

NF7M SERIES DIGITAL ANNOUNCERS

INSTALLATION

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(Central Office, PBX equipment bay, rack mounted or free standing). Brackets permit adaptation to many applications.

1.02 The Digital Announcer requires the user to wire and connect external equipment. Wiring will vary depending on the options, program and interface circuits selected. Connection to external equipment may be either hardwire (wire-wrap) or RJ-11 modular connections. The announcer wire-wrap edge connectors provide leads for power, customer lines, and control signals. Start modes and other options are determined by the user for each application. RJ-11 jacks are available on some options for use with modular plugs.

1.03 Simplified wiring for single chassis units (one or two audio outputs) is shown in Figure 1. Wiring for two chassis units (up to four audio outputs) is shown in Figure 2. Additional chassis may be added for connection of more lines (refer to Section 060-NF7M-203 for more details).

1.04 References.

060-NF7M-100 NF7M Series Digital Announcer Equipment Description

060-NF7M-3XX NF7M Series Digital Announcer Operating Procedures

060-NF7M-400 NF7M Series Digital Announcer Maintenance Procedures

For additional information, contact:
Product Service (Dept. 306)
Northern Telecom
Cook Division
6201 Oakton Street
Morton Grove, IL 60053
Telephone (708) 967-1555
Telex I 72-4472
Telex II 910-223-3654

1. GENERAL CONSIDERATIONS

1.01 The Digital Announcer is designed for installation in a 19-inch rack or stand-alone use. Installation will vary with wiring and equipment

1.05 Installation of the Announcer will vary with the number of subscriber lines, the interface circuits, and the location. This document assumes these items have been defined and all parts are available. The tasks are:

- (1) Incoming Inspection
- (2) Configuration
- (3) Wiring
- (4) Installation
- (5) Testing

2. INSTALLATION CHECKLIST

2.01 A listing of the basic tasks required to properly install a Digital Announcer is provided in Chart 1. Included in the chart are references to more detailed information concerning each step of the procedure.

Chart 1. Installation Checklist.

STEP	ACTION	REFERENCE
1	Unpack unit. Compare packing list with enclosed items. Report discrepancies.	Para. 3.01
2	Determine Announcer operating conditions.	Para. 4.01 to 4.07
2a	Determine interface option operating conditions.	Refer to appropriate section
3	Set DIP switches and jumpers for operation determined in step 2.	Table 1
3a	Set DIP switches and jumpers for operation determined in step 2a	Refer to appropriate section
4	Determine mounting requirements.	Para. 5.01 to 5.07
5	Mount Announcer (rack or stand-alone)	-----
6	Determine Wiring requirements.	Para. 6.01 to 6.16
6a	Determine Interface options wiring.	Refer to appropriate section
7	Wire announcer and any interface options.	-----
8	Apply power	Para. 7.01 to 7.06
9	Record message(s)	Operation Section
10	Test Installation	Para 7.07

CAUTION: This equipment generates, uses and can radiate radio frequency energy. If it is not installed and used in accordance with the instructions given in this section, it may cause interference to radio communications. It has been tested for compliance within the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be necessary to correct the interference.

If this equipment is to be connected to standard telephone lines through an interface circuit, or is to be operated as part of a PBX system, this equipment must also comply with part 68 of FCC rules.

NOTE: FCC registration does not express or imply a guarantee of performance.

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's outside wiring associated

with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone line and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: User should not attempt to make such connection themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

3. INCOMING INSPECTION AND STORAGE

3.01 The Announcer should be inspected immediately upon receipt to determine any shipping damage or missing parts. Report any damage to the shipping carrier. Missing pieces should be reported to the distributor or the factory. Figure 3 illustrates packing.

3.02 If the announcer is not put into immediate service it can be stored in its shipping carton. Store the announcer in a cool, dry place away from magnetic and electrical fields and sources of ultraviolet light. Do not expose to weather. Do not stack heavy objects on top of the announcer.

