



STI 10

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Interface technical specifications
for France Telecom's network

Directive 1999/5/EC

Characteristics of Transfix leased link service access interfaces

Summary: This document gives a brief description of the Transfix and Transfix 2.0 leased link services, and describes the technical characteristics of the interfaces used for accessing these services.

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France Telecom further points out users' attention on the following points:

1. timer values are indicative and can be subject to modification,
2. due to various technical constraints, some services or service options may not be available on some interfaces,
3. the fact that a service not yet commercially open is described in this document can in no case be considered as a binding commitment on France Telecom part to actually open this service.

Table of contents

1. OVERVIEW	1
2. 2048 KBIT/S G.703 INTERFACE FOR ACCESSING TRANSFIX SERVICES	3
2.1 DEFINITION OF THE SERVICE	3
2.2 SYNCHRONISATION AND JITTER.....	3
2.3 CONNECTION INTERFACE.....	3
2.4 OPERATION	3
3. G.703/G.704 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES.....	4
3.1 DEFINITION OF THE SERVICE	4
3.2 SYNCHRONISATION	5
3.3 CONNECTOR.....	5
3.4 OPERATION	5
4. MULTICHANNEL G.703/G.704 INTERFACE FOR ACCESSING TRANSFIX 2.0 SERVICES.....	6
4.1 DEFINITION OF THE SERVICE	6
4.2 SYNCHRONISATION	7
4.3 CONNECTION INTERFACE.....	7
4.4 OPERATION	7
5. X.24/V.11 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES.....	8
5.1 DEFINITION OF THE SERVICE	8
5.2 SYNCHRONISATION	8
5.3 CONNECTION INTERFACE.....	8
5.4 OPERATION	9
6. V.36 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES	10
6.1 DEFINITION OF THE SERVICE	10
6.2 SYNCHRONISATION	10
6.3 CONNECTION INTERFACE.....	10
6.4 OPERATION	11
7. V.35 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES	12
7.1 DEFINITION OF THE SERVICE	12
7.2 CONNECTION INTERFACE.....	12
8. 64 KBIT/S G.703 INTERFACE FOR ACCESSING TRANSFIX 2.0 SERVICES	13
8.1 DEFINITION OF THE SERVICE	13
8.2 SYNCHRONISATION	13
8.3 CONNECTOR.....	13
8.4 OPERATION	13
9. V.24/V.28 INTERFACE FOR ACCESSING TRANSFIX SERVICES	14
9.1 DEFINITION OF THE SERVICE	14
9.2 SYNCHRONISATION	14
9.3 ASYNCHRONOUS TRANSMISSION SERVICE	14
9.4 CONNECTION INTERFACE.....	14
9.5 OPERATION	15
10. HISTORY.....	15

1. OVERVIEW

Transfix and Transfix 2.0 are bidirectional digital leased link service lines. These links support, on standardised interfaces, the low, medium and high rates given below.

Interfaces offered for each service according to the rate:

Low rate	Medium rate		High rate								
2.4 – 19.2 kbit/s	64 kbit/s		128 kbit/s	256 kbit/s	384 kbit/s	512 kbit/s	768 kbit/s	1024 kbit/s	1920 kbit/s	1984 kbit/s	2048 kbit/s
Transfix V.24/V.28											
	Transfix V.35 - V.36	Transfix X.24/V.11	Transfix X.24/V.11					Transfix X.24/V.11			
									Transfix G.703/G.704		Transfix G.703
	Transfix 2.0 X.24/V.11										
	Transfix 2.0 V.35 - V.36										
	Transfix 2.0 G.703-64 kbit/s		Transfix 2.0 G.703/G.704								
	Transfix 2.0 Multichannel G.703/G.704										

Data Terminal Equipment (DTE): The equipment that transmits or receives data (router, multiplexer, automatic branch exchange, computer equipment, etc.).

Data Circuit terminating Equipment (DCE): The equipment supplied, installed and maintained by France Telecom to which the DTE is connected.

France Telecom holds the customer responsible for ensuring that the premises on which link termination points are installed are suitably fitted out, regardless of who owns these premises.

The connecting cable between the DTE and the connection interface is supplied by the customer.

