

Synthesized General Purpose Transmitter
TMC Model HFT-40KAUTOMATIC 40 KILOWATT HF TRANSMITTER

FOR PROFESSIONAL USE WHERE
 AVAILABILITY MUST BE HIGH AND
 COST PER MESSAGE UNIT LOW

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| * 40,000 Watts PEP; 20,000 Watts Average Power Output | * Automatic, Rapid Tuning, with Manual Override |
| * Frequency Range: 2 to 30 MHz | * Remote Tuning Available |
| * Operating Modes: LSB, USB, ISB, AM, AME, CW, FSK, FAX | * Modular Construction; Easily Installed and Maintained |
| * Exceptionally Compact and Lightweight | * Solid State Exciter, Rectifiers and Control Circuitry |
| * Conservatively Rated, for Continuous Duty | * Self-Protecting Against Overloads; Interlocked for Personal Safety |

The NEW AUTOMATIC TMC HFT-40K Transmitter, part of our Universal High Power Group, is the smallest, lightest and most efficient 40 Kilowatt Transmitter we have ever built.

This Automatically Tunable (at front panel or remotely) High Power Transmitter is a completely modern design, employing Solid State techniques in the Exciter, Power Supplies and Control Circuitry. Performance and reliability have been increased; heat, weight, size and power input have been decreased. Yet it retains thoroughly proven design features which made the previous generation of TMC Non-Automatic GPT-40K (AN/FRT-40) HF Radio Transmitters the worldwide standard for hundreds of critical operational requirements by Commercial, NASA, Military and other Government users.

AUTOMATIC 40 KILOWATT HF TRANSMITTER

The Technical Materiel Corporation Model HFT-40K General Purpose Transmitter provides 40,000 watts PEP/20,000 watts Average power output for long range point-to-point, ground-to-air, broadcast and shore-ship communications circuits. With the TMC solid state, synthesized MMX()-2 Exciter, this transmitter has exceptional adaptability and flexibility for multi-mode, multi-purpose applications requiring highly stable (one part in 10^8 or better) emissions for composite Voice/Tone Telegraph/FAX transmissions. This flexibility is evidenced by the available operating modes which can be switch-selected to provide for operation on LSB, USB, ISB, AM, AME, CW, FSK and FAX without adding any additional modules or devices. This Exciter is a field proven unit already in use with other TMC transmitters for a variety of applications, which includes transmission of composite Voice, Data and Voice Frequency Telegraph/Teletype traffic. Thus, the incorporation of this outstanding Exciter in our NEW AUTOMATIC 40 KILOWATT HF TRANSMITTER results in a combination that accommodates not only the simpler operating modes of the present, but the rapidly approaching SSB/ISB composite techniques of the future.

The HFT-40K features synthesized frequency control in 100 Hz incremental tuning steps throughout the tuning range, with a stability of 1 part in 10^8 per day. This high stability is essential to proper operation of VFTG and LINCOMPEX system operations. The transmitter synthesizer may be slaved to a station standard if desired. In the event of failure of the station standard, the transmitter synthesizer standard automatically assumes control, without interruption of operation.

When on local manual control, the output power level is continuously adjustable by manual rotation of the Exciter RF output control. On automatic control (local or remote), there are four pre-settable power levels available for selection by front panel push button or by remote control. These pre-settable power levels are associated with the 40 KW Power Amplifier control circuitry.

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In addition, as an optional feature at slightly increased cost, switching and control circuitry can be provided to permit the 40 KW Linear Amplifier to be deactivated (turned off) and the Exciter/Driver portion of the transmitter becomes an independent transmitter, connected to the same antenna, with a power output of 5 KW PEP and 3 KW Average. This deactivation of the 40 KW Linear Amplifier can be accomplished by both front panel control and by remote control. The reactivation time, with complete automatic retuning of the entire 40 KW transmitter, can be accomplished in approximately 90 seconds.. This option has the operational advantage of matching power output to circuit conditions, from the full 40 KW PEP down to the 5 KW PEP which may be adequate to maintain communications, such as during good propagation conditions or during periods when only order-wire service and occasional single channel radioteletype usage is needed. Line input power then ranges from 60 KW down to 10 KW, for significant economy of operation. No other high power transmitter has such features readily and easily controlled by front panel or remote facilities.