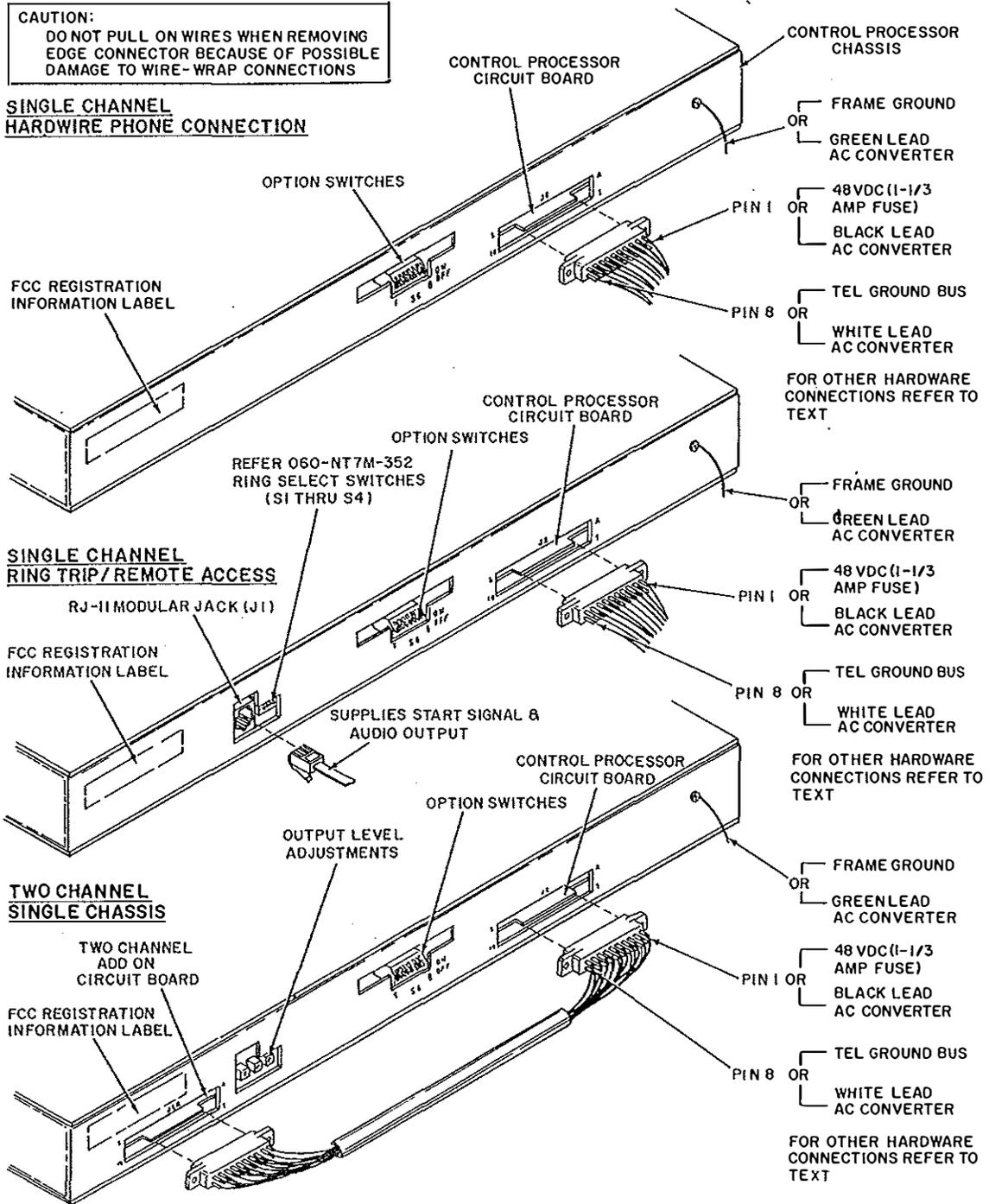


Fig. 1 - Single Chassis Simplified Wiring

CAUTION:
DO NOT PULL ON WIRES WHEN REMOVING
EDGE CONNECTOR BECAUSE OF POSSIBLE
DAMAGE TO WIRE-WRAP CONNECTIONS

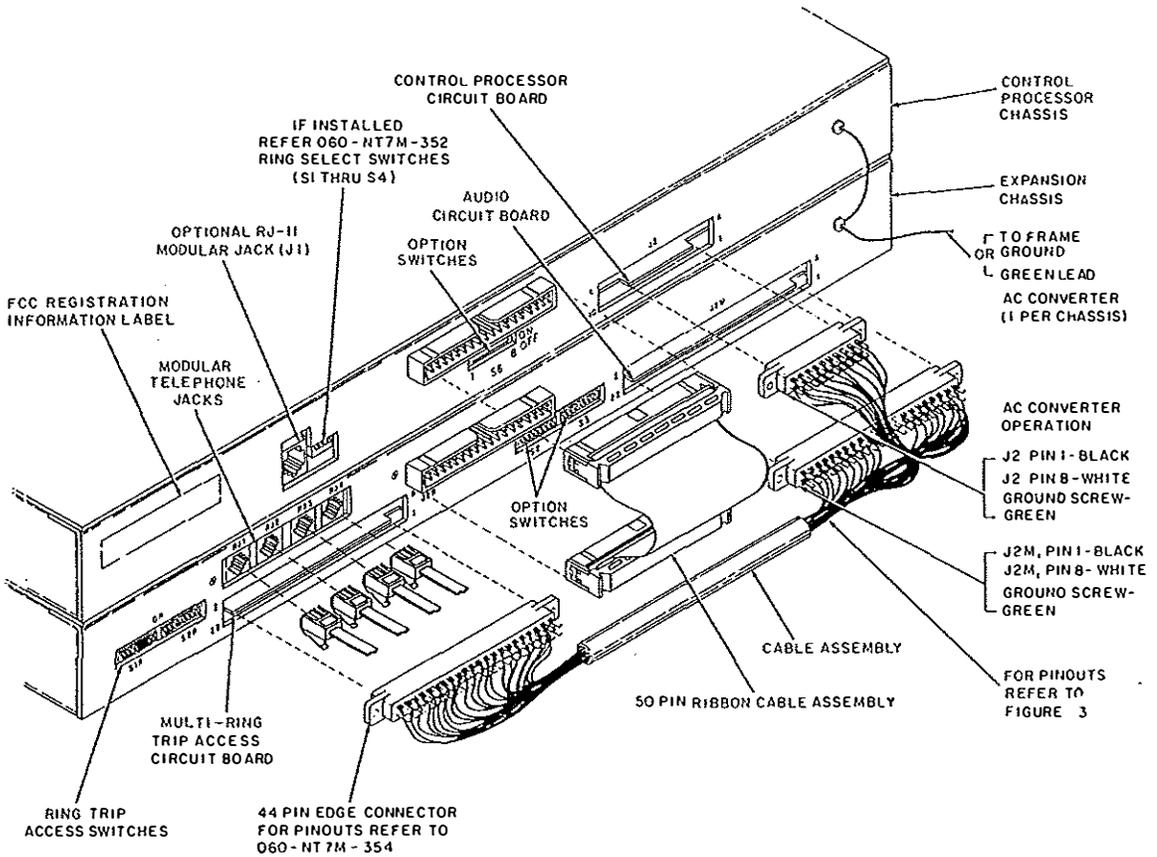


Fig. 2 - Two Chassis Simplified Wiring

PACKING & UNPACKING INSTRUCTIONS

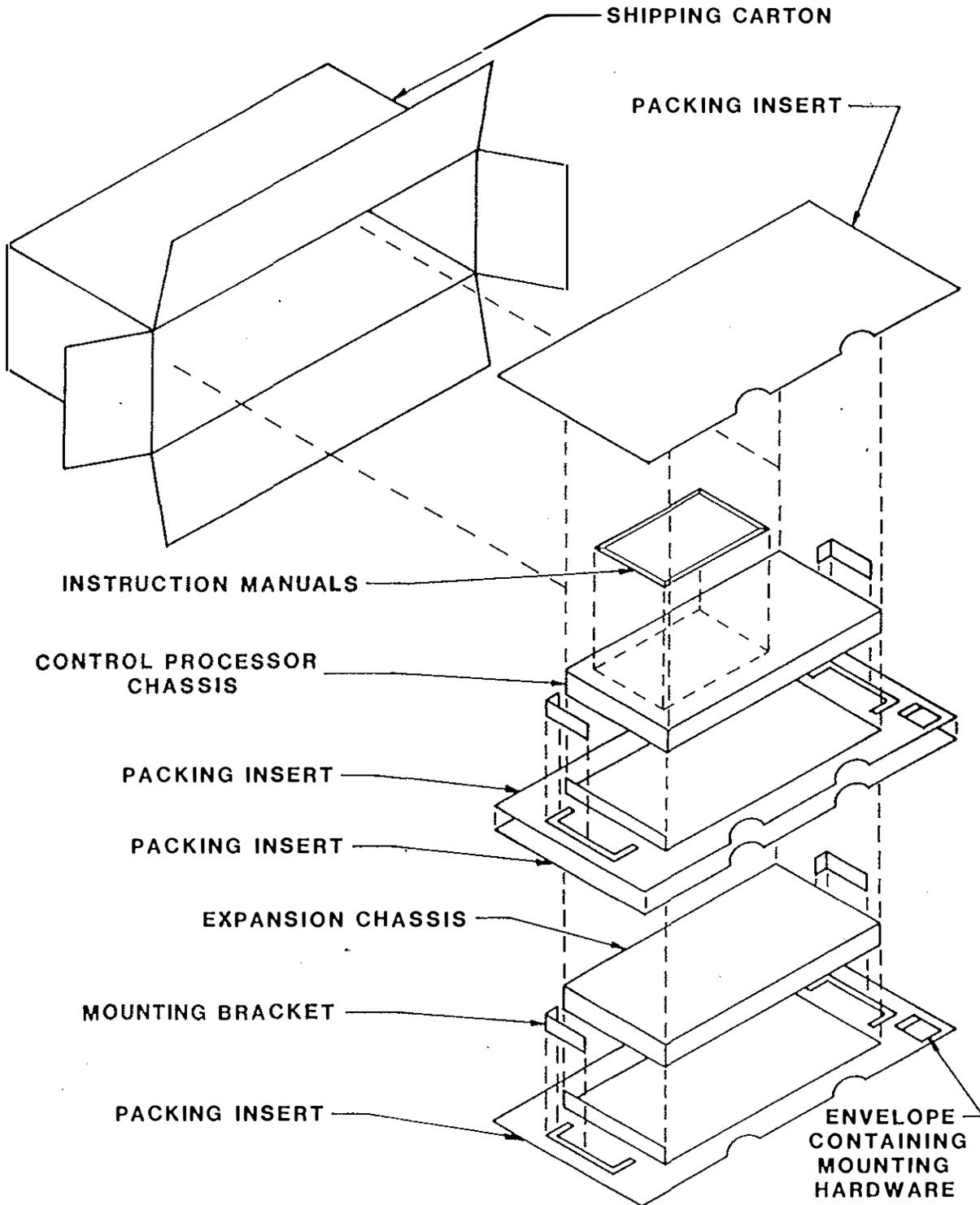


Fig. 3 - Digital Announcer Packing

4. CONFIGURATION

4.01 The Digital Announcer is shipped pre-configured so all options selected will operate properly. The method of operation is controlled by set of DIP switches which are accessible through the Control Processor Chassis rear panel. The function of these switches is described individually. The full affect of the functions is detailed in the appropriate program operation section as required. The switches, their function, and location are detailed in table 1.

REMOTE RECORD (S6-1)

4.02 Remote record requires a remote record option. If remote record is not installed, the switch has no effect. If no remote record is available, set the switch to the OFF position. To allow (enable) remote record set switch ON.

C/MC SIGNAL ACTIVITY (S6-2)

4.03 Control signal activity is used to control other equipment and may be set to either pulse or level mode. Pulse mode will change the state of the signal for 250 msecs. Level mode will change state for the duration of message output (refer to figure 4). Pulse mode must be used with ring trip interfaces (switch ON).

VOICE ALARM OPERATION (S6-3)

4.04 Ten second gaps in the output message, low audio output, or no start/stop signal at the end of the message will cause an alarm signal and display. Voice Alarms are normally left on but may be turned off.

SAMPLING RATE (S6-5)

4.05 Sampling rate determines the speed of recording. Message time is limited by memory size and sampling rate. All specifications listed are at the pre-set sampling rate of 32 kHz. Message time may be increased by almost 50% by using the 22 kHz rate.

NOTE: The 22 kHz sampling rate will degrade audio quality.

NOTE: SIT codes cannot be used with the 22 kHz sampling rate mode.

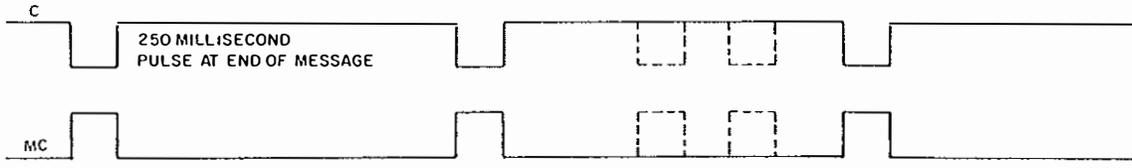
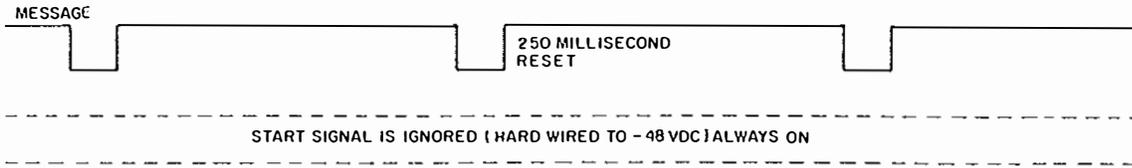
SIT OPERATION (S6-6)

4.06 SIT message tones are used to identify common central office messages. These tones can be selected for each channel individually. Selecting SIT's is covered in the operation section. Switch settings for channels 2, 3, and 4 allow (enable) or dis-allow (disable) SIT tones switch settings. These switches are on the Expansion Chassis and are detailed in Table 2 (refer to the program operation section for more details).

