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8.1 *General*

This section refers to blocks which are part of the digital multiplex hierarchy and which are formatted according to Recommendations G.734, G.736, G.742, G.743, G.745, G.751, G.752, G.753 and G.754 [10]. All other blocks are designated according to § 11.

The format of the designation of digital blocks is shown in Table 6/M.140.

H.T. [T6.140]

TABLE 6/M.140

8 Designations of international digital blocks (bidirectional and unidirectional)

Format of designation Suffix for transmission station or international exchange (optional) } Suffix for transmission station or international exchange (optional) }	Town A —	/ Town B Function code	{ / Serial number	{ 						
Signs	Characters	Slash	Letters/ digits	Hyphen	Characters	Slash	Letters/ digits	Space	Letters/ digits	Digits
Number of characters	12	1	3	1	12	1	3	1	3-6	4

Table 6/M.140 [T6.140], p.

The elements of the format are as follows:

a) *Traffic relation*

Town A and town B, possibly with a suffix for the transmission station or international exchange, indicate the terminal points of the block. For the spelling, see § 1.1. If a town name exceeds the maximum length of 12 characters, the Administration should apply a suitable abbreviation which must be unique (see § 0.1). The town names are arranged in alphabetical order.

The suffix for the transmission station or international exchange (maximum 3 characters) is an optional field which may be used to further identify the terminal point when there is more than one carrier operating in the town. The necessity for a suffix and its form should be decided by the Administration operating the circuit in the town concerned.

In the case of a multiple destination undirectional block, town B is replaced by (MU) (see § 8.4).

b) *Function code:*

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

For blocks in a mixed analogue/digital environment, see § 10.1.2. (In this case 6 characters or less are required.)

c) *Serial number*

This is a 1 to 4 digit number which counts the number of blocks with the same traffic relation and the same function code.

8.2 *Bidirectional digital blocks*

These blocks are designated according to the principles stated in § 8.1.

Example 1:

The fourth secondary order block between London and Paris is designated:

London—Paris 120N4.

Example 2:

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

New York—Tokyo 24N10.

8.3 *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—Stockholm 1920N899.

8.4 *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—(MU) 30N1.

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

Bercenay—(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.

8.5 *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 § 12.16).

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—Roma 30N21.

8.6 *Related information*

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

1. Urgency for restoration;
2. Terminal countries;
3. Administrations’, carriers’ or broadcasting companies’ 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. (Empty item, use: ‘‘—;’’);

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 § 12.

9 Designation of international digital paths

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 § 8.1).

9.1 *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.

9.2 *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—Paris 120N804.

Example 2:

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

Amsterdam—Paris 480N801.

9.3 *Digital line sections and digital radio sections*

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

9.4 *Related Information*

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

1. Urgency for restoration;
2. Terminal countries;
3. Administrations’, carriers’ or broadcasting companies’ 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. (Empty item, use: ‘‘—;’’);

12. Bit rate;

The various items will be dealt with in § 12.

10 Designations of routes in the mixed analogue/digital transmission network

Conforming to the philosophy for lining-up and maintaining a mixed analogue/digital transmission network (Recommendation M.20), 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 funcion code may, therefore, consist of a maximum of 6 characters.

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

10.1 *Transmission routes with one analogue-to-digital conversion*

10.1.1 *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 § 5.1), but have a letter C included in the function code and placed after the nominal number of channels.

Examples:

Group: London—Riyadh 12C02

Amsterdam—Koebenhavn 12C899

(restoration group)

Supergroup: Paris—Sydney 60C01

Mastergroup: Bruxelles—London 300C03

Supermastergroup: Amsterdam—Paris 900C04

Figure 2/M.140 shows a typical analogue/digital arrangement and how it will be designated.

10.1.2 *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—Rome 480NC1.

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 Figure 2/M.140 and Figure 3/M.140.

Figure 2/M.140 shows a typical analogue/digital arrangement and how it will be designated.

10.1.3 *End-to-end designations*

This subject is covered by item 11 in Related Information for digital blocks (see § 12.11).

10.2 *Transmission routes with two analogue-to-digital conversions*

10.2.1 *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 § 10.1.1 should be agreed between the terminal Administrations.

Where both ends are digital, an end-to-end designation using the digital notation described in § 10.1.2 should be agreed between the terminal Administrations.

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.

10.2.2 *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 Administrations 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 3/M.140 shows two examples of routes involving two analogue-to-digital conversions and how they will be designated.

Figure 2/M.140, p. 2

Figure 3/M.140, p. 3

10.3 *Transmission routes with more than two analogue-to-digital conversions*

The transmission planning rules given in Recommendation G.113, § 3 [11] effectively restrict the number of unintegrated digital processes (e.g. analogue-to-digital conversions) permitted in the international part of a telephone connection. Similarly, the routing plan given in Recommendation E.171 [12] restricts the number of international 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 international centres to a maximum of two. Therefore the detailed designation requirements of routes with more than two analogue-to-digital conversions are not considered.

10.4 *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 the item 11, ‘‘End-to-end information’’ is used in addition (see §§ 7.11 and 12.11).

