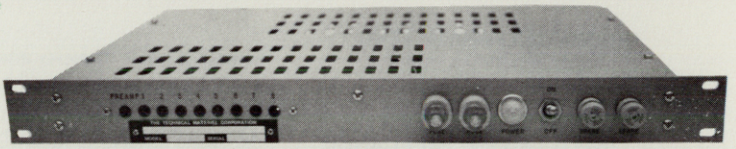
MODEL	DESCRIPTION	BULLETIN OLD	BULLETIN NEW
AMC-8,6,32 Series	HF Receiving Multicoupler	040201	204-4411
AMC-21 Series	HF Receiving Multicoupler		204-4428
ATS-2	HF Antenna Tuning System	2.0501	204-4412
ATS-3	HF Antenna Tuning System		204-4423
ATU Series	HF Antenna Tuning Unit		204-4424
BAC Series	Beverage Antenna Coupler		204-4426
DAC Series	Dipole Antenna Coupler		204-4413
HFD Series	HF Distrubution Unit	8007	204-4414
HLC Series	HF/LF Receiving Coupler	8008	204-4415
LFD Series	LF Distribution Unit	8007	204-4416
LFE-2	Synthesized LF/MF Exciter	2042B	204-4118
LMC Series	LF/MF Receiving Multicoupler		204-4417
LPF Series	HF Low-Pass Filter		204-4311
MAC-1	HF Multi-Antenna Coupler		204-4418
MAT-10K	LF/MF Antenna Tuning Unit		204-4421
MFE-1	Multi-Channel MF Exciter		204-4117
MMX-2	Synthesized HF Exciter		204-4115
RAC Series	Rhombic Antenna Coupler		204-4513
RTB Series	HF Terminal Unit		204-4317
SBG-4	Synthesized HF Exciter		204-4112
SME-5	Multi-Channel HF Exciter	2.030B	204-4113

MODEL	DESCRIPTION	BULLETIN OLD	BULLETIN NEW
STE-5	HF Strip Exciter	2.0308	204-4116
TER Series	HF Antenna Terminator	8009A	204-4316
TFP Series	HF Harmonic Filter		204-4312
TRC Series	HF Antenna Coupler	8015A	204-4420
VMC-8	VHF Receiving Multicoupler		204-4422
VRA Series	Vertical Receiving Antenna		204-4511
VTA Series	Vertical Transmitting Antenna		204-4512

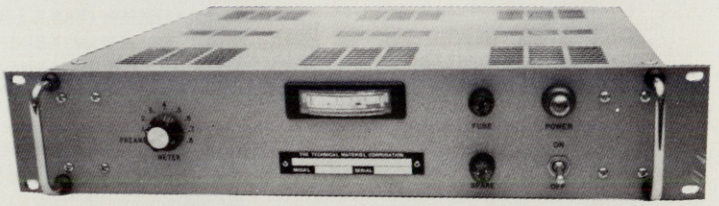
H.F. ANTENNA MULTICOUPLER
Models AMC-8, 16 & 32

TECHNICAL BULLETIN 204-4411

- *2-30 MHz*
- *Completely Solid State*
- *Broad Frequency Coverge*
- *Wide Dynamic Range*
- *Minimum Noise Level*
- *Small Phase Difference Between Outputs*
- *Protection Against Lightning Surges*
- *A.C. Line Filter*
- *Regulated Power Supply*



AMC-8



AMC-16
AMC-32

The TMC Model AMC-8, 16 and 32 receiving antenna multicouplers are solid state, broadbanded devices that couple a single antenna input to up to 32 communications receivers in the operating frequency range. Ideal for a wide variety of receiving antenna applications, the multicoupler is well-suited for both ship or shore installations in either commercial or military service. It incorporates the latest techniques in solid state circuitry in order to provide improved reliability over long periods of time. All units have been designed and fully tested under stringent environmental conditions. Front panel monitoring of critical circuits provides a visual indication of any malfunction within the multicoupler.

TECHNICAL SPECIFICATIONS
AMC Series

STANDARD MODELS	AMC-8 Eight-Output Receiving Antenna Multicoupler AMC-16 Sixteen-Output Receiving Antenna Multicoupler AMC-32 Thirty-two Output Receiving Antenna Multicoupler
OPERATING PARAMETERS	
FREQUENCY RANGE	Without filter: 100KHz-40MHz With band pass filter: 2-30MHz
NUMBER OF OUTPUTS	Eight, sixteen or thirty-two.
INPUT/OUTPUT IMPEDANCE	50 ohms unbalanced. BNC-type connector. Optional: 75 ohms.
GAIN	Nominal + 2 db throughout operating frequency range.
FREQUENCY RESPONSE	± 1.0 db, 100KHz to 32MHz.
NOISE FIGURE	Less than 7 db.
ISOLATION	
Output to Output	Better than 40 db down.
Output to Input	Better than 55 db down.
PHASE BETWEEN OUTPUTS	± 1 degree maximum, jack-to-jack.
DESENSITIZATION	A 4.0 volt peak signal, 10% removed in frequency, will reduce to 100 microvolt signal maximum 3 db.
INTERMODULATION DISTORTION	Second order distortion products are at least 60 db below the level of either signal of a standard two-signal test where each signal is measured across the input and is 0.5 volts RMS for 75-ohm units and 0.4 volts RMS for 50-ohm units. Third order products are at least 65 db down.
VSWR	Output: Better than 1.2-to-1 Input: Better than 1.5-to-1
OVERLOAD	Front-end protective device prevents component failure due to high RF voltages.
SPECIAL FEATURES	
MONITORING	Indicating fuseholders display status of primary power circuits continuously.
SAFETY	Fuse and overload protection. High voltage points covered by protective plates and labeled.
CONPOMENTS/CONSTRUCTION	Manufactured in accordance with MIL-STD specifications wherever practicable. Solid-state throughout.
ENVIRONMENTAL AND INSTALLATION	
COOLING	Convection.
OPERATING AND CONDITIONS	0 °C + 50 °C, up to 95% Relative Humidity at MSL.
STORAGE CONDITIONS	-30 °C to + 80 °C, up to 95% Relative Humidity at MSL.
PRIMARY POWER	115/230 volts AC ± 10%, 48 to 400Hz, single phase. Consumption: Maximum 25 watts for AMC-8. Maximum 85 watts for AMC-32.
SIZE AND WEIGHT	AMC-8, 1.75" (4.4cm) high x 19" (48.3cm) wide x 14" (35.6cm) deep; 8 lbs./3.8 kg. installed. AMC-16, 3.5" (8.9cm) high x 19" (48.3cm) wide x 15.5" (39.4cm) deep; 17 lbs./8.1 kg installed. AMC-32, 3.5" (8.9cm) high x 19" (48.3cm) wide x 15.5" (39.4cm) deep; 17 lbs./8.1 kg installed.
SHIPPING DATA	Commercial packing for domestic U.S. shipment. One (1) container 6" x 24" x 18". Total weight and cube — 35 lbs./1.5 cu. ft.
LOOSE ITEMS	Two (2) Technical Manuals (Operator/Installation/Service); AC Power Cord; Mating RF Connectors.

ACCESSORY PRODUCTS are described in sections 4-9 of the General Catalog and include RF/antenna, terminal, data, connector and power equipment. **TECHNICAL SERVICES** in design, engineering, training, and related areas are described in section 10. **OPTIONS** are listed after each TMC product in Part A of the Price List.

Technical Specifications Are Subject to Change Without Notice.

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

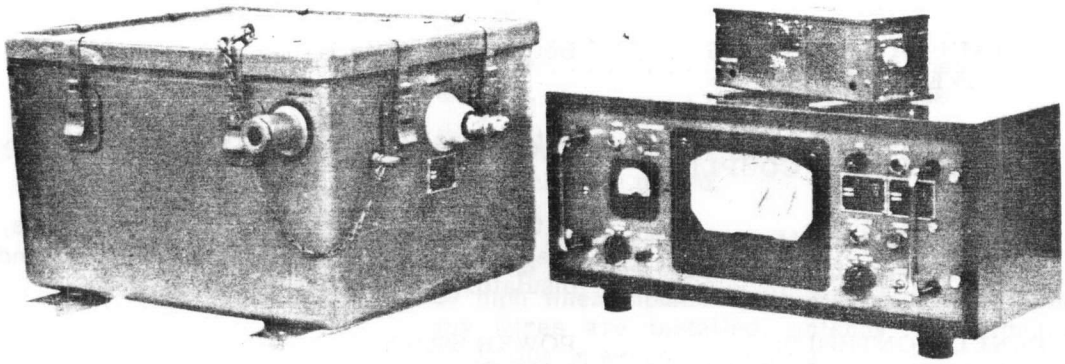
TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

SALES SERVICE BULLETIN NUMBER 2.0501

Antenna Tuning System

TMC Model ATS-50-2 (AN/URA-27)

TMC Model ATS-70-2 (AN/URA-34)



The TMC Model ATS-2 is a remotely controlled Antenna Tuning System designed to couple the unbalanced output of any 1 kw transmitter, within the 2-30 mc frequency range, to a suitable antenna. Instantaneous readings of forward power, reflected power, and voltage standing wave ratio aid in transmitter tuning and provide indications of transmission system efficiency.

The TMC Model ATS-2 system features a safety overload that opens the transmitter interlock circuit whenever the VSWR exceeds 4:1 or when power ratings are exceeded in the tune and operate position.

Remote control of variable reactance and resistance in the antenna tuning unit allows efficient operation of the complete system from the transmitter.

The Tuner is housed in a fiberglass weather-proofed box which contains a desiccant to prevent moisture from gathering around the components. The presence of moisture, which is indicated on the front panel of the control monitor, is detected by a humidity sensing element in the RF Tuner.

The Directional Coupler consists of a precision balanced RF bridge and is calibrated to operate in conjunction with a 50 or 70 ohm coaxial line.

TECHNICAL SPECIFICATIONS:

FREQUENCY RANGE:	**2 to 30 megacycles.**
POWER RATING:	
R. F. TUNER:	**1000 watts input continuous at 100% modulation.**
CONTROL MONITOR:	**Input: 115/230 volts, 50/60 cycles, single phase, 150 watts.**

DIRECTIONAL COUPLER:	1000 watts continuous at 100% modulation for VSWR up to 2.5 to 1
TRANSMISSION LINE:	50 or 70 ohms.
INPUT IMPEDANCE:	Nominally 50 or 70 ohms unbalanced.
OUTPUT IMPEDANCE:	70 ohm system. Will match any antenna with a resistance of 7-650 ohms and -J850 to +J750 reactance to obtain a V.S.W.R. of less than 2.5. 50 ohm system: Will match any antenna with a resistance of 5-500 ohms and -J850 to +J750 reactance to obtain a V.S.W.R. of less than 2.5.
ATTAINABLE STANDING WAVE RATIO:	Better than 2.5 to 1.
DIRECTIVITY OF DIRECTIONAL COUPLER:	Better than 20 db with 1:1 VSWR
EFFICIENCY:	Better than 80% over the 2-30 mc range, when used with the TMC A-1486 35' antenna and Base Insulator.
PANEL CONTROLS: (CONTROL MONITOR)	POWER Switch METER Switch REACTANCE Switch RESISTANCE Switch TUNE/OPERATE Switch RESET Switch

INSTALLATION DATA:

	DIMENSIONS AND WEIGHT	
ATS-( )-TU-2	8 1/4" x 15 1/4" x 12"	49 lbs.
ATS-( )-CU-2	$3\frac{1}{2}$" x $3\frac{1}{2}$" x $9\frac{1}{2}$"	2 lbs.
ATS-MCU-2 (with cabinet)	$20\frac{1}{2}$" x $8\frac{1}{2}$" x 9 3/4"	25 lbs.
ATS-MCU-2 (cabinet removed for rack mounting)	19" x 7" x $7\frac{1}{2}$"	14 lbs.

SHIPPING DATA:	1. Size of box, $32\frac{1}{2}$" x 23 1/4" x 27" - (11.9 cu. ft.) 2. Weight, 175 lbs.
COMPONENTS AND CONSTRUCTION:	Equipment is manufactured in accordance with JAN/MIL Specifications wherever practicable.

TMC MODEL NUMBER	MILITARY NOMENCLATURE	FSN w/o spares	FSN with spares
ATS-50-2	AN/URA-27	F-5985-709-7984	
ATS-70-2	AN/URA-34		
ATS-MCU-2	C-2995/URA-27		
ATS-()-TU-2	CU-772/URA-27		
ATS-50-CU-2	CU-773/URA-27		
ATS-70-CU-2	CU-820/URA-34		

TMC INSTRUCTION MANUAL NUMBER IN-214

ACCESSORY EQUIPMENT:

Remote Control Cable (Control Monitor to R. F. Tuner).

CA-541-X (X indicates length in feet. Please designate when ordering cable).

A-1486 ANTENNA AND BASE INSULATOR.

ANTENNA:

Stainless steel . . . . . 6 section
Extended . . . . . 35 feet, 7 inches
Collapsed . . . . . 6 feet, 4 inches
Base OD . . . . . 1.5 inches
Base ID . . . . . 1.37 inches
Weight . . . . . 19 pounds

BASE INSULATOR:

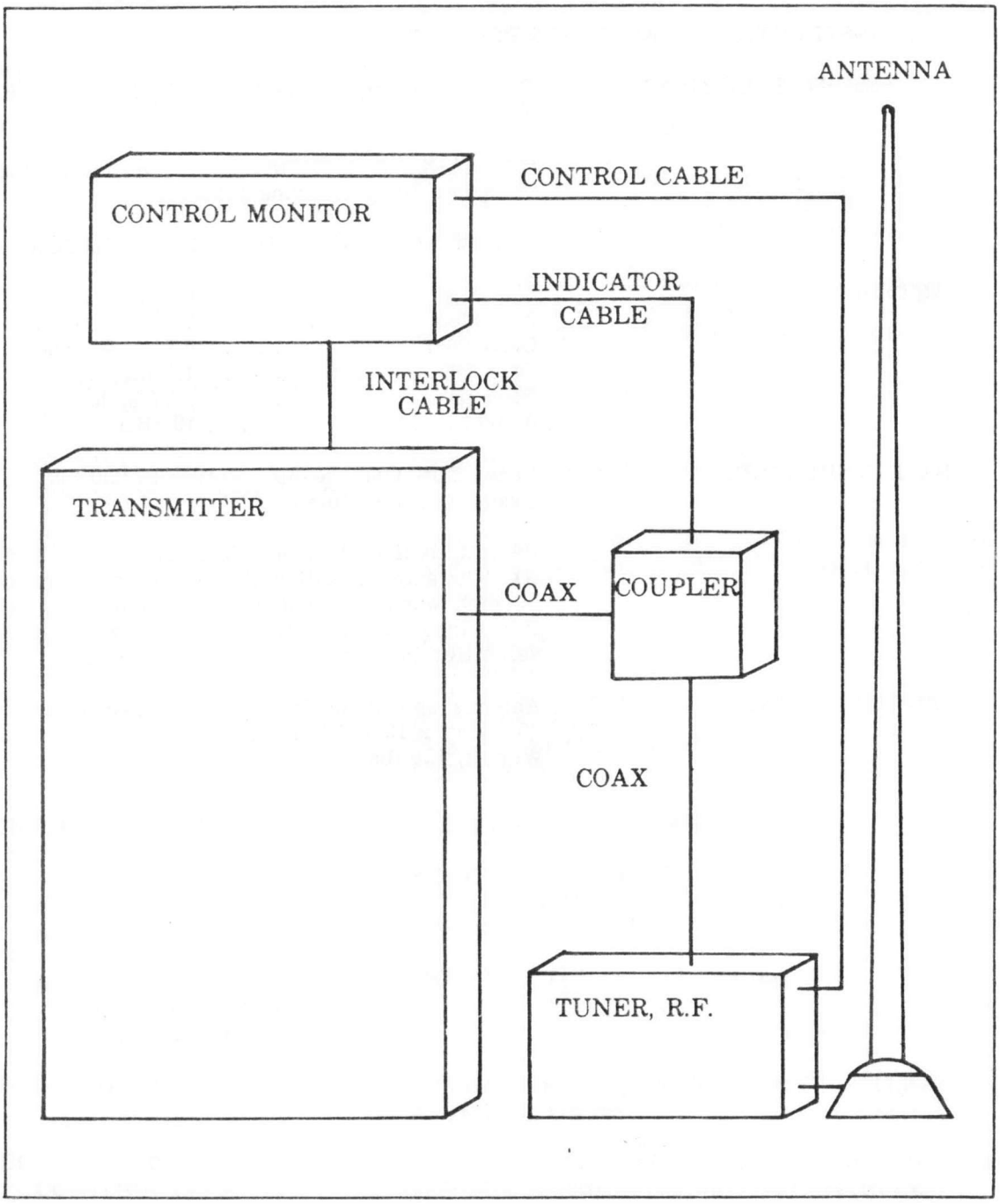
Heavy Duty Compression Rating 10,000 lbs.
Brass, chrome plated.

Height: approx. 8 inches Mtg. Stud to fit Antenna ID. The antenna will withstand wind velocities of 60 mph when mounted with supplied base. When guy wires are installed, antenna will withstand velocities in excess of 100 mph.

SHIPPING DATA:

Antenna and Base Insulator shipped in one box 79'' x 8'' x 12 1/4'' (4.5 cu. ft.)
Weight, 120 lbs.

Antenna Tuning System



Block Diagram Model ATS-2 with Transmitter and Antenna

We reserve the right to
make engineering changes.

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD • MAMARONECK, NEW YORK 10543

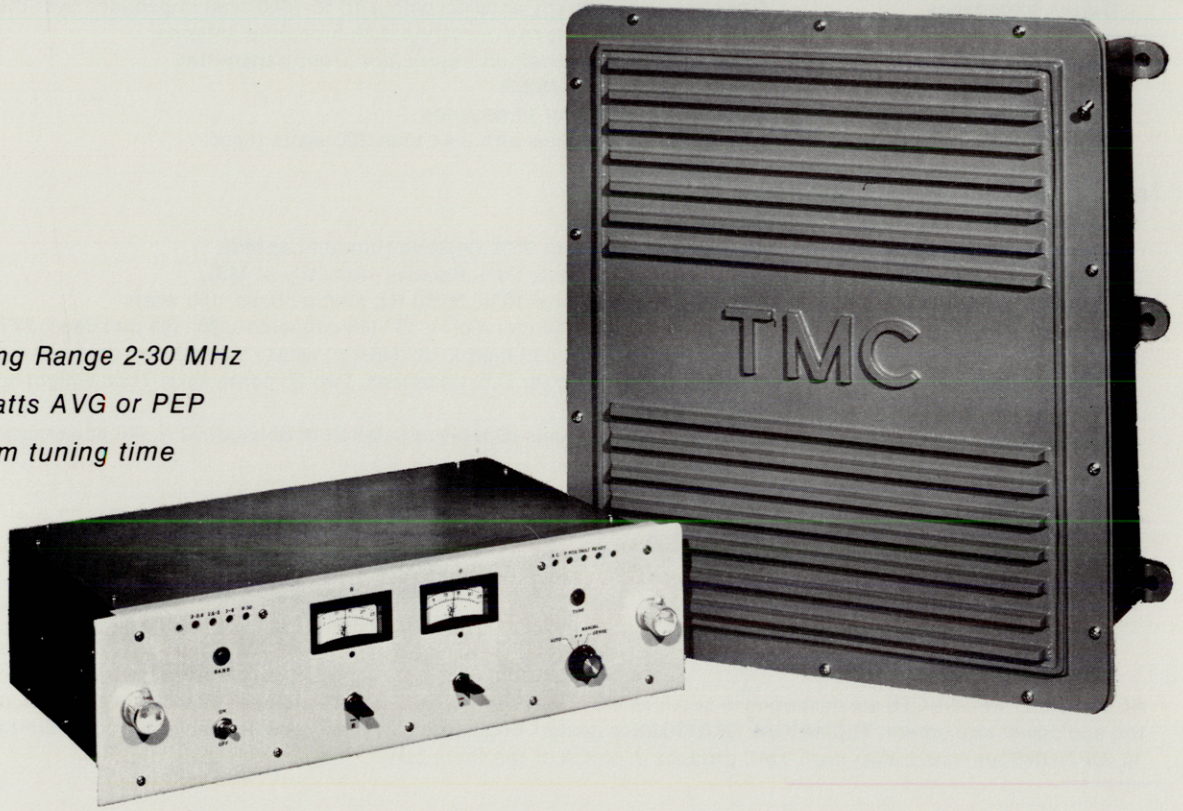
SPRINGFIELD, VIRGINIA • OTTAWA, CANADA • LUZERN, SWITZERLAND • TEMPE, ARIZONA

(914) 698-4800 • (613) 822-0244 • twx 710—566—1100 • telex 013—446

PRINTED IN U.S.A.

