

**D4 CHANNEL BANK CHANNEL UNITS**  
**APPLICATION ENGINEERING**  
**CARRIER ENGINEERING**

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Part 2 of this section provides the channel unit features and applications.

**1.02** This section is being reissued for the reasons listed below. Revision arrows are used to emphasize the more significant changes.

- Circuit switched data capability service (CSDC) channel units are added to Parts 2 and 5 and to Tables B, C, and E.
- Program channel units are added to Parts 2 and 5 and to Tables B, C, and E.
- Tables I through M are added for program channel unit options.
- Dataport and test access channel units are combined under the broader heading of special service channel units. Tables B and E list all special service channel units including dataport.
- Titles of security channel units are corrected in Part 2 and in Tables B, C, and E.
- Test procedures for dataport channel units that were redundant to D4 channel bank (TOP), Section 365-170-000, have been removed.
- Circuit description for dataport channel units in Part 2 has been condensed.
- Information on the +/− and HML options on the office end security channel unit is expanded in paragraph 2.36.

**1.03** The 2-wire gain transfer channel units provide the means for operating a carrier channel at a net gain to overcome partly the loss in a 2-wire cable. Standard practice calls for a carrier channel in special services to operate at a net loss, from 2-wire port to 2-wire port, of at least 1 dB at 1 kHz to insure system stability. The 2DX/GT, 2FXS/GT, and 2FXO/GT channel units are designed to be operated single ended with up to 6 dB of gain transfer or double ended with up to 12 dB of gain transfer and maintain system stability by prescription setting the necessary controls on the channel unit(s).

**1.04** The dataport feature provides a less costly way of direct digital access to the T-Carrier

facility via the D4 channel bank to support services such as the Digital Data System (DDS).

**1.05** The D4 channel units have selectable options which can provide compatibility with a variety of trunk circuits and other connecting circuits. Part 3 of this section provides a description of these options. Compatibility between the D4 channel units and those of the D1D and D3 channel banks is shown in Table C.

**1.06** Two special features of the channel units are card jack access [except the data service unit dataport (DSU DP)] and receive signaling state storage. The card jack is located in the faceplate and provides splitting access to both the transmit and receive sides, plus splitting access to the direct current (dc) signaling leads. The signaling state storage, described in Part 4 of this section, reduces disconnects and false seizures during the D4 trunk processing unit (TPU) initiation time.

◆ **1.07** Special considerations for setting attenuators or equalizers for program and circuit switched data capability channel units are covered in Part 5 of this section.◆

**1.08** The D4 channel units provide for 2- and 4-wire operational designs with a wide range and variety of special capabilities. Part 6 of this section provides a method for prescription setting the transmission path attenuation controls for units without equalization.

**1.09** Active post-equalization is provided in some 4-wire special service channel units to meet voice frequency (VF) objectives. This feature of the channel units will produce amplitude equalization for a variety of services and lengths of metallic extensions. Part 7 explains the calculation of the 1-kHz cable loss. Parts 8 and 9 describe the equalization controls and provide Charts 1 through 48 to aid in prescription setting the equalization, attenuation, hybrid balance, and duplex balance controls.

## 2. CHANNEL UNIT FEATURES AND APPLICATIONS

**2.01** D4 channel units are grouped into two categories in the following paragraphs. In the first grouping are the message channel units intended to interface with office switching machines. The second group contains the channel units used for special service applications. Message and special service channel units are listed in Tables A and B respectively.

## A. Message Channel Units

### 2.02 2-Wire Dial Pulse Originating (DPO):

The DPO unit provides an interface with a dial pulse originating trunk circuit. It uses loop supervision (loop closures and reverse battery) and dial pulse or multifrequency pulse signaling. The terminating end will normally use a dial pulse terminating unit. An E&M terminating unit can be used; however, transient difficulties may be experienced (see paragraph 2.08). A DP/MF option on the List 5 DPO channel unit allows it to interface with a dial pulse or a multifrequency pulse originating trunk circuit. This DPO (J98726BA, L5) replaces the Dial Pulse Multifrequency Originating (DPMO) unit (J98726BM) in all applications. Dial pulse channel units are described in Section 365-170-110.

### 2.03 2-Wire Dial Pulse Terminating (DPT and DPT6):

The DPT channel unit provides a 900 $\Omega$  interface with a dial pulse terminating trunk circuit. The DPT6 provides 600 $\Omega$  interface for private branch exchange (PBX) applications. Both units use loop supervision (loop closures and reverse battery) and dial pulse or multifrequency pulse signaling. The originating end may employ a dial pulse originating, sleeve dial pulse originating, dial pulse multifrequency originating, or E&M channel unit.

### 2.04 4-Wire E&M (4E&M):

The 4E&M channel unit interfaces 4-wire E&M trunk circuits. This unit was designed to be used where a 4-wire VF interface with E&M signaling is required on a 1-way or 2-way trunk. It is also used with external equipment to provide special services, but many of these can now be provided by the special service channel units described in paragraphs 2.18 through 2.39. The E&M channel units are described in Section 365-170-111.

### 2.05 2-Wire E&M (2E&M):

The 2E&M channel unit interfaces 2-wire E&M trunks circuits. This 900-ohm unit was designed to be used where a 2-wire VF interface with E&M signaling is required on a 1-way or 2-way trunk. It may also be used to provide some special service arrangements, such as special access trunks and duplex signaling.

### 2.06 3-Wire Sleeve Dial Pulse Originating (SDPO):

The SDPO channel unit provides an interface with a step-by-step selector or a rotary-out-trunk switch. It provides the sleeve-lead control function and thus eliminates the need for a simple

outgoing repeater. If other trunk circuit functions are needed, a dial pulse originating or dial pulse multifrequency originating unit and a trunk circuit must be used.

### 2.07 4-Wire E&M Extended Range (4E&MER):

The 4E&MER channel unit interfaces 4-wire E&M trunks. This channel unit incorporates more gain and level adjustment capability than the standard 4E&M channel unit. It provides for direct connection to a 4-wire switching machine with no need for external pads (unless an external 4- or 6-wire patching bay is used).

### 2.08 2-Wire Dial Pulse Multifrequency Originating (DPMO):

The DPMO channel unit is manufacture discontinued (Mfr Disc) and is replaced by the List 5 DPO channel unit. (See paragraph 2.02.) The DPMO unit provides an interface with dial pulse or multifrequency pulse originating circuits, utilizing loop supervision and dial pulse or multifrequency pulse signaling. An option of selecting additional delay to provide protection against spurious loop transients makes this unit preferable to the DPO (except List 5) in multifrequency pulse signaling applications. The DPMO unit can be used in all 2-wire loop supervision applications except where a sleeve lead must be split and processed on carrier failure (use DPO/SDPO).

### 2.09 No. 2 ESS\* Switch Direct Interface Originating End (ES20):

The ES20 unit provides for direct control of the channel unit by the No. 2 ESS Switch. This feature permits the elimination of trunk circuit and trunk frames in many No. 2 ESS switch trunks on T Carrier. The T-Carrier interface via trunk circuits is shown in Fig. 1A, and the direct interface is shown in Fig. 1B. It also offers a reverse make-busy feature, permitting distant terminal alarms to be received immediately and the channel unit to be made busy by the No. 2 ESS switch processor. The ES20 unit combines features of the No. 2 ESS switch outgoing trunk circuit and the DPO channel unit (consequently, scanning points are still required). Detailed information on the direct interface between T-Carrier equipment and the No. 2 ESS switch may be found in Section 232-190-027. A channel bank in a direct interface arrangement can have some channels assigned to special services or conventional interface trunk service.

### 2.10 Control of the channel unit is exercised over three control logic leads (A, B, C) by the ESS

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switch trunk peripheral decoder circuit in the direct interface frame. These leads can assume two states (0 or 1); therefore, the three operated together can provide eight states in the unit. The channel unit logic accepts inputs from the peripheral decoder circuits, the loop-closure detector, and the signaling receiver. It also provides signaling toward the far end and reports customer line status and far-end line status to the ESS scan points.

**2.11 No. 2 ESS Switch Direct Interface Terminating End (ES2T):** The ES2T channel unit provides the same functions as the ES2O channel unit except the ES2T channel unit combines the functions of the incoming trunk circuits and the functions of the DPT channel unit. Control of the ES2T channel unit is the same as the ES2O channel unit. Channel units for interfacing No. 2 and No. 3 ESS switches are described in Section 365-170-113.

**2.12 2-Wire E&M 600-Ohm (2E&M6):** The 2E&M6 channel unit provides an interface for applications requiring a 2-wire 600-ohm impedance and E&M signaling. This unit was primarily designed to provide intertoll trunks from No. 5 crossbar and step-by-step switching systems which are 600 ohms on the intertoll side.

**2.13 No. 3 ESS Switch Direct Interface (ES3):** The ES3 channel unit permits direct control of D4 channel units by the No. 3 ESS switch processor without the use of trunk circuits (Fig. 2). The E&M trunk circuit functions have been incorporated into the ES3 channel unit. This arrangement allows the control and scan information to be passed directly between the junctor unit and the ES3 channel unit rather than through the E&M trunk circuit. No additional interface equipment is needed; there is no direct interface frame as in the ES2 direct interface. A specific channel bank can be concurrently used with direct interface trunks, special service facilities such as foreign exchange, and conventional interface trunks. This channel unit provides an option which should be selected when the No. 3 ESS switch requires saturated trunk scan points during a carrier failure. For details on No. 3 ESS switch direct interface, refer to Section 233-190-027.

**2.14 Remote Switching Central Office (RSCO):** The RSCO channel unit provides an interface between central office trunks on the office side and D4 common circuits on the line side with Remote Switching System (RSS) circuits on the far

end of the T-Carrier line (Fig. 3). The remote switching channel unit is described in Section 365-170-114.

**2.15 4-Wire Loop-Simplex Originate (4LSXO):** The 4LSXO channel unit is intended for connecting a Traffic Service Position System (TSPS) trunk incoming to a No. 4 ESS switch office to the switch via a D4 channel bank and a digroup terminal (DT) or digital interface frame (DIF) (Fig. 4). The unit has 600 ohms input and output with a transmit range of +8 to -17.5 dB TLP and a receive range of +8.5 to -17 dB transmission level points (TLP). Options are included to permit loop signaling on a simplex basis over four wires or on a separate pair of leads. The loop-closure detector and battery reversal circuits are essentially the same as in the DPO units.

**Note:** The external resistance should be no greater than 2500 ohms.

The unit provides another option to change the characteristics of the loop-closure detector from a dial pulsing (DP) mode to a multifrequency (MF) pulsing mode. The MF mode provides additional delay which overcomes certain transient problems that could lead to trunk pumping. Trunk processing during a carrier failure alarm will provide an on-hook, releasing the attached customer, followed by an optional off-hook 2 seconds later, making the channel appear busy.

**2.16 2-Wire Revertive Pulse Originating (RPO):** The RPO channel unit provides the 2-wire transmission and signaling interface between the D4 channel bank common circuits on the line side and the trunk circuits of the office side at the originating end of a revertive pulse trunk. This unit detects the near-end trunk loop-closure information which is encoded and transmitted to the far end. Similarly, the signaling receivers decode and pass on the far-end revertive pulse and battery polarity conditions to the near-end trunk circuit. Revertive pulse channel units are described in Section 365-170-112.

**2.17 2-Wire Revertive Pulse Terminating (RPT):** The RPT channel unit provides the interface between revertive pulse incoming trunk circuits on the office side and D4 channel bank common circuits on the line side. In the RPT unit, the roles of the signaling circuits are reversed; ie, the terminating unit has two transmitting signaling circuits for recognizing revertive pulses and battery polarity signal and a signaling receiver which opens or closes the loop.

## B. Special Service Channel Units

### Foreign Exchange Channel Units

**2.18 2-Wire Foreign Exchange Station End (2FXS and 2FXS6):** The 2FXS channel unit provides a 900 $\Omega$  interface for 2-wire foreign exchange circuits at the station end. The 2FXS6 is designed to interface in close proximity with a 600 $\Omega$  PBX. This unit may be used in either loop-start or ground-start applications. The foreign exchange (FX) units pass ringing and tip ground from the office to the subscriber and pass loop closure and ring ground from the subscriber to the office. The subscriber unit has two transmitting signaling circuits which recognize loop closure and ring ground. Two signaling receivers produce tip ground and 20-Hz ringing at the station end. Figure 5A shows a typical 2-wire FX channel unit application. Foreign exchange channel units are described in Section 365-170-115.

**2.19 2-Wire Foreign Exchange Office End (2FXO and 2FXO6):** The 2FXO channel unit provides interface for 2-wire foreign exchange circuits at the office end. This channel unit may be used in either loop-start or ground-start applications. The 2FXO6 channel unit uses only loop-start signaling and is also designed to interface with a 600 $\Omega$  PBX. The FX units pass ringing and tip ground from the office to the subscriber and pass loop closure and ring ground from the subscriber to the office. The office channel unit has two transmitting signaling circuits which recognize tip ground and ringing. Two signaling receivers produce loop-closure and ring ground corresponding to the conditions at the far end.

**2.20 2-Wire Foreign Exchange Station End Loop-Start (2FXSLS):** The 2FXSLS channel unit provides interface for 2-wire foreign exchange circuits at the station end. This unit is used only in loop-start applications, such as FX lines and PBX off-premises stations, in which it provides a cost-reduced FX channel unit. The 2FXSLS channel unit has only one transmitting signaling circuit which recognizes loop closure and one signaling receiver that produces ringing.

**2.21 2-Wire Foreign Exchange Office End Loop-Start (2FXOLS):** The 2FXOLS channel unit provides interface for 2-wire foreign exchange circuits at the office end. This unit is used only in loop-start applications in which it provides a

cost-reduced FX unit. The 2FXOLS channel unit has only one transmitting signaling circuit which recognizes ringing and a receive signaling circuit which produces loop closure. It can be used in some PBX and ESS applications where the loop-start/ground-start 2FXO cannot be used because of interaction between the 2FXO tip ground detector and the PBX/ESS switch line circuit.

**2.22 4-Wire Foreign Exchange Subscriber End (4FXS):** The 4FXS channel unit provides interface for 4-wire foreign exchange circuits at the subscriber (station) end generally where it is necessary to extend signaling and transmission range. In trunk applications, the unit operates in the ground-start signaling mode; while on off-premise stations, wide area telephone service (WATS), or FX lines, it operates in the loop-start mode. The 4FXS unit can accommodate relatively long metallic loop extensions of loaded or nonloaded cable. The unit includes all gain, active equalization, and signaling circuits required on 4-wire extensions with 1-kHz losses up to 15 dB. Figure 5 shows a typical FX trunk application.

**2.23 4-Wire Foreign Exchange Office End (4FXO):** The 4FXO channel unit provides interface for 4-wire foreign exchange circuits at the office end and has the same features as the 4FXS channel unit. Figure 5B shows typical 4-wire FX applications.

**2.24 2-Wire Foreign Exchange Subscriber End With Gain Transfer (2FXS/GT):** The 2FXS/GT channel unit interfaces any 2-wire foreign exchange circuit at the subscriber end in the same manner as the 2FXS channel unit, plus providing the gain transfer capability mentioned in paragraph 1.03. Figure 6 shows a double-ended FX gain transfer circuit.

**2.25 2-Wire Foreign Exchange Office End With Gain Transfer (2FXO/GT):** The 2FXO/GT channel unit interfaces any 2-wire foreign exchange circuit at the office end in the same manner as the 2FXO channel unit, plus providing the gain transfer capability mentioned in paragraph 1.03. (See Fig. 6.)

### Duplex Channel Units

**2.26 4-Wire Duplex (4DX):** The 4DX channel unit provides a direct interface between the D4 channel bank and 4-wire metallic extensions

using duplex (DX) signaling. The primary application for the unit is PBX tie trunks, but it can be used for other applications provided the far end of the VF extension is terminated with a compatible DX converter. The 4DX channel unit includes all gain, equalization, and signaling circuits required to operate with relatively long 4-wire extensions of loaded or nonloaded cable with 1-kHz losses up to 15 dB. Figure 7 shows a typical 4-wire DX tie-line application. Duplex channel units are described in Section 365-170-117.

**2.27 2-Wire Duplex With Gain Transfer (2DX/GT):** The 2DX/GT channel unit is used at the end of a channel to provide 2-way calling (with gain transfer capability mentioned in paragraph 1.03) between PBX locations over T Carrier. Figure 8 shows a single-ended DX gain transfer circuit.

#### Tandem Channel Unit

**2.28 4-Wire Tandem (4TDM):** The 4TDM channel unit provides an interface intended for back-to-back carrier applications and is transparent to the A and B signaling channels. The unit provides the capability to tandem a D4 terminated channel with another D1, D3, or D4 channel equipped with a tandem unit. (See Section 855-351-103.) The 4TDM channel unit also may be used to interface with an analog channel terminated with an F- or G-signaling tandem unit. The unit is primarily intended for 3-/4-state signaling applications; although it will accommodate 2-state signaling requirements, the more economical pulse link repeater is preferred to the 4E&M arrangement. Channel unit options allow processing of signaling states during carrier failure. Figure 9A shows a typical tandem connection using 4TDM channel units. Tandem and pulse link channel units are described in Section 365-170-116.

#### Pulse Link Repeater Channel Unit

**2.29 4-Wire Pulse Link Repeater (PLR):** The PLR channel unit provides the capability to tandem a D4 terminated channel with another carrier channel which is terminated by a 4-wire E&M channel unit without using an external PLR. From a signaling standpoint, the unit gives the appearance of a trunk circuit to the adjacent E&M channel unit. Channel unit options allow processing of signaling states during carrier failure to signal that failure to the distant end of the nonfailed carrier link. Figure

9B shows a typical tandem connection using a PLR unit and an E&M channel unit.

#### Transmission Only Channel Units

**2.30 4-Wire Transmission Only (4TO):** The 4TO channel unit is provided for use on moderate length loops to data sets or SF signaling converters or on circuits requiring no signaling in back-to-back carrier applications. It is also provided with sealing current for loop extensions with hand-wrapped splices. Figure 9C shows a typical tandem connection using four transmission only (TO) units. Transmission only channel units are described in Section 365-170-118.

**2.31 2-Wire Transmission Only (2TO):** The 2TO channel unit is provided for use on 2-wire metallic extensions which require no signaling or use end-to-end inband signaling (eg, a short private line for data transmission). The unit provides a hybrid on the drop side with a compromise balance network of 900 ohms in series with 2.15  $\mu$ F. It is also provided with dc loop-sealing current for extensions with hand-wrapped splices.

**2.32 4-Wire Equalized Transmission Only (4ETO):** The 4ETO channel unit is provided to interface the D4 channel bank with a relatively long 4-wire metallic extension where no signaling is required or where inband end-to-end signaling (eg, a private line for data transmission) is used. The unit contains gain and active equalization circuits required on all loaded or nonloaded 4-wire extensions with 1-kHz losses up to 15 dB. It also is provided with sealing current for extensions with hand-wrapped splices.

#### Private Line Automatic Ringdown Channel Units

**2.33 2-Wire or 4-Wire Ringdown/Private Line Automatic Ringdown (2RD/PLAR or 4RD/PLAR):** Both the 2-wire and 4-wire units provide a nonswitched private line service. Each unit contains options that can be set to determine the mode of operation, either RD or PLAR. The PLAR mode is applicable only to 2-point lines. The RD mode is intended for multipoint bridged private lines and includes features to allow any station to select any other station out of a group of 15 on the same bridge.

**2.34** Signaling is accomplished in the RD application by pushing a button at the calling station

which generates ringing current to the calling channel unit. Signaling is accomplished in the PLAR application by an off-hook condition (loop closure) at the calling station. Options to convert the channel unit to RD or PLAR type signaling are contained on both the 2-wire and 4-wire units. Both the 2-wire and 4-wire units, when optioned in the PLAR mode, provide -48 volt talk battery to the metallic facility. The 2-wire unit, optioned in the PLAR mode, also offers the option of -72 volt talk battery. These channel units are described in Section 365-170-119.♦

### Security Channel Units

**2.35 Security Station End ♦(SEC MC S):** The SEC MC S♦ channel unit provides an interface at the station end (secured point) of a McCulloch security alarm system (Fig. 10). Coded alarm signals from a McCulloch transmitter are detected and the information is sent to the office end security channel unit. The SEC MC S channel unit has two transmit signaling circuits which recognize loop closures and loop grounds. Two receive signaling circuits provide double battery and loopback test at the station end for master or slave operation. The security channel units use only signaling paths and do not contain voice circuits. Security channel units are described in Section 365-170-121.

**2.36 Security Office End ♦(SEC MC O):** The SEC MC O♦ channel unit provides an interface at the office end (monitoring station) of a McCulloch security alarm system (Fig. 10). The office end security channel unit receives and decodes information from the ♦SEC MC S♦ channel unit, regenerates the coded alarm signal, and transmits the signal to the McCulloch receiver. Double battery and loopback test are detected by the transmit signaling circuits. Loop closures and loop grounds are provided by the receive signaling circuits for master or slave operation. ♦Usually the alarm company equipment applies ground to the tip lead and battery to the ring lead. The +/- option is provided to accommodate cases where the customer's polarity is reversed. The customer voltage is adjustable up to about 135 volts, and may include current regulators to limit the current to under about 15 ma. Where current limiting is not provided by the customer's equipment, the HML option should be used to adjust the loop current between 5 and 30 ma. The circuit should be designed to provide 10 ma loop current.♦

### ♦Circuit Switched Data Capability (CSDC) Channel Units

**2.37 Remote Exchange Office End (RXO) and Timed Remote Exchange Station**

**End (TRXS):** The RXO and TRXS channel units are used for CSDC service. The RXO and TRXS channel units provide the same remote exchange features as the FXO and FXS channel units respectively. In addition to the remote exchange features, the RXO and TRXS channel units can handle 56 Kb/s data or voice transmission.

**2.38 Public Switched Dataport (PSDP):** The PSDP channel unit is used with the CSDC service. The PSDP channel unit provides an interface between DSO (64 Kb/s) and DS1 (1.544 Mb/s) signals. The PSDP channel units may be used as tandem channel for RXO and TRXS channel units and for alternate voice data (AVD) and timed AVD (TAVD) channel units. The AVD and TAVD channel units are CSDC channel units which are installed in a digital carrier trunk (DCT) terminal. The PSDP channel units may also be used to tandem SLC-96 carrier system CSDC applications.

**2.39 Circuit Switched Digital Capability Maintenance (CSDC MTCE):** The CSDC MTCE channel unit is mounted in a D4 channel bank at a No. 4 ESS switch office. It is used to test the trunks between the No. 4 ESS switch office and a No. 1 ESS switch office. Test signals are sent from the No. 1 ESS switch office over various lines to the No. 4 ESS switch office to the CSDC MTCE channel unit. The channel unit sends the test signal back just as it was received or inverts the signal before sending it back. The test signal from the No. 1 ESS switch controls when the return signal is inverted. There are no options or drop side connections for the CSDC MTCE channel unit.

**2.40 Program Channel Units (PGCU) 5-kHz and 8-kHz Program Channel Units (PG5T, PG5R, PG8T, and PG8R):** The D4 program channel units are used to provide temporary or permanent service for series 6004, 6005 (5-kHz bandwidth) and series 6006, 6007, (8-kHz bandwidth) programming. Such service includes remote-main studio links, secondary studio links, and network access links. PGCU's may also be used to equip studio-transmitter links (AM broadcasting only, since FM and TV links require 15-kHz bandwidth). The channel units provide one-way service without signaling or control circuits. Transmit units contain circuitry to equalize nonloaded cable. If more equalization is required, it must be provided with external equipment.

**2.41** All D4 PGCU's have 600/150 ohm input impedance options which are selected by socket-and-

plug combinations labeled IMP on the circuit boards. Attenuation controls in the PGCUs are of the slide-switch type and may be used to select 0 through 15 dB of attenuation. Equalization controls on the 5- and 8-kHz transmit units (labeled EQL on the circuit board) and the distortion compensation controls on the 5-kHz units (labeled COMP) are also of the socket-and-plug type. The distortion compensation control on the 8-kHz PGCU is a 3-position rotary switch and is not labeled (except for switch position designations A, B, and C). The 5- and 8-kHz PGCUs are described in Section 365-170-102.

**2.42** The 5- and 8-KHz PGCUs are not used for establishing FM or TV-aural studio-transmitter links because they do not meet FCC bandwidth requirements for that service. Furthermore, when these PGCUs are used to provide an AM studio-transmitter link, extra care should be taken to maintain the transmission requirements (based on FCC requirements) specified in this document.

**2.43** Controlled distortion will occur on a program channel during TPU operation initiated by the program sending D4 bank; therefore, program channels should not be assigned to T lines which historically experience excessive hits, especially those which cause TPU operation. Consequently, program channels should not be assigned to channel banks which have a history of trouble reports (noise, distortion, crosstalk, etc).

**2.44** Program channel units are not recommended for use in banks containing dataport channel units unless the paired metallic extensions of each service can be physically separated. The data pairs may crosstalk into the program pairs. For further information, refer to Section 880-601-115.

**2.45 15-KHz Program Channel Units (PG15T and PG15R):** D4 15-KHz Program channel units are intended to provide high quality program channels suitable for all TV audio and FM stereo service. Each 15-KHz unit (Transmitter or Receiver) occupies three adjacent shelf positions and six digital time slots. Each transmitter-receiver pair provides a single circuit in one direction. The three unoccupied shelf positions may be used for 5-, 8-, or 15-KHz program service in the return direction, provided the additional time slots required are also available. Thus, a digroup may provide four 15-KHz program channels in both directions, or four 15-KHz in one direction and various combinations of 8-KHz

and/or 5-KHz service in the opposite direction. These channel units are compatible with printed wiring board backplanes or wire wrapped backplanes with J98726 list D and WA modifications. The PG15T and PG15R channel units are described in Section 365-170-122.♦

#### Dataport (DP) Channel Units

**2.46** The use of dataports to gain direct digital access to the T-Carrier facility is more economical for end offices that serve a small number of data customers than the use of T1WB4/5 data banks. The data signals will avoid analog-to-digital conversion (and vice versa). These dataport channel units can provide DDS channels on short notice using existing channel bank equipment. Dataport channel units are described in Section 365-170-120. Now any T1 line which meets voice quality requirements can qualify for 56-kb/s data service using the new 56-KB dataport channel units with error correction (See paragraph 2.52). The power supply and heat dissipation requirements indicate that not all 24 channel positions in a digroup should be filled with dataport units. The latest estimate is 6 office channel unit dataport (OCU DP) channel units per digroup when mixed with VF channel units, or 12 OCU DP channel units per digroup alone (not mixed with VF channel units). The estimate includes a limit of 32 DS0 DP channel units per channel bank, unless low power channel units are used. If the low power DS0 DP (J98726DA-2, List 2) is used, all 48 channel positions may be equipped with DS0 DP channel units.

**Note:** Dataport channel units and program channel units should **not** be assigned to the same channel bank.

The application of the D4 office interface unit - 2 (OIU-2) is restricted when an external composite clock source is used. The restrictions listed below apply to the OIU-2 (J98726AL) optioned for external timing.

- (1) Only one J98726AL, L1 may be used in a bay. The J98726AL, L1 may not be used in the same bay with J98726AL, L1 MOD A.
- (2) A maximum of three J98726AL, L1, MOD A units may be used in a bay.
- (3) A maximum of six J98726AL, L2 units may be used in a bay. The J98726AL, L2 may be used

with either the J98726AL, L1 or J98726AL, L1, MOD A.

These restrictions do not apply in loop timing operation.

#### 2.47 **Digital Signal Zero Dataport (DS0 DP):**

The DS0 DP channel unit provides direct digital access to T-Carrier via the equipment (drop) side of the D4 channel bank. This unit interfaces with the 64 kb/s data signal in the bipolar format (DS0-A or DS0-B) and translates the signal to occupy one 64 kb/s time slot of the T-Carrier line. Similarly, it receives one time slot out of 24 slots per frame from the T-Carrier line and translates it to a 64 kb/s (DS0-A or DS0-B) signal.

**Note:** When the data stream contains data from only one customer (eg, a 2.4 kb/s rate that is repeated up to 64 kb/s), it is defined as a DS0-A. When the data stream contains data from more than one customer (eg, up to twenty separate 2.4, or ten separate 4.8, or five separate 9.6 kb/s customers), it is defined as a DS0-B. Substrate multiplexing equipment is involved for DS0-B.

The DS0 DP channel unit has the zero suppression code to prevent all zeros appearing in the 64 kb/s time slot. This unit immediately transmits a "DDS-out-of-sync" code, continuously during a carrier failure, on the DS0-A or DS0-B signal if the T line loses signal. An option in the receive side of this channel unit is provided to activate the error correction scheme for DS0-A signals. An error correction code has been incorporated, and if the T-Carrier line error rate degrades temporarily, this code will maintain the error performance of the data signal. This scheme will keep the error rate signal at  $10^{-8}$  even if the T-line error rate degrades as much as  $10^{-3}$ . Typical application of a DS0 DP in the hub office is shown in Fig. 11.

#### 2.48 **Office Channel Unit Dataport (OCU DP):**

The OCU DP channel unit provides the DDS substrate speeds (2.4, 4.8, and 9.6 kb/s in Lists 1, 2, 3, respectively) for interfacing the customer loop to T Carrier via a D4 channel bank dataport. This unit uses bipolar signals on four wires and connects directly to the local loop. It incorporates not only the function of the DS0 DP but also the OCU function. The main application of the OCU DP will be in the end office as shown in Fig. 11.

#### 2.49 **Data Service Unit Dataport (DSU DP):**

The DSU DP channel unit can provide data

communications between central offices (COs) at speeds (selected by a switch) of 2.4, 4.8, and 9.6 kb/s, if the COs are connected by T Carrier (Fig. 12). Direct access to the dataport is then possible without requiring a DDS data service unit. An interface with the computer terminal follows the guidelines of an industry standard, Electronic Industries Association (EIA) standard RS-449. Up to 200 meters between the terminal equipment in the CO and the D4 channel bank with the DSU DP is allowable. The DSU DP hardware contains four major circuits:

- (1) A digital signal zero circuit interfaces the D4 channel bank and provides a 64 kb/s data stream.
- (2) The office channel unit circuit takes the 64 kb/s data stream and reduces it to the customer data rate.
- (3) A data service unit circuit (which functions like a 500B DSU) to convert this customer data rate into EIA signaling leads.
- (4) The EIA circuit provides the drivers and customer interface.

**2.50** A special patch cable is connected to the backplane of the D4 channel bank at the appropriate channel position. This cable interfaces all the signals. The electrical characteristics of these signals are in accordance with EIA standards RS-423 and RS-334. The DSU DP operates in a bit serial fashion with the users data terminal equipment (DTE). No restriction is placed on the arrangement of the sequence of bits provided to the DSU DP by the DTE. The special cable has 13 leads which carry some pseudobalanced and some unbalanced signals. The pseudobalanced signals are receive timing (RT), send timing (ST), receive data (RD), and send data (SD).

The unbalanced signals are local loop (LL), remote loop (RL), signal quality (SQ), send common (SC), and signal ground (SG).

**2.51** The DSU DP channel unit is designed to include a variety of self-testing and maintenance features. These are *local* DTE and DSU DP, *remote* DSU DP and DTE, and the *telecommunications network* (TCN); ie, T Carrier, D4 channel banks, etc, in between. These tests are similar to the existing 500A-type tests of the DDS and can be useful in verifying the integrity of the DSU DP system. Sec-

tion 365-170-000 (TOP) contains dataport test procedures.

**2.52 56-KB DS0 Dataport (56-KB DS0 DP) and 56-KB Office Channel Unit Dataport (56-KB OCU DP):**

The 56-KB DS0 DP and OCU DP channel units are similar to the existing subrate dataport channel units. The OCU DP interfaces directly with the 56 kb/s customer loop, converts data to DS0-A (64 kb/s) format, and applies the error correction algorithm before inserting the data and parity bytes into the PCM stream at the 1.544 Mb/s (DS1) rate. (See Fig. 13.) The DS0 DP contains only the circuitry for error correction and rate conversion from 64 kb/s DS0 to DS1 speeds.

**2.53** These channel units plug into one channel slot but use two time slots for error correction. This means that the next position to the right of the dataport channel unit must be unoccupied or filled with a blank (of course, if channel 12 is used then channel 13 will be blank). Channel 24 of a D4 digroup can be used for nonerror-corrected dataport, but not for error-corrected dataport. (See Fig. 14 and 15.)

**2.54** There are several options to be selected before installation of the 56-KB dataport channel units in the D4B channel bank. These options are covered in Part 3.

**2.55** A nonerror-corrected 56 kb/s circuit may be installed, if desired, since these dataport channel units can have the error-correction feature removed.

**2.56 Error Correction:** The 56-KB dataport channel units make use of an error-correction algorithm which can remove a substantial number of bit errors that might be introduced by the T-Carrier lines. Use of this coding procedure allows any T1 facility which meets voice quality requirements to meet DDS specifications for data service quality. This eliminates the need to qualify a T1 line before using it to carry 56 kb/s data.

**Note:** Two things should be done to remove the error-correction feature: (1) Set the EC switch to OUT to defeat the error-correction circuitry, and (2) set the MODE SELECT M1 to 1 and M2 to 0 to select single time slot operation.

**2.57** Error correction is accomplished by using a (17, 9) cyclic code which has been shortened to

a (16, 8) code. What this means is that for each eight bits of data (a DS0-A or DS0-B byte), a sixteen-bit codeword is transmitted over the T-Carrier line, requiring *two* of the channel time slots. The first eight bits of this codeword are the data bits and the second eight bits are called the parity word. The code has structure such that if zero, one, or two out of the sixteen received bits are in error, the correct data byte will always be recovered. About one-third of those cases with three errors can be decoded correctly. For randomly occurring bit errors, the probabilities are, for a line error rate of  $10^{-3}$ , the decoded error rate will be only about  $6(10^{-8})$ .

**2.58** If the D4 channel bank has no working dataport channels, it is recommended that the presence of the integrated clock be checked with an oscilloscope by probing pin 31 of the backplane of the channel to be used for dataport. See Fig. 16 for an example of the expected waveform.

**Test Access Channel Unit(s)**

**2.59 4-Wire E&M Dual (4E&MD):** The 4E&MD channel unit provides circuits that connect the 4-wire tip and ring leads and two sets of E&M leads to the transmission and signaling circuits of a D4 channel bank. One application of the 4E&MD is to provide an interface between a remote or local test position and the D4 channel bank used for the Digital Access Cross-Connect System (DACS) test access digroup (Fig. 17). Two 4E&MD units for each DACS test port allow testing of transmission and signaling in both directions on channels cross-connected by DACS. Two sets of E&M leads in the 4E&MD provide 3-state signaling capability with any type channel unit at the far end. Another application is to use the 4E&MD signaling circuits to send control signals over the carrier to connecting equipment. However, the use of the secondary E&M circuit is limited by transient problems that may occur on the twisted E&M leads in this circuit. The 4E&MD unit is not recommended for normal message service because it does not provide trunk processing.

**3. OPTION SELECTION CONSIDERATIONS**

**3.01** D4 channel units have options that can be selected to provide the required signaling and trunk conditioning. Tables D and E list the options and their associated functions for the message and special service channel units, respectively. Table F gives tandem channel unit option settings for various

applications. These options are selected by controls that appear on the channel units as miniswitches or socket-and-plug combinations.

**3.02** Network build-out capacitance (NBOC) options are provided on some 2-wire D4 channel units. These options are used to balance the drop side wiring capacitance. Socket and plug or miniswitches on the channel units labeled 2, 4, 8, 16, 32, and 64 select an NBOC capacitance of 0.002, 0.004, 0.008, 0.016, 0.032, and 0.064  $\mu\text{F}$ , respectively, and combinations of these values can be selected as required.

**3.03** The NBOC should be set to the value established for all 4-wire terminating sets in the office. The method of determining the NBOC value for an office is described in Sections 660-47Y-ZZZ which contain information on through balance and terminal balance.

**3.04** Line build-out capacitance (LBOC) options are provided on the 2-wire gain transfer units for interfacing loaded cable. The capacitance is inserted as required to smooth out the impedance/frequency characteristics of cables with short (eg, 3000 feet) end sections. Channel unit precision balance networks (PBN) have been designed to match cables with end sections up to 6000 feet, and the LBOC should be adjusted to build out the cable to that length. In some SLC-96 carrier system applications where the distance to the first load coil may exceed 6000 feet, it may not be possible to achieve adequate PBN balance, making it necessary to reduce the amount of allowable gain transfer to maintain circuit stability. For nonloaded cable the LBOC is always set to 0 (all switches set to cover the letters).

**3.05** The LBOC slide switches on the channel units are labeled A through F and, when letters are exposed, provide capacitance of 0.002, 0.004, 0.008, 0.016, 0.032, and 0.064  $\mu\text{F}$ , respectively. Combinations of these values can be selected as required. Table G shows LBOC settings relative to length of end sections.

**3.06** The 4FXS, 2FXS/GT, and 2RD/PLAR special service channel units are equipped with an option for selecting  $-48\text{V}$  battery feed or  $-72\text{V}$  battery feed. With  $-48\text{V}$  battery feed, these channel units can supply 23 mA (the minimum required dc) line current for about 1300 ohms maximum cable resistance. Where cable resistance is between 1300 ohms and 2000 ohms, the  $-72\text{V}$  battery feed option

should be selected. Refer to Table E for information on setting this option. Sources of  $-72\text{V}$  office power include the ED-97918-( ) and ED-97919-( ) power supply panels designed for use with D4 channel banks and the metallic facility terminal (MFT) ED-7C073-31 72V power converter panel. In offices where MFT bays are available, an alternative for lines with greater than 1300 ohms cable resistance is to power the 2FXS/GT channel unit with  $-48\text{V}$  then connect an MFT loop signaling extender (LSE) in tandem with the channel unit.

#### 4. TRUNK PROCESSING INTERFACE CONSIDERATIONS

**4.01** The D4 channel units listed in Table H have provisions for conditioning the circuits to respond to a loss of synchronization or other failures of the line. When an out-of-frame condition is detected, the channel units maintain the supervisory states. If the system does not restore within 2.5 seconds of the out-of-frame condition, trunk processing will then take place. When a carrier failure occurs the trunk processing unit (TPU) removes the signaling battery supplied to the channel units, thus causing the channel unit relays to release. Trunk processing is effected by the D4 channel unit under control of the TPU. When a channel unit is removed, a shorting action in the backplane connector grounds the E lead and the make-busy leads.

**4.02** Refer to Fig. 18 and Tables D and E for the sequence of events that apply to each channel unit which has been conditioned for trunk processing. For example, select the DPMO channel unit from Table H which identifies options 1G and SD as those required for trunk processing. Then from Table D, a description of the function for each option can be related to the trunk processing output sequence, Fig. 18. This sequence of events for trunk processing any specific channel unit can be followed through Tables D and E and Fig. 18.

#### 5. SPECIAL CONSIDERATIONS FOR PROGRAM AND CSDC CHANNEL UNITS

**5.01** The program and CSDC channel units are different from other channel units in the following ways:

- equalizer settings
- faceplate test level point (TLP)
- Attenuator settings.

In addition, program channel units require special slot arrangements in the D4 channel bank.

### Equalizer Settings

**5.02** Equalizer settings for program channel units are calculated by sending two tones from the program source. The tones are 1 KHz and 5 KHz for the PG5T and the PG8T channel units. The tones are measured at the faceplate jack with attenuators and equalizers set to zero. Table I lists the equalizer settings based on the difference in dB of the two tones. The PG15T uses 1-KHz and 15-KHz tones and Table J.

### Attenuator Settings

**5.03** To set the attenuators for program transmit channel units send a 1 KHz, 0 dBm signal from a +8VU point at the program source and adjust for a faceplate reading of  $-14 \pm 0.5$  dBm for the PG5T and PG8T or adjust for  $-8 \pm 0.1$  dBm for the PG15T channel units.

**5.04** The attenuators for the PG5R and PG8R channel units are set to provide the desired output level ( $-14$  dBm to  $+1$  dBm) with the nominal faceplate TLP at  $-11$  dBm0. The output range of PG15R is  $-15.4$  to  $1.1$  dBm with a nominal faceplate TLP at  $-8$  dBm0.

**5.05** The attenuators for TRXS channel units are set according to the following rules:

- The transmit attenuator for the TRXS channel units are always set to 4.5 dB.

For routes less than 200 miles:

- If the customer loop loss (CL) is 2 dB or less, set the receive attenuator to 2 dB.
- If the CL is more than 2 dB, set the receive attenuator to 1 dB.

For routes more than 200 miles:

- Set receive attenuator to 1 dB or  $(VNL + 4 - CL)$  (VNL is via net loss), whichever is greater.

**5.06** The attenuators for the RXO channel units are set according to the following rules:

- Determine receive attenuation at TRXS channel unit (TRXSRAT).

- Determine office wiring loss (OWL) at office containing RXO channel unit.
- Set RXO receive attenuator to TRXSRAT-OWL or 1 dB, whichever is greater.
- If receive attenuator is set to 1 dB, set transmit attenuator to 4.5 dB.
- If receive attenuator is set to more than 1 dB, set transmit attenuator to 4.5-OWL dB.

### Program Channel Unit Slot Arrangements

**5.07** The 5- and 8-KHz channel units physically fill one channel unit slot. However, the time needed to transmit or receive for these channel units extend into other channel unit positions. For example a PG5T channel unit plugged into channel 3 transmits during time slots reserved for channels 3 and 15. Therefore channel 15 must be left blank or be equipped with a channel unit that only receives. Table K lists slots which must be kept vacant (or used only for the other direction of transmission) when 5- and 8-kHz channel units are used between D4 channel banks. Table L lists available channel unit slots and vacant slots for a D4-toD3-channel bank system.

**5.08** The COMP and S1 options for the 5- and 8-KHz channel units respectively depend on the position of the channel unit and on the list number of the LIU in the D4 channel bank. Table M lists these options.

**5.09** The 15-KHz program channel units physically fill three channel unit slots and use time slots for six channel unit positions. Unlike the 5- and 8-KHz channel units, the 15-KHz channel units use consecutive time slots. For example, a PG15T channel unit that is plugged into positions 2, 3, and 4 transmits over time slots reserved for channels 2 through 7. Receive channel units follow the same pattern. A PG15R channel unit plugged into positions 21, 22, and 23 receives on channels 21, 22, 23, 24, 1 and 2. Regardless of which three channel unit slots the PG15T or PG15R are used in, the next three higher numbered slots must be left vacant or used for the opposite direction of transmission only. At slot 24 the next higher numbered slot starts at slot 1.♦

### 6. PRESCRIPTION SETTING ATTENUATION CONTROLS FOR NONEQUALIZED CHANNEL UNITS

**6.01** Some D4 channel units provide attenuation controls, which are variable in 0.1-dB incre-

ments, in both the transmit and receive transmission paths. The transmit path attenuators are adjusted to obtain the transmit TLP of  $-8.5$  dB at the unit TST jack so that a receive TLP of  $+4.0$  dB will be obtained at the TST jack of the far-end channel unit. The receive path attenuators are adjusted to obtain the desired TLP level at the unit drop-side T1 and R1 leads (T and R for 2-wire units) with the specified unit receive TLP of  $+4.0$  dB present at the TST jack.

#### A. Channel Unit Attenuation, Gain, and Loss Parameters

**6.02** Tables N and O provide a listing by channel unit of the insertion gain or loss of the unit, the range of the unit attenuators, and the realizable input and output TLP levels at the unit T, R, T1, and R1 leads when the unit transmit TLP of  $-8.5$  dB and the unit receive TLP of  $+4.0$  dB are maintained at the TST jack.

**6.03** The transmit and receive path insertion gain or loss takes into consideration any hybrids, transformers, amplifiers, or fixed pads in the transmission path with all attenuation and equalization controls set to zero. As can be seen in Tables N and O the attenuation range for individual channel units varies considerably from unit to unit and sometimes from transmit to receive path. However, all of the unit attenuators are variable in precise 0.1-dB steps over the entire range.

#### B. Attenuator Types

**6.04** There are two generic types of attenuation controls used in the D4 channel units. They are the socket-and-plug type and a switch type. Whatever the type of attenuation control, the transmission path of which they are a part is identified by a wiring board or attenuation control marking of TRMT or T for the transmit path and RCV or R for the receive path. An exception is the 4ETO unit which has markings of "TRMT GAIN" and "RCV GAIN" for the attenuation controls.

#### C. Calculation of Attenuator Settings

**6.05** Prescription settings for the transmit and receive transmission path attenuation controls in D4 channel units are normally provided to the CO on the circuit layout record card (CLR card). A method is provided in the following paragraphs for calculating the attenuator settings on most units.

This method is not applicable to the 4-wire units with active equalization (which provide additional insertion gain when equalization is used) nor to the 2-wire gain transfer units. Calculation of attenuator settings for these 4-wire and 2-wire units is described in Parts 8 and 9, respectively, of this section.

**6.06** The input and output levels listed in Table O for the PLR unit reflect the obtainable adjustment range of its attenuator controls. The expected transmission levels at the PLR are  $+4.1$  to  $+10.4$  dB TLP on the transmit (input) side, and  $-18.6$  to  $-12.3$  dB TLP on the receive (output) side. These levels cover 0 to 1.5 dB of office wiring loss and  $\pm 0.3$  dB level variation from the connecting system on the transmit side. If a trunk terminating in a No. 4 ESS switch digroup terminal has a via net loss (VNL) design, the additional loss required (up to 2.9 dB) must be inserted in the PLR unit using the transmit attenuator, which has adequate range. This results in a **non-standard transmit TLP** at the CU unit TST jack.

**6.07** The range of the transmit attenuator control for the 4TDM channel unit is shown as 0 to 16.5 dB in Table L. The actual range of the attenuator is 0 to 16.5 dB. However, since the normal range of expected input signal levels to the transmit path is only 1.5 dB, it is anticipated that the 8, 4, 2, and 1 dB sections of the attenuator will be set to "0" for all applications.

**6.08 Transmit Path Calculations:** In calculating the transmit path attenuator setting, it is assumed that the  $-8.5$  dB TLP at the channel unit TST jack must be maintained and that the level of the signal received on the channel unit T and R input leads is known. For switching machine applications this requires that the level leaving the switch and the office wiring loss be known. Office wiring loss may also have to be considered for tandem circuits. For metallic loop applications this requires that the customer output level to the line and the attenuation in the connecting cable be known. Now, using the channel unit transmit path insertion gain (or loss) given in Tables N and O the equation below will provide the transmit attenuator setting. (Refer to Fig. 19.)

$$ATT_T = 8.5 + G_T + TLP_T$$

where  $ATT_T$  = Required CU transmit attenuator setting

$G_T$  = CU transmit insertion gain (or

loss) taken from Tables N and O

$TLP_T =$  Signal level received on CU input T and R leads.

Example: Using a circuit with a DPO unit and a  $-2.5$  dB input signal at the T and R leads as a result of a switch TLP of  $-2$  dB and  $0.5$  dB office wiring loss

$$ATT_T = 8.5 + (-4.0) + (-2.5) = 2.0 \text{ dB.}$$

**6.09 Receive Path Calculations:** In calculating the receive path attenuator setting, it is assumed that the  $+4.0$  dB TLP at the channel unit TST jack is present and that the required level of the signal leaving the channel unit T1 and R1 output leads (T and R for 2-wire units) is known. For switching machine applications, this requires that the level arriving at the switch and the office wiring loss be known. Office wiring loss may also have to be considered for tandem circuits. For metallic loop applications it requires that the expected customer input level from the line and the attenuation in the connecting cable be known. Now, using the channel unit receive path insertion gain (or loss) given in Tables N and O, the equation below will provide the receive attenuator setting. (Refer to Fig. 20.)

$$ATT_R = 4 + G_R - TLP_R$$

where  $ATT_R =$  Required CU receive attenuator setting

$G_R =$  CU receive insertion gain (or loss) taken from Tables N and O

$TLP_R =$  Signal level required on CU output T1 and R1 leads (T and R for 2W units).

Example: Using a circuit with a DPO unit and a  $-2.5$  dB output signal at the T and R leads as a result of a required switch TLP of  $-2$  dB and  $0.5$  dB office wiring loss

$$ATT_R = 4 + (-4.0) - (-2.5) = 2.5 \text{ dB.}$$

## 7. 1-KHZ CABLE LOSS CALCULATIONS

**7.01** The general information required for calculating 1-kHz cable loss is given in the following paragraphs. Specific examples of 1-kHz cable loss

calculations are given, as applicable, in Parts 8 and 9, of this section.

### A. Loaded Cable (No Bridged Taps)

**7.02** The 1-kHz cable loss of loaded cable is determined by multiplying the length of each gauge by the loss constants in Table P and adding for the total.

### B. Nonloaded Cable

**7.03** The 1-kHz loss of nonloaded cable may be determined by using Fig. 21, Fig. 22, or Fig. 23. The facility length and dc resistance must be known. Figure 21 is used for nonloaded facilities terminated in 600 ohms on each end. Figure 22 is used for nonloaded facilities terminated in 900 ohms on each end. Figure 23 is for a facility terminated in 900 ohms on one end and 600 ohms on the other.

**7.04** Each figure is used as follows:

- (1) Determine the total length (Notes 1 and 2) of the facility (channel unit to termination). Add the length of any bridged taps to the total.

**Note 1:** For the gain transfer channel units (2DX/GT, 2FXS/GT, and 2FXO/GT) the total length of the nonloaded facility, including bridged taps, should not exceed 20 kft at one end of a circuit, and the total metallic circuit (including both ends) should not exceed 30 kft including bridged taps.

**Note 2:** 25-gauge (MAT) cable should be converted to an equivalent length of 26-gauge before determining total length. Multiply the length of 25-gauge (MAT) cable by 0.77.

- (2) Determine the dc resistance, using the constants in Table Q. **Do not include bridged tap resistance in total.**
- (3) Read across the appropriate figure to the total length value. Read up to the dc resistance value. The 1-kHz loss may be read at the intersecting point.
- (4) Or alternatively, interpolation of 1-kHz cable loss given in Charts 1 through 5 and 17 through 21 can be used for single-gauge applications.

## 8. PRESCRIPTION SETTING EQUALIZED 4-WIRE CHANNEL UNIT CONTROLS

**8.01** The 4FXS, 4FXO, 4DX, and 4ETO channel units provide the active post-frequency equalization with gain required for interfacing metallic extensions whenever the length of the loop causes the frequency response of the circuit to be distorted to the extent that VF objectives for a service cannot be met. The active equalization is provided in the transmit transmission path only. However, both the transmit and receive paths have selectable transformer taps at 150, 600, and 1200 ohms which provide a measure of passive equalization by giving a deliberate impedance mismatch when used with nonloaded cable. (The 1200-ohm position is never used for nonloaded cable.)

### A. Controls

**8.02 *Equalization Controls:*** Active equalization is a process of amplitude shaping the VF response of the channel unit transmit transmission path. It is accomplished by using compensating networks controlled by a group of three switches, SL and N/L, HT, and BW, whose functions are described in Table R. The HT and BW switches each contain four slide-action sections labeled 1, 2, 4, and 8, respectively. The SL switch has the same four sections plus a fifth section labeled N and L. Thus, a number from 1 to 15 or a blank (0) can be selected for the SL, HT, and BW controls, making them 16-position switches.

**8.03** Figures 24 through 27 show gain-frequency characteristics of the channel unit equalizer with representative settings of the controls. Each figure is a family of curves which shows the approximate range of adjustment of the equalizer functions. There is greater variation in the slope curves at the higher frequencies when the equalizer is set for nonloaded cable. Conversely, the lower frequencies are affected more when the switch is set for loaded cable.

**8.04** The narrow bump shape of Fig. 26 is typical of settings used for high-frequency equalization of loaded cable. A wider bump (Fig. 27) is used to equalize nonloaded facilities.

**8.05** The equalizer is an active equalization-amplification device and introduces additional gain when each equalizer function is activated. Table P gives the additional gain at 1 kHz when the

SL switches are operated. The HT and BW functions likewise introduce gain and are given in Table S for all combinations of these two groups of switches. Thus the total 1-kHz gain is determined by adding the following quantities:

- Gain resulting from the SL function given in Table T.
- Gain resulting from the HT and BW functions given in Table S.

**8.06** The channel transmit path input and receive path output impedance switch functions are given in Table R. These two switches are set as a pair to the 1200-, 600-, or 150-ohm positions by slide-arm action. The 1200-ohm positions are used for all loaded cable applications. The 600-ohm positions are used for application of nonloaded cables which are terminated in metallic facility terminal (MFT) equipment, where active equalization is required. Both the 600-ohm and 150-ohm positions can be used in applications with nonloaded cable where active equalization is not required. In the latter case, the active equalization in the channel unit is disabled by setting SL = 0, HT = 0, and BW = 0; and term sets, V4 repeaters, or MFT units without active equalization are used at the customer end. When the SL, HT, and BW controls are used to post-equalize a line, an additional amount of transmit path gain over and above the channel unit insertion gain,  $G_T$  (see Table T), is introduced. This additional gain varies with the equalizer control settings and must be accurately known to prescription set the unit attenuator controls to obtain the transmit path  $-8.5$  dB TLP at the TST jack. Normally prescription settings for the equalizer and attenuator controls are provided for the CO on the CLR card.

**8.07 *DX Balance Controls:*** Charts 1 through 21 include the DX balance settings for the 4DX channel unit. The 4DX unit contains a 5000-ohm RLP potentiometer whose function is to balance the external loop resistance at the channel unit (see Table R). Options A and B each add 1  $\mu$ F capacitance for loop balance. Optimum balance is obtained for all cable gauges of all lengths, either loaded or nonloaded, when 1  $\mu$ F capacitance is added. Therefore, it is recommended that option A be exercised in all cases.

**8.08 *Attenuation Controls:*** There are two generic types of attenuation controls used in the D4 channel units. They are the socket-and-plug type and a switch type. Whatever the type of attenuation

control, the transmission path of which they are a part is identified by a wiring board or attenuation control marking of TRMT or T for the transmit path and RCV or R for the receive path. An exception is the 4ETO channel unit which has markings of "TRMT GAIN" and "RCV GAIN" for the attenuation controls.

## B. Use of Prescription Setting Charts 1 Through 22

**8.09** Charts 1 through 21 provide the equalizer prescription settings for the equalized 4-wire channel unit controls. Charts 1 through 5 give the settings and cable loss for use with nonloaded single-gauge 19-, 22-, 24-, 25-(MAT) cable, and 26-gauge cables. For mixed-gauge charts the cable length is given in working length (WL). Charts 6, 7, and 8 give the settings for nonloaded mixed-gauge 24- and 22-, 26- and 22-, and 26- and 24-gauge cable applications. Charts 9 through 13 give the settings for loaded single-gauge 19-, 22-, 24-, 25-(MAT) cable, and 26-gauge cables. The settings for loaded mixed-gauge 24- and 22-, 26- and 22-, and 26- and 24-gauge cables are covered on Charts 14, 15, and 16. Charts 17 through 21 provide settings and cable loss for single-gauge 19-, 22-, 24-, 25-(MAT) cable, and 26-gauge cables used on V4 or MFT nonloaded applications without active equalization.

**8.10 Crosstalk Limitations:** The design rules influenced by crosstalk limitations for determining the channel unit transmit and receive attenuator settings are as follows:

(1) The input level to the channel unit T and R leads cannot be lower than a  $-9$  dB TLP. Conversely, the output level from the channel unit T1 and R1 leads cannot be greater than a  $+6$  dB TLP ( $+7$  dB TLP for the 4-wire ETO channel unit). These design rules apply to 600-ohm nonloaded and 1200-ohm loaded cable applications. For 150-ohm nonloaded cable applications, a relaxed input level of  $-15$  dB is permitted.

(2) The 4-wire channel unit is assumed to be located in a CO and is working into a cable section which terminates at a PBX or customer location.

**Note:** If it is assumed that the cable section connects two COs, for loaded cable applications, the relaxed (parenthetical) values in Rules 3 through 5 will apply.

(3) At the PBX or customer location, the minimum input level from the cable section is  $-9$

dB TLP for 600-ohm nonloaded cable applications;  $-15$  dB TLP for 150-ohm applications; and  $-6$  dB TLP ( $-9$  dB TLP) for 1200-ohm loaded cable applications.

(4) At the PBX or customer location, the maximum output level to the cable section is  $+6$  dB TLP for nonloaded cable applications and  $+3$  dB TLP ( $+6$  dB TLP) for loaded cable applications.

(5) The maximum allowable transducer loss at 1 kHz of a cable section is 15 dB for nonloaded cable applications and 12 dB (15 dB) for H88 loaded cable applications.

(6) H88 loaded cables are considered to have nominal 3.0-kft end sections. End sections from 1.5 kft to 4.5 kft will result in additional roll-off at 3 kHz of up to 0.8 dB. End sections over 4.5 kft or bridged taps in the end sections will require field touchup as described in Section 365-170-000 (TOP).

## 8.11 Nonloaded Cable Applications—Single Gauge:

For single-gauge facilities, the prescription equalizer settings may be taken directly from Charts 1, 2, 3, 4, and 5, which are for 19-, 22-, 24-, 25-gauge (MAT) cable, and 26-gauge cable. To use the charts:

- (1) Round the facility length to the nearest whole number in kft to obtain the chart entry point.
- (2) From the chart obtain bandwidth (BW), height (HT), slope (SL), equalizer gain (EQL GN), and cable loss.
- (3) Correct the cable loss for round-off error by **interpolation** or use Fig. 21.

EXAMPLE: Given 14.6 kft of 26-gauge cable:

(a) Round off to 15 kft to get chart entry point.

(b) From Chart 5, 15 kft of 26-gauge cable has the following settings:

BW = 13

HT = 6

SL = 3

EQL GN = 1.6 dB (will be used to calculate attenuator settings).

(c) Chart cable loss = 7.6 dB for 15 kft. **By interpolation**, 14.6 kft of 26-gauge cable has 1 kHz loss of 7.4 dB, or from Fig. 21:

Total length = 14.6 kft

Total resistance =  $14.6 \times 83.3 = 1216$  ohms (use Table Q for determining cable resistance/kft)

1 kHz loss = 7.4 dB.

**8.12 Nonloaded Cable Applications—Two Gauges:**

For facilities composed of two segments of different gauge nonloaded cable, prescription settings may be obtained from the charts. Chart 6 is for 24- and 22-gauge combinations; Chart 7 is for 26- and 22-gauge combinations; and Chart 8 is for 26- and 24-gauge combinations. Combinations of 19-gauge cable are covered separately in paragraph 8.16. To find equalizer settings for two-gauge cable sections:

- (1) Determine the chart entry point by adding the length of the two gauges together and rounding to the nearest kft for the working length (WL). Enter the chart at the WL and round the finer gauge to the nearest whole number.
- (2) Obtain BW, HT, SL, and EQL GN from the chart.
- (3) Obtain the cable loss by use of Fig. 21.

EXAMPLE: Given a facility composed of 10.4 kft of 24-gauge and 8.2 kft of 26-gauge cable:

(a) Determine chart entry points by finding WL:

$10.4 \text{ kft } 24\text{-gauge} + 8.2 \text{ kft } 26\text{-gauge} = 18.6 \text{ kft}$   
or rounding WL = 19 kft.

Round the finer gauge (26) to the nearest kft (8.2 = 8.0). Therefore, the chart entry points become:

WL = 19 kft

8 kft of 26-gauge and 11 kft of 24-gauge.

(b) From Chart 8:

BW = 14

HT = 8

SL = 2

EQL GN = 1.6 dB (will use later to determine TRMT and RCV attenuator settings).

(c) Use Fig. 21 to determine the cable loss of 8.2 kft of 26-gauge and 10.4 kft of 24-gauge:

Total length = 18.6 kft

Total resistance =  $8.2 (83.3) + 10.4 (51.9) = 1223$  ohms (use Table Q for determining cable resistance/kft).

From Fig. 21 cable loss = 8.1 dB.

**8.13 Nonloaded Cable Applications—More Than Two Gauges:**

To determine prescription equalizer settings for facilities composed of more than two gauges, it is necessary to obtain a facility of equivalent length. This equivalent facility is composed of major and minor gauge segments. The two longest segments are designated the major gauges and the remaining segments of cable are minor gauges. The minor gauge segments are converted to major gauge equivalent lengths using the following constants:

MAJOR GAUGE	MINOR GAUGE			
	19	22	24	26
19	1	1.19	1.41	1.70
22	0.87	1	1.17	1.38
24	0.76	0.86	1	1.17
26	0.67	0.74	0.86	1
CONSTANTS*				

\*25-Ga "MAT" Cable is 0.77

The rules for conversion of a minor gauge to the equivalent major gauge are:

- (a) Convert a minor gauge to the major gauge that is in closest physical proximity in the actual makeup of the cable.

- (b) Convert the minor gauges to the major gauge that is nearest in gauge size.

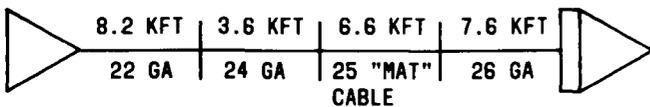
**Note:** 25-gauge (MAT) cable must be converted to an equivalent length of high-capacitance cable before determining major and minor gauges. Multiply 25-gauge (MAT) cable length by 0.77 to arrive at the equivalent length (for all gauges of high-capacitance cable).