11 Designation of data transmission systems

11.1 *General*

This section deals with data transmission systems provided between the premises of Administrations. (Those between renters' premises are designated according to § 3.2.15 concerning digital leased circuits connecting two locations.)

The designation scheme of these data transmission systems can only be used if they are non-hierarchical or not formatted according to the Recommendations 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 Rec. G.702 [13] cannot have a designation taken from this section. They should be designated according to § 8.

Note — This section deals with digital transmission only. Analogue data transmission systems and links are covered by the sections treating circuits, groups and group links.

The format of designations of data transmission systems are shown in Table 7/M.140.

H.T. [T7.140]

TABLE 7/M.140

Format of designation Suffix for transmission station or international exchange (optional) } Suffix for transmission station or international exchange (optional) }	Town A —	/ Town B Function code	{ / Serial number	{ 						
Signs	Characters	Slash	Letters/ digits	Hyphen	Characters	Slash	Letters/ digits	Space	Letters/ digits	Digits
Number of characters	12	1	3	1	12	1	3	1	5	1-3

Table 7/M.140 [T7.140], p.

The elements of the format are as follows:

a) *Traffic relation*

Town A and town B, possibly with a transmission station or international exchange suffix, represent the two terminal stations of the data transmission system. The names are arranged in alphabetical order. For the spelling see § 1.1. If the town name exceeds the maximum length of 12 characters, the responsible Administration should supply a suitable abbreviation which must be unique (see § 0.1).

The transmission station or international exchange suffix (maximum 3 characters) is an optional field which may be used to further identify the terminal point when there is more than one carrier operating in the town. The necessity for a suffix and its form should be decided by the Administration operating the circuit in the town concerned.

b) *Function code*

This code consists of a 2 to 4 digits 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
1 000 to 9 999 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:*

This is a 1 to 3 digit number counting the number of data transmission systems with the same traffic relation and the same function code.

Note — 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 § 12.9.).

Example 1:

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

Lisboa—New York 96H1.

Example 2:

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

London—Paris 2048K11.

11.2 *Data transmission links*

Data transmission links are designated as data transmission systems.

11.3 *Related Information*

The additional information on data transmission systems is covered by the following items:

1. Urgency for restoration;
2. Terminal countries;
3. Administrations', carriers' or broadcasting companies' 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. (Empty item, use: ‘‘—;’’);
13. Occupancy;

The various items will be dealt with in § 12.

12 Related information for international digital blocks, paths and data transmission systems

The following sections explain the items of Related Information concerned with international digital blocks, paths and data transmission systems. Full examples for the designation information of an international digital block, an international digital path and an international data transmission system are given in Annex A, § A.4.

12.1 *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 Administrations.

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;

12.2 *Terminal countries (item 2)*

This item presents the countries in which the block, path or data transmission system is terminating.

Format:

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

Specification:

XXX: code for country of town A

YYY: code for country of town B

In the case of multiple destination unidirectional block, only XXX applies.

Note — The codes are according to ISO Standard 3166 [2].

Example:

For a digital block Bruxelles—Frankfurt 120N1:

2. BEL, DEU;

12.3 *Names of Administration, carriers or broadcasting companies (item 3)*

This item records the names of the carriers, etc. which operate the block, path, etc.

Format:

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

Specification:

XXXXXX: name of company in town A

YYYYYY: name of company in town B

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

Example:

For a digital block Frankfurt—London 30N1 operated by British Telecom International and Deutsche Bundespost:

3. DBP, BTI;

12.4 *Control station (sub-control station(s)) (item 4)*

This item lists the appointed control station and sub-control stations (according to Recs. M.80 and M.90). Further details about the stations can be found in the list of contact points (Rec. M.93).

Format:

4. CS: designation of control station,

SCS1: designation of sub-control station,

SCS2: designation of sub-control station,

. . . . .

. . . . .

. . . . .

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—Venezia 30N1 with control station Stockholm and sub-control stations Venezia and Paris:

4. CS: Stockholm/HAM;

SCS1: Venezia/CEN;

SCS2: Paris/ARC;

Example 2:

For the digital block Rio de Janeiro—(MU) 30N1:

4. CS: Rio de Janei/1;

12.5 *Fault report points (item 5)*

This item presents the names of both fault report points on the block, path, etc. (according to Rec. M.130). Further details about the fault report points can be found in the list of contact points (Rec. M.93).

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 the one of country of town A.

The second fault report point is the one of country of town 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—Zuerich 30N1:

5. Lisboa/MAR, Zuerich/SEL;

Example 2:

For the digital block Jakarta—(MU) 30N1:

5. Jakarta/1;

12.6 *Routing (item 6)*

This item records the next higher block within the multiplex hierarchy on which the block path, data transmission system, has 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 international block/position number or designation of transmission medium, Designation of an international block/position number or designation of transmission medium, . | | , Designation of an international block/position number or designation of transmission medium;

Note — Two consecutive unidirectional blocks are separated by a + sign instead of a comma.

Specification:

The designation of an international block refers to the next higher level in the digital multiplex hierarchy. If there are more than one, the blocks are noted in geographical order from town A to town B.