H.F. ANTENNA TUNING SYSTEM
Model ATS-3

TECHNICAL BULLETIN 204-4423



- *Operating Range 2-30 MHz*
- *1000 Watts AVG or PEP*
- *Minimum tuning time*

The ATS-3 antenna tuning system is a highly versatile automatic device which will remotely tune a 35 foot shipboard antenna to match the 50 ohm output of a 1 KW transmitter over the range of 2-30 Mhz. It will also tune into a long wire antenna as short as fifteen feet depending on frequency and antenna configuration.

The ATS-3 consists of two parts; the station control unit and the completely sealed tuner normally located at the base of the antenna.

The control unit is completely solid state and is cable connected to the tuner. All necessary servo and pre-positioning controls are provided in the station unit as well as the power supply. Two front panel meters monitor "R" and phase sense. These enable the operator to monitor the status of the sensing circuits. Every attempt has been made to produce a "fail safe" device, and in the event of malfunction, the meters may be used to manually adjust the tuner. All parts are easily accessible for service and "LED" indicators continually indicate proper operation. Complete manual override is available.

The tuner is housed in a cast aluminum case completely protected from the elements by weather-proof fittings. Our tests have indicated that pressurization is not necessary, but the unit may be pressurized on special order. A humidity sensor is incorporated which will indicate if moisture accumulation is excessive.

TECHNICAL SPECIFICATIONS
Model ATS-3

OPERATING PARAMETERS

Frequency Range	2-30MHz
Input RF Power	1000 watts PEP or 1000 watts average CW
Input Impedance	50 ohms nominal, unbalanced.
Output Impedance	Designed to match any antenna with a 10 to 1000 ohm impedance over the frequency range. Long wire antenna or standard 35-foot whip antenna.
Tuning	Automatic with pre-position information from transmitter.
Tuning Accuracy	Better than 1.5-to-1 VSWR
Tuning Time	Switched in less than 10 seconds.
Tuning Level	Will automatically tune with less than 200 watts input.

ENVIRONMENTAL AND INSTALLATION

Cooling	Convection
Operationing Conditions	-20° to + 65°C, up to 95% Relative Humidity at MSL
Storage Conditions	-30°C to + 80°C, up to 95% Relative Humidity at MSL
Primary Power	115 or 230 Volts AC ± 10%, 50/60 Hz, single-phase, 100 watts
Size and Weight	Control unit: 5.25" (14 cm) high x 19" (48 cm) wide x 20" (51 cm) deep; 27 lbs./13 kg. Tuning unit: 25" (64 cm) high x 18" (46 cm) wide x 13" (33 cm) deep; 70 lbs./178 kg.
Shipping Data	Commercial packing for U.S. shipment. Two (2) containers. Total weight and cube: 185 lbs./13 cu. ft.
Loose Items	Two Technical Manuals (Operator/Installation/Service) 50 ft. RF power cable and 50 ft. control cable.

ACCESSORIES (Option)

CA480-36-300	RF Power Cable, 300 ft. in length
CA1866-300	DC Control Cable, 300 ft. in length
DTA-11	Long Wire Antenna
VTA-2	Vertical Antenna, 35 ft. stainless
VTA-3	Vertical Antenna, 35 ft. fiberglass

ACCESSORY PRODUCTS are described in sections 4-9 of the General Catalog and include RF/antenna, terminal, data, connector, and power equipment. **TECHNICAL SERVICES** in design, engineering, training, and related areas are described in section 10. **OPTIONS** are listed after each TMC product in part A of the Price List.

Technical Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

CABLE: TEPEI TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

TMC [CANADA] LIMITED **TMC INTERNATIONAL**

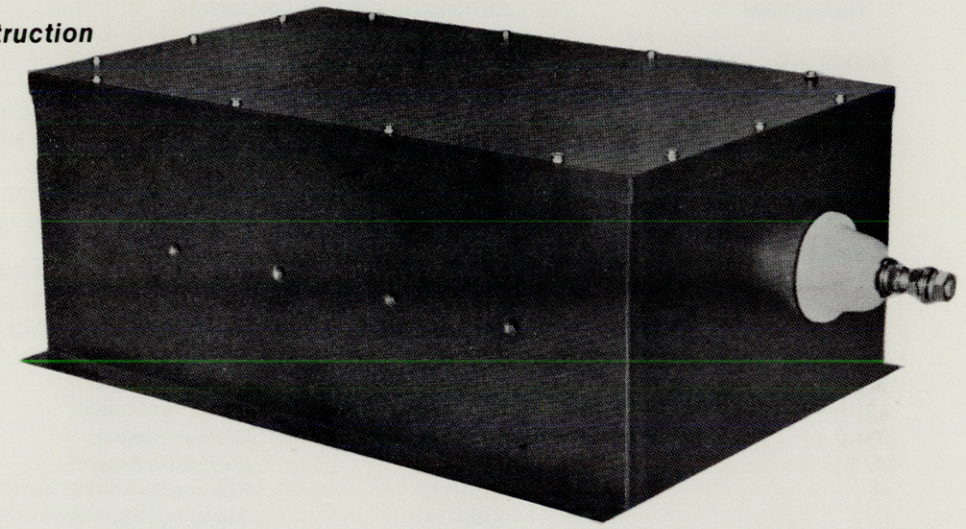
RR NO. 5, OTTAWA, K1G 3N3, ONTARIO, CANADA

TEL.: 613-521-2050 TLX: 053-4146

H.F. ANTENNA TUNING UNIT
Model ATU

TECHNICAL BULLETIN 204-4424

- ***Operating range 2-30MHz***
- ***Eight pre-tuned channels***
- ***Remote control with manual override***
- ***350 or 1000 watts PEP***
- ***Milli-second switching***
- ***Compact, rugged construction***



The ATU series of TMC antenna tuning units are designed to couple the output of a multi-channel transmitter or transceiver with nominally 50 ohms output impedance to a suitable antenna such as a 35-foot vertical. Impedance matching — required in any transmitter system to optimize the transfer of RF power to the antenna — is provided in the ATU for up to eight pre-set channels in the 2 to 30MHz frequency range. The tuner is pre-adjusted at the factory for specific channel frequencies, eliminating the need for lengthy adjustments prior to operation in the field. Since the electrical characteristics on site may differ from the initial set-up, variable capacitor elements are provided in each ATU for fine tuning into the antenna. Eight holes on the top of the ATU case provide access to the capacitors without removing the tuning elements from the case. An accessory SWR indicator, Model SWR-1K, can be provided to assist in measuring the relative efficiency of coupling from transmitter to antenna.

Two basic models of the ATU series are available: the ATU-350, capable of handling up to 350 watts PEP, and the ATU-1000 for 1000 watt PEP operation. Channel selection is automatic with the application of an external + 24-volt DC level applied to the appropriate pins on the tuner's remote jack. This voltage is normally derived from the transmitter power supply, through one wafer on the channel switch to the antenna tuner control cable. As an option, an auxiliary switch panel with DC supply can be provided. This method slaves the tuner to the channel switch, instantly setting up the entire system.

The ATU series are housed in all-weather, metal cases and are normally mounted at the base of the antenna. Mounting taps are provided for bulkhead or upright post mounting. A porcelain insulator terminal is provided on the housing for connection to an antenna lead-in strap. RF input and control cable jack are also provided for cabling to an associated transmitter or transceiver for remote channel selection.

TECHNICAL SPECIFICATIONS
ATU SERIES

STANDARD MODELS

ATU-350 350W HF Antenna Tuning Unit
ATU-1000 1000W HF Antenna Tuning Unit

TECHNICAL CHARACTERISTICS

Frequency Range	2-30MHz on eight pre-set channels each tuned to one carrier operating frequency.
Input RF Power	ATU-350 350 watts PEP; 175 watts average CW ATU-1000 1000 watts PEP; 500 watts average CW
Input Impedance	50 ohms nominal, unbalanced.
Output Impedance	Designed to match any antenna with a 10 to 1000 ohm impedance over the frequency range. Tuning elements are optimized at operating frequencies prior to shipment.
Tuning	Pre-set and switched to proper channel by remote selection. + 24 volts DC required for proper operation.
Tuning Accuracy	Better than 1.5-to-1 VSWR
Tuning Time	Switched in less than one second

ENVIRONMENTAL AND INSTALLATION

Cooling	Convection
Operating Conditions	-20° to + 65°C, up to 95% Relative Humidity at MSL
Storage Conditions	-30°C to + 80°C, up to 95% Relative Humidity at MSL
Primary Power	+ 24 volts DC + /-5%
Size and Weight	ATU-350: 5.8" (14.7cm) high x 8.8" (22.4cm) wide x 12.0" (30.5cm) deep; 15.5 pounds/7.1 kg ATU-1000: 7.5" (19.0cm) high x 17.5" (44.5cm) wide x 21" (53.3cm) deep; 25 pounds/11.4 kg
Shipping Data	Commercial packing for U.S. shipment ATU-350: One (1) container — 8" x 12" x 15"; Total weight and cube — 24 lbs./1.0 cu. ft. ATU-1000: One (1) container — 10" x 21" x 24"; Total weight and cube — 35 lbs./3 cu. ft.
Loose Items	Two Technical Manuals (Operator/Installation/Service)

ACCESSORIES (Option)

CA480-36	RF Power Cable
CA1815	DC Control Cable
DTA-10	Dipole Antenna
DTA-11	Long Wire Antenna
RCP-11	Remote Switching Panel with DC supply
SWR-1K	Standing Wave Ratio Indicator
VTA-2	Vertical Antenna, 35-foot Stainless
VTA-3	Vertical Antenna, 35-foot Fiberglass

ORDERING INFORMATION

Models

ATU-350-1 Single Channel 350W HF Antenna Tuning Unit through ATU-350-8 Eight Channel 350W HF Antenna Tuning Unit
ATU-1000-1 Single Channel 1000W HF Antenna Tuning Unit through ATU-1000-8 Eight Channel 1000W HF Antenna Tuning Unit

ACCESSORY PRODUCTS are described in sections 4-9 of the General Catalog and include RF/antenna, terminal, data, connector, and power equipment. **TECHNICAL SERVICES** in design, engineering, training, and related areas are described in section 10. **OPTIONS** are listed after each TMC product in part A of the Price List.

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700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

CABLE: TEPEI TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

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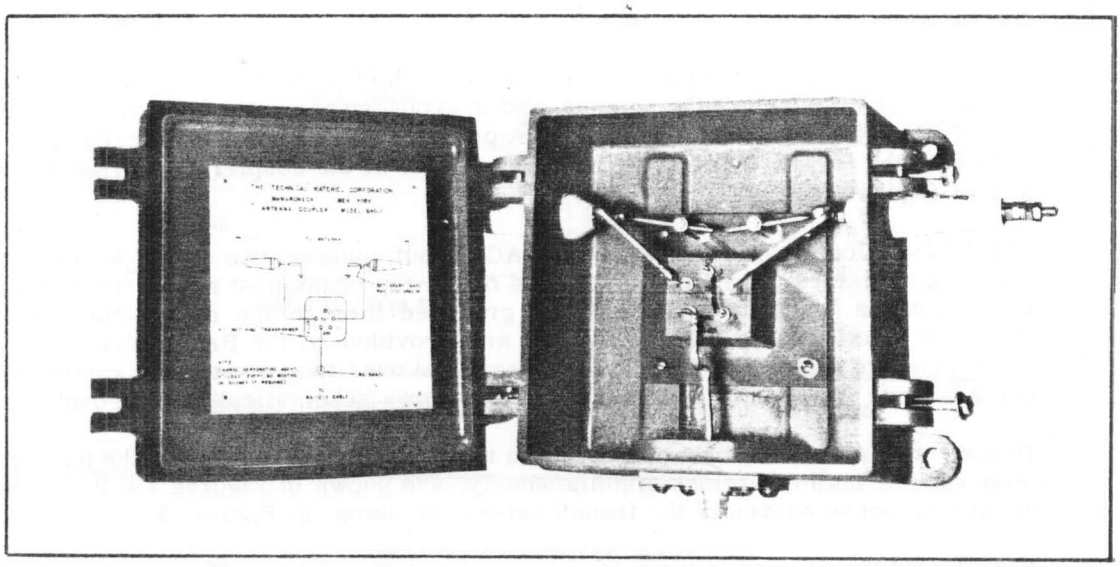
RR NO. 5, OTTAWA, K1G 3N3, ONTARIO, CANADA

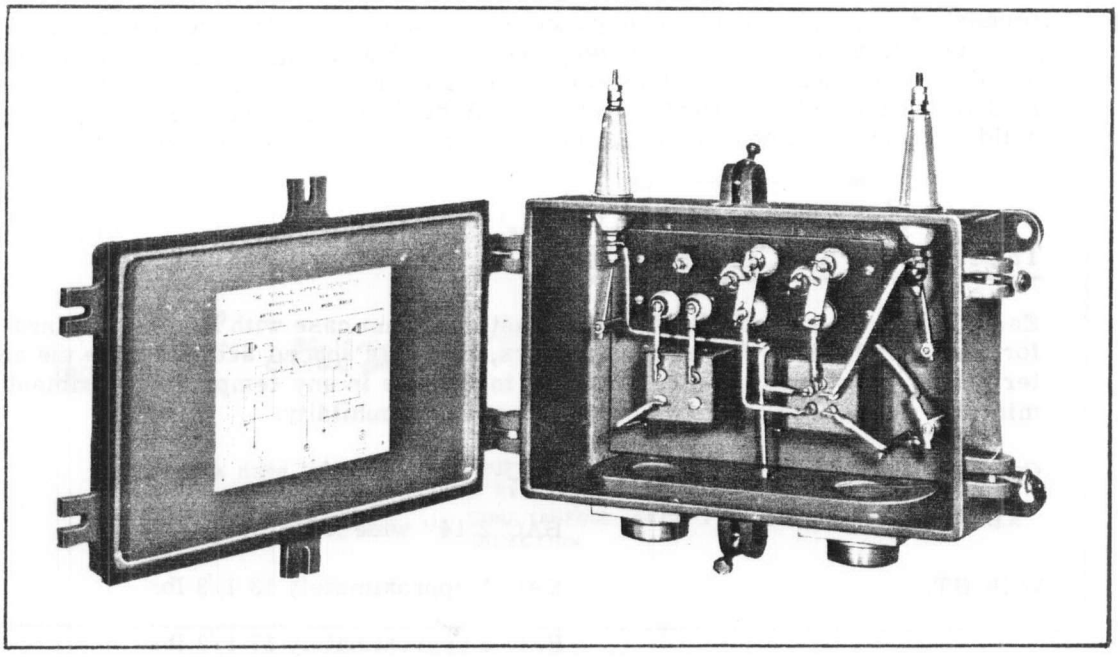
TEL.: 613-521-2050 TLX: 053-4146

SALES SERVICE BULLETIN NUMBER 142A

BEVERAGE WAVE ANTENNA COUPLER MODELS BAC-1, BAC-2



BEVERAGE WAVE ANTENNA COUPLER MODEL BAC-1



BEVERAGE WAVE ANTENNA COUPLER MODEL BAC-2

The Beverage Wave Antenna Couplers, Models BAC-1, and BAC-2 are designed specifically to operate with a two wire Beverage Wave Antenna.

These Couplers provide impedance termination on one end, and impedance transformation to a 75 ohm coaxial line on the receiver end.

This type of Antenna consists of a pair of horizontally mounted parallel wires, which are connected in parallel and are terminated in a resistance equal to the characteristic impedance of the antenna. When a receiver is connected to the antenna, it will be most sensitive to received signals traveling from the terminated end to the receiver.

The BAC-1 and 2 combination provides a special arrangement which makes it possible to terminate the antenna at either end by simply setting two switches. Both switches are contained in the BAC-2 case, (see Figures 1 & 2) which is located at the end of the antenna nearest the receiving location. Proper manipulation of these switches, (see Figures 1 & 2) will permit optimum reception of signals in either direction along the antenna wires or the simultaneous reception of two signals arriving from opposite directions.

The BAC-1 Coupler is a single transformer, which is mounted on the top of the pole supporting the far end of the antenna and is grounded to earth through the center conductor of an RG-12/U coaxial cable. A proper fitting is mounted on the case to accomodate the RG-12/U cable fitting. The details of the coupler are shown schematically in Figures 1 & 2.

The BAC-2 Coupler is similar to the BAC-1, but contains two transformers and terminating resistors. The Coupler mounts on the top of the post supporting the near end of the antenna. The transformers are grounded through the center conductor of an RG-12/U coaxial cable. Three fittings are provided on the BAC-2 case, two fittings to accomodate a standard RG-85/U and seal and one fitting to accomodate the RG-12/U cable fitting. The details of the coupler are shown schematically in Figures 1 & 2.

Proper coupler connections necessary to receive signals from either the far end or the near end, or both directions simultaneously, are shown in Figures 1 & 2, and the frequency response curves of the transformers are shown in Figures 3

Each transformer used in the BAC-1 and BAC-2 Coupler is flat within 3 db for a frequency range of 100 to 1600 kilocycles. The termination ratios are accurate within 10% for each transformer.

The transformers used in the BAC-1 and 2 are broadbanded devices, using core materials employing a recent technique, which accomplish the transformations with minimum insertion losses. The Couplers use no tubes and require no current supply, and are therefore linear for all types of signals and are particularly resistant to cross-modulation and other disturbing effects. A built-in lightning arrestor prevents the building up of static charges which might injure associated equipment.

TECHNICAL SPECIFICATIONS

Each Coupler is housed in a JAN alloy, cast aluminum case with heavy mounting flanges for easy installation. Ceramic insulators, properly spaced accommodate the antenna terminals. The couplers are designed to operate in any temperature ambient from minus 30 to plus 160 degrees F. with any relative humidity.

CASE SIZE:	BAC-1 9'' wide x 9'' high x 5'' deep.
	BAC-2 14'' wide x 9'' high x 5'' deep.
WEIGHT:	BAC-1 approximately 13 1/3 lbs.
	BAC-2 approximately 17 1/2 lbs.

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THE TECHNICAL MATERIEL CORPORATION

NOTE: We have supplied the BAC series for many specialized Beverage requirements for both single and two wire antennas and can accommodate many specific frequency ranges and impedance combinations. Your inquiries and special requirements will be given immediate attention.

