Rauland

DIRECTOR SERIES
MASTER CONTROL PANELS
MODELS MCAlOO, MCAlOOA, MCBlOO & MCBlOOA
FOR SCHOOL SOUND/COMMUNICATIONS SYSTEMS

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Diagrams

Master Control Panel Schematic Diagram.....KC-1305
"DIRECTOR" Series Wiring Diagram.....KM-0515
Limited Warranty

PRINTED IN U.S.A. l0/78

MODEL VARIATIONS

A - suffixed Models MCAlOOA and MCBlOOA replace earlier unsuffixed Models. Model differences are mainly mechanical in nature, except for muting control functions when the MDClOO Administrative Control Center is used in the system. Diodes DlO - D12 replaced resistors R138 - R140 as shown on Schematic Diagram KC-1305-C or later issue. System interface is shown on Wiring Diagram KM-0515-D or later issue. Except for these minor differences, all information provided in this instruction manual for the earliest MCAlOO and MCBlOO Models is fully applicable to the later MCAlOOA and MCBlOOA Models.

SPECIFICATIONS

Rated Output:	1.5 V into 10 k-ohm load
Frequency Response:	-6 dB at 20 Hz, ± 2 dB at 20 kHz
Distortion:	Less than l%, 20 Hz to 20 kHz
Noise Levels:	MICROPHONE -55 dB; AUXILIARY -65 dB
Tone Control Range:	± 10 dB at 100 Hz and 10 kHz
Compression Amplifier:	20 dB range (less than 2% distortion)
Program Inputs:	MICROPHONE, three; balanced 150 ohm; 0.3 mV sensitivity AUXILIARY, four; unbalanced 250 k-ohm; 0.25 V sensitivity BRIDGING (EXPD), one; unbalanced 10 k-ohm; 0.25 V sensitivity
Power Requirements:	28 V dc, and 6 V ac (for switch lamps)
Lamp Life Expectancy:	50,000 hours
Unit Size:	19" panel x 3½" high x 7⅝" deep

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

1. DESCRIPTION

1.1 General

'The Model MCAlOO and MCBlOO Master Control Panels provide the program channels for the Rauland "DIRECTOR" Series School Sound/ Communications Systems. Each master control panel provides one program channel which operates independently of the other program channel. This permits separate selection, audio processing, monitoring, and distribution of the two program channels. The Model MCAlOO serves as the main panel and is designated the GREEN "A" CHANNEL. The Model MCBlOO serves as the secondary panel and is designated the BLUE "B" CHANNEL. The two Models differ only in that the Model MCAlOO includes EMERGENCY and ALL-CALL switches, with corresponding program priority switching and audio processing circuits. The panel color designations provide the means for simplified equipment operation. All associated equipment panels are color coordinated to these master control panels. The use of color coordinated equipment panels, illuminated switches, and step-by-step operating instructions screened on the equipment panels virtually eliminates operator error.

1.2 Features

These master control panels provide the following features:

--State-of-the-art circuitry using integrated circuits for logic switching and some audio amplification stages. This minimizes power consumption, increases reliability, and reduces maintenance costs.

--Selection of seven program input sources; three MICROPHONES and four OTHER PROGRAM SOURCES (auxiliary inputs). The microphone inputs are balanced and are for low-impedance microphones. One microphone input is for the console operator and the other two are for remotely located microphones. The auxiliary inputs are high-impedance and are for inputs from an AM/FM tuner, record changer, tape deck, etc.

--Shared program source operation may be used allowing "loop-through" distribution of the same program through both the Green "A" CHANNEL and BLUE "B" CHANNEL. Any microphone input to the Model MCAlOO may be "looped-through" to the Model MCBlOO. Any auxiliary program source input to the Model MCBlOO may be "looped-through" to the Model MCAlOO.

--An EXPD (expanded) or bridging program input allows four additional microphones to be used. The optional Rauland PRO 204 Microphone Input Expander is required when this mode of operation is used. (See Paragraph 2.2.3 for details.)

--Remote control of the program volume level and/or remote selection Of program precedence. Precedence selection mutes respective input (either the microphone or the auxiliary source) giving program precedence to the other input. Remote control of either function requires the Rauland Model 47RCA Remote Control Adapter. (See Paragraph 2.2.1 for details!.

-- Compression amplifier with 20 dB dynamic range assures optimum operation under widely varying program input levels. This eliminates the need of having separate volume controls for each of the seven inputs and their burdensome readjustment with each change of input level.

-- TREBLE and BASS tone controls with full adjustment range allow the response characteristic of the audio amplification circuits to be changed, matching the sound characteristics of the classrooms.

-- Monitor speaker with level control allows the selected program input to be heard prior to and during its distribution to the classrooms.

-- Program output level and impedance compatible with any Rauland SAX, TAX or DX Series Amplifiers providing between 60 and 250 watts of sound power for distributions to the classrooms. Any Rauland room selector switch panel may be used for program distribution to 25 rooms. Additional switch panels may be added for distribution up to 200 rooms per master control panel.

-- ALL-CALL switch provides program distribution to all classrooms in the sound system, regardless of prior room selections made at the room selector switch panel(s). TO ROOMS SELECTED switch provides program distribution only to those classrooms individually selected at the room selector switch panel(s) for the respective program channel.

-- EMERGENCY switch interrupts in-progress program distribution allowing immediate distribution of the emergency announcement to all classrooms in the sound system.

-- Switches illuminate when depressed (engaged) indicating the selected input for the program source and the type of room distribution. This takes the guesswork out of determining what was selected as frequently happens when conventional switches are used.

-- System priority (take-over control) is readily established using jumper options. Different levels of priority may be assigned to: (1) an emergency announcement from the equipment operator; (2) the tone signaling output from the optional multi-tone generator; and (3) an administrative all-call, in systems using the optional administrative communication stations. Priority is always given to the highest level when two or three priorities occur simultaneously.

-- Three OUTPUT LEVEL indicators provide continuous visual monitoring of the relative audio output level routed to the associated high power amplifier. This allows the equipment operator to easily determine if the output is proper, eliminating the need for reading meters. Equipment operators seldom understand how to read meter scales or how to interpret the reading observed.

-- Direct accessibility to input source level controls, tone adjustment controls, phono-jacks and screw terminals; these items are mounted on the rear of the chassis.

2. ACCESSORIES

2.1 Required

2.1.1 Rauland Model PSX29A DC Power Supply/AC Control -- Provides the 28 V dc power source for the "DIRECTOR" Series School Sound/Communication System. Includes six relay-controlled 120 V ac power outlets for plug-in of associated equipment requiring ac power. This dc power supply/ac control is not required if the Rauland Model SAX60 or SAX100 All-Silicon Solid-State Power Amplifier is provided with the system, as these amplifiers include a 28 V dc power supply.

2.1.2 Rauland Model LP-0413 Transformer -- Provides the 6.3 V ac power source for the "DIRECTOR" Series School Sound/Communications System. All panel-mounted pushbutton switches use 6.3 V ac indicator lamps for long life expectancy.

2.1.3 Rauland Model MCRlOO Master Control Relax -- Provides program source and intercom buss-gathering for routing ALL-CALL or EMERGENCY announcements or signaling tones to all rooms simultaneously.

2.2 Optional

2.2.1 Rauland Model 47RCA Remote Control Adapter -- Permits remote control of the program volume, and/or remote precedence selection of the program input (either the microphone or auxiliary source). "Humfree" operation is provided by optically isolating the remote input from the adaptor output to the master control panel. May be used with either or both the MCAlOO and MCBlOO Master Control Panels.

2.2.2 Rauland Model 47RVC Remote Volume Control -- Provides remote (up to 2,000 feet) volume control of the program source. Accurate adjustment to the desired volume level is provided by the calibrated faceplate and the special taper of the potentiometer.

2.2.3 Rauland Model PRO 204 Microphone Input Expander -- Allows four additional low-impedance microphones to be used. Separate input level controls and remote control terminations are provided for each microphone, This permits remote control of the input level, and/or remote precedence selection of the desired microphone. Add one Model 47RCA Remote Control Adapter and one Model 47RVC Remote Volume Control to the microphone input expander as required, for each remotely controlled input used. The Model PRO 204 may be used with either or both the MCAlOO and MCBlOO Master Control Panels.

2.2.4 Rauland Model MTGlOO Multi-Tone Generator -- Provides signaling tones that may be used for emergency alarm, weather alert, classroom change notification, or other similar applications. Five distinct signals may be generated; an interrupted tone (beeping), a continuous tone, a siren (high-low), European police car (warble), and a repeating chime. Solid-state circuitry is used providing instantaneous operation. This option requires the Rauland Model RX1027 Warning Tone Control Panel for selection of the tone signals.

2.2.5 Locking Master Power Switch -- Prevents unauthorized equipment operation as power can only be applied through the key-operated power off-on switch.

3. INSTALLATION

3.1 Introduction

These master control panels are available either as factory installed items, completely prewired and tested as an integral part of a "DIRECTOR" Series School Sound/Communications System, or separately for field installation into an existing sound system. In either case, peripheral equipment must interconnect as described in the following papagraphs. Sufficient information is provided to do a typical installation. Not every application or interface problem is described. The intraunit connections between these master control panels and the items that comprise a "DIRECTOR" Series System are shown on the wiring diagram provided at the rear of this instructional manual. The wiring diagram includes cabling instructions and explanatory notes about interconnections, the addition of remote control options, and wiring changes needed to accommodate operation with different dc power sources and power audio amplifiers.

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 Mounting Master Control Panel (Field Installations Only)

These master control panels may be mounted in any standard 19-inch rack. The minimum space requirements are: 3½" high by 7¼" deep. Remember that sufficient open space must be kept behind the chassis for making equipment connections and to allow accessibility for equipment maintenance. Mount panel as follows:

Step 1. Secure chassis to the rack with screws through the four mounting holes provided. It is recommended that l0-32 or larger hexagon head screws be used. Rauland supplied racks require l0-32 x 3/8" self-locking screws, and turrets require 10 x 3/8" sheet metal screws and 10-2 Tinnerman-type nuts. The mounting hardware is supplied with the equipment.

NOTE

If remotely controlled volume or program precedence is desired, install the Model 47RCA Remote Control Adapter before mounting the chassis. See Paragraph 3.8 for details.

Step 2. Install the front panel on the chassis using the two 6-32 x 3/8" binder head screws supplied. Install knob onto the monitor speaker level control. Make sure that the knob indexes properly with the OFF and MAX panel markings.

3.4 Master Control Panel Intraunit Wiring Check List

Use the following check list and the wiring diagram provided at the rear of this instruction manual to verify that factory installed wiring is intact, and as a guide for making connections in the field. Refer to the respective equipment instruction manual for making connections to the MCClOO Communications Control Panel and to the MCCPlOO Administrative Communications Control Panel.

Equipment and Termination		Function	Present (✓)
MCAlOO and MCBlOO		Power Connections	
24	24	+28 V dc	
23	23	Common	
22	22	6.3 V ac	
21	21	6.3 V ac	
MTGlOO to MCAlOO		Multi-Tone Generator	
1	3	Tone Out	
2	25	Common	
3	4	MTG Control	
9	1	+18 V dc	
10	3	Chime Out	
MCAlOO to MCBlOO		Muting Control	
16	26	Emergency Mute MCBlOO	
28	28	Mute MCAlOO or MCBlOO	
MCAlOO to MCRlOOA		Relay Enable	
14	12	Switched Ground	

3.5 Microphone Connections

By making different connections, two microphone operational modes can be obtained: (1) individual operation where a separate microphone is used for each input; or (2) shared operation where one microphone is "looped-through" two inputs, allowing distribution of the same program through both master control panels. Connections for individual microphone operation are made to the terminals on the rear chassis, as shown on the wiring diagram provided at the rear of this instruction manual. Connections for shared microphone operation are made to these same terminations, but only on the Model MCAlOO. Use a shielded,

twisted-pair cable to make parallel connections for the "loop". from the Model MCAlOO to the Model MCBlOO. Do not connect the shield of this "looping" cable to the Model MCBlOO, as hum may be introduced into the sound system. Place the appropriate self-adhering labels (provided) on the respective MICROPHONES switches to identify the input source.

3.6 **EXPD** (Expanded) Microphone Input Connections

This is a phono-jack bridging input for the Rauland Model PRO 204 Microphone Input Expander. Four additional microphones may be added to the system through this microphone input expander. Refer to the instruction manual provided with the equipment for interconnection details and for operating instructions.

3.7 Auxiliary Source Connections

By making different connections, both individual operation and. shared ("loop-through") operation can be obtained. Connections for individual operation are made to the phono-jacks on the rear chassis, as shown on the wiring diagram provided at the rear of this instruction manual. Connections for shared auxiliary source operation are made to these same phono-jacks, but only on the Model MCBlOO. Use a shielded cable terminated in phono-plugs to make parallel connections for the " loop" from the Model MCBlOO to the Model MCAlOO. The occurrence of hum due to ground-loops can be minimized by cutting the cable shield at one end, preferably at the signal source (tuner output, etc.) Place the appropriate self-adhering labels (provided) on the respective OTHER PROGRAM SOURCES switches to identify the input source.

