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TECHNICAL MANUAL

JH-400B
SERIES CONSOLE

PRINTED

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This SERVICE AND REPAIR manual supplies all of the information needed to correctly operate and maintain a Series JH-400B Console. The language and the presentation of material is as simple as possible, designed to be quickly and accurately understood by anyone with a technical background.

No discussion of design problems or solutions is included, since such information—although interesting—does not contribute to the purpose of this manual.

The sectional tabs allow quick location of all sections. *(All MCI manuals are organized in this same way.)*

Note that the OPERATION section gives a simplified explanation of the THEORY OF OPERATION. ALL unusual circuits are covered in detail. NO MAINTENANCE or REPAIR should be attempted until this section has been studied carefully.

INTRODUCTION

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INDEX OF ILLUSTRATIONS

DESCRIPTION

2.0 DESCRIPTION

The JH-400B Series Console is an IN-LINE console with all of the circuits needed for one complete MIKE CHANNEL and one complete REMIX CHANNEL in each I/O module. Therefore the number of input/output channels is completely flexible. Any number of I/O modules—up to the maximum for each frame—may be operated in any console. If additional channels are needed, they may be added by simply plugging in new I/O modules.

A proprietary Op-Amp, custom designed for optimum Audio performance is used throughout the console. In critical stages this Op-Amp drives a complementary pair of transistors in an output configuration which produces a complete Audio amplifier with very low impedance, low distortion, unusually good transient response and high drive capability.

This proprietary Op-Amp allows all of the internal circuits in the JH-400B consoles to operate at 0dBv instead of the usual -6dBv. Its larger voltage swing allows more headroom than most consoles in spite of the higher program level. With a program level 6db above the usual level, the signal-to-noise ratio is improved and the RF rejection on all summing buses is improved by 6db.

The JH-400B Series Consoles are supplied in two frame sizes—the JH-428B and the JH-440B. *(Dimensions are shown in the Specification Section.)*

The JH-428B is wired and tested for up to 28 INPUT/OUTPUT (I/O) modules with five Console Control modules:

1. A COMMUNICATION module.
2. A MASTER module.
3. A CONTROL ROOM MONITOR module.
4. A STUDIO MONITOR module.
5. A STATUS module.

The JH-440B Console is wired and tested for up to 40 I/O modules with the same complement of Console Control modules.

2.1 STANDARD FEATURES

Standard features for all JH-400B Series Consoles include:

1. Twenty-four output buses are provided.
2. Five Echo Return circuits are provided. Four of these circuits have full quad panning, and the fifth has full channel assignment capabilities.
3. Three Console Programming buttons are provided, which switch all I/O modules into MIKE mode, TAPE mode, or REMIX mode.

4. REMIX mode outputs include:

   QUAD MIX
   2-MIX derived from the QUAD MIX
   MONO MIX derived from the QUAD MIX
   Two ECHO SENDS
   Two CUE SENDS

   All of the above outputs are available simultaneously.

5. "Variable Q" EQ circuits on each I/O module. The center frequencies of the filters and the rolloff points of Shelf circuits are musically related to each other. A sufficient number of switch points is provided to allow selection of the exact amount of EQ required. Switches used for all circuits allow EXACT reproduction of any EQ previously used.

6. The JH-400B Consoles are NOT Automation-ready, since they do not have the VCAs incorporated into the basic design. However, they have been mechanically designed for easy installation of the necessary Fader Packages. Automation is easy to install.

For a description of the optional equipment available on these Consoles, see the section on OPTIONS.

OPERATION

3.0 OPERATION

The quickest way to become familiar with the operation of the JH-400B Series Console is to study the FLOW CHART on page 3-7. This chart shows the FUNCTIONS performed in each module, and their relationship to each other. Switching, interconnections, etc. are shown in simplified form. Functions ONLY are shown.

Programming controls for THREE MODES OF OPERATION are supplied on the STATUS module. When these buttons are pressed, all I/O modules are switched into one of the three modes. To understand the three modes, it is necessary to follow the signal flow when the appropriate relays are activated.

3.1 MIKE MODE

Neither MONITOR relays nor REMIX relays are activated for this mode.

From the MIKE input, the signal flows through the Mike preamp to the CHANNEL FADER, then through the EQ circuits. The CHANNEL BUS assignment switches come next. *(Including the direct assign switch and a feed to the ECHO switch.)*

Each I/O module contains ONE CHANNEL ACN which is the output amplifier for the CHANNEL BUS having the same number as the I/O module. In addition to feeding the TAPE MACHINE OUTPUT, this amplifier also feeds the MONITOR circuits. *(Through the MONITOR relay contacts.)*

The MONITOR amplifiers distribute the signal to the CUE SENDS, the ECHO SENDS, and the QUAD MIX BUSES *(via the PANNING controls)*.

In this mode, the meters read the output of the CHANNEL ACN *(which is the TAPE MACHINE INPUT level)*.

MIKE mode is used for setting up a taping session. Assignment of channels, recording levels, monitor adjustments, cue send adjustments, and echo send adjustments can all be made in this mode.

The recording can be made in either MIKE mode or in TAPE mode.

3.2 TAPE MODE

In this mode, the MONITOR relays are activated. REMIX relays are not activated.

The Signal flow from the MIKE input through the CHANNEL FADER, the EQ circuits and the CHANNEL BUS assignment switches is the same as it was in MIKE mode. The CHANNEL ACN feeds the TAPE MACHINE output.

When the MONITOR relays are activated, the MONITOR circuits get their signal from the TAPE RETURN input. The MONITOR circuits feed the CUE SENDS, the ECHO SENDS, and the QUAD MIX BUSES in the same way they did in MIKE mode.

In this mode, the meters read the TAPE RETURN level.

The only difference between MIKE mode and TAPE mode is that in MIKE mode the monitors are listening to the program material BEFORE it goes to the TAPE MACHINE, while in TAPE mode, the monitors are listening to the program material AFTER it has been sent to the Tape machine and returned via the TAPE RETURN line.

NOTE THAT THIS DOES NOT MEAN THAT YOU ARE LISTENING TO THE CHANNEL AFTER IT HAS BEEN RECORDED. THE TAPE RETURN LINE MONITORS THE INPUT TO THE TAPE MACHINE DURING RECORD MODE.

TAPE mode is normally used to listen to what you have recorded without having to change the monitor mix. The monitors are fed from the TAPE RETURN LINE. When the Tape machine is in PLAY mode, the TAPE RETURN LINE monitors the output of the PLAY head.

ANY INDIVIDUAL I/O MODULE CAN BE SWITCHED BACK TO MIKE MODE FROM TAPE MODE BY PRESSING THE MON BUTTON. THIS MUST BE DONE IN OVERDUBBING. *(The MON button releases the MONITOR relay.)*

3.3 REMIX MODE

In this mode, BOTH the MONITOR relays and the REMIX relays are activated.

The REMIX relay switches out the Mike input and connects the TAPE RETURN INPUT to the CHANNEL FADER. The EQ circuits and the CHANNEL BUS and the CHANNEL ASSIGNMENT structure is being fed from the TAPE RETURN. The EQ output also feeds *(through the REMIX relay contacts)* the MONITOR circuits. CUE SENDS, ECHO SENDS, and the QUAD MIX BUSES are all fed from the output of the EQ.

Note that the TAPE MACHINE OUTPUT terminals are live, and may be used as additional SENDS.

In this mode, the meters read the TAPE RETURN level.

ANY INDIVIDUAL I/O MODULE CAN BE SWITCHED BACK TO TAPE MODE FROM REMIX MODE BY PRESSING THE FDR BUTTON. TO SWITCH THE MODULE FROM REMIX MODE TO MIKE MODE, PRESS BOTH THE FDR BUTTON AND THE MON BUTTON. *(The FDR button releases the REMIX relay, the MON button releases the MONITOR relay.)*

NOTE: In REMIX mode the rotary MONITOR FADER has no control over the monitor level. The CHANNEL linear fader controls the monitor level.

When the FDR switch is pressed on any modules, changing that module back to TAPE mode, the rotary MONITOR FADER again has control of the MONITOR level. The CHANNEL linear fader no longer has control of the monitors.

REMIX mode is used to combine the outputs of the multitrack recorder into the final tracks to be used in making the record.

3.4 OVERDUBBING

TAPE mode is normally used for overdubbing. The multitrack machine must be in CUE (sync) mode *(Record head being used for playback)*. At the moment when the OVERDUB is to begin, the tracks to be re-recorded must be put into RECORD mode. The console mode will not need to be changed. When the OVERDUB is complete, the only change needed is to switch the tape machine back to PLAY mode.

3.5 SUMMARY

MIKE mode occurs when both the MONITOR relays and the REMIX relays are inactive. This mode is used for preliminary setup and for taping.

TAPE mode occurs when the MONITOR relays are activated, and the REMIX relays are NOT activated. This mode is used for taping, for listening to recorded material, and for overdubbing.

Any individual channel which is in TAPE mode may be returned to MIKE mode by pressing the MON button *(releasing the MONITOR relay)*.

REMIX mode occurs when BOTH the MONITOR relays and the REMIX relays are activated. This mode is used for MIXDOWN functions.

Any individual channel which is in REMIX mode can be returned to TAPE mode by pressing the FDR button *(releasing the REMIX relay)*.

Any individual channel which is in REMIX mode can be returned to MIKE mode by pressing BOTH the FDR button and the MON button *(releasing BOTH the REMIX relay and the MONITOR relay)*.

3.6 ECHO SWITCH

In REMIX MODE, the ECHO switch is a PRE *(fader)* - POST *(EQ)* selector for the input to ECHO SEND #1.

In MIKE or TAPE mode, the ECHO switch is used as a "WET" switch to allow ECHO to be recorded on the MASTER TAPE.

When recording ECHO, a feedback loop may be formed unless the FEED POINT to the ECHO SEND is chosen carefully. The following BLOCK DIAGRAMS show the problem and the solution:

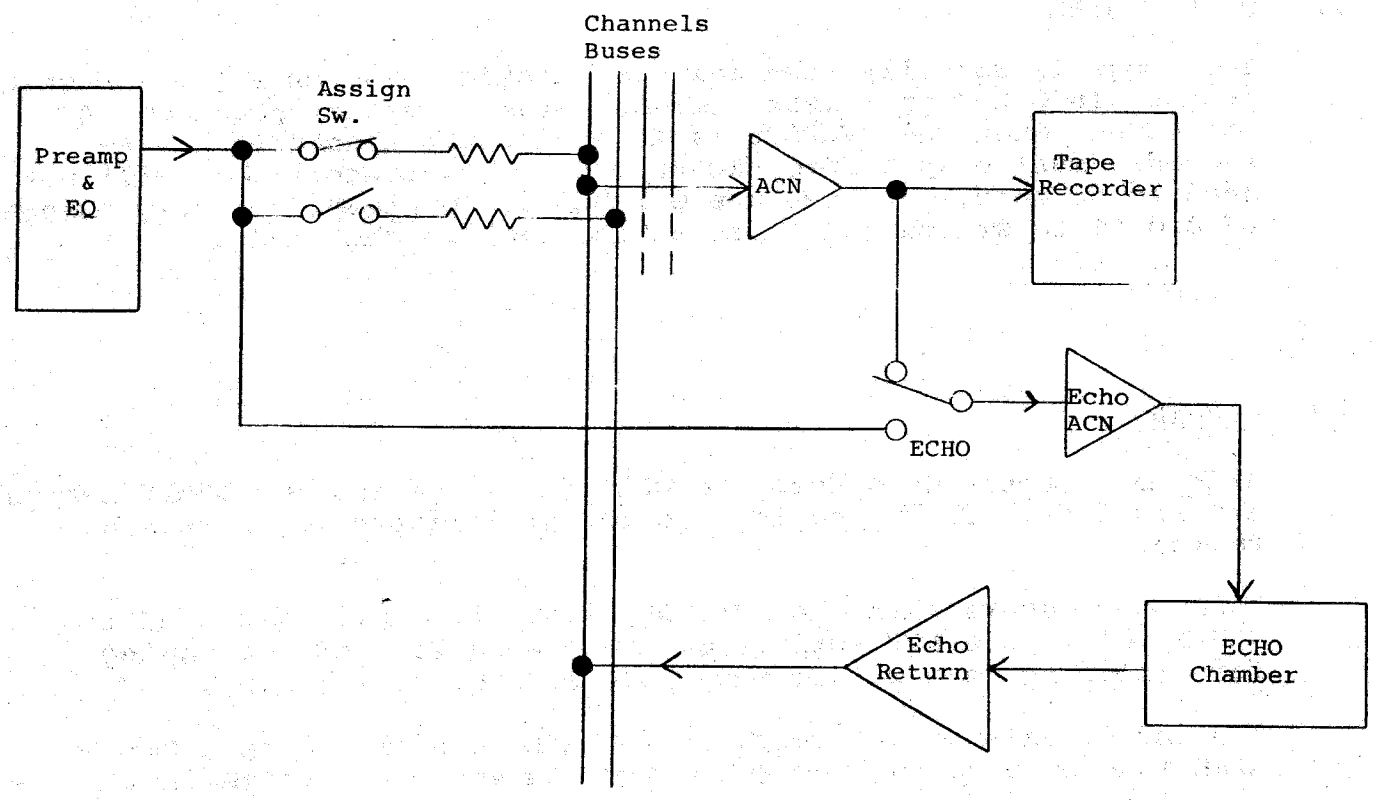


Figure 11 This arrangement produces a feedback loop.

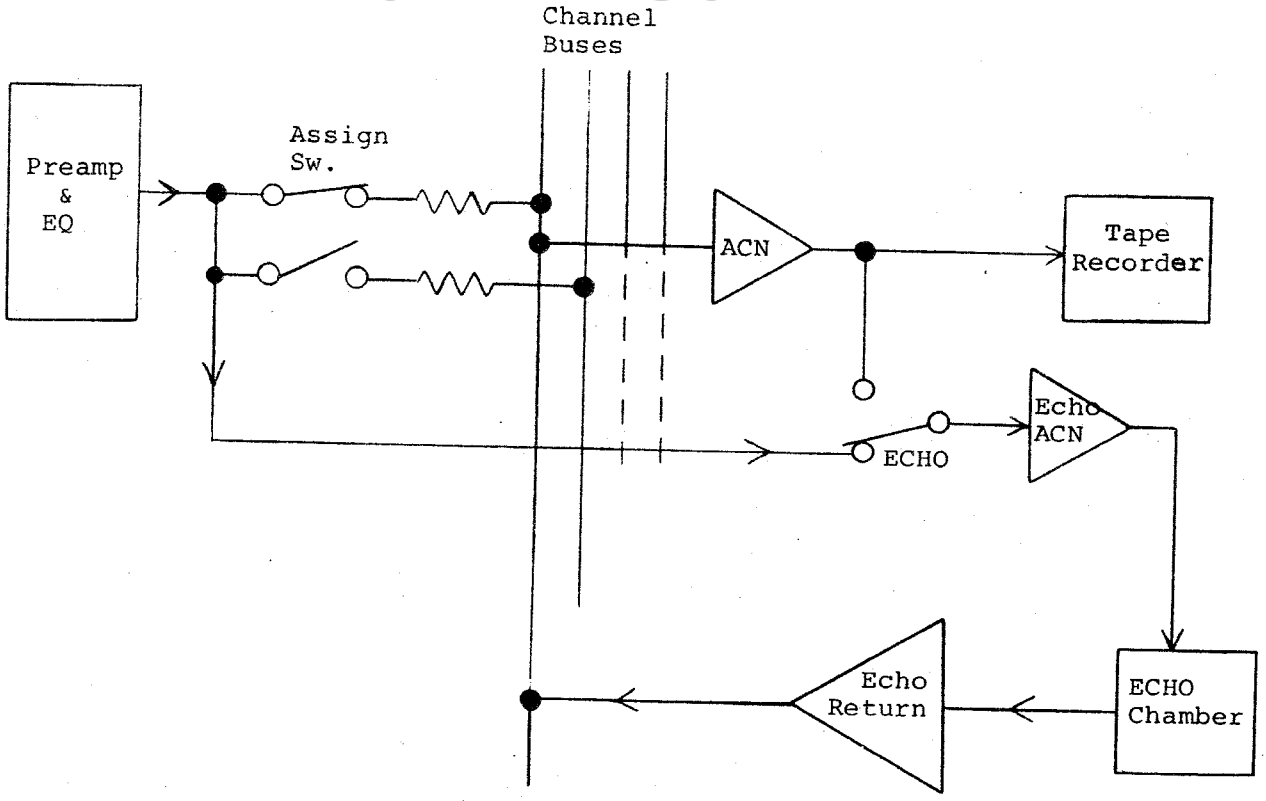


Figure 12

No feedback loop is produced by this arrangement.

3.7 LIGHT METER OPTION

The JH-400B LIGHT METER uses a separate POWER SUPPLY, a MASTER CONTROL BOARD, and one CHANNEL BOARD for each meter.

The MASTER CONTROL BOARD generates the precision RAMP which is used on each CHANNEL BOARD to measure the AUDIO SIGNAL LEVEL. *(See the LIGHT METER BLOCK DIAGRAM on page 3-10).*

Each CHANNEL BOARD controls a set of eight lights which display the level of the AUDIO SIGNAL in one channel.

3.7.1 RAMP GENERATOR

(See Schematic, Figure 29, Page 10-21)

Two "one shot" multivibrators alternately trigger each other and clock a BCD COUNTER through each step from 0000 to 1001 *(0 through 9)*, resets, then repeats the sequence. The counter drives a BCD TO DECIMAL DECODER whose decimal outputs go LOW as the equivalent binary input is fed to it.

The DECODER drives a D/A *(Digital to Analog)* CONVERTER which is contoured to produce a logarithmic change in ten steps. The VOLTAGE DIVIDER, R3-R12, feeds a signal voltage to IC5 which varies from +15 volts to +7.5 volts, depending on which output of the DECODER is pulled to ground potential.

The RAMP output is a positive-going, 15 volt, 10 step, logarithmic shaped wave, with a repetition rate of about 5 to 6 kHz.

The BCD information developed by the COUNTER is also fed into buses to be used by all of the Channel Cards.

3.7.2 CHANNEL BOARDS

(See Schematic, Figure28, Page 10-19)

The incoming AUDIO SIGNAL is rectified and filtered to produce a changing DC voltage which is equivalent to the AUDIO LEVEL. This level is compared to the RAMP coming from the MASTER CONTROL BOARD.

When the RAMP exceeds the AUDIO SIGNAL level, the COMPARATOR output switches to the positive rail and sends a signal to the QUAD LATCH.

The QUAD LATCH receives as its input signal, BCD information from the MASTER CONTROL BOARD. This BCD information is IN STEP with the RAMP *(since the BCD drives the D/A converter which produces the RAMP)*. When the COMPARATOR switches, the QUAD LATCH is clocked, and its output matches the input it is receiving at the moment.

NOTE: *The QUAD LATCH CLOCK works ONLY on the POSITIVE-GOING EDGE of the signal. It will not respond to either a HI level or a LO level signal.*

The DIGITAL "WORD" on the output of the QUAD LATCH is held until a new CLOCK PULSE is received from the COMPARATOR.

The output of the QUAD LATCH drives a BCD TO DECIMAL DECODER. The decimal output corresponding to the digital "WORD" goes to ground potential and turns ON its light.

NOTE: *Outputs corresponding to "0" and "1" have not been supplied with a light. This means that the DISPLAY is unlighted when the AUDIO SIGNAL is at its lowest level.*

A NEW LEVEL COMPARISON IS COMPLETED EVERY 0.2 MILLISECONDS.