STI 10/Edition 2
Transfix leased link services access interface characteristics

- 2 -

Summary of interface characteristics

Common name	Characteristics			Standardised name	Signalling management	Services and rates available
	Functional	Electrical	Mechanical			
2048 kbit/s G.703	G.703 ETS 300 166	G.703 ETS 300 166	2 foiled symmetrical pairs	G.703	-	Transfix 2048 kbit/s
G.703/G.704	G.704 ETS 300 167	G.703 ETS 300 166	Sub-D 9-pin	G.703/G.704	Opt. 1 with TS16 Opt. 2 w/o TS16	Transfix 1984, 1920 kbit/s Transfix 2.0 1920, 1024, 768, 512, 384, 256 kbit/s
Multichannel G.703/G.704	G.704 ETS 300 167	G.703 ETS 300 166	Sub-D 9-pin	Multichannel G.703/G.704	w/o TS16 Signalling not transported	Transfix 2.0 Unit: 1024, 768, 512, 384, 256, 128, 64 kbit/s Composite: 512 - 1920 kbit/s
X.24/V.11	X.24	V.11 - X.27	ISO 4903 15-pin	X.24/V.11	State of C circuit transported on I circuit	Transfix 1920, 256, 128, 64 Transfix 2.0 1920, 1024, 768, 512, 384, 256, 128, 64 kbit/s
V.36	V.24	V.11, V.10	ISO 4902 37-pin	V.24/V.11, V.10	Circuit 109 forced closed	Transfix 64 kbit/s Transfix 2.0 64 kbit/s
V.35¹	V.24	V.11, V.10	ISO 2593 34-pin	V.24/V.11, V.10	Circuit 109 forced closed	Transfix 64 kbit/s Transfix 2.0 64 kbit/s
64 kbit/s G.703	G.703	G.703	Termination or connecting strip	64 kbit/s G.703	-	Transfix 2.0 64 kbit/s
V.24/V.28	V.24	V.28	ISO 2110 25-pin	V.24/V.28	-	Transfix 19200, 9600, 4800, 2400 bit/s

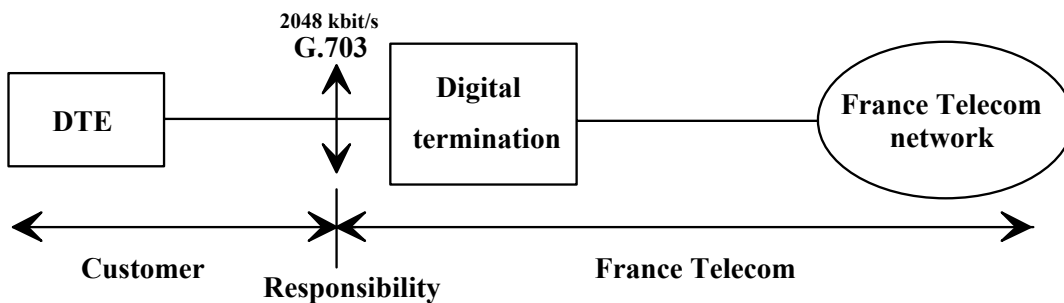
¹ The standardised V.35 interface (V.35 and V.28 electrical characteristics) is no longer offered. The electrical characteristics of this interface are identical to those of the V.36 interface.

2. 2048 KBIT/S G.703 INTERFACE FOR ACCESSING TRANSFIX SERVICES

2.1 DEFINITION OF THE SERVICE

France Telecom provides, between two customer sites, a service for simultaneous bidirectional digital transmission at a rate of 2048 kbit/s.

This service is offered on a 4-wire symmetrical pair interface, which complies with chapter 6 of ITU-T Recommendation G.703.



2.2 SYNCHRONISATION AND JITTER

If the clock frequencies are not aligned in the two transmission directions, they are adjusted by way of frame jumps or repeated frames.

The local DTE provides timing of $2048 \text{ kHz} \pm 50 \cdot 10^{-6}$ to the remote DTE to ensure that the link operates correctly.

The maximum authorised jitter outgoing from the DTE must comply with Recommendation G.823.

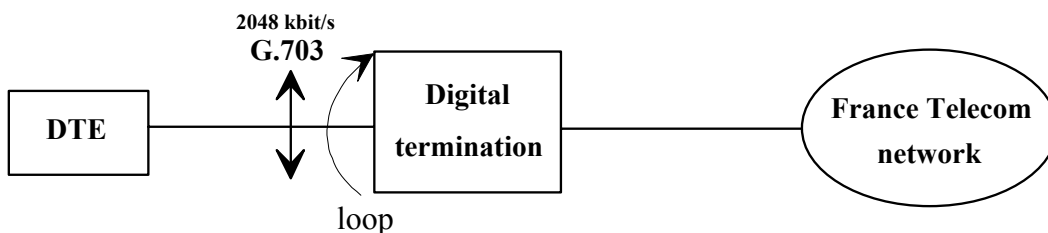
2.3 CONNECTION INTERFACE

The connection interface, available on the customer distribution frame, is composed of four wires with symmetrical pairs, with separate shields per pair.

The connection interface is represented by a terminating block supplied by France Telecom.

2.4 OPERATION

Test loops:



Test loops are available to locate any faults.

Reaction to transmission problems: If there is a problem with the transmission channel, the data transmitted to the DTE in the direction affected is set to 1.

3. G.703/G.704 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES

3.1 DEFINITION OF THE SERVICE

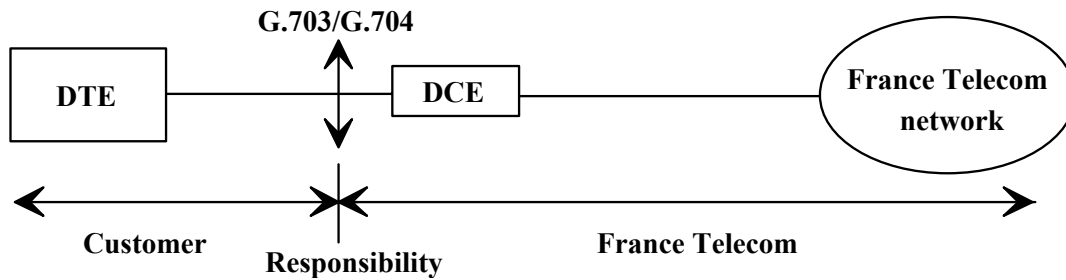
France Telecom provides, between two customer sites, a service for simultaneous bidirectional digital transmission at rates of 256, 384, 512, 768, 1024, 1920 or 1984 kbit/s, on a basic frame at 2048 kbit/s whose structure complies with Recommendation G.704 (§ 2.3 and § 5, excluding § 5.1.3).

