INSTRUCTION MANUAL

*AMPFET 50

50000 WATT
AM BROADCAST TRANSMITTER
535kHz TO 1605kHz

(STEREO CAPABLE)

*AMPFET is a registered Trade Mark

nautel

NAUTICAL ELECTRONIC LABORATORIES LIMITED

RR1 TANTALLON, HACKETT'S COVE

HALIFAX COUNTY, NOVA SCOTIA, CANADA

B0J 3J0

LIST OF EFFECTIVE PAGES

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Original . . . . 15 January 1986

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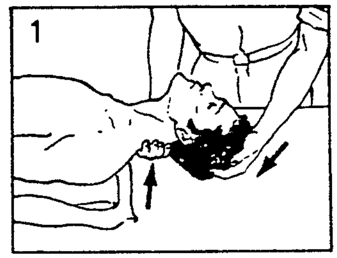
ARTIFICIAL RESPIRATION (MOUTH TO MOUTH METHOD)

1. START MOUTH TO MOUTH BREATHING IMMEDIATELY, SECONDS COUNT. Do not wait to, loosen clothing, warm the casualty, or apply stimulants.

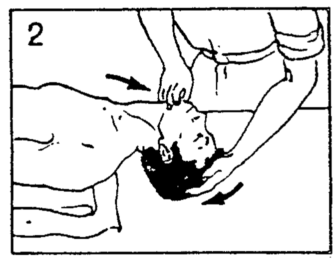


2. LAY CASUALTY ON HIS BACK and place any available jacket or blanket under his shoulders.

3. LIFT THE NECK. (Fig. 1)

4. MOVE FOREHEAD BACK as far as possible and open mouth by lifting jaw forward. (Fig. 2)

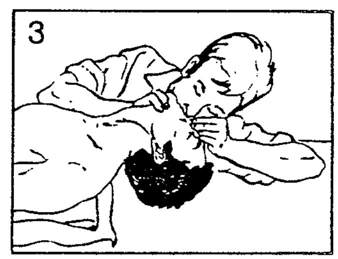
5. TAKE A DEEP BREATH and open your mouth widely.



6. PINCH CASUALTY'S NOSE and blow into casualty until you see the chest rise. (Fig. 3)

7. REMOVE YOUR MOUTH and let casualty's chest deflate. (Fig. 4)

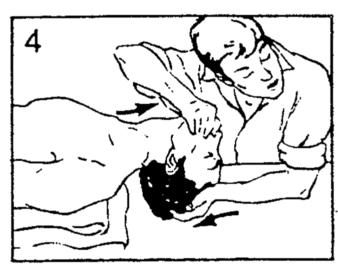
8. CONTINUE MOUTH-TO-MOUTH BREATHING without interruption at the rate of 10 to 12 breaths a minute. If any air retained in the stomach after exhalation by casualty, press gently on stomach to expel air.



9. IF CHEST DOES NOT RISE CHECK for obstruction in casualty's mouth: Clear foreign material by turning the head to one side and using finger, tissues, etc. Check neck extension and recommence mouth-to-mouth breathing.

10. WHILE MOUTH-TO-MOUTH BREATHING IS CONTINUED have someone else:
    (a) Loosen casualty's clothing
    (b) Summon medical aid.
    (c) Keep the casualty warm.

11. DON'T GIVE UP. Continue without interruption until the casualty is revived, or until a doctor pronounces the casualty is dead. Four hours or more may be required.



12. DO NOT LEAVE CASUALTY when he revives. Be ready to resume artificial respiration if necessary.

13. DO NOT give liquids while victim is unconscious.

GENERAL RULES FOR TREATMENT FOR BURNS, BLEEDING, AND SHOCK

1. After casualty has revived, treat for injuries and shock.
2. Reassure casualty.
3. Try to make him comfortable.
4. Keep him reasonably warm but do not apply heat.
5. If thirsty, liquids may be given but no alcohol (no liquids should be given in cases of severe burns).
6. Treat burns or wounds. Infection danger in treating burns or wounds is very great so ensure hands are clean and do not handle affected areas more than necessary.
7. Do not apply salves, grease, etc. to burns.
8. Do not remove burned clothing which adheres to the skin or break blisters.
9. Cover the burn with a dry sterile dressing, piece of sheeting, etc.
10. Bandage lightly over blisters where care must be taken to cover and not to break.
11. If severe bleeding of wound, elevate affected area, except in the case of a fracture.
12. Expose wound, remove visible foreign bodies and apply pressure.
13. Apply dressing, pad and bandage.
14. For burns and bleeding, immobilize injured part using splints if necessary and keep patient in restful position during removal to hospital or expert medical attention.
15. In all cases, send for medical aid immediately.

ELECTRIC SHOCK - RESCUE METHODS

Electricity can damage the body in a number of ways. It may interfere with the proper functioning of the nervous system and the heart action, it can subject the body to extreme heat and can cause severe muscular contractions. The path that the current of electricity takes through the body is important. Currents which pass from hand to hand or from hand to foot may pass directly through the heart and upset its normal functioning. This threat to life is related to the amount of current or amperage which will flow through a victim's body. Very little current (as little as 10 milliamps) can result in severe shock.

Speed in the application of first aid measures is absolutely essential in cases of electrical injury. As soon as the victim is freed safely from the source of the electrical current, if breathing has stopped, artificial respiration should be commenced immediately. If the carotid pulse cannot be felt, external cardiac massage should be commenced simultaneously. Resuscitation should be continued until the patient is breathing on his own or until medical aid arrives. Survival rates can be quite high if cardio-pulmonary resuscitation is started within 3 to 4 minutes of the injury being received.

ACT AT ONCE - DELAY OR INDECISION MAY BE FATAL

1. Remove source or casualty from electrical contact.
2. Commence artificial respiration immediately.
3. Treat for burns, bleeding and shock.

REMOVING A CASUALTY FROM ELECTRICAL CONTACT

LOW VOLTAGE - 0 to 240 volts (household use)

Switch off the current, if possible and time permits. If the switch cannot be located immediately and the supply is through a flexible cord or cable, the current may be shut off by removing the plug or even breaking the cable or wrenching free. Never attempt to shut off current by cutting cord with a knife or scissors.

If the current cannot be shut off, the greatest care is necessary in removing the casualty. Household rubber gloves, rubber or plastic hose (if there is no water in them), a dry unpainted stick or a clean dry rope can be used to free victim.

HIGH VOLTAGE - 240 volts and up (industrial machines and power lines)

Do not touch any person or equipment in contact with a wire.

Use a dry unpainted pole, clean dry rope, dry rubber or plastic water hose to separate the casualty from the contact.

Keep as far away as possible.

Do not touch the casualty until he is free.

WARRANTY

Nautical Electronic Laboratories Limited/Nautel Maine Incorporated, hereinafter referred to as Nautel, guarantees all mechanical and electrical parts of the equipment for a period of thirteen months from date of shipment.

1. A "Part Failure" shall be deemed to have occurred when the part has become defective, or does not have the characteristics required for the specified equipment performance:

   (a) When the equipment is operated within the design parameters, and

   (b) When the equipment is installed and adjusted according to Nautel's prescribed procedures as stated in the instruction manual.

2. Nautel shall provide replacements for all "Parts" at no cost to the Customer when they become defective during the warranty period, and upon the return of the defective part.

3. In the event that a "Part" fails during the warranty period and causes damage to a sub-assembly which cannot be readily repaired in the field, the entire sub-assembly so damaged may be returned to Nautel for repair. The repairs will be made without charge to the Customer.

4. Where no-charge warranty replacements or repair are provided under items 2 or 3, Nautel will pay that part of the shipping costs incurred in returning the part/assembly to the Customer.

5. Nautel will not assume responsibility for any charges incurred by other than Nautel employees.

6. Nautel shall have the privilege of investigating whether failures have been caused by factors beyond its control.

7. Nautel shall in no event be liable for any consequential damages arising from the use of this equipment.

8. When requesting a warranty repair/replacement, please provide complete and accurate information. Observe the instructions regarding 'Equipment Being Returned to Nautel' on page two of this warranty and provide the information requested.

9. When ordering spare/replacement parts; please provide complete and accurate information. Refer to the parts list of this manual for ordering information. Provide as much of the information requested for 'Equipment Being Returned to Nautel' on page two of this warranty as is practical. The information identified by an asterisk is the minimum required.

EQUIPMENT BEING RETURNED TO NAUTEL

All equipment being returned to Nautel and all requests for repairs or replacements should be marked 'field return' and addressed to the appropriate Nautel facility.

United States of America customers use:

Nautel Maine Incorporated
201 Target Industrial Circle
Bangor, Maine 04401

Telephone 207-947-8200 (24 hours)
Telex 944466

All other customers use:

Nautical Electronic Laboratories Limited
Hackett's Cove, RR#1 Tantallon
Halifax County, Nova Scotia, Canada
B0J 3J0

Telephone 902-823-2233 (working hours)
903-422-9641 (non-working hours)
Telex 019-22552

Complete and accurate information regarding the equipment being returned will ensure prompt attention and will expedite the dispatch of replacements. Refer to the nameplate on the transmitter and/or the appropriate module/assembly to obtain name, type, part and serial number information. Refer to the parts list of this manual or the appropriate plug-in module appendix for additional ordering information.

The following information should accompany each request:

- Station name/call sign
- * Model of Transmitter
- * Serial number of Transmitter
- Transmitted Frequency
- * Name of Part/Assembly
- Serial number of Part/Assembly
- * Complete reference designation of Part/Assembly
- * Nautel's part number of Part/Assembly
- * OEM's part number of Part/Assembly
- Number of hours in Use
- Nature of defect
- * Return shipping address

* Denotes minimum information required to order spare/replacement parts

CUSTOMER SERVICE NOTICE

A 'Technical Assistance' and 'Plug-in Module Exchange' service is available to AMPFET users. Direct all communications/requests to the appropriate Nautel facility (refer to top of this page).

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GENERAL INFORMATION

INTRODUCTION

1.1 The AMPFET 50 kilowatt transmitter is a totally solid state, medium wave, amplitude modulated, broadcast transmitter. It contains two independent, drawer mounted, exciters (operational and standby) that contain audio and rf drivers, the exciters are selectable at either a local or remote configuration. There are also 48 - 1.25 kW power amplifier/ modulator subsystem modules and dual power supplies. The AMPFET 50 operates over the AM broadcast frequency band into a nominal 50 ohm, unbalanced, transmission line. Typically, the AMPFET 50 transmitter will operate continuously at 125 percent positive peak modulation and 120 percent of full rated rf output power. Interfacing is provided to enable the transmitter to be remotely controlled. The AMPFET 50 transmitter has been type accepted by Department of Communications, Canada (type approval number 276501068).

PURPOSE AND SCOPE OF MANUAL

1.2 This manual provides the information necessary to install, operate and maintain Nautical Electronic Laboratories Limited (Nautel) AMPFET 50 medium wave broadcast transmitters. Appendices are included with this manual which provide information necessary for troubleshooting and maintaining bench-repair modules used in the transmitter. Nautel also provide a service facility for repair of these modules. See Warranty (Page 2).

PURPOSE OF EQUIPMENT

1.3 The AMPFET 50 transmitter is intended for use in a conventional AM broadcasting station. Remote control facilities are incorporated to allow unattended operation at a transmitter site remotely located from the station studios.

DESIGN CONSIDERATIONS/CHARACTERISTICS

1.4 The AMPFET 50 has been designed to meet the stringent requirements for state-of-art AM broadcast transmitters (see table 1.1). Additionally, two areas of special concern have been given full consideration in the design of the AMPFET series of transmitters. These are: (a) maintainability; (b) efficiency.

1.4.1 MAINTAINABILITY: The subject transmitter utilizes the modular assembly concept in design for ease of maintenance, maximum flexibility and built-in redundancy. Since a broadcast transmitter must operate continuously, it has been traditional to duplicate the entire system, with automatic or remote/manual switchover, to ensure continuing transmission in the event of a failure in the main transmitter. Nautel's AMPFET 50 broadcast transmitter incorporates a number of design innovations that virtually eliminate the need for a second transmitter system. Some of these are:

1.4.1.1 <u>On Air Servicing</u>: The benefits of modular redundancy are optimized by the provision of isolation switches for each 5 kW power block. A 1.25 kW subsystem module may be safely removed for servicing while most of the transmitter remains on-air. Shorting switches are provided at the back of each quad combiner so that once a PA subsystem has been removed the other three in the group may be returned to service by reclosing the isolation switch.

1.4.1.2 Dual Power Supplies: The operating B- voltage of the transmitter is produced by two independent ac/dc power supplies. Each power supply contains its own three phase delta connected transformer and rectifier to provide -72 vdc supply to their associated power amplifier racks. Strap connections are provided to enable one ac/dc supply to power all four power amplifiers racks. The transmitter may then be operated at half power while one power supply is being serviced.

1.4.1.3 Operational and Standby Exciters: Two slide-mounted NAE35 exciter drawers are selected by local or remote switching modes. Each contains its own crystal oscillator and the control circuitry to provide rf drive and modulator drive signals to the power amplifier/modulator sections. The exciters slide forward to provide the user easy access to power level, modulation level and audio processing filter controls.

1.4.2 DESIGN CONSIDERATIONS: The AMPFET 50 is designed to comply with CCIR and FCC standards and to have a performance which meets or exceeds the specifications issued by major broadcasting authorities. It utilizes the modular assembly concept in design for ease of maintenance, flexibility and built-in redundancy that frequently eliminates the need for any form of standby transmitter.

1.4.2.1 Power Amplifier/Modulator Redundancy: The AMPFET 50 consists of 48 identical 1.25 kW power subsystems combined into 5 kW power blocks. The twelve 5 kW blocks are combined in the final harmonic filter/combiner to provide up to 60 kW output capability. Subsystem failure will not result in an off-air condition. The 'Integral Modular Reserve' (IMR) design provides for continued operation at a slightly reduced power without additional stress on the remaining subsystems.

1.4.2.2 AM Stereo: The transmitter is designed to assure superior AM stereo performance with all stereo systems without the need for complex phase equalization.

1.4.2.3 Protection: A fast responding output protection circuit senses amplitude and phase of the rf current to protect the transmitter against unacceptable loads and antenna arcing. A high speed secondary surge arrestor is included in the harmonic filter to provide protection additional to the customers antenna spark gap. A lightning/surge arrestor kit is provided with each AMPFET 50 transmitter.

1.4.2.4 Cooling: Each 1.25 kW power subsystem has its own cooling fan and thermo protection to assure complete redundancy of the cooling system. Air intake is through filters fitted in the transmitters rear doors. Warm air exhausts at the top of the racks as shown in figure FO-45 in the mechanical illustrations.

1.4.2.5 Selection of Audio Processing: Low and high pass filters can be selected to suit program format. Roll-off characteristics may be chosen to provide the best transient response and minimum square wave droop consistent with acceptable frequency response.

1.4.2.6 Stabilized rf Output: An 'ac line voltage compensation' circuit stabilizes the transmitter power output against variations of the line voltage and virtually eliminates hum and distortion products due to ripple voltages on the dc supply from the transmitter output signal.

1.4.3 EFFICIENCY: The highly efficient solid state design assures minimum power is wasted and dissipated as heat. The overall efficiency exceeds 75 percent at all modulation levels and high efficiency is maintained even at reduced power.

1.4.3.1 Reserve Power: The AMPFET 50, 50 kilowatt transmitter provides 20 percent reserve power and has 125 percent positive peak modulation capability even at 55 kilowatts output power.

1.4.3.2 Transparency: NAUTEL utilizes techniques of class 'D' amplification and pulse width modulation (PWM) which are inherently linear. Various parameters such as amplitude stability, distortion and frequency response are optimized without any requirement for overall negative feedback.

MECHANICAL DESCRIPTION

1.5 The AMPFET 50 transmitter as shown in figures FO-13/14/45, is housed in six separate cabinets which are are bolted together, for the physical dimensions and weight of the cabinets, refer to the technical summary listed in table 1.1. Cabinets one, two, four and five contain the 15 kW power blocks these blocks house the 48 - 1.25 kW power amplifiers, cabinet three contains a control/monitor panel, two individual, drawer mounted exciters plus interfacing panels and cabinet six contains two individual ac/dc power supplies plus a final harmonic filter/combiner assembly. The rear portion of all six cabinets are enclosed by full-depth hinged doors, the front sections of each cabinet with the exception of cabinet three, also have full-depth hinged doors. Cabinet three, the control/monitor cabinet contains metering and alarm indicators that are visible at all times. The top of the cabinets have exhaust air vent openings for the purpose of heat dissipation.

1.5.1 NAR70 15 KILOWATT POWER AMPLIFIER CABINET (see figures FO-15/16/): Cabinets one, two, four and five contain the 15 kW power blocks with three quad combiners in each block. The mechanical description of each cabinet will be identical, therefore only one, of the four cabinets will be explained. The power amplifier cabinet houses twelve 1.25 kW power amplifiers (NAP10 AM power amplifier subsystem), three quad combiners and a fan control panel assembly.

1.5.1.1 1.25 kW Power Amplifier (NAP10 sub-system): There are twelve 1.25 kW power amplifiers located within the NAR70 cabinet. Each power amplifier contains its own muffin type cooling fan which is located at the rear section of the amplifier. The 'integral modular reserve' design provides for continued operation of the transmitter when a power amplifier has been removed for servicing. For a more detailed description of the power amplifier, refer to the NAP10 1.25 kW AM power amplifier subsystem service instruction booklet.

1.5.1.2 NAF37 Quad Combiner/Filter (see figures FO-17/18): There are three identical quad combiners located within the NAR70 cabinet, each combiner is associated with four 1.25 kW power amplifiers. The combiners are situated in the upper, middle and lower sections of the cabinet. The front section of the combiner is a formed metal panel with no controls or switches, the rear section contains four manually controlled 5 kW 'operate/short' status switches, an rf current output (J5) and a 5 kW rf output terminal (E1). The inside portion of the combiner houses the electrical components necessary to combine and filter the outputs of four 1.25 power amplifiers which are connected to input jacks J1 through J4. Access to the operate/short switches can be attained by opening the hinged door at the rear of the cabinet.

1.5.1.3 15kW Power Block (NAR70) Fan Control Panel (see figure FO-19): The fan control panel is located at the extreme bottom portion at the front section of the cabinet. The front portion of the panel contains three accessible slow-blow fuses and a control relay for the cooling fan circuitry, the rear portion of the panel contains a terminal board that provides for the external input connections to the panel.

Table 1-1 Technical Summary

Nautel Model Number . . . . AMPFET 50

Configuration . . . . Forty-eight 1.25 kW power amplifier/modulator sub-systems
Main/standby modulator and rf drivers

RF Carrier Output . . . .(Rated) 50,000 Watts, (Capable) 60,000 Watts
Three preset power levels between 10,000 Watts and 50,000 Watts are selective through LOCAL or REMOTE control

RF Frequency Range (supplied to one frequency as ordered). . . . 535 kHz to 1705 kHz

RF Terminating Impedance . . . . 50 ohms, unbalanced

Audio Frequency Response . . . . 30 Hz to 10,000 Hz within $\pm$0.5 dB

Audio Harmonic Distortion . . . Better than 2% (THD) at 95% modulation 30-10,000 Hz
Reduced antenna bandwidth may degrade specification

Audio Intermodulation Distortion
(1) . . . . 1.0% or less at 50 kW, 60/7000 Hz 1:1 ratio at 50 kW output
(2) . . . . 2.0% or less at 50 kW, 60/7000 Hz 4:1 ratio at 50 kW output
(3) . . . . SMPTE Standards at 85% modulation

AM Stereo (RF Phase Shift) . . . . Less than 2° = 0.035 radians (1 radian = 57.29°) incidental phase at 1 kHz

Modulation Capability . . . . .125% positive peak modulation to 55 kW

Carrier Shift . . . . Not exceeding 1%

RF Harmonics . . . . 80 dB or more below 50 kW output

Spurious Outputs . . . . 80 dB or more below 50 kW output

Noise and Hum (unweighted) . . . . .60 dB or more below 100% modulation at 50 kW

Frequency Stability . . .$\pm$5 Hz or $\pm$5ppm whichever is greater over temperature range

Audio Input . . . . 600/150 ohms +10 dBm nominal
(adjustable from 0 dBm to +12 dBm)

Power Input . . . . 480V 3 phase 50/60 Hz Delta
Separate 120V, single phase, 60 Hz supply required for Exciters and Cooling Fans
Other voltages available on request

Permissible Power Supply Variations . . . . $\pm$5% voltage, $\pm$5% frequency

Table 1-1 Technical Summary (Continued)

Power Consumption
0% modulation . . . .(at 50 kW) . . . . 66.7 kW
100% modulation . . .(at 50 kW) . . . . 100.0 kW

Power Factor . . . . 0.98 (typical)

Overall Efficiency . . . . Better than 75%

Metering
(1) . . . . Forward/reflected output power
(2) . . . . DC input current/voltage to each Power Amplifier rack
(3) . . . . Test meter, each Exciter
(4) . . . . DC current meters, each 1.25 kW Power Amplifier/Modulator subsystem

Remote Control
(1) . . . . Transmitter ON/OFF
(2) . . . . Output Power Level Selection
(3) . . . . Selection of Exciter 'A' or 'B'
(4) . . . . External Gain (Power Adjust)

Remote Monitoring
(1) . . . . Forward Power Output
(2) . . . . Reflected Power Output
(3) . . . . Status of Critical Parameters

Environmental Limits:
Temperature . . . . -10 - 50°C
Relative Humidity . . . . 0 - 95%
Altitude . . . . 0 - 10,000 feet

Dimensions . . . . The transmitter is contained in six individual cabinets

(Four) Power Amplifier Cabinets and (one)Master Control Cabinet, the dimensions of each of the five cabinets are the same.

Height . . . . 72 inches (183 cm)
Width . . . . 22.5 inches (61 cm)
Depth . . . . 24 inches (67 cm)

AC/DC Power Supply/Output Filter Cabinet
Height . . . . 73.5 inches (187 cm)
Width . . . . 45 inches (114 cm)
Depth . . . . 30 inches (76 cm)

Total Floor Space . . . . 28.2 sq. ft. (263 sq decimeters.

Total Weight: . . . .(approximately) 4705 pounds (2132 kg)

Type Approval
(1) . . . . DOC (Canada) Type Approval No. 276501068
(2) . . . . FCC Type Accepted ** kW to ** kW
(3) . . . . FCC Id: **************

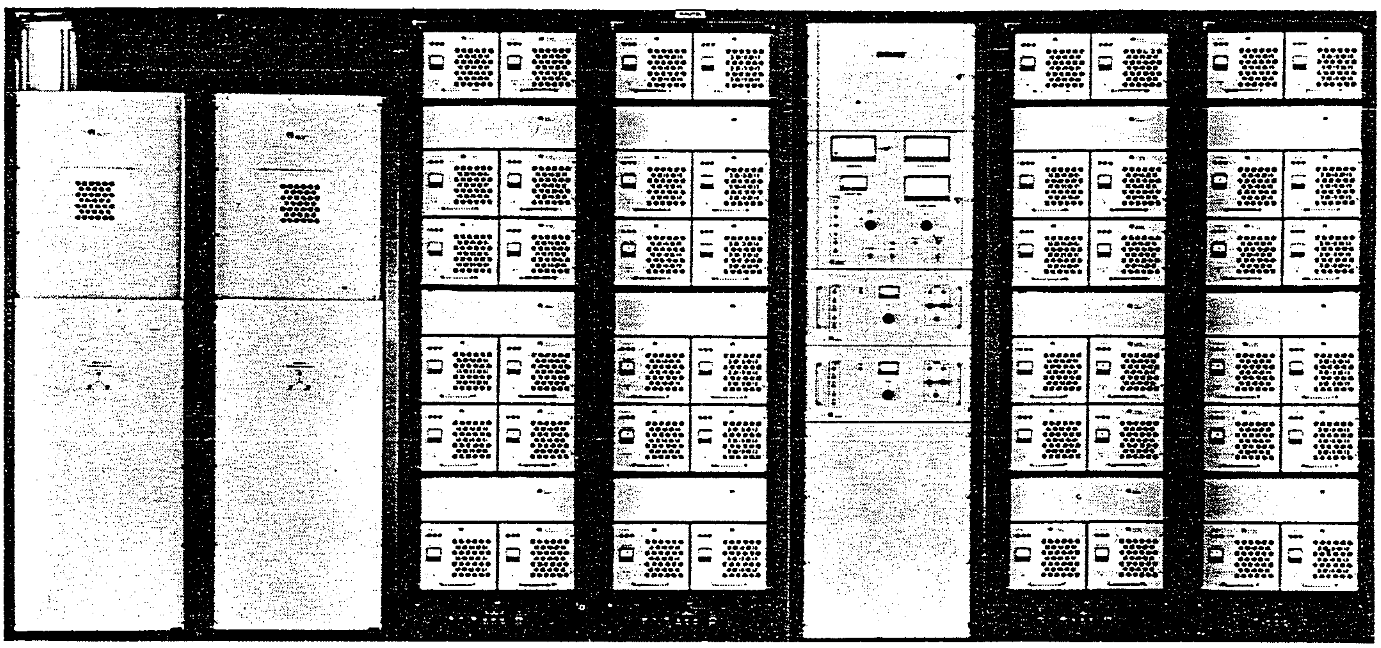

Figure 1-1 AMPFET 50 Transmitter

1.5.2 NAR69 CONTROL/MONITOR CABINET (see figures FO-20/21/22): The control/monitor cabinet contains the control/monitor panel, the operational and standby, drawer mounted, exciters A/B (NAE35), an interface panel with its associated printed circuit boards, a current shunt/interface panel, twelve relay control panels and a -72 vdc choke tray. A full-depth hinged door encloses the rear section of the cabinet, the front section has two hinged panels on the upper portion and a removable panel in the lower portion that is secured by holding screws. The removable panels or hinged upper doors allow for easy access to the circuitry and assemblies located within the cabinet.

1.5.2.1 NAC27 Control/Monitor Panel (see figures FO-23/24): The transmitters control switches, indicator lamps and meters are mounted on the front section of the control/monitors hinged door. The front portion of the panel is visible at all times, this enables the user to monitor the various critical parameters of the transmitter. Access to the inside section of the panel is done by simply turning a latching knob which is adjacent to the dc supply meter. The inner portion of the panel contains a single-sided 'meter' printed circuit board, the board is secured to the rear section of forward power meter (M1). All external input connections are made at J1.

1.5.2.2 Exciter 'A' and 'B' (NAE35) Drawers (see figure FO-20): There are two identical exciter drawers located within the control cabinet. Both exciters are mounted on slides and are equipped with handles on their respective front panels, this allows for easy access to the circuitry within the exciters. For a more detailed mechanical description of the exciters, refer to the associated NAE35 exciter drawer service instruction booklet.

1.5.2.3 NAC29 Interface Panel (see figures FO-25/26): The interface panel is located on the upper inside section of the control/monitor cabinet. Access to the panel is made by simply opening the two upper hinged doors on the front of the cabinet. The panel contains twelve manually controlled 5 kW power block on/off switches with their respective control relays, rf monitor, alarm interface, rf current protection and on/off control printed circuit boards. The boards are mounted on hexagon pillars and secured to the pillars by holding screws. The panel also contains the various jacks and a terminal board which provide for external connections for the panel.

1.5.2.3.1 NAPC10 External Monitoring Switching (A1) Pcb (see figure FO-27): The switching pcb is a single-sided printed circuit board and is situated on the front section of interface panel. External connections are made at J1 and J3. The board is mounted on hexagon pillars and secured to the pillars by holding screws.

1.5.2.3.2 NAPC11 Interface Pcb (see figure FO-28): The alarm interface pcb is a double-sided printed circuit board and situated on the front section of the interface panel. External connections to the board are made at jacks J1 through J3. The board is mounted on hexagon pillars and secured to the pillars by holding screws.

1.5.2.3.3 NAPC13 Rf Current Protection Threshold Pcb (see figure FO-29): The threshold pcb is a double-sided printed circuit board and situated on the front section of the interface panel. External connections to the board are made at jacks J1 through J14. The board is mounted on hexagon pillars and secured to the pillars by holding screws.

1.5.2.3.4 On/Off Control Pcb (see figure FO-30): The control pcb is a single-sided printed circuit board and situated on the front section of the interface panel. External connections to the board are made at J1. The board is mounted on hexagon pillars and secured to the pillars by holding screws.

1.5.2.3.5 NAX25 Relay Control Panel (see figure FO-31): There are twelve relay control panels located within the control/monitor cabinet, the panels are situated on the rear section of the cabinet and access to them can be attained by simply opening the rear full-depth hinged door. The panel contains a single-sided printed circuit board that contains control and protection circuitry. Terminal board TB1 and jack J1 provide for input connections for the panel and pcb, terminal board TB2 provides the external output terminal for the board. Transformer T1 provides interfacing for the rf drive input. Fuses F1 through F4 are connected across the B- line.

1.5.2.3.6 Current Shunt/Interface Panel Assembly (see figures FO-32 through FO-36): The current shunt assembly is situated behind the front lower panel of the control monitor cabinet. Access to the assembly is attained by removing the eight holding screws of the lower panel. The assembly contains the four solid metal, shunt resistors for the associated metering circuits, the resistors are bolted to a formed metal bracket which is secured to the rear panel of the assembly by four bolts. Terminal boards TB1 through TB10 provide the external connectors of the assembly. The panel also contains a single-sided overvoltage protection printed circuit board (A17) and a transient clipper assembly (A18). Cooling fan (B1) is situated above the current shunt resistors.

A -72 vdc choke tray consisting of twelve choke coils that are connected across the output of the two ac/dc power supplies is situated at the extreme lower portion of the control cabinet directly below the current shunt assembly. The cokes are secured to a formed metal bracket which is tiered, six chokes are located on the lower section of the bracket and the remaining six are secured directly above them, the bracket is secured to the cabinet by bolts. Electrical connections in and out of the coils are made at terminals one and two of the respective chokes.

1.5.3 NAR72 FINAL FILTER/POWER SUPPLY CABINET (see figures FO-37/38): The final filter cabinet is configured in two sections, the lower portion of each section contains an ac/dc power supply which produce the -72 vdc for the transmitter, the upper section houses the final rf combiner/filter assembly. Both cabinet sections have hinged, full-depth, front and rear doors and removable panels which provide easy access to the inner portion of the cabinet. The rear section of the cabinet contains the cooling fans which are located behind filter screens. There are ten cooling fans in the NAR72 cabinet and a fan control panel. The front section contains exhaust port holes in the upper portion for heat dissipation and the lower portion has three-phase lamp configurations for each of their respective ac/dc power supplies.

1.5.3.1 NAR72 Cabinet Fan Control Panel (see figure FO-39): The fan control panel is located on the lower, side panel of the cabinet, adjacent to a 15 kW cabinet. Five fuses and an associated 24 vdc control relay are situated on the outer section of the panel, the fuses are connected across the 115 vac input being applied to the cooling fan circuitry in each of the transmitters six cabinets. Terminal boards TB1 and TB2 are situated on the inner section of the panel and provide interfacing for all external/internal wiring .

1.5.3.2 NAF39 50 Kilowatt Combiner/Final Filter (see figures FO-40/41): The combiner assembly is situated across the entire upper section of the cabinet, access to the assembly can be attained by removing the upper panels at the front or rear section of the cabinet. A forward/reflected power probe and an output voltage probe are located beneath the formed metal housing which encloses the rf output jack (J1). A combiner metal strip (E2) is bolted directly above the coil assembly and connects the twelve 5 kW power block inputs to the filtering network.

1.5.3.2.1 NAFP12 Forward/Reflected Power Probe (see figure FO-42): The power probe is configured by two formed metal wafers, four hexagon pillars, approximately one inch in length separate the two wafers. All electrical components are situated on the inside portion of the probe, J2 and J3 are output jacks and J1 provides interfacing from the voltage probe circuit. The power probe is is held to the rear panel of the assembly by four holding screws. A solid metal bolt with two hexagon nuts at each end, traverses through the two wafers and provides connections at each end of the bolt.

1.5.3.2.2 NAFP13 Output Voltage Probe (see figure FO-43): The output voltage probe is a enclosed formed metal housing configuration. The probe is located below the metal housing which encloses the 'rf output' jack J1. Adjustments to electrical components within the probe can be achieved on the outer portion of the probes housing. J1 provides an external 'rf sample' output.

1.5.3.2.3 NASR60 Ac/Dc Power Supply (see figure FO-44): The two power supplies are situated in the lower sections of the cabinet. Formed metal brackets support the transformer and rectifier assemblies, the brackets are bolted to the cabinet bottom. Three metal straps electrically connect the secondary of transformer T1 to the associated three-phase rectifier, the rectifier uses a finned, heat sink for its chassis. The external output connections to the transmitters power blocks are made at E1 and E2. The ac input from service entrance is applied to terminals A/B/C on the three respective primary windings of transformer T1.

TECHNICAL SUMMARY

1.6 Table 1-1 - Technical Summary, contains a detailed technical summary.

BENCH-REPAIR ASSEMBLIES

1.7 Table 1-2 - Bench-Repair Assemblies - AMPFET 50, lists the type and quantity of bench-repair assemblies, drawers and subsystems used in the AMPFET 50 transmitter.

SPECIAL TOOLS AND TEST EQUIPMENT

1.8 Table 1-4 lists the special tools required. Table 1-3 - Test Equipment, lists the test equipment that is required to operate and maintain the AMPFET 50 transmitter.

GLOSSARY OF TERMS

1.9 Table 1-5 - Glossary of Terms, provides a list of all unique terms, abbreviations and acronyms used in this publication.

Table 1-2 Bench-Repair Assemblies - AMPFET 50

NAME DESIGNATOR	DESCRIPTION	QTY
NAP10	1.25 AM Power Amplifier Subsystem	48
NAE35	Exciter Drawer	2
NASR60	AC/DC Power Supply Assembly	2

NOTE Some assemblies/subsystems/drawers may have an alpha suffix on their designator (A, B, C, etc.). The suffix indicates the module contains minor component or circuit variations, but all assemblies having the same basic designator are fully interchangeable.

relocated to as 1-4

Table 1-3 - Test Equipment

NOMENCLATURE	PART, MODEL, OR TYPE NUMBER (EQUIVALENTS MAY BE USED)	APPLICATION
Dummy Load	50 ohms, ~~150~~ 100 kW VSWR: 1.1	'off-air' testing
Digital Multimeter	3 1/2 digit, ac and dc volts (10M ohms input), ohms and amps, ±0.5% accuracy, Beckman 3010	testing and maintenance
Frequency Counter	~~5~~ 1 ppm up to 10 MHz Fluke Model 1900A	measure carrier frequency
Oscilloscope	15 MHz Tektronix Model T922	testing and maintenance
~~Attenuator~~	20db	~~to calibrate current shunts~~
Audio Signal Generator	10 Hz to 10 MHz, 600 ohms, 0 to +15 dBm Hewlett Packard model 651B	simulates modulating audio input during testing and maintenance
Distortion Analyzer	20 Hz to 20 kHz ~~Marconi Model TF231A~~	measures audio distortion during testing and maintenance
Function Generator	sine, square and triangular waveform with dc offset Hewlett Packard model 3310A	signal source for module tests
24Vdc Power Supply	0 to 24 volts dc, 1 amp	dc supplies for module tests
RF Current Probe	40A ~~Calorimeter~~	measuring the rf current

Table 1-4 - Special Tools

NOMENCLATURE	PART, MODEL, OR TYPE NUMBER (EQUIVALENTS MAY BE USED)	APPLICATION
Tuning Tool	HAG38*	Setting carrier frequency. Adjust output levels.
Torque Wrench	Capable of torquing to six pounds, (0.69 Kilograms).	Reinstalling power MOSFETS

*Manufactured by, or available from, Nautel

Table 1-5 - Glossary of Terms

TERM	DESCRIPTION
AMPFET	NAUTEL's nomenclature for this fully solid-state series of broadcast transmitters.
Integral Modular Reserve IMR	Identical modules operating in an overall system design such that failure of individual modules results in a power reduction only and not a complete system shutdown.
Modular Redundancy	Identical bench-repair modules operating in an overall system design such that failure of one module does not affect the output of the system.
PWM	Pulse width modulation

SECTION 2
THEORY OF OPERATION

GENERAL

2.1 The theory of operation for the AMPFET 50 AM broadcast transmitter is presented in this section. The information is presented initially as an overview, then expanded upon using the electrical schematics of the associated circuits as a reference.

2.2 AMPFET 50 AM BROADCAST TRANSMITTER OVERVIEW (Figure FO-1): The AMPFET 50 transmitter operates over the AM broadcast frequency band up to 60 kilowatt rf carrier power. The system may be operated locally where the transmitter and antenna are co-located or by remote configuration where the transmitter and antenna are located at different sites. Selection of one of three output power modes and one of two exciters, may be performed locally or at the remote location. Protection circuits monitor critical functions of the transmitter and generate alarm signals internally and externally to their respective indicators should a fault occur. Internal and external interlock protection is also featured. The AMPFET 50 transmitter is also capable of operating at a reduced output power level should a failure occur in a power amplifier subsystem. Internal metering and external monitoring signals on the transmitter's critical parameters are also featured.

2.2.1 AC/DC POWER SUPPLY OVERVIEW (figure FO-1): The AMPFET 50 transmitter contains two NASR60 power supplies, each identical in its operation. A three-phase, ac power source is passed from the service entrance and applied to the primary of a tapped, stepped down transformer. The signal is applied across three status lamps, the lamps will turn on as each of their respective phase inputs are applied across them. The signal is then passed to a three-phase rectifier circuit that produces the -72 dc voltage, this will be the B- voltage of the transmitter. The B- voltage is then applied across a dc current and dc voltage metering circuit, applied thru a filtering circuit and passed to the various circuits of the transmitter.

2.2.2 LOCAL/REMOTE CONTROL OVERVIEW (figure FO-1): The AMPFET 50 transmitter can be controlled in a local or remote configuration. When switched to local mode, the external input signals are inhibited and all switching functions will be controlled at the local configuration. When switched to remote mode, power selection and exciter 'A' or exciter 'B' selection is controlled from a remote configuration. The +24 dc control voltage can be inhibited at the remote or local configuration when the transmitter is in the remote mode of operation. The +24vdc can not be inhibited at the remote configuration when the transmitter is switched to local mode of operation.

2.2.3 115 VAC DISTRIBUTION OVERVIEW (figure FO-1): The 115 VAC, 50/60 Hz is passed from the service entrance to the transmitter's forced air cooling circuits. When the master control switch on the control/monitor panel is closed, a +24 volt dc control signal energizes their respective cabinet relays and the 115 volt ac is applied to the cooling fans, the fans will turn on. An overvoltage protection circuit monitors the -72vdc input and will inhibit the 115 volt ac input being applied to the selected exciter if the -72vdc exceeds the desired limits. The application of the 115 volt ac power to exciter 'A' or 'B' may be selected at the local or remote configuration.

2.2.4 EXCITER/MONITOR OVERVIEW (figure FO-1): The exciter/monitor circuits produce the internal rf and modulation drive signals, provide interfacing for a external audio input, rf drive transient and rf current protection circuits and alarm interfacing to external and internal alarm indicator lamps. The associated pcb's also contain delay circuits that will inhibit the rf output until the transmitter has reached full power. External monitoring outputs and internal metering for the transmitters critical functions are also featured in this section.

2.2.4.1 NAPC13 RF Current Protection PCB Assembly Overview (figure FO-5): The NAPC13 rf current protection pcb assembly monitors and compares the phase of the pa current sample inputs with an rf drive sample input. The phase difference, if present, is detected and a dc voltage proportional to the phase difference of the two inputs is produced. The assembly also detects peak rf current levels and produces a dc voltage proportional to the peaks, this output is combined with the output of the phase difference detector and applied thru an amplifier circuit. The output of the amplifier will be a 'vswr shutback' control signal and will be a dc voltage proportional to the phase difference and/or magnitude of the rf drive and the power amplifier current. The rf current pcb also detects high rms rf current levels and produces a dc voltage proportional to the amount that the rms rf current exceeds safe limits. The output of this circuit will be an rf current shutback signal and passed to attenuator circuits within the transmitter. The pcb also contains two manually operated 'test' switches for simulating excessive peak rf current signals and excessive rms rf current levels which effectively checks the protection circuits within the transmitter.

2.2.4.2 ON/OFF Control PCB Overview (figure FO-5): The on/off control circuit (3A2A4) monitors the master control on/off switch located on the control/monitor panel. When the master control switch is turned on, a simulated 'rf stress current cutback' signal is generated and applied to attenuator circuits within the transmitter's operational exciter. This will inhibit the rf output of the transmitter for approximately nine seconds while the transmitter comes up to full power.

2.2.4.3 NAPC10 RF Monitor PCB Overview (figure FO-5): The NAPC10 rf monitor printed circuit board is a relay switching circuit that accepts a dc voltage representing the rf carrier output power of the transmitter in either FULL, LOW 1 or LOW 2 mode of operation and provides an rf carrier output signal for external monitoring purposes .

2.2.4.4 Exciter A/B (NAE35) Overiew (see figure FO-5): The exciter circuits provide the rf drive and mod drive for its associated transmitter. The AMPFET 50 transmitter contains two NAE35 exciters, both exciters are identical in their operation. Selection of either exciter may be controlled from the local configuration by a exciter select switch on the control monitor panel or from a remote configuration when the transmitter is set to remote mode of operation. For a more detailed overview, refer to the associated NAE35 exciter drawer service instruction booklet.

2.2.4.5 NAPC11 Alarm Interface PCB Assembly Overview (figure FO-5): The NAPC11 alarm interface pcb assembly accepts alarm signals from the transmitter's operational exciter plus the alarm signals generated from the power amplifier circuitry in cabinets one thru four. It processes the signals and interfaces them to their respective internal alarm lamps on the control/monitor panel and also to external alarm indicators. The printed circuit board also contains a trip-sensor circuit that monitors the regulated +15 volt dc signal. If a fault occurs that removes the +15vdc input from the sensing circuit, an internal and external alarm signal will be generated and applied to its respective internal and external alarm indicators. At the same instance that a alarm signal is generated the trip sensor circuit will also generate a control signal that gates on a trip-reset devise and a +15 volt dc crowbar device. After a delay of approximately eight seconds this circuit will reset +15vdc clamping devices in the associated exciter's power supply circuitry, the +15vdc signal will be re-applied to the trip-sensor circuit resulting in the alarm signal being cancelled. Dc sample voltages, representing the forward and reflected output power of the transmitter, are interfaced thru buffer amplifiers and applied out to external monitoring indicators.

2.2.4.6 Transient Clipper 3A18 Overview (figure FO-5): The transient clipper circuit clips and shunts to ground excessive voltage peaks caused by transients appearing at the rf drive output of the operational exciter. This prevents damage to power MOSFET's in the NAA13 power amplifiers.

2.2.4.7 NAC29 Interface Panel Overview (figure FO-5): The NAC29 interface panel circuit accepts a external 600 ohm or 150 ohm balanced audio input, filters the signal and passes the filtered signal simultaneously to the two exciters within the transmitter.

2.2.5 RF POWER STAGE OVERVIEW (figure FO-1): The rf power stage contains twelve 5 kilowatt power blocks that provide up to 60 kilowatts rf carrier output power. The power amplifier stage provides a sample of the B- voltage, this sample contains modulating audio information and is applied as a compensation input to the incidental phase modulation (IPM) correction circuit in the transmitter's operation exciter. Each 5 kilowatt power block generates rf current sample signals representing the phase and magnitude of the power amplifier current and applies the signal to rf current protection circuits for comparison. If a power amplifier should fail within a 5 kilowatt power block, a pa fail sense alarm signal will be generated and applied to internal and external alarm indicators. Fwd/refl pwr outputs are are produced and utilized for external and internal monitoring indicators plus a 'rf sample' output for external monitoring of the rf output of the transmitter when either 'full', 'low 1' or 'low 2' has been selected.

2.2.5.1 Power Block A/B/C/D Overview (see figure FO-3): The power block circuits contain twelve manually controlled on/off switches that pass or inhibit the -72 volt dc input, under normal operating conditions all twelve of the switches will be set to on. When the master control switch on the control/monitor panel is turned on, a dc control signal is passed to the relay in each block, the relays will energize and pass the -72vdc thru their respective fuses and apply it to the associated relay control assemblies.

2.2.5.2 NAX25 Relay Control Overview (see figure FO-3): The NAX25 relay control assembly is one of twelve assemblies located within the transmitter. Each assembly controls the on/off function of its respective 5 kilowatt power block, monitors the charging capacitors in the power block's individual 1.25kW power amplifiers and applies the -72 volts dc thru a relay circuit to the amplifiers when the capacitors have reached 95 percent of the -72 volt dc switched input. A mod drive fault detector inhibits the mod drive output should a fault occur on the mod drive line. The assembly also contains a turn-off delay circuit that inhibits the mod drive if the -72 volt dc switched signal is removed or turned off. A test switch contained in the mod drive fault detector circuit, when set to 'TEST', simulates a mod drive fault causing a relay to energize which inhibits the mod drive output. Rf drive input is interfaced through an impedance matching transformer and applied to the 5 kilowatt power block circuit.

2.2.5.3 5kW Power Block Overview (see figure FO-3): The 5 kilowatt power block is one of twelve blocks located within the AMPFET 50 transmitter. Each of the twelve blocks combines and filters the output of four 1.25 kilowatt power amplifiers to produce the desired 5 kilowatt rf carrier power for the transmitter. A dc voltage output, representing the combined current of each 5 kilowatt power amplifier is also produced and applied from the power block to an rf current protection printed circuit board.

2.2.5.4 NAF39 Final Filter Overview (figure FO-3): The final filter circuit combines the output of twelve 5 kilowatt power blocks, applies a two-stage filtering network for the combined signal and passes the combined/filtered signal to an antenna or tuning device. The circuit provides dc voltages representing the forward and reflected power of the transmitter for internal and external monitoring and an rf sample output for external monitoring. Two other functions of this circuit are a forced air cooling system and a spark gap assembly for lightning protection.

DETAILED THEORY OF OPERATION

2.3 The following description expands on the overview description presented in paragraph 2.2 of the transmitter's circuits and provides a detailed description of each circuit with the electrical schematics as a reference.

2.3.1 AC/DC POWER SUPPLY DESCRIPTION (figure FO-2): The ac/dc power supply accepts the 3 phase ac power source from the service entrance and produces the -72 dc voltage (B-) for the transmitter. It also provides output signals to meters on the control/monitor panel which indicate the level of the dc supply current and dc voltage being applied and utilized by the transmitter.

2.3.1.1 NASR60 AC/DC Power Supply Description (figure FO-2): The ac/dc power supply contains two NASR60 ac/dc power supplies. Both power supplies operate in the same manner with each supply controlling the B- voltage to six 5 kilowatt power blocks. To simplify circuit description, only one of the supplies (6A2) will be explained. A three-phase, ac power source from the service entrance is applied to terminals H1, H2 and H3. Each phase is passed to a tapped winding on the primary of transformer T1. Taps A, B and C are configured to allow for changes of the input voltage of ±5 percent. The output at the secondary of T1 is stepped down to 55 volts ac and applied across phase A, B and C (6DS1 thru 6DS3) status lamps. The lamps will turn on, indicating each phase is present. The 55 volt ac input is applied to a three-phase rectifier circuit consisting of diodes CR1 thru CR12. By grounding the positive side of the rectifier, a -72 volt dc output will be produced at E1. The -72 volts dc is applied across shunt resistor 3R1 and 3R2 from power source 6A2 and shunt resistors 3R3 and 3R4 from power supply 6A3. The output at terminals 2 and 3 of each of the four shunt resistors is passed to dc supply current switch 3A1S5 terminals one thru ten, selection of rack 'A', 'B', 'C' and 'D' by switch S5 will indicate on meter 3A1M3 the amount of current being applied to each of the four racks.

The output at terminal four of each shunt resistor is applied across inductors 3L1 thru 3L12 which operate in conjunction with capacitors in there respective 1.25 kilowatt power amplifiers in filtering the -72 volt dc output. Dc supply volts meter 3A1M2, located on the control/monitor panel, is connected across inductors 3L5 and 3L8 and ground, the meter indicates the level of the B- voltage being applied to the transmitter. The -72 volt dc output is applied to the 5 kilowatt power section, exciter circuits and a overvoltage protection circuit. Ac/dc power supply 6A2 is applied to power block relay switching circuits A and B while 6A3 power supply is passed to power blocks C and D.

2.3.2 LOCAL/REMOTE CONTROL DESCRIPTION (figure FO-4): The AMPFET 50 transmitter can be controlled in a local or remote configuration. When LOCAL/REMOTE switch 3A1S2 is set to 'local' the external control input signals at terminal board 3A2TB1 are inhibited by the wipers of latching relays 3A2K5 thru 3A2K8. POWER SELECT switch 3A1S3 and EXCITER A/B switch 3A1S4 will be controlled from the control/monitor panel. When S2 is set to 'remote', external control input signals at terminal board 3A2TB1 control the transmitter's POWER SELECT switch 3A1S3 and EXCITER A/B switch 3A1S4, local control of these switches will be inhibited by the wiper of switch S2. The +24 vdc input at 3A1J1-E can be inhibited at the control/monitor panel by MASTER CONTROL switch 3A1S1 when the transmitter is operating in the remote configuration, the +24 dc voltage can not be controlled at the remote site when the transmitter is switched to 'local' mode. Internal and external interlock protection circuits are also contained within the local/remote control switching configuration.

2.3.2.1 Local Control Section Description: The local control section consists of MASTER CONTROL switch 3A1S1, LOCAL/REMOTE switch 3A1S2 and POWER SELECT switch 3A1S3 plus their associated indicator lamps. With switch S2 set to 'local' and switch S1 turned on, the +24 volt dc signal will be passed thru J1-E to the wiper of switch S2, thru the wiper of S2 and passed thru J1-B to terminal board TB1-20. The +24 vdc is applied thru external switches or thru an internal connection and re-applied thru TB1-21 to J4-B. The control voltage is passed thru interlock switches 6S1, 6S2, 6S3, and 3S1, passed thru J4-A and J1-A to the wiper of switch S1. With switch S1 turned on, the +24 volt dc signal is applied thru the wiper of S1 and across MASTER CONTROL lamp DS2, the lamp will turn on. The +24 vdc signal is applied out J1-L and passed to exciter and relay control circuits.

The 115 volts ac is applied through 3A1J1-MM, thru the wiper of S2 to EXCITER A/B switch 3A1S4. If exciter A is selected, the 115 volts ac is applied through 3A1-SS to exciter 'A' circuitry, if exciter 'B' is selected, the 115 volts ac is applied through 3A1-TT to exciter 'B' circuitry. The -15 volt dc signal is passed thru J1-F to the wiper of switch S2-5/4 and applied to the wiper of POWER SELECT switch S3. Selection of either FULL power, whereby the -15 vdc control signal is inhibited, or LOW 1/LOW 2 whereby the -15 volt dc control signal will be applied through 3A1J1-M or N to attenuator circuits within the transmitter's operational exciter and to an rf monitor circuit for external monitoring purposes.