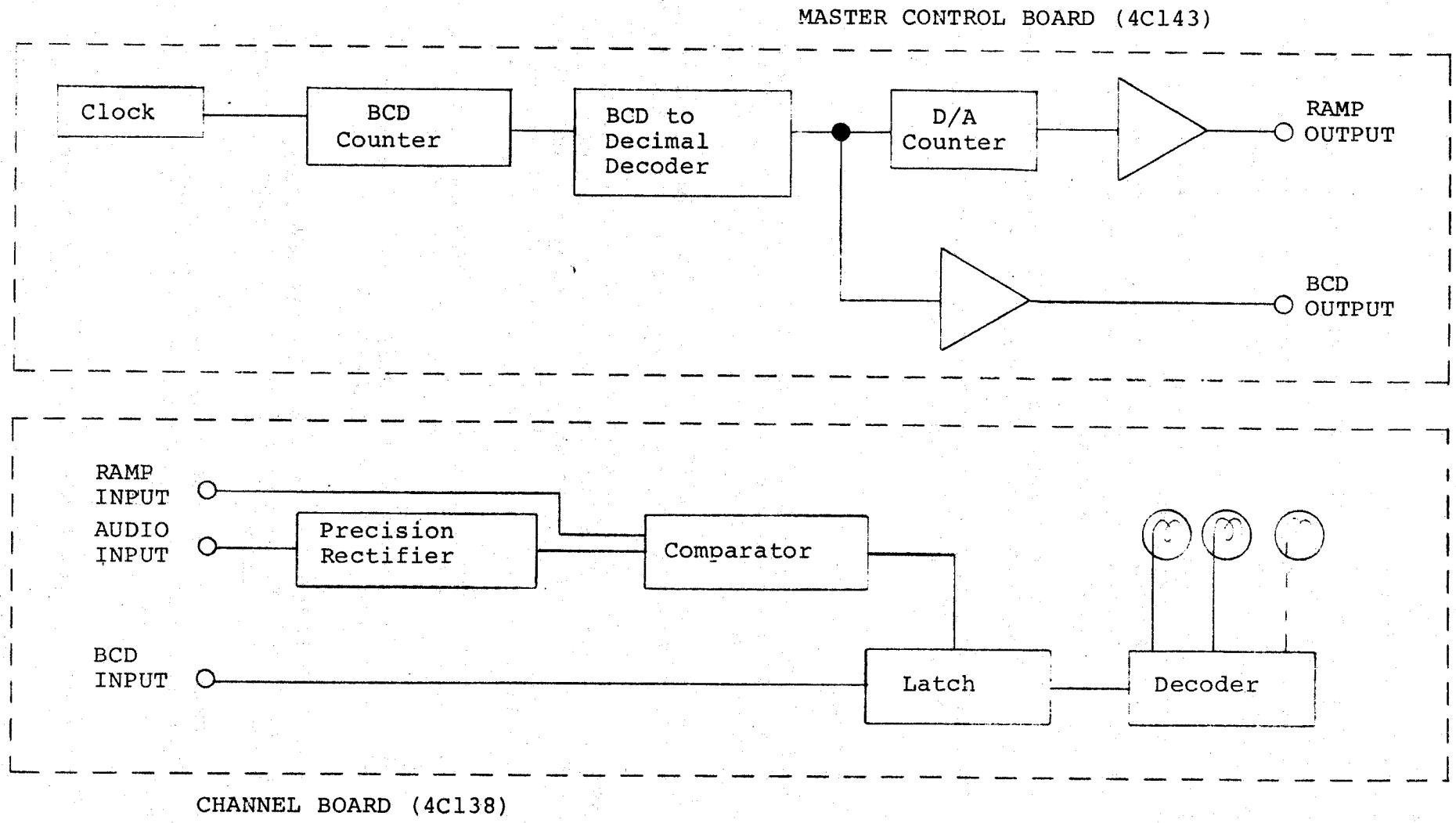


Figure 13

BLOCK DIAGRAM JH-400B LIGHT METER

TROUBLESHOOTING

6.0 TROUBLESHOOTING

6.1 GENERAL INSTRUCTIONS

Most of the process of troubleshooting the JH-400B CONSOLE can be accomplished through the PATCH BAY. The process is called PROGRESSIVE ISOLATION, and use the FLOW CHART, page 3-7 as a guide.

The FLOW CHART is your most reliable guide to the relative positions of the PATCH POINTS and the FUNCTIONS found in each module. With proper use of the built-in signal generator, the patch bay, and the flow chart, you should be able to isolate any problem within a few components before you remove a single panel.

There are two preliminary steps which are important enough to be called RULES to be followed BEFORE you start troubleshooting:

1. FAMILIARIZE YOURSELF with the SIGNAL FLOW in the console.

   A. There are THREE MODES of operation in the JH-400B. They are fully explained on pages 3-1 through 3-3 of this manual.

      FOLLOW THE SIGNAL FLOW FOR EACH MODE.

   B. Be sure that you know the ORDER in which the signal passes through each FUNCTION. (*i.e.- Channel Fader, EQ circuit, Pan controls, etc.*)

2. FAMILIARIZE YOURSELF with the position of each PATCH POINT.

   A. Patch Bay information is available on page 8-5 of this manual.

   B. The FLOW CHART on page 3-7 shows the position of each patch point - LOCATED ON THE SIGNAL PATH.

EVERYTHING NEEDED TO PREPARE YOURSELF TO LOCATE TROUBLE IN THE CONSOLE IS AVAILABLE IN THIS MANUAL.

6.2 SIGNAL SUBSTITUTION

A. Use the AUDIO GENERATOR located in the COMM module as a signal source. The "TRKS" and "MIX" switches on this module connect the signal to the Channel Buses, or to the Quad Mix Buses.

   You may also pick up this signal at the "OSC" jack in the Patch Bay.

B. USE THE FLOW CHART to follow the signal flow through the console. LOCATE THE SPECIFIC SECTION where the signal is lost.

OPTIONS

7.0 OPTIONS

The following options are available when ordered as part of the original console:

OPTION NO.	DESCRIPTION
1	Built-in "SPECTRA VUE" real time analyser
2	56 extra tie line patch points (for JH-428B frames only)
3	"Mike" patchbay, 28 inputs/outputs normalized (for JH-428B frames only)
4	80 extra tie line patch points (for JH-440B frames only)
5	"Mike" patchbay, 40 inputs/outputs normalized (for JH-440B frames only)
6	First "joystick"—panner installed in writing surface including summing amplifiers for up to total of 8 "joystick" panners
7	Up to 7 additional "joystick"—panners installed as Option 6 (specify quantity) each
8	Extra length power supply cables (per foot per cable over 30 feet) Note: JH-428B & JH-440B VU frames: total of 3 cables JH-428B & JH-440B LM frames: total of 4 cables
9	Not assigned
10	Additional channel VU meters (above standard supply of 24 VU meters), connected and labeled as per request (for JH-440B frames only) each
11	Additional channel Light Meters (above standard supply of equal amount as I/O modules installed) connected and labeled as per request (for JH-440B and JH-428B frames) each
12	Built-In Phase Meter
13	"SEND" meters (maximum of 2, depending on other Options requested) each Note: Specify connection and labeling desired.

SPECIFICATIONS

8.0 SPECIFICATIONS

8.1 ELECTRONIC SPECIFICATIONS

FREQUENCY RESPONSE

The JH-400B Series Console is rolled off at 20Hz and 20kHz to minimize room rumble and RF problems in the studio. Any input to any output will measure better than +¼ -½ from 20Hz to 20kHz.

HEAD ROOM

Careful attention has been taken to ensure adequate headroom in the equalizer and MIX bus section of the JH-400B console. Output headroom will exceed the capabilities of any tape machine system. Headroom specs are defined as the number of db between normal level and the maximum 1kHz sine wave level at .5% T.H.D.

	MAX	HEADROOM
Mike Preamp	+24dBv	30dBv
Equalizer	+24dBv	23dBv
Quad Mix Buses (ahead of fader)	+22dBv	24dBv
Channel Line Out	+22dBv	18dBv
Mix Outputs	+22dBv	18dBv

OVERALL GAIN

Measured Mike input to channel line output with a 150 ohm source impedence and 10k ohm output termination— 72 dB.

CROSSTALK

Crosstalk will vary slightly with the size of the console. High frequency crosstalk is caused primarily by capacitive coupling between input lines and summing buses. Low frequency crosstalk is a function of power supply decoupling and transformer coupling.

I/O MODULE LINE INPUT TO MIKE CROSSTALK

This measurement is a measure of crosstalk between the monitor channel and the Mike channel of a module with the module in TAPE mode. It is made with a 150 ohm resistor terminating the Mike Input and a +4dBv signal into the channel line input.

at 1kHz, 60db below +4dBv
at 18kHz, 38db below +4dBv

Specifications subject to change without prior notification.

CHANNEL LINE INPUT IMPEDANCE

600 ohm at 1kHz

MIKE INPUT IMPEDANCE

1.5k ohm at 1kHz

CHANNEL LINE OUTPUT IMPEDANCE

1.2k ohm at 1kHz with pad 100 ohm at 1kHz

8.2 MECHANICAL SPECIFICATIONS

	CONSOLE WEIGHT	SHIPPING WEIGHT *(with required power supplies)*
JH-428VU	199 kilograms 439 lbs	290 kilograms 640 lbs
JH-428LM	264 kilograms 582 lbs	307 kilograms 677 lbs
JH-440VU	290 kilograms 640 lbs	414 kilograms 913 lbs
JH-440LM	310 kilograms 683 lbs	436 kilograms 961 lbs
Console Power Supplies *(3 req'd)*	12.25 kilograms 27 lbs	
Light Meter Power Supply	6.8 kilograms 15 lbs	

Specifications subject to change without prior notification.

8.4 PATCH BAY FACILITIES

PREAMP OUT/LINE RETURN *(normalized pair)*	1-28	Output from the REMIX switch
FADER INPUT	1-28	Inserts signal before the Fader
TAPE MACHINE RETURN *(normalized pair)*	1-28	Signal from Tape before the line input trans.
CHANNEL LINE INPUT	1-28	Inserts signal into the line input trans.
CHANNEL LINE OUTPUT *(normalized pair)*	1-28	Output from the channel output trans.
TAPE MACHINE INPUT	1-28	Inserts signal into the multitrack tape input

In addition to the above patch points for each channel, the following REMIX and Console function patch points are available.

QUAD MIX OUTPUT	1-4	4 TK TAPE INPUT	
2 MIX OUT	1-2	2 TK TAPE IN	
MONO OUT	1	MONO TAPE IN	
TAPE 1 IN	1-2	TAPE 1 RET	
TAPE 2 IN	1-2	TAPE 2 RET	
CUE SEND	1-2	CUE AMP IN	
ECHO SEND	1-2	CHAMBER IN	
CHAMBER RETURNS	1-4	RETURN INPUTS	
4 TK TAPE RETURN	1-4	2 TK TAPE RETURN	1-2
MONO TAPE RETURN	1	OSCILLATOR	1
MULT 1	1-4	MULT 2	1-4
TIE LINES	1-56		

Specifications subject to change without prior notification.

SYSTEM RESOLUTION

100db Fader range is divided into 250 steps of .4db/step. This translates into full 8-bit resolution.

SYSTEM ACCURACY

A-to-D and D-to-A is adjustable to better than System Resolution. System Resolution (0.4db) becomes System Accuracy when this adjustment is properly made.

DITHER (exclusive of system 0.4db maximum resolution)

0.4db maximum

CUMULATIVE SYSTEM ERROR (unlimited passes)

Total error is 0.4db. This error does NOT accumulate. (READ mode ONLY. Other modes are subject to operator changes.)

SCAN TIME

102 milliseconds.
The SCAN TIME is NOT a delay, and does NOT accumulate.

BOUNCE DELAY

1.2ms per pass.
The BOUNCE DELAY IS a delay which accumulates with each UPDATE pass.

DATA RATE

9600 Baud (14kHz bandwidth)

COMPATIBILITY.

Tapes made on a standard Automated JH-400B or JH-500 Console may be played back on any other standard Automated JH-400B or JH-500 console.

POWER REQUIREMENTS

Separate power supply provides: +5v @ 5 amps; ±15v @ 3 amps.
Line requirements: 100v @ 2 amps; 120v @ 2 amps; 240v @ 1 amp.

MECHANICAL

HOUSING

The Processor, the Digitizers, and the Power Distribution boards are housed in a case which mounts underneath the JH-400B Console.

Specifications subject to change without prior notification.

WARRANTY

9.0 SERVICE AND WARRANTY

The following Limited Warranty is designed to assure our customers of reliable and competent help in the event of equipment malfunctions or failures. *This warranty gives you specific legal rights, and you may have other rights which vary from state to state.*

WARRANTY:

MCI Warrants all of its products to be free of defects in material and workmanship for a period of ninety (90) days from the date of installation. During the above period, any defective part(s) will be either repaired or replaced at the discretion of MCI. Installation labor will be supplied by the MCI dealer who installed your equipment. Travel expenses from the dealer's Service Center to your place of business are excluded from this warranty.

The following components are warranted for an additional period of nine months *(a total period of one year)*. Installation labor is NOT included in this additional period.

A. Heads
B. Motors
C. Solenoids
D. Faders
E. Meters
F. Transformers

LIMITATIONS:

All warranties, either written or implied, are void if this equipment was assembled or installed by anyone other than an MCI approved dealer. MCI's obligation is limited to repairing or replacing the defective part(s) which are returned to the factory. *Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.*

The Warranty card shipped with this manual MUST be signed by BOTH the Dealer who installs the equipment and the Customer. This card MUST be returned to MCI within ten (10) days after the installation date.

WARRANTY SERVICE:

For a quick resolution of any Warranty problem, contact the dealer who installed your equipment. He is required by MCI to supply service under the provisions of this Warranty. If necessary, your dealer will secure Prior Permission from MCI to return parts to the factory for inspection, repair, or replacement.

If there is any question concerning operation or service of any of the MCI products, please contact:

MCI Customer Service
4007 NE 6th Avenue
Ft. Lauderdale, Fla. 33334 USA

Telephone (305) 566-2853

Telex 514362 MCI FTL

SCHEMATICS

INDEX OF SCHEMATICS

SPARE PARTS

11.0 SPARE PARTS

11.1 MINIMUM PARTS KITS

The following lists of parts are the MINIMUM inventory of spare parts which should be kept for maintenance of a JH-400B Series Console. Each of the following three kits is available at a nominal additional charge WITH THE ORIGINAL ORDER ONLY.

Kit No. 4300-0117-00 is for a JH-400B console with VU meters.

Kits no. 4300-0117-00 and no. 4300-0118-00 are for a JH-400B console with light meter option.

Kits no. 4300-0117-00 and no. 4300-0305-00 are for a JH-400B console with VU meters and JH-50/400B Automation option.

Kits no. 4300-0117-00,no.4300-0118-00, and no. 4300-0305-00 are for a JH-400B console with BOTH light meter option and with JH-50/400B Automation option.

KIT NO. 4300-0117-00

NO.	PART NO.	DESCRIPTION
1	MJE105	Transistor
1	MJE205	Transistor
1	NPC139	Transistor
2	S39568	Transistor
2	S39569	Transistor
1	2N2270	Transistor
1	2N4354	Transistor
1	2N5416	Transistor
1	PTS-1-UID	Transistor socket
1	MR752	Rectifier diode
1	1N5231B	Zener diode -5.1v
1	1N5252	Zener diode -24v
1	:5M24ZS1	Zener diode -24v, 1%
6	MCI2001	Op-amp
2	MCI2003M	Op-amp
1	TLO84	Quad op-amp
2	741BE	Op-amp
2	741CP	Op-amp
1	MV5075	LED - red
1	MV5274C	LED - green
1	MV5374C	LED - yellow
2	335	Lamp 24v
1	01-903	Lamp 24v Unimax
2	F4UEE	Shadow switch
1	F8UEE	Shadow switch
1	AZ521-07-10	Relay 4PDT
2	RA30321911-99	Electrol relay
1	R714B	Punch tool
1	MC4100-0183-01	Tee Handle *(Module extractor)*
1		Touch-up paint kit

KIT NO. 4300-0118-00

NO.	PART NO.	DESCRIPTION
2	2N2270	Transistor
2	2N4354	Transistor
2	4741	Quad op-amp
1	7417	Hex buffer
2	7445J	BCD decoder/driver
2	74121	Monostable Multivibrator *(One-shot)*
2	74175	Quad "D" flip-flop
1	74192	4-bit up-down counter
1	1N5231B	Zener diode - 5.1v
5	OL 2187	Lamp

KIT NO. 4300-0305-00

NO.	PART NO.	DESCRIPTION
3	2N3904	Transistor
2	2N4354	Transistor
3	2N5638	N-channel FET
1	1N5245B	Zener diode - 15v
1	LM340K-15	Pos. Voltage regulator *(+15v)*
1	LM320K-15	Neg. Voltage regulator *(-15v)*
2	MCI2003P	Op-amp
1	TLO81	Op-amp
2	TLO82	Dual op-amp
1	MV5075	LED - red
1	MV5274C	LED - green
1	MV5374C	LED - yellow
3	SWA-0034	SPDT momentary switch

11.2 PARTS FOR FULL MAINTENANCE AND REPAIR

The following kit of parts may be purchased as an option and will be found useful for more extensive repairs to the JH-400B.

