

CONNECTING ARRANGEMENT CTD

J53050G-TYPE INTERCONNECTING UNIT

1. GENERAL

1.01 This section provides identification, installation, operation, maintenance, and connecting information for Connecting Arrangement CTD. This connecting arrangement provides a means for connecting customer-provided (CP) toll diversion equipment to a Bell System central office (CO) trunk associated with a Bell System PBX.

1.02 This section is reissued to change designations on customer leads shown in Fig. 7.

1.03 When the customer-provided equipment (CPE) requires contact closures for off-hook indication and dc dial pulsing, Connecting Arrangement RCX must be used with Connecting Arrangement CTD. Information concerning Connecting Arrangement RCX is covered in Section 463-382-100.

1.04 One J53050G, List 1 (MD) interconnecting unit (IU), Fig. 1, equipped with six 7C timers provides six Connecting Arrangements CTD. One J53050G, List 2 IU (Fig. 2) equipped with four 7C timers provides four Connecting Arrangements CTD. (The 7C timers must be ordered separately—one per connecting arrangement.)

1.05 A block diagram of a typical Connecting Arrangement CTD, using a J53050G, List 2 IU, is shown in Fig. 3. A block diagram of a typical Connecting Arrangement CTD, using a J53050G, List 1 (MD) IU, is shown in Fig. 4. A block diagram of a typical Connecting Arrangement CTD used with a Connecting Arrangement RCX is shown in Fig. 5.

1.06 If the customer wants a copy of the Technical Reference which covers this interface specification, the customer should contact the local Telephone Company Business Office or the Marketing Representative.

This issue of the section is based on the following drawings:

CD-1E245-01, Issue 3, Appendix 1D

SD-1E245-01, Issue 4

If this section is to be used with equipment or apparatus reflecting later issue(s) of the drawing(s), reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

