DATE 8-6-64	TMC SPECIFICATION NO. S-540	G
SHEET 1 OF [redacted]		
BG COMPILED / CHECKED	TITLE: AUXILIARY FRAME SECTION	
APPROVED	Section 1	

SECTION 1

COMPLETE TEST INSTRUCTIONS

FOR

10K AUXILIARY FRAME SECTION

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

TEST EQUIPMENT REQUIRED

A. Set of test crystals:
2250 Kc or 2270 Kc
3250 Kc or 3270 Ks
4250 Kc or 4270 Kc

When Required.
TMC, PTE is used when transmitter is not required to be equipped with FSA or TTG.

B. Simpson # 260 or equivalent.

C. Square wave generator.

D. Radio receiver GPR # 90 or equivalent.

E. 70 Ohm 2 Watt load.

N te: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets

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All units in auxiliary rack must be tested to meet TMC specifications as a system. After installation all units must be checked as a system for proper interconnection and proper terminations of inputs and outputs.

* MECHANICAL INSPECTION

Give the rack a good visual inspection. Check cabling to se that no strain exists when units are pulled out and tilted. Check slides for ease of operation.

* PRELIMINARY ELECTRICAL INSPECTION

Circuit breaker CB 3000 applies 220 vac. to the primary circuit of T 3000. This is a regulated stepdown transformer whose output is 110 vac. When turning on CB 3000, front fan B 3000 must start blowing air into PA compartment. Removal of F 3000 must stop fan. Turn all power switches to on. After 30 minut s of operation, the SBE, XFK and VOX ovens must cycle.

* PRELIMINARY ELECTRICAL TEST SPECTRUM ANALYZER (F.S.A.)

The F.S.A. is used to check distortion products of the output of the SBE, IPA and PA.

1. Check connection of VMO input to F.S.A., it must go to F.S.A. position on VOX RF switch.

2. Signal input must go to the common position of the analyz r monitor RF switch.

3. Check F.S.A. scope display circuits to see that intensity, focus, horizontal and vertical position manipulate the scope trace.

After completion of above set-up F.S.A.:

a.	I.F. Attenuator	20DB
b.	Sweep selector	14KC
c.	Amp. scale	Log
d.	Gain	Max
e.	Cal. Osc.	OFF
f.	AFC	OFF

Refer to instruction manual for operation of the F.S.A.

* VOX check after half hour warm up.

Check th 2 and 4 mcs. nds for calibration. If off r adjust. Check the HFO output on each band from 2-64 mc. The z ro beat indicator must b check d for prop r operation. Output 2-4 band is two watts, all oth r bands of the VOX is on -half watt.

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Set VOX as follows:

a.	Band MC	2-4 mc
b.	Tuning	2.5 mc
c.	Counter	2.5 mc
d.	Meter switch	H.F.O.
e.	H.F.O. plate switch	On
f.	Zero beat	Off
g.	Output	No higher than .3 volts

In the GPT-10K the VOX's primary use is for V.F.O. input to the analyzer, but its output can be used externally for VMO input to SBE or input to XFK. All will be checked later in test procedure.

*MCP, CONTROL PANEL:

This panel contains switches that should perform the following:-

SBE VMO INPUT:- This should connect the input of the SBE to the XFK or the VOX.

VOX RF OUTPUT:- This should connect the VOX output to the SBE, XFK or FSA.

ANALYZER MONITOR:- This should connect the FSA signal input to the outputs of SBE, IPA or PA.

MODE:- This mode switch should connect the AK-100 to th XFK or the SBE for the various modes of keying. In th SSB position the keying line should be shorted.

* CHANNEL 1 and CHANNEL 2 switches:- These switches should connect the audio inputs of the SBE to the external Lin 1 and Line 2 respectively or to Tone Input which is the 2 tone TTG output.

* SIDEBAND LEVEL MONITOR

The SLM measures the audio levels at the output of the side band filters of the SBE. The LSB and the USB must be calibrat d by the CAL ADJ. control. This is calibrated by using th SBE meter in the LSB position and the USB position. Then calibrat the SLM by adjusting the control in the SLM to read the same as th m t r in th SBE.

DATE		TMC SPECIFICATION NO. S -540	G
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APPROVED			

1. Check all knobs, switches and output tuning dial for proper alignment.
   Place the following crystals in VMO top oven:
   M.F. Xtal pos. 1. 2250 or 2270 KC
   2. 3250 or 3270 KC
   3. 4250 or 4270 KC

2. Switch meter SW. to calibrate position and zero meter.

3. Place M.F. xtal SW. in pos. 3 and turn carrier inserti m t approximately 5.

4. Turn exciter switch on and turn meter SW. to MF.

5. Tune MF. tuning for peak on meter. Dial must correspond to xtal. frequency plus or (-) the tolerance of the crystal.

6. Repeat tuning for pos. 1 (2250) or (2270) KC and position 2 (3250) or (3270) KC to check xtals and dial calibration.

7. Switch meter switch to RF; rotate output control to full clockwise position. Check frequencies as follows, by properly selecting the crystal for the desired frequency with th VMO selector switch;
   a. 4 MC.
   b. 8 MC.
   c. 16 MC.
   d. 28 MC.

8. Turn off the carrier.

FINAL ELECTRICAL TEST.

A. FSA Distortion test using TTG.
   1. Set VOX H.F.O. output to 2.5 MC.
   2. Switch TTG for two tone R.F. out.
   3. MCP panel switch in the position Analyzer to Test.
   4. MCP panel switch in the position Vox. R.F. output to theFSA
B. Place FSA input attenuaters in the up position and I.F. attenuator to 20 DB position.
C. Slightly adjust the frequency of the VOX, two tones must appear on the FSA scope.

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d. Set level of tones to correspond to FSA calibrated graph (0) Index by using input attenuators, for final adjustment use Gain control on FSA. Set level of tones to read directly in DB. The whole scale represents 40 DB and placing I.F. att nuator switch to 0 DB moves scale up 20 more DB for a total scale calibration of 60 DB. Since the two RF tones are 1999 and 2001 kc they should be checked on FSA 14 kc sweep. (By varying the VOX to place the tones directly in the center of the FSA scope.).

* e. Distortion of two RF tones.
Distortion products of the two tones must be 60 db or b tt r, below the two tone level.

f. Attenuator Check
   a. Place IF attenuator to 20 DB
   b. Set level of tone (RF) to correspond to FSA scope graph
   c. By switching one attenuator at a time should move th tone level down or up the same DB level as marked on the attenuator switch.
   d. IF attenuator must raise or lower tone level 20 DB
   e. Switching TTG tone selector must switch tones observ d on FSA.

The above assures the FSA and RF section is OK and part of the MCP is working properly.

* SBE DISTORTION TEST

a. TTG
   1. Turn RF tones on TTG off.
   2. Turn audio tone selector to two tone.
   3. Set audio output midway.

b. MCP
   1. Switch SBE VMO input to off.
   2. Switch VOX RF output to FSA.
   3. Switch Analyzer monitor to SBE.
   4. Switch Mode switch to SSB.
   5. Set channel #1 or #2 to tone input.
   6. Turn crystal VMO switch to desired crystal frequ ncy.

c. SBE
   1. Turn LSB SW to channel 1; turn gain (LSB) midw y.
   2. Turn meter switch to LSB.
      SBE LSB meter must be reading the same as SLM LSB meter. If not, adjust LSB calibrate meter on SLM to correspond to SBE.

* d. Check for sideband reversal by switching RF band to 2-4, USB and LSB on SLM must switch. Place RF band back at 4-8. Return SBE to the 2-4 Mc. band.

e. Turn LSB off; turn USB t chann l 2; s t gain midway; turn m t r SW to USB, SLM and SBE m t r should also be r ading sam l v l. If not, adjust SLM to correspond to SBE.

f. S t USB audio lev l to-10 DB and tune SBE output control midway. Tune SBE for output of 2.0 mc, tun VOX for

output of 2.5 mc, 500 kc above SBE output frequency, adjust VOX output for approximately .1 Ma. Check MCP to make sur VOX RF output is switched FSA and analyzer monitor is switch d to SBE.

g. Adjust the frequency of the VOX to center the two tone patt rn, on the FSA calibrated scope markings. Adjust the level with the input attenuator for 40 db signal. It is important th levels of the tones be equal, adjust if necessary, with TTG Audio level controls.

*h. Check distortion products and carrier rejection (make sur carrier insert adjustment is at zero). Distortion products should be down at least 40 DB; carrier should be down 50 DB. To make sure carrier is being observed reinsert it, remov it, and measure level. (The SBE output is 1 Watt PEP across 70 ohm load).

SBE EXTERNAL VMO

On the MCP panel switch the VOX output to the SBE; and switch SBE VMO input to the VOX; by placing MF crystal selector switch, to the VMO. In this position the SBE MF. must vary with the output of the VOX.

*XFK TEST

To test the XFK, check the XFK for the proper connections and the ovwn for proper operation. Connect the Vox and also a square wave generator the AK 100 keyer must also be used.

To set up XFK for later test do the following:

a. Output Band change #2
b. Xtal switch External

Output of VOX is 200 KC below desired XFK output frequency. Test will be made at 4 MC so VMO has to be set up at 3730 KC.

METHOD OF OBTAINING SBE OUTPUT FREQUENCY

When using XFK to obtain a 4 MC output from the SBE, it must hav a MF input of 3730 KC, from the XFK. To obtain this frequ ncy from the XFK, it is necessary to have the VOX output of 3530 Kc. It must be remembered that the XFK is 200 Kc higher than the VOX.

As per the following example:

To obtain a frequency of 4 MC. from the SBE, with conversion frequ ncy 270 KCS.

SBE MF 3730 KC.
XFK -200 KC.
VOX 3530 KC.

NOTE: For SBE with conversion frequency 250 Kcs, the SBE MF and VOX frequencies in abov example would be 3750 Kcs and 3550 Kcs respectively.

1. On MCP, switch VOX RF output to XFK.
2. On MCP, switch SBE VMO input to XFK.
3. Set mode switch to XFK CW.
4. Connect square wave generator to terminals 5 and 6 of E3000 (REAR PANEL AUX. FRAME).
Set voltage level to 50V; ISK (AK100) keying mode to 50V. Set SBE MF in VMO position and by using output of XFK, tun SBE to 4 mc out. Set output frequency of square wave gen. to min. PA plate current of XFK and RF output of SBE must vary with output of square wave gen.