START OPERATION (S6-7)

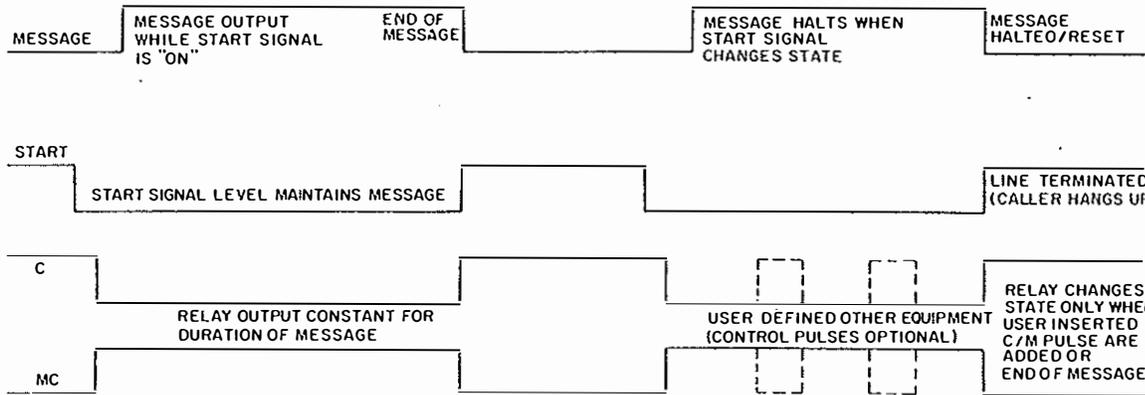
4.07 Message playback is started by the start signal from an attached line. Messages may be set to playback three ways. The playback types are:

- (1) Pulse Start - Start signal pulse initiates playback. The message is output to completion regardless of changes in state of the start signal.
- (2) Level Start - A change in state of the start signal begins message playback. The message will play only when the start signal is present. If a caller hangs-up, the start signal changes state and the message is halted and the announcer is reset to Ready for the next caller.
- (3) Continuous Run - The message is constantly played. Callers "barge-in" on a playing message. (Start signal must be hardwired ON).



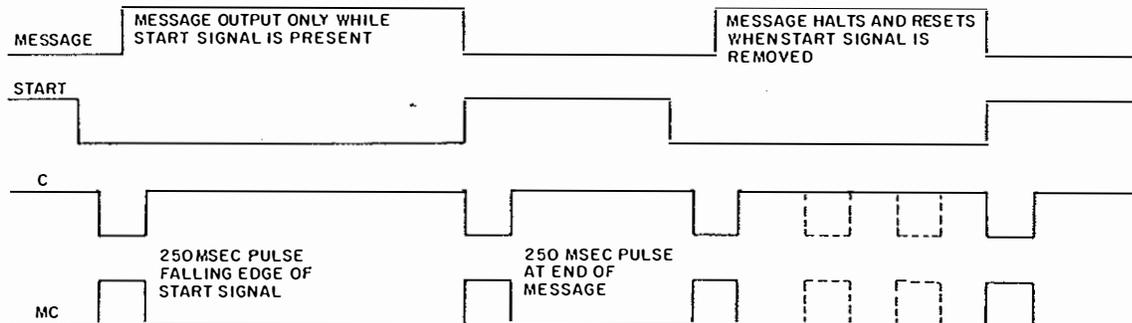
START SIGNAL ALWAYS -48VDC
 C/MC PULSES FOR 250 MILLISECOND AT END OF MESSAGE.
 INTERMEDIATE C/MC PULSES CONTROL OTHER EQUIPMENT.
 END OF MESSAGE AND USER INSERTED C/MC PULSES ARE IDENTICAL!
 EOM AND USER PULSES ARE DISTINGUISHED BY MESSAGE TIME ONLY!

CONTINUOUS OPERATION



250 MILLISECOND AFTER CHANGE IN START SIGNAL, MESSAGE IS OUTPUT AS LONG AS START SIGNAL IS MAINTAINED. DURING OUTPUT, CHANGE IN START SIGNAL WILL HALT AND RESET MESSAGE.
 C/MC RELAY CHANGES STATE FOR DURATION OF MESSAGE OUTPUT. INTERMEDIATE C/MC PULSE ARE USED TO CONTROL OTHER EQUIPMENT.
 DIAGRAM ASSUMES ONE MESSAGE REPEAT PER CALL.

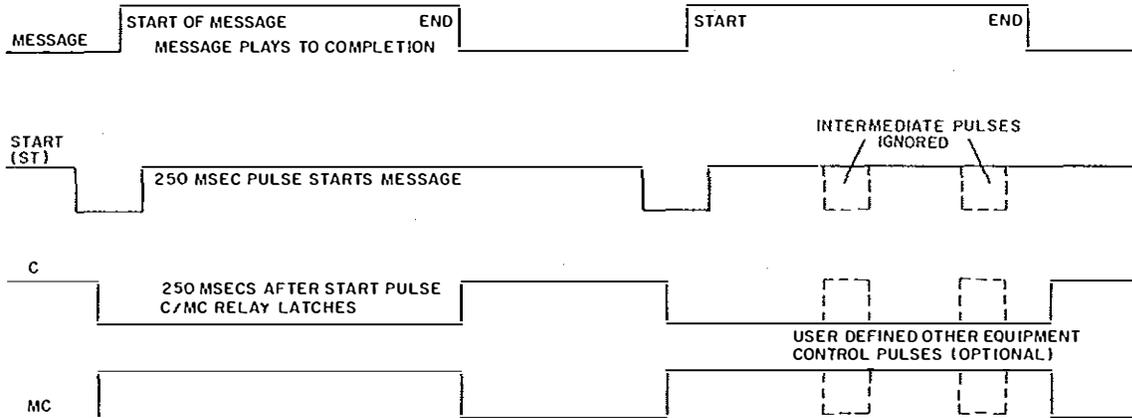
LEVEL START, LEVEL C/MC



CHANGE IN STATE OF START SIGNAL INITIATES AND MAINTAINS MESSAGE OUTPUT.
 250 MILLISECOND C/MC PULSE AT START SIGNAL AND END OF MESSAGE
 INTERMEDIATE C/MC PULSES CONTROL THE EQUIPMENT.

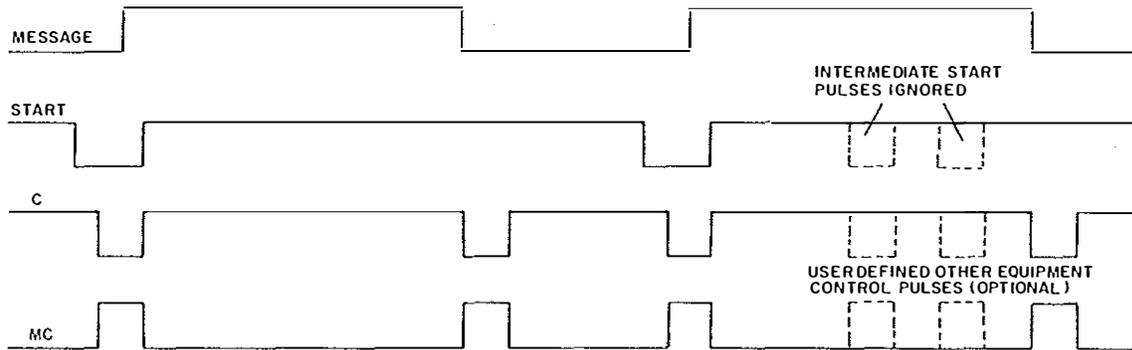
LEVEL START PULSE C/MC

Fig. 4 - C/MC Signal Activity (Sheet 1 of 2)



250 MILLISECOND START PULSE INITIATES MESSAGE OUTPUT. CHANGES IN STATE OF START SIGNAL ARE IGNORED. MESSAGE PLAYS TO COMPLETION.
 C/MC RELAY CHANGES STATE ON START SIGNAL FOR DURATION OF MESSAGE OUTPUT. INTERMEDIATE C/MC PULSES ARE USED TO CONTROL OTHER EQUIPMENT.

PULSE START LEVEL C/MC



250 MILLISECOND START PULSE INITIATES MESSAGE OUTPUT, MESSAGE IS OUTPUT TO COMPLETION.
 250 MILLISECOND C/MC PULSE AT START SIGNAL, AND END OF MESSAGE. INTERMEDIATE C/MC PULSES ARE USED TO CONTROL OTHER EQUIPMENT.

