

PROTECTIVE CONNECTING ARRANGEMENT HZM

1. GENERAL

1.01 This section provides identification, installation, operation, maintenance, and connecting information for Protective Connecting Arrangement (PCA) HZM. PCA HZM provides a connection between customer-provided (CP) traffic measuring equipment and Bell System station lines, PBX central office (CO) trunks, and tie lines. Typical applications are shown in Fig. 1. This arrangement permits the CP equipment to detect on-hook, off-hook, dial pulse, TOUCH-TONE® signals, call progress tones, and ringing signals on the Bell System lines.



PCA HZM cannot be used for recording 2-way conversations. Recording of 2-way conversations is permitted only through PCA RCZ.

1.02 This section is reissued:

- To include information on the 125A interconnecting unit (IU) which replaces the J53050H, List 1 IU, now rated MD
- To show the 254J resistor replaced by the KS-21706 for all applications.

1.03 The equipment used to implement HZM is determined by the size of the specific installation. When the installation requires five or less arrangements, 42A connecting blocks may be used to provide the connecting arrangements as shown in Fig. 2; when more than five are required, the 125A IU (Fig. 3) should be used to provide the connecting arrangements. Each IU provides 25 circuits.

1.04 Information required for servicing existing installations using the J53050H IU (MD) has been retained in this section.

2. IDENTIFICATION

2.01 Purpose: PCA HZM provides the following:

- High-resistance dc and ac connection between CP traffic measuring equipment and the tip and ring conductors of Bell System station lines, tie lines, or PBX trunks (allows CP equipment to bridge across line)
- A high resistance connection to E and M leads of tie trunks such as SD-65718-01 or 02. (This connection is only provided when the tie trunk is installed so that the E and M leads appear on terminal blocks.)
- Protection against hazardous voltages and longitudinal imbalance
- An open condition between the CP equipment and Bell System lines if excessive current flows.

2.02 Ordering Guide:

(a) **Basic Units**

- (1) For small installations, nominally five circuits or less (see Fig. 2):
 - Block, Connecting, 42A—two required per circuit
 - Resistor, KS-21706, 100,000 ohm, $\pm 1\%$ —two required per circuit.



The failure characteristics of the KS-21706 resistor meet the requirements of this arrangement. Do not substitute a resistor of different type or resistance.

- (2) For large installations, nominally more than five circuits (see Fig. 3 and 4):
 - Unit, Interconnecting, 125A—each unit provides 25 circuits.

