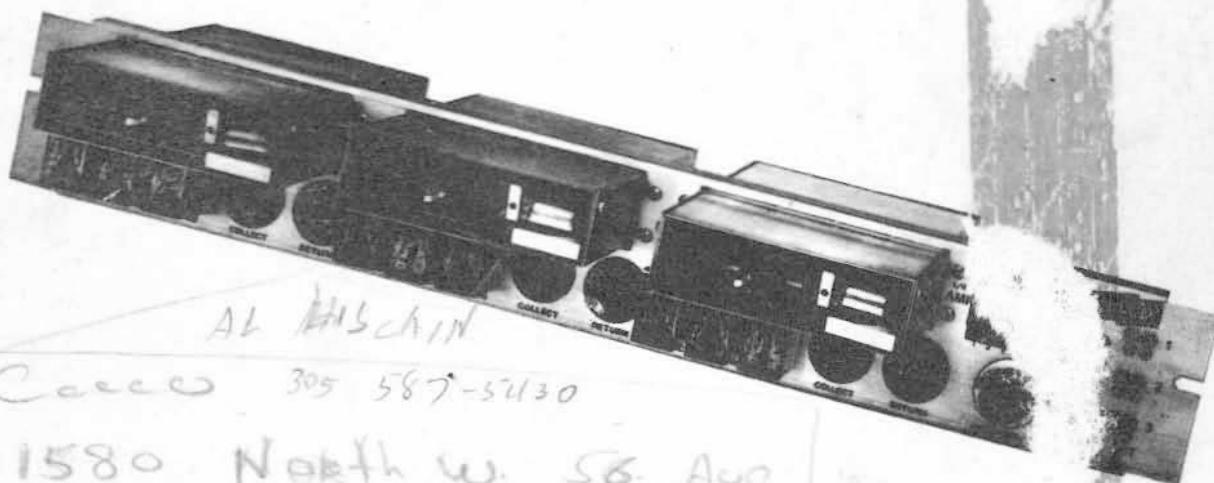


TECHNICAL DESCRIPTION

H/M - 1+ ST 2 P
 0- ST 3 P
 I ST
 0- ST P
 NON 0- ST 3 P

TD-4 TONE CONTROL SYSTEM
FOR FULL PREPAY PAYSTATIONS

TD-4 TONE CONTROL



AL HUSCHIN
 Ceeco 305 587-54130
 1580 North W. 58 Ave
 Phoenix, Fla.
 33313

RAGO

COMMUNICATION EQUIPMENT & ENGINEERING CO.

1800 NORTH 25th AVENUE, MELROSE PARK, ILL. 60160

Telephone: (312) 344-1600
 TWX: (910) 226-1954



for high quality transmission components and accessories

1.0 GENERAL

This system is used primarily for full prepay applications in which Tone-control Signalling is used for paystation coin control. It is also used for many other applications such as, unlocking remote doors, resetting alarms, opening & closing circuits, starting & stopping remote generator units; the possibilities are only limited by your imagination.

The TD-4 System is an adjunct to step-by-step or relaymatic equipment which has no tone receiving equipment. Newer switchboards which use tones instead of voltage to provide paystation coin control functions (such as TSPS & TSD) are being installed. The TD-4 is necessary as an interface between existing equipment and the new switchboards. The TD-4 accepts three combinations of two tones each to perform three functions: coin collect, coin refund and paystation ringback.

2.0 APPLICATION

2.1 The TD-4 system is used in remote (Class 5) central offices serving the paystations to receive M-F tones from the toll center. Tones are received by the TD-4 card and actuate relays on the TDP-2 or 2C panel to supply voltage to the paystations.

2.2 The tone detectors may be installed on a per trunk basis (between linefinders and selectors) or on a per paystation basis depending on the most economical approach.

3.0 DESCRIPTION

3.1 The TD-4 system comprises a tone detector panel (TDP-2 or TDP-2C), the tone detector boards (TD-4), and an optional buss bar panel (BBP-640-23), optional ARN2 or ARN3 automatic return network, and TD-4 test set.

3.2 A TDP-2 panel accommodates 3-TD-4 cards, and includes the necessary ballast lamps, fuses, and relays to provide collect, refund, and ringback voltage for 3 conventional prepay (+ LLOV) paystation circuits.

3.3 A TDP-2C panel is very similar to the TDP-2 panel except without the ballast lamps. This model is used with CEECO prepay (48V) paystations and provides collect, refund, and ringback signals for three such paystation circuits.

3.4 A buss bar panel is required for installations where a readily available buss is not accessible to the installation. One BBP-640-23 will accommodate any size installation of TD-4 equipment.

3.5 The ARN-2 or ARN-3 automatic return network is required if an automatic coin return is desired in the paystation when the operator is called. Either of these devices can be installed at the factory or in the field. They mount on the rear of the TDP-2 or 2C tone detector panels which are pre-wired for them. Selection of the ARN-2 or ARN-3 will depend on signals available in your operation.

3.6 A complete system may be provided on a rack with all interpanel wiring to the buss bar panel complete. Where rack space is available in the central office, it may be desirable to install the panels individually in existing space.

