

CR **CIRCUIT RESEARCH LABS, INC.**
3204 S. Fair Lane - Tempe, Arizona 85281 - (602) 894-0077

CR systems

AM SYSTEM 4

Audio Processing of the 80's

SPECIALIZING IN AUDIO PROCESSOR DESIGN, RESEARCH, AND DEVELOPMENT

SECTION III

The CRL AM System #4
Theory of Operation

APP 300 - Audio Preparation Processor, function and purpose:

The APP 300 is a simple to operate, but actually complex unit which first sends the audio signal through a symmetry generating harmonic phase processing circuit. This removes asymmetry from modulation and process robbing voice and lead musical instrument waveforms. The following gain control stages are then able to operate many times more efficiently.

Next, the audio signal passes through the front panel controlled wide band gain processing element which programs the amount of average level stabilization desired to pre-load the following main processor (SEP 400). While set up from the factory for medium action level control only, so that medium and short term dynamics remain unaffected, the APP 300 can be programmed to faster or slower actions of level controlling and can also be programmed to use low level expansion by a 4 pole IC sized micro-switch located internally on the main processor circuit board

A precision threshold and continuously adjustable gate circuit is available for use by a control located on the rear panel. The gate control prevents upward expansion of background noises and undesirable noise levels during program pauses by "freezing" the gain level previously caused by the interrupted program material. This allows intelligent gain controlling without the usual effects of pumping upward of background sounds like hum and noise, newscast teletype machines, and background reverberation sounds which might occur during program pauses.

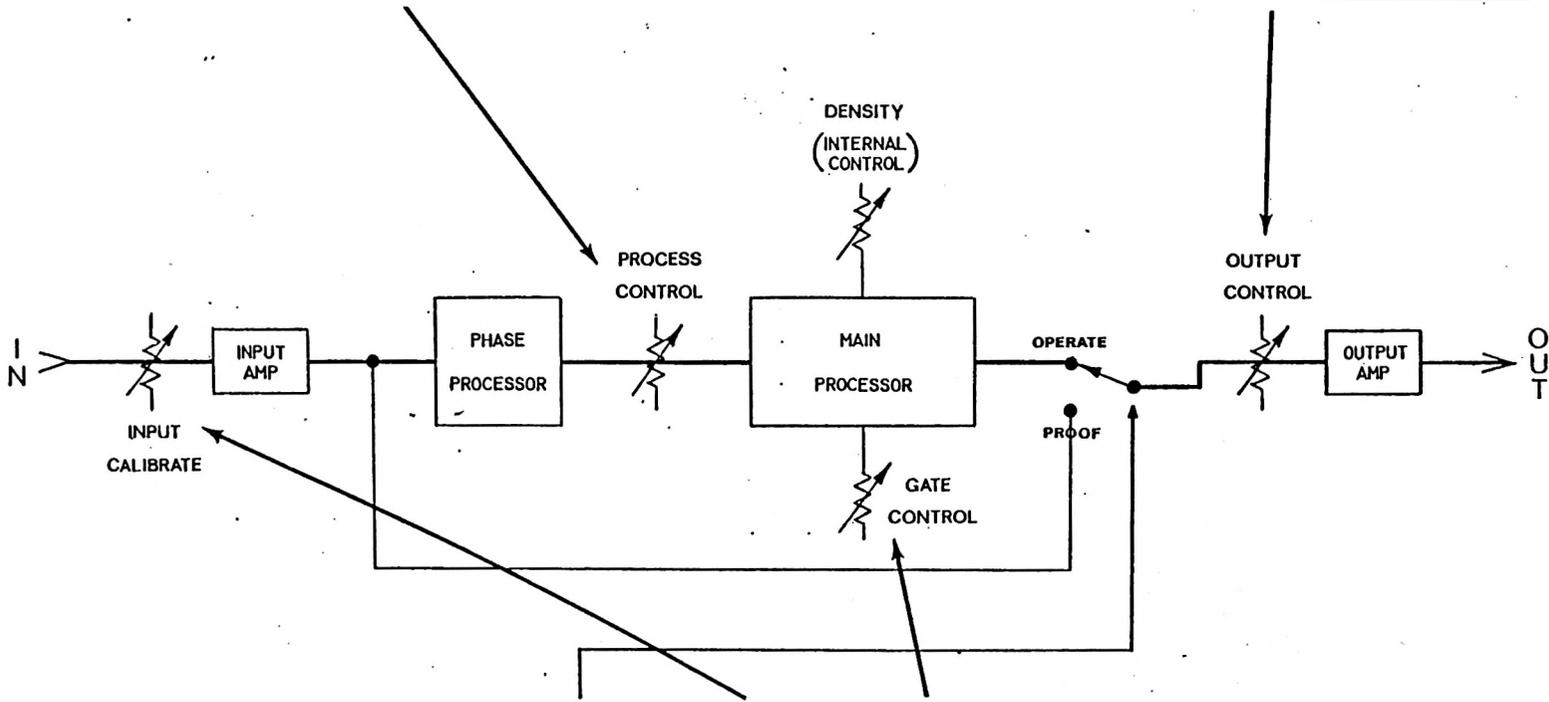
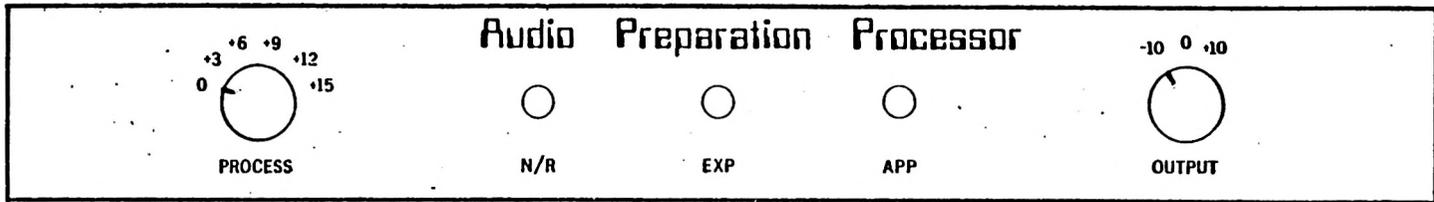
These additional features make the APP 300 capable of being many processors in one and can be used for special applications in production and news areas.

The CRL AM System #4
Installation and Set-Up
Audio Preparation Processor-APP 300

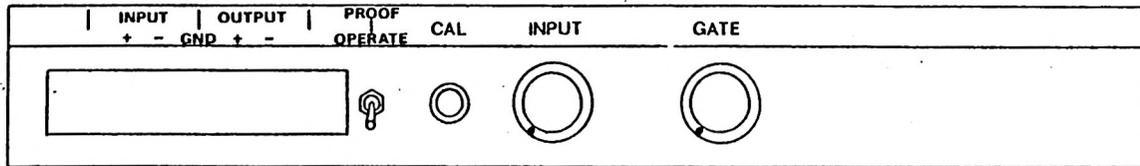
- STEP 1 Set Process switch to 0 on front panel and rear panel Gate control to OFF, or 'fully counter clockwise.
- STEP 2 Apply programming at 0 Vu peak level on the audio console (a constantly peaking or compressed song is recommended).
- STEP 3 Adjust the rear panel Input control until the rear panel calibration light marked CAL just begins to flash on program level peaks. The rear panel CAL light is for convenience and is actually an extension of the amber front panel APP process light.
- STEP 4 Select the -10, 0, or +10 output drive level desired by the front panel output switch.
- STEP 5 Select the desired level of APP processing of long term dynamic level control by simply "dialing" the Process switch to the chosen value.
- STEP 6 The Gate control prevents pumping of background noise levels during speech pauses by means of "freezing" the gain reduction at what ever level was present previous to the pause. The rear panel control sets the threshold level level at which the "freezing" action of the output occurs. The most clockwise setting causes "freezing" at the highest level, typically 5 - 10 db below the threshold of gain reduction. Near the most counter clockwise setting causes "freezing" at the lowest level, typically 25 - 30 db below threshold. A fully counter clockwise setting turns the Gate OFF. For Process setting of +3 to +6, an 8 - 11 o'clock setting of the gate control is recommended. For Process settings of +9 to +15, an 12 - 5 o'clock setting is generally required for proper action. NOTE: the front panel Red "N/R" LED will activate when ever the gate "freezing" action is occurring.

INSTALLATION AND SET-UP IS NOW COMPLETE FOR THE APP 300

FRONT
PANEL
CONTROLS



REAR
PANEL
CONTROLS



APP 300 Audio Preparation Processor
Internal Alignment

Unless the gain control FET, Q1, or Power Supply zeners are replaced, internal alignment of the APP 300 should not be necessary unless an alignment check is desired.

TEST EQUIPMENT:

1. Audio Generator
2. A.C. Voltmeter (or calibrated oscilloscope)

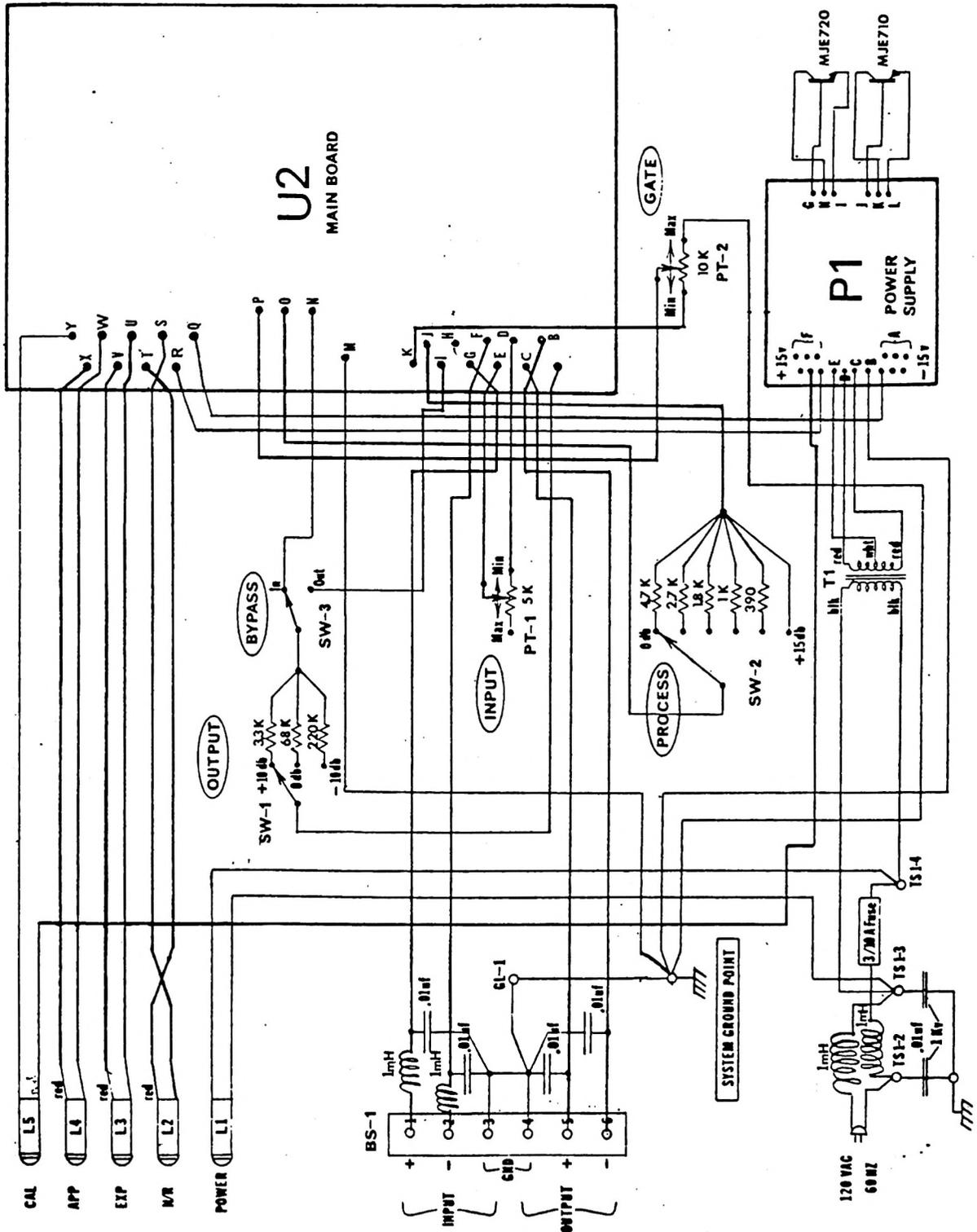
PROCEDURE:

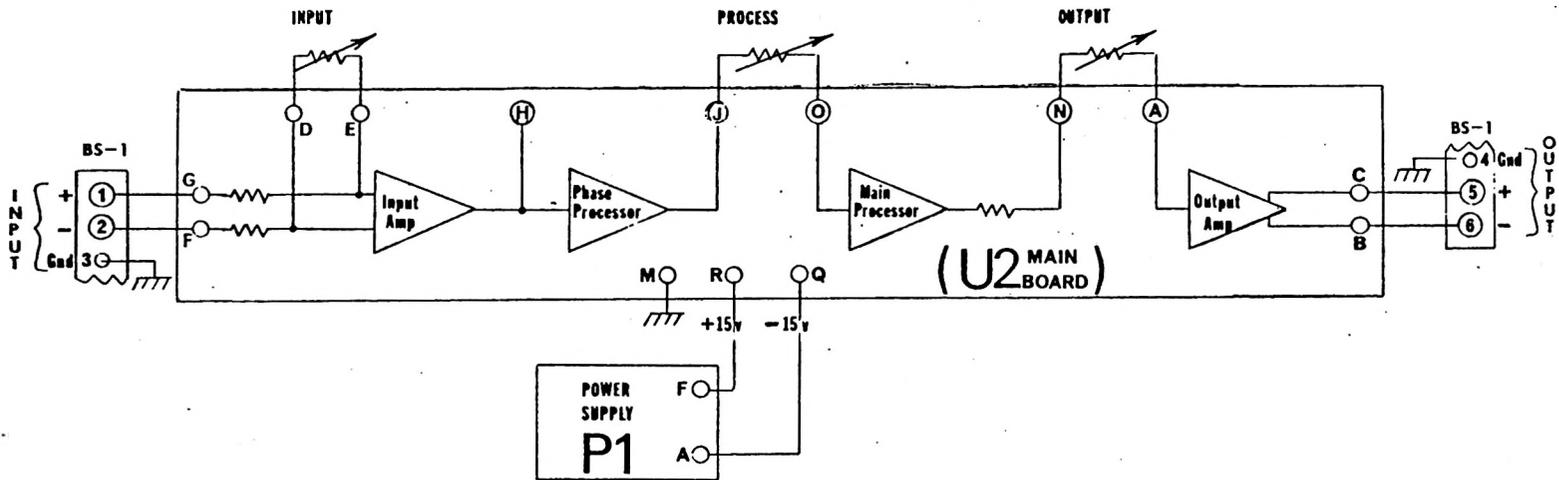
- STEP 1 Set Process switch to 0, and rear panel Gate control to OFF.
- STEP 2 Connect the audio generator to the + and - input terminals and jumper the - terminal to the ground terminal.
- STEP 3 Apply a 400 Hz sine wave and bring the generator level up until the APP amber LED just starts to light on the front panel.
- STEP 4 Set Process switch to +6 and measure the jumper wire in front of terminal "0" on the U1 board for 2.8Vrms (0db gain reference). Adjust Output control (R38) for this value if necessary.
- STEP 5 Reduce generator output until the jumper reads 2.2Vrms (-2db). Adjust Bias control (R52) to the point where the voltage on the jumper just begins to reduce.
- STEP 6 With the Expansion Defeat (S4) switched to ON, reduce the generator output until the jumper reads 89mVrms (-30db).
- STEP 7 Switch Expansion Defeat (S4) to OFF and the jumper voltage should drop smoothly to 28mVrms (-40db) after approximately 4 seconds. Expansion control (R50) is adjusted for this value if necessary. Adjustment is not necessary if the voltage is between 23mV (-42db) to 33mV (-38db).

ALIGNMENT IS NOW COMPLETE.

APP 300

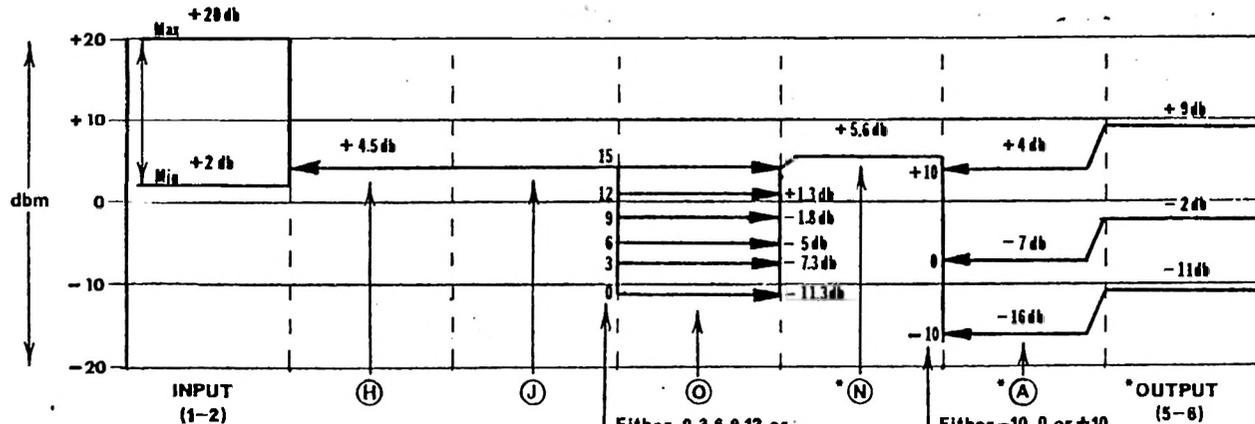
MAIN SCHEMATIC





BLOCK DIAGRAM

SIGNAL LEVEL DIAGRAM



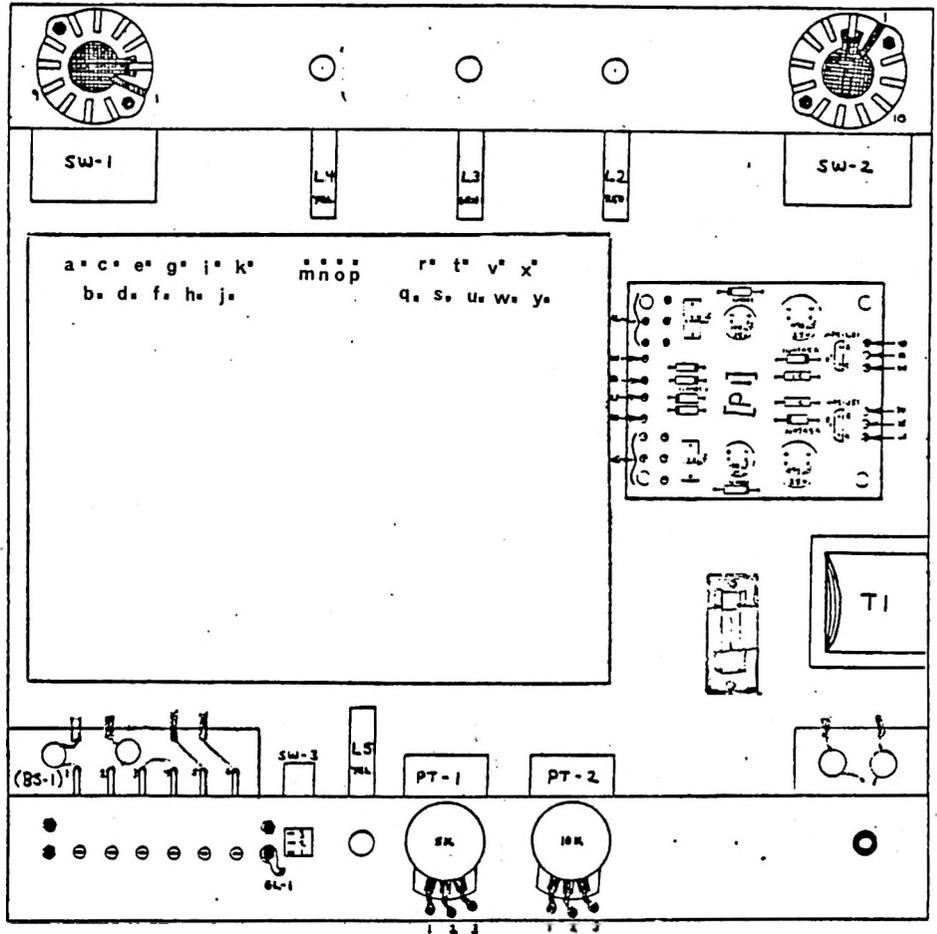
NOTE: (1) Input level set at the point where the rear panel "Cal" light just lights, using a 1KHz sine wave.

(2) 0dbm = .774v

(3) Circles containing letters refer to connection points on U1 board. See Block Diagram above.

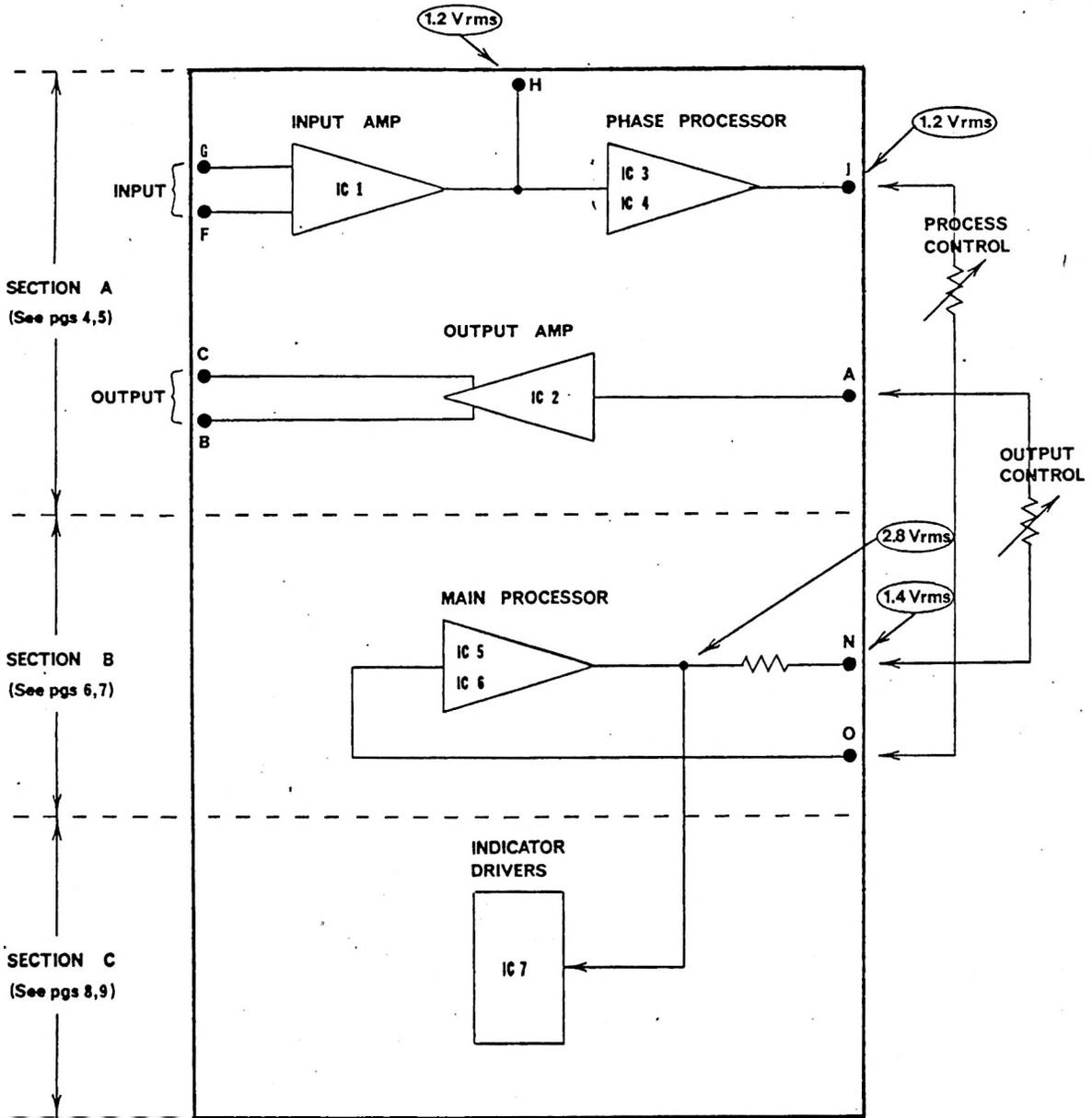
(4) Levels shown at N, A, and Output are with the Process switch in +6.

