RCA

OPERATING INSTRUCTIONS FOR THE

50KW, 52.88MHZ AMPLIFIER CAVITIES

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August 1979

PO#451797 (NSLS)

TABLE OF CONTENTS

I. A3016 TUBE AND Y1377D 50 KW CAVITY REQUIREMENTS

A. Installation and Mounting

B. Air and Water Cooling Requirements

C. A3016 Tube Installation and Removal

D. Wiring and Power Supply Requirements

II. OPERATING INSTRUCTIONS

A. Input Tuning and Matching

B. Output Tuning and Loading

C. Test Results

D. Tuning and Loading Counter Readings

LIST OF FIGURES

Fig. 1 Readings for Tuning and Loading Control for Complete Tuning Capability of the Y1377D Cavity

APPENDIX

Complete Set of Y1377D Cavity Drawings

8984 Tube Bulletin

I. A3016 TUBE AND Y1377D 50 KW CAVITY REQUIREMENTS

A. Installation and Mounting

The Y1377D 50 KW cavity is mounted on a 10" high b wide by 19" deep aluminum angle frame which should used to support the cavity weight. The cavity sup in the cabinet should not be a solid shelf, but ra an angle iron support with the bottom remaining op This will allow the air used for filament cooling dissipate. The front panel is designed and slotte a standard 24" rack mount. This panel was designe retain the cavity in the rack, but should not be u to support the cavity weight.

The required mounting dimensions can be obtained f the Y1377D cavity outline drawing in the Appendix these instructions. (Refer to drawing No. E963-18 Y1377D Outline Drawing.)

B. Air and Water Cooling Requirements

Air cooling is required for the filament and input of the A3016 tube as well as for cavity cooling. inch diameter flange, 1.5 inches long, is provided the air inlet and is located on the bottom of the inside the aluminum angle frame. The air flow req for proper cooling is 100 CFM at 2.5" H_2O. It is

The A3016 tube requires water cooling for the anode
These water requirements are:

Flow	Pressure Drop	KW Dissipatic
20	15 PSI	50 KW
30	34 PSI	75 KW
40	60 PSI	100 KW

The tube has two, 1/2" threaded pipes which are cle
marked for direction of water flow. It is advisabl
connect the flow interlock switches in the output d
the filament blower and the anode water system to p
filament power from being applied if either flow is
off. This feature will prevent damage to the tube
cavity due to inadvertent operation without proper
cooling.

C. A3016 Tube Installation and Removal

High Voltage Warning

Since this is a high voltage device, use extreme ca
to insure the safety of operating personnel. Be ce
that all voltages are removed prior to tube access.
cavity does not have mechanical shorting devices inc
porated into the design, therefore, the anode blocke
capacitor should be shorted before tube removal.

will not collapse. When replacing the front cove
sure that the round insulator on the vacuum capac
properly aligned with the drive mechanism before
pushing the cover into place. Fasten the cover s
with all of the quarter-turn fasteners provided t
minate r.f. radiation and air leaks.

The tube should be removed from the socket by rot
it clockwise while gently lifting. The tube shou
be removed from the socket by rocking the tube ba
forth. This motion crushes the contact fingers a
plies undue force to the internal structure of th

D. Wiring and Power Supply Requirements

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

Plate Voltage (Capacitor feedthrough
on lower left corner of back panel.
10-32 screws provided.)

Screen Voltage (Feedthrough located next

Plate Voltage (Connection will be made on the plate blocker at the top of the cavity. A 10-32 screw is provided for this purpose.)	9 KV to 13 KV 500 V steps
Screen Voltage (Feedthrough located at the bottom of the cavity.)	1000 V to 150 variable
Grid Voltage (Feedthrough located at the bottom of the cavity.)	0 V to -210 V variable
Cathode (Internally grounded)	0 V
Filament (Terminal strip provided at the bottom of the cavity.)	120 V AC

NOTES:

1. Plate Supply

   The plate supply should have the capability of be varied from 9,000 to 13,000 volts in 500 volt step

2. Screen Supply

The screen supply should be a regulated supply variable from 1000 to 1500 volts and should ha a 1 amp capability.

3. Screen Supply Interlocks

It is recommended that the screen supply be in locked with the plate supply, i.e., connected the screen cannot be turned on before the plat voltage is applied. This technique will preve damage to the screen grids due to excessive di pation should the screen be accidentally turne before the plate.

4. Grid Supply

The grid bias supply should be continuously va from 0 to -250 volts. This supply should be and have a 1 amp capability.

5. Grid Supply Interlock

The grid voltage should not be applied to the tube until the filament has had at least a 2 warm-up time. At this point, the supplies ma

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. i terminal, preferably a swept r.f. signal. Two contro knobs and a tapped inductor are provided to adjust th input circuit. Turn the input tuning knob until the number 500 appears on the tuning dial. Lock the inpu 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 inp matching for final input circuit tuning.

CAUTION: The input tuning control must not be used f

II. OPERATING INSTRUCTIONS

There are four tuning adjustments to be made on this ca

1. Input Tuning
2. Input Matching
3. Output Tuning
4. Output Loading

For location of these controls, refer to the Y1377D ou drawing No. F963-18095.

A. Input Tuning and Matching

After all voltages have been applied to the A3016 a small amount of drive should be applied to the a fier. Using the output directional coupler provid with the Y1378D driver cavity, monitor the reverse and tune and match the Y1377D input for minimum re flected power. Final input tuning and matching sh be done at the 25 KW output level so the match wil main fairly constant over the entire range of powe put.

B. Output Tuning and Loading

Monitor the forward port of a directional coupler output line. With a small amount of drive applied the output tuning control for maximum power output

change the operating bandwidth from 1.8 MHz to 3.
when moved across its entire range. Higher count
numbers on the loading control indicate heavier l
or a broader bandwidth.