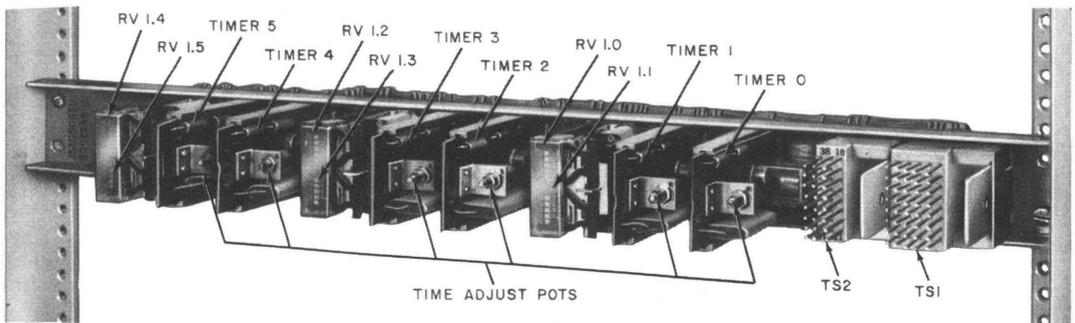


Fig. 1—J53050G, List 1 (MD) Interconnecting Unit Equipped With 7C Timers

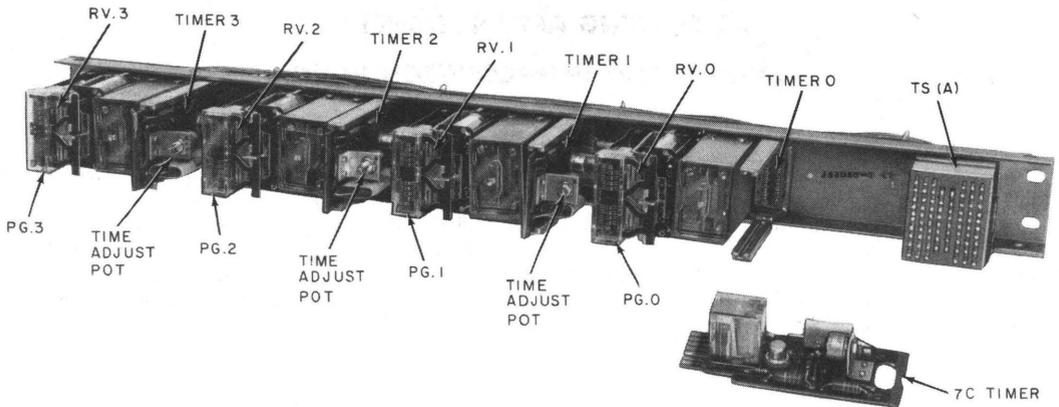


Fig. 2—J53050G, List 2 Interconnecting Unit Equipped With 7C Timers

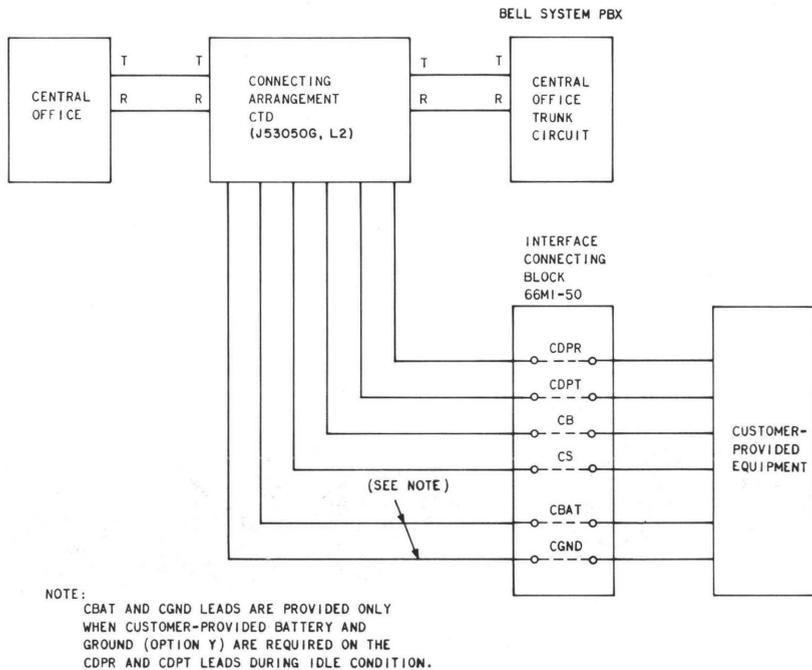


Fig. 3—Block Diagram—Typical Connecting Arrangement CTD—Using J53050G, List 2 IU

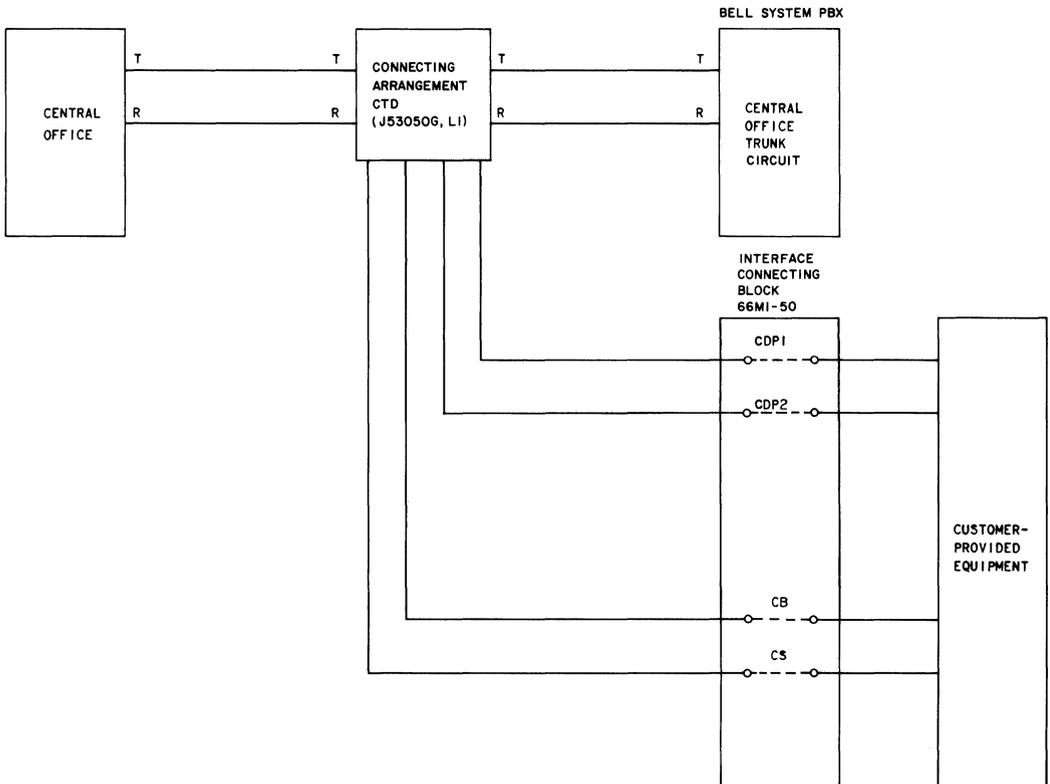


Fig 4—Block Diagram—Typical Connecting Arrangement CTD—Using J53050G, List 1 (MD) IU

2. IDENTIFICATION

PURPOSE

- To provide connection between CP toll diversion equipment and a Bell System CO trunk associated with a Bell System PBX.
- To provide a high resistance connection between the CPE and Bell System CO trunk circuit tip and ring conductors, over leads CDP1 and CDP2 (J53050G, L1) or leads CDPT and CDPR (J53050G, L2). This

connection allows the customer to monitor the telephone line for dc supervisory information and dc and ac addressing information. When Connecting Arrangement CTD is used with Connecting Arrangement RCX, these connections are provided by Connecting Arrangement RCX. Connecting Arrangement RCX does not provide for monitoring ac addressing information.

- To recognize a contact closure from the CPE and reverse CO battery on leads T and R toward the Bell System PBX.

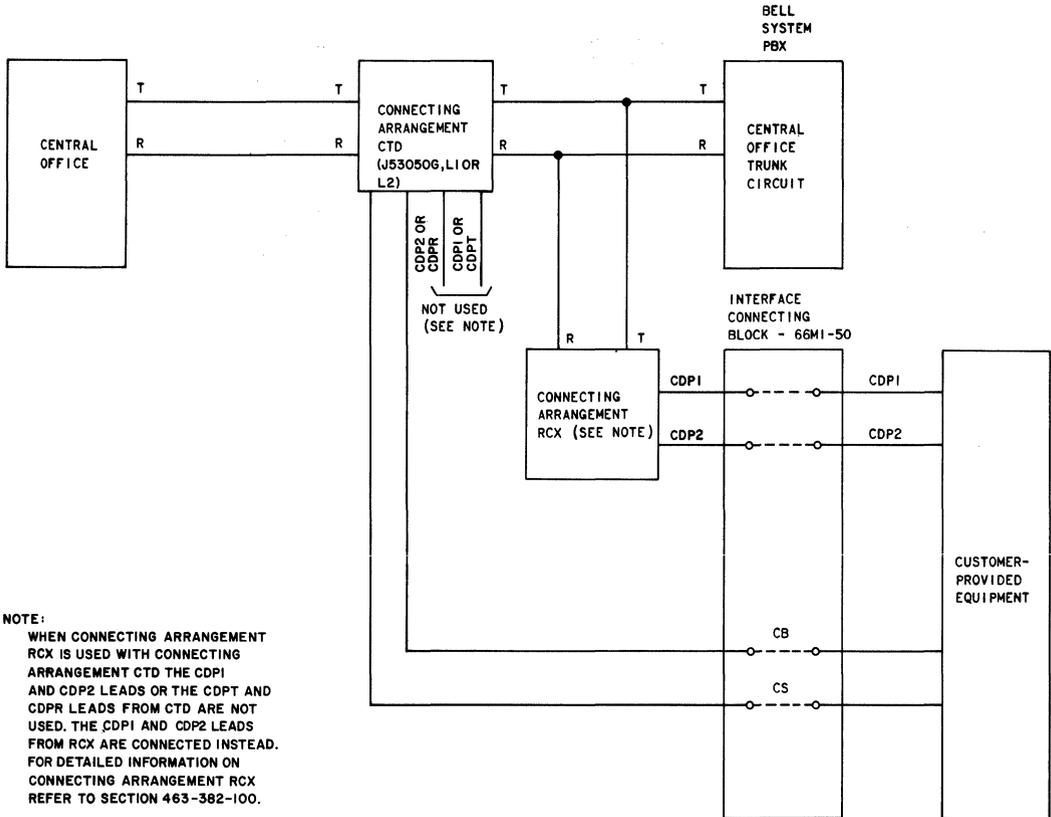


Fig. 5—Block Diagram—Typical Connecting Arrangement CTD Used With Connecting Arrangement RCX

- To block any battery reversal which may come from the CO (J53050G, L2 only) that would result in a false signal to the PBX for toll diversion.
- To restore CO battery on leads T and R toward the PBX to the original polarity after a timed interval.