This service is offered on a 4-wire symmetrical pair interface, which complies with chapter 6 of Recommendation G.703.

The DCEs are supplied, installed and maintained by France Telecom.

Time Slot 0 (TS 0) of the G.704 frame delivered by the customer DTE must comply with section 2.3.2 of Recommendation G.704, but it is not transmitted in the network.

The CRC-4 procedure is not enabled on the G.703/G.704 interface.



One of the options in the table below must be chosen by the customer for presentation of data TS's in the frame sent by the DTE.

"Data" denotes the contents of the TS's assigned to the leased link concerned only (excluding TS 0).

Rate	Option 1 - with TS 16	Option 2 - without TS 16
256 kbit/s	TS 1 - 3 + TS 16	TS 1 - 4
384 kbit/s	TS 1 - 5 + TS 16	TS 1 - 6
512 kbit/s	TS 1 - 7 + TS 16	TS 1 - 8
768 kbit/s	TS 1 - 11 + TS 16	TS 1 - 12
1024 kbit/s	TS 1 - 16	N/A
1920 kbit/s	TS 1 - 30	N/A
1984 kbit/s	TS 1 - 31	N/A

Note: With option 1, TS 16 is handled and carried in the network in the same way as any other data TS.

3.2 SYNCHRONISATION

If the clock frequencies are not aligned in the two transmission directions, they are adjusted by way of frame jumps or repeated frames.

Transfix:

By default, the clock frequencies are produced and delivered by the DCE using its internal oscillator, which has a precision level greater than $50 \cdot 10^{-6}$.

With special configurations, the link can be synchronised by the DTE.

Transfix 2.0:

France Telecom synchronises the link, via the G.703/G.704 interface.

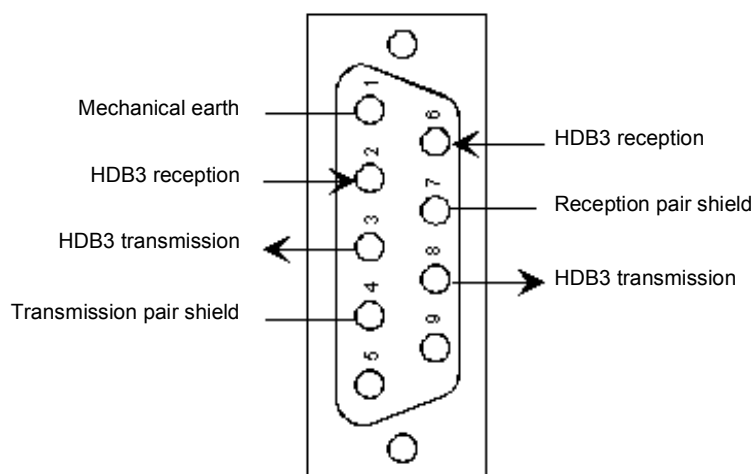
3.3 CONNECTOR

Properties of the connector available on the DCE:

Connection: Female 9-pin Sub-D with lock

Functions: Transmission signal and reception signal

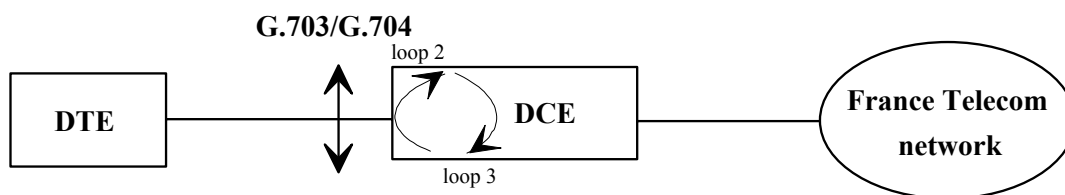
Electrical characteristics: Comply with Recommendation G.703



Note: Pins 4 and 7 are connected to pin 1 (inside the equipment)

3.4 OPERATION

Test loops:



Standardised test loops are available to locate any faults.

It is possible to enable loop 3 for the G.703/G.704 interface. This loop, controlled manually, provokes:

- the loopback of data carried in the link to the local DTE,
- all data transmitted in the remote DTE direction to be set to 1.

It is also possible to enable loop 2 for the G.703/G.704 interface. This loop, controlled manually, provokes:

- the loopback of data to the remote equipment,
- all data transmitted in the local DTE direction to be set to 1.

DCE reaction to transmission problems:

If there is a problem with the transmission channel, the data transmitted to the DTE in the direction affected is set to 1.

