



Publication: 19M031203

Issue Date: 6 August 2002

Technical Manual
for
Receiving Antenna Multicoupler
Model AMC-32

The Technical Materiel Corporation

Mamaroneck, New York 10543-2300



Publication: 19M031203
Issue Date: 6 August 2002

Technical Manual
for
Receiving Antenna Multicoupler
Model AMC-32

PLEASE READ THIS FIRST

Dear TMC Product User:

Thank you for purchasing the TMC Model AMC-32 Receiving Antenna Multicoupler. This model is one of a series of five different types that provide RF distribution from one receiving antenna to up to thirty-two communications receivers, simultaneously. The AMC-32 provides the capability of coupling thirty-two receivers to a single antenna, each with a nominal gain from antenna to receiver of 2dB. The AMC-32 operates from 100KHz to 40MHz depending on the input filters installed. Three such filters are available: 1) a bandpass type which restricts the frequency range to 2-32MHz; 2) a low pass type with the high-end cut-off at 2MHz; and 3) a high pass type with low-end cut-off at 2MHz. A broadcast stopband filter is also available to suppress unwanted signals in the commercial broadcast frequency range.

The antenna multicoupler is described in detail in the enclosed technical manual. Product bulletins and application notes, as appropriate to the AMC-32, are also included. These publications provide important information about using TMC equipment. Please read them.

If you need additional data or some specific technical information, please give our Customer Service a call at (914) 698-4800 or return the business reply card provided in this package. Our FAX (facsimilie) number is (914) 698-4805.

If you are missing any items, please contact TMC directly or through your local sales office.

Thank you for selecting the TMC Model AMC-32 antenna multicoupler.

The Technical Materiel Corporation
Product Marketing

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment - except electron tubes, semi-conductor devices, fuses, lamps, batteries, and articles made of glass or other fragile or expendable materials - purchased hereunder to be free from defect in workmanship and materials 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 FOB 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, FOB factory, which may fail within the stated warranty period, provided:

- 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;
- The defect is not the result of damage incurred in shipment from or to the factory;
- 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; and
- 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.

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 and the TMC RETURN AUTHORIZATION number clearly marked on the package. Electron tube warranty claims should be made directly to the manufacturer of such tubes since tubes furnished by TMC bear only the manufacturer's warranty.

No warranties, expressed 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 purchaser's 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 such equipment, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

All inquiries should be directed to the following:

THE TECHNICAL MATERIEL CORPORATION

700 Fenimore Road

Mamaroneck, New York 10543-2300

Telephone 914-698-4800 * Facsimile (FAX) 914-698-4805

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE CORPORATION.

RECORD OF REVISIONS

| |
|-------------|
| REVISION 01 |
| REVISION 02 |
| REVISION 03 |
| REVISION 04 |
| REVISION 05 |
| REVISION 06 |
| REVISION 07 |
| REVISION 08 |

Table of Contents

| | | |
|------------------|--------------------------------|----|
| Section 1 | General Description | |
| | 1.1 Functional Description | 1 |
| | 1.2 Physical Description | 1 |
| | 1.3 Technical Specifications | 3 |
| | 1.4 AMC Product Group | 4 |
| Section 2 | Installation | |
| | 2.1 Initial Inspection | 5 |
| | 2.2 Electrical Installation | 5 |
| | 2.3 Performance Check | 6 |
| Section 3 | Operation | |
| | 3.1 General | 7 |
| Section 4 | Principles of Operation | |
| | 4.1 General | 8 |
| | 4.2 Preamplifier | 8 |
| | 4.3 Output Buffer Amplifier | 11 |
| | 4.4 Power Supply and Regulator | 11 |
| Section 5 | Maintenance | |
| | 5.1 General | 13 |
| | 5.2 Preventive Maintenance | 13 |
| | 5.3 Troubleshooting | 13 |
| | 5.4 Repair | 16 |
| | 5.5 Adjustments | 16 |
| Section 6 | Parts Lists | 17 |
| Section 7 | Schematic Diagrams | 18 |

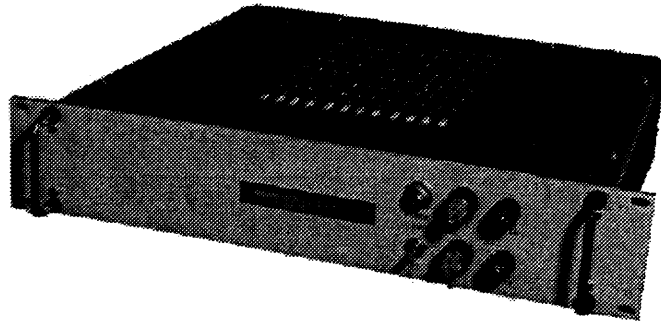
List of Illustrations

| | | |
|------------|------------------------------------|---------|
| Overleaf | Photographic print of AMC-32 | |
| Figure 2.1 | Front/Rear Panel Detail | |
| Figure 4.1 | System Block Diagram | |
| Figure 4.2 | Internal Sub-Assembly Location | |
| Figure 7.1 | Primary Sub-Assembly Location | |
| Figure 7.2 | Preamplifier Assembly | A10735 |
| Figure 7.3 | Output Amplifier Assembly | A10714 |
| Figure 7.4 | Regulator Assembly | A10746 |
| Figure 7.5 | Line Filter Assembly | A5780 |
| Figure 7.6 | Broadcast Stopband Filter Assembly | FX10020 |
| Figure 7.7 | High pass Filter Assembly | FX10021 |
| Figure 7.8 | Low pass Filter Assembly | FX10022 |
| Figure 7.9 | Bandpass Filter Assembly | FX10034 |

List of Tables

| | |
|-----------|---|
| Table 1.1 | Semiconductor and Integrated Circuit Complement |
| Table 2.1 | Loose Items Supplied |
| Table 3.1 | Controls and Indicators |
| Table 5.1 | Troubleshooting Procedures |

Model AMC-32 Receiving Multicoupler



Section 1 - General Description

1.1 Functional Description

1.1.1 Overview

The AMC-32 MF/HF Antenna Multicoupler is a broadband coupling unit, used for coupling up to thirty-two medium/high frequency communication receivers to one common antenna, simultaneously. In addition, the multicoupler may be used as an RF distribution unit when multiple signals from one source are required for test or analysis. The multicoupler provides a nominal 2dB gain from the antenna to any receiver, with a wide dynamic range and low noise characteristic over the frequency range of 100kHz to 40MHz. The equipment is designed to provide excellent isolation from receiver to receiver and from each receiver to the antenna. The multicoupler is fully solid state, including power supply components.

1.1.2 Major Assemblies

The multicoupler consists of one input preamplifier, one output buffer amplifier for each RF output port provided, and a regulated power supply. The input preamplifier is connected to the output amplifiers through an RF distribution line. There are four buffer amplifier boards, each containing eight output networks.

1.1.3 Input/Output Characteristics

The input and output characteristic impedance is 50 ohms, with a VSWR better than 1.5-to-1. Optionally, 70 ohms impedance can be provided. Isolation is maintained to a minimum of -40dB between each receiver terminal and -55dB from each receiver terminal to the antenna input.

1.1.4 RF Outputs

The number of output ports available with the AMC-32 is fixed. Thirty-two MF/HF outputs are provided from a common antenna. Input/output connectors, other than the BNC-type normally installed, may be substituted depending on the interconnect required at the receiving site.

1.2 Physical Description

1.2.1 Equipment Mounting

The AMC-32 is designed for mounting in a standard 19-inch rack. The operating controls are located on the front panel. The input connector, output connectors and primary power socket are mounted on the rear panel. The amplifiers and power supply regulator are mounted on printed circuit boards which are in turn bolted to the iridited aluminum chassis.

1.2.2 Semiconductor Complement

The complement of semiconductors used in the AMC-32 are listed in Table 1.1.

Table 1.1 - Semiconductor and Integrated Circuit Complement

| | |
|----------------------------------|---------|
| Power Supply and Regulator | |
| Rectifier Bridge | NW10005 |
| Bias Regulator | 1N758A |
| Bias Regulator | 1N914B |
| Current Regulator | TX10001 |
| Voltage Regulator | 2N5086 |
| Voltage Regulator | 2N3055 |
| Preamplifier and Output Circuits | |
| Bias Regulator | 1N914B |
| Buffer | 2N3866 |
| Current Amplifier | 2N5160 |

1.3 Technical Specifications

Frequency Range 100kHz-40MHz no filter; 2-32MHz with bandpass filter; 2-40MHz with high pass filter; other filters including broadcast stopband filter are available.

Number of Outputs Thirty-two MF/HF output ports with frequency range determined by input filters installed.

Input/Output Impedance Nominal 50 ohms, unbalanced. 70 ohms is available. BNC-type connectors. N-type and others are available.

