RCA

OPERATING INSTRUCTIONS FOR THE

3KW, 52.88MHZ AMPLIFIER CAVITIES

RCA CORPORATION

SSD Electro Options and Devices

New Holland Avenue

Lancaster,Pennsylvania 17604

August 1979

PO# 461797 - NSLS

TABLE OF CONTENTS

		Page
I.	8806 TUBE AND Y1378D 3 KW CAVITY REQUIREMENTS	1
	A. Installation and Mounting	1
	B. Air Cooling Requirements	1
	C. 8806 Tube Installation and Removal	2
	D. Wiring and Power Supply Requirements	3
II.	OPERATING INSTRUCTIONS	6
	A. Input Tuning and Matching	6
	B. Output Tuning and Loading	7
	C. Test Results	7

LIST OF FIGURES

Fig. 1 Dimensional Outline 9

APPENDIX

Complete Set of Y1378D Cavity Drawings

8806 Tube Bulletin and Pamphlets

I. 8806 TUBE AND Y1378D 3 KW CAVITY REQUIREMENTS

A. Installation and Mounting

This cavity is designed to be mounted in a standard 24 inch rack. The cavity should be mounted by the front panel with no additional support necessary. Refer to the outline drawing supplied with this booklet for dimensions required for proper installation, Fig. 1.

B. Air Cooling Requirements

The 8806 tube and Y1378D cavity require air cooling only. Refer again to the dimensional outline drawing for the air inlet parts and the hardware supplied for this purpose.

Although only 150 CFM at 2.0 inches of water is required to cool the tube at the 3 KW level, RCA recommends that a blower capable of 250 CFM at 3.0 inches of water be available to handle the high dissipation phase into which this system may have to operate.

It must be noted that there are two necessary inlet air supplies. The uppermost, a 4 x 5 inch square opening is for anode cooling of the tube. The lower one, marked Seal Air Inlet on the dimensional drawing, is for filament and cavity cooling.

C. 8806 Tube Installation and Removal

Caution must be observed by the operator to insure that all operating voltages have been removed from the amplifier and that the cooling blowers have been turned off. To avoid handling a "HOT" tube, the air should remain on for three to five minutes after all voltages are removed.

Loosen the quarter-turn fasteners and remove the front access panel by pulling it straight out. Take off the tee nut and remove the two piece air chimney from the cavity. Insert the tube into the cavity socket, rotating clockwise slightly while pushing down to insure proper contact to all elements. Secure the plate radiator connector, designed to clamp around the radiator of the tube, to the tube radiator with the hose clamp provided.

Set the chimney on top of the tube radiator. Slide the upper half of the chimney up until it contacts the metal ring at the top of the cavity. Insert the tee into the clips provided on the upper half of the chimney. The base of the tee should extend through the hole in the upper half and rest on top of the lower half of the chimney. Secure the two nuts to insure that the chimney

will not collapse. When replacing the front cover, be sure that the round insulator on the vacuum capacitor is properly aligned with the drive mechanism before finally pushing the cover into place. Fasten the cover securely with all of the quarter-turn fasteners provided to eliminate r.f. radiation and air leaks.

The tube should be removed from the socket by rotating it clockwise while gently lifting. The tube should not be removed from the socket by rocking the tube back and forth. This motion crushes the contact fingers and applies undue force to the internal structure of the tube.

D. Wiring and Power Supply Requirements

All voltage connections are located and clearly marked on the rear panel of the cavity. Refer to the dimensional drawing for location of these connections.

Plate Voltage (Capacitor feedthrough on lower left corner of back panel. 10-32 screws provided.)	4500 V
Screen Voltage (Feedthrough located next to anode air inlet on back panel.)	1000 V

Grid Voltage (Feedthrough located next to anode air inlet on back panel.)	0 V to -100 V Variable
Cathode (Internally grounded, 3/8-16" bolt provided on back panel.)	0 V
Filament (Terminal strip provided on back panel.)	120 V AC

NOTES:

1. Plate Supply

   This supply should be a 4500 volt fixed or variable supply with 2.0 amp current capability.

