

MCI350B

KI-1252-0



DIRECTOR II™ SERIES
DESK-TOP CONTROL CENTERS FOR
SCHOOL SOUND/COMMUNICATIONS SYSTEMS

RAULAND-BORG CORPORATION • 3535 West Addison Street, Chicago, Illinois 60618 (312) 267-1300

ATTACHMENTS

This service manual includes the following items:

- - MCI350 to SPL1425 System Wiring Diagram KM-0539
- - Two Room Selector Panels Wiring Diagram KM-0540
- - Three Room Selector Panels Wiring Diagram KM-0541
- - DIR350/DIR350L Typical System Wiring Diagram KM-0536/
And Multiple Masters Connections Diagram KM-0535
- - MCI350 Master Control Intercom Diagram KC-1362
- - Room Selector Switch Panel Instruction Manual KI-1200

EQUIPMENT MODEL COMPLEMENT

DIR350B	DIR350LB	INCLUDED ITEMS
X		SW25 Room Selector Panel
	X	SWL25 Room Selector Panels/W LightCall-In
	X	PSL25 Power Supply (6.0 Vdc @ 100 mA)
X	X	MCI350B Master Control Intercom Panel
X		VC-6365*Miscellaneous Hardware Items
	X	VC-6366*Miscellaneous Hardware Items
X	X	PCC300A Cabinet W/Accessories

*VC-6365 and VC-6366 are assembly numbers used for internal **factory** control and fabrication purposes. Do not order hardware items using the VC-6365 and VC-6366 numbers.

S P E C I F I C A T I O N S

Operational Channels: Two; PROGRAM and INTERCOM. Both channels work independently, permitting simultaneous PROGRAM distribution to selected rooms and two-way INTERCOM with another room. Unit can be converted to single-channel operation by jumpering option on circuit board.

Room Capacity: 25, expandable in groups of 25 rooms up to 75 rooms with addition of optional SW25 and SWL25 Room Selector Panel (s).

Rated Power Output: PROGRAM Channel: 35 watts RMS
INTERCOM Channel: 5 watts RMS

Output Available: 25V balanced and center-taped. Readily convertible to 5V (45 ohms) balanced output. Either output is transformer isolated.

Frequency Response: PROGRAM Channel: Flat within + 3 dB,
50 Hz to 15 kHz
INTERCOM Channel: Shaped for maximum intelligibility; approximately 2 kHz to 10 kHz.

Distortion: PROGRAM Channel: Less than 2% at RPO

Noise Levels (below RPO): Microphone: - 60 dB
Auxiliary: - 70 dB
Intercom: - 50 dB

Inputs: Microphone: Two balanced 150 ohm inputs using built-in Model R1050 Microphone Transformers.
Auxiliary: Two unbalanced 500K ohms.

Input Sensitivity (for RPO): Microphone: 0.3mV for low impedance.
Auxiliary: 0.25V

Supervisory Tone
(Intercom Listen Mode) : Duration: 200 msec
Repetition Rate: Every 13 ±3 sec.
Frequency: Approximately 1.2 kHz.

Power Requirements: 120 Vac (105-130 V); 60 Hz; 65 watts.

Safety Devices: Resettable circuit breaker to input of ac power transformer. Automatic resetting 195 ± 7 F thermostat on inside of rear chassis senses heat sink temperature.

MCI350 Panel Size: 19" W x 3½" H x 10½" D

DIR350 or DIR350L Unit Weight: 33 lb.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

1. DESCRIPTION

1.1 General

The Rauland-Borg Director II^{T.M.} Series Desk-Top Control Centers are ideal for small and medium-sized schools requiring the features available on console-type control centers. For these schools, the Desk-Top Control Centers thoroughly fulfill communications and program distribution needs in a space-saving and cost-saving design which is simple to operate.

1.2 Program Channel

Complete facilities are provided for distributing a variety of program materials from microphone, radio, cassette or tape player, and/or tape recorder. Program distribution to individual classrooms, or selected groups of rooms, or to all rooms is extremely flexible and easily accomplished using the "follow-the-color" operational technique.

1.3 Intercom Channel

The Desk-Top Control Center provide efficient control of communications throughout your school. Instant, effective two-way voice communications can be obtained with any classroom. Classrooms may easily call and communicate with you.

Emergency announcements to all rooms is simply made by depressing the ALL-CALL button and speaking into the local microphone/speaker built into the front panel.

2. ACCESSORIES

2.1 Rauland Model 47RCA Remote Control Adapter

Prepares microphone inputs to program channel for operation with remotely controlled volume. An optical-isolator within the 47RCA provides "hum-free" remote operation as the remote volume control signal is completely isolated from the amplifier input circuits.

2.2 Rauland Model 47RVC Remote Volume Control

Provides remote (up to 2,000 feet) volume control of the microphones without changing the level of auxiliary sources. Accurate adjustment to the desired volume level is provided by the calibrated faceplate and the potentiometer taper. Must be used with the Rauland Model 47RCA Remote Control Adapter.

2.3 Rauland Model D0158 Clock Relay

Provides switching that sends a continuous tone to all classrooms indicating class change. Compatible with single-channel, classroom change systems. Switch closure from programmed time-change clock enables D0158 clock relay. OFF buss is gathered and tone from internal MCI350 circuitry is sent to all classrooms for the class change notification.

3. INSTALLATION

3.1 Introduction

A well planned equipment installation saves time and assures best equipment performance. Evaluate the following items:

Equipment location and type of equipment mounting.

Number of microphone inputs to be used.

Field conversion for classroom time-change notification.

Field conversion for remotely controlled functions.

Type of output to be used and if line-matching transformers are needed.

System wiring to and from amplifier.

WARNING

Installation of optional accessories requires removal of amplifier cabinet which could present an electrical shock hazard. Installation of these items must be performed by an authorized Rauland-Borg serviceman.

3.2 Equipment Damaged in Transit

This equipment has been carefully inspected and tested at the factory prior to shipment. If the equipment was damaged in transit, notify the transportation company immediately to place your claim.

3.3 How To Access The MCI350 (Desk-Top Models Only)

Some disassembly of equipment mounted in desk-top models is required in order to access the MCI350 for connection of field wiring, installation of optional accessories, and modification to accommodate special modes of operation. Connection of field wiring requires only removal of the back cover to access the screw terminals provided on the rear of the MCI350. Installation of optional accessories and modification to the circuit board requires removal of all equipment and blank panels mounted in the cabinet.

Removing An Equipment Panel/Chassis

Step 1. Remove dress panel by unscrewing two screws from front of panel.

step 2. Unplug interconnecting cables, as required in order to free chassis from other units. Tag plugs for identification, if necessary.

Step 3. Remove four screws securing chassis to cabinet side rails.

Step 4. Re-install by reversing the above sequence.

3.4 Conversion For Remotely Controlled Volume

Step 1. Access the MCI350 circuit board as described in Paragraph 3.3.

Step 2. Insert the Model 47RCA Remote Control Adapter into four-pin socket LV1, provided on the circuit board.

3.5 Conversion for Single-Zone Time Change Notification

Step 1. Access the MCI350 circuit board as described in Paragraph 3.3.

Step 2. Insert the Model DO158 Clock Relay into socket RY2.

Step 3. Remove jumper connected across wire wrap terminals T58 and T59. These terminals are located adjacent to socket RY2. Refer to attached Schematic Diagram KC-1362 for circuit details.

3.6 Modification For Single-Channel System Operation

Unshielded speaker lines were often used in older buildings. If these are encountered, it may be desirable to operate the MCI350 as a single-channel system, instead of incurring the cost of rewiring the building with shielded cable. Operation of a single-channel system temporarily prevents the distribution of program material to rooms while an intercom conversation is proceeding.

To make modification:

Step 1. Access the MC1350 Circuit board as described in Paragraph 3.3.

Step 2. Install a jumper across wire wrap terminals T19 and T20. These terminals are located about two inches behind the MONITOR PROGRAM control. Refer to attached Schematic Diagram κC-1362 for circuit details.

3.7 Conversion For 5 Volt (45 Ohm) Output

The MCI350 is shipped from the factory wired for 25 Volt constant-voltage output. If 5 Volt (45 Ohm) output is required:

Step 1. Access the MCI350 circuit board as described in Paragraph 3.3.

Step 2. Change the secondary connections of chassis-mounted program output transformer XF502 as shown in Chart 1, below. Refer to attached Schematic Diagram κC-1362 for circuit details.

Chart 1. Program Transformer Output Connections.

<u>Wire Color</u>	<u>25V Jumper</u>	<u>Change To 5V Jumper</u>
Blue	T56 to T69	T56 to T67
White	T53 to T68	T53 to T66

Step 3. Change the secondary connections of circuit-board mounted intercom transformer XF2 as shown in Chart 2. Refer to the attached Schematic Diagram KC-1362 for circuit details.

Chart 2. Intercom Transformer Output Connections.

<u>Wire Color</u>	<u>25V Jumpers</u>	<u>Change to 5V Jumpers</u>
Orange	T39 to T35	T39 to T33
White	T40 to T36	T40 to T34

3.8 Interface For Multiple-Master Intercom Operation

Intercom operation with multiple masters requires interface to wire wrap terminals provided on the amplifier circuit board, and modifications to the room selector panel. Required interface is described in this paragraph. Use of wiring interface and needed room selector panel modifications are given in a subsequent paragraph. Refer to attached Multiple Masters Connections Diagram KM-0535 for circuit details.

Step 1. Locate wire wrap terminals T45 and T48, adjacent to listen/talk relay RY1. These terminals provide the multiple master input connections to the amplifier for master operation. Two ten-inch long wires are needed; connect one wire to each terminal, T45 and T48.

