

PERFORMANCE SPECIFICATIONS FOR SCA100 SERIES POWER AMPLIFIERS

	VHF	UHF
Model No.	SCA100V and SCA100V-10	SCA100 and SCA100-10
Frequency Range	136-174MHz	406-512MHz
RF Output Power	150W nom.	100W nom. (80-90W typ. above 475MHz)
RF Input Power for Full Output	30W nom. (SCA100V) 6W nom. (SCA100V-10)	40W Nom. (SCA100) 10W nom. (SCA100-10)
DC Current Draw @ Rated Output	19A typ. (SCA100V) 23A typ. (SCA100V-10)	15A typ. (SCA100) 20A typ. (SCA100-10)
RF Connectors	UHF S0239	Type N

Harmonics: – 65dB min.

Duty Cycle: 100% Continuous

Insertion Loss in "Bypass" or Xcvr. RX Mode: Less than 1dB

Operating Temperature Range: – 30 to + 60°C

Operating Voltage: 13.6VDC nom. 11V min. 14.5V max.

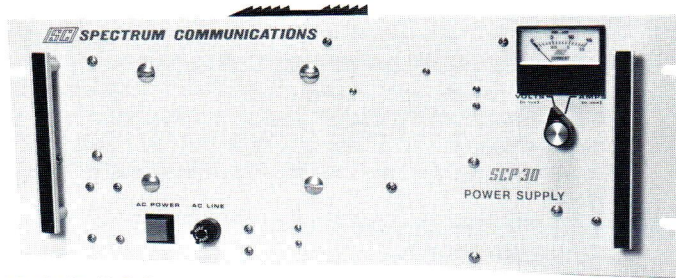
Size: 10½" H × 19" W Panel. 9" Deep.

Weight: 13 lbs. net.

FCC Type Accepted—Parts 21, 22, 74, 90

SCP30 HEAVY DUTY 30A POWER SUPPLY

For use with SCA 100, or any application requiring an Extremely Heavy Duty High Current Supply



Made in U.S.A.

Applications

- High Power RF Amps, Transmitters, etc.
- Service Bench
- Industrial & Commercial

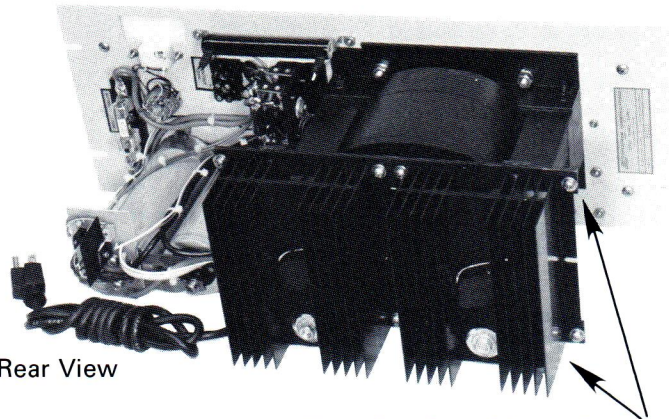
Input Voltage: 115 or 230 VAC nom., 50-60Hz. Other Primary Taps at 105, 125 and 210, 250VAC for high or low AC line areas. Usable worldwide.

Output Voltage: 13.8VDC nom. Adjustable 9.5-16VDC typ.

Max. Output Current: 25A (100% Continuous Duty). 30A (70% Intermittent Duty Cycle: 10 min. max On, 4 min. Off.)

FEATURES

- **The finest unit of its kind available on the market. Outperforms old 'ferro regulated' supplies** – with superior line and load regulation, much lower ripple, variable Vout, and versatile AC input.
- **Designed specifically to operate 100% continuously**, at 25A min. load current (for many years) without running "super hot" and burning-out, as with most competitive units.
- **Unusually Heavy Duty Power Transformer combined with a unique design very low dissipation Solid State Electronic Regulator** provides excellent regulation and ripple rejection without the usual high heat dissipation series regulator, or the complex circuitry and potential problems of a switching regulator. (RFI, etc.) Immune to stray RF.
- **Over-current Protection Circuit** shuts down the supply if there is a short or excessive current draw on the output.