**8.14 Equalizer Settings:** The following steps are used to determine the equalizer settings for facilities composed of more than two gauges:

- (1) Select the two longest sections of cable as the major gauges. The remaining sections are minor gauges.
- (2) Convert a minor gauge to a major gauge.
  - (a) Select the proper constant from paragraph 8.13.
  - (b) Multiply the length of the minor gauge by the constant.
  - (c) Add the results to the length of the major gauge.
- (3) Repeat Step 2 for all minor gauges.
- (4) Use the results of Step 3 to enter the charts for two-gauge facilities (Charts 6, 7, or 8).
- (5) Obtain BW, HT, SL, and EQL GN from the chart.
- (6) Compute the cable loss using Fig. 21.

**Note:** In computing the Fig. 21 entry points, the actual cable gauges and lengths are used **not** the converted gauges and lengths obtained in Steps 2 and 3.

EXAMPLE:



Given the above cable facility:

- (a) Convert 25-gauge (MAT) cable segment to 26-gauge (Rule b in paragraph 8.13):

$$6.6 \text{ kft 25-gauge (MAT) cable} \times 0.77 = 5.1 \text{ kft equivalent length of 26-gauge.}$$

- (b) Select 22- and 26-gauge segments as the major gauges.

- (c) Convert 24-gauge to 22-gauge (Rules a and b in paragraph 8.13):

$$3.6 \text{ kft 24-gauge} \times 1.17 \text{ (24 to 22 conversion constant)} = 4.2 \text{ kft equivalent length of 22-gauge.}$$

$$8.2 \text{ kft 22-gauge} + 4.2 \text{ kft 22-gauge equivalent} = 12.4 \text{ kft 22-gauge chart entry.}$$

- (d) Add the 25-gauge (MAT) cable equivalent length to the 26-gauge segment length:

$$7.6 \text{ kft 26-gauge} + 5.1 \text{ kft 25-gauge (MAT) cable equivalent} = 12.7 \text{ kft 26-gauge chart entry.}$$

- (e) From (c) and (d) above, WL equals:

$$12.4 \text{ kft 22-gauge} + 12.7 \text{ kft 26-gauge} = 25.1 \text{ kft or WL} = 25 \text{ kft.}$$

Round the finer gauge (26) to the nearest whole number:

$$12.7 \text{ kft} = 13 \text{ kft 26 gauge.}$$

Chart 7 entry points are:

$$\text{WL} = 25 \text{ kft}$$

26 gauge = 13 kft and 22 gauge = 12 kft (rounded to the nearest whole number).

- (f) From Chart 7:

$$\text{BW} = 14$$

$$\text{HT} = 8$$

$$\text{SL} = 6$$

$$\text{EQL GN} = 3.5 \text{ dB.}$$

- (g) Calculate the 1-kHz cable loss from Fig. 21:

3.6 kft 24-gauge + 8.2 kft 22-gauge + 7.6 kft 26-gauge + 5.1 kft 25-gauge (MAT) cable equivalent = 24.5 kft total length.

187 ohms 24-gauge + 269 ohms 22-gauge + 633 ohms 26-gauge + 432 ohms 25-gauge (MAT) cable actual resistance of 6.6 kft (**not** converted to 26-gauge) = 1521 ohms total resistance.

From Fig. 21 cable loss equals 10 dB.

### 8.15 Nonloaded Cable Applications—

**Bridged Tap:** The procedure for determining equalizer settings for nonloaded cable with bridged taps (BT) requires that the BT be converted to an equivalent length of cable (Table U). The gauge of the BT is not pertinent since loss and amplitude distortion is caused primarily by cable capacitance. The four gauges of cable considered in this section have essentially the same capacitance (.083  $\mu$ F) per mile. Bridge tap should be converted to an equivalent length as follows:

- (1) If the BT is connected at the junction of two gauges, convert to the equivalent length of the longer gauge.
- (2) Convert the BT to an equivalent length of the gauge to which it connects.
- (3) If the location of the BT is unknown, convert to the gauge which makes up the largest part of the facility.

An example of computing equalizer settings for a facility containing BT is shown below:



Given the above cable facility:

- (a) Convert the BT to an equivalent length of 26-gauge cable from Table U. For this BT length the equivalent 26-gauge length would be approximately 2.4 kft.

- (b) Add the facility length to the equivalent length of BT (ELBT):

12 kft facility length + 2.4 kft ELBT = 14.4 kft total facility length 26-gauge.

- (c) From single-gauge chart determine the equalizer settings. Use Chart 5 with an entry point of 14 kft:

$$BW = 13$$

$$HT = 6$$

$$SL = 2$$

$$EQL\ GN = 1.1.$$

- (d) Determine the estimated cable loss from Fig. 21:

Total resistance 12 kft 26-gauge = 1000 ohms.

Total length 12 kft 26-gauge + 3.6 kft BT = 15.6 kft.

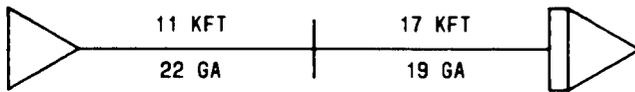
From Fig. 21 cable loss = 6.6 dB.

### 8.16 Nonloaded and Loaded Cable Applications—Mixed 19-Gauge:

Since only small quantities of 19-gauge cable exist in outside plant, it was not included in the two-gauge charts. When two-gauge facilities containing 19-gauge cable are encountered, the facility should be reduced to an equivalent single gauge as follows:

- (1) Select the longer of the two gauges as the major gauge and the shorter as the minor gauge.
- (2) Obtain the constant from paragraph 8.13 to convert the minor gauge to the major gauge.
- (3) Multiply the length of the minor gauge by the constant to obtain the equivalent length of major gauge.
- (4) Use the result of Step 3 to enter the appropriate single-gauge chart and obtain BW, HT, SL, and EQL GN settings.
- (5) Determine cable loss (Fig. 21 or Table P).

EXAMPLE:



Given the above cable facility:

(a) Major gauge is 19-gauge. Minor gauge is 22-gauge.

(b) From paragraph 8.13 the constant is 1.19.

(c) Convert 22-gauge to 19-gauge:

11 kft length of minor gauge (361 ohms)  $\times$  1.19 constant = 13.09 kft equivalent 19-gauge length.

17 kft 19-gauge (277 ohms) + 13.09 kft 19-gauge equivalent = 30.09 kft (round off to 30 kft).

(d) From Chart 1 BW, HT, SL, and EQL GN for 30 kft of 19-gauge:

$$BW = 14$$

$$HT = 7$$

$$SL = 5$$

$$EQL\ GN = 2.8\ dB.$$

(e) Determine cable loss:

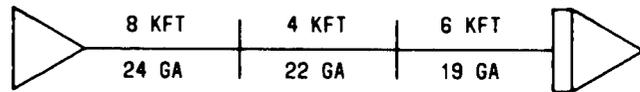
$$\text{Total length} = 11 + 17 = 28\ \text{kft}$$

$$\text{Total resistance} = 361 + 277 = 638\ \text{ohms.}$$

$$\text{Cable loss from Fig. 21} = 6.6\ \text{dB.}$$

When the facility contains more than two gauges and the 19-gauge segment is a minor gauge, the procedure discussed in paragraph 8.13 should be used. If the 19-gauge segment comprises more than one-half of the total length, the facility should be reduced to a 19-gauge equivalent as described above. If neither of the cases described in this paragraph fit the facility, consider the 19-gauge segment as a minor gauge and follow the procedure in paragraph 8.13.

EXAMPLE:



Given the above cable facility:

(a) Since the length of the 19-gauge segment is less than one-half of the total length, the major gauges are 24 and 22.

(b) Convert 19-gauge to 22-gauge:

6 kft 19-gauge (minor gauge)  $\times$  .87 (constant from paragraph 8.13) = 5.22 kft 22-gauge equivalent.

(c) Determine chart entry points:

5.22 kft 22-gauge equivalent + 4.00 kft 22-gauge + 8.00 kft 24-gauge = 17.22 kft.

Round off to WL = 17.0 kft.

24-gauge = 8.0 kft and 22-gauge = 9 kft.

(d) From Chart 6, 24- and 22-gauge:

$$WL = 17\ \text{kft}\ 24\text{-gauge} - 8\ \text{kft}$$

$$BW = 14$$

$$HT = 6$$

$$SL = 2$$

$$EQL\ GN = 1.3\ \text{dB.}$$

(e) Determine cable loss:

$$\text{Total length} = 8 + 4 + 6 = 18\ \text{kft}$$

$$\text{Total resistance} = 415 + 131 + 98 = 644\ \text{ohms.}$$

$$\text{Cable loss from Fig. 21} = 5.2\ \text{dB.}$$

**8.17 Nonloaded Cable Applications—150-Ohm Terminations:** Chart 22 provides the method for calculation of channel unit transmit and receive attenuator settings for mixed, nonloaded V4 cable applications with channel unit equalization disabled.

**8.18 Loaded Cable Applications—Single or Two Gauge:** Prescription equalizer settings

for single-gauge facilities of 19-, 22-, 24-, 25-gauge (MAT) cable, and 26-gauge loaded cable are found in Charts 9, 10, 11, 12, and 13, respectively. Settings for facilities composed of two gauges, 24/22, 26/22, or 26/24, may be found in Charts 14, 15, and 16, respectively. For facilities composed of mixtures of 25H88 (MAT) cable and H88 loaded high-capacitance cable, equalizer settings must be determined by the manual procedures in Section 365-170-000 (TOP). The following steps are used for single- or two-gauge facilities.

- (1) Obtain BW, HT, and SL settings and EQL GN from the appropriate chart for the entry nearest to the facility length.
- (2) The 1-kHz cable loss must be calculated using the loss constants in Table P.

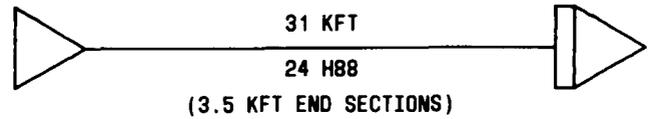
**Note:** Chart entry points for two-gauge facilities should be determined by the following rules:

- Rule 1—Choose the chart entry nearest the actual cable segment lengths. For example, a cable makeup of 7 kft of 26-gauge H88 and 38 kft of 24-gauge H88 (a total of seven H88 loads), the chart entry is 6 kft (26-gauge) and 36 kft (24-gauge).
- Rule 2—If one segment of cable length rounds off to a **lower** chart entry length and the other segment is exactly midway between entry points, that segment should be rounded off to the **higher** entry point. For example, a cable makeup of 9 kft of 26-gauge H88 and 38 kft of 24-gauge H88, the chart entry is 12 kft (26-gauge) and 36 kft (24-gauge).
- Rule 3—If one segment of cable length rounds off to a **higher** entry and the other segment is exactly midway between entry points, that segment should be rounded to the **lower** entry point. For example, a cable makeup of 9 kft of 26-gauge H88 and 40 kft of 24-gauge H88, the chart entry is 6 kft (26-gauge) and 42 kft (24-gauge).
- Rule 4—If both segments of cable length are exactly midway between entry points, round off the larger gauge to the **lower** entry point and the smaller gauge to the **higher** entry point. For example, a cable makeup of 9 kft of 26-gauge H88 and 39 kft of 24-gauge H88,

the chart entry is 12 kft (26-gauge) and 36 kft (24-gauge).

The following examples are for single- and two-gauge facilities.

EXAMPLE 1:



- (a) Obtain BW, HT, and SL settings and EQL GN from Chart 11 (24 gauge, 30 kft):

BW = 3

HT = 4

SL = 2

EQL GN = 2.6 dB.

- (b) Determine the cable loss:

31 kft 24H88 × .23 loss constant from Table P = 7.13 dB cable loss.

EXAMPLE 2:



- (a) Obtain settings from Chart 16 (26/24 gauge):

Entry point = 24 kft of 26-gauge = 18 kft of 24-gauge

BW = 5

HT = 5

SL = 11

EQL GN = 9.5 dB.

(b) Determine the cable loss:

21 kft 26-gauge  $\times$  .34 constant from Table P =  
7.14 dB loss of 26-gauge segment.

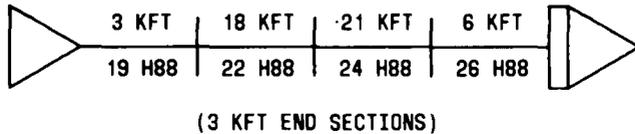
20 kft 24-gauge  $\times$  .23 constant from Table P =  
4.60 dB loss of 24-gauge segment.

7.14 dB loss of 26-gauge + 4.60 dB loss of 24-gauge = 11.74 dB total cable loss.

### 8.19 Loaded Cable Applications—More Than Two Gauges:

When more than two gauges make up the facility, the 1-kHz insertion loss for the individual segments is used to determine the two major gauges. The remaining segments are minor gauges. The length of the minor gauges is added to the length of the nearest gauge size of major gauge to determine the chart entry points. The settings are then determined from the appropriate two-gauge chart.

EXAMPLE:



(a) Compute the 1-kHz insertion loss of each segment using the constants in Table P:

3 kft 19H88  $\times$  .08 constant = .24 dB 1-kHz loss.

18 kft 22H88  $\times$  .15 constant = 2.7 dB 1-kHz loss.

21 kft 24H88  $\times$  .23 constant = 4.83 dB 1-kHz loss.

6 kft 26H88  $\times$  .35 constant = 2.10 dB 1-kHz loss.

.24 dB 19-gauge + 2.7 dB 22-gauge + 4.83 dB 24-gauge + 2.10 dB 26-gauge = 9.87 dB total 1-kHz insertion loss.

(b) Select two major gauges as segments with greatest loss in (a) above. 22-gauge and 24-gauge are major gauges.

(c) Add length of 19-gauge to 22-gauge:

18 kft 22-gauge + 3 kft 19-gauge = 21 kft 22-gauge for chart entry.

(d) Add length of 26-gauge to 24-gauge:

21 kft 24-gauge + 6 kft 26-gauge = 27 kft 24-gauge for chart entry.

(e) Round off 21 kft of 22-gauge to 18 kft. Round off 27 kft of 24-gauge to 30 kft (Rule 4 of paragraph 8.18). WL = 18 + 30 = 48 kft.

From Chart 14:

BW = 3

HT = 5

SL = 2

EQL GN = 2.6 dB.

### 8.20 Loaded Cable Applications—Bridged Taps (BT):

No procedures are given for loaded facilities with BT. If the BT is at the end of the facility and fairly short, the prescription settings may be used as follows:

- (1) Disregard the BT and obtain the prescription settings from the appropriate chart for the facility.
- (2) Make touchup adjustments as described in Section 365-170-000 (TOP) as required.

**Note:** If the above steps do not equalize the facility, the BT must be removed or the actual loss measurements [as described in Section 365-170-000 (TOP)] must be used to determine the equalizer settings.

### C. Calculation of Attenuator Settings

**8.21 Transmit Path Calculations:** In calculating the transmit path attenuator setting, it is assumed that the  $-8.5$  dB TLP at the channel unit TST jack must be maintained and that the level of the signal received on the channel unit T and R input leads can be calculated. This requires that the customer output level to the line and the attenuation in the connecting cable be known. Now, using the channel unit transmit path insertion gain (or loss) given in Table O, the equation below will provide the transmit attenuator setting. (Refer to Fig. 28.)

$$ATT_T = 8.5 + G_T + TLP_{CT} + G_E - C_L \quad \text{setting}$$

where  $ATT_T$  = Required CU transmit attenuator setting

$G_T$  = CU transmit insertion gain (or loss) taken from Table O

$TLP_{CT}$  = Customer output level to line

$G_E$  = Equalizer 1 kHz gain from Charts 1 through 16 (0 dB for Charts 17 through 21)

$C_L$  = Overall cable transducer loss from Charts 1 through 5 and 17 through 21 or calculated per Part 7 of this section.

Example: Using a circuit with a 4DX unit,  $TLP_{CT} = -2.5$  dB, and 31 kft 19-Ga NL cable (Chart 1)

$$ATT_T = 8.5 + G_T + TLP_{CT} + G_E - C_L$$

$$ATT_T = 8.5 + 6.5 + (-2.5) + 3.3 - 6.3$$

$$ATT_T = 9.5 \text{ dB.}$$

To check channel unit crosstalk requirements (see paragraph 8.10, Rule 1), TLP at CU T, R leads =  $TLP_{CT} - C_L \geq -9$  dB.

For above example:

$$TLP_{T,R} = -2.5 - 6.3$$

$$TLP_{T,R} = -8.8 \text{ dB.}$$

**8.22 Receive Path Calculations:** In calculating the receive path attenuator setting, it is assumed that the +4.0 dB TLP at the channel unit TST jack is present and that the required TLP level of the signal leaving the channel unit T1 and R1 output leads is known. It requires that the expected customer input level from the line and the attenuation in the connecting cable be known. Now, using the channel unit receive path insertion gain (or loss) given in Table O, the equation below will provide the receive attenuator setting. (Refer to Fig. 29.)

$$ATT_R = 4 + G_R - TLP_{CR} - C_L$$

where  $ATT_R$  = Required CU receive attenuator

$G_R$  = CU receive insertion gain (or loss) taken from Table O

$TLP_{CR}$  = Customer input level required

$C_L$  = Overall cable transducer loss from Charts 1 through 5 and 17 through 21 or calculated per Part 7 of this section.

Example: Using a circuit with a 4DX channel unit,  $TLP_{CR} = -1.3$  dB, and 31 kft 19-Ga NL cable (Chart 1)

$$ATT_R = 4 + G_R - TLP_{CR} - C_L$$

$$ATT_R = 4 + 2 - (-1.3) - 6.3$$

$$ATT_R = 1.0 \text{ dB.}$$

To check channel unit crosstalk requirements (see paragraph 8.10, Rule 1) TLP at CU T1, R1 leads =  $4 + G_R - ATT_R \leq +6$  dB (+7 dB for 4ETO).

For above example:

$$TLP_{T1,R1} = 4 + 2 - 1.0$$

$$TLP_{T1,R1} = +5 \text{ dB.}$$

## 9. PRESCRIPTION SETTING 2-WIRE GAIN TRANSFER CHANNEL UNIT CONTROLS

**9.01** The 2DX/GT, 2FXS/GT, and 2FXO/GT channel units can be prescription set to provide the equalization, hybrid balance, and attenuation needed for the cable being interfaced. The 2DX/GT channel unit also provides for DX balance. (Refer to Table V.)

### A. Controls

**9.02 Equalization Controls:** Each gain transfer channel unit has four binary-weighted slide switches (8, 4, 2, 1) labeled S2 which can provide 0 through 7.5 dB of *slope* equalization in 16 steps. The switches are operated by sliding to expose the numbers for required equalization or by covering all numbers for zero slope equalization. The slope setting for all loaded facilities is 1 except 25-gauge (MAT) cable, for which the slope setting is 0. The active equalizer produces an additional gain at 1 kHz. This additional

gain must be included in the overall circuit loss calculations. Table W gives this gain relative to slope setting. Refer to Fig. 30, Fig. 31, Fig. 32, and Fig. 33 for slope (SL) equalization settings for nonloaded cable facilities. These figures show in graphic form the slope region based on cable length and resistance. Figure 30 is for the 2FXS/GT or 2FXO/GT terminated with 600 ohms. Figure 31 is for the same type service terminated with 900 ohms. Figure 32 is for the 2DX/GT terminated with 900 ohms and Fig. 33 is for the same DX service terminated with 600 ohms. Use of these figures is outlined in paragraph 9.15.

**9.03 Hybrid Balance Controls:** In order for the hybrid to operate properly, the impedance connected to the line side must be closely matched with an impedance connected to the network side of the hybrid. This is accomplished on the channel unit by either a compromise network (CN) or a PBN. The channel units have an option (jumper plug) for making the CN or PBN selection which is labeled J3 on the 2DX/GT and 2FXS/GT and J6 on the 2FXO/GT. (Refer to Table E for channel unit options.) By selecting CN the channel unit provides a 900 ohm plus 2.15  $\mu\text{F}$  compromise network connected to the hybrid. This option is normally used for testing purposes. By selecting PBN the channel unit provides a precision balancing network which can be prescription set by 14 different switches as follows:

- (a) One switch, designated loaded or nonloaded, is used to select the cable characteristics (loaded or nonloaded).
- (b) One switch, labeled L and located on the group of switches designated R/R1, is used to extend the high-frequency impedance characteristics of the PBN for synthesizing loaded (MAT) cable impedances.
- (c) Three binary-weighted slide switches (4, 2, 1) designated R/R1 are used to control the low-frequency impedance characteristics of the PBN.

**Note:** The R/R1 settings will affect the frequency at which the impedance curve levels out and should therefore be adjusted before setting the switches designated R2.

- (d) Four binary-weighted slide switches (8, 4, 2, 1) designated R2 are used to control the high-frequency impedance characteristics of the PBN for nonloaded cable. This switch should be set to zero (all numbers covered) for loaded cable.

- (e) Five binary-weighted slide switches (16, 8, 4, 2, 1) labeled Z are used to adjust the impedance characteristics of the PBN independent of frequency.

**9.04 DX Balance Controls:** The 2DX/GT channel unit has a 5000-ohm potentiometer (labeled RLP) which is prescription set to balance the external loop resistance. See Table X. Options A and B each add 1  $\mu\text{F}$  of capacitance for loop balance, and it is recommended that 1  $\mu\text{F}$  of capacitance be added (option A selected) for all cable gauges of all lengths, either loaded or nonloaded.

**9.05 Attenuation Controls:** The gain transfer units provide attenuation from 0 through 16.5 dB variable in 0.1-dB increments in both the transmit and receive transmission path. Attenuation is inserted into the transmission path when the rocker switches (designated XMT or TRMT and RCV) are pushed into the IN position for the amount of attenuation required. The attenuator settings should be provided on the CLR card. Section 365-170-000 (TOP) has manual procedures for determining the settings for the transmit and receive attenuators.

## B. Gain Transfer Design Rules

**9.06** When gain transfer circuits are being designed, some rules must be observed to properly prescription set the channel units. For example, **stability** and **crosstalk** are two constraints which limit the transmission levels allowed for 2-wire gain transfer circuits. (It is assumed the channel units are located in the CO).

- (a) For **stability**, the maximum single-ended gain transfer is 6 dB.

**Note:** Single-ended gain transfer is defined as: at one end of the carrier a channel unit operates directly into the switch while at the other end of the carrier a gain transfer channel unit operates into a cable pair (see Fig. 8).

The maximum double-ended gain transfer is 12 dB.

**Note:** Double-ended gain transfer is defined as: at both ends of the carrier there is a gain transfer channel unit which operates into a cable pair (see Fig. 6).

Gain transfer, as indicated in Fig. 6 and 8, is from 2-wire port to 2-wire port in the circuit. If gain

transfer is greater than 4.5 dB for single-ended or 9 dB for double-ended gain transfer circuits, it is recommended that the manual touchup procedure in Section 365-170-000 (TOP) be followed to obtain optimum stability.

(b) For ***crosstalk***, constraints are imposed on the maximum output and minimum input levels with respect to the transmission level point (TLP) as follows:

- Maximum output level = +6 dB (TLP)
- Minimum input level = -9 dB (TLP).

**9.07** Some other limitations are ***roll-off*** and the usual ***1-kHz cable loss***.

(a) For ***roll-off***, the limits differ for circuits engineered to meet trunk objectives from those circuits engineered to meet line objectives. ***It is recommended*** but not required that roll-off at both 400 and 2800 Hz be greater than the 1000-Hz loss.

(1) Roll-off limits for a circuit engineered to meet trunk objectives should be:

400-Hz frequency  $>-1.0$  dB and  $<+3.0$  dB

2800-Hz frequency  $>-1.0$  dB and  $<+4.5$  dB.

Where, with respect to the 1000-Hz level, the negative values indicate more gain and the positive values indicate more loss.

(2) Roll-off limits for a circuit engineered to meet line objectives should not exceed:

400-Hz frequency  $>-1.0$  dB and  $<+5.0$  dB

2800-Hz frequency  $>-1.0$  dB and  $<+7.5$  dB.

(b) For ***1-kHz cable loss***, the single-ended gain transfer circuit is limited to a maximum of 9 dB. The double-ended gain transfer circuit is limited to a maximum cable loss of 15 dB with no more than 9 dB on one side. This 15-dB loss is allowed only when the facilities connected to the channel units match the entry point on the prescription setting charts very closely.

### C. Calculation of Slope Equalizer Settings and 1-kHz Equalizer Gain

#### 9.08 ***Slope Equalizer Settings for Loaded Cable Applications:***

The optimum slope equalizer setting for all high capacitance loaded cable applications regardless of length or gauge is a setting of 1. For loaded 25-gauge (MAT) cable the setting is 0. This is true for both the DX- and FX-type gain transfer channel units.

**Note:** The customer end section of any 2-wire gain transfer loaded cable facility may not exceed 9 kft including bridged tap.

#### 9.09 ***Slope Equalizer Settings for Nonloaded Cable Applications:***

Charts 23 through 27 for single-gauge nonloaded cable provide the slope equalizer settings for the DX and FX channel units by termination impedance. For two-gauge nonloaded facilities, Charts 28 through 33 do ***not*** provide the slope equalization settings and they must be calculated. Slope equalization settings must also be calculated for facilities of more than two gauges. Figures 30 through 33, are slope equalization graphs which show equalizer settings for a given channel unit termination combination as a function of total length and dc resistance of the multigauge nonloaded facility. Optimum or near optimum prescription equalizer settings which meet trunk roll-off objectives for most nonloaded facilities can be obtained from these graphs when properly used.

(a) To use the graphs:

(1) Determine the total length of the nonloaded facility in kilofeet.

**Note:** The total length of the nonloaded facility, including bridged tap, should not exceed 20 kft at one end of a circuit, and the total metallic circuit (including both ends) should not exceed 30 kft including bridged tap.

(2) Include the equivalent length of all bridged taps. Convert to an equivalent length using Table U. Do not include bridged tap resistance in the total.

(3) Any 25-gauge nonloaded (MAT) cable segment must be converted to an equivalent length of high-capacitance cable by multiplying the length of the 25-gauge (MAT) cable by 0.77

to determine the segment length to be included in the total facility length. However, the actual resistance of 25-gauge (MAT) cable obtained from Table Q calculations should be included in the total facility resistance.

- (4) Using Table Q, determine the resistance of the nonloaded facility. Do not use bridged tap length when calculating total resistance.
- (5) Select the applicable graph based on the type of service and far-end termination as follows:

SERVICE	TERMINATION	GRAPH
FX	600 ohm	Fig. 30
FX	900 ohm	Fig. 31
DX	900 ohm	Fig. 32
DX	600 ohm	Fig. 33

- (6) Using the total length and resistance determined previously, locate the intersecting point on the applicable chart.
- (7) The region in which the point is located specifies the equalizer (SL) slope setting. If the point is on a region boundary line, choose the larger of two slope settings.

**9.10 1-kHz Equalizer Gain:** The gain transfer channel unit active equalizer produces an additional gain at 1 kHz. This gain must be included in the overall circuit loss calculations. Table W gives this additional gain relative to the slope setting.

#### D. Use of Prescription Setting Charts 23 Through 45

**9.11** The 2-wire gain transfer channel unit controls can be prescription set for either loaded or nonloaded facilities.

- (a) **LBOC Considerations:** To smooth out the impedance/frequency characteristics of loaded cables with short (eg, 3000 feet) end sections, LBOC is inserted as required. Channel unit PBNs have been designed to match cables with end sections up to 6000 feet, and the LBOC should be

adjusted to build out the cable to that length. Slide switches labeled A through F are provided on the channel units and are positioned to expose the letters for the value of capacitance required. Table G summarizes these values based on end-section length for both high-capacitance and (MAT) cable. This table was developed using the formulas:

$$\text{High-capacitance } C = .008 + .016 (6 - N)$$

$$\text{MAT } C = .008 + .0122 (6 - N)$$

Where C is the value of capacitance in  $\mu\text{F}$  and N is the end section length in kilofeet.

When working with nonloaded cable the LBOC is not used (all letters covered).

(b) **PBN Prescription Settings:** To use the charts for PBN prescription settings requires knowledge of facility gauge, length, and far-end termination. Charts 23 through 27 and 34 through 38 give settings for facilities composed of single gauge and Charts 28 through 33 and 39 through 44 give settings for facilities using two gauges. For facilities composed of more than two gauges, or consisting of a mixture of loaded and nonloaded cable or with bridged taps, Chart 45, or the manual procedures in Section 365-170-000 (TOP) must be used. To minimize the time for optimizing those facilities which closely resemble the chart entry points, use the settings as an initial setting for the channel unit.

(c) **PBN Average Settings:** The settings obtained from Chart 45, should meet balance requirements for most circuits. If improved balance is desired after completion of the procedure in Chart 45, the return loss of the circuit may be optimized using the manual procedure in Section 365-170-000 (TOP). Chart 45, gives average PBN settings based on cable gauge and is self-explanatory.

(d) **DX Loop Balancing:**

- (1) The DX channel units have a potentiometer which must be set to balance the loop resistance. The charts give this setting in the right-hand column (DX RLP).
- (2) In conjunction with loop resistance balancing the loop capacitance must be balanced.

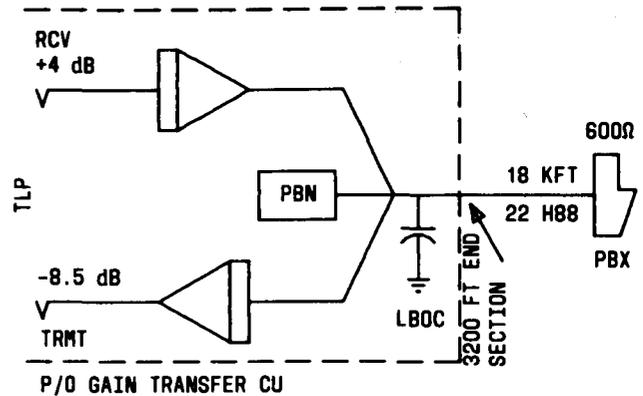
This is accomplished on DX circuits by exercising two options on the DX channel unit. These options are labeled A and B and each add 1  $\mu\text{F}$  of capacitance. It is recommended that optimum balance can be obtained, for all cables, when option A is exercised (adding 1  $\mu\text{F}$  of capacitance). Refer to Table E and Table V for 2DX/GT.

- (e) **Slope Equalization Prescription Settings:** The charts for single-gauge nonloaded cable give the slope settings under the appropriate far-end termination. Since the DX- and FX-type channel units require different SL settings, the charts show in separate columns these settings based on cable length and PBN settings. The charts for two-gauge nonloaded cable do not show SL settings since these settings must be calculated. To calculate slope use the graphs (Fig. 30, Fig. 31, Fig. 32, and Fig. 33) and the dc cable resistance constants from Table Q. These graphs can also be used for calculating SL settings for those cases where the length of nonloaded cable (including bridged tap equivalent from Table U) does not closely match the chart entry points. The SL setting for all loaded cable is 1 except 25-gauge (MAT) cable, for which the SL setting is 0.

**9.12 Loaded Cable Applications—Single Gauge:** For single-gauge facilities, use Charts 34 through 38. The proper chart is selected according to the gauge of cable.

- (a) To use the single-gauge charts:
- (1) Determine the proper chart by the gauge of the facility.
  - (2) Locate the length of cable.
  - (3) Locate the PBN settings under the appropriate termination heading.
  - (4) Also note the positioning for switches L and S2.
  - (5) The settings for the DX RLP (loop resistance for DX circuits) is given in the right-hand column. Although the charts do not show them, the DX CU option A must be exercised in conjunction with the RLP setting.

Example for single-gauge loaded facility:



- (b) Given the above circuit with the near-end section 3200 feet:

- (1) Locate the length of the end section in Table G (3.2 kft) for high capacitance and use the LBOC setting shown to the right (BDE).

**Note:** The LBOC can be calculated also by using the formulas shown in paragraph 9.11(a).

- (2) Using the single-gauge loaded cable charts, determine the PBN settings from Chart 35 (for 22-gauge H88 loaded cable).

- Length = 18 kft.
- Since the circuit terminates in a 600-ohm PBX, the  $600\Omega + 2.15 \mu\text{F}$  termination column is used.
- The PBN settings are:

$$R/R1 = 2 \text{ (also cover the L designation)}$$

$$R2 = 0$$

$$Z = 2$$

**Note:** The slope setting switch S2 is set to 1. If DX unit, set RLP to 600 and exercise option A.

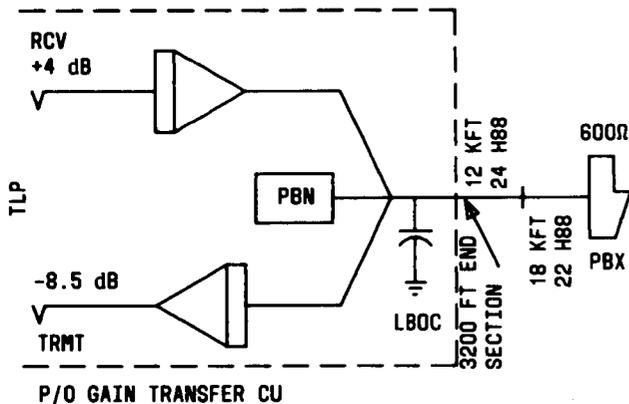
**9.13 Loaded Cable Applications—Two-Gauge:** For two-gauge facilities, use Charts 39 through 44. The proper chart is selected according to the gauge of cable adjacent to the channel unit. The adjacent gauge is listed first in the respective chart. The working length (WL) parameter (total

length of the facility from channel unit to termination) is used to allow better grouping of the settings. The WL is subdivided into the lengths of the individual gauges.

(a) To use the two-gauge charts:

- (1) Determine the proper chart by the gauges of the facility. Make sure the gauge adjacent to the channel unit is listed first in the chart.
- (2) Locate the WL of the facility and then the combination of gauge lengths.
- (3) Locate the PBN settings under the appropriate termination heading.
- (4) Also note the positioning for switches L, R2, and S2.
- (5) The setting for the DX loop resistance (DX RLP) is also given. Although the charts do not show it, the DX CU option A must be exercised in conjunction with the RLP setting.

Example for two-gauge loaded facility:



(b) Given the above circuit with the near-end section 3200 feet:

- (1) Locate the length of the end section in Table G (3.2 kft) for high capacitance and use the LBOC setting shown to the right (BDE).

**Note:** The LBOC can be calculated also by using the formulas shown in paragraph 9.11(a).

(2) Using the two-gauge loaded cable charts, determine the PBN settings from Chart 43 (for 24-gauge adjacent to channel unit combined with 22-gauge).

- $WL = 12 + 18$  or 30 kft.
- Locate under the  $WL = 30$ , the 12 and 18 combination.
- Since the circuit terminates in a 600-ohm PBX, the  $600\Omega + 2.15 \mu F$  termination column is used.
- The PBN settings are:

$R/R1 = 5$  (also cover the L designation)

$R2 = 0$

$Z = 3.$

**Note:** The slope setting switch S2 is set to 1. If DX unit, set RLP to 1300 and exercise option A.

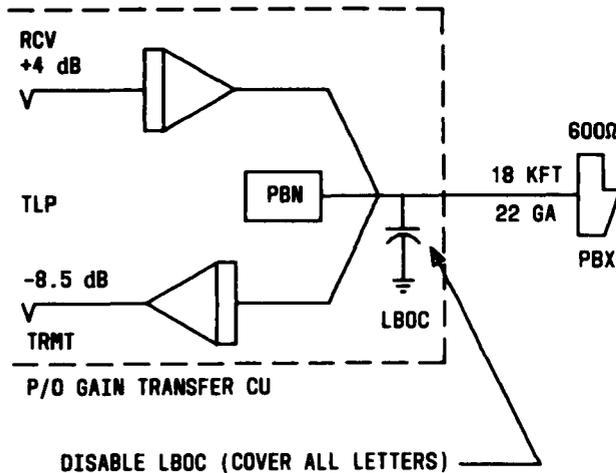
**9.14 Nonloaded Cable Applications—Single Gauge:**

For single-gauge facilities use Charts 23 through 27. The proper chart is selected according to the gauge of cable. These charts are similar to the charts for loaded cable.

(a) To use the single-gauge charts:

- (1) Determine the proper chart by the gauge of the facility.
- (2) Locate the length of cable.
- (3) Locate the PBN settings under the appropriate termination heading.
- (4) Also note the positioning for switch L.
- (5) Obtain the proper slope setting for switch S2 of the channel unit (for 2DX/GT under column DX/SL, and for 2FXS/GT or 2FXO/GT under column FX/SL).
- (6) The settings for the DX RLP are given in the right-hand column. Although the charts do not show it, the DX CU option A must be exercised in conjunction with the RLP setting.

Example for single-gauge nonloaded facility:



(b) Given the above circuit:

(1) Disable the channel unit LBOC switches (A, B, C, D, E, and F) by positioning the switches to cover all letters.

(2) For this example assume the channel unit is a 2DX/GT. Exercise the jack and plug option labeled A (refer to 2DX/GT in Table E) in conjunction with channel unit RLP potentiometer.

(3) Using the single-gauge nonloaded cable charts, determine the channel unit PBN, slope (SL) S2, and RLP settings from Chart 24 (for 22-gauge nonloaded cable).

- Length = 18 kft.
- Since the circuit terminates in a 600-ohm PBX, the  $600\Omega + 2.15 \mu\text{F}$  termination column is used.

• The PBN settings are:

$R/R1 = 5$  (also cover the L designation)

$R2 = 6$

$Z = 16$ .

- The DX SL setting is  $S2 = 5$ .
- The DX RLP setting is  $RLP = 600$  (refer to Step 2 above).

### 9.15 Nonloaded Cable Applications—Two-Gauge:

For two-gauge facilities use Charts 28 through 33 to obtain prescription settings for the channel unit PBN and RLP controls. The SL setting for the two-gauge facility must be determined by using Table Q and the graphs shown in Fig. 30 through 33. The proper *graph* is selected according to the type of channel unit and far-end termination. The proper *chart* is selected according to the gauge of cable adjacent to the channel unit. The adjacent gauge is listed first in the respective chart. The WL parameter (total length of facility from channel unit to termination) is used to allow better grouping of the settings. The WL is subdivided into the lengths of the individual gauges.

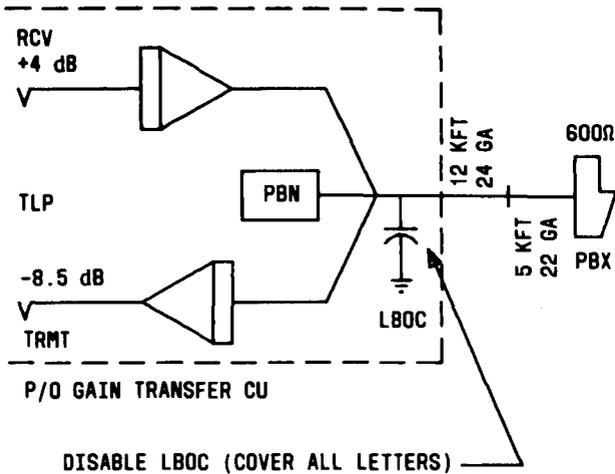
(a) To use the two-gauge charts:

- (1) Determine the proper chart by the gauges of the facility. Make sure the gauge adjacent to the channel unit is listed first in the chart.
- (2) Locate the WL of the facility and then the combination of gauge lengths.
- (3) Locate the PBN settings under the appropriate termination heading.
- (4) Also note the proper positioning for the L switch.
- (5) The DX RLP setting is given in the right-hand column. Although the charts do not show them, the DX CU option A must be exercised in conjunction with the RLP setting.

(b) To use the graphs:

- (1) Determine the proper graph by the type of channel unit and the far-end termination.
- (2) To determine the slope setting, use the cable length of each gauge and multiply each by its dc resistance constant from Table Q; then add the results for a total resistance. Use the WL for the total length. Find these on the proper graph and read the SL setting at the intersecting point. If the point falls on a line, use the next higher SL reading.

Example for two-gauge nonloaded facility:



(c) Given the above circuit:

- (1) Disable the channel unit LBOC switches (A, B, C, D, E, and F) by positioning the switches to cover all letters.
- (2) For this example assume the channel unit is a 2DX/GT. Exercise the jack and plug option labeled A (refer to 2DX/GT in Table E) in conjunction with channel unit RLP potentiometer.
- (3) Determine the channel unit PBN and RLP settings from Chart 30 (for 24-gauge adjacent to the channel unit combined with 22-gauge):

- The circuit shows 12 kft of 24-gauge adjacent to the channel unit combined with 5 kft of 22-gauge.
- $WL = 12 + 5$  or 17 kft.
- Locate under the  $WL = 17$ , the 12 and 5 combination.
- The far-end termination is a 600-ohm PBX.
- Using the  $600\Omega + 2.15 \mu F$  column the channel unit PBN settings are:

$R/R1 = 5$  (also cover the L designation)

$R2 = 4$

$Z = 9$ .

- The DX RLP setting is  $RLP = 800$  (refer to Step 2 above).

(4) Using the graph for a 2DX/GT with a far-end termination of 600 ohms (Fig. 33) and Table L, determine the channel unit slope switch (S2) setting.

- The circuit shows  $WL = 17$  kft for the total nonloaded cable length.
- The 24-gauge is 12 kft multiplied by constant 51.9 (from Table Q) = 623 ohms. The 22-gauge is 5 kft multiplied by constant 32.8 (from Table Q) = 164 ohms.
- The total resistance = 787 ohms.
- Locate 17 horizontally and 787 vertically on the graph which intersects in slope region 5.
- The SL switch setting is  $S2 = 5$ .

#### E. Use of Prescription Setting Charts 46, 47, and 48

**9.16** Charts 46, 47, and Chart 48, were developed to provide prescription settings for gain transfer channel units used on circuits requiring terminal balance. The 837- or J99380-type impedance compensator is used to improve the circuit performance by providing a better impedance match at the location with the balance requirement. Only very short lengths of nonloaded cable are included in Charts 46 and 47 because of the 4.5-dB insertion loss of 837D/J99380AA impedance compensators. Chart 48, is for loaded cable facilities and the 837A, B, J, and G impedance compensators are for drop side impedance of 900 ohms. The 837E, F, J99380AB, and J99380AC are for drop side impedance of 600 ohms. This chart is set up for 3-kft end sections and the compensators are adjusted accordingly.

**9.17** Chart 46 or 47 (drop side impedance of 600 ohms or 900 ohms, respectively) provides the channel unit PBN, equalizer slope, DX loop resistance balance, and the 837D or J99380AA impedance compensator settings. The charts also show the 1-kHz circuit loss which includes only the cable transducer loss and the impedance compensator insertion loss. The channel unit equalizer gain is not included. For this additional gain introduced by the channel unit equalizer slope setting, refer to Table W.

**9.18** Chart 48 provides basically the same information as Charts 46 and 47 except for impedance compensator settings. For prescription settings on

impedance compensators 837A, B, E/J99380AB, 837F, G/J99380AC, and 837J, refer to Sections 332-206-251, 332-206-252, 332-206-255, 332-206-256, 332-206-257, and 332-206-258, respectively. Chart 48 also shows the 1-kHz circuit loss which includes the cable transducer loss and the impedance compensator insertion loss (which varies over a range of approximately 0.2 to 2.4 dB with impedance compensator type). Again the additional gain contributed by the channel unit equalizer slope setting is obtained from Table W.

**9.19** When the facility makeup does not match the charts very closely, the manual adjustment procedures for gain transfer channel units, which are described in Section 365-170-000 (TOP), should be used.

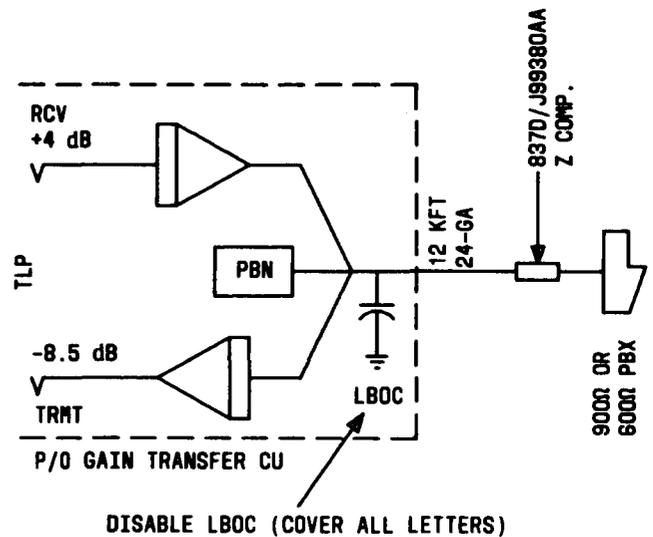
**9.20 Nonloaded Cable Applications:** For single-gauge nonloaded facilities using 837D or J99380AA impedance compensators at the far end with a drop side impedance of 600 ohms, use Chart 46. Use Chart 47 for these facilities with a drop side impedance of 900 ohms.

**Note:** Nonloaded 25-gauge (MAT) cable is not recommended for use on circuits requiring terminal balance.

(a) To use Chart 46 or 47:

- (1) Determine the chart entry point by the gauge and length of the facility.
- (2) Locate the PBN settings under the channel unit column for the proper length.
- (3) Also note the positioning of the L switch.
- (4) Locate the slope switch (S2) setting under channel unit column.
- (5) If the channel unit is a 2DX/GT, then locate the DX RLP setting in the right-hand column. Also exercise DX CU option A.
- (6) The chart also specifies the prescription settings for the impedance compensator. Make sure the 600Ω or 900Ω screws (as appropriate) are down. Locate the proper build-out resistance (BOR) and R potentiometer settings for the cable length entry point.
- (7) The 1-kHz circuit loss information can be obtained from these charts and the channel unit slope equalizer gain from Table W.

Example for single-gauge nonloaded cable using impedance compensator at far end:



(b) Given the above circuit:

(1) Disable the channel unit LBOC switches (A, B, C, D, E, and F) by positioning the switches to cover all letters.

(2) For this example assume the channel unit is a 2DX/GT and the far end is a 600-ohm PBX. Exercise the jack and plug option labeled A (refer to 2DX/GT in Table E) in conjunction with channel unit RLP potentiometer.

(3) Using single-gauge nonloaded cable Chart 46, determine the channel unit PBN, slope, and RLP settings (for 12 kft of 24-gauge). The impedance compensator settings are also given.

- Cable gauge = 24.
- Length = 12 kft.
- The PBN settings are:

R/R1 = 6 (also cover the L designation)

R2 = 10

Z = 13.

- The slope setting is S2 = 1.
- The DX RLP setting is RLP = 800 (refer to Step 2 above).

- The impedance compensator settings are:

600Ω screws = down

900Ω screws = up

BOR = 114

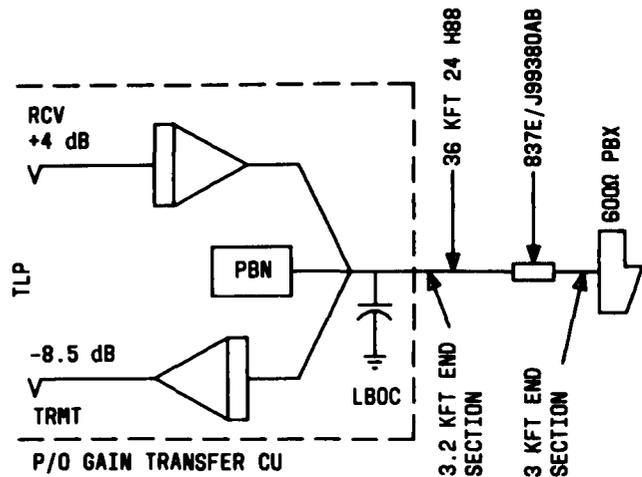
R = 18.

**9.21 Loaded Cable Applications:** For single-gauge loaded facilities using 837/J99380-type impedance compensators at far end adjusted for 3-kft end sections, use Chart 48.

(a) To use Chart 48:

- (1) Determine the chart entry point by the gauge and length of the facility. This chart uses the gauge for headings and the combination of impedance compensator used.
- (2) Locate the PBN settings under channel unit PBN column for the proper length.
- (3) Also note the positioning of the L switch.
- (4) The R2 switch setting is shown in Note 2 of the chart.
- (5) The S2 switch (slope) setting is shown in Note 1 of the chart.
- (6) If the channel unit is a 2DX/GT, then the RLP setting for a particular gauge, length, and impedance compensator can be calculated using Table U.
- (7) The prescription settings for adjusting the impedance compensators are given in Sections 332-206-251, 332-206-252, 332-206-255, 332-206-256, 332-206-257, and 332-206-258.
- (8) The 1-kHz circuit loss information can be obtained from Chart 48 and Table W.

Example for single-gauge loaded cable using impedance compensator at far end:



(b) Given the above circuit with the near-end section 3.2 kft:

- (1) Locate the length of the near-end section in Table G (3.2 kft) for high capacitance and use the LBOC setting shown to the right (BDE).

**Note:** The LBOC can be calculated also by using the formulas shown in paragraph 9.11(a).

- (2) Locate the gauge (24 H88) and the 837 E/J99380AB, then the cable length (36 kft).

- The PBN settings are:

R/R1 = 4 (also cover the L designation)

R2 = 0 (refer to Note 2 of the chart)

Z = 3.

- The slope setting is S2 = 1.

- (3) For this example assume the channel unit is a 2DX/GT. Exercise the channel unit option labeled A in conjunction with the RLP potentiometer.

- The RLP potentiometer setting is calculated using Table X:

RLP =  $C_R + 39$  ohms

RLP =  $1919 + 39 = 1958$

RLP = 2000 (rounded to nearest hundred).

- (4) This example shows a far-end section of 3 kft. Chart 48 indicates for the impedance compensators to be adjusted for 3-kft end sections. For these prescription settings, see Section 332-206-255, which covers the 837E and J99380AB impedance compensator networks installation and prescription settings.

#### F. Calculation of Attenuator Settings

**9.22** The calculations for transmit and receive path attenuator settings are provided in paragraphs 9.23 and 9.24, respectively. The gain transfer circuit shown in Fig. 34A is used in the examples. Fig. 34B shows the completed circuit with the calculated attenuator settings.

**9.23 Transmit Path Calculations:** In calculating the transmit path attenuator setting, it is assumed that the  $-8.5$  dB TLP at the channel unit TST jack must be maintained and that the level of the signal received on the channel unit T and R input leads can be calculated. This requires that the customer output level to the line and the attenuation in the connecting cable be known. Using the equation below will provide the channel unit transmit attenuator setting.

$$ATT_T = 8.5 + G_T + TLP_{CT} + G_E - C_L$$

where  $ATT_T$  = Required channel unit transmit attenuator setting

$G_T$  = Channel unit transmit insertion gain from Table O

$TLP_{CT}$  = TLP at the customer end of the cable (within crosstalk limits of  $+6$  to  $-9$  dB TLP)

$G_E$  = 1 kHz additional gain due to equalizer slope setting (Table W)

$C_L$  = 1 kHz cable loss (refer to Part 7).

Given the double-ended gain transfer circuit in Fig. 34A using 2FXO/GT and 2FXS/GT channel units, calculate the transmit path attenuator settings.

Example A:

Values for 2FXO/GT transmit path and attenuator setting,

$$G_T = 0.5 \text{ dB (from Table O)}$$

$$TLP_{CT} = 0 \text{ dB}$$

$$G_E = 0.1 \text{ dB for slope setting 1 (see paragraph 9.02 and Table W)}$$

Calculating  $C_L$  for **loaded cable** makeup of 13.4 kft 22-Ga and 10.7 kft 24-Ga using constants from Table P:

$$C_L = (13.4 \times 0.15) + (10.7 \times 0.23) \\ = 2.0 + 2.5 = 4.5 \text{ dB}$$

$$ATT_T = 8.5 + G_T + TLP_{CT} + G_E - C_L$$

$$ATT_T = 8.5 + 0.5 + 0 + 0.1 - 4.5$$

$$ATT_T = 4.6 \text{ dB.}$$

Example B:

Values for 2FXS/GT transmit path and attenuator setting,

$$G_T = 0.5 \text{ dB (from Table O)}$$

$$TLP_{CT} = 0 \text{ dB}$$

Calculating  $G_E$  and  $C_L$  for **nonloaded cable** makeup of 10.5 kft 24-Ga with a 4.3 kft bridged tap:

- (1) Bridged tap equivalent length from Table U = 3.6 kft of 24-Ga
- (2) Equivalent 24-Ga NL length =  $10.5 + 3.6 = 14.1$  kft
- (3) Resistance of 10.5 kft of 24-Ga =  $10.5 \times 51.9$  (from Table Q) = 545 ohms
- (4) Using Fig. 24 with entry points of 14.1 kft and 545 ohms: SL = 3
- (5) From Table W:  $G_E = 0.6 \text{ dB}$
- (6) Actual nonloaded length = 24-Ga length + bridged tap length =  $10.5 + 4.3 = 14.8$  kft
- (7) Using Fig. 17 with entry points of 14.8 kft and 545 ohms:  $C_L = 4.2 \text{ dB}$ .

$$ATT_T = 8.5 + G_T + TLP_{CT} + G_E - C_L$$

$$ATT_T = 8.5 + 0.5 + 0 + 0.6 - 4.2$$

$$ATT_T = 5.4 \text{ dB.}$$

To check channel unit crosstalk requirements for 2-wire service (+6 to -9 dB TLP), TLP at the CU T and R leads =  $TLP_{CT} - C_L \geq -9 \text{ dB}$ .

For Example A:

$$TLP_{T,R} = TLP_{CT} - C_L$$

$$TLP_{T,R} = 0 - 4.5$$

$$TLP_{T,R} = -4.5 \text{ dB.}$$

For Example B:

$$TLP_{T,R} = TLP_{CT} - C_L$$

$$TLP_{T,R} = 0 - 4.2$$

$$TLP_{T,R} = -4.2 \text{ dB.}$$

**9.24 Receive Path Calculations:** In calculating the receive path attenuator setting, it is assumed that the +4 dB TLP at the channel unit TST jack is present and that the required TLP level of the signal leaving the channel unit T1 and R1 output leads is known. It requires that the expected customer input level from the line and the attenuation in the connecting cable be known. Using the equation below will provide the receiver attenuator setting.

$$ATT_R = 4 + G_R + G_E - TLP_{CR} - C_L$$

where  $ATT_R$  = Required channel unit receive attenuator setting

$G_R$  = Channel unit receive insertion gain from Table O

$G_E$  = 1 kHz additional gain due to equalizer slope setting (Table W)

$TLP_{CR}$  = Level at far end of cable

$C_L$  = 1 kHz cable loss (refer to Part 7).

Given the double-ended gain transfer circuit in Fig. 34A, using 2FXO/GT and 2FXS/GT channel units calculate the receive path attenuator settings.

Example C:

Values for 2FXO/GT receive path and attenuator settings,

$$G_R = 2 \text{ dB (from Table O)}$$

$G_E$  = 0.1 dB for slope setting 1 (See paragraph 9.02 and Table W)

$$TLP_{CR} = -3 \text{ dB}$$

$C_L$  = 4.5 dB for **loaded cable** makeup of 13.4 kft 22-Ga and 10.7 kft 24-Ga (see paragraph 9.23, Example A calculations)

$$ATT_R = 4 + G_R + G_E - TLP_{CR} - C_L$$

$$ATT_R = 4 + 2 + 0.1 - (-3) - 4.5$$

$$ATT_R = 4.6 \text{ dB.}$$

Example D:

Values for 2FXS/GT receive path and attenuator settings,

$$G_R = 2 \text{ dB (from Table O)}$$

$$TLP_{CR} = -3 \text{ dB}$$

$G_E$  = 0.6 dB for slope setting 3 (see paragraph 9.23, Example B calculations)

$C_L$  = 4.2 dB for **nonloaded cable** of 10.5 kft 24-Ga with 4.3 kft bridged tap (see paragraph 9.23, Example B calculations)

$$ATT_R = 4 + G_R + G_E - TLP_{CR} - C_L$$

$$ATT_R = 4 + 2 + 0.6 - (-3) - 4.2$$

$$ATT_R = 5.4 \text{ dB.}$$

To check channel unit crosstalk requirements for 2-wire service (+6 to -9 dB TLP), TLP at the CU T and R leads =  $4 + G_R + G_E - ATT_R \leq +6 \text{ dB}$ .

For Example C:

$$TLP_{T,R} = 4 + G_R + G_E - ATT_R$$

$$TLP_{T,R} = 4 + 2 + 0.1 - 4.6$$

$$TLP_{T,R} = 1.5 \text{ dB.}$$

For Example D:

$$TLP_{T,R} = 4 + G_R + G_E - ATT_R$$

$$TLP_{T,R} = 4 + 2 + 0.6 - 5.4$$

$$TLP_{T,R} = 1.2 \text{ dB.}$$

## 10. REFERENCES

10.01 The following sections pertain to the D4 channel bank.

SECTION	TITLE	SECTION	TITLE
		332-206-255	837E and J99380AB Impedance Compensator Network Installation and Initial Settings
		332-206-256	837F Network Installation and Prescription Settings
		332-206-257	837G and J99380AC Impedance Compensator Network Installation and Prescription Settings
		332-206-258	837J Network Installation and Prescription Settings
		363-202-100	Subscriber Loop Carrier 96 (SLC-96) Carrier System—General Description
		365-170-000	D4 Channel Bank—TOP
232-190-027	Direct Interface With T Carrier—No. 2 ESS Switch	365-170-100	D4 Channel Bank—Description
233-190-027	Direct Interface With T Carrier—No. 3 ESS Switch	365-170-101	D4 Channel Bank—Channel Unit Description
332-206-251	837A Network Installation and Prescription Settings	365-170-102	D4 Channel Bank—5-kHz and 8-kHz Program Channel Units—Description, Installation, and Tests
332-206-252	837B Network Installation and Prescription Settings	660-47Y-ZZZ	Switching Offices—Through and Terminal Balance
332-206-254	837D and J99380AA Impedance Compensator Network Installation and Initial Settings	855-351-103	D1, D2, D3, and D4 Channel Banks—Application Engineering

TABLE A

## D4 MESSAGE CHANNEL UNITS

J98726( )	SD/CD	CHANNEL UNIT TYPE	FACEPLATE MARKING
BA	3C322-0__	2-Wire Dial Pulse Originating	DPO
BB	3C323-0__	2-Wire Dial Pulse Terminating	DPT
BC	3C324-0__	4-Wire E&M	4E&M
BF	3C340-0__	2-Wire Revertive Pulse, Originating End	RPO
BG	3C341-0__	2-Wire Revertive Pulse, Terminating End	RPT
BH	3C330-0__	3-Wire Sleeve Dial Pulse Originating	SDPO
BJ	3C327-0__	2-Wire E&M	2E&M
BM	3C333-0__	2-Wire Dial Pulse Multifrequency Originating*	DPMO*
BP	3C332-0__	4-Wire E&M Extended Range	4E&MER
BR	3C335-0__	2-Wire No. 2 ESS Terminating Direct Interface	ES2T
BS	3C334-0__	2-Wire No. 2 ESS Originating Direct Interface	ES2O
BT	3C337-0__	2-Wire E&M 600-Ohm	2E&M6
BU	3C328-0__	2-Wire No. 3 ESS T Carrier Direct Interface	ES3
BY	3C392-0__	4-Wire Loop Simplex Originate	4LSXO
BW	3C317-0__	Remote Switching Central Office	RSCO
CH	3C323-0__	2-Wire Dial Pulse Terminating 600-Ohm	DPT6

\*Manufacture Discontinued

◆TABLE B◆

## D4 SPECIAL SERVICE CHANNEL UNITS

J98726( )	SD/CD	CHANNEL UNIT TYPE	FACEPLATE MARKING
BD	3C325-0__	2-Wire Foreign Exchange Station End	2FXS
BE	3C326-0__	2-Wire Foreign Exchange Office End	2FXO
BK	3C338-0__	2-Wire Foreign Exchange Station End Loop-Start	2FXSLS
BL	3C339-0__	2-Wire Foreign Exchange Office End Loop-Start	2FXOLS
BN	3C331-0__	4-Wire Pulse Link Repeater	PLR
CA	3C318-0__	5-KHz Program Transmitter	PG5T
CB	3C319-0__	5-KHz Program Receiver	PG5R
CC	3C320-0__	8-KHz Program Transmitter	PG8T
CD	3C321-0__	8-KHz Program Receiver	PG8R
CE	7C321-0__	15-KHz Program Transmitter	PG15T
CF	7C322-0__	15-KHz Program Receiver	PG15R
CG	3C397-0__	4-Wire E&M Dual	4E&MD
DA	3C336-0__	Digital Signal Zero Dataport	DS0 DP
DB	3C398-0__	Office Channel Unit Dataport [List 1 (2.4 kb), List 2 (4.8 kb), List 3 (9.6 kb)]	OCU DP
DC	3C399-0__	Data Service Unit Dataport	DSU DP
DD	3C448-0__	56-KB Digital Signal Zero Dataport	56-KB DS0 DP
DE	3C447-0__	56-KB Office Channel Unit Dataport	56-KB OCU DP
DF	3C461-0__	Circuit Switched Data Capability Maintenance Channel Unit	CSDC MTCE
DG	7C307-0__	Public Switched Dataport	PSDP
GA	3C464-0__	Security Circuit Station End	SEC MC S
GB	3C465-0__	Security Circuit Office End	SEC MC O
PA	7C302-0__	Remote Exchange Office End	RXO
PB	7C301-0__	Timed Remote Exchange Office End	TRXS
SB	7C024-0__	4-Wire Foreign Exchange Subscriber End	4FXS
SC	7C025-0__	4-Wire Foreign Exchange Office End	4FXO
SD	7C026-0__	2-Wire Duplex With Gain Transfer	2DX/GT
SE	7C027-0__	4-Wire Duplex	4DX
SF	7C028-0__	4-Wire Tandem	4TDM
SG	7C029-0__	2-Wire Foreign Exchange Subscriber End With Gain Transfer	2FXS/GT
SH	7C030-0__	4-Wire Transmission Only	4TO
SJ	7C031-0__	2-Wire Transmission Only	2TO

TABLE B (Contd)

## D4 SPECIAL SERVICE CHANNEL UNITS

J98726 ( )	SD/CD	CHANNEL UNIT TYPE	FACEPLATE MARKING
SK	7C032-0__	2-Wire Foreign Exchange Office End With Gain Transfer	2FXO/GT
SN	7C035-0__	2-Wire Ringdown with Private Line Automatic Ringdown	2RD/PLAR
SP	7C036-0__	4-Wire Ringdown with Private Line Automatic Ringdown	4RD/PLAR
SQ	7C037-0__	4-Wire Equalized Transmission Only	4ETO
SR	3C459-0__	2-Wire Foreign Exchange Station End 600-Ohm	2FXS6
SS	3C460-0__	2-Wire Foreign Exchange Office End 600-Ohm	2FXO6

♦TABLE C♦

## CHANNEL UNIT COMPATIBILITY

CHANNEL UNIT	COMPATIBLE WITH
CSDC MTCE DPMO DPO	NONE (MAINTENANCE ONLY) DPT, ES2T, ES3, PLR, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4TDM DPT, ES2T, ES3, PLR, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M 4E&MER, 4TDM
DPT DPT6 ES20	DPMO, DPO, ES20, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPMO, DPO, ES20, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPT, ES2T, ES3, PLR, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4TDM
ES2T ES3 PG15R	DPMO, DPO, ES20, ES3, PLR, SDPO, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPMO, DPO, ES20, ES3, PLR, SDPO, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM PG15T
PG15T PG5R PG5T	PG15R PG5T PG5R
PG8R PG8T PLR	PG8T PG8R DPMO, DPO, ES20, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM
PSDP RPO RPT	RXO, TRXS RPT, 4TDM RPT, 4TDM
RSCO RXO SDPO	RSCO TRXS, PSDP DPT, ES2T, ES3, PLR, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4TDM
SEC MC O SEC MC S TRXS	SEC MC S, 4TDM* SEC MC O, 4TDM* PSDP, RXO
2DX/GT 2E&M 2E&M6	DPMO, DPO, DPT, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPMO, DPO, DPT, ES20, ES2T, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPMO, DPO, DPT, ES20, ES2T, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM
2FXO 2FXOLS 2FXO6	2FXS, 2FXSLS, 2FXS/GT, 4FXS, 4TDM 2FXS, 2FXSLS, 2FXS/GT, 4FXS, 4TDM 2FXS, 2FXSLS, 2FXS/GT, 4FXS, 4TDM

\* Security channel units are not compatible with 4TDM channel units in the main line. However, 4TDM units may be used in an alternate or a protection line.