NOTE

The external interlock at TB1-20/21 is provided as a method to turn the transmitter off from an external source. It is used in conjunction with the station antenna switching circuit to turn the transmitter off immediately before any action that will cause the transmitter to operate into an open circuit (such as when switching from an antenna to a dummy load or to another antenna). Terminals 3A2TB20 and 3A2TB21 must be shorted by an external switch or connected together before the transmitter can be turned on. Another option available is explained in paragraph ?-?-?. This option will prevent the nine-second delay that is produced when the transmitter has been shut down and will provide instant return of the desired output power of the transmitter.

2.3.2.2 Remote Control Description: With MASTER CONTROL switch 3A1S1 turned on, LOCAL/REMOTE switch 3A1S2 switched to 'remote', and external local/remote switch set to 'remote', latching relay 3A2K6 will energize and the transmitter will be controlled from a remote configuration. The +24 volt dc control signal is passed to 3A1J1-E and applied thru REMOTE lamp DS3, the lamp will turn on. The +24 vdc is also applied thru J1-D, thru the wiper of relay K6-5/10 and returned to J1-C and applied out J1-B to terminal board TB1-20. The +24 vdc is applied thru external switches or thru an internal connection and re-applied thru TB1-21 to J4-B. The control voltage is passed thru interlock switches 6S1, 6S2, 6S3, and 3S1, passed thru J4-A and J1-A to the wiper of switch S1. With switch S1 turned on, the +24 volt dc signal is applied thru the wiper of S1 and across MASTER CONTROL lamp DS2, the lamp will turn on. The +24 vdc signal is applied out J1-L and passed to exciter and relay control circuits.

115 volts ac input is passed through 3A1J1-MM through the wiper of switch S2-8/9 to J1-NN and REMOTE lamp 3A1DS3 through the wiper of relay K6-11/8 to the wiper of relay K5-1/10 or K5-1/5 (dependant on which exciter has been selected), thru J1-SS or J1-TT to the transmiter's remotely selected exciter. The -15 volt dc input is passed to J1-F thru S2-5/6 and J1-H to latching relays K7 and K8. The output of latching relays will depend on the power selected. When high power is selected, -15 volts dc is applied to K8-10/1, the signal will be inhibited and has no influence. When low power is selected, the -15 volts dc will be applied thru relay K8-10/5 to relay K7-10. When 'low pwr 1' is selected the -15 vdc will be applied thru the wiper of K7-10/1 to J1-J, when 'low pwr 2' is selected the -15 vdc signal will be applied thru the wiper of K7-10/5 to J1-K. The -15 volt dc control signal will be applied through 3A1J1-M or N to attenuator circuits within the transmitter's operational exciter and to an rf monitor circuit for external monitoring purposes.

2.3.3 115 VAC POWER DISTRIBUTION DESCRIPTION (see figure FO-6): The 115 volt ac input is applied to terminal board 6TB2-5/6 thru fuses 6F4/5 and passed to relay 6K1-5/6. When the master control switch on the control/monitor panel is turned on, a +24 volt dc control signal is applied through terminal board 6TB2-2 and applied thru the coil of relay 6K1, K1 energizes. The 115 volt ac at 6K1-5/6 is passed through the wipers of relay 6K1-9/10 to eight air cooling fans, 6B1 thru 6B8 and also air cooling fans 6A1B1 and 6A1B2, the fans will turn on. The 115 volt ac input is also passed to terminal board 6TB1-6/8 and applied to terminal boards TB1-4 in cabinets one, two, four and five, the ac input voltage is applied thru fuses F1/F2/F3 in their respective cabinets and passed to the associated wiper of their control relay The +24 volt dc input is passed to TB1-6 of each of the above cabinets and applied to their respective control relays (1K1, 2K1, 4K1 and 5K1)). The relays energize and the 115 volt ac input is passed through the wipers to the associated cabinet air cooling fans. Cabinets two, four and five cooling fan and relay circuits are all configured in the same manner as cabinet one and their circuit descriptions will be identical.

2.3.3.1 Overvoltage Protection PCB 3A17 Description: The overvoltage protection printed circuit board consist of transistors 3A17Q1 and relay 3A17K1 plus their associated components. Under normal operating conditions, transistor Q1 will be reverse biased, relay K1 will be de-energized and overvoltage protection lamp DS1 will be off. The -72vdc at 3A17J1-4 will be applied thru resistor R3, potentiometer R2 and resistor R1 to ground, zener diode CR1 clamps the emitter of Q1 at 5.6 volts dc and potentiometer R2 is set for a less positive voltage appearing at the base of Q1. The 115 volt ac from the service entrance will be passed thru 3A17J1-2, across the wiper of relay K1-3/1 and applied to 3A17J1-3. The ac voltage is then passed to cooling air fan 3B1, the fan will turn on. The 115vac is also passed thru relay and switching circuits of the interface and control/monitor panels and applied to the selected exciter, description of the interface and control/monitor panel circuitry is contained in paragraph 2.3.2. Should the -72vdc at 3A17J1-4 exceed -84 volts dc, the voltage at the base of Q1 will be more positive than the voltage on the emitter, Q1 will be forward biased, relay K1 will energize and lamp DS1 will turn on. When relay K1 energizes, the 115 vac at the wiper of K1-3 will be inhibited.

2.3.4 EXCITER/MONITOR SECTION DESCRIPTION (figure FO-4): The exciter/monitor circuits produce the internal rf and modulation drive signals, provide interfacing for a external audio input, rf drive transient and rf current protection circuits and alarm interfacing to internal and external alarm indicators. The associated pcb's also contain delay circuits that will inhibit the rf power output until the transmitter has reached full power. External monitoring outputs and internal metering for the transmitters critical functions are also featured in this section.

2.3.4.1 NAPC13 RF Current Protection PCB Assembly Description: The NAPC13 rf current protection pcb assembly contains PA Current and RF Drive digitizer circuits, a Phase Difference Detector and Peak and RF Current Detector. The assembly generates and applies 'rf current' and 'vswr' shutback signals that are applied to attenuator circuits with the associated exciter circuitry. The printed circuit board also contains test switches which are manually operated and generate and apply simulated shutback signals, this function checks the protection circuitry within the transmitter and ensures it is operating within the required limits.

2.3.4.1.1 PA Current Digitizer #1 Description: PA digitizer #1 circuit comprises transistors Q3, Q4 and their associated components. A ac voltage representing the rf current of six of the twelve 5 kilowatt power blocks is applied to pa current sample jacks J7 thru J12. The sample is applied through resistor R3 to the base of transistor Q3. Transistors Q3/Q4 are connected as a digitizer circuit that produce a square wave output at the pa current frequency with sharp leading and trailing edges. During the positive half cycles, Q3 will be forward biased and Q4 will be reverse biased. The output at the collector of Q4 will at +15 volt dc. During the negative half cycle, Q3 will be reverse biased and Q4 will be forward biased. The output at the collector of Q4 will be near/or at ground potential. The resultant square wave output at the collector of Q4 is passed to U2B-5. The input signal of digitizer #1 can be monitored at test point TP2.

2.3.4.1.2 PA Current Digitizer #2 Description: PA digitizer #2 circuit comprises transistors Q5, Q6 and their associated components. A ac voltage representing the rf current of six of the twelve 5 kilowatt power blocks is applied to pa current sample jacks J1 thru J6. The sample is applied through resistor R4 to the base of transistor Q5. Transistors Q5/Q6 are connected as a digitizer circuit that produces a square wave output at the pa current frequency with sharp leading and trailing edges. During the positive half cycles, Q5 will be forward biased and Q6 will be reverse biased. The output at the collector of Q6 will at +15 volt dc. During the negative half cycle, Q5 will be reverse biased and Q6 will be forward biased. The output at the collector of Q6 will be near/or at ground potential. The resultant square wave output at the collector of Q4 is passed to U2A-1. The input signal of digitizer #2 can be monitored at test point TP1.

2.3.4.1.3 RF Drive Digitizer Description: Rf drive digitizer circuit consist transistors Q1, Q2 and their associated components. A ac voltage representing the rf drive is passed thru J-13 and applied through resistor R1 and across resistor R2 (voltage divider network) to the base of transistor Q1. Transistors Q1/Q2 are connected as a digitizer circuit that produces a square wave output at the pa current frequency with sharp leading and trailing edges. During the positive half cycles, Q1 will be forward biased and Q2 will be reverse biased. The output at the collector of Q2 will at +15 volt dc. During the negative half cycle, Q1 will be reverse biased and Q5 will be forward biased. The output at the collector of Q2 will be near/or at ground potential. The resultant square wave output at the collector of Q2 is passed to U2B-6 and U2A-2.

2.3.4.1.4 Phase Difference Detector Description: Phase difference detector circuit comprises exclusive 'OR' gate U2 and its associated components. A +15 volt square waveform from pa current digitizer #1 is applied to exclusive OR gate U2B-5. A second +15 volt waveform from the rf drive digitizer circuit is applied to U2B-6. When the phase of the two inputs are identical, the output at U2B-4 will be zero. As a phase difference between pa current sample and rf drive sample develops, the output of U2B-4 will be +15 volt pulses for the duration of the phase difference. The width of these +15 volt pulses will be proportional to this difference. The output at U2B-4 is applied through an integrator circuit comprising resistor R17 and capacitor C7. C7 will charge to the average value of the +15 volt/zero volt ratio and will be a dc voltage proportional to the phase difference from pa current sample at J7 thru J12 and rf drive sample at J13. The operation of OR gate U2A will be identical to the description of U2B. The outputs at U2A-3 and U2B04 are applied through their respective diodes (CR5/CR6) and combined, they are then applied thru resistor R24 to the non-inverting input of U1B-5. The dc voltage representing the phase difference between the pa current and rf drive can be measured at test point TP4 (1.08 volts dc at an 18° phase difference).

2.3.4.1.5 Peak RF Current Detector Description: The peak rf current detector circuit consist of half-wave rectifiers CR1 and CR2, test switch S1 plus their associated components. The pa current sample inputs at J1 thru J12 are applied in parallel through diodes CR1 and CR2. Zener diode CR9 prevents excessive voltage appearing on the current detector line and capacitor C4 shunts the rf component to ground. At 55 kilowatt output power, with 125 percent modulation, the voltage at test point TP3 will be approximately 3.0 volts dc, at 50 kilowatt output, with zero modulation, the voltage at TP3 will be approximately 0.55 volts dc. The resultant dc voltage, which is proportional to the magnitude of the pa current, is applied through voltage divider resistors R20/R22, applied thru resistor R25 to the inverting gate of U1B-6. When closed, test switch S1 removes resistor R20 from the circuit. With R20 bypassed, the voltage level increases. This effectively will simulate an excessive peak rf current condition.

2.3.4.1.6 Buffer Amplifier Description: Buffer amplifier circuit comprises operation amplifier U1B and associated components. The dc voltages representing the phase difference between the rf drive sample and pa current sample is combined with the dc voltage representing the magnitude of the peak rf current. The resultant voltage is applied to the non-inverting and inverting gates of U1B. Resistors R23/R26 provide biasing for U1B resulting in a voltage gain of 4.3. With 55 kilowatt output at 125 percent modulation (18° phase difference), the rf stress current shutback signal at J14 should be approximately 6.15 volts dc. With 50 kilowatt output at zero modulation (18° phase difference), the output at J14 should be approximately 3.0 volts dc and is applied to attenuator circuits within the transmitter's operation exciter.

2.3.4.1.7 RMS RF Current Detector Description: Rms rf current detector circuit consist of operational amplifier U1-C/D, test switch S2 plus their associated components. Under normal operating conditions, PA current sample inputs at J-1 thru J-12 are clipped at test point TP1/TP2 and applied thru half wave rectifiers CR3/CR4. The positive going signal is passed across de-coupling capacitor C5 which shunts the rf component of the signal to ground. A 1.84 volt dc biasing signal developed across voltage divider resistors R28, R21 and R19 is applied thru resistor R15 and combined with the positve going input from diodes CR3/4, the combined signal is applied to the non-inverting input of U1D-12. Operational amplifier U1D, resistors R8/R16 and capacitors C6/C9 form a unity gain, active, low pass filter.

The output at U1D-14 will be passed to the non-inverting input of U1C-10, a 2.72 vdc bias is developed across the same voltage divider network as mentioned above, this biasing voltage is applied to the inverting input of U1C-9. The output at U1C-8 will be inhibited by diode CR7 and the detector circuit will have no influence. Should the rms rf current exceed the desired limits, the output at U1D-14 will be more positive, the input at the non-inverting input of U1C-10 will be more positive than the voltage at its inverting gate. The output at U1C-8 will go to +15 volts dc and applied thru diode CR7 to J14-1, this voltage represents an rf current shutback signal and will be applied to attenuator circuits within the operational exciter. TEST/OPR switch S2, when set to 'test' simulates a high rms rf current condition. Resistor R7 is connected in parallel across the voltage divider network, this causes the bias level at U1D-12 to decrease to approximately 0.98 volts dc and the bias level at U1C-9 to drop to 1.92 volts dc. The output of U1C-8 will go to +15 volts dc and applied thru CR7 to J14-1. This effectively simulates an rms rf current fault condition and allows the protection circuits to be checked.

2.3.4.2 ON/OFF CONTROL PCB DESCRIPTION (figure FO-5): The on/off control circuit (3A2A4) consist of comparator U1 and its associated components. With the transmitter's operational exciter switched on, a +15 volt dc signal will be applied through J1-1 and resistors R1 and R2. Diode CR1 will be forward biased and capacitor C1 will be discharged, a ground potential will be at J1-4. The +15 volt dc signal is applied to the non-inverting input of U1 and thru resistor R1 to the inverting input. A high at U1-7 causes diode CR4 to be forward biased. The output from CR4 is passed to J1-2, this results in a simulated SWR cutback signal being applied to attenuator circuits within the operational exciter that inhibits the output of the transmitter. When master control switch on the transmitter's control panel is switch on, a +24 volt dc signal is applied at J1-4, diode CR1 will be reverse biased and capacitor C1 will begin to charge. After approximately nine seconds, the input at U1-6 will be more positive than the voltage at its non-inverting input, the output at U1-7 will be low and diode CR4 will be reverse biased. The simulated SWR cutback signal will be removed from J1-2 and the transmitter will resume normal operation.

2.3.4.3 NAPC10 RF MONITOR PCB DESCRIPTION: A rf sample input, representing the rf output power of the transmitter (+15 volts rms at 50 kilowatts), is applied simultaneously to potentiometers R1 (FULL) R2 (LOW A) and R3 (LOW B) through J1. When the transmitter is in the 'full' mode of operation, the -15 volt dc signal to J3-2 (low 1) and J3-1 (low 2) is inhibited. Transistors Q1 thru Q4 will be reverse biased and relays K1 and K2 will be de-energized. The wipers of resistors R1, R2 and R3 are adjusted for a 5.0 volt rms output at a 50 ohm impedance termination at J2. When in 'full' mode of operation, the rf sample voltage will be applied through resistor R1, relays K1-1 and K2-1 to J2. The output at J2 is a dc voltage representing the rf carrier output power of the transmitter when in full power mode of operation. When 'low 1' mode of operation is selected, a -15 volt dc signal is applied through resistor R5, to the emitter of Q1, Q1 will be forward biased. The output of Q1 is applied to the base of Q2, Q2 will be forward biased and relay K1 will energize. The rf sample voltage will be applied through resistor R2 (low A), relays K1-14 and K2-1 to output jack J2. The output at J2 will be voltage representing the rf output power of the transmitter in 'low 1' mode of operation. Low 2 description will be the same as low 1 except for component changes. The output signals at J2 will be applied out of the transmitter for external monitoring purposes.

2.3.4.4 EXCITER A/B (NAE35) DESCRIPTION: The exciter circuits provide the rf drive and mod drive for its associated transmitter. The AMPFET 50 transmitter contains two NAE35 exciters, both exciters are identical in their operation. Selection of either exciter may be controlled from the local configuration by a exciter select switch on the control monitor panel or from a remote configuration when the transmitter is set to remote mode of operation. For a more detailed overview, refer to the associated NAE35 exciter drawer service instruction booklet.

2.3.4.5 NAPC11 ALARM INTERFACE PCB ASSEMBLY DESCRIPTION (figure FO-9): The NAPC11 alarm interface pcb assembly provides interfacing of alarm signals for internal and external use, a trip sensor and reset circuit across the +15 volt dc regulated line plus forward and reflected power outputs for external monitoring.

2.3.4.5.1 <u>Alarm Sense Logic Description</u>: The alarm sense logic circuit comprises NOR gates U1A thru U2D; transistors Q10 and Q11 plus their associated components. Exciter selection (A or B) determines which set of four NOR gates will be utilized. When exciter 'A' is selected, the inputs from exciter 'B' will be inhibited and have no influence. The alarm NOR gates all function the same. To simplify circuit description, only one alarm condition will be explained. Under normal operating conditions, alarm gate input at J2-12 will be at ground potential, mod drive alarm input at J2-11 will be at +15 volts dc. The output at U1A-3 will be low, this low will be applied through resistor R17 to the base of transistor Q11, Q11 will be reverse biased and the circuit will have no influence. When a mod drive alarm fault occurs, the input at U1A-2 will go low, the output at U1A-3 will go high, this high will be applied through R17 to the base of transistor Q11, Q11 will be forward biased. The output at the collector of Q11 will be applied through diodes CR16 and CR17 to J3-2 and J3-1. This will be the alarm outputs for the internal and external drive fail alarm indicators. The circuit description for the rf drive, VSWR and rf current alarms will be identical to the mod drive alarm description. The alarm outputs from the associated gates will be applied to their respective internal and external alarm indicators. Zener diodes CR12/CR11 provide transient protection.

2.3.4.5.2 PA Group Failure Sensors Description: The 'pa group' circuit consist of transistors Q1 thru Q8 plus associated components. Under normal operating conditions, power block 'pa fail' inputs at J1-9 thru J1-12 will be effectively at an open state, transistors Q1 thru Q8 will be reverse biased and there will be no alarm signals applied to J1-4 thru J1-8, the circuit will have no influence. Each pair of transistors associated with a power block ('A' thru 'D') operates in the same manner. To simplify circuit descriptions, only power block 'pa fail A' at J1-12 will be described. When a PA failure occurs in power block 'A', J1-12 will go to ground potential, current will flow thru the emitter/base junction of Q1, causing Q1 to be forward biased. The output at the collector of Q1 will be applied through voltage divider resistors R2/R13 and applied to the base of transistor Q2. Q2 will be forward biased. The output at the collector of Q2 will be applied through diodes CR1/CR2 and passed from J1-8 and J1-6 to the internal and external pa alarm indicators.

2.3.4.5.3 15 Vdc Trip Sensor Description: The trip sensor circuit consist of transistor Q12 and its associated components. Under normal operating conditions, +15 volts dc is applied to the emitter of Q12, Q12 will be reversed biased and the circuit will have no influence. Should a fault occur that causes the +15 volt dc regulated signal to be removed from Q12 emitter, Q12 will be forward biased. The output at the collector of Q12 is applied through diode CR20 to J3-3, 'high ac pwr ext' through diodes CR18 and CR16 to J3-1 'drive fail ext'. These two outputs are applied to external alarm indicators. The output of Q12 is also applied through diodes CR18 and CR17 to J3-2, 'drive fail' and turns on an internal 'drive fail-alarm' lamp on the control panel. Zener diode CR19 provides transient protection.

2.3.4.5.4 Trip Reset/15 Vdc Crowbar Description: The 'trip reset/15 vdc crowbar' circuit consist of comparator U3B, power MOSFET Q17 plus their associated components. Under normal operating conditions, the output of comparator U3B-7 will be low, the low indication is passed to the gate of crowbar MOSFET Q17, Q17 will be gated off and the circuit will have no influence. Should a fault occur that removes the +15 volt dc regulated input to the emitter of Q12, Q12 will forward bias. When Q12 turns on, capacitor C8 will slowly discharge (approximately nine second discharge time) thru resistor R35, the discharging dc voltage at the junction of C8/R35 will be applied to the inverting gate of U3B-6, when the input at U3B-6 becomes less positive than the non-inverting input at U3B-5, a high potential will be at U3B-7 output. The high output at U3B-7 is applied through integrating network C9, R39 and R40 to the gate of MOSFET Q17 and will be a positive spike for a fixed duration, Q17 will be gated on. When Q17 turns on it applies a ground potential to the +15 volt dc regulated line. This effectively gates off a crowbar device located in the associated exciters +15 vdc protection circuitry resulting in the +15 vdc signal being re-applied to the emitter of Q12, Q12 will reverse biased, C8 will fast charge through diode CR22, the output of U3B-7 will go low and MOSFET Q17 will be gated off. The alarm condition will reset after a delay of approximately nine seconds from from the time it turned on. If the fault remains on the +15 volt dc regulated line after the circuit has been reset, the alarm will turn on once again and the reset cycle will repeat itself.

2.3.4.5.5 Fwd/Refl Pwr Buffer Description: The fwd/refl pwr buffer circuit comprises amplifiers U3C, U3D plus their associated components. Dc voltages representing the forward and reflected power of the transmitter are applied through low-pass filters R30/C2 (forward power) and R31/C3 (reflected power) to the non-inverting gates of their respective amplifiers, U3C/U3D. The outputs are passed to J3-7 and J3-9 and applied to external monitoring indicators.

2.3.4.6 Transient Clipper 3A18 Description (figure FO-5): Transient clipper circuit comprises a bridge rectifier and its associated components. The circuit is configured in such a way to enable the proper path for the rf output to be applied through zener diode 3A18CR3. The rf output at A4J1/J2 is passed from the operational exciter and applied through diode CR3, voltage peaks in excess of 100 volts peak will be clipped and shunted to ground. The output of the clipper circuit will never exceed a 200 volt peak-to-peak signal.

2.3.4.7 NAC29 Interface Panel Description (see figure FO-5): The external 600 ohm balanced audio signal is passed thru terminal board TB1-17/18 and applied across audio transformer 3A2T1. The primary windings of transformer T1 can also be configured to allow a 150 ohm balanced audio input signal, terminal three will be tied to terminal one and terminal two will be tied to terminal four. The audio signal is applied across a filter network consisting of capacitors C1/C2 and inductor L1, this network removes spurious noise and stray rf components. The unbalanced audio signal is applied thru resistors R1/R2 and passed to exciters 'A' and 'B'.

2.3.5 RF POWER STAGE DESCRIPTION (figure FO-3): The rf power stage contains four power block switching circuits that control the -72 volt dc output; twelve relay control panels that provide rf drive interfacing, mod drive interfacing and protection circuits; twelve 5 kilowatt power blocks that each supply 5 kilowatts of power and a final filter assembly that combines and filters the 5 kilowatt power block inputs to provide up to 60 kilowatts of rf carrier output power. The section also provides 'pa fail sense' outputs for alarm interfacing, forward and reflected power output signals for internal and external metering circuits plus an rf sample output for external monitoring purposes.

2.3.5.1 Power Block A/B/C/D Description (see figure FO-3): The power block circuits contain twelve manually controlled on/off switches S1 thru S12 that pass or inhibit the -72 volt dc input, under normal operating conditions all twelve of the switches will be set to on. When the master control switch on the control/monitor panel is turned on, a +24 vdc control signal is passed to relays K1-B thru K4-B, the relays will energize and apply the -72 vdc across fuses F1 thru F12 to their respective NAX25 relay control assemblies.

2.3.5.2 NAX25 Relay Control Description (see figure FO-7): The NAX25 relay control assembly is one of twelve assemblies located within the transmitter. Each assembly controls the on/off function of its respective 5 kilowatt power block, monitors the charging capacitors in the power block's individual 1.25kW power amplifiers and applies the -72 volts dc thru a relay circuit to the amplifiers when the capacitors have reached 95 percent of the -72 volt dc switched input. A mod drive fault detector inhibits the mod drive output should a fault occur on the mod drive line. The assembly also contains a turn-off delay circuit that inhibits the mod drive if the -72 volt dc switched signal is removed or turned off. A test switch contained in the mod drive fault detector circuit, when set to 'TEST', simulates a mod drive fault causing a relay to energize which inhibits the mod drive output. Rf drive input is interfaced through an impedance matching transformer and applied to the 5 kilowatt power block circuit.

2.3.5.2.1 Voltage Threshold Detector Description: The voltage threshold detector circuit consist of comparator U2A, inverting 'or' gate U1B, transistors Q1/Q2 plus their associated components. A -72 volt dc switched input at terminal board TB1-2 is applied thru resistor R1 and fuses F1 thru F4 to charging capacitors in the NAP10 subsystem. Lamp DS1 turns on when the switched -72 vdc is applied. The -72 volt dc switched input is also applied through voltage divider network R1, /R6 and zener diode CR4. The voltage at the junction of R1/R6 provides biasing at the inverting input of U2A-2. Capacitors in the NAP10 subsystem will begin charging through R1 towards the -72 volt dc level. This voltage will be applied through J1-6 to voltage divider network R2, R17 and zener diode CR4. When the capacitors charge to approximately 95 percent of the B- input, non-inverting input at U1A will become less positive than that being applied to the inverting gate. This will place a ground at the output of U2A-1 which is applied to U1B-5, the output at U1B-4 will be at +15 volts dc. The +15 vdc will be applied through resistor R8 to the emitter of Q1, Q1 will be forward biased. The output at the collector of Q1 is applied to transistor Q2, Q2 will be forward biased. The output of Q2 is passed thru the coils of relays K1 and K2, both relays will energize and apply the -72 volt dc input directly to their associated power amplifiers.

When the output of U1B-4 is high, diode CR2 is forward biased and the input at U1D-13 will be high. The output at U1D-11 will be at ground potential and passed to U1C-9. 'Mod drive' input at J2 is applied through resistor R11 to U1D-8. When the input at U1C-9 is low, the modulation drive will be applied to the balance drive circuit. When the input at U1C-9 is high, the modulation drive will be inhibited.

2.3.5.2.2 Turn-off Delay Description: The turn-off delay circuit consist of 'nor' gate U1A and its associated components. When the -72 volt dc switched signal is removed (switched off) from terminal board TB1-2, TB1-2 will be at ground potential. The ground will be applied through TB1-7 to voltage divider network R4/R5, this places a positive (high) voltage at U1A-1. The output of U1A-3 will be at near ground (low) potential. The output of U1A-3 is passed to diode CR5 and applied to U1D-13. The output at U1D-11 will be +15 volts dc and passed to U1C-9. This effectively inhibits the mod drive input being applied at J2. The near ground signal from the anode of CR5 is passed to the inverting input of U2A-1. The output of AT U2A-1 will go to +15 volts dc and is applied to U1B-5. Ground potential will be applied from the output of U1B-4, through R8 to Q1, Q1 will be reverse biased. resulting in Q2 to being reversed biased. This removes the voltage from relays K2/K1, K2 and K1 will de-energize. The capacitors in the NAP10 subsystem will discharge through R3 to ground. Diode CR3 provides transient protection.

2.3.5.2.3 Balance Drive Description: The balance drive circuit consist of transistors Q3 and Q4 plus their associated components. The 'mod drive' at J2 is applied through inverting gate U1C to the bases of Q3 and Q4. When the output of U1C-10 is high, Q3 is forward biased and Q4 is reverse biased. When the output from U1C-10 is low, the turn on/off sequence is reversed. The output at the emitter junction of Q3/Q4 is passed through the wiper of de-energized relay A1K1 to J1-2 and applied to terminal board TB2-2/3.

2.3.5.2.4 Mod Drive Fault Detector Description: The mod drive fault detector consist of comparator U2B, test switch S1 and their associated components. Under normal operation, the output of U2B-7 will be at ground potential, relay A1K1 will be de-energized and the fault detector circuit will have no influence. Integrator circuit, comprising resistors R12/13 and capacitors C4/C5 produce a positive dc voltage proportional to the average pulse width of the PWM input signal. When the average pulse width (positive-going pulses) exceed safe operating limits, the non-inverting input at U2B-5 will become more positive than the voltage appearing on the inverting input at U2B-6. The output at U2B-7 will be +15 volts dc causing relay A1K1 to energize and remove the mod drive output from J1-2. Test switch S1 is normally closed. When set to 'test', resistor R16 will be connected in series to the voltage divider resistors R15/14. The voltage at the inverting input of U2B will become less negative than the voltage being applied to the inverting gate, the output of U2B will be high causing relay A1K1 to energize. This simulates a mod drive fault and removes the mod drive output from J1-2.

2.3.5.3 5 Kilowatt RF Power Block Description (see figure FO-11): The 5 kilowatt power block is one of twelve blocks located within the AMPFET 50 transmitter. Each of the twelve blocks combines and filters the output of four NAP10 1.25 kilowatt power amplifiers to produce the desired 5 kilowatt rf carrier power for the transmitter. A dc voltage output, representing the combined current of the NAP10 1.25 kilowatt subsystem is also produced and applied from the power block to an rf current protection printed circuit board.

2.3.5.3.1 1.25 kilowatt Power Amplifier (NAP10) Description: The 1.25 kilowatt power amplifier is one of four amplifiers contained within a 5 kilowatt power block. Each of the amplifiers provides a 1.25 kilowatt output for its associated block. Test point TP1 provides a means for measuring the voltage of the power amplifiers within the NAP10 amplifiers. The outputs of the four power amplifiers are applied to a quad combiner circuit. For a more detailed overview of the NAP10 subsystem, refer to the service instruction booklet for the NAP10 1.25 kilowatt AM power subsystem.

2.3.5.3.2 NAF37 Quad Combiner Description: Under normal operating conditions, status switches A3S1 thru A3S4 will be set to 'operate'. The rf power output from four individual 1.25 kilowatt power amplifiers is applied through their respective status switches and applied thru inductors A3L1 thru A3L4 across transformer A3T1 and capacitor A3C1 to A3E1. Transformer T1 and resistors A3R1 thru A3R4 form an rf current probe network. The output of the network is passed to J5 and is a dc voltage representing the rf current of the four NAP10 subsystems. Status switches S1 thru S4, when set to 'short' allow the removal of their respective 1.25kW power amplifiers for servicing and/or repair. The status switches are located on the inductive side of the filters. This effectively provides impedance matching and simulates that the NAP10 subsystem is still connected to the circuit. Inductors L1 thru L4 and capacitor C1 are frequency dependent components. Their values will depend upon the assigned carrier frequency of the transmitter.

NOTE

There are twelve NAF37 quad combiners located within the AMPFET 50 transmitter. Overview and circuit description will be the same for each combiner. Refer to table on figure FO-11 for reference designation of individual 5 kilowatt rf power blocks.

2.3.5.4 NAF39 50 Kilowatt RF Combiner/Filter Description: The NAF39 circuit combines the input of the twelve 5 kilowatt power blocks at E2, applies the combined signal through a two-stage filter network comprising inductors L1 thru L6 and capacitors C1 thru C9. The combined/filtered rf signal is applied across an impedance matching network of inductors L7A/L7B and capacitor C10. The signal is applied across a current probe transformer A1T1 and spark gap assembly E1 to rf sample output J1. Voltage probe circuit NAFP13 provides a reference voltage for the forward/reflected transformer T1 and a dc voltage representing rf output of the transmitter. This dc voltage (rf sample) is used for external monitoring. NAFP12 forward/reflected circuit (A1) provides dc voltage outputs representing the forward and reflected power of the transmitter. Cooling fans B1 and B2 provide forced air cooling for the circuit and spark gap assembly E1 provides lightning protection.

2.3.5.4.1 Combiner/Filter Description: Twelve 5 kilowatt rf power block inputs are applied simultaneously to terminal E2. The twelve rf signals are combined and passed to rf filter network inductors L1 thru L4 and capacitors C1 thru C4. The rf signal is passed to a third rf filter network comprising L5, L6 and capacitors C5 thru C9. The output of the filter network is applied through an impedance matching network comprising inductors L7A/L7B and capacitor C10. The signal is passed across a current probe transformer A1T1, spark gap assembly E1 and to rf current jack J1.

2.3.5.4.2 Fwd/Refl Pwr (A1) description (figure FO-12): A dc voltage, representing the current level of the rf output is coupled to the secondary of current probe transformer A1T1. A second input, a dc voltage representing the voltage level of the rf output, is applied through the voltage probe circuit (A2) to A1J1 and passed to the center tap of T1. The two signals are combined. On the first half cycle, the two inputs of T1 are combined and applied through half-wave rectifier A1CR1 through an rf filter comprising inductors A1L1, A1L3 and capacitor A1C1, across an impedance matching resistor A1R2 to forward power output J2. The resultant output will be a dc voltage representing the forward power (rf output) f the associated transmitter. On the next half-cycle, the two inputs are combined and under normal conditions cancel each other out. Should a signal be developed, it will be applied through half-wave rectifier A1CR2, through the filter and impedance resistors to reflected power output J3. The resultant dc voltage represents the reflected power of the transmitter.

2.3.5.4.3 NAFP13 Voltage Probe (A2) Description: The 'rf output' signal is clipped and passed across capacitor A2C1 and variable capacitor A2C2, the two capacitors form a one hundred to one voltage probe. Variable inductor A2L1 is tuned to resonate with capacitors A2C2/C3, this prevents any change across the voltage probe network that may be caused by a change of impedance at the probe circuit outputs. One of the probe outputs at the junction of inductors A2L1/L2 is passed thru A1J1 to the center tap of current probe transformer A1T1, this is used as a voltage reference in the fwd/refl pwr circuitry. A second output of the probe circuit is applied thru parallel connected resistors A2R1/R2, and passed to A2J1, the 'rf sample' output at A2J1 is used for external monitoring and represents the transmitter's rf output power in either 'full', 'low 1' or 'low 2' mode of operation. Varistor A2RV1 provides transient protection for the voltage probes low power components.

SECTION 3
INSTALLATION AND PREPARATION FOR USE

GENERAL

3.1 This section contains the information required to prepare the equipment site to receive the transmitter and the information required to unpack, install and prepare the transmitter for use.

TEST EQUIPMENT AND SPECIAL TOOLS

3.2 The test equipment required for initial installation is listed in table 1-3 and the special tools are listed in table 1-4.

SITE REQUIREMENTS

3.3 Two information booklets, one entitled AMPFET 50 Site and Pre-installation Considerations and the other entitled Lightning Protection for Radio Transmitter Stations, are provided to all customers on receipt of a formal order for an AMPFET 50 AM broadcast transmitter or to prospective customers on request. The recommendations of these booklets should be incorporated at the transmitter site to obtain optimum performance from the AMPFET 50 transmitter. The following is a brief summary of the booklets recommendations.

3.3.1 TRANSMITTER CLEARANCES: The transmitter should be installed in a building that provides a minimum clearance on all sides, with cabinet doors open, of at least four feet.

3.3.2 LIGHTNING/SAFETY GROUND: The transmitter site must contain a lightning/ safety ground system to protect the transmitter from lightning induced voltage transients. Refer to the Lightning Protection for Radio Transmitter Stations booklet

3.3.3 ANTENNA SYSTEM: It is recommended that the antenna system used with the AMPFET transmitter meet (as a minimum) the standards specified in EIA Standard TR-101-A, paragraph 8(b) with a normal impedance of 50 +j0 ohms at the carrier frequency. Although the transmitter will function while working into a maximum VSWR of 1.2:1 over the frequency band, or with sideband VSWR's of up to 2:1 when the carrier frequency impedance is 50 +j0 ohms, the overall system performance will be greatly degraded. It is essential that the antenna system include provision to protect the transmitter from lightning induced voltage transients. Refer to the Lightning Protection for Radio Transmitter Stations booklet.

3.3.4 ELECTRICAL POWER: The AMPFET 50 transmitter requires a delta connected three-phase ac power source rated at a minimum 120 kVA for the rf power stages and a 115 volt rms, 50/60 Hz, single phase ac power source rated at a minimum 20 VA for low voltage power supplies and cooling air fans. It is recommended that the three-phase ac power source be rated at 150 kVA or greater, to ensure adequate regulation.

3.3.4.1 <u>Ac Power Voltage Stability:</u> The three-phase ac power source must not vary by more than five percent from the nominal rms voltage present when the rf output levels where last calibrated. Internal compensation circuits will not maintain the rf carrier output power at a constant level for variations in excess of five percent.

3.3.4.2 AC Power Surge Protection: The NAX34 ac surge protection panel provided with the transmitter should be installed in close proximity to the service entrance, ensuring it is connected to the ac power wiring between the service entrance and the NAX35 3-phase ac power circuit breaker panel. Each phase of the ac power source should be connected to the surge protector as detailed in the NAX34 ac power surge protection service instruction booklet.

3.3.4.3 3-Phase AC Power Circuit Breaker Panel: The NAX35 3-phase ac power circuit breaker panel provided with the transmitter should be installed between the 3-phase ac power source service entrance and the transmitter. It should be installed as detailed in the NAX35 3-phase ac power circuit breaker panel service instruction booklet.

3.3.4.4 Electrical Power Cabling: The conventional method of installing the 3-phase ac power cabling is to route the wiring through conduit and enter the cabinet from the top of the final filter/power supply cabinet. Refer to FO-45 for combined cabinet dimensional information and to figure 3-1 for conduit entry hole dimensional information. An optional method of entering the cabinet is to route the wiring through below floor level cable ducts and enter the final filter/power supply cabinet through cable entry openings in the bottom of the cabinet. The 3-phase ac power cabling must be the appropriate size for the current requirements of the transmitter. Distance from the service entrance and the voltage of the 3-phase ac power source must be considered when selecting the conductor size.

3.3.5 RF OUTPUT FEEDER CABLE: The rf output cable is normally attached directly to the spark gap assembly on the top of the transmitter as depicted in figure FO-15, unless an alternate connection method is specifically requested by the user. Refer to figure FO-28 for dimensional information to assist in determining cable length.

3.3.6 CONTROL/MONITOR CABLING: Control and monitoring connections are made through an entry hole in the lower rear panel of the transmitter cabinet. Refer to figure FO-28 for dimensional information to assist in determining cable length. Optionally, control and monitor cables may be applied via an opening in the top of the transmitter.

3.3.7 VENTILATION: The interior of the building must contain a ventilation system that will ensure the inside temperature does not exceed 50°C.

3.3.8 HEATING: The interior of the building must contain a heating system that will ensure the inside temperature does not go below 0°C. Operation at temperatures below 0°C is possible; however, special crystals are required.

3.3.9 WORK AREA: It is recommended that a suitable work area with an adequate table surface be provided adjacent to the transmitter to permit bench calibration/repair of modules.

EXTERNAL INPUT/OUTPUT CIRCUIT REQUIREMENTS (see figure 3-3)

3.4 The external input (rf carrier, audio and control) and output (status and alarm monitoring) circuits must comply with the following:

3.4.1 EXTERNAL RF SIGNAL SOURCE: An external rf signal source must be provided for stereo operation and may be provided if the user feels the internally generated rf carrier signal is not sufficiently stable in monaural operation.

3.4.1.1 In stereo operation, the external rf signal source will normally be an AM stereo exciter. The AM stereo exciter must provide a 50-ohm; phase-modulated rf carrier signal, that contains the left minus right (L - R) channel information; at the assigned carrier frequency. The rf signal applied to the transmitter must be a sine wave that is between 0.75 and 1.5 volts rms. If the AM stereo exciter's output is not a sine wave, a Nautel NAF34 square wave to sine wave converter must be connected between the exciter's output and the transmitter's input.

3.4.1.2 In monaural operation, the external rf signal source will normally be obtained from an extremely stable rf signal generator. The rf signal source must provide a 50-ohm; rf signal that is precisely the assigned carrier frequency. The rf signal applied to the transmitter must be between 0.75 and 1.5 volts rms.

3.4.2 EXTERNAL AUDIO SOURCE: An external audio source must be provided. The preferred impedance of the audio source is 600 ohms, but an audio source that is 150 ohms may be used provided the primary windings of audio transformer 3A2T1, which are normally connected in series, are connected in parallel. The audio signal applied to the transmitter must be between 0.0 and 12 dBm (10 dBm preferred). The audio signal may be processed to provide a higher percentage of positive modulation than negative modulation. Internal circuits in the transmitter will linearly attenuate the audio input if its amplitude would cause the positive or negative modulation percentages to exceed user determined limits. The user determined limits are between 95 to 100 percent negative modulation and 100 to 140 percent positive modulation.

3.4.2.1 In stereo operation, the external audio source will normally be the AM stereo exciter that provides the external rf carrier signal. The audio signal from the AM stereo exciter must contain the left plus right (L + R) channel information.

3.4.3 REMOTE CONTROL CIRCUITS: When the transmitter on/off status; the exciter /B selection and the preset power level selection are to be controlled remotely, the following must be observed.

3.4.3.1 A 24 volt dc power source must be provided to energize bistable relays in the transmitter's remote control circuits. An NAS17 power source is provided by Nautel for this purpose. Users may use their own 24 volt dc power source if they desire. The positive output of the 24 volt dc power source must be connected to 3A2TB1-9 and the 24 volt dc return must be connected to the contactor of the remote switching devices.

3.4.3.2 Any switching arrangement that is the equivalent of the switching circuit depicted in figure 3-3 and applies the 24 volt dc return (negative) to the transmitter as the remote control signals may be used. Since the external control circuits and the transmitter circuits are interfaced by bistable relays, the external control signals may be momentary, such as those provided by spring loaded switches, or they may be continuous.

3.4.3.3 The power level selection switches must be connected as depicted in figure 3-3. When 'high' power is selected, the 'low pwr 1' and low pwr 2' switch selections are ignored by the transmitter and the highest preset rf output is selected. When 'low' power is selected, the 'low pwr 1'/'low pwr 2' switch selection will determine which of the two remaining preset power levels is selected by the transmitter.

3.4.4 EXTERNAL INTERLOCK CIRCUIT: The external interlock circuit must provide a low impedance (short circuit) between terminals 20 and 21 of terminal board 3A2TB1 before the rf stages of the transmitter can be turned on. The user may install any number of serial interlock switches between terminals 20 and 21 of terminal board 3A2TB1, provided they apply an infinite impedance (open circuit) between these terminals when the rf output of the transmitter is to be turned off (any interlock switch activated). The transmitter's 24 volt dc power source is present on the external interlock circuit. It is recommended that a user supplied relay be installed as the external interlock circuit, with the energized/de-energized status of the relay determined by the external interlock switches, when the interlock wiring is lengthy. If a relay is used, it is recommended that it be installed as a fail-safe relay (energized when the transmitter's rf stages are to be enabled/ de-energized when the transmitter's rf stages are to be inhibited)

3.4.4.1 The external interlock circuit may be used, in conjunction with antenna switching circuitry, to ensure the transmitter's rf stages are inhibited during opening and closing of contacts in the transmitter's feed cable. The antenna switching circuits must provide an open circuit, as the external interlock status, immediately prior to contact opening and must maintain this open circuit until contact closure has occurred.

NOTE

The transmitter's rf stage will be inhibited for approximately nine seconds after the integrity of the external interlock has been restored. If this delay is unacceptable, consult the factory service representative for other options that may be available.

3.4.5 REMOTE POWER TRIM CIRCUIT: When used, the remote power trim circuit must provide an adjustable dc voltage, from a regulated 15 volt dc power supply, that can be incremented between 0.0 and 15.0 volts dc; as the 'external gain' input . An NAS17/1 AMPFET Relay Supply/Remote Power Control assembly is available from Nautel for this purpose. If the transmitter's preset rf output levels were calibrated with the 'external gain' input set to 7.5 volts dc, the transmitter's rf output level can be remotely increased/decreased by a maximum of approximately ten percent. An increase in the output voltage of the 'external gain' input will cause a corresponding increase in the transmitter's rf output level. A change of 1.0 volts dc will cause a change of approximately 1.33 percent in the transmitter's rf output level.

3.4.6 EXTERNAL FORWARD POWER MONITORING CIRCUIT: A buffered dc voltage that is representative of the forward power level is provided at 3A2TB1-10. This voltage is a non-linear function of the forward power level and will be 12.5 $\pm$0.5 volts dc at 50 000 Watts. An external panel meter that is accurate at all power levels would require a one milliampere movement and have the same modified square law scale as FORWARD POWER meter 3A1M1. It would have to be electrically connected the same as FORWARD POWER meter 3A1M1 (see figure FO-4).

3.4.7 EXTERNAL REFLECTED POWER MONITORING CIRCUIT: A buffered dc voltage that is representative of the reflected power level is provided at 3A2TB1-11. This voltage is a non-linear function of the reflected power level and will be 5.7 $\pm$0.5 volts dc at 2 500 Watts. An external panel meter that is accurate at all power levels would require a one milliampere movement and have the same modified square law scale as REFLECTED POWER meter 3A1M4. It would have to be electrically connected the same as REFLECTED POWER meter 3A1M4 (see figure FO-4).

3.4.8 EXTERNAL ALARM MONITORING CIRCUITS: The transmitter's alarm circuits contain switching transistors that provide a current sink to ground or an open collector as their outputs. The alarm monitoring circuits must be connected as depicted in figure 3-3. The dc voltage source for the alarm monitoring circuits should not exceed 24 volts dc. Each alarm monitoring circuit must present an impedance between the switching transistor and the positive dc voltage source that will result in not more than 40 milliamperes flowing thru any alarm monitoring circuit when its associated switching transistor is providing a current sink to ground. Each of the switching transistors is protected against transients and/or overvoltage by a 56 volt zener diode. The 24 volt dc power source used for the remote control circuits may be used as the 24 volt dc power source for the alarm monitoring circuits. The dc return (negative) path for the 24 volt dc power source must be connected to 3A2TB1-16.

3.4.8.1 PA Fail Alarm: The transmitter provides an open collector as its 'PA Fail' alarm output to 3A2TB1-12 when all of the power amplifiers are operating satisfactorily. When a power amplifier failure is sensed, indicating one or more power amplifiers are not contributing to the transmitter's rf output, a current sink to ground is provided as the 'PA fail' alarm

3.4.8.2 SWR Cutback Alarm: The transmitter provides an open collector as its 'SWR cutback' alarm output to 3A2TB1-13 when the rf output current is within the optimum stress limits of the rf power amplifier stages. When anything occurs that would cause the rf output current to exceed the optimum stress limits of the rf power amplifier stages, the transmitter's rf output will automatically be reduced to the level that will maintain the rf output current within the optimum stress limits. A current sink to ground is provided as the 'SWR Cutback' alarm output 'during the period of time the transmitter's rf output level is being cutback by the rf stress current protection circuit.

3.4.8.3 Drive Fail Alarm: The transmitter provides an open collector as its 'Drive Fail' alarm output to 3A2TB1-14 when the rf drive and the pulse width modulation drive are satisfactory. When a 'Drive Fail' alarm is generated, indicating an rf drive and/or pulse width modulation drive failure has occurred, a current sink to ground is provided as the 'Drive Fail' alarm. A current sink to ground is also provided as the 'Drive Fail' alarm whenever an 'AC Power' alarm output is being generated.

3.4.8.4 AC Power Alarm: The transmitter provides an open collector as its 'AC Power' alarm output to 3A2TB1-15 when the regulated 15 volt dc power supply that supplies the +15 volts dc for the transmitter's logic circuits is satisfactory. An 'AC Power' alarm is generated when this 15 volt dc power source is inhibited as the result of an increase of more than ten percent in the ac power source, a power supply failure or excessive loading of the power supply. When the regulated +15 volt dc power supply is being inhibited, a current sink to ground is provided as the 'AC Power' alarm output.

3.4.9 EXTERNAL RF MONITOR CIRCUIT: A sample of the rf output is provided on O/P connector 3A2A1J2, which is a BNC connector that is located on the rf monitor printed circuit board assembly of the interface panel. This rf voltage is intended to be applied to a 50-0hm load, such as a station modulation monitor, and is set during calibration for a maximum of 5.0 volts rms. It is also set during calibration to provide the same rms voltage for all three preset rf output levels.

PARTS SUPPLIED BY NAUTEL

3.5 The following parts/materials are supplied by or are available from Nautel. Detailed information about these parts is not included in this instruction manual.

3.5.1 PARTS REMOVED DURING DISASSEMBLY FOR SHIPMENT: All the parts that were removed during disassembly for shipment and are required to reassemble the transmitter are provided. An itemized listing of the parts is not provided in this instruction manual, as the extent of disassembly is determined by the method of shipment. Detailed packing lists will be included with a transmitter shipment.

3.5.2 ANCILLARY PARTS: An ancillary parts kit is provided with each transmitter. These parts include spare fuses, some solid state devices and commonly used hardware/repair materials. The ancillary parts are not intended to be long term maintenance spares. They are provided to ensure the initial installation is not delayed because of a lost or damaged part and to allow the user to maintain the equipment until a comprhensive maintenace spares kit is obtained. An itemized listing of the ancillary parts kit contents is included in its packing list.

3.5.3 NAX35 CIRCUIT BREAKER PANEL: An NAX35 circuit breaker panel; that is rated for the three-phase ac power source to be applied to the transmitter, as identified by the user; is supplied by Nautel. The circuit breaker panel is intended to interface the ac power service entrance and the transmitter. It provides to separately switched/fused branch circuits as the power source for the two ac/dc power supplies in the transmitter.

3.5.4 NAX34 SURGE PROTECTOR PANEL: An NAX34 surge protector panel; that is rated for the three-phase ac power source to be applied to the transmitter, is supplied by Nautel. The surge protector panel must be installed between the ac power service entrance and the NAX35 circuit breaker panel. It must also be connected directly to the ground rod associated with the service entrance. transmitter. The surge protector panel will protect the transmitter against any lightning induced voltage transients on the ac power source.

3.5.5 NARS17 AMPFET RELAY SUPPLY/REMOTE POWER CONTROL; An NARS17 AMPFET relay supply is supplied by Nautel as standard equipment. This assembly is designed to be installed in a standard 19-inch mounting rack and contains an unregulated 24 volt dc power supply. This power supply is intended to be the 24 volt dc power source for the bistable relays in the transmitter's remote control circuits. It can also be used as the 24 volt dc power source for the remote, alarm monitoring circuits. An NARS17/1 AMPFET relay supply/remote power control assembly is available as an option. This assembly contains a regulated 15 volt dc power supply, in addition to the unregulated 24 volt dc power supply. The output of the regulated 15 volt dc power supply can be controlled, from a remote source, to provide one of sixteen voltages (0.0 to 15.0 volts dc) in 1.0 volt dc increments. The output voltage of the 15 volt dc power supply is intended to be the external gain input for the transmitter. The NARS17/1 AMPFET relay supply/remote power control assembly is only needed by user's that are required to have the ability to remotely trim (increase/decrease) the transmitter's rf output level.

