



REPORT OF TEST  
ON  
ANTENNA TUNING UNIT  
MODEL TAC.

A. R. Bernardi  
THE TECHNICAL MATERIEL CORPORATION

SEPTEMBER 24, 1955

MODEL TAC - TEST REPORT	
THE TECHNICAL MATERIEL CORPORATION	
MANHATTAN, NEW YORK	
DATE: 9/24/55	CHKD.
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1.

NOTICES

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The information furnished herewith is made available for study upon the understanding that the Government's proprietary interests in and relation thereto shall not be impaired. It is desired that the Judge Advocate office, WJC, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, b promptly notified of any apparent conflict between the Gov rn- ment's proprietary interest and those of others.

2.

ADMINISTRATIVE DATA

PURPOSE OF TEST:

September 24, 1955

To evaluate the effectiveness of the Model  
TAC Antenna Coupler in matching balanced or  
unbalanced loads to a seventy ohm source.

MANUFACTURER: THE TECHNICAL MATERIEL CORPORATION

DRAWING, SPECIFICATION OR EXHIBIT: NONE

QUANTITY OF ITEMS TESTED: TEN

SECURITY CLASSIFICATION OF ITEMS: UNCLASSIFIED

DATE TEST COMPLETED: DECEMBER 1, 1955

TEST CONDUCTED BY: A. R. Bernardi

3.

FACTUAL DATA

3.1. DESCRIPTION OF EQUIPMENT:

The TMC Antenna Tuning Unit Model TAC is employed to couple the output of the BC-610 transmitter, or any other transmitter with a nominal output impedance of 70 ohms, to balanced or unbalanced loads ranging from 50 to 1200 ohms.

The unit is housed in a steel case 9" x 14-1/2" x 22".

CONTROLS:

- 3.1.1. Coupling - An eight position switch which varies the inductive coupling between the input link and the TAC tank circuit. The degree of coupling determines the loading of the transmitter.
- 3.1.2. Band Switch - A seven position switch which varies the inductance in the TAC tank circuit for coverage of the frequency range.
- 3.1.3. Tuning - A variable capacitor for tuning the tank inductance to resonance.
- 3.1.4. Load Adjust - A wheel rolling contact which serves to tap the tank inductor for proper impedance transformation.
- 3.1.5. Load Switch - A two position switch which is set to either BAL for balanced loads or UNBAL for unbalanced loads.

3.2.

DESCRIPTION OF TEST EQUIPMENT

3.2.1. TRANSMITTER:

The transmitter used in these tests is the TMC GPT-750, a bandswitch transmitter operating in the frequency range of 2 to 30 mcs. It has a pi output circuit and is conservatively rated at 750 watts.

3.2.2. DUMMY LOAD:

70 ohms: Corning type H 39-EC  
300 ohms: Two Corning type H 39-EC 600 ohm resistors connected in parallel  
600 ohms: One Corning type H 39-EC resistor  
1200 ohms: Two Corning type H 39-EC 600 ohm resistors connected in series.

Resistors during test forced air blower cooled.

3.2.3.

R.F.

Ammeters: 0-3 amp Simpson Model 137 internal thermocouple type (no correction)

0-1 amp Simpson Model 35 internal thermocouple type (correction included)

R.F. ammeters calibrated at 60 cps. against Sensitive Research Instrument Company 1% standard Model UVA.

FACTUAL DATA (Continued)

- 3.1.6. Rotor  
Switch - A two position switch which in general  
is set to UNGND for balanced loads or  
to GND for unbalanced loads.



The Antenna Tuning Unit Model TAC is mounted over the transmitter in a convenient location, and suitable R.F. connections made from the output of the transmitter to the input of the TAC.

Tests were conducted with balanced and unbalanced loads of 70, 300, 600 and 1200 ohm loads. The load connections are made on the back of the unit at locations indicated on the rear of the cover.

In performing the tests, the following procedure was employed:

3.3.1. The load termination is connected to the rear of the TAC in a balanced or unbalanced manner depending on the test.

3.3.2. For a balanced load, the LOAD switch is set to BAL.

The ROTOR switch is set to UNGND.

For an unbalanced load, the LOAD switch is set to

UNBAL.

The ROTOR switch is set to GND.

3.3.3. Since the frequency of operation and the load termination are known, the approximate settings of the COUPLING, BANDSWITCH and LOAD ADJUST controls may be obtained from the tuning charts.