It is further noted that, when employed with the TMC Exciter/Driver in a co-located position, we can furnish RF patch panels and quick-disconnect control cabling to permit use of any spare Exciter/Driver with any idle HFT-40 KW Amplifier.

In its automatic mode, the HFT-40K Transmitter will tune within 25 seconds at the maximum frequency excursion in the 2 to 30 MHz range. Average tuning time is approximately 15 seconds. All controls and adjustable levels are readily accessible from the front of the transmitter. Transmitters may be placed side by side, as required in transportable vans or shelters. Forced air cooling, with filtering, is provided, and the design permits the addition of air ducts to vent heated air outside of buildings, vans and shelters.

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The HFT-40K contains all power supplies and ventilation equipment. The modular design lends itself to ease of installation, maintenance and repairs. Where weight permits, equipment drawers are on retractable slides. Extensive use is made of plug-in, solid state modules. Quick-disconnect facilitates installation, permits quick checking of circuitry and ready replacement of modules when necessary. This is a transmitter designed for reliability at high power continuous use; yet, it also is a technician's dream. It follows the same design techniques of our new HFT-10K (in use by the U. S. Army as an AN/URT-37) which can be field-stripped of all significant operating modules and components within 50 minutes. It represents a new generation of equipment which reflects the experience by TMC and users over thousands of transmitter equipment life-years by TMC transmitters around the world.

Lower power stages are solid state units, broadbanded where technically feasible. The higher power stages employ ceramic type tubes especially designed for the superior linearity and low noise required for professional single sideband transmitters. All critical circuits are metered, with large, easily read meters. Where applicable, these meters have internally adjustable overload protection circuitry, built in. With an overload condition on such a meter, the meter indicator (needle) remains in a latched condition to indicate the extent of the overload, until the transmitter is reset for normal operation. The meter also glows red to visually indicate its overload condition. A Power Output Meter also is usable, by front panel toggle switch, to indicate VSWR. The VSWR unit has protective circuitry which is settable to provide protection for the transmitter in the event of excessive VSWR conditions. When properly set with relation to the normal VSWR on a transmission line, this feature not only prevents damage to this high power transmitter, but minimizes or eliminates potentially serious damage or fires in coaxial lines, baluns, etc., which may have a sudden fault which in itself is not serious.

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Another optional feature is a Peak Reading Power Output Meter of particular value for users who require composite Voice/Data/FAX type of transmissions which generate significant Peak Power to Average Power ratios when high fidelity and low distortion operation is necessary.

This is a transmitter designed for professional use in applications where the reliability and availability must be high and the cost per message unit as low as propagation conditions permit.

TECHNICAL SPECIFICATIONS - TMC MODEL HFT-40K

Frequency Range: 2 to 30MHz

Frequency Presentation: Direct reading, digital for MMX and SBG exciters. Channel number for SME exciter.

Frequency Stability: Synthesized 1 part in 10^8 standard; 1 part in 10^9 optionally with external standard. MMX and SBG exciters are synthesized. Stability of SME exciter is 10Hz

Operating Modes: USB, LSB, ISB, CW, AM, FSK and FAX with MMX and SME. All modes but FSK and FAX when used with four voice CHANNELS.

Power Output and Distortion Products: 40,000 watts PEP; signal to distortion ratio at least 35 db.
20,000 watts PEP; signal to distortion ratio at least 40 db.
20,000 watts average, CW or FSK.

Output Impedance: 50 ohms unbalanced, 3 1/8" EIA flange. Pi-L network will match a load with VSWR of up to 3:1

Tuning: MMX and SBG exciters feature manual (or remote) frequency selection of output frequency. SME exciter features manual (or remote) channel selection of up to 10 channels. All other tuning and band-switching controls are on the front panel (no plug-in components or mechanical adjustments). Self-cleaning contacts on RF bandswitches. Remote operation option for selection frequency, mode and power output level. Readback available.