TABLE C (Contd)

## CHANNEL UNIT COMPATIBILITY

CHANNEL UNIT	COMPATIBLE WITH
2FXO/GT 2FXS 2FXSLS	2FXS, 2FXSLS, 2FXS/GT, 4FXS, 4TDM 2FXO, 2FXOLS, 2FXO/GT, 4FXO, 4TDM 2FXO, 2FXOLS, 2FXO/GT, 4FXO, 4TDM
2FXS6 2FXS/GT 2RD/PLAR	2FXO, 2FXOLS, 2FXO/GT, 4FXO, 4TDM 2FXO, 2FXOLS, 2FXO/GT, 4FXO, 4TDM TDM, 2RD/PLAR, 4RD/PLAR
2TO 4DX 4ETO	2TO, 4ETO, 4TO DPMO, DPO, DPT, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM 2TO, 4ETO, 4TO
4E&M 4E&MER 4FXO	DPMO, DPO, DPT, ES20, ES2T, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM DPMO, DPO, DPT, ES20, ES2T, ES3, PLR, SDPO, 2DX/GT, 2E&M, 2E&M6, 4DX, 4E&M, 4E&MER, 4DTM 2FXS, 2FXSLS, 2FXS/GT, 4FXS, 4TDM
4FXS 4LSXO 4RD/PLAR 4TDM 4TO	2FXO, 2FXOLS, 2FXO/GT, 4FXO, 4TDM 4LSXO TDM, 2RD/PLAR, 4RD/PLAR (ALL UNITS EXCEPT RSCO, 2TO, 4ETO, 4LSXO, 4TO) 2TO, 4ETO, 4TO

TABLE D

## MESSAGE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
DPO (Orange Dot) J98726BA SD3C322-0__	SD	Forces off-hook (reverse battery) supervision 2 seconds after trunk processing is initiated to make channel appear busy during carrier failure.
	1G	Provides a ground on the 1 lead (make-busy lead) when trunk processing is initiated. After a 2.5-second delay, the ground disappears for 100 milliseconds and then reappears for duration of carrier failure. This option is normally selected for all electromechanical switching machines except No. 5 crossbar.
	S and 1G	Selecting both of these options provides proper conditioning for an outgoing trunk circuit of a step-by-step machine. The sleeve lead from the switch is connected to make-busy lead 1, while the sleeve connection from the trunk circuit is to lead 2. During normal system operation, the channel unit provides a closed circuit between leads 1 and 2, and the trunk circuit and switch interact in the usual way. When trunk processing begins, the channel unit applies a ground to the switch sleeve lead through lead 1 and disconnects lead 2 to isolate the trunk circuit. The 100-millisecond open on lead 1, which occurs after a 2.5-second delay, disconnects any customer who may have been connected to the trunk at the originating end.
	L	Used with No. 5 crossbar switching machine to provide for closure between make-busy leads 1 and 2 during trunk processing. The closure opens for 100 milliseconds after an initial 2.5-second delay, then remains closed until circuit is cleared.
	MF/DP	This option is provided on List 5 DPO channel units. Option is selected corresponding to the type of signaling employed in the trunk (multifrequency or dial pulsing). The DP position provides low dial pulse distortion, while the MF position provides additional protection against loop supervision transients.
	NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.
DPT (Blue Dot) J98726BB or CH SD3C323-0__	NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.
4E&M (White Dot) J98726BC SD3C324-0__ OR 4E&MER (Gray) J98726BP SD3C332-0__	1G	Provides a ground on the 1 lead (make-busy lead) when trunk processing is initiated. After a 2.5-second delay the ground disappears for 100 milliseconds, and then reappears for duration of carrier failure. This option is normally selected for all electromechanical switching machines except No. 5 crossbar. For No. 5 crossbar, connect the 1 and 2 leads but do not use option 1G. This will cause same action as "L" in DPO above.

TABLE D (Contd)

## MESSAGE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
ES2O (Gray) J98726BS SD3C334-0__	NBOC 2, 4, 8, 16, 64	See paragraph 3.02.
ES2T (Gray) J98726BR SD3C335-0__	NBOC 2, 4, 8, 16, 64	See paragraph 3.02.
ES3 (Gray) J98726BU SD3C328-0__	SD	When selected, this option causes the ferrod scanner drive to reappear after 2.5 seconds of trunk processing.
4LSXO (Gray) J98726BY SD3C392-0__	SD  LS  LP  MF/DP	When selected, trunk processing (during a carrier failure alarm) will provide an on-hook, releasing the attached customer, followed 2.5 seconds later by an off-hook, making the channel appear busy.  Selected as a pair to provide loop signaling on a simplex basis over four wires.  Selected as a pair to provide loop signaling over a separate pair of leads.  Selected to correspond to the type of signaling employed in trunk (multifrequency or dial pulsing). The DP position provides low dial pulse distortion, while the MF position provides additional protection against loop supervision transients.
RPO (Gray) J98726BF SD3C340-0__	SD  1G  NBOC 2, 4, 8, 16, 32, 64	When selected, trunk processing (during a carrier failure alarm) will provide an on-hook, releasing the attached customer, followed 2.5 seconds later by an off-hook, making the channel appear busy.  Provides an internal ground on the 1 lead during a carrier failure. When disconnected (black portion of socket exposed and plug inserted to cover white portion), provides a dry contact closure during a carrier failure.  See paragraph 3.02.
RPT (Gray) J98726BG SD3C341-0__	XB  NBOC 2, 4, 8, 16, 32, 64	Conditions the channel unit for use when connected with crossbar incoming registers having U-type relays. When the channel unit is used in panel offices, the option must be disconnected.  See paragraph 3.02.

TABLE E

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
2FXS (Tan Dot) J98726BD SD3C325-0__	SL1 and 2	Exercised as a pair to control loop current by shorting series current-limiting resistors. Selected when cable loop resistance is greater than 300 ohms. (This option is on list 1, 2, and 3 units)
	SD	When selected, this option causes ground to be applied to the tip lead 2.5 seconds after trunk processing begins. This makes the trunk appear busy to the subscriber PBX, preventing the trunk from being seized during a carrier failure.
	CN6 or CN9	Options CN6 and CN9 are exercised separately to form a compromise balance network of 600 or 900 ohms in series with 2.15 $\mu$ F. When neither option is selected, an external PBN can be connected to the channel unit via PN leads. CN6 is normally selected for PBX and automatic call distribution (ACD) applications. CN9 is normally selected for switching office and long connecting loop applications.
	NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.
2FXO (Green Dot) J98726BE SD3C326-0__	LX1 and 2	Exercised as a pair to control loop current by shorting series current-limiting resistors. Both are selected when cable loop resistance exceeds 600 ohms but never used with 72V battery.
	GS	Selected when the unit is used in a ground-start circuit.
	LS	Normally selected. Selection of this option causes the channel unit to provide a loop closure 2.5 seconds after trunk processing begins, which causes the line to appear busy to incoming calls during carrier failure.
	RG	Causes the channel unit to ground the ring lead 2.5 seconds after trunk processing begins. Normally used on a ground-start circuit where the customer prefers his trunk to appear busy to incoming calls during a carrier failure.
	G (Strap)	Provides a ground on the make-busy lead when trunk processing is initiated. After a 2.5-second delay the ground disappears for 100 milliseconds, and then reappears for duration of carrier failure. Normally selected for all electromechanical switching machines except No. 5 crossbar. If a special arrangement requires a dry closure, the strap can be cut.
	CN9	Provides a compromise balance network of 900 ohms in series with 2.5 $\mu$ F and is normally selected for switching office and long connecting loop applications. When not selected, an external PBN can be connected to the channel unit via PN leads.
NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.	

♦TABLE E (Contd)♦

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
2FXSLS (Gray) J98726BK SD3C338-0__	SL1 and 2	Exercised as a pair to control loop current by shorting series current-limiting resistors. Selected when cable loop resistance is greater than 300 ohms. (This option is only on List 1 units)
	4ESS	Selected when channel unit is used to interface a No. 4 ESS switch.
	CN6 or CN9	Options CN6 and CN9 are exercised separately to form a compromise balance network of 600 or 900 ohms in series with 2.15 $\mu$ F. When neither option is selected, an external PBN can be connected to the channel unit via PN leads. CN6 is normally selected for PBX and ACD applications. CN9 is normally selected for switching office and long connecting loop applications.
	STA	Provides a compromise balance network of 600 ohms when used with CN6 or 900 ohms when used with CN9. Should be selected when a nonswitched loop is connected to a station set.
	NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.
2FXOLS (Gray) J98726BL SD3C339-0__	LX1 and 2	Exercised as a pair to control loop current by shorting series current-limiting resistors. Both are selected when loop resistance exceeds 600 ohms but, never used with 72V battery.
	LS	Normally selected in a loop-start circuit. Selection of this option causes the channel unit to provide a loop closure 2.5 seconds after trunk processing begins, which causes the lines to appear busy to incoming calls during carrier failure.
	CN9	This option provides a compromise balance network of 900 ohms in series with 2.15 $\mu$ F and is normally selected for switching office and long connecting loop applications. When not selected, an external PBN can be connected to the channel unit via PN leads.
	4ESS	Selected when channel unit is used to interface a No. 5 ESS.
	NBOC 2, 4, 8, 16, 32, 64	See paragraph 3.02.
PLR (Gray) J98726BN SD3C331-0__	MB and MG	Option MB provides local battery in channel unit and option MG provides ground. These options should be selected for type I interface. Neither option should be selected for type II interface. The MG option is selected and MB option is not selected for type III interface.

♦TABLE E (Contd)♦

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
PLR (Contd) J98726BN SD3C331-0__	MPD	Selection of this option provides a 2.5-second M-lead ground (assuming MB and MG are selected) followed by continuous battery during a carrier failure. This is the standard on-hook/off-hook signal recommended in the latest carrier group alarm plan and should be the normal choice. If a continuous M-lead ground (on-hook) is required during a carrier failure, this option should not be selected.
4FXS (Gray) J98726SB SD7C024-0__	SD	When selected, this option causes ground to be applied to the tip lead 2.5 seconds after trunk processing begins. This makes the trunk appear busy to the subscriber PBX, preventing the trunk from being seized during a carrier failure.
	J6 and J7	Options exercised as a pair to allow reversal of simplex connections at 4-wire pairs.
	J2 (-48V)	Provides -48V battery feed with plug inserted to expose black portion of connector. See paragraph 3.06.
	J2 (-72V)	Provides -72V battery feed with plug inserted to expose white portion of connector. See paragraph 3.06.
	J3 and J4	Always set with plug inserted to expose white portion of connector.
4FXO (Gray) J98726SC SD7C025-0__	LX1	Exercised to control loop current by shorting a series current-limiting resistor. Selected when cable loop resistance exceeds 600 ohms but never used with 72V battery.
	GS	Should be selected when the unit is used in ground-start circuit.
	LS	Normally selected in a loop-start circuit. Selection of this option causes the channel unit to provide a loop closure 2.5 seconds after trunk processing begins which causes the line to appear busy to incoming calls during carrier failure.
	RG	Selection of this option causes the channel unit to ground the ring lead 2.5 seconds after trunk processing begins. Normally used on a ground-start circuit where the customer prefers his trunk to appear busy to incoming calls during a carrier failure.
	G (Strap)	Provides a ground on the make-busy lead when trunk processing is initiated. After a 2.5-second delay, the ground disappears for 100 milliseconds, and then reappears for duration of carrier failure. Option is normally selected for all electromechanical switching machines except No. 5 crossbar. If a special arrangement requires a dry closure, the strap can be cut.
	NOR A and B	Options exercised as a pair to allow reversal of simplex connections at 4-wire pairs.

◆TABLE E (Contd)◆

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
4TDM (Gray) J98726SF SD7C028-0__	EG	Option provides a busy condition after 2.5 seconds during the carrier failure. When option is not exercised, a continuous idle condition is provided.
	E, R, W and V, S or T; and Y or Z	See Table F.
2DX/GT (Gray) J98726SD SD7C026-0__	J4 (SD)	When selected, trunk processing (during a carrier failure alarm) will provide an on-hook, releasing the attached customer, followed 2.5 seconds later by an off-hook, making the channel appear busy.
	J3 (PBN)	When selected, terminates hybrid circuit with PBN.
	J3 (CN)	When selected, terminates hybrid circuit with 900 ohms plus 2.15 $\mu$ F compromise network (CN).
	A and B	Each option adds 1 $\mu$ F capacitance for loop balance. Optimum balance is obtained for all cable gauges of all lengths, either loaded or nonloaded, when 1 $\mu$ F capacitance is added. Therefore, it is recommended that option A be exercised.
	N or R LBOC A-F S1	Switch provides for reversal of simplex connections. See paragraphs 3.04 and 3.05.
2FXO/GT (Gray) J98726SK SD7C032-0__	J4 (GS)	When selected, enables channel for ground-start application.
	LX1/LX2	Selected as a pair, when the channel unit is connected to a loop having more than 600 ohms resistance but, never used with 72V battery.
	J6 (PBN)	When selected, terminates hybrid circuit with PBN.
	J6 (CN)	When selected, terminates hybrid circuit with 900 ohms plus 2.15 $\mu$ F compromise network.
	G (Strap)	Provides a ground on the make-busy lead when trunk processing is initiated. After a 2.5-second delay the ground disappears for 100 milliseconds, and then reappears for duration of carrier failure. Normally selected for all electromechanical switching machines except No. 5 crossbar. If a special arrangement requires a dry closure, the strap can be cut.
	RG	When selected, trunk processing (during a carrier failure alarm) will provide an on-hook, releasing the attached customer, followed 2.5 seconds later by an off-hook, making the channel appear busy.

◆TABLE E (Contd)◆

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
2FXO/GT (Gray) J98726SK SD7C032-0__ (Contd)	LS	When selected, enables channel for loop-start application. Selection of this option causes the channel unit to provide a loop closure 2.5 seconds after trunk processing begins, which causes the line to appear busy to incoming calls during carrier failure.
	LBOC A-F S1	See paragraphs 3.04 and 3.05.
2FXS/GT (Gray) J98726SG SD7C029-0__	J3 (PBN)	When selected, terminates hybrid circuit with PBN.
	J3 (CN)	When selected, terminates hybrid circuit with 900 ohms plus 2.15 $\mu$ F compromise network.
	J4 (SD)	When selected, this option causes ground to be applied to the tip lead 2.5 seconds after trunk processing begins. This makes the trunk appear busy, preventing the trunk from being seized during a carrier failure.
	J2 (SL1, SL2)	Always set with plug inserted to expose white portion of connector.
	J6 (-48V)	Provides -48V battery feed with plug inserted to expose black portion of connector. See paragraph 3.06.
	J6 (-72V)	Provides -72V battery feed with plug inserted to expose white portion of connector. See paragraph 3.06.
2FXO6 (Gray) J98726SS 3C460-0__	LX1 and 2	Increases loop current for loops longer than 600 ohms.
	LS	Loop busied by applying loop closure during a carrier failure.
	4ESS	Ties A and B signaling channels together.
2FXS6 (Gray) J98726SR SD3C459-0__	SD	Trunk busied after a carrier failure by option applying ground to the tip lead.
SEC MC S J98726GA SD3C464-0__	M/S	Set to master (M) position when the channel unit is utilized in the main carrier link. Set to slave (S) position when the channel unit is utilized in the alternate carrier link.
	DIV	Diversity (DIV) is set to white showing for the channel units in both the main and alternate carrier links when an alternate carrier link is in the system. If the system has a main link only, the DIV is set to black showing.

♦TABLE E (Contd)♦

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
SEC MC O J98726GB SD3C465-0__	M/S	Set to master (M) position when the channel unit is utilized in the main carrier link. Set to slave (S) position when the channel unit is utilized in the alternate carrier link.
	DIV	Diversity (DIV) is set to white showing for the channel units in both the main and alternate carrier links when an alternate carrier link is in the system. If the system has a main link only, the DIV is set to black showing.
	3/30	Set to position 3 to make loop look busy for 3 seconds after a carrier failure. Set to position 30 to make busy for 30 seconds after a carrier failure.
	-/+	Set to - position for negative loop voltage. Set to + position for positive loop voltage. (See paragraph 2.36)
	HML (double switch)	Set to high (H), medium (M) or low (L) position to build out the channel unit resistance to 4.7K, 2.7K, or 700 ohms respectively. Both sides of switch should be set in unison. (See paragraph 2.36)
2RD/PLAR J98726SN SD7C035-0__	M(1,2) (double switch)	Selects one of four ringing modes (code, no code, repeat input timing — unlimited, and repeat timing — 2-second limit) for ringdown applications.
	S7, S8	Fifteen switches are used to select the code for code ringing (mode).
	AC/DC (J2)	Selected for PLAR applications or 20-Hz ac ringing in ringdown applications.
	PLAR/RD (J3,J4, J8,J9)	Selected for ringdown application.
	J6 (-48V)	Provides -48V battery feed with plug inserted to expose black portion of connector. See paragraph 3.06.
	J6 (-72V)	Provides -72V battery feed with plug inserted to expose white portion of connector. See paragraph 3.06.
	S (J2)	Selected for nonlooped dc signaling.
4RD/PLAR J98726SP SD7C036-0__	M(1, 2) (double switch)	Selects one of four ringing modes (code, no code, repeat input timing — unlimited, and repeat timing — 2-second limit) for ringdown applications.
	S7, S8	Fifteen switches are used to select the code for code ringing (mode).
	-7 dB (J5)	Selected for PLAR applications.
	AC/DC (J2)	Selected for PLAR applications or 20-Hz ac ringing in ringdown applications.
	PLAR/RD (J3,J4, J8,J9)	Selected for ringdown applications.

♦TABLE E (Contd)♦

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
PSDP ( ) J98726DG SD7C307-0__	SLC*-D4	Faceplate switch to select SLC*-96 carrier or D4 channel bank usage
	Trunk- Loop — CCIS	Selects trunk application without CCIS signaling, loop application or trunk with CCIS signaling application
PG5T J98726CA SD3C318-0__	IMP	Selects 150-ohm or 600-ohm terminating impedance
	COMP	Select according to channel slot and LIU list number per Table M
	EQL	Provides 11 dB of gain at 1 KHz in 32 steps
	AT1	Inserts 0 to 15 dB loss in 1-dB increments
PG5R J9872CB SD3C319-0__	IMP	Same as for PG5T
	COMP	
	AT1	
PG8T J98726CC SD3C320-0__	IMP	Same as for PG5T
	EQL	
	AT1	
PG8R J98726CD SD3C321-0__	S1	Select according to channel slot and LIU list number per Table M
	IMP AT1	Same as for PG5T
PG15T J98726CE SD7C321-0__	S1	Same as for PG8T
	150/600 EQL	Select 150-ohm or 600-ohm terminating impedance Uses six switches (1, 2, 4, 8, 16, 32) to provide 64 settings to shape signal
PG15R J98726CF SD7C322-0__	AT1	Provides up to 16.5 dB attenuation in 0.1 dB steps
	150/600 AT1	Same as for PG15T Same as for PG15T
RXO J98726PA SD7C302-0__	AT1	Provides up to 6.3 dB attenuation in 0.1 dB increments for transmitter
	AT2	Provides up to 6.3 dB attenuation in 0.1 dB increments for receiver
TRXS J98726PB SD7C301-0__	AT1	Same as RXO
	AT2	Same as RXO

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♦TABLE E (Contd)♦

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION								
DS0 DP J98726DA SD3C336-0__	EC IN, OUT  SYS SLC-96, D4	When selected, IN provides error correction for unmultiplexed substrate data; otherwise, select OUT.  This option provides for D4 system applications of dataport or SLC-96 carrier system applications.								
OCU DP J98726DB SD3C336-0__	SLC D4  FLBO (S2) IN, OUT  A*  B*  CSU* (S4)  DSU* (S4)	This option provides for D4 system applications of dataport or SLC-96 carrier system applications.  If estimated loop insertion loss is less than 10 dB, IN must be selected. If the estimated loop insertion loss is 10 dB or greater, OUT must be selected.  Removes customer remote test control (CRTC) with switch open to ground (switch toward A).  Provides for customer remote test control (CRTC) with switch closed (switch toward B).  This option is selected when the customer uses a channel service unit (CSU). Switch closed (switch toward CSU).  This option is selected when the customer uses a 500-type data service unit (DSU). Switch open (switch toward DSU).								
DSU DP J98726DC SD3C399-0__	Rate Selections (S2)	Selection of the data rate is performed by a coded rotary switch as follows: <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">DATA BAUD RATE</th> <th style="text-align: center;">SWITCH POSITION</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2.4 kb/s</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">4.8 kb/s</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">9.6 kb/s</td> <td style="text-align: center;">8</td> </tr> </tbody> </table>	DATA BAUD RATE	SWITCH POSITION	2.4 kb/s	5	4.8 kb/s	6	9.6 kb/s	8
DATA BAUD RATE	SWITCH POSITION									
2.4 kb/s	5									
4.8 kb/s	6									
9.6 kb/s	8									
56-KB DS0 DP J98726DD SD3C448-0__	EC IN, OUT  J2 (P2) IN, OUT	The IN position for both the switch EC and plug (P2) selects the double time slot error-corrected operation.  The OUT position for the switch EC selects the nonerror-corrected data. The OUT position for the plug (P2) if present removes power from the unused error-correction circuitry. Operate together, (both IN or both OUT).								

\*List A of the OCU DP does not have these options.

◆TABLE E (Contd)◆

## SPECIAL SERVICE CHANNEL UNIT OPTIONS

CHANNEL UNIT	OPTION	FUNCTION
56-KB DS0 DP J98726DD SD3C448-0__ (Contd)	MODE SELECT M1 1, 0 M2 1, 0	For time slot option, set the MODE SELECT switches M1 and M2 to 0 (zero) for error-corrected D4 application. Set M1 to 1 (one) and M2 to 0 (zero) for nonerror-corrected D4 and SLC-96 carrier system modes I and III applications. Set M1 and M2 to 1 (one) for error-corrected SLC-96 carrier system modes I and III. Set M1 to 0 (zero) and M2 to 1 (one) for error-corrected SLC-96 carrier system mode II.
56-KB OCU DP J98726DE SD3C447-0__	EC IN, OUT  D,T†  MODE SELECT CM*  CRTC*  CSU,* DSU*	The IN position for the error correction switch selects the double time slot error-corrected operation. The OUT position selects the nonerror-corrected data  Selects D for normal operation. The T position is only for factory tests.  This set of option switches provides the same function as given above for the 56-KB DS0 DP.  Set OUT until customer multiplex is available at the station equipment; then set IN only if the station has customer multiplex equipment.  Set OUT until customer remote test control (CRTC) is available; then set IN only if station has CRTC feature.  Select according to the type of equipment at the station; DSU for data service unit or CSU for channel service unit.
PSDP ( ) J98726DC SD7C307-0__	SLC‡-D4  Trunk- Loop — CCIS	Faceplate switch to select SLC-96 carrier system or D4 channel bank usage.  Selects trunk application without CCIS signaling, loop application or trunk with CCIS signaling application.
4E&MD J98726CG SD-3C397-0__	E1G and E2G  X	When selected, provides a ground on the E1 and E2 leads in the off-hook state. When not selected, provides a ground-free loop between E1-EB2 and E2-EB2 in the off-hook state.  When selected with EG not selected, provides -48 volts on the E1 and/or E2 lead in the off-hook state.

\*List A of the OCU DP does not have these options.

†Replaced by wire strap on List A of OCU DP.

TABLE F

## TANDEM CHANNEL UNIT OPTIONS

TYPE OF CONNECTION (NOTE 2)			FUNCTION DESIGNATION (NOTE 1)							
			Z	Y	E	W	V	T	S	R
Foreign Exchange	Nonlooped Signaling Leads	D4 Tandem Connecting Through the T Carrier Toward the CO	NC	C	C	C	C	NC	C	NC
		D4 Tandem Connecting Through the T Carrier Toward the Sub	C	NC	C	C	C	C	NC	NC
	Looped Signaling Leads	D4 Tandem Connecting Through the T Carrier Toward the CO	NC	C	NC	C	C	NC	C	NC
		D4 Tandem Connecting Through the T Carrier Toward the Sub	C	NC	NC	C	C	C	NC	NC
All 2-State Signaling Connections	Nonlooped Signaling Leads		C	NC	C	NC	NC	NC	C	C
	Looped Signaling Leads		C	NC	NC	NC	NC	NC	C	C
F or G Signaling Tandem	D4 Tandem Connecting Through T Carrier Toward the CO		NC	C	C	C	C	NC	C	NC
	D4 Tandem Connecting Through T Carrier Toward the Sub		C	NC	C	C	C	C	NC	NC

**Note 1:** C = Option(s) selected (connected); NC = Option(s) not selected (not connected).

**Note 2:** Or the option function.

**TABLE G**  
**LINE BUILD-OUT CAPACITANCE**  
**(LBOC) SETTINGS**

END SECTION LENGTH (KFT)	HIGH CAPACITANCE ( $\mu$ F)	EXPOSE LETTER(S) LBOC SETTING	END SECTION LENGTH (KFT)	HIGH CAPACITANCE ( $\mu$ F)	EXPOSE LETTER(S) LBOC SETTING
0.0	.104	CEF			
0.1	.102	ABEF	3.1	.054	ABDE
0.2	.100	BEF	3.2	.052	BDE
0.3	.100	BEF	3.3	.052	BDE
0.4	.098	AEF	3.4	.050	ADE
0.5	.096	EF	3.5	.048	DE
0.6	.094	BCDF	3.6	.046	ABCE
0.7	.092	BCDF	3.7	.044	BCE
0.8	.092	BCDF	3.8	.044	BCE
0.9	.090	ACDF	3.9	.042	ACE
1.0	.088	CDF	4.0	.040	CE
1.1	.086	ABDF	4.1	.038	ABE
1.2	.084	BDF	4.2	.036	BE
1.3	.084	BDF	4.3	.036	BE
1.4	.082	ADF	4.4	.034	AE
1.5	.080	DF	4.5	.032	E
1.6	.078	ABCF	4.6	.030	ABCD
1.7	.076	BCF	4.7	.028	BCD
1.8	.076	BCF	4.8	.028	BCD
1.9	.074	ACF	4.9	.026	ACD
2.0	.072	CF	5.0	.024	CD
2.1	.070	ABF	5.1	.022	ABD
2.2	.068	BF	5.2	.020	BD
2.3	.068	BF	5.3	.020	BD
2.4	.066	AF	5.4	.018	AD
2.5	.064	F	5.5	.016	D
2.6	.062	ABCDE	5.6	.014	ABC
2.7	.060	BCDE	5.7	.012	BC
2.8	.060	BCDE	5.8	.012	BC
2.9	.058	ACDE	5.9	.010	AC
3.0	.056	CDE	6.0	.008	C

TABLE G (Contd)

**LINE BUILD-OUT CAPACITANCE  
(LBOC) SETTINGS**

END SECTION LENGTH (KFT)	"MAT" CABLE CAPACITANCE ( $\mu$ F)	EXPOSE LETTER(S) LBOC SETTING	END SECTION LENGTH (KFT)	"MAT" CABLE CAPACITANCE ( $\mu$ F)	EXPOSE LETTER(S) LBOC SETTING
0.0	.082	ADF			
0.1	.080	DF	3.1	.044	BCE
0.2	.078	ABCF	3.2	.042	ACE
0.3	.078	ABCF	3.3	.042	ACE
0.4	.076	BCF	3.4	.040	CE
0.5	.076	BCF	3.5	.040	CE
0.6	.074	ACF	3.6	.038	ABE
0.7	.072	CF	3.7	.036	BE
0.8	.072	CF	3.8	.036	BE
0.9	.070	ABF	3.9	.034	AE
1.0	.070	ABF	4.0	.032	E
1.1	.068	BF	4.1	.032	E
1.2	.066	AF	4.2	.030	ABCD
1.3	.066	AF	4.3	.030	ABCD
1.4	.064	F	4.4	.028	BCD
1.5	.064	F	4.5	.026	ACD
1.6	.062	ABCDE	4.6	.026	ACD
1.7	.060	BCDE	4.7	.024	CD
1.8	.060	BCDE	4.8	.022	ABD
1.9	.058	ACDE	4.9	.022	ABD
2.0	.058	ACDE	5.0	.020	BD
2.1	.056	CDE	5.1	.018	AD
2.2	.054	ABDE	5.2	.018	AD
2.3	.054	ABDE	5.3	.016	D
2.4	.052	BDE	5.4	.016	D
2.5	.052	BDE	5.5	.014	ABC
2.6	.050	ADE	5.6	.012	BC
2.7	.048	DE	5.7	.012	BC
2.8	.048	DE	5.8	.010	AC
2.9	.046	ABCE	5.9	.010	AC
3.0	.046	ABCE	6.0	.008	C

TABLE H

## TRUNK PROCESSING OPTIONS IN D4 CHANNEL UNITS

CHANNEL UNIT	OPTIONS (NOTE)											
	C	EG	EPD	EPI	G STRAP	1G	L	LS	MPD	RG	SD	S & 1G
DPO						X	X				X	X
ES3											X	
4E&M			X	X		X						
2DX/GT											X	
2E&M			X	X		X						
DPMO						X					X	
4E&MER			X	X		X						
2E&M6			X	X		X						
2FXS											X	
2FXS/GT											X	
2FXO					X			X		X		
2FXO/GT					X			X		X		
2FXOLS					X			X				
2FXS6											X	
2FXO6								X				
4LSXO											X	
PLR									X			
RPO						X					X	
4FXS											X	
4FXO					X			X		X		
4DX	X											
TDM		X										

**Note:** Tables D and E define the functions produced by the options when selected.

♦TABLE 1♦

**CALCULATIONS FOR SETTING  
EQUALIZER FOR PG5T AND PG8T  
CHANNEL UNITS**

DIFFERENCE BETWEEN 5-kHz and 1-kHz RECEIVED LEVELS (dB)	EQUALIZER SETTING
0	0
0.7	1
1.7	2
2.9	3
3.9	4
4.9	5
5.5	6
6.2	7
6.6	8
7.2	9
7.4	10
7.9	11
8.1	12
8.4	13
8.7	14
8.9	15
9.0	16
9.3	17
9.4	18
9.7	19
9.7	20
9.9	21
10.0	22
10.2	23
10.1	24
10.3	25
10.3	26
10.5	27
10.4	28
10.6	29
10.7	30
10.6	31

▶TABLE J◀

## CALCULATIONS FOR SETTING EQUALIZER FOR PG15T CHANNEL UNIT

DIFFERENCE BETWEEN 15+KHz AND 1-KHz RECEIVE LEVELS IN dB		EQUALIZER SETTING	DIFFERENCE BETWEEN 15-KHz AND 1-KHz RECEIVE LEVELS IN dB		EQUALIZER SETTING
0.0		0	8.0		33
0.1		2	8.2		34
0.2		3	8.4		35
0.3		4	8.6		36
0.5		5	8.8		37
0.7		6	9.0		38
1.0		7	9.2		39
1.2		8	9.4		40
1.5		9	9.6		41
1.7		10	9.7		42
2.0		11	9.9		43
2.3		12	10.1		44
2.6		13	10.3		45
2.9		14	10.4		46
3.2		15	10.6		47
3.5		16	10.7		48
3.8		17	10.9		49
4.1		18	11.1		50
4.4		19	11.2		51
4.7		20	11.4		52
5.0		21	11.5		53
5.3		22	11.6		54
5.6		23	11.8		55
5.8		24	11.9		56
6.1		25	12.0		57
6.3		26	12.2		58
6.6		27	12.3		59
6.8		28	12.4		60
7.1		29	12.6		61
7.3		30	12.7		62
7.5		31	12.8		63
7.8		32			

♦TABLE K♦

## PREEMPTED CHANNELS FOR D4-TO-D4 APPLICATIONS

PGCU SLOT (NOTE 1)	SLOT WHICH MUST BE VACANT FOR 5 kHz SERVICE (NOTE 2)	SLOTS WHICH MUST BE VACANT FOR 8 kHz SERVICE (NOTE 2)
1	13	9, 17
2	14	10, 18
3	15	11, 19
4	16	12, 20
5	17	13, 21
6	18	14, 22
7	19	15, 23
8	20	16, 24
9	21	17, 1
10	22	18, 2
11	23	19, 3
12	24	20, 4
13	1	21, 5
14	2	22, 6
15	3	23, 7
16	4	24, 8
17	5	1, 9
18	6	2, 10
19	7	3, 11
20	8	4, 12
21	9	5, 13
22	10	6, 14
23	11	7, 15
24	12	8, 16

**Note 1:** When only D4 banks are used, any channel may be used for program service.

**Note 2:** Blank units should be installed in vacant slots.

♦TABLE L♦

## PREEMPTED CHANNELS FOR D3-TO-D4 OR D4-TO-D3 APPLICATION

5 kHz PGCU SLOT (NOTE 1)	SLOT WHICH MUST BE VACANT FOR 5 kHz SERVICE (NOTE 2)	8 kHz PGCU SLOT	SLOTS WHICH MUST BE VACANT FOR 8 kHz SERVICE (NOTE 2)
2	14	2	10, 18
3	15	3	11, 19
4	16	4	12, 20
5	17	5	13, 21
6	18	6	14, 22
7	19	7	15, 23
8	20		
9	21		
10	22		
11	23		

**Note 1:** When D3 and D4 banks are used together, only the channels shown may be used for program service.

**Note 2:** Blank units should be installed in vacant slots

TABLE M

## SETTINGS FOR COMP OR S1 OPTION

CHANNEL SLOT	DISTORTION COMPENSATION SETTINGS					
	LIU-1, 2, 3, 4		LIU-1		LIU-2, 3, 4	
	PG5T (COMP)	PG5R (COMP)	PG8T (S1)	PG8R (S1)	PG8T (S1)	PG8R (S1)
1	B	B	C	C	C	C
2	A	B	C	A	A	C
3	A	B	A	A	A	C
4	A	B	A	A	A	C
5	A	B	B	A	A	C
6	A	B	C	B	A	C
7	A	B	C	C	A	C
8	A	B	A	C	A	C
9	A	B	A	A	A	A
10	A	B	B	A	B	A
11	A	B	B	B	B	A
12	A	B	B	B	B	A
13	A	A	B	C	B	A
14	B	A	B	A	B	A
15	B	A	A	A	B	A
16	B	A	B	A	B	A
17	B	A	B	B	B	B
18	B	A	C	B	C	B
19	B	A	C	C	C	B
20	B	A	A	C	C	B
21	B	A	A	A	C	B
22	B	A	B	B	C	B
23	B	A	B	B	C	B
24	B	A	C	B	C	B

TABLE N

## MESSAGE CHANNEL UNIT ATTENUATION, GAIN AND LOSS PARAMETERS

CHANNEL UNIT	TRANSMIT PATH (T, R TO TST JACK -8.5 DB TLP POINT)				RECEIVE PATH [(TST JACK +4.0 DB TLP POINT TO T1, R1, OR T, R (2W))]			
	$G_T$ INSERTION GAIN (+) OR LOSS (-) DB	ATTENUATOR RANGE (DB)	INPUT LEVEL AT T, R, (DB)		$G_R$ INSERTION GAIN (+) OR LOSS (-) (DB)	ATTENUATOR RANGE (DB)	OUTPUT LEVEL AT T1, R1 (DB)	
			MIN	MAX			MIN	MAX
DPO	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
DPT or DPT6	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
SPDO	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
DPMO	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
2E&M	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
2E&M6	-4.0	0- 6.3	- 4.5	+ 1.8	-2.6	0-12.7	-11.3	+1.4
ES2O	-7.8	0- 0.7	- 0.7	0	-6.3	0- 3.7	- 6.0	-2.3
ES2T	-7.8	0- 0.7	- 0.7	0	-6.3	0- 3.7	- 6.0	-2.3
4E&M	+9.0	0- 1.5	-17.5	-16.0	+4.5	0- 1.5	+ 7.0	+8.5
4E&MER	+9.0	0-25.5	-17.5	+ 8.0	+4.5	0-25.5	-17.0	+8.5
ES3	-7.8	0- 0.7	- 0.7	0	-6.3	0- 3.7	- 6.0	-2.3
4LSXO	+9.0	0-25.5	-17.5	+ 8.0	+4.5	0-25.5	-17.0	+8.5
RPO	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
RPT	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	- 6.3	0
RSCO	-4.0	0- 6.3	- 4.5	+ 1.8	-2.3	0- 6.3	- 4.6	1.7
2E&M9	-4.0	0- 6.3	- 4.5	+ 1.8	-4.0	0- 6.3	6.3	0

TABLE O4

## SPECIAL SERVICE CHANNEL UNIT ATTENUATION, GAIN, AND LOSS PARAMETERS (NOTE)

CHANNEL UNIT	TRANSMIT PATH (T, R TO TST JACK -8.5 DB TLP POINT)				RECEIVE PATH (TST JACK +4.0 DB TLP POINT TO T1, R1, OR T, R (2W))			
	$G_T$ INSERTION GAIN (+) OR LOSS (-) DB	ATTENUATOR RANGE (DB)	INPUT LEVEL AT T, R, (DB)		$G_R$ INSERTION GAIN (+) OR LOSS (-) (DB)	ATTENUATOR RANGE (DB)	OUTPUT LEVEL AT T1, R1 (DB)	
			MIN	MAX			MIN	MAX
2FXO	- 4.0	0- 6.3	- 4.5	+ 1.8	- 4.0	0- 6.3	- 6.3	0
2FXS	- 4.0	0- 6.3	- 4.5	+ 1.8	- 4.0	0- 6.3	- 6.3	0
2FXS6	- 4.0	0-16.5	- 4.5	+12.0	- 4.0	0-16.5	-16.5	0
2FXO6	- 4.0	0-16.5	- 7.5	+12.0	- 4.0	0-16.5	-16.5	0
2FXOLS	- 4.0	0- 6.3	- 4.5	+ 1.8	- 4.0	0- 6.3	- 6.3	0
2FXSLS	- 4.0	0- 6.3	- 4.5	+ 1.8	- 4.0	0- 6.3	- 6.3	0
2TO	+ 0.5	0-16.5	- 9.0	+ 5.0	- 4.0	0-16.5	-10.5	0
*4FXO	+ 6.5	0-16.5	-15.0*	+ 1.0	+ 2.0	0-16.5	-10.5	+ 6.0
*4FXS	+ 6.5	0-16.5	-15.0*	+ 1.0	+ 2.0	0-16.5	-10.5	+ 6.0
*4ETO	+ 6.5 (HI) - 0.5 (LO)	0-16.5	-15.0* - 8.0*	+ 1.0 + 8.5	+ 3.0	0-16.5	- 3.0	+ 7.0
PLR	-12.6	0- 6.3	+ 4.1	+10.4	-16.3	0- 6.3	-18.6	-12.3
*4DX	+ 6.5	0-16.5	-15.0*	0	+ 2.0	0-16.5	- 9.0	+ 6.0
4TO	+ 7.5 (HI) + 0.5 (LO)	0-16.5	-16.0 - 9.0	+ 0.5 + 7.0	+ 3.0 (HI) - 4.0 (LO)	0-16.5	-9.5 -16.0	-7.0 0
4TDM	- 4.9	†0-16.5	- 3.6	- 2.1	- 6.1	NONE	- 2.1	- 2.1
2FXS/GT	+ 0.5	0-16.5	- 9.0	0	+ 2.0	0-16.5	- 8.0	+ 6.0
2FXO/GT	+ 0.5	0-16.5	- 9.0	0	+ 2.0	0-16.5	- 8.0	+ 6.0
2DX/GT	- 0.5	0-16.5	- 9.0	0	+ 2.0	0-16.5	- 9.0	+ 6.0
4E&MD	+ 9.0	0- 1.5	-17.5	-16.0	+ 4.5	0- 1.5	+ 7.0	+ 8.5
4RD/PLAR	+ 6.5 (HI)	0-16.5	-16.0(RD)	0(RD)	+ 3.0	0-16.5	-10.0	+ 6.0
2RD/PLAR	+ 0.5 (LO) - 4.0	0-16.5	- 9.0(PLAR) - 9.0	+ 5.0(PLAR) 0	- 4.0	0-16.5	-10.0	+ 6.0

**Note:** Special service channel unit input and output levels are recommended values. In some cases, attenuator ranges cover a wider distribution of levels. It is recommended that circuit levels be contained within the input and output levels specified in the table.

\* Units with active post equalization.

† The 4TDM attenuator should only use 0 to 1.5 dB.

**TABLE P**

**H88 LOADED CABLE LOSS**

<b>GAUGE</b>	<b>LOSS/KFT (DB)</b>
26	.35
25 "MAT" Cable	.25
24	.23
22	.15
19	.08

**TABLE Q**

**DC RESISTANCE  
CONSTANTS FOR  
NL CABLE**

<b>GAUGE</b>	<b>LOSS/KFT (DB)</b>
26	83.3
25 (MAT®) Cable	65.5
24	51.9
22	32.8
19	16.3

TABLE R

## EQUALIZATION AND BALANCE CONTROLS FOR 4FXS, 4FXO, 4DX, AND 4ETO CHANNEL UNITS

CONTROL				
NAME	CIRCUIT BOARD STAMPING	POSITIONS	USED ON CU	FUNCTION
Slope	SL	0 to 15	All	Switch in position 0 (no numbers showing) provides no equalization and unit frequency response is essentially flat; ie, for 0 dB at 1 kHz, 500 Hz = -0.4 dB and 3000 Hz = +0.1 dB. As switch position number increases, gain at 1 kHz increases to +6.6 dB (N) or +11.4 dB (L) for position 15 (numbers 1, 2, 4, and 8 showing). With N selected, gain at 500 Hz decreases to -4 dB relative to 1 kHz and gain at 3000 Hz increases to +4.4 dB relative to 1 kHz. SL is the primary unit low-frequency equalization control.
Height	HT	0 to 15	All	Switch in position 0 (no numbers showing) provides no equalization. As switch position number increases, gain at 3250 Hz increases to +11 dB for position 15 (numbers 1, 2, 4, and 8 showing) relative to 1 kHz. Used in conjunction with bandwidth (BW) as primary unit high-frequency equalization controls.
Bandwidth	BW	0 to 15	All	Switch in position 0 (no numbers showing) or HT control in position 0 provides no equalization. As switch position number increases, width of gain "bump" at 3250 Hz increases; height of "bump" is still determined by HT control.
Facility	N/L	N or L	All	Switch set to N (N showing) for nonloaded cable applications and generally set to L (L showing) for loaded cable applications. With switch set to N, SL control provides greater equalization at higher frequencies than it does with switch set to L.
Transmit Path Input Impedance	S1 or OPEN/150	Open, 1200 600, or 150	All	Selects input impedance seen by line; 1200 ohms for loaded cable; 600 ohms or 150 ohms for nonloaded cable.
Receive Path Output Impedance	S2 or S5 or OPEN/150	Open, 1200 600, or 150	All	Selects output impedance seen by line; positions same as S1.
Loop Resistance Balance	RLP	0 to 5 k $\Omega$	4DX only	Balances loop resistance in conjunction with unit capacitance balance options A and B. (Bridge impedance at far end of loop not included.)

**TABLE 5**  
**ADDITIONAL 1 KHZ GAIN IN DB AS A**  
**RESULT OF HT AND BW SETTINGS**

		HT SETTING																
		0 (NOTE)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
B W S E T T I N G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1
	5	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1
	6	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	7	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
	8	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
	9	0	0	0	0	0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5
	10	0	0	0	0	0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.7	0.7
	11	0	0	0	0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.7	0.9	0.9
	12	0	0	0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.8	0.9	1.2	1.2
	13	0	0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.1	1.3	1.7	1.7
	14	0	0	0.1	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.7	2.0	2.5	2.5
15	0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.2	1.5	1.7	2.0	2.4	2.8	3.3	3.9	3.9	

**Note:** HT setting 0 disables the bump unit for all BW settings.

**TABLE T**

**ADDITIONAL 1 KHZ GAIN IN DB AS A RESULT OF SLOPE SETTINGS (4-WIRE CUs)**

SLOPE SETTING	N/L SWITCH	
	N	L
0*	0	0
1	0.4	1.4
2	0.9	2.6
3	1.4	3.7
4	1.8	4.7
5	2.3	5.5
6	2.8	6.3
7	3.4	7.2
8	3.7	7.8
9	4.2	8.4
10	4.6	9.0
11	5.0	9.5
12	5.4	10.0
13	5.8	10.5
14	6.2	11.0
15	6.6	11.4

\* SLOPE setting 0 disables the slope unit.

**TABLE U**

**CABLE EQUIVALENT LENGTHS (KFT) FOR BRIDGED TAPS**

BRIDGED TAP LENGTH (KFT)	GAUGE			
	26	24	22	19
0.5	0.3	0.4	0.4	0.4
1.0	0.6	0.7	0.8	0.9
1.5	0.9	1.1	1.3	1.4
2.0	1.3	1.5	1.7	1.9
2.5	1.6	1.9	2.1	2.3
3.0	2.0	2.3	2.6	2.8
3.5	2.3	2.7	3.1	3.4
4.0	2.7	3.2	3.6	3.9
4.5	3.1	3.6	4.1	4.4
5.0	3.5	4.1	4.6	5.0
5.5	3.9	4.5	5.1	5.5
6.0	4.4	5.0	5.6	6.1

TABLE V

## EQUALIZATION AND BALANCE CONTROLS FOR 2DX/GT, 2FXS/GT, AND 2FXO/GT CHANNEL UNITS

CONTROL		POSITIONS	USED ON CU	FUNCTION
NAME	CIRCUIT BOARD STAMPING			
Slope	S2	0 to 15	All	Switch in position 0 (no numbers showing) provides no equalization, and frequency response is essentially flat. Provides from 0 through 7.5 dB of slope equalization in 16 steps by exposing switch numbers 8, 4, 2, 1 as required.
PBN-LF (for loaded and nonloaded cable; HF for "MAT" loaded cable)	R/R1	0 to 7 and L	All	Switch used to control the low-frequency impedance characteristics of the PBN. Expose numbers 4, 2, 1 as required. Exposing the L affects the degree of roll-off at the higher frequencies, extending the impedance characteristics of the PBN for synthesizing "MAT" loaded cable impedance. The R/R1 adjustment will affect the frequency at which the impedance curve levels out and should therefore be adjusted before setting R2.
PBN-HF (for nonloaded cable)	R2	0 to 15	All	Switch used to control the high-frequency impedance characteristics of the PBN for nonloaded cable. Expose numbers 8, 4, 2, 1 as required. Cover all numbers (zero setting) for loaded cable.
PBN-Z (for loaded and nonloaded cable)	Z	0 to 31	All	Switch used to make impedance adjustment, independent of frequency, to the impedance characteristics of the PBN.
PBN-Loaded, Nonloaded (Facility)	S4 or S5 or LOADED NONLOADED	LOADED or NONLOADED	All	Switch used to select type of cable characteristics to be matched by the PBN. Expose LOADED or NONLOADED as required.
Loop Resistance Balance	RLP	0 to 5 k $\Omega$	2DX/GT	Balances loop resistance in conjunction with unit capacitance balance options A and B. (Bridge impedance at far end of loop not included.)

TABLE W

1-KHZ GAIN OF CHANNEL  
UNIT EQUALIZER  
(2-WIRE CUs)

SLOPE SETTING	EQUALIZER GAIN (DB)
0	0
1	0.1
2	0.3
3	0.6
4	0.9
5	1.3
6	1.7
7	2.1
8	2.4
9	2.8
10	3.3
11	3.7
12	4.1
13	4.5
14	4.9
15	5.3

TABLE X

**CALCULATION OF 2DX/GT RLP SETTING  
FOR IMPEDANCE COMPENSATOR H88  
LOADED CABLE APPLICATIONS (NOTE 1)**

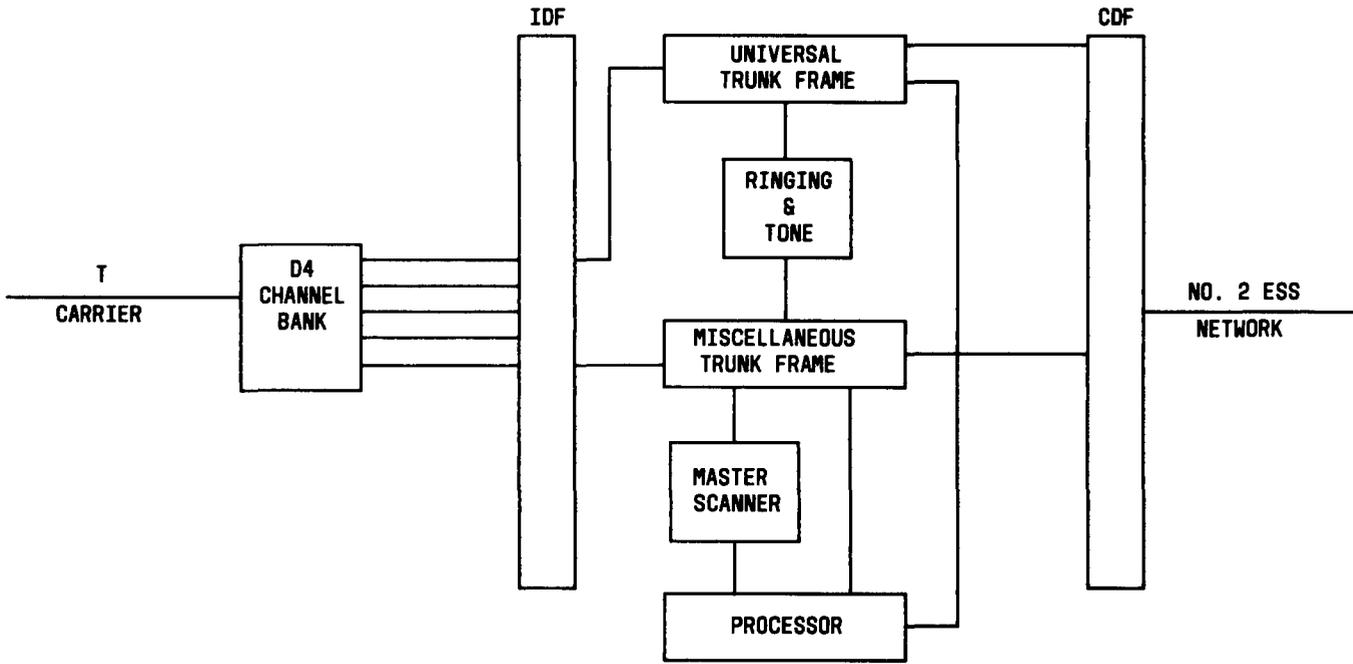
IMPEDANCE COMPENSATOR	CALCULATE RLP (NOTE 2)
837A	$RLP = C_R + 22 \text{ ohms}$
837B	$RLP = C_R + \text{BOR resistance (if used)} + 22 \text{ ohms}$
837E/J99380AB	$RLP = C_R + 39 \text{ ohms}$
837F	$RLP = C_R + 22 \text{ ohms}$
837G	$RLP = C_R + \text{BOR resistance} + \text{LATTICE Y resistance} + 29 \text{ ohms}$
J99380AC	$RLP = C_R + \text{BOR resistance} + \text{LATTICE Y resistance} + 64 \text{ ohms}$
837J	$RLP = C_R + \text{BOR resistance} + \text{LATTICE Y resistance} + 25 \text{ ohms}$

**Note 1:** Calculated RLP resistance should be rounded off to the nearest 100 ohms.

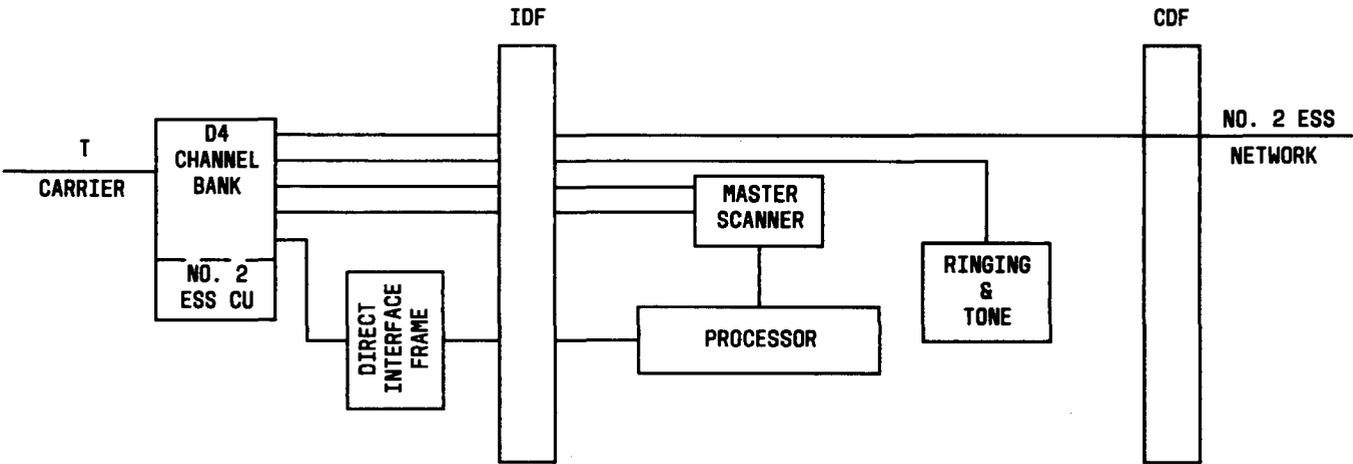
**Note 2:**  $C_R$  = Cable resistance for cable gauge and length taken from chart below:

**H88 LOADED CABLE DC RESISTANCE CHART**

CABLE LENGTH (KFT)	CABLE GAUGE & DC RESISTANCE ( $C_R$ ) IN OHMS			
	22-GA	24-GA	25-GA ("MAT") CABLE	26-GA
12	410	640	803	1017
18	615	959	1204	1525
24	820	1279	1605	
30	1025	1599	2006	
36	1230	1919		
42	1435			
48	1640			
54	1845			



A. INTERFACE VIA TRUNK CIRCUITS



B. DIRECT INTERFACE

Fig. 1—No. 2 ESS/T Carrier Interfaces

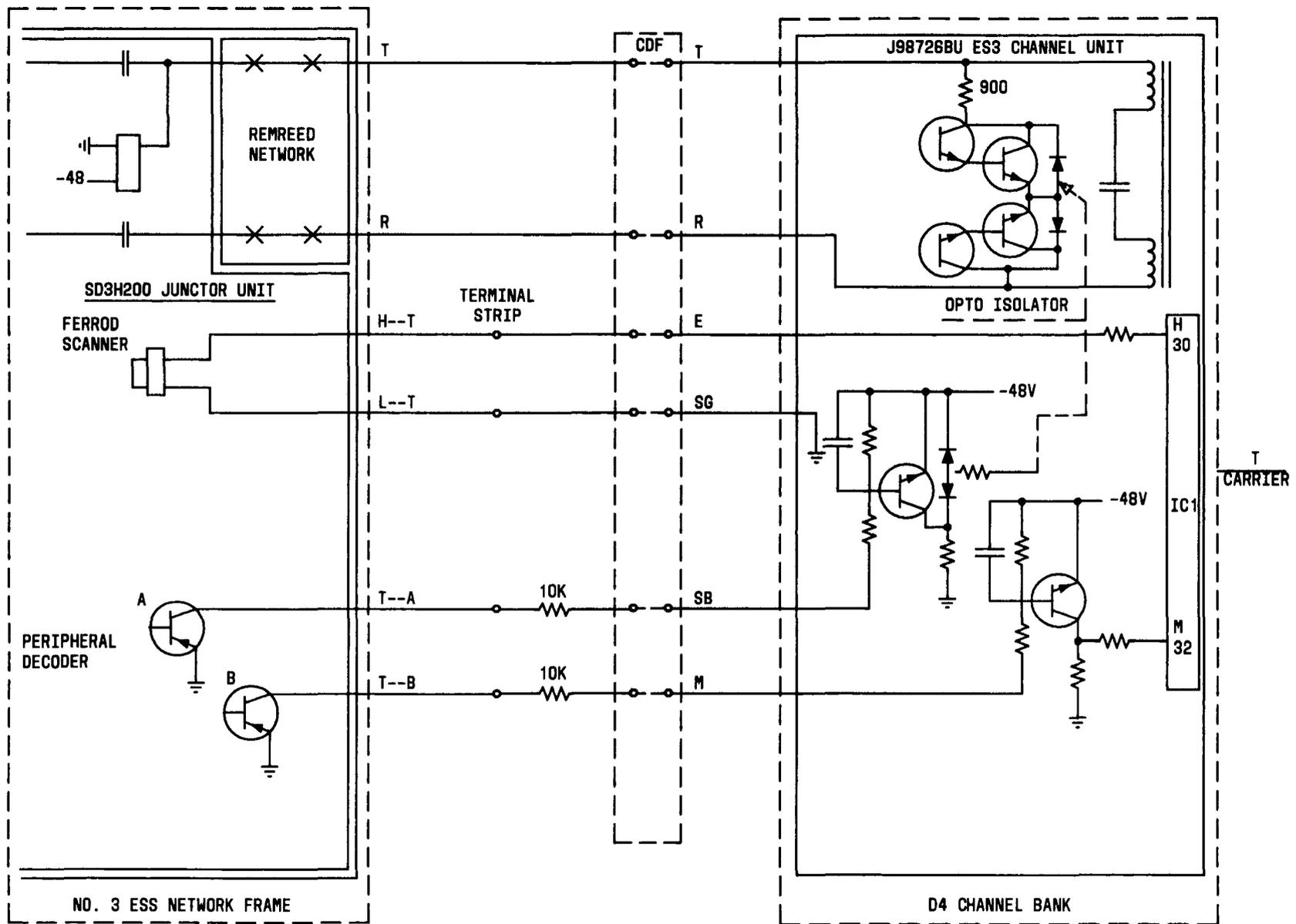
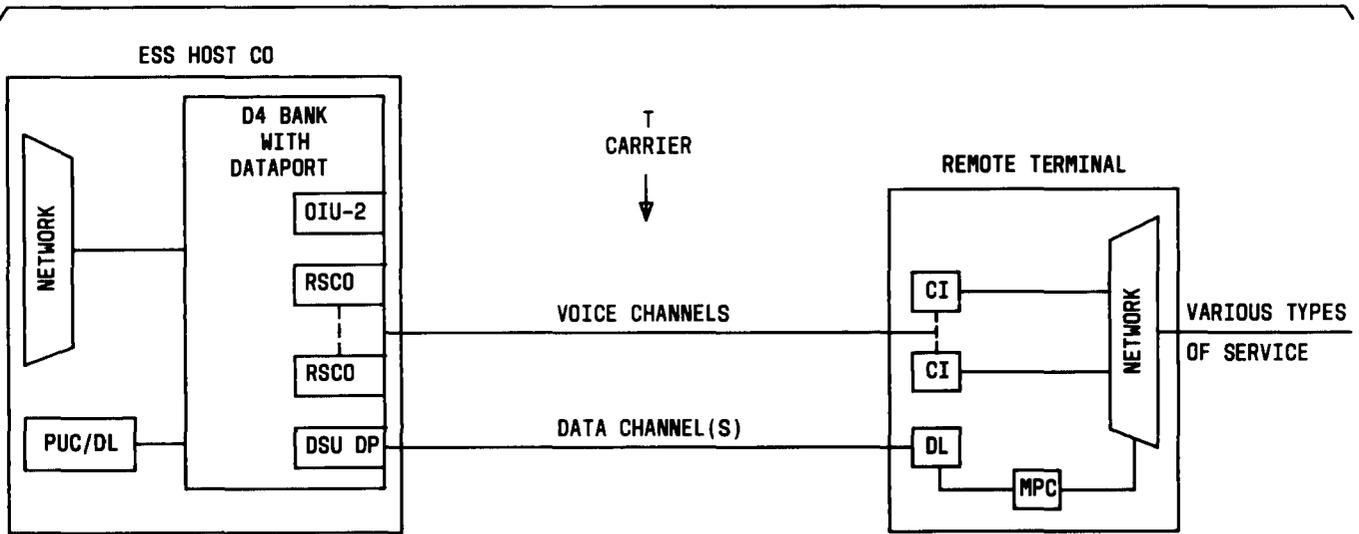


