ITU-T

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STANDARDIZATION SECTOR
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SERIES M: TELECOMMUNICATION MANAGEMENT,
INCLUDING TMN AND NETWORK MAINTENANCE

Designations and information exchange

Designations for interconnections among operators' networks

ITU-T Recommendation M.1400

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ITU-T Recommendation M.1400

Designations for interconnections among operators' networks

Summary

This Recommendation covers the designations of interconnections among operators' networks of circuits, groups, group and line links, digital blocks, digital paths, data transmission systems, digital blocks created between DCMEs, virtual containers and multiplex sections.

The designation information is in two layers:

–   Layer 1: The unique information; the designation;

–   Layer 2: Additional information; the related information.

Guidance for the user is provided in a series of examples.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Introduction

Designation of interconnecting routes is of great importance for identification and information.

Technical developments, especially those due to digital technology, have brought a much greater variety of techniques and allow for a more efficient use of equipment.

Information on the equipment and techniques used is of great interest to staff working in the field of maintenance and operation. Present operational conditions can be more complicated than those previously, e.g., as a consequence of greater competition in the field of telecommunication. Another consideration is automated file handling, which is often a necessity for network operators/service providers, and the standardization of designation is an important factor to facilitate this.

This revision to ITU-T Rec. M.1400 (01/2004) replaces every occurrence of 'Town' with 'Geographical Area' on the basis of 'Geographical Area' being more applicable for the termination of trails than 'Town'. In addition, this revision aligns ITU-T Rec. M.1400 more closely with the ATIS Standard for location identification, which is not restricted to a town.

ITU-T Recommendation M.1400

Designations for interconnections among operators' networks[1]

1 Scope

This Recommendation defines designations and additional information intended primarily for human-to-human communication between various Operators, i.e., network operators or service providers.

This Recommendation focuses on human needs for stable and recognizable data formats independently of the media they are communicated over. Therefore, in order to support the human-to-human communication, the formats defined in this Recommendation will have to be provided at the corresponding human-to-computer interfaces as well. Hence, this Recommendation defines the presentation formats of data at human-to-computer interfaces, but does not define the data communication formats for interfaces between computer systems such as at the TMN X interface, or non-TMN computer interfaces. However, it must be possible to automatically map the human-to-computer formats to the computer-to-computer formats and vice versa. The details of this mapping are for further study.

This Recommendation extends previous designation of international routes to cover routes between national Operators as well. However, use of this Recommendation inside national jurisdictions would be subject to national regulation and/or bilateral agreement between Operators. Although compliance with all ITU-T Recommendations is voluntary, special mention is made for ITU-T Rec. M.1400 due to the sensitivity of designations for interconnection from a regulatory and legal standpoint. This extension greatly increases the number of routes and nodes to be identified, and in this way extends the name spaces to be provided.

This Recommendation defines both designations and additional information to be exchanged between two Operators. However, this Recommendation focuses on information on network resources, Operators and their addresses, and does not define order or transaction identification or additional information on the status or processing of these orders or transactions.

The definition of information is independent of which function it supports. However, the selection of information defined in this Recommendation basically supports provisioning and network maintenance. In addition, this Recommendation may cover some information required for other TMN or non-TMN functions, such as ordering and billing.

This Recommendation aims at supporting communication between network operators, but may also support communication between network operators and service providers, brokers, retailers, customers and installation providers.

This Recommendation aims at defining designations and additional information for technicians and file support personnel at their terminals supporting the network, and serves as design information for developers of operational support systems.

This Recommendation is presented in informal natural language, tables and figures. To support automatic interaction between computer systems of various Operators, more formalization is needed. Also, the formalization may lead to redefinition of the scope of this Recommendation. These issues are for further study.

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[1] Circuits, groups, group and line links, digital blocks, digital paths, data transmission systems, digital blocks created between DCMEs, virtual containers, multiplex sections and related information.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[1]   ITU-T Recommendation Q.9 (1988), *Vocabulary of switching and signalling terms*.

[2]   ISO 3166-1:1997, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*.

[3]   ITU-T Recommendation R.70 (1988), *Designation of international telegraph circuits*.

[4]   ITU-T Recommendation M.1055 (1988), *Lining up an international multiterminal leased circuit*.

[5]   ITU-T Recommendation M.1012 (1988), *Circuit control station for leased and special circuits*.

[6]   ITU-T Recommendation M.1013 (1988), *Sub-control station for leased and special circuits*.

[7]   ITU-T Recommendation M.1045 (1996), *Preliminary exchange of information for the provision of international leased circuits and international data transmission systems*.

[8]   ITU-T Recommendation Q.8 (1988), *Signalling systems to be used for international manual and automatic working on analogue leased circuits*.

[9]   ITU-T Recommendation M.1020 (1993), *Characteristics of special quality international leased circuits with special bandwidth conditioning*.

[10]   ITU-T Recommendations G.731 to G.755, concerning the *Principal characteristics of primary, second order and higher order digital multiplex equipment*.

[11]   ITU-T Recommendation G.113 (2001), *Transmission impairments due to speech processing*.

[12]   ITU-T Recommendation E.171/Q.13 (1988), *International telephone routing plan*.

[13]   ITU-T Recommendation G.702 (1988), *Digital hierarchy bit rates*.

[14]   ITU-T Recommendation G.811 (1997), *Timing characteristics of primary reference clocks*.

[15]   ITU-T Recommendation M.80 (1988), *Control stations*.

[16]   ITU-T Recommendation M.90 (1988), *Sub-control stations*.

[17]   ITU-T Recommendation M.1510 (1992), *Exchange of contact point information for the maintenance of international services and the international network*.

[18]   ITU-T Recommendation M.2130 (2000), *Operational procedures for the maintenance of the transport network*.

[19]   ITU-T Recommendation M.20 (1992), *Maintenance philosophy for telecommunication networks*.

[20]   ITU-T Recommendation G.707/Y.1322 (2003), *Network node interface for the synchronous digital hierarchy (SDH)*.

[21]   ITU-T Recommendation V.29 (1988), *9600 bits per second modem standardized for use on point-to-point 4-wire leased telephone-type circuits.*

[22]   *ITU-T List of ITU Carrier Codes as provided via the ITU distributed ICC web at* www.itu.int/ITU-T/inr/icc/index.html.

[23]   ITU-T Recommendation E.164 (2005), *The international public telecommunication numbering plan.*

[24]   ITU-T Recommendation M.60 (1993), *Maintenance terminology and definitions.*

[25]   ITU-T Recommendation G.831 (2000), *Management capabilities of transport networks based on the synchronous digital hierarchy (SDH).*

[26]   ITU-T Recommendation M.1340 (2000), *Performance objectives, allocations and limits for international PDH leased circuits and supporting data transmission links and systems.*

[27]   ITU-T Recommendation M.1380 (2000), *Bringing-into-service of international leased circuits that are supported by international data transmission systems.*

[28]   ITU-T Recommendation M.1385 (2000), *Maintenance of international leased circuits that are supported by international data transmission systems.*

[29]   ITU-T Recommendation G.692 (1998), *Optical interfaces for multichannel systems with optical amplifiers.*

[30]   ITU-T Recommendation G.872 (2001), *Architecture of optical transport networks.*

3   Definitions

This Recommendation defines the following terms:

3.1   association: Information about a route that identifies which other route(s) are related and what the type of relation is between them (e.g., diverse routing).

3.2   clocking information: Information used to specify if a G.811 compliant clocking system or a Master-Slave clocking system is applied to the digital block. If a Master-Slave clocking system is applied, this information identifies the Master and the Slave.

3.3   composition of transmission: Information about a circuit with respect to its applied routing, i.e., on analogue, digital or mixed transmission.

3.4   created digital block: A digital block created by the interconnection of two Digital Circuit Multiplication Equipments (DCMEs). The bit rate for this kind of digital block is 1544 kbit/s or 2048 kbit/s. Its frame structure does not coincide with the multi-frame structure as defined in ITU-T Rec. G.704 as the bit rate of each channel is one of the following: 64, 40, 32, 24, 16 kbit/s. The number of channel carried by a created digital block ranges from 30 to 240, in multiples of 30.

3.5   designation: Information in a structured format that provides identification of a *route*. The designation consists of *traffic relation*, *function code* and *serial number*.

3.6   digital block: A block which is part of the digital multiplex hierarchy and which is formatted according to ITU-T Recs G.734, G.736, G.742, G.743, G.745, G.751, G.752, G.753 and G.754.

3.7   equipment information: Information about the equipment used in the *route* when this equipment requires special maintenance attention.

3.8   function code: A portion of a designation that identifies the type of route by a distinguishing characteristic, e.g., directionality, bit rate.

3.9   Geographical area name: The official name of a geographical area as identified in the country to which it belongs.

3.10   **ITU carrier code**: A unique identifier of a Network Operator/Service Provider, listed and maintained in the "List of ITU Carrier Codes (according to ITU-T Rec. M.1400)".

3.11   **network operator**: An operator that manages a telecommunications network. A Network Operator may be a *Service Provider* and vice versa. A Network Operator may or may not provide particular telecommunications services. See 1.4.2.3/M.3208.1, 1.4.4/M.3320.

3.12   **operator**: An organization responsible for identification and management of telecommunication resources. An operator must be legally recognized by the telecommunication administration of the Country, or delegation thereof. An Operator may or may not correspond to a trading partner.

3.13   **related information**: Set of information about a route that is necessary to know about at both terminations of that route.

Comment:

•   Related information is also referred to as Layer 2.

•   The set is categorized by numbered items with specified formats. The items cover technical characteristics, e.g., routing and occupancy, as well operational ones, e.g., control stations.

3.14   **route**: All types of telecommunication connections: circuits, groups, blocks, etc.

3.15   **serial number**: A portion of a designation that enumerates routes having the same *traffic relation* and *function code*.

3.16   **service provider**: A general reference to an operator that provides telecommunication services to Customers and other users either on a tariff or contract basis. A Service Provider may or may not operate a network. A Service Provider may or may not be a Customer of another Service provider. See 1.4.6/M.3320.

3.17   **suffix**: Information about the network node and network operator/service provider operating the node and that are associated with a *route* termination.

3.18   **terminal country**: Information that identifies one of the countries in which a route is terminating.

3.19   **transmission medium information**: Information about a route meant to give a warning about routing restrictions with respect to the transmission medium.

3.20   **transport relation**: An ordered pair of *route* terminations.

3.21   **use**: Information on the usage of the *route* when this usage is required by the operator.

The ITU Carrier Code provides a unique identifier of an Operator within a Country. The assignment of ICCs may be delegated to a lower level administration, e.g., province or state.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations:

ADPCM   Adaptive Differential Pulse Code Modulation

AP   Access Point

ATM   Asynchronous Transfer Mode

BC   Bearer Circuit

CIC   Circuit Identification Code

CO   Compandor

CS   Control Station

CTE	Channel Translating Equipment
DC	Derived Circuit
DCME	Digital Circuit Multiplication Equipment
EC	Echo Canceller
EP	Even Position
ES	Echo Suppressor
GTE	Group Translating Equipment
LRE	Low Rate Encoding
NO/SP	Network Operator/Service Provider
OP	Odd Position
PLR	Part of a Longer Route
SCS	Sub-control Station
SDH	Synchronous Digital Hierarchy
SGTE	Supergroup Translating Equipment
SI	Speech Interpolation
SLA	Service Level Agreement
SPC	Signalling Point Code
TDM	Time Division Multiplex
VC	Virtual Container
VC-n	Virtual Container-n

5 Conventions

Data fields in the designation and related information shall consist of sequences of characters, each character being either an alphabetic (A-Z) or numeric (0-9). Additional requirements for symbols are explicitly stated in format requirements for specific fields. It is recommended that alphabetic characters be represented with upper case letters unless stated otherwise.

6 Framework

To cover the need for standardized designations which are easy to handle but which give precise information, the designation information is built up from two layers:

–   Layer 1 provides the unique identification: the designation.

–   Layer 2 provides the necessary additional information which must be known at both terminations of the routes: the related information.

6.1 Layer 1

The general format of layer 1 for the designation of all types of interconnecting routes is shown in Table 1.

Table 1/M.1400 – Layer 1 designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 6	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

An ordered pair of route termination identifiers:

Geographical area A and Geographical area B refer to the names of the two geographical areas in which the origin and destination terminations of the interconnecting routes are located. The Geographical area names (required one to twelve characters or space) (see Note) in all types of designations should always take the official name of a geographical area as used in the country to which it belongs. Upper and lower case letters are permitted. Symbols that may be included in Geographical area A and Geographical area B are hyphen (–), underscore (_), and space ( ).

Termination detail is assigned by an operator to uniquely identify its route terminations within a geographical area. Termination detail is required and consists of one to six characters. Symbols that may be included in Termination detail are hyphen (–), underscore (_), and space ( ).

Operator ID is the ICC that identifies the operator originating a route termination identification (one to six characters, each character being either alphabetic (i.e., A-Z) or numeric (i.e., 0-9) characters). For stability, it is required that this code not be changed for the life of the route termination identifier, regardless of any change in the operator responsible for maintaining the route termination identifier. Thus Related Information Item 3 of ITU-T Rec. M.1400 Layer 2 must be referred to in determining the current responsible operator.

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (required one to six alphabetic or numeric characters):

Indicates the type of route.

c) *Serial number* (required one to four numbers):

Identifies the instance of the route (e.g., circuit, group, digital block, etc.) within the same transport relation and the same function code. The serial numbering starts anew if there is a difference in:

– transport relation;

– function code.

NOTE – If the name of the geographical area exceeds 12 characters, the responsible operator will supply an appropriate abbreviation, which should be unique.

This Recommendation includes specifications for two route configurations: a route for end-to-end service between end points A and B in Figure 1, and a route that includes a transit network service provided by Operator 2. It is important to note that Operator 1 and Operator 3 in the transit network configuration may be the same, e.g., where Operator 1 is operating as a competitor in the country of Operator 2. In such a case, when Operator 2 provides transit service to Operator 1, Operator 2 does not need to know the origin and destination or other characteristics of the end-to-end service route for Operator 1. Transit route connections are specified using their origins and destinations, as opposed to using the origin and destination of the entire route. Operator 1 does not share the designation of the entire route with Operator 2. However, Operator 1 and Operator 2 do share the transit designations.
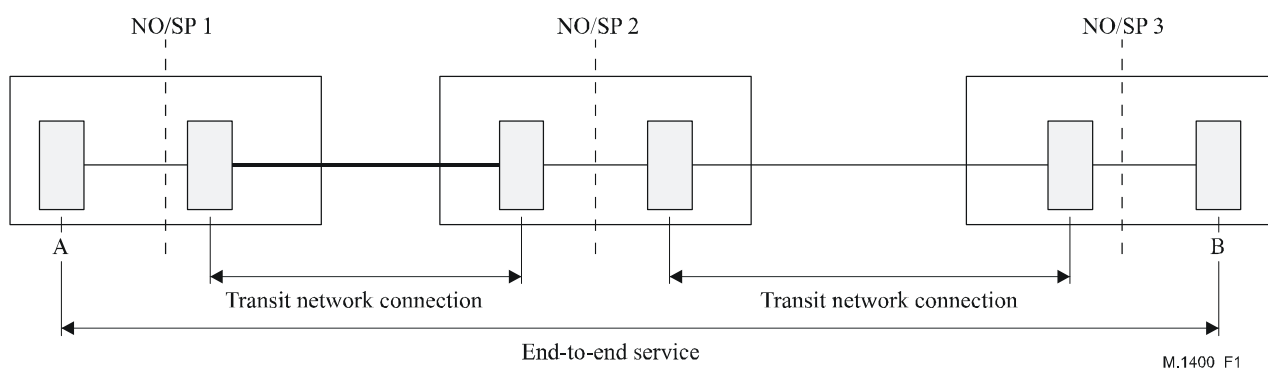
Figure 1/M.1400 – Transit network

The use of transit networks reflects the new operating conditions due to liberalization of telecommunications and the consequent increased competition. To accommodate this approach, clause 23 covers transit networks. In addition, a note is provided in each clause where transit networks apply.

If identical place names occur in different countries, and if confusion is likely to arise, the network operators/service providers concerned should agree to identify the country in the designation by adding after the place name a three-letter country code as defined in ISO 3166-1 [2]. This country code must be included within the 12 characters of the Geographical area name, if necessary by providing an abbreviation of the Geographical area name.

The serial number should be written without leading zeros.

6.2 Layer 2

The general format for layer 2 (related information) is as follows:

1   . . . , . . . ;

2   . . . , . . . ;

3   . . . , . . . ; etc.

The numbers identifying the fields in layer 2 indicate the various items. Each item provides information on the route, e.g., *operational*: operating companies and control station, etc. or *technical*: analogue/digital, use of special equipment, etc. The items provide flexibility in designation information because they can be extended in the future if there is a need.

6.3 Implementation

Where designations do not comply with this Recommendation, e.g., due to out-dated rules, operators are recommended to change such designations.

To facilitate the change, operators with control station responsibility should prepare proposals containing designations conforming to layer 1 and propose the items of related information to be included in layer 2.

Agreement should then follow on the designation as well as an exchange of the agreed layer 2 information.

Operators will need to ensure that the layer 2 related information is kept up to date and that other concerned operators are informed of any changes.

6.4 Operator information

Due to liberalization of telecommunications and increased competition in the telecommunications industry, there is a mandatory requirement that telecommunications operators that interoperate be identified. A centralized list of ITU Carrier Codes (ICCs) has been created, with TSB (ITU-T Secretariat) as the repository [22]. Instead of individual operators sending their ICCs to the TSB for registration, the national regulatory authorities are requested to provide the validated codes and related information of international and domestic network operators directly to the TSB by using the form in Annex E.

This list may be used to identify the operators while completing layer 2 records, related information, as explained in 8.3, 13.3 and 20.3.

Request for assignment should be directed to:

Director of TSB
International Telecommunication Union
Place des Nations
1211 Geneva 20
Switzerland

Fax: +41 22 730 58 53

The ICC list identifies Operators that are recognized by each Member State's Administration. Such a list is provided on the central ITU ICC website at www.itu.int/ITU-T/inr/icc/index.html. The ICCs may be used both for electronic commerce between operators and for designation of resources in their networks. Hence, ICCs can be assigned both to network operators and service providers.

It should be noted that ICCs can be assigned both to ITU-T and non-ITU-T Members, and the referenced local ICC website may contain ICCs of operators of both kinds.

The central ITU ICC website includes a page for ICC information, having one entry for each country. Each entry may have a reference to a local ICC website containing the appropriate information about ICCs in that country. Some administrations may ask the TSB to maintain their list of ICCs at the central ITU ICC website, while others may choose to establish their own website directly, or through another organization, e.g., NECA[2]. All local ICC websites should be accessible free of charge.

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[2] National Exchange Carrier Association, Inc. (NECA) in North America.

7 Designations of public switched circuit interconnections

7.1 General

The format of the designation of public switched circuits is shown in Table 2.

Table 2/M.1400 – Public switched circuit designation format

Format of designation	Geographical area A	/	Exchange detail	/	Operator ID	/	Country code	–	Geographical area B	/	Exchange detail	/	Operator ID	/	Country code	Space	Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	1 or 2	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Switched circuit termination A and switched circuit termination B refer to the names of the two exchanges in which the circuit terminates. The name of each exchange consists of the following elements: Geographical area name, exchange detail, operator ID and country code. The order of the two exchanges is dependent on the operation of the circuit which will be indicated by the function code.

Geographical area: the Geographical area where the exchange is situated (required one to twelve characters or space).

Exchange detail shows the information that makes the exchange unique in the operator domain in that particular geographical area (see Note). Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the exchange identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: one to two letters and/or digits):

Indicates the type of circuit.

c) *Serial number* (required one to four digits):

Identifies the instance of the circuit. The serial numbering starts anew if there is a difference in transport relation and/or function code.

NOTE – In the example given in Figure 2, there may be only one exchange detail or three exchange details to be decided by the operator.

M.1400_F2
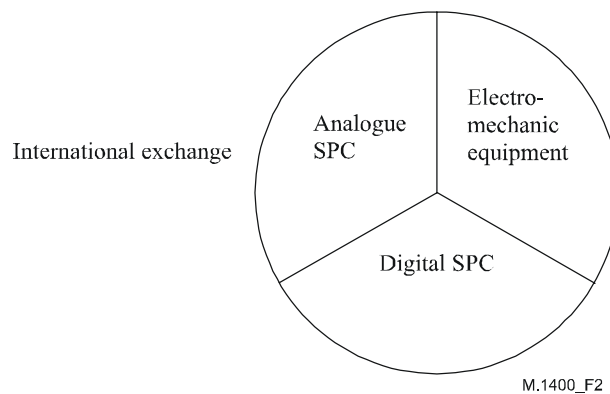
Figure 2/M.1400 – Exchange configuration

7.2 Telephone-type circuits

7.2.1 General

Possible function codes are:

M   manual telephone circuits;

Z   automatic and semi-automatic telephone circuits in one-way operation;

B   both-way telephone circuits.

For the serial number a special condition applies: by bilateral agreement, operators may wish to apply a serial number to telephone-type circuits on a geographical area-to-geographical area basis rather than on an exchange-to-exchange basis.

7.2.2 Telephone circuits used in manual operation

The circuit terminations are arranged in alphabetical order.

The function code is: M.

Example:

The first telephone circuit for manual operation between London Keybridge of BT and the exchange Paris Bagnolet of France is designated:

London/KB/BTPLC/GBR–Paris/BA/FRTE/FRA M1.

7.2.3 One-way telephone circuits used for semi-automatic or automatic operation

The circuit terminations are arranged in the order according to the direction of operation of the circuit.

The function code is: Z.

Serial numbering: Circuits operated in the direction corresponding to the alphabetical order of the terminations should have odd numbers: $(2n - 1)$. Circuits operated in the direction corresponding to an inverse alphabetical order of the terminations should have even numbers: $(2n)$.

Examples:

The 11th circuit operated in the London Mollison exchange of BT to the Montreal 1TE exchange operated by Teleglobe Canada ULC with traffic in the direction from London to Montreal (alphabetical order of geographical areas) is designated:

London/SM/BTPLC/GBR–Montreal/1TE/TGB/CAN Z21.

The 9th circuit operated in the Montreal 1TE to London Mollison direction (inverse alphabetical order of geographical areas) is designated:

Montreal/1TE/TGB/CAN–London/SM/BTPLC/GBR Z18.

7.2.4 Both-way telephone circuits used for semi-automatic or automatic operation

The circuit terminations are arranged in alphabetical order.

The function code is: B.

Example:

The first both-way circuit between the London Kelvin exchange of BT and the New York 24 exchange of MCI is designated:

London/J/BTPLC/GBR–New York/24/MCI/USA B1.

7.3 Circuit used for switched telex and telegraph services

See ITU-T Rec. R.70 [3].

7.4 Interconnecting circuits in the public switched data network

The terminations of the circuit are arranged in alphabetical order.

The function code is: XD.

Example:

The first interconnection public switched data circuit between the Oslo A exchange of Telenor and the Stockholm HYX exchange of Telia Sonera AB is designated:

Oslo/A/TELNOR/NOR–Stockholm/HYX/TELIA/SWE XD1.

7.5 Related information

The additional information on public switched circuits is covered by the following items:

1) urgency for restoration;
2) terminal countries;
3) Network operators/service providers' names;
4) control and sub-control station(s);
5) fault report points;
6) routing;
7) association;
8) equipment information;
9) use;
10) transmission medium information;
11) composition of transmission;
12) bandwidth or bit rate;
13) signalling type.

The various items will be dealt with in clause 8.

8 Related information for public switched circuit interconnections

The following subclauses explain the items of related information concerned with public switched circuit interconnections. A full example for the designation information of a public switched telephone circuit interconnection is given in A.1.

8.1 Urgency for restoration [item 1]

This item supplies information on the urgency of restoration of the circuit based upon bilateral agreement between the terminal Network operators/service providers.

Format:

1.   xxx . . . xx; (maximum 10 characters)

Illustration:

a)   if the priority is top: 1;

      if the priority is second: 2;

      if the priority is third: 3; or

b)   if repair is required within e.g., 24 hours: ≤ 24 h; or

c)   if no urgency has to be indicated: –;

8.2 Terminal countries [item 2]

This item presents the countries in which the circuit is terminating.

Format:

2.   XXX, YYY; (3 characters for each)

Specification:

XXX: code for country of Geographical area A

YYY: code for country of Geographical area B

NOTE – The codes are according to ISO 3166-1 [2].

Example:

For the circuit London/KB/BTPLC/GBR–Paris/BA/FRTE/FRA M1:

2.   UKM, FRA;

8.3 Names of Network operators/service providers [item 3]

This item records the names of the Network operators/service providers which operate the circuit.

The applicable codes can be selected from the List of ITU Carrier Codes as described in 6.4.

Format:

3.   YYYYYY, ZZZZZZ; (maximum 6 characters for each)

Specification:

YYYYYY: code for company operating in Geographical area A

ZZZZZZ: code for company operating in Geographical area B

Example:

For the circuit London/KB/BTPLC/GBR–Paris/BA/FRTE/FRA M1 operated by BT and FRTE:

3.   BT, FRTE;

8.4 Control station (sub-control station(s)) [item 4]

This item lists the appointed control station and sub-control stations (according to ITU-T Recs M.80 [15] and M.90 [16]). Further details about the stations can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

4.	CS:	designation of control station,
	SCS1:	designation of sub-control station,
	SCS2:	designation of sub-control station,
	M	M
	SCSn:	designation of sub-control station;

Specification:

CS:	designation of the control station,
SCS1:	designation of the terminal sub-control station,
SCS2 to SCSn:	if applicable, other sub-control stations have to be placed in the geographical order according to the traffic relation.

Example:

For the circuit New York/10/ATT/USA–Stockholm/HYX/TELIA/SWE XD1 where New York is the control station and sub-control stations are in London and Stockholm:

4.	CS:	New York/10/ATT/USA,
	SCS1:	Stockholm/HYX/TELIA/SWE,
	SCS2:	London/KB/BTPLC/GBR;

8.5 Fault report points [item 5]

This item presents the names of both fault report points on the circuit. Further information about the fault report points can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

5. Designation of fault report point, designation of fault report point;

Specification:

The first report point is that of the country of Geographical area A.

The second fault report point is that of the country of Geographical area B.

Example:

For the circuit London/M/BTPLC/GBR–Reims/IP/FRTE/FRA1 Z999 with fault report points in London M and Reims XRE:

5. London/M/BTPLC/GBR, Reims/XRE/FRTE/FRA;

8.6 Routing [item 6]

This item shows the interconnecting primary group(s) or primary block(s) and channel number(s) which carry the circuit. If there is more than one, the groups or digital blocks appear in the geographical order from Geographical area A to Geographical area B.

Format:

6.   Designation of an interconnecting primary group or primary block/channel number, designation of a primary group/channel number, ..., designation of a primary group/channel number;

NOTE – Primary groups or digital blocks can be unidirectional as well. Two consecutive unidirectional groups or digital blocks are separated by a + sign instead of a comma.

Example:

For a circuit London/KB/BTPLC/GBR–Santiago/CTCMDO/CHL1 Z27:

6.   London/KB/BTPLC/GBR–Paris/IP/FRTE/FRA 1204/4, Paris/IP/FRTE/FRA–(MU) 1202/2+Santiago/CTCMDO/CHL–(MU) 1203/3;

8.7   Association [item 7]

This item informs whether there are associated circuits and if so, of which nature.

Format:

7.   Association code: designation of associated circuit;

Specification:

If the circuit *has* a reserve circuit, the association code is: S followed by the function code and the serial number of the principal circuit.

If the circuit *is* a reserve circuit, the association code is: function code followed by S and the serial *number of the reserve circuit*.

Example 1:

7.   ZS13: Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE T1;

which indicates that the actual circuit Z13 is a reserve circuit for the circuit Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE T1.

If the circuit belongs to a group of circuits for which the time slot sequential order (end-to-end) must be guaranteed, the association code is: TSG. The designations of the associated circuits are abbreviated by taking the function code of the circuits followed by the lowest sequential number, a hyphen and the highest sequential number.

Example 2:

If the circuit Sherman Oaks/4ES/ATT/USA–Singapore/EST/ST/SGP B607 belongs to a group of 30 circuits for which the time slot sequential order must be guaranteed, the association is:

7.   TSG: B601-630;

8.8   Equipment information [item 8]

This item records any equipment in the circuit which requires special maintenance attention.

Format:

8.   XX, XX, XX, XX, XX;

Specification:

If the circuit has been routed via analogue circuit multiplication equipment: AM

If the circuit has been routed via digital circuit multiplication equipment:

–   using reduced bit rate encoding: RB

–   using speech interpolation: SI

If the circuit has a compandor: CO

If the circuit has an echo suppressor: ES

If the circuit has an echo canceller: EC

If the circuit has an echo suppressor in terminal country of Geographical area A and an echo canceller in terminal country of Geographical area B: ES, EC (any combination of EC and ES is possible).

If the circuit is a bearer circuit: BC

If the circuit is a derived circuit: DC

NOTE 1 – If there is a need to record an additional special equipment, additional codes can be used by bilateral agreement between the Network operators/service providers. The codes must be unique and shall have two characters.

NOTE 2 – A bearer circuit refers to the circuit type that continues to be provided in the case of a breakdown of the circuit multiplication equipment. For a derived circuit, this is not the case.

8.9 Use [item 9]

This item supplies information on the usage of the circuit. It concerns the role of the circuit in the traffic (e.g., belonging to a final route) and the usage of the circuit made by the user.