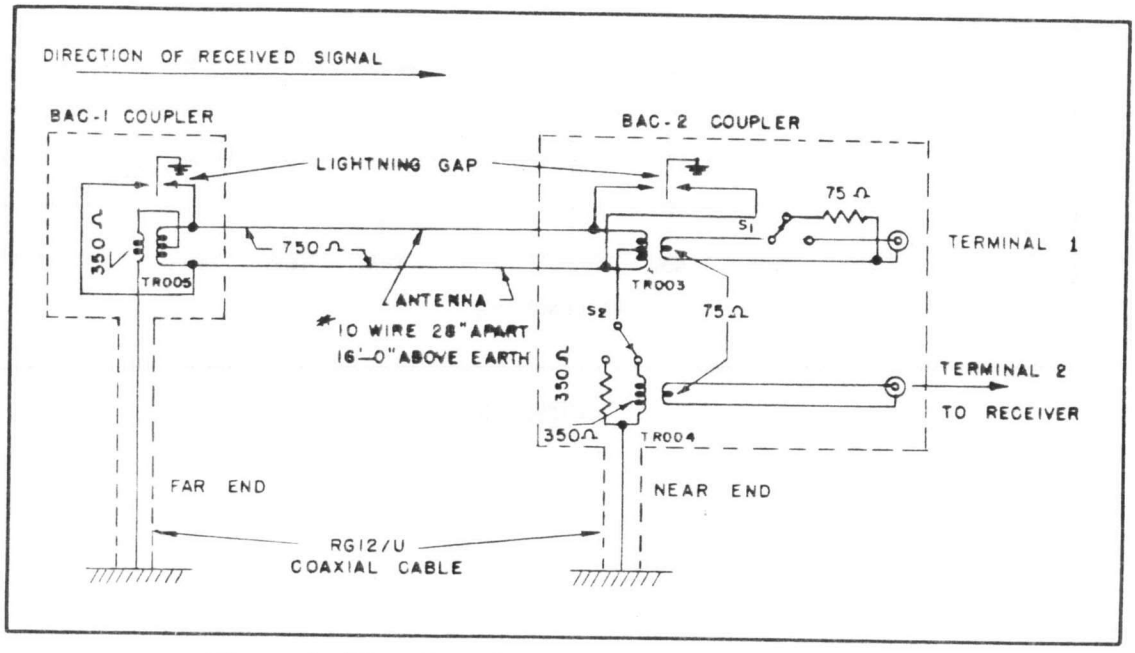


Figure 1. Direction of Received Signal From Far End

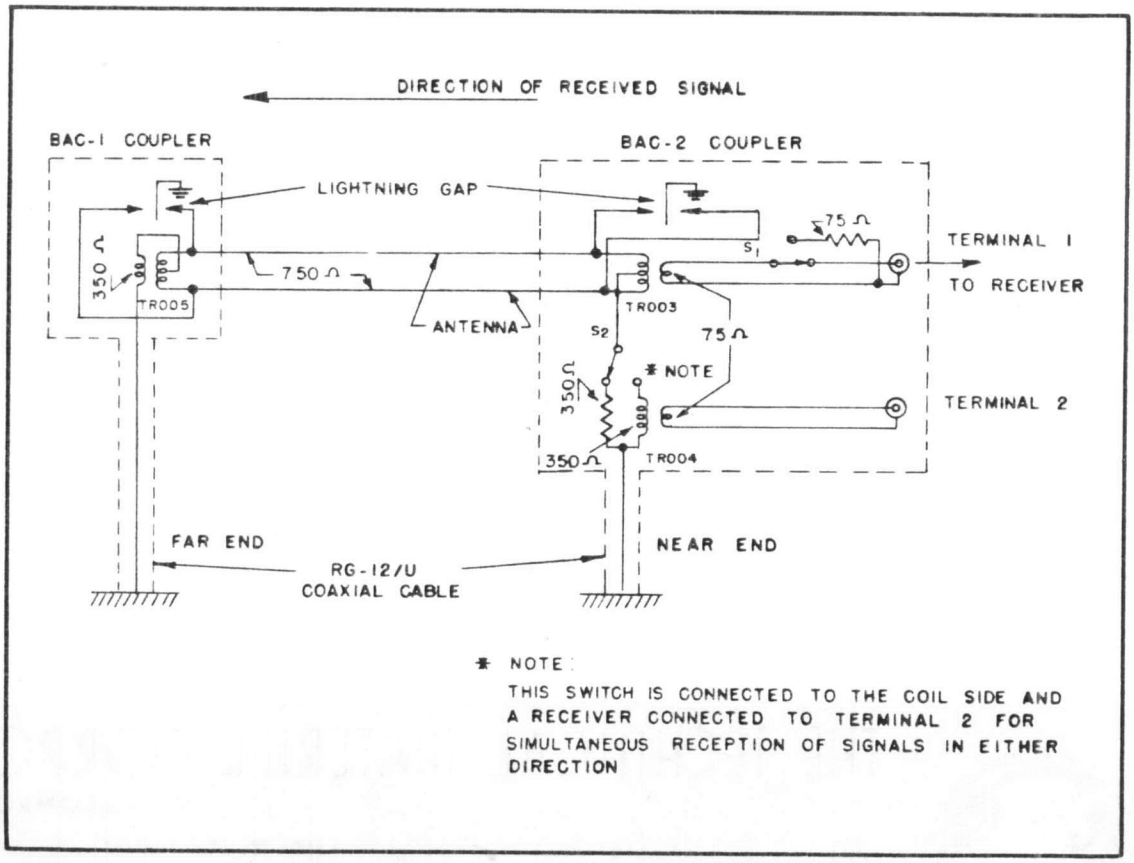


Figure 2. Direction of Received Signal From Near End

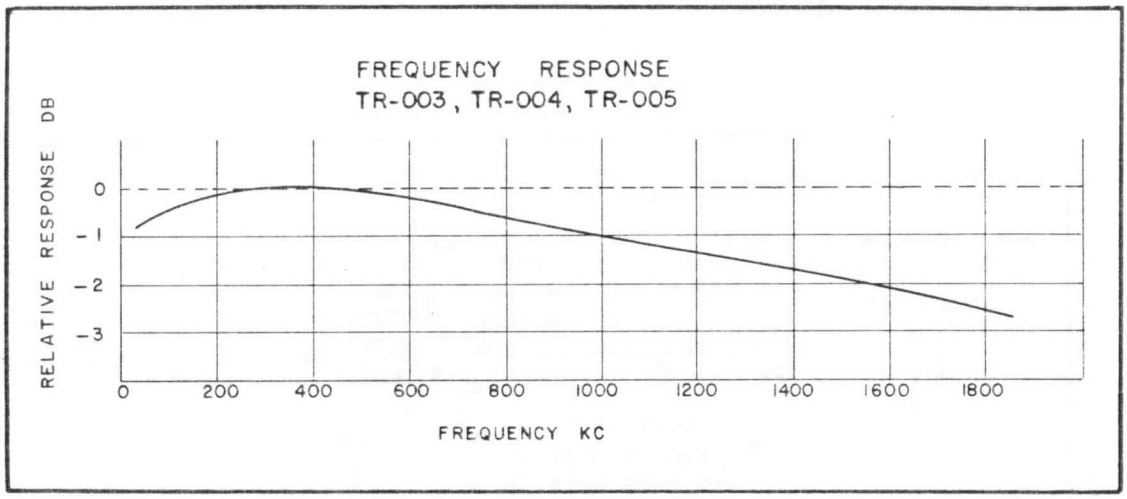


Figure 3.

WORLD WIDE SUPPLIERS OF ELECTRONIC COMMUNICATIONS EQUIPMENT

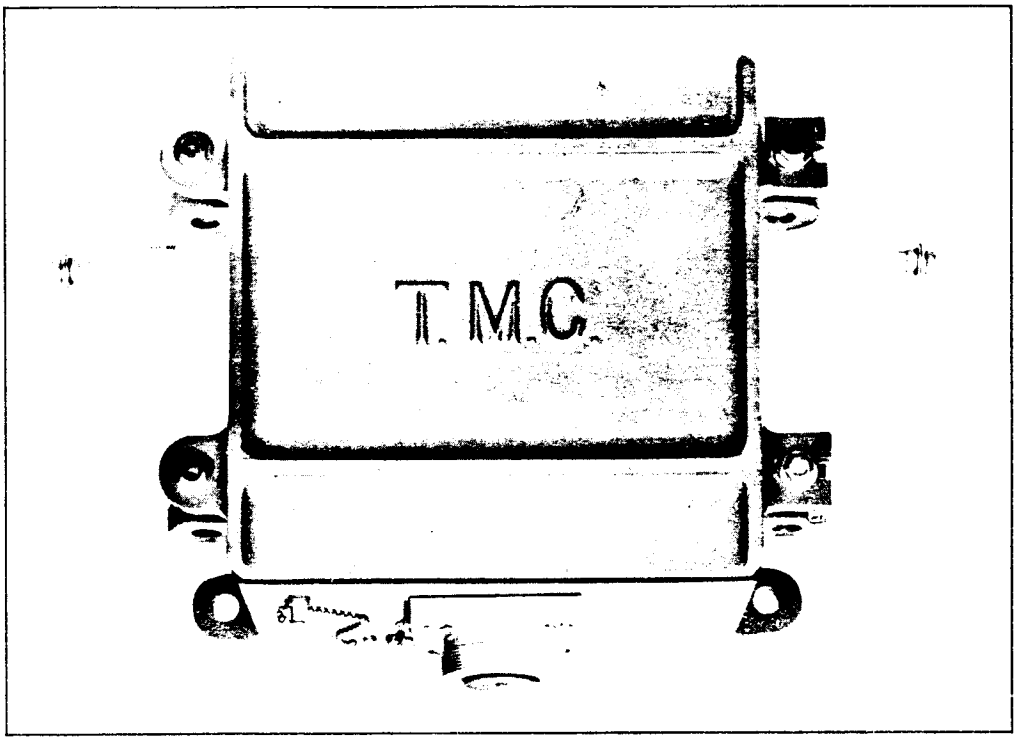
THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, NEW YORK

AND ITS SUBSIDIARIES . . .
TMC (Canada), Ltd., Ottawa, Canada
TMC Industrial Corp., Mamaroneck, N. Y.
TMC Systems, Inc., Alexandria, Va.
TMC Systems, (Texas), Inc., Garland, Texas
TMC Systems, (Calif.), Inc., La Mesa, Calif.
TMC Systems, (Florida), Inc., Pompano Beach, Fla.
TMC Power Distribution, Inc., Alexandria, Va.
TMC Systems, A.G., Luzern, Switzerland

CABLE
TEPEI
MAMARONECK, N. Y.

TECHNICAL BULLETIN NUMBER 8015A

Transmitter Antenna Coupler Series
TMC Models TRC
CU-729/URT
CU-1076/URT



TMC MODEL TRC-500

TMC Models TRC series of Broadband RF transformers provide matching between 50 or 70 ohms unbalanced and 600 ohm balanced impedances, with power capabilities from 250 watts to 40 kw PEP.

Models TRC provide efficient coupling of RF energies from unbalanced to balanced or balanced to unbalanced over the frequency range of 2-30 megacycles, dependent on the model used.

With Model TRC Broadband coupling transformers, it is possible to match 50 or 70 ohm transmitter outputs to any antenna requiring a 600 ohm coupling; thus allowing the flexibility of RF coaxial switching at the transmitting site.

Model TRC transformers are hermetically sealed and potted in a special compound. All of the units in the series are passive devices requiring no power supplies or tuning adjustments at any time. The rugged weatherproof casings differ in construction depending on the power handling requirements of each model. No maintenance is required for these units.

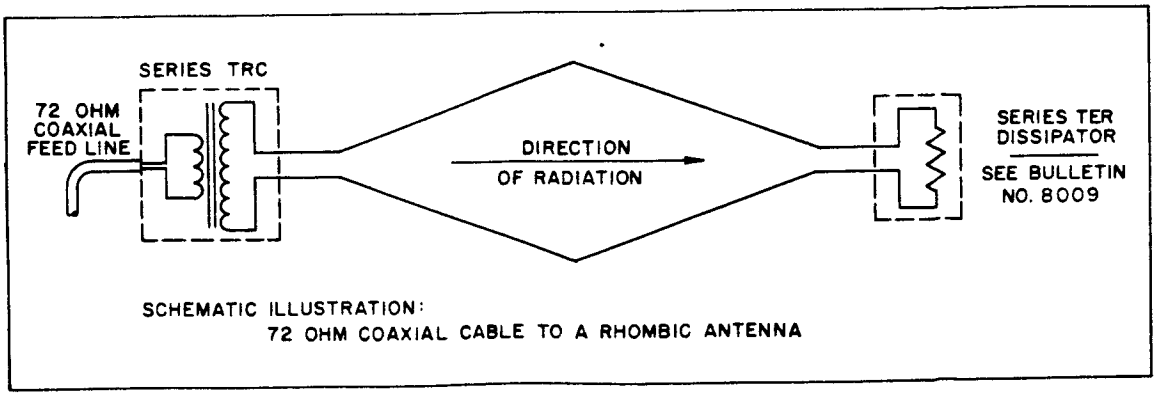
Transmitting Antenna Coupler Series

All Model TRCs are provided with either Mykroy or porcelain bowls for balanced operation. All Model TRC-20Ks are furnished with a 3⅛" EIA flange as standard fittings, and all Model TRC-5000s are furnished with a 1⅝" EIA flange. All other TRCs are furnished with an AX-274 to mate with an ES-85/U coaxial connector. If other than the standard fitting is desired, please indicate by using the appropriate AX number from the chart. As an example, to order a TRC to match a 50 ohm RG-17/U cable with a QDL connector for 1000 watts PEP, order TRC-500-50U/600B/AX-273 ( ).†

† For mating RF cable fittings, refer to TMC Connector Products Catalog.

TECHNICAL SPECIFICATIONS FOR TMC Models TRC

FREQUENCY RANGE:	2-30 megacycles (except as noted on chart).
POWER RATING:	See Chart.
INSERTION LOSS:	Less than 1 db.
IMPEDANCES:	50 or 70 ohms unbalanced to 600 balanced. (Units may be used unbalanced to balanced or vice versa.)
RF FITTINGS:	See Chart.
MOUNTING:	See mounting diagrams.
SAFETY FEATURES:	Spark gap for protection against static charge or lightning.
DIMENSIONS:	See Chart.
WEIGHT:	See Chart.
OPERATING TEMPERATURE:	−40° C. to +75° C. Ambient.
COMPONENTS AND CONSTRUCTION:	Equipment manufactured in accordance with JAN/MIL specifications wherever practicable.



SCHEMATIC ILLUSTRATION:
72 OHM COAXIAL CABLE TO A RHOMBIC ANTENNA

TMC MODEL NUMBER	MILITARY NOMENCLATURE	FREQUENCY RANGE (MC)	AVERAGE POWER (IN WATTS)	PEAK POWER (IN WATTS)	REFER TO NOTES	INSTALLATION DATA				SHIPPING DATA		MOUNTING PLATE CONNECTOR ASSEMBLIES*														BOWL ASSEMBLIES		LOGISTICS DATA	TMC MODEL NUMBER
						HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	WEIGHT (lbs.)	VOLUME (cu. ft.)	WEIGHT (lbs.)	AX-274 (for RG 85/U coax)	AX-272 (50Ω) 1⅝" EIA Flange	AX-271 (70Ω) 1⅝" EIA Flange	(50Ω) 3⅛" EIA Flange	(70Ω) 3⅛" EIA Flange	AX-278 (50Ω) 3⅛" to 1⅝" Adapter	AX-279 (70Ω) 3⅛" to 1⅝" Adapter	AX-273 QDL	AX-281 UHF	AX-282 UHF (T)	AX-283 BN	AX-284 BNC	AX-285 HN	AX-286 C	AX-287 LC	AX-289 QDS	AX-259 N			Two Small Mykroy (¼" bolts on 12" cent.)	Two Large Porcelain (½" bolts on 12" cent.)	A—FSN w/spares B—FSN w/o spares	
TRC-100-70U/600B		2-32	100	200	1, 5	9	9	5	15	1.8	28								X	X	X	X	X	X	X	X	X	X			X		A B	TRC-100-70U/600B
TRC-500-50U/600B		2-30	500	1000	1, 6	9	9	5	15	1.8	28								X	X	X	X	X	X	X	X	X	X			X		A B	TRC-500-50U/600B
TRC-500-70U/600B		2-30	500	1000	1, 5	9	9	5	15	1.8	28								X	X	X	X	X	X	X	X	X	X			X		A B	TRC-500-70U/600B
TRC-3500-50U/600B	CU-1076/URT	2-30	1800	3600	1	14	9	5	32	2.4	45		X						X							X					X		A B	TRC-3500-50U/600B
TRC-3500-70U/600B	CU-729/URT	2-30	1800	3600	1	14	9	5	32	2.4	45			X					X							X					X		A B	TRC-3500-70U/600B
TRC-5000-50U/600B		2-28	5000	10,000	2, 3	14	8	5	20	2.4	45	X							X							X					X		A B	TRC-5000-50U/600B
TRC-5000-70U/600B		2-28	5000	10,000	2, 3	14	8	5	20	2.4	45	X							X							X					X		A B	TRC-5000-70U/600B
TRC-20K-50U/600B		4-30	20,000	40,000	2, 4	20½	20	14	80	14	120						X															X	A B	TRC-20K-50U/600B
TRC-20K-70U/600B		4-30	20,000	40,000	2, 4	20½	20	14	80	14	120							X														X	A B	TRC-20K-70U/600B

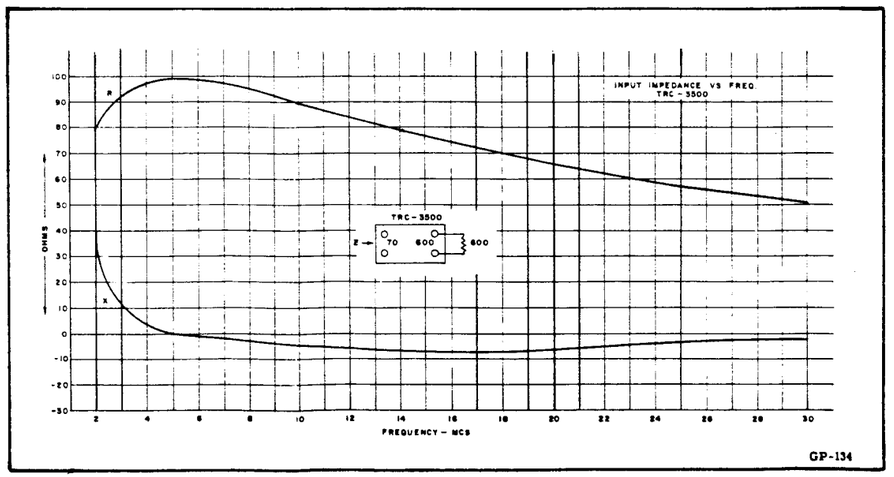
X Indicates standard mounting plate connector assembly provided.
When other fittings are desired, please use appropriate AX number.
Sample: TRC-3500-50U/600B/AX-273.*

NOTES

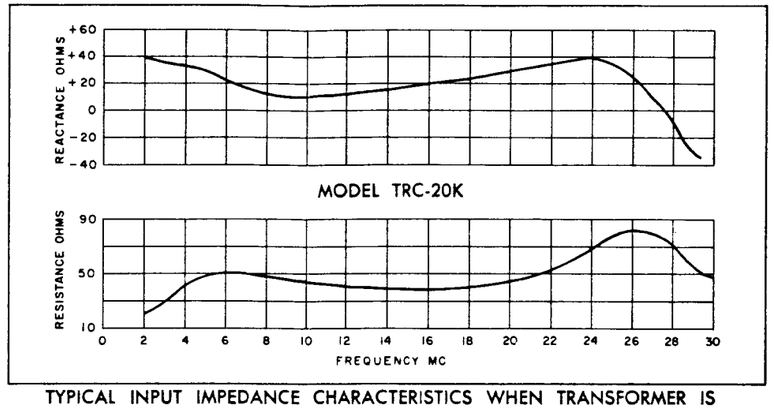
1. Stress relieved cast Aluminum case.
2. Fiberglass reinforced plastic case.
3. Under conditions of a 64 tone voice frequency modulation, this TRC will operate at 50 kw PEP on a 10% duty cycle.
4. Under conditions of a 64 tone voice frequency modulation, this TRC will operate at 100 kw PEP on a 20% duty cycle.
5. Also tapped for 150 and 300 ohm balance.
6. Also tapped for 100 and 200 ohm balance.

* All mounting plate connector assemblies, other than those indicated as being provided, are sold separately.

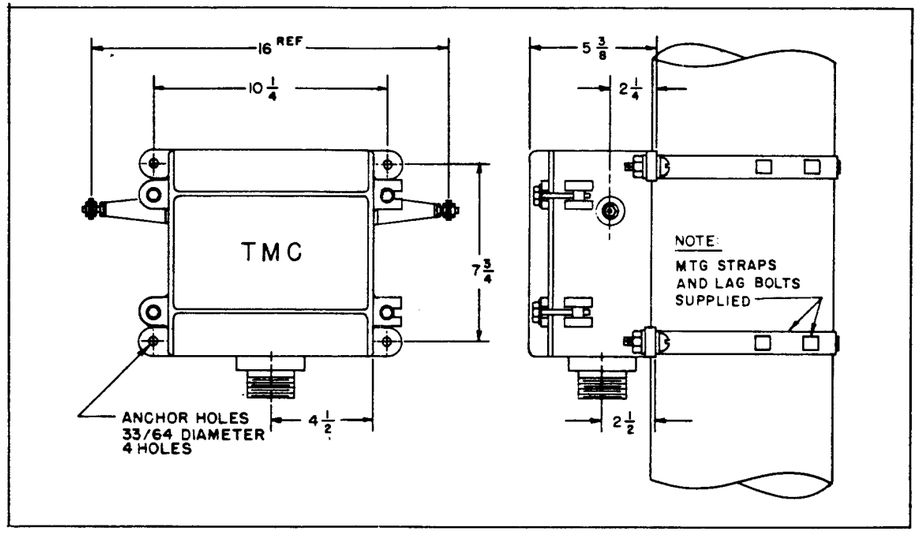
For companion RF antenna terminators/dissipators and dummy loads, refer to TB #8009.



