All drawings appearing in this Fascicle have been done in Autocad.

Recommendation Q.710

SIMPLIFIED MTP VERSION FOR SMALL SYSTEMS

1 Field of application

1.1 This Recommendation is applicable for systems using a simplified MTP version to interface to the public network(s).

1.2 The MTP functions specified in § 3 of this Recommendation may be applied in general for small systems, e.g., PABX's, remote concentrators, etc., interfacing with the message transfer part described in Recommendations Q.702, Q.703, Q.704 and Q.707.

1.3 The Recommendation applies only for digital access arrangements.

1.3.1 In case one channel carries signalling information for more than one multiplex system, at least one additional channel should be pre—assigned as a stand—by signalling link in a multiplex system other than that which contains the active channel. This allows the changeover and changeback procedures specified in §§ 3.4.4 and 3.4.5 to be performed.

1.3.2 The stand—by channel(s) should not be used as B—channel(s).

1.4 Only the associated mode of signalling is applicable.

1.5 A variety of information types may be supported by the signalling system, e.g., relating to circuit switched call control and packet communication.

2 Functional content

The functional requirements are as follows:

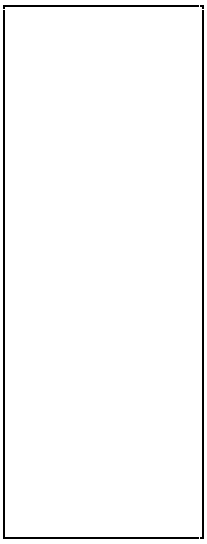
2.1 The network call control functions are as specified in Recommendation Q.930 (I.451).

Note — Different network layer protocols (circuit switching and packet switching) may be supported by using the protocol discriminator included in Recommendation Q.930. As an alternative, different network layer entities may access the interface functions directly. In that case, the interface functions will use separate service indicator codes to discriminate the applicable network layer entity. This will be similar to the use of SAPI specified in Recommendation Q.920. Which principle to be applied is determined by the Administration/RPOA.

2.2 The minimum set of Message Transfer Part functions are specified in Recommendations Q.702, Q.703, Q.704 and Q.707, with the qualifications specified in § 3 of this Recommendation.

2.3 The additional interface functions required for the proper operation of the D—channel call control functions in combination with the message transfer part functions, are specified in § 4 of this Recommendation (see Figure 1/Q.710).

Figure 1/Q.710 - CCITT 72960



3 Message Transfer Part (MTP) functions

3.1 *General*

The MTP functions as specified in Recommendations Q.702, Q.703, Q.704 and Q.707 are applicable. However, the following exceptions and modifications to those Recommendations may be applied for the PABX system, see §§ 3.2—3.4.

In order to prevent fraudulent use of the signalling network, it has to be ensured that no signalling messages generated by a PABX can be routed further than the public exchange to which the PABX has access. The manner in which this is made may be dependent on national circumstances and system implementations. An example of how such a function could be implemented is given in § 3.5.

3.2 *Level 1* (Recommendation Q.702)

Only digital signalling data links are relevant. Recommendation Q.702, § 6, is not applicable.

3.3 *Level 2* (Recommendation Q.703)

3.3.1 *Initial alignment procedure* (Recommendation Q.703, § 7)

In the initial alignment procedure specified in Recommendation Q.703, § 7, only the emergency proving is applicable. Thus, in states “aligned” and “proving” of the initial alignment procedure status indication “N” is not sent.

3.3.2 *Processor outage* (Recommendation Q.703, § 8)

The processor outage function specified in Recommendation Q.703, § 8, is not applicable.

When the level 2 function receives an indication that a processor outage situation exists at the remote and (through the reception of status signal units indicating processor outage), it transmits status signal units indicating “out of service”.

3.3.3 *Flow control* (Recommendation Q.703, § 9)

The sending of the link status indication “B” from the PABX is not applicable.