3.5.6 NAF43 SQUARE WAVE TO SINE WAVE FILTER: An NAF43 square wave to sine wave filter, that is tuned to the user's assigned carrier frequency, is supplied by Nautel. This assembly is only used when the transmitter is being operated in the AM stereo mode and the rf carrier is being supplied by an external AM stereo exciter. The square wave to sine wave filter must interface the phase modulated rf carrier output of an AM stereo exciter and the 'external rf' input of the transmitter when the output of the AM exciter is not a sine wave.

PARTS REQUIRED BUT NOT SUPPLIED BY NAUTEL

3.6 Some parts and materials required to complete an AMPFET 50 installation are not supplied with the transmitter or provided by Nautel. The user must supply these parts. Each installation will dictate the parts required, and will normally include the following:

(a) A suitable 50-ohm rf output coaxial cable, terminated by a 3 1/8 inch EIA connector at the transmitter end, is required.

(b) All external control/monitor wiring, including their associated terminating devices and conduit clamps must be provided by the user.

(c) All electrical power cables, including the cables interconnecting the NAX35 circuit breaker panel and the transmitter; including conduit, terminating devices and conduit clamps must be provided by the user.

UNPACKING

3.7 The transmitter will normally be shipped via a moving company that specializes in the transportation of electronic equipment in air cushioned containers. Transmitter's shipped in this manner will not be crated but will be partially disassembled for shipment. The extent of disassembly will be dictated by the site information provided by the user and the handling equipment of the mover. Transmitters that are shipped by other means of transportation, will be packed in wooden crates. The number of crates will be determined by the extent of disassembly for shipment. Unpacking instructions will accompany any crate that requires special unpacking information. Packing lists provide detailed listings of shipment contents.

NOTE

All shipments should be inspected for transit damage prior to acceptance and/or uncrating.

CAUTION

Sufficient manpower or mechanical assistance should be available prior to attempted removal of crate contents. A crate may weigh in excess of 567 kilograms (1 247 pounds).

PRE-INSTALLATION PROCEDURES

3.8 The following prerequisites must be completed prior to completing the transmitter installation.

3.8.1 SELECTING PRIMARY TAPS OF POWER TRANFORMERS: Determine the mean rms, phase-to-phase voltage of the ac power source and connect the input power taps of both power transformers to the appropriate primary winding taps as follows:

(a) Determine the mean rms, phase-to-phase voltage of the 3-phase ac power source.

(b) Refer to the T1 primary tap selection table in figure FO-2, and determine the tap selection for next lower voltage from the mean rms, phase-to-phase voltage determined in step (a).

(c) Connect the moveable wire from each of the power transformer's input terminals (H1, H2 and H3) to its associated primary winding tap. Ensure the primary winding tap selection (A, B or C) for all three phases of both power transformers are the same.

3.8.2 PREREQUISITES FOR STEREO OPERATION: If the transmitter is to be operated in the stereo mode, set or verify the STEREO/MONO link on the rf driver printed circuit board in the NAE35 exciter drawers is connected as follows:

NOTE

It is recommended the STEREO/MONO link of exciter 'A' be connected for stereo operation and the STEREO/MONO link of exciter 'B' be connected for monaural operation when the transmitter is to be operated in the stereo mode,

(a) Determine which exciter will be used as exciter 'A'.

(b) Connect or verify a STEREO link is installed and remove or verify the MONO link is removed on the rf driver printed circuit board of the exciter drawer which will be used as exciter 'A'.

(c) Connect or verify the MONO link is installed and remove or verify the STEREO link is removed on the rf driver printed circuit board of the exciter drawer which will be used as exciter 'B'.

3.8.3 PREREQUISITES FOR MONAURAL OPERATION: If the transmitter is to be operated in the monaural mode, connect or verify the MONO link on the rf driver printed circuit board of both NAE35 exciter drawers is connected and remove or verify the STEREO link is removed.

NOTE

The exciter drawers are fully interchangeable when they are connectd for monaural operation.

3.8.4 INTERNAL AUDIO FILTER SWITCH SETTINGS: Set all of the sections of the low pass and high pass filter switches, on the modulator drive printed circuit board in both NAE35 exciter drawers, to their closed positions.

NOTE

The protective cover over the modulator drive printed circuit board must be removed to gain access to the high pass and low pass filters. This cover may be left off until final switch settings have been determined.

A -1.0 dB low frequency roll off of 63 Hz and a -1.0 dB high frequency roll off of 7500 Hz will be selected when all sections of the low pass and high pass filter switches are closed. Final switch settings are determined during initial calibration.

INSTALLATION PROCEDURES

3.9 Install the transmitter cabinets, when the final filter/power supply cabinet is located on the left-hand side of the assembled transmitter, and finalize the transmitter assembly as detailed in the following paragraphs.

3.9.1 DISASSEMBLY REQUIRED: Disassemble the delivered assemblies to the extent necessary to bolt the cabinets together, install the ac/dc power supplies and interconnect the electrical wiring, as follows:

NOTE

Do not disassemble to a greater extent than is necessary to complete the procedures detailed in paragraphs 3.9.2 thru 3.9.5.

Any attaching hardware or parts that are removed must be retained for subsequent reuse during reassembly.

3.9.1.1 Ac/Dc Power Supply Disassembly (see figure FO-44): Disassemble each NASR60 power supply to the extent necessary to install it in final filter/power supply cabinet '6' as follows:

(a) Remove the three conductor straps interconnecting terminals X1, X2 and X3 of the power transformer and the rectifier assembly.

(b) Disconnect wire, originating at resistor R4, from negative bus (E1) of rectifier assembly.

(c) Disconnect wire, originating at resistor R4, from positive bus (E2) of rectifier assembly.

(d) Remove four 1/4 hex nuts, four 1/4 split lock washers, four 1/4 flat washers and 1/4-20 X 0.75 inch hex head bolts, securing rectifier assembly to the transformer support brackets and carefully lift off the rectifier assembly.

3.9.1.2 Cabinet Disassembly: Disassemble the cabinets, to the extent necessary to bolt them together and interconnect the electrical wiring, as follows:

(a) Remove the front and rear doors from each cabinet by releasing the spring-loaded hinge pin of each door and carefully lifting away the door, noting that spring-loaded hinge pin may be located at the top or bottom of the door.

(b) Remove the end panel from 15 kW power block cabinet '5', by lifting the panel upwards until it releases from the cabinet retaining bars (approximately one inch) and then carefully lifting the panel from the cabinet.

(c) Remove the end panel from final filter/power supply cabinet '6', by lifting the panel upwards until it releases from the cabinet retaining bars (approximately one inch) and then carefully lifting the panel from the cabinet.

(d) Remove the two lower panels from the front of final filter/power supply cabinet '6', by removing ten 10-32 panel screws from each panel and then carefully lifting the panels away from the cabinet.

(e) Remove the two lower panels from the rear of final filter/power supply cabinet '6', by disconnecting the mating connector from each cooling air fan mounted on the panels, removing ten 10-32 pan head screws, ten #10 flat washers and ten #10 external tooth washers from each panel and then carefully lifting the panels away from the cabinet.

(f) If installed, remove the twelve NAP10 1.25 kW AM power subsystem modules from each 15 kW power block cabinet by disconnecting the mating electrical connectors from J1, J2 and the cooling air fan of each module; removing one 10-24 hex nut, one #10 external tooth washer and one #10 flat washer from the retaining stud of each module (accessible from the rear of the cabinet) and then carefully sliding each NAP10 module out of its support tray from the front of the cabinet.

(g) If installed, remove the two NAE35 exciter drawer modules from the control/monitor cabinet by removing four 10-32 panel screws from each module and then extending the modules on their chassis slides. Disconnect the mating electrical connectors from the rear of each module, release the slide fastening mechanisms and carefully remove the exciter drawer modules.

(h) Remove the two NAP10 1.25 kW AM power subsystem module support trays (A14 and A15) from each 15 kW power block cabinet by removing four 6-32 X 1/2 inch pan head screws and four #6 external tooth washers from each tray and then carefully extracting the trays.

3.9.2 VISUAL INSPECTION: Perform a visual inspection of all accessible parts of the transmitter, including modules and panels removed in paragraph 3.9.1, as follows:

3.9.2.1 Cabinet Inspection: Visually inspect all cabinets, paying particular attention to the following:

(a) Check for obvious damage and missing parts.

(b) Verify all attaching hardware is firmly tightened.

(c) Check electrical wiring for broken or frayed insulation, loose or improper connections and broken, shorted or pinched conductors.

(d) Check for and remove any packing materials, including tape or tyraps securing wiring that was disconnected for shipment.

(e) Check for and remove any unwanted foreign objects from the interior of the cabinets, paying particular attention for floating conductive materials such as strands of wire, metal slivers/filings and loose hardware.

3.9.2.2 NAP10 1.25 kW AM Power Subsystem Module Inspection: Visually inspect each NAP10 1.25 kW AM power subsystem module for obvious damage and listen for loose or free floating objects while rotating the module.

NOTE

Do not disassemble NAP10 AM power subsystem modules unless it is suspected a module contains loose parts or foreign materials. Refer to NAP10 module service booklet for disassembly/reassembly information.

3.9.2.3 NAE35 Exciter Drawer Inspection: Visually inspect both NAE35 exciter drawers as detailed in the NAE35 exciter drawer service booklet.

NOTE

Do not disassemble the NAE35 exciter drawers unless a visual inspection reveals loose, damaged or missing parts.

3.9.2.4 Power Transformer Inspection: Visually inspect both power transformers for obvious damage and verify all attaching hardware is firmly tightened.

3.9.2.5 -72 Volt Dc Rectifier Assembly Inspection: Visually inspect both -72 volt dc rectifier assemblies for obvious damage and verify all attaching hardware is firmly tightened.

3.9.3 CABLE ENTRY HOLES: There are no predrilled cable entry holes in the transmitter cabinets when they are delivered to customers since Nautel does not have control of the method of installing the ac power cabling or of the size of conduit that will be used. It is recommended that all cables be installed in conduits and enter the transmitter from the top of the cabinets.

NOTE

It is possible for the ac power cables to enter the bottom of final filter/power supply cabinet, through existing openings, when cables are routed in below-floor-level cable ducts or through-the-floor conduits. This method is not recommended since cabinet positioning is critical and the limited space may result in unnecessarily sharp bends in the cables.

A conductor from the station reference ground, as described in Nautel's Lightning Protection for Radio Transmitter Stations booklet, must enter the final filter/power supply cabinet. The method and location of entry will be dictated by the type of conductor and the point of origin. Refer to paragraph 3.9.5.12 for installation information.

All swarf must be removed from the interior of the cabinets.

3.9.3.1 Ac Power Cable Entry Holes: When the ac power cables enter the final filter/power supply cabinet from the top, punch out the appropriate size holes in the cabinet as follows:

NOTE

It is assumed an NAX35 circuit breaker panel will interface the transmitter/ac power source and two conduits will carry the three phase ac power cables to the transmitter.

(a) Determine the hole size that will accept the conduit for the three-phase ac power cables and punch two holes, identified as 'A' and 'B' in figure 3-1, using a chassis punch of the required size. Use dimensions shown in figure 3-1 for hole centers.

(b) Determine the hole size that will accept the conduit for the 115 vac power cable and punch one hole, identified as 'C' in figure 3-1, using a chassis punch of the required size. Use dimensions shown in figure 3-1 for hole center.

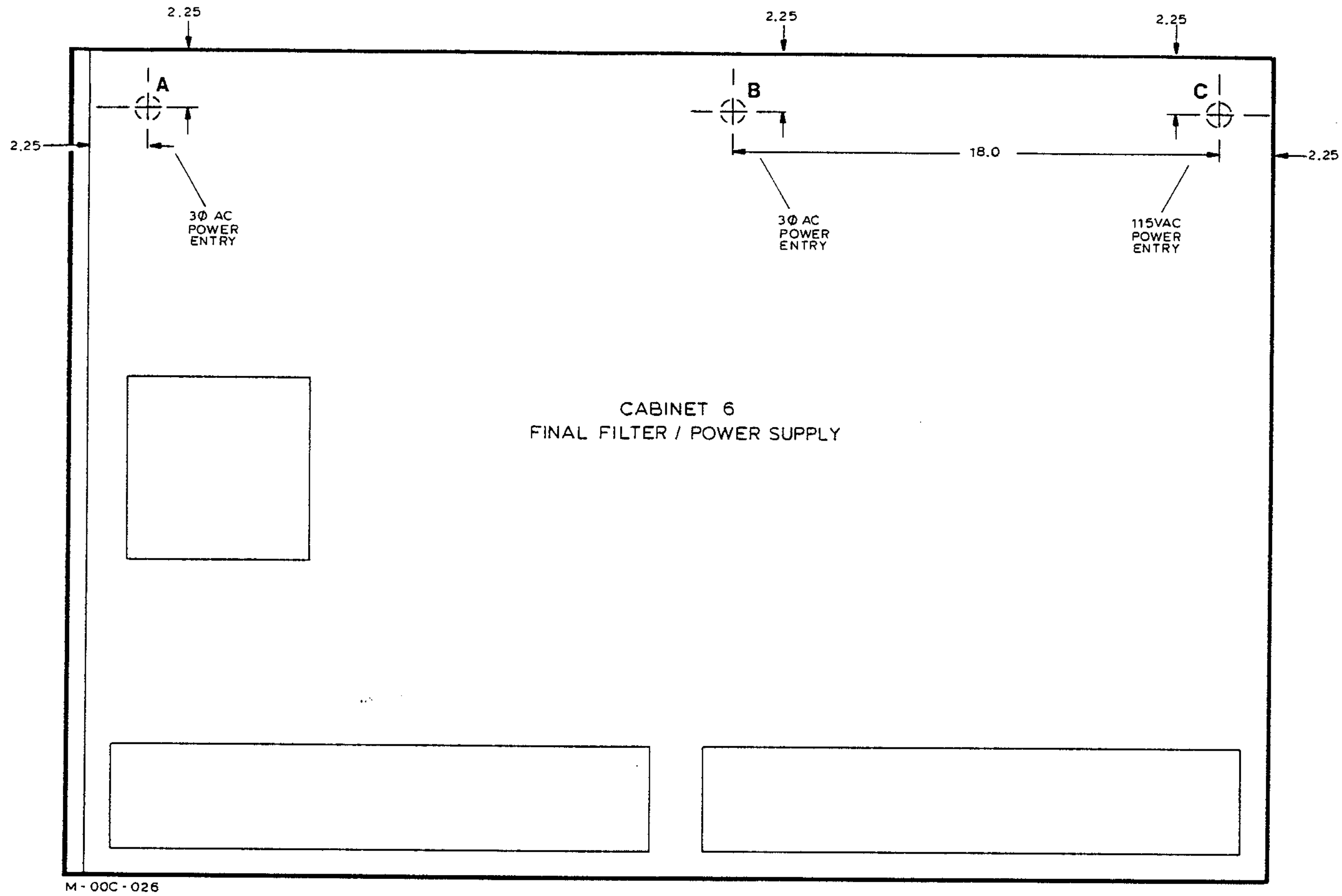

Figure 3-1 Location of Cable Entry Holes in Final Filter/Power Supply Cabinet (When Located On left-Hand Side of Transmitter)

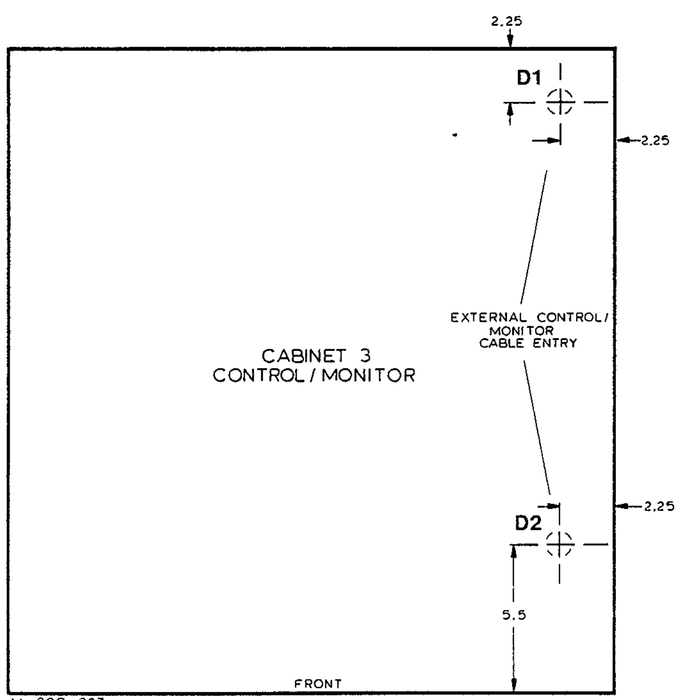

Figure 3-2 Location of Cable Entry Hole(s) in Control/Monitor Cabinet

3.9.3.2 External Control/Monitor Cable Entry Holes: When the external control/monitor wiring enters the control/monitor cabinet from the top, punch out the appropriate size hole(s) in the top of the control/monitor cabinet according to the following instructions:

NOTE

The recommended location for cable entry is identified as 'D1' in figure 3-2. If ventilation ducts or baffles interfere with access to this area of the cabinet, the cable entry hole location identified as 'D2' may be used.

Depending on the installation, more than one control/monitor cable entry hole may be required. Additional holes should be punched on an extension of the hole center line that is parallel with the front/rear face of the cabinet. Separation of the additional holes will be determined by the size of the conduit fittings to be used.

(a) Determine the number of conduits, and therefore the number of cable entry holes that will be required to accommodate the external control/monitor wiring, the modulating audio wiring, the external rf carrier wiring (if fitted) and the external gain control wiring (if fitted).

(b) Determine the hole size for each conduit determined in step (a) and punch the required number of holes on the extended center line of the hole identified as 'D1' or 'D2' in figure 3-2, using a chassis punch of the required size. Use dimensions shown in figure 3-2 for hole center of right-hand hole.

3.9.4 CABINET ASSEMBLY: Position the cabinets in their final location and complete their assembly as follows: Refer to figures FO-13 and FO-14 for assembly detail and to figure FO-45 for dimensional information.

NOTE

Final filter/power supply cabinet '6' is located on the left-hand side of the assembled transmitter as depicted in the referenced illustrations,

Unless otherwise specified, the transmitter is viewed from the front in the following instructions.

(a) Verify a visual inspection has been completed as detailed in paragraph 3.9.3.1 and the cable entry holes have been punched in the control/monitor and final filter/power supply cabinets as detailed in paragraph 3.9.2

(b) Obtain the following attaching hardware from the assembly hardware provided.

*15 - 5/16-18 X 0.75 inch hex head bolts

2 - 5/16-18 X 1.0 inch hex head bolts

*17 - 5/16 split, lock washers

*17 - 5/16-18 hex nuts

* denotes quantity is reduced by six when a pair of 15 kW power block cabinets are preassembled to the control/monitor cabinet.

(c) Position the final filter/power supply cabinet so it will be on the left-hand side of the completely assembled transmitter, with its front edge flush with a line representing the front of the remainder of the transmitter.

CAUTION

Remove any packing material securing interconnecting wires to mating surfaces of cabinets and then ensure wiring is not pinched between cabinets during assembly.

(d) Position the pair of preassembled 15 kW power block cabinets, that have the wiring exiting their rear cable ducts from the right-hand side, to the immediate right of the final filter/power supply cabinet positioned in step (c). Ensure the front edges of all cabinets are flush and coaxial cables #27 thru #32 pass between the top panel and the upper front-to-rear support bracket of the final filter/power supply cabinet and are route to the vicinity of rf bus bar E2 on the top of the NAF39 50 kW combiner/final filter (see figure FO-41).

(e) Secure the 15 kW power block cabinets positioned in step (d) to the final filter/power supply cabinet using a 5/16-18 X 0.75 inch hex head bolt, a 5/16 split, lock washer and a 5/16-18 hex nut at the top, center and bottom of the front of the cabinets. Use a 5/16-18 X 1.0 inch hex head bolt, a 5/16 split, lock washer and a 5/16-18 hex nut at the top and bottom of the rear of the cabinets.

NOTE

The control/monitor cabinet may be preassembled to the remaining pair of 15 kW power block cabinets. In this case, steps (f) should be expanded to include these cabinets and the cable routing information included in step (h). Step (i) may be ignored.

(f) Position the control/monitor cabinet to the immediate right of the 15 kW power block cabinets installed in step (e), ensuring the wiring exiting from the cable ducts of the 15 kW power block cabinets is routed between the rear post and the rear panel of the control/monitor cabinet and the front edges of all cabinets are flush.

(g) Secure the control/monitor cabinet to the 15 kW power block cabinets, installed in step (e), using a 5/16-18 X 0.75 inch hex head bolt, a 5/16 split, lock washer and a 5/16-18 hex nut at the top, center and bottom of the front and rear of the cabinets.

(h) Position the remaining pair of preassembled 15 kW power block cabinets, that have the wiring exiting their rear cable ducts from the left-hand side, to the immediate right of the control/monitor cabinet. Ensure coaxial cables #33 thru #38 pass between the top panel and the upper front-to-rear support bracket of the previously installed cabinets and they are routed to the vicinity of rf bus bar 6A1E2 on the top of the NAF39 50 kW combiner/final filter (see figure FO-41). Ensure the wiring from the cable ducts of the 15 kW power block cabinets is routed between the rear post and the rear panel of the control/monitor cabinet and the front edges of all cabinets are flush.

(i) Secure the 15 kW power block cabinets installed in step (h) to the control/monitor cabinet using a 5/16-18 X 0.75 inch hex head bolt, a 5/16 split, lock washer and a 5/16-18 hex nut at the top, center and bottom of the front and rear of the cabinets.

(j) Perform any final positioning changes to the assembled transmitter cabinets, ensuring the front edge of all cabinets are flush and parallel with a straight line representing the front edge of the transmitter.

3.9.5 AC/DC POWER SUPPLY INSTALLATION: Install the power transformers in the final filter/power supply cabinet and then reassemble the -72 volt dc rectifier assembly on the top of each transformer and connect the -72 volt dc wiring as follows:

(a) Verify the power transformers and -72 volt dc rectifier assemblies have been inspected as detailed in paragraphs 3.9.2.4 and 3.9.2.5.

(b) Obtain the transformer/rectifier assembly interconnecting straps and attaching hardware that were removed during disassembly of the NASR60 ac/dc power supplies in paragraph 3.9.1.2.

NOTE

It is recommended the ac/dc power supplies be installed in the sequence specified in the following paragraphs. The installation and wiring associated with power supply 6A3, which is located in the right-hand side of the final filter/power supply cabinet, should be completed prior to installing power supply 6A2.

3.9.5.1 Installation of Power Transformer 6A3T1: Referring to figure FO-37 as an installation guide, install the power transformer that will eventually be designated as 6A3T1, observing the following:

CAUTION

Each power transformer weighs approximately 217 kilograms (470 pounds). Do not attempt to place in position unless sufficient manpower or mechanical assistance is available to move the transformers into position without damaging the cabinet or causing injury to personnel.

(a) Position one of the power transformers in front (or rear) of the right-hand side of the final filter/power supply cabinet, ensuring the side of the transformer containing its terminals is facing the left-hand side of the cabinet.

(b) Carefully lift or slide the power transformer into the final filter/power supply cabinet, ensuring the side of the transformer containing its terminals is still facing the left-hand side of the cabinet.

(c) Position the transformer until it is approximately centered in the right-hand side of the cabinet.

3.9.5.2 Reassembly of NASR60 Ac/Dc Power Supply 6A2: Referring to figure FO-44 for assembly detail, reassemble the NASR60 ac/dc power supply that will eventually be designated 6A3 as follows:

(a) Position one of the -72 volt dc rectifier assemblies on power transformer 6A3T1's support brackets, as depicted in figure FO-44, ensuring positive (+) rail of rectifier is facing the same direction as the power transformer terminals.

(b) Secure -72 volt dc rectifier assembly to brackets using a 1/4-20 X 0.75 inch hex head bolt, a 1/4 flat washer, a 1/4 split lock washer and a 1/4 hex nut in four places.

(c) Firmly tighten attaching hardware installed in step (b).

(d) Install a strap (P/N 149-7011) to each of the power transformer's secondary winding output terminals (X1, X2 and X3) as depicted in figure FO-44, ensuring top end of strap is positioned in the proper location of the rectifier assembly's heat sink; using a 1/2-13 X 1.0 inch hex head bolt, a 1/2 flat washer, a 1/2 split lock washer and a 1/2 hex nut at each connection.

(e) Connect the top end of each strap to the appropriate attaching hole of the rectifier assembly's heat sink; using a 1/4-20 X 1.25 inch hex head bolt, a 1/4 flat washer, a 1/4 split lock washer and a 1/4 hex nut at each connection. Ensure associated varistor's mounting terminal is located between the strap and the heat sink and the attaching bolt passes through the terminal.

(f) Firmly tighten the strap attaching hardware installed in steps (d) and (e).

3.9.5.3 Installation of -72 Volt Dc Wiring Associated with Ac/Dc Power Supply 6A3: Install the -72 volt dc wiring between -72 volt dc rectifier assembly 6A3A1 and current shunt bus bar 3E2 in the control/monitor cabinet and the associated dc return (ground) wires between rectifier assembly 6A3A1 and the grounds of 15 kW power block cabinets '4' and '5' as follows:

(a) Obtain 2 AWG wires numbered 53 thru 60, with terminating lugs already attached, from wires provided.

(b) Route wires 53 thru 56 from vicinity of 6A3A1's positive (+) rail, under power transformer 6A3T1, along the bottom shelf of the cabinets to the bottom of the 15 kW power block cabinet (cabinet 4) that is to the immediate right of the control/monitor cabinet.

(c) Route wires 57 thru 60 from vicinity of 6A3A1's positive (+) rail, under power transformer 6A3T1, along the bottom shelf of the cabinets to the bottom of the 15 kW power block cabinet (cabinet 5) on the extreme right.

(d) Connect wires 53 thru 60 to the bottom hole of the appropriate vertical support angle in each corner of cabinets 4 and 5 using a 1/4-20 X 0.75 inch hex head screw, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Wires 53/57 go to the front left-hand corner, wires 54/58 go to the front right-hand corner, wires 55/59 go to the rear left-hand corner and wires 56/60 go to the rear right-hand corner of the appropriate cabinet.

(e) Connect wires 53 thru 60, in pairs, to positive (+) rail of -72 volt dc rectifier assembly 6A3A1 using, a 1/4-20 X 3.9.0 inch hex head bolt, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Connect wire 53/54 to outside right-hand mounting hole, wire 55/56 to inside right-hand mounting hole, wire 57/58 to inside left-hand mounting hole and wire 59/60 to outside left-hand mounting hole. Connect wire from one end of resistor 6A3R4 to the appropriate mounting hole of the positive rail.

NOTE:
Wires must be connected to points indicated as they are precut to the specific length required for the specified point-to-point connection.

(f) Obtain 2 AWG wires numbered 61 thru 66, with terminating lugs already attached, from wires provided.

(g) Route wires 61 thru 66 from vicinity of 6A3A1's positive (-) rail, along the bottom shelf of the cabinets to the vicinity of the current shunts on the current shunt/interface panel in the control/monitor cabinet.

(h) Connect wires 61 thru 66 sequentially and individually to mounting holes of bus bar 3E2 (across inputs of current shunt resistors 3R3/3R4) using a 1/4-20 X 0.75 inch hex head screw, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Refer to figures FO-32 and FO-33 to locate current shunt bus bar 3E2.

(i) Connect wires 61 thru 66 to negative (-) rail of -72 volt dc rectifier assembly 6A3A1, using a 1/4-20 X 3.9.0 inch hex head bolt, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Connect wires 61/62 to outside right-hand mounting hole, wire 63 to inside right-hand mounting hole, wire 64 to inside left-hand mounting hole and wires 65/66 to outside left-hand mounting hole. Connect remaining wire from resistor 6A3R4 to the appropriate mounting hole of the negative rail.

(j) Dress and bundle wires 53 thru 66 in a neat manner and tyrap as necessary.

3.9.5.4 Installation of Power Transformer 6A2T1: Referring to figure FO-37 as an installation guide, install the power transformer that will eventually be designated as 6A2T1, observing the following:

(a) Position the remaining power transformer in front (or rear) of the left-hand side of the final filter/power supply cabinet, ensuring the side of the transformer containing its terminals is facing the left-hand side of the cabinet.

(b) Carefully lift or slide the power transformer into the final filter/power supply cabinet, ensuring the side of the transformer containing its terminals is still facing the left-hand side of the cabinet.

(c) Position the transformer until it is approximately centered in the left-hand side of the cabinet.

3.9.5.5 Reassembly of NASR60 Ac/Dc Power Supply 6A2: Referring to figure FO-44 for assembly detail, reassemble the NASR60 ac/dc power supply that will eventually be designated 6A2 as follows:

(a) Position the remaining -72 volt dc rectifier assembly on power transformer 6A3T1's support brackets, as depicted in figure FO-44, ensuring positive (+) rail of rectifier is facing the same direction as the power transformer terminals.

(b) Secure -72 volt dc rectifier assembly to brackets using a 1/4-20 X 0.75 inch hex head bolt, a 1/4 flat washer, a 1/4 split lock washer and a 1/4 hex nut in four places.

(c) Firmly tighten attaching hardware installed in step (b).

(d) Install a strap (P/N 149-7011) to each of the power transformer's secondary winding output terminals (X1, X2 and X3) as depicted in figure FO-44, ensuring top end of strap is positioned in the proper location of the rectifier assembly's heat sink; using a 1/2-13 X 1.0 inch hex head bolt, a 1/2 flat washer, a 1/2 split lock washer and a 1/2 hex nut at each connection.

(e) Connect the top end of each strap to the appropriate attaching hole of the rectifier assembly's heat sink; using a 1/4-20 X 1.25 inch hex head bolt, a 1/4 flat washer, a 1/4 split lock washer and a 1/4 hex nut at each connection. Ensure associated varistor's mounting terminal is located between the strap and the heat sink and the attaching bolt passes through the terminal.

(f) Firmly tighten the strap attaching hardware installed in steps (d) and (e).

3.9.5.6 Installation of -72 Volt Dc Wiring Associated with Ac/Dc Power Supply 6A2: Install the -72 volt dc wiring between -72 volt dc rectifier assembly 6A2A1 and current shunt bus bar 3E1 in the control/monitor cabinet and the associated dc return (ground) wires between rectifier assembly 6A2A1 and the grounds of 15 kW power block cabinets '1' and '2' as follows:

(a) Obtain 2 AWG wires numbered 39 thru 46, with terminating lugs already attached, from wires provided.

(b) Route wires 39 thru 42 from vicinity of 6A2A1's positive (+) rail, under power transformers 6A2T1/6A3T1, along the bottom shelf of the cabinets to the bottom of the 15 kW power block cabinet (cabinet 1) that is to the immediate right of the final filter/power supply cabinet.

(c) Route wires 43 thru 46 from vicinity of 6A2A1's positive (+) rail, under power transformers 6A2T1/6A3T1, along the bottom shelf of the cabinets to the bottom of the 15 kW power block cabinet (cabinet 2) that is to the immediate left of the control/monitor cabinet.

(d) Connect wires 39 thru 46 to the bottom hole of the appropriate vertical support angle in each corner of cabinets 1 and 2 using a 1/4-20 X 0.75 inch hex head screw, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Wires 39/43 go to the front left-hand corner, wires 40/44 go to the front right-hand corner, wires 41/45 go to the rear left-hand corner and wires 42/46 go to the rear right-hand corner of the appropriate cabinet.

NOTE:
Wires must be connected to points indicated as they are precut to the specific length required for the specified point-to-point connection.

(e) Connect wires 39 thru 46, in pairs, to positive (+) rail of -72 volt dc rectifier assembly 6A2A1 using, a 1/4-20 X 0.75 inch hex head bolt, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Connect wires 39/40 to outside right-hand mounting hole, wires 41/42 to inside right-hand mounting hole, wires 43/44 to inside left-hand mounting hole and wires 45/46 to outside left-hand mounting hole. Connect wire from one end of resistor 6A2R4 to the appropriate mounting hole of the positive rail.

(f) Obtain 2 AWG wires numbered 47 thru 52 from wires provided.

(g) Route wires 47 thru 52 under power transformer 6A2T1, along the bottom shelf of the cabinets to the vicinity of the current shunts on the current shunt/interface panel in the control/monitor cabinet.

(h) Connect wires 47 thru 52 sequentially and individually to mounting holes of bus bar 3E1 (across inputs of current shunt resistors 3R1/3R2) using a 1/4-20 X 0.75 inch hex head screw, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Refer to figures FO-32 and FO-33 to locate current shunt bus bar 3E1.

(i) Connect wires 47 thru 52 to negative (-) rail of -72 volt dc rectifier assembly 6A2A1 using, a 1/4-20 X 1.0 inch hex head bolt, a 1/4 external tooth washer and a 1/4 hex nut at each connection. Connect wires 47/48 to outside right-hand mounting hole, wire 49 to inside right-hand mounting hole, wire 50 to inside left-hand mounting hole and wires 51/52 to outside left-hand mounting hole. Connect remaining wire from resistor 6A2R4 to the appropriate mounting hole of the negative rail.

(j) Dress and bundle wires 39 thru 52 in a neat manner and tyrap as necessary.

3.9.5.7 15 kW Power Block To Control/Monitor Cabinet Electrical Interconnection: Connect wiring that interconnects the 15 kW power block to the control/monitor cabinet as follows:

(a) Locate the tinned copper braid that is fastened, at one end, to the 1.25 kW AM power modules support bars of 15 kW power block cabinets 2 and 4, and then route each copper braid behind the cabinet corner brackets to the nearest retaining screw of the panels carrying the NAX25 relay control assemblies.

(b) Connect the wiring extending from the plastic cable ducts under the 1.25 kW AM power modules of each pair of 15 kW power block cabinets (1/2 and 4/5) to the appropriate electrical terminating point in the control/monitor cabinet, as detailed in table 6-1; noting that wires terminated to ground should be routed to the nearest retaining screw of the panels carrying the NAX25 relay control assemblies. Refer to figure FO-21 to determine the location of the specified NAX25 relay control assemblies, to figure FO-32 to locate terminal boards TB1/TB6 and to the following substeps to locate the specified cable assembly:

- Cable 3W1 is located in a plastic cable duct beneath 2A1/2A2/1A1/1A2
- Cable 3W2 is located in a plastic cable duct beneath 2A4/2A5/1A4/1A5
- Cable 3W3 is located in a plastic cable duct beneath 2A6/2A7/1A6/1A7
- Cable 3W4 is located in a plastic cable duct beneath 2A9/2A10/1A9/1A10
- Cable 3W5 is located in a plastic cable duct beneath 2A11/2A12/1A11/1A12
- Cable 3W6 is located in a plastic cable duct beneath 2A14/2A15/1A14/1A15
- Cable 3W7 is located in a plastic cable duct beneath 4A1/4A2/5A1/5A2
- Cable 3W8 is located in a plastic cable duct beneath 4A4/4A5/5A4/5A5
- Cable 3W9 is located in a plastic cable duct beneath 4A6/4A7/5A6/5A7
- Cable 3W10 is located in a plastic cable duct beneath 4A9/4A10/5A9/5A10
- Cable 3W11 is located in a plastic cable duct beneath 4A11/4A12/5A11/5A12
- Cable 3W12 is located in a plastic cable duct beneath 4A14/4A15/5A14/5A15

(c) Remove the retaining screws (one at a time) from the panels carrying the NAX25 relay control assemblies that have a ground strap/wires routed to them and attach the strap/wiring using removed screw. Ensure any wiring previously secured by retaining screws are reconnected and screws are firmly tightened on completion.

(d) Locate coaxial cables (numbered 14 thru 19) that should be bundled at the rear, left-hand side of the control/monitor cabinet, and route these cables to the rear of 15 kW power block cabinet (2), ensuring they are on the inside of cabinet corner posts.

(e) Locate coaxial cables (numbered 20 thru 25), that should be bundled at the rear, right-hand side of the control/monitor cabinet, and route these cables to the rear of 15 kW power block cabinet (4), ensuring they are on the inside of the cabinet corner posts.

NOTE

If the control/monitor cabinet was preassembled to 15 kW power block cabinets '4' and '5', coaxial cables #20 thru #25 will be installed and reference to these numbers in the following steps may be ignored.

(f) Remove the covers from the plastic cable ducts under the 1.25 kW AM power modules and route the coaxial cables positioned in steps (d) and (e) to connector J5 of the NAF37 quad combiner identified in the following substeps. Ensure each coaxial cable is routed thru the cable duct identified and then replace cable duct cover.

- Route coaxial cable #14 (terminated by connector 1P1) thru 3W1 cable duct and connect to J5 (RF CURRENT) of quad combiner A3 of cabinet 1.
- Route coaxial cable #15 (terminated by connector 1P2) thru 3W3 cable duct and connect to J5 (RF CURRENT) of quad combiner A8 of cabinet 1.
- Route coaxial cable #16 (terminated by connector 1P3) thru 3W5 cable duct and connect to J5 (RF CURRENT) of quad combiner A13 of cabinet 1.
- Route coaxial cable #17 (terminated by connector 2P1) thru 3W1 cable duct and connect to J5 (RF CURRENT) of quad combiner A3 of cabinet 2.
- Route coaxial cable #18 (terminated by connector 2P2) thru 3W3 cable duct and connect to J5 (RF CURRENT) of quad combiner A8 of cabinet 2.
- Route coaxial cable #19 (terminated by connector 2P3) thru 3W5 cable duct and connect to J5 (RF CURRENT) of quad combiner A13 of cabinet 2.
- Route coaxial cable #20 (terminated by connector 4P1) thru 3W7 cable duct and connect to J5 (RF CURRENT) of quad combiner A3 of cabinet 4.
- Route coaxial cable #21 (terminated by connector 4P2) thru 3W9 cable duct and connect to J5 (RF CURRENT) of quad combiner A8 of cabinet 4.
- Route coaxial cable #22 (terminated by connector 4P3) thru 3W11 cable duct and connect to J5 (RF CURRENT) of quad combiner A13 of cabinet 4.
- Route coaxial cable #23 (terminated by connector 5P1) thru 3W7 cable duct and connect to J5 (RF CURRENT) of quad combiner A3 of cabinet 5.
- Route coaxial cable #24 (terminated by connector 5P2) thru 3W9 cable duct and connect to J5 (RF CURRENT) of quad combiner A8 of cabinet 5.
- Route coaxial cable #25 (terminated by connector 5P3) thru 3W11 cable duct and connect to J5 (RF CURRENT) of quad combiner A13 of cabinet 5.

3.9.5.8 Connection of Coaxial Cables From 15 kW Power Blocks to Final Filter: Connect the rf coaxial cables from the 15 kW power block cabinets that were previously positioned near the input bus bar of the NAPE39 50 kW combiner/final filter as follows:

(a) Obtain the following attaching hardware from the assembly hardware provided.

24 - #10 external tooth washers
24 - 10-24 hex nuts

(b) Verify the coaxial cables are routed between the top panel and the upper front-to-rear support bracket of each cabinet. Source of each coaxial cables is as follows:

- Coaxial cable #27 originates from quad combiner A3 of cabinet 1.
- Coaxial cable #28 originates from quad combiner A8 of cabinet 1.
- Coaxial cable #29 originates from quad combiner A13 of cabinet 1.
- Coaxial cable #30 originates from quad combiner A3 of cabinet 2.
- Coaxial cable #31 originates from quad combiner A8 of cabinet 2.
- Coaxial cable #32 originates from quad combiner A13 of cabinet 2.
- Coaxial cable #33 originates from quad combiner A3 of cabinet 4.
- Coaxial cable #34 originates from quad combiner A8 of cabinet 4.
- Coaxial cable #35 originates from quad combiner A13 of cabinet 4.
- Coaxial cable #36 originates from quad combiner A3 of cabinet 5.
- Coaxial cable #37 originates from quad combiner A8 of cabinet 5.
- Coaxial cable #38 originates from quad combiner A13 of cabinet 5.

(c) Connect the center conductor of each coaxial cable to rf input bus bar E2 of the NAF39 50 kW combiner/final filter using a #10 external tooth washer and a 10-24 hex nut and then connect the shield to the ground stud immediately below the associated rf input terminal using a #10 external tooth washer and a 10-24 hex nut.

NOTE

Coaxial cables should be connected to 6A1E2 sequentially, according to the ident number assigned, from left to right (when the filter is viewed from the rear) with the highest ident number to the right (closest to 15 kW power block cabinet '5').

3.9.5.9 Interconnection of Remaining Cabinet-to-Cabinet Wiring: Connect the remaining cabinet-to-cabinet wiring as follows:

(a) Remove the front, left-hand cover from NAF39 50 kW combiner/final filter 6A1 by removing fourteen 10-32 X 0.5 inch pan head screws, fourteen flat washers and carefully lifting away the cover.

(b) Locate two grey wires (#1 and #2) originating from 1TB1 and two grey wires (#3 and #4) originating from 2TB1 that should be bundled near the rear, left-hand side of cabinet '1' and route these wires along the bottom shelf of the cabinets to the fan control panel on the rear right-hand side of final filter/power supply cabinet '6'.

(c) Locate one grey wire (#6) originating from 3TB5, two grey wires (#7 and #8) originating from 4TB1, two grey wires (#9 and #10) and one white wire (#13) originating from 5TB1 and one grey wire (#111) originating from 3P55; that should be bundled near the bottom rear, left-hand side of the control/monitor cabinet and route these wires along the bottom shelf of the cabinets to the fan control panel on the rear right-hand side of final filter/power supply cabinet '6'.

NOTE

If the control/monitor cabinet was not preassembled to 15 kW power block cabinets '4' and '5', wires #7, #8, #9, #10 and #13 may be bundled at the bottom rear left-hand side of 15 kW power block cabinet '4'.

(d) Connect wires #1, #2, #3, #4, #6, #7, #8, #9, #10, #13, and #111 to their final destination on the fan control panel as identified in the following substeps. Wires terminated at 6XF1, 6XF2 and 6XF3 are attached using a 4-40 X 1/2 inch pan head screw, a #4 external tooth washer and a 4-40 hex nut.

- Connect wires #1 and #3 to the center terminal of fuseholder 6XF1.
- Connect wires #7 and #9 to the center terminal of fuseholder 6XF2.
- Connect wire #111 to the center terminal of fuseholder 6XF3.
- Connect wires #2 and #4 to terminal 7 of terminal board 6TB1.
- Connect wires #8 and #10 to terminal 5 of terminal board 6TB1.
- Connect wire #13 to terminal 2 of terminal board 6TB2.

(e) Locate three RG188A/U coaxial cables (#46, #47 and #123), one white wire (#26) and two micro switches (6S1 and 6S2), complete with attached wiring; that should be bundled at the top, rear, left-hand side of the control/monitor cabinet. Note that a white wire (#40) is connected to one terminal of micro switch 6S1, a white wire (#5) is connected between the other terminal of 6S1 and one terminal of micro switch 6S2. The other terminal of 6S2 has a white wire (#6) connected to it. The remaining end of wire #6 is not connected.

(f) Route coaxial cables #46, #47 and #123; one white wire (#26) and two micro switches (6S1 and 6S2), complete with attached wiring, between the top panel and the upper front-to-rear support bracket of each cabinet to the final filter/power supply cabinet '6'.

(g) Install micro switch 6S2 in the micro switch bracket located in top corner of the door opening nearest 15 kW power block cabinet '1', using two 6-32 X 0.375 inch recessed head screws provided.

(h) Install micro switch 6S1 in the micro switch bracket located in top corner of the remaining door opening, using two 6-32 X 0.375 inch recessed head screws provided.

(i) Route wire #26 and wire #6, attached to micro switch 6S2, to thermal switch 6S3, which is located beside the center support bracket under 50 kW combiner/final filter 6A1.

(j) Connect wire #26 to one terminal of thermal switch 6S3 and wire #6 to the other terminal of 6S3, using a 4-40 X 1/2 inch pan head screw, a #4 external tooth washer and a 4-40 hex nut at each terminal.

(k) Route coaxial cables #46, #47 and #123 over the top of NAF39 50 kW combiner/final filter 6A1, thru the entry hole on its front, left-hand side to the vicinity of forward reflected power probe 6A1A1, noting that tyrap anchor points for these coaxial cables are attached to the underside of the cabinet top.

- Connect coaxial cable #46 (terminated by connector 3P9) to connector J3 (REFLECTED POWER) on forward/reflected power probe 6A1A1.
- Connect coaxial cable #47 (terminated by connector 3P10) to connector J2 (FORWARD POWER) on forward/reflected power probe 6A1A1.
- Connect coaxial cable #123 (terminated by connector 3P49) to connector J1 (RF SAMPLE) on voltage probe 6A1A2.

(l) Locate one white wire (#127), that should be bundled near the bottom, rear, left-hand side of the control/monitor cabinet ('3'). Route this wire, along the bottom shelf of the cabinets and connect it to terminal 6 of terminal board 2TB1 on the fan control panel of 15 kW power block cabinet '2'.

(m) Locate one white wire (#126), that should be bundled near the bottom, rear, right-hand side of the control/monitor cabinet ('3'). Route this wire, along the bottom shelf of the cabinets and connect it to terminal 6 of terminal board 4TB1 on the fan control panel of 15 kW power block cabinet '4'.

NOTE

If the control/monitor cabinet was preassembled to 15 kW power block cabinets '4' and '5', wire # 126 will be connected to 4TB1-6.

(n) Locate one white wire (#125), which is terminated by phono plug 3P50 and that should be bundled near the center, front, left-hand side of the control/monitor cabinet ('3'). Route this wire to the vicinity of the front of NAP10 1.25 AM power module 2A7's location in 15 kW power block cabinet '2'. Ensure wire is routed behind the corner brackets of cabinets '2' and '3'.

(o) Dress and bundle wires installed in steps (b) thru (n), in a neat manner, using tyraps provided.

(q) Install the front, left-hand cover on NAF39 final filter 6A1 using fourteen 10-32 X 0.5 inch pan head screws, fourteen flat washers removed in step (a). Ensure screws are firmly tightened.

3.9.5.10 <u>Installation of External Control and Monitoring Cables:</u> Install the control and monitor wiring that interconnects to remote control or monitoring circuitry as follows:

NOTE

The external control/monitor wiring enters the transmitter through a cable entry hole or holes in the top of control/monitor cabinet '3' (refer to paragraph 3.9.3.2 for hole punching information). It is recommended the cabling be installed in metal conduit and the metal conduit be rigidly attached to the cabinet.

(a) Route the external wires thru the cable entry hole(s) in the top of control/monitor cabinet '3' to the vicinity of terminal board TB1 on interface panel 3A2. Refer to figure FO-25 as an aid to locating the specified terminations.

NOTE

The external rf carrier input of stereo installations connects to a BNC coaxial connector on the rear of the upper exciter drawer (3A3). The remaining external wiring connects to TB1 on the front of interface panel 3A2. It is recommended these wires be shielded.

(b) Using figure 3-3 as a guide to determine final destinations, cut the wires to the length required to attach to the identified termination when the wiring is neatly dressed and bundled.

NOTE

The external interlock is used in conjunction with one or more external interlock switches to provide a positive method of ensuring the transmitter is off when personnel are required to work on the antenna system or associated rf output circuitry. It may also be used in conjunction with the station antenna switching circuits to turn the transmitter off immediately before any action that will cause the transmitter to operate into an open circuit; such as when switching from an antenna to a dummy load or to another antenna. Terminals 3A2TB1-20 and 3A2TB1-21 must be shorted by an external switch or by a jumper before the transmitter can be turned on.

(c) Remove approximately 0.5 inches of insulation from each of the wires that terminate at 3A2TB1 and install a #6 screw, open terminal lug (HV09 in the ancillary parts kit) on each bared conductor and an appropriate open terminal lug for a #6 screw (not provided) on the shields.

NOTE

If the audio input provides 125% positive/100% negative modulation, the positive input must be connected to 3A2TB1-17 and the negative connected to 3A2TB1-18.

The shield of the audio input cable is normally grounded at one end only, to avoid ground loops. Select the most satisfactory connection.

(d) Connect the wires that terminate at 3A2TB1 to their appropriate terminals (see figure 3-3).

(e) Route the external rf carrier coaxial cable to the rear of the upper exciter drawer location and cut it to the required length, ensuring the length is sufficient to prevent undue stress on the cable when the exciter drawer is extended on its slides.

(f) Install a BNC connector (not provided) on the external rf carrier coaxial cable.

3.9.5.11 Installation of AC Power Source Wiring: Install the three-phase ac power source wiring and the 115 volt ac power source wiring as follows:

NOTE

It is assumed a Nautel NAX35 breaker panel has been installed in the three-phase ac power source from the service entrance and it provides a master on/off switch and fused protection for the transmitter. It is also assumed the two resultant branch circuits will be routed to the transmitter cabinets in individual conduits.

Interconnecting conduit and wires for the three-phase wiring and the 115 volt ac wiring is not provided and must be obtained by the customer.