PULSE START PULSE C/MC

Fig. 4 - C/MC Signal Activity (Sheet 2 of 2)

Table 1. Control Processor Chassis Switch Settings

CONTROL PROCESSOR CHASSIS		
FUNCTION	POSITIONS	RESULT
Remote Record Circuit Operation *	S6-1 OFF S6-1 ON	Remote Access Permitted Remote Access Blocked
C/MC Control Signal Activity	S6-2 OFF S6-2 ON	Level (Usual) State Pulsed (Inverse) State
Voice Alarm Circuit Operation	S6-3 OFF S6-3 ON	Voice Alarm Active Voice Alarm Disabled
S6-4 Not used at this time	S6-4 OFF	No effect on Digital Announcer circuits
Sampling Rate Speed Select	S6-5 OFF S6-5 ON	32 kHz (32-518 seconds) 22 kHz (46-737 seconds)**
Output Channel No. 1 SIT Generation **	S6-6 OFF S6-6 ON	Voice Message only Message preceded by SIT
Start Circuit Operation	S6-7 OFF S6-7 ON	Level (early termination) Pulsed (entire Message)
S6-8 Not used	S6-8 OFF	No effect on Digital Announcer circuits

* If Remote Record is not installed, this switch has no effect on the Announcer. Leave unused switches in OFF position.

** Special Information Tones can not be enabled if the 22 kHz sampling rate is selected.

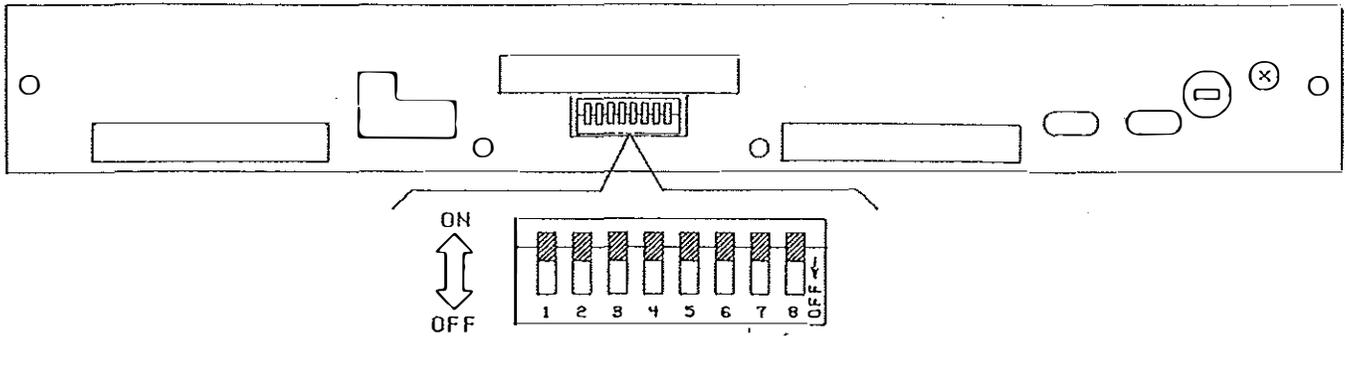


Table 2. Expansion Chassis Switch Settings

MULTI-CHANNEL CARD				
Switch	Description			
S2-1 to S2-8	Not Used.			
S3-1 to S3-4	Not Used.			
S3-5	SIT Select. - Ch. 2. SIT Tones output when switch is ON.			
S3-6	SIT Select. - Ch. 3. SIT Tones output when switch is ON.			
S3-7	SIT Select. - Ch. 4. SIT Tones output when switch is ON.			
S3-8	Not Used			
MULTI-LINE RING TRIP CARD				
Switch	Description			
S1-3	Number of message repeats - Ch. 1. ON = 2 times. OFF = 1 time.			
S1-4	Ring Trip Busy Enable (CH. 1). ON = No Access. OFF = Access.			
S1-7	Number of message repeats - Ch. 2. ON = 2 times. OFF = 1 time.			
S1-8	Ring Trip Busy Enable (Ch. 2). ON = No Access. OFF = Access.			
S2-3	Number of message repeats - Ch. 3. ON = 2 times. OFF = 1 time.			
S2-4	Ring Trip Busy Enable (CH. 3). ON = No Access. OFF = Access.			
S2-7	Number of message repeats - Ch. 4. ON = 2 times. OFF = 1 time.			
S2-8	Ring Trip Busy Enable (Ch. 4). ON = No Access. OFF = Access.			
No. of Rings*	CH. 1	CH. 2	CH. 3	CH. 4
1 Ring	S1-1 (0)	S1-5 (0)	S2-1 (0)	S2-5 (0)
	S1-2 (0)	S1-6 (0)	S2-2 (0)	S2-6 (0)
2 Rings	S1-1 (1)	S1-5 (1)	S2-1 (1)	S2-5 (1)
	S1-2 (X)	S1-6 (X)	S2-2 (X)	S2-6 (X)
3 Rings	S1-1 (0)	S1-5 (0)	S2-1 (0)	S2-5 (0)
	S1-2 (1)	S1-6 (1)	S2-2 (1)	S2-6 (1)
* For this table: 1=ON, 0=OFF and X= On or Off (example, S1-1 (1) = S1-1 is ON).				

OPTIONS CONFIGURATION

4.08 The announcer operation is influenced by wiring and switch settings. If any interface options are included, refer to the appropriate option description section and determine the proper operating conditions for the application.

INTEGRATED CIRCUIT (IC) INSTALLATION

4.09 Installation of any optional integrated circuits requires removal of the chassis top cover, locating the proper IC socket, and proper orientation of the "chip" in the socket.

CAUTION: Improper installation of IC's may damage the IC's. Orient the IC in the socket properly before applying power to the system.

4.10 Figure 5 shows common IC pin identification and proper orientation in the sockets. Figure 6 shows the location of the firmware and memory IC sockets.

NOTE: Take care in handling of IC's. Orient the IC pins properly in the socket and gently but firmly press the IC into the socket.