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

As no CCITT designations of transmission media, nor digital line or radio sections 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:

For the primary digital block Frankfurt—Zuerich 30N7:

6. Frankfurt—Zuerich 120N1/3;

Example 2:

For the block Bruxelles—London 1920N1, with transmission medium corresponding to submarine cable:

6. UK—B 5;

12.7 *Association (item 7)*

This item identifies whether there are associated blocks, paths, data transmission systems and if so, of which nature.

Format:

7. Association code: designation(s) of the associated block(s), path(s);

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 and data transmission systems.

Example:

If the path Hongkong—Singapore 30N801 is the restoration path for the normal block Hongkong—Singapore 30N3, the Related Information for the normal block under Association must show:

7. S30N3: Hongkong—Singapore 30N801;

12.8 *Equipment informations (item 8)*

12.8.1 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.

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 Administrations.

12.8.2 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 section, paragraph, table etc., number.

Example:

For a 9600 bit/s data transmission system with a multiplex configuration as defined in Table A-1/M.1320, item 8 will present:

8. Rec. M.1320TA-1;

12.9 *Use (item 9)*

This item identifies for what purpose the block, path, data transmission system is used (if this known by the Administration and 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—Luxembourg 30N1 is used for sound-programme transmission:

9. R;

12.10 *Transmision 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—(MU) 30N1:

10. ST;

12.11 *End-to-end information or composition of transmission (item 11)*

12.11.1 *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 town and refer to the destinations of the traffic on the block/path. The destinations are placed according to the order of towns in the traffic relation.

If the block has multiple destination the town 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—Paris 30NC6 carrying from Frankfurt—London:

11. Frankfurt, London;

Example 2:

For primary block Amsterdam—Bruxelles 30NC146 carrying traffic from London to Luxembourg:

11. London, Luxembourg;

12.11.2 *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

12.12 *Bit rate (for blocks and paths) (item 12)*

This item shows the bit rate of the block or path.

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, use the sign —.

Example 1:

For the digital block New York—Tokyo 24N2:

12. 1544 kbit/s;

Example 2:

For the digital block Bruxelles—Luxembourg 480N1:

12. 34 Mbit/s;

12.13 *Occupancy (for blocks and for data transmission systems) (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:

(The same format applies to data transmission systems, replacing ‘‘time slot number’’ by ‘‘channel number’’ according to Recommendation M.1320 [14]).

. . . . . .

. . . . . .

. . . . . .

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 —,

. . .

. . .

. . .

Position number: designation of a block, of a leased circuit, of a data transmission system or the sign —,

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 —.

Example 1:

For the digital block Geneve—Paris 120N2:

13. 01: Geneve—Lisboa 30N1,

02: —,

03: Geneve—Paris 2048K1,

04: Bruxelles—Wien 30N1;

Example 2:

For the digital block New York—Paris 24N5:

13. 01: New York/24—Paris/PT2 Z1,

02: New York/24—Paris/PT2 Z3,

03: New York/24—Paris/PT2 Z5,

04: Paris/PT2—New York/24 Z2,

05: Paris/PT2—New York/24 Z4,

06: Paris/PT2—New York/24 Z6,

07: —,

08: —,

09: —,

10: Orlando/TS1—Toulouse/FER 64K1,

11: —,

12: —,

13: —,

14: —,

15: New York/TS1—Paris/ARC R1,

16: New York/TS1—Paris/ARC R3,

17: —,

18: —,

19: —,

20: Paris/BEA—Washington/TS1 NP1,

21: —,

22: —,

23: —,

24: —,

12.14 *Actual number of channels (primary blocks only) (item 14)*

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—Paris 30N5 dedicated to leased circuits:

14. 31;

Example 2:

For the digital block London—New York 30N3 used for switched public telephone circuits with ADPCM, the information may be:

14. 60;

Example 3:

For the digital block Honolulu—Osaka 24N2 used for switched public telephone circuits:

14. 24;

12.15 *Clocking information (for blocks only) (item 15)*

This item specifies whether Administrations apply a clocking system according to Rec. G.811 [15] or use a master/slave system.

Format:

15 XX . | | XX; (maximum 30 characters)

Specification:

If clocking according to Rec. G.811 is applied: Rec. G.811;

If a master/slave clocking is applied:

M = XX . | | XX, S = XX . | | XX;

(Town name for the master) (Town name for the slave)

Example 1:

Clocking according to Rec. G.811:

15. Rec. G.811;

Example 2:

Clocking according to Master/Slave system:

15. M = London, S = Frankfurt;

12.16 *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-Roma 30N1 transmitting in the direction Roma to London:

16. I;

ANNEX A
(to Recommendation M.140)

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 KDD. The signalling type is CCITT 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—Tokyo/SJK B604

Related Information:

1. 2;

2. USA, JPN;

3. ATT, KDD;

4. CS: Sherman Oaks/TS1,

SCS1: Tokyo/TS1;

5. Sherman Oaks/TS1, Tokyo/TS1;

6. Ibaraki—Sherman Oaks 12CO1/4;

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 Bundespost. 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, Recommendation M.1020 [9] is applied. The maintenance contract between Administrations and customer is repair within 24 hours.

Designation:

Frankfurt—London DP1.

