



INTERNATIONAL TELECOMMUNICATION UNION

**CCITT**

THE INTERNATIONAL  
TELEGRAPH AND TELEPHONE  
CONSULTATIVE COMMITTEE

**I.605**

(11/1988)

SERIES I: INTEGRATED SERVICES DIGITAL  
NETWORK (ISDN)

Maintenance principles

---

**Application of maintenance principles to static  
multiplexed ISDN basic accesses**

Reedition of CCITT Recommendation I.605 published in  
the Blue Book, Fascicle III.9 (1989)

---

## NOTES

1 CCITT Recommendation I.605 was published in Fascicle III.9 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.

**Recommendation I.605**

**APPLICATION OF MAINTENANCE PRINCIPLES TO STATIC MULTIPLEXED  
ISDN BASIC ACCESSES**

(Melbourne, 1988)

**1 Scope of application**

This Recommendation covers the maintenance of the static multiplexed basic rate access, controlled by the network, and describes the operations and maintenance aspects of the  $V_4$  interface.

The  $V_4$  interface is defined in Recommendation Q.512. The specification of the operations and maintenance aspects of the  $V_4$  interface is the subject of this Recommendation.

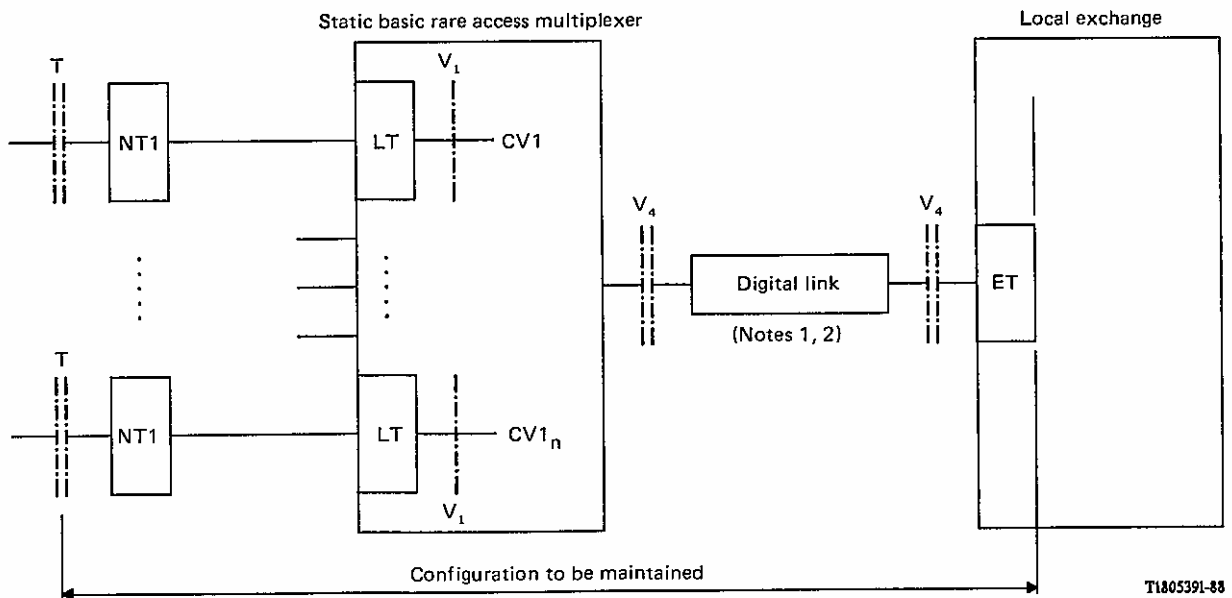
This Recommendation follows the maintenance principles as defined in Recommendation M.20 and applies to the basic rate access connected to the exchange via a multiplexer.

The principle of controlled maintenance is applied for maintaining the static multiplexed basic rate access.

Controlled maintenance is a method of sustaining a desired technical performance by the systematic application of supervision, testing and performance sampling in order to minimize preventive maintenance and to reduce corrective maintenance.

**2 Network configuration for maintenance activities**

Figure 1/I.605 shows the general reference configuration of the multiplexed basic rate access, connected via a digital link to the Exchange Termination (ET).



*Note 1* – The digital link, as defined in Recommendation G.701, can make use of a variety of transmission techniques and media complying with Recommendations G.703 and G.704.

*Note 2* – The digital link may not be present. (Colocated configuration).