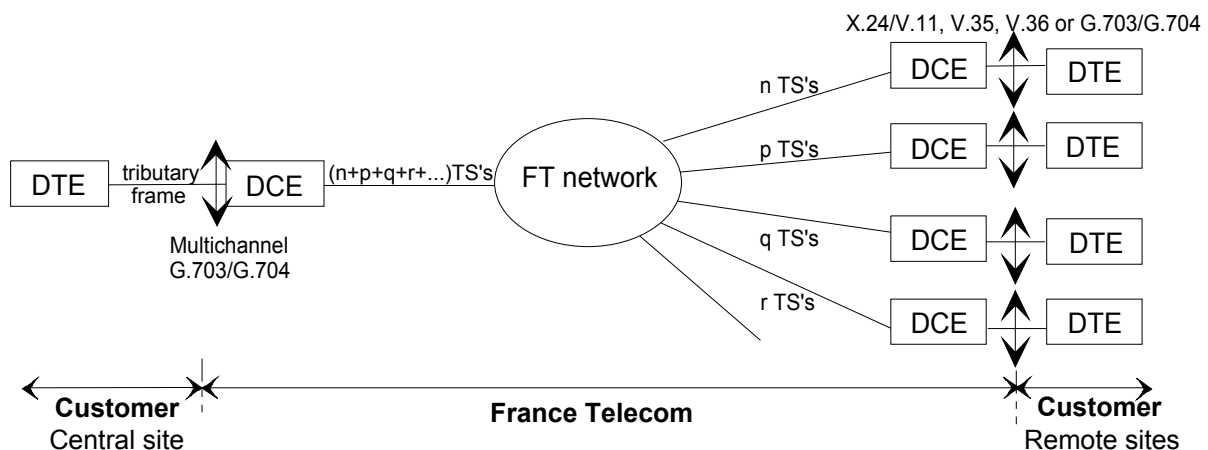
4. MULTICHANNEL G.703/G.704 INTERFACE FOR ACCESSING TRANSFIX 2.0 SERVICES

4.1 DEFINITION OF THE SERVICE

France Telecom provides, between a customer's central site and various customer remote sites, Transfix 2.0 leased links with a rate of 64, 128, 256, 384, 512, 768 or 1024 kbit/s (unit rates).

The links are presented on the DCE of the central site on a multichannel interface which groups all the links on the same G.703/G.704 interface.

The CRC-4 procedure is not enabled on the G.703/G.704 interface.



At the **central site** end, access to the service is via a G.703/G.704 interface; the composite rate on the multichannel interface cannot exceed 1920 kbit/s.

At the **remote site** end, access to the service is via the interfaces defined in the following chapters of this document: X.24/V.11, V.35, V.36, G.703/G.704 or multichannel G.703/G.704 interface.

Data TS's (1 - 15 and 17 - 31) in the tributary frame are assigned by France Telecom, who provides the customer with this information when the leased link is commissioned.

Signalling transport management:

Signalling transport in TS 16 is not permitted. Circuits 109 or I of the remote site interfaces are forced closed.

TS 0 of the G.704 delivered by the customer DTE must comply with section 2.3.2 of Recommendation G.704, but it is not transmitted in the network.

4.2 SYNCHRONISATION

If the clock frequencies are not aligned in the two transmission directions, they are adjusted by way of frame jumps or repeated frames.

France Telecom synchronises the link, via the G.703/G.704 interface.

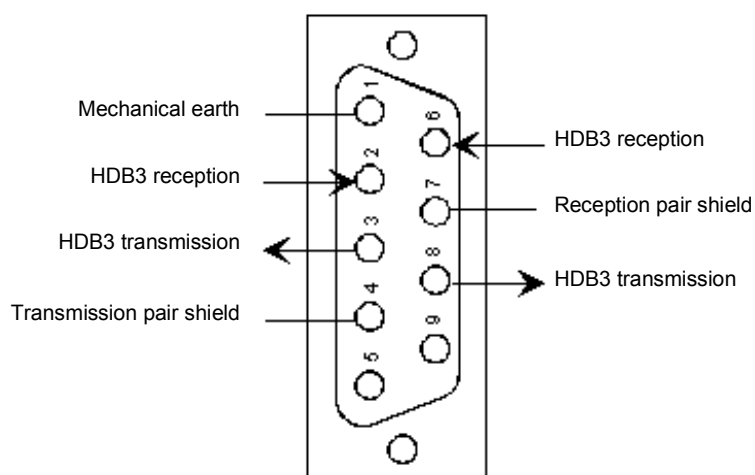
4.3 CONNECTION INTERFACE

Properties of the connection interface available on the DCE:

Connector: Female 9-pin Sub-D with lock

Functions: Transmission signal and reception signal

Electrical characteristics: Comply with Recommendation G.703



Note: Pins 4 and 7 are connected to pin 1 (inside the equipment)

4.4 OPERATION

Test loops:

The customer is not offered any test loops at the multichannel G.703/G.704 interface end.

France Telecom can enable, remotely:

- loop 2 on the access interface, remote site end,
- the loopback of the n data TS's of one or more links on the access interface, central site end.