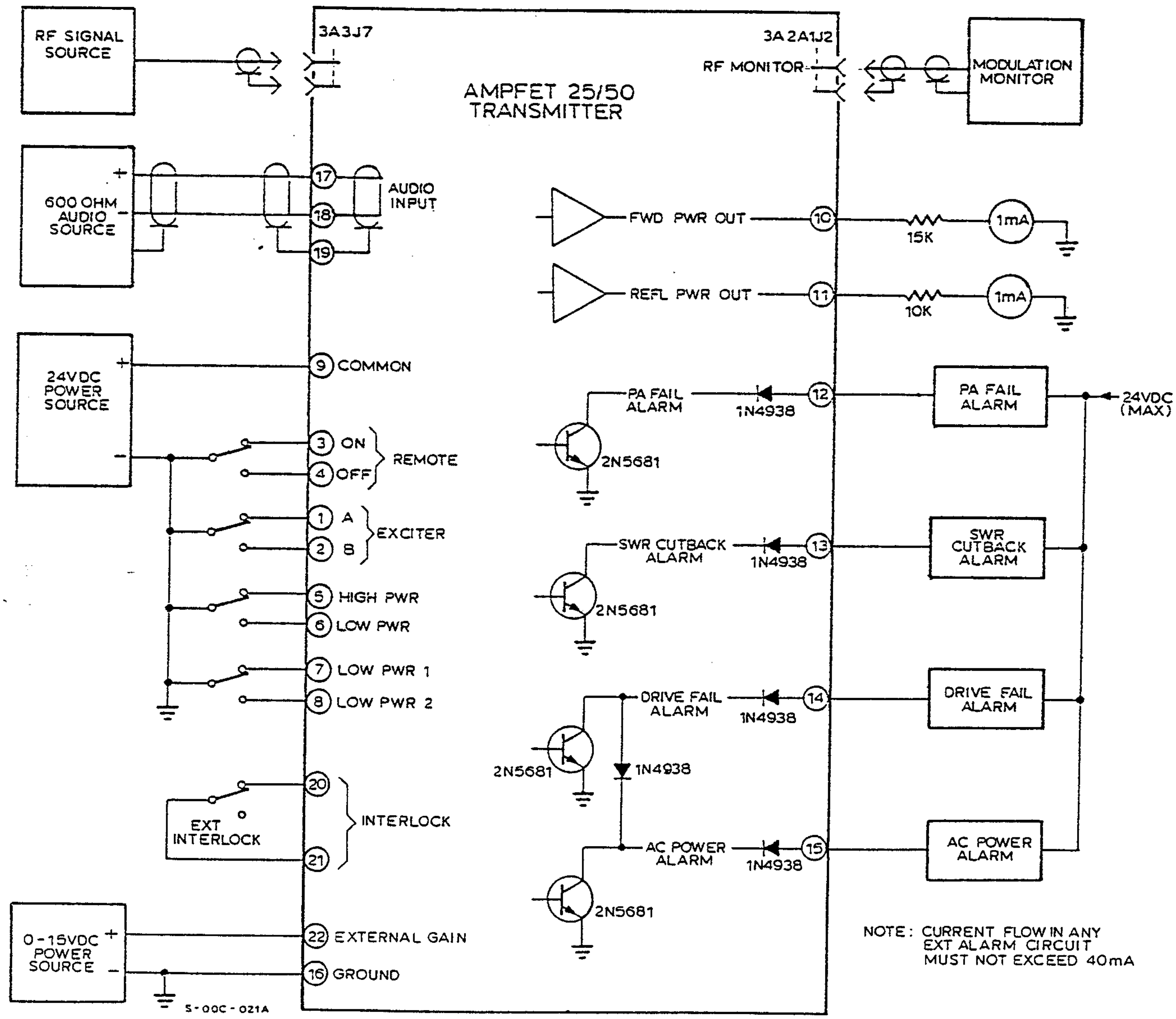

Figure 3-3 External Input/Output Interface

(a) Route one of the conduits carrying the four-wire, three-phase and ground, ac power source wiring to the cable entry hole on the center, top, rear side of final filter/power supply cabinet '6'.

(b) Route the four three-phase ac power wires down the rear, center corner post; of final filter/power supply cabinet '6'; to the vicinity of power transformer 6A2T1.

(c) Cut the ground wire to length required to attach it to the brass ground bolt on the lower, left-hand, terminal side of power transformer 6A2T1. Remove approximately 0.5 inches of insulation from conductor and install a closed terminal for a 5/16 bolt.

(d) Locate the 2AWG ground wire originating from the left-hand angle bracket supporting NAF39 50 kW combiner/final filter 6A1 and connect this wire and the ground wire installed in step (c) to the brass ground bolt on power transformer 6A2T1.

(e) Route the three voltage carrying wires to the primary winding terminals (H1, H2, and H3) of power transformer 6A2T1.

(f) Cut the wires to the length required and then remove approximately 0.5 inches of insulation from each conductor.

(g) Connect wires to terminals H1, H2 and H3 of power transformer 6A2T1 and secure by tightening associated screws, noting a slot screw or an allen screw requiring a 5/16 inch allen wrench may be used in the terminals.

(h) Route the second conduit; carrying four-wire, three-phase and ground, ac power source wiring; to the cable entry hole on the top, rear, right-hand side of final filter/power supply cabinet '6'.

(i) Route the four three-phase ac power wires down the rear, right-hand corner post; of final filter/power supply cabinet '6'; to the vicinity of power transformer 6A3T1.

(j) Cut the ground wire to length required to attach it to the brass ground bolt on the lower, left-hand, terminal side of power transformer 6A3T1. Remove approximately 0.5 inches of insulation from conductor and install a closed terminal for a 5/16 bolt.

(k) Locate the 2AWG ground wire originating from the center angle bracket supporting NAF39 final filter 6A1 and connect this wire and the ground wire installed in step (j) to the brass ground bolt on power transformer 6A3T1.

(l) Route the three voltage carrying wires to the primary winding terminals (H1, H2, and H3) of power transformer 6A3T1.

(m) Cut the wires to the length required and then remove approximately 0.5 inches of insulation from each conductor.

(n) Connect wires to terminals H1, H2 and H3 of power transformer 6A3T1 and secure by tightening associated screws, noting a slot screw or an allen screw requiring a 5/16 inch allen wrench may be used in the terminals.

(o) Route the conduit carrying three-wire (line, neutral and ground) 115 volt ac, single-phase ac power source wiring to the cable entry hole on the top, rear, left-hand side of final filter/power supply cabinet '6'.

(p) Route the three wires down the rear, left-hand corner post; of final filter/power supply cabinet '6'; to the vicinity of terminal board 6TB1 on the final filter/power supply cabinet's fan control panel.

(q) Cut each wire to the length required to connect it to the appropriate terminal of terminal board 6TB1, remove approximately 0.5 inches of insulation from the conductor and install a closed terminal for a #6 screw.

(r) Connect the 115 volt ac wires to terminal board 6TB1 as follows:

- line to 6TB1-4
- neutral to 6TB1-3
- Ground to 6TB1-2.

3.9.5.12 Lightning/Safety Ground Connection: The transmitter must be connected to the station reference ground as described in Nautel's Lightning Protection for Radio Transmitter Stations booklet. A continuous, low-impedance conductor from the station reference (lightning/safety) ground system must be connected to the left-hand angle bracket supporting the NAF39 50 kW combiner/final filter assembly (6A1). Connection to the angle bracket may be made using an existing attaching bolt.

NOTE

The continuous, low-impedance conductor must be a 0 AWG copper wire, a one-inch copper braid or the equivalent. The first point of electrical contact at the transmitter must be at the angle bracket.

The installer may be required to cut an entry hole in the final filter/power supply cabinet for the lightning/safety ground conductor. The type of conductor and the point of entry will dictate the entry method.

3.9.5.13 Final Assembly: Install the modules previously removed, mate electrical wiring terminated by connectors and reinstall panels as follows:

NOTE

Ensure attaching hardware is firmly tightened and connectors are fully mated on completion of each procedure.

(a) Install the two lower power amplifier support trays (A14 and A15) in each 15 kW power block cabinet, using four 6-32 X 1/2 inch pan head screws and four #6 external tooth washers for each tray.

(b) Install twelve NAP10 1.25 kW AM power subsystem modules in each 15 kW power block cabinet, ensuring the retaining stud on the rear of each NAP10 module passes through the hole in the rear of its support tray. Secure each module by installing one #10 flat washer, one #10 external tooth washer and one 10-24 hex nut on the module retaining stud protruding through the rear of its support tray.

(c) Connect the appropriate two-pin connector, associated with each NAP10 1.25 kW AM power subsystem module, to its cooling air fan mating connector; noting that wires terminated by the connector may be bundled to one side of the associated cabinet if the NAP10 modules were removed for shipment. Refer to table 6-9 to determine the reference designation assigned to each cable assembly connector.

(d) If the NAP10 1.25 kW AM power subsystem modules were removed for shipment, obtain twenty-four cable assemblies (P/N 149-8057) and twenty-four cable assemblies (P/N 149-8057-1) from the parts provided. If the NAP10 1.25 kW AM power subsystem modules were not removed for shipment, verify one end of a 149-8057 cable assembly is mated with rf input connector J1 and J2 of each NAF37 quad combiner in the 15 kW power block cabinets and one end of a 149-8057-1 cable assembly is mated with rf input connector J3 and J4 of each NAF37 quad combiner.

(e) Connect the two-pin connectors of the cable assembly; that interconnects rf output connector J2 of each NAP10 1.25 kW AM power subsystem module to the associated rf input connector (J1, J2, J3 or J4) of its associated NAF37 quad combiner; to the mating connectors of the NAP10 module and the NAF37 quad combiner. Refer to figure FO-16 to determine which NAF37 quad combiner rf input connector is associated with which NAP10 module and to table 6-9 to determine the reference designation assigned to each cable assembly connector.

(f) Connect the nine-pin connector terminating the wiring that exits the plastic cable duct below each NAP10 1.25 kW AM power subsystem module to mating connector J1 of each NAP10 module. Refer to table 6-9 to determine the reference designation assigned to each cable assembly connector.

(g) Connect pin jack connector terminating wire #127, that was positioned in paragraph 3.9.5.9(f), to PA VOLTS test point (TP1) on the front panel of NAP10 1.25 kW AM power subsystem module A7 in 15 kW power block '2'.

(h) Install one of the NAE35 exciter drawers on the lower drawer slide (3A4) of control/monitor cabinet '3', ensuring the slide locking devices have engaged.

NOTE

If one of the exciter drawers has been preset for stereo operation and the other exciter drawer has been preset for monaural operation, ensure the stereo exciter drawer is installed as 3A3 in the upper location (exciter 'A') and the monaural exciter is installed as 3A4 in the lower location (exciter 'B').

(i) Locate wiring of control/monitor cabinet '3' cable harness that is terminated by connectors 3P7, 3P8, 3P15, 3P16, 3P17, 3P18, 3P45, 3P52 and 3P54. Connect these connectors to the appropriate mating connector on the rear of lower exciter drawer (3A4) as specified in the following substeps:

- Connect 3P7 to connector J1 of exciter drawer 3A4.
- Connect 3P8 to connector J2 of exciter drawer 3A4.
- Connect 3P15 to connector A4J1 (RF DRIVE O/P) of exciter drawer 3A4.
- Connect 3P16 to connector A4J2 (RF DRIVE O/P) of exciter drawer 3A4.
- Connect 3P17 to connector J3 (MOD.) of exciter drawer 3A4.
- Connect 3P18 to connector J4 (MOD.) of exciter drawer 3A4.
- Connect 3P45 to connector J5 (AUDIO) of exciter drawer 3A4.
- Connect 3P52 to connector J8 (COMP.) of exciter drawer 3A4.
- Connect 3P54 to connector J6 (A.C.) of exciter drawer 3A4.

(j) Install the remaining NAE35 exciter drawer on the upper drawer slide (3A3) of control/monitor cabinet '3', ensuring the slide locking devices have engaged.

(k) Locate wiring of control/monitor cabinet '3' cable harness that is terminated by connectors 3P5, 3P6, 3P11, 3P12, 3P13, 3P14, 3P43, 3P51 and 3P53. Connect these connectors to the appropriate mating connector on the rear of the upper exciter drawer (3A3) as specified in the following substeps:

- Connect 3P5 to connector J1 of exciter drawer 3A3.
- Connect 3P6 to connector J2 of exciter drawer 3A3.
- Connect 3P11 to connector A4J1 (RF DRIVE O/P) of exciter drawer 3A3.
- Connect 3P12 to connector A4J2 (RF DRIVE O/P) of exciter drawer 3A3.
- Connect 3P13 to connector J3 (MOD.) of exciter drawer 3A3.
- Connect 3P14 to connector J4 (MOD.) of exciter drawer 3A3.
- Connect 3P43 to connector J5 (AUDIO) of exciter drawer 3A3.
- Connect 3P51 to connector J8 (COMP.) of exciter drawer 3A3.
- Connect 3P53 to connector J6 (A.C.) of exciter drawer 3A3.

NOTE

If an external rf carrier coaxial cable is installed, connect it to connector J7 (STEREO) of upper exciter drawer (3A3).

(l) Verify all floating connectors are mated to their correct fixed mating connectors using table 6-8 and/or 6-9 for connector mating information.

(m) Position the lower front panels of the final filter/power supply cabinet in front their mounted locations. Connect the pin plugs of the panels' attached wiring to the appropriate mating pin jacks on the top of the straps interconnecting power transformer 6A2T1/6A3T1 and their associated -72 volt dc rectifier.

- Plug 6P11 mates with jack 6A2J1 in the strap connected to 6A2T1-X1.
- Plug 6P12 mates with jack 6A2J2 in the strap connected to 6A2T1-X2.
- Plug 6P13 mates with jack 6A2J3 in the strap connected to 6A2T1-X3.

- Plug 6P14 mates with jack 6A3J1 in the strap connected to 6A3T1-X1.
- Plug 6P15 mates with jack 6A3J2 in the strap connected to 6A3T1-X2.
- Plug 6P16 mates with jack 6A3J3 in the strap connected to 6A3T1-X3.

(n) Install the lower front panels in the final filter/power supply cabinet using previously retained 10-32 panel screws.

(o) Install the two lower panels on the rear of the final filter/power supply cabinet by connecting fan power cable connector to mating connector of each cooling air fan and then secure using ten 10-32 pan head screws, ten #10 flat washers and ten #10 external tooth washers, previously retained, for each panel.

(p) Install the end panel on each end of the assembled transmitter cabinets, ensuring the integral clips of the panels are clipped to the cabinet cross members.

(q) Install the rear doors on each cabinet ensuring the spring-loaded hinge pin of each door is fully engaged.

INITIAL TRANSMITTER TURN-ON

3.10 The following are step-by-step procedures for the initial turn-on of the subject transmitter. It is recommended they be followed sequentially and exactly as presented.

NOTE

The transmitter was precisely calibrated into a 50-ohm dummy load and subjected to a seven day burn-in during manufacture. It should not be necessary to change the setting of any adjustment, other than the ones specified in the following procedures during initial turn-on. If the tests associated with this procedure indicate that the preset adjustments are not optimum, perform the appropriate calibration procedure as detailed in section 5 prior to proceeding with additional tests.

3.10.1 PRECAUTIONS TO BE OBSERVED: The AMPFET 50 transmitter contains many solid state devices that may be damaged if they are subjected to excessive heat or high voltage transients. Every effort must be taken to ensure the circuits are not overdriven and they are not disconnected from their loads while turned on. The precautionary information included in the operating instructions of section four should be read and fully understood prior to applying power and must be observed during operation.

3.10.2 PRELIMINARY SETTINGS: Verify the transmitter is ready to turn on as follows:

(a) Verify all switches are set as tabulated for Initial Setting in table 4-1.

(b) Terminate the transmitter's rf output into a 50 ohm resistive dummy load comprising either the station's antenna system or a dummy load rated at a minimum of 100 kW.

(c) Verify the external interlock is closed or temporarily connect a jumper wire between 3A2TB1-20 and 3A2TB1-21.

WARNING

If a jumper is placed between 3A2TB1-20 and 3A2TB1-21, the safety features provided by the external interlocks will be disabled. It is recommended that a fail safe method of alerting personnel to this fact be implemented. Voltages which are dangerous to life will be present on rf output stages and the antenna system if the transmitter is turned on.

(d) Verify the primary winding taps of power transformers 6A2T1 and 6A3T1 have been connected for the mean, RMS three-phase ac voltage that will be applied to the transmitter, as detailed in paragraph 3.8.1.

(e) Verify the voltage of the 3-phase ac line supply is within 5% of the voltage used as the mean RMS voltage when selecting the primary winding taps of the ac line power transformer in both power supplies (refer to paragraph 3.8.1) and that the power source is rated at a minimum of 100 kilovolt amperes.

(f) Turn off or verify the audio input is turned off at its source.

(g) Set O/P PWR potentiometer R92; on modulator driver printed circuit board A1, of exciter drawer 3A3 (exciter A), fully counterclockwise.

(h) Set O/P PWR potentiometer R92; on modulator driver printed circuit board A1, of exciter drawer 3A4 (exciter B), fully counterclockwise.

3.10.3 -72 VOLT LOAD RESISTANCE CHECKS: Check for short circuits on the outputs of the -72 volt dc power supplies as follows:

(a) Check for short circuits on the output of -72 volt dc rectifier 6A2A1 by connecting an ohmmeter between bus bar 3E1 (input of current shunt resistors 3R1/3R2) and chassis ground.

(b) Resistance reading obtained in step (a) should be approximately 100 ohms.

(c) Check for short circuits on the output of -72 volt dc rectifier 6A3A1 by connecting an ohmmeter between bus bar 3E2 (input of current shunt resistors 3R3/3R4) and chassis ground.

(d) Resistance reading obtained in step (c) should be approximately 100 ohms.

3.10.4 LOW VOLTAGE POWER SUPPLY CHECKS: Apply 115 volt ac power and check the outputs of the low voltage power supplies as follows:

(a) Set or verify EXCITER switch 3A1S4 is set to 'A'.

CAUTION

Do not turn on 3-phase ac power source at this time.

(b) Turn on the 115 volt ac, single phase, ac power source at the service entrance.

(c) Set exciter A's POWER switch (3A3S1) to ON.

(d) Exciter A's POWER ON lamp (3A3DS1) and RF DRIVE ALARM lamp (3A3DS6) and the control/monitor panel's DRIVE FAIL ALARM lamp (3A1DS8) shall turn on.

(d) All remaining lamps shall be off.

(e) Set exciter A's TEST switch (3A3S2) to +24V and record exciter A's TEST meter (3A1M1) indication.

(f) Reading recorded in step (e) shall be 23.0 $\pm$ 1.0 volts dc.

(g) Set exciter A's TEST switch (3A3S2) to +15V and record exciter A's TEST meter (3A1M1) indication.

(h) Reading recorded in step (g) shall be 15.0 $\pm$ 1.0 volts dc.

(i) Momentarily press and release exciter A's Low +15 Vdc Simulator TEST switch (3A3A5S1).

(j) Output of +15 volt dc power supply shall go to near zero volts dc for approximately eight seconds and then return to +15.0 $\pm$ 1.0 volts dc as indicated by reading on Exciter A's TEST meter (3A1M1).

(k) Exciter A's AC POWER lamp (3A3DS8) shall turn on while the output of the +15 volt dc power supply is near zero volts dc and shall turn off when the output returns to +15 volts dc.

(l) Set exciter A's TEST switch (3A3S2) to -15V and record exciter A's TEST meter (3A1M1) indication.

(m) Reading recorded in step (l) shall be 15.0 $\pm$ 1.0 volts dc.

(n) Set EXCITER switch 3A1S4 to 'B' and repeat steps (c) thru (m), substituting exciter 'B' where exciter 'A' is referenced and 3A4 where 3A3 is referenced.

(o) Set EXCITER switch 3A1S4 to 'A'.

3.10.5 INITIAL APPLICATION OF THREE-PHASE AC POWER: Switch on the three-phase ac power source and check the -72 volt dc power supplies as follows:

(a) Verify all switches are set as tabulated for initial setting in table 4-1 and that requirements of paragraphs 3.10.2 thru 3.10.4 have been completed.

(b) Switch on the 3-phase ac power source, to both of the transmitter's ac/dc power supplies, at the NAX35 circuit breaker panel.

(c) PHASE A, B and C lamps on both lower panels of final filter/power supply cabinet '6' shall turn on.

(d) Exciter A's -70V lamp (3A3DS2) shall turn on.

(e) Exciter A's RF DRIVE ALARM lamp (3A3DS6) and the control/monitor panel's, DRIVE FAIL ALARM lamp (3A1DS8) shall turn off.

(f) DC SUPPLY VOLTS meter 3A1M2's indication shall be between 70 and 76 volts.

3.10.6 CHECK OF RF DRIVE LEVEL (INTERNAL SOURCE): When the rf carrier signal is generated by the internal rf carrier oscillator, check the level and frequency of the rf drive to the 15 kW power blocks, as follows:

(a) Check the rf drive level for 15 kW power blocks 'A' (cabinet 1) and 'B' (cabinet 2) by connecting an oscilloscope between 3A2TB3-2 and 3A2TB3-1 (gnd), on the interface panel located behind the control/monitor panel.

(b) Waveform on oscilloscope shall be not less than 160 volts, peak-to-peak, at the carrier frequency.

(c) Check the rf drive level for 15 kW power blocks 'C' (cabinet 4) and 'D' (cabinet 5) by connecting an oscilloscope between 3A2TB8-2 and 3A2TB8-1 (gnd), on the interface panel located behind the control/monitor panel.

(d) Waveform on oscilloscope shall be not less than 160 volts, peak-to-peak, at the carrier frequency.

(e) Check the rf drive frequency by connecting a frequency counter between 3A2TB3-2 and 3A2TB3-1 (gnd).

(f) Frequency indication shall be the assigned carrier frequency plus or minus 5.0 Hz or 5 parts per million (PPM) whichever is greater.

3.10.7 CHECK OF RF DRIVE LEVEL (EXTERNAL SOURCE): When the rf carrier signal is generated and applied from an external source, check the level and frequency of the rf drive to the 15 kW power blocks, as follows:

(a) Verify the external rf carrier source is turned on, is not being modulated, is set to the level that will normally be applied to the transmitter and it is connected to STEREO connector J7 on the rear of exciter drawer 3A3.

(b) Connect an oscilloscope between test point TP2, on rf driver printed circuit board 3A3A2 of exciter A and chassis ground.

(c) Adjust RF GAIN potentiometer R11, on rf driver printed circuit board 3A3A2 of exciter A, for a peak-to-peak waveform of 6.0 volts.

(d) Check the rf drive level for 15 kW power blocks 'A' (cabinet 1) and 'B' (cabinet 2) by connecting an oscilloscope between 3A2TB3-2 ad 3A2TB3-1 (gnd), on the interface panel located behind the control/monitor panel.

(e) Waveform on oscilloscope shall be not less than 160 volts, peak-to-peak.

(f) Check the rf drive level for 15 kW power blocks 'C' (cabinet 4) and 'D' (cabinet 5) by connecting an oscilloscope between 3A2TB8-2 ad 3A2TB8-1 (gnd), on the interface panel located behind the control/monitor panel.

(g) Waveform on oscilloscope shall be not less than 160 volts, peak-to-peak.

(h) Check the rf drive frequency by connecting a frequency counter between 3A2TB3-2 and 3A2TB3-1 (gnd).

(i) Frequency indication shall be the assigned carrier frequency plus or minus 5.0 Hz or 5 parts per million (PPM) whichever is greater.

3.10.8 INITIAL TURN-ON OF 5 kW POWER BLOCKS: Turn on the 5 kW power blocks, one at a time, while monitoring the appropriate meters and alarm lamps for signs of a malfunction as follows:

(a) Verify exciter A's O/P PWR potentiometer (3A3A1R92) is set fully counterclockwise.

(b) Set MASTER CONTROL switch 3A1S1, on the control/monitor panel, to ON.

(c) Control/monitor panel's MASTER CONTROL lamp (3A1DS2) shall turn on.

(d) Control/monitor panel's SWR lamp (3A1DS9) and exciter A's SWR lamp shall turn on for approximately eight seconds and then turn off.

(e) All cooling air fans shall turn on (Check each NAP10 AM power subsystem module to ensure that its cooling fan is operating).

(f) Set or verify RACK switch 3A1S5 is set to 'A'.

(g) Simultaneously perform the requirements of step (h), set POWER BLOCK A-1 switch 3A2S1 to ON; noting that the four upper NAP10 AM power subsystem modules (1A1, 1A2, 1A4 and 1A5) in cabinet '1' and relay control panel 3A5 are associated with POWER BLOCK A-1 switch 3A2S1; and verify the requirements of steps (i) thru (l) are met.

(h) Listen for sound of associated relay control panel relays energizing on rear panel of control/monitor cabinet '3', observe control/monitor panel's DC SUPPLY CURRENT meter (3A1M3) indication and observe four associated NAP10 AM power subsystem modules' INPUT CURRENT meter indications.

(i) Associated relay control panel's relays shall energize within five second, as indicated be an audible click as they energize.

(j) A momentary surge shall be observed on INPUT CURRENT meters of the four associated NAP10 AM power subsystem modules. Indication of all meters shall return to near zero after initial surge.

(k) A momentary surge shall be observed on DC SUPPLY CURRENT meter 3A1M3. Indication shall return to near zero after initial surge.

NOTE

A small residual dc supply current will remain after each 5 kW power block is turned on. The total residual current for a cabinet (15 kW power block) shall not exceed 5.0 amperes when its three 5 kW power blocks are turned on.

(l) Associated relay control panel's B- lamp shall turn on and remain on.

(m) Simultaneously repeat step (h) and set POWER BLOCK A-2 switch 3A2S2 to ON, noting that the four middle NAP10 AM power subsystem modules (1A6, 1A7, 1A9 and 1A10) in cabinet '1' and relay control panel 3A6 are associated with POWER BLOCK A-2 switch 3A2S2. The requirements of steps (i) thru (l) shall be met.

(n) Simultaneously repeat step (h) and set POWER BLOCK A-3 switch 3A2S3 to ON, noting that the four lower NAP10 AM power subsystem modules (1A11, 1A12, 1A14 and 1A15) in cabinet '1' and relay control panel 3A7 are associated with POWER BLOCK A-3 switch 3A2S3. The requirements of steps (i) thru (l) shall be met.

(o) Set RACK switch 3A1S5 to 'B'.

(p) Simultaneously repeat step (h) and set POWER BLOCK B-1 switch 3A2S4 to ON, noting that the four upper NAP10 AM power subsystem modules (2A1, 2A2, 2A4 and 2A5) in cabinet '2' and relay control panel 3A8 are associated with POWER BLOCK B-1 switch 3A2S4. The requirements of steps (i) thru (l) shall be met.

(q) Simultaneously repeat step (h) and set POWER BLOCK B-2 switch 3A2S5 to ON, noting that the four middle NAP10 AM power subsystem modules (2A6, 2A7, 2A9 and 2A10) in cabinet '2' and relay control panel 3A9 are associated with POWER BLOCK B-2 switch 3A2S5. The requirements of steps (i) thru (l) shall be met.

(r) Simultaneously repeat step (h) and set POWER BLOCK B-3 switch 3A2S6 to ON, noting that the four lower NAP10 AM power subsystem modules (2A11, 2A12, 2A14 and 2A15) in cabinet '2' and relay control panel 3A10 are associated with POWER BLOCK B-3 switch 3A2S6. The requirements of steps (i) thru (l) shall be met.

(s) Set RACK switch 3A1S5 to 'C'.

(t) Simultaneously repeat step (h) and set POWER BLOCK C-1 switch 3A2S7 to ON, noting that the four upper NAP10 AM power subsystem modules (4A1, 4A2, 4A4 and 4A5) in cabinet '4' and relay control panel 3A11 are associated with POWER BLOCK C-1 switch 3A2S7. The requirements of steps (i) thru (l) shall be met.

(u) Simultaneously repeat step (h) and set POWER BLOCK C-2 switch 3A2S8 to ON, noting that the four middle NAP10 AM power subsystem modules (4A6, 4A7, 4A9 and 4A10) in cabinet '4' and relay control panel 3A12 are associated with POWER BLOCK C-2 switch 3A2S8. The requirements of steps (i) thru (l) shall be met.

(v) Simultaneously repeat step (h) and set POWER BLOCK C-3 switch 3A2S9 to ON, noting that the four lower NAP10 AM power subsystem modules (4A11, 4A12, 4A14 and 4A15) in cabinet '4' and relay control panel 3A13 are associated with POWER BLOCK C-3 switch 3A2S9. The requirements of steps (i) thru (l) shall be met.

(w) Set RACK switch 3A1S5 to 'D'.

(x) Simultaneously repeat step (h) and set POWER BLOCK D-1 switch 3A2S10 to ON, noting that the four upper NAP10 AM power subsystem modules (5A1, 5A2, 5A4 and 5A5) in cabinet '5' and relay control panel 3A14 are associated with POWER BLOCK D-1 switch 3A2S10. The requirements of steps (i) thru (l) shall be met.

(y) Simultaneously repeat step (h) and set POWER BLOCK D-2 switch 3A2S11 to ON, noting that the four middle NAP10 AM power subsystem modules (5A6, 5A7, 5A9 and 5A10) in cabinet '5' and relay control panel 3A15 are associated with POWER BLOCK D-2 switch 3A2S11. The requirements of steps (i) thru (l) shall be met.

(z) Simultaneously repeat step (h) and set POWER BLOCK D-3 switch 3A2S12 to ON, noting that the four lower NAP10 AM power subsystem modules (5A11, 5A12, 5A14 and 5A15) in cabinet '5' and relay control panel 3A16 are associated with POWER BLOCK D-3 switch 3A2S12. The requirements of steps (i) thru (l) shall be met.

3.10.9 INITIAL CHECK OF RF POWER AMPLIFIER STAGES: Verify the rf power amplifier stages are functioning normally and each power amplifier is contributing equally to the final rf output as follows:

(a) Verify the requirements of paragraphs 3.10.1 thru 3.10.8 have been completed.

CAUTION

Monitor all meters and alarm lamps when adjusting O/P PWR potentiometer 3A3A1R92. Discontinue adjustment if an abnormal meter indication is observed or if an alarm lamp turns on.

(b) Slowly adjust exciter A's O/P PWR potentiometer (3A3A1R92) clockwise until forward power output indication on FORWARD POWER meter 3A1M1 is approximately 10 kW.

NOTE

Press DIVIDE-BY-4 switch 3A1S6 to obtain a more accurate reading on FORWARD POWER meter 3A1M1 when the forward power output is less than 17.5 kilowatts.

(c) Reflected power indication on REFLECTED POWER meter 3A1M4 should be near zero.

(d) All alarm lamps shall be off.

(e) Sequentially set RACK switch 3A1S5 to 'A', 'B', 'C' and 'D' and record DC SUPPLY CURRENT meter 3A1M3 indication at each setting.

NOTE

Indication on SUPPLY CURRENT meter 3A1M3 is the current being drawn from the -72 volt dc power supply, by the 15 kW power block selected by RACK switch 3A1S5.

(f) Dc supply current readings recorded in (e) should be approximately 50 amperes at each setting of RACK switch 3A1S5. The difference between the lowest and highest reading shall not exceed 10 amperes.

(g) Record the INPUT CURRENT meter indication of all NAP10 AM power subsystem modules.

(h) The NAP10 AM power subsystem input current readings recorded in step (g) should all be approximately 4.5 amperes. The difference between the lowest and highest reading should not exceed 0.5 amperes.

NOTE

INPUT CURRENT meter readings at low power levels are relatively inaccurate. If dc supply current readings recorded in step (e) appear to be acceptable and there are no PA FAULT alarm lamps turned on, INPUT CURRENT meter readings that are not extremely abnormal may be accepted.

3.10.10 FULL RF POWER CHECK OF RF POWER AMPLIFIER/FINAL FILTER STAGES: Verify each power amplifier is contributing equally to the final rf output and the final filter stages are properly tuned as follows:

(a) Verify the requirements of paragraphs 3.10.1 thru 3.10.9 have been completed.

CAUTION

Monitor all meters and alarm lamps when adjusting O/P PWR potentiometer 3A3A1R92. Discontinue adjustment if an abnormal meter indication is observed or if an alarm lamp turns on.

(b) Slowly adjust exciter A's O/P PWR potentiometer (3A3A1R92) clockwise until forward power output indication on FORWARD POWER meter 3A1M1 is 50 kW.

(c) Reflected power indication on REFLECTED POWER meter 3A1M4 shall be less than 1.0 kW.

NOTE

The reflected power indication is dependent on the impedance of the transmitter's rf output terminating load. The reflected power level will be a minimum when the load impedance is precisely 50 ohms at the carrier frequency.

(d) All alarm lamps shall be off.

(e) The indication on DC SUPPLY VOLTS meter (3A1M2) shall be between 67.5 and 74.5 volts dc.

(f) Sequentially set RACK switch 3A1S5 to 'A', 'B', 'C' and 'D' and record DC SUPPLY CURRENT meter 3A1M3 indication at each setting.

NOTE

Indication on SUPPLY CURRENT meter 3A1M3 is the current being drawn from the -72 volt dc power supply, by the 15 kW power block selected by RACK switch 3A1S5.

(g) Dc supply current readings recorded in (f) shall be approximately 220 ±11.0 amperes at each setting of RACK switch 3A1S5.

(h) Record the INPUT CURRENT meter indication of all NAP10 AM power subsystem modules.

(i) The NAP10 AM power subsystem input current readings recorded in step (h) should all be approximately 18.0 amperes. The difference between the lowest and highest reading should not exceed 2.0 amperes.

3.10.11 CHECK OF TRANSMITTER INTERLOCK CIRCUIT: Check the operation of the trnsmitter interlock circuit as follows:

(a) While the transmitter is operating, open the rear door of control/monitor cabinet '3'.

(b) INTERLOCK OPEN lamp DS1 shall turn on.

(c) MASTER CONTROL lamp DS2 shall turn off.

(d) Transmitter's rf output shall be reduced to zero (indication on FORWARD POWER meter (M1) and DC SUPPLY CURRENT meter (M3) shall go to zero)

(e) Close control/monitor cabinet '3's rear door'

(f) MASTER CONTROL lamp DS2 shall turn on.

(g) INTERLOCK OPEN lamp DS1 shall turn off.

(h) Transmitter's rf output shall be return to its normal level as indicated on FORWARD POWER meter (M1) and DC SUPPLY CURRENT meter (M3) shall go to zero.

(i) Repeat steps (a) and (h), substituting (in turn), the rear doors of the final filter/power supply cabinet.

3.10.12 RF MONITOR LEVEL ADJUSTMENT: The transmitter is equipped with the facility to provide an rf monitor signal which remains constant when LOW 1 and LOW 2 are selected. To adjust the potentiometers that provide this constant monitor level, proceed as follows.

(a) Verify that the requirements of paragraphs 3.10.1 thru 3.10.6 have been completed.

(b) On the control/monitor panel, set POWER SELECT switch (S3) to FULL.

(c) Connect a switch termination resistance (not less than 50 ohms) and an rf voltmeter to O/P (j2) on the rf monitor pcb. Located the rf monitor pcb on the interface panel and adjust FULL (R1) to produce the desired rf voltage level as indicated on the rf voltmeter (5 volt rms maximum is available).

(d) On the control/monitor panel, set POWER SELECT switch (S3) to LOW 1. On the rf monitor pcb (A1), adjust LOW A (R2) to provide the same voltage level as set in step (c).

(e) On the control/monitor panel, set POWER SELECT switch (S3) to LOW 2. On the rf monitor pcb (A1), adjust LOW B (R3) to provide the same voltage level as set in step (c).

FINAL CALIBRATION/MINIMUM PERFORMANCE TESTS

3.10 Adjust the final calibration adjustments; to provide the desired rf output power levels, the desired audio characteristics and modulation envelope; and then perform a minimum performance test as detailed in section 5.

SECTION 4
OPERATING INSTRUCTIONS

GENERAL

4.1 This section provides the information required to operate the AMPFET 50 transmitter. Normally, the transmitter will not be attended during use. The following instructions are primarily intended for personnel involved in testing or maintenance of the equipment.

EMERGENCY SHUTDOWN PROCEDURE

4.2 There are no special precautions to be taken if an emergency shutdown is required. Switch off the transmitter by initially setting MASTER CONTROL switch 3A1S1 to its OFF position; then turn off the transmitter's ac line power using the wall-mounted circuit breakers.

CONTROLS AND INDICATORS

4.3 The following paragraphs identify modules or major subsystems of the transmitter that contain controls/indicators and reference tables that identify illustrations that depict their location/markings and describe their purpose/function. Controls and indicators that are not monitored or adjusted when installed in the transmitter are not included in this portion of the manual. Refer to the module appendices for information regarding controls and indicators that are only monitored/adjusted during bench testing/servicing.

4.3.1 NAC27 CONTROL/MONITOR PANEL CONTROLS AND INDICATORS (FO-23 and FO-24): Table 4-2 references illustrations that depict the controls and indicators on the NAC27 control/monitor panel. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.2 NAE35 EXCITER FRONT PANEL CONTROLS AND INDICATORS (FO-20): Table 4-3 references illustrations that depict the controls and indicators of the NAE35 exciter front panel. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.3 NAC29 INTERFACE PANEL CONTROLS AND INDICATORS (FO-25): Table 4-4 references an illustrations that depict the controls and indicators of the NAC29 interface panel. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.4 NAPC10 RF MONITOR PCB CONTROLS AND INDICATORS (FO-27): Table 4-5 references an illustration that depicts the controls and indicators of the rf monitor PCB. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.5 NAP10 AM POWER SUBSYSTEM CONTROLS AND INDICATORS (FO-15): Table 4-6 references an illustration that depicts the controls and indicators of the NAP10 am power subsystem. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.6 NAF37 QUAD COMBINER CONTROLS AND INDICATORS (FO-17): Table 4-7 references an illustration that depicts the controls and indicators of the NAR37 quad combiner. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.7 NASR60 AC/DC POWER SUPPLY CONTROLS AND INDICATORS (FO-2): Table 4-8 references an illustration that depicts the controls and indicators of the NASR60 power supply. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.8 NAX25 RELAY CONTROL ASSEMBLY CONTROLS AND INDICATORS (FO-31): Table 4-9 references an illustration that depicts the controls and indicators of the NAX25 relay control. The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.9 OVERVOLTAGE PROTECTION PCB (3A17) CONTROLS AND INDICATORS (FO-36): Table 4-10 references an illustration that depicts the controls and indicators of the 'overvoltage' pcb (3A17). The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

4.3.10 NAPC13 RF CURRENT PROTECTION PCB CONTROLS AND INDICATORS (FO-29): Table 4-11 references an illustration that depicts the controls and indicators of the 'rf current protection pcb (3A2A3). The table is keyed to the reference numbers assigned to the controls/indicators and explains their function.

NOTE

For a more detailed illustration and description of the NAE35 exciter drawer and the NAP10 am power subsystem controls and indicators, see the assembly detail drawings contained in their associated service instruction booklets.

PRE-START-UP CHECKS

4.4 Prior to applying ac power to the transmitter, observe the following precautions.

(a) Verify all assemblies/modules are installed and mating connectors are fully engaged.

(b) Verify the external input/output wiring is connected as detailed in paragraph [illegible].

(c) Verify all panels are installed and securely tightened.

(d) Verify the requirements of section three have been completed.

(e) Verify the transmitter rf output is terminated into a 50 ohm load (an antenna that is interfaced by an appropriate matching system for normal operation), or a 50 ohm resistive dummy that is rated at 75 kilowatts for calibration and testing procedures.

(f) Verify the appropriate primary winding taps of the ac power supply's power transformer have been selected to match the voltage of the input power source (refer to paragraph [illegible]).

(h) Verify the power source has a minimum rating of 2500 volt amperes.

TURNING ON TRANSMITTER

4.5 Turn on the transmitter as described in paragraph 3.10 for initial startup and after repairs that may have affected the operating performance parameters. At other times, set the switches to the positions tabulated for calibration setting in table 4-1 initially and then to the settings tabulated for operational setting.

VERIFICATION OF PA FAULT ALARMS

4.6 Verification of a PA fault alarm condition may be confirmed by momentarily switching the transmitter off and then on. The switching procedure may be performed at the local or the remote location.

4.6.1 REMOTE VERIFICATION OF PA FAULT ALARM: Perform the verification of the transmitter's PA fault alarm condition at the remote location as follows.

(a) Verify transmitter is in the remote mode of operation.

(b) Turn remote master control switch off.

(c) Remote PA alarm.lamp will turn off.

(d) Turn remote master control switch on.

(e) If lamp mentioned in step (c) remains off, no further action is necessary.

(f) If lamp mentioned in step (c) turns on, a fault does exist and troubleshooting will be required at the transmitter site to repair/replace the defective module, (see note following this step).

NOTE

One or more of the am power subsystem's PA FAIL alarms will turn on if failures should occur within the associated power amplifiers. A turned on PA FAIL alarm does not indicate that the transmitter is off the air or that normal programming must be interrupted to correct the defect. The integral modular reserve (IMR) feature allows continued operation at a reduced power level. If such a failure occurs, the O/P PWR should not be readjusted to return it to the original level as this will place increased stress on the remaining functional subsystems. However, the defective subsystem may be removed from the transmitter for repair without interruption of service, as described in paragraph 6.-.-.

4.6.2 LOCAL VERIFICATION OF PA FAULT ALARM: Perform the verification of the transmitter's PA fault alarm condition at the local site as follows.

(a) Verify LOCAL/REMOTE switch 3A1S2 is set to LOCAL.

(b) LOCAL/REMOTE lamp 3A1DS3 shall be off.

(c) Turn MASTER CONTROL switch 3A1S1 off.

(d) MASTER CONTROL lamp 3A1S2 will turn off.

(e) On exciter 'A' or 'B' whichever is operational, set POWER ON/OFF switch S1 off.

(f) All alarm lamps shall be off.

(g) Set MASTER CONTROL switch 3A1S1 to on.

(h) MASTER CONTROL lamp 3A1DS2 shall turn on.

(i) On exciter 'A' or 'B' (3A3 or 3A4) set POWER ON/OFF switch S1 on.

(j) POWER-ON lamp DS1 of the operating exciter will turn on.

(k) PA FAIL RACK-A,B,C and D alarm lamp(s) and associated NAP10 am power subsystem PA FAIL-A,B and C alarm lamp(s) shall either turn on verifying a PA fault exists or will remain off indicating a false or transient condition had triggered the alarm.

MODULATION LEVELS

4.7 The modulation criteria is detailed in paragraph 5.4.12. The modulation level can be adjusted for 100% modulation when the input modulating audio is between +12 dBm and 0 dBm at 600 ohms. If any adjustment in the audio input level is required, refer to the procedures outlined in paragraph 5.4.12. Under normal modulation conditions, the modulator input currents should not exceed the levels indicated in figure 4-1. Actual level of modulator input currents will vary between the nominal level for carrier only, and the maximum level for normal modulation depending upon the degree of signal processing/compression used in the station's audio system, and the program material.

OPERATING PRECAUTIONS

4.8 The AMPFET 50 transmitter contains many solid state devices that may be damaged if they are subjected to excessive heat or high voltage transients. Every effort must be taken to ensure the circuits are not overdriven and they are not disconnected from their loads while turned on. The following should be routinely observed.

4.8.1 The transmitter must transmit into a 50-ohm load (antenna or resistive dummy load). Do not permit the load to be open circuited, by switching or disconnection, when the transmitter is turned on. Turn off the transmitter prior to changing or removing the load. It is not recommended that the transmitter be turned on and operated into an open circuit.

4.8.2 The modulator input current, as indicated on the individual NAP10 subsystems INPUT CURRENT meters, must not exceed prescribed maximums. It is recommended that the modulator input current be routinely monitored whenever the carrier or modulation levels are changed. Figure 4-1 provides a graph that depicts the maximum modulator input current for the full rf carrier forward power output range; when there is no modulation, when the modulation source is normal station programming and when the modulation source is a continuous sine wave from an audio signal generator. The one exception is when the power block is operating with one or more defective power amplifiers. Verify these maximums are not exceeded when the high or low carrier level is varied, when the modulation level is varied and when the rf output loading changes.

REMOTE OPERATION

4.9 The AMPFET 50 transmitter will normally be operated by remote control from the station studio. Control of the transmitter's ON/OFF, HIGH/LOW power functions , selection of a standby exciter and monitoring of the critical operating parameters are provided when switched to the remote mode of operation. To 'enable' the remote controls, REMOTE/LOCAL switch 3A1S2 must be set to REMOTE.

Figure 4-1 Modulator Input Current Versus RF Carrier Forward Power

Table 4-1 Preliminary Switch Settings

PANEL MARKING/ NOMENCLATURE USED IN TEXT	REF DES	INITIAL SETTING	CALIBRATION SETTING	OPERATING SETTING
MASTER CONTROL	3A1S1	OFF	ON	ON
REMOTE/LOCAL	3A1S2	LOCAL	LOCAL	LOCAL or REMOTE
POWER SELECT	3A1S3	FULL	as specified	FULL or LOW 1 or LOW 2
EXCITER A/B	3A1S4	A	as specified	A or B
RACK A/B/C/D	3A1S5	A	as specified	A
: 4	S6	Press as necessary to read on lower scale		
POWER ON/OFF	3A3S1	OFF	ON	ON
POWER ON/OFF	3A4S1	OFF	OFF	OFF
TEST	3A3S2	OFF	ON	ON
TEST	3A4S2	OFF	OFF	OFF
POWER BLOCK A-1	3A2S1	OFF	as specified	ON
POWER BLOCK A-2	3A2S2	OFF	as specified	ON
POWER BLOCK A-3	3A2S3	OFF	as specified	ON
POWER BLOCK B-1	3A2S4	OFF	as specified	ON
POWER BLOCK B-2	3A2S5	OFF	as specified	ON
POWER BLOCK B-3	3A2S6	OFF	as specified	ON
POWER BLOCK C-1	3A2S7	OFF	as specified	ON
POWER BLOCK C-2	3A2S8	OFF	as specified	ON
POWER BLOCK C-3	3A2S9	OFF	as specified	ON
POWER BLOCK D-1	3A2S10	OFF	as specified	ON
POWER BLOCK D-2	3A2S11	OFF	as specified	ON
POWER BLOCK D-3	3A2S12	OFF	as specified	ON
1A1 OUTPUT STATUS	1A3S1	OPERATE	OPERATE	OPERATE

Table 4-1 Preliminary Switch Settings (continued)

PANEL MARKING/ NOMENCLATURE USED IN TEXT	REF DES	INITIAL SETTING	CALIBRATION SETTING	OPERATING SETTING
1A2 OUTPUT STATUS	1A3S2	OPERATE	OPERATE	OPERATE
1A4 OUTPUT STATUS	1A3S3	OPERATE	OPERATE	OPERATE
1A5 OUTPUT STATUS	1A3S4	OPERATE	OPERATE	OPERATE
1A6 OUTPUT STATUS	1A8S1	OPERATE	OPERATE	OPERATE
1A7 OUTPUT STATUS	1A8S2	OPERATE	OPERATE	OPERATE
1A9 OUTPUT STATUS	1A8S3	OPERATE	OPERATE	OPERATE
1A10 OUTPUT STATUS	1A8S4	OPERATE	OPERATE	OPERATE
1A11 OUTPUT STATUS	1A13S1	OPERATE	OPERATE	OPERATE
1A12 OUTPUT STATUS	1A13S2	OPERATE	OPERATE	OPERATE
1A14 OUTPUT STATUS	1A13S3	OPERATE	OPERATE	OPERATE
1A15 OUTPUT STATUS	1A13S4	OPERATE	OPERATE	OPERATE
2B1 OUTPUT STATUS	2B3S1	OPERATE	OPERATE	OPERATE
2B2 OUTPUT STATUS	2B3S2	OPERATE	OPERATE	OPERATE
2B4 OUTPUT STATUS	2B3S3	OPERATE	OPERATE	OPERATE
2B5 OUTPUT STATUS	2B3S4	OPERATE	OPERATE	OPERATE
2B6 OUTPUT STATUS	2B8S1	OPERATE	OPERATE	OPERATE
2B7 OUTPUT STATUS	2B8S2	OPERATE	OPERATE	OPERATE
2B9 OUTPUT STATUS	2B8S3	OPERATE	OPERATE	OPERATE
2B10 OUTPUT STATUS	2B8S4	OPERATE	OPERATE	OPERATE
2B11 OUTPUT STATUS	2B13S1	OPERATE	OPERATE	OPERATE
2B12 OUTPUT STATUS	2B13S2	OPERATE	OPERATE	OPERATE
2B14 OUTPUT STATUS	2B13S3	OPERATE	OPERATE	OPERATE
2B15 OUTPUT STATUS	2B13S4	OPERATE	OPERATE	OPERATE
4C1 OUTPUT STATUS	4C3S1	OPERATE	OPERATE	OPERATE

Table 4-1 Preliminary Switch Settings (continued)

PANEL MARKING/ NOMENCLATURE USED IN TEXT	REF DES	INITIAL SETTING	CALIBRATION SETTING	OPERATING SETTING
4C2 OUTPUT STATUS	4C3S2	OPERATE	OPERATE	OPERATE
4C4 OUTPUT STATUS	4C3S3	OPERATE	OPERATE	OPERATE
4C5 OUTPUT STATUS	4C3S4	OPERATE	OPERATE	OPERATE
4C6 OUTPUT STATUS	4C8S1	OPERATE	OPERATE	OPERATE
4C7 OUTPUT STATUS	4C8S2	OPERATE	OPERATE	OPERATE
4C9 OUTPUT STATUS	4C8S3	OPERATE	OPERATE	OPERATE
4C10 OUTPUT STATUS	4C8S4	OPERATE	OPERATE	OPERATE
4C11 OUTPUT STATUS	4C13S1	OPERATE	OPERATE	OPERATE
4C12 OUTPUT STATUS	4C13S2	OPERATE	OPERATE	OPERATE
4C14 OUTPUT STATUS	4C13S3	OPERATE	OPERATE	OPERATE
4C15 OUTPUT STATUS	4C13S4	OPERATE	OPERATE	OPERATE
5D1 OUTPUT STATUS	5D3S1	OPERATE	OPERATE	OPERATE
5D2 OUTPUT STATUS	5D3S2	OPERATE	OPERATE	OPERATE
5D4 OUTPUT STATUS	5D3S3	OPERATE	OPERATE	OPERATE
5D5 OUTPUT STATUS	5D3S4	OPERATE	OPERATE	OPERATE
5D6 OUTPUT STATUS	5D8S1	OPERATE	OPERATE	OPERATE
5D7 OUTPUT STATUS	5D8S2	OPERATE	OPERATE	OPERATE
5D9 OUTPUT STATUS	5D8S3	OPERATE	OPERATE	OPERATE
5D10 OUTPUT STATUS	5D8S4	OPERATE	OPERATE	OPERATE
5D11 OUTPUT STATUS	5D13S1	OPERATE	OPERATE	OPERATE
5D12 OUTPUT STATUS	5D13S2	OPERATE	OPERATE	OPERATE
5D14 OUTPUT STATUS	5D13S3	OPERATE	OPERATE	OPERATE
4C15 OUTPUT STATUS	5D13S4	OPERATE	OPERATE	OPERATE

Table 4-2 NAC27 Control/Monitor Panel Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
3A1DS1	FO-23	INTERLOCK OPEN	Turns on when one of the transmitter's series connected interlock switches is open causing the drive to be switched off.
3A1DS2	FO-23	MASTER CONTROL ON/OFF	Indicates that +24 volts is applied to the ON/OFF relays, fan relay and mod drive relays.
3A1DS3	FO-23	REMOTE	When on indicates transmitter's MASTER CONTROL switch 3A1S1, POWER SELECT switch 3A1S3 and EXCITER A/B switch are remotely controlled.
3A1DS4	FO-23	PA FAIL ALARM - RACK A	Turns on when a power amplifier failure is detected in rack A.
3A1DS5	FO-23	PA FAIL ALARM - RACK B	Turns on when a power amplifier failure is detected in rack B.
3A1DS6	FO-23	PA FAIL ALARM - RACK C	Turns on when a power amplifier failure is detected in rack C.
3A1DS7	FO-23	PA FAIL ALARM - RACK D	Turns on when a power amplifier failure is detected in rack D.
3A1DS8	FO-23	DRIVE FAIL ALARM	Turns on when the selected exciter fails to produce satisfactory drive signals.
3A1DS9	FO23-	SWR ALARM	Turns on when the transmitter's power level is being automatically-reduced to protect against excessive rf output currents caused by an unacceptable terminating impedance.
3A1M1	FO-23	FORWARD POWER	Provides a meter indication in rf kilowatts of the forward power at the output of the transmitter on high and low ranges as selected by divide-by-4 switch S6.
3A1M2	FO-23	DC SUPPLY VOLTS	Provides a meter indication in volts of the negative dc supply voltage to the am power subsystems.
3A1M3	FO-23	DC SUPPLY CURRENT	Provides a meter indication in amps of the dc current supplied to rack A, B, C or D as selected by S5.

