data base applications, parts of a document may be transferred to generate a whole document sequentially, concatenating parts stored in different resources. The only document manipulation class can be applied to this application.

The document manipulation class consists of:

- a) association use control functional unit;
- b) optionally, capability functional unit;
- c) document manipulation functional unit (unconfirmed);
- d) optionally, token control functional unit;
- e) optionally, typed data transmission functional unit.

### 8.1.3 *Document bulk transfer and manipulation class*

In addition to document transfer applications, there exist conversational applications transmitting documents two-way interactively. This service class is achieved by an arbitrary combination of document bulk transfer and document manipulation. For example, in terminal-to-terminal communications, conversational applications include interactive telematic services with handwriting and point, and interactive remote editing of previously transmitted documents. In host access applications, special characteristics of document architecture include the use of soft copy media. These enable partial document manipulations such as modification or deletion of portions of the structured document received from the host. In this application, document structure of a previously transmitted document may be manipulated.

*Note* - In host-to-terminal communications, the structured document is transferred as a body part for submission, delivery, filing and retrieval. Applicability to other host-to-terminal communications, such as MHS, document filing and retrieval service, is left for further study.

The document bulk transfer and manipulation class consists of:

- a) association use control functional unit;
- b) optionally, capability functional unit;
- c) document bulk transfer functional unit;
- d) exception report functional unit;
- e) optionally, token control functional unit;
- f) optionally, reliable transfer support functional unit;
- g) optionally, typed data transmission functional unit.

### 8.1.4 *Remote document access class*

For further study.

### 8.1.5 *Remote document management class*

For further study.

## 8.2 *Functional units*

### 8.2.1 *Association use control functional unit (kernel)*

The DTAM provides the trigger for the use of the association provided in ACSE, and controls association use during communication. Association use control unit supports basic DTAM services for unique discrimination of both AEs, selection of functional units, establishment, termination and abort of association use.

### 8.2.2 *Capability functional units*

The DTAM capability functional unit provides the means for invocation or negotiation of application and communication characteristics during an association being in effect up to the next subsequent DTAM capability invocation.

### 8.2.3 *Data transmission functional units*

The DTAM provides document transfer methods, such as document bulk transfer, document manipulation and typed data transmission. Data transmission unit consists of the following three units:

a) *Document bulk transfer functional unit*

The DTAM has a function to transmit the document in bulk to the other DTAM user under the communication environment negotiated by D-INITIATE service and additionally by D-CAPABILITY service. The documents represented by ODIF (open document interchange format) is transmitted using bulk document transfer unit.

b) *Document manipulation functional unit (confirmed or unconfirmed)*

In addition to the above bulk transfer, DTAM provides a function to partially modify a document by generating, revising or deleting structures of an existing document. The DTAM user uses this document manipulation unit to manipulate structures in an existing document.

c) *Typed data transmission functional unit*

In host-access applications, data sent to the host by the user are fundamentally unstructured retrieval commands and interrupts such as transmission stop requests. The DTAM has a function to pass such data directly on to the DTAM user as typed data. Typed data transmission unit transmits commands for document filing, document retrieval and interrupt without subjecting to token control.

### 8.2.4 *Session management functional units*

The DTAM has control functions for conversational control provided by the session layer.

a) *Token control functional unit*

Transmission rights required for document transfer and document manipulations are controlled with token control unit.

b) *Reliable transfer support functional unit*

DTAM provides the activity control, synchronization/resynchronization control unit, error recovery control unit.

### 8.2.5 *Exception report functional unit*

DTAM provides the exception reporting service for exceptional condition occurred in DTAM communication environment.

### 8.2.6 *Remote document access functional unit*

For further study.

### 8.2.7 *Remote document management functional unit*

For further study.

### 8.2.8 *Other functional units*

The DTAM may use remote operation service (Recommendation X.219), reliable transfer service (Recommendation X.218) and MHS (X.400 Series of Recommendations). They are left for further study.

## 8.3 *Communication support functions*

This section defines permissible combinations of a service class and communication support functions. Valid combinations of service classes and communication support functions are summarized in Table 2/T.431. Recommendations T.432 and T.433 define DTAM services and procedures that specify two communication support functions: the association control service element (ACSE) service and the presentation service (Recommendation X.216) or session service (Recommendation X.215) according to the rule of Recommendation T.62 *bis*. Other communication support functions such as MHS, RTS and ROS element are left for further study.

### 8.3.1 *Document bulk transfer class*

- a) Use of Recommendation T.62 *bis* (DB<sub>0</sub>)

Application protocol data units (APDU) defined in DTAM are directly mapped to session service defined in Recommendation X.215 according to the rule of Recommendation T.62 *bis*.

- b) Use of ACSE and presentation layer service defined by X.200 (DB<sub>1</sub>)

Other telematic document bulk transfer service classes may be provided in conjunction with the ACSE (Recommendation X.217) and the presentation service (Recommendation X.216).

- c) Use of ACSE, RTSE and presentation layer service defined by X.200 (DB<sub>2</sub>)

For further study.

### 8.3.2 *Document manipulation class*

- a) Use of ACSE and presentation layer service defined by X.200 (DM<sub>1</sub>)

The telematic document manipulation service classes may be provided in conjunction with the ACSE (Recommendation X.217) and the presentation service (Recommendation X.216).

### 8.3.3 *Document bulk transfer and manipulation class*

- a) Use of ACSE and presentation layer service defined by X.200 (DBM<sub>1</sub>)

Telematic document bulk transfer and manipulation service classes may be provided in conjunction with the ACSE (Recommendation X.217) and the presentation service (Recommendation X.216).

- b) Use of ACSE, RTSE and presentation layer service defined by X.200 (DBM<sub>2</sub>)

For further study.

### 8.3.4 *Remote document access class (RDA)*

For further study.

### 8.3.5 *Remote document management class (RDM)*

For further study.

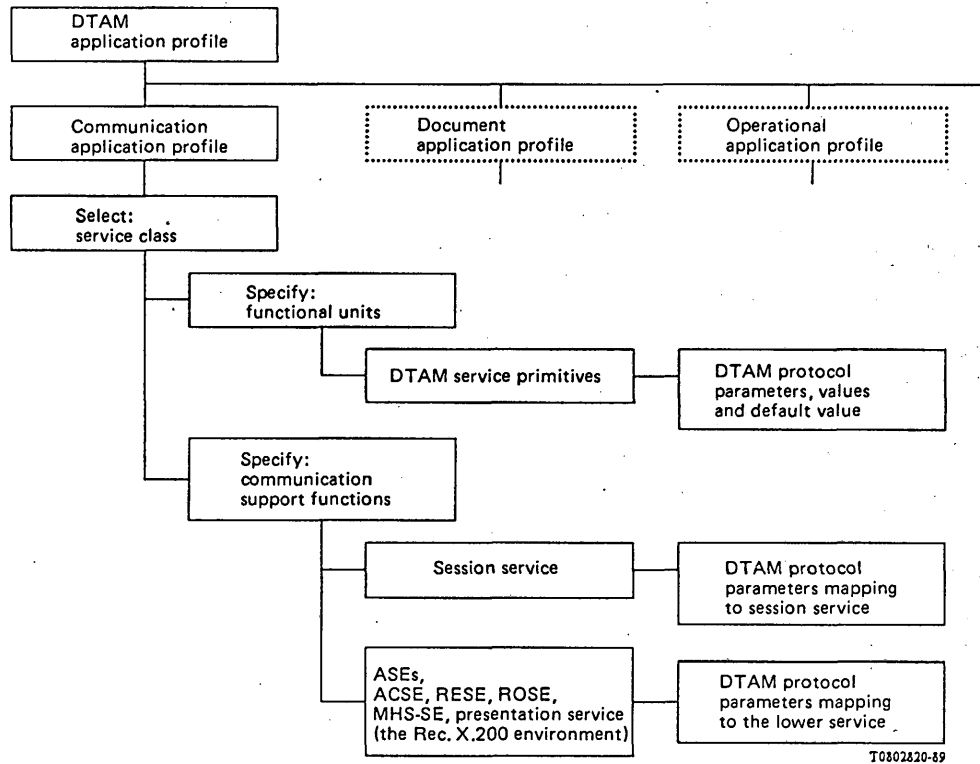
### 8.3.6 *Document bulk transfer class (indirect) (IDB<sub>1</sub>)*

For further study.

## ANNEX A

(to Recommendation T.431)

This Annex summarizes the definition procedure of a communication application profile. (See Figure A-1/T.431.)



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FIGURE A-1/T.431

Defining procedure of communication application profile

DOCUMENT TRANSFER AND MANIPULATION (DTAM) -  
SERVICES AND PROTOCOLS - SERVICE DEFINITION

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9.18	Reliable transfer support service



## 0 Introduction

This Recommendation defines the services provided by an application-service-element, the document transfer and manipulation service element (DTAM), to support applications in a distributed telematic systems environment. This Recommendation is one of a set of Recommendations defining the services for sets of application-service-elements specifically used by a number of applications.

## 1 Scope and field of application

This Recommendation defines in an abstract way the document transfer and manipulation (DTAM) service within the OSI application layer in terms of:

- a) the primitive actions and events of the service;
- b) the parameter data associated with each primitive action and event;
- c) the relationship between, and the valid sequences of, these actions and events.

The DTAM service is provided in conjunction with the association control service element (ACSE) service (Recommendation X.217), and the presentation service (Recommendation X.216) or session-service (Recommendation X.215) according to the rules of Recommendation T.62 *bis*.

This Recommendation does not specify individual implementations or products, nor does it contain the implementation of entities and interfaces within a telematic system.

## 2 References

- Rec. T.62 *bis*: Control procedures for Teletex and Group 4 facsimile services based on Recommendations X.215 and X.225.
- Rec. T.400: Introduction to document architecture, transfer and manipulation.
- Rec. T.411: Open document architecture (ODA) and interchange format - Introduction and general principles.
- Rec. T.412: Open document architecture (ODA) and interchange format - Document structures.
- Rec. T.414: Open document architecture (ODA) and interchange format - Document profile.
- Rec. T.415: Open document architecture (ODA) and interchange format - Open document interchange format (ODIF).
- Rec. T.416: Open document architecture (ODA) and interchange format - Character content architecture.
- Rec. T.417: Open document architecture (ODA) and interchange format - Raster graphics content architectures.
- Rec. T.418: Open document architecture (ODA) and interchange format - Geometric graphics content architectures.
- Rec. T.431: Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles.
- Rec. T.433: Document transfer and manipulation (DTAM) - Services and protocols - Protocol specifications.
- Rec. T.441: Document transfer and manipulation (DTAM) - Operational structure.
- Rec. X.200: Reference model of open systems interconnection for CCITT applications.
- Rec. X.208: Specification of abstract syntax notation one (ASN.1).

- Rec. X.209: Specification of basic encoding rules for abstract syntax notation one (ASN.1).
- Rec. X.215: Session service definition for open systems interconnection for CCITT applications.
- Rec. X.216: Presentation service definition for open system interconnection for CCITT applications.
- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications.
- Rec. X.218: Reliable transfer: Model and service definition.
- Rec. X.219: Remote operation: Model, notation and service definition.

### 3 Definitions and abbreviations

Terms and abbreviations are defined in Recommendation T.431.

### 4 Conventions

This Recommendation defines services for the DTAM following the descriptive conventions defined in Recommendation X.210. In § 9, the definition of each DTAM service includes a table that lists the parameters of its primitives. For a given primitive, the presence of each parameter is described by one of the following values:

blank	Not applicable
M	Presence mandatory
U	Presence is a user option
C	Presence is conditional on a successful negotiation of another parameter in previous Primitive
D	Presence is a DTAM-SE service-provider option
A	Presence subject to conditions defined in Recommendation X.217
P	Presence subject to conditions defined in Recommendation X.216.

In addition, the notation (=) indicates that a parameter value is semantically equal to the value to its left in the table.

### 5 Model of the DTAM service

This Recommendation uses the abstract model for a service defined in the OSI service convention in Recommendation X.210 (see Note 1). The model defines the interactions between the two DTAM-service-users and the DTAM-service-provider which take place between application entities. Information is passed between a DTAM-service-user and the DTAM-service provider by DTAM service primitives which may carry parameters.

One of the DTAM-service-users is defined as the initiator and the other is defined as the responder.

The model of the DTAM service is illustrated in Figure 1/T.432.

The DTAM service defines a single activity between the initiator and the responder (see Note 2).

*Note 1* - Recommendation X.210 defines a model for the service provided by a layer of the OSI reference model.

*Note 2* - At any one time, an application entity may be involved in more than one instance of the DTAM service activity, and each instance is based on a separate application association.

The DTAM is provided in two modes of operations:

a) *Transparent mode*

is provided solely to allow interworking with older implementations based on Recommendation T.73. This mode implies some restrictions in use of DTAM services;

b) *Normal mode*

is provided to allow full use of DTAM services based on the OSI service definition and protocol specification.

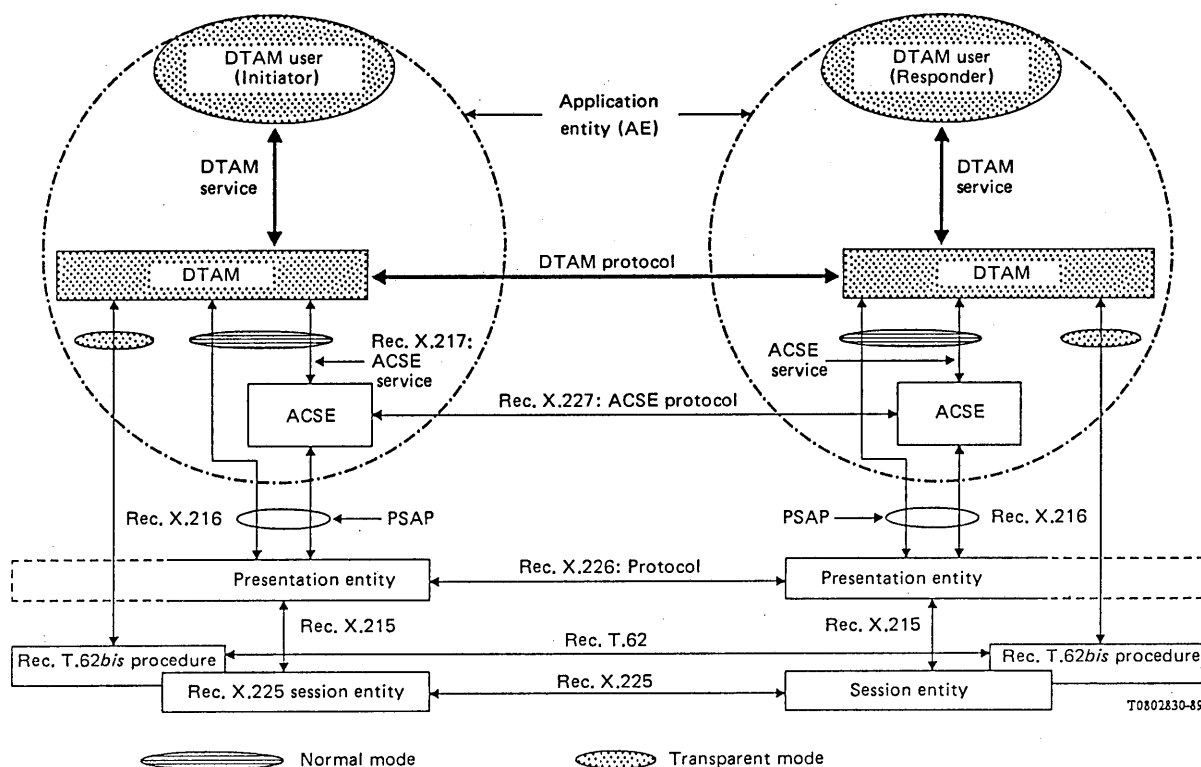


FIGURE 1/T.432

Model of DTAM service

## 6 DTAM services

This section provides a short description of the DTAM service. The services and the primitives by which they are invoked are defined in § 9. For each service, the user of the service (the application entity that begins the sequence of primitives) is stated.

### 6.1 DTAM association use control

Three services are associated with DTAM association use control:

- the DTAM establishment service is used by the initiator to create a DTAM association for the application association linking the two DTAM-service-users;

- b) the DTAM termination service is used by either the initiator or the responder being subject to the owning the data token to dissolve the DTAM association between the DTAM-service-user and the DTAM-service-provider;  
*Note* - The DTAM termination is not restricted to a map into A-RELEASE service provided by ACSE;
- c) the DTAM abort service is used by either the service users or the service provider to dissolve the DTAM association unconditionally.

## 6.2 *DTAM capability*

The DTAM capability service provides the means for invocation or negotiation of application and communication characteristics during an association being in effect up to the next subsequent DTAM capability invocation. A DTAM capability service is used by either the initiator or the responder being subject to the owning the data token to negotiate or invoke the above characteristics.

## 6.3 *Document bulk transfer*

DTAM provides a function to transmit the document in bulk from the one DTAM user to another peer under the communications environment defined by the DTAM association use and the DTAM capability functions.

## 6.4 *Document unconfirmed manipulations*

DTAM provides a function partially modifying a document seen by both users, by generating, revising or deleting structures (pages, blocks, etc.) of an existing document or to create a new document by generating structure without any confirmation of the manipulation. Five services are associated with document manipulation:

- a) the unconfirmed create operation service is used by both sides to add the constituents of ODA and operational structure to an existing document or to create constituents of ODA and operational structure;
- b) the unconfirmed delete operation service is used by both sides to delete the constituents of ODA and operational structure of an existing document;
- c) the unconfirmed modify operation service is used by both sides to modify the attributes of the constituents of ODA and operational structure of an existing document;
- d) the unconfirmed call operation service is used by both sides to request to address or to read an object of the operational structure which contains a sequence of the DTAM protocol data units. These protocol data units are applicable to the existing document;
- e) the unconfirmed rebuild operation service is for further study.

## 6.5 *Document confirmed manipulation (for further study)*

DTAM provides a function to partially modify a document seen by both users, by generating, revising or deleting structure of an existing document or to create a new document by generating structure with a confirmation of the manipulation.

## 6.6 *Typed data transmission*

DTAM optionally provides the function of typed data transmission which is independent of data token control.

## 6.7 *Reliable transfer (checkpointing and retransferring)*

Two services are associated with reliable transfer (checkpointing, restarting and recovery):

- a) the checkpointing service is used by the sender (DTAM-PM) of document to establish marks in the flow of data for the purpose of subsequent recovery or restart;
- b) the document retransfer service is used by the sender or the receiver (DTAM user) of document to interrupt a transfer in progress and negotiate a point at which it is to be restarted.

## 6.8 *Exception report*

DTAM optionally provides an exception reporting function for exceptional error control during the DTAM communication.

## 6.9 *Document selection control (for further study)*

Four services are associated with document selection control:

- a) the document selection service is used by the initiator to select an existing document and to bind the specified document to the DTAM application-association;
- b) the document deselection service is used by the initiator to release the binding between the DTAM application-association and the specified document;
- c) the document creation service is used by the initiator to create a specified document and to select to newly created document;
- d) the document deletion service is used by the initiator to release an existing selection in such a way that the previously selected document ceases to exist.

## 6.10 *Document management (for further study)*

Two services are associated with document management:

- a) the read attributes service is used by the initiator to interrogate the document attributes of the selected document;
- b) the change attributes service is used by the initiator to modify the document attributes of the selected document.

## 6.11 *Document open control (for further study)*

Two services are associated with document open control:

- a) the document open service is used by the initiator to establish the presentation context and the concurrency and commitment controls for data transfer;
- b) the document close service is used by the initiator to release the context established by the document open service.

## 6.12 *Grouping control (for further study)*

Two services are associated with grouping control:

- a) the beginning of grouping service is used by the initiator to indicate the start of a set of grouped primitives which are to be processed and responded to as a group;
- b) the end of grouping service is used by the initiator to indicate the end of a set of grouped primitives which are to be processed and responded to as a group.

## 7 *Functional units*

DTAM service classes in the Recommendation T.431 and functional units are logical groupings of related services defined in this Recommendation for the purpose of:

- a) negotiation of the DTAM-service-user's requirements during DTAM application-association establishment;
- b) reference by other CCITT Recommendations.

### 7.1 *Association use control functional unit*

The DTAM provides the trigger for the establishment and use of the association. The association use control unit supports the basic DTAM services for unique discrimination of both application entities (AEs), selection of functional units, set of an initial DTAM capability, establishment, termination and abort of association use.

## 7.2 *Capability functional unit*

The DTAM capability functional unit provides the means for invocation or negotiation of application and communication characteristics during an association being in effect up to the next subsequent DTAM capability invocation.

## 7.3 *Data transmission functional unit*

The DTAM provides document transfer methods, such as bulk document transfer, document manipulation and typed data transmission. The data transmission unit consists of the following four units.

### 7.3.1 *Document bulk transfer functional unit*

The DTAM has a function to transmit the document in bulk to the other DTAM user under the communication environment defined at the start of the association use and/or the capability control. The documents represented by the document interchange format defined in Recommendations T.415 and T.441 are transmitted using the bulk document transfer unit.

*Note* - The detailed definition of Recommendation T.441 (interchange format of operational structure) depends on the ongoing work on operation structure.

### 7.3.2 *Document unconfirmed manipulation functional unit*

DTAM provides a function to partially modify a document by generating, revising or deleting structures of an existing document or to create a new document. The DTAM user uses a document manipulation unit to manipulate structures of an existing document or to create a new document.

### 7.3.3 *Document confirmed manipulation functional unit*

Use of this functional unit is for further study.

### 7.3.4 *Typed data transmission functional unit*

The DTAM provides a function to pass these units on directly to the DTAM user as typed data. User information (e.g. transmission interrupt) can be transported by typed data transmission unit without being subject to token control.

## 7.4 *Exception report functional unit*

The DTAM provides exception reporting services for exceptional conditions occurring in the DTAM user or DTAM-service-provider.

## 7.5 *Session management functional units*

The DTAM manages dialogue control functions provided by the session layer, the following functional units being available for DTAM communication environment.

### 7.5.1 *Token control functional unit*

Transmission rights required for document transfer and document manipulations are controlled with the token control unit. This functional unit will be selected in the case of the half-duplex communication mode.

For the document manipulation functional unit, only the "data token" is required in nature. However, the right to use the document manipulation is handled as follows:

- when the document bulk transfer functional unit is selected in addition to the document manipulation, D-CONTROL-GIVE service is used;
- when only the document manipulation functional unit is selected, D-TOKEN-GIVE service is used.

### 7.5.2 *Reliable transfer support functional unit*

This functional unit provides two different ways of transferring a document in a reliable way:

- reliable transfer mode 1 where the secure transfer is under the responsibility of the DTAM-PM but the resumption of an interrupted transfer is under the responsibility of the DTAM-user;
- reliable transfer mode 2 where the secure transfer is completely under the responsibility of the DTAM-PM (including the resumptions).

## 7.6 Other functional units

The DTAM will provide a document selection control, a document management, an open control and a grouping control. These DTAM functions are left for further study.

## 8 Service overview

This Recommendation defines the following services for the management of document transfer and manipulation facilities:

- a) D-INITIATE;
- b) D-TERMINATE;
- c) D-P-ABORT;
- d) D-U-ABORT;
- e) D-CAPABILITY;
- f) D-TRANSFER;
- g) D-TYPED-DATA;
- h) D-CREATE;
- i) D-DELETE;
- j) D-MODIFY;
- k) D-CALL;
- l) D-REBUILD;
- m) D-TOKEN-GIVE;
- n) D-CONTROL-GIVE;
- o) D-TOKEN-PLEASE;
- p) D-U-EXCEPTION-REPORT;
- q) D-P-EXCEPTION-REPORT.

*D-INITIATE* service enables a DTAM-service-user to request the establishment of a DTAM application-association with another AE.

*D-TERMINATE* service enables the association initiating or responding DTAM-service-user to request the termination of the established application-association. It may do so only if it possesses the data token.

*D-P-ABORT* service enables a DTAM-service provider to abort the application-association.

*D-U-ABORT* service enables a DTAM-service-user to abort the application-association.

*D-CAPABILITY* service enables the DTAM service user to invoke or negotiate some applications and communication characteristics during the life time of association.

*D-TRANSFER* service enables a DTAM-service-user that possesses the data token to request the bulk document transfer over an application-association.

*D-TYPED-DATA* service enables a DTAM-service-user to request the data transmission without being subject to token control, which is different from the above document transfer service.

*D-CREATE*, *D-DELETE* and *D-MODIFY* services enable a DTAM service user that possesses the data token to request the creation, deletion and modification of the architectural objects and content-portions of a document.

*D-CALL* service enables a DTAM-service-user that possesses the data token to request to address or to read an object of the operational structure which contains a sequence of DTAM protocol data units (with some restrictions, i.e. that only D-CREATE, D-DELETE and D-MODIFY can appear in this sequence). These protocol data units are applicable to the existing document.

*D-REBUILD* service is for further study.

*D-TOKEN-GIVE* service enables a DTAM-service-user to relinquish the data token to its peer. It may do so only if it possesses the data token.

*D-CONTROL-GIVE* service enables a DTAM-service-user to relinquish all the tokens (control) to its peer. It may do so only if it possesses all the tokens.

*D-TOKEN-PLEASE* service enables a DTAM-service-user to request the data token. It may do so only if it does not already possess the data token. The data token is requested by either DTAM-service-user to allow the DTAM-service-user to transfer documents.

*D-U-EXCEPTION REPORT* service provides an exception reporting service for exceptional conditions occurring in either DTAM-service-users.

*D-P-EXCEPTION-REPORT* service provides an exception reporting service for exceptional conditions occurring in the DTAM-service provider.

## 9 Service definition

DTAM service is a logical interface for data handling between the DTAM user and DTAM service provider, and the DTAM services are listed in Table 1/T.432.

TABLE 1/T.432

DTAM services summary

Service	Type
D-INITIATE	confirmed
D-TERMINATE	confirmed
D-P-ABORT	provider-initiated
D-U-ABORT	unconfirmed
D-CAPABILITY	confirmed
D-TRANSFER	provider-confirmed
D-TYPED-DATA	unconfirmed
D-CREATE	unconfirmed
D-DELETE	unconfirmed
D-MODIFY	unconfirmed
D-CALL	unconfirmed
D-REBUILD (see Note)	unconfirmed
D-TOKEN-GIVE	unconfirmed
D-CONTROL-GIVE	unconfirmed
D-TOKEN-PLEASE	unconfirmed
D-P-EXCEPTION-REPORT	provider-initiated
D-U-EXCEPTION-REPORT	unconfirmed

*Note* - D-REBUILD service is for further study.



## 9.1 D-INITIATE service

The DTAM user notifies DTAM-service-provider of association use start with D-INITIATE. This service primitive includes parameter sets for:

- unique discrimination of both AEs;
- selection of functional units for DTAM service used; and
- establishment of a common communication environment in both systems.

The related service structure consists of four events, as illustrated in Figure 2/T.432.

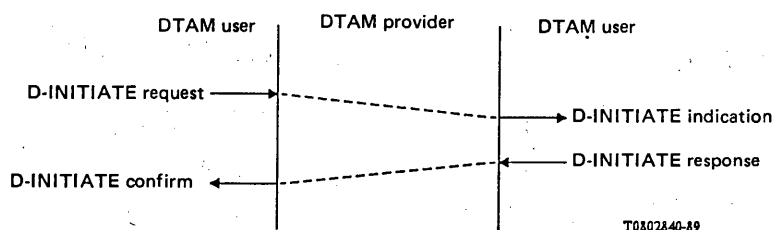


FIGURE 2/T.432

### D-INITIATE service events

#### 9.1.1 D-INITIATE service parameters

Table 2/T.432 lists the D-INITIATE service parameters.

TABLE 2/T.432

### D-INITIATE service parameters

Parameter	D-INITIATE request	D-INITIATE indication	D-INITIATE response	D-INITIATE confirm
Transparent mode	U			
Telematic requirements	M	M(=)	C <sup>a)</sup>	C(=)
Application capabilities	M	M(=)	M	M(=)
DTAM-QOS <sup>b)</sup>	U	C(=)	U	C(=)
Account <sup>b)</sup>	U	C(=)	U	C(=)
Service classes (Note)				
Result			M	M(=)
User information <sup>b)</sup>	U	C(=)	U	C(=)
Application context name <sup>b)</sup>	A	A(=)	A	A(=)
Calling AP title <sup>b)</sup>	A	A(=)		

TABLE 2/T.432 (cont.)

## D-INITIATE service parameters

Parameter	D-INITIATE request	D-INITIATE indication	D-INITIATE response	D-INITIATE confirm
Calling AP invocation-identifier <sup>b)</sup>	A	A(=)		
Calling AE qualifier <sup>b)</sup>	A	A(=)		
Calling AE invocation-identifier <sup>b)</sup>	A	A(=)		
Called AP title <sup>b)</sup>	A	A(=)		
Called AP invocation-identifier <sup>b)</sup>	A	A(=)		
Called AE qualifier <sup>b)</sup>	A	A(=)		
Called AE invocation-identifier <sup>b)</sup>	A	A(=)		
Responding AP title <sup>b)</sup>			A	A(=)
Responding AP invocation-identifier <sup>b)</sup>			A	A(=)
Responding AE qualifier <sup>b)</sup>			A	A(=)
Responding AE invocation-identifier <sup>b)</sup>			A	A(=)
Calling presentation address <sup>b)</sup>	P	P(=)		
Called presentation address <sup>b)</sup>	P	P(=)		
Responding presentation address <sup>b)</sup>			P	P(=)
Presentation context definition list <sup>b)</sup>	P	P(=)		
Presentation context definition result <sup>b)</sup>			P	P(=)
Presentation requirements <sup>b)</sup>	P	P(=)	P	P(=)
Initial assignment of token <sup>b)</sup>	P	P(=)	P	P(=)
Quality of service <sup>b)</sup>	P	P(=)	P	P(=)

a) This parameter is mandatory in case the responder returns the "accepted" result parameter to the proposed requirements.

b) This parameter is absent in transparent mode.

Note - The use of this parameter is for further study.

#### 9.1.1.1 *Transparent mode*

This non-mandatory parameter is used to indicate to the local DTAM-PM how the DTAM protocol is to be mapped onto the lower layers. Presence of this parameter indicates that the mapping is to be done onto the session service. Absence of this parameter indicates that the mapping is to be done onto ACSE and presentation layer services.

#### 9.1.1.2 *Telematic requirements*

As defined in this Recommendation, DTAM has the following functional units as the application protocol in order to simplify the DTAM procedure:

- kernel (association use control);
- capability;
- document bulk transfer;
- typed data transmission;
- document unconfirmed manipulation;
- document confirmed manipulation;
- token control;
- exception report;
- reliable transfer (see Note):
  - a) reliable transfer mode 1;
  - b) reliable transfer mode 2.

Telematic requirements specify the DTAM functional units which should be used during an association. In this case, each DTAM user proposes use or non-use of each functional unit, except for the kernel functional unit, based on the DTAM user requirements. The functional unit is selected only if both the initiator and the responder propose to use the functional unit.

*Note* - When the reliable transfer support function is selected, document bulk transfer function should be used. This support function provides no service primitives but provides the two types of reliable transfer service (mode 1 and mode 2) within DTAM-service-provider to support the secured document transfer (see § 9.18).

#### 9.1.1.3 *Application capabilities*

The requested application capabilities parameter indicates, for each direction of transmission, the receiving application capabilities of the requester. Each DTAM user exchanges its own receiving application capabilities with a peer DTAM user through D-initiate service. Values of this parameter may be the reason for subsequent termination. The continued progress of the service is only guaranteed if the DTAM user acts as a sender of a document within the requested receiving capabilities by the peer DTAM user (receiver of document). This parameter is stated independently by each DTAM user as the maximum receiving capabilities when that user is the receiving side. There is no negotiation. The stated value from each DTAM user is maintained by the corresponding user for use when it is the sending DTAM user. The values for each direction of document transfer are not necessarily the same.

The application capabilities parameter consists of one or more sets of sub-parameters. Each set, if present, shall contain one document application profile parameter and, optionally, a combination of the four other parameters described hereafter.

##### 9.1.1.3.1 *Document application profile*

The parameter specifies the document application profile available to sender of this parameter as the receiving capabilities. The value of its parameter is one of the following capabilities:

- handling the document application profile (Recommendation T.501);
- handling the document application profile (Recommendation T.502);

- handling the document application profile (Recommendation T.503);
- handling the document application profile (Recommendation T.504).

#### 9.1.1.3.2 *Document architecture class*

The parameter specifies the document application profile available to the sender of this parameter as the receiving capabilities. The value of this parameter is:

- formatted.

#### 9.1.1.3.3 *Non-basic document characteristics*

This parameter specifies the non-basic document characteristics available to the sender of this parameter as the receiving capabilities. The values of this parameter are any combination of capabilities defined in Recommendation T.414, and they are related to the value of the document application profile.

#### 9.1.1.3.4 *Non-basic structural characteristics*

This parameter specifies the non-basic structural characteristics available to the sender of this parameter as the receiving capabilities. The values of this parameter are any combination of capabilities defined in Recommendation T.414, and they are related to the value of the document application profile.

#### 9.1.1.3.5 *Operational application profile*

Detailed specification of operational application profile is for further study.

#### 9.1.1.4 *DTAM QOS*

DTAM QOS is left for further study.

#### 9.1.1.5 *Account*

The account parameter identifies the account to which costs incurred in the application-association which is being established are to be charged.

*Note* - Further study will be requested.

#### 9.1.1.6 *Service classes*

The use of this parameter is for further study.

#### 9.1.1.7 *Result*

If the DINK APDU was rejected by the responding DTAM-PM (i.e. a D-INITIATE indication primitive was not issued to the responder), this field is supplied by the responding DTAM-PM; otherwise, this field is the result parameter from the D-INITIATE response primitive. In either situation, it appears as the result parameter on the D-INITIATE confirm primitive. This field can take one of the following symbolic values:

- accepted;
- rejected by responder (reasons-not-specified);
- rejected by responder (protocol version-not-supported);
- rejected by responder (DTAMQOS-not-supported);
- rejected by responder (application-context-not-supported);
- rejected by responding DTAM-QM.

#### 9.1.1.8 *User information*

This is the user information associated with the initiation of application association.

#### 9.1.1.9 *Application context name*

This parameter is used as defined in Recommendation X.217. The initiator of the application-association shall propose one of the application-context names for the specific application in the D-INITIATE request primitive.

The responder shall either:

- accept the application-context proposed by the initiator and return the same value of this parameter in D-INITIATE response primitive;

- or return, in the D-INITIATE response primitive, a result parameter with the value "rejected by responder (application-context name not supported)" and possibly make a counter-proposal by returning a different application-context name in the D-INITIATE response primitive.

#### 9.1.1.10 Presentation context definition list

The presentation context definition list comprises a presentation-context-definition for each abstract-syntax included in the application-context, i.e. one each for the specific application, the DTAM and the ACSE for instance. A presentation-context-definition comprises a presentation-context-identifier and an abstract-syntax-name for the ASE.

#### 9.1.1.11 Other parameters

Parameters marked with "A" in Table 2/T.432 are defined in Recommendation X.217.

Parameters marked with "P" in Table 2/T.432 are defined in Recommendation X.216.

### 9.2 D-TERMINATE service

The D-TERMINATE service is used by either the association-initiator or the association-responder to request the termination of an application-association. It may do so if it possesses the data token and this service is a confirmed service.

The termination of the application-association is without loss of information in transit. This service cannot be rejected by the association-responding DTAM-service user.

The related service structure consists of four events, as illustrated in Figure 3/T.432.

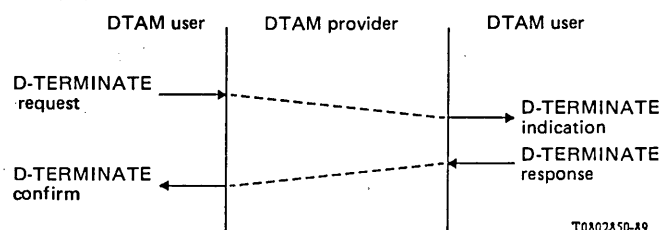


FIGURE 3/T.432

#### D-TERMINATE service events

#### 9.2.1 D-TERMINATE service parameters

Table 3/T.432 lists the D-TERMINATE service parameters. These parameters are only present in the normal mode for use in the OSI lower layer service. In the case of a transparent mode, this service primitive has no parameters.

TABLE 3/T.432

#### D-TERMINATE service parameters

Parameter	D-TERMINATE request	D-TERMINATE indication	D-TERMINATE response	D-TERMINATE confirm
Charging <sup>a)</sup>			C	C
User information <sup>a)</sup>	U	C(=)	U	C(=)

<sup>a)</sup> This parameter is absent in the transparent mode.

### 9.2.1.1 Charging

The charging parameter conveys information on the costs attributed to the account during the DTAM application-association which is being released. The use of this parameter is for further study.

### 9.2.1.2 User information

This is the user information associated with the termination of application-association.

## 9.3 D-P-ABORT service

The D-P-ABORT service provides an indication to both the DTAM users that the application-association cannot be maintained (e.g. because retransmission is not possible). If it is the sender, the DTAM provider first issues a negative D-TRANSFER confirm primitive for the document information not yet transferred. This service is applicable for document manipulation as well as bulk transfer. In the case of bulk transfer, if it is the receiver, the DTAM provider deletes any partially received document information prior to issuing the D-P-ABORT indication. This service is a provider-initiated service.

The related service structure consists of two events, as illustrated in Figure 4/T.432.

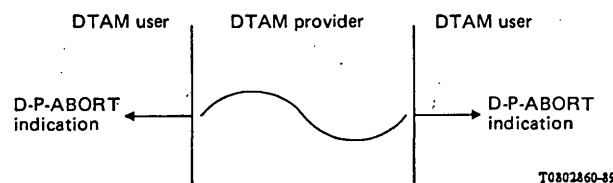


FIGURE 4/T.432

### D-P-ABORT service events

### 9.3.1 D-P-ABORT service parameters

The D-P-ABORT service has no parameters.

## 9.4 D-U-ABORT service

The D-U-ABORT service enables a DTAM user to abort the application-association. The abort may be requested by either DTAM user. This service is an unconfirmed service.

The related service structure consists of two events, as illustrated in Figure 5/T.432.

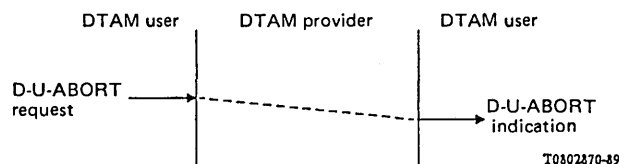


FIGURE 5/T.432

### D-U-ABORT service events

#### 9.4.1 D-U-ABORT service parameters

Table 4/T.432 lists the parameters of D-U-ABORT.

TABLE 4/T.432

#### D-U-ABORT service parameters

Parameter	D-U-ABORT request	D-U-ABORT indication
User information <sup>a)</sup>	U	C(=)

a) This parameter is absent in the transparent mode.

##### 9.4.1.1 User information

This is the user information associated with the abort of application-association.

#### 9.5 D-CAPABILITY service

This service should be used outside the document transmission procedure. The multiple use of the D-CAPABILITY service within a single association may be permitted.

The related service structure consists of four events, as illustrated in Figure 6/T.432.

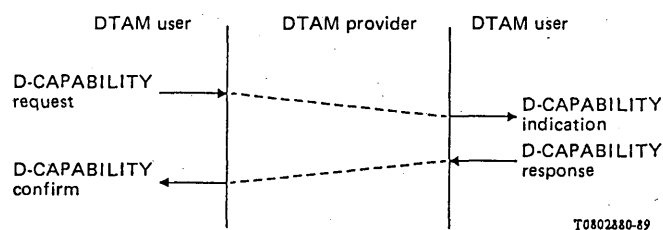


FIGURE 6/T.432

#### D-CAPABILITY service events

### 9.5.1 D-CAPABILITY service parameters

Table 5/T.432 lists the D-CAPABILITY service parameters.

TABLE 5/T.432  
D-CAPABILITY service parameters

Parameter	D-CAPABILITY request	D-CAPABILITY indication	D-CAPABILITY response	D-CAPABILITY confirm
Application capabilities				
Document application profile	U	C(=)	U	C(=)
Document architecture Class	U	C(=)	U	C(=)
Non basic structural characteristics	U	C(=)	U	C(=)
Non basic document characteristics	U	C(=)	U	C(=)
Operational application profile	U	C(=)	U	C(=)
Capability result <sup>a)</sup>			M	M(=)
User information <sup>a)</sup>	U	C(=)	U	C(=)

a) This parameter is absent in the transparent mode.

#### 9.5.1.1 Application capabilities

The application capabilities parameter requested by the requesting DTAM user (requestor: sender of documents) indicates a list of receiving application capabilities that may be required at the responding DTAM user by the requesting DTAM user.

Application capabilities consist of the following five parameters.

##### 9.5.1.1.1 Document application profile

The parameter specifies the document application profile that may be required at the responding DTAM user by the requesting DTAM user. The values of this parameter are any combination of the following capabilities:

- handling the document application profile (Recommendation T.501);
- handling the document application profile (Recommendation T.502);
- handling the document application profile (Recommendation T.503);
- handling the document application profile (Recommendation T.504).



#### 9.5.1.1.2 Document architecture class

This parameter specifies the document architecture classes that may be required at the responding DTAM user by the requesting DTAM user. The value of this parameter is:

- formatted.

#### 9.5.1.1.3 Non-basic document characteristics

This parameter specifies the non-basic document characteristics that may be required at the responding DTAM user by the requesting DTAM user. The values of this parameter are any combination of capabilities defined in Recommendation T.414.

#### 9.5.1.1.4 Non-basic structural characteristics

This parameter specifies the non-basic structural characteristics that may be required at the responding DTAM user by the requesting DTAM user. The values of this parameter are any combination of capabilities defined in Recommendation T.414.

#### 9.5.1.1.5 Operational application profile

Detailed specification of operational application profile is for further study.

#### 9.5.1.2 Capability result

This result parameter contains one of the following:

- a) confirmation that all the requested capabilities are available at the DTAM responder;
- b) a list of the requested capabilities that are available at the DTAM responder;
- c) a complete list of non-basic receiving capabilities;
- d) indication that no extended capabilities are available in the DTAM responder, or that none of the capabilities requested by the initiator are available.

#### 9.5.1.3 User information

This parameter is the user information associated with the capability.

### 9.6 D-TRANSFER service

The remote document bulk transfer is used to convey the document which contains ODA and operational structure to the remote DTAM-user. The requestor who requests the remote document bulk transfer must have a data token in an appropriate manner. It supports the D-TRANSFER services.

In this situation, a reliable transfer support functional unit will be selected by the negotiation of functional units in the association establishment phase. If a reliable transfer support functional unit is not selected, the RTSE service will be used. The use of RTSE is for further study.

The D-TRANSFER service performs the following two types of documents transmission:

- a) transmission of a complete document by transfer procedure defined in § 6.6.3 of Recommendation T.433;
- b) retransmission of a partial document for resuming purposes by transfer-user-resume procedure defined in § 6.6.4 of Recommendation T.433.

The related service structure consists of three events, as illustrated in Figure 7/T.432.

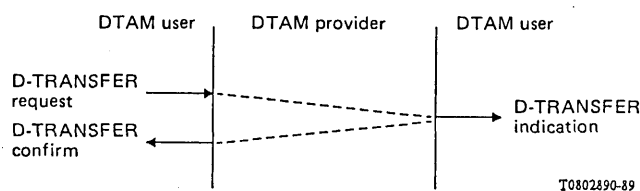


FIGURE 7/T.432

D-TRANSFER service events

### 9.6.1 D-TRANSFER service parameters

Tableau 6/T.432 lists the D-TRANSFER service parameters.

TABLE 6/T.432

#### D-TRANSFER service parameters

Parameter	D-TRANSFER request	D-TRANSFER indication	D-TRANSFER confirm
Document information	M	C (Note 1)	
Transfer time <sup>a)</sup>	M		
Document information type	M	C	C(=)
Document reference information	M	M	M
Synchronization point	C (Note 2)	(Note 4)	C (Note 3)
Result			M
Checkpoint mechanism	M		

<sup>a)</sup> Presence only for reliable transfer mode 2 (see § 9.18).

*Note 1* - Mandatory in the case of successful D-TRANSFER procedure.

*Note 2* - Mandatory when the document information type has the value "transfer of a document from a synchronization point".

*Note 3* - Mandatory in the case of incomplete D-TRANSFER procedure.

*Note 4* - Use of this parameter in D-TRANSFER indication is for further study.

#### 9.6.1.1 Document information

This consists of one or more "interchange data elements" of the types defined in Recommendations T.415, T.441 and T.541, in accordance with the document application profile and operational application profile that are in effect.

#### 9.6.1.2 Transfer time

This parameter defines the time period within which the DTAM-provider must successfully transfer the document information to the other DTAM-user. This parameter is used only in the reliable transfer mode 2 as mandatory parameter and has to be supplied by the requestor of the D-TRANSFER service. The absence of this parameter indicates that the established DTAM application-association is performed under the reliable transfer mode 1 (see § 9.18).

#### 9.6.1.3 Document information type

This parameter may take different values depending on the primitive where it is used:

- a) in a D-TRANSFER request it shall take one of the following values:
  - i) "transfer of a document from its beginning";
  - ii) "transfer of a document from a synchronization point";

when the parameter takes this latter value, the value of the corresponding synchronization point shall be given in the parameter "synchronization point" (see § 9.6.1.5);

b) in a D-TRANSFER indication for confirm it shall take one of the following values:

- i) "transfer completed";
- ii) "transfer not completed";

When this parameter takes this latter value, the value of the last positively acknowledged synchronization point is given in the parameter "synchronization point" (see § 9.6.1.5).

This parameter is used *only* in reliable transfer mode 1.

*Note* - In a logical interface sense, it is assumed that, for retransmission of document, the complete document is submitted to DTAM protocol machine (PM) using the D-TRANSFER service. It is assumed that DTAM PM locates the checkpoints in the same manner as in the first transmission.

#### 9.6.1.4 *Document reference information*

This parameter uniquely identifies a document in the D-TRANSFER service. The value of this parameter shall be assigned as decimal digits, preferably but not necessarily starting from 001. This value shall then sequentially be incremented by one for each successive document transmission. This parameter shall be assigned to all documents by the DTAM user sending the document.

In order to uniquely identify the documents exchanged, it is recommended that the same value of this parameter should not appear within an application association. This parameter is used in reliable transfer mode 1.

#### 9.6.1.5 *Synchronization point*

This parameter has different significations depending on the service primitive:

- i) in a D-TRANSFER-request it indicates the requested minor synchronization point number from which the initiator tries to retransmit. It is used together with the value "transfer of a document from a synchronization point" of the parameter document information type;
- ii) in a D-TRANSFER-indication it indicates the last positively confirmed minor synchronization point number (for further study);
- iii) in a D-TRANSFER-confirm it indicates the last positively confirmed minor synchronization point number. It is used together with the value "transfer not completed" of the parameter document information type. If no synchronization point was confirmed during the document transfer, this parameter may be absent.

This parameter is used only in reliable transfer mode 1.

#### 9.6.1.6 *Result*

This parameter specifies the result of the transfer as follows:

- document-information-transmitted: positive confirm; the document-information has been transferred to, and secured by the receiving DTAM-provider (used for both reliable transfer modes);
- document-information-not-transferred: negative confirm; the document-information could not be transferred within the specified transfer time (used for reliable transfer mode 2);
- document-information-not-completely transferred: negative confirm; the document-information could not be completely transferred, remaining part of the document as indicated by the value of the parameter "document information type" (used for reliable transfer mode 1). The indication of this parameter may result to resume the transmission of the remaining part of the document from the requesting DTAM user;

- document-information-continue-not-possible: negative confirm; this value is used when the document linking information is not available at the sending or receiving side (used for reliable transfer mode 1). This indication of this parameter may result to retry the transmission of the entire document again from the requesting DTAM user.

This parameter has to be supplied by the DTAM-provider.

#### 9.6.1.7 Checkpoint mechanism

This parameter specifies the mechanism for checkpointing in DTAM-PM, and the following mechanisms are defined:

##### 1) Mechanism 1

The places where to insert the checkpoints are related to a maximum size (integral number of octets) indicated by the DTAM user. A checkpoint should be set at the end of each segment and a segment should be composed of the greatest number of integral IDE (Interchange-Data-Element) which is inferior or equal to the maximum size. If the document is smaller than the maximum size, then no checkpoint is required.

##### 2) Mechanism 2

The places where to insert the checkpoints are related to a number of IDEs indicated by the DTAM user. A checkpoint should be set at the end of each segment and a segment should be composed of the number of integral IDE which is indicated by the user. Only the number of IDE of the last segment is equal or inferior to the indicated number.

*Note* - Some applications may not count IDEs of Document Profile and Document Root.

#### 9.7 D-TYPED-DATA service

Typed data transmission is used independent of the data token and is issued from both DTAM users when required.

The related service structure consists of two events, as illustrated in Figure 8/T.432.

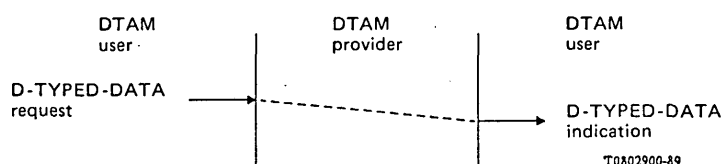


FIGURE 8/T.432

D-TYPED-DATA service events

##### 9.7.1 D-TYPED-DATA service parameters

The parameters of D-TYPED DATA are listed in Table 7/T.432.

TABLE 7/T.432

D-TYPED-DATA service parameters

Parameter	D-TYPED DATA request	D-TYPED DATA indication
Typed-data information	M	M(=)

9.7.1.1      *Typed-data information*

Typed-data information is chosen from the following strings:

- NumericString;
- PrintableString;
- TeletexString;
- VideotexString;
- VisibleString;
- OctetString;
- IA5String;
- GraphicString.

9.8      *D-UNCONFIRMED-CREATE service*

The document create operation procedure is used by the requestor of document manipulation to add the constituents of ODA and Operational Structure to a document without any confirmation of the create manipulation.

The related service structure consists of two events, as illustrated in Figure 9/T.432.

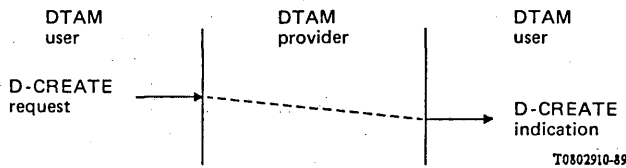


FIGURE 9/T.432

D-CREATE service events

9.8.1      *D-UNCONFIRMED-CREATE service parameters*

Table 8/T.432 lists the D-UNCONFIRMED-CREATE service parameters.

TABLE 8/T.432

D-UNCONFIRMED-CREATE service parameters

Parameter	D-CREATE request	D-CREATE indication
Create information	M	M(=)

9.8.1.1      *Create information*

This parameter consists of a sequence of sequences of Parent Object or Class Identifiers and Objects which are as defined in Recommendations T.412 and T.441.

9.9      *D-UNCONFIRMED-DELETE service*

The document delete operation procedure is used by the requestor of document manipulation to delete the constituents of ODA and Operational Structure of an existing document without any confirmation of the delete operation.

The related service structure consists of two events, as illustrated in Figure 10/T.432.

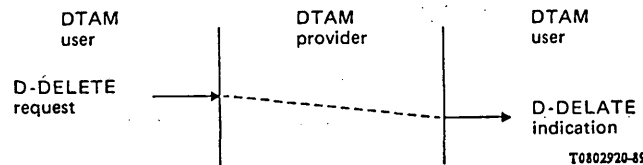


FIGURE 10/T.432

**D-DELETE service events**

**9.9.1 D-UNCONFIRMED-DELETE service parameters**

Table 9/T.432 lists the D-UNCONFIRMED-DELETE service parameters.

TABLE 9/T.432

**D-UNCONFIRMED-DELETE service parameters**

Parameter	D-DELETE request	D-DELETE indication
Delete information	M	M(=)

**9.9.1.1 Delete information**

This parameter consists of a sequence of Object or Class of Identifiers, Content Portion Identifiers and Operational Information Identifiers which are as defined in Recommendations T.412 and T.441.

**9.10 D-UNCONFIRMED-MODIFY service**

The document modify operation procedure is used by the requestor of document manipulation to modify the attributes of constituents of ODA and Operational Structure of an existing document without any confirmation of the modify operation.

The related service structure consists of two events, as illustrated in Figure 11/T.432.

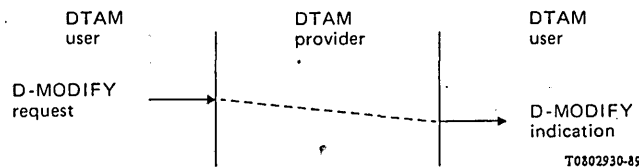


FIGURE 11/T.432

**D-MODIFY service events**

### 9.10.1 D-UNCONFIRMED-MODIFY service parameters

Table 10/T.432 lists the D-UNCONFIRMED-MODIFY service parameters.

TABLE 10/T.432

D-UNCONFIRMED-MODIFY service parameters

Parameter	D-MODIFY request	D-MODIFY indication
Modify information	M	M(=)

#### 9.10.1.1 Modify information

This parameter is a sequence of sequences of Current Object or Class Identifiers and Objects which are as defined in Recommendations T.412 and T.441.

### 9.11 D-UNCONFIRMED-CALL service

This procedure is used to address or to read an object of Operational Structure which contains a sequence of DTAM protocol data units (with some restrictions, i.e. that only D-CREATE, D-DELETE and D-MODIFY can appear in this sequence). These protocol data units are applicable to the existing document.

The related service structure consists of two events, as illustrated in Figure 12/T.432.

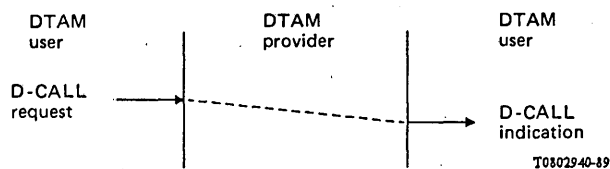


FIGURE 12/T.432

D-CALL service events

#### 9.11.1 D-UNCONFIRMED-CALL service parameters

Table 11/T.432 lists the D-UNCONFIRMED-MODIFY service parameters.

TABLE 11/T.432

D-UNCONFIRMED-CALL service parameters

Parameter	D-CALL request	D-CALL indication
Call information	M	M(=)

#### 9.11.1.1 *Call information*

This parameter is a sequence of choices of Current Object Identifier which are defined in Recommendation T.441.

#### 9.12 *D-UNCONFIRMED-REBUILD service*

This procedure is used to delete an object of ODA and/or the Operational Structure (and all the subordinates of this object, if any) and create an object immediately after this particular object, updating the attributes of the object with the values carried by the D-REBUILD operation.

This service is for further study.

#### 9.13 *D-TOKEN-GIVE service*

The token-give procedure is used by a sender (requestor) to give the data token to the receiver (responder), when the sender wants to give the right to manipulate documents.

The requestor becomes the receiver and the responder becomes the sender. The related service structure consists of two events, as illustrated in Figure 13/T.432.

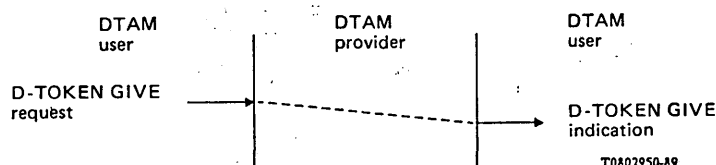


FIGURE 13/T.432

#### D-TOKEN-GIVE service events

##### 9.13.1 *D-TOKEN-GIVE service parameters*

D-TOKEN-GIVE service has no parameters.

#### 9.14 *D-CONTROL-GIVE service*

The control-give procedure is used by a sender (requestor) to give all the tokens to the receiver (responder). This service can only be requested when the document bulk transfer functional unit has been selected and the requestor owns all the tokens.

The related service structure consists of two events, as illustrated in Figure 14/T.432.

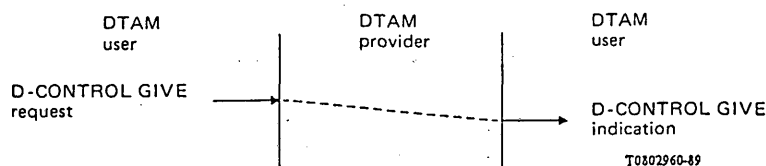


FIGURE 14/T.432

#### D-CONTROL-GIVE service events



9.14.1 *D-CONTROL-GIVE service parameters*

D-CONTROL-GIVE service has no parameters.

9.15 *D-TOKEN-PLEASE service*

The token-please procedure is used by a receiver (requestor) to request the data token from the sender (responder), when the receiver wants to request the right to transfer or manipulate documents.

The related service structure consists of two events, as illustrated in Figure 15/T.432.

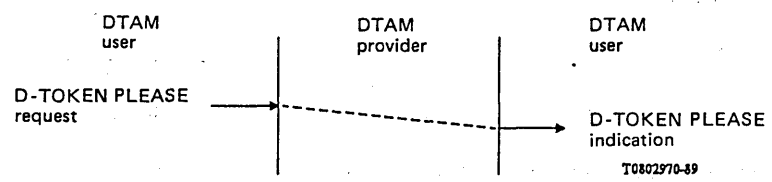


FIGURE 15/T.432

D-TOKEN-PLEASE service events

9.15.1 *D-TOKEN-PLEASE service parameters*

Table 12/T.432 lists the D-TOKEN-PLEASE service parameters.

TABLE 12/T.432

D-TOKEN-PLEASE service parameters

Parameter	D-TOKEN-PLEASE request	D-TOKEN-PLEASE indication
Tokens priority	U	C(=)

*Note* - In the case of using Session service as a lower layer service, this parameter may not be mapped into the session service in Recommendation X.215 applied.

9.15.1.1 *Tokens priority*

This parameter defines the priority of the action, governed by the data token, that the requestor of the D-TOKEN-PLEASE service wishes to carry out. This parameter has to be supplied by the requestor of the D-TOKEN-PLEASE service.

9.16 *D-P-EXCEPTION-REPORT service*

The provider-exception reporting service permits DTAM users to be notified of unanticipated situations not covered by other services. If a service cannot be completed due to DTAM-service provider protocol errors or malfunctions, the provider-exception reporting service is used to indicate this to both DTAM users.

If used with the document bulk transfer service, the provider-exception reporting service is only permitted while a D-TRANSFER service is in progress or waiting for the D-CAPABILITY confirm primitive.

Following a D-P-EXCEPTION-REPORT indication, and until the error condition is cleared:

- a) typed-data information (D-TYPED-DATA service), document informations (D-TRANSFER service) will be discarded by the DTAM-service-provider;
- b) synchronization point indications will not be given to the DTAM-service-provider.

On receipt of a D-P-EXCEPTION-REPORT indication, either DTAM user initiates one of the following services to clear the error:

- c) abort;
- d) retry of the transmission of the document information;
- e) give the data token.

DTAM users are not permitted to initiate any other services until the error is cleared.

The related service structure consists of two events, as illustrated in Figure 16/T.432.

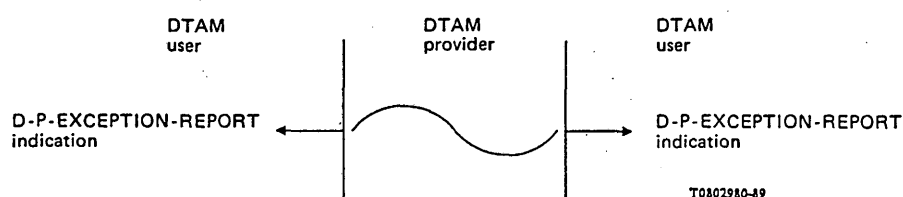


FIGURE 16/T.432

#### D-P-EXCEPTION-REPORT service events

#### 9.16.1 D-P-EXCEPTION-REPORT service

Table 13/T.432 lists the D-P-EXCEPTION-REPORT service.

TABLE 13/T.432

#### D-P-EXCEPTION-REPORT service parameters

Parameter	D-P-EXCEPTION-REPORT indication
Reason	M(=)

##### 9.16.1.1 Reason

Reason is a parameter specifying the reason for the exception report. Its value is one of:

- a) protocol error;
- b) not sufficient storage capacity for transmission at the receiver;
- c) non-specific error.

In a Normal Mode, the storage capacity parameter is optionally used by each of two DTAM protocol machines to indicate its own capacity to the peer. After the negotiation, if the storage capacity of the receiving DTAM-PM is smaller than the largest segment of document information (see § 6.6) according to the checkpoint rule, the sending DTAM-PM shall not transfer the document and D-P-EXCEPTION indication should be issued to the sending DTAM user.

#### 9.17 *D-U-EXCEPTION-REPORT service*

The user-exception reporting service permits a DTAM user to report an exception condition.

The detailed definition of this service is for further study.

#### 9.18 *Reliable transfer support service*

Reliable transfer support service provides the communication secured as DTAM functionalities.

Two types of Reliable Transfer Mode are defined as follows:

##### 1) *Reliable transfer mode 1*

In this mode, the DTAM-Service-provider performs the reliable transfer of a document but, in case of problem, it will interrupt the transfer and indicate to the user that the transfer has not been completed. The user will then have the responsibility to start a new transmission by using the D-TRANSFER request primitive with the appropriate parameters.

##### 2) *Reliable transfer mode 2*

In this mode, the DTAM-Service-provider performs the complete reliable transfer of a document. If the transfer is interrupted, the recovery is under the responsibility of the DTAM-PM. If the document is not transferred within the transfer-time, this will be indicated to the user.

### Recommendation T.433

## DOCUMENT TRANSFER AND MANIPULATION (DTAM) - SERVICES AND PROTOCOLS - PROTOCOL SPECIFICATION

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## 0 **Introduction**

This Recommendation specifies the protocol for the services provided by an application-service-element, the Document Transfer and Manipulation Service Element (DTAM) to support applications in a distributed telematic systems environment. This Recommendation is one of a set of Recommendations specifying the protocols for sets of application-service-elements specifically used by a number of applications.

## 1 **Scope and field of application**

This Recommendation specifies the protocol and procedures for the Document Transfer and Manipulation Service Element (DTAM). The DTAM services are provided in conjunction with the Association Control Service Element (ACSE) service (Recommendation X.217), and the Presentation-service (Recommendation X.216) or the Session-service (Recommendation X.215). Depending on the mapping, Recommendation T.62 *bis* may also apply.

The DTAM procedures are defined in terms of:

- a) the interaction between peer DTAM protocol machines through the use of the ACSE-service and Presentation-service or Session-service; and
- b) the interactions between the DTAM protocol machine and its service-user.

This Recommendation specifies conformance requirements for systems implementing these procedures.

The use of RTSE and/or ROSE is for further study.

## 2 References

References are listed in Recommendation T.432.

## 3 Definitions and abbreviations

Terms and abbreviations are defined in Recommendation T.431. The definitions of service primitive names given in Recommendation T.432 are used in this Recommendation.

## 4 Conventions

This Recommendation specifies the APDU Fields. In § 6, tables are presented for each DTAM APDU. Each field is summarized by the following notation:

- M presence is mandatory
- U presence is a DTAM service-user option
- req source is related request primitive
- ind sink is related indication primitive
- rsp source is related response primitive
- cnf sink is related confirm primitive
- sp source or sink is the DTAM-PM

The structure of each DTAM APDU is specified in § 8 using the abstract syntax notation of Recommendation X.208.

## 5 Overview of the protocol

### 5.1 *Service provision*

The protocol specified in this Recommendation provides the DTAM services defined in Recommendation T.432. These services are listed in Table 1/T.433.

### 5.2 *Relationship with other ASEs and lower layer services*

#### 5.2.1 *ACSE service (when RTSE is not used)*

The DTAM services require access to the A-ASSOCIATE, A-RELEASE, A-ABORT, and A-P-ABORT services. The inclusion of the DTAM in an application-context precludes the use of any of the above ACSE services by any other ASE or the use-element.

The Transparent Mode of DTAM implies that ACSE can pass through it.

TABLE 1/T.433

## DTAM services summary

Service	Type
D-INITIATE	confirmed
D-TERMINATE	confirmed
D-P-ABORT	provider-initiated
D-U-ABORT	unconfirmed
D-CAPABILITY	confirmed
D-TRANSFER	provider-confirmed
D-TYPED-DATA	unconfirmed
D-CREATE	unconfirmed
D-DELETE	unconfirmed
D-MODIFY	unconfirmed
D-CALL	unconfirmed
D-REBUILD	unconfirmed
D-TOKEN-GIVE	unconfirmed
D-CONTROL-GIVE	unconfirmed
D-TOKEN-PLEASE	unconfirmed
D-P-EXCEPTION-REPORT	provider-initiated
D-U-EXCEPTION-REPORT	unconfirmed

*Note* - D-REBUILD service is for further study.

#### 5.2.2 RTSE service

The use of this ASE is for further study.

#### 5.2.3 ROSE service

The use of this ASE is for further study.

#### 5.2.4 Presentation-service

DTAM services may require access to the P-ACTIVITY-START, P-DATA, P-MINOR-SYNCHRONIZE, P-ACTIVITY-END, P-ACTIVITY-INTERRUPT, P-ACTIVITY-DISCARD, P-U-EXCEPTION-REPORT, P-ACTIVITY-RESUME, P-P-EXCEPTION-REPORT, P-TOKEN-PLEASE, P-CONTROL-GIVE and P-TOKEN-GIVE services. This Recommendation recognizes that the ACSE services require access to the P-CONNECT, P-RELEASE, P-U-ABORT and P-P-ABORT services. The inclusion of the DTAM in an application-context precludes the use of any of the above, or of any other, presentation-services by any other ASE or the user element.

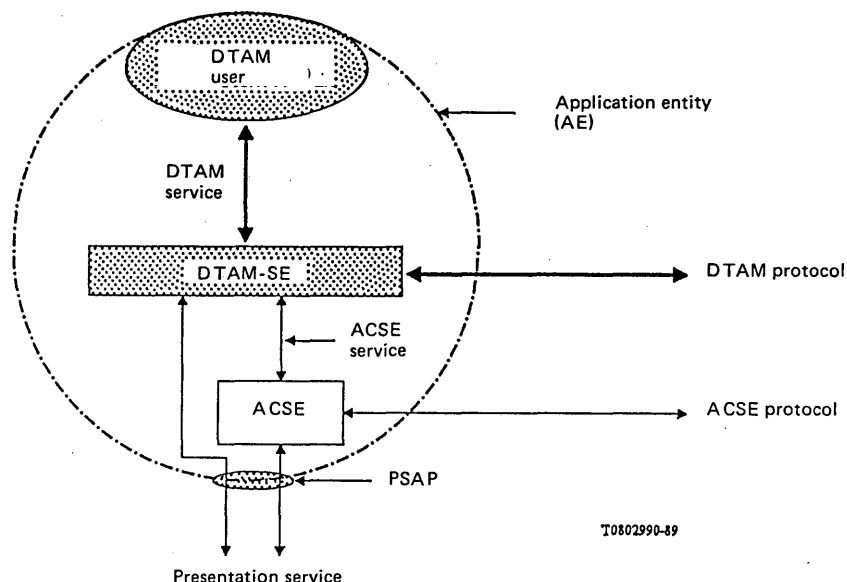
### 5.2.5 Recommendation X.215 session-service

In the Transparent Mode of operation APDUs defined in DTAM are directly mapped to the session service defined in Recommendation X.215. When the Transparent Mode is used the procedure described in Recommendation T.62 *bis* also apply.

DTAM services may require access to the S-CONNECT, S-ACTIVITY-START, S-DATA, S-MINOR-SYNCHRONIZE, S-ACTIVITY-END, S-ACTIVITY-INTERRUPT, S-ACTIVITY-DISCARD, S-U-EXCEPTION-REPORT, S-ACTIVITY-RESUME, S-P-EXCEPTION-REPORT, S-TOKEN-PLEASE, S-CONTROL-GIVE, P-TOKEN-GIVE, S-RELEASE, S-U-ABORT and S-P-ABORT services.

### 5.3 Model of telematic protocol architecture (TPA)

The DTAM operates between two DTAM Protocol Machines (DTAM-PMs) in the Application layer of the OSI model. Protocol elements are exchanged between DTAM-PMs, using the Session service as defined in Recommendation X.215 or the services of ACSE and of the Presentation Layer as defined in Recommendations X.217 and X.216 respectively. The model for Telematic Protocol Architecture (TPA) is illustrated in Figure 1/T.433. This application layer protocol architecture is composed of the ACSE (Association Control Service Element), DTAM-SE (Service Element), and DTAM users. Use of the Reliable Transfer Service Element (RTSE), Remote Operation Service Element (ROSE) and Message Handling Systems (MHS) is for further study.



*Note* - In the case of use of the Session-service (Transparent Mode), the appropriate DTAM APDUs are directly mapped to the Session-service primitives.

FIGURE 1/T.433

#### Telematic protocol architecture (TPA) model in application layer

#### 5.3.1 Functions of DTAM user

DTAM users have the role of accurately reflecting the actual telematic user (i.e. terminal or system user) intentions in communication, and have functions to perform the applications (Document bulk transfer, document manipulation, document transfer and manipulation etc.) on behalf of the actual user. This mechanism is provided by the use of the DTAM-SE through the DTAM service defined in Recommendation T.432. The DTAM service is the logical interface between the DTAM user and DTAM service-provider for data handling, and is independent of specific hardware and software technique.

The DTAM user as an Application Service Element (including the user element) may be capable of interpreting the meaning of the content of an exchanged document. For example, the retrieval command carried during information retrieval is not interpreted by the DTAM, but by the DTAM user.

### 5.3.2 Functions of DTAM service-provider

To realize single-source management of document architecture for telematic services, DTAM service-provider provides the following communication functions.

1) *Association use control (kernel)*

DTAM provides the trigger for the use of the association given in ACSE, and controls association use during communication (termination, abort, etc.). Applying the Session-service to the lower layer functions of DTAM, this association use control will be mapped directly onto the session kernel functional unit.

2) *DTAM capability*

The DTAM capability is defined by a set of parameters in order to specify the communication features which contains the parameters:

- a) document application profile;
- b) operational application profile;
- c) non-basic document characteristics;
- d) non-basic structural characteristics, etc.

3) *Data transmission function*

DTAM provides functions for document bulk transfer, document manipulations and typed data transmission as follows:

a) *Document bulk transfer*

DTAM provides a function to transmit the document in bulk under the communications environment negotiated by D-INITIATE service and additionally by D-CAPABILITY service;

b) *Document manipulations*

DTAM provides a function partially modifying a document seen by both users, by generating, revising or deleting structures (pages, blocks etc.) of an existing document or to create a new document by generating structure of ODA and Operational Structure;

c) *Typed data transmission*

DTAM optionally provides a typed data transmission function which is independent of data token control.

4) *Document remote access*

For further study.

5) *Document remote management*

For further study.

6) *Token control*

DTAM optionally provides the function of Token control to handle the data token for dialogue.

7) *Reliable transfer (support function)*

DTAM optionally provides the function of reliable transfer to ensure reliable communication. Two Reliable Transfer Modes are introduced (see § 6.6.1.4).

8) *Exception report*

DTAM optionally provides the exception reporting function for error control during the DTAM communication.



## 9) Storage capacity negotiation

DTAM optionally provides the Storage Capacity Negotiation to indicate its own capacity to the peer.

## 6 Elements of procedure

This section identifies all the types of protocol data units which constitute the elements of the DTAM protocol between two DTAM-protocol-machines (DTAM-PMs). A protocol data unit (PDU) is the smallest quantity of information exchanged between DTAM-PMs which has a self-contained semantic significance.

When a DTAM service primitive is received from the DTAM user, DTAM transmits the DTAM primitive data to the opposite DTAM through the DTAM protocol, then the opposite DTAM generates the DTAM service primitives and notifies its DTAM user. The DTAM protocol data units (D-PDU) are shown in Table 2/T.433.

Individual parameters of DTAM service primitives are, in principle, all mapped to individual PDU parameters, but there are PDU including parameters other than those specified in service primitives, such as those generated by DTAM itself. For example, D-INITIATE-REQ PDU also includes the DTAM protocol version parameter, which is used to negotiate the version of protocol between the DTAM-PMs. Note that the DTAM user is not concerned with this DTAM negotiation.

The PDUs are here identified symbolically with minimal reference to their mapping on to the lower layer service functions which implement them, thus no differentiation is made, in this section, between PDUs which are effected as specific Presentation service primitives and PDUs which are transferred as DTAM PDUs using the Presentation service data transfer functions. Details of PDU mapping and encoding are given in § 8.

PDUs are given both full names, which should be used outside the context of this Recommendation, and abbreviated names which are used within this Recommendation for brevity. The full names consist of one or two words descriptive for the purpose of the PDU, prefixed by D- and, in the case of request/response pairs of PDUs, suffixed by -REQ or -RESP as appropriate. The abbreviated names are three letters each, with Q or R appended in the case of request/response pairs.

### 6.1 Summary list of DTAM protocol data units

TABLE 2/T.433

DTAM protocol data units

Functional Units	PDU abbrev.	Protocol elements (PDU)	Reference
Association use control (kernel)	DINQ	D-INITIATE-REQ	6.2
	DINR	D-INITIATE-RESP	6.2
	DTEQ	D-TERMINATE-REQ	6.3
	DTER	D-TERMINATE-RESP	6.3
	DAB	D-ABORT	6.4
Capability	DCPQ	D-CAPABILITY-REQ	6.5
	DCPR	D-CAPABILITY-RESP	6.5
Document Bulk transfer	None	None	6.6

TABLE 2/T.433 (Cont.)

Functional Units	PDU abbrev.	Protocol elements (PDU)	Reference
Document unconfirmed manipulation	DCR	D-CREATE	6.7
	DDL	D-DELETE	6.7
	DMD	D-MODIFY	6.7
	DCL	D-CALL	6.7
	DRD	D-REBUILD [Further study]	6.7
Document confirmed manipulation		[Further study]	6.8
Typed data transmission	DTD	D-TYPED-DATA	6.9
Remote document access		[Further study]	6.10
Remote document management		[Further study]	6.11
Token control	DTP	D-TOKEN-PLEASE	6.12
Exception report	None	None - user-exception-report - provider-exception-report	6.13
Reliable transfer (support)	None	None	6.6

## 6.2 DTAM association establishment

### 6.2.1 Purpose

The DTAM association establishment procedure is used to establish an association of DTAM between two AEs. It supports the D-INITIATE service.

### 6.2.2 APDUs used

The DTAM association establishment procedure uses the D-INITIATE-REQ (DINQ) and the D-INITIATE-RESP (DINR) APDUs.

#### 6.2.2.1 DINQ APDU

The fields of the DINQ APDU are listed in Table 3/T.433.

TABLE 3/T.433  
DINQ APDU fields

Field name	Presence	Source	Sink
Service classes (see Note 1)	(see Note 2)	request	indication
Telematic requirements (see Note 1)	M	request	indication
Application capabilities	M	request	indication
Protocol version (see Note 1)	U	sp	sp
DTAM QOS (see Note 1)	U	request	indication
Account (see Note 1)	U	request	indication
Window size	U	request	indication
Storage capacity	U	request	indication
User information (see Note 1)	U	request	indication

*Note 1* - These parameters are not applicable in transparent mode.

*Note 2* - The use of this parameter is for further study.

#### 6.2.2.2 DINR APDU

The fields of the DINR APDU are listed in Table 4/T.433.

TABLE 4/T.433  
DINR APDU fields

Field name	Presence	Source	Sink
Telematic requirements (see Note)	U	response	confirmation
Application capabilities	M	response	confirmation
Protocol version (see Note)	U	sp	sp
DTAM QOS (see Note)	U	response	confirmation
Result (see Note)	M	response	confirmation
Window size	U	response	confirmation
Storage capacity	U	response	confirmation
User information (see Note)	U	response	confirmation

*Note* - These parameters are not applicable in transparent mode..

