

# TMC SPECIFICATION

NO. S - 530

REV:

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LB

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APPD:

SHEET 1

OF //

TITLE:

## TEST PROCEDURES

for

SBT-1KE, SBT-1KG, SBT-1KE6

# TMC SPECIFICATION

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**Note:** This specification is applicable to the SBT-1KE, SBT-1KE6 and the SBT-1KG. The difference is that the 1KE uses the CBE-1 and TIS-3, the 1KE6 uses the CBE-1 and KMCU-1 and the 1KG uses the CBE-2 and TIS-3.

## A. Introduction

The SBT-1K is a general purpose transmitter providing SSB, ISB, DSB, AM, FS and CW operation throughout a frequency range of 2-32 megacycles. The 1KE6 incorporates a Keyer Monitor Control unit that provides high speed synchronous keying, effective muting on standby mode and a front panel transmitter status light which can be monitored externally visually or audible in case of failure.

## B. Main Components

The SBT-1KE, E6, G consists of 17 separate units integrated to form the system. These units are:

- |                                   |            |
|-----------------------------------|------------|
| 1) Rack Ass'y.                    | RAK-11     |
| 2) Sideband Exciter               | CBE-1 or 2 |
| 3) Controlled Harmonic Generator  | CHG-2B     |
| 4) Controlled Master Oscillator   | CMO-1      |
| 5) Low Frequency Loop             | CLL-1      |
| 6) High Frequency Loop            | CHL-1      |
| 7) Frequency Standard             | CSS-1A     |
| 8) Power Supply                   | CPP-5      |
| 9) Power Supply                   | CPP-2      |
| 10) Rack Ass'y.                   | RAK-17A    |
| 11) Standing Wave Ratio Indicator | SWR-1K     |
| 12) Linear Power Amplifier        | RFD-1      |
| 13) Auxiliary Power Panel         | APP-4      |
| 14) Low Voltage Power Supply      | P.S.-4     |
| 15) High Voltage Power Supply     | P.S.-5     |
| 16) Tone Intelligence System      | TIS-3      |
| 17) Keyer Monitor Control Unit    | KMCU-1     |

Modification Kit, KIT-101 may also be supplied as required by the particular installation.

Modification Kit, KIT-315, installation of KMCU-1 may also be supplied.

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## I. Equipment Required

1. 52 ohm load, 1KW dissipation
2. AC power cables
3. PTE
4. RF output cable, RG-8/U
5. Test chart, SBT-1KE (S530 page 11)
6. Voltmeter, Simpson 260 or equivalent
7. Square Wave Generator, Boonton Model 71
8. Audio Generator
9. Modification Kit, KIT-101 (if not supplied with system)
10. Test Receiver (GPR90 or equivalent)
11. 24 VAC or DC source
12. Three (3) 24 VAC or DC Lamps

## II. Procedure TIS (Tone Intelligence System)

1. Install Modification Kit, KIT-101 to inter-connect the SBG (exciter) rack to the power amplifier rack.
2. Install AC input power cables from the rear of the RAK-11 and RAK-17A to the AC line.
3. Apply power to the SBG section and allow unit to warm up as per the test specifications for the SBG-1 (S-527). Make sure RF output controls on CHG are at zero.
4. Remove all jumpers from rear of APP-4 and CMO chassis; these jumpers will be replaced upon completion of this procedure.
5. Connect shielded lead from the output of the TTG mounted in the PTE to CHANNEL 1 and CHANNEL 2 input terminals (balanced) on test cable assembly. Set exciter switches CHANNEL 1 and CHANNEL 2 on TIS-3 to the line positions.
6. Connect R.F. output cable from J609 Jack of AX-198 assembly to R.F. input terminal of dummy load.

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7. Connect dummy load monitor output to signal input jack of PTE Analyzer.
8. Connect a jumper between terminals 5 and 8 on the APP-4. This completes the external interlocks circuit within the rack.
9. Connect a jumper from terminal 21, T602 to terminal 22. This completes the Key Line Circuit to the CMO.
10. Set Main Power Switch on APP-4 to ON position. The red Main Power Indicator Lamp should light.
11. Set Main Power Switch on PS-4 to ON position. The green Main Power Indicator should light and R.F.D. blower and PS-5 fan should start running.