Rear View

Metal Case Available

Massive 30# Transformer and Heat Sinks

Ripple: 30 mVpp typ. @ 25A load

No Load to Full Load Regulation: 0.1V typ.

Line Regulation: <0.1% change in Vo with ± 5% change in Vin.

Operating Temperature Range: – 30 to + 60°C

Metering: Built-in front panel meter for output voltage & current.

- **Over-Voltage Crowbar Circuit** shuts down the supply in the unlikely event of a shorted pass transistor.
- **MOV Transient/Spike Protection** on line input. AC line fuse.
- **Optional Automatic Switchover to External Battery Backup** in the event of AC power failure. All solid state switching—no relays. Includes Trickle Charger to maintain full battery capacity. Battery input fused & reverse polarity protected.
- **Straight forward design, plus extremely heavy duty construction and very conservatively rated components assure years of reliable operation.**
- **Standard 19" rack mount, 7" panel height, 9½" deep. Net weight: 38 lbs. Shipping wt.: 44 lbs.**
- **6 Month Warranty**—covers parts & labor.



SPECTRUM COMMUNICATIONS CORP.

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SPECTRUM NTW

SCP30 POWER SUPPLY MANUAL

SECTION 1 INTRODUCTION

The Spectrum Communications SCP30 is an unusually heavy duty power supply capable of providing 13.8VDC @ 25 Amps at 100% duty cycle and 30 amps at up to 70% duty cycle; (i.e. 10 min. max On, 4 min. Off). Features include front panel metering of output voltage and current, over-voltage and overcurrent protection. The AC line input is protected from spikes and transients by a heavy duty M.O.V. (Metal Oxide Varistor) which is the best device available for this application. [Note that different M.O.V.s are required for 115 or 230VAC input.] As an option, Automatic Switchover to External 12VDC Battery Backup can be provided.

SECTION 2 UNPACKING

Carefully unpack the power supply. Save the packing material for reuse should it ever be necessary to ship the unit.

SECTION 3 INSTALLATION

Connect the DC output to your equipment using #10 or #12 wire. Keep the leads short to minimize voltage drop. The DC connection is made through the screw type terminal block on the rear of the panel. Loosen the screws until the end of the wire can be fully inserted into the hole in the side of the terminal strip. Tighten the screw firmly. After all output connections are made, plug into your AC outlet. The SCP30 will operate on 50 or 60Hz AC input, and transformer taps are available for 105, 115, 125, 210, 230 and 250 Volts AC nom. Unless otherwise specified, all units are factory wired for 115VAC nom. input. The taps are easily rewired in the field. (See the Schematic and Table 1.)

SECTION 4 THEORY OF OPERATION

- 4.1 An unusually heavy duty transformer is used in the SCP30. The transformer's output is rectified and filtered by rectifier diodes CR801 and CR802 and 110,000uF capacitor C801, then fed to a regulator circuit to further reduce the ripple. This circuit combines the functions of regulator and bleeder, and operates with a very low input-output voltage differential.

The output voltage of the supply is sampled at the wiper of potentiometer R811, using zener diode CR804 as a reference. If the output voltage increases, base current of Q801 rises, turning on Q801. Q801's collector-emitter path is in series with the base of Q802, so Q802 is turned on. Current through R803 is shunted from the bases of pass transistors Q803 and Q804, thus reducing the output voltage to its proper level. Similarly, if the output voltage drops, Q801 is turned off. This turns off Q802, allowing more base current to the pass transistors and thereby increasing the output voltage. Q802 shunts all but the base current required by the pass transistors. The phasing of this circuit is such that it serves as a low gain negative feedback amplifier for AC ripple.

- 4.2 Short circuit protection is provided by a reed switch and SCR (CR302) circuit. Output current is sensed by a one turn coil around the reed switch.



