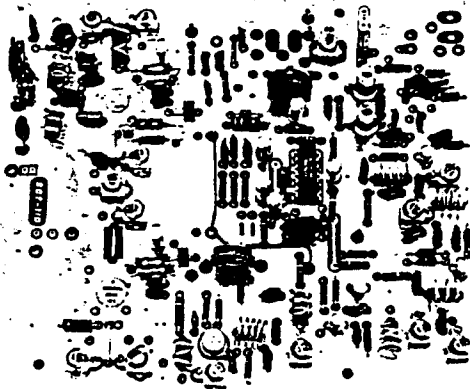


# SCT110 & SCT410B

VHF & UHF FM OR FSK TRANSMITTERS & POWER AMPS  
BOARDS, HOUSING ASSY., OR RACK MOUNT

VHF: 6, 10, 30 or 75 Watts

UHF: 2, 10 or 40 Watts



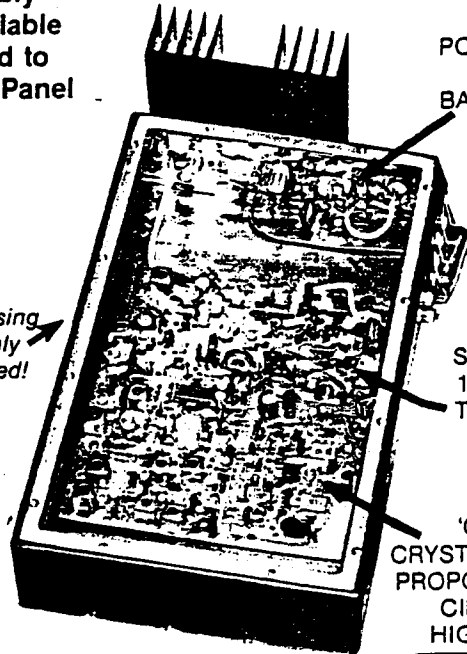
SCT110 BOARD — 6 OR 10W

## APPLICATIONS

- Repeaters
- Security Systems
- RF Links
- Special Applications
- Telemetry

Assembly  
also available  
mounted to  
19" Rack Panel

Shown in  
Shielded Housing  
Assy. - Highly  
Recommended!



POWER AMP. BD.  
& HEATSINK  
BA30, BA40, BA75

SCT410B 2 OR  
10 WATT UHF  
TRANSMITTER/  
EXCITER  
BOARD

'ON BOARD'  
CRYSTAL OSCILLATOR/  
PROPORTIONAL OVEN  
CIRCUIT - FOR  
HIGH STABILITY!

The Spectrum SCT110 & SCT410B Transmitters are solid-state 2 to 10 watt units which are available either as a board (only), or as a complete shielded Transmitter/Housing Assembly. These units embody years of experience in transmitter design and were specifically developed for applications such as Repeater Exciters, RF Links (Voice or Data), etc. The boards include Audio Amplifier/Clipper-Filter, Oscillator, FM Modulator, Multiplier, Driver and Final Amp Stages all on one G-10 Military Grade Board, along with DC Switching, and Voltage Regulator Circuitry. They have been carefully designed to be extremely low in transmitter RF noise and other spurious. Multiplication of the crystal frequency is kept to a minimum in order to keep these emissions as low as possible.

The entire top side of the PC board is copper "ground plane" which provides excellent grounding for all stages and a measure of shielding for the signal traces on the other side of the board. This technique provides excellent transmitter stability and optimum overall performance even over wide temperature ranges. Only the highest quality components and construction techniques are used throughout.

The FM Modulator has been designed for very low distortion. The "On the Air" sound of these transmitters is excellent in quality, and in Repeater/Link applications with a low distortion receiver, the retransmitted audio sounds like "direct copy." The transmitters are normally supplied in a single channel configuration, but the SCT110 may be modified for operation on

up to 3 frequencies. A 2 channel version of the SCT410B is available. A NRZ-FSK Modulator can be supplied instead of the Analog Modulator.

Also included "on board" the SCT410B is a unique solid-state Proportional Crystal Oscillator/Oven Circuit which maintains all of the critical oscillator and associated components at  $+65 \pm 3^\circ\text{C}$  nom. Insulating foam is used above and below the heated portion of the board to isolate all critical components from ambient temperature variations. This arrangement assures high frequency stability over a wide temperature range. *For the ultimate in stability, the OS-18 shielded Oscillator/Oven Module may be used with either exciter.* It is one of the highest stability oscillators available on the market today! Crystals for it are specially baked and aged to assure minimum drift.

The BA30 & BA75 VHF and BA40 UHF Final Amplifier boards were designed to be directly driven by the SCT110 and SCT410B respectively. The BA30 will deliver 30 watts output; the BA75 75 watts; and the BA40 40 watts output. A very rugged and efficient emitter ballasted transistor is used, and it should provide many years of reliable service. The amps will operate at 100% Continuous Duty Cycle when used with our recommended heat sinking - aluminum housing, plus finned heat sink (supplied). A multi-section Low Pass Filter is "built-in", along with a Relative Power Output Sensor circuit, (which can be used to drive a front-panel 1mA DC meter). These features are also included on the SCT110 & SCT410B.