Related Information:

1. 24 h;

2. DEU, GBR;

3. DBP, BTI;

4. CS: London/SM,

SCS1: Frankfurt/0;

5. Frankfurt/0, London/SM;

6. Frankfurt—London 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 an international group and an international group links*

A.3.1 *Full example for the designation information of an international group*

Note — The numbers between parentheses refer to the numbers of the items in the Related Information.

The international 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 Administrations involved (3) are Netherlands PTT 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 bandwith (12) is 48 kHz and the occupancy (13) is to be seen from the example.

Designation:

Amsterdam—Paris 1205

Related Information:

1. 3;

2. NLD, FRA;

3. NLDPTT, FRATEL;

4. CS: Paris/ARC,

SCS1: Amsterdam/1;

5. Amsterdam/2, Paris/ARC;

6. Amsterdam—Bruxelles 6011/1,

Bruxelles—Paris 6002/3;

7. S1205: Amsterdam—Paris 1209;

8. CO;

9. Z, DP;

10. —;

11. —;

12. 48 kHz;

13. 01: Amsterdam—Paris Z111,

02: Amsterdam—Paris Z113,

03: Amsterdam—Paris Z115,

04: Amsterdam—Paris Z117,

05: Amsterdam—Paris Z119,

06: Amsterdam—Paris Z121,

07: Paris—Amsterdam Z120,

08: Paris—Amsterdam Z122,

09: Paris—Amsterdam Z124,

10: Paris—Amsterdam Z126,

11: Paris—Amsterdam Z128,

12: Amsterdam—Paris DP5,

A.3.2 *Full example for the designation information of an international group link*

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 Geneve. The urgency for restoration (1) is 3rd priority, the terminal countries (2) are Switzerland and France, the Administrations (3) are Swiss PTT and France Telecom, the control and sub-control stations (4) are Geneve Monthoux and Paris Archives respectively, the fault report points (5) are the same stations, the routing (6) is in the second supergroup between Geneve 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 bandwith (12) is 48 kHz.

Designation:

Geneve—Paris 12801

Related Information:

1. 3;
2. CHE, FRA;
3. CHEPTT, FRATEL;
4. CS: Geneve/MON,

SCS1: Paris/ARC;

5. Geneve/MON, Paris/ARC;
6. Annemasse—Geneve 6002/1;
7. —;
8. —;
9. —;
10. —;
11. —;
12. 48 kHz;

A.4 *Full examples for the designation information of an international digital block, digital path and data transmission system*

A.4.1 *Full examle for the designation information of an international digital block*

Note — The numbers between parentheses refer to the numbers of the items in the Related Information.

The international 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 Administrations involved (3) are France Telecom and ASST, 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 2.048 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—Roma 30N12

Related Information:

1. 2;

2. FRA, ITA;

3. FRATEL, ASST;

4. CS: Roma/1,

SCS1: Paris/ARC;

5. Paris/ARC, Roma/1;

6. Paris—Roma 120N2/3;

7. S30N12: Paris—Roma 30N5;

8. —;

9. DP, NP;

10. —;

11. —;

12. 2048 kbit/s;

13. 01: London—Roma DP12,

02: Paris—Roma DP2,

03: Napoli—Rouen NP1,

04: Paris—Roma NP3,

05: Paris—Roma NP4,

06: Paris—Roma NP5,

07: —,

08: —,

09: —,

10: Lille—Roma DP1,

11: Paris—Roma DP5,

12: —,

13: —,

14: —,

15: —,

16: Bruxelles—Roma DPM4,

17: Paris—Roma NPM1,

18: —,

19: —,

20: —,

21: —,

22: —,

23: —,

24: —,

25: —,

26: —,

27: —,

28: —,

29: —,

30: —,

31: —;

14. 31;

15. M = Paris, S = Roma;

A.4.2 *Full example for the designation information of an international digital path*

Note — The numbers between parentheses refer to the numbers of the items in the Related Information.

The international 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 Administrations involved (3) are the Belgium RTT 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 8.448 Mbit/s.

Designations:

Bruxelles—Paris 120N801

Related Information:

1. 3;

2. BEL, FRA;

3. BELRTT, FRATEL;

4. CS: Bruxelles/BLA,

SCS1: Paris/ARC;

5. Bruxelles/BLA, Paris/ARC;

6. Bruxelles—Paris 480N1/1;

7. —;

8. —;

9. —;

10. —;

11. —;

12. 8448 kbit/s;

A.4.3 *Full example for the designation information of an international data transmission system*

Note — The numbers between parentheses refer to the numbers of the items in the Related Information.

