

TMC SPECIFICATION

NO. S 1216

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COMPILED: ER

CHECKED: *ER*

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SHEET

OF

TITLE:

2/5/68 jb/

FINAL TEST AND INSPECTION PROCEDURES

FOR

ATLA-2.5K

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SECTION 1

GENERAL INSPECTION AND MANUAL TUNING

A. TEST EQUIPMENT REQUIRED:

1. TMC Model PTE Spectrum Analyzer
2. Simpson Model 260 multimeter or equivalent
3. H-P Model 410B VTVM or equivalent
4. TMC Model TER-5000-50U unbalanced dummy load or equivalent
5. H-P Model 606A Signal Generator or equivalent

B. MECHANICAL INSPECTION:

1. Give this rack a good visual inspection for obvious defects, check the cabling to see that no strain exists when the units are pulled out and tilted, check the slides for ease of operation sliding in and out. All units should line up in rack and no contact made from panels.
2. Check all knobs and switches on the Transmitter for proper operation.
3. Check PA Tune, PA Load controls for a counter indication of about 000 corresponding to maximum capacity.
4. Carefully check for good mechanical condition, obvious miswiring and loose connections.
5. Check power supplies, AP-128 and AP-129, for loose connections and correct value of circuit components.

C. PRELIMINARY ELECTRICAL INSPECTION:

1. With Main Power Switch OFF, check for short circuits to ground.
 - a. The 3 power input phase should read not less than 1 megohm.
 - b. The positive side of the high voltage circuit should read not less than 100 K Ohms with the shorting relay contacts open. With the shorting relay contacts closed; this reading should be ZERO.
2. The following units must be checked for proper termination of cables:
 - Final Amplifier
 - Power Supplies
 - Local Control Panel
 - SWR and or Drive Control Unit
 - Tuning Control System
 - Alarm Panel
 - Preposition Panel (if applicable)

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C. PRELIMINARY ELECTRICAL INSPECTION (continued)

3. Check complete unit for correct value of fuses.
4. Check to insure that PA output circuitry is correctly connected, including DUMMY LOAD.
5. Adjust 1st Amp, 2nd Amp and PA Bias pots for maximum bias. (counterclockwise)
6. Adjust timer M-6000 in the AP-129 for 1 minute.
7. Turn on Main Power switches and observe following:

- a. Technimatic light must go on.
- b. The PA Blower and top fan must turn on.

D. CIRCUIT FUSING CHECKS:

1. Make sure that at least one interlock is open.
2. With the Main Power switch OFF, remove the blower fuse. The main blower and top fan must not run when the Main Power switch is closed. Open Main Power switch and replace the fuse. Close Main Power switch and continue fusing circuit checks below.
3. Remove the Filament fuse, the PA Bias Light will go out.
4. Remove the LV Fuse, PA Bias Light should go out and relay mat chatter.
5. Place Servo On-Off Switch located on TCP-3 to ON.
6. Remove the IPA Bandswitch fuse and turn the SWC() Band Knob. The IPA and the PA Bandswitches should not turn. Replace the fuse and the Bandswitch should turn. At this time you can check to see if the nine Bandswitch and PA Bandswitch positions are correct for each band as compared with the SWC() Band positions.
7. Remove the PA Bandswitch fuse and turn the SWC() Band Knob. The IPA Bandswitch will turn but the PA Bandswitch will not turn. Replace the fuse and the PA Bandswitch should turn.
8. Remove first one and then the other interlock fuse and the interlock light on TCP should go out.

E. PROTECTIVE INTERLOCK SYSTEM:

1. Before checking the interlock system insure that a jumper is connected from COM to NO TERMINALS 1 and 2 on E8006 (E8002, ATLA) on the rear junction box. The interlock indicator light and switch are connected in such a manner that the indicator will be ON if all interlocks are closed. To find an open interlock always turn the interlock switch to extreme counter-clockwise position (PS Covers); rotate in clockwise direction to the position where the indicator

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light goes out. This is an open interlock. In cases where there is more than one interlock open the above procedure must be repeated until all interlocks are closed and all individual interlock lights are energized.

NOTE: For this check the PS Covers, PA Covers, the Air-switch and Timer will not trip the HV Breaker.