Format:

9.   XX, YYYY; (maximum 7 characters)

Specification:

XX   refers to the type of traffic carried by the circuit:

–   if it belongs to an overflow group of circuits: OF

–   if it belongs to a transit group of circuits: TR

–   if the information is not known: –

YYYY refers to the use of the circuit:

–   in the case where a public telephone circuit is used for phototelegraphy or facsimile: F

–   in the case where such a circuit is occasionally used for narrow-band sound programme transmission: RK.

8.10 Transmission medium information [item 10]

This item identifies whether a satellite is involved in the routing of the circuit.

Format:

10.   ST; or –;

Specification:

If the circuit has been routed via satellite: ST

If the circuit is not being routed via satellite: –

Example:

For the circuit Amsterdam/2H/TCOMNL/NLD–New York/24/ATT/USA Z33 routed partly via satellite:

10.   ST;

8.11 Composition of the transmission [item 11]

This item shows the type of transmission on the circuit.

Format:

11.   A; or N; or C;

Specification:

If the transmission is analogue: A

If the transmission is digital: N

If the transmission is mixed analogue/digital: C

8.12 Bandwidth or bit rate [item 12]

This item shows the bandwidth (in the case of an analogue or mixed circuit) or the bit rate (in the case of a digital circuit).

Format:

12.   xxxx.x Hz; or kHz; or MHz; bit/s; or kbit/s; or Mbit/s;

Rule for the notation of the figures:

Leading zeros may be omitted, and if the decimal is a zero, this decimal and the decimal point may also be omitted.

If the figure is up to 999, use Hz, bit/s.

If the figure is between 1000 and 9 999 999, use kHz, kbit/s.

If the figure is 10 000 000 or more, use MHz, Mbit/s.

Specification:

If the circuit is analogue or mixed analogue/digital: the bandwidth in Hz, kHz, MHz.

If the circuit is digital: the bit rate in bit/s, kbit/s, Mbit/s.

8.13 Signalling type [item 13]

This item presents the signalling information that applies to the circuit.

Format:

13.   xx . . . xx; (maximum 20 characters)

Specification:

If the signalling is of the type xxxx Hz/xx Hz: xxxx/xx

If the ITU-T Signalling System R2 is applied: R2

If the ITU-T Signalling System R2-digital is applied: R2D

If the ITU-T Signalling System No. 4 is applied: C4

If the ITU-T Signalling System No. 5 is applied: C5

If the ITU-T Signalling System No. 6 is applied: C6, xxx/yy where xxx/yy refers to band and circuit number respectively.

If the ITU-T Signalling System No. 7 is applied: C7, xxxx, Y–YYY–Y, Z–ZZZ–Z where xxxx refers to the Circuit Identification Code (CIC).

Y–YYY–Y refers to the Signalling Point Code (SPC) or National Signalling Point Code (NSPC) for Geographical area A/exchange.

Z–ZZZ–Z refers to the SPC or NSPC for Geographical area B/exchange.

Example:

For a circuit with C6-signalling type and being the 7th circuit in band number 32:

13.   C6, 032/06; (circuit counting starts at 0)

9   Designations of fixed (non-switched) circuit interconnections between operators

9.1   General

The designations of leased circuits and public fixed circuits are treated in 9.2 and 9.3 respectively. The format of the designation of fixed circuits is shown in Table 3.

Table 3/M.1400 – Leased circuit designation format

Format of designation	Geographical area A	/	Transmission station detail	/	Operator ID	/	Country code	–	Geographical area B	/	Transmission station detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	1 to 4	≤ 4

↑ No space

The elements of the layer 1 format are as follows:

a)   *Transport relation*

Non-switched circuit termination A and non-switched circuit termination B refer to the names of the two transmission stations in which the circuit is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is dependent on the operation of the circuit which will be indicated by the function code.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: one to four letters and/or digits):

Indicates the type of circuit.

c)   *Serial number* (required one to four digits):

Identifies the instance of the circuit. The serial numbering starts anew if there is a difference in transport relation and/or function code.

The designations of the different categories of leased circuits are given below. In special cases in which ITU-T Recommendations do not apply, agreement should be reached between the terminal Network operators/service providers.

9.2 Leased circuit interconnections

9.2.1 General

Leased circuits are fixed circuits for private services or particular purposes. They are distinguished by the letter P. When a leased circuit route includes a transit network, clause 23 applies.

The designation format for leased circuits is as stated in 9.1. Possible function codes are:

P for analogue leased circuits used wholly for telephony;

TP for analogue leased circuits used for voice-frequency telegraphy;

TDP for analogue leased circuits used for TDM-telegraphy;

DP for analogue leased circuits used wholly for data transmission;

FP for analogue leased circuits used wholly for phototelegraphy or facsimile;

RP for analogue leased unidirectional sound-programme circuits;

RRP for analogue leased reversible sound-programme circuits;

VP for analogue leased unidirectional television-programme circuits;

VVP for analogue leased reversible television-programme circuits;

XP for analogue leased circuits used for multiple type transmissions;

NP for digital leased circuits.

NOTE 1 – In case of leased circuits connecting three or more locations, the letter M should follow these function codes.

NOTE 2 – Whether these circuits make use of analogue or digital transmission not relevant for the above codes, the service is coded.

NOTE 3 – For digital leased circuits, the actual use is not relevant; all are coded as NP.

9.2.2 Analogue leased circuits used for telephony

The terminal points of the circuits are arranged in alphabetical order.

The function code is: P.

Example:

The first analogue leased circuit used for telephony between Paris and Wellington (New Zealand) is designated:

Paris/AB/FRTE/FRA–Wellington/E2/CLEAR/NZL P1.

9.2.3 Analogue leased circuits used for telegraphy

9.2.3.1 Voice-frequency telegraphy

The terminal points of the circuits are arranged in alphabetical order.

The function code is: TP.

Example:

The first analogue leased circuit used for voice-frequency telegraphy between Bern 1RS and New York 1RC is designated:

Bern/1RS/CHEPTT/CHE–New York/1RC/ATT/USA TP1.

9.2.3.2 TDM-telegraphy

The terminal points of the circuits are arranged in alphabetical order.

The function code is: TDP.

Example:

The 3rd analogue leased circuit used for TDM-telegraphy between London and Montreal is designated:

London/XZ/BTPLC/GBR–Montreal/AB/TGB/CAN TDP3.

9.2.4 Leased telegraph circuits

See ITU-T Rec. R.70 [3].

9.2.5 Analogue leased circuits used for data transmission

The terminal points of the circuits are arranged in alphabetical order.

The function code is: DP.

Example:

The 3rd analogue leased circuits used for data transmission between London and Paris is designated:

London/AS3/BTPLC/GBR–Paris/HVE/FRTE/FRA DP3.

9.2.6 Analogue leased circuits used for phototelegraphy or facsimile

The terminal points of the circuits are arranged in alphabetical order.

If these circuits are different from P-circuits, the function code is: FP.

Example:

The 2nd analogue leased circuits used for phototelegraphy between London and Paris is designated:

London/AS3/BTPLC/GBR –Paris/HVE/FRTE/FRA FP2.

If normal P-circuits are used, then these circuits are designated accordingly.

9.2.7 Analogue leased circuits used for sound-programme transmission

9.2.7.1 Analogue leased unidirectional sound-programme circuit

The terminal points of the circuits are arranged in the order corresponding to the direction of transmission (instead of alphabetically, if this is different).

The function code for these circuits is: RP.

Serial numbering: Circuits which transmit in the direction corresponding to the alphabetical order of the terminals should have odd serial numbers $(2n-1)$, circuits in the other direction even numbers $(2n)$.

Examples:

The first leased sound-programme circuit transmitting in the direction Montreal to Wellington (New Zealand) will be designated:

Montreal/XX/TGB/CAN–Wellington/E2A/CLEAR/NZL RP1.

The first leased sound-programme circuit transmitting in the direction Wellington (New Zealand) to Montreal will be designated:

Wellington/E2A/CLEAR/NZL–Montreal/XX/TGB/CAN RP2.

9.2.7.2 Analogue leased reversible sound-programme circuits

The terminal points of the circuits are arranged in alphabetical order.

The function code is: RRP.

Example:

The first leased circuit with reversible sound-programme transmission between Montreal and Wellington (New Zealand) is designated:

Montreal/XX/TGB/CAN–Wellington/E2A/CLEAR/NZL RRP1.

9.2.8 Analogue leased circuits used for television transmission

9.2.8.1 Analogue leased unidirectional television-programme circuits

The terminal points of the circuit are arranged in the order corresponding to the direction of transmission (instead of alphabetically, if this is different).

The function code is: VP.

Serial numbering: Circuits which transmit in the direction corresponding to the alphabetical order of the terminals should have odd serial numbers ($2n - 1$), circuits in the other direction even numbers ($2n$).

Example:

The first leased television programme circuit transmitting in the direction Wellington (New Zealand) to Montreal will be designated:

Wellington/E2A/CLEAR/NZL–Montreal/XX/TGB/CAN VP2.

9.2.8.2 Analogue leased reversible television-programme circuits

The terminal points of the circuits are arranged in alphabetical order.

The function code is: VVP.

Example:

The first circuit with reversible television transmission between Montreal and Wellington (New Zealand) is designated:

Montreal/XX/TGB/CAN–Wellington/E2A/CLEAR/NZL VVP1.

9.2.9 Leased circuits used for digital video transmission

These circuits are designated as digital leased circuits (irrespective of the use); see 9.2.15 and 9.2.16.

9.2.10 Analogue leased circuits connecting circuit multiplication terminal equipment at renters' premises

These circuits are designated as normal leased circuits. The information indicating that these circuits connect circuit multiplication terminal equipment can be recorded under item 9 (Use) of related information (see 10.9).

Circuits routed via circuit multiplication equipment are also designated as normal circuits. The multiplication equipment appears under item 8 (Equipment information) of related information (see 10.8).

9.2.11 Analogue leased circuits used for transmission other than those designated above, or used for combinations of transmissions

In this category are circuits used for different transmissions at different times, or circuits in which the bandwidth is divided into two or more bands, thus providing two or more derived circuits which may be used for different transmissions.

The terminal points of the circuits are arranged in alphabetical order.

The function code is: XP.

Example:

Bruxelles/X2E/BGACOM/BEL–Paris/XYZ/FRTE/FRA XP8.

9.2.12 Analogue leased circuits connecting three or more locations

Various types and configurations of multiterminal circuits fall into this category. Each section of the circuit should have a unique designation. A section is any part of the circuit which connects a branching point to either a customer terminal or another branching point.

Interconnecting sections should use the designation described below.

The terminal geographical area points of each section are arranged in alphabetical order.

The function code is formed by adding the letter M to the function codes recommended in 9.2.2 to 9.2.11. This leads, in principle, to the function codes PM, TPM, TDPM, DPM, FPM, RPM, RRPM, VPM, VVPM and XPM.

The association between sections should be recorded in the related information of each section under item 7 (Association) (see 10.7).

Wholly national sections with national designations may be included if bilaterally agreed.

Example:

Let there be an interconnecting multiterminal leased circuit connecting Bruxelles and Paris (7th PM circuit between Bruxelles and Paris) with branches from Bruxelles to Edinburgh (1st PM-circuit on this relation) and from Bruxelles to Muenchen (4th PM-circuit) and with an extension from Paris to Marseille.

The interconnecting sections are designated:

      Bruxelles/X2E/BGACOM/BEL–Edinburgh/EZC/BTPLC/GBR PM1

      Muenchen/XFG/DTAG/DEU–Bruxelles/X2E/BGACOM/BEL PM4

      Bruxelles/X2E/BGACOM/BEL–Paris/X34/FRTE/FRA PM7.

9.2.13 Leased analogue groups, supergroups, etc.

These groups, supergroups, etc. will receive a circuit type designation. The additional information on the constitution of these leased groups, supergroups, etc. is to be recorded in related information under item 12 (Bandwidth or bit rate) (see 10.12) and under item 6 (Routing) (see 10.6).

The function codes are according to the relevant codes for circuits.

Example:

A supergroup between renters' premises in London and Paris for data transmission which is the 15th lease circuit for data transmission on this relation, is designated:

London/SDE/BTPLC/GBR–ParisXXC/FRTE/FRA DP15.

9.2.14 Leased analogue group, supergroup links

These group and supergroup links will receive a circuit type designation. The additional information on the constitution of these leased group, supergroup links, etc. is to be recorded in related information under item 12 (Bandwidth or bit rate) (see 10.12) and under item 6 (Routing) (see 10.6).

Example:

A group link provided between renters' premises in London and Montreal devoted to data transmission which is the 10th leased circuit for data transmission on this relation, is designated:

London/SDE/BTPLC/GBR–Montreal/XNC/TGB/CAN DP10.

9.2.15 Digital leased circuits connecting two locations

Designations given below also apply for leased digital blocks and paths.

NOTE 1 – For digital leased circuits, the use of the circuit will no longer be taken into account for the designation: the use may change without notification to the Network operator/service provider or may be unknown.

The additional information concerning the bit rate is to be found in related information under item 12 (Bandwidth or bit rate) (see 10.12).

The terminations of the circuit are placed in alphabetical order.

The function code is: NP.

Example:

The 5th digital leased circuit between Birmingham and Toulouse is designated:

Birmingham/X2E/BTPLC/GBR–Toulouse/TYU/FRTE/FRA NP5.

NOTE 2 – It may happen that a digital leased circuit has been routed via one or more exchanges; in this case, they are designated as normal digital leased circuits. However, in such cases, an exchange suffix may replace the transmission station suffix. The information concerning the permanent switched mode is recorded in related information under item 8 (Equipment information) (see 10.8).

Example:

The 12th digital leased circuit between users' premises in Athens and Reims which is connected to transmission station TS2 in Athens and permanently switched in the exchange IP2 in Reims is designated:

Athinai/TS2/CDE/OTE/GRC–Reims/IP2/CCV/FRTE/FRA NP12.

9.2.16 Digital leased circuits connecting three or more locations

Various types and configurations of multiterminals circuits fall into this category. Each section of the circuit should have a unique designation. A section is any part of the circuit which connects a branching point to either a customer terminal or another branching point. (See also ITU-T Rec. M.1055 [4].)

Sections should use the designation described below.

The terminal points of each section are arranged in alphabetical order.

The function code is formed by adding the letter M to the function code recommended in 9.2.15, i.e., the function code is: NPM.

The association between sections should be recorded in the related information of each section under item 7 (Association) (see 10.7).

Wholly national sections with national designations may be included if bilaterally agreed.

Example:

In a digital multiterminal leased circuit connecting Oslo, London, Paris, Rome and Amsterdam, the section between Oslo and London (being the first NPM circuit on this relation) is designated:

London/23R/BTPLC/GBR–OsloVPE/TELNOR/NOR NPM1.

9.3 Fixed (non-switched) public circuits

9.3.1 General

The designation format is according to 9.1. When a fixed public circuit route includes a transit network, clause 18 applies. Possible function codes are:

R   for a unidirectional sound-programme circuit;

RR   for a reversible sound-programme circuit;

RK   for telephone type circuits for narrow-band sound-programme transmission;

V   for a unidirectional television circuit;

VV   for a reversible television circuit;

F   for a phototelegraphy or facsimile circuit;

T   for circuits providing voice-frequency telegraph links;

TD   for circuits providing TDM-telegraph systems;

D   for data transmission circuits;

DL   for circuits providing transfer link for common channel signalling systems.

NOTE – Information on whether a sound-programme circuit together with a second sound-programme circuit form a stereophonic pair will be recorded in the related information under the item 7 (Association) (see 10.7).

9.3.2 Circuits used for sound-programme transmission

9.3.2.1 Circuits used for unidirectional sound-programme transmission

The terminations of the circuit are arranged in the order corresponding to the direction of transmission (instead of alphabetically, if this is different).

The function code is: R.

Serial numbering: Circuits which transmit in the direction corresponding to the alphabetical order of the terminals should have odd serial numbers ($2n - 1$). Circuits which transmit in the direction corresponding to the inverse alphabetical order of the terminals should have even serial numbers ($2n$).

Example:

The 1st circuit transmitting in the direction Wellington (New Zealand) to Montreal is designated:

Wellington/FT3/CLEAR/NZL–Montreal/NT4/TGB/CAN R2.

9.3.2.2 Circuits used for reversible sound-programme transmission

The terminations of the circuit are arranged in alphabetical order.

The function code is: RR.

Example:

The 1st circuit with reversible sound-programme transmission between Montreal and Wellington (New Zealand) is designated:

Montreal/NT4/TGB/CAN–Wellington/FT3/CLEAR/NZL RR1.

9.3.2.3 Telephone-type circuits used for narrow-band sound-programme transmission

In the traffic relation, the terminals of the circuit are arranged in the order corresponding to the direction of operation (instead of alphabetically, if this is different).

The function code is: RK.

Serial numbering: Circuits which transmit in the direction corresponding to the alphabetical order of the terminals should have odd serial numbers $(2n - 1)$. Circuits which transmit in the direction corresponding to the inverse alphabetical order of the terminals should have even serial numbers $(2n)$.

Example:

The 1st telephone-type circuit set up for the narrow-band sound-programme transmission in the direction from Milano to Madrid is designated:

Milano/TY5/TI/ITA–Madrid/M2Z/TFCAES/ESP RK2.

9.3.3 Circuits used for television transmission

9.3.3.1 Circuits used for unidirectional television transmission

In the traffic relation, the terminations of the circuit are arranged in the order corresponding to the direction of transmission (instead of alphabetically, if this is different).

The function code is: V.

Serial numbering: Circuits which transmit in the direction corresponding to the alphabetical order of the terminals should have odd serial numbers $(2n - 1)$. Circuits which transmit in the direction corresponding to the inverse alphabetical order of the terminals should have even serial numbers $(2n)$.

Example:

The 1st unidirectional television circuit transmitting in the direction Paris to Helsinki is designated:

Paris/FRU/FRTE/FRA–Helsinki/2R5/SONERA/FIN V2.

9.3.3.2 Circuits used for reversible television transmission

The terminations of the circuit are arranged in alphabetical order.

The function code is: VV.

Example:

The 1st reversible television transmission circuit between Tokyo TS1 and New Delhi is designated:

New Delhi/RT/VSNL/IND–Tokyo/TS1/UUE/NTT/JPN VV1.

9.3.4 Circuits for digital audio and video transmission

These circuits are designated according to the data transmission system, see clause 17.

9.3.5 Telephone-type circuits used for phototelegraphy or facsimile

Circuits used for phototelegraphy or facsimile which are different from normal telephone circuits will have the function code: F.

The terminal points of the circuit are arranged in alphabetical order.

If normal telephone circuits are used, they are designated accordingly. Information about the usage may be recorded in the related information under item 9 (Use) (see 10.9).

Example:

The first circuit for phototelegraphy between Koebenhavn and Tokyo:

Koebenhavn/XCR/TD/DNK–Tokyo/4T5/NTT/JPN F1.

9.3.6 Telephone-type circuits used to provide voice-frequency telegraph links

The terminal points of the circuit are arranged in alphabetical order.

The function code is: T.

Example:

The 1st circuit to provide a voice-frequency telegraph link between Koebenhavn 1 and Montreal 1TE is designated:

Koebenhavn/1/TD/DNK–Montreal/1TE/TGB/CAN T1.

A reserve T-circuit is designated according to its present function. Information concerning the nature of the reserve T-circuit is found in the related information under item 7 (Association) (see 10.7).

9.3.7 Telephone-type circuits used to provide TDM (Time Division Multiplex) telegraph systems

The terminal points of the circuit are arranged in alphabetical order.

The function code is: TD.

Example:

The first circuit to provide a TDM-telegraph system between London Keybridge and Montreal 1TE:

London/KB/BTPLC/GBR–Montreal/1TE/TGB/CAN TD1.

(Suffixes are optional.)

A reserve TD-circuit is designated according to its present function. Information concerning the nature of the reserve TD-circuit is found in the related information under item 7 (Association) (see 10.7).

9.3.8 Telephone-type circuits used for data transmission

The terminal points of the circuit are arranged in alphabetical order.

The function code is: D.

Example:

The 1st circuit used for data transmission between Frankfurt 1 and Toronto 1TE is designated:

Frankfurt/1/DTAG/DEU–Toronto/1TE/SCNM/CAN D1.

9.3.9 Telephone-type circuits used as transfer links for common channel Signalling Systems No. 6 and No. 7

The terminal points of the circuit are arranged in alphabetical order.

The function code is: DL.

Example:

The first data link used for common channel signalling between Sacramento 4ESS and Tokyo Shinjuku is designated:

Sacramento/4ES/ATT/USA–Tokyo/SJK/NTT/JPN DL1.

9.4 Related information

The additional information on fixed circuits is covered by the following items:

1) urgency for restoration;
2) terminal countries;
3) Network operators/service providers' names;
4) control and sub-control station(s);
5) fault report points;
6) routing;
7) association;
8) equipment information;
9) use;
10) transmission medium information;
11) composition of transmission;
12) bandwidth or bit rate;
13) signalling type;
14) applicable ITU-T Recommendations.

The various items will be dealt with in clause 10.

10 Related information for fixed circuit interconnections

The following subclauses explain the items of related information concerned with fixed circuit interconnections. A full example for the designation information of an interconnecting leased analogue circuit is given in A.2.

10.1 Urgency for restoration [item 1]

This item supplies information on the urgency of restoration of the circuit based upon bilateral agreement between the terminal Network operators/service providers.

Format:

1. xxx . . . xx; (maximum 10 characters)

Illustration:

a) if the priority is top: 1;

if the priority is second: 2;

if the priority is third: 3; or

b) if repair is required within e.g., 24 hours: ≤ 24 h; or

c) if no urgency has to be indicated: –;

NOTE – In the case of a digital leased circuit, the priority or urgency may be decided upon by taking into account the bit rate of the circuit.

10.2 Terminal countries [item 2]

This item presents the countries in which the circuit is terminating.

Format:

2.   XXX, YYY; (3 characters for each)

Specification:

XXX: code for country of Geographical area A

YYY: code for country of Geographical area B

NOTE – The codes are according to ISO 3166-1 [2].

Example:

For the circuit Paris/RE3/FRTE/FRA–Wellington/YBC/CLEAR/NZL P1:

2.   FRA, NZL;

10.3 Names of Network operators/service providers [item 3]

This item records the names of the Network operators/service providers which operate the circuit or, in the case of sound-programme and television circuits, the name of the broadcasting company. The applicable carrier codes can be selected from the ITU-T "List of ITU Carrier Codes" [22].

Format:

3.   YYYYYY, ZZZZZZ; (maximum 6 characters for each)

Specification:

YYYYYY: code for company operating in Geographical area A

ZZZZZZ: code for company operating in Geographical area B

Example:

For the circuit Bern/1RS/CHEPTT/CHE–NewYork/1RC/MCI/USA TP1 operated by Radio Suisse and RCA:

3.   RS, MCI;

10.4 Control station (sub-control station(s)) [item 4]

This item lists the appointed control station and sub-control stations (according to ITU-T Recs M.80 [15] and M.90 [16] or M.1012 [5] and M.1013 [6] for leased circuits). Further details about the stations can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

4.	CS:	designation of control station,
	SCS1:	designation of sub-control station,
	SCS2:	designation of sub-control station,
	M	M
	SCSn:	designation of sub-control station.

Specification:

CS:	designation of the control station,
SCS1:	designation of the terminal sub-control station,
SCS2 to SCSn:	if applicable, other sub-control stations have to be placed in the geographical order according to the traffic relation.

Example:

For the circuit London/KB/BTPLC/GBR–Paris/ARC/FRTE/FRA RP1 where Paris Archives is the control station and London Keybridge is the sub-control station:

4.   CS: Paris/ARC/FRTE/FRA,

         SCS1: London/KB/BTPLC/GBR.

10.5   Fault report points [item 5]

This item presents the names of both fault report points on the circuit. Further information about the fault report points can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

5.   Designation of fault report point, designation of fault report point.

Specification:

The first fault report point is that of the country of Geographical area A.

The second fault report point is that of the country of Geographical area B.

Example:

The fault report points for the circuit Athinai/NXQ/OTE/GRC–Roma DP3/TI/ITA:

5.   Athinai/TSB/OTE/GRC, Roma/TS1/TI/ITA.

10.6   Routing [item 6]

This item shows the interconnecting primary group(s) or primary block(s) and the channel number(s) which carry the circuit (see Notes 1 and 2). If there is more than one, the groups or blocks appear in the geographical order from Geographical area A to Geographical area B.

Format:

6.   Designation of an interconnecting primary group (Note 1) or primary block/channel number, designation of a primary group or block/channel number, ... , designation of a primary group or block/channel number;

Example 1:

For the circuit from London Mollison to Paris Archives DP7:

6.   London/MOL/BTPLC/GBR–Paris/ARC/FRTE/FRA 1204/4;

Example 2:

For the wideband circuit Frankfurt–London DP5:

6.   Amsterdam/PR1/TCOMNL/NLD–Frankfurt/ABC/DTAG/DEU 6005/2,
         Amsterdam/PR1/TCOMNL/NLD–London/XYZ/BTPLC/GBR 6002/3;

NOTE 1 – In the case where a leased circuit consists of a group or block, the primary groups or blocks are to be replaced by the next higher groups or blocks. In this case, the channel numbers are to be replaced by the group numbers.

NOTE 2 – Primary groups or blocks can be unidirectional as well. Two consecutive unidirectional groups or blocks are separated by a + sign instead of a comma.

10.7   Association [item 7]

This item informs whether there are associated circuits and if so, of what nature.

Format:

7.   Association code: Designation(s) of associated circuit(s);

Specification:

If the circuit *has* a reserve circuit, the association code is: S. This is followed by the function code and the serial number of the principal circuit.

NOTE 1 – In this case, the designation of the associated circuit may be replaced by the designation of a free time slot or a free channel.

If the circuit is a reserve circuit, the association code is: function code followed by S and this is the serial number of the reserve circuit.

If a circuit must have diverse routing with respect to another circuit, the association code is: DVR. This is followed by the designation of the other circuit.

If the circuit is one of a stereophonic pair, the other circuit will appear in this item. Association code is: H followed by a 2-digit serial number indicating the number of the stereophonic pair. This is followed by the function code and the serial number of actual circuit.

If the circuit belongs to a multiterminal leased circuit, the association code is: PM, DPM, etc. (see 9.2.12 and 9.2.16) and this is followed by the serial number of the circuit.

Example 1:

7.   ST1: Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE Z13;

          which indicates that the reserve circuit for the principal circuit T1 is Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE Z13.

In the case of a free channel in the group Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE 1205:

7.   ST1: Roma/AS1/TI/ITA–Zurich/SEL/CHEPTT/CHE 1205/6;

Example 2:

The two leased circuits Kolding/PTY/DTAG/DEU–Lausanne/CHEPTT/CHE DP and Geneve/RT1/CHEPTT/CHE–Koebenhavn/IVT/TD/DNK DP18 must have diverse routing.

For the first circuit Kolding/PTY/DTAG/DEU–Lausanne/CHEPTT/CHE DP7:

7.   DVR: Geneve/RT1/CHEPTT/CHE–Koebenhavn/IVT/TD/DNK DP18;

Example 3:

If the circuit London/KB/BTPLC/GBR–Paris/ARC/FRTE/FRA R1 is bearing one channel of the second stereophonic pair from London to Paris, and London/KB/BTPLC/GBR–Paris/ARC/FRTE/FRA R5 bearing the other channel of this pair:

7.   H02R1: London/KB/BTPLC/GBR–Paris/ARC/FRTE/FRA R5;

          which indicates that circuit R1, being one of the stereophonic pair number 2, has as the other circuit of this pair: London/KB/BTPLC/GBR–Paris/ARC/FRTE/FRA R5.

Example 4:

If the circuit Bruxelles/Z5A/BGACOM/BEL–Edinburgh PM1/BTPLC/GBR is a part of an interconnecting multiterminal telephone circuit connecting Bruxelles and Paris (being the 7th PM-circuit on that relation) with branches from Bruxelles to Edinburgh and to Aachen (being the 2nd PM-circuit on that relation) and with an extension from Paris to Marseilles, then for the circuit Bruxelles/Z5A/BGACOM/BEL–Edinburgh PM1/BTPLC/GBR:

7.   PM1: Aachen/EB/DTAG/DEU–Bruxelles/Z5A/BGACOM/BEL PM2,
        Bruxelles/Z5A/BGACOM/BEL–Paris/UV/FRTE/FRA PM7;

NOTE 2 – The interconnecting branches may appear in any order. Intraconnecting branches may be added after bilateral agreement.

10.8   Equipment information [item 8]

This item records any equipment in the circuit which requires special maintenance attention.

Format:

8.   XX, XX, XX, XX, XX;

Specification:

If the circuit has been routed via digital circuit multiplication equipment: AM

If the circuit has been routed via digital circuit multiplication equipment

–   using reduced bit rate encoding: RB

–   using speech interpolation: SI

If the circuit/ has a compandor: CO

If the circuit consists of a semi-permanent switched connection: SP

NOTE – If there is a need to record additional special equipment, additional codes can be used by bilateral agreement between the Network operators/service providers. The codes must be unique and shall have two characters.

10.9   Use [item 9]

This item identifies for what purpose the circuit is used (if this is known by the Network operator/service provider and of use for maintenance).

Format:

9.   XXX .. XX; (maximum 7 characters)

Specification:

XX .. XX allows the record of the usage of the circuit. A comma may be included anywhere to separate two or more codes, in case the circuit has two or more simultaneous usages.

If the circuit has been provided with circuit multiplication equipment at renters' premises with connection channels: CC.

If the circuit is used for the COMFAX service: CFX.

10.10   Transmission medium information [item 10]

This item identifies whether a particular transmission medium is required in the routing of the circuit.

