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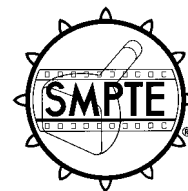
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Note:

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Tributary Interconnection for Digital Control Interface



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1 General

1.1 Scope

This practice describes the mechanism for the transfer of control messages between tributaries used within a general-purpose communications channel of an interface system which transports data and digital control signals between equipment utilized in the production, post-production, and/or transmission of visual and aural information.

It is intended that the mechanism described in this practice be utilized when transferring control messages between tributaries used as a part of an overall system. The tributaries may be located either within a local network or on separate local networks which are interconnected by means of gateways and an interconnection bus.

It is further intended that this mechanism, when used as part of an overall system, shall allow the interconnection of programmable and nonprogrammable equipment as required to configure an operational system with defined functions, and will allow rapid reconfiguration of a system to provide more than one defined function utilizing a given group of equipment.

1.1.1 The message transfer mechanism makes use of virtual circuits, linkage directories, and system service messages (defined below).

1.1.2 The primary intent of this practice is to define the mechanism enabling the transfer of messages between tributaries for the purpose of controlling equipment by external means.

1.2 Definitions

For the purposes of this practice, the following definitions shall apply:

1.2.1 virtual machine: A logical device consisting of a single device or a combination of devices that respond in essence or effect as a generic type of equipment; e.g., VTR, video switcher, telecine, etc.

1.2.2 virtual circuit: A transparent, unidirectional, logical communications connection between virtual machines. The communications path, in reality, passes through other levels and is propagated over a physical medium.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

CCITT Recommendation X.21, Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Synchronous Operation on Public Data Networks

CCITT Recommendation X.24, List of Definitions for Interchange Circuits Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) on Public Data Networks

CCITT Recommendation X.25, Interface Between Data Terminal Equipment (DTE) and Data Circuit-

Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit

CCITT Recommendation X.27, Electrical Characteristics for Balanced Double-Current Interchange Circuits for General Use with Integrated Circuit Equipment in the Field of Data Communications

ISO 4903:1989, Information Technology — Data Communication — 15-Pole DTE/DCE Interface Connector and Contact Number Assignments

ISO/IEC 3309:1993, Information Technology — Telecommunications and Information Exchange Between Systems — High-Level Data Link Control (HDLC) Procedures — Frame Structure

ISO 4335:1993, Information Technology — Telecommunications and Information Exchange Between Systems — High-Level Data Link Control (HDLC) Elements of Procedures

3 Interconnection within a local network

3.1 Message transfer

The mechanism for message transfer between tributaries is based broadly on the principles of communications layering and makes use of virtual circuits. This allows for the establishing of, and breaking down of, multiple links between the tributaries. System service messages perform this function.

A linkage directory is established within the bus controller for each working session. The directory is considered to be a system service feature and provides for the establishment of multiple virtual circuits through the network.

3.2 Linkage directory

The linkage directory shall establish a relationship between virtual machines; i.e., a virtual circuit. Establishment of the linkage directory shall be completed as the initial task in each working session. The linkage directory resident within the system service level of the bus controller binds message sources and destinations.

Linkage information may originate in any application level, and shall effect directory construction within the system service level of the bus controller. Linkage

messages are reserved messages within the system service subset of all message dialects; they establish and disconnect virtual circuits within the network.

The bus controller, on receipt of a transmission request from the supervisory level of any tributary, will identify the destination tributary by reference to the linkage directory; acting as an intermediary, it will forward the message as directed.

3.3 Multiplexing within tributaries

Tributaries, in general, have a single supervisory level address, and a single physical connection end point to the bus. Alternative multiplexing mechanisms, as described below, enable multiple virtual circuits to pass through any single connection end point.

3.3.1 Multiple, logically independent virtual machines, each with a unique supervisory level address, may be attached to the communications channel through a common connection end point. Multiplexing is then performed by multiple polling of the addressing entity residing within the supervisory level (see figure 1).

NOTE - It may be noted that any individual tributary address may achieve a higher priority — and hence an improved response time at the expense of that of the remaining tributaries — by being allocated more than one poll within each poll sequence.

3.3.2 Alternatively, a single supervisory level address may be multiplexed to multiple logically independent virtual machines with selection being performed by a logical switch residing within the entity of the destination tributary system service level (see figure 2).

The required virtual machine is selected from those associated with the single supervisory level address, by means of a system service virtual-machine-select message (see 4.4). This is transmitted from the bus controller under the direction of the linkage directory held within its system service level, to the destination tributary system service level, immediately prior to the transmission of any control message, or sequence of control messages, destined for that specific virtual machine.

The selected routing will remain in existence until receipt, by the system service level, of a new virtual-machine-select message thereby minimizing the message traffic on the communications channel.