Recommendation I.241 - Teleservices supported by an ISDN

Recommendation I.210 describes the principles for defining telecommunication services supported by an ISDN including the concept of bearer services, teleservices, and supplementary services. It also provides the means for the definition and description of such services.

In Recommendation I.240, six teleservices are identified to be supported by an ISDN, i.e., Telephony, Teletex, Telefax 4, Mixed mode, Videotex and Telex.

This Recommendation contains the service descriptions for these teleservices. Descriptions for other teleservices are for further study. The description of teleservices is structured in accordance with the three steps in stage 1 of the service description method.

The recommended support for these teleservices is given in section 7.2 of each individual service description.

I.241.1   Telephony

1.   Definition

The "Telephony Service" provides users with the ability for real-time two-way speech conversation via the network.

2.   Description

2.1   General description

The "Telephony service" provides speech transmission at an audio bandwidth of 3.1 kHz. The communication is bidirectional, with both directions continuously and simultaneously active during the speech phase. The network may use processing techniques appropriate for speech such as analogue transmission, echo cancellation and low bit rate encoding.

The digital signal at the S/T reference point follows the encoding laws for speech (according to Recommendation G.711), A-law or μ-law and the network may use digital signal processing techniques. It may also be necessary to use echo cancellation techniques in particular when interworking with other networks such as the PSTN. User information is provided over a B channel, signalling is provided over the D channel. Tones and announcements are provided by the network, encoded according to Recommendation G.711, although terminals can generate tones or other indications based on the messages received.

2.2   Specific terminology

a)   Voice quality

The required acoustic performance is described in terms of loudness ratings, frequency response, quantizing distortion, etc. Overall requirements are given in the Recommendations in the   P-Series.

b)   Transmission delay

The maximum delay is that specified for the general telephone network (cf. Recommendation G.114). The permissible variation of the actual delay is for further study.

c)   Retention Timer

This timer specifies the amount of time that the network retains the call information of the original call upon encountering busy or being released. This timer is a network provider option. The value for this timer is greater than 15 seconds.

3.   Procedures

3.1   Provision/withdrawal

3.1.1   Provision of this service will be by pre-arrangement with the administration/RPOA.

3.1.2   The teleservice is offered with several subscription options which apply separately to each ISDN number or group of ISDN numbers on the interface. For each subscription option, only one value can be selected. Subscription options for the interface are summarized below:

Subscription Option	Value
Maximum number of information channels available at user B	m, where m is not greater than the number of information channels on the interface
Maximum number of total calls present at user B than the number of	n, where n is not greater information channels on the interface

User B can be an ISDN number or group of ISDN numbers on the interface.
Note - More than one ISDN number can be associated with the service/interface only as a part of a supplementary service such as multiple subscriber number. In the case of one ISDN number, the option given above for the number of calls can only exceed the number of information channels in association with a supplementary service (e.g. call waiting). As a network provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

3.2   Normal procedures

a)   Originating the service (call set up)

The service is originated by the originating user activating the terminal, performing service selection if applicable for the originating terminal, and terminating customer selection. During this process the originating user is given appropriate indications as to the state of the call.

1)   a service selection is required on a multi-service terminal;

2)   terminating customer selection is selecting the required termination (user/network interface) by an appropriate means (for example, the use of DDI, or multiple subscriber number);

3)   indications during call origination may include an indication that the network is ready to receive the network address information (proceed indication) and an indication that the call is progressing through the network. It shall be possible to have audible indications which may be accompanied by other indications.

b)   Call acceptance (answer)

Selection of the terminating customer is indicated to each user by appropriate indications (call arrival indication and awaiting answer indication). The acceptance of the call by the terminating user, i.e., answer, causes the indications to be removed and bidirectional communication paths to be provided. The call is now termed in the "speech phase".

c)   Call release

A request to terminate the service may be generated by either user. If one user terminates the service the other user is given an appropriate indication as to the state of the call.

d)   Failure situations due to user error

The following failure situations may occur due to user error:

1)   user taking too long to input the network address information will be given as a failure indication, e.g. during overlap sending (see Recommendations I.451 and I.220);

2)   user inputting a non valid network address, e.g. an unallocated address, will be given a failure indication.

e)   Failure indications due to terminating termination state

1)   User attempting to set up a call to a termination where no free B channels are available will receive a busy indication unless call waiting or another supplementary service is in operation (Note 1).
Note 1 - In support of some supplementary services (e.g. call waiting, line hunting), it may optionally be necessary for the subscriber to register some additional parameters (e.g. destination number used to distinguish PSTN telephony calls) with the network to allow the network to know when a channel is busy with telephony.

2)   User attempting to set up a call to a termination where the call is not accepted, i.e. no response indicating call acceptance is received, will after a defined period be given a call failure indication. (See Recommendations I.451 and I.220).

f)   Failure situations due to network conditions

1)   User attempting to set up a call but meeting problems in the network (e.g. congestion) will be given a suitable indication.

4.   Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5.   Interworking requirements

5.1   Interworking is required between the ISDN and PSTN.

6. Interaction with supplementary services

Not applicable. Each supplementary service description identifies the applicability with this teleservice.