Format:

10.   ST: XX ... XX; or 10. NS: XX ... XX; or 10. –; (XX ... XX maximum 10 characters)

Specification:

If the circuit has to be routed via satellite: ST followed by the designation of the satellite.

If the circuit must not be routed via satellite: NS followed by the designation of the terrestrial transmission medium.

If there is no transmission medium requirement: –.

Example:

For the circuit London/XYZ/BTPLC/GBR–Paris/ARC/FRTE/FRA DP3 that has to be routed via satellite Telecom 1:

10.   ST: Tel 1.

10.11   Composition of the transmission [item 11]

This item shows the type of transmission on the circuit.

Format:

11.   A; N; or C;

Specification:

If the transmission is analogue: A

If the transmission is digital: N

If the transmission is mixed analogue/digital: C

10.12   Bandwidth or bit rate [item 12]

This item shows the bandwidth (in the case of an analogue circuit or mixed circuit) or the bit rate (in the case of a digital circuit).

Format:

12.   xxxx.x Hz; or kHz; or MHz; bit/s; or kbit/s; or Mbit/s;

Rules for the notation of the figures:

Leading zeros may be omitted, and if the decimal is a zero, this decimal and the decimal point may also be omitted.

If the figure is up to 999, use Hz, bit/s.

If the figure is between 1000 and 9 999 999, use kHz, kbit/s.

If the figure is 10 000 000 or more, use MHz, Mbit/s.

Specification:

If the circuit is analogue or mixed analogue/digital: the bandwidth Hz, kHz, MHz.

If the circuit is digital: the bit rate in bit/s, kbit/s, Mbit/s.

Example:

For the circuit Bordeaux/ZZ/FRTE/FRA–Darmstadt/RA/DTAG/DEU NP7 with a bit rate of 64 kbit/s:

12.   64 kbit/s.

10.13 Signalling type [item 13]

This item presents the signalling type that applies to the circuit (reference is made to ITU-T Recs M.1045 [7] and Q.8 [8]).

Format:

13.   xxxxxxx; (maximum 7 characters)

Specification:

If the signalling is of the type xxxx Hz/xx Hz: xxxx/xx. Otherwise, the characters can be used on the basis of bilateral agreement between the two terminal Network operators/service providers.

Example:

For a circuit with in-band signalling 1000 Hz/20 Hz:

13.   1000/20.

10.14 Applicable ITU-T Recommendations [item 14]

This item records the ITU-T Recommendation(s) applied as regards the parameters of the circuit.

Format:

14.   Rec. X.xxxx, Rec. Y.yyyy; or 14. Rec. X.xxxx; or 14. –;

Specification:

The number of Recommendations to be recorded (2, 1, or 0) is dependent on the need.

Example 1:

If the circuit is an analogue leased line:

14.   Rec. M.1020;

Example 2:

If the circuit is used for the COMFAX (CFX) service:

14.   Rec. F.162, Rec. F.163;

11   Designations of group, supergroup, etc. (bidirectional and unidirectional) interconnections

11.1 General

The format of the designation of groups, etc. is shown in Table 4. When a group, supergroup, etc. route includes a transit network, clause 23 applies.

Table 4/M.1400 – Group designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	1 to 6	2 to 3

↑
No space

The elements of the layer 1 format are as follows:

a)   *Transport relation*

Group termination A and group termination B refer to the names of the two transmission stations in which the group, etc. is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names. For multiple destination unidirectional groups, the name of Geographical area B is replaced by (MU) (see 11.3.1).

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: one to six letters and/or digits)

This code consists of the nominal number of channels in the group (see Note). In the case of a unidirectional single destination group, the number is preceded by (U) (see 11.3.2).

NOTE – Where group, supergroup, etc. links are directly interfaced by analogue to digital conversion equipment, the number of channels is followed by the letter C (see clause 16).

c)   *Serial number* (required two to three digits)

Identifies the instance of the group, etc. The serial numbering starts anew if there is a difference in transport relation and/or function code. The numbering of a group, supergroup, etc. is applied between the point where the group, etc. is assembled to the point where it is broken down, independently of the position it occupies in the band of line frequencies.

If the number is less than 10, it is preceded by a zero.

11.2 Bidirectional groups, etc.

11.2.1 Group

The function code is a number that indicates the nominal number of channels in the group, as follows:

8 for 8-channel groups,

12 for 12-channel groups,

16 for 16-channel groups.

Example:

The third 12-channel group between Moskva and New York is designated:

Moskva/3RA/ROSTEL/RUS–New York/WXX/ATT/USA 1203.

11.2.2 Supergroup

The function code is a number that indicates the nominal number of channels in the supergroup, as follows:

60 for 60-channel supergroups.

80 for 80-channel supergroups.

Example:

The first 60-channel supergroup between London and Amsterdam is designated:

Amsterdam/PRR/TCOMNL/NLD–London/XXC/BTPLC/GBR 6001.

11.2.3 Mastergroup

The function code is: 300.

Example:

The first mastergroup between Bruxelles and London is designated:

Bruxelles/XYZ/BGACOM/BEL–London/FGH/BTPLC/GBR 30001.

11.2.4 Supermastergroup

The function code is: 900.

Example:

The tenth supergroup between Amsterdam and Paris is designated:

Amsterdam/EVR/TCOMNL/NLD–Paris/ARC/FRTE/FRA 90010.

11.2.5 Use of the groups, etc.

This information will be contained in related information under item 9 (Use) (see 13.9). If groups are used for private purposes, see 9.2.13.

11.2.6 Restoration groups and supergroups

Groups and supergroups set up on restoration groups and supergroups, or on spare groups and supergroups for restoration purposes, will receive a serial number from the 800 series, in descending order and starting from 899.

Restoration groups:	8899, 8898, 8897, etc.
	12899, 12898, 12897, etc. or
	16899, 16898, 16897, etc. as appropriate.
Restoration supergroups:	60899, 60898, 60897, etc.

Example 1:

The second 12-channel restoration group between London and Sydney is designated:

London/CVB/BTPLC/GBR–Sydney/VRY/TELSTR/AUS 12898.

Example 2:

The first restoration supergroup between Amsterdam and Bruxelles is designated:

Amsterdam/EVT/TCOMNL/NLD–Bruxelles/1WZ/BGACOM/BEL 60899.

11.3   Unidirectional groups and supergroups

11.3.1   Multiple destination unidirectional groups and supergroups

The unidirectional route will be designated by the name of the sending terminal station (in the general format: Geographical area A) followed by a hyphen, and the letters MU (multiple destination unidirectional) in parentheses replace Geographical area B. This will be followed by the function code and serial number of the group or supergroup.

Example 1:

The first multiple destination unidirectional supergroup from London (to, for example Bogota, Lusaka and Montreal) is designated:

London/ERT/BTPLC/GBR–(MU) 6001.

The next such supergroup from the same point of origin to any destination would take the next number in the series, e.g., the second supergroup from London is designated:

London/ERT/BTPLC/GBR–(MU) 6002.

This supergroup might go, for example, to Tokyo, Hawaii and Melbourne.

Example 2:

The first supergroup from Montreal (to, for example, London, Lusaka and Paris) is designated:

Montreal/5TC/TGB/CAN–(MU) 6001.

NOTE – Groups and supergroups routed via a multiple-access system may be provided for exclusive use between two terminal stations only, in which case the normal designations given above in this Recommendation will apply.

11.3.2   Single destination unidirectional groups and supergroups

The unidirectional route will be designated by the name of the sending terminal station (in the general format: Geographical area A) followed by a hyphen and the name of the receiving terminal station (Geographical area B). The function code consists of the letter U (unidirectional) in parentheses and the nominal number of channels of the group or supergroup.

Example:

A unidirectional group transmitting in the direction from Paris to London, which, in the reverse direction of transmission is assigned to a multiple destination unidirectional (MU) group from London to Paris and Rio de Janeiro, would be designated as:

Paris/ARC/FRTE/FRA–London/VRT/BTPLC/GBR (U) 1201.

The next group between these locations, Paris and London, if bidirectional, would be designated in the normal manner as:

London/VRT/BTPLC/GBR–Paris 1202.

NOTE – Groups and supergroups routed via a multiple-access system may be provided on a bidirectional basis for exclusive use between two terminal stations only, and in this case the normal designations given above in this Recommendation will apply.

11.4 Related information

The additional information on groups etc. is covered by the following items:

1) urgency for restoration;

2) terminal countries;

3) Network operators/service providers' names;

4) control and sub-control station(s);

5) fault report points;

6) routing;

7) association;

8) equipment information;

9) use;

10) transmission medium information;

11) operational agreement;

12) bandwidth;

13) occupancy.

The various items will be dealt with in clause 13.

12 Designations of group link, supergroup link and line link interconnections

12.1 Group and supergroup links

Group links and supergroup links are designated according to the general format for groups (see 11.1). In practice, it may be that terminal equipment is not connected to a group link or supergroup link. Nevertheless, for designation purposes, the link will be numbered as though terminal equipment were connected.

12.1.1 Conventional links not connected to their terminal equipment

Such links are included in the normal numbering sequence of groups and supergroups and are not given a separate numbering sequence.

When a group link or supergroup link is used only part time with terminal translating equipment (to provide a conventional group or supergroup), it will be designated in the normal way. The part time condition of the group link has to be indicated in related information under item 9 (Use) (see 13.9).

Example:

The group link between Amsterdam and London set up following 5 groups already in service, is designated:

Amsterdam/VRT/TCOMNL/NLD–London/B1C/BTPLC/GBR 1206.

12.1.2 Restoration links

Group links and supergroup links nominated for restoration purposes will receive a serial number from the 800-series in ascending order and starting from 801.

Restoration group links: 12801, 12802, 12803, etc.

Restoration supergroup links: 60801, 60802, 60803, etc.

Example:

The second restoration group link between Hong Kong and Sydney is designated:

Hong Kong/33R/CWHKTI/HKG–Sydney/12R/TELSTR/AUS 12802.

NOTE – The first two digits (e.g., 12) in the designation of a restoration group link do not necessarily indicate the number of channels in the group which is set up via the link. For example, a restoration group link London/1VT/BTPLC/GBR–Montreal/RST/TGB/CAN 12801 might be used to restore the group London/1VT/BTPLC/GBR–Montreal/RST/TGB/CAN 1605.

12.2 Line links

The format of the designation of line links is shown in Table 5.

Table 5/M.1400 – Line link designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code	Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3 1	3 to 5	2

↑ No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Group termination A and group termination B refer to the names of the two transmission stations in which the group, etc. is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: three to five letters and/or digits)

This code consists of a number indicating the nominal telephone channel transmission capacity followed by the letter A.

c)   *Serial number* (required two digits)

Identifies the instance of the group link, etc. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example 1:

The first 1840 telephone channel capacity line link between Beaver Harbour and Widemouth is designated:

Beaver Harbo/23R/TGB/CAN–Widemouth/45T/BTPLC/GBR 1840A01.

Example 2:

The first 432 telephone channels capacity line link between London and Pleumeur-Bodou is designated:

London/3ER/BTPLC/GBR–Pleumeur-Bod/DFC/FRTE/FRA 432A01.

NOTE – Line links are sometimes characterized by having channel capacities not in accordance with normal group, supergroup, etc. alignments. Examples of these non-standard capacities may often be found in submarine cable or satellite line links. These links will be numbered in accordance with the nominal channel capacity of the link.

12.3   Related information

The additional information on group links, supergroup links and line links is covered by the following items:

1)   urgency for restoration;

2)   terminal countries;

3)   Network operators/service Providers' names;

4)   control and sub-control station(s);

5)   fault report points;

6)   routing;

7)   association;

8)   equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   bandwidth;

13)   occupancy (this item is not in use for group links and line links).

The various items will be dealt with in clause 13.

13   Related information for group, group link and line link interconnections

The following subclauses explain the items of related information concerned with group, group link, line link, etc. interconnections. Full examples for the designation information of an interconnecting group and an interconnecting group link are given in A.3.

13.1   Urgency for restoration [item 1]

This item supplies information on the urgency of restoration of the group/group link based upon bilateral agreement between the terminal Network operators/service providers.

Format:

1.   xxx ... xx; (maximum 10 characters)

Illustration:

a)   if the priority is top: 1;

         if the priority is second: 2;

         if the priority is third: 3; or

b)   if repair is required within e.g., 24 hours: ≤ 24 h; or

c)   if no urgency has to be indicated: –;

Example:

If the group Bonn/RFT/DTAG/DEU–Paris/ARC/FRTE/FRA 1201 needs top priority restoration:

1.   1;

13.2   Terminal countries [item 2]

This item presents the countries in which the group/group link is terminating.

Format:

2.   XXX, YYY; or XXX; (3 characters for each)

Specification:

XXX: code for country of Geographical area A

YYY: code for country of Geographical area B

In the case of a multiple destination unidirectional group (MU), only XXX applies.

Example 1:

For the group Beograd/RED/YUGTEL/YUG–Roma/EDD/TI/ITA 1201:

2.   YUG, ITA;

Example 2:

For the multiple destination group Toronto/34R/TGB/CAN–(MU) 1202:

2.   CAN;

NOTE – The codes are according to ISO 3166-1 [2].

13.3   Names of Network operators/service providers [item 3]

This item records the names of the carriers, etc., which operate the group/group link. The applicable carrier codes can be selected from the List of ITU Carrier Codes as described in 6.4.

Format:

3.   XXXXXX, YYYYYY; or XXXXXX; (maximum 6 characters for each)

Specification:

XXXXXX: name of company in Geographical area A

YYYYYY: name of company in Geographical area B

In the case of a unidirectional multiple destination, only XXXXXX applies.

Example 1:

For the supergroup Amsterdam/E1R/TCOMNL/NLD–London/ERT/BTPLC/GBR 6002:

3.　　　　TCOMNL, BTPLC;

Example 2:

For the multiple destination group Hong Kong/WXX/CWHKTI/HKG–(MU) 1201:

3.　　　　CWHKTI.

13.4　　Control station sub-control station(s) [item 4]

This item lists the appointed control station and sub-control stations (according to ITU-T Recs M.80 [15] and M.90 [16]). Further details about the stations can be found in the list of contact point (ITU-T Rec. M.1510 [17]).

Format:

4.　　CS:　　　　designation of control station,

　　　SCS1:　　　designation of sub-control station,

　　　SCS2:　　　designation of sub-control station,

　　　 M　　　　　　M

　　　SCSn:　　　designation of sub-control station.

or in the case of a multiple destination unidirectional group:

4.　　CS:　　　　designation of control station,

Specification:

　　　CS:　　　　　　designation of the control station,

　　　SCS1:　　　　　designation of the terminal sub-control station,

　　　SCS2 to SCSn:　if applicable, other sub-control stations have to be placed in the geographical order according to the traffic relation.

In the case of a multiple destination unidirectional group, only CS applies.

Example 1:

For a group Helsinki/TM1/SONERA/FIN–Paris/ARC/FRTE/FRA 1201 where the control station is Helsinki TM1 and the sub-control station is Paris Archives:

4.　　CS:　　　　Helsinki/TM1/SONERA/FIN,

　　　SCS1:　　　Paris/ARC/FRTE/FRA;

Example 2:

For the multiple destination unidirectional group Wien/ARS/RSLCOM/AUT–(MU) 1201:

4.　　CS:　　　　Wien/ARS/RSLCOM/AUT;

13.5　　Fault report points [item 5]

This item presents the names of both fault report points on the group/group link (according to ITU-T Rec. M.2130 [18]). Further details about the fault report points can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

5.　　　　Designation of fault report point, designation of fault report point;

or

5.   Designation of fault report point;

Specification:

The first fault report point is that of the country of Geographical area A. The second fault report point is that of the country of Geographical area B. In the case of a multiple destination unidirectional group, there is only one fault report point under item 5.

Example 1:

For the group Moskva/MNA/ROSTEL/RUS–Paris/ARC/FRTE/FRA 1201:

5.   Moskva/MNA/ROSTEL/RUS, Paris/ARC/FRTE/FRA;

Example 2:

For the multiple destination unidirectional group Caracas/TS1/CANTV/VEN–(MU) 1201:

5.   Caracas/TS1/CANTV/VEN;

13.6   Routing [item 6]

This item records the next higher group within the multiplex hierarchy on which the group/group link has been routed and the position number, or in the case of the highest multiplex level, the transmission media on which the group/group link has been routed.

Format:

6.   Designation of an interconnecting group/position number or designation of transmission medium, designation of an interconnecting group/position number or designation of transmission medium, ... , designation of an interconnecting group/position number or designation of transmission medium;

NOTE – Two consecutive unidirectional groups are separated by a + sign instead of a comma.

Specification:

The designation of an interconnecting group refers to the next higher level in the multiplex hierarchy. If there is more than one, the groups are noted in geographical order from Geographical area A to Geographical area B.

The designation of the transmission medium refers to the transmission medium leaving the country of Geographical area A and to the transmission medium entering the country of Geographical area B, respectively.

As no ITU-T designations of transmission media are provided for the time being, the terminal countries should provide designations or agree on designations.

If there is only one transmission medium, the designation of this medium applies.

Example 1:

A group Alger/5RT/PTT/DZA–London/34R/BTPLC/GBR 1201 has been routed between operators as follows:

6.   Alger/5RT/PTT/DZA–Paris/ARC/FRTE/FRA 6002/2, London/34R/BTPLC/GBR–
        Paris/ARC/FRTE/FRA 6040/5;

Example 2:

A supermaster group Barcelona/WSX/TFCAES/ESP–Perpignan/EST/FRTE/FRA 90001 has been routed as follows:

6.   Gerona/EB2/TFCAES/ESP–Perpignan/EST/FRTE/FRA 1800A08;

Example 3:

A group Caracas/24E/CANTV/VEN–Paris/ARC/FRTE/FRA 1201 has been routed as follows:

6.   Caracas/24E/CANTV/VEN–Paris/ARC/FRTE/FRA 6001/2+Caracas–(MU) 6002/3;

13.7   Association [item 7]

This item informs whether there are associated group/group links and if so, of which nature.

Format:

7.   Association code: designation(s) of the associated group(s) or group link(s);

Specification:

If the group *has* a reserve group, the association code is: S followed by the function code and the serial number of the group.

If the group *is* a reserve group, the association code is: function code followed by S and the serial number of the reserve group.

The same applies for group links.

Example:

If the normal group is Bruxelles/EDC/BGACOM/BEL–Luxembourg/EXX/LUXPT/LUX 1215 and if the group Bruxelles/EDC/BGACOM/BEL–Luxembourg/EXX/LUXPT/LUX 12899 serves as a restoration group for the group Bruxelles/EDC/BGACOM/BEL–LuxembourgEXX/LUXPT/LUX 1215:

7.   S1215: Bruxelles/EDC/BGACOM/BEL–Luxembourg/EXX/LUXPT/LUX 12899;

For the group Bruxelles–Luxembourg 12899 there has to be recorded under item 7:

7.   12S899: Bruxelles/EDC/BGACOM/BEL–Luxembourg/EXX/LUXPT/LUX 1215;

13.8   Equipment information [item 8]

This item records information on equipment in the group/group link which requires special maintenance attention.

Format:

8.   XX, XX, XX, XX;

Specification:

If the group is carrying companded circuits: CO

If a group has been routed via TDMA: TD

If there is no special equipment: –

NOTE – If there is a need to record any additional equipment information, the free codeplaces are available for that purpose. The codes to be used must consist of two characters, be unique and can be chosen by bilateral agreement between Network operators/service providers.

Example:

If a group Genève/DCV/CHEPTT/CHE–Mexico/N1M/TELMEX/MEX 1210 is carrying companded circuits:

8.   CO;

13.9 Use [item 9]

This item identifies for what purpose the group/group link is used (if this is known by the Network operator/service provider and of use for maintenance).

Format:

9.   XXXXXX; (maximum of 6 characters)

Specification:

XXXXXX refers to (among others) the designatory letters Z, B, D, X, DP, RP, VP, etc. as explained in clauses 7 and 9. If no other information available, the sign – is used.

Example:

If the group London/45R/BTPLC/GBR–Melbourne/23E/TELSTR/AUS 1212 is dedicated to DP-circuits:

9.   DP.

13.10 Transmission medium information [item 10]

This item identifies whether a satellite is involved in the routing.

Format:

10.   ST; or –;

Specification:

If the group/group link has been routed via satellite: ST

If the group/group link has not been routed via satellite: –

Example:

If the group Caracas/ECV/CANTV/VEN–Madrid/234/TFCAES/ESP 1203 has been routed via satellite:

10.   ST.

13.11 End-to-end information or Operational Agreement [item 11]

13.11.1 End-to-end information (for mixed analogue/digital routes only)

This item provides information on the destinations of the traffic carried by the group.

Format:

11.   X ... X, Y ... Y; (maximum 12 characters each) or –;

Specification:

X ... X and Y ... Y are the names of a geographical area and refer to the destinations of the traffic on the group. The destinations are placed according to the order of geographical areas in the traffic relation.

If the group has a multiple destination, one Geographical area name is replaced by the code: M.

If the group is within an analogue environment, X ... X, Y ... Y is replaced by the sign –.

Example:

If the group Athinai/ECC/OTE/GRC–Paris/ARC/FRTE/FRA 60C11 carries traffic from Bruxelles to Sofia:

11.   Sofia, Bruxelles;

13.11.2 Operational Agreement (for groups, group links and line links only)

This item signifies that the operators of a network connection have an agreement in place that may require special maintenance or operational procedures.

Format:

11.   XXXXXXXXX; (maximum 10 characters)

Specification:

XXXXXXXXX refers to the interconnecting network for which the operational agreement applies.

Example:

If the group, group link or line link was established for an interconnecting network, e.g., GEN, requiring special maintenance procedures:

11.   GEN;

13.12   Bandwidth [item 12]

This item shows the bandwidth of the group/group link.

Format:

12.   xxxx kHz or MHz or GHz

Rules for the notation of the bandwidth figures:

No leading zeros required.

If the figure is between 10 000 and 9 999 999, use kHz.

If the figure is between 10 000 000 and 9 999 999 999, use MHz.

If the figure is 10 000 000 000 or more, use GHz.

Example:

A group Bangkok/R45/TOT/THA–New Delhi/EDV/VSNL/IND 1201:

12.   48 kHz;

13.13   Occupancy (for groups/supergroups, etc., and for line links) [item 13]

This item lists the occupancy of the group expressed by the next lower group and/or circuits which have been routed in the group.

Format in the case of a group (lowest level):

13.   Position number: designation of the circuit, or the sign –,

           M   M

        Position number: designation of the circuit, or the sign –;

Format in the case of a supergroup or higher level group:

13.   Position number: designation of a group, of a leased circuit, or the sign –,

           M   M

        Position number: designation of a group of a leased circuit, or the sign –;

Specification:

If the position number is occupied by a next lower group: designation of this group.

If the position number is occupied by a leased circuit (with a bandwidth corresponding to the bandwidth of the next lower multiplex level, e.g., see 9.2.13): designation of this leased circuit.

If the position number is not in use: –

Example:

For a supergroup Athinai/WED/OTE/GRC–Paris/ARC/FRTE/FRA 6002:
13.   01: Beyrouth/3ED/BTPLC/GBR–Paris/ARC/FRTE/FRA 1209,

          02: London/2WS/BTPLC/GBR–Sofia/3ED/FRTE/FRA 1202,

          03: Athinai/3CC/OTE/GRC–Paris/ARC/FRTE/FRA 1205,

          04: Athinai/3CC/OTE/GRC–Rotterdam/WSX/TCOMNL/NLD 1202,

          05: Athinai/3CC/OTE/GRC–Paris/ARC/FRTE/FRA DP4;

14 Designations of digital block (bidirectional and unidirectional) interconnections

14.1 General

This clause refers to blocks which are part of the digital multiplex hierarchy and which are formatted according to ITU-T Recs G.734, G.736, G.742, G.743, G.745, G.751, G.752, G.753 and G.754 [10]. When a digital block route includes a transit network, clause 23 applies. The bit rates for these blocks, defined in ITU-T Rec. G.702, are: 1544 kbit/s, 2048 kbit/s, 6312 kbit/s, 8448 kbit/s, 32 064 kbit/s, 34 368 kbit/s, 44 736 kbit/s, 97 728 kbit/s and 139 264 kbit/s. All other blocks are designated according to clause 17.

An interconnecting digital block exists between two terminal points when it is possible to operate and monitor the digital block at both terminal points, without any other intermediate point where the original transmission structure ceases or is in some way modified.

When in the interconnection route between two terminal transmission points an intermediate point is present where the digital transmission structure is demodulated, the route is split in two separate parts. Therefore, all present possible digital blocks exist only between the original route end points and that intermediate point and then have to be designated separately (according to the above rule).

Basically, two different multiplex configurations apply:

Symmetrical: Both terminal points have the same multiplexing configuration. The digital blocks existing (i.e., those effectively operated and monitored) are designated as described in 14.2.1 (according to the above rule).

Asymmetrical: One of the two terminal points has a different multiplexing configuration from the one used by the other point. The digital blocks existing (i.e., those effectively operated and monitored) are designated as described in 14.2.2.

The format of the designation of digital blocks is shown in Table 6.

Table 6/M.1400 – Digital block designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	3 to 6	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Digital block termination A and digital block termination B refer to the names of the two transmission stations in which the digital block is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space). In the case of a multiple destination unidirectional digital block, Geographical area B is replaced by (MU) (see 14.4).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: three to six letters and/or digits)

This code consists of a number indicating the nominal number of channels in the digital block followed by the letter N. The function codes, for digital blocks formatted according to ITU-T Recs G.734, G.736, G.742, G.743, G.745, G.751, G.752, G.753 and G.754 [10], are: 24N, 30N, 96N, 120N, 480N, 672N, 1440N and 1920N.

For blocks in a mixed analogue/digital environment, see 16.1.2. (In this case, 6 characters or less are required.)

c) *Serial number* (required one to four digits)

Identifies the instance of the digital block. The serial numbering starts anew if there is a difference in transport relation and/or function code.

14.2 Bidirectional digital blocks

14.2.1 Symmetrical configuration

As stated in 14.1, symmetric configuration means the same multiplexing configuration is present in both terminal transmission stations. The configuration in use defines the digital blocks to be designated.

Example 1:

In London and Paris, the same multiplexer configuration is being applied with a 34-Mbit/s supplying 4×8-Mbit/s digital block. Then, an 8-Mbit/s block exists. The fourth secondary order block between London and Paris is designated:

London/1L7/BTPLC/GBR–Paris/ARC/FRTE/FRA 120N4.

Example 2:

The tenth primary order block between New York and Tokyo is designated:

New York/ERT/ATT/USA–Tokyo/MNM/NTT/JPN 24N10.

14.2.2 Asymmetrical configuration

As stated in 14.1, asymmetrical configuration means that different multiplexing configurations are present in the two terminal transmission stations. As the transmission station at one end has another multiplexer configuration than the one at the other end, only the digital blocks are deemed to exist that can be manipulated at both stations.

Example 1:

Lisbon and Rome are interconnected by a 34-Mbit/s line system. In Lisbon, a traditional multiplexer configuration is used (i.e., 34 Mbit/s $<>$ 8 Mbit/s $<>$ 2 Mbit/s). In Rome, an equipment with 34 Mbit/s $<>$ 2 Mbit/s multiplexer configuration is used, without the 8-Mbit/s modulation levels. In this case, the 8-Mbit/s blocks do not exist. Only the 34-Mbit/s and the 2-Mbit/s blocks exist between Lisbon and Rome. If only the first 2-Mbit/s block exists within the first 34 Mbit/s, the designation is:

Lisboa/DFT/PT/PRT–Roma/VBB/TI/ITA 30N3.

(See also the example in A.4.1.2.)

14.3 Restoration digital blocks

Digital blocks set up on restoration digital paths or spare digital paths for restoration purposes will receive a serial number from the 800-series, in descending order and starting from 899.

Example:

The first fourth order restoration block between Koebenhavn and Stockholm is designated:

Koebenhavn/SST/TD/DNK–Stockholm/1BR/TELIA/SWE 1920N899.

14.4 Multiple destination unidirectional digital blocks

For these blocks, the traffic relation is composed of the name of the sending terminal station followed by a hyphen and the letters MU (multiple destination unidirectional) in parentheses.

Examples:

The first multiple destination unidirectional primary digital block from Bercenay (to, for example, London and Bruxelles) is designated:

Bercenay/EVE/FRTE/FRA–(MU) 30N1.

The next multiple destination unidirectional primary digital block from Bercenay (to, for example, Frankfurt and Roma) is designated:

Bercenay/EVE/FRTE/FRA–(MU) 30N2.

NOTE – Digital blocks routed via a multi-access system may be provided for exclusive use between two terminal stations only, in which case the normal designations given above in this Recommendation will apply.

14.5   Single destination unidirectional digital blocks

These blocks are designated as normal digital blocks and numbered in the same sequence. The unidirectional property as well as the direction of transmission has to be registered in Related information under item 16 (Direction of transmission) (see 20.16).

Example:

A unidirectional primary digital block transmitting in the direction Roma to London, which is the 21st primary digital block on that relation is designated:

London/CCD/BTPLC/GBR–Roma/DV1/TI/ITA 30N21.

14.6   Related information

The additional information on digital blocks is covered by the following items:

1)   urgency for restoration;
2)   terminal countries;
3)   Network operators/service providers' names;
4)   control and sub-control station(s);
5)   fault report points;
6)   routing;
7)   association;
8)   equipment information;
9)   use;
10)   transmission medium information;
11)   operational agreement;
12)   bit rate;
13)   occupancy;
14)   actual number of channels (for primary blocks only);
15)   clocking information;
16)   direction of transmission (for unidirectional blocks only).

The various items will be dealt with in clause 20.