Appendix I, Page

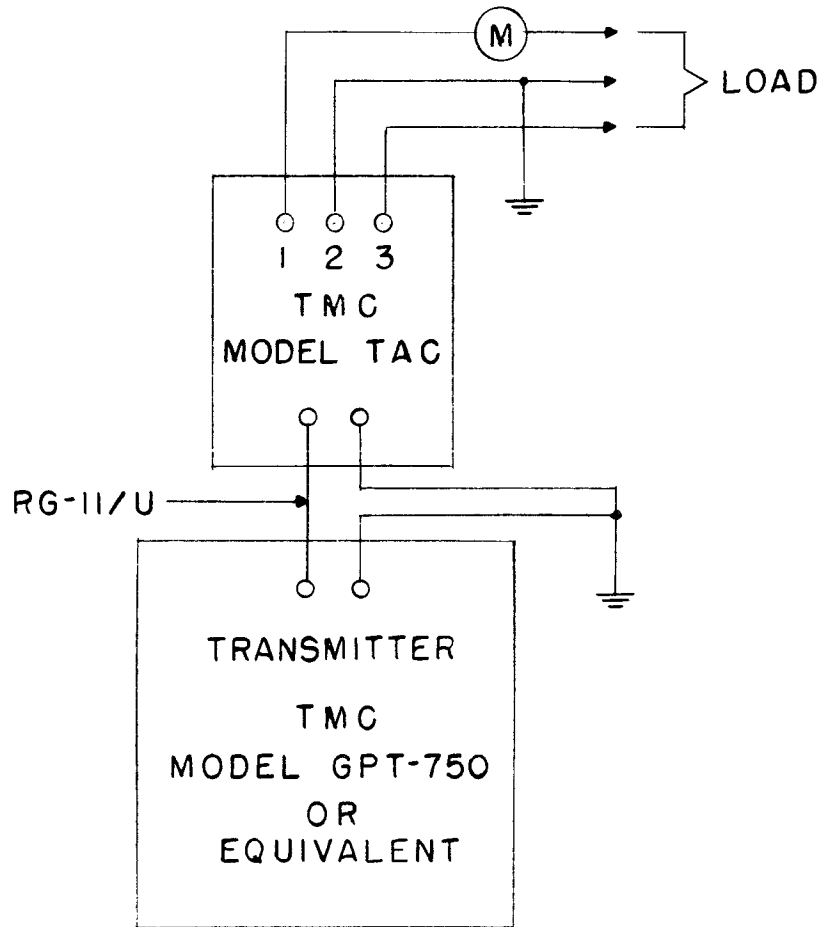
3.3.4. The transmitter is set to the tune position, and the final tank tuned to resonance. The TAC is then

## TEST PROCEDURE (Continued)

tuned to resonance as indicated by a loading of the plate current in the final amplifier. The load adjust controls are then adjusted for proper loading and optimum output. Evidence of serious overloading or under loading may be corrected by varying the coupling switch since this will vary the resistance reflected into the final amplifier.

- 3.3.5. When conditions appear normal for the low power state, the transmitter may then be stepped up to the rated 500 watt output., slight readjustment of the tuning and LOAD ADJUST controls may be necessary to compensate for the change in impedance of the final tank when placed on high power.
- 3.3.6. The R.F. current in the load is then recorded and power calculations made.
- 3.3.7. The frequencies chosen for the test are those which occur at the band limits to ensure adequate overlapping of bands.

### 3.31 TEST CONFIGURATION



BALANCED LOAD      TERMINALS 1 AND 3  
UNBALANCED LOAD    TERMINALS 1 AND 2

(M) R F AMMETER  
3 AMP FOR 70 AND 300 OHM LOADS  
1 AMP FOR 600 AND 1200 OHM LOADS

MODEL TAC  
TECHNICAL MATERIEL CORP.