Note: The PBX must be wired for the toll diversion or toll denial feature. If the CO is wired or equipped in such a manner that battery reversal is *not* provided, the J53050G, List 1 (MD) *may* be used to implement the connecting arrangement. If the CO is equipped and wired in such a manner that battery reversal *is* provided, the J53050G, List 2 *must* be used.

APPLICATION

- 701A, 701B, 701PK, 702A, 711A, 740E, 756A, 800A PBXs or any PBX with reverse battery toll diversion or toll denial feature.

ORDERING GUIDE

- J53050G, List 2 Interconnecting Unit (one per *four* CO trunks)—*may* be used in *all* installations, but *must* be used when the

CO is equipped and wired in such a manner that battery reversal *is* provided. Does not include 7C timers which must be ordered separately.

- J53050G, List 1 (MD) Interconnecting Unit (one per *six* CO trunks)—may be used when CO is equipped and wired in such a manner that battery reversal is *not* provided. Does not include 7C timers which must be ordered separately.

Note: Before using a List 2 in the place of a List 1 in an existing installation, the increased current drain should be considered. Typical current drain for one circuit (including a 7C timer) of a J53050G, L1 (MD) IU connected to a 48-volt power unit is 0.051 amperes; typical current drain for one circuit (including a 7C timer) of a J53050G, L2 IU connected to a 48-volt power unit is 0.103 amperes.

Associated Apparatus (Order Separately)

- Timer, 7C (one per CO trunk, maximum of four per List 2 IU and six per List 1 IU)
- KS-15620, List 22 Rectifier (required when PBX power supply is not used)

Note: This rectifier meets acceptable noise requirements as explained under Power Supplies in Section 332-104-102. Other rectifiers may be used when specified by local engineering.

- KS-14532 Power Cord (for use with KS-15620, List 22 Rectifier)

List 1—10 ft

List 2—2 ft

List 3—15 ft

List 4—20 ft

List 5—25 ft

- Cable, Wiring, "D" Inside, or equivalent (for cabling from connecting arrangement to interface connecting block)
- Block, Connecting, 66M1-50 (Fig. 6 or 9)

Note: Other types of blocks may be used when specified by local engineering.

- Clip, Bridging, B (25 per pkg.)

DESIGN FEATURES

J53050G, List 2 Interconnecting Unit

- Mounts on a standard 23-inch relay rack, in an ED-91180-70 apparatus cabinet, or in a 16C apparatus mounting
- Size—2 by 23 inches
- Equipped with four 912A 14-pin connectors
- Designed to mount four 7C timers
- Provides for customer access to the telephone line, to detect trunk status information, through high resistance connection over leads CDPT and CDPR
- Provides circuitry for reversing CO battery toward Bell System PBX
- Provides polarity guard circuit to block battery reversals from the CO to prevent a false indication, or negation of an intended indication, to the PBX for toll diversion
- Provides options to allow one of three specific conditions on leads CDPT and CDPR during the idle condition (see 6.01)
- Provides wire-wrap terminals for option straps and for connection to Bell System and CPE.

J53050G, List 1 (MD) Interconnecting Unit

- Mounts on a standard 23-inch relay rack, in an ED-91180-70 apparatus cabinet, or in a 16C apparatus mounting
- Size—2 by 23 inches
- Equipped with six 912A 14-pin connectors
- Designed to mount six 7C timers
- Provides for customer access to the telephone line, to detect trunk status information,