**SPECTRUM COMMUNICATIONS CORP.**

1055 W. GERMANTOWN PIKE NORRISTOWN, PA. 19403-3924 U.S.A.  
(215) 631-1710 FAX: (215) 631-5017

# PERFORMANCE SPECIFICATIONS

	<b>SCT110 VHF EXCITER/TRANSMITTER</b>	<b>SCT410B UHF EXCITER/TRANSMITTER</b>
<b>FREQUENCY RANGE</b>	136-174MHz, 216-240MHz, 66-88MHz	406-512MHz
<b>POWER OUTPUT @ 13.8VDC</b>	10 W nom. (5 W nom. 66-88MHz.) Or 6 W nom. to drive BA-30 Amp.	10 W nom. 8 W min. from 406-470MHz (7 W min. above 470MHz.) Or 2 W nom. Unit
<b>CURRENT DRAW</b>	1.5A typ. @ +12-14VDC (10 W Unit) <1A typ. (6 W Unit)	1.75-2.3A typ. @ +12-14VDC (10 W Unit). 0.5A nom. (2 W unit)
<b>MODULATION</b>	"True FM" for the ultimate in audio quality. Low Distortion Modulator with instantaneous deviation limiting and four section audio low pass filter for minimum FM sideband energy. <b>FSK Available.</b>	
<b>AUDIO INPUT IMPEDANCE</b>	25K $\Omega$ nom.	25K $\Omega$ nom.
<b>AUDIO DISTORTION</b>	<2% typ.	<2% typ.
<b>DEVIATION</b>	Adjustable up to $\pm 7$ KHz. Factory set to $\pm 5$ KHz max peak deviation. Pre-emphasis: 6dB/Octave, per EIA specs.	
<b>SPURIOUS</b>	-75dB nom., -70dB min.	-75dB nom., -65dB min.
<b>HARMONICS</b>	-65dB min.	-60dB min., -65dB typ.
<b>TRANSMITTER RF NOISE</b>	-90dB min. @ $\pm 600$ KHz	-90dB min. @ $\pm 5$ MHz
<b>FREQUENCY STABILITY</b>	$\pm 0.001\%$ nom. -10 to +60°C.	$\pm 0.00025\%$ Max. from -30 to +60°C.
<b>ALSO AVAILABLE WITH OPTIONAL ULTRA-HIGH STABILITY PROPORTIONAL CRYSTAL OSCILLATOR/OVEN MODULE (OS-18). (<math>\pm 0.0002\%</math> MAX. -30 TO +60°C.)</b>		
<b>FINAL STAGE</b>	Infinite VSWR protected for up to 1 min. No shutdown required.	
<b>CRYSTAL INFORMATION</b>	(136-174MHz & 66-88MHz) Crystal $F_o = \frac{\text{Transmit Freq.}}{8}$	Crystal $F_o = \frac{\text{Transmit Freq.}}{24}$
	(216-240MHz) Crystal $F_o = \frac{\text{Transmit Freq.}}{12}$	
	Fundamental Mode. Parallel Resonant, 32pF Load Capacity. 25 $\Omega$ or less at resonance. HC-25/U Case. Tolerance: $\pm 0.0005\%$ (-10 to +60°C.)	Fundamental Mode. Parallel Resonant, 32pF Load Capacity. 25 $\Omega$ or less at resonance. HC-18/U Case. Temperature Tolerance: $\pm 0.0005\%$ (+35 to +75°C.) Note: Oven Crystal must be specially calibrated for operation @ +55°C.
<b>CRYSTAL SIZE</b>	One $\pm 0.0005\%$ High Stability, Precision Grade Crystal supplied. (Highest quality available!) Board: 5" x 6". SHTX-1 Housing: 10" x 6" x 2 $\frac{5}{16}$ ". (W/O Connector, Ht. Sink & F.T. Caps)	

	<b>BA-30 (136-174MHz) &amp; BA-20 (216-240 MHz) VHF 30 WATT AMPLIFIER BOARDS</b>	<b>BA-75 VHF 75 WATT AMPLIFIER BOARD</b>	<b>BA-40 UHF 40 WATT AMPLIFIER BOARD</b>
<b>POWER OUTPUT @ 13.8VDC</b>	30 W min. 136-174MHz, 216-240 MHz & 66-88MHz.	75 W min. 136-174MHz 65 W nom. 216-230MHz	40 W nom., 35 W min. (406-470MHz). 30 W min. above 470MHz.
<b>RF DRIVE REQUIREMENTS</b>	6 W nom. @ 136-174MHz, 5 W nom. @ 66-88MHz. 10 W nom. @ 216-240MHz.	10 W nom. @ 136-174MHz 10-12 W typ. @ 216-230MHz	10 W nom.
<b>DC CURRENT DRAW @ 13.8VDC</b>	3.5A nom.	9.0A nom.	5A nom.
<b>HARMONICS</b>	-60dB min., -65dB typ.	-60dB min., -65dB nom.	-60dB min., -65dB typ.
<b>DUTY CYCLE</b>	100% Continuous - With recommended heat sink.	100% Continuous - With recommended heat sink.	Same as VHF units.
<b>HIGH VSWR</b>	Amp. Transistor is the balasted emitter type and will withstand up to 20:1 VSWR for up to 1 min. No shutdown required.		
<b>SIZE</b>	Board: 2" x 4". Heat Sink: 5 $\frac{1}{4}$ "H x 4"W	Board: 1 $\frac{7}{8}$ " x 6 $\frac{7}{8}$ ". Heat Sink: 5 $\frac{1}{4}$ "H x 4"W (Requires Opt. cooling fan). <small>Opt. Oversize Heat Sink Available. No fan required.</small>	Board: 2" x 4 $\frac{1}{2}$ ". Heat Sink: 5 $\frac{1}{4}$ "H x 4"W

**SPECIFY MODEL NUMBER AND FREQUENCY. AMP. HEAT SINK IS SUPPLIED, PLUS MOUNTING HARDWARE.**

**UNITS IN SHIELDED HOUSING ARE FCC TYPE ACCEPTED FOR COMMERCIAL SERVICE PARTS 21, 22, 74, 81, 90, 95. (OS-18 MODULE REQUIRED FOR VHF COMMERCIAL UNITS.)**

For repeater application boards must be mounted in a tightly shielded box. (Spectrum Communications Custom Transmitter Housing SHTX-1 recommended). Feed through capacitors (APX 1000pF) must be used for ALL DC and audio lines entering through the box (except ground). A UHF or Type N connector is recommended for RF output.



## SCT110 TRANSMITTER MANUAL

5/85

### 1.0 TUNE-UP AND ADJUSTING POWER OUTPUT

- 1.1 Each board is carefully adjusted at the factory for minimum spurious and maximum power output. In some cases however, it may be necessary to "tweak" the output network for optimum performance with the exact antenna or power amplifier in use. The two trimmer capacitors, C252 and C253, near the final amplifier Q208 may be adjusted for this purpose. In most applications, the trimmers will be carefully adjusted for maximum output power consistent with minimum current. In some applications, however, it might be desired to reduce the power output slightly. The best way to achieve small power reductions is to adjust C252 and C253. Turn these trimmers in the direction which produces the maximum drop in current consumption, consistent with the desired power output. For 10W 136-174MHz units, another way to reduce output is to ~~move R269's tap point on L231.~~ Unsolder the resistor's lead from L231, and resolder it about 0.1" down the loop, away from Q208. (The further the tap point from Q208's base, the lower the output.) Retune all of the trim caps around Q208's base and collector after each tap point setting. (Note: not all versions of the SCT110 use R269, the "base loading resistor" - although it can be added. 10 ohm,  $\frac{1}{2}$  Watt, carbon comp.) For 216-250MHz units, power output can also be adjusted down to about 5 watts by adding a 10 Wt. W.W. resistor in series with Q207's and Q208's collector B+ leads. In this case, solder the resistor between pads E205 and E212, ( $\frac{1}{2}$ " up off board); and remove the jumper wire that was there. (Retain the E212 to E213 jumper.) Then, retune all of the trim caps associated with the last 2 stages. On 136-174MHz units - if the SCT110 is used to drive the BA30 30 Watt Amp., a 7 Wt. version of the SCT110 is used.

