DIGITAL TRANSMISSION SYSTEMS
D4 CHANNEL BANK
SIGNALING COMPATIBILITY

1. GENERAL

1.01 The primary purpose of this section is to furnish information covering the signaling capabilities and limitations of the D4 channel bank of the T-Carrier System and to furnish signaling compatibility information for this channel bank with switching circuits.

1.02 This section is reissued to include the latest compatibility information. Since the changes are so numerous, revision arrows are not used.

Printed in U.S.A.

DWG ISS	CD ISS	DATE ISSUED	APPD
2	2	12-1-80	GKT
			RNB
			RLS

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COMMON SYSTEMS
DIGITAL TRANSMISSION SYSTEMS
D4 CHANNEL BANK
SIGNALING COMPATIBILITY
WITH SWITCHING CIRCUITS

AT&TCO STANDARD
SD-99421-11-A1
ISSUE 2

BELL TELEPHONE LABORATORIES,
INCORPORATED

PRINTED IN U.S.A.

89 PAGES

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GENERAL INFORMATION

1. DESCRIPTION OF THIS DRAWING

1.1 General

1.1.1 This document is intended to cover the signaling capabilities and limitations or the D4 channel bank of the T-carrier system and to furnish signaling compatibility information for this channel bank with switching circuits.

1.1.2 The issue 2 drawing covers the entire spectrum of D4 channel units, namely:dial pulse, revertive, multirrequency, E&M, foreign exchange, tandem, simplex, duplex, ringdown, pulse link repeater and transmission only channel units.

1.1.3 This document was issued primarily to assure signaling compatibility between switching systems and the D4 bank of T-carrier. A laboratory test and field trial program was undertaken to produce and verity the signaling compatibility information herein provided. Although a similar program was not undertaken to verify transmission, it is believed that all circuits and circuit arrangements herein described as compatible will meet any applicable transmission requirements. Channel unit options needed for proper transmission performance ot the channel units are covered in the D4 channel bank application schematic SD-3C304-01.

1.1.4 Any questions on signaling or transmission compatibility tor circuits connected to these channel banks should be brought to the attention of the local Bell Laboratories field Representative.

1.1.5 In the interest of economy, D4 type banks have been designed with limited DC signaling capabilities. These signaling design capabilities are described in section B of this drawing. Section B also includes general compatibility information and working limits for the various channel units.

1.1.6 Section C provides more detailed signaling compatibility information for certain switching circuits, particularly dial pulsing, E&M, and revertive pulsing circuits.

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1.1.7 Section D of this drawing lists the compatibility of switching circuits with D4 channel units according to switching circuit number. Section D lists each circuit as compatible (Yes or applicable channel unit) or not compatible (None) in the CHANNEL UNITS column. Most circuits that are listed as compatible show the channel unit or units with which they are normally compatible. Some circuits, such as senders or registers can be compatible with a wide variety of channel units so a (Yes) is shown and the choice of a particular channel unit depends on the type of signaling used. With some circuits certain features or options are needed to make the circuit compatible with T-carrier. In these cases, the conditions necessary for compatibility are given in the REMARKS column. For those circuits where a (None) is shown the reasons for the incompatibility are given in the REMARKS column. Where explanatory material about a circuit is given in Section B or C this will be referred to in the REMARKS column. For E&M lead channel units the type of interface is given in the REMARKS column (i.e., Type I, Type II or Type III). If no interface type is shown for an E&M lead channel unit it is automatically assumed to be a Type I interface.

1.1.8 When a switching circuit is listed in Section D, its compatibility has been determined on the basis of normal application of the channel units at both ends. Any known problems encountered under these conditions are listed and described in Sections B and C and are referred to in the REMARKS column in Section D. The use of the channel units in any other arrangement particularly to use the carrier for signaling conversion (e.g., loop to E and M lead) must be carefully studied to ascertain that no new problems are created.

1.1.9 If an existing switching circuit is not listed in Section D, the reason may be that the circuit does not normally connect to a carrier system or that no request has been received to determine its compatibility with the D4 bank.

1.1.10 When a trunk circuit is connected to metallic facilities the proper source of information for compatibility and options is the trunk circuit schematic drawing. If the trunk circuit is connected to the D4 Bank carrier facilities, then additional information may be needed for

proper signaling compatibility. This additional information will be found in the sections of this drawing (SD-99421-11). When this information apparently conflicts with the information given on the trunk circuit schematic drawing, the information given in this Signaling Compatibility drawing supersedes the trunk circuit drawing information.

2. DESIGN CAPABILITIES

2.1 DIAL PULSE ORIGINATING CHANNEL UNIT (DPO) SD-3C322-01

2.1.1 This circuit provides the interface between a dial pulse originating trunk circuit on the office side and the D4 bank common circuits on the line side. For signaling and supervision in the transmit direction, it converts high-low loop resistance conditions from the originating trunk circuit into a time slot signal for the D4 common circuits. For signaling and supervision in the receive direction, it converts a time slot signal from the D4 common circuits into reverse battery conditions toward the originating trunk circuit.

2.1.2 The dial pulse originating channel unit is generally applicable to the following one-way loop dial pulsing trunks.

(A) Open and closed pulsing with open and closed or high-low holding and reverse battery supervision.

(B) Battery and ground pulsing with open and closed or high-low holding and reverse battery supervision.

(C) Battery and ground pulsing with battery and ground holding and reverse battery supervision.

(D) 20 PPS dialing when pulsing is from an outgoing sender to an incoming register or sender.

(E) Reverse high-low 2-way trunk, such as between CDO and operator office: the operator office responds to reverse battery from the CDO and the CDO responds to high-low from the operator office.

GENERAL INFORMATION

2.1.3 The dial pulsing channel units are not generally applicable to trunks using the following supervisory arrangements.

(a) wet-dry

(b) low-high

2.1.4 These channel units are designed to work with trunk circuits that can provide battery on the ring conductor for on-hook polarity. These polarity requirements are generally met by the major systems. In those few cases where the trunk circuit cannot furnish the proper polarity by means of standard wiring options, it will be necessary to provide a tip and ring reversal on a job basis.

2.1.5 Troubles with false seizures and trunk pumping occur on disconnect when the DPO units are used with outgoing trunk circuits having an idle circuit termination (ICT) with 2 mF capacitance. To eliminate these troubles it is necessary to reduce the ICT capacitance to .5 mF or use the DPMO channel unit in the MF mode.

2.1.6 DPO channel units used in delay-dial trunks should preferably be collocated with the outgoing trunk circuit (no VFX). In delay dial trunks the idle circuit termination (ICT) in the outgoing trunk circuit should not exceed 0.5 mF. For those cases where a VFX is needed (up to 600 ohms) the outgoing trunk should not have an ICT. If it has one it may have to be removed. T-carrier provides its own ICT so transmission stability will not be a problem.

2.1.7 The DPO channel unit will be used in SXS offices where its ability to split the "S" lead from an outgoing trunk circuit and ground the switch side of the "S" lead during a carrier failure is needed. All common control and ESS offices do not require such control of the sleeve lead and should use the DPMO channel unit instead of the DPO unit.

GENERAL INFORMATION

2.2 DIAL PULSE/MULTIFREQUENCY ORIGINATING CHANNEL UNIT (DPMO) SD-3C333-01

2.2.1 This circuit provides optional interfaces between a dial pulse or MF originating trunk circuit on the office side and the D4 bank common circuits on the line side. For signaling and supervision in the transmit direction, it converts high-low loop resistance conditions from the originating trunk circuit into a time slot signal for the D4 common circuits. For signaling and supervision in the receive direction, it converts a time slot signal from the D4 common circuits into reverse battery conditions toward the originating trunk circuit.

2.2.2 The dial pulse multifrequency originating channel unit when used in the MF mode, contains transient protection permitting its use with an E&M channel unit at the terminating end. It contains fewer components than the DPO channel unit and can replace it as a dial pulse unit except for use with step-by-step outgoing trunk circuits which require a split "S" lead.

2.2.3 When the DPMO channel unit is used in the DP mode all the cautions and restrictions pertaining to the DPO channel unit given in Section B 2.1 also apply to the DPMO channel unit.

2.2.4 The DPMO channel unit in the MF mode should be used ror providing supervision on multifrequency pulsing trunks not using signaling means given in Section B 3.1.

2.3 SLEEVE-GROUND DIAL PULSE ORIGINATING CHANNEL UNIT (SDPO) SD-3C330-01

2.3.1 The purpose of this circuit is to provide an interface, between a step-by-step selector or a rotary-out-trunk switch (without the need for an outgoing repeater on the office side) and the D4 bank common circuits on the line side. It provides a ground on the sleeve lead when an incoming closure is detected. Also, it converts loop closure from the trunk circuit into signaling pulses for the D4 common circuits. For signaling and supervision in the receive direction, it converts a signal from the D4 common circuits into reverse battery conditions toward the trunk circuit.

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2.3.2 The sleeve-ground dial pulse originating channel unit is intended for use only with SXS where it can be used in lieu of an outgoing repeater and 2-wire DPO channel unit combination. The features of this unit permit its use in place of SXS repeater SD-31779-01 and other SXS repeaters having the same features as SD-31779-01.

2.3.3 This unit cannot be used with ground-start arrangements such as are provided by SD-30855-01.

2.3.4 Where sleeve-ground dial pulse channel units are used in lieu of outgoing repeaters in SXS offices and therefore furnish the sleeve holding ground, the sleeve lead resistance, and potential requirements specified in SXS line finder circuits must be met. If these limits cannot be met it will be necessary to use a sleeve repeating trunk circuit such as SD-31421-01.

2.3.5 The D4 bank unit SD-3C330-01 has some pulsing and supervisory ranges greater than those of SD-31779-01. Nominal release time for this unit is the same as that of SD-31779-01 but variations from unit to unit are smaller than with SD-31779-01.

2.3.6 The D4 SDPO channel unit may be used as a DPO unit, as is, since the S&E Leads are separate entities. Use of the SDPO channel unit as a DPO unit should be limited since it increases power consumption.

2.4 DIAL PULSE TERMINATING CHANNEL UNIT (DPT) SD-3C323-01

2.4.1 This circuit provides the interface between a dial pulse or multifrequency terminating trunk circuit on the office side and the D4 bank common circuits on the line side. For signaling and supervision in the transmit direction, it converts a battery reversal from the terminating trunk circuit into a time slot signal for the D4 common circuits. For signaling and supervision in the receive direction, it converts a time slot signal from the D4 common circuits into a loop closure toward the terminating trunk circuit.

2.4.2 The dial pulse terminating channel unit is generally applicable to one-way loop dial pulsing trunks as well as one-way multifrequency trunks.

GENERAL INFORMATION

2.4.3 Although T-carrier is generally incompatible with wet-dry signaling, it can be used between outgoing facilities having wet-dry supervision and incoming facilities having reverse battery supervision with somewhat unorthodox use of T-carrier channel units. For this case a dial pulse terminating unit is used at each end.

2.4.4 T-carrier can also be used with some facilities using high-low reverse battery supervision, where reverse battery is sent forward and the far end returns high-low supervision. For this use it is necessary to reverse the DP units, using the terminating unit at the originating end and using the originating unit at the terminating end.

2.4.5 It should be noted that where a dial pulse terminating unit is used at the originating end, the voice frequency path will not be closed until off-hook (answer) supervision is received from the terminating end.

2.5 REVERTIVE PULSE CHANNEL UNIT

RPO SD-3C340-01, RPT SD-3C341-01

2.5.1 The revertive-pulse originating (RPO) channel unit and the revertive-pulse terminating (RPT) channel unit are generally capable of working with any combination of the following switching offices.

ORIGINATING OFFICE

GCO Panel
BCO PANEL
No. 1 Crossbar
No. 4 Crossbar
No. 5 Crossbar
Crossbar Tandem
Panel Sender Tandem
Office Selector Tandem (Distant Office Selector)
No. 1 ESS
No. 2 ESS

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TERMINATING OFFICE

GCO Panel with Repeating Incoming Selectors
BCO Panel
No. 1 Crossbar
No. 5 Crossbar
Crossbar Tandem
Office Selector Tandem (Distant Office Selector)
No. 1 ESS
No. 2 ESS

They are not applicable to the following trunks.

(A) Incoming trunks to GCO panel direct incoming selectors in general.

(B) Incoming trunks to tandem offices in which remote control zone registration is used.

2.5.2 T-carrier can be used between an office selector tandem selector (distant office selector) circuit, SD-21733-01 or SD-21092-01 and a terminating panel office, if the loop between the originating panel office and the T-carrier at the office selector tandem does not exceed 7 miles, 600 ohms. For this usage, the office selector tandem selector should provide 900 ohms compensation (D resistance) for office selections and 0 ohms compensation (C resistance) for selections beyond. No additional voice frequency extension is permissible at the terminating end of the T-carrier.

2.5.3 Similarly, T-carrier can be used between an originating panel office and an office selector tandem selector circuit, SD-21733-01 or SD-21092-01 but the loop to the terminating office should not exceed 3 miles, 600 ohms. No additional voice frequency extension is permissible at the originating end of the T-carrier.

2.5.4 The revertive pulse channel units may be used in place of dial pulse channel units.

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2.6 E&M LEAD CHANNEL UNITS, 4-WIRE SD-3C324-01, 2-WIRE 900 OHMS SD-3C327-01, 2-WIRE 600 OHMS SD-3C337-01,-02 AND 4W E&M-ER SD-3C332-01

2.6.1 These circuits provide the interface between E and M lead trunk circuits on the office side and D4 bank common circuits on the line side. For signaling and supervision in the transmit direction, they convert battery and ground conditions on the M lead from the trunk circuit into signaling pulses for the D4 common circuits. For signaling and supervision in the receive direction, they convert signaling pulses from the D4 common circuits into open and ground conditions on the E lead to the trunk circuits. Proper interface with Type I, II, or III E&M signaling leads is provided by applying appropriate options.

2.6.2 Full duplex two-way dialing trunks may be obtained with two-way trunk circuits and E and M lead signaling. The channel units with E and M lead signaling are generally capable of working with all E and M lead trunk circuits. The 4-wire E&M lead channel unit has built-in amplifiers which provide for -16 and +7 dB levels and are suitable for intertoll use. The two-wire E&M lead channel unit has a built-in terminating set but has no amplifiers and no provision for a precision net. They have a built-in capacitor with optional connections to the A and B leads. The capacitor should be used only if no capacitor is provided in the associated trunk circuit.

2.6.3 The E&M lead channel units are capable of working with either the originating or terminating dial pulse channel units in such a way as to effectively make a T-carrier channel an E and M to loop, or loop to E and M converter. The DPMO channel unit has been recommended for all applications between common control central offices, where the need for loop-to-E&M conversions exist, because of its superior transient suppression capabilities in the MF mode. However, should the need for loop-to-E&M conversion arise in the DPMO's dial pulse mode or with the DPO channel unit from a SXS office, the cautions recommended in the D3 compatibility drawing, SD-99421-10, should be observed.

2.6.4 T-carrier can be used as an E and M lead to loop converter on one-way toll connecting trunks from Crossbar No. 4A to either Crossbar No. 1 or Crossbar No. 5

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provided the incoming trunk circuit is arranged for wink-start and the 4A trunk circuit is one of the following:SD-68513-01, SD-68514-01, SD-68595-01, SD-68596-01. Wink-start also is preferred for economic reasons when using these trunk circuits to ESS No. 1 because delay dial circuits require twice the space and cost 50 percent more than wink start circuits.

2.6.5 T-carrier can be used as an E and M lead to loop converter on non-coin, operator assistance or special toll trunks such as Crossbar No. 5 Outgoing Trunk Circuit SD-27550-01 connected to TSPS Incoming Trunk Circuit SD-1B003-01 if the incoming register is wired to send a wink (timed reverse battery) for the ringback signal.

2.6.6 A 2-way trunk glare detection feature has been added to certain No. 5 Crossbar trunks to reduce the possibility of glare on delay dial trunks in which the transit time for signals has been markedly increased by the use of such signaling systems as E and F type signaling. As the signal transit time for T-carrier is low this feature is not needed and should not be used with T-carrier on delay-dial trunks but can be used with wink-start trunks.

2.6.7 The channel units with E and M lead signaling together with standard E and M lead converters already available may be used to provide many signaling arrangements. These applications may include foreign exchange lines, ringdown trunks, etc.

2.6.8 The channel units with E and M lead signaling may also be used with appropriate trunk circuits to provide trunks to assistance operators where it is necessary to handle one or more of the following signals.

(a) Ring forward (rering)

(b) Controlled ringing start signal

(c) Forward flashing

(d) Flashing supervisory signals

(e) Coin collect and return signals

GENERAL INFORMATION

2.6.9 The T-carrier E&M lead channel units can be used where only their transmission capability is required. In this case either no signaling is required or it is provided by the E, F or G type SF units operating inband.

2.7 FOREIGN-EXCHANGE STATION-END CHANNEL UNITS (FXS) 4-WIRE SD-7C024-01, 2-WIRE SD-3C325-01,-02 AND LOOP START SD-3C338-01

2.7.1 The foreign-exchange station-end (FXS) channel units provide the interface between the station end of special services (foreign exchange lines, off-premises extension or PBX-CO trunks, ground- or loop-start) and the D4 bank common circuits. For signaling and supervision in the transmit direction, these units convert loop closure and ring ground states of the trunk circuit (or station) into signaling logic states for the D4 common circuits. For signaling and supervision in the receive direction, these units convert signaling logic states from the D4 common circuits into tip ground and repeated ringing toward the trunk circuit or station.

2.7.2 These units provide 250/250 ohm talking battery to the loop or trunk (battery on ring, ground on tip).

2.7.3 The D4 foreign exchange channel units are capable of working with 2-wire and 4-wire facilities operating on either a ground-start or a loop-start basis. Ringing is detected at the office end and signals are sent to the customer end where local ringing is applied to the line. Ring-trip can take place during either ringing or silent intervals. These units can be used with some one-way ringdown trunk circuits.

2.7.4 The D4 FXS channel units have a few shortcomings. These are:

1. The units cannot transmit reverse battery, thus being incompatible with some circuits using this feature for toll diversion.

2. The units cannot ring into an off-hook at the customer end.

GENERAL INFORMATION

3. The units are not compatible with D1A FX units over tandem facilities. The general rule is that when tandem T-carrier links are used for FX service and the one FX end is a D1A channel bank, then the other FX end must be D1A, D1B, or D1D - it cannot be D3 or D4. It should be noted that if the FXS-end channel bank is D1B or D1D, the FXS unit must have D1A options selected and will not provide forward disconnect.