15   Designation of digital path interconnections

In practice, it may be that terminal equipment is not connected to a digital path. Nevertheless, for designation purposes, the digital path will be designated as though digital blocks had been set up (see 14.1).

15.1 Conventional digital paths not connected to their terminal equipment

Such digital paths are included in the normal serial numbering sequence of digital blocks and are not given a separate numbering sequence. When a digital path route includes a transit network, clause 23 applies.

15.2 Restoration digital paths

Digital paths nominated for restoration purposes are designated by serial numbers taken from the 800-series in ascending order and starting from 801.

Restoration paths for first order digital blocks: 30N801, 30N802, etc.

Restoration paths for second order digital blocks: 120N801, 120N802, etc.

Example 1:

The 4th second order restoration digital path between London and Paris is designated:

London/1N/BTPLC/GBR–Paris/ARC/FRTE/FRA 120N804.

Example 2:

The first third order restoration digital path between Amsterdam and Paris is designated:

Amsterdam/23T/TCOMNL/NLD–Paris/ARC/FRTE/FRA 480N801.

15.3 Digital line sections and digital radio sections

Designations of digital line sections and digital radio sections are under consideration.

15.4 Related information

The additional information on digital paths is covered by the following items:

1) urgency for restoration;
2) terminal countries;
3) Network operators/service provider names;
4) control and sub-control station(s);
5) fault report points;
6) routing;
7) association;
8) equipment information;
9) use;
10) transmission medium information;
11) operational agreement;
12) bit rate.

The various items will be dealt with in clause 20.

16 Designations of routes[3] in the mixed analogue/digital transmission network

Conforming to the philosophy for lining-up and maintaining a mixed analogue/digital transmission network (ITU-T Rec. M.20 [19]), the analogue and digital parts of the network are designated separately. To indicate that the end-to-end transmission relies on a mixture of analogue and digital transmission systems, the letter C is included in both the analogue and digital designations. The function code may, therefore, consist of a maximum of 6 characters.

Transmultiplexer equipment is included in the designation of the analogue part of the route.

16.1 Transmission routes with one analogue-to-digital conversion

16.1.1 Groups and supergroups, etc. forming part of a mixed analogue/digital transmission route

Groups, supergroups, etc. which are converted into digital paths at some point are designated in the same way as conventional groups or supergroups (see 11.1), but have a letter C included in the function code and placed after the nominal number of channels.

Examples:

Group:	London/VEA/BTPLC/GBR–Riyadh/TYU/MOPTT/SAU 12C02
	Amsterdam/REV/TCOMNL/NLD–Koebenhavn/OOP/TD/DNK 12C899
	(restoration group)
Supergroup:	Paris/ARC/FRTE/FRA–Sydney/8UR/TELSTR/AUS 60C01
Mastergroup:	Bruxelles/23E/BGACOM/BEL–London/ERT/BTPLC/GBR 300C03
Supermastergroup:	Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA 900C04

16.1.2 Digital blocks and paths forming part of a mixed analogue/digital transmission route

Digital blocks and paths which are converted into analogue groups, supergroups, etc. at some point, are designated in the same way as conventional digital blocks and paths, but have an additional letter C placed after the letter N.

Example:

Madrid/EEC/TFCAES/ESP–Roma/UE9/TI/ITA 480NC1.

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[3] This term is used provisionally in this context to designate various combinations of analogue and digital sections with appropriate intermediate equipment and usually also including terminal equipment, as illustrated in Figures 3 and 4.

Figure 3 shows a typical analogue/digital arrangement and how it will be designated.
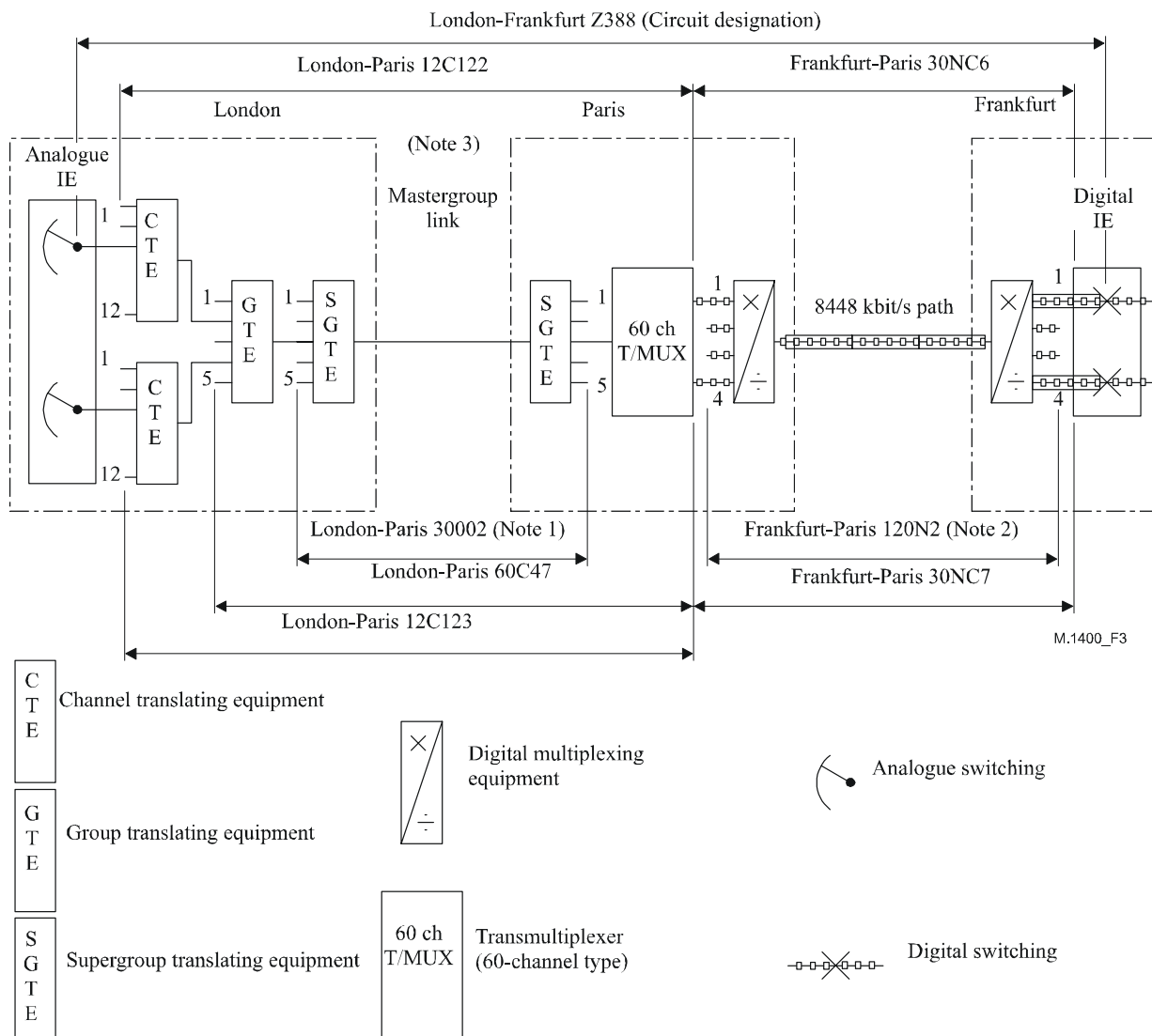
Figure 3/M.1400 – Example of a transmission route involving one analogue-to-digital conversion, showing how the various parts will be designated

16.1.3   End-to-end designations

This subject is covered by item 11 in related information for digital blocks (see 20.11).

16.2   Transmission routes with two analogue-to-digital conversions

16.2.1   End-to-end designations

Where both ends of a route involving two analogue-to-digital conversions are analogue, an end-to-end designation using the analogue notation described in 16.1.1 should be agreed between the terminal Network operators/service providers.

Where both ends are digital, an end-to-end designation using the digital notation described in 16.1.2 should be agreed between the terminal Network operators/service providers.

By the above means, both terminal stations have available a common designation for the end-to-end transmission route, and are informed of its mixed analogue/digital nature.

16.2.2 Intermediate section designation

The intermediate part of the route is given a separate designation using the appropriate notation. The choice of this designation is the responsibility of the Network operators/service providers providing the intermediate part of the route, and it is their responsibility to associate, in their records, this intermediate designation with the overall designation.

Figure 4 shows two examples of routes involving two analogue-to-digital conversions and how they will be designated.

a) Digital-analogue-digital route

b) Analogue-digital-analogue route
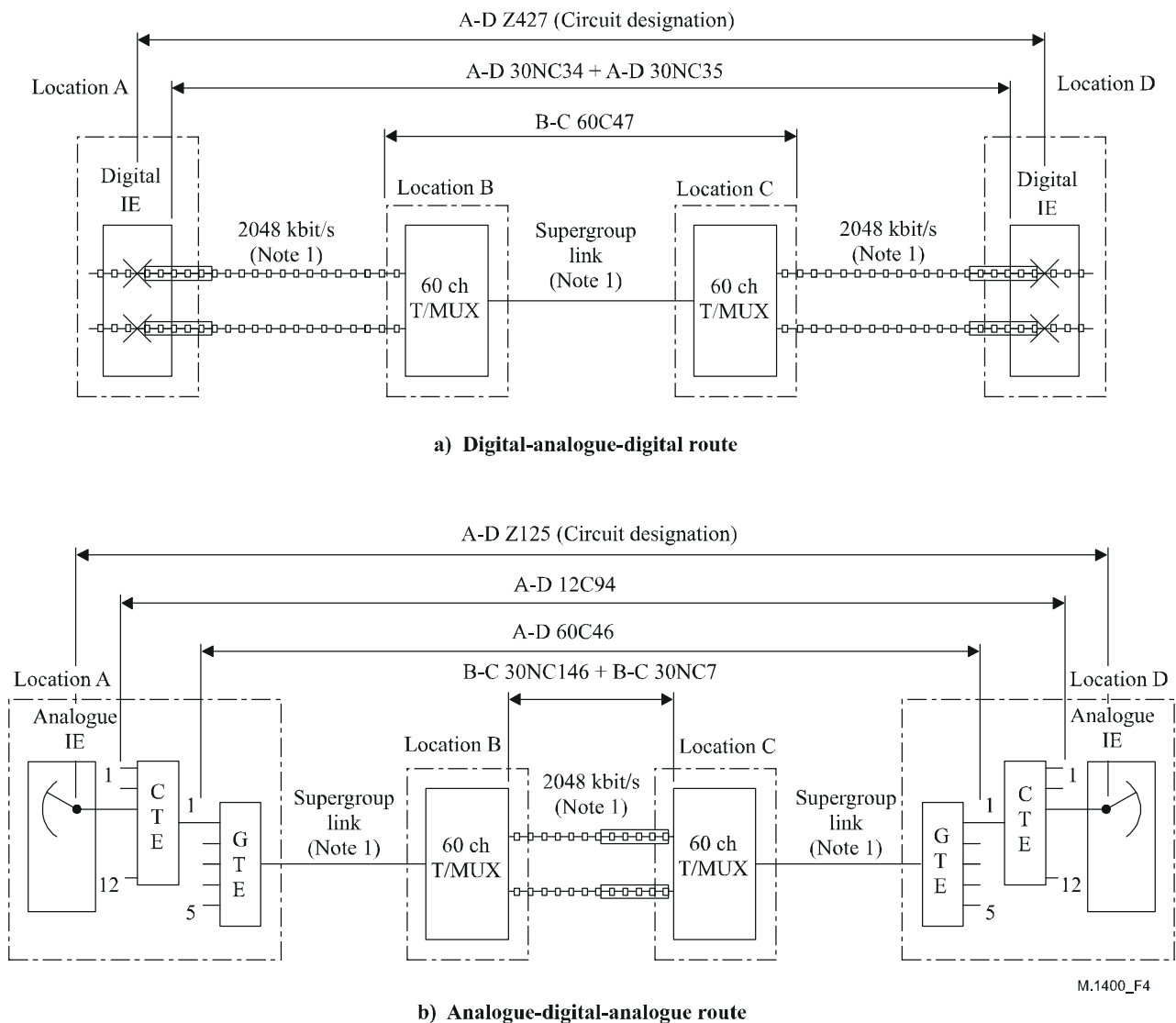
IE   International exchange
NOTE 1 – Higher-order groups and digital blocks would be designated in the conventional manner.
NOTE 2 – Symbols are defined in Figure 3.

Figure 4/M.1400 – Examples of transmission routes involving two analogue-to-digital conversions, showing how the various parts will be designated

16.3 Transmission routes with more than two analogue-to-digital conversions

The transmission planning rules given in clause 3/G.113 [11] effectively restrict the number of unintegrated digital processes (e.g., analogue-to-digital conversions) permitted in the interconnection part of a telephone connection. Similarly, the routing plan given in ITU-T Rec. E.171/Q.13 [12] restricts the number of interconnecting circuits in a connection to four.

In view of these rules, it is desirable to limit the number of analogue-to-digital conversions in each direction between interconnecting centres to a maximum of two. Therefore, the detailed designation requirements of routes with more than two analogue-to-digital conversions are not considered.

16.4 Related information

The additional information on groups and blocks in the mixed analogue/digital network is covered by the same items as analogue groups and digital blocks respectively. However, item 11 "End-to-end information" is used in addition (see 13.11 and 20.11).

17 Designation of data transmission systems

17.1 General

This clause deals with data transmission systems provided between the premises of Network operators/service providers. (Those between renters' premises are designated according to 9.2.15 concerning digital leased circuits connecting two locations.) Individual 56 or 64 kbit/s time slot interconnections (e.g., rented as single bearers in submarine cables) are considered as data transmission links and get a designation accordingly. For an example, see 17.2. When a data transmission system route includes a transit network, clause 23 applies.

The designation scheme of these data transmission systems can only be used if they are non-hierarchical or not formatted according to ITU-T Recs G.734, G.736, G.742, G.743, G.745, G.751, G.752, G.753 and G.754 [10]. This means that digital blocks from a digital multiplex hierarchy, with a format defined in ITU-T Rec. G.702 [13] cannot have a designation taken from this clause. They should be designated according to clause 14. The bit rates for these blocks, defined in ITU-T Rec. G.702 are: 1544 kbit/s, 2048 kbit/s, 6312 kbit/s, 8448 kbit/s, 32 064 kbit/s, 34 368 kbit/s, 44 736 kbit/s, 97 728 kbit/s and 139 264 kbit/s.

NOTE 1 – This clause deals with digital transmission only. Analogue data transmission systems and links are covered by the clauses treating circuits, groups and group links.

The format of designations of data transmission systems is shown in Table 7.

Table 7/M.1400 – Data transmission system designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	3 to 5	1 to 3

↑
No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Data transmission system terminal station A and data transmission system terminal station B refer to the names of the two transmission stations in which the data transmission system is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: three to five letters and/or digits)

This code consists of a 2- to 4-digit number which, together with a letter showing the multiplication factor, indicates the bit rate.

The letters to be used to indicate the multiplication factor are:

Bit rate of system	Letter
Up to 999 bit/s	B
1000 to 9999 bit/s	H
10 000 to 9 999 999 bit/s	K
10 000 000 to 9 999 999 999 bit/s	M

c) *Serial number* (required one to three digits)

Identifies the instance of the transmission system. The serial numbering starts anew if there is a difference in transport relation and/or function code.

NOTE 2 – The use of the data transmission system (e.g., multiplex of digital leased circuits, broadcasting, video) will be recorded in Related information under item 9 (Use) (see 20.9).

Example 1:

The first 9600 bit/s data transmission system between Lisbon RM1 and New York (for example, in use for a multiplex of 2400 bit/s and 7200 bit/s circuits):

Lisboa/RM1/VCE/PT/PRT–New York/56H/ATT/USA 96H1.

Example 2:

The eleventh 2048 kbit/s data transmission system between London and Paris (used, for example, for public video conference):

London/MNM/BTPLC/GBR–Paris/ARC/FRTE/FRA 2048K11.

Example 3:

The first 512 kbit/s data transmission system (in use as an Intermediate Data Rate satellite carrier, rented from INTELSAT) between Dubai and Montreal satellite earth stations (used, for example, for public telephone service):

Dubai/ERD/MOPTT/SAU–Montreal/TGB/CAN 512K1.

17.2   Data transmission links

Data transmission links are designated as data transmission systems.

Example:

In TAT-9, several single bearers between New York and London are in operation being rented from the cable operating company by KPN Telecom in The Netherlands. The first single 64 kbit/s bearer gets the designation:

London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K1.

NOTE 1 – The suffix has to be agreed between the cable operating company and KPN Telecom or can simply be KPN.

NOTE 2 – If the bearer is in use for the leased circuit Amsterdam/ERT/TCOMNL/NLD–New York/ABC/ATT/USA NP25, the occupancy is as follows:

London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K1

1.   Amsterdam/TCOMNL/NLD–New York/ABC/ATT/USA NP25

If the bearer would be idle, the occupancy is: 1.

Reference is made to Annex B, which shows a more detailed example and the remaining part of routing from London to Amsterdam.

17.3   Related information

The additional information on data transmission systems is covered by the following items:
1)   urgency for restoration;
2)   terminal countries;
3)   Network operators/service providers' names;
4)   control and sub-control station(s);
5)   fault report points;
6)   routing;
7)   association;
8)   equipment information;

9)   use;

10)   transmission medium information;

11)   composition of transmission;

12)   (unassigned item, use: "–;");

13)   occupancy.

The various items will be dealt with in clause 20.

18   Designations of digital block interconnections created by the interconnection of Digital Circuit Multiplication Equipments (DCMEs)

18.1   General

The format of the designation of digital blocks created by the interconnection of DCMEs is shown in Table 8.

Table 8/M.1400 – DCME designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 to 4	≤ 4

↑ No space

The elements of the layer 1 format are as follows:

a)   *Transport relation*

Digital block terminal point A and digital block terminal point B refer to the names of the two transmission stations in which the digital block is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: two to four letters and/or digits)

This code consists of a number indicating the nominal maximum number of channels in the block followed by the letter Y.

c)   *Serial number* (required one to four digits)

Identifies the instance of the digital block. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example 1:

The second block created by the interconnection of DCMEs with a nominal maximum number of 240 channels between Frankfurt and Melbourne will be designated:

Frankfurt/1WE/DTAG/DEU–Melbourne/34R/TELSTR/AUS 240Y2.

Example 2:

A block is created by the interconnection of DCMEs, and routed via a 512 kbit/s data transmission system. This data transmission system is an Intermediate Data Rate digital satellite carrier rented from INTELSAT (with 8×64 kbit/s bearer channels). Only one port will be used at both DCMEs. The first of such blocks to be established between Lisbon and Hong Kong will be designated:

Hong Kong/4RT/CWHKTI/HKG–Lisboa/RFV/PT/PRT 30Y1.

18.2   Multi-clique configuration of DCMEs

If the created block is partly directed to destination B and partly to C (Figure 5) the designation of the blocks is:

Geographical area A/Transmission station detail/ICC/CC–Geographical area B/Transmission station detail/ICC/CC $n_1n_1n_1$ Y xxxx

Geographical area A/Transmission station detail/ICC/CC–Geographical area B/Transmission station detail/ICC/CC $n_2n_2n_2$ Y xxxx

− $n_1n_1n_1$, $n_2n_2n_2$ are the numbers of channels dedicated to that relation (multiples of 30);

− $n_1n_1n_1 + n_2n_2n_2 =$ the capacity of the DCME.

Example:

London/EDC/BTPLC/GBR–New York/EV1/ATT/USA 120Y_1

London/EDC/BTPLC/GBR–Pittsburgh/VBE/ATT/USA 120Y_1

M.1400_F5
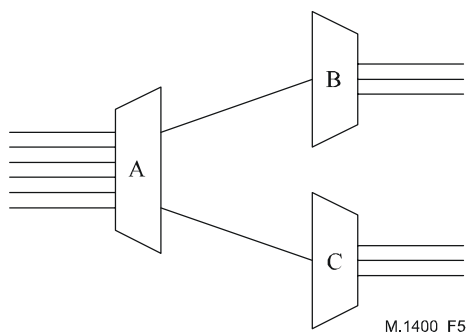
Figure 5/M.1400 – DCME configuration A

The same designation applies to the configuration in Figure 6 ($A_1 - B_1$, $A_1 - B_2$, $A_2 - B_1$ and $A_2 - B_2$).
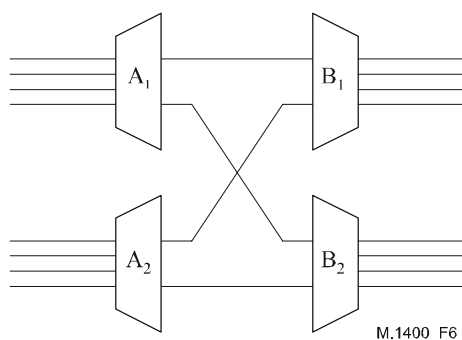
Figure 6/M.1400 – DCME configuration B

18.3 Low rate encoding equipment

Low Rate Encoding Equipment is considered as a special case of DCMEs.

If two of these equipment components are linked, by using a 2-Mbit/s path, the designation 60Y (if multiplication factor = 2) should be applied.

For LREs linked by paths with other bit rates, the function code to be used is also dependent on the nominal maximum number of channels allowed by the configuration.

Example:

A block is created by the interconnection of LREs, and routed via a 512-kbit/s data transmission system. This data transmission system is an Intermediate Data Rate digital satellite carrier rented from INTELSAT (with 8×64 kbit/s bearer channels). The multiplication factor is 2. The first of such blocks to be established between Rome and Beijing will be designated:

Beijing/11W/CT/CHN–Roma/ECB/TI/ITA 16Y1.

18.4 Related information

The additional information digital blocks created by the interconnection of DCMEs is covered by the following items:

1)   urgency for restoration;
2)   terminal countries;
3)   Network operators/service providers' names;
4)   control and sub-control station(s);
5)   fault report points;
6)   routing;
7)   association;
8)   equipment information;
9)   use;
10)   transmission medium information;
11)   operational agreement;
12)   bit rate;
13)   occupancy.

The various items will be dealt with in clause 20.

19 SDH

19.1 Designation of multiplex sections of the Synchronous Digital Hierarchy (SDH)

19.1.1 General

This clause deals with multiplex sections of the SDH (STMs) as defined in ITU-T Rec. G.707/Y.1322 [20]. When a multiplex section route includes a transit network, clause 23 applies.

The format of designation of multiplex sections is shown in Table 9:

Table 9/M.1400 – Multiplex section designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 to 4	1 to 3

↑ No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Multiplex section terminal point A and multiplex section terminal point B refer to the names of the two transmission stations in which the multiplex section is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: two to four letters and/or digits)

This code consists of a number (one to three digits) indicating the nominal number of VC-4s which can be carried by the multiplex section followed by the letter S.

c) *Serial number* (required one to three digits)

Identifies the instance of the multiplex section. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The eleventh multiplex section STM-16 (bit rate = 16 × 155 Mbit/s) between London and Paris is designated:

London/22D/BTPLC/GBR–Paris/ARC/FRTE/FRA 16S11.

19.1.2 Related information

The additional information on multiplex sections is covered by the following items:

1)   urgency for restoration;

2)   terminal countries;

3)   Network operators/service providers' names;

4)   control and sub-control station(s);

5)   fault report points;

6)   routing;

7)   association;

8)   equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   bit rate;

13)   occupancy;

14)   access point identifiers.

The various items will be dealt with in clause 20.

19.2   Designations of Virtual Container interconnections

19.2.1   General

This clause refers to Virtual Containers of the Synchronous Digital Hierarchy as defined in ITU-T Rec. G.707/Y.1322 [20]. When a virtual container route includes a transit network, clause 23 applies. The format of the designation of Virtual Containers is shown in Table 10.

Table 10/M.1400 – Virtual container designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	4 to 5	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a)   *Transport relation*

Data transmission system terminal point A and data transmission system terminal point B refer to the names of the two transmission stations in which the data transmission system is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: four to five letters and/or digits)

This code is the following:

VC11S   for a VC-11 Virtual Container

VC12S   for a VC-12 Virtual Container

VC2S   for a VC-2 Virtual Container

VC3S   for a VC-3 Virtual Container

VC4S   for a VC-4 Virtual Container

Function codes for concatenated virtual containers are covered by 19.3.

c)   *Serial number* (required one to four digits)

Identifies the instance of the virtual container. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The tenth VC-4 Virtual Container between Barcelona and Toulouse is designated:

Barcelona/ECT/TFCAES/ESP–Toulouse/CVB/FRTE/FRA VC4S10.

19.2.2   Related information

The additional information on Virtual Containers is covered by the following items:

1)   urgency for restoration;

2)   terminal countries;

3)   Network operators/service providers' names;

4)   control and sub-control station(s);

5)   fault report points;

6)   routing;

7)   association;

8)   equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   (unassigned item, use: "–;");

13)   occupancy;

14)   access point identifiers.

The various items will be dealt with in clause 20.

19.3   Concatenated virtual containers

Concatenated virtual containers are a group of virtual containers which are being concatenated. Such a concatenation configuration provides higher payload capability because the overhead in all but one virtual container is removed. The configuration therefore is a transport entity and receives a discrete designation.

Concatenation can have two forms: contiguous and virtual. Contiguous refers to the configuration where the individual containers are in time slot order, whilst virtual concatenation refers to the configuration where the individual containers are spread over various time slots. The network management system keeps track of the actual configuration.

The configurations are called in the operational field according to an expression using the letters VC followed by a hyphen followed by the VC level followed by a hyphen followed by the number of concatenated virtual containers followed by the letter v or c depending on the type of concatenation, so contiguous or virtual; example: VC-4-4c.

This operational expression is used to explain the use of function codes for concatenated virtual containers.

The function codes for concatenated virtual containers follows the scheme shown below:

For contiguous concatenation and virtual concatenation respectively the function codes are:

m**V**p**C** and m**V**p**V** with,

$$m \quad V \quad p \quad C/V$$

m indicating the number of concatenated VCs up to 256 (max 3 digits)

V defining that it is a Virtual container (1 letter)

p indicating the VC level (2, 4, 11, 12) (max 2 digits)

C defining that it is a Contiguous concatenated VC (1 letter)
or V defining that it is a Virtual concatenated VC (1 letter)
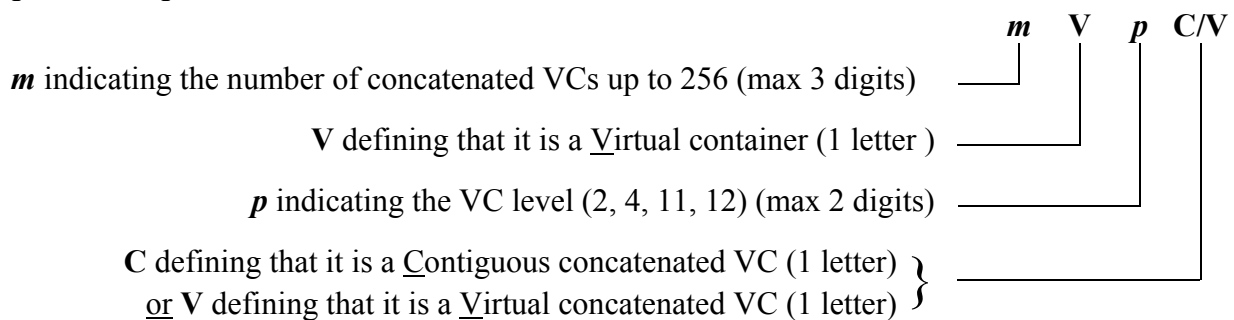
Use of function codes for various payload types:

Payload type		Function code
3 virtual concatenated VC-12's	VC-12-3v	3V12V
5 contiguous concatenated VC-2's	VC-2-5c	5V2C
4 contiguous concatenated VC-4's	VC-4-4c	4V4C
4 virtual concatenated VC-4's	VC-4-4v	4V4V
16 contiguous concatenated VC-4's	VC-4-16c	16V4C
256 contiguous concatenated VC-4's	VC-4-256c	256V4C

Example:

The third group of 16 contiguous concatenated VC-4's of payload type VC-4-16c, between Denver and Grenoble is designated:

Denver/ABC/ATT/USA–Grenoble/EC1/FRTE/FRA 16V4C3.

19.4   Leased circuits based on SDH

19.4.1   General

By placing SDH terminal equipment at users' premises leased circuit service can be offered to such users. This clause deals with these leased circuit types. When a leased circuit based on SDH route includes a transit network, clause 23 applies.

Various configurations apply:

–   terminal equipment at both sides is owned by a network operator/service provider (type A); or

–   by the end user (type B); or

–   on one side by the operator and on the other side by the user (type C).

In case A, a fully managed leased circuit service is offered. The connection is a normal trail namely a virtual container. The use of the virtual container is expressed by a leased circuit service.

In case of type B and C at the side where the terminal equipment is owned by the user, one has to identify a point where the connection is deemed to terminate and is handed over to the user; the role of such a point is expressed by the NTE. Because the connection is not terminating in the regular way, i.e., in the PTE, *this is not a trail* according to the definition of ITU-T Rec. G.803. Instead, this is a so-called *tandem connection*. In these cases no end-to-end managed connection is offered by the operator/provider to the user. The connection can only be partially managed.

19.4.2   Designations

Designation format is according to clause 9. However, new function codes apply. To that end, distinction is made between the fully managed and the partial managed types:

For partially managed SDH leased circuits, the function code is: HP

For fully managed SDH leased circuits, the function code is: MHP

19.4.3   Application

In case A, a virtual container is running from one user location to the other; it will receive a designation according to clause 19: so, for a VC12: Geographical area A/termination detail/ICC/CC–Geographical area B/termination detail/ICC/CC VC12S1

The leased circuit designation then will read: Geographical area A/termination detail/ICC/CC-Geographical area B/termination detail/ICC/CC MHP1

In cases B and C, a tandem connection is running; a new function code applies: TCxxS where

xx can take the values 12, 3 and 4.