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

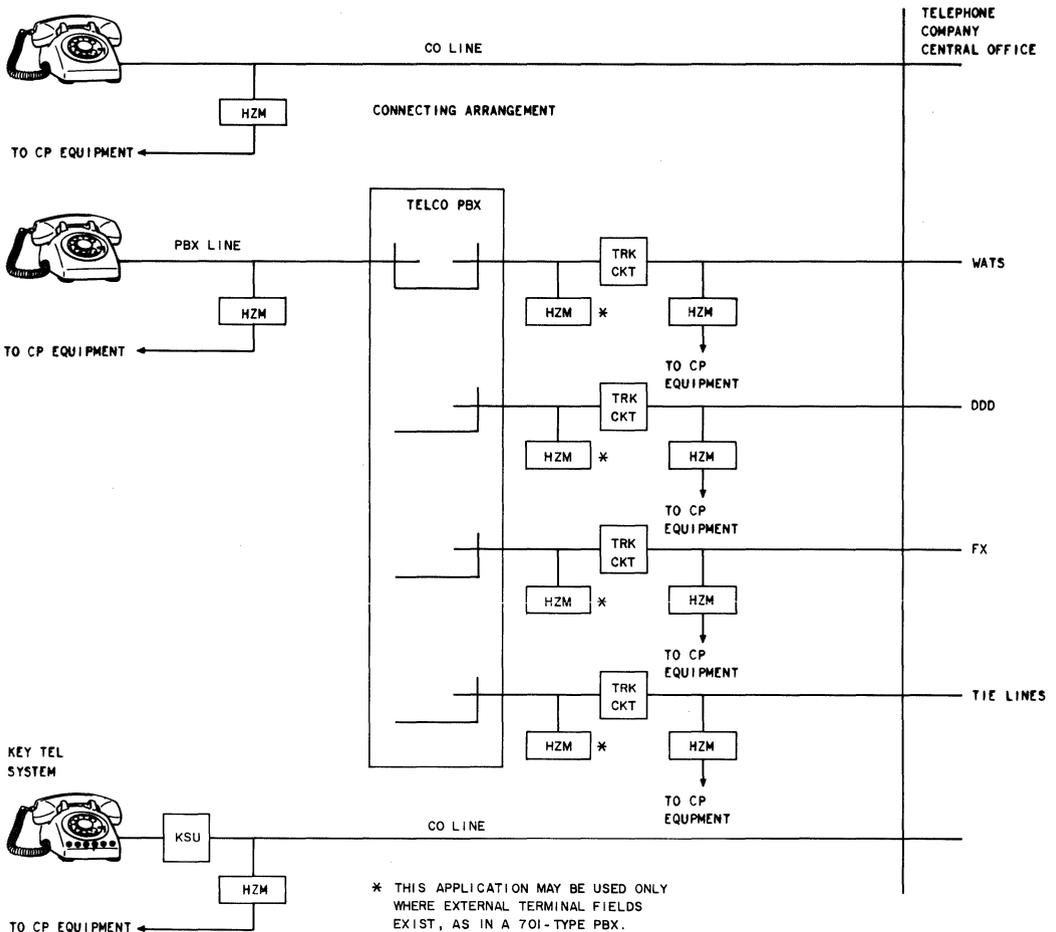


Fig. 1—Typical Applications of PCA HZM

(b) *Associated Apparatus (Order Separately)*

- Wire, D station, or equivalent (for connecting PCA HZM using 42A blocks)
- Cable, D inside wiring, or equivalent (for connecting PCA HZM using 125A IU).

(c) *Replaceable Components*

- Resistor, KS-21706, 100,000 ohm, $\pm 1\%$.



When replacing faulty 254J resistors in a J53050H IU, use KS-21706 resistors.

2.03 Design Features of 125A IU:

- Consists of a 66R-type connecting block with all of the quick-clip connectors in columns C and D removed, a KS-21706 resistor connected between B and E in each row,

