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TECHNICAL MANUAL

VERTICAL RECEIVING ANTENNA

Model VRA-11
Model VRA-12

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THE TECHNICAL MATERIEL CORPORATION
COMMUNICATION ENGINEERS

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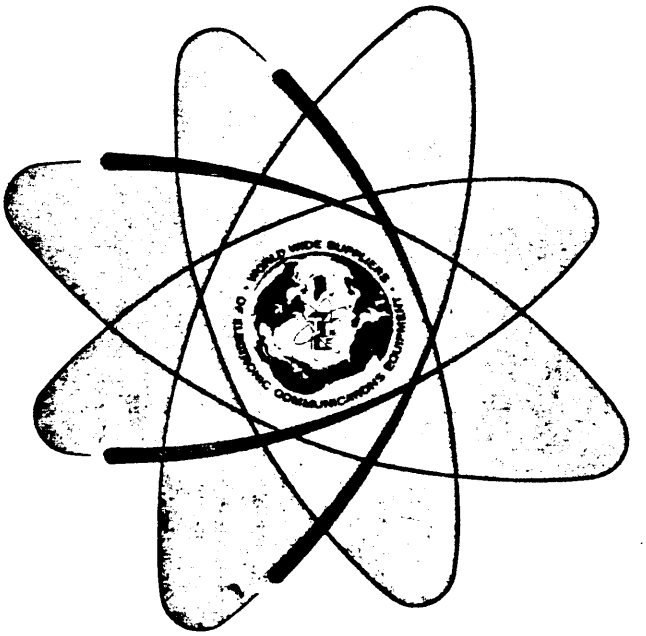
TECHNICAL INFORMATION

FOR

VERTICAL RECEIVING ANTENNA
MODELS VRA-11 AND VRA-12



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

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THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes* furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

LF/MF/HF VERTICAL RECEIVING ANTENNA
VRA Series

Product Bulletin 1B03201

Multiple Operating Ranges:

>> **15 to 300KHz Broadband**

>> **100KHz to 30MHz Broadband**

>> **200 to 800KHz Broadband**

>> **2 to 30MHz Broadband**

>> **3 to 15MHz Broadband**

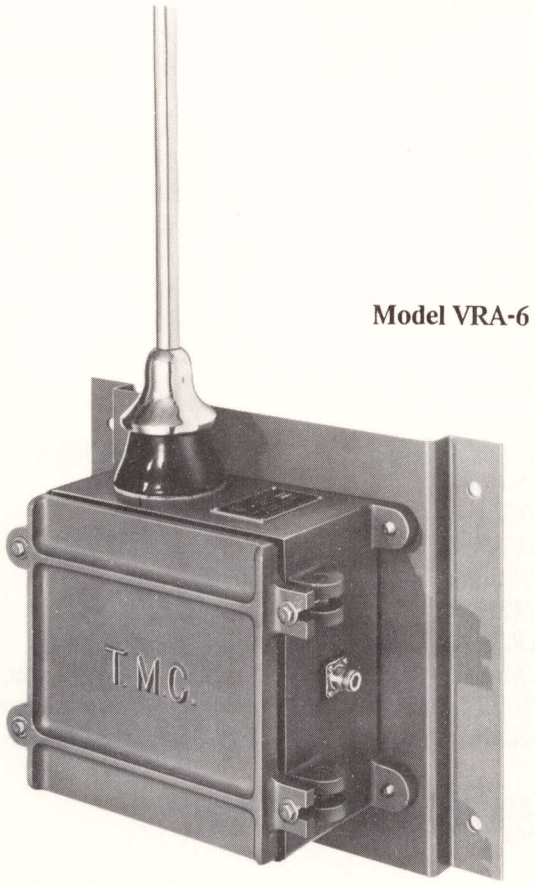
Flat Response Curve

Weatherproofed Case

Adaptable to Any Transmission Line

The VRA Series of vertical receiving antennas are used in all practical communication systems, whether on shipboard, in fixed shore stations, or on transportable facilities. The immediate adaptability of this high-capacity RF antenna system to all environments in both military and commercial applications is readily apparent. The VRA series offer immediate installation by a single, untrained individual. They can be disassembled quickly and stored in a compact "fly-away" case. Both aluminum and fiberglass whips are available and can be supplied to suit any environmental operating condition. The fiberglass models in particular are multi-section with embedded parallel copper wires to simulate a cyclinder. Extra epoxy is added to prevent corrosion and maximize strength since these free-standing whips must often withstand winds up to 100mph (166km/h).

