



MODEL	DESCRIPTION	BULLETIN	
		<u>OLD</u>	<u>NEW</u>
TRS-1K	1 KW H.F. Transmitter-Receiver		201-1410
TRS-1K/ARQ	1 KW H.F. Transmitter-Receiver		201-1412
TTR-1000	1000 W H.F. Synthesized Tranceiver		201-1513

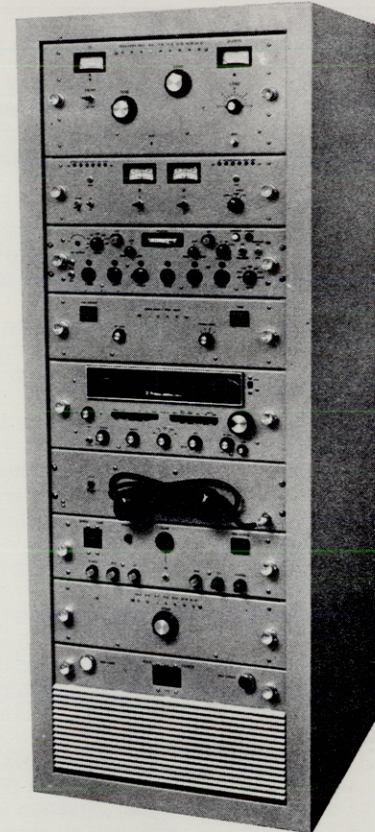
6/14/82

THE TECHNICAL MATERIEL CORPORATION



HIGH FREQUENCY TRANSMITTER-RECEIVER Model TRS-1K Series

TECHNICAL BULLETIN 201-1410



- Frequency range 2MHz to 30MHz
- Synthesized or multi-channel
- Automatic tuning with manual "override"
- Full protection against overload
- Reliable, solid-state design
- Precision frequency control
- CW, AM, AME, USB, LSB, ISB, FSK, FAX
- Rugged, modular construction

The TRS-1K transmitter-receiver is a complete communications station that requires only the application of primary power, audio lines and a suitable antenna system for proper operation. All standard modes of operation are available in this system including CW, AM, AM equivalent, single sideband (SSB), independent sideband (ISB), frequency-shift teletype and facsimile. Designed for operation in the 2-30MHz high frequency range, the synthesized TRS-1KJ is fully capable of receiving signals to 100kHz. The transmitter section delivers 1000 watts peak envelope power (PEP) and 1000 watts average power while the receiver section maintains an SSB sensitivity of better than one micro-volt over its range. This combined capability makes the TRS-1K an ideal system for establishing reliable circuits under the most adverse conditions.

Automated tuning of the transmitter section is standard on TRS-1K systems. However, all TMC transmitter-receivers are also supplied with a unique manual "override" feature which enables the operator to control all functions of the system at any time. In addition to complete automation, each TRS-1K contains the circuits needed to interface with many TMC accessories such as antenna tuners, remote control systems.

All circuits in the TRS-1K are solid state except those handling high power in the final RF amplifier stages. Maximum use is made of removeable assemblies securely fastened to the main chassis yet easily released for servicing. This type design simplifies troubleshooting and ensures the equipment is continuously available for operation.

