TECHNICAL BULLETIN NUMBER 1004B

Transistorized SSB Transmitter/Receiver
TMC Model TTR-10

- 1.6 to 32 megacycles
- Four oven controlled channels
- VOX or PTT operation
- High or low Z microphone input
- Built-in speech processor
- Meets CCIR Recommendations
- Remote operation provisions
- AC or DC power supplies

The Technical Materiel Corporation's Model TTR-10 is a four channel SSB Transmitter/Receiver with a frequency range of 1.6 to 32 mcs. The unit provides upper or lower sideband, CW, AM Equivalent (AME) or MCW modes of operation. With the exception of the driver and final output linear amplifier, the unit is solid state. The flexibility of this unit allows it to be used as a transceiver (simplex operation on 1 frequency) or as a transmitter/receiver (transmitting and receiving on separate frequencies simultaneously).

Each of the four pre-tuned receiver and transmitter plug-in- modules, accepts two crystals that may be no more than 0.5% apart in frequency. This allows change in operating frequency without realignment of the tuned circuits. Additionally, field change to new operating frequencies is easily accomplished. A special plug-in module is provided to permit dynamic testing or tuning of send and receive modules in an extended position.

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Low current drain, low heat and careful selection of components assures long term trouble-free operation. Many optional features, such as; remote control, a wide variety of power supplies, oven control for crystals, etc., makes the unit readily adaptable for fixed or mobile station use, tactical voice circuits, Civil Defense and emergency posts, pipeline operations, harbor circuits and telephone extension circuits.

Recent recommendations by the Geneva Convention, contained in an FCC proposal, require conversion to SSB mode for voice transmission in the high frequency band by 1 January 1970. Mobile installations, such as ocean-going vessels, yachts and harbor craft, are readily adapted to SSB by this solid state transmitter/receiver.

Model TTR-10 contains a unique input circuit that creates a much higher average level of power in the speech envelope, making the transmitter considerably more efficient than others with higher PEP ratings. This circuit also prevents overload of the final amplifier. Carrier control is provided for AME mode of operation. The transmitter section features both push-to-talk and VOX (voice operated relay) operation.

Ordering information for The Technical Material Corporation's Model TTR-10 is set forth below to allow customer selection of power supplies and frequency range of transmit and receiver modules. Additionally, a prepaid postage form is attached for your convience in planning your installation.

POWER SUPPLY	RECEIVER MODULES	TRANSMIT MODULES AND AMPLIFIERS
A. AC supply (TTR-10)	1. 2-4 mcs.	A. 2-4 mcs.
B. DC supply	2. 4-8 mcs.	B. 4-8 mcs.
	3. 8-16 mcs.	C. 8-16 mcs.
	4. 16-32 mcs.	D. 16-32 mcs.
	5. 1.6-2 mcs.	E. 1.6-2 mcs.

It is possible, by using the above method, to select any transmitter/receiver combination. As an example, to order a unit with DC supply having two modules in the 2-4 mc range, 1 module in the 4-8 mc range, and 1 module in the 8-16 range, you would order a TTR-10-B-1123-AABC.

The unit is provided for standard 19″ relay rack mounting unless otherwise specified. Other mounting configurations are featured under Options/Accessories.

The unit will operate with adequate stability with the crystals provided in a normal ambient. When the unit is operated in a changing ambient environment, oven control of the crystals are offered as an optional item and listed under Options/Accessories. When ordered, these ovens will be supplied to operate from the same primary source used for the power supply, unless other voltages are specified.

COMMON TECHNICAL SPECIFICATIONS, TMC MODEL TTR-10

FREQUENCY RANGE:	1.6 to 32 mcs by crystal controlled plug-in RF modules. Modules provide coverage of 1.6-2, 2-4, 4-8, 8-16, 16-32 mcs. In the 1.6 to 2 mc range, all operating modes except lower sideband are available.

FREQUENCY RANGES

FREQUENCY RANGES ARE DIVIDED INTO FIVE GROUPS BETWEEN 1.6 AND 32 MEGACYCLES. THESE RANGES ARE:

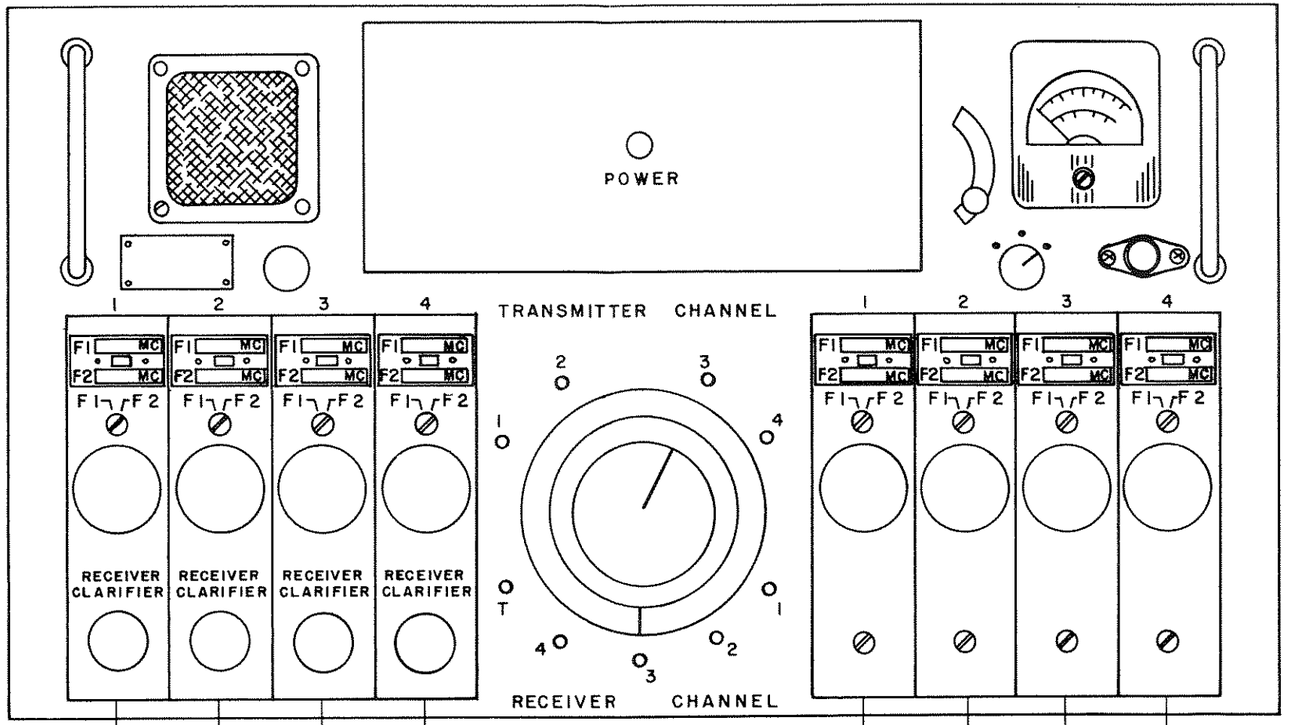
*1.6 - 2 MC
2 - 4 MC
4 - 8 MC
8 - 16 MC
16 - 32 MC

THE ABOVE RANGES SHOULD BE USED IN THE SPECIFICATIONS FOR CONVERTER MODULES.

UNIT IS NORMALLY SUPPLIED WITH STANDARD CRYSTALS. IF CONFORMANCE TO THE RIGID STANDARDS RECOMMENDED BY THE GENEVA CONVENTION IS DESIRED, OVEN CRYSTALS CAN BE PROVIDED. PLEASE INDICATE YOUR CHOICE.

OVEN CONTROL YES ☐ NO ☐

*USB operation only



The Technical Materiel Corporation Model TTR-10.

CABINET INFORMATION

(CHECK ONE)

RELAY RACK MTG WITHOUT SLIDES ☐
RELAY RACK MTG WITH SLIDES ☐
CABINET MTG ☐
CABINET MTG (VEHICULAR INSTALLATION) ☐

POWER SUPPLY

115V AC SINGLE PHASE ☐
208V AC SINGLE PHASE ☐
230V AC SINGLE PHASE ☐
12V DC ☐
24V DC ☐
32V DC ☐

OTHER DC SUPPLIES AVAILABLE ON REQUEST.

MICROPHONE (HAND SET)

CARBON ☐
DYNAMIC ☐

RECEIVER CONVERTER MODULE CHANNEL 1
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

RECEIVER CONVERTER MODULE CHANNEL 2
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

RECEIVER CONVERTER MODULE CHANNEL 3
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

RECEIVER CONVERTER MODULE CHANNEL 4
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

TRANSMITTER EXCITER MODULE CHANNEL 1
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

TRANSMITTER EXCITER MODULE CHANNEL 2
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

TRANSMITTER EXCITER MODULE CHANNEL 3
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

TRANSMITTER EXCITER MODULE CHANNEL 4
SPECIFICATION
FREQ. RANGE IN MCS ☐ TO ☐
OPER. FREQ. IN MCS F1 ☐ F2 ☐
OR
BLANK PANEL ☐

MODES OF OPERATION:

Front panel selectable SSB (upper or lower), AM equivalent, CW, MCW or sideband with carrier 20 db below peak power. Simplex operation by use of coaxial antenna transfer relay, or duplex operation can be accomplished with separate antennas.

FREQUENCY CONTROL:

1. The transmitter and receiver modules are crystal controlled, with front panel selection of one of two crystals in each module, as standard equipment.
2. Crystal ovens may optionally be supplied to control HFO stability to 1 part in 10^6 or better, where changes in ambient are frequent and serious.

TUNING:

Front panel switches provide selection of any one of four transmit/receive or transceiver channels. Output tuning circuit will match into a load of up to 3:1 VSWR.

NOISE LEVEL:

Better than 40 db below full PEP.

METERING:

Front-panel meter monitors PA plate current, PA drive, RF output voltage and PA high voltage.