4.2 Continued...

If the current exceeds 33 amps, the reed switch closes and fires the SCR, which turns Q802 hard on and shunts all base current from the pass transistors, thereby reducing the DC output voltage to zero. To reset this circuit after a shutdown, just turn off the unit for about 10 seconds, and it will automatically reset.

4.3 An overvoltage "crowbar" shutdown circuit is used to shutdown the power supply in the unlikely event that a pass transistor should short out. If Q803 or Q804 does short, zener diode CR806 will conduct, thereby turning on SCR CR807. When CR807 conducts, it will draw a very large current through R821 and R822 for a few hundred milliseconds, thereby quickly blowing front panel AC line fuse F801 and shutting down the supply before any damage is done. If this should happen, F801, Q803 and Q804 must be replaced, but Q803 and Q804 should first be checked with an ohmmeter for shorts.

CURRENT METER

NOTE: Multiply 0-15 meter scale X2 for 0-30 amp. current reading.

SECTION 5 TROUBLESHOOTING

Symptom	Check	Remedy
High Ripple	Terminal Screws on C801	Tighten Screws. These screws <u>must</u> provide a low resistance contact.
	Check Q803 and Q804 for Emitter-Collector short.	Replace shorted transistor.
Low or No Output	Fuse F801	Replace.
	Q803 and Q804 for open junction.	Replace open transistor.
	Open or faulty connections on output wiring.	Tighten connections.
	CR807 (SCR) shorted	Replace
Excessive no load to full load drop	Q803 and Q804 for opens	Replace
Very High output Voltage (Greater than 16V)	Q803 & Q804 for a short. R821 & R822 for an open. CR807.	Replace shorted or open parts. <u>DO NOT</u> use oversize fuse for F801 (4A max. for 115VAC Input.)

SECTION 6 AC INPUT TRANSFORMER TAPS

SCP30s are factory wired for a nominal 115VAC, 50-60Hz input, unless a different AC input is specified at the time of the original order. If your line voltage is different than this, or higher or lower than the present transformer tap wiring, it will be necessary to change the tap wiring. Note that if your AC line voltage is lower than nominal, you may notice high AC ripple (or "hum") on the DC output. And if your line voltage is higher than nominal, (e.g. 125VAC on the 115VAC tap), the pass transistors on the large heat sinks will run extremely hot - which is NOT recommended. (In this case, change to the 125VAC tap; i.e. jumper lugs 3 and 7, instead of lugs 3 and 6 which are normally factory jumpered.) See the Schematic Diagram and Table 1 below.

