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COMMON SYSTEMS
 48 CHANNEL PCM BANK TYPE D4
 TRUNK PROCESSING UNIT (TPU)

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 Provides trunk processing signals to the channel units during a carrier failure, sets the channel counting sequence, and provides equalizers to compensate for cable loss between the D4 bank and office cross-connect bay. Trunk processing is required in order to stop service charges, release connections and make trunks busy, prevent false ringing, and keep carrier noise from reaching the office trunk circuits. Options are provided for selecting the channel counting sequence, thus making the D4 bank compatible with other banks such as D1D, D2, or D3. Cable equalizers are provided as plug-in units to compensate for cable loss between the D4 bank and the office cross connect.

2. GENERAL DESCRIPTION OF OPERATION

2.01 Two sets of relays provide the contact closures for processing the trunk circuits via the channel units. There is one set of relays for each (24 channel) digroup (designated A and B). Control of these

relays is exerted by one or two alarm control units (ACUs), depending on whether the D4 bank is connected to a T1C line T2 line or two T1 lines and the mode of operation. During normal bank operation, all of the relays except two are operated and are released upon signals from the ACU when a carrier group alarm (CGA) is received. Loss of power or removal of the ACU causes the trunks to remain in or go to the processed condition. When the trunks are processed, light-emitting diodes (LEDs) associated with each digroup are turned on.

2.02 The trunk processing unit (TPU) provides two connectors for inserting cable equalizers to compensate for loss between the transmitting side of the D4 bank and office cross-connect bay (DSX1, DSX1C or DSX2). When the bank is connected to a T1C or T2 line, only one equalizer is used. When two T1 lines are connected, an equalizer is provided for each.

2.03 The channel counting sequence of the D4 bank is set by means of a selector block and to shorting plugs to set sequential, alternate sequential, or D2 counting.

SECTION II - DETAILED DESCRIPTION

1. TRUNK PROCESSING

1.01 Two sets of three relays, designated TP, TPD, and TPW, for each digroup A and B (ie, ATP, BTP, etc) provide the necessary sequence of contact closures to process the trunk circuits via the channel units. In addition, transistor drivers Q1 and Q2 provide dc drive signals to the channel units to disable the receive sampling gates when the trunks are taken out of service. When the bank is in service, these transistors are biased off.

1.02 When an alarm occurs, RNDIS goes from open to essentially ground as transistors Q1 and Q2 turn on. Relay TP is the major control relay. It is normally operated and is released when the carrier group alarm occurs. Approximately 2.5 seconds later, relay TPD releases and TPW operates for 70 milliseconds. This sequence of operations provides ground, -48 volts, or open to the channel units to process the trunks. Note 301 illustrates the sequence by means of waveforms which appear at the MREG, -48SD, RT, BT, and -48SD leads. When the TPD relay operates (2.5 seconds after TP), the TPD LEDs turn on, indicating that trunk

processing is complete and the trunks are out of service.

1.03 When the trunks are returned to service, relays TP and TPD are reoperated, and the TPD LEDs are off.

2. CHANNEL COUNTING SEQUENCE

2.01 The channel counting sequence is set using the selector block and shorting pin options per the following table.

Channel Counting Sequence	Shorting Pin Position	
	D1D	D2
Sequential	open	open
Alternate Sequential	short	open
D2	open	short

3. EQUALIZERS

3.01 When the D4 bank is connected to a T1C or T2 line, only one equalizer is required on the A side. The B side is left open. The equalizer is selected based on the wire distance between the bank and office cross connect. (See Application Schematic SD-3C290-01.)

3.02 When the D4 bank is connected to two T1 lines, separate equalizers are provided for each line.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Voltage limits:

	Min	Norm	Max
-48 ABS	-43	-48	-54
-48S	-43	-48	-54
+5	+4.5	+5	+5.5

2. FUNCTIONAL DESIGNATIONS

Note: Pin designations with A or B prefix refer to digroup A or B, respectively.

2.01 Relays:

Desig.	Meaning	Main Function
TP	trunk processor	Primary trunk processing relay makes signaling on-hook (-48SP)
TPD	trunk processor delayed	2.5 second delayed processing relay returns signaling to off-hook (-48SD)
TPW	trunk processor wink	provides 70 ms pulse on BT lead

2.02 Indicating LEDs:

Desig.	Meaning	Main Function
TPD-A	trunk process delayed (A)	Indicates A digroup is out of service
TPD-B	trunk process delayed (B)	Indicates B digroup is out of service

2.03 Leads:

Desig.	Meaning	Function
<u>INPUT</u>		
DIS	Receive sampling gate disable	Drive to Q1 or Q2
ETP	Enter trunk processor	Control of TP relay
ETPW	Enter trunk processor wink	Control of TPW relay
ETPD	Enter trunk processor delayed	Control of TPD relay

-48ABS	-48 alarm battery supply	Alarm battery
SG	signal ground	ground

OUTPUT

Note: Prefix A or B is assigned to indicate that leads are for A or B digroup.

RNDIS	Inverted DIS	Drives channel unit gate disabling circuit
ESS	Electronic switching machine	Trunk condition to ESS
MREG	Message register	-48V, 2.5 second pulse to message register when trunks are processed
-48SD	-48 volts delayed	Returns signaling to off-hook after 2.5 seconds
-48SP	-48 volts processed	Returns signaling to on- hook when trunks are processed
BT	Busy trunk	Make busy signal to re- lays in channel units when trunks are processed
RT	Release trunk	Make busy signal to re- lays in channel units when trunks are processed
D2,D1D		Channel counting sequence control
SI(CGA) SI(CGB)	Carrier Group Alarm	Contact closure to re- mote message register.

3. FUNCTIONS

3.01 Provides relays which operate in time sequence to process the associated trunk circuits via channel units when a carrier alarm is detected in the ACU.

3.02 Provides indicating LEDs to visually indicate trunks are processed (out of service).

3.03 Provides signal to operate message register each time as the trunks are processed.

3.04 Provides equalizers to compensate for wire loss between D4 bank and office cross-connect bay for T1C and T1 lines.

3.05 Provides options for setting the channel counting sequence in the D4 bank.

4. CONNECTING CIRCUITS

4.01 Common Systems - 48 Channel PCM. Bank - Type D4 - Application Schematic - SD-3C304-01

5. MANUFACTURING TESTING REQUIREMENTS

5.01 Manufacturing testing requirements are covered in X-79064.

SECTION IV - REASONS FOR REISSUE

CHANGES

D. Description of Changes

D.1 The changes in this issue provide information for Mode 4 and Mode 4A cable equalizers which compensate for cable length between the bank and the DSX2 cross-connect or T2 office repeater bay.

D.2 The changes also include addition of resistors R17 and R18 and minor drawing changes to correct errors and omissions.

D.3 In the feature or option table of Circuit Note 102, expansion is made to include cable lengths.

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