Fig. 2—No. 3 ESS/T Carrier Direct Interface

REMOTE SWITCHING SYSTEM



CI = CHANNEL INTERFACE  
 DL = DATA LINK  
 DSU DP = DATA SERVICE UNIT DATAPORT (CHANNEL UNIT)  
 MPC = MICROPROCESSOR CONTROLLER  
 OIU-2 = OFFICE INTERFACE UNIT  
 PUC/DL = PERIPHERAL UNIT CONTROLLER/DATA LINK  
 RSCO = REMOTE SWITCHING CENTRAL OFFICE (CHANNEL UNIT)

Fig. 3—D4/T Carrier Remote Switching Interface

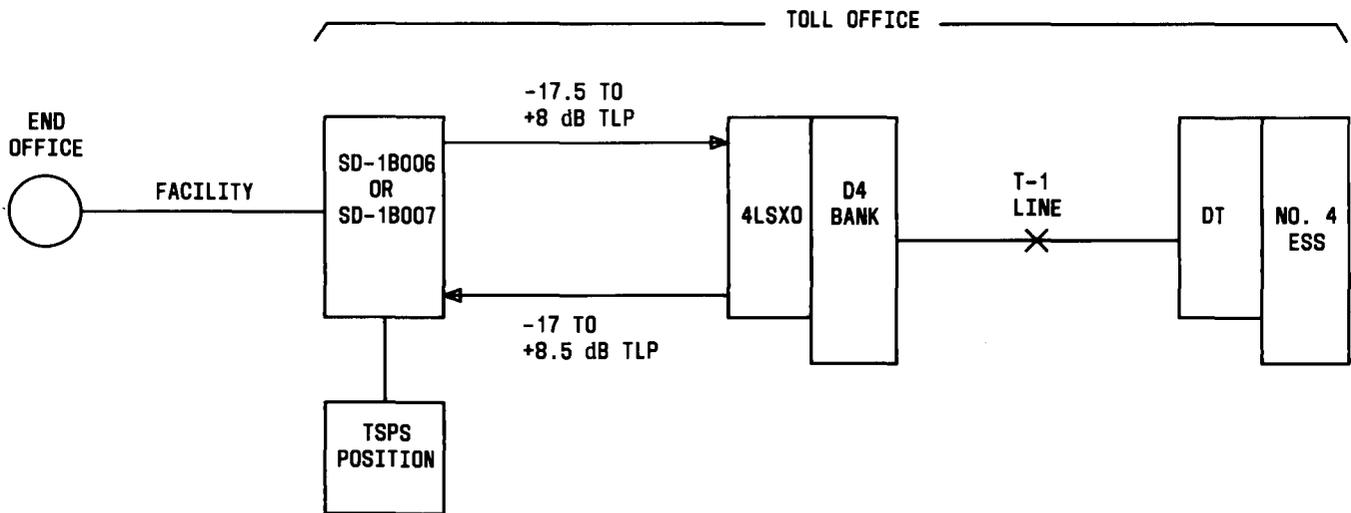
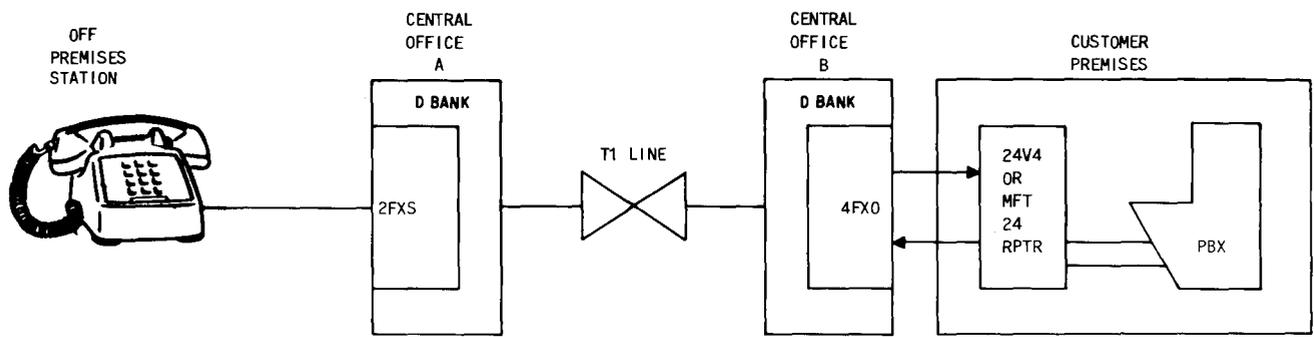
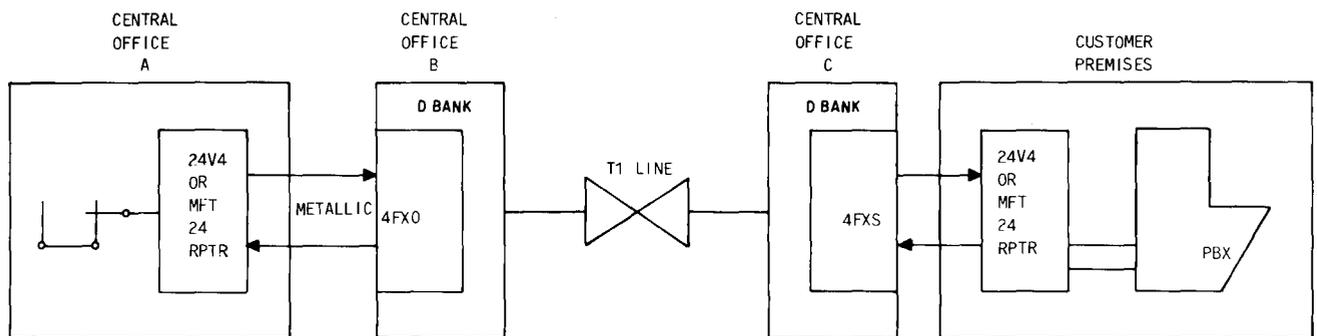


Fig. 4—4-Wire Loop Simplex Originate Channel Unit



A. OFF PREMISES STATION



B. FX TRUNK

Fig. 5—Typical Application for FXO and FXS Channel Units

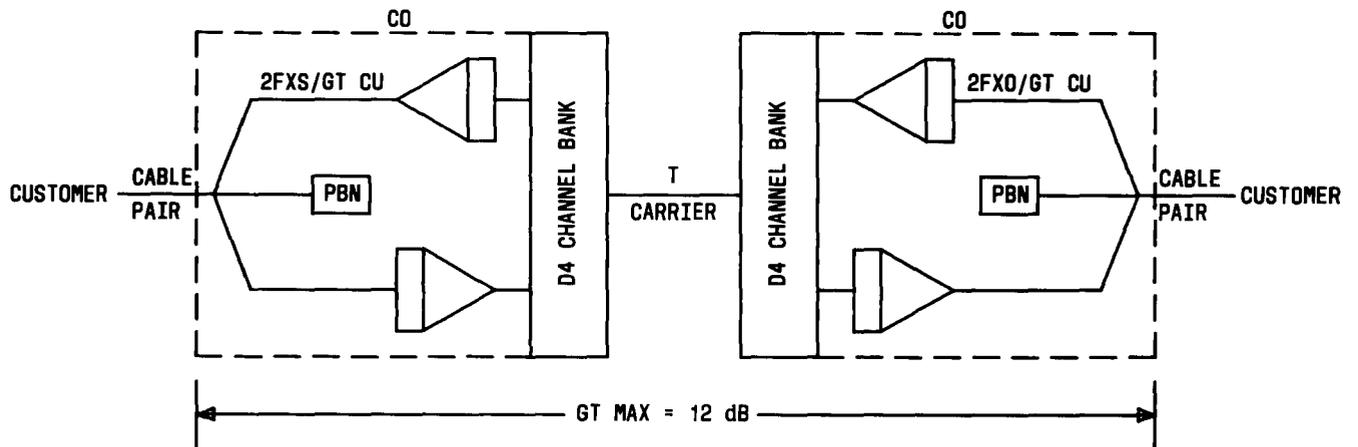


Fig. 6—Double-Ended Application of FX Gain Transfer

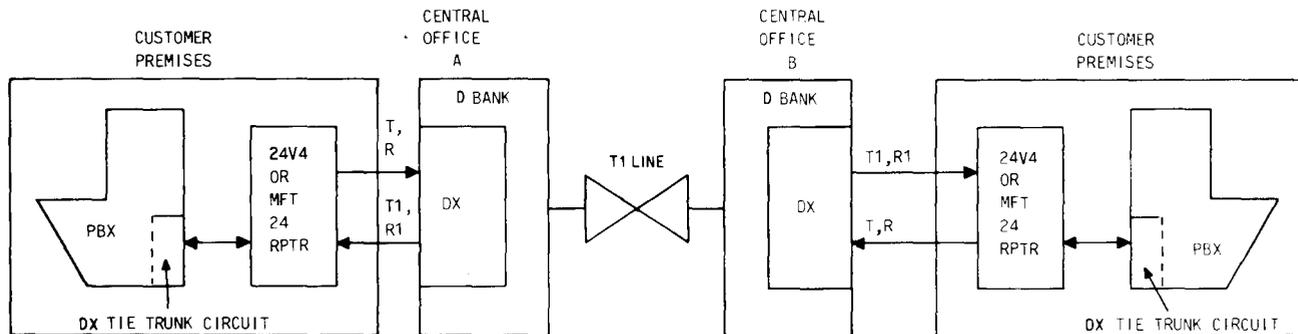


Fig. 7—Typical 4DX Tie Line Application

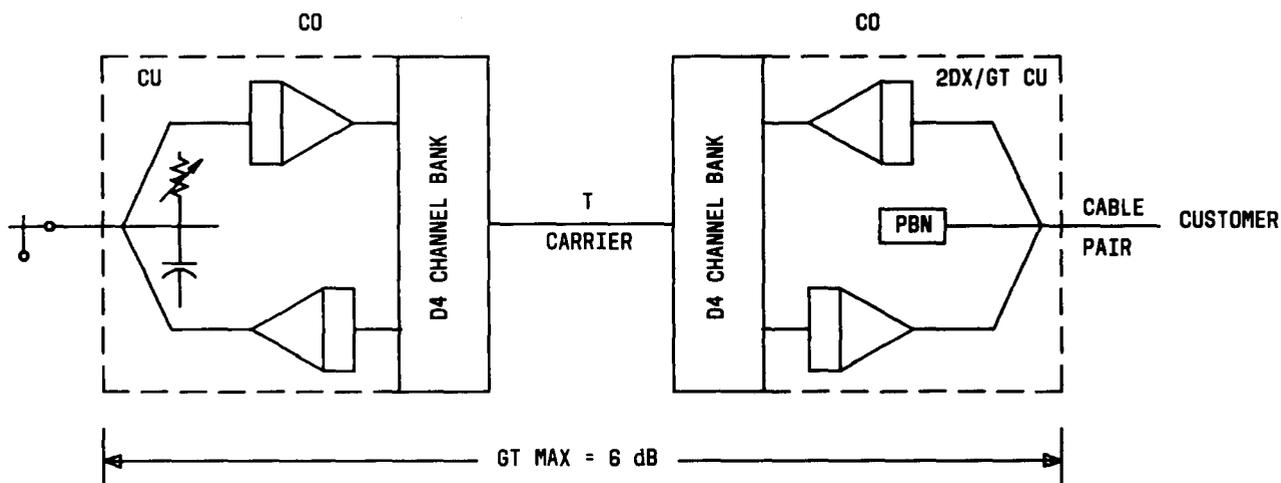


Fig. 8—An Application of the 2DX/GT Channel Unit

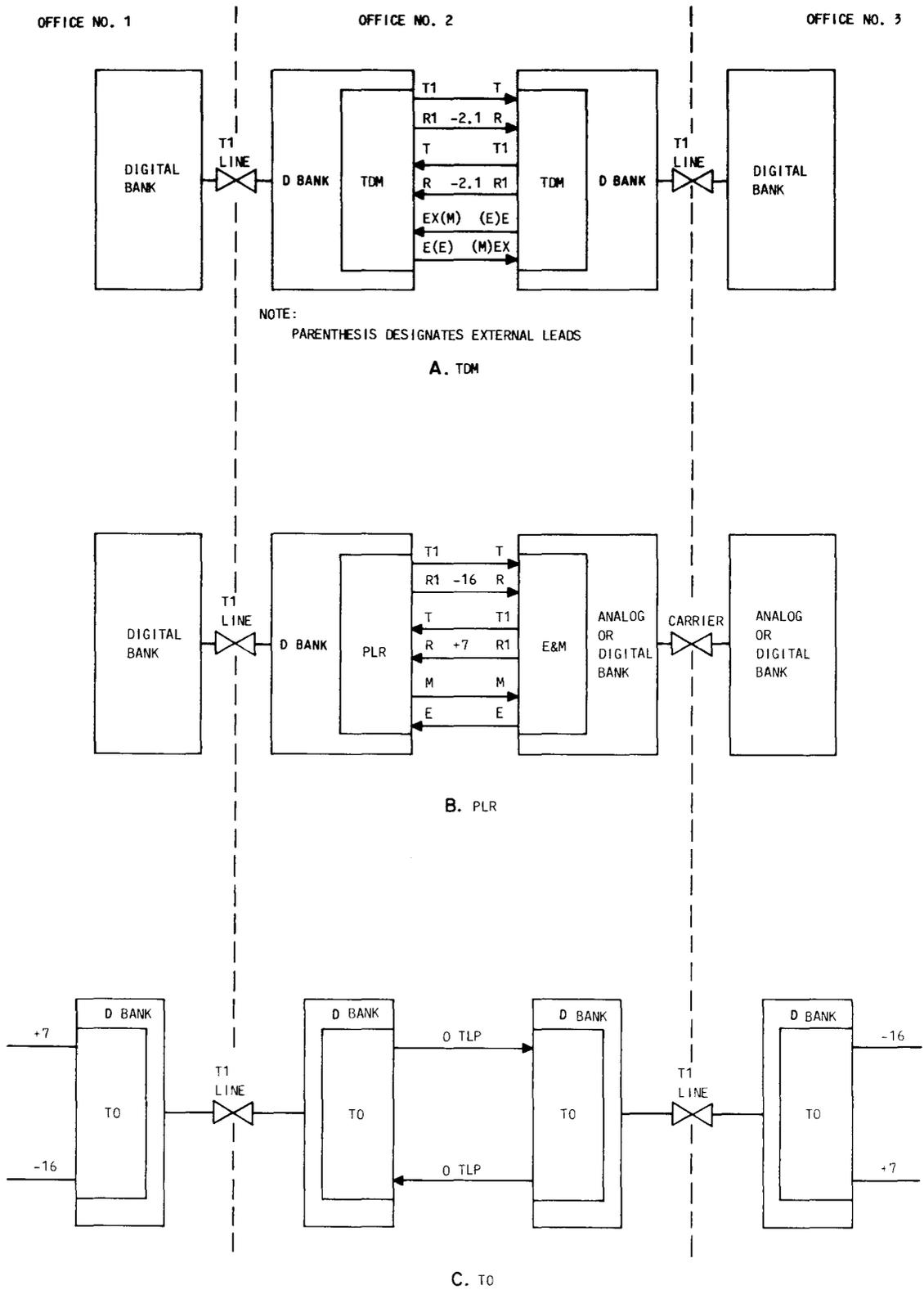


Fig. 9—Tandem Connections Using 4TDM, PLR, and 4TO Channel Units

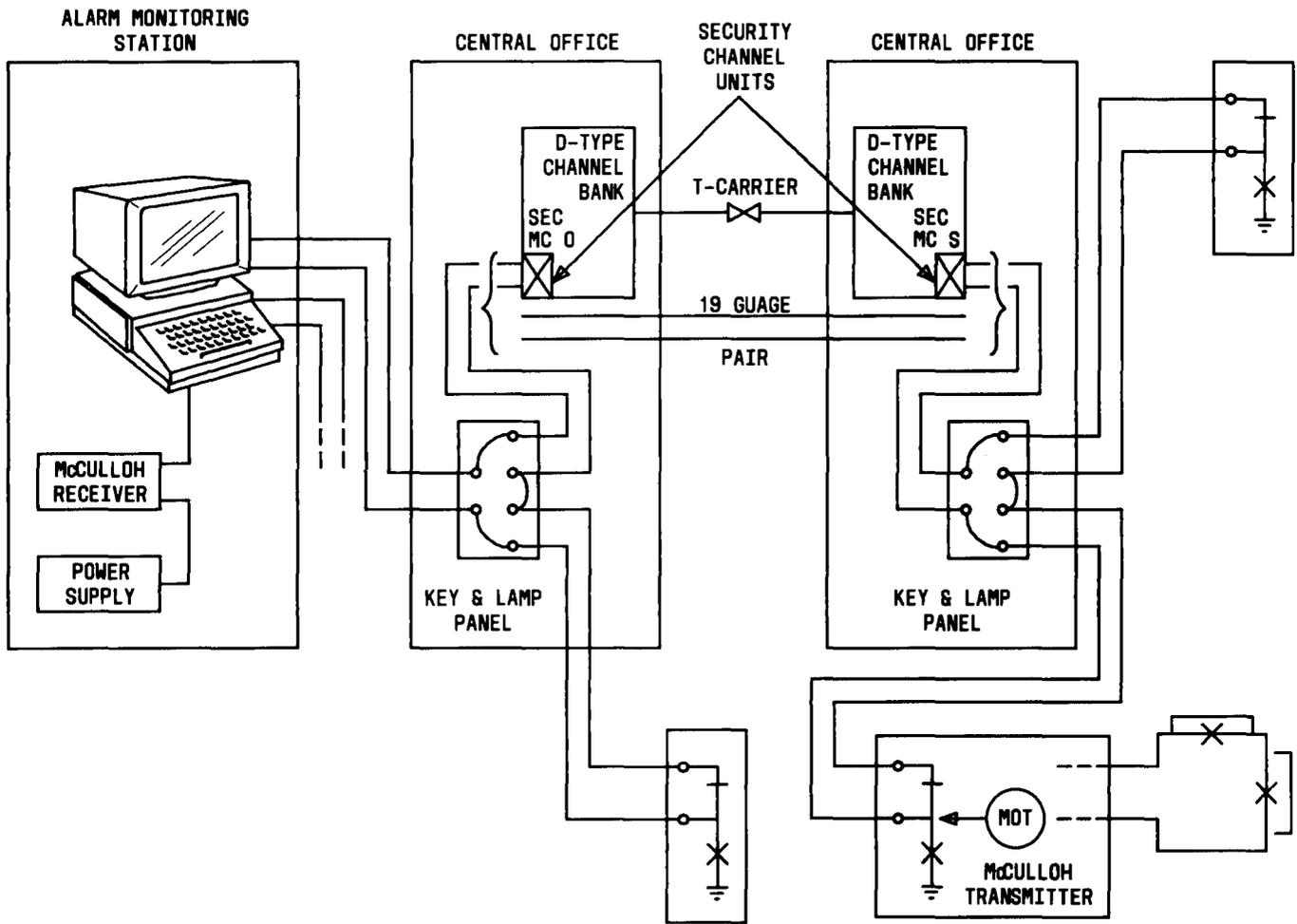


Fig. 10—Typical Application of Security Channel Units

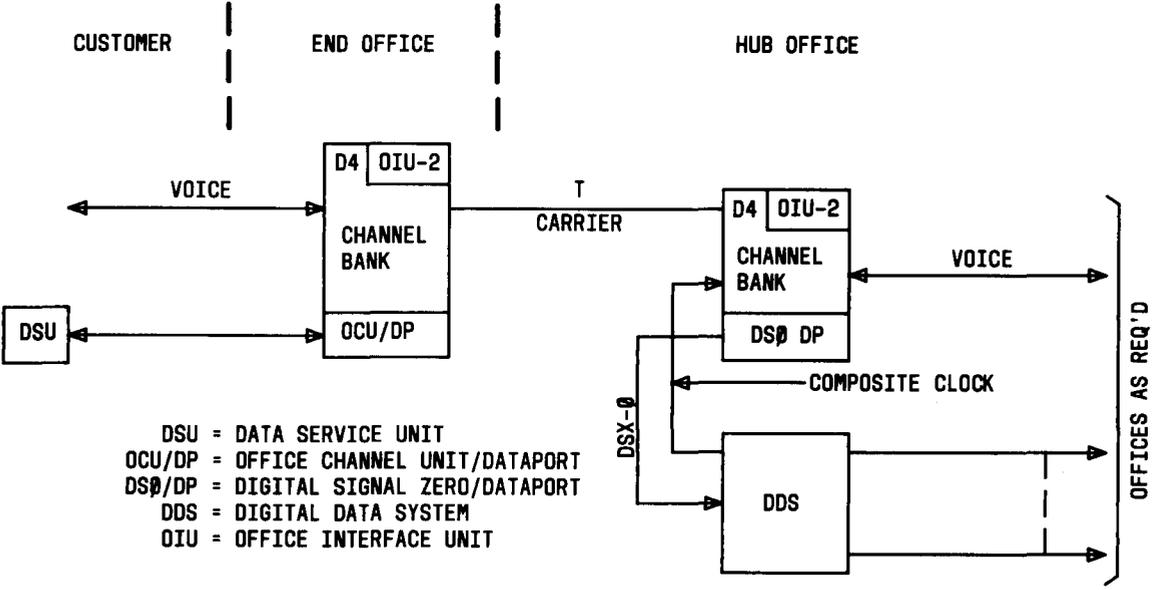


Fig. 11—Typical Dataport Application

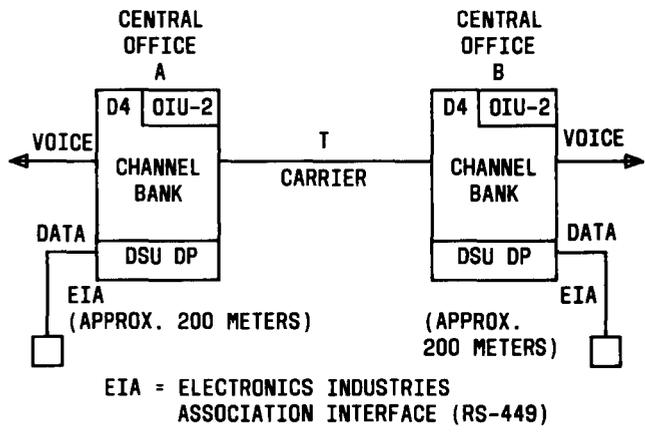
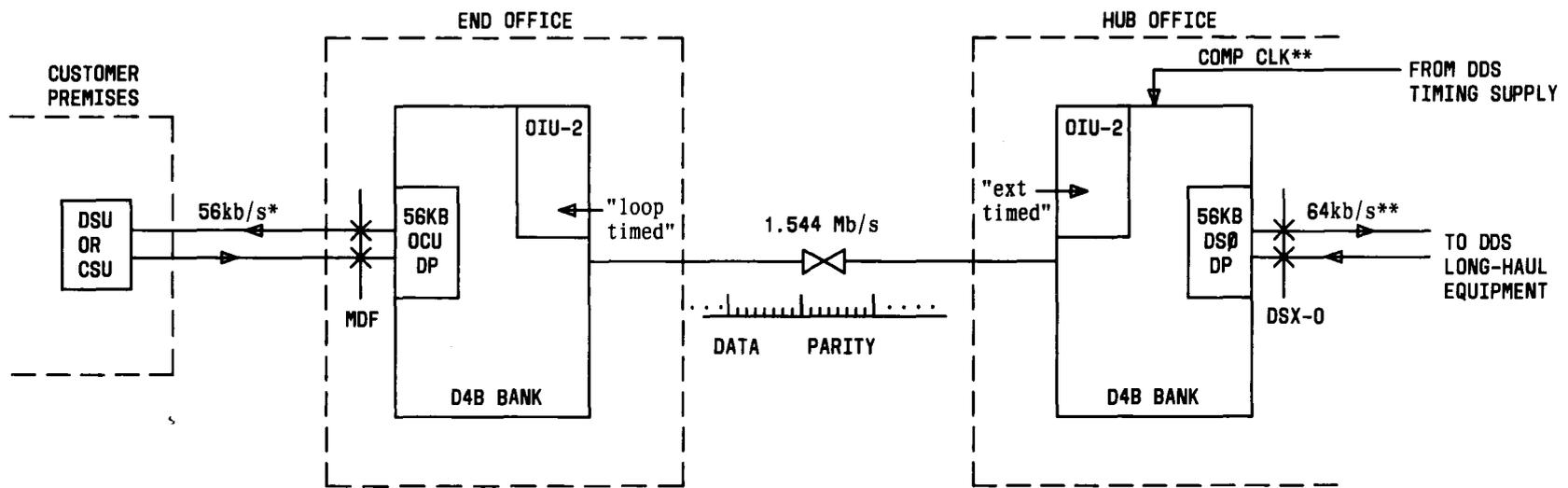


Fig. 12—Central Office Data Communication



\* LOOP IS SUBJECT TO DDS 56 Kb/s REQ

\*\* COMP CLK AND 4-WIRE CONNECTIONS ARE SUBJECT TO THE SAME SPECS (AND 1500 FT. LIMIT) AS OTHER DDS CONFIGURATIONS (SEE IL79-07-348)

Fig. 13—D4B Dataport 56 Kb/s-Data Application

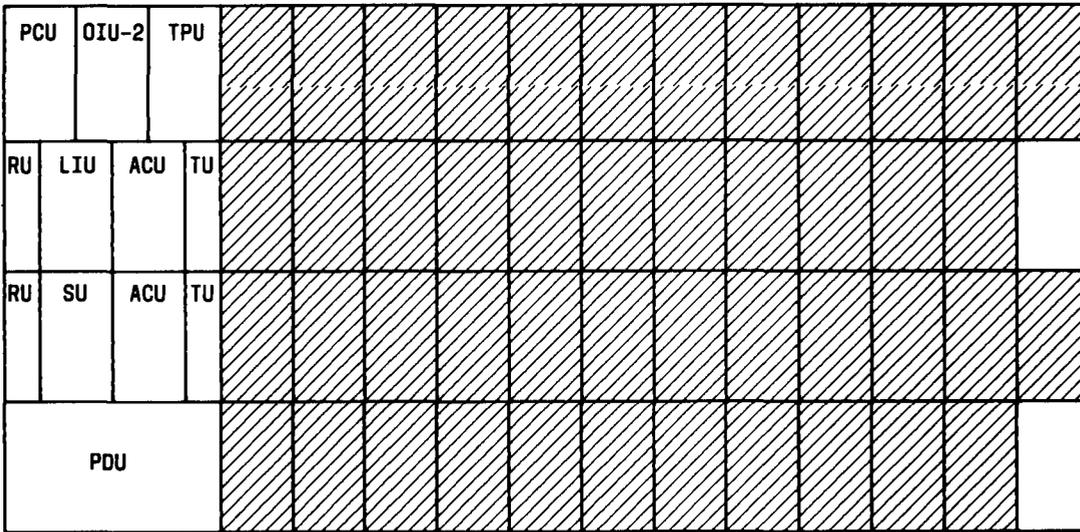


Fig. 14—Allowed Channel Positions (Shaded) for Error-Corrected 56-KB Dataport in D4 Channel Bank

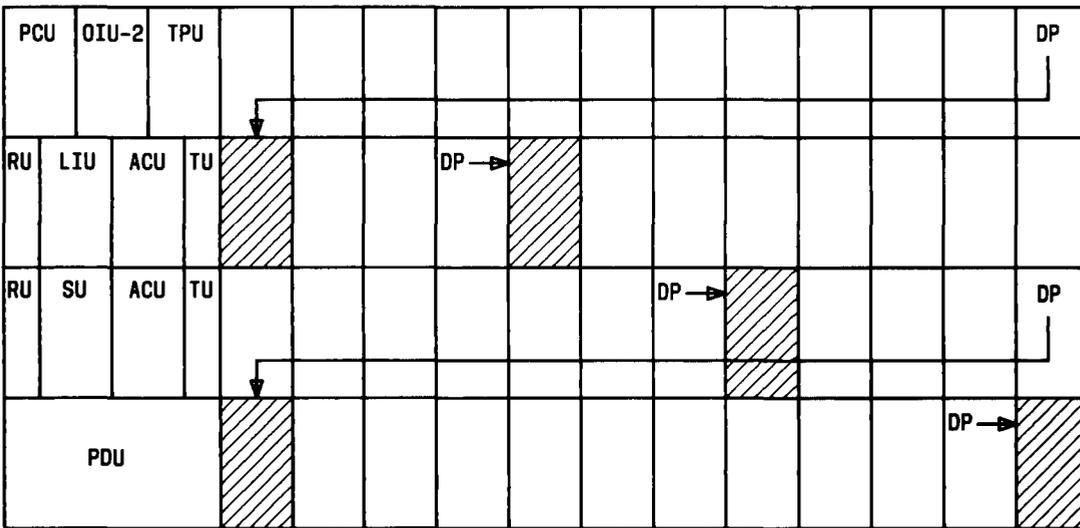
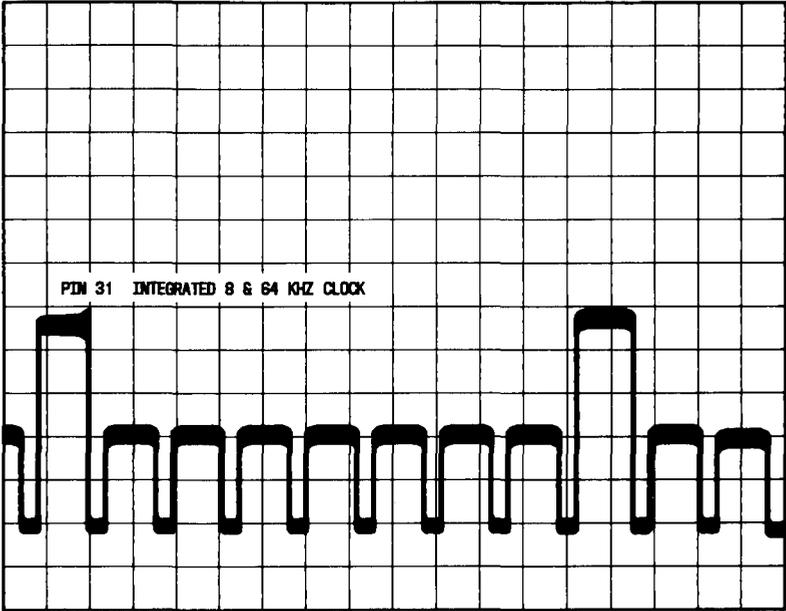
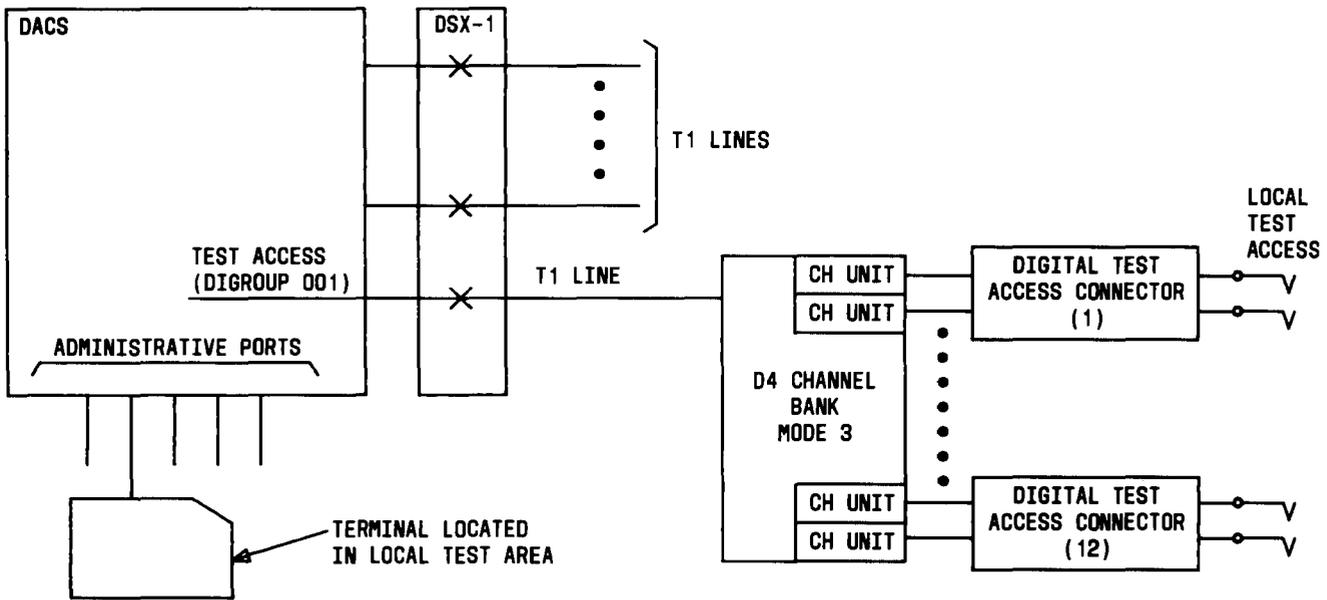


Fig. 15—Examples of Channel Slots (Shaded) Which Must be Left Unused for Error-Corrected 56-KB Dataport in D4 Channel Bank

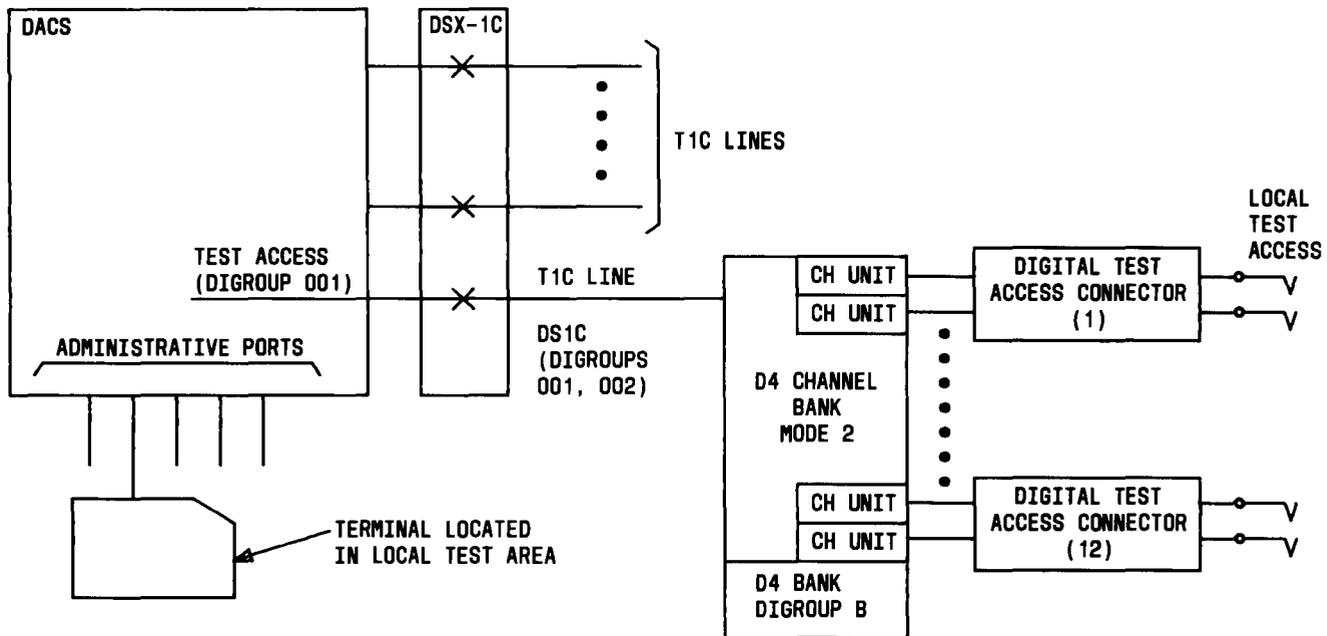


(5V/DIV 20 $\mu$ SEC/DIV SYNC'D ON INTERGRATED CLOCK)

Fig. 16—Integrated Clock Pattern



DS1 TEST ACCESS FACILITY



DS1C TEST ACCESS FACILITY

Fig. 17—Typical DACS Application of 4E&MD Channel Unit

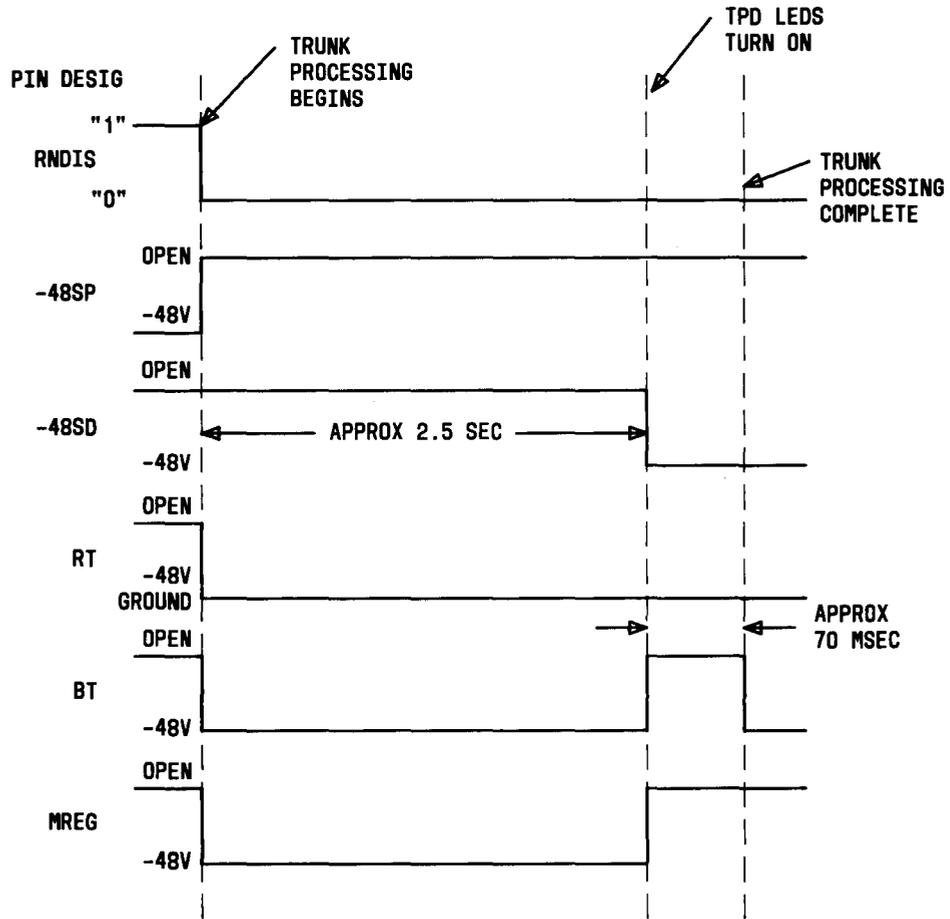


Fig. 18—Trunk Processing Timing Sequence

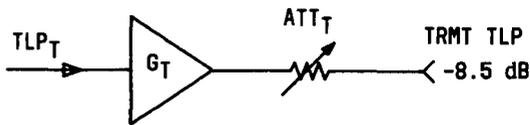


Fig. 19—Simplified Diagram for Calculation of Transmit Path Attenuator Settings for Nonequalized Channel Units

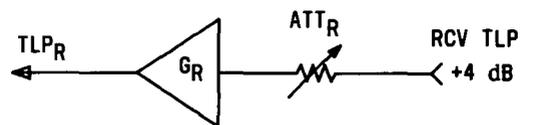


Fig. 20—Simplified Diagram for Calculation of Receive Path Attenuator Settings for Nonequalized Channel Units

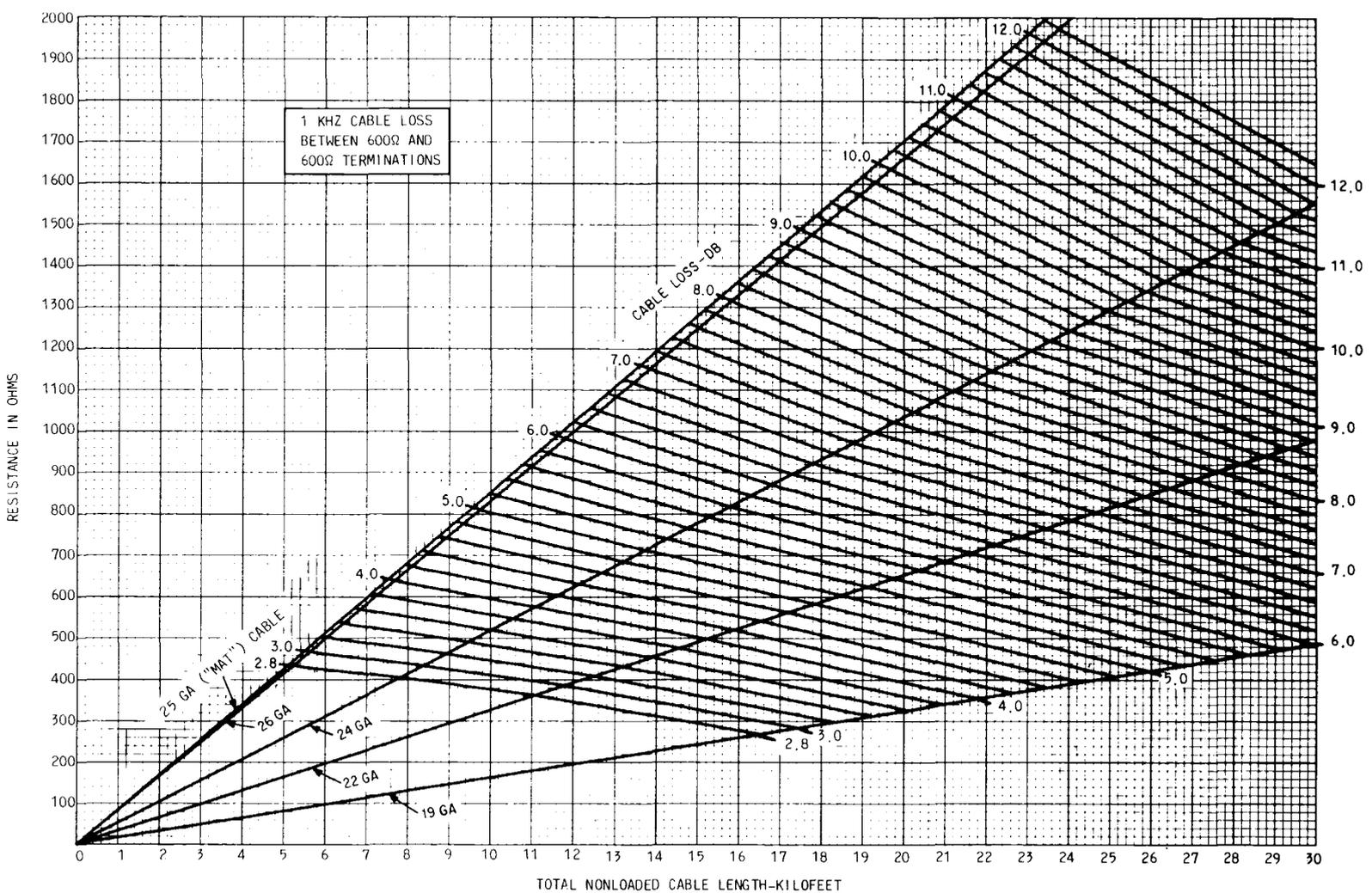


Fig. 21 — 1-KHz Cable Loss, Nonloaded Cable, Between 600 Ohm and 600-Ohm Terminations

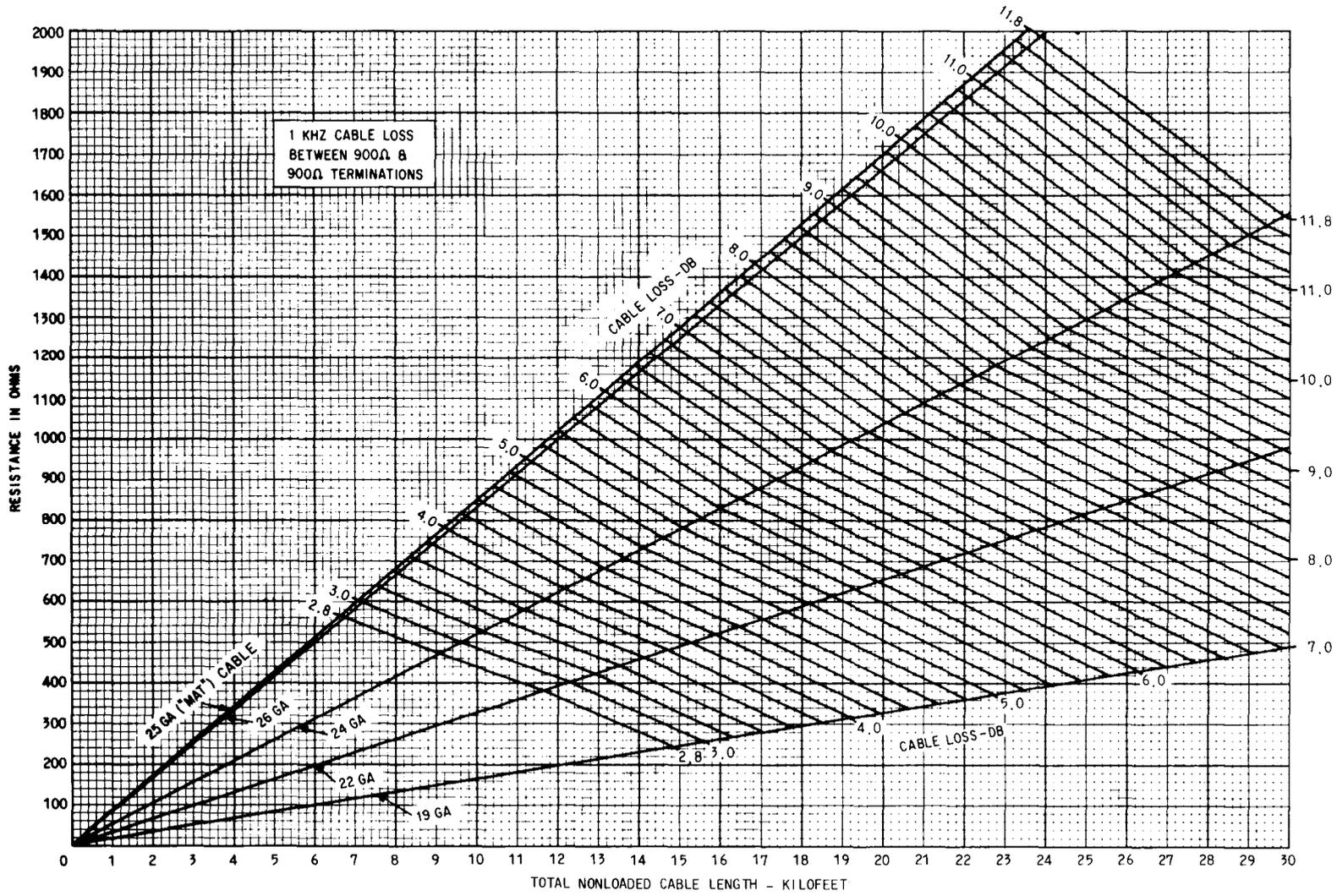


Fig. 22 — 1-kHz Cable Loss, Nonloaded Cable, Between 900 Ohm and 900-Ohm Terminations

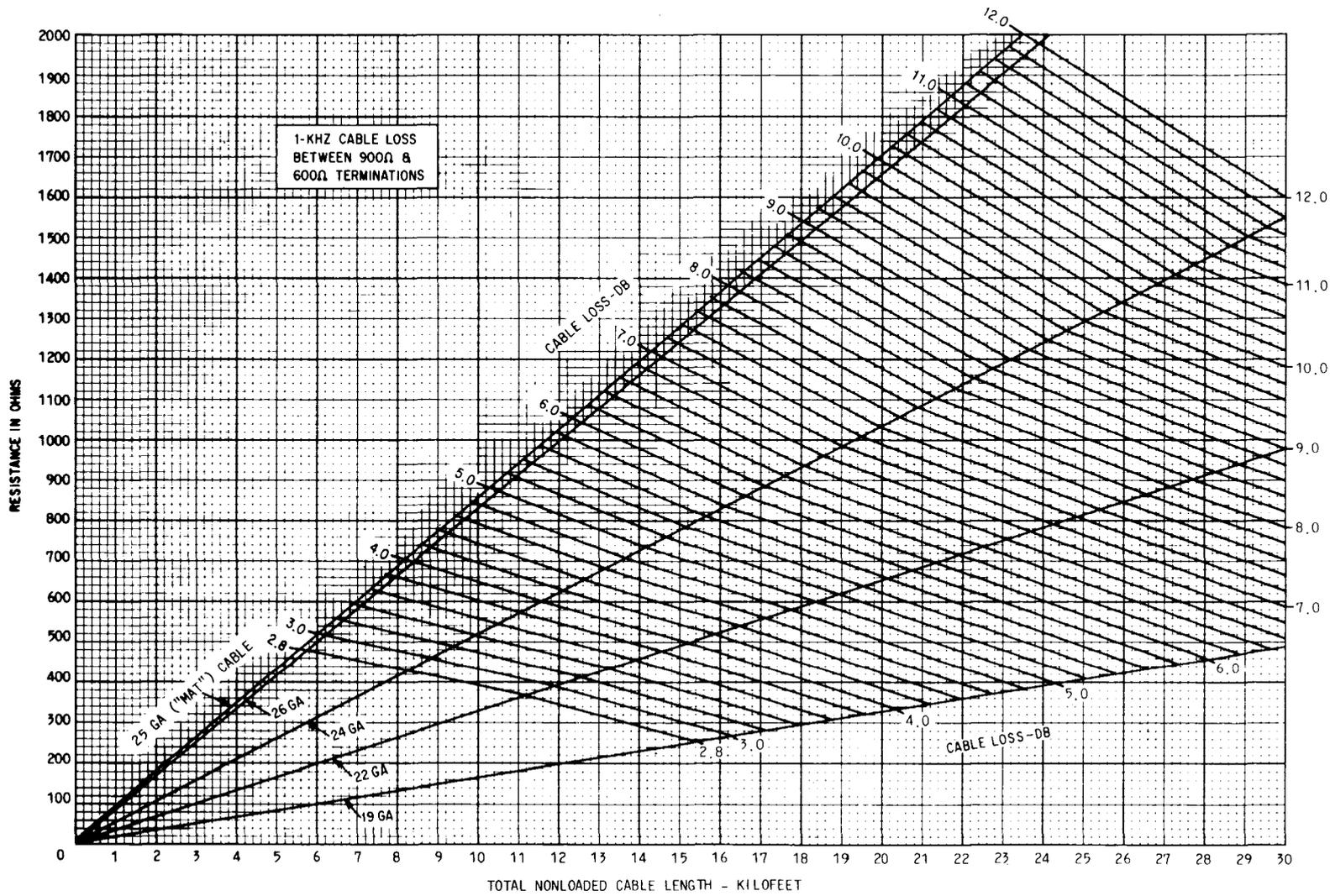


Fig. 23— 1-kHz Cable Loss, Nonloaded Cable, Between 900 Ohm and 600-Ohm Terminations

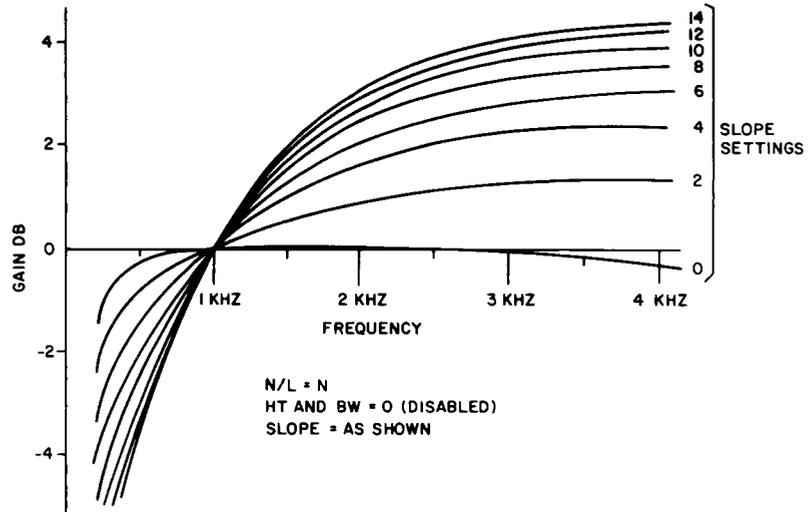


Fig. 24—Gain-Frequency Response of the Equalizer With N/L Switch at N (Nonloaded), Slope Variable

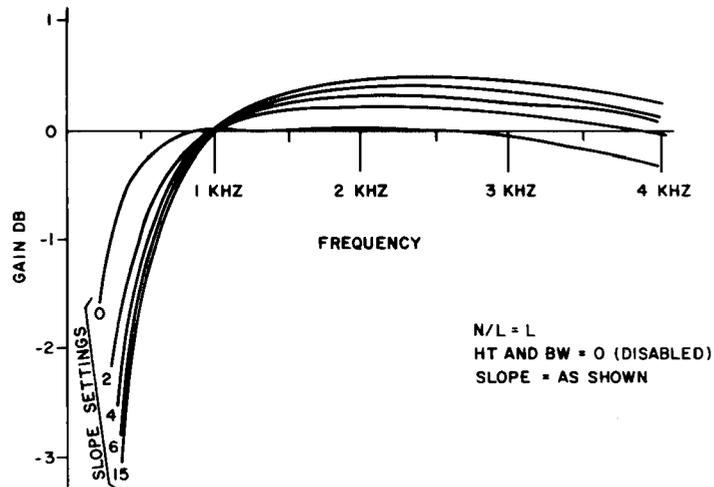


Fig. 25—Gain-Frequency Response of the Equalizers With N/L Switch at L (Loaded), Slope Variable

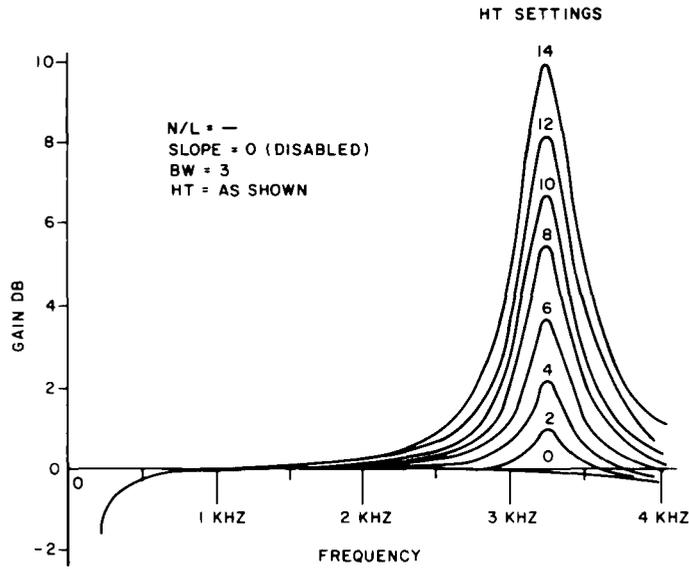


Fig. 26—Gain-Frequency Response of the Equalizer With BW Switch at Low Setting, HT Variable

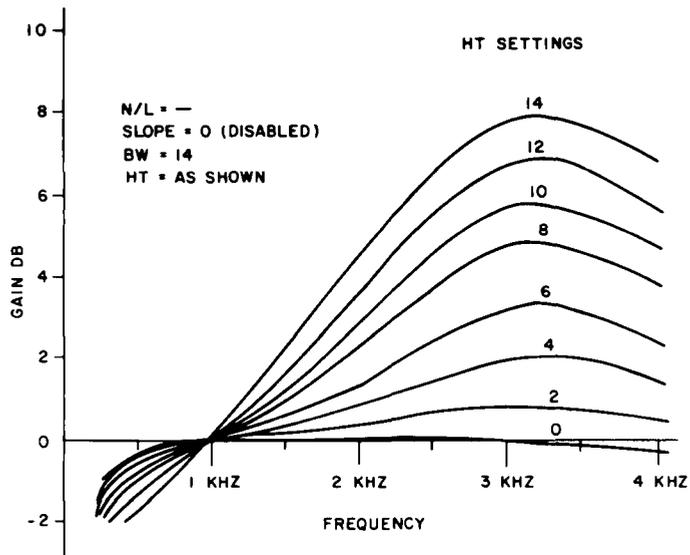


Fig. 27—Gain-Frequency Response of the Equalizer With BW Switch at High Setting, HT Variable

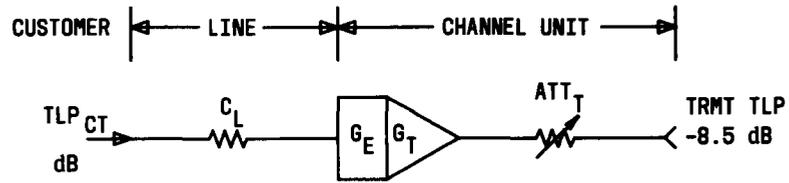


Fig. 28—Simplified Diagram for Calculation of Transmit Path Attenuator Settings for Equalized 4-Wire Channel Units

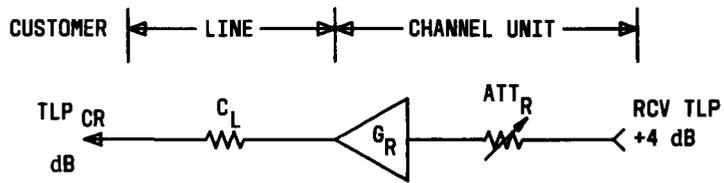


Fig. 29—Simplified Diagram for Calculation of Receive Path Attenuator Settings for Equalized 4-Wire Channel Units