3.8 Remotely Controlled Volume and Program Precedence Connections

The following procedure is required only if remotely controlled options are to be field installed. Either or both master control panels may be equipped for remote operation. The Model 47RCA Remote Control Adapter is required to remotely control the volume or select program precedence. This adapter is a plug-in item and is easily installed in the appropriate four-pin socket provided on the circuit board. The socket marked LVl is used for remotely controlled microphone volume and/or for remotely selected auxiliary source precedence (mutes microphone input). The socket marked LV2 is used for remotely controlled auxiliary source volume and/or for remotely selected microphone precedence (mutes auxiliary source input).

The Model 47RVC Remote Volume Control is also required for remotely controlled volume level. Connect the control as shown below:

Function	Control (Potentiometer) Connections		
	Center-Tap	Minimum	Resistance
Remote Microphone Volume	- - 3 0	—	31
Remote Auxiliary Volume	30		29

A SPST switch is also required for remotely controlled program precedence selection. Switch closure mutes respective input giving program precedence to the other input. Connect the switch as shown below.

Function	SPST Switch Connections
Microphone Precedence (Mute Auxiliary)	29 and 30
Auxiliary Precedence (Mute Microphone)	30 and 31

3.9 Establishing Operational Priorities

As shipped from the factory, the Model MCAlOO is jumpered for the priority sequence shown in the following chart. When two or three priorities occur simultaneously, priority is always given to the highest level. Pl has precedence over P2 and P3; and P2 has precedence over P3. The priority sequence can be easily changed by reconnecting the jumpers to fit the specific requirements of your sound system.

Priority Level	Terminal	Factory Jumpered To Terminal	Function
Pl (First)	5	10	CEM; Console Emergency
P2 (Second)	6	8	AEM; Administrative All-Cal:
P3 (Third)	7	9	MTG; Multi-Tone Generator

3.10 Emergency Take-Over Relay (Optional) Connections

In certain applications, such as where a six-channel time zone system is used, there may be many emergency signal control functions generated that operate peripheral equipment. A 24 V dc relay may be used to ensure that the EMERGENCY switch has absolute priority (take-over control) of the peripheral equipment. Connect the relay coil a-cross the +28 V dc source and one of the EMERGENCY switch contacts as shown below, depending upon the switching requirements of yous sound system.

Terminal	Function
1 9	EMERGENCY Switch NC Contact
20	EMERGENCY Switch NO Contact
24	+28 V dc (Continuous)

3.11 Equipment Grounding

In any sound system, the audio common must be connected to the equipment chassis at some point in the system. To minimize the possibility of ground loops and resultant hum pick-up, it is rec-ommended that only one such connection be made in the entire sound system. For the "DIRECTOR" Series System, this connection should be made between the switch bank ground buss and terminal 23 on the Model MCAlOO Master Control Panel.

3.12 AC Power Connections

Verify that all peripheral equipment is properly connected to the power outlets provided on the PSX29A Power Supply: or on the SAX, TAX, or DX Series of High Power Amplifiers, if used. Connect the main power cable to a 120 V ac, 60 Hz power outlet.

WARNING

Do not disconnect the third wire ground on the power cable. If a 2-wire to 3-wire adapter is used, make sure that the adapter is connected to a good earth ground, such as a water pipe.

4. INITIAL ADJUSTMENTS AND LEVEL SETTINGS

4.1 Introduction

The front-panel mounted OUTPUT LEVEL indicators provide the means for rapidly setting most levels without having to use test equipment and/or making special connections to the circuitry. It is recommended that the sensitivity adjustment for these OUTPUT LEVEL indicators be verified, to ensure proper level settings.

Most level setting adjustments require two men: the first man for the master control panel to make the required adjustment; and the second man sharing duties between being at strategically located classrooms to hear the sound, and being at remote microphone locations to make test announcements. The Model MCClOO Communications Control Panel can be used for two-way intercommunications between the equipment location and the distant classroom(s).

Before setting levels, the master gain control on the associated high power amplifier should be checked for proper preset. With 1.5 V rms applied to the input of the high power amplifier, the rated power output of 25 V rms should be obtained.

4.2 OUTPUT LEVEL Indicator Sensitivity Adjustment

4.2.1 Test Equipment Required

-- Audio Generator; 600-ohm output impedance
-- AC Voltmeter; 1 megohm input impedance (minimum)

4.4.2 Adjustment Procedure

Step 1. Connect the audio generator to the EXPD phono-jack on the rear of the chassis. Connect ac voltmeter across audio generator output.

Step 2. Adjust audio generator for 1,000 Hz at minimum output level.

Step 3. Slowly increase output level until the red OUTPUT LEVEL indicator just illuminates. This should occur at 0.25 V rms. If necessary, adjust control R93 to obtain this display sensitivity. Slight adjustments may not be noticeable due to hysteresis.

step '4. Slowly decrease audio generator output level until red indicator extinguishes. Slowly increase audio generator output level until red indicator illuminates. Only a slight change of output level should be required for either test.

Step 5 Disconnect test equipment.

4.3' MIC (Microphone) LEVEL Adjustment

This adjustment requires two men.

Step 1. Make sure that all remotely located volume controls are set for maximum volume (fully CW). Make sure that all remotely located precedence selection switches are not selecting a program precedence.

Step 2. Depress the first MICROPHONES switch to select the equipment operator's (console) microphone.

Step 3. Make a test announcement by holding microphone close to face while speaking in a normal voice level. Adjust MIC LEVEL control (R10) on the rear chassis until both green OUTPUT LEVEL indicators are illuminated.

Step 4. Have assistant listen to test announcement in a distant classroom. Depress appropriate TRANSMIT THE PROGRAM switch and place the room selector switch on the accessory room selector switch panel in the proper position. The classroom audio output should be at normal level.

Step 5. Have assistant make a test announcement at each of the remote1y located microphones. Select appropriate MICROPHONES switch for each location. Both green OUTPUT LEVEL indicators should illuminate for each test made. While at each location, have assistant make various adjustments of the remote volume control, if so equipped, so ensure proper remote operation. Both green indicators will turn off when the remote volume control is set for minimum level.

Step 6. Return all switches to unselected positions.

4.4 PROG (Program) LEVEL l-4 Adjustment

This adjustment requires two men. There are four program level adjustment controls; one for each of the OTHER PROGRAM SOURCES switches The adjustment procedure for each control is the same. Therefor, only the procedure for PROG LEVEL 1 is given.

Step 1. Make sure that all remotely located volume controls are set for maximum volume (fully CW). Make sure that all remotely located precedence selection switches are not selecting a program precedence.

Step 2. Depress the first OTHER PROGRAM SOURCES switch to select the first auxiliary input.

Step 3. If the auxiliary input has an output volume or level control, adjust for maximum output.

Step 4. Adjust PROG LEVEL 1 control (Rll) on the rear chassis until both green OUTPUT LEVEL indicators are illuminated.

Step 5. Have assistant listen to the program in a distant classroom. Depress the appropriate TRANSMIT THE PROGRAM switch and place the room selector switch on the accessory room selector switch panel in the proper position. The classroom audio output should be at normal level.

Step 6. If a remote volume control is used with the auxiliary input, make various volume adjustments to ensure proper remote operation. Both green indicators will turn off when the remote volume is set for minimum level.

Step 7. Return all switches to unselected position.

4.5 BASS AND TREBLE Adjustment

This adjustment requires two men.

Step 1. Depress one of the OTHER PROGRAM SOURCES switches and the appropriate TRANSMIT THE PROGRAM switch. Distribute the program to a distant classroom by placing the room selector switch on the accessory room selector switch panel in the proper position.

Step 2. Have assistant listen to the program in the selected classroom.

Step 3. Adjust BASS control (R83) and TREBLE control (R86) Until the frequency response of the master control panel achieves the desired characteristics of the classroom.

Step 4. Check sound quality in a nearby classroom. Make compromise adjustment, if required.

Step 5. Return all switches to unselected positions.

4.6 EMERGENCY LEVEL Adjustment

This adjustment requires two men.

Step 1. Station assistant in a distant classroom.

Step 2. Depress and hold EMERGENCY switch. Speak into monitor speaker grille using a normal voice level.

Step 3. The red OUTPUT LEVEL indicator will flash on occasional voice peaks. The classroom audio output level should be no louder than that obtained with normal program distribution.

Step 4. If required, adjust EMERGENCY LEVEL control (R145) to obtain both of these conditions.

5. DESCRIPTION OF OPERATOR'S ITEMS

5.1 MICROPHONES Switches -- Select the microphones as the program channel input source. The first MICROPHONES switch selects the console microphone; the second MICROPHONES switch selects remote microphone #l, and the third MICROPHONES switch selects remote microphone #2. These switches are push-push type and are not interlocked. When a switch is engaged (depressed), its pushbutton illuminates indicating the selection made. When the first MICRO-PHONES switch is depressed, the monitor speaker, on both master, control panels is muted preventing feedback. No adjustment of the microphone input signal level is required, as it is preset during the equipment installation.

5.2 OTHER PROGRAM SOURCES Switches -- Select the auxiliary inputs (such as a tuner, tape deck, etc.) as the program channel input source. The first OTHER PROGRAM SOURCES switch selects the input connected to the AUX 1 phono-jack; the second, third and fourth OTHER PROGRAM SOURCES switches respectively select the inputs connected to the AUX 2, AUX 3, and AUX 4 phono-jacks. These switches are push-push type and are not interlocked. When a switch is en-gaged (depressed), its pushbutton illuminates indicating the selec-tion is made. No adjustment of the auxiliary input signal levels are required, as these are preset during equipment installation.

5.3 Monitor Speaker -- Allows monitoring of the program channel audio during its distribution to the classrooms. If no TRANSMIT THE PROGRAM switches are engaged (depressed), the program content can be monitored prior to its distribution to the classrooms. The speaker output level is adjusted using the OFF-MAX monitor control. During emergency announcements, the monitor speaker on the MCAlOO Master Control Panel is used as the microphone.

5.4 OFF-MAX Monitor Speaker Level Control -- Adjusts the program channel audio level heard from the monitor speaker. The OFF position quiets the speaker so that the program is not heard. The MAX

position provides maximum speaker output level. Adjust this control for the desired speaker output level.

Note that on the MCAlOO Master Control Panel this control does not change the speaker output level: (1) during transmission of emergency tones or other signaling tones; and (2) during administrative All-Call transmissions, in systems using the optional administrative communications stations. These transmissions bypass the monitor level control and are applied directly to the monitor speaker at a preset level.

5.5 ALL-CALL (TO ALL-ROOMS) Switch -- Enables GREEN "A" CHANNEL program source distribution to all classrooms selected at the associated room selector switch panel(s). This switch is provided only with the MCAlOO Master Control Panel. If the communications control system includes both MCAlOO and MCBlOO Master Control Panels, and the MCClOO Communications Control Panel, operating the ALL-CALL switch disables the BLUE "B" CHANNEL program and the ORANGE "C" intercom channel. The GREEN "A"A CHANNEL program source is sent to all classrooms. The switch is a push-push type and when engaged (depressed), its pushbutton illuminates. Disengage the ALL-CALL switch upon completion of the program.

5.6 TO ROOMS SELECTED Switch -- Enables program channel distribution to only the GREEN "A" CHANNEL classrooms individually selected at the associated room selector switch panel(s). This switch is provided only with the MCAlOO Master Control Panel. It is a push-push type and when engaged (depressed), its pushbutton illuminates.

5.7 TRANSMIT THE PROGRAM Switch -- Enables program channel distribution to only the BLUE "B" CHANNEL classrooms individually selected at the associated room selector switch panel(s). This switch is provided only with the MCBlOO Master Control Panel. It is a push-push type and when engaged (depressed), its pushbutton illuminates.

5.8 EMERGENCY Switch -- Interrupts any in-progress program distribution and enables the monitor speaker, on the Model MCAlOO, for use as a microphone for the emergency announcement. All classrooms receive the emergency announcement, regardless of the classroom selections made at the associated room selector switch panels. The EMERGENCY switch is provided only on the Model MCAlOO. It is a momentary-action type switch and must be held depressed during the announcement. While depressed the switch pushbutton illuminates. Program distribution automatically resumes when the switch is released.

5.9 OUTPUT LEVEL Indicators -- Provide visual monitoring of the relative audio output level from the master control panel (input to the

associated high power 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.

6. OPERATING INSTRUCTIONS

6.1 Introduction

The following operating instructions are for program channel distribution only. Instructions for operating with the communications channel (intercom) or the administrative communications system are provided with the respective equipment. Before operating the equipment, read Section 5 of this instruction manual to familiarize yourself with the purpose and use of each operator's item.

6.2 EMERGENCY announcements

Step 1. Depress and hold depressed the EMERGENCY switch; pushbutton illuminates.

Step 2. Speak into the monitor speaker grille on the GREEN "A" CHANNEL using your normal voice level. Red OUTPUT LEVEL indicator may flash occasionally. The BLUE "B" CHANNEL monitor speaker is automatically muted when the EMERGENCY switch is depressed.

Step 3. Upon completion of announcement, release the EMERGENCY switch; pushbutton extinguishes, and program distribution automatically resumes.