4. When the FX channel units are being used with call transfer from 800 and 770 type PBXs into an MFT sometimes the CO trunk is disconnected when using ground-start. A switch to loop-start operation cures this problem. When FX channel units are being used in this manner the loop-start units (FXS) and (FXO) provide a definite advantage in making these applications work. In fact, the reason the loop-start channel units were developed is that it was estimated they should satisfy some 80-90 percent of FX applications at an economic savings to the TelCo.

5. The D4 FX channel units have a signaling format compatible with the D2 SA (Special Access) channel units. An incompatibility can sometimes exist, however, when a D4 "FX OFF" unit is used with a D2 "SA STA" unit at opposite ends of a T-Carrier system. The problem occurs when a tip party test is made at the office end of the circuit as in automatic number identification. To prevent a call processing failure during a tip party test, the FX circuit should not recognize a momentary removal (less than 125 ms) of tip ground. This is accomplished in a D2 SA circuit by providing a delayed release of the tip ground signal in the "SA OFF" channel unit, whereas a D4 FX circuit provides the delay in the "FX STA" channel unit.

   The lack of adequate delay upon release of tip ground with the D2 "SA STA" to D4 "FX OFF" combination has been now corrected by a redesign of the D2 "SA STA" channel unit. This was considered the most desirable way to provide compatibility because this channel unit required other changes on a Class A basis. As a result, all "SA STA" channel units will be compatible with the D4 "FX OFF" unit when this change is incorporated. The change is covered by CCN 196MV and the

modified units are coded Series 2.

6. The Loop Signaling repeater (LSR) is not compatible with the D4 FXO channel unit on an off-premises station line where the LSR is between the FXO and the PBX. In this case the LSR has the chance to stretch the false pulse (pulse correcting circuit) almost guaranteeing pre-trip. Installations with the LSR at the FXS end do not have this problem.

7. The 50A-Customer Premises System (CPS) should not interface with D4 FX channel units because the wink returned from an ESS office will either be totally ignored due to transient protection built into the FXS channel units, or it will be stretched by the nominal inherent delays of the channel unit relays resulting in an attendant disconnect. It is therefore recommended that an alternate trunk configuration other than the use of FX channel units be provided for this service.

8. The early production FXS units (List 1 and 2) are not compatible with dial long line circuits in the central office regardless of whether the dial long line circuit has, or does not have, a pulse corrector. The reason is the false closure or the LC relay contacts of the FXO unit generated when the RG relay of the FXS unit transfers from the ringing to the silent interval of the ringing cycle. This closure makes operating with dial long line circuits, particularly those provided with pulse correctors, subject to false tripping of the central office ringing. The new (list 3 and later J98726BD) cost reduced FXS units no longer have this restriction. The FXS-LS never did.

2.8 FOREIGN-EXCHANGE OFFICE-END CHANNEL UNITS (FXO) 4-WIRE SD-7C025-01, 2-WIRE SD-3C326-01, AND LOOP START SD-3C339-01

2.8.1 The foreign-exchange office-end (FXO) channel units provide the interface between the office end of special service facilities (foreign exchange lines, off-premises extension or PBX-CO trunks, ground- or loop-start) and the D4 bank common circuits. For signaling and supervision in the transmit direction, these units convert tip ground states and ringing states of the office circuits into

signaling logic states for the D4 common circuits. For signaling and supervision in the receive direction, these units convert signaling logic states from the D4 common circuits into ring ground and loop closure toward the office circuits.

2.8.2 The D4 foreign-exchange channel units are capable of working with 2-wire and 4-wire facilities operating on either a ground-start or loop-start basis. Ringing is detected at the office end and signals are sent to the customer end where local ringing is applied to the line. Ring-trip can take place during either the ringing or silent interval.

2.9 Duplex Channel Units (DX) 2W DX SD-7C026-01 and 4W DX SD-7C027-01

The D4 Two-Wire and D4 Four-Wire Duplex (DX) channel units are designed to provide a DX capability for the T-carrier system. Their principle use will be on PBX tie trunks. The DX channel units will provide the following, (a) transmission level adjustment and impedance matching between a metallic facility and the D4 common equipment, (b) conversion from DX signaling to pulse information on the TNSA lead, (c) conversion from pulse information on the RDA Lead to DX signaling and (d) carrier failure M lead conditioning.

2.10 4-WIRE, 600 OHM, TANDEM CHANNEL UNIT (TDM) SD-7C028-01

2.10.1 The D4 4-Wire, 600 Ohm Tandem channel unit is designed to enable two T-carrier systems to operate in a tandem fashion with either two or three-state signaling. Connection of two carrier systems in a tandem fashion requires two tandem units. The D4 tandem unit and the D3 and D1 tandem units have identical equipment interfaces, hence a D4-D4 connection requiring two D4 tandem units, or a D4-D3 or a D4-D1 connection requiring one D4 and one D3 or D1 tandem unit can be effected. Tandem unit signaling is compatible with existing carrier group alarm conditioning circuits. The tandem channel units cannot be used with revertive pulsing because they introduce an additional 6 ms delay which is not tolerable in most revertive pulsing systems.

GENERAL INFORMATION

2.10.2 The tandem unit provides a 4-wire transmission path and also incorporates primary and secondary channel signaling. The primary signaling channel uses the E and EX leads; the E lead sending open/ground, the EX lead detecting open/ground. The secondary signaling channel uses E1 and EX1 leads which are simplexed onto the T and R, and T1 and R1 leads respectively, the E1 lead sending open/ground and the EX1 lead detecting open/ground.

An open-ground signaling format was chosen so that the present D1 carrier group alarm (CGA) circuit could be used to condition the signaling leads in the event of a carrier failure, including a D1-D4 tandem connection. The D1 CGA has several failure options, all of which require open-ground signaling. The secondary channel signaling information which is transmitted over the voice frequency (VF) transmission path travels in the opposite direction from the associated VF information because the D1 CGA opens only the T and R transmission leads to a unit, and the alarm information is needed in the reverse direction to allow proper CGA processing in the D1 bank.

Compatibility with existing channel units requires that the primary signaling channel have the capability of representing the idle state to the channel bank equipment as either a logic "1" or "0" from an E lead consisting of either open or ground. Conversely, an E lead must be able to output an open on a ground from a channel bank logic "1" or "0". Screw options are provided to furnish either one of two modes, E or E'. The E mode implies that an open is equivalent to RDA = 1, and a ground equivalent to RDA = 0. The E' mode implies the inverse of the E mode. The secondary signaling channel is restricted to the E' mode.

2.11 PULSE LINK REPEATER CHANNEL UNIT (PLR) SD-3C331-01

2.11.1 The D4 4-Wire 600 ohm Pulse Link Repeater channel unit when used in conjunction with a 4-wire 600-ohm E&M lead unit in another carrier system provides a straightforward means of forming a tandem connection of the two systems with two-state signaling. The PLR channel unit can be directly connected to any E&M lead signaling device which has a 4-wire, 600-ohm transmission path with the standard -16, +7 dB level points (TLPs) at the voice frequency (VF) metallic interface.

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2.11.2 For a Type I interface, these circuits interface the D4 bank common equipment to the VF and signaling information present at the metallic interface, which is composed of the T, R, T1, R1 and E&M leads. These six leads terminate in an E&M signaling unit in another carrier system. Additionally, looped signaling capability has been included in the PLR which allows the unit to be used with a Type II signaling interface. In the looped signaling mode, the SB and SG leads are included in the wiring to the companion E&M signaling unit to provide the required signaling lead return paths.

2.12 TRANSMISSION ONLY CHANNEL UNITS

2.12.1 2-Wire 900 Ohm Transmission Only Channel Unit (2WTO) SD-7C031-01

The D4 2-Wire 900 ohm Transmission Only channel unit will provide the interface between a D4 channel bank and a two wire voice frequency extension on private lines with no signaling. It provides transmission level adjustment and impedance matching between a metallic facility and the D4 common equipment.

2.12.2 4-Wire 600 Ohm Transmission Only Channel Unit (4WTO) SD-7C030-01

The D4 4-Wire 600 Ohm Transmission Only Channel Unit will provide the interface between a D4 channel bank and a four wire voice frequency extension on private lines with no signaling. This unit can also be used on tandem carrier circuits utilizing end-to-end SF signaling. It provides transmission level adjustment and impedance matching between an F-signaling unit or a metallic facility and the D4 common equipment.

2.12.3 4-Wire Equalized Transmission Only Channel Unit (4W ETO) SD-7C037-01

The D4 4-Wire Equalized Transmission Only Channel Unit will provide a 4-wire ETO capability for the T-Carrier System. The principle use will be as a digital/analog carrier interface, and on tandem digital carrier circuits both utilizing end-to-end SF signaling and on private lines with no signaling. It incorporates a modified 4182C network which

provides high and low frequency equalization to the transmit portion of the channel unit.

2.13 Ringdown and Private Line Automatic Ringdown (RD/PLAR) Channel Units 2W SD-7C035-01 and 4W SD-7C036-01

In the ringdown mode the D4 Two-Wire 900 ohm Ringdown/PLAR channel unit and the D4 Four-Wire 600 ohm Ringdown/PLAR channel unit are designed for D4 special service applications requiring one-way and two-way ringdown signaling. These applications include ringdown tie trunks, two point private line services and multipoint private line services.

In the PLAR mode the D4 Two-Wire 900 ohm Ringdown/PLAR channel unit and the D4 Four-Wire 600 ohm Ringdown/PLAR channel unit are designed for intercom like service where two station sets or PBX switchboards are tied together through nonswitched central office equipment, D4 PLAR units, and T1 carriers. When one of the stations goes off-hook, the other station rings with two second on four second off ringing until it goes off-hook. During ringing a summed 440 and 480 Hz audible ringing tone is sent back by the called (on-hook) PLAR to the calling PLAR.

2.14 Loop Simplex Originate Channel Unit (LSO) SD-3C392-01

The D4 Four-Wire Loop Simplex Originate Channel Unit provides an interface between TSPS originating circuits on the office side and D4 common circuits on the line side. Signaling and supervision in the receive direction converts signaling logic states from the common circuits to either normal or reverse battery conditions on the SX signaling pair or through the transformer in the simplex mode.

GENERAL INFORMATION

3. DESIGN LIMITATIONS OF THE D4 BANK

3.1 General

The D4 channel bank cannot function with the following signaling means:

(A) PCI

(B) Reverse battery forward

3.2 Satellite Transmission Facilities

Use of a satellite link in the transmission facility requires increased trunk guard time and anti-pumping features in the trunk circuit because of the long propagation time in the satellite link. Trunk circuit options providing these features must be used when there is a satellite link in the transmission facility.

3.3 End-to-End Compatibility

It snould be noted that although two trunks circuits may be individually compatible with carrier channel units, the trunk circuits may not be compatible with each other. When the carrier system is used to interconnect two trunk circuits which would not have been compatible over metallic facilities care must be taken to check that each signal furnished by the trunk circuit to one end of the carrier system results in the required signal being received by the distant trunk circuit and in the proper sequence. Furthermore any false signals generated by either trunk circuit must be properly ignored by the other. In particular use of the carrier system as a converter to interconnect loop trunk circuits to E and M lead trunk circuits requires that these checks be made.

GENERAL INFORMATION

3.4 Transmission

Since the D4 bank is basically a 4-wire system with separate transmit and receive paths it accommodates itself directly to 4-wire transmission. If 2-wire transmission is required, the voice frequency signals are first split into two transmission directions by a transformer hybrid circuit in the 2-wire channel unit. Trunk circuits arranged to transform a 2-wire circuit to a 4-wire circuit by means of hybrid repeat coils should not connect to T-carrier channel units which also have 2- to 4-wire hybrid transformers. The multiple repeat coils result in poor return loss. The following trunk circuit Schematic Drawings are in this category, 68242-01, 68325-01, 68326-01, 68480-01, 68961-01, and 68962-01.

Some trunk circuits which function with external repeat coils or hybrid coils provide a hard-wired mid-point capacitor across the A and B leads. To assure proper transmission and signaling any parallel capacitor on the A and B leads in the repeat coil or hybrid coil circuit should be removed. The following trunk circuit Schematic Drawings are in this category, 31749-01 and 31775-01.

3.5 Compatibility With D1, D2, and D3 Channel Banks

The D4 channel bank is compatible with all D1D, D2, or D3 type channel banks at the far end of the PCM system. The D4 coding format is also compatible with the digroup terminal in No. 4 ESS. The D4 bank is not compatible with D1A and D1B banks since they use a different format.

3.6 Off-hook Idle

Even though the D4 bank is completely capable of working with off-hook when idle trunks, it is not allowed from a maintenance standpoint.

4. WORKING LIMITS OF T-CARRIER D4 CHANNEL UNITS

It should be noted that the use of a voice frequency extension (VFX) with any channel unit may require extension of leads to the carrier group alarm circuit. The present carrier group alarm arrangements do not provide for this.

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4.1 Working Limits for DPO Channel Unit

OFFICE BATTERY	43/53V
MAX LONGITUDINAL AC*	60V RMS

MAX EXTERNAL CKT RES

LOOP SUPV	2500 OHMS
B/G SUPV	5000 OHMS

* Longitudinal ac voltage is measured by disconnecting T and R of cable from channel unit and connecting T and R together to ground through 500 ohms resistance. AC voltage is measured across the 500 ohms resistance.

MAXIMUM VOICE FREQUENCY EXTENSION FOR DIAL PULSING

OFFICE BATTERY	48/52V
RESISTANCE	600 OHMS
LOOP LENGTH	7 MILES
MIN LEAK RES	30,000 OHMS

4.1.1 The 600-ohm limitation on the originating end is to prevent trunk pumping on disconnect when the calling customer disconnects first. If trunk pumping is not a problem, VFXs of up to 1500 ohms would be possible before dial pulse distortion would become a limiting factor.

4.2 Working Limits for DPMO Channel Unit SD-3C333-01

OFFICE BATTERY	43/53V
MAX. LONGITUDINAL AC*	60V RMS

GENERAL INFORMATION

MAX EXTERNAL CKT RES

LOOP SUPV	2500 OHMS
B/G SUPV	5000 OHMS

* Longitudinal ac voltage is measured by disconnecting T and R of cable from channel unit and connecting T and R together to ground through 500 ohms resistance. AC voltage is measured across the 500 ohms resistance.

MAXIMUM VOICE FREQUENCY EXTENSION FOR DIAL PULSING

OFFICE BATTERY	48/52V
RESISTANCE	600 OHMS
LOOP LENGTH	7 MILES
MIN LEAK RES	30,000 OHMS

4.2.1 The 600-ohm limitation on the originating end is to prevent trunk pumping on disconnect when the calling customer disconnects first. If trunk pumping is not a problem, VFXs of up to 1500 ohms would be possible before dial pulse distortion would become a limiting factor.

4.3 Working Limits for SDPO Channel Unit SD-3C330-01

OFFICE BATTERY	43/53V
MAX. LONGITUDINAL AC*	60V RMS

* Longitudinal ac is measured by disconnecting T and R of cable from channel unit and connecting T and R together to ground through 500 ohms resistance. AC voltage is measured across the 500-ohm resistance.

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MAXIMUM EXTERNAL CIRCUIT RESISTANCE

LOOP SUPERVISION	2500 OHMS
B/G SUPERVISION	5000 OHMS

MAXIMUM CONDUCTOR LOOP WITH 48/52V

CUSTOMER LOOP PULSING	1500 OHMS
TRUNK B/G PULSING	2000 OHMS

4.3.1 The sleeve lead resistance and potential requirements specified in the circuit drawing notes for the SXS linefinders in the particular installation must be met.

4.4 Working Limits for DPT Channel Unit SD-3C323-01

OFFICE BATTERY	43/53V
MAX. LONGITUDINAL AC*	120V RMS

MAXIMUM EXTERNAL CKT RESISTANCE

SUPERVISION	3000 OHMS

* Longitudinal ac voltage is measured at the tip and ring terminal of the channel unit to ground with the tip and ring leads at the distant end grounded through low impedances.

MAXIMUM VOICE FREQUENCY EXTENSION FOR DIAL PULSING WHEN PULSING DIRECTLY INTO SELECTORS AND CONNECTORS

OFFICE BATTERY	48/52V
RESISTANCE	600 OHMS
LOOP LENGTH	7 MILES
MIN LEAK RES	30,000 OHMS

GENERAL INFORMATION

4.4.1 The 600-ohm limitation on the terminating end is for dial pulse distortion.

4.4.2 The maximum voice frequency extension at the terminating end when working into a pulse correcting repeater depends on the pulsing capability of the repeater and the make-up of the intervening transmission facility.

4.5 Working Limits for RPO Channel Units SD-3C340-01 Revertive Pulsing

WORKING LIMITS AT 43/53V

MAX EXT CKT RES (SUPV)	2000 OHMS
MIN EXT CKT RES (FOR TG TEST)	16,250 OHMS

MAXIMUM VOICE FREQUENCY EXTENSION - (VFX MAY BE USED AT ONE END ONLY)

RESISTANCE	600 OHMS
MILES	7
MIN LEAK RES	100,000 OHMS

4.6 Working Limits for RPO Channel Units SD-3C340-01 When Used as DP Units

USE WITH LOOP SUPV. ONLY
WORKING LIMITS AT 43/53V

MAX EXT CKT RES (SUPV)	2000 OHMS

MAXIMUM VOICE FREQUENCY EXTENSION WITH DIAL PULSING

RESISTANCE	600 OHMS
MILES	7
MIN LEAK RES	30,000 OHMS

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4.7 Working Limits for RPT Channel Units SD-3C341-01

Revertive Pulsing

WORKING LIMITS AT 48/52V

MAX EXT CKT RES (SUPV)	2000 OHMS

MAXIMUM VOICE FREQUENCY EXTENSION
(VFX MAY BE USED AT ONE END ONLY)

RESISTANCE	600 OHMS
MILES	3
MIN LEAK RES	70,000 OHMS

4.8 Working Limits for RPT Channel Units SD-3C341-01 When Used as DP Units

WORKING LIMITS AT 43/53V

MAX EXT CKT RES (SUPV)	2000 OHMS
MIN LEAK RES	30,000 OHMS

MAXIMUM VOICE FREQUENCY EXTENSION WITH DIAL PULSING

RESISTANCE	200 OHMS

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4.9 Working Limits for E&M Lead Channel Units SD-3C324-01, SD-3C327-01 and SD-3C337-01

MAXIMUM M-LEAD RESISTANCE FOR TYPE I, II, OR III INTERFACE

M-LEAD	250 OHMS
SB-LEAD	250 OHMS
SG-LEAD	250 OHMS
OFFICE BATTERY	43/53V
EARTH POTENTIAL	+ or - 5 VOLTS

The allowable E-lead resistance is controlled by the switching circuit.

