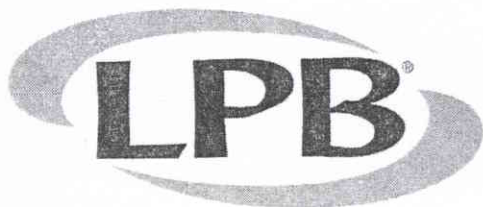


***"TIS" Series
AM Transmitter***

Manual

***Model: AM-30TIS
2-30 watts TPO***



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INSTRUCTION MANUAL

LPB AM-30TIS TRANSMITTER

TRANSMITTERS FOR TRAVELERS INFORMATION STATIONS

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INSTRUCTION MANUAL LPB MODEL AM-30TIS TRANSMITTER

TRANSMITTERS FOR TRAVELERS INFORMATION STATIONS

Revised May 20, 2002

1.0 INTRODUCTION

Low Power AM Transmitters are the product of LPB's nationally recognized broadcast experience since 1960. This AM-30TIS version solid state transmitter utilizes state-of-the-art technology and is Type Accepted as TX 2-30 TIS for use under PART 90 of the FCC Rules. In order to comply with the FCC Rules, this transmitter has been equipped with an audio low-pass filter, modulation limiter, and additional RF harmonic filtering.

The transmitter power output [TPO] is adjustable from about 2 watts to the full rated output of 30 watts. However, note that the applicable FCC Rule allows a maximum power output of 10 watts into a vertical antenna, on frequencies of 530 kHz to 1700 kHz.

2.0 WARRANTY AND SERVICE INFORMATION

2.1 Limited Warranty

We guarantee that you will find the appearance, workmanship and standards of material and construction of this equipment in keeping with the application and with good standards of commercial practice.

For a period of one year from date of delivery, we guarantee this equipment against any form of failure provided that, in the opinion of the manufacturer, no improper use of or modification to this equipment is at fault. The guarantee also requires that the equipment is properly installed and operated within stated parameters. During this period, LPB will furnish materials and labor in our shops to correct any failure. Shipping charges are the responsibility of the customer,

After warranty expiration, service will continue to be available from LPB.

2.2 Service

This equipment is designed and constructed for optimum results and minimum failure. If any problem or question should arise, please call or write LPB Communications Customer Service immediately. Identification information which you should provide include: model number, serial number, operating frequency and date of purchase. This information is found on the identification label on the transmitter.

This equipment, in general, is NOT User Serviceable. If a malfunction arises or is suspected, we urge you to return the equipment to the factory for proper repair.

If the need for service arises contact LPB Communications' Customer Service Department for a **Material Return Authorization [MRA]** and shipping instructions before shipment. The MRA number must be on the shipping label.

Contact: Phone 610-825-4100 Fax 610-825-4047 E-Mail support@lpbinc.com

3.0 APPLICABLE FCC RULES

RF signal from this equipment, however it may be used, is governed by PART 90 of the Rules and Regulations of the FCC. **THEY ARE ENFORCED!** It is the user's responsibility to understand these rules and to insure that the equipment is operated in accordance with them. LPB assumes no responsibility for violations of these rules or improper use of this equipment.

Appended is the most recent applicable FCC Rules, 47 CFR 90.242, 10-1-97 Edition, and applicable portions of 47 CFR 90.20 4-1-02 Edition.

The key points of Part 90.242 for TIS transmitter operation are:

- 1.) Operating frequency: 530 kHz to 1700 kHz
- 2.) Maximum field strength: 2mV/m @ 1.5km
- 3.) Maximum RF power out: 10 watts
- 4.) Antenna height: 15 meters

4.0 CIRCUIT DESCRIPTION

We do not recommend user repair of this equipment but (furnish the following theory of operation information for those interested, it will assist in isolating a problem. Furthermore, refer to the troubleshooting guide in Section 7.0 and to the block diagrams and schematics in this manual.

4.1 Summary

(REFER TO TRANSMITTER BLOCK DIAGRAM, FIG. 1)

The transmitter uses an integrated circuit technique to generate a high-stability signal at six times the carrier frequency. A digital countdown circuit produces the carrier frequency which is then amplitude modulated at a low level. A linear RF power amplifier increases the output to full rated TPO. The linear RF amplifier allows output power adjustment down to about 2 to 30 watts [TPO]. The internal meter is used to measure Modulation and Relative RF Power Output.

A limiter stage is employed at the audio Input, adjustable to avoid over-modulation. This is followed by an audio low-pass filter to limit the audio response above 3000 Hz as required for TIS operation.

4.2 Power Supply

[Refer to Power Supply Fig, 2 and schematic and List # 6015-A]

The low voltage secondary of the transformer T1 feeds a standard full-wave diode bridge D1 (CR1). Diode D2 (CR2) and transistor Q1 provide regulation and ripple rejection. Diode D3 (CR3) provides half-wave rectification for the 15 VDC supply. Both primary AC and B+ voltages are fused (F1 & F2). A metal oxide varistor V1 shunts the low voltage secondary of T1 to protect against damage from voltage transients.

4.3 Exciter

(Refer to TIS Exciter Fig. 3 and schematic)

(Parts list # 6049-F and # 6010-F)

4.3.1 Audio

The audio section utilizes input transformer T2 to provide isolation and balanced 600 ohm line input. The transformer secondary drives an operational amplifier A1 in the inverting mode. This feeds an integrated circuit balanced modulator A4 and the input of the meter amplifier A6. The VU meter is calibrated to read 0 VU at 100% modulation, and is factory calibrated by supplying a 1 kHz tone to the transmitter audio input terminals.

The balanced modulator A4 provides a low amplitude modulated signal. Since the input is a square wave, the modulator output is a square wave, rich in harmonics. DC voltage for the audio input stage, meter amplifier and modulator is provided from a sub-regulated power supply for high stability.

R48 is adjusted to limit the modulation so it will not exceed 95% (with the limiter set) on negative peaks with an input signal 15 dB above normal level. R48 is factory sealed, and is NOT user adjustable.

4.3.2 Oscillator

A precision crystal is used in the integrated circuit oscillator A2. It operates at six times the transmitter carrier frequency for maximum stability. The oscillator output drives a divide-by-six counter A3. This output is square wave at the carrier frequency and is applied to modulator A4.

4.3.3 RF Pre-Driver and Driver Stages

Modulator A4 output drives the pre-driver amplifier consisting of an emitter follower Q2 which drives the power transistor Q3 operating Class A. A tuned circuit (L1 and C43) is in the collector circuit of Q3 to filter the harmonics from the square wave. This results in a carrier output from Q3 that is a sine wave with low harmonic content. The RF drive level control R31 in the pre-driver adjusts the output power of the transmitter. The driver amplifier provides input to the final power amplifier.

4.4 RF Power Amplifier

[Refer to RF Power Amplifier Fig. 4 and schematic, and Parts List # 6005-A & 6047-A] The final power amplifier utilizes a matched pair of balanced emitter transistors Q5 and Q6. Bias must be supplied for linear AM amplification. This operating bias is developed in a series regulated bias supply whose main components are A5 and Q4. Because the power amplifier is push-pull and the transistors are matched, a high degree of second harmonic rejection is automatically achieved. An elliptic function filter (C31 through C35, L4 & L5) at the power amplifier output rejects higher order harmonics. Transmitter RF output is sampled to present Relative RF Output on the VU meter with the switch (S2), on the exciter, in the REL RF OUT position.

The elliptic filter is designed to operate over one-third (1/3) of the 530 kHz to 1700 kHz AM band. Sectioning the band with different filters is necessary because of the width of the band. For example: the second harmonic of 530 kHz falls within the band at 1060 kHz and the third harmonic at 1590 kHz is also within the band. The low-band filter covers 530 kHz to 830 kHz, mid-band 840 kHz to 1270 kHz and high-band 1280 kHz to 1700 kHz.

Any field change of frequency will be restricted to the operating range of the filter. For example: a 640 kHz transmitter can be changed to operate on 710 kHz by simply changing the crystal but it cannot be operated above 830 kHz without first being returned to the factory for a new elliptic output filter and adjustment of the power amplifier.

5.0 INSTALLATION

5.1 Location and Mounting

Select a location which will provide several inches of clearance on all of the sides of the transmitter. Clearance around the heatsink is especially important. Do not block the vent holes on the top and bottom of the chassis. Do not shelf-mount the as this will block the holes and interrupt the air circulation.

Do not mount the transmitter to an electrically conductive surface. We recommend a wood or similar backboard.

Holes are provided in the chassis for three (3) screws to mount the transmitter to a vertical surface. Screws, #10 x 5/8", are supplied for the top two mounting holes and # 8 x 1/2" for the lower hole. Refer to Fig. 7 for proper mounting. A rack mounting kit is also available.

5.2 Interfacing the Transmitter

AC Power: The transmitter requires a standard 117 VAC, 50/60 Hz. Outlet. A 6 foot, 3 conductor line cord with 3 pin AC is supplied. DO NOT REMOVE THE GROUND PIN FROM THE PLUG.

Audio: The audio Impedance is 600-ohm transformer balanced. Any input between -15 dBm and +10 dBm will provide 100% modulation (with the Audio Gain control R4 properly set, and 95% modulation with the limiter properly set). The audio quality delivered to the listener can be no better than that delivered to the transmitter.

Connect the audio feed line to the AUDIO IN terminal block located on the bottom of the transmitter chassis. (see Fig. 8).

RF Output: The RF output impedance is industry-standard 50 ohms, unbalanced, using SO-239 UHF connector (see Fig 8). The RF output cable must be 50-ohm coaxial cable. Type RG-8/U is recommended. For short runs, type RG-58/U is acceptable.

NOTE: A strong RF field exists within a few feet of the transmitter and may affect the operation of other equipment located in close proximity to the transmitter.

6.0 CONTROL SETTINGS AND OPERATION

6.1 User Control Descriptions and Locations

A number of trimpots are located inside the transmitter. Some are factory set and sealed. Removal of any of the seals will void the warranty.

User adjustable controls include:

Power Switch (S1) located on the power supply board. The red LED will be on when power is applied.

Meter Switch (S2) located below the meter on the exciter board. This switch selects the junction of the meter to indicate relative RF Power Output or Percent Modulation.