6.3 Program Distribution

6.3.1 General

The following procedures consider that both the Model MCA100 for the GREEN "A" CHANNEL and the Model MCB100 for the BLUE "B" CHANNEL are part of the sound system. If only the GREEN "A" CHANNEL is used in your system, ignore all references made to the BLUE "B" CHANNEL. The

two program channels may be distributed independently of each other to individually selected classrooms, or the GREEN "A" CHANNEL may be distributed to all classrooms in the sound system, regardless of prior classroom selections.

6.3.2 Independent Program Channel Distribution

Step 1. Select the desired program to be distributed by depressing the appropriate MICROPHONES or OTHER PROGRAM SOURCES switch until switch engages. The pushbutton should illuminate indicating an activated condition.

Step 2. Monitor the selected program by rotating the monitor speaker OFF-MAX level control until a comfortable speaker output level is obtained. Both green OUTPUT LEVEL indicators should be illuminated.

Step 3. Individually select the classrooms that are to receive the program at the associated room selector switch panel(s). Remember that a color coordinated guideline system is used; green for channel "A" and blue for channel "B".

Step 4. Send the program by depressing the TO ROOMS SELECTED switch for the GREEN "A" CHANNEL and the TRANSMIT THE PROGRAM switch for the BLUE "B" CHANNEL until each switch engages. Each pushbutton should illuminate indicating an activated condition.

Step 5. When the program has been completely sent, release all illuminate&switches by depressing each one. Place classroom selector switches to OFF position.

6.3.3 Program Channel Distribution To All Rooms

Step 1. On the GREEN "A" CHANNEL, select the desired program to be distributed by depressing the appropriate MICROPHONES or OTHER PROGRAM SOURCES switch until switch engages. The pushbuttons should illuminate indicating an activated condition.

Step 2. Adjust the monitor speaker output using the OFF-MAX level control until the desired output level is obtained. Both green OUTPUT LEVEL indicators should be illuminated. (Monitor speaker is muted if first MICROPHONE switch is selected for program source.>

Step 3. Send the program by depressing the ALL-CALL (TO ALL ROOMS) switch until switch engages. The pushbuttons should illuminate indicating an activated condition.

Step 4. When the program has been completely sent, release the ALL-CALL switch by depressing the pushbutton. This restores BLUE "B" CHANNEL program distribution and enables the ORANGE "C" channel for intercom operation.

6.4 Remotely Controlled Volume and Program Precedence

These are optional modes of operation which may not be used in your sound system. Caution must be used with remotely controlled option as improper operation could prevent program transmissions through the sound system. Remember the following special operating practices:

Practice 1. Remote precedence selection overrides and mutes the other program source allowing your program to be sent. Always return the precedence switch to its unselected position after your program has bee; sent. Program selection now reverts back to the master control panel operator.

Practice 2. Setting the remote volume control to OFF effectively provides a remote precedence selection preventing distribution of that program source. Always set the remote volume control to MAX at the. end of the announcement.

7. THEORY OF OPERATION

7.1 Introduction

The circuitry used in the master control panels is mainly analog for amplifying the program channel audio. Some digital circuits are used for program priority selection and speaker muting control. The analog circuits are described using functional signal flow. The digital circuits are described using active and inactive terms. This permits the description to be used for troubleshooting purposes. Transistor and integrated circuit biasing is not described. This type of information is provided in technical textbooks found in most libraries.

The Model MCAlOO is described as it is more complex than the Model MCBlOO. References to the Model MCBlOO are made where applicable. Refer to the schematic diagram provided at the rear of this instruction manual for circuit details.

7.2 Program Channel Audio Processing

7.2.1 Input Sources and Mixer

Program channel audio is obtained from any of three input sources MICROPHONE: OTHER PROGRAM SOURCES or auxiliary; and EXPD (expanded) or bridging. A center-tapped input transformer provides a balanced input for microphone audio. Preamplifier Ql increases the audio level, as set by MIC LEVEL control Rl0, for additional amplification in mixer **Q2.** The auxiliary input is high-impedance coupled through a corresponding PROG LEVEL control to mixer Q2. The bridging input is applied through a filtering network to mixer Q2.

Mixer Q2 provides an amplified output which is gated through switch A of program priority switches IC-1 to emitter-follower Q3. The program priority switch is buffered by Q3 to the low impedance of the subsequent compression amplifier. In the Model MCBlOO, the output of mixer Q2 is applied directly to the compression amplifier, as program priority gating is not used and, therefore, Q3 is not required in the circuit. Refer to Paragraph 7.4 for description of program channel audio gating.

7.2.2 Compression Amplifier

The compression amplifier has two operational elements: (1) amplification by Q4, Q5 and Q6; and (2) compression control by feedback from Q6 through Q7 and Q8, which is applied to Q5. Transistor Q4 and Q6. In effect, Q5 and Q6 are a parallel resistive network. Any change in the conduction rate of Q5, due to a change of bias from Q8, changes the effective resistance of Q5. Since Q5 and Q6 are in parallel, this changes the amount of current available for Q6, controlling the voltage gain of Q6. Thus, the output from Q6 is directly dependent on the control bias applied to Q5. This characteristic is used to establish compression control. The output from Q6 is voltage divided by R69 and R70, and is continuously sensed by amplifier Q7. The amplified output is detected by D6 and filtered by R75 and C34. The resultant dc control level is buffered by dc amplifier Q8 and is applied to Q5 changing the conduction rate of Q5, and subsequently the gain of Q6. Thus, a relatively constant output level is obtained for inputs exceeding the "knee-of-compression"; 30 mV into Q4.

SERVICING NOTE

To isolate the feedback loop from the amplifier stages for troubleshooting purposes, temporarily ground the emitter of Q8 using a clip lead. Since this prevents compression, a lower level audio test signal must be used at the program source input.

7.2.3 Tone Controls, Low Level Amplifiers and Output Amplifiers

The compression amplifier output is applied to Q9 which operates as an emitter-follower presenting a low impedance to the two tone control networks. The BASS network provides ± 10 dB boost/attenuation at 100 Hz. The TREBLE network provides + 10 dB boost/attenuation at 10 kHz. Two low level amplifiers provide gain (Ql0), and buffering (Qll) for the three output amplifiers and the output level sensing circuit. Refer to Paragraph 7.3 for description of the output level sensing circuit.

The circuit path to the three output amplifiers is gated through various switches in transmit/speaker muting switches IC-5, depending

upon the operational mode selected. Refer to Paragraph 7.4 for a description of program channel audio gating. During program distribution, switches A and B in IC-5 are closed. Switch A routes the audio to: (1) 6 dB driver amplifier Q13 for distribution of the program to the classrooms: and (2) buffer amplifier Ql0 for administrative monitoring, in systems using the optional administrative communication stations. Switch B routes the audio through the monitor level control and operational amplifier IC-7 to the monitor speaker where the program is heard.

7.3 Output Level Sensing Circuit

The output level sensing circuit continuously senses the output of Qll and provides visual indications of the relative output level. Three operational amplifiers in IC-6 are used as comparators for level sensing The fourth operational amplifier in IC-6 is used as a gain amplifier for the signal from Qll. This signal is rectified and filtered providing a' varying dc voltage that is proportional to the program signal level. This dc voltage level is compared with three preset reference voltage levels. The three separate comparator outputs drive corresponding OUTPUT LEVEL indicator LED's.

Resistor R93 is the sensitivity control for level sensing and sets the signal level applied to pin 14 of IC-6. Signal detection is provided by D8 and filtering is provided by R98 and C45. The three comparators compare the varying dc level to successive 6 dB voltage steps developed across a series resistive network. When the varying dc voltage level exceeds each voltage step, another OUTPUT LEVEL indicator turns on, as follows: (1) LED1 at 3.0 V dc; (2) LED2 at 6.0 V dc; and (3) LED3 at 12.0 V dc.

7.4 Gating Program Channel Audio

Assume that a program source input has been selected, but the ALL-CALL (ALL ROOMS) or TO ROOMS SELECTED program distribution switches have not been selected. Program priority switches IC-1 gate the audio input to the compression amplifier. Priority precedence gates IC2-A and -C with programs inhibit gate IC2-B control which switches of IC-1 are closed at any given time. When there is no priority input from an EMERGENCY announcement, an administrative all-call announcementor a multi-tone generator output, gates IC2-A and -C are inactive. Control lines B, D and C of IC-1 are clamped low opening corresponding switches B, D and C of IC-1

Program inhibit gate IC2-B is high since its three inputs are low. This places a high on-control line A of IC-1 and on the priority message gating bus. Switch A of IC-1 closes routing program audio to the compression amplifier. The high on the priority message gating bus is applied to: (1) terminal 16; (2) IC3-A; and (3) pin 14 of IC3-B.

(1) The high on terminal 16 (MCCPlOO) is routed to circuits within the optional Model MCClOO Communications Control (intercom) panel and

Model MDClOO Administrative Communication Station for audio control purposes.

(2) IC3-A provides inversion placing a low on the base of Q16 and on control line C of IC-5. Q16 remains turned-off and terminal 14 (MCRlOO) continues to be an open circuit condition. The MCRlOO Master Control Relay remains de-energized for normal program distribution. Switch C of IC-5 opens preventing program audio from being routed through the monitor level bypass circuit.

(3) The high on pin 4 of IC3-B along with the highs on pin 3 through R131 and pin 5 through R133 cause IC3-B to change states. Control line A of IC-5 is clamped low opening switch A. This prevents the distribution of program audio as the input to Q13 is opened. (Room distribution of program audio only occurs when the ALL-CALL or TO ROOMS SELECTED switch is depressed.)

Since there are no priorities present, no mute control switched ground functions are placed on terminals 26(C), 27(B) and 28(A). This places a high on control line B of IC-5 through Rl41. Switch B closes routing the program audio through the monitor level control, operational amplifier IC-7 and the monitor speaker. Thus, the program audio is monitored prior to selecting a room distribution.

Depressing the TO ROOMS SELECTED switch, places a low on pin 3 of IC3-B causing the gate to change states. A high is placed on control line A of IC-5. Switch A closes routing program audio through output amplifier Q13 for distribution to the selected rooms.

Depressing the ALL-CALL (ALL ROOMS) switch, places a low on pin 5 of IC3-B and on terminal 14 (MCRlOO). IC-3 changes states and places a high on control line A of IC-5. Switch A closes routing program audio through output amplifier Q13 for distribution to the rooms. The low on terminal 14 causes the master control relay to energize gathering the room distribution buses. The program audio is distributed to all **rooms regardless of prior** room selections at the room selector switch panels.

7.5 EMERGENCY AUDIO Processing

Depressing the EMERGENCY switch, enables the speaker for use as a microphone. The audio level is boosted in preamplifier Q15 and fed through EMERGENCY LEVEL control R145 to Q14. Emitter-follower Q14 buffers the audio for gating through switch D of IC-1 to the compression amplifier. Refer to the following paragraph for a description of circuit gating.

7.6 Gating an EMERGENCY Announcement (Pl)

When the EMERGENCY switch is depressed, a high is applied to: (1) terminal 10 (CEM); (2) control line D of IC-1; and (3) pin 8 of IC2-B.

(1) The high on terminal 10 is coupled through the first priority jumper to terminal 5 (Pl). IC2-A provides inversion placing a low on terminal 6 (P2) through D2 and on terminal 7 (P3) through Dl. The input to IC2-C is clamped low preventing a priority level P2 message from taking precedence over this priority level Pl EMERGENCY message. The low on terminal 6 is coupled through the second priority jumper to terminal 8 (AEM) and to control line B of IC-1. Switch B of IC-1 opens preventing administrative phone all-call audio from being routed to the compression amplifier. The low on terminal 7 is coupled through the third priority jumper to terminal 9 (MTD), control line C of IC-1 and pin 2 of IC2-B. Switch C of IC-1 opens preventing multi-tone generator tones from being routed to the compression amplifier. Since control line C is clamped low for as long as the EMERGENCY input is present, a priority level P3 message cannot take precedence over this priority level Pl message. The low on pin 2 of IC2-B has no effect on this high input NOR gate.

(2) The high on control line D of IC-1 closes switch D, routing the emergency audio to the compression amplifier.

(3) The high on pin 8 of IC2-B causes the gate to change states, placing a low on control line A of IC-1 and on the priority message gating bus. Switch A of IC-1 opens preventing the program audio from being routed to the compression amplifier. The low on the priority message gating bus is applied to: (a) terminal 16; (b) IC3-A;, and (c) pin 4 of IC3-B.

(a) The low on terminal 16 (MCCPlOO) is used for audio control purposes in the optional "DIRECTOR" Series equipment.

(b) IC3-A provides inversion placing a high on the base of Q16 and on control line C of IC-5. Q16 turns on placing a low on terminal 14 (MCRlOO) energizing the master control relay for bus gathering. Switch C of IC-5 closes routing the audio from the compression amplifier through the monitor level bypass circuit to the monitor speaker.

(c) The low on pin 4 of IC3-B causes the gate to change states, placing-a high on control line A of IC-5. Switch A closes routing the audio from the compression amplifier through Q13 for distribution to classrooms.