4.10 Working Limits for FX Station-End Channel Units 4W SD-7C024-01 and 2W SD-3C325-01,-02

MAX CONDUCTOR LOOP AT 43/53V

SUPERVISION		2000 OHMS
RINGING		2000 OHMS
TRIPPING		2000 OHMS
PULSING AT 48/52V	12 PPS	1300 OHMS
MIN LEAK RESISTANCE		15,000 OHMS
MAX NUMBER OF RINGERS		FIVE

GROUND START LIMITS AT 43/53V

MAX EXT CKT RES TO GROUND EARTH POT.	RESISTANCE
-5 TO +20 VOLTS	1500 OHMS

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4.10.1 The maximum longitudinal AC induction the FXS channel unit can stand is 60v rms in the loop signaling mode and the ground start mode. This is measured with a high impedance rms voltmeter to ground with the far end T&Rs both grounded.

4.10.2 One E6 repeater may be used at any point in the customer-end loop or the line-end loop or both. Use of a repeater will reduce the conductor loop limits by 300 ohms.

4.11 Working Limits for FX Office-End Channel Units 4W SD-7C025-01 and 2W SD-3C326-01

MAX CONDUCTOR LOOP

RINGING	84V AC	1300 OHMS*
PULSING AT 48/52V	12 PPS	1300 OHMS**

*LIMITED BY CO TRIPPING RANGE

**PULSING LIMITED BY CO CAPABILITY

GROUND START LIMITS at 43/53V

MAX EXT CKT RES TO GROUND

EARTH POT.	RESISTANCE
-5 to +20 VOLTS	850 OHMS

4.11.1 The maximum longitudinal AC induction the FXO channel unit can stand is 120v rms in the loop signaling mode and 60v rms in the ground start mode. This is measured with a high impedance rms voltmeter to ground with the far end T&Rs both grounded.

4.11.2 One E6 repeater may be used at any point in the subscriber end loop or the line end loop or both. Use of a repeater will reduce the conductor loop limits by 300 ohms.

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4.12 Working Limit for FXS-Loop Start Channel SD-3C338-01

MAX CONDUCTOR LOOP AT 43/53V

SUPERVISION		2000 OHMS
RINGING		2000 OHMS
TRIPPING		2000 OHMS
PULSING AT 48/52V	12 PPS	1300 OHMS
MIN LEAK RESISTANCE		15,000 OHMS
MAX NUMBER OF RINGERS		FIVE

SEE NOTES 4.10.1 and 4.10.2

4.13 Working Limit for FXO-Loop Start Channel Unit SD-3C339-01

MAX CONCUCTOR LOOP

RINGING	84 VAC	1300*
PULSING AT 48/52V	12 PPS	1300 OHMS**

*LIMITED BY CO TRIPPING RANGE

**PULSING LIMITED BY CO CAPABILITY

SEE NOTES 4.11.1 AND 4.11.2

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4.14 Working Limits for 4-Wire 600-Ohm TDM Channel Unit SD-7C028-01

MAX CONDUCTOR LOOP RESISTANCE	
VIA THE SIMPLEXES	5K OHMS
MIN LEAK RESISTANCE	30K OHMS

4.15 Working Limits for 4-Wire 600-Ohm PLR Channel Unit SD-3C331-01

MAX CONDUCTOR E-LEAD RESISTANCE	500 OHMS
MIN LEAK RESISTANCE	30K OHMS

4.16 Working Limits for DX Channel Units 2W SD-7C026-01 and 4W SD-7C027-01

MAX SIG LEAD RES	5K
MIN LEAKAGE RES	30K

4.17 Working Limits for Ringdown/PLAR Channel Units 2W SD-7C035-01 and 4W SD-7C036-01

Ringdown MAX Conductor Loop at 43/53V

20-Hz Ringing	86V RMS	2200-ohms
30-Hz Ringing	105V RMS	2200-ohms

MAX LONGITUDINAL AC 40V RMS

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4.18 Working Limits for LSO Channel Unit SD-3C392-01

OFFICE BATTERY	43/53V
MAX LONGITUDINAL AC	60V RMS

MAX EXTERNAL CKT RES

LOOP SUPV	2500 OHMS
B/G SUPV	5000 OHMS

MAX VOICE FREQUENCY EXTENSION FOR DIAL PULSING

OFFICE BATTERY	48/52V
RESISTANCE	1500 OHMS
MIN LEAK RES	30,000 OHMS

DETAILED CIRCUIT INFORMATION

1. DIAL PULSE CHANNEL UNITS

1.1 Dial Pulse Channel Units With Senders and Registers

The D4 channel bank is generally compatible with senders and registers within the limitations described below.

1.2 False Operation of the Sender (TG) Relay

1.2.1 The TG test made by senders includes a test of the loop for continuity to battery and ground at the terminating end. The TG test is nullified by the T-carrier because the terminating channel unit cannot recognize an open tip or ring condition and consequently normal battery and ground are seen at the originating end.

1.2.2 On calls from Crossbar No. 5 or Crossbar Tandem to Step-by-Step, the sender upon encountering a trunk pair open at the terminating end, will not detect the open and will proceed to pulse into the open trunk. At the end of pulsing, the sender will disconnect itself and return the trunk conductors to the outgoing trunk circuit. The customer will be left high and dry until he hangs up. These failures will continue until the open condition is detected by trunk test maintenance routines or by service observing. On calls from Crossbar No. 5 or Crossbar Tandem to Crossbar senders or registers, the failure of the TG relay to detect an open trunk pair is not as serious because the sender cannot proceed to pulse outward until the change from an off-hook (reverse battery) to an on-hook from the terminating end is detected by the (OF) relay. Therefore, the sender will time out and score the failure on a register, or if the time-out feature is canceled, the sender will become stuck until the trouble is found and cleared.

1.3 Twenty PPS Dialing

Twenty PPS dialing may be used when outgoing to incoming senders or registers.

1.4 Dial Pulse Channel Units With SXS Repeaters

In repeaters where the (A) relay is tuned to meet pulse repeating requirements with simulated trunk conductors, (Figure 1 of BSP 040-012-711), the originating channel unit should be considered to be the distant office relay. The

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channel unit should be removed when testing or adjusting the outgoing repeater for its pulse repeating requirements. Detailed information on the operation of T-carrier with the more common SXS repeaters is given below. Less common SXS repeaters in general have pulsing and supervisory features similar to one of the more common repeaters covered below and should be treated accordingly.

1.5 Step-by-Step Outgoing Repeater SD-31779-01 - Options

1.5.1 Note: On new installations where the features of SD-31779-01 are adequate, the sleeve ground dial pulse originating channel unit SD-3C330-01 should be used in place of the carrier channel unit -SXS repeater combination.

1.5.2 When working with T-carrier and regardless of the terminating switching circuit, SD-31779-01 should be wired with Q and V options and the (A) relay of SD-31779-01 should be tuned to 48 to 78 percent break measured on the contacts of the test set (A) relay. These options provide 550/550 ohm battery - ground pulsing with no compensating resistance in the supervisory loop. The options that provide 150/150 ohm battery-ground pulsing are satisfactory from a pulsing standpoint but may increase impulse noise.

1.6 Step-by-Step Outgoing Repeater SD-31779-01 - Compatibility

The presently allowed arrangement whereby SD-31779-01 can connect through to panel and crossbar No. 1 subscriber senders is incompatible with T-carrier and should not be used. With this arrangement SD-31779-01 is connected to make busy circuit SD-30855-01 at the originating office which is then connected over the trunk conductors to incoming repeater SD-95413-01 which then repeats the pulses to the originating sender. This arrangement is not compatible with T-carrier because SD-95413-01 requires ground start operation which T-carrier cannot provide.

Second dial tone arrangements into crossbar tandem or crossbar No. 5 are also incompatible with T-carrier because these arrangements usually involve the ground start arrangement of SD-30855-01 to hold the originating end busy until full release of the terminating circuits has taken place on disconnect. All other presently used terminations are believed to be compatible when the options of Section C

DETAILED CIRCUIT INFORMATION

1.5.2 are used.

1.7 Step-by-Step Outgoing Repeater SD-31779-01 - Working Limits

When T-carrier is connected between SD-31779-01 and any of its trunk terminations, a VFX of up to seven miles, 600 ohms can be used either at the originating or terminating end of the T-carrier, but not at both ends. However, when connected to SXS repeaters and selectors the use of VFX at the terminating end will necessitate 'end to end' tuning of the (A) relay in outgoing repeater SD-31779-01 instead of the standard tuning procedure now used. BSP 040-012-711 does not provide for such tuning.

1.8 Step-by-Step Repeater SD-32008-01 - Options

When used as an outgoing repeater working into T-carrier and regardless of the terminating switching circuit SD-32008-01 should preferably be wired with M and H options and the (A) relay should be tuned to 46 to 80 percent break. The channel unit should be removed when testing or adjusting the outgoing repeater for its pulse repeating requirements. These options provide 550/550 ohm battery-ground pulsing with no compensating resistance in the supervisory loop. Options that provide 150/150 ohm battery-ground pulsing are satisfactory from a signaling standpoint but may increase impulse noise. When used as an incoming repeater from T-carrier, SD-32008-01 should be wired with M option.

1.9 Step-by-Step Repeater - SD-32008-01 - Compatibility

All presently used connections are believed to be compatible except the arrangement whereby SD-32008-01 connects to panel and crossbar No. 1 senders as described in Section C 1.6 for SD-31779-01. This is an incompatible arrangement and should not be used.

1.10 Step-by-Step Repeater SD-32008-01 - Working Limits

The working limits for VFX are as described for SD-31779-01 in Section C 1.7.

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1.11 Step-by-Step Repeater SD-31648-01 - Compatibility

1.11.1 Step-by-step repeater SD-31648-01 should not be used as an incoming repeater over T-carrier from common control offices. Without T-carrier the operation of this circuit would be as follows: upon disconnect SD-31648-01 releases and then releases the subsequent circuit in tandem. This long release time would provide an unguarded interval during which time the terminating circuit could be reseized by the originating sender. To cover this interval, SD-31648-01 opens the T and R leads to the sender to prevent such reseizure until full release of the terminating circuit has taken place. T-carrier cannot relay the open condition of the T and R leads to the sender and sends battery and ground instead. The (TG) relay in the sender operates to this battery and ground and the sender starts pulsing before the incoming repeater is ready to accept the pulses. This will result in wrong numbers.

1.11.2 SD-31648-01 is compatible with T-carrier when used as an incoming repeater from step-by-step or when used as an outgoing repeater.

1.12 Step-by-Step Repeater SD-32184-01 - Compatibility

1.12.1 If T-carrier is connected to the incoming end of SD-32184-01, the compensating resistance in series with the (A) relay of SD-32184-01 should be zero regardless of which option (221ND or 280FS) is used for the (A) relay.

1.12.2 If T-carrier is connected to the outgoing end of SD-32184-01, R wiring option in SD-32184-01 which provides 2MF and 600 ohms across the pulsing contact should be used.

1.13 Step-by-Step Repeater SD-32184-01 - Working Limits

When used incoming from T-carrier the working limits for VFX for ordinary metallic facilities are as given in CD-32184-01. For facilities incorporating other transmission devices such as E or V transmission repeaters see the appropriate signaling compatibility drawing listed in SD-99421-01. When used as an outgoing repeater the limits given in Section B apply.

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1.14 Step-by-Step Repeater SD-31147-01 - Compatibility

When working with T-carrier, X option should not be used in SD-31147-01. Option R or M should be used depending on the external circuit resistance as required by Note 102 of SD-31147-01.

1.15 Bylink Incoming Trunk Circuits

Bylink trunk circuits are used on calls incoming from a step-by-step office with immediate dialing. There are usually four optional pulsing relays, the AJ-29 or AJ-115 which have 425 ohm windings and the AJ-34 or AJ-136 which have 200 ohm windings. When connected to the T-carrier DPT channel unit the bylink trunk circuit will pulse satisfactorily using any one of these relays.

1.16 No. 4 ESS Signaling Compatibility With SXS Trunk Circuits

TABLE I

SXS trunk circuits which require certain options to suppress split pulsing in order to be compatible with the digroup terminal.

SD Number	Option Designation	Dwg Issue	Issue Date
SD-31779-01	ZR	24D	12/5/73
SD-32087-01	R*	5D	8/20/69
SD-32240-01	ZF*	7B	8/21/68
SD-32241-01	J*	9B	8/1/67
SD-32244-01	ZE*	13B	3/27/67
SD-32245-01	ZK*	14B	8/16/66

*The option consists of a diode which suppresses the split pulsing. A later option which adds a resistor in shunt with the diode is for the purpose of preventing bell tapping induced by the diode.

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TABLE II

SXS trunk circuits which do not split pulses and which are compatible with the digroup terminal.

SD-32184-02
SD-32204-01
SD-35020-01 (Issue 3A or later)

Any trunk circuit including those listed in Tables I, II and III which repeats pulses from the SXS Originating Register Circuit, SD-32351-01.

TABLE III

SXS trunk circuits which have no option or other means to suppress split pulses and are therefore not compatible with the digroup terminal.

SD-32008-01

2. REVERTIVE PULSE CHANNEL UNITS

2.1 Revertive Pulse Channel Units With Senders

T-carrier is generally compatible with revertive pulse senders. The sender should preferably use the MTG relay rather than the TG relay in order to preserve the full advantages of the trunk guard test. The disadvantages which result from the use of the TG relay and some other limitations involved with the use of T-carrier are described below.

2.2 Operation of TG or MTG Relay on Physical Facilities

2.2.1 The TG test is made by revertive senders to test the loop for continuity to battery and ground at the terminating end.

2.2.2 In revertive senders, two different trunk guard relays, the MTG and the TG, are used for trunk test. The decoder in panel systems or the marker in crossbar systems selects which relay is to be used on each call depending on the trunk group of the selected trunk.

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2.2.3 The MTG (marginal trunk guard) relay is always used in making trunk test on trunks which terminate in short range (max. 1300-ohm conductor) nonrepeating GCO incomings. The MTG is designed to nonoperate while the incoming is returning to normal during which time the incoming connects 24-volt battery and ground to the tip and ring leads. When the incoming is fully restored to normal, it connects 48-volt battery and ground which then operates the MTG relay. All other panel and crossbar incomings open the tip and ring lead when returning to normal. The MTG relay nonoperate function is not needed on these latter panel and crossbar trunks. The TG relay is used when its added sensitivity is needed to provide operation over longer loops.

2.2.4 In senders such as the crossbar No. 5 revertive pulsing outgoing sender SD-26052-01 the MTG relay is used, as described above, whenever the trunk group contains trunks terminating in nonrepeating GCO incomings. In senders such as panel sender SD-21194-01 the MTG relay is used when the trunk conductor resistance does not exceed 1300 ohms. Both of these methods for specifying the MTG relay have the basic purpose of requiring the MTG to be used whenever any trunks in a trunk group terminate in nonrepeating GCO incomings.

2.3 Operation of TG Relay on T-Carrier

As described above for the MTG relay, while the incoming selector is returning to normal, the RPT channel unit will signal the RPO channel unit to operate its RP relay thereby adding 16,000 ohms to the tip and ring lead resistance. This added resistance is not enough to prevent operation of the TG relay and therefore the TG test is bypassed with the following consequences.

2.3.1 The crossbar tandem sender normally, upon encountering an open trunk loop, will punch a card and initiate a second trial so that the call is not lost. With T-carrier, the TG relay will operate falsely, advance the sender to the pulsing condition from which the call will be lost, a card will not be punched and the sender will be stuck until released either manually or automatically by the time-out feature.

2.3.2 With a crossbar No. 5 sender, the effect of the T-carrier is less serious since the call will be lost

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with or without the T-carrier. However, a trouble card will be punched with the DC trunk, but with T-carrier, the card cannot be punched because of the bypassing of the TG test. With a crossbar No. 1 sender, the result is similar with the sender becoming stuck until released either manually or by the time-out feature.

2.4 Operation of the MTG Relay on T-Carrier

Regardless of whether the incoming selector returns -24 volt battery to the tip and ground on the ring (GCO) or opens the tip and ring leads (all other), the RPT channel unit will signal the RPO channel unit to operate its RP relay thereby adding 16,000 ohms to the tip and ring lead resistance. This added resistance is enough to prevent operation of the MTG relay and thereby provide a valid trunk guard test. The MTG relay is less sensitive than the TG relay but will operate to 45 volts and an external circuit resistance of 2350 ohms maximum. The T-carrier revertive pulse channel unit has an internal resistance of 1460 ohms maximum plus 90 ohms in the hybrid coil windings. To this must be added the 600 ohms of voice frequency extension giving a total of 2150 ohms which is satisfactory for the MTG.

2.5 Sender Compensating Resistance

2.5.1 To provide for proper pulsing of the STP relay in outgoing revertive senders, it is the practice to add compensating resistance to short loops. The purpose of the compensating resistance is to avoid soaking the STP relay and thereby insure its fast release. The compensating resistance may be added either in the sender or in the terminating circuit or both. Senders will add 0, 300, 600, or 900 ohms to the pulsing loop upon instructions from the panel decoder or crossbar marker. Any additional compensating resistance that is required is added in the terminating circuit by wiring options. When T-carrier is interposed on the trunk loop, no compensating resistance is generally needed. The reason for this is that the T-carrier originating channel unit resistance is high enough (715 ohm/715 ohm resistances to 48-volt battery and ground) to prevent soaking the STP relay. Since T-carrier will normally be used to replace trunk conductors that exceed 900 ohms in resistance, compensating resistance in the sender will be zero and no conflict will arise when part of a trunk group is connected to T-carrier and part remains on wire facilities.

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2.5.2 If compensating resistance is used, the total of the compensating resistance and the resistance of the voice frequency extension to the carrier should not exceed the maximum allowable value for the VFX alone.