3.7 All equipment is manufactured to fit a standard Western Electric Type 23" rack. The TDP-2 panel requires 3.5" of rack space; the BBP-640-23 panel requires 1.75".

3.8 The TD-4 test set is a versatile, compact test set to fully check-out the operation of a TD-4 system. The set will check the operation of each circuit of an installed TDP-2 or 2C panel, or may be used to check the operation of individual TD-4 cards. Lamp indication gives "go" or "no-go" condition of each function being tested.

4.0 OPERATION of TDP-2 System (Conventional Prepay) for use with the CEECO Model 201, Automatic Electric, and Northern Electric paystations.

4.1 The tone detector sits "on line" at all times and receives the tones from the toll center. The TD-4 responds in accordance to the following frequencies:

COIN COLLECT	-	700 and 1,100 Hz
COIN RETURN	-	1,100 and 1,700 Hz
PAYSTATION RINGBACK	-	700 and 1,700 Hz

No function is provided if either all three tones or only one tone is present.

4.2 The tones are received by the tone detector board on terminals 20 and 21. If coin collect tones are received, the tone detector board switches + 48V to terminal 19. This activates relay 1, which inserts + 120V to ground on both the tip and ring conductors facing the paystation. This causes the coin to be collected. At the same time the line facing the central office is terminated with a 900 Ohm resistor to preclude the possibility of the central office dropping the line when an automatic return is performed.

4.4 When return tones are received, the same procedure occurs as above except + 48V is switched to terminal 18, actuating return relay 2 which inserts -120V to ground on both tip and ring conductors to the paystation. This causes the paystation to return coins deposited. At the same time the line facing the central office is terminated with a 900 Ohm resistor to preclude the possibility of the central office dropping the line when an automatic return is performed.

4.5 An optional automatic return network (ARN-2 and ARN-3) is available on a per circuit basis to provide automatic return when the operator comes on-line, for offices which do not provide this feature in the prepay trunk equipment.

4.6 When ringback tones are sent across terminals 20 and 21, a voltage level of + 48V is switched to terminal 17 causing relay 3 to operate which provides a path for ringback signalling to be transmitted to the paystation.

4.7 The Tone Detector card (TD-4) is essentially logic circuitry with appropriate protection circuits.

5.0 OPERATION of TDP-2C System (CEEEO Prepay) for use with the CEEEO Model 200 paystation.

5.1 The tone detector sits "on line" at all times and receives the tones from the toll center. The TD-4 responds in accordance to the following frequencies:

COIN COLLECT	-	700 and 1,100 Hz
COIN RETURN	-	1,100 and 1,700 Hz
PAYSTATION RINGBACK	-	700 and 1,700 Hz

No function is provided if either all three tones or only one tone is present.

5.2 Refer to Figure 3, Page 7 to follow through the method of operation.

5.3 When collect tones are sent across terminals 20 and 21, + 48V is switched from terminal 19 of the tone control board to the collect relay (Relay 1). Relay 1 causes the tip and ring path to be temporarily reversed. This provides for a coin collect on the CEEEO full prepay paystation.

5.4 When return tones are received, + 48V is switched from terminal 18 to Relay 2 which causes tip and ring to paystation to open for approximately 800 milliseconds. This causes the paystation to return coins deposited. At the same time the line facing the control office is terminated with a 900 Ohm resistor to preclude the possibility of central office dropping the line when an automatic return is performed.

6.0 "Optional" automatic coin return networks Models ARN-2 and ARN-3 available for the CEECO TD-4 Tone Detector System.

6.1 PURPOSE: To automatically return any coins deposited in the paystation when the operator is called. Some paystations, such as the CEECO Model 200, do not require a coin to call the operator or an emergency number, but experience has proven most people still deposit coins before dialing. The operator could return this deposit by activating her coin return button as soon as she identifies the call as being a paystation, but experience has proven that it is difficult and expensive to train operators to perform this operation consistently and satisfactorily.