The tandem connection will receive a designation as follows:

Geographical area A/termination detail/ICC/CC–Geographical area B/termination detail/ICC/CC TC12S1 and the leased circuit a designation:

Geographical area A/termination detail/ICC/CC–Geographical area B/termination detail/ICC/CC HP1.

It should be noted that function codes for leased circuits based on other network configurations, e.g., mixed PDH/SDH, require further study.

19.4.4 Related information

This is left for further study. This will be organized within clause 20.

20 Related information for digital block, path, data transmission system, block interconnections created by the interconnection of DCMEs, SDH multiplex sections and Virtual Containers

The following subclauses explain the items of related information concerned with interconnecting digital blocks, paths, data transmission systems, blocks created by the interconnection of DCMEs, Virtual Containers and SDH multiplex sections. Full examples of the designation information of an interconnecting digital block, an interconnecting digital path, an interconnecting data transmission system, an interconnecting block created by the interconnection of DCMEs, an interconnecting Virtual Container and an interconnecting SDH multiplex section are given in A.4.

20.1 Urgency for restoration [item 1]

This item supplies information on the urgency of restoration of the block, path, etc. based upon bilateral agreement between the terminal Network operators/service providers.

Format:

1.   xx ... xx; (maximum 10 characters)

Illustration:

a)   If the priority is top: 1;

      If the priority is second: 2;

      If the priority is third: 3; or

b)   If repair is required within e.g., 24 hours: ≤ 24 h; or

c)   If no urgency has to be indicated: –;

Example:

If a block needs top priority in the case of restoration:

1.   1;

20.2 Terminal countries [item 2]

This item presents the countries in which the block, path, etc. is terminating.

Format:

2.   XXX, YYY; (3 characters for each) or 2. XXX;

Specification:

XXX: code for country of Geographical area A

YYY: code for country of Geographical area B

In the case of multiple destination unidirectional block, only XXX applies.

NOTE – The codes are according to ISO 3166-1 [2].

Example:

For a digital block Bruxelles/ERY/BGACOM/BEL–Frankfurt/EVT/DTAG/DEU 120N1:

2.   BEL, DEU;

20.3   Names of network operators/service providers [item 3]

This item records the names of the carriers, etc., which operate the block, path, etc. The applicable carrier codes can be selected from the List of ITU Carrier Codes as described in 6.4.

Format:

3.   XXXXXX, YYYYYY; (maximum 6 characters for each) or 3. XXXXXX;

Specification:

XXXXXX: name of company in Geographical area A

YYYYYY: name of company in Geographical area B

In the case of a multiple destination unidirectional block, only XXXXXX applies.

Example:

For a digital block Frankfurt/EVT/DTAG/DEU–London/CCB/BTPLC/GBR 30N1 operated by Deutsche Telekom and BT (British Telecom):

3.   DTAG, BTPLC;

20.4   Control station [sub-control station(s)] [item 4]

This item lists the appointed control station and sub-control stations (according to ITU-T Rec. M.80 [15] and M.90 [16]). Further details about the stations can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

4.   CS: designation of control station,

          SCS1:   designation of sub-control station,

          SCS2:   designation of sub-control station,

            M   M

          SCSn: designation of sub-control station,

or, in the case of a multiple destination unidirectional block:

4.   CS: designation of control station.

Specification:

CS: designation of the control station,

SCS1:   designation of the terminal sub-control station,

SCS2 to SCSn: if applicable, other sub-control stations are to be placed in the geographical order according to the traffic relation.

In the case of a multiple destination unidirectional block, only CS applies.

Example 1:

For the digital block Stockholm/ECC/TELIA/SWE–Venezia/XX1/TI/ITA 30N1 with control station Stockholm and sub-control stations Venezia and Paris:

4.   CS: Stockholm/HAM/TELIA/SWE;

          SCS1:   Venezia/CEN/TI/ITA;

          SCS2:   Paris/ARC/FRTE/FRA;

Example 2:

For the digital block Rio de Janei/E1X/EBTLBR/BRA–(MU) 30N1:

4.   CS: Rio de Janei/1/EBTLBR/BRA:

20.5   Fault report points [item 5]

This item presents the names of both fault report points on the block, path, etc. (according to ITU-T Rec. M.2130 [18]). Further details about the fault report points can be found in the list of contact points (ITU-T Rec. M.1510 [17]).

Format:

5.   Designation of fault report point, Designation of fault report point

or

5.   Designation of fault report point;

Specification:

The first fault report point is that of the country of Geographical area A.

The second fault report point is that of the country of Geographical area B.

In the case of a multiple destination unidirectional block, the second station and the comma are omitted.

Example 1:

For the digital block Lisboa/EC1/PT/PRT–Zurich/CCB/CHEPTT/CHE 30N1:

5.   Lisboa/PCS/PT/PRT, Zurich/SEL/CHEPTT/CHE;

Example 2:

For the digital block Jakarta/2WS/INDSAT/IDN–(MU) 30N1:

5.   Jakarta/1/INDSAT/IDN;

20.6   Routing [item 6]

This item records the next higher block within the multiplex hierarchy on which the block, path, Virtual Container, multiplex sections, etc., have been routed and the position number, or in the case of the highest multiplex level, the transmission media on which the block has been routed.

Format:

6.   Designation of an interconnecting block/position number or designation of transmission medium, Designation of an interconnecting block/position number or designation of transmission medium, ... , Designation of an interconnecting block/position number or designation of transmission medium.

NOTE 1 – For the case of a lower order Virtual Container (VC), the position number should be given using KLM addressing. KLM addressing is described in 7.3/G.707/Y.1322 [20]. Also, refer to Annex B for a description of how KLM addressing relates to time slot numbering.

NOTE 2 – Two consecutive unidirectional blocks are separated by a + sign instead of a comma.

NOTE 3 – For contiguous concatenation of lower order virtual containers the KLM-addressing applies as for normal virtual containers; for the concatenation of VC-4s and for virtual concatenation of all VC levels the time slot numbering must be applied.

Specification:

The designation of an interconnecting block refers to the next higher level in the digital multiplex hierarchy. If there is more than one, the blocks are noted in geographical order from Geographical area A to Geographical area B.

The designation of the transmission medium refers to the transmission medium leaving the country of Geographical area A and to the transmission medium entering the country of Geographical area B respectively.

As no ITU-T designations of transmission media, nor digital line or radio sections are recommended for the time being, the terminal countries should provide designations or agree on designations.

If there is only one transmission medium, the designation of this medium applies.

Example 1:

For the primary digital block Frankfurt/DCF/DTAG/DEU–Zurich/37T/CHEPTT/CHE 30N7:

6.   Frankfurt/DCF/DTAG/DEU–Zurich/37T/CHEPTT/CHE 120N1/3;

Example 2:

For the block Bruxelles/2WS/BGACOM/BEL–London/CBN/BTPLC/GBR 1920N1, with transmission medium corresponding to submarine cable:

6.   Bruxelles/2WS/BGACOM/BEL–London/CBN/BTPLC/GBR 5;

20.7   Association [item 7]

This item identifies whether there are associated blocks, paths, data transmission systems, digital blocks created between DCMEs, Virtual Containers and SDH multiplex sections, and if so, of what type.

Format:

7.   Association code: designation(s) of the associated block(s), path(s), etc.;

Further study is needed on the development of association codes for (shared) protection of SDH multiplex sections.

20.7.1   Information on reserve blocks, paths, data transmission systems created digital blocks between DCMEs, Virtual Containers and multiplex sections

Specification:

If the block *has* a reserve block, the association code is: S followed by the function code and the serial number of the principal block.

If the block *is* a reserve block, the association code is: function code followed by S and the serial number of the reserve block.

The same applies for digital paths, data transmission systems, etc.

Example:

If the path Hongkong/11W/CWHKTI/HKG–Singapore/SSD/ST/SGP 30N801 is the restoration path for the normal block Hongkong/11W/CWHKTI/HKG–Singapore/SSD/ST/SGP 30N3, the Related information for the normal block under Association must show:

7.   S30N3: Hongkong/11W/CHKTI/HKG–Singapore/SSD/ST/SGP 30N801;

20.7.2 Information on diverse routing

Specification:

If a block is required to be routed on a different route than other blocks, the association code is DVR followed by the designation of the other blocks.

The same applies for digital paths, data transmission systems, etc.

Example:

If a block Amsterdam/CBN/TCOMNL/NLD–Paris/ARC/FRTE/FRA 30N7 is required to be routed on a different route than the blocks Amsterdam/CBN/TCOMNL/NLD–Bruxelles/VVC/BGACOM/ BEL 30N12 and Bruxelles/VVC/BGACOM/BEL–Paris/ARC/FRTE/FRA 30N2, the related information for the block Amsterdam/CBN/TCOMNL/NLD–Paris/ARC/FRTE/FRA 30N7 under Association must show:

7.　　　DVR:　Amsterdam/CBN/TCOMNL/NLD–Bruxelles/VVC/BGACOM/BEL 30N12,

　　　　　　　Bruxelles/VVC/BGACOM/BEL–Paris/ARC/FRTE/FRA 30N2;

NOTE – The codes listed in 20.7.1 and 20.7.2 may both appear under Association.

20.7.3 Information on consecutive routing

Specification:

If the time slots in a block carry traffic that is consecutively routed on single bearers, the block and the single bearers get an Association code, namely:

PLR = part of a longer route.

Example:

If five single bearers (see the example in 12.2) are connected in London to five time slots in the interconnecting 2 Mbit/s digital block Amsterdam/PTT/TCOMNL/NLD– London/XYZ/BTPLC/GBR 30N1 the Association is as follows:

Amsterdam/PTT/TCOMNL/NLD–London/XYZ/BTPLC/GBR 30N1

7.　　　　PLR:　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K1

　　　　　　　　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K2

　　　　　　　　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K3

　　　　　　　　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K4

　　　　　　　　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K5

Similar for each of the single bearers, e.g., for London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 64K1:

7.　　　PLR:　London/XYZ/BTPLC/GBR–New York/ABC/ATT/USA 30N1

20.7.4 Information on maintaining the sequential order of digital paths (concatenation)

Specification:

If a couple of digital paths together support a service, it may be required to maintain the sequential order of the paths when multiplexed into a higher order block or container. In that case the designations of the paths get an Association code on concatenation, namely TSG = time slot sequential order must be guaranteed on an end-to-end basis; the format then is: 7. TSG followed by the function code and the sequential numbers of all concatenated digital paths including those of the path under consideration.

Example:

Three interconnecting 2-Mbit/s digital paths together support a video service, namely Lisboa/X1Y/PT/PRT–Milano/TI1/TI/ITA 30N21, Lisboa/X1Y/PT/PRT–Milano/TI1/TI/ITA 30N22, Lisboa/X1Y/PT/PRT–Milano/TI1/TI/ITA 30N23;

They must stay concatenated when they are being multiplexed into a virtual container and therefore each of their designations gets the Association code TSG followed by function code and the sequential numbers of all three concatenated 2 Mbit/s digital paths: Lisboa/X1Y/PT/PRT–Milano/ TI1/TI/ITA 30N22 has under Related information item 7:

7.   TSG: 30N21-23

20.8   Equipment information [item 8]

20.8.1   This item records information on equipment in the block, path, etc. which requires special maintenance attention.

Format:

8.   XX, XX, XX, XX;

Specification:

If the block has been routed via TDMA: TD.

If the block has been created by the interconnection of two transcoders (Low Rate Encoding equipment) using the A-law: AI or µ-law: MI.

NOTE – If there is a need to record any additional equipment information, the next free codeplaces are available for that purpose. The codes to be used must consist of two characters, be unique and can be chosen by bilateral agreement between Network operators/service providers.

20.8.2   For data transmission systems, this item supplies information about the multiplex configuration.

Format for data transmission systems only:

8.   XXXXXXYYYYZZZZZ;

Specification:

XXXXXX   refers to the Recommendation series,

YYYY   refers to the Recommendation number,

ZZZZZ   refers to the clause, subclause, table, etc. number.

Example:

For a 9600-bit/s data transmission system with a multiplex configuration as defined in Table D.1, item 8 will present:

8.   Rec. M.1400T12;

20.8.3   For blocks created by the interconnection of DCMEs, this item provides information on through-going channels (which are transmitted even if a DCME fails) and derived channels (which are not transmitted if a DCME fails).

Format:

8.   XXXXXXX = Y;

Specification:

XXXXXXX indicates a range of positions (e.g., 1-30), on all even positions (EP), on all odd positions (OP).

Y indicates whether these positions are through-going (T) or derived (D).

Example 1:

If the 30 first channels of a 240Y block are through-going, item 8 will be:

8.   1-30 = T;

Example 2:

If the even positions of a 60Y block created by the interconnection of two transcoders are derived, item 8 will be:

8.   EP = D;

20.9   Use [item 9]

This item identifies for what purpose the block, path, data transmission system is used (if this is known by the Network operator/service provider and is of use for maintenance).

Format:

9.   XXXXXX; (maximum 6 characters)

Specification:

XXXXXX refers to (among others) the designatory letters Z, B, D, V, etc. to indicate the use of the block. If no information is available, the sign – is used.

Example:

If the digital block Frankfurt/SSD/DTAG/DEU–Luxembourg/ECC/LUXPT/LUX 30N1 is used for sound-programme transmission:

9.   R;

20.10   Transmission medium information [item 10]

This item identifies whether a satellite is involved in the routing.

Format:

10.   ST; or –;

Specification:

If the block has been routed via satellite: ST

If the block has not been routed via satellite: –.

Example:

For the block Paris/ARC/FRTE/FRA–(MU) 30N1:

10.   ST;

20.11   End-to-end information or composition of transmission or Operational Agreement [item 11]

20.11.1 End-to-end information (for blocks and paths on mixed analogue/digital routes only)

This item provides information on the destinations of the traffic carried by the block or path.

Format:

11.   X ... X, Y ... Y; (maximum 12 characters each) or –;

Specification:

X ... X and Y ... Y are the names of a geographical area and refer to the destinations of the traffic on the block/path. The destinations are placed according to the order of geographical areas in the traffic relation.

If the block has multiple destinations the Geographical area name is replaced by the code: M.

If the block is within a digital environment X ... X, Y ... Y is replaced by the sign –.

Example 1:

For primary digital block Frankfurt/MMN/DTAG/DEU–Paris/ARC/FRTE/FRA 30NC6 carrying from Frankfurt–London:

11.   Frankfurt, London;

Example 2:

For primary block Amsterdam/EC2/TCOMNL/NLD–Bruxelles/EXX/BGACOM/BEL 30NC146 carrying traffic from London to Luxembourg:

11.   London, Luxembourg;

20.11.2 Composition of transmission (for data transmission systems)

This item shows the type of transmission on the data transmission system.

Format:

11.   A; N; or C;

Specification:

If the transmission is analogue: A

If the transmission is digital: N

If the transmission is mixed analogue/digital: C

20.11.3 Operational agreement (for digital blocks, digital paths, virtual containers and SDH multiplex sections only)

This item signifies that the operators of a network connection have an agreement in place that may require special maintenance or operational procedures.

Format:

11.   XXXXXXXXXX; (maximum 10 characters)

Specification:

XXXXXXXXXX refers to the interconnecting network for which the operational agreement applies.

Example:

If the digital block, digital path, virtual container or multiplex sections was established for an interconnecting network, e.g., GEN, requiring special maintenance procedures:

11.   GEN;

20.12   Bit rate (for blocks, paths and SDH multiplex sections) [item 12]

This item shows the bit rate of the block, path or multiplex section.

Format:

12.   xxxx.x kbit/s or Mbit/s;

Rules for the notation of the bit rate figures:

Leading zeros may be omitted and if the decimal is a zero, this decimal and the decimal sign may also be omitted.

If the figure is up to 9 999 999, use kbit/s.

If the figure is 10 000 000 or more, use Mbit/s.

NOTE – For data transmission systems and virtual containers, use the sign –.

Example 1:

For the digital block New York/M23/ATT/USA–Tokyo/ECB/NTT/JPN 24N2:

12.   1544 kbit/s;

Example 2:

For the digital block Bruxelles/CBN/BGACOM/BEL–Luxembourg/22W/EPT/LUX 480N1:

12.   34 Mbit/s;

20.13   Occupancy (except for paths) [item 13]

This item lists the occupancy of the block expressed by the next lower blocks and/or circuits and/or data transmission systems which have been routed in the block.

Format in the case of a primary block:

13.   Time slot number: designation of the circuit, or the sign –,

          M   M

         Time slot number: designation of the circuit, or the sign –;

Format in the case of a secondary or higher level block:

13.   Position number: designation of a block, of a leased circuit, of a data transmission system or the sign –,

          M   M

         Position number: designation of a block, of a leased circuit, of a data transmission system or the sign –;

Format in the case of a data transmission system:

1.   Position number: designation of the circuit,

          M   M

n.   Position number: designation of the circuit;

NOTE – Alternatively, instead of the position number, the channel numbering according to Annex D may be applied.

Specification:

If the position number is occupied by a next lower digital block: designation of this block.

If the position number is occupied by a digital leased circuit (with a bit rate corresponding to the bit rate of the next lower multiplex level): designation of this leased circuit.

If the position number is occupied by a data transmission system (with a bit rate corresponding to the bit rate of the next lower multiplex level): designation of this data transmission system.

If the position number is not in use: the sign −.

Format in the case of Virtual Containers

For higher order VCs:

13.   KLM number: designation of the lower order VC,

          M   M

          KLM number: designation of the lower order VC;

For lower order VCs:

13.   Designation of the digital block or digital path carried in this VC;

Format in the case of SDH multiplex sections

13. Position number: designation of the carried VC,

              M   M

          Position number: designation of the carried VC;

Example 1:

For the digital block Genève/XXV/CHEPTT/CHE−Paris/ARC/FRTE/FRA 120N2:

13.   01: Genève/XXV/CHEPTT/CHE−Lisboa/XZX/PT/PRT 30N1,

          02: −,

          03: Genève/XXV/CHEPTT/CHE−Paris/ARC/FRTE/FRA 2048K1,

          04: Bruxelles/23Z/BGACOM/BEL−Wien/XCX/RLSCOM/AUT 30N1;

Example 2:

For the digital block New York/24/ATT/USA−Paris/PT2/FRTE/FRA 24N5:

13.   01: New York/24/ATT/USA−Paris/PT2/FRTE/FRA Z1,

          02: New York/24/ATT/USA−Paris/PT2/FRTE/FRA Z3,

          03: New York/24/ATT/USA−Paris/PT2/FRTE/FRA Z5,

          04: Paris/PT2/FRTE/FRA−New York/24/ATT/USA Z2,

          05: Paris/PT2/FRTE/FRA−New York/24/ATT/USA Z4,

          06: Paris/PT2/FRTE/FRA−New York/24/ATT/USA Z6,

          07: −,

          08: −,

          09: −,

          10: Orlando/TS1/ATT/USA−Toulouse/FER/FRTE/FRA 64K1,

          11: −,

          12: −,

          13: −,

          14: −,

          15: New York/TS1/ATT/USA−Paris/ARC/FRTE/FRA R1,

          16: New York/TS1/ATT/USA−Paris/ARC/FRTE/FRA R3,

          17: −,

          18: −,

          19: −,

20: Paris/BEA/FRTE/FRA–Washington/TS1/ATT/USA NP1,

21: –,

22: –,

23: –,

24: –;

Example 3:

For the VC-4 Paris/ARC/FRTE/FRA–Roma/23T/TI/ITA VC4S12:

13.   1,0,0: Napoli/EC/TI/ITA–Paris/ARC/FRTE/FRA VC3S15,

2,1,0: Lille/WS/FRTE/FRA–Roma/23T/TI/ITA VC2S8,

2,2,0: Lille/WS/FRTE/FRA–Roma/23T/TI/ITA VC2S121,

2,3,0: –,

2,4,1: London/113/BTPLC/GBR–Roma/23T/TI/ITA VC12S30,

2,4,2: Paris/ARC/FRTE/FRA–Roma/23T/TI/ITA VC12S4,

2,4,3: London/113/BTPLC/GBR–Roma/23T/TI/ITA VC12S31,

2,5,0: London/113/BTPLC–Roma/23T/TI/ITA VC2S67,

2,6,0: –,

2,7,0: Paris/ARC/FRTE/FRA–Roma/23T/TI/ITA VC2S82,

3,0,0: Napoli/EC/TI/ITA–Paris/ARC/FRTE/FRA VC3S16;

Example 4:

For the multiplex section London/113/BTPLC/GBR–Paris/ARC/FRTE/FRA 4S1:

13.   1: Glasgow/24R/BTPLC/GBR–Paris/ARC/FRTE/FRA VC4S12,

2: London/113/BTPLC/GBR–Paris/ARC/FRTE/FRA VC4S21,

3: –,

4: London/113/BTPLC/GBR–Toulouse/WSX/FRTE/FRA VC4S;

20.14   Actual number of channels and access point identifier [item 14]

In the case of primary blocks, 20.14.1 applies; in the case of virtual containers and SDH multiplex sections, 20.14.2 applies.

20.14.1 Actual number of channels (primary blocks only)

This item contains the actual number of channels on a primary digital block.

Format:

14.   xxx;

Specification:

xxx indicates the actual number of channels.

For higher blocks xxx is replaced by the sign –.

Example 1:

For the digital block New York/WSX/ATT/USA–Paris/ARC/FRTE/FRA 30N5 dedicated to leased circuits:

14.   31;

Example 2:

For the digital block London/23T/BTPLC/GBR–New York/3ED/ATT/USA 30N3 used for switched public telephone circuits with ADPCM, the information may be:

14.   60;

Example 3:

For the digital block Honolulu/CCC/ATT/USA–Osaka/EDC/NTT/JPN 24N2 used for switched public telephone circuits:

14.   24;

20.14.2 Access point identifiers (virtual containers and SDH multiplex sections)

This item contains the access point identifiers associated with the trail terminations at the ends of the trail. For Geographical area A in the designation of a virtual container or a multiplex section, the APId A applies. For Geographical area B in the designation of a virtual container or a multiplex section, the APId B applies.

Format:

14.   APId A: xxx ... xx, (maximum 15 characters)

APId B: xxx ... xx; (maximum 15 characters)

The access point identifier consists of a maximum of 15 characters and begins with either:

a)   the three alphabetic character country code as defined in ISO 3166-1 [2]; or

b)   the country code as defined in ITU-T Rec. E.164 [23].

For further details, see ITU-T Rec. G.831 [25].

Comments:

1)   the identifiers must be unique per layer, so identifiers may be the same if and only if they belong to different VC-layers;

2)   operators within a country may apply format a) or b), but must agree together with other users of that format on how to keep the remaining part of the code unique.

Application:

1)   A VC-4 Access Point in the USA: USA12345ABC6789 where 12345ABC6789 is to be designated by the responsible operator in the USA.

2)   A VC-3 Access Point in the USA: USA12345ABC6789

Comment: This code may be the same as the one for the VC-4 Access Point, in accordance with Comment 1 above.

3)   A VC-4 Access Point in the UK: 449876543210123 where 9876543210123 is to be designated by the operator in the UK.

4)   A VC-12 Access Point in the Netherlands: NLDTCOMNL99ASD2; here the code TCOMNL99ASD2 was assigned by the operator KPN Telecom in the Netherlands.

Example:

For a VC-4 between Dallas in the USA and Manchester in the UK, item 14 is specified as:

14.   APId A: USA12345ABC6789,
           APId B: 449876543210123;

20.15   Clocking information (for blocks only) [item 15]

This item specifies whether Network operators/service providers apply a clocking system according to ITU-T Rec. G.811 [14] or use a master/slave system.

Format:

15.   XX ... XX; (maximum 30 characters)

Specification:

If clocking according to ITU-T Rec. G.811 is applied: Rec. G.811;

If a master/slave clocking is applied:

M = XX ... XX, S = XX ... XX;

(Geographical area name for the master)   (Geographical area name for the slave)

Example 1:

Clocking according to ITU-T Rec. G.811:

15.   Rec. G.811;

Example 2:

Clocking according to master/slave system:

15.   M = London, S = Frankfurt;

20.16   Direction of transmission (for unidirectional blocks) [item 16]

This item gives information on the direction of transmission of a unidirectional digital block.

Format:

16.   I; or A;

Specification:

If the block is unidirectional and if it has a single destination:

–   if the direction of transmission is in alphabetical order A;
–   if the direction of transmission is in inverse alphabetical order I.

Example:

For the unidirectional digital block London/23E/BTPLC/GBR–Roma/CCB/TI/ITA 30N1 transmitting in the direction Roma to London:

16.   I;

21   Designation of connections for the Asynchronous Transfer Mode (ATM)

21.1   General

This clause deals with semi-permanent or permanent connections for the ATM as defined in ITU-T Recs I.121, I.150, I.211, I.230, I.231.x, I.232.x, I.310, I.311, I.326, I.365 and I.432.x. When an ATM connection includes a transit network, clause 23 applies.

ATM transport network can be supported by PDH and SDH through a number of transmission systems. ATM transport network nodes are connected by transport links (physical layer) and Virtual Path (VP). VP's transmission capacity can be assigned to one or more Virtual Channels (VC).

The format of designation of ATM transport links, VP and VC, is shown in Table 11:

Table 11/M.1400 – ATM transport link, VP and VC designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 to 6	1 to 4

↑
No space

21.2 Transport links

Transport links are based upon either PDH digital paths or SDH virtual containers. So the links are not identical to the paths or containers, but do use them. The paths therefore act as a server and ATM transport link as the client. From a network model point of view, the PDH digital path and the SDH virtual container belong to the server layer and the ATM transport link to the client layer. This relation will be reflected in the routing of ATM transport links: they are being routed either on a PDH digital path or a virtual container.

The elements of the layer 1 format are as follows:

a)   *Transport relation*

ATM transport link terminal station A and ATM transport link terminal station B refer to the names of the two transmission stations in which the ATM transport link is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: two to six letters and/or digits)

This code is the following:

A34M   for 34 Mbit/s ATM transport link

A45M   for 45 Mbit/s ATM transport link

A155M   for 155 Mbit/s ATM transport link

A622M   for 622 Mbit/s ATM transport link

A2500M   for 2.5 Gbit/s ATM transport link

A10G   for 10 Gbit/s ATM transport link

A40G   for 40 Gbit/s ATM transport link

c)   *Serial number* (required one to four digits)

Identifies the instance of the transport link. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The first transport link at the speed of 34 Mbit/s between Lugano and Milan will be designated:

Lugano/SUI/CHEPTT/CHE–Milano/M*I/TI/ITA A34M1

21.3   Virtual path

The elements of the layer 1 format are as follows:

a)   *Transport relation*

ATM virtual path terminal station A and ATM virtual path terminal station B refer to the names of the two transmission stations in which the ATM virtual path is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: three letters)

This code is VPA.

c)   *Serial number* (required one to four digits)

Identifies the instance of the virtual path. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The first ATM virtual path from Leeds to Koeln will be designated:

Leeds/FGY/FRTE/FRA–Koeln/DG/DTAG/DEU VPA1

21.4   Virtual channels

The elements of the layer 1 format are as follows:

a)   *Transport relation*

ATM virtual channel terminal station A and ATM virtual channel terminal station B refer to the names of the two transmission stations in which the ATM virtual channel is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

NOTE – The information about the virtual channel being bidirectional or unidirectional and, in this case, the information about its origin and destination points is crucial for maintenance, and will be addressed in the related information, which is open for further study.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: three letters)

This code is VCA.

c)   *Serial number* (required one to four digits)

Identifies the instance of the virtual channel. The serial numbering starts anew if there is a difference in transport relation and/or function code.

21.5   ATM Layer 2

The related information on ATM is covered by the following items:

1)   urgency for restoration;

2)   terminal countries;

3)   Network operators/service providers' names;

4)   control and sub-control station(s);

5)   fault report points;

6)   routing;

7)   association;

8)   equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   (unassigned item, use: "–;");

13)   occupancy;

14)   direction of transmission (for unidirectional transit Network Services only);

15)   ATM transfer capability;

16)   Source traffic descriptor;

17)   Cell Delay variation tolerance;

18)   Quality of Service.

The various items will be dealt with in clause 22.

22   Related information for the Asynchronous Transfer Mode (ATM)

The following subclauses explain the items of Related information concerned with Asynchronous Transfer Mode:

22.1   Urgency for restoration [item 1]

Normal assignment.

22.2   Terminal countries [item 2]

Normal assignment.

22.3   Names of Network operators/service providers [item 3]

Normal assignment.

22.4   Control and sub-control station(s) [item 4]

Normal assignment.

22.5   Fault report points [item 5]

Normal assignment.

22.6   Routing [item 6]

Normal assignment.

22.7   Association [item 7]

Normal assignment.

22.8   Equipment information [item 8]

Normal assignment.

22.9   Use [item 9]

Normal assignment.

22.10   Transmission medium information [item 10]

Normal assignment.

22.11   Operational agreement [item 11]

Normal assignment.

22.12   Unassigned item [item 12]

Not applicable.

22.13   Occupancy [item 13]

Normal assignment.

22.14 Direction of transmission (for unidirectional transit Network Services only) [item 14]

Normal assignment.

22.15 ATM transfer capability [item 15]

An ATM transfer capability is intended to support an ATM layer service model and associated QoS through a set of ATM layer traffic parameters and procedures. An ATM transfer capability may include the specification of primitives to comply with, and of traffic control information to be exchanged through standardized interfaces.