When the level 2 function of the PABX receives the link status indication “B”, no action is taken by the PABX.

3.4 *Level 3* (Recommendation Q.704)

3.4.1 *Routing label* (Recommendation Q.704, § 2.2)

The signalling link selection (SLS) field defined in § 2.2.4 is always coded 0000.

3.4.2 *Message routing function* (Recommendation Q.704, § 2.3)

The load sharing function between link sets and within a link set defined in § 2.3.2 is not applicable.

3.4.3 *Message discrimination* (Recommendation Q.704, § 2.4)

The discrimination function defined in § 2.4.1 is not applicable.

3.4.4 *Changeover* (Recommendation Q.704, § 5)

Changeover between link sets is not applicable.

Initiation of changeover at the reception of a changeover order from the remote end of a link is not applicable (c.f. Recommendation Q.704, § 3.2.2).

The buffer updating procedure defined in § 5.4 is not applicable.

At reception of a changeover order (or emergency changeover order) an emergency changeover acknowledgement is sent in response.

The message retrieval procedure defined in § 5.5 is not applicable.

Diversion of traffic is performed at expiry of a time—out T1 (c.f. Recommendation Q.704, § 16.8) is started when the changeover is initiated.

3.4.5 *Changeback* (Recommendation Q.704, § 6)

Changeback between link sets is not applicable.

The sequence control procedure defined in § 6.3 is not applicable. At reception of a changeback declaration, a changeback acknowledgement is sent in response.

For the purpose of ensuring message sequence integrity, the time controlled diversion procedure specified in § 6.4 is used.

3.4.6 *Forced rerouting* (Recommendation Q.704, § 7)

Forced rerouting is not applicable.

3.4.7 *Controlled rerouting* (Recommendation Q.704, § 8)

Controlled rerouting is not applicable.

3.4.8 *Signalling point restart* (Recommendation Q.704, § 9)

Signalling point restart is not applicable.

3.4.9 *Management inhibiting* (Recommendation Q.704, § 10)

Management inhibiting is not applicable.

3.4.10 *Signalling traffic flow control* (Recommendation Q.704, § 11)

Signalling route set congestion (Recommendation Q.704, § 11.2.3) is not applicable.

MTP User flow control (Recommendation Q.704, § 11.2.7) is not applicable.

3.4.11 *Signalling link management* (Recommendation Q.704, § 12.2)

Only basic link management procedures are applicable.

3.4.12 *Link set activation* (Recommendation Q.704, § 12.2.4)

Link set normal activation defined in § 12.2.4.1 is not applicable.

Link set emergency restart is used in all cases.

3.4.13 *Transfer prohibited* (Recommendation Q.704, § 13.2)

The transfer prohibited function is not applicable. At the reception of a TFP message, no action should be taken.

3.4.14 *Transfer allowed* (Recommendation Q.704, § 13.3)

The transfer allowed function is not applicable. At the reception of a TFA—message, no action should be taken.

3.4.15 *Transfer restricted* (Recommendation Q.704, § 13.4)

The transfer restricted function is not applicable for the PABX. At the reception of the TFR message no action is taken by the PABX.

3.4.16 *Signalling—route—set—test* (Recommendation Q.704, § 13.5)

The signalling—route—set—test procedure is not applicable.

3.4.17 *Transfer controlled* (Recommendation Q.704, §§ 13.7, 13.8)

The transfer controlled function is not applicable for the PABX. At the reception of the TFC message, no action is taken by PABX.

3.4.18 *Signalling route—set—congestion—test* (Recommendation Q.704, § 13.9)

The signalling route—set—congestion—test function is not applicable for the PABX.

At the reception of signalling—route—set—congestion—test message no action is taken by the PABX.

3.4.19 *Signalling link test* (Recommendation Q.707, § 2.2)

The ability to respond to a signalling link test message with a signalling link test acknowledge message must always be provided by the PABX.