When placing mode switch to SSB-CW, XFK output will not vary but SBE output will.

RTTY and FAX are best checked by setting a receiver to 4 mc and picking up transmitter output. Then place mod switch to RTTY and by varying frequency shift, the receiver signal will change.

In FAX set voltage output of square wave generator to variable, set mode switch to FAX, place XFK in FAX pos. and slightly increasing and decreasing output voltage of square wave generator must make a change in tone of the receiver. FAX connections made on E3001 on terminals #15 and #16.

* EXTERNAL CONNECTIONS ON REAR PANEL

Connect audio generator output to terminal 28 and 30, set generator output to 2 kc. By placing channel 1 on MCP to line 1. Check SBE channel 1, USB and LSB for audio indication.

Connect generator output to term. 32 and 34 and switch channel 2 on MCP to line. Check for audio indication on SBE channel 2 LSB and USB.

Push to talk terminal 21 should read approximat ly 820 ohm to ground.

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Squelch terminal 26 should read approximately 5000 ohms to ground.

XMTR On-off, terminal 25 should be grounded and ungrounded with operation of Xmitter on-off switch on SBE.

Control terminal #17 to ground should read approximately 1 Meg ohm.

Voltage terminal #18 to ground should read approximately 10 K ohm.

EXT. VMO AND EXT. VOX OUTPUT

Use a jumper with BNC connectors on each end. Connect th jumper to connectors, marked Ext. VMO and Ext. Vox. Switch MCP VMO input to the external. Set SBE to VMO (MF xtal. switch). VOX RF output to the external.

Set VOX for 3 mc. output and check SBE MF for output.

* FUSE PROTECTION

In every fused unit in aux. rack pull out fuses one at a time and check to see each unit is de-activated. On MCP the IPA and PA monitor checks the output of the driver and final amp. At this time check to see that they are terminated correctly. In this power amplifier distortion check each will be used.

NOTE:

For transmitters with an auxiliary frame with two (2) VOX's and without an XFK, the following deletions and changes apply:-

The paragraph on XFK TESTS will be omitted.

On the MCP, check to see that the top VOX output terminates at the VOX position of S-303, the SBE VMO INPUT switch. This switch should connect the SBE VMO INPUT either to th top VOX output in the VOX position or to an EXTERNAL sourc in the EXT position.

The second VOX output should terminate at the VFO INPUT on the FSA.

On the MODE switch the keying mod s indicated for the XFK ar no longer available.

DATE	SHEET 10 of 10	TMC SPECIFICATION NO. S-540	G
COMPILED	CHECKED	TITLE: Section 1	
APPROVED			

TEST SHEET

	ACCEPT
1. MECHANICAL INSPECTION	
2. AC POWER AND FAN CHECK	
3. FSA CHECK	
4. VOX CHECK	
5. MCP CHECK	
6. XFK CHECK	
7. SLM CHECK	
8. SBE OUTPUT CHECK-1 Watt, "PEP" across a 70 Ohm load, over the entire frequency range.	
9. SBE DISTORTION CHECK-The third order distortion must be 40db or better, below the two tone level. (1 Watt PEP)	
10. SBE CARRIER REJECTION CHECK-The carrier rejection must be 50db down, or better, below two tone for 1 Watt PEP level	
11. TTG TONES CHECK (A.F. AND R.F.)	
12. SIDEBAND REVERSAL CHECK	
13. MODE SWITCH KEYING CHECK	
14. EXTERNAL CONNECTIONS CHECK	
15. FUSE PROTECTION CHECK	

_____ (TESTER)

_____ (MFG. NO.)

_____ (FINAL APPROVAL)

_____ (DATE)

REMARKS _____

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

OF	TMC SPECIFICATION NO. S 540	B
CHECKED	TITLE:	
APPROVED		

AUXILIARY FRAME SECTION

(AN/FRT 52 & AN/FRT 54)

SECTION 1 A

COMPLETE TEST INSTRUCTIONS

FOR

AN/FRT 52 & AN/FRT 54 AUXILIARY FRAME SECTION

DOUBLE VOX'S

DELETION OF XFK

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Section 1A

DATE 1-19-62 SHEET 1 OF 7	TMC SPECIFICATION NO. S 54(A)	B
L.B. COMPILED / CHECKED	TITLE: AUXILIARY FRAME SECTION (AN/FRT 52 & AN/FRT 54)	
APPROVED		

All units in auxiliary rack must be tested and approv d separately before installation as a system. After installation, referring to CK-530 all units must be checked for proper int r-connection and proper terminations of inputs and outputs.

MECHANICAL INSPECTION

Give the rack a good visual inspection. Check routing of cable to see that no strain exists when units are pulled out and tilted. Check slides for ease of operation.

PRELIMINARY ELECTRICAL INSPECTION

Circuit breaker CB-3000, located on the rear of the center shield panel applies 220VAC to the primary circuit of T3000. This is a regulated stepdown transformer whose output is 115VAC. Upon turning on CB-3000, front fan B3000 must start operating. Removal of F-3000, must stop fan. Turn all power switches located on the various units to the ON position. After approximately ten minutes of operation, the SBE (Side Band Exciter) and two VOX (Variable Frequency Oscillators) ovens must cycle.

PRELIMINARY ELECTRICAL TEST

Spectrum Analyzer (FSA)

The FSA is used to check distortion products of the output of the SBE, IPA and PA.

1. Check to make sure the RF output of the top VOX in the auxiliary rack terminates at the common terminal of S303, VOX RF out. The XFK which is normally used is replaced by a second VOX, the output of which terminates at the FSA VFO IN.

2. Check FSA scope display circuits to see that intensity, focus, horizontal and vertical adjustments manipulate the scope trace.

3. After completion of step 2. Set up FSA:

A.	I.F. Attenuation	20DB
B.	Sweep	7.5KC
C.	AMP. Scale	Log
D.	Gain	Max.
E.	Cal. Osc.	OFF
F.	AFC	OFF

* For detail operation of F.S.A. r fer to Panoramic Radio manual 5B12A.

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VOX'S CHECK AFTER HALF HOUR WARM-UP

Check the 2 and 4 MCS ends for Calibration, if OFF adjust the high and low end trimmers to bring ends on frequency. Check the HFO output on each band from 2 -64MC. Check zero beat indicator for proper operation visual and audible.

M.C.P.

The MCP is a switch panel that switches the units for different configurations.

SBE VMO INPUT S304

This connects the SBE INPUT to the output of top VOX, or to external INPUT.

* The XFK position is not used in this configuration.

VOX RF OUTPUT S303

This connects the top VOX RF output only to the SBE VMO INPUT and Ext. position.

* The XFK position is not used in this configuration.

ANALYZER MONITOR S302

This connects the signal input of the FSA to the SBE, IPA or PA output monitors.

MODE SWITCH S305

This unit switches AK100 to keyline of SBE for contact keying of SBE in CW position and shorts keyline for single sideband operation.

* The XFK is not used in this configuration.

CHANNEL 1, CHANNEL 2 SWITCHES

Audio (600 ohm balance or unbalance) inputs of SBE from external line or tone input from TTG. (Two Tone Generator)

SIDEBAND LEVEL MONITOR

The SLM measures audio levels at output of side band filters of SBE.

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The only control to set-up is the LSB and USB calibrate adjust. This is calibrated by using SBE meter in LSB and USB position, then calibrate in SLM is adjusted to read s m as SBE meters.

SBE

1. Check all knobs, switches and output tuning dial for proper alignment. Place following crystals in VMO top oven:

M.F. xtal Pos. 1 2250
M.F. xtal Pos. 2 3250
M.F. xtal Pos. 3 4250

2. Switch meter switch to calibrate position and zero meter.

3. Place M.F. xtal SW. in position 3 and turn carri r insertion to approximately 5.

4. Turn exciter switch ON and turn meter SW. to M.F.

5. Tune M.F. Tuning for peak on meter. M.F. dial must correspond to xtal frequency.

6. Repeat tuning for position 1. (2250) and position 2. (3250) to check xtals and dial calibration.

7. Switch meter switch to R.F. rotate output control to full clockwise. Check following frequencies:

a. 4 MC
b. 8 MC
c. 16 MC
d. 28 MC

FINAL ELECTRICAL TEST

A. FSA Distortion Test Using TTG

1. Set VOX HFO output to 2.5 mc.
2. Switch TTG for two tone RF out.
3. Switch MCP analyzer monitor to test.
4. Place FSA input attenuators in the up position and IF attenuator to 20DB position.

6. By slightly varying VOX output frequency two tones must must appear on FSA scope.
7. Set levels of tones to correspond to FSA calibrat d graph, by using input attenuators. For final adjustment use gain control on FSA. Set level of tones to read directly in DB. The whole scale represents 40DB and by placing I.F. attenuator to 0DB moves scale up 20 more DB for a total scale calibration of 60DB. Since the two R.F. tones ar 1999 and 2001 KC with a separation of 2KC they should be checked on FSA 7KC sweep. By slightly varying the VOX to place the tones directly in the center of the FSA scope, the 2KC separation of the tones can be checked.
8. Distortion products of the two R.F. tones must be 50DB or better.
9. Attenuator check.
   a. Place I.F. attenuator to 20DB.
   b. Set level of tones (R.F.) to correspond to FSA scope graph.
   c. By switching one attenuator at a time should move the tone level down or up the same DB level as marked near the switch.
   d. I.F. attenuator must raise or lower tone level 20DB.

The above assures the FSA and R.F. section is OK and part of the MCP is working properly.

SBE DISTORTION TEST

a. TTG

1. Turn R.F. tones OFF.
2. Turn audio tone selector to two tone.
3. Set audio output adjust midway.

b. MCP

1. Switch SBE VMO to OFF position.
a. Switch VOX R.F. output to external.
2. Switch mode switch to SSB.
3. Switch analyzer monitor to SBE.
4. Set channel 1, 2 to tone input.

c. SBE

1. Turn LSB SW to channel 1; turn gain LSB midway.
2. Turn meter to LSB.
3. Ch ck for sideband r v rsal by switching R.F. band to 2-4, USB and LSB on SLM must switch.
4. Turn LSB OFF; turn USB to channel 2; set gain midway; turn meter SW to USB.

