

TECHNICAL MANUAL

INSTA-PEAK II

DUAL SPECTRUM AUDIO PROCESSOR
MODEL AP-50 FM
FOR FM RADIO AND TELEVISION



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SECTION I

INTRODUCTION

1.1 GENERAL

THIS MANUAL PROVIDES INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS FOR THE ELCOM ENGINEERING COMPANY, MODEL AP-50 FM INSTA-PEAK II AUDIO PROCESSOR.

THE MODEL AP-50 FM IS DESIGNED FOR USE WITH FM BROADCAST AND TV TRANSMITTERS WHERE PRECISE CONTROL OF DYNAMIC RANGE AND AUDIO TRANSIENTS IS ESSENTIAL. IT ALLOWS THE FULL USE OF TRANSMITTER MODULATION CAPABILITY WITHOUT THE RISK OF OVER-MODULATION. CONTINUOUS LEVEL COMPRESSION OF 20 DB IS ACHIEVABLE WITHOUT AUDIBLE DISTORTION SUCH AS LEVEL PUMPING. THIS IS MADE POSSIBLE BY USE OF PASSIVE OPTICAL ATTENUATORS, SPLIT SPECTRUM AUDIO DISTRIBUTION, INTERNAL PRE-EMPHASIS AND DE-EMPHASIS, AND SPECIAL ANTI-RING CIRCUITRY WHICH PREVENTS OVER-MODULATION CAUSED BY FREQUENCY SELECTIVE NETWORKS WITHIN MOST STEREO GENERATORS AND EXCITERS.

1.2 FUNCTIONAL DESCRIPTION

THE UNIQUE LEVEL CONTROL METHOD TOGETHER WITH THE "SPLIT-SPECTRUM" TECHNIQUE PROVIDES AUTOMATIC LEVEL AND PEAK CONTROL WHICH IS IN-AUDIBLE TO THE LISTNER EVEN WITH HIGH COMPRESSION RATIO.

TESTS INDICATE THAT IN ORDER TO PREVENT THE AUDIBLE PUMPING EFFECTS OF ORDINARY LEVEL CONTROL SYSTEMS THE AUDIO SPECTRUM CAN BE SPLIT INTO TWO SEGMENTS, APPROXIMATELY 10 TO 700 HZ AND 700 TO 15,000 HZ, EACH OPERATING WITH SEPERATE LEVEL CONTROL. DIVIDING THE SPECTRUM INTO MORE SEGMENTS INCREASES THE EQUIPMENT COMPLEXITY AND ADDS NOTHING TO THE PERFORMANCE. THIS SPLITTING TECHNIQUE HAS BEEN KNOWN FOR 20 OR 30 YEARS, BUT HAS NOT BEEN WIDELY USED.

UNTIL RECENTLY. THE SPLIT SPECTRUM TECHNIQUE IS COMBINED WITH A LEVEL CONTROL SYSTEM UTILIZING PHOTO CONDUCTIVE CELLS AS AUTOMATIC VARIABLE ATTENUATORS FOR SMOOTH DISTORTIONLESS OPERATION. THE INITIAL RESPONSE DELAY OF THE ATTENUATOR TO A SUDDEN AUDIO INPUT MAY BE SEVERAL MILLISECONDS, SO TO PREVENT THE PASSAGE OF SUCH A PEAK THROUGH THE SYSTEM A PAIR OF LIGHT EMITTING DIODES CLAMP THE LEVEL FOR A FEW CYCLES UNTIL THE ATTENUATOR CELLS CAN RESPOND AND TAKE CONTROL. MOST FM STEREO GENERATORS AND EXCITERS EXHIBIT AUDIO OVER-SHOOT AND RINGING WHEN SUBJECTED TO FAST RISE AND FALL OF THE AUDIO WAVE FORM SUCH AS CAN BE CAUSED BY THE HARD LIMITING NECESSARY FOR TIGHT CONTROL OF CEILING AMPLITUDE. THE ELCOM INSTA-PEAK II USES A PROPRIETARY "ANTI-RING" CIRCUIT TO PREVENT OVER-SHOOT AND RINGING.

1.3 PHYSICAL DESCRIPTION

THE INSTA-PEAK II IS SELF-CONTAINED IN A WELL SHIELDED MODULE DESIGNED TO MOUNT IN THE STANDARD ELCOM RACK MOUNTING FRAME. THE INSTA-PEAK II MODULES CAN BE INSTALLED IN THE FRAME FOR STEREO OPERATION.

WHEN A SINGLE INSTA-PEAK II IS USED THE ADJACENT MODULE SPACE IS COVERED WITH A BLANK PANEL THAT IS SUPPLIED. A DEPTH OF 12 INCHES BEHIND THE FRONT PANEL IS USED.

A FRONT PANEL METER AND SELECTOR SWITCH INDICATES INPUT LEVEL, GAIN REDUCTION IN DB, AND OUTPUT LEVEL.

1.4 SERVICE AND REPAIRS

IF YOU HAVE DIFFICULTY IN OPERATING OR MAINTAINING YOUR INSTA-PEAK II CALL YOUR LOCAL AUTHORIZED DISTRIBUTOR FROM WHOM YOU ORIGINALLY PURCHASED THE UNIT, OR CALL ELCOM ENGINEERING COMPANY IN SANTA ANA, CALIFORNIA.

1.5 WARRANTY

A STANDARD ELCOM WARRANTY CARD HAS BEEN INCLUDED WITH YOUR INSTA-PEAK II. TO VALIDATE YOUR WARRANTY, COMPLETE AND RETURN THE POSTCARD SECTION TO ELCOM AS SOON AS POSSIBLE.

1.6 SPECIFICATIONS

INPUT IMPEDANCE: 600 OHMS, BALANCED OR UNBALANCED.

OUTPUT LOAD IMPEDANCE: 600 OHMS NOMINAL LOAD, TRANSFORMER ISOLATED.