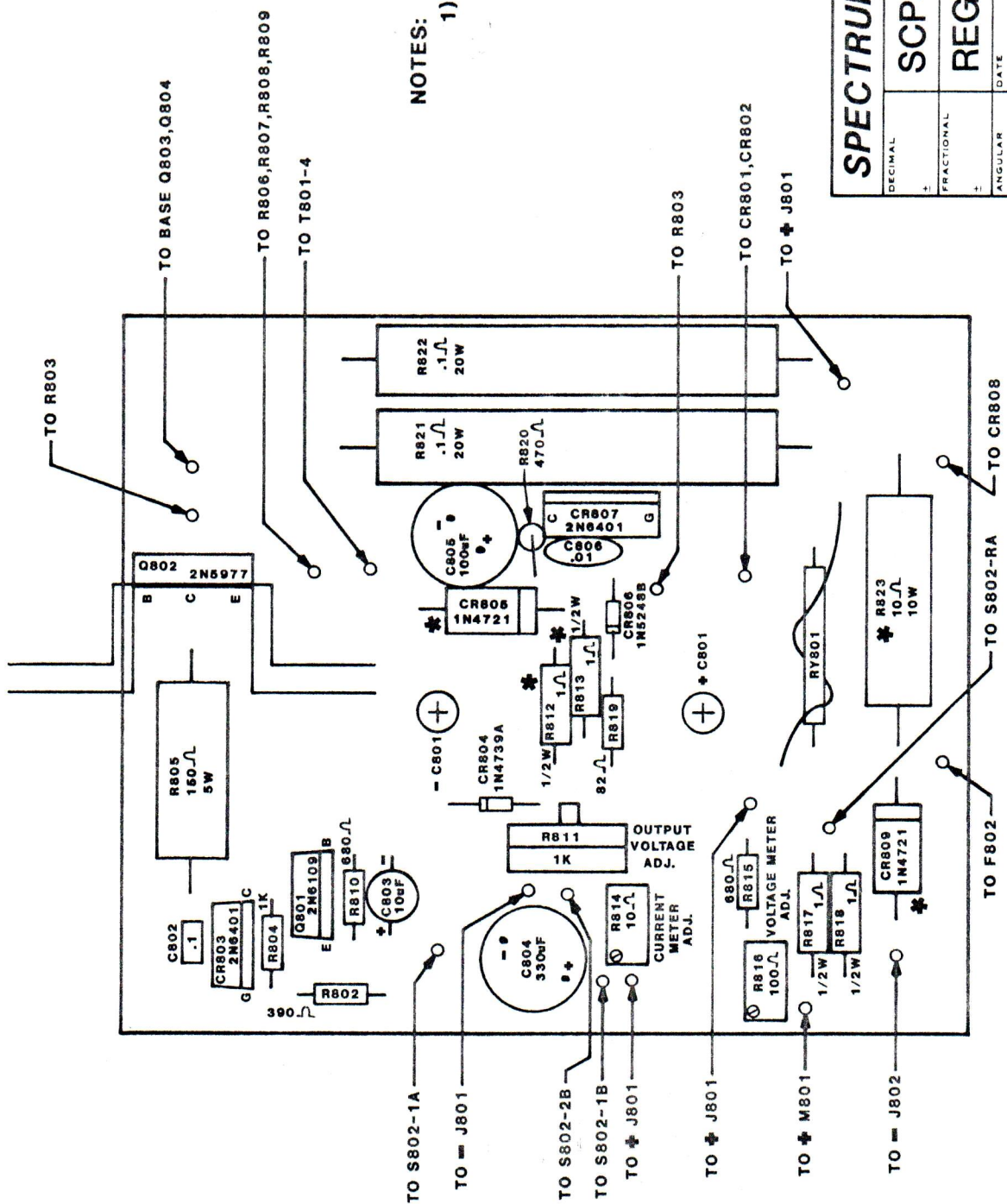
Note that when changing from 115 to 230VAC input, the wiring of the primary lugs is very different, and a higher voltage M.O.V. is used.

TABLE 1

AC INPUT TRANSFORMER TAPS FOR 105-130VAC RANGE	
AC LINE VOLTAGE	JUMPER LUGS
105VAC nom. (105-112VAC range)	3-5
115VAC nom. (113-120VAC range)	3-6
125VAC nom. (121-130VAC range)	3-7
All other connections remain the same as shown on the Schematic Diagram for 115VAC nom. input.	