Table 4-2 NAC27 Control/Monitor Panel Controls and Indicators (Continued)

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
3A1M4	FO-23	REFLECTED POWER	Provides a meter indication in rf kilowatts of the reflected power at the output of the transmitter.
3A1S1	FO-23	MASTER CONTROL ON/OFF	Switches the +24 volt supply to the ON/OFF relays, fan relay and mod drive relay.
3A1S2	FO-23	REMOTE/LOCAL	Enables the function of MASTER CONTROL switch 3A1S1, EXCITER A/B switch 3A1S2 and POWER SELECT (FULL/LOW 1/LOW2) switch 3A1S3 to be controlled from a remote location if switched to REMOTE or locally if switched to LOCAL.
3A1S3	FO-23	POWER SELECT	Determines local operating mode. Selects FULL, LOW 1 or LOW 2 when REMOTE/LOCAL switch 3A1S2 is set to LOCAL.
3A1S4	FO-23	EXCITER	Switches the 115 volt ac line supply to either exciter 'A' or exciter 'B' when REMOTE/LOCAL switch 3A1S2 is set to LOCAL.
3A1S5	FO-23	RACK A/B/C/D	Applies the voltage dropped across the shunt resistor associated with the selected rack to DC SUPPLY CURRENT meter 3A1M3.
3A1S6	FO-23	: 4	A momentary action switch that increases the sensitivity of FORWARD POWER meter 3A1M1 by a factor of 4 (direct reading on lower scale) when pressed.
3A1A1R3	FO-23	3A1A1R3	Provides means to calibrate the FORWARD POWER meter 3A1M1.

Table 4-3 NAE35 Exciter Drawer Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
DS1*	FO-20	POWER-ON	Indicates ac power is being applied to the exciter when turned on.
DS2	FO-20	-70V	Indicates that -72 volts dc is being supplied to the exciter when turned on.
DS3	FO-20	AUDIO LIMIT	Turns on when the audio signal has exceeded preset positive or negative threshold levels causing the transmitter's audio ALC circuits to be active.
DS4	FO-20	SWR-ALARM	Turns on when the transmitter's power level is being automatically reduced to protect against excessive rf output currents caused by a low terminating impedance.
DS5	FO-20	RF DRIVE-ALARM	Turns on when the exciter's rf drive output falls below a critical safe level and the transmitter's output power is being cut back to a very low level.
DS6	FO-20	MOD DRIVE-ALARM	Turns on when the average value of the PWM control signal exceeds a safe operating level and it has been automatically disconnected from the am power subsystems.
DS7	FO-20	RF CURRENT-ALARM	Turns on when the transmitter's output power is being reduced to prevent its rf current from exceeding a safe operating level.
DS8	FO-20	AC POWER-ALARM	Turns on when the ac line voltage exceeds a safe operating level and the +15 volt supply to the rf drive circuits has been automatically turned off.
M1	FO-20	TEST	Provides a meter indication in dc volts of the exciter's low voltage supplies as selected by TEST switch S2 (+15V/-15V/+24V).
S1	FO-20	POWER-ON/OFF	Switches the exciter's ac line supply (connected in series with the transmitter's remote/local switching circuits which select exciter A or exciter B).
S2	FO-20	TEST	Selects parameter (-15V; +15V; or +24V) to be displayed on TEST meter M1.

Table 4-5 NAC29 Interface Panel Controls and Indicators (Continued)

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
S10	FO-25	POWER BLOCK D-1	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 1 in rack D, providing a discharge path for its large electrolytic capacitors.
S11	FO-25	POWER BLOCK D-2	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 2 in rack D, providing a discharge path for its large electrolytic capacitors.
S12	FO-25	POWER BLOCK D3	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 3 in rack D, providing a discharge path for its large electrolytic capacitors.

Table 4-4 NAC29 Interface Panel Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
S1	FO-25	POWER BLOCK A-1	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 1 in rack A, providing a discharge path for its large electrolytic capacitors.
S2	FO-25	POWER BLOCK A-2	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 2 in rack A, providing a discharge path for its large electrolytic capacitors.
S3	FO-25	POWER BLOCK A-3	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 3 in rack A, providing a discharge path for its large electrolytic capacitors.
S4	FO-25	POWER BLOCK B-1	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 1 in rack B, providing a discharge path for its large electrolytic capacitors.
S5	FO-25	POWER BLOCK B-2	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 2 in rack B, providing a discharge path for its large electrolytic capacitors.
S6	FO-25	POWER BLOCK B-3	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 3 in rack B, providing a discharge path for its large electrolytic capacitors.
S7	FO-25	POWER BLOCK C-1	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 1 in rack C, providing a discharge path for its large electrolytic capacitors.
S8	FO-25	POWER BLOCK C-2	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 2 in rack C, providing a discharge path for its large electrolytic capacitors.
S9	FO-25	POWER BLOCK C-3	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 3 in rack C, providing a discharge path for its large electrolytic capacitors.

Table 4-4 NAC29 Interface Panel Controls and Indicators (Continued)

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
S10	FO-25	POWER BLOCK D-1	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 1 in rack D, providing a discharge path for its large electrolytic capacitors.
S11	FO-25	POWER BLOCK D-2	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 2 in rack D, providing a discharge path for its large electrolytic capacitors.
S12	FO-25	POWER BLOCK D3	Provides a facility, when switched to OFF, to disconnect the -72 volt dc supply to power block 3 in rack D, providing a discharge path for its large electrolytic capacitors.

Table 4-5 NAPC10 RF Monitor PCB (A2A1) Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
R1	FO-27	FULL	Adjusts the transmitter's rf monitor output level when FULL power is selected.
R2	FO-27	LOW A	Adjusts the transmitter's rf monitor output level when LOW 1 power is selected.
R3	FO-27	LOW B	Adjusts the transmitter's rf monitor output level when LOW 2 power is selected.

Table 4-6 NAP10 AM Power Subsystem Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
DS1*	FO-15	PA FAIL - A	Turns on when a failure is detected in power amplifier 'A' and its PWM control signal has been automatically turned off.
DS2	FO-15	PA FAIL - B	Turns on when a failure is detected in power amplifier 'B' and its PWM control signal has been automatically turned off.
DS3	FO-15	PA FAIL - C	Turns on when a failure is detected in power amplifier 'C' and its PWM control signal has been automatically turned off.
DS4	FO-15	B-	Indicates that a charge remains in the large electrolytic capacitors within the am power subsystem.
M1	FO-15	INPUT CURRENT	Provides a meter indication in dc amperes of the total current supplied to the three power amplifiers from the -72V.
TP1	FO-15	PA VOLTS	Provides a test point to monitor the modulator output voltage.

NOTE
For a more detailed illustration of NAP10 am subsystem controls and indicators, see assembly detail drawings contained in it's associated service instruction booklet.

*Only paritial reference designation shown for NAP10 am power subsystems. There are 48 identical subsystems within the AMPFET 50 transmitter, each module is prefixed with a different reference designation.

Table 4-7 NAF37 Quad Combiner/Filter Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
S1	FO-17	OPERATE/SHORT	Connects the rf output of power subsystem A1 to the quad combiner input when set to OPERATE. Connects the quad combiner input to ground when set to SHORT when A1 is removed for servicing.
S2	FO-17	OPERATE/SHORT	Connects the rf output of power subsystem A2 to the quad combiner input when set to OPERATE. Connects the quad combiner input to ground when set to SHORT when A2 is removed for servicing.
S3	FO-17	OPERATE/SHORT	Connects the rf output of power subsystem A4 to the quad combiner input when set to OPERATE. Connects the quad combiner input to ground when set to SHORT when A4 is removed for servicing.
S4	FO-17	OPERATE/SHORT	Connects the rf output of power subsystem A5 to the quad combiner input when set to OPERATE. Connects the quad combiner input to ground when set to SHORT when A5 is removed for servicing.

NOTE

Cabinets 'A' thru 'D' contain 12 combiners, three combiners in each cabinet. There are four OUTPUT STATUS switches in one quad combiner for a total of 48 switches. Only paritial reference designations are shown in the above table. For complete reference designations of each OUTPUT STATUS switch, refer to the assembly detail drawings or the reference designation tables in the AMPFET 50 instruction manual.

Table 4-8 NASR60 AC/DC Power Supply Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
6A26DS1	FO-2	PHASE A	When turned on, it indicates that phase 'A' of the three phase ac power source is being applied to ac/dc power supply 6A2.
6A26DS2	FO-2	PHASE B	When turned on, it indicates that phase 'B' of the three phase ac power source is being applied to ac/dc power supply 6A2.
6A26DS3	FO-2	PHASE C	When turned on, it indicates that phase 'C' of the three phase ac power source is being applied to ac/dc power supply 6A2.
6A36DS1	FO-2	PHASE A	When turned on, it indicates that phase 'A' of the three phase ac power source is being applied to ac/dc power supply 6A3.
6A36DS2	FO-2	PHASE B	When turned on, it indicates that phase 'B' of the three phase ac power source is being applied to ac/dc power supply 6A3.
6A36DS3	FO-2	PHASE C	When turned on, it indicates that phase 'C' of the three phase ac power source is being applied to ac/dc power supply 6A3.

Table 4-9 NAX25 Relay Control Assembly Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
3A5A1 R2	FO-17	VOLTAGE/THRESHOLD	Sets the threshold level for the voltage threshold detector circuitry.
3A5A1 DS1	FO-17	DS1	Indicates that a charge remains in the large storage capacitors that are contained in the am power subsystem circuitry.

Table 4-10 3A17 OVERVOLTAGE PROTECTION PCB Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
3A17R2	FO-36	R2	Sets the threshold level for excessive voltage on the -72vdc input line.
3A17DS1	FO-36	DS1	Indicates excessive voltage on the -72vdc input line when turned on.

Table 4-11 NAPC13 Rf Current Protection PCB Assembly Panel Controls and Indicators

REF DES	FIG NO.	PANEL MARKING/ NOMENCLATURE USED IN TEXT	FUNCTION
3A2A3S1	FO-29	TEST	When switched to TEST, checks the overall operation of the peak rf current detector circuit.
3A2A3S2	FO-29	TEST/OPR	When switched to OPR, checks the overall operation of the rms rf current detector circuit.

SECTION 5
TESTING AND CALIBRATION

GENERAL

5.1 This section contains an on-air test procedure, a detailed step-by-step minimum performance test procedure and final calibration procedures for the fully assembled transmitter. Since many of the operating parameters, the audio interfacing equipment and the antenna system are dictated by each individual station, it is necessary that personnel performing these procedures be familiar with the technical details of the transmitter, the associated equipment and the operational requirements of the station.

NOTE

NAE35 exciter drawers contain some controls that are adjusted routinely and some that are adjusted during servicing. Adjustment instructions for the routinely adjusted controls are included in this publication. Adjustment instructions for the service related controls are not included in this publication. They are provided in the NAE35 Exciter Drawer module service instruction booklet.

NAP10 1.25 kW power subsystems are serviced on a work bench independent of the transmitter. Testing and calibration instructions for these modules are not included in this section. They are located in the associated NAP10 am power subsystem service instruction booklet.

OPERATION OF EQUIPMENT

5.2 Operating procedures for the transmitter are provided in section 4. Preliminary switch settings and detailed control and indicator information is presented in tables 4.2 thru 4.12.

CAUTION

The operating precautions detailed in paragraph 4.8 must be read, fully understood prior to and observed during operation of the equipment.

The following tests and required results are predicated on all of the NAP10 AM power subsytems being serviceable and contributing to the rf output current. If any are defective, the specified limits for input current per kilowatt of rf carrier forward power will be invalid.

5.2.1 READING FORWARD POWER METER: FORWARD POWER meter 3A1M1 has two scales. The upper scale should be used when the rf carrier level is greater than 2000 Watts. The lower scale is seleceted when X4 switch 3A1S6 is held closed and should be used when the rf carrier level is less than 2000 Watts.

NOTE

FORWARD POWER meter 3A1M1 has square law scales. The resulting non-linearity makes it difficult to read below 2500 Watts. Any indication that is less than sixty percent of the 2500 Watt scale mark is less than 1000 Watts.

TEST EQUIPMENT

5.3 The test equipment required for testing and calibration is listed in table 1-3. Special tools required are listed in table 1-4.

ON-AIR FUNCTIONAL TEST

5.4 The on-air functional test is a quick and reliable method of determining the operating status of the transmitter without disrupting its operation or station programming.

5.4.1 INITIAL CONTROL SETTINGS: Set or verify the controls are set for normal operation as follows:

(a) Set or verify the switches are set as tabulated for operation setting in table 4-2.

(b) Set or verify REMOTE/LOCAL switch 3A1S2 is set to REMOTE.

(c) Set or verify the transmitter is operating in its 'high' (full) power mode of operation.

(d) Set or verify remote exciter switch is set to 'A'.

(e) PHASE lamps 6DS1 thru 6DS6; MASTER CONTROL lamp 3A1DS2; REMOTE lamp 3A1DS3; exciter 'A' POWER lamp 3A3DS1; exciter 'A' -70V lamp 3A3DS2; and the 48 B- WARNING lamps (DS4) on the associated NAP10 125 kW power subsystems shall turn on.

NOTE

A pa fail-alarm condition does not mean the transmitter is off the air nor that normal programming has been disrupted. The 'integral modular reserve' (IMR) feature allows continued operation at a reduced output power level if an NAA13 modulator/power amplifier is disabled. Table 4-1 tabulates the output power level of the transmitter should one or more NAA13 modulator/power amplifiers become defective.

(f) Verify all cooling fans are operating.

5.4.2 LOW VOLTAGE CHECK: Check the low dc voltages of the transmitter as follows:

(a) Set TEST switch 3A3S2 (exciter 'A') to +15V.

(b) Indication on TEST meter 3A3M2 (exciter 'A') should be +15 $\pm$1.0 volts dc.

(c) Set TEST switch 3A3S2 (exciter 'A') to -15V.

(d) Indication on TEST meter 3A3M1 (exciter 'A') should be -15 $\pm$1.0 volts dc.

(e) Set TEST switch 3A3S2 (exciter 'A') to +24V.

(f) Indication on TEST meter 3A3M1 (exciter 'A') should be +24 $\pm$2.0 volts dc.

(g) If station programming permits, repeat steps (a) thru (f) for exciter 'B', using exciter 'B' reference designations where applicable.

5.4.3 FORWARD AND REFLECTED RF POWER/MODULATOR CURRENT LEVELS (RF OUTPUT LEVELS): Check the forward and reflected rf power and modulator current levels as follows:

NOTE

Communication will be required between the local site and remote site for completion of the rf output level checks.

(a) Verify or set remote high/low power switch to high power.

(b) Record FORWARD POWER meter 3A1M1's forward power indication.

(c) Reading obtained in step (b) should be the desired high level, rf carrier, forward power output and should be within five percent of the reading recorded during the most recent calibration.

(d) Record REFLECTED POWER meter 3A1M4's reflected power indication.

(e) Reading recorded in step (d) should be less than one kilowatt.

(f) Verify the remote indications for forward/reflected power are the same as those recorded in steps (b) and (d).

(g) Sequentially set RACK switch 3A1S5 to positions 'A', 'B', 'C' and 'D' and simultaneously observe and record indications on DC SUPPLY CURRENT meter 3A1M3 and DC SUPPLY VOLTS meter 3A1M2.

(h) Plot forward power reading recorded in step (b) and dc supply current reading recorded in step (g) on the graph shown in figure 4-1. Intersection must be below 'maximum' - carrier only line when there is no modulation and must be below the appropriate 'maximum ' with modulation line when the carrier is being modulated. Dc supply input current readings for cabinets 'A', 'B', 'C' or 'D' should be within five percent of each other.

(i) Dc supply volts reading in step (g) should be -72 ± 3.0 volts dc at each setting.

(j) Verify or set remote low '1'/low '2' power switch to low '1'.

(k) Record meter indication on FORWARD POWER meter 3A1M1.

(l) Reading obtained in step (k) should be the desired low level, rf carrier, forward power output when in low power '1' mode of operation. This reading should be within five percent of the reading recorded during the most recent calibration.

(m) Record meter indication on REFLECTED POWER meter 3A1M4.

(n) Reading recorded in step (m) should be near or at zero Watts.

(o) Verify remote indications for forward/reflected power are the same as those recorded in steps (k) and (m).

(p) Set remote low '1'/low '2' power switch to low '2'.

(q) Record meter indication on FORWARD POWER meter 3A1M1.

(r) Reading obtained in step (q) should be the desired low level, rf carrier, forward power output when in low power '2' mode of operation. This reading should be within five percent of the reading recorded during the most recent calibration.

(s) Record meter indication on REFLECTED POWER meter 3A1M4.

(t) Reading recorded in step (s) should be near or at zero Watts.

(u) Verify remote indications for forward/reflected power are the same as those recorded in steps (q) and (s).

(v) At the remote site, return the high/low power switch to the desired high or low power operating mode.

5.4.4 CARRIER FREQUENCY ACCURACY: Measure the rf carrier frequency as follows:

(a) Connect a frequency counter across the output of the station's rf monitor.

(b) Measure and record the frequency indication on the frequency counter.

(c) Measurement obtained in step (b) should be the assigned carrier frequency of the transmitter, plus or minus 5.0 Hz or 5 parts per million (PPM), whichever is greater.

MINIMUM PERFORMANCE TEST

5.5 The minimum performance test is an off-the-air test that verifies the transmitter is functioning within its design limits. The transmitter's rf output is applied to a precision, 50 ohm, resistive dummy load for these tests. The test instructions are presented in a detailed step-by-step format. It is recommended that personnel who are not intimately familiar with the transmitter circuits follow the instruction in the order presented since prerequisites ;for some procedures are established in preceding steps. A minimum performance test should be performed and the results recorded for comparison with past and future minimum performance tests on completion of calibration procedures and as a routine part of a scheduled maintenance program.

5.5.1 PRELIMINARY REQUIREMENTS: Prepare the transmitter for a minimum performance test as follows:

(a) Verify or set MASTER CONTROL switch 3A1S1 is set to off.

(b) MASTER CONTROL lamp 3A1DS2 will turn off.

(c) Verify or set POWER switch 3A3S1 (exciter 'A') is set to off.

(d) Switch off the transmitter 3-phase ac power source at the wall-mounted circuit breakers.

(e) Disconnect the antenna system and connect a precision, 50 ohm, resistive, dummy load rated at a minimum of 75 kilowatts to rf output connector 6A1J1 using a suitable coaxial cable.

(f) Set the modulation input signal to zero (turned off).

(g) Set ac power source mentioned in step (d) to on and verify its voltage is within 5 percent of the voltage used as the mean rms voltage during the most recent calibration.

(h) Verify or set 115 volt ac power source at the wall mounted breaker panel is set to on.

(i) Verify or set REMOTE/LOCAL switch 3A1S2 is set to LOCAL.

(j) If a remote power trim (external gain) is being used, verify or set trimmer to mid-range.

(k) Verify all cooling fans are operating.

5.5.2 LOW VOLTAGE MEASUREMENTS: Measure the outputs of the low voltage power supplied as follows:

(a) Verify or set exciter 'A' POWER switch 3A3S1 is set to on.

(b) Exciter 'A' POWER lamp 3A3DS1 and -70V lamp 3A3DS2 should turn on.

(c) Extend exciter 'A' from cabinet three on its attached slides.

(d) On exciter 'A' connect positive lead of a dc voltmeter to terminal board A1TB2-3 and negative lead to chassis ground.

(e) Indication on voltmeter should be +15 $\pm$1.0 volts dc.

(f) Set TEST switch 3A3S2 (exciter 'A') to the +15V position.

(g) Indication on meter 3A3M1 (exciter 'A') should be +15 $\pm$1.0 volts dc.

(h) On exciter 'A' connect positive lead of dc voltmeter to terminal board A1TB2-2 and negative lead to chassis ground.

(i) Indication on voltmeter should be +24 $\pm$2.0 volts dc.

(j) Set TEST switch 3A3S2 (exciter 'A') to the +24V position.

(k) Indication on meter 3A3M1 (exciter 'A') should be +24 $\pm$2.0 volts dc.

(l) On exciter 'A' connect negative lead of dc voltmeter to terminal board A1TB2-4 and the positive lead to chassis ground.

(m) Indication on voltmeter should be -15 $\pm$1.0 volts dc.

(n) Set TEST switch 3A3S2 (exciter 'A') to the -15V position.

(o) Indication on meter 3A3M1 (exciter 'A') should be -15 $\pm$1.0 volts dc.

(p) Reinstall exciter 'A' into cabinet three.

(q) Set EXCITER switch 3A1S2 to exciter 'B'.

(r) Repeat steps (a) thru (p) for exciter 'B' using exciter 'B' reference designations where applicable.

(s) Upon completion of test, reinstall exciter 'B' into cabinet three.

(t) Set EXCITER switch 3A1S2 to exciter 'A'.

5.5.3 RF DRIVE LEVEL TEST: Check the level and frequency of the rf drive to the 15 kW power blocks as follows:

(a) Verify or set switches as tabulated for calibration setting in table 4-2.

(b) Verify or set POWER SELECT switch 3A1S3 to FULL.

(c) Check the rf drive level for 15 kW power blocks 'A' (cabinet 1) and 'B' (cabinet 2) by connecting an oscilloscope between terminal board TB3-2 and TB3-1 (ground) on the current shunt/interface panel 3A2, panel is situated behind the lower panel on the NAR69 control/monitor cabinet.

(d) Waveform indication shall be not less than 160 volts, peak-to-peak, at the assigned carrier frequency.

(e) Check the rf drive level for 15 kW power blocks 'C' (cabinet 4) and 'D' (cabinet 5) by connecting an oscilloscope between terminal board TB8-2 and TB8-1 (ground) on the current shunt/interface panel 3A2.

(f) Waveform indication shall be not less than 160 volts, peak-to-peak, at the assigned carrier frequency.

(g) Check the rf drive frequency by connecting a frequency counter between terminal board 3A2TB3-2 and 3A2TB3-1 (ground).

(h) Frequency indication shall be the assigned carrier frequency plus/minus 5.0 Hz or five parts per million (ppm), whichever is greater.

(i) Repeat steps (c) thru (h) using exciter 'B' as the internal rf carrier source.

(j) Upon completion of checks, set EXCITER switch 3A1S4 to exciter 'A'.

5.5.4 FORWARD AND REFLECTED POWER/MODULATOR CURRENT LEVELS CHECK: Measure the forward/reflected power and modulator input current levels as follows:

(a) Set or verify POWER SELECT switch 3A1S3 is set to FULL.

(b) Record FORWARD POWER meter 3A1M1's indication.

(c) Reading obtained in step (b) should be the desired high level, rf carrier, forward power output and should be within five percent of the reading recorded during the most recent calibration.

(d) Record REFLECTED POWER meter 3A1M4's indication.

(e) Reading recorded in step (d) should be nominal zero Watts when the dummy load appears to be precisely 50 ohms.

(f) Sequentially set RACK switch 3A1S5 to positions 'A', 'B', 'C' and 'D' and simultaneously observe and record indications on DC SUPPLY CURRENT meter 3A1M3 and DC SUPPLY VOLT meter 3A1M2.

(g) Plot the rf carrier forward power reading obtained in step (b) and the dc supply current readings obtained in step (f) on the graph shown in figure 4-1. The intersection point must be below the line representing 'maximum' current level.

(h) Each dc supply current reading obtained in step (f) should be within five percent of each rack switch setting.

(i) Dc supply readings recorded in step (f) should be -72 $\pm$3.0 volts dc at each rack switch setting.

(j) Repeat steps (b) thru (i) in turn, for low '1' and low '2' switch settings.

(k) Forward power indication for low '1' shall be the desired rf output power for low pwr '1' mode of operation.

(l) Forward power indication for low '2' shall be the desired rf output power for low pwr '2' mode of operation.

(m) Reflected power indication for low '1' and low '2' shall be nominally zero Watts.

(n) Repeat steps (b) thru (m) with EXCITER switch 3A1S4 set to exciter 'B'.

(o) Upon completion of checks, return EXCITER switch 3A1S4 to exciter 'A'.

5.5.5 LOCAL ALARMS, REMOTE CONTROL/STATUS MONITORING CHECK: Check the operation of local alarms, remote control/status monitoring that is being used at the remote site as follows:

(a) Set transmitter switches as tabulated for 'calibration settings' in figure 4-2.

(b) At remote site, preset control switches as follows; on/off switch to on; exciter switch to 'A' and high power/low power switch to high power and low power '1'/low power '2' switch to low power '1'.

(c) Verify external interlock is closed.

(d) Verify POWER lamp 3A3DS1 and -70V lamp 3A3DS2 on exciter 'A' are turned on.

(e) Set REMOTE/LOCAL switch 3A1S2 to REMOTE.

(f) REMOTE lamp 3A1DS3 will turn on; MASTER CONTROL lamp 3A1DS2; exciter 'A' POWER lamp 3A3DS1 and -70V lamp 3A3DS2 will remain on. All alarm lamps will be off.

(g) Indication on FORWARD POWER meter 3A1M1 will be the desired high level, rf carrier, forward power output.

5.5.5.1 Remote On/Off Control Check: Verify the transmitter's on or off status can be remotely controlled as follows:

(a) Set the remote on/off switch to off.

(b) FORWARD POWER meter 3A1M1 indication shall go to zero and exciter 'A' lamps 3A3DS1 and 3A3DS2 will turn off. MASTER CONTROL lamp 3A1DS2 and REMOTE status lamp 3A1DS3 will turn off.

(c) Set remote on/off switch to on.

(d) The transmitter will turn on; MASTER CONTROL lamp 3A1DS2; REMOTE lamp 3A1DS3; exciter A's -70V lamp 3A3DS2 and POWER-ON lamp 3A3DS1 will turn on. After a delay of approximately eight seconds, FORWARD POWER meter 3A1M1 will be indicating the desired high level, rf carrier, forward power output.

5.5.5.2 Remote High/Low Power Control: Verify the selection of the high power or low power operating modes can be remotely controlled as follows:

(a) Verify transmitter is in high power mode of operation and being controlled remotely.

(b) Indication on FORWARD POWER meter 3A1M1 will be the desired high level, rf carrier, forward power output.

(c) Verify or set remote low pwr '1'/low pwr '2' switch to low pwr '1'.

(d) Set remote high power/low power switch to low power.

(e) Indication on FORWARD POWER meter 3A1M1 will be the desired low level, rf carrier, forward power output for low '1' mode of operation.

(f) Set remote low pwr '1'/low pwr '2' switch to low pwr '2'.

(g) Indication on FORWARD POWER meter 3A1M1 will be the desired low level, rf carrier, forward power output for low '2' mode of operation.

(h) Set remote high power/low power switch to 'high power'.

5.5.5.3 Remote Selection of Exciter 'A' or 'B' Control Checks: Verify the selection of exciter 'A' or 'B' can be remotely selected as follows:

(a) Verify exciter 'A' has been selected at the remote site.

(b) Exciter 'A' POWER lamp 3A3DS1 and -70V lamp 3A3DS2 shall turn on.

(c) Set remote exciter selection switch to exciter 'B'.

(d) Exciter 'B' POWER-ON lamp 3A4DS1 and -70V lamp 3A4DS2 shall turn on; exciter 'A' lamps 3A3DS1 and 3A3DS2 will turn off.

(e) Return remote exciter selection switch to 'A'.

(f) Exciter 'B' status lamps mentioned in step (d) will turn off; exciter 'A' status lamps mentioned in step (d) will turn on.

5.5.5.4 Local PA Failure Alarms Check: Verify a pa failure alarm condition is generated whenever a NAA13 modulator/power amplifier fails, as follows:

(a) Verify the switches are set as tabulated for calibration setting in table 4-2.

(b) Place a 680 ohm, 1/2 Watt resistor between terminal board 3TB1-1 and chassis ground. Terminal board is located behind the lower panel of NAC27 control/monitor cabinet and situated on the current shunt/interface panel.

(c) PA FAIL-RACK 'A' alarm lamp 3A1DS4 will turn on and an external pa fail-alarm signal will be generated.

(d) At the remote site, verify that a pa fail alarm condition is being indicated.

(e) Repeat steps (a) thru (d) for PA FAIL-RACK 'B' at 3TB6-1; PA FAIL-RACK 'C' at 3TB7-1 and PA FAIL-RACK 'D' at 3TB2-1.

(f) In each alarm test, removing the resistor from the respective terminal board will cause the alarm lamp to turn off and cancel the external pa failure-alarm condition.

5.5.5.5 Ac Power Alarm Check: Verify an ac power-alarm and drive fail-alarm condition is generated whenever the B- operating voltage exceeds the desired limits, as follows:

(a) Verify the switches are set as tabulated for 'calibration settings' in table 4-2.

(b) Extend exciter 'A' from cabinet three on its attached slides.

(c) On the underside of the drawer, locate NAX29 power supply 3A3A3.

(d) Connect a 100K ohm resistor momentarily across resistor 3A3A3R9.

(e) AC POWER-ALARM lamp 3A3DS8 (exciter 'A'), RF DRIVE-ALARM 3A3DS5 (exciter 'A') and DRIVE FAIL-ALARM lamp 3A1DS8 will turn on. An external ac power-alarm and drive fail-alarm signal shall be generated.

(f) Verify ac power and drive fail alarm conditions are being indicated at the remote site.

(g) Reinstall exciter 'A' into the cabinet three and extend exciter 'B' from the cabinet.

(h) Set EXCITER switch 3A1S4 to exciter 'B'.

(i) Repeat steps (b) thru (f) for exciter 'B' using exciter 'B' reference designations where applicable.

(j) Upon completion of checks, return exciter 'B' into the cabinet and set EXCITER switch 3A1S4 to exciter 'A'.

5.5.6 MODULATION LEVEL CHECK: Verify the modulation level and response are within acceptable limits as follows:

CAUTION

Continuous modulation levels of more than 60 percent should be avoided when the audio input signal is a sine/square wave. Overheating may occur if the transmitter is operated at 10 kilowatts and the modulation level is a continuous 100 percent for more than ten minutes.

(a) Verify transmitter switches are set as tabulated for calibration settings in table 4-2.

(b) Verify or set POWER SELECT switch 3A1S3 to FULL.

(c) Connect an audio signal generator with an output impedance of 600 ohms between terminals 17, 18 and 19 (gnd) of terminal board 3A2TB1 in lieu of normal station programming.

(d) Connect a modulation monitor to rf monitor (ext) connector 3A2A1J2 using an appropriate coaxial cable.

(e) Connect a distortion analyzer with a nominal 25 kHz bandwidth to the demodulated audio output of the modulation monitor.

(f) Record indication on FORWARD POWER meter 3A1M1.

(g) Reading obtained in step (f) should be the desired high level, rf carrier, forward power output.

5.5.6.1 Modulation Control Check: The input audio level required to produce 100 percent modulation may be adjusted from zero dBm to +12 dBm by the 'audio' level control on the modulator driver printed circuit board (A1). For any given audio level, the 'audio' level control may be adjusted as follows:

(a) Adjust 'AUDIO' potentiometer 3A3A1R4 (exciter 'A') fully counterclockwise. AUDIO potentiometer R4 is located on the NAPE22 modulator driver printed circuit board A1.

(b) The transmitter should be operating in the high power (FULL) mode of operation with the output level adjusted to that required by the station.

(c) Set audio signal generator frequency to 1000 Hz at the output level required for 100 percent modulation.

NOTE

Audio signal generator output level recorded in step (c) represents the normal station programming signal level to obtain 100 percent modulation.

(d) Adjust 'AUDIO' potentiometer A1R4 on the modulator driver to give 100 percent modulation.

(e) Adjust the audio signal generator to zero output.

5.5.6.2 Audio Frequency Response Check: Check the modulation audio frequency response as follows:

(a) Set the audio signal generator's frequency to 1000 Hz.

(b) Adjust the audio signal generator's output level for 25 percent modulation as indicated on the monitoring system's modulation percentage indicator or demodulated audio level indicator.

(c) Record the audio signal generator's output level.

(d) Repeat steps (b) and (c) with the audio signal generator's frequency set to 50 Hz; 100 Hz; 400 Hz; 5000 Hz and 7500 Hz.

(e) Results recorded as the generator's output for the frequencies specified in steps (a) and (d) shall be within 1.0 dB.

(f) Repeat steps (a) thru (e) with the modulation level set to 50 percent in step (b).

(g) Repeat steps (a) thru (e) with the modulation level set to 85 percent in step (b).

(h) Repeat steps (a) thru (e) with the modulation level set to 95 percent in step (b).

5.5.6.3 Signal-To-Noise Ratio: Check the combined noise- and hum-to-signal ratio as follows:

NOTE

When RF MONITOR 3A2A1J2 is used as a signal source, hum and noise introduced by the monitor ground loops may result in measured levels higher than those actually present. Hence, it may be necessary to utilize a current probe with an isolated ground as a signal source for this measurement.

(a) Set the audio signal generator's frequency to 1000 Hz.

(b) Adjust the audio signal generator's output level for 100 percent modulation.

(c) Record the signal level on the distortion analyzer signal level indicator.

(d) Set the audio signal generator's output level to zero.

(e) Record combined noise and hum level on distortion analyzer's signal level indicator.

(f) The combined noise and hum level recorded in step (e) shall be a minimum of 60 dB below the signal level recorded in step (c).

5.5.6.4 Audio Distortion: Check the demodulated audio for distortion as follows:

(a) Set the audio signal generator's frequency to 1000 Hz.

(b) Adjust the audio signal generator's output level for 25 percent modulation.

(c) Measure the audio distortion level using the distortion analyzer.

(d) The distortion measured in step (c) shall not exceed two percent.

(e) Repeat steps (b) thru (d) with the audio signal generator's frequency set to 50 Hz; 100 Hz; 400 Hz; 5000 Hz and 7500 Hz.

(f) Repeat steps (b) thru (d) with the audio signal generator's output level set for 50 percent modulation in step (b).

(g) Repeat steps (b) thru (d) with the audio signal generator's output level set for 85 percent modulation in step (b).

(h) Repeat steps (b) thru (d) with the audio signal generator's output level set for 95 percent modulation in step (b).

5.5.6.5 Carrier Shift: Check the carrier shift with 1000 Hz modulation as follows:

(a) Set the audio signal generator's frequency to 1000 Hz.

(b) Set the audio signal generator's output level to zero (zero percent modulation).

(c) Measure and record the carrier level indication on the modulation monitor.

(d) Adjust the audio signal generator's output level for 95 percent modulation.

(e) Measure and record the carrier level indication on the modulation monitor.

(f) Measurement recorded in step (e) shall not vary from the measurement recorded in step (c) by more than three percent.

(g) Repeat paragraphs 5.5.6 thru 5.5.6.5 using exciter 'B'. Use exciter 'B' reference designations where applicable.

5.5.7 SELF-TEST PROTECTION CHECKS: Verify the self-test protection features of the transmitter are functioning within the desired limits as follows:

(a) Verify or set transmitter switches as tabulated for 'calibration settings' in table 4-2.

(b) Verify the modulation input is zero (turned off).

(c) Connect an audio signal generator to terminals 17, 18 and 19 (gnd) of terminal board TB1 on interface panel 3A2.

(d) Adjust audio signal generator output for 1000 Hz at zero volts.

(e) Set MASTER CONTROL switch 3A1S2 to OFF.

(f) On exciter 'A', adjust O/P PWR potentiometer A1R92 for a zero indication on FORWARD POWER meter 3A1M1.

5.5.7.1 Low Volts Protection Check: Verify remote and local alarms will be generated when the +15 volts dc exceeds or decreases from the desired limits as follows:

(a) Verify transmitter switches are set as tabulated for calibration setting in table 4-2.

(b) Extend exciter 'A' from cabinet three on its attached slides.

(c) Locate switch 3A3A5S1 on exciter 'A' and depress switch.

(d) AC POWER-ALARM lamp 3A3DS8, RF DRIVE-ALARM lamp 3A3DS5 and DRIVE FAIL-ALARM lamp 3A1DS8 will turn on.

(e) Verify ac power and drive fail alarm conditions are being indicated at the remote site.

(f) After approximately eight seconds the alarm circuits should reset.

(g) Set EXCITER switch 3A1S4 to exciter 'B'.

(h) Repeat steps (b) thru (f) for exciter 'B' using exciter 'B' reference designations where applicable.

(i) Reinstall both exciter drawers back into the transmitter cabinet.

(j) Upon completion of checks, set EXCITER switch 3A1S4 to exciter 'A'.

5.5.7.2 Local and Remote Interlock Alarm Check: Verify an interlock alarm condition is generated whenever the interlock circuit is interrupted as follows:

(a) Set or verify the switches are set as tabulated for 'calibration settings' in table 4-2.

(b) Open rear, full-depth, hinged door on the NAC27 control/monitor cabinet.

(c) An internal/external 'interlock alarm' condition should be generated.

(d) INTERLOCK OPEN lamp 3A1DS1 should turn on. Verify a remote interlock alarm is being indicated.

(e) FORWARD POWER meter 3A1M1 indication shall go to zero. MASTER CONTROL lamp 3A1DS2 will turn off and DC SUPPLY CURRENT meter 3A1M3 shall go to zero.

(f) Close cabinet door mentioned in step (b).

(g) Transmitter will turn on; status lamps mentioned in step (e) will turn on; FORWARD POWER meter 3A1M1 will be indicating the desired forward power output.

(h) Repeat steps (b) thru (g), substituting (in turn) the rear doors of the NAR72 final filter/power supply cabinet (6).

5.5.7.3 NAX25 Fault Check: Verify self-test protection circuits located on the NAX25 relay control assembly are functioning within the desired limits as follows:

(a) Locate NAX25 relay control assembly 3A5 on the rear of NAR69 control/monitor cabinet (3).

(b) On relay control panel printed circuit board A1, set switch S1 to TEST.

(c) Indication on the four 'input current' meters (M1) associated with NAX25 relay control 3A5 should be zero.

(d) Set TEST switch A1S1 to the closed position.

(e) Meter indications mentioned in step (c) should return to normal.

(f) Repeat steps (a) thru (e), substituting NAX25 relay control assemblies (in turn), 3A6 thru 3A16.

5.5.7.4 Peak Current Protection Check: Verify the peak current protection circuit is functioning within the desired limits as follows:

NOTE
If the transmitter fails to shut back when the test switch mentioned in step (b) is set to TEST, a small increase in modulation may be required.

(a) On exciter 'A', adjust potentiometer A1R92 for the desired high level, rf carrier, forward power output.

(b) On the NAPC13 rf current protection printed circuit board 3A3A3, set switch S1 to TEST.

(c) SWR-ALARM lamp 3A3DS4 on exciter 'A' and SWR-ALARM lamp 3A1DS7 on the control/monitor panel should turn on.

(d) Indication on FORWARD POWER meter 3A1M1 should be zero Watts.

(e) Verify SWR cutback-alarm is being indicated at the remote site.

(f) Open test switch mentioned in step (b).

(g) Indication on FORWARD POWER meter 3A1M1 should return to the level mentioned in step (a).

5.5.7.5 RMS Current Protection Check: Verify the rms current protection circuit is functioning within the desired limits as follows:

(a) Verify indication on FORWARD POWER meter 3A1M1 is the desired high level, rf carrier, forward power output.

(b) On the NAPC13 rf current protection printed circuit board 3A3A3, set OPR/TEST switch S2 to TEST.

(c) RF CURRENT-ALARM lamp 3A3DS7 on exciter 'A' and SWR-ALARM lamp 3A1DS9 on the control/monitor panel should turn on.

(d) Indication on FORWARD POWER meter 3A1M1 should to to zero Watts.

NOTE
If the transmitter fails to shut back when the test switch mentioned in step (g) is set to TEST, a small increase in modulation may be required.

(e) Set test switch mentioned in step (b) to OPR.

(f) Indication on FORWARD POWER meter 3A1M1 should go to the level mentioned in step (a).

(g) Repeat paragraphs 5.5.7.4 and 5.5.7.5 for exciter 'B' using exciter 'B' reference designations where applicable.

5.5.7.6 Remote Drive Fail-Alarm Check: The remote drive fail-alarm was tested while the low volts protection was being tested (see paragraph 5.5.7.1).

5.5.7.7 Remote PA Fail Alarm Check: The remote pa fail-alarm check was being tested while the local pa failure check was being tested (see paragraph 5.5.5.4).

5.5.7.8 Remote Ac Power-Alarm Check: The remote ac power-alarm check was being tested while the local/ac power alarm check was being tested (see paragraph 5.5.7.1).

5.5.7.9 Remote SWR Cutback Alarm Check: The remote SWR-cutback-alarm was being tested while the peak current protection check was being tested (see paragraph 5.5.7.4).

ROUTINE CALIBRATION PROCEDURES

5.6 Routine calibration consists of adjusting electrical components to bring the operating parameters of a fully assembled transmitter into the required or desired limits.

NOTE

The following procedures are presented in a logical sequence to accommodate a complete recalibration of the transmitter. The calibration procedures may also be performed independently to correct an out-of-tolerance condition discovered during a minimum performance test. It is recommended a complete minimum performance test be carried out after completion of any calibration procedure.

5.6.1 CALIBRATION TEST EQUIPMENT: The test equipment required for calibration is listed in table 1-3, special tools required are listed in table 1-4.

5.6.2 PRE-CALIBRATION REQUIREMENTS: Prepare the transmitter for calibration as follows:

(a) Verify or set MASTER CONTROL switch 3A1S1 to OFF.

(b) Disconnect antenna system and connect a precision, 50 ohm, resistive dummy load rated at a minimum of 75 kilowatts to the rf output using a suitable coaxial cable. Dummy load shall have provision to measure/indicate the rf power being applied to it with an accuracy of ±2 percent.

(c) Verify the voltage of the 3-phase line supply is within five percent of the voltage used as the mean rms voltage present when the rf output levels where last calibrated when selecting the primary winding taps of the ac line power transformer in both power supplies (refer to paragraph 3.8.1) and that the power source is rated at a minimum of 100 kilovolt amperes.

(d) Set modulation input to zero (turned off).

(e) If an external rf carrier is to be used, verify that the external rf carrier frequency is within 100 Hz of the assigned carrier frequency.

(f) Obtain documents recording the last calibration test performed. The recordings will be used for comparison purposes.

(g) Verify that all assemblies are installed and securely fastened.

(h) Verify doors of cabinet six and cabinet three are closed or interlock switches, located behind the mentioned doors, are in the 'override' position.

(i) Verify or set transmitter switches as tabulated for calibration setting in table 4-2.

(j) If a remote power trim (external gain) is being used, verify or set trimmer to mid-range.

(k) Verify all cooling fans are operating.

5.6.3 LOW VOLTAGE CHECKS: Verify low voltages are within desired limits as follows:

(a) Verify or set POWER switch 3A3S1 (exciter 'A') to on.

(b) POWER lamp DS1 and -70V lamp DS2 of exciter 'A' (3A3) should turn on.

(c) Extend exciter 'A' from cabinet three on its attached slides.

(d) On exciter 'A' connect positive lead of a dc voltmeter to terminal board A1TB2-3 and negative lead to chassis ground.

(e) Indication on voltmeter should be +15 $\pm$1.0 volts dc.

(f) Set TEST switch 3A3S2 (exciter 'A') to the +15V position.

(g) Indication on meter 3A3M1 (exciter 'A') should be +15 $\pm$1.0 volts dc.

(h) On exciter 'A' connect positive lead of dc voltmeter to terminal board A1TB2-2 and negative lead to chassis ground.

(i) Indication on voltmeter should be +24 $\pm$2.0 volts dc.

(j) Set TEST switch 3A3S2 (exciter 'A') to the +24V position.

(k) Indication on meter 3A3M1 (exciter 'A') should be +24 $\pm$2.0 volts dc.

(l) On exciter 'A' connect negative lead of dc voltmeter to terminal board A1TB2-4 and positive lead to chassis ground.

(m) Indication on voltmeter should be -15 $\pm$1.0 volts dc.

(n) Set TEST switch 3A3S2 (exciter 'A') to the -15V position.

(o) Indication on meter 3A3M1 (exciter 'A') should be -15 $\pm$1.0 volts dc.

(p) Reinstall exciter 'A' into cabinet three.

(q) Set EXCITER switch 3A1S2 to exciter 'B'.

(r) Repeat steps (a) thru (o) for exciter 'B', using exciter 'B' reference designations where applicable.

(s) Upon completion of test, reinstall exciter 'B' into cabinet three.

(t) Set EXCITER switch 3A1S2 to exciter 'A'.

5.6.3.1 Low +15 Volts Dc Simulator Calibration: Calibrate the low +15 volt dc simulator as follows:

(a) Set transmitter switches as tabulated for calibration settings in table 4-2.

(b) Extend exciter 'A' from cabinet three on its attached slides.

(c) Set potentiometer R2 located on low +15 volt dc simulator 3A3A5 fully counterclockwise.

(d) Set switch 3A3A5S1 to TEST and adjust potentiometer R2 until AC POWER-ALARM lamp 3A3DS8 turns on.

(e) Place switch A5S1 to the 'open' position.

(f) After approximately eight seconds, AC POWER-ALARM lamp 3A3DS8 will turn off.

(g) Repeat steps (a) thru (f) for exciter 'B' using exciter 'B' reference designations where applicable.

5.6.4 RF CARRIER FREQUENCY CALIBRATION: When the rf carrier is internally generated, calibrate as follows:

(a) Verify switches are set as tabulated for calibration settings in table 4-2.

(b) Extend exciter 'A' from cabinet three on its attached slides.

(c) On rf driver printed circuit board 3A3A2, connect a frequency counter between test point TP1 and chassis ground.

(d) Indication on frequency counter, mentioned in step (c), should be the assigned rf carrier frequency $\pm$5.0 Hz or five parts per million (ppm), whichever is greater.

(e) If necessary, adjust FREQ ADJ capacitor A2C4 (exciter 'A') until the requirements of step (d) are met.

(f) Repeat steps (b) thru (e) for exciter 'B' using exciter 'B' reference designations where applicable.

5.6.5 CARRIER LEVEL CALIBRATION: Adjust the rf carrier, forward power output to the desired level as follows:

NOTE

Low '1' and low '2' output power modes can be adjusted to provide up to 80 percent of the desired high level (full), rf carrier, forward power output.

(a) Verify transmitter switches are set as tabulated for calibration settings in table 4-2.

(b) Set POWER SELECT switch 3A3S3 to FULL.

(c) Set the modulation input signal to zero (turned off).

(d) Extend exciter 'A' from cabinet three on its attached slides.

(e) Verify the dummy load has provisions to measure and indicate the rf power being applied to it with an accuracy of ± 2.0 percent.

(f) Simultaneously monitor rf output indicator at the dummy load while adjusting O/P PWR potentiometer R92 on the modulation driver printed circuit board A1 for the desired high level, rf carrier, forward power output.

(g) Indication on FORWARD POWER meter 3A1M1 should be approximately the same as obtained in reading in step (f).

(h) Record indication on FORWARD POWER meter 3A1M1 for future use.

(i) Set POWER SELECT switch 3A1S3 to LOW '1'.

(j) Simultaneously monitor rf output indicator at the dummy load while adjusting LOW PWR 1 potentiometer R6 on modulator driver printed circuit board A1, for the desired low level, rf carrier, forward power output for low '1' mode of operation.

(k) Indication on FORWARD POWER meter 3A1M1 should be approximately the same as reading obtained in step (j).

(l) Record indication on FORWARD POWER meter 3A1M1 for future use.

(m) Set POWER SELECT switch 3A1S3 to LOW '2'.

(n) Simultaneously monitor rf output indicator at the dummy load while adjusting LOW PWR 1 potentiometer R6 on modulator driver printed circuit board A1, for the desired low level, rf carrier, forward power output for low '2' mode of operation.

(o) Indication on FORWARD POWER meter 3A1M1 should be approximately the same as reading obtained in step (n).

(p) Record indication on FORWARD POWER meter 3A1M1 for future use.

(q) Repeat steps (d) thru (p) for exciter 'B' using exciter 'B' reference designations where applicable.

5.6.6 NAPC10 RF MONITOR PCB CALIBRATION: Set the rf monitor output voltage to the level required by the station modulation monitor, ensuring voltages are equal in full; low '1' and low '2' power operating modes, as follows:

NOTE

The following procedure specifies using a 50 ohm resistive load and an rf voltmeter to establish the rf monitor output levels. Users may use a modulation monitor in lieu of this test equipment.

(a) Verify the requirements of paragraphs 5.6.3 thru 5.6.5 have been completed.

(b) Connect a 50 ohm resistive load to external rf monitor connector J2 on the rf monitor printed circuit board 3A2A1.

(c) Connect an rf voltmeter across 50 ohm load mentioned in step (b).

(d) Set transmitter switches as tabulated for calibration setting in table 4-2.

(e) Set POWER SELECT switch 3A1S3 to FULL. Indication on FORWARD POWER meter 3A1M1 should be the desired high level, rf carrier, forward power output.

(f) Adjust FULL potentiometer R1 on rf monitor printed circuit board 3A2A1 for the desired rms ac voltage indication on rf voltmeter (nominal 5.0 volts rms).

(g) Set POWER SELECT switch 3A1S3 to LOW 1. Indication on FORWARD POWER meter 3A1M1 should be the desired LOW 1, rf carrier, forward power output.

(h) Simultaneously monitor the rf voltmeter connected across the dummy load and adjust LOW 'A' potentiometer R2 on rf monitor printed circuit board 3A2A1, for precisely the same indication as obtained in step (f).

(i) Set POWER SELECT switch 3A3S3 to LOW 2. Indication on FORWARD POWER meter 3A1M1 should be the desired LOW 2 level, rf carrier, forward power output.

(j) Simultaneously monitor the rf voltmeter connected across the dummy load and adjust LOW 'B' potentiometer R3 on rf monitor printed circuit board 3A2A1 for precisely the same indication as obtained in step (f).

(k) Repeat steps (e) thru (j) for exciter 'B'.

(l) Disconnect 50 ohm load and rf voltmeter from external rf monitor connector J2 on rf monitor printed circuit board 3A2A1.

5.6.7 MODULATION LEVEL CALIBRATION: Set the modulation to the desired level as follows:

NOTE

The 'audio' potentiometer in exciters 'A' and 'B' are adjusted in conjunction with the station audio source to provide the desired modulation levels. One hundred percent modulation may be obtained provided the input audio level is from zero dBm to +12 dBm. The figures quoted for the input audio level are valid only when the impedance of the signal source is 600 ohms.