### 6.2.3 DTAM association establishment procedure

#### 6.2.3.1 DTAM association establishment procedure mapped onto ACSE service (normal mode: OSI)

This procedure is driven by the following events:

- a) a D-INITIATE request primitive from the requestor;
- b) a DINQ APDU as User Data on an A-ASSOCIATE indication primitive;
- c) a D-INITIATE response primitive from the responder; and
- d) an A-ASSOCIATE confirm primitive (that may contain a DINR APDU);

##### 6.2.3.1.1 D-INITIATE request primitive

6.2.3.1.1.1 The requesting DTAM-PM forms a DINQ APDU from parameter values of the D-INITIATE request primitive and its stored data in DTAM-PM (the Protocol Version field, etc.) It issues an A-ASSOCIATE request primitive also using information from the D-INITIATE request primitive. The User Data parameter of the A-ASSOCIATE request primitive contains the DINQ APDU.

6.2.3.1.1.2 The requesting DTAM-PM waits for a primitive from the ACSE service-provider, and does not accept any other primitive from the requestor other than a D-U-ABORT request primitive.

##### 6.2.3.1.2 DINQ APDU

6.2.3.1.2.1 The responding DTAM-PM receives a DINQ APDU from its peer as User data on an A-ASSOCIATE indication primitive. If any of the parameters of the A-ASSOCIATE indication primitive or the fields in the DINQ APDU are unacceptable to this DTAM-PM, it forms a DINR APDU with the appropriate rejecting Result field, and sends the DINR APDU as User Data on an A-ASSOCIATE response primitive. The Result parameter on the A-ASSOCIATE response primitive specifies "user-rejection". The DTAM-PM does not issue a D-INITIATE indication primitive to the responder, and the association is not established.

6.2.3.1.2.2 If the A-ASSOCIATE indication primitive and its DINQ APDU are acceptable to the responding DTAM-PM, it issues a D-INITIATE indication primitive to the responder. The D-INITIATE indication primitive parameters are derived from the DINQ APDU and from the A-ASSOCIATE indication primitive. The DTAM-PM waits for a D-INITIATE response primitive from the responder and does not accept any other primitives from the responder except for the D-U-ABORT request primitive.

##### 6.2.3.1.3 D-INITIATE response primitive

6.2.3.1.3.1 When the DTAM-PM receives the D-INITIATE response primitive, the Result parameter specifies whether the responder has accepted or rejected the DTAM association. The DTAM-PM forms a DINR APDU using the D-INITIATE response primitive parameters. The DINR APDU is sent as the User Data parameter on the A-ASSOCIATE response primitive.

6.2.3.1.3.2 If the responder accepted the DTAM association request, the Result parameter on the related A-ASSOCIATE response primitive specifies "accepted", and the Result field of the outgoing DINR APDU also specifies "accepted". The DTAM association is established.

6.2.3.1.3.3 If the responder rejected the DTAM association request, the Result parameter on the related A-ASSOCIATE response primitive specifies "Result: rejected (permanent or transient)" and "Source: ACSE service-user", and the Result field of the outgoing DINR APDU contains the appropriate rejection value. The DTAM association is not established.

##### 6.2.3.1.4 A-ASSOCIATE confirm primitive

6.2.3.1.4.1 The requesting DTAM-PM receives an A-ASSOCIATE confirm primitive. The following situations are possible:

- a) the DTAM association has been accepted;
- b) the responding DTAM-PM or the responder has rejected the DTAM association; or
- c) the association service-provider has rejected the related association.

6.2.3.1.4.2 If the DTAM association was accepted, the A-ASSOCIATE confirm primitive Result parameter specifies "accepted". The User Data parameter contains a DINR APDU, and the Result field of the DINR APDU also specifies "accepted". The requesting DTAM-PM issues a D-INITIATE confirm primitive to the requestor based on parameters from the A-ASSOCIATE confirm primitive and from the DINR APDU. The D-INITIATE confirm primitive Result parameter specifies "accepted", and the DTAM association is established.

6.2.3.1.4.3 If the DTAM association was rejected by either the responding DTAM-PM or by the responder, the A-ASSOCIATE confirm primitive Result parameter specifies "Result: rejected (permanent or transient)" and "Source: ACSE service-user". The User Data parameter contains a DINR APDU, and the Result field of the DINR APDU indicates the reason for rejection. The requesting DTAM-PM issues a D-INITIATE confirm primitive to the requestor based on parameters from the A-ASSOCIATE confirm primitive and from the DINR APDU. The D-INITIATE confirm primitive Result parameter contains the appropriate rejection value. The DTAM association is not established.

6.2.3.1.4.4 If the association was rejected by the association service-provider, the A-ASSOCIATE confirm primitive Result parameter specifies "Result: rejected (permanent or transient)" and "Source: ACSEservice-provider". In this situation, the User Data field is not used by the requesting DTAM-PM. The requesting DTAM-PM issues a D-INITIATE confirm primitive with the appropriate Result parameter. The DTAM association is not established.

#### 6.2.3.2 *DTAM association establishment procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-INITIATE request primitive from the requestor;
- b) a DINK APDU as User Data on an S-CONNECT indication primitive;
- c) a D-INITIATE response primitive from the responder; and
- d) an S-CONNECT confirm primitive (that may contain a DINR APDU);

##### 6.2.3.2.1 *D-INITIATE request primitive*

6.2.3.2.1.1 The requesting DTAM-PM forms a DINK APDU from parameter values of the D-INITIATE request primitive and its stored data in DTAM-PM (the Checkpoint Window field, etc.). It issues an S-CONNECT request primitive also using information from the D-INITIATE request primitive. The User Data parameter of the CONNECT request primitive contains the DINK APDU.

6.2.3.2.1.2 The requesting DTAM-PM waits for a primitive from the Session service-provider and does not accept any other primitive from the requestor other than a D-U-ABORT request primitive.

##### 6.2.3.2.2 *DINK APDU*

6.2.3.2.2.1 The responding DTAM-PM receives a DINK APDU from its peer as User Data on an S-CONNECT indication primitive. If any of the parameters of the S-CONNECT indication primitive or the fields in the DINK APDU are unacceptable to this DTAM-PM (e.g. no Session User Data in the S-CONNECT indication,) it issues an S-CONNECT response primitive specified "ss-user-rejection". In this situation, the responding session service-provider issues RSSN (Response Session Start Negative). The DTAM-PM does not issue a D-INITIATE indication primitive to the responder. The association is not established.

6.2.3.2.2.2 If the S-CONNECT indication primitive and its DINK APDU are acceptable to the responding DTAM-PM, it issues a D-INITIATE indication primitive to the responder. The D-INITIATE indication primitive parameters are derived from the DINK APDU. The DTAM-PM waits for a D-INITIATE response primitive from the responder and does not accept any other primitives from the responder except for the D-U-ABORT request primitive.

##### 6.2.3.2.3 *D-INITIATE response primitive*

6.2.3.2.3.1 When the DTAM-PM receives the D-INITIATE response primitive, the Result parameter specifies whether the responder has accepted or rejected the DTAM association. If the DTAM association is accepted, the DTAM-PM forms a DINR APDU using the D-INITIATE response primitive parameters. The DINR APDU is sent as the User Data parameter on the S-CONNECT response primitive.

6.2.3.2.3.2 If the responder accepted the DTAM association request, the Result parameter on the related S-CONNECT response primitive specifies "accept". The DTAM association is established.

6.2.3.2.3.3 If the responder rejected the DTAM association request, the Result parameter on the related S-CONNECT response primitive specifies "user-rejection" and DTAM-PM does not send DINR APDU.

#### 6.2.3.2.4 *S-CONNECT confirm primitive*

6.2.3.2.4.1 The requesting DTAM-PM receives an S-CONNECT confirm primitive. The following situations are possible;

- a) the DTAM association has been accepted;
- b) the responding DTAM-PM or the responder has rejected the DTAM association; or
- c) the Session service-provider has rejected the related association.

6.2.3.2.4.2 If the DTAM association was accepted, the S-CONNECTION confirm primitive Result parameter specifies "accept". The User Data parameter contains a DINR APDU. The requesting DTAM-PM issues a D-INITIATE confirm primitive to the requestor based on parameters from the S-CONNECT confirm primitive and from the DINR APDU. The D-INITIATE confirm primitive Result parameter specifies "accepted". The DTAM association is established.

6.2.3.2.4.3 If the DTAM association was rejected by either the responding DTAM-PM or by the responder, the S-CONNECT confirm primitive Result parameter specifies "user-rejection" and there is no User Data (DINR APDU) in this confirm primitive. The requesting DTAM-PM issues a D-INITIATE confirm primitive to the requestor based on parameters from the S-CONNECT confirm primitive. The D-INITIATE confirm primitive Result parameter contains the value of "user-rejection", and the DTAM association is not established.

6.2.3.2.4.4 If the association was rejected by the session service-provider, the S-CONNECT confirm primitive Result parameter specifies "provider-rejection". In this situation, the User Data field is not used by the requesting DTAM-PM. The requesting DTAM-PM issues a D-INITIATE confirm primitive with the appropriate Result parameter. The DTAM association is not established.

#### 6.2.4 *Use of the DINQ/DINR APDU fields*

The DINQ APDU and DINR APDU fields are used as follows.

##### 6.2.4.1 *Service classes*

The use of this parameter is for further study.

##### 6.2.4.2 *Telematic requirements*

This is the Telematic Requirements parameter value from the D-INITIATE request/response primitives. It appears as the Telematic Requirements parameter value of D-INITIATE indication/confirm primitives respectively. If the Telematic Requirements proposed by the requestor are not acceptable to the responder, the DTAM association fails to be established.

##### 6.2.4.3 *Application capabilities*

This is the Application Capabilities parameter value from the D-INITIATE request/response primitives. It appears as the Application Capabilities parameter value of the D-INITIATE indication/confirm primitives respectively. This parameter consists of sets of the following sub-parameters.

###### 6.2.4.3.1 *Document application profile*

The value of this parameter is either an Octet String or ASN.1 object identifiers. The Octet String designates the document application profile in line with the Recommendation T.73 (Document Application Profile - T.73). The ASN.1 object identifier must conform to the rules specified in ISO 8824 and designate an application profile defined in accordance with the rules specified in Recommendation T.411 (Document Application Profiles).

###### 6.2.4.3.2 *Document architecture class*

The value of this parameter is "formatted".

###### 6.2.4.3.3 *Non basic document characteristics*

The value of this parameter is any combination of Non Basic Document Characteristics defined in Recommendation T.414.

###### 6.2.4.3.4 *Non basic structural characteristics*

The value of this parameter is any combination of Non Basic Structural Characteristics defined in Recommendation T.414.

#### 6.2.4.3.5 *Operational application profile*

The detailed specification of the Operational Application Profile is for further study.

#### 6.2.4.4 *Protocol version*

This identifies the version of the DTAM protocol in use by the requesting DTAM-PM.

#### 6.2.4.5 *DTAM QOS*

DTAM QOS is left for further study.

#### 6.2.4.6 *Account*

The account parameter identifies the account to which costs incurred in the DTAM association which is being established are to be charged.

*Note* - The use of this parameter is for further study.

#### 6.2.4.7 *Window size*

The requested checkpoint window parameter indicates, for each direction of transmission, the maximum number of checkpoints which may remain unacknowledged. This parameter is conditional upon the recovery or restart procedures under the reliable transfer, in which case it is mandatory. Checkpoints are only inserted by the sender of a document. Values of this parameter may be the reason for subsequent termination. The continued progress of the service is only guaranteed if the entity acting as receiver gives acknowledgments within this limit. The window size is stated independently by each entity as the maximum value for when that entity is the receiving entity. There is no negotiation. The values for each direction of data transfer are not necessarily the same. The parameter is an integer.

#### 6.2.4.8 *Storage capacity*

In a Normal Mode, this parameter is optionally used by each of two DTAM-PMs to indicate its own capacity to the peer. After the negotiation, if the storage capacity of the receiving DTAM-PM is smaller than the largest segment of document information (see § 6.6) according to the checkpoint rule, the sending DTAM-PM shall not transfer the document and D-P-EXCEPTION indication should be issued to the requesting DTAM user (sender of documents).

However, for some applications under a Transparent Mode, this parameter is used by the sending DTAM-PM to indicate a 'required storage capacity' to the peer machine. The receiving DTAM-PM uses this parameter to respond whether it is able to provide this storage capacity or not, so as to maintain compatibility with the old implementation based on Recommendation T.73.

#### 6.2.4.9 *Result*

If the DINQ APDU was rejected by the responding DTAM-PM (i.e., a D-INITIATE indication primitive was not issued to the responder), this field is supplied by the responding DTAM-PM, otherwise, this field is the Result parameter from the D-INITIATE response primitive. In either situation, it appears as the Result parameter on the D-INITIATE RESP (DINR) APDU. This field can take one of the following symbolic values:

- accepted;
- rejected by responder (reason-not-specified);
- rejected by responder (protocol Version-not-supported);
- rejected by responder (DTAMQOS-not-supported);
- rejected by responder (application-context-not-supported);
- rejected by responding DTAM-PM.

#### 6.2.4.10 *User information*

This is the User Information parameter from the D-INITIATE request and response primitive. It appears as the User Information parameter of the D-INITIATE indication and confirm primitive respectively, if issued.

### 6.2.5 Collisions and interactions

For further study.

### 6.3 Normal termination of a DTAM association

#### 6.3.1 Purpose

This procedure is used for the normal termination of a DTAM association by an AE without loss of information in transit. It supports the D-TERMINATE service.

#### 6.3.2 APDUs used

The normal termination procedure uses the D-TERMINATE-REQ (DTEQ) APDU and the D-TERMINATE-RESP (DTER) APDU.

##### 6.3.2.1 DTEQ APDU

The fields of the DTEQ APDU are listed in Table 5/T.433.

TABLE 5/T.433

DTEQ APDU fields

Field name	Presence	Source	Sink
User information (see Note)	U	request	indication

*Note* - This parameter is not applicable in transparent mode.

##### 6.3.2.2 DTER APDU

The fields of the DTER APDU are listed in Table 6/T.433.

TABLE 6/T.433

DTER APDU fields

Field name	Presence	Source	Sink
Charging (see Note)	U	response	confirmation
User information (see Note)	U	response	confirmation

*Note* - These parameters are not applicable in transparent mode.

### 6.3.3 Normal termination procedure

#### 6.3.3.1 Normal termination procedure mapped onto ACSE service (normal mode)

This procedure is driven by the following events:

- a D-TERMINATE request primitive from the requestor;
- a DTEQ APDU as User Data on an A-RELEASE indication primitive;
- a D-TERMINATE response primitive from the responder; and
- a DTER APDU as User Data on an A-RELEASE confirm primitive.



#### 6.3.3.1.1 *D-TERMINATE request primitive*

6.3.3.1.1.1 When a D-TERMINATE request primitive is received, the DTAM-PM sends a DTEQ APDU as User Data on an A-RELEASE request primitive using the parameters from the D-TERMINATE request primitive.

*Note* - The requestor is required to meet the association (presentation and session) requirements in order to issue a D-TERMINATE request primitive.

6.3.3.1.1.2 The requesting DTAM-PM now waits for a primitive from the association service-provider. It does not accept any primitives from the requestor other than a D-U-ABORT request primitive.

#### 6.3.3.1.2 *DTEQ APDU*

6.3.3.1.2.1 When the responding DTAM-PM receives the DTEQ APDU as User Data on an A-RELEASE indication primitive, it issues a D-TERMINATE indication primitive to the responder.

#### 6.3.3.1.3 *D-TERMINATE response primitive*

6.3.3.1.3.1 The responding DTAM-PM forms a DTER APDU from the response primitive parameters. The DTER APDU is sent as User Data on an A-RELEASE response primitive. The Result parameter of A-RELEASE response has the value "affirmative".

*Note* - The responder is able to reject the termination request of DTAM association only in the case of selecting a negotiated release session functional unit. The use of this functional unit is for further study.

#### 6.3.3.1.4 *DTER APDU*

6.3.3.1.4.1 The requesting DTAM-PM receives an A-RELEASE confirm primitive containing a DTER APDU from its peer. The Result parameter on the A-RELEASE confirm specifies either that the responder agrees or disagrees that the DTAM association may be terminated. The requesting DTAM-PM forms a D-TERMINATE confirm primitive from the DTER APDU.

#### 6.3.3.2 *Normal termination procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-TERMINATE request primitive from the requestor;
- b) an S-RELEASE indication primitive without sending DTEQ APDU;
- c) a D-TERMINATE response primitive from the responder; and
- d) an S-RELEASE confirm primitive without sending DTER APDU.

#### 6.3.3.2.1 *D-TERMINATE request primitive*

6.3.3.2.1.1 When a D-TERMINATE request primitive is received, the DTAM-PM issues an S-RELEASE request primitive without any SS-user-data.

*Note* - The requestor is required to meet the association (presentation and session) requirements in order to issue a D-TERMINATE request primitive.

6.3.3.2.1.2 The requesting DTAM-PM now waits for a primitive from the Session service-provider. It does not accept any primitives from the requestor other than a D-U-ABORT request primitive.

#### 6.3.3.2.2 *Implicit DTEQ APDU*

6.3.3.2.2.1 When the responding DTAM-PM receives an S-RELEASE indication primitive, it issues a D-TERMINATE indication primitive to the responder without any parameters.

#### 6.3.3.2.3 *D-TERMINATE response primitive*

6.3.3.2.3.1 The responding DTAM-PM forms an S-RELEASE response from the D-TERMINATE response primitive parameters. The Result parameter of S-RELEASE response has the value "affirmative".

#### 6.3.3.2.4 *Implicit DTER APDU*

6.3.3.2.4.1 The requesting DTAM-PM receives an S-RELEASE confirm primitive containing no DTAM APDU from its peer. The Result parameter on the S-RELEASE confirm always specifies "affirmative". The requesting DTAM-PM forms a D-TERMINATE confirm primitive from the S-RELEASE confirm primitive and issues it to the requestor with no parameters.

#### 6.3.4 *Use of the DTEQ APDU fields*

The DTEQ APDU fields are used as specified below.

##### 6.3.4.1 *User information*

This is the User Information parameter on the D-TERMINATE request primitive. It appears as the User Information parameter of the D-TERMINATE indication primitive.

#### 6.3.5 *Use of the DTER APDU fields*

The DTER APDU fields are used as specified below.

##### 6.3.5.1 *Charging*

The charging parameter conveys information on the costs attributed to the account during the DTAM association which is being released. The value of this parameter is for further study. The charging parameter if present at the end of a DTAM association, only if the account parameter was present at the beginning of that DTAM association. It is not mandatory to return a charge if that charge is zero.

##### 6.3.5.2 *User information*

This is the User Information parameter from the D-TERMINATE response primitive. It appears as the User Information parameter on the D-TERMINATE confirm primitive.

#### 6.3.6 *Collisions and interactions*

##### 6.3.6.1 *D-TERMINATE service*

Overlapping attempts by request in both AEs to terminate their DTAM association are governed by the A-RELEASE service or S-RELEASE Session service. The DTAM association is terminated.

*Note* - A D-terminate service collision can not occur if session tokens were selected for the association. Only a request in the AE that owns all of the available session tokens can issue the D-TERMINATE request primitive.

##### 6.3.6.2 *D-U-ABORT service, DAB APDU or A-P-ABORT service*

If either DTAM-PM receives a D-U-ABORT request primitive, a DAB APDU (as User Data on a A(or S)-U-ABORT indication primitive) or a A(orS)-P-ABORT indication primitive, it discontinues the normal DTAM association termination procedure, and instead follows abnormal termination procedure.

#### 6.4 *Abnormal termination of a DTAM association*

##### 6.4.1 *Purpose*

6.4.1.1 The abnormal termination can be used at any time to force the abrupt termination of the DTAM association by a requestor in either DTAM user, by either DTAM-PM, by the ACSE service-provider or by the Session service-provider. It supports the D-U-ABORT, D-P-ABORT and A-P-ABORT or S-P-ABORT services.

6.4.1.2 The Abnormal Termination provides the following three procedures:

- a) user-abort procedure;
- b) association-provider-abort procedure;
- c) transfer-abort procedure.

##### 6.4.2 *APDUs used*

The abnormal termination uses the D-ABORT (DAB) APDU.

##### 6.4.2.1 *DAB APDU*

The fields of the DAB APDU are listed in Table 7/T.433.

TABLE 7/T.433

## DAB APDU fields

Field name	Presence	Source	Sink
Abort source (see Note)	M	sp	indication
Abort reason (see Note)	U	sp	indication
Reflect parameter (see Note)	U	sp	indication
User information (see Note)	U	request	indication

*Note* - These parameters are not applicable in transparent mode.

### 6.4.3 Abnormal termination procedure

#### 6.4.3.1 Abnormal termination procedure mapped onto ACSE service (normal mode)

This procedure is driven by the following events:

##### *User-abort procedure*

- a D-U-ABORT request primitive from the requestor;
- a DAB APDU as User Data on an A-U-ABORT indication primitive;

##### *Association-provider-abort procedure*

- an A-P-ABORT indication primitive from the ACSE-service or

##### *Transfer-abort procedure*

- a severe error detected by a DTAM-PM.

##### 6.4.3.1.1 D-U-ABORT request primitive (user-abort procedure)

6.4.3.1.1.1 When a DTAM-PM receives a D-U-ABORT request primitive, it sends a D-ABORT (DAB) APDU as User Data on an A-U-ABORT request primitive. The DAB APDU "Abort Source" field is specified as a "requestor". If the User Information parameter was included on the D-U-ABORT request primitive, it is included in the DAB APDU. The DTAM association is terminated.

##### 6.4.3.1.2 DAB APDU

6.4.3.1.2.1 When a DTAM-PM receives an A-U-ABORT indication primitive, the User Data parameter contains the DAB APDU. The DTAM-PM issues a D-U-ABORT indication primitive with the Abort Source field of the DAB APDU. If a User Information field was contained in the DAB APDU, it is included in the D-U-ABORT indication primitive. The DTAM association is terminated.

##### 6.4.3.1.3 A-P-ABORT indication primitive (association-provider-abort procedure)

6.4.3.1.3.1 When a DTAM-PM receives an A-P-ABORT indication primitive, the DTAM-PM issues a D-P-ABORT indication primitive to the DTAM user. The DTAM association is terminated.

6.4.3.1.3.2 An association-provider-abort is indicated to both DTAM-PMs by an A-P-ABORT indication primitive and may occur at any time. After such an event, when the Reliable Transfer Mode 2 was selected, the association-initiating DTAM-PM starts the association-recovery procedure.

*Note* - The association-recovery procedure is for further study.

6.4.3.1.3.3 If the association-provider-abort procedure was performed during the transfer procedure the requesting DTAM-PM starts the transfer-resumption procedure after the association-recovery procedure is successfully completed. If the association-recovery procedure was not successfully completed the requesting DTAM-PM performs the transfer-error procedure and the provider-abort procedure.

#### 6.4.3.1.4 *Error detections by a DTAM-PM (transfer-abort procedure)*

6.4.3.1.4.1 When a DTAM-PM detects severe error situations, it performs the transfer-abort procedure followed by issuing a D-P-ABORT indication primitive.

6.4.3.1.4.2 The transfer-abort procedure is performed to send a DAB APDU as User Data on an A-U-ABORT request primitive. The DAB APDU "Abort Source" field is specified as a "DTAM service-provider" and additional DAB APDU parameters are specified to inform a peer DTAM-PM of the situation of the severe error. Following the transfer-abort procedure, the DTAM-PM issues a D-P-ABORT indication primitive to its service-user.

6.4.3.1.4.3 The use of association-recovery procedure (see § 6.6.8) is for further study.

#### 6.4.3.2 *Abnormal termination procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

##### *User-abort procedure*

- a D-U-ABORT request primitive from the requestor;
- an S-U-ABORT indication primitive without sending a DAB APDU;

##### *Association-provider-abort procedure*

- an S-P-ABORT indication primitive from the Session-service or

##### *Transfer-abort procedure*

- a protocol error detected by a DTAM-PM.

#### 6.4.3.2.1 *D-U-ABORT request primitive (user-abort procedure)*

6.4.3.2.1.1 When a DTAM-PM receives a D-U-ABORT request primitive, it issues a S-U-ABORT request primitive without sending a DAB APDU. The using of S-U-ABORT service will be interpreted as "Local Terminal Error". The DTAM association is terminated.

#### 6.4.3.2.2 *Implicit DAB APDU*

6.4.3.2.2.1 When a DTAM-PM receives an S-U-ABORT indication primitive, the DTAM-PM issues a D-U-ABORT indication primitive with the Abort Source field as "requestor". The DTAM association is terminated.

#### 6.4.3.2.3 *S-P-ABORT indication primitive (association-provider-abort procedure)*

6.4.3.2.3.1 When a DTAM-PM receives an S-P-ABORT indication primitive, the DTAM-PM issues a D-U-ABORT indication primitive to the responder. The DTAM association is terminated.

#### 6.4.3.2.4 *Protocol errors (transfer-abort procedure)*

6.4.3.2.4.1 When a DTAM-PM detects an invalid condition such as an unexpected APDU, it issues an S-U-ABORT request primitive without DAB APDU as the User Data. The DTAM-PM also issues a D-P-ABORT indication primitive to its service-user. The DTAM association is terminated.

#### 6.4.4 *Use of the ABORT APDU fields*

The ABORT APDU fields are used as specified below.

##### 6.4.4.1 *Abort source*

This is supplied by the requesting DTAM-PM. It is included in the resulting D-U(orP)-ABORT indication primitive. This field can take one of the following symbolic values:

- DTAM service-provider; or
- requestor.

#### 6.4.4.2 *Abort reason*

This field may contain one of the following values:

- local-system-problem
- invalid-parameter                      the invalid parameters are specified in the Reflected-parameter field
- unrecognized-activity
- temporary-problem                      no attempt at association-recovery should be made for a period of time determined by a local rule
- protocol-error                          of the DTAM-PM
- permanent-error                        this value is used solely by the DTAM provider-abort procedure in normal-mode
- transfer-completed                      the responding DTAM-PM could not discard an already completed transfer

#### 6.4.4.3 *Reflected-parameter*

The Reflected-Parameter field is a bit string that identifies which parameters are regarded as invalid parameters in the primitive received from the used service by the aborting DTAM-PM before the association-abort. The order of the bits in the bit string is the same as the order of the parameters in the tables of service parameters in Recommendations X.216 and X.217 (i.e. bit 1 represents the first parameter, etc).

#### 6.4.4.4 *User information*

This is the information parameter from the D-U-ABORT request primitive. It appears as the User Information parameter on the D-U-ABORT indication primitive.

#### 6.4.5 *Collisions and interactions*

The abnormal termination procedure may be used whenever a DTAM association is established, is in process of being established, or is being normally terminated. This procedure disrupts any other currently active procedure. An A-P-ABORT indication primitive can disrupt the D-U-ABORT exchange with loss of the user information in D-U-ABORT service. Collisions of DAB APDUs are governed by the A-U-ABORT service.

### 6.5 *Capability*

#### 6.5.1 *Purpose*

It supports the D-CAPABILITY service.

#### 6.5.2 *APDUs used*

The DTAM capability procedure uses the D-CAPABILITY-REQ (DCPQ) and the D-CAPABILITY RESP (DCPR) APDUS

##### 6.5.2.1 *DCPQ APDU*

The fields of the DCPQ APDU are listed in Table 8/T.433.

TABLE 8/T.433  
DCPQ APDU fields

Field name	Presence	Source	Sink
Application capabilities			
Document application profile	U	request	indication
Document architecture class	U	request	indication
Non basic structural characteristics	U	request	indication
Non basic document characteristics	U	request	indication
Operational application profile	U	request	indication
Storage capacity	U	request	indication
User information	U	request	indication

#### 6.5.2.2 DCPR APDU

The fields of the DCPR APDU are listed in Table 9/T.433.

TABLE 9/T.433  
DCPR APDU fields

Field name	Presence	Source	Sink
Application capabilities			
Document application profile	U	response	confirmation
Document architecture class	U	response	confirmation
Non basic structural characteristics	U	response	confirmation
Non basic document characteristics	U	response	confirmation
Operational application profile	U	response	confirmation
Storage capacity	U	response	confirmation
Capability result	U	response	confirmation
User information	U	response	confirmation

### 6.5.3 DTAM capability procedure

#### 6.5.3.1 DTAM Capability Procedure mapped onto Presentation Service (Normal Mode)

This procedure is driven by the following events:

- a) a D-CAPABILITY request primitive from the requestor;
- b) a DCPQ APDU as User Data on a P-CAPAB-DATA indication primitive;
- c) a D-CAPABILITY response primitive from the responder; and
- d) a P-CAPAB-DATA confirm primitive (that may contain a DCPR APDU).

##### 6.5.3.1.1 D-CAPABILITY request primitive

6.5.3.1.1.1 The requesting DTAM-PM forms a DCPQ APDU from parameter values of the D-CAPABILITY request primitive. It issues a P-CAPAB-DATA request primitive. The User Data parameter of the P-CAPAB-DATA request primitive contains the DCPQ APDU.

6.5.3.1.1.2 The requesting DTAM-PM waits for a primitive from the Presentation service-provider, and does not accept any other primitive from the requestor other than a D-U-ABORT request primitive.

##### 6.5.3.1.2 DCPQ APDU

6.5.3.1.2.1 The responding DTAM-PM receives a DCPQ APDU from its peer as User Data on a P-CAPAB-DATA indication primitive.

6.5.3.1.2.2 In order that the DCPQ APDU may always be acceptable to the responding DTAM-PM, it issues a D-CAPABILITY indication primitive to the responder. The D-CAPABILITY indication primitive parameters are derived from the DCPQ APDU. The DTAM-PM waits for a D-CAPABILITY response primitive from the responder and does not accept any other primitives from the responder except for the D-U-ABORT request primitive.

##### 6.5.3.1.3 D-CAPABILITY response primitive

6.5.3.1.3.1 When the DTAM-PM receives the D-CAPABILITY response primitive, the Result parameter specifies whether the responder has accepted or rejected the DTAM capability requested. The DTAM-PM forms a DCPR APDU using the D-CAPABILITY response primitive parameters. The DCPR APDU is sent as the User Data parameter on the P-CAPAB-DATA response primitive.

6.5.3.1.3.2 If the responder accepted the DTAM capability request, the Capability Result field of the outgoing DCPR APDU also specifies the appropriate acceptance value. The DTAM capability is negotiated.

6.5.3.1.3.3 If the responder rejected the DTAM capability request, the Result field of the outgoing DCPR APDU contains the appropriate rejection value. The DTAM capability is not established.

##### 6.5.3.1.4 P-CAPAB-DATA confirm primitive

6.5.3.1.4.1 The requesting DTAM-PM receives a P-CAPAB-DATA confirm primitive. The following situations are possible:

- a) the DTAM capability has been accepted; or
- b) the responder has rejected the DTAM capability requested by the requestor.

6.5.3.1.4.2 If the DTAM capability was accepted, the Capability Result field of the DCPR APDU specifies the appropriate acceptance value. The requesting DTAM-PM issues a D-CAPABILITY confirm primitive to the requestor based on parameters from the DCPR APDU. The D-CAPABILITY confirm primitive Capability Result Parameter specifies the appropriate acceptance value. The DTAM capability is negotiated.

6.5.3.1.4.3 If the DTAM capability was rejected by the responder, the Capability Result field of the DCPR APDU on the P-CAPAB-DATA confirm primitive indicates the reason for rejection. The requesting DTAM-PM issues a D-CAPABILITY confirm primitive to the requestor based on parameters from the DCPR APDU. The D-CAPABILITY confirm primitive Capability Result parameter contains the appropriate rejection value. The DTAM capability is not established.

#### 6.5.3.2 DTAM capability procedure mapped onto session service (transparent mode)

This procedure is driven by the following events:

- a) a D-CAPABILITY request primitive from the requestor;

- b) a DCPQ APDU as User Data on an S-CAPAB-DATA indication primitive;
- c) a D-CAPABILITY response primitive from the responder; and
- d) an S-CAPAB-DATA confirm primitive (that may contain a DCPR APDU).

#### 6.5.3.2.1 *D-CAPABILITY request primitive*

6.5.3.2.1.1 The requesting DTAM-PM forms a DCPQ APDU from parameter values of the D-CAPABILITY request primitive, and issues an S-CAPAB DATA request primitive. The User Data parameter of the S-CAPAB DATA request primitive contains the DCPQ APDU.

6.5.3.2.1.2 The requesting DTAM-PM waits for a primitive from the Session service-provider, and does not accept any other primitive from the requestor other than a D-U-ABORT request primitive.

#### 6.5.3.2.2 *DCPQ APDU*

6.5.3.2.2.1 The responding DTAM-PM receives a DCPQ APDU from its peer as User Data on an S-CAPAB DATA indication primitive.

6.5.3.2.2.2 In order that the S-CAPAB DATA indication primitive and its DCPQ APDU may always be acceptable to the responding DTAM-PM, it issues a D-CAPABILITY indication primitive to the responder. The D-CAPABILITY indication primitive parameters are derived from the DCPQ APDU. The DTAM-PM waits for a D-CAPABILITY response primitive from the responder and does not accept any other primitives from the responder except for the D-ABORT request primitive.

#### 6.5.3.2.3 *D-CAPABILITY response primitive*

6.5.3.2.3.1 When the DTAM-PM receives the D-CAPABILITY response primitive, the parameters specified in its response primitive contain the Application Capabilities available at the responder. There is no way to issue the result of the capability negotiation explicitly. The DTAM-PM forms a DCPR APDU using the D-CAPABILITY response primitive parameters, and the DCPR APDU is sent as the User Data parameter on the S-CAPAB DATA response primitive.

6.5.3.2.3.2 In this way, the DTAM capability is negotiated by exchanging the Application Capabilities parameters available at the responder.

#### 6.5.3.2.4 *S-CAPAB DATA confirm primitive*

6.5.3.2.4.1 The requesting DTAM-PM receives an S-CAPAB DATA confirm primitive. The DTAM capability is always negotiated by exchanging the Application Capabilities parameters.

6.5.3.2.4.2 If the DTAM capability was accepted, the requesting DTAM-PM issues a D-CAPABILITY confirm primitive to the requestor based on parameters from the DCPR APDU. The final decision of DTAM capability used in the transmission of a document will be made by the requesting DTAM-PM.

### 6.5.4 *Use of the DCPQ/DCPR APDU fields*

The DCPQ APDU and DCPR APDU fields are used as follows.

#### 6.5.4.1 *Application capabilities*

This is the Application Capabilities parameter value from the D-CAPABILITY request/response primitives. It appears as the Application Capabilities parameter value of the D-CAPABILITY indication/confirm primitives respectively. This parameter consists of the following sub-parameters.

##### 6.5.4.1.1 *Document application profile*

The value of this parameter is either an Octet String or ASN.1 object identifiers. The Octet String designates the document application profile in line with the Recommendation T.73 (Document Application Profile - T.73). the ASN.1 object identifier must conform to the rules specified in ISO 8824 and designate an application profile defined in accordance with the rules specified in Recommendation T.411 (Document Application Profiles).

##### 6.5.4.1.2 *Document architecture class*

The value of this parameter is "formatted".

##### 6.5.4.1.3 *Non basic document characteristics*

The value of this parameter is any combination of Non Basic Document Characteristics defined in Recommendation T.414.



#### 6.5.4.1.4 *Non basic structural characteristics*

The value of this parameter is any combination of Non Basic Structural Characteristics defined in Recommendation T.414.

#### 6.5.4.1.5 *Operational application profile*

The detailed specification of Operational Application Profile is for further study.

#### 6.5.4.1.6 *Storage capacity*

See § 6.2.4.8.

#### 6.5.4.2 *Capability result*

If the DCPQ APDU was rejected by the responder, this field is supplied by the responder and is the Capability Result parameter from the D-CAPABILITY response primitive. In this situation, it appears as the Capability Result parameter on the D-CAPABILITY confirm primitive. This field can take one of the following:

- confirmation that all the requested capabilities are available at the DTAM responder;
- a list of the requested capabilities that are available at the DTAM responder;
- a complete list of non-basic receiving capabilities;
- an indication that no extended capabilities are available in the DTAM responder, or that none of the capabilities requested by the requestor are available.

#### 6.5.4.3 *User information*

This is the User Information parameter from the D-CAPABILITY request and response primitive. It appears as the User Information parameter of the D-CAPABILITY indication and confirm primitive, if issued.

### 6.6 *Document bulk transfer*

#### 6.6.1 *Purpose*

6.6.1.1 The document bulk transfer is used to convey the document which contains ODA and Operational Structure to the remote DTAM user. The requestor who requests the remote Document bulk transfer should have a data taken in an appropriate manner. It supports the D-TRANSFER services.

6.6.1.2 In this situation, either the Reliable Transfer Mode 1 or Mode 2 may be selected by the negotiation of functional units in the association establishment phase.

6.6.1.3 If the reliable transfer functional unit is not selected, the RTSE service will be used. The use of RTSE is for further study.

6.6.1.4 The Document Bulk Transfer is composed of two different sets of procedures depending on the Reliable Transfer Mode.

##### 1) *Reliable transfer mode 1*

- a) Transfer Procedure for transmission of a complete document;
- b) Transfer-user-resume Procedure for retransmission of a partial document for resuming purposes. This procedure is controlled by the DTAM user;
- c) Transfer-interrupt Procedure to interrupt the transmission of a document in case of error;
- d) Transfer-discard Procedure to interrupt the transmission of a document in case of error and indicate that the part of the document already transmitted has to be deleted.

In Reliable Transfer Mode 1, the Transfer-interrupt and the Transfer-discard Procedures result in a D-TRANSFER indication/confirmation to the DTAM user to indicate the failure of the transfer. The user is then responsible for initiating a new transfer (complete or partial document).

Figures A-1/T.433 and A-2/T.433 illustrate the basic protocol sequences for the Reliable Transfer Mode 1.

2) *Reliable transfer mode 2*

- a) Transfer Procedure (see above, Reliable Transfer, Mode 1);
- b) Transfer-resume Procedure for retransmission of a partial document. This procedure is completely controlled by the DTAM-PM;
- c) Transfer-interrupt Procedure (see above Reliable Transfer, Mode 1);
- d) Transfer-discard Procedure (see above Reliable Transfer, Mode 1);
- e) Association-recovery Procedure (for further study).

In Reliable Transfer Mode 2, following the Transfer-interrupt and Transfer-discard Procedures, the DTAM-PM initiates a new Transfer Procedure or a Transfer-resume Procedure. Attempts to transfer or retransfer the document may not be performed by the DTAM-PM after the transfer time is out. The transfer time-out may result to discard the document and to abort the procedure.

Figures A-3/T.433 and A-4/T.433 illustrate the basic protocol sequences for the Reliable Transfer Mode 2.

In the Transparent Mode under Session Service environment, only Reliable Transfer Mode 1 is used.

In the Normal Mode under the OSI environment, both Reliable Transfer Modes 1 and 2 are available.

#### 6.6.2 *APDUs used*

6.6.2.1 No APDUs are used in this procedure. The Document Information corresponds to a D-TRANSFER request service primitive. There is no D-TRANSFER REQ APDU as such.

6.6.2.2 Each Document Information, conveyed in a D-TRANSFER request, constitutes an Activity. For each application association, at most one Activity or one interrupted Activity awaiting resumption may exist at any one time.

6.6.2.3 The Document Information, which consists of one or more interchange-data-elements as defined in § 9.6.1.1 of Recommendation T.432, is segmented and reassembled into/from one or more segments. Each segment consists of one or more groups of interchange-data-elements and is transferred by the Presentation/Session data transfer services.

6.6.2.4 A Document Information is transferred as a single User Data of the Presentation/Session data transfer services if checkpointing is not used within the Document Information, otherwise, the Document Information is transferred as a series of Presentation/Session data transfer services primitives. The concatenation of the user-data values of Presentation/Session data transfer services is Document Information. An example of document segmenting mechanism is given in Figure 2/T.433.

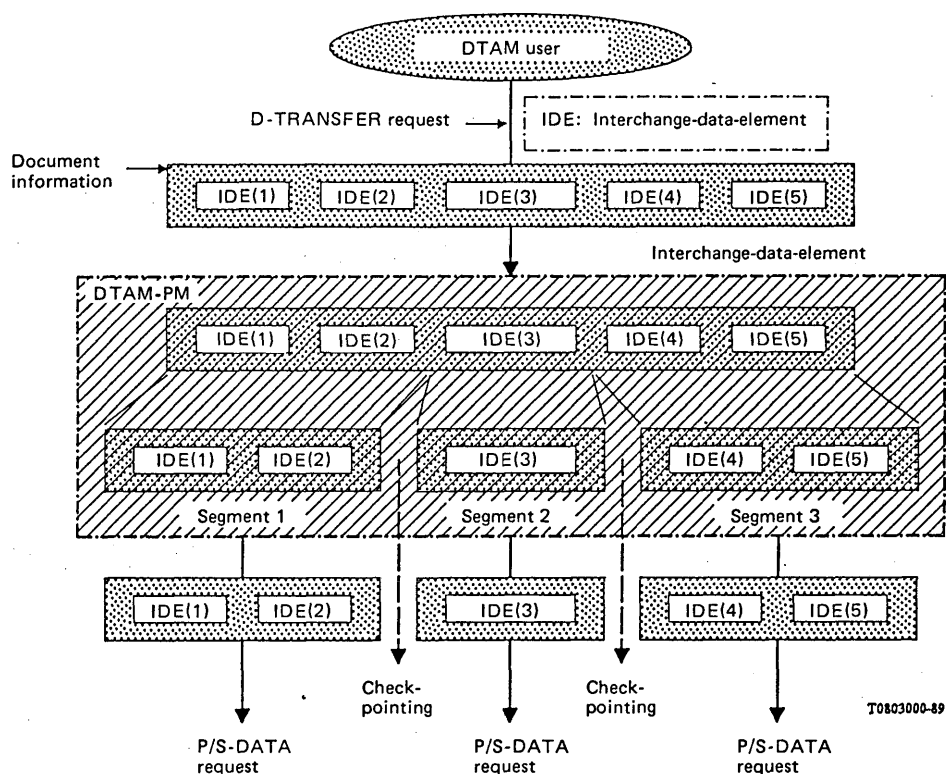


FIGURE 2/T.433

### An example of document segmenting mechanism

#### 6.6.3 Transfer procedure

This procedure is used to transfer a complete document.

##### 6.6.3.1 Transfer procedure mapped onto presentation service (normal mode)

This procedure is driven by the following events:

- a D-TRANSFER request primitive from the requestor (sender of document);
- a P-ACTIVITY-START indication primitive, followed by one or more interchange-data-elements as user-data of P-DATA indication primitives each, except the last, followed by a P-MINOR-SYNCHRONIZE indication primitive;
- a P-MINOR-SYNCHRONIZE confirm primitive;
- a P-ACTIVITY-END indication primitive;
- a P-ACTIVITY-END confirm primitive;
- a Transfer Time-out.

*Note* - In the case of multiple documents transmission within one association, the above procedure will be applied repeatedly.

##### 6.6.3.1.1 D-TRANSFER request primitive

6.6.3.1.1.1 If the requesting DTAM-PM possesses the Data Token and receives a D-TRANSFER request from the requestor, Document Information in the D-TRANSFER request primitive, which has an abstract form, is segmented by the group (segment) of interchange-data-elements. The segmenting unit (e.g. page, block) depends upon the characteristics of the DTAM-PM. The segmented abstract form is then transformed into the User Data in P-DATA.

6.6.3.1.1.2 The parameter "Document Information Type" contained in the D-TRANSFER request should indicate "transfer of a document from its beginning", and the requesting DTAM-PM issues a P-ACTIVITY-START request primitive and may start transmitting the first segment of interchange-data-elements in a P-DATA request primitive immediately after the P-ACTIVITY-START request primitive is issued, since the P-ACTIVITY-START service is not a confirmed service.

6.6.3.1.1.3 If the segment of interchange-data-elements transferred is not the last in a series of those segments, the requesting DTAM-PM inserts a checkpoint by issuing a P-MINOR-SYNCHRONIZE request primitive. The requesting DTAM-PM uses only the "explicit confirmation expected" type of minor synchronization. The requesting DTAM-PM may issue further P-DATA request primitives and P-MINOR-SYNCHRONIZE request primitives unless the agreed Window-size has been reached.

6.6.3.1.1.4 P-Minor-Synchronization Points shall be located at the end of each segment of interchange-data-elements. Additional Minor Synchronization Point can be requested depending on the evaluation of the storage capacity of the sink and the amount of data to be transmitted. This additional Minor Synchronization Point shall only be located at the end of any interchange-data-elements and not within the element.

6.6.3.1.1.5 If the segment of interchange-data-elements is the only one, or the last in a series of segments of interchange-data-elements, the requesting DTAM-PM issues a P-ACTIVITY-END request primitive. All data transfer must take place within an activity.

6.6.3.1.2 *P-ACTIVITY-START indication primitive, P-DATA PDUs, and P-MINOR-SYNCHRONIZE indication primitives*

6.6.3.1.2.1 The responding DTAM-PM receives a P-ACTIVITY-START indication primitive, indicating the start of transfer of Document Information. The responding DTAM-PM receives a P-MINOR-SYNCHRONIZE indication primitive. If the responding DTAM-PM has secured the segment of interchange-data-elements, it issues a P-MINOR-SYNCHRONIZE response primitive.

6.6.3.1.3 *P-MINOR-SYNCHRONIZE confirm primitive*

6.6.3.1.3.1 When the requesting DTAM-PM receives a P-MINOR-SYNCHRONIZE confirm primitive, it assumes that the responding DTAM-PM has secured the segments of interchange-data-elements up to that point.

6.6.3.1.3.2 The requesting DTAM-PM may issue further P-DATA request primitives and P-MINOR-SYNCHRONIZE request primitives unless the agreed Window-size has been reached. The window is advanced when a P-MINOR-SYNCHRONIZE confirm primitive is received by the requesting DTAM-PM.

6.6.3.1.3.3 When a complete Document Information has been transmitted, the requesting DTAM-PM issues a P-ACTIVITY-END request primitive.

6.6.3.1.4 *P-ACTIVITY-END indication primitive*

6.6.3.1.4.1 A P-ACTIVITY-END Indication primitive indicates to the responding DTAM-PM that a complete Document Information has been transferred.

6.6.3.1.4.2 If the responding DTAM-PM has secured the complete Document Information, it issues a D-TRANSFER indication primitive to the responder, and issues a P-ACTIVITY-END response primitive.

6.6.3.1.4.3 The responding DTAM-PM records the Session-connection-identifier and the Activity Identifier of the last Document Information which it completely secured for association-recovery purposes.

6.6.3.1.5 *P-ACTIVITY-END confirm primitive*

6.6.3.1.5.1 An activity end is an implicit major synchronization point and once successfully confirmed by means of a P-ACTIVITY-END confirm primitive, it indicates to the requesting DTAM-PM that the Document Information has been secured by the responding DTAM-PM. The requesting DTAM-PM may then delete the transferred Document Information.

6.6.3.1.5.2 When the requesting DTAM-PM receives the P-ACTIVITY-END confirm primitive, it issues a D-TRANSFER confirm primitive with a Result parameter value of "document-information-transferred" to the requestor.

#### 6.6.3.1.6 *Transfer time-out (only for reliable transfer mode 2)*

6.6.3.1.6.1 If a Document Information has not been transferred within the time specified in the Transfer-time parameter of the D-TRANSFER request primitive (that is, the requesting DTAM-PM has not received the P-ACTIVITY-END confirm primitive), the requesting DTAM-PM performs the transfer-discard procedure (see § 6.6.6) followed by the transfer-abort procedure (see § 6.4.3.1.4).

6.6.3.1.6.2 If during the transfer-discard procedure the requesting DTAM-PM does not receive a P-ACTIVITY-DISCARD confirm primitive within a (locally specified) reasonable time, the requesting DTAM-PM performs the transfer-abort procedure followed by the DTAM provider-abort procedure.

#### 6.6.3.2 *Transfer procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-TRANSFER request primitive from the requestor (sender of document);
- b) an S-ACTIVITY-START indication primitive, followed by one or more interchange-data-elements as user-data of S-DATA indication primitives each, except the last, followed by an S-MINOR-SYNCHRONIZE indication primitive;
- c) an S-MINOR-SYNCHRONIZE confirm primitive;
- d) an S-ACTIVITY-END indication primitive;
- e) an S-ACTIVITY-END confirm primitive;

*Note* - In the case of multiple document transmission within one association, the above procedure will be applied repeatedly.

##### 6.6.3.2.1 *D-TRANSFER request primitive*

6.6.3.2.1.1 If the requesting DTAM-PM possesses the Data Token and receives a D-TRANSFER request from the requestor, Document Information in the D-TRANSFER request primitive which has an abstract form is segmented by the group (segment) of interchange-data-elements. The segmenting unit (e.g. page, block) depends upon the characteristics of the DTAM-PM. The segmented abstract form is then transformed into the User Data in S-DATA.

6.6.3.2.1.2 The parameter "Document Information Type" contained in the D-TRANSFER request should indicate the "transfer of a document from its beginning", and the requesting DTAM-PM issues an S-ACTIVITY-START request primitive and may start transmitting the first segment of interchange-data-elements in an S-DATA request primitive immediately after the S-ACTIVITY-START request primitive is issued, since the S-ACTIVITY-START service is not a confirmed service. All data transfer should take place within an activity.

6.6.3.2.1.3 If the segment of interchange-data-elements transferred is not the last in a series of those segments, the requesting DTAM-PM inserts a checkpoint by issuing an S-MINOR-SYNCHRONIZE request primitive. The requesting DTAM-PM uses only the "explicit confirmation expected" type of minor synchronization. The requesting DTAM-PM may issue further S-DATA request primitives and S-MINOR-SYNCHRONIZE request primitives unless the agreed Window-size has been reached.

6.6.3.2.1.4 S-Minor-Synchronization Points shall be located at the end of each segment of interchange-data-elements. Additional Minor Synchronization Points can be requested depending on the evaluation of the storage capacity of the sink and the amount of data to be transmitted. This additional Minor Synchronization Points shall only be located at the end of any interchange-data-elements and not within the element.

6.6.3.2.1.5 If the segment of interchange-data-elements is the only one, or the last in a series of segments of interchange-data-elements, the requesting DTAM-PM issues an S-ACTIVITY-END request primitive. All data transfer must take place within an activity.

##### 6.6.3.2.2 *S-ACTIVITY-START indication primitive, S-DATA PDUs, and S-MINOR-SYNCHRONIZE indication primitives*

6.6.3.2.2.1 The responding DTAM-PM receives an S-ACTIVITY-START indication primitive, indicating the start of transfer of Document Information. The responding DTAM-PM receives an S-MINOR-SYNCHRONIZE indication primitive. If the responding DTAM-PM has secured the segment of interchange-data-elements, it issues an S-MINOR-SYNCHRONIZE response primitive.

#### 6.6.3.2.3 *S-MINOR-SYNCHRONIZE confirm primitive*

6.6.3.2.3.1 When the requesting DTAM-PM receives an S-MINOR-SYNCHRONIZE confirm primitive, it assumes that the responding DTAM-PM has secured the segments of interchange-data-elements up to that point.

6.6.3.2.3.2 The requesting DTAM-PM may issue further S-DATA request primitives and S-MINOR-SYNCHRONIZE request primitives unless the agreed Window-size has been reached. The window is advanced when an S-MINOR-SYNCHRONIZE confirm primitive is received by the requesting DTAM-PM.

6.6.3.2.3.3 When a complete Document Information has been transmitted, the requesting DTAM-PM issues an S-ACTIVITY-END request primitive.

#### 6.6.3.2.4 *S-ACTIVITY-END indication primitive*

6.6.3.2.4.1 An S-ACTIVITY-END Indication primitive indicates to the responding DTAM-PM that a complete Document Information has been transferred.

6.6.3.2.4.2 If the responding DTAM-PM has secured the complete Document Information, it issues a D-TRANSFER indication primitive to the responder, and issues an S-ACTIVITY-END response primitive.

#### 6.6.3.2.5 *S-ACTIVITY-END confirm primitive*

6.6.3.2.5.1 An activity end is an implicit major synchronization point and once successfully confirmed by means of an S-ACTIVITY-END confirm primitive, it indicates to the requesting DTAM-PM that the Document Information has been secured by the responding DTAM-PM. The requesting DTAM-PM may then delete the transferred Document Information.

6.6.3.2.5.2 When the requesting DTAM-PM receives the S-ACTIVITY-END confirm primitive, it issues a D-TRANSFER confirm primitive with a Result parameter value of "document-information-transferred" to the requestor.

#### 6.6.4 *Transfer-user-resume procedure*

This procedure is used to resume transferring the part of the document which has not been transferred at the previous transmission.

##### 6.6.4.1 *Transfer-user-resume procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a D-TRANSFER request primitive from the requestor (sender of document);
- b) a P-ACTIVITY-RESUME indication primitive, followed by one or more interchange-data-elements as user-data of P-DATA indication primitives each, except the last, followed by a P-MINOR-SYNCHRONIZE indication primitive;
- c) a P-MINOR-SYNCHRONIZE confirm primitive;
- d) a P-ACTIVITY-END indication primitive;
- e) a P-ACTIVITY-END confirm primitive.

##### 6.6.4.1.1 *D-TRANSFER request primitive*

6.6.4.1.1.1 If the requesting DTAM-PM possesses the Data Token and receives a D-TRANSFER request from the requestor, Document Information in the D-TRANSFER request primitive, which has an abstract form, is segmented by the group (segment) of interchange-data-elements. The segmenting unit (e.g. page, block) depends upon the characteristics of the DTAM-PM. The segmented abstract form is then transformed into the User Data in P-DATA.

6.6.4.1.1.2 The parameter "Document Information Type" contained in the D-TRANSFER request should indicate "transfer of a document from a synchronization point", and the requesting DTAM-PM issues a P-ACTIVITY-RESUME request primitive and may continue the transfer procedure by issuing a P-DATA request primitive for the segment of interchange-data-elements following the last confirmed checkpoint. The checkpoint information is from the parameter "Synchronization Point" in the D-TRANSFER request primitive.

6.6.4.1.1.3 Another detailed procedure is followed by the §§ 6.6.3.1.1.3, 6.6.3.1.1.4 and 6.6.3.1.1.5.

6.6.4.1.2 *P-ACTIVITY-RESUME indication primitive, P-DATA PDUs, and P-MINOR-SYNCHRONIZE indication primitives*

6.6.4.1.2.1 The responding DTAM-PM receives a P-ACTIVITY-RESUME indication primitive, indicating the start of transfer of Document Information. The responding DTAM-PM receives a P-MINOR-SYNCHRONIZE indication primitive. If the responding DTAM-PM has secured the segment of interchange-data-elements, it issues a P-MINOR-SYNCHRONIZE response primitive.

6.6.4.1.3 *P-MINOR-SYNCHRONIZE confirm primitive*

6.6.4.1.3.1 The detailed procedure is followed by the §§ 6.6.3.1.3.1, 6.6.3.1.3.2 and 6.6.3.1.3.3.

6.6.4.1.4 *P-ACTIVITY-END indication primitive*

6.6.4.1.4.1 The detailed procedure is followed by the §§ 6.6.3.1.4.1, 6.6.3.1.4.2 and 6.6.3.1.4.3.

6.6.4.1.5 *P-ACTIVITY-END confirm primitive*

6.6.4.1.5.1 The detailed procedure is followed by the §§ 6.6.3.1.5.1 and 6.6.3.1.5.2.

6.6.4.2 *Transfer-user-resume procedure mapped session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-TRANSFER request primitive from the requestor (sender of document);
- b) an S-ACTIVITY-RESUME indication primitive, followed by one or more interchange-data-elements as user-data of S-DATA indication primitives each, except the last, followed by an S-MINOR-SYNCHRONIZE indication primitive;
- c) an S-MINOR-SYNCHRONIZE confirm primitive;
- d) an S-ACTIVITY-END indication primitive;
- e) an S-ACTIVITY-END confirm primitive.

6.6.4.2.1 *D-TRANSFER request primitive*

6.6.4.2.1.1 If the requesting DTAM-PM possesses the Data Token and receives a D-TRANSFER request from the requestor, Document Information in the D-TRANSFER request primitive, which has an abstract form, is segmented by the group (segment) of interchange-data-elements. The segmenting unit (e.g. page, block) depends upon the characteristics of the DTAM-PM. The segmented abstract form is then transformed into the User Data in P-DATA.

6.6.4.2.1.2 The parameter "Document Information Type" contained in the D-TRANSFER request should indicate the "transfer of a document from a synchronization point", and the requesting DTAM-PM issues an S-ACTIVITY-RESUME request primitive and may continue the transfer procedure by issuing a S-DATA request primitive for the segment of interchange-data-elements following the last confirmed checkpoint. The checkpoint information is from the parameter "Synchronization Point" in the D-TRANSFER request primitive.

6.6.4.2.1.3 Another detailed procedure is followed by the §§ 6.6.3.2.1.3, 6.6.3.2.1.4 and 6.6.3.2.1.5.

6.6.4.2.2 *S-ACTIVITY-RESUME indication primitive, S-DATA PDUs, and S-MINOR-SYNCHRONIZE indication primitives*

6.6.4.2.2.1 The responding DTAM-PM receives an S-ACTIVITY-RESUME indication primitive, indicating the start of transfer of Document Information. The responding DTAM-PM receives an S-MINOR-SYNCHRONIZE indication primitive. If the responding DTAM-PM has secured the segment of interchange-data-elements, it issues an S-MINOR-SYNCHRONIZE response primitive.

6.6.4.2.3 *S-MINOR-SYNCHRONIZE confirm primitive*

6.6.4.2.3.1 The detailed procedure is followed by the §§ 6.6.3.2.3.1, 6.6.3.2.3.2 and 6.6.3.2.3.3.

6.6.4.2.4 *S-ACTIVITY-END indication primitive*

6.6.4.2.4.1 The detailed procedure is followed by the §§ 6.6.3.2.4.1 and 6.6.3.2.4.2.

6.6.4.2.5 *S-ACTIVITY-END confirm primitive*

6.6.4.2.5.1 The detailed procedure is followed by the §§ 6.6.3.2.5.1 and 6.6.3.2.5.2.

## 6.6.5 *Transfer-interrupt*

### 6.6.5.1 *Purpose*

The transfer-interrupt procedure is used by the requesting DTAM-PM to handle a less severe (than those handled by the other error handling procedures) error situation during the transfer procedure, if at least one checkpoint was confirmed during the transfer procedure.

### 6.6.5.2 *APDUs used*

No APDUs are used in this procedure.

### 6.6.5.3 *Transfer-interrupt procedure*

#### 6.6.5.3.1 *Transfer-interrupt procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a requesting DTAM-PM problem;
- b) a P-ACTIVITY-INTERRUPT indication primitive;
- c) a P-ACTIVITY-INTERRUPT confirm primitive.

##### 6.6.5.3.1.1 *Requesting DTAM-PM problem*

6.6.5.3.1.1.1 If the requesting DTAM-PM detects a less severe problem and at least one checkpoint was confirmed during the transfer procedure, it issues a P-ACTIVITY-INTERRUPT request primitive with one of the following Reason parameter values:

- a) "non-specific error", if the problem was indicated by an exception reporting procedure,
- b) "local SS-User error", if the problem is a local requesting DTAM-PM problem.

##### 6.6.5.3.1.2 *P-ACTIVITY-INTERRUPT indication primitive*

6.6.5.3.1.2.1 If the responding DTAM-PM receives a P-ACTIVITY-INTERRUPT indication primitive, it issues:

- a P-ACTIVITY-INTERRUPT response primitive followed by a D-TRANSFER indication in Reliable transfer mode 1;
- a P-ACTIVITY-INTERRUPT response primitive in Reliable transfer mode 2.

##### 6.6.5.3.1.3 *P-ACTIVITY-INTERRUPT confirm primitive*

6.6.5.3.1.3.1 If the requesting DTAM-PM receives a P-ACTIVITY-INTERRUPT confirm primitive, it issues:

- D-TRANSFER confirmation to the requesting DTAM user in Reliable transfer mode 1;
- the transfer-resumption procedure in Reliable transfer mode 2.

#### 6.6.5.3.2 *Transfer-interrupt procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a requesting DTAM-PM problem;
- b) a S-ACTIVITY-INTERRUPT indication primitive;
- c) a S-ACTIVITY-INTERRUPT confirm primitive.

##### 6.6.5.3.2.1 *Requesting DTAM-PM problem*

6.6.5.3.2.1.1 If the requesting DTAM-PM detects a less severe problem and at least one checkpoint was confirmed during the transfer procedure, it issues a S-ACTIVITY-INTERRUPT request primitive with one of the following Reason parameter values:

- a) "non-specific error", if the problem was indicated by an exception reporting procedure;
- b) "local SS-User error", if the problem is a local requesting DTAM-PM problem.



#### 6.6.5.3.2.2 *S-ACTIVITY-INTERRUPT indication primitive*

6.6.5.3.2.2.1 If the responding DTAM-PM receives an S-ACTIVITY-INTERRUPT confirm primitive, it issues an S-ACTIVITY-INTERRUPT response primitive followed by D-TRANSFER indication.

#### 6.6.5.3.2.3 *S-ACTIVITY-INTERRUPT confirm primitive*

6.6.5.3.2.3.1 If the requesting DTAM-PM receives an S-ACTIVITY-INTERRUPT confirm primitive, it issues D-TRANSFER confirmation to the requesting DTAM user.

### 6.6.6 *Transfer-discard*

#### 6.6.6.1 *Purpose*

The transfer-discard procedure is used by the requesting DTAM-PM to escape from a more severe (than those handled by the transfer-interrupt procedure) error situation, or a less severe error situation if no checkpoint was confirmed, during the transfer procedure.

#### 6.6.6.2 *APDUs used*

No APDUs are used in this procedure.

#### 6.6.6.3 *Transfer-discard procedure*

##### 6.6.6.3.1 *Transfer-discard procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a requesting DTAM-PM problem;
- b) a P-ACTIVITY-DISCARD indication primitive;
- c) a P-ACTIVITY-DISCARD confirm primitive.

##### 6.6.6.3.1.1 *Requesting DTAM-PM problem*

6.6.6.3.1.1.1 If the requesting DTAM-PM detects a more severe problem, or a less severe problem if no checkpoint was confirmed during the transfer procedure, it issues a P-ACTIVITY-DISCARD request primitive with one of the following reason parameter values:

- a) "non-specific error", if the problem was indicated by an error reporting procedure;
- b) "local SS-User error", or "unrecoverable procedural error", if the problem is a local requesting DTAM-PM problem.

##### 6.6.6.3.1.2 *P-ACTIVITY-DISCARD indication primitive*

6.6.6.3.1.2.1 If the responding DTAM-PM receives a P-ACTIVITY-DISCARD indication primitive, it issues:

- a P-ACTIVITY-DISCARD response primitive followed by D-TRANSFER indication in reliable transfer mode 1;
- a P-ACTIVITY-DISCARD response primitive in reliable transfer mode 2.

6.6.6.3.1.2.2 The responding DTAM-PM deletes all knowledge and contents of the associated DTAM user information (segments of document information) so far received.

6.6.6.3.1.2.3 If the responding DTAM-PM has already issued a D-TRANSFER indication primitive, it performs the association-abort procedure. The abort-reason field of the DAB APDU is "transfer-completed".

##### 6.6.6.3.1.3 *P-ACTIVITY-DISCARD confirm primitive*

6.6.6.3.1.3.1 If the requesting DTAM-PM receives a P-ACTIVITY-DISCARD confirm primitive, it issues:

- D-TRANSFER confirmation to the requesting DTAM user in reliable transfer mode 1;
- the transfer-retry procedure in reliable transfer mode 2.

#### 6.6.6.3.2 *Transfer-discard procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a requesting DTAM-PM problem;
- b) an S-ACTIVITY-DISCARD indication primitive;
- c) an S-ACTIVITY-DISCARD confirm primitive.

##### 6.6.6.3.2.1 *Requesting DTAM-PM problem*

6.6.6.3.2.1.1 If the requesting DTAM-PM detects a more severe problem, or a less severe problem if no checkpoint was confirmed during the transfer procedure, it issues an S-ACTIVITY-DISCARD request primitive with one of following reason parameter values:

- a) "non-specific error", if the problem was indicated by an error reporting procedure;
- b) "local SS-User error", or "unrecoverable procedural error", if the problem is a local requesting DTAM-PM problem.

##### 6.6.6.3.2.2 *S-ACTIVITY-DISCARD indication primitive*

6.6.6.3.2.2.1 If the responding DTAM-PM receives an S-ACTIVITY-DISCARD indication primitive, it issues an S-ACTIVITY-DISCARD response primitive followed by D-TRANSFER indication in reliable transfer mode 1.

6.6.6.3.2.2.2 The responding DTAM-PM deletes all knowledge and contents of the associated DTAM user information (segments of document information) so far received.

6.6.6.3.2.2.3 If the responding DTAM-PM has already issued a D-TRANSFER indication primitive, it performs the session-abort procedure by issuing an S-U-ABORT request.

##### 6.6.6.3.2.3 *S-ACTIVITY-DISCARD confirm primitive*

If the requesting DTAM-PM receives an S-ACTIVITY-DISCARD confirm primitive, it issues D-TRANSFER confirmation to the requesting DTAM user in reliable transfer mode 1.

#### 6.6.7 *Transfer-resumption*

##### 6.6.7.1 *Purpose*

The transfer-resumption procedure is used in the reliable transfer mode 2 by the requesting DTAM-PM to recover from:

- a) an error situation handled by the transfer-interrupt procedure, or
- b) an error situation handled by the association-abort procedure during a transfer procedure. In this case the transfer-resumption procedure is performed after an association-recovery procedure is successfully performed. If no checkpoint was confirmed in the interrupted transfer procedure, the transfer-discard procedure followed by the transfer-retry procedure are performed.

##### 6.6.7.2 *APDUs used*

No APDUs are used in this procedure.

##### 6.6.7.3 *Transfer-resumption procedure*

###### 6.6.7.3.1 *Transfer-resumption procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) the resumption of an interrupted activity;
- b) a P-ACTIVITY-RESUME indication primitive.

After these events, the transfer procedure is used to continue (see § 6.6.3).

###### 6.6.7.3.1.1 *Resumption of an interrupted activity*

6.6.7.3.1.1.1 The requesting DTAM-PM issues a P-ACTIVITY-RESUME request primitive with parameters that link the resumed activity to the previously interrupted one.

6.6.7.3.1.1.2 After the requesting DTAM-PM has issued the P-ACTIVITY-RESUME request primitive and at least one checkpoint was confirmed in the interrupted transfer procedure, it continues the transfer procedure by issuing a P-DATA request primitive for the segment of interchange-data-elements following the last confirmed checkpoint. If no checkpoint was confirmed in the interrupted transfer procedure, the transfer-discard procedure followed by the transfer-retry procedure are performed.

#### 6.6.7.3.1.2 *P-ACTIVITY-RESUME indication primitive*

6.6.7.3.1.2.1 If the responding DTAM-PM receives a P-ACTIVITY-RESUME indication primitive, it checks the old activity identifier and the old session connection identifier parameters of the P-ACTIVITY-RESUME indication primitive with the corresponding information (session-connection-identifier and activity identifier) recorded for the last completely secured transfer (see § 6.6.3.1.4.3).

6.6.7.3.1.2.2 If the information coincides with the recorded ones, the responding DTAM-PM either (a) responds correctly to the requesting DTAM-PM according to the normal transfer procedure, but discards the data it receives, and does not issue a D-TRANSFER indication primitive, or (b) performs the user-exception-report procedure with a Reason parameter value of "sequence error".

6.6.7.3.1.2.3 If the information does not coincide, the transfer-resumption procedure continues as for the transfer procedure with a P-DATA indication primitive for the segment of interchange-data-element following the last confirmed checkpoint.

6.6.7.3.1.2.4 If the responding DTAM-PM cannot resume the activity, the responding DTAM-PM performs the user-exception-report procedure.

### 6.6.8 *Association-recovery*

#### 6.6.8.1 *Purpose*

The association-recovery procedure is used by the association-initiating DTAM-PM to recover from an error situation handled by the association-abort procedure or the association-provider-abort procedure.

This procedure is for further study.

### 6.7 *Document unconfirmed manipulation*

Document unconfirmed manipulation is used by the requestor to manipulate the constituents of ODA and operational structure which are commonly handled by both communication entities. Document unconfirmed manipulation consists of document create operation, document delete operation, document modify operation, document call operation and document rebuild operation.

#### 6.7.1 *Document create operation*

##### 6.7.1.1 *Purpose*

The document create operation procedure is used by the requestor of document manipulation to add the constituents of ODA and operational structure to a document without any confirmation of the create manipulation.

##### 6.7.1.2 *APDUs used*

The document create operation procedure uses D-CREATE (DCR) APDU.

##### 6.7.1.2.1 *DCR APDU*

The field of the DCR APDU is listed in Table 10/T.433.

TABLE 10/T.433

DCR APDU field

Field name	Presence	Source	Sink
Create information	M	req	ind

### 6.7.1.3 Document create operation procedure

#### 6.7.1.3.1 Document create operation procedure mapped onto presentation service (normal mode)

Procedure is driven by the following events:

- a) a D-CREATE request primitive from the requestor;
- b) a DCR APDU as user data of a P-DATA indication primitive.

##### 6.7.1.3.1.1 D-CREATE request primitive

6.7.1.3.1.1.1 If the requesting DTAM-PM receives a D-CREATE request primitive, a DCR APDU is formed from the parameter values of the D-CREATE request primitive and transferred as user-data of a P-DATA request primitive. This may be done outside of an activity.

##### 6.7.1.3.1.2 DCR APDU

6.7.1.3.1.2.1 If the responding DTAM-PM receives the DCR APDU as user data of a P-DATA indication primitive, the responding DTAM-PM issues a D-CREATE indication primitive to the responder. The D-CREATE indication primitive parameter is derived from the DCR APDU.

#### 6.7.1.4 Use of the DCR APDU fields

The DCR APDU fields are used as specified below.

##### 6.7.1.4.1 Create information

This is the create information parameter value from the D-CREATE request primitive. It appears as the create information parameter value of the D-CREATE indication primitive.

### 6.7.2 Document delete operation

#### 6.7.2.1 Purpose

The document delete operation procedure is used by the requestor of document manipulation to delete the constituents of ODA and operational structure of an existing document without any confirmation of the delete operation.

#### 6.7.2.2 APDUs used

The document delete operation procedure uses D-DELETE (DDL) APDU.

##### 6.7.2.2.1 DDL APDU

The field of the DDL APDU is listed in Table 11/T.433.

TABLE 11/T.433

DDL APDU field

Field name	Presence	Source	Sink
Delete information	M	req	ind

### 6.7.2.3 Document delete operation procedure

#### 6.7.2.3.1 Document delete operation procedure mapped onto presentation service (normal mode)

This procedure request is driven by the following events:

- a) a D-DELETE request primitive from the requestor;
- b) a DDL APDU as user data of P-DATA indication primitive.

#### 6.7.2.3.1.1 *D-DELETE request primitive*

6.7.2.3.1.1.1 If the requesting DTAM-PM receives a D-DELETE request primitive, a DDL APDU is formed from the parameter values of D-DELETE request primitive and transferred as user-data of a P-DATA request primitive. This may be done outside of an activity.

#### 6.7.2.3.1.2 *DDL APDU*

6.7.2.3.1.2.1 If the responding DTAM-PM receives the DDL APDU as user data of a P-DATA indication primitive, the responding DTAM-PM issues a D-DELETE indication primitive to the responder. The D-DELETE indication primitive parameter is derived from the DDL APDU.

#### 6.7.2.4 *Use of the DDL APDU fields*

The DDL APDU fields are used as specified below.

##### 6.7.2.4.1 *Delete information*

This is the delete information parameter value from the D-DELETE request primitive. It appears as the delete information parameter value of the D-DELETE indication primitive.

#### 6.7.3 *Document modify operation*

##### 6.7.3.1 *Purpose*

The document modify operation procedure is used by the requestor of document manipulation to modify the attributes of constituents of ODA and operational structure of an existing document without any confirmation of the modifying operation.

##### 6.7.3.2 *APDUs used*

The document modify operation procedure uses D-MODIFY (DMD) APDU.

##### 6.7.3.2.1 *DMD APDU*

The field of the DMD APDU is listed in Table 12/T.433.

TABLE 12/T.433

DMD APDU field

Field name	Presence	Source	Sink
Modify information	M	req	ind

##### 6.7.3.3 *Document modify operation procedure*

##### 6.7.3.3.1 *Document modify operation procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a D-MODIFY request primitive from the requestor;
- a DMD APDU as user data of a P-DATA indication primitive.

##### 6.7.3.3.1.1 *D-MODIFY request primitive*

6.7.3.3.1.1.1 If the requesting DTAM-PM receives a D-MODIFY request primitive, a DMD APDU is formed from the parameter values of D-MODIFY request primitive and transferred as user-data of a P-DATA request primitive. This may be done outside of an activity.

##### 6.7.3.3.1.2 *DMD APDU*

6.7.3.3.1.2.1 If the responding DTAM-PM receives the DMD APDU as user data of a P-DATA indication primitive, the responding DTAM-PM issues a D-MODIFY indication primitive to the responder. The D-MODIFY indication primitive parameter is derived from the DMD APDU.

#### 6.7.3.4 *Use of the DMD APDU fields*

The DMD APDU fields are used as specified below.

##### 6.7.3.4.1 *Modify information*

This is the modify information parameter value from the D-MODIFY request primitive. It appears as the modify information parameter value of the D-MODIFY indication primitive.

#### 6.7.4 *Document call operation*

##### 6.7.4.1 *Purpose*

The document call operation procedure is used by the requestor of document manipulation to address or to read an object of operational structure which contains a sequence of DTAM protocol data units (with some restrictions, i.e. that only D-CREATE, D-DELETE and D-MODIFY can appear in this sequence). These protocol data units are applicable to the existing document.

##### 6.7.4.2 *APDUs used*

The document call operation procedure uses D-CALL (DCL) APDU.

##### 6.7.4.2.1 *DCL APDU*

The field of the DCL APDU is listed in Table 13/T.433.

TABLE 13/T.433

DCL APDU field

Field name	Presence	Source	Sink
Call information	M	req	ind

##### 6.7.4.3 *Document call operation procedure*

##### 6.7.4.3.1 *Document call operation procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a D-CALL request primitive from the requestor;
- b) a DCL APDU as user data of a P-DATA indication primitive.

##### 6.7.4.3.1.1 *D-CALL request primitive*

6.7.4.3.1.1.1 If the requesting DTAM-PM receives a D-CALL request primitive, a DCL APDU is formed from the parameter values of D-CALL request primitive and transferred as user-data of a P-DATA request primitive. This may be done outside of an activity.

##### 6.7.4.3.1.2 *DCL APDU*

6.7.4.3.1.2.1 If the responding DTAM-PM receives the DCL APDU as user data of a P-DATA indication primitive, the responding DTAM-PM issues a D-CALL indication primitive to the responder. The D-CALL indication primitive parameter is derived from the DCL APDU.

#### 6.7.4.4 *Use of the DCL APDU fields*

The DCL APDU fields are used as specified below.

##### 6.7.4.4.1 *Call information*

This is the call information parameter value from the D-CALL request primitive. It appears as the call information parameter value of the D-CALL indication primitive.

#### 6.7.5 *Document rebuild operation*

(For further study.)

## 6.8 Document confirmed manipulation

(For further study.)

## 6.9 Typed data transfer

### 6.9.1 Purpose

Typed data transmission is used independent of the data token and is issued from both DTAM users when required.

### 6.9.2 APDUs used

The typed data transfer procedure uses D-TYPED-DATA (DTD) APDU.

#### 6.9.2.1 DTD APDU

The field of the DTD APDU is listed in Table 14/T.433.

TABLE 14/T.433

DTD APDU field

Field name	Presence	Source	Sink
Typed data information	M	req	ind

### 6.9.3 Typed data transfer procedure

#### 6.9.3.1 Typed data transfer procedure mapped onto presentation service

This procedure is driven by the following events:

- a D-TYPED-DATA request primitive from the requestor;
- a DTD APDU as user data of a P-TYPED-DATA indication primitive.

##### 6.9.3.1.1 D-TYPED-DATA request primitive

6.9.3.1.1.1 If the requesting DTAM-PM receives a D-TYPED-DATA request primitive, a DTD APDU is formed from the parameter values of D-TYPED-DATA request primitive and transferred as user-data of a P-TYPED-DATA request primitive.

##### 6.9.3.1.2 DTD APDU

6.9.3.1.2.1 If the responding DTAM-PM receives the DTD APDU as user data of a P-TYPED-DATA indication primitive, the responding DTAM-PM issues a D-TYPED-DATA indication primitive to the responder. The D-TYPED-DATA indication primitive parameter is derived from the DTD APDU.