OUTPUT SOURCE IMPEDANCE: 125 OHMS.

OUTPUT LEVEL (MAX.): 20 DBM.

INPUT LEVEL: -50 DBM TO +10 DBM.

FREQUENCY RESPONSE: ± 1 DB 50-15,000 HZ WITH OR WITHOUT GAIN REDUCTION.

HARMONIC DISTORTION: LESS THAN 1% WITH OR WITHOUT GAIN REDUCTION AND +20 DBM OUTPUT.

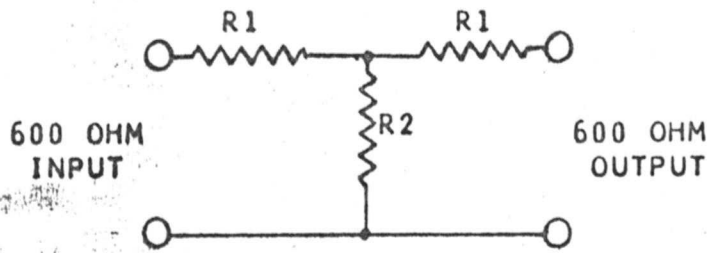
ATTACK TIME: INSTANTANEOUS.

RECOVERY TIME: 0.5 TO 2 SECONDS DEPENDING ON PREVIOUS GAIN REDUCTION.

SIGNAL TO NOISE RATIO: GREATER THAN 65 DB.

POWER REQUIREMENTS: 6 WATTS 100-130 VOLTS 50/60 HZ.

DIMENSIONS (WITH MOUNTING FRAME): 3 1/2 INCHES HIGH, 19 INCHES WIDE AND 12 INCHES DEEP.



DB LOSS	R1	R2
10 (11)	330	360
15	430	220
20	510	120
24	510	75
30	560	39

AUDIO ATTENUATOR NETWORK

FIGURE 2-1

SECTION II

INSTALLATION

2.1 MECHANICAL INSTALLATION

THE INSTA-PEAK II MODULES ARE SUPPLIED IN A 3 1/2 INCH HIGH RACK MOUNTING FRAME. THE FRAME WILL HOLD TWO MODULES OR ONE MODULE WITH A BLANK PANEL. THE MODULES ARE EASILY REMOVED BY MEANS OF TWO THUMB SCREWS. THE MODULES REQUIRE 12 INCHES OF DEPTH BEHIND THE FRAME.

A LOCATION SHOULD BE SELECTED WHICH WILL PROVIDE EASY ACCESS AND ALSO A GOOD VIEW OF THE FRONT PANEL METER. THE INSTA-PEAK II SHOULD NOT BE LOCATED DIRECTLY ABOVE HEAT PRODUCING EQUIPMENT.

2.2 ELECTRICAL CONSIDERATIONS FOR BROADCAST USE

THE INSTA-PEAK II HAS SUFFICIENT GAIN TO OPERATE DIRECTLY FROM AN EQUALIZED TELEPHONE LINE AND A +20 DBM OUTPUT CAPABILITY WHICH IS MORE THAN AMPLE TO ALLOW DIRECT CONNECTION TO THE TRANSMITTER. MOST TRANSMITTERS REQUIRE AN INPUT LEVEL OF +10 DBM FOR 100% MODULATION.

IF THE INSTA-PEAK II IS TO BE USED AT THE STUDIO OR IF IT IS TO BE OPERATED FROM A STL RECEIVER, SUFFICIENT FIXED AUDIO ATTENUATION SUCH AS A "T" PAD SHOULD BE INSTALLED AHEAD OF THE INPUT TERMINALS. A 10 DB ATTENUATOR AT THE OUTPUT TERMINALS IS RECOMMENDED WHEN FEEDING A TELEPHONE LINE SO THAT THE NORMAL AMPLIFIER OUTPUT CAN BE SET FOR +10 DBM. ATTENUATOR CIRCUITS AND COMPONENT VALUES ARE GIVEN IN FIGURE 2.1.

2.3 USE OF PRE-EMPHASIS AND DE-EMPHASIS

THE INSTA-PEAK II CONTAINS PRE-EMPHASIS AND A DE-EMPHASIS CIRCUITS IN THE MAIN AMPLIFIER CHAIN FOR THE PURPOSE OF HIGH FREQUENCY WAVE FORM INTEGRATION AND INTERNAL NOISE REDUCTION.

THE LEVEL CONTROLLING AMPLIFIER USES SUFFICIENT PRE-EMPHASIS TO COMPENSATE FOR THE 75 OR 25 MICROSECOND RESPONSE RISE IN THE TRANSMITTER.

2.4 STEREO INTERCONNECTION

WHEN A PAIR OF INSTA-PEAK II PROCESSORS ARE USED FOR STEREO BROADCASTING, THE LEFT AND RIGHT CHANNEL GAIN REDUCTION CIRCUITS CAN BE INTER-CONNECTED BY MEANS OF THE JUMPER CABLE SUPPLIED. THIS CAUSES BOTH CHANNELS TO HAVE EQUAL GAIN REDUCTION EVEN THOUGH ONLY ONE CHANNEL ACTUALLY REQUIRES COMPRESSION OR GAIN REDUCTION. THE SAME TECHNIQUES CAN BE USED FOR QUADROPHONIC BROADCASTING. HOWEVER, A SPECIAL INTER-CONNECTION CABLE IS REQUIRED.

2.5 ELECTRICAL CONNECTIONS

THE FIVE TERMINAL BARRIER STRIP LOCATED ON THE REAR OF THE INSTA-PEAK II IS USED FOR INPUT AND OUTPUT CONNECTIONS AS WELL AS SHIELD GROUND. POLARITY OF THE INPUT AND OUTPUT LINES MUST BE OBSERVED WHEN CONNECTING FOR STEREO OPERATION.