- Step 2. Make three or four twists throughout the length of the wires. Route twisted wires along side of chassis and insert through access space provided between rear edge of circuit board and chassis bottom.
- Step 3. Locate wire wrap terminals T37 and T38, adjacent to listen/talk relay RY1. These terminals provide the multiple master output connections for the C BUSS on the room selector panel. Connect two two-foot long wires, one wire to each of these terminals.
- Step 4. Make several twists throughout the length of the wires. Route twisted wires along side of chassis and insert through access space provided between rear edge of circuit board and chassis bottom.
- step 5. Locate wire wrap terminals T30 and T31, adjacent to intercom transformer XF2. Remove the jumper connected between T30 and T31 to isolate the center tap of XF2 from circuit common.
- Step 6. Connect each master used in the master-to-master configuration to a proven good earth ground. It's recommended that the shield of the wire pair from Master #1 to Master #2 be connected to chassis ground at Master #2.

3.9 Remounting MCI350 In Cabinet (Desk-Top Models Only)

Cabinet should be upside-down for remounting the MCI350 and the switchbanks in the subsequent paragraphs. Place the MCI350 on the inside of the cabinet. Secure the MCI350 to the cabinet using the four screws previously removed. Don't install dress panel at this time, as controls accessible only through front chassis may have to be adjusted when setting initial levels.

3.10 Rack-Mounting Or Turrent-Mounting MCI350

If rack-mounting the unit, forced air ventilation is recommended for an enclosed equipment rack where the combined rated output power of all equipment exceeds 250 watts RMS, or the input power to the rack from the 60 Hz power line exceeds 500 watts: or where there is the possibility of "hotspots" due to restricted air flow.

CAUTION

Failure to observe the above precautions could result in damage due to overheating, or could cause a possible fire hazard.

If turrent-mounting the unit, use one of the upper positions in the turrent so that there is sufficient clearance beneath the chassis to make switchbank interconnections. Make sure that the mounting position selected is deep enough to accommodate the 10½" depth of the unit, plus the additional space needed to install field wiring and perform routine maintenance functions.

CAUTION

Observe all safety precautions given above for rack-mounted units. Failure to observe these precautions could result in damage due to overheating, or could cause a possible fire hazard.

Install chassis using the following procedure:

Step 1. Insert the four #10 TINNERMAN-type clips supplied with the unit over the corresponding mounting holes in the channel rails for the selected mounting position. Smooth side of clip must face towards outside of channel rail.

Step 2. Secure the MCI350 chassis to the channel rails using the four #10-½" sheet metal screws supplied. Don't install dress panel at this time, as controls accessible only through front **chassis** may have to be adjusted when setting initial levels.

3.11 Room Selector Panel Modifications

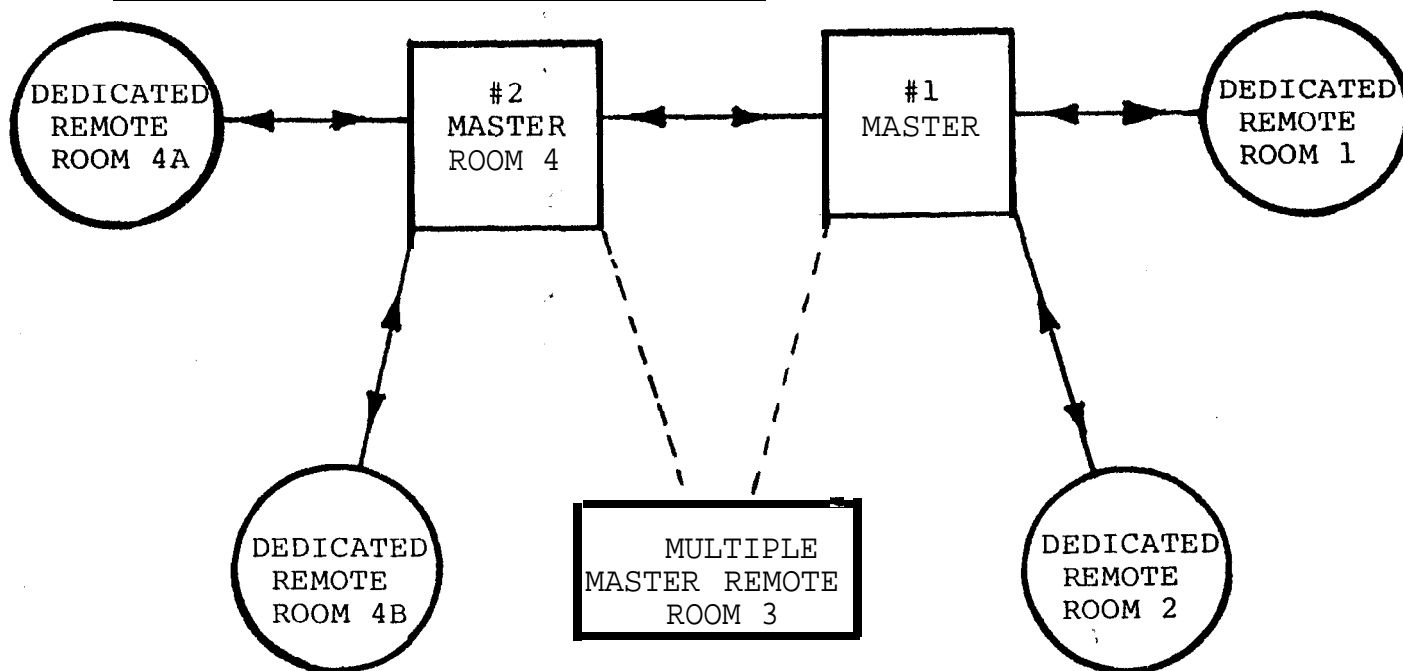


Figure 1. Sample Multiple Master Intercom System

3.11.1 System Definitions and Capabilities

For intercom operation, the MCI350 is considered to be a master and classrooms to be remotes. When only one MCI350 is used in the system, the configuration is called a single master with multiple remotes intercom system. This is the typical intercom system and requires no equipment modifications, as shipped from the factory.

A multiple master system is shown in Figure 1. Each master in this system is capable of operating with several remotes. Multiple master systems require modifications to the associated room selector panels dependent upon how the included remotes are used in the system. When a remote can communicate only with one master, it is called a dedicated remote. When all masters in the system are operated with either dedicated remotes or no remotes, the only modification required is to split the C BUSS on the room selector panel. This isolates the C lines between masters and remotes. In a dedicated remote system, both intercom and program all-call are possible without additional modification.

When a remote can communicate with more than one master, it is called a multiple-master remote and is used in a system configuration called an intermix intercom system. For intermix systems, the room selector panel must be modified by: (1) splitting the C BUSS, and (2) completely removing both OFF BUSSES. In an intermix system, intercom all-call is possible only if a special buss gathering relay is used. Contact Rauland-Borg Sales Engineering for modification details. Program all-call is not practical as lock-out relays would be required.

3.11.2 How To Split C BUSS

Split the C BUSS on the associated room selector panel at the switch position correlating to the number of outlying masters used in the system. For example: if four outlying masters are used in the system, split the C BUSS at switch number four. Outlying masters must always be assigned the low-numbered switch positions. Both C BUSS plating strips run along the top of the room selector circuit board, with C1 on the front of C2 on the rear of the board.

On the SWL25 Room Selector Panel, some disassembly is required since the C BUSS can not be readily accessed. Remove metal spacerbar on rear of unit. Remove two screws securing rear circuit board to mounting frame. Swing rear board away from front board using the wire jumpers along the bottom of both boards as a hinge. Refer to attached Instruction Manual KI-1200 for circuit details.

3.12 Adding Second Or Third Room Selector Panels

The second room selector panel can be installed either below the first room selector panel in the DIR350 or DIR350L Systems, or with a third room selector panel in a separate PCC300A Cabinet. In either case, the physical installation is the same. Remove blank dress panel from selected mounting position, if not previously removed. Remove the two blank panel supports mounted to the channel rails. Make modifications to the room selector panel as required per Paragraph 3.11.

Install the room selector panel using the mounting hardware supplied with the panel. A second PCC300A Cabinet is required for mounting the third room selector panel. Follow the afore-referenced instructions for its installation.

3.13 Cabling Between MCI350 and One Room Selector Panel

Prewired cabling is provided with the MCI350 for direct plug-in to one SW25 or SWL25 Room Selector Panel. Some cabling modifications are required when more than one room selector panel is used in the system. Interface of the MCI350 with equipment other than the SW25 or SWL25 requires custom-made cabling.

- Step 1. Insert the ORANGE four-contact plug onto the A-OFF terminal pins provided on one end of the room selector panel. Proper plug orientation is to have the violet wire correspond with OFF-1.
- Step 2. Insert the RED five-contact plug onto the C-G (SW25) or C-G-L-K (SWL25) terminal pins on the other end of the roomselector panel. Proper plug orientation is to have the red wire of the shielded cable correspond with C2.

3.14 Connections To Two Room Selector Panels

In multiple room selector panel installations, paralld connections must be made to each panel. Connections for the C-G lines and the L-K lines on the SWL25 are made to the screw terminals provided on the rear of the MCI350. Connections for the A-OFF lines are made by splicing into the existing cable. Refer to attached Wiring Diagram KM-0540 while performing the following steps.

- Step 1. Insert the prewired ORANGE four-contact plug onto the A-OFF terminal pins provided on one end of the second room selector panel. Proper plug orientation is to have the violet wire correspond with OFF 1.
- Step 2. Make parallel connections to the corresponding terminal pins on the first room selector panel using the unwired ORANGE insulation-piercing connector provided with the .second room selector panel. This connector may have to be modified by cutting through the shell on one side, if it is notcompatible with loop-through splicing of the interconnecting wires.
- Step 3. Insert the prewired RED five-contact plug onto the C-G (SW25) or C-G-L-K (SWL25) terminal pins on the other end of the first room selector panel. Proper plug orientation is to have the red wire of the shielded cable correspond with C2.

- step 4. To make parallel connections for the C-G (SW25) and the C-G-L-K (SW25) lines, a cable must be fabricated long enough to reach from the screw terminals on the rear of the MCI350 to the unused terminal pins on the other end of the second room selector panel. Use the unwired RED connector provided with the second room selector panel and suitable wires to make the cable. Install #6 spade lugs on the opposite end of the fabricated cable for termination with the MCI350.
- Step 5. Insert RED connector onto terminal pins on the end of the second room selector panel. Proper plug orientation is to have **the red** wire of the shielded cable correspond with C2. Connect other end of cable to screw terminals on the rear of the MCI350, as shown below.