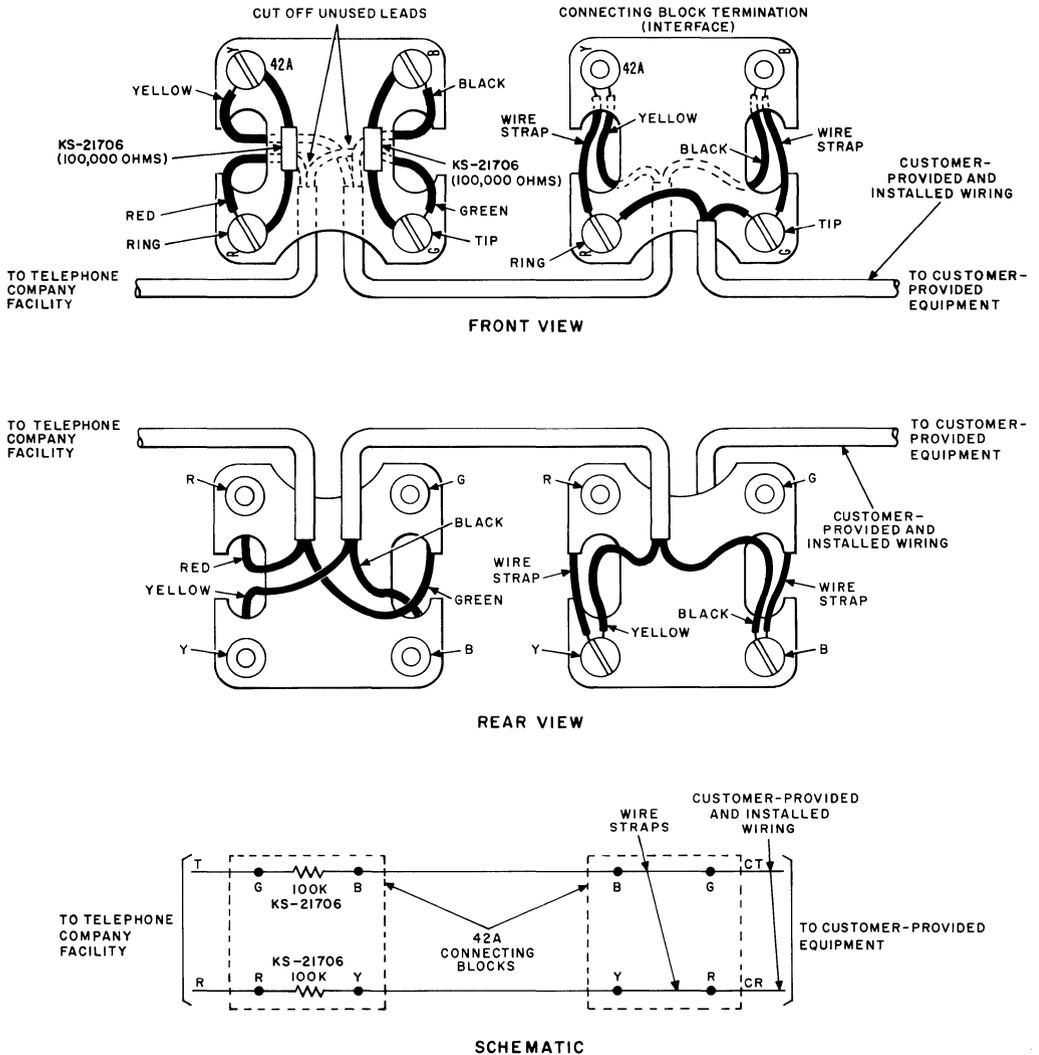


Fig. 2—PCA HZM for Small Installations (Five or Less) Using 42A Connecting Blocks

- and a B bridging clip installed across columns F and G in each row
- Size: 13.4 inches high by 3.36 inches wide by 1.02 inches thick
- Intended for wall mounting
- No separate interface connecting block required
- Provides 25 circuits for connecting between CP traffic measuring equipment and Bell System station lines, PBX CO trunks, and station lines

- Permits CP equipment to detect on-hook, off-hook, dial pulse, ringing and TOUCH-TONE signals on the Bell System lines (*the resistors in this equipment present a high loss to voiceband signals such as TOUCH-TONE address signals. This loss can be up to 46 dB or more, depending on the characteristics of the CP equipment.*)



The CP equipment must be capable of detecting line conditions through the high resistance connection of PCA HZM. Do not substitute lower value or different resistors to meet a special request.

3. INSTALLATION

3.01 Locate the connecting arrangement in an area that is clean and dry and where it is easily accessible. Both the 42A connecting blocks, used for small locally constructed installations, and the 125A IU, used for installations with more than five circuits, can be mounted on a wall or other suitable flat surface.

3.02 When wiring the PCA to the telephone company facilities, use a convenient cross-connect field for making the required connections. Do not go inside telephone sets or PBX equipment to find terminals. Do not wire onto relay plate apparatus or modify equipment in any way to bring out special signals requested by the customer or his representative. Use D station wire or D inside wiring cable for these connections.

3.03 When the 42A blocks are used, connect as shown in Fig. 2. Be sure to observe the proper color codes. One block is used to terminate the T and R leads from the telephone company facilities and to mount the line resistors, while the other block is used to interface with the CP equipment. Note that the screws in terminals Y and B are reversed in the block. Connections from the CP equipment are made directly to screw terminals G and R on the interface block.

3.04 When the 125A IU is used, terminate the leads from the telephone company facilities on the left side of the block (Fig. 3 and 4). Print or stencil the lead designations on each side of the IU. Connections from the CP equipment are made directly to the H column of connectors on the IU.

3.05 *Show the customer where to connect the leads from his equipment.*

4. OPERATION

4.01 PCA HZM provides a high resistance dc and ac connection, typically between CP traffic measuring equipment and Bell System station lines, PBX CO trunks, and tie lines. The CP equipment uses this connection to monitor line condition. The CP equipment must be capable of detecting line conditions through the high resistance provided by this connecting arrangement.

5. MAINTENANCE

5.01 When there is an indication of trouble in the arrangement, the circuit at fault must be opened at the interface and tested to verify in which direction the trouble lies. Procedures for testing the telephone company side of arrangements using the 125A IU, the J53050H IU (MD), or the 42A connecting blocks, respectively, are contained in 5.04, 5.05, and 5.06.

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.

5.03 Apparatus Required to Perform Test:

- (a) Volt-ohm-meter (VOM) capable of measuring 200,000 ohms
- (b) Two test leads with clips for VOM
- (c) 1013A (or equivalent) hand test set.

5.04 Tests—PCA HZM Using 125A IU (Fig. 3 and 4):

- (1) Open the CT and CR output leads of the circuit under test at the 125A IU by removing the B bridging clips for that circuit. Disconnect the corresponding T and R input leads from the telephone company side of the IU.
- (2) Measure the resistance across the CT and CR leads at the IU by connecting the VOM to the column E or F connectors.