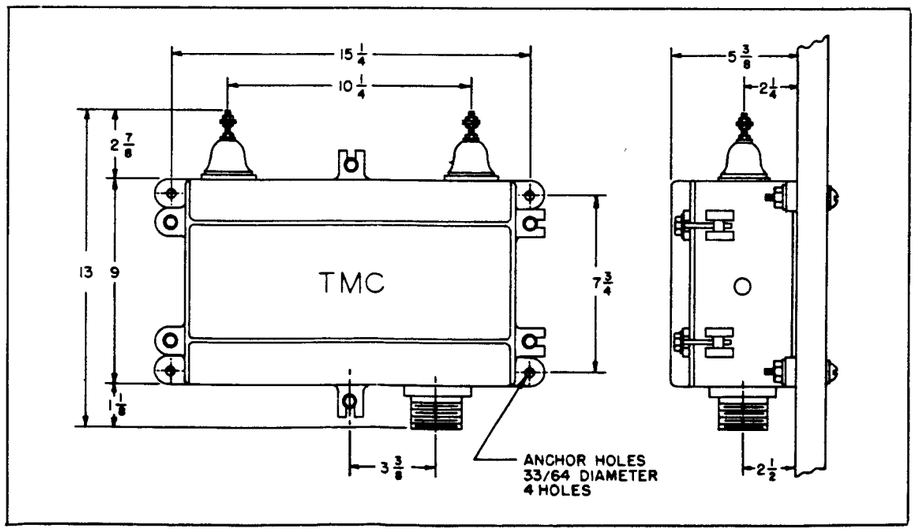
TYPICAL INPUT IMPEDANCE VS FREQUENCY CURVES, MODEL TRC-3500



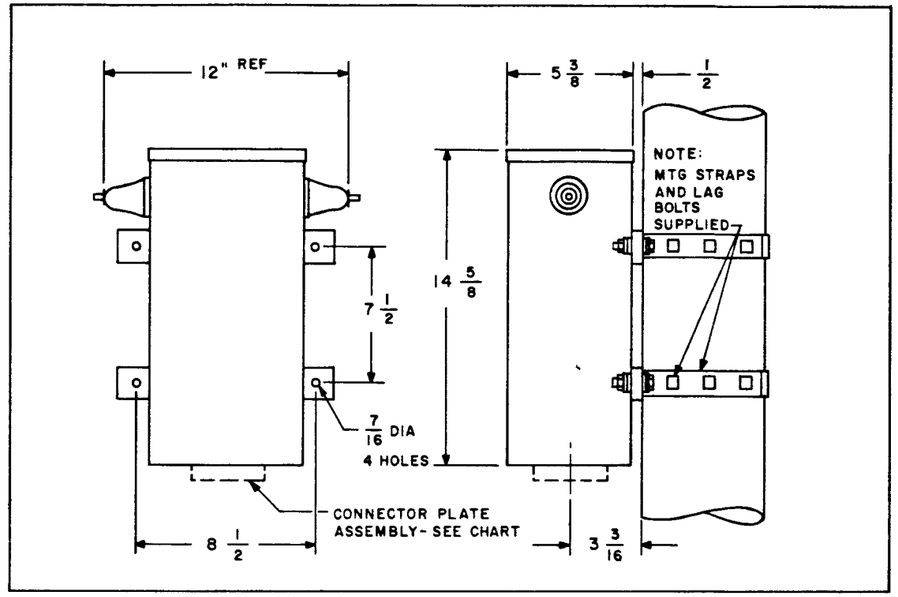
TYPICAL INPUT IMPEDANCE CHARACTERISTICS WHEN TRANSFORMER IS PROPERLY TERMINATED, IN A RESISTIVE LOAD.



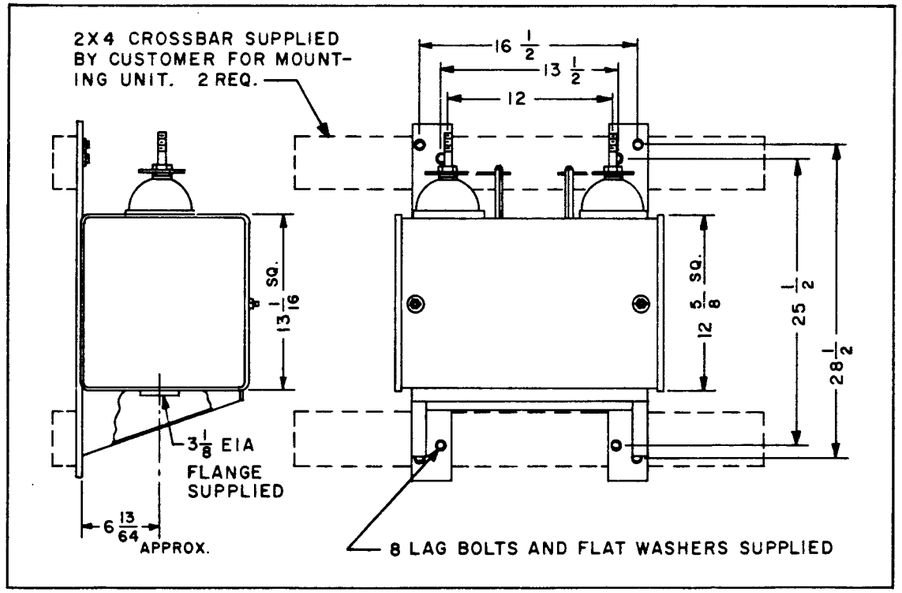
DIMENSIONAL OUTLINE AND MOUNTING, MODELS TRC-100, 500



DIMENSIONAL OUTLINE AND MOUNTING, MODEL TRC-3500



DIMENSIONAL OUTLINE AND MOUNTING, MODEL TRC-5K



DIMENSIONAL OUTLINE AND MOUNTING, MODEL TRC-20K

THE TECHNICAL MATERIEL CORP.

We reserve the right to make engineering changes.

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD • MAMARONECK, NEW YORK 10543

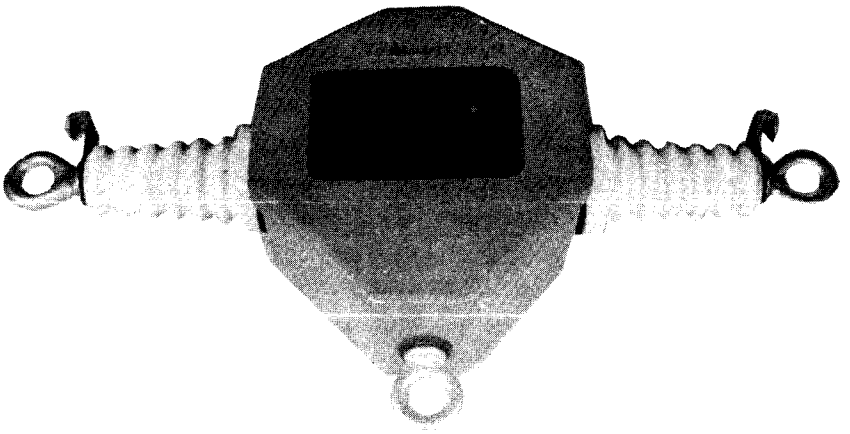
SPRINGFIELD, VIRGINIA • OTTAWA, CANADA • LUZERN, SWITZERLAND • TEMPE, ARIZONA

(914) 698-4800 • (613) 822-0244 • twx 710—566—1100 • telex 013—446

PRINTED IN U.S.A.

TECHNICAL BULLETIN 204-4413

- ***2-32 MHz***
- ***Built-in Lightning Protection***
- ***Weather resistant***
- ***Sealed fiberglass case***
- ***Stainless steel connector rings***
- ***2,000 pound tensile strength***



The Model DAC Antenna Coupler is an impedance matching device that provides a balanced connection for the center of a receiving dipole to a 50 or 70 ohm unbalanced coaxial transmission line. The transformer used in the DAC provides a flat response over a wide frequency range. However, because dipole antennas are constructed for finite frequencies, the impedance match from the antenna to the coaxial transmission line is dependent on the frequency for which the dipole is cut. The DAC couplers are suitable for single or fan dipole antenna systems.

Stainless steel connector rings are provided for the antenna connector and for messenger tie points. The entire unit is contained within a sealed fiberglass reinforced plastic case, and additional strength and weather resistance is provided by potting the transformer and connectors in a plastic compound. A built-in lightning arrestor prevents the accumulation of static charges which might otherwise injure associated equipment.

A tensile test of a sample DAC was conducted by a leading research laboratory to determine the amount of applied tensile stress needed to damage the sample. The sample successfully passed a tensile strain of 2,000 pounds between each of the antenna eye-bolts.

TECHNICAL SPECIFICATIONS

Transformer Frequency Response
Flat within +/-1.5 db throughout the frequency range of the model.

Equipment Case
Reinforced fiberglass plastic.

Input Terminals
Standard Ring-Type.

Impedance Match
Refer to CHART "A" below.

Size and Weight
12½" wide x 7¾" wide x 2¼" deep maximum including terminals.

Mounting
Pole mounting plate or connector rings.

CHART "A" **MODELS AVAILABLE**

Model	Balanced Input	Unbalanced Output	Frequency Range	Connector	TR-
DAC-1	70 ohms nom.	70 ohms nom.	2-32 MHz	N	030
DAC-2	300 ohms	70 ohm	2-32 MHz	N	119
DAC-4	200 ohms	70 ohms	2-32 MHz	BNC	068
DAC-5	70 ohms	70 ohms	2-32 MHz	UHF	030
DAC-6	70 ohms	50 ohms	2-30 MHz	N	120
*DAC-8	70 ohms	50 ohms	2-30 MHz	N	120
DAC-9	475 ohms	50 ohms	2-30 MHz	N	010
DAC-10				N	None
*DAC-13	200 ohms	50 ohms	2-30 MHz	N	039
DAC-14	200 ohms	50 ohms	2-30 MHz	UHF	091

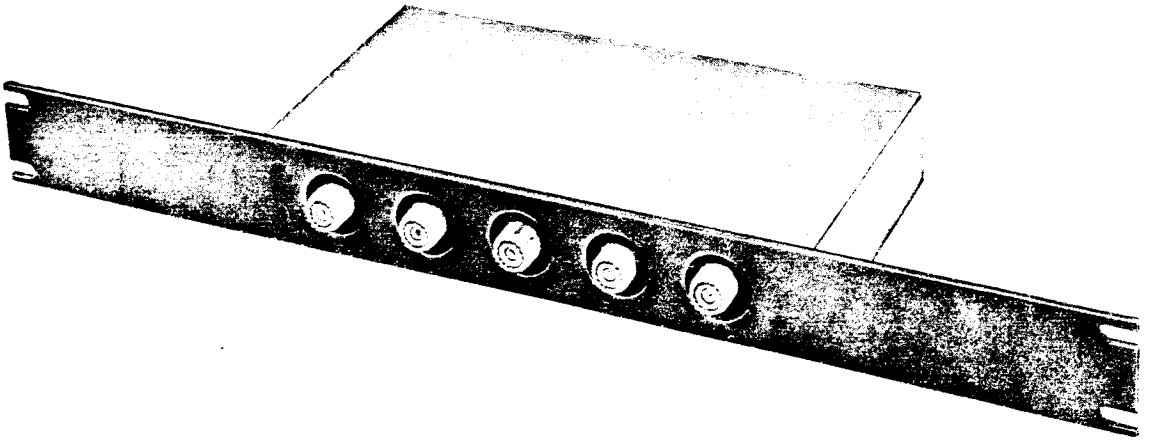
**with pole mounting plate and hardware in place of connector rings.*

Technical Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION
CABLE: TEPEI 700 FENIMORE ROAD, MAMARONECK, NY. 10543 U.S.A. TLX: 137-358
TEL: 914-698-4800 TWX: 710-566 1100

TECHNICAL BULLETIN NUMBER 8007

Antenna Distribution Units
Models HFD-1 & 2
LFD-1 & 2



- 15 kc to 2 mc — Model LFD
  2 to 30 mc — Model HFD
- Minimum interaction and insertion loss
- Specially designed broadband transformer
- Compact design
- Four receiver—single antenna operation

The Technical Materiel Corporation's Models HFD and LFD are passive antenna distribution units incorporating a special design broadband RF transformer that provides four receiver outputs from a single antenna input with minimum receiver interaction.

Models are available to provide coverage from 15 kc to 2 mcs and 2 mcs to 30 mcs with a wide variety of front and rear RF connections. For your convenience, a chart is included showing these variations.

The standard models are supplied for unbalanced input and output. Balanced input and output may be supplied on request.

TECHNICAL SPECIFICATIONS, TMC MODELS HFD AND LFD

FREQUENCY RANGE:	HFD-1 & 2 - 2 to 30 mcs. LFD-1 & 2 - 15 kc to 2 mcs.
FREQUENCY RESPONSE:	HFD-1 & 2 - Flat within ± 0.5 db LFD-1 & 2 - Flat within ± 2 db
INSERTION LOSS:	Approximately 1 db.
INPUT IMPEDANCE:	50 or 70 ohms unbalanced, nominal.
OUTPUT IMPEDANCE:	HFD-1 & 2 - 50 or 70 ohms unbalanced, nominal. LFD-1 & 2 - 50 or 70 ohms unbalanced, nominal.
RF CONNECTORS:	See chart.
MOUNTING:	Standard 19" rack mounting.
INSTALLATION DATA:	Models HFD-1 & 2, LFD-1 & 2. Weight: Approximately 2 lbs. Approximately 6 lbs., commercial packed. Size: 19" w × 1¾" h × 5½" d.
COMPONENTS AND CONSTRUCTION:	Equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.

ORDERING INFORMATION:

When ordering type of connector, prefix type of connector with model and design designation.

EXAMPLE:

HFD-2/BNC

FRONT OR REAR CONNECTION	TYPE OF CONNECTOR
1 (Rear Connection)	BNC C N
2 (Front Connection)	QDM QDS UHF

Synthesized LF/MF Exciter
Model LFE-2

Technical Bulletin 204-4118

- *200 mW, 10KHz to 2MHz*
- *Solid State*
- *Rapid Digital Frequency Selection*
- *CW, AM, SSB, ISB, FSK, FAX*
- *Compact Package*
- *Remote Control Capability*



The Model LFE( ) Synthesizer/Exciter is the low frequency counterpart of the Model MMX for higher frequencies. The LFE( ) covers all frequencies from 10 KHz to 1.9999 MHz in increments of 10 Hz. Like the MMX, it is simply necesasary to set the desired mode of operation and frequency. Adjustable output in the mode desired is then instantly available. This all mode exciter function is self-contained in only 5¼" of panel space.

Your attention is directed to the range of 10 to 30 KHz. Since the transmitted intelligence becomes a significant part of the output frequency, care must be exercised in the use of sideband in this portion of the overall frequency coverage. CW and FSK at suitable keying rates of course will always be satisfactory in this range.

Advanced circuitry innovations and printed circuit techniques have enabled TMC to provide ultra-stable operation under all environmental conditions. Solid state components assure dependable and stable performance over the long life of this equipment. The use of plug-in printed circuit cards facilitates maintenance. Special circuitry is incorporated to improve linearity, limit distortion and enable the associated transmitter to deliver a constant RF output level in all modes and under all conditions of operation.

TECHNICAL SPECIFICATIONS

OPERATING PARAMETERS

FREQUENCY RANGE		10KHz-1.9999MHz
FREQUENCY SELECTION		Direct synthesis in 10Hz steps Phase Jitter: Less than 5 degrees in two successive 10 msec. periods
FREQUENCY STABILITY		One part in 10^8 per day/15°C change
	Optional	One part in 10^9 per day/15°C change
FREQUENCY DISPLAY		Front-panel digital
MODES OF OPERATION		CW (A1)/AM (A3)/AME (A3H)/USB, LSB (A3A, A3J)/ISB (A3B)
	Optional	FSK (F1)/FAX (F4)
POWER OUTPUT		200 milli-watts PEP and Average (CW)
INPUT/OUTPUT IMPEDANCE		50 ohm (nominal) unbalanced, BNC-type connector
TUNING		Six front-panel rotary switches
REMOTE CONTROL	Optional	Interface circuits are available for remote monitoring and control of frequency, mode, carrier, RF level, mains power, and status of complete exciter system including antenna.

AUDIO PARAMETERS

AUDIO SIDEBAND RESPONSE		250-3040Hz, ± 1.5 db CCIR
	Optional	250-6080Hz, ± 1.5 db CCIR
EQUALIZED FILTERS	Optional	250-3040Hz; 1.5 db max. Envelope delay: Less than 500 uscc, 600-2900Hz Less than 150 usec for any 100Hz step, 500-3050Hz
AUDIO INPUT		1. Independent 600-ohm channels, balanced or unbalanced -20 to + 10 dbm; rear-apron terminals. 2. Built-in microphone pre-amplifier for low-level dynamic input; -55 db into 47 K-ohms; front-panel jack.
KEYINT INPUT		1. CW key jack on front panel; 200-baud and higher. 2. FSK: 75-baud or optional 200-baud and higher. Shift ± 42.5/85/170/425Hz; Others on request. Input 20/60 ma, 50 or 100 volts, dry contact ± to ground 3. FAX: + 1 to + 10VDC produces 800Hz linear shift.
	Note	Tone keyers are available for audio FSK operation (single or multi-tone)

TRANSMIT CHARACTERISTICS

UNWANTED SIDEBAND REJECTION	500Hz tone is minimum 60 db below PEP
SPURIOUS SIGNALS	Minimum 50 db below PEP
INTERMODULATION DISTORTION	Minimum 40 db below either tone of a two-tone test at rated PEP
RESIDUAL NOISE AND HUM	Minimum 70 db below PEP. Power supply ripple 55 db below PEP
CARRIER SUPPRESSION	Selectable at -6, -20, -30, -55 db (FULL); Others values on request

ENVIRONMENTAL AND INSTALLATION

COOLING	Convection.
ACOUSTIC NOISE	Less than 70 db above reference level of 10^{-16}w/cm² at 3.25 feet from cabinet (average conversation) when installed to TMC spec.
OPERATING CONDITIONS	0 to + 50°C; up to 90% relative humidity at MSL
STORAGE CONDITIONS	-30°C to + 80°C; up to 95% relative humidity at MSL
POWER SUPPLY	Totally solid-state. 115 or 230 volts AC ± 10%, 50/60/400Hz, single-phase
SIZE AND WEIGHT	5.25" (13.4 cm) high x 19" (48.3 cm) wide x 20" (50.8 cm) deep 36 pounds/16.4 kg installed
SHIPPING DATA	Commercial packing for domestic U.S. (air) shipment. One (1) container — 10" x 30" x 30" Total weight/cube — 58 pounds/5.2 cu. ft.

Technical Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

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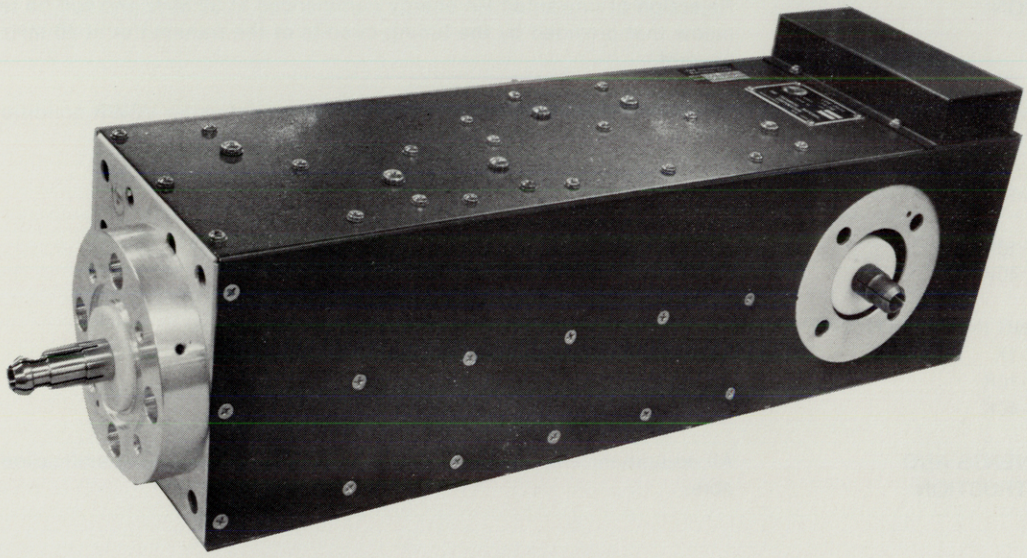
Low Pass H.F. Filter
Model LPF

TECHNICAL BULLETIN 204-4311



- ***2-30 mcs (MHz) Applications***
- ***Standard RF Fittings***
- ***Ease of Installation***
- ***Low Insertion Loss***
- ***Minimizes Harmonic Interference***
- ***Compact Design***
- ***CCIR & FCC Specified Installations***

The Low Pass RF Filters Series LPF are designed to drastically reduce radiation above 32 MHz from MF/HF high power transmitters. Such a drastic reduction is essential in order to minimize harmonic interference to radio receivers used in mobile and fixed station communications including fire, police, security, television and other services.