Depending upon the system interconnections, the switched ground muting control signals applied to terminal 26, 27 or 28 cause control line B of IC-5 to be clamped low, opening switch B. This prevents the routing of audio from the compression amplifier to the monitor level control and the monitor speaker.

7.7 Gating An Administrative Phone All-Call Announcement (P2)

Administrative phone switched ground is applied to terminal 15 when an all-call administrative announcement is made, in systems equipped with the optional administrative communication stations. IC3-C provides

inversion placing a high on: (1) terminal 8 (AEM); (2) control line B of IC-1; and (3) pin 1 of IC2-B.

(1) The high on terminal 8 is coupled through the second priority jumper to terminal 6 (P2). IC2-C provides inversion placing a low on terminal 7 (P3). This is coupled through the third priority jumper to terminal 9 **(MTG).** Control line C of IC-1 goes low opening switch C. This prevents the multi-tone generator tones from being routed to the compression amplifier. Since control line C is clamped low for as long as the all-call input is present, a priority level P3 message cannot take precedence over this priority level P2 message. The low on pin 2 Of IC2-B has no effect on this high input NOR gate.

(2) The high on control line B of IC-1 closes switch B, routing the administrative audio from terminal 12 to the compression amplifier.

(3) The high on pin 1 of IC2-B causes the gate to change states, placing a low on control line A of IC-1 and on the priority message gating bus. Circuit operation from this point is the same as previously described in Paragraph 7.6(3).

An EMERGENCY announcement (priority level Pl) initiated during an administrative all-call (priority level P2) would take priority precedence. The switched high from the EMERGENCY switch would cause IC2-A to change states. The input to IC2-C would be clamped low through D2. This would overrride (inhibit) the administrative all-call circuit gating. The EMERGENCY announcement would be gated as previously described in Paragraph 7.6.

7.8 Gating A Multi-Tone Generator Tone Transmission (P3)

Multi-tone generator control switched high is applied to terminal 4 when a tone transmission is initiated, in systems equipped with this option. The high is routed to control line C of IC-1 and to pin 2 of IC2-B. Switch C of IC-1 closes routing the tone generator signal from terminal 3 (MTG AUDIO) to the compression amplifier. IC2-B changes states placing a low on control line A of IC-1 and on the priority message gating bus. Circuit operation from this point is the same as previously described in Paragraph 7.6(3).

An EMERGENCY announcement (priority level Pl) initiated during a tone transmission (priority level P3) would take priority precedence. The switched high from the **EMERGENCY** switch would cause IC2-A to change states. Control line C of IC-1 would be clamped low through Dl. This would override (inhibit) the tone generator circuit gating. An administrative all-call announcement (priority level P2) would take priority precedence over a tone transmission (priority level P3). IC2-c would change states, and control line **c** of IC-1 would be clamped low through D3. The circuit gating of either of these two higher priority announcements is the same as previously described in Paragraphs. 7.6 and 7.7.

7.9 Remotely Controlled Volume

Contained within the Model 47RCA Remote Control Adapter are a light bulb and a light dependent resistor (LDR). These provide an optical coupling which isolates the remote control input to the light bulb. from the LDR output to the amplifier. This isolation ensures "humfree" remote control. The remote volume control is connected in series with the light bulb. Each setting of the volume control causes a proportional change in the light bulb intensity; brightest in OFF position and dimmest in MAX position. Since the LDR has a negative resistance co-efficient, the LDR resistance changes from 1 K at brightest to 10M at dimmest. Thus, at the OFF volume setting, there is brightest light and minimum LDR resistance. This appears as a short circuit shunting the program source to ground. An apparent open circuit condition exists at MAX volume.

8. MAINTENANCE

8.1 Pushbutton Switch Indicator Lamp Replacement

Step 1. Remove switch lens by pulling outward on lens.

Step 2. Remove lamp by pulling outward on lamp. Note that a better grip on the bulb may be obtained by wrapping electrical tape over the front edge of the bulb.

Step 3. Install replacement lamp by pushing inward into lamp socket until lamp seats.

Step 4. Reinstall switch lens by positioning track on inside bottom of lens onto switch actuator bar and pushing lens inward until lens seats.

Step 5. Depress switch until it engages. Lamp should illuminate. If it does not, verify that the second set of contacts from switch front are making electrical contact. If necessary, bend lamp contacts or solder lamp contacts to switch.

8.2 Pushbutton Switch Replacement

If one of the pushbutton switches in the MICROPHONE or OTHER PROGRAM SOURCES switch bank requires replacement, the entire switch bank must be replaced. The following procedure applies to all pushbutton switches.

Step 1. Remove the bottom plate from the chassis by unscrewing the appropriate screws.

Step 2. Using side cutters, cut switch pins on solder side of circuit board as close to the circuit board as possible.

Step 3. Unsolder cut switch pins from circuit board.

Step 4. Remove lens from switch by pulling outward on lens.

Step 5. Remove switch from front panel by unscrewing appropriate screws.

Step' 6. If necessary, remove OUTPUT LEVEL indicator circuit board from front panel by unscrewing appropriate screws.

Step 7. Remove two screws, one on each side of chassis, securing rear panel to chassis.

Step 8. Slide rear panel with circuit board attached out of chassis just far enough for the pushbutton switch to clear the front panel and enable replacement.

Step 9. Replace switch and reinstall rear panel by reversing the order of the above steps.

8.3 OUTPUT LEVEL Indicator Replacement

Step 1. Remove OUTPUT LEVEL indicator circuit board from front panel by unscrewing appropriate screws.

Step 2. Note placement of LED on circuit board. The flat side of LED is the cathode and is always connected to circuit common.

Step 3. Remove LED by unsoldering leads.

Step 4. Noting polarity, replace LED and reinstall circuit board.

8.4 Potentiometer Replacement

Use the following procedure when any of the eight potentiometer accessible through the rear panel require replacement.

Step 1. Remove the bottom plate from the chassis by unscrewing the appropriate screws.

Step 2. Using side cutters, cut potentiometer leads on solder side of circuit board as close to the circuit board as possible.

Step 3. Unsolder cut potentiometer leads from circuit board.

Step 4. Remove two screws, on bottom rear of circuit board,, securing circuit board to chassis.

Step 5. Remove two screws, one on each side of chassis, securing rear panel to chassis.

Step 6. Life rear panel away from chassis until bottom of rear panel clears terminal strips. Then, continue to lift rear panel away from chassis until clear of potentiometer shafts.

Step 7. Replace the potentiometer and reinstall equipment by reversing the order of the above steps.

9. UNIQUE ITEMS PARTS REPLACEMENT LIST

9.1 General

The majority of electrical parts used in the master control panels are readily obtainable from local parts suppliers. Only those items which are difficult to obtain or are factory selected are listed. Components mounted on the circuit board can be easily located as the reference designator is screened on the circuit board. Use routine circuit tracing procedures to locate chassis-mounted components.

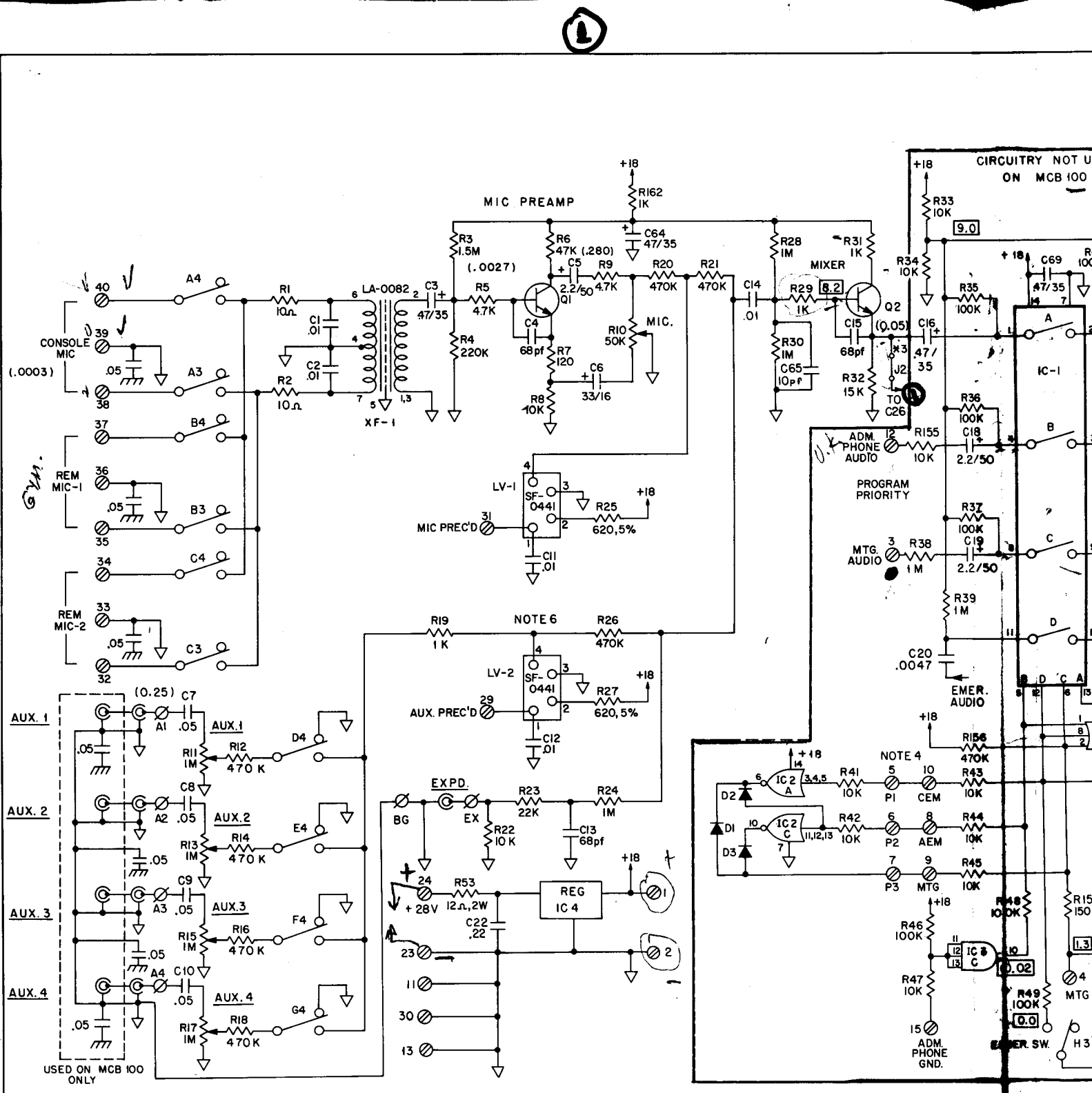
9.2 Parts Listing

Rauland Part Number	Description	Quantity Used MCA100	Quantity Used MCB100
	DIODES		
ET-IN457A	Silicon; signal	7	4
JL-0072-A	Light Emitting; red: See Note 1.	1	1
JL-0078	Light Emitting; green; See Note 1.	2	1
JR-0090-12	Zener 5.6 V,-1 W	1	1
	INTEGRATED CIRCUITS:		
EC-009	Regulator; 18 V	1	1
EC-0024	Quad Operational Amplifier	1	1
EC-0034	Triple Three-Input NAND Gate	1	-
EC-0035	Triple Three-Input NOR Gate	1	-
EC-0052	Quad Bilateral Analog Switch	2	1
EC-0061	5 W Audio Power Amplifier	1	1
	LENS:		
QP-0741-1	Switch, red; See Note 2.	1	
QP-0741-2	Switch; green	9	
QP-0741-4	Switch, blue		8
	POTENTIOMETERS:		
RP-104AR	100 k-ohms; R93	1	1
RP-104AX-A	100 k-ohms; R83, 86	2	2
RP-105BM	1 megohm; R11, 13, 15, 17, 145	5	4
RP-503AN-A	50 k-ohm; R10	1	1
RP-504AW	500 k-ohm; R123	1	1

Rauland Part Number	Description	Quantity Used MCA100	MCB100
	SWITCHES:		
X-0612-02	Pushbutton; seven-section 4PDT section; push-push	1	1
X-0612-05	Pushbutton; 4PDT; push-push	2	1
X-0612-07	Pushbutton; 6PDT; momentary action	1	
	TRANSFORMER:		
LA-0082	Type R1050	1	1
	TRANSISTORS:		
ET-2N5089	NPN	5	5
ET-MPS-A05	NPN	1	
ET-MPS-A18	NPN	7	5
ETS-014A	NPN; See Note 3.	3	1

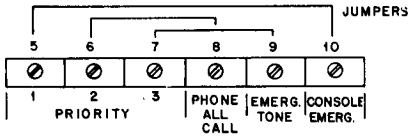
NOTES:

1. Light emitting diode uses MOUNTING CLIP P/N QP-0700.
2. Lens use HOUSING P/N QP-0740; 10 for MCA100 and 8 for MCB100.
3. Must be ordered from Rauland as this item is selected for a specific operating characteristic.