NOMINAL INPUT AND OUTPUT IMPEDANCES ARE 600 OHMS WITH TRANSFORMER ISOLATION. THE OUTPUT SOURCE IMPEDANCE IS 125 OHMS.

THE STEREO INTER-CONNECTION CABLE PLUGS INTO THE JACKS LOCATED ON THE REAR OF EACH CHASSIS.

SECTION III

OPERATIONAL SET-UP

3.1 GENERAL

ALL OF THE NECESSARY OPERATIONAL CONTROLS ARE LOCATED ON THE FRONT PANEL OF THE INSTA-PEAK II. ACCESS TO THE CONTROL SHAFTS IS SUCH THAT THEY CANNOT BE TURNED WITHOUT THE USE OF A SCREWDRIVER, BUT THE ROTATIONAL POSITION OF EACH CONTROL IS CLEARLY VISIBLE. KNOBS FOR USE WITH THESE CONTROLS ARE AVAILABLE ON REQUEST.

THE V.U. TYPE METER CAN BE SWITCHED TO READ OUTPUT LEVEL OR GAIN REDUCTION (COMPRESSION) IN DB. IN THE OUTPUT POSITION 0 DB ON THE METER IS ADJUSTED (R46) TO CORRESPOND TO +5 DBM FOR STEREO, AND +10 DBM FOR OTHER APPLICATIONS SUCH A.M. OR MONAURAL FM.

FOUR VARIABLE CONTROLS ARE ACCESSABLE ON THE FRONT PANEL. INPUT LEVEL CONTROL SETS THE INPUT TO THE HIGH AND LOW FREQUENCY CHANNEL AMPLIFIERS. THE GAIN REDUCTION CONTROL SETS THE AMOUNT OF COMPRESSION OR LIMITING TO BE USED. THE SPECTRUM BALANCE ADJUSTS THE OVERALL FREQUENCY RESPONSE BY OBTAINING EQUAL OUTPUT FROM THE HIGH AND LOW FREQUENCY AMPLIFIERS, OR UNEQUAL OUTPUT FOR HIGH OR LOW FREQUENCY BOOST.

THE OUTPUT LEVEL CONTROL IS USED TO SET THE INSTA-PEAK II OUTPUT TO THE DESIRED LEVEL AFTER THE INPUT AND GAIN REDUCTION CONTROLS HAVE BEEN SET.

3.2 CONTROL SETTINGS

SET UP FOR MAXIMUM AVERAGE LEVEL AND ABSOLUTE PREVENTION OF OUTPUT OVERSHOOT OR PEAKS EXCEEDING A PRE-SET LIMIT IS RELATIVELY EASY SINCE CONTROL INTERACTION IS MINIMIZED BY THE SYSTEM

EMPLOYED IN THE INSTA-PEAK II.

AFTER COMPLETING THE INSTALLATION AS DESCRIBED IN THE PRECEEDING SECTIONS, APPLY NORMAL PROGRAM MATERIAL TO THE INPUT OF THE INSTA-PEAK II. A STEADY STATE TONE CAN BE USED IN PLACE OF PROGRAM MATERIAL, BUT THE FINAL GAIN REDUCTION SETTINGS SHOULD BE MADE WITH THE PROGRAM APPLIED.

THE GAIN REDUCTION CONTROL IS INDEPENDENT OF ALL OTHER CONTROLS SO IT CAN BE ADJUSTED TO PROVIDE THE DESIRED AMOUNT OF GAIN REDUCTION AS OBSERVED ON THE FRONT PANEL METER. A TYPICAL INITIAL SETTING CAN BE FOR 5 DB OF GAIN REDUCTION ON AVERAGE PROGRAM LEVELS. PRELIMINARY STEREO SET-UP SHOULD BE MADE WITH THE STEREO INTER-CONNECTION CABLE REMOVED.

THE INPUT LEVEL CONTROL IS THEN ADVANCED UNTIL THE POSITIVE AND NEGATIVE CEILING LAMPS JUST BEGIN TO FLASH ON PROGRAM PEAKS.

THE OUTPUT LEVEL CONTROL CAN NOW BE TURNED CLOCKWISE UNTIL THE DESIRED OUTPUT LEVEL IS OBTAINED AS INDICATED BY SWITCHING THE METER TO THE OUTPUT POSITION OR BY CHECKING THE TRANSMITTER FOR 100% MODULATION.

THE BALANCE CONTROL MUST BE SET TO THE RED DOT ON THE PANEL (FLAT RESPONSE) DURING THE ABOVE SET-UP PROCEDURES. UPON COMPLETION OF THE SET-UP THE BALANCE CONTROL CAN BE TURNED SLIGHTLY CLOCKWISE TO INCREASE THE HIGH FREQUENCY RESPONSE, AND COUNTER-CLOCKWISE TO INCREASE THE LOW FREQUENCY RESPONSE. IT SHOULD BE NOTED THAT A DRASTIC DEVIATION FROM THE BALANCED OR FLAT RESPONSE SETTING MAY INTRODUCE SOME PUMPING EFFECT DURING HEAVY GAIN REDUCTION.