The use of low pass RF filters is often mandatory and always most desirable with fixed station transmiters, mobile transmitters, and with shipboard and other mobile high density electronic equipment environments in general. Often such filters will be required to meet applicable CCIR or FCC installation criteria. These requirements stem from the fact that the increased use of electronic communication, detection and data systems demands that every possible measure be employed to reduce unwanted radiation to an absolute minimum. The frequency spectrum above 32 MHz is employed for important low-power services which are particularly susceptible to unwanted harmonics which may be radiated by high power MF/HF transmitters operating below 30 MHz. Although the design of current TMC transmitters in particular takes the foregoing factors into account, it is possible to reduce unwanted emissions even further by using the Series LPF low pass filters.

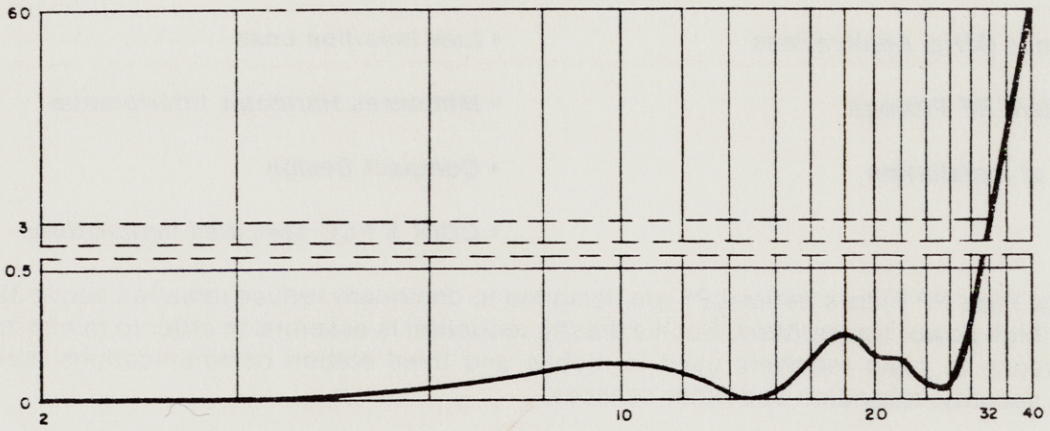
The filters are provided with standard RF fittings for quick installation, and are so fabricated as to assure that they will continue to handle their rated power under VSWR conditions of up to 2.5:1.

Filters available are designed for 1, 10 and 40 kw peak power applications and the models in this series are designated accordingly LPF-1K, 10K and 40K.

TECHNICAL SPECIFICATIONS
TMC MODEL LPF

INSERTION LOSS:	Nominally less than 0.25 db (See chart below).
PASS BAND:	2-30 MHz.
FREQUENCY CUTOFF:	32 MHz nominal.
REJECTION:	Rejection of unwanted RF energy commences at 32 MHz and will be reduced at least 60 db below that provided by the tuning circuits of the transmitter at 40 MHz (± 1 MHz) and beyond.
INPUT AND OUTPUT IMPEDANCE:	50 ohm nominal. Unit will operate at rated power under VSWR conditions up to 2.5:1.
INSTALLATION INFORMATION:	
1. LPF-1K	Size: 2½" x 2½" x 15" mounted on 3½" x 19" panel, Weight: 8 lbs.
2. LPF-10K	Size: 18" x 5" x 5", Weight: 19 lbs.
3. LPF-40K	Size: 23" x 7" x 10", Weight: 27 lbs.
ORDERING INFORMATION:	
1. LPF-1K	1 kw unit provided with standard N type RF fittings.
2. LPF-10K	10 kw unit with 1⅝" EIA flange.
3. LPF-40K	40 kw units have 3⅛" EIA flange.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

TYPICAL FREQUENCY RESPONSE



Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

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TEL: 914-698-4800 TWX: 710-566-1100

TMC (CANADA) LIMITED **TMC INTERNATIONAL**
RR No. 5, Ottawa K1G 3N3 Ontario CANADA
TEL. 613-521-2050 TLX: 053-4146

H.F. MULTI-ANTENNA COUPLER
Model MAC-1

TECHNICAL BULLETIN 204-4418

- ***Eight antenna inputs***
- ***Completely solid state***
- ***Broad frequency range***
- ***Wide dynamic range***
- ***Minimum noise level***



The Eight Input Multi-antenna Coupler, Model MAC-1 is a broadband coupling unit, used for coupling from one to eight antennas to a single receiver. The coupler will provide a nominal 2db gain from any antenna to the receiver, with a wide dynamic range and low noise characteristic over the frequency range from 2MHz to 32MHz. The equipment has been designed to provide excellent isolation from antenna to antenna and from the receiver to each antenna. The Multi-antenna Coupler is a solid state, transistor-type design.

It is particularly useful in multiple directional antenna installations where it is necessary to guard or monitor certain specified frequencies on a omni-directional basis. When a signal is heard on the monitor receiver, the operator may then switch the input of the operational receiver from the combined output of the MAC-1 to the most effective directional antenna and establish contact with the distant station.

TECHNICAL SPECIFICATIONS
MAC-1

OPERATING PARAMETERS	
FREQUENCY RANGE	2MHz to 30 MHZ
NUMBER OF INPUTS	E i g h t
INPUT/OUTPUT IMPEDANCE	75 ohms unbalanced. BNC-type connector.
GAIN	2 db throughout operating frequency range.
FREQUENCY RESPONSE	± 0.5 db
NOISE FIGURE	Less than 7 db
ISOLATION	
INPUT TO INPUT	Better than 40 db attenuation
OUTPUT TO OUTPUT	Better than 55 db attenuation
PHASE CORRELATION BETWEEN INPUTS	± 2 degrees maximum between inputs
DESENSITIZATION	A 3.5 volt peak signal, 10% removed in frequency, will reduce a 100 microvolt signal less than 3 db.
INTERMODULATION DISTORTION	Second order distortion products are at least 60 db below the level of either signal of a standard two-signal input test where each signal is measured across the input and is 0.5 volt RMS. Third order products are at least 65 db down.
VSWR	
INPUT	Better than 1.5 to 1
OUTPUT	Better than 1.5 to 1
ENVIRONMENTAL AND INSTALLATION	
COOLING	Convection.
OPERATING CONDITIONS	0° to 50°C. Up to 90% relative humidity at MSL.
STORAGE CONDITIONS	-30° to + 75°C. Up to 90% relative humidity at MSL.
PRIMARY POWER	115 volts A.C. ± 10%, 47Hz to 400Hz, single phase, 30 watts.
SIZE AND WEIGHT	3.5" (8.9cm) high x 19" (48.25cm) wide x 17.5" (44.4cm) deep 15 pounds/6.8 Kg installed.
SHIPPING DATA	Commercial packing for U.S. shipment. Special packing available at additional cost. One (1) container — 6" x 24" x 18". Weight/cube — 25 lbs./1.5 cu. ft.
LOOSE ITEMS	Technical manual (2) and mating RF/signal connectors.

ACCESSORY PRODUCTS are described in sections 4-9 of the General Catalog and include RF/antenna, terminal, data, connector and power equipment. **TECHNICAL SERVICES** in design, engineering, training, and related areas are described in section 10. **OPTIONS** are listed after each TMC product in part A of the Price List.

Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

CABLE: TEPEI TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

TMC (CANADA) LIMITED **TMC INTERNATIONAL**

RR NO. 5, OTTAWA, K1G 3N3, ONTARIO, CANADA

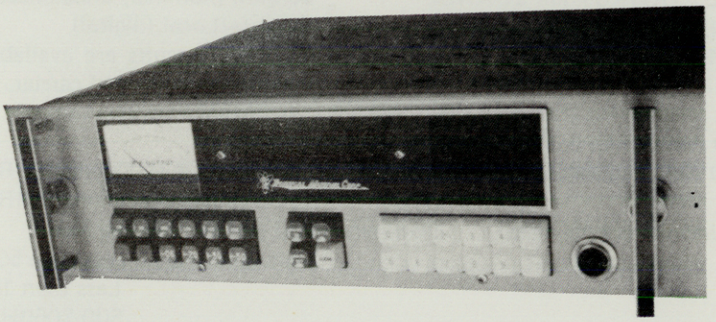
TEL.: 613-521-2050 TLX: 053-4146

SYNTHESIZED H.F. EXCITER
Model MMX-4

TECHNICAL BULLETIN 204-4119

13,644

* *1 Watt, 2-30 MHz*
* *CW, AM, SSB, ISB, FSK, FAX*
* *Remote Control Capability with RS-232 Interface*
* *Milli-second Frequency and Mode Selection*



The TMC Model MMX-4 Series, Two Channel Independent Sideband Exciter is a compact all solid state unit designed particularly to accommodate the high capacity, multi-channel voice, teletype, data requirements of critical commercial or government point-to-point and tactical circuits. It is readily adaptable however to the less sophisticated single channel CW, USB, LSB or ISB requirements of back-up or other circuits where frequency allocations or operational needs dictate.

The small size, versatility and operational simplicity of this Exciter make it especially suitable for transportable applications. Radio operators will immediately appreciate the ease of operation. Output frequencies are easily set up without any calculation, and are displayed clearly in digital form. No tuning or peaking is required.

Advanced circuitry innovations and printed circuit techniques have enabled TMC to provide ultra-stable operation under all environmental conditions. Solid state components assure dependable and stable performance over the long life of this equipment. The use of plug-in circuit cards facilitates maintenance. Special circuitry is incorporated to improve linearity, limit distortion and enable the associated transmitter to deliver a constant RF output level in all modes and under all conditions of operation.

All frequencies are derived from a 1 MHz source, without the use of phase locked oscillators, making the MMX-4 a truly synthesized exciter. There are no relays or electro-mechanical components other than the front panel controls. All of these features combine to make the MMX-4 an extremely reliable synthesized exciter.

TECHNICAL SPECIFICATIONS

OPERATING PARAMETERS

FREQUENCY RANGE		2-29.9999MHz
	Optional	1.6-29.9999MHz
FREQUENCY SELECTION		Direct synthesis in 100Hz steps Phase Jitter: Less than 5 degrees in two successive 10 msec. periods
FREQUENCY STABILITY		One part in 10^8 per day/15°C change
	Optional	One part in 10^9 per day/15°C change
FREQUENCY DISPLAY		Front-panel digital
MODES OF OPERATION		CW (A1)/AM (A3)/AME (A3H)/UBS, LSB (A3A, A3J)/ISB (A3B)
	Optional	FSK (F1)/FAX (F4) (Special options AFSK, MCW)
POWER OUTPUT		1W PEP and Average (CW)
INPUT/OUTPUT IMPEDANCE		50 ohm (nominal) unbalanced, BNC-type connector
TUNING		Remote/Local (digital)
REMOTE CONTROL	Optional	Interface circuits are available for remote monitoring and control of frequency, mode and carrier.

AUDIO PARAMETERS

AUDIO SIDEBAND RESPONSE		250-3040Hz, +/- 1.5 db CCIR
	Optional	250-6080Hz, +/- 1.5 db CCIR
EQUALIZED FILTERS	Optional	250-3040Hz: 1.5 db max. Envelope delay: Less than 500 usec, 600-2900Hz Less than 150 usec for any 100 Hz step, 500-3050Hz
AUDIO INPUT		1. Independent 600-ohm channels, balanced or unbalanced -20 to + 10 dbm; rear-apron terminals. 2. Built-in microphone pre-amplifier for low-level dynamic input; -55 db into 47 K-ohms; front-panel jack.
KEYING INPUT		1. CW key jack on front panel; 200-baud; dry contact 2. FSK: 75-baud or optional 200-baud and higher. Shift +/- 42.5/85/170/425Hz; Others on request. Input Neutral or Polar 20/60 ma, 50 or 100 volts and dry contact keying. 3. FAX: + 1 to + 10VDC produces 800 Hz linear shift. Tone keyers are available for audio FSK operation (single or multi-tone)

TRANSMIT CHARACTERISTICS

UNWANTED SIDEBAND REJECTION	500Hz tone is minimum 60 db below PEP
SPURIOUS SIGNALS	Nominal 60 db below PEP
INTERMODULATION DISTORTION	Minimum 40 db below either tone of a two-tone test at 100 mw PEP
RESIDUAL NOISE AND HUM	Minimum 70 db below PEP. Power supply ripple 55 db below PEP
CARRIER SUPPRESSION	Selectable at -6, -20, -30, -55 db (FULL); Others values on request

ENVIRONMENTAL AND INSTALLATION

COOLING	Convection.
OPERATING CONDITIONS	0 to + 50°C; up to 90% relative humidity at MSL
STORAGE CONDITIONS	-30°C to + 80°C; up to 95% humidity at MSL
POWER SUPPLY	Totally solid-state. 115 or 230 volts AC +/- 10%, 50/60/400Hz, single-phase
SIZE AND WEIGHT	5.25" (13.4 cm) high x 19" (48.3 cm) wide x 20" (50.8 cm) deep 30 pounds/(13.66 kg)
SHIPPING DATA	Commercial packing for domestic U.S. (air) shipment. One (1) container – 10" x 30" x 30" Total weight – 58 pounds (26.36 kg) Total cube – 5.2 cu. ft. (.15 cu. meters)

Technical Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

Synthesized HF Exciter
Model MMX-2

TECHNICAL BULLETIN 204-4115

- ***200 mW, 2-30 MHz***
- ***Solid State***
- ***Rapid Digital Frequency Selection***
- ***CW, AM, SSB, ISB, FSK, FAX***
- ***Compact Package***
- ***Remote Control Capability***



The TMC Model MMX-2 Series, Two Channel Independent Sideband Exciter is a compact all solid state unit designed particularly to accommodate the high capacity, multi-channel voice, teletype, data and FAX requirements of critical commercial and government point-to-point and tactical circuits. It is readily adaptable however to the less sophisticated single channel CW, USB or LSB requirements of back-up or other circuits where frequency allocations or operational needs dictate.

The small size, versatility and operational simplicity of this Exciter make it especially suitable for transportable applications. Radio operators will immediately appreciate the ease of operation. Output frequencies are easily set up without any calculation, and are displayed clearly in digital form. No tuning or peaking is required.

Advanced circuitry innovations and printed circuit techniques have enabled TMC to provide ultra-stable operation under all environmental conditions. Solid state components assure dependable and stable performance over the long life of this equipment. The use of plug-in circuit cards facilitates maintenance. Special circuitry is incorporated to improve linearity, limit distortion and enable the associated transmitter to deliver a constant RF output level in all modes and under all conditions of operation.

The MMX-2 Exciter is currently being procured by Government agencies for the purpose of upgrading their existing unsynthesized transmitter installations. It has been assigned military nomenclature designations MD-946/UR and O-1706/TSC-25 and is also available on GSA Contract No. GS-00-86443. In addition, all of its components and plug-in modules are fully identified with national stock numbers and are supported in the Defense Electronics Supply system.

TECHNICAL SPECIFICATIONS

OPERATING PARAMETERS

FREQUENCY RANGE		2-29.9999MHz
	Optional	1.6-29.9999MHz
FREQUENCY SELECTION		Direct synthesis in 100Hz steps Phase Jitter: Less than 5 degrees in two successive 10 msec. periods
FREQUENCY STABILITY		One part in 10^8 per day/15°C change
	Optional	One part in 10^9 per day/15°C change
FREQUENCY DISPLAY		Front-panel digital
MODES OF OPERATION		CW (A1)/AM (A3)/AME (A3H)/UBS, LSB (A3A, A3J)/ISB (A3B)
	Optional	FSK (F1)/FAX (F4)
POWER OUTPUT		100 milli-watts PEP and Average (CW)
INPUT/OUTPUT IMPEDANCE		50 ohm (nominal) unbalanced, BNC-type connector
TUNING		Six front-panel rotary switches
REMOTE CONTROL	Optional	Interface circuits are available for remote monitoring and control of frequency, mode, carrier, RF level, main power, and status of complete exciter system including antenna.

AUDIO PARAMETERS

AUDIO SIDEBAND RESPONSE		250-3040Hz, ± 1.5 db CCIR
	Optional	250-6080Hz, ± 1.5 db CCIR
EQUALIZED FILTERS	Optional	250-3040Hz; 1.5 db max. Envelope delay: Less than 500 uscc, 600-2900Hz Less than 150 usec for any 100 Hz step, 500-3050Hz
AUDIO INPUT		1. Independent 600-ohm channels, balanced or unbalanced -20 to + 10 dbm; rear-apron terminals. 2. Built-in microphone pre-amplifier for low-level dynamic input; -55 db into 47 K-ohms; front-panel jack.
KEYINT INPUT		1. CW key jack on front panel; 200-baud; dry contact 2. FSK: 75-baud or optional 200-baud and higher. Shift ± 42.5/85/170/425Hz; Others on request. Input 20/60 ma, 50 or 100 volts, dry contact ± to ground 3. FAX: + 1 to + 10VDC produces 800 Hz linear shift.
	Note	Tone keyers are available for audio FSK operation (single or multi-tone)

TRANSMIT CHARACTERISTICS

UNWANTED SIDEBAND REJECTION	500Hz tone is minimum 60 db below PEP
SPURIOUS SIGNALS	Minimum 60 db below PEP
INTERMODULATION DISTORTION	Minimum 40 db below either tone of a two-tone test at rated PEP
RESIDUAL NOISE AND HUM	Minimum 70 db below PEP. Power supply ripple 55 db below PEP
CARRIER SUPPRESSION	Selectable at -6, -20, -30, -55 db (FULL); Others values on request

ENVIRONMENTAL AND INSTALLATION

COOLING	Convection.
ACOUSTIC NOISE	Less than 70 db above reference level of 10^{-16}w/cm² at 3.25 feet from cabinet (average conversation) when installed to TMC spec.
OPERATING CONDITIONS	0 to + 50°C; up to 90% relative humidity at MSL
STORAGE CONDITIONS	-30°C to + 80°C; up to 95% humidity at MSL
POWER SUPPLY	Totally solid-state. 115 or 230 volts AC ± 10%, 50/60/400Hz, single-phase
SIZE AND WEIGHT	5.25" (13.4 cm) high x 19" (48.3 cm) wide x 20" (50.8 cm) deep 36 pounds/16.4 kg installed
SHIPPING DATA	Commercial packing for domestic U.S. (air) shipment. One (1) container — 10" x 30" x 30" Total weight/cube — 58 pounds/5.2 cu. ft.

Technical Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

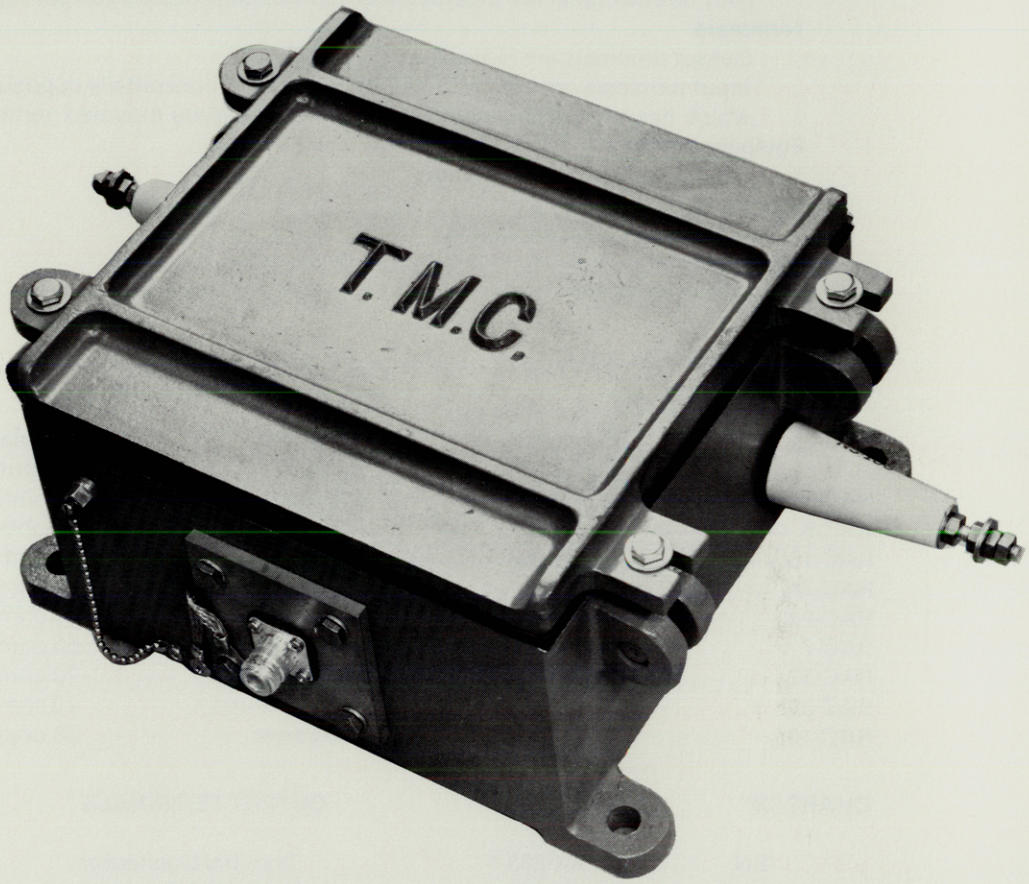
CABLE: TEPEI 700 FENIMORE ROAD, MAMARONECK, NY. 10543 U.S.A. TLX: 137-358

TEL: 914-698-4800 TWX: 710-566-1100

Rhombic Antenna Coupler Model RAC

TECHNICAL BULLETIN 204-4513

- *2-30 MHz*
- *Flat Response*
- *Lightning Protection*
- *Rugged Weatherproof Case*
- *Adapts to any Coax Cable*



TMC Models RAC are a series of passive receiving rhombic antenna couplers designed to provide optimum impedance matching over a wide range of frequencies between rhombic antennas and coaxial transmisson lines to radio receivers.

