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6/85

BA-75 75WATT 136-174MHz AMPLIFIER (OR 65WATT FOR 216-240MHz)

1.0 INTRODUCTION

- 1.1 The BA-75 is a solid state 75 Watt RF Power Amplifier designed for the 136-174MHz range. (A 65 Watt 216-230 MHz version is also available.) It is used to increase transmitter output power in a wide variety of applications such as repeaters, base or mobile transceivers, link or paging transmitters, etc. The BA-75 uses two emitter ballasted transistors for high reliability, greatest resistance to high VSWR damage, and better heat distribution than a single device amp. The unit is supplied as part of a complete 75W transmitter, or as an amp board only - complete with heat sink. Included on the board is a Relative Power Output Sensor which can be used to drive a 1mA DC meter, and a triple section Low Pass Filter which provides about 65dB of harmonic rejection.

2.0 BA-75 BOARD INSTALLATION

- 2.1 Choose a suitable mounting surface for the amplifier/heat sink assembly. The preferred mounting surface is an outside vertical wall of a housing which is .062 to .090" thick. Be sure the heat sink is not located in a confined area, (which would restrict the flow of cooling air). Orient the heat fins vertically.
- 2.2 Use Figure 1 as a drilling template to locate the correct positions for the board mounting holes. Position the template over the desired mounting area on the outside (fin side) surface, and center punch the 6 holes through the drawing. Drill the holes as indicated on the drawing.
- 2.3 Insert the four #4-40 mounting screws through the board from the component side, and put a .090" spacer on the opposite side of the board. (Be sure to use silicon grease under the flanges of the 2 transistors for good heat sinking!!)
- 2.4 Locate the board on the inside of the mounting surface so that the transistor studs and the four screws go through their respective holes. The board is designed such that the hole at J605 will mount directly over a S0239 jack for RF Output. The center pin of the jack protrudes through hole J605 and is connected to RF Output pad E211 with a very short and direct piece of heavy solid wire. (Appx. 3/8" of #14 buss bar recommended.)

If this method is not used, connect a short length of RG58/U coax from E211 to your RF Output connector. (S0239, Type N, or BNC recommended.) Locate the heat sink on the outside of the housing and tighten the screws firmly into the heat sink assembly. Put the 8-32 nuts on the transistor studs, and tighten snugly. (10 in-lbs of torque.) Do Not overtighten the nuts or the transistor studs will snap off!!

- 2.5 Connect a heavy wire (#14 typ.) from E204 to the source of +13.8VDC @ 9A nom. (Usually a feed-through cap.)
- 2.6 Connect a wire from pad E208 (at the trim pot) to the + side of a 1mA Meter. Connect the - side of the meter to ground. (Delete if a Relative Output Meter is not to be used.)
- 2.7 Using 50 ohm coax, connect your source of RF Drive to terminal E210. Connect the shield to the ground plane foil nearby. (Keep coax pigtails short - ¼" max.)

3.0 TUNE UP AND OPERATION

- 3.1 Energize the power supply and apply RF drive - (10W nom). Tune the 2 trim caps for maximum output. Current draw will normally be about 8-9.2 Amps @ 13.8VDC for 75 Wts. output (65W on 220MHz.) Currents much in excess of 9.5 Amps indicate an abnormality, and should be avoided in prolonged service. Sometimes the output coils can be squeezed or stretched slightly for maximum output in your system. The final adjustment on the output trimmer C283A should be in a clockwise direction, and peaked for max output consistent with minimum current. (Max Efficiency.) Often this trimmer can be adjusted so that a large current savings can be had at the loss of only a few watts of output power. This is highly desirable for maximum reliability. Note that BA-75s are pretuned and tested at the factory, but minor retuning may be required in your system.
- 3.2 The amplifier is designed to withstand VSWRs up to 3:1 for as much as 5 minutes. Although the amp uses the most rugged "emitter ballasted" transistors available, it was not designed to withstand open or shorted load conditions, (although it may do so for very short periods). A good 50 ohm load must always be connected to the output before transmitting!
- 3.3 After the amp is tuned for best performance, adjust trim pot R247 for the desired reading on the relative output 1mA meter (if used). (Typically, 8 on a scale of 0 to 10.)