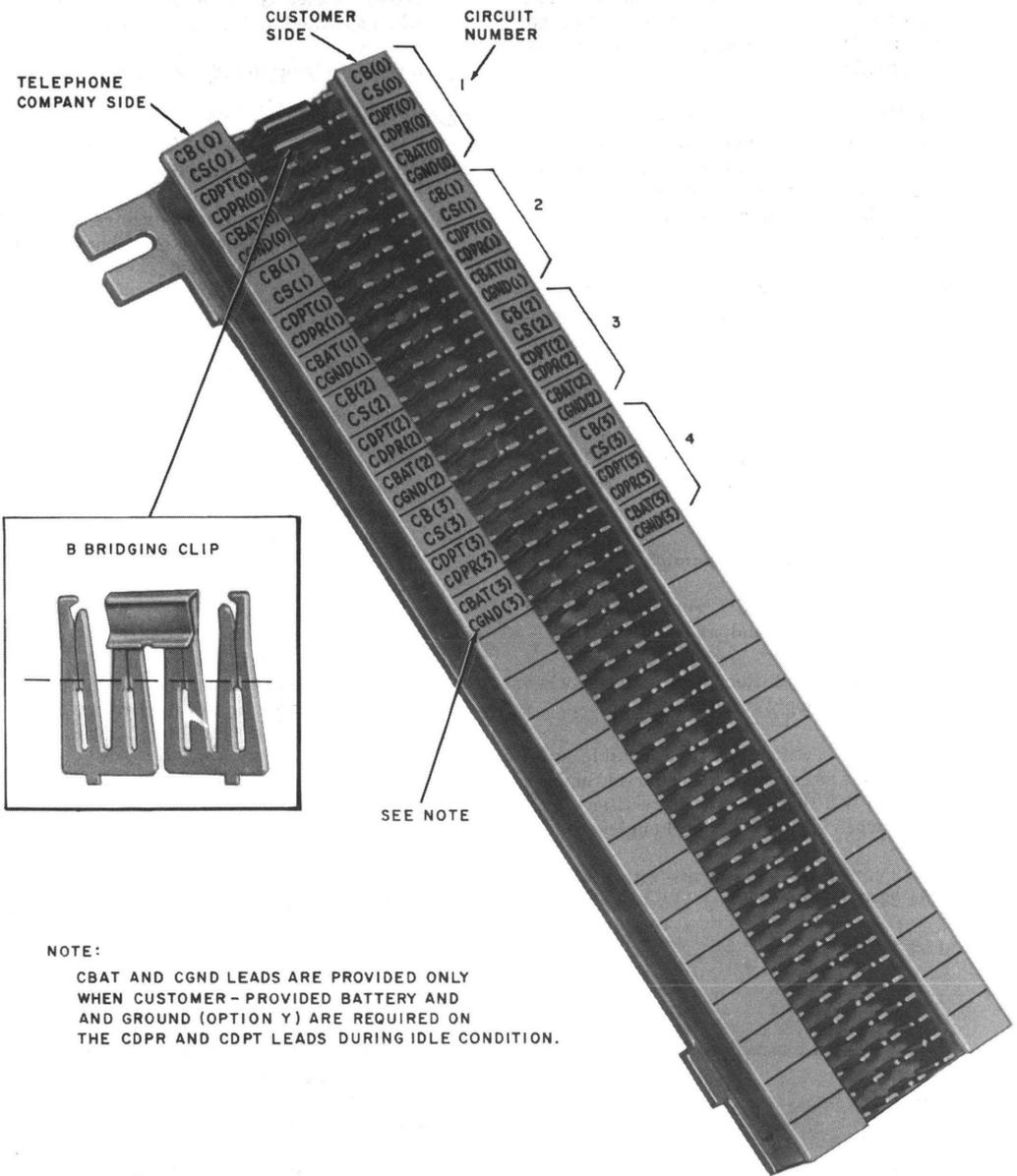


Fig. 6—Typical Interface Connecting Block, Connecting Arrangement CTD Equipped With J53050G, List 2 IU

through high resistance connection over leads CDP1 and CDP2

- Provides circuitry for reversing CO battery toward Bell System PBX
- Provides wire-wrap terminals for connection to Bell System and CPE.

7C Timer

- Components are mounted on a 14-pin printed wiring board.
- Size—approximately 4-1/3 inches long by 1-1/3 inches deep by 1-3/4 inches wide.
- Provides circuitry to return CO battery toward the PBX to the original polarity, after a preset time-out interval (250 to 500 ms).
- Provides variable adjustment of time-out interval from approximately 100 ms to one second.

3. INSTALLATION

3.01 Locate the connecting arrangement in an area free of dampness and excessive dust or dirt, with adequate room for access to front and rear of equipment and connecting blocks. The equipment typically mounts on a standard 23-inch relay rack, in an ED-91180-70 apparatus cabinet, or in a 16C apparatus mounting. Installation of Connecting Arrangement RCX is covered in Section 463-382-100.

3.02 Use "D" inside wiring cable or equivalent to terminate the leads associated with the CPE on the interface connecting block. Stencil trunk number and lead designations on interface connecting block designation strip (see Fig. 6 or 9).

3.03 One 7C timer must be provided per CO trunk to be connected to the CPE (maximum of six per J53050G, List 1—maximum of four per J53050G, List 2). *Adjust the timing potentiometer on the 7C timer (see Fig. 1 and 2) fully counterclockwise, then adjust it one-quarter turn clockwise.* This provides the proper time-out interval (250 to 500 ms) for the operation of Connecting Arrangement CTD. Plug the 7C timer

into the connector associated with the specific CO trunk being connected (see Fig. 7 and 10).

3.04 When the KS-15620, List 22 rectifier is used to power the connecting arrangement, the customer must provide a 117-volt, 60-Hz power outlet within power cord length of the customer-designated mounting location of the connecting arrangement (see Ordering Guide for cord lengths).

3.05 The power output supplying connecting arrangement(s) must not be under control of a switch and should be fused on a separately fused power circuit to prevent accidental loss of ac line voltage. Where local instructions permit, secure the power cord to the outlet with a power cord plug retainer assembly.

3.06 Refer to appropriate sections in Division 167 for proper grounding of power plants.

3.07 When installation is complete, perform tests given in Part 5.

4. OPERATION

Note: The operational details for Connecting Arrangement CTD depend on the CPE with which it is used. If the CPE is arranged to detect line seizure and dial pulsing by contact closures from Bell System equipment rather than by means of the high resistance connection to the telephone line, Connecting Arrangement RCX must be used in conjunction with Connecting Arrangement CTD. Detailed information concerning Connecting Arrangement RCX is contained in Section 463-382-100.

4.01 *Connecting Arrangement CTD, Using J53050G, List 2 IU (Fig. 7):* When a Bell System PBX seizes a CO trunk for an outgoing call, CO line current causes relay L to operate. Relay L operated causes relay PG to operate. Relay PG operated connects the polarity guard in the transmission path between the CO and the Bell System PBX. The polarity guard isolates the PBX from any battery reversal from the CO, preventing a PBX wired for the toll diversion or toll denial feature from recognizing the battery reversal as an indication that the call should be denied or diverted. The polarity guard also prevents the reversal of polarity from the CO overriding a bona-fide signal from the CPE to restrict a call.