7. Attributes/values

7.1 a) Low layer attributes
Information transfer attributes

1. Information transfer mode: Circuit
2. Information transfer rate: 64 kbit/s
3. Information transfer capability: Speech
4. Structure: 8 kHz integrity
5. Establishment of communication: on demand
6. Communication configuration: Point-to-point
7. Symmetry: Bidirectional symmetric

Access attributes

Access channel (and rate): B(64) for user information, D for signalling (Note 2)

9.1 Signalling access protocol layer 1: I.430/I.431
9.4 Information access protocol layer 1: I.430/I.431; G.711
9.2 Signalling access protocol layer 2: I.440/I.441
9.5 Information access protocol layer 2: -
9.3 Signalling access protocol layer 3: I.450/I.451
9.6 Information access protocol layer 3: -

Note 2 - For reserved/permanent service the operational, administrative and maintenance message related to these services may be conveyed over the D channel.

b) Higher layer attributes

10. Type of user information: Speech
11. Layer 4 protocol functions: -
12. Layer 5 protocol functions: -
13. Layer 6 protocol functions: G.711
14. Layer 7 protocol functions: -

c) General attributes

15. Supplementary services provided: FS
16. Quality of Service: FS
17. Interworking possibilities: to and from PSTN
18. Operational and commercial: FS

-     Not applicable
FS   for further study

7.2 Telephony supported by an ISDN

In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (essential) and A (additional) can be found in Recommendation I.240.

a)   Overall support: E/A (Note 3)

Variations of non-dominant attributes:

b1)

Information transfer mode	Support
circuit	E

b2)

Establishment of communication	Symmetry	Communication configuration	Support
demand		pt-pt	E
reserved	Bidirectional	pt-pt	FS
permanent	Symmetric	pt-pt	A
demand		multipt	A
reserved	Bidirectional	pt-pt	FS
permanent	Symmetric	multipt	A

b3)   Access:

Signalling and OAM (Note 4)		User information		Support
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.430, I.440, I.441, I.450, I.451 (Note 5)	B(64)	I.430, G.711	E
D(64)	I.431, I.440, I.441, I.450, I.451 (Note 5)	B(64)	I.431, G.711	E

Note 3 - It is anticipated that ISDNs offer telephony as a basic telecommunication service. Some networks will offer this as a teleservice. However, due to national regulation policies some networks will offer telephony as a bearer service rather than as a teleservice.

Note 4 - Definition of protocols for OAM are FFS.

Note 5 - Demand services only. Others are FFS.

8.   Dynamic description

The circuit-mode dynamic description appears in Recommendation I.220.

I.241.2   Teletex

The prose description of the Teletex service is an extract of Recommendation F.200. If more detail is required this Recommendation should be referred to. As such, this service description does not strictly follow the substeps for step 1.1 of the service description method. Further alignment with the substeps requires further study.

1.   Definition

Teletex is an international service, enabling subscribers to exchange office correspondence in the form of documents containing Teletex coded information on an automatic memory-to-memory basis via the ISDN.

2.   Description

2.1   Scope

The Teletex service provides communication between Teletex equipment* which are used for the preparation, editing and printing of correspondence containing text information using a standardized character set (Recommendation T.61).

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* Teletex equipment may be a Teletex terminal or a system.

The basic element of the correspondence between people using the service is the page, as the smallest unit of text treated as an entity. No restrictions shall exist as far as the operator procedures for generation of the text or the positioning of text within the printable area on a page are concerned.

Note 1 - This does not necessarily imply that the characters used to construct a graphic symbol are transmitted in the same sequence as that in which they are keyed.

Note 2 - This does not necessarily imply that the order in which text on a page is transmitted is the same as that in which it was keyed.

Note 3 - An exception to this rule is the application of the processable mode of operation for which the page as a basic element of correspondence cannot be used. The processable mode of operation within the Teletex service is defined in Recommendation F.220.

2.2   Operation

2.2.1   General

The Teletex service in each country and the international interconnection between countries or networks shall

use automatic switching so that it is possible for any Teletex subscriber to reach any other Teletex subscriber using fully automatic selection.

It is a requirement to allow the through-connection of a call between a Teletex terminal connected to a private automatic branch exchange (or similar systems) and those connected to public exchanges used for the Teletex service.

A virtual dialogue mode of operation, which appears to the subscriber as an interactive mode should be possible, although this is not a basic requirement of the Teletex service.

A virtual dialogue mode of operation, which appears to the subscriber as an interactive mode may become possible as a new standardized option within the Teletex service, both allowing communications between persons and data base access (refer to Recommendation I.210).

Processable mode of operation, as a standardized option within the Teletex service, allows the transfer of text containing information to permit convenient further editing and processing by the recipient (refer to Recommendation F.220).

Mixed mode of operation using the techniques of Telefax 4 for the transfer of facsimile-coded information and of Teletex for the transfer of character-coded text is described as a standardized option within the Teletex service in Recommendation F.230.

Two-way alternate (TWA) communication is a capability of the Teletex service, which also includes one-way communication (OWC); the calling subscriber will have full control of the Teletex call.

3.   Procedures

3.1   Provision/withdrawal

The national and international facilities of the Teletex service, including the Teletex/telex conversion facilities, shall be open continuously.

Teletex subscriber equipment for which call numbers are published in the directories shall, in principle, be available to accept calls continuously.

In order to facilitate the twenty-four hour duration of the service it is permitted to use a centralized storage in the network to realize receiving memory capability of the terminal.

3.2   Call phases

The operations for each call may be divided into the following three phases:

a)   Preparation

-       preparation of the information in local mode;

-       loading of the information into a memory,

b)   Transmission (in principle, automatic)

-       call establishment;

-        pre-information phase (see note);

-        information transfer from memory-to-memory (see note);

-        post information phase (see note);

-        call clearing.

Note - During these parts of the transmission phase the network must be transparent with respect to control procedures.

c)   Output

-        emptying the memory.

Note - The information may consist of one or more Teletex documents each consisting of one or more Teletex pages.

The control procedures as specified in Recommendation T.62 shall be used as end-to-end communication procedures between any Teletex equipment in the basic service.

The lower layer protocols and the network independent basic transport protocol to be used for Teletex are specified in Recommendations T.70 and T.90.

The network-dependent control procedures for the Teletex are those that are defined for ISDN.

3.3   Call identification line

The Teletex procedures include the exchange of reference information prior to sending any document. This reference information includes identification of the parties to the call as well as the date and time. Also, supplementary reference information is exchanged during a call to allow reference to an individual document or page for error recovery or other purposes.