2.6 Panel Incoming Selector Compensating Resistance

Panel incoming selectors usually provide an optional compensating resistance to supplement sender compensating resistance on short loops. This compensating resistance is not wanted with T-carrier and should be strapped out.

2.7 Panel Incoming Selector Compatibility

2.7.1 The revertive pulse channel units are compatible with ground cutoff repeating incoming selectors per ES-20292-01, ES-20293-01, and SD-21949-01 using either the original pulsing arrangement (L relay = 206FA, 280AB) or the present standard pulsing arrangement (L RELAY = 280DG).

2.7.2 The revertive pulse channel units are compatible with battery cutoff incoming selectors per SD-21115-01 and similar selectors using either the long-range pulsing arrangement (L relay = N3, N6) or the long-range balanced pulsing arrangement (L relay = N5) or the short-range pulsing arrangement (L relay = R132, etc.). GCO panel direct incoming selectors, in general, are not compatible with T-carrier because the resistance they would see in the channel unit is greater than the maximum allowable loop.

2.8 Panel Incoming Selector Working Limits

2.8.1 For both GCO and BCO long-range selectors, a voice frequency extension not greater than 6 miles, 600 ohms can be used at the originating end of the T-carrier or a VFX of 3 miles 600 ohms can be used at the terminating end. VFX can be used at one end only. For short range selectors, the range of the selector may limit the VFX resistance. For the short-range battery cutoff selectors having 1645 ohm range, the terminating voice frequency extension should not exceed 200 ohms.

2.8.2 Voice frequency extension can be used with D4 channel banks at one end only because of the margins required for the round trip time requirement.

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2.9 Revertive Pulse Channel Units With Test Circuits

The crossbar system automatic test circuit for incoming trunks, SD-25161-01, should be arranged as follows when testing revertive pulse trunks through T-carrier.

(A) Skip the (L) relay nonoperate test.

(B) Use zero compensating resistance on (L) relay operate test.

(C) Use zero compensating resistance on (A) relay operate test.

(D) Use 3000-ohm compensating resistance on (A) relay nonoperate test.

2.10 Revertive Pulse Channel Units with Crossbar Registers and Trunks

2.10.1 The D4 bank revertive pulse terminating channel unit has a split mid-point capacitor which can be grounded with a screw type switch to more closely simulate the grounded capacitance of a cable. This arrangement slows the revertive pulsing to a satisfactory speed.

In addition to the optional feature of grounding the mid point capacitor there should be a U3 cover placed on the GR relay. This cover will improve the pulsing whether the signaling facility is cable, E signaling, or T carrier.

2.10.2 The circuits in present installations to which these covers should be applied are as follows:

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SYSTEM	SD	FIG	CODE
XB1	25013-01	N	U309
		P	U1254
XB1	25382-01	1	U309
XB5	25565-01	E	U309
		F	U1254
XB5	25731-01	J	U309
		K	U1254
XB5	25794-01	J	U309
		K	U1254
XBT	25359-01	1	U309

2.10.3 U type relays with the new welded backstop must not be used as the GR relay in these senders, under any circumstances.

2.10.4 Some incoming trunk circuits make provision for adding compensating resistance in the RP loop. This resistance should not be used with T-carrier as it aggravates the speed-up of pulsing.

3. E AND M LEAD CHANNEL UNITS

3.1 Interconnection of E and M Leads

All E&M lead circuits are designed with certain standardized two- or four-lead interfacing arrangements, currently called Types I, II, III, IV and V interfaces. These types are briefly defined below. The signaling leads of a trunk or switching circuit with a particular interface type may connect directly to a signaling circuit only if the signaling circuit has that same interface type. D4 E and M lead signaling units provide only for Types I, II and III interfaces via the internal [EG] option switch; they are not compatible with types IV or V.

3.2 Definition of Interface Types

3.2.1 Type I interface is the original two-lead E&M interface. Signaling from trunk circuit to signaling circuit is by means of ground and battery signals (on-hook and off-hook respectively) over the M lead. Signaling from signaling circuit to trunk circuit is by means of open and ground signals (on-hook and off-hook, respectively) over the

DETAILED CIRCUIT INFORMATION

E lead.

3.2.2 Type II interface is a looped four-lead E&M interface arrangement. Signaling in either direction is by means of an open for on-hook and a closure for off-hook. The M and SB leads are used for signaling from trunk circuit to signaling circuit. The E and SG leads are used for signaling from signaling circuit to trunk circuit. The signaling circuit supplies battery on the SB lead and the trunk circuit supplies ground on the SG lead.

3.2.3 Type III interface is a compromise partially looped four-lead E&M interface arrangement. Signaling over the M lead is similar to that of Type I interface with the distinction being that battery and ground for the signaling are provided to the trunk circuit by the signaling circuit over leads SB and SG, respectively. All aspects and requirements of signaling over the E lead are identical to those of Type I interface.

3.2.4 Type IV interface is a symmetrical four-lead looped E&M signaling interface that is primarily intended for use between a trunk circuit and a signaling circuit. Signaling from trunk circuit to signaling circuit is by means of open and closures across the SB and M leads for on-hook and off-hook, respectively. From signaling circuit to trunk circuit signaling is by open and closure across the SG and E leads for on-hook and off-hook, respectively. The signaling circuit supplies ground on the SB lead and the trunk circuit supplies ground on the SG lead. The result of this is a symmetrical format of open and ground signals on both the E and M leads for on-hook and off-hook respectively.

3.2.5 Type V interface is a symmetrical two-lead E&M interface that is used primarily between trunk circuits and signaling circuits. Signaling from the trunk circuit is over the M lead and. toward the trunk circuit over the E lead. Signaling in either direction is by an open for on-hook and application of local ground for off-hook. This interface is the unbalanced two-lead version of the looped four-wire Type IV interface.

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3.3 Nonconforming E&M Lead Interfaces

Non-conforming E&M lead interfaces may be found on some circuit schematic drawings. Since the signaling compatibility drawings provide information only for standard E&M lead interface arrangements, compatibility information for nonconforming interfaces will be found on the individual circuit schematic drawings.

3.4 Selection of the Signaling Circuit Interface Type By Means of the [EG] Option on E&M Channel Units

When E&M lead trunk circuits having Type I or Type III signaling interface connect to the E&M channel unit, the [EG] function on the channel unit must be connected. With a Type II interface, the [EG] function should not be connected on the channel unit.

3.5 TSPS Trunk Circuits

3.5.1 Certain TSPS base unit trunk circuits have 4-wire transmission paths with separate SX and SX1 leads for loop reverse battery supervision. Furthermore, these TSPS trunk circuits always interpose a voice frequency repeater circuit in one or both directions of voice transmission. When metallic facilities are used the SX and SX1 leads connect to simplexes, but when carrier facilities are used it is necessary to convert the loop signaling to E&M lead signaling by one of the means described below. The signaling circuit connection is always made to the converter, never to the TSPS base unit trunk circuit itself.

3.5.2 The first generation TSPS base unit trunk circuits use a 424V4B repeater per SD-97047-01. The loop to E & M lead conversion was originally done by a plug-in 333A relay in the repeater. This Manufacture Discontinued arrangement provides a pseudo Type II interface that is nonconforming with E & M lead standards. Ferrod sensors in the trunk circuit are in series with the M lead and require a certain minimum current for proper operation. Certain signaling circuits cannot always guarantee enough current and none are required to do so. This compatibility drawing, in accordance with paragraph C 3.3, does not provide signaling compatibility information for use with the 333A relay. See 3.5.4 and 3.5.5 for the use of a 333B relay in place of the 333A relay.

DETAILED CIRCUIT INFORMATION

3.5.3 The second generation TSPS base unit trunk circuits use a 3-way 4-wire bridging repeater per SD-99782-01. This arrangement requires a separate signal converter and SX inductor circuit, SD-1B145-01, for the loop to E and M lead conversion. This converter circuit can also be used when the 424V4B repeater version is used. Circuit SD-1B145-01 itself has a pseudo type I interface per option Q that is nonconforming, and for which this compatibility drawing does not provide signaling compatibility information. Information is provided in this compatibility drawing for standard Types II and III interfaces obtainable in SD-1B145-01.

3.5.4 The third generation TSPS base unit trunk circuits use a 3-way 4-wire repeater per SD-7C022-01. A 333B relay can be plugged into this repeater to provide the loop to E&M lead conversion. Screw switches on the relay permit the selection of either Type II or Type III interface. Circuit SD-1B145-01 can also be used with the SD-7C022-01 arrangement for the signaling conversion, but the 333B relay is the better choice.

3.5.5 The 333B relay can be used in the 424V4B repeater in place of the 333A relay. If this relay is used in the NET 1 position it is necessary that wiring option ZH be used also. If trouble with low M lead current is encountered with the 333A relay, it should be replaced on a job basis with the 333B relay. Net 1 use for 333B is for delayed call trunk SD-1B009-01 only.

3.5.6 Signaling facilities never connect directly to the TSPS base unit trunk circuit SX and SX1 leads, but rather to the converter as described above. Signaling compatibility information in Section D of this drawing is shown under the appropriate associated SD number as summarized in the following table.

DETAILED CIRCUIT INFORMATION

Associated Repeater	Loop to E&M Converter	For Compatibility See Sec. D Under:
424V4B/SD-97047-01	333A	(Note 1)
	333B	SD-97047-01
	SD-1B145-01	SD-1B145-01
3W 4-wire/SD-99782-01	SD-1B145-01	SD-1B145-01
3W 4-wire/SD-7C022-01	333B	SD-7C022-01
	SD-1B145-01	SD-1B145-01

Note 1: Nonconforming interface. See specific TSPS schematic drawing for compatibility information.

3.5.7 Any signaling unit having a Type II or III interface will be compatible with either of the 333B relay applications or with any application of the converter circuit SD-1B145-01. The screw switches on the 333B relay must be set for the desired interface type. In SD-1B145-01 options W and T must be used for Type III interfaces and options W and V must be used for Type II interface.

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-10574-01	DPT	
SD-10730-01	DPMO	
SD-11324-01	None	High-Low supv
SD-11370-01	None	High-Low supv
SD-12139-01	2W E&M	OK with E&M supv (Fig. 1)
SD-12141-01	2W E&M	OK with E&M supv (Fig. 1)
SD-12149-01	None	High-Low supv
SD-12295-01	DPT	OK with rev bat. supv (Fig. 2B)
SD-12460-01	2W E&M	
SD-12715-02	None	PCI and High-Low supv
SD-12718-01	None	PCI and High-Low SX supv
SD-12754-01	None	PCI and SX supv
SD-12826-01	None	20-Hz ringing
SD-12884-01	DPT	OK with rev bat. supv (Fig. 4)
SD-12900-01	DPT	OK with rev bat. supv (Fig. 1,2,3,5)
SD-12929-03	DPT	OK with rev bat. supv (Fig. 4)
SD-12929-05	DPT	OK with rev bat. supv (Fig. 4)
SD-12999-01	DPMO	
SD-13332-01	None	Wet-Dry, High-Low supv
SD-13988-01	DPMO	
SD-14021-01	DPT	OK Fig. 1,2,3,5,6, opt. D and 48V
SD-14034-01	None	Wet-Dry rev bat. supv
SD-14044-01	DPMO	
SD-14067-01	2W E&M	OK with E&M supv (Fig. 7)
SD-14068-01	None	High-Low supv
SD-14177-01	None	Ringdown
SD-14194-01	None	High-Low supv
SD-14199-01	None	High-Low supv
SD-14200-01	None	High-Low supv
SD-14217-01	None	SX control of ringing
SD-14225-01	None	Wet-Dry rev bat. supv
SD-15096-01	None	PCI pulsing
SD-15097-01	DPT	OK with rev bat. (B and W wiring)
SD-15098-01	DPT	Tandem Comp. and Call Announc. only
SD-15193-01	DPMO	
SD-15240-01	None	High-Low supv
SD-15288-01	None	20-Hz ringing
SD-15289-01	None	20-Hz ringing
SD-15327-01	2W E&M	OK with E&M supv (Fig. E or F)
SD-15334-01	2W E&M	
SD-15341-01	2W E&M	
SD-15346-01	2W E&M	
SD-15362-01	2W E&M	OK with E&M supv (Fig. 3,5,7)

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-15367-01	None	Wet-Dry supv
SD-15382-01	DPMO	
SD-15515-01	None	High-Low supv
ES-20009-01	RPT	
SD-20011-02	RPO	
ES-20012-02	RPT	
SD-20042-01	RPO	Marginal on level no. test
SD-20082-01	RPO	
SD-20083-01	RPO	
ES-20139-01	None	High-Low Supv
ES-20139-02	RPT	See Sec. C 2.
ES-20292-01	RPT	See Sec. C 2.7.
ES-20293-01	RPT	See Sec. C 2.7.
SD-20545-01	None	High-Low Supv
ES-20641-01	RPO	NG with remote control zone reg.
ES-20734-01	None	20-Hz ringing
ES-20743-01	None	20-Hz ringing
SD-20746-01	DPMO	Reverse T&R. See Sec B 2.1.4
ES-21030-01	RPO	NG with remote control zone reg.
ES-21031-01	RPO	
SD-21031-02	RPO	
ES-21032-01	RPO	NG with remote control zone reg.
SD-21032-02	RPO	
SD-21032-03	RPO	NG with remote control zone reg.
ES-21036-01	RPT	OK with 48V - No VFX
ES-21043-01	RPT	OK with 48V - No VFX
ES-21043-02	None	High-Low supv.
ES-21053-01	RPT	OK with 48V- No VFX
SD-21053-02	None	High-Low supv
SD-21077-01	RPO	NG with remote control zone reg.
SD-21078-01	RPO	
SD-21092-01	RPO	See Sec. B 2.5.2.
	RPT	See Sec. B 2.5.3.
SD-21115-01	RPT	See Sec. C 2.7.
SD-21115-03	None	High-Low supv
SD-21115-05	RPT	See Sec. C.
SD-21115-07	None	High-Low supv.
SD-21116-01	RPT	See Sec. C 2.
SD-21116-03	None	High-Low supv.
SD-21123-01	None	20-Hz ringing
SD-21124-01	RPT	OK with auto start of ringing
SD-21130-01	None	Wet-Dry supv, 20-Hz ringing
SD-21143-01	RPT	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-21147-01	RPT	OK with X, M opt.
SD-21193-01	DPT	Subscriber Sender - See Sec.C 1.1
SD-21193-05	DPT	Subscriber Sender - See Sec.C 1.1
SD-21194-01	DPT	Subscriber Sender - See Sec.C 1.1, 2.2
SD-21339-01	None	Ringdown
SD-21349-01	None	High-Low supv - 20-Hz ringing
SD-21364-01	None	Wet-Dry supv
SD-21370-01	None	20-Hz ringing
SD-21441-01	DPMO	Reverse T&R. See Sec.B 1.1.4
SD-21451-01	None	Wet-Dry supv
SD-21452-01	None	PCI pulsing
SD-21459-01	None	Wet-Dry supv. 20-Hz rering
SD-21504-01	None	20-Hz remote control ringing
SD-21505-01	None	20-Hz remote control ringing
SD-21542-01	None	Wet-Dry supv, +110, -48 coin
SD-21543-01	None	Wet-Dry supv
SD-21544-01	None	Wet-Dry supv, 20-Hz ringing
SD-21545-01	None	Bridged supv
SD-21560-01	None	Rev Bat and SX ringing
SD-21570-01	None	Wet-Dry supv
SD-21572-01	None	PCI pulsing
SD-21573-01	RPO	OK outgoing
SD-21574-01	None	20-Hz ringing
SD-21576-01	None	20-Hz ringing
SD-21578-01	RPT	
SD-21600-01	None	Three-wire
SD-21612-01	Yes	Test Circuit
SD-21627-01	RPO	NG with remote control zone reg.
SD-21628-01	RPO	
SD-21630-01	RPO	NG with remote control zone reg.
SD-21631-01	RPO	
SD-21634-01	None	PCI pulsing
SD-21691-01	Yes	Three digit sender - See Sec.C 1.1
SD-21733-01	RPO	See Sec. B 2.5.2
	RPT	See Sec. B 2.5.3
SD-21734-01	None	PCI pulsing
SD-21792-01	None	Requires metallic ckt, and 3-wire
SD-21821-01	RPO	NG with remote control zone reg.
SD-21822-01	RPO	
SD-21823-01	None	Wet-Dry supv, 20-Hz ring
SD-21826-01	None	8000-ohm TG Test
SD-21839-01	None	8000-ohm TG Test
SD-21840-01	None	8000-ohm TG Test

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-21858-01	None	Wet-Dry, High-Low supv
SD-21859-01	None	High-Low supv, 20-Hz ring
SD-21917-01	None	Short Range
SD-21918-01	None	Short range
SD-21924-01	DPT	
SD-21946-01	RPT	OK with no VFX
SD-21949-01	RPT	OK with Fig. C or D. See Sec. C 2.7
SD-21972-01	DPMO	Reverse T&R. See Sec. B 2.1.4
SD-21974-01	None	PCI pulsing
SD-21981-01	None	+130, -48V volt coin control
SD-21982-01	None	+130, -48 volt ringback
SD-25012-01	Yes	Subscriber Sender - See Sec. C 1.1
SD-25013-01	Yes	FS Term Sender - See Sec. C 2.10
SD-25015-01	Yes	KP Sender-See Sec. C 1.1
SD-25020-01	RPO	
SD-25021-01	RPO	
SD-25022-01	DPT, RPT	
SD-25024-01	None	High-Low supv, 3-wire
SD-25033-01	DPMO, RPO	
SD-25119-01	None	Wet-Dry supv
SD-25120-01	FXO	
SD-25124-01	None	Wet-Dry supv, 20-Hz ringing
SD-25127-01	RPO	
SD-25161-01	Yes	Auto test ckt - See Sec. C 2.9
SD-25181-01	Yes	Test circuit
SD-25210-01	RPO	
SD-25218-01	None	Wet-Dry supv, 20-Hz ringing
SD-25259-01	DPT, RPT	
SD-25292-01	DPT, RPT	
SD-25295-01	DPT, RPT	
SD-25302-01	DPT, RPT	Machine ring only
SD-25303-01	None	20-Hz ringing
SD-25304-01	DPT, RPT	OK with D1, D2 Res
SD-25305-01	DPT, RPT	Use D Res.
SD-25307-01	None	20-Hz rering
SD-25313-01	None	Wet-Dry supv
SD-25314-01	DPT	Use auto ring start.
SD-25322-01	None	Three-wire
SD-25329-01	DPT, RPT	
SD-25351-01	None	Grd sig over ring - 3-wire
SD-25356-01	None	Through supervision
SD-25357-01	DPT	NG with remote control zone reg.
SD-25359-01	Yes	RP Sender - See Sec. C 2.10