Models RAC contain linear broadband matching transformers enclosed in weatherproof cast aluminum cases for outdoor installation. The broadband transformers vary in design to provide a wide variety of impedance matching applications. The unique design of Models RAC permit continuity checking of the complete antenna system at the coaxial termination at the receiving site. The flat response of the transformers in Models RAC minimizes cross-modulation and permits reception of any type of signal within the unit's frequency range.

A complete set of hardware is provided to mount Model RACs on a pole or other vertical surfaces and an internal spark gap provides protection against lightning or static charges from the antenna or transmission line.

TMC Models RTB, Rhombic Terminal Units, described in Technical Bulletin 204-4317, complement Models RAC by providing proper and correct termination to Rhombic and Sloping Vee antennas for best antenna efficiency.

TECHNICAL SPECIFICATIONS

Frequency Range
As indicated in CHART "A"

Frequency Response
Maximum deviation ± 1.5 db

Impedance Matching
Refer to CHART "A" below

Lightning Protection
RAC-1 through RAC-24 are provided with air gap lightning protection.
RAC-30 and higher are provided with hermetically sealed gas gap lightning protection and plug-in fuses.

Terminals
Output terminals are indicated on CHART "B"
Input terminals are ceramic insulators mounted horizontally opposite (see photo) except for Model RAC 7A which has two parallel ceramic feed thru insulators mounted vertically with 6" spacing, center to center.

Equipment Case
Weatherproof cast aluminum

Mounting
Four heavy-duty cast flanges

Weight
Maximum 12 lbs.

CHART "A" — MODELS AVAILABLE

Models	Frequency Range	Balanced Input	Unbalanced Output	Transformer TR-
RAC-11	2-30 MHz	300 ohms nom.	50 ohms nom.	012
RAC-9	2-30 MHz	500 ohms	50 ohms	034
RAC-13	2-30 MHz	500 ohms	70 ohms	168
RAC-7A	2-32 MHz	600 ohms	70 ohms	069
RAC-24	2-32 MHz	600 ohms	50 ohms	032
RAC-7	2-32 MHz	600/200 ohms	50 ohms	090
RAC-32	2-32 MHz	600/200 ohms	70 ohms	132
RAC-30	2-32 MHz	700/200 ohms	70 ohms	130
RAC-12	2-30 MHz	800 ohms	50 ohms	112

CHART "B" — OUTPUT TERMINALS

/BN	AX-283-1	Type BN Connector
/BNC	AX-284-1	Type BNC Connector
/C	AX-286-1	Type C Connector
/HN	AX-285-1	Type HN Connector
/LC5	AX-287-1	Type LC Connector, 50 ohm
/LC7	AX-287-5	Type LC Connector, 70 ohm
/N	AX-259-1	Type N Connector
/QDL	AX-273-1	Type QDL Connector
/QDS	AX-289-1	Type QDS Connector
/UHF	AX-281-1	Type UHF Connector
/UHFT	AX-282-1	Type UHF Twin Connector
/UHFL	AX-256-1	Type UHF(L) Connector
/ALC5	AX-276-1	3⅛" Adapter Assembly, 50 ohm to LC female
/ALC7	AX-277-1	3⅛" Adapter Assembly, 70 ohm to LC female
/ES5	ES-ST5875	⅞" styroflex end seal, 50 ohm
/ES7	ES-ST7875	⅞" styroflex end seal, 70 ohm
/RG8	AX-274-1	Flange for RG-85/U Coaxial Cable

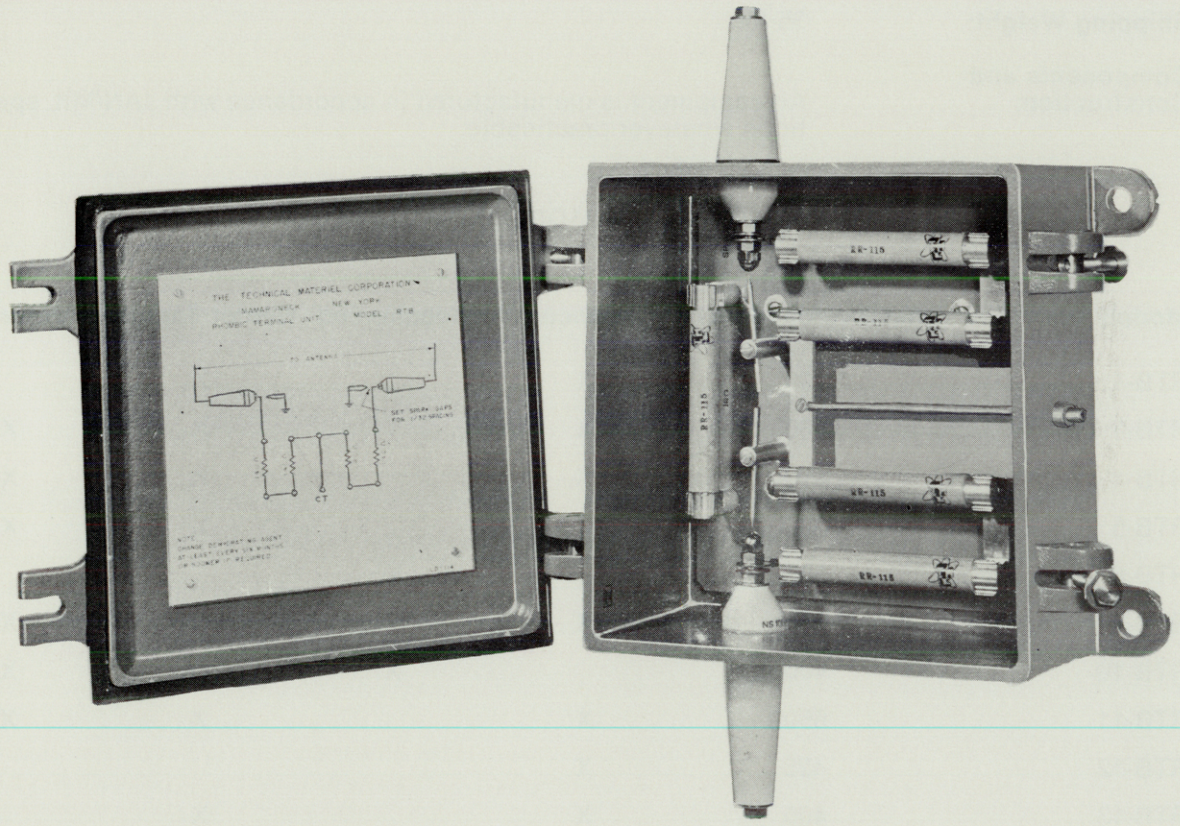
Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION
CABLE: TEPEI 700 FENIMORE ROAD, MAMARONECK, NY. 10543 U.S.A. TLX: 137-358
TEL: 914-698-4800 TWX: 710-566-1100

RHOMBIC TERMINATING UNIT
Model RTB

TECHNICAL BULLETIN 204-4317

- ***DC to 30MHz***
- ***Lightning Protection***
- ***Rugged Weatherproof Case***



The Model RTB Rhombic Terminal Units contain rugged and stable resistive terminations for rhombic and sloping Vee antennas to increase their efficiency. They complement TMC's balanced to unbalanced receiving antenna couplers that are described in Technical Bulletin 204-4513.

Each model RTB contain non-inductive resistors mounted in weatherproof cast aluminum cases that feature an internal spark gap for protection against lightning and static charges. The resistors are plug-in Ferrule type, for ease of replacement, and a spare resistor is provided within the case. Uniform antenna characteristics are easier to maintain when Models RTB are used as the termination resistor due to freedom from rain, dust, snow, and soot accumulation. This latter factor also minimizes antenna maintenance problems.

A complete set of hardware is provided to mount Model RTBs on a pole or other vertical surfaces.

TECHNICAL SPECIFICATIONS

Termination Resistance:	As indicated in Chart "A".
Equipment Case:	Weatherproof, cast aluminum alloy.
Input Terminals:	Two ceramic insulators properly spaced to accommodate a rhombic antenna or one ceramic insulator for a sloping Vee antenna.
Ground Connection:	A ground connection is provided on the bottom of the case.
Mounting:	Pole mounting by means of four heavy cast mounting flanges. Four 1/2" dia. holes on 7-3/4" x 10-1/4" mounting centers.
Dimensions:	9" x 9" x 5".
Weight:	18 lbs.
Shipping Weight:	35 lbs.
Components and Construction:	All equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.

CHART "A" — MODELS AVAILABLE

Models	Terminating Resistance (ohms)	Balanced	Unbalanced	Center Tapped	Grounded
RTB-1	700	X		X	
RTB-3	280	X		X	X
RTB-4	700	X		X	X
RTB-5	600	X		X	X
RTB-6	500		X		
RTB-9	650	X		X	X
RTB-10	400		X		X
RTB-11	650	X		X	X
RTB-12	425	X			
RTB-13	400	X		X	

NOTE: RTB-11 is grounded through 280 ohms.

Specifications Are Subject to Change Without Notice.

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.

CABLE: TEPEI TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

TMC (CANADA) LIMITED **TMC INTERNATIONAL**

RR NO. 5, OTTAWA, K1G 3N3, ONTARIO, CANADA

TEL.: 613-521-2050 TLX: 053-4146

Four Channel Synthesized Exciter Model SBG-4

TECHNICAL BULLETIN 204-4112

- ***100 mW, 2-30MHz***
- ***Solid State***
- ***Rapid Digital Frequency selection***
- ***Independent Channel squelch and VOX operation***
- ***Individual channel A.L.C.***
- ***Remote control capability***



The TMC Model SBG-4 Series, Four Channel Independent Sideband Exciter is a compact all solid state unit designed particularly to accommodate the high capacity, multi-channel voice, teletype, data and FAX requirements of critical commercial and government point-to-point and tactical circuits. It is readily adaptable however to the less sophisticated single channel CW, USB or LSB requirements of back-up or other circuits where frequency allocations or operational needs dictate.

The small size, versatility and operational simplicity of this Exciter make it especially suitable for transportable applications. Radio operators will immediately appreciate the ease of operation. Output frequencies are easily set up without any calculation, and are displayed clearly in digital form. No tuning or peaking is required.

By the use of the Model SBG-4 Series Exciter, four separate and discrete voice-frequency channels may be transmitted simultaneously by a single transmitter.

Idle Channel Squelch and VOX control are particularly valuable for intermittent channel usage, to preclude idle channel noise transmission, by the transmitter, when a channel is not in use. VOX reactivation of the idle channel is automatic and virtually instantaneous whenever the idle channel is activated. When all four voice-frequency channels are inactive for a preset period of time, an Exciter Standby circuit can be activated to place an entire transmitter in the Standby condition pending reactivation of a channel. The Idle Channel Squelch feature is particularly valuable with modern transmitters having an automatic power output level control, isasmuch as the total average transmitter output power remains the same whenever channels are inactivated, thus increasing the output power per activated channel. The SBG-4 Series Exciter has an ALDC input which can be employed with an associated linear amplifier to maintain constant drive level and prevent over-modulation of the amplifier during input level changes.

TECHNICAL SPECIFICATIONS

OPERATING PARAMETERS		
FREQUENCY RANGE		2-29.9999MHz
	Optional	1.6-29.9999MHz
FREQUENCY SELECTION		Direct synthesis in 100Hz steps
FREQUENCY STABILITY		One part in 10^8 per day/15°C change
	Optional	One part in 10^9 per day/15°C change
FREQUENCY DISPLAY		Front-panel digital
MODES OF OPERATION		CW (A1)/AME (A3H)/USB, LSB (A3A, A3J)/2ISB (A3B)
	Optional	3ISB or 4ISB (A9B)
POWER OUTPUT		100 milli-watts PEP and Average (CW)
INPUT/OUTPUT IMPEDANCE		50-ohm (nominal) unbalanced. BNC-type connector
TUNING		Six front-panel rotary switches
REMOTE CONTROL	Optional	Interface circuits are available for remote monitoring and control of frequency, mode, carrier, RF level, mains power, and status of complete exciter system including antenna.
AUDIO PARAMETERS		
AUDIO SIDEBAND RESPONSE		250-3040Hz, ± 1.5 db CCIR; Other filters on request.
EQUALIZED FILTERS	Optional	250-3040Hz; 1.5 db max; Other filters on request.
		Phase Jitter: Less than 5 degrees in two successive 10 msec. periods
	Optional	Envelope delay: Less than 500 usec, 600-2900Hz
		Less than 150 usec for any 100 Hz step, 500-3050Hz
SUB-CARRIER FREQUENCY		± 6290 Hz from Carrier Frequency, snythesized
	Optional	± 6250 Hz (CCIR)
AUDIO INPUT		1. Independent 600-ohm channels, balanced or unbalanced
		-20 to + 10 dbm; rear-apron terminals
KEYING INPUT		1. CW key jack on front panel; 200-baud; dry contact
	Note	Tone keyers are available for audio FSK operation (single or multi-tone)
TRANSMIT CHARACTERISTICS		
UNWANTED SIDEBAND REJECTION		500Hz tone is minimum 60 db below PEP
SPURIOUS SIGNALS		Minimum 60 db below PEP
INTERMODULATION DISTORTION		Minimum 40 db below either tone of a two-tone test at rated PEP
RESIDUAL NOISE AND HUM		Minimum 70 db below PEP. Power supply ripple 55 db below PEP
CARRIER SUPPRESSION		Selectable at -6, -20, -30, -55 db (FULL); Other values on request
ENVIRONMENTAL AND INSTALLATIONS		
COOLING		Convection.
ACOUSTIC NOISE		Less than 70 db above reference level of 10^{-16} w/cm² at 3.25 feet. from cabinet (average conversation) when installed to TMC spec.
OPERATING CONDITIONS		0 to ± 50°; up to 90% relative humidity at MSL
STORAGE CONDITIONS		-30° to + 80°C; up to 95% relative humidity at MSL
POWER SUPPLY		Totally solid-state. 115 or 230 volts AC + 10%, 50/60/400Hz, single-phase
SIZE AND WEIGHT		12.25" (31.1 cm) high x 19" (48.3 cm) wide x 20" (50.8 cm) deep 64 pounds/29.1 kg installed.
SHIPPING DATA		Commercial packing for domestic U.S. (air) shipment. One (1) container — 18" x 30" x 30" Total weight/cube — 104 pounds/9.4 cu. ft.

Specifications Are Subject to Change Without Notice

THE TECHNICAL MATERIEL CORPORATION

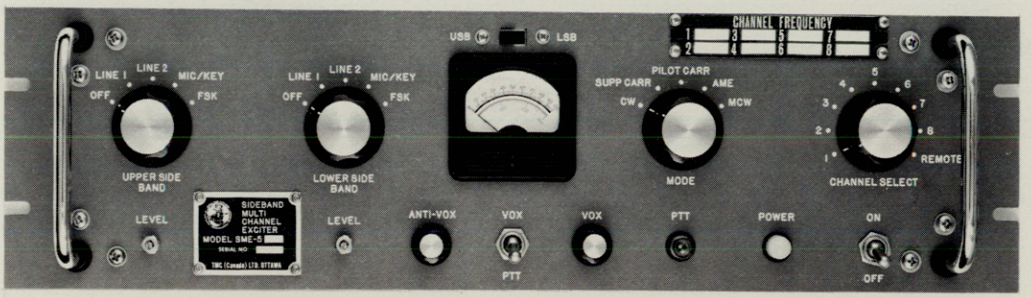
CABLE: TEPEI 700 FENIMORE ROAD, MAMARONECK, NY. 10543 U.S.A. TLX: 137-358
TEL: 914-698-4800 TWX: 710-566-1100

TMC (CANADA) LIMITED **TMC INTERNATIONAL**
RR No. 5, Ottawa K1G 3N3 Ontario CANADA
TEL. 613-521-2050 TLX: 053-4146

TECHNICAL BULLETIN 2030B–2
[Supersedes 102033]

MULTI–CHANNEL SIDEBAND EXCITER

SME-5



The SME-5 is a fully transistorized, eight channel ISB exciter with a frequency range of 2 to 30 MHz. It provides up to 100 milliwatts PEP output as drive power for an associated linear amplifier. Capable of operating in all modes normally encountered in this range, it is particularly useful as a single sideband device for voice, teletype, facsimilie or other type of communication.

The Model SME-5 is designed to accept a variety of audio inputs from two 600-ohm lines; a carbon microphone; a high impedance microphone; a low impedance microphone; and a telegraph key. Two independent audio inputs may be provided for simultaneous transmission in each of two sidebands. Voice operated relay (VOX) operation is available on special order.

Full front panel control facilities are available for channel selection; upper and lower sideband operation; PTT operation; and operating mode selection. A meter is also provided with a selector switch for measuring the operating levels of critical circuits. The exciter may be automated for remote selection of channel, mode and sideband operation. When used in this manner, information on band may be supplied an automated linear amplifier for complete automatic tuning of the entire transmitter through to the antenna.

Revised 1 August 1971

WORLD WIDE SUPPLIERS OF ELECTRONIC COMMUNICATIONS EQUIPMENT

THE TECHNICAL MATERIEL CORPORATION

AND SUBSIDIARIES

TECHNICAL SPECIFICATIONS

FREQUENCY INFORMATION

Range
2 to 30 MHz

Stability
+/— 10 Hz max. deviation from 0 to +50°C using temp-controlled oscillator

Presentation
Eight position channel select switch

OPERATING PARAMETERS

Modes
CW(A1)/MCW/AME/USB(A3A,A3J)
OPTIONAL: LSB; ISB(A3B)
FSK(A7J); FAX(A7J)

Power Output
0 to 100 milliwatts PEP

Output Impedance
50 ohms nominal unbalanced

Tuning
Eight pre-set crystal controlled channels
Remote selection is available on request

Metering
Built-in multimeter permits monitoring of USB/LSB audio levels.

ALDC
Automatic Load and Drive Control
Accepts 0 to -11 VDC from an associated linear to improve linearity, limit distortion, and deliver a relatively constant RF output.

Carrier Suppression
Level is continuously adjustable -50 to full carrier output, all modes.

Voice Operated Relay
OPTIONAL voice controlled switch with adjustable threshold.

DISTORTION AND NOISE

Intermodulation
Min. 40db below either tone of a standard two tone test; full PEP output

Spurious
Min. 60db below full PEP output

Harmonic Suppression
Second Harmonics
Min. 45db below full PEP output
Third and Higher Harmonics
Min. 55db below full PEP output
Filters available for additional rejection

Hum and Noise
Min. 60db down at full PEP output

AUDIO

Sideband Response
250-3040 Hz (CCIR), +/—1.5db
OPTIONAL:
250-6080 Hz (CCIR)
300-7500 Hz
350-3000 Hz

Inputs
Dual 600 ohm lines
-20 to 10dbm balanced or unbalanced

Microphone Control
-55dbm into 47K ohms; front panel jack
Microphone selection is made by USB or LSB switch control

KEYING INFORMATION

CW	Up to 200 baud Rear panel, dry contact
FSK Sources	20/60 ma, 50 and 100 volts Dry contact
Shift	Up to 2700 Hz with plug-in crystals for MARK and SPACE tones X 1000.
Speed	1000 baud

INSTALLATION AND ENVIRONMENTAL

Operating Conditions
0 to +50°C; up to 90% relative humidity
Storage: —40 to +85°C. 95% R.H.

Size and Weight
5¼" high X 19" wide X 18" deep
Approximately 30 lbs.
13.3 cm high X 98.25 cm wide X 45.57 deep
Approximately 14 Kg.

Primary Power
115/230 VAC, 50/60 Hz, single phase

Loose Items
Mating RF connectors
Primary power cable connector
Service Extension Board
Two copies of Instruction Manual

We reserve the right to make engineering changes.