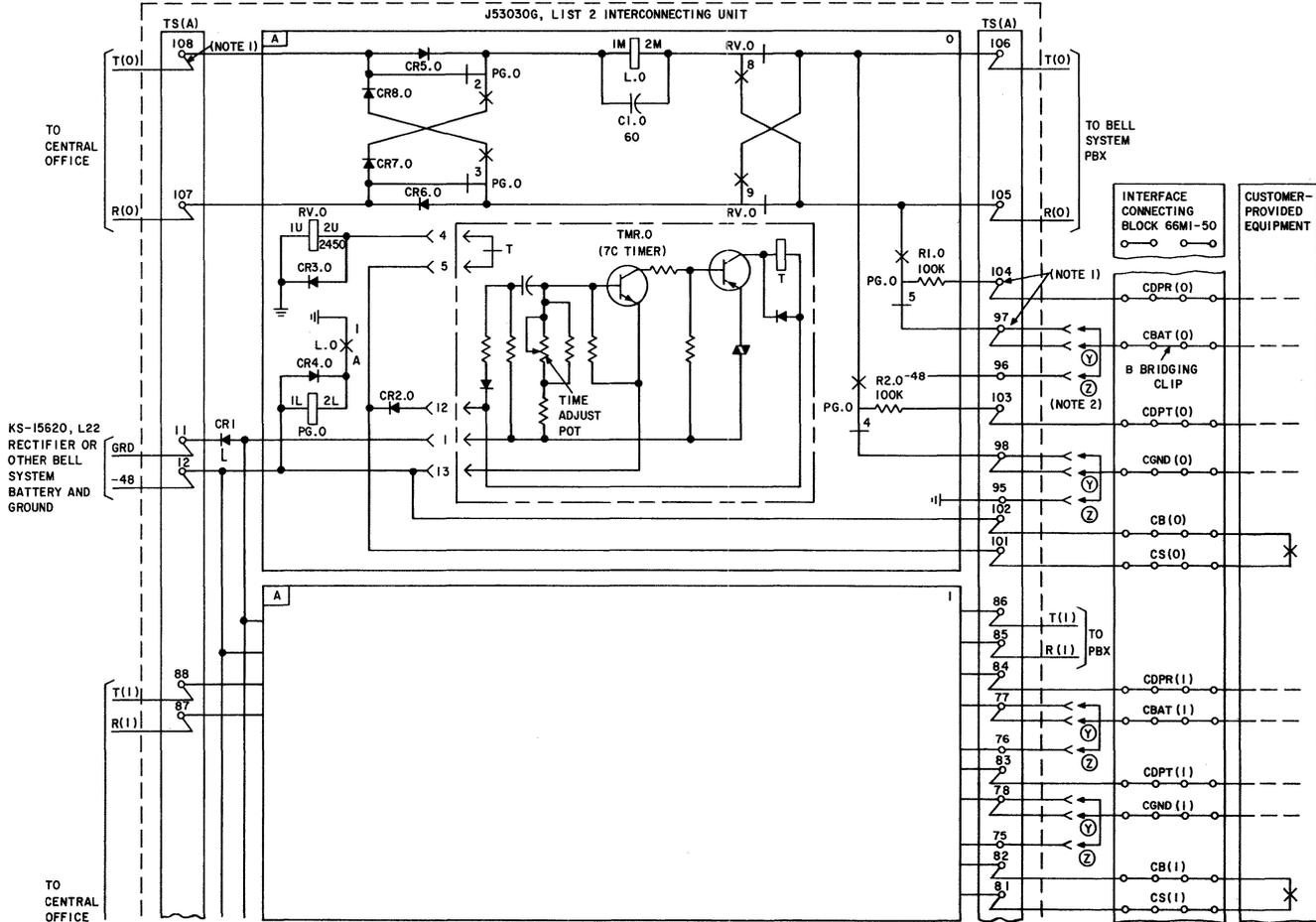
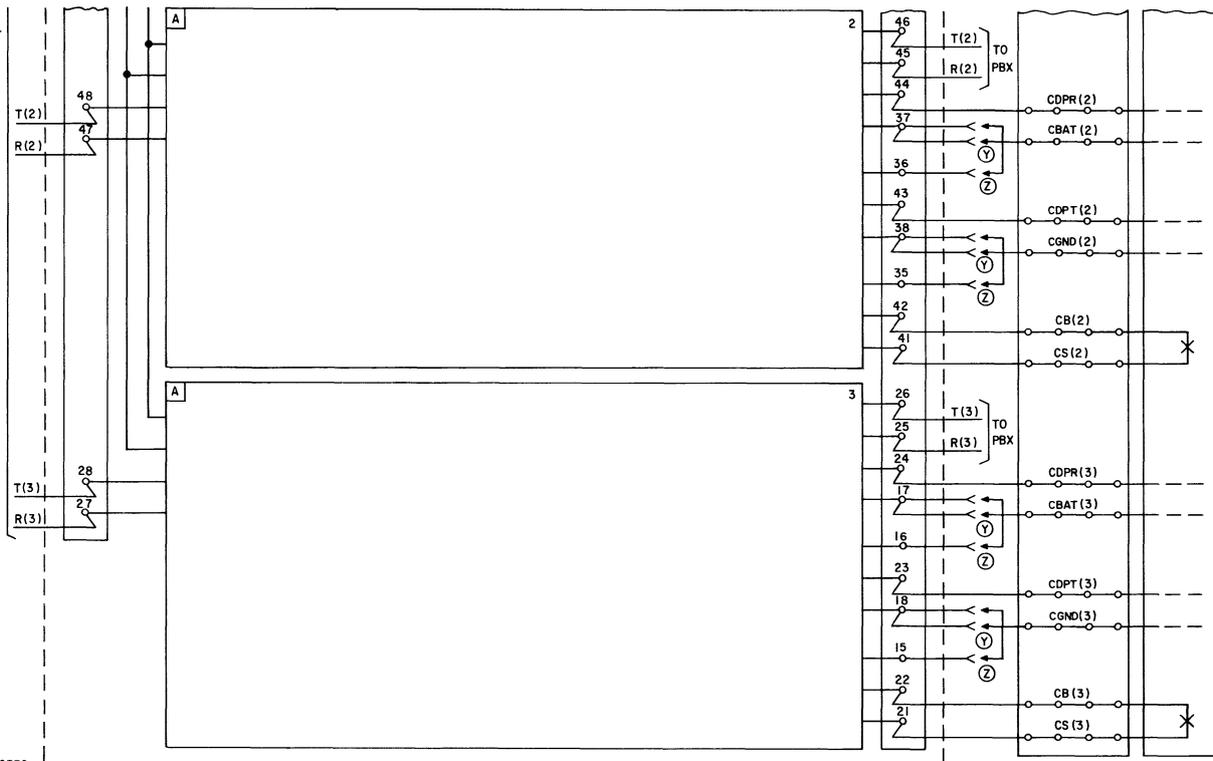


Fig. 7—Simplified Schematic and Connections—Connecting Arrangement CTD, Using J53050G, List 2 IU (Sheet 1)

TO
CENTRAL
OFFICE



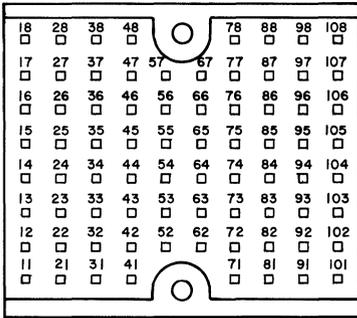
NOTES:

1. CONNECTIONS MUST BE MADE TO THE FACTORY WIRING SIDE OF TERMINAL STRIP TS(A). OPTION STRAPPING MAY BE PERFORMED ON THE INSTALLER WIRING SIDE OF TERMINAL STRIP TS(A). SEE FIG. 8 FOR TERMINAL STRIP NUMBERING PLAN.
2. IF THE CUSTOMER REQUIRES TELEPHONE COMPANY-PROVIDED BATTERY AND GROUND ON LEADS CDPR AND CDPT DURING THE IDLE CONDITION, PROVIDE OPTION ②. IF THE CUSTOMER USES CUSTOMER-PROVIDED BATTERY AND GROUND ON LEADS CDPR AND CDPT DURING THE IDLE CONDITION, PROVIDE OPTION ①. WHEN AN OPEN CIRCUIT IS REQUIRED ON LEADS CDPR AND CDPT DURING THE IDLE CONDITION, OPTIONS ② AND ① ARE NOT USED. WHEN OPTION IS NOT SPECIFIED, PROVIDE OPTION ②.