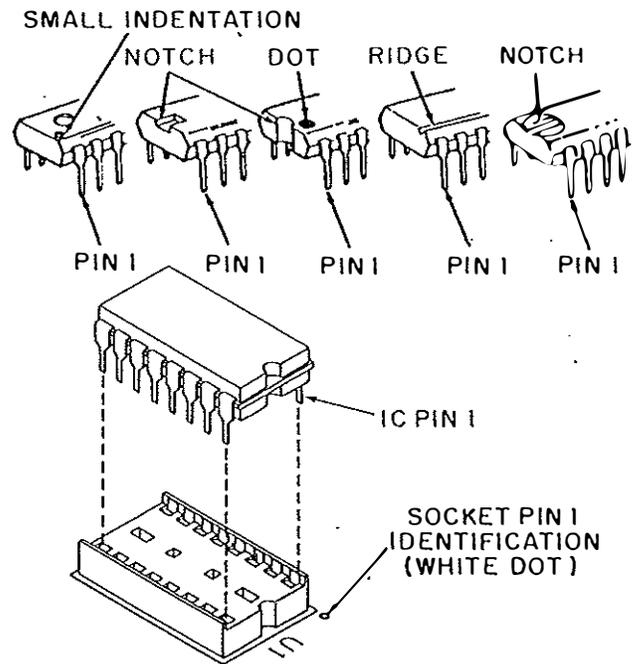


Fig. 5 - IC Orientation

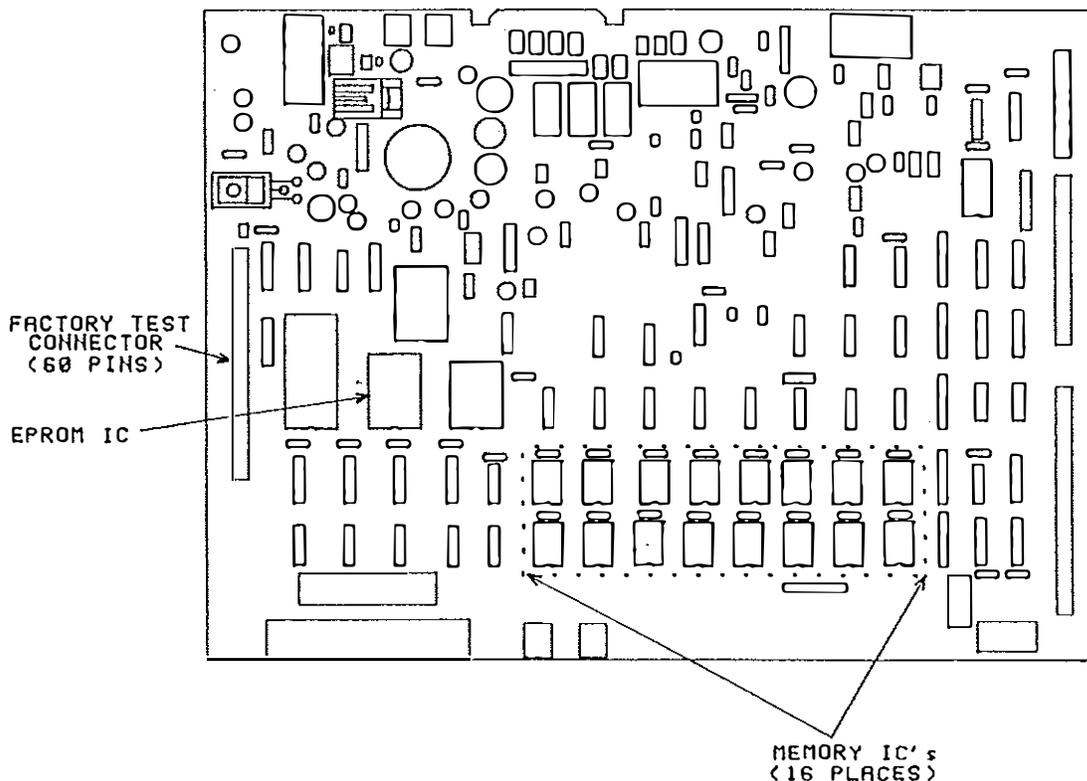
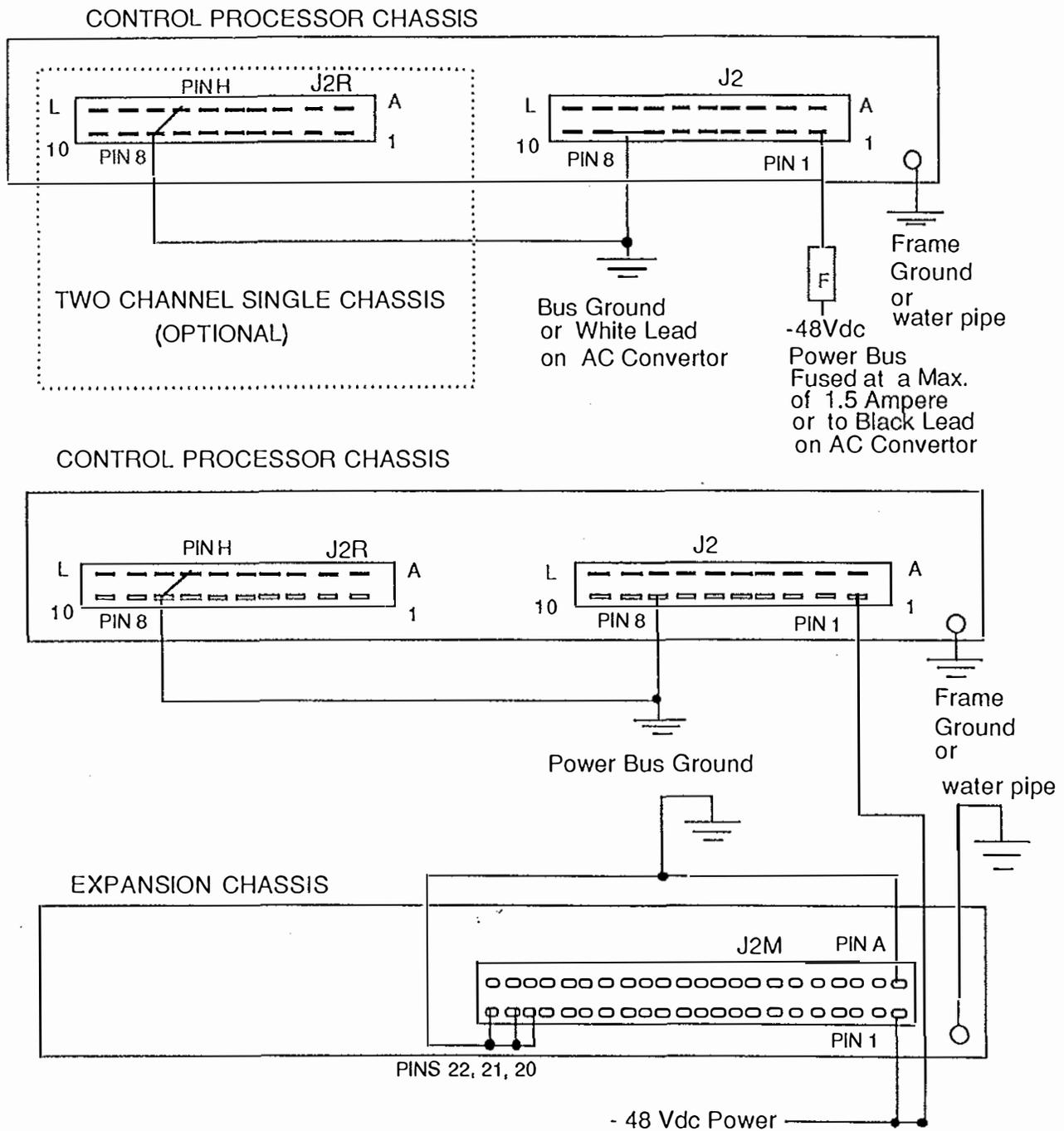
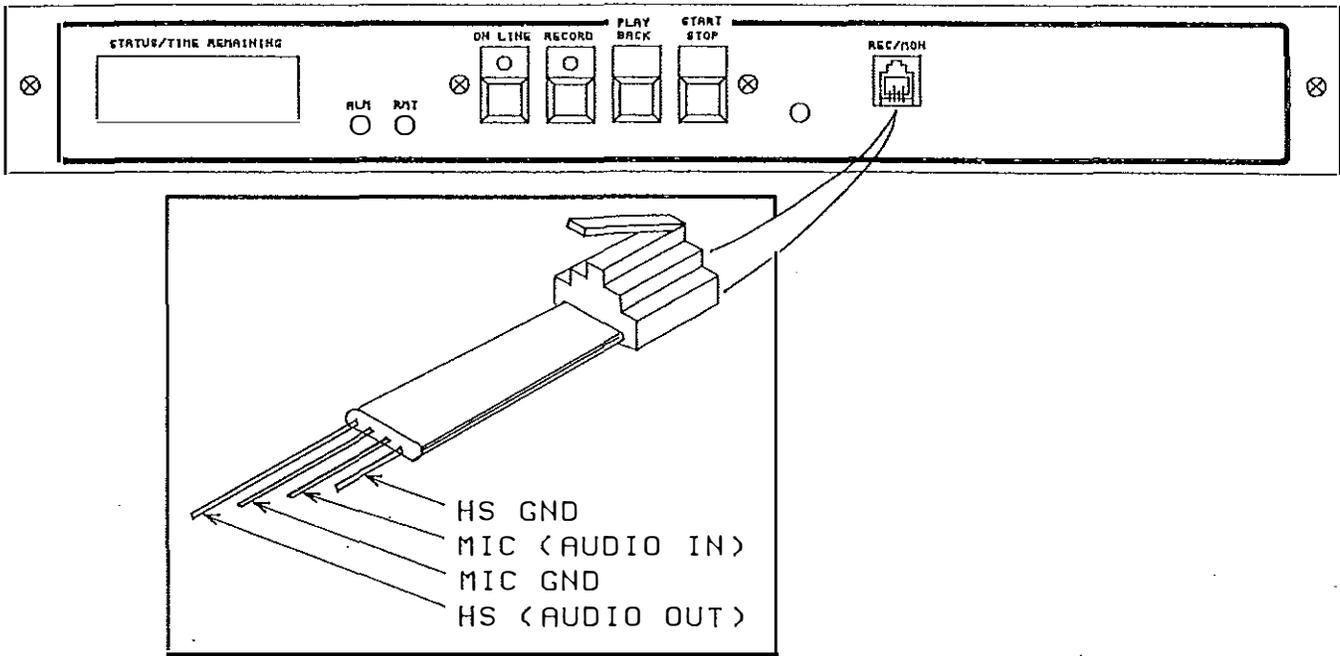


Fig. 6 - Control Processor IC Sockets

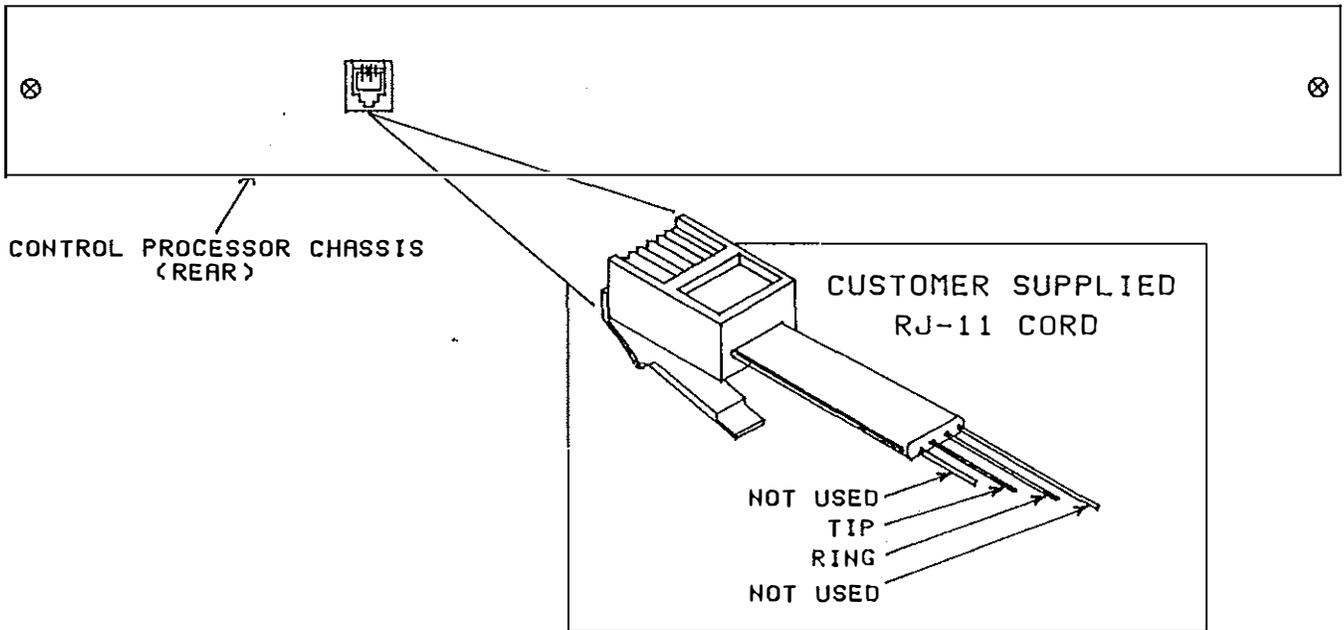
**NOTES:**

1. If an AC Converter is used, one per chassis is required.
Control Processor Chassis: J2-pin 1 to Black lead, J2-pin 8 (J2R-pins 8, H) to White lead.
Expansion Chassis: J2M-pin 1 to Black lead, J2M-pins A, 20, 21, 22 to White lead.
2. Continuous Operation wiring requires start signals be hardwired.
ST+ should be wired to ground and ST- should be wired to -48Vdc.

