

## NT7M SERIES DIGITAL ANNOUNCERS

### MAINTENANCE

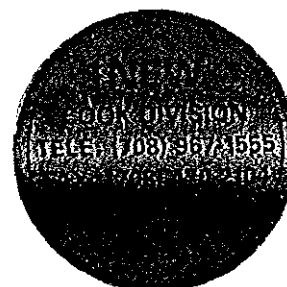
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#### 1. GENERAL CONSIDERATIONS

1.01 The NT7M Series Digital Announcers are designed to operate independently and require little maintenance. User serviceable items are limited to: fuse replacement, battery check and replacement, wiring of external equipment, operational configuration, interface option configuration, adjustment of message output volume,. Maintenance will vary with wiring and associated equipment (Central Office or PBX equipment bay, rack mounted or free standing).

1.02 It is recommended that the procedures and recommendations of the program operation Section be followed before conducting any of the procedures in this Section. Some of the procedures listed will erase and/or disrupt operation and the recorded message(s).

1.03 If the announcer is to be returned to the factory for repair, please return in the original shipping carton and packing inserts (figure 1). Please note the mounting brackets are to be removed. Please include a detailed description of the problem, the chassis serial numbers, the date of purchase, and other items required for warranty verification.



## PACKING & UNPACKING INSTRUCTIONS

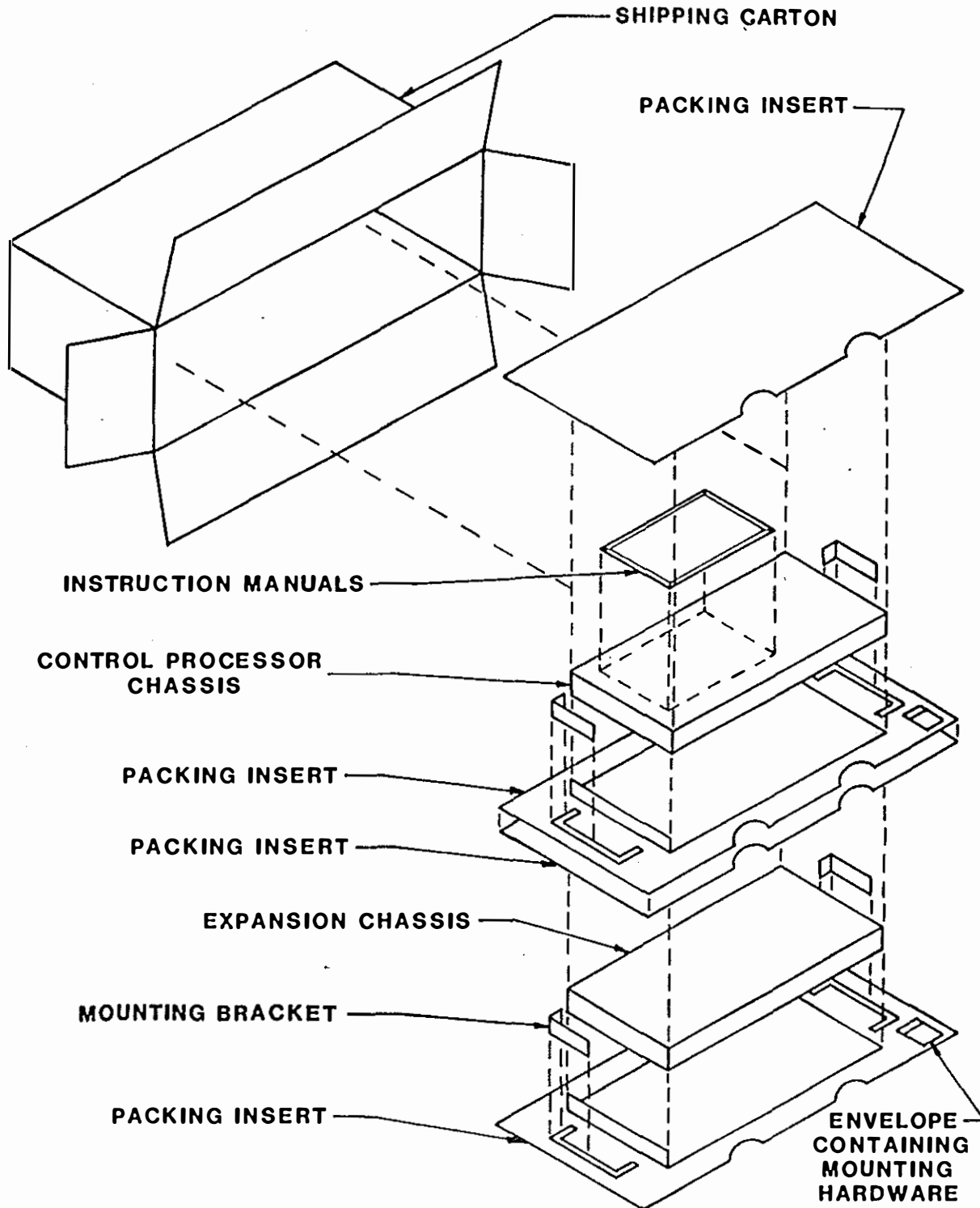


Fig. 1 - Digital Announcer Packing

## 1.04 References

60-NT7M-100	NT7M Series Digital Announcer Equipment Description
60-NT7M-200	NT7M Series Digital Announcer Installation
60-NT7M-3XX	NT7M Series Digital Announcer Operating Procedures

For additional information, contact:

Product Service (Dept. 306)  
Northern Telecom  
Cook Electric Division  
6201 Oakton Street  
Morton Grove, Illinois 60053  
Telephone (312)-967-6600  
Telex I 72-4472  
Telex II 910-223-3654  
Cable "Cookpro"

## 2. ROUTINE MAINTENANCE

2.01 Routine maintenance consists of verification of message integrity, assuring the charge of the battery (if present), and visual inspection of the associated wiring. When and how often the inspection is to take place is the responsibility of the user.

### MESSAGE INTEGRITY

2.02 Verification of message should take place every time an announcement is changed. A message is verified through the playback procedure. Message playback will assure the proper volume, inflection and provide duration of the message. Message verification is discussed in greater detail in para. 3.

### BATTERY BACKUP

2.03 For announcers with a battery backup for the message, the charge on the battery should be checked during normal scheduled maintenance. The procedure for battery checking is detailed in paragraphs 3.08 and 3.09.

## 3. FAULT ISOLATION

### PRECAUTIONS

3.01 It is recommended that a means of static grounding to the announcer chassis be used to prevent accidental damage to static sensitive parts (refer figure 2).

### ALARM CODES

3.02 The announcer provides internal self-test procedures. These background tests do not affect the operation of the announcer. Background tests assure proper operation of critical areas of the announcer hardware. Table 1 lists the alarm codes.

### VOICE ALARMS

3.03 The announcer test routines examine message output. If ten seconds of silence, ten seconds without message playback or low audio output is detected, a voice alarm condition exists. If ten seconds of silence is encountered, a voice alarm will be displayed. The voice alarm may be turned off (disabled).

### INPUT POWER SUPPLY

3.04 Input power may be supplied by either a -48 Vdc bus or through an AC convertor. For units with power bus connection, the bus-announcer connection should be fused at a maximum of 1-1/3 amperes. This places two fuses on input power. The external, user-supplied fuse, and an internal 1 ampere 3AG Slow Blow fuse. AC Convertor powered announcers will have only the internal fuse.

3.05 AC convertors are required for the Control Processor and Expansion Chassis only. The Line Expansion Chassis is powered by the attached lines. When AC convertors are used, supplied cabling may have to be re-wired to allow attachment of the AC convertor leads.