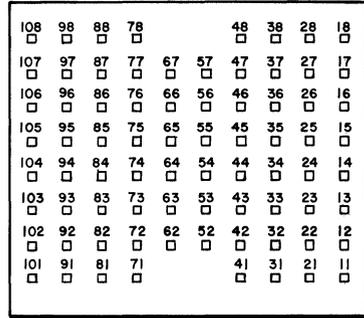
Fig. 7—Simplified Schematic and Connections—Connecting Arrangement CTD, Using J53050G, List 2 IU (Sheet 2)

342A TERMINAL BLOCK NUMBERING PLAN

VIEWED FROM FACTORY WIRING SIDE



VIEWED FROM INSTALLER SIDE



SEE FIG. 7 FOR CONNECTIONS AND OPTION WIRING

Fig. 8—Terminal Block Numbering Plan for CTD, Using J53050G, List 2 IU

Relay PG operated also connects leads CDPT and CDPR to the line through 100K resistors. Connecting Arrangement CTD provides an off-hook indication and passes dialing to the CPE over leads CDPT and CDPR (if the CPE requires contact closures for off-hook indication and dial pulsing, these are provided by Connecting Arrangement RCX; leads CDPT and CDPR from Connecting Arrangement CTD are not used—see Fig. 5). When the station dials, relay L may follow dial pulses; however, relay PG is a slow release relay and will remain operated during dialing. If the CPE determines that the dialed number is to be denied completion, it places a contact closure of at least one second duration across leads CB, CS toward Connecting Arrangement CTD. The contact closure across leads CB, CS causes relay RV to operate (Fig. 7) and starts the 7C timer circuit associated with the CO trunk. The RV relay operated reverses the CO battery on leads T, R toward the PBX. Within approximately 250 to 500 ms after the closure across leads CB and CS, the T relay in the timer circuit operates (the Time Adjust Pot on the 7C timer covers a total interval of 100 to 1000 ms and must be set at one-quarter turn clockwise to produce the 250 to 500 ms interval). The T relay operated releases the RV relay which restores the CO battery, on leads T, R toward the PBX, to the original polarity. The T relay remains operated until the contact closure across leads CB, CS is removed by the CPE.

4.02 The PBX recognizes the reversal of CO battery during the timed interval (relay RV operated) and diverts the call in the normal manner to indicate to the calling station that the call has been denied. This will also cause the CO to abandon the call.

Note: The PBX must be wired for the reverse polarity toll diversion or toll denial feature.

4.03 When the PBX diverts the call, relay L in the IU releases. Relay L released removes ground from relay PG, causing it to release; relay PG released removes the polarity guard and resistors R1 and R2 from the CO line and returns Connecting Arrangement CTD to the idle condition.

Note: The polarity guard is connected in the transmission path during the interval that the associated station is off-hook, to block battery reversals coming from the CO when an outgoing call is originated. During the interval that the polarity guard is in the circuit (station off-hook), the PBX recognizes only the battery reversal provided by the IU as a legitimate signal to divert the call.

4.04 **Connecting Arrangement CTD, Using J53050G, List 1 (MD) IU (Fig. 10):** When a station on a Bell System PBX seizes a CO trunk for an outgoing call, Connecting Arrangement CTD

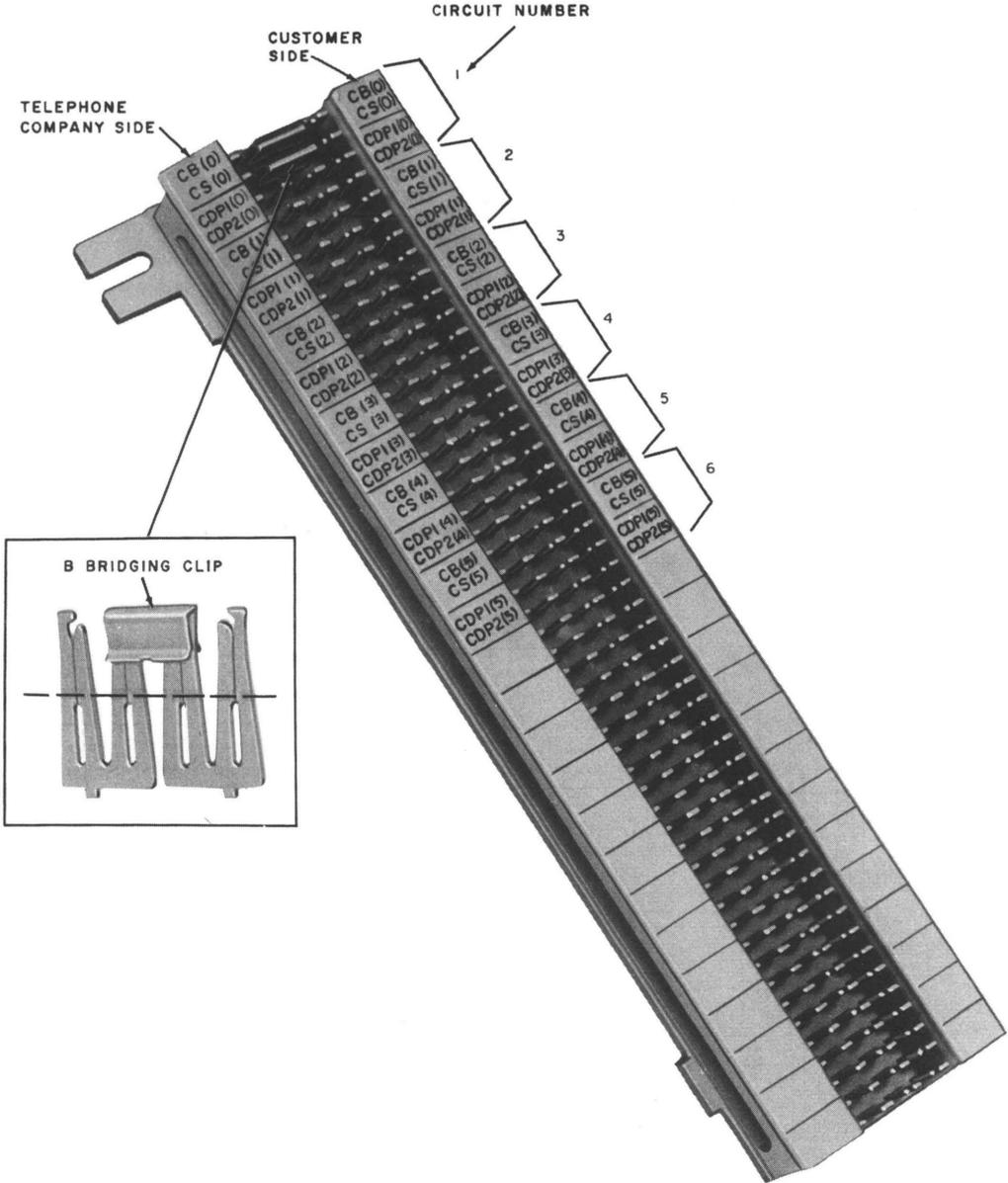


Fig. 9—Typical Interface Connecting Block, Connecting Arrangement CTD Equipped With J53050G, List 1 (MD) IU