Users are given added flexibility with these units since the unbalanced RF coaxial cables used at receiver sites are easier to install and re-route. They can easily be terminated on switching patch panels, such as the QDS Series of Connector Products manufactured by TMC. The appropriate RF path can then be selected either to the antenna, a receiving multicoupler or a receiver.



Model VRA-6

The frequency response of the matching unit is flat within +/-1.5dB over the operating range. Field tests show that the compensating networks significantly improve the over-all electrical characteristics of the antenna. It should be noted that matching any impedance over a wide frequency range is of necessity a compromise. Consequently, the VRA Series was designed to provide an optimum match near the center of the band with less efficiency noted at the high and low ends. Typical response curves for the VRA-10 and VRA-11 antennas is depicted on the next page. This well-engineered TMC product requires minimal maintenance to perform consistently within specification over its service life. The broadband matching transformers are individually sealed and securely anchored in rugged, weatherproof cases that are constructed of cast aluminum alloys to assure protection from hostile environments.

TECHNICAL SPECIFICATIONS

Frequency Range	10KHz to 32MHz	**Nominal Gain**	+1dB except at 1/4-wave points.
Impedance	Matches into 70 ohms nom.	**RF Fittings - Unbalanced**	See Optional Connector Assemblies
Equipment Case	All-weather cast aluminum	**Mounting**	Bulkhead or pole mount using four heavy cast mounting flanges
Safety Feature	Spark gap for protection from lightning/static discharge	**Case Dimensions**	9H x 11.5W x 5.5D inches, 27 lbs.
Operating Temperature	-40°C to +75°C		22.9H x 29.2W x 14D cm, 12.3Kg.

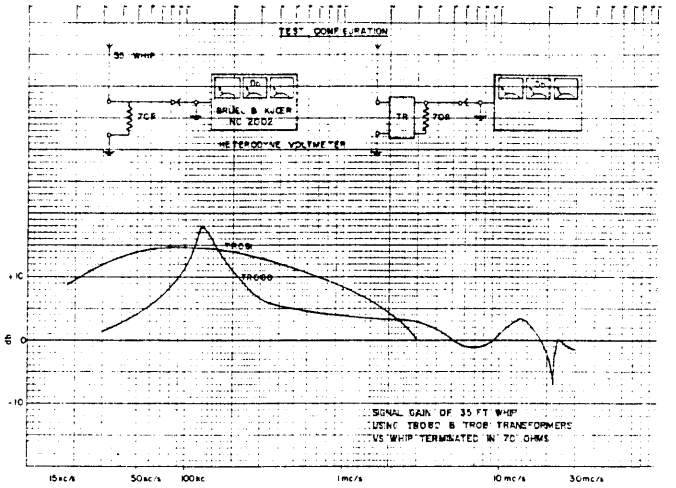
ACCESSORIES AND ORDERING INFORMATION

Model	Frequency Range	Antenna	Transformer
VRA-5	200-800KHz	18-foot Aluminum	TR042
VRA-6	2-32MHz	18-foot Aluminum	TR044
VRA-7	3-15MHz	35-foot Aluminum	TR160
VRA-8	200-800KHz	16-foot Fiberglass	TR042
VRA-9	2-32MHz	16-foot Fiberglass	TR044
VRA-10	3-15MHz	32-foot Fiberglass	TR160
VRA-11	100KHz-30MHz	35-foot Fiberglass	TR080
VRA-12	15-300KHz	35-foot Fiberglass	TR081

Optional Unbalanced Connector Assemblies:

/**AX283-1**	BN type	/**AX284-1**	BNC type
/**AX286-1**	C type	/**AX285-1**	HN type
/**AX287-1**	LC type/50-ohm	/**AX287-5**	LC type/70-ohm
/**AX259-1**	N type	/**AX273-1**	QDL type
/**AX289-1**	QDS type	/**AX281-1**	UHF type
/**AX282-1**	UHF-Twin type	/**AX256-1**	UHF (L)_type
/**AX276-1** (50-ohm)	3-1/8" EIA to LC adapter	/**AX277-1** (70-ohm)	3-1/8" EIA to LC adapter
/**ES-ST5875** (50-ohm)	7/8" Styroflex End Seal	/**ES-ST7875** (70-ohm)	7/8" Styroflex End Seal
/**AX274-1**	RG-85U Coax Flange		

Typical Frequency Response
[Model VRA-10 and VRA-11]



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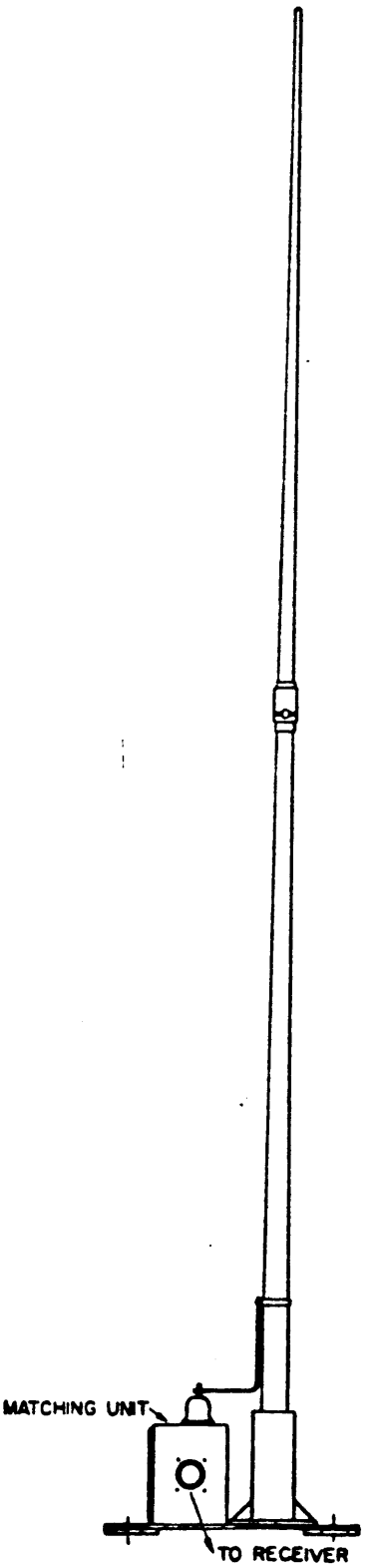
TECHNICAL BULLETIN NUMBER 8020

Vertical Receiving Antennas
TMC Models VRA-11, VRA-12



The Technical Materiel Corporation's Models VRA-11 and VRA-12 are 35 foot vertical whip receiving antennas providing frequency coverage of 15 kilocycles to 300 kilocycles for the VRA-12 and 100 kilocycles to 30 megacycles for the VRA-11. A broadbanded RF transformer is included within a base mounted matching unit to provide relatively flat response under the operating range of each antenna.

The matching unit with its associated broadbanded RF transformer is mounted in a waterproof aluminum case and is installed on a mounting plate with the associated antenna base for convenient mounting on a vehicle or a building roof.

The coupling transformers are designed for optimized matching conditions into the associated 35 foot whip antenna and are so arranged that the impedance transformation from the 35 foot whip throughout the wide frequency range is optimized to present 70 ohms to the receiver with a signal gain in the design frequency ranges. Test results show that the response of the 35 foot whip is considerably improved by the use of these coupling transformers.

The gain of these antennas will be better than 1 db, in comparison to the gain of the antenna without the impedance matching transformers, throughout the range of .5 to 30 mcs, except at the ¼ wave points where slight losses occur; and, due to the compensating network, below .5 mcs will be in excess of this figure. (See typical frequency curves on back.)