(a) Verify the requirements of paragraphs 5.6.3 thru 5.6.5 have been completed.

(b) Verify or set transmitter switches as tabulated for calibration setting in table 4-2.

(c) Set POWER SELECT switch 3A1S3 to FULL. FORWARD POWER meter 3A1M1 indication should be the desired high level, rf carrier, forward power output.

(d) Connect a station modulation monitor to external rf monitor connector J2 on rf monitor printed circuit board 3A2A1.

(e) Turn on normal station program modulating audio (nominal +10 dBm).

(f) Simultaneously monitor station modulation monitor at A1J2 and adjust AUDIO potentiometer R4 on the modulator driver printed circuit board 3A3A1 (exciter 'A') for the desired modulation.

(g) Simultaneously monitor station modulation monitor and adjust HI LIMIT potentiometer 3A3A1R16 counterclockwise until positive modulation peaks are just being limited: then adjust clockwise until not limiting, noting that circuit design restricts limiting range between 100% to 125% (nominal) positive modulation peaks.

(h) Simultaneously monitor station modulation monitor and adjust LO LIMIT potentiometer 3A3A1R18 clockwise until negative modulation peaks are just being limited: then adjust counterclockwise until not limiting, noting that circuit design restricts limiting range between 95% to 100% (nominal) negative modulation peaks.

(i) Repeat steps (f) thru (h) for exciter 'B' using exciter 'B' reference designations where applicable.

5.6.8 SPECIAL CALIBRATION PROCEDURES: Procedures referred to as special calibration procedures require test equipment that is not normally available at transmitter sites. The adjustments have been precisely set at the factory prior to shipment and should not require further adjustment. The accuracy of the settings will affect the accuracy of the calibration settings, therefore they should not be disturbed unless their accuracy is suspect and then only if the specified test equipment is available.

5.6.9 NAFP13 VOLTAGE PROBE CALIBRATION: Calibrate the NAFP13 voltage probe circuit as follows:

WARNING

Under no circumstances will calibration procedures be carried out on the NAFP13 voltage probe while rf voltages are present in the transmitter. Serious injury could be caused by electrical shock.

(a) Set MASTER CONTROL switch 3A1S1 to off.

(b) Turn off 3-phase ac source at the wall-mounted circuit breaker.

(c) Disconnect electrical leads and mounting hardware of NAFP13 voltage probe and remove assembly from the transmitter cabinet.

(d) Connect an audio signal generator across capacitor C1 and chassis ground. Adjust generator for a 15 volt peak-to-peak input.

(e) Connect oscilloscope across rf sample connector J1 and chassis ground.

(f) Adjust capacitor C2 for an indication at rf sample connector of 0.15 volts peak-to-peak.

(g) Remove oscillator from rf sample connector J1 and reconnect across plug A2P1 and chassis ground.

(h) Simultaneously adjust inductor L1 while applying and removing a 50 ohm resistor across rf sample connector J1.

(i) Continue adjusting inductor L1 until the signal at A2P1 remains unchanged.

(j) Remove all test equipment.

(k) Reinstall voltage probe and reconnect electrical wiring that was removed in step (c).

5.6.10 FORWARD POWER METER 3A1M1 CALIBRATION: Calibrate FORWARD POWER meter 3A1M1 as follows:

(a) Verify or set MASTER CONTROL switch 3A1S1 to off.

(b) Disconnect antenna system from transmitter and connect a precision, 50 ohm, resistive dummy load. Dummy load must have the capability to measure and indicate the rf power output of the transmitter.

(c) Turn the modulation input to zero (turned off).

(d) Set transmitter switches as tabulated for calibration settings in table 4-2.

(e) Verify or set POWER SELECT switch 3A1S3 to FULL.

(f) Indication on FORWARD POWER meter 3A1M1 should be the desired high level, rf carrier, forward power output.

(g) Compare reading in step (f) with indication at indicator connected across dummy load. Reading should be the same.

(h) If necessary, adjust potentiometer A1R3 on control/monitor panel 3A1, until requirements of step (g) are met.

(i) Disconnect all test equipment if no further tests are required.

NOTE

Calibration procedures for the NAE35 exciter drawer and NAP10 1.25 AM power subsystem that are not contained in this manual can be found in their respective service instruction booklets.

SECTION 6
THEORY OF OPERATION

GENERAL

6.1 This section contains scheduled and corrective maintenance information for the subject transmitter. Fault symptoms should be analyzed to determine the corrective action required. Normally, faults will be isolated to an assembly which is then removed from the transmitter and repaired on a work bench. Replacement of the defective assembly with a serviceable assembly will restore the transmitter to an operational status. In any event, the most practical way to isolate a fault is to perform a minimum performance test in conjunction with troubleshooting procedures. This section contains wiring information for each hard wired assembly and reference illustrations in the foldout section that depict the mechanical assembly of the transmitter components and provides information regarding the location. It also provides marking of all controls and indicators.

ELECTRICAL SCHEMATICS/LOGIC DIAGRAMS

6.2 An electrical schematic for each electrical assembly in the AMPFET 50 AM broadcast transmitter is provided.

6.2.1 COMPONENT VALUES: Unless otherwise specified on the schematic:

All resistor values are shown in ohms (K = 1000 and M = 1,000,000).
All capacitor values are shown in microfarads (uf).
Unidentified diodes are part number 1N4938.

6.2.2 GRAPHIC SYMBOLS: The graphic symbols used on the electrical schematics are in accordance with the American National Standard ANSI Y32.2-1975 - Graphic Symbols for Electrical and Electronic Diagrams.

6.2.3 LOGIC SYMBOLS: The logic symbols used on electrical schematics and logic diagrams are in accordance with the American National Standard ANSI Y32.14-1975 - Graphic Symbols for Logic Diagrams.

6.2.4 REFERENCE DESIGNATIONS: Reference designations have been assigned in accordance with American National Standard ANSI Y32.16-1975 - Reference Designations for Electrical and Electronic Parts and Equipment. Each electrical symbol has been identified with its basic reference designation. To obtain the full reference designation for a specific part, this basic identifier must be prefixed with the reference designation assigned to all higher assemblies.

WIRING INFORMATION

6.3 Point-to-point interconnection information for the wiring and cabling in and between the transmitter cabinets is provided in tables 6-1 thru 6-7. Connector mating information is provided in tables 6-8 and 6-9.

6.3.1 AMPFET 50 CABINET TO CABINET WIRING: Table 6-1 provides a tabular wiring list for the AMPFET 50 transmitter's cabinet-to-cabinet interconnections.

6.3.2 NAR69 CONTROL/MONITOR CABINET WIRING: Table 6-2 provides a tabular wiring list for the NAR69 control/monitor cabinet.

6.3.3 NAR70 15 kW POWER BLOCK CABINET WIRING: Table 6-3 provides a tabular wiring list for the NAR70 15 kW power block cabinet.

6.3.4 NAR72 FINAL FILTER/POWER SUPPLY CABINET WIRING: Table 6-4 provides a tabular wiring list for the NAR72 final filter/power supply cabinet.

6.3.5 NAC27 CONTROL/MONITOR PANEL ASSEMBLY WIRING: Table 6-5 provides a tabular wiring list for the control/monitor panel assembly.

6.3.6 NAC29 INTERFACE PANEL ASSEMBLY: Table 6-6 provides a tabular wiring list for the NAC29 interface panel assembly.

6.3.7 NAX25 RELAY CONTROL PANEL ASSEMBLY: Table 6-7 provides a tabular wiring list for the NAX25 relay control panel assembly.

6.3.8 CONNECTOR MATING (sorted by floating connector): Table 6-8 provides the connector mating information for the AMPFET 50 floating connectors.

6.3.9 CONNECTOR MATING (sorted by fixed connector): Table 6-9 provides the connector mating information for the AMPFET 50 fixed connectors.

MECHANICAL DRAWINGS

6.4 Mechanical drawings that depict the location of electrical components and show assembly outline detail are provided in the foldout section. The assembly illustrations are presented in the order of their assigned reference designations.

6.4.1 AMPFET 50 TRANSMITTER CABINETS: Assembly detail of the AMPFET 50 transmitter cabinets is depicted in figures FO-13 and FO-14.

6.4.2 NAR70 15 kW POWER BLOCK CABINET: Assembly detail of the NAR70 15kW power block cabinet is depicted in figures FO-15 and FO-16.

6.4.2.1 NAF37 Quad Combiner/Final Filter: Assembly detail of the NAF37 quad combiner/ final filter is depicted in figures FO-17 and FO-18.

6.4.2.2 15 kW Power Block (NAR70) Fan Control Panel: Assembly detail of the 15 kW power block (NAR70) fan control panel is depicted in figure FO-19.

6.4.3 NAR69 CONTROL/MONITOR CABINET: Assembly detail of the NAR69 control monitor cabinet is depicted in figures FO-20, FO-21 and FO-22.

6.4.3.1 NAC27 Control/Monitor Panel: Assembly detail of the NAC27 control/monitor panel is depicted in figures FO-23 and FO-24.

6.4.3.2 NAC29 Interface Panel: Assembly detail of the NAC29 interface panel is depicted in figures FO-25 and FO-26.

6.4.3.3 NAPC10 Rf Monitor Pcb: Assembly detail of the NAPC10 rf monitor pcb is depicted in figure FO-27.

6.4.3.4 NAPC11 Interface Pcb: Assembly detail of the NAPC11 interface pcb is depicted in figure FO-28.

6.4.3.5 NAPC13 Rf Current Protection Threshold Pcb: Assembly detail of the NAPC13 current protection threshold pcb is depicted in figure FO-29.

6.4.3.6 On/Off Control Pcb: Assembly detail of the on/off control pcb is depicted in figure FO-30.

6.4.3.7 NAX25 Relay Control Panel: Assembly detail of the NAX25 relay control panel is depicted in figure FO-31.

6.4.3.8 Current Shunt/Interface Panel Assembly: Assembly detail of the current shunt/interface panel assembly is depicted in figure FO-32.

6.4.3.8.1 Current Shunt Resistor Assembly: Assembly detail of the current shunt resistor assembly is depicted in figure FO-33.

6.4.3.8.2 Overvoltage Protection Pcb and Transient Clipper Assembly: Assembly detail of the overvoltage protection pcb and transient clipper assembly is depicted in figure FO-34.

6.4.3.9 -72 Vdc Choke Tray: Assembly detail of the -72 volt dc choke tray is depicted in figures FO-35 and FO-36.

6.4.4 NAR72 FINAL FILTER/POWER SUPPLY CABINET: Assembly detail of the NAR72 final filter/power supply cabinet is depicted in figures FO-37 and FO-38.

6.4.4.1 NAR72 Cabinet Fan Control Panel: Assembly detail of the NAR72 cabinet fan control panel is depicted in figure FO-39.

6.4.4.2 NAF39 50 Kilowatt Combiner/Final Filter: Assembly detail of the NAR39 50 kilowatt control panel is depicted in figures FO-40 and FO-41.

6.4.4.3 NAF12 Forward/Reflected Power Probe: Assembly detail of the NAR12 forward/ reflected power probe is depicted in figure FO-42.

6.4.4.4 NAR13 Output Voltage Probe: Assembly detail of the NAR13 output voltage probe is depicted in figure FO-43.

6.4.4.5 NASR60 Ac/Dc Power Supply: Assembly detail of the NASR60 ac/dc power supply is depicted in figure FO-44.

SCHEDULED MAINTENANCE

6.5 Scheduled maintenance consists of performing a visual inspection of the transmitter in conjunction with a minimum performance test procedure (see paragraph 5.4) at scheduled intervals. The recommended minimum time between scheduled maintenance visits is three months. Local operating and environmental conditions may dictate more frequent visits and in the case of remote sites, less frequent visits may be acceptable. Experience and system reliability will determine the most practical schedule for a specific installation.

CORRECTIVE MAINTENANCE

6.6 Corrective maintenance procedures comprises identifying and correcting defects or deficiencies that arise during operation and/or calibration and testing of the AMPFET 50 transmitter. Local and remote alarm signals will be generated when a defect occurs, but normally the built-in redundancy and integral modular reserve (IMR) features will permit the transmitter to maintain normal operation or at a reduced rf output level. The nature of the fault and station policy will dictate whether immediate maintenance response is necessary. Fault analysis and rectification may be conducted from four different levels with a different technical competence level required for each.

6.6.1 REMOTE ON-AIR TROUBLESHOOTING: Remote on-air troubleshooting consists of monitoring the transmitter's radiated signal using an on-air monitor and observing the status of remote fault alarm indicators. Figure 6-1 provides remote, on-air, troubleshooting assistance information. This information should enable an operator to decide whether the standby transmitter must be enabled (if one is available) and/or immediate corrective action must be taken or if response may be deferred to a more convenient time. It is recommended that this information be incorporated into a station's standard operating procedures.

6.6.2 LOCAL ON-AIR TROUBLESHOOTING: Local on-air troubleshooting consists of monitoring the transmitter's integral meters and fault alarm indicators, analyzing the readings and indications obtained and determining whether minor calibrations or adjustments will restore the transmitter to fully operational status. Figure 6-2 provides local, on-air, troubleshooting assistance information. Built-in rf drive and modulator drive redundancy features permit the transmitter to be switched to the standby exciter drawer should the main exciter drawer fail. The switching of the exciters can be done at the local or remote site. Under these circumstances, the defective drawer may be serviced at a more convenient time. The integral modular reserve (IMR) feature allows the transmitter to function at a reduced rf output level while faults are present in the power stages. When such a condition occurs, replacement of defective NAP10 1.25 kW AM power subsystem with a spare, or removal of that module to allow bench testing and repair, may be carried out at a convenient time in the program format. This is provided the rf output level is above the station minimum.

6.6.3 LOCAL OFF-AIR TROUBLESHOOTING: Local off-air troubleshooting must be performed when minor calibrations and/or adjustments will not correct a fault. Figure 6-3 is a step-by-step troubleshooting assistance chart for use in fault isolation when the transmitter has been taken off the air and is connected to a precision, 50-ohm, resistive dummy load. The transmitter may utilize its own antenna system for the dummy load provided the twelve power block switches have been turned off. The master control switch will be turned on after all power block switches have been set to off.

NAA13 MODULATOR/POWER AMPLIFIER FAULT ISOLATION PROCEDURES

6.7 The procedure for isolating a defective NAA13 modulator/power amplifier module is as follows:

NOTE

Once isolated, the defective NAP10 subsystem which contains the three NAA13 modulator/power amplifiers can be removed for repair while the transmitter will continue operating at a reduced output power level. Refer to table 4-1, 'pa failures versus rf output'.

(a) Check the PA DRIVE-ALARM lamps on the control/monitor panel to determine which 15 kW power block cabinet the defective module is located in.

(b) Open full-depth, hinged, front door of the 15 kW power block cabinet that contains the defective module.

(c) Check the twelve NAP10 1.25 kW AM power subsystems located within the cabinet for a PA FAIL-ALARM lamp (A,B or C) indication.

(d) When defective module has been isolated, refer to paragraph 6.8, removal/replacement procedures for the NAP10 1.25 AM power subsystem.

NOTE

The original indication of a defective power amplifier is the presence of a transmitter 'pa drive alarm' and one or more NAP10 power amplifier PA FAIL - 'A', 'B' or'C' alarm lamps turned on.

REMOVAL/REPLACEMENT PROCEDURES FOR NAP10 1.25 kW AM POWER SUBSYSTEM

6.8 REMOVAL PROCEDURE: Removal of NAP10 1.25 AM power subsystems is as follows: (refer to the NAP10 1.25 kW AM power subsystem module service instruction booklet for detailed drawings).

(a) Open the upper, hinged front panel on the control/monitor cabinet. There are twelve 5 kW power block switches situated on the NAC29 interface panel. Locate the respective switch for the defective power block (see figure FO-20).

NOTE

If a pa fail alarm lamp is not on and a 1.25 kW power amplifier (NAP10) fault exists, check individual 'input current' meters on the 48 NAP10 subsystem front panels: normal indication will be between 18 to 20 amperes.

(b) Set the associated power block switch (3A1S1 thru 3A1S12) of the defective 5 kW power block to 'off' (see figure FO-25).

(c) Open rear full-depth hinged door of the 15 kW cabinet and locate the associated operate/short switch of the defective NAP10 subsystem (see figure FO-16/17). Set switch to 'short'. B- WARNING lamp DS4 will turn off after several seconds.

(d) Disconnect fixed mating connectors from J1 and J2 of the defective module and remove the 115 volt ac connector from the muffin type cooling fan.

(e) Locate and remove hexagon nut and washer from the ground lug connection at rear section of the NAP10 subsystem.

(f) Remove subsystem by withdrawing module from the front of the cabinet.

(g) Set the associated power block switch mentioned in step (b) to 'on'.

(h) Maintenance can now be carried out on the defective NAA13 modulator/power amplifier (see service instruction booklet for the NAP10 1.25 kW AM power amplifier).

6.8.1 REPLACEMENT PROCEDURE: Replace 1.25 kW power amplifiers as follows:

(a) Open the full-depth hinged front and rear doors of the 15 kW cabinet.

(b) Set the associated power block switch, located on the NAC29 interface panel (3A2S1 thru 3A2S12) to 'off'.

(c) Replace power amplifier by carefully sliding module into the cabinet housing.

(d) Replace hexagon nut and washer to the ground lug connection at rear section of the power amplifier.

(e) Reconnect fixed mating connectors to J1 and J2 of the repaired module and reconnect 115 volt ac connector to the muffin cooling fan.

(f) Set associated operate/status switch of the amplifier to 'operate'.

(g) Set the associated power block switch mentioned in step (b) to 'on'. B- WARNING lamp DS4 on the rear section of the NAP10 subsystem will turn on.

(h) All alarm lamps shall be off and 'input current' meter of repaired/replaced module will be indicating between 18 and 20 amperes.

(i) Close the front and rear hinged doors of the cabinet.

CAUTION

Irreparable damage to solid state devices and mating connectors may result if the removal/replacement procedures are not observed.

REMOVAL/REPLACEMENT PROCEDURES FOR NAE35 EXCITER DRAWER

6.9 There are no removal/replacement procedures for the NAE35 exciter drawer. Two NAE35 exciters are located within the AMPFET 50 transmitter, main and standby. Should the main exciter develope a fault, provision is made for the standby exciter to be enabled either by local or remote switching. Troubleshooting a defective NAE35 exciter drawer can only be accomplished with the transmitter in the off-air mode of operation, using the transmitter as a test bed or a suitable dummy load.

REDUCED POWER OPERATION WITH ONE AC/DC POWER SUPPLY (NASR60) DISABLED:

6.10 The AMPFET 50 is capable of operating at a reduced power level should one of the transmitter's two ac/dc power supplies develop a fault. Observe the following procedures when one power supply is to be used to produce and provide the operating B- voltage for the transmitter:

(a) Switch 'off' the 3 phase ac power source input at the service entrance.

(b) Switch 'off' the 115 volt ac power source input at the service entrance.

(c) Remove the lower front panel from the control/monitor cabinet (see figure FO-20).

(d) Remove plate that supports cooling fan 3A1B1. Plate is located directly above the current shunt resistor assembly (see figure FO-32).

(e) Locate the six leads being applied from the defective power supply to the current shunt resistor assembly. Remove leads from associated mating connector 3E1 or 3E2. It will not be necessary to remove the six leads from the serviceable power supply (see figure FO-33).

(f) Carefully tie back leads from defective power supply. Ensure leads are free from contact with the chassis or any electrical connections.

(g) Remove mating connectors 3E1 and 3E2 from the current shunt resistor assembly.

(h) Connect the shunt strap (part number 149-8067) provided in the ancillary parts kit, across the two mating connectors 3E1 and 3E2. There will be two bolts securing each mating connector to the current shunt resistor assembly.

(i) Replace fan supporting plate mentioned in step (d).

(j) Replace panel mentioned in step (c).

(k) Switch on circuit breakers at the service entrance for the 3 phase ac power source and 115 volt ac power source inputs.

(l) Transmitter will now be operating at a reduced power level. Repair or replacement of defective power supply can be carried out at the stations convenience or when station programming permits.

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection

SOURCE	DESTINATION	CODE		SIZE	REMARKS
1TB1-4	6XF1-Center	1	Grey	18	
1TB1-5	6TB1-7	2	Grey	18	
2TB1-4	6XF1-Center	3	Grey	18	
2TB1-5	6TB1-7	4	Grey	18	
-	-	5		Not Used	
3TB5-1	6TB1-3	6	Grey	18	
4TB1-4	6XF2-Center	7	Grey	18	
4TB1-5	6TB1-5	8	Grey	18	
5TB1-4	6XF2-Center	9	Grey	18	
5TB1-5	6TB1-5	10	Grey	18	
1TB1-6	2TB1-6	11	White	20	
4TB1-6	5TB1-6	12	White	20	
5TB1-6	6TB2-2	13	White	20	
1P1-Center	1P4-Center	14	Core	RG188A/U	1P1 mates with 1A3J5
1P1-Shell	1P4-Shell	-	Shield		1P4 mates with 3A2A3J1
1P2-Center	1P5-Center	15	Core	RG188A/U	1P2 mates with 1A8J5
1P2-Shell	1P5-Shell	-	Shield		1P5 mates with 3A2A3J2
1P3-Center	1P6-Center	16	Core	RG188A/U	1P3 mates with 1A13J5
1P3-Shell	1P6-Shell	-	Shield		1P6 mates with 3A2A3J3
2P1-Center	2P4-Center	17	Core	RG188A/U	2P1 mates with 2A3J5
2P1-Shell	2P4-Shell	-	Shield		2P4 mates with 3A2A3J4
2P2-Center	2P5-Center	18	Core	RG188A/U	2P2 mates with 2A8J5
2P2-Shell	2P5-Shell	-	Shield		2P5 mates with 3A2A3J5
2P3-Center	2P6-Center	19	Core	RG188A/U	2P3 mates with 2A13J5
2P3-Shell	2P6-Shell	-	Shield		2P6 mates with 3A2A3J6
4P1-Center	4P4-Center	20	Core	RG188A/U	4P1 mates with 4A3J5
4P1-Shell	4P4-Shell	-	Shield		4P4 mates with 3A2A3J7
4P2-Center	4P5-Center	21	Core	RG188A/U	4P2 mates with 4A8J5
4P2-Shell	4P5-Shell	-	Shield		4P5 mates with 3A2A3J8
4P3-Center	4P6-Center	22	Core	RG188A/U	4P3 mates with 4A13J5
4P3-Shell	4P6-Shell	-	Shield		4P6 mates with 3A2A3J9
5P1-Center	5P4-Center	23	Core	RG188A/U	5P1 mates with 5A3J5
5P1-Shell	5P4-Shell	-	Shield		5P4 mates with 3A2A3J10
5P2-Center	5P5-Center	24	Core	RG188A/U	5P2 mates with 5A8J5
5P2-Shell	5P5-Shell	-	Shield		5P5 mates with 3A2A3J11
5P3-Center	5P6-Center	25	Core	RG188A/U	5P3 mates with 5A13J5
5P3-Shell	5P6-Shell	-	Shield		5P6 mates with 3A2A3J12
3S1-2	6S3-2	26	White	22	
1A3E1	6A1E2	27	Core	RG217U	
1A3-Ground	6A1-Ground	-	Shield		
1A8E1	6A1E2	28	Core	RG217U	
1A8-Ground	6A1-Ground	-	Shield		
1A13E1	6A1E2	29	Core	RG217U	
1A13-Ground	6A1-Ground	-	Shield		
2A3E1	6A1E2	30	Core	RG217U	
2A3-Ground	6A1-Ground	-	Shield		
2A8E1	6A1E2	31	Core	RG217U	
2A8-Ground	6A1-Ground	-	Shield		
2A13E1	6A1E2	32	Core	RG217U	
2A13-Ground	6A1-Ground	-	Shield		

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
4A3E1	6A1E2	33 Core	RG217U	
4A3-Ground	6A1-Ground	- Shield		
4A8E1	6A1E2	34 Core	RG217U	
4A8-Ground	6A1-Ground	- Shield		
4A13E1	6A1E2	35 Core	RG217U	
4A13-Ground	6A1-Ground	- Shield		
5A3E1	6A1E2	36 Core	RG217U	
5A3-Ground	6A1-Ground	- Shield		
5A8E1	6A1E2	37 Core	RG217U	
5A8-Ground	6A1-Ground	- Shield		
5A13E1	6A1E2	38 Core	RG217U	
5A13-Ground	6A1-Ground	- Shield		
6A2A1 (+ve)	Cabinet 1 Gnd	39 White	2	
6A2A1 (+ve)	Cabinet 1 Gnd	40 White	2	
6A2A1 (+ve)	Cabinet 1 Gnd	41 White	2	
6A2A1 (+ve)	Cabinet 1 Gnd	42 White	2	
6A2A1 (+ve)	Cabinet 2 Gnd	43 White	2	
6A2A1 (+ve)	Cabinet 2 Gnd	44 White	2	
6A2A1 (+ve)	Cabinet 2 Gnd	45 White	2	
6A2A1 (+ve)	Cabinet 2 Gnd	46 White	2	
6A2A1 (-ve)	3E1	47 White	2	
6A2A1 (-ve)	3E1	48 White	2	
6A2A1 (-ve)	3E1	49 White	2	
6A2A1 (-ve)	3E1	50 White	2	
6A2A1 (-ve)	3E1	51 White	2	
6A2A1 (-ve)	3E1	52 White	2	
6A3A1 (+ve)	Cabinet 4 Gnd	53 White	2	
6A3A1 (+ve)	Cabinet 4 Gnd	54 White	2	
6A3A1 (+ve)	Cabinet 4 Gnd	55 White	2	
6A3A1 (+ve)	Cabinet 4 Gnd	56 White	2	
6A3A1 (+ve)	Cabinet 5 Gnd	57 White	2	
6A3A1 (+ve)	Cabinet 5 Gnd	58 White	2	
6A3A1 (+ve)	Cabinet 5 Gnd	59 White	2	
6A3A1 (+ve)	Cabinet 5 Gnd	60 White	2	
6A3A1 (-ve)	3E2	61 White	2	
6A3A1 (-ve)	3E2	62 White	2	
6A3A1 (-ve)	3E2	63 White	2	
6A3A1 (-ve)	3E2	64 White	2	
6A3A1 (-ve)	3E2	65 White	2	
6A3A1 (-ve)	3E2	66 White	2	
Cabinet 3 Gnd	Cabinet 2 Gnd	Copper Braid	3/4 Inch	Top of Cabinet
Cabinet 3 Gnd	Cabinet 2 Gnd	Copper Braid	3/4 Inch	Middle of Cabinet
Cabinet 3 Gnd	Cabinet 2 Gnd	Copper Braid	3/4 Inch	Bottom of Cabinet
Cabinet 3 Gnd	Cabinet 4 Gnd	Copper Braid	3/4 Inch	Top of Cabinet
Cabinet 3 Gnd	Cabinet 4 Gnd	Copper Braid	3/4 Inch	Middle of Cabinet
Cabinet 3 Gnd	Cabinet 4 Gnd	Copper Braid	3/4 Inch	Bottom of Cabinet

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A8XF2-2	3W1P1-1	3W1-01 White	14	3W1P1 mates with 2A2J1
3A8XF2-2	3W1P1-2	3W1-02 White	14	
3A8XF2-2	3W1P1-3	3W1-03 White	14	
3A8XF1-2	3W1P2-1	3W1-04 White	14	3W1P2 mates with 2A1J1
3A8XF1-2	3W1P2-2	3W1-05 White	14	
3A8XF1-2	3W1P2-3	3W1-06 White	14	
3A5XF2-2	3W1P3-1	3W1-07 White	14	3W1P3 mates with 1A2J1
3A5XF2-2	3W1P3-2	3W1-08 White	14	
3A5XF2-2	3W1P3-3	3W1-09 White	14	
3A5XF1-2	3W1P4-1	3W1-10 White	14	3W1P4 mates with 1A1J1
3A5XF1-2	3W1P4-2	3W1-11 White	14	
3A5XF1-2	3W1P4-3	3W1-12 White	14	
3A8TB2-2	3W1P1-9	3W1-13 Core	RG58A/U	
3A8TB2-1	3W1P1-6	3W1-14 Shield	-	
3A8TB2-6	3W1P1-7	3W1-15 Core	RG58A/U	
3A8TB2-5	3W1P1-4	3W1-16 Shield	-	
3A8TB2-2	3W1P2-9	3W1-17 Core	RG58A/U	
3A8TB2-1	3W1P2-6	3W1-18 Shield	-	
3A8TB2-6	3W1P2-7	3W1-19 Core	RG58A/U	
3A8TB2-5	3W1P2-4	3W1-20 Shield	-	
3A5TB2-2	3W1P3-9	3W1-21 Core	RG58A/U	
3A5TB2-1	3W1P3-6	3W1-22 Shield	-	
3A5TB2-6	3W1P3-7	3W1-23 Core	RG58A/U	
3A5TB2-5	3W1P3-4	3W1-24 Shield	-	
3A5TB2-2	3W1P4-9	3W1-25 Core	RG58A/U	
3A5TB2-1	3W1P4-6	3W1-26 Shield	-	
3A5TB2-6	3W1P4-7	3W1-27 Core	RG58A/U	
3A5TB2-5	3W1P4-4	3W1-28 Shield	-	
Ground	3W1P1-5	3W1-29 Black	20	
Ground	3W1P2-5	3W1-30 Black	20	
Ground	3W1P3-5	3W1-31 Black	20	
Ground	3W1P4-5	3W1-32 Black	20	
3TB6-1	3W1P1-8	3W1-33 Red	20	
3TB6-1	3W1P2-8	3W1-34 Red	20	
3TB1-1	3W1P3-8	3W1-35 Red	20	
3TB1-1	3W1P4-8	3W1-36 Red	20	
3A5XF4-2	3W2P3-1	3W2-01 White	14	3W2P3 mates with 1A5J1
3A5XF4-2	3W2P3-2	3W2-02 White	14	
3A5XF4-2	3W2P3-3	3W2-03 White	14	
3A5XF3-2	3W2P4-1	3W2-04 White	14	3W2P4 mates with 1A4J1
3A5XF3-2	3W2P4-2	3W2-05 White	14	
3A5XF3-2	3W2P4-3	3W2-06 White	14	
3A8XF4-2	3W2P1-1	3W2-07 White	14	3W2P1 mates with 2A5J1
3A8XF4-2	3W2P1-2	3W2-08 White	14	
3A8XF4-2	3W2P1-3	3W2-09 White	14	
3A8XF3-2	3W2P2-1	3W2-10 White	14	3W2P2 mates with 2A4J1
3A8XF3-2	3W2P2-2	3W2-11 White	14	
3A8XF3-2	3W2P2-3	3W2-12 White	14	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A5TB2-3	3W2P3-9	3W2-13 Core	RG58A/U	
3A5TB2-4	3W2P3-6	3W2-14 Shield	-	
3A5TB2-7	3W2P3-7	3W2-15 Core	RG58A/U	
3A5TB2-8	3W2P3-4	3W2-16 Shield	-	
3A5TB2-3	3W2P4-9	3W2-17 Core	RG58A/U	
3A5TB2-4	3W2P4-6	3W2-18 Shield	-	
3A5TB2-7	3W2P4-7	3W2-19 Core	RG58A/U	
3A5TB2-8	3W2P4-4	3W2-20 Shield	-	
3A8TB2-3	3W2P1-9	3W2-21 Core	RG58A/U	
3A8TB2-4	3W2P1-6	3W2-22 Shield	-	
3A8TB2-7	3W2P1-7	3W2-23 Core	RG58A/U	
3A8TB2-8	3W2P1-4	3W2-24 Shield	-	
3A8TB2-3	3W2P2-9	3W2-25 Core	RG58A/U	
3A8TB2-4	3W2P2-6	3W2-26 Shield	-	
3A8TB2-7	3W2P2-7	3W2-27 Core	RG58A/U	
3A8TB2-8	3W2P2-4	3W2-28 Shield	-	
Ground	3W2P1-5	3W2-29 Black	20	
Ground	3W2P2-5	3W2-30 Black	20	
Ground	3W2P3-5	3W2-31 Black	20	
Ground	3W2P4-5	3W2-32 Black	20	
3TB6-2	3W2P1-8	3W2-33 Red	20	
3TB6-2	3W2P2-8	3W2-34 Red	20	
3TB1-2	3W2P3-8	3W2-35 Red	20	
3TB1-2	3W2P4-8	3W2-36 Red	20	
3A9XF2-2	3W3P1-1	3W3-01 White	14	3W3P1 mates with 2A7J1
3A9XF2-2	3W3P1-2	3W3-02 White	14	
3A9XF2-2	3W3P1-3	3W3-03 White	14	
3A9XF1-2	3W3P2-1	3W3-04 White	14	3W3P2 mates with 2A6J1
3A9XF1-2	3W3P2-2	3W3-05 White	14	
3A9XF1-2	3W3P2-3	3W3-06 White	14	
3A6XF2-2	3W3P3-1	3W3-07 White	14	3W3P3 mates with 1A7J1
3A6XF2-2	3W3P3-2	3W3-08 White	14	
3A6XF2-2	3W3P3-3	3W3-09 White	14	
3A6XF1-2	3W3P4-1	3W3-10 White	14	3W3P4 mates with 1A6J1
3A6XF1-2	3W3P4-2	3W3-11 White	14	
3A6XF1-2	3W3P4-3	3W3-12 White	14	
3A9TB2-2	3W3P1-9	3W3-13 Core	RG58A/U	
3A9TB2-1	3W3P1-6	3W3-14 Shield	-	
3A9TB2-6	3W3P1-7	3W3-15 Core	RG58A/U	
3A9TB2-5	3W3P1-4	3W3-16 Shield	-	
3A9TB2-2	3W3P2-9	3W3-17 Core	RG58A/U	
3A9TB2-1	3W3P2-6	3W3-18 Shield	-	
3A9TB2-6	3W3P2-7	3W3-19 Core	RG58A/U	
3A9TB2-5	3W3P2-4	3W3-20 Shield	-	
3A6TB2-2	3W3P3-9	3W3-21 Core	RG58A/U	
3A6TB2-1	3W3P3-6	3W3-22 Shield	-	
3A6TB2-6	3W3P3-7	3W3-23 Core	RG58A/U	
3A6TB2-5	3W3P3-4	3W3-24 Shield	-	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A6TB2-2	3W3P4-9	3W3-25 Core	RG58A/U	
3A6TB2-1	3W3P4-6	3W3-26 Shield	-	
3A6TB2-6	3W3P4-7	3W3-27 Core	RG58A/U	
3A6TB2-5	3W3P4-4	3W3-28 Shield	-	
Ground	3W3P1-5	3W3-29 Black	20	
Ground	3W3P2-5	3W3-30 Black	20	
Ground	3W3P3-5	3W3-31 Black	20	
Ground	3W3P4-5	3W3-32 Black	20	
3TB6-3	3W3P1-8	3W3-33 Red	20	
3TB6-3	3W3P2-8	3W3-34 Red	20	
3TB1-3	3W3P3-8	3W3-35 Red	20	
3TB1-3	3W3P4-8	3W3-36 Red	20	
3A6XF4-2	3W4P3-1	3W4-01 White	14	3W4P3 mates with 1A10J1
3A6XF4-2	3W4P3-2	3W4-02 White	14	
3A6XF4-2	3W4P3-3	3W4-03 White	14	
3A6XF3-2	3W4P4-1	3W4-04 White	14	3W4P4 mates with 1A9J1
3A6XF3-2	3W4P4-2	3W4-05 White	14	
3A6XF3-2	3W4P4-3	3W4-06 White	14	
3A9XF4-2	3W4P1-1	3W4-07 White	14	3W4P1 mates with 2A10J1
3A9XF4-2	3W4P1-2	3W4-08 White	14	
3A9XF4-2	3W4P1-3	3W4-09 White	14	
3A9XF3-2	3W4P2-1	3W4-10 White	14	3W4P2 mates with 2A9J1
3A9XF3-2	3W4P2-2	3W4-11 White	14	
3A9XF3-2	3W4P2-3	3W4-12 White	14	
3A6TB2-3	3W4P3-9	3W4-13 Core	RG58A/U	
3A6TB2-4	3W4P3-6	3W4-14 Shield	-	
3A6TB2-7	3W4P3-7	3W4-15 Core	RG58A/U	
3A6TB2-8	3W4P3-4	3W4-16 Shield	-	
3A6TB2-3	3W4P4-9	3W4-17 Core	RG58A/U	
3A6TB2-4	3W4P4-6	3W4-18 Shield	-	
3A6TB2-7	3W4P4-7	3W4-19 Core	RG58A/U	
3A6TB2-8	3W4P4-4	3W4-20 Shield	-	
3A9TB2-3	3W4P1-9	3W4-21 Core	RG58A/U	
3A9TB2-4	3W4P1-6	3W4-22 Shield	-	
3A9TB2-7	3W4P1-7	3W4-23 Core	RG58A/U	
3A9TB2-8	3W4P1-4	3W4-24 Shield	-	
3A9TB2-3	3W4P2-9	3W4-25 Core	RG58A/U	
3A9TB2-4	3W4P2-6	3W4-26 Shield	-	
3A9TB2-7	3W4P2-7	3W4-27 Core	RG58A/U	
3A9TB2-8	3W4P2-4	3W4-28 Shield	-	
Ground	3W4P1-5	3W4-29 Black	20	
Ground	3W4P2-5	3W4-30 Black	20	
Ground	3W4P3-5	3W4-31 Black	20	
Ground	3W4P4-5	3W4-32 Black	20	
3TB6-4	3W4P1-8	3W4-33 Red	20	
3TB6-4	3W4P2-8	3W4-34 Red	20	
3TB1-4	3W4P3-8	3W4-35 Red	20	
3TB1-4	3W4P4-8	3W4-36 Red	20	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
3A10XF2-2	3W5P1-1	3W5-01	White	14	3W5P1 mates with 2A12J1
3A10XF2-2	3W5P1-2	3W5-02	White	14	
3A10XF2-2	3W5P1-3	3W5-03	White	14	
3A10XF1-2	3W5P2-1	3W5-04	White	14	3W5P2 mates with 2A11J1
3A10XF1-2	3W5P2-2	3W5-05	White	14	
3A10XF1-2	3W5P2-3	3W5-06	White	14	
3A7XF2-2	3W5P3-1	3W5-07	White	14	3W5P3 mates with 1A12J1
3A7XF2-2	3W5P3-2	3W5-08	White	14	
3A7XF2-2	3W5P3-3	3W5-09	White	14	
3A7XF1-2	3W5P4-1	3W5-10	White	14	3W5P4 mates with 1A11J1
3A7XF1-2	3W5P4-2	3W5-11	White	14	
3A7XF1-2	3W5P4-3	3W5-12	White	14	
3A10TB2-2	3W5P1-9	3W5-13	Core	RG58A/U	
3A10TB2-1	3W5P1-6	3W5-14	Shield	-	
3A10TB2-6	3W5P1-7	3W5-15	Core	RG58A/U	
3A10TB2-5	3W5P1-4	3W5-16	Shield	-	
3A10TB2-2	3W5P2-9	3W5-17	Core	RG58A/U	
3A10TB2-1	3W5P2-6	3W5-18	Shield	-	
3A10TB2-6	3W5P2-7	3W5-19	Core	RG58A/U	
3A10TB2-5	3W5P2-4	3W5-20	Shield	-	
3A7TB2-2	3W5P3-9	3W5-21	Core	RG58A/U	
3A7TB2-1	3W5P3-6	3W5-22	Shield	-	
3A7TB2-6	3W5P3-7	3W5-23	Core	RG58A/U	
3A7TB2-5	3W5P3-4	3W5-24	Shield	-	
3A7TB2-2	3W5P4-9	3W5-25	Core	RG58A/U	
3A7TB2-1	3W5P4-6	3W5-26	Shield	-	
3A7TB2-6	3W5P4-7	3W5-27	Core	RG58A/U	
3A7TB2-5	3W5P4-4	3W5-28	Shield	-	
Ground	3W5P1-5	3W5-29	Black	20	
Ground	3W5P2-5	3W5-30	Black	20	
Ground	3W5P3-5	3W5-31	Black	20	
Ground	3W5P4-5	3W5-32	Black	20	
3TB6-5	3W5P1-8	3W5-33	Red	20	
3TB6-5	3W5P2-8	3W5-34	Red	20	
3TB1-5	3W5P3-8	3W5-35	Red	20	
3TB1-5	3W5P4-8	3W5-36	Red	20	
3A7XF4-2	3W6P3-1	3W6-01	White	14	3W6P3 mates with 1A15J1
3A7XF4-2	3W6P3-2	3W6-02	White	14	
3A7XF4-2	3W6P3-3	3W6-03	White	14	
3A7XF3-2	3W6P4-1	3W6-04	White	14	3W6P4 mates with 1A14J1
3A7XF3-2	3W6P4-2	3W6-05	White	14	
3A7XF3-2	3W6P4-3	3W6-06	White	14	
3A10XF4-2	3W6P1-1	3W6-07	White	14	3W6P1 mates with 2A15J1
3A10XF4-2	3W6P1-2	3W6-08	White	14	
3A10XF4-2	3W6P1-3	3W6-09	White	14	
3A10XF3-2	3W6P2-1	3W6-10	White	14	3W6P2 mates with 2A14J1
3A10XF3-2	3W6P2-2	3W6-11	White	14	
3A10XF3-2	3W6P2-3	3W6-12	White	14	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A7TB2-3	3W6P3-9	3W6-13 Core	RG58A/U	
3A7TB2-4	3W6P3-6	3W6-14 Shield	-	
3A7TB2-7	3W6P3-7	3W6-15 Core	RG58A/U	
3A7TB2-8	3W6P3-4	3W6-16 Shield	-	
3A7TB2-3	3W6P4-9	3W6-17 Core	RG58A/U	
3A7TB2-4	3W6P4-6	3W6-18 Shield	-	
3A7TB2-7	3W6P4-7	3W6-19 Core	RG58A/U	
3A7TB2-8	3W6P4-4	3W6-20 Shield	-	
3A10TB2-3	3W6P1-9	3W6-21 Core	RG58A/U	
3A10TB2-4	3W6P1-6	3W6-22 Shield	-	
3A10TB2-7	3W6P1-7	3W6-23 Core	RG58A/U	
3A10TB2-8	3W6P1-4	3W6-24 Shield	-	
3A10TB2-3	3W6P2-9	3W6-25 Core	RG58A/U	
3A10TB2-4	3W6P2-6	3W6-26 Shield	-	
3A10TB2-7	3W6P2-7	3W6-27 Core	RG58A/U	
3A10TB2-8	3W6P2-4	3W6-28 Shield	-	
Ground	3W6P1-5	3W6-29 Black	20	
Ground	3W6P2-5	3W6-30 Black	20	
Ground	3W6P3-5	3W6-31 Black	20	
Ground	3W6P4-5	3W6-32 Black	20	
3TB6-6	3W6P1-8	3W6-33 Red	20	
3TB6-6	3W6P2-8	3W6-34 Red	20	
3TB1-6	3W6P3-8	3W6-35 Red	20	
3TB1-6	3W6P4-8	3W6-36 Red	20	
3A11XF2-2	3W7P1-1	3W7-01 White	14	3W7P1 mates with 4A1J1
3A11XF2-2	3W7P1-2	3W7-02 White	14	
3A11XF2-2	3W7P1-3	3W7-03 White	14	
3A11XF1-2	3W7P2-1	3W7-04 White	14	3W7P2 mates with 4A2J1
3A11XF1-2	3W7P2-2	3W7-05 White	14	
3A11XF1-2	3W7P2-3	3W7-06 White	14	
3A14XF2-2	3W7P3-1	3W7-07 White	14	3W7P3 mates with 5A1J1
3A14XF2-2	3W7P3-2	3W7-08 White	14	
3A14XF2-2	3W7P3-3	3W7-09 White	14	
3A14XF1-2	3W7P4-1	3W7-10 White	14	3W7P4 mates with 5A2J1
3A14XF1-2	3W7P4-2	3W7-11 White	14	
3A14XF1-2	3W7P4-3	3W7-12 White	14	
3A11TB2-2	3W7P1-9	3W7-13 Core	RG58A/U	
3A11TB2-1	3W7P1-6	3W7-14 Shield	-	
3A11TB2-6	3W7P1-7	3W7-15 Core	RG58A/U	
3A11TB2-5	3W7P1-4	3W7-16 Shield	-	
3A11TB2-2	3W7P2-9	3W7-17 Core	RG58A/U	
3A11TB2-1	3W7P2-6	3W7-18 Shield	-	
3A11TB2-6	3W7P2-7	3W7-19 Core	RG58A/U	
3A11TB2-5	3W7P2-4	3W7-20 Shield	-	
3A14TB2-2	3W7P3-9	3W7-21 Core	RG58A/U	
3A14TB2-1	3W7P3-6	3W7-22 Shield	-	
3A14TB2-6	3W7P3-7	3W7-23 Core	RG58A/U	
3A14TB2-5	3W7P3-4	3W7-24 Shield	-	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A14TB2-2	3W7P4-9	3W7-25 Core	RG58A/U	
3A14TB2-1	3W7P4-6	3W7-26 Shield	-	
3A14TB2-6	3W7P4-7	3W7-27 Core	RG58A/U	
3A14TB2-5	3W7P4-4	3W7-28 Shield	-	
Ground	3W7P1-5	3W7-29 Black	20	
Ground	3W7P2-5	3W7-30 Black	20	
Ground	3W7P3-5	3W7-31 Black	20	
Ground	3W7P4-5	3W7-32 Black	20	
3TB7-1	3W7P1-8	3W7-33 Red	20	
3TB7-1	3W7P2-8	3W7-34 Red	20	
3TB2-1	3W7P3-8	3W7-35 Red	20	
3TB2-1	3W7P4-8	3W7-36 Red	20	
3A14XF4-2	3W8P3-1	3W8-01 White	14	3W8P3 mates with 5A4J1
3A14XF4-2	3W8P3-2	3W8-02 White	14	
3A14XF4-2	3W8P3-3	3W8-03 White	14	
3A14XF3-2	3W8P4-1	3W8-04 White	14	3W8P4 mates with 5A5J1
3A14XF3-2	3W8P4-2	3W8-05 White	14	
3A14XF3-2	3W8P4-3	3W8-06 White	14	
3A11XF4-2	3W8P1-1	3W8-07 White	14	3W8P1 mates with 4A4J1
3A11XF4-2	3W8P1-2	3W8-08 White	14	
3A11XF4-2	3W8P1-3	3W8-09 White	14	
3A11XF3-2	3W8P2-1	3W8-10 White	14	3W8P2 mates with 4A5J1
3A11XF3-2	3W8P2-2	3W8-11 White	14	
3A11XF3-2	3W8P2-3	3W8-12 White	14	
3A14TB2-3	3W8P3-9	3W8-13 Core	RG58A/U	
3A14TB2-4	3W8P3-6	3W8-14 Shield	-	
3A14TB2-7	3W8P3-7	3W8-15 Core	RG58A/U	
3A14TB2-8	3W8P3-4	3W8-16 Shield	-	
3A14TB2-3	3W8P4-9	3W8-17 Core	RG58A/U	
3A14TB2-4	3W8P4-6	3W8-18 Shield	-	
3A14TB2-7	3W8P4-7	3W8-19 Core	RG58A/U	
3A14TB2-8	3W8P4-4	3W8-20 Shield	-	
3A11TB2-3	3W8P1-9	3W8-21 Core	RG58A/U	
3A11TB2-4	3W8P1-6	3W8-22 Shield	-	
3A11TB2-7	3W8P1-7	3W8-23 Core	RG58A/U	
3A11TB2-8	3W8P1-4	3W8-24 Shield	-	
3A11TB2-3	3W8P2-9	3W8-25 Core	RG58A/U	
3A11TB2-4	3W8P2-6	3W8-26 Shield	-	
3A11TB2-7	3W8P2-7	3W8-27 Core	RG58A/U	
3A11TB2-8	3W8P2-4	3W8-28 Shield	-	
Ground	3W8P1-5	3W8-29 Black	20	
Ground	3W8P2-5	3W8-30 Black	20	
Ground	3W8P3-5	3W8-31 Black	20	
Ground	3W8P4-5	3W8-32 Black	20	
3TB7-2	3W8P1-8	3W8-33 Red	20	
3TB7-2	3W8P2-8	3W8-34 Red	20	
3TB2-2	3W8P3-8	3W8-35 Red	20	
3TB2-2	3W8P4-8	3W8-36 Red	20	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
3A12XF2-2	3W9P1-1	3W9-01	White	14	3W9P1 mates with 4A6J1
3A12XF2-2	3W9P1-2	3W9-02	White	14	
3A12XF2-2	3W9P1-3	3W9-03	White	14	
3A12XF1-2	3W9P2-1	3W9-04	White	14	3W9P2 mates with 4A7J1
3A12XF1-2	3W9P2-2	3W9-05	White	14	
3A12XF1-2	3W9P2-3	3W9-06	White	14	
3A15XF2-2	3W9P3-1	3W9-07	White	14	3W9P3 mates with 5A6J1
3A15XF2-2	3W9P3-2	3W9-08	White	14	
3A15XF2-2	3W9P3-3	3W9-09	White	14	
3A15XF1-2	3W9P4-1	3W9-10	White	14	3W9P4 mates with 5A7J1
3A15XF1-2	3W9P4-2	3W9-11	White	14	
3A15XF1-2	3W9P4-3	3W9-12	White	14	
3A12TB2-2	3W9P1-9	3W9-13	Core	RG58A/U	
3A12TB2-1	3W9P1-6	3W9-14	Shield	-	
3A12TB2-6	3W9P1-7	3W9-15	Core	RG58A/U	
3A12TB2-5	3W9P1-4	3W9-16	Shield	-	
3A12TB2-2	3W9P2-9	3W9-17	Core	RG58A/U	
3A12TB2-1	3W9P2-6	3W9-18	Shield	-	
3A12TB2-6	3W9P2-7	3W9-19	Core	RG58A/U	
3A12TB2-5	3W9P2-4	3W9-20	Shield	-	
3A15TB2-2	3W9P3-9	3W9-21	Core	RG58A/U	
3A15TB2-1	3W9P3-6	3W9-22	Shield	-	
3A15TB2-6	3W9P3-7	3W9-23	Core	RG58A/U	
3A15TB2-5	3W9P3-4	3W9-24	Shield	-	
3A15TB2-2	3W9P4-9	3W9-25	Core	RG58A/U	
3A15TB2-1	3W9P4-6	3W9-26	Shield	-	
3A15TB2-6	3W9P4-7	3W9-27	Core	RG58A/U	
3A15TB2-5	3W9P4-4	3W9-28	Shield	-	
Ground	3W9P1-5	3W9-29	Black	20	
Ground	3W9P2-5	3W9-30	Black	20	
Ground	3W9P3-5	3W9-31	Black	20	
Ground	3W9P4-5	3W9-32	Black	20	
3TB7-3	3W9P1-8	3W9-33	Red	20	
3TB7-3	3W9P2-8	3W9-34	Red	20	
3TB2-3	3W9P3-8	3W9-35	Red	20	
3TB2-3	3W9P4-8	3W9-36	Red	20	
3A15XF4-2	3W10P3-1	3W10-01	White	14	3W10P3 mates with 5A9J1
3A15XF4-2	3W10P3-2	3W10-02	White	14	
3A15XF4-2	3W10P3-3	3W10-03	White	14	
3A15XF3-2	3W10P4-1	3W10-04	White	14	3W10P4 mates with 5A10J1
3A15XF3-2	3W10P4-2	3W10-05	White	14	
3A15XF3-2	3W10P4-3	3W10-06	White	14	
3A12XF4-2	3W10P1-1	3W10-07	White	14	3W10P1 mates with 4A9J1
3A12XF4-2	3W10P1-2	3W10-08	White	14	
3A12XF4-2	3W10P1-3	3W10-09	White	14	
3A12XF3-2	3W10P2-1	3W10-10	White	14	3W10P2 mates with 4A10J1
3A12XF3-2	3W10P2-2	3W10-11	White	14	
3A12XF3-2	3W10P2-3	3W10-12	White	14	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A15TB2-3	3W10P3-9	3W10-13 Core	RG58A/U	
3A15TB2-4	3W10P3-6	3W10-14 Shield	-	
3A15TB2-7	3W10P3-7	3W10-15 Core	RG58A/U	
3A15TB2-8	3W10P3-4	3W10-16 Shield	-	
3A15TB2-3	3W10P4-9	3W10-17 Core	RG58A/U	
3A15TB2-4	3W10P4-6	3W10-18 Shield	-	
3A15TB2-7	3W10P4-7	3W10-19 Core	RG58A/U	
3A15TB2-8	3W10P4-4	3W10-20 Shield	-	
3A12TB2-3	3W10P1-9	3W10-21 Core	RG58A/U	
3A12TB2-4	3W10P1-6	3W10-22 Shield	-	
3A12TB2-7	3W10P1-7	3W10-23 Core	RG58A/U	
3A12TB2-8	3W10P1-4	3W10-24 Shield	-	
3A12TB2-3	3W10P2-9	3W10-25 Core	RG58A/U	
3A12TB2-4	3W10P2-6	3W10-26 Shield	-	
3A12TB2-7	3W10P2-7	3W10-27 Core	RG58A/U	
3A12TB2-8	3W10P2-4	3W10-28 Shield	-	
Ground	3W10P1-5	3W10-29 Black	20	
Ground	3W10P2-5	3W10-30 Black	20	
Ground	3W10P3-5	3W10-31 Black	20	
Ground	3W10P4-5	3W10-32 Black	20	
3TB7-4	3W10P1-8	3W10-33 Red	20	
3TB7-4	3W10P2-8	3W10-34 Red	20	
3TB2-4	3W10P3-8	3W10-35 Red	20	
3TB2-4	3W10P4-8	3W10-36 Red	20	
3A13XF2-2	3W11P1-1	3W11-01 White	14	3W11P1 mates with 4A11J1
3A13XF2-2	3W11P1-2	3W11-02 White	14	
3A13XF2-2	3W11P1-3	3W11-03 White	14	
3A13XF1-2	3W11P2-1	3W11-04 White	14	3W11P2 mates with 4A12J1
3A13XF1-2	3W11P2-2	3W11-05 White	14	
3A13XF1-2	3W11P2-3	3W11-06 White	14	
3A16XF2-2	3W11P3-1	3W11-07 White	14	3W11P3 mates with 5A11J1
3A16XF2-2	3W11P3-2	3W11-08 White	14	
3A16XF2-2	3W11P3-3	3W11-09 White	14	
3A16XF1-2	3W11P4-1	3W11-10 White	14	3W11P4 mates with 5A12J1
3A16XF1-2	3W11P4-2	3W11-11 White	14	
3A16XF1-2	3W11P4-3	3W11-12 White	14	
3A13TB2-2	3W11P1-9	3W11-13 Core	RG58A/U	
3A13TB2-1	3W11P1-6	3W11-14 Shield	-	
3A13TB2-6	3W11P1-7	3W11-15 Core	RG58A/U	
3A13TB2-5	3W11P1-4	3W11-16 Shield	-	
3A13TB2-2	3W11P2-9	3W11-17 Core	RG58A/U	
3A13TB2-1	3W11P2-6	3W11-18 Shield	-	
3A13TB2-6	3W11P2-7	3W11-19 Core	RG58A/U	
3A13TB2-5	3W11P2-4	3W11-20 Shield	-	
3A16TB2-2	3W11P3-9	3W11-21 Core	RG58A/U	
3A16TB2-1	3W11P3-6	3W11-22 Shield	-	
3A16TB2-6	3W11P3-7	3W11-23 Core	RG58A/U	
3A16TB2-5	3W11P3-4	3W11-24 Shield	-	