Table 1. Alarm Codes

CODE	DESCRIPTION
AL-0	A power failure or application of power has been detected (if battery backup is installed the batteries have been exhausted).
AL-1	DRAM Scan. Message memory area is checked on Power-up before memory scan mode. If page boundaries do not correlate, an error is displayed.
AL-2*	Voice Alarm. More than 10 seconds of silence on a channel to which a message is being output has been detected.
AL-3	No Announcement Recorded. This is displayed whenever there is an attempt to put an empty message Online.
AL-4	Interrupt Monitor. Loss of interrupts has been detected. The system will attempt recovery from this error.
AL-5	Static RAM failure. An error in the memory for the operating instructions has been detected. Overall operation will most likely be affected.
AL-6	DRAM Failure. A error in message storage memory has been detected. Message memory is unusable.
AL-7	EPROM Test Failure. The firmware operating instructions checksum does not compare to most recent value. Possible firmware (program) corruption.
* May be disabled on Control Processor PCB	

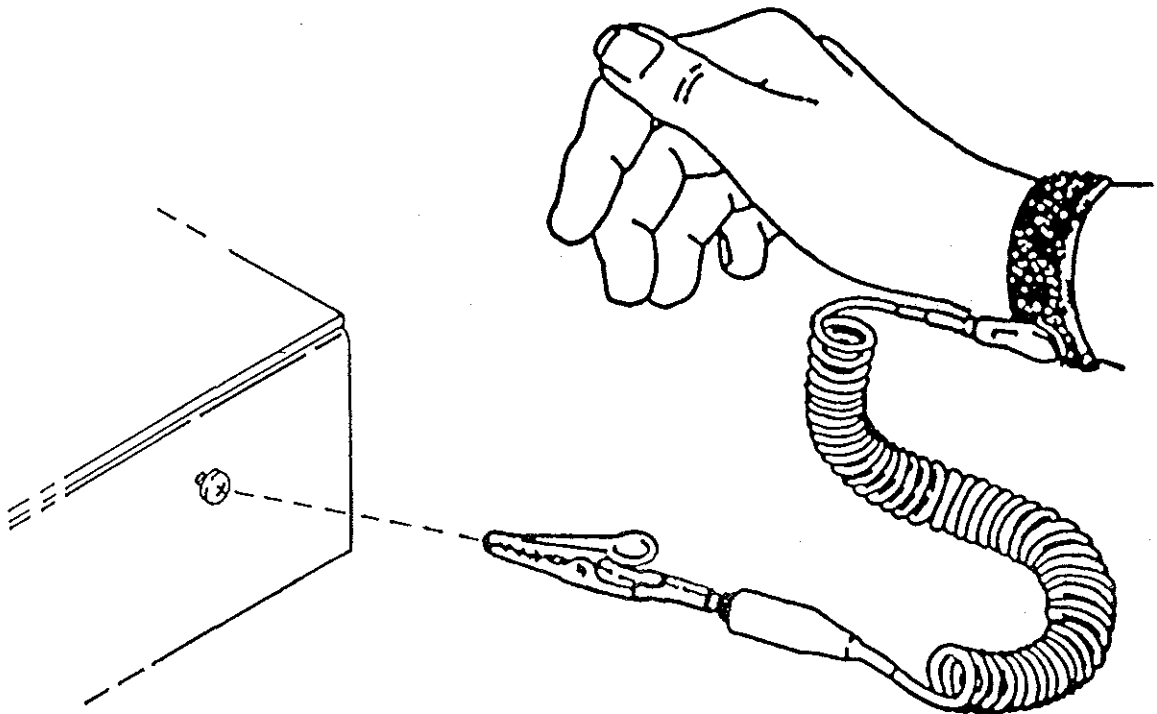


Fig. 2 - Anti-Static Chassis Ground Screw Connection

3.06 Should the announcer exhibit a lack of input power, assure the unit is ON at the rear panel power and battery switches. If other equipment on the same power line is active, the input power supply is operational. Input power is the responsibility of the user.

3.07 If input power is operational and the announcer is ON, either power connections or fuses are suspect. Reseat edge connectors. If problems persist, determine if the fuses are blown.

#### EXTERNAL FUSE

3.08 External fuses are the responsibility of the user. The location of the fuse will vary with each installation. Disconnect the input power supply and inspect the fuse.

NOTE: Visual inspection of a fuse will not always determine if it is blown (open). Resistance should be measured. (If it is infinite, the fuse is open.)

#### INTERNAL FUSE

3.09 The location of the internal fuse on the Control Processor chassis is shown in figure 3. The Expansion Chassis and Line Expansion Chassis fuse locations are the same. To determine the integrity of the internal fuse, remove input power, unscrew the fuse retainer, measure electrical resistance of the fuse. If the fuse resistance is infinite, replace the fuse with a 1 ampere 3AG Slow Blow fuse; Northern Telecom, Cook Electric Division (NT/CED) Part No. 752-5872-019 or equivalent.

#### BATTERY

3.10 The battery back-up option for the message memory should be checked periodically for proper charge. If it is not checked, message integrity may be lost during power OFF periods.

NOTE: This test may disrupt messages contained in the announcer. It is recommended that a backup copy of the message be available before beginning the test.

3.11 During a period of low announcer activity, simulate a power failure:

- (a) Record or note message for re-recording if necessary.
- (b) Turn the control processor chassis Power switch OFF (battery switch must remain ON).
- (c) Wait five minutes. Turn power ON, clear any alarms, and playback the message.

If the message is corrupted, the battery(ies) should be replaced (see figure 3).

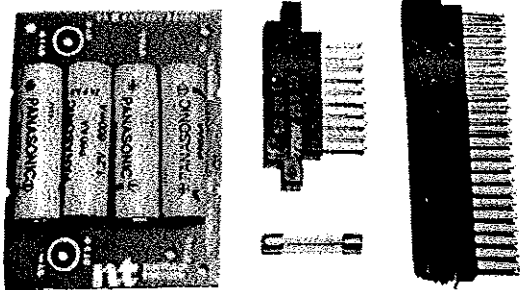
#### VERIFY MESSAGE INTEGRITY

3.12 Verifying message integrity will assist in fault isolation. Using the playback procedures, monitor the message(s) through the REC/MON jack and start the playback for each message on the system. This will help isolate the problem to the Control Processor or a particular channel. It will also determine audio quality and volume of message output. Corruption of the message will require re-recording the message (refer to the operation section). Changing output level is discussed in paragraph 5.06.

#### INDIVIDUAL LINE CHECKS

3.13 If no difficulty with messages is found, initiate calls from the attached line(s). Call on each channel being used. If the message is degraded, the interface circuit, the line wiring, or the line itself are suspect.

3.14 For installations with modular jack connection of lines. The difficulty may be isolated to the line or the channel by exchanging a known good line with the suspect line. If the message is clear with the known good line, the original line is suspect. If the message is corrupted, the interface circuit is suspect.



PART NO.	DESCRIPTION
752-5872-019	1 Amp 3AG Slow Blow Fuse
NT7M03AA	Rechargeable Battery Pack
680-7264	20-pin Card Edge Connector
213364	44-pin Card Edge Connector