Insertion Gain Nominal +2dB over 2-30MHz range.

Frequency Response -1.0/+2.0dB, 100kHz-32MHz (no filter)

Offband Rejection Greater than -60dB, 10-100kHz, depending on filter. Greater than -30dB, 46-1000MHz with filter.

Noise Figure Nominal +7dB.

Output/Output Isolation Greater than -40dB

Output/Input Isolation Greater than -55dB

Phase Differential +/-1 degree maximum, output-output

Desensitization For a 4-volt peak input, 10% removed from the operating frequency, a 100 microvolt received signal drops less than 3dB.

Intermodulation Distortion For 50-ohm units: Second order is greater than -60dB for a 0.4-volt input; Third order is greater than -65dB.

VSWR Output, input better than 1.5-to-1. (No filter, 2-30MHz)

Mean-Time-Between-Failure Nominally 18,000 hours.

Operating Features

Cooling Convection, no fans or moving parts

Ambient Conditions 0°C to +50°C; Up to 95% R.H. Storage -30°C to +80°C

Primary Power 115VAC standard/230VAC optional, 48-400Hz, single phase.

Power Consumption 85 watts maximum.

Size and Weight 3.5H x 19W x 15.5D inches, 17lbs

Line Filters Greater than 40dB attenuation.

Special Features

Monitoring Indicating fuseholders display status of primary power circuits

Safety Fuse and front-end overload protection, preventing circuit failure from high RF voltages at the input. High voltage points are covered and labelled.

Components and Construction Totally solid state circuits mounted to an aluminum alloy chassis. External hardware is stainless steel. Track slides are optional and due to weight distribution, are usually not required.

1.4 AMC Product Group

| | |
|-----------|---|
| AMC-2X4 | Dual MF/HF Receiving Antenna Multicoupler, 2X4 Outputs |
| AMC-2X8 | Dual MF/HF Receiving Antenna Multicoupler, 2X8 Outputs |
| AMC-2X16 | Dual MF/HF Receiving Antenna Multicoupler, 2X16 Outputs |
| AMC-8 | MF/HF Receiving Antenna Multicoupler, Eight Outputs |
| AMC-16 | MF/HF Receiving Antenna Multicoupler, 16 Outputs |
| AMC-32 | MF/HF Receiving Antenna Multicoupler, 32 Outputs |
| AMC-21-4 | MF/HF Receiving Antenna Multicoupler, Four Outputs |
| AMC-21-8 | MF/HF Receiving Antenna Multicoupler, Eight Outputs |
| AMC-21-12 | MF/HF Receiving Antenna Multicoupler, 12 Outputs |
| AMC-21-16 | MF/HF Receiving Antenna Multicoupler, 16 Outputs |

Input RF Filter Options: [z=5 for 50-ohm and z=7 for 70-ohm operation]

| | |
|---------|--|
| /zF0 | No input filter |
| /zF2 | Low-pass input filter ($f_c=2.0\text{MHz}$) |
| /zF3 | High pass input filter ($f_c=2.0\text{MHz}$) |
| /zF4 | Broadcast stopband filter (0.6-1.9MHz) |
| /zF5** | Bandpass filter (2-32MHz) |
| /zF23* | Includes Options /zF2 & /zF3 (switched) |
| /zF24* | Includes Options /zF2 & /zF4 (switched) |
| /zF34* | Includes Options /zF3 & /zF4 (switched) |
| /zF234* | Includes Options /zF2, /zF3 & /zF4 (switched) |

Other filters are available to suit specific applications.

* Available in Model AMC-21 series only.

** Not available in Model AMC-21 series.

Note: Input filters may be combined in AMC-2X and AMC-21 series only.

When ordering, specify both model and option. Example: AMC-32/5F4

2.1 Initial Inspection

2.1.1 General

Every AMC-32 undergoes a thorough testing and calibration prior to shipment. Upon receipt of the unit, check the packing case and its contents for obvious damage. Unpack the equipment carefully to reduce the risk of damage and to avoid misplacing any parts shipped as loose items. See Table 2.1 for a list of the loose items.

2.1.2 Damage By Carrier

With respect to equipment damage for which the carrier is liable, TMC will assist in describing methods of repair as well as furnishing replacement parts.

2.2 Electrical Installation

2.2.1 Primary Power

The AMC-32 operates from a 115VAC, 48 to 400Hz power source. Optionally, the AMC-32 may be wired for 230VAC, which will be noted by a decal on the rear panel adjacent to the input power connector.

2.2.2 External Connections

The following external connections must be made to the AMC-32 after it has been mechanically installed:

Antenna

The antenna cable must be fitted with a connector that mates with the AMC-32 connectors provided. Normally, this is a BNC-type connector, although such connectors as type N are also available. This antenna cable is then connected to ANTENNA INPUT jack J33 (see Figure 2.1) on the rear panel of the AMC-32.

Power

Connect primary power to the unit by plugging the supplied power cable assembly into recessed male POWER connector on the rear panel. Ensure that the plug lines up properly with the socket.

Outputs

Connect the outputs of the AMC-32 to the associated receivers via the RF connectors (J1 through J32) mounted to the rear panel. RF coaxial cables, terminated with the proper mating connectors, are required for this connection. The CA-480 series of coaxial cables are specifically designed for this purpose.

2.2.3 Clearance Requirements

The AMC-32 equipment should be located in such a way that sufficient clearance is obtained at the rear of the unit for making all RF connections. The front panel controls should also be within easy reach of an operator. The solid state design of the AMC-32 reduces heat problems, allowing "stacking" of up to five units, one above the other, in the same rack. If more than five units are stacked, heat-related problems may occur after prolonged use of the multicouplers. To reduce the possibility of this happening, the equipment cabinet should be fitted for forced air cooling or the couplers should be separated vertically by sufficient space (at least one panel height) to allow dissipation of the heat.

2.3 Performance Check

2.3.1 General

When the appropriate power connections have been made to the AMC-32, turn the POWER switch S1 to the ON position. The POWER lamp LP1 will light, indicating that the AMC-32 is ready for use. No further checks are required.

Table 2.1 - Loose Items Supplied

| | | |
|------------|----------------------|--------|
| CA1906 | Power Cable Assembly | 1 each |
| 210303B-32 | Technical Manual | 1 each |

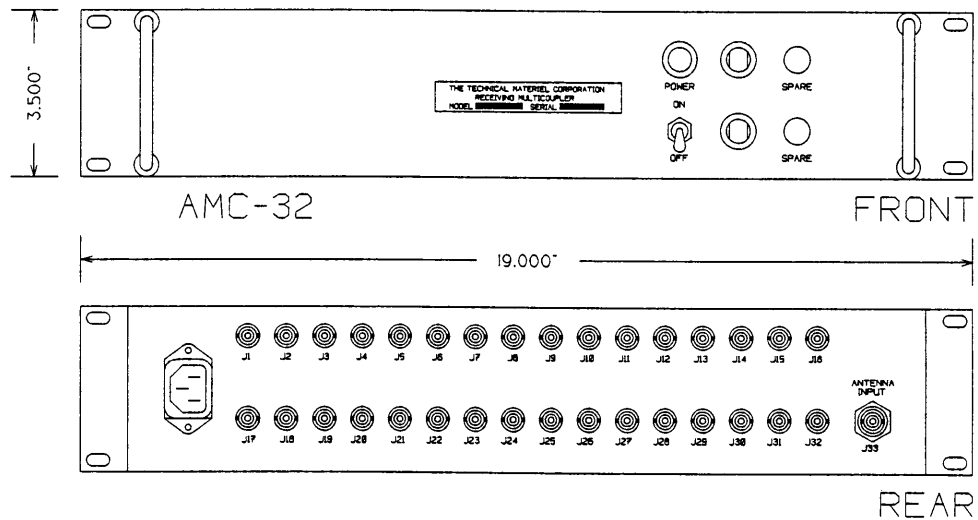


Figure 2.1 Front/Rear Panel Detail

Section 3 - Operation

3.1 General

3.1.1 Controls

Table 3.1 contains a list of the operating controls and indicators that are located on the front panel of the AMC-32.

3.1.2 Procedures

After connecting the antenna, communication receivers and power supply, and turning on the POWER switch, no further operating procedures are required. The AMC-32 is now fully operational without further adjustment.

Table 3.1 Controls and Indicators

| | | |
|-----------------------|-------|--|
| Power ON/OFF switch | S1 | Controls primary power application |
| POWER lamps | LP1 | Lights when primary power is applied and switch S1 is turned ON. |
| FUSE holder/indicator | F1,F2 | Indicates failure of fuse by illumination of the fuseholder. |
| SPARE fuse | | Two spare fuses are contained in spare fuseholders located on the front panel. |

Section 4 - Principles of Operation

4.1 General

4.1.1 Capabilities

The Model AMC-32 Medium/High Frequency Antenna Multicoupler is a broadband antenna distribution system, designed to couple one MF/HF antenna to the antenna inputs of up to 32 communication receivers.