3.5 *Example of "Screening Function"*

Note — This paragraph is provided for illustration purposes only.

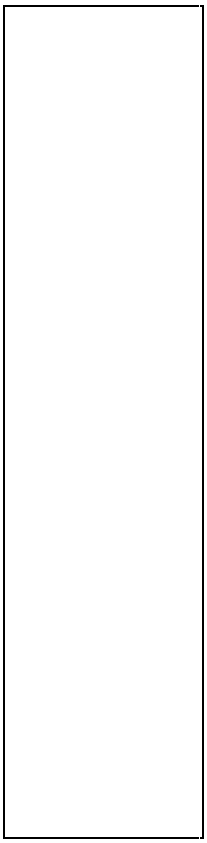
At an exchange (which has the capability of acting as an STP) each message received on a PABX access link is passed through a "screening function" that checks that the DPC of the message is the same as the SP code of the exchange. If that is the case, the message is sent to the normal MTP message handling functions. Otherwise, the message is discarded.

4 Interface functions

4.1 *General*

The task of the interface functions is to provide the layer—to—layer interfaces according to what is specified in Recommendations Q.920, Q.930 on the one hand and in Recommendation Q.704 on the other, see the Figure 2/Q.710. This will include some conversion functions which are specified in § 4.4.

Figure 2/Q.710 - CCITT 72970



4.2 *Interactions with the network layer entity (Q.930)*

The layer—to—layer interactions between the network layer and the data link layer of the D—channel protocol are specified in Recommendation Q.920, § 4. The interactions are specified in the form of primitives. The primitive applicable for the primary rate interface structure are:

DL—DATA—REQUEST/INDICATION

The DL—DATA—REQUEST primitive is used to request that a network layer message unit be sent. The DL—DATA—INDICATION indicates the arrival of a message unit.

4.3 *Interactions with the message transfer part*

The layer—to—layer interactions between the MTP and the User Parts of Signalling System No. 7 are specified in Recommendations Q.701 and Q.704, Figures 23/Q.704 and 27/Q.704.

The following primitives are used:

a) MTP—TRANSFER (see Recommendation Q.701, § 8.1),

b) MTP—PAUSE (see Recommendation Q.701, § 8.2),

c) MTP—RESUME (see Recommendation Q.701, § 8.3).

4.4 *Conversion functions*

The Table 1/Q.710 shows the association between the D—channel primitives and the Signalling System No. 7 interactions.

TABLE 1/Q.710

	D—channel	SS No. 7
Information transfer	DL—DATA	MTP—TRANSFER
Flow control	— —	MTP—PAUSE (STOP) MTP—RESUME (START)

4.4.1 *Information transfer*

When receiving a DL—DATA—REQUEST primitive from the network layer entity, the interface entity generates a MTP—TRANSFER Request primitive which contains:

— The message unit associated with the primitive.

— A label consisting of DPC, OPC and SLS. The label is generated by the interface entity on the basis of information regarding the destination of the message. The SLS is coded 0000.

Note — In some implementations where the label is not used for routing purposes, the entire label may be coded "all zeros".

— A service information octet (SIO) is generated by the interface entity in accordance with a predetermined rule and, as a national option, on the basis of priority information associated with the primitive. The NI is coded 10 or 11. The SI code is determined by the Administration or RPOA.

Note — In the case when the interface functions provide direct access to more than one network layer entity, the SI code will depend on the network layer entity to which the message is associated.

When receiving a MTP—TRANSFER Indication from the MTP, the interface entity sends a DL—DATA—INDICATION primitive to the network layer entity.

4.4.2 *Flow control*

When receiving a MTP—PAUSE indication from the MTP, the interface entity will generate a DL—PAUSE—INDICATION primitive to the network layer entity.

When receiving a MTP—RESUME indication from the MTP, the interface entity will generate a DL—RESUME—INDICATION primitive to the network layer entity.