KIT NO. 4300-0306-00

NO.	PART NO.	DESCRIPTION
2	S39568	Transistor
2	S39569	Transistor
2	NPC139	Transistor
2	2N2270	Transistor
2	2N3053	Transistor
2	2N3568	Transistor
1	2N4249	Transistor
2	2N4354	Transistor
2	2N5416	Transistor
2	MR752	Rectifier diode
1	250JB2L	Bridge rectifier
2	1N5231B	Zener diode -5.1v
2	1N5252	Zener diode - 24v
1	MV5075C	LED - red
1	MV5274C	LED - green
1	MV5374C	LED - yellow
5	335	Lamp
2	01-903	Unimax lamp
1	420-8CA-B	8-pin op-amp socket
2	22MF25V-CLY	Electrolytic capacitor
2	100MF25V-CLY	Electrolytic capacitor
2	220MF40V-CLY	Electrolytic capacitor
2	.18-OHM-10%-3W	Resistor
1	SP-7000-0162-01	1k Dual linear pot.
1	SP-7000-0158-01	5k pot.
1	SP-7000-0158-04	5k pot.
1	SP-7000-0159-03	10k audio pot.
1	SP-7000-0159-04	10K CCW audio pot.
1	SP-7000-0159-01	10k Quad linear pot.
1	SP-7000-0160-02	25k pot w/switch
2	F4UEE	Shadow switch
1	F8UEE	Shadow switch
1	MST 205N	Toggle switch
1	01-282	Unimax switch
1	SPA7000-0164-01	Grayhill switch
1	SPA7000-0165-01	Grayhill switch
1	SPA7000-0166-01	Grayhill switch
1	AZ521-07-10	Relay 4PDT
1	RA30321911-02	Electrol relay
1	SP7000-0106-00	Toroid
1	SP7000-0108-00	Transformer
1	SP7000-0125-00	Transformer

INSTALLATION

13.0 INSTALLATION

13.1 PUNCH BLOCK CONNECTIONS

Mike Input	1
Mike Input	2
Mike Input	3
Mike Input	4
Mike Input	5
Mike Input	6
Mike Input	7
Mike Input	8
Mike Input	9
Mike Input	10
Mike Input	11
Mike Input	12
Mike Input	13
Mike Input	14
Mike Input	15
Mike Input	16
Mike Input	17
Mike Input	18
Mike Input	19
Mike Input	20
Mike Input	21
Mike Input	22
Mike Input	23
Mike Input	24
Mike Input	25
Mike Input	26
Mike Input	27
Mike Input	28

4 Tk Tape Input	1	WHT
4 Tk Tape Input	2	WHT
4 Tk Tape Input	3	WHT
4 Tk Tape Input	4	WHT
4 Tk Tape Output	1	BLK
4 Tk Tape Output	2	BLK
4 Tk Tape Output	3	BLK
4 Tk Tape Output	4	BLK
2 Tk Tape Input	1	WHT
2 Tk Tape Input	2	WHT
2 Tk Tape Output	1	BLK
2 Tk Tape Output	2	BLK
Mono Tape Input		WHT
Mono Tape Output		BLK
Aux Tape 1 Input	1	WHT
Aux Tape 1 Input	2	WHT
Aux Tape 1 Output	1	BLK
Aux Tape 1 Output	2	BLK

#1 JH-428B

Multitrack Machine 1 Input	
Multitrack Machine 1 Input	2
Multitrack Machine 1 Input	3
Multitrack Machine 1 Input	4
Multitrack Machine 1 Input	5
Multitrack Machine 1 Input	6
Multitrack Machine 1 Input	7
Multitrack Machine 1 Input	8
Multitrack Machine 1 Input	9
Multitrack Machine 1 Input	10
Multitrack Machine 1 Input	11
Multitrack Machine 1 Input	12
Multitrack Machine 1 Input	13
Multitrack Machine 1 Input	14
Multitrack Machine 1 Input	15
Multitrack Machine 1 Input	16
Multitrack Machine 1 Input	17
Multitrack Machine 1 Input	18
Multitrack Machine 1 Input	19
Multitrack Machine 1 Input	20
Multitrack Machine 1 Input	21
Multitrack Machine 1 Input	22
Multitrack Machine 1 Input	23
Multitrack Machine 1 Input	24
Multitrack Machine 1 Input	25
Multitrack Machine 1 Input	26
Multitrack Machine 1 Input	27
Multitrack Machine 1 Input	28

connect Shields GRN 1-28

Tie Line	1
Tie Line	2
Tie Line	3
Tie Line	4
Tie Line	5
Tie Line	6
Tie Line	7
Tie Line	8
Tie Line	9
Tie Line	10
Tie Line	11
Tie Line	12
Tie Line	13
Tie Line	14
Tie Line	15
Tie Line	16
Tie Line	17
Tie Line	18
Tie Line	19
Tie Line	20
Tie Line	21
Tie Line	22

BLK 1-22

#2 JH-428B

Multitrack Machine Output	1	Connect Shields BLU 1-28
Multitrack Machine Output	2	
Multitrack Machine Output	3	
Multitrack Machine Output	4	
Multitrack Machine Output	5	
Multitrack Machine Output	6	
Multitrack Machine Output	7	
Multitrack Machine Output	8	
Multitrack Machine Output	9	
Multitrack Machine Output	10	
Multitrack Machine Output	11	
Multitrack Machine Output	12	
Multitrack Machine Output	13	
Multitrack Machine Output	14	
Multitrack Machine Output	15	
Multitrack Machine Output	16	
Multitrack Machine Output	17	
Multitrack Machine Output	18	
Multitrack Machine Output	19	
Multitrack Machine Output	20	
Multitrack Machine Output	21	
Multitrack Machine Output	22	
Multitrack Machine Output	23	
Multitrack Machine Output	24	
Multitrack Machine Output	25	
Multitrack Machine Output	26	
Multitrack Machine Output	27	
Multitrack Machine Output	28	
Tie Line	23	BLK
Tie Line	24	
Tie Line	25	
Tie Line	26	
Tie Line	27	
Tie Line	28	
Tie Line	29	RED 29-44
Tie Line	30	
Tie Line	31	
Tie Line	32	
Tie Line	33	
Tie Line	34	
Tie Line	35	
Tie Line	36	
Tie Line	37	
Tie Line	38	
Tie Line	39	
Tie Line	40	
Tie Line	41	
Tie Line	42	
Tie Line	43	
Tie Line	44	

#3 JH-428B

Echo Send	1	YEL
Echo Send	2	YEL
Cue Send	1	BRN
Cue Send	2	BRN
Control Monitor F L	1	YEL
Control MOnitor R L	2	YEL
Control Monitor F R	3	YEL
Control Monitor R R	4	YEL
Studio Monitor F L	1	RED
Studio Monitor R L	2	RED
Studio Monitor F R	3	RED
Studio MOnitor R R	4	RED
Echo Return	1	WHT
Echo Return	2	WHT
Echo Return	3	WHT
Echo Return	4	WHT
Echo Return	5	WHT
Talkback Sense		BLU/WHT
Talkback Mike		BRN
Alternate Speaker	1	GRN
Relay Output	2	GRN
REG.	3	GRN
	4	GRN
Alternate Speaker	1	ORN
Relay Output	2	ORN
ALT.	3	ORN
	4	ORN
Aux Tape 2 Input	321	WHT
Aux Tape 2 Input	322	WHT
Aux Tape 2 Output	321	BLK
Aux Tape 2 Output	322	BLK
Tie Line	45	RED 45-56
Tie Line	46	
Tie Line	47	
Tie Line	48	
Tie Line	49	
Tie Line	50	
Tie Line	51	
Tie Line	52	
Tie Line	53	
Tie Line	54	
Tie Line	55	
Tie Line	56	
Tie Line	57	GRY 57-62
Tie Line	58	
Tie Line	59	
Tie Line	60	
Tie Line	61	
Tie Line	63	

#4 JH-428B

Tie Line	63	GRY 63-84
Tie Line	64	
Tie Line	65	
Tie Line	66	
Tie Line	67	
Tie Line	68	
Tie Line	69	
Tie Line	70	
Tie Line	71	
Tie Line	72	
Tie Line	73	
Tie Line	74	
Tie Line	75	
Tie Line	76	
Tie Line	77	
Tie Line	78	
Tie Line	79	
Tie Line	80	
Tie Line	81	
Tie Line	82	
Tie Line	83	
Tie Line	84	
Tie Line	85	WHT 85-112
Tie Line	86	
Tie Line	87	
Tie Line	88	
Tie Line	89	
Tie Line	90	
Tie Line	91	
Tie Line	92	
Tie Line	93	
Tie Line	94	
Tie Line	95	
Tie Line	96	
Tie Line	97	
Tie Line	98	
Tie Line	99	
Tie Line	100	
Tie Line	101	
Tie Line	102	
Tie Line	103	
Tie Line	104	
Tie Line	105	
Tie Line	106	
Tie Line	107	
Tie Line	108	
Tie Line	109	
Tie Line	110	
Tie Line	111	
Tie Line	112	

#3 JH-428B

OPTIONAL PUNCH BLOCK

GROUND RULES

FOR GROUNDING A RECORDING SYSTEM

I. A SINGLE SYSTEM GROUND MUST BE CHOSEN.

This SYSTEM GROUND should be the PUNCH BLOCK GROUND BUS of the console. ALL grounds MUST be brought back individually to this point. NEVER jump a ground wire from one piece of equipment to another and then back to the SYSTEM GROUND.

A. IF the 3rd wire of your AC power system is an EXCELLENT "earth" ground, it may be used as your SYSTEM GROUND. The 3rd wire system is seldom satisfactory.

B. If the 3rd wire of your AC power system depends on the conduit for its connection, or if there is a heavy or a rapidly changing load on your power circuits, THEN THE 3RD WIRE OF YOUR AC SUPPLY IS NOT A GOOD GROUND AND WILL NOT BE A SATISFACTORY SYSTEM GROUND.

C. UNDER NO CIRCUMSTANCES should air conditioners, fan motors, coke machines, florescent lights, etc. be fed from the same power circuit as the recording equipment.

HAVE A SEPARATE POWER CIRCUIT INSTALLED.

II. Insist that the power company DISCONNECT, CLEAN, and RECONNECT all outside contacts at least once a year. Corrosion WILL CAUSE considerable RF noise on your line.

A. UNLESS the 3rd wire of your AC power system is UNUSUALLY NOISE FREE, you MUST locate and install a "COLD WATER PIPE" ground or a "STAKE" ground.

CONSULT YOUR LOCAL BUILDING CODE FOR INSTALLATION REQUIREMENTS.

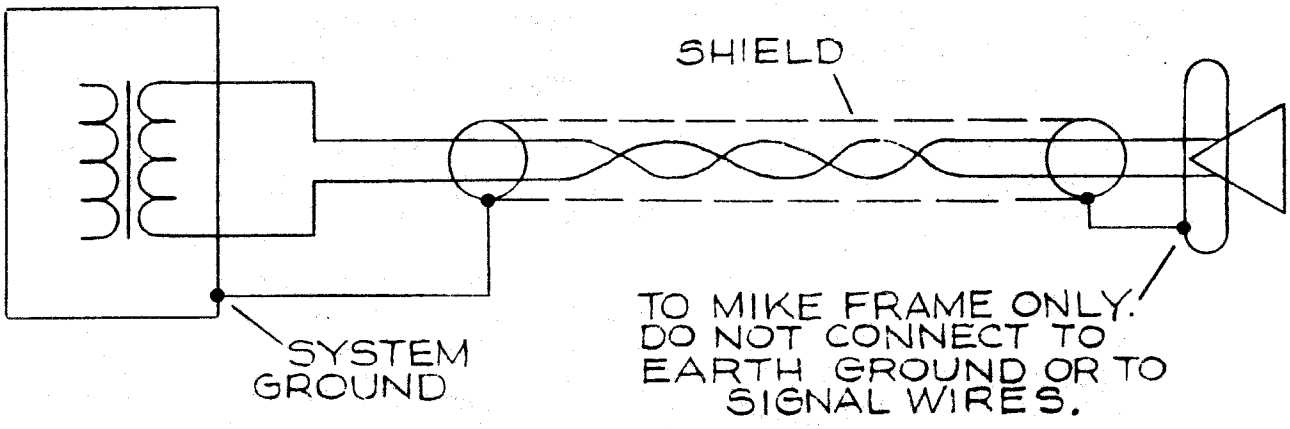
III. INSTALL YOUR SYSTEM SO AS TO MINIMIZE GROUND LOOPS

Ground loops are created when there are two or more DC paths from a device to the System Ground.

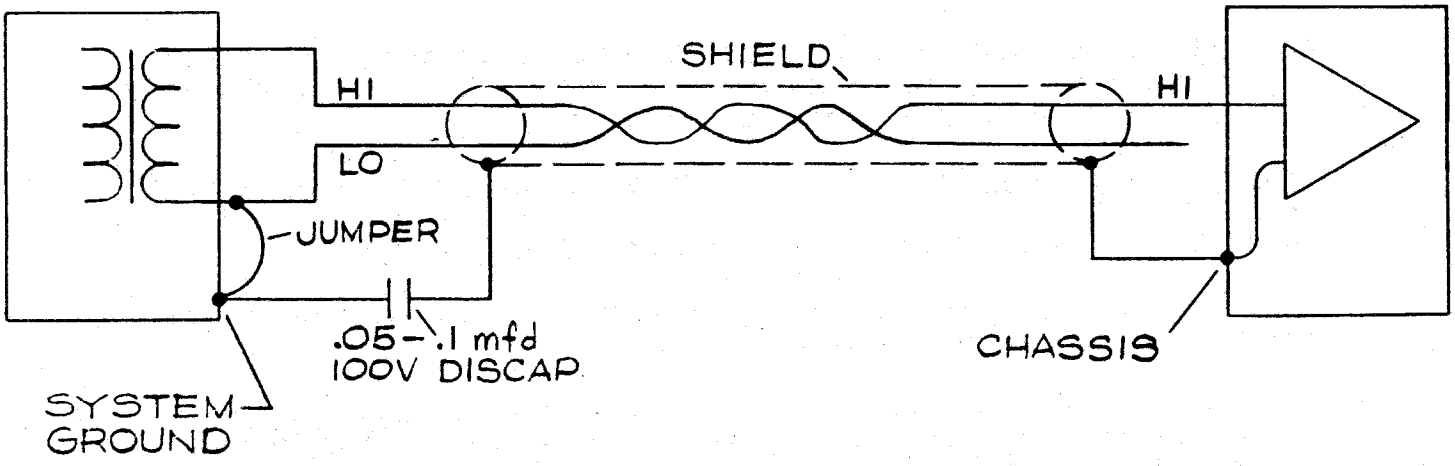
A. ALL shields MUST be connected to ground <u>AT ONE END ONLY</u>. The other end of the shield must be connected to the chassis of the device through a .05 mfd or a .1 mfd 100 volt capacitor.

B. The capacitors may be installed at either end of the line, but MUST be installed in ALL LINES except mike lines. ANY ONE LINE which is not DC isolated at one end WILL cause an unacceptable ground loop.

C. Microphone shields should NEVER be connected together outside the console. They are tied to the SYSTEM GROUND inside the console. DO NOT USE CAPACITORS.



D. Most devices with unbalanced inputs must be fed from an unbalanced output so as to minimize spurious oscillations. When feeding an unbalanced input from a balanced output, the output must be unbalanced by connecting the low side of the output to ground at the Console end of the line.



IV. PREPARE FOR ANY GROUNDING PROBLEM BY PULLING SEPARATE GROUND WIRES INTO EVERY CONDUIT.

Use #16 copper wire unless local building codes require larger wire. EACH GROUND WIRE MUST GO ALL THE WAY BACK TO THE SYSTEM GROUND FROM EACH LOCATION. DO NOT combine grounds at any other point.

A. A relay rack of equipment counts as a single unit and should be connected to a single ground wire going to the System Ground. DO NOT "DAISY CHAIN" separate racks.

B. Make ALL shield connections FIRST—leaving chassis ground wires disconnected until the following tests have been completed:

Be sure that all power plugs are DISCONNECTED.

With an OHMMETER, test the resistance between each chassis in the system. You should find a high resistance between all units.

THIS HIGH RESISTANCE READING IS YOUR BEST ASSURANCE AGAINST "GROUND LOOPS".

C. Plug in the power cables. IF your 3rd wire is a satisfactory ground, and IF all units have a 3rd wire power cable, then your grounding system is complete.

NOTE: Using the 3rd wire grounding system breaks the FIRST rule of grounding. The 3rd wire usually goes from one plug to another—so that EACH PIECE OF APPARATUS does not have a separate ground wire going straight back to the system ground.

V. IF EXCESSIVE NOISE—OR GROUND LOOPS—ARE PRESENT IN YOUR SYSTEM WHEN USING THE 3RD WIRE GROUND, REMOVE THE 3RD WIRE GROUNDS.

The single exception to the above instruction is the Audio power supply for the Console. This supply has a Faraday shield in the power transformer which must connect directly to the 3rd wire to be most effective. You may use this point as the 3rd wire ground required by most codes.

A jumper is provided between the power supply common and the frame of the supply to make it possible to "float" the low voltage audio supply if necessary.

CAUTION: DO NOT OPERATE ANY PART OF THE SYSTEM WITH GROUNDS REMOVED.

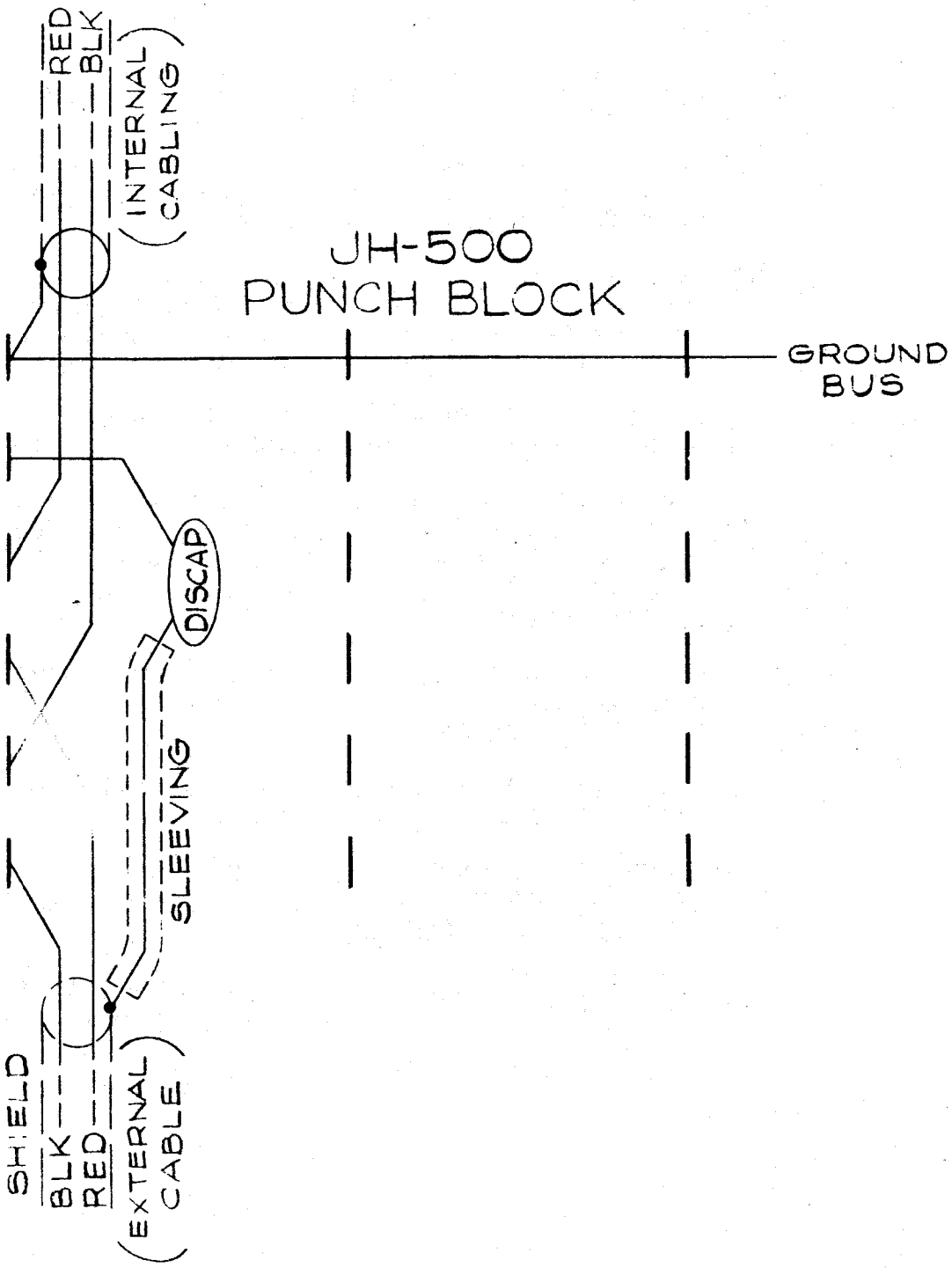
CONNECT A GROUND WIRE TO EACH CHASSIS (OR EACH RACK) MAKING SURE THAT EACH WIRE IS CONNECTED DIRECTLY TO THE SYSTEM GROUND.

BE VERY SURE THAT THE SYSTEM GROUND IS CONNECTED TO A WATER PIPE OR A GROUNDING STAKE.

ALWAYS CONSULT YOUR LOCAL BUILDING CODES FOR REQUIRED ELECTRICAL GROUNDING PROCEDURE.