User Replaceable Parts

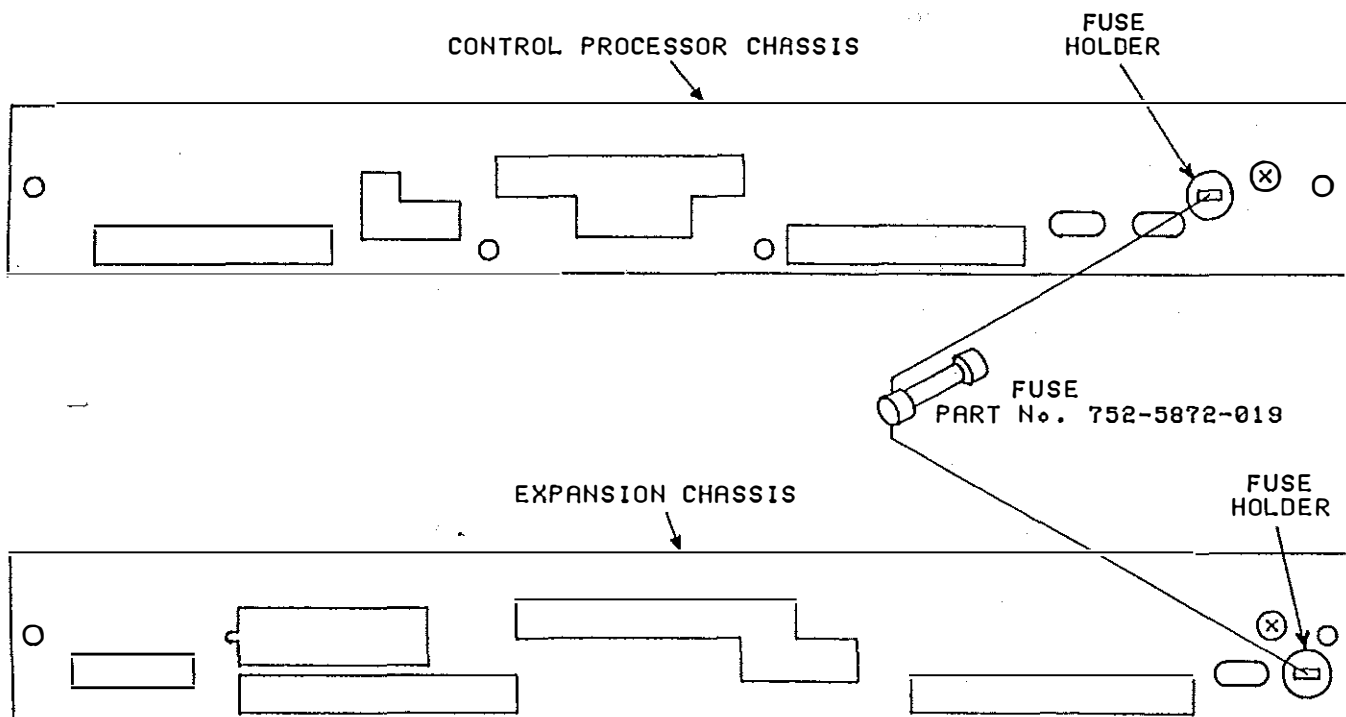


Fig. 3 - Digital Announcer Replaceable Parts and Fuse Locations

3.15 Since hardwire connections are more difficult to exchange, the exchange test is not recommended for hardwire applications. Individual channels may be checked with handset test equipment which allows non-destructive attachment to the line connection. Line integrity may be checked by the user or telephone service provider. If the line is verified, the continuity of the wire wrap connection or interference from a third source is suspect. Visual and/or electrical verification of the connection will be required to determine source of the difficulty.

**CAUTION;** Always disconnect power before performing close visual and/or electrical tests on wiring!

3.16 Telephone line difficulties are the responsibility of the user or telephone service provider. Matching of electrical characteristics of any external equipment to the announcer is the responsibility of the user. Specifications for the announcer are listed in the Equipment Description (Section 060-NT7M-100). Specifications for available interface options are listed in the appropriate description and installation section.

#### INTERFERENCE

3.17 This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause interference to radio communications. Units are tested for compliance within the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC rules. The user will be required to take whatever measures are necessary to correct any interference.

3.18 To verify if the announcer is causing interference, turn the announcer ON and OFF while monitoring for interference. If interference is found, the announcer must be shielded or moved. Shielding will be installation specific.

3.19 In rare cases, noise on the power ground bus may interfere with the announcer. If this is found, the unit should be isolated from the interference using a noise filter.

3.20 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, it must also comply with part 68 of the FCC regulations. Connection of user interface circuits is the responsibility of the user.

#### TROUBLESHOOTING

3.21 A troubleshooting chart (Chart 1) will assist in returning the announcer to operation.

**CAUTION:** Repair of PCB components should only be attempted by qualified service personnel or the factory.

#### RINGER EQUIVALENCE

3.22 Telephone service has standards which will ring devices on the line. These characteristics determine the type and number of devices which can be attached to the line. A Ringer Equivalence Number (REN) is the value of each device. If the total of the REN's on the line exceeds the specified maximum (usually 5), the devices may not ring. Consult the service provider to the REN do not exceed the maximum for the line(s). The REN for the Four Line Ring Trip Circuit is 0.6 B.

#### LOAD NUMBER

3.23 The Load Number is the Canadian version of ringer equivalence. The Load Number for the Four Line Ring Trip Circuit is 10.7.

Chart 1. Troubleshooting Procedures

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Non-operational - No lights	1. No Input Power	1. Restore Power. Measure input power. Voltage must be less than -42 Vdc (Announcer ON) but greater than -60 Vdc (Announcer OFF).
	2. Defective Fuse	2. Measure resistance of external fuse and internal fuse. If resistance is infinite, replace the fuse. Verify condition of all circuit breakers on power bus.
	3. Loose Connectors	3. Verify all connectors are right side up. Gently but firmly reseal connectors to assure good contact.
	4. Incorrect wiring	4. Compare wiring with desired installation diagram. The voltage difference at Control Processor Chassis connector J2 (Pin 1 and Pin 8) must be at least -42 Vdc.
	5. Malfunction	5. Return Unit for factory service.
Erratic behavior (front panel display flashes, nonsense characters, pushbuttons don't work)	External Wiring Error	Correct wiring
	1. Shorted, open, reversed or missing connections.	1. Review all wiring. Check for sound electrical connections. Re-seat all edge connectors.
	2. Inadequate ground	2. Measure ground connection for AC voltage and low resistance. Assure solid ground (power ground bus or cold water pipe).
	3. Internal component connections loose.	3. Remove power, remove cover. Firmly but gently re-seat socketed IC's. Disconnect and re-seat internal cables. <b>CAUTION:</b> Excessive force may damage printed circuit board!
	4. Expansion or Upgrade Kit improperly installed	4. Verify installation of socketed IC's (refer to installation section); re-install or replace if necessary.
	5. ESD Protectors installed on interface connectors	5. Remove and discard ESD Wire-wrap pin protectors used for shipping.



Chart 1. Troubleshooting Procedures (contd)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Erratic behavior (contd)	6. Interference	6. Twist or shield signal wires. Route wiring away from other wires. Check continuity of NS pins and ground. Use separate power source if necessary. If problems persist contact Northern Telecom, Cook Electric Division (NT/CED) Product Service for advice on noise suppression.
Alarm Mode  1. AL-0	1. Power Disrupted	1. This is the normal power-up display. Reset Alarm (Press START/STOP). If AL-0 reoccurs, check for intermittent power dropouts. Test batteries if present. If first time power-up follow record a message procedure (Refer to Operation section).
2. AL-1	2. Memory Failure	2. Reset Alarm (Press START/STOP). If AL-1 reoccurs, remove power, remove cover. Firmly but gently re-seat socketed IC's. Disconnect and re-seat internal cables. CAUTION: Excessive force may damage printed circuit board! If alarm cannot be cleared unit must be serviced.
3. AL-2	3. Output Level Error	3. This will display if more than ten seconds of low (no) message level is encountered during message output. Reset Alarm (Press START/STOP). If AL-2 reoccurs, re-record the message at a higher volume.
4. AL-3	4. No Message	4. No message has been recorded for desired message to be Online. Reset Alarm (Press START/STOP). If AL-3 reoccurs, unit must be serviced.
5. AL-(4-7)	5. Process Alarms	5. Clear alarm by turning OFF power for a few minutes then re-start announcer (Cold Reset). If alarm cannot be cleared, the unit must be serviced.

Chart 1. Troubleshooting Procedures (contd)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Announcer will not Record	1. No input cord at REC/MON jack.	1. Insert plug into REC/MON jack.
	2. Audio source impedance too high.	2. Message input device must have an impedance of less than 1000 Ohms.
	3. Input device wiring mis-matched.	3. Use recommended handset, cassette of microphone. Jack wiring is detailed in the Installation Section (060-NT7M-200).
	4. Shorted or open input device.	4. Plug input device into jack. Expose input device wiring. Short device wiring and press RECORD button at same time. If RECORD lamp does not light, repair or replace device cord.
Poor Message Quality	1. Audio level too low	1. Re-record message at higher volume.
	2. High background noise	2. Re-record message with noise cancelling handset, a pre-recorded tape or in a quiet location.
	3. Background Hum or Buzz	3. Re-record message with wires away from other electrical devices. If device is AC power, try using battery operation.
Output through REC/MON jack OK but, output from rear panel connections not as expected	1. Announcer not Online	1. Press ONLINE.
	2. Start signal error	2. Verify start signal wiring. Potential difference must be at least -48 Vdc for 250 msec in pulse mode. For level start, the signal must be available for the duration of the message. Otherwise the message will halt on line terminate.
	3. Faulty audio connection	3. Verify wiring and re-seat all connectors to assure proper signal(s).
	4. Series resistor used in external circuit.	4. Set level matching pads or line resistors to lower levels to increase message volume.