### 6.9.4 Use of the DTD APDU fields

The DTD APDU fields are used as specified below.

#### 6.9.4.1 Typed data information

This is the typed data information parameter value from the D-TYPED-DATA request primitive. It appears as the typed data information parameter value of the D-TYPED-DATA indication primitive.

## 6.10 Remote document access

(For further study.)

## 6.11 Remote document management

(For further study.)

## 6.12 Token control

### 6.12.1 Token please control

#### 6.12.1.1 Purpose

The token please procedure is used by a requestor (receiver of documents) to request the token from the responder (sender of documents).

#### 6.12.1.2 APDUs used

The token please procedure uses the D-TOKEN-PLEASE (DTP) APDU.

##### 6.12.1.2.1 DTP APDU

The field of the DTP APDU is listed in Table 15/T.433.

TABLE 15/T.433

DTP APDU field

Field name	Presence	Source	Sink
Priority	U	req	ind

#### 6.12.1.3 Token please procedure

##### 6.12.1.3.1 Token please procedure mapped onto presentation service (normal mode)

This procedure is driven by the following events:

- a D-TOKEN-PLEASE request primitive from the requestor; and
- a DTP APDU as user data of a P-TOKEN-PLEASE indication primitive.

###### 6.12.1.3.1.1 D-TOKEN-PLEASE request primitive

6.12.1.3.1.1.1 If the requesting DTAM-PM does not possess the token and receives a D-TOKEN-PLEASE request from the requestor, a DTP APDU is formed from the parameter value of the D-TOKEN-PLEASE request primitive and transferred as user data of a P-TOKEN-PLEASE request primitive. This may be done either inside or outside an activity.

###### 6.12.1.3.1.2 DTP APDU

6.12.1.3.1.2.1 If the responding DTAM-PM receives the DTP APDU as user data of a P-TOKEN-PLEASE indication primitive, the responding DTAM-PM issues a D-TOKEN-PLEASE indication primitive to the responder. The D-TOKEN-PLEASE indication primitive parameter is derived from the DTP APDU.

##### 6.12.1.3.2 Token please procedure mapped onto session service (transparent mode)

This procedure is driven by the following events:

- a D-TOKEN-PLEASE requestor primitive from the requestor;
- an S-TOKEN-PLEASE indication primitive.

###### 6.12.1.3.2.1 D-TOKEN-PLEASE request primitive

6.12.1.3.2.1.1 If the requesting DTAM-PM does not possess the token and receives a D-TOKEN-PLEASE request from the requestor, DTAM-PM issues a S-TOKEN-PLEASE request primitive. This may be done either inside or outside an activity.

###### 6.12.1.3.2.2 Implicit DTP APDU

6.12.1.3.2.2.1 If the responding DTAM-PM receives an S-TOKEN-PLEASE indication primitive without any APDU on its user data, the responding DTAM-PM issues a D-TOKEN-PLEASE indication primitive to the responder.



#### 6.12.1.4 *Use of the DTP APDU fields*

The DTP APDU fields are use as specified below.

##### 6.12.1.4.1 *Priority*

This parameter is the priority of the action, governed by the data token, that the requestor of the D-TOKEN-PLEASE service wishes to carry out. This parameter has to be supplied by the requestor of the D-TOKEN-PLEASE service.

#### 6.12.2 *Token give control*

##### 6.12.2.1 *Purpose*

6.12.2.1.1 The token-give procedure is used by a requestor (sender of documents) to give the token to the responder (receiver of documents).

6.12.2.1.2 The requestor becomes the receiver and the responder becomes the sender.

##### 6.12.2.2 *APDUs used*

No APDUs are used in this procedure.

##### 6.12.2.3 *Token give procedure*

###### 6.12.2.3.1 *Token give procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a D-TOKEN-GIVE request primitive;
- b) a P-TOKEN-GIVE indication primitive.

###### 6.12.2.3.1.1 *D-TOKEN-GIVE request primitive*

6.12.2.3.1.1.1 If the requesting DTAM-PM possesses the token and receives a D-TOKEN-GIVE request primitive from the requestor, it issues a P-TOKEN-GIVE request primitive and becomes the responding DTAM-PM. This may be done only outside an activity.

###### 6.12.2.3.1.2 *P-TOKEN-GIVE indication primitive*

6.12.2.3.1.2.1 If the responding DTAM-PM receives a P-TOKEN-GIVE indication primitive, the responding DTAM-PM issues a D-TOKEN-GIVE indication primitive to the responder. The responding DTAM-PM becomes the requesting DTAM-PM.

###### 6.12.2.3.2 *Token give procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-TOKEN-GIVE request primitive from the requestor;
- b) an S-TOKEN-GIVE indication primitive.

###### 6.12.2.3.2.1 *D-TOKEN-GIVE request primitive*

6.12.2.3.2.1.1 If the requesting DTAM-PM possesses the token and receives a D-TOKEN-GIVE request primitive from the requestor, it issues an S-TOKEN-GIVE request primitive and becomes the responding DTAM-PM. This may be done only outside an activity.

###### 6.12.2.3.2.2 *S-TOKEN-GIVE indication primitive*

6.12.2.3.2.2.1 If the responding DTAM-PM receives an S-TOKEN-GIVE indication primitive, the responding DTAM-PM issues a D-TOKEN-GIVE indication primitive to the responder. The responding DTAM-PM becomes the requesting DTAM-PM.

#### 6.12.3 *Control-give*

##### 6.12.3.1 *Purpose*

6.12.3.1.1 The CONTROL-GIVE procedure is used by a requestor to give all the tokens to the responder.

6.12.3.1.2 The requestor becomes the receiver and the responder becomes the sender.

##### 6.12.3.2 *APDUs used*

No APDUs are used in this procedure.

### 6.12.3.3 *CONTROL-GIVE procedure*

#### 6.12.3.3.1 *CONTROL-GIVE procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a D-CONTROL-GIVE request primitive;
- b) a P-CONTROL-GIVE indication primitive.

##### 6.12.3.3.1.1 *D-CONTROL-GIVE request primitive*

6.12.3.3.1.1.1 If the requesting DTAM-PM possesses the tokens and receives a D-CONTROL-GIVE request primitive from the requestor, it issues a P-CONTROL-GIVE request primitive and becomes the responding DTAM-PM. This may be done only outside an activity.

##### 6.12.3.3.1.2 *P-CONTROL-GIVE indication primitive*

6.12.3.3.1.2.1 If the responding DTAM-PM receives a P-CONTROL-GIVE indication primitive, the responding DTAM-PM issues a D-CONTROL-GIVE indication primitive to the responder. The responding DTAM-PM becomes the requesting DTAM-PM.

#### 6.12.3.3.2 *CONTROL GIVE procedure mapped onto session service (transparent mode)*

This procedure is driven by the following events:

- a) a D-CONTROL-GIVE request primitive from the requestor;
- b) an S-CONTROL-GIVE indication primitive.

##### 6.12.3.3.2.1 *D-CONTROL-GIVE request primitive*

6.12.3.3.2.1.1 If the requesting DTAM-PM possesses the tokens and receives a D-CONTROL-GIVE request primitive from the requestor, it issues an S-CONTROL-GIVE request primitive and becomes the responding DTAM-PM. This may be done only outside an activity.

##### 6.12.3.3.2.2 *S-CONTROL-GIVE indication primitive*

6.12.3.3.2.2.1 If the responding DTAM-PM receives an S-CONTROL-GIVE indication primitive, the responding DTAM-PM issues a D-CONTROL-GIVE indication primitive to the responder. The responding DTAM-PM becomes the requesting DTAM-PM.

### 6.13 *Exception report*

#### 6.13.1 *User-exception report*

##### 6.13.1.1 *Purpose*

The user-exception-report procedure is used by the responding DTAM-PM to report an error situation to the requesting DTAM-PM during document bulk transfer.

##### 6.13.1.2 *APDUs used*

No APDUs are used in this procedure.

##### 6.13.1.3 *User-exception report procedure*

#### 6.13.1.3.1 *User-exception-report procedure mapped onto presentation service (normal mode)*

This procedure is driven by the following events:

- a) a responding DTAM-PM problem;
- b) a P-U-EXCEPTION-REPORT indication primitive.

##### 6.13.1.3.1.1 *Receiving DTAM-PM problem*

6.13.1.3.1.1.1 If the responding DTAM-PM detects a problem, it issues a P-U-EXCEPTION-REPORT request primitive. Depending on the severity of the detected error, the value of the Reason parameter of the P-U-EXCEPTION-REPORT request primitive is as follows:

- a) in severe problem situations, the value "receiving ability jeopardized" is used;

- b) in exceptional circumstances, the responding DTAM-PM may have to delete a partially received document information, even though some minor synchronization points have been confirmed. In this case, the value "unrecoverable procedure error" is used;
- c) if the responding DTAM-PM is not willing to complete a transfer procedure (see § 6.6.3), the value "non-specific error" is used;
- d) if the requesting DTAM-PM resumes a transfer procedure already finished by the responding DTAM-PM within an application-association, the value "sequence error" is used;
- e) for all other less severe error situations, the value "local SS-User error" is used.

#### 6.13.1.3.1.2 *P-U-EXCEPTION-REPORT* indication primitive

6.13.1.3.1.2.1 If the requesting DTAM-PM receives a P-U-EXCEPTION-REPORT indication primitive, it performs one of the following procedures depending on the Reason parameter value of the P-U-EXCEPTION-REPORT indication primitive and Reliable transfer modes:

- a) With a value "receiving ability jeopardized",
  - the transfer-abort procedure (see § 6.4.3.1.4) followed by the DTAM provider-abort procedure are performed (mode 1/2).
- b) With a value "unrecoverable procedure error",
  - the transfer-discard procedure (see § 6.6.6) followed by D-TRANSFER service (indication and confirmation) are performed (mode 1),
  - the transfer-discard procedure followed by transfer procedure are performed (mode 2).
- c) With a value "non-specific error",
  - the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) are performed (mode 1),
  - the transfer-discard procedure followed by transfer procedure are performed (mode 2).
- d) With a value "sequence error",
  - the transfer-discard procedure is performed and the requesting DTAM-PM issues an D-TRANSFER confirm primitive with a result parameter value "document-information-transferred" to the requestor and the transfer procedure is finished (mode 1/2).
- e) With a value "local SS-User error" and at least one confirmed checkpoint in the transfer procedure,
  - the transfer-interrupt procedure (see § 6.6.5) followed by D-TRANSFER service (indication and confirmation) are performed (mode 1),
  - the transfer-interrupt procedure followed by the transfer-resumption procedure (see § 6.6.7) are performed (mode 2).
- f) With a value "local SS-User error" and no checkpoint was confirmed in the transfer procedure,
  - the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) are performed (mode 1),
  - the transfer-discard procedure followed by the transfer procedure are performed (mode 2).

6.13.1.3.1.2.2 Table 16/T.433 summarizes the actions of the requesting DTAM-PM when receiving the P-U-EXCEPTION-REPORT indication primitive.

TABLE 16/T.433

The actions of the requesting DTAM-PM in  
the error detection at the responding DTAM-PM

Parameter values (P/S-U-EXCEPTION-REPORT indication)	List of procedures in reliable transfer mode 1	List of procedures in reliable transfer mode 2
Receiving ability jeopardized	- transfer-abort - DTAM provider-abort	- transfer-abort - DTAM provider abort
Unrecoverable procedure error	- transfer-discard - D-TRANSFER indication/ confirmation - transfer-procedure by DTAM-user <sup>a)</sup>	- transfer-discard - transfer-procedure by DTAM-PM
Non-specific error	- transfer-discard - D-TRANSFER indication/ confirmation - transfer-procedure by DTAM-user <sup>a)</sup>	- transfer-discard - transfer-procedure by DTAM-PM
Sequence error	- transfer-discard	- transfer-discard
Local SS-user error (any checkpoint)	- transfer-interrupt - D-TRANSFER indication/ confirmation - transfer-resume by DTAM-user <sup>a)</sup>	- transfer-interrupt - transfer-resume by DTAM-PM
Local SS-user error (no checkpoint)	- transfer-discard - D-TRANSFER indication/ confirmation - transfer-procedure by DTAM-user <sup>a)</sup>	- transfer-discard - transfer-procedure by DTAM-PM

- a) Transfer-resume procedure and transfer-procedure by DTAM-user may be performed in accordance with the decision of DTAM-user.

#### 6.13.1.3.2 User-exception-report procedure mapped onto session service (transparent mode)

This procedure is driven by the following events:

- a) a responding DTAM-PM problem;
- b) an S-U-EXCEPTION-REPORT indication primitive.

##### 6.13.1.3.2.1 Receiving DTAM-PM problem

6.13.1.3.2.1.1 If the responding DTAM-PM detects a problem, it issues a S-U-EXCEPTION-REPORT request primitive. Depending on the severity of the detected error, the value of the Reason parameter of the S-U-EXCEPTION-REPORT request primitive is as follows:

- a) in severe problem situations, the value "receiving ability jeopardized" is used;

- b) in exceptional circumstances, the responding DTAM-PM may have to delete a partially received document information, even though some minor synchronization points have been confirmed. In this case, the value "unrecoverable procedure error" is used;
- c) if the responding DTAM-PM is not willing to complete a transfer procedure, the value "non-specific error" is used;
- d) if the requesting DTAM-PM resumes a transfer procedure already finished by the responding DTAM-PM, the value "sequence error" is used;
- e) for all other less severe error situations, the value "local SS-user error" is used.

#### 6.13.1.3.2.2 *S-U-EXCEPTION-REPORT indication primitive*

6.13.1.3.2.2.1 If the requesting DTAM-PM receives an S-U-EXCEPTION-REPORT indication primitive, it performs one of following procedures depending on the Reason parameter value of the S-U-EXCEPTION-REPORT indication primitive (in the transparent mode, only Reliable transfer mode 1 is available):

- a) with a value "receiving ability jeopardized", the transfer-abort procedure followed by the DTAM provider-abort procedure are performed;
- b) with a value "unrecoverable procedure error", the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) are performed;
- c) with a value "non-specific error", the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) are performed;
- d) with a value "sequence error", the transfer-discard procedure is performed and the requesting DTAM-PM issues a D-TRANSFER confirm primitive with a result parameter value of "document-information-transferred" to the requestor and the transfer procedure is finished;
- e) with a value "local SS-user error" and at least one confirmed checkpoint in the transfer procedure, the transfer-interrupt procedure followed by D-TRANSFER service (indication and confirmation) are performed. If no checkpoint was confirmed in the transfer procedure, the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) are performed.

6.13.1.3.2.2.2 Table 16/T.433 summarizes the actions of the requesting DTAM-PM when receiving the S-U-EXCEPTION-REPORT indication primitive in the column of Reliable transfer mode 1.

### 6.13.2 *Provider-exception-report*

#### 6.13.2.1 *Purpose*

If the presentation service-provider (normal mode) or the session service-provider (transparent mode) (responding side) detects an unexpected situation during an activity, not covered by other services, a P-P-EXCEPTION-REPORT or S-P-EXCEPTION-REPORT indication primitive is respectively issued to both DTAM-PMs.

#### 6.13.2.2 *APDUs used*

No APDUs are used in this procedure.

#### 6.13.2.3 *Provider-exception-report procedure*

##### 6.13.2.3.1 *Provider-exception-report procedure (normal mode)*

This procedure is driven by the following events:

- a) a P-P-EXCEPTION-REPORT indication primitive.

##### 6.13.2.3.1.1 *P-P-EXCEPTION-REPORT indication primitive*

6.13.2.3.1.1.1 The responding DTAM-PM ignores a P-P-EXCEPTION-REPORT indication primitive.

6.13.2.3.1.1.2 If the requesting DTAM-PM receives a P-P-EXCEPTION-REPORT indication primitive, it may perform one of the following procedures:

- a) if at least one checkpoint was confirmed in the transfer procedure,
  - the transfer-interrupt procedure followed by D-TRANSFER service (indication and confirmation) (Reliable transfer mode 1),

- the transfer-interrupt procedure followed by the transfer-resumption procedure (Reliable transfer mode 2), or
- b) if no checkpoint was confirmed in the transfer procedure,
  - the transfer-discard procedure followed by D-TRANSFER service (indication and confirmation) (Reliable transfer mode 1),
  - the transfer-discard procedure followed by the transfer-retry procedure (Reliable transfer mode 2), or
- c) the transfer-abort procedure followed by the DTAM provider-abort procedure.

#### 6.13.2.3.2 *Provider-exception-report procedure (transparent mode)*

This procedure is driven by the following event:

- a) an S-P-EXCEPTION-REPORT indication primitive.

##### 6.13.2.3.2.1 *S-P-EXCEPTION-REPORT indication primitive*

6.13.2.3.2.1.1 The responding DTAM-PM ignores an S-P-EXCEPTION-REPORT indication primitive.

6.13.2.3.2.1.2 If the requesting DTAM-PM receives an S-P-EXCEPTION-REPORT indication primitive, it may perform one of the following procedure:

- a) if at least one checkpoint was confirmed in the transfer procedure, the transfer-interrupt procedure followed by the D-TRANSFER service (indication and confirmation), or
- b) if no checkpoint was confirmed in the transfer procedure, the transfer-discard procedure followed by the D-TRANSFER service (indication and confirmation), or
- c) the transfer-abort procedure followed by the DTAM provider-abort procedure.

#### 6.14 *Rules for extensibility*

In addition to the procedures stated above, the following applies when processing the APDUs defined in this part of Recommendation T.433:

- a) fields are ignored that are not defined in this part of Recommendation T.433 in DTAM association establishing phase PDUs (DINQ, DINR and DAB); and
- b) for fields defined as having a maximum length in this part of Recommendation T.433, that portion of any value beyond the maximum length is ignored.

## 7 Mapping to the lower layer services

### 7.1 *Mapping to the OSI lower layer services*

This section defines how a DTAM-PM transfers APDUs by means of:

- a) the ACSE services, or
- b) the presentation-services.

Table 17/T.433 lists the overview of ACSE or presentation-service mapping.

TABLE 17/T.433

## ACSE and presentation services mapping overview

Functional units	Service primitive	Protocol elements (PDU)	Mapping DTAM PDU to ACSE service/presentation service
Association use control	D-INITIATE req/ind rsp/cnf D-TERMINATE req/ind rsp/cnf D-U-ABORT req/ind	D-INITIATE-REQ PDU D-INITIATE-RESP PDU D-TERMINATE-REQ PDU D-TERMINATE-RESP PDU D-ABORT PDU	A-ASSOCIATE req/ind A-ASSOCIATE rsp/cnf A-RELEASE req/ind A-RELEASE rsp/cnf A-U-ABORT req/ind
Capability	D-CAPABILITY req/ind rsp/conf	D-CAPABILITY REQ PDU D-CAPABILITY RESP PDU	P-CAPAB-DATA req/ind P-CAPAB-DATA rsp/cnf
Document bulk transfer	D-TRANSFER req  ind cnf	none  none none  - transfer-interrupt - transfer-discard - transfer-resume	P-ACT-START/RESUME <sup>a)</sup> req/ind P-DATA req/ind P-ACT-END/DCD <sup>a)</sup> /INT <sup>a)</sup> req/ind P-ACT-END/DCD <sup>a)</sup> /INT <sup>a)</sup> rsp/cnf  P-ACT-INT req/ind/rsp/cnf P-ACT-DCD req/ind/rsp/cnf P-ACT-RESUME req/ind
Document unconfirmed manipulation	D-CREATE req/ind D-DELETE req/ind D-MODIFY req/ind D-CALL req/ind D-REBUILD <sup>b)</sup> req/ind	D-CREATE PDU D-DELETE PDU D-MODIFY PDU D-CALL PDU D-REBUILD PDU <sup>b)</sup>	P-DATA req/ind P-DATA req/ind P-DATA req/ind P-DATA req/ind P-DATA req/ind
Token control	D-TOKEN-GIVE req/ind D-TOKEN-PLS req/ine D-CONTROL-GIVE req/ind	none D-TOKEN-PLS PDU none	P-TOKEN-GIVE req/ind P-TOKEN-PLS req/ind P-CONTROL-GIVE req/ind
Typed data transmission	D-TYPED-DATA req/ind	D-TYPED-DATA PDU	P-TYPED-DATA req/ind
Exception report	D-U-EXCEPTION-REPORT req/ind <sup>b)</sup>	D-EXCEPTION-REPORT PDU <sup>b)</sup> - user-exception-report - provider-exception-report	P-U-EXCEPTION-REPORT req/ind  P-U-EXCEPTION-REPORT req/ind  P-P-EXCEPTION-REPORT ind

a) This mapping is only applied in Reliable transfer mode 1.

b) This DTAM service or PDU is for further study.

### 7.1.1 Mapping on the ACSE services

#### 7.1.1.1 Association-establishment procedure

Association-establishment procedure takes place concurrently with the underlying ACSE association establishment.

##### 7.1.1.1.1 Directly mapped parameters

The following parameters of D-INITIATE service primitives are mapped directly onto the corresponding parameter of the A-ASSOCIATE service primitive:

- application context name
- calling AP title
- calling AP invocation-identifier
- calling AE qualifier
- calling AE invocation-identifier
- called AP title
- called AP invocation-identifier
- called AE qualifier
- called AE invocation-identifier
- responding AP title
- responding AP invocation-identifier
- responding AE qualifier
- responding AE invocation-identifier

- n) calling presentation address
- o) called presentation address
- p) responding presentation address
- q) presentation context definition list
- r) presentation context definition result
- s) presentation requirements
- t) initial assignment of token
- u) quality of services.

#### 7.1.1.1.2 *Parameters not used*

The following parameter of A-ASSOCIATE service primitives is not used:

- initial synchronization point serial number.

#### 7.1.1.1.3 *Use of the other A-ASSOCIATE request and indication primitive parameters*

##### 7.1.1.1.3.1 *Mode*

This parameter shall be supplied by the requestor of the association in the A-ASSOCIATE request primitive, and shall have the value "normal mode".

##### 7.1.1.1.3.2 *User information*

For both the A-ASSOCIATE request and indication primitives, the user information parameter is used to carry the D-INITIATE-REQ APDU.

##### 7.1.1.1.3.3 *Session requirements*

This parameter is set by the association-initiating DTAM-PM to select the following functional units:

- a) kernel
- b) half-duplex functional unit
- c) typed-data functional unit
- d) capability data exchange functional unit
- e) minor synchronize functional unit
- f) exceptions functional unit
- g) activity management functional unit.

*Note* - The use of duplex functional unit and negotiated release functional unit are for further study.

##### 7.1.1.1.3.4 *Session connection identifier*

The association-initiating DTAM-PM will supply a session connection identifier, which will be used to uniquely identify the session-connection. This identifier is formed of the following components:

- a) SS-user reference;
- b) common reference;
- c) additional reference information (optionally).

The SS-user reference is conveyed as the calling SS-user reference by the association-initiating DTAM-PM. Common reference and additional reference information are conveyed in similarly named parameters of the P-CONNECT primitive.

Each component, when present, will contain a data element of the appropriate type from the following definitions:

CallingSS-UserReference ::= PresentationAddress -- of the requestor

CommonReference ::= UTCTime

AdditionalReferenceInformation ::= T.61 String

The PresentationAddress is represented as a string of octets.



#### 7.1.1.1.4 *Use of the other A-ASSOCIATE response and confirm primitive parameters*

##### 7.1.1.1.4.1 *User information*

This parameter only has relevance if the application-association is accepted by the ACSE service-provider.

For both the A-ASSOCIATE response and confirmation primitives, the user information parameter is used to carry the D-INITIATE-RESP APDU, whether the application-association is accepted or is rejected by the association-responding DTAM-PM.

##### 7.1.1.1.4.2 *Result*

For the A-ASSOCIATE response primitive the result parameter is set by the association responding DTAM-PM as follows:

- a) if the association-responding DTAM-PM rejects the application-association, the value of this parameter is set to either "rejected by responder (transient)" or "rejected by responder (permanent)";
- b) if the association-responding DTAM-PM accepts the request, the value of this parameter is derived from the result parameter of the D-INITIATE response primitive.

##### 7.1.1.1.4.3 *Session requirements*

This parameter has the same values as in the A-ASSOCIATE request and indication primitive.

##### 7.1.1.1.4.4 *Session connection identifier*

This parameter has the same value as in the A-ASSOCIATE indication primitives. The calling SS-user reference value of the A-ASSOCIATE indication primitive is returned as a called SS=user reference by the association-responding DTAM-PM.

#### 7.1.1.2 *Association-release procedure*

Association-release procedure takes place concurrently with the underlying ACSE association release.

##### 7.1.1.2.1 *Directly mapped parameters*

The following parameter of D-TERMINATE service primitives is mapped directly onto the corresponding parameters of the A-RELEASE service primitives:

- User data (on user information).

##### 7.1.1.2.2 *Parameters not used*

The following parameter of the A-RELEASE service primitives is not used:

- Reason.

#### 7.1.1.2.3 *Use of the other A-RELEASE response and confirm primitive parameters*

##### 7.1.1.2.3.1 *Result*

The value of this parameter is "affirmative".

#### 7.1.1.3 *Association-provider-abort*

The use of the A-P-ABORT indication primitive parameters are defined in Recommendation X.217.

### 7.1.2 *Mapping on the presentation services*

#### 7.1.2.1 *Transfer procedure*

##### 7.1.2.1.1 *Use of the P-ACTIVITY-START request and indication primitive parameters*

###### 7.1.2.1.1.1 *Activity identifier*

The activity identifier identifies the activity by means of a serial number. The first activity started on the session-connection is assigned to number 1. Each successive activity for that direction of transfer is assigned the next number. This number is separate for each direction of transfer.

The DTAM-PMs should manage the local mapping between the parameter "activity identifier" in the P-ACTIVITY-START request and indication primitive and the parameter "document reference information in D-TRANSFER service.

The property required of activity identifiers is that they should uniquely identify an activity during a reasonable time interval within a particular session-connection, so that duplicates can be detected in the case of error situations. These identifiers are allocated by numbering the activities during a session, starting with one for the first and incrementing for each successive activity, and representing the number by a data element of type INTEGER encoded according to Recommendation X.209. It is unnecessary for the responding DTAM-PM to make assumptions on allocation method, it need only be able to compare two identifiers for equality, octet by octet.

#### 7.1.2.1.1.2 *User data*

This parameter is not used.

#### 7.1.2.1.2 *Use of the P-DATA request and indication primitive parameters*

##### 7.1.2.1.2.1 *User data*

The following DTAM APDUs are conveyed by this parameter:

- a) D-CREATE APDU
- b) D-DELETE APDU
- c) D-MODIFY APDU
- d) D-CALL APDU.

*Note* - A segment of interchange-data-elements of document information is also conveyed by this parameter.

#### 7.1.2.1.3 *Use of the P-TYPED-DATA request and indication primitive parameters*

##### 7.1.2.1.3.1 *User data*

The D-TYPED-DATA APDU is conveyed by this parameter.

#### 7.1.2.1.4 *Use of the P-MINOR-SYNCHRONIZE request and indication primitive parameters*

##### 7.1.2.1.4.1 *Type*

The DTAM-PM uses only the "explicit confirmation expected" type of minor synchronization.

##### 7.1.2.1.4.2 *Synchronization point serial number*

The session service-provider allocates checkpoint serial numbers, and passes them to the requesting and responding DTAM-PMs to associate with the transmitted data.

##### 7.1.2.1.4.3 *User data*

This parameter is not used.

#### 7.1.2.1.5 *Use of the P-ACTIVITY-END request and indication primitive parameters*

##### 7.1.2.1.5.1 *User data*

This parameter is not used.

#### 7.1.2.2 *Token please procedure*

When the DTAM user issues a D-TOKEN-PLEASE service primitive, this results into a P-TOKEN-PLEASE.

#### 7.1.2.2.1 *Use of the P-TOKEN-PLEASE request and indication primitive parameters*

##### 7.1.2.2.1.1 *Tokens*

This parameter takes a value which corresponds to requesting the data token.

##### 7.1.2.2.1.2 *User data*

The D-TOKEN-PLEASE APDU is conveyed by this parameter.

#### 7.1.2.3 *Token give procedure*

When the DTAM user issues a D-TOKEN-GIVE service primitive, this results into a P-TOKEN-GIVE.

7.1.2.3.1 *Use of the P-TOKEN-GIVE request and indication primitive parameters*

7.1.1.3.1.1 *Tokens*

This parameter takes a value which corresponds to giving the data token.

7.1.2.4 *Control give procedure*

When the DTAM-user issues a D-CONTROL-GIVE service primitive, this results into a P-CONTROL-GIVE. This will transfer all the tokens from the requestor to the responder.

7.1.2.4.1 *Use of the P-CONTROL-GIVE request and indication primitive parameters*

The P-CONTROL-GIVE service primitives have no parameters. All the tokens are automatically passed to the other DTAM-PM.

7.1.2.5 *Capability data exchange procedure*

7.1.2.5.1 *Use of the P-CAPAB-DATA service parameters*

7.1.2.5.1.1 *User data*

The following DTAM APDUs are conveyed by this parameter:

- a) D-CAPABILITY-REQ APDU;
- b) D-CAPABILITY-RESP APDU.

7.1.2.6 *User-exception-report procedure*

7.1.2.6.1 *Use of the P-U-EXCEPTION-REPORT service parameters*

7.1.2.6.1.1 *Reason*

This parameter may specify one of the following reasons:

- a) receiving ability jeopardized;
- b) local SS-user error;
- c) sequence error;
- d) unrecoverable error;
- e) non-specific error.

7.1.2.6.1.2 *User data*

This parameter is not used.

7.1.2.7 *Provider-exception-report procedure*

7.1.2.7.1 *Use of the P-P-EXCEPTION-REPORT service parameter*

7.1.2.7.1.1 *Reason*

This parameter may specify one of the following reasons:

- a) protocol error,
- b) non-specific error.

7.1.2.8 *Transfer-interrupt procedure*

7.1.2.8.1 *Use of the P-ACTIVITY-INTERRUPT service parameters*

7.1.2.8.1.1 *Reason*

This parameter may specify one of the following reasons:

- a) local SS-user error;
- b) non-specific error.

7.1.2.9 *Transfer-discard procedure*

7.1.2.9.1 *Use of the P-ACTIVITY-DISCARD service parameters*

7.1.2.9.1.1 *Reason*

This parameter may specify one of the following reasons:

- a) local SS-user error;

- b) unrecoverable procedure error;
- c) non-specific error.

#### 7.1.2.10 *Transfer-resumption procedure*

##### 7.1.2.10.1 *Use of the P-ACTIVITY-RESUME service parameters*

###### 7.1.2.10.1.1 *Activity identifier*

The requesting DTAM-PM must allocate and supply the next activity identifier number for the current session.

###### 7.1.2.10.1.2 *Old activity identifier*

The requesting DTAM must supply the original activity identifier assigned to the previously interrupted activity in the P-ACTIVITY-START request primitive.

###### 7.1.2.10.1.3 *Synchronization point serial number*

The requesting DTAM-PM will specify the serial number of the last confirmed checkpoint in the interrupted activity. The session service-provider will also set the current session serial number to this value. If there was no previously confirmed checkpoint, the activity cannot be continued. The requesting DTAM-PM must then send a P-ACTIVITY-RESUME request primitive (with the synchronization point serial number set to zero), followed by a P-ACTIVITY-DISCARD request primitive.

###### 7.1.2.10.1.4 *Old session connection identifier*

The requesting DTAM-PM must supply the session connection identifier of the session-connection during which the activity was started. The session connection identifier of the previous session-connection is conveyed in the calling SS-user reference, common reference and optionally additional reference information components of this parameter. The called SS-user reference component is not used.

###### 7.1.2.10.1.5 *User data*

This parameter is not used.

#### 7.2 *Mapping to the Recommendation X.215 session service (transparent mode)*

This section defines how a DTAM-PM transfers APDUs by means of the session service.

Table 20/T.433 lists the overview of session mapping.

##### 7.2.1 *DTAM association-establishment procedure*

The association-establishment procedure takes place concurrently with the underlying establishment of session connection.

###### 7.2.1.1 *Directly mapped parameters*

No parameters of D-INITIATE service primitives are mapped directly onto the corresponding parameters of the S-CONNECT service primitive.

###### 7.2.1.2 *Use of the other S-CONNECT request and indication primitive parameters*

###### 7.2.1.2.1 *User information*

For both the S-CONNECT request and indication primitives, the user information parameter is used to carry the D-INITIATE-REQ APDU.

###### 7.2.1.2.2 *Session requirements*

This parameter is set by the initiating DTAM-PM to select the following functional units by means of the "telematic requirements parameter" in the D-INITIATE service primitive as shown in Table 18/T.433.

TABLE 18/T.433

## Mapping into/out of the session requirements

"Telematic requirements"	Functional units
Token management	Half-duplex functional unit
Non-token management	Duplex functional unit
Typed data management	Typed-data functional unit
Capability	Capability data exchange functional unit
Reliable transfer management	Minor synchronize functional unit Activity management functional unit
Exception report	Exceptions functional unit

## 7.2.1.2.3 Session reference

The initiating DTAM-PM will supply a session connection identifier, which will be used to uniquely identify the session-connection. This identifier is formed of the following components:

- a) terminal identifier of the calling terminal;
- b) date and time;
- c) additional session reference number (optionally).

The terminal identifier of the calling terminal is conveyed as the calling SS-user reference by the initiating DTAM-PM. Date and time and additional session reference number are conveyed in parameters of the S-CONNECT primitive.

Each component, when present, will contain a data element of the appropriate type from the following definitions:

Terminal identifier                    ::= T.62 SessionAddress -- of the requestor  
Date and time                        ::= UTCTime  
Additional session  
reference number                    ::= T.61 String

The SessionAddress is represented as a string of octets.

#### 7.2.1.2.4 *Service identifier*

The initiating DTAM-PM must supply a service identifier which has the value '1' to specify the telematic services.

#### 7.2.1.2.5 *Non-basic session capabilities*

The initiating DTAM-PM may supply non-basic session capabilities, which will be used to specify the non-basic session capabilities available as receiving capabilities of the sender of this primitive. This parameter is formed of the following components:

- a) miscellaneous session capabilities;
- b) window size.

#### 7.2.1.2.6 *Inactivity timer*

The initiating DTAM-PM may use to negotiate the value of an inactivity timer.

#### 7.2.1.3 *Use of the other S-CONNECT response and confirm primitive parameters*

##### 7.2.1.3.1 *User information*

This parameter only has relevance if the application-association is accepted by the session service-provider.

For both the S-CONNECT response and confirmation primitives, the user information parameter is used to carry the D-INITIATE-RESP APDU if the application-association is accepted or is rejected by the responding DTAM-PM.

##### 7.2.1.3.2 *Result*

For the S-CONNECT response primitive the result parameter is set by the association responding DTAM-PM as follows:

- a) when the association-responding DTAM-PM detects errors in the S-CONNECT indication primitive (e.g., no session user data), the association-responding DTAM-PM rejects the application-association. The value of this parameter is set to "refuse";
- b) if the association-responding DTAM-PM accepts the request, the value of this parameter is derived from the result parameter of the D-INITIATE response primitive as shown in Table 19/T.433.

For the S-CONNECT confirm primitive the result parameter is set by the association responding DTAM-PM as follows:

- a) when the association-requesting (initiating) DTAM-PM receives the S-CONNECT confirm primitive with the result parameter of "refuse", the association/requesting DTAM-PM issues the D-INITIATE confirm primitive with the result parameter of "rejected by responding DTAM-PM" to the association-requesting DTAM user;
- b) when the association-requesting DTAM-PM receives the S-CONNECT confirm primitive with the result parameter of "accept", the association-requesting DTAM-PM issues the D-INITIATE confirm primitive with the result parameter of "accepted" to the association-requesting DTAM user.

TABLE 19/T.433

## Result parameter mapping

D-INITIATE response	S-CONNECT response/ confirmation	D-INITIATE confirmation
accepted	accept	accepted
rejected by responder with some reasons	refuse	rejected by responding DTAM-PM
rejected by responding DTAM-PM	refuse	rejected by responding DTAM-PM

TABLE 20/T.433

## DTAM service primitive-protocol mapping to session services

Functional units	Service primitive	Protocol elements (PDU)	Mapping DTAM PDU to session service
Association use control	D-INITIATE req/ind resp/conf D-TERMINATE req/ind resp/conf D-ABORT req/ind	D-INITIATE-REQ PDU D-INITIATE-RESP PDU	S-CONNECT req/ind S-CONNECT rsp/cnf S-RELEASE req/ind S-RELEASE rsp/cnf S-ABORT req/ind
Capability	D-CAPABILITY req/ind resp/conf	D-CAPABILITY-REQ PDU D-CAPABILITY-RESP PDU	S-CAPAB-DATA req/ind S-CAPAB-DATA rsp/cnf
Document bulk transfer	D-TRANSFER req ind cnf	none none none	S-ACT-START/RESUME req/ind S-DATA req/ind S-ACT-END/DCD/INT req/ind S-ACT-END/DCD/INT rsp/cnf
Token control	D-CONTROL-GIVE req/ind D-TOKEN-PLS req/ind	none none	S-CONTROL-GIVE req/ind S-TOKEN-PLS req/ind
Typed data transmission	D-TYPED-DATA req/ind	D-TYPED-DATA PDU	S-TYPED-DATA req/ind
Exception report	D-U-EXCEPTION-REPORT req/ind*	- user-exception-report - provider-exception-report	S-U-EXCEPTION-REPORT req/ind S-U-EXCEPTION-REPORT req/ind S-P-EXCEPTION-REPORT ind

Note - D-U-EXCEPTION-REPORT req/ind\* is for further study.

## 7.2.1.3.3 Session requirements

This parameter has the same values as in the S-CONNECT request and indication primitives.

## 7.2.1.3.4 Session reference

This parameter has the same values as in the S-CONNECT indication primitives. The terminal identifier of the calling terminal value of the S-CONNECT indication primitive is returned as the terminal identifier of the called terminal by the responding DTAM-PM.

## 7.2.1.3.5 Service identifier

This parameter has the same values as in the S-CONNECT request and indication primitives.

#### 7.2.1.3.6 *Non-basic session capabilities*

The responding DTAM-PM may supply non-basic session capabilities, which will be used to specify the non basic session capabilities available as receiving capabilities of the sender of this primitive. This parameter is formed of the same components as those in S-CONNECT request and indication primitives.

#### 7.2.1.3.7 *Inactivity timer*

The responding DTAM-PM may use this parameter to negotiate an inactivity timer.

#### 7.2.2 *Association release procedure*

The association release procedure takes place concurrently with the underlying release of session connection.

There are no D-TERMINATE service parameters to map onto session connection release service parameters.

#### 7.2.3 *Association-provider-abort*

The uses of the S-P-ABORT indication primitive parameters are defined in Recommendation X.215.

#### 7.2.4 *Transfer procedure*

##### 7.2.4.1 *Use of the S-ACTIVITY-START request and indication primitive parameters*

###### 7.2.4.1.1 *Document reference number*

The requesting DTAM-PM must allocate and supply the next document reference number for the current session.

The DTAM-PMs should manage the mapping between the parameter "document reference number" in D-TRANSFER service and the parameter "document reference number" in the S-ACTIVITY-START request and indication primitives.

###### 7.2.4.1.2 *Document type identifier*

This parameter may be user option.

###### 7.2.4.1.3 *Service interworking identifier*

This parameter may be user option.

###### 7.2.4.1.4 *User data*

This parameter is only used to invoke the DTAM capability. The information, which is generated by the DTAM-PM based on the parameter of "document characteristics" in document profile contained in the document information, is conveyed as shown in Figure 3/T.433.



```

S-ACTIVITY-START-user-data ::= CHOICE

    ( [4] IMPLICIT DocumentCharacteristics )

DocumentCharacteristics ::= SET(
    documentApplicationProfile ::= CHOICE {
        [0] IMPLICIT OCTET STRING
        -- '01'H Non-DocumentsApplicationProfile
        -- '02'H DocumentsApplicationProfile T.503
        [4] IMPLICIT SET OF OBJECT IDENTIFIER )

    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL,
        -- '00'H means FDA

    nonBasicDocumentCharacteristics [2] IMPLICIT NonBasicDocumentCharacteristics
        OPTIONAL,

    nonBasicStructuralCharacteristics [3] IMPLICIT NonBasicStructuralCharacteristics
        OPTIONAL )

NonBasicDocumentCharacteristics ::= SET (
    commentsCharacterSets [1] IMPLICIT OCTET STRING OPTIONAL,
        -- string of escape sequences

    pageDimensions [2] IMPLICIT SET OF Dimension-Pair OPTIONAL,

    ra-gr-coding-attributes [3] IMPLICIT SET OF Ra-Gr-Coding-Attribute OPTIONAL,
        -- Ra-Gr-Coding-Attribute is defined in
        -- Recommendation T.415

    ra-gr-presentation-features [4] IMPLICIT SET OF
        Ra-Gr-Presentation-Features OPTIONAL
        -- Ra-Gr-Presentation-Features is defined in
        -- Recommendation T.415 )

NonBasicStructuralCharacteristics ::= SET(
    numberOfObjectsPerPage [0] IMPLICIT INTEGER OPTIONAL)

```

FIGURE 3/T.433

### User data in S-ACTIVITY-START/RESUME

#### 7.2.4.2 Use of the S-DATA request and indication primitive parameters

The document information is divided into segments such that the segment boundaries coincide with the minor synchronization points. Each segment consists of an integral number of interchange-data-elements. The interchange-data-elements of each segment are encoded using the basic encoding rules defined in Recommendation X.209. The encoded interchange-data-elements of each segment are concatenated, forming an encoded segment.

##### 7.2.4.2.1 User data

A segment of interchange-data-elements is conveyed by the user data.

*Note* - Some DTAM-PMs may take one of the following actions:

- when sending the document information, the requesting DTAM-PM may suppress the document profile located at the top of the document information;
- when receiving the document information, the responding DTAM-PM may re-generate the document profile and may attach it to the top of the document information based on the User Data of S-ACTIVITY-START indication.

#### 7.2.4.3 Use of the S-TYPED-DATA request and indication primitive parameters

##### 7.2.4.3.1 User data

The D-TYPED-DATA APDU is conveyed by this parameter.

#### 7.2.4.4 *Use of the S-MINOR-SYNCHRONIZE service parameters*

##### 7.2.4.4.1 *Type*

The DTAM-PM uses only the "explicit confirmation expected" type of minor synchronization.

##### 7.2.4.4.2 *Synchronization point serial number (checkpoint reference number)*

The session service-provider allocates checkpoint serial numbers and passes them to the requesting and the responding DTAM-PMs to associate with the transmitted data.

#### 7.2.4.5 *Use of the S-ACTIVITY-END service parameters*

##### 7.2.4.5.1 *Synchronization point serial number (checkpoint reference number)*

The serial number of the implied major synchronization point is allocated by the session service-provider and passed up to both DTAM-PMs. This parameter will be mapped into/out of the parameter "synchronization point" in D-TRANSFER service.

#### 7.2.5 *Token please procedure*

When the DTAM-user issues a D-TOKEN-PLEASE service primitive, this results into an S-TOKEN-PLEASE.

##### 7.2.5.1 *Use of the S-TOKEN-PLEASE request and indication primitive parameters*

###### 7.2.5.1.1 *Tokens*

The responding DTAM-PM (receiver of document) will only request the data token.

#### 7.2.6 *Control give procedure*

When the DTAM-user issues a D-CONTROL-GIVE service primitive, this results into an S-CONTROL-GIVE. This will transfer all the tokens from the requestor to the responder.

##### 7.2.6.1 *Use of the S-CONTROL-GIVE request and indication primitive parameters*

The S-CONTROL-GIVE service primitives have no parameters.

#### 7.2.7 *Capability data exchange procedure*

##### 7.2.7.1 *Use of the S-CAPAB-DATA service parameters*

###### 7.2.7.1.1 *User data*

The following DTAM APDUs are conveyed by this parameter:

- a) D-CAPABILITY-REQ APDU;
- b) D-CAPABILITY-RESP APDU.

###### 7.2.7.1.2 *Inactivity timer*

The initiating/responding DTAM-PMs may use this parameter to negotiate an inactivity timer.

###### 7.2.7.1.3 *Storage capacity*

The initiating/responding DTAM-PMs may supply a storage capacity to negotiate the memory size for the communication.

#### 7.2.8 *User-exception-report procedure*

##### 7.2.8.1 *Use of the S-U-EXCEPTION-REPORT service parameters*

###### 7.2.8.1.1 *Reason*

This parameter may specify one of the following reasons:

- a) no specific reason;
- b) temporarily unable to enter into, or to continue a session;
- c) sequence error;
- d) unrecoverable error;
- e) local terminal error.

### 7.2.9 *Provider-exception-report procedure*

#### 7.2.9.1 *Use of the S-P-EXCEPTION-REPORT service parameters*

##### 7.2.9.1.1 *Reason*

This parameter may specify one of the following reasons:

- protocol error.

### 7.2.10 *Transfer-interrupt procedure*

#### 7.2.10.1 *Use of the S-ACTIVITY-INTERRUPT service parameters*

##### 7.2.10.1.1 *Reason*

This parameter may specify one of the reasons as described in reason for S-U-EXCEPTION-REPORT service primitive.

### 7.2.11 *Transfer-discard procedure*

#### 7.2.11.1 *Use of the S-ACTIVITY-DISCARD service parameters*

##### 7.2.11.2.1 *Reason*

This parameter may specify one of the reasons as described in reason for S-U-EXCEPTION-REPORT service primitive.

### 7.2.12 *Transfer-user-resumption procedure*

#### 7.2.12.1 *Use of the S-ACTIVITY-RESUME service parameters*

##### 7.2.12.1.1 *Document reference number*

The requesting DTAM-PM must allocate and supply the next document reference number for the current session.

##### 7.2.12.1.2 *Old document reference number*

The requesting DTAM-PM must supply the original activity identifier assigned to the previously interrupted activity in the S-ACTIVITY-START request primitive.

##### 7.2.12.1.3 *Checkpoint serial number*

The requesting DTAM-PM will specify the serial number of the last confirmed checkpoint in the interrupted activity. The session service-provider will also set the current session serial number to this value. If there was no previously confirmed checkpoint, the activity cannot be continued. The requesting DTAM-PM must then send an S-ACTIVITY-RESUME request primitive (with the synchronization point serial number set to zero), followed by an S-ACTIVITY-DISCARD request primitive.

This parameter will be mapped into/out of the parameter "synchronization point" in D-TRANSFER service.

##### 7.2.12.1.4 *Old session reference*

The requesting DTAM-PM must supply the session reference of the session-connection during which the activity was started. The session reference of the previous session-connection is conveyed in the calling and called terminal identifier, common reference and optionally, additional reference information components of this parameter.

##### 7.2.12.1.5 *Document type identifier*

This parameter may be user option.

##### 7.2.12.1.6 *Service interworking identifier*

This parameter may be user option.

##### 7.2.12.1.7 *User data*

This parameter has the same format of user-data as for the S-ACTIVITY-START service parameters.

## 8 Abstract syntax definition of APDUs

### 8.1 Abstract syntax definition of APDUs in normal mode

This abstract syntax is described by the notation of ASN.1 defined in the Recommendation X.208.

DTAM-APDUs {ccitt dTAM(x) apdus(0)} DEFINITIONS ::=

BEGIN

EXPORTS dTAMSE;

dTAMSE OBJECT IDENTIFIER ::= {ccitt dTAM(x) aseID(1)} -- ASE identifier for DTAMSE

IMPORTS

-- For further study

```
[1] D-INITIATE-REQ ::= [APPLICATION 10] IMPLICIT SEQUENCE
    {
        serviceClasses [0] IMPLICIT INTEGER OPTIONAL
            -- the use of this parameter is
            -- for further study

        telematicRequirements [1] IMPLICIT BIT STRING
            {
                kernel (0),
                capabilityManagement (1),
                documentBulkTransfer (2),
                typedDataTransmission (3),
                documentUnconfirmedManipulation (4),
                documentConfirmedManipulation (5),
                remoteDocumentAccess (6),
                remoteDocumentManagement (7),
                tokenControl (8),
                exceptionReport (9),
                reliableTransferModel (10),
                reliableTransferMode2 (11), },

        applicationCapabilities [2] IMPLICIT SET OF Application Capabilities
        protocolVersion [3] IMPLICIT BIT STRING
            { version-1 (0) } OPTIONAL,

        dTAMQOS [4] IMPLICIT BIT STRING OPTIONAL,
        account [5] IMPLICIT Account OPTIONAL,
        checkpointWindow [6] IMPLICIT INTEGER DEFAULT 3 OPTIONAL,
        storageCapacity [7] IMPLICIT BIT STRING OPTIONAL,
        userInformation [8] OCTET STRING OPTIONAL
    }
}
```

-- Registration of OBJECT IDENTIFIER for the Recommendation T.503 is required

-- dTAMQOS and account parameters are for further study

```
Application Capabilities ::= SET
    {
        documentApplicationProfile [0] IMPLICIT OBJECT IDENTIFIER,
        nonBasicDocCharacteristics [1] IMPLICIT NonBasicDocCharacteristics OPTIONAL,
        nonBasicStrucCharacteristics [2] IMPLICIT NonBasicStrucCharacteristics, OPTIONAL,
        operationalApplicationProfile [3] IMPLICIT SET OF OBJECT IDENTIFIER OPTIONAL }
}
```

-- Registration of OBJECT IDENTIFIER for the Recommendation T.503 is required

-- NonBasicStrucCharacteristics ::= {Refer to Recommendation T.415 }

-- NonBasicDocCharacteristics ::= {Refer to Recommendation T.415 }

```
[2] D-INITIATE-RESP ::= [APPLICATION 11] IMPLICIT SEQUENCE
    {
        telematicRequirements [0] IMPLICIT BIT STRING,
        Application Capabilities [1] IMPLICIT SET OF Application Capabilities,
        protocolVersion [2] IMPLICIT BIT STRING
            { version-1 (0) } OPTIONAL,

        dTAMQOS [3] IMPLICIT BIT STRING OPTIONAL,
        result [4] INTEGER
    }
```

{		accepted	(0),
		rejected by responder(reason-not-specified)	(1),
		rejected by responder(protocolVersion-not-supported)	(2),
		rejected by responder(DTAMQOS-not-supported)	(3),
		rejected by responder(application-context-not-supported)	(4),
		rejected by responding DTAM-PM	(5) },
checkpointWindow		[5] IMPLICIT INTEGER DEFAULT 3	OPTIONAL,
storageCapacity		[6] IMPLICIT BIT STRING	OPTIONAL,
userInformation		[7] OCTET STRING	OPTIONAL
}			
[3] D-TERMINATE-REQ	::=	IMPLICIT SEQUENCE	
{		userInformation	[0] OCTET STRING
		}	OPTIONAL
[4] D-TERMINATE-RESP	::=	IMPLICIT SEQUENCE	
{		charging	[0] IMPLICIT Charging
		userInformation	[1] OCTET STRING
		}	OPTIONAL,
			OPTIONAL
[5] D-ABORT-REQ	::=	[APPLICATION 13] IMPLICIT SEQUENCE	
{		aBORTSource	[0] INTEGER
			{
		requestingDTAMPM	(0),
		DTAMserviceProvider	(1) },
		aBORTReason	[1] INTEGER
			{
		local-system-problem	(0),
		invalid-parameter	(1),
		unrecognized-activity	(2),
		temporary-problem	(3),
		protocol-error	(4),
		permanent-error	(5),
		transfer-completed	(6) },
Reflected-parameter		[2] IMPLICIT BIT STRING	OPTIONAL,
		-- 8 bits maximum, only if abortReason is invalid parameter	
userInformation		[3] OCTET STRING	OPTIONAL
}			
[6] D-CAPABILITY-REQ	::=	[APPLICATION 14] IMPLICIT SEQUENCE	
{		applicationCapabilities	[0] IMPLICIT Application Capabilities
		storageCapacity	[1] IMPLICIT BIT STRING
		userInformation	[2] OCTET STRING
		}	OPTIONAL,
			OPTIONAL,
			OPTIONAL
[7] D-CAPABILITY-RESP	::=	[APPLICATION 15] IMPLICIT SEQUENCE	
{		applicationCapabilities	[0] IMPLICIT Application Capabilities
		storageCapacity	[1] IMPLICIT BIT STRING
		capabilityResult	[2] IMPLICIT Capability Result
		userInformation	[3] OCTET STRING
		}	OPTIONAL,
			OPTIONAL,
			OPTIONAL
CapabilityResult	::=	INTEGER	
{		confirmation-of-all-the-	
		requestedCapabilities	(0),
		a-list-of-the-requestedCapabilities	(1),
		a-complete-list-of-non-	
		basic ReceivingCapabilities	(2),
		none-of-the-capabilities-requested-	
		by-the-initiator	(3) }

```

[8] D-TYPED-DATA ::= [APPLICATION 16] CHOICE
{
    NumericString,
    PrintableString,
    TeletexString,
    VideotexString,
    VisibleString,
    OctetString,
    IA5String,
    GraphicString }

[9] D-CREATE ::= [APPLICATION 17] IMPLICIT SEQUENCE OF CreateInformation
CreateInformation ::= SEQUENCE
{
    [0] IMPLICIT ParentObjectOrClassIdentifier OPTIONAL,
    [1] Object }

ParentObjectOrClassIdentifier ::= ObjectOrClassIdentifier
-- ObjectOrClassIdentifier ::= { Refer to Recommendation T.415 }

Objet ::= CHOICE
{
    [0] IMPLICIT DocumentProfileDescriptor,
    [1] IMPLICIT LayoutClassDescriptor,
    [2] IMPLICIT LayoutObjectDescriptor,
    [3] IMPLICIT TextUnit,
    [5] IMPLICIT LogicalClassDescriptor,
    [6] IMPLICIT LogicalObjectDescriptor,
    [7] IMPLICIT PresentationStyleDescriptor,
    [8] IMPLICIT LayoutStyleDescriptor,
    -- The above descriptors and text portion are defined
    -- in Recommendation T.415
    [9] IMPLICIT OperationalDescriptor.
    -- The above descriptor is defined
    -- in Recommendations T.441 and T.541 }

[10] D-DELETE ::= [APPLICATION 18] IMPLICIT DeleteInformation
DeleteInformation ::= SEQUENCE OF CHOICE
{
    [0] IMPLICIT ObjectOrClassIdentifier,
    [1] IMPLICIT ContentPortionIdentifier,
    -- The above descriptors and text unit are defined
    -- in Recommendation T.415
    [2] IMPLICIT OperationalInformationIdentifier
    -- The above identifiers are defined
    -- in Recommendations T.441 and T.541 }

[11] D-MODIFY ::= [APPLICATION 19] IMPLICIT SEQUENCE OF
ModifyInformation
ModifyInformation ::= SEQUENCE
{
    [0] IMPLICIT CurrentObjectOrClassIdentifier OPTIONAL,
    [1] Object }

CurrentObjectOrClassIdentifier ::= ObjectOrClassIdentifier
-- ObjectOrClassIdentifier ::= { refer to Recommendation T.415 }

Object ::= CHOICE
{
    [0] IMPLICIT DocumentProfileDescriptor,
    [1] IMPLICIT LayoutClassDescriptor,
    [2] IMPLICIT LayoutObjectDescriptor,
    [3] IMPLICIT TextUnit,
    [5] IMPLICIT LogicalClassDescriptor,
    [6] IMPLICIT LogicalObjectDescriptor,
    [7] IMPLICIT PresentationStyleDescriptor,
    [8] IMPLICIT LayoutStyleDescriptor,

```

```

-- The above descriptors and text unit are defined
-- in Recommendation T.415
[9] IMPLICIT OperationalDescriptor,
-- The above descriptor is defined
-- in Recommendations T.441 and T.541 }

[12] D-CALL ::= [APPLICATION 20] IMPLICIT CALLInformation

CALLInformation ::= SEQUENCE OF CHOICE
{
    [0] IMPLICIT OperationalInformationIdentifier
    -- The above descriptors and text unit are defined
    -- in Recommendations T.441 and T.541 }

[13] D-REBUILD ::= [APPLICATION 21] IMPLICIT REBUILDInformation
[for further study]

[14] D-TOKEN-PLEASE ::= [APPLICATION 22] IMPLICIT Priority
Priority ::= INTEGER

END -- of DTAM Protocol Normal Mode

```

## 8.2 Abstract syntax definition of APDUs for use of session service

This abstract syntax is described by the notation of ASN.1 defined in the Recommendation X.208.

[1] D-INITIATE-REQ ::= CHOICE

```

{
    [4] IMPLICIT ApplicationCapabilities }
ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL,
    -- '02'H document application profile (T.503)
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    -- '00'H means FDA }

```

[2] D-INITIATE-RESP ::= CHOICE

```

{
    [4] IMPLICIT ApplicationCapabilities }
ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL,
    -- '02'H document application profile (T.503)
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    -- '00'H means FDA }

```

[3] D-CAPABILITY-REQ ::= CHOICE

```

{
    [4] IMPLICIT ApplicationCapabilities }
ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL,
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL,
    nonBasicDocCharacteristics [2] IMPLICIT NonBasicDocCharacteristics OPTIONAL,
    nonBasicStrucCharacteristics [3] IMPLICIT NonBasicStrucCharacteristics OPTIONAL }
    -- "NonBasicDocCharacteristics" and "NonBasicStrucCharacteristics" are defined
    -- in Recommendation T.415

```

[4] D-CAPABILITY-RESP ::= CHOICE

```

{
    [4] IMPLICIT ApplicationCapabilities }
ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL,
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL,
    nonBasicDocCharacteristics [2] IMPLICIT NonBasicDocCharacteristics OPTIONAL,
    nonBasicStrucCharacteristics [3] IMPLICIT NonBasicStrucCharacteristics OPTIONAL }

```

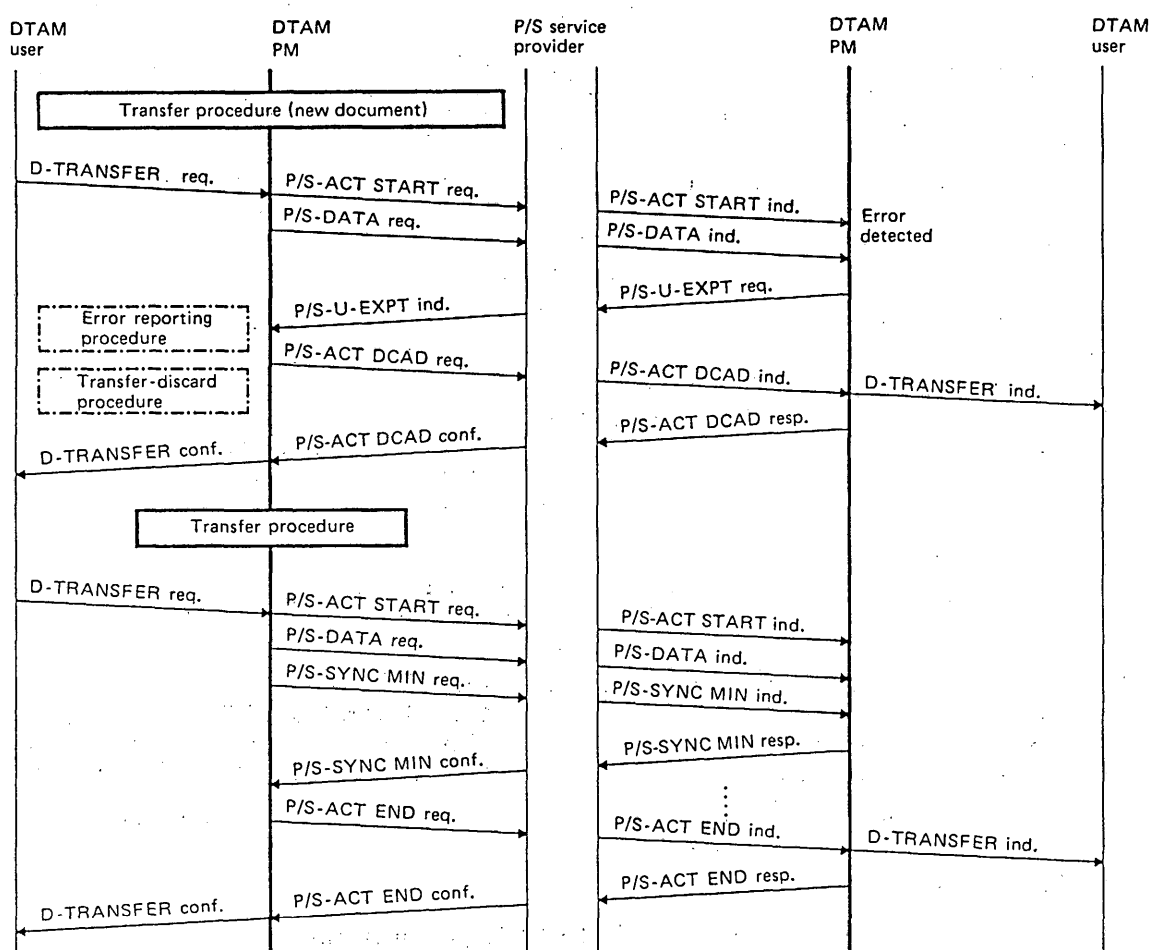
## 9 Conformance

For further study.

ANNEX A  
(to Recommendation T.433)

Reliable transfer modes  
(Informative)

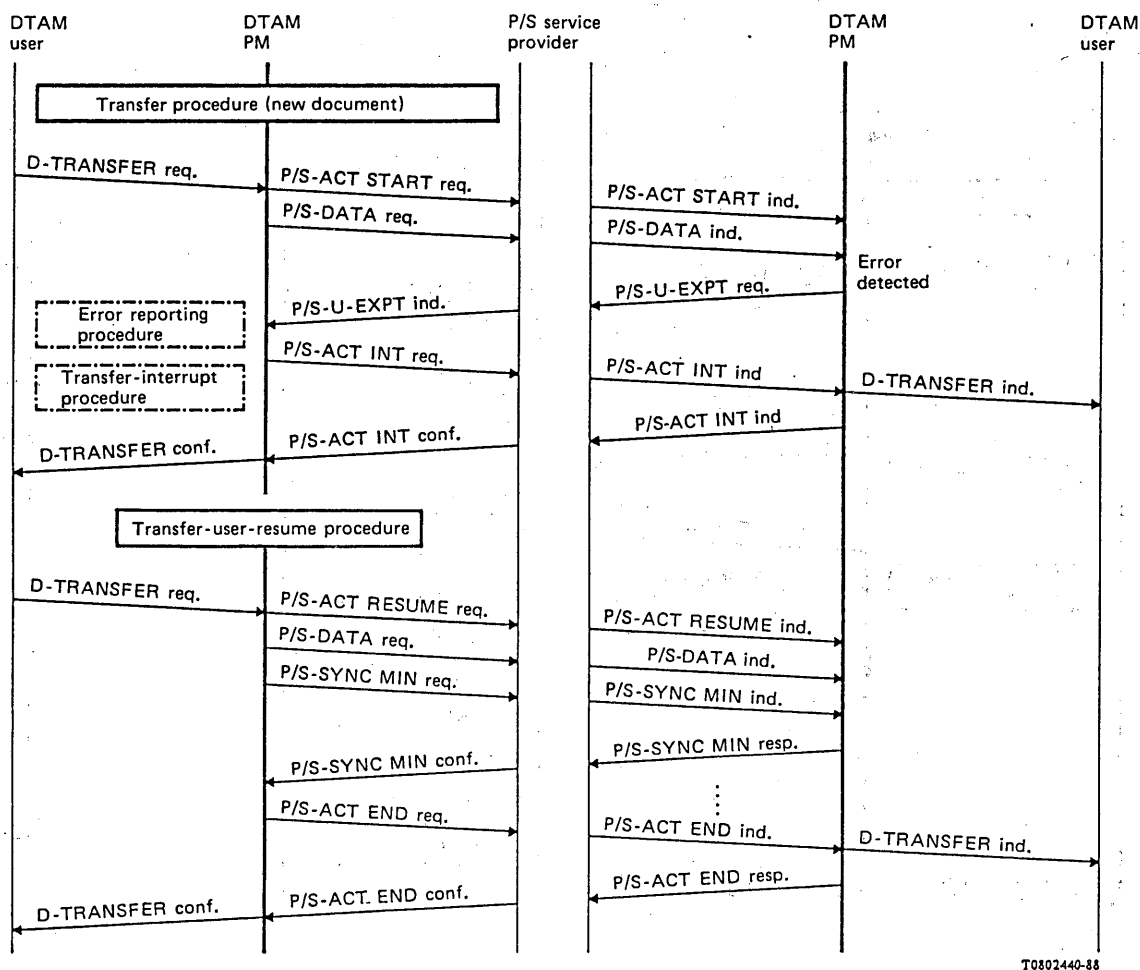
The following figures show the examples of protocol sequence for the reliable transfer modes.



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FIGURE A-1/T.433  
Transfer procedure (transfer-discard procedure)  
(reliable transfer mode 1)

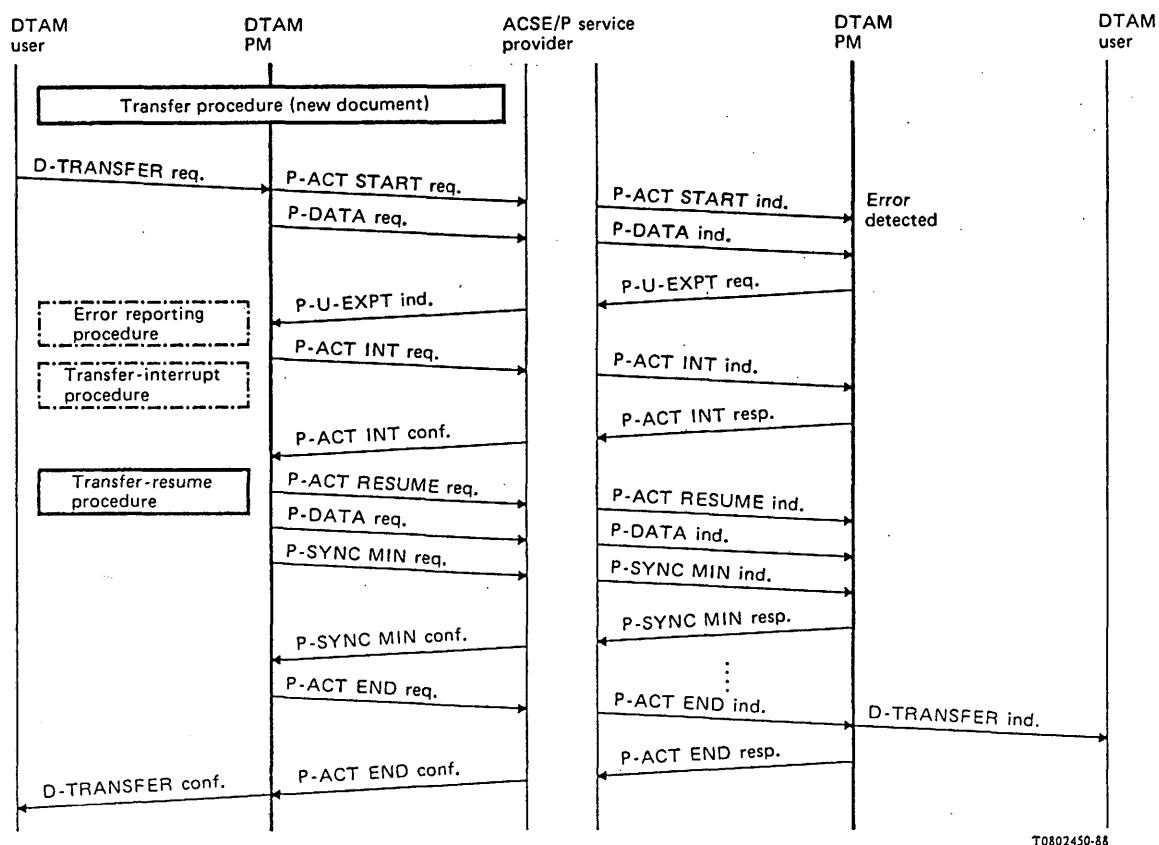




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FIGURE A-2/T.433

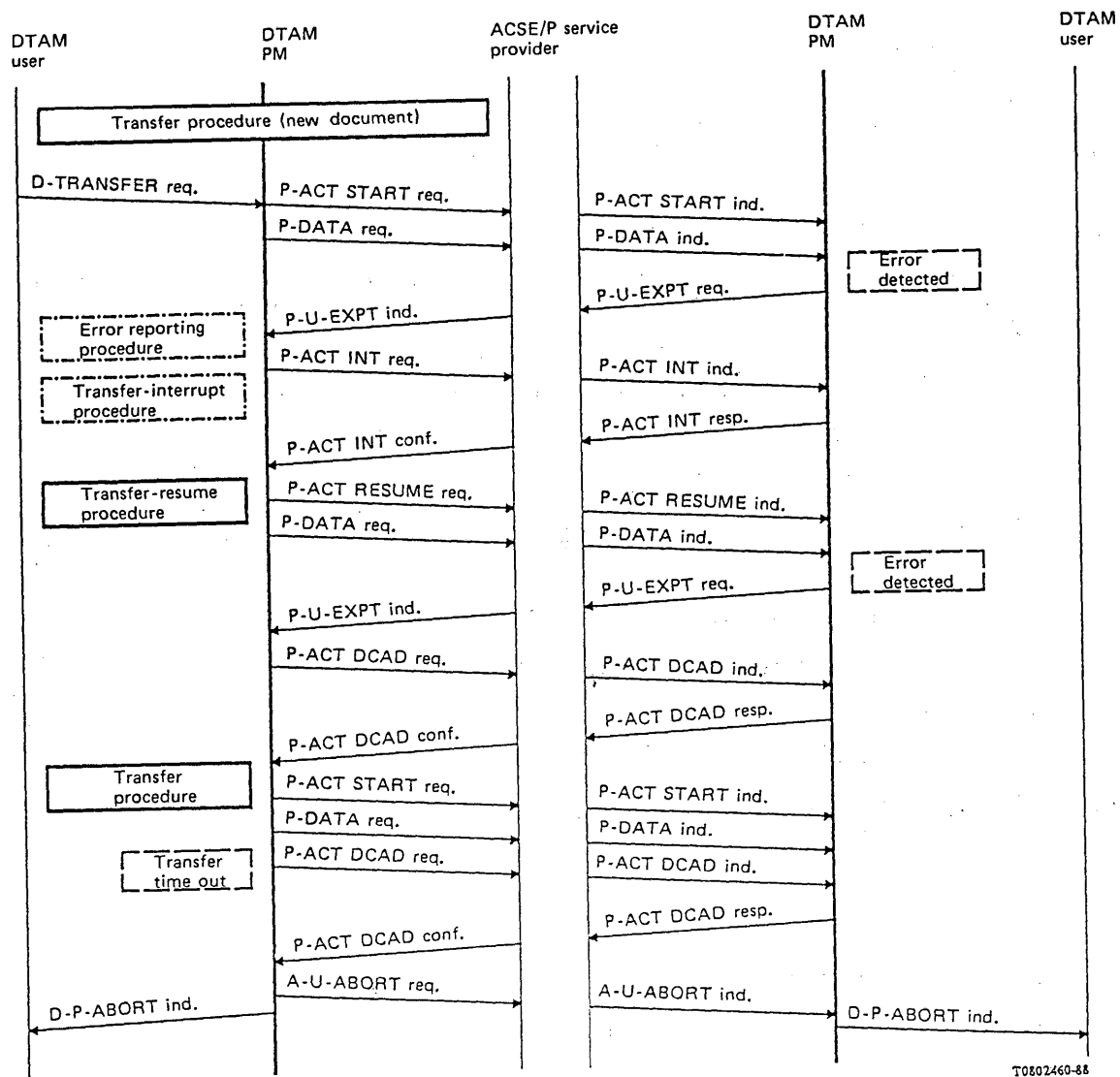
Transfer procedure (transfer-interrupt procedure) and  
transfer-user-resume procedure  
(reliable transfer mode 1)



T0802450-88

FIGURE A-3/T.433

Transfer procedure (transfer-interrupt procedure) and transfer-resume procedure (reliable transfer mode 2)



T0802460-88

FIGURE A-4/T.433

Transfer procedure, transfer-interrupt procedure,  
transfer-resume procedure and transfer time out  
(reliable transfer mode 2)

## ANNEX B

(to Recommendation T.433)

### DTAM-PM state tables

(transparent mode/reliable transfer mode 1)

This Annex forms an informal part of this Recommendation. This Annex is just for reference. Further study is required.

#### B.1 General

This Annex defines a single DTAM Protocol Machine (DTAM-PM) in terms of a state table. The state table shows the interrelationship between the state of an application-association, the incoming events that occur in the protocol, the actions taken, and finally, the resultant state of the application-association.

The DTAM-PM state table does not constitute a formal definition of a DTAM-PM. It is included to provide a more precise specification of the elements of procedure defined in § 6.

This Annex contains the following tables:

- a) Table B-1/T.433 specifies the abbreviated name, source, and name/description of each incoming event. The sources are:
  - 1) DTAM-SE-user (DTAM-SE-user);
  - 2) peer DTAM-PM (DTAM-PM-peer);
  - 3) session service provider (SS-provider);
  - 4) DTAM-PM (DTAM-PM).
- b) Table B-2/T.433 specifies the abbreviated name of each state of the DTAM-PM.
- c) Table B-3/T.433 specifies the abbreviated name, target, and name/description of each outgoing event. The targets are:
  - 1) DTAM-SE-user (DTAM-SE-user);
  - 2) peer DTAM-PM (DTAM-PM-peer);
  - 3) session service provider (SS-provider);
  - 4) DTAM-PM (DTAM-PM).
- d) Table B-4/T.433 specifies the predicates;
- e) Table B-5/T.433 specifies the specific actions;
- f) Table B-6/T.433 through B-14/T.433 including specifies the DTAM-PM state table using the abbreviations of the above tables.

For some events the source and the target is the DTAM-PM (internal event). If the DTAM-PM issues an internal event as part of an action taken, the DTAM-PM awaits that internal event in the resultant state.

TABLE B-1/T.433 (part 1 of 3)

## Incoming event list

Abbreviated name	Source	Name and description
D-CAPreq	DTAM-SE-user	D-CAPABILITY request primitive
D-CAPres+	DTAM-SE-user	D-CAPABILITY response primitive (Result = "accepted")
D-CAPres-	DTAM-SE-user	D-CAPABILITY response primitive (Result = "rejected")
D-INTreq	DTAM-SE-user	D-INITIATE request primitive
D-INTres+	DTAM-SE-user	D-INITIATE response primitive (Result = "accepted")
D-INTres-	DTAM-SE-user	D-INITIATE response primitive (Result = "rejected")
D-TERreq	DTAM-SE-user	D-TERMINATE request primitive
D-TERres	DTAM-SE-user	D-TERMINATE response primitive
D-TRreq	DTAM-SE-user	D-TRANSFER request primitive
D-TRreq*	DTAM-SE-user	D-TRANSFER request primitive for resuming purpose
D-TPreq	DTAM-SE-user	D-TOKEN-PLEASE request primitive
D-CGreq	DTAM-SE-user	D-CONTROL GIVE request primitive
D-UAreq	DTAM-SE-user	D-(USER-)ABORT request primitive
DCPQ	DTAM-PM-PEER	D-CAPABILITY-REQUEST APDU as user data of an S-CAPAB-DATA indication primitive
DCPR+	DTAM-PM-PEER	D-CAPABILITY-RESPONSE APDU as user data of an S-CAPAB-DATA confirm primitive (result = "accepted")

TABLE B-1/T.433 (part 1 of 3) (cont.)