Audio Gain (R4) located on the upper left corner of the exciter. This adjusts the audio gain of the transmitter to provide 100% modulation (95% with the limiter set) for any audio input level from -15 dBm to +10 dBm.

RF Drive (R31) located lower center of exciter board. This control adjusts the RF drive to the final power amplifier for the desired RF output power between 7% and 100% of rated TPO, 30 watts.

6.2 Setup and Operation

Refer to Section 6.1 of this manual and the operating instructions located on the inside of the transmitter front panel. With power switch (S1) off (down position) make sure RF Drive level (R31) and Audio Gain (R4) are at MINIMUM (full counter-clockwise).

1. Be sure all connections to and from the transmitter are secure.
2. When using an Antenna Tuning Unit (ATU-30), refer to the ATU-30 manual for proper matching procedure.
3. Turn transmitter power switch on.
4. Place Meter Function Switch in REL RF OUT (Relative RF Output).
5. Set RF Drive control (R31) for the minimum power required for the application. This may be measured using the Relative RF Output Meter. This meter reads output voltage referenced to 100% TPO. The AM-30TIS full-scale reading (100%) indicates the voltage generated for 30 watts output. Since power is a function of the square of the relative voltage, to convert the meter reading to power out in watts use the following equation:

$$(\text{Meter Reading} / 100)^2 \times \text{Rated TPO} = \text{WATTS}$$

Example: Meter reads 70, TPO = 30 watts

$$(70/100)^2 \times 30 = 0.49 \times 30 = 14.7 \text{ watts}$$

(These are approximate calculations; the meter may not read precisely.)

NOTE: Transmitter RF power out (watts) can be read from the ATU-30 meter POWER.

6. Function Switch to percent modulation position (% MOD).
7. Adjust Audio Gain Control [R4] so the meter indicates approximately 50% during program material peaks. The VU meter is an average responding device; however, the modulation level relates to the peak of the waveform. As a result, the program levels should be set not to exceed about 50%. (The most accurate means to measure the modulation is to observe the modulated carrier waveform on an oscilloscope.)
8. A final check of the power output should be made at this time, to ensure compliance with Part 90.242 of the FCC Rules and Regulations.

7.0 BASIC TROUBLESHOOTING GUIDE

<u>Problem</u>	<u>Possible Cause</u>
LED power indicator does not light.	No power on AC receptacle F1 blown.
No RF output indication.	Fuse F1 and/or F2 blown. Shorted output cable. Drive control [R31] set to minimum. Crystal not seated properly. Meter Switch (S2) in % MOD position. Defective Transistor Q1 Defective oscillator chip A2. Detective Divide-by-six chip A3. Defective Modulator chip A4. Open RF output cable. Bad match to load.
RF output reads off scale when drive control (R31) is advanced.	Output badly mismatched.
Fuse F2 blows after a short period of operation.	Audio input cable not connected. Audio gain control (R4) set at minimum.
No modulation indication with RF output OK (unmodulated carrier is heard on a monitor).	No audio from source.
Audio distortion heard on radio receiver.	Audio gain control set too high.
Hum heard on radio receiver.	Problem audio source or audio feed line.

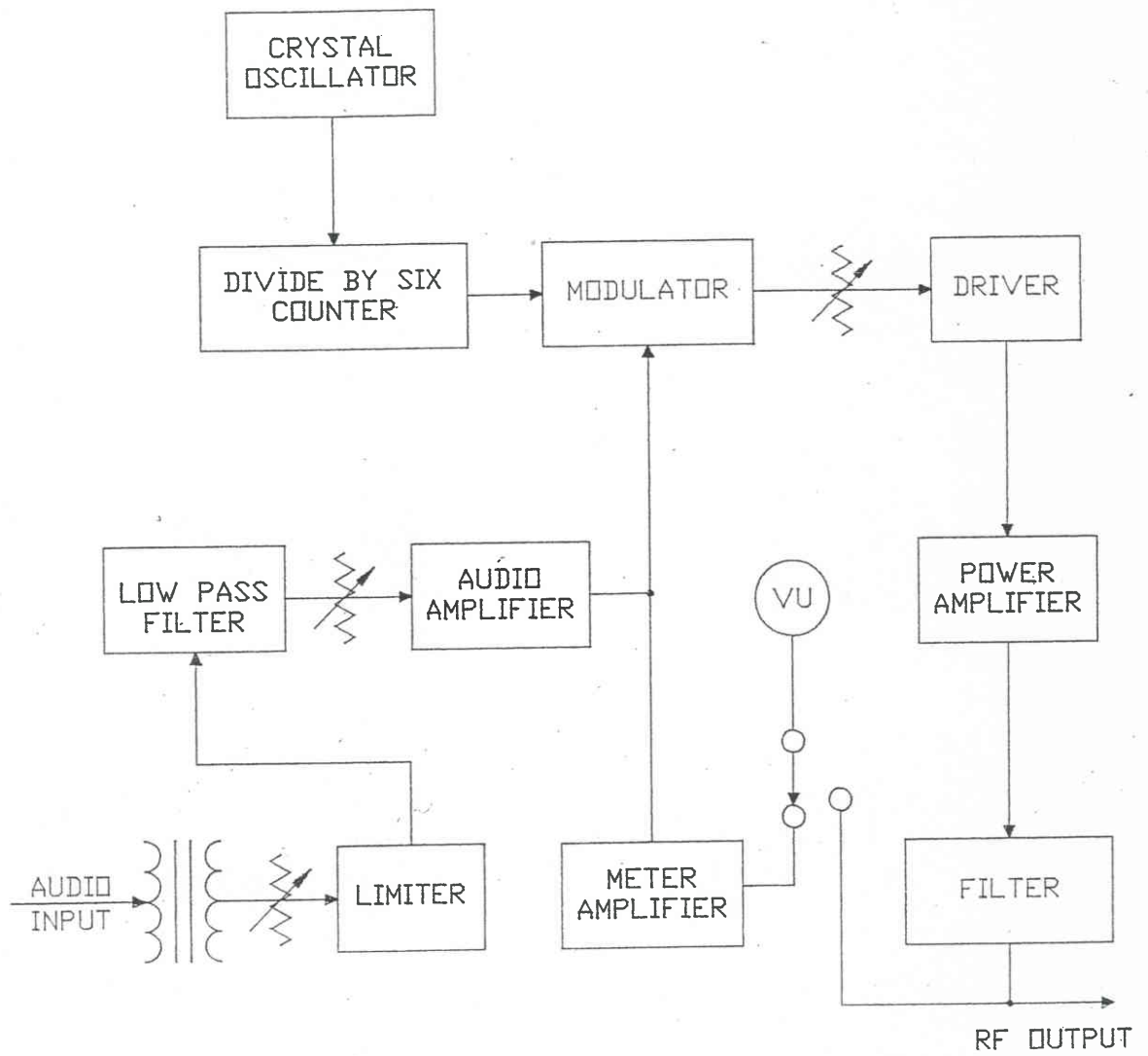
8.0 MAINTENANCE

These transmitters are designed for continuous 24-hour service. Periodic checks of the transmitter and associated equipment are recommended to catch any problems that may rise.

Modulation level, RF output level and output matching should be checked regularly.

9.0 PARTS LIST AND SCHEMATICS

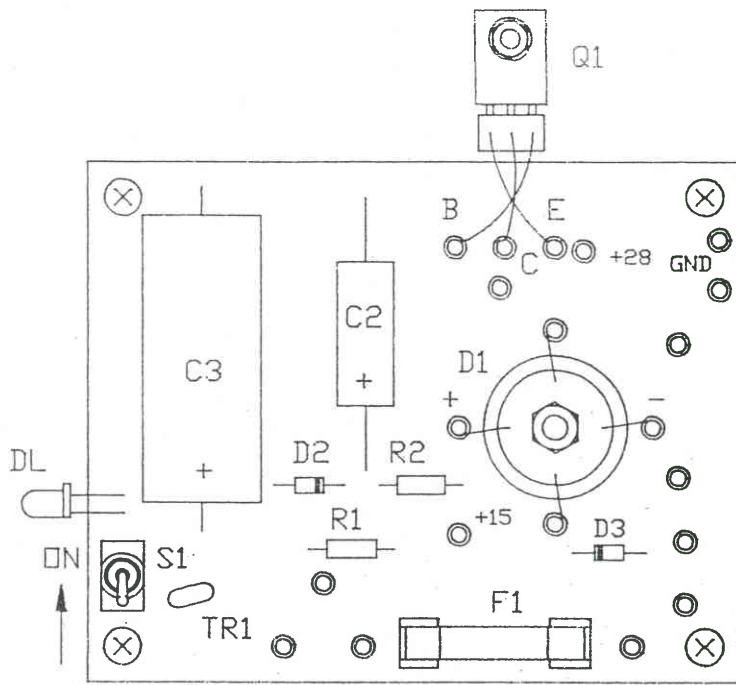
Following this section is a complete set of parts lists and schematics. Refer to these lists for the LPB Communications part numbers and value.



