

FEDERAL TELECOMMUNICATION LABORATORIES

ELECTRON TUBE

TYPE REGISTRATION

Reservation No:	Manufacturers Designation:	X190
Reservation Date: February 3, 1950	Data Bureau Designation:	5929

TRAVELING WAVE AMPLIFIER

General Characteristics

The X-190 is a super-high-frequency traveling wave amplifier tube employing a helical wave-propagating structure. The tube is designed for use as a continuous-wave amplifier in the frequency range 4400 to 5000 megacycles per second; it will transmit any type of modulation.

For the amplifier circuit, 1" x 2" waveguide sections are used. A magnetic field is used to hold the electron beam to constant diameter.

Electrical Data

Heater Voltage	6.3 volts
Heater Current	2.0 amperes
Maximum Frequency	5000 megacycles
Minimum Frequency	4400 megacycles
Cold Transmission Loss	30 decibels

Maximum Ratings, Absolute Values

Accelerator Voltage	5500 volts
Accelerator Current	2 milliamperes
Helix Voltage*	3500 volts
Helix Current	1 milliampere
Collector Voltage	3800 volts
Collector Dissipation	200 watts
Focusing Electrode Voltage	-100 volts

* Helix voltage to ground should not exceed 1000 volts.

Mechanical Information

Type of Cathode	Coated Unipotential
Base	Medium shell diheptal, 14 pin
Physical Specifications	(See outline drawing)
Base Connections	(See outline drawing)
Mounting Position	Any
Weight	8 Ounces
RF Input and Output	For use with waveguide RG49/U (2"x1"). Matching sections in amplifier are fitted with choke flanges UG148/U.

Mechanical Information (Cont.)

Type of Cooling	Forced Air	
Collector Dissipation - Watts	200	160
Air Flow - Cubic Feet per Minute	20	17
Pressure - Inches of Water	0.20	0.16

Typical Operation

Frequency	4700 megacycles per second
Heater Voltage	6.3 volts
Heater Current	2.0 amperes
Accelerator Voltage	3150 volts
Accelerator Current	1 milliamperes
Helix Voltage	3150 volts
Helix Current	1 milliamperes
Collector Voltage	3450 volts
Collector Current	45 milliamperes
Focus Cup Voltage (adjusted for maximum beam transmission)	25 volts
Power Output	10 watts
Bandwidth to 3 db points	greater than 600 megacycles
Gain	20 decibels

Bottom View

- BASE PIN
14. HEATER - CATHODE
11. HEATER
9. ACCELERATOR
7. GETTER
4. HEATER
2. FOCUSING CUP

MATERIAL

TOLERANCE

	BASIC DIMENSIONS	FRACT. DIMENSIONS	DEC. DIMENSIONS
1	1.00	1.00	1.00
2	1.00	1.00	1.00
3	1.00	1.00	1.00
4	1.00	1.00	1.00
5	1.00	1.00	1.00
6	1.00	1.00	1.00
7	1.00	1.00	1.00
8	1.00	1.00	1.00
9	1.00	1.00	1.00
10	1.00	1.00	1.00
11	1.00	1.00	1.00
12	1.00	1.00	1.00
13	1.00	1.00	1.00
14	1.00	1.00	1.00
15	1.00	1.00	1.00
16	1.00	1.00	1.00
17	1.00	1.00	1.00
18	1.00	1.00	1.00
19	1.00	1.00	1.00
20	1.00	1.00	1.00
21	1.00	1.00	1.00
22	1.00	1.00	1.00
23	1.00	1.00	1.00
24	1.00	1.00	1.00
25	1.00	1.00	1.00
26	1.00	1.00	1.00
27	1.00	1.00	1.00
28	1.00	1.00	1.00
29	1.00	1.00	1.00
30	1.00	1.00	1.00
31	1.00	1.00	1.00
32	1.00	1.00	1.00
33	1.00	1.00	1.00
34	1.00	1.00	1.00
35	1.00	1.00	1.00
36	1.00	1.00	1.00
37	1.00	1.00	1.00
38	1.00	1.00	1.00
39	1.00	1.00	1.00
40	1.00	1.00	1.00
41	1.00	1.00	1.00
42	1.00	1.00	1.00
43	1.00	1.00	1.00
44	1.00	1.00	1.00
45	1.00	1.00	1.00
46	1.00	1.00	1.00
47	1.00	1.00	1.00
48	1.00	1.00	1.00
49	1.00	1.00	1.00
50	1.00	1.00	1.00
51	1.00	1.00	1.00
52	1.00	1.00	1.00
53	1.00	1.00	1.00
54	1.00	1.00	1.00
55	1.00	1.00	1.00
56	1.00	1.00	1.00
57	1.00	1.00	1.00
58	1.00	1.00	1.00
59	1.00	1.00	1.00
60	1.00	1.00	1.00
61	1.00	1.00	1.00
62	1.00	1.00	1.00
63	1.00	1.00	1.00
64	1.00	1.00	1.00
65	1.00	1.00	1.00
66	1.00	1.00	1.00
67	1.00	1.00	1.00
68	1.00	1.00	1.00
69	1.00	1.00	1.00
70	1.00	1.00	1.00
71	1.00	1.00	1.00
72	1.00	1.00	1.00
73	1.00	1.00	1.00
74	1.00	1.00	1.00
75	1.00	1.00	1.00
76	1.00	1.00	1.00
77	1.00	1.00	1.00
78	1.00	1.00	1.00
79	1.00	1.00	1.00
80	1.00	1.00	1.00
81	1.00	1.00	1.00
82	1.00	1.00	1.00
83	1.00	1.00	1.00
84	1.00	1.00	1.00
85	1.00	1.00	1.00
86	1.00	1.00	1.00
87	1.00	1.00	1.00
88	1.00	1.00	1.00
89	1.00	1.00	1.00
90	1.00	1.00	1.00

UP TO 6	1 1/4	± .008
ABOVE 6 TO 24	1 1/2	± .010
ABOVE 24	1 3/4	± .015

UNLESS OTHERWISE SPECIFIED

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APP'D.	REVISIONS
THM	F-1-20-50-1/2. REDRAWN & REVISED

USED WITH

PLAYING

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Outline Dwg

8-190

SCALE 5000

APPEND.

CHG

DRAWING

10551

#4-40 TAP
(FOR SECURING)
(COOLER)

10-32 TA
(FOR REMO
(COOLER)