Table 6-1 Wiring List - Cabinet-to-Cabinet Interconnection (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3A16TB2-2	3W11P4-9	3W11-25 Core	RG58A/U	
3A16TB2-1	3W11P4-6	3W11-26 Shield	-	
3A16TB2-6	3W11P4-7	3W11-27 Core	RG58A/U	
3A16TB2-5	3W11P4-4	3W11-28 Shield	-	
Ground	3W11P1-5	3W11-29 Black	20	
Ground	3W11P2-5	3W11-30 Black	20	
Ground	3W11P3-5	3W11-31 Black	20	
Ground	3W11P4-5	3W11-32 Black	20	
3TB7-5	3W11P1-8	3W11-33 Red	20	
3TB7-5	3W11P2-8	3W11-34 Red	20	
3TB2-5	3W11P3-8	3W11-35 Red	20	
3TB2-5	3W11P4-8	3W11-36 Red	20	
3A16XF4-2	3W12P3-1	3W12-01 White	14	3W12P3 mates with 5A14J1
3A16XF4-2	3W12P3-2	3W12-02 White	14	
3A16XF4-2	3W12P3-3	3W12-03 White	14	
3A16XF3-2	3W12P4-1	3W12-04 White	14	3W12P4 mates with 5A15J1
3A16XF3-2	3W12P4-2	3W12-05 White	14	
3A16XF3-2	3W12P4-3	3W12-06 White	14	
3A13XF4-2	3W12P1-1	3W12-07 White	14	3W12P1 mates with 4A14J1
3A13XF4-2	3W12P1-2	3W12-08 White	14	
3A13XF4-2	3W12P1-3	3W12-09 White	14	
3A13XF3-2	3W12P2-1	3W12-10 White	14	3W12P2 mates with 4A15J1
3A13XF3-2	3W12P2-2	3W12-11 White	14	
3A13XF3-2	3W12P2-3	3W12-12 White	14	
3A16TB2-3	3W12P3-9	3W12-13 Core	RG58A/U	
3A16TB2-4	3W12P3-6	3W12-14 Shield	-	
3A16TB2-7	3W12P3-7	3W12-15 Core	RG58A/U	
3A16TB2-8	3W12P3-4	3W12-16 Shield	-	
3A16TB2-3	3W12P4-9	3W12-17 Core	RG58A/U	
3A16TB2-4	3W12P4-6	3W12-18 Shield	-	
3A16TB2-7	3W12P4-7	3W12-19 Core	RG58A/U	
3A16TB2-8	3W12P4-4	3W12-20 Shield	-	
3A13TB2-3	3W12P1-9	3W12-21 Core	RG58A/U	
3A13TB2-4	3W12P1-6	3W12-22 Shield	-	
3A13TB2-7	3W12P1-7	3W12-23 Core	RG58A/U	
3A13TB2-8	3W12P1-4	3W12-24 Shield	-	
3A13TB2-3	3W12P2-9	3W12-25 Core	RG58A/U	
3A13TB2-4	3W12P2-6	3W12-26 Shield	-	
3A13TB2-7	3W12P2-7	3W12-27 Core	RG58A/U	
3A13TB2-8	3W12P2-4	3W12-28 Shield	-	
Ground	3W12P1-5	3W12-29 Black	20	
Ground	3W12P2-5	3W12-30 Black	20	
Ground	3W12P3-5	3W12-31 Black	20	
Ground	3W12P4-5	3W12-32 Black	20	
3TB7-6	3W12P1-8	3W12-33 Red	20	
3TB7-6	3W12P2-8	3W12-34 Red	20	
3TB2-6	3W12P3-8	3W12-35 Red	20	
3TB2-6	3W12P4-8	3W12-36 Red	20	

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3P6-1	3P8-1	1 White	20	
3P8-1	3P3-AA	2 White	20	
3P6-3	3P8-3	3 White	20	
3P8-3	3P3-CC	4 White	20	
3P6-2	3P8-2	5 White	20	
3P8-2	3P3-N	6 White	20	
3P6-4	3P3-L	7 White	20	
3P6-5	3P3-F	8 White	20	
3P6-6	3P3-K	9 White	20	
3P6-7	3P3-J	10 White	20	
3P6-8	3P3-H	11 White	20	
3P8-4	3P3-C	12 White	20	
3P8-5	3P3-A	13 White	20	
3P8-6	3P3-E	14 White	20	
3P8-7	3P3-D	15 White	20	
3P8-8	3P3-B	16 White	20	
3P5-4	3P7-4	17 White	22	2-Conductor,
3P5-7	3P7-7	18 Black	22	Shielded
3P5-5	3P7-5	- Shield	-	
3P7-4	3P3-V	19 White	22	2-Conductor,
3P7-7	3P3-S	20 Black	22	Shielded
3P7-5	3P3-R	- Shield	-	
3P5-3	3P7-3	21 Red	22	3-Conductor,
3P5-6	3P7-6	22 White	22	Shielded
3P5-9	3P7-9	23 Black	22	
3P5-8	3P7-8	- Shield	-	
3P7-3	3P3-DD	24 Red	22	3-Conductor,
3P7-6	3P3-Z	25 White	22	Shielded
3P7-9	3P3-Y	26 Black	22	
3P7-8	3P3-EE	- Shield	-	
3P5-1	3P7-1	27 White	20	
3P7-1	3P3-BB	28 White	20	
3P5-2	3P7-2	29 White	20	
3P7-2	3XF1-1	30 White	16	
3P4-X	3R1-2	31 White	20	
3P4-T	3R1-3	32 White	20	
3P4-Y	3R2-2	33 White	20	
3P4-U	3R2-3	34 White	20	
3P4-Z	3R3-2	35 White	20	
3P4-V	3R3-3	36 White	20	
3P4-AA	3R4-2	37 White	20	
3P4-W	3R4-3	38 White	20	
3P4-A	3S1-1	39 White	20	
$ 3P4-B	6S1-1	40 White	20	
3P4-R	3XF1-1	41 White	16	
3P4-C	3TB1-1	42 White	20	
3P4-D	3TB6-1	43 White	20	
3P4-E	3TB7-1	44 White	20	
3P4-F	3TB2-1	45 White	20	

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
$ 3P4-L	3P9-Center	46	Core	RG188A/U	3P9 mates with 6A1A1J3
3P4-N	3P9-Shell	-	Shield		
$ 3P4-K	3P10-Center	47	Core	RG188A/U	3P10 mates with 6A1A1J2
3P4-N	3P10-Shell	-	Shield		
3P4-MM	3TB5-2	48	Grey	18	
3P4-SS	3TB5-3	49	Grey	18	
3P4-TT	3TB5-4	50	Grey	18	
3P1-1	3XF2-2	51	White	20	
3P1-2	3XF2-2	52	White	20	
3P1-3	3XF2-2	53	White	20	
3P2-1	3XF3-2	54	White	20	
3P2-2	3XF3-2	55	White	20	
3P2-3	3XF3-2	56	White	20	
3P1-4	3A5TB1-2	57	White	20	
3P1-5	3A6TB1-2	58	White	20	
3P1-6	3A7TB1-2	59	White	20	
3P1-7	3A8TB1-2	60	White	20	
3P1-8	3A9TB1-2	61	White	20	
3P1-9	3A10TB1-2	62	White	20	
3P2-4	3A11TB1-2	63	White	20	
3P2-5	3A12TB1-2	64	White	20	
3P2-6	3A13TB1-2	65	White	20	
3P2-7	3A14TB1-2	66	White	20	
3P2-8	3A15TB1-2	67	White	20	
3P2-9	3A16TB1-2	68	White	20	
3P6-2	3A14TB1-3	69	White	20	
3P6-9	3P8-9	70	White	20	
3P6-9	3P3-X	71	White	20	
3A5TB1-3	3A11TB1-3	72	White	20	
3A8TB1-3	3A15TB1-3	73	White	20	
3A6TB1-3	3A12TB1-3	74	White	20	
3A9TB1-3	3A16TB1-3	75	White	20	
3A7TB1-3	3A13TB1-3	76	White	20	
3XF1-2	3TB10-5	77	White	16	
3TB3-2	3P11-Center	78	White	14	3P11 mates with 3A3A4J1
3TB3-1	3P11-Shell	-	Shield	-	
3TB8-2	3P12-Center	79	White	14	3P12 mates with 3A3A4J2
3TB8-1	3P12-Shell	-	Shield	-	
3TB3-9	3P15-Center	80	White	14	3P15 mates with 3A4A4J1
3TB3-10	3P15-Shell	-	Shield	-	
3TB8-9	3P16-Center	81	White	14	3P16 mates with 3A4A4J2
3TB8-10	3P16-Shell	-	Shield	-	
3TB4-1	3P13-Center	82	Core	RG188A/U	3P13 mates with 3A3J3
3TB4-2	3P13-Shell	-	Shield		
3TB9-1	3P14-Center	83	Core	RG188A/U	3P14 mates with 3A3J4
3TB9-2	3P14-Shell	-	Shield		
3TB4-1	3P17-Center	84	Core	RG188A/U	3P17 mates with 3A4J3
3TB4-2	3P17-Shell	-	Shield		

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
3TB9-1	3P18-Center	85 Core	RG188A/U	3P18 mates with 3A4J4
3TB9-2	3P18-Shell	- Shield		
3TB4-1	3P36-Center	86 Core	RG188A/U	3P36 mates with 3A13A1J2
3TB4-2	3P36-Shell	- Shield		
3TB9-1	3P30-Center	87 Core	RG188A/U	3P30 mates with 3A10A1J2
3TB9-2	3P30-Shell	- Shield		
3TB3-2	3P19-Center	88 Core	RG188A/U	3P19 mates with 3A5J1
3TB3-1	3P19-Shell	- Shield		
3TB3-3	3P25-Center	89 Core	RG188A/U	3P25 mates with 3A8J1
3TB3-4	3P25-Shell	- Shield		
3TB3-5	3P21-Center	90 Core	RG188A/U	3P21 mates with 3A6J1
3TB3-4	3P21-Shell	- Shield		
3TB3-6	3P27-Center	91 Core	RG188A/U	3P27 mates with 3A9J1
3TB3-7	3P27-Shell	- Shield		
3TB3-8	3P23-Center	92 Core	RG188A/U	3P23 mates with 3A7J1
3TB3-7	3P23-Shell	- Shield		
3TB3-9	3P29-Center	93 Core	RG188A/U	3P29 mates with 3A10J1
3TB3-10	3P29-Shell	- Shield		
3TB8-2	3P37-Center	94 Core	RG188A/U	3P37 mates with 3A14J1
3TB8-1	3P37-Shell	- Shield		
3TB8-3	3P31-Center	95 Core	RG188A/U	3P31 mates with 3A11J1
3TB8-4	3P31-Shell	- Shield		
3TB8-5	3P39-Center	96 Core	RG188A/U	3P39 mates with 3A15J1
3TB8-4	3P39-Shell	- Shield		
3TB8-6	3P33-Center	97 Core	RG188A/U	3P33 mates with 3A12J1
3TB8-7	3P33-Shell	- Shield		
3TB8-8	3P41-Center	98 Core	RG188A/U	3P41 mates with 3A16J1
3TB8-7	3P41-Shell	- Shield		
3TB8-9	3P35-Center	99 Core	RG188A/U	3P35 mates with 3A13J1
3TB8-10	3P35-Shell	- Shield		
3XF2-1	3R2-4	100 White	14	
3TB10-1	3L5-2	101 White	14	
3TB10-3	3L8-2	102 White	14	
3XF3-1	3R3-4	103 White	14	
3P56-1	3E3	- Black	-	3P56 mates with 3B1
3P56-2	3E4	- Black	-	
3TB5-1	3E3	104 Grey	18	
3TB5-2	3E4	105 Grey	18	
-	-	106 Not used		
-	-	107 Not used		
-	-	108 Not used		
-	-	109 Not used		
3P55-1	Ground	110 Black	20	
$ 3P55-2	6XF3-Center	111 Gray	20	
3P55-3	3TB5-2	112 Gray	20	
3P55-4	3XF1-1	113 White	20	
-	-	114 Not used		
-	-	115 Not used		
-	-	116 Not used		

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
-	-	117	Not used		
-	-	118	Not used		
3P43-Center	3P44-Center	119	Core	RG188A/U	3P43 mates with 3A3J5
3P43-Shell	3P44-Shell	-	Shield	-	3P44 mates with 3A2J5
3P45-Center	3P46-Center	120	Core	RG188A/U	3P45 mates with 3A4J5
3P45-Shell	3P46-Shell	-	Shield	-	3P46 mates with 3A2J6
-	-	121	Not used		
3TB8-9	3P47-Center	122	Core	RG188A/U	3P47 mates with 3A2A3J13
3TB8-10	3P47-Shell	-	Shield		
$ 3P48-Center	3P49-Center	123	White	14	3P48 mates with 3A2A1J1
3P48-Shell	3P49-Shell	-	Shield	-	3P49 mates with 6A1A2J1
3P51-Center	3P52-Center	124	Core	RG188A/U	3P51 mates with 3A3J8
3P51-Shell	3P52-Shell	-	Shield	-	3P52 mates with 3A4J8
$ 3P51-Center	3P50	125	Core	RG188A/U	3P50 mates with 2A7J1
3P51-Shell	Not Connected	-	Shield		
$ 3P4-BB	4TB1-6	126	White	20	
$ 3P4-BB	2TB1-6	127	White	20	
-	-	128	Not used		
-	-	129	Not used		
-	-	130	Not used		
-	-	131	Not used		
-	-	132	Not used		
-	-	133	Not used		
-	-	134	Not used		
-	-	135	Not used		
-	-	136	Not used		
-	-	137	Not used		
-	-	138	Not used		
-	-	139	Not used		
-	-	140	Not used		
-	-	141	Not used		
-	-	142	Not used		
3L1-2	3A5K1-5	143	White	10	
3L1-2	3A5K1-6	144	White	10	
3L1-2	3A5K2-5	145	White	10	
3L1-2	3A5K2-6	146	White	10	
3L2-2	3A6K1-5	147	White	10	
3L2-2	3A6K1-6	148	White	10	
3L2-2	3A6K2-5	149	White	10	
3L2-2	3A6K2-6	150	White	10	
3L3-2	3A7K1-5	151	White	10	
3L3-2	3A7K1-6	152	White	10	
3L3-2	3A7K2-5	153	White	10	
3L3-2	3A7K2-6	154	White	10	
3L4-2	3A8K1-5	155	White	10	
3L4-2	3A8K1-6	156	White	10	
3L4-2	3A8K2-5	157	White	10	
3L4-2	3A8K2-6	158	White	10	

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
3L5-2	3A9K1-5	159	White	10	
3L5-2	3A9K1-6	160	White	10	
3L5-2	3A9K2-5	161	White	10	
3L5-2	3A9K2-6	162	White	10	
3L6-2	3A10K1-5	163	White	10	
3L6-2	3A10K1-6	164	White	10	
3L6-2	3A10K2-5	165	White	10	
3L6-2	3A10K2-6	166	White	10	
3L7-2	3A11K1-5	167	White	10	
3L7-2	3A11K1-6	168	White	10	
3L7-2	3A11K2-5	169	White	10	
3L7-2	3A11K2-6	170	White	10	
3L8-2	3A12K1-5	171	White	10	
3L8-2	3A12K1-6	172	White	10	
3L8-2	3A12K2-5	173	White	10	
3L8-2	3A12K2-6	174	White	10	
3L9-2	3A13K1-5	175	White	10	
3L9-2	3A13K1-6	176	White	10	
3L9-2	3A13K2-5	177	White	10	
3L9-2	3A13K2-6	178	White	10	
3L10-2	3A14K1-5	179	White	10	
3L10-2	3A14K1-6	180	White	10	
3L10-2	3A14K2-5	181	White	10	
3L10-2	3A14K2-6	182	White	10	
3L11-2	3A15K1-5	183	White	10	
3L11-2	3A15K1-6	184	White	10	
3L11-2	3A15K2-5	185	White	10	
3L11-2	3A15K2-6	186	White	10	
3L12-2	3A16K1-5	187	White	10	
3L12-2	3A16K1-6	188	White	10	
3L12-2	3A16K2-5	189	White	10	
3L12-2	3A16K2-6	190	White	10	
3R1-4	3L1-1	191	White	2	
3R1-4	3L2-1	192	White	2	
3R1-4	3L3-1	193	White	2	
3R2-4	3L4-1	194	White	2	
3R2-4	3L5-1	195	White	2	
3R2-4	3L6-1	196	White	2	
3R3-4	3L7-1	197	White	2	
3R3-4	3L8-1	198	White	2	
3R3-4	3L9-1	199	White	2	
3R4-4	3L10-1	200	White	2	
3R4-4	3L11-1	201	White	2	
3R4-4	3L12-1	202	White	2	
3P36-Center	3P42-Center	203	Core	RG188A/U	3P36 mates with 3A13A1J2
3P36-Shell	3P42-Shell	-	Shield		3P42 mates with 3A16A1J2
3P42-Center	3P34-Center	204	Core	RG188A/U	3P34 mates with 3A12A1J2
3P42-Shell	3P34-Shell	-	Shield		

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
3P34-Center	3P40-Center	205	Core	RG188A/U	3P40 mates with 3A15A1J2
3P34-Shell	3P40-Shell	-	Shield		
3P40-Center	3P32-Center	206	Core	RG188A/U	3P32 mates with 3A11A1J2
3P40-Shell	3P32-Shell	-	Shield		
3P32-Center	3P38-Center	207	Core	RG188A/U	3P38 mates with 3A14A1J2
3P32-Shell	3P38-Shell	-	Shield		
3P30-Center	3P24-Center	208	Core	RG188A/U	3P30 mates with 3A10A1J2
3P30-Shell	3P24-Shell	-	Shield		3P24 mates with 3A7A1J2
3P24-Center	3P28-Center	209	Core	RG188A/U	3P28 mates with 3A9A1J2
3P24-Shell	3P28-Shell	-	Shield		
3P28-Center	3P22-Center	210	Core	RG188A/U	3P22 mates with 3A6A1J2
3P28-Shell	3P22-Shell	-	Shield		
3P22-Center	3P26-Center	211	Core	RG188A/U	3P26 mates with 3A8A1J2
3P22-Shell	3P26-Shell	-	Shield		
3P26-Center	3P20-Center	212	Core	RG188A/U	3P20 mates with 3A5A1J2
3P26-Shell	3P20-Shell	-	Shield		
3P53-Black	3TB5-3	213	Black		3P53 mates with 3A3J6
3P53-White	3TB5-1	214	White		
3P53-Green	Ground	215	Green		
3P54-Black	3TB5-4	216	Black		3P54 mates with 3A4J6
3P54-White	3TB5-1	217	White		
3P54-Green	Ground	218	Green		
3P3-AA	3P3-M	-	White	20	Jumper
3A14TB1-3	3A5TB1-3	-	White	20	Jumper
3A11TB1-3	3A8TB1-3	-	White	20	Jumper
3A15TB1-3	3A6TB1-3	-	White	20	Jumper
3A12TB1-3	3A9TB1-3	-	White	20	Jumper
3A16TB1-3	3A7TB1-3	-	White	20	Jumper
3A13TB1-3	3A10TB1-3	-	White	20	Jumper
3TB1-1	3TB1-2	-	Red	20	Jumper
3TB1-2	3TB1-3	-	Red	20	Jumper
3TB1-3	3TB1-4	-	Red	20	Jumper
3TB1-4	3TB1-5	-	Red	20	Jumper
3TB1-5	3TB1-6	-	Red	20	Jumper
3TB2-1	3TB2-2	-	Red	20	Jumper
3TB2-2	3TB2-3	-	Red	20	Jumper
3TB2-3	3TB2-4	-	Red	20	Jumper
3TB2-4	3TB2-5	-	Red	20	Jumper
3TB2-5	3TB2-6	-	Red	20	Jumper
3TB6-1	3TB6-2	-	Red	20	Jumper
3TB6-2	3TB6-3	-	Red	20	Jumper
3TB6-3	3TB6-4	-	Red	20	Jumper
3TB6-4	3TB6-5	-	Red	20	Jumper
3TB6-5	3TB6-6	-	Red	20	Jumper
3TB7-1	3TB7-2	-	Red	20	Jumper
3TB7-2	3TB7-3	-	Red	20	Jumper
3TB7-3	3TB7-4	-	Red	20	Jumper
3TB7-4	3TB7-5	-	Red	20	Jumper
3TB7-5	3TB7-6	-	Red	20	Jumper

Table 6-2 Wiring List - NAR69 Control/Monitor Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
3TB3-1	3TB3-4	-	Black	20	Jumper
3TB3-4	3TB3-7	-	Black	20	Jumper
3TB3-7	3TB3-10	-	Black	20	Jumper
3TB3-2	3TB3-3	-	-		Link
3TB3-5	3TB3-6	-	-		Link
3TB3-8	3TB3-9	-	-		Link
3TB3-3	3TB3-5	-	White	20	Jumper
3TB3-6	3TB3-8	-	White	20	Jumper
3TB8-1	3TB8-4	-	Black	20	Jumper
3TB8-4	3TB8-7	-	Black	20	Jumper
3TB8-7	3TB8-10	-	Black	20	Jumper
3TB8-2	3TB8-3	-	-		Link
3TB8-5	3TB8-6	-	-		Link
3TB8-8	3TB8-9	-	-		Link
3TB8-3	3TB8-5	-	White	20	Jumper
3TB8-6	3TB8-8	-	White	20	Jumper

$ Denotes destination is not in control/monitor cabinet

Table 6-3 Wiring List - NAR70 15 kW Power Block Cabinet

SOURCE	DESTINATION	CODE		SIZE	REMARKS
P7-1	E1	-	Black	-	Lead of P7
P8-1	E1	-	Black	-	Lead of P8
P9-1	E1	-	Black	-	Lead of P9
P10-1	E1	-	Black	-	Lead of P10
TB1-1	E1	1	Grey	18	
P11-1	E3	-	Black	-	Lead of P11
P12-1	E3	-	Black	-	Lead of P12
P13-1	E3	-	Black	-	Lead of P13
P14-1	E3	-	Black	-	Lead of P14
TB1-2	E3	2	Grey	18	
P15-1	E5	-	Black	-	Lead of P15
P16-1	E5	-	Black	-	Lead of P16
P17-1	E5	-	Black	-	Lead of P17
P18-1	E5	-	Black	-	Lead of P18
TB1-3	E5	3	Grey	18	
P7-2	E2	-	Black	-	Lead of P7
P8-2	E2	-	Black	-	Lead of P8
P9-2	E2	-	Black	-	Lead of P9
P10-2	E2	-	Black	-	Lead of P10
TB1-5	E2	4	Grey	18	
P11-2	E4	-	Black	-	Lead of P11
P12-2	E4	-	Black	-	Lead of P12
P13-2	E4	-	Black	-	Lead of P13
P14-2	E4	-	Black	-	Lead of P14
TB1-5	E4	5	Grey	18	
P15-2	E6	-	Black	-	Lead of P15
P16-2	E6	-	Black	-	Lead of P16
P17-2	E6	-	Black	-	Lead of P17
P18-2	E6	-	Black	-	Lead of P18
TB1-5	E6	6	Grey	18	
TB1-1	XK1-5	-	Grey	.18	
TB1-2	XK1-6	-	Grey	18	
TB1-3	XK1-7	-	Grey	18	
TB1-4	XF1-Center	-	Grey	18	
XF1-Center	XF2-Center	-	Grey	18	
XF2-Center	XF3-Center	-	Grey	18	
TB1-6	XK1-13	-	White	22	
XF1-Side	XK1-9	-	Grey	18	
XF2-Side	XK1-10	-	Grey	18	
XF3-Side	XK1-11	-	Grey	18	
TB1-Gnd	XK1-14	-	Black	22	
TB1-Gnd	Gnd front angle	-	Black	20	

NOTE: Prefix reference designation with reference designation of appropriate cabinet ('1', '2', '3' or '4')

Table 6-4 Wiring List - NAR72 Final Filter/Power Supply Cabinet

SOURCE	DESTINATION	CODE		SIZE	REMARKS
* 6XDS1-Anode	6XDS1-Cathode	QAP29	Diode	1N4938	6CR1 (See note)
* 6XDS2-Anode	6XDS2-Cathode	QAP29	Diode	1N4938	6CR2 (See note)
* 6XDS3-Anode	6XDS3-Cathode	QAP29	Diode	1N4938	6CR3 (See note)
* 6XDS4-Anode	6XDS4-Cathode	QAP29	Diode	1N4938	6CR4 (See note)
* 6XDS5-Anode	6XDS5-Cathode	QAP29	Diode	1N4938	6CR5 (See note)
* 6XDS6-Anode	6XDS6-Cathode	QAP29	Diode	1N4938	6CR6 (See note)
6TB1-4	6TB1-6	-	Grey	14	
6TB1-6	6TB1-8	-	Grey	14	
6TB1-3	6TB1-5	-	Grey/White	14	
6TB1-5	6TB1-7	-	Grey/White	14	
6TB1-4	6XF3-Side	-	Grey	18	
6TB1-6	6XF2-Side	-	Grey	14	
6TB1-8	6XF1-Side	-	Grey	14	
6TB1-2	Ground	-	Black	20	
6TB1-4	6TB2-6	-	Grey	18	
6TB1-3	6TB2-4	-	Grey/White	18	
6TB2-6	6TB2-5	-	Link	JB10	
6TB2-4	6TB2-3	-	Link	JB10	
6TB2-1	Ground	-	Black	20	
6TB2-1	6XK1-14	-	Black	20	
6TB2-2	6XK1-13	-	White	20	
6TB2-5	6XF5-Side	-	Grey	18	
6TB2-6	6XF4-Side	-	Grey	18	
6XF4-Center	6XK1-5	-	Grey	18	
6XF5-Center	6XK1-6	-	Grey	18	
6P1-1	6E1	-	Black	-	Lead of 6P1
6P2-1	6E1	-	Black	-	Lead of 6P2
6P3-1	6E1	-	Black	-	Lead of 6P3
6P4-1	6E1	-	Black	-	Lead of 6P4
6P9-1	6E1	-	Black	-	Lead of 6P9
6XK1-9	6E1	1	Grey	18	
6P5-1	6E3	-	Black	-	Lead of 6P5
6P6-1	6E3	-	Black	-	Lead of 6P6
6P7-1	6E3	-	Black	-	Lead of 6P7
6P8-1	6E3	-	Black	-	Lead of 6P8
6P10-1	6E3	-	Black	-	Lead of 6P10
6XK1-10	6E3	2	Grey	18	
6P1-2	6E2	-	Black	-	Lead of 6P1
6P2-2	6E2	-	Black	-	Lead of 6P2
6P3-2	6E2	-	Black	-	Lead of 6P3
6P4-2	6E2	-	Black	-	Lead of 6P4
6P9-2	6E2	-	Black	-	Lead of 6P9
6TB2-4	6E2	3	Grey	18	
6P5-2	6E4	-	Black	-	Lead of 6P5
6P6-2	6E4	-	Black	-	Lead of 6P6
6P7-2	6E4	-	Black	-	Lead of 6P7
6P8-2	6E4	-	Black	-	Lead of 6P8
6P10-2	6E4	-	Black	-	Lead of 6P10
6TB2-3	6E4	4	Grey	18	

Table 6-4 Wiring List - NAR72 Final Filter/Power Supply Cabinet (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
6S1-2	6S2-1	5	White	22	
6S2-2	6S3-1	6	White	22	
6XDS1-Anode	6XDS2-Anode	-	White	22	
6XDS2-Anode	6XDS3-Anode	-	White	22	
6XDS1-Cathode	6P11	-	White	22	
6XDS2-Cathode	6P12	-	White	22	
6XDS3-Cathode	6P13	-	White	22	
6XDS4-Anode	6XDS5-Anode	-	White	22	
6XDS5-Anode	6XDS6-Anode	-	White	22	
6XDS4-Cathode	6P14	-	White	22	
6XDS5-Cathode	6P15	-	White	22	
6XDS6-Cathode	6P16	-	White	22	
6A2T1 Gnd Stud	Chassis gnd	-	Black	2	Near 6A1 Filter
6A3T1 Gnd Stud	Chassis gnd	-	Black	2	Near 6A1 Filter

NOTE: Cathode of diode (6CR1 thru 6CR6) is connected to anode terminal of applicable LED socket (6XDS1 thru 6XDS6).

Table 6-5 Wiring List - NAC27 Control/Monitor Panel Assembly

SOURCE	DESTINATION	CODE		SIZE	REMARKS
S5-11	S5-12	RAP09	Resistor	1000 Ohms	R1
XDS2-Cathode	Ground	RAP09	Resistor	1000 Ohms	R2
XDS3-Cathode	Ground	RAP09	Resistor	1000 Ohms	R3
S3-7	S3-8	RD05	Resistor	6800 Ohms	R4
S1-1	J1-A	1	White	22	
S1-1	XDS1-Cathode	2	White	22	
XDS1-Anode	S5-12	3	White	22	
S5-11	S2-1	4	White	22	
S2-1	J1-C	5	White	22	
S1-2	J1-L	6	White	22	
S1-2	XDS2-Anode	7	White	22	
S2-3	XDS3-Anode	8	White	22	
S2-2	XDS7-Anode	9	White	22	
S2-5	J1-F	10	White	22	
S2-6	J1-H	11	White	22	
S2-4	S3-W1	12	White	22	
S3-2	J1-M	13	White	22	
S3-3	J1-N	14	White	22	
S2-8	J1-MM	15	Grey	18	
S2-9	J1-NN	16	Grey	18	
S2-7	S4-3	17	Grey	18	
S4-1	J1-PP	18	Grey	18	
S4-1	J1-SS	19	Grey	18	
S4-5	J1-RR	20	Grey	18	
S4-5	J1-TT	21	Grey	18	
S5-W1	M3 (+)	22	White	22	
S5-W2	M3 (-)	23	White	22	
S5-1	J1-T	24	White	22	
S5-2	J1-U	25	White	22	
S5-7	J1-X	26	White	22	
S5-8	J1-Y	27	White	22	
M2 (-)	J1-R	28	White	22	
A1-1	J1-P	29	White	22	
M4 (+)	J1-S	30	White	22	
XDS4-Cathode	J1-BB	31	White	22	
XDS5-Cathode	J1-CC	32	White	22	
XDS8-Cathode	J1-FF	33	White	22	
XDS9-Cathode	J1-HH	34	White	22	
XDS4-Anode	J1-D	35	White	22	
S5-3	J1-V	36	White	22	
S5-4	J1-W	37	White	22	
S5-9	J1-Z	38	White	22	
S5-10	J1-AA	39	White	22	
XDS6-Cathode	J1-DD	40	White	22	
XDS7-Cathode	J1-EE	41	White	22	
M4 (-)	S3-7	42	White	22	
S3-8	Ground	43	Black	22	
A1-2	S6-2	44	White	22	
A1-3	S6-4	45	White	22	

Table 6-5 Wiring List - NAC27 Control/Monitor Panel Assembly (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
A1-4	Ground	46 Black	22	
M2 (+)	Ground	47 Black	22	
J1-JJ	Ground	48 Black	22	
J1-E	XDS4-Anode	49 White	22	
J1-B	S2-1	50 White	22	
S3-2	J1-J	51 White	22	
S3-3	J1-K	52 White	22	
XDS4-Anode	XDS5-Anode	Tinned Copper	22	Jumper
XDS5-Anode	XDS6-Anode	Tinned Copper	22	Jumper
XDS6-Anode	XDS7-Anode	Tinned Copper	22	Jumper
XDS7-Anode	XDS8-Anode	Tinned Copper	22	Jumper
XDS8-Anode	XDS9-Anode	Tinned Copper	22	Jumper

Table 6-6 Wiring List - NAC29 Interface Panel Assembly

SOURCE	DESTINATION	CODE		SIZE	REMARKS
TT3	Ground	CB40	Capacitor	1800 pF	C1
TT7	Ground	CB40	Capacitor	1800 pF	C2
XF1-Center	Ground	CNP38	Capacitor	2.2 uF	C3
XF2-Center	Ground	CNP38	Capacitor	2.2 uF	C4
XF3-Center	Ground	CNP38	Capacitor	2.2 uF	C5
XF4-Center	Ground	CNP38	Capacitor	2.2 uF	C6
XF5-Center	Ground	CNP38	Capacitor	2.2 uF	C7
XF6-Center	Ground	CNP38	Capacitor	2.2 uF	C8
XF7-Center	Ground	CNP38	Capacitor	2.2 uF	C9
XF8-Center	Ground	CNP38	Capacitor	2.2 uF	C10
XF9-Center	Ground	CNP38	Capacitor	2.2 uF	C11
XF10-Center	Ground	CNP38	Capacitor	2.2 uF	C12
XF11-Center	Ground	CNP38	Capacitor	2.2 uF	C13
XF12-Center	Ground	CNP38	Capacitor	2.2 uF	C14
S3-3	Ground	CNP37	Capacitor	20 uF	C15
S12-3	Ground	CNP37	Capacitor	20 uF	C16
XK5-14 (Anode)	XK5-13 (Cathode)	QAP29	Diode	1N4938	CR1
XK5-12 (Anode)	XK5-9 (Cathode)	QAP29	Diode	1N4938	CR2
XK6-14 (Anode)	XK6-13 (Cathode)	QAP29	Diode	1N4938	CR3
XK6-12 (Anode)	XK6-9 (Cathode)	QAP29	Diode	1N4938	CR4
XK7-14 (Anode)	XK7-13 (Cathode)	QAP29	Diode	1N4938	CR5
XK7-12 (Anode)	XK7-9 (Cathode)	QAP29	Diode	1N4938	CR6
XK8-14 (Anode)	XK8-13 (Cathode)	QAP29	Diode	1N4938	CR7
XK8-12 (Anode)	XK8-9 (Cathode)	QAP29	Diode	1N4938	CR8
TT4	TT8	-	Inductor	1353 uH	L1
TT1	TT5	RC35	Resistor	680 Ohms	R1
TT2	TT6	RC35	Resistor	680 Ohms	R2
J4-A	P1-A	1	White	22	
J4-B	TB1-21	2	White	22	
J3-Z	P1-M	3	White	22	
J3-Y	P1-N	4	White	22	
J4-R	P1-R	5	White	22	
J4-Z	P1-Z	6	White	22	
J4-V	P1-V	7	White	22	
J4-AA	P1-AA	8	White	22	
J4-W	P1-W	9	White	22	
J4-X	P1-X	10	White	22	
J4-T	P1-T	11	White	22	
J4-Y	P1-Y	12	White	22	
J4-U	P1-U	13	White	22	
J4-MM	P1-MM	14	Grey	18	
J4-SS	P1-SS	15	Grey	18	
J4-TT	P1-TT	16	Grey	18	
J4-C	P2-12	17	White	22	
J4-D	P2-11	18	White	22	
J4-E	P2-10	19	White	22	
J4-F	P2-9	20	White	22	
P1-BB	P2-8	21	White	22	
P1-CC	P2-7	22	White	22	

Table 6-6 Wiring List - NAC29 Interface Panel Assembly (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
P1-DD	P2-5	23	White	22	
P1-EE	P2-4	24	White	22	
P1-HH	P3-1	25	White	22	
P1-FF	P4-2	26	White	22	
P1-P	J4-K	27	White	22	
P1-S	J4-L	28	White	22	
P1-L	XK1-B	29	White	22	
J3-A	P3-5	30	White	22	
J3-B	P3-6	31	White	22	
J3-C	P3-7	32	White	22	
J3-D	P3-8	33	White	22	
J3-E	P3-9	34	White	22	
J3-F	P3-3	35	White	22	
J3-H	P3-4	36	White	22	
J3-J	P3-10	37	White	22	
J3-K	P3-11	38	White	22	
J3-L	P3-12	39	White	22	
J3-M	P4-6	40	White	22	
J3-M	P6-4	41	White	22	
J3-N	P5-2	42	White	22	
J3-N	P4-4	43	White	22	
J3-S	P7-2	44	White	22	
J3-V	P5-1	45	White	22	
J3-CC	P5-3	46	White	22	
J3-Z	P6-2	47	White	22	
J3-Y	P6-1	48	White	22	
J3-X	P6-3	49	Black	22	
P1-C	XK6-10	50	White	22	
P1-D	XK6-5	51	White	22	
P1-PP	XK5-1	52	Grey	18	
P1-RR	XK5-5	53	Grey	18	
P1-NN	XK6-11	54	Grey	18	
P1-H	XK8-10	55	White	22	
P1-K	XK7-5	56	White	22	
P1-J	XK7-1	57	White	22	
J3-DD	TB1-22	58	White	22	
J1-1	S1-3	59	White	20	
J1-2	S2-3	60	White	20	
J1-3	S3-3	61	White	20	
J1-6	XF3-Side	62	White	20	
J1-5	XF2-Side	63	White	20	
J1-4	XF1-Side	64	White	20	
J2-7	XF10-Side	65	White	20	
J2-8	XF11-Side	66	White	20	
J2-9	XF12-Side	67	White	20	
J2-1	S7-3	68	White	20	
J2-2	S8-3	69	White	20	
J2-3	S9-3	70	White	20	
J1-7	XF4-Side	71	White	20	

Table 6-6 Wiring List - NAC29 Interface Panel Assembly (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
J1-8	XF5-Side	72	White	20	
J1-9	XF6-Side	73	White	20	
J2-6	XF9-Side	74	White	20	
J2-5	XF8-Side	75	White	20	
J2-4	XF7-Side	76	White	20	
XK5-14	TB1-2	77	Grey	18	
XK5-12	TB1-1	78	Grey	18	
XK6-14	TB1-3	79	White	22	
XK6-12	TB1-4	80	White	22	
XK7-14	TB1-8	81	White	22	
XK7-12	TB1-7	82	White	22	
XK8-14	TB1-6	83	White	22	
XK8-12	TB1-5	84	White	22	
P4-7	TB1-10	85	White	22	
P4-9	TB1-11	86	White	22	
P2-6	TB1-12	87	White	22	
P3-2	TB1-13	88	White	22	
P4-1	TB1-14	89	White	22	
P4-3	TB1-15	90	White	22	
TB1-17	T1-1	91	White	22	2 conductor
TB1-18	T1-4	92	Black	22	Shield
TB1-19	Ground near TB1	-	Shield		
XK8-13	TB1-9	93	White	22	
P7-1	P5-2	94	White	22	
S1-2	XK1-4	95	White	20	
P7-4	XK4-B	96	White	22	
S2-2	XK1-5	97	White	20	
P7-3	P5-4	98	White	22	
S3-2	XK1-6	99	White	20	
-	-	100	Not Used		
S4-2	XK2-4	101	White .	20	
-	-	102	Not Used		
S5-2	XK2-5	103	White	20	
-	-	104	Not Used		
S6-2	XK2-6	105	White	20	
-	-	106	Not Used		
S7-2	XK3-4	107	White	20	
-	-	108	Not Used		
S8-2	XK3-5	109	White	20	
-	-	110	Not Used		
S9-2	XK3-6	111	White	20	
-	-	112	Not Used		
S10-2	XK4-4	113	White	20	
-	-	114	Not Used		
S11-2	XK4-5	115	White	20	
-	-	116	Not Used		
S12-2	XK4-6	117	White	20	
J3-BB	XK1-B	118	White	20	
J4-K	P4-5	119	White	22	

Table 6-6 Wiring List - NAC29 Interface Panel Assembly (Continued)

SOURCE	DESTINATION	CODE		SIZE	REMARKS
J4-L	P4-8	120	White	22	
J3-CC	P1-F	121	White	22	
J3-AA	P1-E	122	White	22	
P1-B	TB1-20	123	White	22	
S1-3	S4-3	124	White	20	
S2-3	S5-3	125	White	20	
S3-3	S6-3	126	White	20	
S7-3	S10-3	127	White	20	
S8-3	S11-3	128	White	20	
S9-3	S12-3	129	White	20	
P1-JJ	Ground	130	Black	22	
XK1-7	XF1-Center	131	White	22	
XK1-8	XF2-Center	132	White	22	
XK1-9	XF3-Center	133	White	22	
XK2-7	XF4-Center	134	White	22	
XK2-8	XF5-Center	135	White	22	
XK2-9	XF6-Center	136	White	22	
XK3-7	XF7-Center	137	White	22	
XK3-8	XF8-Center	138	White	22	
XK3-9	XF9-Center	139	White	22	
XK4-7	XF10-Center	140	White	22	
XK4-8	XF11-Center	141	White	22	
XK4-9	XF12-Center	142	White	22	
XK6-8	XK5-10	143	Grey	18	
T1-2	T1-3	Tinned Copper		24	Jumper
T1-6	T1-7	Tinned Copper		24	Jumper
T1-8	T1-9	Tinned Copper		24	Jumper
T1-8	Ground	Tinned Copper		24	Jumper
TT 1	TT 2	Tinned Copper		24	Jumper
TT 2	TT 3	Tinned Copper		24	Jumper
TT 3	TT 4	Tinned Copper		24	Jumper
TT 5	J5-Center	Tinned Copper		24	Jumper
TT 6	J6-Center	Tinned Copper		24	Jumper
TT 7	TT 8	Tinned Copper		24	Jumper
TT 8	T1-5	Tinned Copper		24	Jumper
XK5-13	XK6-9	Tinned Copper		24	Jumper
XK5-9	XK5-13	Tinned Copper		24	Jumper
XK6-13	XK7-9	Tinned Copper		24	Jumper
XK6-9	XK6-13	Tinned Copper		24	Jumper
XK7-13	XK8-9	Tinned Copper		24	Jumper
XK7-9	XK7-13	Tinned Copper		24	Jumper
XK8-9	XK8-13	Tinned Copper		24	Jumper
J3-BB	J4-BB	-	White	20	Jumper
J3-EE	Ground	-	Black	20	Jumper
J3-R	Ground	-	Black	22	Jumper
J4-N	Ground	-	Black	20	Jumper
S1-1	Ground	-	Black	20	Jumper
S10-1	Ground	-	Black	20	Jumper
S11-1	Ground	-	Black	20	Jumper

Table 6-6 Wiring List - NAC29 Interface Panel Assembly (Continued)

SOURCE	DESTINATION	CODE	SIZE	REMARKS
S12-1	Ground	- Black	20	Jumper
S2-1	Ground	- Black	20	Jumper
S3-1	Ground	- Black	20	Jumper
S4-1	Ground	- Black	20	Jumper
S5-1	Ground	- Black	20	Jumper
S6-1	Ground	- Black	20	Jumper
S7-1	Ground	- Black	20	Jumper
S8-1	Ground	- Black	20	Jumper
S9-1	Ground	- Black	20	Jumper
TB1-16	Ground near TB1	- Black	20	Jumper
XK1-1	Ground	- Black	20	Jumper
XK1-2	Ground	- Black	20	Jumper
XK1-3	Ground	- Black	20	Jumper
XK1-A	XK2-A	- Black	22	Jumper
XK1-B	XK2-B	- White	22	Jumper
XK2-1	Ground	- Black	20	Jumper
XK2-2	Ground	- Black	20	Jumper
XK2-3	Ground	- Black	20	Jumper
XK2-A	XK3-A	- Black	22	Jumper
XK2-B	XK3-B	- White	22	Jumper
XK3-1	Ground	- Black	20	Jumper
XK3-2	Ground	- Black	20	Jumper
XK3-3	Ground	- Black	20	Jumper
XK3-A	XK4-A	- Black	22	Jumper
XK3-B	XK4-B	- White	22	Jumper
XK4-1	Ground	- Black	20	Jumper
XK4-2	Ground	- Black	20	Jumper
XK4-3	Ground	- Black	20	Jumper
XK4-A	Ground	- Black	22	Jumper
XK7-10	XK8-5	- White	22	Jumper

Table 6-7 Wiring List - NAX25 Relay Control Panel Assembly

SOURCE	DESTINATION	CODE	SIZE	REMARKS
P1-1	TB1-3	1 White	22	
P1-2	TB2-2	2 White	22	
-	-	3 Not Used		
P1-5	K2-2	4 White	22	
P1-6	R1-1	5 White	22	
R1-2	TB1-2	6 White	14	
P1-4	K1-1	7 White	22	
P1-7	R1-2	8 White	22	
P1-3	TB2-4	9 Black	22	
R1-1	XF1-1	- White	24	6 inch Jumper
R1-1	XF2-1	- White	24	6 inch Jumper
R1-1	XF3-1	- White	24	6 inch Jumper
R1-1	XF4-1	- White	24	6 inch Jumper
TB2-1	TB2-4	Tinned Copper	20	Jumper
TB2-4	TB2-5	Tinned Copper	20	Jumper
TB2-5	TB2-8	Tinned Copper	20	Jumper
TB2-8	Ground	Tinned Copper	20	Jumper
TB2-7	TB2-6	Tinned Copper	20	Jumper
TB2-2	TB2-3	Tinned Copper	20	Jumper
T1-1	J1-Center	- Core	18	Jumper
-	TB2-6	- Shield		Jumper
T1-2	TB2-7	- Core	18	Jumper
-	Ground	- Shield		Jumper
K2-4	XF1-1	Metal Strap		
K2-3	XF2-1	Metal Strap		
K1-4	XF3-1	Metal Strap		
K1-3	XF4-1	Metal Strap		
K1-2	K2-1	Metal Strap		
K1-1	R2-2	- White	22	Jumper