AM-30TIS TRANSMITTER

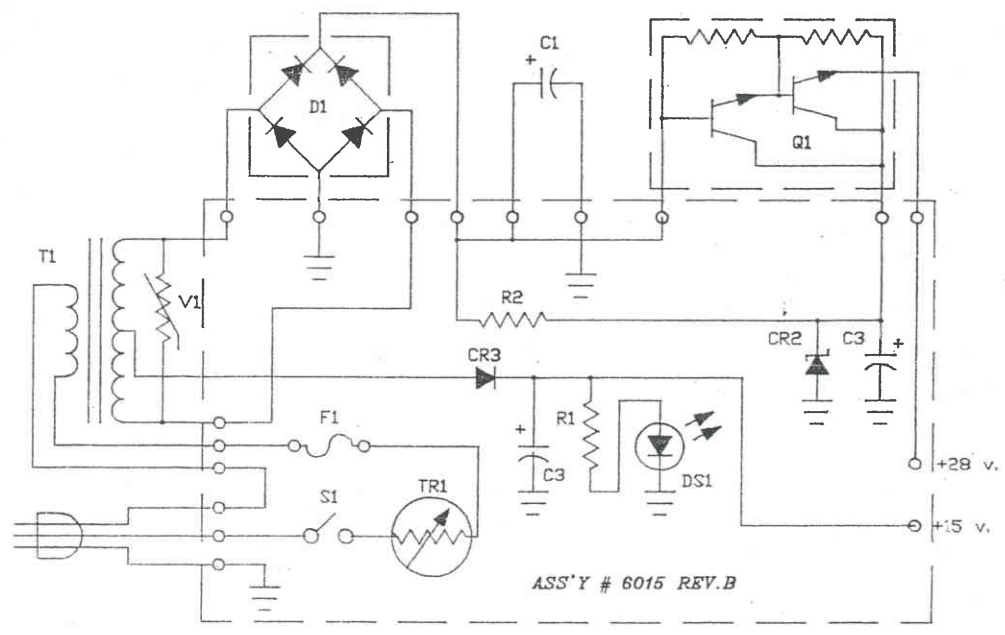
BLOCK DIAGRAM

FIGURE #1



POWER SUPPLY
COMPONENT LAYOUT

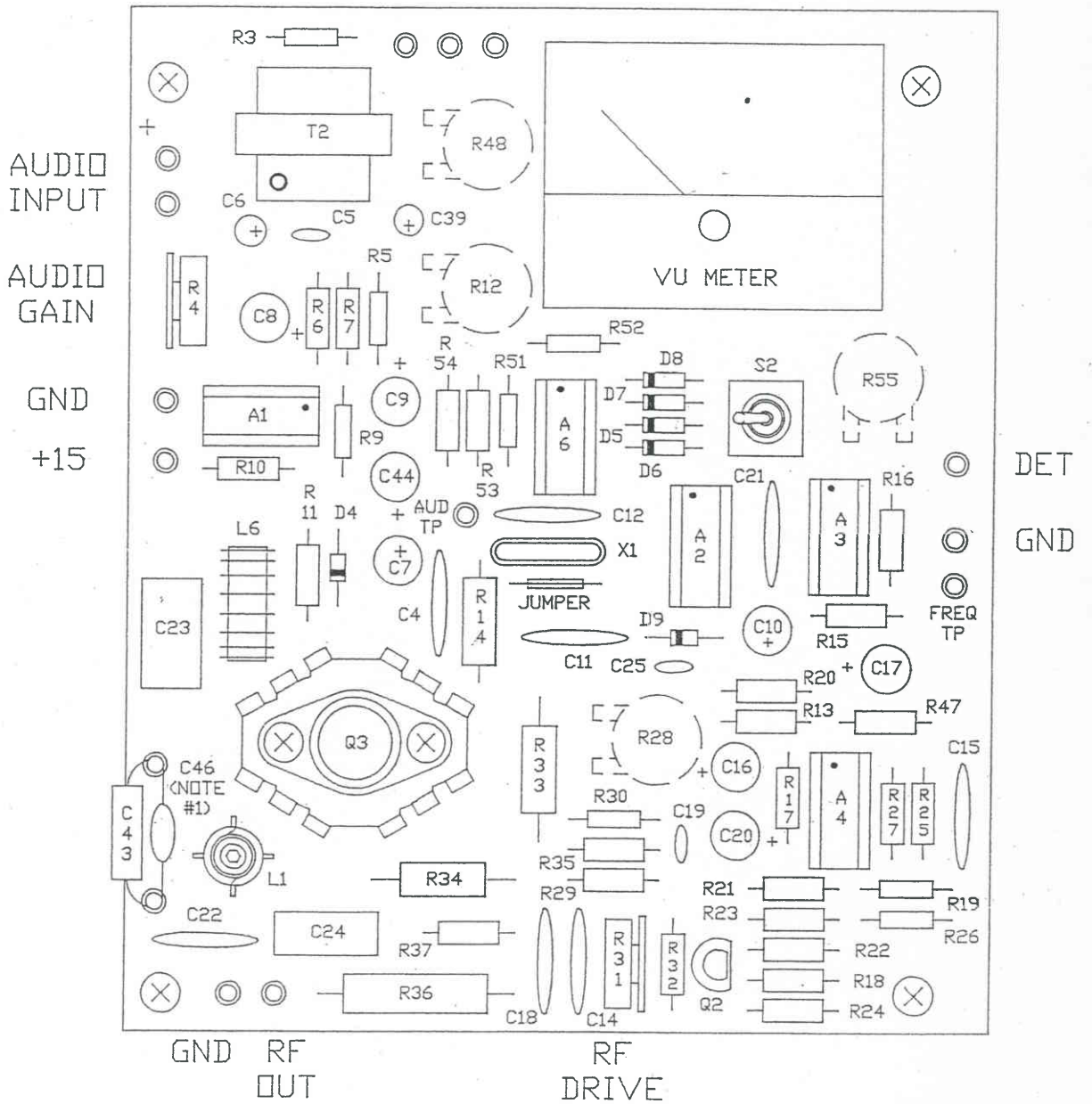
FIG. 2



AM-30P/60P/100P POWER SUPPLY #6016 REV.B

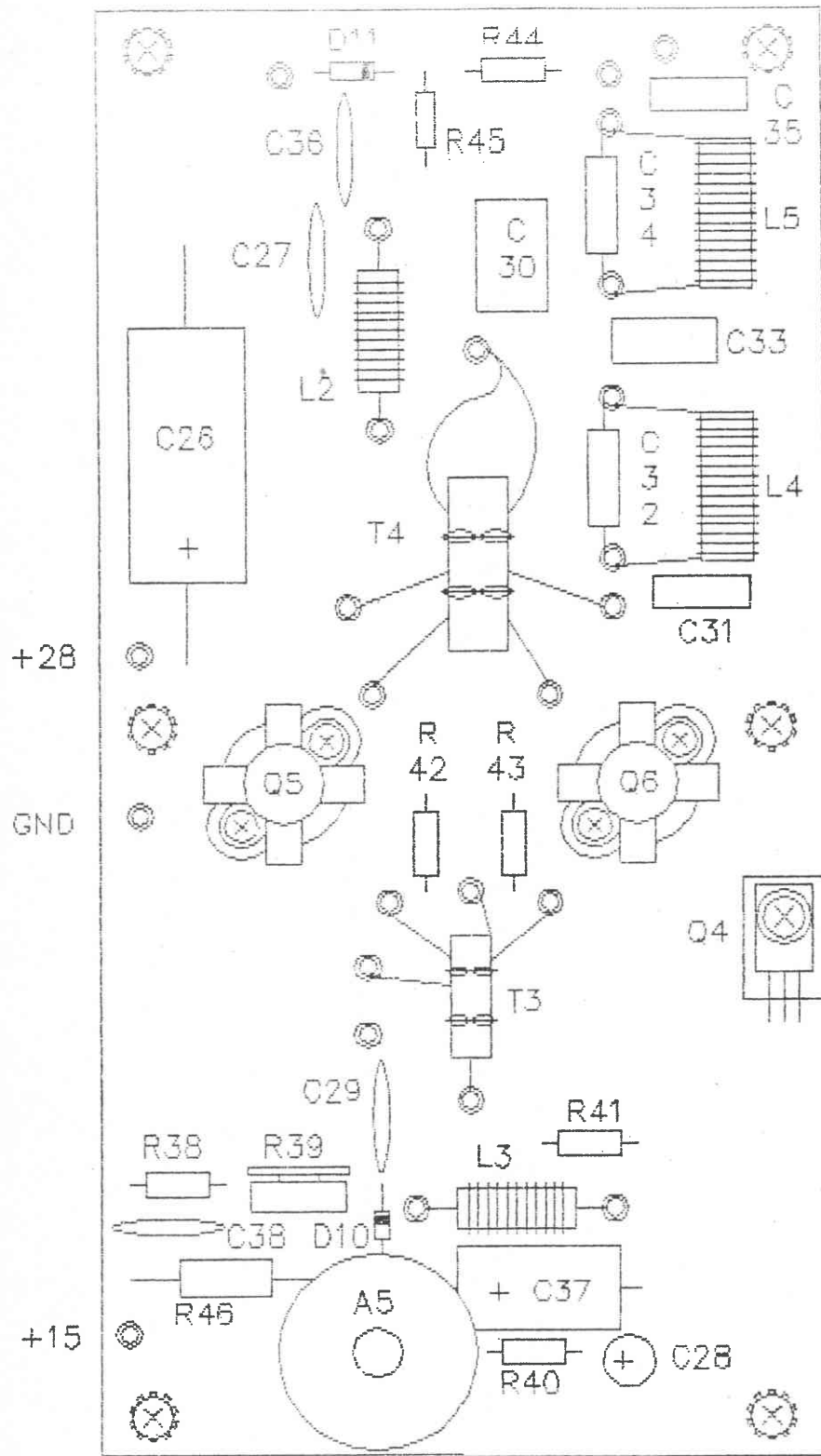
NOTES:
 1. C46 IS NOT USED IN 1610kHz UNITS.