Note: PS-4 Transmitter Voltages Switch should be in standby position; final Voltages Switch on OFF position and Overload breakers in ON position. Adjust line voltage to 115 volts.

12. After a warm-up time of approximately 5 minutes, set the Transmitter Voltages Switch to ON position. The red indicator Lamp should light.
13. Set the Final Voltages Switch to ON position. The red indicator should light and approximately 200 ma of plate current should appear on the P.A. Plate Current meter on the RFD.
14. Place voltmeter across terminals 3 and 4 on APP-4. Meter should read 115 volts A.C. This is transmitter antenna relay voltage, and may vary  $\pm 10\%$ .
15. With voltmeter connected as in (step 14) above, set XMTR voltages switch on PS-4 to standby position.
  - a. Voltmeter should read zero volts.
  - b. Final voltages and Transmitter voltage indicators on PS-4 should go out. Remove meter.
16. Place a jumper across terminals 1 and 2 on APP-4. Transmitter voltages and final voltages indicator should light. Remove jumper. This checks the remote XMTR Place Circuit to the PS-4.

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17. Place an ohmmeter across terminals 24 and 25. It should be 10 ohms  $\pm$  10% and infinity between 23 and 24.
18. Place a jumper across terminals 21 and 22 to key the unit. An ohmmeter connected between 23 and 24 should read 10 ohms  $\pm$  20% and infinity between 24 and 25. Remove jumper and meter.
19. Insert two tones from TTG and adjust SBG section for two tone test at required test frequency. Reduce CHG output to zero.
20. Set Transmitter Voltage Switch on PS-4 to ON position.
21. Adjust for 1KW PEP at the test frequency. 1KW PEP is 225 VRMS across 52 ohm load when measured with HP410B.
22. Adjust system for 40 db third order distortion at test frequency. See Chart.
23. Adjust system for 1KW, CW at test frequencies (225 VRMS across 52 ohms)
24. Adjust CHG output to zero.
25. Turn the level adj. knob on the TIS-3 maximum clockwise.
26. Set the Shift CPS indicator to 850.
27. Turn the Function selector switch to the CW position.
28. Turn the center Frequency CPS selector switch to the 2000 position.
29. Turn the Test selector switch to the line position.
30. Turn the Key Mode selector switch to the 50 V position.
31. Set the Multiply by frequency selector on the Square Wave Generator to 1 position.
32. Turn the Cycles frequency selector maximum count r-clockwise and observe fluctuating meter reading.

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33. Turn the control knob under the Peak Volts meter maximum counter-clockwise.
34. Set the small output selector switch to the 50 position.
35. Connect the output of the Square Wave Generator to terminal 27 and 29 of T602.
36. Set the B+ switch on TIS-3 to the ON position.
37. Set the exciter switches, Channel 1 and Channel 2, to the FSK, FAX, CW position.
38. Increase the level adj. knob for a fluctuating meter indication approximately one third full scale reading.
39. Adjust the LSB section of the CBE for an indication of a fluctuating input on both Channel 1 and Channel 2. Turn LSB section Off.
40. Adjust the USB section of the CBE for an indication of a fluctuating input on both Channel 1 and Channel 2. Adjust USB Gain control for approximately 1/3 scale deflection.
41. Set up test receiver to receive test frequency. BFO on.
42. Adjust transmitter for 500 watts CW output at test frequency using either sideband.
43. A Keyed 1KC tone should be heard on the receiver.
44. Reduce transmitter output to zero.
45. Turn function selector switch on TIS-3 to the FSK position.
46. Increase transmitter output to 1000 watts. A varying tone, above and below the center frequency should be heard.
47. Vary the center freq. CPS selector between 2550 and 1900 and listen for changes in pitch of varying tone. Set switch back to 2000.