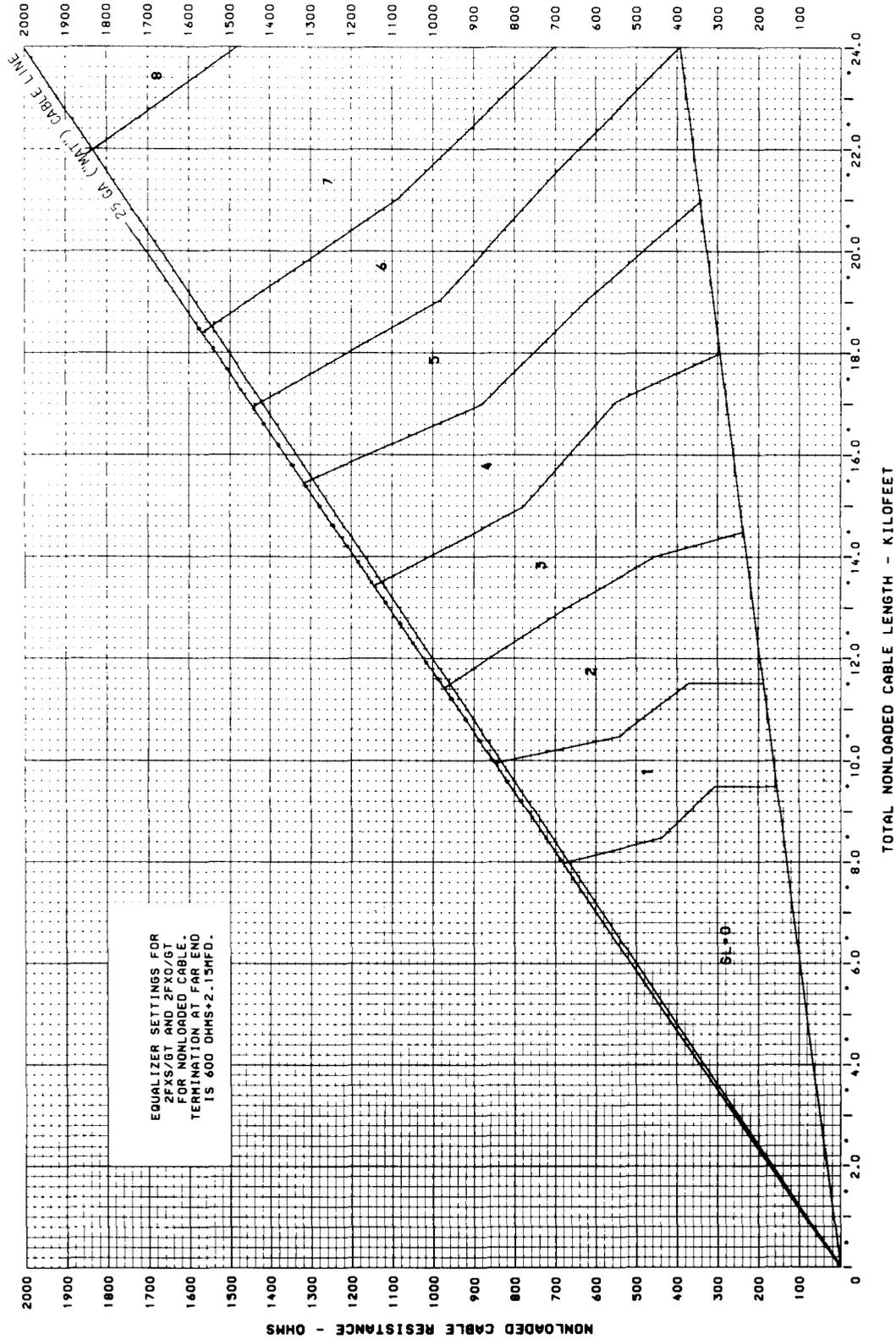


Fig. 30—Slope Equalization Settings for FX Channel Units With Gain Transfer Used With Nonloaded Cable Terminated With 600 Ohms

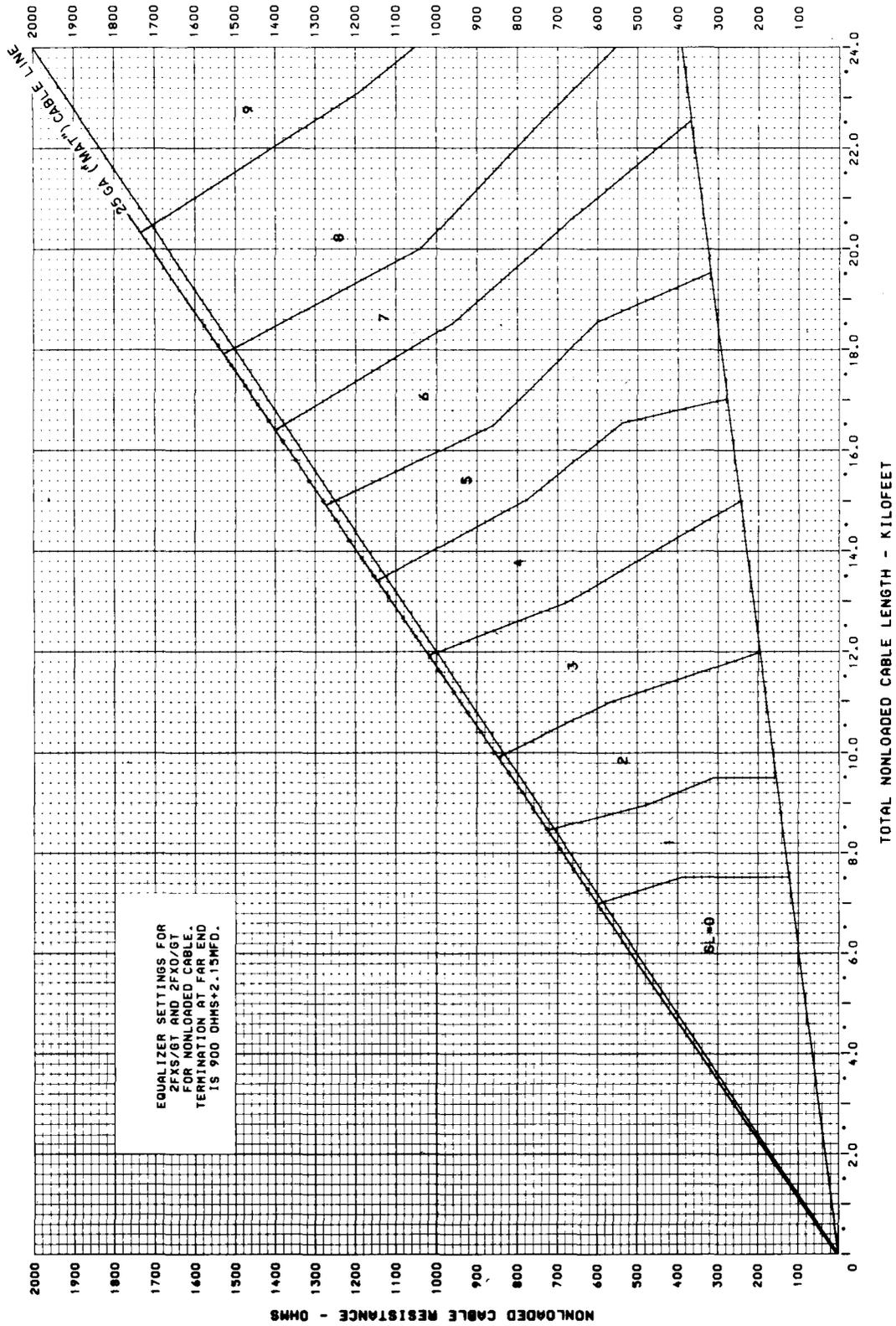


Fig. 31—Slope Equalization Settings for FX Channel Units With Gain Transfer Used With Nonloaded Cable Terminated With 900 Ohms

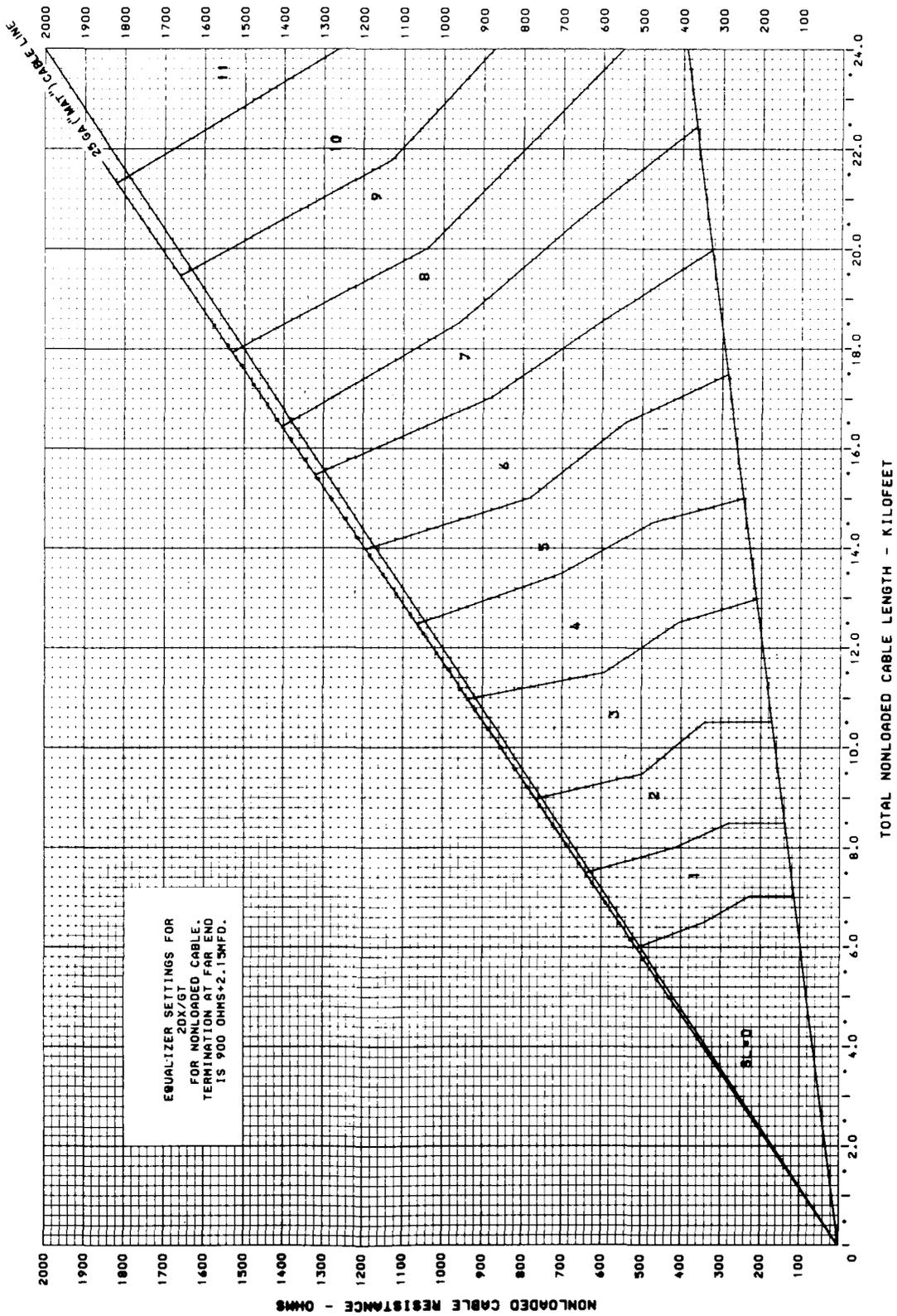
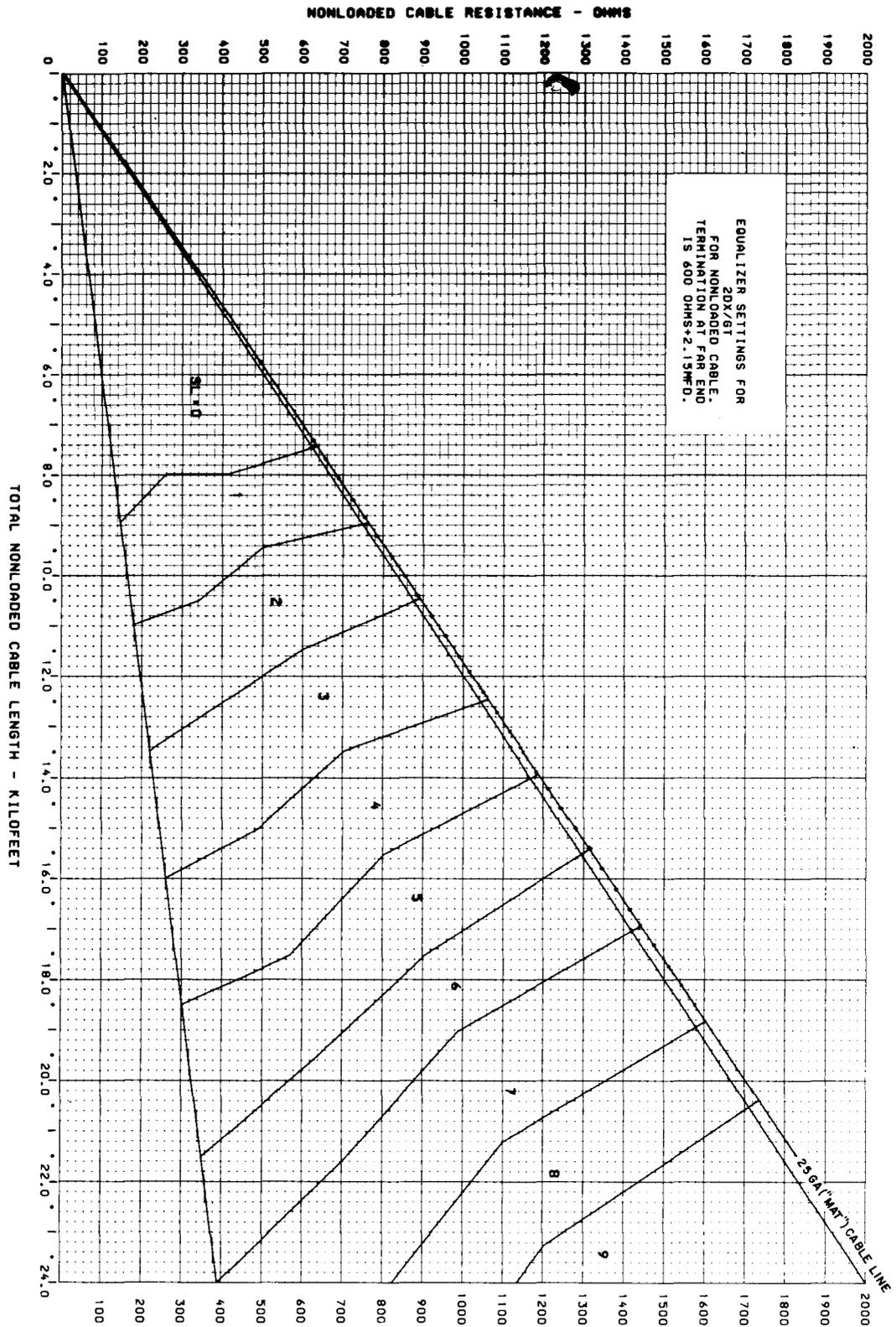


Fig. 32—Slope Equalization Settings for the DX Channel Unit With Gain Transfer Used With Nonloaded Cable Terminated With 900 Ohms



**Fig. 33—Slope Equalization Settings for the DX Channel Unit With Gain Transfer Used With Nonloaded Cable Terminated With 600 Ohms**

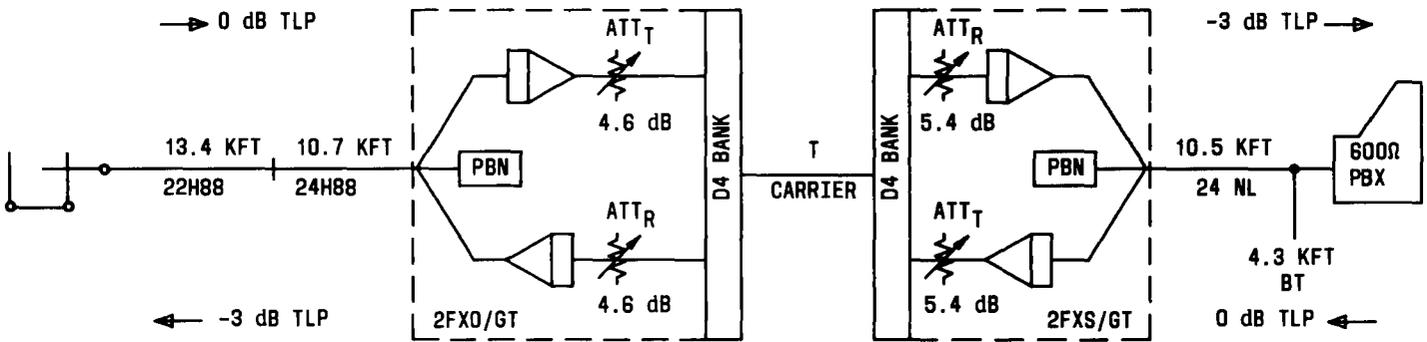


Fig. 34—Simplified Diagram for Calculation of Attenuator Settings for 2-Wire Gain Transfer Channel Units

CHART 1

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 19-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
1	14	0	0	0.0	0.1	0
2	14	0	0	0.0	0.3	0
3	14	0	0	0.0	0.4	0
4	14	0	0	0.0	0.5	0
5	14	0	0	0.0	0.7	0
6	14	2	0	0.1	0.8	0
7	14	1	1	0.4	1.0	100
8	14	3	0	0.1	1.2	100
9	14	2	1	0.5	1.3	100
10	14	4	0	0.2	1.5	100
11	14	3	1	0.5	1.7	100
12	14	5	0	0.3	1.9	100
13	14	4	1	0.6	2.1	100
14	14	6	0	0.4	2.3	100
15	14	5	1	0.7	2.5	100
16	13	5	2	1.1	2.7	100
17	14	5	2	1.2	2.9	100
18	13	5	3	1.5	3.1	100
19	14	6	2	1.3	3.4	200
20	14	6	2	1.3	3.6	200
21	14	6	3	1.7	3.8	200
22	14	7	2	1.4	4.1	200
23	14	6	4	2.2	4.3	200
24	14	6	4	2.2	4.5	200
25	14	7	3	1.9	4.8	200
26	14	6	5	2.7	5.0	200
27	14	7	4	2.4	5.3	200
28	14	7	4	2.4	5.5	200
29	14	7	5	2.8	5.8	200
30	14	7	5	2.8	6.0	200
31	14	7	6	3.3	6.3	300
32	14	7	6	3.3	6.5	300
33	14	7	6	3.3	6.8	300
34	14	7	7	3.9	7.0	300
35	14	7	8	4.2	7.3	300

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 1 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 19-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
36	14	7	8	4.2	7.6	300
37	14	7	9	4.7	7.8	300
38	14	7	10	5.1	8.1	300
39	14	7	11	5.5	8.3	300
40	14	7	11	5.5	8.6	300
41	14	8	8	4.4	8.8	300
42	14	8	9	4.9	9.1	300
43	14	8	9	4.9	9.3	400
44	14	8	10	5.3	9.6	400
45	14	8	11	5.7	9.8	400
46	14	8	12	6.1	10.1	400
47	14	8	13	6.5	10.3	400
48	14	8	14	6.9	10.6	400
49	14	9	12	6.2	10.8	400
50	14	9	13	6.6	11.1	400
51	14	9	14	7.0	11.3	400
52	14	9	15	7.4	11.6	400
53	14	9	15	7.4	11.8	400
54	14	10	13	6.8	12.1	400
55	14	10	14	7.2	12.3	400
56	14	10	15	7.5	12.6	500
57	14	10	15	7.5	12.8	500
58	14	11	14	7.4	13.1	500
59	14	11	15	7.7	13.3	500
60	14	11	15	7.7	13.6	500
61	14	11	15	7.7	13.8	500
62	14	12	14	7.6	14.0	500
63	14	12	15	8.0	14.3	500
64	14	12	15	8.0	14.5	500
65	14	12	15	8.0	14.8	500
66	14	13	15	8.2	15.0	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 2

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
1	14	0	0	0.0	0.2	0
2	14	0	0	0.0	0.5	0
3	14	0	0	0.0	0.7	0
4	14	0	0	0.0	1.0	100
5	14	0	0	0.0	1.2	100
6	14	1	1	0.4	1.5	100
7	14	2	0	0.1	1.7	100
8	14	3	0	0.1	2.0	100
9	13	2	1	0.5	2.2	100
10	14	4	0	0.2	2.5	200
11	14	5	0	0.3	2.8	200
12	14	4	1	0.6	3.1	200
13	14	6	0	0.4	3.4	200
14	14	5	1	0.7	3.6	200
15	13	5	2	1.1	3.9	200
16	14	6	1	0.8	4.2	300
17	13	5	3	1.5	4.6	300
18	14	6	2	1.3	4.9	300
19	13	6	3	1.6	5.2	300
20	14	7	2	1.4	5.5	300
21	14	6	4	2.2	5.8	300
22	14	7	3	1.9	6.1	400
23	14	6	5	2.7	6.5	400
24	14	7	4	2.4	6.8	400
25	14	7	5	2.8	7.1	400
26	14	7	5	2.8	7.5	400
27	14	8	4	2.5	7.8	400
28	14	8	5	3.0	8.2	500
29	14	8	5	3.0	8.5	500
30	14	8	6	3.5	8.8	500
31	14	8	7	4.1	9.2	500
32	14	8	8	4.4	9.5	500
33	14	8	9	4.9	9.9	500
34	14	9	8	4.5	10.2	600
35	14	9	9	5.0	10.6	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 2 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
36	14	9	10	5.4	10.9	600
37	14	10	8	4.7	11.3	600
38	14	10	9	5.1	11.6	600
39	14	10	11	6.0	12.0	600
40	14	11	9	5.3	12.3	700
41	14	11	10	5.8	12.7	700
42	14	11	12	6.6	13.0	700
43	14	11	13	7.0	13.4	700
44	14	12	11	6.4	13.7	700
45	14	12	12	6.8	14.1	800
46	14	12	14	7.6	14.4	800
47	14	13	11	6.7	14.8	800
48	13	13	15	7.7	15.1	800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 3

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 24-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
1	14	0	0	0.0	0.4	0
2	14	0	0	0.0	0.7	100
3	14	0	0	0.0	1.1	100
4	14	0	0	0.0	1.5	100
5	14	2	0	0.1	1.8	100
6	14	2	0	0.1	2.2	200
7	13	3	0	0.1	2.5	200
8	14	3	0	0.1	2.9	200
9	14	4	0	0.2	3.2	200
10	14	3	1	0.6	3.6	300
11	14	4	1	0.6	4.0	300
12	14	6	0	0.4	4.3	300
13	14	5	1	0.7	4.7	300
14	14	6	1	0.8	5.1	400
15	13	5	3	1.5	5.5	400
16	14	6	2	1.3	5.9	400
17	13	6	3	1.6	6.3	400
18	14	7	2	1.4	6.7	500
19	14	7	3	1.9	7.1	500
20	14	8	2	1.6	7.5	500
21	14	7	4	2.4	7.9	500
22	14	7	5	2.8	8.4	600
23	14	8	4	2.5	8.8	600
24	14	8	5	3.0	9.2	600
25	14	8	5	3.0	9.6	600
26	14	9	5	3.1	10.1	700
27	14	9	6	3.6	10.5	700
28	14	9	7	4.2	11.0	700
29	14	9	8	4.5	11.4	800
30	14	10	7	4.3	11.8	800
31	14	10	9	5.1	12.3	800
32	14	10	10	5.6	12.7	800
33	14	11	9	5.3	13.2	900
34	13	11	13	6.6	13.6	900
35	14	12	9	5.6	14.0	900

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 3 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 24-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
36	13	12	13	6.7	14.5	900
37	13	12	15	7.5	14.9	1000
38	13	13	12	6.5	15.4	1000

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 4

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 25-GA ("MAT") NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
1	14	0	0	0.0	0.5	0
2	14	0	0	0.0	0.9	100
3	14	0	0	0.0	1.3	100
4	14	0	0	0.0	1.8	100
5	14	2	0	0.1	2.2	200
6	14	2	0	0.1	2.6	200
7	14	2	0	0.1	2.9	200
8	14	2	1	0.5	3.3	300
9	14	2	1	0.5	3.7	300
10	14	5	0	0.3	4.1	300
11	14	5	0	0.3	4.4	400
12	14	5	1	0.7	4.8	400
13	14	5	1	0.7	5.2	400
14	14	5	2	1.2	5.6	500
15	14	6	2	1.3	5.9	500
16	14	6	2	1.3	6.3	500
17	14	7	2	1.4	6.7	600
18	14	7	2	1.4	7.1	600
19	14	7	4	2.3	7.5	600
20	14	7	4	2.3	7.9	700
21	14	7	5	2.8	8.2	700
22	14	8	5	3.0	8.7	700
23	14	8	5	3.0	9.0	800
24	14	8	7	4.1	9.5	800
25	14	8	7	4.1	9.8	800
26	14	9	7	4.2	10.3	900
27	14	9	7	4.2	10.6	900
28	14	10	8	4.7	11.0	900
29	14	10	8	4.7	11.4	900
30	14	11	8	4.9	11.8	1000

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 5

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 26-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	BW	HT	SL			
1	14	0	0	0.0	0.6	0
2	14	1	0	0.0	1.2	100
3	14	2	0	0.1	1.7	100
4	13	1	0	0.0	2.2	200
5	15	1	0	0.1	2.7	200
6	14	2	0	0.1	3.2	200
7	13	3	0	0.1	3.7	300
8	13	2	1	0.5	4.2	300
9	13	3	1	0.5	4.7	400
10	14	5	0	0.3	5.1	400
11	14	6	0	0.4	5.6	500
12	14	5	1	0.7	6.1	500
13	14	6	1	0.8	6.6	500
14	13	6	2	1.1	7.1	600
15	13	6	3	1.6	7.6	600
16	14	7	2	1.4	8.1	700
17	14	7	3	1.9	8.6	700
18	14	8	2	1.6	9.1	800
19	14	8	3	2.1	9.7	800
20	14	8	4	2.5	10.2	800
21	14	8	5	3.0	10.7	900
22	14	8	6	3.5	11.3	900
23	14	9	6	3.6	11.8	1000
24	14	9	7	4.2	12.4	1000
25	14	11	5	3.5	12.9	1000
26	14	11	6	4.0	13.5	1100
27	13	11	9	4.9	14.0	1100
28	13	11	11	5.8	14.6	1200
29	13	12	10	5.5	15.1	1200

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 6

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 9						
7	2	14	4	0	0.2	200
8	1	14	4	0	0.2	200
WL = 10						
5	5	13	3	1	0.5	200
6	4	13	3	1	0.5	200
7	3	13	3	1	0.5	200
8	2	13	3	1	0.5	200
9	1	14	3	1	0.6	200
WL = 11						
2	9	14	5	0	0.3	200
3	8	14	5	0	0.3	200
4	7	14	5	0	0.3	200
5	6	14	5	0	0.3	200
6	5	14	5	0	0.3	200
7	4	14	5	0	0.3	200
8	3	14	5	0	0.3	300
9	2	13	4	1	0.5	300
10	1	13	4	1	0.5	300
WL = 12						
1	11	14	4	1	0.6	200
2	10	14	4	1	0.6	200
3	9	14	4	1	0.6	200
4	8	14	4	1	0.6	200
5	7	14	4	1	0.6	200
6	6	14	4	1	0.6	300
7	5	14	4	1	0.6	300
8	4	14	4	1	0.6	300
9	3	14	4	1	0.6	300
10	2	14	6	0	0.4	300
11	1	14	6	0	0.4	300
WL = 13						
1	12	14	6	0	0.4	200
2	11	14	6	0	0.4	200
3	10	14	6	0	0.4	200
4	9	14	5	1	0.7	300
5	8	14	5	1	0.7	300
6	7	14	5	1	0.7	300

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 13 (Contd)						
7	6	14	5	1	0.7	300
8	5	14	5	1	0.7	300
9	4	14	5	1	0.7	300
10	3	14	5	1	0.7	300
11	2	14	5	1	0.7	300
12	1	14	5	1	0.7	300
WL = 14						
1	13	14	5	1	0.7	300
2	12	14	5	1	0.7	200
3	11	14	4	2	1.1	300
4	10	14	4	2	1.1	300
5	9	14	4	2	1.1	300
6	8	14	4	2	1.1	300
7	7	14	4	2	1.1	300
8	6	12	5	2	1.0	300
9	5	13	5	2	1.1	300
10	4	13	5	2	1.1	300
11	3	13	5	2	1.1	300
12	2	13	5	2	1.1	300
13	1	14	7	0	0.5	300
WL = 15						
1	14	13	5	2	1.1	300
2	13	14	6	1	0.8	300
3	12	14	6	1	0.8	300
4	11	14	6	1	0.8	300
5	10	14	6	1	0.8	300
6	9	14	6	1	0.8	300
7	8	14	6	1	0.8	300
8	7	14	6	1	0.8	300
9	6	14	6	1	0.8	300
10	5	14	6	1	0.8	300
11	4	14	6	1	0.8	300
12	3	14	5	2	1.2	400
13	2	14	5	2	1.2	400
14	1	14	5	2	1.2	400

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 16						
1	15	14	5	2	1.2	300
2	14	14	5	2	1.2	300
3	13	14	5	2	1.2	300
4	12	13	5	3	1.5	300
5	11	13	5	3	1.5	300
6	10	13	5	3	1.5	300
7	9	13	5	3	1.5	300
8	8	13	5	3	1.5	300
9	7	13	5	3	1.5	300
10	6	13	5	3	1.5	300
11	5	13	6	2	1.1	400
12	4	13	6	2	1.1	400
13	3	14	6	2	1.3	400
14	2	14	6	2	1.3	400
15	1	14	6	2	1.3	400
WL = 17						
1	16	13	5	3	1.5	300
2	15	14	6	2	1.3	300
3	14	14	6	2	1.3	300
4	13	14	6	2	1.3	300
5	12	14	6	2	1.3	300
6	11	14	6	2	1.3	300
7	10	14	6	2	1.3	300
8	9	14	6	2	1.3	400
9	8	14	6	2	1.3	400
10	7	14	6	2	1.3	400
11	6	14	6	2	1.3	400
12	5	14	6	2	1.3	400
13	4	14	6	2	1.3	400
14	3	14	6	2	1.3	400
15	2	13	6	3	1.6	400
16	1	13	6	3	1.6	400
WL = 18						
1	17	14	6	2	1.3	300
2	16	14	6	2	1.3	300
3	15	13	5	4	2.0	300
4	14	13	5	4	2.0	300

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 18 (Contd)						
5	13	13	6	3	1.6	300
6	12	13	6	3	1.6	400
7	11	13	6	3	1.6	400
8	10	13	6	3	1.6	400
9	9	13	6	3	1.6	400
10	8	14	6	3	1.7	400
11	7	14	6	3	1.7	400
12	6	14	6	3	1.7	400
13	5	14	6	3	1.7	400
14	4	14	6	3	1.7	400
15	3	14	7	2	1.4	400
16	2	14	7	2	1.4	400
17	1	14	7	2	1.4	500
W = 19						
1	18	14	6	3	1.7	300
2	17	14	6	3	1.7	300
3	16	14	6	3	1.7	300
4	15	14	6	3	1.7	300
5	14	14	7	2	1.4	400
6	13	14	7	2	1.4	400
7	12	14	7	2	1.4	400
8	11	14	7	2	1.4	400
9	10	14	7	2	1.4	400
10	9	14	7	2	1.4	400
11	8	14	7	2	1.4	400
12	7	14	7	2	1.4	400
13	6	14	7	2	1.4	400
14	5	13	6	4	2.1	400
15	4	13	6	4	2.1	500
16	3	14	6	4	2.2	500
17	2	14	6	4	2.2	500
18	1	14	6	4	2.2	500
WL = 20						
1	19	14	7	2	1.4	300
2	18	14	7	2	1.4	300
3	17	14	7	2	1.4	400
4	16	13	6	4	2.1	400

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 20 (Contd)						
5	15	13	6	4	2.1	400
6	14	14	6	4	2.2	400
7	13	14	6	4	2.2	400
8	12	14	6	4	2.2	400
9	11	14	6	4	2.2	400
10	10	14	6	4	2.2	400
11	9	14	6	4	2.2	400
12	8	14	7	3	1.9	400
13	7	14	7	3	1.9	500
14	6	14	7	3	1.9	500
15	5	14	7	3	1.9	500
16	4	14	7	3	1.9	500
17	3	14	7	3	1.9	500
18	2	14	7	3	1.9	500
19	1	14	8	2	1.6	500
WL = 21						
1	20	14	6	4	2.2	400
2	19	14	6	4	2.2	400
3	18	14	6	4	2.2	400
4	17	14	7	3	1.9	400
5	16	14	7	3	1.9	400
6	15	14	7	3	1.9	400
7	14	14	7	3	1.9	400
8	13	14	7	3	1.9	400
9	12	14	7	3	1.9	400
10	11	14	7	3	1.9	400
11	10	14	7	3	1.9	400
12	9	14	8	2	1.6	400
13	8	14	8	2	1.6	400
14	7	14	8	2	1.6	500
15	6	14	8	2	1.6	500
16	5	14	8	2	1.6	500
17	4	14	7	4	2.4	500
18	3	14	7	4	2.4	500
19	2	14	7	4	2.4	500
20	1	14	7	4	2.4	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 22						
1	21	14	7	3	1.9	400
2	20	14	7	3	1.9	400
3	19	14	7	3	1.9	400
4	18	14	7	3	1.9	400
5	17	14	6	5	2.7	400
6	16	14	6	5	2.7	400
7	15	14	6	5	2.7	400
8	14	14	7	4	2.4	400
9	13	14	7	4	2.4	400
10	12	14	7	4	2.4	400
11	11	14	7	4	2.4	500
12	10	14	7	4	2.4	500
13	9	14	7	4	2.4	500
14	8	14	7	4	2.4	500
15	7	14	7	4	2.4	500
16	6	14	7	4	2.4	500
17	5	14	8	3	2.1	500
18	4	14	8	3	2.1	500
19	3	14	8	3	2.1	500
20	2	14	8	3	2.1	600
21	1	14	8	3	2.1	600
WL = 23						
1	22	14	7	4	2.4	400
2	21	14	7	4	2.4	400
3	20	14	7	4	2.4	400
4	19	14	7	4	2.4	400
5	18	14	7	4	2.4	400
6	17	14	7	4	2.4	400
7	16	14	7	4	2.4	500
8	15	14	7	4	2.4	500
9	14	14	7	4	2.4	500
10	13	14	7	4	2.4	500
11	12	14	8	3	2.1	500
12	11	14	8	3	2.1	500
13	10	14	8	3	2.1	500
14	9	14	8	3	2.1	500
15	8	14	7	5	2.8	500
16	7	14	7	5	2.8	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 23 (Contd)						
17	6	14	7	5	2.8	500
18	5	14	7	5	2.8	500
19	4	14	7	5	2.8	500
20	3	14	7	5	2.8	600
21	2	14	8	4	2.5	600
22	1	14	8	4	2.5	600
WL = 24						
1	23	14	7	4	2.4	400
2	22	14	7	4	2.4	400
3	21	14	7	4	2.4	400
4	20	14	8	3	2.1	400
5	19	14	7	5	2.8	400
6	18	14	7	5	2.8	500
7	17	14	7	5	2.8	500
8	16	14	7	5	2.8	500
9	15	14	7	5	2.8	500
10	14	14	7	5	2.8	500
11	13	14	7	5	2.8	500
12	12	14	7	5	2.8	500
13	11	14	7	5	2.8	500
14	10	14	7	6	3.3	500
15	9	14	8	4	2.5	500
16	8	14	8	4	2.5	500
17	7	14	8	4	2.5	600
18	6	14	8	4	2.5	600
19	5	14	8	4	2.5	600
20	4	14	8	4	2.5	600
21	3	14	8	4	2.5	600
22	2	14	8	4	2.5	600
23	1	14	8	4	2.5	600
WL = 25						
1	24	14	7	5	2.8	400
2	23	14	7	5	2.8	400
3	22	14	7	5	2.8	400
4	21	14	7	5	2.8	400
5	20	14	7	5	2.8	500
6	19	14	7	5	2.8	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 25 (Contd)						
7	18	14	7	6	3.3	500
8	17	14	7	6	3.3	500
9	16	14	7	6	3.3	500
10	15	14	8	4	2.5	500
11	14	14	8	4	2.5	500
12	13	14	8	4	2.5	500
13	12	14	8	4	2.5	500
14	11	14	8	4	2.5	500
15	10	14	8	4	2.5	600
16	9	14	8	4	2.5	600
17	8	14	8	5	3.0	600
18	7	14	8	5	3.0	600
19	6	14	8	5	3.0	600
20	5	14	8	5	3.0	600
21	4	14	8	5	3.0	600
22	3	14	8	5	3.0	600
23	2	14	8	5	3.0	600
24	1	14	8	5	3.0	600
WL = 26						
1	25	14	7	6	3.3	400
2	24	14	7	6	3.3	400
3	23	14	7	6	3.3	500
4	22	14	7	6	3.3	500
5	21	14	8	4	2.5	500
6	20	14	8	4	2.5	500
7	19	14	8	4	2.5	500
8	18	14	8	4	2.5	500
9	17	14	8	4	2.5	500
10	16	14	7	7	3.9	500
11	15	14	7	7	3.9	500
12	14	14	8	5	3.0	500
13	13	14	8	5	3.0	600
14	12	14	8	5	3.0	600
15	11	14	8	5	3.0	600
16	10	14	8	5	3.0	600
17	9	14	8	5	3.0	600
18	8	14	8	5	3.0	600
19	7	14	8	6	3.5	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 26 (Contd)						
20	6	14	8	6	3.5	600
21	5	14	8	6	3.5	600
22	4	14	8	6	3.5	600
23	3	14	8	6	3.5	600
24	2	14	9	5	3.1	700
25	1	14	9	5	3.1	700
WL = 27						
1	26	14	8	4	2.5	500
2	25	14	7	6	3.3	500
3	24	14	7	7	3.9	500
4	23	14	7	7	3.9	500
5	22	14	7	7	3.9	500
6	21	14	7	7	3.9	500
7	20	14	8	5	3.0	500
8	19	14	8	5	3.0	500
9	18	14	8	5	3.0	500
10	17	14	8	5	3.0	500
11	16	14	8	5	3.0	500
12	15	14	8	5	3.0	600
13	14	14	8	5	3.0	600
14	13	14	8	6	3.5	600
15	12	14	8	6	3.5	600
16	11	14	8	6	3.5	600
17	10	14	8	6	3.5	600
18	9	14	9	5	3.1	600
19	8	14	9	5	3.1	600
20	7	14	9	5	3.1	600
21	6	14	9	5	3.1	600
22	5	14	9	5	3.1	700
23	4	14	8	7	4.1	700
24	3	14	8	7	4.1	700
25	2	14	9	6	3.6	700
26	1	14	9	6	3.6	700
WL = 28						
1	27	14	8	5	3.0	500
2	26	14	8	5	3.0	500
3	25	14	8	5	3.0	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 28 (Contd)						
4	24	14	8	5	3.0	500
5	23	14	8	5	3.0	500
6	22	14	8	5	3.0	500
7	21	14	8	5	3.0	500
8	20	14	8	6	3.5	500
9	19	14	8	6	3.5	500
10	18	14	8	6	3.5	600
11	17	14	8	6	3.5	600
12	16	14	8	6	3.5	600
13	15	14	8	6	3.5	600
14	14	14	9	5	3.1	600
15	13	14	9	5	3.1	600
16	12	14	8	7	4.1	600
17	11	14	8	7	4.1	600
18	10	14	8	7	4.1	600
19	9	14	9	6	3.6	600
20	8	14	9	6	3.6	600
21	7	14	9	6	3.6	600
22	6	14	9	6	3.6	700
23	5	14	9	6	3.6	700
24	4	14	9	6	3.6	700
25	3	14	10	5	3.3	700
26	2	14	10	5	3.3	700
27	1	14	9	7	4.2	700
WL = 29						
1	28	14	8	5	3.0	500
2	27	14	8	6	3.5	500
3	26	14	8	6	3.5	500
4	25	14	8	6	3.5	500
5	24	14	8	6	3.5	500
6	23	14	8	6	3.5	500
7	22	14	8	6	3.5	500
8	21	14	8	6	3.5	600
9	20	14	8	6	3.5	600
10	19	14	8	6	3.5	600
11	18	14	8	7	4.1	600
12	17	14	8	7	4.1	600
13	16	14	8	7	4.1	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 29 (Contd)						
14	15	14	9	6	3.6	600
15	14	14	9	6	3.6	600
16	13	14	9	6	3.6	600
17	12	14	9	6	3.6	600
18	11	14	9	6	3.6	600
19	10	14	10	5	3.3	700
20	9	14	9	7	4.2	700
21	8	14	9	7	4.2	700
22	7	14	9	7	4.2	700
23	6	14	9	7	4.2	700
24	5	14	9	7	4.2	700
25	4	14	9	7	4.2	700
26	3	14	10	6	3.8	700
27	2	14	10	6	3.8	700
28	1	14	10	6	3.8	700
WL = 30						
1	29	14	8	6	3.5	500
2	28	14	8	6	3.5	500
3	27	14	8	6	3.5	500
4	26	14	8	6	3.5	500
5	25	14	8	7	4.1	500
6	24	14	8	7	4.1	500
7	23	14	8	7	4.1	600
8	22	14	8	7	4.1	600
9	21	14	8	7	4.1	600
10	20	14	8	7	4.1	600
11	19	14	9	6	3.6	600
12	18	14	9	6	3.6	600
13	17	14	9	6	3.6	600
14	16	14	8	8	4.4	600
15	15	14	9	7	4.2	600
16	14	14	9	7	4.2	600
17	13	14	9	7	4.2	700
18	12	14	9	7	4.2	700
19	11	14	9	7	4.2	700
20	10	14	10	6	3.8	700
21	9	14	10	6	3.8	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 6 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 24- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 30 (Contd)						
22	8	14	10	6	3.8	700
23	7	14	10	6	3.8	700
24	6	14	10	6	3.8	700
25	5	14	9	9	5.0	700
26	4	14	9	9	5.0	700
27	3	14	10	7	4.3	700
28	2	14	10	7	4.3	800
29	1	14	10	7	4.3	800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE CHANNEL  
UNITS FOR MIXED 26- AND 22-GA NONLOADED CABLE WITHOUT BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 7						
5	2	13	3	0	0.1	200
6	1	13	3	0	0.1	300
WL = 8						
4	4	14	3	0	0.1	200
5	3	14	3	0	0.1	300
6	2	14	3	0	0.1	300
7	1	12	2	1	0.5	300
WL = 9						
3	6	14	4	0	0.2	200
4	5	14	4	0	0.2	200
5	4	14	4	0	0.2	300
6	3	14	4	0	0.2	300
7	2	14	4	0	0.2	300
8	1	14	4	0	0.2	300
WL = 10						
2	8	13	3	1	0.5	200
3	7	14	3	1	0.6	200
4	6	14	3	1	0.6	300
5	5	14	3	1	0.6	300
6	4	14	3	1	0.6	300
7	3	14	3	1	0.6	300
8	2	14	5	0	0.3	400
9	1	14	5	0	0.3	400
WL = 11						
1	10	14	5	0	0.3	200
2	9	14	5	0	0.3	200
3	8	13	4	1	0.5	300
4	7	13	4	1	0.5	300
5	6	13	4	1	0.5	300
6	5	14	4	1	0.6	300
7	4	14	4	1	0.6	400
8	3	14	4	1	0.6	400
9	2	14	4	1	0.6	400
10	1	14	4	1	0.6	400
WL = 12						
1	11	14	4	1	0.6	200
2	10	14	4	1	0.6	200

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 12 (Contd)						
3	9	14	4	1	0.6	300
4	8	14	6	0	0.4	300
5	7	14	6	0	0.4	300
6	6	14	6	0	0.4	300
7	5	14	6	0	0.4	400
8	4	14	6	0	0.4	400
9	3	14	6	0	0.4	400
10	2	14	5	1	0.7	400
11	1	14	5	1	0.7	500
WL = 13						
1	12	14	6	0	0.4	200
2	11	14	5	1	0.7	300
3	10	14	5	1	0.7	300
4	9	14	5	1	0.7	300
5	8	14	5	1	0.7	400
6	7	14	5	1	0.7	400
7	6	14	5	1	0.7	400
8	5	14	5	1	0.7	400
9	4	14	4	2	1.1	400
10	3	12	5	2	1.0	500
11	2	13	5	2	1.1	500
12	1	14	7	0	0.5	500
WL = 14						
1	13	14	4	2	1.1	300
2	12	12	4	3	1.4	300
3	11	13	5	2	1.1	300
4	10	13	5	2	1.1	300
5	9	14	7	0	0.5	400
6	8	14	7	0	0.5	400
7	7	14	6	1	0.8	400
8	6	14	6	1	0.8	400
9	5	14	6	1	0.8	500
10	4	14	6	1	0.8	500
11	3	14	6	1	0.8	500
12	2	14	5	2	1.2	500
13	1	13	5	3	1.5	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 15						
1	14	14	6	1	0.8	300
2	13	14	6	1	0.8	300
3	12	14	6	1	0.8	300
4	11	14	5	2	1.2	300
5	10	14	5	2	1.2	400
6	9	14	5	2	1.2	400
7	8	13	5	3	1.5	400
8	7	13	5	3	1.5	400
9	6	13	5	3	1.5	500
10	5	13	6	2	1.1	500
11	4	13	6	2	1.1	500
12	3	14	7	1	0.9	500
13	2	14	7	1	0.9	600
14	1	14	7	1	0.9	600
WL = 16						
1	15	14	5	2	1.2	300
2	14	13	5	3	1.5	300
3	13	13	5	3	1.5	300
4	12	13	6	2	1.1	400
5	11	14	6	2	1.3	400
6	10	14	6	2	1.3	400
7	9	14	6	2	1.3	400
8	8	14	7	1	0.9	500
9	7	14	7	1	0.9	500
10	6	14	7	1	0.9	500
11	5	14	6	2	1.3	500
12	4	13	6	3	1.6	600
13	3	13	6	3	1.6	600
14	2	13	6	3	1.6	600
15	1	14	7	2	1.4	600
WL = 17						
1	16	14	6	2	1.3	300
2	15	14	6	2	1.3	300
3	14	14	6	2	1.3	300
4	13	14	6	2	1.3	400
5	12	14	6	2	1.3	400
6	11	13	6	3	1.6	400

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 19 (Contd)						
9	10	14	7	3	1.9	500
10	9	14	7	3	1.9	600
11	8	14	7	3	1.9	600
12	7	14	7	3	1.9	600
13	6	14	8	2	1.6	600
14	5	14	8	2	1.6	700
15	4	14	8	2	1.6	700
16	3	14	7	4	2.4	700
17	2	14	7	4	2.4	700
18	1	14	9	2	1.7	800
WL = 20						
1	19	14	7	2	1.4	400
2	18	14	6	4	2.2	400
3	17	14	6	4	2.2	400
4	16	14	6	4	2.2	400
5	15	14	7	3	1.9	500
6	14	14	7	3	1.9	500
7	13	14	7	3	1.9	500
8	12	14	7	3	1.9	500
9	11	14	8	2	1.6	600
10	10	14	8	2	1.6	600
11	9	14	7	4	2.4	600
12	8	14	7	4	2.4	600
13	7	14	7	4	2.4	700
14	6	14	7	4	2.4	700
15	5	14	9	2	1.7	700
16	4	14	8	3	2.1	700
17	3	14	8	3	2.1	800
18	2	14	8	3	2.1	800
19	1	13	8	4	2.3	800
WL = 21						
1	20	14	6	4	2.2	400
2	19	14	7	3	1.9	400
3	18	14	7	3	1.9	400
4	17	14	7	3	1.9	400
5	16	14	6	5	2.7	500
6	15	14	6	5	2.7	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 21 (Contd)						
7	14	14	7	4	2.4	500
8	13	14	7	4	2.4	500
9	12	14	7	4	2.4	600
10	11	14	7	4	2.4	600
11	10	14	8	3	2.1	600
12	9	14	8	3	2.1	600
13	8	14	8	3	2.1	700
14	7	14	8	3	2.1	700
15	6	14	8	3	2.1	700
16	5	13	8	4	2.3	700
17	4	14	8	4	2.5	800
18	3	14	8	4	2.5	800
19	2	14	8	4	2.5	800
20	1	13	8	5	2.8	800
WL = 22						
1	21	14	7	3	1.9	400
2	20	14	6	5	2.7	400
3	19	14	7	4	2.4	400
4	18	14	7	4	2.4	500
5	17	14	7	4	2.4	500
6	16	14	7	4	2.4	500
7	15	14	7	4	2.4	500
8	14	14	8	3	2.1	600
9	13	14	8	3	2.1	600
10	12	14	7	5	2.8	600
11	11	14	7	5	2.8	600
12	10	14	7	5	2.8	700
13	9	14	8	4	2.5	700
14	8	14	8	4	2.5	700
15	7	14	8	4	2.5	700
16	6	14	8	4	2.5	800
17	5	13	8	5	2.8	800
18	4	14	8	5	3.0	800
19	3	14	9	4	2.7	800
20	2	14	9	4	2.7	900
21	1	14	9	4	2.7	900

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 23						
1	22	14	7	4	2.4	400
2	21	14	7	4	2.4	400
3	20	14	7	4	2.4	500
4	19	14	7	4	2.4	500
5	18	14	7	5	2.8	500
6	17	14	7	5	2.8	500
7	16	14	7	5	2.8	600
8	15	14	7	5	2.8	600
9	14	14	7	5	2.8	600
10	13	14	8	4	2.5	600
11	12	14	8	4	2.5	700
12	11	14	8	4	2.5	700
13	10	14	8	4	2.5	700
14	9	14	8	5	3.0	700
15	8	14	8	5	3.0	800
16	7	14	9	4	2.7	800
17	6	14	9	4	2.7	800
18	5	14	9	4	2.7	800
19	4	14	8	6	3.5	900
20	3	14	9	5	3.1	900
21	2	14	9	5	3.1	900
22	1	14	10	4	2.8	900
WL = 24						
1	23	14	7	4	2.4	400
2	22	14	7	5	2.8	400
3	21	14	7	5	2.8	500
4	20	14	7	5	2.8	500
5	19	14	7	5	2.8	500
6	18	14	7	6	3.3	500
7	17	14	7	6	3.3	600
8	16	14	8	4	2.5	600
9	15	14	8	4	2.5	600
10	14	14	8	4	2.5	700
11	13	14	8	5	3.0	700
12	12	14	8	5	3.0	700
13	11	14	9	4	2.7	700
14	10	14	9	4	2.7	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 24 (Contd)						
15	9	14	8	6	3.5	800
16	8	14	9	5	3.1	800
17	7	14	9	5	3.1	800
18	6	14	10	4	2.8	800
19	5	14	10	4	2.8	800
20	4	14	9	6	3.6	900
21	3	14	9	6	3.6	900
22	2	14	10	5	3.3	900
23	1	14	10	5	3.3	1000
WL = 25						
1	24	14	7	5	2.8	400
2	23	14	7	5	2.8	500
3	22	14	7	6	3.3	500
4	21	14	7	6	3.3	500
5	20	14	7	6	3.3	500
6	19	14	7	6	3.3	600
7	18	14	7	7	3.9	600
8	17	14	7	7	3.9	600
9	16	14	8	5	3.0	600
10	15	14	8	5	3.0	700
11	14	14	8	5	3.0	700
12	13	14	8	6	3.5	700
13	12	14	8	6	3.5	700
14	11	14	9	5	3.1	800
15	10	14	10	4	2.8	800
16	9	14	10	4	2.8	800
17	8	14	9	6	3.6	800
18	7	14	9	6	3.6	900
19	6	14	10	5	3.3	900
20	5	14	10	5	3.3	900
21	4	14	10	5	3.3	900
22	3	14	10	6	3.8	1000
23	2	14	10	6	3.8	1000
24	1	14	10	6	3.8	1000
WL = 26						
1	25	14	7	6	3.3	500
2	24	14	7	6	3.3	500

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 26 (Contd)						
3	23	14	7	6	3.3	500
4	22	14	7	7	3.9	500
5	21	14	7	7	3.9	600
6	20	14	8	5	3.0	600
7	19	14	8	5	3.0	600
8	18	14	8	5	3.0	600
9	17	14	8	6	3.5	700
10	16	14	8	6	3.5	700
11	15	14	9	5	3.1	700
12	14	14	9	5	3.1	700
13	13	14	8	7	4.1	700
14	12	14	9	6	3.6	800
15	11	14	9	6	3.6	800
16	10	14	10	5	3.3	800
17	9	14	10	5	3.3	800
18	8	14	9	7	4.2	900
19	7	14	10	6	3.8	900
20	6	14	10	6	3.8	900
21	5	14	11	5	3.5	1000
22	4	14	11	5	3.5	1000
23	3	13	10	8	4.3	1000
24	2	14	10	7	4.3	1000
25	1	14	11	6	4.0	1100
WL = 27						
1	26	14	7	7	3.9	500
2	25	14	7	7	3.9	500
3	24	14	8	5	3.0	500
4	23	14	8	5	3.0	500
5	22	14	8	5	3.0	600
6	21	14	8	5	3.0	600
7	20	14	8	6	3.5	600
8	19	14	8	6	3.5	600
9	18	14	8	6	3.5	700
10	17	14	9	5	3.1	700
11	16	14	8	7	4.1	700
12	15	14	9	6	3.6	700
13	14	14	9	6	3.6	800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 27 (Contd)						
14	13	14	10	5	3.3	800
15	12	14	9	7	4.2	800
16	11	14	10	6	3.8	800
17	10	14	10	6	3.8	900
18	9	14	11	5	3.5	900
19	8	14	11	5	3.5	900
20	7	14	10	7	4.3	900
21	6	13	10	9	4.8	1000
22	5	14	11	6	4.0	1000
23	4	14	11	6	4.0	1000
24	3	14	11	6	4.0	1100
25	2	13	11	8	4.5	1100
26	1	14	11	7	4.5	1100
WL = 28						
1	27	14	8	5	3.0	500
2	26	14	8	5	3.0	500
3	25	14	8	6	3.5	500
4	24	14	8	6	3.5	600
5	23	14	8	6	3.5	600
6	22	14	8	6	3.5	600
7	21	14	8	6	3.5	600
8	20	14	8	7	4.1	700
9	19	14	8	7	4.1	700
10	18	14	9	6	3.6	700
11	17	14	9	6	3.6	700
12	16	14	9	7	4.2	800
13	15	14	9	7	4.2	800
14	14	14	10	6	3.8	800
15	13	14	10	6	3.8	800
16	12	14	11	5	3.5	900
17	11	14	10	7	4.3	900
18	10	13	10	9	4.8	900
19	9	14	11	6	4.0	900
20	8	14	11	6	4.0	1000
21	7	13	11	8	4.5	1000
22	6	13	11	8	4.5	1000
23	5	14	11	7	4.5	1000
24	4	13	11	9	4.9	1100

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 28 (Contd)						
25	3	13	11	9	4.9	1100
26	2	13	11	10	5.3	1100
27	1	13	11	10	5.3	1100
WL = 29						
1	28	14	8	6	3.5	500
2	27	14	8	6	3.5	500
3	26	14	8	6	3.5	600
4	25	14	8	6	3.5	600
5	24	14	8	7	4.1	600
6	23	14	8	7	4.1	600
7	22	14	8	7	4.1	700
8	21	14	8	8	4.4	700
9	20	14	8	8	4.4	700
10	19	14	9	7	4.2	800
11	18	14	9	7	4.2	800
12	17	14	10	6	3.8	800
13	16	14	10	6	3.8	800
14	15	14	10	7	4.3	900
15	14	14	10	7	4.3	900
16	13	14	11	6	4.0	900
17	12	14	11	6	4.0	900
18	11	13	10	10	5.2	900
19	10	14	11	7	4.5	1000
20	9	14	11	7	4.5	1000
21	8	13	11	9	4.9	1000
22	7	13	11	10	5.3	1000
23	6	13	11	10	5.3	1100
24	5	13	11	11	5.8	1100
25	4	13	11	11	5.8	1100
26	3	14	12	7	4.7	1200
27	2	14	12	7	4.7	1200
28	1	13	12	9	5.1	1200
WL = 30						
1	29	14	8	6	3.5	500
2	28	14	8	7	4.1	500
3	27	14	8	7	4.1	600
4	26	14	8	7	4.1	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 7 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 30 (Contd)						
5	25	14	8	8	4.4	600
6	24	14	8	8	4.4	600
7	23	14	8	8	4.4	700
8	22	14	8	9	4.9	700
9	21	14	9	7	4.2	700
10	20	14	9	7	4.2	700
11	19	14	9	8	4.5	800
12	18	14	9	9	5.0	800
13	17	14	10	7	4.3	800
14	16	14	10	7	4.3	800
15	15	14	10	8	4.7	900
16	14	14	10	9	5.1	900
17	13	14	11	7	4.5	900
18	12	13	11	9	4.9	900
19	11	14	12	6	4.2	900
20	10	13	11	10	5.3	1000
21	9	13	11	11	5.8	1000
22	8	13	12	8	4.6	1000
23	7	13	12	9	5.1	1100
24	6	13	12	9	5.1	1100
25	5	13	12	9	5.1	1100
26	4	13	12	10	5.5	1100
27	3	13	12	10	5.5	1200
28	2	13	12	11	5.9	1200

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 8

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE CHANNEL  
UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 6 5	1	14	2	0	0.1	200
WL = 7 3	4	13	3	0	0.1	200
4	3	13	3	0	0.1	200
5	2	13	3	0	0.1	300
6	1	13	3	0	0.1	300
WL = 8 1	7	14	3	0	0.1	200
2	6	12	2	1	0.5	200
3	5	12	2	1	0.5	300
4	4	12	2	1	0.5	300
5	3	12	2	1	0.5	300
6	2	12	2	1	0.5	300
7	1	12	2	1	0.5	300
WL = 9 1	8	14	4	0	0.2	200
2	7	14	4	0	0.2	300
3	6	14	4	0	0.2	300
4	5	14	4	0	0.2	300
5	4	14	4	0	0.2	300
6	3	14	4	0	0.2	300
7	2	14	4	0	0.2	300
8	1	13	3	1	0.5	400
WL = 10 1	9	14	3	1	0.6	300
2	8	14	5	0	0.3	300
3	7	14	5	0	0.3	300
4	6	14	5	0	0.3	300
5	5	14	5	0	0.3	300
6	4	14	5	0	0.3	400
7	3	14	5	0	0.3	400
8	2	14	5	0	0.3	400
9	1	14	5	0	0.3	400
WL = 11 1	10	14	4	1	0.6	300
2	9	14	4	1	0.6	300

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 11 (Contd)						
3	8	14	4	1	0.6	300
4	7	14	4	1	0.6	300
5	6	14	4	1	0.6	300
6	5	14	4	1	0.6	400
7	4	14	4	1	0.6	400
8	3	14	4	1	0.6	400
9	2	14	4	1	0.6	400
10	1	14	4	1	0.6	400
WL = 12						
1	11	14	6	0	0.4	300
2	10	14	6	0	0.4	300
3	9	14	5	1	0.7	400
4	8	14	5	1	0.7	400
5	7	14	5	1	0.7	400
6	6	14	5	1	0.7	400
7	5	14	5	1	0.7	400
8	4	14	5	1	0.7	400
9	3	14	5	1	0.7	400
10	2	14	5	1	0.7	500
11	1	14	5	1	0.7	500
WL = 13						
1	12	14	4	2	1.1	400
2	11	14	4	2	1.1	400
3	10	12	5	2	1.0	400
4	9	13	5	2	1.1	400
5	8	13	5	2	1.1	400
6	7	13	5	2	1.1	400
7	6	13	5	2	1.1	400
8	5	13	5	2	1.1	500
9	4	13	5	2	1.1	500
10	3	14	7	0	0.5	500
11	2	14	7	0	0.5	500
12	1	14	6	1	0.8	500
WL = 14						
1	13	14	6	1	0.8	400
2	12	14	6	1	0.8	400
3	11	14	6	1	0.8	400

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 14 (Contd)						
4	10	14	6	1	0.8	400
5	9	14	6	1	0.8	400
6	8	14	6	1	0.8	500
7	7	15	5	2	1.2	500
8	6	14	5	2	1.2	500
9	5	14	5	2	1.2	500
10	4	12	5	3	1.5	500
11	3	13	5	3	1.5	500
12	2	13	5	3	1.5	600
13	1	13	5	3	1.5	600
WL = 15						
1	14	13	5	3	1.5	400
2	13	13	5	3	1.5	400
3	12	13	6	2	1.1	400
4	11	13	6	2	1.1	500
5	10	14	6	2	1.3	500
6	9	14	6	2	1.3	500
7	8	14	6	2	1.3	500
8	7	14	6	2	1.3	500
9	6	14	7	1	0.9	500
10	5	14	7	1	0.9	500
11	4	14	7	1	0.9	600
12	3	14	7	1	0.9	600
13	2	14	7	1	0.9	600
14	1	14	6	2	1.3	600
WL = 16						
1	15	14	6	2	1.3	400
2	14	14	6	2	1.3	400
3	13	14	6	2	1.3	500
4	12	14	6	2	1.3	500
5	11	13	6	3	1.6	500
6	10	13	6	3	1.6	500
7	9	13	6	3	1.6	500
8	8	13	6	3	1.6	500
9	7	13	6	3	1.6	600
10	6	13	6	3	1.6	600
11	5	13	6	3	1.6	600