Abbreviated name	Source	Name and description
DCPR-	DTAM-PM-PEER	D-CAPABILITY-RESPONSE APDU as user data of an S-CAPAB-DATA confirm primitive (result = "rejected by ...")
DINQ	DTAM-PM-PEER	D-INITIATE-REQUEST APDU as user data of an S-CONNECT indication primitive
DINR+	DTAM-PM-PEER	D-INITIATE-RESPONSE APDU as user data of an S-CONNECT confirm primitive (result = "accepted")
DINR-	DTAM-PM-PEER	D-INITIATE-RESPONSE APDU as user data of an S-CONNECT confirm primitive (result = "rejected by ...")
DAB	DTAM-PM-PEER	D-ABORT APDU as user data of an S-ABORT indication primitive
DTEQ	DTAM-PM-PEER	D-TERMINATE-RESPONSE APDU as user data of an S-RELEASE indication primitive
DTER	DTAM-PM-PEER	D-TERMINATE-RESPONSE APDU as user data of an S-RELEASE confirm primitive
SEG	DTAM-PM-PEER	Segment of document information as user data of an D-DATA indication primitive

TABLE B-1/T.433 (part 2 of 3)

## Incoming event list

Abbreviated name	Source	Name and description
S-CONcnf-	SS-provider	S-CONNECT confirm primitive (Result = "rejected") no DINR- APDU
S-RElind	SS-provider	S-RELEASE indication primitive
S-RElcnf	SS-provider	S-RELEASE confirm primitive
S-PABind	SS-provider	S-P-ABORT indication primitive
S-ASind	SS-provider	S-ACTIVITY-START indication primitive
S-MSind	SS-provider	S-MINOR-SYNCHRONIZE indication primitive
S-MScnf	SS-provider	S-MINOR-SYNCHRONIZE confirm primitive
S-AEind	SS-provider	S-ACTIVITY-END indication primitive
S-AEcnf	SS-provider	S-ACTIVITY-END confirm primitive
S-CGind	SS-provider	S-CONTROL-GIVE indication primitive
S-TPind	SS-provider	S-TOKEN-PLEASE indication primitive
S-UEind	SS-provider	S-U-EXCEPTION-REPORT indication primitive
S-PEind	SS-provider	S-P-EXCEPTION-REPORT indication primitive
S-AIind	SS-provider	S-ACTIVITY-INTERRUPT indication primitive
S-AIcnf	SS-provider	S-ACTIVITY-INTERRUPT confirm primitive
S-ADind	SS-provider	S-ACTIVITY-DISCARD indication primitive
S-ADcnf	SS-provider	S-ACTIVITY-DISCARD confirm primitive
S-ARind	SS-provider	S-ACTIVITY-RESUME indication primitive

TABLE B-1/T.433 (part 3 of 3)

## Incoming event list

Abbreviated name	Source	Name and description
a-ab	DTAM-PM	association (connection) aborted
a-res	DTAM-PM	activity resumption by the receiving DTAM-PM
a-ret	DTAM-PM	activity completed, discarded, or interrupted
ass-ab	DTAM-PM	start of association (connection)-abort procedure
next	DTAM-PM	transfer of the next segment
p-ab	DTAM-PM	start of provider-abort procedure
tr-discard	DTAM-PM	start of transfer-discard procedure
tr-interr	DTAM-PM	start of transfer-interrupt procedure
tr-p-ab	DTAM-PM	start of procedures transfer-abort followed by provider-abort
tr-pos	DTAM-PM	transfer successful completed
tr-res	DTAM-PM	start of transfer-resumption procedure
transfer	DTAM-PM	start of transfer procedure
resume	DTAM-PM	start of resume procedure
u-exr	DTAM-PM	start of user-exception-report procedure



TABLE B-2/T.433 (part 1 of 2)

## DTAM-PM states

Abbreviated name	Name and description
STA0	idle: unassociated
STA01	awaiting DINR+, DINR-, or A-ASCnf-
STA02	awaiting D-INTres+, or D-INTres-
STA11	associated: DTAM-PM is association-initiating DTAM-PM and sending DTAM-PM
STA111	associated: DTAM-PM is association-initiating DTAM-PM and awaiting DCPR+ or DCPR-
STA12	associated: DTAM-PM is association-initiating DTAM-PM and receiving DTAM-PM
STA121	associated: DTAM-PM is association-initiating DTAM-PM and awaiting D-CAPres+ or D-CAPres-
STA21	associated: DTAM-PM is association-responding DTAM-PM and sending DTAM-PM
STA211	associated: DTAM-PM is association-responding DTAM-PM and awaiting DCPR+ or DCPR-
STA22	associated: DTAM-PM is association-responding DTAM-PM and receiving DTAM-PM
STA221	associated: DTAM-PM is association-responding DTAM-PM and awaiting D-CAPres+ or D-CAPres-
STA30	transfer: sending DTAM-PM
STA31	suspended transfer: sending DTAM-PM
STA32	awaiting-S-AEcnf: sending DTAM-PM
STA321*	awaiting tr-pos: sending DTAM-PM
STA34*	awaiting tr-discard to be followed by D-TRcnf+ sending DTAM-PM
STA341	awaiting S-ADcnf to be followed by D-TRcnf+: sending DTAM-PM
STA35*	awaiting tr-discard to be followed by D-TRcnf-: sending DTAM-PM
STA351	awaiting S-ADcnf to be followed by D-TRcnf-: sending DTAM-PM

TABLE B-2/T.433 (part 2 of 2)

## DTAM-PM states

Abbreviated name	Name and description
STA37*	awaiting tr-interr to be followed by D-TRcnf-: sending DTAM-PM
STA371	awaiting S-AIcnf: sending DTAM-PM
STA38*	awaiting ass-ab: sending DTAM-PM
STA381*	awaiting a-ab: transfer sending DTAM-PM
STA40	awaiting DTR: transfer receiving DTAM-PM
STA400	awaiting DTR: ignored transfer receiving DTAM-PM
STA41	awaiting S-MSind or S-AEind: transfer receiving DTAM-PM
STA410	awaiting S-MSind or S-AEind: ignored transfer receiving DTAM-PM
STA42	awaiting recovery after u-exr event: transfer receiving DTAM-PM
STA43*	awaiting a-ret: transfer receiving DTAM-PM
STA44*	awaiting u-exr: transfer receiving DTAM-PM
STA45*	awaiting a-res: transfer receiving DTAM-PM
STA48*	awaiting ass-ab: transfer receiving DTAM-PM
STA481*	awaiting a-ab: transfer receiving DTAM-PM
STA70*	awaiting abort: unassociated
STA71*	awaiting abort: associated
STA91	awaiting D-TERres
STA92	awaiting S-RELCnf

TABLE B-3/T.433 (part 1 of 3)

## Outgoing event list

Abbreviated name	Target	Name and description
D-CAPind	DTAM-SE-user	D-CAPABILITY indication primitive
D-CAPcnf+	DTAM-SE-user	D-CAPABILITY confirm primitive (Result = "accepted")
D-CAPcnf-	DTAM-SE-user	D-CAPABILITY confirm primitive (Result = "rejected")
D-INTind	DTAM-SE-user	D-INITIATE indication primitive
D-INTcnf+	DTAM-SE-user	D-INITIATE confirm primitive (Result = "accepted")
D-INTcnf-	DTAM-SE-user	D-INITIATE confirm primitive (Result = "rejected")
D-TERind	DTAM-SE-user	D-TERMINATE indication primitive
D-TERcnf	DTAM-SE-user	D-TERMINATE confirm primitive
D-TPind	DTAM-SE-user	D-TOKEN-PLEASE indication primitive
D-TRind	DTAM-SE-user	D-TRANSFER indication primitive
D-TRcnf+	DTAM-SE-user	D-TRANSFER confirm primitive (Result = "Document Information-transferred")
D-TRcnf-	DTAM-SE-user	D-TRANSFER confirm primitive (Result = "Document Information-not-transferred")
D-CGind	DTAM-SE-user	D-CONTROL-GIVE indication primitive
D-UAind	DTAM-SE-user	D-U-ABORT indication primitive
D-PAind	DTAM-SE-user	D-P-ABORT indication primitive

TABLE B-3/T.433 (part 1 of 3) (cont.)

Abbreviated name	Target	Name and description
DCPQ	DTAM-PM-peer	D-CAPABILITY-REQUEST APDU as user data of an S-CAPAB-DATA request primitive
DCPR+	DTAM-PM-peer	D-CAPABILITY-RESPONSE APDU as user data of an S-CAPAB-DATA response primitive (result = "accepted")
DCPR-	DTAM-PM-peer	D-CAPABILITY-RESPONSE APDU as user data of an S-CAPAB-DATA response primitive (result = "rejected by ...")
DINQ	DTAM-PM-peer	D-INITIATE-REQUEST APDU as user data of an S-CONNECT request primitive
DINR+	DTAM-PM-peer	D-INITIATE-RESPONSE APDU as user data of an S-CONNECT response primitive (result = "accepted")
DINR-	DTAM-PM-peer	D-INITIATE-RESPONSE APDU as user data of an S-CONNECT response primitive (result = "rejected by ...")
DAB	DTAM-PM-peer	D-ABORT APDU as user data of an S-ABORT request primitive
DTEQ	DTAM-PM-peer	D-TERMINATE-REQUEST APDU as user data of an S-RELEASE request primitive
DTERR	DTAM-PM-peer	D-TERMINATE-RESPONSE APDU as user data of an S-RELEASE response primitive
SEG	DTAM-PM-peer	Segment of Document Information as user data of an D-DATA request primitive

TABLE B-3/T.433 (part 2 of 3)

## Outgoing event list

Abbreviated name	Target	Name and description
S-RELreq	SS-provider	S-RELEASE request primitive
S-RELres	SS-provider	S-RELEASE response primitive
S-ASreq	SS-provider	S-ACTIVITY-START request primitive
S-MSreq	SS-provider	S-MINOR-SYNCHRONIZE request primitive
S-MSres	SS-provider	S-MINOR-SYNCHRONIZE response primitive
S-AEreq	SS-provider	S-ACTIVITY-END request primitive
S-AEres	SS-provider	S-ACTIVITY-END response primitive
S-CGreq	SS-provider	S-CONTROL-GIVE request primitive
S-TPreq	SS-provider	S-TOKEN-PLEASE request primitive
S-UEreq	SS-provider	S-U-EXCEPTION-REPORT request primitive
S-AIreq	SS-provider	S-ACTIVITY-INTERRUPT request primitive
S-AIres	SS-provider	S-ACTIVITY-INTERRUPT response primitive
S-ADreq	SS-provider	S-ACTIVITY-DISCARD request primitive
S-ADres	SS-provider	S-ACTIVITY-DISCARD response primitive
S-ARreq	SS-provider	S-ACTIVITY-RESUME request primitive

TABLE B-3/T.433 (part 3 of 3)

## Outgoing event list

Abbreviated name	Target	Name and description
a-ab	DTAM-PM	association (connection) aborted
a-res	DTAM-PM	activity resumption by the receiving DTAM-PM
a-ret	DTAM-PM	activity completed, discarded, or interrupted
ass-ab	DTAM-PM	start of association-abort procedure
ass-rec	DTAM-PM	start of association-recovery procedure
next	DTAM-PM	transfer of the next segment
p-ab	DTAM-PM	start of provider-abort procedure
tr-discard	DTAM-PM	start of transfer-discard procedure
tr-interr	DTAM-PM	start transfer-interrupt procedure
tr-p-ab	DTAM-PM	start of procedures transfer-abort followed by provider-abort
tr-pos	DTAM-PM	transfer successful completed
transfer	DTAM-PM	start of transfer procedure
resume	DTAM-PM	start of user-resume procedure
u-exr	DTAM-PM	start of user-exception-report procedure

TABLE B-4/T.433

## Predicates

Code	Name and description
p1	DTAM-PM can support the request application-association (connection)
p2	turn assigned to DTAM-PM
p11	association-initiating DTAM-PM
P30	only one segment required to transfer the encoded-APDU-value (no checkpointing)
p31	segment is the last one in a series of segments to transfer the encoded-APDU-value
p32	outstanding-minor-syncs < window-size
p33	outstanding-minor-syncs = 0
p34	sending DTAM-PM is willing to recover from S-PEind
p35	checkpoint-confirmed (at least on S-MScnf received)
p361	reason parameter value of S-UEind is "receiving ability jeopardized"
p362	reason parameter value of S-UEind is "unrecoverable procedure error"
p363	reason parameter value of S-UEind is "non-specific error"
p364	reason parameter value of S-UEind is "sequence error"
p365	reason parameter value of S-UEind is "local SS-user error"
p37	transfer-completed
p41	received segment secured
p42	complete DTAM-SE-user APDU secured
p43	transfer to be resumed was already completed
p44	receiving DTAM-PM is willing to perform and ignore transfer

TABLE B-5/T.433

## Specific actions

Code	Name and description
a1	association-initiating DTAM-PM = TRUE
a2	association-initiating DTAM-PM = FALSE
a30	outstanding-minor-syncs = 0, set timer tr to transfer-time, transfer-completed = FALSE, checkpoint-confirmed = FALSE.
a31	outstanding-minor-syncs = outstanding-minor-syncs +1
a32	outstanding-minor-syncs = outstanding-minor-syncs -1 checkpoint-confirmed = TRUE
a41	set reason parameter value of S-UEreq to "sequence error"
a93	transfer-completed = TRUE
a94	transfer-completed = FALSE



TABLE B-6/T.433

DTAM-PM state table: Association-establishment

	STA01	STA01	STA02
D-INTreq	p1: DINQ [a1] STA01		
D-INTres+			DINR+ STA22
D-INTres-			DINR- STA0
DINQ	p1: D-INTind [a2] STA02  -p1: DINR- STA0		
DINR+		D-INTcnf+ STA11	
DINR-		D-INTcnf- STA0	
D-UAreq		DAB STA0	DAB STA0
DAB		D-UAind STA0	D-UAind STA0
S-PABind		D-PAind STA0	D-PAind STA0

TABLE B-7/T.433 (part 1 of 2)

DTAMPM state table: Association-established, outside transfer

	STA11	STA12	STA21	STA22
D-TRreq	transfer		transfer	
D-TRreq*	resume		resume	
D-CAPreq	DCPQ STA111		DCPQ STA211	
DCPQ		D-CAPind STA121		D-CAPind STA221
D-TERreq	DTEQ STA92			
DTEQ				D-TERind STA91
D-TPreq		S-TPreq STA12		S-TPreq STA22
S-TPind	D-TPind STA11		D-TPind STA21	
D-CGreq	S-CGreq STA12		S-CGreq STA22	
S-CGind		D-CGind STA11		D-CGind STA21
D-UAreq	DAB STA0	DAB STA0	DAB STA0	DAB STA0
DAB	D-UAind STA0	D-UAind STA0	D-UAind STA0	D-UAind STA0
S-PABind	D-PAind STA0	D-PAind STA0	D-PAind STA0	D-PAind STA0

TABLE B-7/T.433 (part 2 of 2)

DTAMPM state table: Association-established, outside transfer

	STA111	STA121	STA211	STA221
D-CAPres+		DCPR+ STA12		DCPR+ STA22
D-CAPres-				
DCPR+	D-CAPcnf+ STA11		D-CAPcnf+ STA21	
DCPR-				
D-UAreq	DAB STA0	DAB STA0	DAB STA0	DAB STA0
DAB	D-UAind STA0	D-UAind STA0	D-UAind STA0	D-UAind STA0
S-PABind	D-PAind STA0	D-PAind STA0	D-PAind STA0	D-PAind STA0

TABLE B-8/T.433 (part 1 of 2)

DTAM-PM, transfere: Sending DTAM-PM, transfer

	STA30	STA31	STA32	STA321*
transfer	p30 [a30] S-ASreq SEG S-AEreq STA32 ~p30: [a30] S-ASreq next STA30			
resume	p30 [a30] S-ARreq SEG S-AEreq STA32 ~p30: [a30] S-ARreq next STA30			
next	p32&~p31: SEG S-MSreq [a31] next STA30 p32&~p31: SEG S-AEreq STA32 ~p32: STA31			
P-MScnf	[a32] STA30	[a32] next STA30	[a32] STA32	
P-AEcnf			p33 tr-pos STA321	
tr-pos				p11: D-TRcnf+ STA11 ~p11: D-TRcnf+ STA21

TABLE B-8/T.433 (part 2 of 2)

DTAM-PM state table: Sending DTAM-PM, transfer

	STA30	STA31	STA32
S-UEind	p361: tr-p-ab STA71 p362: tr-discard STA35 p363: tr-discard STA35 p364: tr-discard STA34 p365&p35: tr-interr STA37 p365&¬p35: tr-discard STA35	p361: tr-p-ab STA71 p362: tr-discard STA35 p363: tr-discard STA35 p364: tr-discard STA34 p365&p35: tr-interr STA37 p365&¬p35: tr-discard STA35	p361: tr-p-ab STA71 p362: tr-discard STA35 p363: tr-discard STA35 p364: tr-discard STA34 p365&p35: tr-interr STA37 p365&¬p35: tr-discard STA35
S-PEind	p34&p35: tr-interr STA37 p34&¬p35: tr-discard STA35 ¬p34: tr-p-ab STA71	p34&p35: tr-interr STA37 p34&¬p35: tr-discard STA35 ¬p34: tr-p-ab STA71	p34&p35: tr-interr STA37 p34&¬p35: tr-discard STA35 ¬p34: tr-p-ab STA71
S-PABind	a-ab STA381	a-ab STA381	a-ab STA381
D-UAreq	DAB STA0	DAB STA0	DAB STA0
DAB	D-UAind STA0	D-UAind STA0	D-UAind STA0

TABLE B-9/T.433

DTAM-PM state table: Sending DTAM-PM, error handling

	STA34*	STA341	STA35*	STA351
tr-discard	S-ADreq STA341		S-ADreq STA351	
D-ADcnf		tr-pos STA321		p11: D-TRcnf- STA11  ¬p11: D-TRcnf- STA21
S-PABind		a-ab STA381		a-ab STA381
D-UAreq		DAB STA0		DAB STA0
DAB		D-UAind STA0		D-UAind STA0

TABLE B-10/T.433

DTAM-PM state table: Sending DTAM-PM error handling

	STA37*	STA371
tr-interr	S-AIreq STA371	
S-AIcnf		p11: D-TRcnf- STA11 ¬p11 D-TRcnf- STA12
S-PABind		a-ab STA381
D-UAreq		DAB STA0
DAB		D-UAind STA0

TABLE B-11/T.433

DTAM-PM state table: Sending DTAM-PM error handling

	STA38*	STA381*
ass-ab	DAB a-ab STA381	
a-ab		D-PAind STA0

TABLE B-12/T.433

DTAM-PM state table: Receiving DTAM-PM

	STA40	STA41	STA400	STA410	STA42
DTNQ	STA41		STA41		
S-MSind		p41: S-MSres STA40		S-MSres STA400	
S-AEind		D-TRind			
S-AIind	S-AIres a-ret STA43	S-AIres a-ret STA43	S-AIres a-ret STA43	S-AIres a-ret STA43	S-AIres a-ret STA43
S-ADind	S-ADres a-ret STA43	S-ADres a-ret STA43	S-ADres a-ret STA43	S-ADres a-ret STA43	S-ADres a-ret STA43
S-PEind	STA40	STA41	STA400	STA410	STA42
S-PABind	a-ab STA481	a-ab STA481	a-ab STA481	a-ab STA481	a-ab STA481
D-TPreq	S-TPreq STA40	S-TPreq STA41	S-TPreq STA400	S-TPreq STA410	
D-UAreq	DAB STA0	DAB STA0	DAB STA0	DAB STA0	DAB STA0
DAB	D-UAind STA0	D-UAind STA0	D-UAind STA0	D-UAind STA0	D-UAind STA0

TABLE B-13/T.433

DTAM-PM state table: Receiving DTAM-PM error handling

	STA43*	STA44*	STA45*	STA48*	STA481*
a-ret	p11: STA12  ¬p11: STA22				
u-exr		S-UEreq [a38] STA42			
a-res			¬p43: STA40  p43&p44: STA400  p43&¬p44: [a41] u-exr STA44		
ass-ab				DAB a-ab STA481	
a-ab					D-PAind STA0

TABLE B-14/T.433

DTAM-PM state table: Abort and association-release

	STA70*	STA71*	STA91	STA92
tr-p-ab	D-TRcnf- D-PAind STA0	D-TRcnf- DAB D-PAind STA0		
p-ab	D-PAind STA0	D-PAind DAB STA0		
D-TERres			S-RELres STA0	
S-RELcnf				D-TERcnf STA0

## B.2 Conventions

The intersection of an incoming event (row) and a state (column) forms a cell.

In the state table, a blank cell represents the combination of an incoming event and a state that is not defined for the DTAM-PM (see § B.3.1). Some states await solely some incoming events from the source DTAM-PM (internal events). These states are marked by \* and no other incoming events are considered.

A non-blank cell represents an incoming event and a state that is defined for the DTAM-PM. Such a cell contains one or more action lists. An action list may be either mandatory or conditional. If a cell contains a mandatory action list, it is the only action list in the cell.

A mandatory action list contains:

- a) optionally one or more outgoing events;
- b) optionally one or more specific actions;
- c) an resultant state.

A conditional action list contains:

- a) a predicate expression comprising predicates and Boolean operators (– represents the Boolean NOT, & represents the Boolean AND);
- b) a mandatory action list. (This mandatory action list is used only if the predicate expression is true.)

## B.3 Actions to be taken by the DTAM-PM

The DTAM-PM state table defines the action to be taken by the DTAM-PM in terms of an optional outgoing event, optional specific actions, and the resultant state of the application-association.

### B.3.1 Invalid intersections

Blank cells indicate an invalid intersection of an incoming event and state. If such an intersection occurs, one of the following actions is taken:

- a) If the incoming event comes from the DTAM-SE-user, or is an internal event, any action taken by the DTAM-PM is a local matter.
- b) If the incoming event is related to a received APDU, or SS-provider, either the DTAM-PM issues an appropriate internal event, or the DTAM-PM issues both a D-PAind outgoing event (to its DTAM-SE-user) and a DAB outgoing event (to its peer DTAM-PM).

### B.3.2 Valid intersections

If the intersection of the state and incoming event is valid, one of the following actions is taken:

- a) If the cell contains a mandatory action list, the DTAM-PM takes the actions specified.
- b) If a cell contains one or more conditional action lists, for each predicate expression that is true, the DTAM-PM takes the actions specified. If none of the predicate expressions are true, the DTAM-PM takes one of the actions defined in § B.3.1.

## B.4 Definition of variables

The following variables are specified.

### B.4.1 Association-initiating DTAM-PM

This Boolean variable is set TRUE if the DTAM-PM is the association-initiating DTAM-PM (specific action [a1]), otherwise it is set FALSE (specific action [a2]).

This Boolean variable is tested in the predicate p11.



#### B.4.2 *Checkpoint-confirmed*

This Boolean variable is TRUE, if at least one checkpoint was confirmed during the transfer procedure. It is set FALSE at the beginning of the transfer procedure (specific action [a30]). It is set TRUE, if an S-MINOR-SYNCHRONIZE confirm primitive is issued to the sending DTAM-PM (specific action [a32]).

#### B.4.3 *Transfer-completed*

This Boolean variable is TRUE, if the receiving DTAM-PM aborted the association because it could not discard an already completed transfer. It is set by the specific actions [a93] and [a94].

This Boolean variable is tested in the predicate p37.

#### B.4.4 *Outstanding-minor-syncs*

This integer variable indicates the number of outstanding checkpoint confirmations during the transfer procedure. It is set to zero at the beginning of the transfer procedure (specific action [a30]). It is incremented by one, if a S-MINOR-SYNCHRONIZE request primitive is issued by the sending user to the sending DTAM-PM (specific action [a31]).

The value of this variable is compared with the value of the window-size field of the S-CONcnf in the predicate p32. The value of this variable is compared with the value zero in the predicate p33.

### Recommendation T.441

## DOCUMENT TRANSFER AND MANIPULATION (DTAM) - OPERATIONAL STRUCTURE

### CONTENTS

#### *Scope*

- 1 *Overview of operational concept*
- 2 *Operational application profile rules*
- 3 *Operational structures*
- 4 *Operational reference model*
- 5 *Operational profile information*
- 6 *Operational data formats*

#### *Scope*

This Recommendation has been established to cover the needs of videotex interworking. It will be further developed to cover the needs of other telematic services.

The operational structure should be developed as a set of rules for an interface between telematic applications based on T.400 Series of Recommendations and an ODA-document.

## 1 Overview of operational concept

A document is defined in terms of logical and/or layout structure according to the specifications of the T.410 Series of Recommendations.

The basic principle of the operational concept is to provide the means for the integration of telematic services requirements, not covered by the T.410 Series of Recommendations within the applications on the top of DTAM (see Figure 1/T.441).

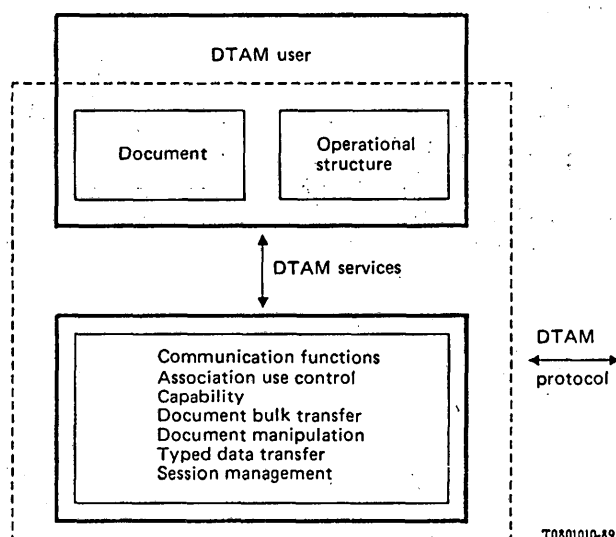


FIGURE 1/T.441

### Overview of DTAM (including operational structure)

Document handling, e.g. access to parts of a document and manipulation of a document requires detailed considerations; two aspects of document handling shall be distinguished:

- a) In addition to the document, structural concepts need to be defined in T.400 Series of Recommendations; these concepts shall define the structural aspect of the document handling (as for example "forms for data entry").

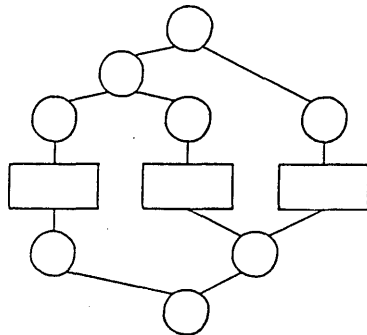
*Note* - The definition of structural concepts is not in the scope of this Recommendation. Specifications concerning such concepts require further detailed study.

- b) In addition to the document, applications may require operational features which provide information for the interface between the document and the application. Interfaces are for example necessary for "Data Entry", "Spread Sheet", "Remote Editing", etc.

As an application on top of DTAM shall solely use DTAM service and protocol, this Recommendation provides the operational concept which allows to integrate operational features within the concept of DTAM.

The operational structure is introduced as a set of rules to structure the interface between a document and the application (see Figure 2/T.441). By defining a mapping onto the operational structure, the application integrates its operational features within DTAM. The mapping has to be specified within the appropriate Recommendation for the relevant application. The semantic of the interface is generally determined by the relevant application.

T. 410 Series of Recommendations provide the document structure



Additional features such as forms for data entry, for further study

This Recommendation provides operational structures

The application handles the document in a specific way:  
(For example data entry programs) using the structured interface



T0801020-89

FIGURE 2/T.441

**Operational structures provide the information for a structured interface between the document and the application**

## 2 Operational application profile rules

### 2.1 General principles

This section specifies how operational application profiles can be implemented by using this Recommendation. Application defined usage of T.400 Series of Recommendations is specified in terms of application profiles. An application profile consists of a combination of:

- document application profiles according to the rules defined in T.411;
- communication application profiles according to the rules defined in T.431;
- operational structure application profiles according to the rules which will be defined in this Recommendation.

## 3 Operational structures

This section describes the operational concept which is the basis for remote operation on a document. It facilitates access and manipulation to parts of a document through operations defined in T.430 Series of Recommendations.

The concept can be used to associate application defined attributes and content with constituents of documents. For example, it may be used to specify fields for data entry and actions on the content of these fields. In this example, the semantics for data entry and actions may be expressed by the application.

The operational structure follows in general the structuring principles typical of the document architecture as described in T.412.

The constituents of the operational structure reference the document constituents they are operating on.

Multiple operational structures may be defined referring to a single document class.

#### **4 Operational reference model**

This section describes the common understanding of operations on:

- the document as a whole;
- parts of document.

This section provides a narrative description of these operations.

At present two types of operations will be defined:

- partial document transfer;
- remote document update.

Any complete set of operations on a document using the operational structure should result in a document conforming to the rules of the T.410 Series of Recommendations.

#### **5 Operational profile information**

An operational structure profile includes information concerning:

- the reference to a document or a document class;
- application dependent references;
- operational structure level;
- the type of the content.

#### **6 Operational data formats**

This section describes the format of the datastream used to interchange operational structures.

The operational structure can be interchanged as a whole or in parts.

The datastream is described in terms of a set of operational interchange data units which represent the constituents (e.g. operational profile, object class descriptors, object descriptors, and content) of an operational structure.

The formats of the interchanged data units are defined using the abstract syntax notation one (ASN.1).

A DOCUMENT APPLICATION PROFILE MM  
FOR THE INTERCHANGE OF FORMATTED MIXED MODE DOCUMENT

CONTENTS

- 1 *Scope*
  - 2 *Field of application*
  - 3 *References*
  - 4 *Definitions*
  - 5 *Characteristics supported by this document application profile*
    - 5.1 Overview
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    - 5.3 Layout characteristics
    - 5.4 Document layout features
    - 5.5 Content layout and imaging characteristics
  - 6 *Specification of the document application profile*
    - 6.1 Summary of the technical specification
    - 6.2 Logical structure
    - 6.3 Layout structure
    - 6.4 Content architectures
    - 6.5 Document profile
    - 6.6 Interchange format
- Annex A* - Format of the values of the attributes "object identifier", "object class identifier", "object class" and "subordinates"

1 *Scope*

1.1 This Recommendation defines a document application profile conforming to the T.410 Series of Recommendations.

Its purpose is to specify an interchange format suitable for the interchange of mixed mode documents such as memoranda, letters and reports that contain characters and raster graphics.

Documents are interchanged only in a formatted form which enables the recipient to only display or print the document as intended by the originator.

1.2 The features which can be interchanged using this document application profile fall into the following categories:

- a) page format features - these concern how the layout of each page of a document will appear when reproduced;
- b) character content and raster graphics layout and imaging features - these concern how the document content will appear within pages of the reproduced document;
- c) character repertoire - these concern the character sets and control functions that make up the document character content;
- d) raster graphics coding - these concern the raster graphics representations and control functions that make up the document raster graphics content.

## 2 Field of application

2.1 This Recommendation defines a document application profile that is in conformance with the T.410 Series of Recommendations and that allows mixed mode documents to be interchanged only in a formatted form, which allows a recipient to reproduce the document as intended by the originator.

2.2 This recommendation defines a document application profile that may be used by any telematic service.

2.3 This document application profile is designed to be independent of the means used to create or to interchange the encoded documents.

2.4 It is assumed that, when negotiation is performed by the service using this document application profile, all non-basic features are subject to negotiation.

## 3 References

The following references are required in order to implement this Recommendation:

- T.400 Series of Recommendation: "Document architecture, transfer and manipulation".
- Rec. T.6: "Facsimile coding schemes and coding control functions for group 4 facsimile apparatus".
- Rec. T.61: "Character repertoire and coded character sets for the international teletex service".
- Rec. X.208: "Specification of abstract syntax notation one (ASN.1)".
- Rec. X.209: "Specification of basic encoding rules for abstract syntax notation one (ASN.1)".
- ISO 6937: "Information processing - coded character sets for text communication".

## 4 Definitions

The definitions in Recommendation T.411 apply to this Recommendation.

## 5 Characteristics supported by this document application profile

### 5.1 Overview

A mixed mode document is the result of a formatting process and therefore the purpose of this document application profile is to allow transfer of the complete layout of the interchanged document.

Furthermore, two categories of content are allowed within the same page, namely:

- a character content as used by word processing machines (e.g. basic teletex equipment);
- a raster graphics content as used by facsimile group 4 apparatus.

This section specifies the functional description of the features supported by this document application profile.

### 5.2 Logical characteristics

Not applicable.

### 5.3 Layout characteristics

#### 5.3.1 The document layout structure

A document is seen as a succession of pages.

The content of a page may be:

- character content; or
- raster graphics content; or
- both of them.

When different content types are used within the same page, this page must be composed of several blocks.

Each block has a homogeneous content.

### 5.3.2 Page layout characteristics

#### 5.3.2.1 The text area

The text area is the area made available for the positioning and display of the document content. The dimensions of the text area must be equal to or smaller than the dimensions of the nominal page corresponding to the paper format used.

The possible paper formats are defined in Recommendation T.561.

Only the vertical orientation of the page is permitted.

#### 5.3.2.2 Block

##### 5.3.2.2.1 Position and dimension

Each block is positioned in the page and has its own dimensions (independently of the other blocks). Figure 1/T.501 gives an example of a page.

### 3.3 First application example: THE MIXED MODE

This is the possibility of mixing various coding types (characters, pels, geometric primitives, etc.) on the same page of a document. The document architecture is thus used to mark out physical areas (blocks) and associates contents with it so as to reproduce the initial image of the page.

The CCITT has, during its last study period, standardized the "mixed mode" application for teletex terminals and group 4 facsimile equipments. This application, described in Recommendation T.72, only allows at present the mixture of characters and photographic images (facsimile encoded information).

Figure 10 illustrates the mixed mode application in the form of a layout tree with which leaves of different natures are associated. It is as yet too early to know horticulturists' or agronomists' impressions about this surprising property which electronics can now offer!!!

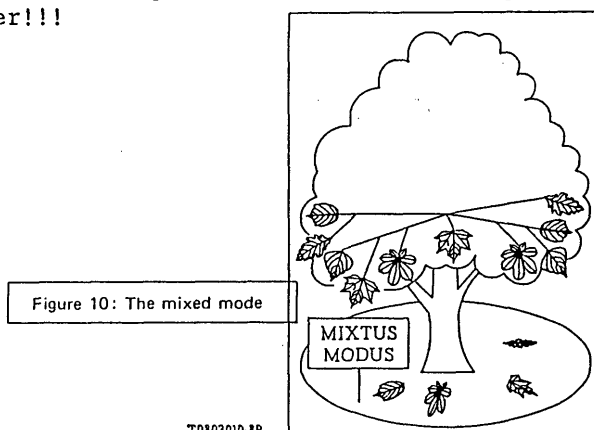


FIGURE 1/T.501

An example of a page

#### 5.3.2.2.2 Overlay

Within a page, blocks may be positioned in such a way that they intersect partially or fully, i.e. they share common areas.

All blocks are "transparent", that means that the contents of the intersecting areas are combined.

#### 5.4 Document layout features

Not applicable.

#### 5.5 Content layout and imaging characteristics

5.5.1 The mixed mode document may contain blocks with characters in teletex format and blocks with raster graphics in facsimile group 4 format.

The characteristics of the content of a block, such as the line spacing or the character path, are independent of those of other blocks.

All the characteristics cannot be altered anywhere within a block.

#### 5.5.2 Character content block

##### 5.5.2.1 General

The character content blocks contain graphic characters and control functions. The control functions define format effectors such as space or carriage return.

##### 5.5.2.2 Line spacing

This property specifies the distance between successive lines of text.  
The basic values are:

SMU	Lines per 25.4 mm (when the scaling factor is one)
200 (by default)	6 (by default)
400	3
300	4
100	12

The negotiable value is 150 SMU which correspond to 8 lines per 25.4 mm when the scaling factor is one.

##### 5.5.2.3 Character spacing

This specifies the distance between successive characters on a line of text.

The basic value is 120 SMU which correspond to 10 characters per 25.4 mm when the scaling factor is one.

The negotiable values are:

SMU	Characters 25.4 mm (when the scaling factor is one)
200	6
100	12
80	15



#### 5.5.2.4 *Character path*

This specifies that direction of progression of successive characters along a line of characters.

The basic values are 0° (by default) and 90°.

The negotiable value is 270°.

The mentioned values are measured anti-clockwise.

#### 5.5.2.5 *Emphasis*

This specifies the presentation of the characters. Four modes are available: normal rendition (by default), underlined, italicized and bold.

#### 5.5.2.6 *First character position*

The position of the first character, that may be a space, is defined by cartesian coordinates.

### 5.5.3 *Raster graphics content block*

#### 5.5.3.1 *General*

The content of blocks of raster graphics is defined by the initial offset (by default, the left top corner) and the dimensions of the array of pixels.

#### 5.5.3.2 *Pel transmission density*

The basic values are:

SMU	Pels per 25.4 mm (when the scaling factor is one)
5	240
4	300

The negotiable values are:

SMU	Pels per 25.4 mm (when the scaling factor is one)
6	200
3	400
2	600
1	1200

#### 5.5.4 *Received document*

This document application profile, being limited to formatted form, does not support any features to facilitate processing of an interchanged document by a receiver.

## 6 *Specification of the document application profile*

### 6.1 *Summary of the technical specification*

#### 6.1.1 *Overview*

This section contains the technical specification of the document application profile MM.1. This is in accordance with Recommendation T.411.

MM.1 allows documents to be represented in the formatted form, which allows a recipient to reproduce the document as intended by the originator.

#### 6.1.2 *Specification of constituents*

This section specifies the required and optional constituents used for the representation of documents that conform to MM.1. Also, it specifies the content architectures that may be present in these documents.

Constituents specified as "required" must occur in any document that conforms with MM.1. Constituents listed as "optional" may or may not be present in the document depending upon the requirements of the particular document. The document profile indicates which constituents are present in the document.

##### 6.1.2.1 *Required constituents*

- a document profile as specified in § 6.5;
- layout object descriptions representing a specific layout structure as defined in § 6.3.2.

##### 6.1.2.2 *Optional constituents*

- layout object class descriptions representing a "partial" generic layout structure as defined in § 6.3.1.

#### 6.1.3 *Interchange format class*

The interchange format class used in this document application profile is "A", as defined in Recommendation T.415.

#### 6.1.4 *Object identifiers*

The ASN.1 object identifier value to designate the document application profile MM.1 is:

{0020 501 0}

#### 6.2 *Logical structure*

Not applicable.

#### 6.3 *Layout structure*

##### 6.3.1 *The generic layout structure*

The generic layout structure is a "partial" structure and its purpose is to provide for factorization. That is, the "partial" generic layout structure provides for predefined attributes values and content portions for objects in the specific layout structure.

The generic layout structure may contain three types of object classes, namely the document layout root class, the page class and the block class. All are optional.

##### 6.3.2 *The specific layout structure*

The number of hierarchical levels allowed is 3, namely:

- document layout root;
- page;
- block.

The three levels are mandatory. If the content portions are not directly associated with each block, then the content portions must be derived from a referenced object class of type block.

### 6.3.3 Attributes of layout components

#### 6.3.3.1 Application and classification of attribute for layout component descriptions

The attributes application for MM are defined in Table 1/T.501. The following notation is used in this table:

The form .../... represents:  
object class description/object description

where ... is replaced by:

--- attribute not applicable to either object class or object description;

-- attribute not applicable;

m mandatory attribute;

nm non-mandatory attribute;

d defaultable attribute.

Capital letters (M, NM and D) are used for groups of attributes.

TABLE 1/T.501

Attributes application and classification

Attribute	Document layout root	Page	Block
<i>Shared attributes</i>			
Object type	m/m	m/m	m/m
Object identifier	--/m	--/m	--/m
Object class identifier	m/--	m/--	m/--
Generator for subordinates	---	---	---
Object class	--/nm	--/nm	--/nm
Subordinates	--/m	--/m	--/--
Resource	---	---	---
Presentation style	---	---	---
Presentation attributes	---	---	nm/d
User visible name	---	---	---
Bindings	---	---	---
Content portions	---	---	nm/nm
User readable comments	nm/d	nm/d	nm/d
Default value lists	nm/nm	nm/nm	---
<i>Layout attributes</i>			
Dimensions	---	nm/d	nm/d
Position	---	nm/d	nm/d
Layout texture	---	---	---
Border	---	---	---
Balance	---	---	---
Layout path	---	---	---
Logical source	---	---	---
Permitted category	---	---	---
Imaging order	---	---	---
Page position	---	---	---
Medium type	---	---	---

TABLE 2/T.501

## Attribute values for layout object class descriptions

Attribute	Basic value	Non-basic value
<i>Shared attributes</i>		
Object type	document layout root, page, block	none
Object class identifier	as defined in Rec. T.412 (see also Annex A)	none
Content portions	as defined in Rec. T.412	none
Default value lists	see Table 4/T.501	none
Presentation attributes	see Table 5/T.501	
Dimensions	horizontal $\leq 9920$ SMU vertical $\leq 14030$ SMU	North-American $\leq (10200, 13200)$ ISO A3 $\leq (14030,$ 19840) Japanese legal $\leq (12141, 17196)$ Japanese letter $\leq (8598, 12141)$
Position	horizontal = any non-negative integer vertical = any non- negative integer	

TABLE 3/T.501

## Attribute values for layout object descriptions

Attribute	Basic value	Default value	Non-basic value
<i>Shared attributes</i>			
Object type	document layout root, page, block	none	none
Object identifier	as defined in Rec. T.412 (see also Annex A)	none	none
Object class	as defined in Rec. T.412 (see also Annex A)	none	none
Subordinates	as defined in Rec. T.412 (see also Annex A)	none	none
Content portions	as defined in Rec. T.412	none	none
Default value lists	see Table 4/T.501	none	none
Presentation attributes	see Table 5/T.501		
Dimensions	horizontal $\leq 9920$ SMU vertical $\leq 14030$ SMU	as defined in Rec. T.412	North-American $\leq (10200, 13200)$ ISO A3 $\leq (14030,$ 19840) Japanese legal $\leq (12141, 17196)$ Japanese letter $\leq (8598, 12141)$
Position	horizontal = any non-negative integer vertical = any non- negative integer		

#### 6.3.4 Default value lists for layout component descriptions (see Table 4/T.501)

TABLE 4/T.501

Defaultable attributes that may be specified  
in a default value list

Object type	Defaultable attributes that can be specified
Page	dimensions
Block	presentation attributes dimensions position

#### 6.4 Content architectures

##### 6.4.1 Content architecture levels

Two content architecture levels are defined in this document application profile, namely:

- a formatted character content architecture level;
- a formatted raster graphics content architecture level.

These are defined in the following subsections in accordance with Recommendation T.411.

##### 6.4.2 Type of coding for the formatted character content architecture level

The set of graphic elements and the type of coding to be used are defined in Recommendation T.61.

##### 6.4.3 Type of coding for the formatted raster graphics content architecture level

The type of coding to be used is as defined in Recommendation T.6. The code extension control function may be used, provided its use is agreed by prior negotiation and is indicated in the document profile. This control function is used to invoke uncompressed mode of coding.

##### 6.4.4 Presentation attributes

Table 5/T.501 specifies the allowable presentation attribute values for MM.1.

TABLE 5/T.501

## Presentation attributes

Attribute	Basic value	Default value	Non-basic value
Content architecture class	formatted character content  formatted raster graphic content	formatted character content	
<i>Character attributes</i>			
Character path	0°, 90°	0°	270°
Line progression	270°	270°	none
Character orientation	0°	0°	90°
Initial offset	horizontal offset = any non-negative integer  vertical offset = any non-negative integer	see definition of attribute "initial offset" in Rec. T.416	none
Graphic character sets	basic teletex graphic character set	basic teletex graphic character set	any registered graphic character sets
Character spacing	120 SMU	120 SMU	80, 100, 200 SMU
Line spacing	100, 200, 300, 400 SMU	200 SMU	150 SMU
Alignment	left aligned	left aligned	none
Graphic rendition	default rendition, underlined, not underlined, italicized, not italicized, bold/not bold	default rendition	proportional spacing, Constant spacing
<i>Raster graphics attributes</i>			
Pel path	0°	0°	none
Line progression	270°	270°	none
Pel spacing	4 and 5 SMU	none	1, 2, 3, 6 SMU
Initial offset	horizontal offset = any integer  vertical offset = any integer	see definition of the attribute "initial offset" in Rec. T.417	none

Note - All presentation attributes are defaultable except "pel spacing" which is mandatory.

#### 6.4.5 Control functions

Table 6/T.501 defines the allowable values of control function parameters.

TABLE 6/T.501

Control functions applicable to the formatted  
character content architecture level

##### Control function with parameters

Control functions	Basic values	Default values	Non-basic values
Identify graphic sub-repertoire (IGS)	0	0	none
Select character spacing (SHS)	0	0	1, 2, 3
Select graphic rendition (SGR)	0, 1, 3, 4, 22, 23, 24	0	26, 50
Select line spacing (SVS)	0, 1, 2, 3	0	4
Code extension	note	, none	

##### Control functions without parameters

- \* backspace (BS)
- \* carriage return (CR)
- \* line feed (LF)
- \* partial line down (PLD)
- \* partial line up (PLU)
- \* space (SP)
- \* substitute (SUB)

*Note* - The values are defined by registration numbers and have to be negotiated.

#### 6.4.6 Attributes of content portions

Attributes applicable to content portions are defined in Table 7/T.501.



TABLE 7/T.501

## Attributes applicable to content portions

Attributes	Qual.	Basic values	Default value	Non-basic values
Content portion identifier	m	as defined in Rec. T.412	none	none
Type of coding	m	ISO 2022, Rec. T.6	none	none
<i>Character coding attributes</i>	---	none	none	none
<i>Raster graphics coding attributes</i>				
Number of pels per line	m	any	none	none
Compression	d	compressed	compressed	uncompressed
Alternative representation	nm	string of graphics characters + CarriageRet. and LineFeed (see Note)	none	none
Content information	m	coded character string, T.6 string	none	none

*Note* - Graphic characters belong to the basic teletex repertoire.

#### 6.5 Document profile

The document profile level used in this document application profile is defined in Table 8/T.501. Every document interchanged in accordance with this document application profile must include a document profile. Every non-basic attribute value used in a document must be indicated in the document profile.

TABLE 8/T.501

## Document profile attributes

Attribute	Qual.	Permissible value	Comments
Generic layout structure	nm Note 1	partial	presence of generic layout structure
Specific layout structure	m	present	presence of specific layout structure
Document characteristics	M		
Document application profile	m	mixed mode	
Document architecture class	m	FDA	formatted document architecture
Content architecture classes	m	formatted character and raster graphics content architectures	
Interchange format class	m	A	
Non-basic document character	NM Note 2		
Alternative character sets	nm	basic teletex graphic character set	
Page dimensions	nm	NA $\leq$ (10200, 13200) ISO A3 $\leq$ (14030, 19840) Japanese legal $\leq$ (12141, 17196) Japanese letter $\leq$ (8598, 12141)	
Raster graphics coding attributes	NM		
Compression	nm	uncompressed	

TABLE 8/T.501 (cont.)

Attribute	Qual.	Permissible value	Comments
<i>Character presentation attributes</i>	NM		
Character path	nm	270°	
Character orientation	nm	90°	
Character spacing	nm	80, 100, 200 SMU	
Line spacing	nm	150 SMU	
Graphic rendition	nm	proportional spacing	
Graphic character sets	nm	any registered graphic character sets	
<i>Raster graphics presentation attributes</i>	NM		
Pel spacing	nm	6, 3, 2 and 1 SMU	
<i>Non-basic structure character</i>	NM		
Number of objects per page	nm	> 31 blocks/page	

*Note 1* - Present for documents including a partial generic layout structure.

*Note 2* - Present for documents including non-basic document characteristics.

#### 6.6 Interchange format

The interchange format class used in this document application profile is "A", as defined in Recommendation T.415.

### ANNEX A

(to Recommendation T.501)

**Format of the values of the attributes "object identifier", "object class identifier", "object class" and "subordinates"**

The object identifiers of the specific layout object descriptions are composed of sequences of numbers, each of these numbers representing a particular level of the specific layout structure.

The number assigned to the specific document layout root object description is "1". The subordinate pages have a second number which uniquely identifies a particular page. The delimiter between "1" and this second number is the "space" character.

*Example:*

"1 27" corresponding coding: '31 20 32 37'H

The subordinate block identifiers are composed of the identifier of the page to which they belong extended with an additional number which uniquely identifies a particular block. The delimiter between the prefix derived from the page identifier and this additional number is the "space" character.

*Example:*

"1 27 5" corresponding coding: '31 20 32 37 20 35'H

The generic structure of a document for mixed mode of operation is composed of a set of object class descriptions, some of them being structured.

The first number of the object class identifier is always "0". The other number may be allocated as mentioned above for specific object identifiers for object class descriptions which are internally structured.

*Example:* page class description composed of blocks, etc....

For independent object class descriptions, a second number is added to "0" with a "space" character as a delimiter.

*Examples:*

a) *page class description with two block class descriptions*

page class description "0 5" coding: '30 20 35'H

first block class description "0 5 0" coding: '30 20 35 20 30'H

second block class description "0 5 1" coding: '30 20 35 20 31'H

b) *independent block class description*

block class description "0 25" coding: '30 20 32 35'H

For both generic and specific structures, content portion identifiers are composed of the identifier of the object/object class to which the content portion belongs and an additional number which uniquely identifies a particular content portion.

*Examples:*

block description "1 27 5" coding: '312032372035'H

content portion "1 27 5 6" coding: '3120323720352036'H  
associated with the block

The value of the attribute "object class" is the complete identifier of the object class description concerned.

The value of the attribute "generator for subordinates" is a sequence of complete identifiers of subordinate object class descriptions.

The value of the attribute "subordinates" consists of a sequence of numbers, each of which indicates a subordinate object at the next lower level of the hierarchy. Each of these numbers is equal to the last number in the object identifier of the corresponding subordinate object.

The value of the attribute "content portion" consists of a sequence of numbers, each of which indicates a content portion of that object. Each of these numbers is equal to the last number in the content portion identifier.

DOCUMENT APPLICATION PROFILE PM1  
FOR THE INTERCHANGE OF PROCESSABLE FORM DOCUMENTS

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0 Introduction

The purpose of this Recommendation is to specify a document application profile referred to as PM1 that will support the transfer of documents containing character coded content only between word processors. This profile is defined in accordance with the T.410 Series of Recommendations.

This Recommendation contains two main sections. Section 5 defines the features that are supported by PM1 in terms of features commonly found on word processors as perceived by users. Section 6 then formally defines the document application profiles in accordance with Recommendation T.411. That is, it defines the document architecture and content architectures levels, and the corresponding allowable attributes and attribute values, that pertain to these profiles.

When using this Recommendation to encode a document, it is intended that the features in the document are represented in terms of the features described in section 5 which can then be encoded in accordance with section 6.

This Recommendation does not define a precise mapping between the features in a particular document and the document architecture and content architecture features defined in section 6. Although this mapping will be obvious for most documents, in some cases a feature in a document may not have a precise equivalent in this profile. In this case, a feature in a particular document may have to be approximated, if possible, by a relate feature specified in section 5 of this profile.

The definition of these mappings is outside the scope of this Recommendation and is more appropriately defined in Recommendations specifying the characteristics of terminal equipment and the service aspects.

This Recommendation is intended to provide a means of encoding documents that can be used in any telematic service. It is independent of the means used to create, process, reproduce or transfer documents. These aspects may be specified in other Recommendations that make use of this Recommendation.

This version of PM1 provides for the representation and encoding of documents in which the text is laid out and read from left to right and from top to bottom on a page. That is, it provides for documents that contain latin based languages. It is intended to extend this Recommendation to provide for documents in which the text is written from top to bottom and from left to right on a page.

## 1 Scope

1.1 This Recommendation defines a document application profile conforming to the T.410 Series of Recommendations. This profile is referred to as PM1.

Its purpose is to specify interchange formats suitable for the transfer of documents between word processors. The profile caters for the transfer of documents such as memoranda, letters and reports that contain character only.

Documents can be transferred in either of the following forms:

- processable form, which facilitates the revision of documents by a recipient;
- formatted form, which facilitates the reproduction of documents as intended by a recipient;
- formatted processable form, which facilitate the reproduction of documents by a recipient as intended by an originator and facilitates the revision of documents by a recipient;

1.2 The features which can be interchanged using this application profile fall into the following categories:

- a) page format features - these concern how the layout of each page of a document will appear when reproduced;
- b) character content - these concern the character sets and control functions that make up the document content;
- c) character content layout and imaging features - these concern how the document content will appear within the page of the reproduced document;
- d) document management features - these concern the information associated with the document that relates to the document as a whole, such as its title, history and creation date; this information can be used in applications such as filing and retrieval.

1.3 It is assumed that when negotiation is performed by the service using this document application profile, that all non-basic features are subject to negotiations.

## 2 Field of application

2.1 The document application profile defined in this Recommendation is designed to be independent of the means to create or transfer the encoded documents.

2.2 This Recommendation defines a document application profile that may be used by any telematic service.

## 3 References

T.410 Series of Recommendations: "Open document architecture (ODA) and interchange format".

## 4 Definitions used in attribute tables

### 4.1 Definitions of terms

The terms defined in Recommendation T.411 are applicable to this Recommendation.

### 4.2 Notation used in attribute tables

The notation used in attribute applicability tables in this Recommendation is as follows:

The applicability of attributes for components is denoted by .../...; this represents: object class descriptions/object descriptions.

The symbol ... is then replaced by:

M mandatory attribute

NM non-mandatory attribute

D defaultable attribute

-- attribute is not applicable

(--- is equivalent to --/--).

In the tables defining allowable attribute values, the word 'any' means that any value is allowed subject to that value being a permissible value specified by the T.410 Series of Recommendations. A dash '-' in an attribute value table indicates that it is not applicable to specify a value for that entry. For example, it is not applicable to specify a default value for a non-mandatory attribute.

The presence of attributes in layout styles and presentation styles is denoted by the symbols:

O the attribute must always be present

X the attribute may be present

- the attribute is always absent

## 5 Characteristics supported by this document application profile

### 5.1 Overview

This section summarizes the processable and layout features which are supported by the document application profile defined by this Recommendation, in terms which are known by users of current word processors.

The logical and layout views of a document may be described in the same interchange format, in order to cope with the needs of different office automation applications (word processors, mail services, printing services, filing services, etc.).

Only character content may be used within the document.

### 5.2 Logical characteristics

From the logical point of view, the document content is divided into portions referred to as "paragraphs". Three types of "paragraphs" are distinguished, namely paragraphs corresponding to header, footer and body text. These types of paragraph are intended to be reproduced in the header, footer and body areas respectively of each page of the document, as described in § 5.3.

"Paragraphs" corresponding to body text are arranged into groups, which may contain any number of "paragraphs".

The division of the content into "paragraphs" provides the means to specify different layout and presentation requirements for individual or groups of successive "paragraphs".

The grouping of "paragraphs" allows different parts of the content of a document to be laid out in different sets of pages which have different layout format (as described in § 5.3).

The header and footer text also consists of a group of one or more "paragraphs". This allows different layout and presentation characteristics to be specified for different parts of the header and footer text.

Also, a document may consist of any number of such groups of header and footer "paragraphs". This allows different layout and presentation characteristics to be change within the document, as well as the layout and presentation of that content.

It is not guaranteed that the semantics of "paragraphs" and groups of "paragraphs" are the same for the originator and recipient.

### 5.3 *Layout characteristics*

#### 5.3.1 *The document layout structure*

From the layout point of view, the document consists of one or more page sets. This allows sets of pages having different layout characteristics to be distinguished.

Each page set consists of a sequence of one or more pages, in accordance with one of the following formats:

- a) a single page;
- b) a sequence of two or more pages, all of which have the same layout characteristics;
- c) a sequence of pages which are intended to be laid out alternatively on the 'recto' and 'verso' (see Note 1) side of a presentation medium; the layout characteristics of the 'recto' and 'verso' pages may be identical or different;
- d) an initial page followed by a sequence of one or more pages such that the layout characteristics of the initial page is different from that of the subsequent pages; (*Note* - The initial page may have the same layout characteristics as the subsequent pages but may have different header and/or footer text);
- e) an initial page followed by a sequence of recto-verso pages as described in c); the layout characteristics of the initial page may be (but is not necessarily) different from that of the 'recto/verso' pages.

The area made available within each nominal page (see Note 2) for the reproduction of the document content is called the *text area*. The text area has the same general characteristics for every page in the document and may consist of three independent and non-overlapping areas.

These consist of a *header area* lying at the top of the text area that is reserved for *header text*, a *footer area* lying at the bottom reserved for footer text and a *body area* lying between the header and footer areas that is reserved for *body text*. Either or both the areas reserved for header and footer text may not be present on each of the pages within a particular page set; however, each page of the document must have an area reserved for body text.

*Note 1* - A 'recto' page is one that is imaged on the side of a sheet that is to be read first. A 'verso' page is imaged on the side of a sheet that is to be read second (see Recommendation T.412).

*Note 2* - A nominal page is the ideal size of the presentation medium on which the document is reproduced, e.g the sheet of paper on which the content is to be imaged (see Recommendation T.412).

#### 5.3.2 *Page layout characteristics*

##### 5.3.2.1 *The text area*

The text area is the area made available for the positioning and display of the document content. It consists of three independent and non overlapping areas, as shown in Figures 1/T.502 and 2/T.502), namely:

- the header area (optional);
- the body area;
- the footer area (optional).

Text may be laid out only within these three areas. The header and footer areas may or may not be present within the text area; the body area must always be present.



Each text area is intended to be reproduced within a nominal page; the following nominal page sizes in both portrait and landscape orientations are supported:

- basic nominal pages: ISO A4 and NAL (North American Letter);
- non-basic nominal pages: ISO A3.

The sizes of these nominal pages are defined in Recommendation T.412.

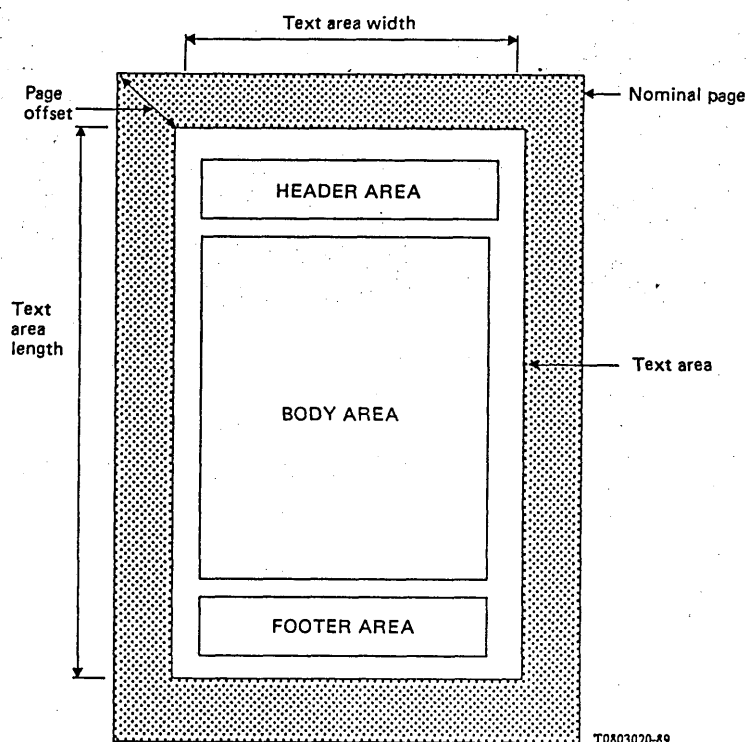


FIGURE 1/T.502

Illustration of the text area (portrait orientation)

#### 5.3.2.2 Size of the text area

The text area is specified in terms of its length (vertical dimension) and width (horizontal dimension).

This document application profile allows the size of the text area to be specified as equal to or smaller than the common assured reproduction area of ISO A4 and NAL (North American Letter) paper sizes. Larger areas, up to the size of the nominal paper size of ISO A3 may also be specified, but this is a non-basic feature.

When the nominal page is in portrait orientation, the positions of the header and footer areas are as illustrated in Figure 1/T.502.

When the nominal page is in landscape orientation, the positions of the header and footer areas are as illustrated in Figure 2/T.502.

The size of the text area supported by this document application profile is the common assured reproduction area of ISO A4 and NAL. Larger sizes are supported as a non-basic feature.

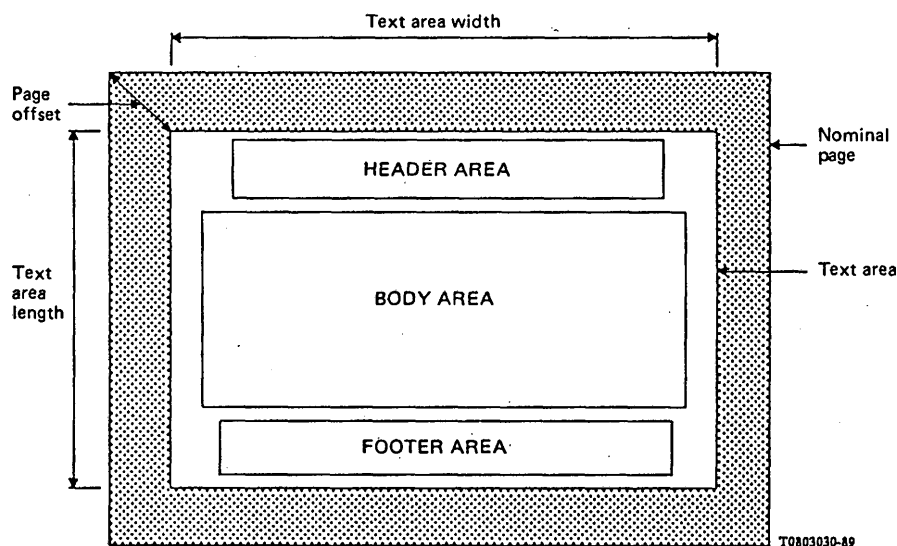


FIGURE 2/T.502

Illustration of the text area (landscape orientation)

#### 5.3.2.3 *Text area offset*

The text area offset is the distance between the positions of the left and top edges of the text area and the left and top edges of the nominal page respectively (see Figures 1/T.502 and 2/T.502).

The value of this offset may vary for alternate pages in order to provide for the reproduction of pages in 'recto/verso' form.

#### 5.3.2.4 *Header area*

The header area lies between the top edge of the text area and the top of the body area and is the area made available for header text. The dimensions and position of this area must be such that it does not extend beyond the edge of the text area in any direction or overlap the body area.

#### 5.3.2.5 *Body area*

The body area is the area intended for the reproduction of the document content, apart from any header or footer content. It lies between the bottom of the header area and the top of the footer area. The dimensions and position of this area must be such that it does not extend beyond the edge of the text area in any direction or overlap either the header or footer areas.

#### 5.3.2.6 *Footer area*

The footer area is an area which lies between the bottom of the body area and the bottom of the text area and is the area made available for footer text. The dimensions and position of this area must be such that it does not extend beyond the edge of the text area in any direction or overlap the body area.

### 5.4 *Document layout features*

This section defines the features associated with the presentation of text within the text area. Unless otherwise indicated, these properties can be changed anywhere in the document.

#### 5.4.1 *Layout of the document content*

The successive paragraphs in a document can be laid out in the header, body and footer areas in a direction of 270 degrees relative to the positive horizontal direction of the page coordinate system (as defined in Recommendation T.412). This is illustrated in Figure 3/T.502.

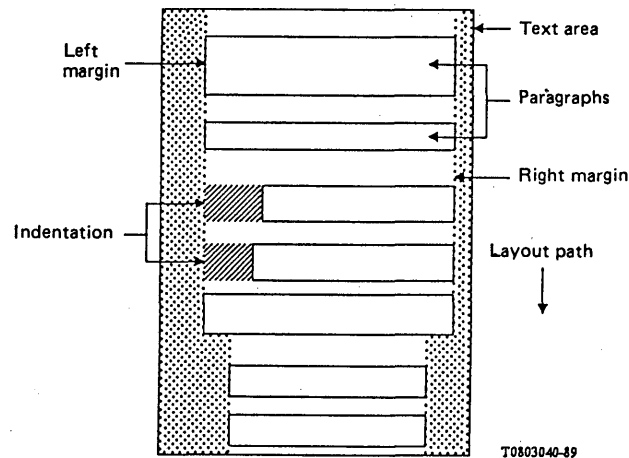


FIGURE 3/T.502

#### **Layout of the document content**

#### 5.4.2 *Left and right margins*

The left and right margins are the distances, or offsets, between a portion of the document content and an edge of the particular area in which that content is positioned. The margins specify the extents between which text is allowed to be positioned. Margins can be independently specified for the content in the header, footer and body areas and also they may vary throughout the document.

The left margin position is the first character position that is available on each line of text. This position is specified relative to the left edge of the area in which that content is positioned.

The right margin position is the maximum extent of each line of text. This position is also specified relative to the left edge of the area in which that content is positioned.

There is no restriction on the positions of these margins, provided that neither is set so that it exceeds the width of the area in which the text is positioned. Also, the position of the right margin must be equal to or to the right of the position of the left margin.

If the left and right margins are not explicitly specified then they are set to coincide with the position of the left and right edges, respectively, of the area in which the content is positioned.

#### 5.4.3 *Separation*

This feature specifies the number of blank lines to be placed between one paragraph and the next text if the two paragraphs are on the same page.

If a value for the separation is not explicitly specified, then the next paragraph will be laid out directly on the line below the last line of the previous paragraph in accordance with the line spacing specified.

#### 5.4.4 *Page breaks*

When the content associated with a section of a document is laid out, as many lines of text as possible will be placed in the body area of the current page before a new page is generated.

Because of this, page breaks can occur at inconvenient points within the text and hence a number of methods are provided to control the points at which page breaks can occur.

#### 5.4.4.1 *Unconditional page breaks*

This feature specifies that an unconditional page break is required immediately. This is, the subsequent text must be displayed on the next page.

#### 5.4.4.2 *Conditional page breaks - widows and orphans*

##### a) *Widows and orphans*

Widows and orphans control where page breaks may occur within the body of a paragraph.

The orphan size specifies the minimum number of lines of text in a paragraph that must be placed on the current page when a paragraph is split over two pages. If this minimum number cannot be accommodated, then the whole paragraph is to be placed on the next page.

The widow size specifies the minimum number of lines that must be allocated to the second page when a paragraph is split over two pages. If, during the layout process, the number of lines of text on the second page is less than the value specified, then lines must be moved from the bottom of the first page to the top of the second page until the value is satisfied.

##### b) *Indivisibility and association of paragraphs*

This feature determines whether a single paragraph or a group of two or more paragraphs is allowed to be split over more than one page when the document content is laid out. This can be used, for example, to ensure that a section title is placed on the same page as the following text.

If the specified paragraph or paragraphs must be displayed within one page, then it may be necessary to cause a page break to occur if the current page has insufficient space to accommodate the specified paragraphs. In the absence of the specification of this feature, no restriction is placed on placing of successive paragraphs on successive pages.

#### 5.4.4.3 *Sheet breaks*

This feature provides the ability to specify that the following text is to begin on a recto or on a verso page, irrespective of the type of page on which the immediately preceding text is laid out.

When a document is reproduced on paper, this may cause the generation of a new sheet of paper. This may occur anywhere in the document content.

### 5.5 *Content layout and imaging characteristics*

#### 5.5.1 *Character repertoires*

The basic character repertoire that can be used in the subrepertoire of ISO 6937-2, corresponding to Recommendation T.61 (including non-spacing underline).

The coding of the character repertoire is that defined in Recommendation T.61 (or ISO 6937-2).

Any other registered graphic set can be used and are regarded as non-basic features (i.e their use must be indicated in the document profile).

#### 5.5.2 *Line spacing*

This feature specifies the distance between successive lines of text.

The basic values are:

- 3 lines per 25.4 mm;
- 4 lines per 25.4 mm;
- 6 lines per 25.4 mm;
- 12 lines per 25.4 mm.

The following is a non-basic value:

- 8 lines per 25.4 mm.

The default is 6 lines per 25.4 mm.

### 5.5.3 Character spacing

This feature specifies the distance between successive characters on a line of text.

The basic value is:

- 10 characters per 25.4 mm.

The non-basic values are:

- 6 characters per 25.4 mm;
- 12 characters per 25.4 mm;
- 15 characters per 25.4 mm.

The default is 10 characters per 25.4 mm.

### 5.5.4 Character path and line progression

The character path is the direction of progression of successive characters along a line of characters. The lines progression is the direction of successive lines of text relative to the characters path direction.

The basic values are:

- character path: 0 degrees;
- line progression: 270 degrees.

There are no non-basic values.

### 5.5.5 Emphasis

This feature concerns the imaging of the graphic characters on the presentation medium.

The following basic modes of emphasis may be used:

- normal rendition;
- normal intensity;
- increased intensity (bold);
- italicized;
- not italicized;
- underlined;
- not underlined.

The following mode is non-basic:

- crossed out.

If a mode of emphasis is specified then it remains in effect until changed into a mutually exclusive mode or by the specification of 'normal rendition' (see below). Mutually exclusive modes are normal/increased intensity, italicized/not italicized and underlined/not underlined. One mode from each mutually exclusive set may be in operation at any point in the document content.

Normal rendition cancels the effect of all methods of emphasis that are currently in operation and specifies that the text should be displayed in accordance with the default rendition parameters set for the presentation device. Thus, if it is required to ensure that the content is not underlined, then the appropriate parameter value must be explicitly specified.

### 5.5.6 Tabulation

Tabulation stop positions can be specified at any character position along the character path. Each stop is specified by means of the following:

- a) the tabulation position relative to the left margin position;
- b) an optional alignment qualifier that specifies the type of alignment to be used at the designated tabulation position. The type can be as follows (see Figure 4/T.502):
  - i) start aligned - the first character is placed at the tabulation stop position;
  - ii) end aligned - the last character is placed at the tabulation position;
  - iii) centred - the character string is centred around the tabulation stop position;
  - iv) aligned on - the first character of a specified group of characters is placed at the tabulation stop position.

Only one set of tabulation stops can be specified to be applicable for a particular paragraph. No limit is placed on the number of tabulation stops that can be specified within a given set.

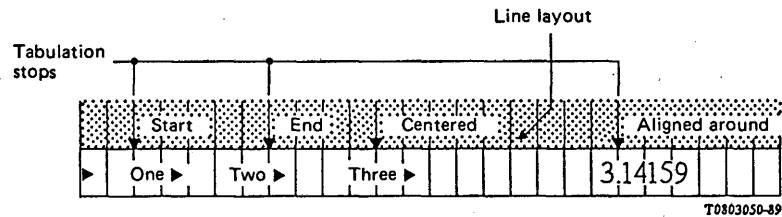


FIGURE 4/T.502

Examples of tabulations

5.5.7 Alignment

This feature specifies whether the text is to be aligned only at the left of each line of text, aligned only at the right of each line, centred or both left and right aligned (see Figure 5/T.502). If this feature is not specified, then the paragraph is assumed to be left aligned only.

*Note* - The value 'left aligned' means that the first character on each line is positioned at the indentation position. 'Right aligned' means that the content of each line is adjusted in position such that the last character on each line is placed adjacent to the margin position in the direction of the character path.

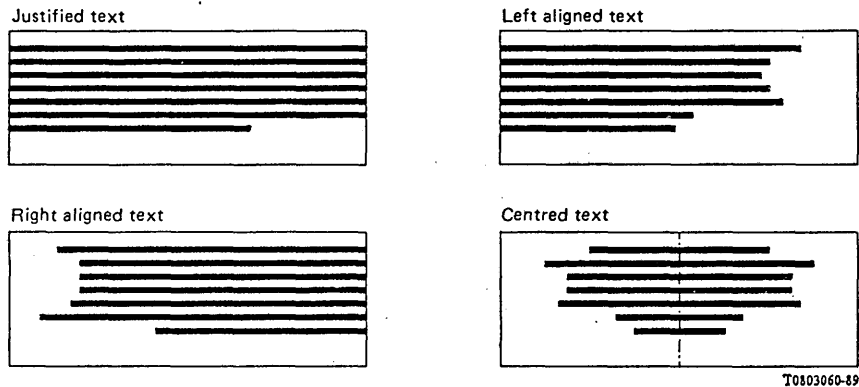


FIGURE 5/T.502

Examples of the use of 'alignment'

5.5.8 Indentation

Indentation is the distance between the first character on a line of text and the position of the margin position in the direction opposite to the direction of the character path.

Indentation acts as temporary alteration in the position of the offset in the direction opposite to the direction of the character path. When text is formatted, it is intended to be laid out between the indentation position and the right margin position (see Figure 3/T.502 for an example).

### 5.5.9 *First line format*

This feature specifies how the first line of a paragraph is to be laid out and provides for the itemization of paragraphs.

It allows the first character in the paragraph to be positioned at some points along the character path relative to the indentation position (as specified in § 5.5.8). This point may be in the direction of the character path or in the direction opposite to the direction of the character path relative to the indentation position.

In addition, this feature provides for the specification of an item identifier on the first line. The item identifier is a string of characters that precedes and is separated from the remaining characters that form the first line. The control function CR (carriage return) is used as the separator.

The features provided correspond to examples 10.1 to 10.4 shown in Figure 10/T.416.

### 5.5.10 *Page numbering*

This feature provides a means of indicating the number of each page of document.

The page number can be reset at the beginning of each page set. Also, the page number can be represented as a numeric character string, an alphabetic character string (lower or upper case) or as a roman numeral (lower or upper case).

These features allow, for example, the method of numbering the introduction or annexes of a document to be different than the method of page numbering used in the body of the document.

The page number can be used within a string of characters that is to be laid out in the header or footer area. By this means, each page of a document can be automatically numbered when the document is laid out. These page numbers cannot be referenced in the body text.

An example of page numbering is "Page X" which consists of two concatenated character strings. The first is the literal character string 'Page'. And this is concatenated to a string function denoted by 'X'. When 'X' is evaluated in a particular instance it may, for example, return the character string 'iv', the roman numeral (lower case) for the number '4'.

## 5.6 *Document management features*

A document profile is associated with every document to provide information about the document as a whole.

The features specified by the document profile are listed below. A definition of the information contained in these features is given in the corresponding attribute definitions in Recommendation T.414.

#### *Presence of document constituents:*

- generic layout structure;
- specific layout structure;
- generic logical structure;
- specific logical structure;
- layout styles;
- presentation styles.

#### *Document characteristics:*

- document application profile;
- document application profile default;
- document architecture class;
- content architecture class;
- interchange format class;
- ODA version date.

#### *Non-basic document characteristics:*

- profile character sets;
- comments character sets;
- page dimensions;
- medium types;
- layout path;
- coding attributes;
- presentation attributes;

*Document management attributes:*

- document reference.

Any other of the document management attributes defined in Recommendation T.414 may be specified.

The attributes that constitute "presence of document constituents" must be present when applicable (e.g if the document contains a specific layout structure then this must be indicated by this appropriate attribute).

The document characteristics attributes listed above are all mandatory.

The appropriate non-basic document characteristics attribute must be used when a non-basic feature is used within a document. The use all other feature listed above are non-mandatory.

## **6 Specification of the document application profiles**

This section contains the technical specification for the document application profile PM1.

The notation used in the tables of attributes contained in this section is described in § 4.2. The allowable values of expressions are defined using the notation defined in Annex A of Recommendation T.412.

The unit scaling factor (see Recommendation T.412) used throughout PM1 is (1,1). Because of this, all dimensions and positions are specified in BMUs.

### **6.1 Summary of the technical specification**

#### **6.1.1 Overview**

PM1 allows documents to be represented in the following forms:

- processable form, which facilitates the revision of a document by a recipient;
- formatted form, which facilitates the reproduction of a document as intended by the originator;
- formatted processable form, which facilitates the reproduction of a document as intended by the originator or facilitates the revision of a document.

#### **6.1.2 Specification of constituents**

This paragraph specifies the required and optional constituents used for the representation of documents that conform to PM1. Also, it specified the content architectures that may be present in these documents.

Constituents specified as 'required' must occur in any document that conforms to PM1. Constituents listed as 'optional' may or may not be present in the document depending upon the requirements of the particular document. The document profile indicated which constituents are present in the document.

##### **6.1.2.1 Formatted form documents**

###### **6.1.2.1.1 Required constituents:**

- a document profile as specified in § 6.5;
- layout object descriptions representing a specific layout structure as defined in § 6.3.2.

###### **6.1.2.1.2 Optional constituents:**

- layout object class description representing a 'partial' generic layout structure, as defined in § 6.3.1.2;
- presentation styles, as defined in § 6.4.4.2.

###### **6.1.2.1.3 Content architecture**

- the formatted character content architecture defined in § 6.4;
- the formatted processable character content architecture defined in § 6.4.



#### 6.1.2.2 *Processable form documents*

##### 6.1.2.2.1 *Required constituents:*

- a document profile as defined in § 6.5;
- logical object class descriptions representing a 'complete' generic logical structure, as defined in § 6.2.1;
- logical object descriptions representing a specific logical structure, as defined in § 6.2.2;
- layout object class descriptions representing a 'complete' generic layout structure, as defined in § 6.3.1.1;
- layout styles as defined in § 6.2.4.