We recommend that local building codes be followed except when IMPROVED GROUNDING PROCEDURES ARE NECESSARY. Always clear the changes with your inspector.

The following sketch shows a method of installing the blocking capacitors in the JH-500 Series Consoles:



SERVICE BULLETIN

BULLETIN NO. 403
DATE MAY 24, 1976

P.C. BD. I/O module NO. 43C95

ECO NO. 186 IN NEW PRODUCTION May 14, 1976

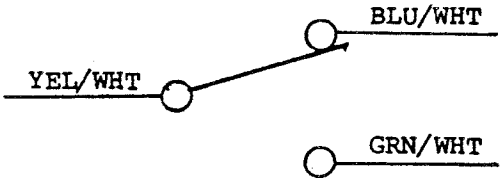
DESCRIPTION:

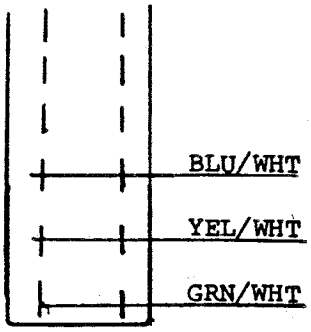
Change the following component values:

COMPONENT	OLD VALUE	NEW VALUE
R16	1k	47k ½w 5%
R19	33k	3k ½w 5%
R109	10k	680 ohms ½w 5%

REMOVE R112 - 680 ohms

FOR PHASE REVERSE OPTION, rewire phase reverse switch as shown below:





REASON FOR CHANGE:

To achieve better signal-to-noise ratio. This change restructures the gain of the Fader Buffer, and achieves a 5 dB improvement.

COMPONENT REQUIREMENT

FOR EACH I/O MODULE:

(1) - 47K ½w 5%
(1) - 3K ½w 5%
(1) - 680 ohm ½w 5%

SERVICE BULLETIN

BULLETIN NO. 406
DATE May 24, 1976

P.C. BD. I/O MODULE No. 43C95

ECO No. 191 IN NEW PRODUCTION May 18, 1976

DESCRIPTION:

Change the following component value:

COMPONENT	OLD VALUE	NEW VALUE
C24	56 pf	129pf

REASON FOR CHANGE:

To stop High Frequency oscillation in MID EQ Amplifier

COMPONENT REQUIREMENT:

FOR EACH I/O MODULE:

(1) - 120 pf cap.

SERVICE BULLETIN

BULLETIN NO. 409

DATE 10-2-78

P.C. Bd. I/O Module No. 4300-0241-00

ECO No. 758 IN NEW PRODUCTION ON SERIAL No. 123

THIS IS AN OPTIONAL CHANGE

REASON FOR CHANGE:

To reduce switching noise in MID EQUALIZER

DESCRIPTION OF CHANGE:

On SW4 of the MID EQ circuit, add a 100K resistor from the wiper (Yellow) to the hi end (Red) of the switch.

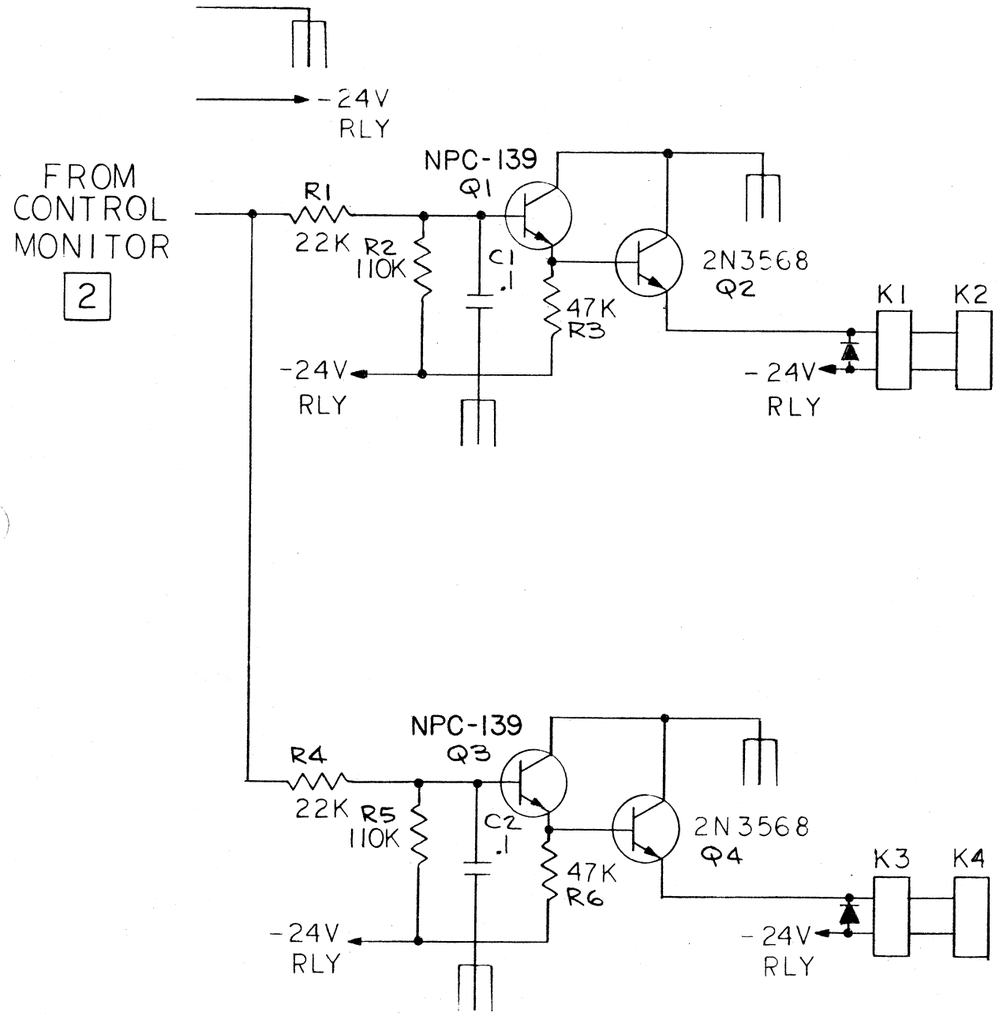
COMPONENT REQUIREMENT:

(1) 100K ¼w 5% resistor.

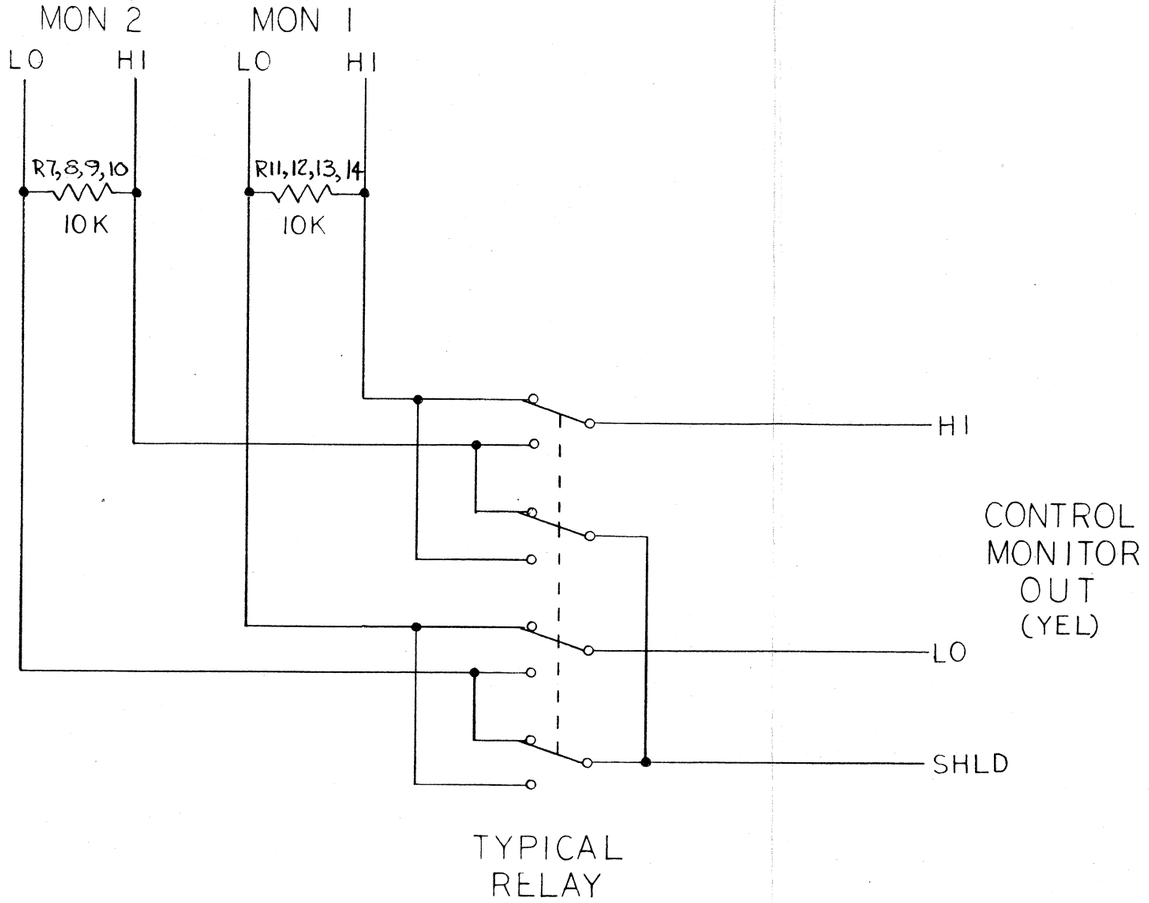
AUDIO INDUSTRIES CORP.

RECEIVED

OCT 20 1978

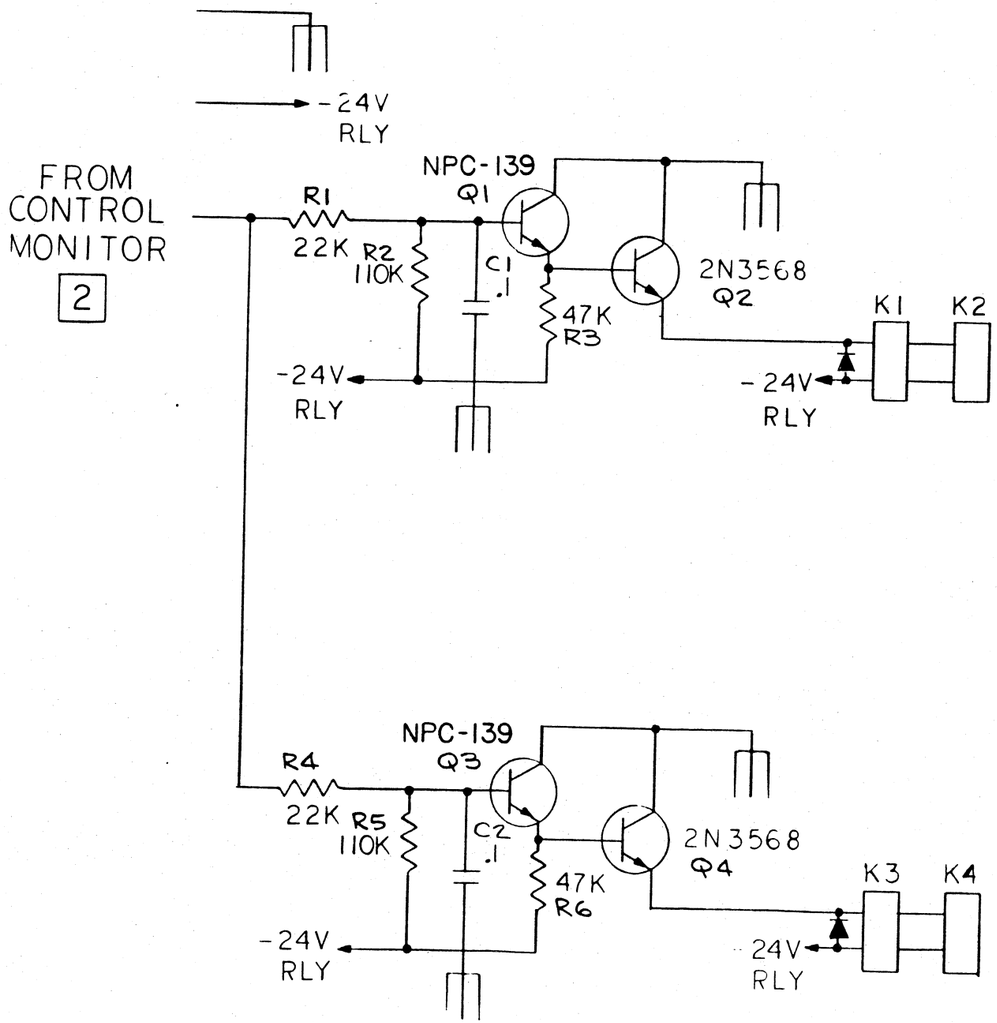


NOTES: UNLESS OTHERWISE SPECIFIED;
1. ALL RESISTOR VALUES ARE IN OHMS, ½W, 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL DIODES ARE 1N4004.

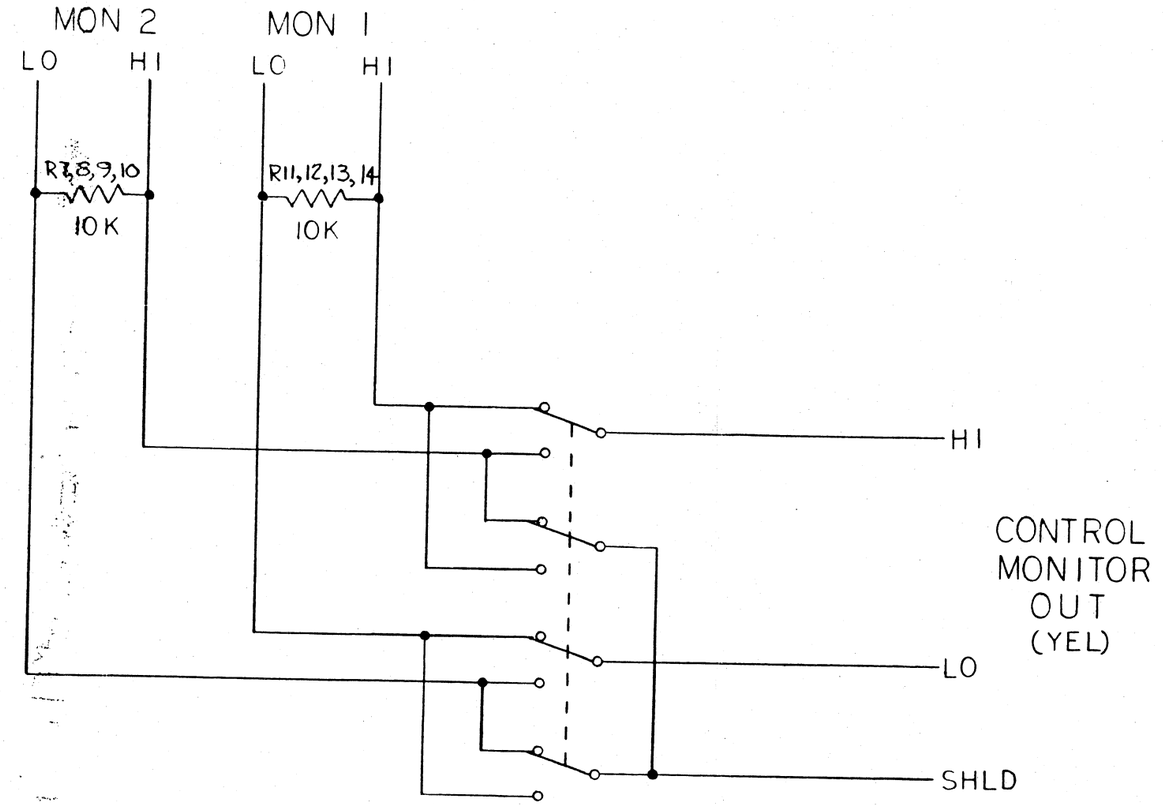


TYPICAL
RELAY

ALTERNATE SPEAKER RELAY 43C110
Figure 31 *JH-400B* *Page 10-25*



NOTES: UNLESS OTHERWISE SPECIFIED;
1. ALL RESISTOR VALUES ARE IN OHMS, ½W, 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL DIODES ARE 1N4004.