The Spectrum PCB-1 Power Control Board is available to continuously vary power output from 10W down to as low as 1W output. This is highly recommended where adjustable output is required, or where it is desired to switch from high to low power output.

### 2.0 INTERCONNECTIONS - SEE COMPONENT LAYOUT DRAWING FOR MOUNTING INFO. - SEE SECTION 6

- 2.1 DC INPUT: Terminal E205 is the main 13.8VDC Input. (Appx. 1.5A.)
- 2.2 PTT - Terminal E203. This terminal is used to "key" the transmitter by connecting it to ground. Whatever device is used to switch this terminal should be able to "sink" up to 25mA. The terminal voltage must be allowed to rise to the full supply voltage to turn the transmitter off. (A small switching transistor such as 2N2222A may be used to switch this point, or a relay, manual switch, etc.)

- 2.3 RF OUTPUT - E214 at rear corner of board. Solder coax shield to P.C. board topside 'ground plane' adjacent to E214. (Keep coax 'pigtailed' short -  $\frac{1}{4}$ " max.)
- 2.4 AF INPUT - E201 - High Impedance, 25K ohm. (Additional AF Inputs may be coupled-in through 20K ohm (or greater) resistors in parallel with the main AF Input. Use shielded wire into this terminal - connect shield to P.C. board ground plane.
- 2.5 SUB-AUDIBLE TONE INPUT - Terminal E202. For CTCSS sub-audible tones only. (Less than 200Hz.)
- 2.6 GROUND - Solder a ground wire to the top (ground-plane) side of the P.C. board.
- 2.7 RELATIVE OUTPUT METER - Terminal E207. To 1mA DC Meter. (Optional.)

### 3.0 MODULATION

- 3.1 Audio Input Level to this board is adjusted by means of R218 the AF Input Level Adjust Pot. The function of this pot is similar to that of the "mic gain" control found on many transceivers in that it adjusts the amount of audio "clipping" of the transmitted signal. The deviation control on the board sets the absolute max peak deviation and is normally factory set for 5KHz max. (This prevents overdeviation of the transmitter regardless of the audio input level.) For Repeater service, the Audio Input Level control should be adjusted so that a signal into the repeater receiver (deviated 4KHz) deviates the repeater transmitter to just 4KHz also. This will keep the transmitter audio stages out of clipping and will result in lowest possible system distortion. In this manner, only overdeviated received signals will drive the transmitter into clipping - thus preventing overdeviation of the repeater transmitter. Remember - all signals coming into the repeater are already speech processed. Any further processing (clipping) only results in needless distortion. The deviation level of any Tones should be kept well below the 'clipping' point. Normal deviation for DTMF Tones is apx. 3.5KHz; and 0.5KHz for CTCSS Tones.

- 3.2 If desired, the audio response (Pre-emphasis) of this board may be "custom tailored" by changing the value of C201, (0.005uF normally). For more "lows" (bassy sound), increase the value of C201. The smaller the capacitor value, the less "lows" and more "highs". Normally, this should not be required, as the pre-emphasis is near perfect. (6dB/octave.) Typical AF Input level for 5KHz deviation is 100mVp-p min. for a 1KHz tone.

#### 4.0 THEORY OF OPERATION

- 4.1 Initial FM signal generation is accomplished at Q202 and its supporting circuitry. This stage is a modified Clapp oscillator with the 18MHz crystal operating on the inductive slope of its parallel resonance curve. The collector circuit of Q202 is resonated at the second harmonic of the crystal frequency (third harmonic on 216-250MHz versions) by a double-tuned filter, and is applied to the base of Q203, a frequency doubler. FM modulation is affected by "modulating" the crystal load capacitance with varactor diode CR203. A steady-state DC bias for CR203 is provided by R217, and the modulating audio signal is superimposed on this voltage through C209.
- 4.2 Modulating Audio for CR203 is pre-emphasized by R203 and C201, and is applied to IC201A where it is amplified by a factor of about 10. The output of IC201A is applied to "back-to-back" diodes CR201 and CR202 which cause the audio signal to be limited to a maximum value of about 1.4Vpp. The limited audio signal is next applied to a 3 section RC lowpass filter which removes most of the high order harmonic distortion produced by the limiting process. The output of the lowpass filter is fed to IC201B for further amplification, and is finally connected to the varactor modulator through Deviation Pot R212.
- 4.3 The RF drive to Q203, now at 37MHz (55MHz in 220MHz versions), is doubled in frequency and is filtered by another double tuned circuit before being applied to the base of Q204. Q204 is another frequency doubler, and the 75MHz drive at its base (110MHz in 220MHz versions), is multiplied in the collector circuit to the 150MHz range (220MHz), the final output frequency. The signal is again filtered in a double-tuned circuit, and is fed to the base of pre-driver Q205. The signal is further amplified by Q206, and is applied as drive to the Class "C" amplifier chain consisting of Q207 and Q208. (For 136-174MHz units, the output from Q206 is applied directly to Q208, and Q207 is not used. Power output from Q208 in this case is about 6-7W to drive the BA-30 Amp., or 10 watts for other applications.)

The output of Q208 (about 10-12 watts in 220MHz versions) is finally applied to a 2 section harmonic filter, and is routed to the RF output of the board. A sample of the RF output from Q208 is picked off before the harmonic filter, and is rectified by CR205 and CR206 to drive a Relative Output meter - (if used).

- 4.4 The 13.8VDC input is applied directly to Class "C" stages Q207 and Q208, and also to audio stage IC201A. Oscillator stage Q202 is run continuously from a 9 volt zener diode regulator for maximum stability. Grounding the PTT input to Q201 causes Q201 to turn on, applying +13.5 volts to both frequency doubler stages and both pre-driver stages.

