30-BAUD PRIVATE LINE CHANNELS

INTERFACE SPECIFICATION

1. GENERAL

INTRODUCTION

1.01 The purpose of this specification is to define the interface between the 30-Baud Private Line Channel and a Customer-Provided Terminal (CPT).

The 30-Baud Private Line Channel is capable of transmitting direct-current "markspace" or "binary" signals at rates up to 30-Bauds for metering, supervisory control, and miscellaneous signaling purposes. The 30-Baud channel may not be used for transmission of signal elements whose nominal duration is less than 33.3 milliseconds. Within the speed capability of the channel, transmission is code and speed insensitive. These channels are furnished for one-way operation on a two-wire basis, and for half-duplex (two-way, nonsimultaneous) operation or for full duplex (two-way, simultaneous) operation on a four-wire basis at the interface. Metallic continuity, end-to-end, however, is not a requirement of this channel and will generally not be available.

BACKGROUND AND PHILOSOPHY

1.02 The 30-Baud channel has evolved over the years primarily to meet the need for a low speed signaling channel with a contact closure input and output sufficient to drive electromechanical relays. Current rather than voltage is the significant parameter. The 62.5 mA mark, O mA space neutral current loop, is the arrangement most commonly available, but there is also some use of 20 mA mark signal levels to hold down the cost of providing the service. Therefore, it is suggested that CPT equipment using these channels be designed to work with either level of marking current; either directly or by a wiring option.

VARIATIONS FROM STANDARD ARRANGEMENTS

1.03 In low speed signaling systems where an arrangement, which is not compatible with this specification is required, or additional service features are desired, special arrangements must be made with the local Telephone Company representatives. In some of these systems it may be determined that either a tariff other than the 30-Baud Channel applies or a special contract with the Telephone Company is required. An example of such a special arrangement might be for an interface that is described in the Electronics Industries Association specification RS-232-B.

2. DESCRIPTION

PHYSICAL

2.01 Normally, a terminal block having 6-32 screws will be provided by the Telephone Company to serve as an interface between the 30-Baud Channel and the CPT. Figure 1 shows typical send-only, receive-only, half-duplex, and full-duplex interface arrangements.

The channel side of the interface terminal block will appear as one or two pair of wires connecting to the serving telephone office or to transmission equipment supplied by the Telephone Company and located on the customer's premises. The need for, and type of, transmission equipment will be determined by the Telephone Company. Space for this equipment shall be provided by the customer.

The CPT side of the interface should consist of one pair of wires connected to the input of the CPT and one pair of wires connected to the output of the CPT as shown in Figure 1.

POWER REQUIREMENTS

2.02 In systems where the Telephone Company provides transmission equipment at the interface, the customer must provide a source of continuous 117 volt, 60 Hz ac power from a nonswitched outlet. The equipment supplied by the Telephone Company will work properly over a voltage range of 105 to 129 volts and a frequency deviation of ± 0.45 Hz. The power receptable provided must accept a U-bladeground type plug and supply a valid ground to the ground pin. The power consumption will not exceed 70 watts per channel. Where transmission equipment is not provided, the customer does not need to provide any power for the 30-Baud Channel.

ENVIRONMENT

2.03 In systems where the Telephone Company provides transmission equipment at the interface, the ambient temperature should be in the range of 40° to 120°F and the relative humidity should be in the range of 20 percent to 95 percent.

3. INTERFACE ELECTRICAL CHARACTERISTICS

CHANNEL SIGNALS

3.01 The signals at the interface will be either 20 ± 1 milliamperes or 62.5 ± 2.5 milliamperes neutral signals (current—no current). The value of dc voltage selected by the Telephone Company to supply this current will vary depending on local conditions and the type of transmission equipment used. The tip (T) or ring (R) side of the send data (SD) terminals or receive data (RD) terminals may have a potential of 0 up to 135 volts dc to ground (positive or negative). From 24 volts up to 270 volts dc may exist across the SD terminals when the CPT send contact is open (station sending a space signal). Polarity is such that current flow through the CPT is from ring to tip; i.e., the ring side is positive with respect to tip. Identification of the terminals will be furnished by the Telephone Company who will also make the dc current adjustments.

INPUT OF THE CPT

3.02 The input (receive side) of the CPT should appear to the channel as a circuit having a fixed resistance of less than 150 ohms and an inductance of less than 0.5 Henry. (Non-inductive impedances are preferred as they cause less CPT send contact deterioration.) The receiving circuity should be isolated from ground (leakage at least 1.0 megohm) and should not impress foreign voltages in excess of 1/2 volt on the interface terminals.