2. Screen Supply

   The screen supply should be a regulated supply, variable from 500 to 1200 volts and should have 0.2 amp capability.

3. Screen Supply Interlocks

   It is recommended that the screen supply be interlocked with the plate supply, i.e., connected so the screen cannot be turned on before the plate voltage is applied. This technique will prevent

damage to the screen grid due to excessive dissipation if the screen should be accidently turned on before the plate.

4. Grid Supply

The grid bias supply should be continuously variable from 0 to 100 volts. This supply should be regulated and have 0.25 amp capability.

5. Cathode

The cathode is internally grounded to the case. When the cavity is installed be sure to properly ground the case to the power supplies.

6. Filament Voltage

A terminal strip is provided for the 120 volt AC connection to the filament transformer. Six taps are provided on the transformer and are wired to a terminal strip for convenient voltage changes. Typical requirement for the tube filament is 5.7 volts at 115 amps.

7. Tube Protection

If high speed crow bar protection is not used on the voltage supplies, it is imperative that the 8806 tube bulletin recommendations, outlined under Note K, for series resistance be followed.

Plate - 30 ohms

Screen - 50 ohms

Grid - 50 ohms

At this point, the supplies may be turned on in this sequence: (1) air, (2) filament, (3) bias, (4) plate, and (5) screen.

II. OPERATING INSTRUCTIONS

A. Input Tuning and Matching

Apply a reduced r.f. drive signal (20%) to the r.f. input terminal, preferably a swept r.f. signal. Two control knobs and a tapped inductor are provided to adjust the input circuit. Turn the input tuning knob until the number 500 appears on the tuning dial. Lock the input tuning control for this position. Adjust the series tapped inductor attached to the bottom of the socket and the input matching control for minimum reflected power as measured on a reverse-reading directional coupler or equivalent. When the above step is completed, the input tuning control may be unlocked and alternately adjusted with the tapped inductor and input matching for final input circuit tuning.

CAUTION: The input tuning control must not be used for large input circuit adjustments. Tube to tube variations may require a slight change in the input tuning and matching controls.

B. Output Tuning and Loading

Adjust the plate tuning control until the counter reads 01400. This should be the approximate setting for 52.88 MHz operation. With the reduced drive applied to the input, adjust the plate tuning control for maximum power output as measured on a forward-reading directional coupler in the output line.

CAUTION: Be sure the output line is terminated in a 50 ohm resistive load before operating.

Adjust the loading control to 200 on the counter setting as a starting point. Alternately adjust plate tuning and loading for maximum power output at the operating frequency. The final operating bandwidth of the Y1378D should be adjusted for 2.5 MHz at the 3 dB points. This can be achieved by adjusting the loading control. Clockwise rotation will decrease the bandwidth and counter clockwise rotation will increase bandwidth.

C. Test Results

Listed below are the test results of the 8806 tube and the Y1378D cavity that were operated in a linear mode from 10% power out to 100% power out. Zero signal plate current was adjusted to 0.5 amp before drive was applied.

KV E_b	Amps I_b	Volts E_{c2}	Amps I_{c2}	Volts E_{c1}	Amps I_{c1}	Watts Drive	Watts Power Out	dB Gain	% Eff.	Amps I_{bo}
4.5	1.38	1000	0.041	-56	0	56.4	3151	17.47	50.7	0.5
4.5	1.17	1000	0.018	-56	0	41.3	2148	17.16	40.2	0.5
4.5	0.98	1000	0.008	-56	0	25.5	1432	17.0	32.3	0.5
4.5	0.76	1000	0	-56	0	14.3	716	16.9	20.8	0.5
4.5	0.66	1000	0	-56	0	8.6	430	16.9	14.3	0.5
4.5	0.61	1000	0	-56	0	6.5	315	16.8	11.4	0.5