Chart 1. Troubleshooting Procedures (contd)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Output through REC/MON jack OK but, output from rear panel connections not as expected (cont.)	5. Output level mismatch.	5. Adjust output level of announcer (Refer to Installation Section. 060-MT7M-200). <b>CAUTION:</b> Adjustment of audio output level may void FCC registration. Use minimum output level for a satisfactory message. <b>NOTE:</b> Distortion may occur if output level is set too high.
Message starts OK but ends incorrectly	1. Announcer set to Level Start operation	1. Set control processor S6-7 to pulse operation (ON).
Message repeats endlessly	1. Announcer set for continuous operation	1. Verify wiring at ST- and ST+ for the channel.
One or more channels do not operate	1. Expansion Chassis Fuse	1. Measure resistance of expansion chassis fuse. Replace if necessary.
	2. Loose edge connectors	2. Properly orient and re-seat edge connectors.
	3. Improper wiring.	3. Verify wiring with desired operation. Check for sound electrical connections between chassis.
Messages are lost and alarms occur after several hours	1. Power disruption	1. Connect announcer to isolated, non-switched power supply. Use filters if necessary.
	2. Defective batteries	2. Inspect batteries for corrosion. Test batteries, replace if necessary. Measure current across BT+ and BT- contacts (75 - 125 milliamps DC). Repair or replace if necessary.
	3. Interference	3. Twist or shield signal wires. Route wiring away from other wires. Check continuity of NS pins and ground. Use separate power source if necessary. If problems persist contact NT/CED Product Service for advice on noise suppression.

Chart 1. Troubleshooting Procedures (contd)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Relays do not react as expected	1. Incorrect switch settings	1. Verify switch setting to assure proper setting for desired operation.
	2. Mis-wired contacts	2. Verify wiring to external equipment.
	3. Faulty relay	3. Measure continuity across relay switches (some relay activity occurs in 250 msec).
Ring Trip Circuits do not operate	1. Ring Trip disabled	1. Control Processor C/MC activity must be set to Pulse start (S6-2, ON).
	2. Configuration mismatch	2. Confirm configuration of ring trip circuit and matching external equipment (Refer to table in this section and the Ring Trip Circuit Section for more details).
	3. Incorrect wiring	3. The announcer will hang up before message output if hardwired Ring and Trip wires are crossed. Verify wiring for application (refer to table in this section and the Ring Trip Circuit Section for more details).
Ring Trip Line output weak	1. Line Mis-match	1. Limiters or control (Attenuator pads, etc.) should be adjusted for maximum message output. Some cases may require the devices be removed.
	2. Marginal Telephone circuits.	2. Attach a known good line to the output. If problems clears contact telephone service provider for assistance.
	3. Audio output too low	3. Adjust output level of announcer (Refer installation section). CAUTION: Adjustment of audio output level may void FCC registration. Use minimum output level for a satisfactory message.  NOTE: Distortion may occur if output level is set too high.

Chart 1. Troubleshooting Procedures (contd)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Audio output distorted	1. Message recorded too loud	1. Re-record the message at a lower volume.
	2. Audio output level too high	2. Ring Trip circuits have limiting components to prevent overloading telephone lines. Adjust output level of announcer (Refer to installation section).  CAUTION: Adjustment of audio output level may void FCC registration. Use minimum output level for a satisfactory message. NOTE: Distortion may occur if output level is set too high.
Remote Record does not work as expected	1. Remote Record disabled	1. Set Control Processor S6-1 OFF (Remote Record enabled).
	2. Incorrect operating mode	2. Remote access is not permitted when the announcer is in RECORD, PLAYBACK or SELECT mode. Set the Announcer ONLINE.
	3. Access code may be changed	3. The access code is reset to the factory norm after prolonged periods of no power or, unauthorized usage has reset the code. If the code is unknown turn the power off for several minutes and try again with the factory code (967).
	4. Incorrect wiring or poor connections	4. Review wiring and re-seat edge connectors.
Remote Record output weak	1. Line Mis-match	1. Limiters or control (Attenuator pads, etc.) should be adjusted for maximum message output. Some cases may require the devices be removed.
	2. Marginal Telephone circuits.	2. Attach a known good line to the output. If problems clears contact telephone service provider for assistance.
	3. Audio output too low	3. Adjust output level of announcer (Refer to installation section).  CAUTION: Adjustment of audio output level may void FCC registration. Use minimum output level for a satisfactory message. NOTE: Distortion may occur if output level is set too high.

#### 4. WIRING

4.01 If power supply problems or erratic operation persists, the user wiring is suspect. Proper -48 Vdc wiring will vary with application and option(s) installed. The edge connector pin outs and functions for each major circuit are detailed individually.

##### SUPPLIED WIRING

4.02 Some options and configurations supply cables with the proper wiring. Attachment of external equipment to these connectors is the responsibility of the user. Edge connectors may have to be removed. Removal of edge connectors is illustrated in figure 4.

##### USER SUPPLIED WIRING

4.03 Wiring is installation dependent. The electrical characteristics of circuits and the selected functions will determine the connection. Always follow local codes and standard wiring conventions. The function and pin for signals are detailed in Tables 2 - 5.

#### 5. CONFIGURATION

5.01 Configuration of the announcer and interface options is the responsibility of the user. Wiring, switch settings, and jumper locations will vary with each installation.

##### SWITCH SETTINGS

5.02 DIP switch settings have a direct affect on the operation of the announcer. The Control Processor Main Circuit Board has one set of eight switches (S6). The function of these switches are listed in Table 6. The Multi-Channel circuit board has 2 sets of DIP switches (S2 and S3). S2 is currently not used. S3 controls the SIT output of channels 2, 3 and 4 (Refer Table 7).

##### INTERFACE CIRCUIT SWITCH SETTINGS

5.03 The Remote Access and Four-line Ring Trip interface options have DIP switches. These switches are detailed in Tables 8 and 9 respectively.

#### JUMPERS

5.04 The Control Processor has jumpers which are used for production tests of the announcer. DO Not change jumpers on the Main PCB.

##### INTERFACE CIRCUIT OPTION JUMPERS

5.05 Ring Trip interface options require jumper setting for line impedance, loop current, and access. The setting of these jumper is detailed in table 12.

##### OUTPUT LEVEL ADJUSTMENT

5.06 Message volume is up to user discretion. The volume may be checked by playback (refer to appropriate operation section) or, by initiating a call to each line(s). The 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-record at an adjusted volume.

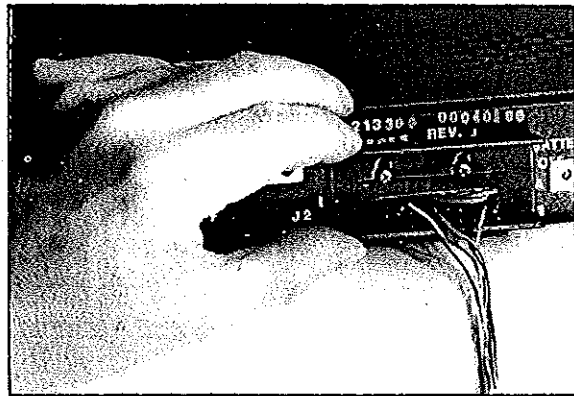
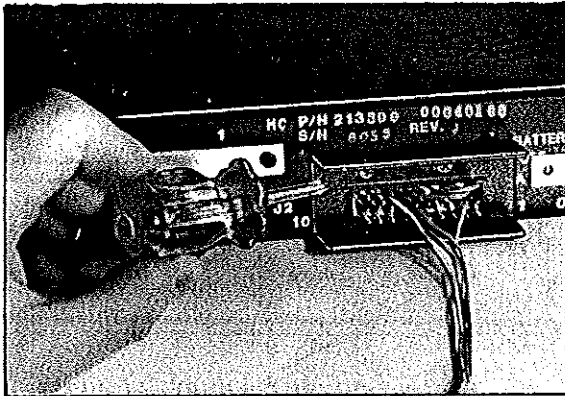
**CAUTION:** Output level is preset to comply with FCC limits. User adjustment may void FCC registration.