TEST SUMMARY SHEET


9/24/55 DATE TEST BEGUN  
12/1/55 DATE TEST COMPLETED

FREQUENCY KILOCYCLES	LOAD OHMS	TAC TUNING	TAC COUPLING	TAC BAND SW.	TAC LOAD	TAC OUTPUT		TAC TUNING	TAC COUPLING	TAC BAND SW.	TAC LOAD ADJ.	TAC OUTPUT	
						AMPS	WATTS					AMPS	WATTS
						BALANCED LOAD						UNBALANCED LOAD	
3500	73	40	MAX.	LOW	146	2.7	527	38	MAX.	LOW	148	2.68	518
	300	41	"	"	146	1.34	540	39	"	"	157	1.32	512
	600	42	"	"	149	.92	508	39	"	"	167	.92	508
3500	1200	42	"	"	159	.66	522	39	"	"	170	.67	538
	300	0	MAX.	2	132	1.33	532	0	"	2	152	1.33	532
	73	42	2	2	126	2.69	520	39	2	2	123	2.69	520
5500	300	42	2	2	129	1.32	512	39	2	2	131	1.32	512
	600	42	2	2	130	.94	530	41	2	2	137	.95	542
	1200	43	2	2	135	.67	538	41	2	2	151	.68	558
5500	300	7	2	3	114	1.30	508	5	2	3	122	1.31	515
	73	43	3	3	121	2.72	532	42	3	3	117	2.71	530
	300	44	3	3	121	1.36	558	43	3	3	117	1.35	548
8600	300	47	3	3	125	.93	520	43	3	3	125	.92	508
	600	48	3	3	127	.68	558	44	3	3	132	.67	538
	300	.0	4	4	119	1.34	540	0	4	4	120	1.33	532
13000	73	37	4	4	117	2.68	518	36	4	4	111	2.69	520
	300	39	4	4	111	1.37	565	37	4	4	112	1.36	558
	600	39	4	4	111	.94	530	37	4	4	114	.93	520
13000	1200	40	4	4	113	.67	538	38	4	4	114	.67	538
	300	2	4	5	106	1.35	548	13	4	5	112	1.30	508
	73	36	5	5	111	2.72	532	37	5	5	114	2.72	532
18000	300	36	5	5	110	1.32	512	37	5	5	110	1.3	508
	600	37	5	5	109	.92	508	39	5	5	110	.94	530
	1200	39	5	5	109	.66	522	39	5	5	108	.66	522
18000	300	13	5	6	105	1.32	512	27	5	6	114	1.31	515

Recommendations: None. Data submitted.

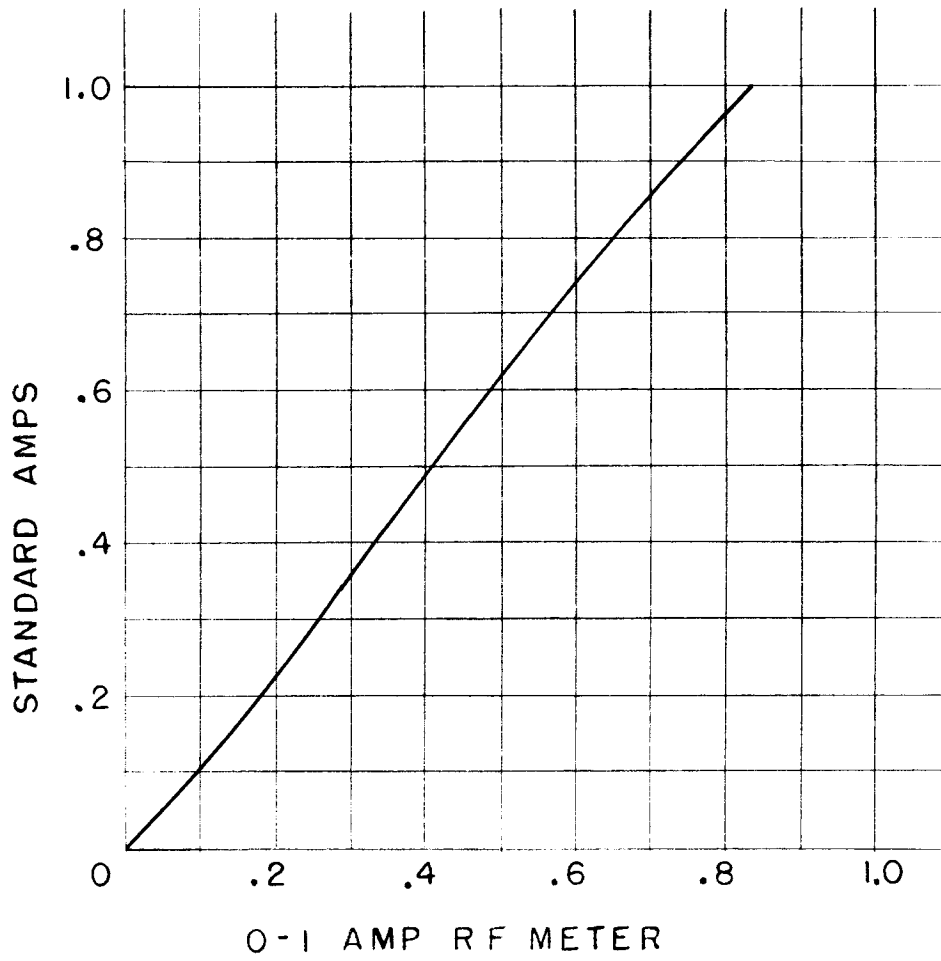
4. Signatures:

  
A. R. Bernardi,  
Project Engineer

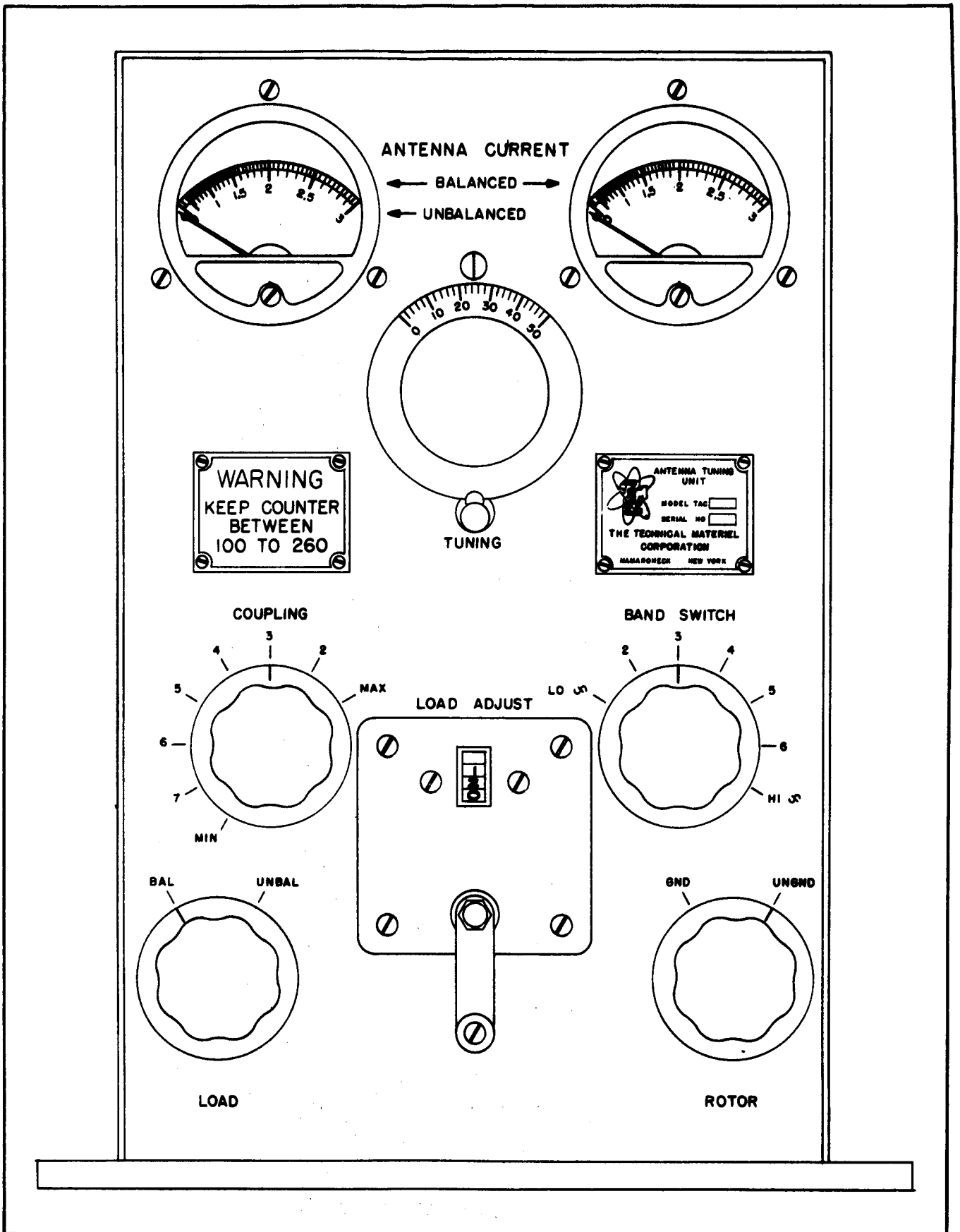
  
H. N. Olsen, QARIC,  
U. S. Signal Corps

**Appendix I.**

CALIBRATION CURVE  
0-1 AMP RF METER

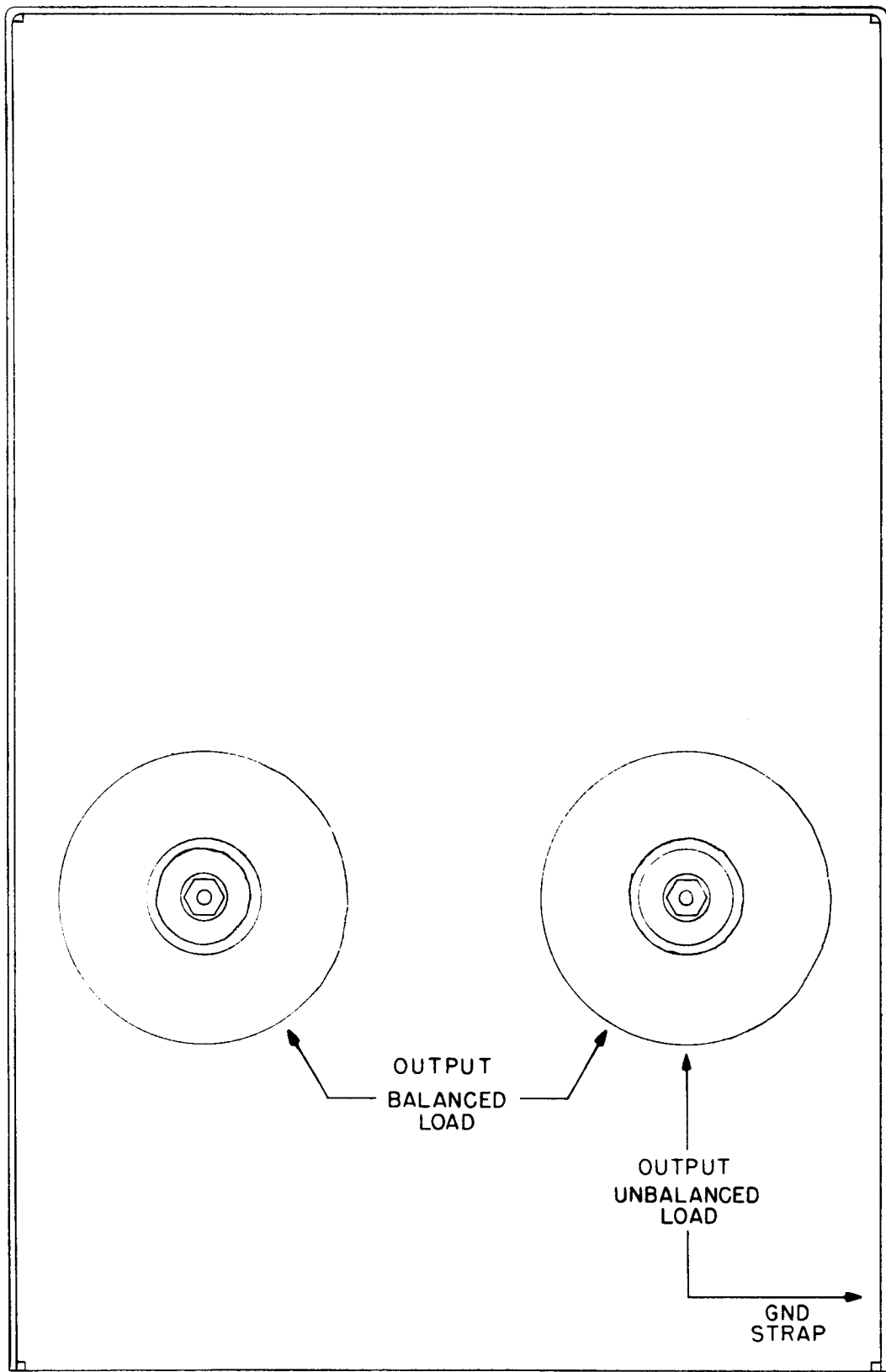


9/5/55



5.2.1 Front Pan 1, Antenna Tuning Unit. Model TAC.





5.2.2 Rear Panel, Antenna Tuning Unit. Model TAC.

# ANTENNA TUNING UNIT MODEL TAC TUNING CHART

APPROXIMATE SETTINGS FOR RESISTIVE LOADS

FREQ. Kcs	LOAD $\Omega$	BALANCED				UNBALANCED			
		TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER	TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER
2000 (C104 IN- STALLED)	70	15	MAX	LO	162	8	MAX	LO	155
	300	17	MAX	LO	181	8	MAX	LO	190
	600	19	MAX	LO	189	8	MAX	LO	220
	1200	20	MAX	LO	208	8	MAX	LO	260
2500	70	17	MAX	LO	147	15	MAX	LO	155
	300	17	MAX	LO	164	16	MAX	LO	182
	600	17	MAX	LO	174	16	MAX	LO	182