Fig. 10 - External Power Connections



a. REC/MON Jack Wiring



b. Line Jack Wiring

Fig. 11 - Modular Jack Wiring

6.12 In Level mode, 250 milliseconds after the falling edge of the start signal, MC relay closes and remains closed until end of message (C opens when MC closes). User inserted C/MC pulses are used to control other equipment (refer to the Operation Section).

6.13 In Pulse mode, 250 msec after the start signal the MC signal closes for 250 msec (falling edge of the signal denotes the beginning of message output). If the start signal is removed, the relay will change state and signal the end of the message output (terminate message on caller hangup). Intermediate pulses terminate message.

ALARM RELAY

6.14 A 4 Ampere at 48 Vdc resistive, three-lead, Alarm Relay reacts to alarm conditions. The leads of the relay are: ALMx, ALMx (high) and ALMx. ALM COMx is the common lead. Common may be wired to ground or power. ALMx is open while ALMx (high) is closed. In an alarm condition, ALM (high) closes and ALM opens. Alarm detection equipment may be wired to the alarm relay.

BUSY RELAY

6.15 Each channel has a three-lead, 4 Ampere at 48 Vdc resistive Busy/Make Busy Relay. The leads are: MBY COMx, BYx and MBYx. MBY COMx is the common lead. Common may be wired to ground or power. BYx is open while MBYx is closed. If the announcer is not busy and Online with no alarms, BY closes. This relay may be wired to external equipment controlled by the busy state.

START SIGNALS (ST+, ST-)

6.16 External Start Signals activate the announcer. For continuous operation; wire ST+ to ground and ST- to -48 Vdc. Depending on external equipment, either lead ST(±) may be used as a start signal. These signals are not used with Ring Trip circuits because Ring Trip circuits provide the start signals.

NOISE SUPPRESSION

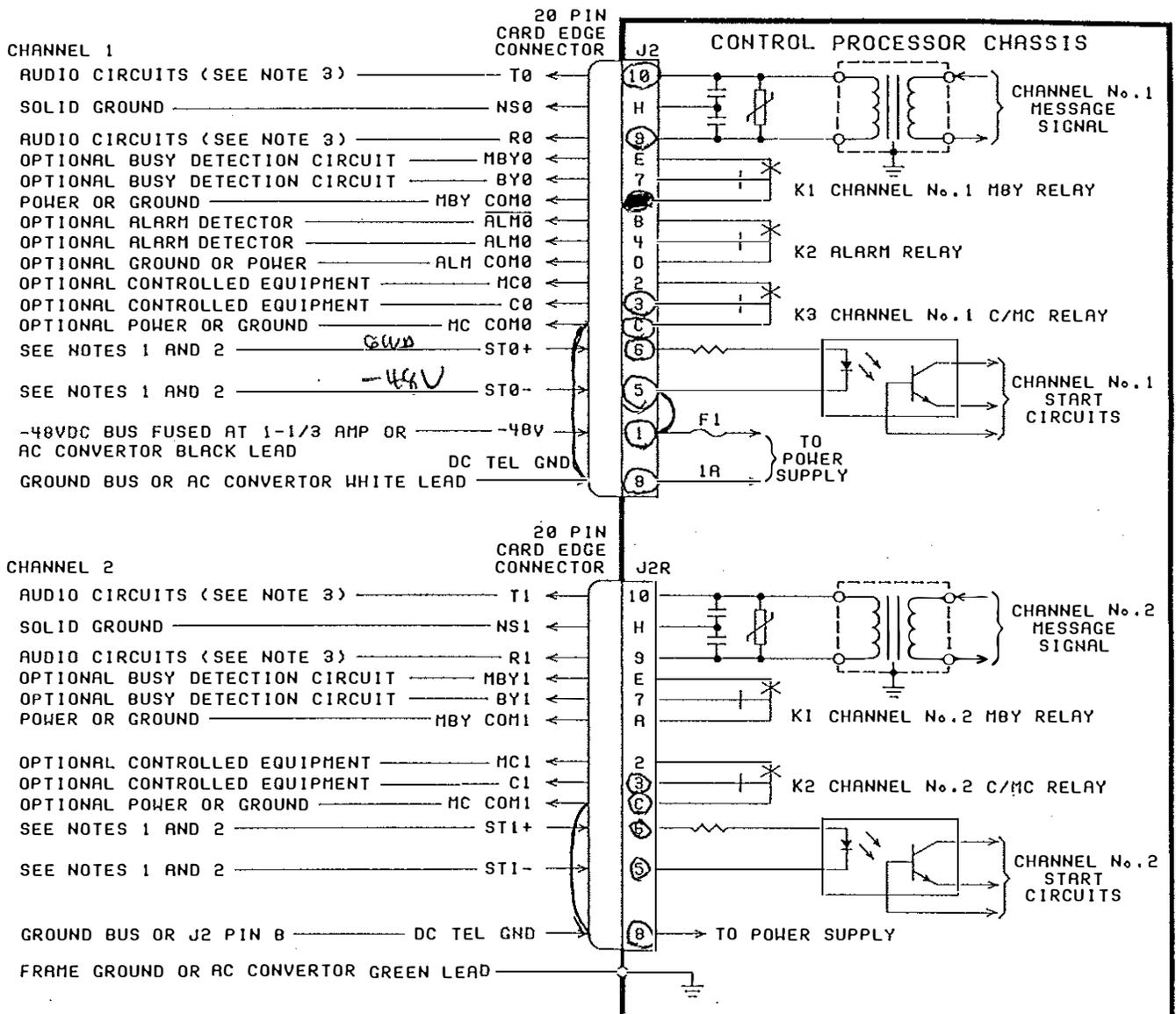
6.17 To reduce interference to message output, a noise suppression lead is provided to capacitively ground noise the audio circuit. The NS lead may be wired to ground on the audio circuit. For best results keep ground wires short.

AUDIO

6.18 Audio leads are provided in pairs for output of the audio message. The leads are labeled T and R for each channel. The T and R wires may be crossed. These leads are to be wired to the audio receiver circuit (RJ-11 jacks are provided with some line interface circuits to provide modular connection to the telephone network).

Table 3. Control Signals and Typical Wiring

SIGNAL NAME	COMMENT	STANDARD CONNECTION	ALTERNATE CONNECTION
T R	Audio (message) output to telephone line or external equipment. Not used with Ring Trip interface options.	T to Trip and R to Ring on trunk or interface.	To message input on distribution system
NS	Noise Suppression to limit interference of external (message input) equipment.	To common GND	-----
MBY COM BY MBY	Message status relay. MBYCOM - common. BY - closed when message is "busy". MBY closed when Online and no errors	To trunk or interface	MBYCOM to TEL GND or to -48Vdc
ALMCOM ALM ALM (h)	Alarm relay. ALMCOM - common. ALM - closed when alarm is present. ALM(h) - closed when no alarm exists.	To ALM on trunk or interface	ALMCOM to TEL GND or to -48Vdc
MC COM MC C	Contact relay. MCCOM - common. MC - closed when message is in use. C - open when message is in use.	To MC on trunk of interface	MCCOM to TEL GND or to -48Vdc
ST+ ST-	Start signal positive (+) and negative (-). Starts message. Not used with Ring Trip. Alternate is continuous operation.	To S or ST on trunk or interface	ST- to -48Vdc and ST+ to GND for continuous play
-48Vdc TEL GND	Power leads. -48Vdc range is -42Vdc to -60Vdc. Convertor may be used.	-48Vdc to power bus. GND to bus GND.	To leads of external power supply.
Chassis GND Screw	Ground announcer chassis. Provides shock and interference protection.	To TEL frame GND	To cold water pipe.