5.07 In cases where re-recording does little to change the acceptability of the message, the volume of the message may be adjustable through the front panel Output Level controls (Figure 5). 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.

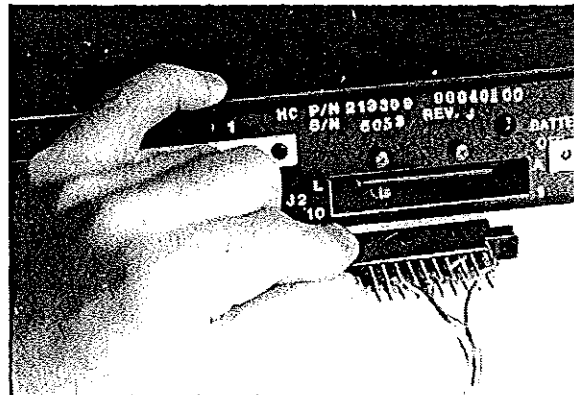
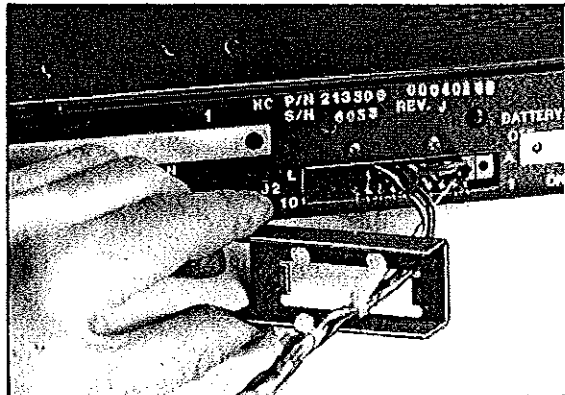
#### 6. SUPPLIED OPTIONS

6.01 The installation location of the major interface options is shown in Figure 6. Specifics concerning each option are contained in the Equipment Description section (060-NT7M-100) and Installation section (060-NT7M-200).

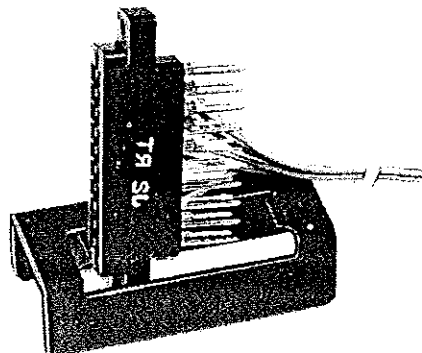
- A. -CAUTION: ALWAYS SHUT OFF THE POWER BY REMOVING THE FUSE AT THE -48V POWER DISTRIBUTION POINT OR UNPLUGGING THE AC CONVERTER BEFORE MOVING A RETAINER.



- B. -LOOSEN CONNECTOR RETAINER MOUNTING SCREWS ONE FULL TURN ( DO NOT REMOVE ).
- C. -LIFT CONNECTOR RETAINER UP TO DISENGAGE KEYHOLE SLOTS FROM THE SCREWS.

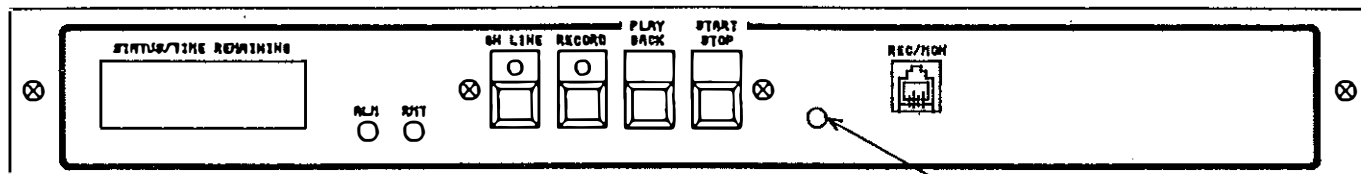


- D. -PULL CONNECTOR RETAINER BACK ENOUGH TO CLEAR EDGE CONNECTOR WIREWRAP PINS.
- E. -REMOVE EDGE CONNECTOR FROM PRINTED CIRCUIT BOARD WITH A ROCKING MOTION.



- F. - IF NECESSARY, TURN CONNECTOR RETAINER SIDeways AND SLIDE OFF EDGE CONNECTOR.

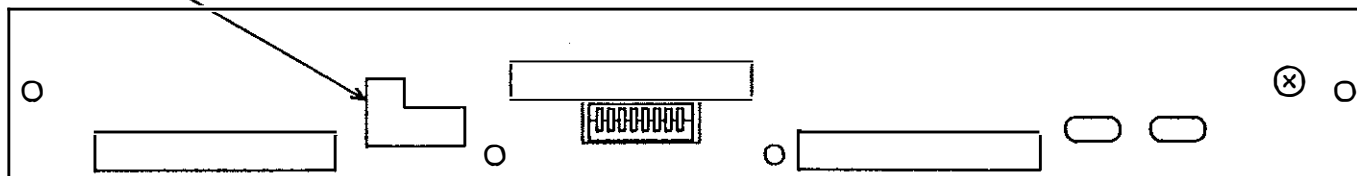
Fig. 4 - Removal of Edge Connectors  
(Reverse steps for installation)



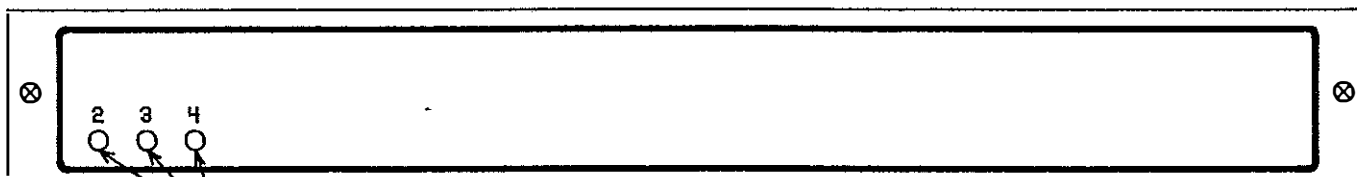
CONTROL PROCESSOR CHASSIS  
(FRONT)

OUTPUT LEVEL ADJUST  
(CHANNEL 1)

OUTPUT LEVEL ADJUST  
(TWO CHANNEL ONLY)



CONTROL PROCESSOR CHASSIS  
(REAR)



OUTPUT LEVEL ADJUST  
(CHANNELS 2, 3, 4)

EXPANSION CHASSIS (FRONT)