TYPICAL
RELAY

ALTERNATE SPEAKER RELAY 43C110
Figure 31 *JH-400B* *Page 10-*

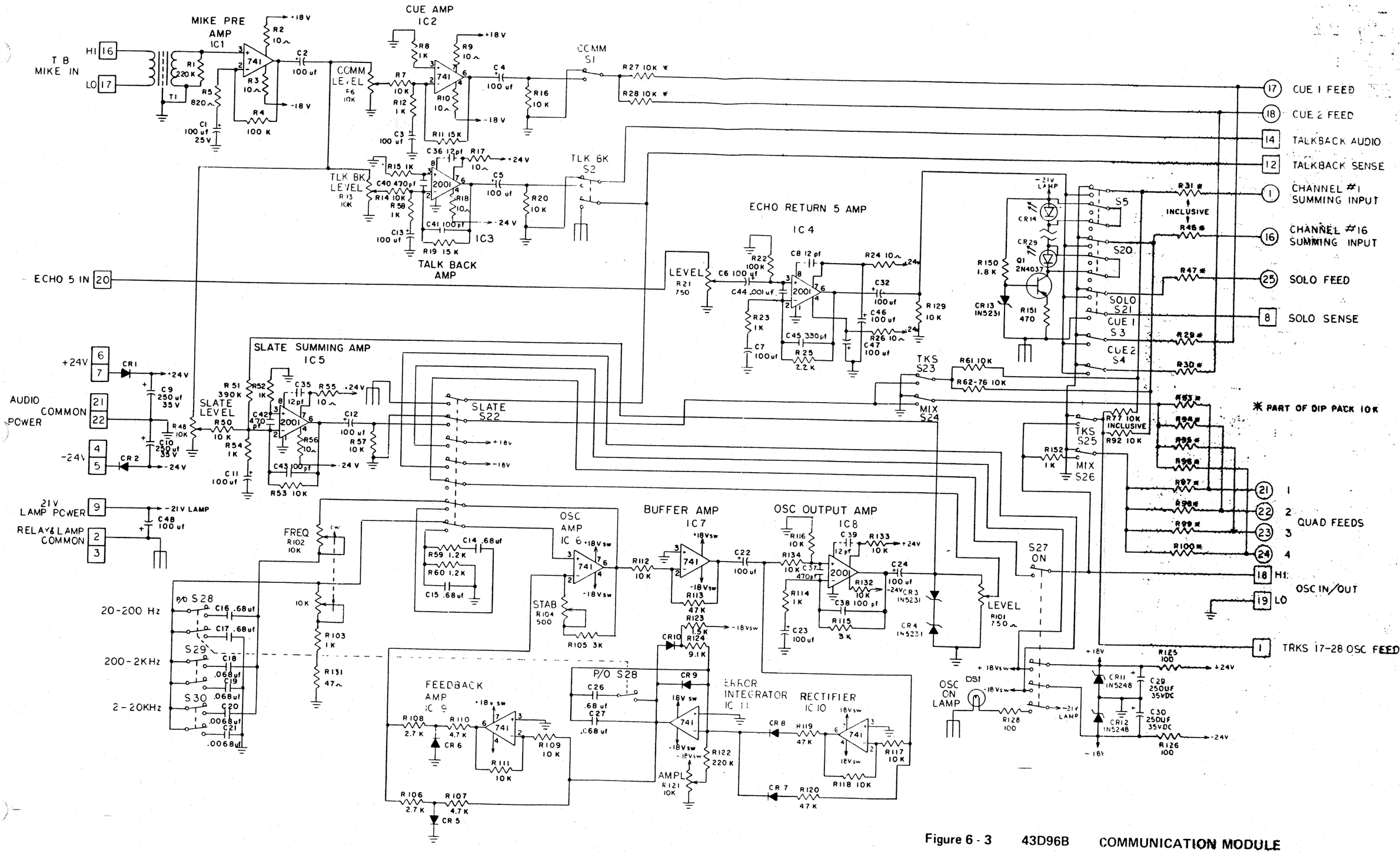
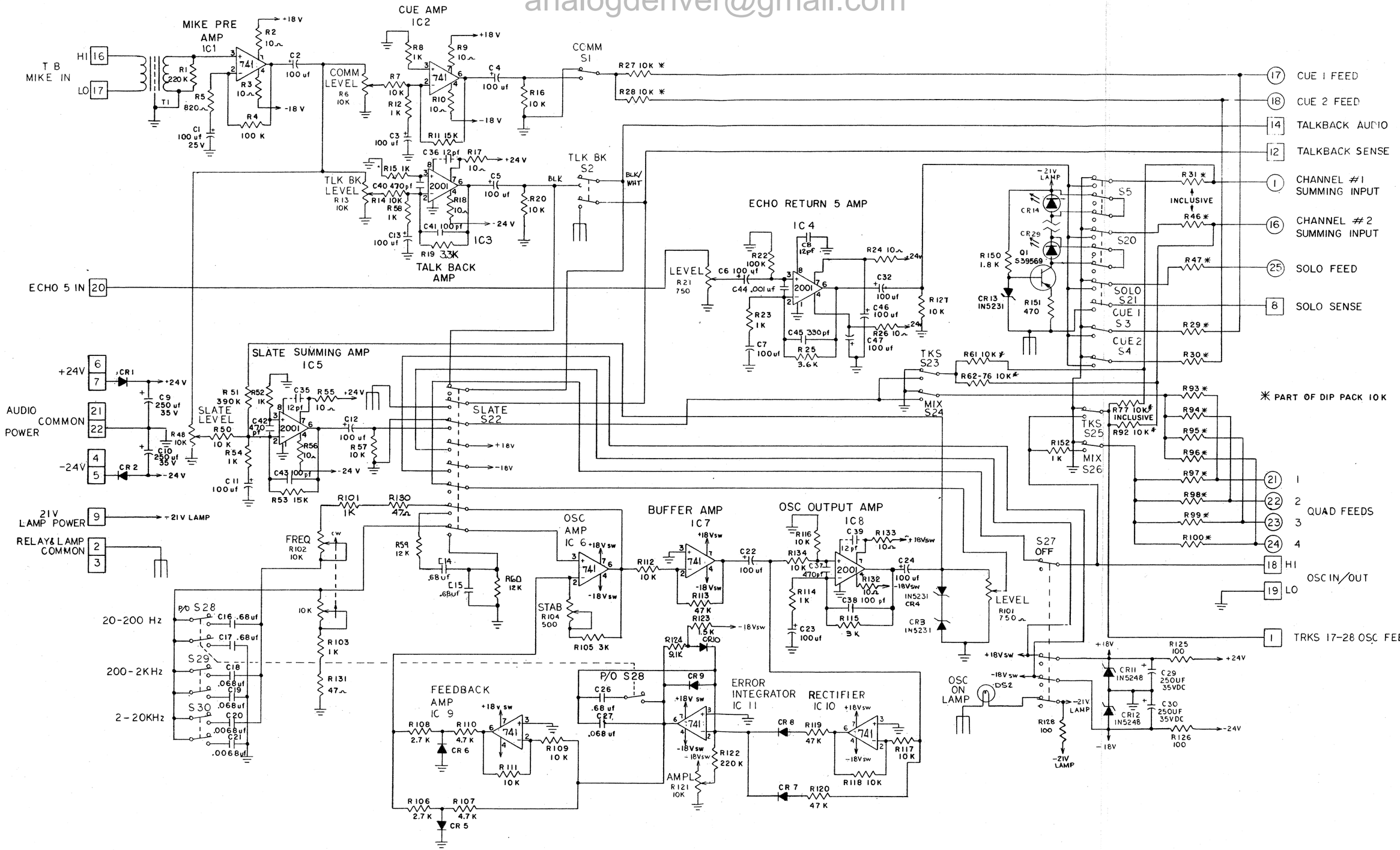
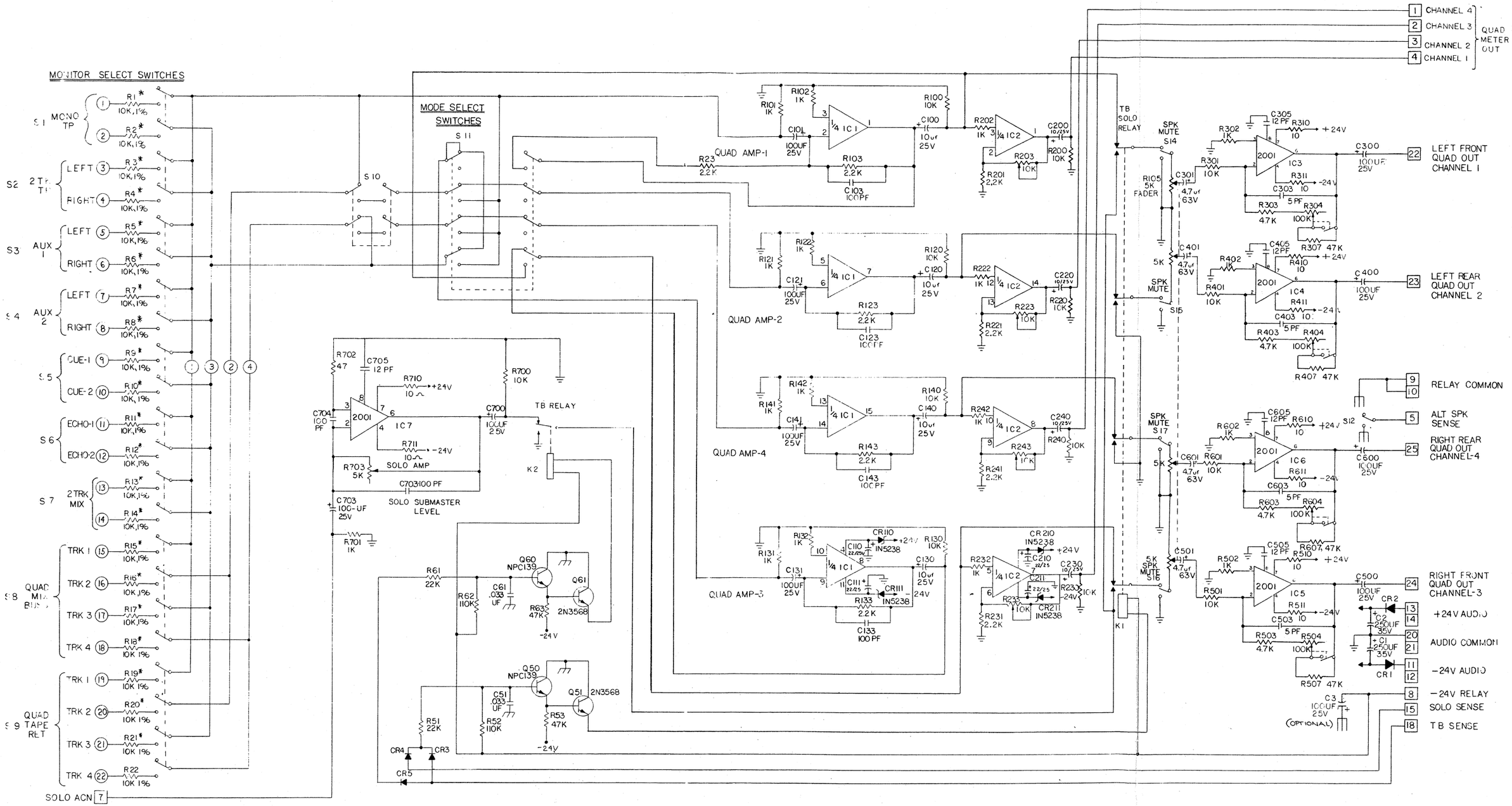


Figure 6 - 3 43D96B COMMUNICATION MODULE



COMMUNICATIONS MODULE 43D96

Figure 22 *JH-400B* *Page 10-7*



NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE ½ W 5%
2. ALL DIODES ARE IN4004.
3. IC1 & IC-2 ARE TL084CN. QUAD OP AMP
4. * DENOTES PART OF AB 314BI03 RESISTOR PACK

CONTROL ROOM MODULE 43E246
Figure 23 *JH-400B* *Page 10-9*

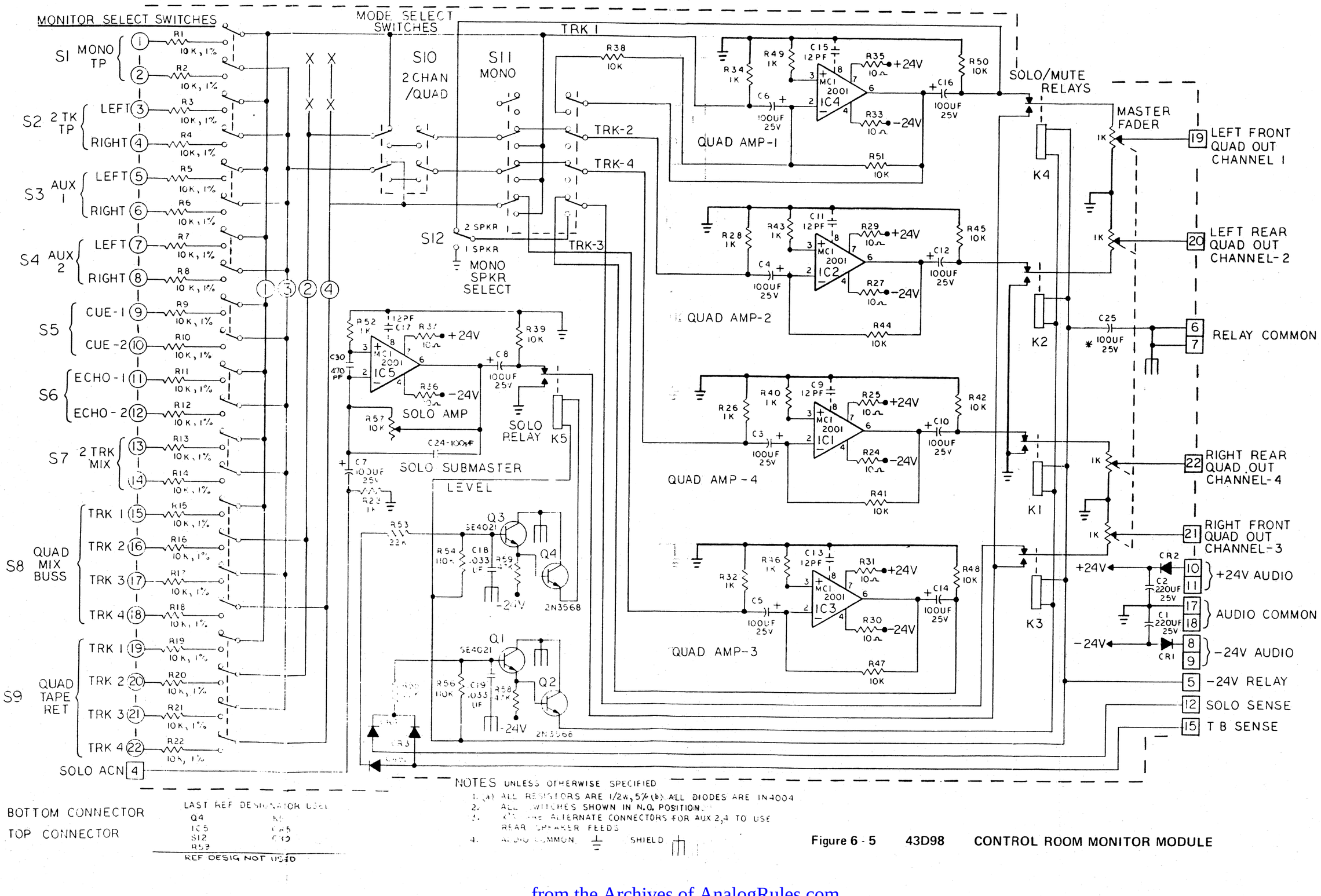
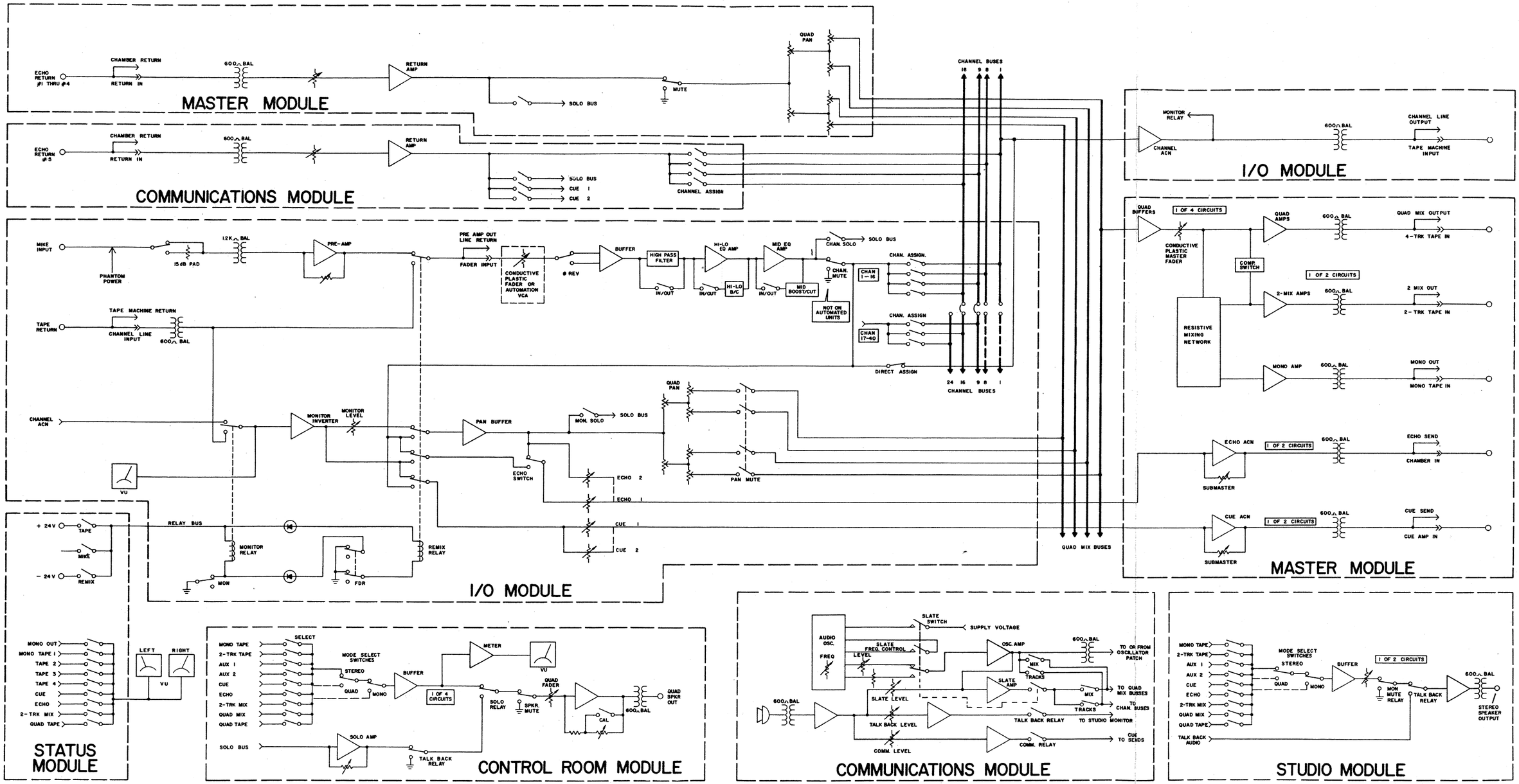
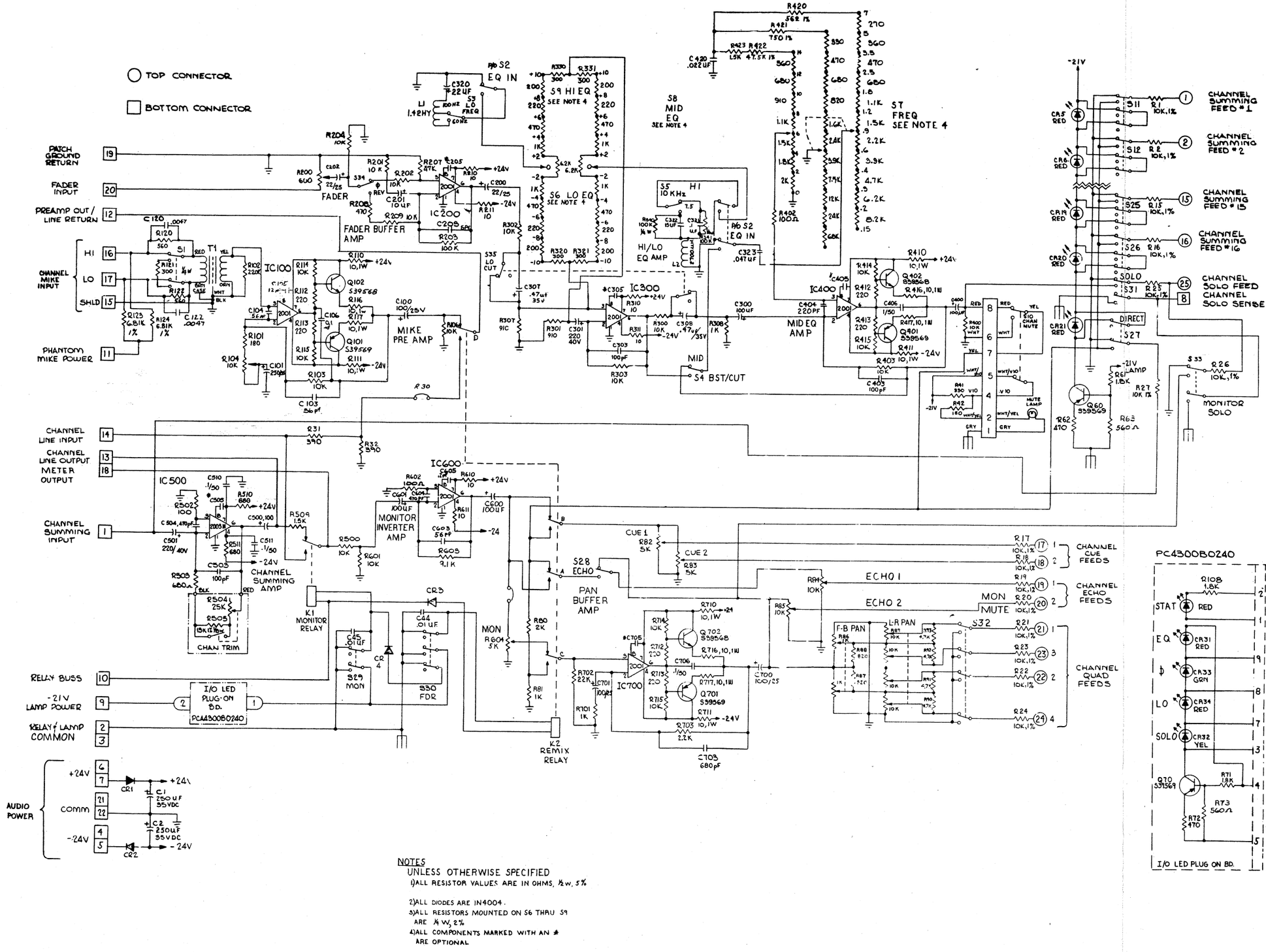


Figure 6 - 5 43D98 CONTROL ROOM MONITOR MODULE



JH-400B FLOW CHART
Figure 14 *JH-400B* Page 3-7



NOTES
UNLESS OTHERWISE SPECIFIED
1) ALL RESISTOR VALUES ARE IN OHMS, ½w, 5%

2) ALL DIODES ARE IN4004.