The international data transmission system 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 Administrations 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—Paris 64K1

Related Information:

1. 1;
2. GBR, FRA;
3. BTI, FRATEL;

4. CS: London/SM,

SCS1: Paris/ARC;

5. London/SM, Paris/ARC;

6. London—Paris 30N12/3;

7. —;

8. —;

9. —;

10. —;

11. N;

12. —;

13. A4: London—Paris NP12,

B4: London—Toulouse NP3,

C4: —;

D4: Dublin—Paris NP6,

E4: London—Paris NP11,

F4: London—Paris NP14;

ANNEX B
(to Recommendation M.140)

Reference section numbers for the various types of routes

Section	*Type of international route*
1.2.2	Telephone circuits used in manual operation
1.2.3	One-way telephone circuits used for semi-automatic or automatic operation
1.2.4	Both-way telephone circuits used for semi-automatic or automatic operation
1.3	Circuits used for switched telex and telegraph service
1.4	Circuits in the international public switched data network
3.2.2	Analogue leased circuit used for telephony
3.2.3.1	Analogue circuits used for voice-frequency telegraphy
3.2.3.2	Analogue leased circuits used for TDM-telegraphy
3.2.4	Leased telegraph circuits
3.2.5	Analogue leased circuits used for data transmission
3.2.6	Analogue leased circuits used for phototelegraphy or facsimile
3.2.7.1	Analogue leased unidirectional sound-programme transmission circuits
3.2.7.2	Analogue leased reversible sound-programme transmission circuits

3.2.8.1 Analogue leased unidirectional television-programme circuits

3.2.8.2 Analogue leased reversible television-programme circuits

3.2.9 Leased circuits used for digital video transmission

3.2.10 Analogue leased circuits connecting circuit multiplication terminal equipment at renters’ premises

3.2.11 Analogue leased circuits used for combinations of transmissions, etc.

3.2.12 Analogue leased circuits connecting three or more locations

3.2.13 Leased analogue groups, supergroups, etc.

3.2.14 Leased analogue group, supergroup links

3.2.15 Digital leased circuits connecting two locations

3.2.16 Digital leased circuits connecting three or more locations

3.3.2.1 Public circuits used for unidirectional sound-programme transmission

3.3.2.2 Public circuits used for reversible sound-programme transmission

3.3.2.3 Public circuits used for narrow-band sound-programme transmission

3.3.3.1 Public circuits used for unidirectional television transmission

3.3.3.2 Public circuits used for reversible television transmission

3.3.4 Public circuits for digital audio and video transmission

3.3.5 Public telephone-type circuits used for phototelegraphy or facsimile

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

3.3.7 Telephone-type circuits used to provide time division multiplex telegraph systems

3.3.8 Telephone-type circuits used for data transmission

3.3.9 Telephone-type circuits used as transfer links for common channel Signalling Systems Nos. 6 and 7

5.2.1 Groups (bidirectional)

5.2.2 Supergroups (bidirectional)

5.2.3 Mastergroups (bidirectional)

5.2.4 Supermastergroup (bidirectional)

5.2.6 Restoration groups and supergroups (bidirectional)

5.3.1 Multiple destination unidirectional groups and supergroups

5.3.2 Single destination unidirectional groups and supergroups

6.1.1 Conventional group and supergroup links

6.1.2 Restoration links

6.2 Line links

8.2 Bidirectional digital blocks

8.3 Restoration digital blocks

8.4 Multiple destination unidirectional digital blocks

8.5 Single destination unidirectional digital blocks

9.1 Conventional digital paths

9.2 Restoration digital paths

10.1.1 Groups and supergroups, etc. on a mixed analogue/digital route

10.1.2 Digital blocks and paths on a mixed analogue/digital route

10.2 Routes with two analogue-to-digital conversions

11.1 Data transmisssion systems

11.2 Data transmission links

References

[1] CCITT Recommendation *Terms and definitions of traffic engineering* , Vol. II, Rec. E.600.

[2] ISO International standard 3166 *Codes for the representation of names of countries* , Second edition, 1981.

[3] CCITT Recommendation *Designation of international telegraph circuits* , Vol. VI, Rec. R.70.

[4] CCITT Recommendation *Lining up an international miltiterminal leased circuit* , Vol. IV, Rec. M.1055.

[5] CCITT Recommendation *Circuit control station for leased and special circuits* , Vol. IV, Rec. M.1012.

[6] CCITT Recommendation *Sub-control station for leased and special circuits* , Vol. IV, Rec. M.1013.

[7] CCITT Recommendation *Preliminary exchange of information for the provision of international leased circuits* , Vol. IV, Rec. M.1045.

[8] CCITT Recommendation *Signalling systems to be used for international normal and automatic working on analog leased circuits* , Vol. VI, Rec. Q.8.

[9] CCITT Recommendation *Characteristics of special quality international leased circuits with special bandwidth conditioning* , Vol. IV, Rec. M.1020.

[10] CCITT Recommendations concerning the *Specification of primary, secondary and higher order digital multiplex equipment* , Vol. III, Rec. G.731 to G.755.

[11] CCITT Recommendation *Transmission impairments* , Vol. III, Rec. G.113.

[12] CCITT Recommendation *International telephone routing plan* , Vol. II, Rec. E.171.

[13] CCITT Recommendation *Digital hierarchy bit rates* , Vol. III, Rec. G.702.

[14] CCITT Recommendation *Numbering of channels in data transmission systems* , Vol. IV, Rec. M.1320.

[15] CCITT Recommendation *Timing requirements at the outputs of reference clocks and network nodes suitable for plesiochronous operation of international digital links* , Vol. III, Rec. G.811.

Recommendation M.160

STABILITY OF TRANSMISSION

1 Variation of circuit overall loss with time

1.1 The objective is that the following values should not be exceeded:

1.1.1 difference between the mean value and the nominal value of the overall transmission loss:

0.5 dB for all circuits,

1.1.2 standard deviation about the mean value of the variation of the overall transmission loss:

1.0 dB for all circuits.