##### 6.1.2.2.2 *Optional constituents:*

- presentation styles as defined in § 6.4.4.2.

##### 6.1.2.2.3 *Content architecture*

- the processable form content architecture, as defined in § 6.4;
- the formatted processable form character content architecture, as defined in § 6.4.

#### 6.1.2.3 *Formatted processable form documents*

##### 6.1.2.3.1 *Required constituents*

- a document profile as defined in § 6.5;
- logical object class descriptions representing a 'complete' generic logical structure, as defined in § 6.2.1;
- logical object descriptions representing a specific logical structure, as defined in § 6.2.2;
- layout object class description representing a 'complete' generic layout structure defined in § 6.3.1.1;
- layout object descriptions representing a specific layout structure, as defined in § 6.3.2;
- layout styles as defined in § 6.2.4.

##### 6.1.2.3.2 *Optional constituents*

- presentation styles, as defined in § 6.4.4.2.

##### 6.1.2.3.3 *Content architectures*

- the formatted character content architecture level defined in § 6.4;
- the processable content architecture level defined in § 6.4;
- the formatted processable character content architecture level defined in § 6.4.

*Note 1* - The formatted character content architecture level may only be contained in content portions referenced by basic layout objects only.

*Note 2* - The processable form content architecture can only be used in content portions associated with generic logical objects.

#### 6.1.3 *Interchange format*

The interchange format class "A" is to be used in this application profile, as defined in Recommendation T.415.

#### 6.1.4 *Object identifiers*

The ASN.1 object identifier value to be used to designate the document application profile PM1 is:

{0 0 20 502 0}

## 6.2 Logical structures

### 6.2.1 The generic logical structure

the generic logical structure is shown in Figure 6/T.502. It consists of two parts, namely a "body" part, which defines the allowable specific logical structures that may be used to represent the document, and the "header and footer" part, which specifies the header and footer text that may be used in the document.

The "body" part consists of:

- a single document logical root class;
- a single composite logical object class;
- a single basic logical object class.

Content portions and the attribute "content generators" may not be associated with the basic logical object class.

The "header and footer" part is optional and, if present, contains one or more of either or both of the following:

- a composite logical object class (called "header root") consisting of a sequence of one or more subordinate basic logical object classes named "header text";
- a composite logical object class (called "footer root") consisting of a sequence of one or more subordinate basic logical object classes named "footer text".

In each case, the basic logical object class must reference a single content portion or must contain the attribute "content generator".

Also, each basic logical object class of the types "header text" and "footer text" may be referenced by one or more composite logical object classes of the type "header root" or "footer root".

*Note* - Each logical object class of the type "header root" or "footer root" is referenced by an attribute "logical source" applied to a header or footer frame respectively that is defined in the generic layout structure. This causes the content associated with, for example, the header root to be laid out in each instance of the header frame that is generated during the document layout process.

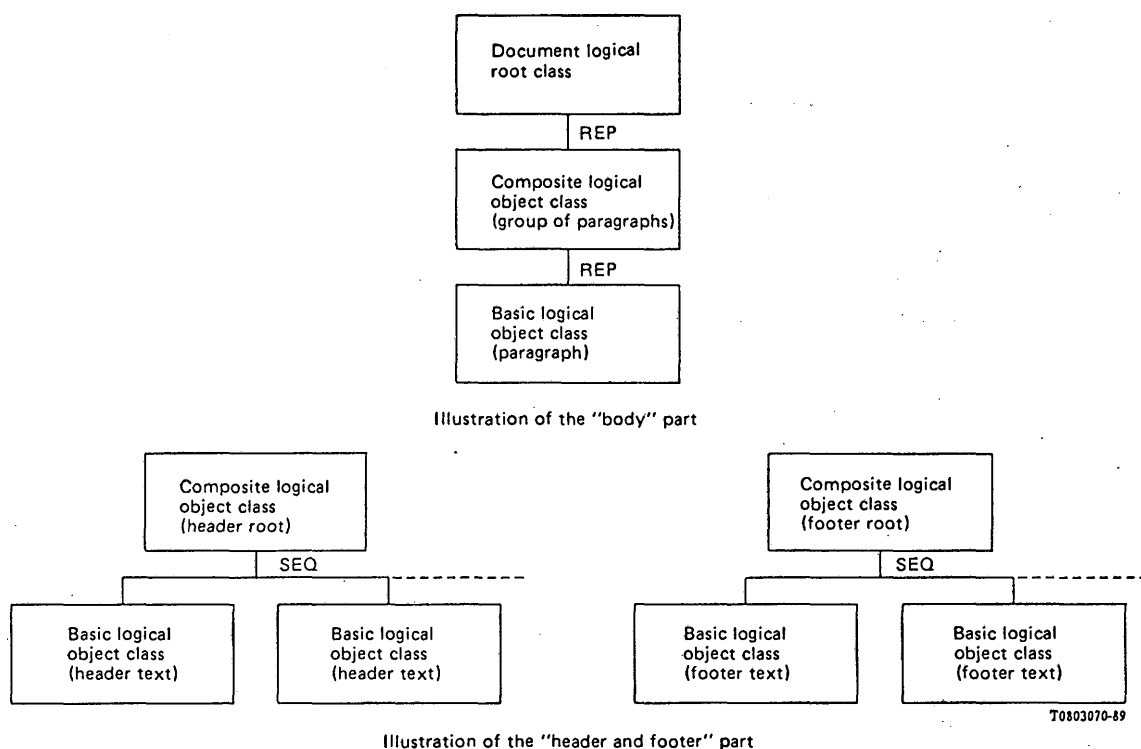


FIGURE 6/T.502

Illustration of the "header and footer" part

### 6.2.2 The specific logical structure

The specific logical structure is controlled by the "body" part of the generic logical structure as defined in § 6.2.1.

As shown in Figure 6/T.502, the document logical root class specifies that the document logical root consists of a sequence of one or more composite logical objects.

Each of these composite logical objects consists of a sequence of one or more basic logical object referred to as "paragraphs".

Each paragraph may reference one or more content portions.

An example of a specific logical structure is illustrated in Figure 7/T.502.

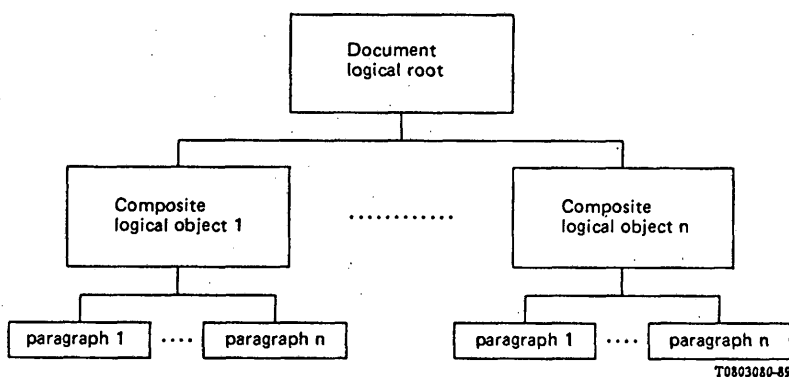


FIGURE 7/T.502

Illustration of a specific logical structure

### 6.2.3 Attributes of logical components

#### 6.2.3.1 Attributes applicable to logical component descriptions

Table 1/T.502 defines the attributes applicable to logical object classes for the "body" part of the generic logical structure and corresponding logical objects in the specific logical structure. Table 2/T.502 defines the attributes applicable to logical object classes in the "header and footer" part of the generic logical structure.

TABLE 1/T.502

Attributes applicable to the "body" part of the generic logical structure and the specific logical structure

Attribute	Document logical root		
		Composite logical component	
			Basic logical component
<i>Shared attributes</i>			
Object type	M/D	M/D	M/D
Object identifier	--/M	--/M	--/M
Object class identifier	M/--	M/--	M/--
Generator for subordinates	M/--	M/--	---
Content generator	---	---	---
Object class	--/M	--/M	--/M
Subordinates	--/M	--/M	---
Content portions	---	---	--/M
Resource	---	---	---
Presentation style	---	---	--/NM
Content architecture class	---	---	--/D
Content type	---	---	---
User readable comments	--/D	--/D	--/D
Application comments	---	---	---
User visible name	--/NM	--/NM	--/NM
Bindings	---	---	---
Default value list	---	---	---
<i>Logical attributes</i>			
Protection	---	---	---
Layout style	---	--/M	--/NM

TABLE 2/T.502

Attributes applicable to the "header and footer" part of the generic logical structure

Attribute	Composite logical component	
		Basic logical component
<i>Shared attributes</i>		
Object type	M	M
Object identifier	--	--
Object class identifier	M	M
Generator for subordinates	M	--
Content generator (see Note)	--	NM
Object class	--	--
Subordinates	--	--
Content portions (see Note)	--	NM
Resource	--	--
Presentation style	--	NM
Presentation attributes	--	--
Content architecture class	--	NM
Content type	--	--
User readable comments	--	--
Application comments	--	--
User visible name	--	--
Bindings	--	--
Default value list	--	--
<i>Logical attributes</i>		
Protection	--	--
Layout style	--	NM
Layout directives	--	--

*Note* - Each basic logical object class in the "header and footer" part must reference a generic content portion or contain the attribute "content generator".

### 6.2.3.2 *Specifications of attribute values for logical object class descriptions*

Table 3/T.502 specifies attribute values allowed in logical object class descriptions representing the "body" part of the generic logical structure. Table 4/T.502 specifies attribute values allowed in logical object class descriptions representing the "header and footer" part of the generic logical structure.

**TABLE 3/T.502**

**Attribute values allowed for object classes in the "body" part of the generic logical structure**

Attribute	Basic value	Non-basic value
Object type	document root, composite logical object, basic logical object	none
Object class identifier	any	none
Generator for subordinates	see § 6.2.3.2.1	none

**TABLE 4/T.502**

**Attribute values allowed for object classes in the "header and footer" part of the generic logical structure**

Attribute	Basic value	Non-basic value
Object type	composite logical object, basic logical object	none
Object class identifier	any	none
Generator for subordinates	see § 6.2.3.2.2	none
Content generator	see § 6.2.3.2.3	none
Content portions	any	none
Presentation style	any (see § 6.4.4.2)	none
Content architecture class	'processable', 'formatted processable'	none
Layout style	any (see § 6.2.4)	none

6.2.3.2.1 In the "body" part of the generic structure, the attribute "generator" for subordinates has the following values:

document logical root class: REP ({GroupOfParagraphsObjClassId})

composite logical object class: REP ({ParagraphObjClassId})

where 'GroupOfParagraphsObjClassId' is the object class identifier of the composite logical object class that represents a group of "paragraphs" and 'ParagraphObjClassId' is the object class identifier of the basic logical object class that represents a "paragraph".

6.2.3.2.2 In the "header and footer" part of the generic logical structure, the allowable format of the attribute "generator for subordinates" for the composite logical object classes of the types "header root" and "footer root" is:

SEQ ({BasicObjectClassId} ...)

where 'BasicObjectClassId' is the object class identifier of any basic logical object class of the type "header text" and "footer text".

*Note* - A basic logical object class in the header and footer part may be referenced by more than one "header root" and by more than one "footer root".

6.2.3.2.3 The allowable formats of the attribute "content generator" is specified by the following production rule:

<string expression> ::= [<string expression 1>]{<string expression 2>  
[<string expression 3>]}

<string expression 1> ::= "<character string>"

<string expression 3> ::= "<character string>"

<string expression 2> ::= MAKE-STRING (<numeric expression>  
/UPPER-ALPHA (<numeric expression>  
/LOWER-ALPHA (<numeric expression>  
/UPPER-ROMAN (<numeric expression>  
/LOWER-ROMAN (<numeric expression>)

<numeric expression> ::= BINDING REFERENCE (<binding selection  
function>, 'PGnum')

<binding selection  
function> ::= SUPERIOR (CURRENT-INSTANCE (FRAME, CURRENT-OBJECT)

### 6.2.3.3 *Specifications of attributes for logical object descriptions*

Table 5/T.502 specifies the attribute values allowed in logical object descriptions.

TABLE 5/T.502

Attribute values allowed for objects in the specific logical structure

Attribute	Basic value	Non-basic value	Default value
Object type	Document root, composite logical object, basic logical object	none	-
Object identifier	any	none	-
Object class	any	none	-
Subordinates	any	none	-
Content portion	any	none	-
Presentation style	any	none	-
Content architecture class	'processable', 'formatted processable'	none	see § 6.2.3.3.1
User readable comments	any	none	empty string
User visible name	any	none	-
Layout style	any (see § 6.2.4)	none	-

6.2.3.3.1 For processable form documents, the default value of the attribute "content architecture class" is 'processable'; for formatted processable form documents, the default value is 'formatted processable'. As these are a non-standard default values, their use must be indicated in the document profile. The value of this attribute is an ASN.1 object identifier whose values are defined in Recommendation T.416.

#### 6.2.4 Layout styles

##### 6.2.4.1 Applicability of layout style attributes

Table 6/T.502 defines the layout style attributes that may be specified in layout styles that are referenced by logical object classes in the "body" part of the specific logical structure.



TABLE 6/T.502

Layout style attributes applicable to the "body"  
part of the specific logical structure

Attribute	Composite logical object	
		Basic logical object
Layout style identifier	0	0
User readable comments	X	X
User visible name	X	X
Concatenation	-	-
Indivisibility	X	X
Layout object class	0	-
New layout object	-	X
Offset		
- leading offset	-	X
- trailing offset	-	X
- left-hand offset	-	X
- right-hand offset	-	X
Same layout object		
- first parameter	-	X
- second parameter	-	X
Separation		
- leading edge	-	X
- trailing edge	-	X
- centre separation		

Table 7/T.502 defines the layout style attributes applicable to the "header and footer" part of the generic logical structure.

TABLE 7/T.502

Layout style attributes applicable to the "header and footer" part  
of the generic logical structure

Attribute	Composite logical component	
		Basic logical component
Layout style identifier	-	0
User readable comments	-	X
User visible name	-	X
Concatenation	-	X
Indivisibility	-	-
Layout object class	-	-
New layout object	-	-
Offset		
- leading offset	-	X
- trailing offset	-	X
- left-hand offset	-	X
- right-hand offset	-	X
Same layout object		
- first parameter	-	-
- second parameter	-	-
Separation		
- leading edge	-	X
- trailing edge	-	X
- centre separation	-	-

### 6.2.4.2 *Specification of layout style attribute values*

Table 8/T.502 specifies attribute values allowed in layout style.

TABLE 8/T.502  
Values allowed for layout style attributes

Attribute	Basic value	Non-basic value	Default value
Layout style identifier	any	none	-
User readable comments	any	none	-
User visible name	any	none	-
Concatenation	non-concatenated, concatenated	none	non- concatenated
Indivisibility	the object type 'page' or 'null'	none	'null'
Layout object class	the identifier of a page set class	none	-
New layout object	the identifier of a layout object class, the object type 'page' or 'null'	none	'null'
Offset leading offset trailing offset right offset left offset	any any any any	none none none none	0 BMU 0 BMU 0 BMU 0 BMU
Same layout object first parameter  second parameter	an expression (see § 6.2.4.2.1) or 'null'  the object type 'page' or 'null'	none	'null'  as defined in Rec. T.412
Separation leading edge trailing edge	any any	none none	0 BMU 0 BMU

6.2.4.2.1 The attribute "same layout object" may contain the following expression: (PREC-OBJ(CURR-OBJ)), which indicates that the basic logical object is to be laid out in the same layout object as the immediately preceding basic logical object. No other expression is allowed.

## 6.3 *Layout structure*

### 6.3.1 *The generic layout structures*

A 'complete' and a 'partial' generic layout structure are defined in this document application profile. The 'complete' generic layout structure is present in processable and formatted processable documents and defines all possible specific layout structures that may be created as a result of the document layout process.

The 'partial' generic layout structure may only be used in formatted form documents. It is used only to provide predefined attribute values and content portions for layout objects in the specific layout structure (i.e. factorization).

#### 6.3.1.1 *The 'complete' generic layout structure*

A general description of the permissible document layout structure is given in § 5.3.1. In order to represent these structures, the generic layout structure consists of four hierarchical levels, each of which must always be present:

- the document layout root;
- the page set level (one level only);
- the page level;
- the frame level (one level only).

The document layout root consists of one or more subordinate page sets, where the number of page sets is unrestricted. Each page set may consist of a sequence of one or more subordinate pages in accordance with the specification given in § 5.3.1.

Each of these pages may contain one, two or three subordinate frames that are used to represent the header, body and footer area as described in § 5.3.2. The body area frame is mandatory, whereas the header and footer frames are optional. These frames any or may not be adjacent to one another but they must not overlap.

The layout path is always 270 degrees for each frame and it is not possible to alter this value. The attribute "medium type" specifies the size of the nominal page corresponding to each layout object of the type page and specifies whether the nominal page is to be in portrait or landscape orientation.

Content in the specific logical structure is laid out in the body frames; this content cannot be laid out in the header or footer frames. The header and footer frames, if present, must contain the attribute "logical source" which indicates the appropriate generic logical object class that contains the content to be laid out in those frames.

The 'complete' generic layout structure may vary in accordance with the layout requirements of each particular document. In a particular 'complete' generic layout structure, the value of the attribute "generator for subordinates" in the document layout root, in each page set and in each page define the allowable specific layout structures for that particular document. The ranges of all possible values of the attribute "generator for subordinates" at each of the hierarchical levels in the 'complete' generic layout structure are defined formally in § 6.3.3.2.1.

This definition, in effect, defines all possible generic layout structures that are allowed by PM1. These structures are illustrated in Figures 8/T.502 and 9/T.502. Figure 9/T.502 shows the five ways in which pages within a page set can be specified, in accordance with § 5.3.1.

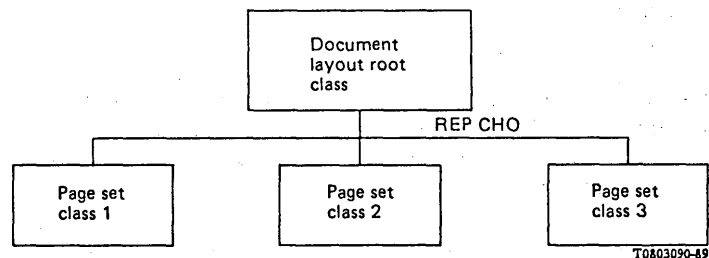


FIGURE 8/T.502

Example of a particular generic layout structure

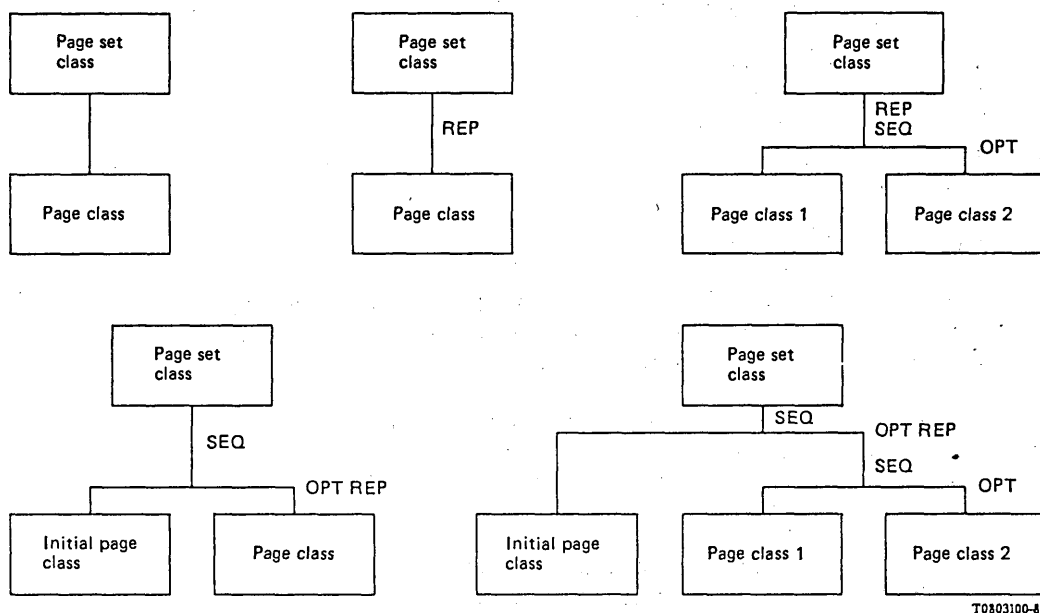


FIGURE 9/T.502

Illustration of the possible page set classes

#### 6.3.1.2 The 'partial' generic layout structure

The 'partial' generic layout structure may consist of the following object classes:

- the document layout root class;
- page set classes;
- page classes;
- frame classes.

All these classes are optional; each type of class may occur one or more times within a particular document, except the document layout root class, which may only occur one. The document layout root, each page set class and each page class may or may not reference other object classes in the 'partial' generic layout structure by means of the attribute "generator for subordinates".

### 6.3.2 The specific layout structure

In the case of a formatted processable document, the specific layout structure present in a document must comply with the particular generic layout structure present in that document.

In the case of formatted documents, no 'complete' generic layout structure is present but the specific structure must comply with an allowable 'complete' generic layout structure, as defined in § 6.3.2.1. If a 'partial' generic layout structure is present, then the objects in the specific layout structure may or may not refer to objects in that generic layout structure.

The following additional restrictions are also applicable to the specific layout structure:

- each frame must contain one or more subordinate blocks;
- each block must reference only one content portion.

### 6.3.3. Attributes of layout components

#### 6.3.3.1 Attributes application to layout component descriptions

Table 9/T.502 defines the attributes applicable to layout components.

TABLE 9/T.502

Attributes applicable to layout objects and layout object classes

Attribute	Document layout root				
	Page set				
	Page				
	Frame				
	Block				
Shared attributes					
Object type	M/D	M/D	M/D	M/D	--/M
Object identifier	--/M	--/M	--/M	--/M	--/M
Object class identifier	M/--	M/--	M/--	M/--	---
Generator for subordinates (Note 3)	M/--	M/--	M/--	---	---
Object class (Note 4)	--/M	--/M	--/M	--/M	---
Subordinates	--/M	--/M	--/M	--/M	---
Content portions	---	---	---	---	--/M
Resource	---	---	---	---	---
Presentation style	---	---	---	---	--/D
Presentation attributes	---	---	---	---	--/NM
Content architecture class	---	---	---	---	--/D
Content type	---	---	---	---	---
User readable comments	NM/D	NM/D	NM/D	NM/D	--/D
Application comments	---	---	---	---	---
User visible name	NM/NM	NM/NM	NM/NM	NM/NM	--/NM
Bindings	NM/-	NM/-	NM/-	---	---
Default value list	---	---	---	---	---
Layout attributes					
Position (Note 2)	---	---	---	NM/D	--/M
Dimension (Note 2)	---	---	NM/D	NM/D	--/D
Layout texture	---	---	---	---	---
Border	---	---	---	---	---
Balance	---	---	---	---	---
Layout path	---	---	---	--/D	---
Logical source (Note 1)	---	---	---	M/--	---
Permitted categories	---	---	---	---	---
Imaging order	---	---	---	---	---
Page position	---	---	NM/D	---	---
Medium type	---	---	M/D	---	---

*Note 1* - The attribute logical source is only applicable to frame classes of the type "header frame" and "footer frame".

*Note 2* - For the attribute "dimension" and "position", only the subparameters "fixed dimension" and "fixed position" respectively, may be specified.

*Note 3* - The attribute "generator for subordinates" is non-mandatory for layout object classes in a formatted form document.

*Note 4* - The attribute "object class" is non-mandatory for layout objects in a formatted form document.

### 6.3.3.2 Specification of attribute for layout object class descriptions

Table 10/T.502 specifies the attribute values allowed in layout component descriptions.

TABLE 10/T.502

Attribute values allowed for objects in the generic layout structure

Attribute	Basic value	Non-basic value
Object type	document layout root, page-set, page frame	none
Object class identifier	any	none
Generator for subordinates	see § 6.3.3.2.1	none
User readable comments	any	none
User visible name	any	none
Bindings	see § 6.3.3.2.2	none
Position	frame: any value within the limits of a page (overlapping of frames not allowed)	none
Dimensions	Portrait: $x \leq 9240$ BMU $y \leq 12400$ BMU Landscape: $x \leq 12400$ BMU $y \leq 9240$ BMU	Portrait (ISO A4) $x \leq 9920$ BMU $y \leq 14030$ BMU Landscape (ISO A4) $x \leq 14030$ BMU $y \leq 9920$ BMU  Portrait (NAL) $x \leq 10200$ BMU $y \leq 13200$ BMU Landscape (NAL) $x \leq 13200$ BMU $y \leq 10200$ BMU  Portrait (ISO A3) $x \leq 14030$ BMU $y \leq 19840$ BMU Landscape (ISO A3) $x \leq 19840$ BMU $y \leq 14030$ BMU
Logical source	any	none
Page position	any	none
Medium type nominal page size (see § 6.3.3.2.3) side of sheet	ISO A4 NAL 'recto' , 'verso', 'unspecified'	ISO A3 none

6.3.3.2.1 The following production rules define all possible values of the attribute "generator for subordinates" for the object classes in the generic layout structure:

For the document layout root class level:

```

<construction expression>      ::= <single term construction>
<single term construction>     ::= REP (<construction factor>)
<construction factor>         ::= CHO (<term sequence>)
<term sequence>               ::= {<construction term>}...
<construction term>           ::= PageSetClassId

```

where PageSetClassId is the identifier of a particular page set class.

For the page set class level:

```

<construction expression>      ::= <construction term A>
                                   /<construction term B>
                                   /<construction term C>
                                   /<construction term D>
                                   /<construction term E>
<construction term A>          ::= PageClassId1
<construction term B>          ::= REP PageClassId1
<construction term C>          ::= REP SEQ(PageClassId1,
                                             OPT PageClassId2)
<construction term D>          ::= SEQ(InitialPageClassId,
                                       OPT REP PageClassId1)
<construction term E>          ::= SEQ(InitialPageClassId,
                                       OPT REP SEQ(PageClassId1, OPT PageClassId2))

```

InitialPageClassId, PageClassId1 and PageClassId2 are page class identifiers defined by the document originator. PageClassId1 and PageClassId2 are differentiated in order to distinguish between pages which are specified as being 'recto' and 'verso' with the same page set definition. However, it should be noted that any page class within the generic layout structure may be set to 'recto' or 'verso'.

For the page class level:

```

<construction expression>      ::= SEQ (<term-sequence>)
<term-sequence>               ::= [<construction term A>]
                                   [<construction term B>]
                                   [<construction term C>]
<construction term A>          ::= HeaderFrameClassId
<construction term B>          ::= BodyFrameClassId
<construction term C>          ::= FooterFrameClassId

```

HeaderFrameClassId, BodyFrameClassId and FooterFrameClassId are the identifiers of header, body and footer frames respectively, as defined by the document originator.

6.3.3.2.2 The following production rule defines all possible values of the attribute "bindings" contained in the document layout root class, the page-set and the page class descriptions:

```

binding pair                   ::= <binding identifier><binding value>
<binding identifier>           ::= 'PGnum'
<binding value>               ::= <cardinal expression>

```

where, in the case of the document layout root class and page set classes,

```

<cardinal expression>         ::= -- any non-negative integer

```

and in the case of page classes:

```

<cardinal expression>         ::= INC(B-REF(PREC(CURR-OBJ))('PGnum'))

```

No other binding pairs are allowed to be specified for any of the layout object classes.

Expressions in binding values are evaluated during the document layout process and therefore the attribute "bindings" is not specified for layout objects.

*Note* - In order to operate the page numbering mechanism, it is necessary to set the binding value corresponding to the binding identifier 'PGnum' to zero or to a positive integer in the document layout root class description or in a page set class description. This binding value can be set and re-set in any page set class description in order to alter the page numbering throughout the document.

6.3.3.2.3 The attribute 'medium type' can specify page sizes in either recto or verso format for the page sizes indicated (see Recommendation T.412 for specification of the page sizes).

### 6.3.3.3 *Specification of attributes for layout object descriptions*

Table 11/T.502 specifies the attribute values allowed in layout object descriptions.

TABLE 11/T.502

Attribute values allowed for objects in the specific layout structure

Attribute	Basic value	Non-basic value	Default value
Object type	document layout root, page set, page, frame, block	none	-
Object identifier	any	none	-
Object class	any	none	-
Subordinates	any	none	-
Content portion	any	none	-
Presentation style	any	none	-
Content architecture class	'formatted' 'formatted processable'	none	'formatted'
Presentation attributes	see § 6.4.4 for allowable attributes	none	-
User readable comments	any	none	empty string
User visible name	any	none	-
Position	Frame: any value within a page, block: any value within a frame	none	horizontal = 0 vertical = 0
Dimensions	portrait: x ≤ 9240 BMU y ≤ 12400 BMU landscape: x ≤ 12400 BMU y ≤ 9240 BMU	Portrait (ISO A4) x ≤ 9920 BMU y ≤ 14030 BMU Landscape (ISO A4) x ≤ 14030 BMU y ≤ 9920 BMU	x ≤ 9240 BMU y ≤ 12400 BMU (see § 6.3.3.3.1)



TABLE 11/T.502 (cont.)

Attribute	Basic value	Non-basic value	Default value
		Portrait (NAL) $x \leq 10200$ BMU $y \leq 13200$ BMU Landscape (NAL) $x \leq 13200$ BMU $y \leq 10200$ BMU  Portrait (ISO A3) $x \leq 14030$ BMU $y \leq 19840$ BMU Landscape (ISO A3) $x \leq 19840$ BMU $y \leq 14030$ BMU	
Page position	Any	None	Such that edge losses are minimized
Medium type nominal page size (see § 6.3.3.2.3)	ISO A4, NAL	ISO A3	ISO A4 (portrait orientation)
side of sheet	'recto', 'verso', 'unspecified'	None	'unspecified'
Layout path	270 degrees	None	270 degrees

6.3.3.3.1 The default value for the dimensions of a layout object are independent of the medium type specified. For example, if "medium type" specifies ISO A3, then the default value of the attribute "dimensions" remains as given in the above table.

#### 6.4 Content architectures

##### 6.4.1 Content architecture levels

Three character content architecture levels are defined in this document application profile, namely:

- a formatted character content architecture level;
- a processable form content architecture level;
- a formatted processable character content architecture level.

##### 6.4.2 Graphic elements

The basic character set is the subrepertoire of ISO 6937/2 corresponding to Recommendation T.61. Any other registered subrepertoire may be used as a non-basic feature (and their use indicated in the document profile).

##### 6.4.3 Type of coding

The coding of the graphic characters and control functions is as specified in Recommendation T.61 (or ISO 6937). No other type of coding may be used.

##### 6.4.4 Presentation attributes

Paragraphs 6.4.4.1 and 6.4.4.2 define respectively the applicability of presentation style attributes and presentation attributes for PM1.

Paragraphs 6.4.4.3 and 6.4.4.4 define respectively the allowable presentation style attribute values and the presentation attribute values.

Presentation attributes are classified as 'shared', 'logical' and 'layout'. Shared attributes are applicable to all three character content architectures listed in § 6.4.1. Logical attributes are applicable to the processable and the formatted processable content architecture levels and layout attributes are applicable to the formatted and formatted processable character content architecture levels.

If an attribute is specified as not-applicable (N/A), then it is not allowed to occur in component descriptions or in presentation styles. The default values for non-applicable attributes are assumed to be those defined in Recommendation T.416.

#### 6.4.4.1 *Applicability of presentation style attributes* (see Table 12/T.502)

TABLE 12/T.502

##### Attributes applicable to presentation style

Attribute	Applicability
Presentation style identifier	M
User readable comments	NM
User visible name	NM
Presentation attributes	NM (see § 6.4.4.2)

#### 6.4.4.2 *Applicability of presentation attributes* (see Table 13/T.502)

TABLE 13/T.502

##### Applicability of presentation attributes

Presentation attribute	Applicability
Alignment	D
Character fonts	--
Character orientation	--
Character path	--
Character spacing	D
Code extension announcers	D
First line offset	D
Graphic character sets	D
Graphic character subrepertoire	D
Graphic rendition	D
Itemization	D
Kerning offset	--
Line layout table	D
Line progression	--
Line spacing	D
Formatting indicator	--
Initial offset	D
Indentation	D
Orphan size	D
Pairwise kerning	--
Widow size	D

6.4.4.3 *Specification of presentation style attribute values (see Table 14/T.502)*

TABLE 14/T.502

Attribute values allowed for presentation style attributes

Attribute	Basic value	Non-basic value
Presentation style identifier	any	none
User readable comments	any	none
User visible name	any	none
Presentation attributes	see § 6.4.4.3	

6.4.4.4 *Presentation attribute values*

6.4.4.4.1 *Shared presentation attributes (see Table 15/T.502)*

TABLE 15/T.502

Allowed values for shared presentation attributes

Attribute	Basic value	Non-basic value	Default value
Alignment	start-aligned end-aligned centred justified	none	start-aligned
Character spacing	120 BMU	80 BMU 100 BMU 200 BMU	120 BMU
Code extension announcers	the default value defined in Recommendation T.416	any string of escape sequences in accordance with ISO 2022	as defined in Recommendation T.416
Itemization	1) no itemization start-aligned end-aligned 2) any integer 3) any integer	none  none none	as defined in Recommendation T.416
First line format	any integer	none	0
Graphic character sets	the default value defined in Recommendation T.416	any other registered graphic character set	as defined in Recommendation T.416
Graphic character subrepertoire	subrepertoire of ISO 6937/2 corresponding to Recommendation T.61	any other registered graphic character set	as defined in Recommendation T.416
Graphic rendition	0, 1, 3, 4, 22, 23, 24	9, 29	0
Line layout table	any, as defined in Recommendation T.416	none	no tabulation stops specified
Line spacing	100, 200, 300, 400 BMU	150 BMU	200 BMU

#### 6.4.4.4.2 Logical presentation attributes (see Table 16/T.502)

TABLE 16/T.502

##### Allowed values for logical presentation attributes

Attribute	Basic value	Non-basic value	Default value
Indentation	any	none	0 BMU
Orphan size	any	none	'1'
Widow size	any	none	'1'

#### 6.4.4.4.3 Layout presentation attributes (see Table 17/T.502)

TABLE 17/T.502

##### Allowed values for layout presentation attributes

Attribute	Basic value	Non-basic value	Default value
Initial offset	any	none	As defined in Recommendation T.416

#### 6.4.5 Control functions

Control functions are classified as 'shared', 'logical' and 'layout'. Shared control functions are applicable to all three character content architectures listed in § 6.4.1. Logical control functions are applicable to the processable and the formatted processable content architecture levels and layout control functions are applicable to the formatted and formatted processable character content architecture levels.

Paragraphs 6.4.5.1 and 6.4.5.2 define the applicability of control functions for PM1; control functions that are not listed here are not applicable.

##### 6.4.5.1 Control functions with parameters

The functions enumerated in Table 18/T.502 are all shared control functions.

TABLE 18/T.502

##### Allowable values for shared control functions

Control function	Basic value	Non-basic value	Default value
Selective tabulation (STAB)	any	none	none
Select character spacing (SHS)	0	1, 2, 3	0
Select graphic rendition (SGR)	0, 1, 3, 4 22, 23, 24	9, 29	0
Select line spacing (SVS)	0, 1, 2, 3	4	0

#### 6.4.5.2 Control functions without parameters

##### 6.4.5.2.1 Shared control functions

Carriage return (CR)  
Line feed (LF)  
Partial line down (PLD)  
Partial line up (PLU)  
Space (SP)  
Substitute character (SUB)

##### 6.4.5.2.2 Logical control functions

Break permitted here (BPH)  
No break here (NBH)

##### 6.4.5.2.3 Layout control functions

No justify (JFY)

##### 6.4.5.2.4 Delimiters

Start of string (SOS)  
End of string (ST)

##### 6.4.5.2.5 Code extension control functions

Any code extension control function defined in ISO 2022 is permitted.

#### 6.4.6 Attributes of content portions

##### 6.4.6.1 Applicability of content portion attributes

The applicability of content portion attributes is defined in Table 19/T.502; this table applies to both logical and layout components.

TABLE 19/T.502

Attributes applicable to content portions

Attribute	Basic component
Content identifier-logical (Note 1)	M/M
Content identifier-layout (Note 2)	--/M
Type of coding	----
Content information	NM/NM

*Note 1* - This attribute is only applicable to content associated with logical components.

*Note 2* - This attribute is only applicable to content associated with layout components.

##### 6.4.6.2 Specification content portion attribute values

Table 20/T.502 specifies the permissible content portion attribute values for PM1.

TABLE 20/T.502

Attribute values for content portions

Attribute	Basic value	Non-basic value
Content identifier-layout	any	-
Content identifier-logical	any	-
Content information	octet string	-

## 6.5 Document profile

Table 21/T.502 defines the applicability of attributes in the document profile and their allowable values. The use of these attributes must conform to Recommendation T.414.

TABLE 21/T.502

### Applicability of and allowed values of document profile attributes

Attribute	Applicability	Basic value
Presence of document constituents		
Generic layout structure	NM	'partial', 'present'
Specific layout structure	NM	'present'
Generic logical structure	NM	'partial', 'present'
Specific logical structure	NM	'present'
Layout styles	NM	'present'
Presentation style	NM	'present'
Document characteristics		
Document application profile	M	see § 6.5.1
Document application profile defaults		
Document architecture defaults		
Content architecture class	NM	
Dimensions	M	see § 6.5.2
Character content defaults		
Graphic character subrepertoire	M	'3'
Document architecture class	M	'formatted', 'processable'
		'formatted processable'
Content architecture class	M	see § 6.5.3
Interchange format class	M	'A'
ODA version date	M	see § 6.5.4
Non-basic document characteristics		
Profile character sets	NM	any
Comments character sets	NM	any
Document constituent attributes		
Page dimensions	NM	see § 6.5.5
Medium types	NM	see § 6.5.6
Presentation attributes	NM	any
		(see Table 14/T.502)
Document management attributes		
Document reference	M	
Any other document management attribute defined in Recommendation T.414 may be specified		

6.5.1 The value of the attribute "Document application profile" is:

{0 0 20 502 0}

6.5.2 The only non-standard default values that may be specified are for the document architecture attribute "Dimensions" and for the presentation attribute "Content architecture class". In the case of the attribute "Dimensions", the non-standard default value applies only to the attribute "Dimension" that is applicable to layout object of the type 'page'. It should be noted that the default value for "Dimensions" specified in § 6.3.3.3 is a non-standard default value and the use of this default value must be indicated in the document application profile.

In the case of the presentation attribute "Content architecture class", the non-standard default values that can be specified are 'processable' and 'formatted processable'. One of these values must be indicated in the document profile when the default value for the presentation attribute "Content architecture class" is not 'formatted'.

6.5.3 The value of the attribute "content architecture classes" is a set of one or more values, each of which is an ASN.1 object identifier. These object identifiers are defined in Recommendation T.416.

6.5.4 The value of the attribute "ODA version date" consists of two parameters (see Recommendation T.414). In respect to this document application profile, the value of the first parameter is the character string "T.410" and the value of the second parameter is the date "1988" represented in accordance with ISO 8601.

6.5.5 The attribute "page dimensions" must be specified when the page dimensions used in the document exceed the basic values defined in Tables 10/T.502 and 11/T.502.

6.5.6 If no value is specified for the attribute "medium type", then it is assumed that ISO A4 paper size (portrait orientation) is to be used throughout the document.

## Recommendation T.503

### A DOCUMENT APPLICATION PROFILE FOR THE INTERCHANGE OF GROUP 4 FACSIMILE DOCUMENTS

#### CONTENTS

- 1 *Scope*
- 2 *Field of application*
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*Annex A* - Format of the values of the attributes "object identifier".

## 1 Scope

1.1 This Recommendation defines a document application profile conforming to the T.410 Series of Recommendations.

Its purpose is to specify an interchange format suitable for the interchange of group 4 facsimile documents that contain only raster graphics.

Documents are interchanged in a formatted form, which enables the recipient to display or print the document as intended by the originator.

1.2 This Recommendation, together with designated parts of T.563, defines a document application profile that may be used by any telematic service.

## 2 Field of application

2.1 This Recommendation defines a document application profile that is in conformance with the T.410 Series of Recommendations and that allows group 4 facsimile documents to be interchanged only in a formatted form, which allows a recipient to reproduce the document as intended by the originator.

2.2 This document application profile is designed to be independent of the means used to create or to interchange the encoded documents.

2.3 The features which can be interchanged using this document application profile fall into the following categories:

- a) page format features - these concern how the layout of each page of a document will appear when reproduced;
- b) raster graphics layout and imaging features - these concern how the document content will appear within pages of the reproduced document;
- c) raster graphics coding - these concern the raster graphics representations and control functions that make up the document raster graphics content;

2.4 It is assumed that, when negotiation is performed by the service using this document application profile, all non-basic features are subject to negotiation.

## 3 References

The following references are required in order to implement this Recommendation:

- T.410 Series Recommendations: Open document architecture (ODA) and interchange format
- Rec. T.6: Facsimile coding schemes and coding control functions for Group 4 facsimile apparatus
- Rec. X.208: Specification of abstract syntax notation one (ASN.1)
- Rec. X.209: Specification of basic encoding rules for abstract syntax notation one (ASN.1)
- Rec. T.417: Open document architecture (ODA) and interchange format - raster graphics content architectures
- Rec. T.563: Terminal characteristics for group 4 facsimile apparatus



## 4 Definitions

The definitions in Recommendation T.411 apply to this Recommendation.

## 5 Characteristics supported by this document application profile

### 5.1 Overview

A group 4 facsimile document is the result of a formatting process and therefore the purpose of this document application profile is to allow transfer of the complete layout of the document.

Only one category of content is allowed within the same page, namely: *raster graphics content* (per Recommendation T.417) as used by facsimile group 4 apparatus.

This section specifies the functional description of the features supported by this document application profile.

### 5.2 Logical characteristics

Not applicable.

### 5.3 Layout characteristics

#### 5.3.1 Layout document structure

A document is seen as a succession of pages.

The content of a page is: *raster graphics content* architecture.

#### 5.3.2 Document structure elements

##### 5.3.2.1 Page format

5.3.2.1.1 The document is imaged in a text area which must be within the assured reproduction area.

5.3.2.1.2 The dimensions of the assured reproduction area depend on the paper used.

5.3.2.1.3 The possible paper formats are defined in Recommendation T.563.

5.3.2.1.4 Only the vertical orientation of the page is permitted.

##### 5.3.2.2 Block

Not applicable (the content is directly related to the page).

### 5.4 Content characteristics

The group 4 facsimile document contains raster graphics in facsimile group 4 format.

#### 5.4.1 Raster graphics content

##### 5.4.1.1 Raster graphics imaging

The content of raster graphics is defined by the dimensions of the page and the number of pels per line, in accordance with Table 2/T.563.

##### 5.4.1.2 Pel spacing, line spacing and pel transmission density

This property defines the distance between successive pels on a line and between successive line of pels.

The basic value is 6 BMU, corresponding to 200 pels per 25.4 mm. It is also the default value.

The non-basic values are 3, 4 and 5 BMU respectively, corresponding to 400, 300 and 240 pels per 25.4 mm.

#### 5.4.2 Received document

This document application profile, being limited to formatted form, does not support any features to facilitate processing of an interchanged document by a receiver.

## 6 Definition of the document application profile

### 6.1 Overview

#### 6.1.1 Document architecture level

This document profile makes use of document architecture class FDA, as defined in Recommendation T.412. A document according to this document architecture profile includes a specific layout structure only.

The document architecture level is defined in Tables 2/T.503, 3/T.503 and 4/T.503.

The specific layout structure is always present in any document conforming to this document application profile.

#### 6.1.2 Content architecture level

The content architecture level that may be used in documents conforming to this document application profile is as follows: *raster graphics formatted content architecture level*, defined in Tables 5/T.503 and 6/T.503.

The coding method to be used is that defined by Recommendation T.6. In addition, any non-basic features defined in Recommendation T.6 may be used, provided that they are indicated in the document profile.

#### 6.1.3 Document profile level

The document profile level used in this document application profile is defined in Table 1/T.503. Every document interchanged in accordance with this document application profile must include a document profile. Every non-basic attribute value used in a document must be indicated in the document profile.

#### 6.1.4 Interchange format class

The interchange format class used in this document application profile is "B", as defined in Recommendation T.415.

### 6.2 Definition of document structure

#### 6.2.1 Specific layout structure

The number of hierarchical levels is 2, namely:

- document layout root;
- page.

The document layout root and page levels are mandatory. Only one content portion must be associated with each page.

#### 6.2.2 Generic layout structure

Not applicable.

### 6.3 Definition of attribute values

The attributes applicable to layout components are defined in Table 2/T.503. The following notation is used in this table:

- attribute not applicable to object description
- m mandatory attribute
- nm non-mandatory attribute
- d defaultable attribute

Capital letters (M, NM and D) are used for groups of attributes. The allowable attribute values for object descriptions are defined in Table 3/T.503.

TABLE 1/T.503

## Document profile attributes

Attribute	Class	Permissible value
Document profile descriptor	M	
Specific layout structure	m	Present
Document characteristics	M	
Document application profile	m	Group 4 fax
Document architecture class	m	Formatted
Non-basic document characteristics	NM	
Page dimensions (see Note 1)	nm	North American = (10200, 13200 fixed or variable) ISO B4 = (11811, 16677 fixed or variable) ISO A3 = (14030, 19840 fixed or variable) Japanese legal = (12141, 17196 fixed or variable) Japanese letter = (8598, 12141 fixed or variable) (see Note 2)
Raster graphics coding attributes	NM	
Compression	nm	Uncompressed
Raster graphics presentation attributes	NM	
Pel transmission density	nm	5 BMU (240 pels/25.4 mm) 4 BMU (300 pels/25.4 mm) 3 BMU (400 pels/25.4 mm)

*Note 1* - This dimension attribute is represented as a data element which consists of two integers. The two integers specify width and height of a page in basic measurement units (BMUs).

*Note 2* - An indefinite page length is represented by a variable measure in the vertical dimension. The value of this data is then arbitrary and should be the nominal page length.

TABLE 2/T.503

## Attributes applicable to layout components

Attribute	Document layout root	Page
<i>Shared attributes</i>		
Object type	m	m
Object identifier	nm	nm
Content portions	---	nm
Default value lists	nm	---
<i>Layout attributes</i>		
Presentation attributes	---	d
Dimensions	---	d

TABLE 3/T.503

## Attribute values for layout object descriptions

Attribute	Basic value	Default value	Non-basic value
<i>Shared attributes</i>			
Object type	Document layout root, page	None	None
Object identifier	As defined in Rec. T.412 (see also Annex A)	None	None
Content portions	As defined in Rec. T.412	None	None
Default value lists	See Table 4/T.503	None	None
<i>Layout attributes</i>			
Presentation attributes	See Table 5/T.503		

TABLE 3/T.503 (end)

Attribute	Basic value	Default value	Non-basic value
Dimensions (see Note 1)	Horizontal = 9920 BMU  Vertical = 14030 BMU (see Note 2)	Horizontal = 9920  Vertical = 14030 BMU (see Note 3)	North American = (10200, 13200)  ISO B4 = (11811, 16677) ISO A3 = (14030, 19840) Japanese legal = (12141, 17196) Japanese letter = (8598, 12141) (see Note 2)

*Note 1* - This dimension attribute is represented as a data element which consists of two integers. The Two integers specify width and height of a page in basic measurement units (BMUs).

*Note 2* - Width is indicated by fixed measure, and at the same time height is indicated by either fixed or variable measure.

The use of variable measure for height indication depends on each application, for example, real time scanning, fixed printing paper, etc. Therefore, for example, when a transmitting terminal requests to use variable measure for height indication, a receiving terminal will accept variable measure for height indication even though the receiving terminal adopts cut sheet paper (fixed size paper) for printing.

*Note 3* - Both width and height are indicated by fixed measures.

TABLE 4/T.503

Defaultable attributes that may be specified in a default value list of the document layout root

Object type	Defaultable attributes that can be specified
Page	Presentation attributes Dimensions

#### 6.4 Content architectures

The following raster graphics content architecture level is used in this document application profile.

#### 6.4.1 Raster graphics content architecture level

The type of coding to be used is as defined in Recommendation T.6.

The code extension control function may be used, provided its use is agreed by prior negotiation and is indicated in the document profile. This control function is used to invoke uncompressed mode of coding.

The presentation attributes that may be used are defined in Table 5/T.503.

TABLE 5/T.503

#### Presentation attributes

Attribute	Basic value	Default value	Non-basic value
Content type	Formatted raster graphics content architecture	Formatted raster graphics content architecture	None
<i>Raster graphics attributes</i>			
Pel path	0°	0°	None
Line progression	270°	270°	None
Pel transmission density	6 BMU (200 pels/25.4 mm)	6 BMU	5 BMU (240 pels/25.4 mm) 4 BMU (300 pels/25.4 mm) 3 BMU (400 pels/25.4 mm)

#### 6.4.2 Coding attributes

Attributes applicable to content portions are defined in Table 6/T.503.

TABLE 6/T.503

#### Attributes applicable to content portions

Attribute	Qualifier	Basic value	Default value	Non-basic value
Content identifier layout	nm	As defined in Rec. T.412	None	None
Type of coding	d	T.6	T.6	None
<i>Raster graphics coding attributes</i>				
Number of pels per line	d	As defined in Table 3/T.563	As defined in Table 3/T.563	None
Compression	d	Compressed	Compressed	Uncompressed
Number of discarded pels	d	As defined in Table 3/T.563	As defined in Table 3/T.563	None
Content information	m	T.6 string	None	None

## ANNEX A

(to Recommendation T.503)

### Format of the values of the attributes "object identifier"

The object identifiers of the specific layout object descriptions are composed of sequences of numbers, each of these numbers representing a particular level of the specific layout structure.

The number assigned to the specific document layout root object description is "1". The subordinate pages have a second number which uniquely identifies a particular page. The delimiter between "1" and this second number is the "space" character.

#### *Examples:*

"1 27" corresponding coding: '31 20 32 37'H

where character '1' is coded 03/01 or 31 in hexadecimal

where character 'space' is coded 02/00 or 20 in hexadecimal

where character '2' is coded 03/02 or 32 in hexadecimal

and where character '7' is coded 03/07 or 37 in hexadecimal

Content portion identifiers are composed of the identifier of the page to which the content portion belongs and an additional number which identifies the content portion.

#### *Examples:*

page description "1 27" coding: '31203237'H

content portion associated with the page "1 27 1" coding: '312032372031'H (optional)

The value of the attribute "content portions" consists of a single number, which indicates the content portion of that object. This number is equal to the last number in the content portion identifier.

### Recommendation T.504

## DOCUMENT APPLICATION PROFILE FOR VIDEOTEX INTERWORKING

### CONTENTS

- 1 *Scope*
- 2 *Field of application*
- 3 *References*
- 4 *Definitions*

## 5 *Characteristics supported by this document application profile*

- 5.1 Overview
- 5.2 Logical characteristics
- 5.3 Layout characteristics

## 6 *Definition of the document application profile*

- 6.1 Overview
- 6.2 Document profile level
- 6.3 Specification of attributes

## *Annex A - Summary of ASN.1 object identifiers*

### 1 **Scope**

1.1 This Recommendation defines a document application profile which conforms to T.400 Series of Recommendations.

Its purpose is to specify a document architecture level and a content architecture level, and to select an interchange format class suitable for videotex interworking as defined in configuration 1 of Recommendation F.300 and in Recommendation T.564.

### 2 **Field of application**

This Recommendation defines a document that is in conformance with the T.400 Series of Recommendations and that allows interworking between two videotex services using configuration 1 defined in CCITT Recommendation F.300 and Recommendation T.564. The videotex documents are interchanged only in a formatted form, allowing the recipient to reproduce them as intended by the originator.

This document application profile is defines the features of the document structure that can be interchanged.

### 3 **References**

- Rec. F.300: Videotex service
- Rec. X.200: Reference model of open systems interconnection for CCITT applications
- Rec. X.213: Network service definition for open systems interconnection for CCITT applications
- Rec. X.214: Transport service definition for open systems interconnection of CCITT applications
- Rec. X.224: Transport protocol specification for open systems interconnection for CCITT applications
- Rec. X.215: Session service definition for open systems interconnection of CCITT applications
- Rec. X.225: Session protocol specification for open systems interconnection for CCITT applications
- Rec. X.216: Presentation service definition for open systems interconnection for CCITT applications
- Rec. X.226: Presentation protocol specification for open systems interconnection for CCITT applications



- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications
- Rec. X.227: Association control service specification for open systems interconnection for CCITT applications
- Rec. T.101: International interworking for videotex services
- Rec. T.400: Introduction to document architecture, transfer and manipulation
- Rec. T.411: Open document architecture (ODA) and interchange format - Introduction and general principles
- Rec. T.412: Open document architecture (ODA) and interchange format - Document structures
- Rec. T.414: Open document architecture (ODA) and interchange format - Document profile
- Rec. T.415: Open document architecture (ODA) and interchange format - Open document interchange format (ODIF)
- Rec. T.431: Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles
- Rec. T.432: Document transfer and manipulation (DTAM) - Services and protocols - Service definition
- Rec. T.433: Document transfer and manipulation (DTAM) - Services and protocols - Protocol specification
- Rec. T.441: Document transfer and manipulation (DTAM) - Operational structure
- Rec. T.523: Communication application profile DMI for videotex interworking
- Rec. T.541: Operational application profile for videotex interworking
- Rec. T.564: Gateway characteristics for videotex interworking

#### 4 Definitions

The definitions of T.400 Series of Recommendations apply also to this Recommendation.

#### 5 Characteristics supported by this document application profile

##### 5.1 Overview

A videotex document is the information that is retrieved by a single user function and presented as a complete entity. Therefore the purpose of this document application profile is to allow the recipient to image the layout of the interchanged document as intended by the originator.

This section specifies the functional description of the features supported by this document application profile.

##### 5.2 Logical characteristics

Not used.

##### 5.3 Layout characteristics

###### 5.3.1 Layout document structure

At a given time a document contains one single page which contains one or more blocks.

The content of the block is:

- "Videotex" content.

### 5.3.2 *Document structure elements*

#### 5.3.2.1 *Page format*

The page format is expressed in accordance with the definition of the videotex service or videotex terminal, by using scaled measurement units. The relation between BMUs and SMUs is specified in the document profile.

#### 5.3.2.2 *Block size*

The position and the dimension of the blocks are restricted to be equal to those of the page. Block size not equal to page is for further study.

## 6 **Definition of the document application profile**

### 6.1 *Overview*

#### 6.1.1 *Document architecture level*

The document application profile makes use of document architecture class FDA as defined in Recommendation T.412.

The document architecture level includes the following structure:

- a specific layout structure.

The document architecture level is defined in Tables 1/T.504, 2/T.504 and 3/T.504.

#### 6.1.2 *Content architecture level*

The content architecture level that may be used in documents conforming to this document application profile is as follows:

- "Videotex"

Details are specified in Recommendation T.101.

### 6.2 *Document profile level*

The document profile level used in this document application profile is defined in Table 4/T.504. Every document interchanged in accordance with this document application profile must include a document profile.

#### 6.2.1 *Interchange format class*

The interchange format class used in this document application profile is "B" as defined in Recommendation T.415.

#### 6.2.2 *Definition of document structure*

The document structure contains a specific layout structure. The number of hierarchical levels is 3, namely:

- document layout root;
- page;
- block.

All these levels are mandatory.

At most one content portion can be associated with one block.

### 6.3 *Specification of attributes*

The attributes applicable to constituents of the layout structure are defined in Tables 1/T.504 and 2/T.504, using the following notation:

- attribute not applicable;
- m attribute is mandatory;
- nm attribute is non-mandatory;
- d attribute is defaultable;
- \* exceptionally not used by this document application profile.

TABLE 1/T.504

## Attributes applicable to layout objects

Attribute	Document layout root	Page	Block
<i>Shared attributes</i>			
- Object type	m	m	m
- Object identifier (Note 1)	m	m	m
- Subordinates	*	*	*
- Content architecture class	--	d	d
- Default value list	nm	--	--
- Application comments	--	--	d
<i>Layout attributes</i>			
- Position (Note 2)	--	--	d
- Dimensions (Note 2)	--	d	d
- Page position	--	d	--
- Medium type	--	d	--

*Note 1* - According to the specifications of Recommendation T.412 this attribute may be omitted if the value can be derived unambiguously from the transmission sequence of the relevant objects.

*Note 2* - For the block, the value of the attributes position and dimensions is restricted to those of the page. Using other values is for further study.

TABLE 2/T.504

## Attributes applicable to content portions

Attribute	Content portion
- Content identifier layout (Note 1)	m
- Type of coding	d
- Coding attributes (Note 2)	d
- Content information (Note 2)	d

*Note 1* - According to the specifications of Recommendation T.412 this attribute may be omitted if the value can be derived unambiguously from the transmission sequence of the relevant objects and content portions.

*Note 2* - The use of these attributes applicable to content portions is specified in Recommendation T.101.

TABLE 3/T.504

## Attribute values for layout objects

Attribute	Basic value	Default value	Non-basic value
<i>Shared attributes</i>			
Object type	Document layout	None	None
	root		None
	Page		None
	Block		
Object identifier	See Rec. T.412	None	None
Content architecture class	Videotex content architecture		None
Default value lists	See Table 5/T.504	None	None
Application comments	See Rec. T.564	See Table 6/T.504	None
<i>Layout attributes</i>			
Position	See Rec. T.412 and Notes 1 and 2	(0,0)	None
Dimensions	See Rec. T.412 and Notes 1 and 2	(40,24)	None
Page position	See Rec. T.412 and Note 1	(0,0)	None
Medium type	See Rec. T.412	(40,24), unspecified)	None

*Note 1* - Positions and dimensions are specified by using scaled measurement units. The unit scaling factor is defined by the attribute "unite scaling" within the document profile. The "nominal page size" within the attribute "medium type" defines the number of rows and columns to be imaged on the screen by the videotex application in terms of SMUs.

For the block, the position and dimensions are those of the page.

*Note 2* - It has to be taken into account that within the national videotex systems the position is usually determined by (1,1).

TABLE 4/T.504

## Document profile descriptor

Data element name	Class	Value	Comments
Document profile descriptor Specific layout structure	M m	1	Presence of specific layout structure
Document characteristics Document application profile	M m	0 1 8 16 0	Object identifier
Document application profile default	m		See Note 1
Document architecture class	m	1	FDA
Content architecture classes	m	0 1 8 16 3	Object identifier
Interchange format class	m	"B"	
ODA version	m		
Unit scaling	m		
Document management attributes	NM		See Note 2
Title	nm		
Document date and time	nm		
Owners	nm		
Document reference	nm		
Additional information	nm		

Note 1 - Default values differing from those defined in T.412 are specified for the attributes (see Table 3/T.504):

- content architecture class;
- dimensions;
- page position;
- medium type.

Note 2 - The relation specified by this attribute is not taken into account within the videotex interworking application. It is used when printing on paper of a videotex page is intended.

TABLE 5/T.504

Default attributes that may be specified  
in a default value list

Object type	Defaultable attribute
Page	Dimensions Page position Application comments
Block	Object identifier Presentation attributes Dimensions Position Application comments
Content portion	Type of coding Coding attributes Content information

TABLE 6/T.504

Default values for application defined attributes defined in  
Recommendation T.564 and mapped to the attribute application  
comments defined in Recommendation T.412

List of attributes	Default value
<i>Block:</i> Display-indication	"Mandatory"

## ANNEX A

(to Recommendation T.504)

## Summary of ASN.1 object identifiers

This Annex is an integral part of this Recommendation.

ASN.1 object identifier value	Description	Section
0 1 8 16 0	Object identifier for this document application profile	Table 4/T.504, § 6.3

## Recommendation T.521

COMMUNICATION APPLICATION PROFILE BT0 FOR DOCUMENT BULK  
TRANSFER BASED ON THE SESSION SERVICE

(According to the rules defined in Recommendation T.62 *bis*)

## CONTENTS

0	<i>Introduction</i>
1	<i>Scope and field of application</i>
2	<i>References</i>
3	<i>Definitions</i>
4	<i>Abbreviations and conventions</i>
5	<i>Definition of communication application profile BT0</i>
5.1	Overview of BT0
5.2	DTAM functional units
5.3	DTAM service primitives and lower layer mapping

- 6 Document interchange data structures
- 7 Document transfer
  - 7.1 Synchronization
  - 7.2 Document transfer recovery

*Annex A* - Overall protocol sequence

## 0 Introduction

T.400 Series of Recommendations define the open document architecture and interchange format (T.410 Series) and the DTAM Services and protocols (T.430 Series) for the purpose of the document transfer and manipulation. In order to apply T.400 Series to various telematic services it is necessary to specify the application profiles for each service that consists of a document application profile and a communication application profile.

According to this requirement, T.500 Series of Recommendations define the document application profiles and T.520 Series of Recommendations define the communication application profiles.

Recommendation T.521 is one of a set of T.520 Series of Recommendations to define the communication application profile for the document bulk transfer based on the session service according to the rules defined in Recommendation T.62 *bis*.

## 1 Scope and field application

This Recommendation defines the communication application profile for the document bulk transfer using the session service defined in Recommendation T.62 *bis* in terms of:

- a) DTAM functional units used;
- b) DTAM service primitives and parameters used;
- c) lower layer X.215 session service mapping according to the rules of T.62 *bis*.

## 2 References

The following references are required in order to implement this communication profile defined in this Recommendation.

- Rec. T.431: Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles
- Rec. T.432: Document transfer and manipulation (DTAM) - Service protocols - Service definition
- Rec. T.433: Document transfer and manipulation (DTAM) - Service protocols - Service specification
- Rec. T.62: Control procedures for teletex and Group 4 facsimile services
- Rec. T.62 *bis*: Control procedures for teletex and Group 4 facsimile services based on Recommendation X.215/X.225
- Rec. X.215: Session service definition for open systems interconnection of CCITT application

### 3 Definitions

The definitions of T.400 Series of Recommendations and Recommendation T.62 *bis* also apply to this Recommendation.

### 4 Abbreviations and conventions

The abbreviations and conventions defined in T.400 Series of Recommendations and Recommendation T.62 *bis* also apply to this Recommendation.

### 5 Definitions of communication application profile BT0

#### 5.1 Overview of BT0

This Recommendation defines units and communication support function in accordance with Recommendation T.431.

#### 5.2 DTAM functional units

The following functional units defined in Recommendation T.432 are used for BT0:

- association use control (kernel);
- capability;
- document bulk transfer;
- token control;
- exception report;
- reliable transfer mode 1.

#### 5.3 DTAM service primitives and lower layer mapping

##### 5.3.1 DTAM service primitives and parameters

General DTAM service definition and parameters are defined in Recommendation T.432. This section specifies the parameters of DTAM service of BT0.

##### 5.3.1.1 D-INITIATE service parameters

The following parameters of this service are used as follows:

- transparent mode;
- telematic requirements;
- application capabilities;
- result.

Table 1-A/T.521 lists the D-INITIATE service parameters.

##### 1) Transparent mode

This parameter should be specified in D-INITIATE request service primitive.

##### 2) Telematic requirements

The following functional units defined in Recommendation T.432 are used for BT0 as mandatory functional units.

- association use control (kernel);
- capability;
- document bulk transfer;
- token control;
- exception report;
- reliable transfer mode 1.



### 3) *Application capabilities*

This "application capabilities" is defined in Recommendation T.432 and the following sub-parameters:

#### a) *document application profile*

The value of this parameter indicates the document application profile being used. Its value is specified in Recommendations that define terminal characteristics for particular telematic services.

#### b) *Document architecture class*

The value of this parameter indicates the document architecture class used in the entire association. The use of this parameter and its possible value is specified in the Recommendations that define terminal characteristics for particular telematic services.

### 4) *Result*

This field can take the values defined in Recommendation T.432.

TABLE 1-A/T.521

#### D-INITIATE service parameters

	D-INITIATE request	D-INITIATE indication	D-INITIATE response	D-INITIATE confirm
Transparent mode	M			
Telematic requirements	M	M(=)	M	M(=)
Application capabilities	M	M(=)	M	M(=)
Document application profile	M	M(=)	M	M(=)
Document architecture class	M	M(=)	M	M(=)
Result			U	C(=)

#### 5.3.1.2 *D-TERMINATE service parameters*

This service has no parameter for BT0. Only the initiator can issue D-TERMINATE. In addition, the initiator can issue D-TERMINATE only if he has a data token.

#### 5.3.1.3 *D-U-ABORT service parameters*

This service has the parameter of "user information".

Table 1-B/T.521 lists the D-U-ABORT service parameters.

TABLE 1-B/T.521

#### D-U-ABORT service parameters

	D-U-ABORT request	D-U-ABORT indication
User information	U	C(=)

#### 5.3.1.4 D-CAPABILITY service parameters

This service has the parameter "application capabilities" which consists of sub-parameters as follows:

- document application profile;
- document architecture class;
- none-basic document characteristics.

Table 1-C/T.521 lists the D-CAPABILITY service parameters.

TABLE 1-C/T.521

#### D-CAPABILITY service parameters

	D-CAPABILITY request	D-CAPABILITY indication	D-CAPABILITY response	D-CAPABILITY confirm
Application capabilities				
Document application profile	M	M(=)	M	M(=)
Document architecture class	M	M(=)	M	M(=)
Non-basic document characteristics	U	C(=)	U	C(=)

- 1) Application capabilities  
See § 5.3.1.1.
  - a) Document application profile  
See § 5.3.1.1.
  - b) Document architecture class  
See § 5.3.1.1.
  - c) Non-basic document characteristics  
This is the "non-basic document characteristics" defined in Recommendation T.432.

#### 5.3.1.5 D-TRANSFER service parameters

This service has the following parameters:

- 1) Document information  
This consists of the interchange data elements representing the document. The "Document characteristics" from the document profile are transferred using S-ACT-START (Note).  
*Note* - All interchange data elements, except the document profile descriptor, are transferred using S-DATA service. The document profile is reconstructed by the receiving DTAM PM, on the basis of the "document characteristics" transferred in the S-ACT-START.
- 2) Document information type  
This parameter always has the value "transfer of a document from its beginning" (see Recommendation T.432).
- 3) Document reference information  
The value of this parameter is to be provided by the DTAM user in accordance with the rules specified in Recommendation T.432.
- 4) Result  
This parameter has one of the values "document information transferred" and "document information not transferred", as defined in Recommendation T.432.

5) *Checkpoint mechanism*

Checkpoint mechanism 2 is applied. Value of this parameter is integer 2.

The following restriction is applied to the transfer syntax coding rules defined in X.209 for the interchange of the document application profile defined in Recommendation T.503:

- Length fields longer than three octets shall not be used. A length field of three octets allows for the representation of a length of up to 65 535; a data element with a length exceeding 65 535 shall have a length field of the indefinite form.

Table 1-D/T.521 lists the D-TRANSFER service parameter.

TABLE 1-D/T.521  
D-TRANSFER service parameters

Parameter	D-TRANSFER request	D-TRANSFER indication	D-TRANSFER confirmation
Document information	M	M(=)	
Document information type	M	M(=)	M(=)
Document reference information	M	M(=)	M(=)
Result			M
Checkpoint mechanism	M		

*Note* - The document information is transferred using the type of normal document.

5.3.1.6 *D-CONTROL GIVE service parameters*

The D-CONTROL GIVE service surrenders all available tokens and has no parameter.

5.3.1.7 *D-TOKEN PLEASE service parameters*

The D-TOKEN PLEASE service is used to request the data token and has no parameter.

5.3.1.8 *D-U-EXCEPTION-REPORT service parameters*

This service has the parameter of "user information".

Table 1-E/T.521 lists the D-U-EXCEPTION-REPORT service parameter.

- *User information*

This is the user information associated with the exception report of application association.

TABLE 1-E/T.521  
D-U-EXCEPTION-REPORT service parameters

	D-U-EXCEPTION-REPORT request	D-U-EXCEPTION-REPORT indication
User information	U	C(=)

### 5.3.1.9 D-P-EXCEPTION-REPORT service parameter

This is used as defined in Recommendation T.432.

### 5.3.2 Use of session service and parameter mapping

#### 5.3.2.1 DTAM protocol mapping to Recommendation X.215 session service

This mapping rule is defined in § 7.2 of Recommendation T.433.

*Note* - D-TRANSFER conf is implicitly informed by receipt of S-ACT END conf, S-ACT INT conf and S-ACT DCAD conf.

#### 5.3.2.2 Parameters mapping to session parameters

Tables 2-A/T.521 to 2-H/T.521 show the mapping rule between DTAM service parameters and basic and additional session parameters.

The category of parameters is defined as follows:

- 1: parameters are generated by DTAM user;
- 2: parameters are generated by DTAM provider;
- 3: parameters are generated by DTAM session provider.

Annex A illustrates the example of protocol sequences for BT0.

TABLE 2-A/T.521

#### D-INITIATE

DTAM service parameters	Basic and additional session parameters	Category
Telematic requirements	Session requirements	1
Application capabilities		
Document application profile	Session user data	
Document architecture class		
None	Session reference	2
	Non-basic session capabilities	
	Service identifier	
	Inactivity timer	
None	Private use	3
	Non-standardized capabilities	
	Session control functions	
	Reason	

TABLE 2-B/T.521

**D-TERMINATE**

DTAM service parameters	Basic and additional session parameters	Category
None	Session termination parameter	3

TABLE 2-C/T.521

**D-U-ABORT**

DTAM service parameters	Basic and additional session parameters	Category
User information (Note)	Session termination parameter (reason)	1
None	Session termination parameter (transport disconnect)	3

*Note* - This parameter is equal to reason of session termination parameter.

TABLE 2-D/T.521

**D-U-CAPABILITY**

DTAM service parameters	Basic and additional session parameters	Category
Application capabilities	Session user data	1
Document application profile		
Document architecture class		
Non-basic document characteristics		
None	Inactivity timer	2
None	Acceptance of CDCL parameters	3
	Private use	
	Non-standardized capabilities	

TABLE 2-E/T.521

**D-TRANSFER**

DTAM service parameters	Basic and additional session parameters	Category
Document information	Session user data	1
Document information type	None	1
Document reference information	Document reference number	
Result	None	

TABLE 2-F/T.521

**D-CONTROL GIVE**

DTAM service parameters	Basic and additional session parameters	Category
None	None	-

TABLE 2-G/T.521

**D-TOKEN PLEASE**

DTAM service parameters	Basic and additional session parameters	Category
None	Tokens	2

TABLE 2-H/T.521

**D-U-EXCEPTION-REPORT**

DTAM service parameters	Basic and additional session parameters	Category
User information	Reason	1

**6 Document interchange data structures**

The interchange representation of a document has to be defined in accordance with the Recommendation which specifies the relevant document application profile.

## 7 Document transfer

### 7.1 Synchronization

The document information is divided into segments, in accordance with § 7.2.4 of Recommendation T.433, such that each segment contains one page descriptor and the associated content portion. A minor synchronization point is associated with each segment.

### 7.2 Document transfer recovery

For further study.

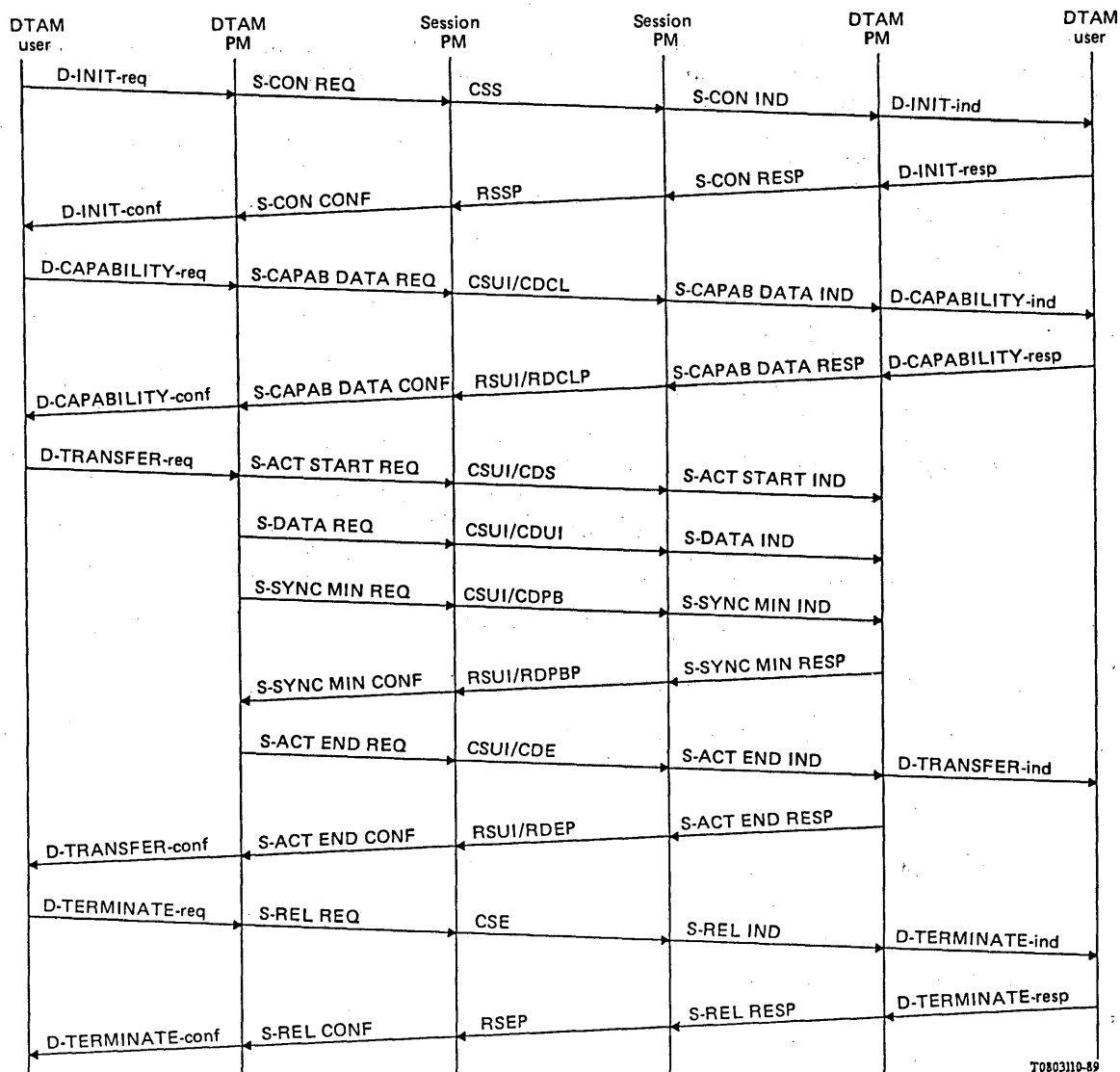
## ANNEX A

(to Recommendation T.521)

### Overall protocol sequence

This Annex illustrates the following procedures provided by BT0 (see Figures A-1/T.521 to A-4/T.521):

- normal procedure;
- token control procedure;
- abort procedure;
- exception report procedure.