3) ALL RESISTORS MOUNTED ON S6 THRU S9 ARE ¼ W, 2%

4) ALL COMPONENTS MARKED WITH AN * ARE OPTIONAL

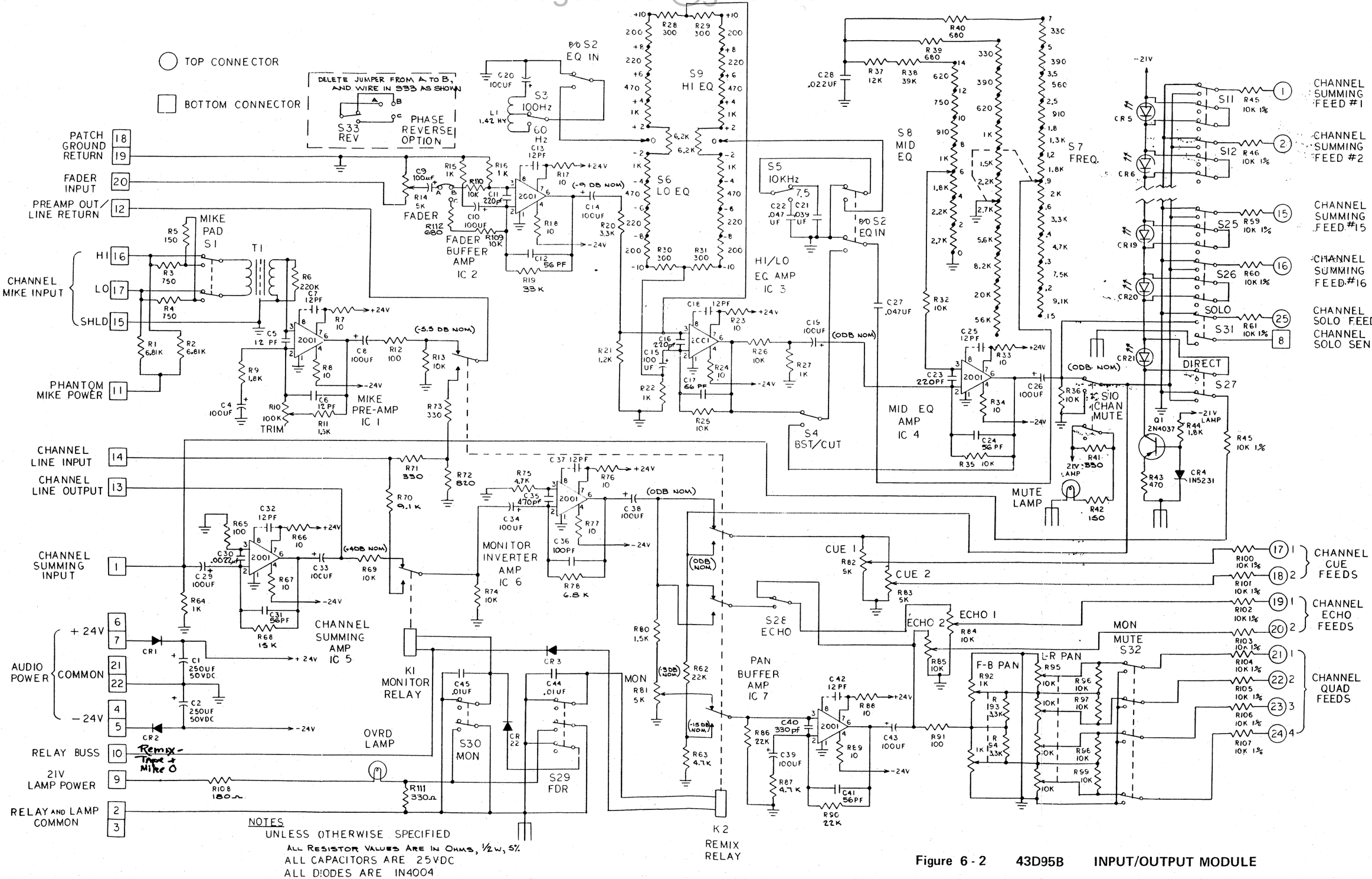
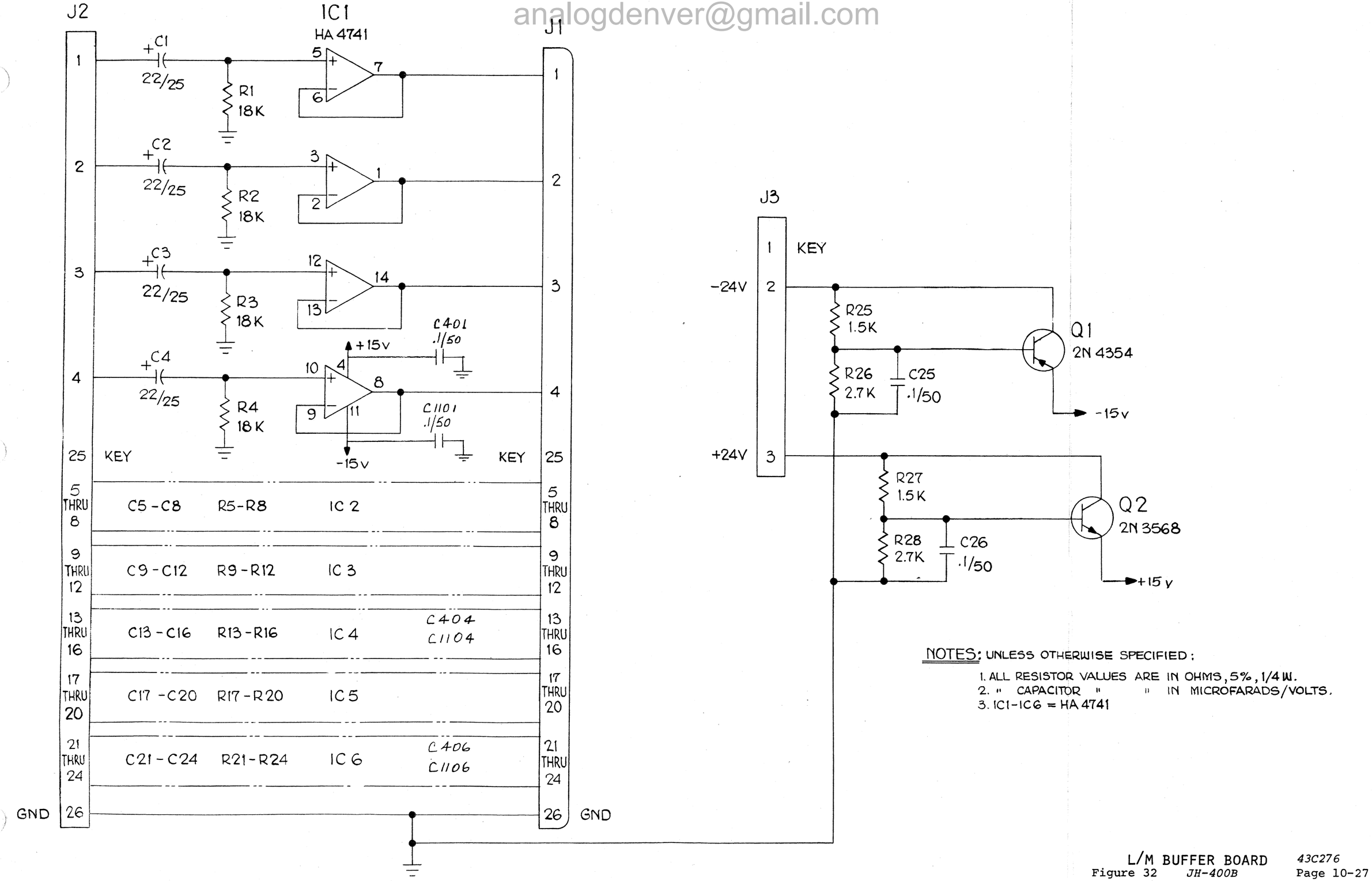


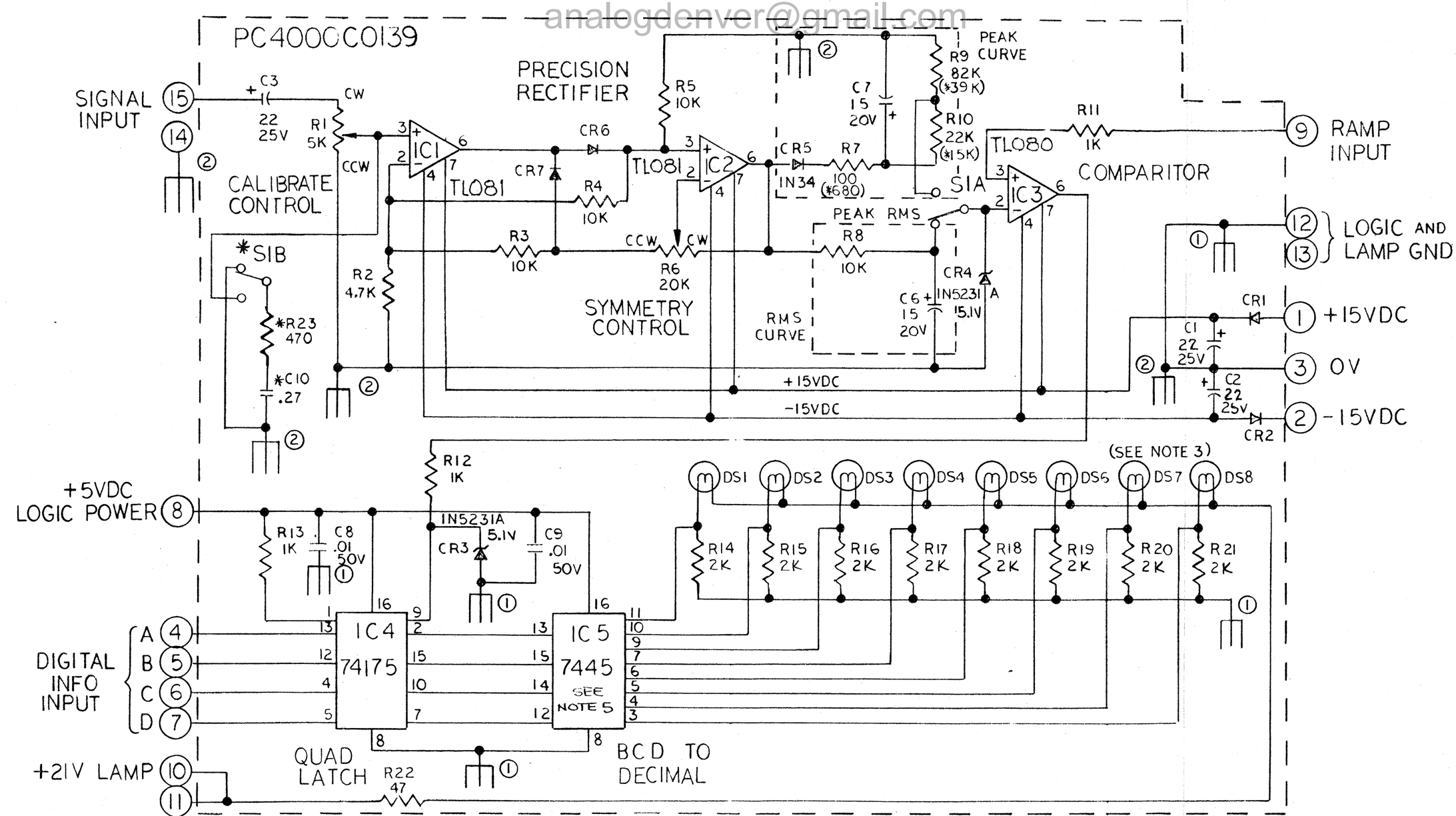
Figure 6 - 2 43D95B INPUT/OUTPUT MODULE



NOTES: UNLESS OTHERWISE SPECIFIED:

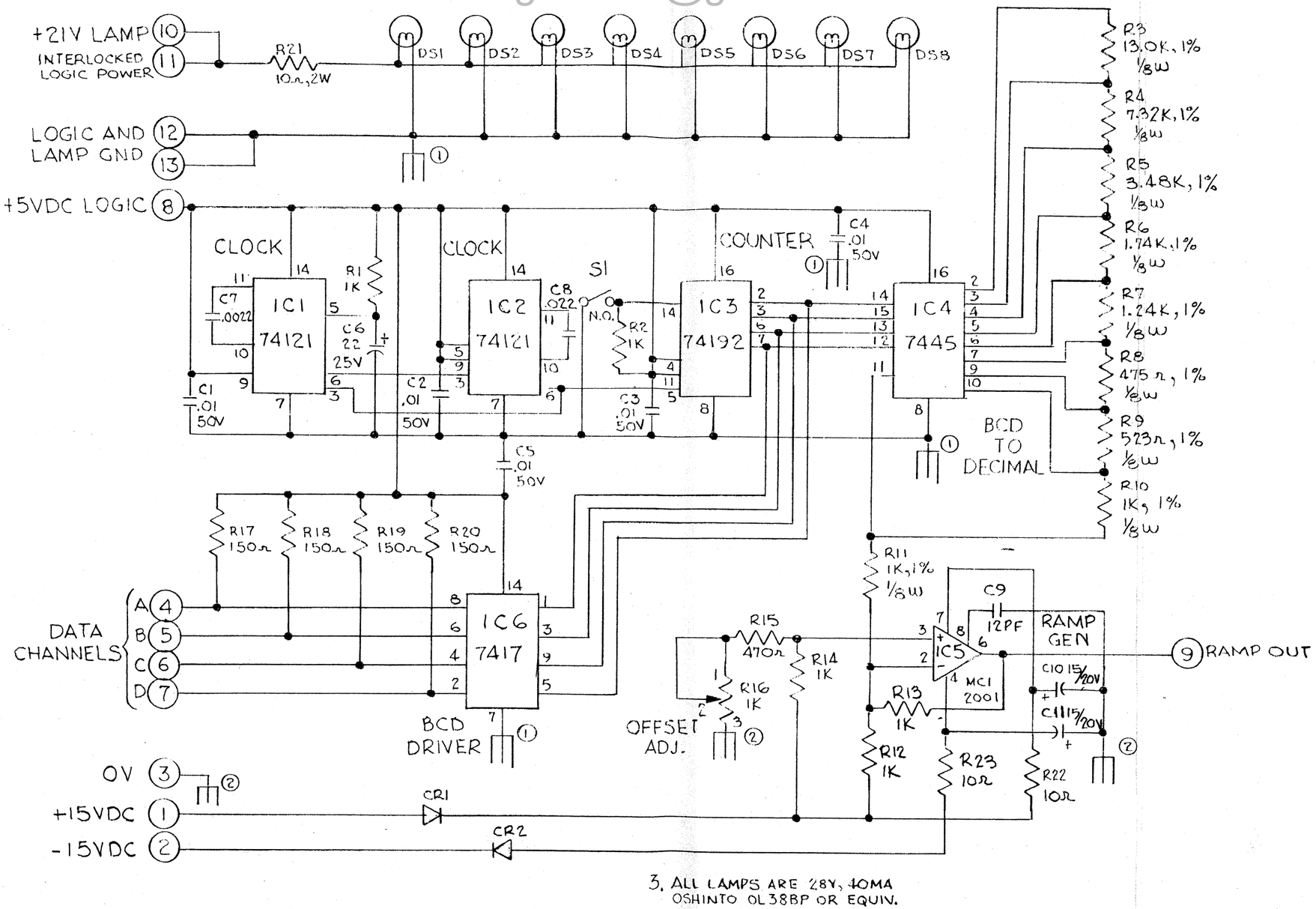
1. ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4 W.
2. " CAPACITOR " " IN MICROFARADS/VOLTS.
3. IC1-IC6 = HA 4741

L/M BUFFER BOARD 43C276
Figure 32 JH-400B Page 10-27



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   1. RESISTORS ARE 1/2W, 5%, VALUE IN OHMS.
   2. DIODE ARE IN4004
   3. CAPACITORS ARE SPECIFIED IN MICROFARADS
2. ① LOGIC & LAMP GND. ② OP. AMP. GND.
3. ALL LAMPS ARE 28V 40 MA OSHINTO OL387BP OR EQUIV.
4. * USED ON EQUALIZER PEAK READING METER ONLY MOD II ONLY.
5. IC5 SHOULD BE A CERAMIC CHIP, DO NOT USE PLASTIC.



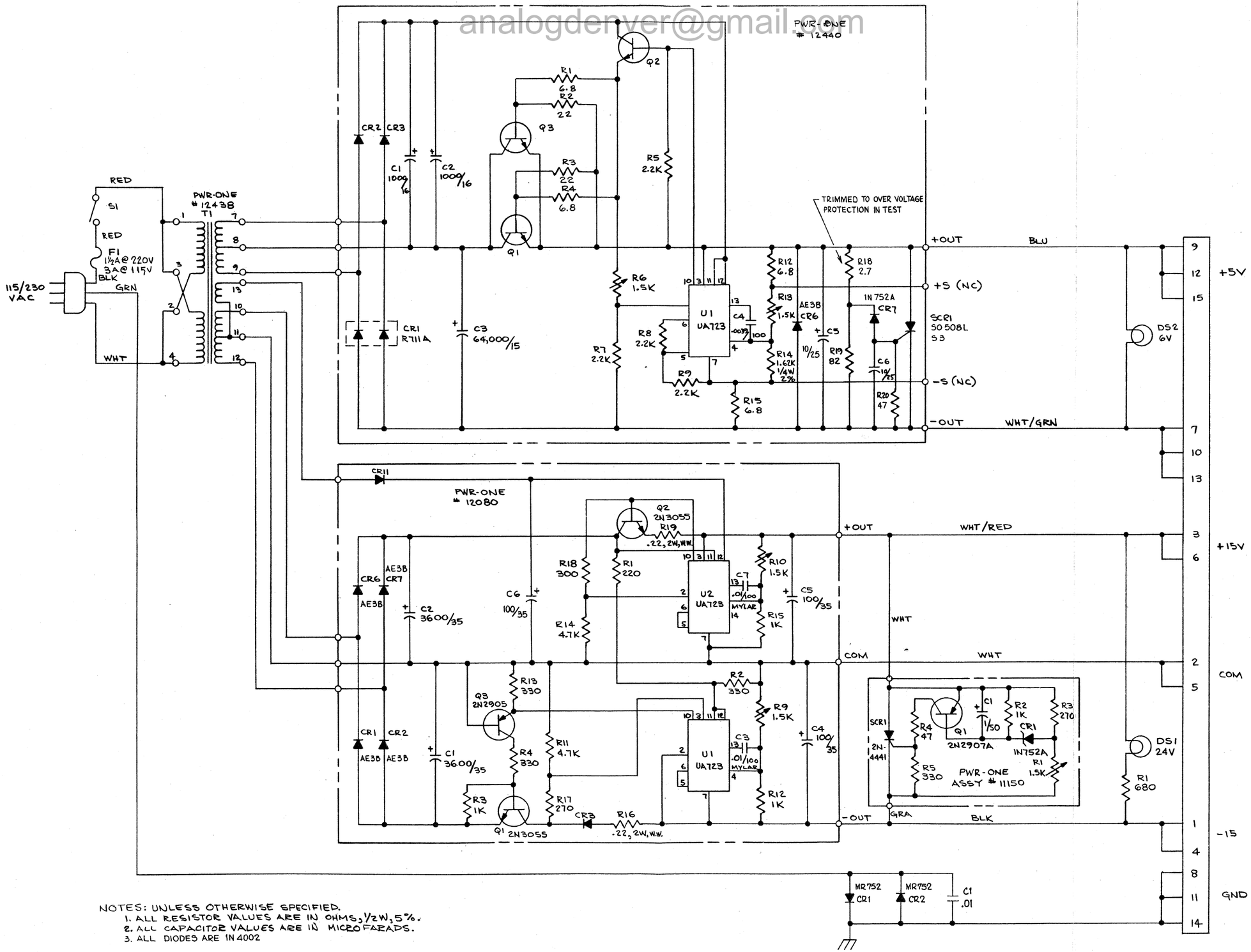
3. ALL LAMPS ARE 28V, 40MA OSHINTO OL38BP OR EQUIV.