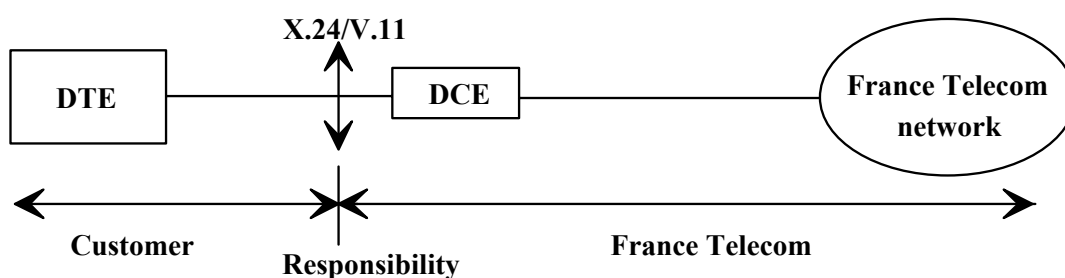
DCE reaction to transmission problems:

If there is a problem with the transmission channel, the data transmitted to the DTE in the direction affected and on each link concerned is set to 1.

5. X.24/V.11 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES

5.1 DEFINITION OF THE SERVICE

France Telecom provides, between two customer sites, a service for simultaneous bidirectional digital transmission at rates of 64, 128, 256, 384, 512, 768, 1024 and 1920 kbit/s.



5.2 SYNCHRONISATION

Transfix:

The clock frequencies delivered to the S and B circuits are produced by the DCE using its internal oscillator.

Transfix 2.0:

The clock frequencies delivered to the S and B circuits are produced using the reference timing supplied by the France Telecom network.

5.3 CONNECTION INTERFACE

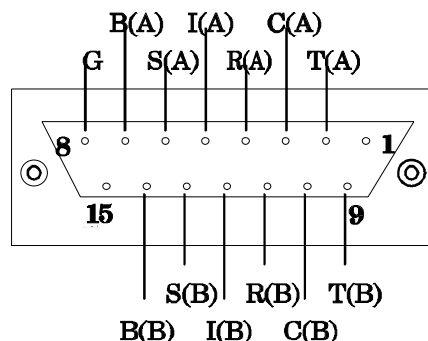
The functional characteristics of the circuits comply with Recommendation X.24.

The G, T, C, R, I, S and B circuits are available. The electrical characteristics of the T, C, R, I, S and B circuits comply with Recommendation V.11. Provision of the B circuit is optional.

Transport on the I circuit of the state of the C circuit, provided by the DTE located at one end of the link, is optional. Reproduction of any phase relationship between the T and C circuits of the DCE at one end of the link and the R and I circuits of the remote DCE is not supported.

Connector

The interface is available on a 15-pin female connector (illustrated below) that complies with the ISO 4903 standard. The connector is attached to the DCE, to a connection strip, or to the end of an adapter unit.

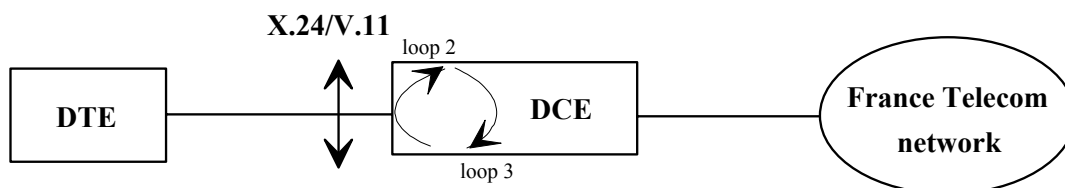


ISO 4903 connector – Contact side

5.4 OPERATION

Test loops:

Standardised test loops are available to locate any faults.



Standardised loops 2 and 3 can be enabled (Recommendation X.150). These loops are enabled by the customer using a control device (e.g. switch or key).

It is possible to remotely control loop 2 on the DCE located at the other end of a link by way of manual intervention on the local DCE.

DCE reaction to transmission problems:

If there is a problem with the transmission channel (reception direction), circuit R is set to 1 and circuit I is opened.

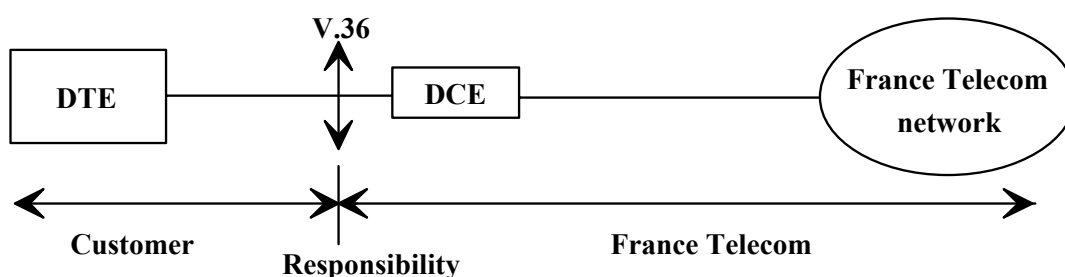
Note: This action is taken immediately for data, but only on expiry of a 1 s timer after detection of the problem for the I circuit.