<u>Screw Terminal</u>	<u>SWL25 Function</u>	<u>SW25 Function</u>
C1	C1	C1
c2	c2	c2
GND	G	G
+PSL25	L	--
-PSL25	K	--

3.15 Connections To Three Room Selector Panels

In multiple room selector panel installations, parallel connections must be made to each panel. Connections for the C-G lines and the L-K lines on the SWL25 are made to the screw terminals provided on the rear of the MCI350. Connections for the A-OFF lines are made by splicing into the existing cable. Refer to attached Wiring Diagram KM-0541 while performing the following steps.

- Step 1. Locate the ORANGE plug on the end of one of the **cables** provided with the MCI350. Remove the ORANGE plug by cutting the wires close to the plug.
- Step 2. Connect the four wires previously terminated at the orange plug to the second room selector panel by wire wrapping to the following terminals:

<u>Wire Color</u>	<u>SW25/SWL25 Terminal</u>
Violet	OFF 1
Gray	OFF 2
Blue	A2
White	A1

- Step 3. Make parallel connections to the corresponding terminal pins on the first room selector panel using the unwired ORANGE insulation-piercing connector provided with the second room selector panel. This connector may have to be modified by cutting through the shell on one side, if it is not compatible with loop-through splicing of the wires.
- Step 4. Make parallel connections from the second to the third room selector panels, using a specially fabricated cable. Use the unwired ORANGE connector provided with the third room selector panel and suitable wire to make the cable. Leave the opposite end of this cable unfinished.
- Step 5. Insert the ORANGE connector onto the A-OFF terminal pins on the end of the third room selector panel. Proper plug orientation is to have the violet wire correspond with OFF 1. Terminate other end of cable to the second room selector panel by wire wrapping to the corresponding terminals pins used in Step 2 above.
- Step 6. Two additional cables will have to be fabricated using the RED connectors provided with the second and third room selector panels. Connect these cables from the MCI350 to the second and third room selector panels.

3.16 Connections To More Than-Three Room Selector Panels

For intercom systems where program all-call and emergency all-call are not required, more than three room selector panels may be used. Parallel connect these room selector panels to the third room selector panel and to the MCI350 as if adding a second panel. Refer to paragraph 3.14 for procedural guidelines.

3.17 Equipment Location Considerations For Desk-Top Models

Good judgement must be used when selecting the equipment location. Consider user safety, environmental conditions, and accessibility to equipment controls. Never use a location where the equipment is subjected to "hotspots" or "coldspots", or widely changing temperatures. Never place the unit on a soft, yielding surface that could impede air flow underneath or around the sides of the cabinet.

CAUTION

Failure to observe the above precautions could result in damage due to over-heating, or could cause a possible fire hazard.

3.18 Wiring Guidelines

Local codes and ordinances should be checked before permanent ac power lines, if required, are installed and terminated at the equipment. If using conduits for cable runs, separate conduits should be used for AC power lines and audio lines. To minimize the possibility of high frequency oscillations, high level audio lines should be kept as far as possible from microphone input lines. Good practice dictates that the microphone lines be shielded and preferably run in a separate conduit.

WARNING

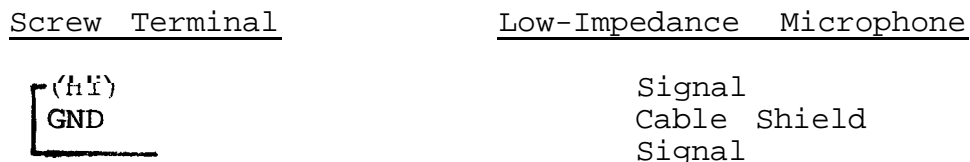
Make AC power connections to these amplifiers only after all other connections have been made.

When using more than one speaker in the same room, make sure the speakers are correctly phased to prevent low frequency cancellation. For a parallel-wired system, make sure all system components are connected to the same polarity; speaker wires to speaker terminals and line-matching transformers to speaker terminals. For a series-wired system, make sure all system components are connected to opposite polarities, from one item to the next item.

In intercom systems using voice-call origination, one twisted-pair shielded cable is "looped" between all classrooms equipped with voice call origination switches before it is terminated at the MCI350. In some installations, it may be easier or less costly to make the call origination connections directly to certain classrooms; so called "home-run" connections.

3.19 Microphone Input Connections

Follow the wiring guidelines given in Paragraph 3.18 before making microphone connections. Make connections to the MIC1 and MIC 2 screw terminals shown in the following chart using appropriate space lugs. Both microphone inputs must be low impedance.

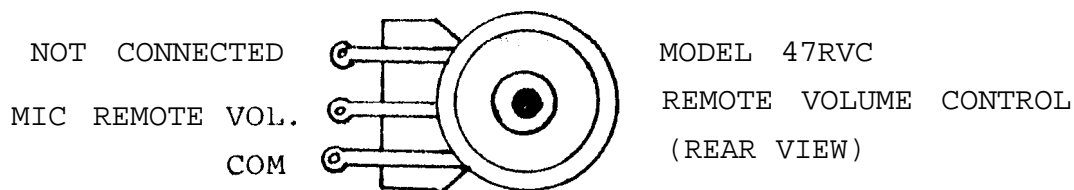


3.20 Auxiliary Input Connections

Follow the wiring guidelines given in Paragraph 3.18 before making auxiliary input connections. The AUX and TAPE/TUNER jacks accept an RCA-type phono-plug for unbalanced input sources. High impedance auxiliary sources are acceptable. Applicable equipment are: record - changer, AM-FM tuner, tape player, etc.

3.21 Remote Volume Control. Connections

Make the connections shown in the following detail to the MIC REMOTE VOLUME and COM screw terminals using #6 spade lugs.



3.22 Time Clock Closure Connections

Use only a dry-contact closure to energize the clock relay within the MC1350. If the programmed time-change clock provides a switched voltage for time-change activation, use a suitable slave relay to produce the required closure. Connect the dry-contact closure across the CLOCK screw terminals using #6 spade lugs.

3.23 Intercom Voice-Call Origination Connections

Step 1. Follow the wiring guidelines given in Paragraph 3.18 before making voice-call origination connections.

Step 2. Connect the voice-call origination cable to the C BUSS screw terminals shown in the following chart using #6 spade lugs.

<u>C BUSS Terminals</u>	<u>Function</u>
C1	Voice Call-In
c2	Voice Call-In
GND	Cable Shield

3.24 Room Speaker And Light Call-In Connections

Connect speaker and light call-in lines to the room selector panel following the procedure given in attached Instruction Manual KI-1200. If the SWL25 Room Selector Panel is used, verify that Power Supply PSL25 is securely mounted to the bottom of the MC1350. Also, verify that the power supply is connected to the PSL25 + and - screw terminals. (Positive wire is marked with a colored dot or tracer stripe.)

3.25 Cabinet Reassembly

Step 1. Place back panel on cabinet and secure with the screws originally removed.

Step 2. Protective strips are supplied with the unit for the leg rails. Install these protective strips, if needed, to prevent damage to the table top.

Step 3. Identify the purpose of each room selector switch position using, the typable strips provided. Install strip and protective plastic strip using the four rivets and spring clips provided.

3.26 AC Power And Grounding

Plug power cord into a 120 Vac, 60 Hz three-wire grounded outlet.

WARNING

Do not disconnect the third wire on the power plug as it grounds the amplifier chassis preventing a possible electrical shock hazard. If a two-wire to three-wire adapter is used, make sure the adapter ground wire is connected to a proven good earth ground.

4. LEVEL SETTING

4.1 Introduction

Setting levels require two men: one man at the MCI350 to make the required adjustment; and the other man at strategically located rooms to hear the sound, follow voice instructions and reply as required. Controls are accessible through the front chassis when the dress panel is removed.

4.2 INTERCOM LINE BALANCE Control R31

This control has been preset at the factory, but may need readjustment if hum or noise is found in the intercom system. One 1.2k \pm 5%, $\frac{1}{2}$ watt resistor is required for this adjustment.

Step 1. In a distant room, have assistant disconnect the speaker and connect the 1.2 k load resistor across the audio line.

Step 2. Place appropriate room selector switch in the PROGRAM C position.

Step 3. Adjust INTERCOM LINE BALANCE Control R31, for minimum hum or noise.

Step 4. Disconnect the 1.2 k load resistor and reconnect the speaker.

Step 5. Place appropriate room selector switch in the OFF position.

4.3 INTERCOM TALK LEVEL Control R30

- Step 1. In a distant room, have assistant place call origination switch in NORMAL position, if the room is so equipped.
- Step 2. Place appropriate room selector switch in the PROGRAM C position.
- Step 3. Depress and hold the PRESS-TO-TALK/release to listen switch. Talk into the monitor speaker grille using your normal voice level.
- Step 4. Adjust INTERCOM TALK LEVEL Control R30 to obtain the desired room speaker volume level.
- Step 5. Place appropriate room selector switch in the OFF position.

4.4 SUPERVISORY TONE LEVEL Control R126

- Step 1. In a distant room, have assistant place call origination switch in NORMAL position, if the room is so equipped.
- Step 2. Place appropriate room selector switch in the PROGRAM C position. About every thirteen seconds, the supervisory tone will briefly sound in the selected room.
- Step 3. Adjust SUPERVISORY TONE LEVEL Control R126 to obtain the desired room speaker volume level.
- Step 4. Place appropriate room selector switch in the OFF position.

5. OPERATION

5.1 Introduction

Equipment operation is straightforward using the color coordinated guidelines and condensed instructions provided on the equipment. Calls from rooms will either be by voice when the SW25 is used, or by the sounding of a tone and an illuminated lamp when the SWL25 is used. Once you have operated the equipment as a system, you will find that it is as simple as A.B.C. to do so.