There may be more than one Quality of Service (QoS) class for a given ATM Transfer Capability (ATC) (see ITU-T Rec. I.356). Given that a user can commit to submitting cells in conformance to traffic descriptors in addition to the Peak Cell Rate (PCR), the reason a user would choose a service based on an ATM transfer capability other than the deterministic bit rate transfer capability is the potential of incurring a lower cost from the network provider.

It is mandatory that the ATM transfer capability used on a given ATM connection, among those that are made available by the network, be implicitly or explicitly declared at connection establishment.

Once an ATM connection is established, the agreed-upon ATC is the same at all standardized interfaces along the connection. However, it is a network operator's choice on how to support a given ATM transfer capability, provided it is complying with specifications at standardized interfaces.

A given ATM communication uses the same ATM transfer capability for both directions. Use of different transfer capabilities for the two connections of a communication raises issues relating, for example, to OAM and resource management cells, or to routing and is thus not currently specified in this Recommendation. This also applies to multicast connections.

Format:

15.   XXX;   (3 characters)

Specifications:

DBR   Deterministic Bit Rate capability

SBR   Statistical Bit Rate capability

ABR   Available Bit Rate capability

ABT   ATM Block Transfer capabilities

Example:

For an ATM-transport link Bruxelles/ZXC/BGACOM/BEL–Frankfurt/54T/DTAG/DEU A34M1 in which the ATM transfer capability is the Deterministic Bit Rate capability:

15.   DBR;

22.16 Source traffic descriptor [item 16]

This descriptor includes parameters that describe the traffic originated from the source. These parameters depend on the ATC. The source traffic descriptor (STD) and cell delay variation tolerance (CDVT) specified for each connection describe the traffic descriptor at the interface.

Peak cell rate in the source traffic descriptor specifies an upper bound on the traffic that can be submitted on an ATM connection.

Sustainable cell rate (SCR) together with a parameter characterizing the maximum burst size at the peak cell rate, i.e., intrinsic burst tolerance (IBT), are intended to describe variable bit rate (VBR)

sources and allow for statistical multiplexing of traffic flows from such sources. SCR and IBT limit the medium frequency on which a connection can transmit cells.

Format:

16.   XXXXXX, YYYYYY, ZZZZZZ;   (maximum 6 characters each)

Specifications:

XXXXXX Peak cell rate [cells/s]

YYYYYY Sustainable cell rate [cells/s]

ZZZZZZ   Intrinsic Burst Tolerance[cells]

Example:

For an ATM-transport link Bruxelles/XCV/BGACOM/BEL–Frankfurt/RTY/DTAG/DEU A34M1 in which the Peak cell rate = 32000 cell/s, Sustainable cell rate = not specified, Intrinsic Burst Tolerance = not specified.

16.   32000, , ;

22.17   Cell Delay variation tolerance [item 17]

This parameter specifies the maximum acceptable delay from the network, of the real arrival time of a cell at a UNI/INI interface compared to the theoretical arrival time of a cell at the UNI/INI interface at the same interface.

Format:

17.   XXXXXX; (6 characters)

Specifications:

XXXXXX Cell Delay Variation Tolerance [s]

Example:

17.   (For further study.)

22.18   Quality of Service [item 18]

These parameters characterize the quality of the connection.

Cell Error Ratio is the ratio of total errored cells to the total of successfully transmitted cells.

Cell Loss Ratio is the ratio of total lost cells to total transmitted cells in a population of interest.

Cell Transfer Delay is the maximum delay for transferring a cell from the entry of the network to the exit of the network.

Cell delay variation is the maximum variation of the cell transfer delay accepted between two points of the network.

Format:

18.   XXXXXX,YYYYYY,ZZZZZZ,KKKKKK;   (maximum 6 characters each)

Specifications:

XXXXXX   Cell Loss Ratio

YYYYYY   Cell Error Ratio

ZZZZZZ   Cell Transfer Delay [s]

KKKKKK   Cell Delay Variation [s]

Example:

For an ATM-transport link Bruxelles/XCV/BGACOM/BEL–Frankfurt/45G/DTAG/DEU A34M1 in which are defined Cell Loss Ratio $= 3 \times 10^{-7}$, Cell Error Ratio $= 3 \times 10^{-6}$, Cell Transfer Delay $= 400 \times 10^{-3}$ ms, Cell Delay Variation $= 3 \times 10^{-3}$

18. 3×10^{-7}, 3×10^{-6}, 4×10^{-1}, 3×10^{-3};

23   Transit network services

23.1   General

Up till now operators providing transit network service were aware of the terminations used by the other operators. Particularly in a multi-operator competitive environment (either domestic or international), this is no longer necessarily a desirable situation. Today's view is that the operator, which provides the transit network service, does not need to know the actual terminations of the carried characteristic information. So, the operator(s) which provides this kind of service does not need to know the actual routing and destination inside the renter's domain. Figure 7 illustrates a transit network.
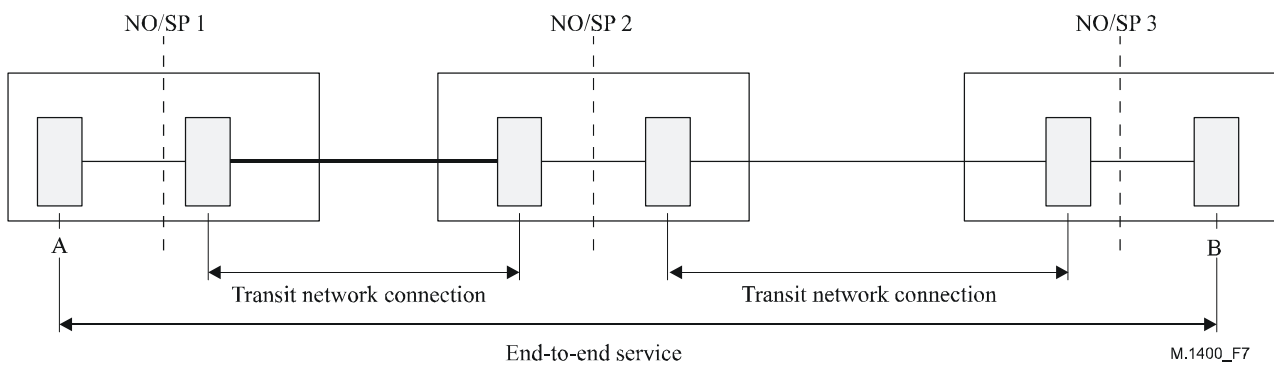

Figure 7/M.1400 – Transit network

The format for the designation of transit network services is shown in Table 12.

Table 12/M.1400 – Transit network service designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code	Space	Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 or 3	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a) *Transport relation*

Transit network service terminal station A and transit network service terminal station B refer to the names of the two transmission stations in which the transit network service is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: two to three letters)

The function code for transit network services may vary depending on the type. See 23.2 and 23.3.

c) *Serial number* (required one to four digits)

Identifies the instance of the transit network service. The serial numbering starts anew if there is a difference in transport relation and/or function code. For each traffic relation, the numbering of transit network services will begin from 1 and will increase by 1 for each new one. If a transit network service is deleted (i.e., it ceases to exist), its serial number can be reused without renumbering the other ones.

23.2 Transit digital transmission service

This clause deals with the transit network service consisting of a digital transmission route. This may be PDH or SDH transmission. The service is referred to as a circuit. In this case, the function code is DC. DC stands for digital circuit.

Example 1:

The first 2 Mbit/s PDH Transit Network Service supplied by Telecom Italia connecting the WIND's building in Rome with France Telecom building in Reims (named Roma/taw and Reims/xmr respectively) will have the following designation:

Roma/TAW/TI/ITA–Reims/XMR/FRTE/FRA DC1

Example 2:

The first 155 Mbit/s SDH Transit Network Service connecting the WIND's Main Site in Rome and the Telecom Italia International Exchange in Rome (named Roma/taw and Roma/tat respectively) will have the following designation:

Roma/TAW/WIND–Roma/TAT/TI DC1

23.3 Transit dark fibre service

Optical fibres owned by one operator may be rented by another. This clause covers dark fibres: a bare optical fibre, i.e., without optical signals. This is referred to as "dark" because no light is turned

on by the owner. Instead, providing the light is the responsibility of the renter. The dark fibre service may be built upon one single fibre or upon consecutive dark fibres in series.

NOTE – If the fibres are offered in combination with a digital, optical or electrical interface, the previous clause applies.

In this case, the function code is DFS. DFS stands for dark fibre service.

Example 1:

The first dark fibre service between Paris/FT1 and Strasbourg/FT1 owned by France Telecom (and possibly rented by KPN Telecom) is designated (by France Telecom):

Paris/FT1/FRTE–Strasbourg/FT1/FRTE DFS1

Example 2:

The third dark fibre service between Muenster and Osnabrueck in Germany owned by Deutsche Telekom (and possibly rented by Belgacom) is designated (by Deutsche Telekom):

Muenster/DT1/DTAG–Osnabrueck/DT1/DTAG DFS3

23.4   Related information

The related information on transit network service is covered by the following items:

1)   urgency for restoration;
2)   terminal countries;
3)   Network operators/service providers' names;
4)   control and sub-control station(s);
5)   fault report points;
6)   –;   (unassigned item because no routing information applicable)
7)   association;
8)   equipment information;
9)   –;   (no information on use applicable)
10)   transmission medium information;
11)   SLA;
12)   bit rate;
13)   commercial identifier;
14)   –;   (unassigned item)
15)   clocking information;
16)   direction of transmission (for unidirectional transit network services only).

The various items will be dealt with in clause 24.

24   Related information on transit network service

The following subclauses explain the items of Related information concerned with international or domestic transit network service.

24.1   Urgency for restoration [item 1]

Normal assignment.

24.2 Terminal countries [item 2]

Normal assignment.

24.3 Names of network operators/service providers [item 3]

Normal assignment.

24.4 Control station [sub-control station(s)] [item 4]

Normal assignment.

24.5 Fault report points [item 5]

Normal assignment.

24.6 Routing [item 6]

Not applicable.

24.7 Association [item 7]

Normal assignment.

24.8 Equipment information [item 8]

Normal assignment.

24.9 Use [item 9]

Not applicable.

24.10 Transmission medium information [item 10]

Normal assignment.

24.11 SLA [item 11]

Format:

SLA;

Specification:

It is an indicator that an SLA agreement exists between the renter operator and the leased operator(s). This reference has to be agreed bilaterally or multilaterally among the operators involved. SLA definitions and further details may be found in other ITU-T Recs, e.g., ITU-T Rec. M.1340 [26], M.1380 [27] and M.1385 [28].

24.12 Bit rate [item 12]

Normal assignment.

24.13 Commercial identifier [item 13]

Format:

xxx ... xx; (maximum 20 characters)

Specification:

It is a service identifier used to uniquely identify the contract between the renter operator and the leaser operator(s). This identifier has to be agreed bilaterally or multilaterally among the operators involved.

24.14 Unassigned item[item 14]

Not applicable.

24.15 Clocking information [item 15]

Normal assignment.

24.16 Direction of transmission (for unidirectional transit network services only) [item 16]

Normal assignment.

25 Designations for wavelength division multiplexing (Simple and Dense)

25.1 General

Wavelength Division Multiplexing (WDM) is an optical transport functionality that allows for the use of more than one wavelength on a fibre. The term WDM is applied if there are just two wavelengths to be combined and split by a passive element: the wave division (de)multiplexer.

Dense Wavelength Division Multiplexing (DWDM) is a species of WDM where combining and splitting of more than two channels with different wavelength. The actual numbers of channels may vary according to the equipment manufacturer and to the state of the technical art at given point in time; 4, 8, 16, 32 and even 64 channels are now typical figures.

Comment 1: Though optical, the DWDM can use converters that convert an optical signal into an electrical one, process that signal and convert it back to optical.

Comment 2: The interface is not yet a standard interface and varies per manufacturer. When ITU-T Rec. G.692 comes into operation, this situation may change.

Comment 3: The definitions for bidirectional systems (two directions in a single fibre) need further study.

25.2 The equipment

The equipment coding convention in this text is as follows:

• WDM2: Simple Wave Division Multiplexing using two wavelengths.

• DWDMnW.

DWDM stands for Dense Wavelength Division Multiplexing and nW for the number of wavelengths which can be carried by the DWDM.

This Dense Wavelength Division Multiplexer is made of three different parts:

• The wavelength multiplexer which multiplexes the wavelengths. The abbreviation for this unit is: WMXn, (n is the number of wavelengths of the system).

• The wavelength adapter which converts the wavelength. The abbreviation for this unit is: WLAnn (nn is the number of the wavelength counted from 1 to n according to a numbering scheme for the allowed wavelengths).

• The optical (line) amplifier, which amplifies the multiplex signal. The abbreviation for this unit is: OAnW (n is the number of wavelengths and W stands for wavelength).

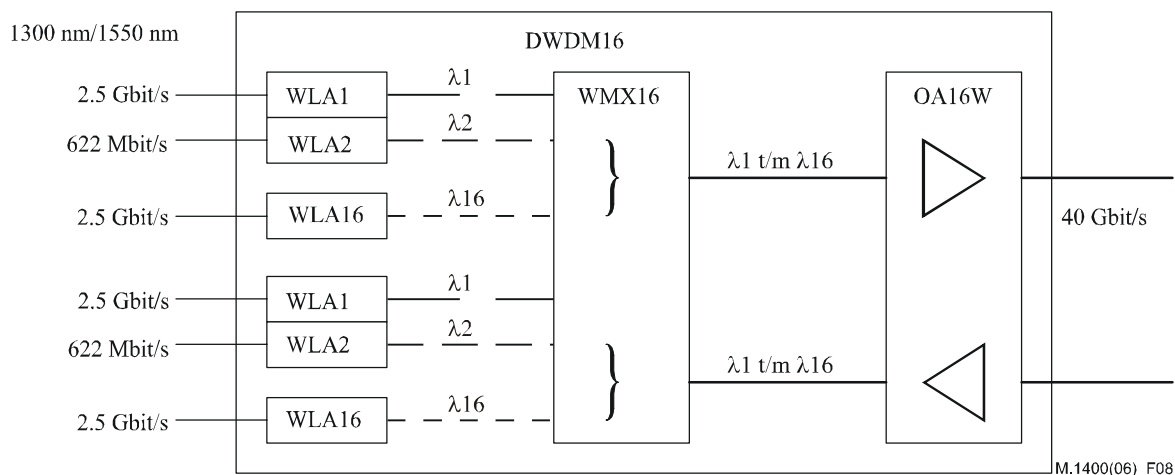Figure 8 shows an example of the scheme for an DWDM16W.

Figure 8/M.1400 – Example of the equipment on one side with 16 wavelengths

The optical regenerator: In the future it is possible to apply equipment that regenerates the optical DWDM signal. The equipment is called Optical Regenerator. The abbreviation for this equipment is: OREGnW. OREG stands for Optical Regenerator and nW for the number of wavelengths which are regenerated.

The optical add-drop multiplexer (OADM): It is possible now to add-drop in an optical DWDM system. The functionality of this equipment is an Optical Add – Drop Multiplexer. The abbreviation for this equipment is: OADMnW. OADM stands for Optical Add-Drop Multiplexer and nW for the number of Wavelengths which can be carried by an OADM. Figure 9 shows an example of the scheme for an Optical Add – Drop Multiplexing.
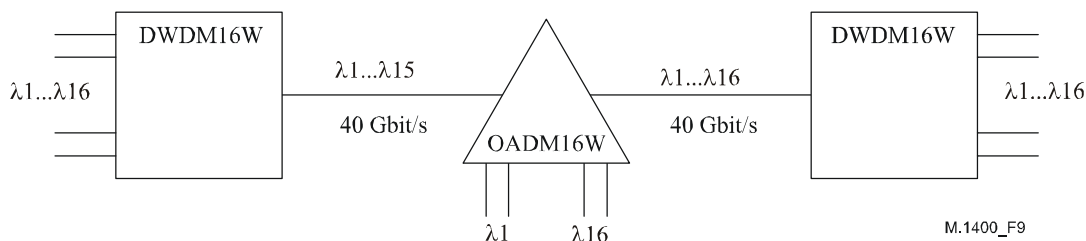

Figure 9/M.1400 – Example of an Optical Add-Drop Multiplexer 16 Wavelengths with 2 wavelengths extracted and inserted

A special case of OADM is the fixed optical add-drop multiplexer (FOADM); it is realized by two multiplexers in a back-to-back configuration. The dropped channels (wavelengths) are defined by optical cabling. This network element is referred to as FOADMn where n represents the number of wavelengths that is added/dropped at the location.

Figure 10 shows an example of the detail scheme for an Optical Add-Drop Multiplexer.
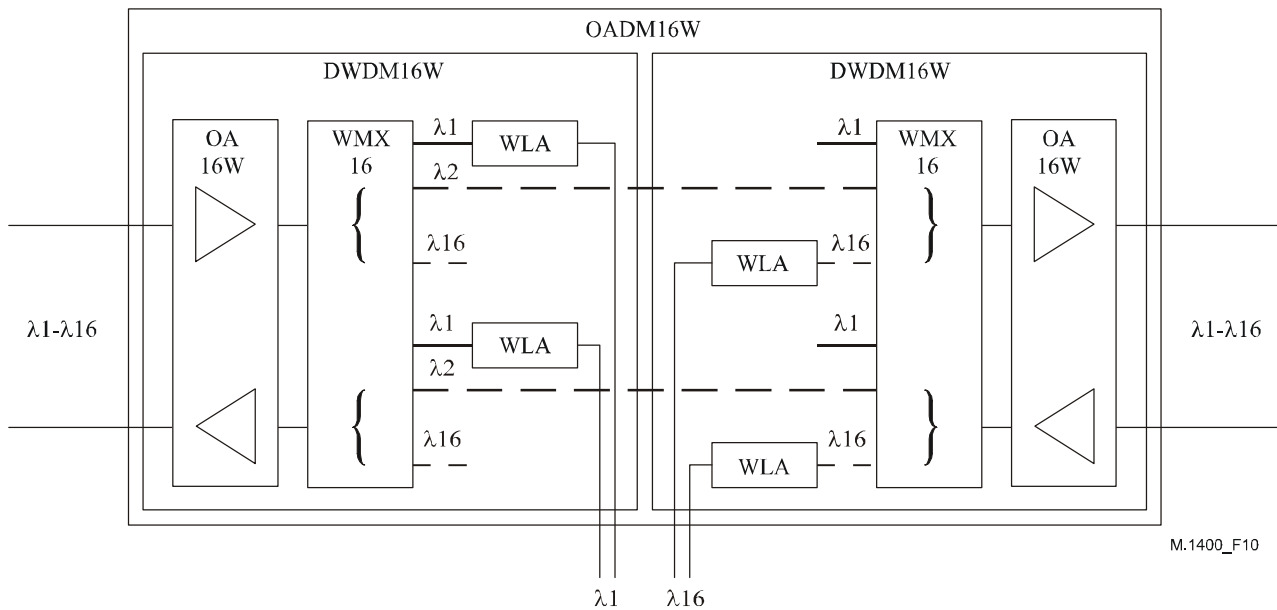

**Figure 10/M.1400 – Detail of the Optical Add-Drop Multiplexer 16 Wavelengths
with 2 wavelengths extracted and inserted**

25.3 Configurations for the newly created transmission systems

This clause deals with multiplex sections on the DWDM as defined in ITU-T Recs G.692 [29] and G.872 [30].

According to the terminology used throughout this Recommendation, the newly created higher order multiplex section will be addressed as optical multiplex section. It includes the multiplex equipment. The lower order multiplex section will be called *optical channel*. No multiplex equipment is involved on this level. If optical amplifiers are required, then *optical amplifier sections* are being created (not shown in the figures below) and if an optical regenerator is applied due to long distances or poor fibre performance before and after this regenerator, an *optical regenerator section* will be identified.

There are three different configurations to use DWDM equipment and each deserves a distinct registration.

Configuration 1:

The use of wavelength adapters in both sides of the DWDM equipment.

Figure 11 shows an example.
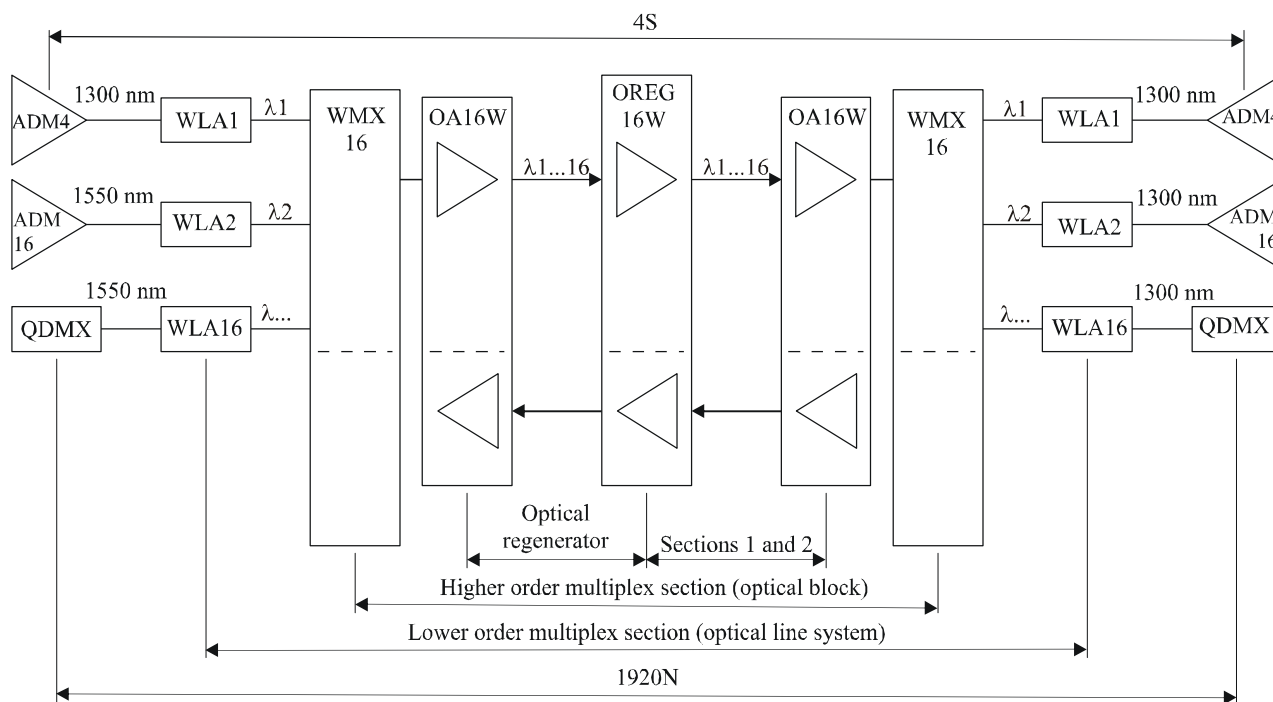
Figure 11/M.1400 – Example of the scheme for DWDM with wavelength adapters on both sides

Configuration 2:

The use of wavelength adapters is only at the receive side of the DWDM equipment. The sending side does not have wavelength adapters and the PDH/SDH equipment has the possibility to recognize the DWDM wavelength.

Figure 12 shows an example.
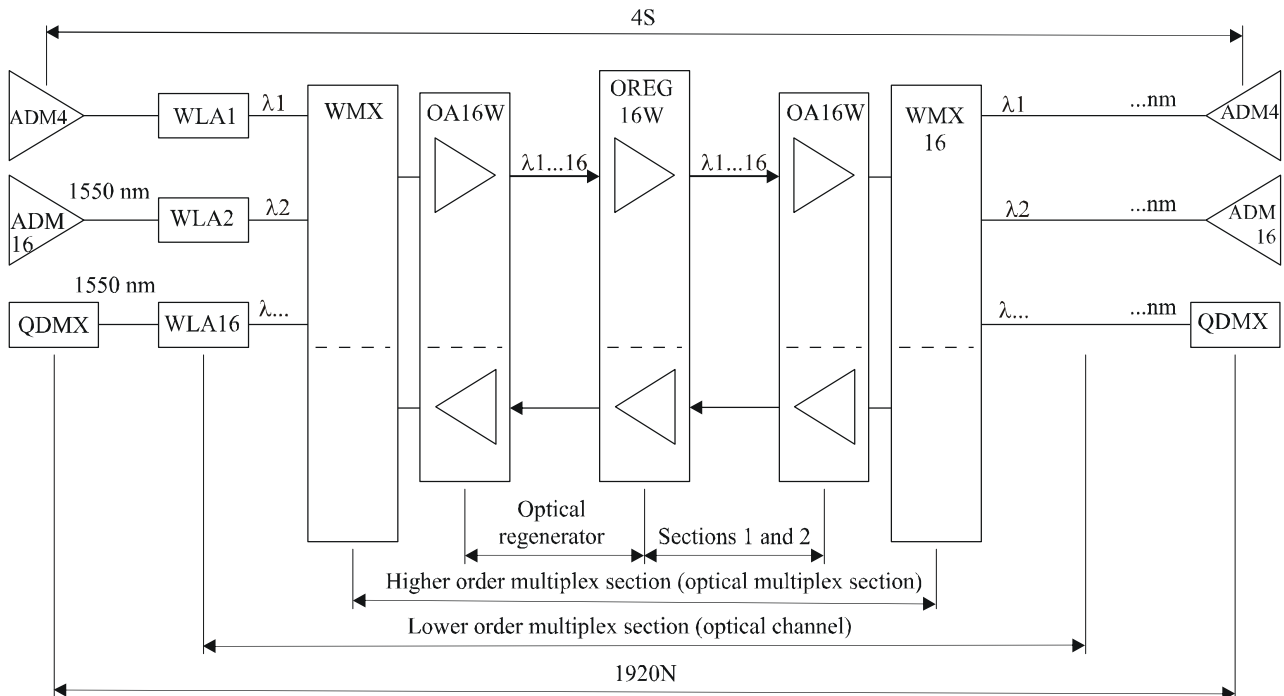
**Figure 12/M.1400 – Example of the scheme for DWDM
with wavelength adapters on one side**

Configuration 3:

DWDM equipment without wavelength adapters. The sending and receive sides do not have these adapters and the PDH/SDH equipment has the possibility to transmit and recognize the DWDM wavelength. In this case the optical line systems do not exist.

Figure 13 shows an example.
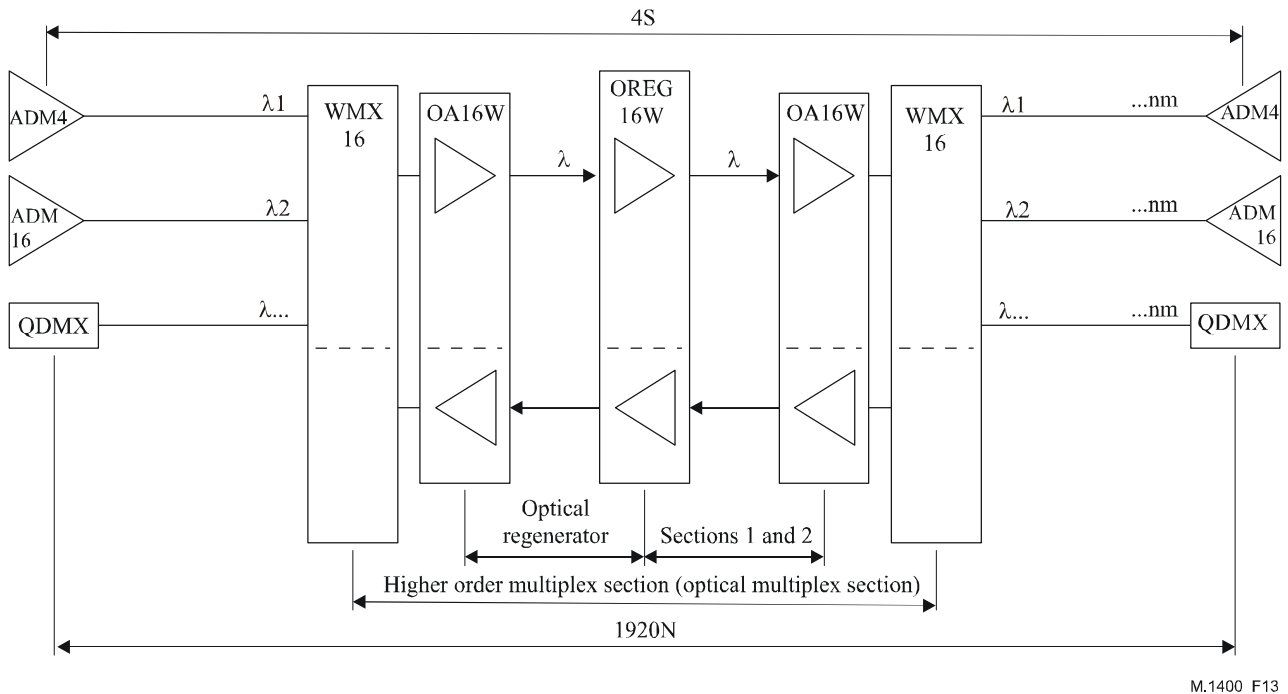
Figure 13/M.1400 – Example of the scheme for DWDM without wavelength adapters

25.4 General format for the optical transmission systems

The optical transmission systems are designated according to the general format. We recognize four system types to describe the coupling of the DWDM equipment:

• the optical regenerator section;

• the optical amplifier section;

• the optical multiplex section (multiplex section at higher order);

• the optical channel (multiplex section at lower order between two wavelength adapters).

These four system types have their own function codes; see 25.4.1.