6. V.36 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES

6.1 DEFINITION OF THE SERVICE

France Telecom provides, between two customer sites, a service for simultaneous bidirectional digital transmission at a rate of 64 kbit/s.

The service is established on point-to-point links. Access to the service is via an ISO 4902 connector (also called a V.36 connector).



6.2 SYNCHRONISATION

Transfix:

The clock frequencies delivered to circuits 114 and 115 are produced by the DCE using its internal oscillator.

Transfix 2.0:

The clock frequencies delivered to circuits 114 and 115 are produced by the DCE using the reference timing supplied by the France Telecom network.

6.3 CONNECTION INTERFACE

The functional characteristics of the circuits comply with Recommendation V.24.

The electrical characteristics of circuits 103, 104, 114 and 115 comply with Recommendation V.11.

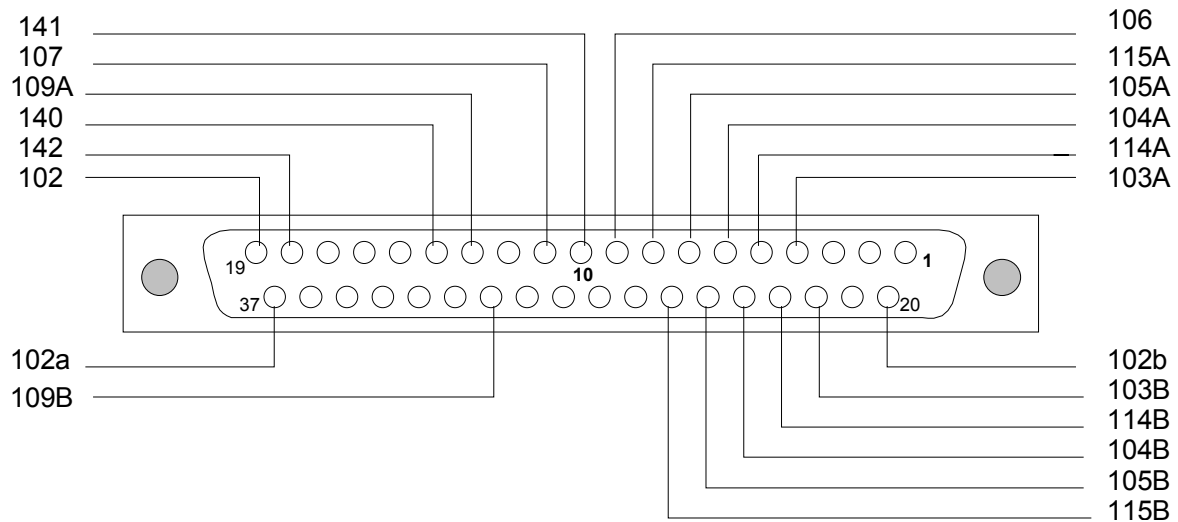
The electrical characteristics of circuits 105 and 109 comply with Recommendation V.10 or V.11. The receiver complies with Recommendation V.10 category 1 or V.11, without termination.

The electrical characteristics of circuits 106, 107, 140, 141 and 142 comply with Recommendation V.10. The receiver complies with Recommendation V.10 category 2.

Transport to the remote end on circuit 109 of the state of circuit 105, provided by the DTE located at one end of the link, is optional.

Connector

The interface is available on a 37-pin female connector (illustrated below) that complies with the ISO 4902 standard. The connector is attached to the DCE or to a connection strip.

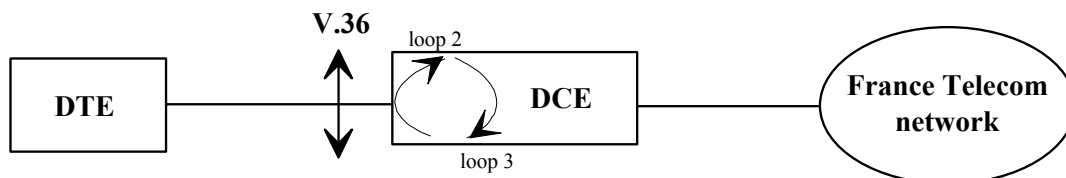


ISO 4902 connector – Contact side

6.4 OPERATION

Test loops:

Standardised test loops are available to locate any faults.



Standardised loops 2 and 3 can be enabled (Recommendation V.54). The user can control these loops using a control device.

It is possible to remotely control loop 2 on the DCE located at the other end of a link by way of manual intervention on the local DCE.

DCE reaction to transmission problems:

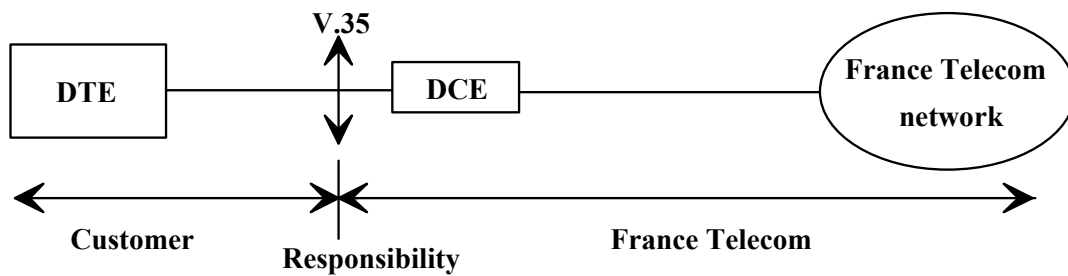
If there is a problem with the transmission channel, the data bits on circuit 104 are set to 1 and circuits 109 and 107 are opened.