5.2 How To Use The Output Level Indicators

These indicators provide visual monitoring of the relative audio output from the program amplifier. PROPER output level is indicated when the TWO GREEN lamps are on. This condition permits optimum operation of the program amplifier for undistorted sound amplification. The red lamp may flash occasionally on voice peaks: this is a normal condition and indication. EXCESSIVE output level is indicated when the TWO GREEN and the RED lamps are on. This condition can cause overdriving of the program amplifier producing much distortion. If excessive audio output is continuously indicated, have the equipment **checked** by a Rauland-Borg serviceman for possible malfunction or improperly made input level adjustments.

LOW output is indicated when only the FIRST GREEN lamp is on. This condition may produce low or distorted output for the program amplifier. If low output is continuously indicated, have the equipment checked for proper operation.

5.3 Remotely Controlled Microphone Volume

This mode of operation is an option that may be used in your sound system. Caution must be used with remotely controlled volume as improper operation could prevent transmission of microphone audio throughout the system. Setting the remote volume control to OFF blocks transmission of audio through both microphone channels (MIC1 and MIC2). Always set the remote volume control to MAX (not OFF) when leaving the control unattended.

6. MAINTENANCE

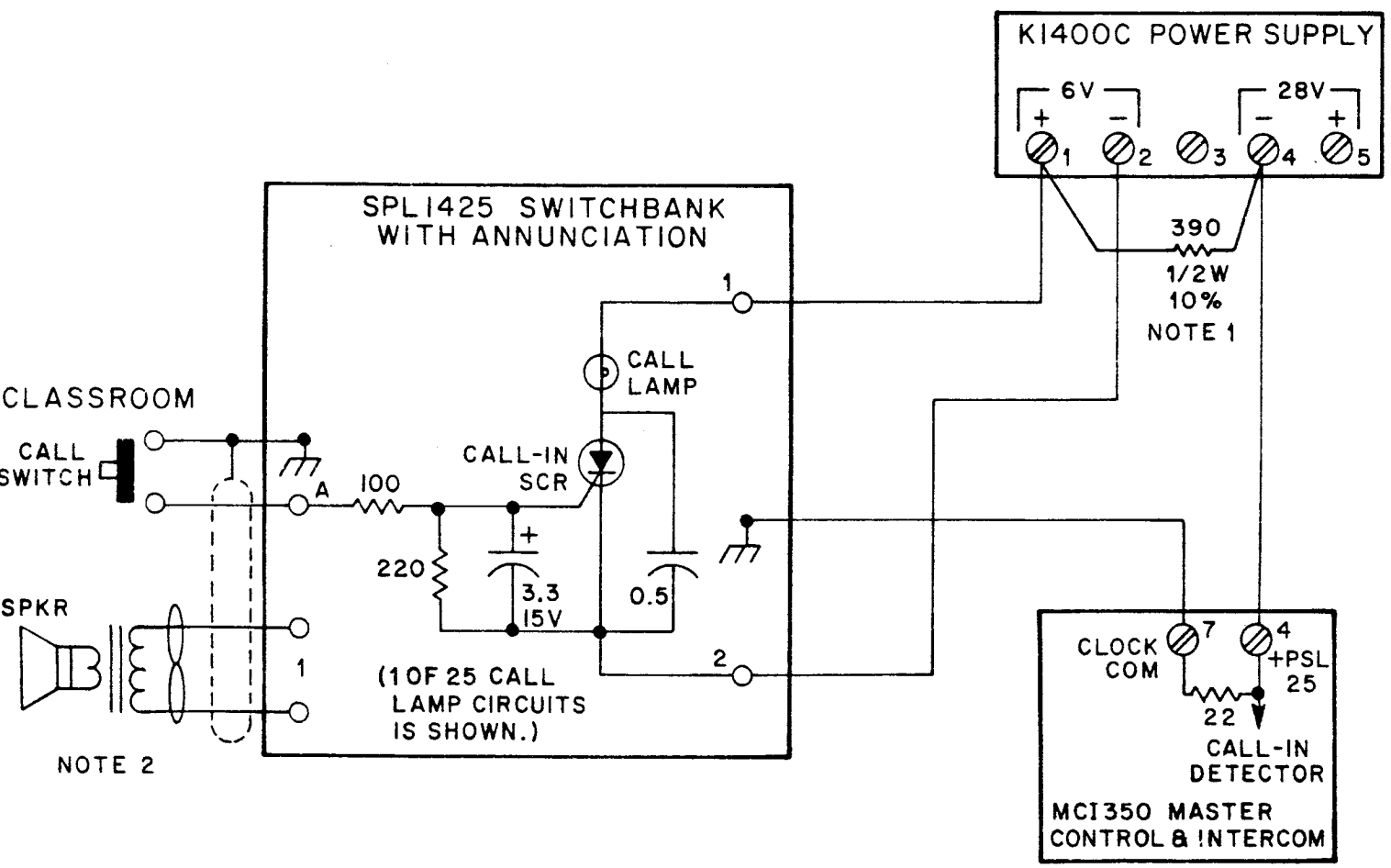
6.1 Simulating Classroom Selection

A classroom selection can be easily simulated when the MCI350 Master Control Intercom Panel is operated without a room selector panel, **as** may be required for servicing in the shop. Simply, jumper the "C" buss using a 1.2 k \pm 5%, ½ watt resistor across the C1 and C2 screw terminals.

6.2 Monitoring Without Supervisory Alerting Tone Transmissions

The periodic supervisory tone transmissions that normally occur during the intercom listening mode may be objectional. These transmissions can be defeated by adding a jumper across C26 or C27 in the supervisory tone timer circuitry. Refer to attached Schematic Diagram KC-1362 for circuit details.

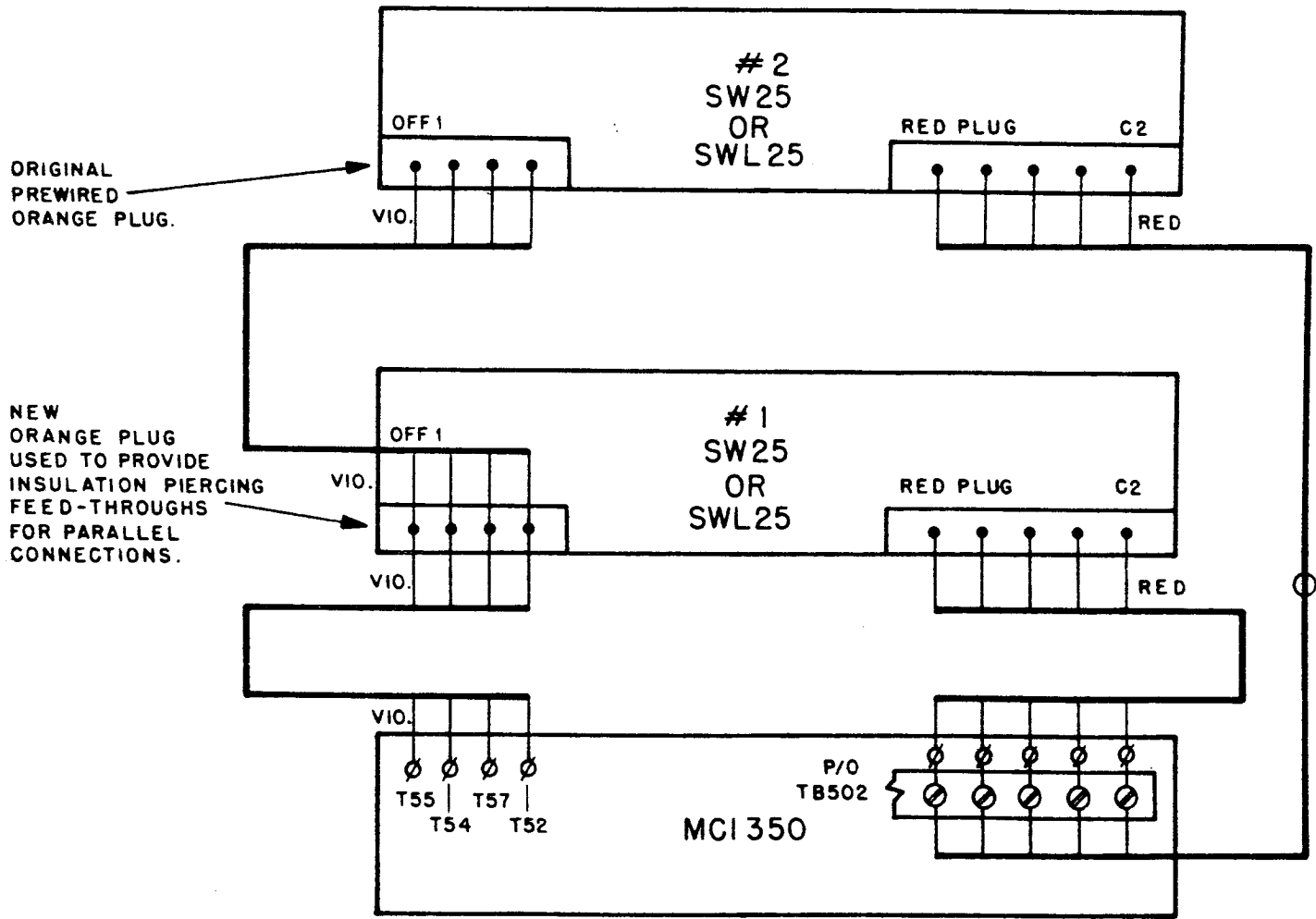
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- NOTES:
1. INSTALL 390Ω RESISTOR ACROSS K1400 TERMINALS 1 & 4 TO PROVIDE SUFFICIENT CURRENT FOR CALL-IN BEEP.
 2. TWO-WIRE ADAPTER FOR CALL-IN ANNUNCIATION MAY BE USED IN THIS SYSTEM, VC-5827.
 3. VC-4011 CHIME ASSEMBLY IS NOT USED WITH MCI 350.

MCI 350 CONTROL PANEL AND
 SPLI425 SWITCHBANK W/ANNUNCIATION
 SYSTEM WIRING DIAGRAM
 KM-0539-0

DRG. NO.	KM-0540	0
DATE	3-21-80	
ISS.	CHANGE	



MCI 350 WITH
TWO ROOM SELECTOR PANELS
SYSTEM WIRING DIAGRAM

RAULAND-BORG CORP.
CHICAGO, ILL.
MADE IN U.S.A.