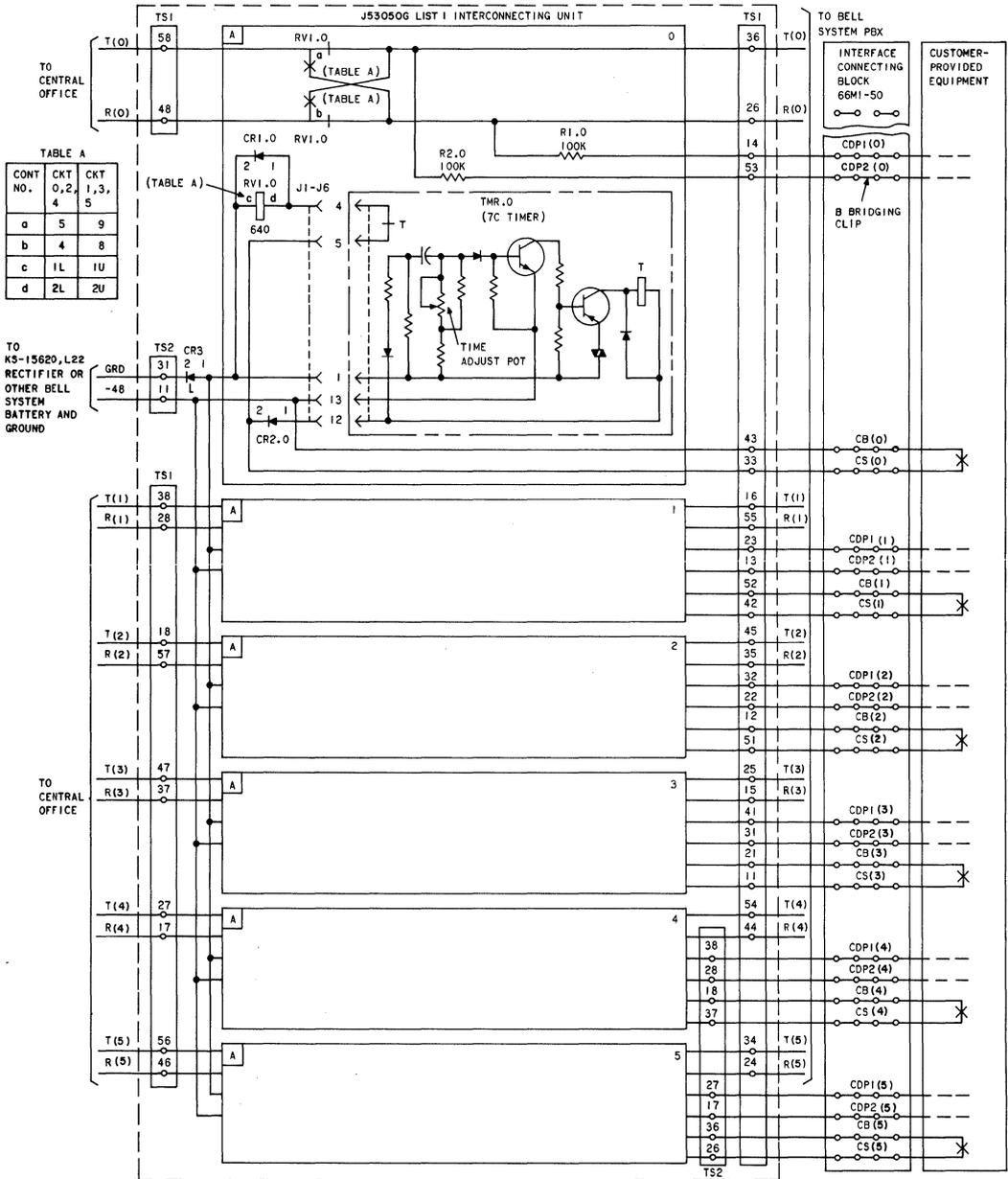


Fig. 10—Simplified Schematic and Connections—Connecting Arrangement CTD, Using J53050G, List 1 (MD) IU

provides an off-hook indication and passes dialing to the CPE over leads CDP1 and CDP2 (if the CPE requires contact closures for off-hook indication and dial pulsing, these are provided by Connecting Arrangement RCX; leads CDP1 and CDP2 from Connecting Arrangement CTD are not used—see Fig. 5). If the CPE determines that the dialed number is to be denied completion, it places a contact closure of at least one second duration across leads CB, CS toward Connecting Arrangement CTD. The contact closure across leads CB, CS causes relay RV to operate (Fig. 10) and starts the 7C timer circuit associated with the CO trunk. The RV relay operated reverses the CO battery on leads T, R toward the PBX. Within approximately 250 to 500 ms after the closure across leads CB and CS, the T relay in the timer circuit operates (the Time Adjust Pot on the 7C timer covers a total interval of 100 to 1000 ms and must be set at one-quarter turn clockwise to produce the 250 to 500 ms interval). The T relay operated releases the RV relay which restores the CO battery, on leads T, R toward the PBX, to the original polarity. The T relay remains operated until the contact closure across leads CB, CS is removed by the CPE, which returns Connecting Arrangement CTD to the idle condition.

4.05 The PBX recognizes the reversal of CO battery during the timed interval (relay RV operated) and diverts the call in the normal manner to indicate to the calling station that the call has been denied. This will also cause the CO to abandon the call.

Note: The PBX must be wired for the reverse polarity toll diversion or toll denial feature and the CO must be wired or equipped in such a manner that battery reversal is *not* provided.

5. MAINTENANCE

5.01 Where there is an indication of trouble in the connecting arrangement(s), the circuit at fault must be opened at the interface connecting block to verify in which direction the trouble exists. The circuit can be opened at the connecting block by removing the B bridging clip associated with each lead.