Requirement: VOM indicates an open circuit.

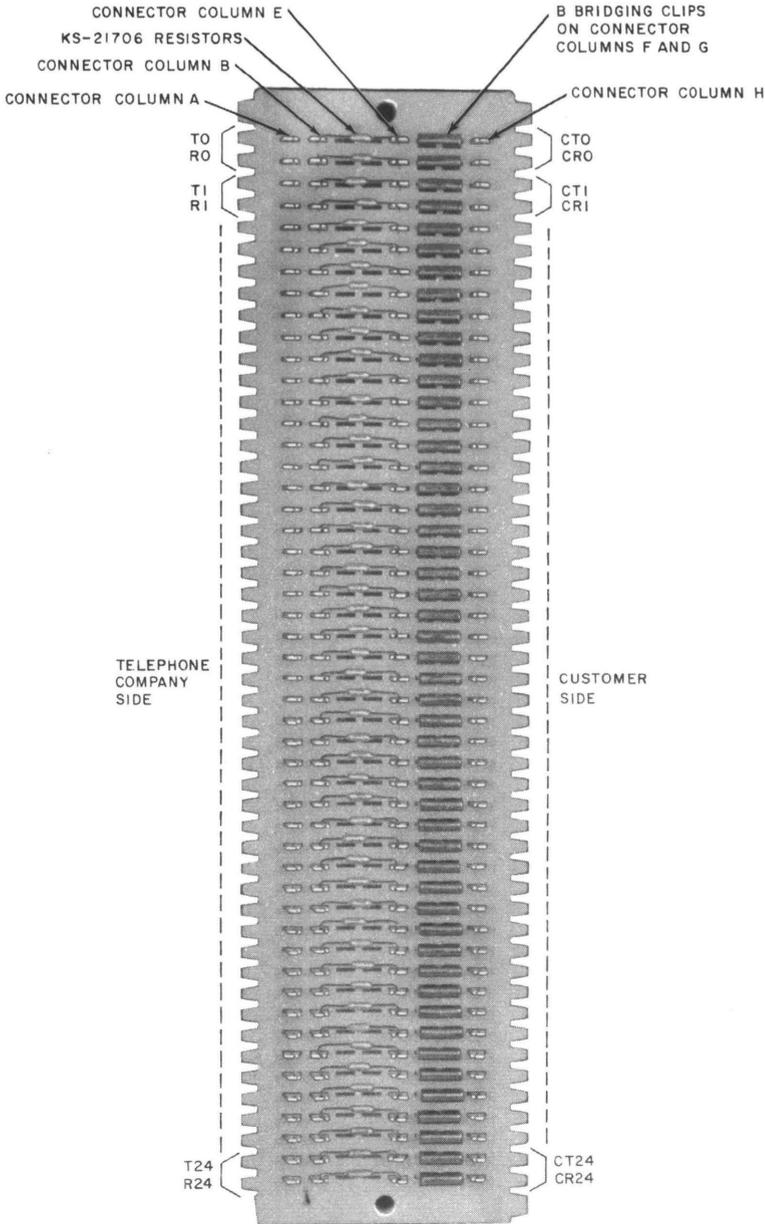


Fig. 3—125A IU

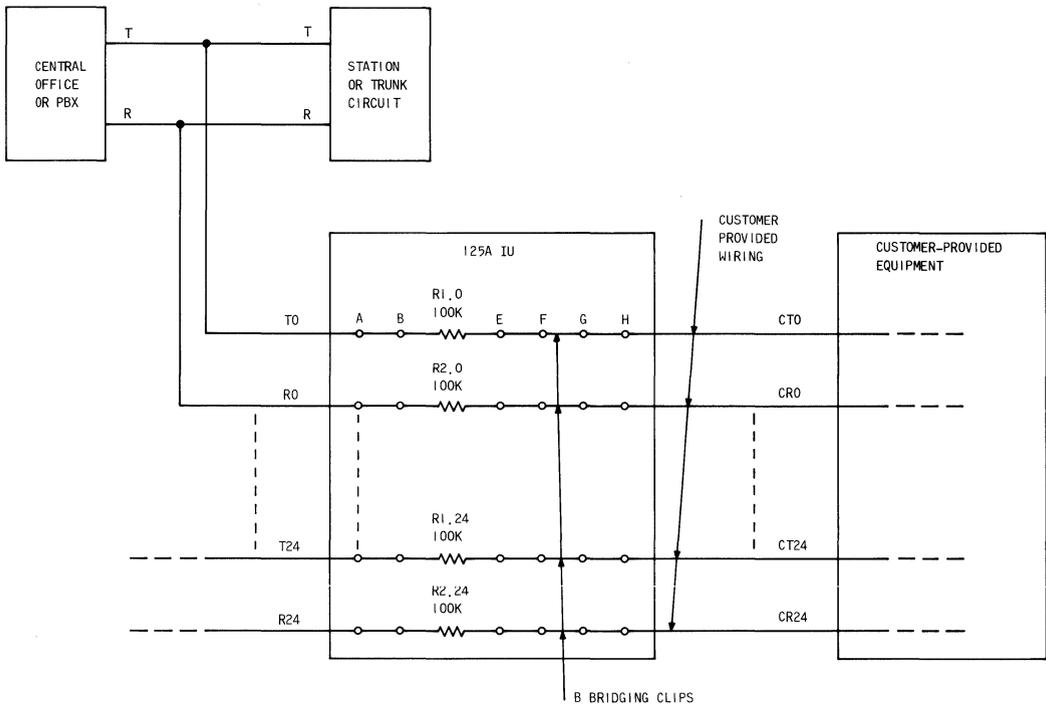


Fig. 4—PCA HZM, Using 125A IU

- (3) Short the input to the IU by connecting a wire strap across the T and R terminals at column A.

Requirement: The meter connected across the CT and CR leads indicates approximately 200,000 ohms. (If requirement is not met, check the value of the two resistors in the circuit and the continuity of the quick-clip connectors.)

- (4) If tests indicate that resistor replacement is required, use the type specified in 2.02. **Do not substitute a resistor of different type or resistance.**
- (5) To check the continuity of the transmission path into the IU, connect a 1013A (or equivalent) hand test set across the T and R leads previously disconnected from the telephone company side of the IU. Put the hand test set

into the MON mode. Place a call on the line or trunk being tested.

Requirement: Voice signals are heard at normal volume.



If E and M leads are connected to the IU, a different method must be used to check the continuity of the transmission path into the IU. Connect the VOM across the E and M leads. A voltage level should be present when the associated trunk is idle. When the trunk is seized, a voltage reversal should be observed.

- (6) On completion of tests, remove the wire strap from the T and R terminals of the IU. Reconnect the T and R input leads to the IU, being careful not to reverse polarity. Replace

the B bridging clips on columns F and G for the circuit under test.⚡

5.05 **▶Tests—PCA HZM Using J53050H, List 1 IU (MD) (Fig. 5 and 6, Table A)**

(1) Open the CT and CR output leads of the circuit under test at the interface connecting block by removing the B bridging clips for that circuit. Disconnect the corresponding T and R input leads from the telephone company side of the IU.