G M B



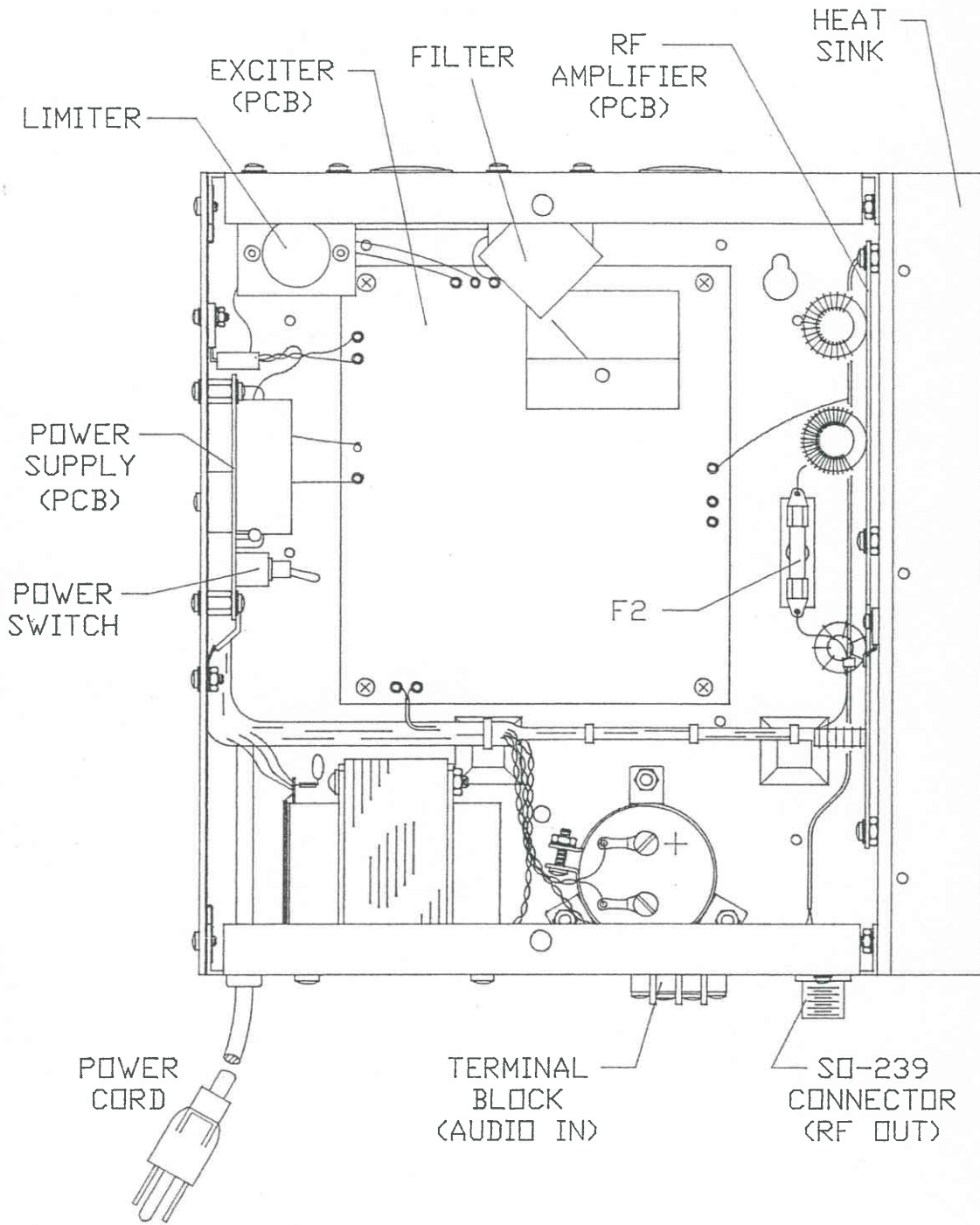
AM-30 TIS EXCITER
 COMPONENT LAYOUT

FIGURE #3



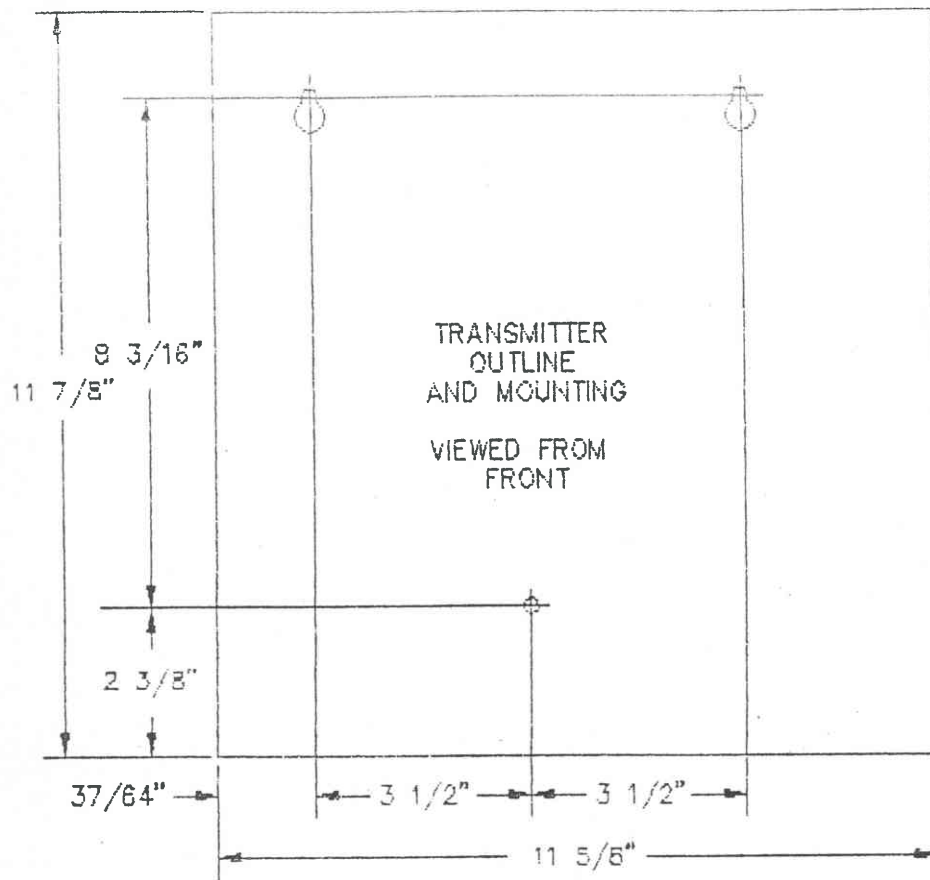
RF POWER AMP
COMPONENT LAYOUT

FIG. 4



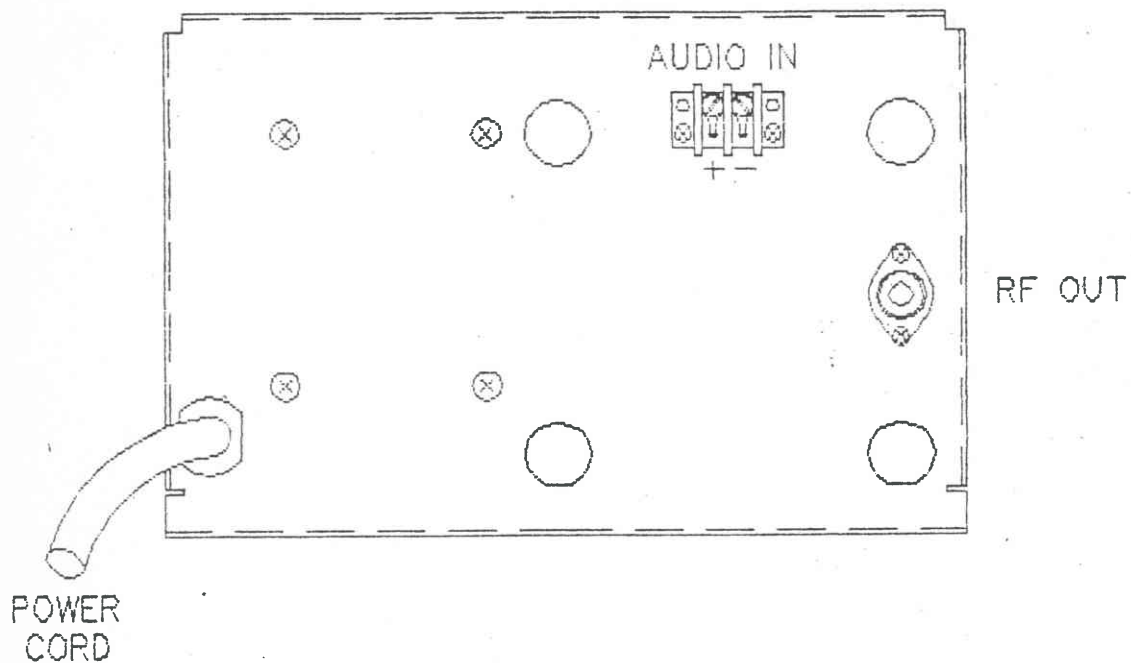
AM-30 TIS TRANSMITTER
COMPONENTS

FIGURE #5



TRANSMITTER MOUNTING DIMENSIONS

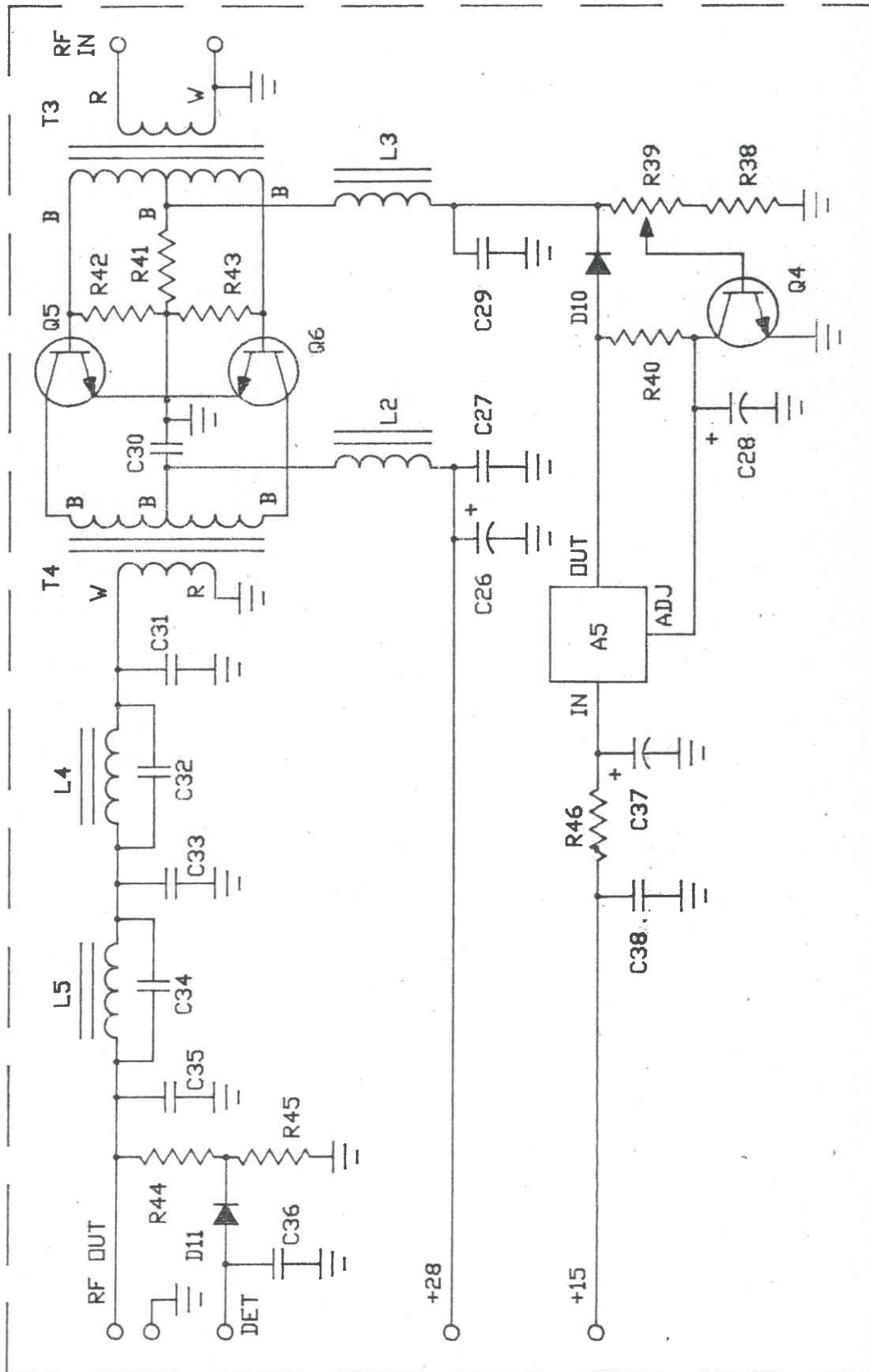
FIG. 7



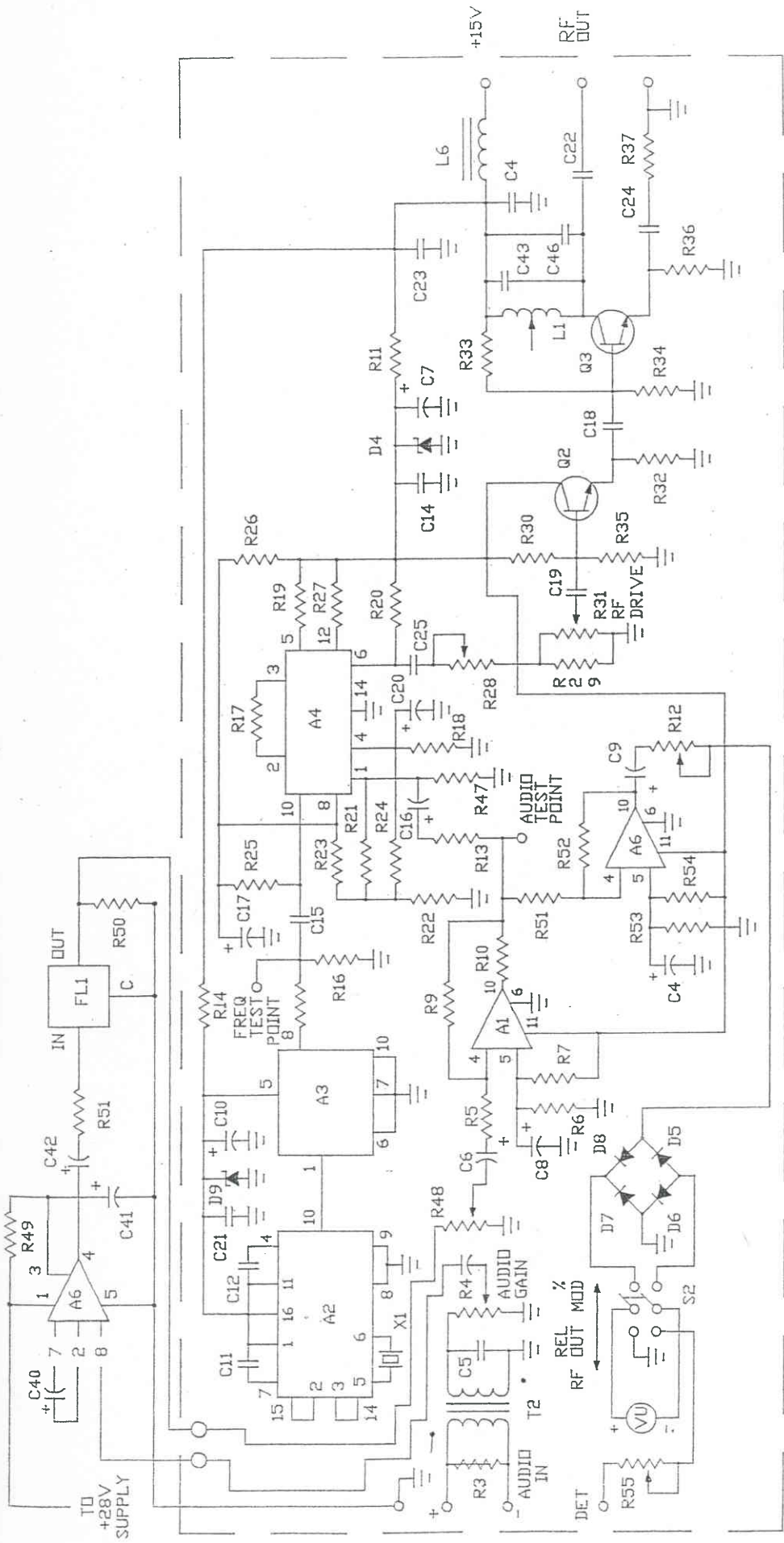
CHASSIS VIEWED FROM BOTTOM

TRANSMITTER CONNECTIONS

FIG. 8



AM-30P/60P/100P
 RF POWER AMP MODULE RFA-30 SCHEMATIC
 Dwg. No. 6006 REV. A



'TIS' VERSION
 EXCITER BOARD SCHEMATIC
 AM-30TIS
 DWG. #6051 REV.F

NOTES:

1. R12, R28, R55 are factory set.
2. REFER TO PARTS LIST #6010 REV.F & #6049 REV.F FOR COMPLETE LIST OF EXCITER COMPONENTS

L P B P A R T S L I S T

RF POWER AMPLIFIER MODULE

ASSY NO. 6005-A

PAGE 1

DATE 2/20/90

SUPERCEDES 7/25/89

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30/60/100,RF POWER AMP.PCB.	671-6008-A	
R39	1	1K OHM TRIMPOT,VERT MNT,THMBWHL ADJ	775-1080	
R40	1	680 OHM,1/2W,5% RESISTOR,CARB FILM	762-2117	
R41	1	4.7 OHM,1/2W,5% RESISTOR,CARB FILM	762-2065	
R42	1	22 OHM,1/2W,5% RESISTOR,CARB FILM	762-2081	
R43	1	22 OHM,1/2W,5% RESISTOR,CARB FILM	762-2081	
C26	1	2200 MFD AL CAP AXL 35V -10/+50 %	172-2197	
C27	1	.1 MFD CER DISC CAP 50V	174-1254	
C28	1	22 MFD AL CAP RAD 63V +/-20 %	172-1067	
C29	1	.1 MFD CER DISC CAP 50V	174-1254	
C30	1	.33 MFD MYLAR CAP 100V 10%	175-1091	
C37	1	470 MFD AL CAP AXL 50V -10/+50 %	172-2153	
C38	1	.1 MFD CER DISC CAP 50V	174-1254	
A5	1	LM317H ADJ VOLT REG IC (TO-5)	363-1001	