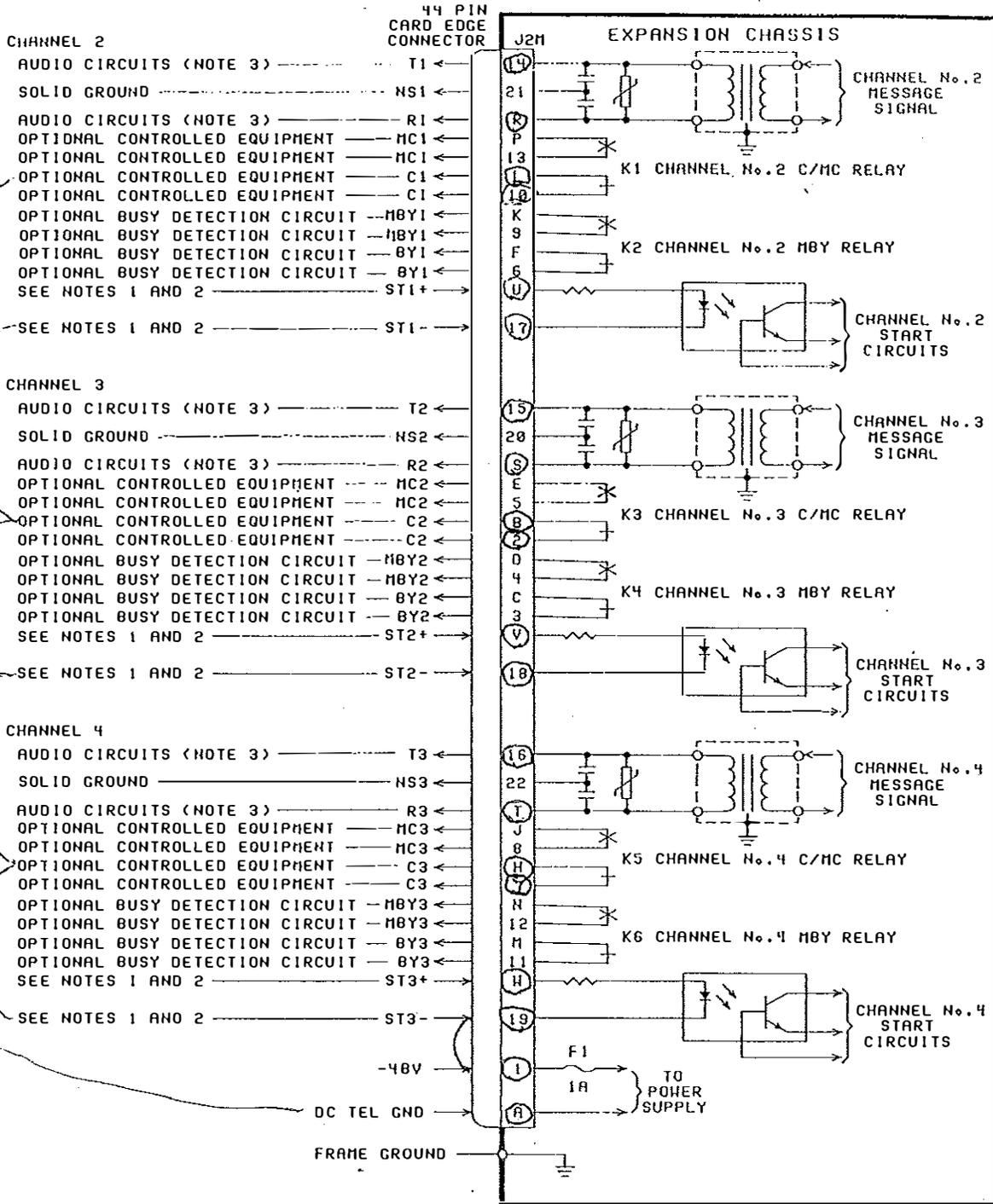
NOTES:

- FOR CONTINUOUS OPERATION, STRAP ST- TO -48VDC AND ST+ TO GROUND FOR DESIRED CHANNEL AND SET ANNOUNCER TO LEVEL START (S6-7, OFF). STRAP AS LISTED.

CHANNEL	START	STRAPPING
1	ST+	J2-6 TO J2-8
1	ST-	J2-5 TO J2-1
2	ST+	J2R-6 TO J2R-8
2	ST-	J2R-5 TO J2R-1

- NOT USED FOR RING TRIP OPERATION, ST- AND ST+ SIGNALS ARE SUPPLIED BY ATTACHED LINE.
- NOT USED WITH RJ-11's.

Fig. 12 - Control Processor Chassis Signal Connections



NOTES:

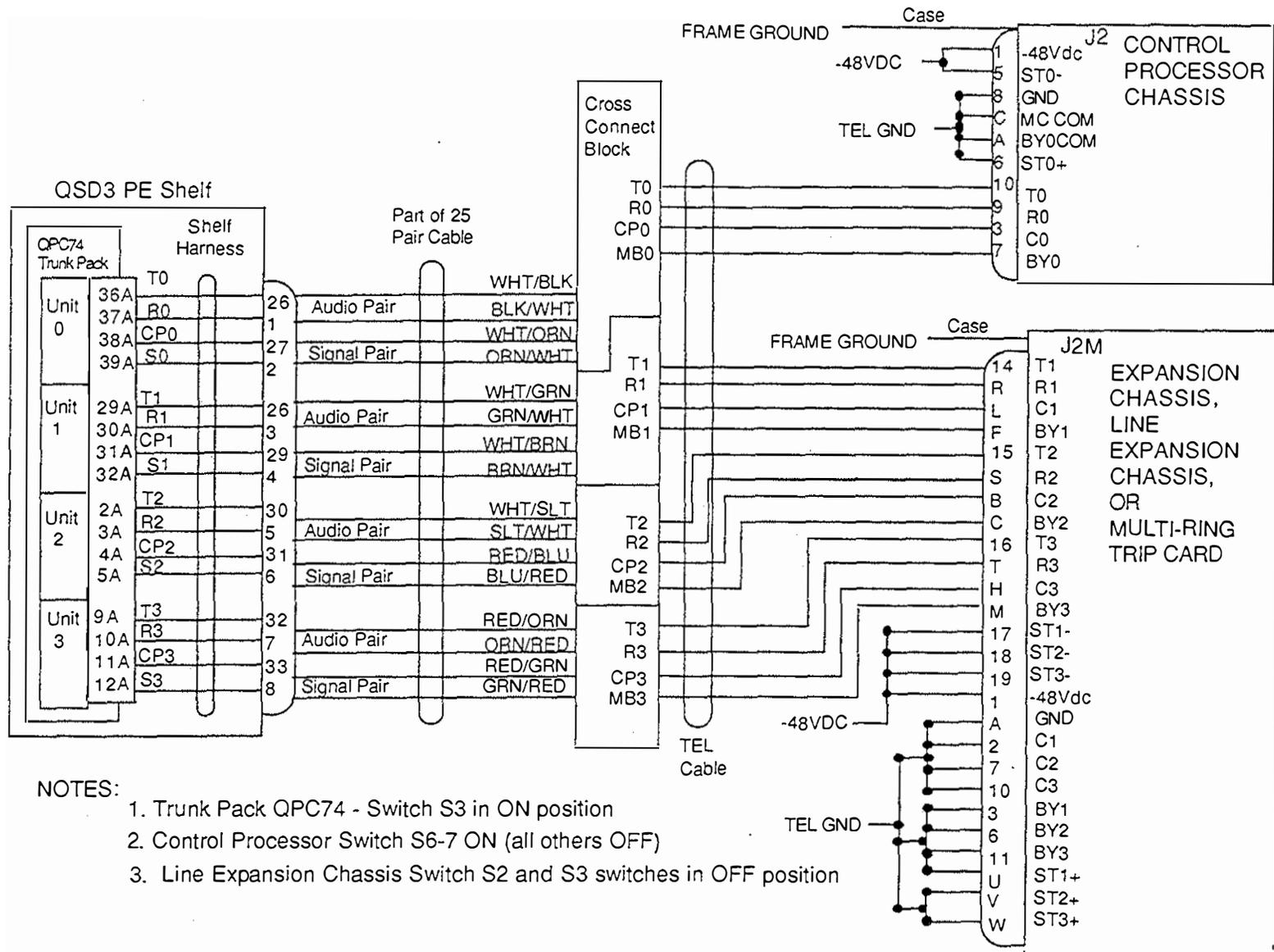
- FOR CONTINUOUS OPERATION, STRAP ST- TO -48VDC AND ST+ TO GROUND FOR DESIRED CHANNEL AND SET ANNOUNCER TO LEVEL START (S6-7, OFF). STRAP AS LISTED.

CHANNEL	START	STRAPPING
2	ST+	J2M-U TO J2M-A
2	ST-	J2M-17 TO J2M-1
3	ST+	J2M-V TO J2M-A
3	ST-	J2M-18 TO J2M-1
4	ST+	J2M-W TO J2M-A
4	ST-	J2M-19 TO J2M-1

- NOT USED FOR RING TRIP OPERATION, ST- AND ST+ SIGNALS ARE SUPPLIED BY ATTACHED LINE.