THE TECHNICAL MATERIEL CORPORATION

TECHNICAL SPECIFICATIONS TRS-1K Series

STANDARD MODELS	TRS-1KE Multi-Channel 1KW HF Transmitter-Receiver TRS-1KJ Synthesized 2KW HF Transmitter-Receiver
OPERATING PARAMETERS	
Frequency Range	TRS-1KE 2-30MHz TRS-1KJ 2-29.9999MHz; Receive to 100KHz
Frequency Selection	Eight pre-set channels Continuous in 100Hz steps
Frequency Stability	One part in 10 ⁻⁹ /day One part in 10 ⁻⁸ /day
Frequency Display	Front panel card Direct-reading, digital display
Modes of Operation	CW, AME, USB, LSB, ISB CW, AME, USB, LSB, ISB
Power Output	Optional: Audio FSK 1000 watts Peak Envelope Power (PEP); 1000 watts average
Input/Output Impedance	50 ohms nominal, unbalanced .2-to-1 VSWR adjustable to 3:1.
Tuning	Transmit: Automated with manual, front-panel override 30 seconds nominal Receive: Front-panel manual tuning (1KJ) or channel switch (1KE).
AUDIO PARAMETERS	
Audio Sideband Response	250-3040Hz, ± 1.5 db CCIR Optional: 250-6080Hz, 300-2700Hz. Others on request.
Audio Input	Two independent 600-ohm channels, balanced or unbalanced. -20 dbm to +5 dbm, rear apron terminals. Built-in microphone preamplifier for low-level dynamic input -55 db in to 47,000 ohms, front panel jack.
Keying Input	CW key jack and rear apron terminals, 200 baud, dry contact. FSK rear apron terminals, 75 baud. Optional 200 baud and higher. Shift ± 42.5Hz, ± 85 Hz, ± 170Hz, ± 425Hz. Input 20/60ma, 50 or 100 volts, dry contact, + to ground. FAX (TRS-1KJ) rear apron terminal. +1 to +10VDC produces 800Hz linear shift.
Audio Output	Internal monitor speaker; Headphone jack with speaker muting. External monitor speaker jack, 3 watts, max 5% THD at 1 watt: Two independent 600-ohm channels, balanced, adjustable to -10 db.
Automatic Gain Control	90 db RF dynamic range from 2uv (3KHz passband). Less than 10 db change in audio output for a 2uv to 500mv variation in input TRS-1KJ AGC partially independent for each SSB IF to minimize cross-channel interference.
TRANSMIT CHARACTERISTICS	
Unwanted Sideband Rejection	500Hz tone is minimum 50 db below PEP.
Spurious Signals	Minimum 50 db below PEP.
Intermodulation Distortion	Minimum 35 db below either tone of a two-tone test at rated PEP.
Residual Noise and Hum	Minimum 50 db below PEP. Power supply ripple 55 db below PEP.
Carrier Suppression	Continuously variable to -55 db. Optional: selectable at 0, -3, -6, -20, -30, -55 db.
Harmonic Suppression	Minimum 45 db below PEP for second harmonics; 55 db for higher order. Optional RF filter available for added rejection.
RECEIVE CHARACTERISTICS	
If Selectivity	SSB: 300-2700Hz at 3 db points. Optional: 250-3040Hz, 250-6080Hz. AM (TRS-1KE): 6KHz symmetrical at 3 db points; (TRS-1KJ): 12KHz symmetrical at 3 db points with selection to 6KHz and 3KHz. Optional selection to 1KHz and 0.4Hz.
If Ripple	Within 3 db absolute in SSB mode.
Sensitivity 10 db (S + N)/N	1.0uv SSB/3KHz passband 2-30MHz (400KHz-29.9999MHz TRS-1KJ) 4.0uv AM/6KHz passband 2-30MHz (400KHz-29.9999MHz TRS-1KJ) 1.0uv CW/1KHz passband 2-30MHz (400KHz-29.9999MHz TRS-1KJ)
Image Rejection	First -80 db minimum; second -60 db minimum.
If Rejection	Minimum -80 db.
Opposite Sideband Rejection	300Hz tone minimum 50 db down.
Hum and Noise	Minimum 40 db below full output.
ENVIRONMENTAL AND INSTALLATION	
Cooling	Filtered, forced air in semi-pressurized cabinet. Intake air at bottom front (optional bottom rear); exhaust out top rear.
Operating Conditions	0°C to +50°C, up to 90% Relative Humidity at MSL.
Storage Conditions	-30°C to +80°C, up to 90% Relative Humidity at MSL.
Primary Power	230 volts AC ± 10%, 50/60Hz, single phase (three-phase optional). Taps provided for 210, 220, 240 or 250 volt operation. Optional 380 volt supply available on request. Consumption: Maximum 3.2KW Average of CW, 0.9pf. Solid state power supply. Optional voltage regulator on request.
Size and Weight	49" (124.5cm)* high x 23" (58.4cm) wide x 26" (66.0cm) deep. 654 lbs./297.3 kg installed. (*Rack space included for accessory equipment.)
Shipping Data	Commercial packing for domestic U.S. shipment. Five (5) containers. Largest: 65" x 27" x 35". Total weight and cube: 1060 lbs./74.4 cu. ft.
Loose Items	Two technical manuals (Operator/Installation/Service). Mating signals and RF connectors.
ORDERING INFORMATION	
Models	TRS-M-1K/E: Multi-channel manually tuned 1 KW Transmitter TRS-M-1K/J: Synthesized manually tuned 1 KW Transmitter TRS-A-1K/E: Multi-channel automatically tuned 1 KW Transmitter TRS-A-1K/J: Synthesized automatically tuned 1 KW Transmitter TRS-R-1K/E: Multi-channel automatically tuned Transmitter with remote control interface.