(2) Measure the resistance across the CT and CR leads of the circuit under test by connecting the VOM to the connections on the telephone company side of the interface block.

Requirement: The VOM indicates an open circuit.

(3) Short the input to the IU by connecting a wire strap across the T and R terminals of the circuit under test at the IU terminal strip.

Requirement: The meter connected across the CT and CR leads indicates approximately 200,000 ohms. (If requirement is not met, check the value of the two resistors in the circuit and the continuity of the IU wiring.)

(4) If tests indicate that resistor replacement is required, use KS-21706 resistors to replace faulty 254J resistors.

(5) To check the continuity of the transmission path into the IU, connect a 1013A (or equivalent) hand test set across the T and R leads previously disconnected from the telephone company side of the IU. Put the hand test set into the MON mode. Place a call on the line or trunk being tested.

Requirement: Voice signals are heard at normal volume.



If E and M leads are connected to the IU, a different method must be used to check the continuity of the transmission path into the IU. Connect the VOM across the E and M leads. A voltage level should be present when the associated trunk is idle. When

the trunk is seized, a voltage reversal should be observed.

(6) On completion of tests, remove the wire strap from the T and R terminals of IU. Reconnect the T and R input leads to the IU, being careful not to reverse polarity. Replace the B bridging clips on the interface block for the circuit under test.⚡

5.06 **▶Tests—Locally Constructed PCA HZM Using 42A Connecting Blocks (Fig. 2)**

(1) Open the CT and CR output leads of the circuit under test by removing the wire straps from terminals G and R of the interface connecting block. Disconnect the corresponding T and R input leads from terminals G and R of the block on which the resistors are mounted.