This reference information, taken together, is defined to be printable on a single line called the call identification line. The use of this information is a local decision except in recovering from an interrupted transmission.

The Call Identification Line is composed of four fields as follows:

-        Field 1: identification of the called Teletex equipment;
-        Field 2: identification of the calling Teletex equipment;
-        Field 3: date and time;
-        Field 4: supplementary reference information.

| 24 characters |1| 24 characters |1| 14 characters |1| 7 characters |

<——————————————————————— 72 Characters

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Field 1 - (identification of the called equipment) contains the identification of the called equipment. It is originated in the control procedures by the called equipment.

Field 2 - (identification of the calling equipment) contains the identification of the calling equipment. It is originated in the control procedures by the calling equipment.

Field 3 - (date and time) contains the date and time reference information showing the year, month, day, hour and minute in the fixed format of 14 characters thus YY-MM-DD-HH:MM. This field is originated in the control procedures by the calling equipment which obtains this information from the network. This time represents the local time at the calling equipment and is intended to represent the time of call origination.

Field 4 - (supplementary reference information) contains a document reference number, a hyphen (coding 2/13) as a separator and a page reference number as defined in Recommendation T.62. This field has a fixed length of seven character positions and is originated in the control procedures by the Teletex equipment that is sending the associated documents.

FIGURE 1/I.241.2

Format of the Call Identification Line

3.4   Error protection

Within the Teletex service a high layer error detection and correction is provided in the session layer for all those errors which are not corrected by the network layers.

To ensure call integrity, error protection will be provided by Teletex control procedures (see Recommendations T.62, T.70 and T.90). The error rate on the pre-information, information and post-information phases should not exceed 1 in 10^6 characters.

4.   Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5.   Interworking requirements

5.1   Within the Teletex service interworking between terminals connected to different networks is required. Real-time connection between terminals operating at different speeds has to be provided on the basis of at least 2.4 kbit/s.

5.2   Intercommunication with other services

5.2.1   The Teletex service will provide the ability to intercommunication both directions with the telex service by

means of conversion facilities (refer to Recommendations F.201, U.201, T.390).

5.2.2   Intercommunication between basic mode and mixed mode Teletex terminals and Classes I, II and III Group 4 facsimile terminals is shown in Table 1 (refer to Recommendation F.184).

5.2.3   The Teletex service allows for intercommunication with telex and with Interpersonal Messaging Service (IPM) (Ref. to F.421, F.422).

TABLE 1/I.241.2

Current status of direct intercommunication for Teletex and
Group 4 facsimile terminals on the same network

To \ From	Facsimile Group 4 Class I	Facsimile Group 4 Class II	Facsimile Group 4 Class III	Teletex basic mode	Teletex mixed mode	Teletex Processable Mode 1
Facsimile Group 4 Class I	F	F	F			
Facsimile Group 4 Class II	F	F	F			
Facsimile Group 4 Class III	F	T, F, MM	T, F, MM	T	T, MM	T
Teletex basic mode		T	T	T	T	
Teletex mixed mode		T, MM	T, MM	T	T, MM	T
Teletex Processable Mode 1		T	T	T	T	T, PM1

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T: Basic Teletex document with character coded information only.
F: Group 4 Facsimile document with facsimile coded information only.
MM: Mixed-mode document with character and facsimile coded information.
PM1:   Processable mode document with character coded information only.

6.   Interaction with supplementary services

Each supplementary service description identifies the applicability with this teleservice.

For the ISDN, the international supplementary services which may be used for Teletex in the circuit mode using a B Channel:

i)   Closed User Group;

ii)   Multiple Subscriber Number;

iii)   User-to-User Signalling;

iv)   Calling Line Identification Presentation;

v)   Calling Line Identification Restriction;

vi)   Connected Line Identification Presentation;

vii)   Connected Line Identification Restriction;

viii)   Direct Dialling In;

The use of other supplementary services is for further study.

Supplementary Services for Teletex with packet mode of operation are for further study.

7.   Attributes/values

7.1   a)   Low layer attributes

Information transfer attributes

Circuit mode bearer capability	Packet mode bearer capability
1. Mode: Circuit	Packet
2. Rate: 64 kbit/s	Maximum throughput of a given virtual circuit is less than or equal to the maximum bit rate of the user information access

	channel and the throughput class of the virtual circuit.	
3. Info transfer cap:	Unrestricted (Note 4)	Unrestricted
4. Structure:	Unstructured (Note 5)	Service data unit integrity
5. Establishment:	Demand	Demand (VC), permanent (PVC)
6. Configuration:	Point-to-point	Point-to-point
7. Symmetry:	Bidirectional symmetric	Bidirectional symmetric

Access attributes

	Circuit mode bearer capability	Packet mode bearer capability
8. Access channel:	B Channel (B for user info. D for signalling)	User information over virtual circuit within B or D Channel. When D Channel is used, maximum packet size and quality of service may be restricted. Signalling may be provided via D and/or virtual circuit within B Channel.
9.1 Signalling access protocol layer 1:	I.430/I.431	I.430/I.431
9.2 Signalling access protocol layer 2:	I.440/I.441	I.440/I.441, X.31
9.3 Signalling access protocol layer 3:	I.450/I.451	I.450/I.451, X.31
9.4 Information access protocol layer 1:	I.430/I.431	I.430/I.431
9.5 Information access protocol layer 2:	X.75 (SLP)	X.25 LAP B

9.6 Information   ISO 8208   X.25 (PLP)
   access protocol
   layer 3:

Note 4 - The interworking arrangements with networks having restricted 64 kbit/s information transfer capability require further study.