NOTES:

1. ▽ CIRCUIT COMMON, ⫽ CHASSIS GROUND
   - ▭ DENOTES D.C. VOLTAGES MEASURED WITH A 20KOHM/VOLT METER AND NO SIGNAL INPUTS.
   - ( ) DENOTES A.C. VOLTAGES MEASURED WITH AN A.C. VOLTOMETER WITH 1 MEGOHM INPUT IMPEADANCE.
2. UNLESS OTHERWISE SPECIFIED, THE COMPONENTS ENCLOSED INSIDE THE DOTTED LINES ARE NOT USED ON THE MCB 100.
3. * JUMPERS J1, J2 & J3 USED ON MCB ONLY.
4. JUMPERS ON TERMINALS 5-10 SET UP THE EMERGENCY PRIORITES. JUMPERS CAN BE REARANGED FOR ANY DESIRED PRIORITES.

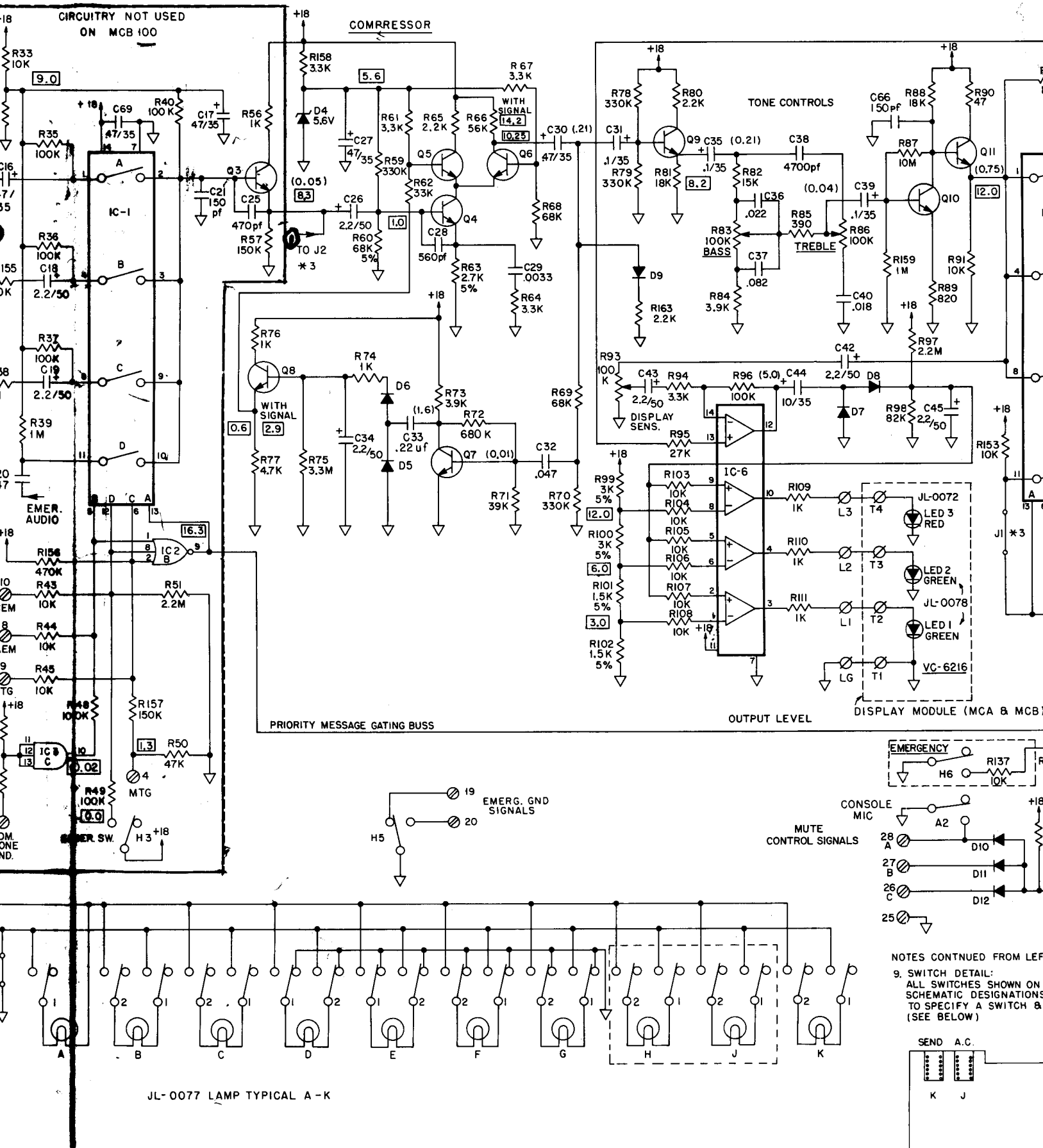


5. WHEN USED WITH TELECENTER REMOVE R160.
6. FOR AUX. OR MIC PRECEDENCE, PLUG INTO LV1 AND/OR LV2 A RAULAND 47RCA PRECIDENCE MODULE. FOR REMOTE VOLUME CONTROL ALSO USE ONE OR TWO 47RVC REMOTE VOLUME POTS.
7. SEMICONDUCTOR COMPONENTS:

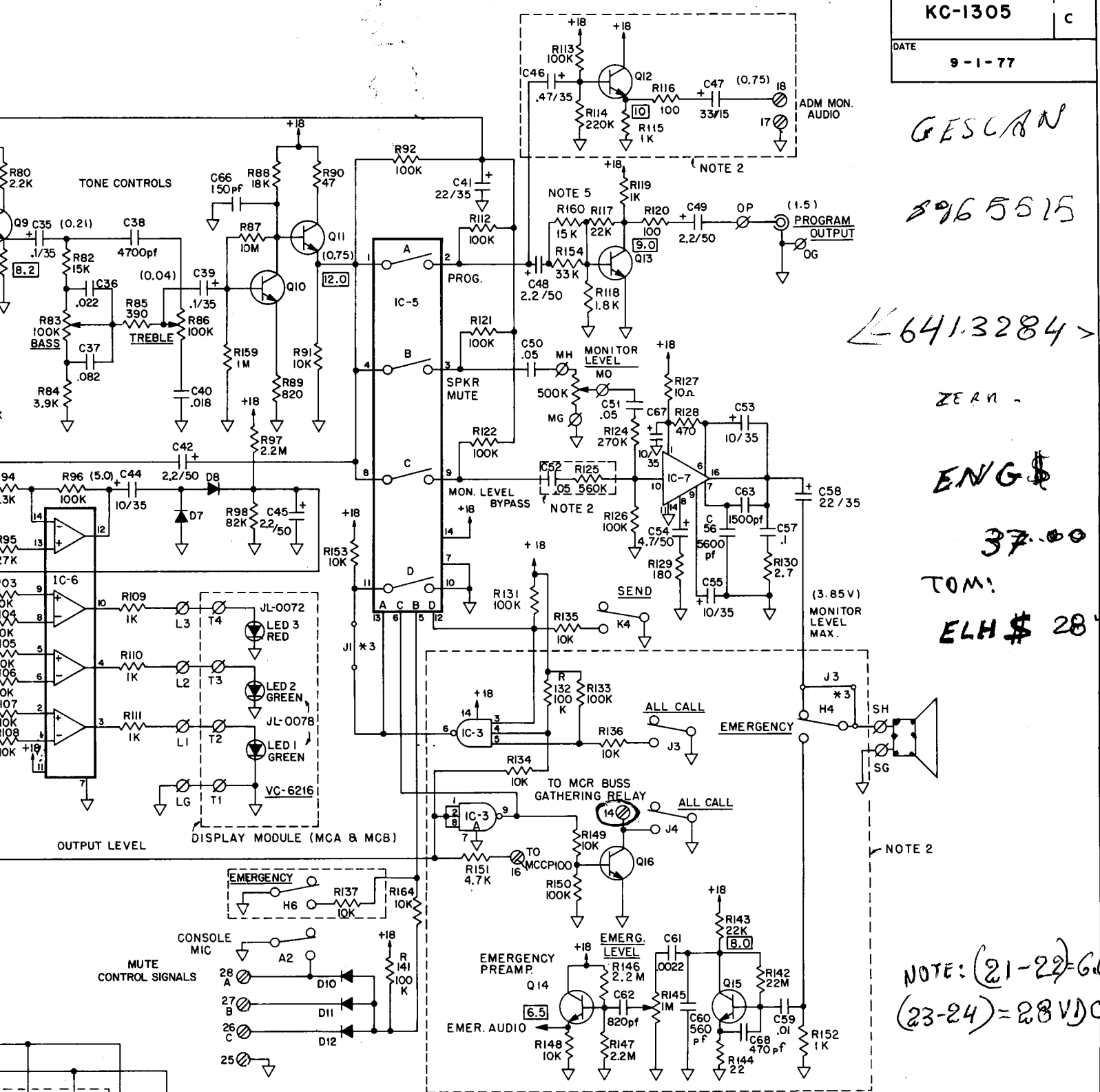
TYPE	RAULAND P/N	SCHEMATIC REF. NO.	DESCRIPTION
7818	EC-0009	IC4	18V. REGULATOR
4136	EC-0024	IC6	QUAD 741 OP. AMP.
4023	EC-0034	IC3	TRIPLE 3 INPUT NAND GATE
4025	EC-0035	IC2	TRIPLE 3 INPUT NOR GATE
4016	EC-0052	IC1, IC5	QUAD BILATERAL ANALOG SWITCH
TBA810S	EC-0061	IC7	5 WATT AUDIO AMP.
	ET-2N5089	Q4,5,6,8,9	NPN TRANSISTOR
	ET-MPS-A05	Q16	NPN TRANSISTOR
	ET-MPS-A18	Q1,2,3,7,10,11,15	NPN TRANSISTOR
	ETS-014A	Q12,Q13,Q14	NPN TRANSISTOR
	IN457A	D1,2,3,5,6,7,8,9	SILICON SIGNAL DIODE
IN4734	JR-0090-12	D4	5.6V 1W

8. FOR WIRING DIAGRAM SEE KM-0515 PRINTED ON REVERSE SIDE.

NOTES CONTINUED AT RIGHT.

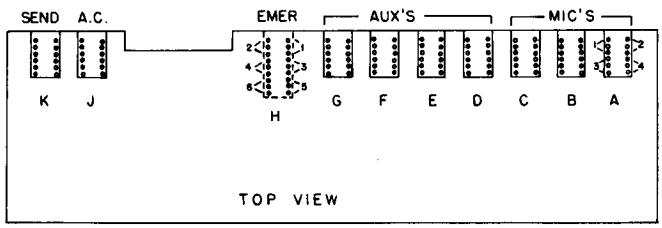

CIRCUITRY NOT USED ON MCB 100
COMPRESSOR
TONE CONTROLS
IC-1
IC-6
IC2
TO J2 *3
WITH SIGNAL
BASS
TREBLE
DISPLAY SENS.
EMER. AUDIO
PRIORITY MESSAGE GATING BUSS
OUTPUT LEVEL
DISPLAY MODULE (MCA & MCB)
JL-0072
LED 3 RED
LED 2 GREEN
JL-0078
LED 1 GREEN
VC-6216
EMERGENCY
CONSOLE MIC
MUTE CONTROL SIGNALS
EMERG. GND SIGNALS
MTG
JL-0077 LAMP TYPICAL A-K
NOTES CONTNUED FROM LEF
9. SWITCH DETAIL:
ALL SWITCHES SHOWN ON
SCHEMATIC DESIGNATIONS
TO SPECIFY A SWITCH &
(SEE BELOW)
SEND A.C.

DWG. NO	
KC-1305	C
DATE	
9-1-77	



NOTES CONTNUED FROM LEFT.