D10	1	1N4007-1000V,1A SILICON RECTIFIER	781-1037	
Q4	1	2N5190 NPN SIL PWR TRANSISTOR,PLAS	782-1105	1
Q5	1	SD-1407 NPN RF PWR XSTR,28V,HI-GAIN	782-1211	1
Q6	1	SD-1407 NPN RF PWR XSTR,28V,HI-GAIN	782-1211	1
L2	1	0.75" FERRITE TOROID	201-1005	2
L3	1	0.75" FERRITE TOROID	201-1005	2
T3	1	0.75" FERRITE TOROID	201-1005	3
T4	1	1.1 " FERRITE TOROID	201-1006	4
2	1	AM-30 RFA HEATSINK	333-6035-A	
3	1	TO-5 PRESS-ON HEATSINK	332-1005	
4	5	4-40 X 3/8" PAN HD SCREW PHILLIPS	301-1108	
5	6	6-32 X 1/2" PAN HD SCREW PHILLIPS	301-1212	
6	6	#6 EXTERNAL TOOTH LOCKWASHER	303-1010	
7	6	10-24 HEX NUT W/LOCKWASHER (KEPS)	302-6020	
9	4	#4 EXTERNAL TOOTH LOCKWASHER	303-1005	
10	1	#4 COMPRESSION WASHER	789-1021	
11	1	MICA INSULATOR,.5" X .85"	789-1016	1
	15	18 AWG PVC HOOK-UP WIRE,RED	931-1022	5
	17	18 AWG PVC HOOK-UP WIRE,BLACK	931-1021	5
	15	18 AWG PVC HOOK-UP WIRE,WHITE	931-1020	5
	12	22 AWG PVC HOOK-UP WIRE,RED	931-1003	5
	14	22 AWG PVC HOOK-UP WIRE,BLACK	931-1002	5
	12	22 AWG PVC HOOK-UP WIRE,WHITE	931-1001	5
C31	1		-	6
C32	1		-	7
C33	1		-	8
C34	1		-	9
C35	1		-	10
L4	1		-	11
L5	1		-	12

CONTINUED ON PAGE 2

L P B P A R T S L I S T

RF POWER AMPLIFIER MODULE

ASSY NO. 6005-A
 PAGE 2
 DATE 2/20/90
 SUPERCEDES 7/25/89

NOTES:

1. USE A THIN COAT OF THERMAL HEATSINK COMPOUND.
 BETWEEN COMPONENT AND HEATSINK - SCRAPE PAINT IN REQUIRED.
2. 52 UH FERRITE CORE COIL TOROIDAL - SEE SCD #184-1005
3. RF TOROIDAL TRANSFORMER INPUT TRIFILAR - SEE SCD #865-1005
4. RF TOROIDAL TRANSFORMER OUTPUT TRIFILAR - SEE SCD #865-1010
5. QUANTITY EQUALS LENGTH IN INCHES.