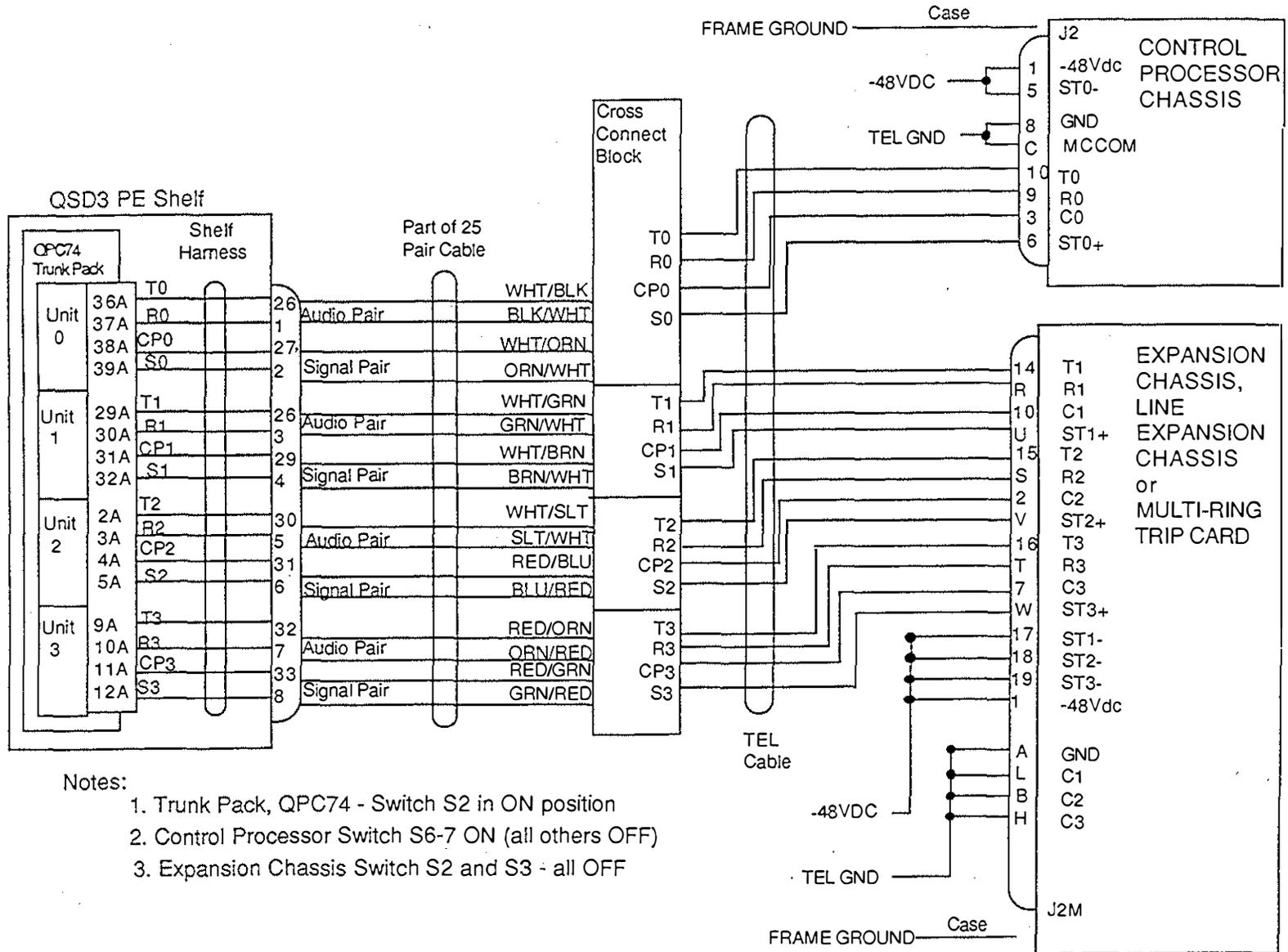
- NOT USED WITH RJ-11's.

Fig. 13 - Expansion Chassis Signal Connections



- NOTES:
1. Trunk Pack QPC74 - Switch S3 in ON position
 2. Control Processor Switch S6-7 ON (all others OFF)
 3. Line Expansion Chassis Switch S2 and S3 switches in OFF position

Fig. 14 - Continuous Run DA/SL-1 Wiring



Notes:

1. Trunk Pack, QPC74 - Switch S2 in ON position
2. Control Processor Switch S6-7 ON (all others OFF)
3. Expansion Chassis Switch S2 and S3 - all OFF

Fig. 15 - Ground Start DA/SL-1 Wiring

7. INITIAL POWER UP AND TESTING

7.01 After all wiring is in place and continuity has been verified, the small plate covering the power switch may be removed and discarded (replace the screw in the rear panel). Turn the Control Processor Chassis POWER and BATTERY Switches ON; turn any Expansion Chassis, ON last.

7.02 The announcer front panel will display AL-0. This is a normal indication for an initial power up or a restart after a power outage. The Operating Instructions will cover the procedures for clearing alarms, recording messages, and putting the Announcer into service.

7.03 If the Digital Announcer cannot be made to display AL-0, consult the Troubleshooting chart found in the Maintenance Section 060-NT7M-400.

OUTPUT LEVEL ADJUSTMENT

7.04 Message volume is the at the discretion of the user. Output volume may be checked by playback through program operation (refer appropriate operation section) or, by initiating a call on the line(s) attached to the channel and listening to the message. The initial recording level of each message may be too low to be audible or too high and offensive. In such cases it is recommended the message be re-recorded at an adjusted volume.

CAUTION: Output level is preset to comply with FCC limits. User adjustment may void FCC registration.

7.05 If after re-recording the message is still unacceptable, the message volume may be adjustable through the front panel Output Level controls. Plastic caps cover and protect each output level control. Each channel is adjusted individually. Output level is set by initiating a playback of the message and adjusting the Output Level control. The call may be initiated through control procedures and monitored through the front panel Record/Monitor jack or, by initiating a request on an attached line and monitoring the volume from the line.

WIRING CHECKS

7.06 If the announcer does not work properly, wiring and/or external connections may be at fault. Reversal of the Tip and Ring wires of the interface circuits will cause the announcer to hang up immediately when a call comes in (no message will be heard before the call is terminated). Internal circuits are not effected or damaged by this type of mis-wiring.

FUNCTIONAL TESTING

7.07 Functional testing is dependent of the operating firmware and the type of operation selected by the user. Full functional testing requires initiating a call on each line connected to the system and verifying the proper operation according to the desired operation. Functional operation is described in the program operation section. System failure and troubleshooting is covered in the maintenance section.

PRODUCT SUPPORT INFORMATION

7.08 If, after testing and verification of all the connections, the equipment still does not work contact the product service department. Because of the wide variety of firmware programs and options available in the product line, the following information will greatly assist in the resolution of any difficulties.

- (a) The announcer serial number from the rear panel.
- (b) The firmware identification number.

7.09 The firmware identification number can be displayed in four segments of four digits. To display the number:

- 1) Press the START/STOP. The number will display in the order:

Part Number - xxx
Revision level - r-xx
Checksum (hex) - xxxx
Assembly code - xxx

To repeat the number press START/STOP as often as required.

PRODUCT WARRANTY

The Digital Announcer is covered by the following manufacturer's limited warranty:

The Cook Division of Northern Telecom warrants that the products purchased shall, under normal use and service, be free from defective material and faulty workmanship for a period of twelve (12) months from the date of shipment. Northern Telecom's sole obligation, and the Buyer's exclusive remedy under this warranty shall be limited to (at Northern Telecom's option) repair or replacement (on an exchange basis) of the defective product. Such obligation and remedy is conditioned upon (a) Northern Telecom receiving written notice of the defect within the specified warranty period; (b) Buyer receiving authorization from the manufacturer for the return of the defective product, (c) Buyer, at its own expense, returning the product to Northern Telecom, (d) the product not having been altered or repaired by any party other than Northern Telecom, (e) the defect not being the result of mishandling, abuse, misuse, improper storage, installation, maintenance, or operation by other than Northern Telecom (including use in conjunction with equipment which is electrically or mechanically incompatible); and (f) the product not having been damaged by fire, power failure, explosion, Act of God, or any other similar act or occurrence not attributable to Northern Telecom. The repair or replacement of any defective product shall not extend the applicable warranty period.

THE WARRANTY AND REMEDY SET FORTH ABOVE SHALL CONSTITUTE NORTHERN TELECOM'S ONLY WARRANTY WITH RESPECT TO THE PRODUCT AND BUYER'S EXCLUSIVE REMEDY IN THE EVENT SUCH WARRANTY IS BREACHED, AND SHALL BE IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. NORTHERN TELECOM SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER BEFORE OR AFTER SHIPMENT OF ANY PRODUCTS.

Please address any communication concerning this product to:

Northern Telecom
Cook Division
6201 Oakton Street
Morton Grove, Illinois 60053
Telephone (708) 967-1555
Telex I 72-4472
Telex II 910-223-3654

Information subject to change since Northern Telecom reserves the right, without notice, to make changes in equipment design or components as progress in engineering or manufacturing methods may warrant.

For additional information, contact:

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