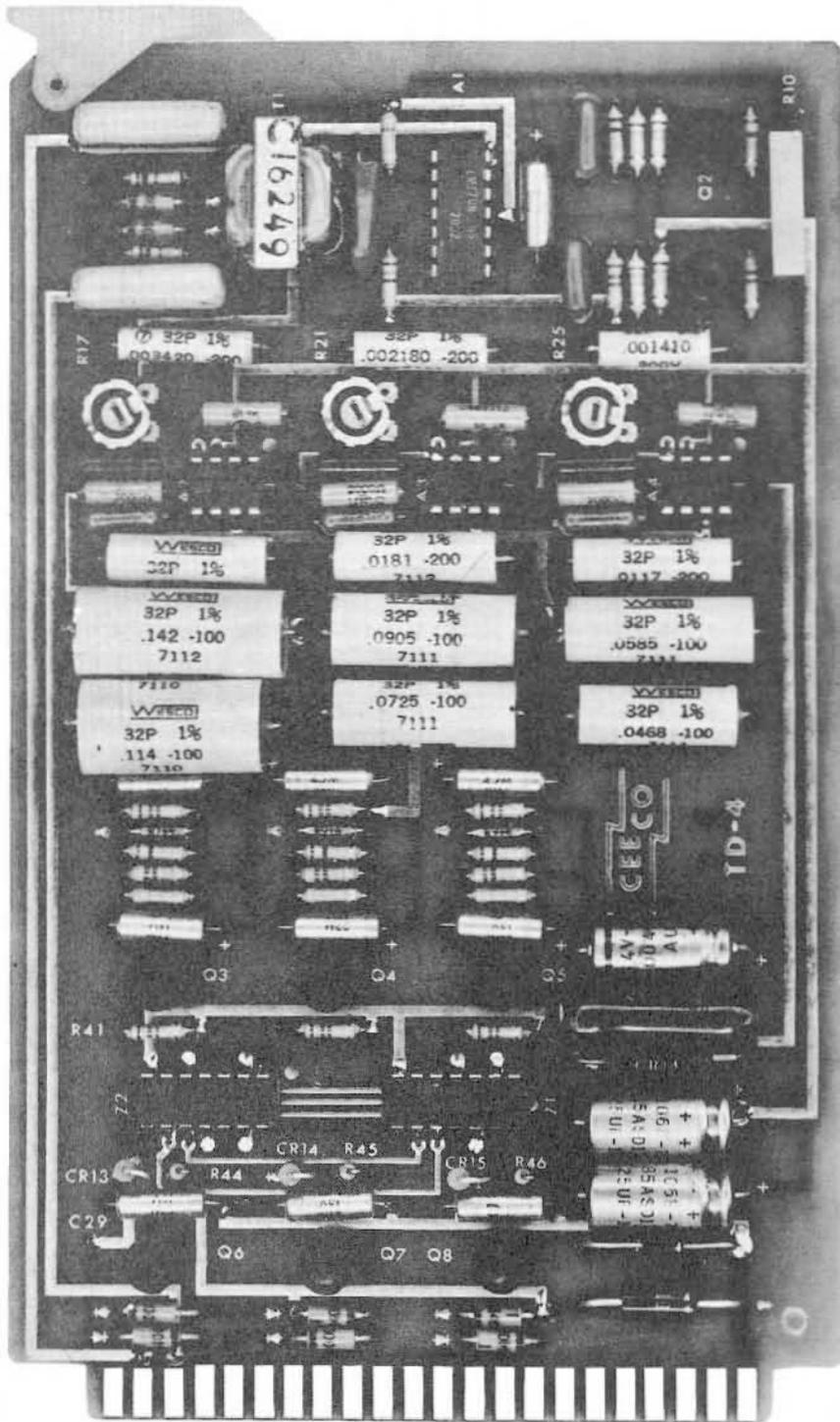
6.2 GENERAL: CEECO Tone Detector Panels TDP-2 or TDP-2C are wired at the factory to accommodate either the ARN-2 or ARN-3 automatic return network. All connections required for installation in central office are wired to a single terminal block, located on the tone detector panel. These networks can be installed at the factory or in the field. If either of these networks are ordered from the factory at the time the tone detector panels are ordered they will be installed at no charge. The ARN-2 or ARN-3 can be easily installed in the field. Automatic coin return requires one ARN circuit for each TD-4 tone detector card. There are 3 TD-4 tone detector cards on each TDP-2 or TDP-2C panel.

6.3 ARN-2-SPECIFICATIONS: Generally the ARN-2 automatic return network is used on a per trunk basis as it requires a ground connection after the customer has called the operator. This ground connection can be picked up from any set of contacts available in the central office that will give a ground connection during this condition. In a step office this ground is generally received from a spare set of contacts on the selector or repeater that operates when the operator answers. The ARN-2 will work on a per line basis if a ground can be supplied to the ARN-2 from any source after the operator is called. The ground connection must be applied for not less than 500 milliseconds to operate. No maximum duration is specified as the only requirement is that the ground be removed when or before the call is completed.

6.4 ARN-2 OPERATION: When the ARN-2 is connected to ground, current flows thru the ARN-2 circuitry to the return relay (RLY-2, RLY-5 or RLY-8) of the TDP-2 or TDP-2C panel. This current will continue to flow for approximately 800 milliseconds in order to keep the return relay energized long enough for the paystation to return the coin. Then, the ARN-2 will interrupt this current, causing the return relay to de-energize, thus restoring the system to a normal condition. The toll operators return button is not effected by the ARN-2.

6.5 ARN-3 SPECIFICATIONS: The ARN-3 automatic return network is used on a per trunk or per line basis and requires a + voltage above ground of not less than 10VDC or 10V RMS AC for not less than 10 milliseconds when the customer has called the operator. This voltage is generally but not necessarily received from the sleeve lead from signals and voltages received from the ANI equipment such as mini-pulse. It is important that no additional signals meeting these requirements are received until the call is completed as monies deposited for toll calls could conceivably be returned.

6.6 ARN-3 OPERATION: When the specified signal is detected by the high impedance input circuitry, an integrated circuit connected as a "one shot" triggers the output transistor into conduction for a period of about 800 milliseconds. This operates the return relay (RLY-2, 5 or 8 of the TDP-2 or TDP-2C panel) long enough for the paystation to return the coin, and then restores the system to a normal condition. The toll operator's return button is not effected by the ARN-3.