4.0 IMPORTANT! - VSWR

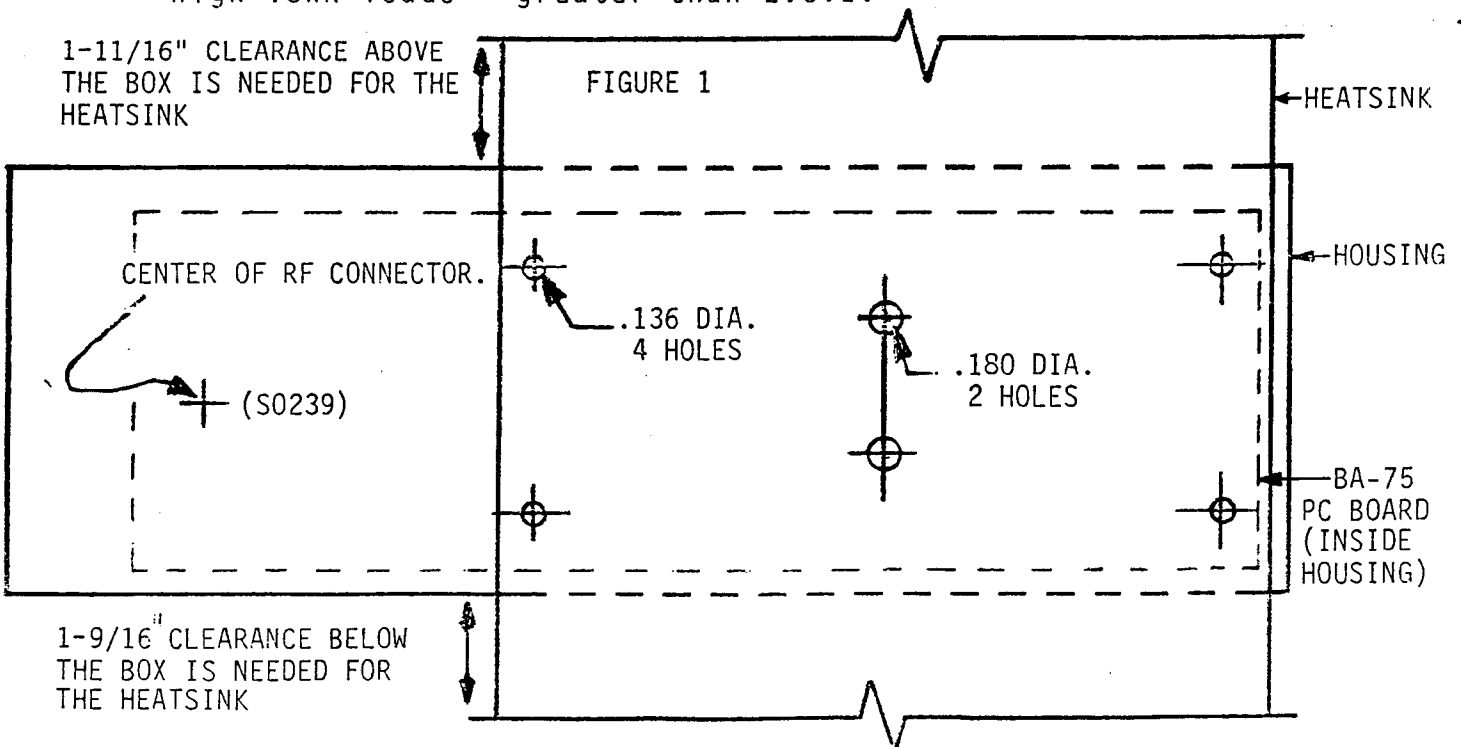
4.1 For maximum operating life and best reliability, be sure that the load VSWR does not exceed 1.5:1. When using a duplexer, this is the VSWR looking into the duplexer's "TX" input. Also, DO NOT TUNE the duplexer while transmitting at full 75 watt level, since extremely high VSWR loads can be presented to the amp when the duplexer is "de-tuned". A high VSWR load could cause damage to the output circuitry if the transmitter is left keyed for prolonged periods.