The format of designation of optical transmission systems in (D)WDM is shown in Table 13:

Table 13/M.1400 – (D)WDM optical transmission system designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 to 3	≤ 4

↑
No space

The elements of the layer 1 format are as follows:

a)   *Transport relation*

Optical transmission system terminal station A and optical transmission system terminal station B refer to the names of the two transmission stations in which the optical transmission system is terminating. The name of each transmission station consists of the following elements: Geographical area name, transmission station detail, operator ID and country code. The order of the two transmission stations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the transmission station is situated (required one to twelve characters or space).

Transmission station detail shows the information that makes the transmission station unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the transmission station identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: two to three letters)

This code identifies the type of optical transmission system; see 25.4.1.

c)   *Serial number* (required one to four digits)

Identifies the instance of the optical transmission system. The serial numbering starts anew if there is a difference in transport relation and/or function code.

25.4.1   The function codes

25.4.1.1   The optical regenerator section

This clause applies in case where DWDM with an optical regenerator is used.

A regenerator section is defined as being between the optical amplifier just next to the DWDMultiplexer and an optical regenerator, or between two consecutive optical regenerators. The function code for the optical regenerator section is DWDMultiplexer ORS. It should be noted that this code is independent of the number of channels carried.

Example 1:

A third optical regenerator section (between an amplifier in Bruxelles/KQ1 and a regenerator in Paris/KQ1) is designated as:

Bruxelles/KQ1/BGACOM/BEL–Paris/KQ1/FRTE/FRA ORS3.

25.4.1.2 The optical amplifier section

An amplifier section is defined as being between a first multiplexer and a first amplifier, between two consecutive amplifiers and between a last amplifier in the route and a final multiplexer. The function code is OAS.

Example 2:

The second optical regenerator section between an amplifier in London/KQ1 and Lille/KQ1 is designated as:

London/KQ1/BTPLC/GBR–Lille/KQ1/FRTE/FRA OAS2.

25.4.1.3 The optical multiplex section

Such a block is defined as being from one DWDMultiplexer to another. The equipment components are a part of the block. The function code for the optical block is OMS. It should be noted that this code is independent of the number of channels carried.

Example 3:

The eleventh optical block (e.g., carrying 16 channels with 2.5 Gbit/s) between London/BT1 and Paris/FT1 is designated as:

London/BT1/BTPLC/GBR–Paris/FT1/FRTE/FRA OMS11.

25.4.1.4 The optical channel

This clause applies when DWDM is used with wavelength adapters.

Such a system is defined as being between two corresponding wavelength adapters. The function code for the optical line system is: OC. If the adapters are built into other equipment, the "OC" may not be registered as a separate resource. In this case, the use of OC is optional.

Example 4:

The fourth optical line system between Amsterdam/KP1 and Roma/TI1 is designated as:

Amsterdam/KP1/TCOMNL/NLD–Roma/TI1/TI/ITA OC4.

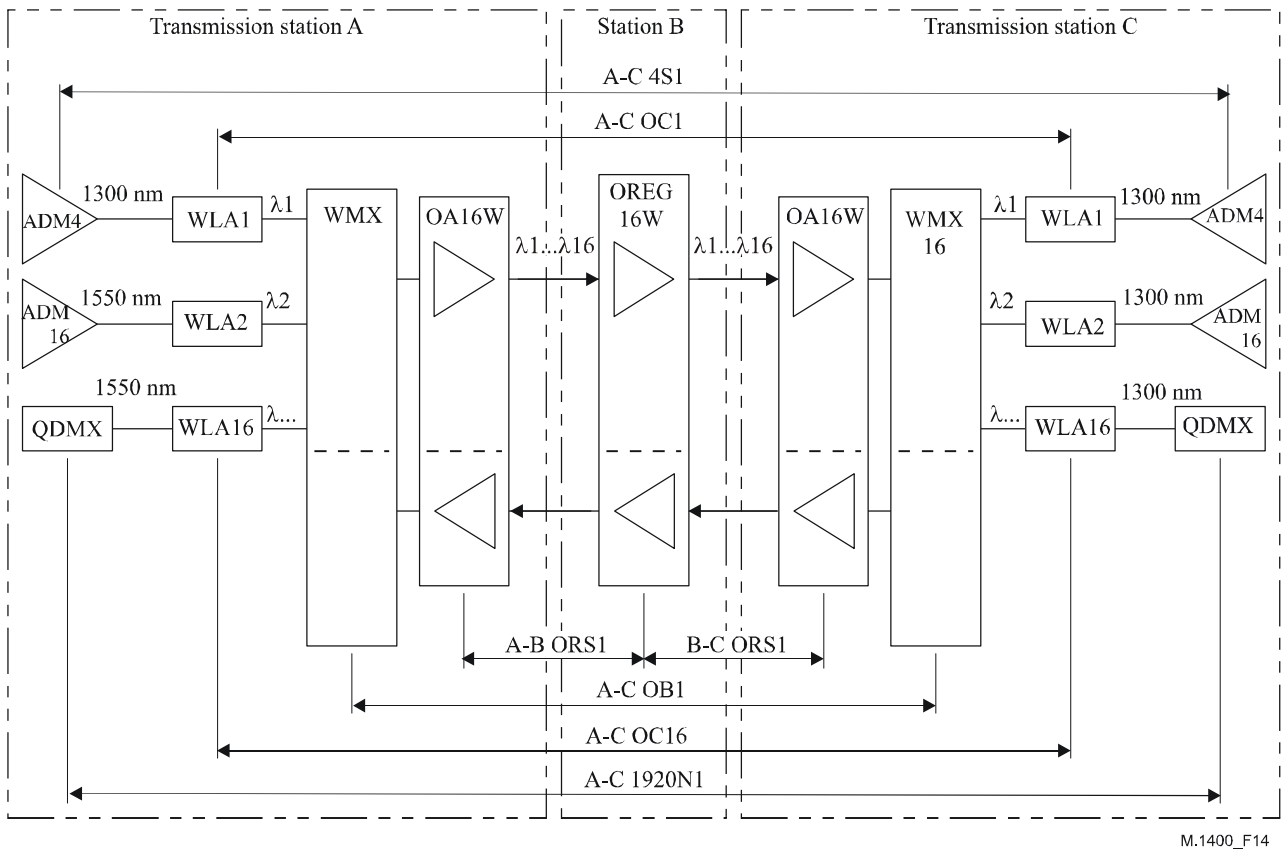Figure 14 presents an example of the scheme with the function codes.

Figure 14/M.1400 – Example of the DWDM scheme with the function codes

25.5 Related information

The related information on DWDM is covered by the following items:

1) urgency for restoration;
2) terminal countries;
3) Network operators/service providers' names;
4) control and sub-control station(s);
5) fault report points;
6) routing;
7) association;
8) equipment information;
9) use;
10) transmission medium information;
11) operational agreement;
12) bit rate;
13) occupancy;
14) access point identifiers.

The various items will be dealt with in clause 26.

26 Related information on DWDM

The related information on optical transmission in DWDM is indicated in Table 14:

Further study is needed on the development of association codes for protection of WDM systems.

Table 14/M.1400 – DWDM optical transmission system related information

	Item	For OMS	For ORS	For OAS	For OC
1)	Urgency for restoration	Normal assignment	Normal assignment	Normal assignment	Normal assignment
2)	Terminal countries	Normal assignment	Normal assignment	Normal assignment	Normal assignment
3)	Names of Network operators/service providers	Normal assignment	Normal assignment	Normal assignment	Normal assignment
4)	Control and sub-control station(s)	Normal assignment	Normal assignment	Normal assignment	Normal assignment
5)	Fault report points	Normal assignment	Normal assignment	Normal assignment	Normal assignment
6)	Routing	OAS or ORS or the fibre	Pair of fibre	Pair of fibres	OMS
7)	Association	Not applicable	Not applicable	Not applicable	Set of OC on direction West and East respectively
8)	Equipment information	– Maximum number channels/wavelengths – G.692 if applicable or manufacturer type	– Maximum number of channels/wavelengths – G.692 if applicable or manufacturer type	– Maximum number of channels/wavelengths – G.692 if applicable or manufacturer type	G.692 if applicable or manufacturer type
9)	Use	Not applicable	Not applicable	Not applicable	Not applicable
10)	Transmission medium information	SMF = single mode fibre DSF = dispersion shift fibre NZ DSF+ = non-zero DSF+ NZ DSF– = non-zero DSF– Other	SMF = single mode fibre DSF = dispersion shift fibre NZ DSF+ = non-zero DSF+ NZ DSF– = non-zero DSF– Other	SMF = single mode fibre DSF = dispersion shift fibre NZ DSF+ = non-zero DSF+ NZ DSF– = non-zero DSF– other	No
11)	Operational agreement	Normal assignment	Normal assignment	Normal assignment	Normal assignment
12)	Bit rate	Normal assignment	No	No	No
13)	Occupancy	Position in the block: designation of client	Designation of OMS carried	Designation of OMS carried	Designation of SDH or PDH system
14)	Access point identifiers	Not applicable	Not applicable	Not applicable	Not applicable

27 Designation of connections for the Digital Subscriber Line (DSL)

27.1 General

This clause deals with connections for the DSL as defined in the family of ITU-T Recs G.991.1, G.992.1, G.992.2, G.994.1, G.995.1, G.996.1 and G.997.1.

Within the access network, some DSL connections can be created between two equipments: a Customer Premises Equipment (CPE) on the customer side and a Digital Subscriber Line Access Multiplexer (DSLAM) on the operator side. According to the type of cards contained in the DSLAM, the DSL connection will be symmetrical (SDSL connection) or asymmetrical (ADSL connection).

In the following, an xDSL connection will represent either an ADSL connection or an SDSL connection.

The format of designation of xDSL connections is shown in Table 15:

Table 15/M.1400 – xDSL connection designation format

Format of designation	Geographical area A	/	Termination detail	/	Operator ID	/	Country code	–	Geographical area B	/	Termination detail	/	Operator ID	/	Country code		Function code	Serial number
Character Types	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Hyphen	Letters or space	Slash	Letters or digits	Slash	Letters or digits	Slash	Letters	Space	Letters or digits	Digits
Number of characters	≤ 12	1	≤ 6	1	≤ 6	1	3	1	≤ 12	1	≤ 6	1	≤ 6	1	3	1	2 to 6	1 to 4

↑ No space

27.1.1 ADSL connection

ADSL connections are based upon bare copper connections. An ADSL connection uses one and only one bare copper connection. One bare copper connection can only be used once in the routing of an ADSL connection. From a network point of view, the bare copper connection belongs to the server layer and the ADSL connection to the client layer.

The elements of the layer 1 format are as follows:

a)   *Transport relation*

ADSL connection termination A and ADSL connection termination B refer to the names of the two extremities in which the ADSL connection is terminating. The name of each termination consists of the following elements: Geographical area name, node detail, operator ID and country code. The order of the two terminations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the terminal equipments are situated (required one to twelve characters or space).

Termination detail shows the information that makes the extremity of an ADSL connection unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the extremity identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b)   *Function code* (format: two to six letters and/or digits)

This function code is **8448A** (8448 kbit/s being the maximum bit rate of an ADSL connection and the character "A" being set for ADSL).

c)   *Serial number* (required one to four digits)

Identifies the instance of the ADSL connection. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The second 64 kbit/s ADSL connection between two nodes in Toulouse, using France Telecom copper lines and a DSLAM belonging to Deutsche Telekom will be designed as:

Toulouse/Matab/FRTE/FRA–Toulouse/Balma/DTAG/DEU 8448A2

27.1.2   ADSL Layer 2

The related information on ADSL is covered by the following items:

1)   urgency for restoration;

2)   terminal countries;

3)   Network operators/service providers' names;

4)   control and sub-control station(s);

5)   fault report points;

6)   routing;

7)   association;

8)   equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   bandwidth;

13)   occupancy;

14)   actual number of channel/access point identifiers;

15)   clocking information;

16)   direction of transmission;

The various items will be dealt with in 27.2.

27.1.3   SDSL connection

SDSL connections are based upon bare copper connections. An SDSL connection uses one bare copper connection or several bare copper connections in parallel. One bare copper connection can only be used once in the routing of an SDSL connection. From a network point of view, the bare copper connection belongs to the server layer and the SDSL connection to the client layer.

The elements of the layer 1 format are as follows:

a) *Transport relation*

SDSL connection termination A and SDSL connection termination B refer to the names of the two extremities in which the SDSL connection is terminating. The name of each termination consists of the following elements: Geographical area name, node detail, operator ID and country code. The order of the two terminations is arranged according to alphabetical order of the respective Geographical area names.

Geographical area: the geographical area where the terminal equipments are situated (required one to twelve characters or space).

Termination detail shows the information that makes the extremity of an SDSL connection unique in the operator domain in that particular geographical area. Format: one to six letters and/or digits.

Operator ID is the identification of the operator that created the extremity identification. Format: ICC (consisting of one to six letters and/or digits).

Country code identifies the country in which the geographical area is located. Format: ISO 3166-1 three alpha-code.

b) *Function code* (format: two to six letters and/or digits)

This function code is built from:

–   A bit rate information that represents the maximum bit rate of the SDSL connection;

–   A character "S" set for SDSL.

Format:

xxxxxS where x is a numerical value from 0 to 9

Examples:

8448S

4224S

c) *Serial number* (required one to four digits)

Identifies the instance of SDSL connection. The serial numbering starts anew if there is a difference in transport relation and/or function code.

Example:

The first 4 Mbit/s SDSL connection sold by France Telecom between two nodes in Paris will be designed as:

Paris/Monp1 – Paris/Bertra 4224S1

27.1.4 SDSL Layer 2

The related information on SDSL is covered by the following items:

1) urgency for restoration;

2) terminal countries;

3) Network operators/service providers' names;

4) control and sub-control station(s);

5) fault report points;

6) routing;

7) association;

8) equipment information;

9)   use;

10)   transmission medium information;

11)   operational agreement;

12)   bandwidth;

13)   occupancy;

14)   actual number of channel/access point identifiers;

15)   clocking information;

16)   direction of transmission.

The various items will be dealt with in 27.3.

27.2   Related information for the ADSL connections

The following subclauses explain the items of Related information concerned with ADSL connections:

27.2.1   Urgency for restoration [item 1]

Normal assignment.

27.2.2   Terminal countries [item 2]

Normal assignment.

27.2.3   Names of Network operators/service providers [item 3]

Normal assignment.

27.2.4   Control and sub-control station(s) [item 4]

Not applicable.

27.2.5   Fault report points [item 5]

Normal assignment.

27.2.6   Routing [item 6]

Normal assignment.

27.2.7   Association [item 7]

Not applicable.

27.2.8   Equipment information [item 8]

Normal assignment.

27.2.9   Use [item 9]

Not applicable.

27.2.10 Transmission medium information [item 10]

Normal assignment.

27.2.11 Operational agreement [item 11]

Normal assignment.

27.2.12 Bandwidth [item 12]

This item shows the real bit rate of the ADSL connection.

Format:

12.   xxxx kbit/s or Mbit/s;

Rules for the notation of the bandwidth figures:

No leading zeros required.

If the figure is between 0 and 9999, use kbit/s, else use Mbit/s.

Example:

A 64 kbit/s ADSL connection:

Toulouse/Matab/FRTE–Toulouse/Balma/DTAG 8448A2

12.   64 kbit/s;

27.2.13 Occupancy [item 13]

Normal assignment.

27.2.14 Actual number of channel/access point identifiers [item 14]

Not applicable.

27.2.15 Clocking information [item 15]

Normal assignment.

27.2.16 Direction of transmission [item 16]

Normal assignment.

27.3   Related information for the SDSL connection

The following subclauses explain the items of Related information concerned with SDSL connections:

27.3.1   Urgency for restoration [item 1]

Normal assignment.

27.3.2   Terminal countries [item 2]

Normal assignment.

27.3.3   Names of Network operators/service providers [item 3]

Normal assignment.

27.3.4   Control and sub-control station(s) [item 4]

Not applicable.

27.3.5   Fault report points [item 5]

Normal assignment.

27.3.6   Routing [item 6]

Normal assignment.

27.3.7   Association [item 7]

Not applicable.

27.3.8 Equipment information [item 8]

Normal assignment.

27.3.9 Use [item 9]

Not applicable.

27.3.10 Transmission medium information [item 10]

This item shows the number of pairs of copper lines used for the given SDSL connection.

Format:

10.   xP where x is a numerical value from 0 to 9

Example:

10.   2P

27.3.11 Operational agreement [item 11]

Normal assignment.

27.3.12 Bandwidth [item 12]

This item shows the real bit rate of the SDSL connection.

Format:

12.   xxxx kbit/s or Mbit/s;

Rules for the notation of the bandwidth figures:

No leading zeros required.

If the figure is between 0 and 9999, use kbit/s, else use Mbit/s.

Example:

A 64 kbit/s SDSL connection:

Toulouse/Matab/FRTE/FRA–Toulouse/Balma/DTAG/DEU 8448A2

12.   64 kbit/s;

27.3.13 Occupancy [item 13]

Normal assignment.

27.3.14 Actual number of channel/access point identifiers [item 14]

Not applicable.

27.3.15 Clocking information [item 15]

Normal assignment.

27.3.16 Direction of transmission [item 16]

Normal assignment.

27.4 Examples

The first 4 Mbit/s SDSL connection (using two pairs of copper lines) sold by France Telecom between two nodes in Paris will be designed as:

Paris/Monp1–Paris/Bertra 4224S1

10. 2P

12. 4224 kbit/s

The second 64 kbit/s ADSL connection between two nodes in Toulouse, using France Telecom copper lines and a DSLAM belonging to Deutsche Telekom will be designed as:

Toulouse/Matab/FRTE/FRA–Toulouse/Balma/DTAG/DEU 8448A2

12. 64 kbit/s

28 Exceptional designations

This clause deals with designations that are temporarily tolerated until the Related Information in this Recommendation is generally applied. These designations namely do not comply with the spirit of the Recommendation because they violate the regular use of traffic relation, function code or serial numbering. In the latter case, such an exceptional designation may contain information in the serial number.

28.1 Exceptional designations with intelligence in the serial number

Rationale

Operational staff want to see as quickly as possible what spare routes are available in case a telecommunication system breaks down. This need may lead to the wish to recognize from the layer 1 designation what dedicated restoration routes are available, and which dedicated restoration route is the back-up for the interrupted main route. This information can be supplied by the serial number as follows:

The main route and the dedicated back-up route share the traffic relation and the function code; the serial number for the main route is as usual but the serial number of the dedicated back-up route is precisely 8000 higher, so if the serial number of the main route is xx, the serial number of the back-up route is 80xx.

Therefore, in case of dedicated restoration routes, the designations are:

For the main route of the usual type: A-B Function code xx

For the dedicated protection route a special type: A-B Function code 80xx

Example:

In case of a Virtual Container-4 on a submarine cable between the United Kingdom and Spain the main route may be designated as:

Brighton-Valladolid VC4S1   with a dedicated restoration route:

Brighton-Valladolid VC4S8001

Corresponding correct registration

The correct designations according to the spirit of ITU-T Rec. M.1400 are (see clauses 19 and 20):

For the main route: A-B Function code serial number and

For the restoration route: A-B Function code another serial number

in combination with the item Association from the Related Information as follows:

For the main route, e.g., a VC-4:   A-B VC4S1:

Item 7 Association: 7. S1:   A-B VC4S2

And for the restoration route   A-B VC4S2:

Item 7 Association: 7. 2S: A-B VC4S1

Annex A

Full examples for designation information

A.1 Full example for the designation information of a public switched telephone circuit

The circuit is the 604th both-way telephone circuit between Sherman Oaks 4ES and Tokyo Shinjuku, operated by AT&T and KDDI. The signalling type is ITU-T No. 6 with band/circuit number assigned as 000/03. The control station and sub-control station of the circuit are Sherman Oaks-transmission station 1 and Tokyo-transmission station 1 respectively. Both stations are also the fault report points of the circuit. The circuit has been routed on the 4th channel of the first group between Sherman Oaks and Ibaraki which is routed via satellite and has been connected to digital blocks in domestic networks.

Designation:

Sherman Oaks/4ES/ATT/USA–Tokyo/SJK/KDDI/JPN B604

Related information:

1.   2;
2.   USA, JPN;
3.   ATT, KDDI;
4.   CS: Sherman Oaks/TS1/ATT/USA,

    SCS1: Tokyo/TS1/KDDI/JPN;
5.   Sherman Oaks/TS1/ATT/USA, Tokyo/TS1/KDDI/JPN;
6.   Ibaraki/2SD/KDDI/JPN–Sherman Oaks/EC/ATT/USA 12C01/4;
7.   –;
8.   –;
9.   –;
10.   ST;
11.   C;
12.   3.4 kHz;
13.   C6, 000/03.

A.2 Full example for the designation information of a leased analogue circuit

The circuit is the first analogue leased circuit used for data transmission between London and Frankfurt, operated by British Telecom International and the Deutsche Telekom. The signalling type is 500 Hz/20 Hz. The control station and sub-control station of the circuit are London Mollison and Frankfurt 0 respectively. Both stations are also the fault report points of the circuit. The circuit is routed on the 3rd channel of the first group between Frankfurt and London. As regards the parameters of the circuit, ITU-T Rec. M.1020 [9] is applied. The maintenance contract between Network operators/service providers and customer is repair within 24 hours.

Designation:

Frankfurt/ERT/DTAG/DEU–London/EVC/BTPLC/GBR DP1

Related information:

1.   ≤ 24 h;
2.   DEU, GBR;

3.   DTAG, BTPLC;

4.   CS: London/SM/BTPLC/GBR,

       SCS1: Frankfurt/0/DTAG/DEU;

5.   Frankfurt/0/DTAG/DEU, London/SM/BTPLC/GBR;

6.   Frankfurt/ERT/DTAG/DEU–London/EVC/BTPLC/GBR 1201/3;

7.   –;

8.   –;

9.   D;

10.   –;

11.   A;

12.   3.4 kHz;

13.   500/20;

14.   Rec. M.1020.

A.3   Full examples for the designation information of a group and a group link interconnection

A.3.1   Full example for the designation information of a group interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The interconnecting group is the fifth group between Amsterdam and Paris. The urgency for restoration (1) is 3rd priority, the terminal countries (2) are Netherlands and France, the Network operators/service providers involved (3) are Netherlands KPN Telecom and France Telecom, the control station and sub-control station (4) are Paris Archives and Amsterdam 1 respectively, the fault report points (5) are Amsterdam 2 and Paris Archives, the routing (6) of the group is in the supergroup Amsterdam–Bruxelles 6011 on position 1 and in the supergroup Bruxelles–Paris 6002 on position 3, there is an associated group (7) carrying traffic but indicated for restoration namely Amsterdam–Paris 1209, there is special equipment involved (8) because the group is carrying companded circuits, the use (9) is: Z-circuits and a DP circuit, no satellite (10) is involved, no end-to-end information (11) is to be recorded, the bandwidth (12) is 48 kHz and the occupancy (13) is to be seen from the example.

Designation:

Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA 1205

Related information:

1.   3;

2.   NLD, FRA;

3.   TCOMNL, FRTE;

4.   CS: Paris/ARC/FRTE/FRA,

       SCS1: Amsterdam/1/TCOMNL/NLD;

5.   Amsterdam/2/TCOMNL/NLD, Paris/ARC/FRTE/FRA;

6.   Amsterdam/EDC/TCOMNL/NLD–Bruxelles/ZZC/BGACOM/BEL 6011/1,

       Bruxelles/ZZC/BGACOM/BEL–Paris/ARC/FRTE/FRA 6002/3;

7.   S1205: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA 1209;

8.   CO;

9.   Z, DP;

10. −;

11. −;

12. 48 kHz;

13. 01: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z111,

02: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z113,

03: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z115,

04: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z117,

05: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z119,

06: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA Z121,

07: Paris/ARC/FRTE/FRA–Amsterdam/EDC/TCOMNL/NLD Z120,

08: Paris/ARC/FRTE/FRA–Amsterdam/EDC/TCOMNL/NLD Z122,

09: Paris/ARC/FRTE/FRA–Amsterdam/EDC/TCOMNL/NLD Z124,

10: Paris/ARC/FRTE/FRA–Amsterdam/EDC/TCOMNL/NLD Z126,

11: Paris/ARC/FRTE/FRA–Amsterdam/EDC/TCOMNL/NLD Z128,

12: Amsterdam/EDC/TCOMNL/NLD–Paris/ARC/FRTE/FRA DP5.

A.3.2 Full example for the designation information of a group link interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The link is the first restoration group link between Paris and Genève. The urgency for restoration (1) is 3rd priority, the terminal countries (2) are Switzerland and France, the Network operators/service providers (3) are Swisscom and France Telecom, the control and sub-control stations (4) are Genève Monthoux and Paris Archives respectively, the fault report points (5) are the same stations, the routing (6) is in the second supergroup between Genève and Annemasse on position 1, there is no information to be recorded about association (7), special equipment (8), use (9), there is no satellite involved (10), no end-to-end information (11) is required, the bandwidth (12) is 48 kHz.

Designation:

Genève/MON/CHEPTT/CHE–Paris/ARC/FRTE/FRA 12801

Related information:

1. 3;

2. CHE, FRA;

3. CHEPTT, FRTE;

4. CS: Genève/MON/CHEPTT/CHE,

SCS1: Paris/ARC/FRTE/FRA;

5. Genève/MON/CHEPTT/CHE, Paris/ARC/FRTE/FRA;

6. Annemasse/WSX/FRTE/FRA–Genève/11W/CHEPTT/CHE 6002/1;

7. −;

8. −;

9. −;

10. −;

11. −;

12. 48 kHz;

A.4 Full examples for the designation information of a digital block, digital path, data transmission system, blocks created between DCMEs, Virtual Containers and SDH multiplex section interconnections

A.4.1 Full example for the designation information of a digital block (bidirectional) interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

A.4.1.1 Full example for the designation information of a digital block (bidirectional symmetrical configuration) interconnection

The interconnecting digital block is the 12th primary digital block between Roma and Paris. The urgency for restoration (1) is 2, the terminal countries (2) are France and Italy, the Network operators/service providers involved (3) are France Telecom and Telecom Italia, control station (4) is Roma 1 and sub-control station is Paris Archives, the fault report points (5) are the same stations, the block has been routed (6) in the secondary digital block Paris–Roma 120N2 on position number 3, it has an associated block (7) indicated for restoration: Paris–Roma 30N5, no special equipment (8) is involved, the use of the block (9) is DP- and NP-circuits, no satellite is involved (10), no end-to-end information (11) is required, the bit rate (12) is 2048 Mbit/s, the occupancy (13) is seen in the example, the actual number of channels (14) is 31, the clocking system (15) is a master/slave system with the master in Paris and the slave in Roma.

Designation:

Paris/ARC/FRTE/FRA–Roma/TI/ITA 30N12

Related information:

1. 2;
2. FRA, ITA;
3. FRTE, TI;
4. CS: Roma/1/TI/ITA,

   SCS1: Paris/ARC/FRTE/FRA;
5. Paris/ARC/FRTE/FRA, Roma/1/TI/ITA;
6. Paris/ARC/FRTE/FRA–Roma1/TI/ITA 120N2/3;
7. S30N12: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA 30N5;
8. –;
9. DP, NP;
10. –;
11. –;
12. 2048 kbit/s;
13. 01: London/22/BTPLCL/GBR–Roma/1/TI/ITA DP12,

   02: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA DP2,

   03: Napoli/34/TI/ITA–Rouen/CDD/FRTE/FRA NP1,

   04: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA NP3,

   05: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA NP4,

   06: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA NP5,

   07: –,

   08: –,

   09: –,

10: Lille/XVC/FRTE/FRA–Roma/1/TI/ITA DP1,

11: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA DP5,

12: –,

13: –,

14: –,

15: –,

16: Bruxelles/DCC/BGACOM/BEL–Roma/1/TI/ITA DPM4,

17: Paris/ARC/FRTE/FRA–Roma/1/TI/ITA DPM1,

18: –,

19: –,

20: –,

21: –,

22: –,

23: –,

24: –,

25: –,

26: –,

27: –,

28: –,

29: –,

30: –,

31: –;

14.   31;

15.   M = Paris, S = Roma.

A.4.1.2   Full example for the designation information of a digital block – Bidirectional asymmetrical configuration interconnection

In the asymmetrical configuration, one transmission station has less modulation levels than the other one. In Figure A.1, the transmission station on the left (Palermo) uses a 2-Mbit/s<>140-Mbit/s multiplexer without intermediate modulation levels. The transmission station on the right (Marseille) uses an equipment with three possible modulation schemes: 2 Mbit/s<>140 Mbit/s, 2 Mbit/s<>34 Mbit/s<>140 Mbit/s and the traditional 2 Mbit/s<>8 Mbit/s<>34 Mbit/s<>140 Mbit/s.
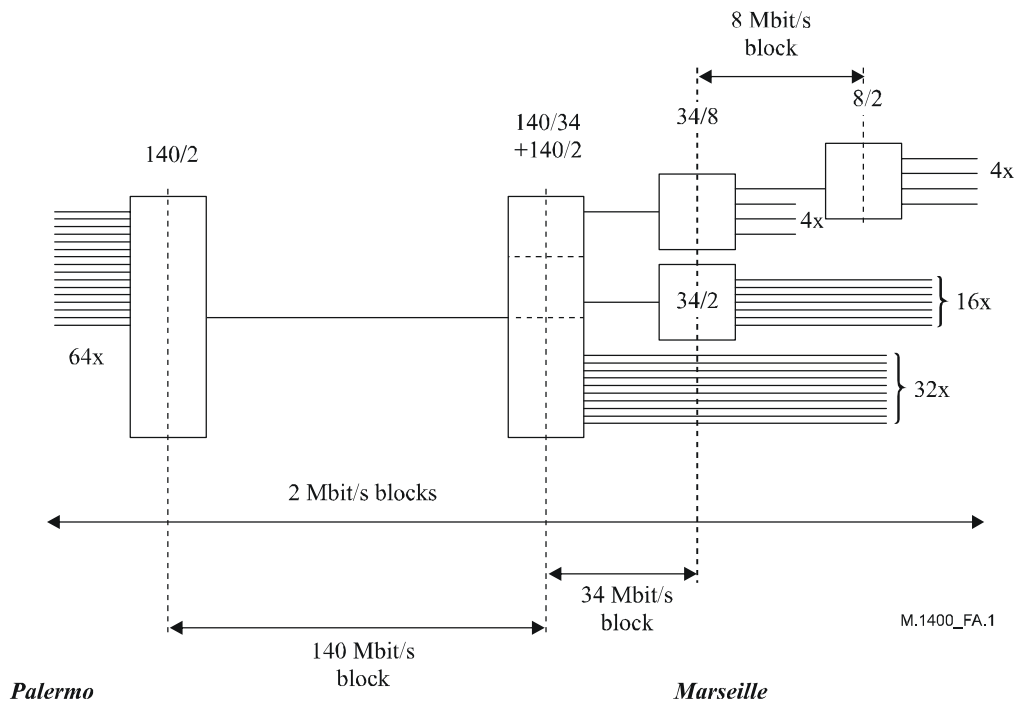
Figure A.1/M.1400 – Digital block bidirectional asymmetrical configuration

In this case, only the 2-Mbit/s and 140-Mbit/s blocks exist between Palermo and Marseille. The 8-Mbit/s and 34-Mbit/s blocks exist only between the multiplexing equipment components in the transmission station at the right (Marseille). The 8-Mbit/s and 34-Mbit/s blocks do not exist between operators. Therefore no interconnecting designation is needed.