Fig. 5 - Location of Output Level Adjustments



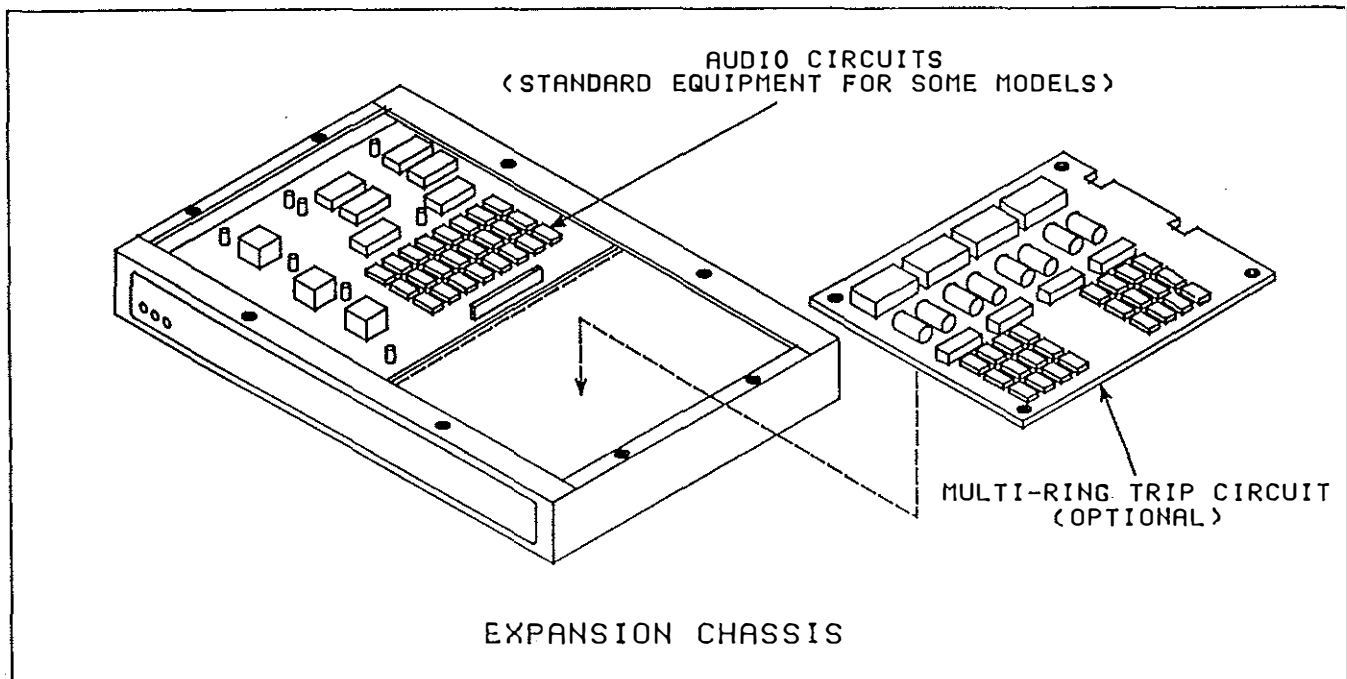
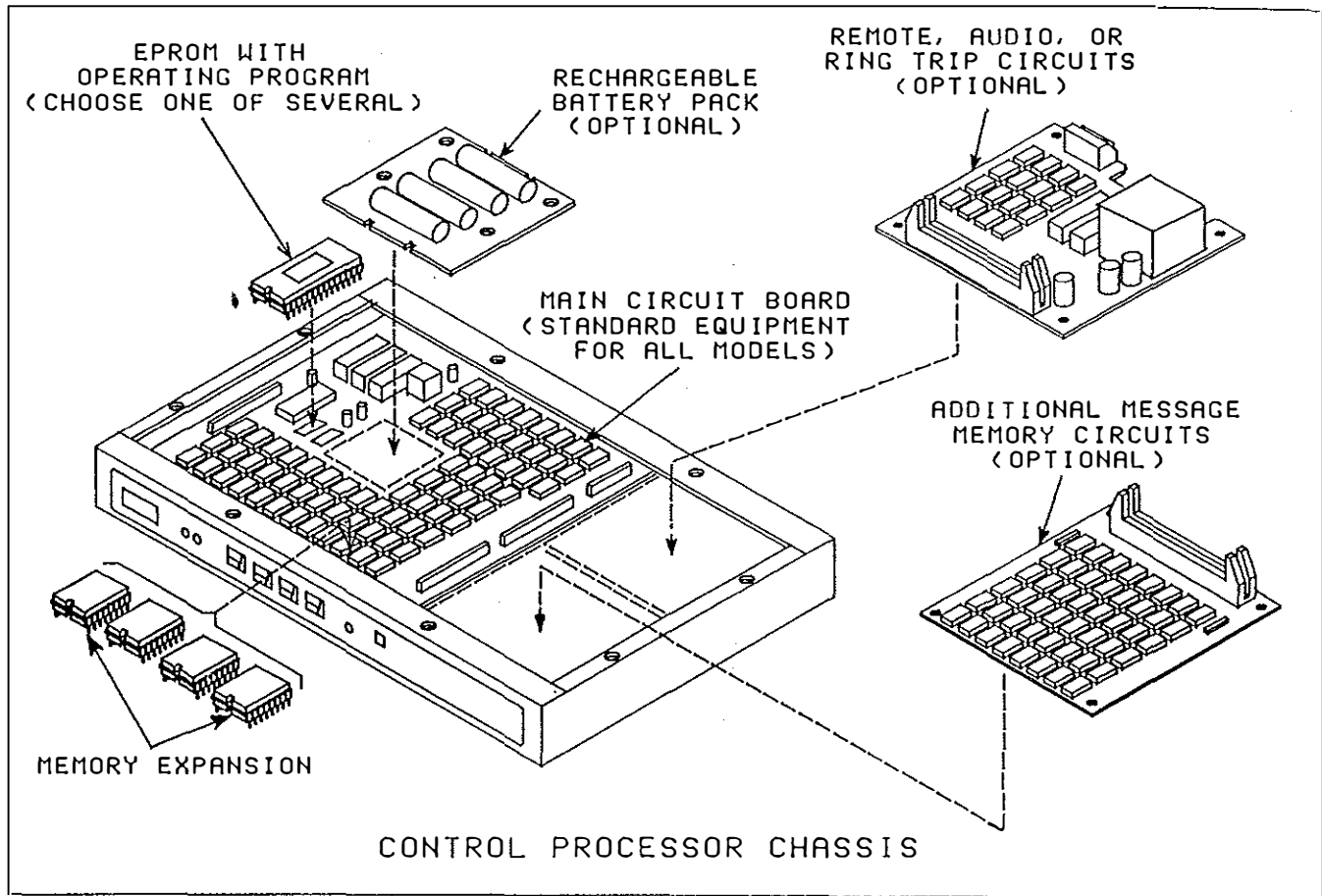


Fig. 6 - Location of Major Digital Announcer Components

Table 2. Control Processor Edge Connector (J2) Functions and Wiring

PINOUT	FUNCTION	DESCRIPTION
Pin 1	-48Vdc	Wire to AC Convertor black lead or -48 Vdc bus (fused at 1-1/3 amp)
Pin 2	MC0	Make Contact Relay - Ch. 1 (normally open). For external equipment control. Dependent on S6-2 (pulse or level). Level mode - 250 milliseconds (msec) after the falling edge of the start signal, MC relay closes and remains closed until end of message. Intermediate pulses are used to control other equipment. Pulse mode - 250 msec after the start signal the MC relay closes for 250 msec (falling edge signals message output). Another 250 msec pulse is initiated at the end of the message.
Pin 3	C0	Contact Relay - Ch. 1 (normally closed). Same as MC except the opposite (C opens while MC closes).
Pin 4	ALM0	Alarm Relay - Ch. 1 (normally open). Closes on alarm condition. Wire to external alarm detection circuits (Alarm = closed relay).
Pin 5	ST0-	Negative Start Signal - Ch. 1. Not used with Ring Trip circuits. For continuous operation (Ch. 1) wire -48 Vdc. Otherwise wire to external equipment start circuit.
Pin 6	ST0+	Positive Start Signal for Ch. 1. Not used with Ring Trip Circuits. For continuous operation wire to TEL GND (Pin 8). Otherwise, wire to external start circuit.
Pin 7	BY0	Busy Signal (normally closed). Announcer busy when open. Wire to external equipment needing open relay busy signal.
Pin 8	TEL GND	Circuit ground. Wire to external ground.
Pin 9	R0	Audio Ring - Ch. 1. Not used with Ring Trip Circuits. Wire to message receiver with T0 (R0 and T0 may be crossed).
Pin 10	T0	Audio Trip signal for Ch. 1. Not used with Ring Trip Circuits. Wire to receiver with R0 (R0 and T0 may be crossed).
Pin A	MBYCOM0	Common for Busy Relay. Wire to Busy circuit ground.
Pin B	ALM0	Alarm Relay (normally closed). Opens on alarm condition. Wire to external alarm circuits (Alarm = open relay).
Pin C	MCCOM0	Contact relay common. Wire to external controlled equipment.
Pin D	ALMCOM0	Alarm relay common. Wire to external ground or power.
Pin E	MBY0	Make Busy Relay (normally open) indicates busy when closed (high). Wire to equipment requiring closed relay busy signals.
Pin F		Not Used
Pin G		Not Used
Pin H	NS0	Noise Suppression - Channel 1. Wire to receiver equipment ground.

