Typed by CL

TMC SPECIFICATION

NO. S-1084	
REV: Ø A	
COMPILED: RT	CHECKED: R. Trotter
APPD:	SHEET 1 OF 16
TITLE: AUXILIARY FRAME SECTION I&II	

COMPLETE TEST INSTRUCTIONS

FOR

10K-LF AUXILIARY FRAME SIDEBAND

GENERATOR SYSTEM

All units in auxiliary rack must be tested to meet specification before installation as a system. For proper interconnection and termination refer to CK-956.

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 CB-3000 to the ON position, this applies 230 VAC to the primary circuit of T-3002, a regulated stepdown transformer the output of which is 115 VAC. Top fan B-1200 should start operating, removal of F-3000 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, LFA, 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 stablized.

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 J-2701 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 10KC output from the divider chain, (CHL) of which is derived from the highly stable 1MC standard (CSS). The variable master oscillator is kept stable by mixing its output to a selected 10KC harmonic of the highly stable CHL. The product which is between 510-520KC. 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 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 voltage in 100 CPS steps control the CMO output. Each loop is monitor upon a test oscilloscope, a square lissajoupattern 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 mutlples to be used thru out the whole system.

APP-8 This unit has three functions, (1) to supply auxiliary A.C. power. (2) monitor the output of the exciter, driver, PA (3) t supply audio tones from TTG to system for distortion checks if necessary.

CPP-5 Supplies power to the CHG.

CPP-2 Supplies power to rest of the system.

LFA-4 This unit takes 1 (one) MC output of the CSS and doubles it to provide 2 (two) MC which is then mixed with the output of the CHG-2A to provide and output frequency between 5 and 600 KC.

TEST INSTRUCTIONS:

A. Proceed as outlined in Part #1 of the Test Procedure.

B. After completion of Part #1, proceed with Part #2.

PART I

A. Connect a 5 Watt 68 ohm resistor to CHG J2704 and ground.

B. Connect the output of a TTG (two tone generator) to line one terminal 20 and 21 of center shield assy or to APP-8 Channel One. Both lines have to checked for proper operation.

C. Remove connector from J-3005 LFA Monitor and Place it in CHG J-2705 Monitor.

D. Connect analyzer to APP-8 output and set Monitor to the Exciter position.

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 2750 KC. The CMO can be synchronized on frequency every 10 KC. Tune and adjust output to a meter reading of 3. This 2750 KC 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 P-3010, 250 KC input of the CBE and in the same manner 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 2750 KC 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 + 2750 KC 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 indicator meter, this repres nts and output wattage of 2 watts PEP, this f at must be achieved over the complet range of the CHG 1.75-33.75 MC.

GENERAL CHECKOUT CONT'D

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 and intermediate frequency of 500KC. The unit has two inputs, VFO and signal. The VFO frequency has to be 500KC above the signal frequency to obtain in display on FSA scope.

EXAMPLE: Desired Frequency: 12,750,000 Cycles

Intermediate Frequency: 500,000

V.F.O. Frequency: 13,250,000

Set MO of VOX to 3.3125 and tune output frequency or VOX to 13,250,000 and connect this signal to V.F.O. input of F.S.A.

GENERAL CHECKOUT CONT'D

5. Set up FSA as follows:

A. IF attenuator 20 DB

B. Sweep selector to 10 KC or 7KC

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.) Now by slightly varying the VOX output frequency 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 60 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 scop , now by varying CMO through its sync. rang no spurious should appear which is indicated by erratic distortion of the display.

DISTORTION CHECK:

7. Insert the two tones to E-3002 line 1 (one) or APP-8, turn LSB switch on the CBE to channel one, adj. gain to a midscale 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 approximately 2KC apart, by using 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 (one) watt PEP, the 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. Enter results on report sheet Part 1.

8. SIDEBAND CHECK: By reinserting the carrier the 250KC 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 cycl s and by varying th CMO through its synchronizing range without losing synchronizing the output of transmitt r should stay constant.

10. TIS KEYING CHECK:

Connect a square wave generator to terminal 15 and 16 of E3002, this is the key line to the TIS, set output 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 E3000 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-8

The monitor out should be checked by looking at the output of the PA and IPA . The exciter monitor has already been checked and so also have the audio input lines.

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 P3011 to J1302 on the CHG, connect J602 to J606 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.

13. EXTERNAL 1 (ONE) MC IN

On the center shield assy. check J3004 external 1 MC in to see that it t rminated prop rly to J602 on CSS.

14. EXTERNAL INTERLOCKS

By removing jumper from terminal 8 and 10 on E3000 should disable 10K interlock system.

After completion of all checks fill out all test papers.

PART-2

1. (a) Remove load from CHG 2704 and replace with the proper connector.

   (b) Remove the connector from CHG J2705 monitor and replace on LFA J3005 monitor.

   (c) Remove the connector LFA J3004 and replace with a 50 ohms 20 watt non inductive resistor.

   (d) Replace FSA with Spectrum Analyzer Model LP-1A with modified rack. To fully understand the operation of Spectrum Analyzer refer to Panoramic Instruction Manual LP-1A.

2. DETERMINING OUTPUT FREQUENCY:

   (a) The output frequency is determined by KCS above 2 MCS on the CMO.

   EXAMPLE: If 300 KCS output is required, set CMO and CHG for 2,300,000 MCS.

   NOTE: The output control on the CHG must be set to 4 or 5 divisions on the CHG output meter.

3. SYSTEM OUTPUT:

   (a) Set up the system for 300 KCS, using two tone.

   (b) Advance LFA output control for 5 watts PEP (15.8V) on a HP-410 Vacuum Tube Voltmeter connected to the output load.

   (c) Note the reading on LFA output meter and enter the number into report sheet.

4. DISTORTION TEST:

   (a) Using two tones, measure distortion of system and enter r sults into report sheet Part 2. In all cases third order distortion should be 40 DB or better over the complete range.

   (b). Remove audio tones and reinsert carrier for full 5W output and enter results on report sheet Part 3.

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

THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, NEW YORK

SBG-1LA TEST DATA SHEET - Page 1 of 2

MFG. NO.: _____

A. MECHANICAL

1. Slides _____ OK

2. Front panel line-up _____ OK

3. Cables _____ OK

B. OVEN CYCLING

1. CMO _____ OK

2. CHG _____ OK

C. CMO

1. Calibration _____ OK

2. Beat Indicator _____ OK

D. CHG

1. Output Voltage _____ Volts

E. Carrier Suppression _____ DB

PART 1

LOWER BAND LIMIT		UPPER BAND LIMIT	BAND SW NUMBER	OUTPUT TUNING DIAL BAND	COUNTER	SPURIOUS DISTORTION	
1.750	2.750	3.750	C	A			
3.750	4.750	5.750	2	B			
	4.000		2	B			
	5.000		2	B			
5.750	6.750	7.750	4	C			
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	D			
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			

*S/D:40db down from each tone

PART 2

FREQUENCY	CMO FREQUENCY	BAND SW NUMBER	OUTPUT TUNING DIAL BAND			
50 KCS	2.050 MCS	0	A			
300 KCS	2.300 MCS	0	A			
500 KCS	2.500 MCS	0	A			

*S/D:39db down from each tone (equiv. 45db PEP)

"POWER OUTPUT: 5 WATTS AVG."

5 KCS _____

600 KCS _____

KMCU Keying _____

TEST REPORT SHEET PAGE 2 f 2

SERIAL NUMBER _____

DATA _____

TESTED BY _____

ACCEPTED BY _____

*SIGNAL TO DISTORTION

CL

TITLE: AUXILIARY FRAME SECTION I

COMPILED: RT | CHECKED: | APPD:

REV: Ø A

8/5/65

TMC SPECIFICATION

NO. S - 1084

SHEET 14 OF 16

REPLACEMENT OF TIS (TONE INTELLIGENCE SYSTEM) WITH KMCU (KEYER MONITOR CONTROL UNIT)

KMCU (Principle of Operation)

The KMCU consists of two separate sections, a keyer control circuit and a monitor circuit. The keyer is designed to sequentially key the various sections of a high power transmitter. The monitor section provides for observation of the transmitter operation.

In the auxiliary frame part of the keyer control is utilized to contact key the CMO Key Line and place the CHG B+ on.

Test Equipment Required

This is in access to that supplied in Section I.

1. Square Wave Generator
2. 3 - 24 VAC or DC Lamps
3. 24 VAC or DC power source

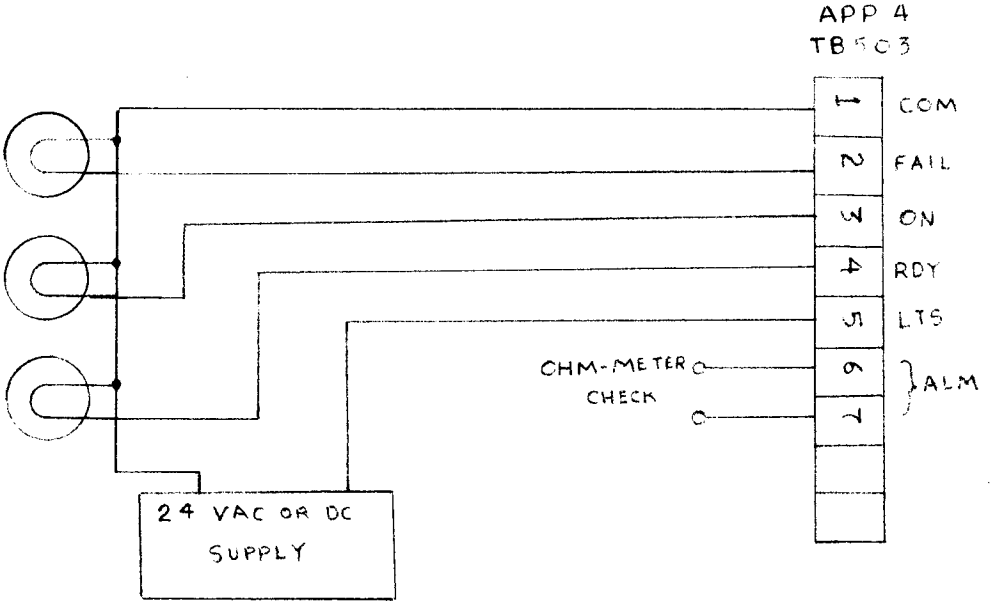
Procedure

1. Connect square wave generator output to key line input on center shield.
2. Place keying selector of KMCU to 50 volt keying position.
3. Apply power to KMCU.
4. Place keying control to local.
5. Place test key to its up position.
6. The above completes the CMO key line and places the CHG B+ to its on position.
7. Now proceed to check out auxiliary frame as outlined in section one omitting step 10 (TIS keying check).
8. Step 11 of Section One, the APP-8 is replaced by the APP-15. The only difference is the addition of Channel 2 input.
9. Check Channel 2 for proper operation in system.

10. With the proper output out of the SBG system. By placing the test key to neutral, the output must reduce to zero.

11. Place keying control to remote. With proper output from square wave generator the KMCU must key the SBG system at the same repetition rate.

12. Remove power from auxiliary frame. Connect 24 volt lamps and power supply as outlined in diagram below. This procedure will be checked in test instructions for transmitter.



REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S 1084
LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
3/25/66	Ø			ORIGINAL RELEASE FOR PRODUCTION	
10/25/66	A	14	17136	Revised per EMN	

TMC FORM MLR-1 2-65—AINS.