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   1. RESISTORS ARE 1/2W, 5%
   2. DIODES ARE IN4004
   3. CAPACITORS ARE IN MICROFARADS
2. 1 +5V LOGIC AND +24 LAMP GND 2 15V-BI-POLAR COMMON

L/M MASTER CONTROL BOARD 4C143

Figure 29 *JH-400B* *Page 10-21*



NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTOR VALUES ARE IN OHMS, ½W, 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL DIODES ARE IN4002

L/M POWER SUPPLY 43D112

CHANNEL QUAD FEEDS (FROM 4 MIX BUSSES)

ECHO RETURN INPUTS

LEVEL CONTROL

4 MIX ACN AMPS

ECHO RETURN AMP#1

ECHO RETURN AMP#2

ECHO RETURN AMP 3

MUTE SWITCH S1

S2

S3

S4

R201-R208 MOUNTED ON F-C-B CONTROL

FRONT/BACK F-C-B CONTROL

LEFT/RIGHT PAN CONTROL

MASTER FADER 5K

COMP SWITCH S9 / S9A / S9B / S9C

SOLO SWITCH S5 S6 S7 S8

R701-R719

C701-C704
C712-C719

1/50 C401-C404
C412-C419

-24V

TYPICAL ON ALL IC OP AMPS IC1 THRU IC4 & IC12 THRU IC19 ARE 2003M OP AMPS. IC5 THRU IC11 ARE 2001 OP AMPS.
R701-R704, R712-R719, R401-R404, R412-R419 ARE 680Ω R705-R711 R405-R411 ARE 10Ω.

NOTES: UNLESS SPECIFIED
1. ALL RESISTORS 1/2W 5%
ALL CAPACITORS 100uf/28V
ALL DIODES 1N4004

2 MIX OUTPUTS

2 MIX ACN AMPS

MONO ACN AMP

CUE ACN AMPS

ECHO ACN AMPS

CUE SEND OUTPUTS

ECHO SEND OUTPUTS

SOLO AUDIO 9

SOLO SENSE 16

CHANNEL CUE FEEDS 1 (11) 2 (12)

CHANNEL ECHO FEEDS 1 (13) 2 (14)

CONNECTOR CODE
- ○ - TOP CONN
- □ - BOTTOM CONN.
- ⏚ - AUDIO GND
- ⏚ - RELAY/LAMP GND

MASTER MODULE 43D97
Figure 21 JH-400B Page 10-5

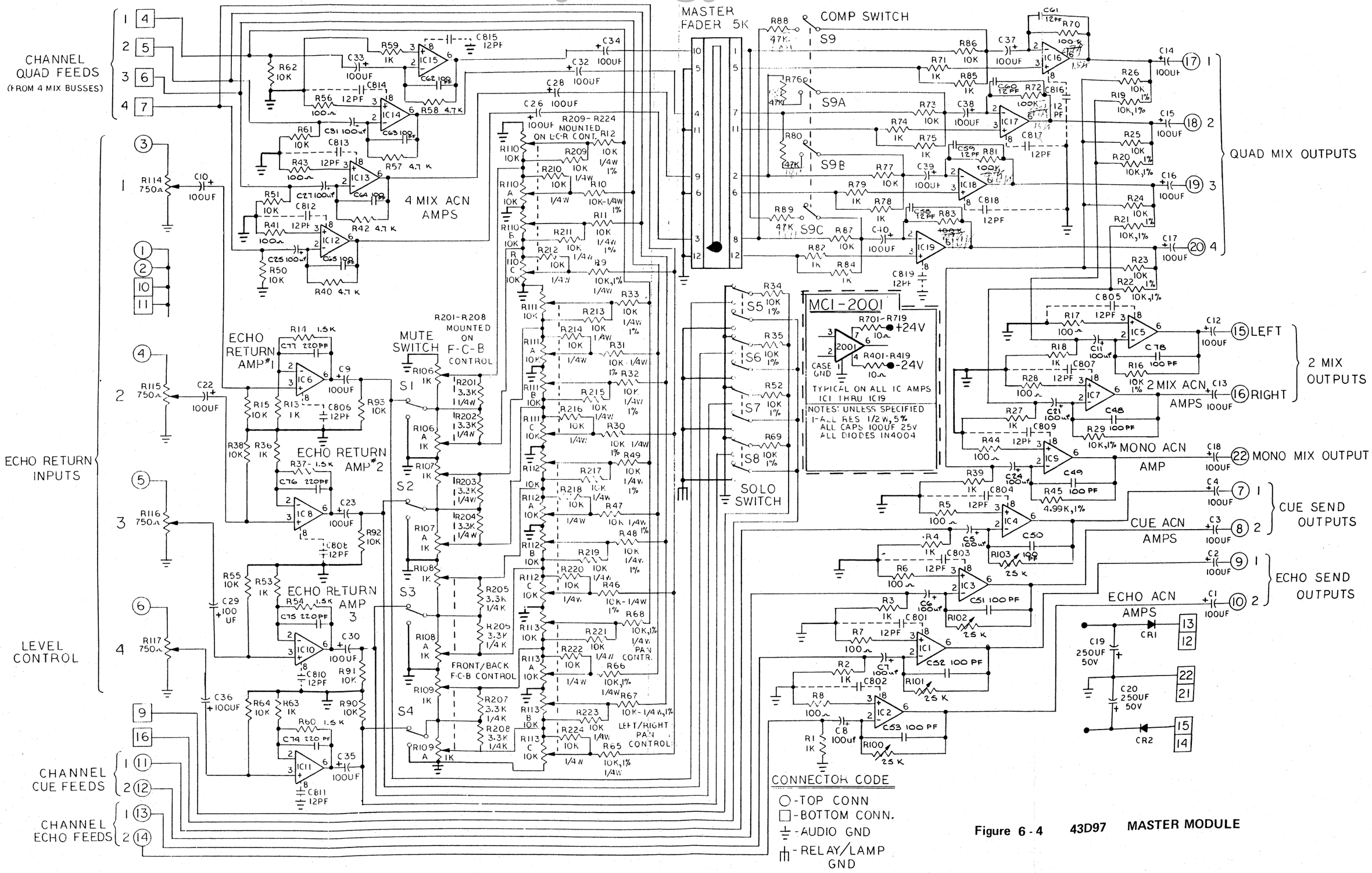
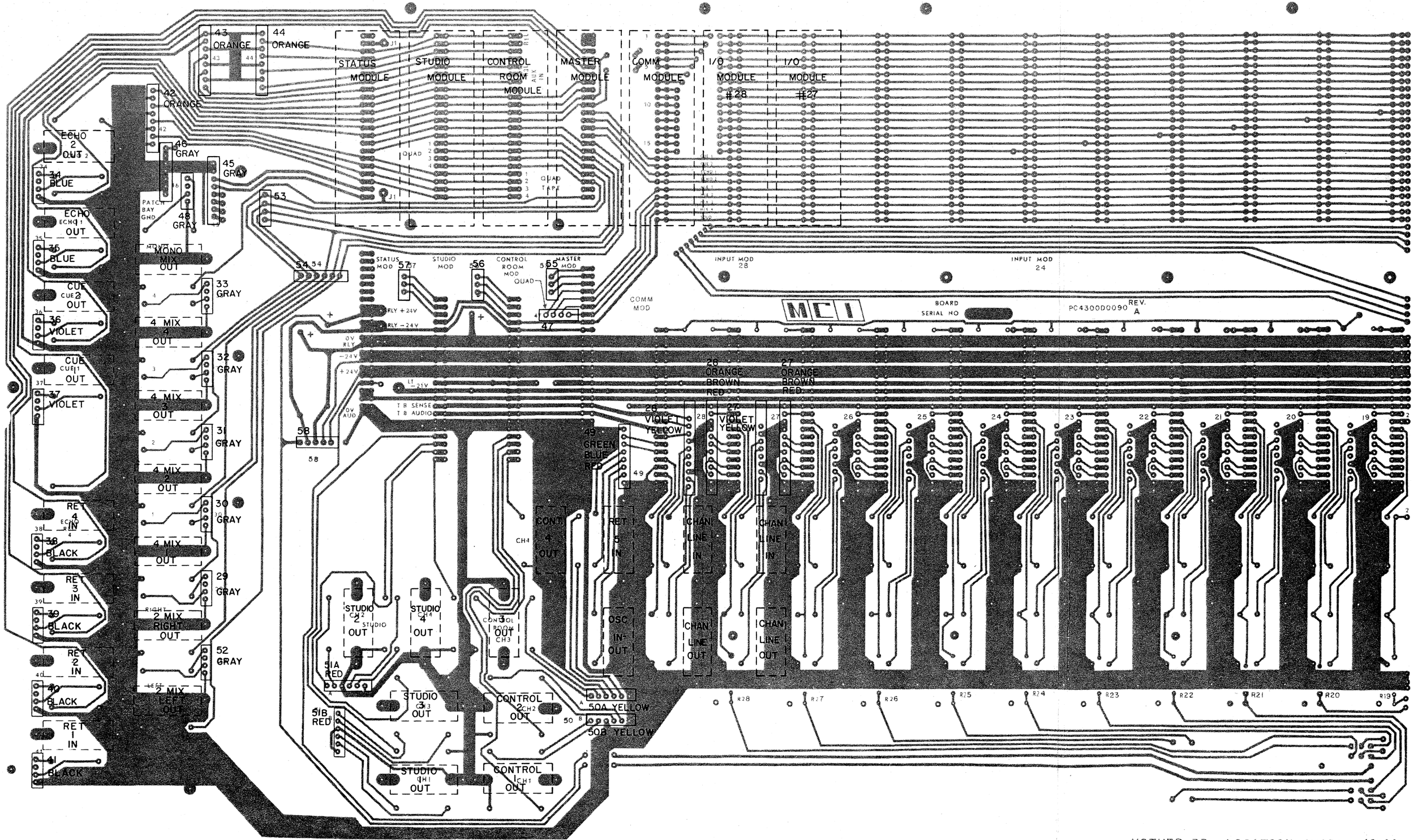
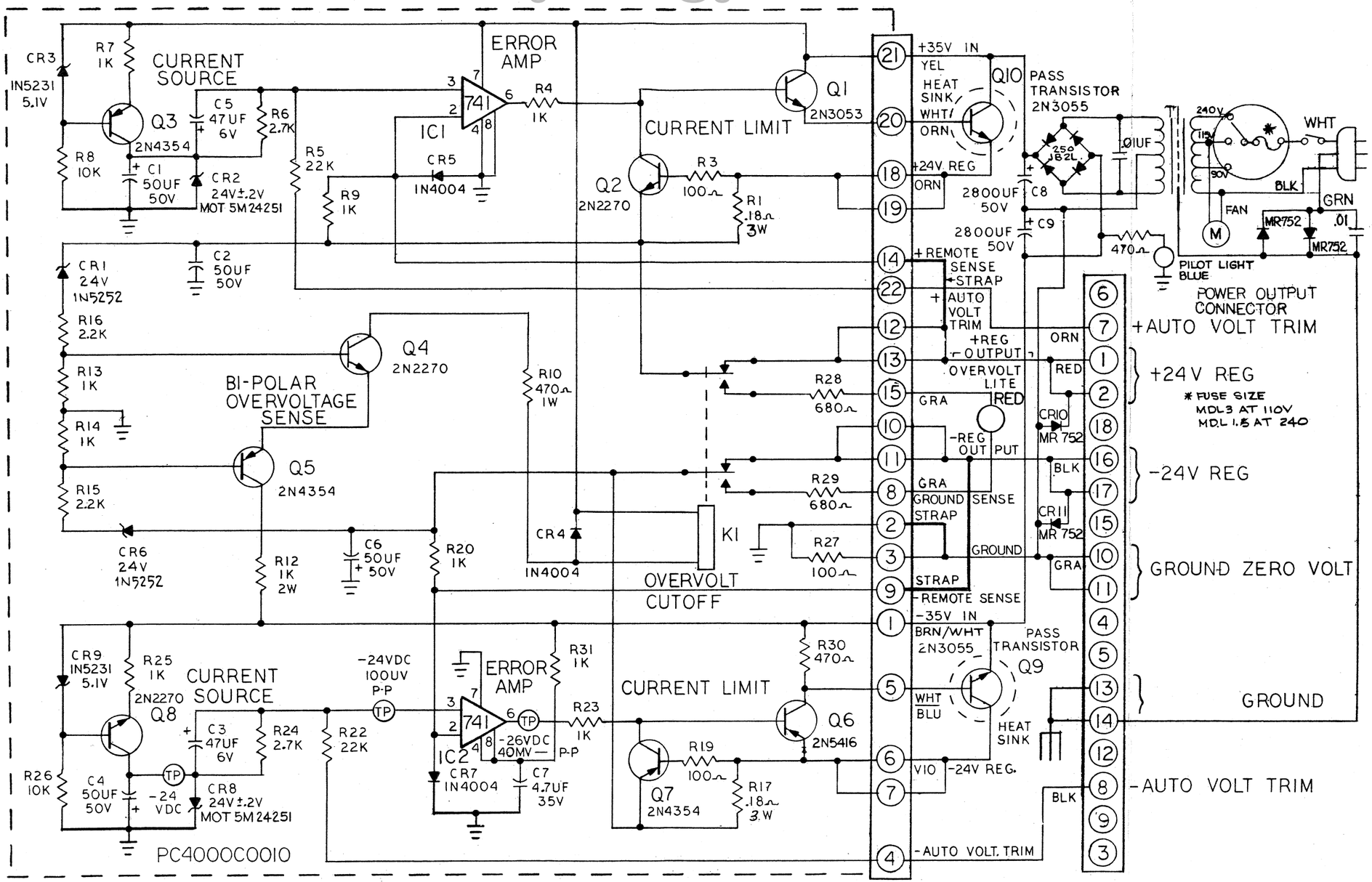


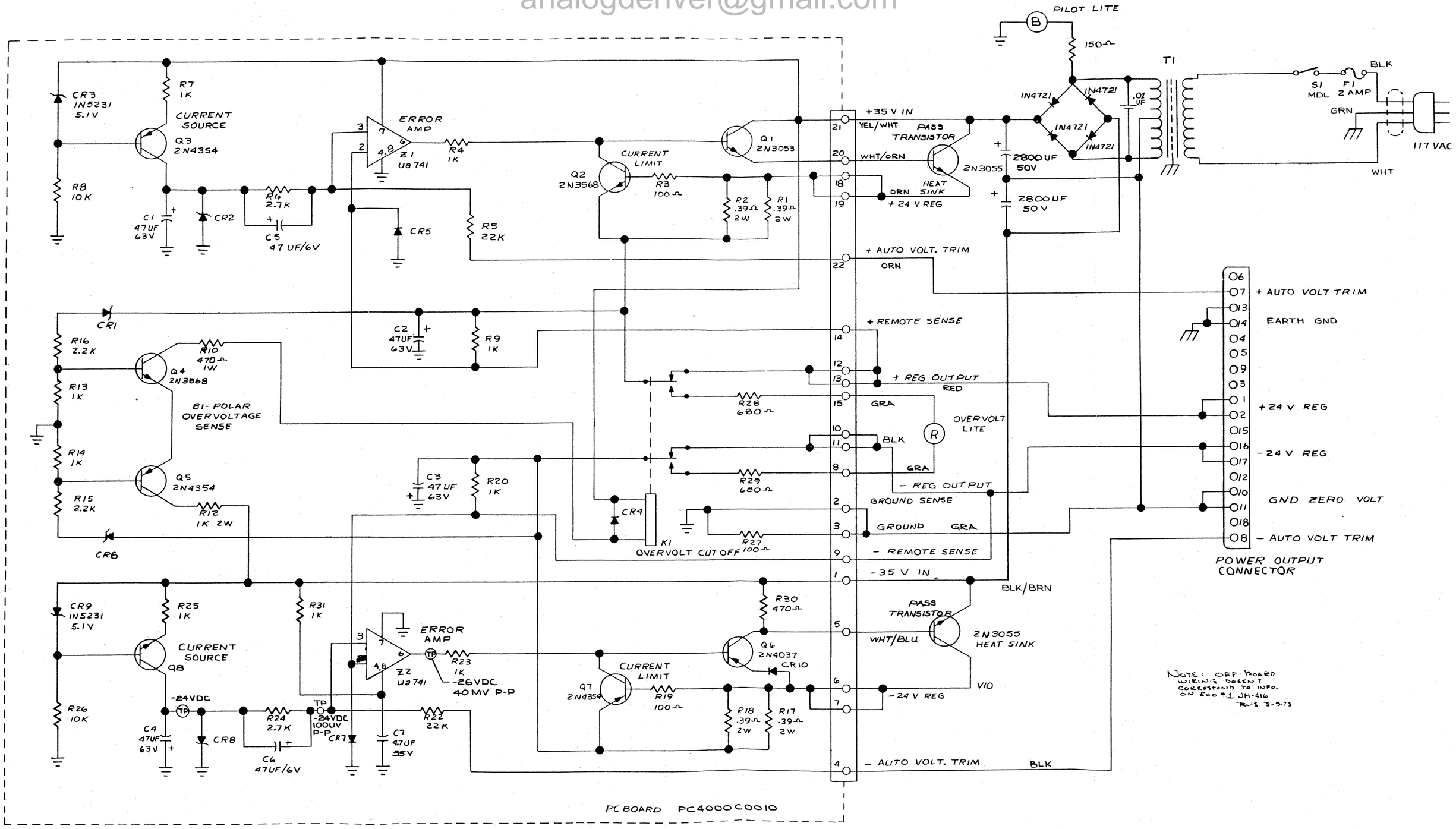
Figure 6 - 4 43D97 MASTER MODULE





NOTES: UNLESS OTHERWISE SPECIFIED
1.- ALL RESISTORS ARE 1/2 WATT 5%
2.- ALL CAPACITORS ARE UF
3.- TO CONNECT ZERO VOLTS BUSS TO EARTH GND, JUMPER PIN 10 TO 13 ON POWER OUTPUT CONN.
4.- TO TRIM VOLTAGE TO ±22V, JUMPER PINS 7,8 & 10,11 ON POWER OUTPUT CONNECTOR.