CEECO

Figure 1

AL Lichen

TRAPPER

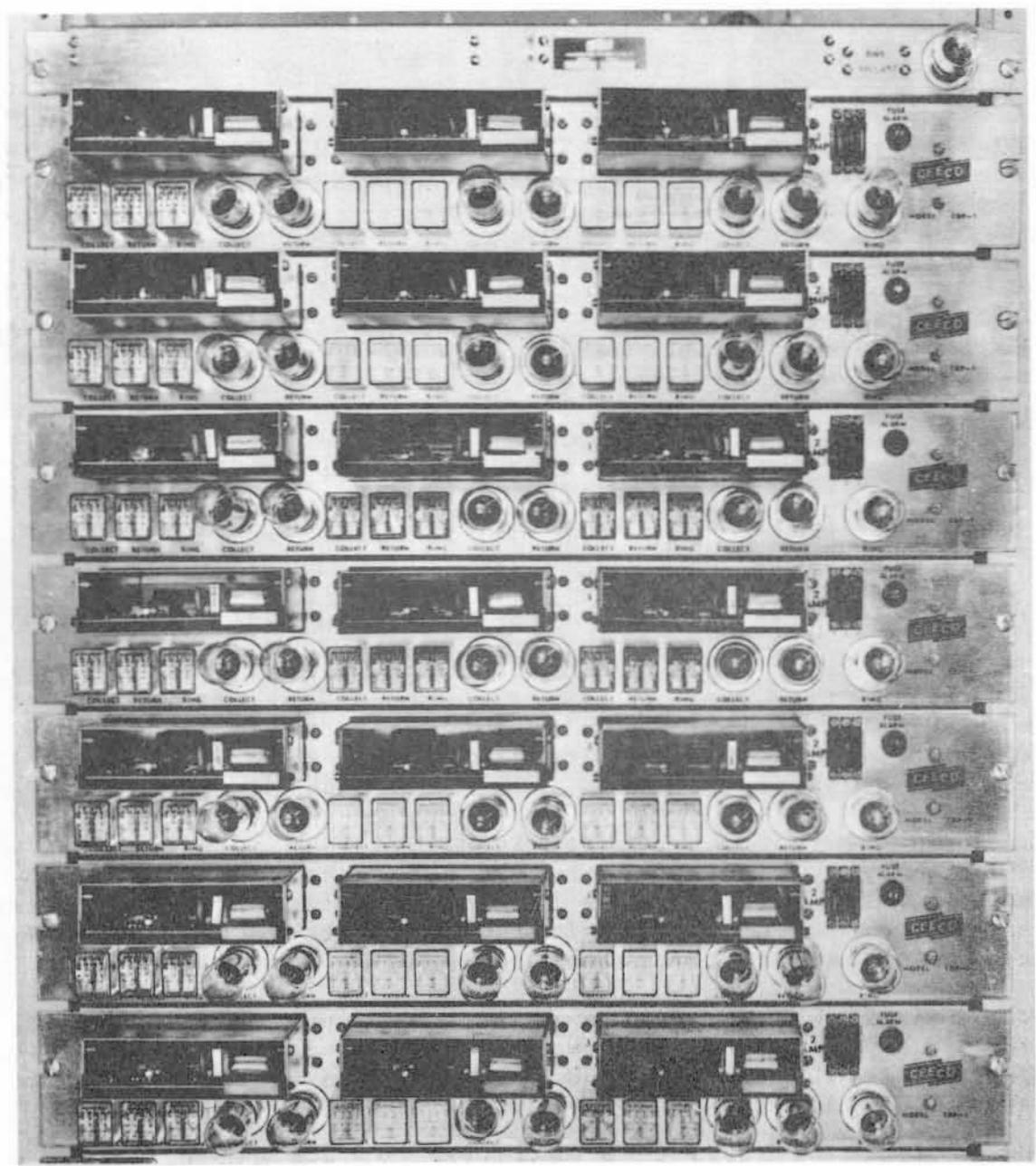
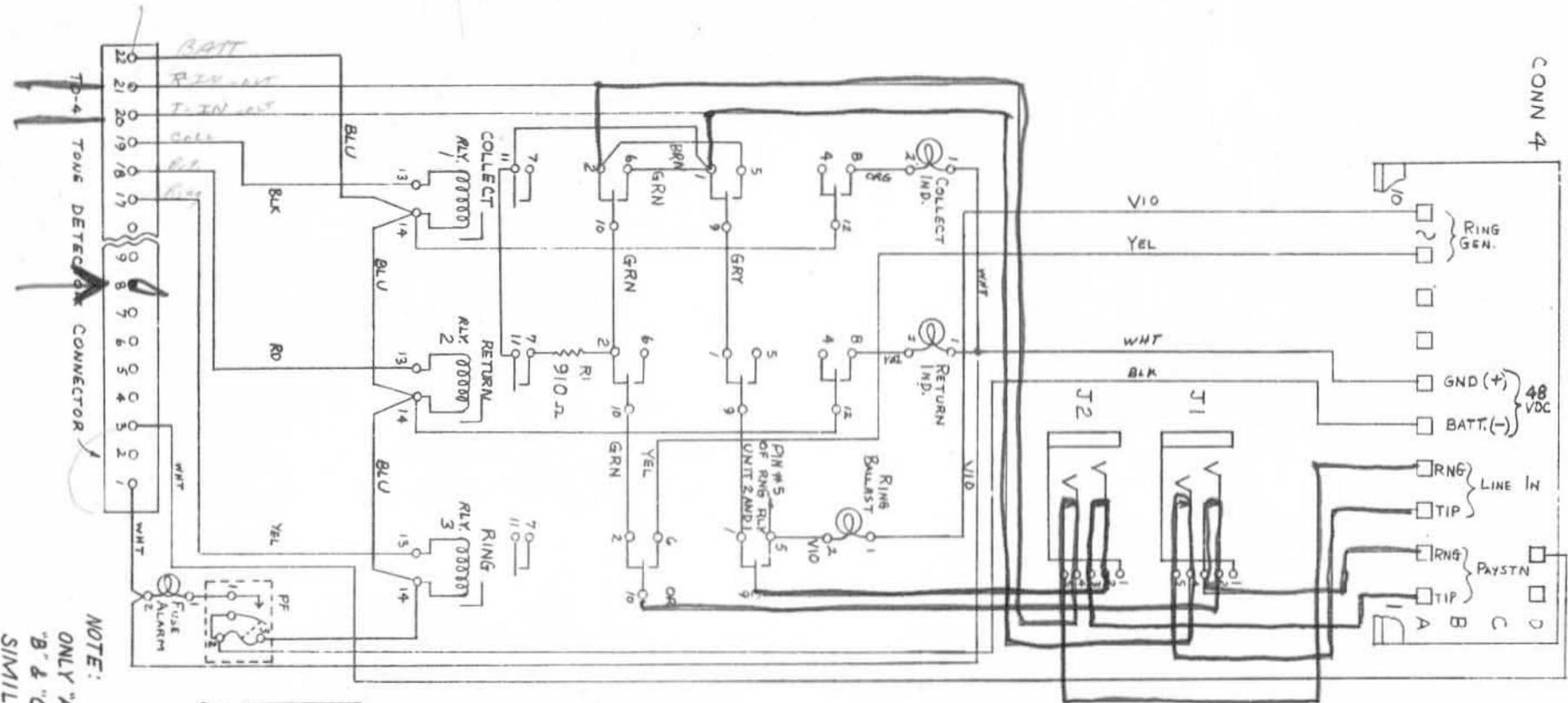
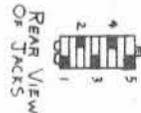
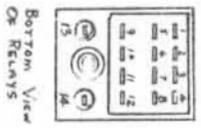