3.3 PROOF-OF-PERFORMANCE MEASUREMENTS

BROADCAST PROOF-OF-PERFORMANCE MEASUREMENTS MUST BE MADE WITHOUT COMPRESSION, SINCE IT WOULD BE IMPOSSIBLE TO OBTAIN MEANINGFUL

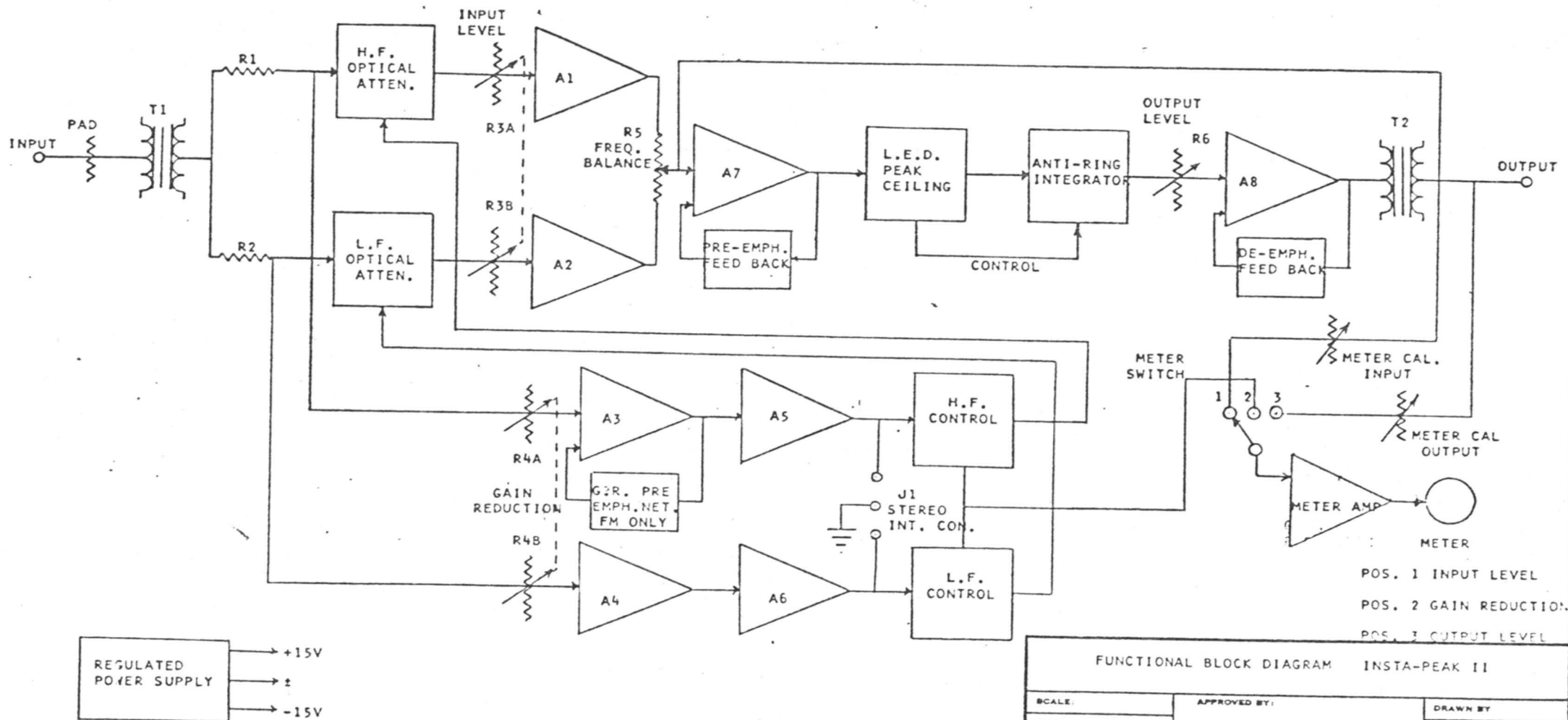
FREQUENCY RESPONSE MEASUREMENTS WITH AUTOMATIC LEVEL CONTROL.
THE COMPRESSION ACTION CAN BE DISABLED BY TURNING THE GAIN
REDUCTION CONTROL FULLY COUNTER-CLOCKWISE AND ADJUSTING THE INPUT
AND OUTPUT CONTROLS FOR NORMAL MODULATION AND NO FLASHING OF THE
CEILING INDICATORS.

3.4 CONDENSED SET-UP INSTRUCTIONS

1. TURN OUTPUT LEVEL CONTROL FULLY CCW.
2. SET METER SELECTOR SWITCH TO "G.R."
3. FEED NORMAL PROGRAM LEVEL INTO THE INSTA-PEAK II.
4. SET THE GAIN REDUCTION CONTROL FOR NORMAL COMPRESSION (5 TO 10 DB) AS INDICATED BY THE METER.
5. TURN INPUT CONTROL CLOCKWISE UNTIL PEAK CEILING INDICATORS JUST BEGIN TO LIGHT DIMLY ON PROGRAM PEAKS.
6. TURN THE OUTPUT CONTROL CLOCKWISE UNTIL THE DESIRED OUTPUT LEVEL IS OBTAINED.

NOTE: IF PEAKS EXCEED THE DESIRED MAXIMUM LEVEL THE OUTPUT SHOULD BE DECREASED AND THE INPUT LEVEL CONTROL INCREASED TO PROVIDE TIGHTER CLAMPING LIMITS. THIS WILL BE INDICATED BY INCREASED PEAK CEILING LAMP INTENSITY. HOWEVER, EXCESSIVE CLAMPING SHOULD BE AVOIDED AS IT CAN CAUSE NOTICEABLE DISTORTION.

7. THE BALANCE CONTROL MAY BE ADJUSTED SLIGHTLY FROM THE REFERENCE MARK TO OBTAIN THE MOST PLEASING FREQUENCY BALANCE.



SECTION IV

THEORY OF OPERATION

4.1 GENERAL

THE ELCOM INSTA-PEAK II COMBINES THE ADVANTAGES OF AN OPTICAL AUDIO ATTENUATOR, SPLIT SPECTRUM CONTROL AND ABSOLUTE PEAK CEILING TO PROVIDE AN AUTOMATIC LEVEL CONTROL SYSTEM WHICH CAN EASILY PRODUCE OVER 20 DB OF CONTROL WITHOUT THE EFFECTS OF PUMPING AND AUDIBLE DISTORTION THAT IS CHARACTERISTIC OF OTHER GAIN CONTROL DEVICES OR PROCESSORS. AN UNIQUE "ANTI-RING" CIRCUIT PREVENTS OVER-MODULATION CAUSED BY OVER-SHOOT AND RINGING WITHIN THE FM EXCITER.