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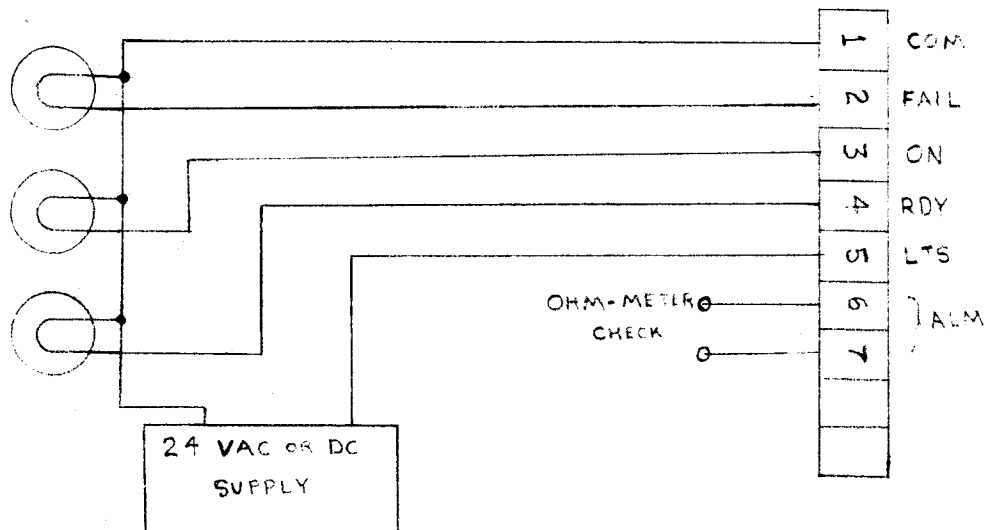
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48. Vary the Shift CPS indicator to a lower value and not a narrower above and below the center frequency.
49. Reduce transmitter output to zero.
50. Change the small output selector on the Square Wave Generator to the 10 position.
51. Remove wires from terminals 27 and 29 of T602 and connect to terminals 31 and 32. This connects the square wave generator to the fax input.
52. Set the Function selector switch on the TIS-3 to the FAX position.
53. Increase transmitter output to 1000 watts. A varying tone should be heard.
54. Reversal of the output lead of the square wave generator should change frequency of output tone of receiver.
55. Reduce transmitter output to zero.
56. Turn off all power switches and reduce all gain controls to zero.
57. Record all data on Test Data Sheets.

### III. Procedure KMCU-1 (Keyer Monitor Control Unit) (Ref Schematics CK1216, CK1215)

APP 4  
TB503



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TITLE: SBT-1KE, SBT-1KG, SBT-1KE6

## Functional Description

Keyer-Monitor Control Unit controls various sections of the SBT-1K and provides indications of transmitter operation, and audio, r-f, and plate voltage failure.

The internal and external Green Status Lamp lights when keying or modulating signals are applied to transmitter and transmitter is radiating.

The Amber Status Lamp lights when Plate Voltage is applied and the transmitter is awaiting a modulating signal.

The Red Status (failure) Lamp lights when keying or modulating signals are applied to transmitter, but transmitter does not radiate; and the loss of Plate Voltage indication.

The alarm circuitry of the KMCU provides a switch closure which may be externally connected to provide an audible alarm in case of failure.



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1. Connect E502 on rear of APP-4 as shown in fig. 1
2. Same as Step 1, Procedure II
3. Same as Step 2, Procedure II
4. Same as Step 3, Procedure II
5. Same as Step 4, Procedure II
6. Connect shielded lead from the output of the TTG mounted in the PTE to Channel 1 and Channel 2 input terminals balanced.
7. Same as Step 6, Procedure II
8. Same as Step 7, Procedure II
9. Same as Step 8, Procedure II
10. Turn the KMCU to the ON position and place the test key up. This completes the key line to the CMO, CHG B+ On and reduces the bias from the PS-4A. Th external and internal failure light should be on.
11. Same as Step 10, Procedure II
12. Same as Step 11, Procedure II
13. Same as Step 12, Procedure II
14. Set the Final Voltage Switch to ON position. Th red indicator should light and approximately 200 ma of plate current should appear on the PA Plat current on the R.F.D. Upon releasing test key on KMCU-1 to neutral position the plate current should reduce to zero and failure light on the KMCU-1 should go out and Ready light should go on.
15. Same as Step 14, Procedure II
16. Same as Step 15, Procedure II
17. Same as Step 16, Procedure II
18. Same as Step 17, Procedure II

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19. Place KMCU Test Key to the up position to key the unit. An ohmmeter connected between 23 and 24 should read 10 ohms  $\pm$  20% and infinity between 24 and 25. Place test back to its neutral position and remove meter.
20. Same as Step 19, Procedure II
21. Same as Step 20, Procedure II
22. Place keying selector of KMCU to the 50 V position. Place test key up. Adjust for 1KW PEP at the test frequency. 1KW PEP is 225 VRMS across 52 ohm load when measured with HP410B.
23. Same as Step 22, Procedure II
24. Same as Step 23, Procedure II
25. Adjust CHG output to zero.
26. Turn on Square Wave Generator, Adjust KMCU to 50 V keying, place KMCU Test Key to UP position and adjust Transmitter output to 1KW PEP. Upon releasing test key the transmitter should key at the same rate as the square wave generator.
27. The green on the air light should be on and upon removing Square Wave Generator the red light should go on. Also, placing an ohmmeter across E503 terminal 5 and 6 should read zero ohms.
28. Remove ohmmeter
29. Record all measurements on Test Data Sheet.

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TEST CHART SBT-1KE, ser. no.

DATE	CBE ser. no.	CHL ser. no.	RFD-1 ser. no.
TEST BY	CHG ser. no.	CSS ser. no.	P.S.-4 ser. no.
	CMO ser. no.	CPP-5 ser.no.	P.S.-5 ser. no.
	CLL ser. no.	CPP-2 ser.no.	APP-4 ser. no.
	KMCU ser. no.	TIS-3 ser.no.	SWR-1K ser. no.

1KW PEP, SSB

1KW, CW

FREQ. MC	CMO SETTING	CHG BAND	DRIVER BAND	1st AMPL. TUNE	PA GRID TUNE	PA TUNING	PA LOADING	PA LOADING SWITCH	MA, PA PLATE CURRENT	MA, PA SCREEN CURRENT	3rd ORDER DISTORTION -DB	MA, PA PLATE CURRENT	MA, PA SCREEN CURRENT	FORWARD POWER WATTS	REFLECTED POWER WATTS	ACTUAL POWER WATTS	REMARKS
2																	
5																	
10																	
20																	
30																	

NOTE: 1. 1KW, PEP, IS 225 VRMS ACROSS 52 ohm LOAD. (HP 410B)  
 2. 1KW, CW IS 225 VRMS ACROSS 52 ohm LOAD.  
 3. 3rd ORDER DISTORTION REQUIRED AT 30 MCS-32 MCS is 35 DB.

ITEMS	ACCEPT	REJECT
1. A.C. POWER TO APP-4	_____	_____
2. A.C. POWER TO PS-4	_____	_____
3. A.C. POWER TO TIS-3	_____	_____
4. A.C. POWER TO CBE	_____	_____
5. A.C. POWER TO CMO	_____	_____
6. A.C. POWER TO CSS	_____	_____
7. A.C. POWER TO CHG	_____	_____
8. INTERLOCK CIRCUITS	_____	_____
9. KEY LINE CIRCUIT	_____	_____
10. CHANNEL 1 CIRCUIT	_____	_____
11. CHANNEL 2 CIRCUIT	_____	_____
12. REMOTE XMTR PLATE CIRCUIT	_____	_____
13. INTERCONNECT CABLING	_____	_____
14. RECEIVER MUTING	_____	_____
15. 115V ANTENNA RELAY	_____	_____
16. TIS OPERATION, CW	_____	_____
FSK	_____	_____
FAX	_____	_____

ACCEPT	REJECT
17. KMCU OPERATION	_____
status lights	_____
keying	_____

SYM	DESCRIPTION	DATE	CH. NO.	DRAFTS	CHECKER	ENG. APP.
UNLESS OTHERWISE SPECIFIED:						
DIMENSIONS ARE IN INCHES		SCALE:				
TOLERANCES ON		MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND ANY DEVIATIONS WILL BE CAUSE FOR REJECTION.				
FRACTI NS ± 1/64		REMOVE ALL BURRS AND SHARP EDGES				
DECIMALS ± .005						
ANGLES ± 1/2°						

REQ. PER UNIT	MODEL	SECTION	ASS'Y. NO.	DATE

REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK				
S-530 SHEET				
TEST PROCEDURE CHART, SBT-1K				
TYPE & TEMPER		HEAT TREAT. SPEC.		FINAL APPROVAL
		DRAWN		
		CHECKER		
		ELEC. DES. APP.		
		MECH. DES. APP.		
				S-530
				B