OUTPUT OF THE CPT

3.03 The output (send side) from the CPT should appear as a set of contacts or their electrical equivalent (isolated from ground) capable of repeatedly making and breaking a nominal 62.5 milliamperes at up to 270 volts dc. When the contacts are "open," the resistance across the contacts should be at least one megohm and when closed, the contact resistance should be less than 5 ohms. Any device used to monitor the output of the CPT should not insert more than 150 ohms and less than 0.5 Henry inductance in series with the send contacts. (Relays having dry reed contacts have not proven satisfactory for this application.) If mechanical or mercury wetted contacts are used, it is recommended that a spark suppression network be provided in the CPT to reduce electrical circuit noise and prevent excessive contact erosion. Nominal values of the spark suppression circuit components should be a resistance of 470 to 1000 ohms in series with a capacitance of 0.1 microfarad.

4. TRANSMISSION CHARACTERISTICS OF CHANNEL

SIGNAL DISTORTION—TRANSITION DISPLACEMENT

4.01 For the purpose of this specification, transition displacement is defined as the time displacement of a mark-to-space or a space-to-mark transition from its ideal instant.

The random transition displacement, measured at the 50% point of the rising and falling waveform, caused by the channel normally will not exceed 10 milliseconds in either direction (early or late). The 10 millisecond value does not include any allowance for transition displacements introduced by a transmitting CPT. Figure 2 compares typical transmitted and received waveforms at the interface.

PROPAGATION TIME—ABSOLUTE DELAY

4.02 Signal propagation time will vary depending on the particular type and length of the line facilities and type of transmission equipment (if any) provided at the interface. It is expected that the one-way propagtion time will generally be less than 1/4 second.

Channel turnaround time, which is related to propagation time and is a function of the complexity and length of the channel, is not specified. If propagation time or turnaround time is an important factor in providing service, the local Telephone Company representative should be consulted for more exact information concerning a specific channel.

CHANNEL FAILURE

4.03 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 RD 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 a steady space to occur on the RD leads.