#### 4.5 BA-30 30 WATT AMPLIFIER OPTION

The RF output of the exciter board is next applied to the final amplifier board (if used). The final amplifier is Q209 (or Q210), an emitter ballasted RF power transistor. The power amplifier is designed to provide a nominal output of 30 watts in continuous service when operated with recommended heat sinking into a proper 50 ohm load. The power transistor is capable of withstanding open and shorted load conditions for short periods of time, but this should be avoided, since certain VSWR conditions can cause excessive heat buildup in the amplifier and possible damage the device.

- 4.6 The output of the amplifier is passed through a 3 section (2 section on 220MHz) lowpass filter which greatly attenuates all harmonics. A diode rectifier provides a relative indication of RF output voltage which is sampled just ahead of the low-pass filter. R247 is set for a relative final output reading on an optional 1mA DC panel meter. (Spectrum #SM-10.)

#### 5.0 ALIGNMENT

If alignment is necessary, perform only the applicable steps below.

- 5.1 Observe the Exciter Current on a DC mA Meter, with no crystal installed, the unit should draw 125-200mA in the transmit mode.
- 5.2 Check operation of the audio processing stages by connecting an oscilloscope probe to the wiper of the Deviation Control R212. With an input at E201 from an external audio generator, the waveform should be a clean sine-wave, turning into square wave as the

input audio level is increased. Adjustment of the deviation control should produce up to 7-8 volts of peak to peak audio at this point. When proper operation of these stages has been confirmed, set the Deviation Control at its mid-point and check for the modulated signal on a Deviation Meter or a nearby receiver.

- 5.3 Install the crystal in its socket and key the transmitter. The indicated exciter current consumption should be noticeably higher, (about 1.2 Amp.@ 6W out, and about 1.6-2.2 Amp.@10W out for the 220MHz board). A VHF RF power meter (such as a Bird Model 43) connected to the antenna connector should now indicate some RF output. Tune all trimmer capacitors for maximum RF output. C278 in the input circuit of the 30W power amp. stage is adjusted for maximum drive to the device (indicated by final collector current), while C282 is adjusted for maximum power output consistent with good efficiency, (minimum collector current. Normally, CW adjustment). When tuning this stage and Q208, observe that tuning the output trimmer in one direction, (normally CCW), will cause a sharp rise in collector current with only a small change in output power. This indicates a decline in stage efficiency and should be avoided. When operating properly, the stage should draw 2.9 to 3.5 amps (at 13.8V) for 30W output, and, in no case should the stage collector current be allowed to exceed 3.5 amps. Always tune Q208 & Q209's collector caps for maximum output efficiency and minimum white noise. Don't hesitate to loose a watt or two of output if a large current savings or white noise reduction can be obtained. The reduced current will result in increased long term reliability!
- 5.4 Tuning a system Duplexer while the Transmitter is activated can cause very high VSWR conditions to be presented to the final amplifier stage. Always observe final collector current when tuning a duplexer, and keep transmissions short when VSWR conditions are high.
- 5.5 REPLACING TRANSMIT CRYSTAL: If the crystal is replaced and it cannot be zeroed on frequency, change the value of C269 near the crystal. If the TX frequency is too high, increase the value of C269. If it is too low, decrease the value of C269. (typical range: 30 to 200pF.) Always set Transmitter Deviation after setting a new crystal on frequency.

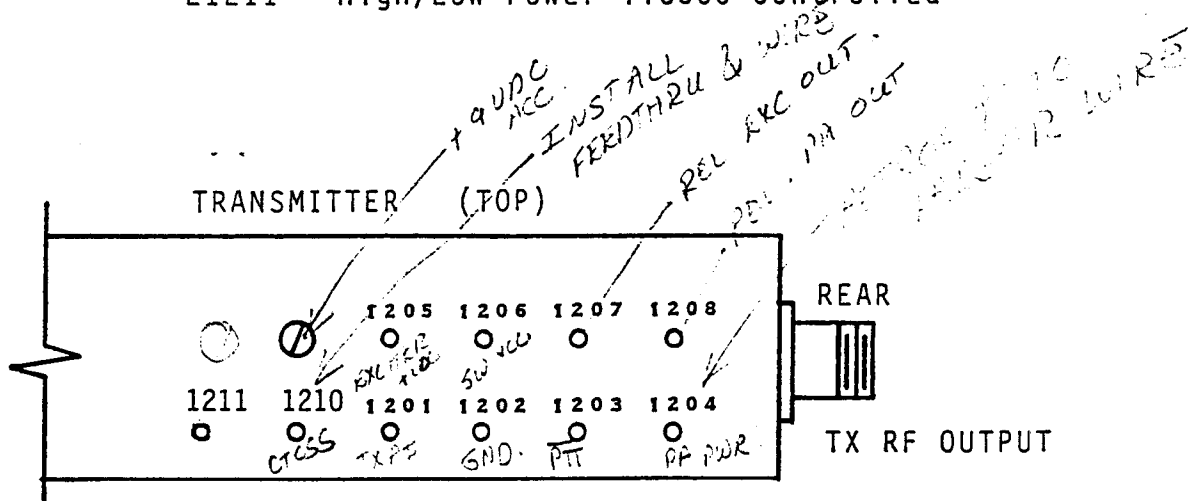
5.6 SETTING TRANSMITTER DEVIATION: In a Repeater Application set R218 near all of the way up. Apply a strong signal to the receiver input (100uV min.) modulated  $\pm 5\text{KHz}$  with a 1KHz tone. Set the DEVIATION Adj. pot (R212) for the desired max. deviation. (Typically 5KHz MAX.) Set the generator dev. for  $\pm 4\text{KHz}$ , and set the AF Input Level pot (R218) for 4KHz transmitter deviation.

TRANSMITTER FEED-THRU CAP NO'S.

EXCITER  
6.8 WATTS OUT @ 2.5

FOR SCT110 (& BA-30) IN SHIELDED HOUSING ASSEMBLY @ 15.33

- E1201 = A.F. Input,
- E1202 = Ground ✓
- E1203 = Transmit Enable, (PTT) ✓
- E1204 = Final DC Input, 13.8V PA POWER
- E1205 = Exciter DC Input, 13.8V
- E1206 = Transmit Light, (13V switched)
- E1207 = Exciter Relative Output
- E1208 = Final Relative Output
- E1209 = Not Used
- E1210 = CTCSS AF Input, (Option)
- E1211 = High/Low Power TTC300 Controlled



6.0 MOUNTING THE SCT110 BOARD

- 6.1 It is important that the exciter board be mounted on a metal surface, with the spacers provided. Be sure that the 4 mounting screws are securely tightened; but tighten the 8-32 hex nut on the final transistor stud only until it seats 'snugly' - do not overtighten, or breakage of the stud-to-package bond might occur! (Be sure to use a small amount of thermal grease on the stud-mount transistor's flange for good heat conductivity.)
- 6.2 For Repeater or Full Duplex applications, the board must be mounted in a tightly shielded box - aluminum preferred. (Spectrum custom housing #SHTX-1 recommended.) Feedthrough caps (APX. 1000pF) must be used for all DC and audio lines entering the box (except ground). An S0239 or BNC connector is recommended for RF Output.