Note 5 - Even if no structure is required the network may provide 8 kHz integrity.

   b)   High layer attributes

   10.   Type of user info: Teletex
   11.   Layer 4 protocol: T.70
   12.   Layer 5 protocol: T.62
   13.   Layer 6 protocol: T.61
   14.   Layer 7 protocol: T.60

   c)   General attributes

   15.   Supplementary services provided: See sub-section 6/I.241.2
   16.   Quality of service: FS
   17.   Interworking possibilities: See sub-section 5/I.241.2
   18.   Operational and commercial: FS

SLP - Single Link Protocol
PLP - Packet Layer Protocol

7.2   Teletex supported by an ISDN

   In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (Essential) and A (Additional) can be found in Recommendation I.240.

   a)   Overall support: A

   b)   Variations of non-dominant attributes:

b.1) Information transfer mode (Note 6) | Support

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   circuit | A
   packet | A

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b.2) Establishment   Symmetry   Communication | Support
   of communication   configuration |

demand	bidirectional symmetric	pt-pt	E

b.3) Access:

Signalling & OAM (Note 7)		User information		Support
Channel & rate	Protocols	Channel & rate	Protocols	

Circuit mode

D(16)	I.430, I.440, I.441, I.450, I.451 (Note 8)	B(64)	I.430, X.75 (SLP), ISO 8208	A
D(64)	I.431, I.440, I.441, I.450, I.451 (Note 8)	B(64)	I.431, X.75 (SLP), ISO 8208	A

Packet mode

D(16)	I.430, I.440, I.441, I.450, I.451, X.31	B(64) of D(16)	I.430, X.25 LAP B, X.25 (PLP)	A
D(64)	I.431, I.440, I.441, I.450, I.451, X.31	B(64)	I.431, X.25 LAP B, X.25 (PLP)	FS
VC in B(64)	FS	B(64)	FS	FS

Note 6 - In the interim period the circuit-mode method of operation is preferred.

Note 7 - Definition of protocols for OAM are FFS

Note 8 - Demand services only. Other are FFS.

8.   Dynamic description

        The circuit-mode dynamic description appears in Recommendation I.220.

I.241.3   Telefax 4

        The prose description of the Telefax 4 service is an extract of Recommendation F.184. If more detail is required this Recommendation should be referred to. As such this service is not strictly structured a wording to the substeps for Step 1.1 of the service description method. Further alignment with the substeps requires further study.

1.   Definition

        Telefax 4 is an international service enabling subscribers to exchange office correspondence in the form of documents containing facsimile coded information automatically via the ISDN.

2.   Description

2.1   General description

        The Telefax 4 service provides a basic level of compatibility between all terminals participating in the service. It offers bidirectional communication between two users via the ISDN using 64 kbit/s digital signals over the B channel.

        There are three classes of Group 4 facsimile terminals:

        Class I - minimum requirement terminal is a terminal able to send and   receive documents containing facsimile encoded information   (in accordance with Recommendations T.6 and T.400-Series).

        Class II - minimum requirement terminal is a terminal able to transmit   documents that are facsimile encoded (in accordance with   Recommendations T.6 and T.400-Series). In addition, the   terminal must be capable of receiving documents which are   facsimile coded (in accordance with Recommendations T.6 and   T.400-Series), teletex coded (in accordance with the basic   coded character repertoire and defined in   Recommendation T.61) and also mixed-mode documents (in   accordance with Recommendations of the T.400-Series).

        Class III - minimum requirement terminal is a terminal that is capable   of generating, transmitting and receiving facsimile coded   documents (in accordance with Recommendations T.6 and   T.400-Series), teletex coded documents (in accordance with   the basic coded character repertoire as defined in   Recommendation T.61) and mixed-mode documents (in   accordance with Recommendations of the T.400-Series).

        The basic element of the correspondence between people using the service is the page, as the smallest unit of text treated as an entity.
No restrictions shall exist as far as the operator procedures for generation of the text or the positioning of text within the reproducible area on a page are concerned.

3. Procedures

3.1 Provision/withdrawal

The national and international Telefax 4 service shall be open continuously.

Telefax 4 terminals for which call numbers are published in the directories shall, in principle, be available to accept calls continuously.

In order to facilitate the 24 hour duration of service it is permitted to use a centralized storage in the network to realize receiving memory capability of the terminal.

3.2 General

The Telefax 4 service in each country and the interconnection between countries or networks shall use automatic switching so that it is possible for any Telefax 4 subscriber to reach any other Telefax 4 subscriber using fully automatic selection.

It is a requirement to allow the through-connection of a call between Group 4 facsimile terminals connected to a private automatic branch exchange (or similar systems) and those connected to public exchanges used for the Group 4 facsimile service.

Two-way alternate (TWA) communication is a capability of the Telefax 4 service, which also includes one-way communication (OWC); the calling subscriber will have full control of the Group 4 facsimile call.

3.3 Call phases

The operations for each call may be divided into the following three phases:

a) preparation: preparation of the information to be transmitted;

b) transmission:

- call establishment (automatic);

- pre-information phase (see Note);

- information transfer (see Note);

- post information phase (see Note);

- call clearing.

Note - During these parts of the transmission phase the network must be transparent with respect to control procedures.

c) output: displaying the message either by immediate printing or from a storage medium upon control by the operator.

Note - The information may consist of one or more Telefax 4 documents each consisting of one or more Telefax pages.

The control procedures as specified in the Recommendations of the T.400-Series and T.62 shall be used as end-to-end communication procedures between terminals in the service.

The low layer protocols and the network independent basic transport protocol for Telefax 4 are specified in Recommendations T.70 and T.90.

The network dependent control procedures for the Telefax 4 service are those that are defined for ISDN.

3.4 Call identification

The Telefax 4 procedures include the exchange of reference information prior to sending any document. This reference information includes identification of the parties to the call as well as the date and time. Also, supplementary reference information is exchanged during a call to allow reference to an individual document or page for error recovery or other purposes. Date and time have to be provided by the network and sent to the calling terminal in the call set up phase.