30 BAUD CHANNEL
INTERFACE ARRANGEMENTS

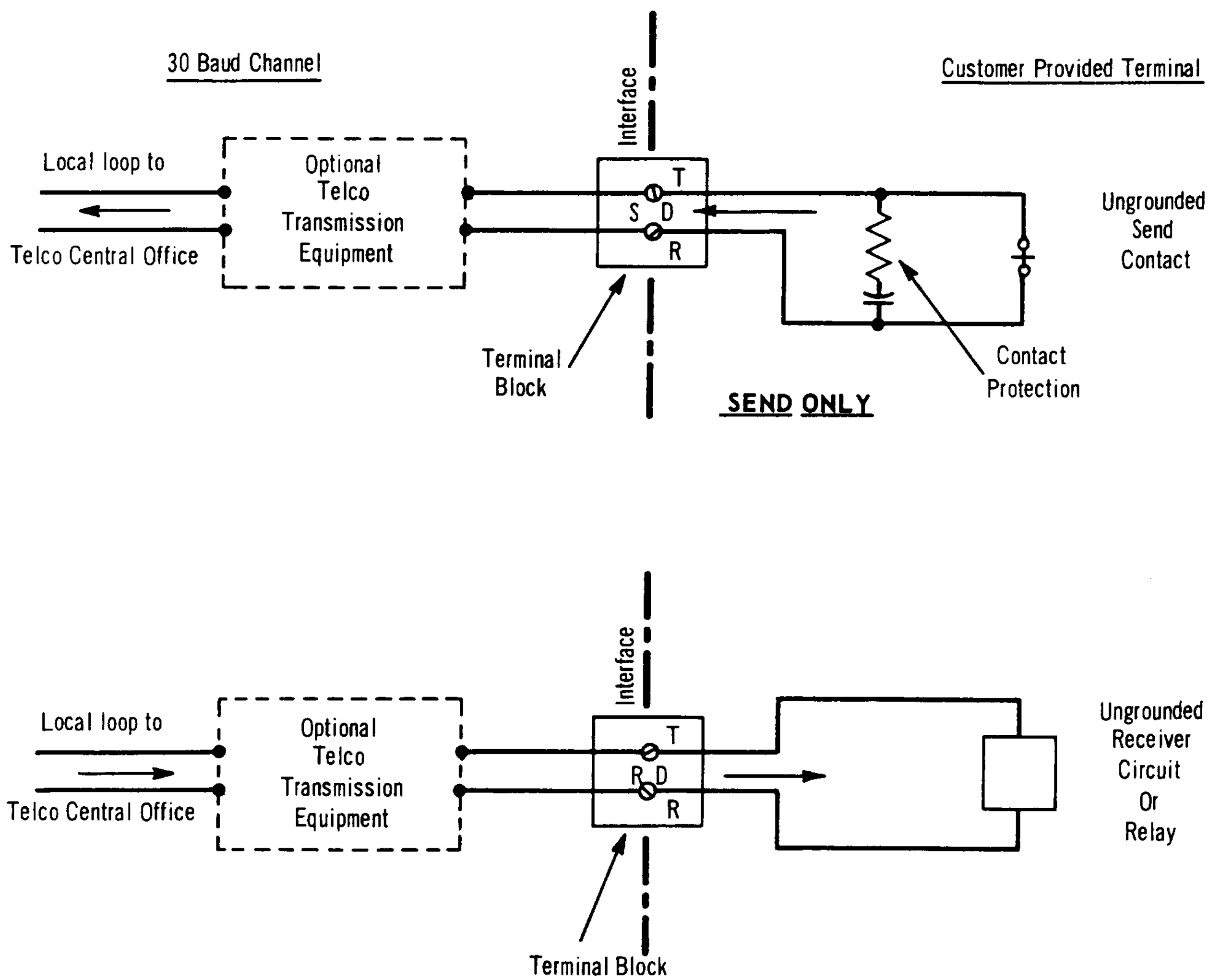


Fig. 1—Receive Only (Cont'd on Next Page)