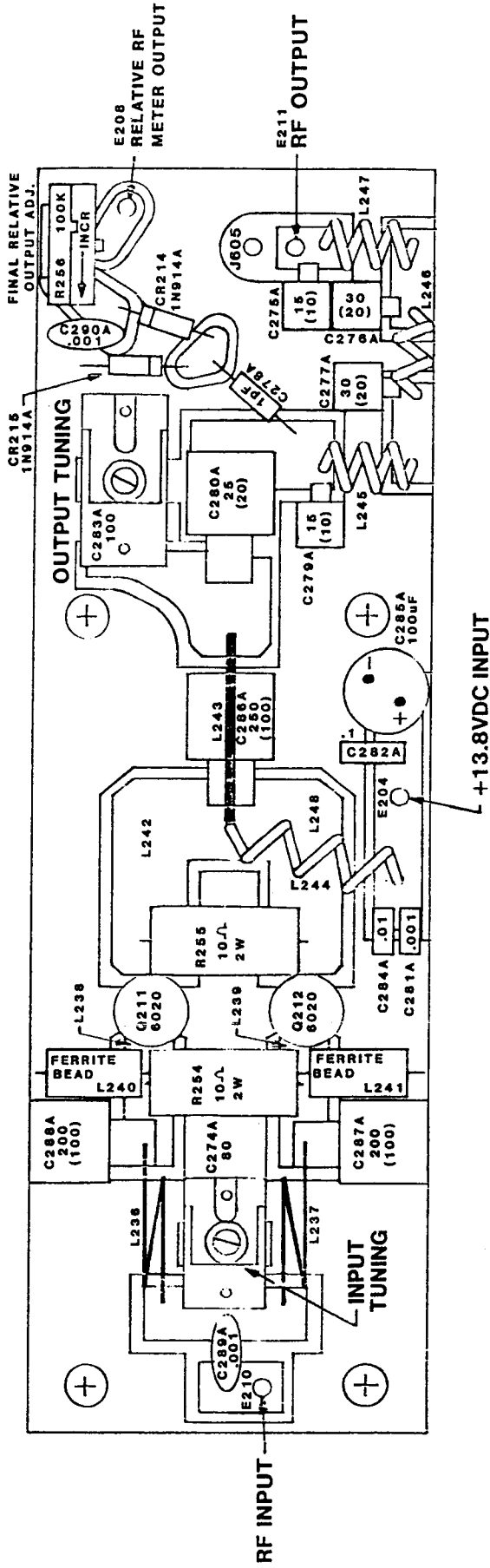
5.0 IMPORTANT! - COOLING

5.1 This amplifier was designed for use with an external cooling fan, positioned to provide airflow over the heat sink. (A minimum of 100 ft³/minute is recommended.) The unit may be operated without the fan for short periods, (maximum 15 min. on with 30 min. cool down). Of course with the fan maximum transmit time is unlimited, (100% duty cycle). An optional oversize heatsink is available for the BA-75. If it is used, then no fan is required.

6.0 LIMITED WARRANTY

6.1 The Warranty covers manufacturing defects for 100 days after receipt by the original purchaser. The warranty is voided if the cooling fan is not used or if the amp is operated into high VSWR loads - greater than 2.5:1.





NOTES:
 1) () DENOTES VALUE CHANGES FOR 216-230MHZ.
 2) POWER OUTPUT IS 60W MIN. FOR 216-230MHZ.