5.02 Precautions should be taken when performing tests to avoid adversely affecting service to the customer. Local instructions should be followed

with reference to notifying the customer before performing the test.

TESTS—J53050G, LIST 2 INTERCONNECTING UNIT (FIG. 7)

Note: —48 volt battery is present on the CB leads at the interface connecting block; and depending on the particular option of the circuit under test, —48 volt battery may be present on leads CBAT and/or CDPR. Precautions should be taken when performing tests to avoid shorting these leads to frame ground.

5.03 Open the leads of the circuit under test at the interface connecting block. Provide a short across the CB and CS leads of the circuit under test and observe that the associated RV relay operates and releases. If the RV relay of the circuit under test does not operate and release, replace the associated 7C timer with a timer known to be good (see Fig. 2 and 7).



The 7C timer must be adjusted to provide the proper time-out interval for the operation of Connecting Arrangement CTD—adjust the timing potentiometer on the 7C timer (see Fig. 2) fully counterclockwise, then adjust it one-quarter turn clockwise.

5.04 When option Z is provided, check for presence of —48 volts between lead CDPR of the circuit under test and ground. When option Y is provided, replace the B bridging clip, at the interface connecting block, associated with the CBAT lead of the circuit under test; then check for presence of CP voltage between lead CDPR of the circuit under test and ground.

Note: Determine from the customer the amount and polarity of the CP voltage; observe the correct polarity and ascertain that the amount being measured does not exceed the capabilities of the meter being used.

5.05 Connect a 1013A (or equivalent) hand test set across leads T and R on the PBX side of the IU (if the trunk under test is a ground start trunk, momentarily ground lead R). Listen for dial tone; after obtaining dial tone, observe that relay PG of the circuit under test is operated.

5.06 On completion of tests, remove all shorting straps and replace the B bridging clips at the interface connecting block.

5.07 If trouble is indicated in the transmission path (tip and ring), use existing practices to perform normal circuit transmission tests.

TESTS—J53050G, LIST 1 (MD) INTERCONNECTING UNIT (FIG. 10)

Note: —48 volt battery is present on the CB leads at the interface connecting block. Precautions should be taken when performing tests to avoid shorting these leads to frame ground.

5.08 Open the leads of the circuit under test at the interface connecting block. Provide a short across the CB and CS leads of the circuit under test and observe that the associated RV relay operates and releases. If the RV relay of the circuit under test does not operate and release, replace the associated 7C timer with a timer known to be good (see Fig. 1 and 10).



The 7C timer must be adjusted to provide the proper time-out interval for the operation of Connecting Arrangement CTD—adjust the timing potentiometer on the 7C timer (see Fig. 1) fully counterclockwise, then adjust it one-quarter turn clockwise.

5.09 On completion of tests, remove all shorting straps and replace the B bridging clips at the interface connecting block.

5.10 If trouble is indicated in the transmission path (tip and ring), use existing practices to perform normal circuit transmission tests.

5.11 When in the repairman's judgment the trouble is located in the CPE, the Repair Service Bureau should be notified so that proper Maintenance of Service Charge billing can be initiated as outlined in Section 660-101-312 entitled Maintenance of Service Charge on Services With Customer-Provided Equipment (CPE).



Do not attempt any tests or repairs on the CPE.

6. CONNECTIONS

6.01 Options—J53050G, List 2 IU: The J53050G, L2 IU may be arranged to allow three different conditions on leads CDPT and CDPR during the idle condition—CP battery and ground, telephone company provided battery and ground, or open circuit. When the customer requires his own battery and ground on leads CDPT and CDPR during the idle condition, provide option Y as shown in Fig. 7. When the customer requires telephone company provided battery and ground on leads CDPT and CDPR during the idle condition, provide option Z as shown in Fig. 7. When the customer requires an open circuit on leads CDPT and CDPR during the idle condition, do not provide either option.

6.02 For connecting information refer to Table A, Fig. 7 and 10.

TABLE A
CONNECTING ARRANGEMENT CTD CONNECTIONS FROM J53050G
LIST 2 IU TO INTERFACE CONNECTING BLOCK

IU	CKT NO.	LEAD DESIG.*	IU T(S)A PIN NO.	25-PR CABLE COLOR†	66M1-50 INTERFACE CONN. BLOCK ROW NO.
FIRST J53050G LIST 2	1	CB(0)	102	W-BL	1
		CS(0)	101	BL-W	2
		CDPT(0)	103	W-O	3
		CDPR(0)	104	O-W	4
		CBAT(0)	97	W-G	5
		CGND(0)	98	G-W	6
	2	CB(1)	82	W-BR	7
		CS(1)	81	BR-W	8
		CDPT(1)	83	W-S	9
		CDPR(1)	84	S-W	10
		CBAT(1)	77	R-BL	11
		CGND(1)	78	BL-R	12
	3	CB(2)	42	R-O	13
		CS(2)	41	O-R	14
		CDPT(2)	43	R-G	15
		CDPR(2)	44	G-R	16
		CBAT(2)	37	R-BR	17
		CGND(2)	38	BR-R	18
	4	CB(3)	22	R-S	19
		CS(3)	21	S-R	20
		CDPT(3)	23	BK-BL	21
		CDPR(3)	24	BL-BK	22
		CBAT(3)	17	BK-O	23
		CGND(3)	18	O-BK	24
SECOND J53050G LIST 2	5	CB(4)	102	BK-G	25
		CS(4)	101	G-BK	26
		CDPT(4)	103	BK-BR	27
		CDPR(4)	104	BR-BK	28
		CBAT(4)	97	BK-S	29
		CGND(4)	98	S-BK	30
	6	CB(5)	82	Y-BL	31
		CS(5)	81	BL-Y	32
		CDPT(5)	83	Y-O	33
		CDPR(5)	84	O-Y	34
		CBAT(5)	77	Y-G	35
		CGND(5)	78	G-Y	36
	7	CB(6)	42	Y-BR	37
		CS(6)	41	BR-Y	38
		CDPT(6)	43	Y-S	39
		CDPR(6)	44	S-Y	40
		CBAT(6)	37	V-BL	41
		CGND(6)	38	BL-V	42
	8	CB(7)	22	V-O	43
		CS(7)	21	O-V	44
		CDPT(7)	23	V-G	45
		CDPR(7)	24	G-V	46
		CBAT(7)	17	V-BR	47
		CGND(7)	18	BR-V	48

*Stencil lead designations on fanning strip.

†If only one IU is to be installed, a 12-pair cable can be used.