6. FILTER COMPONENT VALUES VS. FREQUENCY RANGE:

	-----LOW BAND-----	-----MID-BAND-----	-----HIGH-BAND-----
C31	3600PF (171-1218)	2400PF (171-1202)	2000PF (171-1197)
7. C32	1000PF (171-1176)	680PF (171-1164)	220PF (171-1120)
8. C33	5600PF (171-1236)	3600PF (171-1218)	3300PF (171-1215)
9. C34	3300PF (171-1215)	2200PF (171-1200)	750PF (171-1167)
10. C35	2200PF (171-1200)	1500PF (171-1188)	1600PF (171-1191)
11. L4	9.3uH SCD #184-1032	6.1uH SCD #184-1023	5.5uH SCD #184-1021
12. L5	5.8uH SCD #184-1024	3.8uH SCD #184-1018	4.0uH SCD #184-1018

L P B P A R T S L I S T

AM-30/60/100 EXCITER BOARD ASSEMBLY

ASSY NO. 6010-F

PAGE 1

DATE 2/20/90

SUPERCEDES 11/21/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30/60/100, EXCITER PCB.	671-6013-A	
R3	1	620 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2116	
R4	1	10K OHM TRIMPOT, VERT MNT, THMWHL ADJ	775-1130	
R5	1	10K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2145	
R6	1	47K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2161	
R7	1	47K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2161	
R9	1	100K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2169	
R10	1	100 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2097	
R11	1	100 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2097	
R12	1	1K OHM TRIMPOT, HORZ MNT, SCRDR ADJ	775-1085	1
R13	1	1.8K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2127	
R14	1	100 OHM, 2W, 5% RESISTOR, MET OXIDE	763-4097	2
R15	1	820 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2119	
R16	1	1K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2121	
R17	1	1K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2121	
R18	1	1.8K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2127	
R19	1	10K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2145	
R20	1	3K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2132	
R21	1	100 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2097	
R22	1	1K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2121	
R23	1	820 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2119	
R24	1	100 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2097	
R25	1	47 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2089	
R26	1	1.3K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2124	
R27	1	3K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2132	
R28	1	10K OHM TRIMPOT, HORZ MNT, THMWHL ADJ	775-1135	1
R29	1	2.2K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2129	
R30	1	100K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2169	
R31	1	10K OHM TRIMPOT, VERT MNT, THMWHL ADJ	775-1130	
R32	1	300 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2108	
R33	1	1K OHM, 2W, 5% RESISTOR, MET OXIDE	763-4121	2
R34	1	1K OHM, 2W, 5% RESISTOR, MET OXIDE	763-4121	2
R35	1	220K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2177	
R36	1	50 OHM, 5W, 5% RESISTOR, WIREWND	765-1247	2
R37	1	3.3 OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2061	
R47	1	47K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2161	
R51	1	10K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2145	
R52	1	22K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2153	
R53	1	47K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2161	
R54	1	47K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2161	
R55	1	1K OHM TRIMPOT, HORZ MNT, SCRDR ADJ	775-1085	1
C4	1	.1 MFD CER DISC CAP 50V	174-1254	
C5	1	.001 MFD CER DISC CAP 1000V	174-1155	
C6	1	1.0 MFD AL CAP RAD 50V -10/+75 %	172-1007	
C7	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	
C8	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	

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L P B P A R T S L I S T

AM-30/60/100 EXCITER BOARD ASSEMBLY

ASSY NO. 6Q10-F

PAGE 2

DATE 2/20/90

SUPERCEDES 11/21/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
D9	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	
C10	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	
C11	1	.1 MFD CER DISC CAP 50V	174-1254	
C12	1	.1 MFD CER DISC CAP 50V	174-1254	
C14	1	.1 MFD CER DISC CAP 50V	174-1254	
C15	1	.1 MFD CER DISC CAP 50V	174-1254	
C16	1	100MFD TANT CAP RAD 20V	173-1094	
C17	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	
C18	1	.1 MFD CER DISC CAP 50V	174-1254	
C19	1	.001 MFD CER DISC CAP 1000V	174-1155	
C20	1	100MFD TANT CAP RAD 20V	173-1094	
C21	1	.1 MFD CER DISC CAP 50V	174-1254	
C22	1	.1 MFD CER DISC CAP 50V	174-1254	
C23	1	.33 MFD MYLAR CAP 100V 10%	175-1091	
C24	1	.15 MFD MYLAR CAP 100V 10%	175-1079	
C25	1	.001 MFD CER DISC CAP 1000V	174-1155	
C44	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	
A1	1	RM741DC LINEAR IC (14 PIN DIP)	361-1013	
A2	1	MC12061P DIGITAL IC (16 PIN DIP)	364-1005	
A3	1	LM7492PC DIGITAL IC (14 PIN DIP)	364-1001	
A4	1	MC1496P LINEAR IC (14 PIN DIP)	361-1023	
A6	1	RM741DC LINEAR IC (14 PIN DIP)	361-1013	
D4	1	1N4742A-12V,1W,5% ZENER DIODE	781-1072	
D5	1	1N270 GERMANIUM SIGNAL DIODE	781-1015	
D6	1	1N270 GERMANIUM SIGNAL DIODE	781-1015	
D7	1	1N270 GERMANIUM SIGNAL DIODE	781-1015	
D8	1	1N270 GERMANIUM SIGNAL DIODE	781-1015	
D9	1	1N4733A-5.1V,1W,5% ZENER DIODE	781-1063	
T2	1	600:600 LINE IN XFR BOBBIN LPB-B12	863-1075	
L1	1	330UH FERRITE CORE COIL-MOLDED	184-1330	
L6	1	0.75" FERRITE TOROID	201-1005	3
2	14	20 AWG MAGNET WIRE,NYLEZE,RED	939-1012	4
S2	1	DPDT MIN TOGGLE SWITCH,PC MOUNT	821-1013	
Q2	1	2N3904 NPN SIL SIG TRANSISTOR,TO-92	782-1072	
Q3	1	2N3879 NPN SIL PWR TRANSISTOR,TO-66	782-1069	5
X1	1		-	6
3	1	XTAL SOCK .5" CTR PLASTIC PC MOUNT	216-1002	
4	1	1.5"VU METER B SCALE (DC TYPE)	541-1001	
5	1	20 AWG TINNED COPPER BUS WIRE	935-1016	4
6	1	TRANSISTOR SOCKET,3 PIN,TO-5,NYLON	789-1001	
7	1	TO-66 PC BOARD MNT HEATSINK 1.25"H	331-1012	
8	3	14 PIN IC SOCKET RECESSED	365-1003	
9	1	14 PIN HEADER SOCKET	365-1010	
10	1	16 PIN IC SOCKET RECESSED	365-1005	
11	2	6-32 X 3/8" PAN HD SCREW PHILLIPS	301-1208	
12	2	4-40 HEX NUT	302-1005	

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L P B P A R T S L I S T

AM-30/60/100 EXCITER BOARD ASSEMBLY

ASSY NO. 6Q10-F

PAGE 3

DATE 2/20/90

SUPERCEDES 11/21/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
14	2	6-32 HEX NUT W/LOCKWASHER (KEPS)	302-6018	
15	2	18 AWG TINNED COPPER BUS WIRE	935-1017	4
16	1	20 AWG PVC TUBING,CLEAR	936-1003	4

NOTES:

1. MOUNT ON BOTTOM OF PC BOARD.
2. MOUNT SO BODY OF COMPONENT IS 1/8" TO 3/16" ABOVE BOARD.
3. 52 UH FERRITE CORE COIL TOROIDAL - SEE SCD #184-1005
4. QUANTITY EQUALS LENGTH IN INCHES.
5. USE A THIN COAT OF THERMAL HEATSINK COMPOUND BETWEEN COMPONENT AND HEATSINK - SCRAPE PAINT IN REQUIRED.
6. 6X CRYSTAL, STANDARD TOLERANCE, 10 KHZ SPACING (212-XXXX)

L P B P A R T S L I S T

AM-30 POWER SUPPLY ASSEMBLY

ASSY NO. 6015-A

PAGE 1

DATE 2/20/90

SUPERCEDES 11/23/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30/60/100,POWER SUPPLY PCB.	671-6018-B	
R1	1	1K OHM,1/2W,5% RESISTOR,CARB FILM	762-2121	
R2	1	390 OHM,1/2W,5% RESISTOR,CARB FILM	762-2111	
D2	1	1N4751A-30V,1W,5% ZENER DIODE	781-1081	
D3	1	1N4007-1000V,1A SILICON RECTIFIER	781-1037	
DL	1	LED T-1-3/4 -RED	473-1006	
C2	1	220 MFD AL CAP AXL 50V -10/+50 %	172-2132	
C3	1	6800 MFD AL CAP AXL 25V -10/+50 %	172-2228	
	1	QUICK FIT FUSE COVER	699-1020	
F1	1	2-1/2 AMP,250V,SLO-BLO FUSE	691-1017	
TR1	1	2 AMP INRUSH CURRENT SUPPRESSOR	696-1002	
2	2	PC MOUNT FUSE CLIPS	699-1001	