Specifications Are Subject to Change Without Notice.

THE TECHNICAL MATERIEL CORPORATION

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700 FENIMORE ROAD, MAMARONECK, NY 10543 U.S.A.

TLX: 137-358

TEL.: 914-698-4800

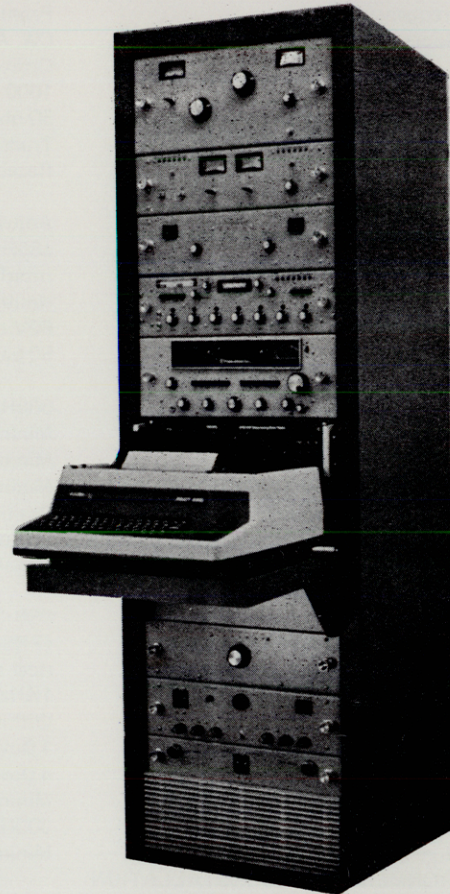
TWX: 710 566 1100



HIGH FREQUENCY ARQ COMMUNICATIONS SYSTEM Model TRS-1K/ARQ

TECHNICAL BULLETIN 201-1412

- * *Frequency Range 2MHz to 30MHz*
- * *Synthesized or multi-channel*
- * *Automatic transmitter tuning with manual override*
- * *Automatic Error Correction*
- * *Precision frequency control*
- * *CW, AM, AME, USB, LSB, ISB, FSK*
- * *Rugged, modular construction*



The TRS-1K/ARQ High Frequency ARQ Communications System is the result of combining the field proven T.M.C. Model HFT-1K H.F. Radio Transmitter System with the North American Philips Corporation Model STB-750 A.R.Q. System to produce a versatile radio terminal capable of satisfying all of the requirements for a reliable radio teleprinter link.

It has the ability to operate in either the ARQ (Automatic request for repetition) mode or the FEC (Forward error correction) mode between shore stations, ship-shore or ship-ship.

