

# TMC SPECIFICATION

NO. S 1007

REV:

Ø A

COMPILED: RP

CHECKED:

APPD:

*Handwritten signature and date: 9/1/65*

SHEET 1

OF 13

TITLE: KIT 180

typed by vab 9/1/65

TEST PROCEDURE

KIT 180

SECTION 1:

GENERAL VIEW OF THE KIT

SECTION 2: MATERIALS

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SHEET

2

OF 13

TITLE:

KIT 180 SECTION 1

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## TEST EQUIPMENT REQUIRED

- A. TMC PTE SPECTRUM ANALYZER
- B. SIMPSON 260 OHMMETER OR EQUIVALENT
- C. TWO RF AMMETERS 0-5 RFA
- D. TER 18K 50 OR 70 OHM UNBALANCE LOAD
- E. TER 18K 600 OHM BALANCE LOAD
- F. CALIBRATED DIRECTIONAL COUPLER WATTMETER MODEL 4715 OR EQUIVALENT.

NOTE: FOR TRANSMITTERS NOT EQUIPPED WITH SWCU-1 DIRECTIONAL WATTMETER, PART "M" TESTS SHALL BE OMITTED.

DATE 1 Sept. 1965		TMC SPECIFICATION NO. <u>S-1007</u>	A
SHEET <u>3</u> OF <u>3</u>			
RP COMPILED	CHECKED	TITLE: KIT 180 SECTION 1	
APPROVED			

\*A. MECHANICAL INSPECTION

- ✓ 1. Check all knobs and switches on the PA frame for proper operation.
2. Check PA Tune, PA Load, Mode (TUNE-OPERATE-EMERGENCY) and Output Balance controls for a counter reading of about 000 corresponding to minimum capacity.
3. Check to see that PA bandswitch counter reading correspond to proper PA bandswitch position.
4. Carefully check the PA bandswitch and PA compartment for good mechanical condition, obvious miswiring and loose connections.
5. Check power supply for loose connections and correct value of circuit components.
6. Check hose clamps and make sure they are tight.

B. PRELIMINARY ELECTRICAL INSPECTION

- \*1. With Main Power switch OFF, check for short circuits to ground:
  - a. The 3 power input phases should read not less than 1 megohm.
  - b. The positive side of the high voltage circuit should read not less than 100k 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:
  - a. Relay Panel
  - b. Bias Drawer
  - c. IPA Drawer
- \*3. Check complete unit for correct value of fuses.

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## TMC SPECIFICATION

NO. S 1007

REV:  $\emptyset$  A

COMPILED: RP

CHECKED:

APPD:

SHEET 4 OF 13

TITLE:

KIT 180 SECTION 1

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4. Check to insure that PA output circuit is correctly connected for unbalanced output.
5. Check water in reservoir and make sure it is up to water line. Turn on Main Power switches and Pump Switch.
  - a. Main Power and pump must go on.
  - b. The PA Blower must come on. "Water On" indicator must light. The water level in 10K boiler must come up to normal level.
  - c. Check system for water leaks.

## \*6. Circuit fusing checks:

- a. With the Main Power switch Off, remove F-701 B-801 main blower fuse for main blower B-801, the main blower 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.
  - b. Remove Rear Fan fuse, the Rear Fan will stop.
  - c. Remove the PA Filament fuse, the PA filament voltage must be removed.
  - d. Remove the Timer fuse, the PA filament voltage must be removed.
  - e. Remove the IPA Blower fuse, the IPA blower must stop.
  - f. Remove the IPA Filament fuse, the IPA filament voltage must be removed from the IPA tube.
  - g. Remove the IPA LV fuse, this must remove the AC power from the LV power supply.
  - h. Remove the IPA Bias fuse, this must remove the IPA Bias voltage and deactivate the IPA Bias relay.
  - i. Remove the B plus fuse on the driver drawer, this must remove the B plus voltages, 200 and 400 volts.
- \*7. The Filament Primary voltmeter must read the AC filament primary voltage and Filament Adjust control must vary this reading. It must be adjusted to read as close as possible to the red mark on the voltmeter.

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DATE 1 Sept. 1965

SHEET 5 OF 13

TMC SPECIFICATION NO. 51007

A

COMPILED

CHECKED

TITLE: KIT 180 SECTION 1

APPROVED

- \*8. The PA Bias voltmeter should read between -215 and -300 volts and be adjustable by the PA Bias adjust control on the relay panel. Set this to -Max. volts.
- \*9. Set the IPA Bias to about -100 volts using the IPA Bias adjustment on the driver panel.
- \*10. Unlatch the following overload relays and note the corresponding overload light indicator, it must light:
  - a. PA Plate
  - b. PA Screen
  - c. IPA Plate
  - d. IPA Screen

By pushing the Overload Reset switch on the main control panel the overload light indicators must go out and the overload relays must reset.