4.1.2 Input/Output

Both the input and output impedance of the AMC-32 multicoupler is nominally 50 ohms, and optionally 70 ohms. The standing wave ratio characteristic is better than 1.5-to-1 over the frequency range of 100kHz to 40MHz.

4.1.3 Salient Performance Features

The AMC-32 multicoupler provides a nominal insertion gain of 2dB from the antenna input to each connected receiver. The coupler is designed to ensure minimum noise generation, and to provide a high degree of intermodulation rejection and isolation between the connected receivers. The rejection and isolation figures for this equipment are stated in the Technical Specifications section of this manual (See Section 1.3).

4.1.4 Equipment Structure

The AMC-32 multicoupler consists of three major sections as shown in Figures 4.1 (System Block Diagram) and Figure 4.2 (Internal Sub-Assembly Location). All are described in the following paragraphs. These sections consist of the preamplifier assembly (A3); the output buffer assemblies (A4/A5/A6/A7); and the regulated power supply (A1). An input filter (A2) is optionally available configured for bandpass, lowpass, highpass or broadcast-stopband operation.

4.2 Preamplifier (A3)

4.2.1 Location and Features

The preamplifier is mounted on a printed circuit board designated A3. It is a low-noise, wide-band amplifier having a 50-ohm impedance and a nominal voltage gain of 8.5dB. Figures 4.2 and 7.1 depict its location in the chassis, while Figure 7.2 combines the schematic and component-location diagrams.

4.2.2 Circuit Analysis

The input to amplifier Q1 is coupled through a step-up transformer T1. This transformer with the proper selection of resistor R1 sets up the input impedance for 50 or 70-ohm operation. C2 and L2 located on the input to T1 are frequency compensation elements. Q1 provides the required voltage gain to the complementary push-pull output amplifiers Q2/Q3. The bias for the output stages is set up by potentiometer R6. Total input current is nominally set up for 85ma. Resistors R8/R9 are selected to match the correct impedance to output circuits. Nominal gain for the preamplifier board is 8dB.

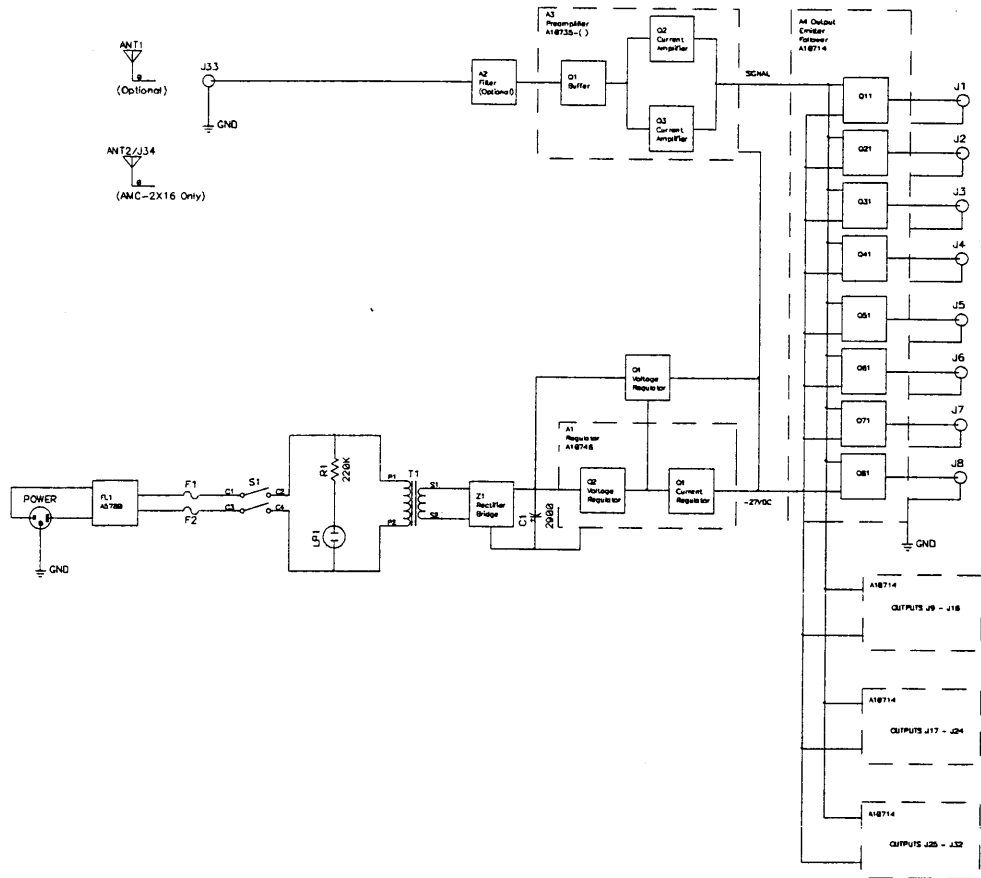


Figure 4.1 System Block Diagram

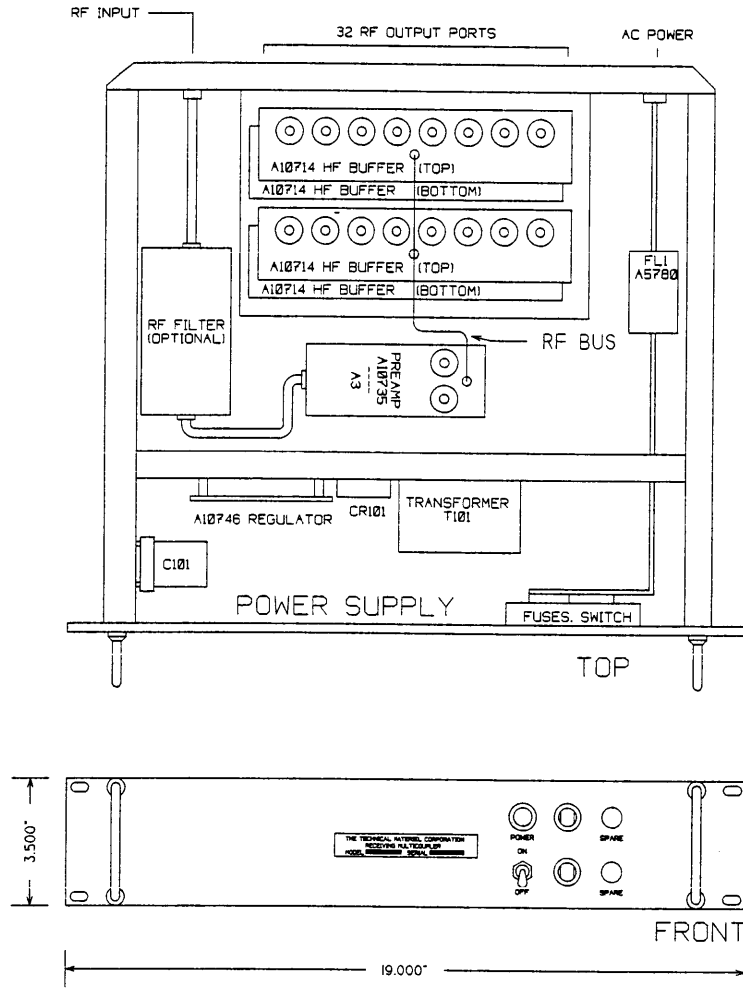


Figure 4.2 Internal Sub-Assembly Location

4.2.3 Power Distribution

Power for the preamplifier is obtained from the -27VDC regulated supply A1. This DC voltage is heavily decoupled at the input to all preamplifier and output amplifier circuits to prevent distortion from the rectified power supply.

4.3 Output Buffer Amplifier

4.3.1 Location and Features

The RF distribution line parallel-feeds identical buffer amplifier assemblies, as shown in Figures 7.1 (assembly), 7.3 (components and schematic). Each amplifier assembly consists of emitter-follower amplifiers, with an output impedance of 50 ohms and an attenuation of 6.5dB. Therefore, the overall nominal multicoupler insertion gain from the antenna to each output is +2dB.

4.3.2 Circuit Analysis

The input from the RF distribution line is RC-coupled through R11/C11 to the base of emitter-follower Q11. Bias is obtained with R12/R13. The output from the emitter-follower is applied to the output terminal through a matched 50-ohm load circuit consisting of R15/C13. This network is identical for all output buffer amplifiers.

4.3.3 Power Distribution

The -27VDC power is obtained from the regulated power supply A1 and is filtered through C10 and L11 to the decoupling capacitor C12 and load compensator L12 to the 2N3866 transistor via R14.

