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SERIES Q: SWITCHING AND SIGNALLING

International automatic and semi-automatic working –
Signalling for circuit multiplication equipment

Signalling between Circuit Multiplication Equipment (CME) and International Switching Centres (ISC)

ITU-T Recommendation Q.50

(Formerly CCITT Recommendation)

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ITU-T Recommendation Q.50

Signalling between circuit multiplication equipment (CME) and international switching centres (ISC)

Summary

This Recommendation contains the Signalling Interface between a International Switching Centre (ISC) and Circuit Multiplication Equipment.

Source

ITU-T Recommendation Q.50 was revised by ITU-T Study Group 11 (2001-2004) and approved under the WTSA Resolution 1 procedure on 13 July 2001.

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.

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ITU-T Recommendation Q.50

Signalling between Circuit Multiplication Equipment (CME) and International Switching Centres (ISC)

1 Introduction

This Recommendation contains principles and examples of signalling between the International Switching Centre (ISC) (exchanges) (see Note) and their associated circuit multiplication equipments.

Circuit multiplication equipments may have integral echo control and A/μ law converter functions. The information in this Recommendation is compatible with the control procedures for such devices.

NOTE – As Circuit Multiplication Equipment may also be used in national networks, the signalling described here could not only be used in International Switching Centres but also in national exchanges.

2 References

2.1 Normative 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.

- [1] ITU-T G.703 (1998), *Physical/Electrical characteristics of hierarchical digital interfaces*.
- [2] ITU-T G.704 (1998), *Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels*.
- [3] ITU-T Q.33 (1988), *Protection against the effects of faulty transmission on groups of circuits* (Fascicle VI.I of *Blue Book*).

2.2 Bibliography

The documents listed in this clause provide informative background information for the reader and are not normative within this Recommendation.

- ITU-T G.763 (1998), *Digital circuit multiplication equipment using G.726 ADPCM and digital speech interpolation*.
- ITU-T G.767 (1998), *Digital circuit multiplication equipment using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation*.

3 Definitions relating to Circuit Multiplication Equipment

For a complete description of additional definitions see ITU-T G.763.

3.1 digital circuit multiplication equipment (DCME) and circuit multiplication equipment (CME): DCME and Circuit Multiplication Equipment constitute a general class of equipment which permits concentration of a number of trunks on a reduced number of transmission channels. DCME in particular permits concentration of a number of 64 kbit/s PCM encoded trunks on a reduced number of digital transmission channels.

3.2 speech interpolation; digital speech interpolation (DSI): A method of profiting from the time instants when a speaker is not active, which is indicated by a speech detector. The channel is then used by another active connection. The signals carried by a transmission channel therefore represent interleaved bursts of speech signals derived from a number of different trunks.

3.3 low rate encoding (LRE): Speech coding methods with bit rates less than 64 kbit/s, e.g. the 32 kbit/s transcoding process defined in ITU-T G.721 applied to speech coded according to ITU-T G.711.

3.4 speech activity: The ratio of the time speech and corresponding hangover occupies the trunk to the total measuring time, averaged over the total number of trunks carrying speech.

3.5 circuit multiplication equipment gain: The trunk channel to transmission channel multiplication ratio, which is achieved through application of Circuit Multiplication Equipment, including LRE and/or speech interpolation (DSI) (see Figure 1).

3.6 trunk: A bidirectional connection consisting of a forward channel and a backward channel between the International Switching Centre and Circuit Multiplication Equipment not subject to LRE or DSI operation.

3.7 transmission channel; bearer channel: One channel of the connection between the transmit unit and receive unit of corresponding Circuit Multiplication Equipment.

3.8 freeze-out: The temporary condition when a trunk channel becomes active and cannot immediately be assigned to a transmission channel, due to lack of available transmission capacity.

3.9 freeze-out fraction: The ratio of the sum of the individual channel freeze-outs to the sum of the active signals and their corresponding hangover times and front end delays, for all trunk channels over a fixed interval of time, e.g. one minute.

3.10 transmission overload: The condition when the freeze-out fraction or average bits per sample goes beyond the value set in accordance with speech quality requirements.