4.2 INPUT LEVEL CONTROL CIRCUITRY (SEE FIGURE 4.1)

THE INPUT SIGNAL IS APPLIED THROUGH A PAD AND TRANSFORMER T1 WHICH SUPPLIES SIGNAL VOLTAGE BY WAY OF THE OPTICAL AND MANUAL ATTENUATORS TO FREQUENCY SELECTIVE AMPLIFIERS A1 AND A2. A1 AMPLIFIES FREQUENCIES BELOW 700HZ. THE PASS-BAND FREQUENCY ROLL-OFF FOR THE AMPLIFIER IS VERY GRADUAL TO PREVENT PHASE DISTORTION IN THE CROSS OVER AREA. BALANCE CONTROL R5 IS NORMALLY SET FOR FLAT FREQUENCY RESPONSE, BUT CAN BE OFFSET TO BOOST THE HIGH OR LOW FREQUENCY PORTION OF THE AUDIO SPECTRUM. THE PEAK CEILING CIRCUIT CONSISTS OF TWO LIGHT EMITTING DIODES CONNECTED BACK TO BACK TO PROVIDE INSTANTANEOUS LIMITING OF THE AUDIO PEAKS THAT MAY PASS THROUGH THE OPTICAL ATTENUATOR BEFORE THE PHOTO CONDUCTIVE CELL CAN RESPOND. THE PANEL MOUNTED L.E.D.'S ALSO GIVE A VISUAL INDICATION OF PEAK LIMITING. A DIODE SWITCHED INTEGRATING CIRCUIT IS USED IN CONJUNCTION WITH THE PEAK CEILING L.E.D.'S TO ELIMINATE WAVE FORM HARMONICS WHICH CAN CAUSE RINGING AND OVER-MODULATION FROM FILTERS AND PRE-EMPHASIS NETWORKS WITHIN THE EXCITER.

THE INPUT LEVEL AND GAIN REDUCTION CONTROLS ARE SET FOR LIMITING PEAKS NOT CONTROLLED BY THE OPTICAL ATTENUATORS. OUTPUT AMPLIFIER A8 PRODUCES AN OUTPUT OF +22 DBM BEFORE CLIPPING OR AMPLIFIER OVERLOAD OCCURS. A PRE-EMPHASIS IS DEVELOPED IN AMPLIFIER A7 BY MEANS OF THE FEED BACK NETWORK. CORRESPONDING DE-EMPHASIS IS SIMILIARLY APPLIED TO AMPLIFIER A8. HIGH FREQUENCY GAIN REDUCTION AMPLIFIER A3 INCORPORATES PRE-EMPHASIS IN ORDER TO INCREASE GAIN REDUCTION OF THE HIGHER FREQUENCIES.

AUTOMATIC GAIN CONTROL IS ACCOMPLISHED BY THE VOLTAGE DIVIDER ACTION OF THE PHOTO-CONDUCTIVE CELLS IN THE OPTICAL ATTENUATORS IN COMBINATION WITH RESISTORS R1 AND R2. L.E.D.'S ARE USED AS A LIGHT SOURCE FOR THE OPTICAL ATTENUATORS. AMPLIFIERS A3 AND A4 RECEIVE INPUT SIGNAL VOLTAGE FROM THE GAIN REDUCTION CONTROLS R4A AND R4B AND DRIVE CONTROL AMPLIFIERS A5 AND A6, WHOSE OUTPUTS ARE RECTIFIED AND APPLIED TO THE L.E.D. LIGHT SOURCES IN THE OPTICAL ATTENUATORS. THE RECTIFIER OUTPUT ALSO OPERATES THE GAIN REDUCTION INDICATOR. THE OUTPUT OF AMPLIFIERS A5 AND A6 IS CROSS CONNECTED TO THE IDENTICAL POINTS IN THE COMPANION INSTA-PEAK II WHEN THE STEREO INTER-CONNECTION IS USED.

SECTION V

MAINTENANCE AND REPAIR

5.1 GENERAL

THE INSTA-PEAK II IS AN ALL SOLID STATE DEVICE, INCLUDING THE INDICATOR LIGHTS. NORMAL ROUTINE MAINTENANCE IS NOT REQUIRED, OTHER THAN POSSIBLY AN OCCASIONAL PERFORMANCE CHECK TO INSURE THAT THE EQUIPMENT IS OPERATING WITHIN SPECIFICATIONS.

5.2 ACCESS TO INTERNAL COMPONENTS

THE COMPONENTS ARE ACCESSIBLE BY REMOVING THE TOP COVER OF THE INSTA-PEAK II MODULE. THE BOTTOM COVER CAN BE REMOVED TO EXPOSE THE BOTTOM OF THE CIRCUIT BOARD.

5.3 TROUBLE SHOOTING METHODS

MOST MALFUNCTIONS CAN BE LOCATED BY USING A D.C. VOLTMETER. READINGS OF A DIGITAL VOLTMETER OR VTVM SHOULD FALL WITHIN 10% OF THE TYPICAL VOLTAGES LISTED IN TABLE 5.1 OF THIS SECTION. AUDIO VOLTAGE CAN BEST BE CHECKED BY USE OF AN OSCILLOSCOPE.