CHASSIS PICTORIAL

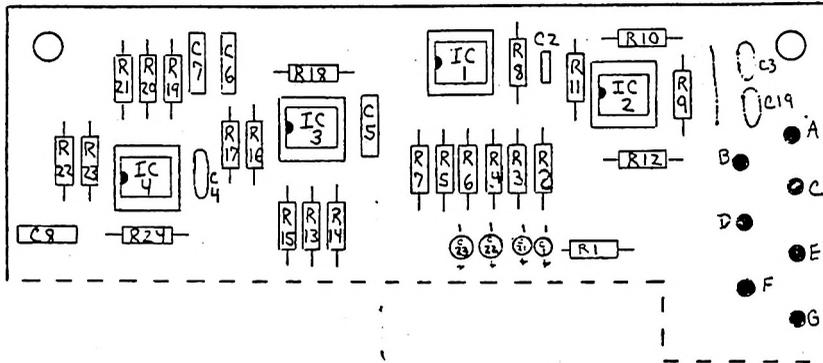


U2 BOARD

BLOCK DIAGRAM.



INPUT AMP, OUTPUT AMP, and PHASE PROCESSOR



PARTS LIST

RESISTORS

All resistors are $\frac{1}{2}$ watt, 5% carbon film unless otherwise noted. Values are in ohms.

R1	620	R9	22 K	R17	18 K
R2	4.7 K	R10	22 K	R18	10 K
R3	4.7 K	R11	22	R19	18 K
R4	270	R12	22	R20	10 K
R5	100 K	R13	10 K	R21	10 K
R6	100 K	R14	18 K	R22	18 K
R7	330 K	R15	10 K	R23	10 K
R8	330 K	R16	10 K	R24	10 K

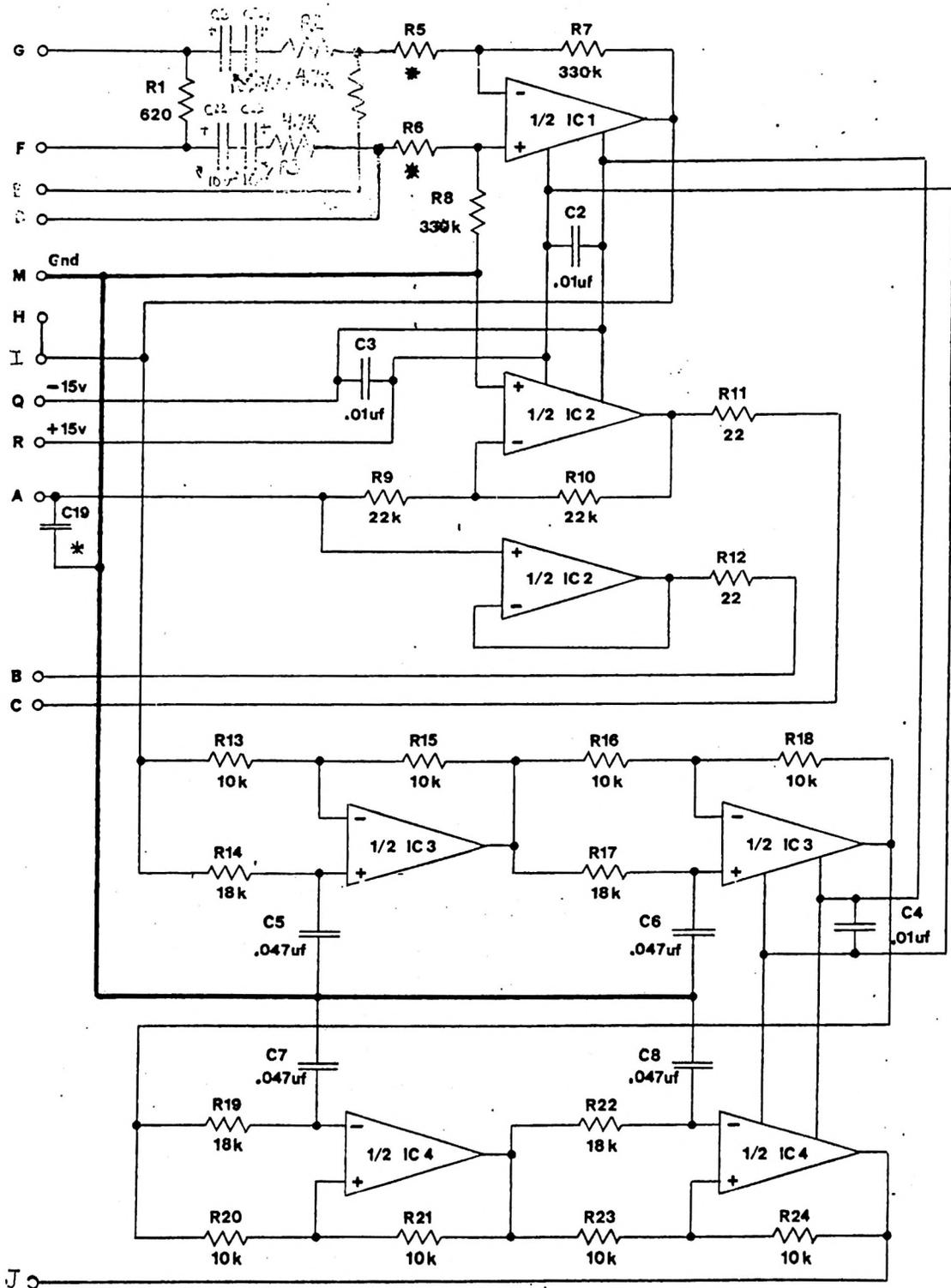
CAPACITORS

C1, C21, C22, C23	- 10uf/10v Electro	C5-C8	.047 uf, 50v 5% film
C2-C4	.01 uf, 50v film	C19	100 pf disc (mounted underneath board)

SEMICONDUCTORS

IC1, IC2	RC4558NB (no substitution)
IC3, IC4	MC1458CP1 or equivalent

INPUT AMP, OUTPUT AMP, and PHASE PROCESSOR



* See Parts List

U2 Board
MAIN PROCESSOR

RESISTORS

All resistors are $\frac{1}{4}$ watt unless otherwise noted.
Values are in ohms,

R25	47k	R46	47k
R27	1k	R47	82k
R28	100k	R48	100k
R29	10k	R49	4.7k
R30	1.5k	R50	10k trim
R31	100k	R51	22k
R32	2.2k	R52	10k trim
R33	2.2k	R53	10k
R34	100k	R54	1k
R35	10k	R55	10k
R36	4.7k	R56	10M
R37	2.2k	R57	10M
R38	10k trim	R58	2.2M
R39	82k	R59	1k
R40	100k	R60	1.5k
R41	47k		
R42	47k	R76	3.3k
R43	4.7k		
R44	100k		
R45	47k		

Capacitors

C10, C15, C24 ---10uf/16v
C19.

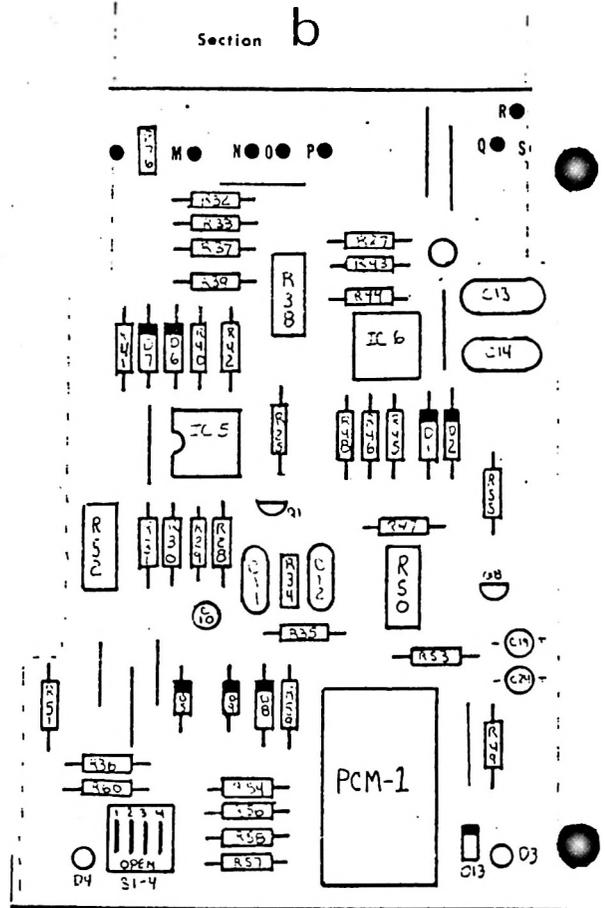
C11, C12 .1uf/50v 10%film
C13, C14 .22uf/50v 10%film

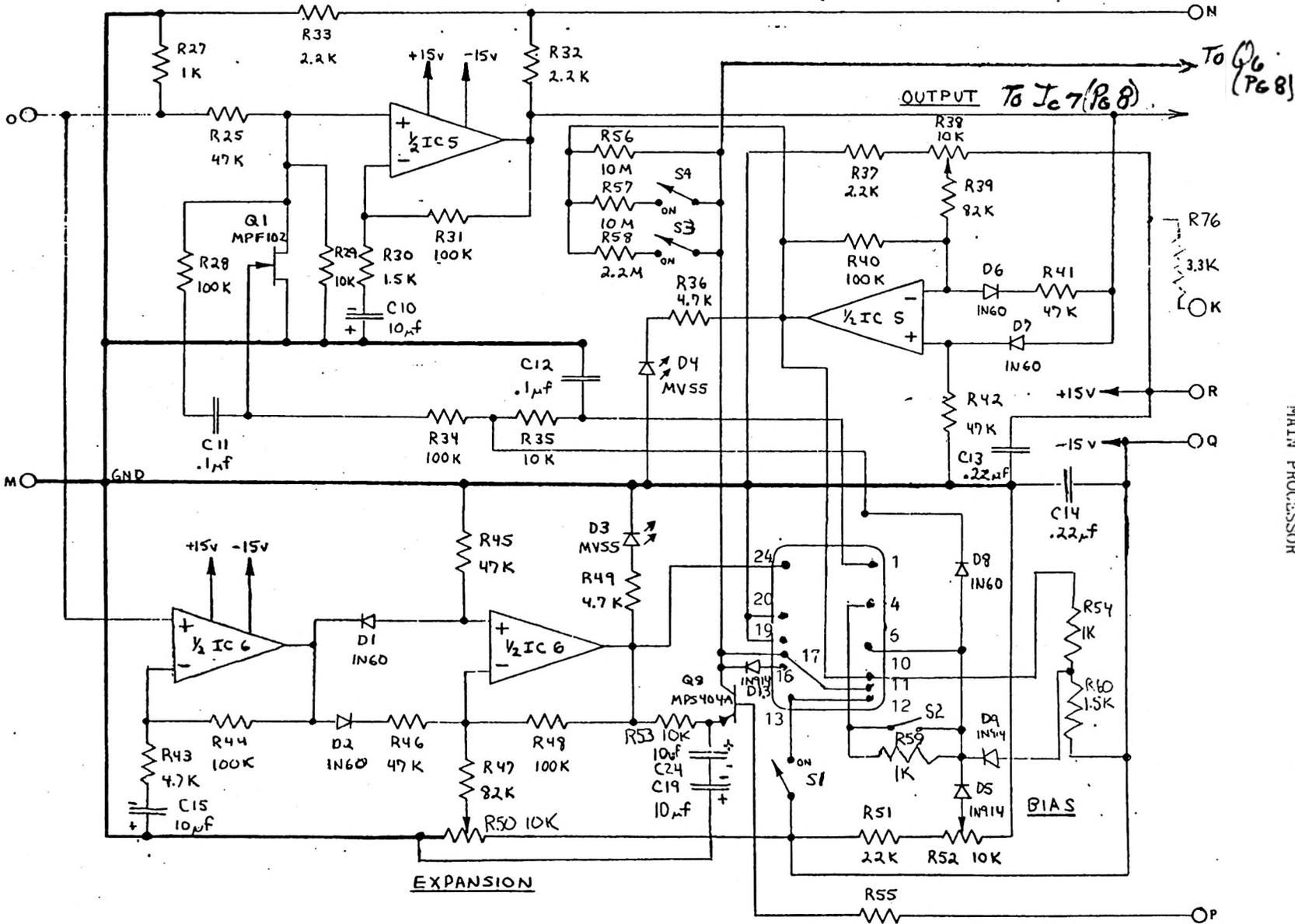
Semiconductors

D1, D2, D7, D6, D8	1n60	Q1	MPF 102 FET or equiv.
D5, D13, D9,	1N914	Q8	MPS404A
D3, D4	MV55 Monsanto	IC 5	RC4558NB
IC 6	Mc1458CP1		

MISC

PCM-1 Process Control Memory S1-S4 4 pole dip switch

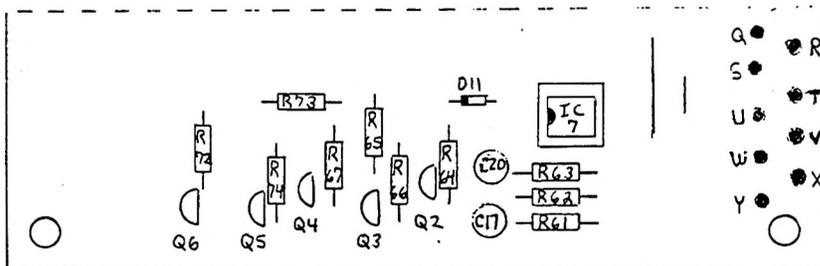




MAIN PROCESSOR

U2 BOARD
INDICATOR DRIVERS

Section VII



PARTS LIST

RESISTORS

All resistors are $\frac{1}{2}$ watt, 5% carbon film unless otherwise noted. Values are in ohms.