Table 3. Two Channel Add-On Edge Connector (J2R) Functions and Wiring

PINOUT	FUNCTION	DESCRIPTION
Pin 1	-48Vdc	Wire to AC Convertor or through 1-1/3 amp fuse to -48 Vdc bus.
Pin 2	MC1	Make Contact Relay - Ch. 2 (normally open). Status of message activity. Dependent on S6-2 (pulse or level). Level mode - 250 milliseconds (msec) after the falling edge of the start signal, MC relay closes and remains closed until end of message. Intermediate pulses are used to control other equipment. Pulse mode - 250 msec after the start signal the MC relay closes for 250 msec (falling edge signals message output). Another 250 msec pulse is initiated at the end of the message.
Pin 3	C1	Contact Relay - Ch. 2 (normally closed). Same as MC1 except the opposite (MC opens when C closes).
Pin 4	ALM1	Alarm Relay for Ch. 2 (normally open). Closes on alarm condition. Wire to external alarm detection circuits (Alarm = closed relay).
Pin 5	ST1-	Negative Start Signal - Ch. 2. Not used with Ring Trip Circuits. For continuous operation wire to -48 Vdc. Otherwise wire to external equipment start circuit.
Pin 6	ST1+	Positive Start Signal - Ch. 2 Not used with Ring Trip Circuits. For continuous operation wire to TEL GND (Pin 8). Otherwise, wire to external start circuit.
Pin 7	BY1	Busy Signal (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin 8	TEL GND	Internal circuit ground wire to solid external ground.
Pin 9	R1	Audio Ring Ch. 2. Not used with Ring Trip Circuits. Wire to receiver T1 for that channel.
Pin A	MBYCOM1	Busy Relay Common - Ch. 2. Wire to busy circuit power or ground.
Pin B	ALM1	Alarm Relay - Ch. 2 (normally open). Closes on alarm condition. Wire to external alarm detection circuits (Alarm = closed relay).
Pin C	MCCOM1	Contact common - Ch. 2. Wire to status circuit ground or power.
Pin D	ALMCOM1	Alarm Relay common for Ch. 2. Wire to external alarm equipment ground or power.
Pin E	MBY1	Make Busy Relay (normally open) Busy when closed. Wire to equipment requiring closed relay busy signal.
Pin F		Not Used
Pin G		Not Used
Pin H	NS1	Noise Suppression - Ch. 2. Wire to external equipment ground.

Table 4. Multi-Channel Edge Connector (J2M) Functions and Wiring

PINOUT	FUNCTION	DESCRIPTION
Pin 1	-48Vdc	Wire to AC Convertor black lead or to -48 Vdc (fuse at 1-1/3 amps)
Pin 2	C2	Contact Relay - Ch. 3 (normally closed). For control of equipment. Dependent on S6-2 (pulse or level). Level mode - 250 msec after the falling edge of the start signal, the relay opens and remains open until end of message. Intermediate pulses used to start other equipment. Pulse mode - 250 msec after the start signal, C will open for 250 msec. Another 250 msec pulse at end of message.
Pin 3	BY2	Busy Signal Relay - Ch. 3 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin 4	MBY2	Make Busy Relay - Ch. 3 (normally open) Busy when closed. Wire to equipment requiring closed relay busy signal.
Pin 5	MC2	Make Contact Relay - Ch. 2 (normally open). Same as C2 except MC2 opens when C2 closes.
Pin 6	BY1	Busy Signal Relay - Ch. 2 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin 7	C3	Contact Relay - Ch. 4 (normally closed).
Pin 8	MC3	Make Contact Relay - Ch. 4 (normally open).
Pin 9	MBY1	Make Busy Relay - Ch. 2 (normally open).
Pin 10	C1	Contact Relay - Ch. 2 (normally closed).
Pin 11	BY3	Busy Signal Relay - Ch. 4 (normally closed).
Pin 12	MBY3	Make Busy Relay - Ch. 3 (normally open).
Pin 13	MC1	Make Contact Relay - Ch. 4 (normally open).
Pin 14	T1	Audio Trip - Ch 2. Not used with Ring Trip Circuits. Wire to audio receiver.
Pin 15	T2	Audio Trip - Ch 3.
Pin 16	T3	Audio Trip - Ch 4.
Pin 17	ST1-	Negative Start Signal - Ch. 2. Not used with Ring Trip Circuits. Wire to start circuit (continuous operation wire to -48 Vdc).
Pin 18	ST2-	Negative Start Signal - Ch. 3.
Pin 19	ST3-	Negative Start Signal - Ch. 4.
Pin 20	NS2	Noise Suppression - Ch. 3. Wire to external equipment ground.
Pin 21	NS1	Noise Suppression - Ch. 2. Wire to external equipment ground.
Pin 22	NS3	Noise Suppression - Ch. 4. Wire to external equipment ground.

Table 4. Multi-Channel Edge Connector (J2M) Functions and Wiring (contd)

PINOUT	FUNCTION	DESCRIPTION
Pin A	TEL GND	Internal Ground. Wire to ground bus.
Pin B	C2	Contact Relay - Ch. 2 (normally closed).
Pin C	BY2	Busy Signal Relay - Ch. 3 (normally closed). Busy when open. Wire to external equipment needing a open relay busy signal.
Pin D	MBY2	Make Busy Relay - Ch. 3 (normally open) Busy when closed. Wire to equipment requiring a closed relay busy signal.
Pin E	MC2	Make Contact Relay - Ch. 3 (normally open).
Pin F	BY1	Busy Signal Relay - Ch. 2 (normally closed). Busy when open. Wire to external equipment needing an open relay busy signal.
Pin G		Not Used.
Pin H	C3	Contact Relay - Ch. 4 (normally closed).
Pin I		Not Used.
Pin J		Not Used.
Pin K	MBY1	Make Busy Relay - Ch. 2 (normally open). Busy when closed (high). Wire to equipment requiring a closed relay busy signal.
Pin L	C1	Contact Relay - Ch. 2 (normally closed).
Pin M	BY3	Busy Signal Relay - Ch. 4 (normally closed). Busy when open. Wire to external equipment needing an open relay busy signal.
Pin N	MBY3	Make Busy Relay - Ch. 4 (normally open). Busy when closed (high). Wire to equipment requiring a closed relay busy signal.
Pin O		Not Used.
Pin P	MC1	Make Contact Relay - Ch. 2 (normally open).
Pin Q		Not Used.
Pin R	R1	Audio Ring - Ch. 2. Wire to audio receiver equipment with T1.
Pin S	R2	Audio Ring - Ch. 3. Wire to audio receiver equipment with T2.
Pin T	R3	Audio Ring - Ch. 4. Wire to audio receiver equipment with T3.
Pin U	ST1+	Positive Start Signal - Ch. 2. Not used with Ring Trip. Wire to start circuits (For continuous operation wire to TEL GND).
Pin V	ST2+	Positive Start Signal - Ch. 3.
Pin W	ST3+	Positive Start Signal - Ch. 4.