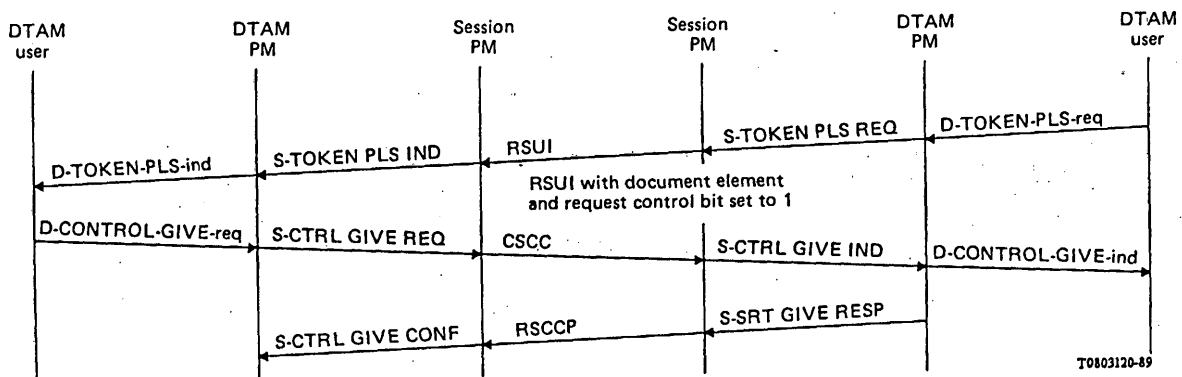


CDCL	Command document capability list
CDE	Command document end
CDPB	Command document page boundary
CDS	Command document start
CDUI	Command document user information
CSE	Command session end
CSS	Command session start
CSUI	Command session user information
RDCLP	Response document capacity list positive
RDEP	Response document end positive
RDPBP	Response document page boundary positive
RSEP	Response session end positive
RSSP	Response session start positive
RSUI	Response session user information

FIGURE A-1/T.521

Normal procedure

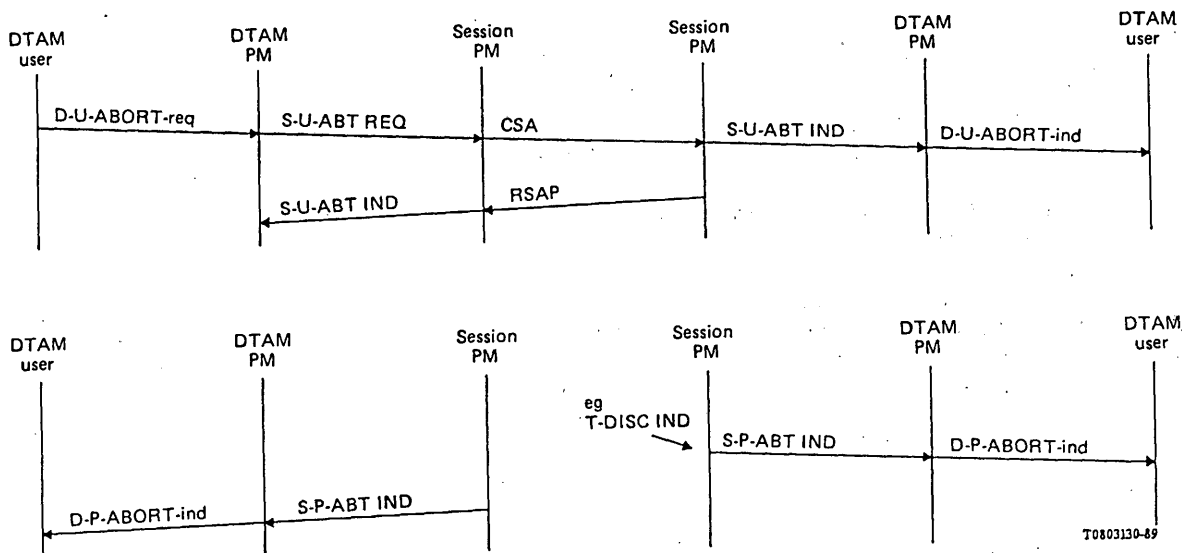




CSCC      Command session change control  
RSCCP      Response session change control positive  
RSUI      Response session user information

FIGURE A-2/T.521

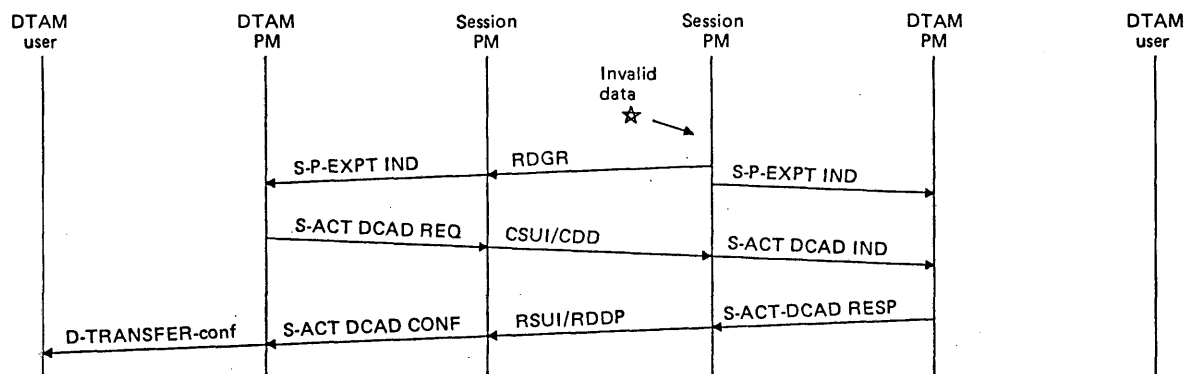
Token control procedure



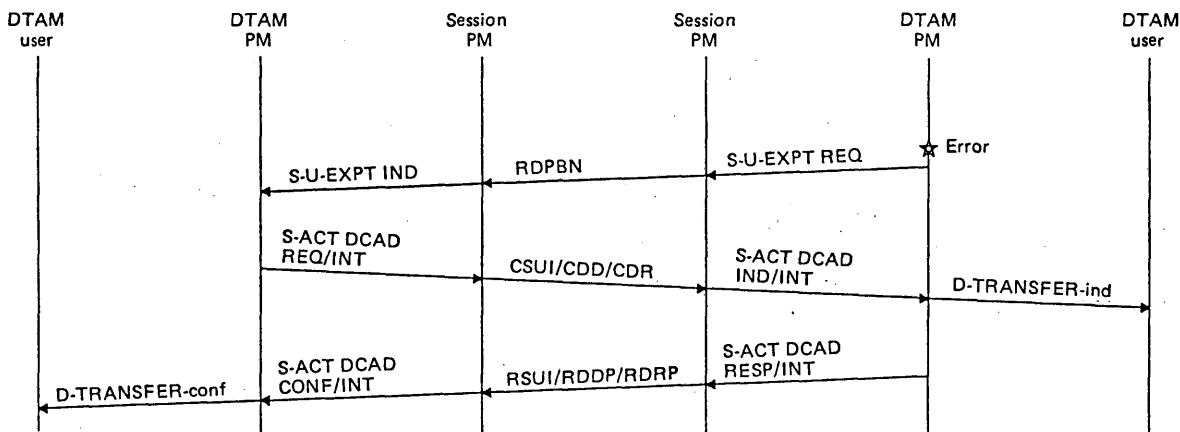
CSA      Command session abort  
RSAP      Response session abort positive

FIGURE A-3/T.521

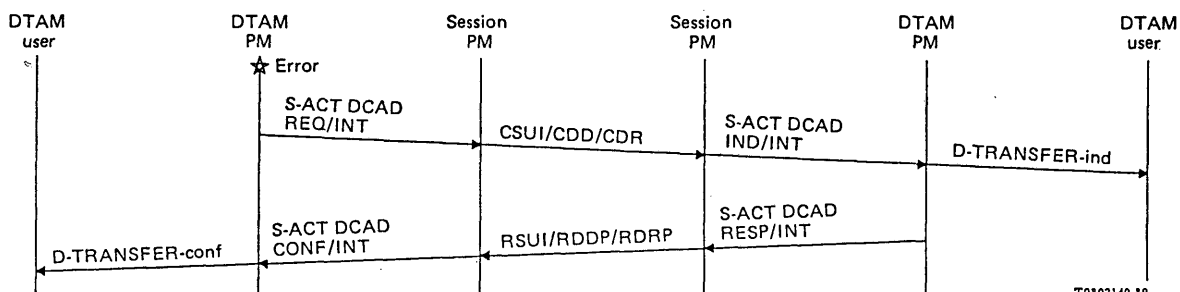
Abort procedure



Session PM error detection



DTAM PM error detection



DTAM PM error detection

T0803140-89

CDD	Command document discard
CDR	Command document resynchronize
CSUI	Command session user information
RDDP	Response document discard positive
RDGR	Response document general reject
RDPBN	Response document page boundary negative
RDRP	Response document resynchronize positive
RSUI	Response session user information

FIGURE A-4/T.521

### Exception report procedure

## COMMUNICATION APPLICATION PROFILE BT1 FOR DOCUMENT BULK TRANSFER

### CONTENTS

- 0 *Introduction*
- 1 *Scope and field of application*
- 2 *References*
- 3 *Definitions*
- 4 *Abbreviations and conventions*
- 5 *Definition of communication application profile BT1*
  - 5.1 Overview of BT1
  - 5.2 DTAM functional units
  - 5.3 DTAM service primitives and parameters

#### 0 Introduction

T.400 Series of Recommendations define the open document architecture (T.410 Series) and the DTAM services and protocols (T.430 Series) for the purpose of the document transfer and manipulation. In order to apply T.400 Series to various telematic services, it is necessary to specify the DTAM application profile for each service that consists of a document application profile and a communication application profile.

According to this requirement, T.500 Series of Recommendations define the document application profiles and T.520 Series of Recommendations define the communication application profiles.

Recommendation T.522 is one of a set of T.520 Series of Recommendations to define the communication application profile for the document bulk transfer using X.200 environment.

#### 1 Scope and field of application

This Recommendation defines the communication application profile for the document bulk transfer in terms of:

- a) DTAM functional units used;
- b) DTAM service primitives and parameters used.

#### 2 References

The following references are required in order to implement this communication profile defined in this Recommendation.

- Rec. T.431: Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles
- Rec. T.432: Document transfer and manipulation (DTAM) - Services protocols - Service definition
- Rec. T.433: Document transfer and manipulation (DTAM) - Services and protocols - Protocol specification

### 3 Definitions

The definitions of T.400 Series of Recommendations also apply to this Recommendation.

### 4 Abbreviations and conventions

The abbreviations and conventions defined in T.400 Series of Recommendations also apply to this Recommendation.

### 5 Definitions of communication application profile BT1

#### 5.1 Overview of BT1

This Recommendation defines functional units and communication support function in accordance with Recommendation T.431.

#### 5.2 DTAM functional units

The following functional units defined in Recommendation T.432 are used for BT1:

- association use control (kernel);
- capability;
- document bulk transfer;
- token control;
- exception report;
- reliable transfer mode 2.

#### 5.3 DTAM service primitives and parameters

General DTAM service definition and parameters are defined in Recommendation T.432. This section specifies the parameters of DTAM service of BT1.

##### 5.3.1 D-INITIATE service parameters

The following parameters of this service are used as follows:

- telematic requirements;
- application capabilities;
- result.

The parameter "transparent mode" is not used.

Table 1-A/T.522 lists the D-INITIATE service parameters.

##### 1) Telematic requirements

The following functional units defined in Recommendation T.432 are used for BT1 as mandatory functional units:

- association control (kernel);
- document bulk transfer;
- token control;
- exception report;
- reliable transfer mode 2.

The following functional units defined in Recommendation T.432 are used for BT1 as optional functional units:

- capability.

## 2) *Application capabilities*

This "application capabilities" is defined in Recommendation T.432 and the following sub-parameters are used:

### a) *document application profile*

This parameter indicates the document application profile being used. Its value is specified in Recommendations that define terminal characteristics for particular telematic services.

### b) *non-basic document characteristics*

This is the "non-basic document characteristics" defined in Recommendation T.432.

### c) *non-basic structure characteristics*

This is the "non-basic structure characteristics" defined in Recommendation T.432.

## 3) *Result*

This field can take all the values defined in Recommendation T.432.

TABLE 1-A/T.522

### D-INITIATE service parameters

	D-INITIATE request	D-INITIATE indication	D-INITIATE response	D-INITIATE confirm
Telematic requirements	M	M(=)	M	M(=)
Application capabilities	M	M(=)	M	M(=)
----- Document application profile	M	M(=)	M	M(=)
Non-basic document characteristics	U	C(=)	U	C(=)
Non-basic structure characteristics	U	C(=)	U	C(=)
Result			U	C(=)

### 5.3.2 *D-TERMINATE service parameters*

This service has no parameter for BT1. Only the initiator can issue D-TERMINATE. In addition, the initiator can issue D-TERMINATE only if he has a data token.

#### 5.3.1.3 *D-U-ABORT service parameters*

This service has the parameter of "user information".

Table 1-B/T.522 lists the D-U-ABORT service parameter.

TABLE 1-B/T.522

### D-U-ABORT service parameters

	D-U-ABORT request	D-U-ABORT indication
Use information	U	C(=)

### 5.3.4 *D-CAPABILITY service parameters*

This service has the following parameters:

- application capabilities which consists of three sub-parameters: document application profile, non-basic document characteristics and non-basic structure characteristics;
- user information.

Table 1-C/T.522 lists the D-CAPABILITY service parameters.

TABLE 1-C/T.522  
D-CAPABILITY service parameters

	D-CAPABILITY request	D-CAPABILITY indication	D-CAPABILITY response	D-CAPABILITY confirm
User information	U	C(=)	U	C(=)
Application capabilities	M	M(=)	M	M(=)
Document application profile	M	M(=)	M	M(=)
Non-basic document characteristics	U	C(=)	U	C(=)
Non-basic structure characteristics	U	C(=)	U	C(=)
User information	U	C(=)	U	C(=)

### 5.3.5 *D-TRANSFER service parameters*

This D-TRANSFER service is used as defined in Recommendation T.432.

### 5.3.6 *D-CONTROL GIVE service parameters*

The D-CONTROL GIVE service surrenders all available tokens and has no parameter.

### 5.3.7 *D-TOKEN PLEASE service parameters*

The D-TOKEN PLEASE service is used to request all available tokens and has no parameter.

### 5.3.8 *D-U-EXCEPTION-REPORT service parameters*

This is left for further study.

### 5.3.9 *D-P-EXCEPTION-REPORT service parameters*

This is used as defined in Recommendation T.432.

## COMMUNICATION APPLICATION PROFILE DM-1 FOR VIDEOTEX INTERWORKING

### CONTENTS

- 1 *Scope*
  - 2 *Field of application*
  - 3 *References*
  - 4 *Definitions*
  - 5 *Overview of communication profile DM-1*
  - 6 *Basic communication requirements for DM-1*
  - 7 *Communication procedure for DM-1*
  - 8 *Elements of procedure*
  - 9 *Action of the EH and the LH*
  - 10 *Object identifier*
- Annex - Abstract syntax definition of videotex specific information

#### 1 Scope

1.1 The T.400 Series of Recommendations generally defines open document architecture (ODA), document architecture operations and DTAM service/protocol for document architecture transfer and manipulation under the telematic communication environment.

1.2 This Recommendation defines a communication application profile DM-1 for document unconfirmed manipulation to specify an interactive communication profile based on DTAM between videotex gateway systems.

1.3 The use of Recommendations X.215/X.225, X.216/X.226, X.217/X.227 for this communication profile is described in this Recommendation.

#### 2 Field of application

2.1 The communication application profile DM-1 enables document manipulation for documents which are represented in accordance with the document application profile defined by Recommendation T.504, and the operational application profile defined by Recommendation T.541.

2.2 The ODA documents that are manipulated should be in formatted form.

2.3 The field of application of this Recommendation is the international videotex interworking service between videotex gateways, representing the external host (EH) and the local host (LH).

2.4 Videotex communication procedure is based on the model defined in this Recommendation in accordance with the Recommendation T.564 which defines gateway characteristics for videotex interworking.

### 3 References

- Rec. T.101: International interworking for videotex services
- Rec. T.430 Series: Document transfer and manipulation (DTAM)
- Rec. T.504: Document application profile for videotex interworking
- Rec. T.541: Operational application profile for videotex interworking
- Rec. T.564: Gateway characteristics for videotex interworking
- Rec. X.215: Session service definition for open systems interconnection for CCITT applications
- Rec. X.225: Session protocol specification for open systems interconnection for CCITT applications
- Rec. X.216: Presentation service definition for open systems interconnection for CCITT applications
- Rec. X.226: Presentation protocol specification for open systems interconnection for CCITT applications
- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications
- Rec. X.227: Association control protocol specification for open systems interconnection for CCITT applications
- Rec. X.208: Specification of abstract syntax notation one (ASN.1)
- Rec. X.209: Specification of basic encoding rules for abstract syntax notation one (ASN.1)

### 4 Definitions

Terms and their definitions are defined by the Recommendations listed above.

### 5 Overview of communication profile DM-1

5.1 Communication profile DM-1 defines the communication functionalities which provide a real time remote document manipulation on ODA and operational structure documents by create, delete, modify and call operations between videotex gateways under OSI ACSE and presentation communication support functions (normal mode defined in Recommendation T.432). These operations are the unconfirmed type of manipulation.

5.2 This profile defines the communication model which consists of the local host DTAM user and the external host DTAM user as illustrated in Figure 1/T.523. Either the LH or the EH is capable of managing the initiation and termination of application-association. At the association establishment phase, initial VIA structures are automatically generated in both hosts.



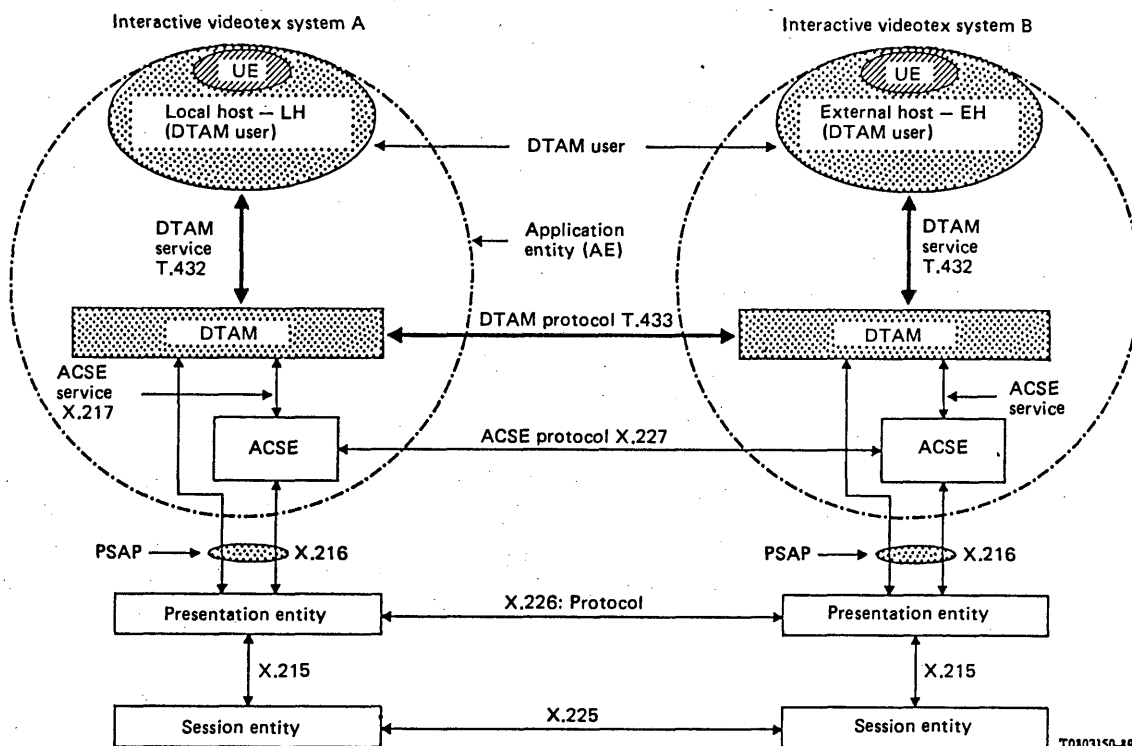


FIGURE 1/T.523

**A model of communication application profile DM-1  
for videotex interworking**

5.3 The owner of the data token, managed by the DTAM token control function, is able to manipulate ODA and operational structure documents which are directly mapped from VIA operations defined in the Recommendation T.564.

5.4 The manipulation provides the operations which can be applied to one or more constituents of the ODA document and/or the operational structure. In this profile, these operations do effect addition, deletion or modification of constituent to a document which existed identically between both hosts.

5.5 When the data token belongs to the LH DTAM user, only modify operations on operational structure are allowed to be used by the LH DTAM user. On the other hand, the EH DTAM user is able to use all of the operations defined in DTAM when it has the data token.

## 6 Basic communication requirements for DM-1

DM-1 is defined under the following OSI communication environment. Mapping rules of DTAM APDUs into/out of the ACSE and presentation layer are used as defined in the Recommendation T.433.

### 6.1 DTAM functionalities

The following DTAM functionalities defined in Recommendation T.432 are basic requirements for this communication profile DM-1:

- i) document unconfirmed manipulation by using create, modify, delete and call operations;
- ii) association use control;

- iii) token management for dialogue control;
- iv) typed data transmission.

## 6.2 ACSE functionalities

The basic functionalities of the association control service element defined by Recommendations X.217 and X.227 are used.

## 6.3 Presentation functionalities

The kernel functional unit is used as defined by Recommendation X.216 and X.226. Recommendations X.208 and X.209 are used for the definition of abstract notation and basic encoding rules of abstract notation respectively for DM-1.

## 6.4 Session functionalities

The kernel functional unit, two ways alternate functional unit and typed data functional unit are used in accordance with Recommendations X.215 and X.225.

# 7 Communication procedure for DM-1

## 7.1 General communication procedure

The general communication procedure for videotex gateway application is defined in line with the basic procedure in Recommendation T.432. The procedure consists of:

- application-association establishment;
- application-association termination;
- application-association abort;
- data transmission.

## 7.2 Application-association establishment

A communication normally begins with the establishment of application-association from the LH or EH DTAM user to initialize the communication environment and to set the initial parameters and the VIA structures being used. The initial data token is assigned to the EH DTAM user. After the establishment of application-association, both DTAM users move to the data transmission phase.

## 7.3 Application-association terminate and abort

The DTAM application-association may be normally terminated by either the LH or the EH DTAM user subject to the owning of the data token. The DTAM application-association may also be abruptly terminated by either the LH or the EH DTAM user or provider using the appropriate DTAM abort services.

## 7.4 Data transmission

### 7.4.1 General

Videotex gateway application provides the following communication functions in the data transmission phase:

- 1) manipulation of display information;
- 2) manipulation of data entry information;
- 3) manipulation of application control memory information;
- 4) manipulation of special terminal facilities information;
- 5) manipulation of administrative information;
- 6) exchange of over limit information (for further study);
- 7) transmission of asynchronous message.

#### 7.4.2 Manipulation of display information

Display is performed by VIA operations, defined in Recommendation T.564, initiated by the external host on the display structure.

To perform VIA operations on the display structure the EH uses D-CREATE, D-MODIFY, D-DELETE or D-CALL service primitives under data token control.

#### 7.4.3 Manipulation of data entry information

##### 7.4.3.1 General

The Recommendation T.564 defines the following four types of data entry:

- 1) data entry type 1 --- information retrieval;
- 2) data entry type 2 --- data collection;
- 3) data entry type 3 --- data entry on the fly;
- 4) data entry type 4 --- duplex data entry.

These data entry types are categorized into half duplex mode (data entry type 1, 2 and 3) and duplex mode (data entry type 4).

The EH may use D-CREATE, D-MODIFY, D-DELETE, D-CALL to perform VIA operations on each structure element of the data entry structure, except modifying the RESULT-SE and its associated content portion.

*Half duplex mode* of data entry provides the dialogues between the LH and the EH under the data token control. Data entry is performed from the LH by VIA operations via DTAM manipulation (D-MODIFY) on the data entry structure. In this case the EH should give the data token to the LH to perform data entry.

*Duplex mode* of data entry is not dependent upon the token control. Data entry is performed from the LH by the use of typed data and the data token is always located at the EH side.

##### 7.4.3.2 Management of data entry mode

The management of the data entry modes is bound to the following rule:

- i) the LH issues the parameter of "data entry mode" to indicate the data entry capabilities at the LH side in the DTAM association establishment phase. This parameter is a choice of (a) half duplex mode, (b) duplex mode and (c) half duplex and duplex modes;
- ii) the EH recognizes the capabilities of data entry mode which is capable to be managed by the LH. It is not necessary to inform the LH of the EH capabilities of the data entry mode;
- iii) if the LH indicates the only half duplex mode and selects the application based on the duplex mode, the EH may refuse to connect with the selected application from the LH;
- iv) if the LH indicates the only duplex mode and selects the application based on the half duplex mode, the EH may refuse to connect with the selected application from the LH;
- v) if the LH indicates both modes, all the applications based on the half duplex or duplex modes are available to the LH.

##### 7.4.3.3 Operation of data entry in half duplex mode (type 1, 2, 3)

In data entry type 1 or 3, the entered data are sent from the LH to the EH using D-MODIFY for the RESULT-SE and the content portion associated to the RESULT-SE. In data entry type 2, the entered data are sent from the LH to the EH using D-MODIFY for the RESULT-SE and the content portions associated with the entered fields and the RESULT-SE (if necessary).

The EH gives the token to the LH to enable the LH to send the entered data.

The LH gives the token to the EH after having completed the data entry (i.e. after having initiated the appropriate D-MODIFY corresponding to the SEs concerned with data entry). Examples are given in Figure 2/T.523 and Figure 3/T.523.

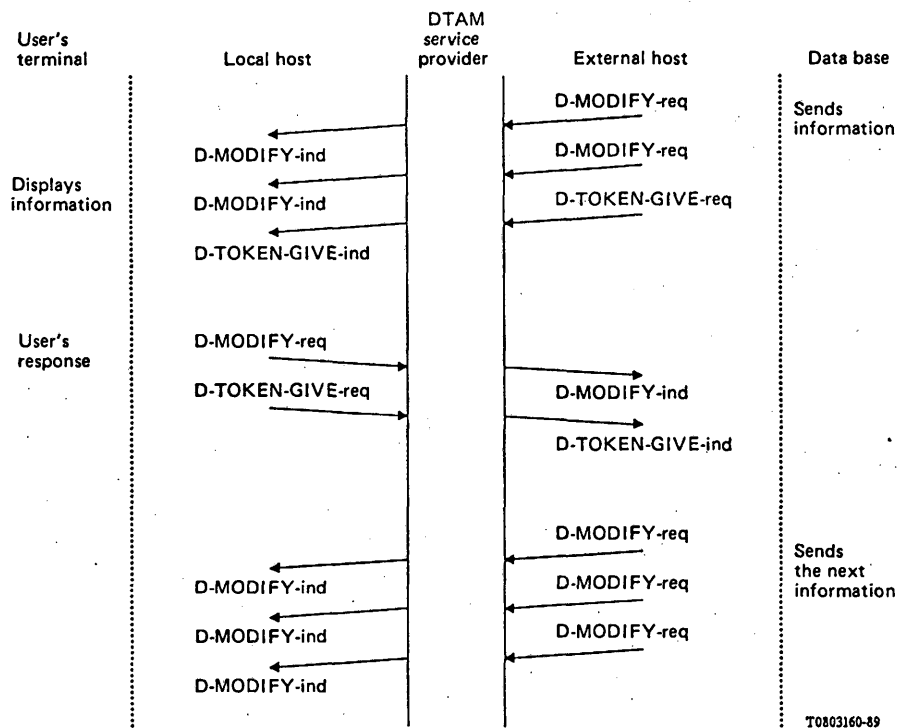


FIGURE 2/T.523

Example of data entry in type 1 or 3

(Information retrieval or on the fly: half duplex)

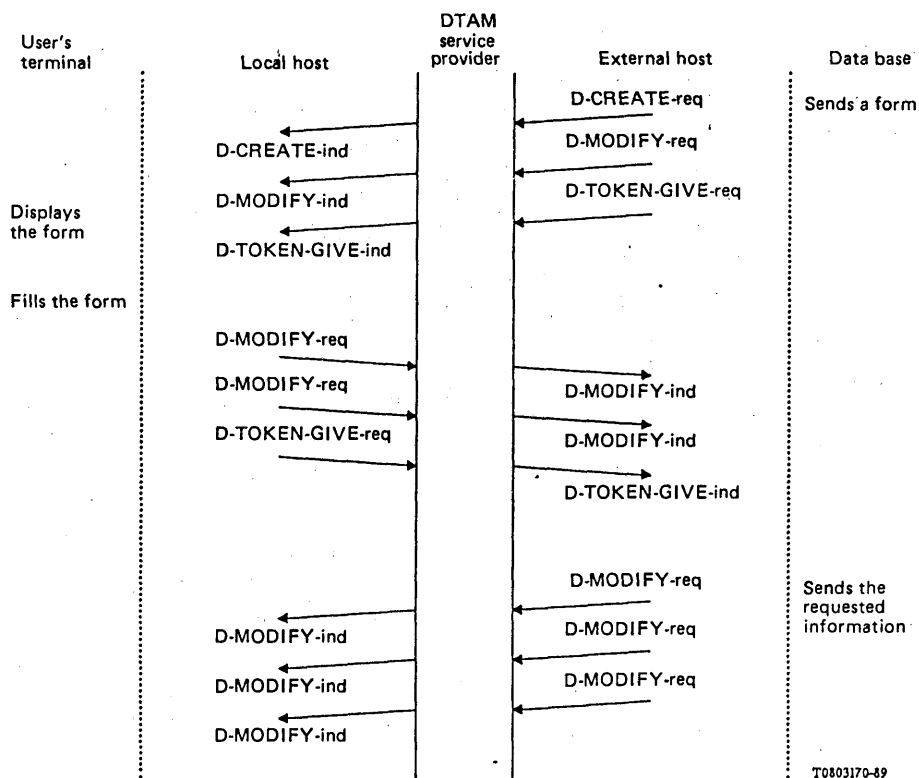


FIGURE 3/T.523

### Example of data entry in type 2

(Data collection: half duplex)

#### 7.4.3.4 Operation of data entry in duplex mode (type 4)

When the data entry type attribute of the DATA-ENTRY-PROGRAM-SE is set the data entry type 4, the LH sends the entered data and the termination reason in D-TYPED-DATA with the termination reason associated. The data token remains assigned to the EH. An example is given in Figure 4/T.523.

When the EH resets the data entry type attribute to another type (1, 2 or 3) under the condition that both modes are available at the LH, the LH stops sending data in D-TYPED-DATA and uses again D-MODIFY to send the entered data. The EH ignores the possible colliding D-TYPED-DATA.

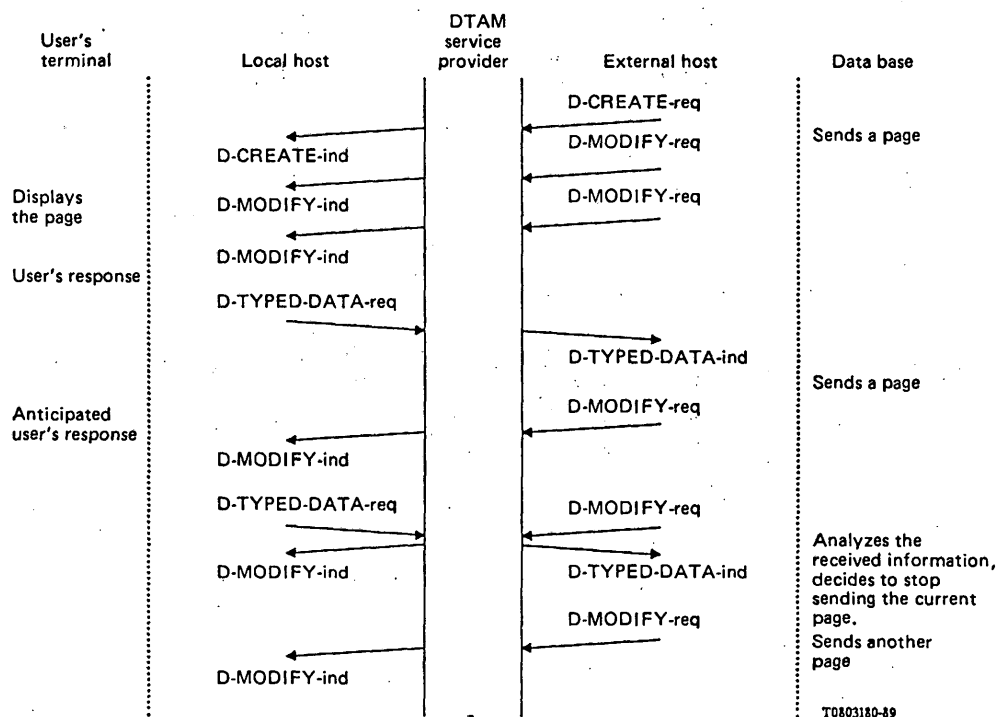


FIGURE 4/T.523

#### Example of data entry in type 4

(Duplex)

##### 7.4.3.5 Switching of entry type

The entry type is modified by the EH when sending a D-MODIFY, D-CREATE, D-DELETE or D-REBUILD for the DATA-ENTRY-PROGRAM-SE.

After sending such a D-MODIFY, the EH may send further VIA operations via DTAM manipulation, if required, and should send the token, even when switching to data entry type 4, in order to indicate to the LH the end of entry type redefinition and to permit echoing of characters (if any).

When receiving a primitive which redefines the data-entry type, the LH should stop sending information and consider all information from the videotex user as typed ahead information. The sending of information is resumed when receiving the data token. If the new defined data entry type is 1, 2 or 3, the token remains assigned to the LH until the entry is entirely performed. If the new defined data entry type is 4, the token is immediately sent back to the EH.

The echoing of characters is started after the reception of the data token depending on the value of the echo attribute. The echoing is stopped in modes 1, 2, 3 when sending back the data token after completion of the data entry. The echoing is only stopped in mode 4 after redefinition of a new data entry mode (or modification of the echo attribute).

Examples are given in Figures 5/T.523 and 6/T.523.

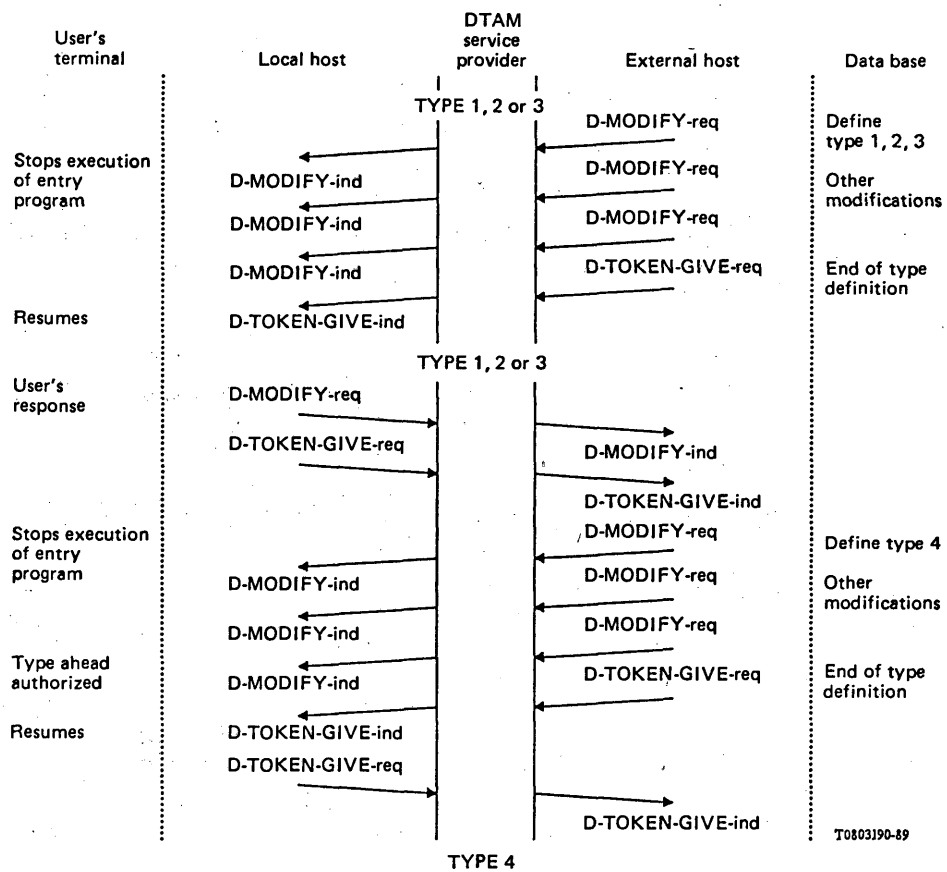


FIGURE 5/T.523  
Example of mode switch

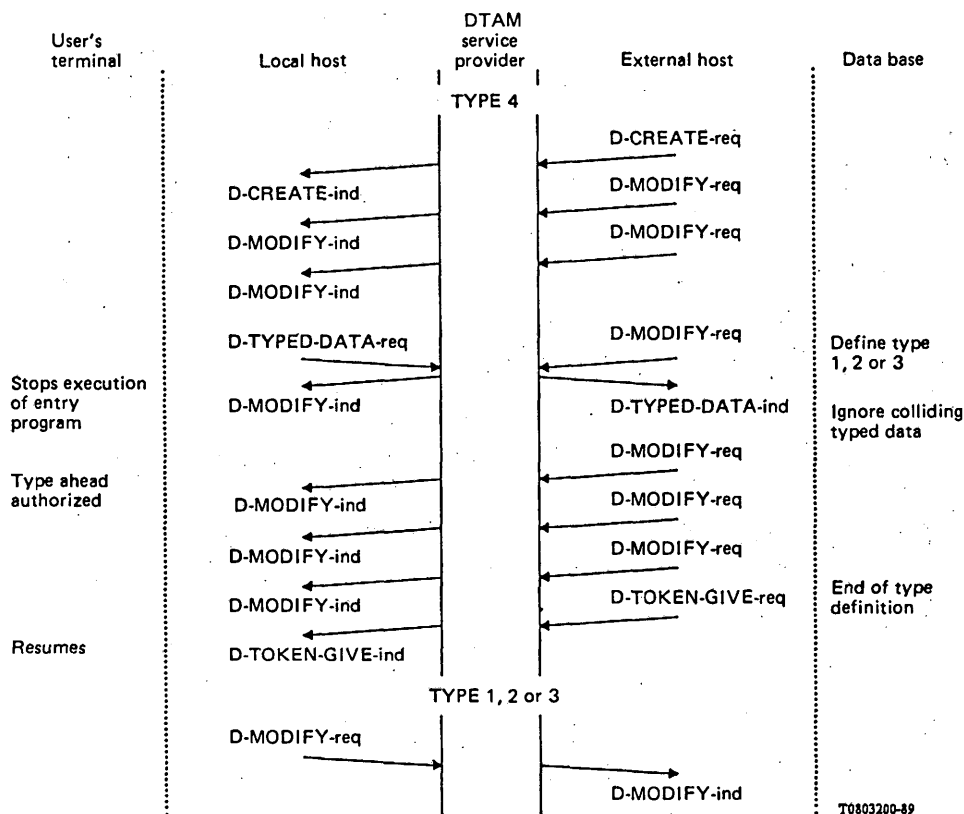


FIGURE 6/T.523

Example of mode switch

#### 7.4.4 Manipulation of application control memory information

The EH manipulates the application control memory information which is represented in accordance with the application control memory SE and its subordinates SEs defined in Recommendation T.564 via the DTAM document manipulation services in order to record the sequence of VIA operations to be repeatedly invoked. This transmission should be done under the token control.

#### 7.4.5 Manipulation of special terminal facilities information

The EH manipulates the special terminal facilities information which is represented in accordance with the application special terminal facilities SE and its subordinates SEs defined in Recommendation T.564 via the DTAM document manipulation services in order to set the special terminal facilities such as characters of DRCS. This transmission should be done under the token control.

#### 7.4.6 Manipulation of administrative information

The EH manipulates administrative information which is represented in accordance with the administrative SE and its subordinates SEs defined in Recommendation T.564 via the DTAM document manipulation services in order to manage the accounting and the identification aspects. This transmission should be done under the token control.

*Note* - Administrative information is for further study in the Recommendation T.564.



#### 7.4.7 *Exchange of over limit information*

The exchanging over limit information is for further study.

#### 7.4.8 *Transmission of asynchronous message*

The EH transmits the asynchronous message indicting the warnings (e.g. "close host within 5 minutes") to the LH. The transmission of this message is not dependent of the data token and the message is conveyed by the DTAM TYPED-DATA service.

### 8 **Elements of procedure**

#### 8.1 *Application-association establishment*

##### 8.1.1 *General*

Either the LH or the EH establishes an application-association in accordance with the D-INITIATE service described in Recommendation T.432. The purpose of the application-association establishment is:

- to identify the remote peer videotex hosts;
- to exchange the videotex application capabilities such as document application profile;
- to implicitly set the initial VIA between peer videotex hosts.

##### 8.1.2 *Service primitives used*

The following D-INITIATE service primitives, defined in Recommendation T.432, are used:

- D-INITIATE request;
- D-INITIATE indication;
- D-INITIATE response;
- D-INITIATE confirm.

##### 8.1.3 *D-INITIATE service parameters*

The service parameters defined in Table 2/T.432 are basically used. The semantics of these parameters are given below. The use of the parameters which are not defined in this Recommendation but listed in Table 2/T.432 is bound to the Recommendations X.217 or X.216.

###### 1) *Telematic requirements*

The following functional units defined in Recommendation T.432 are used:

- kernel (association control);
- typed data transfer;
- document unconfirmed manipulation;
- token management.

If the telematic requirements proposed by the LH are not acceptable to the EH, the videotex application-association establishment fails by responding with a "reject" result parameter.

###### 2) *Application capabilities*

This parameter contains the following sub-parameters:

###### a) *Document application profile*

The value of this parameter is an object identifier which indicates the document application profile being used. Its value is 0 1 8 16 0 (object identifier).

###### b) *Operational application profile*

The value of this parameter is an object identifier which indicates the operational application profile being used. Its value is 0 1 8 16 2 (object identifier).

3) *Account*

The use of the account parameter depends on the ongoing work of CCITT Study Group I on this topic.

4) *Result*

The field can take one of the following symbolic values:

- accepted;
- rejected by responder (reason-not-specified);
- rejected by responder (applicationCapabilities-not-supported);
- rejected by responder (protocolVersion-not-supported);
- rejected by responder (application-context-name-not-supported);
- rejected by responding DTAM-PM.

5) *Vi-Initiate-Information (Vi-Init-Information)*

This is the user information associated with the initiation of application association. This contains the following parameters:

a) *Videotex interworking protocol version*

This parameter identifies the version of videotex interworking protocol being used. The value is represented by bit string.

b) *Inactivity timer*

This parameter identifies the time for inactive period to terminate the videotex application-association because of its inactivity. The value of this parameter is subject to the agreement between both hosts. If the values which are exchanged are different each other, the value which is indicated by the EH is in effect for that association.

c) *Data entry mode*

This parameter identifies the capabilities of the data entry modes to indicate to the peer host. Normally, this parameter is issued by the LH, and may not be used by the EH. The value is represented by integers 1, 2 and 3 which means half-duplex data entry mode, duplex data entry mode and half-duplex/duplex data entry modes respectively.

d) *Bilateral management*

This attribute is reserved for information which is exchanged between the two gateways and can be based on bilateral agreement.

The Vi-Init-information described by the ASN.1 is defined in Annex A of this Recommendation.

6) *Called application entity title*

This parameter, which is composed of a called application-process title and a called application-entity qualifier, is used as defined in Recommendation X.217. This identifies the external-host-identifier or the local-host-identifier.

7) *Calling application entity title*

This parameter, which is composed of a calling application-process title and a calling application-entity qualifier, is used as defined in Recommendation X.217. This identifies the local-host-identifier or the external-host-identifier.

8) *Application context name*

This parameter is used as defined in Recommendation X.217. The initiator of the application-association shall propose one of the application-contexts for the videotex interworking (Recommendation T.101) in the D-INITIATE request primitive. The responder shall either accept the application-context proposed by the initiator and return the same value of this parameter in the D-INITIATE response primitive, or shall return a result parameter with the value 'rejected (permanent)' and a diagnostic parameter with the value 'application context name not supported'.

### 9) *Presentation context list*

The presentation context definition list comprises a presentation-context-definition for each abstract-syntax included in the application-context, i.e. one each for the videotex interworking, the DTAM and the ACSE. A presentation-context-definition comprises a presentation-context-identifier and an abstract-syntax-name for the ASE.

#### 8.1.4 *DTAM-PM parameters*

DTAM-PM parameters are set by the DATM-PM to D-INITIATE REQ and D-INITIATE RESP PDUs indicating the characteristics of DTAM-PM as follows. These parameters are not issued by the LH and the EH, but are generated by the protocol machines when required.

##### 1) *DTAM protocol version*

DTAM protocol version parameter identifies the version of DTAM protocol being used. The value is represented by bit string (0) which means version-1.

##### 2) *Storage capacity*

The storage capacity parameter identifies the memory size which is available to the DTAM-PM. This parameter is exchanged independently from both directions in order to indicate the own memory size.

#### 8.1.5 *Initial VIA*

The following VIA structure elements (SEs) are implicitly created in both hosts at the videotex application-association establishment. The videotex communication starts with the initial VIA to manipulate for the videotex dialogue between the LH and the EH:

- DOCUMENT-SE
- DATA-ENTRY-SE
- APPLICATION-CONTROL-MEMORY-SE
- ADMINISTRATIVE-INFORMATION-SE
- SPECIAL-TERMINAL-FACILITIES-SE

### 8.2 *Application-association termination*

#### 8.2.1 *General*

Either the LH or the EH requests a normal termination of current videotex application-association in accordance with the D-TERMINATE service described in Recommendation T.432.

#### 8.2.2 *Service primitives used*

The following D-TERMINATE service primitives, defined in Recommendation T.432, are used:

- D-TERMINATE request;
- D-TERMINATE indication;
- D-TERMINATE response;
- D-TERMINATE confirm.

#### 8.2.3 *D-TERMINATE service parameters*

The D-TERMINATE service parameters are for further study.

### 8.3 *Application-association abort*

#### 8.3.1 *General*

The LH or the EH requests an abrupt termination of the ongoing videotex application-association in accordance with the D-ABORT service described in Recommendation T.432.

#### 8.3.2 *Service primitive used*

The following D-ABORT service primitives, defined in Recommendation T.432, are used:

- D-ABORT request;
- D-ABORT indication.

### 8.3.3 *D-ABORT service parameters*

The following service parameter is used as defined in the Recommendation T.432.

#### 1) *Vi-Abort-Information*

This parameter is the user information associated with the abort of application association and contains the following sub-parameter:

##### - *Error-code*

This parameter indicates the reason of the abort.

#### a) *Error-Report-To-Local-Host attributes (issued by the EH)*

- Inactivity time-out
- Unrecoverable errors

#### b) *Error-Report-To-External-Host attributes (issued by the LH)*

- Unrecoverable errors

The Vi-abort-information described by ASN.1 is defined in Annex A of this Recommendation.

### 8.4 *Data transmission*

The data transmission procedure is realized by DTAM document manipulation service and typed data service. Document manipulation service should be invoked under the token control by using DTAM token document manipulation, data token control and typed data services for videotex gateway application.

#### 8.4.1 *Document manipulation procedure*

##### 8.4.1.1 *General*

VIA operations, defined in Recommendation T. 564, should be directly mapped into the relevant DTAM document manipulation services, D-CREATE, D-MODIFY, D-DELETE, D-CALL services defined in Recommendation T.432. These services provide the following communication functions:

- manipulation of display structure information;
- manipulation of date entry structure information;
- manipulation of application control memory information;
- manipulation of special terminal facilities information;
- manipulation of administrative information (for further study);
- exchange of over limit information (for further study).

*Note* - The use of D-REBUILD service is for further study.

##### 8.4.1.2 *Service primitives used*

The following D-CREATE, D-DELETE, D-MODIFY and D-CALL service primitives defined in Recommendation T.432, are used:

- D-CREATE request;
- D-CREATE indication;
- D-DELETE request;
- D-DELETE indication;
- D-MODIFY request;
- D-MODIFY indication;
- D-CALL request;
- D-CALL indication.

*Note* - The use of these service primitives bounds to the rule defined in § 9.

The above document manipulation is managed under the token control by using the following D-TOKEN-PLEASE and D-TOKEN-GIVE service primitives:

- D-TOKEN-PLEASE request;
- D-TOKEN-PLEASE indication;
- D-TOKEN-GIVE request;
- D-TOKEN-GIVE indication.

#### 8.4.1.3 *Service parameters for document manipulation*

##### 8.4.1.3.1 *D-CREATE service parameters*

- *Create information*

This parameter consists of a sequence of objects as defined in Recommendations T.504 and T.541.

##### 8.4.1.3.2 *D-DELETE service parameters*

- *Delete information*

This parameter consists of a sequence of object or class identifiers, content portion identifiers and operation elements identifiers and defined in Recommendations T.504 and T.541.

##### 8.4.1.3.3 *D-MODIFY service parameters*

- *Modify information*

This parameter a sequence of objects as defined in Recommendations T.504 and T.541.

##### 8.4.1.3.4 *D-CALL service parameters*

- *Call information*

This parameter a sequence of choices of current object identifiers which are defined in Recommendation T.541. The CALL information consists of the designation of a RECORD-SE in the application control memory structure element as defined in Recommendation T.564. This record contains the VIA operations.

#### 8.4.2 *Data token control procedure*

##### 8.4.2.1 *General*

Document manipulation services are invoked under the data token control provided by the DTAM token control function, and the owner of the data token has the right to manipulate the VIA.

##### 8.4.2.2 *Dialogue rules*

The dialogue between the LH and the EH is bound by the following rules:

- 1) The initial data token is set to the EH at the videotex application-association establishment;
- 2) The data token may be given by the EH to the LH at the end of a sequence of VIA manipulations in order to enable the LH to send the entered data in the data entry types 1, 2 or 3;
- 3) In the data entry types 1, 2 or 3 the LH gives the data token to the EH after having sent the sequence of VIA manipulations corresponding to the entered data;
- 4) If the data token is not owned by the LH or EH, that host may issue the D-TOKEN PLEASE to request the data token. The host which receives the D-TOKEN PLEASE may or may not react on the D-TOKEN PLEASE;
- 5) In the data entry type 4, the EH may send the token to the LH in order to switch to data entry types 1, 2 or 3 (see § 7.4.3.3).

##### 8.4.2.3 *D-TOKEN GIVE service parameters*

D-TOKEN GIVE service has no parameters.

##### 8.4.2.4 *D-TOKEN PLEASE service parameters*

- *Tokens priority*

This parameter defines the priority of the action, governed by the data token, that the requestor of the D-TOKEN PLEASE service wishes to carry out. This parameter has to be supplied by the requestor of the D-TOKEN PLEASE service.

### 8.4.3 TYPE-DATA transmission

#### 8.4.3.1 General

Typed data transmission is used independent of the data token and is issued from both hosts (DTAM users) when required. This procedure may be used for the transmission of warning message indicating the warning from the EH and for the transmission of the user entered data in data entry type 4 from the LH.

#### 8.4.3.2 Service primitives used

The following D-TYPED-DATA service primitives, defined in Recommendation T.432, are used:

- D-TYPED-DATA request;
- D-TYPED-DATA indication.

#### 8.4.3.3 D-TYPED-DATA service parameters

This is the octet string information which represents the following ViTypedData:

```
ViTypedData ::= CHOICE {
  asyncMessage [0] IMPLICIT INTEGER
    {
      warnTimeout (0),
      serviceClose1Minute (1),
      serviceClose5Minutes (2) },
    -- Other values are for further study
  entryResponse [1] IMPLICIT EntryResponse }
entryResponse ::= SEQUENCE {
  [0] IMPLICIT Termination-Reason,
    -- identical with the coding of termination reason in RESULT-SE
  [1] IMPLICIT Operational-Content-Type OPTIONAL,
    -- identical with the coding of operational content-type of RESULT-SE
  [2] IMPLICIT OCTET STRING OPTIONAL
    -- identical with operational-element-content}
```

#### 8.4.4 Order of the VIA-DTAM manipulation

The order of the VIA operations via DTAM manipulation (VIA-DTAM manipulation for short) is basically followed by the interchange data format defined in Recommendations T.504 and T.541. That is, in principle, VIA should be manipulated from the higher order of structure element, however, the order of display information represented by ODA and the other videotex specific information represented by operational structure is dependent of the local rule and is not defined in this Recommendation.

The following exceptional order of the VIA-DTAM manipulation is defined:

- a) VIA-DATM manipulation concerning data entry SE appears before the the other all VIA-DTAM manipulations;
- b) All VIA-DTAM manipulations concerning REDEFINITION-ENTITY-SEs appear before all VIA-manipulations concerning BLOCK SEs;
- c) All VIA-DTAM manipulations concerning BLOCK SEs appear before all VIA-DTAM manipulations concerning FIELD SEs.

## 9 Actions of the EH and the LH

### 9.1 EH action

The EH provides the videotex frame to be displayed on the user's terminal by manipulating the display structure of the VIA through DTAM manipulations.

*Note* - Although the action of displaying information on a videotex terminal is outside the scope of this Recommendation, it is assumed in the Recommendation that:

- 1) The display of Redefinition-Entity-SEs, Block-SEs and Field-SEs is in natural order, whereby Redefinition-Entity-SEs precede Block-SEs and Field-SEs;

- 2) Only those parts of the display structure which are created or modified in a dialogue step are redisplayed in that dialogue step (i.e. deletion and recreation of Page-SE is assumed to trigger redisplay of the full screen, whereas modification of a Block-SE or Field-SE is assumed to trigger display of the new block or field content on the existing screen picture);
- 3) Deletion of a Block-SE or Field-SE has no effect on the screen;
- 4) This may result in different behaviour of the local repeat functions.

In addition to providing the videotex frame, the EH controls the videotex dialogue by defining a data entry program to be executed by the LH. This is provided by the manipulation of the data entry structure of the VIA through DTAM manipulations. The EH may leave the data entry structure unchanged, implying reuse of the data entry program for the next dialogue step.

If a data entry program is of the "data entry type 2: data collection", it refers to a form made up of the fields where the user enters data. If the data entry program is of the "data entry type 1: information retrieval", it refers to an implicit field, defined by the national videotex service of the LH, where the user enters videotex commands.

The data entry program contains the description of the form, and it contains the reaction, called rules to user's input the LH has to follow. Moreover, one or two guidance messages (prompts) may be associated with each field. This message will be displayed by the LH each time user enters the field.

## 9.2 *LH action*

### 9.2.1 *Report to the EH*

The user input form (if any), which may consist of one or more data input fields, is reported to the EH after execution of a data entry program together with the status of the data entry program.

Each field of the form respectively the implicit field used for command entry is associated with a single data entry sub-program, which is executed when data is to be entered into the field.

The data entry program is terminated implicitly by the termination of the last data entry program or explicitly by some user action.

The report to the EH consists of:

- a) the termination status of the data entry program;
- b) the text contents of the fields and the number of the last sub-program executed;
- c) the text contents associated with a command.

The report is performed by the manipulation of the display structure and the data entry structure, updating field text content attributes and attributes belonging to the RESULT-SE and RESULT-Content-Portion.

### 9.2.2 *Local actions*

When a data entry program is active, some local actions may be directly supported by the LH to allow for correction of mistyping, cancel of an entry and local frame repeat for instance. Such local actions as well as the local management of user errors (e.g. entry of characters not allowed in the data entry program) are treated in the LH and not reported to the EH.

## 9.3 *List of permissible actions on VIA structure elements in both hosts*

The following Table 1/T.523 lists up the permissible actions on VIA structure elements for both hosts. The structure elements marked by ① are automatically generated at the association establishment phase. On the other hand, the structure elements marked by ② and ③ are generated by the EH and the LH respectively and are transmitted by the DTAM manipulation services which are indicated at the top of the row on the Table 1/T.523.

TABLE 1/T.523

VIA DTAM manipulation	D-CREATE	D-MODIFY	D-DELETE	D-CALL
Document profile	Ⓘ	ⓔ		
Display Document layout root Page Block Content portion	Ⓘ ⓔ ⓔ ⓔ	ⓔ ⓔ ⓔ ⓔ	ⓔ ⓔ ⓔ	
Operational profile [For further study]				
Data entry Data entry Field Field-content portion Data-entry program Data-entry sub-program Rules Prompt Prompt-content portion Result Result-content portion	Ⓘ / ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ Ⓘ Ⓘ	ⓔ ⓔ ⓔ / ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ ⓔ	Ⓢ ⓔ  ⓔ ⓔ ⓔ ⓔ	
Application control memory Application control Memory record	Ⓘ / ⓔ ⓔ	ⓔ	ⓔ ⓔ	ⓔ
Administrative Administrative information Local host information External host information Document information	Ⓘ Ⓘ Ⓘ Ⓘ	Ⓘ ⓔ ⓔ		
Special terminal facilities Special terminal facilities Redefinition entity	Ⓘ ⓔ	ⓔ	ⓔ	

## 10 Object identifier

The value of object identifier for communication application profile DM1 defined in this Recommendation is 0 1 8 16 1.



## ANNEX A

(to Recommendation T.523)

### Abstract syntax definition of videotex specific information

#### A.1 Encoding of user information associated with D-INITIATE services

The following syntax is carried by the user information of the D-INITIATE REQ and the D-INITIATE RESP DPUs as octet string:

```
ViInitInformation ::= SEQUENCE {  
    protocolVersion      [0] IMPLICIT INTEGER  
                           {viProtocolVersion1 (1)},  
    inactivityTimeOut    [1] IMPLICIT INTEGER OPTIONAL,  
    dataEntryMode        [2] IMPLICIT INTEGER OPTIONAL  
                           {halfDuplexDataEntryMode (1)  
                           duplexDataEntryMode (2)  
                           halfDuplex/duplexDataEntryMode (3)  
                           -- the EH may not use this parameter}  
    bilateralManagement [3] IMPLICIT OCTET STRING OPTIONAL  
}
```

#### A.2 Encoding of user information associated with D-ABORT services

The following syntax is carried by the user information of the D-ABORT REQ PDU as octet string:

```
ViAbortInformation ::= CHOICE {  
    errorReport [0] IMPLICIT INTEGER  
                -- used for Error-Report-to-LH and Error-Report-to-EH;  
                -- Note:  
                -- the total length of this PDU must not be greater than  
                -- 4 octets to be compatible with the requirements for the  
                -- ACSE ABRTpdu  
}
```

## OPERATIONAL APPLICATION PROFILE FOR VIDEOTEX INTERWORKING

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#### 1 Scope

This Recommendation defines an operational application profile which conforms to T.400 Series of Recommendations.

Its purpose is to specify an operational structure class suitable for videotex interworking as defined in configuration 1 of CCITT Recommendation F.300 and in Recommendation T.564.

#### 2 Field of application

This Recommendation defines an operational application profile, that is in conformance with DTAM (T.400 Series of Recommendations) and that allows operational structures to be interchanged for the purpose of an international videotex interworking.

This operational application profile defines the features of the operational structure that can be interchanged. These features are depending on the document structures as specified in the document application profile (see Recommendation T.504).

### 3 References

- Rec. F.300: Videotex service
- Rec. X.200: Reference model of open systems interconnection for CCITT applications
- Rec. X.213: Network service definition for open systems interconnection for CCITT applications
- Rec. X.214: Transport service definition for open systems interconnection for CCITT applications
- Rec. X.224: Transport protocol specification for open systems interconnection for CCITT applications
- Rec. X.215: Session service definition for open systems interconnection for CCITT applications
- Rec. X.225: Session protocol specification for open systems interconnection for CCITT applications
- Rec. X.216: Presentation service definition for open systems interconnection for CCITT applications
- Rec. X.226: Presentation protocol specification for open systems interconnection for CCITT applications
- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications
- Rec. X.227: Association control protocol specification for open systems interconnection for CCITT applications
- Rec. T.101: International interworking for videotex services
- Rec. T.400: Introduction to document architecture, transfer and manipulation
- Rec. T.411: Open document architecture (ODA) and interchange format - Introduction and general principles
- Rec. T.412: Open document architecture (ODA) and interchange format - Document structures
- Rec. T.414: Open document architecture (ODA) and interchange format - Document profile
- Rec. T.415: Open document architecture (ODA) and interchange format - Open document interchange format (ODIF)
- Rec. T.431: Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles
- Rec. T.432: Document transfer and manipulation (DTAM) - Services and protocols - Service definition
- Rec. T.433: Document transfer and manipulation (DTAM) - Services and protocols - Protocol specification
- Rec. T.441: Document transfer and manipulation (DTAM) - Services and protocols - Operational structure
- Rec. T.504: Document application profile for videotex interworking
- Rec. T.523: Communication application profile DM-1 for videotex interworking
- Rec. T.564: Gateway characteristics for videotex interworking

### 4 Definitions

The definitions of T.400 Series of Recommendations apply also to this Recommendation.

## 5 Characteristics supported by this operational application profile

### 5.1 Overview

For the purpose of videotex interworking operational structures are associated with a videotex document to provide an environment for interactive communication, necessary for a recipient to handle the user's input data as intended by the originator.

Therefore the purpose of this section is to specify the functional description of the features supported by this operational application profile.

### 5.2 Range of operational structures

For the purpose of an international videotex interworking four operational structures are specified, one of each representing the "data entry structure", the "application control memory", the "administrative structure" and the "special terminal facilities structure" as defined in Recommendation T.564.

### 5.3 Generic characteristics

Not used.

### 5.4 Specific characteristics

Each of the operational structures specified in this operational application profile only supports specific features of operational structures.

## 6 Definition of the operational application profile

### 6.1 Complexity level of operational structures

For further study.

### 6.2 Operational profile level

One operational profile has to be defined for every application using operational structures.

This operational profile specifies:

- Four operational structures are used;
- Each of the operational structures only contains specific features.

Details are for further study.

### 6.3 Specification of operational structures

Four operational structures are specified by this operational application profile.

#### 6.3.1 Data entry structure

The data entry structure as defined in draft Recommendation T.564 is mapped onto one specific operational structure. No generic operational structure is present.

The Data-Entry-SE is mapped to the specific operational root. The object identifier of the root of this operational structure has an assigned value of 11.

The subordinates of Data-Entry-SE are: Data-Entry-Program-SE, Field-SE, Rules-SE, Prompt-SE, and Result-SE.

Data-Entry-Program-SE is mapped to composite operational object. Field-SE, Rules-SE, Prompt-SE and Result-SE are mapped to basic operational objects.

Field-SE, Prompt-SE and Result-SE may have associated operational elements.

Subordinate to Data-Entry-Program-SE is Data-Entry-Subprogram-SE. Data-Entry-Subprogram-SE is mapped to basic operational object.

For each of the SEs specified above, constraints are defined on the number of SEs which may exist at one time. These constraints are defined in Recommendation T.564.

### 6.3.2 *Application control memory structure*

The application control memory structure as defined in Recommendation T.564 is mapped onto one specific operational structure. No generic operational structure is present.

The Application-Control-Memory-SE is mapped to the specific operational root. The object identifier of the root of this operational structure has an assigned value of 12.

Subordinate to the Application-Control-Memory-SE is the Record-SE. The Record-SE is mapped to basic operational object.

For each of the SEs specified above, constraints are defined on the number of SEs which may exist at one time. These constraints are defined in Recommendation T.564.

### 6.3.3 *The administrative structure*

The administrative structure as defined in Recommendation T.564 is mapped onto one specific operational structure. No generic operational structure is present.

The Administrative-Information-SE is mapped to the specific operational root. The object identifier of the root of this operational structure has an assigned value of 13.

### 6.3.4 *Special terminal facilities structure*

The special terminal facilities structure as defined in Recommendation T.564 is mapped onto one specific operational structure. No generic operational structure is present.

The Specific-Terminal-Facilities-SE is mapped to the specific operational root. The object identifier of the root of this operational structure has an assigned value of 14.

Subordinate to the Special-Terminal-Facilities-SE is the Redefinition-Entity-SE. Redefinition-Entity-SE is mapped to basic operational object.

For each of the SEs specified above, constraints are defined on the number of SEs which may exist at one time. These constraints are defined in Recommendation T.564.

## 6.4 *Specification of attributes*

The attributes applicable to constituents of the operational structure are defined in the following tables, using the following notation:

- attribute not applicable
- m attribute is mandatory
- nm attribute is non-mandatory
- d attribute is defaultable

From the attributes specified for operational structures in Annex A to this Recommendation, videotex interworking will not use the attributes operational object class and subordinates.

The use of the attribute document fragment is for further study.

### 6.4.1 *Attributes of the data entry structure*

Table 1/T.541 shows the use of attributes defined for objects of operational structures.

TABLE 1/T.541

Attributes	Data-Entry-SE						
	Data-Entry-Program-SE						
	Data-Entry-Subprogram-SE						
	Field-SE						
	Rules-SE						
	Prompt-SE						
							Result-SE
Object type	m	m	m	m	m	m	m
Object identifier (Note)	m	m	m	m	m	m	m
Reference attribute	--	d	d	--	--	--	nm
Application defined attribute lists	d	d	d	d	d	d	d
Default value lists	nm	--	--	--	--	--	--

*Note* - This attribute may be omitted when the value can be unambiguously derived from the transmission sequence of the relevant objects.

*Values for the attribute object-type*

Data-Entry-SE: 0

Data-Entry-Program-SE: 1

Data-Entry-Subprogram-SE: 2

Field-SE: 3

Rules-SE: 4

Prompt-SE: 5

Result-SE: 6

Table 2/T.541 shows the use of attributes defined for operational elements.

TABLE 2/T.541

	Field-content portion		
		Prompt-content portion	
			Result-content portion
Operational element identifier (Note)	m	m	m
Operational element content type	d	d	d
Operational element content	d	d	d

*Note* - This attribute may be omitted when the value can be unambiguously derived from the transmission sequence of the relevant elements.

#### 6.4.1.1 Data-Entry-SE

#### 6.4.1.2 Data-Entry-Program-SE

The attribute first-subprogram, defined in Recommendation T.564, is mapped to the reference attribute, defined in Recommendation T.441 (or currently in Annex A of this Recommendation).

This application profile specifies the use of this attribute as defaultable. Currently no default value is defined within this standard.

The application defined attribute list for the Data-Entry-Program-SE contains the following attributes:

Data-Entry-Type	d
Allowed-characters-for-keyword-access	nm
Character-list-for-keyword-access	nm
Max-length-keyword-access	d
Allowed-characters-for-a-direct-access-command	nm
Max-length-direct-access	d

#### 6.4.1.3 Result-SE

The attribute Last-sub-program defined in Recommendation T.564 is mapped to the reference attribute defined in Recommendation T.441 (or currently in Annex A of this Recommendation). The application defined attribute-list for the Result-SE contains the following attribute:

Termination reason	d
--------------------	---

#### 6.4.1.4 *Field-SE*

The application defined attribute list for the field-SE contains the following attributes:

Field-layout	d
Field-type	nm
Protected	nm
Data-source	nm
Field-text-marking	nm

#### 6.4.1.5 *Data-Entry-Subprogram-SE*

The attributes:

reference-to-rules-SE

reference-to-field-SE

reference-to-prompt-in-SE, and reference-to-a-prompt-out-SE

defined in Recommendation T.564, are mapped to the reference attribute defined in Recommendation T.441 and in Annex A of this Recommendation.

This application profile specifies the use of these attributes as defaultable. Currently no default values are defined within this standard.

The application defined attribute list for the Data-Entry-Subprogram-SE contains the following attributes:

Echo	d
Echoed-character	d
Echo-parameter	nm

#### 6.4.1.6 *Rules-SE*

The application defined attribute list for the Rules-SE contains the following attributes:

Time-out	d
List-of-valid-commands	d
Length-of-choice	d
List-of-enabled-choices	d
Allowed-characters	nm
Character-list	nm
Entry-invoke-character	nm
Local-editing	nm



6.4.1.7 *Prompt-SE*

The application defined attribute list for the Prompt-SE contains the following attributes:

Position	d
Dimensions	d

6.4.1.8 *Prompt content portion*

The application defined attribute content portion is the following:

Coding attributes	d
-------------------	---

6.4.2 *Attributes of the application control memory structure*

Table 3/T.541 shows the use of attributes defined for operational structures.

TABLE 3/T.541

Attributes	Data-Entry-SE	
		Record-SE
Object type	m	m
Object identifier (Note)	m	m
Reference attribute	--	--
Application defined attribute lists	d	d
Default value lists	nm	--

*Note* - This attribute may be omitted when the value can be unambiguously derived from the transmission sequence of the relevant objects.

*Values for the attribute object-type*

Application-Control-Memory-SE: 7

Record-Content: 8

6.4.2.1 *Application-Control-Memory-SE*

6.4.2.2 *Record-SE*

The application defined attribute list for the Record-SE contains the following attributes:

Record-content	d
----------------	---

*Note* - Specifying the record content by using operational elements is for further study.

6.4.3 *Attributes of the administrative structure*

Table 4/T.541 shows the attributes defined for operational structures.

TABLE 4/T.541

Attributes	Administrative-Information-SE			
		Local-Host-Information-SE		
		External-Host-Information-SE		Document-Information-SE
Object type	m	m	m	m
Object identifier (Note)	m	m	m	m
Reference attribute	--	--	--	--
Application defined attribute list		nm	nm	d
Default value list	nm	--	--	--

*Note* - This attribute may be omitted when the value can be ambiguously derived from the transmission sequence of the relevant objects.

*Values for the attribute object-type*

Administrative-Information-SE: 9

Local-Host-Information-SE: 10

External-Host-Information-SE: 11

Document-Information-SE: 12

#### 6.4.3.1 Administrative-Information-SE

The application defined attribute list for the Administrative-Information-SE:

External-Host-Id	m
Local-Host-Id	m
Bilateral-Management-Parameter	nm

#### 6.4.3.2 Local-Host-Information-SE

The application defined attribute list for the Local-Host-Information-SE contains the following attribute:

Error-Report-to-External-Host	nm
-------------------------------	----

#### 6.4.3.3 External-Host-Information-SE

The application defined attribute list for the External-Host-Information-SE contains the following attribute:

Error-Report-to-Local-Host	nm
Asynchronous-Message	nm

6.4.3.4 Document-Information-SE

The application defined attribute list for the Document-Information-SE contains the following attributes:

Application-Time-based-charging-period	d
Application-price-Frame-based	d
Application-price-Transaction-based	d
Application-Time-based-charging-price	d
Communication-Cost-Time-based-charging-period	d
Communication-Cost-Time-based-charging-price	d

6.4.4 Attributes of the special terminal facilities structure

Table 5/T.541 shows the use of attributes defined for operational structures:

TABLE 5/T.541

Attributes	Special-Terminal-Facilities-SE	
		Redefinition-Entry-SE
Object type	m	m
Object identifier (Note)	m	m
Reference attribute	--	--
Application defined attribute lists	d	d
Default value lists	nm	--

Note - This attribute may be omitted when the value can be unambiguously derived from the transmission sequence of the relevant objects.

Values for the attribute object-type

Special-Terminal-Facilities-SE: 13

Redefinition-Entry-SE: 14

6.4.4.1 Special-Terminal-Facilities-SE

The application defined attribute-list for the Special-Terminal-Facilities-SE contains the following attributes:

Measurement-unit	d
Dimensions	d

#### 6.4.4.2 *Redefinition-Entity-SE*

The application defined attribute-list for the Redefinition-Entity-SE contains the following attributes:

Redefinition-coding	d
Redefinition-content	d

*Note* - Specifying the redefinition content by using operational elements is for further study.

### 6.5 *Attribute values for constituents of the operational structures*

#### 6.5.1 *Object type*

The value of the attribute object type is given by the relevant value of the operational structure (see Recommendation T.441 or Annex A of this Recommendation) and §§ 6.4.1, 6.4.2 and 6.4.4 of this Recommendation.

#### 6.5.2 *Object identifier*

The assignment of values to the operational roots is specified in this Recommendation.

The procedure of assigning values to the subordinate constituents of the operational structure is specified in Recommendation T.441 or in Annex A of this Recommendation).

#### 6.5.3 *Reference attribute*

The reference attribute is used in the context of the Data-Entry-Program-SE and Data-Entry-Subprogram-SE and Result-SE. The assignment of values to the reference attribute is specified in Recommendation T.564.

#### 6.5.4 *Application defined attribute lists*

The values of attributes, mapped to the application defined attribute lists, are specified in Recommendation T.564.

This Recommendation specifies the mapping of the attributes defined in Recommendation T.564 to the application defined attribute lists.

#### 6.5.5 *Default value lists*

For the application defined attributes of each of the SE:

- Data-Entry-SE
- Application-Control-Memory-SE
- Administrative-Information-SE
- Special-Terminal-Facilities-SE

default values for the application defined attributes are specified in this Recommendation.

The default values of each of the concerned SE are mapped to the attribute default value lists of the relevant operational root.

#### 6.5.6 *Operational element content type*

The attribute type-of-coding, specified in Recommendation T.564, is mapped to the attribute operational element content type, specified in Recommendation T.441 or in Annex A of this Recommendation). Recommendation T.564 specifies the values for this attribute.

#### 6.5.7 *Operational element content*

The attribute content-information, specified in Recommendation T.564, is mapped to the attribute operational element content, specified in Recommendation T.441 or in Annex A of this Recommendation). Recommendation T.564 specifies the values for this attribut .

## 6.6 Default values for application defined attributes

The default value nil indicates that no default value is defined within this standard. In these cases steps 1 and 2 of the defaulting mechanism specified in § 9.2.4 of Recommendation T.564 shall uniquely derive the default value for the relevant attribute.

### 6.6.1 Data entry structure

List of attributes	Default value
Data-Entry-Program-SE attributes:	
Data-Entry-Type	Nil
Max-Length-Keyword-Access	0
Max-Length-Direct-Access	0
Result-SE attributes:	
Termination reason	Nil
Field-SE attributes:	
Field-Layout	(0,0), (40,24)
Data-Entry-Program-SE attributes:	
Echo	"normal"
Echoed character	Nil
Rules-SE attributes:	
Time-Out	600 seconds
Valid-Commands	Nil
Length-Of-Valid-Choices	Nil
List-Of-Enabled-Choices	Nil
Prompt-SE attributes:	
Position	(0,0)
Dimensions	(40,24)

### 6.6.2 Application control memory structure

List of attributes	Default value
Record-contents	Nil

### 6.6.3 Special terminal facilities structure

List of attributes	Default value
Special-Terminal-Facilities-SE attributes:	
Measurement-unit	Characterbox
Dimensions	(40,24)
Redefinition-Entity-SE attributes:	
Redefinition-coding	Nil
Redefinition-content	Nil

## 6.7 *Implicitly created constituents*

Some constituents of the display structure or operational structures are implicitly created at connection establishment time (see Annex A of Recommendation T.564 or Table 1/T.532).

To ensure that manipulation of these constituents during association is always possible, the following values for the object identifier shall be used:

- "11 0" for Result-SE
- "11 0 0" for Result-Content-Portion
- "13 0" for Local-Host-Information-SE
- "13 1" for External-Host-Information SE
- "13 2" for Document-Information-SE

## ANNEX A

(to Recommendation T.541)

### Operational structure

This Annex is an integral part of this Recommendation. It specifies details on operational structures currently not covered by Recommendation T.441. It is intended that future work on operational structures will be compatible with the specifications of this annex.

#### A.1 *Constituents of the operational structure*

The operational structure is used (in addition to the specific document) for describing application defined structures in terms of operational objects and operational elements. The following constituents occur in this structure:

- operational root;
- composite operational object;
- basic operational object;
- operational elements.

##### A.1.1 *Operational root*

The operational root is the highest level object in the hierarchy of this structure. It is a composite object whose immediate subordinates can be any number and combination of composite and basic operational objects.

##### A.1.2 *Composite operational objects*

A composite operational object is a composite object of the operational structure.

A composite operational object can be immediately subordinate to the operational root or to another composite operational object of one hierarchy level above. (Only one level of composite operational objects will be used by videotex interworking.)

The immediate subordinates of a composite operational object can be any number and combination of composite and basic operational objects. Operational elements cannot be directly associated with a composite operational object.

##### A.1.3 *Basic operational objects*

A basic operational object is a basic object of the operational structure.

A basic operational object can be immediately subordinate to the operational root or to a composite operational object.

A basic operational object has no subordinates. It is directly associated with the operational elements if any are present.

#### A.1.4 Operational elements

Operational elements are associated with basic operational objects. They describe application specific data, which are specified in the appropriate Recommendation of the application.

#### A.2 Definitions of attributes

This clause defines the attributes and their applicability to the operational objects. Each attribute has a name and a value by which it describes a characteristic of a structure element or the relationship to another structure element.

Table A-1/T.541 shows which attribute can be specified for each type of constituent.

TABLE A-1/T.541

Attribute name	Operational root	Composite operational object	Basic operational object	Operational element
Object type	D	D	D	-
Object identifier	M*	M*	M*	-
Operational element identifier	-	-	-	M*
Operational object class	NM	NM	NM	-
Subordinates	NM	NM	-	-
Operational elements	-	-	NM	-
Document fragment	NM	NM	NM	-
Reference attribute	-	NM	NM	NM
Operational element content type	-	-	-	D
Operational element content	-	-	-	D
Default value lists	NM	NM	-	-
Application defined attribute lists	NM	NM	NM	NM

M	Mandatory
D	Defaultable
NM	Non-mandatory
-	Not applicable
M*	Mandatory; exceptions specified

##### A.2.1 Identification attributes

###### A.2.1.1 Object type

Mandatory for all operational object class descriptions, defaultable for operational object descriptions.

