TELEGRAPHIC TYPE SERVICES
STANDARD INTERFACE SPECIFICATIONS
SERIES 1000 CHANNELS

1. GENERAL

1.01 This section contains Bell System Standard Interface Specifications for:

A. 30-Baud Private Line Channels

B. 45-, 55- & 75-Baud Private Line Channels

C. 150-Baud Private Line Channels

1.02 The section provides descriptive information on the various 1000 series of telegraphic type channel services.

1.03 The series 1000 channels are defined in F.C.C. tariff 260 as:

Unconditioned channels capable of transmitting direct current mark-space or binary signals at rates up to 150 bauds. These channels are not suitable for the transmission of alternating current tones. These channels are furnished for half-duplex or duplex operation on a two-point or multi-point basis for a minimum period of one month except as otherwise specified. The transmission characteristics and various types of services furnished within this series are as follows:

(1) Type 1001—Transmission up to 30 bauds for remote metering, supervisory control, and miscellaneous signaling purposes.

(2) Type 1002—Transmission up to 55 bauds for teletypewriter, teletypesetter, data or remote metering, supervisory control and miscellaneous signaling purposes, or transmission up to 45 bauds for morse.

(3) Type 1003—Transmission up to 55 bauds for remote operation of radiotelegraph.

(4) Type 1004—Transmission up to 45 bauds for foreign exchange teletypewriter.

(5) Type 1005—Transmission up to 75 bauds for teletypewriter, teletypesetter, data or remote metering, supervisory control, and miscellaneous signaling purposes.

(6) Type 1006—Transmission up to 150 bauds for teletypewriter, foreign exchange teletypewriter, data or remote metering, supervisory control, and miscellaneous signaling purposes.

1.04 This information is provided to customers and outside manufacturers to aid them in the design of their equipment.

1.05 The term "Baud" is a unit of signaling speed derived from the duration of the shortest signaling element. The signaling speed in Bauds is equal to the reciprocal of the shortest element length in seconds to be transmitted.

1.06 The following appendices to this practice contain the specific information on the channels.

Appendix 1—30-Baud Private Line Channels

Appendix 2—45-, 55- and 75-Baud Private Line Channels

Appendix 3—150-Baud Private Line Channels

4. TRANSMISSION CHARACTERISTICS OF CHANNEL

CHANNEL DISTORTION—DEFINITION

4.01 The 45-, 55- and 75-Baud Channels are normally lined-up and maintained by the Telephone Company using "start-stop" telegraph characters as a source of test signals. These characters will generally be transmitted at the highest rated speed of the channel ordered. The exception to this is where the configuration of a channel requires a regenerative repeater (see Paragraph 4.02) and thus must be tested using a precise speed and code format. The received signals will be measured in terms of "telegraph distortion."

The start-stop character used is composed of several elements: a single-unit "start" element which is a space; five, single-unit information elements, which may be mark or space; and a "stop" element which is a mark, and is one unit or longer in length. A typical 5-level character is illustrated in Figure 2.

Telegraph distortion is the measure of the maximum displacement of any mark-to-space or any space-to-mark transition from its ideal instant. The reference point used when measuring telegraph distortion is the initial mark-to-space transition of each character which occurs at the beginning of each "start" element. The slicing level for all measurements is at the 50% point on the rising or falling current waveforms.

Referring to Figure 2, transitions measured at the slicing level should occur at integral multiplex of t_e for no distortion. If a transition occurs at time Δ t earlier or later than this time, the distortion is:

$$\text{Percent Distortion} = \frac{\Delta t}{t_e} \times 100$$

For example, refer to Figure 2 and examine the distortion of information element No. 3 which is in the space condition. Assume the nominal element length t_e = 20 milliseconds and that Δt_2 = 2 milliseconds and that Δt_3 = 4 milliseconds.

$$\text{Peak Distortion Per Character} = \frac{\Delta t \text{ max.}}{t_e} \times 100 = 20\%$$

Thus, although the element is 30 percent shorter than its nominal length, its telegraph distortion by definition is 20 percent.

CHANNEL DISTORTION

4.02 The amount of inherent channel distortion encountered on 45-, 55- and 75-Baud channels is a function of the channel length and its complexity (number of transmission links in tandem between any two stations). If the CPT character code format and Baud rate is any one of those listed in Table B, the Telephone Company may place a regenerative repeater in the channel to insure that it will perform as specified in paragraph 4.03. For this reason, the Telephone Company will generally ask for the speed and code format used by the CPT. However, if the CPT uses the channel for transmitting other codes, variable length bits or character, or if the CPT uses it alternately at different signal rates and/or different character code formats, standard regenerative repeaters can not be provided and the inherent distortion of the channel is not specified.

TABLE B

COMMON DATA CHARACTER FORMATS

Start-Stop	
Start Element	— Unity length
	— Always "Space"
Information Elements	— 5, 6, 7, or 8 per character
	— Unity length
	— "Mark" or "Space"
Stop Element	— Unity or greater in length
	— Always "Mark"
Synchronous	
All Elements	— Unity length
	— "Mark" or "Space"

TABLE B (Cont'd)

COMMON DATA RATES

(0-75 Bauds)

45.55 Bauds

50.00 Bauds

56.85 Bauds

61.12 Bauds

66.67 Bauds

74.23 Bauds

75.00 Bauds

PERFORMANCE OBJECTIVES

4.03 The long term objectives of 45-, 55-, or 75-Baud channels is to have an average performance of 1 error in ◗10^5 bits◖ transmitted. The CPT should deliver no more than 8% telegraph distortion at the interface and should be capable of processing received data signals at the interface with up to 35% telegraph distortion. CPT's unable to meet these requirements may expect that special engineering and possible associated charges may be incurred.

TURN AROUND TIME—HALF DUPLEX OPERATION

4.04 The near-end or local turn around time of a half duplex 45-, 55- or 75-Baud channel (the required time interval for any Telephone Company supplied local transmission equipment to condition itself to reverse the direction of transmission) is essentially zero. However, the CPT should not be arranged to reverse its direction of transmission until it has received the entire nominal length "stop" pulse of the last received character in a message.

The far-end or distant turn around time of a half duplex channel (the time interval consisting of the two-way propogation time of the channel, delay through regenerative repeaters and directional control circuit operation in the transmission equipment) may be as high as 500 milliseconds. However, if far-end turn around time is critical to the CPT operating procedure, it is recommended that the specific case be discussed with the local Telephone Company representatives.

CHANNEL FAILURE INDICATION

4.05 No separate leads are brought out at the interface to indicate when a channel failure or interruption occurs. If the channel goes into a steady spacing condition (no current on the receive data leads), this indicates a channel failure and the CPT equipment may use this signal condition as a channel failure indication, if so desired. However, certain channel failure conditions may not cause steady spacing to occur on the receive data (RD) leads.