R61	33K	R64	10K	R67	10K
R62	10K	R65	10K	R72	22
R63	22K	R66	22K	R73	10K
				R74	620

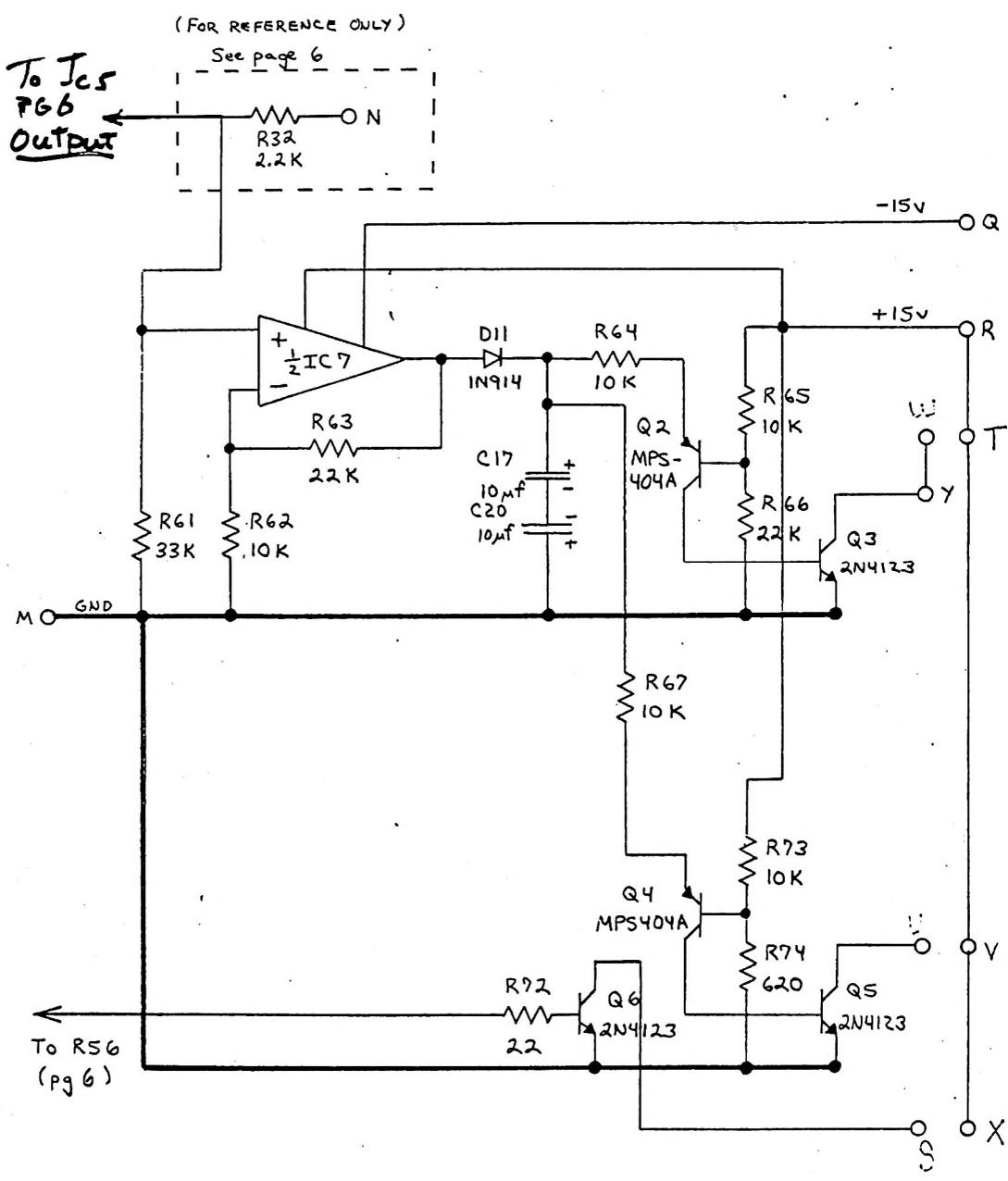
CAPACITORS

C17, C20 10 uf, 16v electrolytic

SEMICONDUCTORS

D11 1N914
Q2, Q4 MPS404A
Q3, Q5, Q6 2N4123
IC7 MC1458CP1

INDICATOR DRIVERS



SECRET 111

The CRL AM System #4
Theory of Operation

SEP 400 - Spectral Energy Processor, function and purpose:

The SEP 400 is the heart of the CRL processing system and consists of 5 analog computer controlled gain processors all of which can be externally controlled and programmed.

First, 4 of the processors are ganged in parallel to form one 4 channel discriminate processor which carefully divides the audio spectrum into 4 electro-acoustically chosen bands. This section is called the DEP or Dynamic Energy Processor section. In order to match with human hearing, these bands were chosen upon their logarithmically equal spacing through the audible frequency range. Choice was also made to separate the musical instrument bands of bass and high frequencies apart from the human voice band. In addition to these divisions, the human voice band was further divided into the vowel or fundamental harmonics band and the consonant or presence and intelligibility band. This division of the audio spectrum produces a maximum audio presence not capable with other discriminate processors.

The amount of processing in the DEP section is controlled by the front panel DEP Process switch. After input level calibration has been initially performed, the desired level of 4 channel processing can be adjusted in 3db steps from 0 to 12db. The process switch is a precision step type which controls the total input level to all bands and therefore allows for REPEATABLE levels of processing.

PRELIMINARY SET-UP INSTRUCTIONS
FOR THE SEP-400A AUDIO PROCESSOR

1. Connect input leads to the SEP-400A and be sure that the APP-500 is feeding the SEP-400A with a 0 dbm level. If the SEP-400 is receiving its feed from a STL or telco line, simply insure that the APP-300 is driving the STL or telco line at the proper level.
2. Bring the rear panel INPUT control UP (CLOCKWISE) until the rear panel CAL light just begins to blink on program peaks. This is the threshold of processing for the SEP-400A, when you have arrived at this point the INPUT calibration is complete.

What if the CAL light doesn't blink??

Open the SEP-400A and locate the INPUT SENSITIVITY MICRO DIP SWITCHES..

S3 AND S4 should be on, giving the SEP a sensitivity region from -15DBM to +5DBM.

If you are sending the SEP-400A a level less than -15DBM then you must turn switches S1, S2 on also. (in Addition to S3, S4) This will change the SEP-400A sensitivity to -10dbm -30dbm.

What if the CAL light blinks even with the INPUT control all the way down??

In this case the unit is much too sensitive. Open up the SEP-400A and locate the INPUT SENSITIVITY MICRO-SWITCH. Only S3 and S4 should be on, giving the SEP-400A a sensitivity from -15DBM to +5dbm. You must switch S4 and S3 off giving you a range from +15 to 0 dbm.

INTERNAL HIGH SPEED ATTACK LIMITERS

THE SEP-400A comes with switchable floating threshold limiter circuitry on each of the four bands. Inside the SEP-400 there is micro dip switches S7 - S10. These four Micro Dip switches control whether or not the bands have this extra limiter capability. There is one mini dip switch per band, the switch causes the band its in to have a very fast attack time on transients, giving a more compressed sound to some program material. From the factory the switches S8 and S9 are ON giving the M1 and the M2 bands a faster transient catching attack time, which seems to lower the distortion content in some voices. If you would like to defeat these limiters for a more dynamic sound simply switch S8, S9 to OFF. If you prefer this action in all bands then simply switch S7 thru S10 to ON. S7 is L Band, S8 is M1, S9 is M2, S10 is H band.

The attack and release times of all 4 channels are controlled by analog computer circuits. These circuits produce the complex program dependent attack and release times from the measurement of program density, frequency content, transient content, and average to peak level ratio. While the processing is automatically program controlled, the range or activity of the automatic control can be varied. The ability to control this range or activity was incorporated into the DEP Density switch on the front panel. In the 0 density position the 4 channels resemble AGC action and operate primarily as dynamic equalizers which maintain consistent sound equalization. In the +3 density position the 4 channels resemble AGC/Compression devices and operate on reducing long term and medium dynamic ranges. Finally, in the +6 density position the channels become more similar to compression/limiting devices and operate heavily on medium term dynamic reduction.

Output control of each processing channel has been provided on the front panel and has been arranged into a 4 channel equalizer so that a specific ON AIR sound can be tailored to any individual taste. These outputs have been labeled L or low, M1 for the lower range, M2 for upper mid-range, and H for high frequencies.

It should also be noted that when the DEP section is operated at the process level (0db), it becomes basically a standard 4 band equalizer and can be used as such.