This attribute must be specified for an operational object description, unless generic structures are used.

The attribute specifies the object type whose value is an integer.

The relevant operational application profile shall specify the values for this attribute and shall identify for each of the relevant objects if it is a:

- operational root;
- composite operational object;
- basic operational object.

From this specification it can be derived which attributes are applicable to the relevant object (see Table A-1/T.541).

#### A.2.1.2 *Object identifier*

Mandatory for all operational object descriptions. For the same exceptions as specified in Recommendation T.412, § 5.3.1.3, the object identifier may be omitted.

This attribute uniquely identifies an operational object description.

The object identifier consists of a sequence of numbers. Each number in the sequence corresponds to a hierarchical level of the specific operational structure and identifies one specific object description at that level (see Recommendation T.412).

The first number in the sequence identifies the object description of the operational root.

An object identifier consisting of just this first number identifies the object description of the operational root.

The operational application profile (T.540 Series of Recommendations) defines the assignment of integers to the operational structures used by the application.

The value of the subsequent numbers in the sequence is not significant. It is required, however, that the sequence of numbers assigned to an object description must distinguish it from all other object descriptions among the operational structures used by the relevant application.

The object identifier is represented as a character string of decimal-coded numerals with a space character as separator between each pair of numerals.

#### A.2.1.3 *Operational element identifier*

Mandatory for all operational object descriptions. In the same exceptional cases as specified in Recommendation T.412, § 5.3.1.3, the operational element identifier may be omitted.

This attribute uniquely identifies an operational element description.

The value of the operational element identifier consists of a sequence of numbers which is composed of two parts. In the first part, it is identical to the identifier of the basic operational component that the operational element is associated with. The second part is a number appended to this identifier which identifies this operational element.

The operational element identifier is presented as a character string of decimal-coded numerals with a space character as separator between each pair of numerals.

#### A.2.2 *Relationship attributes*

##### A.2.2.1 *Operational object class*

Non-mandatory; may be specified for all operational object descriptions.

This attribute is not supported by this Annex, as videotex interworking makes no use of generic structures.

##### A.2.2.2 *Subordinates*

Non-mandatory for composite operational object descriptions.

This attribute identifies the set of objects immediately subordinate to a composite operational object.

The value of the attribute is a sequence of one or more numbers. Each number corresponds to an immediately subordinate object description and consists of the last number of identifier of that object description. The same number may not occur more than once in the sequence.

The order of the appearance of the numbers in the sequence - and the order of their numeric values - defines the sequential order among the immediately subordinate objects.

##### A.2.2.3 *Operational elements*

Non-mandatory for basic component descriptions.

This attribute links operational elements to a particular basic component. There may be zero, one or more operational elements per basic object description.

The value of this attribute is the sequence of the second parts of the identifiers of the corresponding operational element descriptions.



#### A.2.2.4 *Document fragment*

Non-mandatory may be specified for any component description. There is no constraint as to where this attribute may be specified. i.e., at what level or for what component descriptions.

This attribute establishes the relationship between constituents of the operational structure and constituents of the logical and layout structures and their associated content portions, thereby defining the document fragments as such.

The value of this attribute is a pair of parameters. The first parameter is the fragment name. The fragment name is to be provided by the application. The second parameter is a sequence of one or more identifiers of the referenced document constituents.

The interpretation of this attribute (e.g., if the reference to an object of the specific document includes the reference to all subordinate objects) is application dependent.

#### A.2.2.5 *Reference attribute*

Non-mandatory; may be specified for any operational object description, or operational element description. The value of this attribute is a sequence of pairs of parameters. The first parameter is the reference name. The reference name is to be provided by the application. The second parameter is a sequence of identifiers of operational object descriptions, or operational element descriptions.

This attribute permits to reference from one constituent of the operational structure to other constituents. This reference can only be interpreted in the specific context of the application.

Maintaining consistency when using this attribute has to be provided by the application and is not within the scope of this Annex.

#### A.2.3 *Miscellaneous attribute*

##### A.2.3.1 *Operational element content type*

Defaultable; to be specified for any operational element description, if present.

This attribute specifies the type of the content contained in the relevant operational element. The operational application profile shall specify the set of permissible values of this attribute, according to the relevant content architecture.

##### A.2.3.2 *Operational element content*

Defaultable; to be specified for any operational element description, if present.

The value of this attribute is a string in accordance with the value of the relevant operational element content type.

##### A.2.3.3 *Default value lists*

Non-mandatory; may be specified for composite component description.

This attribute defines default values for attributes of subordinate object descriptions.

The value of the attribute is a sequence of one or more lists of attributes, each list being applicable to a different subordinate object type.

#### A.2.4 *Application defined attribute list*

Defaultable for operational object descriptions and operational element descriptions; default value: NULL. NULL means that no default value list is present.

This attribute allows for the definition of application specific information to be included in any operational component or operational element description.

The value of the attribute is a set of application defined values, i.e., the applications define the contents of the lists.

## ANNEX B

(to Recommendation T.541)

### B.1 Operational data formats

Operational-Descriptor ::= CHOICE {  
operational-object-class [0] IMPLICIT Operational-Class-Descriptor,  
-- not used by the videotex interworking application;  
-- therefore not specified in this document  
operational-object [1] IMPLICIT Operational-Object-Descriptor,  
operational-element [2] IMPLICIT Operational-Element }  
Operational-Information-Identifier ::= Object-or-Class-Identifier  
-- used in the case of the delete operation

#### B.1.1 Operational object descriptor

Operational-Object-Descriptor ::= SEQUENCE {  
object-type Operational-Object-Type OPTIONAL,  
descriptor-body Operational-Object-Descriptor-Body OPTIONAL}  
Operational-Object-Type ::= INTEGER {  
data-entry (0),  
data-entry-program (1),  
data-entry-subprogram (2),  
field (3),  
rules (4),  
prompt (5),  
result (6),  
application-control-memory (7),  
record (8),  
document-information (12),  
special-terminal-facilities (13),  
redefinition-entity (14) }  
Operational-Object-Descriptor-Body ::= SET {  
object-identifier Object-Or-Class-Identifier OPTIONAL,  
subordinates [0] IMPLICIT SEQUENCE OF Numeric-String OPTIONAL,  
-- not used by the videotex interworking application;  
-- therefore not specified in this document  
operational-elements [1] IMPLICIT SEQUENCE OF Numeric-String, OPTIONAL,  
object-class [2] IMPLICIT Object-Or-Class-Identifier OPTIONAL,  
-- not used by the videotex interworking application;  
-- therefore not specified in this document  
-- document-fragment [3] IMPLICIT Document-Fragment OPTIONAL,  
-- not used by the videotex interworking application;  
-- therefore not specified in this document  
reference-attribute [4] IMPLICIT Reference-Attribute OPTIONAL,  
default-value-lists [5] IMPLICIT Default-Value-Lists OPTIONAL,  
application-defined-attribute-lists [6] IMPLICIT Application-Defined-Attribute-Lists OPTIONAL }  
B.1.2 Operational elements

Operational-Element ::= SET {  
operational-element-identifier Object-or-Class-Identifier OPTIONAL,  
reference-attribute [4] IMPLICIT Reference-Attribute OPTIONAL,  
-- not used by the videotex interworking application

application-defined-attribute-lists	[6] IMPLICIT Application-Defined-Attribute-Lists OPTIONAL,
operational-element-content-type	[7] Operational-Content-Type OPTIONAL,
operational-element-content	[8] IMPLICIT OCTET STRING OPTIONAL }

### B.1.3 Common attributes

Reference-Attribute	::= SEQUENCE OF SEQUENCE {
reference-name	[0] IMPLICIT OCTET STRING OPTIONAL, -- '00'H reference to a rules SE -- '01'H reference to a prompt-in SE -- '02'H reference to a prompt-out SE -- '03'H reference to a field SE -- in the case of first subprogram and last subprogram no -- reference name is used
referenced-constituent	Object-Or-Class Identifier }
Default-Value-Lists	::= Operational-Object-Descriptor-Body

### B.1.4 Application defined attributes

Application-Defined-Attribute-List	::= SET { -- DATA ENTRY STRUCTURE
data-entry-type	[0] IMPLICIT INTEGER { information-retrieval (1), data-collection (2), on-the-fly (3), duplex (4)} OPTIONAL,
allowed-characters-for-a-keyword-access-command	[1] IMPLICIT BOOLEAN OPTIONAL, -- true = yes -- false = no
character-list-for-keyword-access	[2] Character-List OPTIONAL,
max-length-keyword-access	[3] IMPLICIT INTEGER OPTIONAL,
allowed-character-for-a-direct-access-command	[4] IMPLICIT BOOLEAN OPTIONAL, -- true = yes -- false = no
termination-reason	[5] IMPLICIT Termination-Reason OPTIONAL,
field-layout	[6] IMPLICIT Field-Layout OPTIONAL,
field-text-marking	CHOICE { [7] IMPLICIT NULL, [8] Appearance } OPTIONAL,
echo	[9] IMPLICIT INTEGER { normal-echo (0), fixed-echo (1), null (2) } OPTIONAL,
echoed-character	[10] G0G2-Character OPTIONAL,
echo-parameter	[11] Appearance OPTIONAL,
time-out	[12] IMPLICIT INTEGER OPTIONAL -- measured in seconds
entry-invoke-character	[13] G0G2-Character OPTIONAL,
local-editing	[33] IMPLICIT INTEGER OPTIONAL, -- details for further study
length-of-valid-choices	[15] IMPLICIT INTEGER { one-digit (1) two-digits (2) } OPTIONAL,
list-of-enabled-choices	[16] List-of-Choices OPTIONAL,

allowed-characters-for-data-collection	[17] IMPLICIT INTEGER { forbidden (0), allowed (1), alphabetic (2), alphanumeric (3), numeric (4) } OPTIONAL,
character-list	[18] Character-List OPTIONAL,
list-of-valid-commands	[19] OCTET STRING OPTIONAL, -- the OCTET STRING is encoded in a way that the bits are -- representing the commands as follows: -- bit 0: time-out, bit 2 = V2, bit 3: V3, bit 8: D1a, -- bit 9: D1b, bit 10: D1c, bit 11: D1d, bit 14: D4, bit 15: D5, -- bit 16: D6, bit 17: D7, bit 19: D9, bit 20: D10, bit 21: D11, -- bit 22: D12, bit 23: D13, bit 24: D14, bit 27: D17, bit 28: -- D18, bit 29: end-of-field, -- a command is enabled by setting the bit to 1 and disabled by -- setting the bit to 0.
field-type	[20] IMPLICIT INTEGER { data-collection-field (0), country-code-field (1), tel-number-field (2), subscr-number-field (3), co-user-suffix-field (4), user-number-field (5), subscr-title-field (6), subscr-name-field (7), additional-name-field (8), street-field (9), town-field (10), postcode-field (11), date-field (12), time-field (13), date-and-time field (14) } OPTIONAL,
system-field-attributes	[21] IMPLICIT System-Field-Attributes OPTIONAL, -- the following two attributes are used for prompts, the -- second also for the SPECIAL TERMINAL-FACILITIES-SE
position	[22] IMPLICIT Measure-Pair OPTIONAL,
dimension	[23] IMPLICIT Measure-Pair OPTIONAL,
	-- APPLICATION CONTROL MEMORY STRUCTURE
record-content	[14] IMPLICIT Record-Content OPTIONAL, -- SPECIAL TERMINAL FACILITIES STRUCTURE
measurement-unit	[31] IMPLICIT Measurement-Unit OPTIONAL,
redefinition-coding	[25] IMPLICIT Redefinition-Coding OPTIONAL,
redefinition-content	[26] IMPLICIT IMPLICIT OCTET STRING OPTIONAL,
	-- ADMINISTRATIVE STRUCTURE
a-price-frame-based	[27] IMPLICIT Real-Number OPTIONAL,
a-price-transaction-based	[32] IMPLICIT Real-Number OPTIONAL,
a-time-based-charging-price	[28] IMPLICIT Real-Number OPTIONAL,
a-time-based-charging-period	[29] IMPLICIT INTEGER OPTIONAL,
c-cost-tbc-period	[30] IMPLICIT INTEGER OPTIONAL,
c-cost-tbc-price	[24] IMPLICIT Real-Number OPTIONAL,
	-- OPERATIONAL ELEMENTS
coding attributes	[8] IMPLICIT Videotex-Coding-Attributes -- coding attributes are to be specified for prompt content -- portions by the relevant content architecture; coding -- attributes are the same as for blocks }

## B.1.5 Basic types

Object-or-Class-  
Identifier

```
 ::= [APPLICATION 1] IMPLICIT Printable-String
      -- only digits and space are used in the present version of
      -- the standard
      -- a "null" value is represented by an empty string
      -- the first digit identifies the relevant root:
      -- data entry root "0", application
      -- control memory root "1", administrative
      -- information root "2", special terminal
      -- facilities root "3"
```

Character-List

```
 ::= CHOICE {
      [0] IMPLICIT SET OF G0G2-Bit-8-Character,
      [1] IMPLICIT SET OF G0G2-Bit-7-Character }
```

bit-8-character-list  
bit-7-character-list

G0G2-Character

```
 ::= CHOICE {
      [0] IMPLICIT G0G2-Bit-8-Character,
      [1] G0G2-Bit-7-Character }
```

bit-8-character  
bit-7-character

G0G2-Bit-8-  
Character

```
 ::= INTEGER
      -- G0 or G2 character included. Space with 8-bit encoding;
      -- values between 20H-7FH and AOH-FFH
```

G0G2-Bit-7-  
Character

```
 ::= CHOICE {
      [0] IMPLICIT INTEGER {
            -- G0 character included. Space with 7-bit encoding;
            -- values between 20H-7FH
      [1] IMPLICIT INTEGER {
            -- G2 character included. Space with 7-bit encoding;
            -- values between 20H-7FH
```

g0-character

g2-character

Field-Layout

```
 ::= SEQUENCE OF SEQUENCE {
      Measure-Pair, Measure-Pair }
```

List-of-Choices

```
 ::= BIT STRING
      -- the length of the string is equal to 10 bits if the length
      -- of choices is 1, equal to 100 bits if the length is 2
      -- the bit position is representing actual choice value
```

Appearance

```
 ::= IMPLICIT SET {
      [0] IMPLICIT INTEGER OPTIONAL,
      [1] IMPLICIT INTEGER OPTIONAL,
      [2] IMPLICIT BOOLEAN OPTIONAL,
            -- true means on; false means off
      [3] IMPLICIT BOOLEAN OPTIONAL,
            -- true means on; false means off
      [4] IMPLICIT BOOLEAN OPTIONAL,
            -- true means on; false means off
```

foreground-colour  
background-colour  
underline

reverse-video

flashing

-- the following parameters are only used for the echo parameter

height

```
 [5] IMPLICIT BOOLEAN OPTIONAL,
      -- true means double; false means normal
```

width

```
 [6] IMPLICIT BOOLEAN OPTIONAL,
      -- true means double; false means normal
}
```

Termination-Reason

```
 ::= INTEGER {
      time-out (0), V2 (2),
      V3 (3), D1a (8),
      D1b (9), D1c (10), D1d (11),
      D4 (14), D5 (15), D6 (16),
      D7 (17), D9 (19), D10 (20),
      D11 (21), D12 (22), D13 (23),
      D14 (24), D17 (27), D18 (28),
      end-of-field (29)}
```

```

Real-Number      ::= SEQUENCE {
integer-part      [0] IMPLICIT INTEGER DEFAULT 0,
decimal-exponent  [7] IMPLICIT INTEGER DEFAULT 2 }
-- the encoded real number is obtained by dividing the
-- integer-part by 10**decimal-exponent

Measurement-Unit ::= INTEGER {
character-box (0) }

Measure-Pair     ::= SEQUENCE {
horizontal        INTEGER,
vertical          INTEGER }

Redefinition-Coding ::= SEQUENCE {
redefinition-type [0] IMPLICIT INTEGER {
dracs (0),
colour-redefinition (1),
reset-sequence (2),

redefinition-coding-data-
syntax            [1] IMPLICIT OBJECT IDENTIFIER }

Record-Content   ::= SET OF CHOICE {
D-CREATE,
D-DELETE,
D-MODIFY }
-- these operations are defined in Recommendations T.432
-- and T.433

Operational-Content-
Type             ::= CHOICE {

[0] IMPLICIT INTEGER {
g0g2-bit-8 (0),
-- G0/G2 character included. Space with 8-bit encoding
g0g2-bit-7 (1),
-- G0/G2 character included. Space and SS2 with
-- 7-bit encoding
ascii1) (3)
-- T.50 (international reference version)
-- character
} OPTIONAL,
-- the integer value is used in the cases of a field
-- content portion and a result content portion
[1] IMPLICIT OBJECT IDENTIFIER OPTIONAL }
-- the OBJECT IDENTIFIER is used in the case of a prompt
-- content portion

System-Field-Attributes ::= SEQUENCE {
protected        [0] IMPLICIT BOOLEAN OPTIONAL,
-- true = protected
-- false = not protected

data-source       [1] IMPLICIT BOOLEAN OPTIONAL,
-- true = data supplied by local host
-- false = data supplied by the user }

```

---

<sup>1)</sup> American standard code for information interchange.

ANNEX C  
(to Recommendation T.541)

This Annex is an integral part of this Recommendation.

Summary of ASN.1 object identifiers

ASN.1 object identifier value	Description	Section
0 1 8 16 2	Object identifier for this operational application profile	Annex C of this Recommendation

**Recommendation T.561**

**TERMINAL CHARACTERISTICS FOR MIXED MODE OF OPERATION MM**

CONTENTS

- 1 *Scope*
- 2 *Field of application*
- 3 *References*
- 4 *Definitions*
- 5 *General characteristics of the equipment*
- 6 *Document handling*
- 7 *Communication aspects*
- 8 *Interworking between basic teletex equipments and teletex equipments supporting MM and/or PM.1*

The CCITT,

*considering*

(a) that telematic services have been defined or are going to be defined for a number of applications;

(b) that these applications, in some cases, can be conveniently combined into one single terminal to give improved performance to the users of these terminals;

(c) that standardization work has been aiming at common protocols and compatible parameters for various equipments and procedures;

(d) that teletex and Group 4 facsimile seem particularly suited to form a common service where required;

(e) that other services already defined or under study could be incorporated,

*unanimously declares*

that mixed mode characteristics should be designed and operated in accordance with the following standards.

## **1 Scope**

1.1 The international teletex service requirements to the mixed mode of operation MM.1 are defined in Recommendation F.230.

1.2 the service requirements for Group 4 facsimile service related to the mixed mode of operation MM.1 are defined in Recommendation F.161.

1.3 This Recommendation defines terminal characteristics unique to the mixed mode of operation MM.1.

## **2 Field of application**

This Recommendation applies to terminal equipment of the teletex service or the Group 4 facsimile service supporting the mixed mode of operation MM.1.

## **3 References**

The following CCITT Recommendations also apply to equipments for mixed mode of operations:

- Rec. T.6: "Facsimile coding schemes and coding control functions for Group 4 facsimile apparatus";
- Rec. T.60: "Terminal equipment for use in teletex service";
- Rec. T.61: "Character repertoire and coded character sets for the international teletex service";
- Rec. T.62: "Control procedures for the teletex and Group 4 facsimile services";
- Rec. T.70: "Network-independent basic transport service for telematic services";
- Rec. T.400 Series: "Document architecture transfer and manipulation";
- Rec. T.501: "A document application profile MM for the interchange of formatted mixed mode documents";
- Rec. T.522: "Communication application profile BT1 for document bulk transfer";
- Rec. T.563: "Terminal characteristics for Group 4 facsimile apparatus".

## **4 Definitions**

Terms and their definitions are defined by Recommendation listed above.



## 5 General characteristics of the equipment

### 5.1 General

5.1.1 Equipments supporting mixed mode of operation MM.1 shall provide a set of basic features. The ability to provide this minimum set of basic features is indicated and negotiated before the document interchange.

5.1.2 These equipments may in addition to the set of basic features provide other facilities. These facilities are negotiated separately from the set of basic features defined below.

### 5.2 Basic features required for equipments supporting mixed mode MM.1

The basic features required for equipments supporting mixed mode of operation are:

5.2.1 The ability to create, transmit and receive documents conforming to the document application profile MM.1 defined in Recommendation T.501;

5.2.2 The ability to interchange documents by using the application context defined in § 7.1 of this Recommendation;

5.2.3 The ability to handle the ISO A4 nominal page defined in § 6.1.1.3 and to provide, at least, the assured reproduction area which is defined for ISO A4 paper size in § 6.1.1.4.

5.2.4 The ability to receive and present documents, composed of:

- a) one (or more) page(s) containing only content belonging to the teletex basic repertoire of Recommendation T.61;
- b) one (or more) page(s) containing only content encoded by the raster graphics coding scheme defined in Recommendation T.6;
- c) one (or more) page(s) containing content encoded as per a) and b);
- d) any combination of pages defined in a), b) and c).

5.2.5 For characters and raster graphics content, the ability to handle the basic features defined by Recommendation T.501.

5.2.6 The ability to create blocks of different sizes which can overlap within the page.

5.2.7 The ability to process up to 31 received blocks for presentation as a single page, without using negotiation.

5.2.8 The ability to handle the call identification line information (see § 6.1.2).

### 5.3 Non-basic features for mixed mode

One or more additional features listed in this section may be provided by a terminal supporting mixed mode. These features have to be negotiated before the interchange of the mixed mode document.

5.3.1 The ability to handle the nominal page and to provide, at least, the assured reproduction area which are defined for North American letter paper size, ISO A3 paper size, Japanese legal and Japanese letter paper sizes (see §§ 6.1.1.3 and 6.1.1.4).

5.3.2 The ability to process more than 31 received blocks for presentation as a single page;

5.3.3 The ability to negotiate additional presentation characteristics for particular blocks of the document for character and raster graphics content. These non-basic characteristics are specified in Recommendation T.501.

## 6 Document handling

### 6.1 Requirements for the imaging process

#### 6.1.1 Dimensions for text presentation

##### 6.1.1.1 Basic measurement unit (BMU)

The size of the basic measurement unit (BMU) is  $1/1200 \times 25.4$  mm if the output medium is paper and the locally defined scaling factor is one. To avoid introducing positioning errors between the mandatory image resolutions, it is preferred that the positioning of layout objects to specified in multiples of 20 BMU.

#### 6.1.1.2 *Paper size*

Different physical paper sizes can be used for presentation of mixed mode information. Such paper sizes are ISO A4 paper size (210 × 297 mm), North American letter paper size (215.9 × 279.4 mm), ISO A3 paper size (297 × 420 mm), Japanese legal paper size (257 × 364 mm) and Japanese letter paper size (182 × 257 mm).

#### 6.1.1.3 *Pages and nominal pages*

As defined in Recommendation T.412, a page is a rectangular area used as the reference area for positioning and imaging the content of the document. The page is intended to be positioned and imaged on a unit of the presentation surface. The ideal size of the presentation surface, as assumed by the sender of a document is the nominal page. This nominal page is equal to the ideal paper sized used (see below). In this Recommendation, the page may be equal to or smaller than the nominal page of the corresponding physical paper format.

The following nominal page are defined, showing the maximum allowed dimensions of "page" layout objects:

- a) nominal page for the ISO A4 paper size:
  - width 9 920 BMU (210 mm);
  - height 14 030 BMU (297 mm);
- b) optional nominal page for the North American letter paper size:
  - width 10 200 BMU (215.9 mm);
  - height 13 200 BMU (279.4 mm);
- c) optional nominal page for the ISO A3 paper size:
  - width 14 030 BMU (297 mm);
  - height 19 840 BMU (420 mm);
- d) optional nominal page for Japanese legal paper size:
  - width 12 141 BMU (257 mm);
  - height 17 196 BMU (364 mm);
- e) optional nominal page for Japanese letter paper size:
  - width 8 598 BMU (182 mm);
  - height 12 141 BMU (257 mm).

The pages defined above describe the presentation of text information on the specified paper sizes in both the vertical and horizontal image orientations.

#### 6.1.1.4 *Assured reproduction area*

Hard-copy devices must allow for the possibility of edge losses cause, for example by the optional printing of a call identification line at the receiver, by tolerances on the physical paper size, and by equipment tolerances (see Annex A of Recommendation T.60). In order to cater for these edge losses, an assured reproduction area is defined which is the rectangular area that remains one the nominal page after deducting an agreed allowance for edge losses.

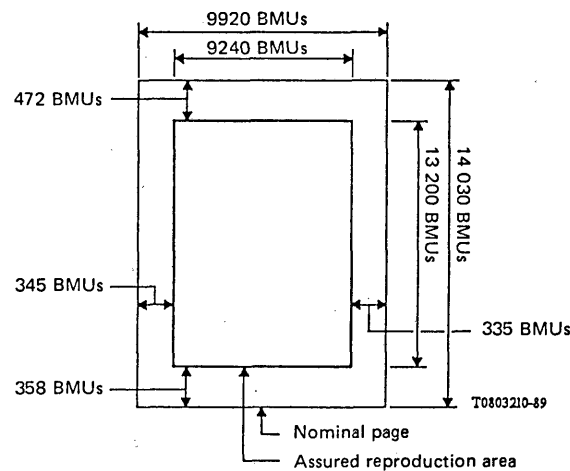
For the option of printing a call identification line, an area at the top of the page is reserved. The same area is used for both vertical and horizontal image orientations, If used, the call identification line is to be printed on the second character baseline which is 400 BMU (8.466 mm) from the X-axis. The reserved area consists of 72 characters boxes, each 120 BMU in width and 200 BMU in height, starting at 945 BMU (20 mm) from the Y-axis and extending for 8640 BMU. The maximum permitted character baseline offset of these character boxes is 72 BMU, so that the area of assured reproduction starts at 472 BMU (10 mm) from the X-axis. Any interchanged text in the area of these character boxes may be suppressed, to avoid obscuring the image of the call identification line.

The assured reproduction areas are defined as follows:

- a) ISO A4 assured reproduction area:
  - width = 9 240 BMU;
  - height = 13 200 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU;
- b) North American letter assured reproduction area:
  - width = 9 240 BMU;
  - height = 12 400 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU;
- c) ISO A3 assured reproduction area:
  - width = 13 200 BMU;
  - height = 18 480 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU;
- d) Japanese legal assured reproduction area:
  - width = 11 200 BMU;
  - height = 15 300 BMU;
  - top margin = 900 BMU;
  - left margin = 400 BMU;
- e) Japanese letter assured reproduction area:
  - width = 7 600 BMU;
  - height = 10 200 BMU;
  - top margin = 900 BMU;
  - left margin = 400 BMU;

The assured reproduction areas for ISO A4, North American letter, ISO A3, Japanese legal and Japanese letter paper sizes are illustrated in Figure 1/T.561, Figure 2/T.561, Figure 3/T.561, Figure 4/T.561 and Figure 5/T.561 respectively, showing the maximum edge losses on each paper edge. The indicated edge losses are based on the idealized or nominal paper sizes as defined in § 6.1.1.2 and do not take account of paper size tolerances.

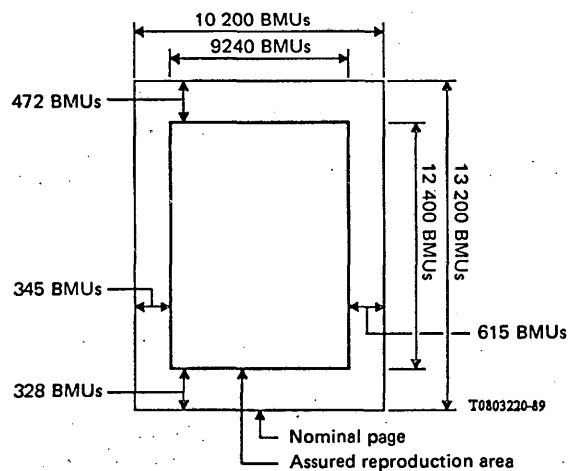
Raster graphics image parameters, for the image dimensions mentioned in Figures 1/T.561 and 2/T.561 are shown for reference in Table 1/T.561.



*Note* - These edge margin values are shown for reference only and do not take account of tolerances on either paper sizes or insertion angles.

FIGURE 1/T.561

Nominal page and assured reproduction area for ISO A4 paper size



*Note* - The indicated size and location of the assured reproduction area accommodates ISO 3535 forms UN/ECE trade documents, and the printed line lengths of the basic teletex service (i.e. 77 characters at 10 characters per 25.4 mm) for the ISO A4 paper size. For the North American letter paper size, it also accommodates ISO 3535 forms and UN/ECE trade documents, as used for that paper size.

FIGURE 2/T.561

Nominal page and assured reproduction area for the North American letter paper size

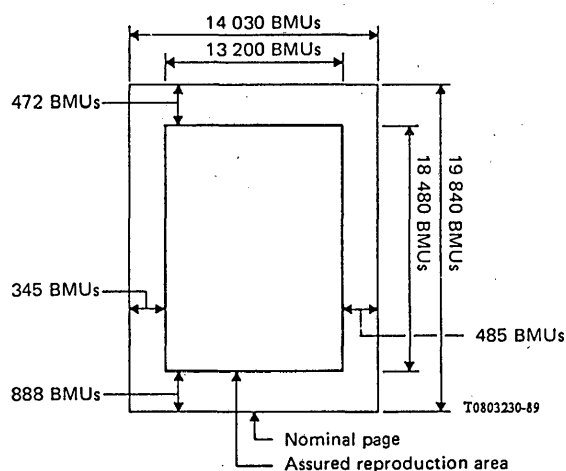


FIGURE 3/T.561

Nominal page and assured reproduction area for ISO A3 paper size

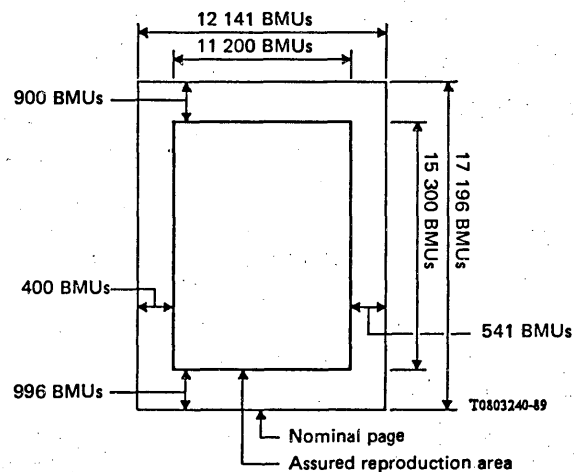


FIGURE 4/T.561

Nominal page and assured reproduction area for Japanese legal paper size

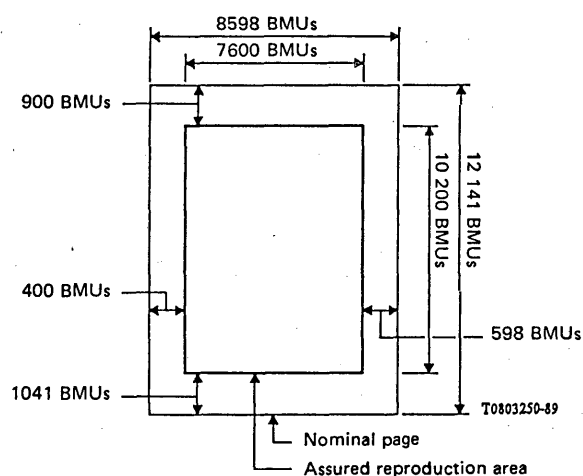


FIGURE 5/T.561

Nominal page and assured reproduction area for Japanese letter paper size

TABLE 1/T.561

Parameters for raster graphics images with dimensions equal to the dimensions shown in Figures 1/T.561 and 2/T.561

(For reference only)

Image dimensions		Number of pels per line at various image resolutions				
BMU	mm	180 pels/ 25.4 mm	200 pels/ 25.4 mm	240 pels/ 25.4 mm	300 pels/ 25.4 mm	400 pels/ 25.4 mm
9 920	210.0	1488	1654	1984	2480	3308
9 240	195.6	1386	1540	1848	2310	3080
10 200	215.9	1530	1700	2040	2550	3400
		Number of raster graphics lines at various image resolutions				
14 030	297.0	2104	2339	2806	3508	4677
13 200	279.4	1980	2200	2640	3300	4400
12 400	262.5	1860	2067	2480	3100	4133

#### 6.1.1.5 Positioning of the page relative to the nominal page

The rules defined in Recommendation T.412, § 7.3.2 apply.

#### 6.1.2 Call identification line (CIL)

6.1.2.1 The basic CIL presentation rules as defined in Recommendation F.200 should apply.

6.1.2.2 For printing CIL, an area, as defined in § 6.1.1.4 is provided.

#### 6.1.3 Fall-back techniques

Some basic and non-basic features described in Recommendation T.501 are allowed to be approximated using fall-back techniques.

This paragraph determines the fall-back procedure which may be used by the recipient if features present in the interchanged document are not locally available.

The table below identifies the features for which fall-back procedure may be used. All other features, not listed in this table, must not be approximated.

Features	Fall-back
Bold	Italicized or underlined
Italicized	Bold or underlined

## 6.2 Requirements for the formatting process

Not applicable.

## 7 Communication aspects

### 7.1 Application context for interchange of MM documents

#### 7.1.1 Application context name

The value of the "application context name" parameter is the following object identifier value: {0 0 20 561 0}.

#### 7.1.2 Use of application service elements

##### 7.1.2.1 Use of DTAM services

The DTAM service element (DTAMSE) is described in Recommendation T.432. For this application context, the use of DTAMSE is defined in Recommendation T.522.

Specific parameter values to be used in the D-INITIATE service parameter are:

- the parameter value to represent the document application profile for mixed mode MM, defined in Recommendation T.501, is the object identifier value: {0 0 20 501 0}.
- the parameter value to represent the document application profile for processable mode PM.1, defined in Recommendation T.502, is the object identifier value: {0 0 20 502 0}.

##### 7.1.2.2 Use of association control service element (ACSE)

The ACSE is described in Recommendation X.217. For this application context, DTAMSE is the sole user of the ACSE services.

*Note* - The use of reliable transfer service element (RTSE) is for further study.

#### 7.1.3 Use of presentation service

The presentation service is defined in Recommendation X.216. The ACSE is the sole user of the P-CONNECT, P-RELEASE, P-U-ABORT and P-P-ABORT services of the presentation service. For this application context, DTAMSE is the sole user of the other presentation services required for using the session functional units specified in § 7.1.4.

#### 7.1.4 Use of session service

The following session functional units are mandatory:

- kernel;
- half duplex;
- capability data exchange;
- minor synchronization;
- exceptions;
- activity management.

*Note* - When the sender cannot know before the communication the nature of the receiver (Recommendation T.62 based or Recommendation X.200 based equipment), it is requested, for an interim period, that the "service identifier" parameter be present in the CONNECT SPDU.

#### 7.1.5 Use of transport service

The transport service is described in Recommendation X.214. The protocol shall be in accordance with Recommendation X.224, Class 0.

*Note* - When the sender cannot know before the communication the nature of the receiver (Recommendation T.62 or Recommendation X.200 based equipment), it is requested, for an interim period, that additional rules in accordance with Recommendation T.70, § 5, including Annexes A and B<sup>1)</sup>, be applied in addition to Recommendations X.214/X.224.

## 7.2 *Coding schemes available*

7.2.1 Recommendation T.61 defines the coding scheme to be used for character coded text.

7.2.2 Recommendation T.6 defines the coding techniques to be used for raster graphics.

## 7.3 *Pel spacing for raster graphics content*

7.3.1 Equipments must provide the capability to receive raster graphics content using pel spacings of 4 and 5 BMU which correspond respectively to pel transmission densities of 300 and 240 pels per 25.4 mm in both horizontal and vertical directions.

7.3.2 Optional pel spacing may be negotiated (see § 5.3).

## 7.4 *Orientation of mixed-mode page for transmission*

The intended viewing orientation of mixed-mode pages may be either vertical or horizontal. For the transmission of the page the orientation shall be vertical.

## 7.5 *Receiving capabilities*

7.5.1 The negotiation of the storage capacity is mandatory for equipments providing mixed mode of operation.

# 8 *Interworking between basic teletex equipments and teletex equipments support MM and/or PM.1*

## 8.1 *General*

For teletex equipments supporting MM and/or PM.1:

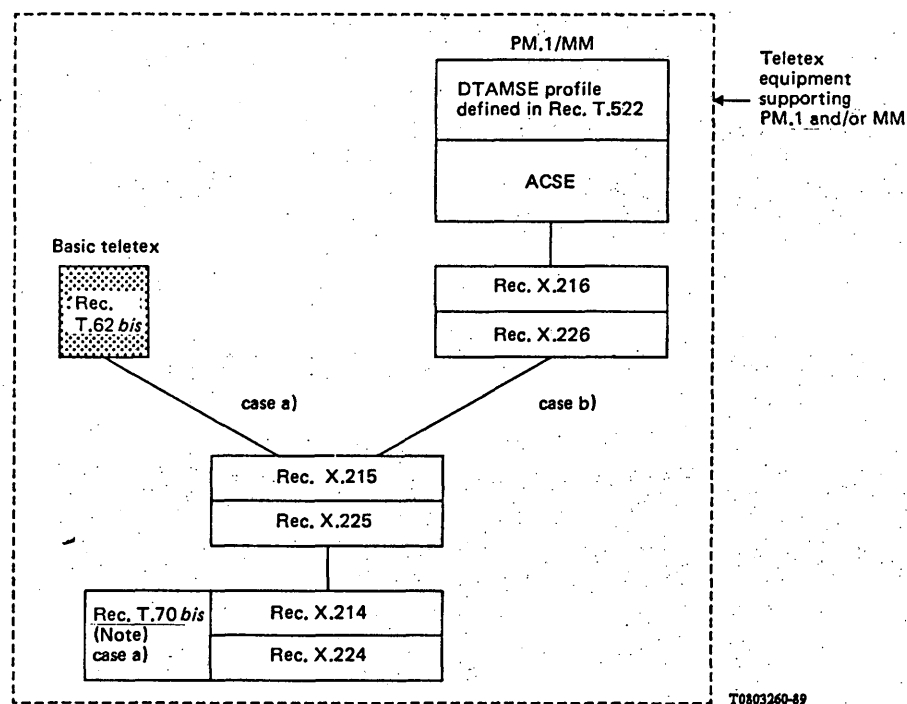
- basic teletex documents are to be interchanged according to the rules defined in Recommendation T.62 *bis*;
- PM.1 and MM teletex documents are to be interchanged according to the application context defined in Recommendations T.561 and T.562.

Figure 6/T.561 below illustrates the two different sets of rules to be used by teletex equipments depending on the interchanged document format.

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<sup>1)</sup> These rules are to be specified in future Recommendation T.70 *bis*.





*Note* - Recommendation T.70 bis has to be specified in the future.

FIGURE 6/T.561

**Illustration of the communication rules to be used  
by teletex equipment supporting PM.1 and/or MM**

## 8.2 Interworking rules

### 8.2.1 The basic teletex equipment is the sender

The only type of document that can be sent by the basic teletex equipment is the basic teletex document. The sender will therefore send this type of document by using Recommendations T.62 and T.70.

In order to accept the reception of the basic teletex document, the receiver has to recognize the "nature" of the originator and to select the adequate rules. For this purpose, when receiving CONNECT SPDU (which corresponds to the CSS command of Recommendation T.62), the recipient must detect the absence of session user data (SUD) and select the T.62 bis module to accept the interchanged document [case a)].

### 8.2.2 The PM.1 and/or MM teletex equipment is the sender

#### 8.2.2.1 The recipient is a basic teletex equipment

If the document type to be transmitted is a basic teletex document, the sender will initiate the communication by selecting case a) and the basic teletex equipment can accept the document.

If the document type to be transmitted is a PM.1 and/or MM document, the sender will initiate the communication by selecting case b).

The sender will then receive an ACCEPT SPDU without session user data. This allows the sender to recognize that the receiver is a basic teletex equipment and therefore that the documents are to be interchanged in a basic teletex format by using case a).

The sender could then inform the user that the interchange of the PM.1/MM documents is not possible as the addressee is a basic teletex equipment.

#### 8.2.2.2 *The recipient is a PM.1 and/or MM teletex equipment*

If the document type to be transmitted is a basic teletex document, the sender will initiate the communication by selecting case a) and the rules specified in § 8.2.1 apply.

If the document type to be transmitted is a PM.1 or MM teletex document, the sender will initiate the communication by selecting the case b).

The recipient will detect the presence of session user data and therefore will select the T.522 module to give an adequate response to the sender.

### Recommendation T.562

## TERMINAL CHARACTERISTICS FOR TELETEX PROCESSABLE MODE PM.1

### CONTENTS

- 1 *Scope*
- 2 *Field of application*
- 3 *References*
- 4 *Definitions*
- 5 *General characteristics of the equipment*
- 6 *Document handling*
- 7 *Communication aspects*
- 8 *Interworking between and basic teletex equipment and teletex equipments supporting PM.1*

The CCITT,

*considering*

(a) that telematic services have been defined or are going to be defined for a number of application;

(b) that these applications, in some cases, can be conveniently combined into one single terminal to give improved performance to the users of these terminals;

(c) that standardization work has been aiming at common protocols and compatible parameters for various equipments and procedures;

*unanimously declares*

that processable mode characteristics should be designed and operated in accordance with the following standards.

## 1 Scope

1.1 The international teletex service requirements to the processable mode of operation PM.1 are defined in Recommendation F.220.

1.2 This Recommendation defines terminal characteristics unique to the processable mode of operation PM.1.

## 2 Field of application

This Recommendation applies to terminal equipment of the teletex service supporting the processable mode of operation PM.1.

## 3 References

The following CCITT Recommendations also apply to equipments for processable mode of operation:

- Rec. T.60: "Terminal equipment for use in teletex service";
- Rec. T.61: "Character repertoire and coded character sets for the international teletex service";
- Rec. T.62: "Control procedures for the teletex and Group 4 facsimile services";
- Rec. T.70: "Network-independent basic transport service for telematic services";
- Rec. T.400 Series: "Document architecture, transfer and manipulation";
- Rec. T.502: "A document application profile PM.1 for the interchange of processable form documents";
- Rec. T.522: "Communication application profile BT1 for document bulk transfer".

## 4 Definitions

Terms and their definitions are defined by Recommendations listed above.

## 5 General characteristics of the equipment

### 5.1 General

5.1.1 Equipments supporting processable mode of operation PM.1 shall provide a set of basic features. The ability to provide this minimum set of basic features is indicated and negotiated before the document interchange.

5.1.2 These equipments may in addition to the set of basic features provide other facilities. These facilities are negotiated separately from the set of basic features defined below.

5.1.3 Some basic and/or non-basic features are allowed to be approximated by the receiver using fall-back techniques. These features are defined in § 6.1.3.

5.1.4 The negotiation is only allowed to fail when a non-basic feature is required that is not supported by the recipient and for which no suitable fall-back mode is available.

## 5.2 *Basic features required for equipments supporting processable PM.1*

The basic features required for equipments supporting processable mode of operation are:

5.2.1 The ability to create, transmit and receive document conforming to the document application profile PM.1 defined in Recommendation T.502;

5.2.2 The ability to interchange documents by using the application context defined in § 7.1 of this Recommendation;

5.2.3 The ability to handle the basic nominal page defined in § 6.1.1.3 and to provide, at least, the assured reproduction area which is defined for the basic nominal page in § 6.1.1.4;

5.2.4 For character content, the ability to handle the basic features defined in Recommendation T.502;

5.2.5 The ability to handle the call identification line information (see § 6.1.2);

5.2.6 A teletex equipment supporting PM.1 shall be able to convert PM.1 documents in formatted and/or formatted processable forms into basic teletex documents.

## 5.3 *Non-basic features for processable mode*

One or more additional features listed in this section may be provided by a terminal supporting PM.1.

5.3.1 The ability to handle the nominal page and to provide, at least, the assured reproduction area which are defined for North American letter paper size, ISO A3 paper size (see §§ 6.1.1.3 and 6.1.1.4).

5.3.2 The ability to negotiate additional presentation characteristics for characters. These non-basic characteristics are specified in Recommendation T.502.

# 6 **Document handling**

## 6.1 *Requirements for the imaging process*

### 6.1.1 *Dimensions for text presentation*

#### 6.1.1.1 *Basic measurement unit (BMU)*

The size of the basic measurement unit (BMU) is  $1/1200 \times 25.4$  mm if the output medium is paper and the locally defined scaling factor is one.

#### 6.1.1.2 *Paper size*

Different physical paper sizes can be used for presentation of PM.1 formatted form document. Such paper sizes are ISO A4 paper size (210 × 297 mm), North American letter paper size (215.9 × 279.4 mm), ISO A3 paper size (297 × 420 mm).

Character content may be imaged on those sheets of paper in horizontal as well as in vertical orientation. A single orientation must be used for all characters within one side of the sheet of paper (recto or verso).

#### 6.1.1.3 *Pages and nominal pages*

As defined in Recommendation T.412, a page is a rectangular area used as the reference area for positioning and imaging the content of the document. The page is intended to be positioned and imaged on a unit of the presentation surface. The ideal size of the presentation surface, as assumed by the sender of a document is the nominal page.

The basic page dimensions are:

- width 9 240 BMU (195.6 mm);
- height 12 400 BMU (262.5 mm).

Others than the basic page dimensions are optional. These dimensions are given below:

- a) page dimensions for the ISO A4 paper size:
  - width 9 920 BMU (210 mm);
  - height 14 030 BMU (297 mm);
- b) page dimensions for the North American letter paper size:
  - width 10 200 BMU (215.9 mm);
  - height 13 200 BMU (279.4 mm);
- c) page dimensions for the ISO A3 paper size:
  - width 14 030 BMU (297 mm);
  - height 19 840 BMU (420 mm).

#### 6.1.1.4 *Assured reproduction area*

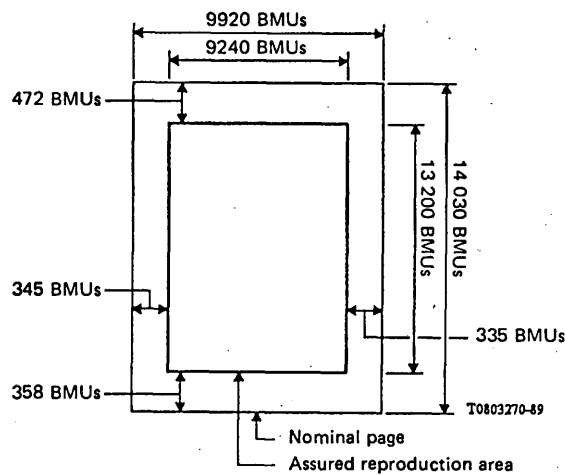
Hard-copy devices must allow for the possibility of edge losses caused, for example by the optional printing of a call identification line at the receiver, by tolerances on the physical paper size, and by equipment tolerance (see Annex A of Recommendation T.60). In order to cater for these edge losses, an assured reproduction area is defined which is the rectangular area that remains on the nominal page after deducting an agreed allowance for edge losses.

For the option of printing a call identification line, an area at the top of the page is reserved. The same area is used for both vertical and horizontal image orientations. If used, the call identification line is to be printed on the second character baseline which is 400 BMU (8.466 mm) from the X-axis. The reserved area consists of 72 character boxes, each 120 BMU in width and 200 BMU in height, starting at 945 BMU (20 mm) from the Y-axis and extending for 8 640 BMU. The maximum permitted character baseline offset of these character boxes is 72 BMU, so that the area of assured reproduction starts at 472 BMU (10 mm) from the X-axis. Any interchanged text in the area of these character boxes may be suppressed, to avoid obscuring the image of the call identification line.

The assured reproduction areas are defined as follows:

- a) ISO A4 assured reproduction area:
  - width = 9 240 BMU;
  - height = 13 200 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU;
- b) North American letter assured reproduction area:
  - width = 9 240 BMU;
  - height = 12 400 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU;
- c) ISO A3 assured reproduction area:
  - width = 13 200 BMU;
  - height = 18 480 BMU;
  - top margin = 472 BMU;
  - left margin = 345 BMU.

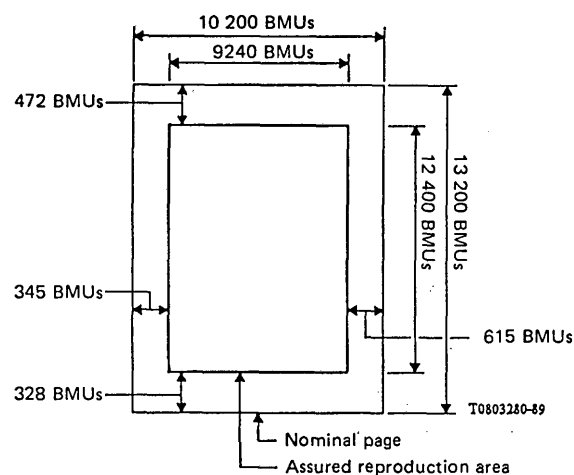
The assured reproduction areas for ISO A4, North American letter, and ISO A3 are illustrated in Figure 1/T.562, Figure 2/T.562, Figure 3/T.562, respectively, showing the maximum edge losses on each paper edge. The indicated edge losses are based on the idealized or nominal paper sizes as defined in § 6.1.1.2 and do not take account of paper size tolerances.



*Note* -These edge margin values are shown for reference only and do not take account of tolerances on either paper sizes or insertion angles.

FIGURE 1/T.562

Nominal page and assured reproduction area for ISO A4 paper size



*Note* - The indicated size and location of the assured reproduction area accommodates ISO 3535 forms, UN/ECE Trade Documents, and the printed line lengths of the basic teletex service (i.e. 77 characters at 10 characters per 25.4 mm) for the ISO A4 paper size. For the North American letter paper size, it also accommodates ISO 3535 forms and UN/ECE Trade Documents, as used for that paper size.

FIGURE 2/T.562

Nominal page and assured reproduction area for the North American letter paper size

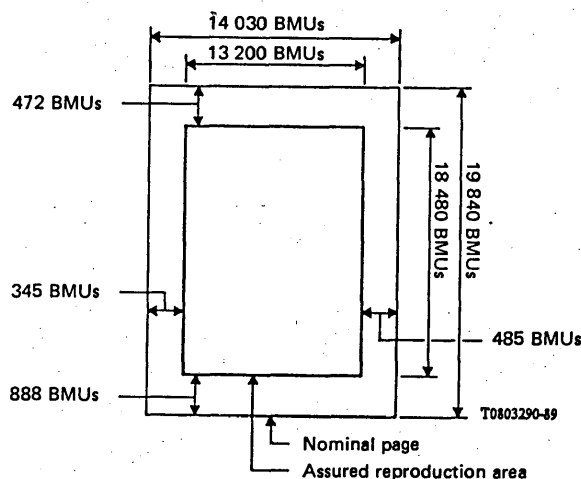


FIGURE 3/T.562

Nominal page and assured reproduction area for ISO A3 paper size

#### 6.1.1.5 Positioning of the page relative to the nominal page

The rules defined in Recommendation T.412, § 7.3.2 apply.

#### 6.1.1.6 Positioning of pages on soft copy media

The rules defined in Recommendation T.412, § 7.3.5 apply.

#### 6.1.2 Call identification line (CIL)

6.1.2.1 The basic CIL presentation rules as defined in Recommendation F.200 should apply with the restriction specified in Recommendation F.220 (deletion of the page number from the CIL).

6.1.2.2 For printing the CIL, an area as defined in § 6.1.1.4 is provided.

#### 6.1.3 Fall-back techniques

Some basic and non-basic features described in Recommendation T.502 are allowed to be approximated using fall-back techniques.

This paragraph determines the fall-back procedure which may be used by the recipient if features present in the interchanged document are not locally available.

Table 1/T.562 below identifies the features for which fall-back procedure may be used. All other features, not listed in this table, must not be approximated.

TABLE 1/T.562

Features	Fall-back modes
<i>Document layout features</i>	
Separation	IGNORE
Widows and orphans	IGNORE
Association of paragraphs	IGNORE
Recto/verso pages	RECTO
<i>Content layout and imaging features</i>	
Emphasis	
- italicized	Bold or underlined
- bold	Italicized or underlined
<i>Document management features</i>	IGNORE

## 6.2 Requirements for the formatting process

The formatting process shall be capable to format locally a processable PM.1 document into the formatted or the formatted-processable form before the document is sent. Additional requirements are for further study.

## 6.3 Requirements for the editing process

For further study.

## 6.4 Requirements for the imaging process

The rules for printing or displaying on screen described in Recommendation T.60 only apply to PM.1 documents in formatted and/or formatted-processable forms. Additional requirements are for further study.

# 7 Communication aspects

## 7.1 Application context for interchange of PM.1 documents

The application context to be used for the interchange of PM.1 documents is defined in Recommendation T.561, § 7.1.

## 7.2 Coding schemes available

7.2.1 Recommendation T.61 defines the coding scheme to be used for character content.

## 7.3 Receiving capabilities

7.3.1 The negotiation of the storage capacity by the DTAM protocol is mandatory for equipments providing processable mode of operation.

# 8 Interworking between basic teletex equipments and teletex equipments supporting PM.1

The rules defined in Recommendation T.561, § 8 apply.



## TERMINAL CHARACTERISTICS FOR GROUP 4 FACSIMILE APPARATUS

### CONTENTS

1	<i>General</i>
2	<i>Scope of Recommendations concerning Group 4 facsimile apparatus</i>
3	<i>General characteristics of the apparatus</i>
4	<i>Mixed mode capabilities</i>
5	<i>Communications</i>
6	<i>Network-related requirements</i>
7	<i>Indicators</i>
8	<i>Access to facsimile MHS</i>
9	<i>Implementation of apparatus</i>
<i>Annex A - Guaranteed reproducible area for Group 4 apparatus conforming to Recommendation T.563</i>	
<i>Appendix I - Communication environment establishment</i>	

The CCITT,  
*considering*

(a) that Recommendation T.2 refers to Group 1 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately six minutes;

(b) that Recommendation T.3 refers to Group 2 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately three minutes;

(c) that Recommendation T.4 refers to Group 3 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately one minute;

(d) that there is a demand for Group 4 apparatus which incorporates means for reducing the transmission time and assures essentially error-free reception of the document;

(e) that telematic terminals including Group 4 facsimile apparatus are to be standardized, taking into account the commonality among these terminals;

(f) that there is a demand for mixed mode of operation where both facsimile coded information and character coded information can be treated within a page by the same apparatus;

*unanimously declares*

that Group 4 facsimile apparatus as defined in Recommendation T.0 should be designed and operated according to the following standard.

#### 1 General

1.1 Group 4 facsimile apparatus is used mainly on public data networks (PDN) including circuit-switched, packet-switched, and the integrated services digital network (ISDN). The apparatus may be also used on the public switched telephone network (PSTN) where an appropriate modulation process will be utilized.

1.2 The procedures used with Group 4 facsimile apparatus enable it to transmit and reproduce image coded information essentially without transmission errors.

1.3 Group 4 facsimile apparatus has the means for reducing the redundant information in facsimile signals prior to transmission.

1.4 The basic image type of the Group 4 facsimile apparatus is black and white. Other image types, e.g. grey scale image or colour image are for further study.

1.5 There are three classes of Group 4 facsimile terminals:

- *Class I* - Minimum requirement is a terminal able to send and receive documents containing facsimile encoded information (in accordance with Recommendations T.6, T.503 and T.521).
- *Class II* - Minimum requirement is a terminal able to transmit documents which are facsimile encoded (in accordance with Recommendations T.6, T.503 and T.521). In addition, the terminal must be capable of receiving documents which are facsimile coded (in accordance with Recommendations T.6, T.503 and T.521), teletex coded (in accordance with the basic coded character repertoire as defined in Recommendations T.60 and T.61), and also mixed-mode documents (in accordance with Recommendation T.561).
- *Class III* - Minimum requirement is a terminal which is capable of generating, transmitting and receiving facsimile coded document (in accordance with the Recommendations T.6, T.503 and T.521), teletex coded document (in accordance with the basic coded character repertoire as defined in Recommendations T.60 and T.61), and mixed-mode documents (in accordance with Recommendation T.561), see Note.

*Note* - The above definitions are extracted from Study Group I where "terminal" is used instead of "apparatus".

## 2 Scope of Recommendations concerning Group 4 facsimile apparatus

2.1 This Recommendation defines the general aspects of Group 4 facsimile apparatus.

2.2 The rules to be followed in the Group 4 facsimile services are defined in Recommendation F.184.

2.3 The Group 4 facsimile coding scheme and facsimile control functions are defined in Recommendation T.6.

2.4 Terminal supporting Group 4 facsimile mode of operation communicates with unique procedures that are described as follows:

- a) the interface to the physical network is defined in this Recommendation (see Note);
- b) the transport end-to-end control procedure is defined in Recommendation T.70;
- c) Group 4 facsimile control procedures are defined in Recommendation T.62;
- d) Group 4 facsimile communication application profile is defined in Recommendation T.521;
- e) Group 4 facsimile document application profile is defined in Recommendation T.503.

*Note* - Recommendation T.71 may be applicable for PSTN operation.

2.5 When operating as mixed-mode terminals, Recommendation T.561 applies.

2.6 When operating as basic teletex terminals, Recommendations T.60 and T.61 apply.

### 3 General characteristics of the apparatus

#### 3.1 Basic characteristics

3.1.1 The Group 4 facsimile apparatus provides the means for direct document transmission from any subscriber to any other subscriber.

3.1.2 All apparatus participating in the international Group 4 facsimile service has to be compatible with each other at the basic level defined in this Recommendation. Additional operational functions may be invoked.

3.1.3 The range of data rates is described in § 6. Detailed arrangements on a national level are left to the Administrations concerned, as it is recognized that national implementation of the Group 4 facsimile service on various types of network may involve national operation at different data throughput rates.

3.1.4 The page is the basis for facsimile message formatting and transmission. Both A4 and North American paper formats are taken into account.

3.1.5 Facsimile coding schemes are applied in order to reduce the redundant information in facsimile signals prior to transmission.

3.1.6 The apparatus must have the ability to reproduce facsimile messages. The content, layout and format of facsimile messages must be identical at the transmitting and receiving apparatus.

3.1.7 The reproducible area is defined within which facsimile messages are assured to be reproduced (see § 3.2.6).

3.1.8 The Group 4 facsimile apparatus should provide means for automatic reception. In addition Class II/III apparatus should provide means for automatic reception of teletex and mixed mode documents.

3.1.9 All classes of Group 4 facsimile apparatus shall incorporate the functions defined as basic for the Group 4 facsimile service in § 3.2 below. In addition, optional functions can be incorporated. In this Recommendation, the optional functions are divided into CCITT standardized options and nationally and/or privately specified options.

#### 3.2 Basic functions

3.2.1 Group 4 facsimile mode of operation shall be capable of handling:

- a) communication application profile as defined in Recommendation T.521;
- b) document application profile as defined in Recommendation T.503;
- c) the basic facsimile coding scheme as defined in Recommendation T.6;
- d) the control function associated with the basic facsimile coding scheme as defined in Recommendation T.6.

3.2.2 All classes of Group 4 apparatus shall have the following provisions for facsimile messages:

- a) provision for scanning the documents to be transmitted (see § 3.2.5);
- b) provision for receiving and presenting hard or soft copies of the documents.

3.2.2.1 In addition Group 4 class II apparatus shall have provision for receiving and displaying basic teletex and mixed mode documents.

3.2.2.2 In addition to the requirements for Group 4 Class II apparatus, Class III apparatus shall have provisions for generating and transmitting basic teletex and mixed mode documents.

#### 3.2.3 Basic page formatting functions are as follows

- a) vertical page orientation;
- b) paper size of ISO A4;
- c) reproducible area/printable area is defined taking into account ISO A4 and North American paper formats and ISO standard 3535.

### 3.2.4 Terminal identification

Each Group 4 facsimile apparatus should be equipped with a unique identification. Details of the identification are given in Recommendation F.184.

### 3.2.5 Scanning

The message area should be scanned in the same direction in the transmitter and receiver. Viewing the message area in a vertical plane, the picture elements shall be processed as if the scanning direction were from left to right with subsequent scans adjacent to and below the previous scan.

### 3.2.6 Page size and reproducible area

3.2.6.1 Sometimes paper length may not be specified, because the paper end is detected by paper scanning.

3.2.6.2 The size of the guaranteed reproducible area for ISO A4 paper size is shown in Annex A to this Recommendation.

### 3.2.7 Group 4 facsimile transmission pel density (resolution) requirements

The Group 4 facsimile resolution requirements and their tolerances are given in Table 1/T.563.

TABLE 1/T.563

Resolution (pels/25.4 mm)	Horizontal and vertical tolerance %
200 × 200	± 1
240 × 240	± 1
300 × 300	± 1
400 × 400	± 1

Centre line referencing will be used for paper positioning. Each page will be positioned on the scanner so that the centre line is in registration with the value: (number of pels/line)/2. (For further study.)

Specific values for the number of pels per line, scan line length and nominal number of scan lines per page are given in Tables 2a/T.563 and 2b/T.563 for all the Group 4 resolutions for ISO A4, North American, ISO B4, ISO A3, Japanese legal and Japanese letter paper.

TABLE 2a/T.563

Number of pels and scan line length for different paper sizes

		ISO A4	North American	ISO B4	ISO A3	Japanese legal	Japanese letter
Number of picture elements along a scan line	Resolution (pels/25.4 mm)						
	200	1728	1728	2048	2432	2048	1728
	240	2074	2074	2458	2918	2458	2074
	300	2592	2592	3072	3648	3072	2592
	400	3456	3456	4096	4864	4096	3456
Scan line length (mm) (P)		219.46	219.46	260.10	308.86	260.10	219.46
Paper width (mm) (Q)		210	215.9	250	297	257	182
P - Q		9.46	3.56	10.10	11.86	3.10	37.46

TABLE 2b/T.563

## Nominal number of scan lines for different paper sizes

		ISO A4	North American	ISO B4	ISO A3	Japanese legal	Japanese letter
Nominal number of scan lines per page for each pel-transmission density	Resolution (pels/25.4 mm)						
	200	2339	2200	2780	3307	2866	2024
	240	2806	2640	3335	3969	3439	2428
	300	3508	3300	4169	4961	4299	3035
	400	4677	4400	5559	6614	5732	4047
Nominal paper length (mm)		297	279.4	353	420	364	257

Table 3/T.563 specifies the blanking procedure for all of the Group 4 paper sizes. An equal number of pels on the left and right side of the page are set to white to fit the paper format. Figure 1/T.563 illustrates the blanking procedure for ISO A4 and North American paper. The same procedure is used for the other paper formats.

TABLE 3/T.563

## Blanking and address reference point for different paper sizes

Paper size	Resolution (pels/25.4 mm)	Pels per line	Pels per each paper size line	Blanking margin (pels)	Reference point	Total line length (mm)
ISO A4	200 × 200	1728	1654	(B) 37	(38.1)	219.46
	240 × 240	2074	1984	45	(46.1)	219.46
	300 × 300	2592	2480	56	(57.1)	219.46
	400 × 400	3456	3308	74	(75.1)	219.46
North American	200 × 200	1728	1700	(A) 14	(15.1)	219.46
	240 × 240	2074	2040	17	(18.1)	219.46
	300 × 300	2592	2550	21	(22.1)	219.46
	400 × 400	3456	3400	28	(29.1)	219.46
ISO B4	200 × 200	2048	1968	40	(41.1)	260.10
	240 × 240	2458	2362	48	(49.1)	260.10
	300 × 300	3072	2952	60	(61.1)	260.10
	400 × 400	4096	3936	80	(81.1)	260.10
ISO A3	200 × 200	2432	2338	47	(48.1)	308.86
	240 × 240	2918	2806	56	(57.1)	308.86
	300 × 300	3648	3508	70	(71.1)	308.86
	400 × 400	4864	4676	94	(95.1)	308.86
Japanese legal	200 × 200	2048	2024	12	(13.1)	260.10
	240 × 240	2458	2428	15	(16.1)	260.10
	300 × 300	3072	3036	18	(19.1)	260.10
	400 × 400	4096	4048	24	(25.1)	260.10
North American	200 × 200	1728	1434	147	(148.1)	219.46
	240 × 240	2074	1720	177	(178.1)	219.46
	300 × 300	2592	2150	221	(222.1)	219.46
	400 × 400	3456	2868	294	(295.1)	219.46

Note - The pels as defined in the blanking margin section (blanking margin A and B are shown in Figure 1/T.563) are equivalent to the discarded pels defined in Recommendation T.503.

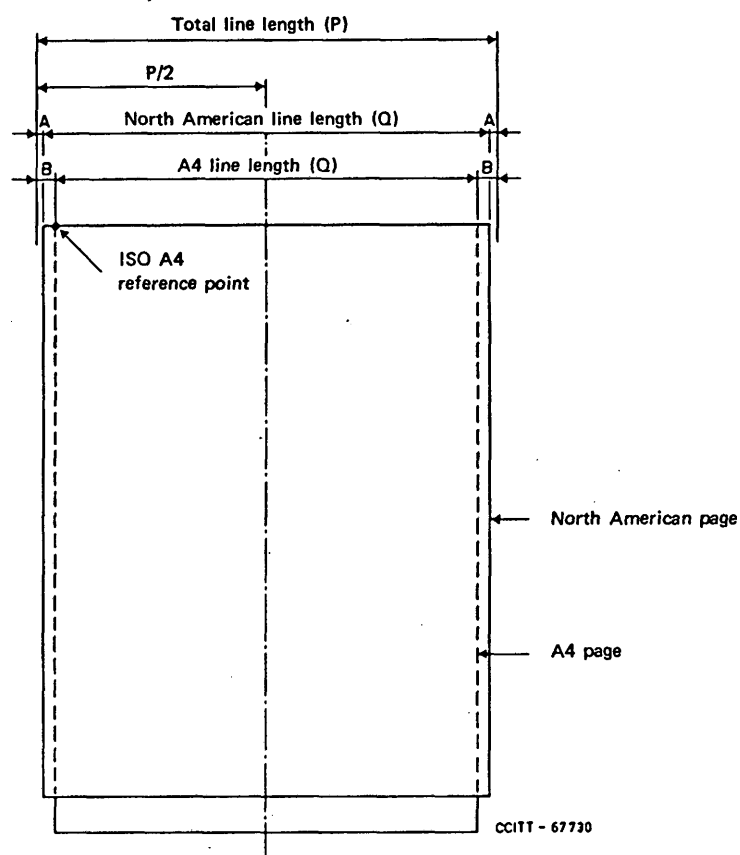


FIGURE 1/T.563

#### Reference point and blanking margins

The raster point is the upper left corner of an ISO page is used as a reference for portrait mode character printing. This raster point, termed the (1,1) raster reference point, is used as a starting point for determining character margins and positions. This is also illustrated in Figure 1/T.563.

#### 3.2.8 Group 4 facsimile class structure

Table 4/T.563 shows the class structure of Group 4 facsimile apparatus.

TABLE 4/T.563

## Class structure

Class	I (see Note 1)	II (see Note 1)	III (see Note 1)
Standard pel transmission density (pels/25.4 mm)	200	200 and 300 (see Note 2)	200 and 300 (see Note 2)
Optional pel transmission density (pels/25.4 mm)	200 and/or 300 and/or 400	240 and/or 400 (see Note 3)	240 and/or 400 (see Note 3)
Pel conversion capability in standard	not required	yes	yes
Teletex	not required	reception only	yes
Mixed mode	not required	reception only	yes
Page memory	not required	yes	yes
Use of document application profile	see Table 5/T.563		
Use of communication application profile	see Table 5/T.563		

*Note 1* - Administrations may determine which class with options to be used for their national service. Standardization work has to continue with the goal of achieving a uniform standard.

*Note 2* - When operating as a mixed mode terminal per Recommendation T.561, the pel receiving density of 240 pels/25.4 mm is required.

*Note 3* - To achieve a high service quality, the pel density of the scanner and printer should be greater than or equal to the transmission pel density. This requirement is waived for a terminal which has a scanner or printer with a pel density of  $240 \times 240$  pels per 25.4 mm and can communicate at 300 pels per 25.4 mm. In this case, the  $240 \times 240$  pels per 25.4 mm terminal will exceptionally meet the standard Class II/III requirement.

*Note 4* - When a resolution conversion is necessary, the conversion is performed by the apparatus which minimizes the transmission cost and time. An exception would be a  $240 \times 240$  pels per 25.4 mm terminal transmitting to a  $300 \times 300$  pels per 25.4 mm terminal which is operating at the standard transmission quality.

*Note 5* - Pel conversion algorithms should aim at low impairment of the quality and are for further study.

### 3.2.9 Facsimile coding scheme

3.2.9.1 In order to reduce the redundant information in facsimile signals, the basic facsimile coding scheme is defined in Recommendation T.6. This coding scheme is used assuming that transmission errors are corrected by control procedures in lower levels.

3.2.9.2 On an optional basis an apparatus can use other CCITT standardized coding schemes defined in Recommendation T.6.

### 3.3 CCITT-standardized optional functions of Group 4 facsimile mode of operation

3.3.1 The possibility of using optional functions can be negotiated during a handshaking procedure in the communication application profile (see Recommendation T.521).

3.3.2 The optional functions are invoked by the communication application profile (see Recommendation T.521).

3.3.3 As the service develops, additions and changes to the CCITT-standardized optional function listed below may be needed:

- a) optional coding schemes defined in Recommendation T.6;
- b) control functions associated with optional coding schemes;
- c) grey scale images;
- d) colour images;
- e) resolution conversion algorithms.

3.3.4 Optional page formatting functions are as follows:

- a) page sizes of ISO B4, ISO A3, Japanese legal and Japanese letter;
- b) other page formats are for further study.

3.4 *Optional functions of Group 4 facsimile mode of operation for national standardization or private use*

The CCITT standardization includes the necessary rules and means for indication of, or escape into, functions specified nationally or for private use (see Recommendations T.62, T.521).

3.5 *Default conditions for Group 4 facsimile mode of operation*

In the absence of specific indications, the receiving apparatus shall assume the following conditions:

- a) communication (as specified in Recommendation T.521):
  - one way (calling apparatus transmitting the facsimile message);
  - normal document;
- b) coding scheme:
  - basic facsimile coding scheme;
- c) image type:
  - black and white two-level image;
- d) presentation:
  - paper size of ISO A4;
  - pel transmission density of 200 pels per 25.4 mm;
  - number of picture elements along scan line of defined values in Table 3/T.563,
  - blanking margin of defined values in Table 3/T.563,
  - vertical page orientation.

## 4 Mixed mode capabilities

For mixed mode of operation, requirements for Group 4 class II and III terminals are specified in Recommendation T.561.



## 5 Communications

### 5.1 Storage

Receiving storage is not required for Group 4 class I terminals. The minimum storage requirement for Group 4 Class II and III is 128 K octets. This value is based on a pel transmission density of 300 pels per 25.4 mm for an ISO A4 document. However, this does not cover the worst case situation for dense documents. Additional memory may be required and can be negotiated.

### 5.2 Call identification

The control procedures include the exchange of reference information prior to sending any document. Details of the call identification line are covered in Recommendation F.184.

Printing capability of the call identification line (CIL) is mandatory. The printing of the CIL is selected by the user.

If printing is selected, the CIL is printed on a reserved area at either the top of the page or the bottom. Refer to Figure A-1/T.563. The reserved area is 4.23 mm (200 BMU) in height and 183 mm (8640 BMU) in width. The size of the basic measurement unit (BMU) is 1/1200 per 25.4 mm.

### 5.3 Interworking

There are three document types, namely "facsimile", "mixed mode" and "basic teletex". These are shown in Table 5/T.563. A terminal can transfer one or more documents of the same type in a single association. In this case of "facsimile" or "mixed mode", the document type is indicated in D-INITIATE service primitive using the parameter "document application profile". If the document type is not supported by the called terminal, this will be indicated by the "result" parameter of the D-INITIATE service confirmation.

TABLE 5/T.563

Document type

Document type	Group 4 facsimile	Mixed mode	Basic teletex
Class of Group 4 facsimile apparatus	Class I, II and III	Class II and III	Class II and III
Document architecture class	FDA	FDA	None (see Note 2)
Document application profile	Rec. T.503 (see Note 1)	Rec. T.501	Non-profile (see Note 2)
Communication application profile	Rec. T.521	Rec. T.522	Non-profile (see Note 2)

*Note 1* - When using the Group 4 facsimile mode, document profile descriptor defined in Recommendation T.503 is not transmitted using session protocol data unit (SPDU).

*Note 2* - Basic teletex documents are transmitted outside DTAM application.

The negotiation and indication mechanism is defined in Recommendation T.433. Appendix I illustrates some examples of the session establishment phase. Table 6/T.563 specifies the interworking matrix among Group 4 facsimile apparatus based on negotiation result.

TABLE 6/T.563

## Interworking matrix among Group 4 facsimile apparatus

Sender Receiver	Class I	Class II	Class III
	Class I	Class II	Class III
Class I	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile
Class II	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile Mixed mode Basic teletex
Class III	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile Mixed mode Basic teletex

5.4 *Communication application profile for Group 4 facsimile document*

The communication application profile to be used is BT 0, specified in Recommendation T.521.

Specific parameter values to be used in the D-INITIATE and D-CAPABILITY service primitive are:

- the parameter value for document application profile is "Recommendation T.503";
- the parameter value for document architecture class is "FDA (formatted)".

6 **Network-related requirements**6.1 *Networks*

The Group 4 facsimile transport service can be provided using a circuit-switched public data network (CSPDN), a packet-switched public data network (PDPDN), a public switched telephone network (PSTN), or an integrated services digital network (ISDN). In all types of network the Group 4 facsimile apparatus will provide automatic answering, transmission, reception and clearing.

6.2 *Circuit-switched public data network (CSPDN)*

- a) Function and procedural aspect of the interface: Recommendation X.21;
- b) With external data circuit terminating equipment (DCE) - mechanical and electrical and characteristics of the interface: Recommendation X.21;
- c) Bit rates: user classes of service 4 to 7 in Recommendation X.1;
- d) Link procedure: LAPB/Recommendation X.75.

6.3 *Packet-switched public data network (PSPDN)*

- a) Function and procedure aspects of the interface: Recommendation X.25, levels 1, 2, 3;
- b) Duplex transmission;
- c) Bit rates: user classes of services 8 to 11 in Recommendation X.1;
- d) Number of logical channels at a time: one or more.

#### 6.4 *Public switched telephone network (PSTN)*

- a) Modulation/demodulation schemes are for further study;
- b) Function and procedural aspects of the interface: for further study;
- c) Link procedure: Recommendation T.71 may be applicable;
- d) Bit rate: for further study;
- e) Automatic response: Recommendation V.25.

#### 6.5 *Integrated services digital network (ISDN)*

The operations and rules of Group 4 facsimile apparatus on the ISDN are defined in Recommendation T.90.

### 7 Indicators

7.1 Indicators should inform users about situations in which negative effects on the grade of service can be expected.

7.2 The following indicators are required:

- a) Apparatus unable to transmit (e.g. paper jam at transmitting end);
- b) Apparatus unable or soon unable to receive (e.g. paper jam or receiving memory nearly full);
- c) Operator assistance required;
- d) Message received in store.

### 8 Access to facsimile MHS

Users of Group 4 facsimile apparatus may wish to have access to the services offered by message handling system (MHS). This requires the ability to generate control documents (see Recommendation T.300 Series). The details are left for further study.