5. Set USB audio level to 10DB and turn SBE output control midway. Terminate SBE R.F. output with a 50 ohm 2 watt resistor. Tune SBE for output of 2.0mc, tune VOX 500KC above SBE output. Adjust VOX output for approximately .1 volt.
6. Adjust frequency of VOX to place two tones in c nter of FSA scope; adjust level with input attenuator for 40DB signal. IF amplitude of tones are un qual, adjust levels to be equal with TTG audio lev l controls.

SBE EXTERNAL VMO

On MCP switch VOX out to SBE; switch SBE VMO input to VOX; set VOX R.F. output to 2.250MC; By adjusting M.F. dial to 2.250 the M.F. position on meter must peak.

SBE CW KEYING

1. Tune SBE to any output frequency.
2. Connect output of square wave generator to t rminals 5 and 6 of E3000 on rear center shield panel.
3. Place ISK located on top rear of auxilliary frame to 50V keying position.
4. Place mode switch to SBE CW.
5. Increase output of square wave generator to 50V, by varying output frequency of square wave gen rator must vary output of SBE.

EXTERNAL CONNECTIONS ON REAR PANEL

1. Connect audio generator output to terminals 28 and 30 set generator output to 2KC. By placing chann l 1 on MCP to line 1 check SBE channel 1, USB and lower sideband for audio indication.
2. Connect audio generator output to terminal 32 and set generator output 2KC. Check for audio indication on SBE channel 2, LSB and USB.
3. Push to talk terminal 21 should read approximately 820 ohms to ground.
4. Squelch terminal 26 should read 5000 ohms to ground.
5. Xmtr ON-OFF terminal 25 should be grounded and un-grounded with operation of xmitter ON-OFF switch on SBE.

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VMO AND EXT VOX OUTPUT

Place jumper with BNC connector on each end (J3004 and J3005). Switch MCP VMO input to external, set SBE to VMO (MF xtal SW.) VOX R,F, output to external.'

Set VOX output for 3MC and check SBE MF for output.

FUSE PROTECTION

In every fused unit in aux. rack pull out fuses one at a time and check to see each unit is de-activated.

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SHEET 1 OF 7	TMC SPECIFICATION NO. S 5401	G
L.B. COMPILE / CHECKED	TITLE: SECTION 1A	
APPROVED		

TEST SHEET

		ACCEPT
1.	MECHANICAL INSPECTION	
2.	AC POWER AND FAN CHECK	
3.	FSA CHECK	
4.	VOX CHECK	
5.	MCP CHECK	
6.	SLM CHECK	
7.	SBE OUTPUT CHECK	
8.	SBE DISTORTION CHECK	
9.	SBE CARRIER REJECTION CHECK	
10.	TTG TONES CHECK (A.F. AND R.F.)	
11.	SIDEBAND REVERSAL CHECK	
12.	MODE SWITCH KEYING CHECK	
13.	EXTERNAL CONNECTIONS CHECK	
14.	FUSE PROTECTION CHECK	

TESTER _____ INSPECTORS _____

FINAL APPROVAL _____ DATE _____

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 436M.

SECTION 2A

COMPLETE TEST INSTRUCTIONS

for

10K AUXILIARY FRAME

SIDEBAND MULTI-MODE EXCITER

NOTE

Section 1 and 2 of this test procedure are not applicable and have been omitted.

1. Test Equipment Required

   A. Spectrum Analyzer: Model LA-40A, or equivalent

   B. VTVM: Hewlett Packard Model 410B, or equivalent

   C. 0-10 volt power supply

   D. Ballantine VTVM Model 314, or equivalent

   E. Two Tone Generator, TMC Model TTG-2, or equivalent

   F. Oscilloscope: Tektronix Model 541A, or equivalent

All units in auxiliary rack must be tested to meet specification before installation as a system. For proper interconnection and termination refer to appropriate schematic diagram.

2. MECHANICAL INSPECTION

Give the rack a good visual inspection for obvious malfunctions, check cabling to see that no strain exists when units are pulled out and tilted, check slides for ease of operation sliding in and out. All units should line up in rack and no contact made between front panels.

3. PRELIMINARY ELECTRICAL INSPECTION

A. Place circuit breaker CB3000 to the on position, this applies 230 VAC to the primary circuit of T3000, a regulated stepdown transformer the output of which is 115 VAC. Front fan B3000 should start operating, removal of F3000 must stop fan.

B. Set MMX ON/STANDBY switch to ON position. STANDBY lamp should go out and POWER lamp should light.

C. Connect a 5 watt 50 ohm resistor MMX RF OUT jack and ground, this terminates the output of the MMX to its approximate characteristic impedance.

D. Connect the output of a TTG (two tone generator) to line 1 on the center shield assembly. Both lines have to be checked for proper operation. (Audio should be -20 dbm (69 mv).

E. Set MMX exciter controls as follows:

1. RF OUTPUT - maximum counterclockwise
2. CARRIER - maximum counterclockwise
3. MODE - USB
4. LSB and USB MIKE/LINE - 0
5. METER switch - Q1
6. Frequency Selector switches - 020000 (2 MHz)

F. MONITOR meter should indicate at Q1 mark on meter face with meter switch in Q1 position. Rotate METER switch to Q2 and Q3 positions observing that MONITOR meter indicates at Q2 and Q3 mark respectively.

G. Connect Spectrum Analyzer to MON jack on APP panel and rotate MONITOR switch to EXCITER position.

H. Connect VTVM (HP-410B, or equivalent) across 50 ohm resistor and set EXCITER ON/PTT switch to ON position.

GENERAL EXCITER CHECKOUT

A. CARRIER TEST

1. Set CARRIER control on front panel fully clockwise and adjust the RF OUTPUT control on the front panel for 3.5 volts on the VTVM.
2. Connect scope to output of unit. Displayed waveform should be sharp undistorted sine wave with no modulation signal appearing in any position of the time/cm dial of the scope.
3. Adjust carrier control for maximum cw position ISB mode. Adjust for 2.5V rms output on HP-410B meter. Change frequency at random and check for equal RF output.

B. SIDEBAND CHECK

1. Turn CARRIER control on front panel fully ccw and MODE switch to ISB position. Switch audio input to two tones. Adjust MIKE/LINE controls for 4/5 full scale readings on meter in appropriate meter switch positions (both sidebands). Adjust RF control for 5.0 volts output indication on Hewlett-Packard 410B meter.
2. Touch up level of tones for equal display by adjusting MIKE/LINE controls.
3. Display 5.0 volt output signal on analyzer with four (4) clear tones (distortion -40 dbm). Readjust RF control for 5.0 volts if necessary. Check distortion in sideband position of mode switch. Should be (-40 db minimum).

Check carrier suppression in USB, LSB and ISB should be (-55 db minimum).

4. Repeat Step B. Return mode switch to ISB position.
5. Attenuate display -3 db using input attenuator of analyzer. Turn carrier control on front panel cw for center tone at top line of analyzer. See the following:

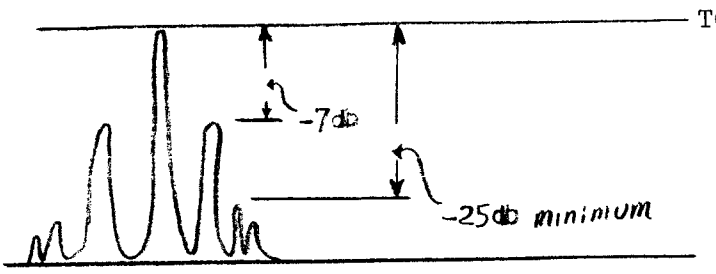
6. Turn mode switch to cw position and key unit by front panel key or by rear panel jumper across key terminals. Adjust RF output for top line on analyzer. Unkey unit. Output should drop to 0 (-60 db minimum). Key unit.
7. Turn mode switch to FSK position and adjust RF output for top line on analyzer. Turn mode switch to FAX position. Level should remain the same.

C. AM CHECK

1. Return MIKE/LINE controls to zero positions, switch audio input to single tone and turn MODE switch to AM position. Remove 3 db of attenuation from input attenuator of analyzer.
2. Adjust RF output for top line on analyzer.
3. Using LSB or USB mike/line control, modulate displayed carrier so that sidebands (as measured with input attenuator of analyzer) are 7 db below carrier).
4. Repeat Steps 2 and 3 until the following is obtained:

Distortion should be -25 db minimum below carrier as shown.

a



5. Return MIKE/LINE control to zero and turn carrier control fully cw. Turn meter switch to carrier position. Meter should read approximately 4/5 full scale. Turn meter switch to RF position. Meter should indicate approximate RF output in volts.

D. ALDC TEST

1. Connect 0-10 volt power supply to ALDC connector on rear of exciter unit (+ to ground, - to ALDC jack). Output of unit should drop to zero with between -7 and -8 volts of ALDC input.

E. FSK SHIFT TEST

1. Turn mode switch to FSK position.
2. Check FSK shift as follows:

   Sense switch (+)

   Shift switch ±425 cps.

   Counter should indicate 425 cps less than original frequency.

   Set sense switch to (-).

   Counter should indicate 425 cps above original frequency.
3. Repeat SHIFT test for 212, 106 and 53 cps.

F. FAX TEST

1. Turn mode switch to FAX position and connect 0-10 volt DC supply to FAX terminals at rear of unit.

2. Check for linearity by varying input from 1.0 to 10.0 volts. Counter should change 89 ±50 cps for every 1.0 volts change from 1.0 V to 10.0 V.

VOLTS	FREQUENCY	VOLTS	FREQUENCY
1	2999600 ±5 cps	6	3000045 ±50 cps
2	2999689 ±50 cps	7	3000134 ±50 cps
3	2999778 ±50 cps	8	3000223 ±50 cps
4	2999867 ±50 cps	9	3000312 ±50 cps
5	2999956 ±50 cps	10	3000400 ±50 cps

NOTE

Center frequency will be selected by frequency dials on front panel.

G. EXTERNAL 1 (ONE) MC IN

On the center shield assy. check external 1 MC jack to see that it's terminated properly to Ext 1 MC STD in MMX.

H. EXTERNAL INTERLOCKS

By removing jumper fron external terminals should disable 10K interlock system.

After completion of all checks fill out test chart attached.

TEST CHART

FREQUENCIES IN MC/S	OUTPUT POWER PEP	CARRIER SUPPRESSION	DISTORTION FOR 100 MW PEP
02.0000			
04.0000			
06.0000			
08.0000			
10.0000			
12.0000			
14.0000			
16.0000			
18.0000			
20.0000			
22.0000			
24.0000			
26.0000			
28.0000			

DATE	TMC SPECIFICATION NO. S-540	G
SH. 1 OF 7		
COMPILED Y	TITLE: AUXILIARY FRAME SECTION	JOB
APPROVED		

SECTION 2

COMPLETE TEST INSTRUCTIONS

FOR

10K AUXILIARY FRAME SIDEBAND

GENERATOR SYSTEM

DATE 2-8-61 SH. 2 OF 11 COMPILED BY LB	TMC SPECIFICATION NO. S-540	
	TITLE: AUXILIARY FRAME SECTION	JOB
APPROVED QAR	(Section 2)	

All units in auxiliary rack must be tested to meet specification before installation as a system. For proper interconnection and termination refer to CK 925.

1. MECHANICAL INSPECTION

Give the rack a good visual inspection for obvious malfunctions, check cabling to see that no strain exists when units are pulled out and tilted, check slides for ease of operation sliding in and out. All units should line up in rack and no contact made between front panels.

2. PRELIMINARY ELECTRICAL INSPECTION

A. Place circuit breaker CB3000 to the on position, this applies 230 VAC to the primary circuit of T3000, a regulated stepdown transformer the output of which is 115 VAC. Front fan B3000 should start operating, removal of F3000 must stop fan.

B. Set CPP-2 and CHG Power switches to "ON". CHG and CMO oven lights should be lit. Because of the delay tube in the CPP-2, a 60 second delay is necessary before B+ is applied. This delay must be checked.

C. TIS, CBE and CSS power switches should be turned to their "ON" position.

D. SBG system should have at least a 24 hour warm-up period before testing to insure the frequency determining elements have stabilized.

E. Connect a 5 watt 68 ohm resistor to CHG J2704 and ground, this terminates the output of the CHG to its approximate characteristic impedance.

F. Connect the output of a T.T.G. (two tone generator) to line one terminal 28 and 30 of the center shield assy. Both lines have to be checked for proper operation.

SBG SYSTEM IN GENERAL

CBE-1 This unit accepts two channels of audio intelligence and processes them for sideband transmission by use of a balanced modulator a 250 KC carrier can be re-inserted at will by a front panel control. The output of the CBE is fed to J2701 on the CHG.

CHG This unit accepts frequency controlled signals from the CMO and CSS to get a highly stable radio frequency output in the range of 1.75 to 33.75 MC. The sideband output of the CBE is modulated with 1.75 to 3.75 of the CMO. Also contained in the CHG is a auxiliary standard.

CMO This unit accepts 10 KC output from the divider chain, (CHL) of which is derived from the highly stable 1 MC standard (CSS). The variable master oscillator is kept stable by mixing its output to a selected 10 KC harmonic of the highly stable CHL, The product which is between 510-520 KC. This signal which in turn is compared with the CLL reactance tube controlled 510-520 KC osc., a phase difference produces a corrective d.c. voltage that is fed to the reactance control Master oscillator which in turn brings its output back on frequency. The MC selector is automatically set by tuning the 2-4 MC amplifier for a peak. This precised output

CMO- cont'd.

from the CMO is fed to the CHG to be mixed with the audio intelligence.

CLL-1 This unit consists of three loops:

Loop 1 1000-1900 CPS in 100 CPS steps
Loop 2 9-18-KC in 1 KC steps
Loop 3 510-519: 9 KC in 100 CPS steps

The end result of the CLL-1 are precise voltages in 100 CPS steps control the CMO output. Each loop is monitor upon a test oscilloscope, a square lissajou-pattern gives correct frequency indication.

TIS-3 This unit accepts three types of D.C. signals (FSK, CW, FAX) and converts them into audio frequency signals to be fed to the CBE to be processed for sideband transmission.

CSS-1 This unit produces a precise 1 (one) MC signal that is used as the primary standard for the whole system. This internal signal can be compared to an external know precise standard.

CHL This unit takes the 1 (one) MC output of the CSS and Sub-divide to produce highly stable mutiples to be used thru out the whole system.

APP-10 This unit has two functions, one to supply auxiliary A.C. power and monitor the output of the exciter, driver and final.

CPP-5 Supplies power to the CHG.

CPP-2 Supplies power to rest of the system.

GENERAL CHECKOUT

1. Adjust the upper and lower limits of CMO osc. by using the high and low frequency trimmers. Set output of Master osc. to 2.750 MCS. The CMO can be synchronized on frequency every 10 KC. Tune and adjust output to a meter reading of 3. This 2750 MC output of the CMO is connected to J2702 of CHG for mid-frequency. Check the output of the CMO for approximately 2 KC synchronizing range, that is a 1 KC above and below the synchronized output.

2. With both sidebands in the off position turn carrier level to zero DB on the CBE.

   NOTE: The CBE will not function unless the 250 KC signal from the regenerative divider is generating a signal to P3010, 250 KC input of the CBE and in the same manner the CHG must have the 250 KC output of the CBE to operate the mid-frequency.

3. Tune the MF tuning to 2.750MC output of the CMO to a maximum reading of the MF indicator.

   NOTE: The output frequency of the CHG is derived by adding the CMO output frequency to Band MC of the CHG.

   Example: Band 10 of CHG + 2.750MC of CMO = 12,750,000 cycles.

4. CHG TUNING

   Rotate CHG to Band 10 and tune the output to 12,750,000 cycles, adjust output to a 8.5 indication on the output

GENERAL CHECKOUT CONT'D.

4. indicator meter, this represents an output wattage of 1 watt PEP, this feat must be achieved over the complete range of the CHG 1.75-33.75 MC.

5. Carrier rejection measured with F.S.A.

The frequency spectrum analyzer is used to check distortion products. In brief, the units consists of a superhetrodyne receiver with an intermediate frequency of 500 KC. The unit has two inputs, VFO and signal. The VFO frequency has to be 500 KC above the signal frequency to obtain a display on FSA scope.

Example: Desired Freq: 12,750,000 cycles
Intermediate Freq. 500,000
V.F.O. Freq. 13,250,000

Connect output monitor to on APP-3 to the signal input of the F.S.A. Set MO of VOX to 3.3125 and tune output freq. of VOX to 13,250,000 and connect this signal to V.F.O. input of F.S.A. Set monitor on APP-3 to exciter.

Set up FSA as follows:

A. IF attenuator 20 DB
B. Sweep selector 10 KC
C. Amp. Scale Log
D. Cal. Osc. Off
E. Gain Maximum
F. AFC Off

Note: To fully understand the operation of the FSA refer to Panoramic Instruction Manual SB12A.

GENERAL CHECKOUT CONT'D.

5. Now by slightly varying the VOX output freq. a large pip should present itself on the scope of the FSA. Make sure the carrier level on the CBE is at 0, adjust FSA input attenuators to a full display of 40 DB. Now turn carrier level on the CBE to min. The presentation on the FSA scope should disappear, place IF attenuators to 0 (zero) DB position, now the 0 (zero) DB position on the scope represents 40 DB, in other words, the FSA attenuator range is now at a 60 DB level. The carrier level must be down at least 55 DB on all the Bands of the CHG, if not the 250 KC carrier in the CBE has to be rebalanced, for balancing procedure refer to test procedure of the CBE.

6. SPURIOUS CHECK

Re-insert carrier to 0 DB,display should appear on FSA scope, now by varying CMO through its sync. range no spurious should appear which is indicated by erratic distortion of the display.

7. DISTORTION CHECK

Insert the two tones to E 3002 line 1 (one), turn LSB switch on the CBE to channel one, adj. gain to a mid-scale reading on the LSB indicator meter. Repeat the above procedure for the USB channel on the CBE and then turn USB to the OFF position. Turn carrier level on CBE to min. Retune CHG to an output of 12,750,000 cycles and output level to one watt PEP. On the FSA two tones should appear approx. 2 KC apart, by using

GENERAL CHECKOUT CONT'D.

7. the input attenuators adj. tones to max. of the log scale. For best distortion turn CHG output gain to max. and turn the gain control down to 1 (one) watt PEP, the M.F. output of CMO should never exceed a meter reading of 3 (three). In all cases the third order distortion should be 40 DB or better over the complete range of the CHG.

8. SIDEBAND CHECK

By reinserting the carrier the 250 KC signal should appear facing the FSA scope to the right of LSB and to the left of the USB, if not the CBE should be corrected.

9. CMO and CLL FREQUENCY CONTROL CHECK

Retune CHG output to 12,750,000, now turn the KC knob on the CLL-1 to 1 (one) this represents one kilocycle and hundred of cycles to two (2) which represents 200 cycles. By retuning and synchronizing the output of the CMO the mid-frequency is now 2,751,200 cycles, by doing this the CHG has to be retuned and then its output is now 12,751,200 cycles. To check the synthesing of the system tune the out of the transmitter to 12,751,200 cycles and by varying the CMO through its synchronizing range without losing sync., the output of transmitter should stay constant.

10. TIS KEYING CHECK

Connect a square wave generator to terminal 23 and 24 of E 3002, this is the key line to the TIS, set output

GENERAL CHECKOUT CONT'D.

10. of generator to 50V, place exciter switches on TIS to the FSK, FAX and CW position, place mode switch to FSK position. Now tune the output of a receiver to the CHG output frequency, by varying the CPS shift, the fixed tones and mark line space should vary the audio of the receiver. By placing the mode switch to CW a continuous tone should be heard. FAX is checked by placing the key line to FAX, terminal 3 and 4 of E 3000, and placing the square generator to variable, by varying the output between 0 and 5 should vary the output of the receiver. Check both keying channels of the TIS.

11. APP- 10

A-The monitor out should be checked by looking at the output of the PA and IPA, when this system is used as a driver for the 40 K the PA monitor the 40K amplifier and the IPA monitors the 10 K amplifier. The exciter monitor has already been checked.

12. 1 (One) MC Standard Check.

The CHG has an internal 1 MC oscillator that can be used upon failure of the primary standard (CSS), to check connect P 3011 to J 1302 on the CHG, connect J 602 to J 606 on the CSS, place the 1 MC switch in the CHG to internal, by doing this you are taking the 1 MC out of the CHG and using it as the standard, the whole system should work as usual.

GENERAL CHECKOUT CONT'D.

13. EXTERNAL 1 (ONE) MC IN

On the center shield assy. check J 3004 external 1 MC in to see that it terminated properly to J 603 on CSS 1B or J1 of CSS1C.

14. EXTERNAL INTERLOCKS

By removing jumper from terminal 8 and 10 on E 3000 should disable 10 K interlock system.

After completion of all checks fill out all test papers and release system.

SBG-2 Serial No._____ CBE-1_____ CLL_____ CPP-2_____ DATE:_____

SBG-2 SIDEBAND GENERATOR CHG-2_____ CSS_____ TIS-3_____ CHL_____

CMO-1_____ CPP-5_____ TESTER_____

FREQUENCIES IN MC/S	VOX SETTING	BAND SW	OUTPUT TUNING BAND	OUTPUT POWER PEP	CARRIER SUPPRESSION	DISTORTION FOR WATT PEP	
1.750 2.750 3.750		0	A				
3.750 4.750 5.750		2	B				
5.750 6.750 7.750		4	B				
7.750 8.750 9.750		6	C				
9.750 10.750 11.750		8	C				
11.750 12.750 13.750		10	C				
13.750 14.750 15.750		12	C				
15.750 16.750 17.750		14	D				
17.750 18.750 19.750		16	D				
19.750 20.750 21.750		18	D				
21.750 22.750 23.750		20	D				
23.750 24.750 25.750		22	D				
25.750 26.750 27.750		24	D				
27.750 28.750 29.750		26	D				
29.750 30.750 31.750		28	D				
31.750 32.750 33.750		30	D				

SIDEBAND CHECK _____ MECH. INSPECT._____ APP-10_____

TIS KEYING_____ TIS SHIFT_____ TIS CHANNEL_____

SECTION 3

COMPLETE TEST INSTRUCTIONS

FOR

GPT-10K TRANSMITTER

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 450M

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.

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 439M

*A. MECHANICAL INSPECTION

1. Check all knobs and switches on the PA frame for proper operation.

2. Check PA Tune, PA Load, Output Load 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.

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.

NOTE: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 439M

4. Check to insure that PA output circuit is correctly connected for unbalanced output.

*5. Turn ON Main Power switches and observe following:

a. Main Power light must go on.

b. The PA Blower must turn in the same direction as arrow stamped on the housing.

c. The bottom and top fans must turn counterclockwise when viewed facing the hub.

*6. Circuit fusing checks:

a. With the Main Power switch Off, remove any two of the three main blower fuses, the main blower must not run when the Main Power switch is closed. Open Main Power switch and replace the two fuses. Close Main Power switch and continue fusing circuit checks below.

b. Remove Rear Fan fuse, the Rear Fan must stop.

c. Remove the PA Filament fuse, the PA filament voltage must be removed.

d. Remove the Timer fuse, this must deactivate the Timer.

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 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 mut 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.

NOTE: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

*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.

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

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 switch closed, 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.

D. HIGH VOLTAGE CHECKS

1. With the Main Power switch closed the high voltage mercury rectifier tubes and PA tube should have a minimum of one half hour warmup time before applying plate voltage.

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.

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

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*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 Positon.

E. IDLING PLATE CURRENT ADJUSTMENTS

1. With transmitter energized, blowers 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).

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached Data Sheets.

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.

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

*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.

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

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. <u>UNBALANCE OUTPUT TUNING AND DISTORTION TEST</u>

1. The transmitter PA output must be connected for Unbalance output 50-70 ohms, operation and terminated in 50-70 ohm unbalance load.

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

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2. Two tone audio test signal from the analyzer must be connected with a shielded pair to LINE 1, terminals on E-3002, terminals 20 and 22 with the shield to ground terminal 21. E-3002 is located on rear-panel of the auxiliary frame. Connect the RF INPUT of the analyzer to RF MON jack on the APP panel and place selector switch to PA Position. For this test the Upper Sideband will be employed.

3. Tune the transmitter to all frequencies listed on tuning test chart CH-189 or CH-210 depending on whether transmitter is "Synthesized" or "Non Synthesized", utilizing the tuning procedure in paragraph I. Make signal to distortion check at each frequency at full power output, 10 KW PEP and at half power output, 5 KW PEP. Record all data required by the tuning chart.

   REQUIREMENT:

   a. At 10 KW PEP the third order distortion products must be at least 35 db below the two tone test level.

   b. At 5 KW PEP the third order distortion products must be at least 40 db below the two tone test level.

*K. BALANCE OUTPUT TUNING AND DISTORTION TEST

1. The transmitter output circuit must be connected for Balance output, 600 ohm, operation and terminated in a 600 ohm balance load.

2. Connect the two tone audio test signal to LINE 2 terminals 24 and 26, ground shield to 25 on E-3002. For this test use the Lower Sideband. Other analyzer connections remain the same as in the Unbalance test.

3. Tune transmitter to all test frequencies listed on tuning test chart CH-189 or CH-210 depending on whether transmitter is "Synthesized" or "Non Synthesized". Make signal to distortion check at each frequency at full power output, 10 KW PEP, and half power, 5 KW PEP. Record all data required by the tuning chart.

NOTE: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) markas required on attached test Data Sheets.

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REQUIREMENT:

a. At 10 KW PEP the third order distortion products must be at least 35 db below the two tone test level.

b. At 5 KW PEP the third order distortion products must be at least 40 db below the two tone test level.

*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. DIRECTIONAL WATTMETER, SWCU-1, GENERAL

Due to large variation of output impedances that a transmitter must tune into, it is necessary to protect the transmitter and transmission line from a relative high standing waves. The SWCU-1 (standing wave control unit) used in conjuction with a two tone calibrated directional wattmeter has two bi-directional elements that sense forward and reverse power in watts. The forward element has 10 (ten) kilowatt range ± 5%. The reverse element has a 1 (one) kilowatt range ± 5%. There is no need for a calibrate circuit for the coupler was designed to give accurate output SWR for maximum output of GPT-10K which is 5 (five) kilowatts average or 10 (ten) kilowatt PEP (Peak Envelope Power).
The output of the Wattmeter sensing elements feeds the kilowatt output meter. This meter serves two functions, to read forward power and by activating a spring loaded switch on the main power panel read SWR (Standing Wave Ratio). This SWR switch in its

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

normal position provides the kilowatt meter with forward power information and the SWCU-1 with reflected power information. The SWCU-1 mounted in rear of exciter frame consists of a power supply, DC amplifier, high sensitive relay and a control relay. With approximately 540 watts of reflected power which constitutes a 2:1 standing wave ratio for 5 (five) kilowatt causes the reflected power element of the directional 51 (fifty-one) micro-ampers.
This current causes the Hi-sens relay to energize and inject a bias voltage on the DC amplifier, this inturn causes the control relay to energize and trip the High Voltage breaker. The above is accomplished with the SWR switch on the SWCU-1 in the 2:1 position. In the 3:1 position it takes approximately 1250 watts reflected, based upon 5 (five) kilowatts output to trip the high voltage breaker. Since this will produce a current that is out of the range of the meter (SWR portion), This position will be checked by reversing the reflected power diode and driving the transmitter to approximately 1250 watts for trip out of HV breaker. The control relay used in the SWCU-1 is a latch type relay and in the event it is tripped, resetting is accomplished by the overload reset button on main power panel of GPT-10K.

1. TEST PROCEDURE FOR SWCU-1

a. Place ratio switch of SWCU-1 in 2:1 position.

b. Check for proper termination of SWCU-1 (refer to CK-649 or CK-650).

c. Rotate reflected power diode toread forward. Arrow on diode must point toward load.

d. Terminate transmitter to a 50-ohm load.

e. Apply power to transmitter and tune output to any frequency.

f. Increase side band exciter drive to 540 watts. This point is indicative by SWR ratio of 2 (two) on the output power meter.

NOTE: SWR switch on Main Power Panel must be activated.

*g. Leave power at this level and adjust the SWR overload until the High Voltage breaker trips. Leave Potentiometer (SWR OVLD) at this point. SWR overload is located in SWCU-1 accessible from front panel. (cont'd on next sheet)

NOTE: Indicate completion and acceptance of portion(s) of this test preceeded by (*) by recording r quired observed value or by check (✓) mark as required on attached test Data Sheets.

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NOTE: SWR switch on Main Power Panel must not be activated.

h. Reduce drive to minimum and reset SWR overload by pushing overload reset button.

i. Reduce drive and turn OFF High Voltage.

j. Place SWR switch of SWCU-1 to 3:1 position. Turn transmitter on and drive to approximately 1250 watts.

NOTE: SWR switch on Main power panel must not be activated. Use external coupler to determine output power for this check.

*k. High voltage breaker must trip at ± 10% of the above power.

l. Remove power and assemble wattmeter to its normal state.

NOTE: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

DATE 4-2-64 SHEET 15 OF 16	TMC SPECIFICATION NO. QA S-540	6
COMPILED / CHECKED	TITLE: GPT 10K	
APPROVED	Section 3	

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.

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 439M

DATE 4-2-64 SHEET 16 OF 16	TMC SPECIFICATION NO. QA S-540	G
COMPILED / CHECKED	TITLE: GPT 10K	
APPROVED	Section 3	

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. (J) Unbalance Tuning Completed on Chan 1, USB _____
22. (K) Balance Tuning Completed on Chan 2, LSB _____
23. (L) ALDC Circuit test made on _____ MC _____
24. (M) Directional Wattmeter, SWCU-1
    a. (M-1g) SWR on 2 to 1 trips out _____
    b. (M-k-1) SWR on 3 to 1 trips out _____

Tested by _____ Mfg. No. _____

Approved by _____ Date _____

Remarks _____

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 430M

DATE 6-9-64 SHEET 1 OF 3	TMC SPECIFICATION NO. S-540	G
COMPILED / CHECKED	TITLE: GPT-40K Driver	
APPROVED	Section 4	

SECTION 4

MODIFICATIONS TO GPT-10K

TRANSMITTER WHEN

USED AS DRIVER FOR GPT-40K

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

TMC SPECIFICATION NO. S-540

G

COMPILED | CHECKED

TITLE: GPT-40K Driver

APPROVED

Section 4

MODIFICATION FOR GPT-10K WHEN USED AS A DRIVER FOR GPT-40K

1. GPT-10K MODIFICATION.-Since the PA (10K) is only used as a 50-ohm unbalanced transmitter, there is no longer need for the antenna tuner. In its place a three-position switch and three 900-watt, 140-ohm resistors are used. The thr e position switch has three modes of operation.

   TUNE- For preliminary tuning of PA (10K) before applying power to the PA (40K).

   OPERATE- For connecting the RF output of the PA (10K) to the input of the PA (40K).

   EMERGENCY-In case of failure of PA (40K), the output of the PA (10K) can be switched into a balanced or unbalanc d antenna.

2. INTERLOCK SYSTEM.-The PA (10K) and the PA (40K) are design d to work as a single integrated transmitter except in cas f emergency. This means that a failure in one causes pow r to be removed from both simultaneously. A wafer switch that tracks the main switch's three modes of operation is mount d on the mode switch shaft.

   TUNE- Opens the PA (40K)'s interlock system to prev nt high voltage from being applied to the PA (40K) during the process of tuning the PA (10K), and applies voltag to the TUNE indicator on the PA (40K)'s main front panel.

   OPERATE- Closes PA (10K)'s interlock circuit through PA (10K)'s cabling, applies power to the OPERATE indicator, and permits PA (40K)'s high voltage to go on.

   EMERGENCY-Completes the PA (10K)'s interlock system, and opens the PA (40K)'s interlock system.

   NOTE- Additional details on this interlock system will be covered in Section 5, GPT-40K tests.

EXCEPTION/OMISSIONS TO S-540, SECTION 3, GPT-10K TEST

The 10K driver must be checked out using Section 3 of S-540 with the exception that the following t sts will be modified or omitted as indicated b low:

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DATE 6-9-64	TMC SPECIFICATION NO. S-540	C
SHEET 3 OF 3		
COMPILED / CHECKED	TITLE: GPT-40K Driv r	
APPROVED	Section 4	

1. Sheet 3, Para A-2: The "Output Loading" Control now becomes the "Mode" Switch (TUNE-OPERATE-EMERGENCY).

2. Sheet 10, Para J-Omit the Unbalance Output Tuning and S/D test. In lieu a similar test will be performed for the GPT-40K in section 5.

3. Sheet 11, Para K-Omit the Balance Output Tuning and S/D test. In lieu a similar test will be performed for the GPT-40K in section 5.

4. Sheet 12 & 13, Para M, 1; - Omit the SWCU-1 Test Proc dur . A similar test will be performed for the GPT-40K driv r in section 5.

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

DATE 6-9-64	TMC SPECIFICATION NO. S-540	G
SHEET 1 OF 19		
COMPILED	CHECKED	TITLE: GPT 40K
APPROVED		Section 5

SECTION 5

COMPLETE TEST INSTRUCTIONS

FOR

GPT-40K TRANSMITTER

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

TEST EQUIPMENT REQUIRED

A. TMC PTE Spectrum Analyzer

B. Simpson 260 ohmmeter or equivalent

C. Two RF Ammeters 0-10 amperes.

D. TER 25K 50 or 70 ohm Unbalance Load.

E. TER 25K 600 ohm Balance Load.

F. TRC 20K

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 6444

A. NOTE TO TESTER

The three phase power input leads are not to be conn ct d to the transmitter until so directed in this test specification.

*B. MECHANICAL INSPECTION

1. Check all knobs and switches on the PA and PS frem s for proper operation.

2. Check PA Tune, PA Load, and Antenna Tuner, "Balanc " controls for counter readings of about 000 corresponding to minimum capacity. In addition, insur that the two PA load variable capacitors are so ganged as to provide equal capacity variation.

3. Check to see that the PA bandswitch counter r ading corresponds to the proper PA bandswitch position.

4. Carefully check the PA bandswitch and PA compartment for good mechanical condition, obvious miswiring and loose connections.

5. Check units in both frames for obvious miswiring, loose connections, and any stray hardware.

6. Open small door on the PA blower, rear, and remove any foreign matter that may be inside.

7. Check the arrows on the Directional Coupler, for the proper directions. Two diodes are incorporat d in this coupler, the front diode is for the forward power and the arrow must be pointing up. Th second diode is for the reflected power and is locat d at the back of the coupler, and the arrow must b pointing down. At this time the inspection of the diodes should include checking to see that th diodes are properly seated in their sockets, and making proper electrical contact. Also check the two coaxial leads with the fittings to see that they are s cur d properly to the front and the back coaxial fittings on the directional coupler.

NOTE: Indicate compl tion and acceptanc of portion (s) of this t st prec d d by (*) by r cording r quir d obs rv d value or by ch ck (✓) mark as r quir d on attach d t st Data Sh ts.

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*C. PRELIMINARY ELECTRICAL INSPECTION

1. Check the 3 power input phases for shorts to ground, reading should be approximately 1 megohm.

2. Check the Shorting Relay, ascertain that it shorts both sides of the HV filter capacitors to ground. Place a piece of insulation between spring contacts and ground studs and check HV B plus to ground, it should read approximately 180K ohms.

3. Pull out the bias drawer and check B minus to ground, from the +600 volt end of R7531, this reading should be approximately 3K ohms. With the ohmmeter connected to same point, remove connector J7501 from the bias drawer, the resistance reading should now be infinity.

4. Remove the piece of insulation from the shorting relay contacts which was inserted in 2 above.

5. Check wiring of the Antenna Connector board in top of PA compartment for unbalance output operation. Connect the TER 25K unbalance load to the 40K output.

6. In the Crowbar drawer set the triggering level control, R8304, to mid position.

7. Connect the three phase input power to the transmitter.

8. Turn the Main Power and Blower breakers ON. The PA, Main blower, must operate.

9. Turn OFF the wall power disconnect switch and when the main blower has slowed sufficiently, check the direction of rotation by feel of the hub of the shaft. It must turn in the direction of the arrow indicator. The top fans should have the fan hubs facing up as viewed from below and rotate clockwise.

10. Turn ON the wall power switch and Final Filament breakers. Set Filament adjust switch on the PS frame for a reading as close to the red marker as possible on the Filament Primary voltmeter.

NOTE: Indicate completion and acceptance of portion(s) of this test procedure by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

11. Set the Crowbar Reservoir Filament with crowbar filament adjustment to the voltage stamped on the base of the crowbar tube. Note that the crowbar Filament voltage should read about 6.3 volts.

12. Close the interlock circuit and with the Bias adjust potentiometer, check the Bias Voltmet r variation from one extreme to the other. Th variation should be approximately 400 to 600 volts. Set this voltage to its maximum negativ value, about 600 volts.

13. Check the meter lights, they should be ON. The PA compartment light (white) should go ON when its switch on the control panel is turned ON.

14. The Motorized Circuit breaker should go ON and OFF with the Main Power breaker.

15. Depressing the HV Reset switch must electrically reset the motorized circuit breaker.

16. Depressing the Band Switch release must energize the band switch release solenoid and permit a band change with the "PA Band Switch" front panel control.

17. Mechanically unlatch the Plate, Grid overloads, Retune and SWR relays. Depressing the Overload Reset switch must reset these relays.

18. Turn the Blower circuit breaker OFF and set th Blower delay timer to approximately ½ minute. Turn ON the Blower breaker. Turn the Main Power breaker OFF. The main blower should stay on and Blower Delay timer should start operating; wh n it reaches zero the main blower should stop and the timer should de-activate. Set the Blower Delay timer at 3 minutes for normal operation.

19. Set the Time Delay timer for approximately 30 s conds the normal recommended delay for the HVR, type 6895 rectifier tube.

20. Turn the Final Filament breaker OFF. The Final Filam nt light on the r lay pan l sh uld go ON and the Tim Delay tim r should r s t. The Filam nt Primary voltm ter should not indicat and the PA tube filament, as view d through the rear shi ld window, should b d en rgiz d.

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*D. FUSE CHECKS

In the below listed fuse checks as the fuse is remov d to check for the specified indication(s), each fuse must be checked for correct value and type. Turn ON the Main Power, Blower and Final Filament circuit breakers.

1. Remove the Crowbar Filament fuse:-the Crowbar Filament meter should drop to zero and the Tim Delay Timer should deenergize.

2. Remove the HVR filament fuses one at a time:-Th corresponding HVR tube filament must be deen rgiz d.

3. Remove the meter light fuse:-The meter lights should go out.

4. Remove the Breaker motor fuse:-The breaker motor should be rendered inoperative.

5. Remove the Interlock fuse: must remove voltage from the interlock system and the interlock indicator light (make certain the 10K Mode switch is in the OPERATE position).

6. Remove the fuses on the Bias supply one at a time:- must remove the associated voltage.

7. Remove the following fuses on the relay panel and observe for the listed indication:-

   a. The Blower Contactor:-must deactivate the Main Blower.

   b. The Blower Delay:-must deactivate the Blow r Delay timer.

   c. The Time Delay:-must deactivate the Time Delay timer.

   d. The Top Fan:-must stop the Top Fan.

   e. Shorting Relay:-must make the Shorting R lay solenoid inoperative.

NOTE: Indicate completion and acc ptanc of portion (s) of this t st pr c ed d by (*) by r c rding r quir d observ d valu or by ch ck (✓) mark as r quir d on attach d t st Data She ts.

f. Filament Elapse time meter:-must deactivat the Filament Elapse time meter.

CAUTION

NEVER TOUCH ANY EXPOSED PARTS OF THE TRANSMITTER WHEN THE SHORTING RELAY IS ENERGIZED, 600 VOLTS D.C. FROM THE BIAS SUPPLY IS ON THE B-LINE. BE EXTREMELY CAREFUL WHEN WORKING ON THE BIAS SUPPLY AND VICINITY OF SHORTING RELAY IN REAR OF P/S FRAME WHEN THE POWER IS ON. THE RED LIGHT IN THE REAR OF THE PS FRAME SHOULD BE ON INDICATING THE PRESENCE OF THE 600 VOLTS.

*E. INTERLOCK SWITCH CHECKS

*1. Turn the 10 KW mode switch to the TUNE position. On the 40K PA front panel the TUNE indicator should light. The 40K EXTERNAL interlock position indicator on the main control panel should be OUT.

*2. Place the 10K mode switch to the OPERATE position. The 40K EXTERNAL interlock indicator and OPERATE light on the 40K PA panel should light.

*3. Place 10K Mode switch in EMERGENCY position, both the TUNE and OPERATE lights should go out in th 40K panel.

4. Placing the 10K Mode switch in TUNE or EMERGENCY position must permit the 10K HV to be turned ON but the 40K HV must be disabled.

*5. Turn the mode switch to OPERATE and check th following interlocks. If all the following switches are closed, the interlock indicator lights as the interlock switch is turned to its 12 positions successively.

a. PA DECK (2) (Top one is the EMERGENCY: Bottom one is 40K DECK)

b. BIAS DRAWER

c. RELAY PANEL

NOTE: Indicat completion and acc ptance of portion (s) of this t st prec d d by (*) by r cording r quir d observed valu or by ch ck (✓) mark as r quir d on attached t st Data Sh ts.

d. PA FRAME rear door

e. AIR SWITCH (to deenergize turn Blower OFF)

f. BAND SWITCH

g. HV RECTIFIER

h. CROWBAR

i. ANTENNA TUNER (to deenergize place BAND MCS control in mid position)

j. PS FRAME rear door

k. TIMER Time Delay (PS front bottom shield monitor d in this position)

l. EXTERNAL (2) (10K PA deck front: 10K PA deck rear)

*6. With Main Power, Blower and Filament Circuit breaker rs ON, the HV circuit breaker OFF, deenergize each interlock one at a time:-

a. The Interlock indicator should go OUT in each respective position.

b. The Shorting relay should deenergize.

c. Bias relay should deenergize, Bias light should come ON..

d. The HV circuit breaker should not hold in the ON position when so positioned.

7. Before the HV is turned ON, the HV rectifier tub filaments should be preheated for 30 minutes, this is assuming that they have not been warmed up prior to this point.

*8. Place the Driver Interlock switch in the ON position. Turn ON the 40K HV:-

*a. When the first HV contactor closes the Plate

NOTE: Indicate compl tion and acc ptance of portion (s) of this t st pr c d d by (*) by r cording r quir d bserved valu or by ch ck (✓) mark as r quired on attach d t st Data Sh ets.

voltmeter should read 5.5 KV ± 10%.

*b. The time between the closing of the first and second HV contactors should be about 4 seconds.

*c. When the second HV contactor closes the Plate voltmeter should read 11.5 KV ± 10%.

d. The HV Breaker light should go ON, the plate elapsed time meter should also energize. The Plate ON indicator should be ON.

e. Turn ON the 10K HV, placing the Driver Interlock in the OFF position should not disable the 10K and 40K HV; However, if the Driver Interlock switch is in the OFF position and the 10K HV is OFF, the 40K HV should be disabled.

f. Turn OFF the 10K and 40K HV. Set the 40K Filament Adjust switch midway between two positions this should remove AC power from the filament circuits and their respectiv voltmeters of the Crowbar, HV rectifiers, Bias supply and PA tube. In addition, the interlock circuit will be disabled.

*g. With all power ON successively trip the following relays:-

PLATE OVLD
GRID OVLD
RETUNE
SWR

This should deenergize the HV contactors, thus removing HV, and the Plate Elapse Time Meter should stop.

F. RF OUTPUT:

1. Prior to tuning the transmitter, insure that all necessary safety shields are properly installed

NOTE: Indicate compl tion and a ptanc of portion (s) of this test pr ce d d by (*) by r cording required obs rv d value or by ch ck (✓) mark as r quired on attach d t st Data Sh ts.

and an unbalanced 50/70 ohm TER 25K is connected to the unbalanced output of the 40K. For transmitt rs equipped with the DC-101 and MR-167, directional wattmeter and RF output meter; 40KW PEP output is obtained when the RF output meter is reading 16.2 KW with 2 tone drive. With Carrier or Single tone drive 40 KW PEP requires a reading of 20 KW. (For 2 tone drive, the Output meter indication equals the product of .405 and the required PEP output).

2. In the case of the 10K Driver equipped with a SWCU-1 Directional Wattmeter (DC-104 and MR-170), the RF Output meter will indicate the correct average output, 5 KW, with 2 tone drive. With carrier or single tone drive the Output meter should indicate 6.15 KW for average 5 KW (10 KW PEP) output.

G. TUNING NOTES:

1. In tuning the 40K transmitter with the 10K Driver TUNE-OPERATE-EMERGENCY in the TUNE position, it is essential that the output of the 10K driver does not exceed 2 KW for any appreciable time.

2. The OUTPUT BAL control on the 10K PA panel should be used to reduce the SWR as indicated on the 10K PA Output Meter, after the transmitter has been tun d and loaded. Press the SWR switch on the 10K control panel to the SWR position and adjust the OUTPUT BAL control for minimum SWR. Release the SWR switch and if necessary retune to 10K PA Plate Tuning to r sonanc .

3. For proper tuning of the transmitter to its rat d full power output, 40 KW PEP, the meter indications list d below should not be exceeded:

PA plate current	5.8 amperes
PA grid current	70. ma.
PA plate RF	7.5 KV

*H. IDLE PLATE CURRENT ADJUSTMENT:

With transmitter turned ON but no RF drive from the xciter, set the PA idle plate current with the Bias Adjust Control for 1.8 amperes.

NOTE: Indicat ompl tion and acceptance of portion (s) of this t st pr c ded by (*) by r cording r quir d obs rv d valu or by ch ck (✓) mark as required on attach d t st Data Sh ets.

*I. OVERLOAD ADJUSTMENTS:

1. Set the Retune Overload adjust Control to maximum clockwise. Tune transmitter to full power output on 6 MCS and set the following protective ov r-loads to trip as indicated below:

*2. PA Plate Overload-Overload the transmitter for 6 amperes of plate current and adjust PA plat Overload Adjust so it will trip at 6 amper s of plate current.

*3. PA Grid Overload-Unload transmitter until th PA Grid current is 200MA then set PA Grid Overload Adjust so that it will trip with 200 MA PA grid current.

*4. PA Bias Relay-The PA Bias Relay should en rgiz with 550V of PA Bias voltage. Return PA Bias to value that provides 1.8 amperes idle PA plat current.

*5. Retune Tube Protect Circuit, DC Adjustment:

a. With transmitter power ON including th HV, the Tube Protect relay must operat (activate) at 3. amperes and must release (deactivat) at 2.1 amperes of PA plate current.

b. Adjust the PA Bias control for 3. amp r s of PA plate current.

c. With the Retune relay mechanically d feated, set the Tube Protect Adjust on the R lay Panel so that the Tube Protect relay op rates (activates) at 3. amperes of plate curr nt.

d. To check the release current, 2.1 amperes, hold Overload Reset switch closed, s t Bias Adjust for 3. amperes plate current so that relay operates. Increase the Bias and note the plate current reading at which th relay releases. If the current is less than 2.1 amperes, turns must be removed from the shumt coil on the relay until it releases at 2.1 amp r s of PA plat current.

NOTE: Indicat compl tion and acc ptanc of portion (s) of this test pr c d d by (*) by r cording r quir d obs rved valu or by ch ck (✓) mark as r quir d on attach d t st Data Sh ets.

*6. a. SWR Overload-The SWR Overload should trip at whatev r value (except ZERO) of SWR the RED pointer is s t to on the meter. With the transmitter tuned prop rly, set the RED pointer to any value above the CAL point. Hold SWR calibrate switch to calibrate and adjust SWR calibrate control until meter indicates on the CAL point. Release switch, the meter should indicat zero or the true SWR value present. Set the RED pointer to a value below the CAL point, about 2 to 1, place calibrate switch in calibrate. The SWR overload should trip when the black pointer reaches the RED pointer.

b. To check the reflected power diode and its cir uit in the directional coupler shut down the transmitt r and reverse the rear diode, diode arrow pointed upwards, and set red pointer on SWR meter to extrem CW position. Turn ON the transmitter and bring up the RF drive carrier only for 20KW output on the Output meter. The SWR meter should indicate in th same relative position on the scale as the Output m ter 20KW indication. Slowly turn the red pointer on th SWR meter CCW until it touches the black point r. At this point the SWR overload should trip the transmitter and turn the reflected power diode to normal position, arrow pointing downwards.

*7. Retune Overload:

1. With transmitter power OFF, place a milliamm t r in series with terminal #23 on the relay pan l. With transmitter power ON, HV OFF, no RF driv and the Tube Protect relay activated by hand, the reading should be between 10 and 15 ma. Remov Bias fuse from the bias supply. Adjust R-7522 in the bias supply for 1.5 ma. reading. Replac the Bias fuse and current should be about 12 ma. With the Tube Protect relay in the deenergiz d state, the current reading should be zero. Turn OFF transmitter remove milliammeter from th circuit and reconnect lead to terminal #23.

NOTE: Indicate completion and acceptance of portion (s) of this test preceeded by (*) by recording required observed value or by check (✓) mark as required on attached test Data Sheets.

2. Turn transmitter ON and maintain reduced RF drive to a value between 2 to 2.5 KV PA Plate RF. Turn the Retune Overload adjustment clockwise until Retune Overload trips. Now turn this control slightly counterclockwise, Recheck the Retune Overload by detuning PA Plate until the PA plat current reaches 3 amperes and the PA plate RF voltage is less than 2 KV. The Retune Overload should trip.

*8. PA Tube Protect Thermostat, S-7305, Check:

In the PA tube compartment, place a jumper across terminals 2 and 3 (ground) of E7307, simulating clos d circuit condition of S-7305. With the interlock circuit open, turn ON transmitter except the HV. The Retune Overload must trip.

*9. Test Procedure for SWCU-1 in 10K Driver:

a. The following tests and adjustments will be p r-formed with the TUNE-OPERATE-EMERGENCY switch in the TUNE position.

b. Place ratio switch of SWCU-1 in 2:1 position.

c. Check for proper termination of SWCU-1 (refer to CK-649 or CK-650).

d. Rotate reflected power diode to read forward. Arrow on diode must point toward load.

e. Apply power to the transmitter and tune output to 6 Mc. Do not exceed output power for the 10 KW driver required in subsequent paragraphs of this test.

f. Increase side band exciter drive to 540 watts. This point is indicative by SWR ratio of 2 (two) on th output power meter.

NOTE: SWR switch on Main Control Pan l must be activated.

g. Leave Power at this level and adjust the SWR ov rload until the High Voltage breaker trips. Leave SWR Pot ntiom t r at this point. SWR ov rload is located

NOTE: Indicat compl tion and acc ptanc of portion (s) of this t st pr ce d d by (*) by r cording r quir d obs rv d valu or by check (✓) mark as r quir d on attached t st Data Sheets.

in SWCU-1 accessible from front panel.
NOTE: SWR switch on Main Control Pan l must not be activated.

h. Reduce drive to minimum and reset SWR overload by pushing overload reset button.

i. Reduce drive and turn OFF High Voltage.

j. Place SWR switch of SWCU-1 to 3:1 position. Turn transmitter on and drive to approximately 1250 watts.
NOTE: SWR switch on Main Control pan 1 must not be activated.

k. High Voltage breaker must trip at ± 10% of th above power.

l. Remove power and assemble wattmeter to its normal state.

*J. UNBALANCE OUTPUT TUNING AND DISTORTION TEST

1. The transmitter PA output must be connected for Unbalance output 50-70 ohms, operation and t r- minated in 50-70 ohm unbalance load.

2. Two tone audio test signal from the PTE must b connected with a shielded pair to LINE 1, ter- minals on E-3002, terminals 20 and 22 with th shield to ground terminal 21. E-3002 is locat d on rear-panel of the auxiliary frame. Connect the RF INPUT of the analyzer to RF MON jack on the APP panel and place selector switch to PA Position. For this test the Upper-Sideband will be employed.

3. Tune the transmitter to all frequencies listed on tuning test chart CH-223 or CH-222 depending on whether transmitter is "Synthesized" or "Non-Synthesized." Make signal to distortion check at each frequency at full power output, 40 KW PEP and at half power output, 20 KW PEP. Record all data required by the tuning chart.

NOTE: Indicate compl tion and a eptanc of portion (s) of this t st pr c d d by (*) by r c rding requir d obs rv d value or by check (✓) mark as r quired n attached t st Data Sh ts.

REQUIREMENT:

a. At 40 KW PEP the third order distortion products must be at least 35 db below the two tone test l v l.

b. At 20 KW PEP the third order distortion products must be at least 40 db below the two tone test lev l.

*K. EMERGENCY OUTPUT TEST:

1. Check the Emergency Output, 10K driver unbalanc , of the 40K by selecting two frequencies at random separated at least 10 MCS.

REQUIREMENT: 10 KW PEP RF output.

*L. BALANCE OUTPUT TUNING AND DISTORTION TEST

1. The transmitter output circuit must be connected for Balance output, 600 ohm, operation and t r-minated in a 600 ohm balance load.

2. Connect the two tone audio test signal to LINE 2 terminals 24 and 26, ground shield to 25 on E-3002. For this test use the Lower Sideband. Other analyz r connections remain the same as in the Unbalanc test.

3. Tune transmitter to all test frequencies list d on tuning test chart CH-223 or CH-222 depending on whether transmitter is "Synthesized" or "Non-Synthesized." Make signal to distortion check at each frequency at full power output, 40 KW PEP, and half power, 20 KW PEP. Record all data required by the tuning chart.

REQUIREMENT:

a. At 40 KW PEP the third order distortion products must be at least 35 db below the two tone test l v l.

b. At 20 KW PEP the third order distortion products must be at least 40 db below the two tone test l vel.

NOTE: Indicat compl tion and acc ptance of portion (s) of this t st pr c d d by (*) by r cording required observed valu or by ch ck (✓) mark as r quir d n attach d t st Data Sh ets.

*M. CROWBAR TEST AND ADJUSTMENT:

Caution: The first two steps of the procedure below must be done with the HV OFF, and the HV filter capacitors, C-8107 and C-8108 discharged with a Gibbons stick.

1. Check R-8304, triggering level adjustment in the crowbar drawer, arm on this pot should be in mid position.

2. Connect a 1K, ½ watt resistor between the +HV t r-minal of capacitor C-8108 and ground.

3. Turn ON the HV; the following should happen:-

   a. The crowbar tube should flash.

   b. The 1K, ¼ w. resistor should shatter.

   c. The main circuit breaker should trip.

   d. The grid overload should trip.

   e. The PA plate overload should trip.

NOTE: When a Crowbar Test Jig is available, the test above may be performed by carefully noting the Operating Instructions appended to the jig.

NOTE: Indicate compl tion and acc ptance of portion (s) of this test pr c d d by (*) by r c rding required observ d valu or by check (✓) mark as r quired on attached t st Data She ts.

*N. CHECK E-8119 TERMINAL BOARD CIRCUITS

1. With transmitter power turned OFF remove the jump r from Terminals 5 and 6 on E-8119 located in th back of the 40K PS frame. Turn transmitter power ON and insure all interlocks are closed and overloads r s t, attempt to turn ON the HV-the HV circuit should be disabled under the above conditions. If the HV is not disabled check E-8119 wiring, with transmitter power off. After completion of this test, r plac the jumper across terminals 5 and 6.

2. There is 230V AC present across terminals 1 and 2 of E-8119. Turn transmitter power OFF, short out all HV points with a gibbon stick, and connect AC voltmeter with long leads to terminals 1 and 2 on E-8119. After this meter is connected do not touch the meter or leads when transmitter is ON. Turn transmitter power ON including the HV. The voltmeter should read approximately 230V AC. Turn the HV OFF and remove F-8102. Turn the HV ON, th meter reading should be zero. Restore F-8102 and remove F-8103, when the HV is turned ON the met r should read zero. Turn OFF power and replac F-8102 and F-8103.

TEST DATA SHEET

1.	(B-1 thru 7) Mechanical Inspection completed.	_____ (✓)
2.	(C-1 thru 20) Preliminary Electrical Inspection completed	_____ (✓)
3.	(D-1 thru 7) Fuse Checks completed.	_____ (✓)
4.	(E) Interlocks & Overloads:-	
	a. (E-1,2,3) 10K Mode Switch check	_____ (✓)
	b. (E-5,6) Interlock Circuit check	_____ (✓)
	c. (E-8a) Plate Voltage after 1st Contactor Closes	_____ V.DC
	d. (E-8c) Plate Voltage after 2nd Contactor Closes	_____ V.DC
	e. (E-8b) Time interval between 1st and 2nd Contactor Closing, approximately	_____ secs
	f. (E-8g) Removal of HV by overloads tripping	_____ (✓)
5.	(H) PA Idle Plate Current adjusted to	_____ amps
6.	(I) Overloads Adjusted to trip as follows:-	
	a. (I-2) PA Plate at	_____ amps
	b. (I-3) PA Grid at	_____ ma.
	c. (I-4) PA Bias Relay Energizes at	_____ V.
	d. (I-5) Retune Tube Protect activates at	_____ amps
	and deactivates at	_____ amps
	e. (I-6) 40K SWR at	to 1 SWR
	f. (I-7) Retune overload at Plate RF,	_____ KV.
	and PA Plate current	_____ amps
	g. (I-8) PA tube Protect thermostat circuit operation checked	_____ (✓)
	h. (I-9) SWCU-1 in 10K driver adjusted at	to 1 SWR
	and checked for tripping at	to 1 SWR
7.	(J) Unbalance Output tuning and Distortion test completed	_____ (✓)

DATE 6-9-64 SHEET 19 OF 19	TMC SPECIFICATION NO. S-540	C
COMPILED / CHECKED	TITLE: GPT-40K	
APPROVED	Section 5	

8. (K) Emergency Output for 10 KW PEP performed and _____ MCS. _____ MCS.

9. (L) Balance Output tuning and Distortion test completed _____ (✓)

10. (M) Crowbar test completed _____ (✓)

11. (N) Terminal Board E-8119 Checks completed _____ (✓)

12. Upon completion of tests record below the following time meters:-
    a. 10K, Filament Time Elapse _____ hrs.
    b. 10K, Plate Time Elapse _____ hrs.
    c. 40K, Filament Time Elapse _____ hrs.
    d. 40K, Plate Time Elapse _____ hrs.

TESTED BY _____ MFG. NO. _____

APPROVED BY _____ SER. NO. _____

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M 8444

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 Adjustment _____

    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. (J) Unbalance Tuning Completed on Chan 1, USB _____

23. (L) ALDC Circuit test made on _____ MC _____

Tested by _____ Mfg. No. _____

Approved by _____ Date _____

Remarks _____

Sh. #2 of 28

REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S540

MODEL _____ PROJECT NO _____

DATE	REV.	PAGE	EMN#	DESCRIPTION	CHK.	APP.
4/2/61	A	—		Completely Retyped Sections 1,3,4,5		
				For Clarity Purposes.		
7-31-63	B		9706	Revised Sec. 1, Sh. 2,3,4 and Sec. 3, Sh. 3-6 per EMN		K

3/12/64	C	5	11047	Revised Sht. 5 section 3 per EMN		K
4/30/64	D	-----	11258	Completely Revised section 3 per EMN		K
6/29/64	E	------	11648	Completely Revised Sections 1,4,5 per EMN		K
12/11/67	F		18657	Revise Section 5 sh. 9		K
1/24/69	G		19286	Revise Sect. 2 Completely per EMN.		
				19256		