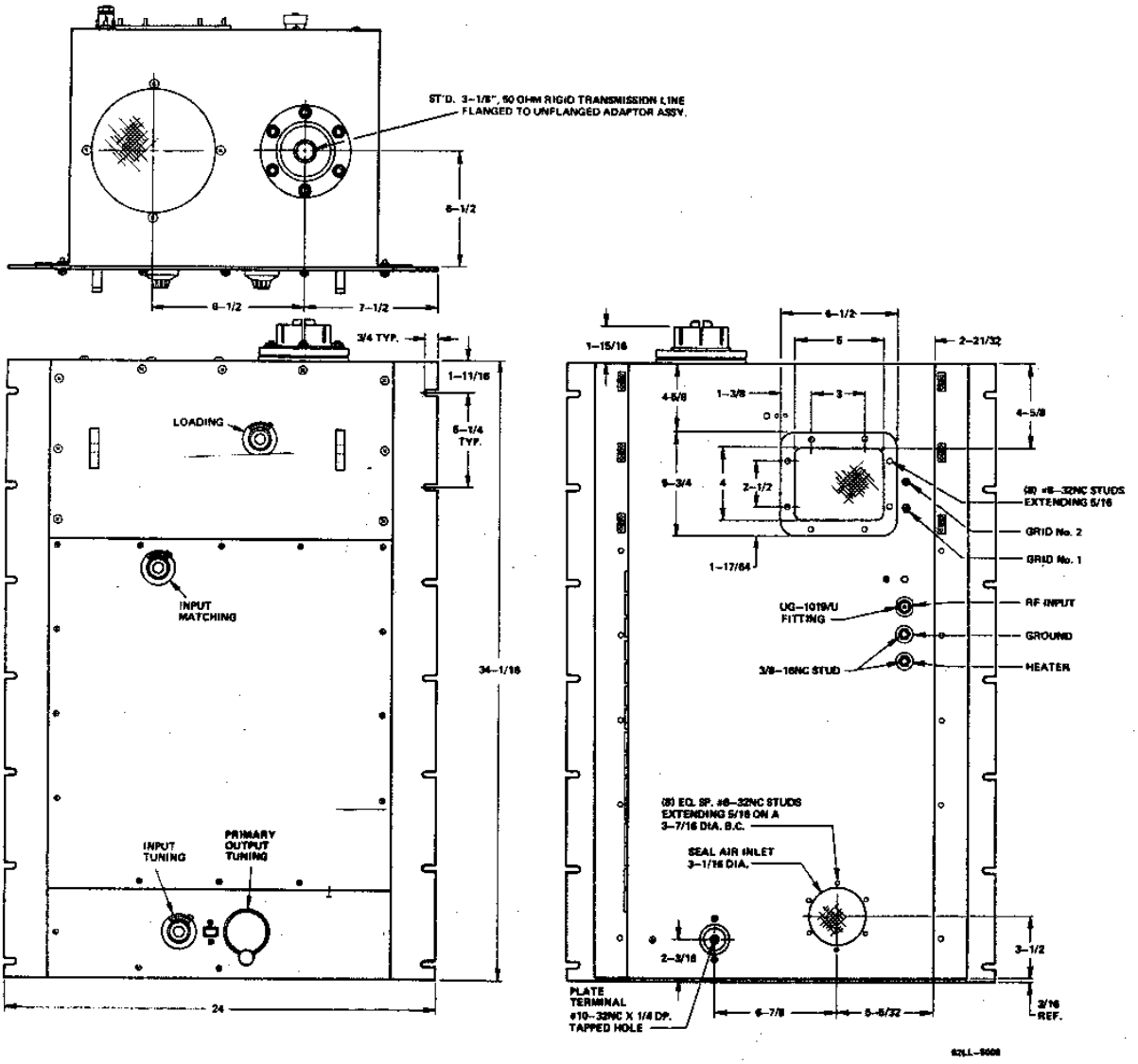

Fig. 1 – **Dimensional Outline**