SPECTRUM COMMUNICATIONS CORPORATION

BOARDS & SUBASSEMBLIES

LIMITED WARRANTY

Spectrum Communications warrants its equipment to be free from defective material or factory workmanship and agrees to remedy any such defect by repair or replacement at the company's option, which in the company's judgement is a fault of its manufacturing, for a period of 100 days from date of original receipt by the original purchaser, provided that the equipment is returned to the factory or its authorized dealer intact and with all transportation charges prepaid. If a malfunction is suspected, call or write IN DETAIL to our service department for suggestions concerning the operation, repair or return of the unit if this should prove necessary. Do Not return equipment to the factory without authorization!

NOTE THAT THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT ONLY. WE DO NOT OFFER A MONEY-BACK GUARANTEE.

WHEN IT IS NECESSARY TO RETURN A UNIT FOR FACTORY REPAIR (AT NO CHARGE UNDER WARRANTY), BE SURE TO RETURN IT BEFORE THE 100 DAY WARRANTY EXPIRES. UNITS RETURNED FOR REPAIR AFTER THAT TIME PERIOD ARE OF COURSE SUBJECT TO OUR NORMAL PARTS AND LABOR CHARGES.

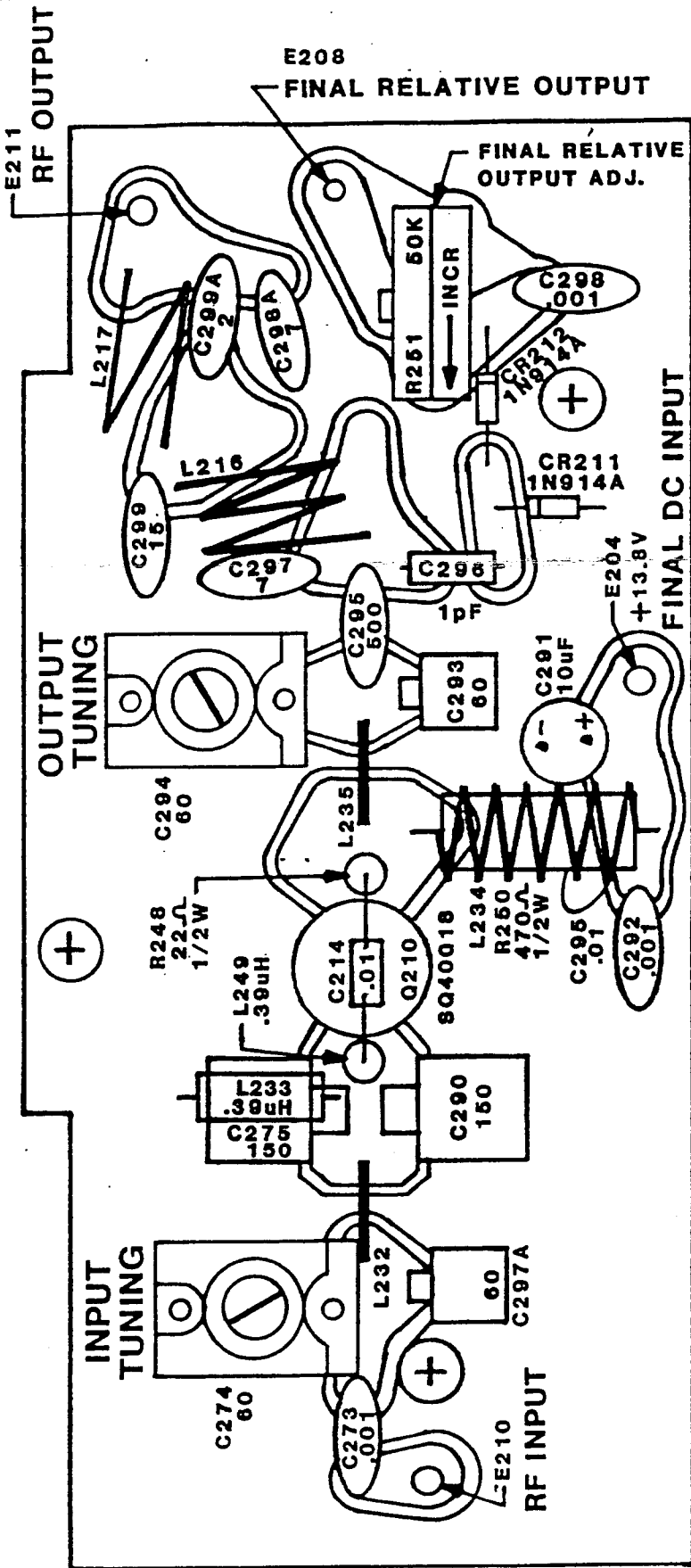
For units to be shipped within the continental 48 U.S. states, return freight from the factory to the customer via U.P.S. Surface will be prepaid by Spectrum. For units to be shipped outside of the 48 states, or where a customer desires some premium method of shipment such as Airfreight, the customer must pay the full amount of the freight.

This warranty shall be invalid in the event of (a) unauthorized repair, detuning, tampering or alteration of any kind, (b) misuse, abuse, negligence or accident, (c) connection, installation, or operation in a manner at variance with the instruction manual, (d) alteration, disfigurement or removal of the serial number, or (e) use with accessories not manufactured or recommended by us.

Any part of a unit approved for remedy or exchange will be remedied or exchanged by Spectrum Communications Corp. or its authorized dealer without charge to the owner. Spectrum is liable only for the repair or replacement of defective equipment during the warranty period, and not for any incidental or consequential damages.

SPECTRUM COMMUNICATIONS CORP. reserves the right to make any changes to designs or specifications of its products without notice, and without assuming any obligations to install such changes in its previously manufactured products.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.