4.4 Power Supply and Regulator

4.4.1 Location and Features

The components comprising the power supply are all chassis mounted except for the regulator circuit which is mounted on circuit assembly 1A1. The latter is described in the following paragraphs (See Figures 7.1, 7.6 and 7.7).

4.4.2 Circuit Analysis

Primary power is supplied through AC line filter FL1 to the ON/OFF switch S1. When S1 is in the ON position, power is supplied through the two fuses F1/F2 to the power transformer T1 and the front panel indicator lamp LP1. The secondary of transformer T1 produces 29VAC, which is rectified by bridge rectifier Z1, and filtered by capacitor C1.

The input to the current amplifier is RC-coupled through R1/C1. This input drives a grounded emitter-buffer amplifier 1Q1 (chassis-mount). The amplifier bias is controlled by the parallel combination of Q1/Q2 which is sensitive to the output of 1Q1 through resistor R6 and the series combination of CR1/CR2. Temperature compensation is also obtained with diodes CR1/CR2 in the bias circuit.

4.4.3 Current and Voltage Regulation

The regulator board and transistor Q1 provide the voltage and current regulation required for the -27V supply. All components in this section, with the exception of transistor Q1, are mounted on printed circuit assembly A1. Potentiometer R7 is used to set up the initial operating bias required by the AMC. Transistor Q1 and diodes CR1/CR2 form a voltage reference circuit (sensitive to temperature and load changes) which in turn control Darlington-connected transistors Q2/Q1. In addition to providing short-circuit protection, this also provides the necessary voltage and current regulation for the power supply. The -24V output from the regulator board is then fed to the amplifier circuit boards.

Section 5 - Maintenance

5.1 General

5.1.1 Test Equipment Requirements

This section describes preventive maintenance, trouble-shooting and repair procedures for the AMC-32. The following basic equipment is suggested in order to perform these procedures properly:

RF Signal Generator, H/P Model 651B or equivalent
Oscilloscope, Tektronix Model 545 or equivalent
Standard Volt-Ohmmeter

5.1.2 Component Location

For aid in the location of components, refer to Figures 7.1, 7.2, 7.3 and 7.4.

5.2 Preventive Maintenance

5.2.1 General Cleaning Methods

Preventive maintenance for the AMC-32 consists of routine functions such as visual inspection and cleaning. Periodic cleaning is recommended as dust may build up on components, reducing the efficiency of the coupler unit and possibly causing circuit failure. To facilitate cleaning the unit, use a vacuum cleaner or a low-pressure filtered compressed-air supply.

5.2.2 Visual Check and Adjustment

A simple visual check of the unit when it is opened up for servicing or cleaning will often reveal potential trouble spots and thereby reduce downtime due to component failure. Signs of trouble may be found in discoloration, warped printed circuit boards and damaged wiring or cables. Any deteriorating component should be replaced immediately. All hardware should be checked for tightness during preventive maintenance inspections.

5.3 Troubleshooting

5.3.1 General Failure Symptoms

During operation of the AMC-32, the following failure symptoms may be observed:

No signal output from one or all receivers.

Weak or noisy signals in one or all receivers.

5.3.2 Fault Localization

The primary objective of the troubleshooting procedure is to localize the fault to a particular section of the coupler unit. Table 5.1 provides a guide to locating and correcting the possible failures.

Table 5.1 - Troubleshooting Procedures

| Symptom | No signal output at one or more receivers |
|-------------------------------------|---|
| Possible Cause: Remedial Action: | Receiver failure (One output affected) Refer to receiver manual |
| Possible Cause: Remedial Action: | Interconnection, coupler to receiver (One output affected) Check the RF cable between the receiver and coupler |
| Possible Cause: Remedial Action: | Power supply failure in the coupler (All outputs affected) If POWER ON lamp LP1 is not illuminated, check for power input failure or defective input filter FL1. If POWER ON lamp is on, check indicating type fuses F1/F2 and replace with spare if necessary. If both fuses are intact, proceed to check the transformer T1, bridge rectifier Z1 and voltage regulator A1. -27VDC should be available at terminal 6 of the regulator board A1. |
| Possible Cause: Remedial Action: | Output buffer amplifier failure (One output affected) If DC voltage is present at the output of the regulator and at the output buffer amplifier, possible failure of a component in the output amplifier is indicated. Removal, testing and repair of modules A4, A5, A6 or A7 will be necessary. |
| Possible Cause: Remedial Action: | Failure of input preamplifier (All outputs affected) If DC voltage is present at the output of the regulator and at the preamplifier, possible failure of a component in the preamplifier or failure in the input antenna circuit is indicated. For repair of the preamplifier, removal and testing of the module A3 will be necessary. |

Table 5 - Troubleshooting (Continued)

| | |
|------------------|---|
| Symptom | Weak or noisy signals to ALL receivers |
| Possible Cause: | Antenna fault |
| Remedial Action: | Connect the antenna lead-in directly to the antenna input of the receiver. If the symptom persists, check for a fault in the antenna system. |
| Possible Cause: | Faulty preamplifier |
| Remedial Action: | If the cause is not attributable to the antenna, possible failure of a component in the preamplifier is indicated. The removal, testing and repair of module A3 will be necessary. |
| Symptom | Weak or noisy signals in ONE receiver |
| Possible Cause | Receiver noise |
| Remedial Action | Refer to receiver manual |
| Possible Cause | Interconnection, coupler to receiver |
| Remedial Action | Check the RF cable between the coupler and receiver. |
| Possible Cause | Faulty output buffer amplifier |
| Remedial Action | Connect the receiver to another output terminal of the same module (A4-A7). If the symptom persists, the probable cause will be found in the power supply circuit of the module. If the symptom is no longer present, the fault will be found in the directly-associated buffer amplifier circuit or output connection. Removal, testing and repair of the module will be necessary if the fault is not located in the output connection. |

5.4 Repair

5.4.1 General Method

Repair work generally consists of replacing the defective component. The following cautions should be observed:

- Make sure the replacement component is an exact duplicate of the defective one. This is particularly important in the amplifier modules.
- Place any new component in the same location as the component it replaces. The dressing of any wire runs should not be altered.
- Observe standard practice when replacing semiconductor components by using a low-wattage soldering iron and appropriate heat-sink tools.
- Avoid damage to the printed circuit wiring when handling or repairing amplifier and regulator modules.

5.5 Adjustments

5.5.1 Output Voltage Trim

Only one adjustment may be required in the AMC-32 multicoupler. Power supply regulator A1 contains a screwdriver-adjustable potentiometer R7 that was pre-set, prior to shipment, to provide a -27VDC. If the output voltage is found to require adjustment, use an accurate voltmeter and re-set the voltage to -27VDC by rotating the potentiometer control clockwise to reduce voltage or counter-clockwise to raise voltage.

5.5.2 Amplifier Trim

The amplifiers do not require any adjustment. Components are of fixed values.

Section 6 - Parts Lists

AMC-32
A10746
A10735
A10714

Front Panel, Rear Panel and Main Chassis Assembly
Regulator Assembly (A1)
Preamplifier Assembly (A3)
Output Amplifier Assembly (A4-A7)

Technical Materiel Corporation

Item Material Listing

| Item/Part Number | Rev | Description | Qty | Notes |
|------------------|-----|--------------------------------|------|-------|
| AMC-32 | | Antenna Multicoupler, Receive | | |
| 2N3055 | | Transistor, Silicon, NPN | 1EA | |
| A10714-6 | | Printed Circuit Board Assembly | 4EA | |
| A10735-8 | | Printed Circuit Board Assembly | 1EA | |
| A10746-5 | | Printed Circuit Board Assembly | 1EA | |
| A5780 | | Printed Circuit Board Assembly | 1EA | |
| AX5250 | | Assembly, Electro-Mechanical | 1EA | |
| CA10531-3 | | Cable Assembly | 3EA | |
| CA10534-1 | | Cable Assembly | 1EA | |
| CA10537 | | Cable Assembly | 1EA | |
| CA10548 | | Cable Assembly | 1EA | |
| CA10549 | | Cable Assembly | 1EA | |
| CE112-19 | | Capacitor, Electrolytic | 1EA | |
| LP10014-2 | | Loose Items Package | 1EA | |
| NW10007 | | Network, Integrated Circuit | 1EA | |
| RC07GF110J | | Resistor, Fixed, Composition | 2EA | |
| RC20GF104J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF110J | | Resistor, Fixed, Composition | 2EA | |
| TF445 | | Transformer | 1EA | |
| UG625B/U | | Connector, Receptacle, RF | 32EA | |