- \*11. The energizing of the Tune Operate lights must correspond to the position of the Tune-Operate switch. Also the Tune-Operate relay must energize and deenergize with this switch.
- \*12. With the PA Screen switch in the ON position the PA Screen relay must be deenergized. When in the OFF position the relay must energize.
- 13. The Filament Elapse time meter must indicate when the filaments are on.
- \*14. Check the Time Delay relay for proper operation and time interval, between 3 and 5 minutes.
- \*15. With the Alarm switch ON the alarm must sound.

C. PROTECTIVE INTERLOCK SYSTEM

- 1. Before checking the interlock system insure that a jumper is connected from COM to NO (terminals 8 and 10) on E-3000 on the rear panel of the auxiliary frame.

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DATE 1 Sept. 1965

SHEET 6 OF 13

TMC SPECIFICATION NO. S1007 A

COMPILED

CHECKED

TITLE: KIT 180 SECTION 1

APPROVED

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 counterclockwise position (IPA Bandswitch); rotate in clockwise direction to the position where the indicator 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. With the interlock switch in the H.V. DECK position the interlock indicator light is monitoring the IPA DRAWER, and the HIGH VOLT DECK interlocks. If the IPA DRAWER indicator is ON, and the High Volt Deck interlock indicator is OFF. This condition indicates the IPA DRAWER is not properly closed.

\*2. With the Main Power switches and breaker switch, on each interlock must be checked individually by manually opening and observing the following:

- a. The Shorting relay must release (deenergize).
- b. The corresponding indicator light should go out.
- c. To check PA water, turn boiler knob fully counterclockwise until water level drops causing shorting relay to release.

D. HIGH VOLTAGE CHECKS

1. NOTE: Main Power SW and Pump Breaker 40K must be on.

2. Turn ON the High Voltage switch and check following:

- a. As the 1st contactor is energized the RED HV light on top of transmitter must light somewhat dimly.
- \*b. Before the 2nd contactor is energized the PA Plate voltmeter must read approximately 2.5 KV.
- \*c. The time interval between energizing of the 1st contactor and the 2nd contactor must be approximately 5 seconds.
- \*d. After the 2nd contactor is energized the PA Plate voltmeter should read approximately 7.5 KV, and the RED HV light on top of the transmitter should be at full brightness.

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DATE 1 Sept. 1965

SHEET 7 OF 13

TMC SPECIFICATION NO. S1007 L

A

COMPILED

CHECKED

TITLE: KIT 180 SECTION 1

APPROVED

- \*3. The PA Screen voltmeter should read approximately 1150 volts with the Tune-Operate switch in the Operate position and approximately 550 volts when in the Tune position.
4. Placing the Screen Voltage switch in the OFF position should remove the screen voltage.
- \*5. The IPA Screen voltage must change from approximately 400 volts to 200 volts as the Tune-Operate switch is moved from the Operate to Tune Position.

#### E. IDLING PLATE CURRENT ADJUSTMENTS

1. With transmitter energized, pump running, HV switch ON, Tune-Operate switch in Operate position and Screen Voltage switch in ON position make following adjustments:
- \*a. Adjust PA Bias on the relay panel to a PA Plate current reading of 0.5 ampere.
- \*b. Adjust IPA Bias on the driver drawer for an IPA plate current of 200 ma.

#### F. CHECK OF PROTECTIVE DEVICES FOR REMOVAL OF HIGH VOLTAGES

1. With the transmitter energized as in paragraph E 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, and the HIGH VOLTAGE must be turned ON again, before testing the next PROTECTIVE DEVICE.
- \*a. PA Plate overload
- \*b. PA Screen overload
- \*c. Zener Diode Protect relay
- \*d. IPA Plate overload
- \*e. IPA Screen overload
- \*f. PA and IPA Bias relays (by removal of respective fuses).

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DATE 1 Sept. 1965

SHEET 8 OF 13

TMC SPECIFICATION NO. S1007

A

COMPILED

CHECKED

TITLE: KIT 180 SECTION 1

APPROVED

2. 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.
3. Turn the High Voltage switch to the OFF position.