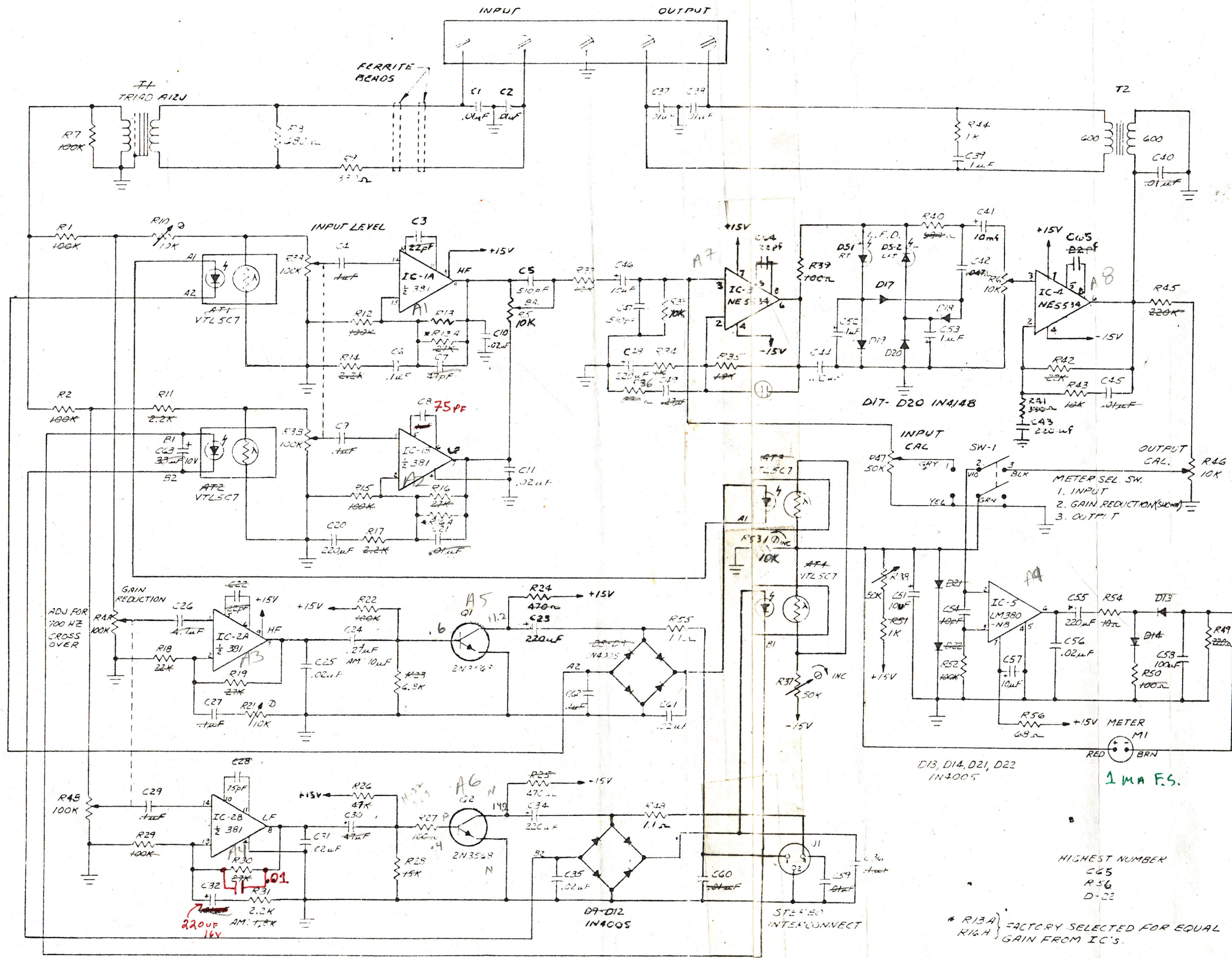
5.4 CHECK OF BALANCE CONTROL SETTING

THE FRONT PANEL BALANCE CONTROL SHOULD BE SET TO PROVIDE AN OVER ALL FLAT FREQUENCY RESPONSE WHEN THE RED INDICATOR MARK ON THE CONTROL DIAL COINCIDES WITH THE RED MARK ON THE PANEL.

THIS SETTING CAN BE CHECKED BY ALTERNATELY APPLYING AN EQUAL LEVEL TONE OF 100 HZ AND 10,000 HZ. THE INSTA-PEAK II OUTPUT SHOULD REMAIN THE SAME FOR EITHER TONE. THE GAIN REDUCTION CONTROL SHOULD BE SET FULLY COUNTER-CLOCKWISE DURING THIS TEST. IF THE SETTING SHOWS A LARGE VARIANCE, CHECK FOR DEFECTIVE COMPONENTS IN THE FREQUENCY SELECTIVE FEED-BACK NETWORK OF AMPLIFIERS A1 AND A2.

5.5 ADJUSTMENT OF GAIN REDUCTION METER ZERO

THE FRONT PANEL METER POINTER SHOULD RETURN TO 0 VU (AT THE BEGINNING OF THE RED BAND), WHEN NO GAIN REDUCTION IS PRESENT. VARIATION CAN BE CORRECTED BY ADJUSTING THE TRIM POT LOCATED ADJACENT TO OUTPUT TRANSFORMER T2 ON THE MAIN CIRCUIT BOARD.



D13, D14, D21, D22
IN4005

1 mA F.S.