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 16 (Contd)						
12	4	14	6	3	1.7	600
13	3	14	6	3	1.7	600
14	2	14	7	2	1.4	600
15	1	14	7	2	1.4	600
WL = 17						
1	16	14	6	3	1.7	500
2	15	14	6	3	1.7	500
3	14	14	6	3	1.7	500
4	13	14	7	2	1.4	500
5	12	14	7	2	1.4	500
6	11	14	7	2	1.4	500
7	10	14	7	2	1.4	600
8	9	14	7	2	1.4	600
9	8	14	7	2	1.4	600
10	7	14	7	2	1.4	600
11	6	14	8	1	1.1	600
12	5	14	8	1	1.1	600
13	4	14	8	1	1.1	600
14	3	13	7	3	1.7	600
15	2	13	7	3	1.7	700
16	1	13	7	3	1.7	700
WL = 18						
1	17	14	7	2	1.4	500
2	16	13	6	4	2.1	500
3	15	14	6	4	2.2	500
4	14	14	6	4	2.2	500
5	13	14	6	4	2.2	500
6	12	14	6	4	2.2	600
7	11	14	6	4	2.2	600
8	10	14	7	3	1.9	600
9	9	14	7	3	1.9	600
10	8	14	7	3	1.9	600
11	7	14	7	3	1.9	600
12	6	14	7	3	1.9	700
13	5	14	7	3	1.9	700
14	4	14	7	3	1.9	700
15	3	14	8	2	1.6	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 18 (Contd)						
16	2	14	8	2	1.6	700
17	1	14	8	2	1.6	700
WL = 19						
1	18	14	7	3	1.9	500
2	17	14	7	3	1.9	500
3	16	14	7	3	1.9	500
4	15	14	7	3	1.9	600
5	14	14	7	3	1.9	600
6	13	14	8	2	1.6	600
7	12	14	8	2	1.6	600
8	11	14	8	2	1.6	600
9	10	14	8	2	1.6	600
10	9	14	8	2	1.6	700
11	8	14	7	4	2.4	700
12	7	14	7	4	2.4	700
13	6	14	7	4	2.4	700
14	5	14	7	4	2.4	700
15	4	14	7	4	2.4	700
16	3	14	7	4	2.4	700
17	2	14	9	2	1.7	800
18	1	14	8	3	2.1	800
WL = 20						
1	19	14	8	2	1.6	500
2	18	14	7	4	2.4	500
3	17	14	7	4	2.4	600
4	16	14	7	4	2.4	600
5	15	14	7	4	2.4	600
6	14	14	7	4	2.4	600
7	13	14	7	4	2.4	600
8	12	14	7	4	2.4	600
9	11	14	7	4	2.4	700
10	10	14	8	3	2.1	700
11	9	14	8	3	2.1	700
12	8	14	8	3	2.1	700
13	7	14	8	3	2.1	700
14	6	14	8	3	2.1	700
15	5	14	8	3	2.1	800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 20 (Contd)						
16	4	14	8	3	2.1	800
17	3	14	8	3	2.1	800
18	2	13	8	4	2.3	800
19	1	14	8	4	2.5	800
WL = 21						
1	20	14	7	4	2.4	600
2	19	14	8	3	2.1	600
3	18	14	8	3	2.1	600
4	17	14	8	3	2.1	600
5	16	14	8	3	2.1	600
6	15	14	7	5	2.8	700
7	14	14	7	5	2.8	700
8	13	14	7	5	2.8	700
9	12	14	7	5	2.8	700
10	11	14	7	5	2.8	700
11	10	14	8	4	2.5	700
12	9	14	8	4	2.5	700
13	8	14	8	4	2.5	800
14	7	14	8	4	2.5	800
15	6	14	8	4	2.5	800
16	5	14	8	4	2.5	800
17	4	14	8	4	2.5	800
18	3	14	8	4	2.5	800
19	2	13	8	5	2.8	800
20	1	14	8	5	3.0	800
WL = 22						
1	21	14	7	5	2.8	600
2	20	14	7	5	2.8	600
3	19	14	7	5	2.8	600
4	18	14	7	6	3.3	600
5	17	14	8	4	2.5	700
6	16	14	8	4	2.5	700
7	15	14	8	4	2.5	700
8	14	14	8	4	2.5	700
9	13	14	8	4	2.5	700
10	12	14	8	4	2.5	700
11	11	14	8	4	2.5	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 22 (Contd)						
12	10	14	8	4	2.5	800
13	9	14	8	5	3.0	800
14	8	14	8	5	3.0	800
15	7	14	8	5	3.0	800
16	6	14	9	4	2.7	800
17	5	14	9	4	2.7	800
18	4	14	9	4	2.7	800
19	3	14	9	4	2.7	900
20	2	14	9	4	2.7	900
21	1	14	8	6	3.5	900
WL = 23						
1	22	14	8	4	2.5	600
2	21	14	8	4	2.5	600
3	20	14	8	4	2.5	600
4	19	14	8	4	2.5	700
5	18	14	8	4	2.5	700
6	17	14	8	5	3.0	700
7	16	14	8	5	3.0	700
8	15	14	8	5	3.0	700
9	14	14	8	5	3.0	700
10	13	14	8	5	3.0	700
11	12	14	9	4	2.7	800
12	11	14	9	4	2.7	800
13	10	14	9	4	2.7	800
14	9	14	8	6	3.5	800
15	8	14	8	6	3.5	800
16	7	14	9	5	3.1	800
17	6	14	9	5	3.1	900
18	5	14	9	5	3.1	900
19	4	14	9	5	3.1	900
20	3	14	10	4	2.8	900
21	2	14	10	4	2.8	900
22	1	14	10	4	2.8	900
WL = 24						
1	23	14	8	5	3.0	600
2	22	14	8	5	3.0	700
3	21	14	8	5	3.0	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 24 (Contd)						
4	20	14	8	5	3.0	700
5	19	14	8	5	3.0	700
6	18	14	8	5	3.0	700
7	17	14	8	6	3.5	700
8	16	14	8	6	3.5	700
9	15	14	8	6	3.5	800
10	14	14	8	6	3.5	800
11	13	14	9	5	3.1	800
12	12	14	9	5	3.1	800
13	11	14	9	5	3.1	800
14	10	14	10	4	2.8	800
15	9	14	10	4	2.8	900
16	8	14	9	6	3.6	900
17	7	14	9	6	3.6	900
18	6	14	9	6	3.6	900
19	5	14	9	6	3.6	900
20	4	14	10	5	3.3	900
21	3	14	10	5	3.3	1000
22	2	14	10	5	3.3	1000
23	1	14	10	5	3.3	1000
WL = 25						
1	24	14	8	6	3.5	700
2	23	14	8	6	3.5	700
3	22	14	8	6	3.5	700
4	21	14	8	6	3.5	700
5	20	14	9	5	3.1	700
6	19	14	9	5	3.1	700
7	18	14	9	5	3.1	800
8	17	14	9	5	3.1	800
9	16	14	8	7	4.1	800
10	15	14	8	7	4.1	800
11	14	14	9	6	3.6	800
12	13	14	9	6	3.6	800
13	12	14	9	6	3.6	900
14	11	14	10	5	3.3	900
15	10	14	10	5	3.3	900
16	9	14	10	5	3.3	900
17	8	14	10	5	3.3	900

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 25 (Contd)						
18	7	14	9	7	4.2	900
19	6	14	10	6	3.8	900
20	5	14	10	6	3.8	1000
21	4	14	10	6	3.8	1000
22	3	14	10	6	3.8	1000
23	2	14	10	6	3.8	1000
24	1	14	10	6	3.8	1000
WL = 26						
1	25	14	9	5	3.1	700
2	24	14	8	7	4.1	700
3	23	14	8	7	4.1	700
4	22	14	8	7	4.1	700
5	21	14	9	6	3.6	800
6	20	14	9	6	3.6	800
7	19	14	9	6	3.6	800
8	18	14	9	6	3.6	800
9	17	14	9	6	3.6	800
10	16	14	10	5	3.3	800
11	15	14	9	7	4.2	800
12	14	14	9	7	4.2	900
13	13	14	9	7	4.2	900
14	12	14	10	6	3.8	900
15	11	14	10	6	3.8	900
16	10	14	10	6	3.8	900
17	9	14	11	5	3.5	900
18	8	14	11	5	3.5	1000
19	7	14	11	5	3.5	1000
20	6	14	10	7	4.3	1000
21	5	14	10	7	4.3	1000
22	4	14	10	7	4.3	1000
23	3	13	10	9	4.8	1000
24	2	14	11	6	4.0	1000
25	1	14	11	6	4.0	1100
WL = 27						
1	26	14	9	6	3.6	700
2	25	14	9	6	3.6	700
3	24	14	9	6	3.6	700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 27	(Contd)					
4	23	14	9	7	4.2	800
5	22	14	9	7	4.2	800
6	21	14	9	7	4.2	800
7	20	14	9	7	4.2	800
8	19	14	9	7	4.2	800
9	18	14	9	7	4.2	800
10	17	14	10	6	3.8	900
11	16	14	10	6	3.8	900
12	15	14	10	6	3.8	900
13	14	14	9	9	5.0	900
14	13	14	10	7	4.3	900
15	12	14	10	7	4.3	900
16	11	14	10	7	4.3	1000
17	10	14	11	6	4.0	1000
18	9	14	11	6	4.0	1000
19	8	14	11	6	4.0	1000
20	7	14	11	6	4.0	1000
21	6	13	10	10	5.2	1000
22	5	13	11	8	4.5	1100
23	4	13	11	8	4.5	1100
24	3	14	11	7	4.5	1100
25	2	14	11	7	4.5	1100
26	1	14	11	7	4.5	1100
WL = 28						
1	27	14	9	7	4.2	700
2	26	14	9	7	4.2	700
3	25	14	9	8	4.5	700
4	24	14	9	8	4.5	700
5	23	14	9	8	4.5	800
6	22	14	9	8	4.5	800
7	21	14	9	8	4.5	800
8	20	14	9	9	5.0	800
9	19	14	9	9	5.0	900
10	18	14	10	7	4.3	900
11	17	14	10	7	4.3	900
12	16	14	10	7	4.3	900
13	15	14	10	8	4.7	900
14	14	14	10	8	4.7	900

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 28 (Contd)						
15	13	13	10	10	5.2	1000
16	12	14	10	9	5.1	1000
17	11	14	11	7	4.5	1000
18	10	14	11	7	4.5	1000
19	9	14	11	7	4.5	1000
20	8	13	11	9	4.9	1000
21	7	13	11	9	4.9	1100
22	6	13	11	9	4.9	1100
23	5	13	11	10	5.3	1100
24	4	13	11	10	5.3	1100
25	3	13	11	10	5.3	1100
26	2	13	11	10	5.3	1100
27	1	13	11	11	5.8	1200
WL = 29						
1	28	14	9	8	4.5	800
2	27	14	9	9	5.0	800
3	26	14	10	7	4.3	800
4	25	14	10	7	4.3	800
5	24	14	10	7	4.3	800
6	23	14	10	7	4.3	800
7	22	14	10	7	4.3	900
8	21	14	10	8	4.7	900
9	20	14	10	8	4.7	900
10	19	14	10	8	4.7	900
11	18	14	10	8	4.7	900
12	17	14	10	9	5.1	900
13	16	14	11	7	4.5	1000
14	15	14	11	7	4.5	1000
15	14	14	11	7	4.5	1000
16	13	14	11	8	4.9	1000
17	12	14	11	8	4.9	1000
18	11	13	11	10	5.3	1000
19	10	13	11	10	5.3	1100
20	9	13	11	11	5.8	1100
21	8	13	11	11	5.8	1100
22	7	13	11	12	6.2	1100
23	6	14	12	7	4.7	1100

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 8 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 24-GA NONLOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 29 (Contd)						
24	5	14	12	7	4.7	1100
25	4	13	12	9	5.1	1100
26	3	13	12	9	5.1	1200
27	2	13	12	9	5.1	1200
28	1	14	12	8	5.1	1200
WL = 30						
1	29	14	10	7	4.3	800
2	28	14	10	8	4.7	800
3	27	14	10	8	4.7	800
4	26	14	10	8	4.7	800
5	25	14	10	8	4.7	900
6	24	14	10	8	4.7	900
7	23	14	10	9	5.1	900
8	22	14	10	9	5.1	900
9	21	14	10	9	5.1	900
10	20	14	11	7	4.5	900
11	19	14	11	7	4.5	1000
12	18	14	11	8	4.9	1000
13	17	14	11	8	4.9	1000
14	16	14	11	8	4.9	1000
15	15	13	11	10	5.3	1000
16	14	13	11	11	5.8	1000
17	13	13	11	12	6.2	1000
18	12	14	12	7	4.7	1100
19	11	13	12	9	5.1	1100
20	10	13	12	9	5.1	1100
21	9	13	12	10	5.5	1100
22	8	13	12	10	5.5	1100
23	7	13	12	10	5.5	1100
24	6	13	12	10	5.5	1100
25	5	13	12	11	5.9	1200
26	4	13	12	11	5.9	1200
27	3	13	12	11	5.9	1200
28	2	13	12	12	6.3	1200

**Note 1:** Set channel unit switches S1 and S2 (S5) to 600. Set the N/L switch to N.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 9

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 19-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
	BW	HT	SL		
18	1	3	0	0.0	200
24	5	2	0	0.0	200
30	5	3	0	0.0	300
36	5	4	0	0.0	300
42	5	4	0	0.0	400
48	5	4	0	0.0	400
54	4	5	0	0.0	500
60	6	4	0	0.0	500
66	5	5	0	0.0	600
72	6	5	0	0.0	600
78	6	5	0	0.0	700
84	6	5	0	0.0	700
90	5	6	0	0.0	800
96	6	6	0	0.0	800
102	6	6	0	0.0	900
108	6	6	0	0.0	1000
114	5	7	0	0.0	1000
120	5	7	0	0.0	1100
126	5	7	0	0.0	1100
132	6	7	0	0.0	1200
138	6	7	0	0.0	1200
144	6	7	0	0.0	1300
150	5	8	0	0.0	1300
156	5	8	0	0.0	1400
162	5	9	0	0.0	1400
168	5	9	0	0.0	1500
174	5	9	0	0.0	1500
180	5	9	0	0.0	1600
186	5	10	0	0.0	1600
192	5	10	0	0.0	1700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 10

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 22-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
	BW	HT	SL		
18	3	3	0	0.0	300
24	6	2	0	0.0	400
30	4	4	0	0.0	500
36	3	4	1	1.4	600
42	4	4	1	1.4	700
48	4	4	1	1.4	800
54	3	5	1	1.4	900
60	4	5	1	1.4	1000
66	4	5	1	1.4	1100
72	3	6	1	1.4	1200
78	4	6	1	1.4	1300
84	4	6	1	1.4	1400
90	3	7	1	1.4	1500
96	3	7	1	1.4	1600
102	4	7	1	1.4	1700

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 11

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 24-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
	BW	HT	SL		
18	3	4	1	1.4	500
24	3	4	1	1.4	600
30	3	4	2	2.6	800
36	3	5	2	2.6	1000
42	4	5	2	2.6	1200
48	3	6	3	3.7	1300
54	3	6	3	3.7	1400
60	2	7	4	4.7	1600
66	3	7	5	5.6	1800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 12

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 25-GA ("MAT") H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
	BW	HT	SL		
12	15	1	0	0.1	400
18	15	1	0	0.1	600
24	15	0	2	2.6	800
30	15	0	3	3.7	1000
36	15	0	3	3.7	1200
42	15	0	4	4.7	1400
48	15	0	5	5.5	1600
54	15	0	7	7.2	1800
60	15	0	10	9.0	2000

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 13

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR 26-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)	EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
	BW	HT	SL		
12	8	3	1	1.4	500
18	5	4	3	3.7	800
24	5	4	7	7.2	1000
30	6	4	12	10.0	1300
36	5	5	12	10.0	1500
42	6	5	12	10.0	1800
48	6	6	12	10.0	2000

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 14

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE CHANNEL  
UNITS FOR MIXED 24- AND 22-GA H88 LOADED CABLE WITHOUT BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 18						
6	12	4	3	0	0.0	400
12	6	4	3	1	1.4	400
WL = 24						
6	18	5	3	0	0.0	500
12	12	4	3	1	1.4	500
18	6	5	3	1	1.4	600
WL = 30						
6	24	2	4	1	1.4	600
12	18	3	4	1	1.4	600
18	12	3	4	1	1.4	700
24	6	3	4	2	2.6	700
WL = 36						
6	30	4	4	1	1.4	700
12	24	5	4	1	1.4	700
18	18	3	5	1	1.4	800
24	12	1	5	2	2.6	800
30	6	3	5	2	2.6	900
WL = 42						
6	36	5	4	1	1.4	800
12	30	5	4	1	1.4	800
18	24	4	5	1	1.4	900
24	18	3	5	2	2.6	900
30	12	3	5	2	2.6	1000
36	6	4	5	2	2.6	1100
WL = 48						
6	42	5	4	1	1.4	900
12	36	4	5	1	1.4	900
18	30	4	5	1	1.4	1000
24	24	4	5	2	2.6	1000
30	18	3	5	2	2.6	1100
36	12	3	5	2	2.6	1200
42	6	2	6	3	3.7	1200
WL = 54						
6	48	4	5	1	1.4	1000
12	42	4	5	1	1.4	1000
18	36	5	5	1	1.4	1100

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 14 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 24- AND 22-GA H88 LOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 54 (Contd)						
24	30	4	5	2	2.6	1200
30	24	2	6	2	2.6	1200
36	18	3	6	2	2.6	1300
42	12	2	6	3	3.7	1300
48	6	3	6	3	3.7	1400
WL = 60						
6	54	4	5	1	1.4	1100
12	48	5	5	1	1.4	1100
18	42	3	6	1	1.4	1200
24	36	3	6	2	2.6	1300
30	30	3	6	2	2.6	1300
36	24	3	6	2	2.6	1400
42	18	3	6	3	3.7	1400
48	12	3	6	3	3.7	1500
54	6	2	7	4	4.7	1500
WL = 66						
6	60	5	5	1	1.4	1200
12	54	4	6	1	1.4	1200
18	48	4	6	1	1.4	1300
24	42	3	6	2	2.6	1400
30	36	4	6	2	2.6	1400
36	30	4	6	2	2.6	1500
42	24	2	7	3	3.7	1500
48	18	2	7	3	3.7	1600
54	12	2	7	4	4.7	1600
60	6	3	7	4	4.7	1700
WL = 72						
6	66	4	6	1	1.4	1300
12	60	4	6	1	1.4	1300
18	54	4	6	2	2.6	1400
24	48	4	6	2	2.6	1500
30	42	4	6	2	2.6	1500
36	36	3	7	2	2.6	1600
42	30	3	7	3	3.7	1600
48	24	3	7	3	3.7	1700
54	18	2	7	4	4.7	1700
60	12	2	7	5	5.5	1800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 14 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 24- AND 22-GA H88 LOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
24-GA	22-GA	BW	HT	SL		
WL = 78						
6	72	4	6	1	1.4	1400
12	66	5	6	1	1.4	1400
18	60	4	6	2	2.6	1500
24	54	3	7	2	2.6	1600
30	48	3	7	2	2.6	1600
36	42	3	7	3	3.7	1700
42	36	3	7	3	3.7	1700
48	30	3	7	3	3.7	1800
WL = 84						
6	78	4	6	1	1.4	1500
12	72	5	6	1	1.4	1500
18	66	3	7	2	2.6	1600
24	60	3	7	2	2.6	1700
30	54	3	7	2	2.6	1700
36	48	3	7	3	3.7	1800
42	42	3	7	3	3.7	1800
WL = 90						
6	84	3	7	1	1.4	1600
12	78	3	7	2	2.6	1700
18	72	3	7	2	2.6	1700
24	66	3	7	2	2.6	1700
30	60	3	7	3	3.7	1800
WL = 96						
6	90	4	7	1	1.4	1700
12	84	4	7	2	2.6	1800
18	78	4	7	2	2.6	1800
WL = 102						
6	96	3	7	2	2.6	1800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 15

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE CHANNEL  
UNITS FOR MIXED 26- AND 22-GA H88 LOADED CABLE WITHOUT BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 18						
6	12	2	3	1	1.4	500
12	6	6	3	2	2.6	600
WL = 24						
6	18	4	2	1	1.4	600
12	12	5	3	2	2.6	700
18	6	5	4	5	5.5	800
WL = 30						
6	24	4	3	1	1.4	700
12	18	5	4	2	2.6	800
18	12	4	4	4	4.7	1000
24	6	4	5	9	8.4	1100
WL = 36						
6	30	4	4	1	1.4	800
12	24	6	4	1	1.4	900
18	18	4	5	3	3.7	1100
24	12	3	5	7	7.2	1200
30	6	5	5	12	10.0	1400
WL = 42						
6	36	5	4	1	1.4	900
12	30	7	4	1	1.4	1000
18	24	5	5	3	3.7	1200
24	18	4	5	6	6.3	1300
30	12	4	5	12	10.0	1500
36	6	6	5	12	10.0	1600
WL = 48						
6	42	5	4	1	1.4	1000
12	36	7	4	1	1.4	1100
18	30	6	5	2	2.6	1300
24	24	5	5	5	5.6	1400
30	18	5	5	11	9.5	1600
36	12	4	6	12	10.0	1700
WL = 54						
6	48	4	5	1	1.4	1100
12	42	5	5	2	2.6	1200
18	36	6	5	3	3.7	1400

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 15 (CONTD)

**EQUALIZER PRESCRIPTION SETTINGS FOR 4-WIRE SPECIAL SERVICE  
CHANNEL UNITS FOR MIXED 26- AND 22-GA H88 LOADED CABLE WITHOUT  
BRIDGED TAPS**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	22-GA	BW	HT	SL		
WL = 54	(Contd)					
24	30	4	6	6	6.3	1500
30	24	4	6	11	9.5	1700
36	18	4	6	12	10.0	1800
WL = 60						
6	54	4	5	1	1.4	1200
12	48	5	5	2	2.6	1300
18	42	4	6	4	4.7	1500
24	36	4	6	7	7.2	1600
30	30	5	6	9	8.4	1800
WL = 66						
6	60	5	5	1	1.4	1300
12	54	6	5	2	2.6	1400
18	48	5	6	3	3.7	1600
24	42	5	6	6	6.4	1700
30	36	5	6	12	10.0	1900
WL = 72						
6	66	4	6	1	1.4	1400
12	60	5	6	2	2.6	1500
18	54	5	6	4	4.7	1700
24	48	5	6	7	7.2	1800
WL = 78						
6	72	4	6	1	1.4	1500
12	66	5	6	2	2.6	1600
18	60	5	6	5	5.6	1800
WL = 84						
6	78	5	6	1	1.4	1600
12	72	5	6	3	3.7	1700
18	66	4	7	5	5.6	1900
WL = 90						
6	84	5	6	1	1.4	1700
12	78	4	7	3	3.7	1800
WL = 96						
6	90	3	7	2	2.6	1800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

CHART 16

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 24-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 12 6	6	7	3	1	1.4	400
WL = 18 6 12	12 6	4 6	3 3	2 3	2.6 3.7	600 700
WL = 24 6 12 18	18 12 6	4 4 5	3 4 4	2 3 6	2.6 3.7 6.3	700 800 900
WL = 30 6 12 18 24	24 18 12 6	4 5 3 4	4 4 5 5	2 3 6 12	2.6 3.7 6.3 10.0	900 1000 1100 1200
WL = 36 6 12 18 24 30	30 24 18 12 6	4 5 4 4 5	5 5 5 5 5	2 3 6 12 12	2.6 3.7 6.3 10.0 10.0	1100 1100 1200 1300 1400
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	4 5 5 5 4 6	5 5 5 5 6 5	3 4 6 11 12 12	3.7 4.7 6.3 9.5 10.0 10.0	1200 1300 1400 1500 1600 1700
WL = 48 6 12 18 24 30 36	42 36 30 24 18 12	3 4 4 4 4 5	6 6 6 6 6 6	3 5 8 12 12 12	3.7 5.6 7.8 10.0 10.0 10.0	1400 1500 1600 1700 1800 1800

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 16 (Contd)

**EQUALIZER PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
FOR MIXED 26- AND 24-GA H88 LOADED CABLE  
WITHOUT BRIDGED TAPS (NOTES 1 AND 2)**

CABLE LENGTH (KFT)		EQUALIZER SETTINGS			1 KHZ EQUALIZER GAIN (DB)	DX RLP (OHMS)
26-GA	24-GA	BW	HT	SL		
WL = 54						
6	48	3	6	4	4.7	1500
12	42	4	6	6	6.3	1600
18	36	5	6	7	7.2	1700
24	30	5	6	12	10.0	1800
30	24	5	6	12	10.0	1900
WL = 60						
6	54	3	7	4	4.7	1700
12	48	3	7	7	7.2	1800
18	42	3	7	12	10.0	1900
WL = 66						
6	60	3	7	5	5.6	1900

**Note 1:** Set channel unit switches S1 and S2 (S5) to 1200. Set the N/L switch to L.

**Note 2:** Equalizer gain impacts only the channel unit TRMT path.

## CHART 17

**PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
USED IN V4 AND MFT (WITHOUT ACTIVE EQUALIZATION)  
APPLICATIONS WITH 19-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTE)**

CABLE LENGTH (KFT)	TERMINATION IMPEDANCES (OHMS)			1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	CHANNEL UNIT		FAR-END		
	S1	S2 (S5)			
1	600	600	600	0.1	0
2	600	600	600	0.3	0
3	600	600	600	0.4	0
4	600	600	600	0.5	0
5	600	600	600	0.7	0
6	600	600	600	0.8	0
7	600	600	600	1.0	100
8	600	600	600	1.2	100
9	600	600	600	1.3	100
9.1	150	150	600	3.6	100
10	150	150	600	3.7	100
12	150	150	600	4.1	100
14	150	150	600	4.4	100
16	150	150	600	4.8	100

**Note:** Disable channel unit equalization controls by setting switches BW, HT, and SL to zero (numerals covered). Set the N/L switch to N.

## CHART 18

**PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
USED IN V4 AND MFT (WITHOUT ACTIVE EQUALIZATION)  
APPLICATIONS WITH 22-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTE)**

CABLE LENGTH (KFT)	TERMINATION IMPEDANCES (OHMS)			1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	CHANNEL UNIT		FAR-END		
	S1	S2 (S5)			
1	600	600	600	0.2	0
2	600	600	600	0.5	0
3	600	600	600	0.7	0
4	600	600	600	1.0	100
5	600	600	600	1.2	100
6	600	600	600	1.5	100
7	600	600	600	1.7	100
8	600	600	600	2.0	100
8.1	150	150	600	4.6	100
9	150	150	600	4.9	100
10	150	150	600	5.2	200
12	150	150	600	5.8	200
14	150	150	600	6.3	200

**Note:** Disable channel unit equalization controls by setting switches BW, HT, and SL to zero (numerals covered). Set the N/L switch to N.

## CHART 19

**PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
USED IN V4 AND MFT (WITHOUT ACTIVE EQUALIZATION)  
APPLICATIONS WITH 24-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTE)**

CABLE LENGTH (KFT)	TERMINATION IMPEDANCES (OHMS)			1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	CHANNEL UNIT		FAR-END		
	S1	S2 (S5)			
1	600	600	600	0.4	0
2	600	600	600	0.7	100
3	600	600	600	1.1	100
4	600	600	600	1.5	100
5	600	600	600	1.8	100
6	600	600	600	2.2	200
7	600	600	600	2.5	200
7.5	600	600	600	2.7	200
7.6	150	150	600	5.7	200
8	150	150	600	5.9	200
9	150	150	600	6.3	200
10	150	150	600	6.7	300
12	150	150	600	7.4	300

**Note:** Disable channel unit equalization controls by setting switches BW, HT, and SL to zero (numerals covered). Set the N/L switch to N.

## CHART 20

**PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
USED IN V4 AND MFT (WITHOUT ACTIVE EQUALIZATION)  
APPLICATIONS WITH 25-GA NONLOADED ("MAT") CABLE  
WITHOUT BRIDGED TAPS (NOTE)**

CABLE LENGTH (KFT)	TERMINATION IMPEDANCES (OHMS)			1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	CHANNEL UNIT		FAR-END		
	S1	S2 (S5)			
1	600	600	600	0.5	0
2	600	600	600	0.9	100
3	600	600	600	1.3	100
4	600	600	600	1.8	100
5	600	600	600	2.2	200
6	600	600	600	2.6	200
7	600	600	600	2.9	200
8	600	600	600	3.3	300
9	600	600	600	3.7	300
9.1	150	150	600	7.1	300
10	150	150	600	7.5	300
12	150	150	600	8.3	400

**Note:** Disable channel unit equalization controls by setting switches BW, HT, and SL to zero (numerals covered). Set the N/L switch to N.



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## CHART 21

**PRESCRIPTION SETTINGS FOR  
4-WIRE SPECIAL SERVICE CHANNEL UNITS  
USED IN V4 AND MFT (WITHOUT ACTIVE EQUALIZATION)  
APPLICATIONS WITH 26-GA NONLOADED CABLE  
WITHOUT BRIDGED TAPS (NOTE)**

CABLE LENGTH (KFT)	TERMINATION IMPEDANCES (OHMS)			1 KHZ CABLE TRANSDUCER LOSS (DB)	DX RLP (OHMS)
	CHANNEL UNIT		FAR-END		
	S1	S2 (S5)			
1	600	600	600	0.6	0
2	600	600	600	1.2	100
3	600	600	600	1.7	100
4	600	600	600	2.2	100
5	600	600	600	2.7	200
6	600	600	600	3.2	200
7	600	600	600	3.7	300
7.1	150	150	600	7.1	300
8	150	150	600	7.6	300
9	150	150	600	8.1	400
10	150	150	600	8.7	400
10.1	150	150	150*	11.7	400
12	150	150	150*	12.9	500

**Note:** Disable channel unit equalization controls by setting switches BW, HT, and SL to zero (numerals covered). Set the N/L switch to N.

\* Not applicable with MFT far-end equipment.

## CHART 22

**METHOD FOR CALCULATION OF CU ATTENUATION FOR MIXED GAUGE  
NONLOADED CABLE WITHOUT BRIDGED TAPS IN V4 APPLICATIONS WITH CU AC-  
TIVE EQUALIZATION DISABLED**

Given the circuit below, prescription set the CU attenuation controls

STEP 1. Calculate the overall cable transducer loss  $C_L$ :

(a) From Table I, obtain loss in dB/kft for #22, #24, and #26  
Overall Attenuation Loss = 3 (0.55) + 5 (0.44) + 6 (0.34) = 5.9 dB

(b) From Table II, obtain reflection losses at cable junctions and impedance mismatches at terminations and sum the losses with (a) above

150 ohm to #26 loss	=	2.9
#26 to #24 loss	=	0.1
#24 to #22 loss	=	0.1
150 ohm to #22 loss	=	1.4
Loss from (a)	=	5.9

$$C_L = 10.4 \text{ dB, cable transducer loss}$$

STEP 2. Calculate the CU XMT attenuation setting:

(a) CU XMT Gain Factor =  $G_T + dB_{in} + 8.5$  (see Table III)

Let  $G_T = 6.5$  and  $dB_{in} = -4.5$  dB, then in this example

(b)  $ATT_T = \text{Gain Factor} - C_L$  (from Step 1) =  $6.5 - 4.5 + 8.5 - 10.4 = 0.1$  dB

STEP 3. Calculate  $\max dB_{out}$  the predicted signal level customer will receive when CU RCV attenuation setting is zero.

$$\max dB_{out} = 6 - C_L \text{ (from Step 1)}$$

For example, in this case, for any 4W CU with equalization,

$$\max dB_{out} = 6 - 10.4 = -4.4 \text{ dB*}$$

\*Add 1.0 dB for 4ETO channel unit

CHART 22 (CONTD)

METHOD FOR CALCULATION OF CU ATTENUATION FOR MIXED GAUGE  
NONLOADED CABLE WITHOUT BRIDGED TAPS IN V4 APPLICATIONS WITH CU AC-  
TIVE EQUALIZATION DISABLED

TABLE I

1-KHZ NONLOADED  
CABLE ATTENUATION

CABLE GAUGE	ATTENUATION IN DB/KFT
19	0.24
22	0.34
24	0.44
25 (MAT) Cable	0.43
26	0.55

TABLE II

1-KHZ NONLOADED CABLE REFLECTION LOSS

CABLE GAUGE	REFLECTION LOSS IN DB				150 OHMS
	22 GA	24 GA	25 ("MAT") CABLE	26 GA	
19	0.1	0.4	0.7	0.7	0.5
22		0.1	0.2	0.2	1.4
24			0.1	0.1	2.1
25 (MAT) Cable				0	2.9
26					2.9

TABLE III

CU OVERALL XMT GAIN FACTOR

<p>Gain Factor = <math>G_T + dB_{in} + 8.5</math>                  Where: <math>G_T</math> for 4FXS, 4FXO, 4ETO, or  <math>4DX = 6.5</math> (from Table O)  <math>dB_{in}</math> = dB input to line at Customer End</p>
---

**CHART 23**  
**PRESCRIPTION SETTINGS 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**19-GA NONLOADED CABLE**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN), SLOPE EQUALIZER SETTINGS BY TERMINATION															DX RLP (OHMS)
	900Ω + 2.15 μF					600Ω + 2.15 μF					TEL SET (35 MA)					
	PBN			DX	FX	PBN			DX	FX	PBN			DX	FX	
	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	
4.0	7	12	7	0	0	7	4	6	0	0	7	3	0	0	0	100
4.5	7	14	13	0	0	7	7	9	0	0	7	4	0	0	0	100
5.0	7	15	16	0	0	7	10	13	0	0	7	5	0	0	0	100
5.5	7	15	17	0	0	7	12	16	0	0	7	5	0	0	0	100
6.0	7	15	18	0	0	7	13	18	0	0	7	5	0	0	0	100
6.5	6	10	13	0	0	7	14	20	0	0	7	9	5	0	0	100
7.0	6	11	15	1	0	7	15	23	0	0	7	12	11	0	0	100
7.5	6	11	16	1	1	7	15	23	0	0	7	14	16	0	0	100
8.0	6	12	18	1	1	7	15	23	0	0	7	15	19	0	0	100
8.5	6	13	21	2	1	7	15	24	0	0	7	15	20	0	0	100
9.0	6	13	21	2	1	7	15	24	1	0	7	15	20	1	0	100
9.5	6	14	23	2	2	6	9	19	1	1	7	15	21	1	1	200
10.0	6	14	24	2	2	6	9	19	1	1	7	15	21	1	1	200
10.5	6	14	24	3	2	6	10	21	1	1	7	15	21	1	1	200
11.0	6	14	25	3	2	6	10	21	2	1	7	15	22	2	1	200
11.5	6	15	27	3	2	6	11	22	2	2	7	15	22	2	2	200
12.0	6	15	27	3	3	6	11	23	2	2	6	12	21	2	2	200
12.5	6	15	27	3	3	6	11	23	2	2	6	12	21	2	2	200
13.0	5	12	24	4	3	6	12	24	2	2	6	13	23	2	2	200
13.5	5	12	24	4	3	6	12	25	3	2	6	13	23	3	2	200
14.0	5	12	25	4	3	6	12	25	3	2	6	13	24	3	2	200
14.5	5	12	25	4	3	6	12	25	3	3	6	13	24	3	3	200
15.0	5	12	25	5	4	6	12	25	3	3	6	14	26	3	3	200
15.5	5	12	25	5	4	6	12	25	3	3	6	14	26	3	3	300
16.0	5	12	26	5	4	6	13	27	4	3	6	14	26	4	3	300
16.5	5	12	26	5	4	6	13	27	4	3	6	14	26	4	3	300
17.0	5	12	26	5	5	6	13	27	4	3	6	14	27	4	3	300
17.5	5	12	26	6	5	5	9	24	4	3	6	14	27	4	3	300
18.0	4	10	25	6	5	5	9	24	4	4	6	14	27	4	4	300
18.5	4	10	25	6	5	5	9	24	5	4	6	14	27	5	4	300
19.0	4	10	25	6	5	5	9	24	5	4	6	14	27	5	4	300
19.5	4	10	25	6	6	5	9	24	5	4	6	14	28	5	4	300
20.0	4	9	25	7	6	5	8	24	5	4	6	14	28	5	4	300
20.5	4	9	25	7	6	5	8	24	5	4	6	14	28	5	4	300
21.0	4	9	25	7	6	5	8	24	5	5	5	11	25	5	5	300
21.5	4	9	25	7	6	5	8	24	6	5	5	11	25	6	5	400
22.0	3	7	24	7	6	5	8	24	6	5	5	10	25	6	5	400
22.5	3	7	24	8	7	5	8	24	6	5	5	10	25	6	5	400
23.0	3	7	24	8	7	4	6	23	6	5	5	10	25	6	5	400
23.5	3	7	24	8	7	4	5	23	6	5	5	10	25	6	5	400
24.0	3	7	24	8	7	4	5	23	7	6	5	10	25	7	6	400

**Note:** Position the "L" switch to cover the "L" designation.

**CHART 24**  
**PRESCRIPTION SETTINGS 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**22-GA NONLOADED CABLE**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN), SLOPE EQUALIZER SETTINGS BY TERMINATION															DX RLP (OHMS)
	900Ω + 2.15 μF					600Ω + 2.15 μF					TEL SET (35 MA)					
	PBN			DX	FX	PBN			DX	FX	PBN			DX	FX	
	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	
4.0	7	11	2	0	0	7	2	1	0	0	7	6	0	0	0	100
4.5	7	13	8	0	0	7	6	5	0	0	7	7	0	0	0	100
5.0	7	15	14	0	0	7	8	7	0	0	7	8	0	0	0	200
5.5	7	15	15	0	0	7	10	10	0	0	7	8	0	0	0	200
6.0	7	15	16	0	0	7	12	13	0	0	7	8	0	0	0	200
6.5	7	15	16	0	0	7	13	16	0	0	7	10	3	0	0	200
7.0	6	9	9	1	0	7	14	18	0	0	7	12	8	0	0	200
7.5	6	10	11	1	1	7	15	20	0	0	7	14	13	0	0	200
8.0	6	11	14	1	1	7	15	21	1	0	7	15	17	1	0	300
8.5	6	12	16	2	1	7	15	21	1	0	7	15	17	1	0	300
9.0	6	12	17	2	1	7	15	21	1	0	7	15	17	1	0	300
9.5	6	12	17	2	2	6	7	13	1	1	7	15	18	1	1	300
10.0	6	12	18	2	2	6	8	14	1	1	7	15	18	1	1	300
10.5	6	13	20	3	2	6	8	14	2	1	7	15	19	2	1	300
11.0	6	13	20	3	2	6	9	16	2	1	7	15	19	2	1	400
11.5	6	13	21	3	3	6	9	16	2	2	7	15	19	2	2	400
12.0	6	13	21	3	3	6	9	16	2	2	6	11	16	2	2	400
12.5	5	9	16	4	3	6	10	18	3	2	6	11	16	3	2	400
13.0	5	10	18	4	3	6	10	18	3	2	6	12	18	3	2	400
13.5	5	9	17	4	3	6	10	18	3	2	6	12	19	3	2	400
14.0	5	9	17	4	4	6	10	18	3	3	6	12	19	3	3	500
14.5	5	10	19	5	4	6	11	20	3	3	6	12	19	3	3	500
15.0	5	9	18	5	4	6	11	20	4	3	6	12	19	4	3	500
15.5	5	9	18	5	4	6	11	20	4	3	6	12	20	4	3	500
16.0	5	9	18	5	4	5	6	16	4	3	6	12	20	4	3	500
16.5	4	7	17	6	5	5	6	16	4	3	6	12	20	4	3	500
17.0	4	7	17	6	5	5	6	16	4	4	6	12	20	4	4	600
17.5	4	6	16	6	5	5	6	16	5	4	6	12	21	5	4	600
18.0	4	6	16	6	5	5	6	16	5	4	6	12	21	5	4	600
18.5	4	6	17	7	6	5	6	16	5	4	6	12	21	5	4	600
19.0	4	6	17	7	6	5	6	16	5	5	5	8	17	5	5	600
19.5	4	6	17	7	6	5	6	16	6	5	5	8	17	6	5	600
20.0	4	6	17	7	6	5	6	17	6	5	5	8	17	6	5	700
20.5	4	5	16	8	7	5	6	17	6	5	5	8	17	6	5	700
21.0	3	3	15	8	7	5	6	17	6	5	5	8	17	6	5	700
21.5	3	3	15	8	7	5	6	17	7	6	5	8	18	7	6	700
22.0	3	3	15	8	7	4	3	15	7	6	5	8	18	7	6	700
22.5	3	3	15	9	8	4	3	15	7	6	5	8	18	7	6	700
23.0	3	3	15	9	8	4	3	15	7	6	5	7	17	7	6	800
23.5	3	3	15	9	8	4	3	15	8	7	5	7	17	8	7	800
24.0	3	2	15	9	8	4	3	15	8	7	4	5	16	8	7	800

**Note:** Position the "L" switch to cover the "L" designation.

**CHART 25**  
**PRESCRIPTION SETTINGS 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**24-GA NONLOADED CABLE**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN), SLOPE EQUALIZER SETTINGS BY TERMINATION															DX RLP (OHMS)
	900Ω + 2.15 μF					600Ω + 2.15 μF					TEL SET (35 MA)					
	PBN			DX	FX	PBN			DX	FX	PBN			DX	FX	
	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	
4.0	7	11	0	0	0	7	4	0	0	0	7	8	0	0	0	200
4.5	7	13	6	0	0	7	6	1	0	0	7	9	0	0	0	200
5.0	7	15	13	0	0	7	9	5	0	0	7	10	0	0	0	300
5.5	7	15	13	0	0	7	11	8	0	0	7	10	0	0	0	300
6.0	7	15	14	0	0	7	12	10	0	0	7	10	0	0	0	300
6.5	7	15	14	1	0	7	13	12	0	0	7	12	4	0	0	300
7.0	6	9	6	1	0	7	14	15	0	0	7	13	7	0	0	400
7.5	6	10	9	1	1	7	15	18	0	0	7	15	14	0	0	400
8.0	6	10	9	2	1	7	15	18	1	0	7	15	14	1	0	400
8.5	6	11	12	2	1	7	15	18	1	1	7	15	15	1	1	400
9.0	6	11	12	2	2	6	6	7	1	1	7	15	15	1	1	500
9.5	6	11	13	3	2	6	7	8	2	1	7	15	15	2	1	500
10.0	6	12	15	3	2	6	8	10	2	1	7	15	16	2	1	500
10.5	6	12	15	3	2	6	8	10	2	2	7	15	16	2	2	500
11.0	6	12	16	3	3	6	8	10	2	2	6	10	10	2	2	600
11.5	5	8	11	4	3	6	9	12	3	2	6	10	11	3	2	600
12.0	5	8	11	4	3	6	9	12	3	2	6	11	13	3	2	600
12.5	5	8	12	4	3	6	9	12	3	2	6	11	13	3	2	600
13.0	5	8	12	4	4	6	10	14	3	3	6	11	14	3	3	700
13.5	5	8	12	5	4	6	10	14	4	3	6	11	14	4	3	700
14.0	5	8	12	5	4	6	10	14	4	3	6	11	14	4	3	700
14.5	5	7	11	5	4	5	5	9	4	3	6	11	14	4	3	800
15.0	5	8	13	6	5	5	5	9	4	4	6	11	15	4	4	800
15.5	4	5	10	6	5	5	5	9	5	4	6	11	15	5	4	800
16.0	4	5	10	6	5	5	5	10	5	4	6	11	15	5	4	800
16.5	4	4	9	6	6	5	5	10	5	4	5	7	11	5	4	900
17.0	4	4	9	7	6	5	5	10	5	5	5	7	11	5	5	900
17.5	4	4	9	7	6	5	5	10	6	5	5	7	11	6	5	900
18.0	4	4	10	7	6	5	5	10	6	5	5	7	11	6	5	900
18.5	4	4	10	8	7	5	5	10	6	5	5	7	11	6	5	1000
19.0	4	4	10	8	7	5	5	10	7	6	5	7	11	7	6	1000
19.5	3	2	8	8	7	4	2	8	7	6	5	7	11	7	6	1000
20.0	3	2	8	9	8	4	2	8	7	6	5	6	10	7	6	1000
20.5	3	1	7	9	8	4	2	8	7	6	4	4	9	7	6	1100
21.0	3	1	8	9	8	4	2	8	8	7	4	4	9	8	7	1100
21.5	3	1	8	9	8	4	2	8	8	7	4	4	9	8	7	1100
22.0	3	1	8	10	9	4	2	8	8	7	4	4	9	8	7	1100
22.5	3	1	8	10	9	4	2	8	9	8	4	3	8	9	8	1200
23.0	3	0	7	10	9	4	2	8	9	8	4	3	8	9	8	1200
23.5	3	0	7	11	10	4	2	8	9	8	4	3	8	9	8	1200
24.0	3	0	7	12	11	4	2	8	9	9	4	3	8	9	9	1200

**Note:** Position the "L" switch to cover the "L" designation.

CHART 26

PRESCRIPTION SETTINGS 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR 25-GA NONLOADED ("MAT") CABLE

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN), SLOPE EQUALIZER SETTINGS BY TERMINATION															1-KHZ CABLE TRANSDUCER LOSS (DB)		DX RLP (OHMS)
	900Ω + 2.15 μF					600Ω + 2.15 μF					TEL SET (35 MA)					TERMINATION		
	PBN			DX	FX	PBN			DX	FX	PBN			DX	FX	900Ω	600Ω	
	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL			
1.0	7	8	0	0	0	7	0	0	0	0	7	0	0	0	0	0.3	0.6	100
1.5	7	10	0	0	0	7	0	0	0	0	7	0	0	0	0	0.4	0.7	100
2.0	7	10	0	0	0	7	0	0	0	0	7	0	0	0	0	0.6	0.9	100
2.5	7	11	0	0	0	7	1	0	0	0	7	2	0	0	0	0.7	1.1	200
3.0	7	12	0	0	0	7	3	0	0	0	7	5	0	0	0	1.0	1.3	200
3.5	7	12	0	0	0	7	3	0	0	0	7	5	0	0	0	1.2	1.4	200
4.0	7	12	0	0	0	7	6	0	0	0	7	9	0	0	0	1.3	1.6	300
4.5	7	12	0	0	0	7	7	0	0	0	7	10	0	0	0	1.4	1.7	300
5.0	7	12	0	0	0	7	8	0	0	0	7	11	0	0	0	1.6	2.0	300
5.5	7	13	1	0	0	7	9	0	0	0	7	11	0	0	0	1.7	2.1	400
6.0	7	13	2	0	0	7	9	0	0	0	7	12	0	0	0	1.9	2.3	400
6.5	7	14	5	0	0	7	10	1	0	0	7	12	0	0	0	2.1	2.5	400
7.0	7	15	9	0	0	7	10	0	0	0	7	12	0	0	0	2.3	2.7	500
7.5	7	15	10	0	0	7	11	2	0	0	7	12	0	0	0	2.5	2.8	500
8.0	7	15	10	1	0	7	12	4	0	0	7	13	1	0	0	2.6	3.0	500
8.5	7	15	10	1	0	7	13	7	0	0	7	13	2	0	0	2.8	3.2	600
9.0	6	8	0	1	0	7	14	10	0	0	7	14	5	0	0	2.9	3.4	600
9.5	6	9	1	1	1	7	14	10	0	0	7	15	9	0	0	3.1	3.5	600
10.0	6	9	2	2	1	7	15	13	1	0	7	15	10	1	0	3.3	3.7	700
10.5	6	9	2	2	1	7	15	13	1	1	7	15	10	1	1	3.4	3.8	700
11.0	6	10	4	2	2	6	6	0	1	1	7	15	10	1	1	3.6	4.0	700
11.5	6	10	5	2	2	6	6	0	1	1	7	15	10	1	1	3.8	4.3	800
12.0	6	10	5	3	2	6	6	0	2	1	7	15	11	2	1	4.0	4.5	800
12.5	6	10	5	3	2	6	7	1	2	1	6	9	1	2	1	4.2	4.6	800
13.0	6	10	6	3	3	6	7	1	2	2	6	9	2	2	2	4.4	4.8	900
13.5	6	10	6	3	3	6	8	3	2	2	6	9	2	2	2	4.6	5.0	900
14.0	5	6	1	3	3	6	8	3	3	2	6	10	4	3	2	4.8	5.2	900
14.5	5	6	1	4	3	6	8	3	3	2	6	10	5	3	2	5.0	5.3	900
15.0	5	6	1	4	3	6	8	3	3	3	6	10	5	3	3	5.1	5.5	1000
15.5	5	6	2	4	4	6	9	5	3	3	6	10	5	3	3	5.4	5.8	1000
16.0	5	6	2	4	4	6	9	5	3	3	6	10	5	3	3	5.6	6.0	1000
16.5	5	6	2	5	4	6	9	5	4	3	6	10	6	4	3	5.7	6.2	1100
17.0	5	6	2	5	4	5	4	0	4	3	6	10	6	4	3	5.9	6.4	1100
17.5	5	6	2	5	5	5	4	0	4	4	6	10	6	4	4	6.2	6.6	1100
18.0	5	6	2	5	5	5	4	0	4	4	6	10	6	4	4	6.4	6.7	1200
18.5	4	3	0	6	5	5	4	0	5	4	5	6	1	5	4	6.6	7.0	1200
19.0	4	3	0	6	5	5	4	0	5	4	5	6	1	5	4	6.7	7.1	1200
19.5	4	3	0	6	6	5	4	0	5	4	5	6	1	5	4	7.0	7.3	1300
20.0	4	3	0	6	6	5	4	0	6	4	5	6	1	6	4	7.2	7.5	1300
20.5	4	3	0	7	6	5	4	0	6	5	5	6	2	6	5	7.3	7.7	1300
21.0	4	3	0	7	6	5	4	0	6	5	5	6	2	6	5	7.5	7.9	1400
21.5	4	3	0	8	7	5	4	0	6	5	5	6	2	6	5	7.8	8.1	1400
22.0	4	3	0	8	7	5	4	0	7	6	5	6	2	7	6	8.0	8.3	1400
22.5	4	3	0	8	7	5	4	0	7	6	5	6	2	7	6	8.3	8.5	1500
23.0	4	3	0	8	7	4	3	0	7	6	4	4	0	7	6	8.5	8.7	1500
23.5	4	3	0	9	8	4	3	0	7	6	4	4	0	7	6	8.7	9.0	1500
24.0	4	3	0	9	8	4	3	0	7	7	4	4	0	7	7	8.9	9.2	1600

Note: Position the "L" switch to expose the "L" designation.

**CHART 27**  
**PRESCRIPTION SETTINGS 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**26-GA NONLOADED CABLE**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN), SLOPE EQUALIZER SETTINGS BY TERMINATION															DX RLP (OHMS)
	900Ω + 2.15 μF					600Ω + 2.15 μF					TEL SET (35 MA)					
	PBN			DX	FX	PBN			DX	FX	PBN			DX	FX	
	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	R/R1 (NOTE)	R2	Z	SL	SL	
4.0	7	12	0	0	0	7	8	0	0	0	7	11	0	0	0	300
4.5	7	13	2	0	0	7	9	0	0	0	7	12	0	0	0	400
5.0	7	14	5	0	0	7	9	0	0	0	7	12	0	0	0	400
5.5	7	15	10	0	0	7	10	1	0	0	7	12	0	0	0	500
6.0	7	15	10	1	0	7	12	5	0	0	7	12	0	0	0	500
6.5	7	15	10	1	0	7	13	7	0	0	7	13	2	0	0	500
7.0	6	8	0	1	1	7	14	10	0	0	7	14	5	0	0	600
7.5	6	9	2	2	1	7	15	13	1	0	7	15	10	1	0	600
8.0	6	9	2	2	1	7	15	13	1	1	7	15	10	1	1	700
8.5	5	10	5	2	2	6	6	0	1	1	7	15	10	1	1	700
9.0	6	10	5	3	2	6	6	0	2	1	7	15	11	2	1	800
9.5	6	10	5	3	2	6	6	0	2	1	7	15	11	2	1	800
10.0	6	10	6	3	3	6	7	1	2	2	6	9	2	2	2	800
10.5	6	10	6	3	3	6	8	3	3	2	6	9	2	3	2	900
11.0	5	6	1	4	3	6	8	3	3	2	6	10	5	3	2	900
11.5	5	6	1	4	3	6	8	4	3	3	6	10	5	3	3	1000
12.0	5	6	2	4	4	6	9	5	3	3	6	10	5	3	3	1000
12.5	5	6	2	5	4	6	9	5	4	3	6	10	6	4	3	1000
13.0	5	6	2	5	4	5	4	0	4	3	6	10	6	4	3	1100
13.5	5	6	2	5	5	5	4	0	4	4	6	10	6	4	4	1100
14.0	5	6	3	6	5	5	4	0	5	4	6	10	6	5	4	1200
14.5	4	3	0	6	5	5	4	0	5	4	5	6	1	5	4	1200
15.0	4	3	0	6	6	5	4	0	5	4	5	6	1	5	4	1300
15.5	4	3	0	7	6	5	4	0	6	5	5	6	2	6	5	1300
16.0	4	3	0	7	6	5	4	0	6	5	5	6	2	6	5	1300
16.5	4	3	0	8	6	5	5	2	6	5	5	6	2	6	5	1400
17.0	4	3	0	8	7	5	5	2	7	6	5	6	2	7	6	1400
17.5	4	3	0	8	7	5	5	2	7	6	5	6	2	7	6	1500
18.0	4	3	0	9	8	4	3	0	7	6	4	4	0	7	6	1500
18.5	4	3	0	9	8	4	3	0	7	7	4	4	0	7	7	1500
19.0	4	3	0	9	8	4	3	0	8	7	4	3	0	8	7	1600
19.5	4	2	0	9	8	4	3	0	8	7	4	3	0	8	7	1600
20.0	4	2	0	10	8	4	2	0	8	7	4	3	0	8	7	1700
20.5	3	2	0	10	8	4	2	0	9	7	4	3	0	9	7	1700
21.0	3	2	0	10	9	4	2	0	9	7	4	3	0	9	7	1800
21.5	3	1	0	10	9	4	2	0	9	7	4	3	0	9	7	1800
22.0	3	1	0	10	9	4	2	0	9	7	4	3	0	9	7	1800
22.5	3	1	0	10	9	4	2	0	9	8	4	3	0	9	8	1900
23.0	3	1	0	10	9	4	2	0	9	8	4	3	0	9	8	1900
23.5	3	1	0	10	9	4	2	0	9	8	3	2	0	9	8	2000
24.0	3	1	0	11	9	4	2	0	9	8	3	2	0	9	8	2000

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 28

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 7											
4	3	6	7	0	7	13	9	7	12	1	500
5	2	6	8	0	7	13	8	7	13	3	500
6	1	6	8	0	7	13	8	7	13	3	600
WL = 8											
1	7	6	9	7	7	15	17	7	15	13	400
2	6	6	8	4	7	14	13	7	14	9	500
3	5	6	8	3	7	14	13	7	14	9	500
4	4	6	8	2	7	14	12	7	14	8	500
5	3	6	8	1	7	14	11	7	15	11	600
6	2	6	8	1	7	14	11	7	15	10	600
7	1	6	9	2	7	15	13	7	15	10	600
WL = 9											
1	8	6	10	10	6	5	5	7	15	14	500
2	7	6	9	7	6	3	1	7	15	13	500
3	6	6	9	6	6	3	0	7	15	13	600
4	5	6	9	5	6	4	0	7	15	12	600
5	4	6	9	4	6	4	0	7	15	12	600
6	3	6	9	4	6	5	0	7	15	11	700
7	2	6	9	4	6	5	0	7	15	11	700
8	1	6	10	5	6	6	0	7	15	11	700
WL = 10											
1	9	6	11	12	6	6	6	7	15	15	600
2	8	6	10	10	6	5	4	7	15	14	600
3	7	6	9	7	6	5	3	7	15	14	600
4	6	6	9	6	6	4	1	7	15	13	600
5	5	6	9	6	6	5	1	7	15	12	700
6	4	6	9	5	6	5	0	7	15	12	700
7	3	6	10	6	6	6	1	7	15	12	700
8	2	6	10	6	6	6	0	7	15	12	800
9	1	6	10	6	6	6	0	6	8	0	800
WL = 11											
1	10	6	11	13	6	7	8	6	9	8	600
2	9	6	10	10	6	6	6	6	8	5	600
3	8	6	9	8	6	5	3	6	8	4	700
4	7	6	9	7	6	5	2	6	8	3	700
5	6	6	9	6	6	5	1	6	8	2	700
6	5	6	9	6	6	6	2	6	8	2	800
7	4	6	10	7	6	6	1	6	8	1	800
8	3	6	10	7	6	7	2	6	9	3	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 11 (Contd)											
9	2	5	5	0	6	7	2	6	9	3	900
10	1	5	6	1	6	7	2	6	9	3	900
WL = 12											
1	11	5	6	8	6	8	10	6	10	10	700
2	10	5	5	5	6	7	7	6	9	7	700
3	9	5	5	4	6	6	5	6	8	5	700
4	8	5	4	2	6	6	4	6	8	4	700
5	7	5	4	1	6	6	3	6	8	3	800
6	6	5	4	1	6	6	2	6	8	3	800
7	5	5	5	1	6	7	3	6	9	4	800
8	4	5	5	1	6	7	3	6	9	4	900
9	3	5	5	1	6	8	4	6	9	3	900
10	2	5	6	2	6	8	4	6	10	5	900
11	1	5	6	2	6	8	4	6	10	5	1000
WL = 13											
1	12	5	6	8	6	8	10	6	10	11	700
2	11	5	5	6	6	7	8	6	9	8	700
3	10	5	5	5	6	6	5	6	9	7	800
4	9	5	4	3	6	6	4	6	8	5	800
5	8	5	4	2	6	6	4	6	8	4	800
6	7	5	4	1	6	6	3	6	9	5	900
7	6	5	4	1	6	7	4	6	9	5	900
8	5	5	5	2	6	7	3	6	9	4	900
9	4	5	5	1	6	8	4	6	9	4	1000
10	3	5	5	1	6	8	4	6	10	6	1000
11	2	5	6	2	6	8	4	6	10	6	1000
12	1	5	6	2	6	9	6	6	10	6	1100
WL = 14											
1	13	5	6	9	6	8	10	6	10	11	800
2	12	5	5	7	6	7	8	6	9	9	800
3	11	5	4	4	6	7	7	6	9	8	800
4	10	5	4	3	6	7	6	6	9	7	900
5	9	5	4	3	6	6	4	6	8	5	900
6	8	5	4	2	6	6	3	6	9	6	900
7	7	5	4	1	6	7	4	6	9	5	900
8	6	5	4	1	6	7	3	6	9	5	1000
9	5	5	5	2	6	8	5	6	9	5	1000
10	4	5	5	2	6	8	4	6	10	6	1000
11	3	5	5	1	5	4	0	6	10	6	1100

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 14 (Contd)											
12	2	5	6	3	5	4	0	6	10	6	1100
13	1	5	6	3	5	4	0	6	10	6	1100
WL = 15											
1	14	5	6	9	5	3	6	6	10	12	800
2	13	4	2	4	5	2	4	6	9	9	800
3	12	4	1	2	5	1	2	6	9	8	900
4	11	4	1	1	5	1	1	6	8	6	900
5	10	5	4	3	5	1	0	6	8	5	900
6	9	5	4	2	5	2	0	6	9	6	1000
7	8	5	4	2	5	2	0	6	9	6	1000
8	7	5	4	1	5	3	0	6	9	5	1000
9	6	5	4	1	5	3	0	6	9	5	1100
10	5	5	5	2	5	3	0	6	10	7	1100
11	4	5	5	2	5	4	0	6	10	7	1100
12	3	4	3	0	5	4	0	5	6	1	1200
13	2	4	3	0	5	4	0	5	6	1	1200
14	1	4	3	0	5	4	0	5	6	1	1200
WL = 16											
1	15	4	3	7	5	4	7	5	6	8	900
2	14	4	2	5	5	2	4	5	5	6	900
3	13	4	1	3	5	1	2	5	4	3	900
4	12	4	0	1	5	1	1	5	3	1	1000
5	11	4	0	0	5	1	0	5	3	0	1000
6	10	4	1	0	5	2	0	5	4	1	1000
7	9	4	1	0	5	2	0	5	4	0	1100
8	8	4	2	0	5	3	0	5	4	0	1100
9	7	4	2	0	5	3	0	5	5	1	1100
10	6	4	2	0	5	3	0	5	5	0	1100
11	5	4	3	0	5	3	0	5	5	0	1200
12	4	4	3	0	5	4	0	5	5	0	1200
13	3	4	3	0	5	4	0	5	6	2	1200
14	2	4	3	0	5	4	0	5	6	2	1300
15	1	4	3	0	5	4	0	5	6	2	1300
WL = 17											
1	16	4	3	7	5	3	7	5	6	8	900
2	15	4	1	4	5	2	5	5	5	6	900
3	14	4	0	2	5	2	3	5	4	4	1000
4	13	4	0	1	5	1	1	5	3	2	1000
5	12	4	0	0	5	1	0	5	3	1	1000