2. When checking the Timer, all of the other interlocks should be closed and in 60 seconds the Timer will energize and the Timer Light will light. After the 60 seconds and the Timer Light is on the relay K-6001 located in the AP-129 should energize.
3. With the Main Power switch closed(ON), each interlock should be opened and closed with the interlock indicator switch in the appropriate position to show that the interlock is properly wired. Each time an interlock is opened the High Voltage switch should be placed in the ON position. This switch should trip, preventing High Voltage from coming on.

F. PROTECTIVE RELAY CHECKS:

1. Caution line voltage is present at all times on leads connected to top of Main Power switch located in TCP-3. Unlatch the following overload relays and note that the corresponding overload light indicators light.
 - a. PA Plate
 - b. PA Screen

By pushing the Overload Reset Switch on the Main Control Panel the overload light indicators must go out and stay out and the overload relays must reset.

2. Check to see if the Filament Elapse Meter is operating. This meter will operate as long as the Main Power is on.
3. On the TLA - () place the multi-meter switch in the 1st Amp Ip position, and adjust the 1st amp pot located on the AP-128 for a plate current of 10 mills on multi-meter.
4. On the TLA- () place the multi-meter switch in the 2nd Amp Ip position and adjust the 2nd amp pot located on the AP-128 for a plate current of 12 mills on multi-meter.
5. On the TCP place the auto-manual switch in the Manual position. Turn on the High Voltage. Adjust the PA bias control located on the AP-128 for a PA Plate Current of 450 M.A. indicated on the TLA - () Plate Current Meter.

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6. With the High Voltage on, the High Voltage Light should be lit. On the AX-633 place the Alarm Switch to the On position. The alarm will not sound. With the Alarm Switch left in the On position, turn OFF the High Voltage. Now the alarm should sound indicating that the High Voltage is Off. Also, the High Voltage light should be Off. Turn OFF Alarm Switch. Check to see if Plate Elapse Time Meter is operating. When High Voltage is On, the Meter should operate. When High Voltage is Off, it should stop.

G. CHECK OF PROTECTIVE DEVICES FOR REMOVAL OF HIGH VOLTAGES:

1. With the transmitter energized as in Paragraph above, and with the Alarm Switch in the ON position, mechanically trip Protective Devices as listed below in sequence. Each time a Protective Device is mechanically tripped the device must be reset electrically.
 - a. PA Plate overload
 - b. PA Screen overload
2. Turn High Voltage OFF. Remove PA Bias Fuse. Placing HV switch in ON position should not energize the HV.
3. Mechanically tripping each of the above devices one at a time, the High Voltage must go OFF, the alarm must be energized, the Plate Elapse time meter must stop running.
4. Turn the High Voltage switch to the OFF position.

H. PARASITIC CHECK:

1. Set the 2nd amp and PA Bandswitches to 24-30 band.
2. Set the PA loading capacitor to minimum capacity.
3. With no RF drive turn ON the High Voltage switch.
4. Rotate the PA tune capacitor from minimum to maximum capacity. There must be no indication on the PA Plate RF meter.
5. Turn OFF the High Voltage switch.

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I. OVERLOAD ADJUSTMENTS:

1. Connect the Signal Generator into the TLA.
(You can also use the SBE-10, CHG-3 or equivalent exciter.)
2. PA Plate overload
 - a. Tune transmitter to full output on any frequency within range.
 - b. Overload the transmitter output by increasing the PA output loading (decreasing Output Load capacity). PA output loading (decreasing Output Load capacity).
 - c. Retune the PA and increase the Signal Generator output.
 - d. Adjust the PA Plate overload adjust to trip at 1.3 amperes.
3. PA Screen overload
 - a. With the transmitter tuned as in Paragraph 2a, above, underload transmitter output by decreasing the PA output loading (increasing Output Load capacity).
 - b. Connect a Simpson 260 meter in series with the screen overload relay K4003 or Terminal 1 E4001.
 - c. Return the PA and increase the output of the Signal Generator to increase the screen current.
 - d. Adjust the PA Screen overload with the PA Screen. Adjust to trip at 45 ma.