	1200	18	MAX	LO	183	18	MAX	LO	211
3000	70	32	MAX	LO	141	32	MAX	LO	150
	300	33	MAX	LO	159	32	MAX	LO	170
	600	34	MAX	LO	167	32	MAX	LO	177
	1200	35	MAX	LO	177	33	MAX	LO	190
3500	70	43	MAX	LO	210	40	MAX	LO	138
	300	43	MAX	LO	160	40	MAX	LO	155
	600	43	MAX	LO	171	42	MAX	LO	172
	1200	43	MAX	LO	180	42	MAX	LO	172
4000	70	9	2	2	122	8	MAX	2	126
	300	9	2	2	133	8	MAX	2	141
	600	10	2	2	137	8	MAX	2	150
	1200	10	2	2	143	10	2	2	168
4500	70	22	2	2	125	22	2	2	128
	300	22	2	2	131	22	2	2	142
	600	23	2	2	135	22	2	2	144
	1200	23	2	2	141	23	2	2	155
5000	70	32	2	2	129	32	2	2	129
	300	33	2	2	139	33	2	2	142
	600	34	2	2	147	34	2	2	150
	1200	35	2	2	150	34	2	2	152

CH-124-1

2000 - 5000 Kcs

# ANTENNA TUNING UNIT

## MODEL TAC

# TUNING CHART

### APPROXIMATE SETTINGS FOR RESISTIVE LOADS

FREQ. Kcs	LOAD $\Omega$	BALANCED				UNBALANCED			
		TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER	TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER
6000	70	42	2	2	129	41	2	2	128
	300	43	2	2	131	42	2	2	139
	600	44	2	2	134	42	2	2	142
	1200	44	2	2	139	43	2	2	153
7000	70	18	2	3	122	15	2	3	128
	300	21	2	3	133	21	2	3	139
	600	27	2	3	135	22	2	3	137
	1200	31	2	3	141	24	2	3	142
8000	70	28	2	3	127	26	2	3	125
	300	37	2	3	131	30	2	3	138
	600	40	2	3	129	33	2	3	140
	1200	43	2	3	131	34	2	3	147
9000	70	32	3	3	131	40	3	3	127
	300	38	3	3	129	46	3	3	140
	600	43	3	3	130	48	3	3	133
	1200	44	3	3	134	50	3	3	132
10000	70	41	3	3	121	40	3	3	126
	300	41	3	3	126	42	3	3	133
	600	42	3	3	127	44	3	3	132
	1200	44	3	3	129	45	3	3	135
11000	70	50	6	3	128	19	6	4	117
	300	24	8	4	119	21	6	4	125
	600	22	7	4	111	21	6	4	123
	1200	24	7	4	116	22	6	4	122
12000	70	26	6	4	122	26	6	4	120
	300	26	6	4	126	27	6	4	120
	600	32	6	4	123	28	6	4	120
	1200	36	6	4	123	30	6	4	121