Note: This action is taken immediately for data, but only on expiry of a 1 s timer after detection of the problem for circuit 109.

7. V.35 INTERFACE FOR ACCESSING TRANSFIX AND TRANSFIX 2.0 SERVICES

7.1 DEFINITION OF THE SERVICE

France Telecom provides, between two customer sites, a service for simultaneous bidirectional point-to-point digital transmission at a rate of 64 kbit/s.



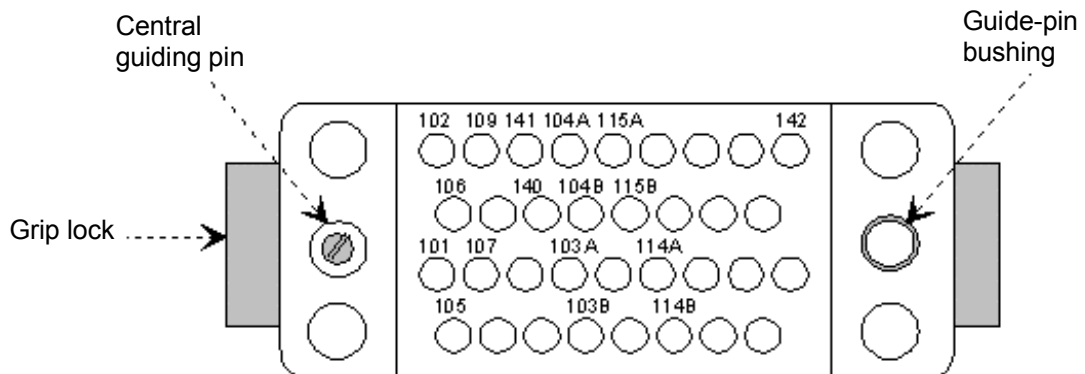
7.2 CONNECTION INTERFACE

As the V.35 standardised interface (V.35 and V.28 electrical characteristics) is no longer offered, the service is established on links and access to the service is via an ISO 2593 connector (also called a V.35 connector). The electrical characteristics of the circuits of this interface are identical to those of the V.36 interface (see chapter 6).

Connector

The interface is available on a 34-pin female connector (illustrated below) that complies with the ISO 2593 standard. **The pin diameter is 1 mm.**

The connector is attached to the DCE, to a connection strip, or to the end of an adapter unit.



ISO 2593 connector – Contact side

8. 64 KBIT/S G.703 INTERFACE FOR ACCESSING TRANSFIX 2.0 SERVICES

8.1 DEFINITION OF THE SERVICE

France Telecom provides, between two customer sites, a service for simultaneous bidirectional point-to-point digital transmission at a rate of 64 kbit/s, unrestricted with octet integrity.

The service is established on point-to-point links and access to the service is via a codirectional physical interface that complies with chapter 1 of Recommendation G.703.

8.2 SYNCHRONISATION

The clock frequencies are produced by the DCE using its internal oscillator, which has a precision level greater than $100 \cdot 10^{-6}$.

8.3 CONNECTOR

Properties of the connector available on the DCE:

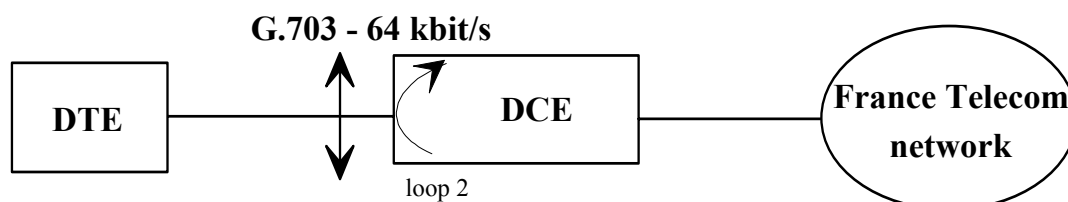
Connection: Termination strip or connecting strip

Functions: Transmission signal and reception signal

Electrical characteristics: Comply with Recommendation G.703

8.4 OPERATION

Test loops:



Standardised test loops are available to locate any faults.

It is possible to enable local loop 2. This loop is enabled by the customer using the control device on the front of the DCE.

Note:

When it is enabled, loop 2 provokes:

- the loopback of data to the remote DTE,
- all data transmitted in the local DTE direction to be set to 1.

DCE reaction to transmission problems:

If there is a problem with the transmission channel, the data transmitted to the DTE in the direction affected is set to 1.