J. TRANSMITTER TUNING GENERAL:

1. Set transmitter tuning controls to the approximate setting for the desired output frequency either from previous tuning charts or sample tuning chart in the instruction book.
2. Set the Signal Generator output to minimum to prevent the PA Screen overload from tripping, and always be certain that the drive is at minimum before applying high voltage to the transmitter.
3. Turn transmitter ON with High Voltage OFF. Set Signal Generator to 5 MCS.

NOTE: Set the multimeter switch on the TLA() to the 2nd amp EP position. Advance exciter output slightly and adjust the 2nd amp tuning capacitor to resonance peak indication on the meter.

4. Set Signal Generator output to minimum and turn High Voltage ON.

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5. Advance SB exciter output to a point where the PA Plate current increases and adjust PA Tuning to resonance, dip PA Plate Current Meter.
6. Adjust PA Load until the PA is properly loaded, depending on the frequency. After each change of loading the PA tuning should be retuned to resonance. Proper loading usually will occur at a power output of 2.5KW, and a plate current of between .8 and 1.2 amps depending on frequency.

K. INTERMODULATION DISTORTION AND POWER TEST:

1. Connect 50 ohm resistive dummy load to XMTR output jack J-8304 located at top, rear, right of cabinet. On AX294, place Band Switch Auto/Man to Auto. Turn ALDC fully counter-clockwise. Place multi-meter switch located on TLA () to 2nd amp EP position.
2. Tune XMTR to frequencies indicated on TEST DATA sheet MARKED Intermodulation Distortion/Tuning/Power Output: and record PA Tune, PA Load, PA IP amp; P out KW PEP and DIST for each Frequency in appropriate spaces.
3. This Test should be conducted under automatic tuning conditions.

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L. PRE-POSITION CHECK OUT:

1. On TCP unit, place the Servo ON/OFF switch in the Off position.
2. Install Load Servo Module and place the Servo ON/OFF switch to the ON position. Check to see if the fault light is On. If it is ON the Servo Amp will not have the 220 Volt input voltage. Press the tune button on the TCP. The fault light should go Out and the A.C. light on the Servo will light.
3. On the SWC() place the Master Band Switch on the 2-2.5 MHz position.
4. Vary load preposition pot #1 located under side SWC , CW, Rotation of pot causes load knob to move CW and counter numbers to decrease to zero, opposite condition occurs when pot moved CCW, with pot max CCW, numbers should be approximately 180.

Install tune servo module. AC light comes on with Band Switch on SWCA to 2-2.5, tune counter should read approximately 150. On Bands 2.5-3, a slight change will be noted (reading of approximately 148) Place BS on SWC to 24-26 mc position; tune counter will indicate approximately 80. With BS on SWCA from 26-30 mc position. Tune counter will not move, but load counter will indicate a change, the amount of which is insignificant at this time.

Leave 2nd amp servo module out.

M. ALIGNMENT:

1. BS on SWCA to 2-2.5 mc
2. Connect Signal Gen. to J8011 (RF Drive) interconnection junction box.
3. On TCP, place SERVO switch to OFF.
4. Set Signal Gen. to 2 mc, 2 V output RMS.
5. With Multi-meter SW on TLLA in 2nd amp EP position, advance RF Gain Control on SWCA and adjust 2nd ampl. tuning control for max. peak indication on multi-meter.
6. Place RF Gain Control on SWCA fully CCW.

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7. Set HP VTVM to -DC Volts, 1V Range, and set pointer to center scale. Connect the VTVM to SENSE jack J-9003 and set sense function SW to PA load position.

Turn HV CKT breaker on.
8. Manually tune and load XMTR for maximum output with minimum input. Output should be 2.5 KW, with plate current between .8 and 1.2a, depending on frequency.
9. Move RF Gain Control on SWCA CCW until PWR meter reads 1KW.
10. Adjust load sense pot #1 for a reading on the VTVM for (0) Volts. (Zero Volts is center scale)
11. Detune XMTR by moving Tune and Load controls at random.
12. Adjust alternately the Tune and Load Capacitors on TLAA for a reading of -.25 V on VTVM. Note Load Counter reading.
13. Set sense function switch S-9001 on the AX633 to the PA Plate trigger position.
14. Adjust the plate trigger pot located on the bottom center of the TLA- () for a reading of .5 negative voltage on the VTVM
15. RF Gain on SWC fully CCW.
16. Place HV CKT breaker to OFF.
17. On TCP-1 place SERVO Switch ON.
18. Adjust pot #1 load preposition to obtain reading obtained in step 12.
19. It should be noted that whenever we are talking about the automatic tuning of the transmitter the fault light must be off.
20. Turn ON the High Voltage.
21. Adjust RF drive on the SWC- () for a reading of 300 ma. of plate current as indicated on the PA plate current meter.
22. On the front of the Tune Servo amplifier there is a pot R.F.P.O. (RF Power On). Adjust this pot to a point where the search light on the tune servo amplifier is energized. At the same time that the tune servo amplifier goes into search, the PA tuning capacitor will rotate in a clockwise direction.