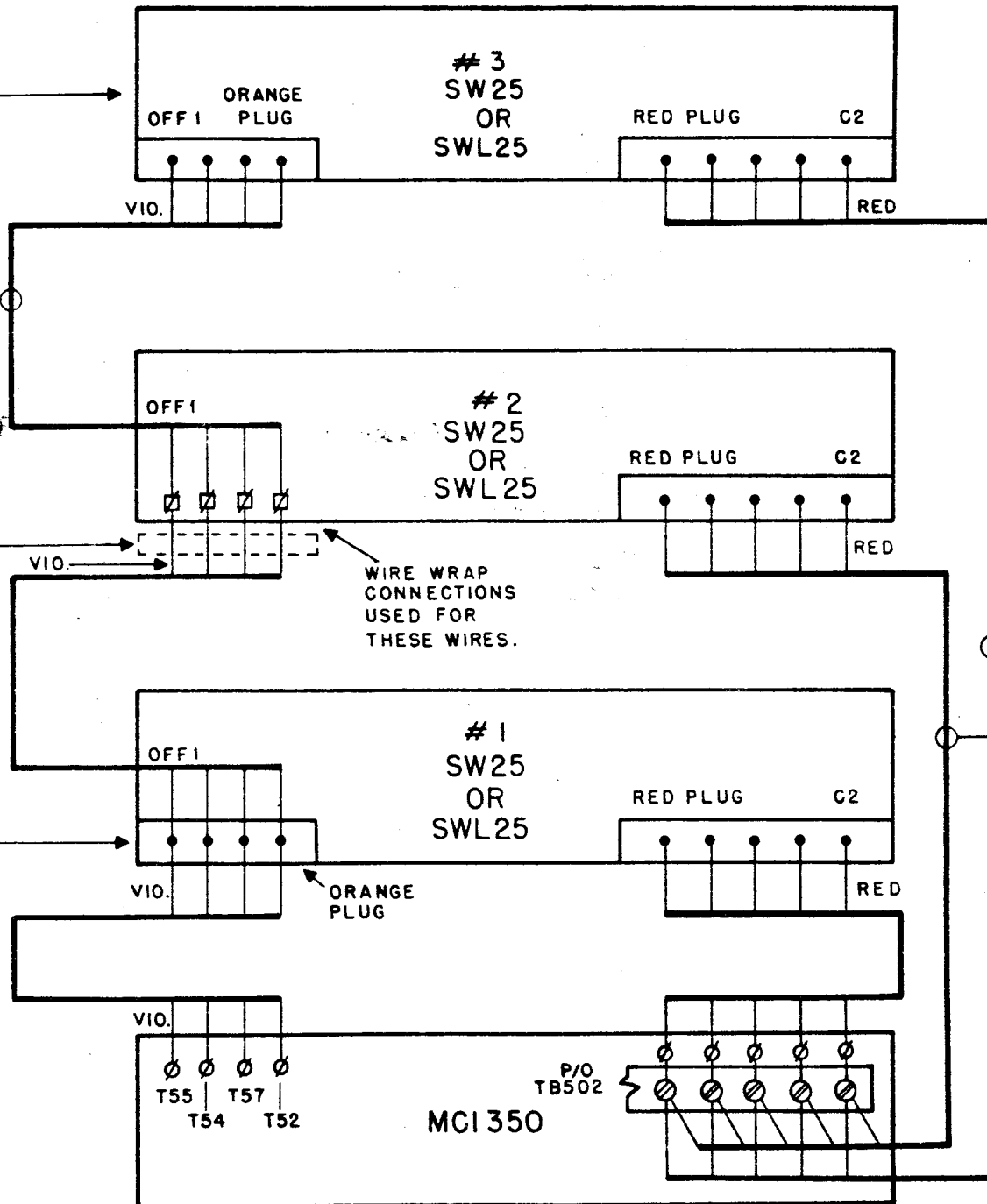
DRG. NO.		KM-0541		0	
DATE					
3-20-80					
ISS		CHANGE			

THIS ROOM SELECTOR PANEL MUST BE IN A SECOND PCC300A CABINET.

THIS CABLE MUST BE MADE BY FIELD PERSONNEL.

ORIGINAL ORANGE PLUG MUST BE REMOVED.

NEW ORANGE PLUG USED TO PROVIDE INSULATION PIERCING FEED-THROUGHS FOR PARALLEL CONNECTIONS.



MCI 350 WITH
THREE ROOM SELECTOR PANELS
SYSTEM WIRING DIAGRAM

RAULAND-BORG CORP.
CHICAGO, ILL.

MADE IN U.S.A.

KM-0541- 0

MCI350 MASTER CONTROL INTERCOM

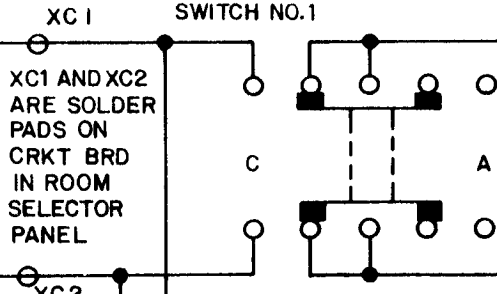
SW25 ROOM SELECTOR PANEL

GOING AUDIO FROM MONITOR AMPLIFIER

NOTE:
ISOLATE 5V OUTPUT OF XF2 BY REMOVING JUMPER CONNECTED BETWEEN T31 AND T30

TO LINE SENSING CIRCUITRY

INCOMING AUDIO TO INTERCOM AMPLIFIER VIA RY 1



CUT "C" BUSSES TO ISOLATE SWITCHES USED FOR MASTER-TO-MASTER OPERATION

SPECIAL APPLICATION:
CUT "OFF" BUSSES TO ISOLATE EACH SWITCH WHERE THE SAME REMOTE ROOM LOCATION CAN BE CALLED BY TWO OR MORE MASTERS

"C" BUSS TO ALL SWITCHES

CONN. NO.1

CONN. NO. 25

TO SWITCH NO.25

CONN. NO.1

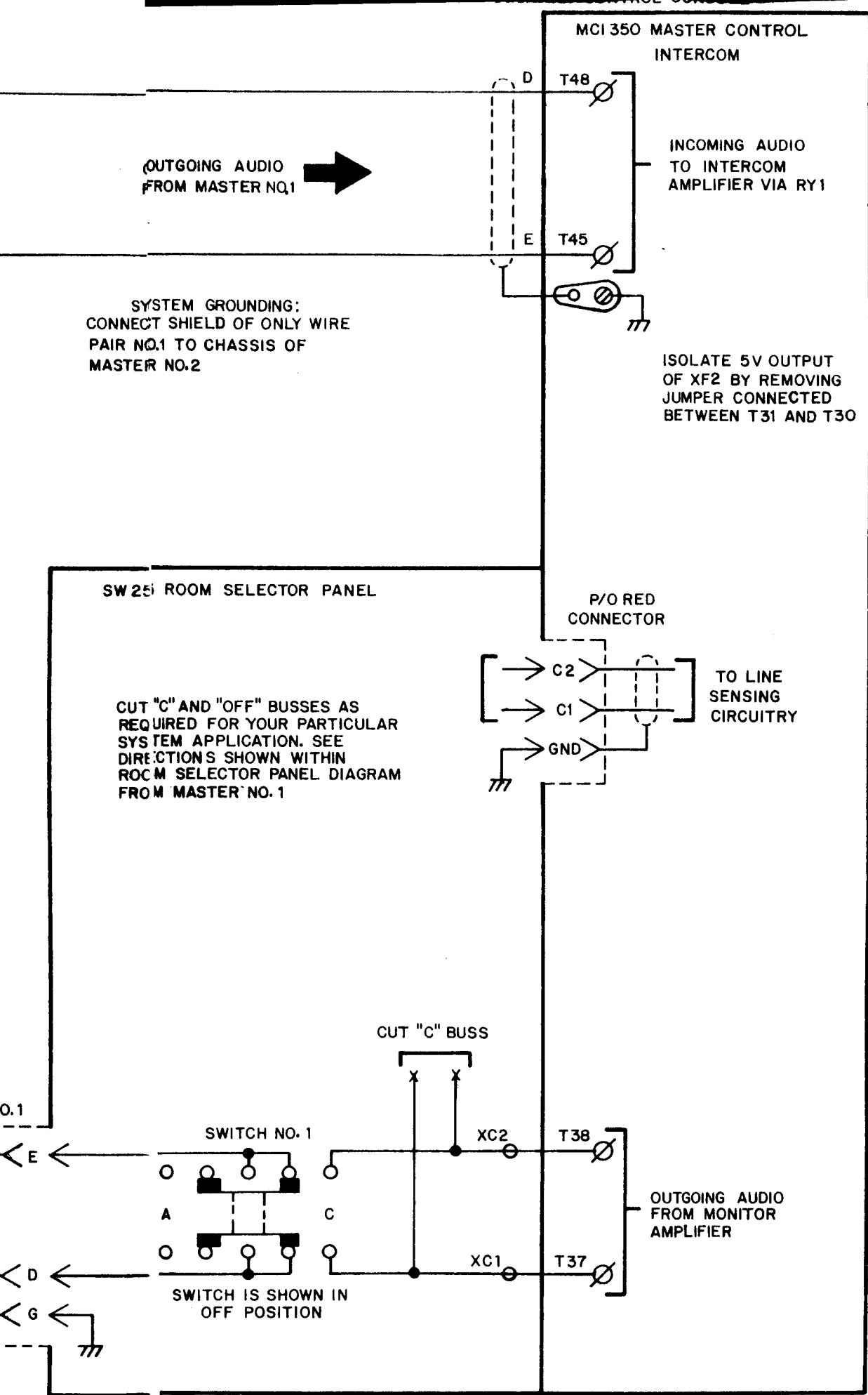
DO NOT CONNECT THIS END OF SHIELD TO CHASSIS