9. SWITCH DETAIL:
ALL SWITCHES SHOWN ON SCHEMATIC IN EXTENDED POSITION.
SCHEMATIC DESIGNATIONS INCLUDE A LETTER & A NUMBER
TO SPECIFY A SWITCH & ITS CONTACT ASSEMBLY RESPECTIVELY
(SEE BELOW)



MODEL MCA-100, MCB-100

DIRECTOR SERIES
MASTER CONTROL PANELS

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

KC-1305 - C

GESCAN

3965515

<641.3284>

ZERN -

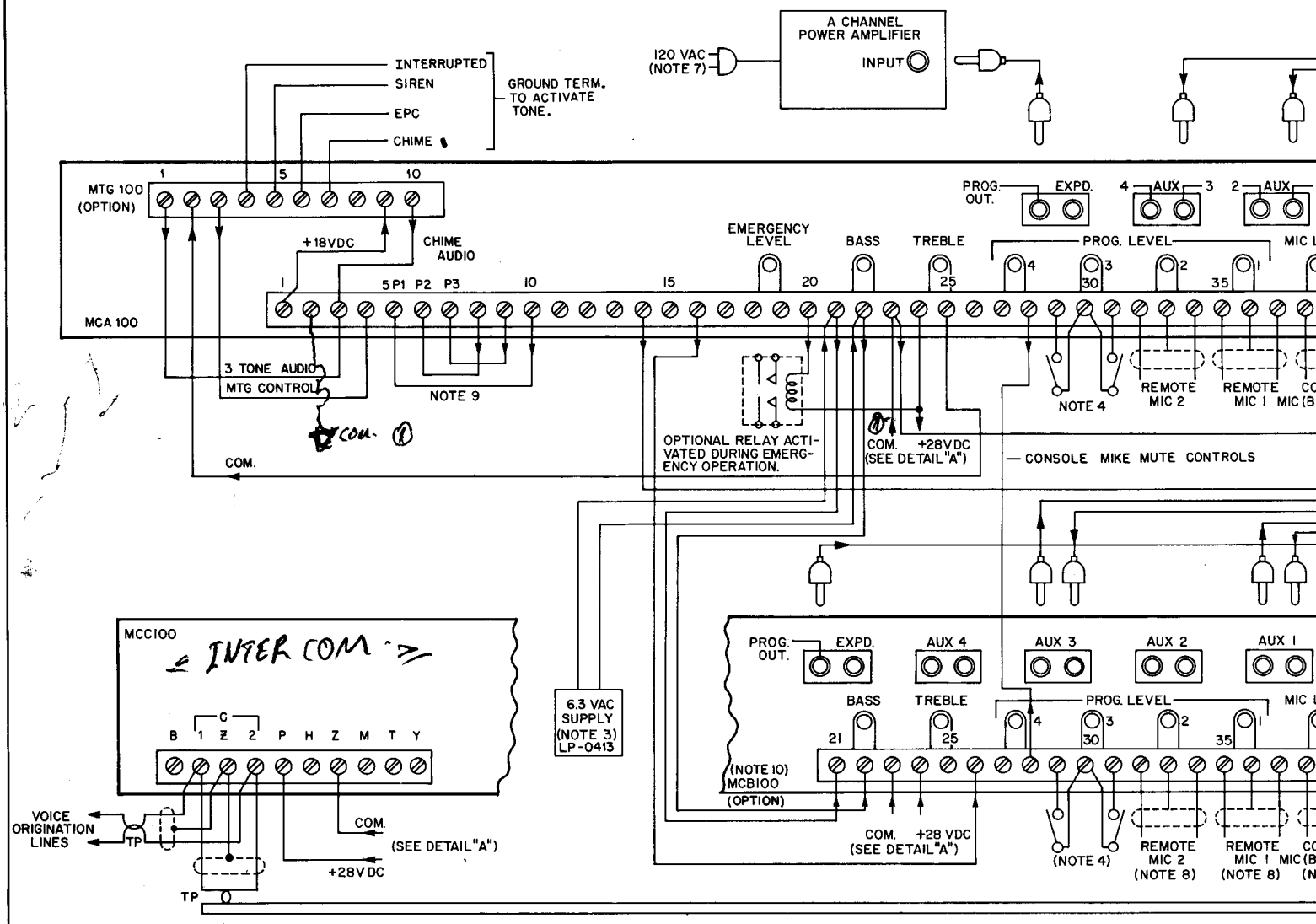
ENG $

37.00

TOM:

ELH $ 28.50

NOTE: (21-22) = 6.0V
(23-24) = 28VDC.

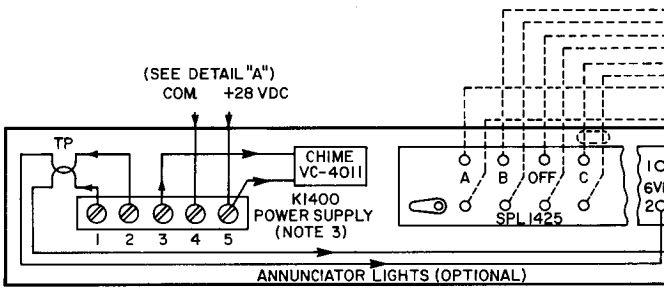


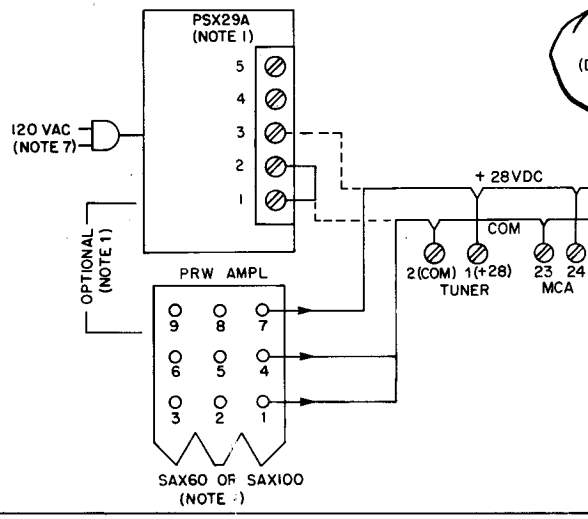
NOTES:

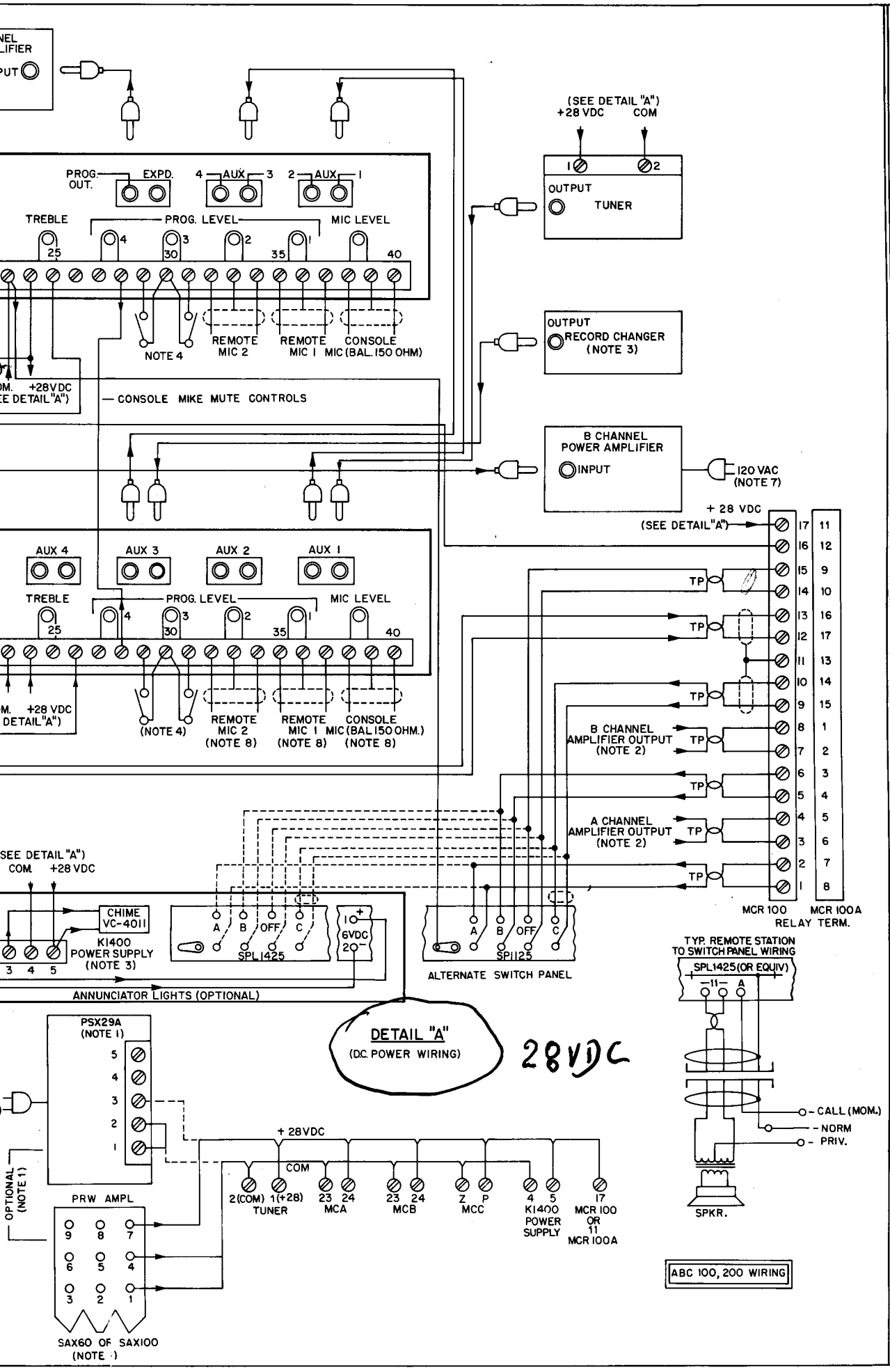
1. IF SAX60 USED, PSX29A NOT REQUIRED; IF ANY OTHER POWER AMPLIFIER IS USED, PSX29A REQUIRED.
2. CONNECT POWER AMPLIFIER OUTPUT WIRES AS INDICATED BELOW:

POWER AMPLIFIER	CONNECT WIRES TO OUTPUT CONNECTOR PINS
DX125B DX250B SAX100 TAX125B TAX250B	JUMPER PINS 2,5 AND 8 TOGETHER " " 3,6 AND 9 " TAKE OUTPUT FROM PINS 8 AND 9
SAX60	8 AND 9
TAX75B	6 AND 2

3. CONNECT PRIMARY POWER PLUGS OF RECORD CHANGER, 6.3 VAC SUPPLY, AND KI400 POWER SUPPLY TO PRIMARY POWER RECEPTACLES ON SAX60 (OR PSX29A IF OTHER POWER AMPLIFIER USED).
4. FOR PRECEDENCE OPERATION, CONNECT SPST SWITCH AS SHOWN. WHEN CLOSED, SWITCH CONNECTED TO TERMINALS 29 AND 30 WILL MUTE PROGRAM MATERIAL; WHEN CLOSED, SWITCH CONNECTED TO TERMS. 30 AND 31 WILL MUTE MICROPHONE CHANNEL. FOR REMOTE VOLUME CONTROL OF PROGRAM MATERIAL, CONNECT ONE SIDE OF 47 RVC TO TERMINAL 30 AND CONNECT CENTER TERMINAL OF 47RVC TO TERMINAL 29. FOR REMOTE VOLUME CONTROL OF MICROPHONE CHANNEL, CONNECT 47RVC AS ABOVE EXCEPT USE TERMINALS 30 AND 31. FOR PRECEDENCE OR REMOTE VOLUME CONTROL 47 RCA MUST BE INSTALLED.
5. MICROPHONE INPUTS ARE TRANSFORMER COUPLED BALANCED 150 OHM.
6. TP INDICATES TWISTED PAIR.
7. IF SAX60 USED, CONNECT SAX60 POWER PLUG TO 120 VAC PRIMARY POWER RECEPTACLE; IF PSX29A USED, CONNECT PSX29A POWER PLUG TO 120 VAC PRIMARY POWER RECEPTACLE AND CONNECT POWER AMPLIFIER POWER PLUG TO PRIMARY POWER RECEPTACLE ON PSX29A.
8. TO INTERCONNECT MCA100 AND MCB100 MIC INPUTS FOR OPERATION FROM ONE REMOTE MIC 1 OR 2 OR CONSOLE MIC; CONNECT MICS TO MCA100 AS SHOWN; CONNECT SHIELDED TWISTED PAIR CABLE BETWEEN MCA100 AND MCB100 TERMINALS 38 AND 40 OR 35 AND 37 OR 32 AND 34 AND CONNECT CABLE SHIELD TO MCA100 TERMINAL 39 OR 36 OR 33; DO NOT CONNECT CABLE SHIELD TO MCB100 TERMINAL 39 OR 37 OR 35.
9. AS SHOWN CONNECTED IN DIAGRAM (TERMINALS 5 THROUGH 10), MCA100 EMERGENCY SWITCH HAS PRIORITY OVER ADMINISTRATOR ALL-CALL AND EMERGENCY TONE, AND ADMINISTRATOR ALL-CALL HAS PRIORITY OVER EMERGENCY TONE. TERMINALS 5,6 AND 7 (PRIORITY NO. 1, 2 AND 3 RESPECTIVELY) CAN BE INTERCONNECTED TO TERMINALS 8, 9 AND 10 SUCH THAT ADMINISTRATOR ALL-CALL, EMERGENCY TONE, AND MCA100 EMERGENCY SWITCH (TERMINALS 8, 9 AND 10 RESPECTIVELY) CAN HAVE ANY PRIORITY ORDER DESIRED.
10. IN SYSTEMS WITH A MCA AND MCB100 CUT JUMPER J4 IN THE MCB100. FOR SYSTEMS WITH TWO MCB100's CUT J4 ON THE MCB100 WHICH HAS ONLY ONE WIRE TO TERMS. 21-22.







P/O M

12 13 14 15

NOTE 5

S A L V NOTE 6

T Z O E K J NC

P C

REAR VIEW OF CONNECTOR P/N SF-0410
(MATES WITH MDC100 CONNECTOR P/N SM-0284)

TO CONNECTOR P/N SF-0410 FOR 2ND MDC100.