Unwanted Sideband Rejection: 500 cps single tone 60 db down from full PEP output.

Spurious Signals: At least 60 db below full PEP output.

Noise: Power supply ripple 55 db down from full PEP output. Other, 70 db down from full PEP output. Special "White Noise" rejection at -80 db down, when unmodulated, available as an option.

TECHNICAL SPECIFICATIONS - TMC MODEL HFT-40K

Carrier Insertion: -55 db to full PEP output continuously variable. Programmable to preset levels in some exciter options.

Harmonic Suppression: ** Second harmonic at least 50 db down from PEP output.
(Without CCIR/FCC Filters)
**See NOTE at bottom of this page.
** Third harmonic at least 65 db down from PEP output.

Audio Response, Sideband Filters: All circuitry for sideband operation is included in the exciters. Selection of the proper filters determines the audio bandwidth. Three types of filters are available:
1. +1.5 db 350-3500Hz
2. +1.5 db 250-3040Hz
3. +1.5 db 250-6080Hz
Note: 350-3500Hz filter normally supplied. Others available on special order.

Input: Depends on exciter used. Typical with MMX:
1. Two independent 600 ohm channels, balanced or unbalanced. -20 dbm to +5 dbm.
2. Built in microphone preamplifier for low level dynamic microphone. Front panel selection and jack.

Audio Control: Two front panel "fader" controls allow ease in injecting either the microphone or the line inputs into the upper or the lower sideband.

CW Keying: Key jack on front panel and terminals on rear apron allow up to 300 WPM carrier keying, dry contact.

Keying Input: 60 ma, 20 ma, 50 volt, 100 volt, either positive or negative with respect to ground.

Keying Speed: Up to 75 baud (higher keying speeds available).

Shift: 850 cps (Hz), 425 cps (Hz), 212 cps (Hz).

FAX: +1 to +10 VDC will provide a linear shift of 800Hz.

**NOTE: Automatic Switch-Selectable Low Pass Filter Networks are available to meet CCIR and FCC Harmonic/Spurious Suppression requirements.

TECHNICAL SPECIFICATIONS - TMC MODEL HFT-40K

Heat Dissipation: Maximum 40KW

Special Features: Multi-mode, solid state MMX and SME exciters provide all modes of operation without additional accessories.

ALDC (Automatic Load and Drive Control) is provided to improve linearity, limit distortion, and deliver a relatively constant RF output level during high modulation peaks or load changes.

Front panel control allows adjustment of the level at which the ALDC takes effect or for switching off the ALDC, if desired.

High voltage rectifiers are solid state.

Metering: Large scale meters with special overload features are mounted at the top of the units to indicate operation and any overload conditions of all critical circuits. Multi-meter provided on exciters to permit monitoring selected circuits and exciter power output.

Environmental: Designed to operate in any ambient temperature between the limits of 0 and 50° for any value of humidity up to 90%.

Cooling: Filtered forced air cooling, semi-pressurized cabinet.

Safety Features: Overload and bias protection with visual and audible alarm. Automatic recycling optional. Safety interlocks are provided on all high voltage points and high voltage shorted to ground when high voltage removed.

Primary Power: 210/220/230/240/250 volts standard. Other voltages such as 380/400/480 available on special order; 50 or 60 Hz, 3 phase. Maximum 70,000 watts. Primary of transformer may be connected for either DELTA or "Y" input.

Installation Data: Weight approximately 6200 lbs.
Size: 78" wide, 38" deep, 72" high

Shipping Weight and Cube: 9570 lbs, 200 cubic feet

TECHNICAL SPECIFICATIONS - TMC MODEL HFT-40K

- Selectable Output Power Levels: Four pre-settable, front panel (or remotely) selectable power output levels, with optional front panel (or remotely) deactivation and reactivation of HFT-40K power amplifier.
- Components and Construction: All equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.
- Customer Service: A variety of accessory kits are available for special purposes. Engineers are available for installation and/or maintenance, by contractual arrangements.