INCOMING AUDIO TO MASTER NO.1

CONN. PAIR MASTER

SW 2

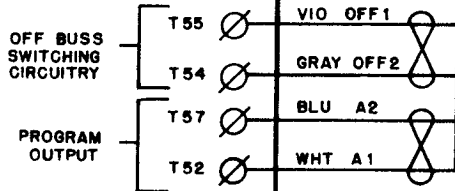
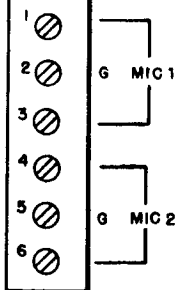
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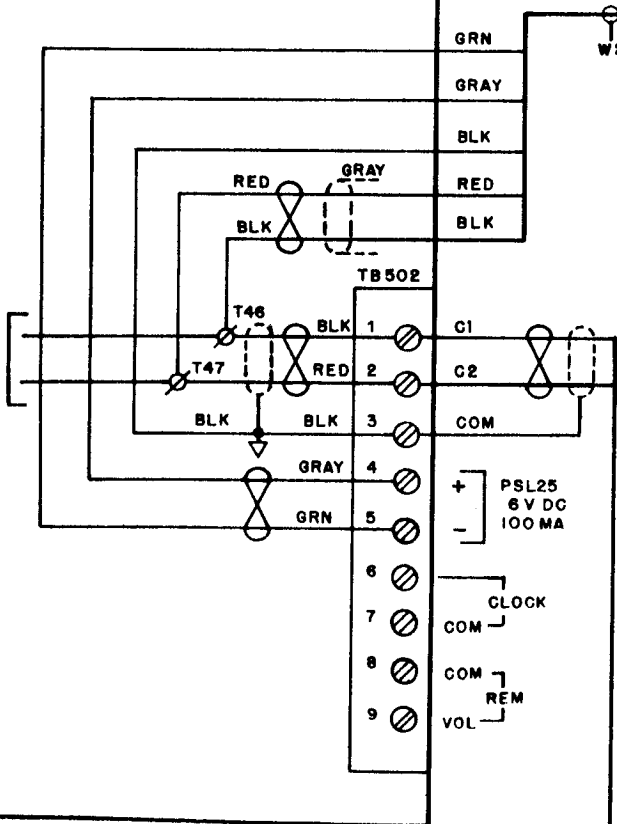
**MCI350
MASTER CONTROL & INTERCOM**

○ TAPE / TUNER
○ AUX

TB501

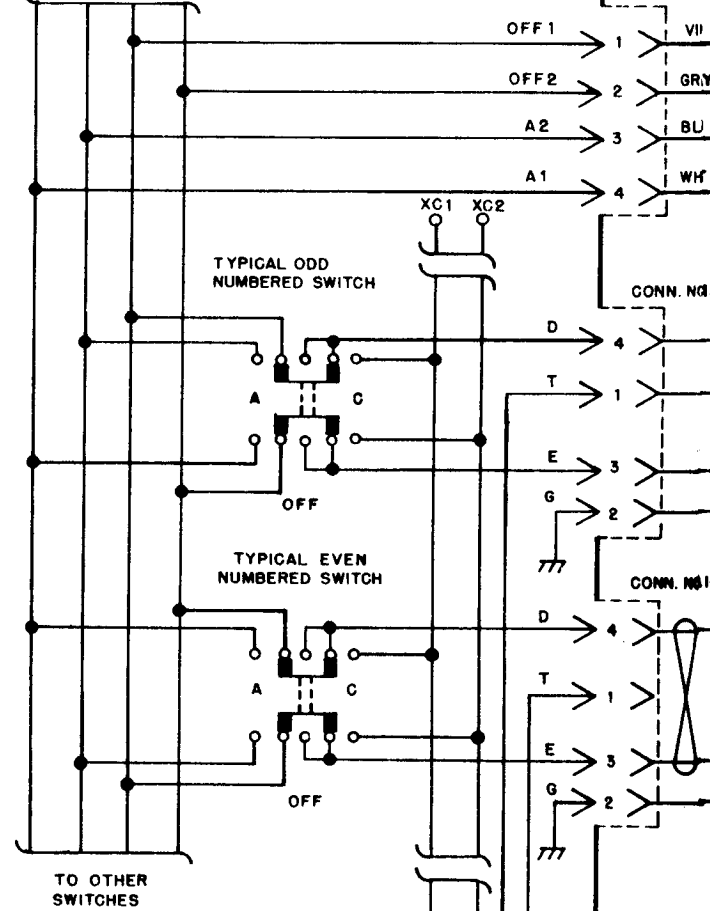


TO LINE
SENSING
CIRCUITRY



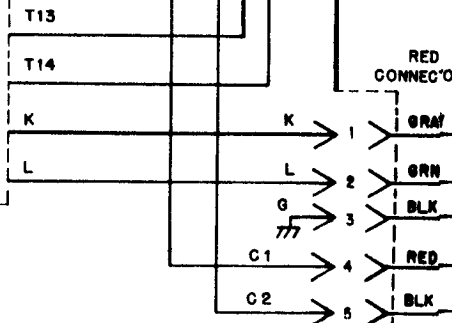
**TYPICAL ROOM SELECTOR PANEL
(SW25 OR SWL25)**

TO OTHER
SWITCHES





SWL 25 ONLY

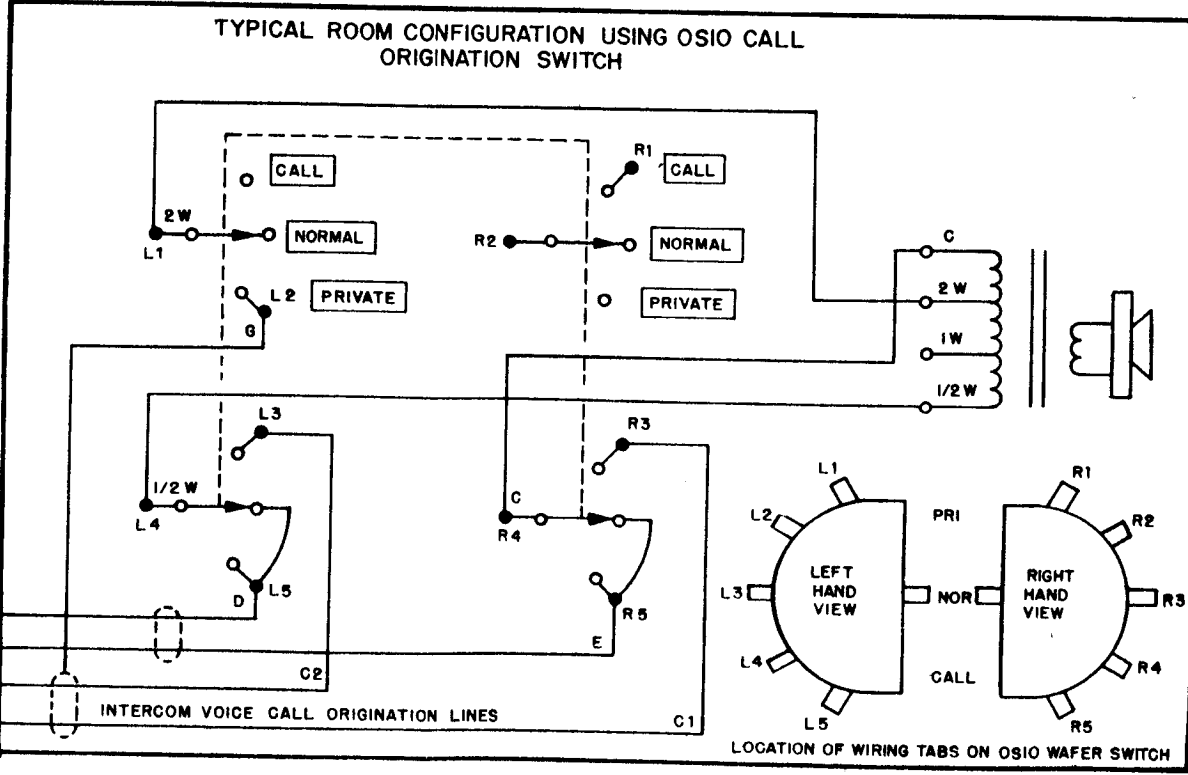
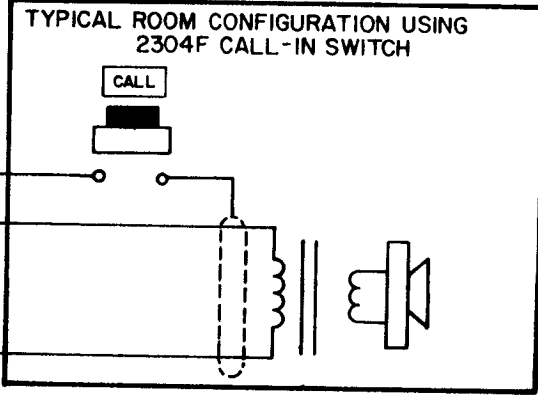
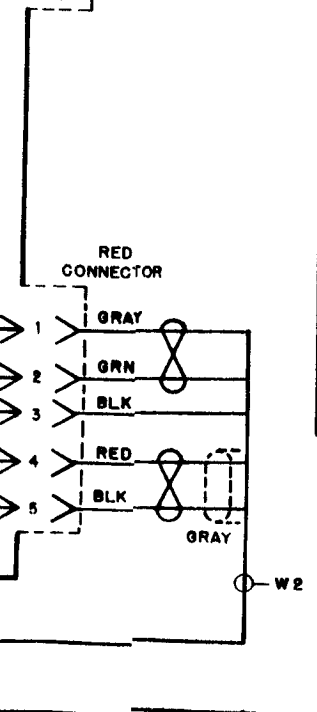
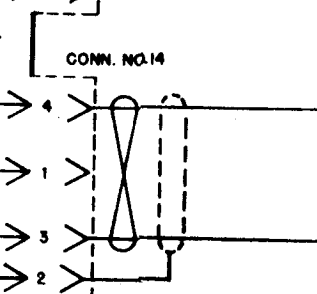
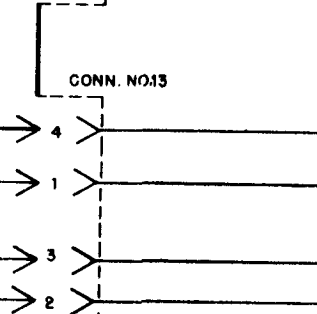
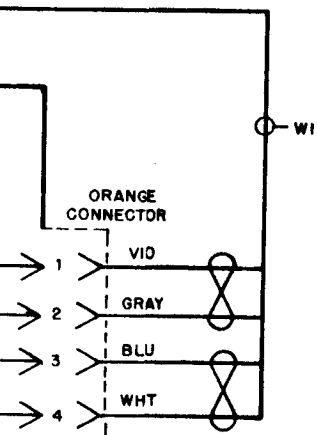
SCR LIGHT
ENABLING
CIRCUITRY