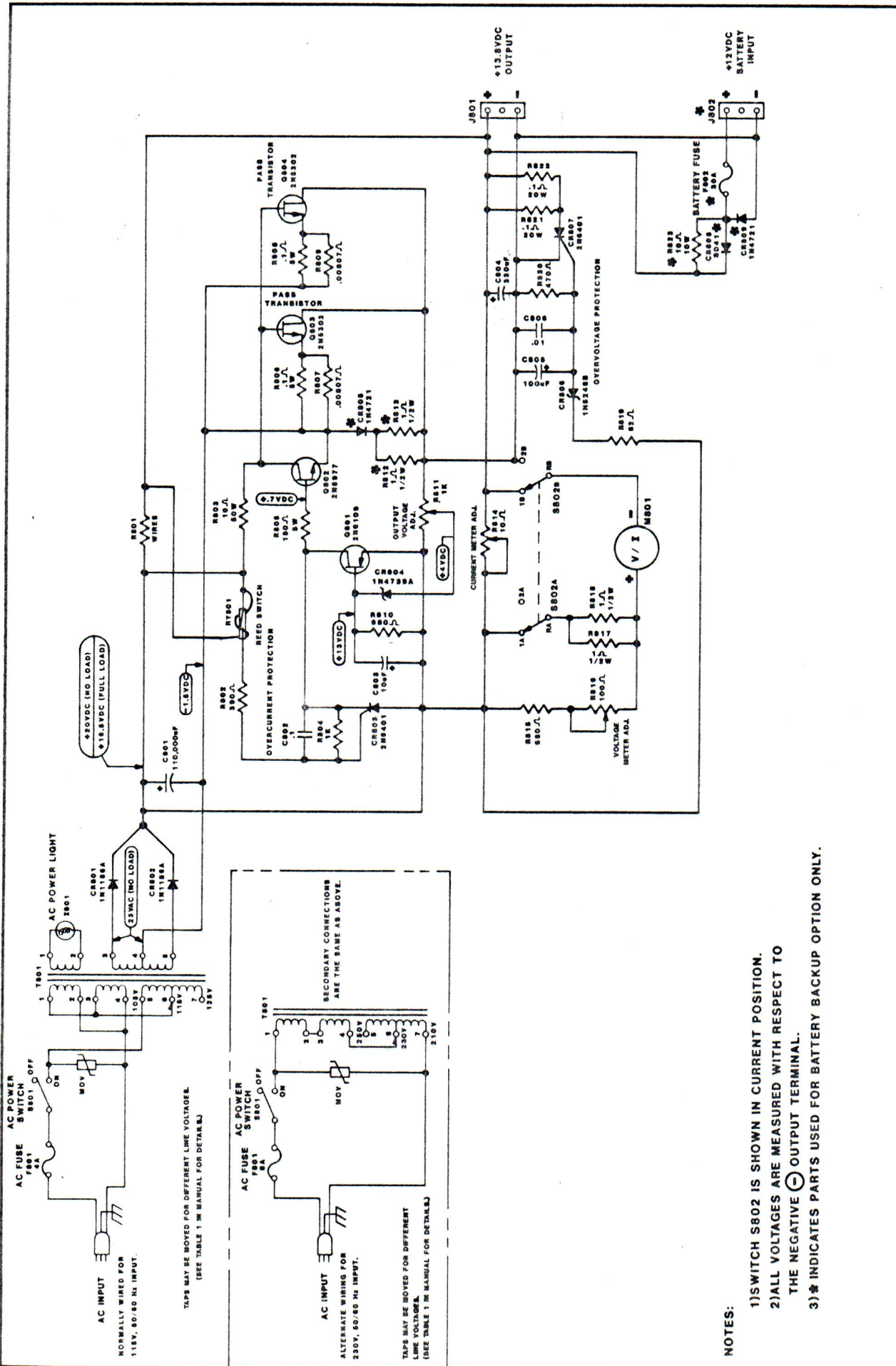
AC INPUT TRANSFORMER TAPS FOR 210-250VAC RANGE	
AC LINE VOLTAGE	JUMPER LUGS
210VAC nom. (210-222VAC range)	4-7
230VAC nom. (222-230VAC range)	4-6
250VAC nom. (230-250VAC range)	4-5
All other connections remain the same as shown on the Schematic Diagram for 230VAC nom. input.	

DATE	SYM	REVISION RECORD	AUTH	DR	CK



NOTES:
 1) * INDICATES PARTS USED FOR BATTERY BACKUP OPTION.