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-25382-01	Yes	RP Sender - See Sec. C 2.10
SD-25413-01	None	SX signaling
SD-25420-01	DPT,RPT	OK for verification only
SD-25423-01	None	20-Hz or SX ringing
SD-25428-01	None	High-Low, Wet-Dry supv
SD-25429-01	None	Wet-Dry supv
SD-25434-01	Yes	DP Term Sender - See Sec. C 1.1
SD-25446-01	None	20-Hz or SX ringing, 3rd wire coin
SD-25447-01	None	Wet-Dry supv
SD-25454-01	None	Wet-Dry supv
SD-25455-01	Yes	MF Term Sender - See Sec. C 1.1
SD-25462-01	None	20-Hz or SX ringing, 3rd wire coin
SD-25478-01	Yes	DP Sender - See Sec. C 1.1
SD-25481-01	RPO	
SD-25490-01	2W E&M	
SD-25491-01	2W E&M	
SD-25493-01	None	Built in term set
SD-25503-01	None	Must send Bat and Grd both ways
SD-25512-01	None	Wet-Dry supv
SD-25517-01	DPT,RPT	
SD-25519-01	None	130V SX rering
SD-25520-01	None	PCI pulsing
SD-25534-01	Yes	DP Inc Register
SD-25551-01	Yes	DP Orig Register
SD-25552-01	DPT	
SD-25565-01	Yes	RP Register - See Sec. C 2.10
SD-25578-01	DPMO,RPO	
SD-25578-02	DPMO,RPO	
SD-25578-03	DPMO,RPO	
SD-25579-01	Yes	DP Sender - See Sec. C 1.1
SD-25580-01	Yes	MF Sender - See Sec. C 1.1
SD-25581-01	DPT	
SD-25582-01	DPT,RPT	
SD-25583-01	DPT,RPT	
SD-25620-01	RPO	
SD-25620-02	RPO	
SD-25634-01	DPMO	
SD-25645-01	DPMO	
SD-25648-01	None	Wet-Dry supv, SX signaling
SD-25651-01	None	20-Hz ringing
SD-25655-01	2W E&M	
SD-25663-01	DPT	OK for verification only
SD-25665-01	None	SX control of ringing

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-25666-01	None	Needs metal ckt. 3-wire
SD-25667-01	2W E&M	
SD-25673-01	DPMO	
SD-25687-01	None	Wet-Dry supv
SD-25689-01	DPMO	
SD-25690-01	DPMO	
SD-25694-01	DPMO,RPO	
SD-25694-02	DPMO,RPO	
SD-25696-01	None	High-Low supv
SD-25698-01	None	High-Low supv
SD-25701-01	None	Wet-Dry supv
SD-25708-01	None	Needs metallic ckt for tests
SD-25708-02	None	Needs metallic ckt for tests
SD-25711-01	DPMO,RPO	
SD-25721-01	None	130V coin battery
SD-25729-01	Yes	DP Register
SD-25730-01	Yes	MF Register
SD-25731-01	Yes	RP Register - See Sec. C 2.10
SD-25732-01	Yes	RP Sender
SD-25733-01	None	PCI Sender
SD-25736-01	None	130V DC
SD-25739-01	DPMO,RPO	
SD-25739-02	DPMO,RPO	
SD-25739-03	DPMO,RPO	
SD-25739-04	DPMO,RPO	
SD-25758-01	DPMO,RPO	
SD-25766-01	None	Multi-state signaling
SD-25768-01	2W E&M	
SD-25769-01	Yes	MF Sender - See Sec. C 1.1
SD-25794-01	DPMO,RPT	DPMO on T&R, RPT on FT&RT, RP Register, See Sec. C 2.10.
SD-25816-01	DPMO	
SD-25823-01	DPMO,RPO	
SD-25823-02	DPMO,RPO	
SD-25832-01	DPT,RPT	
SD-25833-01	DPT,RPT	
SD-25842-01	2W E&M	
SD-25842-02	2W E&M	Use diodes on P relay wdgs.
SD-25843-01	2W E&M	
SD-25843-02	2W E&M	
SD-25844-01	2W E&M	
SD-25845-01	2W E&M	
SD-25846-02	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-25847-01	2W E&M	
SD-25848-01	DPMO	
SD-25849-01	DPMO,RPO	
SD-25850-01	None	Uses T for rering. 3-wire trunk
SD-25851-01	None	SX supv and ringdown
SD-25852-01	None	SX supv and ringdown
SD-25853-01	2W E&M	
SD-25858-01	None	SX supv and 3-wire
SD-25866-01	Yes	DP sender - See Sec.C 1.1
SD-25867-01	2W E&M	
SD-25868-01	DPT,RPT	
SD-25875-01	DPT,RPT	
SD-25887-01	DPT,RPT	Use CX rering, Fig. D
SD-25888-01	None	Ring through
SD-25889-01	None	High-Low supv
SD-25893-01	DPT,RPT	
SD-25895-01	2W E&M	
SD-25902-01	None	SX and High-Low supv
SD-25904-01	None	CX or SX supv
SD-25905-01	2W E&M	
SD-25906-01	None	CX or SX supv
SD-25908-01	Yes	Trunk test circuit
SD-25909-01	2W E&M	OK without SX rering
SD-25910-01	None	SX ringing
SD-25911-01	None	SX ringing
SD-25913-01	DPMO,RPO	
SD-25913-02	DPMO,RPO	
SD-25918-01	Yes	Trunk test circuit
SD-25923-01	None	High-Low supv, SX coin control
SD-25923-02	None	High-Low supv, SX coin control
SD-25923-03	None	High-Low supv, SX coin control
SD-25923-04	None	High-Low supv, SX coin control
SD-25925-01	DPMO	
SD-25926-01	None	High-Low supv
SD-25928-01	FXO	
SD-25934-01	DPT	OK with Fig. E
SD-25939-01	None	SX rering
SD-25943-01	None	Rev bat. signal on phantom
SD-25944-01	2W E&M	
SD-25946-01	DPMO,RPO	
SD-25954-01	2W E&M	
SD-25956-01	None	PCI pulsing
SD-25961-01	None	PCI pulsing

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-25978-01	Yes	MF Sender - See Sec. C 1.1.
SD-25999-01	Yes	DP Sender - See Sec. C 1.1.
SD-26017-01	2W E&M	Use FS2.
SD-26040-01	Yes	MF Orig Register
SD-26041-01	Yes	DP Inc Register
SD-26042-01	Yes	MF Inc Register
SD-26043-01	Yes	RP Inc Register
SD-26044-01	None	DP Orig Reg. 4-wire loop signaling
SD-26045-01	Yes	MF Inc Register
SD-26047-01	DPT	Use option 8.
	2W E&M	Use option 10.
SD-26050-01	Yes	DP Outg Sender. See Sec. C 1.1.
SD-26051-01	Yes	MF Outg Sender. See Sec. C 1.1.
SD-26052-01	Yes	RP Outg Sender. See Sec. C 2.2.
SD-26053-01	None	PCI Outg Sender
SD-26056-01	Yes	CAMA Sender. See Sec. C 1.1.
SD-26065-01	DPMO	
SD-26070-01	DPT	
SD-26071-01	DPT	
SD-26073-01	2W E&M	OK with E&M supv (Fig. 3 & 4)
	4W E&M	OK with E&M supv (Fig. 3)
	DPT	OK for verification only (Fig. 2)
SD-26074-01	2W E&M	OK with E&M supv (Fig. 2)
SD-26077-01	DPT	See Sec. C 1.15.
SD-26078-01	DPMO, RPO	
SD-26079-01	DPT	
SD-26083-01	2W E&M	OK with E&M supv (Fig. 3,6,7)
SD-26085-01	DPMO, RPO	
SD-26086-01	DPMO, RPO	
SD-26087-01	DPMO, RPO	
SD-26088-01	DPT	
SD-26090-01	None	High-Low, Wet-Dry supv
SD-26090-05	None	High-Low, Wet-Dry supv
SD-26091-01	None	High-Low supv
SD-26094-01	2W E&M	
SD-26095-01	None	High-Low supv
SD-26096-01	2W E&M	
SD-26098-01	2W E&M	OK with Y option
SD-26099-01	2W E&M	
SD-26100-01	DPT	
SD-26101-01	DPT	Use Z option. See Sec. C 1.15.
	2W E&M	Use W option.
SD-26104-01	DPT	Use FS2. See Sec. C 1.15.

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	2W E&M6	Use FS3.
SD-26108-01	None	SX supv
SD-26110-01	2W E&M	
SD-26116-01	DPMO	
SD-26117-01	None	SX supv
SD-26122-01	2W E&M	OK with E&M supv only
SD-26123-01	DPT	Use App Fig. 2.
	2W E&M	Use App Fig. 3.
SD-26124-01	2W E&M	
SD-26125-01	DPMO	
SD-26126-01	2W E&M	
SD-26127-01	DPMO	
SD-26128-01	2W E&M	
SD-26128-05	2W E&M	
SD-26138-01	None	High-Low, Wet-Dry supv to trunk
	FXO	Towards customer
SD-26144-01	DPMO	
SD-26148-01	DPMO	
SD-26149-01	None	SX ring start
SD-26152-01	DPT	OK without rering feature
SD-26178-01	DPMO	
SD-26183-01	DPT	See Sec. C 1.15.
SD-26201-01	RPO	District Junctor
SD-26204-01	DPT	
SD-26209-01	DPMO	Reverse T&R. See Sec. B 2.1.4.
SD-26210-01	None	PCI pulsing
SD-26257-01	DPT	
ES-26277-01	DPMO	OK with rev bat supv, opt Y
SD-26282-01	DPT	See Sec. C 1.15.
ES-26302-01	DPMO, RPO	
SD-26378-01	DPMO	Use App Fig. 2.
	2W E&M	Use App. Fig. 3.
SD-26380-01	DPMO	Use App. Fig. 2.
	2W E&M	Use App. Fig. 3.
SD-26391-01	2W E&M	
SD-26396-01	None	Rev High-Low supv
SD-26398-01	DPMO	
SD-26399-01	DPT	
SD-26400-01	2W E&M	
SD-26401-01	None	High-Low supv
SD-26402-01	None	High-Low supv
SD-26404-01	2W E&M	Use with E&M only (Fig. 3).
SD-26410-01	DPT	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-26413-01	None	3-wire ckt
SD-26416-01	2W E&M	
SD-26417-01	2W E&M	
SD-26418-01	DPT	App Fig. 2. See Sec. C 1.15.
	2W E&M	App Fig. 3.
SD-26419-01	DPT	Use App Fig. 2. Use only if SX ringing.
	2W E&M	Use App Fig. 3. Control is not used.
SD-26420-01	2W E&M	
SD-26421-01	2W E&M	
SD-26422-01	2W E&M	
SD-26423-01	2W E&M	
SD-26424-01	DPMO	Only with multi-wink (Fig. 3) and options V,W,X
SD-26425-01	2W E&M	
SD-26426-01	2W E&M	
SD-26427-01	None	High-Low supv
SD-26428-01	2W E&M	
SD-26429-01	2W E&M	
SD-26430-01	2W E&M	
SD-26432-01	None	High-Low supv
SD-26433-01	DPMO	
SD-26445-01	DPMO	App Fig. 2
	2W E&M	App Fig. 3
SD-26447-01	None	Wet-Dry, rev bat supv
SD-26448-01	None	Wet-Dry, rev bat supv
SD-27000-01	2W E&M	
SD-27001-01	None	Requires DC path
SD-27003-01	2W E&M	
SD-27008-01	2W E&M	Use T option.
SD-27009-01	2W E&M	
SD-27010-01	DPT	See Sec. C 1.15.
SD-27012-01	None	Requires DC path
SD-27014-01	DPT	See Sec. C 1.15.
SD-27015-01	DPT	
SD-27016-01	None	Rev bat signal on phantom
SD-27024-01	Yes	MF sender - See Sec. C 1.1.
SD-27036-01	2W E&M	
SD-27043-01	None	3-wire trunk
SD-27044-01	2W E&M	
SD-27051-01	2W E&M	
SD-27058-01	Yes	Test Set Circuit
SD-27061-01	DPMO	OK outgoing only
	DPT	OK incoming only

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-27066-01	FXO	
SD-27067-01	DPT	
SD-27079-01	None	+130, -48 volt ring
SD-27080-01	DPT	-48 volt ring or coin, OK w/o +130
SD-27081-01	2W E&M	
SD-27082-01	2W E&M	
SD-27083-01	DPT	OK with wink ringback
SD-27084-01	2W E&M	
SD-27092-01	DPT	Use App Fig. 2.
	2W E&M	Use App Fig. 3.
SD-27097-01	None	+130, -48 volt ring
SD-27103-01	2W E&M	
SD-27104-01	2W E&M	Use E&M only. NG loop +130, -48 volt ring
SD-27148-01	DPT	
SD-27150-01	2W E&M	
SD-27500-01	4W E&M	
SD-27504-01	None	4-wire loop signaling
SD-27505-01	None	4-wire loop signaling
SD-27506-01	None	4-wire loop signaling
SD-27516-01	4W E&M	
SD-27517-01	4W E&M	
SD-27535-01	4W E&M	OK without SX ring or rering
SD-27546-01	None	High-Low supv, 130V ringback
SD-27547-01	None	High-Low supv
SD-27550-01	2W E&M	See Sec. B 2.6.5.
SD-27551-01	2W E&M	
SD-27554-01	None	+130, -48 volt ring
SD-27555-01	None	+130, -48 volt ring
SD-27568-01	DPMO	
SD-27579-01	None	130V SX signal
SD-27580-01	DPT	
SD-27581-01	DPT	See Sec. C 1.15.
SD-27593-01	2W E&M	
SD-27611-01	2W E&M	
SD-27614-01	None	DP Sender, 4-wire loop signaling
SD-27617-01	DPMO	
SD-27618-01	None	2-way loop (4-state signal)
SD-27619-01	2W E&M	
SD-27620-01	2W E&M	
SD-27621-01	4W E&M	
SD-27624-01	Yes	FSP Outg sender. NG for Loop-to-E&M conversion, E relay releases too fast.
SD-27625-01	Yes	FSP Inc register

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-27629-01	DPMO	DP Sender - See Sec. C 1.1.
SD-27641-01	None	Uses T and R separately
SD-27642-01	4W E&M	
SD-27646-01	2W E&M	
SD-27654-01	2W E&M	
SD-27655-01	2W E&M	See Sec. B 2.6.6.
SD-27667-01	Yes	STD Register
SD-27669-01	2W E&M	
SD-27686-01	DPT	
SD-27687-01	DPT	See Sec. C 1.15.
SD-27711-01	4W E&M	
SD-27712-01	2W E&M	
SD-27721-01	None	3-wire trunk
SD-27723-01	DPT	
SD-27729-01	DPMO	With opts X&Y
SD-27730-01	2W E&M	
SD-27732-01	None	4-wire loop signaling
SD-27735-01	4W E&M	
SD-27738-01	4W E&M	
SD-27744-01	4W E&M	
SD-27750-01	DPMO	
SD-27751-01	2W E&M	
SD-27752-01	DPMO	
SD-27753-01	None	2-way loop trunk (Wet-Dry)
SD-27798-01	DPT, RPT	NG with rering or SXS MB ckt
SD-27802-01	DPT	
SD-27803-01	4W E&M	
SD-27810-01	Yes	Subscriber Sender - See Sec. C 1.1.
SD-27813-01	DPMO	Loop signaling without ringback
	2W E&M	E&M signaling
SD-27814-01	2W E&M	Use E&M only. NG loop +130, -48V coin voltage
SD-27815-01	DPMO	Loop signaling without ringback
	2W E&M	E&M signaling
SD-27816-01	2W E&M	Use E&M only. NG loop +130, -48V coin voltage
SD-27829-01	DPMO	
SD-27830-01	DPT	Use FS2 with T wiring.
	2W E&M	Use FS4. See Sec. B 2.6.3.
SD-27836-01	2W E&M	
SD-27838-01	2W E&M	
SD-27843-01	4W E&M	
SD-27844-01	4W E&M	
SD-27851-01	None	3-wire line
SD-27858-01	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-27866-01	2W E&M	Use option R.
SD-27877-01	2W E&M	
SD-27882-01	Yes	MF Sender - See Sec. C 1.1.
SD-27892-01	2W E&M	
SD-27893-01	DPMO	With opts X&Y
SD-27912-01	2W E&M	
SD-27913-01	2W E&M	
SD-27927-01	DPT	Use FS3.
	2W E&M	Use FS2.
SD-27928-01	DPT	Use FS2.
	2W E&M	Use FS3.
SD-27929-01	DPMO	Use FS2.
	2W E&M	Use FS3.
SD-27933-01	2W E&M	
SD-27942-01	2W E&M	
SD-27945-01	2w E&M	
SD-27946-01	2W E&M	
SD-27963-01	DPMO	
SD-27964-01	2W E&M	
SD-27970-01	2W E&M	
SD-27981-01	2W E&M	OK with E&M lead supv (FS3)
SD-27988-01	4W TO	OK with option Y and 405 type data sets
SD-27989-01	4W TO	OK with option V and 405 type data sets
SD-27996-01	FXO	
SD-28040-01	DPT	Use FS3.
	2W E&M	Use FS5. See Sec. B 2.6.3.
SD-28041-01	4W TO	OK with option Y and 405 type data sets
SD-28042-01	4W TO	OK with option Y and 405 type data sets
SD-28043-01	4W E&M	Use Fig. 2 with use of a 24V4C repeater to T,R,T1,R1.
	4W SX	Use Fig. 3.
	FXS	Use Fig. 4.
SD-28045-01	2W E&M	OK with E&M lead supv (FS2)
SD-28048-01	2W E&M	OK with E&M lead supv (FS3)
SD-28062-01	2W E&M	
SD-28063-01	DPMO	OK with multi-wink coin control signals (App Fig. 3). Use option W,V.
SD-28080-01	DPMO	Use FS2.
	2W E&M	Use FS4.
ES-30052-01	None	Wet-Dry supv on busy
ES-30053-01	None	Wet-Dry supv on busy
ES-30183-01	None	Wet-Dry supv
SD-30200-01	SDPO	Originating end