(2) Using the VOM, measure the resistance across terminals B and Y of the interface block.

Requirement: The meter indicates an open circuit.

(3) Short the input to the arrangement by connecting a wire strap across terminals G and R of the block on which the resistors are mounted.

Requirement: The meter connected across the B and Y terminals of the interface block indicates approximately 200,000 ohms. (If requirement is not met, check the value of the two resistors in the circuit and the continuity of the wiring of the blocks.)

(4) If tests indicate that resistor replacement is required, use the type specified in 2.02.

Do not substitute a resistor of different type of resistance.

(5) To check the continuity of the transmission path into the arrangement, connect a 1013A (or equivalent) hand test set across the T and R leads previously disconnected from terminals G and R. Put the hand test set into the MON mode. Place a call on the line or trunk being tested.

Requirement: Voice signals are heard at normal volume.



If E and M leads are connected to the IU, a different method must be used to check the continuity of the transmission path into the IU. Connect the VOM across the E and M leads. A voltage level should be present when the associated trunk is idle. When the trunk is seized, a voltage reversal should be observed.

(6) On completion of tests, remove the wire strap from terminals G and R of the first block. Reconnect the T and R leads, being careful not to reverse polarity. Replace the wire straps on the interface connecting block.⚡

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

5.08 When in the judgment of repair personnel the trouble is located in the CP equipment, the Repair Service Bureau should be notified so that proper Maintenance of Service Charge billing can be initiated as outlined in BSP 660-101-312 entitled Maintenance of Service Charge on Services With Customer-Provided Equipment (CPE).



Do not attempt any tests or repairs on the CP equipment.

6. CONNECTIONS

6.01 For connecting information on PCA HZM using the 42A connecting blocks, refer to Fig. 2.

6.03 For connecting information on PCA HZM using the 125A IU, refer to Fig. 3 and 4.

6.04 For connecting information on PCA HZM using the J53050H, List 1 IU (MD), refer to Fig. 5, 6, and 7, and Table A.



In dial tie trunk applications, PCA HZM may be connected in a variety of ways to permit detection of off-hook conditions and dialed numbers. When DX signaling is used, connection to the E and M leads may be appropriate. If the E and M leads are not available, connection to the A and B leads will permit the customer to detect supervisory and dialing conditions. Local engineering department should provide connections to the tie trunk. ⚡In general, the input to PCA HZM can come from tip, ring, E, M, A, or B leads at any point where they are readily accessible on a terminal punching. Relay terminals, back plane wiring, etc., are not acceptable connection points.⚡