However, in the case of circuits which are set up, wholly or in part, on older type equipment, and which are composed of two or more circuit sections, a standard deviation not exceeding 1.5 dB may be admitted.

1.2 The method for achieving the above objective values is left to the discretion of Administrations (better maintenance, fitting of automatic regulators, etc.).

2 Variation of pilot levels with time on group, supergroup, etc. links

2.1 The objective is that the following values of M and S should be met, where M represents the mean deviation of the pilot level from its nominal value and S represents the standard deviation of the variations of the pilot level:

2.2 conditions concerning through-connection points of group, supergroup, etc. links:

Recommendation G.214 [4] also concerns the subject of the stability of transmission.
See [1] concerning questions of statistical theory.

|| 0.5 dB, S 1.3 dB

2.3 conditions concerning the receiving end:

2.3.1 group links:

|| 0.3 dB, S 0.6 dB

2.3.2 supergroup links:

|| 0.3 dB, S 0.5 dB

2.3.3 mastergroup links:

| | 0.3 dB, S 0.4 dB

2.3.4 supermastergroup links:

| | 0.3 dB, S 0.3 dB.

3 Practical application of limits

The assumption is made that the limits set out in §§ 1 and 2 above for the variation with time of:

— the loss of each individual circuit, or

— the level of each individual group, supergroup, etc. pilot,

may be used as limits for the results of measurements made on a set of circuits, groups, supergroups, etc. at a given time. Experience indicates that such a use has a practical validity and hence Administrations are encouraged to use this Recommendation as giving currently practical limits for sets of circuits, groups, supergroups, etc. This does not preclude the application of these limits to single circuits, groups, supergroups, etc.

4 Reline-up of circuits, groups, supergroups, etc.

When a circuit, group, supergroup, etc., has its routing or composition permanently changed over part or all of its length, it is essential to ensure that a complete line-up of the circuit, group, etc., is made in accordance with the relevant line-up Recommendations since the rerouting constitutes a re-establishment of the circuit, group, etc.

This procedure is necessary in order to maintain the transmission performance and stability of the network. The pressing needs of the operating services should not be allowed to prevent these measurements from being properly carried out, since this could only result in a degradation of the stability and performance of the circuits in the network. Under all circumstances the circuit control station should be kept advised.

5 Basic factors for transmission stability

The CCITT recommends that the following basic factors should be taken into account for achieving a stable network:

5.1 *Staff training*

The importance of this factor cannot be overemphasized.

The staff should understand why level variations are to be kept to a low value and should be made fully aware of the results of incorrect adjustments. It is important that adjustments should be made only when absolutely necessary and an adjustment should never be made to cover up a fault.

The staff must realize the possible effects of a brief interruption on any type of circuit.

5.2 *Design of installations*

Installations should be such that sudden interruptions are avoided. For example, this may be achieved by:

a) the arrangement of transmission equipment to facilitate maintenance, patching out, the replacement of subassemblies;

b) the design of carrier generators with a view to great reliability;

c) the design of power supplies; attention is particularly drawn to the importance of the judicious choice and grading of protective devices (fuses, circuit-breakers) in the power feeds to repeater station racks.

Note — See in this connection Recommendation G.231 [2].

5.3 *Care in the organization of work in international exchanges, repeater stations, and on the transmission lines, cables and systems used in the international network*

Experience has shown that operations carried out on exchange and repeater station equipment and on the external plants (underground cables, etc.) are a major cause of attenuation and phase variations and of interruptions to service in the international network.

All work liable to cause interference should therefore be carried out, when possible, at times of light traffic. It must be recognized that for very long routes it will become increasingly difficult to find suitable periods of light traffic, bearing in mind the time differences which will exist between the terminal countries on such routes. This will require good coordination and cooperation between Administrations. In particular, the control stations should be consulted well in advance (see Recommendation M.490).

5.4 *Care in the organization of maintenance*

The same reasons for transferring working operations to times of light traffic apply to maintenance operations.

It is desirable to avoid all equipment changeovers which are not absolutely necessary.

It is also desirable to guard against maintenance operations which appear harmless but which may, however, result in short interruptions and which are all the more dangerous if they affect common units (e.g. changeover of master oscillators).

5.5 *Power supplies*

5.5.1 Too frequent changeover of power supplies for routine maintenance must be avoided. It should be possible to make partial tests to check that the standby motor-generator starts, without changing over the power supplies.

5.5.2 The instruction or training of staff during the day on working power supplies should be forbidden.

5.5.3 Changeover of power supplies should be carried out at times of light traffic and as far as possible at night.

5.5.4 To ensure that circuits in the international network are not interrupted owing to the failure of public power supplies, repeater stations in the international network should have power-continuity arrangements which ensure that the transmission equipment continues to operate, *without any interruption* , in the event of a failure of the public power supply.

5.6 *Care in the testing of new equipment*

Equipment should not be put into service until after the most thorough inspection. It is necessary to ensure that the pressing needs of the operating services do not result in these tests being omitted or hastily done.