**Note:** Position the "L" switch to cover the "L" designation.

CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 17 (Contd)											
6	11	4	0	0	5	1	0	5	3	0	1100
7	10	4	1	0	5	2	0	5	4	1	1100
8	9	4	1	0	5	2	0	5	4	0	1100
9	8	4	2	0	5	3	0	5	4	0	1200
10	7	4	2	0	5	3	0	5	5	1	1200
11	6	4	2	0	5	3	0	5	5	1	1200
12	5	4	2	0	5	4	1	5	5	1	1300
13	4	4	3	0	5	4	0	5	6	2	1300
14	3	4	3	0	5	4	0	5	6	2	1300
15	2	4	3	0	5	4	0	5	6	2	1400
16	1	4	3	0	5	5	2	5	6	2	1400
WL = 18											
1	17	4	2	7	5	3	7	5	6	9	1000
2	16	4	1	4	5	2	5	5	4	5	1000
3	15	4	0	2	5	1	3	5	4	4	1000
4	14	4	0	1	5	1	2	5	3	2	1100
5	13	4	0	0	5	1	1	5	3	1	1100
6	12	4	0	0	5	1	0	5	3	0	1100
7	11	4	1	0	5	2	0	5	3	0	1200
8	10	4	1	0	5	2	0	5	4	0	1200
9	9	4	1	0	5	3	0	5	4	0	1200
10	8	4	2	0	5	3	0	5	4	0	1200
11	7	4	2	0	5	3	0	5	5	1	1300
12	6	4	2	0	5	4	1	5	5	1	1300
13	5	4	2	0	5	4	1	5	5	1	1300
14	4	4	3	0	5	4	1	5	5	1	1400
15	3	4	3	0	5	4	1	5	6	2	1400
16	2	4	3	0	5	4	1	5	6	2	1400
17	1	4	3	0	5	5	2	5	6	2	1500
WL = 19											
1	18	3	0	5	4	0	5	5	5	8	1000
2	17	4	0	4	5	2	5	5	4	6	1000
3	16	4	0	3	5	1	3	5	3	3	1100
4	15	4	0	1	5	1	2	5	3	2	1100
5	14	4	0	0	5	1	1	5	3	1	1100
6	13	4	0	0	5	1	0	5	3	1	1200
7	12	4	0	0	5	2	0	5	3	0	1200
8	11	4	1	0	5	2	0	5	4	1	1200
9	10	4	1	0	5	3	0	5	4	0	1300
10	9	4	2	0	5	3	0	5	4	0	1300

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 19 (Contd)											
11	8	4	2	0	5	3	0	5	4	0	1300
12	7	4	2	0	5	3	0	5	5	1	1400
13	6	4	2	0	5	4	1	5	5	1	1400
14	5	4	2	0	5	4	1	5	5	1	1400
15	4	4	2	0	5	4	1	5	5	1	1500
16	3	4	2	0	4	2	0	4	4	0	1500
17	2	4	3	0	4	3	0	4	4	0	1500
18	1	4	3	0	4	3	0	4	4	0	1600
WL = 20											
1	19	3	0	5	4	0	5	5	5	8	1100
2	18	4	0	4	4	0	4	5	4	6	1100
3	17	4	0	3	4	0	2	5	3	4	1100
4	16	4	0	1	5	1	2	5	3	3	1200
5	15	4	0	0	5	1	1	5	3	2	1200
6	14	4	0	0	5	1	0	5	3	1	1200
7	13	4	0	0	5	2	0	5	3	0	1300
8	12	4	1	0	5	2	0	5	3	0	1300
9	11	4	1	0	5	2	0	5	4	0	1300
10	10	4	1	0	5	3	0	5	4	0	1400
11	9	4	2	0	5	3	0	5	4	0	1400
12	8	4	2	0	5	3	0	5	5	1	1400
13	7	4	2	0	5	4	1	5	5	1	1400
14	6	4	2	0	5	4	1	4	3	0	1500
15	5	4	2	0	4	2	0	4	3	0	1500
16	4	4	2	0	4	2	0	4	3	0	1500
17	3	4	2	0	4	2	0	4	3	0	1600
18	2	4	2	0	4	2	0	4	3	0	1600
19	1	4	2	0	4	2	0	4	3	0	1600
WL = 21											
1	20	3	0	5	4	0	5	4	2	6	1100
2	19	4	0	4	4	0	4	4	1	3	1200
3	18	4	0	3	4	0	2	4	0	1	1200
4	17	4	0	2	4	0	1	4	0	0	1200
5	16	4	0	1	5	1	1	4	0	0	1200
6	15	4	0	0	5	1	0	5	2	0	1300
7	14	4	0	0	5	1	0	5	3	0	1300
8	13	4	0	0	5	2	0	5	3	0	1300
9	12	4	1	0	5	2	0	5	3	0	1400
10	11	4	1	0	5	3	0	5	4	0	1400

**Note:** Position the "L" switch to cover the "L" designation.

CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 21 (Contd)											
11	10	4	2	0	5	3	0	5	4	0	1400
12	9	4	2	0	5	3	0	4	3	0	1500
13	8	4	2	0	5	3	0	4	3	0	1500
14	7	4	2	0	4	2	0	4	3	0	1500
15	6	4	2	0	4	2	0	4	3	0	1600
16	5	4	2	0	4	2	0	4	3	0	1600
17	4	4	2	0	4	2	0	4	3	0	1600
18	3	4	2	0	4	2	0	4	3	0	1700
19	2	4	2	0	4	2	0	4	3	0	1700
20	1	4	2	0	4	2	0	4	3	0	1700
WL = 22											
1	21	3	0	5	4	0	5	4	2	6	1200
2	20	3	0	4	4	0	4	4	0	3	1200
3	19	4	0	3	4	0	3	4	0	2	1200
4	18	4	0	2	4	0	1	4	0	0	1300
5	17	4	0	1	4	0	0	4	0	0	1300
6	16	4	0	0	4	0	0	4	1	0	1300
7	15	4	0	0	5	1	0	4	1	0	1400
8	14	4	0	0	5	2	0	5	3	0	1400
9	13	4	1	0	5	2	0	4	2	0	1400
10	12	4	1	0	5	3	0	4	2	0	1500
11	11	4	1	0	5	3	0	4	3	0	1500
12	10	4	2	0	5	3	0	4	3	0	1500
13	9	4	2	0	4	2	0	4	3	0	1600
14	8	4	2	0	4	2	0	4	3	0	1600
15	7	4	2	0	4	2	0	4	3	0	1600
16	6	4	2	0	4	2	0	4	3	0	1600
17	5	4	2	0	4	2	0	4	3	0	1700
18	4	4	2	0	4	2	0	4	3	0	1700
19	3	4	2	0	4	2	0	4	3	0	1700
20	2	4	2	0	4	2	0	4	3	0	1800
21	1	3	1	0	4	2	0	4	3	0	1800
WL = 23											
1	22	3	0	6	4	0	5	4	2	6	1200
2	21	3	0	4	4	0	4	4	0	3	1300
3	20	4	0	3	4	0	3	4	0	2	1300
4	19	4	0	2	4	0	1	4	0	1	1300
5	18	4	0	1	4	0	0	4	0	0	1400
6	17	4	0	0	4	0	0	4	0	0	1400

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 28 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 23 (Contd)											
7	16	4	0	0	4	0	0	4	1	0	1400
8	15	4	0	0	5	2	0	4	1	0	1400
9	14	4	1	0	5	2	0	4	2	0	1500
10	13	4	1	0	5	3	0	4	2	0	1500
11	12	4	1	0	5	3	0	4	2	0	1500
12	11	4	2	0	4	2	0	4	3	0	1600
13	10	4	2	0	4	2	0	4	3	0	1600
14	9	4	2	0	4	2	0	4	3	0	1600
15	8	4	2	0	4	2	0	4	3	0	1700
16	7	4	2	0	4	2	0	4	3	0	1700
17	6	4	2	0	4	2	0	4	3	0	1700
18	5	4	2	0	4	2	0	4	3	0	1800
19	4	4	2	0	4	2	0	4	3	0	1800
20	3	3	1	0	4	2	0	4	3	0	1800
21	2	3	1	0	4	2	0	4	3	0	1900
22	1	3	1	0	4	2	0	4	3	0	1900
WL = 24											
1	23	3	0	6	4	0	5	4	1	5	1300
2	22	3	0	4	4	0	4	4	0	3	1300
3	21	4	0	3	4	0	3	4	0	2	1300
4	20	4	0	2	4	0	1	4	0	1	1400
5	19	4	0	1	4	0	0	4	0	0	1400
6	18	4	0	0	4	0	0	4	0	0	1400
7	17	4	0	0	4	0	0	4	1	0	1500
8	16	4	0	0	4	0	0	4	1	0	1500
9	15	4	1	0	5	2	0	4	2	0	1500
10	14	4	1	0	4	1	0	4	2	0	1600
11	13	4	1	0	4	1	0	4	2	0	1600
12	12	4	1	0	4	2	0	4	2	0	1600
13	11	4	2	0	4	2	0	4	3	0	1700
14	10	4	2	0	4	2	0	4	3	0	1700
15	9	4	2	0	4	2	0	4	3	0	1700
16	8	4	2	0	4	2	0	4	3	0	1700
17	7	4	2	0	4	2	0	4	3	0	1800
18	6	4	2	0	4	2	0	4	3	0	1800
19	5	4	2	0	4	2	0	4	3	0	1800
20	4	3	1	0	4	2	0	4	3	0	1900

**Note:** Position the "L" switch to cover the "L" designation.

CHART 29

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900 $\Omega$ + 2.15 $\mu$ F			600 $\Omega$ + 2.15 $\mu$ F			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 7											
1	6	6	9	2	7	15	14	7	15	10	600
2	5	6	10	5	7	15	15	7	15	11	600
3	4	6	10	6	7	15	15	7	15	12	500
WL = 8											
1	7	6	10	5	7	15	14	7	15	11	600
2	6	6	11	8	7	15	15	7	15	11	600
3	5	6	11	9	7	15	16	7	15	12	600
4	4	6	11	10	7	15	16	7	15	13	500
5	3	6	11	10	7	15	17	7	15	13	500
6	2	6	11	11	7	15	17	7	15	14	500
7	1	6	11	11	7	15	18	7	15	14	400
WL = 9											
1	8	6	11	8	6	7	2	7	15	11	700
2	7	6	12	11	6	8	5	7	15	12	700
3	6	6	12	12	6	8	6	7	15	13	700
4	5	6	12	12	6	8	7	7	15	13	600
5	4	6	12	13	6	8	8	7	15	14	600
6	3	6	12	13	6	8	8	7	15	14	600
7	2	6	12	14	6	7	7	7	15	15	500
8	1	6	11	12	6	7	8	7	15	15	500
WL = 10											
1	9	6	11	9	6	8	4	6	10	5	800
2	8	6	12	12	6	9	7	6	11	8	800
3	7	6	12	13	6	9	8	6	11	9	700
4	6	6	12	13	6	10	10	6	11	9	700
5	5	6	13	16	6	10	11	6	11	10	700
6	4	6	12	14	6	9	10	6	11	10	600
7	3	6	12	14	6	9	10	6	10	9	600
8	2	6	12	15	6	9	11	6	10	9	600
9	1	6	12	15	6	8	10	7	15	16	600
WL = 11											
1	10	5	7	4	6	9	6	6	11	8	900
2	9	5	8	6	6	10	9	6	11	9	900
3	8	5	9	9	6	10	10	6	12	11	800
4	7	5	9	10	6	11	12	6	12	12	800
5	6	5	9	10	6	10	11	6	12	13	800
6	5	5	9	11	6	10	12	6	12	13	700
7	4	5	9	11	6	10	12	6	11	11	700
8	3	5	9	11	6	10	13	6	11	12	700

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 11 (Contd)											
9	2	5	8	10	6	9	11	6	11	12	600
10	1	6	12	16	6	9	12	6	10	10	600
WL = 12											
1	1	5	7	4	6	10	8	6	11	8	1000
2	10	5	8	7	6	10	9	6	12	11	900
3	9	5	9	9	6	11	12	6	12	12	900
4	8	5	9	10	6	11	13	6	12	13	900
5	7	5	9	11	6	11	13	6	12	13	800
6	6	5	9	11	6	11	14	6	12	14	800
7	5	5	9	12	6	11	14	6	12	14	800
8	4	5	9	12	6	10	13	6	12	14	800
9	3	5	9	12	6	10	13	6	12	15	700
10	2	5	8	11	6	10	13	6	11	13	700
11	1	5	8	11	6	9	12	6	11	13	700
WL = 13											
1	12	5	7	5	6	10	8	6	11	9	1100
2	11	5	8	7	6	11	11	6	12	12	1000
3	10	5	9	10	6	11	12	6	12	13	1000
4	9	5	9	11	6	11	13	6	13	15	1000
5	8	5	9	11	6	11	13	6	13	16	900
6	7	5	9	12	6	11	14	6	13	16	900
7	6	5	9	12	6	11	14	6	13	17	900
8	5	5	9	12	6	11	15	6	12	15	800
9	4	5	9	13	6	11	15	6	12	15	800
10	3	5	9	13	6	11	15	6	12	15	800
11	2	5	8	12	6	10	14	6	12	15	700
12	1	5	8	12	6	10	14	6	11	14	700
WL = 14											
1	13	5	7	5	5	6	4	6	11	9	1100
2	12	5	8	8	5	7	6	6	12	12	1100
3	11	5	9	10	5	7	7	6	12	13	1100
4	10	5	9	11	5	7	8	6	13	16	1000
5	9	5	9	12	5	8	10	6	13	16	1000
6	8	5	9	12	5	7	9	6	13	17	1000
7	7	5	9	12	5	7	10	6	13	17	900
8	6	5	9	13	5	7	10	6	13	17	900
9	5	5	9	13	5	7	11	6	12	16	900
10	4	5	8	12	5	7	11	6	12	16	900
11	3	5	8	12	5	6	10	6	12	16	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 14 (Contd)											
12	2	5	8	12	5	6	10	6	12	16	800
13	1	5	8	12	6	10	14	6	11	14	800
WL = 15											
1	14	4	4	2	5	6	4	5	7	4	1200
2	13	4	5	4	5	7	6	5	8	7	1200
3	12	4	6	7	5	7	7	5	9	9	1200
4	11	4	6	7	5	7	8	5	9	10	1100
5	10	4	7	9	5	8	10	5	9	10	1100
6	9	4	7	10	5	8	11	5	9	11	1100
7	8	4	7	10	5	8	11	5	9	11	1000
8	7	4	7	11	5	7	10	5	9	12	1000
9	6	4	6	10	5	7	11	5	9	12	1000
10	5	4	6	10	5	7	11	5	8	11	900
11	4	4	6	10	5	6	10	5	8	11	900
12	3	4	6	11	5	6	10	6	12	16	900
13	2	4	5	10	5	6	10	6	12	16	800
14	1	4	5	10	5	5	9	6	12	16	800
WL = 16											
1	15	4	4	2	5	6	4	5	7	4	1300
2	14	4	5	5	5	7	6	5	8	7	1300
3	13	4	6	7	5	8	9	5	9	9	1200
4	12	4	6	8	5	8	10	5	9	10	1200
5	11	4	6	8	5	8	10	5	9	11	1200
6	10	4	7	10	5	8	11	5	9	11	1100
7	9	4	7	11	5	8	11	5	9	12	1100
8	8	4	6	10	5	8	12	5	9	12	1100
9	7	4	6	10	5	7	11	5	9	12	1100
10	6	4	6	11	5	7	11	5	9	13	1000
11	5	4	6	11	5	7	11	5	8	11	1000
12	4	4	6	11	5	6	10	5	8	12	1000
13	3	4	5	10	5	6	11	5	8	12	900
14	2	4	5	10	5	6	11	5	8	12	900
15	1	4	5	10	5	6	11	5	7	10	900
WL = 17											
1	16	4	4	2	5	6	4	5	7	5	1400
2	15	4	5	5	5	7	7	5	8	7	1400
3	14	4	6	7	5	8	9	5	8	8	1300
4	13	4	6	8	5	8	10	5	9	10	1300
5	12	4	6	9	5	8	11	5	9	11	1300

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 17 (Contd)											
6	11	4	6	9	5	8	11	5	9	12	1200
7	10	4	6	10	5	8	12	5	9	12	1200
8	9	4	6	10	5	8	12	5	9	12	1200
9	8	4	6	10	5	7	11	5	9	13	1100
10	7	4	6	11	5	7	11	5	9	13	1100
11	6	4	6	11	5	7	12	5	8	12	1100
12	5	4	5	10	5	7	12	5	8	12	1000
13	4	4	5	10	5	6	11	5	8	12	1000
14	3	4	5	10	5	6	11	5	8	12	1000
15	2	4	5	10	5	6	11	5	8	12	900
16	1	4	4	9	5	6	11	5	7	11	900
WL = 18											
1	17	4	4	2	4	3	1	4	4	1	1500
2	16	4	5	5	4	4	3	4	6	5	1400
3	15	4	5	6	4	5	6	4	6	6	1400
4	14	4	6	8	4	5	6	4	6	7	1400
5	13	4	6	9	4	5	7	4	7	9	1300
6	12	3	5	8	4	6	9	4	7	9	1300
7	11	3	5	9	4	5	8	4	7	10	1300
8	10	3	4	8	4	5	9	4	6	9	1200
9	9	3	4	9	4	5	9	5	9	13	1200
10	8	3	4	9	4	5	10	5	8	12	1200
11	7	3	4	9	4	4	9	5	8	12	1200
12	6	3	4	9	4	4	9	5	8	12	1100
13	5	3	3	9	4	4	9	5	8	12	1100
14	4	3	3	9	4	4	9	5	8	12	1100
15	3	3	3	9	5	6	11	5	7	11	1000
16	2	4	4	10	5	6	11	5	7	11	1000
17	1	4	4	10	5	5	10	5	7	11	1000
WL = 19											
1	18	3	2	0	4	3	1	4	4	1	1600
2	17	3	3	3	4	4	3	4	5	4	1500
3	16	3	4	5	4	5	6	4	6	6	1500
4	15	3	4	6	4	5	7	4	6	7	1500
5	14	3	4	7	4	5	7	4	7	9	1400
6	13	3	4	7	4	5	8	4	7	10	1400
7	12	3	4	8	4	5	9	4	7	10	1400
8	11	3	4	8	4	5	9	4	6	9	1300
9	10	3	4	9	4	5	9	4	6	10	1300

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900 $\Omega$ + 2.15 $\mu$ F			600 $\Omega$ + 2.15 $\mu$ F			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 19 (Contd)											
10	9	3	4	9	4	5	10	4	6	10	1300
11	8	3	4	9	4	4	9	4	6	10	1200
12	7	3	3	9	4	4	9	4	6	10	1200
13	6	3	3	9	4	4	9	4	5	9	1200
14	5	3	3	9	4	4	9	4	5	9	1100
15	4	3	3	9	4	3	9	4	5	9	1100
16	3	3	2	8	4	3	9	5	7	11	1100
17	2	3	2	8	4	3	9	5	7	11	1000
18	1	3	2	8	4	2	8	5	7	11	1000
WL = 20											
1	19	3	2	1	4	3	1	4	4	2	1600
2	18	3	3	3	4	4	4	4	5	4	1600
3	17	3	3	4	4	5	6	4	6	6	1600
4	16	3	4	6	4	5	7	4	6	7	1500
5	15	3	4	7	4	5	7	4	6	8	1500
6	14	3	4	7	4	5	8	4	7	10	1500
7	13	3	4	8	4	5	9	4	6	9	1400
8	12	3	4	8	4	5	9	4	6	10	1400
9	11	3	4	9	4	5	10	4	6	10	1400
10	10	3	4	9	4	5	10	4	6	10	1400
11	9	3	3	9	4	4	9	4	6	10	1300
12	8	3	3	9	4	4	9	4	5	10	1300
13	7	3	3	9	4	4	9	4	5	10	1300
14	6	3	3	9	4	3	9	4	5	10	1200
15	5	3	2	8	4	3	9	4	5	10	1200
16	4	3	2	8	4	3	9	4	5	10	1200
17	3	3	2	8	4	3	9	4	4	9	1100
18	2	3	2	8	4	3	9	4	4	9	1100
19	1	3	2	8	4	2	8	4	4	9	1100
WL = 21											
1	20	3	1	0	4	3	1	4	4	2	1700
2	19	3	2	2	4	4	4	4	5	4	1700
3	18	3	3	4	4	5	6	4	6	6	1700
4	17	3	4	6	4	5	7	4	6	7	1600
5	16	3	4	7	4	5	8	4	6	8	1600
6	15	3	4	7	4	5	8	4	6	9	1600
7	14	3	4	8	4	5	9	4	6	9	1500
8	13	3	4	9	4	5	9	4	6	10	1500
9	12	3	4	9	3	3	8	4	6	10	1500

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 21 (Contd)											
10	11	3	3	8	3	3	8	4	6	10	1400
11	10	2	2	8	3	3	8	4	6	11	1400
12	9	2	2	8	3	2	8	4	5	10	1400
13	8	3	3	9	3	2	8	4	5	10	1300
14	7	3	2	8	4	4	10	4	5	10	1300
15	6	3	2	8	4	3	9	4	5	10	1300
16	5	3	2	8	4	3	9	4	4	9	1200
17	4	3	2	8	4	3	9	4	4	9	1200
18	3	3	2	8	4	3	9	4	4	9	1200
19	2	3	1	8	4	2	8	4	4	9	1200
20	1	3	1	8	4	2	8	4	4	9	1100
WL = 22											
1	21	3	1	0	4	3	1	3	2	0	1800
2	20	3	2	2	4	4	4	3	3	2	1800
3	19	3	3	4	4	5	6	3	4	4	1700
4	18	3	4	6	4	5	7	3	4	5	1700
5	17	3	4	7	3	4	7	3	5	7	1700
6	16	3	4	8	3	4	7	3	5	8	1600
7	15	2	3	7	3	4	8	3	5	8	1600
8	14	2	2	7	3	4	8	3	4	8	1600
9	13	2	2	7	3	3	8	3	4	8	1600
10	12	2	2	7	3	3	8	3	4	8	1500
11	11	2	2	8	3	3	8	3	4	9	1500
12	10	2	2	8	3	2	8	3	4	9	1500
13	9	2	1	7	3	2	8	3	3	8	1400
14	8	2	1	7	3	2	8	3	3	8	1400
15	7	2	0	7	3	2	8	3	3	8	1400
16	6	2	0	7	3	1	7	4	4	9	1300
17	5	2	0	7	4	3	9	4	4	9	1300
18	4	2	0	7	4	3	9	4	4	9	1300
19	3	3	1	8	4	2	8	4	4	9	1200
20	2	3	1	8	4	2	8	4	4	9	1200
21	1	3	1	8	4	2	8	4	4	9	1200
WL = 23											
1	22	3	1	0	3	1	0	3	2	0	1900
2	21	3	2	2	3	2	2	3	3	2	1900
3	20	3	3	4	3	3	4	3	4	4	1800
4	19	3	3	5	3	3	5	3	4	5	1800
5	18	3	4	7	3	4	7	3	4	6	1800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 29 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 23 (Contd)											
6	17	2	3	7	3	4	7	3	4	7	1700
7	16	2	3	7	3	4	8	3	4	7	1700
8	15	2	2	7	3	3	7	3	4	8	1700
9	14	2	2	7	3	3	8	3	4	8	1600
10	13	2	2	8	3	3	8	3	4	9	1600
11	12	2	2	8	3	3	8	3	4	9	1600
12	11	2	1	7	3	2	8	3	3	8	1500
13	10	2	1	7	3	2	8	3	3	8	1500
14	9	2	1	7	3	2	8	3	3	8	1500
15	8	2	0	7	3	2	8	3	3	8	1400
16	7	2	0	7	3	1	7	3	2	8	1400
17	6	2	0	7	3	1	7	3	2	8	1400
18	5	2	0	7	3	1	7	3	2	8	1400
19	4	2	0	7	3	0	7	4	4	9	1300
20	3	2	0	7	4	2	8	4	4	9	1300
21	2	3	1	8	4	2	8	4	3	8	1300
22	1	3	0	7	4	2	8	4	3	8	1200
WL = 24											
3	21	3	3	4	3	3	4	3	4	4	1900
4	20	2	2	4	3	3	5	3	4	5	1900
5	19	2	2	5	3	4	7	3	4	6	1800
6	18	2	2	6	3	4	7	3	4	7	1800
7	17	2	2	6	3	4	8	3	4	7	1800
8	16	2	2	7	3	3	8	3	4	8	1700
9	15	2	2	7	3	3	8	3	4	8	1700
10	14	2	2	8	3	3	8	3	4	9	1700
11	13	2	1	7	3	2	8	3	3	8	1700
12	12	2	1	7	3	2	8	3	3	8	1600
13	11	2	1	7	3	2	8	3	3	8	1600
14	10	2	0	7	3	2	8	3	3	8	1600
15	9	2	0	7	3	2	8	3	2	8	1500
16	8	2	0	7	3	1	7	3	2	8	1500
17	7	2	0	7	3	1	8	3	2	8	1500
18	6	2	0	7	3	0	7	3	2	8	1400
19	5	2	0	7	3	0	7	3	2	8	1400
20	4	2	0	7	3	0	7	3	2	8	1400
21	3	2	0	7	3	0	7	3	1	7	1300
22	2	3	0	7	3	0	7	3	1	7	1300
23	1	3	0	7	4	2	8	4	3	8	1300

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 30

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 9											
6	3	6	11	13	7	15	19	7	15	15	400
7	2	6	11	13	7	15	19	7	15	15	400
8	1	6	11	12	7	15	18	7	15	15	400
WL = 10											
3	7	6	11	15	6	6	10	7	15	17	400
4	6	6	11	14	6	6	9	7	15	17	400
5	5	6	11	14	6	6	9	7	15	16	400
6	4	6	11	14	6	6	8	7	15	16	400
7	3	6	11	14	6	6	8	7	15	16	500
8	2	6	11	13	6	7	9	7	15	16	500
9	1	6	11	13	6	7	9	7	15	16	500
WL = 11											
1	10	6	12	18	6	8	14	7	15	19	400
2	9	6	12	18	6	7	12	7	15	18	400
3	8	6	11	16	6	7	12	7	15	18	400
4	7	6	11	15	6	7	11	7	15	18	400
5	6	6	11	15	6	7	11	7	15	17	500
6	5	6	11	15	6	7	10	7	15	17	500
7	4	6	11	14	6	7	10	7	15	17	500
8	3	6	11	14	6	8	11	7	15	17	500
9	2	6	12	16	6	8	11	6	9	9	500
10	1	6	12	16	6	8	10	6	10	10	600
WL = 12											
1	11	6	12	19	6	9	16	6	10	14	400
2	10	6	12	18	6	8	14	6	10	13	400
3	9	6	12	18	6	7	12	6	10	13	500
4	8	6	11	16	6	7	12	6	9	11	500
5	7	5	7	11	6	7	11	6	9	11	500
6	6	5	7	11	6	7	11	6	9	10	500
7	5	5	7	11	6	8	12	6	9	10	500
8	4	5	7	10	6	8	11	6	10	11	500
9	3	5	7	10	6	8	11	6	10	11	600
10	2	5	7	10	6	8	11	6	10	11	600
11	1	5	8	11	6	9	12	6	10	11	600
WL = 13											
1	12	5	9	16	6	9	16	6	11	16	400
2	11	5	8	14	6	8	14	6	10	14	500
3	10	5	7	13	6	8	14	6	10	14	500
4	9	5	7	12	6	8	13	6	10	13	500

**Note:** Position the "L" switch to cover the "L" designation.

CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 13 (Contd)											
5	8	5	7	12	6	8	13	6	10	13	500
6	7	5	7	12	6	8	12	6	10	13	500
7	6	5	7	11	6	8	12	6	10	12	600
8	5	5	7	11	6	8	12	6	10	12	600
9	4	5	7	11	6	9	13	6	10	12	600
10	3	5	7	11	6	9	13	6	10	12	600
11	2	5	8	12	6	9	13	6	11	14	600
12	1	5	8	12	6	9	13	6	11	13	700
WL = 14											
1	13	5	9	17	6	10	18	6	11	17	500
2	12	5	8	15	6	9	16	6	11	16	500
3	11	5	7	13	6	8	14	6	10	14	500
4	10	5	7	13	6	8	14	6	10	14	500
5	9	5	7	13	6	8	13	6	10	14	600
6	8	5	7	12	6	8	13	6	10	13	600
7	7	5	7	12	6	8	12	6	10	13	600
8	6	5	7	12	6	8	12	6	10	13	600
9	5	5	7	11	6	8	12	6	11	14	600
10	4	5	7	11	6	9	13	6	11	14	700
11	3	5	7	11	6	9	13	6	11	14	700
12	2	5	7	11	6	9	13	6	11	14	700
13	1	5	7	11	6	9	13	6	11	14	700
WL = 15											
1	14	5	8	16	6	10	18	6	12	19	500
2	13	5	8	16	6	9	16	6	11	17	500
3	12	5	7	14	6	9	16	6	10	15	500
4	11	5	7	14	6	8	14	6	10	15	600
5	10	5	6	12	6	8	14	6	10	14	600
6	9	5	6	12	6	8	13	6	10	14	600
7	8	5	6	11	6	8	13	6	10	14	600
8	7	5	6	11	6	9	14	6	10	13	600
9	6	5	7	12	6	8	12	6	10	13	700
10	5	5	7	12	6	9	13	6	11	15	700
11	4	5	7	12	6	9	13	6	11	15	700
12	3	5	7	12	6	9	13	6	11	15	700
13	2	5	7	12	5	5	9	6	11	15	700
14	1	5	7	12	5	5	9	6	11	15	800
WL = 16											
1	15	5	8	17	5	5	14	6	11	18	500

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 16 (Contd)											
2	14	5	7	15	5	4	13	6	11	17	600
3	13	5	7	15	5	4	12	6	11	17	600
4	12	5	6	13	5	3	10	6	10	15	600
5	11	5	6	13	5	3	10	6	10	15	600
6	10	5	6	12	5	3	9	6	10	14	600
7	9	5	6	12	5	3	9	6	10	14	700
8	8	5	6	11	5	3	9	6	10	14	700
9	7	5	6	11	5	4	9	6	10	14	700
10	6	5	6	11	5	4	9	6	11	15	700
11	5	5	7	12	5	4	9	6	11	15	700
12	4	4	4	9	5	4	9	6	11	15	800
13	3	4	4	9	5	5	10	6	11	15	800
14	2	4	4	9	5	5	10	6	11	15	800
15	1	4	5	10	5	5	10	6	11	15	800
WL = 17											
1	16	4	6	15	5	5	14	6	12	20	600
2	15	4	5	14	5	4	13	6	11	18	600
3	14	4	4	12	5	4	12	6	10	16	600
4	13	4	3	11	5	3	11	6	10	16	600
5	12	4	3	10	5	3	10	6	10	15	700
6	11	4	3	10	5	3	10	6	10	15	700
7	10	4	3	10	5	3	9	6	10	14	700
8	9	4	3	9	5	3	9	6	10	14	700
9	8	4	3	9	5	3	9	6	10	14	700
10	7	4	3	9	5	4	9	6	10	14	700
11	6	4	3	9	5	4	9	6	10	14	800
12	5	4	4	9	5	4	9	6	11	15	800
13	4	4	4	9	5	4	9	6	11	15	800
14	3	4	4	9	5	5	10	5	7	11	800
15	2	4	4	9	5	5	10	5	7	11	800
16	1	4	4	9	5	5	10	5	7	11	900
WL = 18											
1	17	4	5	15	5	5	15	6	11	19	600
2	16	4	4	13	5	4	13	6	11	18	600
3	15	4	3	12	5	3	12	6	10	16	600
4	14	4	3	11	5	3	11	6	10	16	700
5	13	4	3	11	5	3	11	6	10	16	700
6	12	4	3	10	5	3	10	6	10	15	700
7	11	4	3	10	5	3	10	6	10	15	700
8	10	4	2	9	5	3	9	5	6	11	700

**Note:** Position the "L" switch to cover the "L" designation.

CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 18 (Contd)											
9	9	4	3	9	5	3	9	5	6	10	800
10	8	4	3	9	5	3	9	5	6	10	800
11	7	4	3	9	5	4	9	5	6	10	800
12	6	4	3	9	5	4	9	5	6	10	800
13	5	4	3	9	5	4	9	5	6	10	800
14	4	4	3	9	5	5	10	5	7	11	900
15	3	4	4	10	5	5	10	5	7	11	900
16	2	4	4	10	5	5	10	5	7	11	900
17	1	4	4	10	5	5	10	5	7	11	900
WL = 19											
1	18	4	5	15	5	5	15	5	7	15	600
2	17	4	4	14	5	4	13	5	7	15	700
3	16	4	3	12	5	3	12	5	6	13	700
4	15	4	2	11	5	3	11	5	6	13	700
5	14	4	2	10	5	3	11	5	5	11	700
6	13	4	2	10	5	3	10	5	5	11	700
7	12	4	2	9	5	3	10	5	5	10	800
8	11	4	2	9	5	3	9	5	5	10	800
9	10	4	2	9	5	3	9	5	5	10	800
10	9	4	2	9	5	3	9	5	6	10	800
11	8	4	3	9	5	4	10	5	6	10	800
12	7	4	3	9	5	4	9	5	6	10	900
13	6	4	3	9	5	4	9	5	6	10	900
14	5	4	3	9	5	4	9	5	6	10	900
15	4	4	3	9	5	5	10	5	6	10	900
16	3	4	3	9	5	5	10	5	7	11	900
17	2	4	3	9	5	5	10	5	7	11	900
18	1	4	4	10	5	5	10	5	7	11	1000
WL = 20											
1	19	4	4	15	5	5	15	5	7	16	700
2	18	4	3	13	5	4	14	5	6	14	700
3	17	4	2	12	5	3	12	5	6	13	700
4	16	4	2	11	5	3	12	5	5	12	700
5	15	4	2	11	5	3	11	5	5	11	800
6	14	4	2	10	5	2	10	5	5	11	800
7	13	4	1	9	5	3	10	5	5	10	800
8	12	4	2	9	5	3	10	5	5	10	800
9	11	4	2	9	5	3	9	5	5	10	800
10	10	4	2	9	5	3	9	5	5	10	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 20 (Contd)											
11	9	4	2	9	5	3	9	5	6	11	900
12	8	4	2	8	5	4	10	5	6	10	900
13	7	4	3	9	5	4	9	5	6	10	900
14	6	4	3	9	5	4	9	5	6	10	900
15	5	4	3	9	5	4	9	5	6	10	900
16	4	4	3	9	5	5	10	5	6	10	1000
17	3	4	3	9	5	5	10	5	6	10	1000
18	2	4	3	9	4	2	8	5	6	10	1000
19	1	3	2	8	4	2	8	5	6	10	1000
WL = 21											
1	20	3	2	13	5	5	15	5	7	16	700
2	19	3	1	12	4	1	12	5	6	14	700
3	18	3	0	11	5	3	12	5	5	13	700
4	17	3	0	10	4	0	10	5	5	12	800
5	16	3	0	9	5	3	11	5	5	12	800
6	15	3	0	9	5	2	10	5	5	11	800
7	14	4	1	9	5	3	10	5	5	11	800
8	13	4	1	9	5	3	10	5	5	10	800
9	12	4	1	8	5	3	9	5	5	10	900
10	11	4	1	8	5	3	9	5	5	10	900
11	10	4	2	9	5	3	9	5	5	10	900
12	9	3	0	7	5	4	10	5	5	10	900
13	8	3	0	7	5	4	10	5	6	11	900
14	7	3	0	7	5	4	10	5	6	10	1000
15	6	3	0	7	4	1	7	5	6	10	1000
16	5	3	0	7	4	2	8	5	6	10	1000
17	4	3	1	7	4	2	8	5	6	10	1000
18	3	3	1	7	4	2	8	5	6	10	1000
19	2	3	1	7	4	2	8	4	4	9	1100
20	1	3	1	7	4	2	8	4	4	9	1100
WL = 22											
1	21	3	2	14	4	2	13	5	7	16	700
2	20	3	1	12	4	1	12	5	6	15	800
3	19	3	0	11	4	0	11	5	5	13	800
4	18	3	0	10	4	0	10	5	5	12	800
5	17	3	0	10	4	0	9	5	4	11	800
6	16	3	0	9	4	0	9	5	4	10	800
7	15	3	0	9	4	0	8	5	4	10	900
8	14	3	0	8	4	0	8	5	4	10	900

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 22 (Contd)											
9	13	3	0	8	4	0	8	5	5	10	900
10	12	3	0	8	4	0	7	5	5	10	900
11	11	3	0	7	4	0	7	5	5	10	900
12	10	3	0	7	4	0	7	5	5	10	1000
13	9	3	0	7	4	0	7	5	5	10	1000
14	8	3	0	7	4	1	7	5	6	11	1000
15	7	3	0	7	4	1	7	5	6	11	1000
16	6	3	0	7	4	1	7	4	3	8	1000
17	5	3	0	7	4	2	8	4	3	8	1000
18	4	3	0	7	4	2	8	4	3	8	1100
19	3	3	0	7	4	2	8	4	3	8	1100
20	2	3	1	8	4	2	8	4	4	9	1100
21	1	3	1	8	4	2	8	4	4	9	1100
WL = 23											
1	22	3	1	13	4	1	13	5	6	15	800
2	21	3	0	12	4	1	12	5	5	14	800
3	20	3	0	11	4	0	11	5	5	13	800
4	19	3	0	10	4	0	10	5	4	12	800
5	18	3	0	10	4	0	9	5	4	11	800
6	17	3	0	9	4	0	9	5	4	11	900
7	16	3	0	9	4	0	8	5	4	10	900
8	15	3	0	8	4	0	8	5	4	10	900
9	14	3	0	8	4	0	8	5	4	10	900
10	13	3	0	8	4	0	7	5	5	10	900
11	12	3	0	7	4	0	7	5	5	10	1000
12	11	3	0	7	4	0	7	5	5	10	1000
13	10	3	0	7	4	0	7	4	2	7	1000
14	9	3	0	7	4	1	7	4	3	8	1000
15	8	3	0	7	4	1	7	4	3	8	1000
16	7	3	0	7	4	1	7	4	3	8	1100
17	6	3	0	7	4	1	7	4	3	8	1100
18	5	3	0	7	4	2	8	4	3	8	1100
19	4	3	0	7	4	2	8	4	3	8	1100
20	3	3	0	7	4	2	8	4	3	8	1100
21	2	3	0	7	4	2	8	4	3	8	1200
22	1	3	0	7	4	2	8	4	3	8	1200
WL = 24											
1	23	3	1	13	4	1	13	4	4	14	800
2	22	3	0	12	4	1	12	4	2	12	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 30 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA NONLOADED CABLE**  
**24-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
24-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 24 (Contd)											
3	21	3	0	11	4	0	11	4	2	11	800
4	20	3	0	10	4	0	10	4	1	10	900
5	19	3	0	10	4	0	10	4	1	9	900
6	18	3	0	9	4	0	9	4	1	9	900
7	17	3	0	9	4	0	8	4	1	8	900
8	16	3	0	8	4	0	8	4	1	8	900
9	15	3	0	8	4	0	8	4	1	7	1000
10	14	3	0	8	4	0	7	4	1	7	1000
11	13	3	0	7	4	0	7	4	2	8	1000
12	12	3	0	7	4	0	7	4	2	8	1000
13	11	3	0	7	4	0	7	4	2	7	1000
14	10	3	0	7	4	0	7	4	2	7	1100
15	9	3	0	7	4	1	7	4	3	8	1100
16	8	3	0	7	4	1	7	4	3	8	1100
17	7	3	0	7	4	1	7	4	3	8	1100
18	6	3	0	7	4	1	7	4	3	8	1100
19	5	3	0	7	4	2	8	4	3	8	1100
20	4	3	0	7	4	2	8	4	3	8	1200
21	3	3	0	7	4	2	8	4	3	8	1200
22	2	3	0	7	4	2	8	4	3	8	1200
23	1	3	0	7	4	2	8	4	3	8	1200

**Note:** Position the "L" switch to cover the "L" designation.

CHART 31

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 9											
1	8	6	12	15	6	7	9	7	15	15	400
2	7	6	12	15	6	7	9	7	15	16	400
3	6	6	12	15	6	8	11	7	15	16	400
WL = 10											
1	9	6	12	15	6	8	11	7	15	16	500
2	8	6	13	18	6	9	12	7	15	17	500
3	7	6	13	18	6	9	13	7	15	17	500
4	6	6	13	19	6	9	13	7	15	17	400
5	5	6	13	19	6	9	14	7	15	17	400
6	4	6	13	19	6	9	14	7	15	18	400
7	3	6	13	19	6	9	14	7	15	18	400
WL = 11											
1	10	6	12	16	6	9	12	6	11	13	600
2	9	6	13	19	6	10	14	6	11	13	500
3	8	6	13	19	6	10	15	6	11	13	500
4	7	6	13	19	6	10	15	6	11	14	500
5	6	6	13	19	6	10	16	6	11	14	500
6	5	6	14	22	6	10	16	6	11	14	500
7	4	6	13	20	6	10	16	6	11	15	400
8	3	6	13	20	6	10	16	6	11	15	400
9	2	6	13	20	6	10	17	7	15	19	400
10	1	6	13	20	6	9	16	7	15	19	400
WL = 12											
1	11	5	9	13	6	10	14	6	11	13	600
2	10	5	9	14	6	10	15	6	12	16	600
3	9	5	9	14	6	10	15	6	12	16	600
4	8	5	10	16	6	11	17	6	12	16	500
5	7	5	10	16	6	11	17	6	12	17	500
6	6	5	10	16	6	11	18	6	12	17	500
7	5	5	10	17	6	11	18	6	12	17	500
8	4	5	10	17	6	11	18	6	12	17	500
9	3	5	10	17	6	10	17	6	12	17	500
10	2	6	13	21	6	10	17	6	11	16	400
11	1	6	13	21	6	10	17	6	11	16	400
WL = 13											
1	12	5	9	14	6	10	14	6	12	16	700
2	11	5	9	14	6	10	15	6	12	16	600
3	10	5	10	16	6	11	17	6	12	17	600
4	9	5	10	16	6	11	17	6	13	19	600

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 31 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 13 (Contd)											
5	8	5	10	17	6	11	18	6	13	19	600
6	7	5	10	17	6	11	18	6	13	19	600
7	6	5	10	17	6	11	18	6	13	20	500
8	5	5	10	17	6	11	19	6	13	20	500
9	4	5	10	18	6	11	19	6	12	18	500
10	3	5	10	18	6	11	19	6	12	18	500
11	2	5	10	18	6	11	19	6	12	18	500
12	1	5	10	18	6	10	18	6	12	18	400
WL = 14											
1	13	5	8	13	6	10	15	6	12	16	700
2	12	5	9	15	6	11	17	6	12	17	700
3	11	5	9	15	6	11	17	6	13	19	700
4	10	5	10	17	6	12	19	6	13	19	700
5	9	5	10	17	6	11	18	6	13	20	600
6	8	5	10	18	6	12	20	6	13	20	600
7	7	5	10	18	6	12	20	6	13	20	600
8	6	5	10	18	6	12	20	6	13	20	600
9	5	5	10	18	6	11	19	6	13	20	600
10	4	5	10	18	6	11	19	6	13	20	500
11	3	5	10	18	6	11	19	6	12	19	500
12	2	5	10	19	6	11	19	6	12	19	500
13	1	5	10	19	6	10	18	6	12	19	500
WL = 15											
1	14	5	8	13	5	6	11	6	12	17	800
2	13	5	9	15	5	7	13	6	13	19	700
3	12	5	10	17	5	7	13	6	13	19	700
4	11	5	10	17	5	8	15	6	13	20	700
5	10	5	10	18	5	8	15	6	13	20	700
6	9	5	10	18	5	8	16	6	13	20	700
7	8	5	10	18	5	8	16	6	13	21	600
8	7	5	10	18	5	8	16	6	13	21	600
9	6	5	10	19	5	8	16	6	13	21	600
10	5	5	10	19	5	7	16	6	13	21	600
11	4	5	10	19	5	7	16	6	13	21	600
12	3	5	10	19	6	11	20	6	13	21	500
13	2	5	10	19	6	11	20	6	13	21	500
14	1	5	10	19	6	11	20	6	13	21	500
WL = 16											
1	15	4	6	12	5	6	11	6	12	17	800
2	14	4	6	12	5	7	13	6	12	18	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 31 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 16 (Contd)											
3	13	4	7	14	5	7	13	6	13	20	800
4	12	4	7	14	5	8	15	6	13	20	800
5	11	4	8	16	5	8	16	6	13	20	700
6	10	4	8	16	5	8	16	6	13	21	700
7	9	4	8	16	5	8	16	6	13	21	700
8	8	4	8	17	5	8	16	6	13	21	700
9	7	4	8	17	5	8	17	6	13	21	700
10	6	4	8	17	5	8	17	6	13	21	600
11	5	4	8	17	5	7	16	6	13	21	600
12	4	4	7	16	5	7	16	6	13	22	600
13	3	5	9	18	5	7	16	6	13	22	600
14	2	5	9	18	5	7	16	6	12	20	600
15	1	5	9	18	5	7	16	6	12	20	500
WL = 17											
1	16	4	5	11	5	6	12	5	8	13	900
2	15	4	6	13	5	7	13	5	8	13	800
3	14	4	7	14	5	7	14	5	9	15	800
4	13	4	7	15	5	8	15	5	9	15	800
5	12	4	7	15	5	8	16	5	10	17	800
6	11	4	7	15	5	8	16	5	10	17	800
7	10	4	8	17	5	8	16	5	10	18	700
8	9	4	8	17	5	8	17	5	10	18	700
9	8	4	8	17	5	8	17	5	10	18	700
10	7	4	7	16	5	8	17	5	10	18	700
11	6	4	7	17	5	8	17	6	13	22	700
12	5	4	7	17	5	7	16	6	13	22	700
13	4	4	7	17	5	7	17	6	13	22	600
14	3	4	7	17	5	7	17	6	13	22	600
15	2	4	7	17	5	7	17	6	13	22	600
16	1	4	7	17	5	7	17	6	13	22	600
WL = 18											
1	17	4	5	11	5	6	12	5	8	13	900
2	16	4	6	13	5	7	13	5	9	15	900
3	15	4	6	13	5	7	14	5	9	15	900
4	14	4	7	15	5	8	15	5	9	16	900
5	13	4	7	15	5	8	16	5	9	16	800
6	12	4	7	16	5	8	16	5	10	18	800
7	11	4	7	16	5	8	17	5	10	18	800
8	10	4	7	16	5	8	17	5	10	18	800
9	9	4	7	17	5	8	17	5	10	18	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 31 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 18 (Contd)											
10	8	4	7	17	5	8	17	5	9	17	700
11	7	4	7	17	5	8	18	5	10	19	700
12	6	4	7	17	5	8	18	5	9	18	700
13	5	4	7	17	5	7	17	5	9	18	700
14	4	4	7	17	5	7	17	5	9	18	700
15	3	4	7	17	5	7	17	5	9	18	600
16	2	4	7	17	5	7	17	5	9	18	600
17	1	4	6	16	5	7	17	6	12	21	600
WL = 19											
1	18	4	5	11	5	6	12	5	8	13	1000
2	17	4	5	12	5	7	13	5	8	14	900
3	16	4	6	13	5	7	14	5	9	15	900
4	15	4	6	14	5	8	16	5	9	16	900
5	14	4	7	15	5	8	16	5	9	16	900
6	13	4	7	16	5	8	16	5	10	18	900
7	12	4	7	16	5	8	17	5	10	18	900
8	11	4	7	16	5	8	17	5	9	17	800
9	10	4	7	17	5	8	17	5	10	19	800
10	9	4	7	17	5	8	18	5	10	19	800
11	8	4	7	17	5	8	18	5	9	18	800
12	7	4	7	17	5	8	18	5	9	18	800
13	6	4	7	17	5	7	17	5	9	18	700
14	5	4	7	17	5	7	17	5	9	18	700
15	4	4	6	17	5	7	17	5	9	18	700
16	3	4	6	17	5	7	17	5	9	18	700
17	2	4	6	17	5	7	17	5	9	18	700
18	1	4	6	17	5	7	17	5	8	17	600
WL = 20											
1	19	3	3	10	4	3	9	5	7	12	1000
2	18	3	3	10	4	4	11	5	8	14	1000
3	17	3	4	12	4	5	12	5	9	16	1000
4	16	3	5	13	4	5	13	5	9	16	1000
5	15	3	5	14	4	5	13	5	9	16	900
6	14	3	5	14	4	6	15	5	9	17	900
7	13	3	5	15	4	6	15	5	9	17	900
8	12	3	5	15	4	6	15	5	9	17	900
9	11	3	5	15	4	5	15	5	9	18	900
10	10	3	5	15	4	5	15	5	9	18	800
11	9	3	5	16	4	5	15	5	9	19	800
12	8	3	5	16	4	5	15	5	9	18	800

**Note:** Position the "L" switch to cover the "L" designation.

CHART 31 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 20 (Contd)											
13	7	3	5	16	4	5	16	5	9	18	800
14	6	3	5	16	4	5	16	5	9	18	800
15	5	3	5	16	4	4	15	5	9	18	800
16	4	4	6	17	5	7	17	5	9	18	700
17	3	4	6	17	5	7	17	5	8	17	700
18	2	4	6	17	5	7	17	5	8	17	700
19	1	4	6	17	5	6	17	5	8	17	700
WL = 21											
1	20	3	2	9	4	3	9	4	5	10	1100
2	19	3	3	10	4	4	11	4	6	12	1100
3	18	3	4	12	4	4	12	4	6	13	1000
4	17	3	4	12	4	5	13	4	6	13	1000
5	16	3	5	14	4	5	14	4	7	15	1000
6	15	3	5	14	4	5	14	4	7	15	1000
7	14	3	5	15	4	6	15	4	7	15	1000
8	13	3	5	15	4	5	15	4	7	16	900
9	12	3	5	15	4	5	15	4	7	16	900
10	11	3	5	16	4	4	15	5	7	16	900
11	10	3	5	16	4	5	15	5	9	18	900
12	9	3	5	16	4	5	16	5	9	18	900
13	8	3	5	16	4	5	16	5	9	18	800
14	7	3	5	16	4	5	16	5	9	19	800
15	6	3	4	15	4	5	16	5	9	19	800
16	5	3	4	15	4	4	15	5	9	19	800
17	4	3	4	16	4	4	15	5	8	18	800
18	3	3	4	16	4	4	15	5	8	18	700
19	2	3	3	15	4	4	15	5	8	18	700
20	1	3	3	15	5	6	17	5	8	18	700
WL = 22											
1	21	3	2	9	4	3	10	4	5	11	1100
2	20	3	3	11	4	4	11	4	5	11	1100
3	19	3	3	11	4	4	12	4	6	13	1100
4	18	3	4	13	4	5	13	4	6	13	1100
5	17	3	4	13	4	5	14	4	7	15	1000
6	16	3	5	14	4	5	14	4	7	15	1000
7	15	3	5	15	4	6	15	4	7	16	1000
8	14	3	5	15	4	5	15	4	7	16	1000
9	13	3	5	15	4	5	15	4	7	16	1000
10	12	3	4	15	4	5	15	4	7	16	1000

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 31 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 22 (Contd)											
11	11	3	4	15	4	5	16	4	7	17	900
12	10	3	4	15	4	5	16	4	7	17	900
13	9	3	4	15	4	5	16	4	6	16	900
14	8	3	4	15	4	5	16	4	6	16	900
15	7	3	4	16	4	5	16	4	6	16	900
16	6	3	4	16	4	4	15	4	6	16	800
17	5	3	3	15	4	4	15	4	6	16	800
18	4	3	3	15	4	4	15	5	8	18	800
19	3	3	3	15	4	3	15	5	8	18	800
20	2	3	3	15	4	3	15	5	8	18	800
21	1	3	3	15	4	3	15	5	8	18	700
WL = 23											
1	22	3	2	9	4	3	10	4	4	10	1200
2	21	3	2	10	4	4	11	4	5	11	1200
3	20	3	3	11	4	4	12	4	6	13	1100
4	19	3	4	13	4	5	13	4	6	13	1100
5	18	3	4	13	4	5	14	4	6	14	1100
6	17	3	4	14	4	5	14	4	7	15	1100
7	16	3	4	14	4	5	15	4	7	16	1100
8	15	3	4	14	4	5	15	4	7	16	1000
9	14	3	4	15	4	5	15	4	7	16	1000
10	13	3	4	15	4	5	15	4	6	16	1000
11	12	3	4	15	4	5	16	4	6	16	1000
12	11	3	4	15	4	5	16	4	6	16	1000
13	10	2	3	15	4	5	16	4	6	16	900
14	9	2	3	15	4	5	16	4	6	16	900
15	8	3	3	15	4	5	16	4	6	16	900
16	7	3	3	15	4	4	15	4	6	16	900
17	6	3	3	15	4	4	16	4	6	16	900
18	5	3	3	15	4	3	15	4	6	16	800
19	4	3	3	15	4	3	15	4	6	16	800
20	3	3	3	15	4	3	15	4	5	15	800
21	2	3	3	15	4	3	15	4	5	15	800
22	1	3	3	15	4	3	15	5	8	18	800
WL = 24											
1	23	3	2	9	4	3	10	4	4	10	1200
2	22	3	2	10	4	4	11	4	5	11	1200
3	21	3	3	11	4	4	12	4	5	12	1200
4	20	3	3	12	4	5	13	4	6	14	1200
5	19	3	4	13	4	5	14	4	6	14	1100

**Note:** Position the "L" switch to cover the "L" designation.

CHART 31 (Contd)

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 24-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 24 (Contd)											
6	18	3	4	14	4	5	14	4	6	14	1100
7	17	3	4	14	4	5	15	4	6	15	1100
8	16	2	3	14	4	5	15	4	6	15	1100
9	15	2	3	14	4	5	15	4	6	15	1100
10	14	2	3	14	3	3	14	4	6	16	1100
11	13	2	3	14	4	5	16	4	6	16	1000
12	12	2	2	14	4	5	16	4	6	16	1000
13	11	2	2	14	4	5	16	4	6	16	1000
14	10	2	2	14	4	5	16	4	6	16	1000
15	9	2	2	14	4	4	15	4	6	16	1000
16	8	2	2	14	4	4	16	4	6	16	900
17	7	3	3	15	4	4	16	4	5	16	900
18	6	2	1	14	4	3	15	4	5	16	900
19	5	2	1	14	4	3	15	4	5	16	900
20	4	2	1	14	4	3	15	4	5	16	900
21	3	2	1	14	4	3	15	4	5	16	800
22	2	3	2	15	4	3	15	4	5	16	800
23	1	3	2	15	4	3	15	4	5	16	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 32

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 7											
5	2	7	15	12	7	12	6	7	12	1	500
6	1	6	8	0	7	13	8	7	13	3	500
WL = 8											
4	4	6	7	2	7	13	10	7	13	6	500
5	3	6	8	2	7	13	9	7	14	8	500
6	2	6	8	1	7	14	11	7	14	7	600
7	1	6	8	1	7	15	14	7	15	10	600
WL = 9											
3	6	6	8	6	7	14	15	7	14	11	400
4	5	6	8	5	7	14	14	7	15	13	500
5	4	6	8	4	7	14	13	7	15	12	500
6	3	6	8	3	7	14	12	7	15	12	600
7	2	6	9	4	7	15	14	7	15	11	600
8	1	6	9	3	6	6	0	7	15	11	700
WL = 10											
1	9	6	11	15	6	5	9	7	15	17	400
2	8	6	9	10	6	3	5	7	15	16	400
3	7	6	8	7	6	2	2	7	15	15	500
4	6	6	8	6	6	2	1	7	15	14	500
5	5	6	8	5	6	3	0	7	15	13	600
6	4	6	8	4	6	4	0	7	15	12	600
7	3	6	9	5	6	5	0	7	15	12	700
8	2	6	9	4	6	6	1	7	15	12	700
9	1	6	10	6	6	6	0	7	15	11	800
WL = 11											
1	10	6	11	16	6	6	11	7	15	18	400
2	9	6	10	13	6	4	7	7	15	17	500
3	8	6	9	10	6	3	4	7	15	16	500
4	7	6	8	7	6	3	2	7	15	15	600
5	6	6	8	6	6	3	1	7	15	14	600
6	5	6	8	5	6	4	0	7	15	13	700
7	4	6	9	6	6	5	1	7	15	13	700
8	3	6	9	5	6	6	1	6	8	1	800
9	2	6	10	7	6	7	2	6	9	3	800
10	1	5	6	1	6	7	2	6	9	3	900
WL = 12											
1	11	5	7	12	6	7	12	6	9	11	400
2	10	5	5	8	6	5	8	7	15	17	500
3	9	5	4	5	6	4	6	7	15	16	500

**Note:** Position the "L" switch to cover the "L" designation.

CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 12 (Contd)											
4	8	5	3	3	6	4	4	7	15	15	600
5	7	5	3	1	6	4	2	6	6	1	600
6	6	5	3	0	6	4	1	6	7	2	700
7	5	5	4	1	6	5	1	6	7	1	700
8	4	5	4	0	6	6	2	6	8	2	800
9	3	5	5	1	6	7	3	6	9	3	800
10	2	5	5	1	6	7	2	6	9	3	900
11	1	5	6	2	6	8	4	6	10	5	900
WL = 13											
1	12	5	7	13	6	8	14	6	10	14	500
2	11	5	5	9	6	6	10	6	8	9	500
3	10	5	4	6	6	5	7	6	7	6	600
4	9	5	3	4	6	4	4	6	7	5	600
5	8	5	3	2	6	4	3	6	7	4	700
6	7	5	3	1	6	5	3	6	7	3	700
7	6	5	3	0	6	5	2	6	8	3	800
8	5	5	4	1	6	6	2	6	8	3	800
9	4	5	4	0	6	7	3	6	9	4	900
10	3	5	5	1	6	7	3	6	9	4	900
11	2	5	5	1	6	8	4	6	10	6	1000
12	1	5	6	2	6	8	4	6	10	6	1000
WL = 14											
1	13	5	7	14	6	8	14	6	10	14	500
2	12	5	5	10	6	6	10	6	8	10	600
3	11	5	4	7	6	5	8	6	7	7	600
4	10	5	3	4	6	4	5	6	7	6	700
5	9	5	2	2	6	4	3	6	7	4	700
6	8	5	3	2	6	5	3	6	7	3	800
7	7	5	3	1	6	5	2	6	8	4	800
8	6	5	3	0	6	6	3	6	8	3	900
9	5	5	4	1	6	6	2	6	9	5	900
10	4	5	5	2	6	7	3	6	9	4	1000
11	3	5	5	1	6	8	4	6	10	6	1000
12	2	5	5	1	5	4	0	6	10	6	1100
13	1	5	6	3	5	4	0	6	10	6	1100
WL = 15											
1	14	5	7	14	6	8	15	6	10	15	500
2	13	5	5	10	6	6	11	6	9	12	600
3	12	5	3	7	6	5	8	6	7	8	600

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 15 (Contd)											
4	11	5	2	4	6	4	5	6	7	6	700
5	10	5	2	3	6	4	4	6	7	5	700
6	9	5	2	1	6	5	4	6	7	4	800
7	8	5	2	0	6	5	3	6	7	3	800
8	7	5	3	1	6	6	3	6	8	4	900
9	6	5	3	0	6	7	4	6	9	5	900
10	5	5	4	1	6	7	3	6	9	5	1000
11	4	5	5	2	5	3	0	6	9	5	1000
12	3	5	5	2	5	4	0	6	10	7	1100
13	2	5	5	2	5	4	0	5	6	1	1100
14	1	4	3	0	5	4	0	5	6	1	1200
WL = 16											
1	15	4	4	12	5	3	11	6	10	16	600
2	14	4	1	8	5	0	7	6	9	13	600
3	13	4	0	5	5	0	5	6	8	10	700
4	12	5	2	5	5	0	3	6	7	7	700
5	11	5	2	3	5	0	1	6	7	6	800
6	10	5	2	2	5	0	0	6	7	4	800
7	9	5	2	1	6	5	3	6	7	4	900
8	8	5	2	0	6	6	3	6	8	4	900
9	7	5	3	0	5	2	0	6	8	4	1000
10	6	5	4	1	5	3	0	6	9	5	1000
11	5	5	4	1	5	3	0	6	9	5	1100
12	4	5	5	2	5	3	0	5	5	0	1100
13	3	4	3	0	5	4	0	5	5	0	1200
14	2	4	3	0	5	4	0	5	6	2	1200
15	1	4	3	0	5	4	0	5	6	2	1300
WL = 17											
1	16	4	3	12	5	3	12	6	10	16	600
2	15	4	1	8	5	1	8	6	8	12	700
3	14	4	0	5	5	0	5	6	7	9	700
4	13	4	0	4	5	0	3	6	7	7	800
5	12	4	0	2	5	0	2	6	7	6	800
6	11	5	1	1	5	0	0	6	7	5	900
7	10	5	1	0	5	0	0	6	7	4	900
8	9	5	2	0	5	1	0	6	8	5	1000
9	8	5	3	1	5	2	0	6	8	4	1000
10	7	5	3	0	5	2	0	5	4	0	1100
11	6	5	4	1	5	3	0	5	4	0	1100
12	5	4	2	0	5	3	0	5	5	0	1200