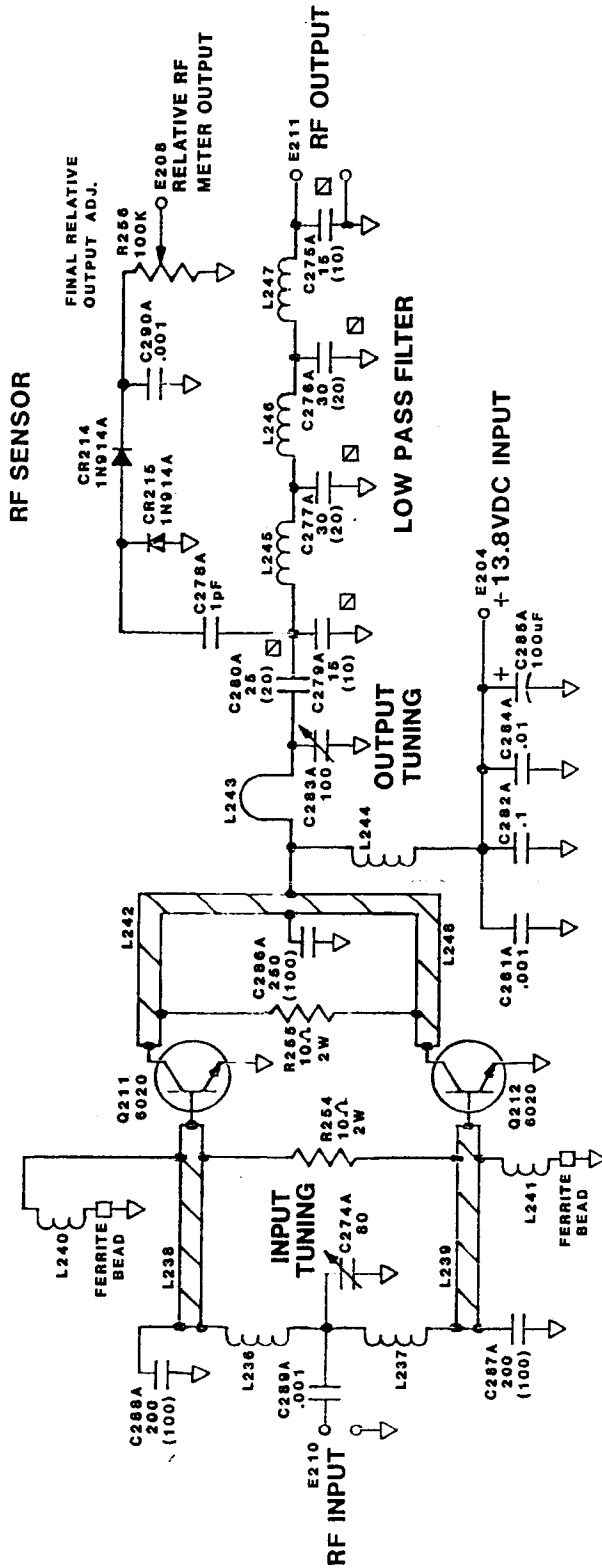
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APPROVED BY: *[Signature]*
 DRAWN BY: R.L.A.
 DATE: 7-21-80
 REVISED: 5-30-84

BA-75 AMP. LAYOUT

136-174 & 216-250MHZ
 DRAWING NUMBER 2200117

FIGURE 14



- NOTES:
- 1) □ INDICATES CHIP CAPS.
 - 2) () DENOTES VALUE CHANGES FOR 216-230MHZ.
 - 3) POWER OUTPUT IS 60W MIN. FOR 216-230MHZ.

SPECTRUM COMMUNICATIONS

APPROVED BY: *[Signature]* DATE: 7-22-80

DRAWN BY: R.L.A. REVISED: 5-30-84

BA-75 AMP. SCHEMATIC

136-174 & 216-250MHZ

DRAWING NUMBER 2200119

FIGURE 13