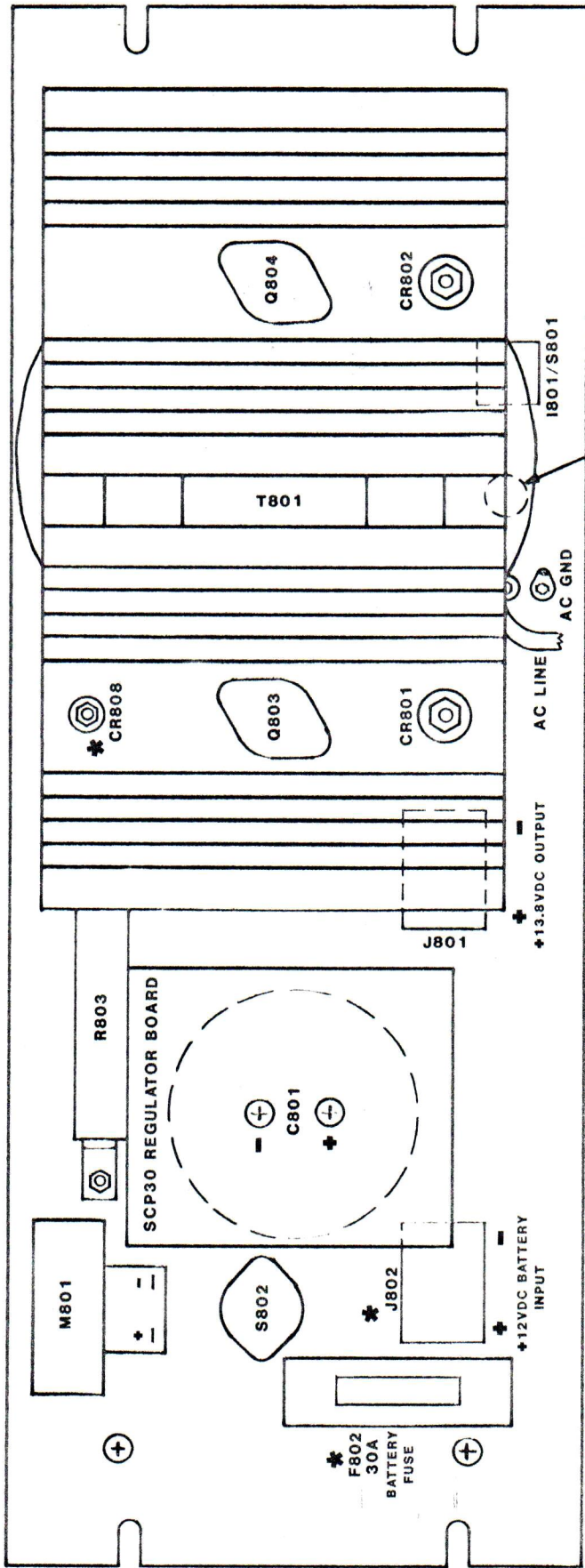
SPECTRUM COMMUNICATIONS		SCALE	DRAWN BY	R.L.A.
DECIMAL	+	—	APPROVED BY	8-28-86
FRACTIONAL	±			
ANGULAR	±			
DATE		DRAWING NUMBER		2200159
8-6-86				



SPECTRUM COMMUNICATIONS	
DATE: 6-13-66	DESIGNED BY: R.L.A.
SCP30 POWER SUPPLY	
SCHEMATIC	
DRAWING NUMBER: 3200177	

- NOTES:**
- 1) SWITCH S802 IS SHOWN IN CURRENT POSITION.
 - 2) ALL VOLTAGES ARE MEASURED WITH RESPECT TO THE NEGATIVE ⊖ OUTPUT TERMINAL.
 - 3) * INDICATES PARTS USED FOR BATTERY BACKUP OPTION ONLY.

DATE	BY	REVISION RECORD	AUTH	DR	CK



NOTES:

1)* INDICATES PARTS USED FOR BATTERY BACKUP OPTION.

SPECTRUM COMMUNICATIONS	
DECIMAL	SCF30 PWR
FRACTIONAL	SUPPLY PANEL ASSEMBLY
ANGULAR	DATE 7-30-86
	DRAWING NUMBER 2200141
	DRAWN BY R.L.A.
	APPROVED BY R.L.A.