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD • MAMARONECK, NEW YORK 10543

SPRINGFIELD, VIRGINIA • OTTAWA, CANADA • LUZERN, SWITZERLAND • TEMPE, ARIZONA

(914) 698-4800 • (613) 822-0244 • twx 710—566—1100 • telex 013—446

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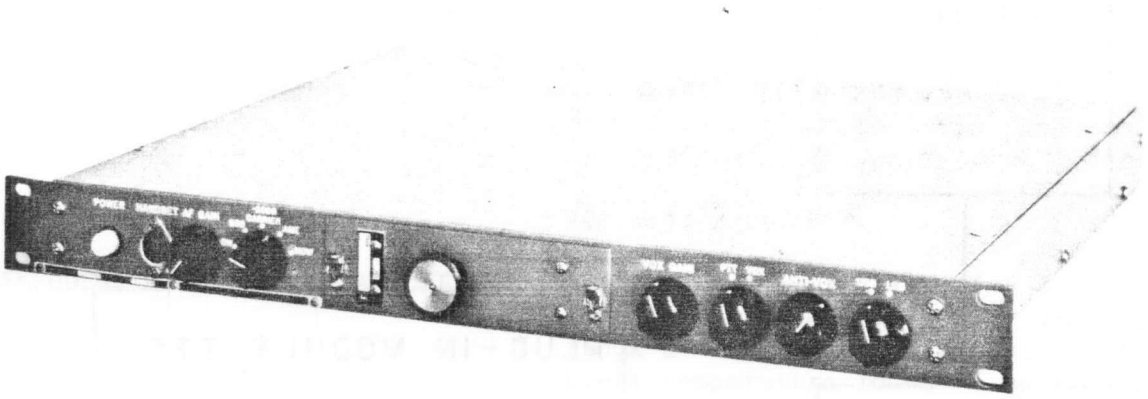
TMC SALES BULLETIN 2032A

Sideband Strip Exciter
TMC Model STE-5U/L
STE - 5U
STE - 5L

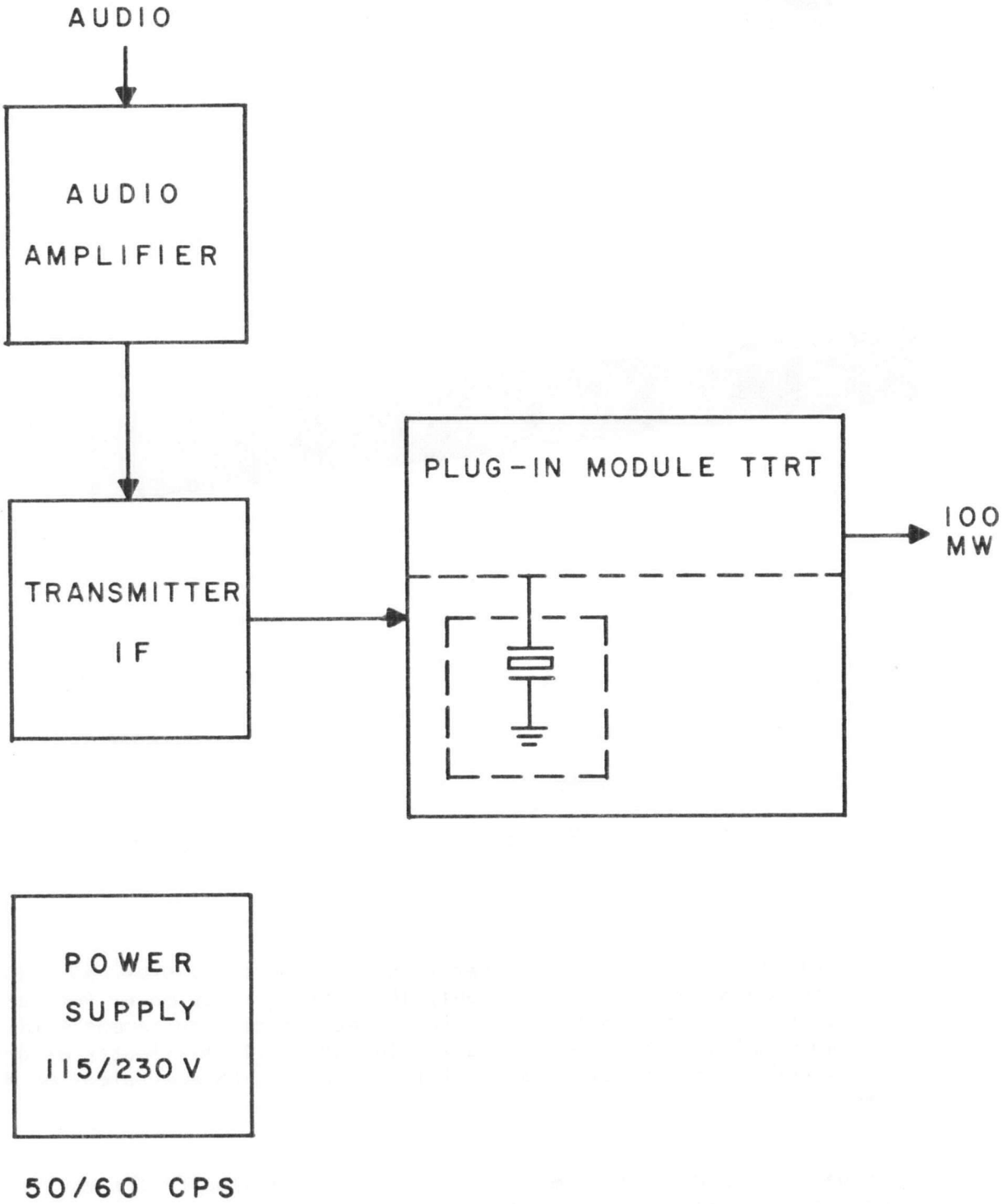


* *SSB, AME, CW, MCW*
* *100 Milliwatt Output*
* *Completely Solid State*
* *Only 14 Watts Power Required*
* *Push-to-Talk*
* *VOX, Anti-VOX*
* *High Stability*
* *Plug-in RF Heads*

The Model STE-5 solid state exciter is completely transistorized and contains its own power supply using only 14 watts of input power for full output. Low heat dissipation and minute rack-space requirement permits a great many units to be placed in a single rack. 100 milliwatts of drive is provided to the following amplifier in SSB, CW, AM equivalent or MCW modes.

In order to expeditiously meet your needs, please specify the desired carrier frequency of operation and the power source, when ordering.

00168



MODEL STE-5 FUNCTIONAL BLOCK DIAGRAM

TMC TECHNICAL BULLETIN 2032A

Sideband Strip Exciter
TMC Model STE-5U/L
STE - 5U
STE - 5L

TECHNICAL SPECIFICATIONS:

FREQUENCY RANGE:	2.0 to 32 MHz in five crystal-controlled plug-in RF Modules. Modules provide coverage of 2-4, 4-8, 8-16, 16-24 and 24-32 MHz.

When ordering please specify carrier frequency desired.

MODES OF OPERATION:	Standard: USB, AM Equivalent, CW, MCW. *Front panel selectable SSB (upper or lower) optional. ISB on special order.*
POWER OUTPUT:	100 milliwatts PEP.
FREQUENCY CONTROL & STABILITY:	Oven crystal controlled, for standard maximum deviation of ±50 cps ambient range of 0°C o +50°C. Extension of ambient temperature to -30°C optional.
OUTPUT IMPEDANCE:	Nominal 50 ohms unbalanced.
SIGNAL/DISTORTION RATIO:	At least 40 db below full PEP output.
UNWANTED SIDEBAND REJECTION:	At least 50 db below full PEP output.
SPURIOUS & HARMONIC SUPPRESSION:	50 db below full PEP output, into a tuned linear amplifier.
NOISE LEVEL:	Better than 40 db below full PEP.
CARRIER INSERTION:	Automatically preset at -50, -20 and -6 db by mode selector switch.
AUDIO RESPONSE/BANDWIDTH:	± 2 db, 300 to 3000 cps.
AUDIO INPUT:	600 ohms, -20 dbm, balanced, telephone handset carbon microphone, hi- and lo-impedance microphone. (Front panel plug or rear panel connections).
OVERLOAD LIMIT:	Special built-in circuit prevents exciter overloading. ALDC input from following linear amplifier.
VOICE OPERATED RELAY:	Voice operated relay with adjustable VOX and anti-VOX control available on front panel.

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The Technical Materiel Corp.

Sideband Strip Exciter
TMC Model STE-5U/L
STE - 5U
STE - 5L

TECHNICAL SPECIFICATIONS (continued):

ENVIRONMENTAL CONDITIONS:	Designed to operate in an ambient temperature range of 0° C to +50° C *(-30°C to +50° C optional)*, and any value of humidity up to 90%.
STORAGE CONDITIONS:	Equipment is not materially affected under storage at -40°C to +85°C, and humidity of up to 95%.
SAFETY FEATURES:	Power supply voltages fused.
INSTALLATION DATA (in inches):	1 3/4 High x 19 Wide x 15 Deep. Weight 10 pounds.
PRIMARY POWER:	115 or 230, ±10%, 50/60 cps, single phase, 14 watts (including ovens).

Voltage should be specified in advance in order that appropriate ovens may be supplied.

LOOSE ITEMS:	Instruction manuals, module extender and mating connectors provided.
COMPONENTS & CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.
OPTIONS/ACCESSSORIES:	Priced separately:

MODULE STORAGE DRAWER: The Model THRA-1, RF Module Storage Panel, provides space for 3 RF modules with oven voltages for maintaining oscillators at operating temperature. Size (in inches): 1 3/4 High x 10 Wide x 15 Deep.

MK-102-4 High Impedance, and MK-102-3 Low Impedance, dynamic microphones, noise cancelling, desk-type, with push-to-talk switch.

HS-100-3C and HS-100-3D handsets, push-to-talk, carbon and dynamic respectively.

00168

WORLD WIDE SUPPLIERS OF ELECTRONIC EQUIPMENT
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THE TECHNICAL MATERIEL CORPORATION
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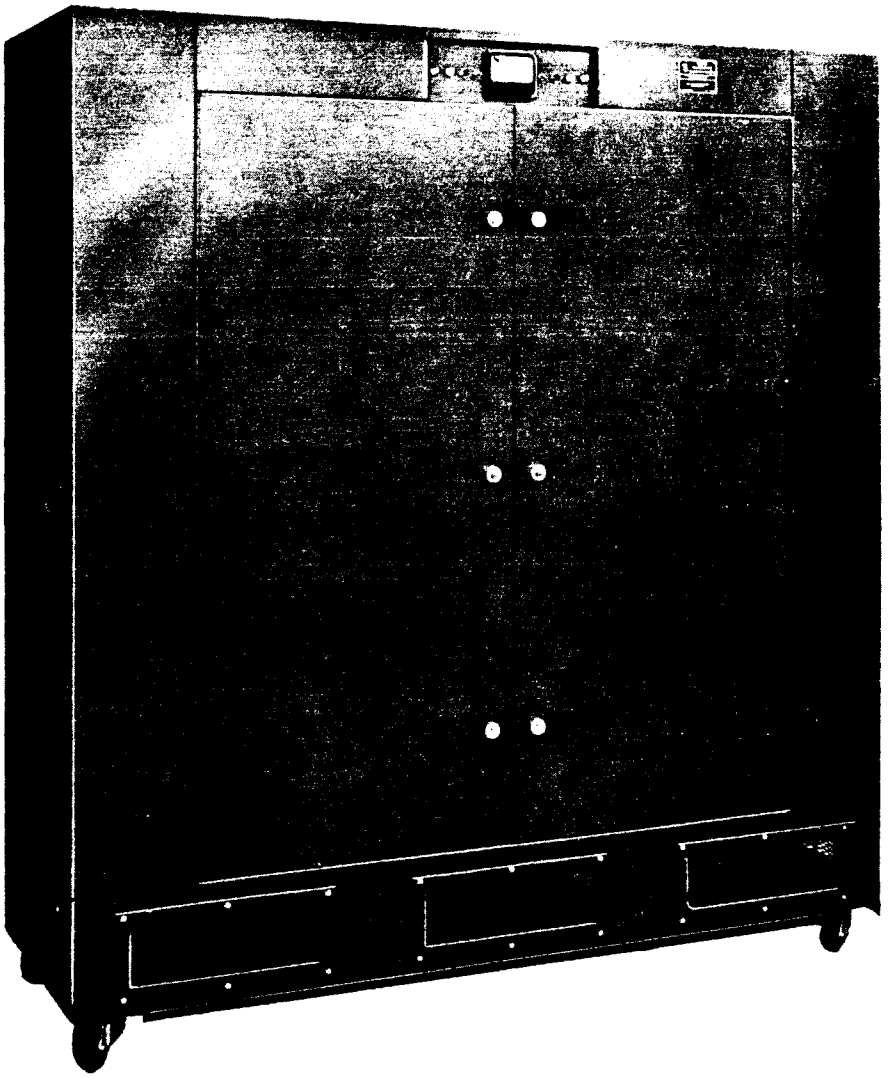
TECHNICAL BULLETIN NUMBER 8016

High Power Dummy Load
TMC Model TER-100K/50U



TMC Model TER-100K/50U, High Power Dummy Load, provides power dissipation of 100 kw average, 200 kw PEP, from 2-30 mcs with SWR not exceeding 1.5 to 1. Power and SWR ratio is indicated on a front panel meter.

Model TER-100K/50U is housed in a metal cabinet, 85" high × 79" wide × 26" deep, with casters for mobility and 7 blowers for filtered forced air cooling of the dissipation resistors.

A transmitter interlock is provided for safety to operating personnel.

TMC Model TER - 100K/50U

TECHNICAL SPECIFICATIONS

FREQUENCY RANGE:	2-30 mcs.
DISSIPATION:	100 kw average, 200 kw peak power.
IMPEDANCE:	50 ohms unbalanced.
COOLING:	Filtered air blower system by means of 7 base mounted fans.
INPUT TERMINAL:	6⅛" EIA Flange.
OPERATING TEMPERATURE:	−40°C to +75°C ambient. Unit may be brought to full power in a −40°C ambient without damage to resistors.
RESISTORS:	Special glass resistors with resistive element electro-fused into surface. Baked silicone protective coating. Fired on silver bands to assure positive connection. Resistor spiral cut to insure even heat dissipation.
CASE MATERIAL:	Heavy gauge steel case with interlocks for connection to transmitter.
SIZE:	85" h × 79" w × 26" d.
INSTALLED WEIGHT:	Approx. 1100 lbs.
AC POWER REQUIREMENT:	115v single phase, 50/60 cps, approx. 700 watts.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

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CABLE TEPEI
TWX 914-835-3782

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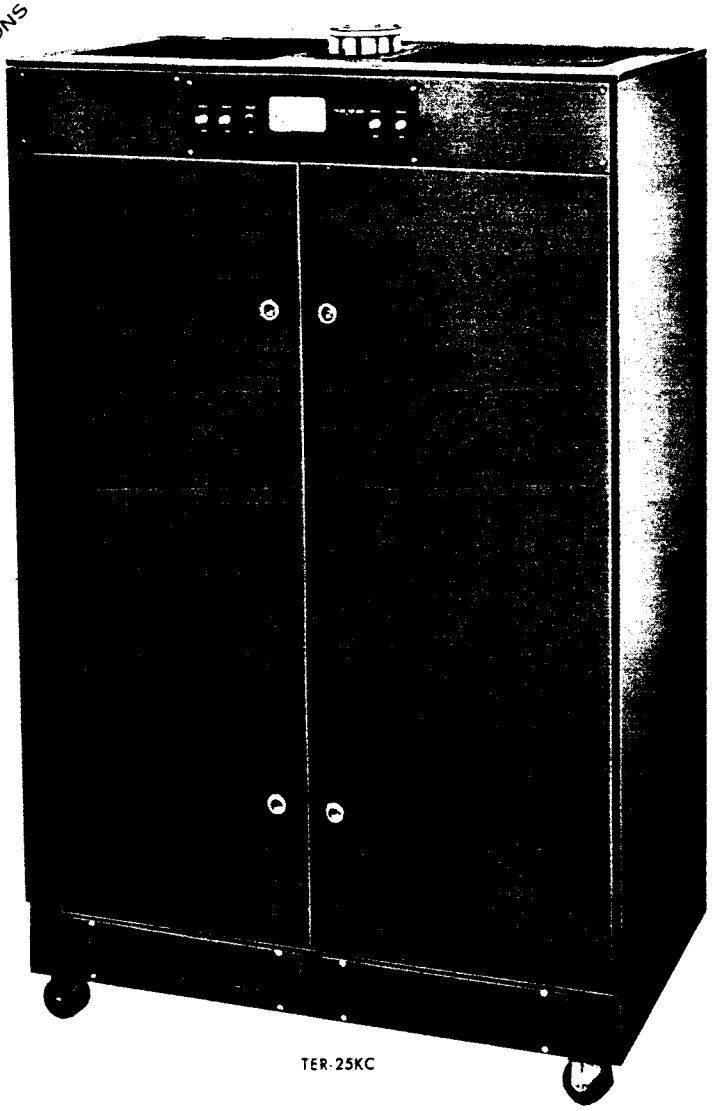
TMC Research Inc., San Luis Obispo

TECHNICAL BULLETIN NUMBER 8009A

Antenna Terminators and Dummy loads
TMC Models TER
DA-199/U
DA-200/U
DA-210/U
DA-201/U
DA-209/U



TER-25KC

TMC Models TER are a series of RF Antenna Terminators and Dummy Loads, available in a wide range of power dissipation from 250 watts to 50 kilowatts peak power in either balanced or unbalanced operation.

Models TER are used at transmitting sites for routine off-the-air tuning of transmitters and for termination of Rhombic, Sloping Vee, or other types of antennas requiring resistive termination.

Models TER are housed in rugged weatherproof cases easily installed on poles or platforms and require a minimum of maintenance. The special glass resistors used afford a minimum of reactance and may be instantly brought to full rated power in a —40° C. ambient. Models

TER-25K dissipators include filtered forced air cooling, forward and reflected power metering to compute VSWR. Casters for mobility and transmit interlock connections for personnel and equipment safety are included on all TER-25K and TER-18K (less TER-18K-600BF). Casters can be locked for permanent installations.

A wide variety of RF fittings are available to mate the TER series to many standard transmission systems, as featured in TMC's Connector Products Catalog. As an example: to order a TER 5000-70U with an L. C. coupling connector, order TER 5000-70U/AX-287-( )*.

All TER-18K and TER-25K unbalanced units are provided with 3⅛" EIA flanges. All Models TER of either 300 or 600 ohm impedances are provided with bowl insulators.

For models available and individual specifications, see accompanying Chart.

GENERAL TECHNICAL SPECIFICATIONS, Models TER:

FREQUENCY RANGE:	DC to 30 megacycles, except as noted in Chart.
DISSIPATION RATINGS:	250 w to 50 kw (refer to Chart)
IMPEDANCE:	See Chart. First group of figures in TMC Model number indicates power dissipation, and second group of figures shows input impedance. Last letter indicates whether termination is balanced or unbalanced. Example: Model TER-500-600B is a 500 watt average dissipator with 600 ohm balanced input terminals.
COOLING:	1. Convection cooling by means of screened vent ports. 2. Filtered air blower system for TER-25K series, by means of 4 base mounted fans.
INPUT TERMINALS:	Insulator bowls on balanced units, 12" on center. Insulator bowls or coaxial connectors on unbalanced units. (See Chart.)
OPERATING TEMPERATURE:	—40°C. to +75°C. ambient.
RESISTORS:	Special glass cylinders with resistive element electro-fused into surface. Baked silicone protective coating. Fired on silver bands to assure positive connection. Resistor spiral cut to insure even heat dissipation.

* For matching RF fittings see TMC Connector Products Catalog.