THE TECHNICAL MATERIEL CORPORATION

**TECHNICAL SPECIFICATIONS
TRS-1K/ARQ SERIES**

STANDARD MODELS

TRS-1KE/ARQ Multi-Channel 1KW HF Transmitter-Receiver

TRS-1KJ/ARQ Synthesized 1KW HF Transmitter-Receiver

OPERATING PARAMETERS

Frequency Range
Frequency Selection
Frequency Stability
Frequency Display
Modes of Operation

TRS-1KE/ARQ
2-30MHz
Eight pre-set channels
One part in 10^{-6} /day
Front panel card
CW, AME, USB, LSB, ISB
Optional: Audio FSK

TRS-1KJ/ARQ
2-29.9999MHz: Receive to 100KHz
Continuous in 100Hz steps
One part in 10^{-8} /day
Direct-reading, digital display
CW, AME, USB, LSB, ISB
Optional: AM, FSK/FAX
1000 watts Peak Envelope Power (PEP); 1000 watts average
50 ohms nominal, unbalanced .2-to-1 VSWR adjustable to 3:1.
Transmit: Automated with manual, front-panel override 30 seconds nominal
Receive: Front-panel manual tuning (1KJ) or channel switch (1KE).

Power Output
Input/Output Impedance
Tuning

ARQ TERMINAL

Audio Frequencies
Shift
Audio Input/Output
Teleprinter I/O
Current
Speed

Adjustable to 1500, 1700 or 1900Hz
 ± 85 Hz.
Interfaces directly with the transmitter and receiver units.
Neutral or polar signal
60V or 80V/20MA
50 baud, 7 or $7\frac{1}{2}$ units.

TRANSMIT CHARACTERISTICS

Unwanted Sideband Rejection
Spurious Signals
Intermodulation Distortion
Residual Noise and Hum
Carrier Suppression
Harmonic Suppression

500Hz tone is minimum 50 db below PEP.
Minimum 50 db below PEP.
Minimum 35 db below either tone of a two-tone test at rated PEP.
Minimum 50 db below PEP. Power supply ripple 55 db below PEP.
Continuously variable to -55 db. Optional: selectable at 0, -3, -6, -20, -30, -55 db.
Minimum 45 db below PEP for second harmonics: 55 db for higher order. Optional RF filter available for added rejection.

RECEIVE CHARACTERISTICS

If Selectivity

SSB: 300-2700Hz at 3 db points. Optional: 250-3040Hz, 250-6080Hz. AM (TRS-1KE): 6KHz symmetrical at 3 db points; (TRS-1KJ): 12KHz symmetrical at 3 db points with selection to 6KHz and 3KHz. Optional selection to 1KHz and 0.4KHz.

If Ripple
Sensitivity 10 db (S + N)/N

Within 3 db absolute in SSB mode.
1.0uv SSB/3KHz passband 2-30MHz (400KHz-29.9999MHz TRS-1KJ)
4.0uv AM/6KHz passband 2-30MHz (400KHz-29.9999MHz TRS-1KJ)

If Rejection
Opposite Sideband Rejection
Hum and Noise

Minimum -80 db.
300Hz tone minimum 50 db down.
Minimum 40 db below full output.

ENVIRONMENTAL AND INSTALLATION

Cooling

Filtered, forced air in semi-pressurized cabinet. Intake air at bottom front (optional bottom rear); exhaust out top rear.

Operating Conditions
Storage Conditions
Primary Power

0 C to + 50 C, up to 90% Relative Humidity at MSL.
-30 C to + 80 C, up to 90% Relative Humidity at MSL.
230 volts AC $\pm 10\%$, 50/60Hz, single phase (three-phase optional). Taps provided for 210, 220, 240 or 250 volt operation. Optional 380 volt supply available on request. Consumption: Maximum 3.2KW Average of CW, 0.9pf. Solid state power supply. Optional voltage regulator on request.

Size and Weight

72"(182.5cm)*high x 23" (58.4cm) wide x 26" (66.0cm) deep .654 lbs./297.3kg installed. (*Rack space included for accessory equipment.)