# SPECTRUM COMMUNICATIONS

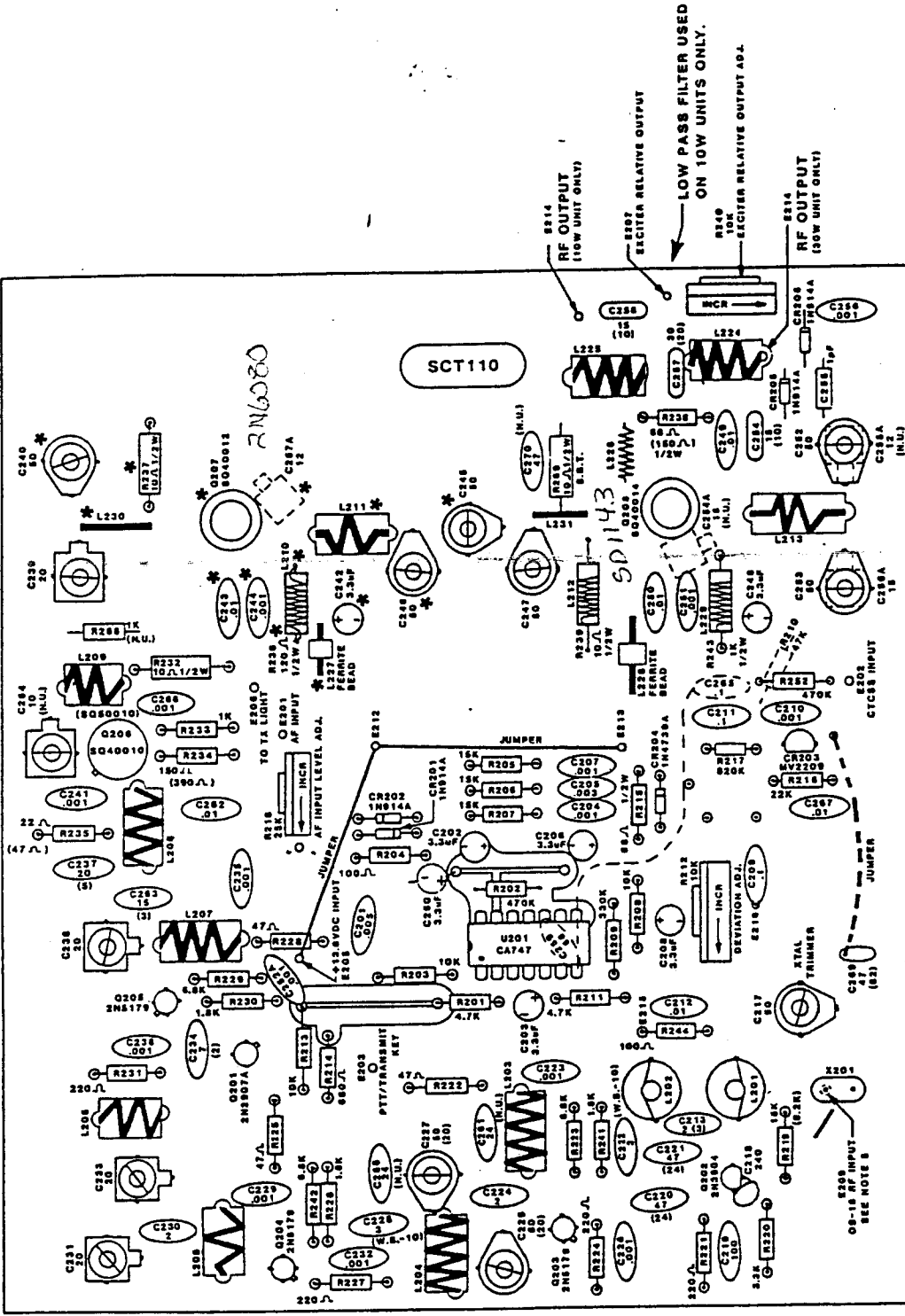
SCALE: \_\_\_\_\_ APPROVED BY: *JDC 2/9/87*  
 DATE: 2-9-87 DRAWN BY: R.L.A.  
 REVISED

## BA-20 AMPLIFIER BOARD COMPONENT LAYOUT

216-250MHZ

DRAWING NUMBER  
 1200135

FIGURE 9B



**NOTES:**

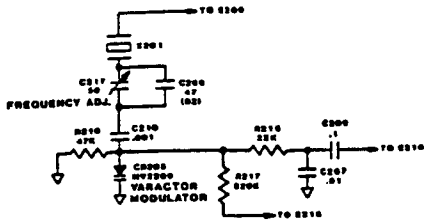
- 1) VALUES IN ( ) ARE FOR 216-250MHz UNITS.
- 2) (N.U.) INDICATES PARTS NOT USED FOR 216-250MHz UNITS.
- 3) NOT ALL PARTS SHOWN ARE USED ON ALL VERSIONS OF THE SCT110.
- 4) \* DENOTES EXTRA PARTS USED FOR 216-250MHz UNITS AND NOT USED FOR 136-174MHz UNITS.
- 5) WHEN AN OS-18 IS USED C218 IS DELETED AND C219 IS A .001 DISC CAP.