C. Test Results

The cavity was tested for all contract specificat
prior to shipment. A typical sample of the resul
the cavity and tube operation while running with
tube loaded for high efficiency at 50 KW are list
below.

KV E_b	Amp. I_b	Volts E_{c2}	Amps I_{c2}	Volts E_{c1}	Amps I_{c1}	Watts Drive	KW P_{out}
12.05	2.79	1200	0	-180	0.005	327	10.8
11.91	3.94	1200	-30	-181	0.060	504	20.36
11.83	4.86	1200	0	-180	0.145	648	30.79
11.75	5.67	1200	0.032	-175	0.260	832	40.59
11.67	6.32	1200	0.120	-180	0.350	986	51.7

If linear operation is required, the bias will have to be
set the I_{bo} with no drive at 0.75 amps. Typical results c
at this condition are listed below:

11.68	6.83	1460	0.210	-120	0.200	634	51.12
11.91	4.93	1500	0	-109	0	295	25.27

The cavity was also operated at 75 KW output. Typi operating conditions at this power level are as fol

E_b	I_b	E_{c2}	I_{c2}	E_{c1}	I_{c1}	P_{drive}	P_{out}
12.39	9.06	1260	0.275	-188	0.840	1832	77.19

D. Tuning and Loading Counter Readings

The graph in Fig. 1 shows the proper counter readin the tuning and loading control for the complete tun capability of the Y1377D cavity.

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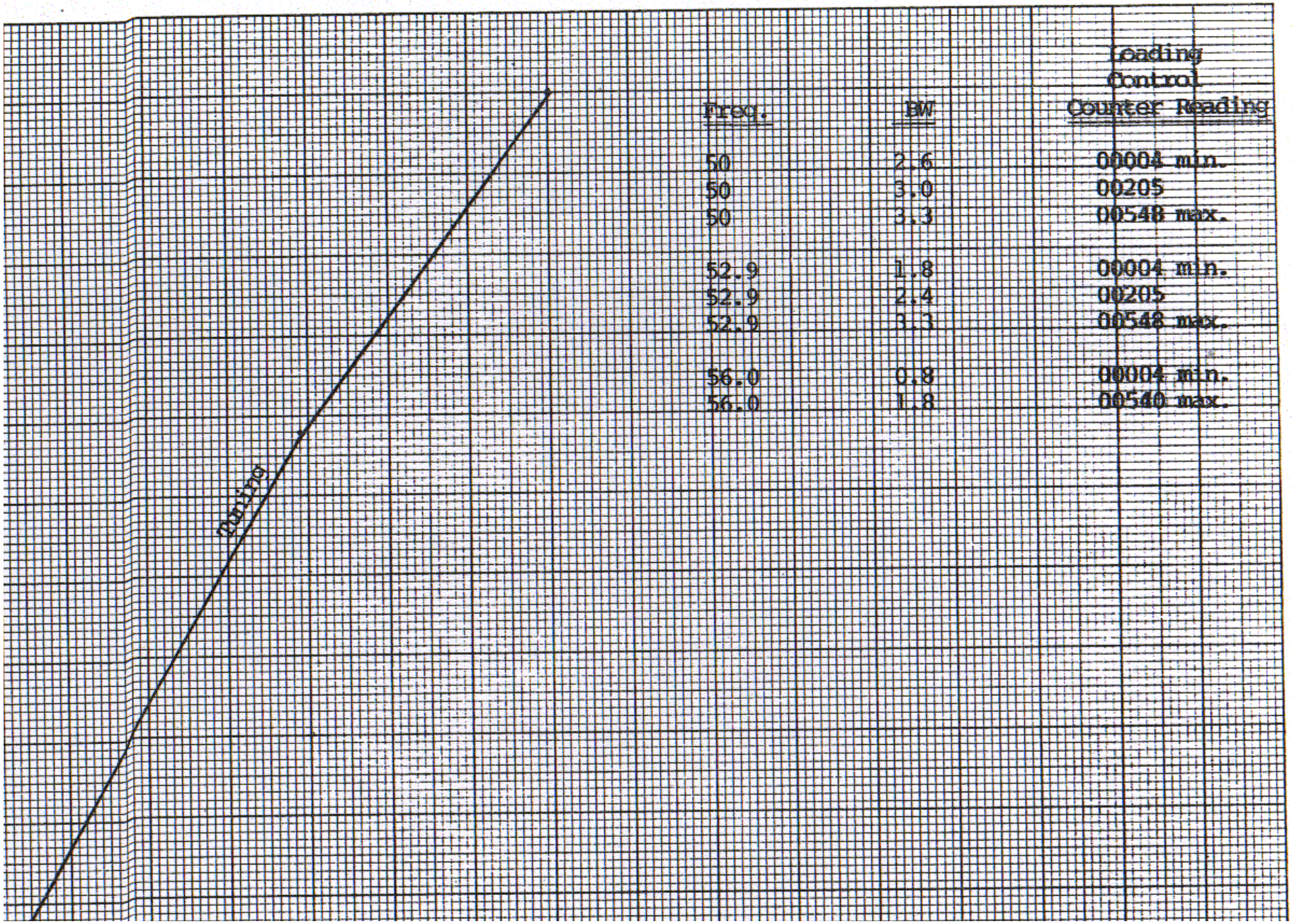
GPG

Fig. 1. Readings for Tuning and Loading Control for Complete Tuning Capability of the Y1377D Cavity



Freq.	BW	Loading Control Counter Reading
50	2.6	00004 min.
50	3.0	00205
50	3.3	00548 max.
52.9	1.8	00004 min.
52.9	2.4	00205
52.9	3.3	00548 max.
56.0	0.8	00004 min.
56.0	1.8	00540 max.