SAFETY FEATURES:

1. PA magnetic operated, overload circuit breaker on front panel.
2. All DC operating voltages fused.
3. Transformer primary fused.
4. Oven supply lines fused.
5. Interlock on output modules prevents accidental operation when no module is in place.

TRANSMIT/RECEIVE RELAY:

A transmit/receive relay is provided to facilitate operation of the unit to send and receive on the same antenna. This relay may be bypassed if simultaneous transmission and reception on separate frequencies using separate antennas is desired.

POWER SUPPLIES:

Selection of any one of the following:

1. AC power supply for operation on 115/230 volts ± 10%, 47 to 400 cps.
2. DC supplies of:
   a. 12 volts DC
   b. 24 volts DC
   c. 32 volts DC

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POWER CONSUMPTION:	1. Transmit 230 volts, key down. 2. Transmit standby 25 watts (receiver on). 3. Receive only, 8 watts. Ovens require 6 watts each in addition to the above.
INSTALLATION DATA:	Size: 10½″ h × 19″ w × 16½″ d. Weight: Approximately 65 lbs. less cabinet and slides.
INSTRUCTION BOOKS:	TMC IN 1004A.
LOOSE ITEMS:	1 extension drawer for transmit and receive modules, and mating RF connectors.

RECEIVER SPECIFICATIONS

INPUT IMPEDANCE:	Nominal 50 ohms unbalanced.
SENSITIVITY:	1 uv to 15 db, signal + noise-to-noise ratio.
INTERMODULATION:	Intermodulation distortion products are down a minimum of 35 db from PEP with 100 microvolts at the antenna.
IF SELECTIVITY:	Selection of upper or lower sideband filters as follows: 1. ± 2 db 300-3300 cps (mechanical filter) or 2. ± 2 db 250-3000 cps (crystal filter) (Meets CCIR recommendations.)
AGC CHARACTERISTICS	Delayed AGC. Output rise less than 6 db for a 100 db antenna rise from 1 uv at the antenna input.
SQUELCH:	Threshold adjustable squelch. AGC activated relay has contacts brought to rear panel for remote indication of receiver signal activity.
AUDIO OUTPUT LEVEL:	1. 1 milliwatt into 600 ohm line available for headset, extended service or telephone handset. 2. 500 milliwatts into 3.2 ohm speaker.

TRANSMITTER SPECIFICATIONS

POWER OUTPUT:	A minimum of 100 watts PEP.

OUTPUT IMPEDANCE:	Nominal 50 ohms unbalanced into a load with up to 3:1 VSWR.
SIGNAL/DISTORTION RATIO:	35 db minimum below full PEP output.
UNWANTED SIDEBAND REJECTION:	At least 40 db below full PEP output.
SPURIOUS & HARMONIC OUTPUT:	50 db below full PEP output.
CARRIER SUPPRESSION:	—6, —20, —50 db from full PEP output.
AUDIO RESPONSE:	Selection of upper or lower sideband filters, as follows: 1. ± 2 db 300-3300 cps (mechanical filter) or 2. ± 2 db 250-3000 cps (crystal filter) (Meets CCIR recommendations.)
AUDIO INPUT:	600 ohm, —20 dbm, balanced and center tapped telephone handset carbon mike, hi or low Z mike.
VOICE OPERATED RELAY:	Voice operated relay with adjustable VOX and anti-VOX controls available on front panel.

OPTIONS/ACCESSORIES

(Priced separately.)

KIT-162:	Cabinet, shock mounting for vehicular installation of TTR-10.
KIT-163:	Slide mounting for rack servicing of TTR-10.
CAB-9:	Desk cabinet enclosure for TTR-10.
TPC-1 TRANSMITTER/RECEIVER TELEPHONE CONTROL:	Desk telephone handset with 6 pushbuttons; 4 to select required transmitter/receiver tuning modules and 2 for selection of upper or lower sideband operation. A loudspeaker and volume control are incorporated within the desk set. DC cabling for "inhouse" remote operation is provided.
TTC-1 TRANSMITTER/RECEIVER ANTENNA COUPLER:	Provides 4 position remote tuning of a 35 foot whip and is controlled directly from the TTR-10 Ledex drive to tune the antenna to one of four preset frequencies. The unit must be collocated with the whip antenna and is provided in a fiberglass waterproof housing.

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SMC-1, TELEPHONE REMOTE CONTROL:	Permits remote tuning, through landlines, microwave links or radio circuits, of channel selection as well as upper or lower sideband operation.
THRA-1, SPARE TUNING DRAWER STORAGE PANEL:	Provides space for three tuning modules and heater voltage for maintaining crystal ovens of spare transmit and receive tuning modules at operating temperature. Size: 1¾″ h × 19″ w × 17″ d.
MK-102:	Dynamic microphone, desk-type, with push-to-talk switch. Built-in pre-amp in base.
MK-106:	Dynamic microphone, desk-type, with push-to-talk switch. Built-in pre-amp in base.
HS-100-3C:	Handset, push-to-talk carbon with cradle.
HS-100-3D:	Handset, push-to-talk dynamic with cradle (with built-in pre-amp.)

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