#### \*G. PARASITIC CHECK

1. Set the IPA and PA bandswitches to the 24-28 mc. 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.

#### H. OVERLOAD ADJUSTMENTS

##### \*1. PA Plate overload.

- a. Tune transmitter to full output on any frequency within its range.
- b. Overload the transmitter output by increasing the PA output loading (decreasing Output Load capacity.)
- c. Retune the PA and increase the SB exciter output.
- d. Adjust the PA Plate overload adjust to trip at 2. amperes.

##### \*2. PA Screen overload.

- a. With the transmitter tuned as in paragraph 1a. above, underload transmitter output by decreasing the PA output loading (increasing Output Load capacity).
- b. Retune the PA and increase the output of the SB exciter to increase the screen current.
- c. Adjust the PA Screen overload with the PA Screen; Adjust to trip at 80 ma.

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DATE	1 Sept. 1965	TMC SPECIFICATION NO. 51007	A
SHEET	9 OF 13		
COMPILED	CHECKED	TITLE: KIT 180 SECTION 1	
APPROVED			

\*3. IPA Plate overload.

- a. Adjust the IPA Plate Overload to trip at 600 ma. with the IPA Plate Overload Adjust and perform transmitter tuning as in paragraph 1, PA Plate Overload.

\*4. IPA Screen Overload.

- a. Adjust the IPA Screen Overload to trip at 30 ma. with the IPA Screen Overload Adjust and perform transmitter tuning as in paragraph 2, PA Screen Overload.

I. 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. Normally during test the transmitter is tuned with a two tone audio signal connected to one of the two channel inputs. However, it may also be tuned with the carrier or a single audio tone.
3. Set the SB exciter output to minimum to prevent the IPA screen overload from tripping, and always ascertain that the drive is at minimum before applying high voltage to the transmitter.
4. The PA tube must not be driven beyond .75 ampere of plate current with its output circuit in a nonresonant condition.
5. The IPA plate current must not be driven beyond 300 ma. with its output circuit in a nonresonant condition.
6. Turn transmitter ON with High Voltage OFF. Set SB exciter to minimum.
7. Set the multimeter position on the driver to 1st AMP Ep. Advance exciter output slightly and commencing at the low end dial setting adjust 1st IPA Tuning to resonance, peak indication on the meter.
8. Set the multimeter to IPA Eg and commencing at low end of dial setting adjust IPA Grid Tuning to resonance, peak indication on meter.
9. Set SB exciter output to minimum and turn High Voltage ON.

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DATE <u>9/1/65</u>		TMC SPECIFICATION NO. <u>S-1067</u>	A
SHEET <u>10</u> OF <u>13</u>			
COMPILED	CHECKED	TITLE: KIT 180 SECTION 1	
APPROVED			

10. Advance SB exciter output to a point where the IPA Plate current increases and adjust IPA Tuning to resonance, dip in IPA Plate current and increase in PA Plate current.
11. Adjust PA Tune control for resonance, dip in PA Plate current, and increase on PA Plate RF meter.
12. Adjust IPA Load until the IPA is properly loaded, 250 to 350 ma. depending on the frequency. After each change of loading the IPA Tuning should be returned to resonance.
13. Readjust the PA Tune control for resonance and adjust PA Loading for the required output. After each change of PA Loading the PA tuning must be readjusted for resonance, and reresonate IPA Plate tuning.
14. For Balance output, 600 ohms, the tuning procedure is the same as above with the exception that the Balance control which equalizes the line currents and Output Load control required for correct impedance match are employed.
15. Some indications of transmitter tuning conditions are:
  - a. Transmitter output underloaded, PA Screen current over 40 ma.
  - b. Transmitter output overloaded, PA Screen current will show little or no variation as PA is tuned through resonance.
  - c. Correct output loading, PA Screen current is 10 to 40 ma. for full output.
  - d. PA Plate RF, 1.25 to 7.5 KV.
  - e. PA Plate current, 1.2 to 1.5 amperes.
  - f. IPA Plate current, 250 to 350 ma.
  - g. RF output 10 KW PEP or 5 KW AVE. (Full output)

\*J. DELETED

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DATE <u>9/1/65</u>		TMC SPECIFICATION NO. <u>S 1007</u>	A
SHEET <u>11</u> OF <u>13</u>			
COMPILED	CHECKED	TITLE: KIT 180 SECTION 1	
APPROVED			

K. DELETED

\*L. ALDC CHECK

1. With transmitter loaded to full output, 10 KW PEP, on any frequency within its range turn on the ALDC. The transmitter output must decrease with an increase in ALDC voltage, counterclockwise rotation of ALDC Control.
  - a. Set the ALDC control full clockwise, no ALDC, make a distortion check.
  - b. Adjust the ALDC to a point where the output commences to decrease and make a distortion check.