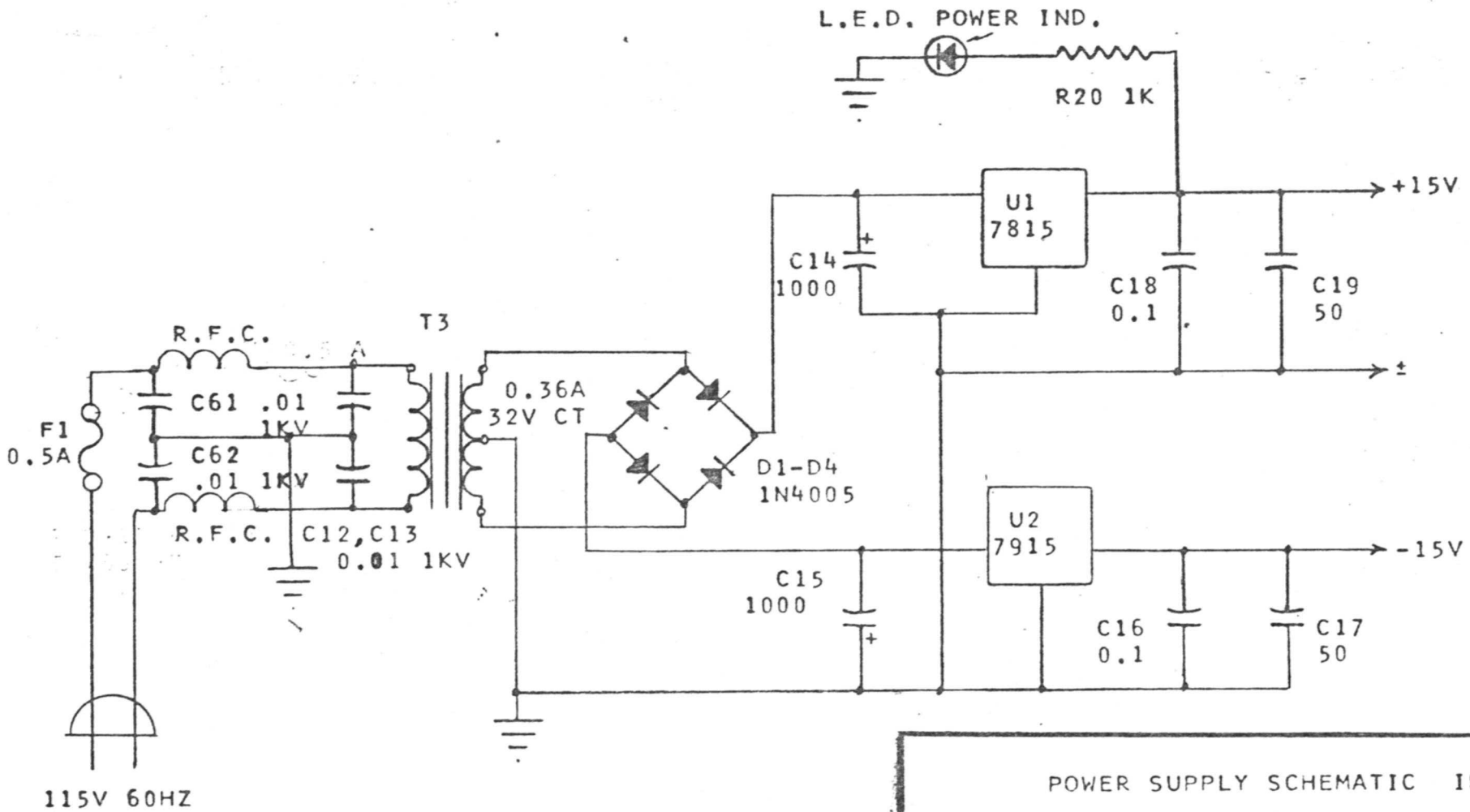
HIGHEST NUMBER
C65
R56
D-22

* R13A } FACTORY SELECTED FOR EQUAL
R16A } GAIN FROM IC'S.

SCHEMATIC DIAGRAM
MODEL AP-50

If You Didn't Get This From My Site,
Then It Was Stolen From...
www.SteamPoweredRadio.Com