Technical Materiel Corporation

Item Material Listing

| Item/Part Number | Rev | Description | Qty | Notes |
|------------------|-----|--------------------------------|-----|-------|
| A10746 | | Printed Circuit Board Assembly | | |
| 1N758 | | Diode, Zener | 1EA | |
| 1N914B | | Diode, Silicon | 1EA | |
| 2N5086 | | Transistor, Silicon, PNP | 1EA | |
| A10746-4 | | Printed Circuit Board | 1EA | |
| CC131-32 | | Capacitor, Fixed, Ceramic | 1EA | |
| CC131-39 | | Capacitor, Fixed, Ceramic | 2EA | |
| CSR13G474ML | | Capacitor, Fixed, Ceramic | 2EA | |
| CSR13G685ML | | Capacitor, Fixed, Ceramic | 1EA | |
| HD10002-7 | | Heat Sink | 1EA | |
| PX829-1 | | Insulator, Transistor Pad | 1EA | |
| RC20GF122J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF150J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF392J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF473J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF561J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF682J | | Resistor, Fixed, Composition | 1EA | |
| RC20GF683J | | Resistor, Fixed, Composition | 1EA | |
| RV111U102A | | Resistor, Variable, Non-W/W | 1EA | |
| TX10001 | | Transistor, Germanium, NPN | 1EA | |

Technical Materiel Corporation

Item Material Listing

| Item/Part Number | Rev | Description | Qty | Notes |
|------------------|-----|--------------------------------|-----|-------|
| A10735 | | Printed Circuit Board Assembly | | |
| 1N914B | | Diode, Silicon | 1EA | |
| 2N3866 | | Transistor, Silicon, NPN | 1EA | |
| 2N5160 | | Transistor, Silicon, PNP | 2EA | |
| A10735-4 | | Printed Circuit Board | 1EA | |
| CC100-28 | | Capacitor, Fixed, Ceramic | 2EA | |
| CC100-43 | | Capacitor, Fixed, Ceramic | 5EA | |
| CL275-221 | | Coil | 3EA | |
| CL275-330 | | Coil Assembly, RF, Tuned | 1EA | |
| CM111E050J1SS | | To Be Determined | 1EA | |
| CM111E680J1SS | | To Be Determined | 1EA | |
| HD10002-7 | | Heat Sink | 1EA | |
| HD10004 | | Heat Sink | 2EA | |
| PX829-1 | | Insulator, Transistor Pad | 2EA | |
| RC07GF7R5J | | Resistor, Fixed, Composition | 2EA | |
| RC20GF331J | | Resistor, Fixed, Composition | 1EA | |
| RL07S182G | | Resistor, Fixed, Composition | 2EA | |
| RL07S302G | | Resistor, Fixed, Composition | 1EA | |
| RL07S681G | | Resistor, Fixed, Composition | 1EA | |
| RL07S822G | | Resistor, Fixed, Composition | 1EA | |
| RV10009-501AP | | Resistor, Variable, Non-W/W | 1EA | |
| SCBP0256BN4 | | Screw, Machine | 4EA | |
| TR10005 | | Transformer, RF | 1EA | |

Technical Materiel Corporation

Item Material Listing

| Item/Part Number | Rev | Description | Qty | Notes |
|------------------|-----|--------------------------------|------|-------|
| A10714 | | Printed Circuit Board Assembly | | |
| 2N3866 | | Transistor, Silicon, NPN | 8EA | |
| A10714-4 | | Printed Circuit Board | 1EA | |
| CC131-39 | | Capacitor, Fixed, Ceramic | 18EA | |
| CC131-32 | | Capacitor, Fixed, Ceramic | 8EA | |
| CL275-330 | | Coil Assembly, RF, Tuned | 8EA | |
| CL275-221 | | Coil | 8EA | |
| HD10004 | | Heat Sink | 8EA | |
| RC07GF432J | | Resistor, Fixed, Composition | 8EA | |
| RC07GF332J | | Resistor, Fixed, Composition | 8EA | |
| RC07GF101J | | Resistor, Fixed, Composition | 8EA | |
| RC42GF221J | | Resistor, Fixed, Composition | 8EA | |
| RN60D52R3F | | Resistor, Fixed, Film | 8EA | |
| SCBP0256BN4 | | Screw, Machine | 16EA | |

Section 7 - Schematic Diagrams

| | | |
|------------|------------------------------------|---------|
| Figure 7.1 | Primary Sub-Assembly Location | |
| Figure 7.2 | Preamplifier Assembly | A10714 |
| Figure 7.3 | Output Amplifier Assembly | A10746 |
| Figure 7.4 | Regulator Assembly | A10735 |
| Figure 7.5 | Line Filter Assembly | A5780 |
| Figure 7.6 | Broadcast Stopband Filter Assembly | FX10020 |
| Figure 7.7 | High pass Filter Assembly | FX10021 |
| Figure 7.8 | Low pass Filter Assembly | FX10022 |
| Figure 7.9 | Bandpass Filter Assembly | FX10034 |

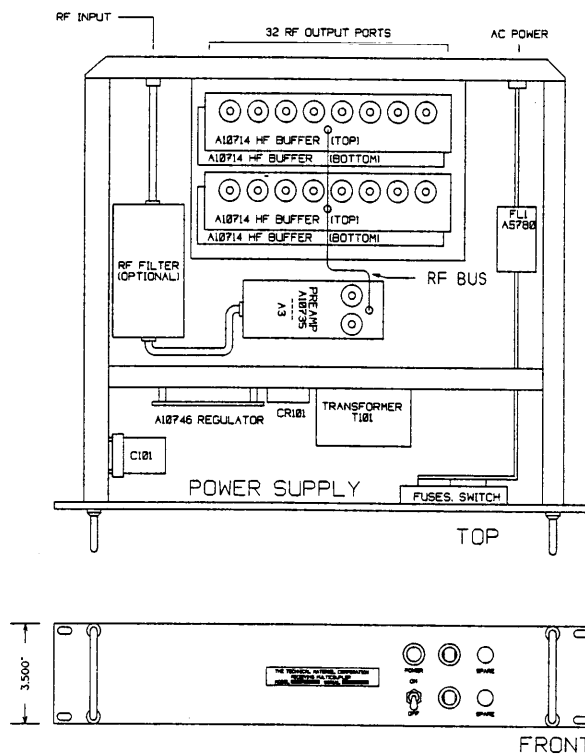


Figure 7.1 Primary Sub-Assembly Location

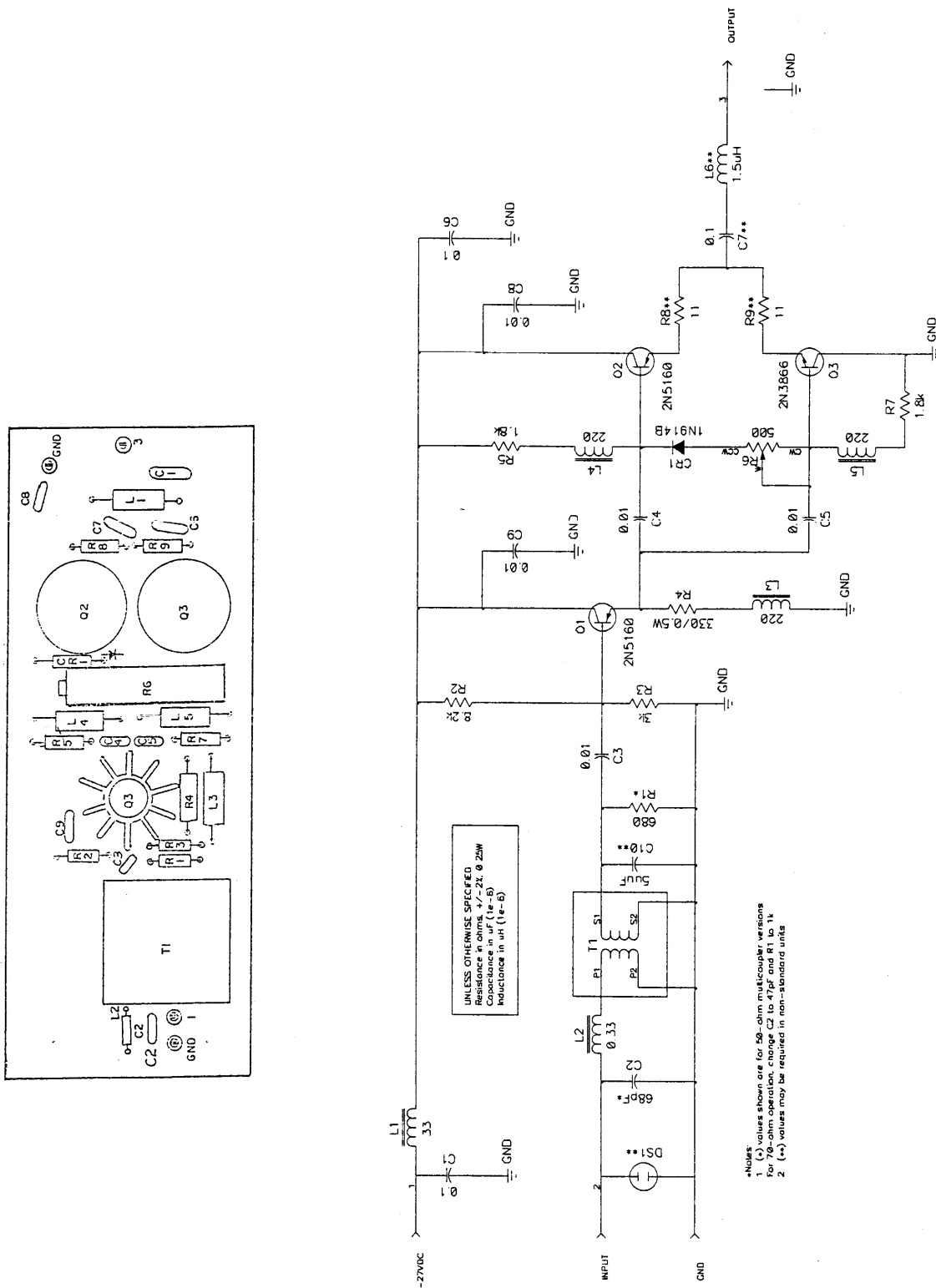


Figure 7.2 Preamplifier Assembly [A10714]

