INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

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TELEGRAPHY

TELEGRAPH TRANSMISSION

DUPLEX MULDEX CONCENTRATOR, CONNECTING A GROUP OF GENTEX AND TELEX SUBSCRIBERS TO A TELEGRAPH EXCHANGE BY ASSIGNING VIRTUAL CHANNELS TO TIME SLOTS OF A BIT-INTERLEAVED TDM SYSTEM

ITU-T Recommendation R.105

(Previously “CCITT Recommendation”)

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The 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 Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation R.105 was revised by the ITU-T Study Group IX (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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Recommendation R.105

DUPLEX MULDEX CONCENTRATOR, CONNECTING A GROUP OF GENTEX AND TELEX SUBSCRIBERS TO A TELEGRAPH EXCHANGE BY ASSIGNING VIRTUAL CHANNELS TO TIME SLOTS OF A BIT-INTERLEAVED TDM SYSTEM

(Malaga-Torremolinos, 1984; amended at Melbourne, 1988 and at Helsinki, 1993)

The CCITT,

considering

(a) that the specifications of code and speed dependent TDM muldexes are already given in Recommendation R.101;

(b) that code and speed dependent TDM muldexes can be successfully used for connecting a group of gentex and telex subscribers to an exchange;

(c) that a considerable increase in the efficiency of muldex channel utilization may be achieved by concentration, i.e. allocating time slots to subscribers only while they are operating;

(d) that the busy-hour load generated by gentex and telex subscribers averages from 0.05 to 0.2 erlang;

(e) that both the virtual and assigned (fixed) telegraph channels can be set up on the same aggregate channel using the TDM method,

unanimously declares the view

that, when a bit-interleaved TDM system is used on gentex and telex subscriber lines for concentrating telegraph signals by assigning virtual channels to time slots in the 2400 bit/s aggregate bit stream, the equipment should meet the following requirements:

1 Channel types

1.1 The duplex muldex/concentrator should ensure that virtual channels are only allocated time slots in the 2400 bit/s aggregate bit stream for the duration of their seizure.

1.2 The duplex muldex/concentrator should also ensure that assigned (fixed) channels are permanently allocated specific time slots in the 2400 bit/s aggregate bit stream.

1.3 Virtual channels should ensure the connection of gentex and telex subscribers operating at 50 bauds and using the International Telegraph Alphabet No. 2 (ITA2) code who have an average load of 0.05 to 0.2 erlang. The use of other rates requires further study.

1.4 Assigned (fixed) channels should ensure data and telegraph signal transmission in compliance with Recommendation R.101, alternative B.

2 System capacity

2.1 The duplex muldex/concentrator should ensure the setting-up of virtual and assigned channels in any combination within the range of the 2400 bit/s aggregate rate.

2.2 When a system has only virtual channels, the number of connected subscribers with an average load of 0.05 to 0.1 erlang each should not exceed 256 and with an average load of 0.1 to 0.2 erlang each should not exceed 128. In either case, the percentage value of the failures to connect is not more than 0.1%.

2.3 When a system has only assigned (fixed) channels, their number, depending on the types and rates of the channels, should comply with Recommendation R.101, alternative B.

3 Multiplexing system specifications

Multiplexing scheme, frame structure, frame synchronization, aggregate signal parameters, interfaces, telegraph signal parameters at input-output and telegraph signal delay time should conform to Recommendation R.101, alternative B.

4 Virtual channel parameters

4.1 Virtual channels are intended for use on the telex network subscriber section with type A and type B signalling (Recommendation U.1).

4.2 Seizure of virtual channels may be from either end. In order to decrease the probability of call collisions it is necessary:

- to perform blocking of the backward path immediately after the first calling signal stop element polarity appearing in a receiver vacant channel position;
- to establish the following order for seizure of time slots in the opposite muldexes;
- for a muldex installed at the exchange seizure should start with the first in a frame-free channel time slot while for the opposite muldex seizure begins with the last free channel time slot.

When encountering a call collision, a through-connection should be given to a call coming from the telegraph exchange, and a busy signal should be sent to the calling subscriber.

4.3 *In the initial state*, a virtual channel should be free and a start polarity should be transmitted over it between statistical muldex/concentrator assemblies.

4.4 *When a call arrives*, i.e. stop polarity with an interval of more than 150 ms, either from the subscriber side or from the exchange side, a virtual channel should be seized, and a stop polarity having a duration of 140-160 ms should be transmitted over it to the remote side followed by the transmission of two start-stop characters having a length of 8 units each in accordance with Figure 1.

The signal elements indicated as 1 to 8 are used for the transmission of an 8-digit conventional number indicating which subscriber (maximum $2^8 = 256$; see also 2.2 above) is/should be connected to the equipment.

4.5 For error protection of a conventional number, transmitted over a channel, the following should be carried out:

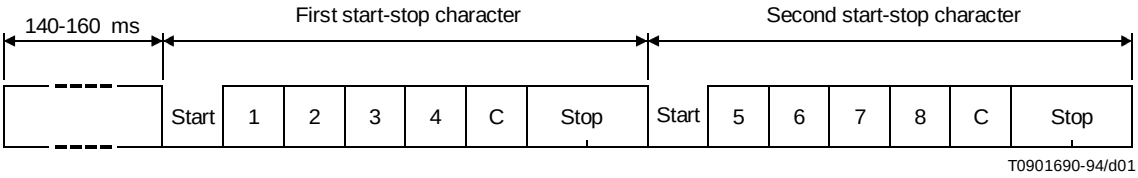
- a parity check;
- a check for anticoincidence of a convention number with any of the numbers of a circuit already seized.

In the case of an error or coincidence of a conventional number a service signal (a busy pulse signal or “OCC”) should be transmitted to the connection initiator side (a customer or exchange), returning a customer or exchange to initial state.

4.6 The element “C” of the second start-stop character (see Figure 1) is used for parity check.

A parity check element should correspond to the even number of elements in Z condition.

Element “C” of the first start-stop character remains vacant and may be used for service purposes.



NOTE – Unit No. 1 of the code is the least significant; unit No. 8 of fhe code is the most significant.

FIGURE 1/R.105

Structure for transmission of the conventional number in the virtual channel

4.7 When the setting up of a virtual channel fails because all time slots are engaged by other virtual or assigned (fixed) channels, a busy signal, the structure of which is specified by current CCITT Recommendations should be returned to the calling subscriber side.

5 Link performance and availability indicators

A system must be provided for monitoring performance and availability in accordance with Recommendation R.118.