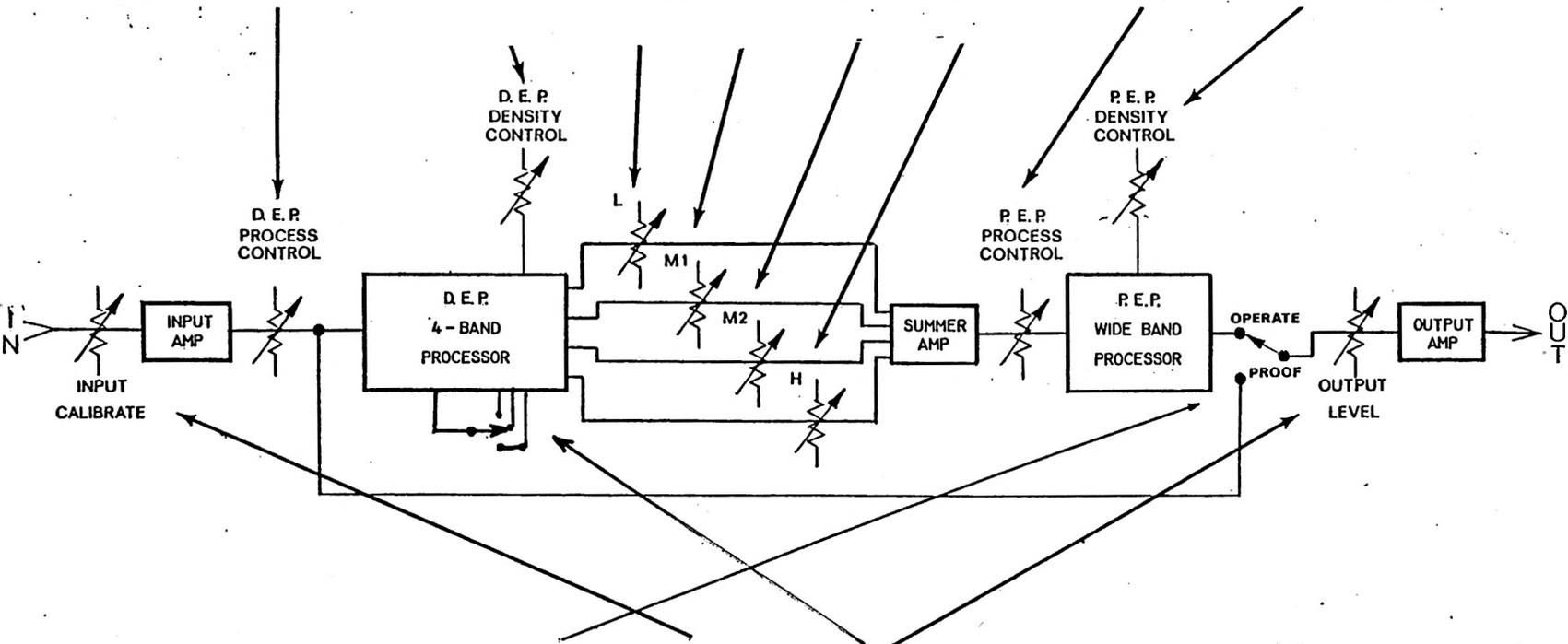
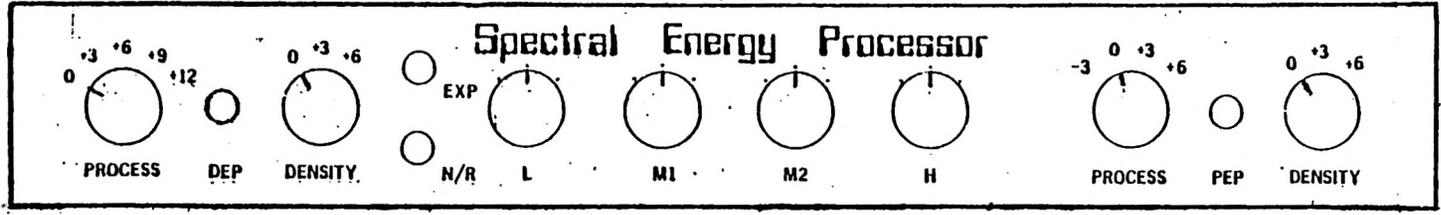
The final and most powerful of the 5 computer controlled gain processors is placed following the summation of the previous 4 channel processor section. Called the PEP section (Peak Energy Processor), this stage controls the peak to average energy level of the previously processed audio and does so in such a fashion that its level of processing produces almost the same level of loudness and energy increase.

The process capability of this stage can also be by-passed by simply placing the PEP Process switch in the -3 position.

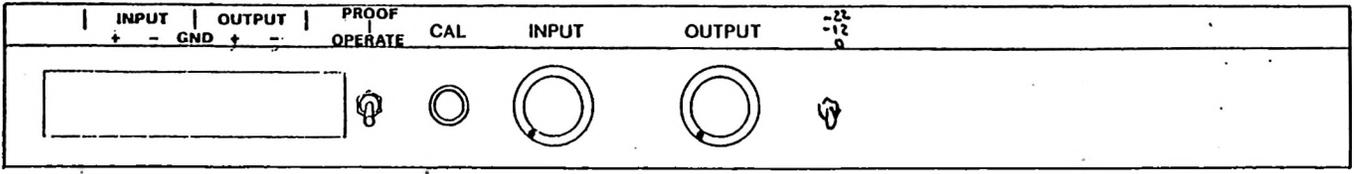
The range and activity of the PEP computer controlled attack and release times can also be controlled as in the 4 channel section (except to a lesser degree) by the front panel PEP Density control which features 0, +3, and +6 positions.

It might be asked at this time why must such complexity of control be necessary. The answer is in the elimination of conventional processing circuit deficiencies which have long "colored" the audio coming from them. Such things as pumping, loss of apparent dynamic punch, "hole" punching or gain intermodulation, and fatigue creating over-driven sounds are eliminated by this method. The results have proven to be an obviously processed but transparent and quality sound.

FRONT
PANEL
CONTROLS



REAR
PANEL
CONTROLS



Preliminary operation instructions
for the SEP-400A audio processor

These instructions are to help you in the actual sound tailoring process and to provide general information on the controls available on the SEP-400A.

Front Panel.

1. Process Control(left side DEP)

The Process control for the DEP section of the SEP-400 controls the amount of processing or if you prefer, Dynamic Equalization occurring in the four parallel bands. The process control is basically a step attenuator that is calibrated in 3db steps & will provide the same increase in processing to all four channels. Increasing the amount of processing on the DEP Process Control will have the effect of a more consistent dynamic level and equalization.

2. Density Control(left side DEP)

As the Density control on the DEP section of the SEP-400A is increased (turned Clockwise) the four PCM modules are instructed to allow faster attack and release times if needed to control the occurring program material. With the Density control in the smaller numerical positions the attack and release times are inhibited to a slower time scale in effect you are going toward AGC type versus compression type gain controlling. Increasing the Density control will begin to rearrange the original musical dynamics of the programming to provide the desired equalization and density. Decreasing the density control will preserve the original mix with some loss of the density effect.

3. NR LIGHT

This LED indicator shows when the SEP-400A has frozen its automatic gain control circuitry in the four channels and has gone to a linear mode.

4. EXP LIGHT

This LED indicator shows when there is program material within the 15db region below process.

5. DEP LIGHT

This LED indicator allows visual indications of the amount of processing occurring in any one or all of the 4 bands.

6. L, M1, M2, H Band Controls

These four output controls allow you to adjust the output remix of the four processing bands. This in effect sets the ultimate E.Q. of the station.

7. Process (right hand PEP)

The four bands sum and are then fed into the PEP process control. This control set the amount of peak to average processing used on the air. As the control is advanced the average output to peak output of the SEP-400A becomes closer to the same value. In other words the Energy content of the waveform becomes greater, thus loudness goes up. Increasing the Process control causes loudness to go up while decreasing causes loudness to go down.

8. DENSITY(right hand PEP)

This Density control instructs the PEP PCM module to allow attack and release times ranges on average energy content to shorten as the control is increased however peak attack and release times are program controlled always, and the Density control has little effect on them. In other words the PEP section maintains a constant ratio of peak energy to average energy, this is set by the Process control, (the higher the process the lower the ratio) The density control controls how fast the PCM module in the PEP stage will recognize a shift in the average level.

REAR PANEL CONTROLS

1 Proof/Operate

This control is not a Sound Setting control and is explained in the Proof of performance set up procedure section.

2. INPUT

This control is explained in the SEP-400A set up procedure section.

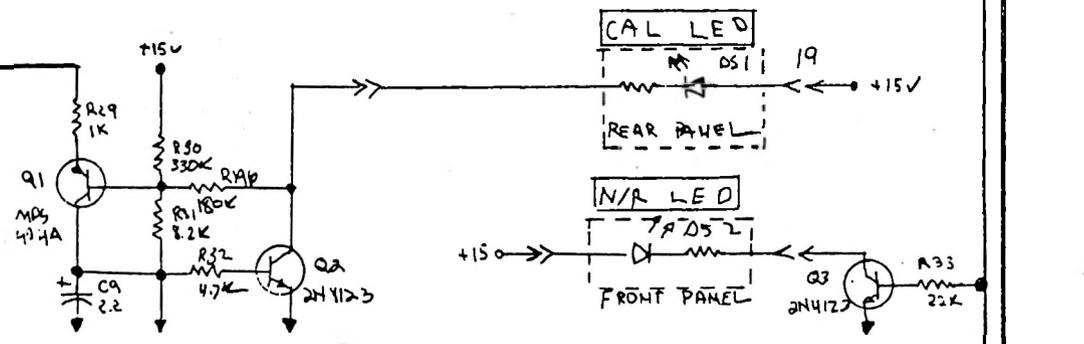
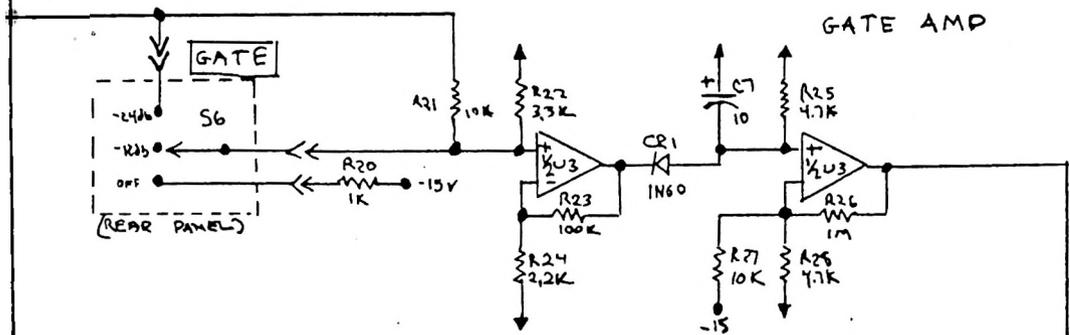
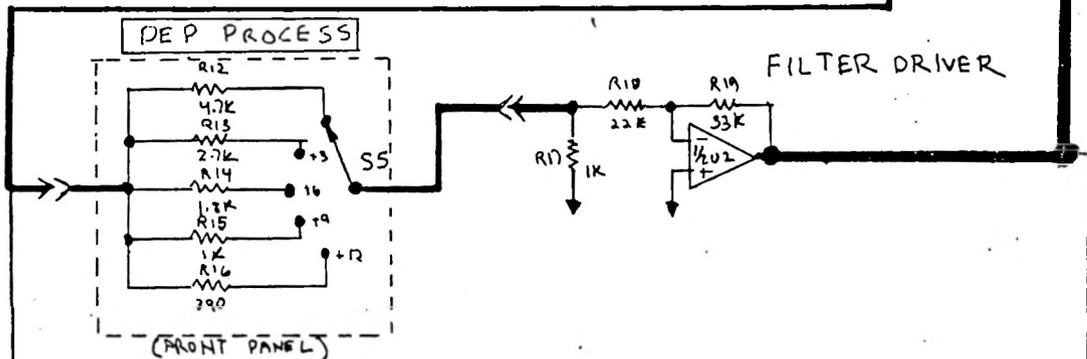
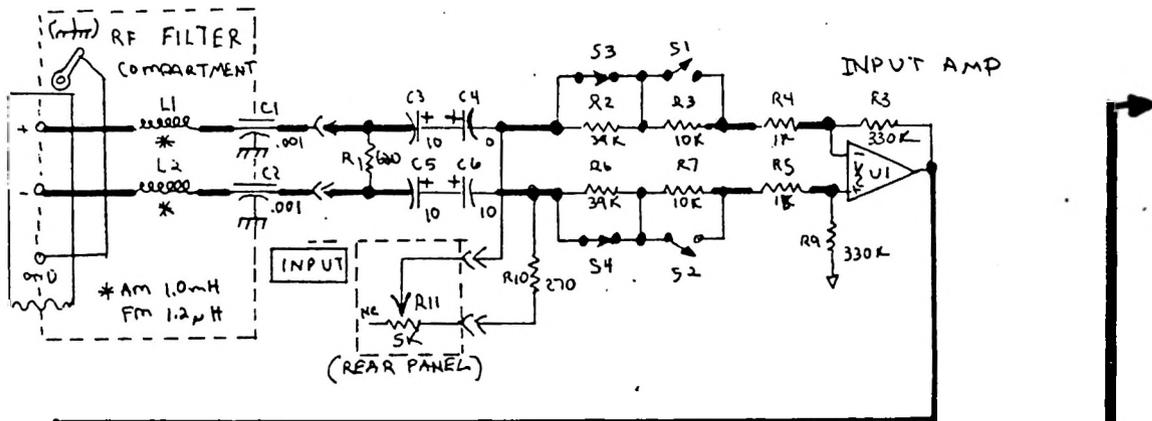
3. OUTPUT