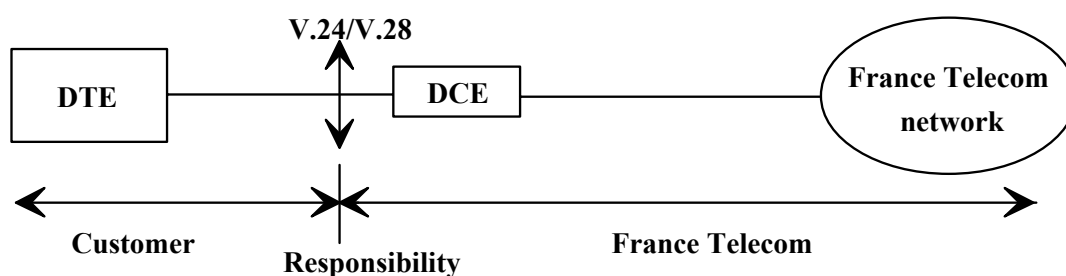
9. V.24/V.28 INTERFACE FOR ACCESSING TRANSFIX SERVICES

9.1 DEFINITION OF THE SERVICE

The Transfix low bit rate service is a service for simultaneous bidirectional synchronous digital transmission at rates of 2400, 4800, 9600 and 19200 bit/s. With the Transfix option for (simplex) asynchronous transmission without error correction described in section 9.3, the modulation rates are 1200, 2400, 4800, 9600 and 19200 bauds.

Access to the service is via a V.24/V.28 physical interface available on the DCE.

The connecting cable between the DTE and the service termination point is supplied by the customer.



9.2 SYNCHRONISATION

The clock frequencies delivered to circuits 114 and 115 are produced using the reference timing supplied by the France Telecom network.

9.3 ASYNCHRONOUS TRANSMISSION SERVICE

Flow control is not available with this version of the service. Simplex operation is not offered.

Default configuration:

The tolerance for the rate of modulation of the signals transmitted by the DTE is +2.3 to -2.5%. The characters processed by the DCE contain:

- 1 start element,
- 7 information elements,
- 1 stop element.

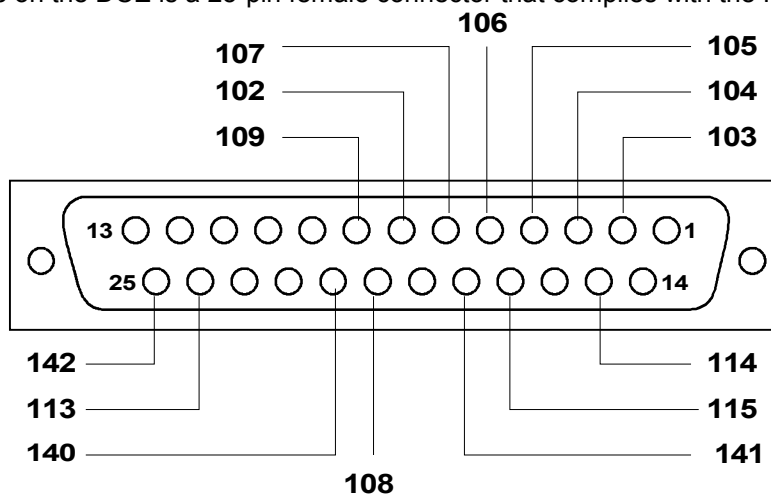
9.4 CONNECTION INTERFACE

The functional characteristics of the physical interface comply with Recommendation V.24. The circuits used for the service are circuits 102, 103, 104, 105, 106, 107, 108, 109, 113, 114, 115, 140, 141 and 142.

The electrical characteristics given in this section comply with Recommendation V.28.

Connector

The connector available on the DCE is a 25-pin female connector that complies with the ISO 2110 standard.



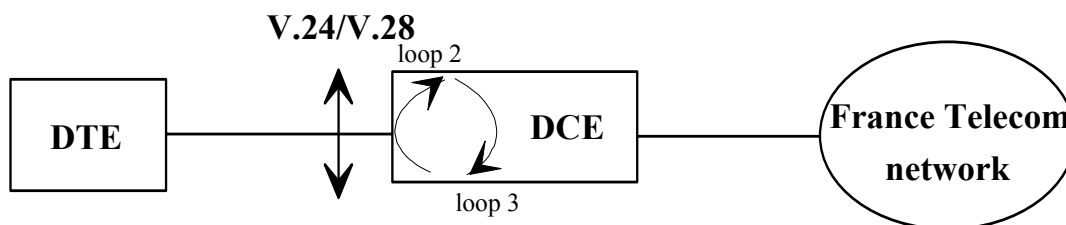
ISO 2110 connector – Contact side

Note: Some of the equipment used by France Telecom, on pin 9 of the V.24 connector (marked national reserve in the ISO 2110 standard) has a direct voltage of +5 V.

9.5 OPERATION

Test loops:

Standardised test loops are available to locate any faults.



Standardised loops 2 and 3 can be enabled (Recommendation V.54). The user can control these loops using a control device.

DCE reaction to transmission problems:

If there is a problem with the transmission channel, the data transmitted to the DTE in the direction affected is set to 1.

10. HISTORY

Edition	Date	Comments
1	March 2000	First version
2	October 2000	Title changed and minor modifications made