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23. The PA tune capacitor will continue tuning until a negative .5 volts is reached on the PA plate trigger. At this time, the Tune Servo Amplifier will go into operate and the Load Servo Amplifier will go into search causing the Load Capacitor to rotate in a clockwise direction until the error voltage to the Servo Amplifier reaches Zero. This voltage can be seen on the VTVM when the switch S-9001 is in the PA load position. Then the error voltage is at Zero, the Load Servo Amplifier will go into operate.
24. Observe the output on the meter on the SWC- (). After a 5 second delay the servo amplifier will turn Off and the RF gain control will drive down causing the output to go down. The RF gain control will drive all the way down until it hits the limit switches, then it will reverse and start driving up. It will continue to drive up until the output indicator hits the first red pointer. The red pointer should be set to 2.5 KW. When the output indicator reaches the first pointer it will also energize the ready light.
25. Set RF gain control on the SWC- () for 1.0 KW output. Manually adjust tune control to see if the transmitter is in resonance. If the controls are appreciably far from resonance then an adjustment of the tune sense balance capacitor located in the TLAA is required.
26. Set RF gain control on the SWC- () to minimum.
27. High Voltage circuit breaker on TCP to Off position.
28. On TCP-1 depress Tune button. Tune and load controls on TLAA will return to preset position and Tune Load servo amps will come on.
29. This completes the adjustment of one of the load pre-position pots. There are six more to do. To do this with the exception of 13, 14-22 repeat steps 1 through 28. Refer to load pre-position adjustment chart for band position and pot position.

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LOAD PRE-POSITION CHART

POTENTIOMETERS	PRE-POSITION BANDS	COUNTER READING
1	2 - 2.5	
2	2.5 - 3	
	3 - 4	
3	4 - 5	
	5 - 6	
4	6 - 7	
	19 - 22	
	22 - 24	
	24 - 26	
5	7 - 9	
	11 - 13	
	15 - 17	
6	9 - 11	
	17 - 19	
	28 - 30	
7	13 - 15	
	26 - 28	

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N. INSTALL 2nd AMPLIFIER SERVO:

- a. Set Sig. Gen. for exactly 100 mw output.
- b. Adjust R7014 on SWC for .5V positions on VTVM.
- c. Place HV CKT Breaker to On.
- d. Depress Tune button on TCP-1.
- e. 2nd amp servo will go into search.
- f. 2nd amp Tuning control will search in a CCW direction for a resonant point (drive 2nd amp).
- g. RF drive on SWCA will drive up for 300 ma PA plate current; tune, load, servos will adjust PA for proper tuning and loading.
- h. RF drive control on SWC will drive down to Zero.
- i. RF drive control on SWC will drive up to preset position.

READY LIGHT WILL COME ON.

O. CHECK OF SECOND LIMIT SWITCH ON METER ON SWC:

Adjust 1st lower (left) limit pointer for 1.5 KW.

Adjust 2nd upper (right) limit pointer for 2.5 KW.

Advance signal gen. for output beyond 2nd pointer, about 3.5 KW.

RF Gain Control should drive down to 2nd pointer (upper limit) position.

P. FAULT LIGHT ADJUSTMENT:

HV CKT Breaker OFF

Press Tune button on TPC-1. READY LIGHT SHOULD BE OUT.

Signal generator output to Zero.

Fault lamp should light in 60 seconds; and 3 servo amps should shut off. If these conditions do not occur, adjust R-7019 on SWC, its control on PC 266; use card extender.

Signal generator to 2.5 mcs.