L P B P A R T S L I S T

AM-30 CHASSIS ASSEMBLY

ASSY NO. 6020-A
 PAGE 1
 DATE 2/20/90
 SUPERCEDES 11/21/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	RF CHASSIS	521-6036-C	
C1	1	9600 MFD AL CAP CAN 50V	172-3040	
V1	1	40VAC, 400A PEAK, MET-OX-VARISTOR	695-1020	
T1	1	56V 2A PWR XFMR CH MNT 56-2	861-1065	
2	1	MOUNTING BRACKET FOR 172-3040	172-3043	
	1	18 AWG 3-COND POWER CORD, GRAY VINYL	939-1003	
4	3	6-32 X 3/8" PAN HD SCREW PHILLIPS	301-1208	
5	1	6-32 X 5/8" PAN HD SCREW PHILLIPS	301-1214	
6	4	10-32 X 1/2" PAN HD SCREW PHILLIPS	301-1512	
8	4	6-32 HEX NUT W/LOCKWASHER (KEPS)	302-6018	
9	4	10-32 HEX NUT	302-1020	
F1	1	CHASSIS MOUNT FUSEHOLDER	699-1010	
12	4	#10 EXTERNAL TOOTH LOCKWASHER	303-1020	
13	2	#10 SOLDER LUG	306-1020	
14	4	1" NYLON VENT PLUG	309-7025	
15	25	18 AWG PVC HOOK-UP WIRE, BLACK	931-1021	1
16	10	18 AWG PVC HOOK-UP WIRE, RED	931-1022	1
17	3	20 AWG PVC TUBING, CLEAR	936-1003	
	1	2 SCR TERM BLK BHD MNT 3/8 CTR	191-1003	
	1	SG-239 UHF CONNECTOR 2 HOLE MOUNT	194-1006	

NOTES:

1. QUANTITY EQUALS LENGTH IN INCHES.

L P B P A R T S L I S T

AM-30 SIDE PANEL ASSEMBLY

ASSY NO. 6021-A

PAGE 1

DATE 2/20/90

SUPERCEDES 11/23/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30 POWER SUPPLY ASSEMBLY	6015-A	
2	1	RF DRILLED SIDE PANEL	521-6033-C	1
Q1 <i>NIE-263</i>	1	MJE6043 NPN DARLINGTON PR XSTR, PLAS	782-1127	2
D1	1	RECTIFIER BRIDGE-50V, 6A	781-1155	2
S1	1	SPDT MIN TOGGLE SWITCH, PC MOUNT	821-1005	
P1	1	MOLEX PLUG 3 HOLE	195-1002	
3	3	MOLEX PIN (FOR 195-1002)	195-1005	
4	1	4-40 X 3/8" PAN HD SCREW PHILLIPS	301-1108	
5	8	6-32 X 1/4" PAN HD SCREW PHILLIPS	301-1204	
6	1	6-32 X 3/8" PAN HD SCREW PHILLIPS	301-1208	
7	1	6-32 X 5/8" PAN HD SCREW PHILLIPS	301-1214	
8	1	4-40 HEX NUT	302-1005	
9	2	6-32 HEX NUT W/LOCKWASHER (KEPS)	302-6018	
10	1	#4 EXTERNAL TOOTH LOCKWASHER	303-1005	
11	9	#6 EXTERNAL TOOTH LOCKWASHER	303-1010	
12	4	6-32 X 3/8" HEX THREADED SPACER	304-1078	
13	1	#6 SOLDER LUG	306-1010	
14	1	"CAUTION LINE VOLTAGE" LABEL	444-1000	
16	1	MICA INSULATOR, .5" X .85"	789-1016	2
17	1	#4 COMPRESSION WASHER	789-1021	
18	4	22 AWG PVC HOOK-UP WIRE, BLACK	931-1002	3
19	9	22 AWG PVC HOOK-UP WIRE, GREEN	931-1004	3
20	18	22 AWG PVC HOOK-UP WIRE, BLUE	931-1006	3
21	4	18 AWG PVC HOOK-UP WIRE, WHITE	931-1020	3
22	40	18 AWG PVC HOOK-UP WIRE, BLACK	931-1021	3
23	48	18 AWG PVC HOOK-UP WIRE, RED	931-1022	3
24	19	18 AWG PVC HOOK-UP WIRE, GRAY	931-1029	3
25	3	18 AWG TINNED COPPER BUS WIRE	935-1017	3
27	5	6" SELF-LOCKING NYLON TIE-WRAP	937-1004	
28	1	1" ADHES BASE TIE-WRAP HOLD-DOWN, NY	937-1012	

NOTES:

1. REMOVE PAINT UNDER D1 & Q1 MOUNTING LOCATION IF NECESSARY. APPLY THIN COAT OF THERMAL HEATSINK COMPOUND.
2. USE A THIN COAT OF THERMAL HEATSINK COMPOUND BETWEEN COMPONENT AND HEATSINK - SCRAPE PAINT IN REQUIRED.
3. QUANTITY EQUALS LENGTH IN INCHES.

L P B P A R T S L I S T

AM-30 TIS SHELF ASSEMBLY

ASSY NO. 6046-A

PAGE 1

DATE 6/24/88

SUPERCEDES 3/30/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30 TIS FINAL ASSEMBLY	6047-A	
2	1	RF FRONT PANEL	521-6034-A	
3	2	LATCH GROMMET-NYLON	309-1021	
4	2	LATCH PLUNGER-NYLON	309-1020	
5	1	3' RG-58A/U COAX CABLE,W/PL-259(RFP)	933-1040	
6	1	AM-30/60 TIS INSTRUCTION SHEET	441-6048-A	
7	3	#10 X 1/2" HEX HD SHEET METAL SCREW	301-6412	
8	2	FORK LUG,#6 STUD,22-18 GA WIRE	195-1015	
9	2	QUICK FIT FUSE COVER	699-1020	

L P B P A R T S L I S T

AM-30 TIS FINAL ASSEMBLY

ASSY NO. 6047-A

PAGE 1

DATE 2/21/90

SUPERCEDES 9/22/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	RF POWER AMPLIFIER MODULE	6005-A	
2	1	AM-30 TIS EXCITER BOARD ASSEMBLY	6049-F	
3	1	AM-30 CHASSIS ASSEMBLY	6020-A	
4	1	AM-30 SIDE PANEL ASSEMBLY	6021-A	
5	1	2 SCR TERM BLK BHD MNT 3/8 CTR	191-1003	
6	1	50-239 UHF CONNECTOR 2 HOLE MOUNT	194-1006	1
7	3	4-40 X 3/8" PAN HD SCREW PHILLIPS	301-1108	
8	16	6-32 X 1/4" PAN HD SCREW PHILLIPS	301-1204	
10	6	6-32 X 1/2" PAN HD SCREW PHILLIPS	301-1212	
11	3	4-40 HEX NUT	302-1005	
13	6	6-32 HEX NUT W/LOCKWASHER (KEPS)	302-6018	
14	5	#4 EXTERNAL TOOTH LOCKWASHER	303-1005	
15	16	#6 EXTERNAL TOOTH LOCKWASHER	303-1010	
16	4	6-32 X 3/4" HEX THREADED SPACER	304-1086	
17	1	#4 SOLDER LUG	306-1005	
F2	1	4 AMP, 250V, NON-TIME-DELAY FUSE	692-1021	
18	12	22 AWG PVC HOOK-UP WIRE, WHITE	931-1001	2
19	4	6-32 X 5/16" PAN HD SCREW PHIL NYL	301-1257	
20	36	RG-174/U COAXIAL CABLE	933-1019	2
21	2	1/8" PVC SHRINKABLE TUBING, BLACK	936-1024	2
22	10	6" SELF-LOCKING NYLON TIE-WRAP	937-1004	
23	2	1" ADHES BASE TIE-WRAP HOLD-DOWN, NY	937-1012	
24	1	18 AWG 3-COND POWER CORD, GRAY VINYL	939-1003	
25	1	STRAIN RELIEF BUSHING 18-3, .125 PNL	939-1022	
26	4	6-32 X 3/8" HEX THREADED SPACER	304-1078	
27	2	1.013" X .487" L BRACKET	305-1018	
28	2	.330"L X 1/8" D BLIND RIVET ST AVEX	307-1013	
29	1	OCTAL SOCKET, OPAMP LABS	122-1003	
30	8	22 AWG PVC HOOK-UP WIRE, GREEN	931-1004	2
31	7	22 AWG PVC HOOK-UP WIRE, BLUE	931-1006	2
32	9	22 AWG PVC HOOK-UP WIRE, ORANGE	931-1008	2
33	5	22 AWG 2-COND, SHIELDED AUDIO CABLE	932-1002	2
34	6	1/8" AWG TEFLON TUBING, CLEAR	936-1008	2
35	4	#6 TINNED NUT	302-3010	
36	1	MOUNTING BRACKET, OPAMP LABS	122-1004	
R38	1	12K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2147	
R44	1	5.1K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2138	
R45	1	1.5K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2125	
R46	1	56 OHM, 5W, 5% RESISTOR, WIREWND	765-1250	
C36	1	.1 MFD CER DISC CAP 50V	174-1254	
D11	1	1N34A GERMANIUM SIGNAL DIODE	781-1001	
R49	1	220 OHM, 2W, 5% RESISTOR, MET OXIDE	763-4105	
R50	1	10K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2145	
R51	1	4.7K OHM, 1/2W, 5% RESISTOR, CARB FILM	762-2137	
C40	1	330 MFD AL CAP RAD 6.3V -10/+50 %	172-1140	
C41	1	100 MFD AL CAP RAD 25V -10/+50 %	172-1117	

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L P B P A R T S L I S T

AM-30 TIS FINAL ASSEMBLY

ASSY NO. 6047-A

PAGE 2

DATE 2/21/90

SUPERCEDES 9/22/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
C42	1	10 MFD AL CAP RAD 35V -10/+50 %	172-1051	
A6	1	MODEL 37 LIMITER, OPAMP LABS	122-1002	
FL1	1	LOW PASS AUDIO FILTER(CC-1030-3000)	124-1001	
SA	1	150-300VDC SURGE ARRESTOR	697-1010	

NOTES:

1. REMOVE PAINT INSIDE CHASSIS UNDER MOUNTING HARDWARE
2. QUANTITY EQUALS LENGTH IN INCHES.

L P B P A R T S L I S T

AM-30 TIS EXCITER BOARD ASSEMBLY

ASSY NO. 6049-F

PAGE 1

DATE 3/24/88

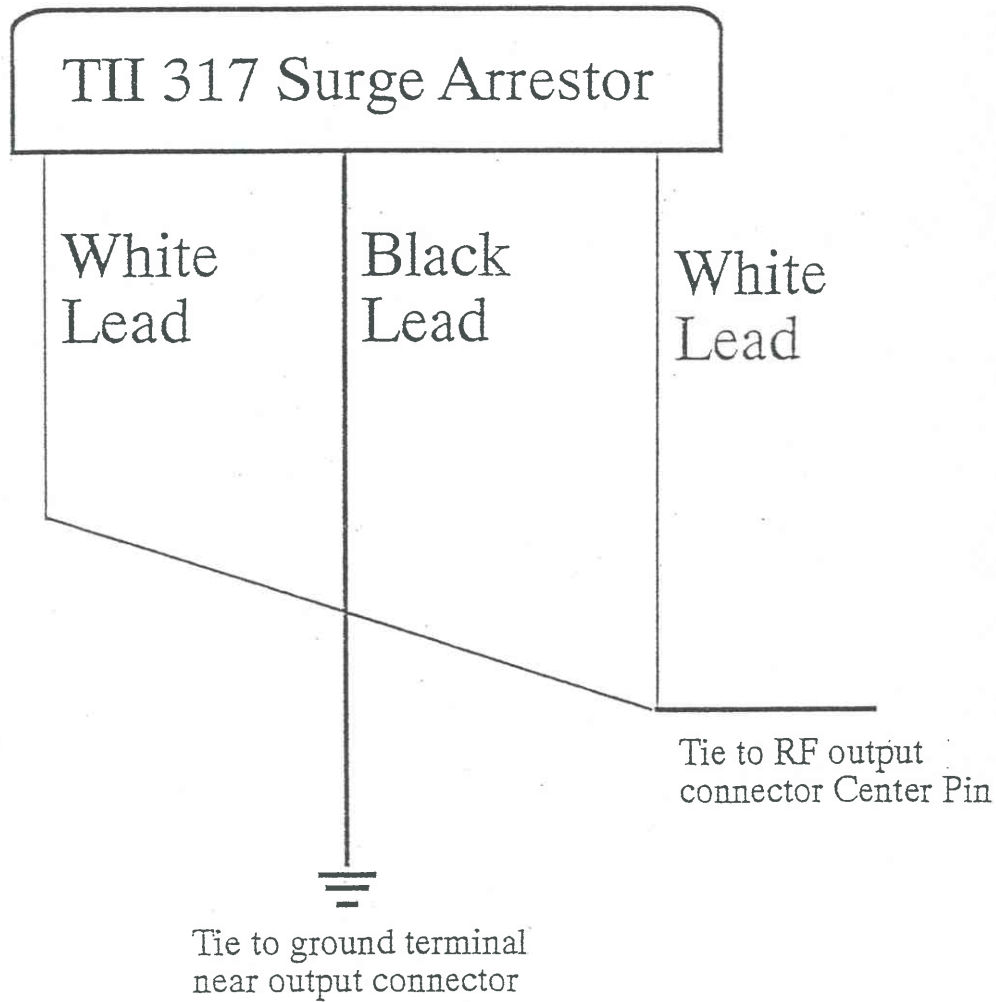
SUPERCEDES 1/5/88

SYMBOL	QTY	DESCRIPTION	PART	NOTES
1	1	AM-30/60/100 EXCITER BOARD ASSEMBLY	6010-F	
R48	1	10K OHM TRIMPOT, HORZ MNT, THMWHL ADJ	775-1135	
C39	1	1.0 MFD AL CAP RAD 50V -10/+75 %	172-1007	
C43	0		-	1
C46	0		-	2
L1	1	2 UH VAR COIL PC MOUNT VERTICAL	185-1001	
L1	-1	330UH FERRITE CORE COIL-MOLDED	184-1330	3

NOTES:

- .033 MFD FILM CAP (175-1055) FOR 530 KHZ
3900 PF DIP MICA (171-1221) FOR 1610 KHZ
- .01 MFD CERAMIC DISC CAP 100V (174-1217) FOR 530 KHZ
NOT USED FOR 1610 KHZ
- REMOVE 330 UF FERRITE CORE COIL- MOLDED (184-1330)

Installation Diagram for TII Surge Arrestor into LPB AM Transmitters



LPB[®]

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§ 90.242 Travelers' information stations.

(a) The frequencies 530 through 1700 kHz in 10 kHz increments may be assigned to the Public Safety Pool for the operation of Travelers' Information Stations subject to the following conditions and limitations.

(1) For Travelers' Information Station applications only, eligibility requirements as set forth in § 90.20(a) are extended to include park districts and authorities.

(2) Each application for a station or system shall be accompanied by:

(i) A statement certifying that the transmitting site of the Travelers Information Station will be located at least 15 km (9.3 miles) measured orthogonally outside the measured 0.5 mV/m daytime contour (0.1 mV/m for Class A stations) of any AM broadcast station operating on a first adjacent channel or at least 130 km (80.6 miles) outside the measured 0.5 mV/m daytime contour (0.1 mV/m for Class A stations) of any AM broadcast station operating on the same channel, or, if nighttime operation is proposed, outside the theoretical 0.5 mV/m-50% nighttime skywave contour of a U.S. Class A station. If the measured contour is not available, then the calculated 0.5 mV/m field strength contour shall be acceptable. These contours are available for inspection at the concerned AM broadcast station and FCC offices in Washington, DC.

(ii) In consideration of possible cross-modulation and inter-modulation interference effects which may result from the operation of a Travelers Information Station in the vicinity of an AM broadcast station on the second or

third adjacent channel, the applicant shall certify that he has considered these possible interference effects and, to the best of his knowledge, does not foresee interference occurring to broadcast stations operating on second or third adjacent channels.

(iii) A map showing the geographical location of each transmitter site and an estimate of the signal strength at the contour of the desired coverage area. For a cable system, the contour to be shown is the estimated field strength at 60 meters (197 feet) from any point on the cable. For a conventional radiating antenna, the estimated field strength contour at 1.5 km (0.93 mile) shall be shown. A contour map comprised of actual on-the-air measurements shall be submitted to the Commission within 60 days after station authorization or completion of station construction, whichever occurs later. A sufficient number of points shall be chosen at the specified distances (extrapolated measurements are acceptable) to adequately show compliance with the field strength limits.

(iv) For each transmitter site, the transmitter's output power, the type of antenna utilized, its length (for a cable system), its height above ground, distance from transmitter to the antenna, and the elevation above sea level at the transmitting site.

(3) Travelers Information Stations will be authorized on a secondary basis to stations authorized on a primary basis in the bands 510-535 and 1605-1715 kHz.

(4) A Travelers Information Station authorization may be suspended, modified, or withdrawn by the Commission without prior notice of right to hearing if necessary to resolve interference conflicts, to implement agreements with foreign governments, or in other circumstances warranting such action.

(5) The transmitting site of each Travelers' Information Station shall be restricted to the immediate vicinity of the following specified areas: Air, train, and bus transportation terminals, public parks and historical sites, bridges, tunnels, and any intersection of a Federal Interstate Highway with any other Interstate, Federal, State, or local highway.

(6) A Travelers Information Station shall normally be authorized to use a single transmitter. However, a system of stations, with each station in the system employing a separate transmitter, may be authorized for a specified area provided sufficient need is demonstrated by the applicant.

(7) Travelers Information Stations shall transmit only noncommercial voice information pertaining to traffic and road conditions, traffic hazard and travel advisories, directions, availability of lodging, rest stops and service stations, and descriptions of local points of interest. It is not permissible to identify the commercial name of any business establishment whose service may be available within or outside the coverage area of a Travelers Information Station. However, to facilitate announcements concerning departures/arrivals and parking areas at air, train, and bus terminals, the trade name identification of carriers is permitted.

(b) *Technical standards.* (1) The use of 6K00A3E emission will be authorized, however NON emission may be used for purposes of receiver quieting, but only for a system of stations employing "leaky" cable antennas.

(2) A frequency tolerance of 100 Hz shall be maintained.

(3) For a station employing a cable antenna, the following restrictions apply:

(i) The length of the cable antenna shall not exceed 3.0 km (1.9 miles).

(ii) Transmitter RF output power shall not exceed 50 watts and shall be adjustable downward to enable the user to comply with the specified field strength limit.

(iii) The field strength of the emission on the operating frequency shall not exceed 2 mV/m when measured with a standard field strength meter at a distance of 60 meters (197 feet) from any part of the station.

(4) For a station employing a conventional radiating antenna(s) (ex. vertical monopole, directional array) the following restrictions apply:

(i) The antenna height above ground level shall not exceed 15.0 meters (49.2 feet).

(ii) Only vertical polarization of antennas shall be permitted.

(iii) Transmitter RF output power shall not exceed 10 watts to enable the user to comply with the specified field strength limit.

(iv) The field strength of the emission on the operating frequency shall not exceed 2 mV/m when measured with a standard field strength meter at a distance of 1.50 km (0.93 miles) from the transmitting antenna system.

(5) For co-channel stations operating under different licenses, the following minimum separation distances shall apply:

(i) 0.50 km (0.31 miles) for the case when both stations are using cable antennas.

(ii) 7.50 km (4.66 miles) for the case when one station is using a conventional antenna and the other is using a cable antenna.

(iii) 15.0 km (9.3 miles) for the case when both stations are using conventional antennas.

(6) For a system of co-channel transmitters operating under a single authorization utilizing either cable or conventional antennas, or both, no minimum separation distance is required.

(7) An applicant desiring to locate a station that does not comply with the separation requirements of this section shall coordinate with the affected station.

(8) Each transmitter in a Travelers Information Station shall be equipped with an audio low-pass filter. Such filter shall be installed between the modulation limiter and the modulated stage. At audio frequencies between 3 kHz and 20 kHz this filter shall have an attenuation greater than the attenuation at 1 kHz by at least:

$60 \log_{10} (f/3)$ decibels.

where "f" is the audio frequency in kHz. At audio frequencies above 20 kHz, the attenuation shall be at least 50 decibels greater than the attenuation at 1 kHz.

[43 FR 54791, Nov. 22, 1978; 44 FR 67118, Nov. 23, 1979; 49 FR 48712, Dec. 14, 1984, as amended at 54 FR 39740, Sept. 28, 1989; 56 FR 64874, Dec. 12, 1991; 62 FR 18928, Apr. 17, 1997]

EFFECTIVE DATE NOTE: At 62 FR 18928, Apr. 17, 1997, § 90.242 was amended by revising the introductory text of paragraph (a) and revising paragraph (a)(1), effective Oct. 17, 1997.