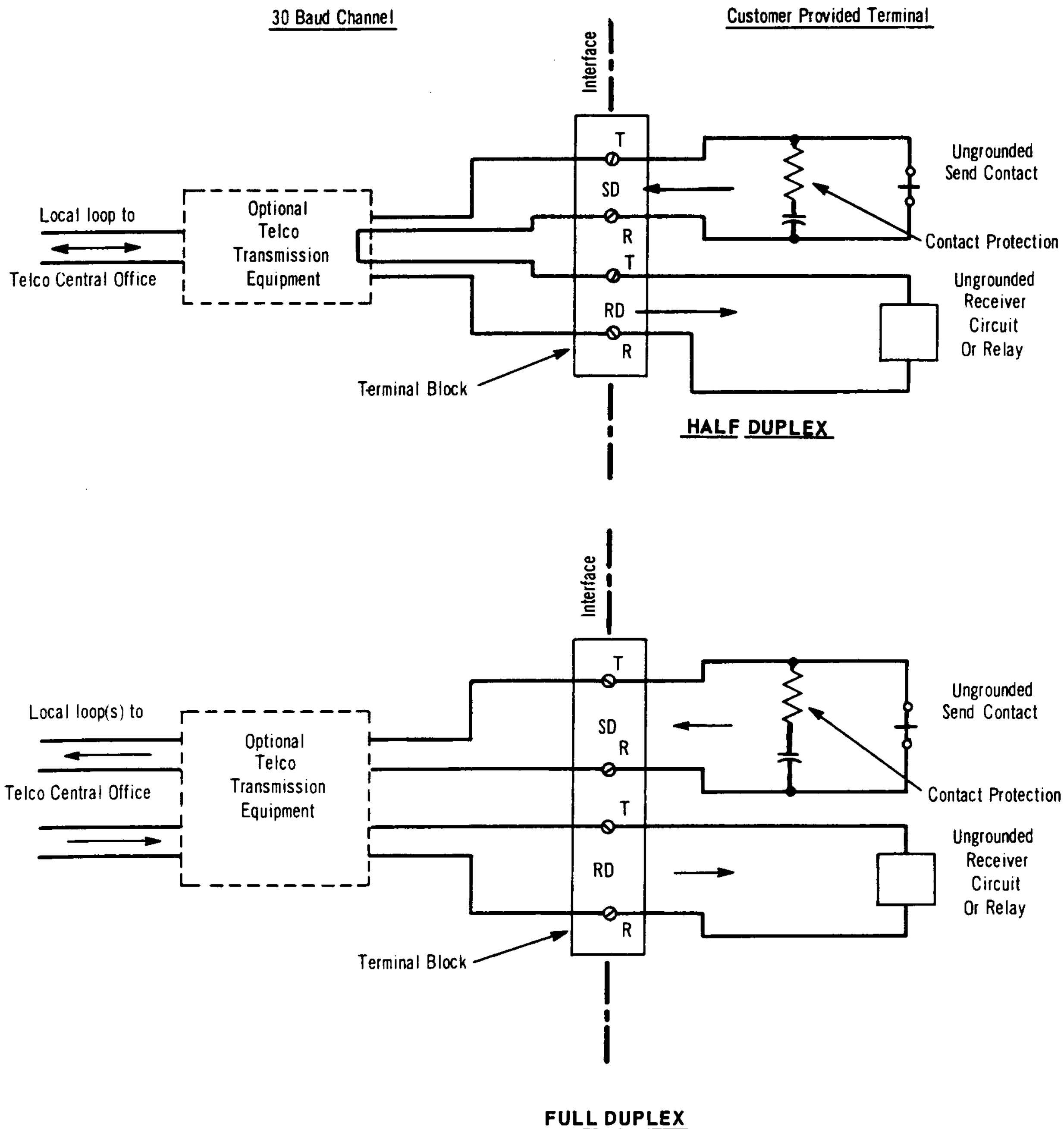
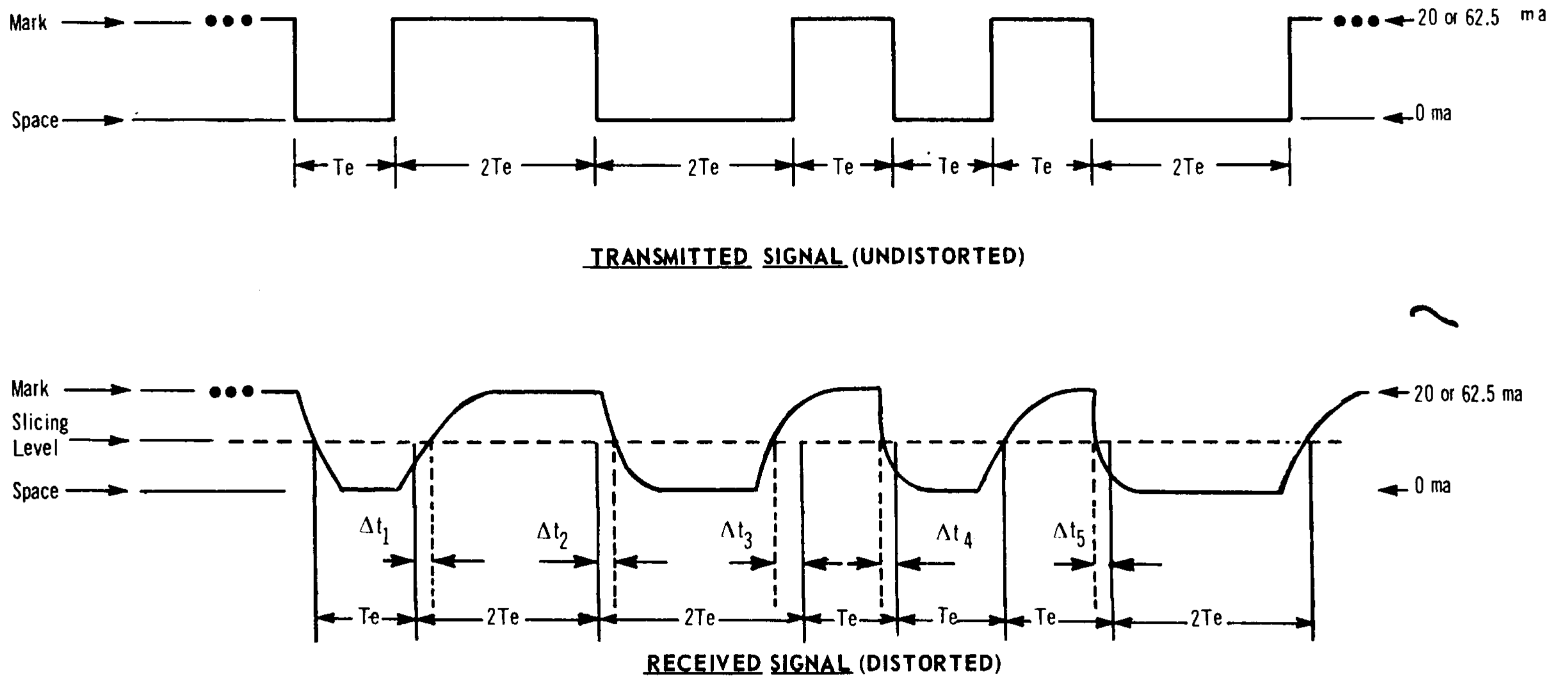


Fig. 1—(Continued)



Notes:

1) Te = Shortest element in the transmitted signal.
2) Δt = Transition displacement caused by the 30 baud channel.
3) Baud Rate = $\frac{1}{Te}$ (in seconds)
4) Received waveform is generally not a square wave
5) Slicing level is assumed to be at the 50% point of the rising and falling waveform.

Fig. 2—Received Signal