**SPECTRUM COMMUNICATIONS**

SCALE: 2-3-87 *VC-1/97*

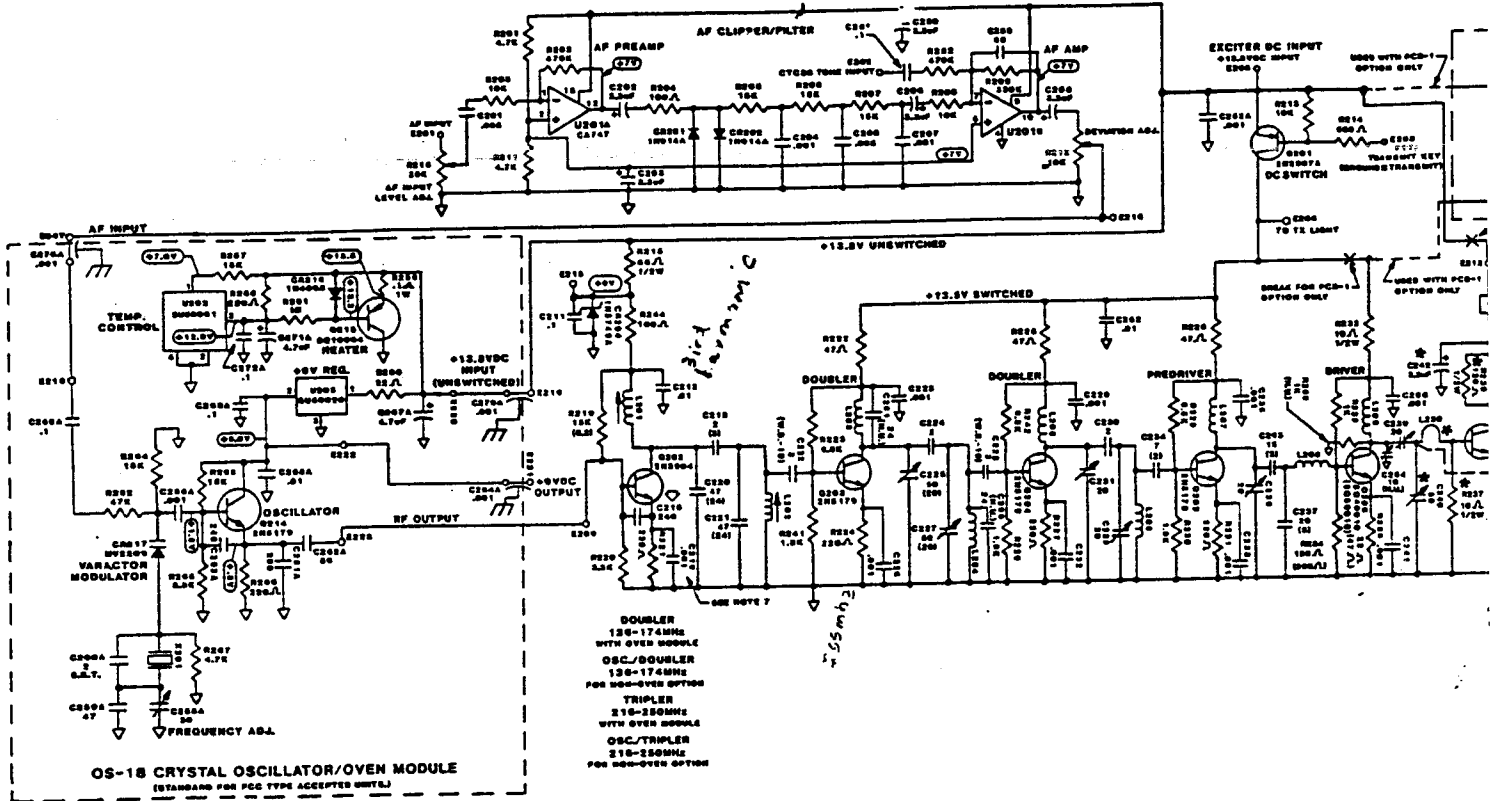
**VHF EXCITER BOARD LAYOUT**

PART NUMBER: 3200132



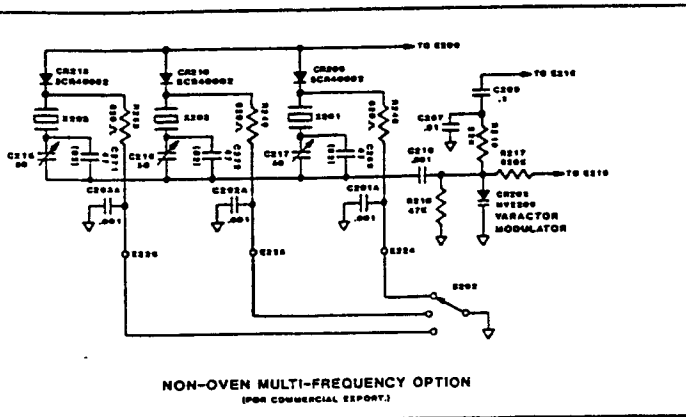
SINGLE FREQUENCY NON-OVEN OSCILLATOR OPTION  
(STANDARD FOR COMMERCIAL EXPORT AND AMATEUR UNITS.)

SCT 110 TRANSMITTER/EXCITER B



OS-18 CRYSTAL OSCILLATOR/OVEN MODULE  
(STANDARD FOR FCC TYPE ACCEPTED UNITS.)

- DOUBLER 136-174MHz WITH OVEN MODULE
- OSC./DOUBLER 136-174MHz FOR NON-OVEN OPTION
- TRIPLER 216-258MHz WITH OVEN MODULE
- OSC./TRIPLER 216-258MHz FOR NON-OVEN OPTION