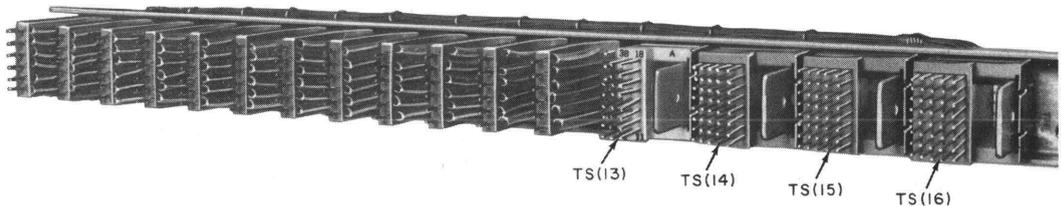
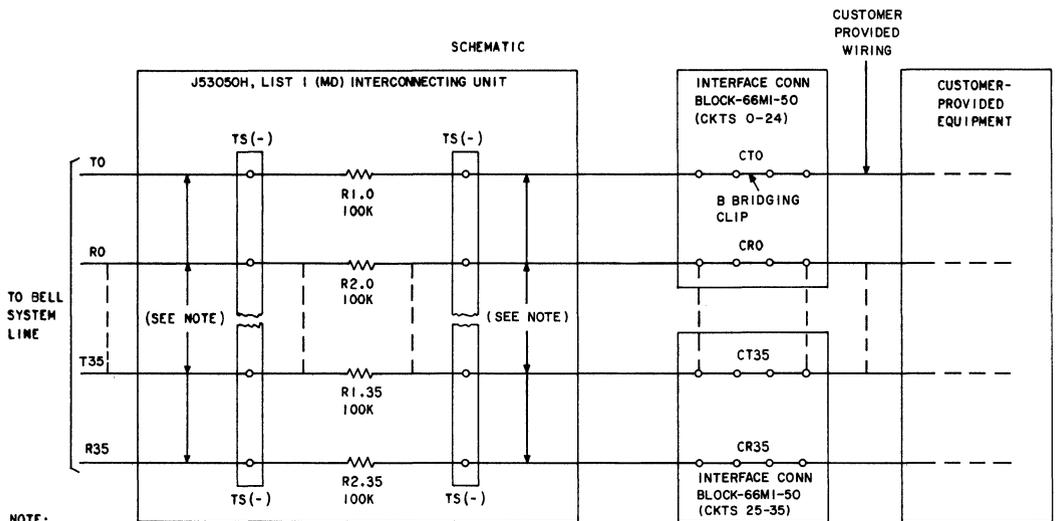
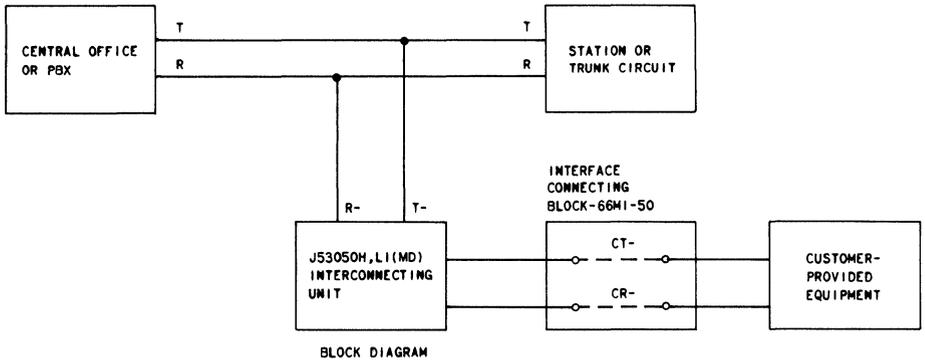


Fig. 5—J53050H, List 1 (MD) IU



NOTE:
SEE TABLE A FOR CONNECTIONS, TERMINAL STRIP DESIGNATIONS, AND TERMINAL NUMBERS.

Fig. 6—PCA HZM, Using J53050H, List 1 (MD) IU

TABLE A
LEGEND FOR FIG. 6

CKT NO.	LEAD DESIG	TS13 TERM. NO.	CKT NO.	LEAD DESIG	TS14 TERM. NO.	CKT NO.	LEAD DESIG	TS15 TERM. NO.	CKT NO.	LEAD DESIG	TS16 TERM. NO.			
0	T0	38	6	T6	58	16	T16	58	26	T26	58			
	R0	37		R6	57		R16	57		R26	57			
	CT0	36		CT6	56		CT16	56		CT26	56			
	CR0	35		CR6	55		CR16	55		CR26	55			
1	T1	34	7	T7	54	17	T17	54	27	T27	54			
	R1	33		R7	53		R17	53		R27	53			
	CT1	32		CT7	52		CT17	52		CT27	52			
	CR1	31		CR7	51		CR17	51		CR27	51			
2	T2	28	8	T8	48	18	T18	48	28	T28	48			
	R2	27		R8	47		R18	47		R28	47			
	CT2	26		CT8	46		CT18	46		CT28	46			
	CR2	25		CR8	45		CR18	45		CR28	45			
3	T3	24	9	T9	44	19	T19	44	29	T29	44			
	R3	23		R9	43		R19	43		R29	43			
	CT3	22		CT9	42		CT19	42		CT29	42			
	CR3	21		CR9	41		CR19	41		CR29	41			
4	T4	18	10	T10	38	20	T20	38	30	T30	38			
	R4	17		R10	37		R20	37		R30	37			
	CT4	16		CT10	36		CT20	36		CT30	36			
	CR4	15		CR10	35		CR20	35		CR30	35			
5	T5	14	11	T11	34	21	T21	34	31	T31	34			
	R5	13		R11	33		R21	33		R31	33			
	CT5	12		CT11	32		CT21	32		CT31	32			
	CR5	11		CR11	31		CR21	31		CR31	31			
			12	T12	28	22	T22	28	32	T32	28			
				R12	27		R22	27		R32	27			
				CT12	26		CT22	26		CT32	26			
				CR12	25		CR22	25		CR32	25			
			13			13	T13	24	23	T23	24	33	T33	24
							R13	23		R23	23		R33	23
							CT13	22		CT23	22		CT33	22
							CR13	21		CR23	21		CR33	21
			14			14	T14	18	24	T24	18	34	T34	18
							R14	17		R24	17		R34	17
							CT14	16		CT24	16		CT34	16
							CR14	15		CR24	15		CR34	15
15			15	T15	14	25	T25	14	35	T35	14			
				R15	13		R25	13		R35	13			
				CT15	12		CT25	12		CT35	12			
				CR15	11		CR25	11		CR35	11			