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	DPT	Terminating end
ES-30203-01	None	Wet-Dry supv
SD-30205-01	DPO	
SD-30214-01	DPO	
SD-30215-01	DPT,FXO	Connector
SD-30220-01	DPT,FXO	Connector. NG with busy grd on ring
SD-30228-01	DPT,FXO	Connector. OK for local calls
SD-30243-01	DPT	OK for verification only
SD-30442-01	None	20-Hz ringing
SD-30503-01	DPT	Reverse T&R. See Sec. B 2.1.4.
SD-30645-01	DPO	
SD-30737-01	FXO	OK incoming only
SD-30816-01	None	Wet-Dry supv
SD-30817-01	None	3- or 4-wire trunk
SD-30855-01	None	Grd start. rev bat. See Sec. B 2.3.3, C 1.6.
SD-30856-01	SDPO	
SD-30862-01	DPT,FXO	Connector. OK on local calls
SD-30865-01	DPT	OK if VFX not exceeded
SD-30868-01	SDPO	
SD-30868-02	SDPO	
SD-30869-01	SDPO	Originating
	DPT	Terminating
SD-30872-01	SDPO	NG with grd start. Use opt W.
SD-30889-01	None	Sends back short on T and R
SD-30890-01	2W E&M	
SD-30891-01	SDPO	
SD-30895-01	DPT	
SD-30900-01	DPO	Towards inc selector. OK one-way only.
	DPT	Towards operator. OK one-way only.
SD-30901-01	2W E&M	OK with E and M supv (Fig. 4)
SD-30902-01	DPT,FXO	Connector. OK with A and ZJ option
SD-30903-01	DPT,FXO	Connector
SD-30904-01	DPT,FXO	Connector
SD-30909-01	DPT,FXO	Connector
SD-30910-01	SDPO	Originating, OK with ZR and ZQ option
	DPT	Terminating, OK with Z option
SD-30911-01	DPT,FXO	Connector
SD-30912-01	DPT,FXO	Connector
SD-30913-01	SDPO	Originating
	DPT	Terminating
SD-30914-01	None	Signals over one conductor
SD-30915-01	2W E&M	OK with E and M supv (Fig. 3)
SD-30916-01	DPO	OK outgoing only

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	DPT	OK incoming only
SD-30918-01	DPT,FXO	Connector
SD-30921-01	DPO	OK outgoing only
	DPT	OK incoming only
SD-30922-01	DPT,FXO	Connector
SD-30923-01	DPO	OK outgoing only
	DPT	OK incoming only
SD-30924-01	DPT,FXO	Connector
SD-30925-01	DPT,FXO	Connector
SD-30927-01	DPT,FXO	Connector
SD-30928-01	DPT,FXO	Connector
SD-30931-01	DPT	OK without ringback
SD-30932-01	DPT,FXO	Connector
SD-30934-01	2W E&M	OK with E&M supv (Fig. 3)
SD-30935-01	SDPO	Originating
	DPT	Terminating
SD-30938-01	DPO	OK outgoing only
	DPT	OK incoming only
SD-30939-01	DPT,FXO	Connector
SD-30943-01	2W E&M	OK with E & M supv (Fig. 2)
SD-30944-01	DPT,FXO	Connector
SD-30945-01	DPT	
SD-30946-01	DPT,FXO	Connector
SD-30949-01	None	20-Hz ringing
SD-30950-01	DPT,FXO	Connector
SD-30951-01	DPT,FXO	Connector
SD-30952-01	DPT,FXO	Connector
SD-30953-01	DPT	OK without 20-Hz rering
SD-30954-01	DPT,FXO	Connector
SD-30956-01	DPT,FXO	Connector
SD-30957-01	DPT,FXO	Connector
SD-30958-01	DPT,FXO	Connector
SD-30960-01	DPT,FXO	Connector
SD-30961-01	DPO	OK outgoing only
	DPT	OK incoming only
SD-30971-01	DPO	See Sec.C 1.1.
SD-30973-01	DPT,FXO	Connector
SD-30974-01	DPT	
SD-30976-01	SDPO	Originating, OK with option V
	DPT	Terminating end
SD-30977-01	DPT,FXO	Connector
SD-30979-01	DPT,FXO	Connector
SD-30990-01	None	Uses two voltage signaling

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-30991-01	None	SX start signal
SD-30994-01	DPT	
SD-31028-01	None	Uses T and R separately
SD-31088-01	DPT, FXO	Connector
SD-31105-01	SDPO	Originating
	DPT	Terminating
SD-31114-01	None	Busy flash over ring
SD-31123-01	None	Wet-Dry supv
SD-31127-01	None	Wet-Dry supv
SD-31147-01	DPO	See Sec. C 1.14.
SD-31162-01	None	Dry ckt at term end
SD-31179-01	None	Wet-Dry supv
SD-31180-01	None	20-Hz ring, Wet-Dry supv
SD-31188-01	None	Wet-Dry supv
SD-31214-01	None	Wet-Dry supv
SD-31225-01	None	Requires dc path
SD-31233-01	DPT	
SD-31241-01	DPT	
SD-31242-01	None	Wet-Dry supv, 20-Hz ringing
SD-31302-01	None	Wet-Dry supv
SD-31314-01	None	Wet-Dry supv, 20-Hz ringing
SD-31315-01	None	20-Hz ringing
SD-31339-01	Yes	Intercept trunk
SD-31346-01	SDPO	Originating
	DPT	Terminating
SD-31362-01	Yes	Announcement Trunk
SD-31365-01	SDPO	Originating
	DPT	Terminating
SD-31375-01	None	Wet-Dry supv
SD-31409-01	None	Wet-Dry supv
SD-31410-01	None	Wet-Dry supv
SD-31425-01	None	Uses open loop for test
SD-31428-01	None	Requires 3800-ohm min. trk loop
SD-31432-01	None	Wet-Dry supv, 20-Hz ring
SD-31433-01	DPT	OK with high res sleeve + no ring.
SD-31449-01	None	Ringdown
SD-31454-01	SDPO	Originating
	DPT	Terminating
SD-31457-01	None	Wet-Dry supv
SD-31522-01	None	Wet-Dry supv, 20-Hz ring
SD-31532-01	DPT	
SD-31534-01	None	CX sig and VF repeater
SD-31538-01	None	Wet-Dry supv

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-31539-01	DPT	
SD-31540-01	None	Wet-Dry supv
SD-31541-01	None	For use with 22-type repeater
SD-31542-01	DPT	
SD-31588-01	None	Wet-Dry supv
SD-31589-01	None	3-wire trunk
SD-31602-01	None	For use with 22-type repeater
SD-31609-01	None	Opens T and R
SD-31609-02	None	For use with 22-type repeater
SD-31622-01	DPT	No VFX (high res A relay)
SD-31642-01	Yes	Test Line Circuit
SD-31648-01	DPO	See Sec. C 1.11.
SD-31651-01	None	Wet-Dry supv
SD-31656-01	DPT, FXO	Connector
SD-31658-01	None	Two-Way loop trunk
SD-31668-01	None	Ringdown trunk
SD-31670-01	DPT	
SD-31674-01	DPO	OK outgoing only
SD-31678-01	None	High-Low supv
SD-31678-02	None	Wet-Dry, High-Low supv
SD-31681-01	None	SX pulsing req trk ckt ahead
SD-31682-01	SDPO	Originating
	DPT	Terminating
SD-31683-01	DPT	
SD-31692-01	DPO	
SD-31693-01	DPO	Use opt V. See Sec. C 1.1.
SD-31700-01	Yes	Announcement trunk
SD-31702-01	SDPO	Originating
	DPT	Terminating
SD-31703-01	None	Wet-Dry supv, 20-Hz ring
SD-31708-01	None	20-Hz ringing
SD-31709-01	DPT	
SD-31710-01	2W E&M	
SD-31712-01	DPT	
SD-31714-01	None	3-wire trunk
SD-31722-01	SDPO	Originating
	DPT	Terminating
SD-31723-01	DPT	Use opt S, adjustment C
SD-31726-01	2W E&M	
SD-31737-01	DPT, FXO	Connector
SD-31738-01	DPT, FXO	Connector
SD-31742-01	DPT, FXO	Connector
SD-31744-01	None	4-wire trunk

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-31745-01	None	Wet-Dry supv
SD-31746-01	DPT	OK on inc end
SD-31747-01	DPT	
SD-31749-01	2W E&M	OK with E&M supv (Fig. 3 or 5), see Sec.B 3.4
SD-31752-01	None	Coin battery
SD-31753-01	None	High-Low bridged supv
SD-31767-01	Yes	Compat depends on assoc. trunk
SD-31771-01	None	3- or 4-wire trunk
SD-31773-01	DPT,FXO	Connector
SD-31775-01	2W E&M	OK with E&M supv. See Sec. B 3.4.
SD-31779-01	DPO	See Sec. B 3.1.1, 3.2.3, C 1.4, 1.5, 1.6, 1.7, 1.16
SD-31795-01	2W E&M	With option H
SD-31805-01	DPT,FXO	Connector
SD-31810-01	DPT,FXO	Connector
SD-31811-01	DPT,FXO	Local only, NG with busy grd on ring
SD-31815-01	DPT,FXO	Connector
SD-31816-01	DPT,FXO	Connector
SD-31832-01	DPT,FXO	Connector
SD-31833-01	DPT,FXO	Connector
SD-31840-01	DPO	
SD-31841-01	DPT	OK with immediate ring and no rering
SD-31842-01	DPO	OK outgoing only
SD-31851-01	None	Interrupted ground on ring
SD-31853-01	None	Coin voltage
SD-31856-01	DPT	
SD-31862-01	DPT	
SD-31865-01	2W E&M	
SD-31866-01	None	GRD outgoing
SD-31867-01	2W E&M	OK with E&M supv (opt Q)
SD-31872-01	Yes	Vacant level or overflow trunk
SD-31874-01	DPT	
SD-31885-01	2W E&M	OK with E&M supv (opt M)
SD-31886-01	DPO	OK outgoing only
SD-31887-01	2W E&M	
SD-31888-01	2W E&M	
SD-31892-01	DPO	
SD-31902-01	None	Wet-Dry, High-Low supv
SD-31914-01	DPO	NG with grd start
SD-31915-01	None	4-wire selector T, R, S & C
SD-31919-01	DPT,FXO	Connector
SD-31920-01	DPT,FXO	Connector
SD-31925-01	DPT	Use opt G.
SD-31928-01	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-31929-01	DPO	Outgoing
	DPT	Incoming
SD-31933-01	SDPO	Originating
	DPT	Terminating
SD-31937-01	DPT	
SD-31951-01	SDPO	Rotary Out-Trunk Switch
SD-31953-01	Yes	Trunk Finder
SD-31955-01	Yes	Sender - See Sec.C 1.1.
SD-31965-01	None	Uses two voltage signaling
SD-31981-01	DPT,FXO	Connector
SD-31996-01	None	Coin battery
SD-32007-01	DPT	OK for verification
SD-32008-01	DPO	Outgoing. See Sec.C 1.8, 1.9, 1.16.
	DPT	Incoming
SD-32042-01	2W E&M	
SD-32061-01	DPT	Use Fig. 1.
SD-32061-01	2W E&M	Use Fig. 1&3.
SD-32067-01	None	Customer line unit cannot pass rev bat
SD-32077-01	DPT	
SD-32087-01	DPO	Use V or T option. See Sec.C 1.16.
SD-32124-01	None	Ringdown
SD-32133-01	FXO	
SD-32136-01	None	Wet-Dry supv, 20-Hz ring
SD-32162-01	None	Two-Way supv
SD-32163-01	None	3-wire trunk
SD-32167-01	DPO	
SD-32168-01	None	Wet-Dry supv, 20-Hz ring
SD-32170-01	None	Wet-Dry supv
SD-32178-01	DPT	Wet-Dry supv, See Sec.B 2.4.3 and 2.4.5.
SD-32183-01	DPT	
SD-32184-01	DPO,DPT	See Sec.C 1.12, 1.13.
SD-32184-02	DPO,DPT	See Sec.C 1.16.
SD-32199-01	DPO	Use N,V and W options.
SD-32202-01	DPT	OK with Fig. 2 only
SD-32204-01	DPO	See Sec.C 1.16.
SD-32207-01	Yes	AMA sender
SD-32216-01	FXO	
SD-32240-01	DPO	Use M,X,Y or N,J,Y options. See Sec.C 1.16.
SD-32241-01	2W E&M	See Sec.C 1.16.
SD-32244-01	2W E&M	See Sec.C 1.16.
SD-32245-01	DPO	Use Y,Z option. See Sec.C 1.16.
SD-32253-01	SDPO	
SD-32255-01	DPT	Use FS2. See Sec.C 1.15.

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	2W E&M	Use FS1.
SD-32256-01	DPT	Use FS2.
	2W E&M	Use FS1.
SD-32281-01	SDPO	
SD-32288-01	Yes	Comp depends on assoc. trk. ckt.
SD-32289-01	Yes	Comp depends on assoc. trk. ckt.
SD-32298-01	Yes	Comp depends on assoc.trk. ckt.
SD-32309-01	2W E&M	
SD-32311-01	2W E&M	
SD-32312-01	2W E&M	
SD-32315-01	Yes	Auto Trunk Test Ckt
SD-32317-01	DPO	
SD-32340-01	2W E&M	
SD-32342-01	None	Cannot modify for E&M supv only
SD-32344-01	DPO	OK with multi-wink coin control only
	2W E&M	OK with E&M supv
SD-32346-01	DPO	
SD-32367-01	2W E&M	Use FS3.
	DPO	Use FS2 without ringback.
SD-32369-01	DPO	Without option Z
SD-32508-01	2W E&M	Use FS3 for E&M. Not compatible with loop because of ringback.
SD-32532-01	DPO	Use option 2 .
	2W E&M	Use option 3,Z.
SD-32542-01	2W E&M	
SD-32543-01	2W E&M	
SD-32551-01	2W E&M	
SD-33001-01	SDPO	Originating
	DPT	Terminating
SD-33003-01	SDPO	Originating
	DPT	Terminating
SD-33005-01	DPT,FXO	Local connector
SD-33006-01	DPT,FXO	Local connector
SD-33007-01	DPT,FXO	Local connector
SD-33008-01	DPT,FXO	Local connector
SD-33009-01	DPT,FXO	Comb connector
SD-33010-01	DPT,FXO	Comb connector
SD-33011-01	DPT	OK for verification only
SD-33016-01	DPT	
SD-33017-01	DPT	
SD-33018-01	DPT	
SD-33019-01	DPT	
SD-33020-01	DPT	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-33021-01	None	3-wire trunk
SD-33022-01	DPT,FXO	Coin Connector
SD-35004-01	FXO	Use option W.
SD-35006-01	DPO	Use option 2.
	2W E&M	Use option 3Z.
SD-35012-01	FXO	
SD-35020-01	DPO	Use FS3. See Sec.C 1.16.
	2W E&M	Use FS1.
SD-35021-01	2W E&M	OK with E&M supv only
SD-35022-01	2W E&M	
SD-35023-01	DPO	OK with multi-wink coin control only. Use opt W,X,Y.
	2W E&M	OK with E&M supv
SD-35024-01	2W E&M	
SD-35036-01	DPO	Use FS 1,3.
	2W E&M	Use FS 2,3.
SD-35037-01	DPO	Use option 2.
	2W E&M	Use option 3.
SD-35059-01	DPO	Use FS 1&2 options Y&Z.
	2W E&M	Use FS1.
ES-36009-01	None	Wet-Dry supv
SD-55015-01	None	CX signal without E&M lead
SD-55050-01	2W E&M	
SD-55060-01	DPMO	
SD-55062-01	None	Simplex control
SD-55086-01	DPMO	Loop
	2W E&M	E&M
SD-55088-01	2W E&M	
SD-55109-01	2W E&M	
SD-55113-01	2W E&M	
SD-55114-01	2W E&M	
SD-55151-01	DPMO	Use Fig. 1&4,6,12 or 14.
	2W E&M	Use Fig. 1&7,8,9,10,11 or 13.
SD-55158-01	DPT	Use Fig. 1&2,3, or 4.
	2W E&M	Use Fig. 1&5,6,7 or 8.
SD-55177-01	None	SX signal without E&M leads
SD-55184-01	None	Wet-Dry supv
SD-55213-01	None	High-Low supv (High too Low)
SD-55224-01	DPMO	Without controlled ringing
SD-55242-01	None	4-wire selector - T, R, S, & SP
SD-55243-01	None	4-wire trunk - T, R, S, & SP
SD-55255-01	DPMO	Use Fig. 2.
	2W E&M	Use Fig. 3.