Figure 2 TD-4 Equipment Installed on Rack for 21 Paystation Circuits

ISSUE	REVISION - DATE - DRAWN	CHKD.	APPD.
1	5-15-75	GB	
2	ECN 114 10-15-76		



NOTE:
ONLY "A" SECTION SHOWN.
"B" & "C" SECTIONS ARE
SIMILAR.



QTY.	PART NUMBER	DESCRIPTION	ISSUE
			2
			↑
			ISSUE
			B
			434-225 B

MATERIAL	FINISH	PROJECT
		SCHEMATIC TDP-2C TONE DETECTOR PANEL

COMMUNICATION EQUIPMENT & ENGRG. CO. 5646 W. RACE AVE. CHICAGO, ILL. 60644		DRAWN B	CHKD.	APPD.
----------------------------------------------------------------------------------------	--	------------	-------	-------

C Load Control

Adapter
CA-4

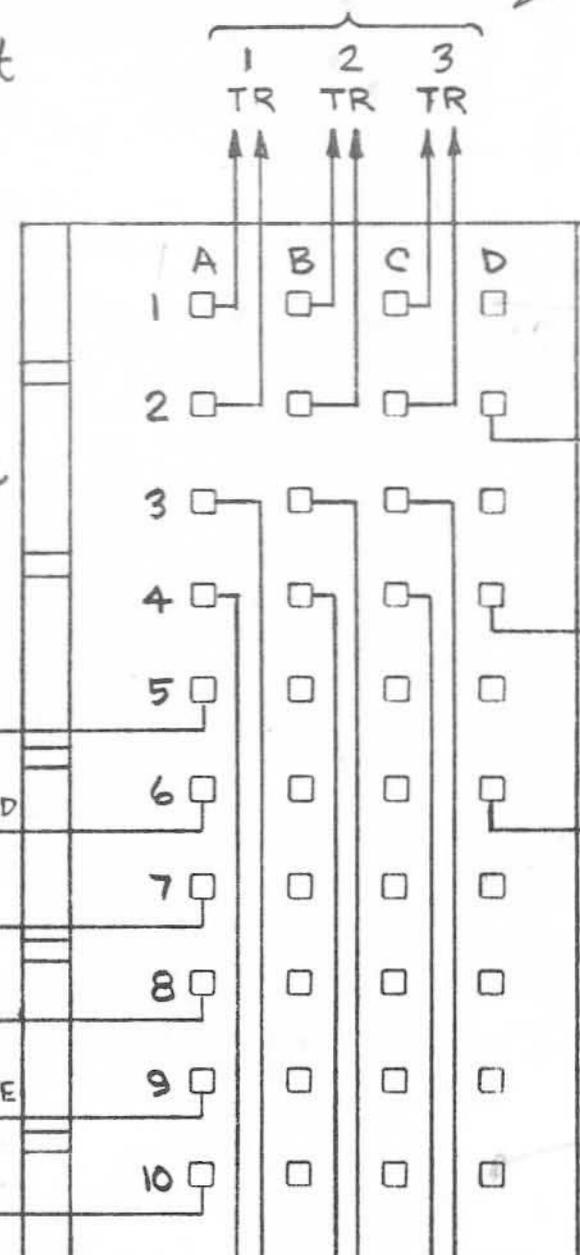
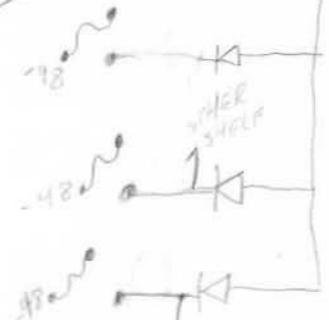
TO
PAYSTATION