Where the urgent requirements of the operating services resulted in equipment being put into service before it had been sufficiently tested, the equipment should be temporarily taken out of service and a thorough inspection made as soon as possible.

5.7 *Vibration testing*

Vibration tests, using the principles described in [3], help in improving transmission stability and in ensuring satisfactory operation of transmission equipment. They should be made, wherever applicable, when new equipment is put into service, under special circumstances for fault locating purposes or even as a routine measure for preventive maintenance, if the Administration concerned deems it necessary.

5.8 *Automatic regulation by pilots (group pilots, supergroup pilots, etc.)*

In carrier systems, the presence of pilots (line pilots, group pilots, supergroup pilots, etc.) makes it possible to supervise transmission, to keep track of short-duration phenomena where necessary and to give the alarm if there are large variations in level.

Regulation by pilots and the way such regulation (manual or automatic) is carried out has a decisive effect on transmission stability. In addition to regulation by line pilots, with which wideband transmission systems are normally equipped, it may be necessary to regulate the group links themselves (group links, supergroup links, etc.), both to achieve adequate stability for the circuits formed from the groups and to reduce system overloading risks due to the existence of unduly high line levels.

Automatic regulation of links is a convenient means to meet the requirements for the values of M and S of the pilot levels as stated under § 2 above. Therefore, automatic regulators should be fitted into a link when these limits cannot be achieved by other means.

However, when setting up a link the need for fitting automatic regulators cannot be determined solely by these requirements. It is also necessary to take practical considerations into account such as those given in the Annex to this Recommendation.

In the case of through-connection points of group, supergroup, etc. links, the insertion of automatic regulators prevents overloading of sections further down the line. If a link is through-connected several times and several regulators have to be inserted for the same direction of transmission to meet the conditions of § 2.2 above, the first insertion should be made at the first through-connection point requiring regulation in that direction of transmission. A regulator should be inserted at the through-connection point nearest the frontier (in the outgoing direction) when there are one or more other through-connection points before this point on the same link. This is to ensure that the level of the signals entering the next country is kept within the prescribed limits.

ANNEX A

(to Recommendation M.160)

Practical aspects to be considered

when determining the need for regulators

When setting up a link the need for fitting regulators cannot be determined solely by the requirements of § 2 above of this Recommendation. It is necessary to take the following practical considerations into account.

A.1 In order to establish that a link meets the stability requirements of this Recommendation it is either necessary to conduct long-term tests at the time of setting up the link or to accept measurements made on similar links, that is, to predict the performance.

If the former method is adopted, then, in the case of a link passing in transit through the territory of a third Administration it is probable that transit charges will apply from the date the link is set up. In any event, the cooperation of the distant terminal Administration will be required and this may not be readily forthcoming.

If the latter method is adopted and the stability requirements are not met, then the problem will arise of taking the link out of service to fit a regulator and to reline the link. This could entail a substantial loss of revenue and will require distant end cooperation.

A.2 It is unusual for a supergroup to be provided with all five groups allocated from the outset and it cannot be assumed that these groups will end at the same point as the supergroup. In any case, if a group that ends at the same point is changed to a through-group, then, unless a supergroup regulator has already been fitted, it may be necessary to interrupt service to fit a regulator and reline the supergroup link.

A.3 Consideration also has to be given to the restoration requirements when deciding to fit regulators to supergroup links. Lack of such regulators may seriously hamper restoration arrangements.

A.4 Frequent rearrangements occur on international routes and are outside the control of the distant Administration.

References

[1] CCITT Supplement *Statistical theory requirements* , Green Book, Vol. IV.2, Supplement No. 1.6, ITU, Geneva, 1973.

[2] CCITT Recommendation *Arrangement of carrier equipment* , Vol. III, Rec. G.231.

[3] CCITT Supplement *Vibration testing* , Green Book, Vol. IV.2, Supplement No. 2.9, ITU, Geneva, 1973.

[4] CCITT Recommendation *Line stability of cable systems* , Vol. III, Rec. G.214.

Recommendation M.250

USE OF CCITT MAN-MACHINE LANGUAGE (MML) FOR MAINTENANCE

1 MML as an instrument of maintenance

1.1 *Introduction*

This Recommendation provides an introduction to the subject of MML as an instrument of maintenance.

MML is a stored program controlled (SPC) facility which can operate only within a computer controlled environment. When considering international telephone system maintenance this will generally mean an SPC controlled exchange or network.

MML is the medium used by the operations and maintenance staff to communicate with the exchange control processor and vice versa

The purposes of this Recommendation are to:

— bring to the attention of the user the range of functions and facilities offered by MML in the field of maintenance;

— identify the full range of MML functions and facilities provided to deal with maintenance;

— define a standard terminology to describe the conditions that can exist within an SPC network.

The objectives, tests and measurements for the maintenance of circuits between exchanges, remain as described in all relevant Series M Recommendations. This Recommendation does not seek to supplant existing

Recommendations nor to provide alternative methods or values for maintenance but to give guidance on how the use of MML might be applied to existing standards and procedures.

1.2 *Definition of MML functions*

MML functions are those system functions which provide the MML user with the means of control of system functions by MML. The word ‘‘control’’ is assumed to include all types of inputs and outputs.