**Note:** Position the "L" switch to cover the "L" designation.

CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 17 (Contd)											
13	4	4	2	0	5	4	0	5	5	0	1200
14	3	4	3	0	5	4	0	5	6	2	1300
15	2	4	3	0	5	4	0	5	6	2	1300
16	1	4	3	0	5	4	0	5	6	2	1400
WL = 18											
1	17	4	3	12	5	3	12	6	10	16	600
2	16	4	0	8	5	1	8	6	8	12	700
3	15	4	0	6	5	0	6	5	2	5	700
4	14	4	0	4	5	0	4	5	1	3	800
5	13	4	0	2	5	0	2	5	1	1	800
6	12	4	0	1	5	0	1	5	1	0	900
7	11	4	0	0	5	0	0	5	2	0	900
8	10	4	0	0	5	1	0	5	3	0	1000
9	9	5	2	0	5	2	0	5	3	0	1000
10	8	5	3	0	5	2	0	5	4	0	1100
11	7	4	2	0	5	3	0	5	4	0	1100
12	6	4	2	0	5	3	0	5	5	1	1200
13	5	4	2	0	5	3	0	5	5	1	1200
14	4	4	2	0	5	4	0	5	5	1	1300
15	3	4	3	0	5	4	0	5	5	1	1300
16	2	4	3	0	5	4	1	5	6	2	1400
17	1	4	3	0	5	5	2	5	6	2	1400
WL = 19											
1	18	4	3	12	5	3	12	5	6	13	700
2	17	4	0	8	5	0	8	5	3	8	700
3	16	4	0	6	5	0	6	5	2	6	800
4	15	4	0	4	5	0	4	5	1	3	800
5	14	4	0	3	5	0	2	5	1	1	900
6	13	4	0	1	5	0	1	5	1	0	900
7	12	4	0	0	5	0	0	5	2	0	1000
8	11	4	0	0	5	1	0	5	3	0	1000
9	10	4	0	0	5	2	0	5	3	0	1100
10	9	4	1	0	5	2	0	5	4	0	1100
11	8	4	1	0	5	3	0	5	4	0	1200
12	7	4	2	0	5	3	0	5	4	0	1200
13	6	4	2	0	5	3	0	5	5	1	1300
14	5	4	2	0	5	4	1	5	5	1	1300
15	4	4	2	0	5	4	1	5	5	1	1400
16	3	4	2	0	5	4	1	5	5	1	1400

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	22-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 19 (Contd)											
17	2	4	3	0	5	4	1	4	4	0	1500
17	1	4	3	0	4	3	0	4	4	0	1500
WL = 20											
1	19	4	2	12	5	3	12	5	5	13	700
2	18	4	0	8	5	0	8	5	3	9	800
3	17	4	0	6	5	0	6	5	2	6	800
4	16	4	0	5	5	0	4	5	1	3	900
5	15	4	0	3	5	0	2	5	0	1	900
6	14	5	0	1	5	0	1	5	1	0	1000
7	13	4	0	0	5	0	0	5	2	0	1000
8	12	4	0	0	5	1	0	5	2	0	1100
9	11	4	0	0	5	1	0	5	3	0	1100
10	10	4	1	0	5	2	0	5	3	0	1200
11	9	4	1	0	5	3	0	5	4	0	1200
12	8	4	2	0	5	3	0	5	4	0	1300
13	7	4	2	0	5	3	0	5	4	0	1300
14	6	4	2	0	5	3	0	5	5	1	1400
15	5	4	2	0	5	4	1	5	5	1	1400
16	4	4	2	0	5	4	1	5	5	1	1500
17	3	4	2	0	4	2	0	4	3	1	1500
18	2	4	2	0	4	2	0	4	3	0	1600
19	1	4	2	0	4	2	0	4	3	0	1600
WL = 21											
1	20	3	0	11	4	0	11	5	5	13	700
2	19	4	0	9	5	0	8	5	3	9	800
3	18	4	0	7	5	0	6	5	1	6	800
4	17	4	0	5	5	0	4	5	0	3	900
5	16	4	0	3	5	0	3	5	0	1	900
6	15	5	0	1	5	0	1	5	0	0	1000
7	14	5	0	0	5	0	0	5	1	0	1000
8	13	4	0	0	5	0	0	5	2	0	1100
9	12	4	0	0	5	1	0	5	3	0	1100
10	11	4	0	0	5	2	0	5	3	0	1200
11	10	4	1	0	5	2	0	5	4	0	1200
12	9	4	1	0	5	3	0	5	4	0	1300
13	8	4	2	0	5	3	0	5	4	0	1300
14	7	4	2	0	5	3	0	5	4	0	1400
15	6	4	2	0	5	4	1	5	5	1	1400
16	5	4	2	0	5	4	1	4	3	0	1500

**Note:** Position the "L" switch to cover the "L" designation.

CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 21 (Contd)											
17	4	4	2	0	4	2	0	4	3	0	1500
18	3	4	2	0	4	2	0	4	3	0	1600
19	2	4	2	0	4	2	0	4	3	0	1600
20	1	4	2	0	4	2	0	4	3	0	1700
WL = 22											
1	21	3	0	11	4	0	11	5	5	13	800
2	20	4	0	9	5	0	8	5	3	9	800
3	19	4	0	7	5	0	6	5	1	6	900
4	18	4	0	5	5	0	4	5	0	3	900
5	17	4	0	3	5	0	3	5	0	1	1000
6	16	5	0	2	5	0	1	5	0	0	1000
7	15	5	0	0	5	0	0	5	1	0	1100
8	14	4	0	0	5	0	0	5	2	0	1100
9	13	4	0	0	5	1	0	5	3	0	1200
10	12	4	0	0	5	2	0	5	3	0	1200
11	11	4	1	0	5	2	0	5	3	0	1300
12	10	4	1	0	5	3	0	5	4	0	1300
13	9	4	2	0	5	3	0	5	4	0	1400
14	8	4	2	0	5	3	0	5	4	0	1400
15	7	4	2	0	5	3	0	4	3	0	1500
16	6	4	2	0	4	2	0	4	3	0	1500
17	5	4	2	0	4	2	0	4	3	0	1600
18	4	4	2	0	4	2	0	4	3	0	1600
19	3	4	2	0	4	2	0	4	3	0	1700
20	2	4	2	0	4	2	0	4	3	0	1700
21	1	3	1	0	4	2	0	4	3	0	1800
WL = 23											
1	22	3	0	11	4	0	11	5	5	13	800
2	21	4	0	9	5	0	9	5	2	9	900
3	20	4	0	7	5	0	6	5	1	6	900
4	19	4	0	5	5	0	4	5	0	3	1000
5	18	5	0	3	5	0	3	5	0	2	1000
6	17	5	0	2	5	0	1	5	0	0	1100
7	16	5	0	0	5	0	0	5	1	0	1100
8	15	4	0	0	5	0	0	5	2	0	1200
9	14	4	0	0	5	1	0	5	2	0	1200
10	13	4	0	0	5	2	0	5	3	0	1300
11	12	4	1	0	5	2	0	5	3	0	1300
12	11	4	1	0	5	3	0	5	4	0	1400

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 32 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA NONLOADED CABLE**  
**26-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
26-GA	24-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 23 (Contd)											
13	10	4	1	0	5	3	0	5	4	0	1400
14	9	4	2	0	5	3	0	5	4	0	1500
15	8	4	2	0	5	3	0	4	3	0	1500
16	7	4	2	0	4	2	0	4	3	0	1600
17	6	4	2	0	4	2	0	4	3	0	1600
18	5	4	2	0	4	2	0	4	3	0	1700
19	4	4	2	0	4	2	0	4	3	0	1700
20	3	4	2	0	4	2	0	4	3	0	1800
21	2	3	1	0	4	2	0	4	3	0	1800
22	1	3	1	0	4	2	0	4	3	0	1900
WL = 24											
1	23	3	0	11	4	0	11	4	2	11	800
2	22	4	0	9	5	0	9	4	0	8	900
3	21	4	0	7	5	0	7	5	0	5	900
4	20	4	0	5	5	0	5	5	0	3	1000
5	19	5	0	3	5	0	3	5	0	2	1000
6	18	5	0	2	5	0	1	5	0	0	1100
7	17	5	0	0	5	0	0	5	1	0	1100
8	16	5	0	0	5	0	0	5	1	0	1200
9	15	4	0	0	5	1	0	5	2	0	1200
10	14	4	0	0	5	2	0	5	3	0	1300
11	13	4	1	0	5	2	0	5	3	0	1300
12	12	4	1	0	5	3	0	5	4	0	1400
13	11	4	1	0	5	3	0	5	4	0	1400
14	10	4	2	0	5	3	0	4	3	0	1500
15	9	4	2	0	5	3	0	4	3	0	1500
16	8	4	2	0	4	2	0	4	3	0	1600
17	7	4	2	0	4	2	0	4	3	0	1600
18	6	4	2	0	4	2	0	4	3	0	1700
19	5	4	2	0	4	2	0	4	3	0	1700
20	4	4	2	0	4	2	0	4	3	0	1800
21	3	4	2	0	4	2	0	4	3	0	1800

**Note:** Position the "L" switch to cover the "L" designation.

CHART 33

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 26-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 7											
1	6	6	9	3	7	15	14	7	15	10	500
2	5	6	10	6	7	15	16	7	15	12	500
WL = 8											
1	7	6	11	8	7	15	14	7	15	11	600
2	6	6	12	11	7	15	16	7	15	12	600
3	5	6	12	12	7	15	17	7	15	13	500
4	4	6	12	13	7	15	18	7	15	14	500
WL = 9											
1	8	6	12	11	6	8	4	7	15	12	700
2	7	6	12	12	6	9	8	7	15	13	600
3	6	6	13	15	6	9	9	7	15	14	600
4	5	6	13	16	6	10	12	7	15	15	500
5	4	6	13	17	6	10	13	7	15	16	500
6	3	6	13	17	6	9	12	7	15	16	400
WL = 10											
1	9	6	12	11	6	9	6	6	10	5	800
2	8	6	13	15	6	10	10	6	11	9	700
3	7	6	13	16	6	11	13	6	12	12	700
4	6	6	14	19	6	11	14	6	12	13	600
5	5	6	14	20	6	11	15	6	12	14	500
6	4	6	14	20	6	11	16	6	12	14	500
7	3	6	14	21	6	10	15	6	11	13	500
8	2	6	13	19	6	10	15	7	15	18	400
9	1	6	13	19	6	9	15	7	15	18	400
WL = 11											
1	10	5	8	6	6	10	8	6	11	8	900
2	9	5	9	9	6	11	12	6	12	12	800
3	8	6	14	19	6	11	13	6	13	15	800
4	7	6	14	19	6	12	16	6	13	16	700
5	6	6	14	20	6	12	17	6	13	16	700
6	5	6	14	21	6	12	17	6	13	17	600
7	4	6	14	21	6	12	18	6	13	18	600
8	3	6	14	21	6	11	17	6	12	16	500
9	2	6	14	22	6	10	16	6	12	16	500
10	1	6	13	20	6	10	17	6	11	15	400
WL = 12											
1	11	5	8	6	6	10	9	6	12	11	900
2	10	5	9	9	6	11	12	6	12	12	900

**Note:** Position the "L" switch to cover the "L" designation.

CHART 33 (Contd)

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 26-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 12 (Contd)											
3	9	5	10	12	6	12	15	6	13	15	800
4	8	5	11	15	6	12	16	6	14	19	800
5	7	5	11	16	6	13	19	6	14	19	700
6	6	5	11	17	6	13	19	6	14	20	700
7	5	5	11	17	6	12	18	6	13	18	600
8	4	5	11	18	6	12	19	6	13	19	600
9	3	5	11	18	6	12	19	6	13	19	500
10	2	5	10	17	6	11	18	6	12	17	500
11	1	5	10	17	6	10	17	6	11	16	400
WL = 13											
1	12	5	8	7	6	11	11	6	12	11	1000
2	11	5	9	10	6	12	14	6	13	15	1000
3	10	5	10	13	6	12	15	6	13	16	900
4	9	5	11	15	6	13	18	6	14	19	900
5	8	5	11	16	6	13	19	6	14	20	800
6	7	5	11	17	6	13	20	6	14	20	800
7	6	5	11	18	6	13	20	6	14	21	700
8	5	5	11	18	6	13	21	6	14	21	700
9	4	5	11	18	6	13	21	6	14	21	600
10	3	5	11	19	6	12	20	6	13	20	600
11	2	5	11	19	6	11	19	6	13	20	500
12	1	5	10	18	6	11	19	6	12	18	500
WL = 14											
1	13	5	8	7	5	6	4	6	12	12	1100
2	12	5	9	10	5	8	9	6	13	15	1100
3	11	5	10	13	5	9	11	6	14	19	1000
4	10	5	11	16	5	9	13	6	14	19	1000
5	9	5	11	17	5	10	15	6	14	20	900
6	8	5	11	17	5	10	16	6	14	21	900
7	7	5	11	18	5	9	15	6	14	21	800
8	6	5	12	20	5	9	16	6	14	22	800
9	5	5	11	19	5	9	16	6	14	22	700
10	4	5	11	19	5	9	17	6	14	22	700
11	3	5	10	18	6	12	20	6	13	20	600
12	2	5	10	18	6	11	19	6	13	21	600
13	1	5	10	18	6	11	19	6	12	19	500
WL = 15											
1	14	4	5	4	5	7	6	5	8	6	1200
2	13	4	7	8	5	8	9	5	9	9	1100

**Note:** Position the "L" switch to cover the "L" designation.

CHART 33 (Contd)

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 26-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 15 (Contd)											
3	12	4	8	11	5	9	12	5	10	12	1100
4	11	4	8	12	5	9	13	5	11	15	1000
5	10	4	9	14	5	10	15	5	11	16	1000
6	9	4	9	15	5	10	16	5	11	16	900
7	8	4	9	16	5	10	17	5	11	17	900
8	7	4	9	16	5	10	17	6	14	22	800
9	6	4	9	17	5	10	18	6	14	22	800
10	5	4	9	17	5	9	17	6	14	23	700
11	4	5	11	20	5	9	17	6	14	23	700
12	3	5	10	19	5	8	17	6	13	21	600
13	2	5	10	19	5	8	17	6	13	21	600
14	1	5	10	19	6	11	20	6	13	21	500
WL = 16											
1	15	4	5	4	5	7	6	5	8	6	1300
2	14	4	7	8	5	8	9	5	9	10	1200
3	13	4	8	11	5	9	12	5	10	12	1200
4	12	4	8	12	5	9	13	5	11	15	1100
5	11	4	9	14	5	10	15	5	11	16	1100
6	10	4	9	15	5	10	16	5	11	17	1000
7	9	4	9	16	5	10	17	5	11	17	1000
8	8	4	9	17	5	10	18	5	11	18	900
9	7	4	9	17	5	10	18	5	11	18	900
10	6	4	9	18	5	9	17	5	11	19	800
11	5	4	9	18	5	9	18	5	11	19	800
12	4	4	8	17	5	9	18	5	10	18	700
13	3	4	8	17	5	8	17	6	13	22	700
14	2	4	8	17	5	8	17	6	13	22	600
15	1	5	9	18	5	7	16	6	12	20	600
WL = 17											
1	16	4	5	4	5	7	6	5	8	7	1400
2	15	4	6	7	5	8	9	5	9	10	1300
3	14	4	7	10	5	9	12	5	10	13	1300
4	13	4	8	12	5	10	15	5	11	15	1200
5	12	4	9	15	5	10	16	5	11	16	1200
6	11	4	9	16	5	10	16	5	11	17	1100
7	10	4	9	16	5	10	17	5	11	18	1100
8	9	4	9	17	5	10	18	5	11	18	1000
9	8	4	9	17	5	10	18	5	11	19	1000
10	7	4	9	18	5	10	19	5	11	19	900

**Note:** Position the "L" switch to cover the "L" designation.

CHART 33 (Contd)

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 26-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 19 (Contd)											
15	4	3	6	17	4	6	16	5	9	18	800
16	3	3	5	16	5	8	18	5	9	18	800
17	2	4	6	17	5	7	17	5	9	18	700
18	1	4	6	17	5	7	17	5	9	18	700
WL = 20											
1	19	3	2	1	4	4	3	4	5	3	1600
2	18	3	4	5	4	6	7	4	6	6	1600
3	17	3	5	8	4	7	10	4	7	9	1500
4	16	3	6	10	4	7	11	4	8	12	1500
5	15	3	7	13	4	8	13	4	9	14	1400
6	14	3	7	14	4	8	14	4	9	15	1400
7	13	3	7	14	4	8	15	4	9	16	1300
8	12	3	7	15	4	8	16	4	9	16	1300
9	11	3	7	16	4	8	16	4	9	17	1200
10	10	3	7	16	4	8	17	4	9	17	1200
11	9	3	7	17	4	7	16	4	9	18	1100
12	8	3	6	16	4	7	17	4	8	17	1100
13	7	3	6	16	4	7	17	4	8	17	1000
14	6	3	6	17	4	6	16	4	8	17	1000
15	5	3	5	16	4	6	16	4	7	16	900
16	4	3	5	16	4	5	16	5	9	18	900
17	3	3	5	16	4	5	16	5	9	18	800
18	2	3	5	16	4	4	15	5	9	18	800
19	1	4	6	17	5	7	17	5	8	17	700
WL = 21											
1	20	3	2	1	4	4	3	4	5	4	1700
2	19	3	4	5	4	5	6	4	6	7	1600
3	18	3	5	8	4	7	10	4	7	9	1600
4	17	3	6	10	4	7	11	4	8	12	1500
5	16	3	7	13	4	8	14	4	8	13	1500
6	15	3	7	14	4	8	14	4	9	15	1400
7	14	3	7	14	4	8	15	4	9	16	1400
8	13	3	7	15	4	8	16	4	9	17	1300
9	12	3	7	16	4	8	17	4	9	17	1300
10	11	3	7	16	4	8	17	4	9	18	1200
11	10	2	6	16	3	6	16	4	8	17	1200
12	9	3	6	16	4	7	17	4	8	17	1100
13	8	2	5	16	4	7	17	4	8	17	1100
14	7	2	5	16	4	6	16	4	8	18	1000

**Note:** Position the "L" switch to cover the "L" designation.

CHART 33 (Contd)

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 22- AND 26-GA NONLOADED CABLE  
22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 17 (Contd)											
11	6	4	9	18	5	9	18	5	11	19	900
12	5	4	8	17	5	9	18	5	10	18	800
13	4	4	8	18	5	8	17	5	10	18	800
14	3	4	8	18	5	8	17	5	10	18	700
15	2	4	7	17	5	7	17	6	13	22	700
16	1	4	7	17	5	7	17	6	13	22	600
WL = 18											
1	17	4	4	3	4	4	3	4	5	3	1400
2	16	4	6	7	4	6	7	5	9	10	1400
3	15	4	7	10	4	7	10	5	10	13	1300
4	14	4	8	12	4	7	11	5	10	14	1300
5	13	4	9	15	4	8	13	5	11	17	1200
6	12	4	9	16	4	8	14	5	11	17	1200
7	11	3	7	14	4	8	15	5	11	18	1100
8	10	3	8	16	4	8	16	5	11	18	1100
9	9	3	7	15	4	8	16	5	11	19	1000
10	8	3	7	16	4	8	17	5	11	19	1000
11	7	3	7	16	4	7	16	5	11	20	900
12	6	3	7	17	4	7	16	5	11	20	900
13	5	4	8	18	4	6	16	5	10	19	800
14	4	4	8	18	5	8	18	5	10	19	800
15	3	4	7	17	5	8	18	5	10	19	700
16	2	4	7	17	5	7	17	5	9	18	700
17	1	4	7	17	5	7	17	5	9	18	600
WL = 19											
1	18	3	3	2	4	4	3	4	5	3	1500
2	17	3	4	5	4	6	7	4	7	8	1500
3	16	3	6	9	4	7	10	4	8	10	1400
4	25	3	6	10	4	7	11	4	8	12	1400
5	14	3	7	12	4	8	13	4	9	14	1300
6	13	3	7	13	4	8	14	4	9	15	1300
7	12	3	7	14	4	8	15	4	9	16	1200
8	11	3	7	15	4	8	16	4	9	16	1200
9	10	3	7	16	4	8	16	4	9	17	1100
10	9	3	7	16	4	8	17	4	9	17	1100
11	8	3	7	16	4	7	16	4	9	18	1000
12	7	3	7	17	4	7	17	5	10	19	1000
13	6	3	6	16	4	7	17	5	10	19	900
14	5	3	6	16	4	6	16	5	10	19	900

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 33 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 26-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 21 (Contd)											
15	6	3	5	16	4	6	17	4	7	17	1000
16	5	3	5	16	4	5	16	4	7	17	900
17	4	3	5	16	4	5	16	4	7	17	900
18	3	3	4	16	4	5	16	5	9	19	800
19	2	3	4	16	4	4	15	5	8	18	800
20	1	3	4	16	4	4	15	5	8	18	700
WL = 22											
1	21	3	2	1	4	4	3	3	3	1	1800
2	20	3	4	5	4	5	6	4	6	7	1700
3	19	3	5	8	4	7	10	3	6	8	1700
4	18	3	6	10	4	7	11	4	8	12	1600
5	17	3	6	12	4	8	14	3	7	12	1600
6	16	3	7	14	3	6	12	3	7	13	1500
7	15	2	6	13	3	7	14	3	8	15	1500
8	14	2	6	14	3	7	15	3	8	16	1400
9	13	2	6	15	3	7	16	3	7	15	1400
10	12	2	6	15	3	6	15	3	7	16	1300
11	11	2	5	15	3	6	16	3	7	16	1300
12	10	2	5	15	3	6	16	3	7	16	1200
13	9	2	5	16	3	5	15	4	8	18	1200
14	8	2	4	15	3	5	16	4	8	18	1100
15	7	2	4	15	3	4	15	4	7	17	1100
16	6	2	3	15	3	4	15	4	7	17	1000
17	5	2	3	15	4	5	16	4	7	17	1000
18	4	2	3	15	4	5	16	4	6	16	900
19	3	3	4	16	4	5	16	4	6	16	900
20	2	3	3	15	4	4	16	4	6	16	800
21	1	3	3	15	4	3	15	5	8	18	800
WL = 23											
1	22	3	2	1	3	2	1	3	3	2	1900
2	21	3	4	5	3	4	5	3	4	4	1800
3	20	3	5	8	3	5	8	3	6	8	1800
4	19	3	6	10	3	6	10	3	6	10	1700
5	18	3	6	12	3	6	11	3	7	12	1700
6	17	2	6	13	3	6	12	3	7	13	1600
7	16	2	6	13	3	7	14	3	7	14	1600
8	15	2	6	14	3	7	15	3	7	15	1500
9	14	2	6	15	3	6	15	3	7	15	1500
10	13	2	5	15	3	6	15	3	7	16	1400

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 33 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 26-GA NONLOADED CABLE**  
**22-GA ADJACENT TO CU**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION									DX RLP (OHMS)
		900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
22-GA	26-GA	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	R/R1 (NOTE)	R2	Z	
WL = 23 (Contd)											
11	12	2	5	15	3	6	16	3	7	16	1400
12	11	2	5	15	3	6	16	3	7	17	1300
13	10	2	5	16	3	5	16	3	6	16	1300
14	9	2	4	15	3	5	16	3	6	16	1200
15	8	2	4	15	3	4	15	3	6	16	1200
16	7	2	3	15	3	4	15	4	7	17	1100
17	6	2	3	15	3	3	15	4	7	17	1100
18	5	2	3	15	3	3	15	4	6	16	1000
19	4	2	3	15	3	3	15	4	6	16	1000
20	3	3	3	15	4	4	16	4	6	16	900
21	2	3	3	15	4	3	15	4	6	16	900
22	1	3	3	15	4	3	15	4	5	15	800
WL = 24											
2	22	3	4	5	3	4	5	3	4	5	1900
3	21	3	5	8	3	5	8	3	5	7	1800
4	20	3	6	10	3	6	10	3	6	10	1800
5	19	2	5	11	3	6	11	3	7	12	1700
6	18	2	5	12	3	6	12	3	7	13	1700
7	17	2	6	14	3	7	14	3	7	14	1600
8	16	2	6	14	3	7	15	3	7	15	1600
9	15	2	6	15	3	6	15	3	7	15	1500
10	14	2	5	15	3	6	15	3	7	16	1500
11	13	2	5	15	3	6	16	3	7	16	1400
12	12	2	5	15	3	6	16	3	6	16	1400
13	11	2	4	15	3	5	16	3	6	16	1300
14	10	2	4	15	3	5	16	3	6	16	1300
15	9	1	3	15	3	5	16	3	6	16	1200
16	8	2	3	15	3	4	15	3	5	16	1200
17	7	2	3	15	3	3	15	3	5	16	1100
18	6	2	3	15	3	3	15	3	5	16	1100
19	5	2	2	15	3	3	15	3	4	15	1000
20	4	2	2	15	3	3	15	4	5	16	1000
21	3	2	1	14	4	4	16	4	5	16	900
22	2	2	1	14	4	3	15	4	5	16	900
23	1	2	1	14	4	3	15	4	5	16	800

**Note:** Position the "L" switch to cover the "L" designation.

## CHART 34

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**19-GA H88 LOADED CABLE (NOTE 1)**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN) SETTINGS BY TERMINATION									DX RLP (OHMS)
	900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
	PBN			PBN			PBN			
	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	
24	0	0	2	0	0	1	3	0	2	400
30	0	0	2	1	0	2	2	0	2	500
36	0	0	2	1	0	2	2	0	2	600
42	0	0	2	1	0	2	1	0	2	700
48	0	0	2	1	0	2	1	0	2	800
54	0	0	2	0	0	2	0	0	2	1000
60	0	0	2	0	0	2	0	0	2	1100
66	0	0	2	0	0	2	0	0	2	1200
72	0	0	2	0	0	2	0	0	2	1300
78	0	0	2	0	0	2	0	0	2	1400
84	0	0	2	0	0	2	0	0	2	1500
90	0	0	2	0	0	2	0	0	2	1600
96	0	0	2	0	0	2	0	0	2	1700
102	0	0	2	0	0	2	0	0	2	1800
108	0	0	2	0	0	2	0	0	2	1900
114	0	0	2	0	0	2	0	0	2	2000
120	0	0	2	0	0	2	0	0	2	2100
126	0	0	2	0	0	2	0	0	2	2200
132	0	0	2	0	0	2	0	0	2	2300
138	0	0	2	0	0	2	0	0	2	2400
144	0	0	2	0	0	2	0	0	2	2500
150	0	0	2	0	0	2	0	0	2	2700
156	0	0	2	0	0	2	0	0	2	2800
162	0	0	2	0	0	2	0	0	2	2900
168	0	0	2	0	0	2	0	0	2	3000
174	0	0	2	0	0	2	0	0	2	3100
180	0	0	2	0	0	2	0	0	2	3200
186	0	0	2	0	0	2	0	0	2	3300
192	0	0	2	0	0	2	0	0	2	3400

**Note 1:** Set switch S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 35

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**22-GA H88 LOADED CABLE (NOTE 1)**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN) SETTINGS BY TERMINATION									DX RLP (OHMS)
	900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
	PBN			PBN			PBN			
	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	
12	2	0	2	0	0	1	2	0	0	400
18	2	0	2	2	0	2	4	0	2	600
24	2	0	2	3	0	2	5	0	3	800
30	2	0	2	3	0	3	4	0	3	1000
36	2	0	2	3	0	3	3	0	3	1200
42	2	0	2	2	0	2	3	0	3	1400
48	2	0	2	2	0	2	2	0	3	1600
54	2	0	2	2	0	2	2	0	3	1800
60	2	0	2	2	0	2	2	0	3	2100
66	2	0	2	2	0	2	2	0	3	2300
72	2	0	2	2	0	2	2	0	3	2500
78	2	0	2	2	0	2	2	0	3	2700
84	2	0	2	2	0	2	2	0	2	2900
90	2	0	2	2	0	2	2	0	2	3100
96	2	0	2	2	0	2	2	0	2	3300
102	2	0	2	2	0	2	2	0	2	3500

**Note 1:** Set switch S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 36

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**24-GA H88 LOADED CABLE (NOTE 1)**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN) SETTINGS BY TERMINATION									DX RLP (OHMS)
	900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
	PBN			PBN			PBN			
	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	
6	2	0	1	0	0	0	0	0	0	300
12	4	0	2	3	0	2	5	0	1	600
18	5	0	3	5	0	3	6	0	3	1000
24	4	0	3	5	0	3	6	0	3	1300
30	4	0	3	4	0	3	5	0	3	1600
36	4	0	3	4	0	3	4	0	3	1900
42	4	0	3	4	0	3	4	0	3	2200
48	4	0	3	4	0	3	4	0	3	2600
54	4	0	3	4	0	3	4	0	3	2900
60	4	0	3	4	0	3	4	0	3	3200
66	4	0	3	4	0	3	4	0	3	3500

**Note 1:** Set switch S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 37

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR**  
**25-GA H88 LOADED ("MAT") CABLE (NOTE 1)**

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN) SETTINGS BY TERMINATION									DX RLP (OHMS)
	900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
	PBN			PBN			PBN			
	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	
12	6	0	0	4	0	0	7	0	0	800
18	7	0	1	7	0	1	7	0	0	1200
24	7	0	1	7	0	1	7	0	0	1600
30	6	0	1	7	0	1	7	0	1	2000
36	6	0	1	6	0	1	7	0	1	2400
42	6	0	1	6	0	1	6	0	1	2800
48	6	0	1	6	0	1	6	0	1	3200
54	6	0	1	6	0	1	6	0	1	3600
60	6	0	1	6	0	1	6	0	1	4000

**Note 1:** Set switch S2 to = 0.

**Note 2:** Position the "L" switch to expose the "L" designation.

CHART 38

PRESCRIPTION SETTINGS  
 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS FOR  
 26-GA H88 LOADED CABLE (NOTE 1)

CABLE LENGTH (KFT)	PRECISION BALANCE NETWORK (PBN) SETTINGS BY TERMINATION									DX RLP (OHMS)
	900Ω + 2.15 μF			600Ω + 2.15 μF			TEL SET (35 MA)			
	PBN			PBN			PBN			
	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	R/R1 (NOTE 2)	R2	Z	
6	5	0	2	1	0	0	1	0	0	500
12	7	0	3	7	0	3	7	0	2	1000
18	7	0	4	7	0	3	7	0	3	1500
24	7	0	4	7	0	4	7	0	4	2000
30	7	0	4	7	0	4	7	0	4	2500
36	7	0	4	7	0	4	7	0	4	3100
42	7	0	4	7	0	4	7	0	4	3600

**Note 1:** Set switch S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 39

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA H88 LOADED CABLE**  
**26-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
26-GA	24-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	7	3	6	2	7	2	800
WL = 18 6 12	12 6	7 7	3 3	7 7	3 3	7 7	3 3	1100 1300
WL = 24 6 12 18	18 12 6	7 7 7	3 4 4	7 7 7	3 3 4	7 7 7	3 3 3	1500 1700 1800
WL = 30 6 12 18 24	24 18 12 6	6 7 7 7	3 4 4 4	7 7 7 7	3 4 4 4	7 7 7 7	3 4 4 4	1800 2000 2200 2400
WL = 36.0 6 12 18 24 30	30 24 18 12 6	6 7 7 7 7	3 4 4 4 4	6 7 7 7 7	3 4 4 4 4	7 7 7 7 7	4 4 4 4 4	2100 2300 2500 2700 2900
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	6 7 7 7 7 7	3 4 4 4 4 4	6 7 7 7 7 7	3 4 4 4 4 4	6 7 7 7 7 7	3 4 4 4 4 4	2400 2600 2800 3000 3200 3400
WL = 48 6 12 18 24 30 36 42	42 36 30 24 18 12 6	6 7 7 7 7 7 7	3 4 4 4 4 4 4	6 7 7 7 7 7 7	3 4 4 4 4 4 4	6 7 7 7 7 7 7	3 4 4 4 4 4 4	2700 2900 3100 3300 3500 3700 3900
WL = 54 6 12	48 42	6 7	3 4	6 7	3 4	6 7	3 4	3100 3300

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 39 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 24-GA H88 LOADED CABLE**  
**26-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
26-GA	24-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
18	36	7	4	7	4	7	4	3400
24	30	7	4	7	4	7	4	3600
30	24	7	4	7	4	7	4	3800
WL = 60								
6	54	6	3	6	3	6	3	3400
12	48	7	4	7	4	7	4	3600
18	42	7	4	7	4	7	4	3800
WL = 66								
6	60	6	3	6	3	6	3	3700

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 40

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 24- AND 26-GA H88 LOADED CABLE  
24-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
24-GA	26-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	5	3	4	2	6	2	800
WL = 18 6 12	12 6	6 5	4 3	6 5	4 3	7 6	4 3	1300 1100
WL = 24 6 12 18	18 12 6	6 4 4	4 3 3	6 5 5	4 3 3	6 5 5	4 3 3	1800 1700 1500
WL = 30 6 12 18 24	24 18 12 6	5 4 4 4	4 3 3 3	5 4 4 4	4 3 3 3	6 5 5 5	4 4 3 3	2400 2200 2000 1800
WL = 36 6 12 18 24 30	30 24 18 12 6	5 4 4 4 4	4 3 3 3 3	5 4 4 4 4	4 3 3 3 3	5 4 4 4 4	4 3 3 3 3	2900 2700 2500 2300 2100
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	5 4 4 4 4 4	4 3 3 3 3 3	5 4 4 4 4 4	4 3 3 3 3 3	5 4 4 4 4 4	4 3 3 3 3 3	3400 3200 3000 2800 2600 2400
WL = 48 6 12 18 24 30 36 42	42 36 30 24 18 12 6	5 4 4 4 4 4 4	4 3 3 3 3 3 3	5 4 4 4 4 4 4	4 3 3 3 3 3 3	5 4 4 4 4 4 4	4 3 3 3 3 3 3	3900 3700 3500 3300 3100 2900 2700
WL = 54 24 30	30 24	4 4	3 3	4 4	3 3	3 4	3 3	3800 3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 40 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 26-GA H88 LOADED CABLE**  
**24-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
24-GA	26-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
36	18	4	3	4	3	4	3	3400
42	12	4	3	4	3	4	3	3300
48	6	4	3	4	3	4	3	3100
WL = 60								
42	18	4	3	4	3	4	3	3800
48	12	4	3	4	3	4	3	3600
54	6	4	3	4	3	4	3	3400
WL = 66								
60	6	4	3	4	3	4	3	3700

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 41

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 26- AND 22-GA H88 LOADED CABLE  
26-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
26-GA	22-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	6	2	5	2	7	2	700
WL = 18 6 12	12 6	7 7	3 3	7 7	3 3	7 7	2 3	900 1200
WL = 24 6 12 18	18 12 6	6 7 7	3 3 4	7 7 7	3 3 4	7 7 7	3 3 3	1100 1400 1700
WL = 30 6 12 18 24	24 18 12 6	6 7 7 7	3 3 4 4	7 7 7 7	3 3 4 4	7 7 7 7	3 3 4 4	1300 1600 1900 2200
WL = 36 6 12 18 24 30	30 24 18 12 6	6 7 7 7 7	3 4 4 4 4	6 7 7 7 7	3 3 4 4 4	7 7 7 7 7	3 3 4 4 4	1500 1800 2100 2400 2700
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	6 7 7 7 7 7	3 4 4 4 4 4	6 7 7 7 7 7	3 4 4 4 4 4	6 7 7 7 7 7	3 4 4 4 4 4	1700 2000 2300 2600 3000 3300
WL = 48 6 12 18 24 30 36 42	42 36 30 24 18 12 6	6 7 7 7 7 7 7	3 4 4 4 4 4 4	6 7 7 7 7 7 7	3 4 4 4 4 4 4	6 7 7 7 7 7 7	3 4 4 4 4 4 4	1900 2200 2600 2900 3200 3500 3800
WL = 54 6 12	48 42	6 7	3 4	6 7	3 4	6 7	3 4	2100 2500

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 41 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 26- AND 22-GA H88 LOADED CABLE**  
**26-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
26-GA	22-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
18	36	7	4	7	4	7	4	2800
24	30	7	4	7	4	7	4	3100
30	24	7	4	7	4	7	4	3400
36	18	7	4	7	4	7	4	3700
WL = 60								
6	54	6	3	6	3	6	3	2400
12	48	7	4	7	4	7	4	2700
18	42	7	4	7	4	7	4	3000
24	36	7	4	7	4	7	4	3300
30	30	7	4	7	4	7	4	3600
WL = 66								
6	60	6	3	6	3	6	3	2600
12	54	7	4	7	4	7	4	2900
18	48	7	4	7	4	7	4	3200
24	42	7	4	7	4	7	4	3500
30	36	7	4	7	4	7	4	3800
WL = 72								
6	66	6	3	6	3	6	3	2800
12	60	7	4	7	4	7	4	3100
18	54	7	4	7	4	7	4	3400
24	48	7	4	7	4	7	4	3700
WL = 78								
6	72	6	3	6	3	6	3	3000
12	66	7	4	7	4	7	4	3300
18	60	7	4	7	4	7	4	3600
WL = 84								
6	78	6	3	6	3	6	3	3200
12	72	7	4	7	4	7	4	3500
WL = 90								
6	84	6	3	6	3	6	3	3400
12	78	7	4	7	4	7	4	3700
WL = 96								
6	90	6	3	6	3	6	3	3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 42

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 26-GA H88 LOADED CABLE**  
**22-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
22-GA	26-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	4	3	3	2	5	2	700
WL = 18 6 12	12 6	4 3	3 3	4 3	3 3	5 4	3 2	1200 900
WL = 24 6 12 18	18 12 6	4 3 3	4 3 3	5 3 3	4 3 3	5 4 4	4 3 3	1700 1400 1100
WL = 30 6 12 18 24	24 18 12 6	4 2 2 2	4 3 3 3	4 3 2 3	4 3 3 3	5 3 3 3	4 3 3 3	2200 1900 1600 1300
WL = 36 6 12 18 24 30	30 24 18 12 6	4 2 2 2 2	4 3 3 3 2	4 2 2 2 2	4 3 3 3 2	4 3 2 2 3	4 3 3 3 3	2700 2400 2100 1800 1500
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	4 2 2 2 2 2	4 3 3 3 3 2	4 2 2 2 2 2	4 3 3 3 3 2	4 2 2 2 2 2	4 3 3 3 3 3	3300 3000 2600 2300 2000 1700
WL = 48 5 12 18 24 30 36 42	42 36 30 24 18 12 6	4 2 2 2 2 2 2	4 3 3 3 3 3 2	4 2 2 2 2 2 2	4 3 3 3 3 3 2	4 2 2 2 2 2 2	4 3 3 3 3 3 3	3800 3500 3200 2900 2600 2200 1900
WL = 54 18 24	36 30	2 1	3 2	2 1	3 2	2 1	3 2	3700 3400

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 42 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 26-GA H88 LOADED CABLE**  
**22-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
22-GA	26-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
30	24	1	2	1	2	1	2	3100
36	18	2	3	2	3	2	3	2800
42	12	2	3	2	3	2	3	2500
48	6	2	2	2	2	2	3	2100
WL = 60								
30	30	1	2	1	2	1	2	3600
36	24	1	2	2	3	1	2	3300
42	18	2	3	2	3	2	3	3000
48	12	2	2	2	2	2	3	2700
54	6	2	2	2	2	2	3	2400
WL = 66								
36	30	1	2	1	2	1	2	3800
42	24	2	2	2	3	2	3	3500
48	18	2	2	2	2	2	3	3200
54	12	2	2	2	2	2	3	2900
60	6	2	2	2	2	2	3	2600
WL = 72								
48	24	2	2	2	2	2	2	3700
54	18	2	2	2	2	2	2	3400
60	12	2	2	2	2	2	2	3100
66	6	2	2	2	2	2	3	2800
WL = 78								
60	18	2	2	2	2	2	2	3600
66	12	2	2	2	2	2	2	3300
72	6	2	2	2	2	2	2	3000
WL = 84								
66	18	2	2	2	2	2	2	3800
72	12	2	2	2	2	2	2	3500
78	6	2	2	2	2	2	2	3200
WL = 90								
78	12	2	2	2	2	2	2	3700
84	6	2	2	2	2	2	2	3400
WL = 96								
90	6	2	2	2	2	2	2	3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 43

**PRESCRIPTION SETTINGS  
2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
USED WITH MIXED 24- AND 22-GA H88 LOADED CABLE  
24-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
24-GA	22-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	3	2	2	1	4	1	500
WL = 18 6 12	12 6	4 5	3 3	4 5	2 3	6 7	2 3	700 800
WL = 24 6 12 18	18 12 6	4 5 5	3 3 3	5 5 5	3 3 3	6 6 6	3 3 3	900 1000 1200
WL = 30 6 12 18 24	24 18 12 6	4 4 4 4	3 3 3 3	4 5 5 5	3 3 3 3	5 5 5 5	3 3 3 3	1100 1300 1400 1500
WL = 36 6 12 18 24 30	30 24 18 12 6	4 4 4 4 4	3 3 3 3 3	4 5 5 4 4	3 3 3 3 3	5 5 5 5 5	3 3 3 3 3	1300 1500 1600 1700 1800
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	4 4 4 4 4 4	3 3 3 3 3 3	4 4 4 4 4 4	3 3 3 3 3 3	4 4 4 4 4 4	3 3 3 3 3 3	1500 1700 1800 1900 2000 2100
WL = 48 6 12 18 24 30 36 42	42 36 30 24 18 12 6	4 4 4 4 4 4 4	3 3 3 3 3 3 3	4 4 4 4 4 4 4	3 3 3 3 3 3 3	4 4 4 4 4 4 4	3 3 3 3 3 3 3	1800 1900 2000 2100 2200 2300 2400
WL = 54 6 12	48 42	4 4	3 3	4 4	3 3	4 4	3 3	2000 2100

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 43 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA H88 LOADED CABLE**  
**24-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
24-GA	22-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
18	36	4	3	4	3	4	3	2200
24	30	4	3	4	3	4	3	2300
30	24	4	3	4	3	4	3	2400
36	18	4	3	4	3	4	3	2500
42	12	4	3	4	3	4	3	2600
48	6	4	3	4	3	4	3	2800
WL = 60								
6	54	4	3	4	3	3	3	2200
12	48	4	3	4	3	4	3	2300
18	42	4	3	4	3	4	3	2400
24	36	4	3	4	3	4	3	2500
30	30	4	3	4	3	4	3	2600
36	24	4	3	4	3	4	3	2700
42	18	4	3	4	3	4	3	2900
48	12	4	3	4	3	4	3	3000
54	6	4	3	4	3	4	3	3100
WL = 66								
6	60	4	3	4	3	3	3	2400
12	54	4	3	4	3	4	3	2500
18	48	4	3	4	3	4	3	2600
24	42	4	3	4	3	4	3	2700
30	36	4	3	4	3	4	3	2800
36	30	4	3	4	3	4	3	2900
42	24	4	3	4	3	4	3	3100
48	18	4	3	4	3	4	3	3200
54	12	4	3	4	3	4	3	3300
60	6	4	3	4	3	4	3	3400
WL = 72								
6	66	4	3	4	3	3	3	2600
12	60	4	3	4	3	4	3	2700
18	54	4	3	4	3	4	3	2800
24	48	4	3	4	3	4	3	2900
30	42	4	3	4	3	4	3	3000
36	36	4	3	4	3	4	3	3100
42	30	4	3	4	3	4	3	3300
48	24	4	3	4	3	4	3	3400
54	18	4	3	4	3	4	3	3500
60	12	4	3	4	3	4	3	3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 43 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 24- AND 22-GA H88 LOADED CABLE**  
**24-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
24-GA	22-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 78								
6	72	4	3	4	3	3	3	2800
12	66	4	3	4	3	4	3	2900
18	60	4	3	4	3	4	3	3000
24	54	4	3	4	3	4	3	3100
30	48	4	3	4	3	4	3	3200
36	42	4	3	4	3	4	3	3400
42	36	4	3	4	3	4	3	3500
48	30	4	3	4	3	4	3	3600
WL = 84								
6	78	4	3	4	3	4	3	3000
12	72	4	3	4	3	4	3	3100
18	66	4	3	4	3	4	3	3200
24	60	4	3	4	3	4	3	3300
30	54	4	3	4	3	4	3	3400
36	48	4	3	4	3	4	3	3600
42	42	4	3	4	3	4	3	3700
WL = 90								
6	84	4	3	4	3	4	3	3200
12	78	4	3	4	3	4	3	3300
18	72	4	3	4	3	4	3	3400
24	66	4	3	4	3	4	3	3500
30	60	4	3	4	3	4	3	3600
WL = 96								
6	90	4	3	4	3	4	3	3400
12	84	4	3	4	3	4	3	3500
18	78	4	3	4	3	4	3	3600
WL = 102								
6	96	4	3	4	3	4	3	3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

CHART 44

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA H88 LOADED CABLE**  
**22-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
22-GA	24-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 12 6	6	2	2	1	1	3	1	500
WL = 18.0 6 12	12 6	3 2	3 2	3 2	2 2	5 4	3 2	800 700
WL = 24 6 12 18	18 12 6	3 3 3	3 3 3	3 3 3	3 3 3	5 4 4	3 3 3	1200 1000 900
WL = 30 6 12 18 24	24 18 12 6	3 3 2 2	3 3 3 2	3 3 3 3	3 3 3 3	4 3 4 4	3 3 3 3	1500 1400 1300 1100
WL = 36 6 12 18 24 30	30 24 18 12 6	3 2 2 2 2	3 3 3 2 2	3 3 2 2 2	3 3 2 2 2	3 3 3 3 3	3 3 3 3 3	1800 1700 1600 1500 1300
WL = 42 6 12 18 24 30 36	36 30 24 18 12 6	3 2 2 2 2 2	3 3 3 3 2 2	3 2 2 2 2 2	3 3 3 2 2 2	3 2 2 2 3 3	3 3 3 3 3 3	2100 2000 1900 1800 1700 1500
WL = 48 6 12 18 24 30 36 42	42 36 30 24 18 12 6	3 2 2 2 2 2 2	3 3 3 3 3 2 2	3 2 2 2 2 2 2	3 3 3 3 2 2 2	3 2 2 2 2 2 2	3 3 3 3 3 3 3	2400 2300 2200 2100 2000 1900 1800
WL = 54 6 12	48 42	3 2	3 3	3 2	3 3	2 2	3 3	2800 2600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 44 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA H88 LOADED CABLE**  
**22-GA ADJACENT TO CU (NOTE 1)**

CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
22-GA	24-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 54 (Contd)								
18	36	2	3	2	3	2	3	2500
24	30	2	3	2	3	2	3	2400
30	24	2	3	2	3	2	3	2300
36	18	2	3	2	3	2	3	2200
42	12	2	2	2	2	2	3	2100
48	6	2	2	2	2	2	3	2000
WL = 60								
6	54	3	3	3	3	2	3	3100
12	48	2	3	2	3	2	3	3000
18	42	2	3	2	3	2	3	2900
24	36	2	3	2	3	2	3	2700
30	30	2	3	2	3	2	3	2600
36	24	2	3	2	3	2	3	2500
42	18	2	2	2	3	2	3	2400
48	12	2	2	2	2	2	3	2300
54	6	2	2	2	2	2	3	2200
WL = 66								
6	60	3	3	3	3	2	3	3400
12	54	2	3	2	3	2	3	3300
18	48	2	3	2	3	2	3	3200
24	42	2	3	2	3	2	3	3100
30	36	2	3	2	3	2	3	2900
36	30	2	2	2	3	2	3	2800
42	24	2	2	2	2	2	3	2700
48	18	2	2	2	2	2	3	2600
54	12	2	2	2	2	2	3	2500
60	6	2	2	2	2	2	3	2400
WL = 72								
12	60	2	3	2	3	2	3	3600
18	54	2	3	2	3	2	3	3500
24	48	2	3	2	3	2	3	3400
30	42	2	3	2	3	2	3	3300
36	36	2	2	2	3	2	3	3100
42	30	2	2	2	2	2	3	3000
48	24	2	2	2	2	2	3	2900
54	18	2	2	2	2	2	3	2800
60	12	2	2	2	2	2	3	2700
66	6	2	2	2	2	2	3	2600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 44 (Contd)

**PRESCRIPTION SETTINGS**  
**2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS**  
**USED WITH MIXED 22- AND 24-GA H88 LOADED CABLE**  
**22-GA ADJACENT TO CU (NOTE 1)**

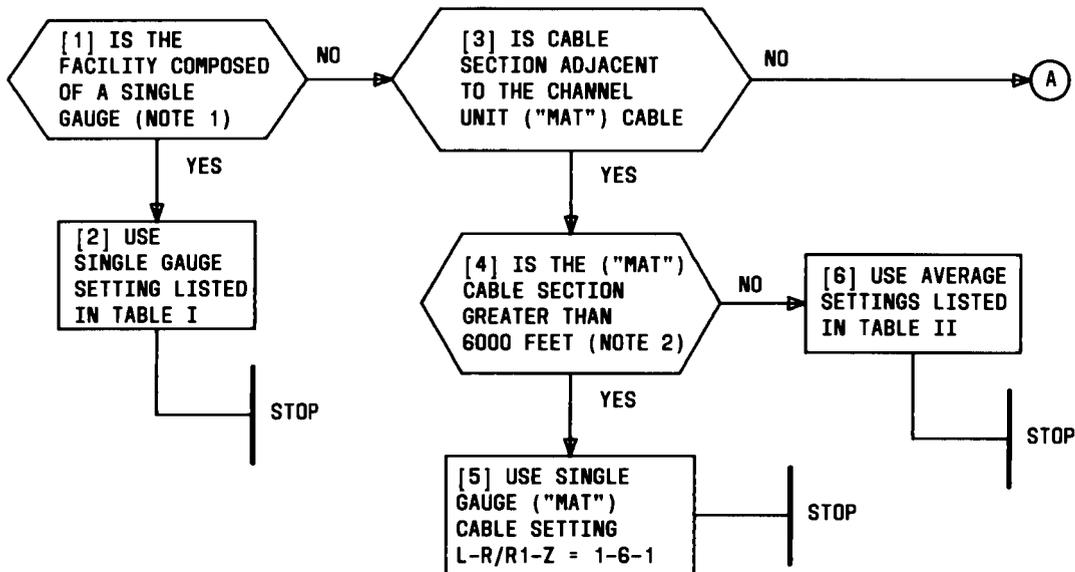
CABLE LENGTH (KFT)		CU PBN SETTINGS BY TERMINATION						DX RLP (OHMS)
		900Ω + 2.15 μF		600Ω + 2.15 μF		TEL SET (35 MA)		
22-GA	24-GA	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	R/R1 (NOTE 2)	Z	
WL = 78								
24	54	2	3	2	3	2	3	3700
30	48	2	3	2	3	2	3	3600
36	42	2	2	2	2	2	3	3500
42	36	2	2	2	2	2	2	3400
48	30	2	2	2	2	2	2	3200
54	24	2	2	2	2	2	2	3100
60	18	2	2	2	2	2	2	3000
66	12	2	2	2	2	2	2	2900
72	6	2	2	2	2	2	2	2800
WL = 84								
42	42	2	2	2	2	2	2	3700
48	36	2	2	2	2	2	2	3600
54	30	2	2	2	2	2	2	3400
60	24	2	2	2	2	2	2	3300
66	18	2	2	2	2	2	2	3200
72	12	2	2	2	2	2	2	3100
78	6	2	2	2	2	2	2	3000
WL = 90								
60	30	2	2	2	2	2	2	3600
66	24	2	2	2	2	2	2	3500
72	18	2	2	2	2	2	2	3400
78	12	2	2	2	2	2	2	3300
84	6	2	2	2	2	2	2	3200
WL = 96								
78	18	2	2	2	2	2	2	3600
84	12	2	2	2	2	2	2	3500
90	6	2	2	2	2	2	2	3400
WL = 102								
96	6	2	2	2	2	2	2	3600

**Note 1:** R2 switches set to = 0. Set S2 to = 1.

**Note 2:** Position the "L" switch to cover the "L" designation.

## CHART 45

## PRESCRIPTION SETTINGS FOR CU PRECISION BALANCE NETWORKS WITH LOADED CABLE

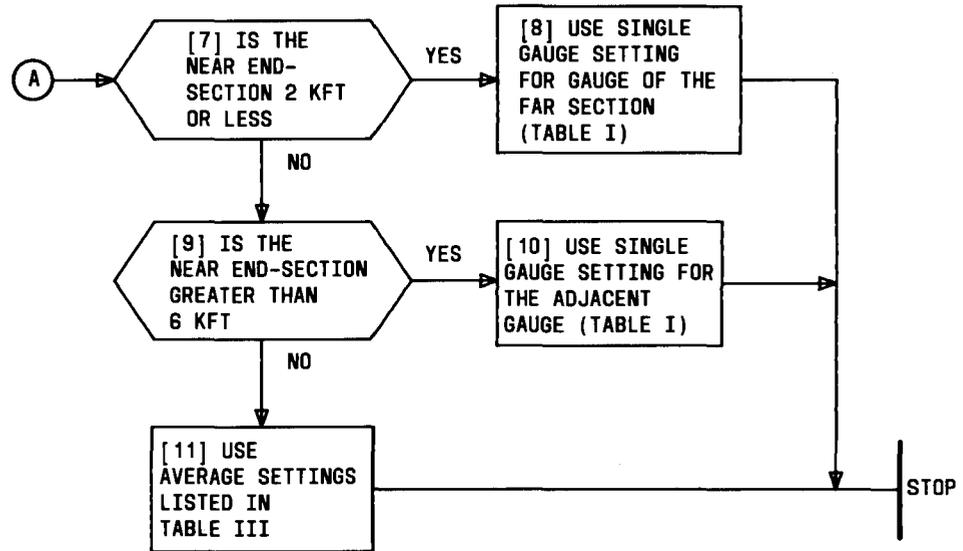


## NOTES:

1. FOR FACILITIES COMPOSED OF TWO OR MORE GAUGES, THE NEAR GAUGE IS ADJACENT TO THE CHANNEL UNIT AND FAR SECTION IS THE NEXT GAUGE. ALL OTHER GAUGES ARE IGNORED.
2. IT IS ASSUMED THAT ("MAT") CABLE WILL BE BUILT OUT TO MULTIPLES OF 6 KFT.

CHART 45 (CONTD)

PRESCRIPTION SETTINGS FOR CU PRECISION BALANCE NETWORKS WITH LOADED CABLE



GAUGE	TABLE I CU PBN		
	L*	R/R1	Z
19	0	0	2
22	0	2	2
24	0	4	3
25†	1	6	1
26	0	7	4

\* 0 = L DESIGNATION COVERED  
 1 = L DESIGNATION VISIBLE  
 † ("MAT") CABLE

GAUGES	TABLE II CU PBN		
	L*	R/R1	Z
25† AND 19	1	3	0
25† AND 22	1	3	0
25† AND 24	1	6	1
25† AND 26	1	6	1

\* 0 = L DESIGNATION COVERED  
 1 = L DESIGNATION VISIBLE  
 † ("MAT") CABLE

GAUGES	TABLE III CU PBN		
	L*	R/R1	Z
19 AND 22	0	1	2
19 AND 24	0	2	2
19 AND 25†	0	2	3
19 AND 26	0	3	3
22 AND 24	0	3	2
22 AND 25†	0	4	5
22 AND 26	0	4	3
24 AND 25†	0	4	4
24 AND 26	0	5	3
26 AND 25†	0	5	5

\* 0 = L DESIGNATION COVERED  
 1 = L DESIGNATION VISIBLE  
 † ("MAT") CABLE

## CHART 46

**PRESCRIPTION SETTINGS  
FOR 2-WIRE DX AND FX GAIN TRANSFER CHANNEL  
UNITS AND 837D/J99380AA IMPEDANCE COMPENSATOR USED  
WITH NONLOADED CABLE (DROP SIDE IMPEDANCE = 600Ω)**

CABLE LENGTH (KFT)	CHANNEL UNIT				IMPEDANCE COMPENSATOR (600 OHM SCREWS DOWN)		1 KHZ CKT LOSS (DB) (NOTE 2)	DX RLP (OHMS)
	PBN			SLOPE S2	BOR	R POTENTIOMETER		
	R/R1 (NOTE 1)	R2	Z					
26-GA								
8	6	7	0	0	114	32	8.3	800
9	6	7	0	0	114	30	8.8	900
10	6	8	2	1	114	28	9.3	1000
24-GA								
9	6	7	6	0	114	22	7.6	600
10	6	9	10	0	114	20	7.9	700
11	6	10	12	1	114	18	8.3	700
12	6	10	13	1	114	18	8.7	800
13	5	6	9	2	114	16	9.1	900
14	5	6	10	2	114	16	9.4	900
22-GA								
9	6	10	13	0	228	28	6.7	600
10	6	11	16	1	228	26	7.0	600
11	6	12	18	1	228	24	7.3	700
12	6	10	16	1	114	10	7.5	600
13	6	11	18	1	114	10	7.8	600
14	6	11	19	1	114	8	8.1	600
15	5	7	15	2	114	8	8.4	700
16	5	7	16	2	114	6	8.8	700
17	5	7	16	3	114	6	9.1	700
18	5	7	17	3	114	6	9.4	800

**Note 1:** Position the "L" switch to cover the "L" designation.

**Note 2:** Circuit loss does **not** include channel unit equalizer gain.

## CHART 47

**PRESCRIPTION SETTINGS  
FOR 2-WIRE DX AND FX GAIN TRANSFER CHANNEL  
UNITS AND 837D/J99380AA IMPEDANCE COMPENSATOR USED  
WITH NONLOADED CABLE (DROP SIDE IMPEDANCE = 900Ω)**

CABLE LENGTH (KFT)	CHANNEL UNIT				IMPEDANCE COMPENSATOR (600 OHM SCREWS DOWN)		1 KHZ CKT LOSS (DB) (NOTE 2)	DX RLP (OHMS)
	PBN			SLOPE	BOR	R POTENTIOMETER		
	R/R1 (NOTE 1)	R2	Z	S2				
26-GA								
8	7	15	12	0	114	36	7.9	900
9	6	7	0	0	114	34	8.4	900
10	6	8	2	1	114	34	8.8	1000
11	6	9	4	1	114	32	9.3	1100
24-GA								
9	6	6	5	0	114	30	7.3	700
10	6	8	9	0	114	28	7.7	700
11	6	9	11	1	114	26	8.0	800
12	6	10	13	1	114	24	8.4	800
13	6	10	13	2	114	24	8.8	900
14	5	6	10	2	114	24	9.3	900
22-GA								
9	6	9	12	0	228	36	6.5	600
10	6	11	16	1	228	34	6.8	600
11	6	11	17	1	228	34	7.1	700
12	6	10	16	1	114	18	7.4	600
13	6	11	18	1	114	18	7.7	600
14	6	11	19	1	114	16	8.1	600
15	6	11	19	1	114	16	8.4	700
16	5	7	16	2	114	16	8.8	700
17	5	7	16	3	114	14	9.1	700
18	5	7	17	3	114	14	9.4	800

**Note 1:** Position the "L" switch to cover the "L" designation.

**Note 2:** Circuit loss does **not** include channel unit equalizer gain.

CHART 48

PRESCRIPTION SETTINGS  
FOR 2-WIRE DX AND FX GAIN TRANSFER CHANNEL UNITS  
AND 837/J99380-TYPE IMPEDANCE COMPENSATORS USED WITH  
LOADED CABLE (END SECTION = 3 KFT) (COMPENSATORS ADJUSTED  
FOR 3-KFT END SECTION) (NOTES 1 AND 2)

CABLE LENGTH (KFT)	22-GA H88						24-GA H88						24-H88 ("MAT") CABLE			26-GA H88		
	737A B			837E, F/799380AB			837A, B			837E, F/J99380AB			837J			837G/J99380AC		
	CHANNEL UNIT PBN		1 KHZ CKT LOSS	CU PBN		1 KHZ CKT LOSS	CU PBN		1 KHZ CKT LOSS	CU PBN		1 KHZ CKT LOSS	CU PBN		1 KHZ CKT LOSS	CU PGN		1 KHZ CKT LOSS
	R/R1 (NOTE 3)	Z		R/R1 (NOTE 3)	Z		R/R1 (NOTE 3)	Z		R/R1 (NOTE 3)	Z		R/R1 (NOTE 4)	Z		R/R1 (NOTE 3)	Z	
12	2	2	2.1	3	2	2.3	4	2	2.9	5	3	3.1	5	0	5.7	7	3	6.4
18	2	2	2.9	3	2	3.1	5	3	4.2	5	3	4.5	7	1	7.0	7	4	8.4
24	3	3	3.8	3	3	4.0	5	3	5.6	5	3	5.9	7	1	8.4			
30	3	3	4.8	3	3	5.0	4	3	7.1	4	3	7.3	6	1	9.9			
36	2	2	5.7	2	2	5.9	4	3	8.5	4	3	8.7						
42	2	2	6.6	2	3	6.8												
48	2	2	7.5	2	3	7.6												
54	2	2	8.3	2	3	8.5												

**Note 1:** Set switch S2 to 1 for all cable gauges except 25-GA H88 (MAT) Cable. The setting for this gauge is 0. The 1 kHz circuit loss shown in dB does *not* include channel equalize gain.

**Note 2:** Set switch R2 to equal 0 (cover all numbers).

**Note 3:** Position the "L" switch to *cover* the "L" designation.

**Note 4:** Position the "L" switch to *expose* the "L" designation.