Depress Tune button.

HV Breaker to ON.

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Adj. Sig. generator output to 100 mw.

System will tune XMTR at 2.5 mcs.

Q. SWR ADJUSTMENT:

Servo tune XMTR at 2.0 mcs; HV OFF; RF Gain Control fully CCW.

In the directional coupler at rear of XMTR, rotate reflected diode 180° (arrow toward top).

Set S 7001 at rear of SWCA to 2 to 1 position.

HV Breaker ON

Drive XMTR to a power of 260-290 watts

Hold KW REFL switch on front of SWCA down, then release.

SWR ovld light should light; HV breaker should kick down.

Set S 7001 to 3.1 pointer. Repeat steps 4,5,6, 7 with 500 watts drive.

Return REFLECTED DIODE to normal position.

R. ALDC ADJUSTMENT:

- A. Set the main ALDC control potentiometer, located on the front panel of the TLAA, to its midpoint position.
- B. Extend the SWCA-3K unit so as to expose R-7038, R-7039 and R-7040 which are accessible from the underside.
- C. Tune the transmitter into a resistive load, to a frequency between 2-5MHz. Adjust the output using the carrier only, to a level of 2.7KW. Adjust R-7038 until the output drops to 2.5 KW.
- D. Tune the transmitter to a frequency between 5-15 MHz and follow the procedure outlined in Step C with the following exception: R-7039 is adjusted to obtain the 2.5KW reading.

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- E. Tune the transmitter to a frequency between 15-30 MHz and follow the same procedure as set forth in Step C with the following exception: R-7040 is adjusted to obtain the 2.5KW reading.
- F. It is emphasized that the ALDC capturing voltage be adjusted in such a manner as to make its affects definitely discernable.
- G. Return the SWCA into the rack and secure. If further ALDC adjustment is required, the main ALDC pot located on the front panel is to be used.

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TEST DATA SHEET

CONTROL SETTINGS				INDICATOR READINGS			
F _{mc}	VOX-5 FREQ.	PA BAND	PA TUNE	PA LOAD	PA OUTPUT KW	PA I p amp	DIST. DB
2.0	2.250	2-2.5			2.5		
2.5	2.750	2-2.5			2.5		
2.5	2.750	2.5-3.0			2.5		
3.0	3.250	2.5-3.0			2.5		
3.0	3.250	3.0-5.0			2.5		
5.0	3.250	3.0-5.0			2.5		
5.0	3.250	5.0-7.0			2.5		
7.0	3.250	5.0-7.0			2.5		
7.0	3.250	7.0-11.0			2.5		
11.0	3.250	7.0-11.0			2.5		
11.0	3.250	11.0-15.0			2.5		
15.0	3.250	11.0-15.0			2.5		
15.0	3.250	15.0-19.0			2.5		
19.0	3.250	15.0-19.0			2.5		
19.0	3.250	19.0-24.0			2.5		
24.0	2.250	19.0-24.0			2.5		
24.0	2.250	24.0-30.0			2.5		
30.0	2.250	24.0-30.0			2.5		

INTERMODULATION DISTORTION/TUNING/POWER OUTPUT:

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CHECK-OFF SHEET

- B. MECHANICAL INSPECTION _____
- C. PRELIMINARY ELECTRICAL INSPECTION _____
- D. CIRCUIT FUSING CHECKS _____
- E. PROTECTIVE INTERLOCK SYSTEM _____
- F. PROTECTIVE RELAY CHECKS _____
- G. CHECK OF PROTECTIVE DEVICES FOR REMOVAL
OF HIGH VOLTAGES _____
- H. PARASITIC CHECK _____
- I. OVERLOAD ADJUSTMENTS _____
- J. TRANSMITTER TUNING GENERAL _____
- K. INTERMODULATION DISTORTION AND POWER TEST _____
- L. PRE-POSITION CHECK OUT _____
- M. ALIGNMENT _____
- N. INSTALL 2nd AMPLIFIER SERVO _____
- O. CHECK OF SECOND LIMIT SWITCH ON METER ON SWC _____
- P. FAULT LIGHT ADJUSTMENT _____
- Q. SWR ADJUSTMENT _____
- R. ALDC ADJUSTMENT _____