FDR
FDR

OFFICE
ALARMS

NO SUP - Collect
Sep Refund

PPA
Prepay adapter



TO
48VDC
BUSS

TO
120VDC
BUSS

TO
RINGING
GENERATOR
BUSS

3 2 1

TO OPTIONAL ARN
AUTOMATIC COIN
RETURN NETWORKS

NOTE:
TERMINAL 9 TO GROUND
IF ONE SIDE OF RINGING
GENERATOR IS GROUND.

In
TO
CENTRAL OFFICE

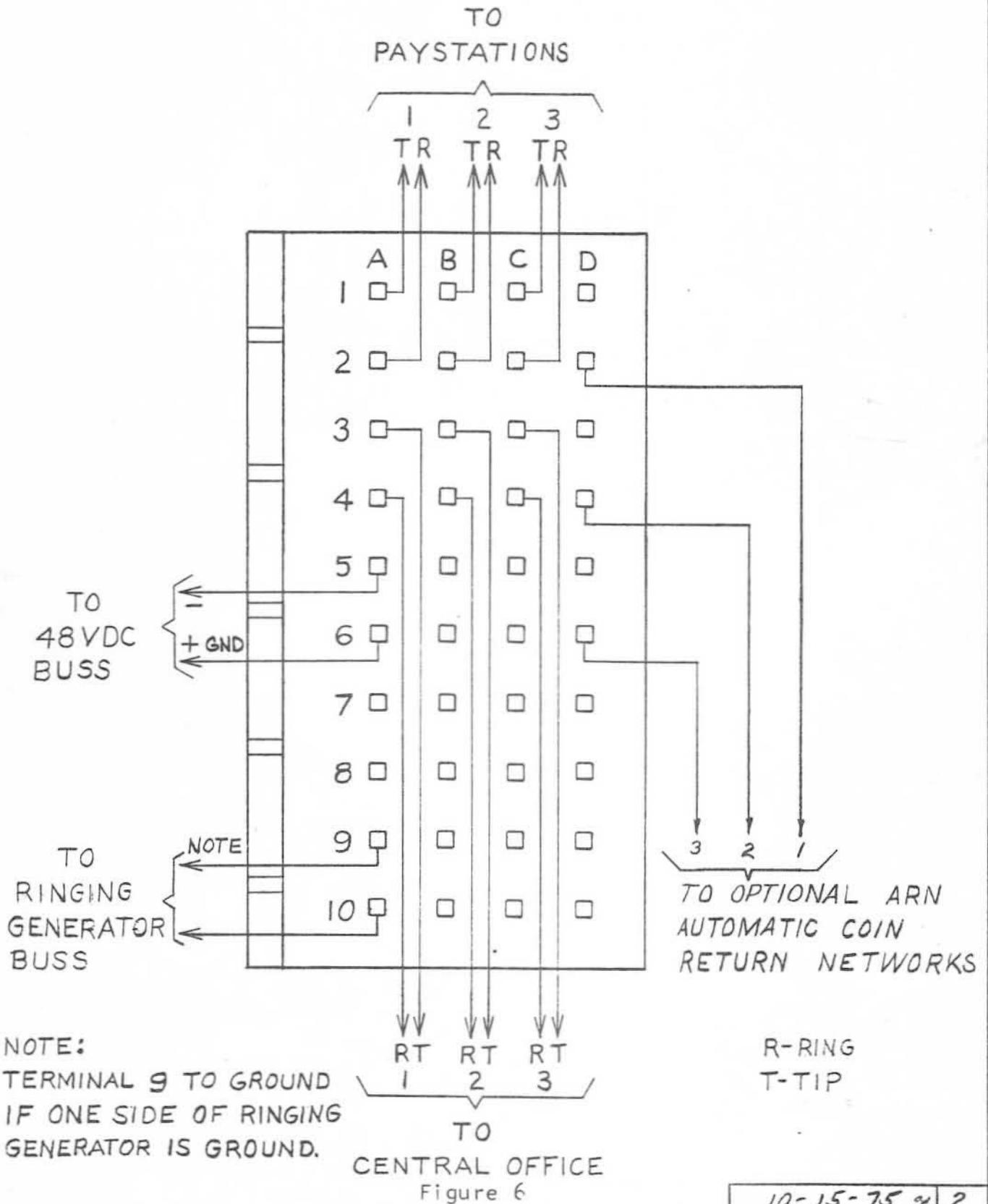
R - RING
T - TIP

Figure 5

COMMUNICATION
EQUIPMENT &
ENGRG. CO.
1800 N. 25TH AVE.
MELROSE PK. ILL. 60160

TDP-2
TERMINAL BLOCK
CENTRAL OFFICE
INSTALLATION WIRING

10-15-76	2
SEPT 23 75	1
HAUSMANN	ISSUE