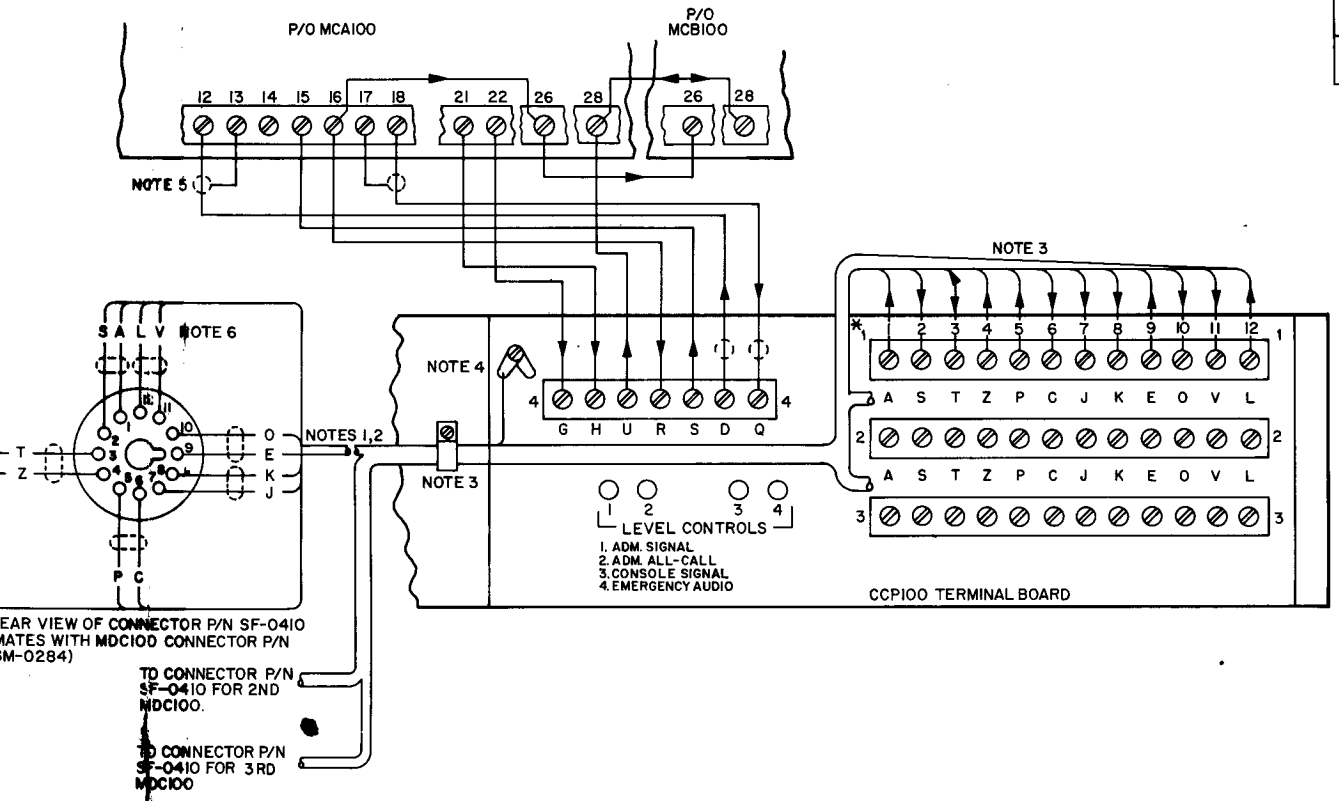
TO CONNECTOR P/N SF-0410 FOR 3RD MDC100

NOTES:

1. CABLE SHALL CONSIST OF SIX PA TINNED COPPER WIRES SUCH AS D P/N 8778, OR ALPHA WIRE CO. P/
2. OBSERVE THE FOLLOWING PRECAU
   A. CABLE LENGTH SHALL NOT E
   B. DO NOT RUN CABLE ADJACENT SOURCES OR CLOSE TO X-RAY TRANSMITTING EQUIPMENT.
   C. SECURELY ATTACH CABLE TO A CLAMPS OR BRACKETS; DO NO
   D. INSTALL CABLE IN A LOCATION IF CABLES ARE RUN ALONG BA FLOOR LEVEL TO AVOID WATE
   E. DO NOT RUN CABLES IN CONTA SUCH AS STEAM RADIATORS, E
3. TO ROUTE CABLE AND CONNECT
   A. SOLDER OR CRIMP SPADE LUGS TERMINAL STRIPS.
   B. CUT CABLE JACKET BACK II IN TO GROUND LUGS (SEE NOTE
   C. ROUTE CABLE(S) THROUGH CA TERMINAL STRIP(S) 1, 2, AND/
   D. CONNECT WIRES FROM CONNE STRIP 1; CONNECT WIRES FR STRIP 2; " " " STRIP 3; WIRE CONNECTIONS SHOWN FOR FIRST MDC100.
4. SOLDER SHIELDS OF WIRE PAIRS E AND O OF TERMINAL STRIPS I,
5. WIRES CONNECTED TO MCA100 A BOTTOM OF UNITS TO LEFT SIDE THROUGH CABLE CLAMP AND CO TERMINAL BOARD.
* 6. NUMBERS AT TERMINAL STRIP I SF-0410 PIN IDENTIFICATIONS/T CONNECTOR P/N SF-0410 PIN WI TERMINAL IDENTIFICATIONS/TE
7. ——— DENOTES S

MCCP, MDC 100 WIRING

DRG. NO.	
KM-0515	D
DATE	
10-13-77	



EAR VIEW OF CONNECTOR P/N SF-0410
MATES WITH MDC100 CONNECTOR P/N
SM-0284)

TO CONNECTOR P/N SF-0410 FOR 2ND MDC100.

TO CONNECTOR P/N SF-0410 FOR 3RD MDC100

NOTES:

1. CABLE SHALL CONSIST OF SIX PAIR INDIVIDUALLY SHIELDED NO. 22AWG STRANDED TINNED COPPER WIRES SUCH AS DEARBORN WIRE CO. P/N 962206, BELDEN WIRE CO. P/N 8778, OR ALPHA WIRE CO. P/N 6012.
2. OBSERVE THE FOLLOWING PRECAUTIONS WHEN INSTALLING CABLING:
   A. CABLE LENGTH SHALL NOT EXCEED 500 FEET MAX.
   B. DO NOT RUN CABLE ADJACENT TO ELECTRICAL POWER OR OTHER HIGH SIGNAL SOURCES OR CLOSE TO X-RAY, DIATHERMY, INDUCTION HEATING, OR RADIO TRANSMITTING EQUIPMENT.
   C. SECURELY ATTACH CABLE TO A FIRM SUPPORTING SURFACE USING MOUNTING CLAMPS OR BRACKETS; DO NOT USE STAPLES, TACKS OR NAILS.
   D. INSTALL CABLE IN A LOCATION THAT WILL PROVIDE PROTECTION FROM DAMAGE. IF CABLES ARE RUN ALONG BASEBOARD, MOUNT CABLE 5 INCHES OR MORE ABOVE FLOOR LEVEL TO AVOID WATER DAMAGE BY FLOOR MOPS OR BY FLOOR POLISHERS.
   E. DO NOT RUN CABLES IN CONTACT WITH WATER PIPES, OR NEAR HEAT SOURCES SUCH AS STEAM RADIATORS, ELECTRIC HEATERS, ETC...
3. TO ROUTE CABLE AND CONNECT WIRES TO CCP100 TERMINAL BOARD:
   A. SOLDER OR CRIMP SPADE LUGS TO WIRE ENDS FOR CONNECTIONS TO CCP100 TERMINAL STRIPS.
   B. CUT CABLE JACKET BACK 11 INCHES TO FACILITATE CONNECTING WIRE SHIELDS TO GROUND LUGS (SEE NOTE 4).
   C. ROUTE CABLE(S) THROUGH CABLE CLAMP, UNDER TERMINAL STRIP 4, AND ABOVE TERMINAL STRIP(S) 1, 2, AND/OR 3.
   D. CONNECT WIRES FROM CONNECTOR P/N SF-0410 FOR FIRST MDC100 TO TERMINAL STRIP 1; CONNECT WIRES FROM CONNECTOR FOR SECOND MDC100 TO TERMINAL STRIP 2; " " " " FOR THIRD MDC100 TO TERMINAL STRIP 3; WIRE CONNECTIONS FOR SECOND AND THIRD MDC100 ARE SAME AS SHOWN FOR FIRST MDC100.
4. SOLDER SHIELDS OF WIRE PAIRS CONNECTED TO TERMINALS A AND S, T, AND Z, AND E AND O OF TERMINAL STRIPS 1, 2, AND 3 TO GROUND LUGS.
5. WIRES CONNECTED TO MCA100 AND MCB100 TERMINAL STRIPS ARE ROUTED ALONG BOTTOM OF UNITS TO LEFT SIDE OF UNITS, DOWN TO BOTTOM OF MCC100, TO RIGHT THROUGH CABLE CLAMP AND CONNECTED TO TERMINAL STRIP 4 OF CCP100 TERMINAL BOARD.
6. * NUMBERS AT TERMINAL STRIP 1 WIRE CONNECTIONS DESIGNATE CONNECTOR P/N SF-0410 PIN IDENTIFICATIONS/TERMINATIONS; ALPHABETICAL CHARACTERS AT CONNECTOR P/N SF-0410 PIN WIRE CONNECTIONS DESIGNATE TERMINAL STRIP TERMINAL IDENTIFICATIONS/TERMINATIONS.
7. ——— DENOTES SIGNAL FLOW.

SCHEMATIC LIST	
MODEL	DWG. NO
MCB-100	KC-1305
MCC-100	KC-1303
MTG-100	KC-1309
MCR-100	KC-1306
CCP-100	KC-1304
SPL 1425	KC-1011
PSX 29A	KC-0934
K-1400	KC-0109
MCR-100A	KC-1326

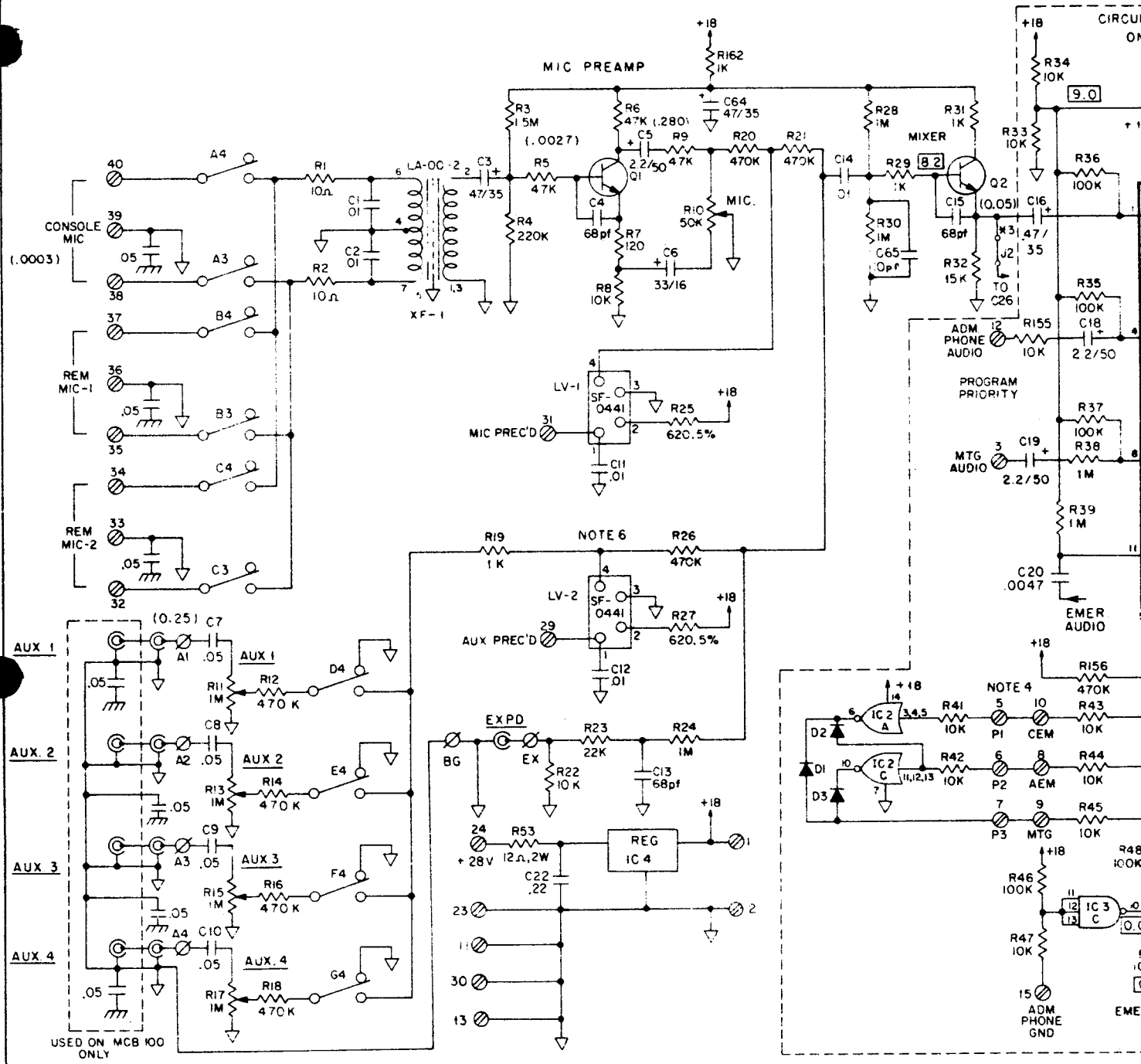
MCCP, MDC 100 WIRING

DIRECTOR SERIES WIRING DIAGRAM

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

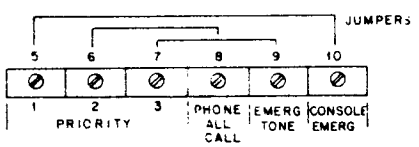
KM-0515 D

USED IN INSTRUCTION MANUALS
KI-1152 AND KI-1175



NOTES:

1. ▽ CIRCUIT COMMON, ⏚ CHASSIS GROUND
   □ DENOTES D.C. VOLTAGES MEASURED WITH A 20KOHM/VOLT METER AND NO SIGNAL INPUTS.
   ( ) DENOTES A.C. VOLTAGES MEASURED WITH AN A.C. VOLTOMETER WITH 1 MEGOHM INPUT IMPEADANCE
2. UNLESS OTHERWISE SPECIFIED, THE COMPONENTS ENCLOSED INSIDE THE DOTTED LINES ARE NOT USED ON THE MCB 100.
* 3. JUMPERS J1, J2 & J3 USED ON MCB ONLY.
4. JUMPERS ON TERMINALS 5-10 SET UP THE EMERGENCY PRIORITES. JUMPERS CAN BE REARANGED FOR ANY DESIRED PRIORITES

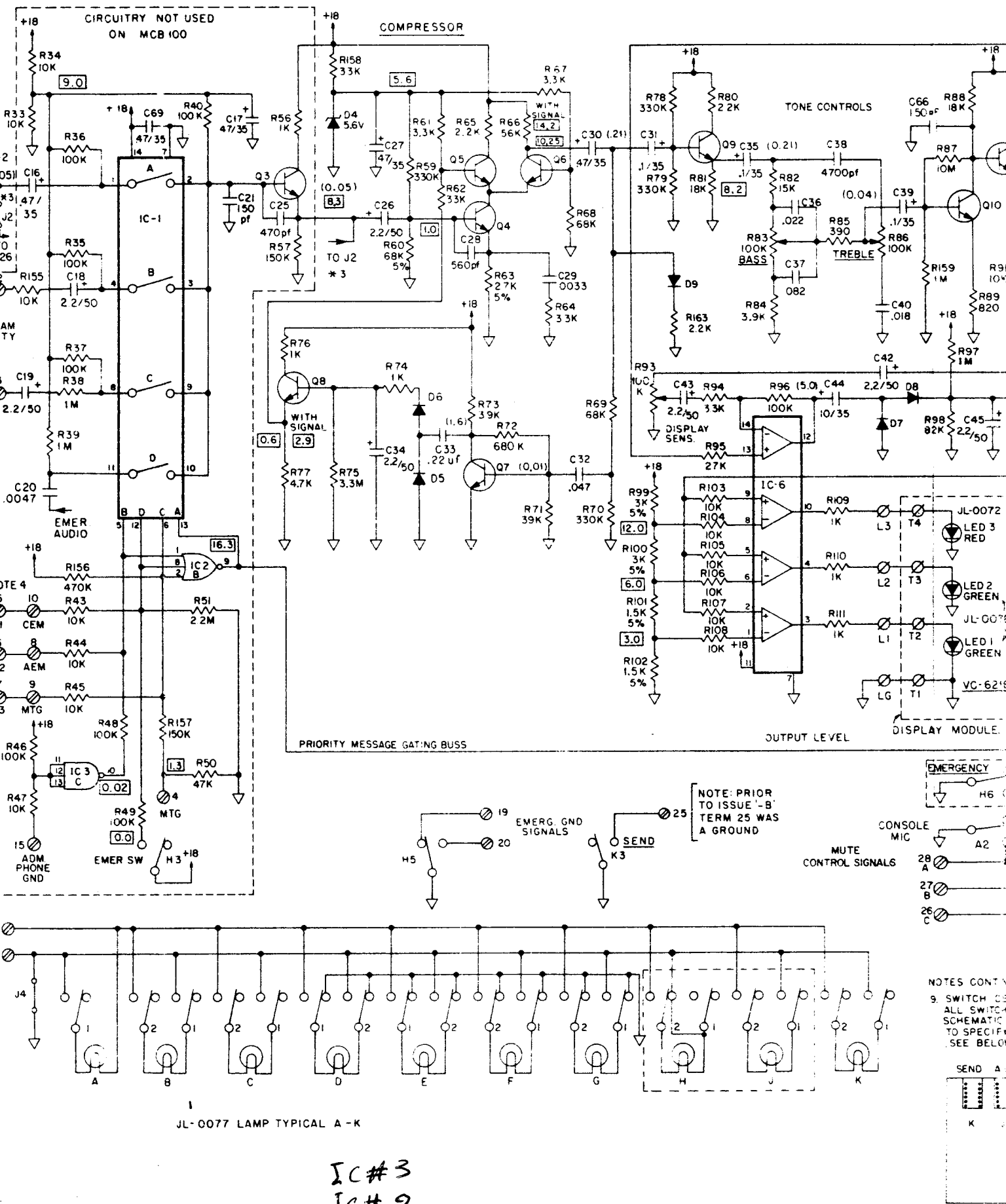


5. WHEN USED WITH TELECENTER REMOVE R160.
6. FOR AUX OR MIC PRECEDENCE, PLUG INTO LV1 AND/OR LV2 A RAULAND 47RCA PRECIDENCE MODULE. FOR REMOTE VOLUME CONTROL ALSO USE ONE OR TWO 47RVC REMOTE VOLUME POTS
7. SEMICONDUCTOR COMPONENTS:

TYPE	RAULAND P/N	SCHEMATIC REF NO	DESCRIPTION
7818	EC-0009	IC4	18V REGULATOR
4136	EC-0024	IC6	QUAD 741 OP AMP
4023	EC-0034	IC3	TRIPLE 3 INPUT NAND GATE
4025	EC-0035	IC2	TRIPLE 3 INPUT NOR GATE
4016	EC-0052	IC1, IC5	QUAD BILATERAL ANALOG SWITCH
TBA810S	EC-0061	IC 7	5 WATT AUDIO AMP
	ET-2N5089	Q4,5,6,8,9	NPN TRANSISTOR
	ET-MPS-A05	Q 16	NPN TRANSISTOR
	ET-MPS-A18	Q1,2,3,7,10,11,15	NPN TRANSISTOR
	ETS-014A	Q12,Q13,Q14	NPN TRANSISTOR
	IN457A	D1,2,3,5,6,7,8,9	SILICON SIGNAL DIODE
IN4734	JR-0090-12	D4	5.6V 1W

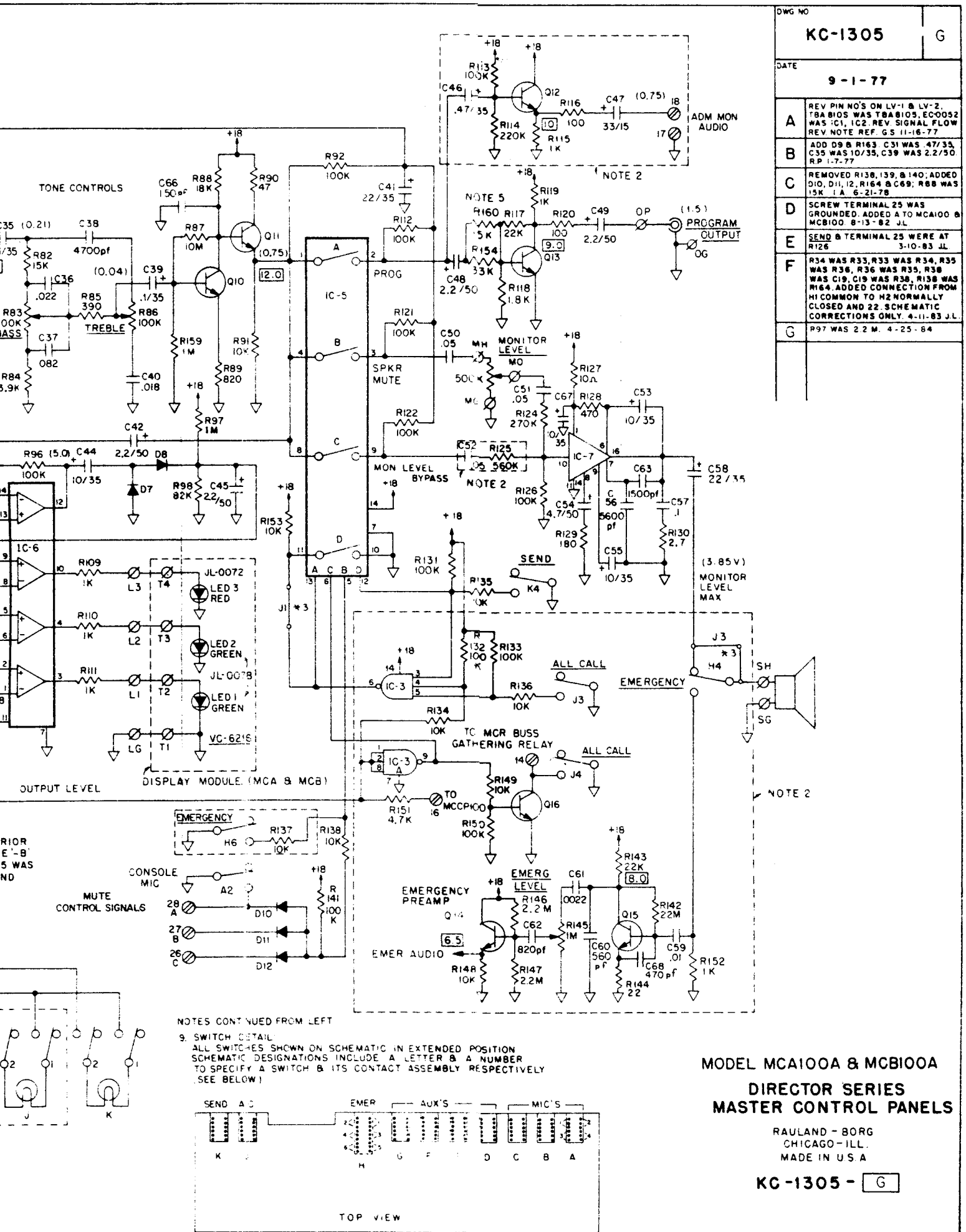
8. FOR WIRING DIAGRAM SEE KM-0570 PRINTED ON REVERSE SIDE

NOTES CONTINUED AT RIGHT



JL-0077 LAMP TYPICAL A-K

IC#3
IC#2


DWG NO
KC-1305
G
DATE
9-1-77
A REV PIN NO'S ON LV-1 & LV-2, TBA 810S WAS TBA 8105, EC-0052 WAS IC1, IC2. REV. SIGNAL FLOW REV. NOTE REF. G.S 11-16-77
B ADD D9 & R163. C31 WAS .47/35, C35 WAS 10/35, C39 WAS 2.2/50. R.P. 1-7-77
C REMOVED R138, 139, & 140; ADDED D10, D11, 12, R164 & C69; R88 WAS 15K. I.A. 6-21-78
D SCREW TERMINAL 25 WAS GROUNDED. ADDED A TO MCA100 & MCB100. 8-13-82 J.L.
E SEND & TERMINAL 25 WERE AT R126 3-10-83 JL
F R34 WAS R33, R33 WAS R34, R35 WAS R36, R36 WAS R35, R38 WAS C19, C19 WAS R38, R38 WAS R164. ADDED CONNECTION FROM H1 COMMON TO H2 NORMALLY CLOSED AND 22. SCHEMATIC CORRECTIONS ONLY. 4-11-83 J.L.
G R97 WAS 2.2 M. 4-25-84
TONE CONTROLS
TREBLE
BASS
IC-5
IC-6
IC-7
IC-3
PROG
SPKR MUTE
MON LEVEL BYPASS
MONITOR LEVEL
MO
MC
SEND
(3.85V) MONITOR LEVEL MAX
ADM MON AUDIO
PROGRAM OUTPUT
NOTE 2
NOTE 5
ALL CALL
EMERGENCY
TO MCR BUSS GATHERING RELAY
TO MCCP
EMERG LEVEL
EMERGENCY PREAMP
EMER AUDIO
CONSOLE MIC
MUTE CONTROL SIGNALS
OUTPUT LEVEL
DISPLAY MODULE (MCA & MCB)
JL-0072
LED 3 RED
LED 2 GREEN
JL-0078
LED 1 GREEN
VC-6216
NOTES CONTINUED FROM LEFT
9. SWITCH DETAIL
ALL SWITCHES SHOWN ON SCHEMATIC IN EXTENDED POSITION
SCHEMATIC DESIGNATIONS INCLUDE A LETTER & A NUMBER TO SPECIFY A SWITCH & ITS CONTACT ASSEMBLY RESPECTIVELY (SEE BELOW)
SEND
EMER
AUX'S
MIC'S
TOP VIEW
MODEL MCA100A & MCB100A
DIRECTOR SERIES
MASTER CONTROL PANELS
RAULAND - BORG
CHICAGO - ILL.
MADE IN U.S.A.
KC-1305 - G