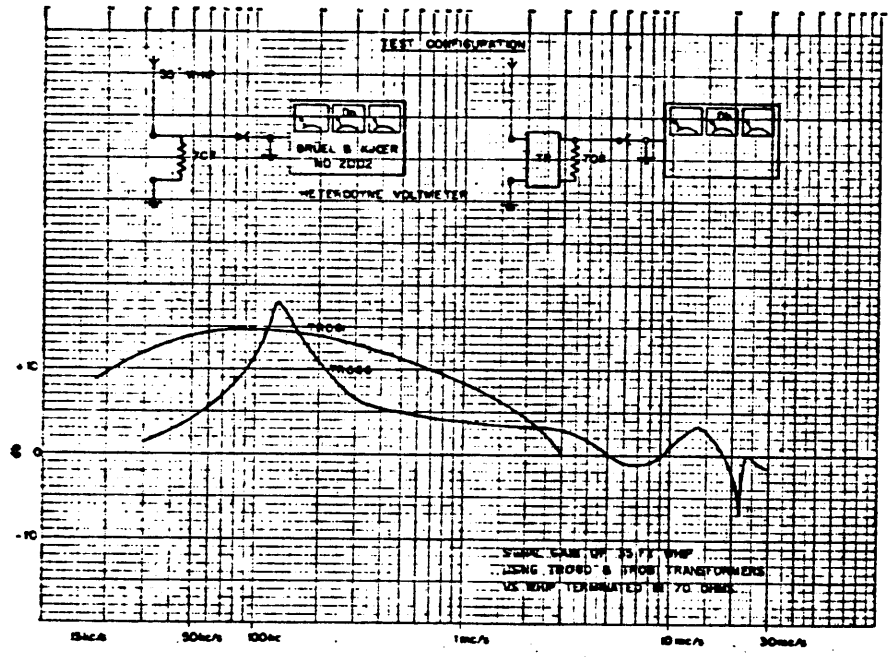
The heavy duty 35 foot whip antenna included in this system is a two-section fiberglass antenna, with parallel copper wires embedded, equally spaced around the circumference to simulate a cylinder. The design uses the finest quality fiberglass for maximum strength and freedom from corrosion. Extra epoxy coating is added to ensure increased weather resistance. The whip is self-supporting in winds up to 100 mph.

TECHNICAL SPECIFICATIONS

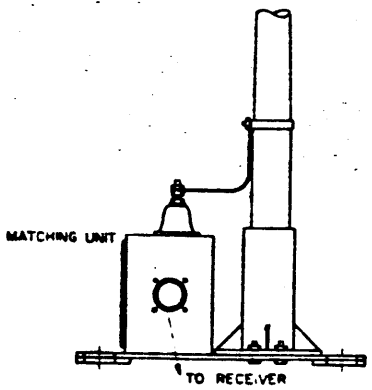
TRANSFORMER FREQUENCY RANGE:	VRA-11, 100 kcs to 30 mcs. VRA-12, 15 kcs to 300 kcs.
SYSTEM RESPONSE:	Will provide gain to a 70 ohm load better than 1 db .5 to 30 mcs and due to compensating network in excess of this figure below .5 mcs.
EQUIPMENT CASE:	Waterproof all weather cast aluminum alloy.
ANTENNA:	Vertical 35 foot fiberglass whip, 2 sections, self-supporting.

Vertical Receiving Antennas

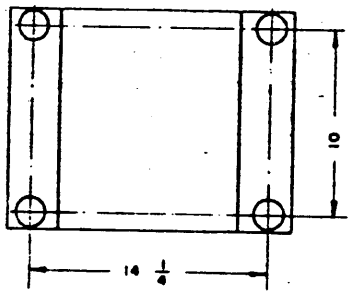
OUTPUT IMPEDANCE:	70 ohms nominal.
STANDARD WEATHERPROOF CONNECTION PROVIDED:	UG58A/U Receptacle mounted on case with mating cable connector, TMC Part No. AX-259-2.
SAFETY:	Receiver and personnel protected from lightning by means of a gas-filled spark gap, TMC Part No. SW-176.



Typical Response Curves



Antenna Base Detail



Mounting Detail

THE TECHNICAL MATERIEL CORPORATION

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