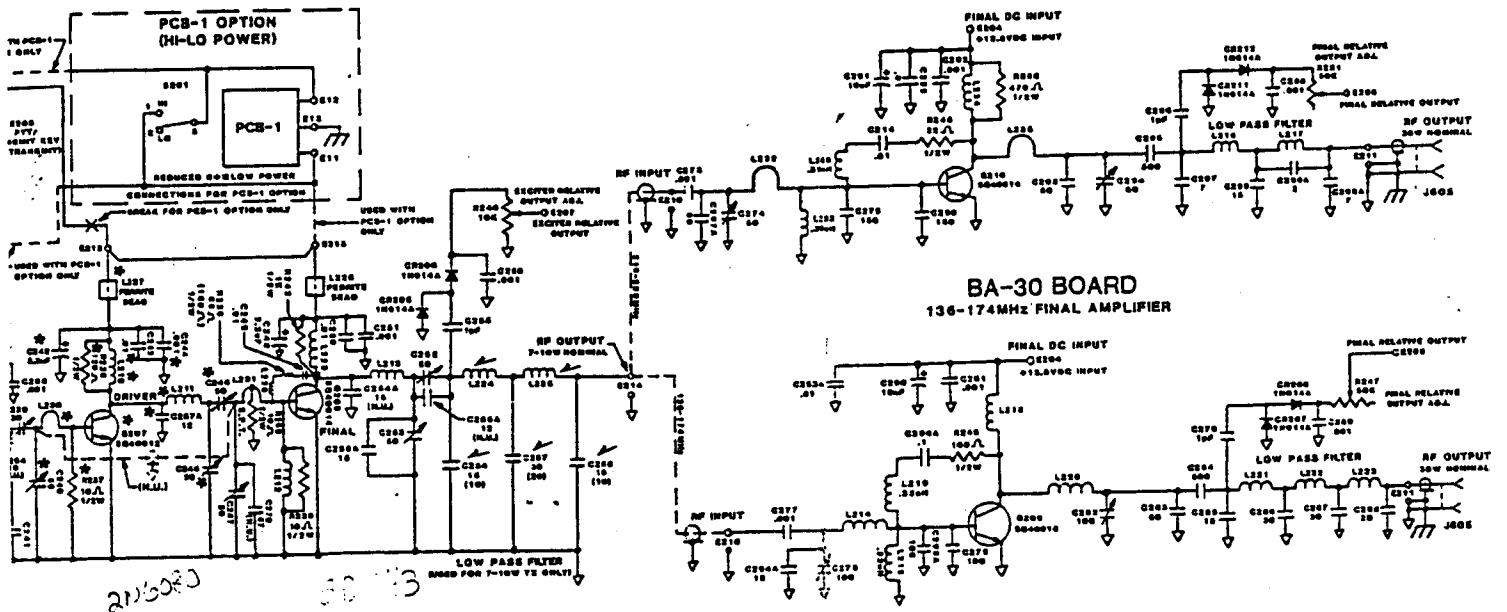


NON-OVEN MULTI-FREQUENCY OPTION  
(FOR COMMERCIAL EXPORT.)

- NOTES:
- 1) EXCEPT AS INDICATED, DECIM MICROFARADS (uF); OTHERS.
  - 2) ( ) DENOTES PARTS USED FOR
  - 3) ( ) DENOTES VALUE CHANGE
  - 4) (N.U.) DENOTES PARTS NOT USED
  - 5) \* DENOTES EXTRA PARTS USED
  - 6) ( ) DENOTES PART USED FOR 171C219 BECOMES A 100pF DISC

ICITER BOARD

**BA-20 BOARD**  
216-250MHz FINAL AMPLIFIER



**Radio Properties**  
Two-Way Radio: Sales, Rental, Leasing,  
Parts, Repairs and Specialized Electronics.  
Repeater Access & Vault Space.  
**KENWOOD** Authorized Sales & Service

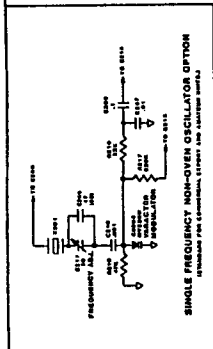
Skipp May P.O. Box 192  
Elmira, CA. 95625

Voice (707) 678-4187 - Fax (707) 693-8057  
nospan4me@juno.com www.radiowrench.com

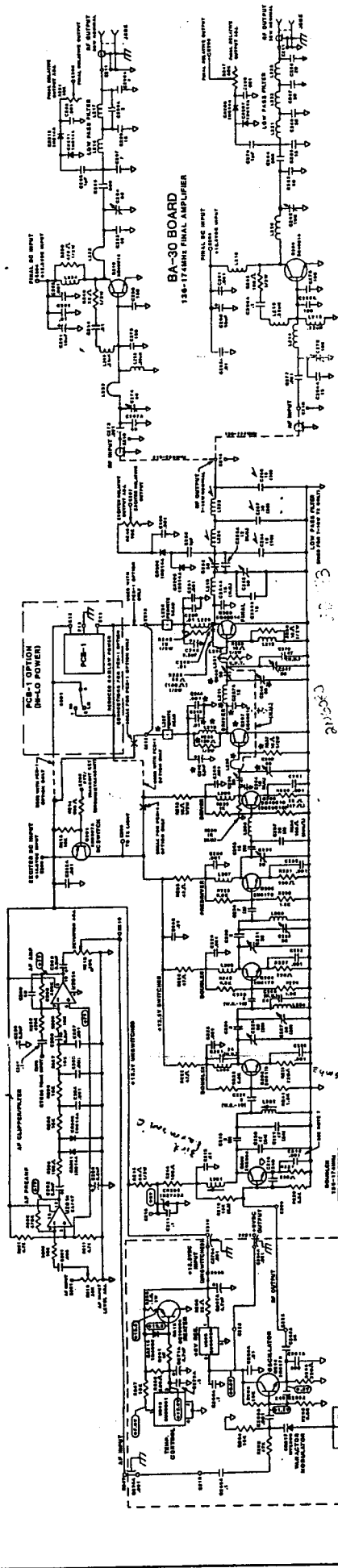
ATED, DECIMAL VALUES OF CAPACITANCE ARE IN  
F); OTHERS ARE IN PICO FARADS (pF).  
TS USED FOR 7-10 WATT TRANSMITTER ONLY.  
LUE CHANGES FOR 216-250MHZ.  
ARTS NOT USED FOR 216-250MHZ.  
A PARTS USED FOR 216-250MHZ.  
USED FOR NON-OVEN UNITS ONLY.  
100pF DISC CAPACITOR FOR NON-OVEN UNITS.

SPECTRUM COMMUNICATINIONS		
SCALE: _____	APPROVED BY: <i>[Signature]</i>	DRAWN BY: R.L.C.
DATE: 2-3-87		REVISED:
VHF TRANSMITTER SCHEMATIC		
(SCT1500) (SCT500)	DRAWING NUMBER	4100128
(SCR7000X) (SCR1000A) (BOARD5)		

136-174MHz & 216-250MHz



SCT110 TRANSMITTER/EXCITER BOARD



**Radio Properties**

Two-Way Radio: Sales, Rental, Leasing,  
Parts, Repairs and Specialized Electronics.

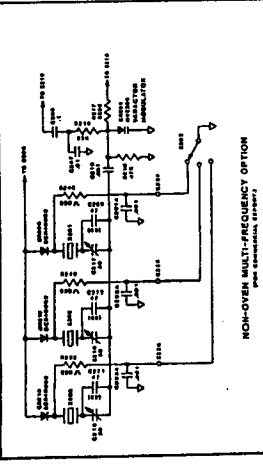
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- NOTES:**
- 1) EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN PICO FARADS.
  - 2) " " DEMOTES PARTS USED FOR T-10 WATT TRANSMITTER ONLY.
  - 3) " " DEMOTES WAVE CHANGES FOR 218-250MHz.
  - 4) (L) DEMOTES PARTS NOT USED FOR 218-250MHz.
  - 5) (H) DEMOTES PARTS NOT USED FOR 218-250MHz.
  - 6) (S) DEMOTES PARTS USED FOR NON-OVEN UNITS ONLY.
  - 7) (C) BECOMES A 100PF DISC CAPACITOR FOR NON-OVEN UNITS.



SPECTRUM COMMUNICATIONS	
DATE	REVISED BY
3-20-87	W.D.S.
VHF TRANSMITTER SCHEMATIC	
158-174MHz & 218-250MHz	
4100128	