



TECHNICAL BULLETIN NUMBER 1004C

Transistorized SSB Transmitter/Receiver
TMC Model TTR-10



- 2 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
- Better than 1 part in 10^6 per day stability

The Technical Materiel Corporation's Model TTR-10 is a four channel SSB Transmitter/Receiver with a frequency range of 2 to 32 mc. 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 have crystal ovens to stabilize the HFO and second conversion oscillator for a stability of 1 part in 10^6 per day. 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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Transistorized SSB Transmitter/Receiver

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., make 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 Materiel 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 convenience in planning your installation.

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

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-mc 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.

COMMON TECHNICAL SPECIFICATIONS, TMC MODEL TTR-10

FREQUENCY RANGE: 2 to 32-mc by crystal controlled plug-in RF modules. Modules provide coverage of 2-4, 4-8, 8-16, 16-32 mc.

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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 AND STABILITY:	Crystal ovens control HFO and IFO stability to better than 1 part in 10^6 per day.
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 50 db below full PEP.
METERING:	Front-panel meter monitors PA plate current, PA drive, RF output voltage and PA high voltage.
SAFETY FEATURES:	<ol style="list-style-type: none">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.
INSTALLATION DATA:	Size: 10½" h. x 19" w. x 16½" d. Weight: approximately 65 lbs less cabinet and slides.
PRIMARY POWER:	115/230 volts AC \pm 10%, 50/60 cps, 1 phase (DC supply available. See OPTIONS/ACCESSORIES.)
POWER REQUIREMENTS:	<ol style="list-style-type: none">1. Transmit 230 watts, key down.2. Transmit standby 25 watts (receiver on).3. Receive only, 8 watts. Ovens require 6 watts each in addition to the above.
INSTRUCTION BOOKS:	TMC IN 1004A.

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LOOSE ITEMS:	One extension drawer for transmit and receive modules, and mating connectors.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

RECEIVER SPECIFICATIONS

INPUT IMPEDANCE:	Nominal 50 ohms unbalanced.
SENSITIVITY:	1 uv for 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:	± 2 db 300-3000 cps.
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:	<ol style="list-style-type: none">1 milliwatt into 600-ohm line available for headset, extended service, or telephone handset.500 milliwatts into 3.2-ohm speaker.

TRANSMITTER SPECIFICATIONS

POWER OUTPUT:	A minimum of 100 watts PEP, 50 watts average.
OUTPUT IMPEDANCE:	Nominal 50 ohms unbalanced into a load with up to 3:1 VSWR.
SIGNAL/DISTORTION RATIO:	Distortion products are at least 35 db down from full PEP output.
UNWANTED SIDEBAND REJECTION:	At least 40 db down at full PEP output.
SPURIOUS & HARMONIC SUPPRESSION:	50 db down at full PEP output.
CARRIER INSERTION:	Automatically preset at -50, -20 and -6db from sideband envelope power by mode selector switch.

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AUDIO RESPONSE:	Selection of upper or lower sideband filters, ± 2 db, 300 to 3000 cps.
AUDIO INPUT:	-20 dbm at 600 ohm balanced or unbalanced, telephone handset, carbon mike, and hi- or lo- impedance mike with push-to-talk. (Front panel plug-in or rear panel connections.)
OVERLOAD LIMIT:	Special built-in circuit prevents exciter overloading.
VOICE OPERATED RELAY:	Voice controlled switch includes an anti-trip feature with an adjustable threshold and gain adjustment.

OPTIONS/ACCESSORIES

(Priced separately.)

KIT-162:	Cabinet, shock mounting for vehicular installation or 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.
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: 1 $\frac{3}{4}$ " h. x 19" w. x 17" d.

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MK-102:	Dynamic microphone, noise cancelling, desk-type, with push-to-talk switch.
HS-100-3C:	Handset, push-to-talk carbon with cradle.
HS-100-3D:	Handset, push-to-talk dynamic with cradle.
DC POWER SUPPLY:	TPSG-1, 12/24/32V DC power supply for TTR-10 in place of AC supply.

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