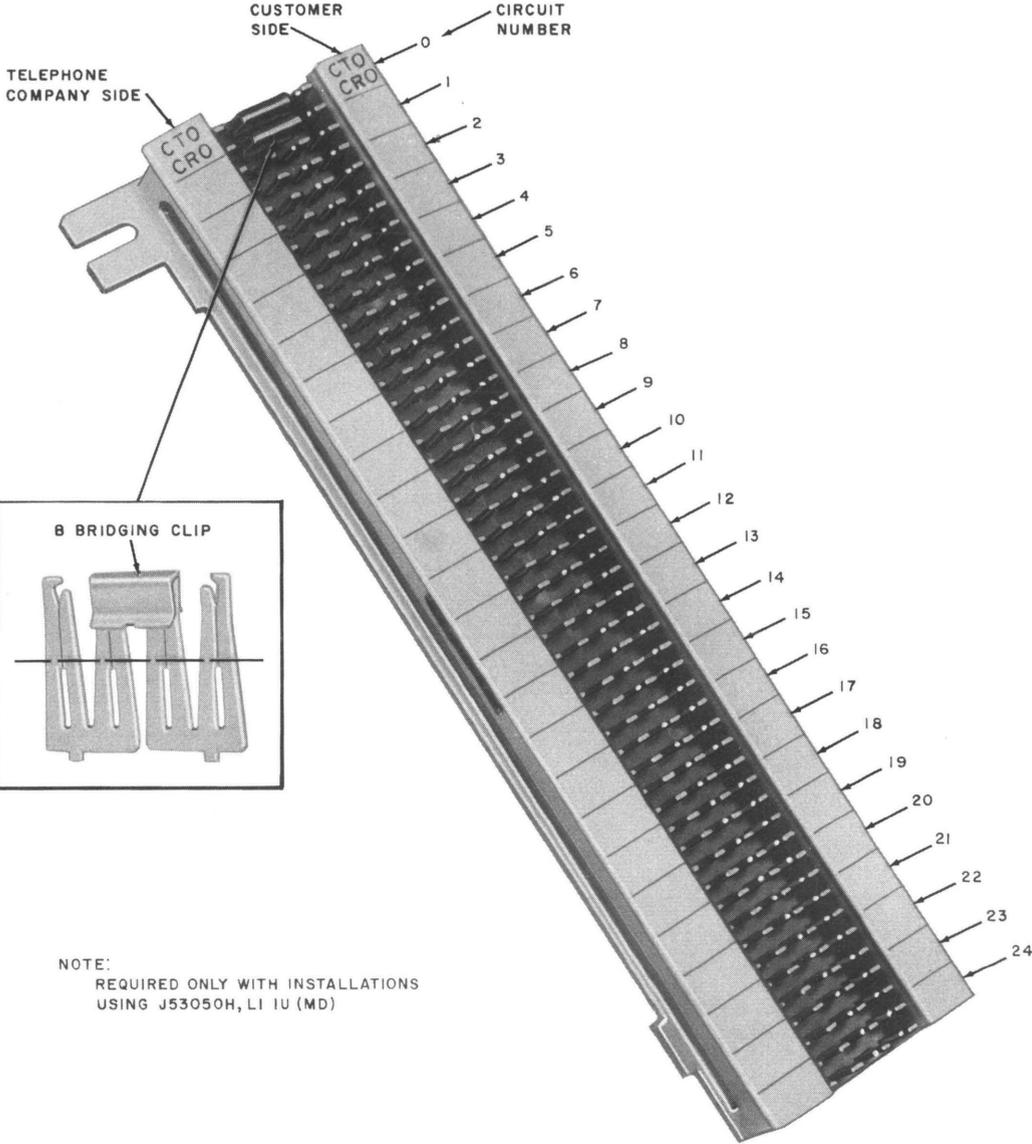


Fig. 7—66M1-50 Interface Connecting Block