Shipping Data

Commercial packing for domestic U.S. Shipment. Five (5) containers. Largest: 75" x 27" x 35". Total weight and cube: 1060 lbs./74.4 cu. ft. Two technical manuals (operator/installation/service). Mating signals and RF connectors.

Loose Items

ORDERING INFORMATION

Models

TRS-M-1KE/ARQ: Multi-channel manually tuned 1 KW Transmitter
TRS-M-1KJ/ARQ: Synthesized manually Tuned 1 KW Transmitter
TRS-A-1KE/ARQ: Multi-channel automatically tuned 1 KW Transmitter
TRS-A-1KJ/ARQ: Synthesized automatically tuned 1 KW Transmitter

Specifications Are Subject to Change Without Notice.

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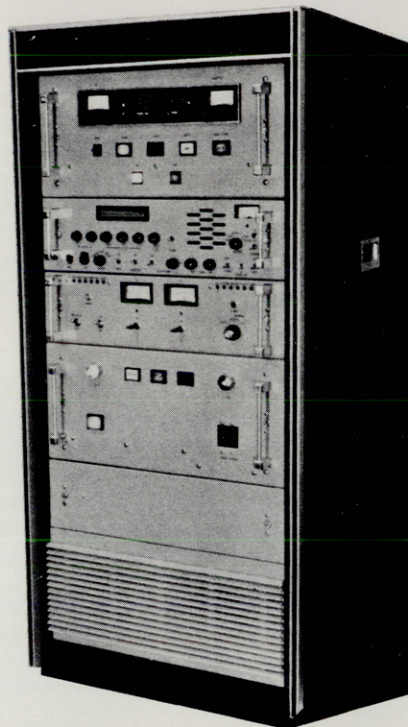
TWX: 710 566 1100



1000W HIGH FREQUENCY TRANSCIVER TTR-1000

TECHNICAL BULLETIN 201-1513

- *Automatic with manual "override"*
- *2 to 30MHz basic operating range*
- *Synthesized, multi-channel or channelized*
- *Complete overload protection*
- *Precision frequency control*
- *CW, AME, USB, LSB, (FSK, FAX optional)*
- *Reliable, solid-state design*
- *Rugged, modular construction*



Model TTR-1000
(Shown with extra rack space in cabinet)

The TTR-1000 is in many respects similar to lower power TMC transceivers except that added RF output power is available for longer distance communications — particularly when operating in unfavorable atmospheric conditions. This reserve of power provides up to 500 watts average for teletype and over 1000 watts PEP for sideband voice operations. In addition, the companion receiver maintains an SSB sensitivity of better than one micro-volt over its operating range, making the TTR-1000 an exceptional system for establishing reliable circuits.

The transmit section is normally automated with all controls on the front panel for manual "override" at any time. A complete line of accessory equipment can be interfaced with the TTR-1000 to build upon its basic capability and improve overall performance. Such accessories include harmonic output filters, antenna tuning controls, and telephone terminal equipment. Sufficient space is left in the standard equipment rack to accept these accessories but still retain a system that is simple to operate and maintain.

The TTR-1000 is solid state up to the higher RF amplifier stages. The functional modules of the amplifier, exciter and receiver sections are mounted on extensive track slides. Printed circuit cards and removeable subassemblies are used extensively in the system and are securely fastened to the chassis yet easily removed for servicing. This modular design simplifies maintenance and ensures maximum service from the transceiver.

THE TECHNICAL MATERIEL CORPORATION

TECHNICAL SPECIFICATIONS

Model TTR-1000

STANDARD MODELS

TTR-1000 Synthesized 1000W HF Transceiver

OPERATING PARAMETERS

FREQUENCY RANGE 2-29.9999MHz.
FREQUENCY SELECTION Continuous in 100Hz steps.
FREQUENCY STABILITY 1 ppm over temp range, option higher.
FREQUENCY DISPLAY Direct-reading, digital display.
MODES OF OPERATION CW, AME, USB, LSB, ISB. Optional: AM, FSK/FAX.
POWER OUTPUT 1000 watts Peak Envelope Power (PEP); 500 watts Average CW.
INPUT/OUTPUT IMPEDANCE 50 ohms nominal, unbalanced .2-to-1 VSWR adjustable to 3:1.
TUNING Automated with manual, front-panel override.