This reference information, taken together, is defined to be printable on a single line called the call identification line. Use of this information is a local decision except in recovering from an interrupted transmission. In the case of automatic linking, the use of this information is for further study.

For the format of the call identification line: see Recommendation F.200.

3.5 Error protection

To ensure call integrity, error protection will be provided by Telefax 4 control procedures (see Recommendations T.62, T.70 and T.90). Besides the error detection and correction mechanism in the layer 2 (and 3) an additional error detection and correction mechanism is provided in the session layer. By this mechanism errors of the higher layer functions (e.g. command/response sequence error) and transmission errors, which are not corrected by the lower layers, will be corrected by e.g. retransmission of one or several pages.

The error rate on the pre-information, information and post-information phases should not exceed 1×10^{-6}.

4. Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5. Interworking requirements

5.1   Within the Telefax 4 service interworking between terminals connected to different networks is required

    a)   Telefax 4 (ISDN) - Telefax 4 (CSPDN)

    b)   Telefax 4 (ISDN) - Telefax 4 (PSPDN)

    c)   Telefax 4 (ISDN) - Telefax 4 (PSTN)

In the case of international interworking between Group 4 facsimile terminals connected to dissimilar networks, Recommendation X.300 shall
apply. For international interworking between PSTN and ISDN, a (separate) Telefax 4 interworking unit may be

necessary.

International routes between ISDNs for the Telefax 4 service shall be capable of supporting user data rates up to 64 kbit/s.

5.2 Intercommunication with other services

5.2.1 Intercommunication between basic mode and mixed mode Teletex terminals and Classes I, II and III Group 4 facsimile terminals connected to the Telefax 4 service is shown in Table 1/I.241.3.

TABLE 1/I.241.3

Current status possible cases of direct intercommunication for Teletex
and Group 4 facsimile terminals
on the same network

To From	Facsimile Group 4 Class I	Facsimile Group 4 Class II	Facsimile Group 4 Class III	Teletex basic mode	Teletex mixed mode	Teletex proces-sable Mode 1
Facsimile Group 4 Class I	F	F	F			
Facsimile Group 4 Class II	F	F	F			
Facsimile Group 4 Class III	F	T, F, MM	T, F, MM	T	T, MM	T
Teletex basic mode		T	T	T	T	T
Teletex mixed mode		T, MM	T, MM	T	T, MM	T

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| Teletex     |        |   |   |   |   |   |         |
| Processable |        | T | T | T | T | T, PM1 |
| Mode 1      |        |   |   |   |   |   |         |
```

T: Basic Teletex document with character coded information only.
F: Group 4 Facsimile document with facsimile coded information only.
MM: Mixed-mode document with character and facsimile coded information.
PM1: Processable mode document with character coded information only.

In both the Teletex and Telefax 4 services, the equipment providing mixed mode should enable a direct exchange of documents in accordance with Recommendations T.6, T.61 and T.400-Series.

5.2.2   Intercommunication is desirable between terminals of the Telefax 4 service and terminals of services other than Telefax 4 provided over ISDN and other public switched networks.

Intercommunication possibilities between Telefax 4 terminals and Telefax 3 terminals have to be provided (see also Recommendation F.180):

a)   Telefax 4 (ISDN) - Telefax 3 (PSTN);

b)   Telefax 4 (ISDN) - Telefax 3 (ISDN, via terminal adaptors).

In case a) Telefax 4 terminals use specific service features in ISDN. Intercommunication should be supported by ISDN-PSTN interworking units.

In case b) Telefax 3 terminals and Telefax 4 terminals which are to be connected in the PSTN can also be connected to the ISDN via terminal adaptors.

6.   Interaction with supplementary services

Each supplementary service description identifies the applicability with this teleservice.

International supplementary services for the Telefax 4 service in the circuit mode on a B channel:

i)   Closed User Group;

ii)   Multiple Subscriber Number;

iii)   User to User Signalling;

iv)   Calling Line Identification Presentation;

v)   Calling Line Identification Restriction;

vi)   Connected Line Identification Presentation;

vii)   Connected Line Identification Restriction;

viii)   Direct Dialling In.

The use of other supplementary services is for further study. Supplementary services for Telefax 4 with packet mode of operation are for further study.

7.   Attributes/values

7.1   a)   Low layer attributes

        Information transfer attributes

	Circuit mode bearer capability	Packet mode bearer capability
1. Mode:	Circuit	Packet
2. Rate:	64 kbit/s	Maximum throughput of a given virtual circuit is less than or equal to the maximum bit rate of the user information access channel and the throughput class of the virtual circuit.
3. Info transfer cap:	Unrestricted (Note 3)	Unrestricted
4. Structure:	Unstructured (Note 4)	Service data unit integrity
5. Establishment:	Demand	Demand (VC), permanent (PVC)
6. Configuration:	Point-to-point	Point-to-point
7. Symmetry:	Bidirectional symmetric	Bidirectional symmetric

Access attributes

	Circuit mode bearer capability	Packet mode bearer capability
8. Access channel:	B Channel (B for user info D for signalling)	User information over virtual circuit within B or D Channel. When D Channel is used, maximum packet size and quality of service may be restricted. Signalling may be provided via D and/or virtual

circuit within B Channel
(Note 1).

9.1 Signalling access protocol layer 1:	I.430/I.431	I.430/I.431
9.2 Signalling access protocol layer 2:	I.440/I.441	I.440/I.441, X.31
9.3 Signalling access protocol layer 3:	I.450/I.451	I.450/I.451, X.31
9.4 Information access protocol layer 1:	I.430/I.431	I.430/I.431
9.5 Information access protocol layer 2:	X.75 (SLP)	X.25 LAP B
9.6 Information access protocol layer 3:	ISO 8208	X.25 (PLP)

    b)   <u>High layer attributes</u>

    10.   Type of user info: Teletex
    11.   Layer 4 protocol: T.70
    12.   Layer 5 protocol: T.62
    13.   Layer 6 protocol: T.400-Series (Note 2)
    13.1 Resolution [ppi]: 200 x 200 standard;
                       240 x 240, 300 x 300, 400 x 400 optional
    14.   Layer 7 protocol: T.503, 521, 563

    c)   <u>General attributes</u>

    15.   Supplementary services provided: see section 6/I.241.3
    16.   Quality of service: FS
    17.   Interworking possibilities: see section 5/I.241.3
    18.   Operational and commercial: FS

<u>Note 1</u> - User information transferred via virtual channel on the D Channel is for further study.

<u>Note 2</u> - Further study is required to identify a more precise reference in the T.400-Series of Recommendations.

<u>Note 3</u> - The interworking arrangements with networks having restricted 64 kbit/s information transfer capability require further study.

Note 4 - Even if no structure is required the network may provide 8 kHz integrity.

7.2 Telefax 4 supported by an ISDN

In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (Essential) and A (Additional) can be found in Recommendation I.240.

a) Overall support: A

b) Variations of non-dominant attributes:

b.1)

Information transfer mode (Note 5)	Support
circuit packet	A

b.2)

Establishment of communication	Symmetry	Communication configuration	Support
demand	bidirectional symmetric	pt-pt	E

b.3) Access:

Signalling & OAM (Note 6)		User information		Support
Channel & rate	Protocols	Channel & rate	Protocol	
Circuit mode				
D(16)	I.430, I.440, I.441, I.450, I.451 (Note 7)	B(64)	I.430, X.75 (SLP), ISO 8208	A