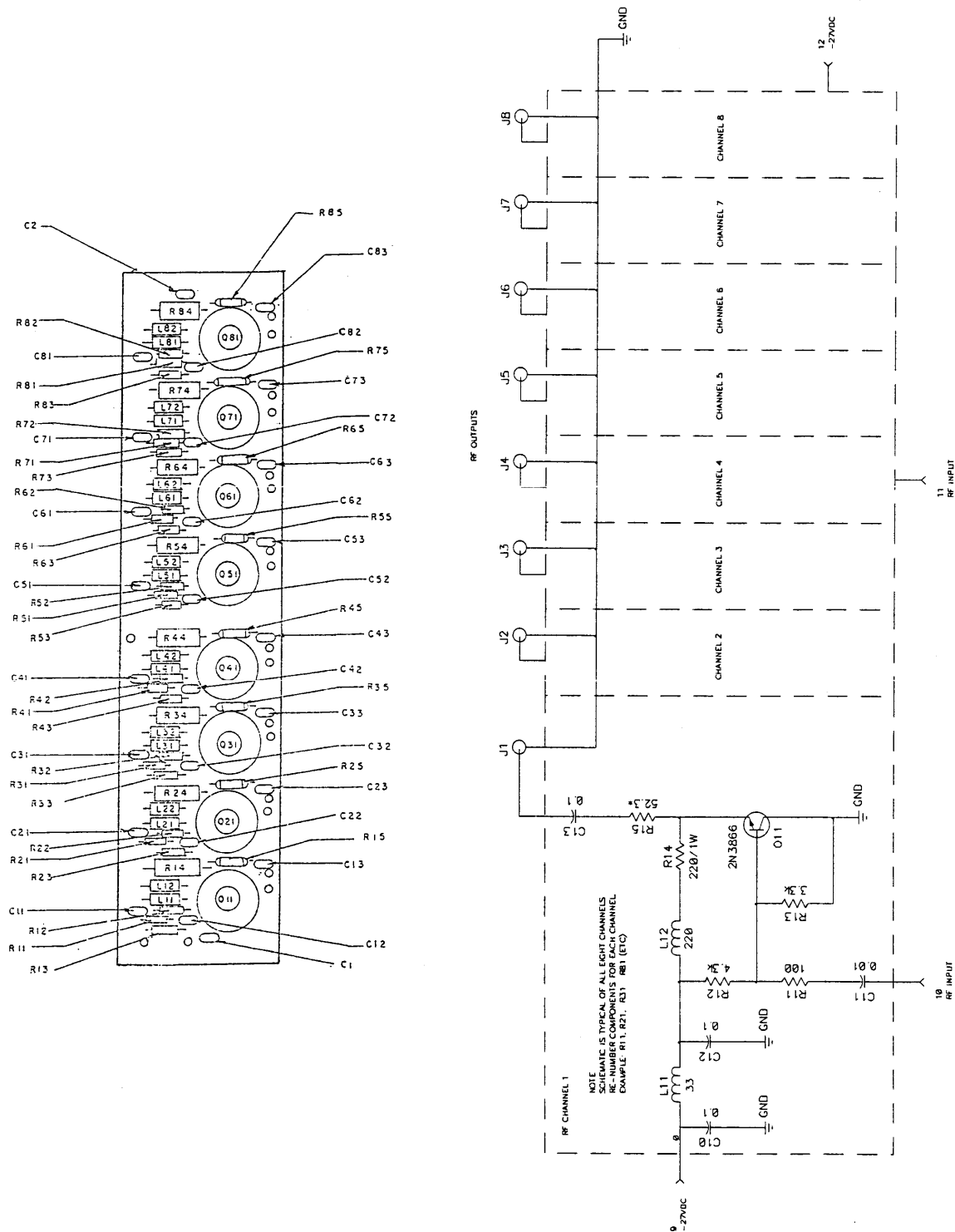


Figure 7.3 Output Amplifier Assembly [A10746]

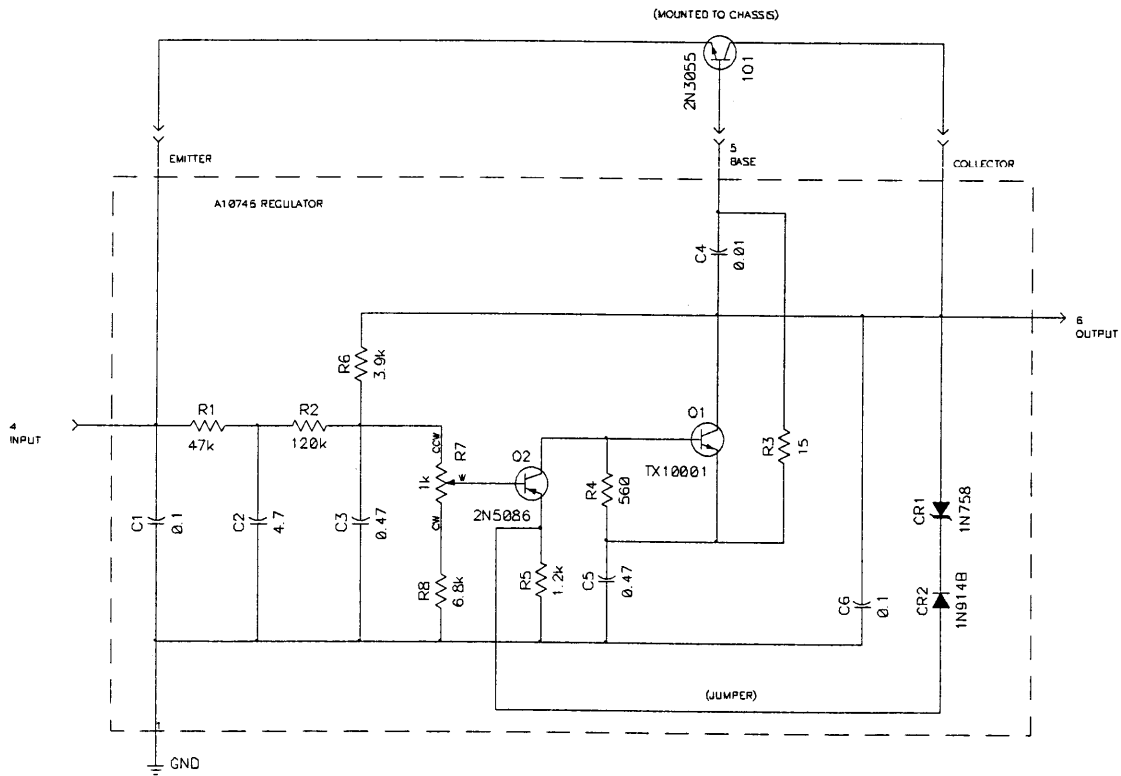
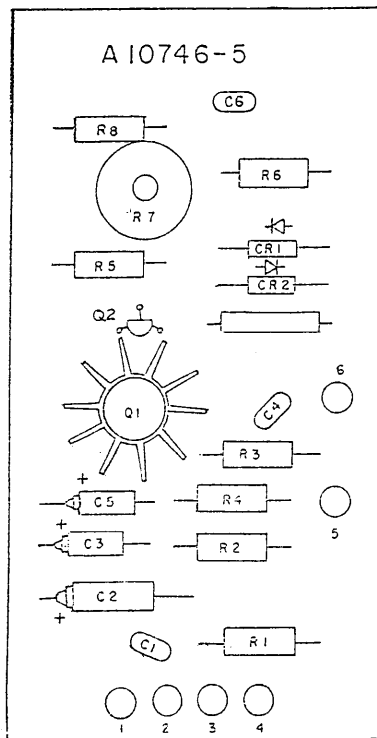