FIGURE 1/I.605

**Equipment configuration for maintenance of the multiplexed basic rate access**

### 3 Relationship to the maintenance of the basic rate access

The same principles as given in Recommendation I.603 for the ISDN basic rate accesses directly connected to the local exchange, should be applied. Therefore, the NT1 and LT for the basic rate accesses connected via a static basic access multiplexer to the local exchange must have the same functions as NT1 and LT for the basic rate accesses connected directly to the local exchange.

(The loopback mechanism must be implemented according to Recommendation I.603.)

In order to support these principles, operation and maintenance information has to be exchanged between the digital section for the ISDN basic rate access and the exchange termination (ET). This information is conveyed in the CV1-channel, which is defined in Recommendation Q.512. This CV1-channel is shown in Figure 2/I.605.

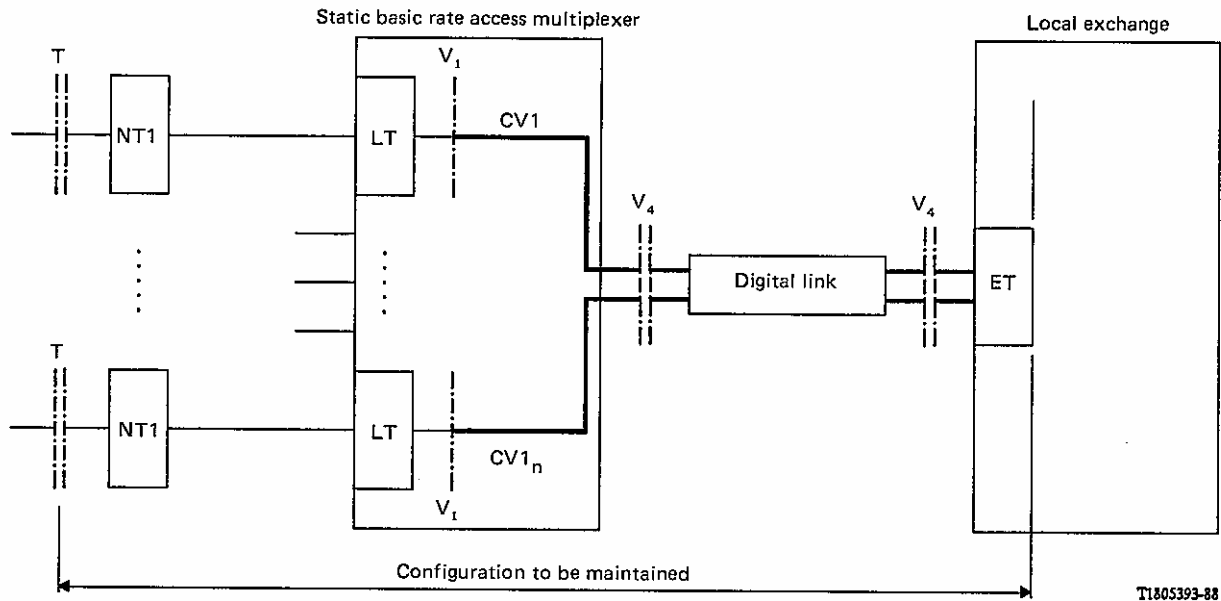


FIGURE 2/I.605

#### Information exchange between the digital section for the ISDN basic rate access and the local exchange termination (ET)

The functions which are allocated within this CV1-channel are defined in Recommendation G.960 on the digital section for the ISDN basic rate access.

These functions can be classified according to:

- activation/deactivation procedures;
- error and status reporting to the ET;
- failure localization within the digital section for the ISDN basic rate access;
- conveyance of control information from the ET to the digital section of the ISDN basic rate access.

### 4 Maintenance of the digital link and basic access multiplexer

#### 4.1 Failure detection

Unlike the ISDN basic access, the digital link and basic access multiplexer are always in the active state (as seen by the exchange). Continuous automatic supervision, supervising the correct functioning of layer 1 up to the basic access multiplexer, is operating. This supervision is called continuous automatic supervision on layer 1.

#### 4.1.1 *Functions applied to the ET*

The functions which are allocated to the ET are listed below:

- detection of loss of incoming signal;
- detection of loss of frame alignment;
- detection of AIS;
- detection of RAI;
- generation of the frame signal;
- CRC code generation;
- RAI generation;
- CRC monitoring of the incoming signal (basic access multiplexer to the ET);
- detection of CRC error information;
- CRC error reporting (ET to the basic access multiplexer) (optional);
- AIS generation.

The implementation of these functions should be the same as for the ET in the ISDN primary rate access, as defined in Recommendation I.604 for the exchange termination (ET).