```
 D(64) | I.431, I.440, I.441,  | B(64) | I.431,        |    A
        | I.450, I.451 (Note 7) |       | X.75 (SLP),   |
        |                       |       | ISO 8208      |
```

Packet mode

```
 D(16) | I.430, I.440, I.441,  | B(64) | I.430,        |    A
        | I.450, I.451, X.31    |  or   | X.25 LAP B,   |
        |                  D(16)|       | X.25 (PLP)    |
 D(64) | I.431, I.440, I.441,  | B(64) | I.431, ...    |    FS
        | I.450, I.451, X.31    |       |               |

 VC in |       FS        | B(64) |  FS       |    FS
 B(64) |                 |       |           |
```

Note 5 - In the interim period the circuit mode method of operation is preferred.

Note 6 - Definition of protocols for OAM is for further study.

Note 7 - Demand services only. Others are FFS.

8.   Dynamic description

        The circuit mode dynamic description appears in Recommendation I.220.

I.241.4   Mixed mode

        The prose definition of the mixed mode service is an extract of Recommendation F.230.

1.   Definition

        This service provides combined text and facsimile communication for end-to-end transfer of documents containing mixed information of text and fixed images. The high layer attributes are based on the CCITT Recommendations for Teletex amd Telefax 4.

2.   Description

        For further study.

3.   Procedures

        For further study.

4.   Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5.   Interworking requirements

For further study.

6.   Interaction with supplementary services

For further study.

7.   Attributes/values

7.1   a)   Low layer attributes

Information transfer attributes

	Circuit mode bearer capability	Packet mode bearer capability
1. Mode:	Circuit	Packet
2. Rate:	64 kbit/s	Maximum throughput of a given virtual circuit is less than or equal to the maximum bit rate of the user information access channel and the throughput class of the virtual circuit.
3. Info transfer cap:	Unrestricted (Note 2)	Unrestricted
4. Structure:	Unstructured (Note 3)	Service data unit integrity
5. Establishment:	Demand	Demand (VC), permanent (PVC)
6. Configuration:	Point-to-point	Point-to-point
7. Symmetry:	Bidirectional symmetric	Bidirectional symmetric

Access attributes

	Circuit mode bearer capability	Packet mode bearer capability

8. Access channel:	B Channel (B for user info D for signalling)	User information over virtual circuit within B or D Channel. When D Channel is used, maximum packet size and quality of service may be restricted. Signalling may be provided via D and/or virtual circuit within B Channel (Note 1).
9.1 Signalling access protocol layer 1:	I.430/I.431	I.430/I.431
9.2 Signalling access protocol layer 2:	I.440/I.441	I.440/I.441, X.31
9.3 Signalling access protocol layer 3:	I.450/I.451	I.450/I.451, X.31
9.4 Information access protocol layer 1:	I.430/I.431	I.430/I.431
9.5 Information access protocol layer 2:	X.75 (SLP)	X.25 LAP B
9.6 Information access protocol layer 3:	ISO 8208	X.25 (PLP)

b)   <u>High layer attributes</u>

10.	Type of user info:	<u>Mixed mode</u>	
11.	Layer 4 protocol:		X.224, X.214
12.	Layer 5 protocol:		X.225, X.215
13.	Layer 6 protocol: T.61, X.226, X.216	X.226, X.216	
13.1	Resolution [ppi]:	300 x 300	
			240 x 240 400 x 400 optional, 600, 1200
14.	Layer 7 protocol: T.501, T.522, T.561		

c)   <u>General attributes</u>

15.   Supplementary services provided: FS

16. Quality of service: FS
17. Interworking possibilities: ISDN Teletex, ISDN Telefax 4;
others: FS
18. Operational and commercial: FS

Note 1 - User information transferred via virtual channel on the D Channel is for further study.

Note 2 - The interworking arrangements with networks having restricted 64 kbit/s information transfer capability require further study.

Note 3 - Even if no structure is required the network may provide 8 kHz integrity.

7.2   Mixed mode supported by an ISDN

In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (Essential) and A (Additional) can be found in Recommendation I.240.

a)   Overall support: A

b)   Variations of non-dominant attributes:

b.1) Information transfer mode

	Support
circuit	A
packet	A

b.2) Establishment of communication

Establishment of communication	Symmetry	Communication configuration	Support
demand	bidirectional symmetric	pt-pt	E

b.3) Access:

Signalling & OAM (Note 4)		User information		Support
Channel & rate	Protocols	Channel & rate	Protocols	

Circuit mode