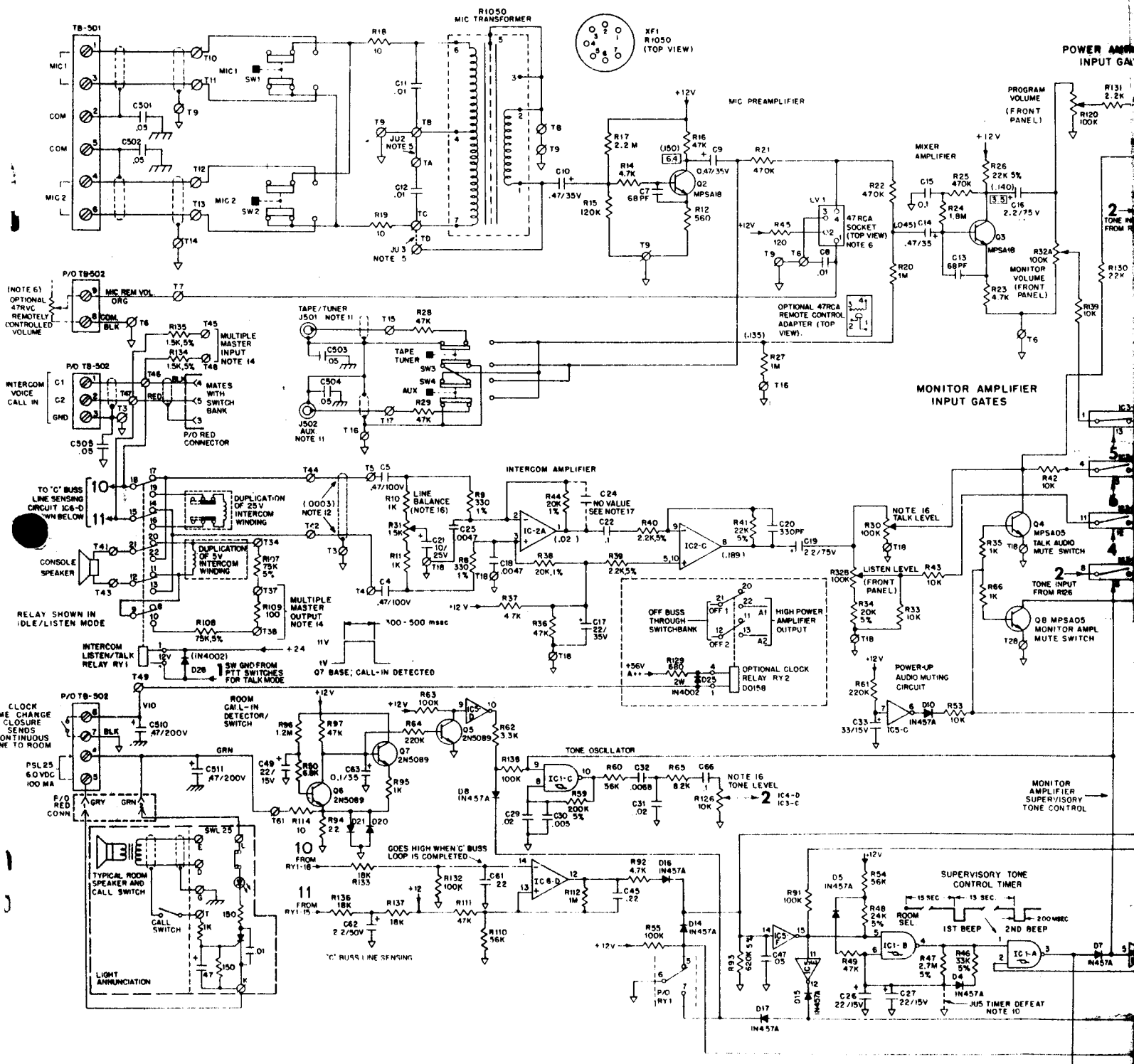
DRG. NO. KM-0536	
DATE 8-21-79	
ISSUE	CHANGE

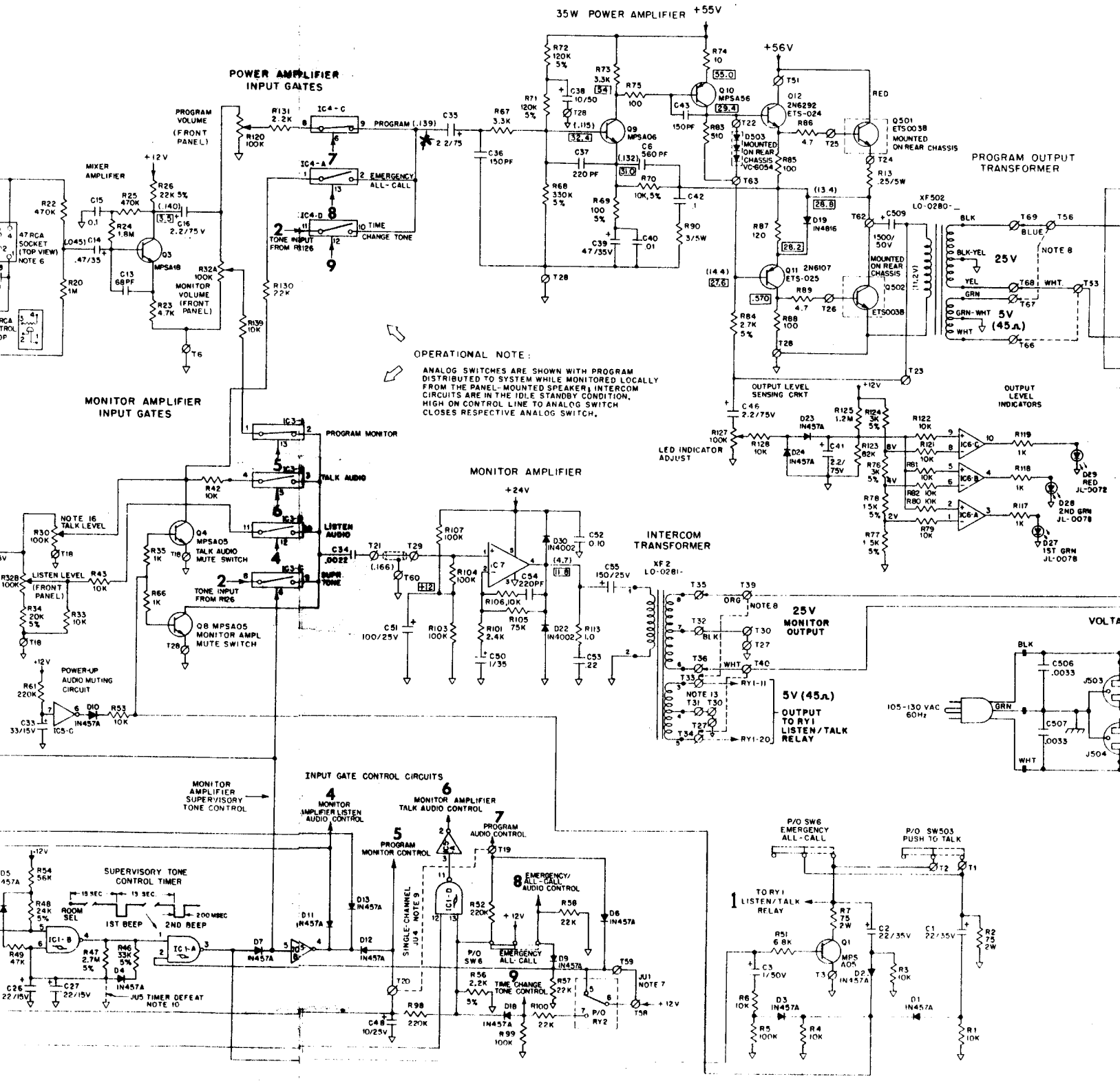
LEGEND

-  - TWISTED PAIR
-  - W - CABLE ASSEMBLY



DIR 350 AND DIR 350L
 DESK-TOP CONTROL CONSOLES
 TYPICAL SYSTEM WIRING
 RAULAND - BORG CORP
 CHICAGO ILL.
 KM-0536-





OPERATIONAL NOTE:
 ANALOG SWITCHES ARE SHOWN WITH PROGRAM DISTRIBUTED TO SYSTEM WHILE MONITORED LOCALLY FROM THE PANEL-MOUNTED SPEAKER; INTERCOM CIRCUITS ARE IN THE IDLE STANDBY CONDITION. HIGH ON CONTROL LINE TO ANALOG SWITCH CLOSERS RESPECTIVE ANALOG SWITCH.

35W POWER AMPLIFIER +55V

POWER AMPLIFIER INPUT GATES

MONITOR AMPLIFIER INPUT GATES

MONITOR AMPLIFIER

INTERCOM TRANSFORMER

PROGRAM OUTPUT TRANSFORMER

OUTPUT LEVEL INDICATORS

VOLTA

INPUT GATE CONTROL CIRCUITS

SUPERVISORY TONE CONTROL TIMER

P/O SW6 EMERGENCY ALL-CALL

P/O SW503 PUSH TO TALK

TORY I LISTEN/TALK RELAY

MPS AOR

IC6-A

IC6-B

IC7

IC4-A

IC4-B

IC4-D

IC1-B

D5

D6

D7

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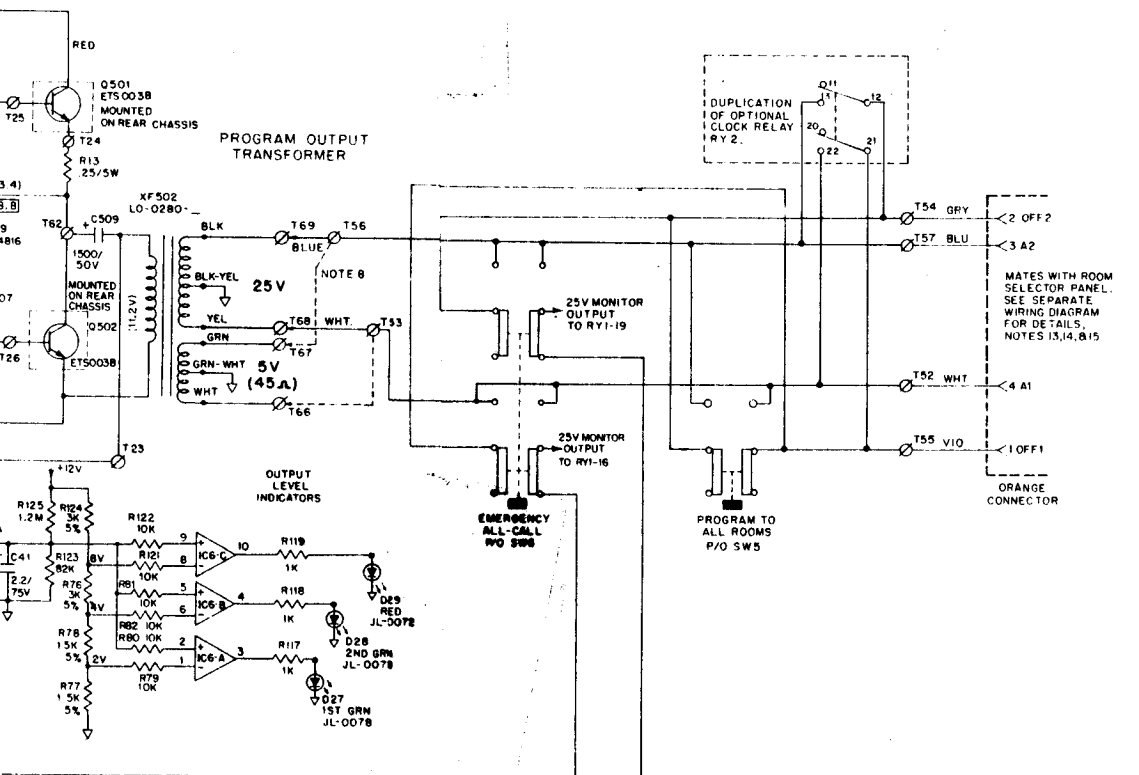
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D268

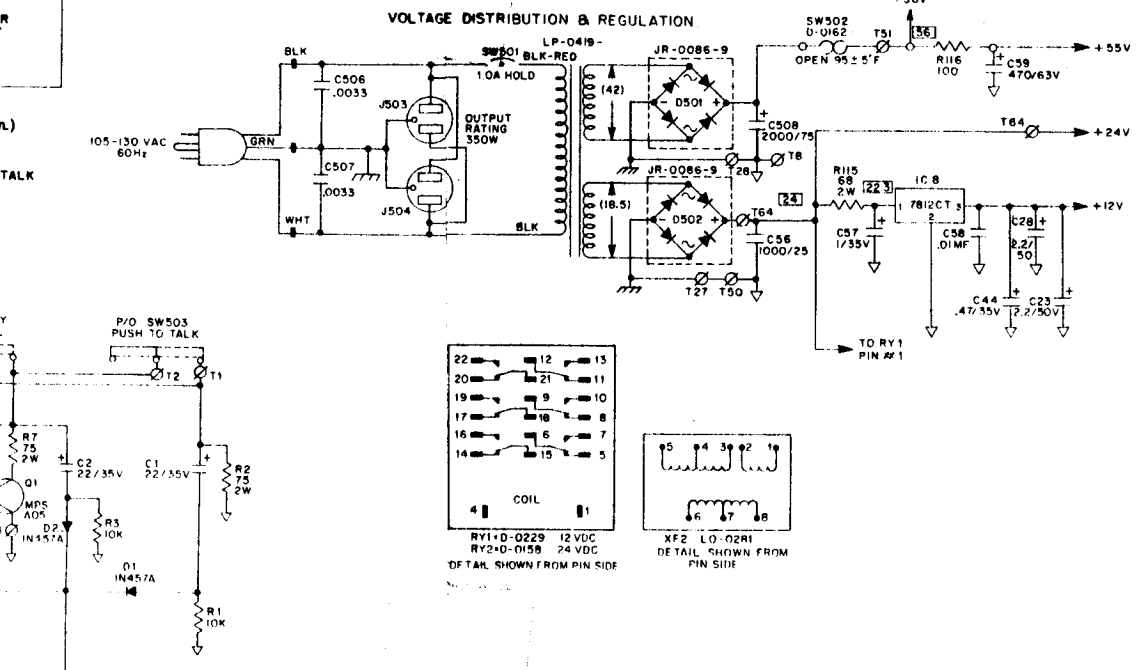
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- NOTES
- COMPONENTS WITH 500 SERIES REFERENCE NUMBERS ARE CHASSIS MOUNTED. ALL OTHER COMPONENTS ARE MOUNTED ON THE CIRCUIT BOARD. REFERENCE NUMBERS ARE SCREENED ON CIRCUIT BOARD NEAR COMPONENT.
 - UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, TOLERANCE $\pm 10\%$, AND ARE 1/2 WATT; ALL CAPACITORS ARE IN μF .
 - CHASSIS GROUND; ∇ CIRCUIT COMMON; \square WIRE WRAP TERMINAL; \square DC VOLTAGE; \square AC VOLTAGE; \square SIGNAL ORIGIN OR INPUT.
 - DC VOLTAGE MEASURED AT ZERO INPUT SIGNAL USING 20K Ω/V METER. AC VOLTAGES MEASURED USING 1M Ω INPUT IMPEDANCE METER.
 - MODEL MC1350B MODEL IS PERMANENTLY CONNECTED FOR LOW Σ MICROPHONE OPERATION. R1050 MICROPHONE TRANSFORMER IS PROVIDED. J02 IS IN AND J03 IS OUT.
 - REMOTELY CONTROLLED VOLUME REQUIRES MODEL 47RC REMOTE VOLUME CONTROL ADAPTER AND MODEL 47RVC REMOTE VOLUME CONTROL. CONNECT 47RVC ACROSS T8-502 TERMINALS AS SHOWN.
 - FOR OPERATION WITH SINGLE-ZONE TIME CHANGE, REMOVE J01 FROM T58 AND T59 (NEAR RELAY SOCKET RY2), INSTALL RELAY D-0158.
 - PROGRAM OUTPUT AND INTERCOM TRANSFORMERS ARE STRAPPED FOR 25V SYSTEM AS SHIPPED FROM FACTORY. FOR 5V (45A) SYSTEM, CHANGE STRAPPING ON BOTH THE PROGRAM AND INTERCOM TRANSFORMERS.
 - FOR SINGLE-CHANNEL OPERATION, ADD J04 ACROSS T19 & T20 THESE TERMINALS ARE LOCATED NEAR MONITOR PROGRAM CONTROL.
 - TO DEFEAT TIMER, ADD J05 ACROSS C26 OR C27. THIS PREVENTS PERIODIC TRANSMISSION OF SUPERVISORY TONE TO ROOM.
 - FOR AUX MEASUREMENTS INJECT 1KHZ AND SET MONITOR VOLUME TO MINIMUM AND PROGRAM VOLUME TO MAXIMUM.
 - FOR INTERCOM MEASUREMENTS IN TALK MODE, INJECT 3KHZ ACROSS T41 AND T43 WITH SPEAKER DISCONNECTED. SET TALK LEVEL CONTROL R30 TO MAXIMUM.
 - FOR MASTER-TO-MASTER OPERATION REMOVE JUMPER BETWEEN T31 AND T30 ON INTERCOM TRANSFORMER XF2. BOTH MASTERS MUST BE CONNECTED TO PROVEN GOOD EARTH GROUND.
 - SEE WIRING DIAGRAM KM-0535 FOR MASTER-TO-MASTER INTERCONNECTIONS AND SYSTEM MODIFICATIONS.
 - SEE WIRING DIAGRAM KM-0536 FOR SYSTEM INTERCONNECTIONS TO SWITCHBANK AND TYPICAL CLASSROOM SPEAKER.
 - LINE BALANCE R31, TALK LEVEL R30 AND SUPERVISORY TONE LEVEL R16 ARE FACTORY ADJUSTED. THESE CONTROLS ARE ACCESSIBLE ONLY WHEN FRONT PANEL IS REMOVED.
 - C24 MAY BE PROVIDED IN SOME UNITS. VALUE IS SELECTED BY FACTORY.



I.C. TABLE

I.C. NO.	RAULAND PART NO.	TYPE	DESCRIPTION	SUPPLY VDD	PIN	GND PINS
1	EC-0064	4093	QUAD TWO INPUT NAND	+12	14	7
2	EC-0066	4741	QUAD LOW NOISE OP AMP	+12	4	11,12
3,4	EC-0052	4016	QUAD BILATERAL ANALOG SWITCH	+12	14	7
5	EC-0042	4049	HEX INVERTER BUFFER	+12	1	8
6	EC-0024	4136	QUAD OP AMP	+12	11	7
7	EC-0084	TDA 2006	5W AUDIO POWER AMP	+24	5	3
8	EC-0062	7812	12V POS REGULATOR	+24	1	2

MASTER CONTROL INTERCOM
MODEL MC1350B
 RAULAND-BORG CORP.
 CHICAGO ILL.
 MADE IN U.S.A.
 KC-1362-A