Any MML function can be subdivided into a general part which relates to items such as the syntax check, information transmission control, etc., and an application part which relates to the job in hand.

The relationship between actual jobs to be performed, MML functions and system functions is shown in Figure 1/M.250.

Figure 1/M.250, p.

The structure, syntax and semantics of MML are fully described in the Series Z Recommendations published in Volume VI. Recommendation Z.311 describes the basis of the CCITT man-machine language and its fields of application. It also identifies the content of the other Series Z Recommendations all of which are addressed to the implementors of such languages rather than to the users.

1.3 Although the purpose of this Recommendation is to cover the whole maintenance field, the following paragraphs deal only with maintenance of circuits between exchanges. The rest is for further study.

2 List of system functions associated with the maintenance of circuits between exchanges

Table 1/M.250 presents a list of functions associated with the maintenance of circuits between exchanges which are considered to be controllable by means of MML.

H.T. [T1.250]
TABLE 1/M.250
List of system functions

1 Tests/measurements of one circuit or a group of circuits and associated equipments }	{
2 Observation and supervision of circuits and associated equipments between exchanges }	{
3 Control of the status of a circuit or a group of circuits and associated equipments }	{
4	Analysis of maintenance data
5 Administration and control of maintenance reports }	{

Table [T1.250], p.

The broad categories of system function shown in Table 1/M.250 relate to the activities engaged in by all Administrations with a responsibility for the maintenance of circuits interconnecting exchanges. The application of these activities will vary between Administrations as will the proportion of such activities that are performed by some degree of mechanization (partial or fully automatic).

System functions 4 and 5 may have such broad application that the extent of on-line and off-line treatment must be considered carefully by each Administration in relation to its requirements.

3 List of MML functions

Table 2/M.250 represents the list of MML functions necessary to control the system functions given in Table 1/M.250. The table presents the functions at their most basic level and does not necessarily represent the actual command structure of any real implementation of the man-machine language.

Each of the MML functions in the list could be implemented either by providing a separate and distinctive command, or several MML functions of the list could be implemented by means of a single command.

For example, in one implementation of MML, a single command CREATE, in which the object to be created will be defined as a parameter of the command (e.g. A MEASUREMENT), will perform internally precisely the same activities and functions as another implementation which provides a separate and distinctive command for the creation of each object (e.g. CREATE A MEASUREMENT). In this way the list of MML functions can be said to be system independent, as each function exists either implicitly or explicitly regardless of the methods of implementation chosen for particular systems.

The list of MML functions shown in Table 2/M.250 have a wider application than the maintenance of circuits between exchanges. Many of the functions identified are common to a wide range of maintenance and operational requirements, and the contents of the table should be considered whenever changes to the maintenance strategy and procedures are necessitated by the introduction or extension of MML in the maintenance field.

4 Terminology

The MML terminology to be used for maintenance is a subject for further study.

Note — Recommendation Z.341, Glossary of terms (for the man-machine language), suggests that a function may be considered as an ''action upon an object'', e.g. create a routine test. Actions e.g. ''CREATE'' are defined in the Appendix I to Recommendation Z.333 which describes the methodology for the specification of a man-machine interface. Objects and their modifiers, e.g. routine test, are the subject of further study.

H.T. [T2.250]
TABLE 2/M.250
List of MML functions

1.1	Create a routine test
1.2	Create a routine measurement
1.3	Create a test set
1.4	Create a measurement set
1.5	Create a list of circuits
1.6	Create a time data list
1.7	Create an output media list
1.8	Delete a test set
1.9	Delete a measurement set
1.10	Delete a list of circuits
1.11	Delete a time data list
1.12	Delete an output media list
1.13	Interrogate a test
1.14	Interrogate a test set
1.15	Interrogate a measurement
1.16	Interrogate a measurement set
1.17	{ Interrogate a list of circuits }
1.18	Interrogate a time data list
1.19	{ Interrogate an output media list }
1.20	Activate a routine test
1.21	{ Activate a routine measurement }
1.22	Activate an on-demand test
1.23	{ Activate an on-demand measurement }
1.24	Deactivate a routine test
1.25	{ Deactivate a routine measurement }
1.26	{ Output the results of a routine test }
1.27	{ Output the results of a routine measurement }
2.1	{ Interrogate the status of a circuit(s) and/or associated equipment(s) }
2.2	{ Input trouble or restoral report }
3.1	{ Remove a circuit (or group of circuits) }
3.2	{ Restore a circuit (or group of circuits) }
4.1	{ Activate maintenance analysis functions }
4.2	{ Deactivate maintenance analysis functions }
4.3	Change analysis thresholds
4.4	Change analysis groups
4.5	{

Interrogate analysis thresholds } 4.6	Interrogate analysis groups
4.7	{
Allow, inhibit, initialize a threshold } 5.1	{
Sort trouble or restoral reports } 5.2	Move reports to other files
5.3	Browse report files
5.4	Create summary reports
5.5	Activate a report on demand
5.6	Activate a report on routine
5.7	{
Deactivate a report on routine } 5.8	Change report classification
5.9	Output summary reports
5.10	Route output of reports

Table [2.250], p.