```
D(16) │ I.430, I.440, I.441,    │  B(64)  │ I.430,          │      A
      │ I.450, I.451 (Note 5)   │         │ X.75(SLP),      │
      │                         │         │ ISO 8208        │
      │                         │         │                 │
D(64) │ I.431, I.440, I.441,    │  B(64)  │ I.431,          │      A
      │ I.450, I.451 (Note 5)   │         │ X.75(SLP),      │
      │                         │         │ ISO 8208        │
```

Packet mode

```
D(16) │ I.430, I.440, I.441,    │  B(64)  │ I.430,          │      FS
      │ I.450, I.451, X.31      │   or    │ X.25 LAP B,     │
      │                         │  D(16)  │ X.25(PLP)       │
      │                         │         │                 │
D(64) │ I.431, I.440, I.441,    │  B(64)  │ I.431, ...      │      FS
      │ I.450, I.451, X.31      │         │                 │
      │                         │         │                 │
VC in │        FS               │ B(64)   │   FS            │      FS
B(64) │                         │         │                 │
```

Note 4 - Definition of protocols for OAM are FFS.

Note 5 - Demand services only. Others are FFS.

8.   Dynamic description

        The circuit mode dynamic description appears in Recommendation I.220.

I.241.5   Videotex

        The prose description for the Videotex service in ISDN is for further study and is intended to be based on Recommendation F.300.

1.   Definition

        The Videotex service in the ISDN is an enhancement of the existing Videotex service with retrieval and mailbox functions for text (alpha) and graphic information.

2.   Description

        For further study.

3.   Procedures

For further study.

4.   Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5.   Interworking requirements

For further study.

6.   Interaction with supplementary services

For further study.

7.1   Attributes/values

a)   Low layer attributes

Information transfer attributes