Figure 7.4 Regulator Assembly [A10735]

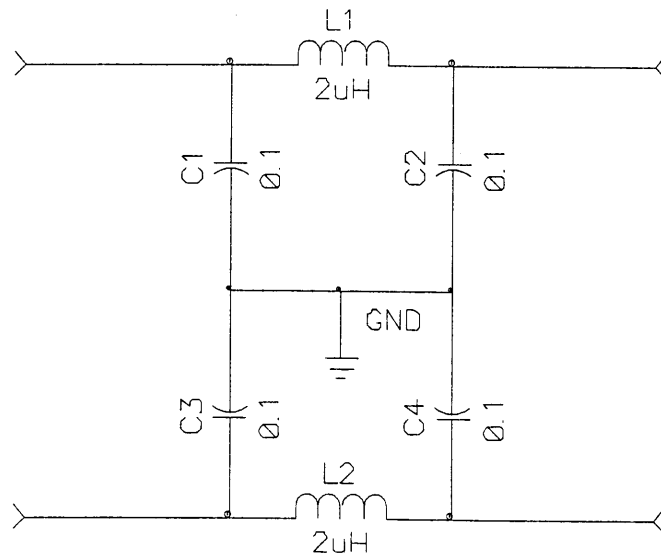
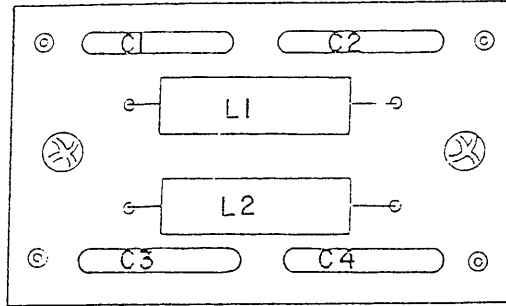


Figure 7.5 Line Filter Assembly [A5780]

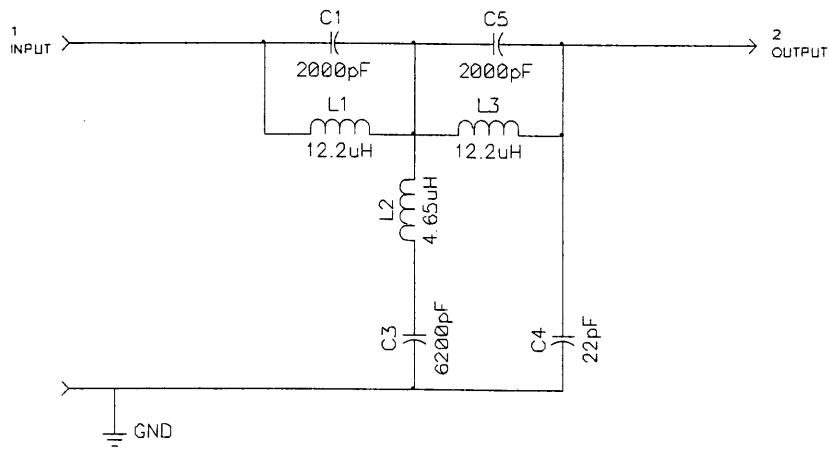
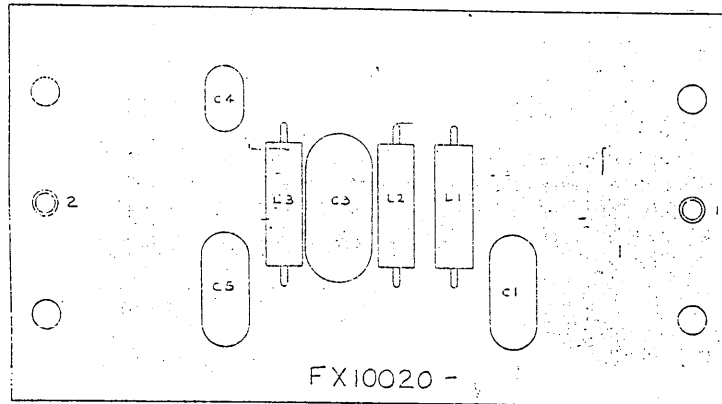


Figure 7.6 Broadcast Stopband Filter Assembly [FX10020]

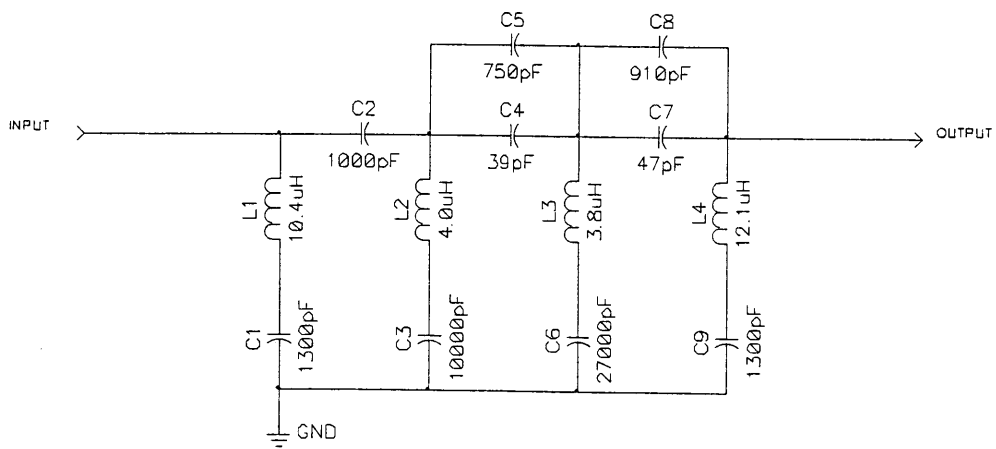
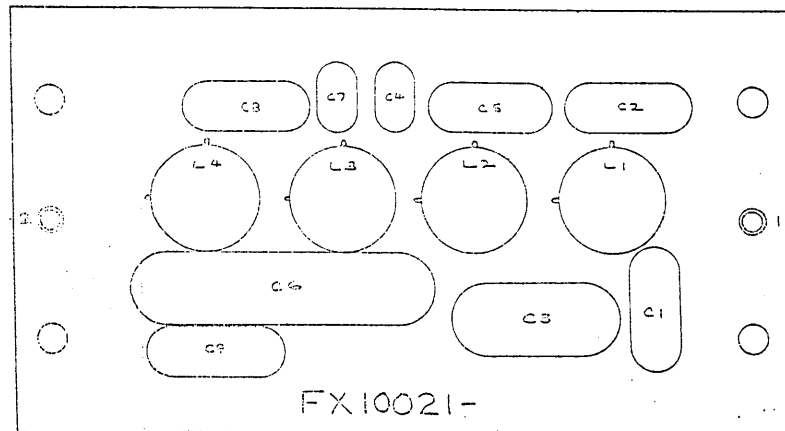


Figure 7.7 High Pass Filter Assembly [FX10021]

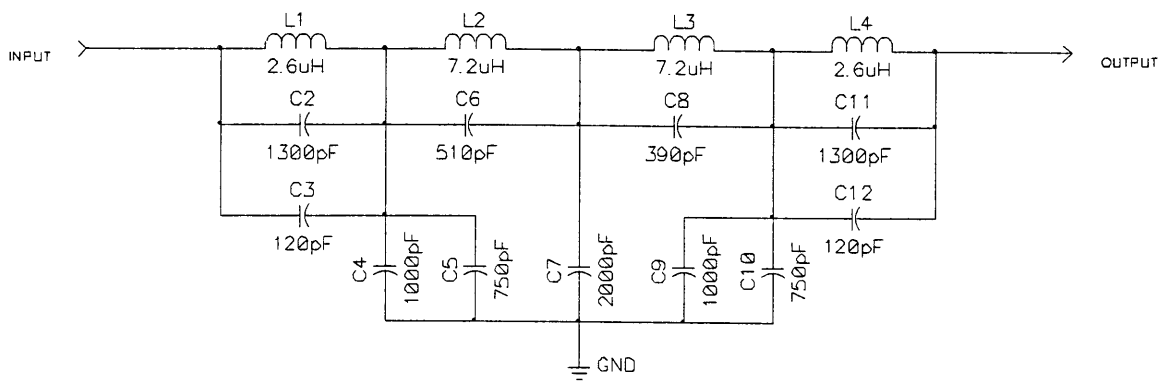
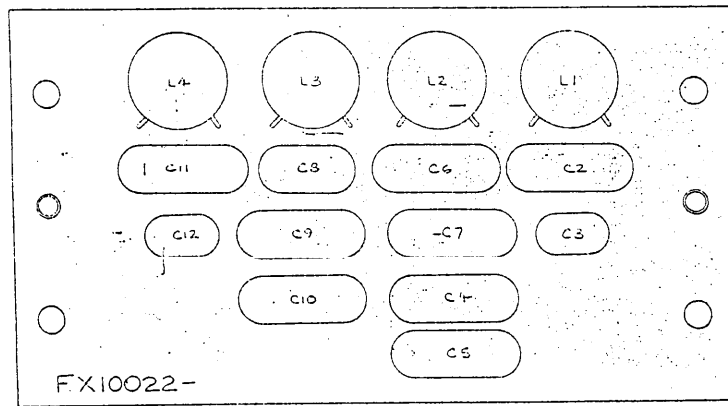