### 9 Implementation of apparatus

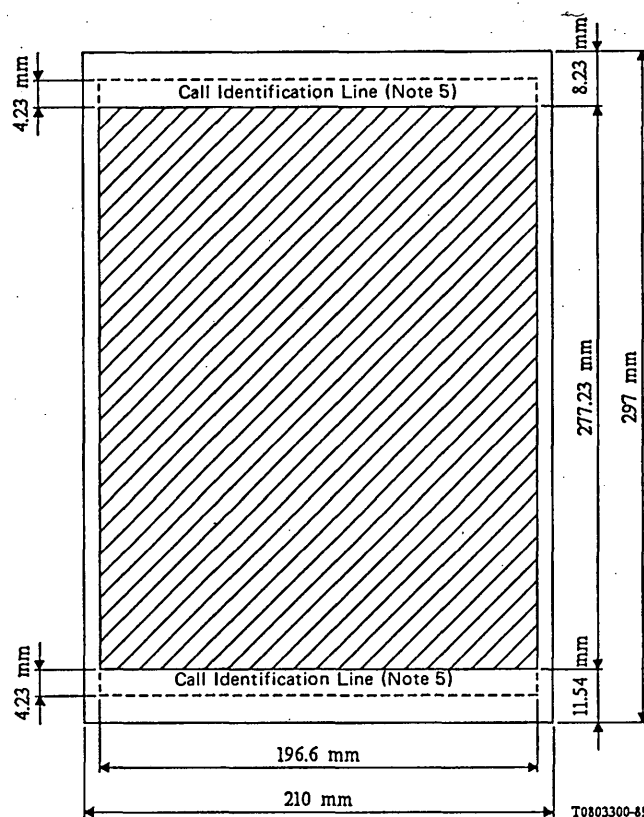
Although paper sizes are referred to, this does not always require physical paper scanner and/or printer to be implemented. Details may be defined by Administrations.

If the message is not generated from a physical scanner or displayed on paper then the signals appearing across the network interface shall be identical to those which would be generated if paper input and/or output has been implemented.

## ANNEX A

(to Recommendation T.563)

### Guaranteed reproducible area for Group 4 apparatus conforming to Recommendation T.563



*Note 1* - Paper characteristics (i.e weight) are important parameters. Lightweight paper may cause additional paper handling errors and may result in a reduced guaranteed reproducible area.

*Note 2* - Sheet feed mechanisms may reduce the guaranteed reproducible area.

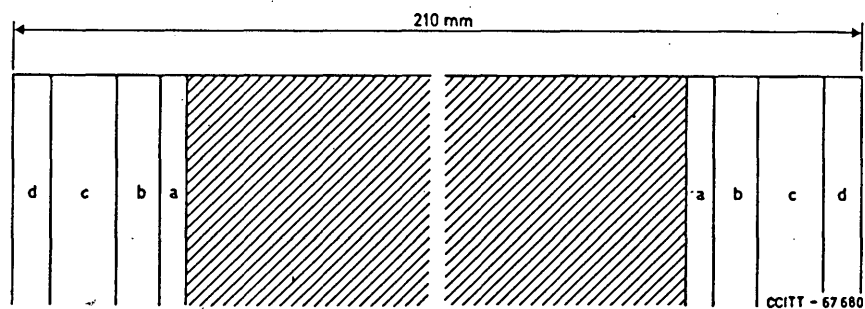
*Note 3* - All calculations were done using worst case values. Using nominal values increases the reproducible area.

*Note 4* - The exact horizontal position of this area within the ISO A4 paper size as well as sizes larger than the above are subject to national recommendations and/or definitions.

*Note 5* - The call identification line is printed either above or below the guaranteed reproducible area.

FIGURE A-1/T.563

Guaranteed reproducible area for Group 4 apparatus for use on  
facsimile services referring to ISO A4 paper size



- a Printer/scanner tolerances
- b Loss caused by the enlarging effect due to TLL tolerance
- c Loss caused by skew
- d Record medium positioning errors

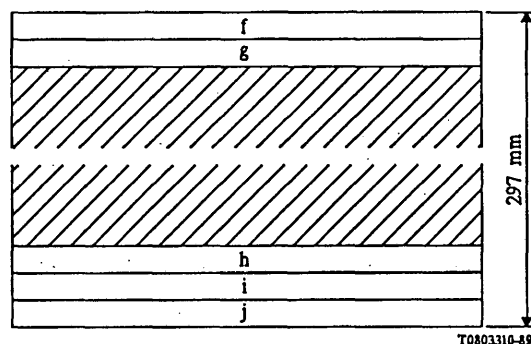
FIGURE A-2/T.563

Horizontal loss

TABLE A-1/T.563

Horizontal losses

Printer/scanner	a	$\pm 0.5$ mm
Enlarging	b	$\pm 2.1$ mm
Skew	c	$\pm 2.6$ mm
Positioning errors	d	$\pm 1.5$ mm



- f Paper insertion loss
- g Loss caused by CIL printing at the top of the page
- h Loss caused by skew
- i Scanning density tolerance
- j Gripping loss

FIGURE A-3/T.563

Vertical loss

TABLE A-2/T.563

Vertical losses

Paper insertion	f	4.0 mm
CIL printing	g	4.23 mm
Skew	h	$\pm 1.8$ mm
Scan line tolerance (see Note)	i	$\pm 2.97$ mm
Gripping loss	j	2.0 mm

*Note* - Scanning density tolerance will reduce to 0 mm on roll-fed machines

APPENDIX I

(to Recommendation T.563)

Communication environment establishment

I.1 Table I-1/T.563 summarizes the selection of communication application profile and initial session command exchange.

TABLE I-1/T.563

## Selection of communication application profile

Called Calling	G-4 Class I	G-4 Class II	G-4 Class III	Basic teletex
G4 Class I	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP (no SUD) (Calling terminal: disconnect)
G4 Class II	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP (no SUD) (Calling terminal: disconnect)
G4 Class III	T.522 CN <sup>a)</sup> /RSSP T.521 selection (fall-back)	T.522 CN/AC	T.522 CN/AC	T.522 CN <sup>a)</sup> /RSSP T.62 selection
Basic teletex	T.62 (no SUD) CSS/RSSN (calling terminal: disconnect)	T.62 (no SUD) CSS/RSSP	T.62 (no SUD) CSS/RSSP	T.62 (no SUD) CSS/RSSP

CN CONNECT SPDU defined in Recommendation X.225

AC ACCEPT SPDU defined in Recommendation X.225

- a) When interworking with Recommendation T.62 based equipment, service identifier parameter defined in Recommendation T.62 is present in the CONNECT SPDU.

I.2 Some examples of the session establishment phase are as follows:

I.2.1 In case of Group 4 Class I terminal calling (see Figure I-1/T.563)

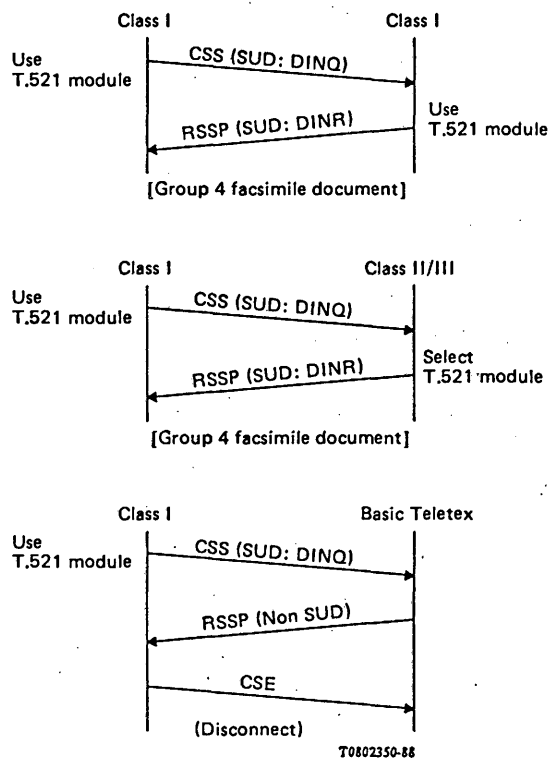


FIGURE I-1/T.563



I.2.2 In case of Group 4 Class II terminal calling (see Figure I-2/T.563)

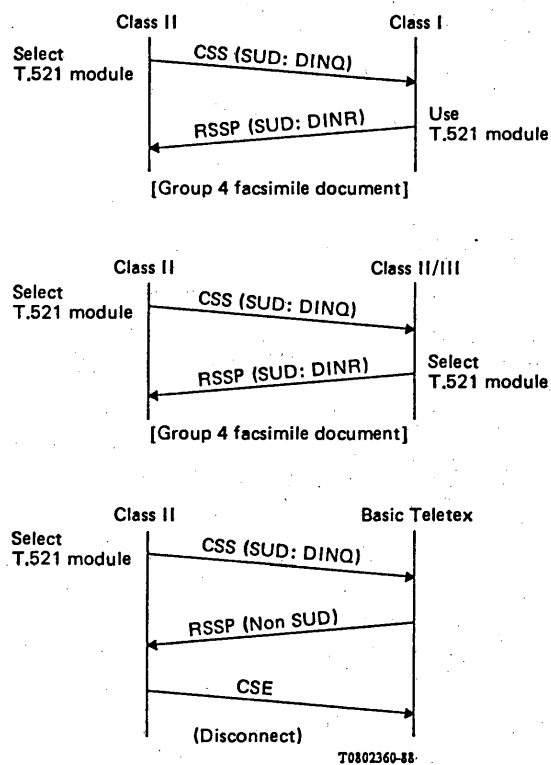


FIGURE I-2/T.563

I.2.3 In case of Group 4 Class III terminal calling (see Figure I-3/T.563)

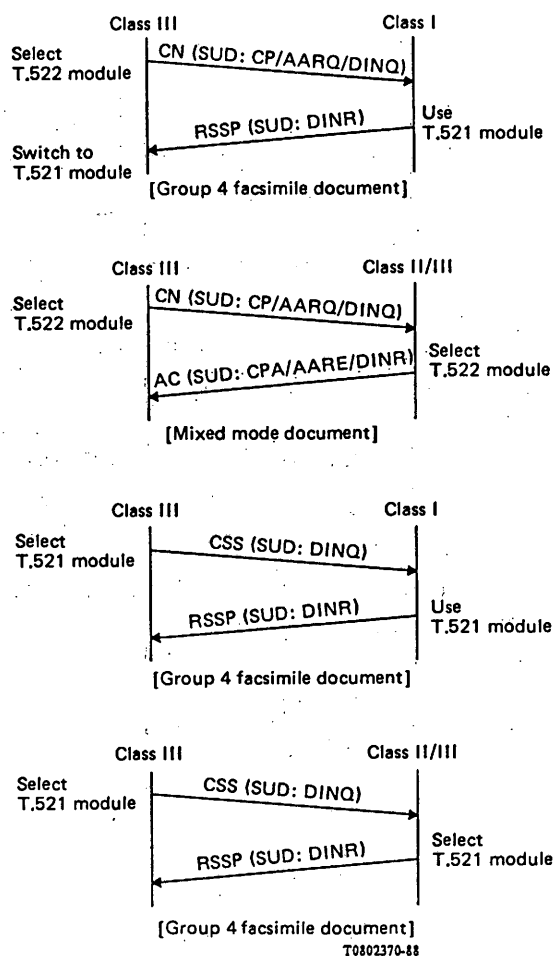


FIGURE I-3/T.563 (sheet 1 of 2)

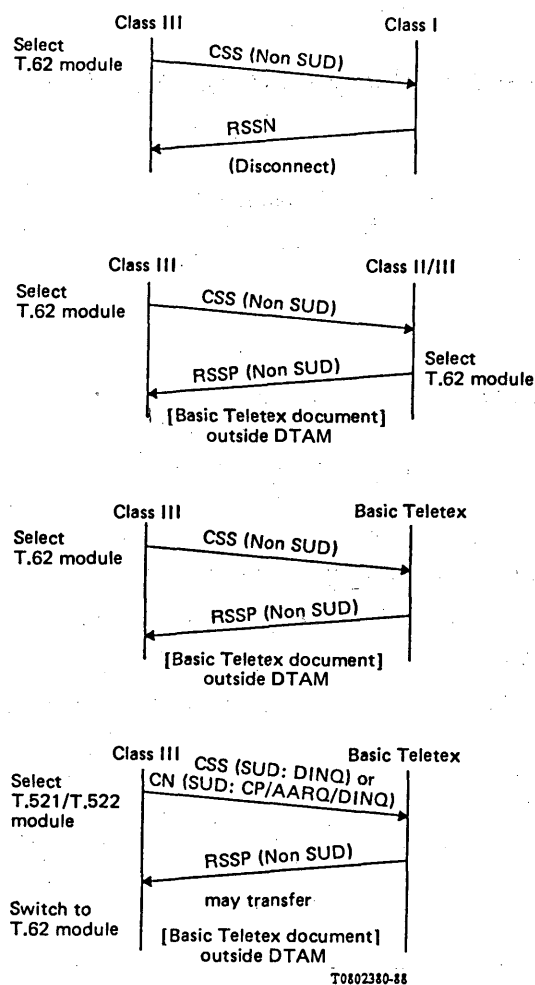


FIGURE I-3/563 (sheet 2 of 2)

I.2.4 In case of basic teletex terminal calling (see Figure I-4/T.563)

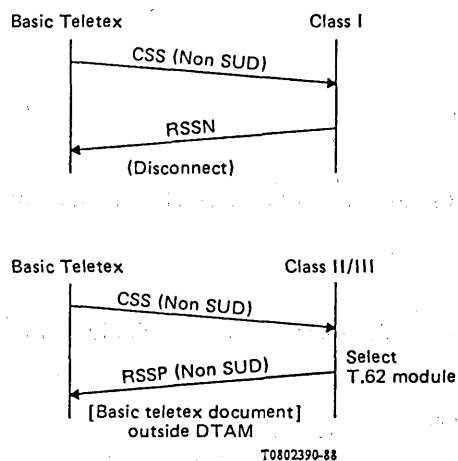


FIGURE I-4/T.563

## GATEWAY CHARACTERISTICS FOR VIDEOTEX INTERWORKING

### CONTENTS

- 1 *Introduction*
- 2 *Scope and field of application*
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- 8 *Use of lower layer services*
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- 10 *Videotex structure*

#### 1 **Introduction**

This Recommendation specifies gateway characteristics which should be used for international videotex interworking between gateways.

This document is a part of a set of standards produced to facilitate the interconnection of national videotex services. This set of standards is positioned with respect to the open systems interconnection basic reference model (Recommendation X.200). This document lies within the field of application layer of the OSI application layer. Inside the application layer it makes use of DTAM (document transfer, access and manipulation) specific application service element (Recommendation T.400).

#### 2 **Scope and field of application**

This Recommendation applies to the international videotex interworking between gateways as specified in this section.

##### 2.1 *National videotex services*

It is the responsibility of Administrations to decide the configuration of the national videotex services.

##### 2.2 *Videotex interworking definition*

*Videotex interworking* allows a videotex terminal pertaining to a given videotex service of a given country to interact in real time with a videotex host computer located in a different country. This videotex host may be either a videotex center of an external computer.

### 2.3 *Relation to other Recommendations*

Videotex interworking gateway characteristics are based upon concepts of DTAM defined in T.400 Series of Recommendations.

Videotex interworking is conform to the videotex service defined in Recommendation F.300 and it is specified by the following profiles:

- a document application profile specified in Recommendation T.504;
- a communication application profile specified in Recommendation T.523;
- an operational application profile specified in Recommendation T.541.

General concepts of the international videotex interworking and the data syntaxes relevant for the videotex interworking are defined in Recommendation T.101.

### 3 **References**

- Rec. F.300: Videotex service
- Rec. X.200: Reference model of open systems interconnection for CCITT applications
- Rec. X.213: Network service definition for open systems interconnection for CCITT applications
- Rec. X.214: Transport service definition for open systems interconnection for CCITT applications
- Rec. X.224: Transport protocol specification for open systems interconnection for CCITT applications
- Rec. X.215: Session service definition for open systems interconnection for CCITT applications
- Rec. X.225: Session protocol specification for open systems interconnection for CCITT applications
- Rec. X.216: Presentation service definition for open systems interconnection for CCITT applications
- Rec. X.226: Presentation protocol specification for open systems interconnection for CCITT applications
- Rec. X.217: Association control service definition for open systems interconnection for CCITT applications
- Rec. X.227: Association control protocol specification for open systems interconnection for CCITT applications
- Rec. T.101: International interworking for videotex services
- Rec. T.400 (1988): Introduction to document architecture, transfer and manipulation
- Rec. T.411 (1988): Open document architecture (ODA) and interchange format - Introduction and general principles
- Rec. T.412 (1988): Open document architecture (ODA) and interchange format - Document structures
- Rec. T.414 (1988): Open document architecture (ODA) and interchange format - Document profile
- Rec. T.415 (1988): Open document architecture (ODA) and interchange format - Open document interchange format (ODIF)
- Rec. T.431 (1988): Document transfer and manipulation (DTAM) - Services and protocols - Introduction and general principles
- Rec. T.432 (1988): Document transfer and manipulation (DTAM) - Services and protocols - Service definition

- Rec. T.433 (1988): Document transfer and manipulation (DTAM) - Services and protocols - Protocol specification
- Rec. T.441 (1988): Document transfer and manipulation (DTAM) - Operational structure
- Rec. T.504: Document application profile for videotex interworking
- Rec. T.523: Communication application profile DM-1 for videotex interworking
- Rec. T.541: Operational application profile for videotex interworking

## 4 Definitions

The following definitions apply to all other parts of the Recommendation.

This Recommendation makes use of the following terms as they are defined in Recommendation F.300:

- videotex access point;
- videotex frame;
- videotex gateway;
- videotex host;
- videotex service;
- videotex service center;
- videotex terminal;
- videotex user.

This Recommendation makes use of the following terms as they are defined in Recommendation T.400:

- attribute;
- content portion;
- page;
- block;
- specific layout structure;
- subordinate.

## 5 Abbreviations

ACSE	Association control service element
CASE	Common application service elements
DDA	Defined display area
DTAM	Document transfer, access and manipulation
OSI	Open systems interconnection
SASE	Specific application service element
SE	Structure element
VIA	Videotex interworking architecture

## 6 Model of the communication between local and external host

### 6.1 International videotex interworking between gateways

Videotex interworking may take place between videotex services in different countries, independently from the national configuration being used. An abstract configuration model has been established in Recommendation F.300 to represent an international videotex interworking configuration using gateways. In this abstract model, each cooperating country is represented by a videotex gateway. The DTAM protocol is intended to be used between the two gateways. Consequently a typical communication may be described as shown in Figure 1/T.564.

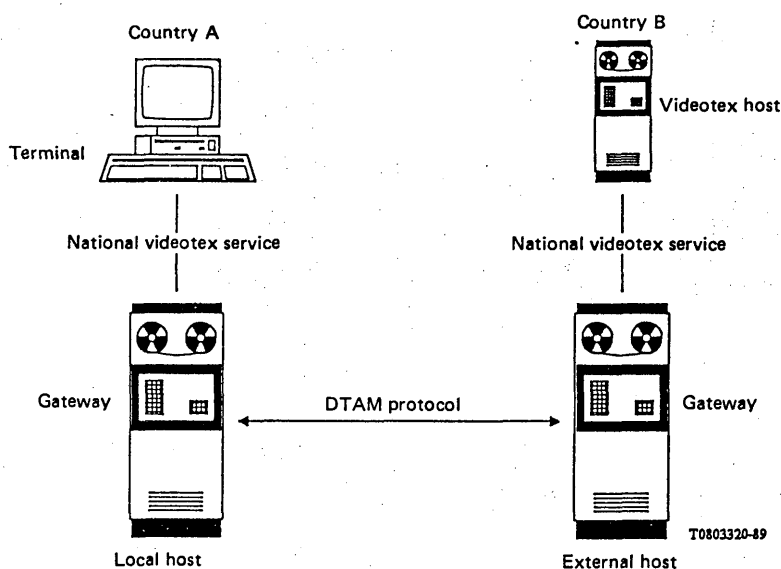


FIGURE 1/T.564

The abstract model is not intended to be implemented as such. It is the responsibility of Administrations to decide how a gateway may be implemented.

Throughout this document, and for a given terminal to videotex host communication, the gateway which supports the videotex terminal through its own national videotex service is called local host. On the other hand, the gateway which supports the videotex host through its own national videotex service is called external host.

### 6.2 Position of videotex interworking relative to OSI

Videotex interworking between gateways is specified in a set of Recommendations (see § 2.3) which are a part of the OSI application layer as defined by the OSI reference model (Recommendation X.200).

Videotex interworking between gateways handles a specific architecture called videotex interworking architecture (VIA), conforming to DTAM document structures (T.410 Series of Recommendations) and DTAM operational structure (T.440 Series of Recommendations), and makes use of services and protocol provided by DTAM (T.430 Series of Recommendations).

Videotex interworking gateway characteristics are specifying the general concepts of handling the VIA. The application profiles are specifying the use of DTAM document structures, DTAM operational structures, and DTAM service and protocol.

Figure 2/T.564 depicts this situation:

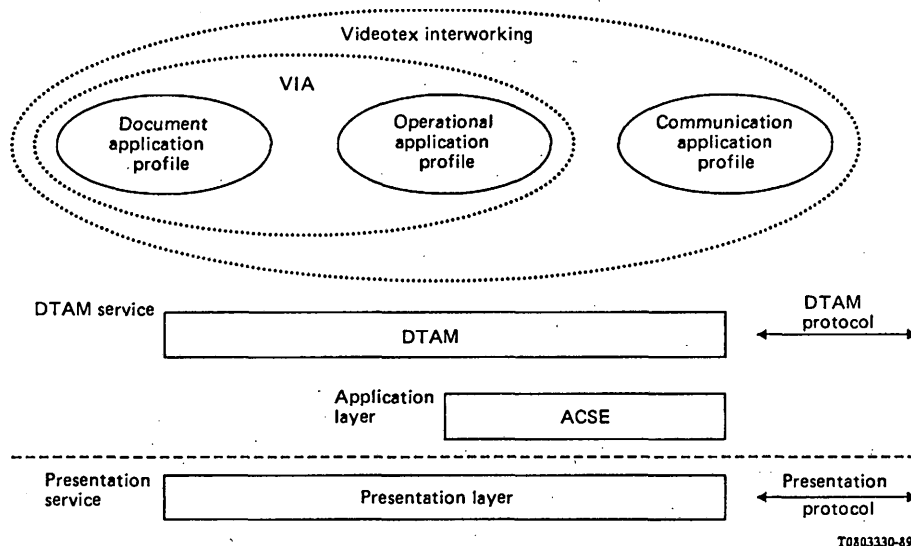


FIGURE 2/T.564

### 6.3 Organization of the videotex interworking

The videotex interworking application process consists of two parts which are in charge respectively of:

- managing the communication with the peer entity;
- supporting the local application process.

The videotex interworking architecture (VIA), the DTAM service and the DTAM protocol correspond to the communicating part of the application process and represent those aspects of the application process which are pertinent to OSI.

The VIA is a virtual data structure with a set of possible actions that can be performed on it. This structure is used to represent the current state of the communication between the two application processes.

Any operation on VIA must be reported to the peer entity and to the videotex service user. These operations are reported to the peer entity by using the DTAM service which is provided by the DTAM protocol.

Therefore, any action on the VIA implies:

- an update of the local VIA;
- the exchange of DTAM protocol elements in order to update accordingly the peer VIA.

The local application process may also be expressed in terms of a videotex service which is offered on a national basis to a human user. This local application process is in charge of the mapping between the videotex service and the DTAM service.

*Note* - Figure 3/T.564 is for information on the videotex interworking organization only.



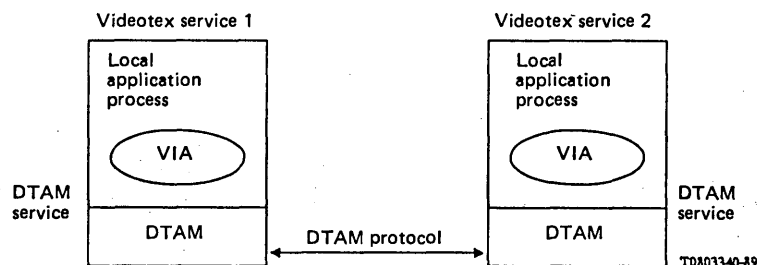


FIGURE 3/T.564

## 7 Relation between videotex and DTAM service (see Figure 4/T.564)

This section does not form an integral part of this Recommendation.

The local application process is in charge of the local mapping between the communicating OSI environment and the videotex service as defined by a given Administration. On the local host side, the local application process is in charge of converting the local host to external host dialogue into a videotex user dialogue. On the external host side, the local application process is in charge of converting the external host to local host dialogue into a national videotex host access dialogue.

The two local application processes are able to communicate on an international basis by updating both their own and the peer entity VIA, which represents the common view of the communication as seen by both partners. To indicate that a VIA update is needed, the local process may express all the VIA modifications as DTAM service elements through the DTAM service interface. Any modification of the VIA must be reported to both the local and the remote users.

When receiving a DTAM service primitive, the VIA is updated and the receiving local application process takes the updating into account.

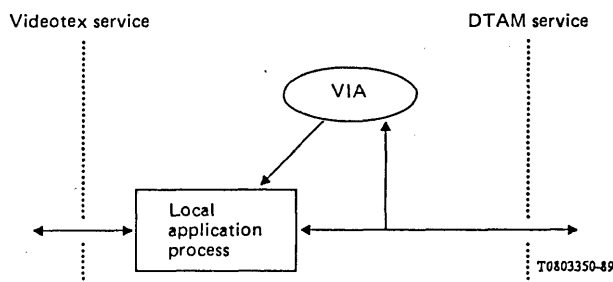


FIGURE 4/T.564

For a given definition of a videotex service, several local application processes may exist with different levels of complexity. For example, a given local application process may not take into account the existing VIA, or for each new frame to be displayed, delete the existing VIA and create a brand new one. A more clever local application process may, on its own, take care of the previous VIA and express through the DTAM service interface the sole modification of the VIA.

It is up to the Administrations concerned to define all the details of the local application process to communicate through the DTAM service, which supports the local application process.

## 8 Use of lower layer services

The use of lower layer services is specified in Recommendation T.101.

## 9 General structure of the VIA

### 9.1 General data structure

The following list is a basic set of requirements for the properties of a general data structure handled by the videotex interworking gateway.

Videotex interworking is an application profile on top of DTAM and the videotex interworking architecture (VIA) is in line with the general structuring principles defined in Recommendation T.400.

The VIA consists of a document profile, an operational profile and five data structures:

- a specific layout structure: the display structure;
- four operational structures which are used to carry:
  - 1) the data entry structure;
  - 2) the application control memory structure;
  - 3) the administrative structure;
  - 4) the special terminal facilities structure.

*Note* - Only one operation profile is used for the four concerned operational structures.

The data structure is composed of structure elements (SE) which can be manipulated independently as long as the protocol and other dependency rules are observed.

The state of the VIA is determined by the states of all the elements of the VIA and the relationship between them.

The station of the VIA expresses the current state of communication between the two partners.

Manipulations of the structure elements of the VIA are specified as VIA operations and mapped to DTAM service elements.

### 9.2 Attributes

The categories of SE attributes are:

- a) identification attributes which specify the type of the SE and identify individual SE;
- b) application defined attributes which are only meaningful for the videotex interworking architecture;
- c) specific attributes which depend on the SE type;
- d) default-value attributes which specify values to be used in identified SE types at lower level in the hierarchy;
- e) reference attributes which specify the relation between SEs.

#### 9.2.1 Identification attributes

The identification attributes are the object type and object identifier attributes defined in Recommendation T.412 and in Recommendation T.441 (resp. Annex A to Recommendation T.541).

### 9.2.2 *Application defined attributes*

Application defined attributes are attributes specified within this Recommendation for the structure elements of the VIA, with non-equivalent attributes within the T.400 Series of Recommendations. They are either mapped to the attribute "application comments" specified in Recommendation T.412 (for attributes pertaining to the display structure) or mapped on the "application defined attribute list" specified in Recommendation T.441 (for attributes pertaining to one of the four other VIA data structures). The mapping is specified in Recommendation T.504 or in Recommendation T.541 respectively.

### 9.2.3 *Specific attributes*

These attributes are depending on the SE-type. Examples of specific attributes are attributes specifying the position or the dimension of the text. These attributes are defined in Recommendation T.412.

### 9.2.4 *Default value attributes*

Since no generic structure, neither object class specification, nor styles are used for the VIA, the values of defaultable attributes may only be derived from either standard default values specified for the VIA (in a relevant CCITT Recommendation) or from a default value list. A default value list may only be used at the highest level of hierarchy in a given data structure.

Therefore, to determine the value of an attribute classified as defaultable the priority order is:

- 1) attribute values specified explicitly in the attribute list of the SE itself;
- 2) attribute values specified in the "default value list" attributes of the SE situated at the highest level of hierarchy in the considered data structure;
- 3) the default value derived from the document profile (see Recommendation T.504) or from the operational application profile (see Recommendation T.541);
- 4) the default value defined in Recommendation T.412 or Recommendation T.441 (resp. Annex A to Recommendation T.541).

### 9.2.5 *Reference attributes*

Reference attributes specify the relationships between the SEs aside from the tree-structure. Reference attributes are specified in Recommendation T.441 (resp. Annex A to Recommendation T.541). The use of the reference attribute is specified in this Recommendation.

## 9.3 *General VIA operation*

The VIA data structure is partly initialized at the connection establishment time. A number of SEs are implicitly created (see Annex A).

The VIA is then created and modified by a series of general VIA-operations on SEs. All the VIA operations provoke:

- a modification of the local VIA;
- the exchange of DTAM primitives specifying which VIA operations are to be performed on the remote VIA. Recommendation T.523 specifies the mapping of the general VIA operations onto the relevant DTAM operations and the rules for the use of the DTAM service.

After reception of an indication primitive from the DTAM service the VIA is updated and the VIA operations are indicated to the local videotex service user.

The general VIA operations to be performed on the SEs are:

- a) CREATE: the creation of an SE;
- b) DELETE: the deletion of an SE and all its subordinate SEs;
- c) MODIFY: the modification of attributes of an SE;

*Note* - Use of MODIFY operation to add text to both content information attribute of text-unit and operational element content attribute is for further study.

- d) REBUILD: the deletion of an SE and its subordinates followed by the creation of a new SE replacing the previously deleted one. This is for further study.
- e) CALL MEMORY: the invocation of predefined or stored sequences of VIA operations.

A DTAM service primitive addressing a particular SE has influence on the existence of that SE (CREATE, DELETE) or on the attributes of the SE (MODIFY).

## 10 Videotex structure

The videotex structure consists of a document profile, an operational profile and the following structures:

- *The display structure (layout structure)*

It contains informations concerning the layout and informations to be displayed. In the VIA the display structure is represented by the DOCUMENT-SE and the subordinate SEs of the DOCUMENT-SE.

- *Four operational structures*

- 1) *The data entry structure*

It provides the user with a flexible means of entering data. It contains elements for describing the layout of fields, for storing data and for describing the reaction to various user inputs. It is represented in the VIA by the DATA-ENTRY-SE and its subordinate SEs.

- 2) *The application control memory structure*

It is used to store VIA operations which can be repeatedly invoked. It is represented in the VIA by the APPLICATION-CONTROL-MEMORY-SE and its subordinate SEs.

- 3) *The administrative structure*

It copes with informations such as accounting and identification and is represented in the VIA by the ADMINISTRATIVE-INFORMATION-SE and its subordinate SEs.

- 4) *The special terminal facilities structure*

It is used to handle data necessary to set the terminal in a special state. This data is sent to the terminal before the actual "display data" is sent (e.g. character of dynamically redefinable character set). It is represented in the VIA by the SPECIAL-TERMINAL-FACILITIES-SE and its subordinate SEs.

### 10.1 Display structure

#### 10.1.1 Overview of the display structure

The display structure is concerned with the data to be displayed on the videotex terminal. The following paragraphs only describe the elements specific to the display structure. The text of a document to be displayed on a screen can be separated into various parts in order to:

- distinguish between presentation units (such as areas on the screen) or logical units and the rest of the screen;
- use of different types of coding;
- allow some parts of the screen to be protected or scrolled;
- allow some parts of the screen to be updated independently from the rest of the screen and have a longer or shorter life than other parts.

This separation introduces a subimage concept which allows different logical and independent areas to be recognized within the screen. These subimages can be:

- updated independently;
- coded independently;
- organized in order to take care of application requirements.

The subimage concept also allows:

- to clearly separate data entry and display areas;
- to compose a screen via a library of subimages;
- to store subimages independently of the final position on the screen.

The display structure consists of:

- one DOCUMENT-SE;
- one PAGE-SE describing the page structure which is used to display videotex frames;
- one or more BLOCK-SEs subordinate to the page;
- at most one content portion subordinate to each block.

Figure 5/T.564 describes the hierarchy of the display structure elements.

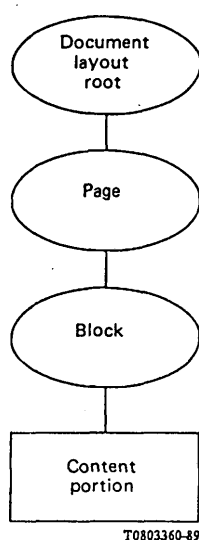


FIGURE 5/T.564

In the context of videotex interworking between gateways, a page is a rectangular area that correspond to the interchanged defined display area (DDA). A page is always a composite object.

Blocks are immediately subordinate to a page. Blocks are rectangular areas. Block-size is restricted to be equal to the page. The use of block-size not equal to page is for further study.

All constituents of the display structure conform the definitions of the document structures as specified in T.400 Series of Recommendations.

The document application profile defined in Recommendation T.504 specifies details on the document profile and the display structure for the videotex interworking between gateways.

#### 10.1.2 *Application defined attributes*

This section identifies specific attributes used by the videotex interworking gateway which do not influence the layout process as defined in T.400 Series of Recommendations. These attributes have no direct equivalent in Recommendation T.412 and are mapped to the attribute "application comments".

#### 10.1.2.1 *Write-access attribute*

This attribute is associated with each SE. The specification of this attribute is valid for all structures of the VIA. Its value is used to control the independent manipulation of the SE by any of two communicating hosts (local and external), specifying which host may, at any time:

- modify the attributes of the SE;
- delete or create subordinates SEs.

This attribute also specifies the way how the write access may be transferred between the two hosts.

This attribute is introduced for further structuring and controlling of the dialogue. This is for further study.

#### 10.1.2.2 *Display-indication*

This attribute identifies if the block is to be displayed or not. It may take the value "mandatory" or "optional".

If the value "mandatory" is selected, then the block is to be displayed, even if the user types ahead.

If the value "optional" is selected, then the local host may decide not to display the block when the user types ahead.

All "mandatory" blocks within the page must be displayed.

### 10.2 *Data entry structure*

#### 10.2.1 *Overview of the data entry structure*

The data entry structure is used to represent the data entry function. This function is sometimes also referred to as data collection function. It allows for a controlled entrance of user supplied information in a truly distributed environment between the local and external hosts. In order to prevent exchange of data through the network for each elementary action of the user, several dialogue steps have to be considered between the local and external host:

- a) In the first dialogue step, the external host defines a data entry program which describes all the actions the local host must follow when the user enters data. This data entry program contains the description of the form, i.e. the description of the different areas of the screen where entry will be performed. It also contains the reactions to user's inputs the local host has to follow. These reactions, called rules, contain e.g. the list of allowed character, the type of echo to be performed, the list of possible commands, etc. Moreover, a guidance message, called prompts, may be associated with each field. These messages are displayed each time the cursor reaches or leaves the corresponding field in order to give to the user some information about the filling of the form;
- b) When the local host then receives the run (in the case of duplex mode) the local host immediately sends it back to external host. It executes the defined data entry program till encountering an event which provokes the termination of the entry. This event must be one of the termination reasons defined by the external host and correspond either to a valid user command or to the running out of a time out or to the entire filling of a field. The termination reason is reported back to the external host as the second dialogue step. According to the regulations of the videotex service at the local host side, the report may or may not contain the data entered by the videotex user.

#### 10.2.2 *Data entry structure description (see Figure 6/T.564)*

The data entry structure consists of:

- a) one DATA-ENTRY-SE;
- b) subordinate to the DATA-ENTRY-SE:
  - zero, none or more FIELD-SEs;
  - one DATA-ENTRY-PROGRAM-SE;
  - one or more RULES-SEs;
  - zero, one or more PROMPT-SEs;
  - one RESULT-SE;

- c) a single content portion subordinate to a FIELD-SE;
- d) a single content portion subordinate to RESULT-SE;
- e) one or more DATA-ENTRY-SUBPROGRAM-SEs subordinate to the DATA-ENTRY--PROGRAM-SE;
- f) a single content portion subordinate to a PROMPT-SE.

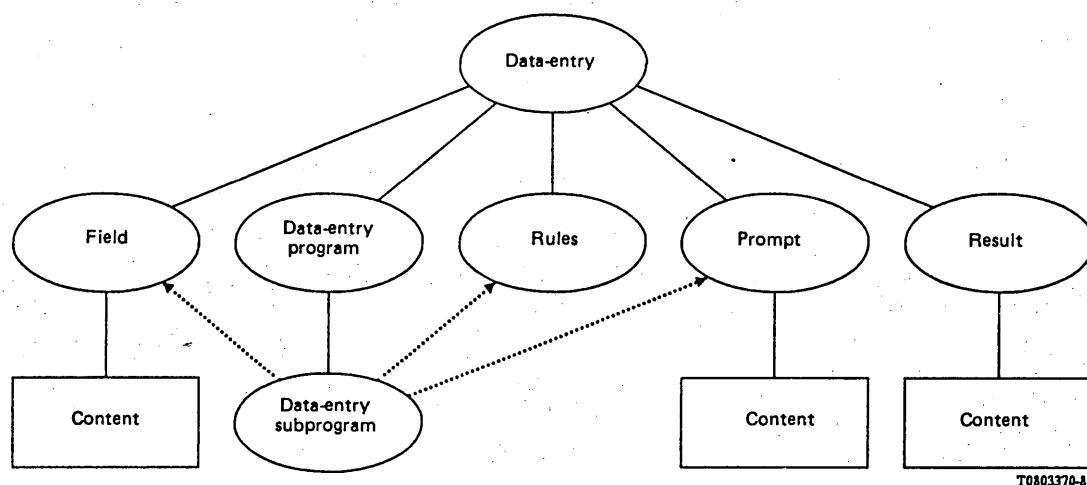


FIGURE 6/T.564

### 10.2.3 Modes of communication

Two modes of communication between local and external host are defined:

- alternate mode;
- duplex mode.

The communication between local and external host may be based on the alternate mode, on the duplex mode, or on both modes.

If the communication is based on the alternate mode, the local host should support data entry type 1, type 2 and type 3.

If the communication is based on the duplex mode, the local host should support data entry type 4.

If the communication is based on both modes, the local host should support all types of data entry.

The mode of communication is negotiated in the DTAM association initialization phase. Details are specified in Recommendation T.523.

### 10.2.4 Types of data entry

The four different types of data entry program which have been identified, are corresponding to different types of applications and different characteristics of fields:

#### a) Type 1 - Information retrieval

This type makes use of a single implicit information retrieval field which is always present when data entry type 1 is selected. The position and dimensions of the field are determined by the host, generally corresponding to an area located in the bottom part of the screen. Consequently, non-specific FIELD-SE must be used and the reference-to-a-FIELD-SE attribute of the DATA-ENTRY-SUBPROGRAM-SE may be set to undefined or not be taken into account if defined. When the user has terminated the data entry, the

information which is sent back to the external host consists of the RESULT-SE which describes all the conditions encountered when the entry is stopped (termination reason, ...). The text associated with the termination reason, if any, is sent to the external host via the content portion associated with the RESULT-SE.

b) *Type 2 - Data collection*

This type generally corresponds to a form type of entry and makes use of one or more fields entirely defined by the external host. Moreover, in some videotex services, a single implicit information retrieval field may also be associated with this entry type to enter a videotex command (see § 10.2.12.8.1). When the user has terminated the data entry, the information which is sent back to the external host are the content portions associated with the fields and the RESULT-SE. The text associated with the termination reason, if any, is sent to the external host via the content portion associated with the RESULT-SE.

c) *Type 3 - Data entry "on the fly"*

This type makes use of a single implicit field which is always present when data entry type 3 is selected. The position and dimensions of this implicit field are determined by the cursor position after the display of the information sent by the external host. Consequently, no specified FIELD-SE is used and reference-to-a-FIELD-SE attribute of the DATA-ENTRY-SUBPROGRAM-SE may be set to undefined and should not be taken into account when defined. The size of the field is fixed to 128 bytes. When the user has terminated the data entry, the information which is sent back to the external host consists of the RESULT-SE. The text associated with the termination reason, if any, is sent to the external host via the content portion associated with the RESULT-SE.

d) *Type 4 - Duplex data entry*

This type makes use of a single implicit field which is always present when data entry type 4 is selected. The position and dimensions of this implicit field are determined by the current cursor position. Consequently, no specific FIELD-SE is used and reference-to-a-FIELD-SE attribute of the DATA-ENTRY-SUBPROGRAM-SE may be set to undefined and should not be taken into account when defined. The size of the field is fixed to 128 bytes. When the user has terminated the data entry, the information which is sent back to the external host consists of the RESULT-SE. The text associated with the termination reason, if any, is sent to the external host via the content portion associated with the RESULT-SE.

## 10.2.5 DATA-ENTRY-SE

This is the SE at the highest level of the data entry structure. Only one DATA-ENTRY-SE may be defined at a given time.

## 10.2.6 DATA-ENTRY-PROGRAM-SE

This SE is subordinate to the DATA-ENTRY-SE. At a given time, one and only one DATA-ENTRY-PROGRAM-SE may be subordinate to the DATA-ENTRY-SE. A data entry program performs a data collection function on a form. A form corresponds to a screen structured into none, one or more fields where the user may enter data.

The following attribute is mapped to the reference attribute defined in Recommendation T.441 (resp. Annex A to Recommendation T.541).

### 10.2.6.1 First-subprogram

This attribute is set by the external host to indicate to the local host the reference to the first data entry subprogram to be executed. However if the local host is not able to start with the indicated first subprogram the local host may fall back to process the subprograms in the natural order of the SE-identifiers.

The application defined attributes of the DATA-ENTRY-PROGRAM-SE are the following:

### 10.2.6.2 Data-entry-type

This attribute is specified by the external host to indicate which interpretation the local host has to perform in order to be able to support the entry. This attribute may take the value type 1, 2, 3 or 4. The value indicates which type of data entry has to be performed.



*Remark on the control of the user input*

In the general situation of an international videotex interworking the following attributes, specified to allow local hosts to control the users' input, may not be supported by some local hosts. In these cases no checking of the relevant attributes will be performed by the local host.

**10.2.6.3**     *Allowed-characters-for-a-keyword-access-command*

This attribute set by the external host indicates whether the list of characters represents the allowed or forbidden characters.

Possible values:     Yes: means allowed characters in the list;  
                         No: means forbidden characters in the list.

This attribute is not taken into account if the D1 d command is disabled.

**10.2.6.4**     *Character-list-for-keyword-access*

This attribute set by the external host contains a list of allowed or forbidden characters for keyword access. The list is encoded according to T.51 plus "space".

This attribute is not taken into account if the D1 d command is disabled.

**10.2.6.5**     *Max-length-keyword-access*

This attribute set by the external host specifies the maximum length of the input field for keyword access.

**10.2.6.6**     *Allowed-character-for-a-direct-access-command*

This attribute indicates whether alphabetic characters (a, b, ... z) may be used inside a direct access command. This attribute is defined by the external host but not taken into account if the D1 b command is disabled.

Possible values:     Yes: means alphabetic characters are allowed;  
                         No: means alphabetic characters are not allowed.

**10.2.6.7**     *Max-length-direct-access*

This attribute set by the external host specifies the maximum length of the direct access input.

**10.2.7**     *RESULT-SE*

The RESULT-SE is subordinate to the DATA-ENTRY-SE. At a given time only one RESULT-SE may be subordinate to the DATA-ENTRY-SE.

The following attribute is mapped to the reference attribute defined in Recommendation T.441 (resp. Annex A to Recommendation T.541).

**10.2.7.1**     *Last subprogram*

This attribute set by the local host reflects the reference to the data entry subprogram currently being executed when a termination reason was detected. Some local hosts may not be able to update this attribute when the user aborts the filling of the form. Consequently, this attribute may be left undefined when the termination reason is D17.

The application defined attribute of the RESULT-SE is the following:

**10.2.7.2**     *Termination reason*

This attribute set by the local host indicates the reason which provoked the termination of the data entry. This reason may be either a valid command, the entire filling of the field or the expiration of a time out.

**10.2.8**     *Result content portion*

This content portion set by the local host and reported in some cases to the external host if the termination reason attribute of the RESULT-SE corresponds to a command with parameter: D1.

The result content portion makes use of the attribute operational element content type (see Recommendation T.441, resp. Annex A to Recommendation T.541), as follows:

#### 10.2.8.1 *Type of coding*

This attribute is set by the local host and specifies the coding used to represent the content and may take one of the following values:

- T.50 (IRV);
- T.51 "plus space".

The result content portion makes use of the attribute operational element content (see Recommendation T.441, or Annex A to Recommendation T.541), as follows:

#### 10.2.8.2 *Content information*

This attribute is set by the local host to report the text associated with the termination-reason attribute of the RESULT-SE, if any.

#### 10.2.9 *FIELD-SE*

A field is used to define a subimage where user inputs are to be echoed. It is used by the local host for reporting to the external host user inputs. It may also be used by the external host to describe a subimage or to set initial data into an entry area. A FIELD-SE is subordinate to a DATA-ENTRY-SE. At a given time, several FIELD-SEs may be subordinate to a DATA-ENTRY-SE.

The application defined attributes of the FIELD-SE are the following:

##### 10.2.9.1 *Field layout*

This attribute specifies the layout characteristics of the field. A field is described as a sequence of rectangular areas called hereafter field-blocks. Each field-block is described by its position (X, Y) and its dimensions (DX, DY).

##### *Remarks on the use of system fields*

The system field facility is an optional function provided by a videotex service. A system field is a data collection field in which predetermined type of data is filled in by the videotex service or by the user.

When using system fields in an international connection it has to be taken into account that a general user identification mechanism based on the ongoing work on ACSE and the use of association (D-INITIATE service) is for further study, and that the harmonization of the concerned type of data with other telematic services is still under study.

It is up to the Administrations to decide to set up or not the system field facility.

The implementation and use of the above system fields in international connections may be subject to legal restrictions (e.g. consumer privacy) that may be in effect nationally or internationally.

Services which do not support the system field facility will ignore all the associated protocol items and consider all the system fields as normal data collection fields.

The international availability of this data or parts of it may be subject to legal restrictions or restrictions imposed by users or Administrations.

##### 10.2.9.2 *Field-type*

This attribute is set by the external host to indicate whether or not the field is a system field. A system field is a field that should be filled in by the local host system itself and not by the user. If this attribute has the value "0" then the field is to be completed by the user - i.e. a normal data collection field. A non-zero value indicates that (if possible) the local host should complete the field with system data as follows:

- 1 Country code
- 1a National telephone number
- 2 Subscriber No.
- 2a Co-user-suffix
- 2b User No.
- 3 Subscriber title
- 4 Subscriber name
- 5 Additional name
- 6 Street

- 7 Town
- 8 Postcode
- 9 Date
- 10 Time
- 11 Date and time

*Note* - Local hosts which do not support system fields regard all system fields as marked with a zero value.

If on the other hand an external host does not support system fields, local hosts requiring this attribute are defaulting the value of the field-type attribute to "0".

#### 10.2.9.3 *Protected*

This attribute is only meaningful for system fields. For those local hosts which are not able to process system fields, this attribute is not taken into account.

This attribute indicates whether or not the system field may be modified by the user. The value "yes" indicates that the local host must prevent the user from modifying the contents of the field.

#### 10.2.9.4 *Data-source*

This attribute is only meaningful when the field-type attribute is used, the value is not equal to "0" and the protected attribute has the value "not protected".

This attribute can have the values "local host" and "user" to indicate whether the data returned to the external host was supplied by the local host or by the user.

#### 10.2.9.5 *Field-text-marking*

This attribute specifies the visual appearance on the terminal of the contents of the field. The following values have been identified:

a) "explicit" means that a value for one or more of the following attributes:

- foreground colour;
- background colour;
- underlining;
- flashing;
- reverse video;

may explicitly be defined by the external host.

b) "keep current attributes" means that the value of the foreground colour, background colour, underlining, flashing and reverse video are then those naturally defined by positioning the cursor in the field.

In both cases, this attribute is applied by the local host as far as possible but the local host may ignore it.

#### 10.2.10 *Field content portion*

This content portion is used when data entry type 2 is selected. The field content portion makes use of the attribute operational element content type (see Recommendation T.441, or Annex A of Recommendation T.541) as follows:

##### 10.2.10.1 *Type of coding*

This attribute may be set either by the external or local host and specifies the coding used to represent the content and may take one of the following values:

- T.50 (IRV);
- T.51 "plus space"

The field content portion makes use of the attribute operational element content (see Recommendation T.441, or Annex A of Recommendation T.541) as follows:

#### 10.2.10.2 *Content information*

This attribute may be set either by the external or by the local host and represents the contents of the field. The correspondence between the content information and the different field-blocks of the field is given by the defined order of these field-blocks in the layout attribute of the FIELD-SE, regardless of the relative position of these parts with respect to the screen.

When set by the external host, this attribute represents the initial content of the field.

When set by the local host, this attribute represents the data entered by the user.

#### 10.2.11 *DATA-ENTRY-SUBPROGRAM-SE*

The DATA-ENTRY-SUBPROGRAM-SE is subordinate to the DATA-ENTRY-PROGRAM-SE. Each data entry subprogram applies to one and only one field. There are as many subprograms as fields in the form; consequently, depending on the complexity of the form, one or more data entry subprograms may be defined at the same time.

The following attributes are mapped to the reference attribute defined in Recommendation T.441 (or in Annex A to Recommendation T.541).

##### 10.2.11.1 *Reference-to-a-RULES-SE*

This attribute points to a RULES-SE. This attribute cannot take the value "undefined" and must be defined either explicitly or via the default value list mechanism.

##### *Remark on the use of prompts*

Prompts are guidance messages that may be associated with each data entry subprogram and are described by the corresponding PROMPT-SEs. Zero, one or two prompts may be associated with each data entry subprogram. If no prompt is associated, both of the relevant reference attributes will not be defined and no prompt message is to be displayed. It is up to the external host to use only a prompt-in or a prompt-in and a prompt-out. On the other hand some local hosts may not support the use of a prompt-out and consequently will ignore the relevant attribute and automatically erase the prompt-in.

##### 10.2.11.2 *Reference-to-a-PROMPT-IN-SE*

This attribute set by the external host points to a PROMPT-SE which is displayed by the local host when this data entry subprogram starts. This attribute may be set to undefined if no prompt-in message is to be displayed.

##### 10.2.11.3 *Reference-to-a-PROMPT-OUT-SE*

This attribute set by the external host points to a PROMPT-SE which is displayed by the local host when this data entry subprogram is stopped. This attribute may be set to undefined if no prompt-out message is to be displayed.

Using a prompt-in and a prompt-out instead of one prompt has not been finally discussed. This is for further study.

##### 10.2.11.4 *Reference-to-a-FIELD-SE*

The value of this attribute depends on the type of the data entry subprogram concerned (information retrieval, data collection or data entry "on-the-fly" or duplex data entry). When defined, it indicates the area in which input characters have to be echoed.

The application defined attributes of the data entry subprogram are the following:

##### 10.2.11.5 *Echo*

This attribute set by the external host specifies the type of echo to be performed by the local host. It may take one of the three values:

- normal echo: the input character is echoed;
- fixed echo: a fixed character is displayed;
- null: no echo is performed.

##### 10.2.11.6 *Echoed character*

This attribute set by the external host and taken into account only if the echo attribute is set to "fixed echo". This attribute specifies a character from the list described in Recommendation T.51 "plus space".

#### 10.2.11.7 *Echoed parameter*

This attribute set by the external host specifies the videotex attributes which should apply to the echo, if any. This attribute may specify values for one or several of the following attributes: foreground colour, background colour, underline, echo size (normal size, double high, double width, double size), flashing and reverse video.

This attribute is applied by the local host as far as possible, but the local host may ignore it.

#### 10.2.12 *RULES-SE*

This SE is subordinate to the DATA-ENTRY-SE. It describes the rules applicable to the entry in a field: list of allowed characters, list of authorized retrieval functions, etc.

The application defined attributes of the RULES-SE are the following:

##### 10.2.12.1 *Time-out*

This attribute set by the external host defines the maximum time allowed to the user to enter data. The length of time is measured in seconds. Value 0 indicates that there is no time limit imposed in seconds. Value 1 is reserved for data entry type 1 and will be interpreted by some external hosts as a request for chained frames. A value 1 should be interpreted by the local host as a normal time-out. Some local hosts may overwrite with their own value a time-out whose value is greater than 1.

Expiration of time-out provokes termination of the data entry.

##### 10.2.12.2 *Entry-invoke-character*

This attribute set by the external host defines how the empty positions of the field are filled after displaying the initial contents. The following value is identified:

- a fixed character from T.51 plus the character "space".

The visual appearance of the entry-invoke-character is controlled by the field-text-marking attribute. These characters are not entered in the field content portion and not reported to the external host.

##### 10.2.12.3 *Local editing*

This attribute set by the external host indicates that powerful editing capabilities should be performed in the associated field. Such a local editing capability defined by the local host, would allow to insert/delete character/word/line, powerful cursor movement, etc. This local editing facility is intended to be used by applications dealing with message handling.

##### *Remark on the control of the user input*

In the general situation of an international videotex interworking the following attributes (from §§ 10.2.12.4 to 10.2.12.7), specified to allow local hosts to control the users input, may not be supported by some local hosts. In those cases no checking of the relevant attributes will be performed by the local host.

##### 10.2.12.4 *Length of valid choices*

This attribute may take the value 1 or 2 depending on the size of the choice (one or two digits). This attribute is used only in data entry type 1 and not taken into account if the DI c command is disabled.

##### 10.2.12.5 *List-of-enabled-choices*

This attribute is set by the external host and specifies the list of enabled choices. This attribute is not taken into account by the local host if the DI c command is disabled. This attribute is used only in data entry type 1.

##### 10.2.12.6 *Allowed-characters* (for data collections)

This attribute set by the external host indicates if the list of characters represents the allowed or forbidden characters.

Possible values:

- "allowed": means allowed characters in the list;
- "not allowed": means forbidden characters in the list;

- "alphabetic": only alphabetic characters may be entered;
- "alphanumeric": only alphanumeric characters may be entered;
- "numeric": only numeric characters may be entered.

When this attribute does not have the value "allowed" or "not allowed", the character-list attribute must not be used or will be ignored.

This attribute is only used in data-entry-type 2.

#### 10.2.12.7 *Character-list (for data collection)*

List of characters according to the specified set in the type of coding attribute of the FIELD-SE. This attribute is set by the external host. It specifies the list of characters which may or may not be entered as user inputs in the field associated with the DATA-ENTRY-SUBPROGRAM-SE from which the RULES-SE is referred. The list of characters is encoded according to T.51 plus "space".

This attribute is only used in data-entry-type 2.

#### 10.2.12.8 *List of valid commands*

This attribute set by the external host specifies the list of commands which are enabled and then may be used as values for the termination reason attribute of the RESULT-SE. Other commands are disabled and cannot be used as value for the termination-reason attribute. However, enabling of commands does not imply that the local host is forced to support all the enabled commands. It is up to the local host to do its best to properly image some commands. Some local hosts may transform some commands into a disconnect.

##### *Abbreviations:*

E: Enabled

D: Disabled

Y: Yes

N: No

CP: Indicates if a result content portion may be associated with the command

local: Functions handled locally between the user and the local host; such functions are not exchanged on the international link between gateways. Some functions of this type may provoke a disconnect between the local and the external host.

not used: Not used for a given type of data entry.

*Note* - Further development of videotex interworking may identify a requirement to use also the commands V1, V4, V7 on the international link. This is for further study.

The following list defines the valid commands taken from the list of functions defined by Recommendation F.300.

##### a) *Type 1: Information retrieval*

<i>Termination reason</i>	<i>Command</i>	<i>Local</i>	<i>CP</i>	<i>E/D</i>
- Select an application on a videotex service	V1	Y		
- Leave the application and return to the first effective choice of the national videotex service (see Note 1)	V2	N	N	E/D
- Return to the first effective choice of the foreign videotex service	V3	N	N	E
- Leave the application and return to the point from which this application was selected	V4	Y		
- Provide billing information	V5	Y		
- Leave the videotex service (mandatory) (see Note 2)	V6	Y		
- Request service/application Id	V7	Y		

-	Declare and validate an input (see Note 3)	D1			
a)	free text input	a)	N	Y	E/D
b)	direct selection of a frame	b)	N	Y	E/D
c)	progress through a choice from one frame to another by the use of one or two digits	c)	N	Y	E/D
d)	select a frame through the use of a keyword	d)	N	Y	E/D
-	Correcting an input	D2	Y		
-	Clearing an input	D3	Y		
-	Move one step forward in the application	D4	N	N	E/D
-	Move to the next input field	D5	--	not used	--
-	Retrace the previous step	D6	N	N	E/D
-	Move to the previous field	D7	--	not used	--
-	Repeat the frame	D8	Y		
-	Repeat the updated frame	D9	N	N	E/D
-	Return to the first menu in the application	D10	N	N	E/D
-	Previous menu	D11	N	N	E/D
-	Ask for help or guidance without leaving the application	D12	N	N	E/D
-	Redisplay the initial version of the currently active form	D13	N	N	E/D
-	Redisplay the completed version of the currently active form	D14	N	N	E/D
-	Interrupt the action in progress	D15	Y		
-	Set a marker at the current point in the application for access at a later time within the same session	D16	Y		
-	Abstain from forwarding the contents of the input field	D17	--	not used	--
-	Declare valid a "set" of inputs	D18	--	not used	--
-	Time out (see Note 4)		N	N	E
-	End of field		--	not used	--

*Note 1* - If this command is not supported by the local host or if this command is disabled, then the corresponding local command is mapped to a D-TERMINATE.

*Note 2* - This command is directly mapped to a D-TERMINATE.

*Note 3* - Some local hosts may not be able to make the difference between the four D1 sub-commands and consequently may replace D1 b, D1 c and D1 d by D1 a, even if disabled.

*Note 4* - The time-out is disabled by setting its value to 0.

*Remark on the use of "good-by" frames*

- 1) The local host does not support the use of "good-by" frames: in this case the local host maps the local V2 command to a D-TERMINATE req. on the international connection.
- 2) The external host does not support the use of "good-by" frames: in this case the external host should disable the V2 command and the local host consequently maps a local V2 command to a D-TERMINATE req. on the international connection.

- 3) Both hosts are supporting the use of "good-by" frames: in this case the external host enables the V2 command. If the local host sends a V2 command to the external host, the external host may send the "good-by" frame, followed by a D-TERMINATE req.

b) *Type 2: Data collection*

<i>Termination reason</i>	<i>Command</i>	<i>Local</i>	<i>CP</i>	<i>E/D</i>
- Select an application on a videotex service	V1	Y		
- Leave the application and return to the first effective choice of the national videotex service (see Note 1)	V2	N	N	E/D
- Return to the first effective choice of the foreign videotex service	V3	N	N	E
- Leave the application and return to the point from which this application was selected	V4	Y		
- Provide billing information	V5	Y		
- Leave the videotex service (mandatory) (see Note 2)	V6	Y		
- Request service/application Id	V7	Y		
- Declare and valid an input (see Note 3)	D1			
a) free text input	a)	N	Y	E/D
b) direct selection of a frame	b)	N	Y	E/D
c) progress through a choice from one frame to another by the use of one or two digits	c)	-- not used --		
d) select a frame through the use of a keyword	d)	N	Y	E/D
- Correcting an input	D2	Y		
- Clearing an input	D3	Y		
- Move one step forward in the application	D4	N	N	E/D
- Move to the next input field	D5	N	N	E/D
- Retrace the previous step	D6	N	N	E/D
- Move to the previous field	D7	N	N	E/D
- Repeat the frame	D8	Y		
- Repeat the updated frame	D9	N	N	E/D
- Return to the first menu in the application	D10	N	N	E/D
- Previous menu	D11	N	N	E/D
- Ask for help or guidance without leaving the application	D12	N	N	E/D
- Redisplay the initial version of the currently active form	D13	N	N	E/D
- Redisplay the completed version of the currently active form	D14	N	N	E/D
- Interrupt the action in progress	D15	Y		
- Set a marker at the current point in the application for access at a later time within the same session	D16	Y		
- Abstain from forwarding the contents of the input field	D17	N	N	E/D
- Declare valid a "set" of inputs	D18	N	N	E/D
- Time out (see Note 4)		N	N	E
- End of field		N	N	E/D



*Note 1* - If this command is not supported by the local host or if this command is disabled, then the corresponding local command is mapped to a D-TERMINATE.

*Note 2* - This command is directly mapped to a D-TERMINATE.

*Note 3* - Some local hosts may not be able to make the difference between the four D1 sub-commands and consequently may replace D1 b, D1 c and D1 d by D1 a, even if disabled.

*Note 4* - The time-out is disabled by setting its value to 0.

*Remark* - See also remark to data-entry type 1.

c) *Types 3 and 4: Data entry on the fly/duplex data entry*

<i>Termination reason</i>	<i>Command</i>	<i>Local</i>	<i>CP</i>	<i>E/D</i>
- Select an application on a videotex service	V1	Y		
- Leave the application and return to the first effective choice of the national videotex service (see Note 1)	V2	N	N	E/D
- Return to the first effective choice of the foreign videotex service	V3	N	N	E
- Leave the application and return to the point from which this application was selected	V4	Y		
- Provide billing information	V5	Y		
- Leave the videotex service (see Note 2) (mandatory)	V6	Y		
- Request service/application Id	V7	Y		
- Declare and valid an input (see Note 3)	D1			
a) free text input	a)	N	Y	E/D
b) direct selection of a frame	b)	-- not used --		
c) progress through a choice from one frame to another by the use of one or two digits	c)	-- not used --		
d) select a frame through the use of a keyword	d)	-- not used --		
- Correcting an input	D2	Y		
- Clearing an input	D3	Y		
- Move one step forward in the application move to the next input field	D4	N	N	E/D
	D5	-- not used --		
- Retrace the previous step	D6	N	N	E/D
- Move to the previous field	D7	-- not used --		
- Repeat the frame	D8	Y		
- Repeat the updated frame	D9	N	N	E/D
- Return to the first menu in the application	D10	N	N	E/D
- Previous menu	D11	N	N	E/D
- Ask for help or guidance without leaving the application	D12	N	N	E/D
- Redisplay the initial version of the currently active form	D13	N	N	E/D
- Redisplay the completed version of the currently active form	D14	N	N	E/D
- Interrupt the action in progress	D15	Y		

- Set a marker at the current point in the application for access at a later time within the same session	D16	Y		
- Abstain from forwarding the contents of the input field	D17	N	N	E/D
- Declare valid a "set" of inputs	D18	-- not used --		
- Time out (see Note 3)		N	N	E
- End of field		N	N	E/D

*Note 1* - If this command is not supported by the local host or if this command is disabled, then the corresponding local command is mapped to a D-TERMINATE.

*Note 2* - This command is directly mapped to a D-TERMINATE.

*Note 3* - Time-out is disabled by setting its value to 0.

*Remark* - See also remark to data-entry type 1.

#### 10.2.12.8.1 *Specification of local characteristics*

Within the national videotex service of country A the user may enter commands which are:

- disabled by the external host;
- specified as local in the list of valid commands;
- or not used in a specific type of data entry.

As these commands may not be passed to the external host, the following list describes the behaviour a local host should perform when receiving such a command:

- V1: Select an application on a videotex service  
Local action
- V2: Leave the application and return to the first effective choice of the national videotex service  
Enabled: send to the EH or D-TERMINATE  
Disabled: D-TERMINATE
- V3: Return to the first effective choice of the foreign videotex service  
Enabled: send to the EH  
Disabled: local error indication
- V4: Leave the application and return to the point from which this application was selected  
Local action
- V5: Provide billing information  
Local action
- V6: Leave the videotex service  
D-TERMINATE
- V7: Request service/application id  
Local action
- D1: Declare and valid an input  
Enabled: send to the EH  
Disabled: local error indication
- D2: Correcting an input  
Local action: delete the character, if any
- D3: Clearing an input  
Local action: delete the current field content and restart the current input
- D4: Move one step forward in the application (typically Next or # on the last field)  
Enabled: send to the EH  
Disabled: local error indication
- D5: Move to the next input field  
Enabled: send to the EH  
Disabled: move to the next field if any

- D6: Retrace the previous field  
Enabled: send to the EH  
Disabled: local error indication
- D7: Move to the previous field  
Enabled: send to the EH  
Disabled: move to the previous field if any
- D8: Repeat the frame  
Local action: redisplay the display structure and the content of the data entry structure (field contents and prompts) then restart the data entry at the interrupted point
- D9: Repeat the updated frame  
Enabled: send to the EH  
Disabled: local error indication
- D10: Return to the first menu in the application  
Enabled: send to the EH  
Disabled: local error indication
- D11: Previous menu  
Enabled: send to the EH  
Disabled: local error indication
- D12: Ask for help or guidance without leaving the application  
Enabled: send to the EH  
Disabled: local error indication
- D13: Redisplay the initial version of the currently active form  
Enabled: local error indication. (When no user input has been transmitted to the external host, also other local actions may be taken)
- D14: Redisplay the completed version of the currently active form  
Enabled: send to the EH  
Disabled: local error indication
- D15: Interrupt the action in progress  
Local action
- D16: Set a marker at the current point  
For further study
- D17: Abstain from forwarding the content (abort data collection)  
Enabled: send to the EH  
Disabled: local error indication
- D18: Declare valid a set of inputs  
Enabled: send to the EH  
Disabled: local error indication
- : End of field  
Enabled: send to the EH  
Disabled: move to the next field if any, otherwise local error indication
- : Time-out  
Enabled: send to the EH  
Disabled: no action

#### 10.2.12.8.2 *Use of the information retrieval field in data collection*

In some videotex services, some user's keying action (e.g. \* or Next) may automatically provoke, even in a data entry subprogram, the termination of the filling of the current field and a cursor movement to the information retrieval field where a retrieval command may be entered. Such a command, once completed, will be interpreted as a termination event by the local host and reported back to the external host as a termination reason.

Moreover, in the case of a direct access or keyword command, an associated text is also to be reported to the external host, setting the termination-reason-text attribute of the DATA-ENTRY-PROGRAM-SE.

There is not a DATA-ENTRY-SUBPROGRAM-SE present in the VIA for the information retrieval field when "data-collection-type" has been selected. This includes that the RULES-SE of the last data collection field, the user has "touched", before going to the information retrieval field, is to be used also for the information retrieval field.

#### 10.2.13 *PROMPT-SE*

The PROMPT-SE is subordinate to the DATA-ENTRY-SE. The attributes of a PROMPT-SE are those of a BLOCK-SE, except for the SE-type which is PROMPT. A prompt is a message to be displayed to the user for guidance by the filling of a field.

The prompt referred from a DATA-ENTRY-SUBPROGRAM-SE is automatically displayed when the data entry subprogram becomes active. The prompt is cancelled by the local host when the associated data entry subprogram becomes inactive i.e. when another data entry subprogram becomes active or when the data entry program is terminated.

The cancelled prompt text on the screen must be replaced by a new prompt text and/or by "spaces".

The application defined attributes of a PROMPT-SE are the following (as defined for the display structure):

##### 10.2.13.1 *Position*

##### 10.2.13.2 *Dimensions*

#### 10.2.14 *Prompt content portion*

The prompt content portion makes use of the attributes operational element identifier, operational element content type, operational element content (see Recommendation T.441, resp. Annex A of Recommendation T.541) as the related attributes for content portions (defined in Recommendation T.412) are used for blocks.

The application defined attributes for prompt is the following:

##### 10.2.14.1 *Coding attributes*

This attribute is used in the same way as for blocks, it is specified within Recommendation T.412.

#### 10.2.15 *Application control memory structure*

The application control memory structure can be used to store any operation on the VIA, for example:

- the display structure or parts of it (e.g. create BLOCK-SE or modify FIELD-SE) or parts of it;
- the data entry structure or parts of it;
- the administrative structure or parts of it;
- the special terminal facilities structure or parts of it.

An element from the application control memory is invoked by a D-CALL operation and applied to the VIA, if applicable, in both hosts.

The application control memory structure consists of:

- the APPLICATION-CONTROL-MEMORY-SE;
- one or more RECORD-SEs subordinate to the APPLICATION-CONTROL-MEMORY-SE.

The RECORD-SE contains a sequence of one or more of the operations: D-CREATE, D-DELETE, D-MODIFY, which do not concern SEs of the application control memory structure.

Figure 7/T.564 describes the hierarchy of the application control memory structure constituents.

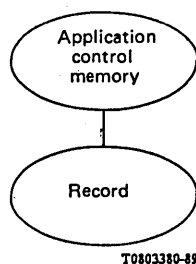


FIGURE 7/T.564

#### 10.2.16 APPLICATION-CONTROL-MEMORY-SE

#### 10.2.17 RECORD-SE

The application defined attributes of the RECORD-SE are the following:

##### 10.2.17.1 Record content

This attribute consists of a list of VIA operations which do not concern the RECORD-SE or the APPLICATION-CONTROL-MEMORY-SE.

Details are depending on the ongoing work on operational structures.

#### 10.3 Administrative structure

*Note* - This section is provisional. Final version will be established taken into account the results of CCITT Study Groups I and III concerning videotex administrative and charging matters.

##### 10.3.1 Overview of the administrative structure

This structure is used for exchanging supervisory information such as:

- items subject to negotiation (e.g. limits);
- accounting information;
- global information related to the state of the association;
- global information related to the document transferred.

This structure consists of the ADMINISTRATIVE-INFORMATION-SE which has three subordinates:

- LOCAL-HOST-INFORMATION-SE;
- EXTERNAL-HOST-INFORMATION-SE;
- DOCUMENT-INFORMATION-SE.

One and only one SE of each type should exist within the administrative structure (see Figure 8/T.564).

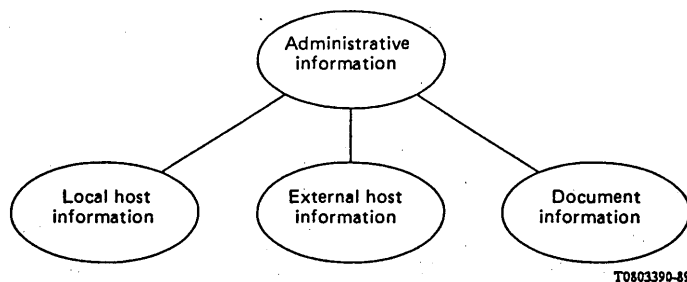


FIGURE 8/T.564

### 10.3.2 ADMINISTRATIVE-INFORMATION-SE

This SE contains information pertinent throughout the whole association.

This SE makes use of the following application defined attributes:

#### 10.3.2.1 *External host Id*

This attribute identifies the external host to be connected to.

#### 10.3.2.2 *Local host Id*

This attribute identifies the originating host.

#### 10.3.2.3 *Bilateral management parameter*

This attribute is reserved for information which is exchanged between the two gateways and can be based on bilateral agreement.

### 10.3.3 LOCAL-HOST-INFORMATION-SE

This element is used to transfer information from the local host to the external host.

This element makes use of the following application defined attribute:

#### 10.3.3.1 *Error report to external host*

This attribute is used to indicate to the external host the reason why the local host could not handle the previously received reply.

### 10.3.4 EXTERNAL-HOST-INFORMATION-SE

This element is used to transfer information from the external host to the local host.

This element makes use of the following application defined attributes:

#### 10.3.4.1 *Error report to local host*

This attribute is used to indicate to the local host the reason why the external host could not handle the previously received reply.

#### 10.3.4.2 *Asynchronous message*

This attribute is used to transfer a warning message to the local host.

### 10.3.5 DOCUMENT-INFORMATION-SE

This element contains attributes that supply additional charging information associated with the document and to be used by the local host.

This element contains the following application defined attributes:

#### 10.3.5.1 *Application time based charging period*

This attribute defines the length of the time base in seconds.

#### 10.3.5.2 *Application price: frame based*

This attribute indicates the frame based price of the application in the currency of the external host.

#### 10.3.5.3 *Application price: transaction based*

This attribute indicates the transaction based price of the application in the currency of the external host.

#### 10.3.5.4 *Application time based charging price*

This attribute defines the price per unit in the currency of the external host.

#### 10.3.5.5 *Communication cost: time based charging period*

The service cost corresponds to the additional cost in the currency of the external host for using a videotex service. This cost is time dependent. This attribute indicates the value of the period for the service cost. It may depend on the day and the time (for further study).

#### 10.3.5.6 *Communication cost: time based charging price*

The service cost corresponds to the additional cost in the currency of the external host for using a videotex service. This cost is time dependent. This attribute indicates the value of the price for the service cost per time unit. It may depend on the day and the time (for further study).

#### 10.3.6 *Items for further study concerning the administrative structure*

- a) Depending on the decisions of CCITT Study Group III on the interpretation of the item-over-limit facility, the introduction of an accounting-information-SE might be necessary so that the local host can provide the external host with limits on the:
  - item cost;
  - time-based charging;
  - session cost;and the currently translation. This is for further study.
- b) The exchange of total session cost at the end of the session, which might be achieved by introducing a charge-info and a charge-info-request attribute to the LOCAL-HOST-SE and to the EXTERNAL-HOST-SE, is for further study.
- c) Introducing value added taxes is for further study.
- d) Using a result parameter is for further study.
- e) In addition to a time-based charging for the communication cost, other methods could be taken into account (i.e. volume oriented). This is for further study.

#### 10.4 *Special terminal facilities structure*

This special terminal facilities structure is concerned with information which enables the external host to reconfigure the videotex terminal. The following categories of such information are identified:

- screen format;
- dynamically redefinable character sets (DRCS);
- redefinable colours.

*Note* - If the local host do not support these categories the structure is not used.

The special terminal facilities structure consists of:

- one SPECIAL-TERMINAL-FACILITIES-SE;
- zero, one or more REDEFINITION-ENTRY-SEs subordinate to the SPECIAL-TERMINAL-FACILITIES-SE.

Terminal redefinition data shall be downloaded by the local host to the videotex terminal, before any blocks or fields are displayed.

Figure 9/T.564 describes the hierarchy of the special terminal facilities structure.

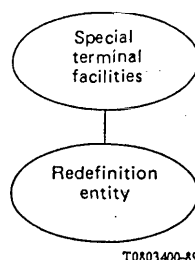


FIGURE 9/T.564

#### 10.4.1 *SPECIAL-TERMINAL-FACILITIES-SE*

This element contains the following application defined attributes:

##### 10.4.1.1 *Measurement unit*

This attribute specifies the unit used to express the dimensions attribute of the PAGE-SE. The following value is identified:

- character box.

##### 10.4.1.2 *Dimensions*

This attribute consists of a pair of coordinates that specify the dimensions of the DDA of the videotex terminal. These dimensions are expressed in accordance with the measurement-unit attribute.

#### 10.4.2 *REDEFINITION-ENTITY-SE*

This SE contains the following application defined attribute:

##### 10.4.2.1 *Redefinition coding*

This attribute is subdivided in two parts: it specifies the type and it specifies the syntax used to encode the redefinition content. The following redefinition types have been identified:

- DRCS;
- colour redefinition.

The following redefinition syntax have been identified:

- interworking data syntax;
- data syntax I;
- data syntax II;
- data syntax III.

##### 10.4.2.2 *Redefinition content*

This attribute contains the actual redefinition data to be downloaded to the user's terminal. This data will redefine a terminal facility as identified by the redefinition coding type. It consists of a sequel of bytes coded in accordance to the value of the redefinition coding attribute.

## ANNEX A

(to Recommendation T.564)

This Annex is an integral part of this Recommendation.

This Annex specifies the constituents of the layout structure and of the operational structure which are implicitly created at connection time.

#### *Profiles:*

- document profile;
- operational profile (for further study).

#### *Layout structure:*

- specific layout root;

#### *Operational structure:*

- data-entry-SE;
- result-SE;
- result-content portion;



- application-control-memory-SE;
- administrative-information-SE;
- local-host-information-SE;
- external-host-information-SE;
- document-information-SE;
- special-terminal-facilities-SE.

Some attributes of these objects are updated at connection time with values carried by parameters of the D-INITIATE service element (to be detailed).

## ANNEX B

(to Recommendation T.564)

This Annex is a provisional part of this Recommendation.

This Annex describes the minimum size of the data structures which must be supported by the local host.

Size of the display and the data entry structures: 2 K bytes;

Size of application control memory structure: FFS;

Number of characters that may be input in the fields: 500;

Number of data entry subprograms: 24;

Number of fields: 24;

Number of rules: 24;

Number of prompts: 24

Number of records: FFS