```
                            Videotex centre to
                  User to Videotex │ Videotex centre,
                      centre       │ external computers
                 ─────────────────────────────────────────────────
   1.    Mode:                  Circuit (Note 1)│   Circuit/packet
   2.    Rate:              64 kbit/s    │       FS
   3.    Info transfer cap.:    unrestricted   │        FS
   4.    Structure:          FS          │       FS
   5.    Establishment:       Demand      │    Demand/permanent
   6.    Configuration:        Point-to-point │   Point-to-point,
                          │      multipoint
                          │
                          │
   7.    Symmetry:           Bidirectional  │   Bidirectional
              symmetric      │   symmetric
```

Access attributes

8.   Access channel: B for user info (Note 2), D for signalling
9.   Signalling a.p. layer 1: I.430/I.431
9.1   Signalling a.p. layer 2: I.440/I.441
9.2   Signalling a.p. layer 3: I.450/I.451
9.3   Information a.p. layer 1: I.430/I.431
9.4   Information a.p. layer 2: X.75 (SLP)
9.5   Information a.p. layer 3: ISO 8208

b)   High layer attributes

10. Type of user info: Videotex
11. Layer 4 protocol:
12. Layer 5 protocol:
13. Layer 6 protocol: FS
13.1 Resolution [ppi]:
13.2 Graphic mode:
14. Layer 7 protocol:

c) General attributes: FS

Note 1 - The use of packet mode is for further study.

Note 2 - The use of the D Channel for Videotex information is for further study.
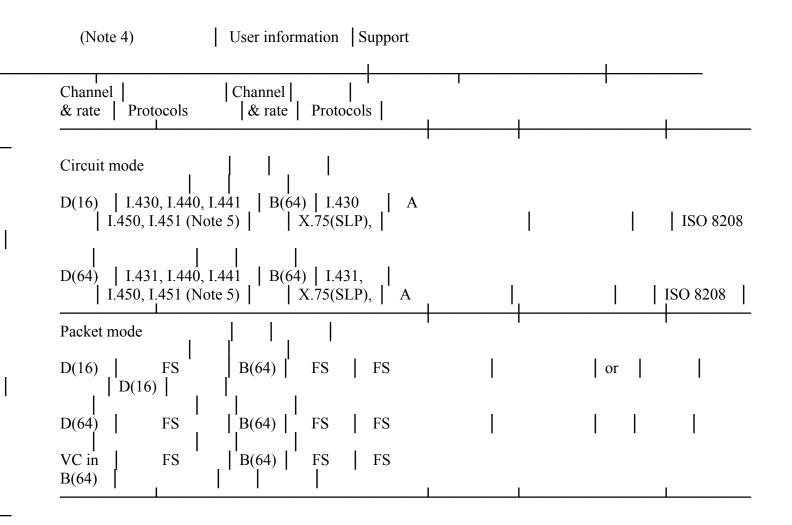
7.2 Videotex supported by an ISDN

In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (Essential) and A (Additional) can be found in Recommendation I.240.

a) Overall support: A

b) Variations of non-dominant attributes:

b.1) Information transfer mode

		Support
circuit	user terminal-to-Videotex centre	A
	videotex centre to Videotex centre, external computer	A
packet	Videotex centre to Videotex centre, external computer	A

b.2)

Establishment of communication	Symmetry	Communication configuration	Support
demand permanent (Note 3)	bidirectional symmetric	pt-pt	E
demand permanent (Note 3)	bidirectional symmetric	multipoint (Note 3)	A

b.3) Access:

Signalling & OAM

(Note 4)		User information		Support		
Channel & rate	Protocols	Channel & rate	Protocols			
Circuit mode						
D(16)	I.430, I.440, I.441 I.450, I.451 (Note 5)	B(64)	I.430 X.75(SLP),	A		ISO 8208
D(64)	I.431, I.440, I.441 I.450, I.451 (Note 5)	B(64)	I.431, X.75(SLP),	A		ISO 8208
Packet mode						
D(16)	FS D(16)	B(64)	FS	FS	or	
D(64)	FS	B(64)	FS	FS		
VC in B(64)	FS	B(64)	FS	FS		

Note 3 - Between Videotex centres and to external computers.

Note 4 - Definition of protocols for OAM are FFS.

Note 5 - Demand services only. Others are FFS.

8.   Dynamic description

The circuit mode dynamic description appears in Recommendation I.220.

I.241.6   Telex

1.   Definition

This service provides interactive text communication. The digital signal at the S/T reference point follows the internationally agreed Recommendations for telex above the ISDN physical layer.

2.   Description

For further study.

3.   Procedures

For further study.

4.   <u>Network capabilities for charging</u>

      This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5.   <u>Interworking requirements</u>

      For further study.

6.   <u>Interaction with supplementary services</u>

      For further study.

7.   <u>Attributes/values</u>

7.1   a) <u>Low layer attributes</u>

<u>Information transfer attributes</u>

1.   Information transfer mode: circuit; packet is FFS (Note 1)
2.   Information transfer rate: 64 kbit/s
3.   Information transfer capabilitiy: unrestricted
4.   Structure: 8 kHz integrity
5.   Establishment of communication: reserved/permanent
6.   Communication configuration: point-to-point
7.   Symmetry: bidirectional

<u>Access attributes</u>

8.   Access channel: B/user information, D/signalling, D/telex user   information is FFS (Note 1)

9.1   Signalling a.p. layer 1: I.430/I.431
9.2   Signalling a.p. layer 2: U.202
9.3   Signalling a.p. layer 3: U.202
9.4   Information a.p. layer 1: I.430/I.431
9.5   Information a.p. layer 2: U.202
9.6   Information a.p. layer 3: FS

b)   <u>High layer attributes</u>

10.   Type of user information: Telex
11.   Layer 4 protocol: -   -
12.   Layer 5 protocol: -   -
13.   Layer 6 protocol: -   -
14.   Layer 7 protocol: -   -

c) <u>General attributes</u>

15.   Supplementary services provided: FS

16. Quality of service: FS
17. Interworking possibilities: Telex, Teletex, others: FS
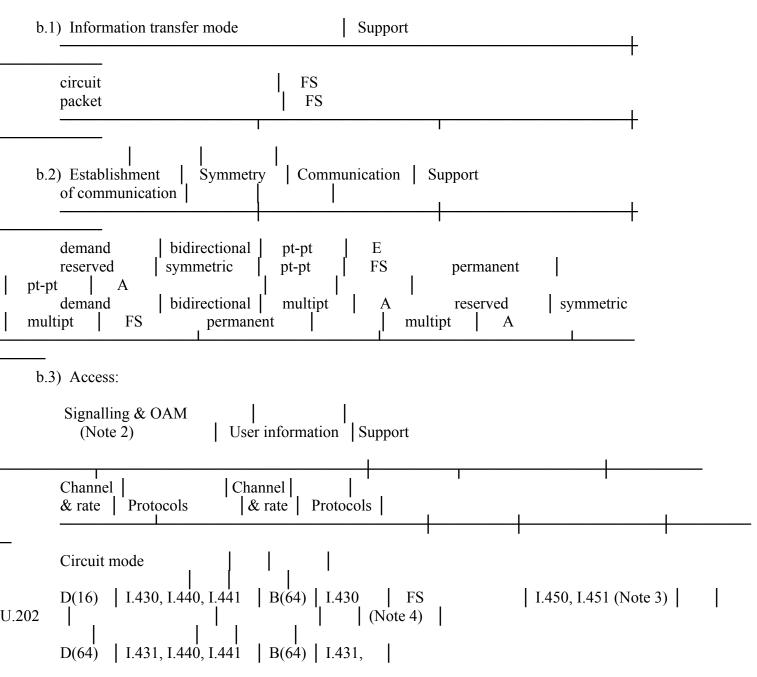18. Operational and commercial: FS

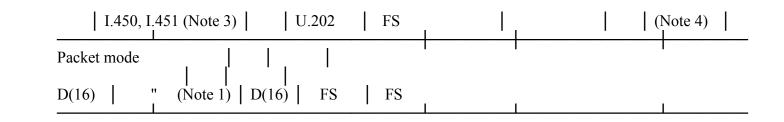Note 1 - Subject to satisfying telex quality of service on D-channel.

7.2 Telex supported by an ISDN

In the following table the recommended overall support, and recommended support for the variations of the non-dominant attributes are given. The definition of E (Essential) and A (Additional) can be found in Recommendation I.240.

a) Overall support: FS

b) Variations of non-dominant attributes:

b.1)
Information transfer mode	Support
circuit	FS
packet	FS

b.2)
Establishment of communication	Symmetry	Communication	Support
demand	bidirectional	pt-pt	E
reserved	symmetric	pt-pt	FS
demand	bidirectional	multipt	A
permanent		pt-pt	A
reserved		multipt	FS
demand	symmetric	multipt	A
permanent		multipt	A

b.3) Access:

Signalling & OAM (Note 2)		User information		Support
Channel & rate	Protocols	Channel & rate	Protocols	

Circuit mode

D(16)	I.430, I.440, I.441	B(64)	I.430	FS I.450, I.451 (Note 3)
				(Note 4)
D(64)	I.431, I.440, I.441	B(64)	I.431,	

U.202

I.450, I.451 (Note 3)		U.202	FS				(Note 4)	

Packet mode

D(16) | " (Note 1) | D(16) | FS | FS

Note 2 - Definition of protocols for OAM are FFS.

Note 3 - Layer 2 and 3 protocols are FFS.

Note 4 - Others are FFS.

8.   Dynamic description

For further study.