Example 1:

The interconnecting digital block is the 2nd 140 Mbit/s digital block between Palermo and Marseille. The urgency for restoration (1) is not indicated, the terminal countries (2) are France and Italy, the Network operators/service providers involved (3) are France Telecom and Telecom Italia, control station (4) is Marseille/KND and sub-control station is Palermo/L*I, the fault report points (5) are the same stations, the block has been routed (6) in the optical fibre systems Marseille-Ajaccio F01, Ajaccio-Golfo Aranci F02, Golfo Aranci–Palermo/L*I F02, it has no associated block (7) indicated for restoration, no special equipment (8) is involved, the use of the block (9) is not specified, no satellite is involved (10), no end-to-end information (11) is required, the bit rate (12) is 139 264 kbit/s, the occupancy (13) is seen in the example, the actual number of channels (14) is 64, the clocking system (15) is a master/slave system with the master in Marseille and the slave in Palermo.

Designation:

Marseille/KND/FRTE/FRA–Palermo/L*I/TI/ITA 1920N2

Related information:

1.   –;

2.   FRA, ITA;

3.   FRTE, TI;

4.   CS: Marseille/KND/FRTE/FRA

    SCS1: Palermo/L*I/TI/ITA;

5.   Marseille/KND/FRTE/FRA, Palermo/L*I/TI/ITA;

6.   Marseille/KND/FRTE/FRA–Ajaccio/34F/TI/ITA F01,

            Ajaccio/34F/TI/ITA–Golfo Aranci/VBN/TI/ITA F02,

            Golfo Aranci/VBN/TI/ITA–Palermo/L*I/TI/ITA F02;

7.   –;

8.   –;

9.   –;

10.   –;

11.   –;

12.   139 264 kbit/s;

13.   01: Athinai/CCB/OTE/GRC–Bracknell/NMN/BTPLC/GBR 30N1,

           02: Athinai/CCB/OTE/GRC–Bracknell/NMN/BTPLC/GBR 30N2,

           03: Dublin/RRT/EIRCOM/IRL–Tel Aviv/BARAK/ISR 30N1,

           04: Athinai/CCB/OTE/GRC–Linda Velha/WX/ROMTL/ROM 30N1,

           05: Marseille/KND/FRTE/FRA–Palermo/L*I/TI/ITA 30N1,

           .

           .

           35 –,

           36: –,

           37: New York/MLT/ATT/USA–Whitehill/MCL/BTPLC/GBR 30N1,

           38: New York/MLT/ATT/USA–Bruxelles/ZZD/BGACOM/BEL 30N1

           .

           .

           .

           62: Athinai/CCB/OTE/GRC–White Plains/ZXC/ATT/USA 30N5,

           63: Istanbul/3DF/TT/TUR–Vauxhall/2/BTPLC/GBR 30N4,

           64: –;

14.   64;

15.   M = Marseille, S = Palermo.

Example 2:

Routing of a 2 Mbit/s digital block between Marseille and Palermo routed on the 5th time slot of the Marseille/KND/FRTE/FRA–Palermo/L*I/TI/ITA1920N2

Designation:

Marseille/KND/FRTE/FRA–Palermo/L*I/TI/ITA 30N1

Related information:

6.   Marseille/KND/FRTE/FRA–Palermo/L*I/TI/ITA 1920N2/5

NOTE – The related information does not describe the actual routing of the 2-Mbit/s digital block, but only its interconnecting portion. The country in which the multiplexer equipment components exist (in this example, France) will document the local routing which is not the object of this Recommendation.

A.4.2 Full example for the designation information of a digital path interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The interconnecting digital path is the first restoration digital second order path between Paris and Bruxelles. The urgency for restoration (1) is 3, the terminal countries (2) are Belgium and France, the Network operators/service providers involved (3) are Belgacom and France Telecom, control station (4) is Bruxelles BLA and sub-control station is Paris Archives, the fault report points (5) are the same stations, the path has been routed (6) in the first third order block Bruxelles–Paris on position number 1, there are no associated blocks (7), no special equipment (8), use (9) has not been indicated, no satellite is involved (10), no end-to-end information (11) is required, the bit rate (12) is 8448 Mbit/s.

Designation:

Bruxelles/BLA/BGACOM/BEL–Paris/ARC/FRTE/FRA 120N801

Related information:

1.   3;
2.   BEL, FRA;
3.   BGACOM, FRTE;
4.   CS: Bruxelles/BLA/BGACOM/BEL,

       SCS1: Paris/ARC/FRTE/FRA;
5.   Bruxelles/BLA/BGACOM/BEL–Paris/ARC/FRTE/FRA;
6.   Bruxelles/BLA/BGACOM/BEL–Paris/ARC/FRTE/FRA 480N1/1;
7.   –;
8.   –;
9.   –;
10.   –;
11.   –;
12.   8448 kbit/s.

A.4.3 Full example for the designation information of a data transmission system interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The data transmission system interconnection is the first 64-kbit/s data transmission system between London and Paris. The urgency for restoration (1) is 1, the terminal countries (2) are United Kingdom and France, the Network operators/service providers involved (3) are British Telecom International and France Telecom, the control and sub-control stations (4) are London Mollison and Paris Archives respectively, the fault report points (5) are the same stations, the system has been routed (6) in the 12th primary block between Paris and London on timeslot number 3, there is no information to be recorded about association (7), equipment information (8) and use (9), there is no satellite involved (10), composition of transmission (11) is digital, item (12) does not apply, the occupancy (13) is seen in the example.

Designation:

London/SM/BTPLC/GBR–Paris/ARC/FRTE/FRA 64K1

Related information:

1.   1;
2.   GBR, FRA;
3.   BTPLC, FRTE;
4.   CS: London/SM/BTPLC/GBR,

    SCS1: Paris/ARC/FRTE/FRA;
5.   London/SM/BTPLC/GBR–Paris/ARC/FRTE/FRA;
6.   London/113/BTPLC/GBR–Paris/EDC/FRTE/FRA 30N12/3;
7.   –;
8.   –;
9.   –;
10.   –;
11.   N;
12.   –;
13.   A4: London/113/BTPLC/GBR–Paris/EDC/FRTE/FRA NP12,

    B4: London/113/BTPLC/GBR–Toulouse/RRC/FRTE/FRA NP3,

    C4: –;

    D4: Dublin/45/BTE/IRL–Paris/EDC/FRTE/FRA NP6,

    E4: London/113/BTPLC/GBR–Paris/EDC/FRTE/FRA NP11,

    F4: London/113/BTPLC/GBR–Paris/EDC/FRTE/FRA NP14.

A.4.4 Full example for the designation information of a block created by the interconnection of DCMEs

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

This block is the second block created by the interconnection of DCMEs with a maximal nominal number of 240 channels between Boston and Reims. The urgency for restoration (1) is 2, the terminal countries (2) are the United States and France, the Network operators/service providers involved (3) are AT&T and France Telecom, control station is Boston (4) and sub-control station is Reims/CRE, the fault report points (5) are the same stations, the block has been routed (6) on the 22nd primary digital path between Reims and New York, it has no associated block (7), the first 30 channels are through-going (8), use (9) has not been indicated, a satellite is involved in transmission (10), items 11 and 12 do not apply and the occupancy (13) is seen in the example (only 90 channels are occupied with circuits).

Designation:

Boston/FRC/ATT/USA–Reims/CRE/FRTE/FRA 240Y2

Related information:

1.   2;
2.   USA, FRA;
3.   ATT, FRTE;
4.   CS: Boston/FRC/ATT/USA,

    SCS1: Reims/CRE/FRTE/FRA;
5.   Boston/FRC/ATT/USA, Reims/CRE/FRTE/FRA;
6.   New York/45/ATT/USA–Reims/CRE/FRTE/FRA 30N22;

7. –;

8. 1-30 = T;

9. –;

10. ST;

11. –;

12. –;

13. 001:   New York/24/ATT/USA–Paris/PT3/FRTE/FRA B1,

    002:   New York/24/ATT/USA–Paris/PT3/FRTE/FRA B2,

    .....

    090:   New York/24/ATT/USA–Paris/PT3/FRTE/FRA B90.

A.4.5   Full example for the designation of a Virtual Container interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The Virtual Container interconnection is the 12th VC-4 between Roma and Paris. The urgency for restoration (1) is 2, the terminal countries (2) are France and Italy, the Network operators/service providers involved (3) are France Telecom and Telecom Italia, control station (4) is Roma 1 and sub-control station is Paris Archives, the fault report points (5) are the same stations, the block has been routed (6) in the multiplex section Paris–Roma 4S2 on position number 3, it has no associated block (7), no special equipment (8) is involved, the use of the block (9) is unknown, no satellite is involved (10), no end-to-end information (11) is required, the bit rate (12) is 155 Mbit/s, the occupancy (13) is seen in the example and the access points (14) are shown there as well.

Designation:

Paris/35R/FRTE/FRA–Roma/VVB/TI/ITA VC4S12

Related information:

1. 2;

2. FRA, ITA;

3. FRTE, TI;

4. CS: Roma/1/TI/ITA,

    SCS1: Paris/ARC/FRTE/FRA;

5. Paris/ARC/FRTE/FRA, Roma/1/TI/ITA;

6. Paris/35R/FRTE/FRA–Roma/VVB/TI/ITA 4S2/3;

7. –;

8. –;

9. –;

10. –;

11. –;

12. –;

13. 1,0,0: Napoli/55E/TI/ITA–Paris/35R/FRTE/FRA VC3S15,

    2,1,0: Lille/CVB/FRTE/FRA–Roma/1/TI/ITA VC2S8,

    2,2,0: Lille/CVB/FRTE/FRA–Roma/1/TI/ITA VC2S121,

    2,3,0: –,

    2,4,1: London/XXC/BTPLC/GBR–Roma/1/TI/ITA VC12S30,

2,4,2: Paris/35R/FRTE/FRA–Roma/VVB/TI/ITA VC12S4,

2,4,3: London/XXC/BTPLC/GBR–Roma/VVB/TI/ITA VC12S31,

2,5,0: London/XXC/BTPLC/GBR–Roma/VVB/TI/ITA VC2S67,

2,6,0: –,

2,7,0: Paris/35R/FRTE/FRA–Roma/VVB/TI/ITA VC2S82,

3,0,0: Napoli/55E/TI/ITA–Paris/35R/FRTE/FRA VC3S16;

14.   APId A: FRAFRTE12345678,

        APId B: ITATI987654321.

A.4.6   Full example for the designation information of a multiplex section interconnection

NOTE – The numbers between parentheses refer to the numbers of the items in the Related information.

The multiplex section interconnection is the first STM-4 between London and Paris. The urgency for restoration (1) is 1, the terminal countries (2) are United Kingdom and France, the Network operators/service providers involved (3) are British Telecom International and France Telecom, the control and sub-control stations (4) are London Mollison and Paris Archives respectively, the fault report points (5) are the same stations, the system has been routed (6) on the France–UK 4 submarine cable, there is no information to be recorded about association (7), equipment information (8) and use (9), there is no satellite involved (10), item (11) does not apply, the bit rate (12) is 620 Mbit/s, the occupancy (13) is seen in the example.

Designation:

London/SM/BTPLC/GBR–Paris/ARC/FRTE/FRA 4S1

Related information:

1.   1;

2.   GBR, FRA;

3.   BTPLC, FRTE;

4.   CS: London/SM/BTPLC/GBR,

        SCS1: Paris/ARC/FRTE/FRA

5.   London/SM/BTPLC/GBR, Paris/ARC/FRTE/FRA;

6.   France–UK 4;

7.   –;

8.   –;

9.   –;

10.   –;

11.   –;

12.   620 Mbit/s;

13.   1: Glasgow/DDC/BTPLC/GBR–Paris/ARC/FRTE/FRA VC4S12,

        2: London/SM/BTPLC/GBR–Paris/ARC/FRTE/FRA VC4S21,

        3: –,

        4: London/SM/BTPLC/GBR–Toulouse/EDR/FRTE/FRA VC4S2;

14.   APId A: 441234567890123,

        APId B: FRAFRTE87654321.

Annex B

KLM addressing and its relationship to time slot
numbering for virtual containers

B.1   KLM addressing relationship to time slot numbering

It is possible to relate VC-4 occupancy listing with time slot numbering or tributary numbering to an occupancy listing with KLM addressing by using the following process.

−   List the designations of all tributaries (irrespective of type) in order. This will consist of a possible combination of VC-12s, VC-2s and/or VC-3s.

−   *Assign a K number*:

Every VC-n is contained in one of three TU3s (or TUG3s). Each VC-n tributary should be assigned a K number, from 1 to 3, corresponding to the position in which its TU3 (or TUG3) is contained within the VC-4, e.g., the VC-3 in the second TU3 has a K number of 2; any VC-12 in the third TU3 has a K number of 3, etc.

−   *Assign an L number*:

For each VC-3, the L number is 0.

Each VC-2 or VC-12 is contained within one of seven TU2s (or TUG2s) within a TUG3. Each VC-2 or VC-12 should be assigned an L number from 1 to 7, corresponding to the position in which its TU2 (or TUG2) is contained within its TU3, e.g., a VC-2 in the fifth TU2 within its TUG3 has an L number of 5; any VC-12 within the sixth TUG2 in a TUG3 has an L number of 6, etc.

−   *Assign an M number*:

For each VC-3 and VC-2, the M number is 0.

Each VC-12 is contained within one of three TU12s within a TUG2. Each VC-12 should be assigned an M number from 1 to 3, corresponding to the position in which its TU12 is contained within its TUG2, e.g., the VC-12 corresponding to the third TU12 within a TUG2 has an M number of 3.

B.2   KLM addressing of VC-4 occupancy

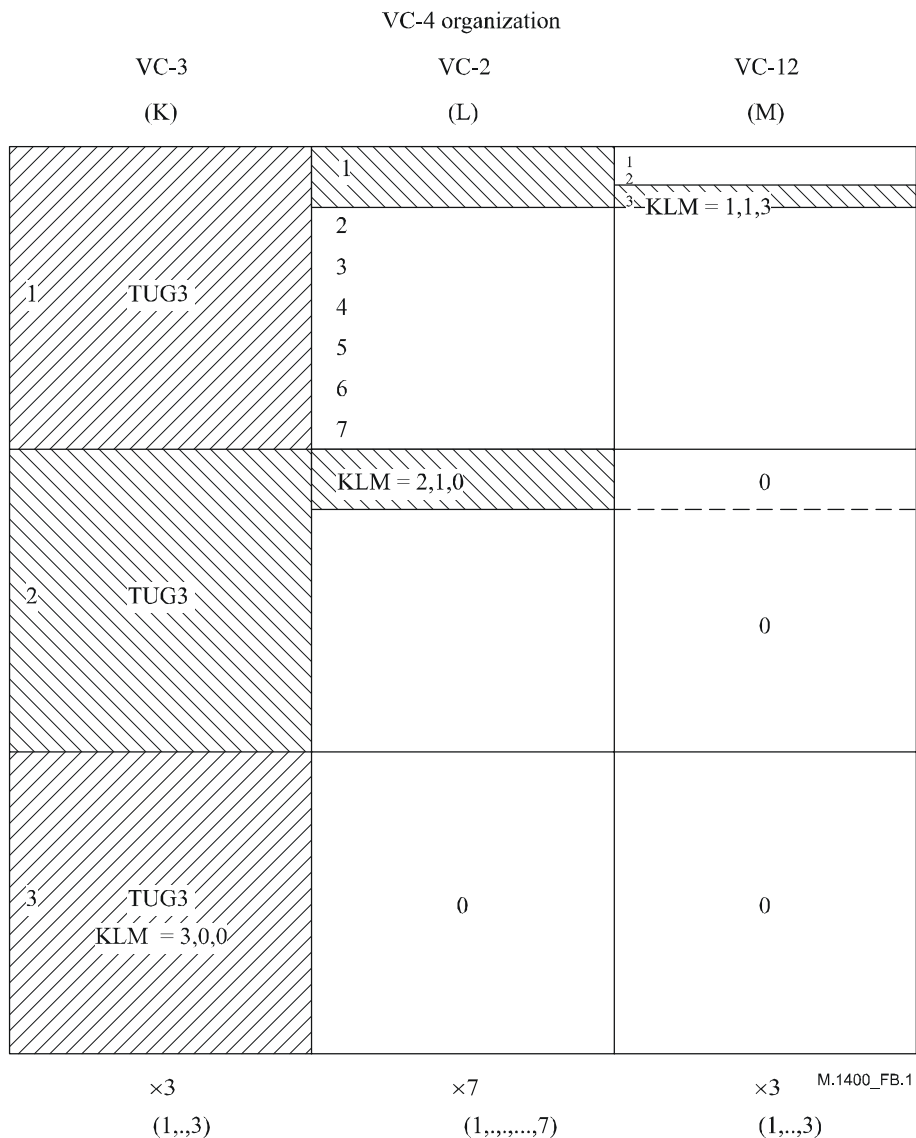Figure B.1 illustrates VC-3, VC-2 and VC-12 occupancy of a VC-4.

Figure B.1/M.1400 – VC-4 organization

B.3   Comparative notation of KLM addressing vs. time slot numbering

The following example shows the two alternative ways of presenting occupancy. List 1 shows an occupancy listing using KLM numbering. List 2 shows the corresponding occupancy using time slot numbering. Note that each KLM address is specified only once in list 1. Also note that in list 2 a VC-3 (n,0,0) is repeated at every third time slot; a VC-2, (n,n,0) is repeated at every 21st time slot: a VC-12 (n,n,n) is not repeated within the 63 time slots.

List 1	List 2
Using KLM addressing	**Using time slot numbering**
1,0,0: Napoli/1/TI/ITA–Paris/2/FT/FRA VC3S15, 2,1,0: Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S8, 2,2,0: Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S66, 2,3,0: –, 2,4,1: London/5/BTPLC/GBR–Roma/4/TI/ITA VC12S30, 2,4,2: Paris/2/FRTE/FRA–Roma/4/TI/ITA VC12S44, 2,4,3: London/5/BTPLC/GBR–Roma/4/TI/ITA VC12S31, 2,5,0: Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S67, 2,6,0: –, 2,7,0: Paris/2/FRTE/FRA–Roma/4/TI/ITA VC2S82, 3,0,0: Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16;	01:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 02:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S8, 03:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 04:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 05:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S66, 06:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 07:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 08:–, 09:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 10:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 11:London/5/BTPLC/GBR–Roma/4/TI/ITA VC12S30, 12:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 13:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 14:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S67, 15:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 16:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 17:–, 18:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 19:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 20:Paris/2/FRTE/FRA–Roma/4/TI/ITA VC2S82, 21:Napoli/1/TI/ITA–Paris2/FRTE/FRA VC3S16, 22:Napoli/1/TI/ITA–Paris2/FRTE/FRA VC3S15, 23:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S8, 24:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 25:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 26:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S66, 27:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 28:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 29:–, 30:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 31:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 32:Paris/2/FRTE/FRA–Roma/4/TI/ITA VC12S44, 33:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 34:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 35:Lille3/FRTE/FRA–Roma/4/TI/ITA VC2S67, 36:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 37:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 38:–, 39:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 40:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 41:Paris/2/FRTE/FRA–Roma/4/TI/ITA VC2S82, 42:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 43:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 44:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S8, 45:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16,

List 1	List 2
Using KLM addressing	**Using time slot numbering**
	46:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 47:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S66, 48:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 49:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 50:–, 51:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 52:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 53:London/5/BTPLC/GBR–Roma/4/TI/ITA VC12S31, 54:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 55:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 56:Lille/3/FRTE/FRA–Roma/4/TI/ITA VC2S67, 57:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 58:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 59:–, 60:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16, 61:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S15, 62:Paris/2/FRTE/FRA–Roma/4/TI/ITA VC2S82, 63:Napoli/1/TI/ITA–Paris/2/FRTE/FRA VC3S16;

Annex C

Reference clause numbers for the various types of routes

Clause	Type of interconnecting route
7.2.2	Telephone circuits used in manual operation
7.2.3	One-way telephone circuits used for semi-automatic or automatic operation
7.2.4	Both-way telephone circuits used for semi-automatic or automatic operation
7.3	Circuits used for switched telex and telegraph service
7.4	Interconnecting circuits in the public switched data network
9.2.2	Analogue leased circuits used for telephony
9.2.3.1	Analogue circuits used for voice-frequency telegraphy
9.2.3.2	Analogue leased circuits used for TDM-telegraphy
9.2.4	Leased telegraph circuits
9.2.5	Analogue leased circuits used for data transmission
9.2.6	Analogue leased circuits used for phototelegraphy or facsimile
9.2.7.1	Analogue leased unidirectional sound-programme transmission circuits
9.2.7.2	Analogue leased reversible sound-programme transmission circuits
9.2.8.1	Analogue leased unidirectional television-programme circuits
9.2.8.2	Analogue leased reversible television-programme circuits
9.2.9	Leased circuits used for digital video transmission
9.2.10	Analogue leased circuits connecting circuit multiplication terminal equipment at renters' premises
9.2.11	Analogue leased circuits used for combinations of transmissions, etc.
9.2.12	Analogue leased circuits connecting three or more locations
9.2.13	Leased analogue groups, supergroups, etc.
9.2.14	Leased analogue group, supergroup links
9.2.15	Digital leased circuits connecting two locations
9.2.16	Digital leased circuits connecting three or more locations
9.3.2.1	Public circuits used for unidirectional sound-programme transmission
9.3.2.2	Public circuits used for reversible sound-programme transmission
9.3.2.3	Public circuits used for narrow-band sound-programme transmission
9.3.3.1	Public circuits used for unidirectional television transmission
9.3.3.2	Public circuits used for reversible television transmission
9.3.4	Public circuits for digital audio and video transmission
9.3.5	Public telephone-type circuits used for phototelegraphy or facsimile
9.3.6	Telephone-type circuits used to provide voice-frequency telegraph links
9.3.7	Telephone-type circuits used to provide time division multiplex telegraph systems
9.3.8	Telephone-type circuits used for data transmission
9.3.9	Telephone-type circuits used as transfer links for common channel Signalling Systems Nos 6 and 7

Annex D

Numbering of channels in data transmission systems

Using suitable modems and multiplexers, it is possible to provide for a combination of data channels multiplexed together to form an aggregate bit rate for data transmission purposes.

The principle shown in Figure D.1 and Table D.1 may be applied to higher bit rates as modems, etc. are developed and deployed.

The numbering of data channels is obtained by indicating the multiplex channel followed by the sub-channel data rate assigned number in accordance with the scheme contained in Table D.1.

As an example, Figure D.1 shows a data transmission system, London/EVY/BTPLC/GBR–Montreal/CCN/TGB/CAN 96H001, employing equipment providing for 2 channels at 2400 bit/s and one channel at 4800 bit/s, forming an aggregate bit rate of 9600 bit/s.

London/EVY/BTPLC/GBR–Montreal/CCN/TGB/CAN 96H001/A2

London/EVY/BTPLC/GBR–Montreal/CCN/TGB/CAN 96H001/B1

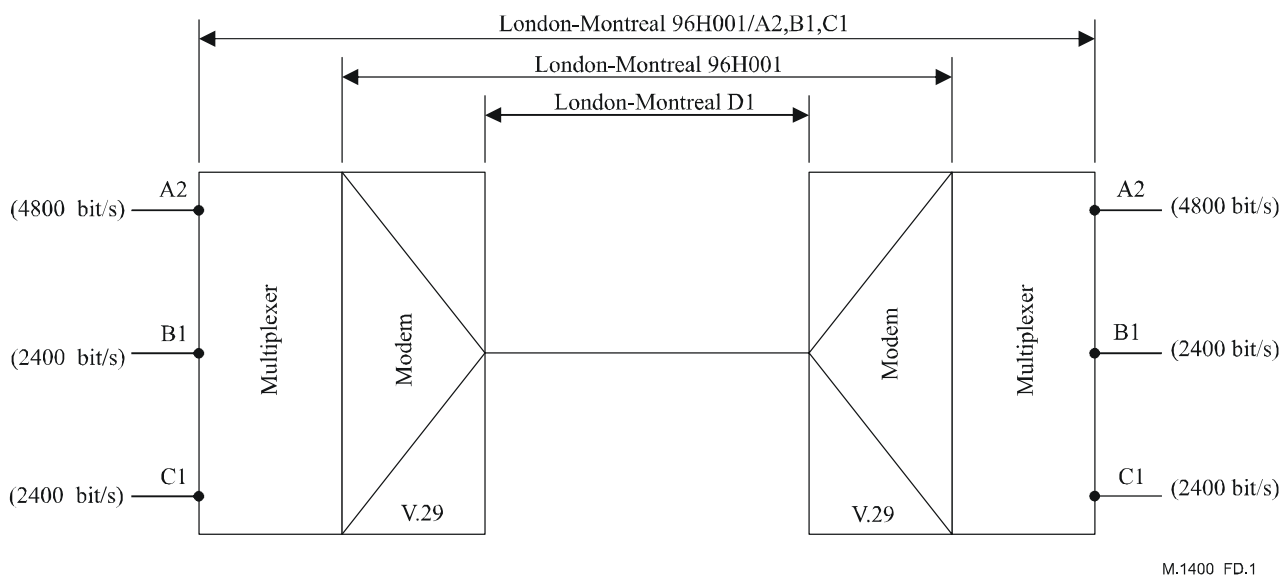London/EVY/BTPLC/GBR–Montreal/CCN/TGB/CAN 96H001/C1

**Figure D.1/M.1400 – Example of the channel numbering scheme
for data transmission systems**

Table D.1 shows the channel numbering scheme for data transmission systems operated at an aggregate data rate of 9600 bit/s. The table also shows the channel numbering scheme for systems using 9600 bit/s modems operated at reduced rates of 7200 bit/s or 4800 bit/s.

Table D.1/M.1400 – Channel numbering scheme for data transmission systems using 9600 bit/s data modems conforming to ITU-T Rec. V.29 [21]

Aggregate data rate	Multiplex configuration	Sub-channel data rate	Multiplex channel	Channel number
9600 bit/s	1	9600	A	A4
	2	7200	A	A3
		2400	B	B1
	3	4800	A	A2
		4800	B	B2
	4	4800	A	A2
		2400	B	B1
		2400	C	C1
	5	2400	A	A1
		2400	B	B1
		2400	C	C1
		2400	D	D1
7200 bit/s	6	7200	A	A3
	7	4800	A	A2
		2400	B	B1
	8	2400	A	A1
		2400	B	B1
		2400	C	C1
4800 bit/s	9	4800	A	A2
	10	2400	A	A1
		2400	B	B1

Sub-channel data rate	Assigned number
9600	4
7200	3
4800	2
2400	1

Annex E

Notification form for List of ITU Carrier Codes

For Operators utilizing ITU-T Rec. M.1400, Operator ID or ITU Carrier Code (ICC) is mandatory in the revised Layer 1 structure to identify route terminations, beginning 1 January 2004. An ICC is mandatory for interconnections between operators in different countries and different operators in the same country. This code is used in ITU-T Rec. M.1400 Layer 1 records to uniquely identify route terminations as well as for the purpose of an Operator registering its interconnecting Operators.

In order to develop a listing of ICCs that may be used to identify the interconnecting operators in ITU-T Rec. M.1400 records, as explained in ITU-T Rec. M.1400, national regulatory authorities are requested to provide the validated codes and related information for both international and domestic operators directly to the TSB using the following form.

1. **Company full name**: _____

    (the name of operator) _____

2. **Company Code**: | | | | | | |

    (the code by which the operator wishes to identify itself. This code shall be alphabetic (A-Z or numeric (0-9)), six or less in length and shall be a unique identifier of a network operator/service provider within each country. This code may be one that is in use today, provided it fits the definition).

3. **Company official address**: _____

    _____

    _____

    _____

4. **Contact point**: _____

    Tel.:   +_____

    Fax: +_____

    E-mail: _____

    _____

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