Figure 7.8 Low Pass Filter Assembly [FX10022]

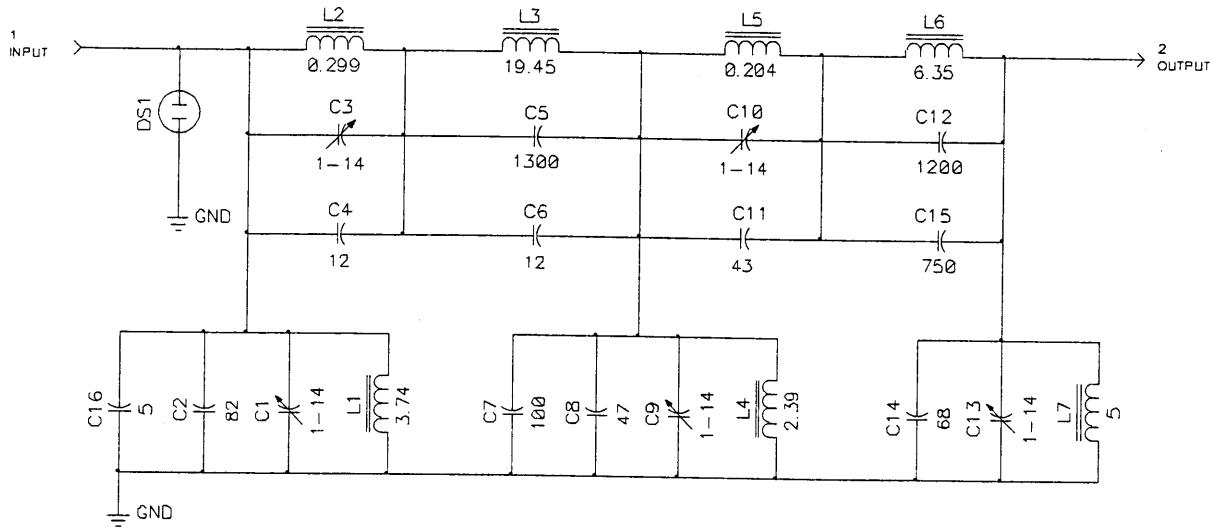
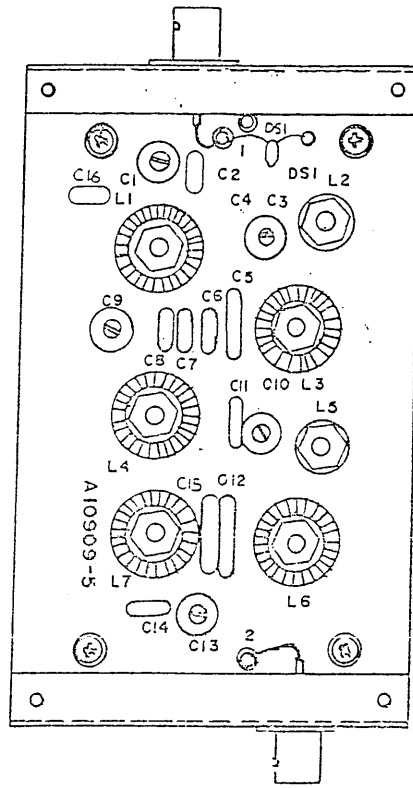


Figure 7.9 Band Pass Filter Assembly [FX10034]

Some of our Customers . . .

Communications equipment manufactured by TMC has been purchased for use in a large number of organizations and countries throughout the free world. In addition, TMC is a large-volume producer of communications equipment for the worldwide commercial, government and defense markets. Active sites using TMC products are depicted on the world locator map. A partial list of customers indicates how widely accepted TMC products and services have become.

Government and PTT Organizations

Greece, Italy, Switzerland, Spain, Portugal, Turkey, Kenya, Morocco, Liberia, Saudi Arabia, Pakistan, Korea, Indonesia, Canada, United States, Australia, Papua New Guinea, New Zealand, Nepal, Singapore, Thailand

Civil Aviation Agencies

Belgium, France, Spain, Greece, Chile, Brazil, Turkey, Italy, Pakistan, Algeria, Saudi Arabia, Liberia, Kenya, Zambia, Canada, United States, Phillipines

The United Nations

NATO Procurement Agencies (Europe)

International Corporations

American Telephone & Telegraph (ATT), International Telephone & Telegraph (ITT), General Telephone & Electronics (GTE), Contel-Page Communications, Marconi, Racal, Rockwell International/Collins, Harris/RF Communications, General Electric/RCA, Raytheon Service, Bell Canada, Arabian-American Oil (Aramco), Air Canada, Pan American Airways, Continental Electronics, Thomson CSF, General Dynamics, Lockheed Aircraft, Sandia, Western Electric

Military and Defense Forces

Norway, Denmark, West Germany, Belgium, France, Italy, Spain, Portugal, Greece, Turkey, United Kingdom, Algeria, Saudi Arabia, Nigeria, Kenya, Pakistan, United States, Canada, Thailand, New Zealand, Australia, India

Complete Families of TMC Products

COMMUNICATIONS EQUIPMENT

| | | | | |
|--------------|-----|-----|-----|--|
| Systems | SYM | | | Transportable/Contingency Communications |
| Transmitters | GPT | HFT | | High Frequency Sideband Transmitters |
| | LFT | MFT | BCT | Broadcast, LF and MF Transmitters |
| | MMX | LFE | SBG | Multi-mode LF/MF/HF Synthesized Exciters |
| Exciters | STE | SME | | Multi-mode Multi-Channel Exciters |
| Receivers | GPR | STR | SMR | Synthesized and Multi-Channel Receivers |
| Transceivers | TTR | | | High Frequency Synthesized Transceivers |

COMPUTER PRODUCTS

| | | | | |
|------------------|-----|-----|-----|--------------------------------------|
| Remote Control | TCR | TCS | RMC | Remote Monitor and Control Systems |
| Security Systems | SCS | | | Security Monitor and Control Systems |
| Software | TMC | | | Network Monitor and Control Software |

ANTENNA PRODUCTS

| | | | | |
|---------------|-----|-----|-----|--|
| Antennas | ARA | VRA | VTA | Vertical Receiving/Transmitting Antennas |
| | DPA | RBA | SVA | Dipole, Rhombic, Sloping-V Antenna Systems |
| | VDA | VOA | | Directional/Omnidirectional VHF Antennas |
| Tuners | ATS | ATU | MAT | Antenna Tuners and Tuning Systems |
| Couplers | RAC | TRC | DAC | Receiving/Transmitting Antenna Couplers |
| Multicouplers | AMC | LMC | VMC | Receiving Antenna Multicouplers |
| Filters | LPF | RFP | TFP | Low Pass, Harmonic and Receiving Filters |

CONNECTOR PRODUCTS

| | | | | |
|---------------|-----|-----|-----|---|
| Patch Panels | SPP | QDP | JPP | Switching/Quick-Disconnect Patch Panels |
| RF Connectors | CA | AX | TCA | RF Cables and Connector Assemblies |
| | PL | ES | SW | Plugs, Switches, End Seal Assemblies |

"The World-Wide System of Remote Controlled Communications"



Locations of TMC Communication Installations Throughout The World

Mamaroneck, NEW YORK * Washington, DC * Dayton, OHIO * San Diego, CALIFORNIA
Ottawa, Ontario, CANADA
UNITED KINGDOM * NORWAY * FRANCE * WEST GERMANY * SWITZERLAND * ITALY
GREECE * PORTUGAL * SPAIN * ALGERIA * SAUDI ARABIA * TURKEY * CYPRUS
EGYPT * NIGERIA * ALGERIA * LIBERIA * KENYA * KUWAIT * TANZANIA * INDIA
PAKISTAN * BURMA * THAILAND * TAIWAN * KOREA * SRI LANKA * SINGAPORE
AUSTRALIA * NEW ZEALAND * MALAYSIA * NEPAL * BRAZIL * CHILE * PERU
ARGENTINA * ECUADOR * BOLIVIA * MEXICO * VENEZUELA * URUGUAY

The Technical Materiel Corporation

700 Fenimore Road
Mamaroneck, New York 10543-0142 U.S.A.



Customer Service: 914-698-4800/Telex 137358