CHECKED	APPROVED
434-214	A

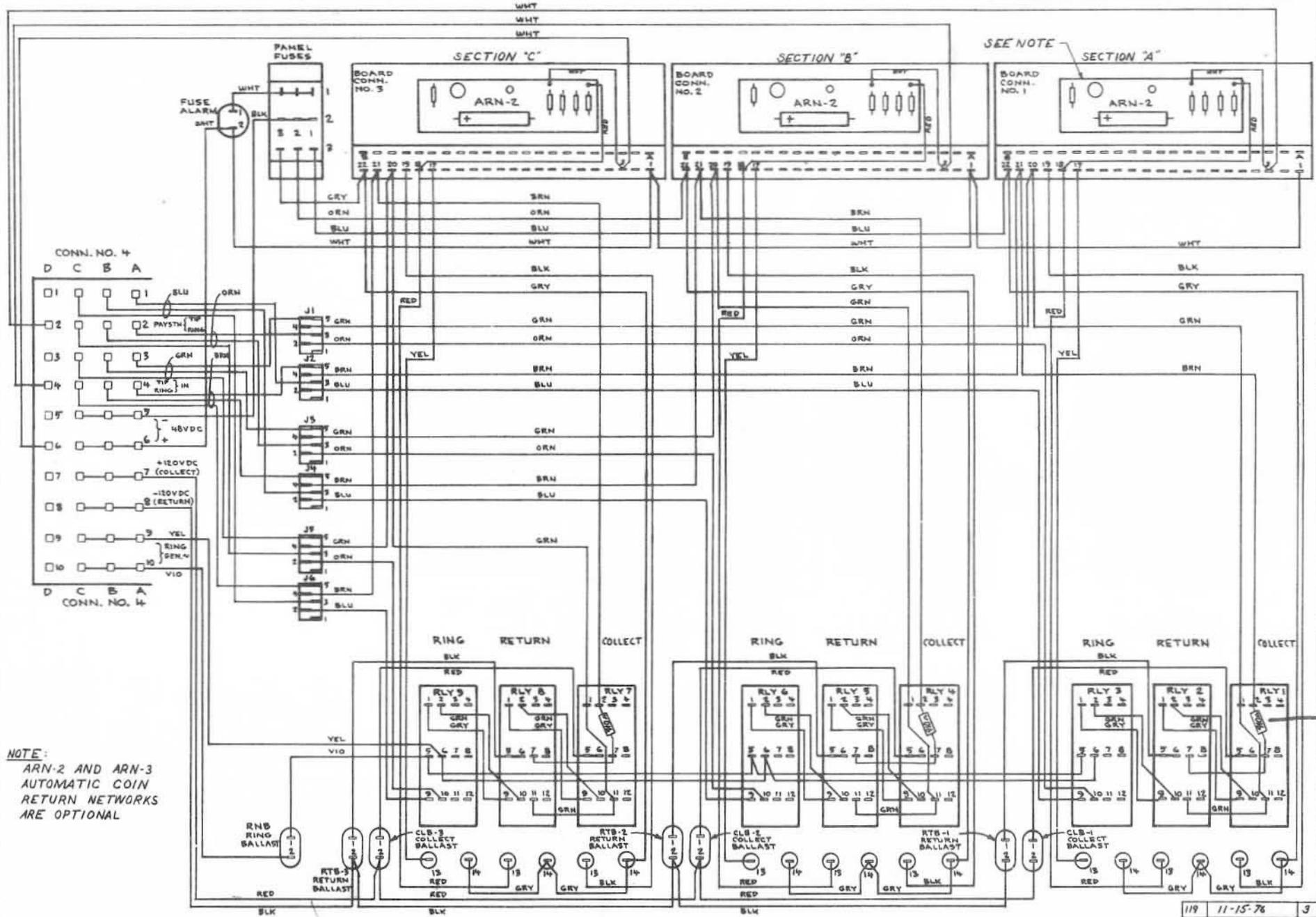


**COMMUNICATION
EQUIPMENT &
ENGRG. CO.**
5646 W. RACE AVE.
CHGO., ILL. 60644

TDP-2C
TERMINAL BLOCK
CENTRAL OFFICE
INSTALLATION WIRING

10-15-75	2
SEPT 23 75	1
HAUSMANN D.B.	MA ISSUE
CHECKED	APPROVED 1
434-213	A

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL



NOTE:
ARN-2 AND ARN-3
AUTOMATIC COIN
RETURN NETWORKS
ARE OPTIONAL

MAKE SURE ITS OUT

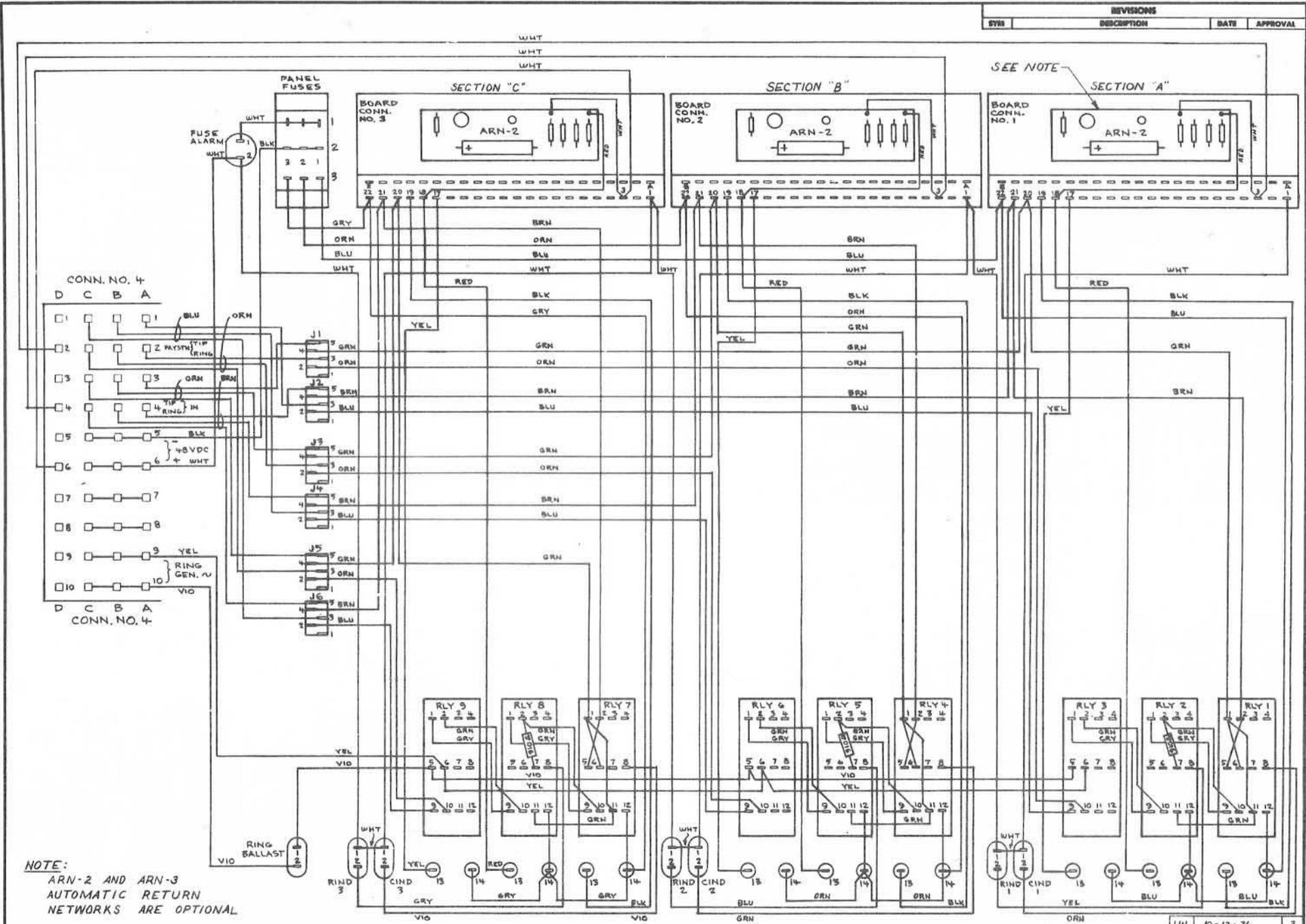
119	11-15-76	3
114	10-11-76	2
ECN	SEPT 76	1

COMMUNICATION
EQUIPMENT &
ENGRG. CO.
5048 W. BRIDGE AVE.
CHICAGO, ILL. 60644

WIRING DIAGRAM TDP-2
TONE DETECTOR PANEL

434-233

REVISIONS			
SYN	DESCRIPTION	DATE	APPROVAL
114	10-12-76	3	
	REL. WIRE WAS PH II TO PIN 2, 11-26-75	2	
ECN	SEPT 23-75	1	



NOTE:
 ARN-2 AND ARN-3
 AUTOMATIC RETURN
 NETWORKS ARE OPTIONAL

Figure 8

Page 12

**COMMUNICATION
 EQUIPMENT &
 ENGRG. CO.**
 3546 W. BAKER AVE.
 CHICAGO, ILL. 60644

WIRING DIAGRAM TDP-2C
 TONE DETECTOR PANEL

114	10-12-76	3
	REL. WIRE WAS PH II TO PIN 2, 11-26-75	2
ECN	SEPT 23-75	1
434-232 E		