CH-124 - 2

6000-12000 Kcs

# ANTENNA TUNING UNIT MODEL TAC TUNING CHART

## APPROXIMATE SETTINGS FOR RESISTIVE LOADS

FREQ. Kcs	LOAD $\Omega$	BALANCED				UNBALANCED			
		TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER	TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER
13000	70	14	6	4	124	25	4	4	130
	300	22	4	4	115	32	4	4	135
	600	24	4	4	113	42	7	4	120
	1200	24	4	4	114	43	7	4	118
14000	70	30	6	4	123	34	6	4	122
	300	40	6	4	120	38	6	4	122
	600	45	6	4	120	38	5	4	116
	1200	47	6	4	120	40	6	4	116
15000	70	36	6	4	120	40	4	4	120
	300	43	7	4	117	43	4	4	122
	600	47	7	4	115	45	4	4	120
	1200	50	7	4	114	45	4	4	117
16000	70	30	MIN	5	119	32	6	5	119
	300	36	MIN	5	112	34	6	5	116
	600	37	MIN	5	111	36	6	5	116
	1200	39	MIN	5	111	37	6	5	116
17000	70	35	7	5	120	36	6	5	119
	300	41	MIN	5	114	39	6	5	119
	600	42	MIN	5	111	42	4	5	114
	1200	48	MIN	5	111	42	4	5	115
18000	70	40	7	5	118	43	5	5	120
	300	40	7	5	115	42	6	5	117
	600	39	7	5	115	44	6	5	118
	1200	45	7	5	115	50	6	5	114
19000	70	14	7	6	202	34	3	6	168
	300	10	7	6	199	24	6	6	178
	600	11	7	6	199	25	6	6	176
	1200	11	7	6	201	25	6	6	176

GH-124-3

13000 - 19000 Kcs

# ANTENNA TUNING UNIT

## MODEL TAC

# TUNING CHART

### APPROXIMATE SETTINGS FOR RESISTIVE LOADS

FREQ. Kcs	LOAD $\Omega$	BALANCED				UNBALANCED			
		TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER	TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER
20000	70	33	5	6	155	30	4	6	190
	300	14	7	6	178	29	4	6	174
	600	14	7	6	178	30	4	6	174
	1200	13	7	6	173	30	4	6	174
21000	70	26	7	6	202	31	6	6	192
	300	24	7	6	200	32	6	6	182
	600	25	7	6	200	33	6	6	180
	1200	25	7	6	194	33	6	6	179
22000	70	37	7	6	181	34	6	6	182
	300	20	7	6	180	35	5	6	176
	600	22	7	6	170	35	5	6	179
	1200	22	7	6	185	35	5	6	168
23000	70	30	7	6	198	36	7	6	185
	300	32	7	6	194	36	7	6	183
	600	33	7	6	186	36	7	6	182
	1200	30	7	6	186	36	7	6	182
24000	70	30	7	6	180	39	7	6	184
	300	30	7	6	182	39	7	6	181
	600	30	7	6	182	40	7	6	180
	1200	30	7	6	182	40	7	6	180
25000	70	35	7	6	188	13	7	6	197
	300	40	7	6	194	13	7	6	197
	600	40	7	6	194	13	7	6	197
	1200	40	7	6	194	13	7	6	191
26000	70	35	7	6	197	20	6	6	150
	300	35	7	6	188	25	6	6	151
	600	35	7	6	188	25	6	6	151
	1200	35	7	6	188	13	6	6	160

GH-124-4

20000 - 26000 Kcs

# ANTENNA TUNING UNIT

## MODEL TAG

# TUNING CHART

APPROXIMATE SETTINGS FOR RESISTIVE LOADS

FREQ. Kcs	LOAD $\Omega$	BALANCED				UNBALANCED			
		TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER	TUNING CONDENSER	COUPLING TAP	BANDSWITCH TAP	LOAD ADJ. COUNTER
27000	70	37	5	6	129	40	6	6	128
	300	42	6	6	124	47	6	6	132
	600	42	6	6	124	38	6	6	132
	1200	42	6	6	128	19	5	6	109
28000	70	44	7	6	129	44	6	6	133
	300	44	7	6	129	50	6	6	132
	600	44	7	6	129	50	6	6	132
	1200	44	7	6	129	50	6	6	132
29000	70	40	7	6	132	45	5	6	143
	300	40	7	6	132	50	5	6	132
	600	40	7	6	132	48	5	6	133
	1200	40	7	6	132	35	5	6	131
30000	70	50	7	6	149	20	4	HI	130
	300	50	MIN	6	127	22	4	HI	120
	600	50	MIN	6	127	22	4	HI	120
	1200	50	MIN	6	127	15	4	HI	122

GH-124-5

27000 - 30000 Kcs