This control the ultimate output level of the SEP-400A

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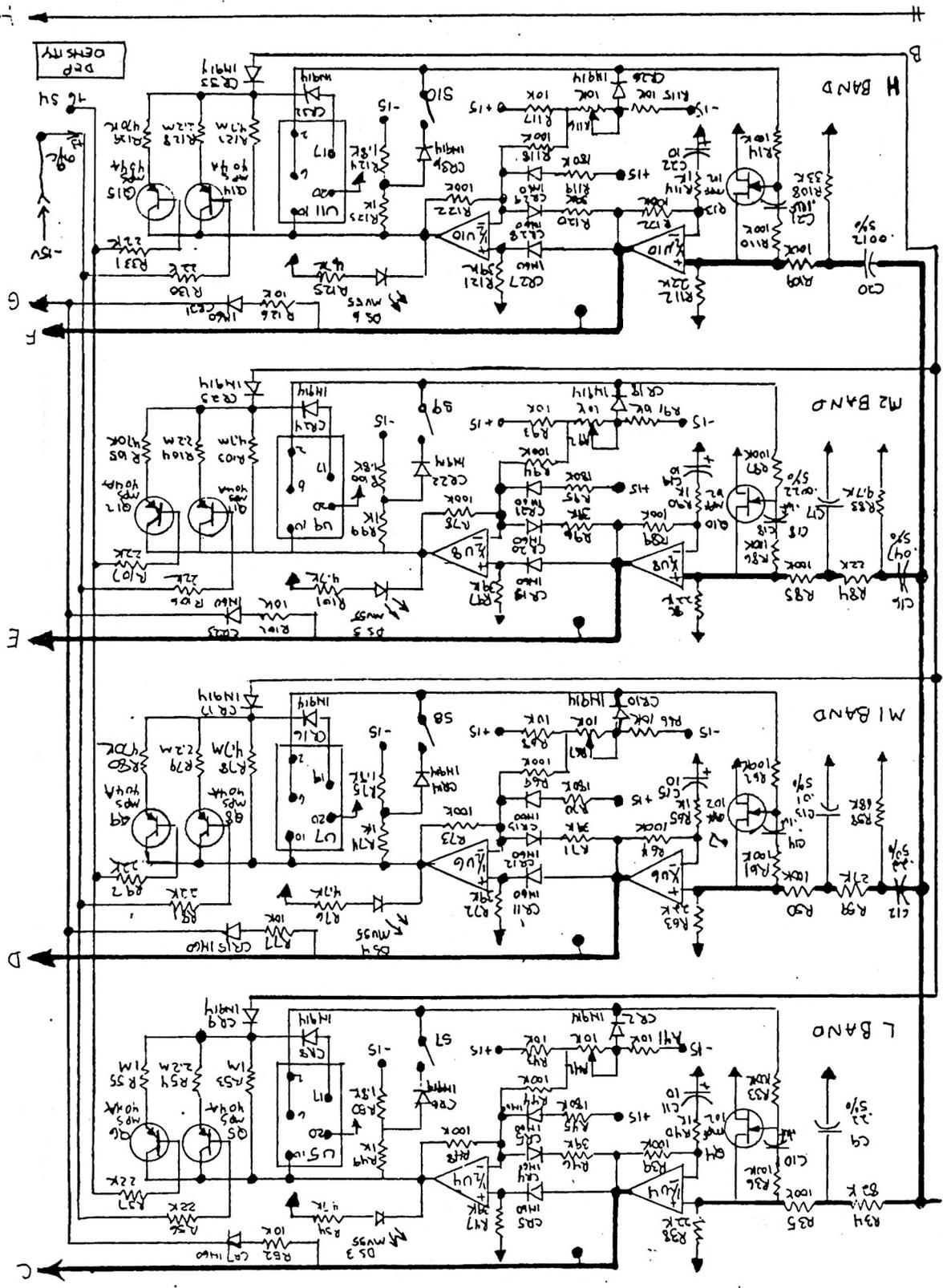
4. Gate

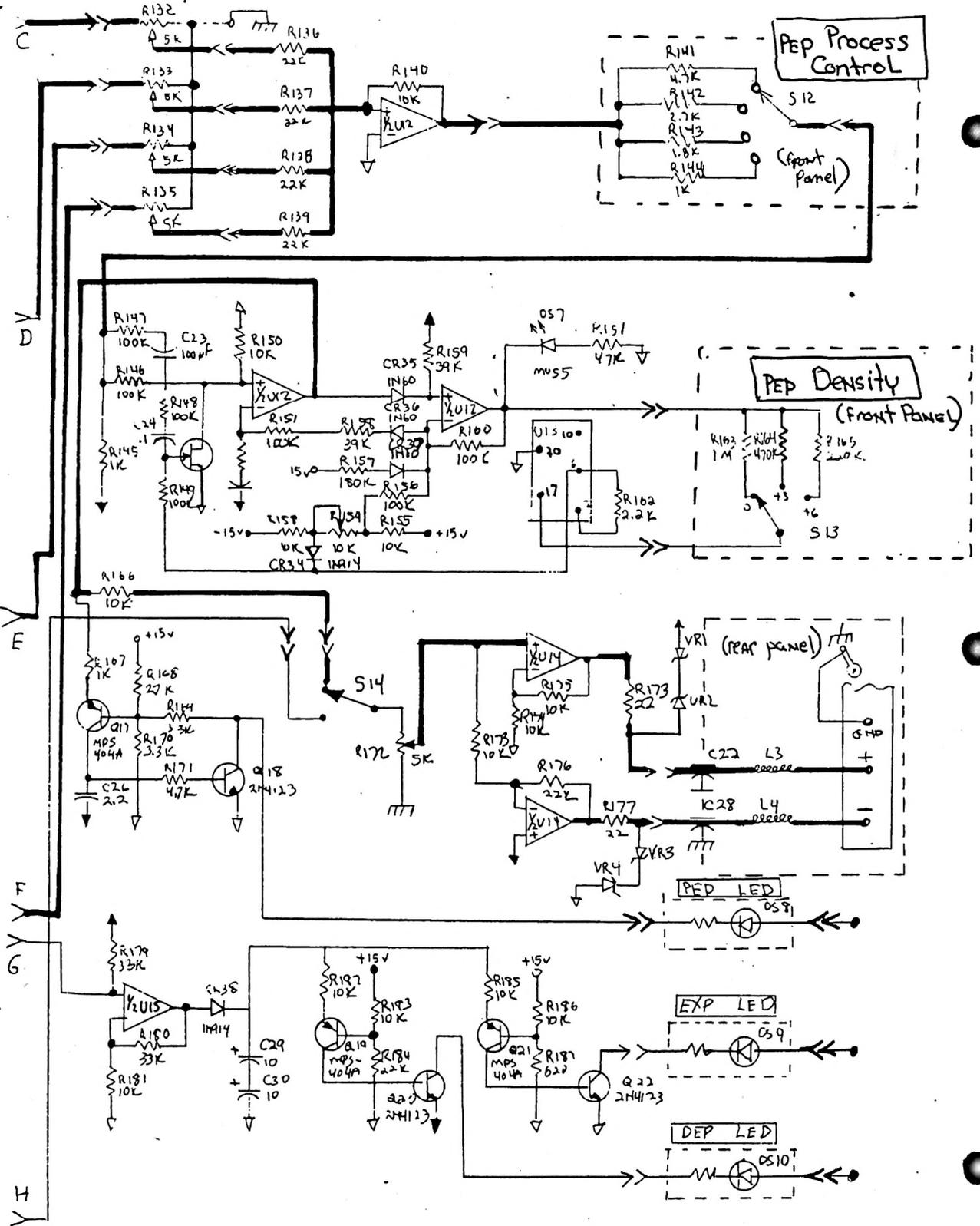
This is a three position switch which will set the threshold of the automatic gain freeze circuitry in the SEP-400A. OFF is for defeating all gating action. 12, sets the gate freeze threshold at 12db below the calibrated input level, this setting will provide a very open apparently dynamic sound, with some loss of the "compression type sound". -22 sets the gate threshold at 22db down from the calibrated input level and allows maximum processing while still affording noise-reducing gain freezing of low noise levels.



Sep 400A preliminary Schematics

SE 4004 Preliminary Schematics

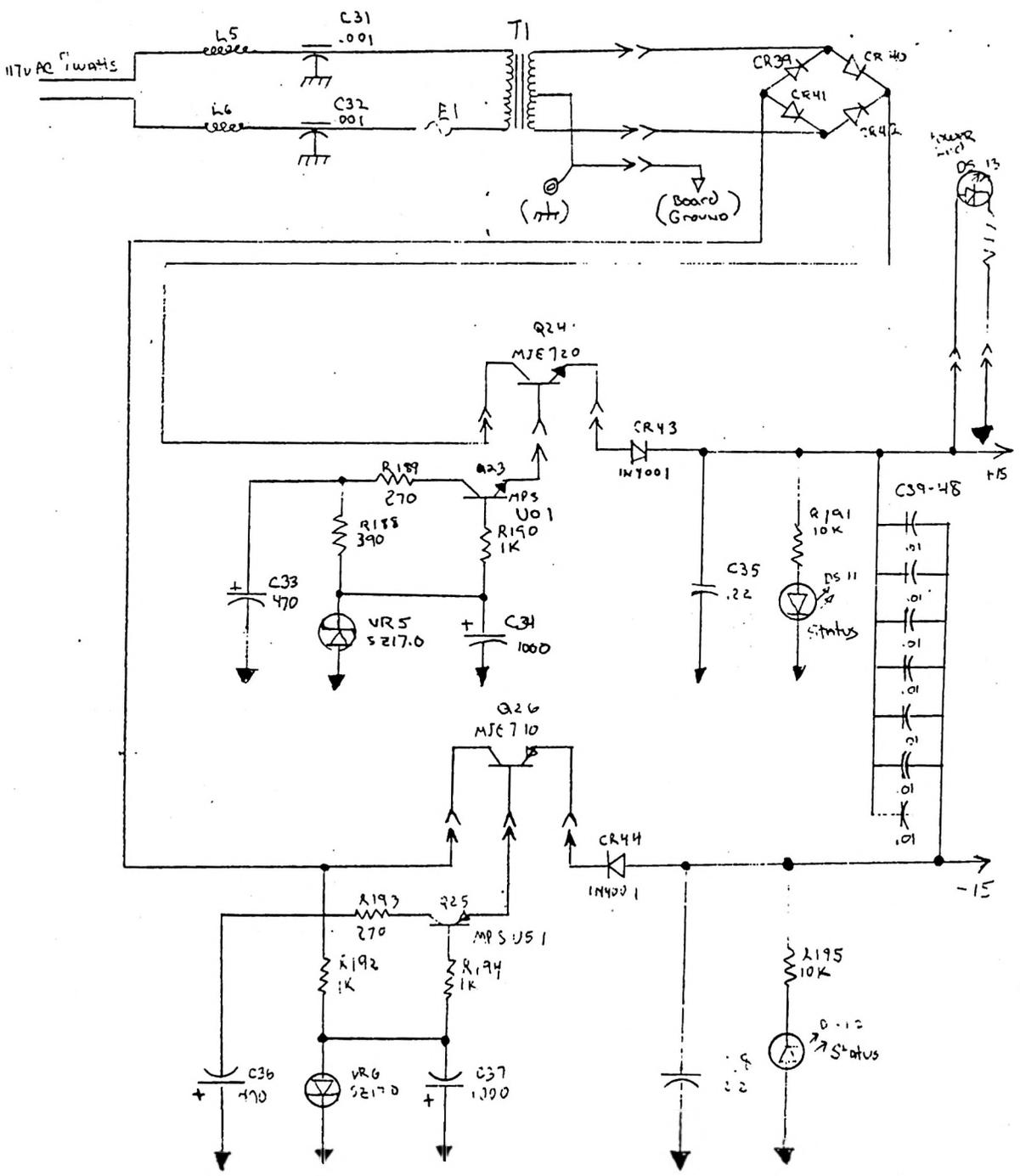




Sep 400A Preliminary Schematics

4)