Table 5. Multi-Ring Trip Edge Connector (J2RM, J3, J4) Functions and Wiring

NOTE: This table is provided for signal cross-reference only. In most applications the signals described will be provided by other equipment or other circuits in the Announcer.		
PINOUT	FUNCTION	DESCRIPTION
Pin 1	-48Vdc	Wire to AC Convertor black lead or -48 Vdc (fuse at 1-1/3 amps).
Pin 2	MC2+	Make Contact Relay - Ch. 3 (normally open). For control of equipment. Dependent on S6-2 (pulse or level). Level mode - 250 msec after the falling edge of the start signal, the relay closes and remains closed until end of message. Intermediate pulses used to start other equipment. Pulse mode - 250 msec after the start signal, MC will close for 250 msec. Falling edge of MC signals message output. Another 250 msec pulse at end of message.
Pin 3	MC0+	Make Contact Relay - Ch. 1 (normally open).
Pin 4*	TIP 1	Trip signal - line 2. Not used with RJ-11 jacks. Wire to subscriber line trip signal.
Pin 5*	RING 1	Ring signal - line 2. Not used with RJ-11 jacks. Wire to subscriber line ring signal.
Pin 6*	ST0+	Positive Start Signal - Ch. 1. Not used with Ring Trip circuits. Wire to start circuit (For continuous operation on wire to ground).
Pin 7	MC3+	Make Contact Relay - Ch. 4 (normally open).
Pin 8	BY0+	Busy Signal - Ch. 1 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin 9*	AUDIO	Audio Ring - Ch. 1. Wire to audio receiver with Pin 11.
Pin 10	MC1+	Make Contact Relay - Ch. 2 (normally open).
Pin 11*	AUDIO	Audio Trip - Ch. 1. Wire to audio receiver with Pin 9.
Pin 12		Not Used.
Pin 13		Not Used.
Pin 14*	AUDIO	Audio Trip - Ch. 2. Wire to audio receiver with Pin R.
Pin 15*	AUDIO	Audio Trip - Ch. 3. Wire to audio receiver with Pin S.
Pin 16*	AUDIO	Audio Trip - Ch. 4. Wire to audio receiver with Pin T.
Pin 17		Not Used.
Pin 18*	TIP 3	Trip signal - line 4. Not used with RJ-11 jacks. Wire to subscriber line trip signal.
Pin 19*	RING 3	Ring signal - line 4. Not used with RJ-11 jacks. Wire to subscriber line ring signal.

Table 5. Multi-Ring Trip Edge Connector (J2RM, J2, J4) Functions and Wiring (contd)

PINOUT	FUNCTION	DESCRIPTION
Pin A	TEL GND	Internal circuit ground wire to solid external ground.
Pin C	BY2+	Busy Signal - Ch. 3 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin D*	TIP 0	Trip signal - line 1. Not used with RJ-11 jacks. Wire to subscriber line trip signal.
Pin E*	RING 0	Ring signal - line 1. Not used with RJ-11 jacks. Wire to subscriber line ring signal.
Pin F	BY1+	Busy Signal - Ch. 2 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin G-L		Not Used.
Pin M	BY3+	Busy Signal - Ch. 4 (normally closed). Busy when open. Wire to external equipment needing open relay busy signal.
Pin N*	RING 2	Ring signal - line 3. Not used with RJ-11 jacks. Wire to subscriber line ring signal.
Pin O		Not Used.
Pin P*	RING 2	Ring signal - line 3. Not used with RJ-11 jacks. Wire to subscriber line ring signal.
Pin Q		Not Used.
Pin R*	AUDIO	Audio Ring - Ch. 2. Wire to audio receiver with Pin 14.
Pin S*	AUDIO	Audio Ring - Ch. 3. Wire to audio receiver with Pin 15.
Pin T*	AUDIO	Audio Ring - Ch. 4. Wire to audio receiver with Pin 16,
Pin U*	ST1+	Positive Start Signal - Ch. 2. Not used with Ring Trip Circuits Wire to ground bus (For continuous play operation wire to pin 8).
Pin V*	ST2+	Positive Start Signal - CH. 3.
Pin W*	ST3+	Positive Start Signal - Ch. 4.

\* Four Line Ring Trip operation generally utilizes modular plugs which will provide the start signals and audio output wiring.

Table 6. Control Processor Switch Settings

SWITCH	DESCRIPTION
S6-1	Remote Record Enable - ON = Remote access permitted
S6-2	C/MC Signal Activity - ON = Pulsed, OFF = Level. Level mode - 250 milliseconds (msec) after the start signal, the C/MC relay changes state until end of message. User defined intermediate pulses control other equipment. Pulse mode - 250 msec after the start signal the C/MC relay changes state for 250 msec. Another 250 msec pulse at end of message.
S6-3	Voice Alarm Disable - Some Voice Alarm conditions can be turned off. ON = no voice alarm. Non-Voice alarms are not affected.
S6-4	Not Used
S6-5	Sampling Rate. ON = 22 Khz, OFF = 32 kHz.
S6-6	SIT Selection. ON = message preceded by SIT tones. OFF = No SIT tones before message.
S6-7	Start Operation. ON = Pulsed (entire message output on receipt of 250 millisecond start signal. OFF = Level (message output only while start signal is present).
S6-8	Not Used.

Table 7. Multi-Channel Circuit Switch Settings

SWITCH	DESCRIPTION
S2-1 to S2-8	Not Used.
S3-1	Not Used.
S3-2	Not Used.
S3-3	Not Used.
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



Table 8. Remote Access/Ring Trip Switch Settings

SWITCH	DESCRIPTION
S-1	Ring Trip Enable. ON = no ring trip operation. OFF = Ring Trip enabled.
S-2	Rings before answer. ON = 2 Rings. OFF = 1 Ring.
S-3	Number of Message Plays. ON = 2 times. OFF = 1 time.
S-4	Not Used.

Table 9. Multi-Ring Trip Switch Settings

SWITCH	DESCRIPTION
S1-1	Number of rings before answering (see below)
S1-2	Number of rings before answering (see below)
S1-3	Number of message repeats on Channel 1. ON = 2 times. OFF = 1 time.
S1-4	Ring Trip Busy Enable (CH. 1). ON = No Access. OFF = Access permitted.
S1-5	Number of rings before answering (see below)
S1-6	Number of rings before answering (see below)
S1-7	Number of message repeats - Channel 2. ON = 2 times. OFF = 1 time.
S1-8	Ring Trip Busy Enable (Ch. 2). ON = No Access. OFF = Access permitted.
S2-1	Number of rings before answering (see below)
S2-2	Number of rings before answering (see below)
S2-3	Number of message repeats - Channel 3. ON = 2 times. OFF = 1 time.
S2-4	Ring Trip Busy Enable (CH. 1). ON = No Access. OFF = Access permitted.
S2-5	Number of rings before answering (see below)
S2-6	Number of rings before answering (see below)
S2-7	Number of message repeats - Channel 4. ON = 2 times. OFF = 1 time.
S2-8	Ring Trip Busy Enable (Ch. 2). ON = No Access. OFF = Access permitted.

No. of Rings*	CH. 1	CH. 2	CH. 3	CH. 4
1 Ring	S1-1 (0) S1-2 (0)	S1-5 (0) S1-6 (0)	S2-1 (0) S2-2 (0)	S2-5 (0) S2-6 (0)
2 Rings	S1-1 (1) S1-2 (x)	S1-5 (1) S1-6 (x)	S2-1 (1) S2-2 (x)	S2-5 (1) S2-6 (x)
3 Rings	S1-1 (0) S1-2 (1)	S1-5 (0) S1-6 (1)	S2-1 (0) S2-2 (1)	S2-5 (0) S2-6 (1)

\* For this table: 1 = ON and 0 = OFF (example, S1-1 (1) = S1-1 is ON).  
x = ON or OFF

Table 10. Digital Announcer Jumper Settings

CONTROL PROCESSOR MAIN PCB				
Main PCB jumpers are pre-set at the factory. These jumpers are used during manufacture to assure non-destructive assembly. <u>DO NOT</u> relocate jumpers.				
REMOTE ACCESS RING TRIP PCB				
Line Impedance matching*				
600 Ohm	B and D			
900 Ohm	C and E			
FOUR LINE RING TRIP PCB				
Line Impedance matching*	Ch. 1	Ch. 2	Ch. 3	Ch. 4
600 Ohm	B - D	G - I	L - N	R - T
900 Ohm	C - E	H - J	M - O	S - U
Loop Current				
15 to 50 mA (Normal)	F	X	P	V
5 to 25 mA (Lossy)	A	W	K	Q
Audio Access				
Normal	P2 - A	P3 - A	P4 - A	P5 - A
Barge-In	P2 - B	P3 - B	P4 - B	P5 - B
* Line Impedance matching may not be available on the latest versions of these options.				

## PRODUCT WARRANTY

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

The Cook Electric 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 Electric Division  
6201 Oakton Street  
Morton Grove, Illinois 60053  
Telephone (312)-967-6600  
Telex I 72-4472  
Telex II 910-223-3654  
Cable "Cookpro"

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For more information, contact:

Northern Telecom  
Cook Electric Division  
6201 Oakton Street  
Morton Grove, IL 60053-2722-USA  
(312) 967-6600