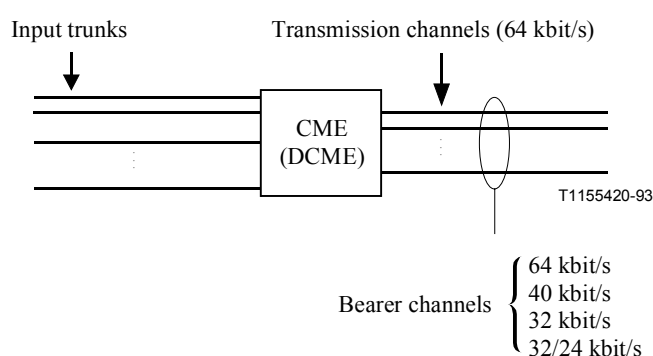


Figure 1/Q.50 – Circuit Multiplication Equipment gain

Operating modes

3.11 Point-to-point mode (see diagrams a) and b) of Figure 2)

Using diagram a) of Figure 2 for reference, the transmit side Circuit Multiplication Equipment concentrates N trunks into N/G transmission channels, where G is the Circuit Multiplication Equipment gain.

At the receive side, the receiving Circuit Multiplication Equipment simply reconstitutes the N trunks from the N/G transmission channels.

The example in diagram b) of Figure 2 also shows a point-to-point mode. From the switching point of view there could be a difference between the configurations in diagrams a) and b) of Figure 2.

For transmission of alarms it has also to be considered that different exchanges may be connected to one Circuit Multiplication Equipment.

3.12 Multi-clique mode (see Figure 3)

In this mode the pool of transmission channels is sub-divided into several independent pools (cliques) of fixed capacity, each destination specific. If a part of the cliques capacity is not used, it cannot be used for another destination (see Figure 3).

3.13 Multi-destination mode

A DCME operational mode where input trunk channel traffic is interpolated over a pool of available transmission channels for all destinations having traffic in the pool. The transmit trunk channels are designated to receive trunk channels at corresponding locations.

Figure 4 shows a unidirectional system block diagram for a multi-destination mode with two transmit and two receive DCME units.

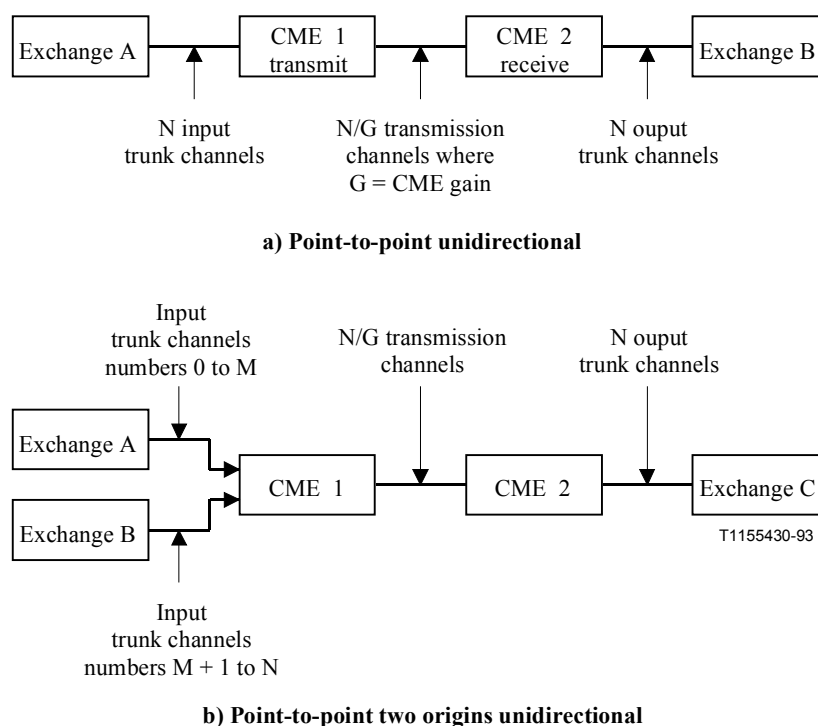


Figure 2/Q.50 – Multi-clique for two origins and two destinations unidirectional