REQUIREMENT:

The distortion requirement of 35 db below the two tone test level at full output must not be degraded by application of ALDC in paragraph b above.

M. DELETED

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DATE 9/1/65  
SHEET 12 OF 13

TMC SPECIFICATION NO. S1007 A

COMPILED \_\_\_\_\_ CHECKED \_\_\_\_\_

TITLE: KIT 180 SECTION 1

APPROVED \_\_\_\_\_

TEST DATA SHEET

- 1. (A) Mechanical Inspection \_\_\_\_\_
- 2. (B-1) Short Circuit Checks \_\_\_\_\_
- 3. (B-2) Cable Termination Checks \_\_\_\_\_
- 4. (B-3) Fuse Checks \_\_\_\_\_
- 5. (B-5) Blower Checks \_\_\_\_\_
- 6. (B-6) Circuit Fusing Checks \_\_\_\_\_
- 7. (B-7) Filament Primary Voltage set at \_\_\_\_\_ V.AC
- 8. (B-8) PA Bias Voltage set at \_\_\_\_\_ V.DC
- 9. (B-9) IPA Bias Voltage set at \_\_\_\_\_ V.DC
- 10. (B-10) Overload Relays Check \_\_\_\_\_
- 11. (B-11) Tune-Operate Lights and Relay Check \_\_\_\_\_
- 12. (B-12) PA Screen Switch and Relay Check \_\_\_\_\_
- 13. (B-14) Time Delay Relay Operation Check \_\_\_\_\_
- 14. (B-15) Alarm Operation Check \_\_\_\_\_
- 15. (C-2) Protective Interlock System Check \_\_\_\_\_
- 16. (D) High Voltage Circuits Check \_\_\_\_\_
  - a. (2b) PA Plate Voltage, 1st Contactor Closed \_\_\_\_\_ KV
  - b. (2c) Time Interval between 1st Contactor & 2nd Contactor Closing Approx. \_\_\_\_\_ Secs
  - c. (2d) PA Plate Voltage, 2nd Contactor Closed \_\_\_\_\_ KV
  - d. (3) PA Screen Voltage, Operate \_\_\_\_\_ V; Tune \_\_\_\_\_ V.
  - e. (5) IPA Screen Voltage, Operate \_\_\_\_\_ V; Tune \_\_\_\_\_ V.

DATE: 9/1/65  
SHEET 13 OF 13

TMC SPECIFICATION NO. 51007

A

COMPILED \_\_\_\_\_  
CHECKED \_\_\_\_\_

TITLE: KIT 180 SECTION 1

APPROVED \_\_\_\_\_

TEST DATA SHEET (cont'd)

- 17. (E)
  - a. (a) PA Idling Plate Current Adjusted to \_\_\_\_\_ Amp.
  - b. (b) IPA Idling Plate Current Adjusted to \_\_\_\_\_ ma.
- 18. (F) CHECK PROTECTIVE DEVICES FOR REMOVAL H. V.
  - a. (a) PA Plate Overload \_\_\_\_\_
  - b. (b) PA Screen Overload \_\_\_\_\_
  - c. (c) Zener Diode Protect Relay \_\_\_\_\_
  - d. (d) IPA Plate Overload \_\_\_\_\_
  - e. (e) IPA Screen Overload \_\_\_\_\_
  - f. (f) PA & IPA Bias Relays \_\_\_\_\_
- 19. (G) Parasitic Check \_\_\_\_\_
- 20. (H) Overload Adjustments
  - a. (1) PA Plate Overload set to trip at \_\_\_\_\_ Amp.
  - b. (2) PA Screen Overload set to trip at \_\_\_\_\_ ma.
  - c. (3) IPA Plate Overload set to trip at \_\_\_\_\_ ma.
  - d. (4) IPA Screen Overload set to trip at \_\_\_\_\_ ma.
- 21. \_\_\_\_\_
- 22. \_\_\_\_\_
- 23. (L) ALDC Circuit test made on \_\_\_\_\_ MC
- 24. \_\_\_\_\_

Tested by \_\_\_\_\_

Mfg. No. \_\_\_\_\_

Approved by \_\_\_\_\_

Date \_\_\_\_\_

Remarks \_\_\_\_\_  
\_\_\_\_\_