TMC MODEL NUMBER	MILITARY NOMENCLATURE	FREQUENCY RANGE	TYPICAL VSWR RATIO TO UNITY	AVERAGE POWER (In watts)	PEAK ENVELOPE POWER (In watts)	TYPE OF CASE (refer to notes)	DIRECTIONAL COUPLER AND METER	LIGHTNING SPARK GAP PROTECTION	INSTALLATION DATA				SHIPPING DATA		MOUNTING PLATE CONNECTOR ASSEMBLIES •										BOWL ASSEMBLIES				LOGISTICS DATA		TMC MODEL NUMBER
									HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	WEIGHT (lbs.) (APPROX.)	VOLUME (cu. ft.) (APPROX.)	WEIGHT (lbs.) (APPROX.)	AX-271 (70Ω) 1⅝" EIA Flange	AX-272 (50Ω) 1⅝" EIA FLANGE	AX-273 QDL	AX-278 (50Ω) 3⅛" to 1⅝" Reducer	AX-279 (70Ω) 3⅛" to 1⅝" Reducer	AX-281 UHF.	AX-285 HN	AX-286 C	AX-287 LC	AX-289 QDS	3⅛" EIA (50Ω) Flange	3⅛" EIA (70Ω) Flange	2 SMALL MYKROY (¼" RODS)	1 SMALL MYKROY (¼" RODS)	1 Large Porcelain (½" RODS)	2 Large Por.elain (½" RODS)	FSN W/SPARES FSN W/O SPARES		
TER-250-300 U		DC to 30 mc	1.2	250	500	1		X	14	9	5	25	3	42																		TER-250-300 U
TER-500-70 U		DC to 30 mc	1.2	500	1000	2		X	28	20¼	16	21	11	100	X					X	X	X	X	X								TER-500-70 U
TER-500-600 B	DA-199/U	DC to 30 mc	1.2	500	1000	2		X	28	20¼	16	21	"	100																	F5985-682-2711 w/o	TER-500-600 B
TER-1800-300 U		DC to 30 mc	1.15	1800	3600	2		X	28	20¼	16	25	"	104																		TER-1800-300 U
TER-3500-70 U		DC to 30 mc	1.15	1750	3500	2		X	28	20¼	16	25	"	104									X									TER-3500-70 U
TER-3500-600 B	DA-200/U	DC to 30 mc	1.2	1750	3500	2		X	28	20¼	16	25	"	104																	F5985-624-0400 w/o	TER-3500-600 B
TER-5000-50U	DA-209/U	DC to 30 mc	1.1	5000	10,000	2		X	63½	47	27	125	60	275			X						X									TER-5000-50U
TER-5000-70 U	DA-210/U	DC to 30 mc	1.2	5000	10,000	2		X	63½	47	27	125	60	275			X						X								F5820-799-8438 w/o	TER-5000-70 U
TER-5000-300 U		2-30 mc	1.5	5000	10,000	2		X	63½	28	27	90	44	275																		TER-5000-300 U
TER-5000-600 B	DA-201/U	DC to 30 mc	1.2	5000	10,000	2		X	63½	47	27	125	60	275																		TER-5000-600 B
TER-18KA-50 U		DC to 30 mc	1.15	18,000	36,000	3			75	44	22	410	60	615				X														TER-18KA-50 U
TER-18KC-50 U		DC to 30 mc	1.15	18,000	36,000	3	X		"	"	"	415	85	620				X														TER-18KC-50 U
TER-18KA-70 U		"	1.1	18,000	36,000	3			"	"	"	410	"	615					X													TER-18KA-70 U
TER-18KC-70 U		"	1.1	18,000	36,000	3	X		"	"	"	415	"	620					X													TER-18KC-70 U
TER-18K-600 B		DC to 28 mc	1.5	18,000	36,000	3			"	"	"	410	"	615																		TER-18K-600 B
TER-18K-600 BF		DC to 28 mc	1.5	18,000	36,000	2		X	70	47	26	285	90	425																		TER-18K-600 BF
TER-25KA-50 U		DC to 30 mc	1.15	25,000	50,000	3			70	44	22	420	"	625				X														TER-25KA-50 U
TER-25KC-50 U		"	1.15	25,000	50,000	3	X		"	"	"	425	"	630				X														TER-25KC-50 U
TER-25KA-70 U		"	1.1	25,000	50,000	3			"	"	"	420	"	625					X													TER-25KA-70 U
TER-25KC-70 U		"	1.1	25,000	50,000	3	X		"	"	"	425	"	630					X													TER-25KC-70 U
TER-25K-600 B		DC to 28 mc	1.5	25,000	50,000	3			75	47	26	420	85	625																		TER-25K-600 B

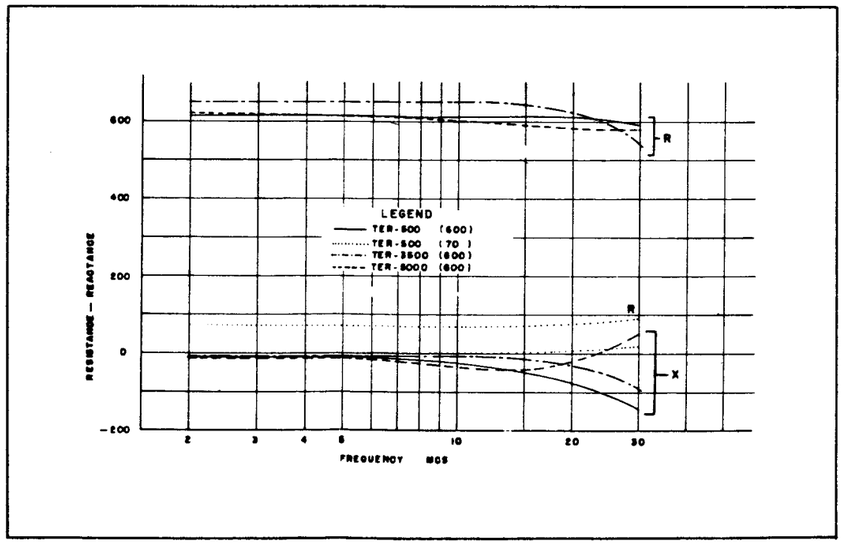
For companion RF Broadband Transformers refer to Technical Bulletin #8015.

• Supplied angle or straight. Refer to Connector Products Catalog. Priced separately.

Indicates Standard Mounting Plate Connector Assembly Provided.
When other assemblies are desired please use appropriate AX number.
Example: TER-3500-70U/AX-287

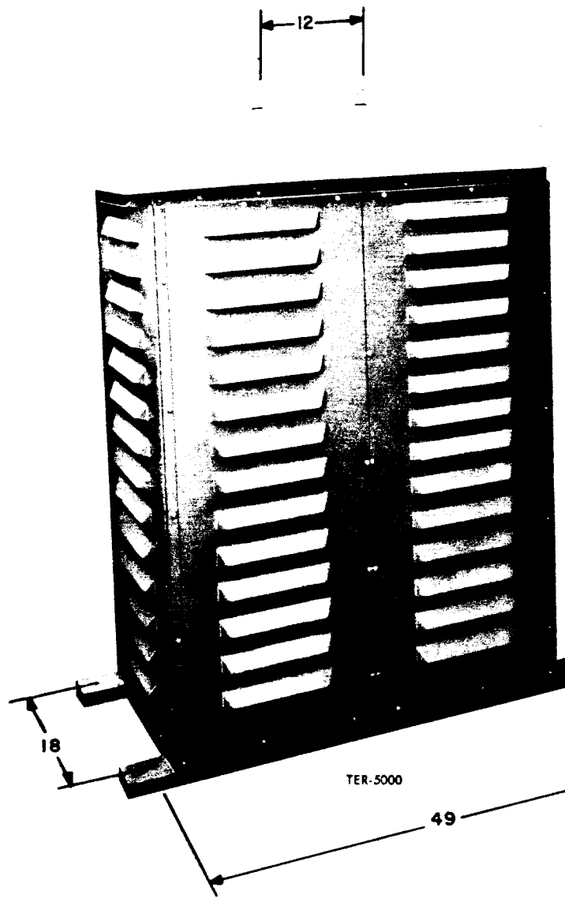
NOTES:
1. Stress relieved cast aluminum case.
2. Fiberglass reinforced plastic case.
3. Heavy gauge steel case with interlocks for connection to transmitter provided.

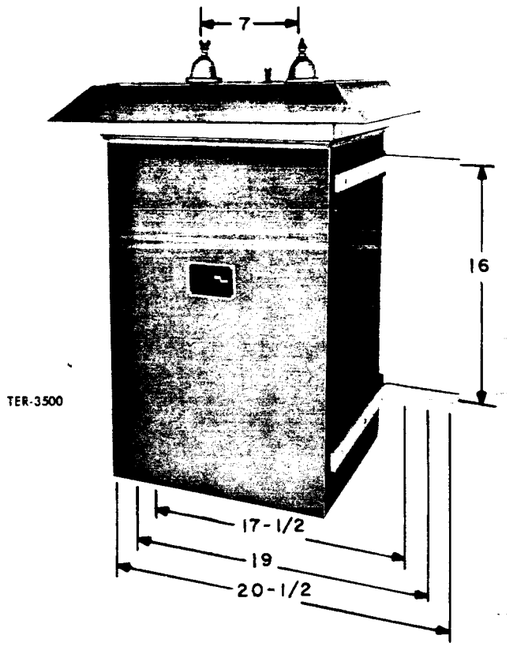
CENTER TAP:	Furnished on 600 ohm units.
PROTECTION:	Internal spark gaps for lightning protection.
CASE MATERIAL:	Refer to Chart.
SIZE:	See Chart.
MOUNTING:	All outdoor units fitted for pole or platform mounting. (See Back Page for mounting details).
WEIGHT:	See Chart.
AC POWER REQUIREMENTS: (For TER-25K series)	115/230 v, 1 ϕ, 50-60 cps Approx. 400 watts.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.
OPTIONAL EQUIPMENT:	See Chart.
SHIPPING DATA:	See Chart.



Typical Impedance Characteristics. GP-152

Models TER





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THE TECHNICAL MATERIEL CORPORATION
CABLE "TEPE" TWX 710-566 1100 MAMARONECK, N.Y. 10543

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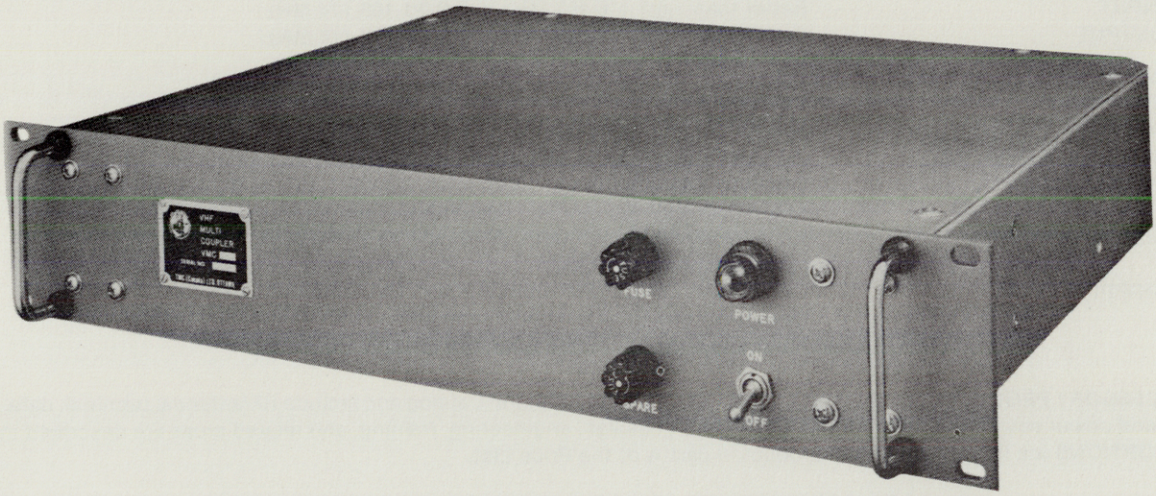
VHF ANTENNA MULTICOUPLER
Model VMC-8

TECHNICAL BULLETIN 204-4422

- ***20MHz to 200MHz***
- ***Completely Solid State***
- ***Low noise level***
- ***Wide dynamic range***
- ***Eight (8) outputs***



The VHF Multicoupler, Model VMC-8, is a broadband antenna coupling device which connects eight VHF receivers to a common antenna. It consists of a bandpass filter, broadband transistorized preamplifier, eight individual output amplifiers, and a power regulator. The unit is designed for maximum isolation between receivers and from receiver to antenna. The VMC-8 is capable of operating over a frequency range of 20 MHz to 200 MHz; the specific bandwidth is determined by the filter and preamplifier assembly selected. The standard model is the VMC-8-108/174 which covers the band 108-184 MHz.

The preamplifier has a low noise figure and large signal handling capability. It has greater than 3 db overall insertion gain with minimum intermodulation. In addition, it provides good VSWR over the frequency range.

The VMC-8 is designed for mounting in a standard 19-inch rack. The power switch, lamp and fuses are located on the front panel. All connectors are located on the rear panel. The standard VMC-8 is provided with N type connectors; other connectors or adaptors can be supplied.

The unit is designed for fast repair in the field. The filter/preamplifier, the eight output modules, the power divider and the power supply regulator are replaceable assemblies.

TECHNICAL SPECIFICATIONS
VMC-8

OPERATING PARAMETERS	
FREQUENCY RANGE	20MHz to 200MHz, specific bandwidth determined by filter.
NUMBER OF OUTPUTS	Eight
INPUT/OUTPUT IMPEDANCE	50 ohms unbalanced
GAIN	Greater than 3 db
NOISE FIGURE	Less than 8 db
ISOLATION	
OUTPUT TO OUTPUT	Greater than 60 db
OUTPUT TO INPUT	Greater than 60 db
INTERMODULATION DISTORTION	All products at least 55 db down when two 0.25 volt r.m.s. signals are applied to the antenna input.
CROSS MODULATION	With a desired signal of up to 100 volts r.m.s., an interfering signal 5% removed and modulated 30% at an amplitude of 52 db above that of the desired signal, shall not produce more than 1% cross modulation.
VSWR	
INPUT	Better than 1.5:1 118-162 MHz and 2.0:1 108-174 MHz
OUTPUT	Better than 1.5:1 118-162 MHz and 2.0:1 108-174 MHz
ENVIRONMENTAL AND INSTALLATION	
COOLING	Convection.
OPERATING CONDITIONS	0 to 50°C; up to 90% relative humidity at MSL
STORAGE CONDITIONS	-30°C to +80°C; up to 95% humidity at MSL
POWER SUPPLY	Totally solid-state 115 or 230 volts AC ± 10%, 50/60/400Hz, single-phase, 25 watts
SIZE AND WEIGHT	3.5" (8.9cm) high x 19" (48.3cm) wide x 14.5" (36.9cm) deep 13 pounds/5.9 kg installed
SHIPPING DATA	Commercial packing for domestic U.S. (air) shipment. One (1) container — 21" x 8.5" x 26.5" Total weight/cube — 23 pounds/2.8 cu. ft.

ACCESSORY PRODUCTS are described in sections 4-9 of the General Catalog and include RF/antenna, terminal, data, connector and power equipment. **TECHNICAL SERVICES** in design, engineering, training, and related areas are described in section 10. **OPTIONS** are lighted after TMC product in part A of the Price List.

Specifications Are Subject to Change Without Notice

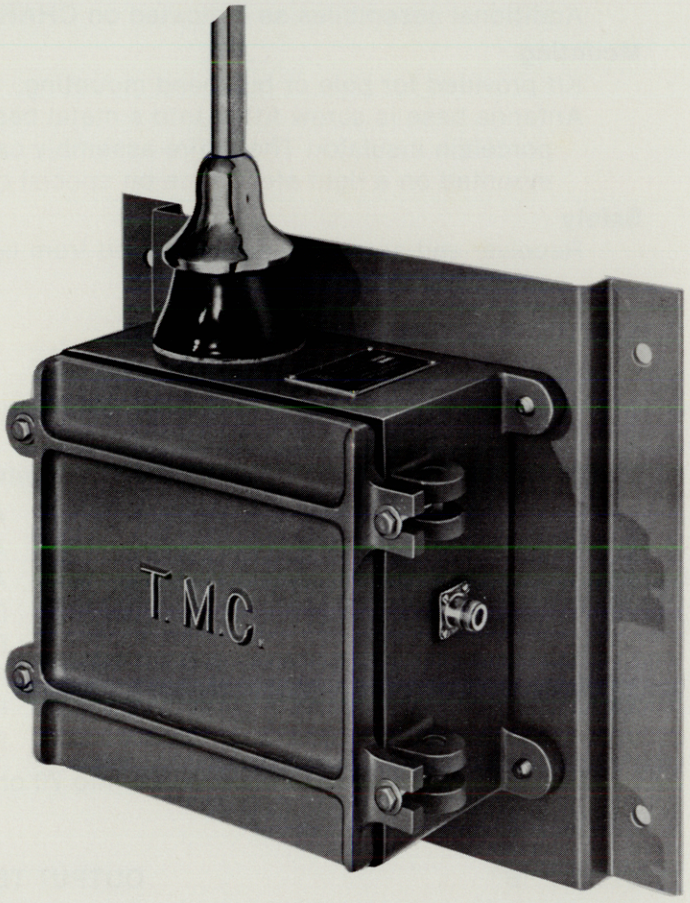
THE TECHNICAL MATERIEL CORPORATION
700 FENIMORE ROAD, MAMARONECK, NEW YORK 10543 U.S.A.
CABLE: TEPEI TEL.: 914-698-4800 TWX: 710-566-1100 TLX: 137-358

TMC (CANADA) LIMITED **TMC INTERNATIONAL**
RR NO. 5, OTTAWA, K1G 3N3, ONTARIO, CANADA
TEL.: 613-521-2050 TLX: 053-4146

Vertical Receiving Antenna
MODEL VRA

TECHNICAL BULLETIN 204-4511

- ***15 KHz-300 KHz***
- ***100 KHz-30 MHz***
- ***2 MHz-32 MHz***
- ***Lightning Protection***
- ***Rugged Weatherproof Case***
- ***Adapt to any Coax Cable***
- ***Universal Mounting***



The VRA Vertical Receiving Antenna is used in all practical operating systems both on shipboard and on shore for fixed or transportable applications. Separate models of the VRA are available with either aluminum or fiberglass whips depending on the environment operating conditions.

The matching unit associated with the antenna mast is housed in a cast aluminum container installed on a mounting plate with the associated antenna base. This arrangement affords optimum protection from the environment while maintaining the entire system as a compact assembly.

The frequency response of the matching unit is flat within +/– 1.5 db over the operating range and, as test results show, the compensating networks significantly improve the over-all electrical characteristics of the antenna. It should be noted that impedance match over wide frequency ranges must of necessity be a compromise. In the VRA series, the optimum match is provided near the center of the band with less efficiency noted at the high and low ends. Typical response curves and test circuits are available on request.

The VRA-11 and VRA-12 antennas are heavy duty 35-foot fiberglass models constructed in two sections and designed to withstand 100 mph winds. The masts are free-standing (no guy wires) and contain equally spaced copper wires to simulate a vertical cylinder. Extra epoxy is coated on the antenna surface for better protection against corrosion and for added strength.

TECHNICAL SPECIFICATIONS

Frequency Range
Refer to CHART "A" below.

Equipment Case
All weather cast alluminum alloy.

Connector Assemblies
UG-58A/U receptacle with mating RF connector. P/N AX-259-2
Additional assemblies as indicated on CHART "B".

Mounting
Kit provided for pole or bulkhead mounting.
Antenna base is screw fitted into a metal base mounted on a porcelain insulator. The entire assembly can be further mounted on a rigid steel plate on special order (See photo).

Safety
Receiver and personnel are protected from lightning by an adjustable internal spark gap.

CHART "A" **MODELS AVAILABLE**

Model	Frequency	Height	Antenna Material	Transformer
VRA-5	200-800 KHz	18'	Aluminum	TR-042
VRA-6	2-32 MHz	18'	Aluminum	044
VRA-7	3-15 MHz	35'	Aluminum	160
VRA-8	200-800 KHz	16'	Fiberglass	042
VRA-9	2-32 MHz	16'	Fiberglass	044
VRA-10	3-15 MHz	32'	Fiberglass	160
VRA-11	100KHz-30MHz	35'	Fiberglass	080
VRA-12	15-300 KHz	35'	Fiberglass	081

All Units Match into 70 ohms Nominal Impedance.

CHART "B" **OUTPUT TERMINALS**

/BN	AX-283-1	Type BN Connector
/BNC	AX-284-1	Type BNC Connector
/C	AX-286-1	Type C Connector
/HN	AX-285-1	Type HN Connector
/LC5	AX-287-1	Type LC Connector, 50 ohm
/LC7	AX-287-5	Type LC Connector, 70 ohm
/N	AX-259-1	Type N Connector
/QDL	AX-273-1	Type QDL Connector
/QDS	AX-289-1	Type QDS Connector
/UHF	AX-281-1	Type UHF Connector
/UHFT	AX-282-1	Type UHF Twin Connector
/UHFL	AX-256-1	Type UHF(L) Connector
/ES5	ES-ST5875	7/8" styroflex end seal, 50 ohm
/ES7	ES-ST7875	7/8" sytroflex end seal, 70 ohm
/RG85	AX-274-1	Flange for RG-85/U Coaxial Cable

Specifications Are Subject to Change Without Notice

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