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**INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
SERVICE CAPABILITIES**

**TELESERVICES SUPPORTED BY AN ISDN:
TELEFAX 4**

ITU-T Recommendation I.241.3

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation I.241.3 was published in Fascicle III.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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TELESERVICES SUPPORTED BY AN ISDN: TELEFAX 4

(Melbourne, 1988)

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.) Therefore it does not strictly follow Step 1.1 of the service description method. Closer alignment with the method requires further study.

3.1 *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.

3.2 *Description*

3.2.1 *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 - In this class the minimum requirement terminal is a terminal able to send and receive documents containing facsimile encoded information (in accordance with Recommendation T.6 and the T.400-Series).
- Class II - In this class the minimum requirement terminal is a terminal able to transmit documents that are facsimile encoded (in accordance with Recommendation T.6 and the T.400-Series). In addition, the terminal must be capable of receiving documents which are facsimile coded (in accordance with Recommendation T.6 and the T.400-Series), teletex coded (in accordance with the basic coded character repertoire as defined in Recommendation T.61) and also mixed-mode documents (in accordance with Recommendations of the T.400-Series).
- Class III - In this class the minimum requirement terminal is a terminal that is capable of generating, transmitting and receiving facsimile coded documents (in accordance with Recommendation T.6 and the 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 users is the page which is the smallest unit of text treated as an entity. No restrictions shall exist concerning the operator procedures for generation of the text or the positioning of text within the reproducible area on a page.

3.2.2 *Operation – 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. *Procedures*

3.3.1 *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 the receiving memory capability of the terminal.

3.3.2 *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 Recommendation T.62 and Recommendations of the T.400-Series 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.

3.3.3 *Call identification line*

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.

3.3.4 *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 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, for example, by retransmission of one or several pages.

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

3.4 *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.

3.5 *Interworking requirements*

3.5.1 Within the Telefax 4 service, interworking between terminals connected to different networks is required for:

- a) Telefax 4 (ISDN) - Telefax 4 (CSPDN: Circuit switched public data network)
- b) Telefax 4 (ISDN) - Telefax 4 (PSPDN: Packet switched public data network)
- c) Telefax 4 (ISDN) - Telefax 4 (PSTN: Public switched telephone network)

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.

3.5.2 *Intercommunication with other services*

3.5.2.1 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.

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 of the T.400-Series.

TABLE 1/I.241.3
**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	T
Teletex mixed mode		T, MM	T, MM	T	T, MM	T
Teletex processable mode 1		T	T	T	T	T, PM1

- 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.

3.5.2.2 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.

3.6 *Interaction with supplementary services*

Each supplementary service description identifies the applicability with this teleservice.

For the ISDN, the international supplementary services for the Telefax 4 service in the circuit mode using a B-channel are:

- 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 a packet mode of operation are for further study.

3.7 *Attributes and values of attributes of the Telefax 4 service*

a) *LOW LAYER ATTRIBUTES*

Information transfer attributes

	<i>Circuit-mode bearer capability</i>	<i>Packet-mode bearer capability</i>
1. Information transfer mode	circuit	packet
2. Information transfer 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. Information transfer capability	unrestricted (Note 1)	unrestricted
4. Structure	unstructured (Note 2)	service data unit integrity
5. Establishment of communication	demand	demand (VC)/ permanent (PVC)
6. Symmetry	bidirectional symmetric	bidirectional symmetric
7. Communication configuration	point-to-point	point-to-point

Access attributes

	<i>Circuit-mode bearer capability</i>	<i>Packet-mode bearer capability</i>
8. Access channel:	B for user information 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-channel and/or virtual circuit within B-channel.
9. Access protocol		
9.1 Signalling access protocol layer 1:	Rec. I.430/I.431	Rec. I.430/I.431
9.2 Signalling access protocol layer 2:	Rec. I.440/I.441	Rec. I.440/I.441, X.31
9.3 Signalling access protocol layer 3:	Rec. I.450/I.451	Rec. I.450/I.451, X.31
9.4 Information access protocol layer 1:	Rec. I.430/I.431	Rec. I.430/I.431
9.5 Information access protocol layer 2:	Rec. X.75 (SLP)	Rec. X.25 (LAPB)
9.6 Information access protocol layer 3:	ISO 8208	Rec. X.25 (PLP)

b) *HIGH LAYER ATTRIBUTES*

10. Type of user information :	Telefax 4
11. Layer 4 protocol functions:	T.70
12. Layer 5 protocol functions:	T.62
13. Layer 6 protocol functions:	T.400-Series (Note 4)
13.1 Resolution [pixels per inch (ppi)]:	200 × 200 standard; 240 × 240, 300 × 300, 400 × 400 optional
14. Layer 7 protocol functions:	T.503, T.521, T.563

c) *GENERAL ATTRIBUTES*

15. Supplementary services provided:	see § 3.6
16. Quality of service:	for further study
17. Interworking possibilities:	see § 3.5
18. Operational and commercial:	for further study

Note 1 - The interworking arrangements with networks having a restricted 64 kbit/s information transfer capability require further study.

Note 2 - Even if no structure is required the network may provide 8 kHz integrity.

Note 3 - User information transferred via virtual channel on the D-channel is for further study.

Note 4 - Further study is required to identify a more precise reference in the T.400-Series of Recommendations.

3.8 *Recommended support of Telefax 4 by an ISDN*

- a) Overall support¹: A
- b) Variations of non-dominant attributes:
 - 1) Information transfer mode

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

- circuit: A
- packet: A

- 2) *Establishment of communication* *Symmetry* *Communication configuration* *Support*¹

demand	bidirectional symmetric	pt-pt	E
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- 3) Access

Signalling and OAM (Note 1)		User information		Support
Channel and rate	Protocols	Channel and rate	Protocols	
Circuit mode				
D(16)	I.430, I.440, I.441, I.450, I.451 (Note 2)	B(64)	I.430, X.75 (SLP), ISO 8208	A
D(64)	I.431, I.440, I.441, I.450, I.451 (Note 2)	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) or D (16)	I.430, X.25 LAPB, X.25 (PLP)	A
D(64)	I.431, I.440, I.441, I.450, I.451, X.31	B(64)	I.431, X.25 LAPB, X.25 (PLP)	FS
VC in B(64)	for further study	B(64)	FS	FS

Note 1 - Definition of protocols for OAM is for further study.

Note 2 - Demand services only. Others are for further study.

3.9 *Dynamic description*

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

¹ The definition of E (essential) and A (additional) can be found in Recommendation I.240.