POWER SUPPLY 43C111
Figure 27 JH-400B Page 10-17



NOTES: UNLESS OTHERWISE SPECIFIED

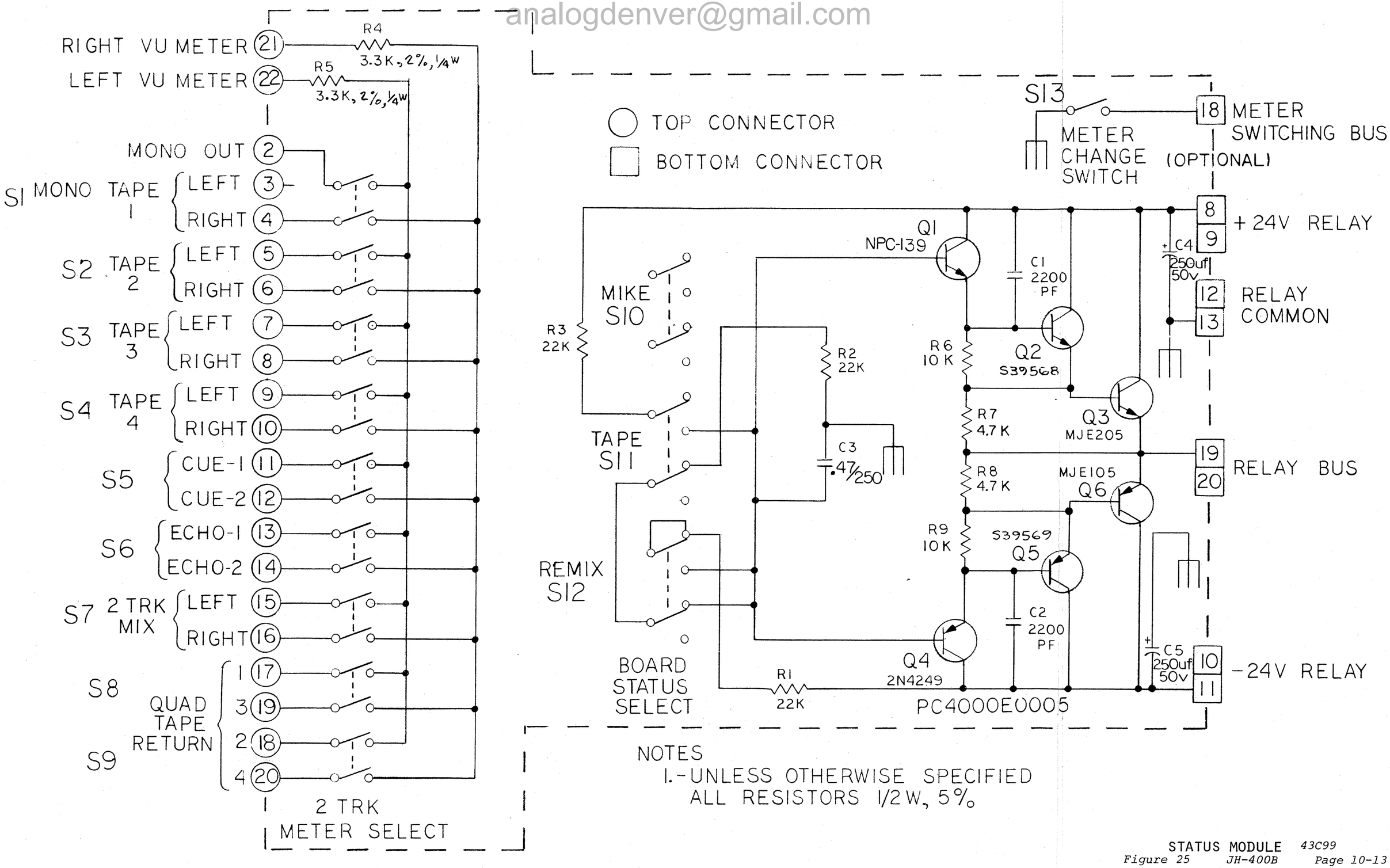
1. ALL RESISTORS 1/2W 5%
2. ALL CAPACITORS IN UF
3. REF. PC.BOARD PC4000C0010.
4. ALL DIODES IN4004
4. TO CONNECT ZERO VOLTS BUS TO EARTH GND, JUMPER PIN 10 TO PIN 13 ON POWER OUTPUT CONNECTOR.
5. TO TRIM VOLTAGE TO ±22V, JUMPER PINS 7,8, & 10,11 ON POWER OUTPUT CONNECTOR.

Figure 6 - 8 SC40D21 CONSOLE POWER SUPPLY

FILTER NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
FREQUENCY	45 Hz	70 Hz	100 Hz.	140 Hz	200 Hz	280 Hz	400 Hz	560 Hz	800 Hz	1.1K Hz	1.6K Hz	2.2K Hz	3.2K Hz	4.5K Hz	6.3K Hz	9.0K Hz	12.8K Hz	16.5K Hz
CX01, CX02	.1	.1	.1	.033	.033	.033	.01	.01	.01	.0033	.0033	.0033	.0033	.001	.001	.001	.00033	.00033
RX02, RX04	2.2K	1.5K	1.0K	2.2K	1.6K	1.1K	2.4K	1.8K	1.3K	2.7K	2.0K	1.3K	1.0K	2.2K	1.6K	1.1K	2.4K	1.8K
RX03, RX05	150	20	62	91	--	39	240	100	30	220	--	160	--	150	91	68	100	130
RX06	510K	330K	220K	510K	330K	240K	560K	390K	270K	620K	430K	300K	220K	510K	360K	240K	560K	430K
RX07	16K	10K	16K	3.9K	27K	15K	33K	36K	27K	33K	18K	27K	3.9K	16K	18K	22K	--	6.2K

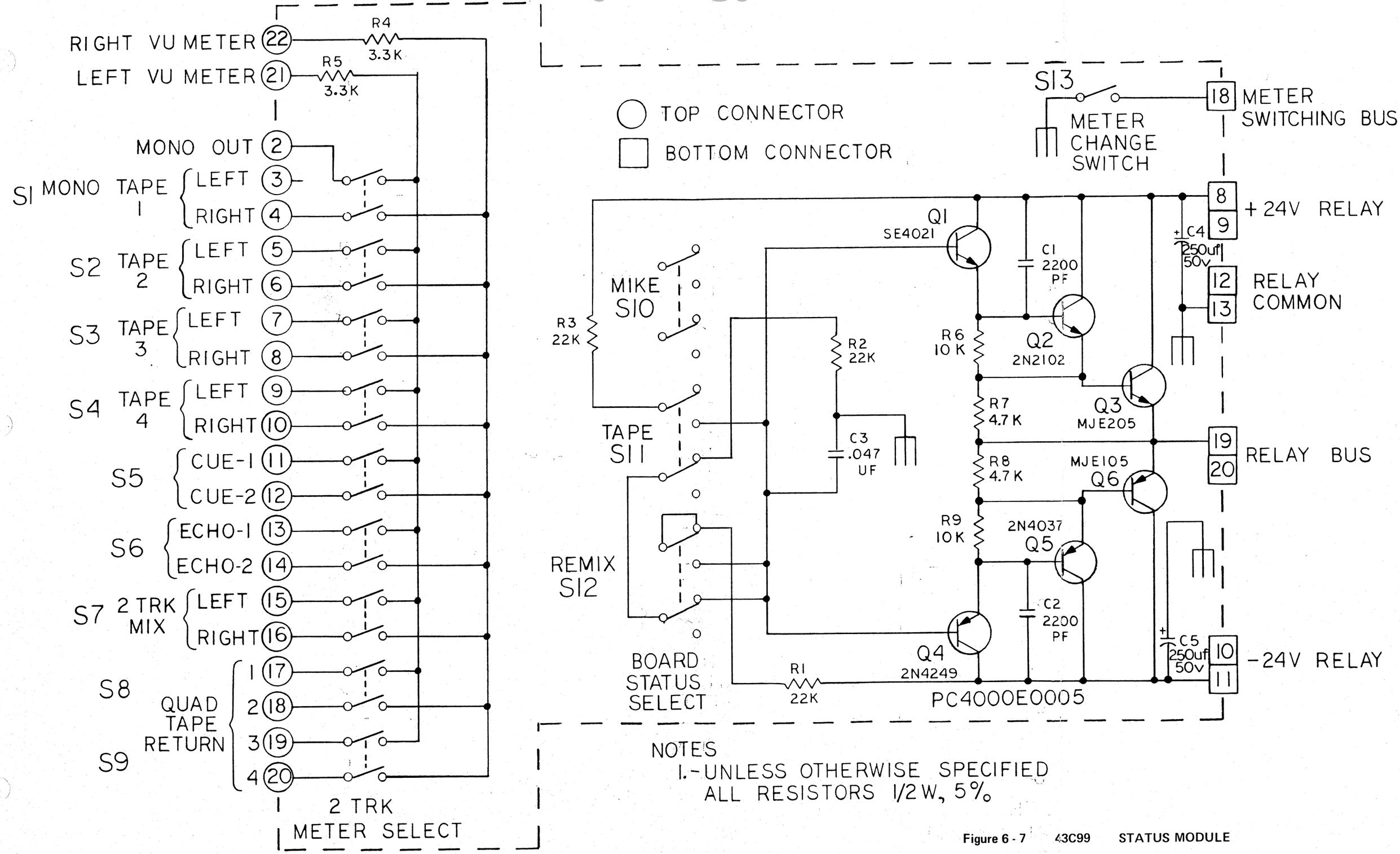
NOTE: ALL FILTER RESISTORS 1/4W 2%

NOTE:
1. UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE 1/4W, 5%
ALL CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
ALL DIODES ARE IN4004
2. FILTER COMP. DESIG START AT #101, THE FIRST DIGIT IS THE FLTR NO. EX: C104 = FLTR #4 CAP. C4. R1805 = FLTR #18 RESIS R5. ETC.



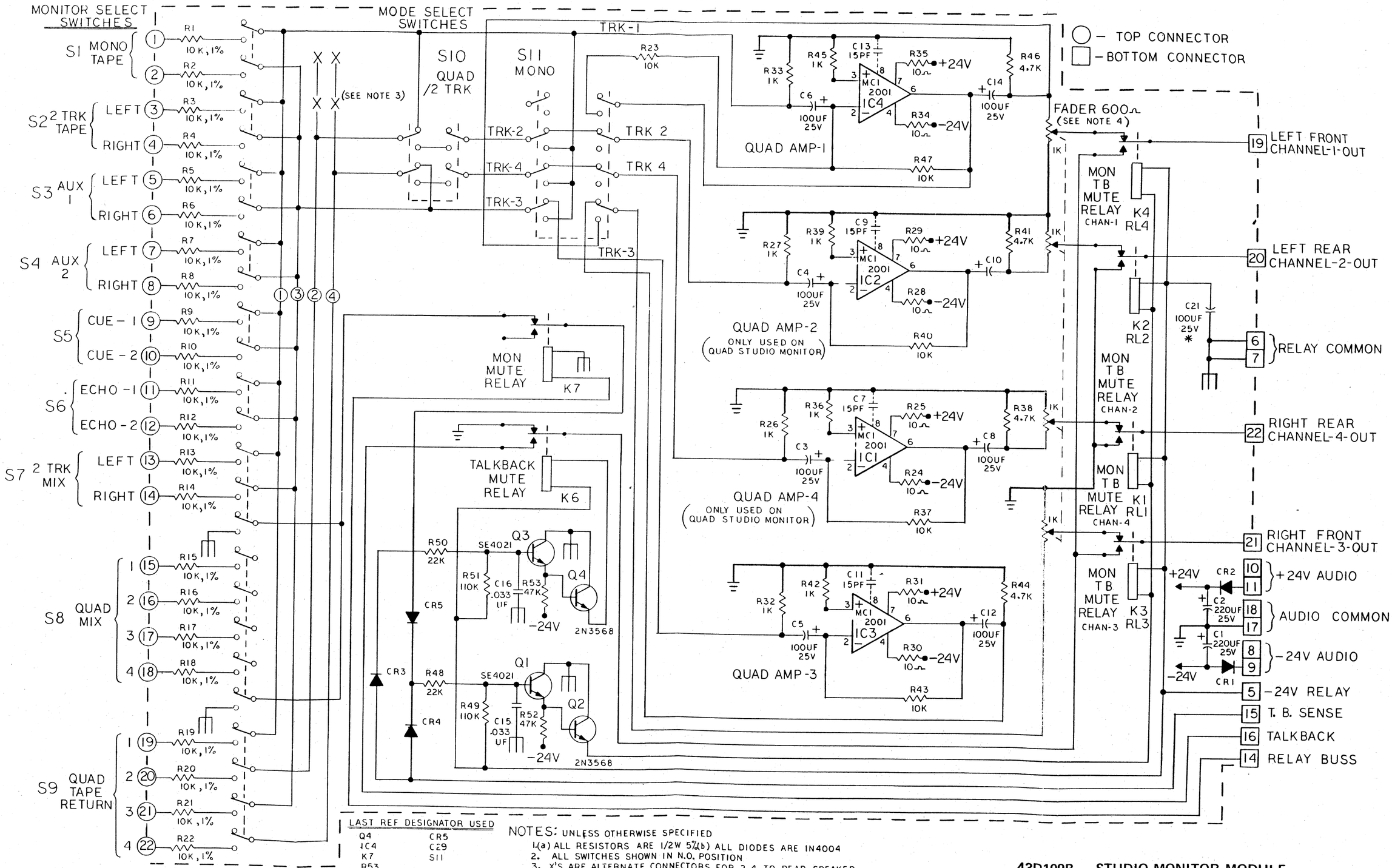
NOTES
1.-UNLESS OTHERWISE SPECIFIED ALL RESISTORS 1/2W, 5%

STATUS MODULE 43C99
Figure 25 JH-400B Page 10-13



NOTES
1.-UNLESS OTHERWISE SPECIFIED
ALL RESISTORS 1/2W, 5%

Figure 6 - 7 43C99 STATUS MODULE



LAST REF DESIGNATOR USED

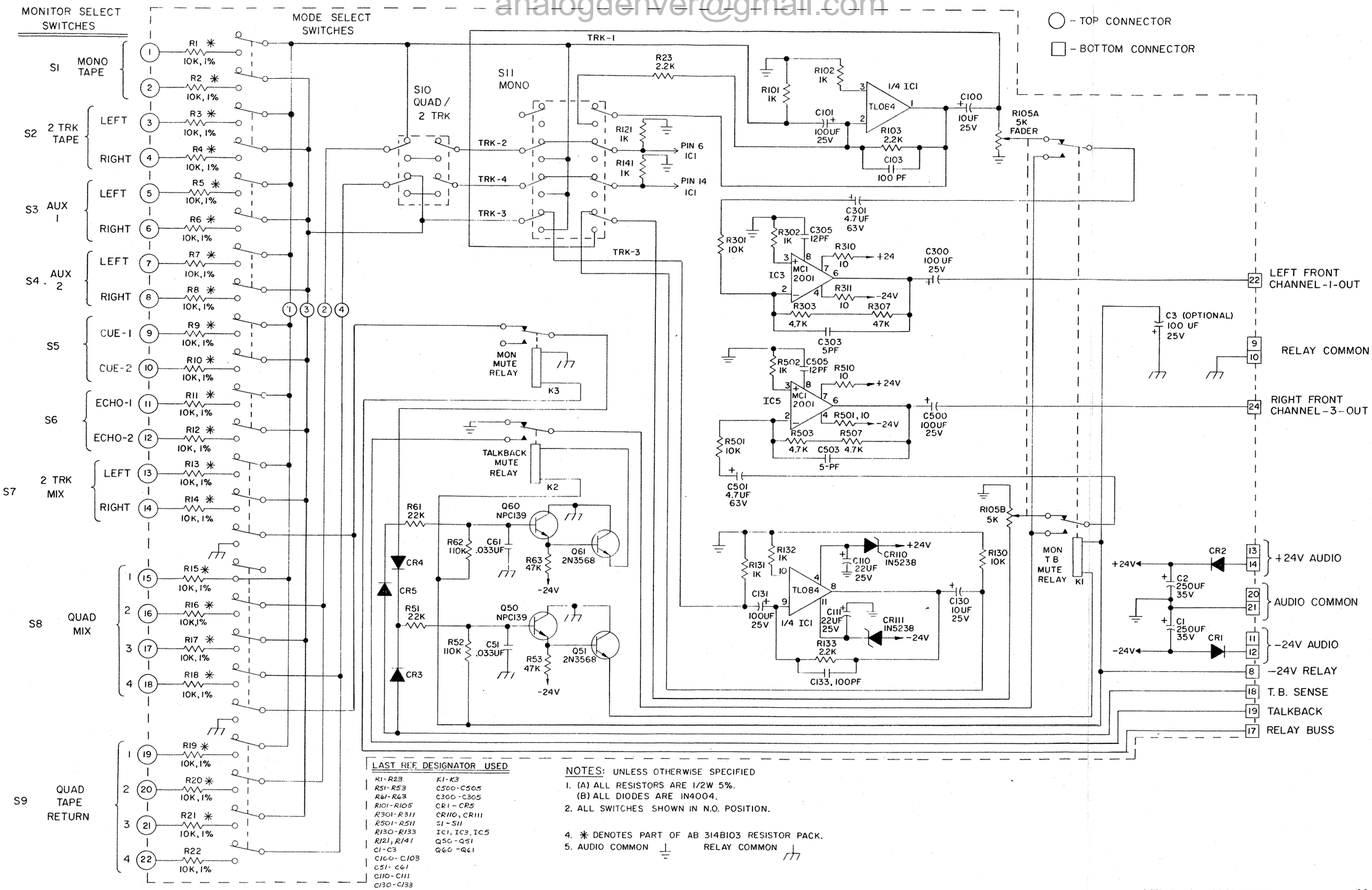
Q4	CR5
IC4	C29
K7	S11
R53	

NOTES: UNLESS OTHERWISE SPECIFIED

1.(a) ALL RESISTORS ARE 1/2W 5%(b) ALL DIODES ARE IN4004
2. ALL SWITCHES SHOWN IN N.O. POSITION
3. X'S ARE ALTERNATE CONNECTORS FOR 2,4 TO REAR SPEAKER MONITORS
4. STUDIO MONITOR CHANNEL 2,4 AMPS & RELAYS ARE OPTIONAL
5. AUDIO COMMON ⏚ RELAY COMMON ⏚

43D109B STUDIO MONITOR MODULE

Figure 6 - 6



LAST REF. DESIGNATOR USED

R1-R23	K1-K3
R51-R53	C500-C505
R61-R63	C300-C305
R101-R105	CR1-CR5
R301-R311	CR110, CR111
R501-R511	S1-S11
R130-R133	IC1, IC3, IC5
R121, R141	Q50-Q51
C1-C3	Q60-Q61
C100-C103	
C51-C61	
C110-C111	
C130-C133	

NOTES: UNLESS OTHERWISE SPECIFIED

1. (A) ALL RESISTORS ARE 1/2W 5%.
   (B) ALL DIODES ARE IN4004.
2. ALL SWITCHES SHOWN IN N.O. POSITION.

4. ✳ DENOTES PART OF AB 314B103 RESISTOR PACK.
5. AUDIO COMMON ⏚ RELAY COMMON

STUDIO MONITOR MODULE 43D247

Figure 24 *JH-400B* *Page 10-11*