P.A.C. 10-26-79
A.B.J.E. 3-11-80

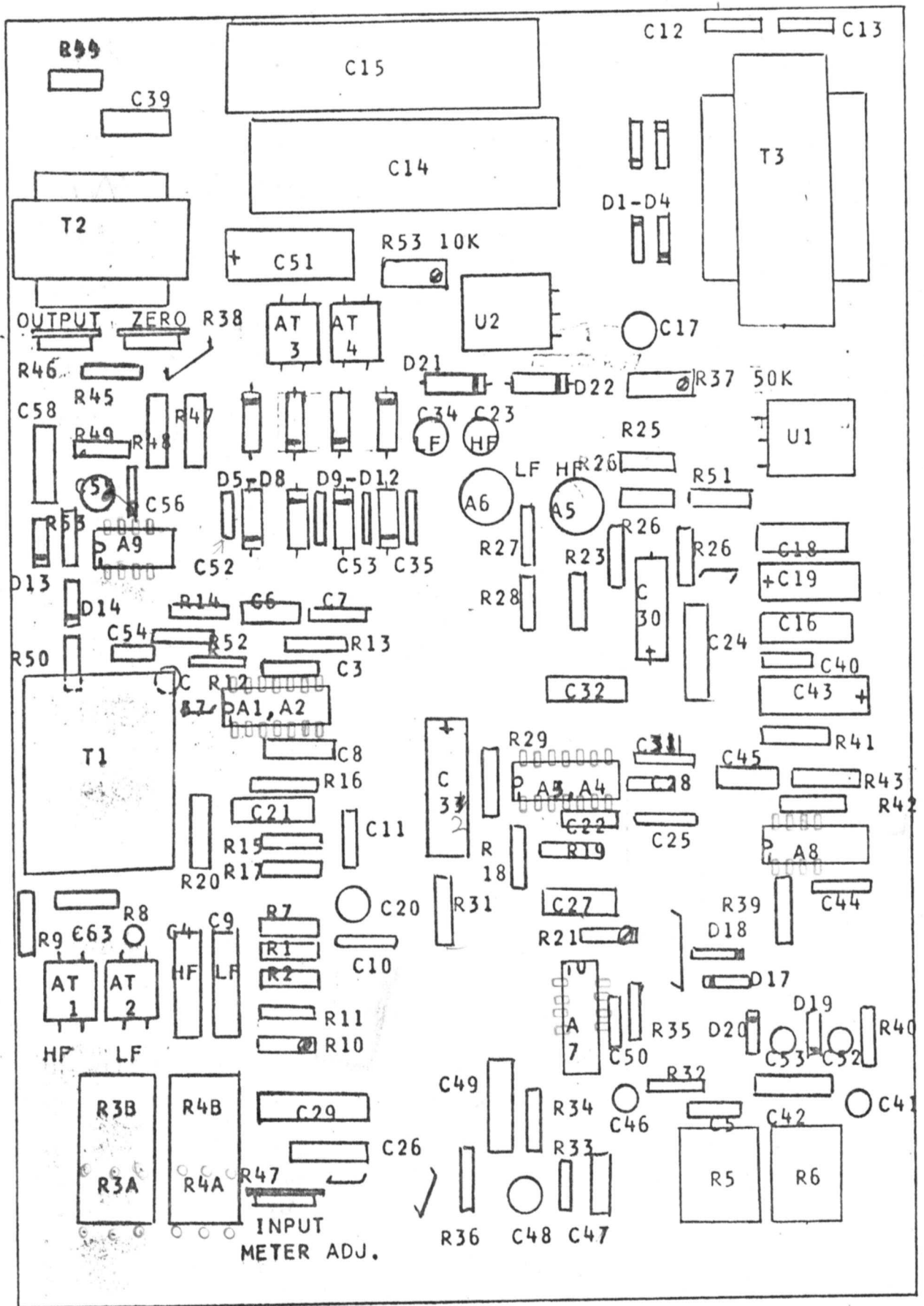


POWER SUPPLY SCHEMATIC INSTA-PEAK II

SCALE:	APPROVED BY:	DRAWN BY
DATE: APR. 15/77		REVISED 4/24/

FIGURE 5.2

ELCOM ENGINEERING CO.
SANTA ANA, CALIF. DRAWING NUMBER



COMPONENT LOCATION

FIGURE 5.3

FINAL INSPECTION AND TEST

Model AP-50

Model: AM ___ FM ___

Serial: _____

MECHANICAL

1. Wiring and Soldering _____
2. Mechanical Alignment _____
3. Hardware Tightness _____
4. Wire Dress _____
5. Control indicator positions _____
6. Meter mechanical zero _____

ELECTRICAL

7. Verify component polarities and proper value and rating. _____
8. Set input control @ center, gain reduction control @ full CCW, spectrum balance control @ center, output control @ full CCW, R53 @ full CCW, R37 @ full CW, R21 @ full CW; apply AC power. _____
9. Verify panel LED operation. _____
10. Set meter switch to GR and adjust R38 for 0 VU. _____
11. Apply 1 kHz at -25 dBmW and adjust output control for +10 dBmW output. _____
12. Set meter switch to OUT and adjust R46 for 0 VU. _____
13. Increase input control to full CW, set meter switch to IN, and adjust R47 for 0 VU. ✓ _____
14. Switch frequency to 10 kHz and verify equal intensity of peak ceiling LED's. ✓ _____
15. Verify output is a triangle waveform. ✓ _____
16. Switch to 100 Hz, set input control for +10 dBmW output, and balance control for ± 0.5 dB overall response. ✓ _____
17. Switch to 700 Hz and shunt R13 or R16 for equal level at pin 7 and 8 of A1 and A2 (respectively); test for flatest response. _____

18. Align balance control indicator for center, if necessary, and mark front panel. _____
19. Set frequency to 100 Hz and adjust gain reduction control for 5 dB of GR. Switch to 10 kHz and adjust R21 for:

AM UNITS: 5 dB GR _____ ✓

FM UNITS: 10 dB GR _____

Check at 1 kHz for:

AM UNITS: 5 dB GR _____ ✓

FM UNITS: 6-7 dB GR _____

20. With frequency at 1 kHz, adjust gain reduction control for 5 dB of GR, and set meter switch to GR. Adjust R37 for -5 VU. Check calibration at 10 dB of GR. If necessary, adjust R53 (meter linearity), R37, and R38 for proper meter calibration at 0, -5, and -10 VU. _____

21. Adjust R10 for positive compression slope with GR to 30 dB at 10 kHz and 1 kHz. _____

22. Set gain reduction control @ full CCW and test for:

1 kHz THD _____ % Noise _____ dB

50 Hz to 15 kHz Response _____ dB

23. Set input and output controls @ full CCW. _____

Date: _____

Tech: _____

ELCOM SPECIALTY PRODUCTS

This proof of performance is provided to insure that this piece of equipment meets all manufacturing specifications.

Model AP-50 AM FM Date 5-20-80

MECHANICAL

Alignment ✓ Control indicator position ✓
 Hardware ✓ Meter mechanical zero ✓

ELECTRONICS

Fuse ½A-SB ✓ Power LED operation ✓
 Power supply + 14.61 V - 15.11 V
 Gain reduction calibrated for 0 VU ✓
 VU meter calibrated for 0 VU at +10 DBm output ✓
 Spectrum balance control set for ± 0.5 db overall response ✓
 R13A & R16A factory selected for equal gain from IC-1 HF 100K LF —

Gain reduction calibration
 100Hz (5DB) 5.0 DB 1KHz AM (4-5DB) DB
 10KHz AM (5DB) DB FM (5-7DB) 6.20 DB
 FM (10DB) 10.0 DB

Meter linearity calibration ✓
 Positive compression slope @ 10KHz ✓ @ 1KHz ✓

<u>Frequency</u>	<u>Harmonic Distortion</u>	<u>Frequency Response</u>
50 Hz	<u>.26</u> %	<u>+2.20</u> DB
100 Hz	<u>.24</u> %	<u>+1.60</u> DB
400 Hz	<u>.25</u> %	<u>0</u> DB
1KHz	<u>.26</u> %	<u>0</u> DB
5KHz	<u>.27</u> %	<u>+1.70</u> DB
10KHz	<u>.29</u> %	<u>+1.60</u> DB

Signal to noise -61 DB

Calibrated by RC H