Power Supply Preliminary



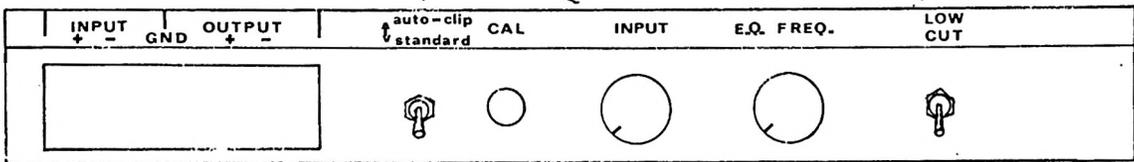
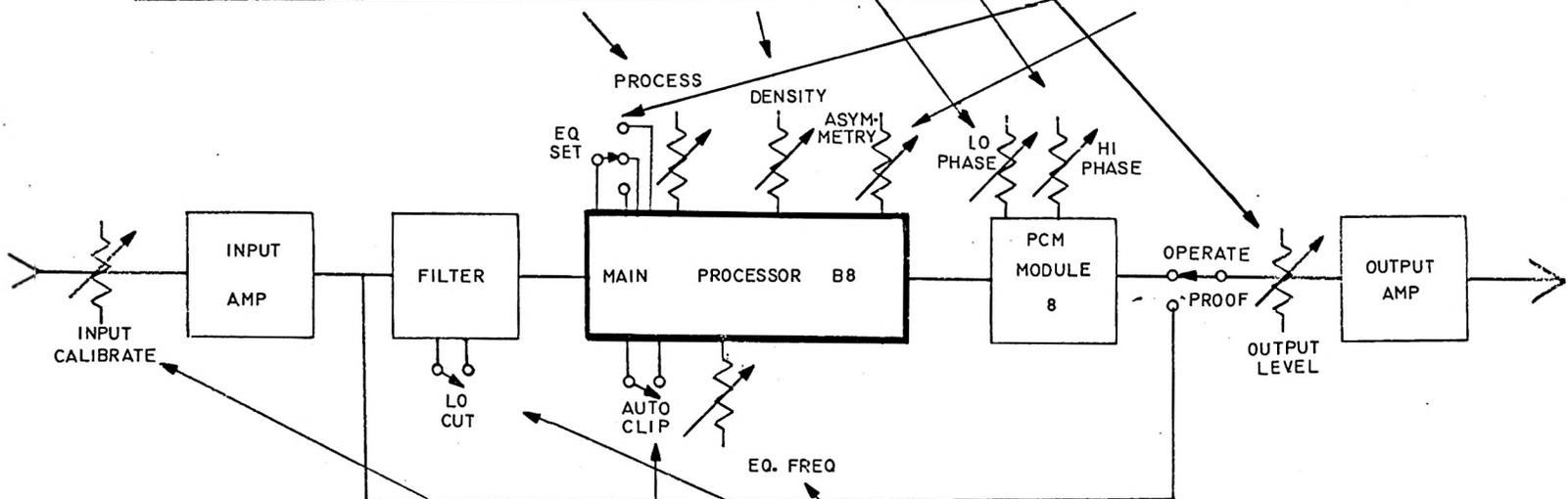
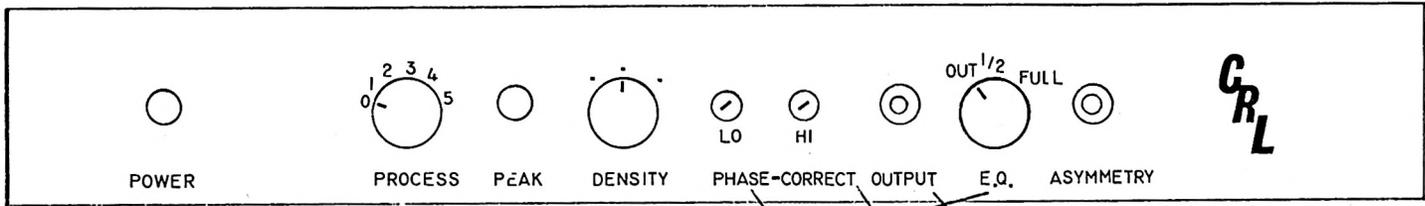


3204 S. Fair Lane - Tempe, Arizona 85281 - (602) 894-0077

PMC - 300A

CRL SYSTEM PRELIMINARY MANUAL

SPECIALIZING IN AUDIO PROCESSOR DESIGN, RESEARCH, AND DEVELOPMENT



Preliminary Setup and Operation
Instructions for the PMC-300A

.SETUP

To calibrate the input control on the PMC-300A you must have the SEP-400A set to approximately the level of processing that you will ultimately use on the air. If you have no idea where your desired air settings will end up then simply dial the process and density controls to half way thru their range. Or use one of the SUGGESTED SETTINGS in the manual that seems to fit your application.

Some stations may be using our PMC-300A alone at a transmitter site or with the SEP-400A and possibly the App-300 along with it.

In either circumstance the calibration of the PMC-300a Input control is the same. The input control must be turned up to the point where the Peak flasher on the PMC-300A matches the DEP yellow lamp on the SEP-400A, by 'matches' we mean, blinks at approximately the same rate.

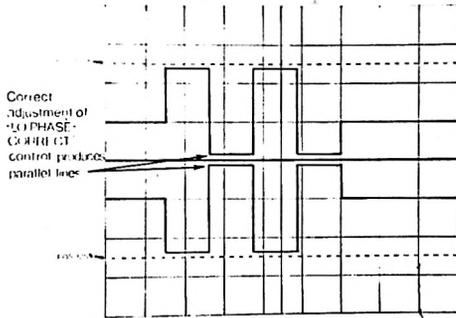
If you are a music station and the SEP-400A is not located at the same site as the PMC-300A then an alternate method would be to adjust the PMC-300A input control to the point where the PMC-300A Peak light indicates or flashes about 60 to 80 percent of the time with standard programming feeding thru. If you are a talk type station then the Peak light should be flashing approximately in step with the syllables in the speech waveform.

The PEAK flasher on the PMC-300A is a very precise peak reading type of indicator and requires no fine tuning of the INPUT control. If you have filled the requirements as outlined above you may proceed to the SETUP of the LO and HI Phase correct controls.

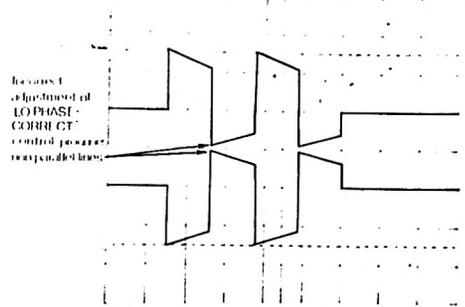
Set the front panel PROCESS control to +4, the DENSITY switch full clockwise, the E.Q. switch to out, rear panel AUTO-CLIP switch to STANDARD, rear panel LO CUT switch to FLAT.

If your transmitter is a plate modulated transmitter using a modulation transformer technic or an older Doherty type transmitter you may need to use LO freq Phase correction. In order to tell for sure observe your oscilloscope and bring the output control up until you see modulation around 70 to 80 per cent on negatives. Carefully observe the modulation peaks and compare them to the pictures 'a', 'b', & 'c'. If your transmitter's output looks like picture 'a' then no adjustment of the LO Phase correct control is necessary and you may proceed to step 12. If your transmitter output looks like that of picture 'b' then slowly

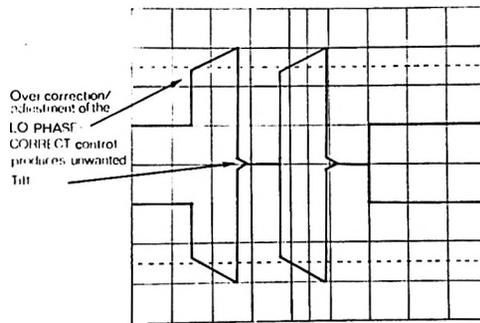
LOW FREQ. Tilt. Drawing A (Correct)



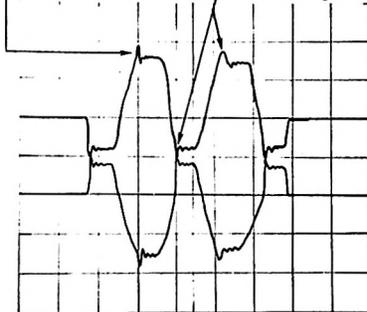
LOW FREQ. Tilt. Drawing B (Incorrect)



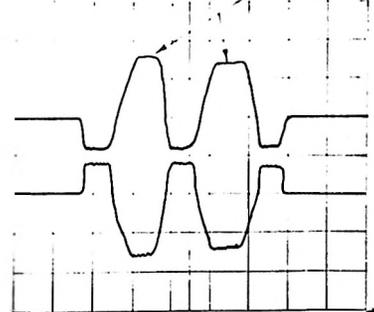
LOW FREQ. Tilt. Drawing C (Incorrect)



HI FREQ. Overshoot (Incorrect) Drawing D



HI FREQ. Overshoot (Correct) Drawing E



PMC SETUP Instructions cont.

increase the LO Phase Correct control until the modulation looks like that of picture 'a'. If your modulation looks like that of picture 'c' then your transmitter needs no Phase Correction on the Low end at all. Turn the out put control all the way down and open the PMC 300A. Find the two pins marked LO & DEF and solder a small bare jumper wire between these two terminals. This jumper will defeat the action of the LO Phase Correct control. NOTE: For any of the NEW type transmitters PDM, PCM, PSM, or the new Continental transmitters this jumper should be added as these transmitters have no need of LO correction.

Adjust the E.Q. switch to FULL and observe ocelliscope, set negative modulation to about 80 percent. Compare the modulation envelope with the pictures 'd' and 'e', if your modulation is free of the high frequency spikes of 'e' and looks like 'd' no adjustment of the HI Phase Correct control is needed. If your modulation looks like 'e' you will need to advance the HI Correct control until the "spikes" are minimized.

Adjust the output control for the desired amount of negative modulation.

Adjust the assymetry control for the desired amount of positive modulation.

Adjust the Process, Density, E.Q., Auto-Clip, E.Q. Freq, and Low Cut controls for the desired sound.

Preliminary Setup and Operation
Instructions for the PMC-300A

OPERATION

The purpose of this section is to acquaint you with the operation and effects of the controls on the PMC-300A.

FRONT PANEL

1. Process Control

This control is calibrated in steps of 1db. Its function is to set the maximum amount of clipping on the program material. Note that the unit may do more clipping than shown on the control if the PMC unit is separated from the SEP or APP units by a phone line or STL link, However this extra clipping will only occur on the overshoots created by these types of links. However we will consider that there is no overshoot and continue this discussion from the standpoint of a perfect link between the PMC-300A and the other CRL units. Note that the control sets the maximum amount of overall clipping performed on the waveform, it is important to understand that the PMC depending on what the DENSITY control and the rear panel AUTO-CLIP control are set for is capable turning down its own clipping to nearly 0 giving the appearance of a distortionless peak limiter, or instantaneously going from the maximum amount of overall clipping set by the process control to near 0 and back again depending on program content.

2. Peak

This is a precision threshold peak indicator LED circuit which is also tied in with the CAL light on the back panel, these two lights will indicate precisely the same information. You will use these lights when performing the SET-UP procedure. Under normal operation these lights should blink along with the programming, they should never lock on and stay on but rather they should conform with the dynamic sound of the material being aired. Conversely they should, with programming on, always light. A peak or CAL light that does not light at all indicates an improperly setup system.

3. Density

This control will primarily regulate the speed at which the PMC300A will return from a gentle action (gentle FET type peak limiting) to a harsher but louder action (CRL's soft slidless clipping). As the control is advanced clockwise the average density will also increase and loudness will increase provided that the program content is not such that the extra density will not cause undue distortion.

PMC operating instructions cont.

4. LO Phase Correct

This control will Tune OUT low frequency TILT in older transmitters. It's adjustment is discussed in the SET-UP section.

5. HI Phase Correct

This control will eliminate the effects of High Frequency overshoot in transmitters. Its adjustment is covered in the SET-UP section.

6. Output

This is a multi-turn control used for the precise setting of negative modulation.

7. E.Q.

The E.Q. switch is a 4 selection mode switch for the PMC-300A. One step counterclockwise from the OUT position is the PROOF position, this PROOF position bypasses all gain and frequency modifying circuitry leaving in only the input and output amplifiers. The OUT position engages the processor circuitry but leaves the pre-emphasis circuitry out. With the E.Q. switch in the $\frac{1}{2}$ position one half of the pre-emphasis curve is engaged, the breakpoint of where this curve begins is determined by the setting of the back panel EQ FREQ control. At the FULL position of the E.Q. switch the full pre-emphasis curve is engaged, (mids + high end) again the breakpoint of where this curve begins is adjusted by the rear panel E.Q. FREQ control.

The OUT position is provided for those stations who prefer to have their sound transmitted as flat as possible. The HALF position is for those stations who would prefer to have a high frequency boost to compensate for the roll off of the high end by typical receivers, but cannot use the full boost of the PMC-300A due to antenna or transmitter difficulties. The FULL position for those stations wanting the best high end response possible.

8. Asymmetry

This control is a Multi-turn pot that will set the limits of positive modulation after the negative modulation has been set to the desired modulation level.

PMC operating instructions cont.

REAR PANEL

1. Auto-Clip/ Standard

With this control in the standard position the PMC-300A will operate in a fashion where it will treat all frequencies and amplitudes in a relatively unbiased manner, but yet it will still handle these sounds in an intelligent fashion. With the control in the Auto-Clip position, the unit becomes very biased. The PMC-300A will be very gentle on programming that cannot be clipped while being very radical on material that can be clipped. With process levels under 4db and the autoclip control activated the PMC-300A can be extremely dynamic, clean and loud. However with 4db or more of processing the effect may be fatiguing and it is recommended for stations whose primary concern is loudness, to use the Standard mode.

2. CAL

The CAL light function is covered in paragraph 2 on the FRONT PANEL DESCRIPTION.

3. Input control

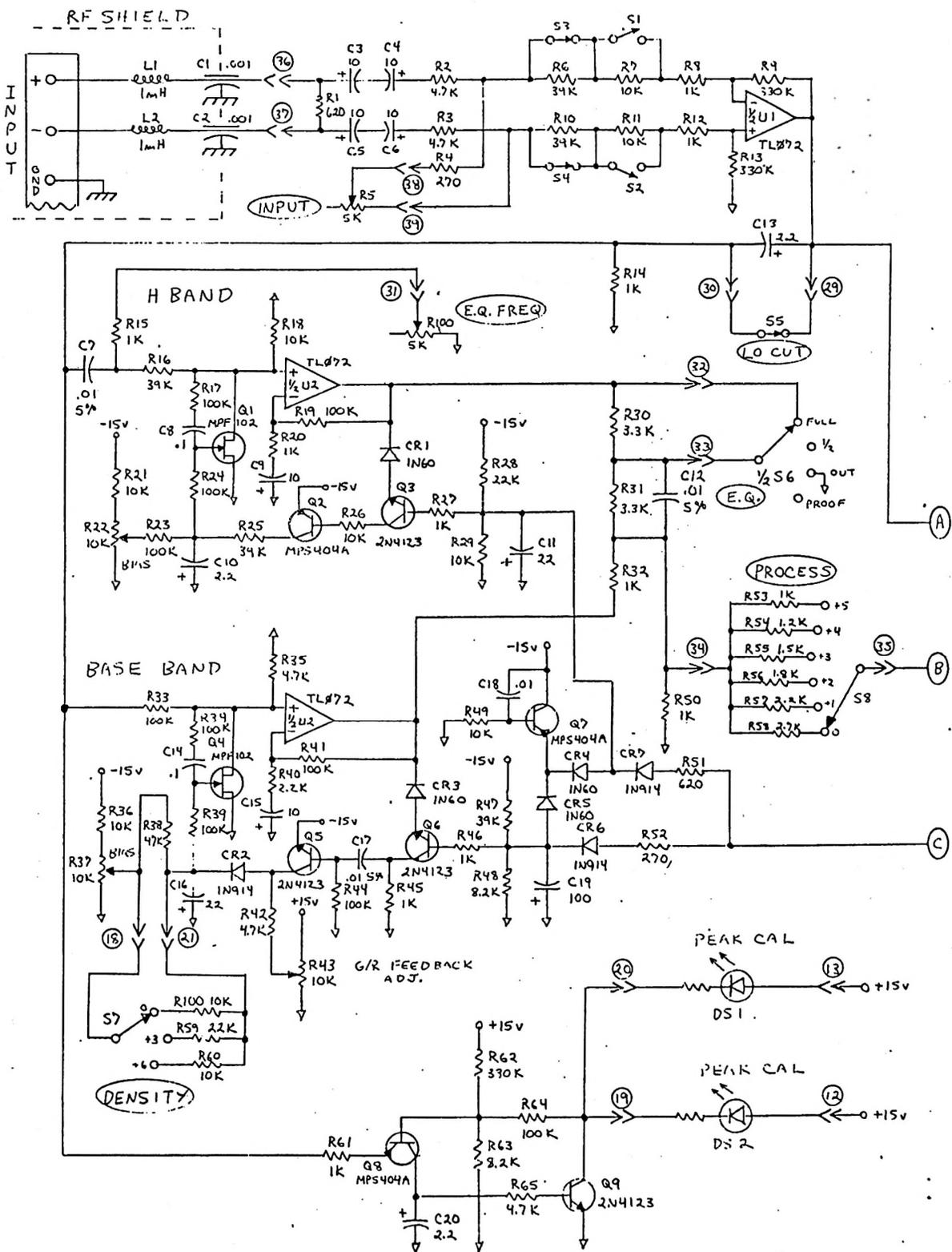
The use of this control is covered in the SET-UP section.

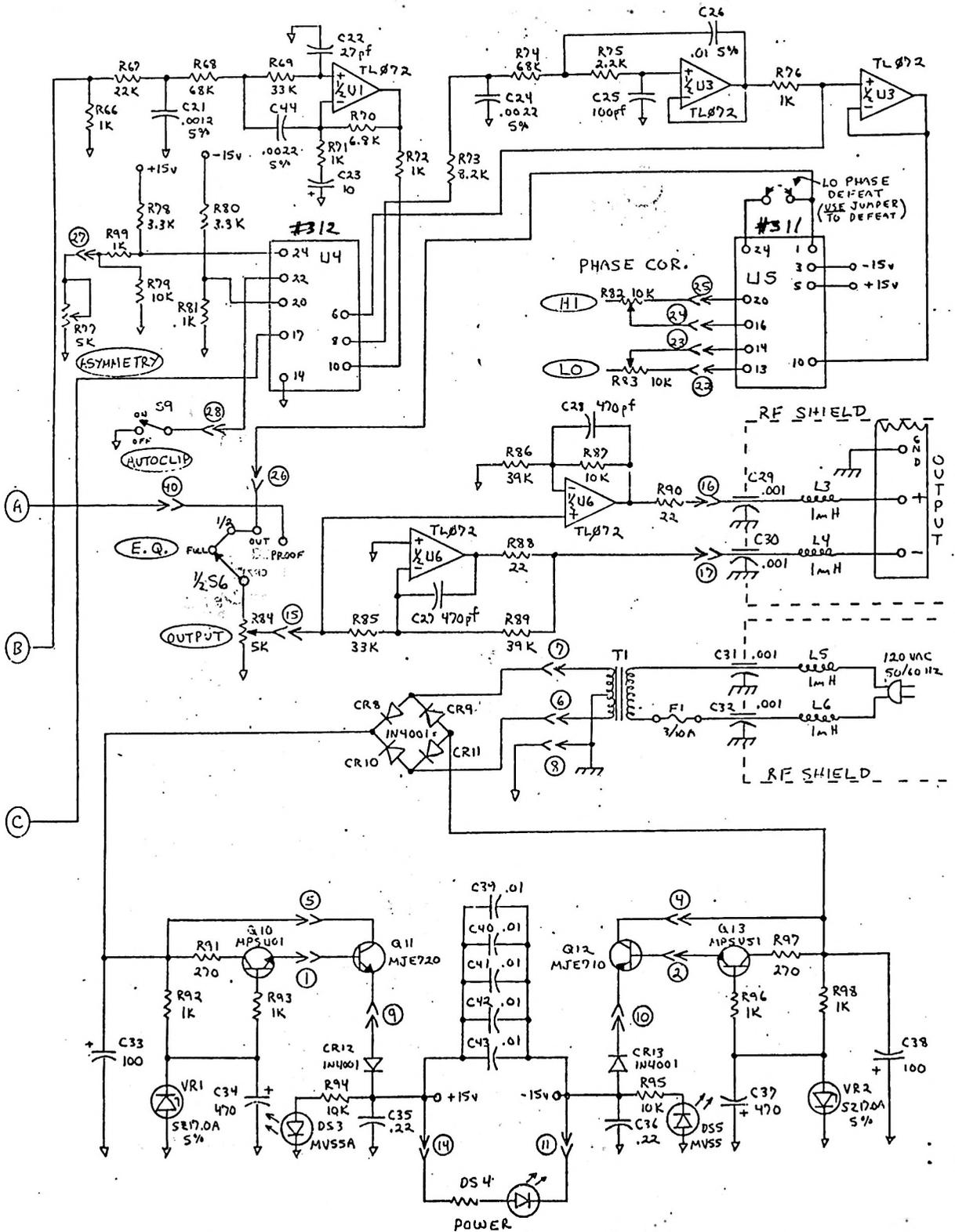
4. E.Q. FREQ

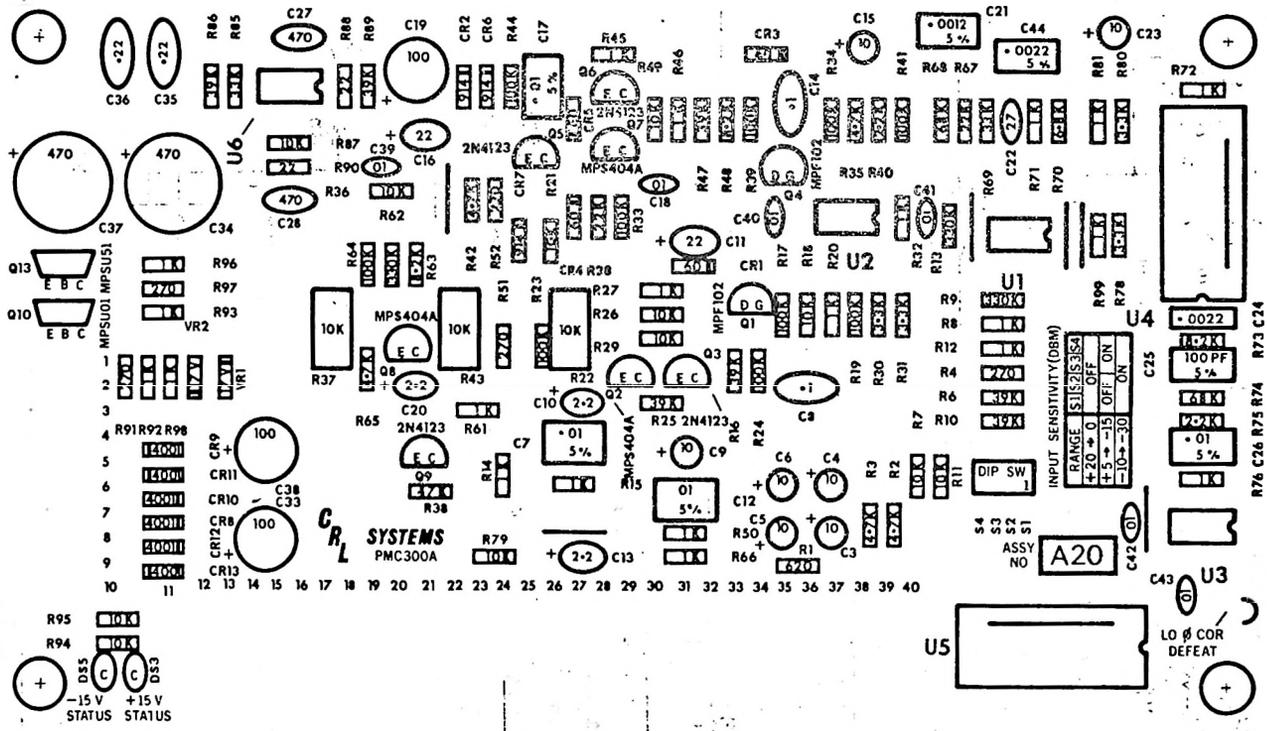
With the front panel E.Q. control in either the HALF or FULL position this E.Q. FREQ control will control the breakpoint of where the pre-emphasis curve in the PMC-300A begins. This breakpoint may be adjusted from 1kHz to 6kHz dependent on where the control is set. Note that this control has very little effect on amount (amplitude) of boost in any position.

5 Low Cut

For transmitters not able to handle the large low frequency energy produced by the PMC-300A, the Low Cut filter switch may be needed. This filter will greatly attenuate the sub bass frequencies, the most troublesome frequencies in improperly designed transmitters.







← REDUCE TO 800 ± 005 →

The CRL AM System #4
Theory of Operation

Connection Methods:

The CRL System #4 is divided strategically into three physically separated units to provide maximum flexibility for use with direct, remote telephone, and remote STL operations.

For direct operations, all three units are connected in series at the same location. For remote telephone operations, the first unit (APP 300) is located at the studio and the two following units (SEP 400 and PMC 300) are located at the transmitter site. Finally, for use with remote STL operations, the first two units are located at the studio and the final unit is located at the transmitter.