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-55256-01	DPMO	Use Fig. 2.
	2W E&M	Use Fig. 3.
SD-55259-01	None	Wet-Dry supv
SD-55275-01	2W E&M	
SD-55291-01	DPMO,RPO	OK with Fig. B and rev bat. supv (opt Y)
SD-55301-01	DPMO	OK without opt H
SD-55346-01	DPMO	OK with Fig. 1 and rering control
SD-55358-01	2W E&M	
SD-55379-01	2W E&M	
SD-55380-01	2W E&M	
SD-55381-01	2W E&M	OK E&M supv (Fig. 4)
SD-55382-01	None	20-Hz ringing
SD-55386-01	2W E&M	OK with no ring control
SD-55463-01	None	20-Hz ringing
ES-55515-01	Yes	Marine Radio Terminal
SD-55600-01	None	Ringdown
SD-55602-01	None	Ringdown
SD-55609-01	2W E&M	
SD-55615-01	Yes	Compat. depends on assoc. trunk ckt.
SD-55637-01	None	Ringdown
SD-55719-01	None	Thru ringing
SD-55775-01	Yes	Compat. depends on assoc. trunk ckt.
SD-55776-01	None	Wet-Dry supv
SD-55778-01	DPMO	
SD-55793-01	None	20-Hz ring, 24V battery
SD-55844-01	None	130V coin battery
SD-55852-01	2W E&M	
SD-55864-01	None	20-Hz ringing
SD-55872-01	None	Wet-Dry supv
SD-55875-01	None	Wet-dry supv, +110, -48V coin
SD-55879-01	DPMO	Use rev bat supv. NG for controlled ringing, coin or no-test use
SD-55889-01	None	Multistate signaling
SD-55894-01	None	CX supv
SD-55917-01	DPMO	OK with rev. bat. supv and Fig. B
SD-55921-01	None	SX ring control
SD-55926-01	None	Wet-Dry, rev bat. supv
SD-55952-01	None	Wet-dry, High-Low supv
SD-56009-01	2W E&M	OK outgoing only
SD-56010-01	2W E&M	
SD-56032-01	None	Requires metallic circuit
SD-56036-01	None	CX or SX supv
SD-56045-01	None	SX rering

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-56051-01	None	20-Hz ringing
SD-56055-01	4W SX	SX signaling on phantom
SD-56056-01	4W SX	SX signaling on phantom
SD-56057-01	DPT	
SD-56062-01	2W E&M	
SD-56082-01	DPMO	
SD-56105-01	DPMO	OK with auto start ringing
SD-56109-01	2W E&M	
SD-56119-01	None	Multi-state signaling
SD-56121-01	None	Wet-Dry supv
SD-56123-01	None	Uses T&R separately, 130V bat.
SD-56128-01	DPMO,RPO	OK with rev bat. supv no ring start signal
SD-56131-01	2W E&M	
SD-56133-01	2W E&M	
SD-56146-01	None	SX ringing
SD-56153-01	DPMO	
SD-56154-01	2W E&M	
SD-56155-01	2W E&M	
SD-56159-01	2W E&M	
SD-56163-01	2W E&M	
SD-56172-01	None	Requires two-way loop trunk
SD-56199-01	None	20-Hz applied to T&R
SD-56209-01	None	SX ringing
SD-56210-01	None	SX ringing
SD-56211-01	None	SX ringing
SD-56214-01	2W E&M	
SD-56219-01	None	SX ringing
SD-56225-01	None	Requires DC path
SD-56241-01	None	High-Low supv
SD-56257-01	2W E&M	OK outgoing only
SD-56314-01	2W E&M	
SD-56355-01	None	SX ring control
SD-56358-01	None	Wet-Dry supv
SD-56371-01	None	Test trunk using 2 pairs
SD-56389-01	FXO	
SD-56413-01	2W E&M	
SD-56414-01	2W E&M	
SD-56415-01	2W E&M	OK with AUX VF ring ckts
SD-56416-01	2W E&M	
SD-56420-01	2W E&M	
SD-56421-01	2W E&M	
SD-56422-01	2W E&M	
SD-56423-01	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-56424-01	2W E&M	
SD-56434-01	2W E&M	
SD-56435-01	2W E&M	
SD-56474-01	DPMO	
SD-56475-01	2W E&M	
SD-56477-01	2W E&M	
SD-56478-01	2W E&M	
SD-56479-01	2W E&M	
SD-56480-01	DPMO	
SD-56481-01	2W E&M	
SD-56482-01	DPMO	
SD-56483-01	2W E&M	
SD-56487-01	2W E&M	OK without coin control
SD-56488-01	2W E&M	OK without coin control
SD-56492-01	None	130V SX battery
SD-56496-01	DPT	
SD-56501-01	FXO	Use option K.
SD-56507-01	2W E&M	
SD-56509-01	2W E&M	
SD-56521-01	2W E&M	
SD-56525-01	DPMO,RPO	Use option XF, XH, ZL for Hi-Low supv out. 2-way trunk not compatible. Rec Comp trk. not compat. because of SX or 20-Hzring Toll Switch trk. not compat. with SX or 20 Hz ring
	2W E&M	Type I (opt A, XN) or Type II (opt A, XO)
SD-61609-01	None	Ringdown
SD-62049-01	DPT	
SD-62085-01	None	3-wire trunk
SD-62209-01	None	High-Low supv
SD-62210-01	None	3-wire trunk
SD-62213-01	None	3-wire trunk
SD-62285-01	None	3-wire trunk
SD-62290-01	None	3-wire trunk
SD-62313-01	None	3-wire trunk
SD-62352-01	None	Ringdown
SD-62403-01	None	Wet-Dry supv
SD-62409-01	None	Ringdown trunk
SD-62423-01	None	Wet-Dry, High-Low supv
SD-62487-01	FXO	Use option K.
SD-62496-01	None	3-wire trunk
SD-62521-01	None	3-wire trunk
SD-62533-01	None	Ringdown trunk
SD-62576-01	None	CX signaling

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-62611-01	None	20-Hz ringing
SD-62648-01	None	3-wire trunk
SD-62650-01	None	Wet-Dry, Hi-Low Supv
SD-62717-01	FXO	
SD-62745-01	None	High-Low supv
SD-62825-01	None	Ringdown trunk
SD-62833-01	None	Ringdown trunk
SD-62884-01	None	Ringdown trunk
SD-63820-01	None	High-Low, Wet-Dry supv
SD-63823-01	None	Arr for use with repeater
SD-63824-01	None	Arr for use with repeater
SD-64221-01	None	Hi-Low supv
SD-64430-01	Yes	For use with Rec-Comp trunks
SD-64469-01	2W E&M	Drawing issue 34B or later
SD-64472-01	2W E&M	
SD-64473-01	None	20-Hz ringing
SD-64474-01	2W E&M	OK with E&M supv only
SD-64475-01	2W E&M	
SD-64482-01	DPT	
SD-64484-01	2W E&M	
SD-64487-01	None	20-Hz ringing
SD-64501-01	FXO	
SD-64531-01	2W E&M	
SD-64538-01	2W E&M	
SD-64539-01	None	Wet-Dry supv
SD-64553-01	DPT	
SD-64568-01	None	3- or 4-wire trunk
SD-64571-01	None	Wet-Dry supv, 20-Hz ringing
SD-64574-01	None	CX signaling
SD-64583-01	DPMO	
SD-64584-01	None	CX signaling
SD-64590-01	2W E&M	
SD-64626-01	DPMO	OK with Fig. F and P or S
SD-64645-01	2W E&M	OK with E&M leads only (Fig. 7)
SD-64646-01	2W E&M	
SD-64649-01	DPT	
SD-64662-01	2W E&M	
ES-64663-01	2W E&M	
SD-64664-01	DPT	
SD-64680-01	2W E&M	
SD-64697-01	2W E&M	OK E&M port only
SD-64698-01	2W E&M	
SD-64724-01	Yes	Toll testboard

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-64767-01	FXS	X option not compatible
SD-64824-01	2W E&M	
SD-64832-01	DPMO	Not compat. with wet-dry supv or controlled ringing
SD-65066-01	None	20-Hz Ringdown
SD-65067-01	None	20-Hz Ringdown
ES-65125-01	None	Wet-Dry supv
SD-65176-01	None	20-Hz Ringdown
SD-65530-01	DPO	OK outgoing only
SD-65531-01	DPO	OK outgoing only
SD-65535-01	DPO	OK outgoing only
ES-65602-01	2W E&M	
ES-65625-01	2W E&M	
SD-65652-01	None	20-Hz ringdown
SD-65657-01	FXS	Not good for toll diversion
ES-65669-01	2W E&M	
SD-65691-01	None	20-Hz ringdown
SD-65718-01	2W E&M	OK with E&M supv only
SD-65718-02	2W E&M	OK with E&M supv only
SD-65733-01	DPO	Use option W with T&R leads reversed.
SD-65752-01	FXS	
SD-65755-01	DPT	OK incoming only
SD-65788-01	None	3-wire trunk
SD-65791-01	DPO	
SD-65792-01	DPT	
SD-65793-01	DPT	
SD-65799-01	No	3-wire trunk
SD-65812-01	DPT	
SD-65813-01	None	3-wire trunk
SD-65823-01	DPO	Use option Y with T&R leads reversed.
SD-65831-01	DPO	OK without camp-on, ring or busy flash
SD-65893-01	None	20-Hz ringdown
SD-65952-01	DPT	OK for verification only
SD-65978-01	DPT	Reverse T&R. See Sec. B 2.1.4.
SD-66013-01	None	20-Hz Ringdown
SD-66025-01	None	20-Hz ringdown
SD-66038-01	DPO	
SD-66039-01	DPO	
SD-66040-01	DPO	
SD-66041-01	DPT	OK outgoing only
SD-66042-01	DPT	
SD-66043-01	DPT	
SD-66044-01	None	Wet-Dry supv

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-66065-01	DPO	Use option F with T&R leads reversed.
SD-66066-01	DPO	Use option ZB with T&R leads reversed.
SD-66068-01	None	20-Hz Ringdown
SD-66098-01	None	Wet-Dry supv
SD-66099-01	None	Wet-Dry supv
SD-66100-01	None	Wet-Dry supv
SD-66101-01	None	Wet-Dry supv
SD-66102-01	None	Wet-Dry supv
SD-66104-01	DPO	OK outgoing only
SD-66106-01	DPO	OK outgoing only
SD-66192-01	FXS	Towards subscriber line circuit
	FXO	Towards PBX trunk circuit
SD-66211-01	None	Wet-Dry supv
SD-66241-01	None	Wet-Dry supv
SD-66257-01	None	Wet-Dry supv
SD-66268-01	None	Two-Way ringdown tie trunk
SD-66296-01	None	Wet-Dry supv
SD-66297-01	DPO	
SD-66298-01	DPO	
SD-66299-01	DPT	
SD-66300-01	DPO	OK outgoing only
SD-66305-01	None	Wet-Dry supv
SD-66310-01	None	Wet-Dry supv
SD-66310-02	None	Wet-Dry supv
SD-66311-01	None	Wet-Dry supv
SD-66311-02	None	Wet-Dry supv
SD-66312-01	DPO	OK outgoing only
SD-66359-01	None	Wet-Dry flash
SD-66360-01	None	Wet-Dry flash
SD-66401-01	None	20-Hz ringdown
SD-66431-01	DPO	OK outgoing only
SD-66470-01	None	Two-way ringdown tie trunk
SD-66470-02	None	Two-way ringdown tie trunk
SD-66470-03	None	Two-way ringdown tie trunk
SD-66470-04	None	Two-way ringdown tie trunk
SD-66470-05	None	Two-way ringdown tie trunk
SD-66520-01	FXS	See Sec. B 2.7.
SD-66523-01	DPO	
SD-66524-01	DPO	Use option F with T&R leads reversed.
SD-66578-01	None	20-Hz Ringdown
SD-66592-01	FXS	
SD-66594-01	DPT	Inc. first selector
SD-66601-01	DPT	OK incoming only

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	DPO	OK outgoing only
SD-66605-01	None	Two-way ringdown tie trunk
SD-66606-01	None	Two-way ringdown tie trunk
SD-66607-01	FXS	
SD-66617-01	FXS	NG with option V
SD-66622-01	DPO	Use option ZJ with T&R leads reversed.
SD-66715-01	FXO	
SD-66740-01	DPT	NG with trunk simplexing, see Sec. C 1.15.
SD-66741-01	DPT	
SD-66749-01	None	20-Hz Ringdown
SD-66766-01	None	20-Hz Ringdown
SD-66777-01	DPT	OK with option Z
SD-66799-01	2W E&M	OK with E&M supv (Y opt)
SD-66861-01	None	3-wire trunk
SD-66896-01	2W E&M	Compatible, but see Sec. B 2.6.
SD-66979-01	None	ACD requires forward disconnect
SD-68012-01	DPMO	OK for rev bat supv
SD-68015-01	Yes	DP Inc Sender. See Sec. C 1.1.
SD-68018-01	Yes	Rev & PCI Outg Sender. See Sec. C 1.1.
SD-68019-01	Yes	DP Outg Sender. See Sec. C 1.1.
SD-68097-01	DPT	OK with Fig. B
	DPMO	OK with Fig. C
SD-68102-01	4W E&M	
SD-68135-01	4W E&M	
SD-68142-01	None	Two-way Ringdown
SD-68154-01	4W E&M	
SD-68221-01	Yes	DP Inc Sender. See Sec. C 1.1.
SD-68222-01	Yes	MF Inc Sender. See Sec. C 1.1.
SD-68230-01	4W E&M	
SD-68231-01	4W E&M	
SD-68232-01	4W E&M	
SD-68233-01	4W E&M	
SD-68239-01	None	SX DC rering
SD-68240-01	None	Wet-Dry supv
SD-68242-01	DPMO	See Sec. B 3.4.
SD-68259-01	4W E&M	
SD-68260-01	None	Ringdown
SD-68289-01	None	SX supervision
SD-68290-01	DPT	OK w/o SX supervision
SD-68299-01	None	SX supervision
SD-68302-01	None	SX ringing
SD-68307-01	None	SX ringing
SD-68308-01	4W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-68309-01	None	SX supervision
SD-68312-01	4W E&M	
SD-68314-01	None	SX supvervision
SD-68315-01	None	20-Hz ringing
SD-68318-01	DPT	OK w/o 20-Hz ringing
SD-68323-01	None	SX supervision
SD-68325-01	DPMO	OK rev bat, no SX rering, see Sec.B 3.4
SD-68326-01	DPMO,RPO	See Sec.B 3.4.
SD-68331-01	DPT	OK w/o SX rering
SD-68332-01	None	Wet-dry supv
SD-68355-01	4W E&M	
SD-68357-01	None	SX supervision
SD-68358-01	DPT	Use option A, V and ZA. See Sec.B 2.1.4. OK without simplex rering
SD-68362-01	None	Two-way ringdown
SD-68363-01	None	Two-way supervision
SD-68364-01	None	Ringdown
SD-68366-01	None	Equipped with repeater
SD-68397-01	None	4-wire with SX on phantom
SD-68401-01	None	Requires DC path
SD-68459-01	None	Ringdown
SD-68479-01	4W E&M	
SD-68480-01	DPT	See Sec.B 3.4 and Sec.C 1.15.
SD-68481-01	4W E&M	
SD-68482-01	DPT	See Sec.B 3.4.
SD-68485-01	None	Requires DC path
SD-68508-01	4W E&M	
SD-68513-01	4W E&M	See Sec.B 2.6.4.
SD-68514-01	4W E&M	See Sec.B 2.6.4.
SD-68527-01	None	20-Hz or SX ringing
SD-68529-01	4W E&M	
SD-68537-01	4W E&M	
SD-68547-01	None	SX signaling
SD-68564-01	FXO	
SD-68575-01	Yes	MF Inc Sender
SD-68579-01	4W E&M	
SD-68581-01	4W E&M	
SD-68582-01	4W E&M	
SD-68595-01	4W E&M	See Sec.B 2.6.4.
SD-68596-01	4W E&M	See Sec.B 2.6.4.
SD-68621-01	4W E&M	
SD-68623-01	4W E&M DPMO	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-68625-01	4W E&M DPT	
SD-68626-01	4W E&M	
SD-68627-01	4W E&M	
SD-68961-01	DPT	OK without SX, or 20-Hz ringing. See Sec. B 3.4.
SD-68962-01	DPMO	OK with opt R (rev bat). See Sec. B 3.4.
SD-68966-01	None	SX supervision
SD-69286-01	FXO	Reverse leads 9&10 in Fig. 12
SD-90000-01	DPT	OK (Fig. B,C,D or E)
SD-90036-01	None	Wet-Dry supv
SD-90077-01	FXO	See Sec. B 2.8 .
SD-90257-01	None	24-volt rev bat supv
SD-90275-01	None	Wet-Dry supv
SD-90403-01	None	Requires metallic loop for test
SD-90434-01	DPT	OK with Fig. 1 rev. T&R. See Sec. B 2.1.4.
SD-90439-01	None	CX signaling
SD-90451-01	None	High-Low, Wet-Dry supv
SD-90506-01	None	Requires metallic ckt for test
SD-90527-01	None	24V rev bat supv
SD-90555-01	None	3- or 4-wire
SD-90558-01	None	See Sec. B 2.3.
SD-90566-01	DPT	
SD-90580-01	None	Wet-Dry rev battery
SD-90581-01	None	Wet-Dry rev battery
SD-90647-01	None	PCI pulsing
SD-95037-01	DPMO	
SD-95060-01	DPT 2W E&M	Loop Incoming. Loop-to-E&M E&M Outgoing. Converter
SD-95061-01	2W E&M	
SD-95079-01	DPO	OK rev bat supv. Auto start of ring
SD-95095-01	2W E&M 4W E&M	
SD-95405-01	None	T&R used independently
SD-95413-01	None	Grd start trunk. See Sec. C 1.6.
SD-95425-01	DPMO	
SD-95426-01	None	Wet-Dry, bat and grd supv
SD-95436-01	None	SX and DC ringing control
SD-95443-01	4W E&M	
SD-95459-01	DPMO	
SD-95462-01	DPT	OK with Fig. B,C or D
SD-95467-01	DPMO	OK with rev bat. (Fig. B)
SD-95470-01	None	Wet-Dry supv