#### 4.1.2 *Functions applied to the static basic access multiplexer*

The functions which are allocated to the basic access multiplexer are listed below:

- detection of loss of incoming signal;
- detection of loss of frame alignment;
- detection of AIS;
- detection of RAI;
- generation of the frame signal;
- CRC code generation;
- CRC monitoring of the incoming signal (network to basic access multiplexer) and detection of CRC error information (if provided from the ET);
- CRC error reporting (basic access multiplexer to the ET).

The implementation of these functions should be the same as for the NT2 in the primary rate access, as defined in Recommendation I.604.

In addition, the following functions are allocated to the basic access multiplexer:

- sending of AIS on the  $V_4$  interface, in case of a defect in the basic access multiplexer between the  $V_1$  reference point and the  $V_4$  interface of the multiplexer;
- signalling to all the basic rate accesses the condition “out of service due to failure”, in the case of a defect occurring in the basic access multiplexer, between the  $V_1$  reference point and the  $V_4$  interface of the multiplexer, and in the digital link.

#### 4.1.3 *Functions allocated to the digital links*

The functions, which are allocated to the digital links are:

- detection of loss of incoming signal on either end and within the digital link;
- generation and transmission of AIS within the digital link.

#### 4.2 *System protection*

When a defect is detected in the digital link or basic access multiplexer, which has an adverse effect on the availability and/or functionality of all the ISDN basic rate accesses, all the ISDN basic rate accesses connected via this digital link and basic access multiplexer are considered to be “out of service due to failure” and call attempts may be rejected.

When a defect is detected in the digital link or basic access multiplexer, which has an adverse effect on the availability and/or functionality of only one basic rate access, then this particular basic access is considered to be “out of service due to failure” and call attempts may be rejected.

#### 4.3 *Failure information*

When a defect is detected in the basic access multiplexer or digital links, this should be reported to the SAMC by a message.

#### 4.4 *Failure localization*

When a defect is detected in the digital link, additional information for failure localization may be required from other network management entities.

#### 4.5 *Logistic delay time*

See Recommendation M.20.

#### 4.6 *Failure correction*

See Recommendation M.20.

#### 4.7 *Verification*

The verification that the failure has been corrected is performed on demand of the SAMC.

#### 4.8 *Restoration*

After a failure has been rectified and the correct operation of all the accesses verified (during which time the accesses will be in either the “out of service due to failure” or “degraded transmission” conditions), the accesses shall be returned to the “in service” condition. The mechanism/procedure for returning the accesses to the “in service” condition (e.g. automatic or manual) is not a subject of this Recommendation.

#### 4.9 *Overall performance measurements*

See Recommendation I.603 for the performance related to the digital section of the basic rate access, and Recommendation I.604 for the V<sub>4</sub> digital section.

ITU-T I-SERIES RECOMMENDATIONS  
**INTEGRATED SERVICES DIGITAL NETWORK (ISDN)**

<b>GENERAL STRUCTURE</b>	
Terminology	I.110–I.119
Description of ISDNs	I.120–I.129
General modelling methods	I.130–I.139
Telecommunication network and service attributes	I.140–I.149
General description of asynchronous transfer mode	I.150–I.199
<b>SERVICE CAPABILITIES</b>	
Scope	I.200–I.209
General aspects of services in ISDN	I.210–I.219
Common aspects of services in the ISDN	I.220–I.229
Bearer services supported by an ISDN	I.230–I.239
Teleservices supported by an ISDN	I.240–I.249
Supplementary services in ISDN	I.250–I.299
<b>OVERALL NETWORK ASPECTS AND FUNCTIONS</b>	
Network functional principles	I.310–I.319
Reference models	I.320–I.329
Numbering, addressing and routing	I.330–I.339
Connection types	I.340–I.349
Performance objectives	I.350–I.359
Protocol layer requirements	I.360–I.369
General network requirements and functions	I.370–I.399
<b>ISDN USER-NETWORK INTERFACES</b>	
Application of I-Lettres Recommendations to ISDN user-network interfaces	I.420–I.429
Layer 1 Recommendations	I.430–I.439
Layer 2 Recommendations	I.440–I.449
Layer 3 Recommendations	I.450–I.459
Multiplexing, rate adaption and support of existing interfaces	I.460–I.469
Aspects of ISDN affecting terminal requirements	I.470–I.499
<b>INTERNETWORK INTERFACES</b>	
<b>MAINTENANCE PRINCIPLES</b>	
<b>I.600–I.699</b>	
<b>B-ISDN EQUIPMENT ASPECTS</b>	
ATM equipment	I.730–I.739
Transport functions	I.740–I.749
Management of ATM equipment	I.750–I.799

*For further details, please refer to ITU-T List of Recommendations.*

## ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
<b>Series I</b>	<b>Integrated services digital network</b>
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems