

BILL GRAY

TECHNICAL MANUAL

FOR

GENERAL PURPOSE TRANSMITTER

MODEL SBT-1K(J)

(AN/FRT-53)

IMPORTANT NOTICE: This is an INTERIM Technical
Manual for SBT-1K(J) (AN/FRT-53)

_____, supplied under Contract
_____. Copies of the FINAL Technical
Manual will be forwarded if you fill in and return
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NUMBER OF EQUIPMENTS _____ DATE _____

RETURN ADDRESS

THE TECHNICAL MATERIEL CORPORATION
Mamaroneck, N.Y. Ottawa, Ontario

IN-209J

1 June 1961

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(AN/FRT-53)

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- Part V: Appendix, including Auxiliary Power Panel, APP-4 and Rack Wiring Diagram.

FOREWORD

The SBT-1K transmitters consist of a family of transmitters comprising models A through S. This manual deals only with model J. The modular make up of the SBT-1K manuals is designed to cover, as efficiently as possible, the many combinations found in practice. Small individual manuals, when properly collated, are integrated into a manual applicable to any desired manual.

The following sketch illustrates the major components of model J.

RFD-1A AM-2785/URA-36
VOX-5 O-330B/FR
AO-101 O-672/URA-28
A-1397 PP-1769/URA-23
APP-4 SB- /UR
PS-4 PP-2765/URA-36
PS-5 PP-2766/URA-36

RACK: RAK-10A W/O

AX-198 RELAY ASSEMBLY

E/W WIRING HARNESS

PART I - GENERAL AND SYSTEM OPERATION

I-1-1 GENERAL

The SBT-1K(J) is a conservatively rated general purpose transmitter capable of providing 1000 watt peak envelope power (PEP) output throughout the 2-to-32-mc range. The principal function of the equipment is to effect communication with reliability and precision from shore-to-ship or point-to-point over long and difficult circuits by single sideband operation primarily. It may be used for many types of transmission; for example:

- a. SSB (Single sideband, suppressed carrier)
- b. DSB (Double sideband, suppressed carrier)
- c. ISB (Independent sideband, suppressed carrier)
- d. AM (Single or double sideband with carrier)
- e. CW (Keyed carrier)

I-1-2 ADVANTAGES OF SINGLE SIDEBAND CARRIER SUPPRESSED VERSUS CONVENTIONAL AM OPERATION: RATING SUPPRESSED CARRIER TRANSMITTER.

- a. The advantages of single sideband, working for point-to-point long-distance radio telegraph communication circuits at high frequency, as compared with ordinary carrier frequency shift (FSK), are in economy in equipment and antennas, greater simplicity in operation, spectrum conservation, and power gain. This type of transmission will enable the industry to increase traffic at the same time that frequency occupancy is reduced. The following paragraphs describe these advantages in greater detail.
 - (1) The RF spectrum is more efficiently utilized because in SSB operation the residual carrier and a single sideband is transmitted in one-half the bandwidth required in AM operation by the carrier and both sidebands.
 - (2) The smaller RF power and narrower band (less noise) of a single sideband signal compared with a conventional AM signal of equal effectiveness result in an overall theoretical advantage of 9db in favor of a single sideband operation.
 - (3) The narrower bandwidths of transmission and reception, in SSB as compared with AM operation, provide better signal-to-noise ratio and minimize possibilities of interference. The effects of selective fading and phase distortion are greatly reduced.
- b. In conventional AM operation, transmitter power capabilities are usually expressed in terms of carrier power. In suppressed carrier operation, transmitter capabilities are generally expressed in terms of (PEP) which can be handled without excessive distortion. In single sideband two-tone carrier suppressed operation, PEP is twice the average power. For example, on balanced output operation into a 600-ohm antenna, three amperes of radio frequency in each leg of the rhombic indicates a PEP of $2 \times 3 \times 3 \times 600 = 10,800$.

I-1-3 REFERENCE DATA

See parts II through V as pertinent for information pertaining to shipping data, tube complement data, and panel control data pertaining to electrical characteristics and power requirements for the overall SBT-1K equipments. See parts II through V as pertinent for additional information on SBT-1K equipment components.

TABLE I-1-1

TECHNICAL SPECIFICATIONS, SBT-1K

FREQUENCY RANGE:	2-32 megacycles continuously tunable.
OUTPUT POWER:	At least 1000 watts PEP-1000 watts CW.
OPERATING MODES:	AM, CW, SSB, ISB and DSB.
OUTPUT IMPEDANCE:	With SWR-1K: 50 or 70 ohms unbalanced.
HARMONIC SUPPRESSION:	Second: at least 40 db down from PEP output. Third: at least 50 db down from full output.
STABILITY:	SBE-3 crystal controlled: 1 part in 10^6 . VOX - Better than 20 cycles per megacycle for a 0° to 50° change in ambient temperature.
FREQUENCY CONTROL:	VOX - Continuously tunable. SBE-3 oven controlled crystal position plus provision for external VFO.
TUNING:	All tuning and bandswitching controls are on the front panels. (No plug-in components).
METERING:	Meters accurately indicate operation of all circuits.
OUTPUT STAGE:	PL-172 tube. Pi-output network.
ALDC:	An automatic load and drive control is provided to limit distortion during high drive peaks or load changes.
COOLING:	Pressurized cabinet forced air system for maximum heat dissipation.
TEMPERATURE AND HUMIDITY:	Designed to operate in any ambient temperature between the limits of 0-50 degrees C for any value of humidity up to 90%.
SAFETY FEATURES:	Full interlock protection. Full overload and fuse protection.

TABLE I-1-1

TECHNICAL SPECIFICATIONS, SBT-1K

COMPONENTS AND
CONSTRUCTION:

Equipment is manufactured in accordance with
JAN/MIL Specifications where is practicable.

SIZE:

TMC-rack RAK-10 measuring approximately
64½" H x 20½" W x 21½" D.
(Note: 64½" w/o shocks)

POWER REQUIREMENTS:
115/230 Volts
Single Phase
50/60 Cycle AC

2100-2350 watts.

APPROXIMATE SHIPPING
WEIGHTS:

900-1200 lbs.

SECTION I-2 INSTALLATION

I-2-1 GENERAL

Since TMC's SBT-1K equipments are modular type transmitters, they are shipped in wooden crates, the number depending upon the model. On arrival, uncrate each and carefully inspect for damage. If any damage is found, notify the carrier or supply department immediately. Inspect all packing materials for parts shipped as loose items.

The contents of all cases are carefully packaged according to military specifications. The units are wrapped to avoid being scratched, placed in cartons, cushioned against shock, and wrapped and sealed with a waterproof material within which the units are kept dry with a desiccant.

I-2-2 PRODUCTION LINE CHECKOUT

Before any SBT-1K is shipped, it has been assembled on the test floor and thoroughly checked against the manufactures specifications. This procedure eliminates assembly line errors and guarantees that a SBT-1K shall fully satisfy all design requirements. After this thorough check out, the SBT-1K is disassembled and packed for customer use. The packaging operation is such as to minimize troubles that may develop in transit.

I-2-3 LOCATION OF SBT-1K's RACKS

After unpacking and inspecting the equipment and before assembling the SBT-1K in its operating location, select a location that will provide a minimum clearance of 3 feet at the sides, 4 feet in the rear and 4½ feet in the front, and 1 foot overhead. The overhead clearance is the clearance above the highest component on top of the SBT-1K.

The second step in the assembly of the SBT-1K is to check that the rack is located properly for convenient power and signal outlets (inputs and outputs); for example, the base assembly should be placed directly over the conduit raceway. It should be laid level and bolted firmly to the floor.

I-2-4 INITIAL ADJUSTMENTS AND CHECKOUT

As stated in paragraph I-2-2. the SBT-1K has been adjusted, thoroughly tested and checked out on the manufacturers test floor just prior to shipment. Barring rough handling during shipment and installation, initial adjustments and check out agree with the operating procedures given in section 3 of pertinent parts II through V.