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-95471-01	None	20-Hz ringing or SX ringing
SD-95474-01	None	Multi-state signaling on T&R
SD-95475-01	None	SX ringing or 20-Hz ringing
SD-95476-01	Yes	Test Circuit
SD-95481-01	Yes	Sender
SD-95486-01	None	SX ringing
SD-95487-01	None	Works with trunks only (DX-1)
SD-95488-01	2W E&M 4W E&M	(DX-2)
SD-95489-01	4W E&M	
SD-95495-01	None	Wet-Dry supv
SD-95504-01	None	CX or SX supv
SD-95513-01	DPT	OK with Fig. C,D or E
SD-95530-01	None	PCI pulsing
SD-95538-01	DPT	
SD-95542-01	DPMO	OK with opt Y
SD-95543-01	DPT	OK with Fig. 7 or 8
SD-95545-01	None	Requires metallic ckt for test
SD-95546-01	DPMO	
SD-95560-01	DPMO	Use Fig. 6 only.
SD-95563-01	None	Requires DC path
SD-95564-01	None	Requires DC path
SD-95565-01	None	SX or 20-Hz ringing
SD-95566-01	None	High-Low rev bat. supv
SD-95569-01	DPT 2W E&M	Use Fig.A or B. Use Fig.C .
SD-95585-01	DPT	OK with rev bat. supv (Fig. C or D)
SD-95615-01	None	High-Low supv
SD-95617-01	DPMO	
ES-95668-01	2W E&M	
SD-95673-01	None	Wet-Dry supv
SD-95691-01	None	Wet-Dry supv
SD-95704-01	None	SX ringing
SD-95711-01	None	SX ringing
SD-95731-01	None	3- or 4-wire
SD-95740-01	None	SX control
SD-95744-01	None	Wet-Dry supv
SD-95745-01	None	Wet-Dry supv
SD-95777-01	DPT	
SD-95782-01	None	Wet-Dry supv
SD-95789-01	None	SX and Wet-Dry supv
SD-95793-01	None	3- or 4-wire
SD-95846-01	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-95850-01	2W E&M	
SD-95851-01	None	DX signal and coin control
SD-95861-01	DPT	
SD-95862-01	DPT	
SD-95876-01	None	See Sec. B 2.3.
SD-95890-01	Yes	See assoc. trunk ckt.
SD-95962-01	2W E&M	Issue 19B or later
SD-95964-01	2W E&M	
SD-95974-01	2W E&M	
SD-95976-01	2W E&M	
SD-95979-01	DPMO,FXS	Use DPMO or FXS unit as req. by far end
SD-96098-01	DPT	
SD-96117-01	None	CX signal without E&M leads
SD-96149-01	SDPO	
SD-96169-01	None	High-Low supv
SD-96189-01	DPT	
SD-96195-01	None	3-wire trunk
SD-96202-01	None	PCI pulsing
SD-96209-01	None	Wet-Dry supv
SD-96210-01	None	Bat and Grd and rev bat. supv
SD-96216-01	None	Ringdown
SD-96221-01	None	Ringdown
SD-96250-01	None	Wet-Dry supv
SD-96251-01	2W E&M	
SD-96252-01	2W E&M	
SD-96268-01	DPT	
SD-96279-01	DPT	Announcement Trunk
SD-96283-01	DPMO	
SD-96301-01	None	2-way bat and grd supv
SD-96333-01	DPT	
SD-96334-01	None	20-Hz ringing
SD-96340-01	DPT	
SD-96352-01	None	24V rev bat supv
SD-96355-01	DPT	OK with Fig. B,C or D
SD-96363-01	DPT	OK with Fig. D or H
SD-96365-01	None	Wet-Dry supv, SX coin
SD-96366-01	None	PCI pulsing
SD-96369-01	None	Simplex
SD-96370-01	DPMO	
SD-96384-01	Yes	OK with Fig. 5,6,7,9,11,13,15
SD-96389-01	None	PCI pulsing
SD-96394-01	None	Ringdown trunk
SD-96395-01	None	Wet-Dry supv, 20-Hz ringing

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-96398-01	DPMO 2W E&M	Loop Outgoing. E&M-to-Loop E&M Incoming. Converter
SD-96412-01	None	20-Hz ringing
SD-96413-01	DPT	
SD-96452-01	None	Low return loss
SD-96453-01	Yes	Pulse converter circuit
SD-96459-01	DPMO	
SD-96461-01	None	SX or 20-Hz ringing
SD-96463-01	2W E&M	
SD-96467-01	DPMO	OK with Fig. 3,5,9
SD-96469-01	None	SX ringing
SD-96479-01	Yes	Aux Sender. See Sec. C1.1.
SD-96481-01	2W E&M	OK with E&M supv only
SD-96482-01	2W E&M	OK with E&M supv only
SD-96487-01	2W E&M	
SD-96488-01	2W E&M	
SD-96517-01	Yes	Compat. depends on connected trunk
SD-96541-01	DPMO	
SD-96544-01	None	Requires DC path
SD-97047-01	4W E&M	Use 333B relay, set screw switches for Type II or III Interface. See Sec. C 3.5.
SD-97570-01	4W E&M	
SD-97571-01	DPT	Use FS1.
	2W E&M	Use FS2.
	4W E&M	Use FS3.
SD-97572-01	DPT	Use FS1. NG for High-Low
	2W E&M	Use FS3.
	4W E&M	Use FS4.
SD-97573-01	None	+130 volts simplexed on T&R
SD-97574-01	2W E&M	Use FS1.
	4W E&M	Use FS2.
SD-97577-01	DPT	Use FS1. NG for High-Low or DX conversion
	2W E&M	Use FS3.
	4W E&M	Use FS4.
SD-97578-01	4W E&M	
SD-98060-01	None	130V SX
SD-98061-01	None	High-Low rev bat supv
SD-99301-01	Yes	FSP Receiver
SD-99309-01	2W E&M	Remote Test Circuit
SD-99311-01	2W E&M	Remote Test Circuit
SD-99378-01	DPT	
SD-99388-01	DPMO	OK with opt. Y. See Sec. B 2.2.
SD-99415-01	2W E&M	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-99419-01	2W E&M	
SD-99420-01	DPT	Use DPT unit at orig and term end
SD-99434-01	DPMO	OK with FS 22 or 24
SD-99435-01	2W E&M	E&M to SX converter
SD-99446-01	2W E&M	SX to E&M converter
SD-99449-01	2W E&M	Issue 9B or later
SD-99782-01	None	Transmission only, see SD-1B145-01 for signaling compatibility. See Sec. C 3.5 also.
SD-1A120-01	Yes	AMA circuit
SD-1A156-01	DPT	Use FS2.
	2W E&M	Use FS3.
SD-1A157-01	None	Req metallic ckt for tests
SD-1A163-01	2W E&M	Option Z for Type III or option Y for Type II interface
SD-1A165-01	DPMO,RPO	OK for MF. OK DP except with delay dial trunks. See Sec. B 2.2.
SD-1A165-02	DPMO,RPO	Up to Issue 5AC see SD-1A165-01 above. Issue 6B OK for MF or DP.
SD-1A165-05	DPMO,RPO	OK for MF or DP.
SD-1A166-01	DPT,RPT	
SD-1A166-02	DPT,RPT	
SD-1A166-05	DPT,RPT	
SD-1A167-01	2W E&M	
SD-1A169-01	None	Wet-Dry supv
SD-1A172-01	Yes	Customer DP Receiver
SD-1A173-01	Yes	TT Call Detector
SD-1A175-01	Yes	MF Transmitter
SD-1A176-01	Yes	Network Access Trunk
SD-1A177-01	None	Wet-Dry and simplex supv
SD-1A178-01	DPT	
SD-1A179-01	Yes	DP Transmitter
SD-1A180-01	RPT	
SD-1A181-01	RPO	
SD-1A184-01	None	Simplex rering
SD-1A184-05	None	Simplex rering
SD-1A185-01	None	DC ring & coin
SD-1A186-01	None	Simplex and marginal signaling
SD-1A187-01	None	Requires metallic ckt for tests
SD-1A187-05	None	Requires metallic ckt for tests
SD-1A189-01	Yes	Conference circuit
SD-1A190-01	None	High-Low supv
SD-1A190-05	None	High-Low supv
SD-1A192-01	DPT	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-1A192-05	DPT	
SD-1A193-01	DPT	
SD-1A195-01	None	PCI pulsing
SD-1A198-01	None	130V dc SX signaling
SD-1A199-01	Yes	Touch-Tone Station Test Set
SD-1A203-01	DPMO	OK for MF. OK DP except with delay dial trunks. OK for AIC. See Sec. B 2.2.
SD-1A203-05	DPMO	OK for MF. OK DP except with delay dial trunks. OK for AIC. See Sec. B 2.
SD-1A218-01	Yes	Tone or announcement circuit
SD-1A220-01	DPT	See Sec. C 1.15.
SD-1A221-01	Yes	Audible ring circuit
SD-1A222-01	Yes	Perm signal, partial dial holding ckt
SD-1A225-01	Yes	Milliwatt and loop around test ckt
SD-1A226-01	Yes	Continuity Polarity Test ckt
SD-1A227-01	Yes	Transmission Test Termination ckt
SD-1A236-01	4W E&M	Opt W for Type III or opt V for Type II
SD-1A236-05	4W E&M	Type II or Type III interface switch
SD-1A237-01	4W E&M	Opt W for Type II interface
SD-1A237-02	4W E&M	Type II or Type III interface key
SD-1A237-05	4W E&M	Type II or Type III interface switch
SD-1A238-01	DPT	OK incoming only
	DPMO	OK outgoing only
SD-1A239-01	DPMO	Requires 2 channels
SD-1A240-01	FXS	
SD-1A241-01	FXS	
SD-1A244-01	Yes	Attendant loop circuit
SD-1A245-01	DPMO	
SD-1A246-01	Yes	MF Receiver
SD-1A248-01	None	4-wire loop
SD-1A249-01	Yes	3 port conference circuit
SD-1A252-01	2W E&M	Type III interface only
SD-1A252-05	2W E&M	Type II or Type III interface switch
SD-1A254-01	None	130V battery
SD-1A255-01	None	130v battery
SD-1A264-01	DPMO	OK outgoing only
	DPT	OK incoming only
SD-1A266-01	DPT	
SD-1A266-05	DPT	
SD-1A287-01	4W E&M	Option Y for Type II interface
SD-1A301-01	None	SX signaling, use SD-99435-01
SD-1A311-01	DPT	
SD-1A312-05	2W E&M	Type II or Type III interface switch

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-1A315-01	DPMO,DPT	Requires DPMO and DPT unit at each end of trunk (2 carrier channels)
SD-1A316-01	2W E&M	Type III interface only. Two channels req.
SD-1A317-01	NO	To many signaling states
SD-1A318-01	4W E&M	Opt Z for Type III or OPT Y for Type II
SD-1A319-01	FXO	Use option Z.
SD-1A362-01	4W E&M	Type II interface only
SD-1A366-01	4W E&M	Type II interface only
SD-1A367-01	DPT	
SD-1A367-02	DPT	
SD-1A368-01	4W SX	
SD-1A371-01	DPT	
SD-1A371-02	DPT	
SD-1A373-01	DPO	
SD-1A373-02	DPO	
SD-1A374-01	4W SX	
SD-1A374-02	4W SX	
SD-1A383-01	None	Announcement Circuit
SD-1A383-02	None	Announcement Circuit
SD-1A393-01	4W EM	Type II interface only
SD-1A393-02	4W E&M	Type II interface only
SD-1A396-01	4W FXS	
SD-1A396-02	4W FXS	
SD-1B002-01	DPT	OK only with in-band coin & ringback.
SD-1B003-01	DPT	OK with in-band coin & ringback signals or non-coin with wink ringback. See Sec.B 5.2.3.
SD-1B004-01	2W E&M	Use CAD 9&12 for Type III or CAD 11&13 for Type II interface. See Sec. C 3.5.
SD-1B005-01	2W E&M	Use CAD 11 for Type III or CAD 13 for Type II interface. See Sec. C 3.5.
SD-1B006-01	4W E&M	Toward cust use CAD 6 for Type III or CAD 7 for Type II interface. See Sec. C 3.5. Toward office see Sec. C 3.5
SD-1B007-01	4W E&M	Toward cust use CAD 6 for Type III or CAD 7 for Type II interface. See Sec. C 3.5. Toward office see Sec. C 3.5
SD-1B008-01	None	Not recommended for transmission reasons.
SD-1B009-01	4W E&M	See Sec. C 3.5.5.
SD-1B010-01	DPMO	OK with loop signaling (Z option)
SD-1B016-01	2W E&M	OK with E&M signaling (FS2) only. Type III interface. Uses two carrier channels. See Sec. C 3.5.
SD-1B102-01	DPT,DPMO	DPT inc, DPMO outg, use opt Z

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
	2W E&M	Use opt Y. Two channels required.
SD-1B103-01	DPMO	Use opt Z.
	2W E&M	Use opt Y. Two channels required.
SD-1B110-01	2W E&M	
SD-1B115-01	DPMO	Outg. Wink ringforward only. Omit option V.
	DPT	Incoming. Use option R.
SD-1B116-01	2W E&M	Inc. Type II (opt S) or Type III (opt T)
	DPMO	Outg. Wink ringforward only. Omit option V.
SD-1B117-01	4W E&M	Inc. Type II (opt W) or Type III (opt X)
	None	Outg. SX signaling. See Sec. C 3.5.
SD-1B118-01	4W E&M	Inc. Type II (opt W) or Type III (opt X)
	4W E&M	Outg. Type II (opt Y) or Type III (opt Z)
SD-1B145-01	4W E&M	Type II (opt W, V) or Type III (opt W, T) See Sec.C 3.5.
SD-1B154-01	DPMO	
SD-1B183-01	DPMO	
SD-1B185-01	DPT	Use DPT channel unit, INC & OTG.
SD-1B186-01	DPT	
SD-1B188-01	None	SX supv
SD-1B191-01	DPMO	Use DPMO channel unit, INC & OTG.
SD-1B193-01	DPMO	
SD-1B195-01	DPMO	
SD-1B197-01	DPMO	
SD-1B198-01	DPMO	
SD-1B250-01	DPMO	
SD-1B276-01	4W E&M	Type I (opt X) or Type II (opt W) interface
SD-1B283-01	4W E&M	
SD-1C004-01	None	SX signaling, use SD-99435-01
SD-1C234-01	None	SX signaling, use SD-99435-01
SD-1C353-01	2W E&M	Use FS1&3.
	4W E&M	Use FS1.
SD-1C354-01	2W E&M	Use FS1&3.
	4W E&M	Use FS1.
SD-1D203-01	Yes	405A Data Set
SD-1D204-01	Yes	405B Data Set
SD-1E000-01	FXO	
SD-1E003-01	DPT	See Sec.C 1.15.
SD-1E004-01	DPT	
SD-1E007-01	None	SX signaling, use SD-99446-01
SD-1E011-01	FXO	
SD-1E088-01	FXS	
SD-1E201-01	FXS	NG with Toll Conn or Rev Bat.
SD-1E202-01	FXS	

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-1E213-01	FXS	
SD-1E219-02	None	Two-way ringdown
SD-1E220-02	2W E&M	Two-wire transmission facility
	4W E&M	Four-wire transmission facility
SD-1E240-01	DPT	
SD-1E304-01	FXO	NG with toll diversion
SD-1E306-01	FXS	NG with toll diversion
SD-1E307-01	FXS	NG with toll diversion
SD-1E318-01	None	Two-way ringdown
SD-1E321-01	2W E&M	
SD-1E369-01	DPT	
SD-1E446-01	DPT	DPT OK
	2W E&M	Non-conforming interface, See Sec.3.3.
SD-1E500-01	None	See Sec.C 3.3.
SD-1E500-02	None	See Sec.C 3.3.
SD-1E505-01	None	SX signaling, use SD-99446-01
SD-1G228-01	None	High-Low supv
SD-1G235-01	4W E&M	
SD-1H027-01	None	SX signaling
SD-1H042-01	2W E&M	
SD-1H043-01	DPT	
SD-1H044-01	None	Wet-Dry supv
SD-1H061-01	2W E&M	
SD-1H065-01	2W E&M	
SD-1H083-01	2W E&M	
SD-1H084-01	2W E&M	
SD-2A014-01	4W E&M	
SD-2H101-01	DPT	
SD-2H103-01	DPMO	
SD-2H103-02	DPMO	
SD-2H104-01	DPT	
SD-2H105-01	None	High-Low, Wet-Dry supv
SD-2H107-01	None	Wet-Dry, High-Low supv
SD-2H108-01	None	Three-wire, SX rering
SD-2H109-01	None	Sleeve lead supv
SD-2H110-01	DPT	
SD-2H111-01	DPT	
SD-2H112-01	2W E&M	T or E,J wiring for Type II Interface S or E,H wiring for Type III Interface
SD-2H113-01	None	130V coin battery
SD-2H141-01	None	Sleeve lead supv
SD-2H144-01	DPMO	
SD-2H147-01	None	Wet-Dry supv

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
SD-2H148-01	None	4-state supv. Incompatible ICT
SD-2H149-01	DPT	
SD-2H151-01	None	Polar duplex signaling
SD-2H154-01	DPT	
SD-2H155-01	None	Supv over sleeve leads
SD-2H156-01	None	Supv over sleeve leads
SD-2H157-01	4W E&M	W wiring for Type II Interface X wiring for Type III Interface
SD-2H158-01	4W E&M	Z wiring for Type II Interface Y wiring for Type III Interface
SD-2H173-01	FXO	
SD-2H174-01	FXS	
SD-2H180-01	None	Signaling on A&B leads
SD-2H186-01	FXO	
SD-3B204-01	4W E&M	
SD-3B205-01	4W E&M	
SD-3H220-01		See CPS's below.
CPS-FB360	DPMO	
CPS-FB361	2W E&M	Type II interface only
CPS-FB370	None	Incompatibility at distant end (4A Office)
CPS-FB371	DPT	
CPS-FB382	2W E&M	Type II interface only
CPS-FB391	2W E&M	Type III interface only
CPS-FB399	DPMO	
SD-5E001-01	FXS	NG with toll diversion or cord ckts with ringing feature
SD-5E004-01	2W E&M	
SD-5E028-01	2W E&M	
SD-5E041-01	4W E&M 2W E&M	
SD-5E046-01	DPT	
SD-5E047-01	DPT	
ES-6G108-01	4W E&M	For associated audio facility
SD-7C005-01	4W E&M	Type II interface only
SD-7C022-01	4W E&M	See Sec.C 3.5. Use 333B relay, set screw switches for type II or III interface.
ES-226524	RPT	
ES-239443	RPT	
ES-240053	None	Low res TG test
ES-240102	RPT	
ES-240252	None	Short range

SWITCHING CIRCUIT COMPATIBILITY LIST

CKT. NUMBER	CHANNEL UNITS	REMARKS
ES-241921	None	Ringdown, Wet-Dry supv
ES-358100	None	T and R to 24V bat on return to normal
ES-358101	None	T and R to 24V bat on return to normal
ES-360040	None	Wet-Dry supv
S-30213	Yes	(Stromberg-Carlson trk)
S-30269	Yes	(Stromberg-Carlson trk)
S-30299	None	(Stromberg-Carlson trk)
S-30315	Cond	OK with Fig.9(S-C co. ckt)
S-33164	Yes	(Stromberg-Carlson trk)
S-33266	Yes	(Stromberg-Carlson trk)
S-408001	Yes	(Stromberg-Carlson trk)
S-408007	Yes	(Stromberg-Carlson trk)
S-408092	Yes	(Stromberg-Carlson trk)
103A	Yes	Data set
103E	Yes	Data set
103G	Yes	Data set
108A	Yes	Data set
108B	Yes	Data set
108C	Yes	Data set
108D	Yes	Data set
203A	Yes	Data set
405A	Yes	Data set
405B	Yes	Data set