AUDIO PARAMETERS

AUDIO SIDEBAND RESPONSE 500Hz to 2600Hz.
AUDIO INPUT 600-ohm channel, balanced or unbalanced; -20 dbm to +5 dbm, rear apron terminals; Built-in microphone preamplifier for low-level dynamic input -55 db in to 47,000 ohms, front panel jack.
KEYING INPUT CW key jack and rear apron terminals, 200 baud, dry contact.
AUDIO OUTPUT Internal monitor speaker; Headphone jack with muting. 600 ohm, + 10 dbm.
AUTOMATIC GAIN CONTROL 120 db RF dynamic from 2uv (3KHz passband). Less than 10 db change in audio output for a 2uv to 500mv variation in input.

TRANSMIT CHARACTERISTICS

UNWANTED SIDEBAND REJECTION 1000Hz tone is minimum 50 db below PEP.
SPURIOUS SIGNALS Minimum 40 db below PEP.
INTERMODULATION DISTORTION Minimum 30 db below rated PEP.
RESIDUAL NOISE AND HUM Minimum 40 db below PEP.
CARRIER SUPPRESSION At least 50 db below PEP.
HARMONIC SUPPRESSION Minimum 40 db below PEP. Optional RF filter available for added rejection.

RECEIVE CHARACTERISTICS

IF SELECTIVITY SSB: 2200Hz at 3 db points. AM: 12KHz symmetrical at 3 db. Optional selection 500Hz.
IF RIPPLE Within 3 db absolute in SSB mode.
SENSITIVITY 10 db (S + N)/N 1.0uv SSB; 4.0uv AM; 1.0uv CW.
IMAGE REJECTION Minimum -76 db.
IF REJECTION Minimum -76 db.
OPPOSITE SIDEBAND REJECTION 500Hz tone minimum 50 db down.
HUM AND NOISE Minimum 40 db below full output.
CLARIFIER Receive clarifier control provides variable shift of ± 1000 Hz.

SPECIAL FEATURES

METERING Front panel meters monitor operation of critical RF and audio circuits. Indicating lamps and fuse-holders display status continuously.
SAFETY Fully high-voltage interlocked with fuse and overload protection. High voltage points covered by protective plates and labeled.
ALDC Automatic load and drive control improves linearity, limits distortion and maintains a relatively constant output level during high peaks of modulation or load changes.
COMPONENTS/CONSTRUCTION Manufactured in accordance with MIL-STD specifications wherever practicable. Components used are solid-state up to the final RF output stages of the linear amplifier.

ENVIRONMENTAL AND INSTALLATION

COOLING Filtered, forced air in semi-pressurized cabinet. Intake air at bottom front (optional bottom rear); exhaust out top rear.
OPERATING CONDITIONS 0 °C to + 50 °C, up to 90% Relative Humidity at MSL.
STORAGE CONDITIONS -30 °C to + 80 °C, up to 90% Relative Humidity at MSL.
PRIMARY POWER 115/230 volts AC $\pm 5\%$ 50/60Hz, single phase. Consumption: Maximum 1.5KW Average on CW, 0.9pf. Solid-state power supply. Optional voltage regulator on request.
SIZE AND WEIGHT 49" (124.5cm) * high x 23" (58.4cm) wide x 26" (66.0cm) deep; 384 lbs./174.6 kg installed. *Rack space for optional accessories is provided.
SHIPPING DATA Commercial packing for domestic U.S. Shipment. Four (4) containers. Largest: 54" x 27" x 33". Total weight and cube: 540lbs./51 cu. ft.
LOOSE ITEMS Two Technical Manuals (Operator/Installation/Service). Mating signal and RF connectors.

Technical Specifications Are Subject to Change Without Notice.

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