Table 6-8 Connector Mating Information - Sorted by Floating Connector

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
1P1	Plug, phono	1A3J5	Jack, phono
1P2	Plug, phono	1A8J5	Jack, phono
1P3	Plug, phono	1A13J5	Jack, phono
1P4	Plug, phono	3A2A3J1	Jack, phono
1P5	Plug, phono	3A2A3J2	Jack, phono
1P6	Plug, phono	3A2A3J3	Jack, phono
1P7	Plug, 2-socket (fan)	1A1B1	Part of fan
1P8	Plug, 2-socket (fan)	1A2B1	Part of fan
1P9	Plug, 2-socket (fan)	1A4B1	Part of fan
1P10	Plug, 2-socket (fan)	1A5B1	Part of fan
1P11	Plug, 2-socket (fan)	1A6B1	Part of fan
1P12	Plug, 2-socket (fan)	1A7B1	Part of fan
1P13	Plug, 2-socket (fan)	1A9B1	Part of fan
1P14	Plug, 2-socket (fan)	1A10B1	Part of fan
1P15	Plug, 2-socket (fan)	1A11B1	Part of fan
1P16	Plug, 2-socket (fan)	1A12B1	Part of fan
1P17	Plug, 2-socket (fan)	1A14B1	Part of fan
1P18	Plug, 2-socket (fan)	1A15B1	Part of fan
1W1P1	Plug, 2-socket	1A3J1	Receptacle, 2-pin
1W1P2	Plug, 2-socket	1A1J2	Receptacle, 2-pin
1W2P1	Plug, 2-socket	1A3J2	Receptacle, 2-pin
1W2P2	Plug, 2-socket	1A2J2	Receptacle, 2-pin
1W3P1	Plug, 2-socket	1A3J3	Receptacle, 2-pin
1W3P2	Plug, 2-socket	1A4J2	Receptacle, 2-pin
1W4P1	Plug, 2-socket	1A3J4	Receptacle, 2-pin
1W4P2	Plug, 2-socket	1A5J2	Receptacle, 2-pin
1W5P1	Plug, 2-socket	1A8J1	Receptacle, 2-pin
1W5P2	Plug, 2-socket	1A6J2	Receptacle, 2-pin
1W6P1	Plug, 2-socket	1A8J2	Receptacle, 2-pin
1W6P2	Plug, 2-socket	1A7J2	Receptacle, 2-pin
1W7P1	Plug, 2-socket	1A8J3	Receptacle, 2-pin
1W7P2	Plug, 2-socket	1A9J2	Receptacle, 2-pin
1W8P1	Plug, 2-socket	1A8J4	Receptacle, 2-pin
1W8P2	Plug, 2-socket	1A10J2	Receptacle, 2-pin
1W9P1	Plug, 2-socket	1A13J1	Receptacle, 2-pin
1W9P2	Plug, 2-socket	1A11J2	Receptacle, 2-pin
1W10P1	Plug, 2-socket	1A13J2	Receptacle, 2-pin
1W10P2	Plug, 2-socket	1A12J2	Receptacle, 2-pin
1W11P1	Plug, 2-socket	1A13J3	Receptacle, 2-pin
1W11P2	Plug, 2-socket	1A14J2	Receptacle, 2-pin
1W12P1	Plug, 2-socket	1A13J4	Receptacle, 2-pin
1W12P2	Plug, 2-socket	1A15J2	Receptacle, 2-pin
2P1	Plug, phono	2A3J5	Jack, phono
2P2	Plug, phono	2A8J5	Jack, phono
2P3	Plug, phono	2A13J5	Jack, phono
2P4	Plug, phono	3A2A3J4	Jack, phono
2P5	Plug, phono	3A2A3J5	Jack, phono

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
2P6	Plug, phono	3A2A3J6	Jack, phono
2P7	Plug, 2-socket (fan)	2A1B1	Part of fan
2P8	Plug, 2-socket (fan)	2A2B1	Part of fan
2P9	Plug, 2-socket (fan)	2A4B1	Part of fan
2P10	Plug, 2-socket (fan)	2A5B1	Part of fan
2P11	Plug, 2-socket (fan)	2A6B1	Part of fan
2P12	Plug, 2-socket (fan)	2A7B1	Part of fan
2P13	Plug, 2-socket (fan)	2A9B1	Part of fan
2P14	Plug, 2-socket (fan)	2A10B1	Part of fan
2P15	Plug, 2-socket (fan)	2A11B1	Part of fan
2P16	Plug, 2-socket (fan)	2A12B1	Part of fan
2P17	Plug, 2-socket (fan)	2A14B1	Part of fan
2P18	Plug, 2-socket (fan)	2A15B1	Part of fan
2W1P1	Plug, 2-socket	2A3J1	Receptacle, 2-pin
2W1P2	Plug, 2-socket	2A1J2	Receptacle, 2-pin
2W2P1	Plug, 2-socket	2A3J2	Receptacle, 2-pin
2W2P2	Plug, 2-socket	2A2J2	Receptacle, 2-pin
2W3P1	Plug, 2-socket	2A3J3	Receptacle, 2-pin
2W3P2	Plug, 2-socket	2A4J2	Receptacle, 2-pin
2W4P1	Plug, 2-socket	2A3J4	Receptacle, 2-pin
2W4P2	Plug, 2-socket	2A5J2	Receptacle, 2-pin
2W5P1	Plug, 2-socket	2A8J1	Receptacle, 2-pin
2W5P2	Plug, 2-socket	2A6J2	Receptacle, 2-pin
2W6P1	Plug, 2-socket	2A8J2	Receptacle, 2-pin
2W6P2	Plug, 2-socket	2A7J2	Receptacle, 2-pin
2W7P1	Plug, 2-socket	2A8J3	Receptacle, 2-pin
2W7P2	Plug, 2-socket	2A9J2	Receptacle, 2-pin
2W8P1	Plug, 2-socket	2A8J4	Receptacle, 2-pin
2W8P2	Plug, 2-socket	2A10J2	Receptacle, 2-pin
2W9P1	Plug, 2-socket	2A13J1	Receptacle, 2-pin
2W9P2	Plug, 2-socket	2A11J2	Receptacle, 2-pin
2W10P1	Plug, 2-socket	2A13J2	Receptacle, 2-pin
2W10P2	Plug, 2-socket	2A12J2	Receptacle, 2-pin
2W11P1	Plug, 2-socket	2A13J3	Receptacle, 2-pin
2W11P2	Plug, 2-socket	2A14J2	Receptacle, 2-pin
2W12P1	Plug, 2-socket	2A13J4	Receptacle, 2-pin
2W12P2	Plug, 2-socket	2A15J2	Receptacle, 2-pin
3A2P1	Plug, 36-bisexual pins	3A1J1	Receptacle, 36-bisexual pins
3A2P2	MTA, housing, 12-socket	3A2A2J1	MTA, header, 12-pin
3A2P3	MTA, housing, 12-socket	3A2A2J2	MTA, header, 12-pin
3A2P4	MTA, housing, 12-socket	3A2A2J3	MTA, header, 12-pin
3A2P5	MTA, housing, 4-socket	3A2A3J14	MTA, header, 4-pin
3A2P6	MTA, housing, 4-socket	3A2A1J3	MTA, header, 4-pin
3A2P7	MTA, housing, 4-socket	3A2A4J1	MTA, header, 4-pin
3P1	Plug, 9-pin	3A2J1	Receptacle, 9-socket
3P2	Plug, 9-socket	3A2J2	Receptacle, 9-pin
3P3	Plug, bisexual, 23-pin	3A2J3	Receptacle, bisexual, 23-pin

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
3P4	Plug, bisexual, 22-pin	3A2J4	Receptacle, bisexual, 22-pin
3P5	Plug, 9-pin	3A3J1	Receptacle, 9-socket
3P6	Plug, 9-socket	3A3J2	Receptacle, 9-pin
3P7	Plug, 9-pin	3A4J1	Receptacle, 9-socket
3P8	Plug, 9-socket	3A4J2	Receptacle, 9-pin
3P9	Plug, phono	6A1A1J3	Jack, phono
3P10	Plug, phono	6A1A1J2	Jack, phono
3P11	Plug, phono	3A3A4J1	Jack, phono
3P12	Plug, phono	3A3A4J2	Jack, phono
3P13	Plug, phono	3A3J3	Jack, phono
3P14	Plug, phono	3A3J4	Jack, phono
3P15	Plug, phono	3A4A4J1	Jack, phono
3P16	Plug, phono	3A4A4J2	Jack, phono
3P17	Plug, phono	3A4J3	Jack, phono
3P18	Plug, phono	3A4J4	Jack, phono
3P19	Plug, phono	3A5J1	Jack, phono
3P20	Plug, phono	3A5A1J2	Jack, phono
3P21	Plug, phono	3A6J1	Jack, phono
3P22	Plug, phono	3A6A1J2	Jack, phono
3P23	Plug, phono	3A7J1	Jack, phono
3P24	Plug, phono	3A7A1J2	Jack, phono
3P25	Plug, phono	3A8J1	Jack, phono
3P26	Plug, phono	3A8A1J2	Jack, phono
3P27	Plug, phono	3A9J1	Jack, phono
3P28	Plug, phono	3A9A1J2	Jack, phono
3P29	Plug, phono	3A10J1	Jack, phono
3P30	Plug, phono	3A10A1J2	Jack, phono
3P31	Plug, phono	3A11J1	Jack, phono
3P32	Plug, phono	3A11A1J2	Jack, phono
3P33	Plug, phono	3A12J1	Jack, phono
3P34	Plug, phono	3A12A1J2	Jack, phono
3P35	Plug, phono	3A13J1	Jack, phono
3P36	Plug, phono	3A13A1J2	Jack, phono
3P37	Plug, phono	3A14J1	Jack, phono
3P38	Plug, phono	3A14A1J2	Jack, phono
3P39	Plug, phono	3A15J1	Jack, phono
3P40	Plug, phono	3A15A1J2	Jack, phono
3P41	Plug, phono	3A16J1	Jack, phono
3P42	Plug, phono	3A16A1J2	Jack, phono
3P43	Plug, phono	3A3J5	Jack, phono
3P44	Plug, phono	3A2J5	Jack, phono
3P45	Plug, phono	3A4J5	Jack, phono
3P46	Plug, phono	3A2J6	Jack, phono
3P47	Plug, phono	3A2A3J13	Jack, phono
3P48	Plug, phono	3A2A1J1	Jack, phono
3P49	Plug, phono	6A1A2J1	Jack, phono
3P50	plug, 1-pin	2A7TP1	Jack, 1-pin

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
3P51	Plug, phono	3A3J8	Jack, phono
3P52	Plug, phono	3A4J8	Jack, phono
3P53	Plug, 115 Vac	3A3J6	Receptacle, 115 Vac
3P54	Plug, 115 Vac	3A4J6	Receptacle, 115 Vac
3P55	MTA housing, 4-socket	3A17J1	MTA, header, 4-pin
3P56	Plug, 2-socket (fan)	3B1	Part of fan
3W1P1	Plug, 9-socket	2A2J1	Receptacle, 9-pin
3W1P2	Plug, 9-socket	2A1J1	Receptacle, 9-pin
3W1P3	Plug, 9-socket	1A2J1	Receptacle, 9-pin
3W1P4	Plug, 9-socket	1A1J1	Receptacle, 9-pin
3W2P1	Plug, 9-socket	2A5J1	Receptacle, 9-pin
3W2P2	Plug, 9-socket	2A4J1	Receptacle, 9-pin
3W2P3	Plug, 9-socket	1A5J1	Receptacle, 9-pin
3W2P4	Plug, 9-socket	1A4J1	Receptacle, 9-pin
3W3P1	Plug, 9-socket	2A7J1	Receptacle, 9-pin
3W3P2	Plug, 9-socket	2A6J1	Receptacle, 9-pin
3W3P3	Plug, 9-socket	1A7J1	Receptacle, 9-pin
3W3P4	Plug, 9-socket	1A6J1	Receptacle, 9-pin
3W4P1	Plug, 9-socket	2A10J1	Receptacle, 9-pin
3W4P2	Plug, 9-socket	2A9J1	Receptacle, 9-pin
3W4P3	Plug, 9-socket	1A10J1	Receptacle, 9-pin
3W4P4	Plug, 9-socket	1A9J1	Receptacle, 9-pin
3W5P1	Plug, 9-socket	2A12J1	Receptacle, 9-pin
3W5P2	Plug, 9-socket	2A11J1	Receptacle, 9-pin
3W5P3	Plug, 9-socket	1A12J1	Receptacle, 9-pin
3W5P4	Plug, 9-socket	1A11J1	Receptacle, 9-pin
3W6P1	Plug, 9-socket	2A15J1	Receptacle, 9-pin
3W6P2	Plug, 9-socket	2A14J1	Receptacle, 9-pin
3W6P3	Plug, 9-socket	1A15J1	Receptacle, 9-pin
3W6P4	Plug, 9-socket	1A14J1	Receptacle, 9-pin
3W7P1	Plug, 9-socket	4A1J1	Receptacle, 9-pin
3W7P2	Plug, 9-socket	4A2J1	Receptacle, 9-pin
3W7P3	Plug, 9-socket	5A1J1	Receptacle, 9-pin
3W7P4	Plug, 9-socket	5A2J1	Receptacle, 9-pin
3W8P1	Plug, 9-socket	4A4J1	Receptacle, 9-pin
3W8P2	Plug, 9-socket	4A5J1	Receptacle, 9-pin
3W8P3	Plug, 9-socket	5A4J1	Receptacle, 9-pin
3W8P4	Plug, 9-socket	5A5J1	Receptacle, 9-pin
3W9P1	Plug, 9-socket	4A6J1	Receptacle, 9-pin
3W9P2	Plug, 9-socket	4A7J1	Receptacle, 9-pin
3W9P3	Plug, 9-socket	5A6J1	Receptacle, 9-pin
3W9P4	Plug, 9-socket	5A7J1	Receptacle, 9-pin
3W10P1	Plug, 9-socket	4A9J1	Receptacle, 9-pin
3W10P2	Plug, 9-socket	4A10J1	Receptacle, 9-pin
3W10P3	Plug, 9-socket	5A9J1	Receptacle, 9-pin
3W10P4	Plug, 9-socket	5A10J1	Receptacle, 9-pin
3W11P1	Plug, 9-socket	4A11J1	Receptacle, 9-pin

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
3W11P2	Plug, 9-socket	4A12J1	Receptacle, 9-pin
3W11P3	Plug, 9-socket	5A11J1	Receptacle, 9-pin
3W11P4	Plug, 9-socket	5A12J1	Receptacle, 9-pin
3W12P1	Plug, 9-socket	4A14J1	Receptacle, 9-pin
3W12P2	Plug, 9-socket	4A15J1	Receptacle, 9-pin
3W12P3	Plug, 9-socket	5A14J1	Receptacle, 9-pin
3W12P4	Plug, 9-socket	5A15J1	Receptacle, 9-pin
4P1	Plug, phono	4A3J5	Jack, phono
4P2	Plug, phono	4A8J5	Jack, phono
4P3	Plug, phono	4A13J5	Jack, phono
4P4	Plug, phono	3A2A3J7	Jack, phono
4P5	Plug, phono	3A2A3J8	Jack, phono
4P6	Plug, phono	3A2A3J9	Jack, phono
4P7	Plug, 2-socket (fan)	4A1B1	Part of fan
4P8	Plug, 2-socket (fan)	4A2B1	Part of fan
4P9	Plug, 2-socket (fan)	4A4B1	Part of fan
4P10	Plug, 2-socket (fan)	4A5B1	Part of fan
4P11	Plug, 2-socket (fan)	4A6B1	Part of fan
4P12	Plug, 2-socket (fan)	4A7B1	Part of fan
4P13	Plug, 2-socket (fan)	4A9B1	Part of fan
4P14	Plug, 2-socket (fan)	4A10B1	Part of fan
4P15	Plug, 2-socket (fan)	4A11B1	Part of fan
4P16	Plug, 2-socket (fan)	4A12B1	Part of fan
4P17	Plug, 2-socket (fan)	4A14B1	Part of fan
4P18	Plug, 2-socket (fan)	4A15B1	Part of fan
4W1P1	Plug, 2-socket	4A3J1	Receptacle, 2-pin
4W1P2	Plug, 2-socket	4A1J2	Receptacle, 2-pin
4W2P1	Plug, 2-socket	4A3J2	Receptacle, 2-pin
4W2P2	Plug, 2-socket	4A2J2	Receptacle, 2-pin
4W3P1	Plug, 2-socket	4A3J3	Receptacle, 2-pin
4W3P2	Plug, 2-socket	4A4J2	Receptacle, 2-pin
4W4P1	Plug, 2-socket	4A3J4	Receptacle, 2-pin
4W4P2	Plug, 2-socket	4A5J2	Receptacle, 2-pin
4W5P1	Plug, 2-socket	4A8J1	Receptacle, 2-pin
4W5P2	Plug, 2-socket	4A6J2	Receptacle, 2-pin
4W6P1	Plug, 2-socket	4A8J2	Receptacle, 2-pin
4W6P2	Plug, 2-socket	4A7J2	Receptacle, 2-pin
4W7P1	Plug, 2-socket	4A8J3	Receptacle, 2-pin
4W7P2	Plug, 2-socket	4A9J2	Receptacle, 2-pin
4W8P1	Plug, 2-socket	4A8J4	Receptacle, 2-pin
4W8P2	Plug, 2-socket	4A10J2	Receptacle, 2-pin
4W9P1	Plug, 2-socket	4A13J1	Receptacle, 2-pin
4W9P2	Plug, 2-socket	4A11J2	Receptacle, 2-pin
4W10P1	Plug, 2-socket	4A13J2	Receptacle, 2-pin
4W10P2	Plug, 2-socket	4A12J2	Receptacle, 2-pin
4W11P1	Plug, 2-socket	4A13J3	Receptacle, 2-pin
4W11P2	Plug, 2-socket	4A14J2	Receptacle, 2-pin

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
4W12P1	Plug, 2-socket	4A13J4	Receptacle, 2-pin
4W12P2	Plug, 2-socket	4A15J2	Receptacle, 2-pin
5P1	Plug, phono	5A3J5	Jack, phono
5P2	Plug, phono	5A8J5	Jack, phono
5P3	Plug, phono	5A13J5	Jack, phono
5P4	Plug, phono	3A2A3J10	Jack, phono
5P5	Plug, phono	3A2A3J11	Jack, phono
5P6	Plug, phono	3A2A3J12	Jack, phono
5P7	Plug, 2-socket (fan)	5A1B1	Part of fan
5P8	Plug, 2-socket (fan)	5A2B1	Part of fan
5P9	Plug, 2-socket (fan)	5A4B1	Part of fan
5P10	Plug, 2-socket (fan)	5A5B1	Part of fan
5P11	Plug, 2-socket (fan)	5A6B1	Part of fan
5P12	Plug, 2-socket (fan)	5A7B1	Part of fan
5P13	Plug, 2-socket (fan)	5A9B1	Part of fan
5P14	Plug, 2-socket (fan)	5A10B1	Part of fan
5P15	Plug, 2-socket (fan)	5A11B1	Part of fan
5P16	Plug, 2-socket (fan)	5A12B1	Part of fan
5P17	Plug, 2-socket (fan)	5A14B1	Part of fan
5P18	Plug, 2-socket (fan)	5A15B1	Part of fan
5W1P1	Plug, 2-socket	5A3J1	Receptacle, 2-pin
5W1P2	Plug, 2-socket	5A1J2	Receptacle, 2-pin
5W2P1	Plug, 2-socket	5A3J2	Receptacle, 2-pin
5W2P2	Plug, 2-socket	5A2J2	Receptacle, 2-pin
5W3P1	Plug, 2-socket	5A3J3	Receptacle, 2-pin
5W3P2	Plug, 2-socket	5A4J2	Receptacle, 2-pin
5W4P1	Plug, 2-socket	5A3J4	Receptacle, 2-pin
5W4P2	Plug, 2-socket	5A5J2	Receptacle, 2-pin
5W5P1	Plug, 2-socket	5A8J1	Receptacle, 2-pin
5W5P2	Plug, 2-socket	5A6J2	Receptacle, 2-pin
5W6P1	Plug, 2-socket	5A8J2	Receptacle, 2-pin
5W6P2	Plug, 2-socket	5A7J2	Receptacle, 2-pin
5W7P1	Plug, 2-socket	5A8J3	Receptacle, 2-pin
5W7P2	Plug, 2-socket	5A9J2	Receptacle, 2-pin
5W8P1	Plug, 2-socket	5A8J4	Receptacle, 2-pin
5W8P2	Plug, 2-socket	5A10J2	Receptacle, 2-pin
5W9P1	Plug, 2-socket	5A13J1	Receptacle, 2-pin
5W9P2	Plug, 2-socket	5A11J2	Receptacle, 2-pin
5W10P1	Plug, 2-socket	5A13J2	Receptacle, 2-pin
5W10P2	Plug, 2-socket	5A12J2	Receptacle, 2-pin
5W11P1	Plug, 2-socket	5A13J3	Receptacle, 2-pin
5W11P2	Plug, 2-socket	5A14J2	Receptacle, 2-pin
5W12P1	Plug, 2-socket	5A13J4	Receptacle, 2-pin
5W12P2	Plug, 2-socket	5A15J2	Receptacle, 2-pin
6A1A2P1	Plug, phono	6A1A1J1	Jack, phono
6P1	Plug, 2-socket (fan)	6B1	Part of fan
6P2	Plug, 2-socket (fan)	6B2	Part of fan

Table 6-8 Connector Mating Information - Sorted by Floating Connector (Continued)

FLOATING CONNECTOR		FIXED CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
6P3	Plug, 2-socket (fan)	6B3	Part of fan
6P4	Plug, 2-socket (fan)	6B4	Part of fan
6P5	Plug, 2-socket (fan)	6B5	Part of fan
6P6	Plug, 2-socket (fan)	6B6	Part of fan
6P7	Plug, 2-socket (fan)	6B7	Part of fan
6P8	Plug, 2-socket (fan)	6B8	Part of fan
6P9	Plug, 2-socket (fan)	6A1B1	Part of fan
6P10	Plug, 2-socket (fan)	6A1B2	Part of fan
6P11	Plug, 1-pin	6A2J1	Jack, 1-pin
6P12	Plug, 1-pin	6A2J2	Jack, 1-pin
6P13	Plug, 1-pin	6A2J3	Jack, 1-pin
6P14	Plug, 1-pin	6A3J1	Jack, 1-pin
6P15	Plug, 1-pin	6A3J2	Jack, 1-pin
6P16	Plug, 1-pin	6A3J3	Jack, 1-pin
External	BNC	3A2A1J2	BNC
External	BNC	3A3J7	BNC

Table 6-9 Connector Mating Information - Sorted by Fixed Connector

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
1A1B1	Part of fan	1P7	Plug, 2-socket (fan)
1A1J1	Receptacle, 9-pin	3W1P4	Plug, 9-socket
1A1J2	Receptacle, 2-pin	1W1P2	Plug, 2-socket
1A2B1	Part of fan	1P8	Plug, 2-socket (fan)
1A2J1	Receptacle, 9-pin	3W1P3	Plug, 9-socket
1A2J2	Receptacle, 2-pin	1W2P2	Plug, 2-socket
1A3J1	Receptacle, 2-pin	1W1P1	Plug, 2-socket
1A3J2	Receptacle, 2-pin	1W2P1	Plug, 2-socket
1A3J3	Receptacle, 2-pin	1W3P1	Plug, 2-socket
1A3J4	Receptacle, 2-pin	1W4P1	Plug, 2-socket
1A3J5	Jack, phono	1P1	Plug, phono
1A4B1	Part of fan	1P9	Plug, 2-socket (fan)
1A4J1	Receptacle, 9-pin	3W2P4	Plug, 9-socket
1A4J2	Receptacle, 2-pin	1W3P2	Plug, 2-socket
1A5B1	Part of fan	1P10	Plug, 2-socket (fan)
1A5J1	Receptacle, 9-pin	3W2P3	Plug, 9-socket
1A5J2	Receptacle, 2-pin	1W4P2	Plug, 2-socket
1A6B1	Part of fan	1P11	Plug, 2-socket (fan)
1A6J1	Receptacle, 9-pin	3W3P4	Plug, 9-socket
1A6J2	Receptacle, 2-pin	1W5P2	Plug, 2-socket
1A7B1	Part of fan	1P12	Plug, 2-socket (fan)
1A7J1	Receptacle, 9-pin	3W3P3	Plug, 9-socket
1A7J2	Receptacle, 2-pin	1W6P2	Plug, 2-socket
1A8J1	Receptacle, 2-pin	1W5P1	Plug, 2-socket
1A8J2	Receptacle, 2-pin	1W6P1	Plug, 2-socket
1A8J3	Receptacle, 2-pin	1W7P1	Plug, 2-socket
1A8J4	Receptacle, 2-pin	1W8P1	Plug, 2-socket
1A8J5	Jack, phono	1P2	Plug, phono
1A9B1	Part of fan	1P13	Plug, 2-socket (fan)
1A9J1	Receptacle, 9-pin	3W4P4	Plug, 9-socket
1A9J2	Receptacle, 2-pin	1W7P2	Plug, 2-socket
1A10B1	Part of fan	1P14	Plug, 2-socket (fan)
1A10J1	Receptacle, 9-pin	3W4P3	Plug, 9-socket
1A10J2	Receptacle, 2-pin	1W8P2	Plug, 2-socket
1A11B1	Part of fan	1P15	Plug, 2-socket (fan)
1A11J1	Receptacle, 9-pin	3W5P4	Plug, 9-socket
1A11J2	Receptacle, 2-pin	1W9P2	Plug, 2-socket
1A12B1	Part of fan	1P16	Plug, 2-socket (fan)
1A12J1	Receptacle, 9-pin	3W5P3	Plug, 9-socket
1A12J2	Receptacle, 2-pin	1W10P2	Plug, 2-socket
1A13J1	Receptacle, 2-pin	1W9P1	Plug, 2-socket
1A13J2	Receptacle, 2-pin	1W10P1	Plug, 2-socket
1A13J3	Receptacle, 2-pin	1W11P1	Plug, 2-socket
1A13J4	Receptacle, 2-pin	1W12P1	Plug, 2-socket
1A13J5	Jack, phono	1P3	Plug, phono
1A14B1	Part of fan	1P17	Plug, 2-socket (fan)
1A14J1	Receptacle, 9-pin	3W6P4	Plug, 9-socket

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
1A14J2	Receptacle, 2-pin	1W11P2	Plug, 2-socket
1A15B1	Part of fan	1P18	Plug, 2-socket (fan)
1A15J1	Receptacle, 9-pin	3W6P3	Plug, 9-socket
1A15J2	Receptacle, 2-pin	1W12P2	Plug, 2-socket
2A1B1	Part of fan	2P7	Plug, 2-socket (fan)
2A1J1	Receptacle, 9-pin	3W1P2	Plug, 9-socket
2A1J2	Receptacle, 2-pin	2W1P2	Plug, 2-socket
2A2B1	Part of fan	2P8	Plug, 2-socket (fan)
2A2J1	Receptacle, 9-pin	3W1P1	Plug, 9-socket
2A2J2	Receptacle, 2-pin	2W2P2	Plug, 2-socket
2A3J1	Receptacle, 2-pin	2W1P1	Plug, 2-socket
2A3J2	Receptacle, 2-pin	2W2P1	Plug, 2-socket
2A3J3	Receptacle, 2-pin	2W3P1	Plug, 2-socket
2A3J4	Receptacle, 2-pin	2W4P1	Plug, 2-socket
2A3J5	Jack, phono	2P1	Plug, phono
2A4B1	Part of fan	2P9	Plug, 2-socket (fan)
2A4J1	Receptacle, 9-pin	3W2P2	Plug, 9-socket
2A4J2	Receptacle, 2-pin	2W3P2	Plug, 2-socket
2A5B1	Part of fan	2P10	Plug, 2-socket (fan)
2A5J1	Receptacle, 9-pin	3W2P1	Plug, 9-socket
2A5J2	Receptacle, 2-pin	2W4P2	Plug, 2-socket
2A6B1	Part of fan	2P11	Plug, 2-socket (fan)
2A6J1	Receptacle, 9-pin	3W3P2	Plug, 9-socket
2A6J2	Receptacle, 2-pin	2W5P2	Plug, 2-socket
2A7B1	Part of fan	2P12	Plug, 2-socket (fan)
2A7J1	Receptacle, 9-pin	3W3P1	Plug, 9-socket
2A7J2	Receptacle, 2-pin	2W6P2	Plug, 2-socket
2A7TP1	Jack, 1-pin	3P50	plug, 1-pin
2A8J1	Receptacle, 2-pin	2W5P1	Plug, 2-socket
2A8J2	Receptacle, 2-pin	2W6P1	Plug, 2-socket
2A8J3	Receptacle, 2-pin	2W7P1	Plug, 2-socket
2A8J4	Receptacle, 2-pin	2W8P1	Plug, 2-socket
2A8J5	Jack, phono	2P2	Plug, phono
2A9B1	Part of fan	2P13	Plug, 2-socket (fan)
2A9J1	Receptacle, 9-pin	3W4P2	Plug, 9-socket
2A9J2	Receptacle, 2-pin	2W7P2	Plug, 2-socket
2A10B1	Part of fan	2P14	Plug, 2-socket (fan)
2A10J1	Receptacle, 9-pin	3W4P1	Plug, 9-socket
2A10J2	Receptacle, 2-pin	2W8P2	Plug, 2-socket
2A11B1	Part of fan	2P15	Plug, 2-socket (fan)
2A11J1	Receptacle, 9-pin	3W5P2	Plug, 9-socket
2A11J2	Receptacle, 2-pin	2W9P2	Plug, 2-socket
2A12B1	Part of fan	2P16	Plug, 2-socket (fan)
2A12J1	Receptacle, 9-pin	3W5P1	Plug, 9-socket
2A12J2	Receptacle, 2-pin	2W10P2	Plug, 2-socket
2A13J1	Receptacle, 2-pin	2W9P1	Plug, 2-socket
2A13J2	Receptacle, 2-pin	2W10P1	Plug, 2-socket

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
2A13J3	Receptacle, 2-pin	2W11P1	Plug, 2-socket
2A13J4	Receptacle, 2-pin	2W12P1	Plug, 2-socket
2A13J5	Jack, phono	2P3	Plug, phono
2A14B1	Part of fan	2P17	Plug, 2-socket (fan)
2A14J1	Receptacle, 9-pin	3W6P2	Plug, 9-socket
2A14J2	Receptacle, 2-pin	2W11P2	Plug, 2-socket
2A15B1	Part of fan	2P18	Plug, 2-socket (fan)
2A15J1	Receptacle, 9-pin	3W6P1	Plug, 9-socket
2A15J2	Receptacle, 2-pin	2W12P2	Plug, 2-socket
3A1J1	Receptacle, 36-bisexual pins	3A2P1	Plug, 36-bisexual pins
3A2A1J1	Jack, phono	3P48	Plug, phono
3A2A1J2	BNC	External	BNC
3A2A1J3	MTA, header, 4-pin	3A2P6	MTA, housing, 4-socket
3A2A2J1	MTA, header, 12-pin	3A2P2	MTA, housing, 12-socket
3A2A2J2	MTA, header, 12-pin	3A2P3	MTA, housing, 12-socket
3A2A2J3	MTA, header, 12-pin	3A2P4	MTA, housing, 12-socket
3A2A3J1	Jack, phono	1P4	Plug, phono
3A2A3J2	Jack, phono	1P5	Plug, phono
3A2A3J3	Jack, phono	1P6	Plug, phono
3A2A3J4	Jack, phono	2P4	Plug, phono
3A2A3J5	Jack, phono	2P5	Plug, phono
3A2A3J6	Jack, phono	2P6	Plug, phono
3A2A3J7	Jack, phono	4P4	Plug, phono
3A2A3J8	Jack, phono	4P5	Plug, phono
3A2A3J9	Jack, phono	4P6	Plug, phono
3A2A3J10	Jack, phono	5P4	Plug, phono
3A2A3J11	Jack, phono	5P5	Plug, phono
3A2A3J12	Jack, phono	5P6	Plug, phono
3A2A3J13	Jack, phono	3P47	Plug, phono
3A2A3J14	MTA, header, 4-pin	3A2P5	MTA, housing, 4-socket
3A2A4J1	MTA, header, 4-pin	3A2P7	MTA, housing, 4-socket
3A2J1	Receptacle, 9-socket	3P1	Plug, 9-pin
3A2J2	Receptacle, 9-pin	3P2	Plug, 9-socket
3A2J3	Receptacle, bisexual, 23-pin	3P3	Plug, bisexual, 23-pin
3A2J4	Receptacle, bisexual, 22-pin	3P4	Plug, bisexual, 22-pin
3A2J5	Jack, phono	3P44	Plug, phono
3A2J6	Jack, phono	3P46	Plug, phono
3A3A4J1	Jack, phono	3P11	Plug, phono
3A3A4J2	Jack, phono	3P12	Plug, phono
3A3J1	Receptacle, 9-socket	3P5	Plug, 9-pin
3A3J2	Receptacle, 9-pin	3P6	Plug, 9-socket
3A3J3	Jack, phono	3P13	Plug, phono
3A3J4	Jack, phono	3P14	Plug, phono
3A3J5	Jack, phono	3P43	Plug, phono
3A3J6	Receptacle, 115 Vac	3P53	Plug, 115 Vac
3A3J7	BNC	External	BNC
3A3J8	Jack, phono	3P51	Plug, phono

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
3A4A4J1	Jack, phono	3P15	Plug, phono
3A4A4J2	Jack, phono	3P16	Plug, phono
3A4J1	Receptacle, 9-socket	3P7	Plug, 9-pin
3A4J2	Receptacle, 9-pin	3P8	Plug, 9-socket
3A4J3	Jack, phono	3P17	Plug, phono
3A4J4	Jack, phono	3P18	Plug, phono
3A4J5	Jack, phono	3P45	Plug, phono
3A4J6	Receptacle, 115 Vac	3P54	Plug, 115 Vac
3A4J7	BNC	-	Not normally used
3A4J8	Jack, phono	3P52	Plug, phono
3A5A1J2	Jack, phono	3P20	Plug, phono
3A5J1	Jack, phono	3P19	Plug, phono
3A6A1J2	Jack, phono	3P22	Plug, phono
3A6J1	Jack, phono	3P21	Plug, phono
3A7A1J2	Jack, phono	3P24	Plug, phono
3A7J1	Jack, phono	3P23	Plug, phono
3A8A1J2	Jack, phono	3P26	Plug, phono
3A8J1	Jack, phono	3P25	Plug, phono
3A9A1J2	Jack, phono	3P28	Plug, phono
3A9J1	Jack, phono	3P27	Plug, phono
3A10A1J2	Jack, phono	3P30	Plug, phono
3A10J1	Jack, phono	3P29	Plug, phono
3A11A1J2	Jack, phono	3P32	Plug, phono
3A11J1	Jack, phono	3P31	Plug, phono
3A12A1J2	Jack, phono	3P34	Plug, phono
3A12J1	Jack, phono	3P33	Plug, phono
3A13A1J2	Jack, phono	3P36	Plug, phono
3A13J1	Jack, phono	3P35	Plug, phono
3A14A1J2	Jack, phono	3P38	Plug, phono
3A14J1	Jack, phono	3P37	Plug, phono
3A15A1J2	Jack, phono	3P40	Plug, phono
3A15J1	Jack, phono	3P39	Plug, phono
3A16A1J2	Jack, phono	3P42	Plug, phono
3A16J1	Jack, phono	3P41	Plug, phono
3A17J1	MTA, header, 4-pin	3P55	MTA housing, 4-socket
3B1	Part of fan	3P56	Plug, 2-socket (fan)
4A1B1	Part of fan	4P7	Plug, 2-socket (fan)
4A1J1	Receptacle, 9-pin	3W7P1	Plug, 9-socket
4A1J2	Receptacle, 2-pin	4W1P2	Plug, 2-socket
4A2B1	Part of fan	4P8	Plug, 2-socket (fan)
4A2J1	Receptacle, 9-pin	3W7P2	Plug, 9-socket
4A2J2	Receptacle, 2-pin	4W2P2	Plug, 2-socket
4A3J1	Receptacle, 2-pin	4W1P1	Plug, 2-socket
4A3J2	Receptacle, 2-pin	4W2P1	Plug, 2-socket
4A3J3	Receptacle, 2-pin	4W3P1	Plug, 2-socket
4A3J4	Receptacle, 2-pin	4W4P1	Plug, 2-socket
4A3J5	Jack, phono	4P1	Plug, phono

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
4A4B1	Part of fan	4P9	Plug, 2-socket (fan)
4A4J1	Receptacle, 9-pin	3W8P1	Plug, 9-socket
4A4J2	Receptacle, 2-pin	4W3P2	Plug, 2-socket
4A5B1	Part of fan	4P10	Plug, 2-socket (fan)
4A5J1	Receptacle, 9-pin	3W8P2	Plug, 9-socket
4A5J2	Receptacle, 2-pin	4W4P2	Plug, 2-socket
4A6B1	Part of fan	4P11	Plug, 2-socket (fan)
4A6J1	Receptacle, 9-pin	3W9P1	Plug, 9-socket
4A6J2	Receptacle, 2-pin	4W5P2	Plug, 2-socket
4A7B1	Part of fan	4P12	Plug, 2-socket (fan)
4A7J1	Receptacle, 9-pin	3W9P2	Plug, 9-socket
4A7J2	Receptacle, 2-pin	4W6P2	Plug, 2-socket
4A8J1	Receptacle, 2-pin	4W5P1	Plug, 2-socket
4A8J2	Receptacle, 2-pin	4W6P1	Plug, 2-socket
4A8J3	Receptacle, 2-pin	4W7P1	Plug, 2-socket
4A8J4	Receptacle, 2-pin	4W8P1	Plug, 2-socket
4A8J5	Jack, phono	4P2	Plug, phono
4A9B1	Part of fan	4P13	Plug, 2-socket (fan)
4A9J1	Receptacle, 9-pin	3W10P1	Plug, 9-socket
4A9J2	Receptacle, 2-pin	4W7P2	Plug, 2-socket
4A10B1	Part of fan	4P14	Plug, 2-socket (fan)
4A10J1	Receptacle, 9-pin	3W10P2	Plug, 9-socket
4A10J2	Receptacle, 2-pin	4W8P2	Plug, 2-socket
4A11B1	Part of fan	4P15	Plug, 2-socket (fan)
4A11J1	Receptacle, 9-pin	3W11P1	Plug, 9-socket
4A11J2	Receptacle, 2-pin	4W9P2	Plug, 2-socket
4A12B1	Part of fan	4P16	Plug, 2-socket (fan)
4A12J1	Receptacle, 9-pin	3W11P2	Plug, 9-socket
4A12J2	Receptacle, 2-pin	4W10P2	Plug, 2-socket
4A13J1	Receptacle, 2-pin	4W9P1	Plug, 2-socket
4A13J2	Receptacle, 2-pin	4W10P1	Plug, 2-socket
4A13J3	Receptacle, 2-pin	4W11P1	Plug, 2-socket
4A13J4	Receptacle, 2-pin	4W12P1	Plug, 2-socket
4A13J5	Jack, phono	4P3	Plug, phono
4A14B1	Part of fan	4P17	Plug, 2-socket (fan)
4A14J1	Receptacle, 9-pin	3W12P1	Plug, 9-socket
4A14J2	Receptacle, 2-pin	4W11P2	Plug, 2-socket
4A15B1	Part of fan	4P18	Plug, 2-socket (fan)
4A15J1	Receptacle, 9-pin	3W12P2	Plug, 9-socket
4A15J2	Receptacle, 2-pin	4W12P2	Plug, 2-socket
5A1B1	Part of fan	5P7	Plug, 2-socket (fan)
5A1J1	Receptacle, 9-pin	3W7P3	Plug, 9-socket
5A1J2	Receptacle, 2-pin	5W1P2	Plug, 2-socket
5A2B1	Part of fan	5P8	Plug, 2-socket (fan)
5A2J1	Receptacle, 9-pin	3W7P4	Plug, 9-socket
5A2J2	Receptacle, 2-pin	5W2P2	Plug, 2-socket
5A3J1	Receptacle, 2-pin	5W1P1	Plug, 2-socket

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
5A3J2	Receptacle, 2-pin	5W2P1	Plug, 2-socket
5A3J3	Receptacle, 2-pin	5W3P1	Plug, 2-socket
5A3J4	Receptacle, 2-pin	5W4P1	Plug, 2-socket
5A3J5	Jack, phono	5P1	Plug, phono
5A4B1	Part of fan	5P9	Plug, 2-socket (fan)
5A4J1	Receptacle, 9-pin	3W8P3	Plug, 9-socket
5A4J2	Receptacle, 2-pin	5W3P2	Plug, 2-socket
5A5B1	Part of fan	5P10	Plug, 2-socket (fan)
5A5J1	Receptacle, 9-pin	3W8P4	Plug, 9-socket
5A5J2	Receptacle, 2-pin	5W4P2	Plug, 2-socket
5A6B1	Part of fan	5P11	Plug, 2-socket (fan)
5A6J1	Receptacle, 9-pin	3W9P3	Plug, 9-socket
5A6J2	Receptacle, 2-pin	5W5P2	Plug, 2-socket
5A7B1	Part of fan	5P12	Plug, 2-socket (fan)
5A7J1	Receptacle, 9-pin	3W9P4	Plug, 9-socket
5A7J2	Receptacle, 2-pin	5W6P2	Plug, 2-socket
5A8J1	Receptacle, 2-pin	5W5P1	Plug, 2-socket
5A8J2	Receptacle, 2-pin	5W6P1	Plug, 2-socket
5A8J3	Receptacle, 2-pin	5W7P1	Plug, 2-socket
5A8J4	Receptacle, 2-pin	5W8P1	Plug, 2-socket
5A8J5	Jack, phono	5P2	Plug, phono
5A9B1	Part of fan	5P13	Plug, 2-socket (fan)
5A9J1	Receptacle, 9-pin	3W10P3	Plug, 9-socket
5A9J2	Receptacle, 2-pin	5W7P2	Plug, 2-socket
5A10B1	Part of fan	5P14	Plug, 2-socket (fan)
5A10J1	Receptacle, 9-pin	3W10P4	Plug, 9-socket
5A10J2	Receptacle, 2-pin	5W8P2	Plug, 2-socket
5A11B1	Part of fan	5P15	Plug, 2-socket (fan)
5A11J1	Receptacle, 9-pin	3W11P3	Plug, 9-socket
5A11J2	Receptacle, 2-pin	5W9P2	Plug, 2-socket
5A12B1	Part of fan	5P16	Plug, 2-socket (fan)
5A12J1	Receptacle, 9-pin	3W11P4	Plug, 9-socket
5A12J2	Receptacle, 2-pin	5W10P2	Plug, 2-socket
5A13J1	Receptacle, 2-pin	5W9P1	Plug, 2-socket
5A13J2	Receptacle, 2-pin	5W10P1	Plug, 2-socket
5A13J3	Receptacle, 2-pin	5W11P1	Plug, 2-socket
5A13J4	Receptacle, 2-pin	5W12P1	Plug, 2-socket
5A13J5	Jack, phono	5P3	Plug, phono
5A14B1	Part of fan	5P17	Plug, 2-socket (fan)
5A14J1	Receptacle, 9-pin	3W12P3	Plug, 9-socket
5A14J2	Receptacle, 2-pin	5W11P2	Plug, 2-socket
5A15B1	Part of fan	5P18	Plug, 2-socket (fan)
5A15J1	Receptacle, 9-pin	3W12P4	Plug, 9-socket
5A15J2	Receptacle, 2-pin	5W12P2	Plug, 2-socket
6A1A1J1	Jack, phono	6A1A2P1	Plug, phono
6A1A1J2	Jack, phono	3P10	Plug, phono
6A1A1J3	Jack, phono	3P9	Plug, phono

Table 6-9 Connector Mating Information - Sorted by Fixed Connector (Continued)

FIXED CONNECTOR		FLOATING CONNECTOR	
REF DES	DESCRIPTION	REF DES	DESCRIPTION
6A1A2J1	Jack, phono	3P49	Plug, phono
6A1B1	Part of fan	6P9	Plug, 2-socket (fan)
6A1B2	Part of fan	6P10	Plug, 2-socket (fan)
6A2J1	Jack, 1-pin	6P11	Plug, 1-pin
6A2J2	Jack, 1-pin	6P12	Plug, 1-pin
6A2J3	Jack, 1-pin	6P13	Plug, 1-pin
6A3J1	Jack, 1-pin	6P14	Plug, 1-pin
6A3J2	Jack, 1-pin	6P15	Plug, 1-pin
6A3J3	Jack, 1-pin	6P16	Plug, 1-pin
6B1	Part of fan	6P1	Plug, 2-socket (fan)
6B2	Part of fan	6P2	Plug, 2-socket (fan)
6B3	Part of fan	6P3	Plug, 2-socket (fan)
6B4	Part of fan	6P4	Plug, 2-socket (fan)
6B5	Part of fan	6P5	Plug, 2-socket (fan)
6B6	Part of fan	6P6	Plug, 2-socket (fan)
6B7	Part of fan	6P7	Plug, 2-socket (fan)
6B8	Part of fan	6P8	Plug, 2-socket (fan)

Not available at time of printing

Figure 6-1 Remote On-Air Trouble Shooting Assistance Information

Not available at time of printing

Figure 6-2 Local On-Air Trouble Shooting Assistance Information

Not available at time of printing

Figure 6-3 Local Off-Air Trouble Shooting Assistance Information

SECTION 7
PARTS LIST

INTRODUCTION

7.1 This section contains a complete listing of all electrical and mechanical parts that have been assigned a reference designation and form a part of the subject transmitter. Detailed parts of NAP10 - 1.25 kW power amplifier sub-system modules and NAE35 - exciter drawer assemblies, which are normally removed from the transmitter for servicing, are not listed in the reference designation index and are not included in the parts per unit index. Refer to the NAP10 or NAE35 service instruction boolklet for detailed parts information of these assemblies.

FAMILY TREE:

7.2 Figure 7-1 depicts the family tree for an AMPFET 50 AM broadcast transmitter.

MANUFACTURER'S INDEX

7.3 Table 7-1 provides a cross reference from the original equipment manufacturers (OEM) codes to the manufacturer's name and address. The listing is sorted alpha/numerically by the manufacturers' codes.

REFERENCE DESIGNATION INDEXES:

7.4 Table 7-2 through 7-14 provide a parts listing for the subject transmitter, in alpha/numeric order of its reference designations. Table 7-2 provides a detailed listing for all assemblies that do not contain frequency dependent parts. Tables 7-3 thru 7-14 provide detailed lists for assemblies containing frequency dependent parts, with each table allocated to a specific carrier frequency band. The reference designation indexes are divided into four columns as an aid to locating specific information. Refer to paragraph 7.6 for an explanation of column contents.

PARTS PER UNIT INDEXES:

7.5 Table 7-15 provides a listing of the total number of each part that is not frequency dependent in the subject transmitter, in alpha/numeric order of the Nautel part number. Tables 7-16 thru 7-27 provide a listing of the total number of each frequency dependent part. Each table lists the frequency dependent parts for one of twelve carrier frequency bands. The parts per unit indexes are divided into five columns as an aid to locating specific information, including a column that identifies the original equipment manufacturer for each part. Refer to paragraph 7.6 for an explanation of column contents.

COLUMN CONTENT EXPLANATION:

7.6 The following paragraphs provide an explanation of the purpose and contents of each column in the reference designation and parts per unit indexes.

7.6.1 REF DES COLUMN: The first column in the reference designation index contains the full reference designation, in accordance with American National Standard Specification ANSI Y32.16, assigned to a specific part. The reference designation index is sorted and listed alpha/numerically according to the reference designation in this column. There is no Ref Des column in the parts per unit indexes.

7.6.2 NAME OF PART AND DESCRIPTION COLUMN: The second column of the reference designation and the parts per unit indexes contains the name and descriptive information for each part. The key word or noun is presented first, followed by the adjective identifiers.

7.6.3 NAUTEL'S PART NO. COLUMN: The third column of the reference designation index and the first column of the parts per unit index contains the Nautel in-house part number assigned to each part. This number is a Nautel inventory management aid that allows a single number to represent two or more different manufacturers part numbers for interchangeable parts. The parts per unit index is sorted and listed alpha/numerically according to the part number in this column.

7.6.4 JAN, MIL OR MFR PART NO. COLUMN: The fourth column of the reference designation index and the third column of the parts per unit index contains an original equipment manufacturer's part number for a part. A single part number is listed for each part, even though there may be more than one known manufacturer. The listed number is Nautel's usual or preferred choice. A JAN or MIL number has been assigned as the manufacturer's part number, where practical, to assist the user in finding a suitable replacement part. The use of this number does not restrict Nautel from selecting and using commercial equivalents, where their use will not degrade circuit operation or reliability, during manufacture.

7.6.5 OEM CODE COLUMN: The fourth column of the parts per unit index contains a five digit coded group as the original equipment manufacturer's (OEM) identifier. The code is based on and was extracted from Cataloging Handbook H4-2 - Federal Supply Code for Manufacturers (United States and Canada). Manufacturers that were not listed in the H4 catalog at the time this listing was compiled have been assigned a five letter code. The five letter code is assigned arbitrarily and has no other significance. The manufacturers identified for parts that have JAN or MIL part numbers are Nautel's normal supply source for that part. There is no OEM Code column in the reference designtion indexes.

7.6.6 TOTAL IDENT PARTS COLUMN: The fifth column of the parts per unit index contains a number that represents the total quantity of that specific part in the subject transmitter. This quantity does not include the detailed parts of the NAP10 - 1.25 kW power amplifier sub-systems and NAE35 - exciter drawer assemblies, or the detailed parts of optional or external assemblies that may be provided with the transmitter. There is no Total Ident Parts column in the reference designation indexes.

Table 7-1 Manufacturers' Code to Address Index

00213	Nytronics Incorporated, Nytronics Components Group, Orange Street, Darlington, South Carolina 29532
00779	AMP incorporated, P O Box 3608, Harrisburg, Pa 17105
00809	Croven, 500 Beech Street, Whitby, Ontario, L1N 5S5
00853	Sangamo Weston Incorporated, Sangamo Capacitor Division, PO Box 128, Route 3, Sangamo Road, Pickens, South Carolina 29671
01295	Texas Instruments Incorporated, US Semiconductor Group, PO Box 225012, M/S 49, 13500 North Central Expressway, Dallas, Texas 75265
02111	Spectrol Electronics Corporation, 17070 East Gale Avenue, City of Industry, California 91745
02660	Bunker Ramo Corporation, Amphenol Connector Division, 2801 South 25th Avenue, Broadview, Illinois 60153
04713	Motorola Incorporated, Semiconductor Products Group, 5005 East McDowell Road, Phoenix, Arizona 85008
06383	Panduit Corp., 17301 Ridgeland, Tinley Park, Il 60477
08372	Cutler-hammer Canada Limited, 45 Progress Avenue, Scarsborough, Ontario, Canada, M1P 2T6
09482	AMP of Canada Ltd., 20 Esna Park Drive, Markham, Ontario, L3R 1E1
12617	Hamlin Incorporated, Grove & Lake Streets, Lake Mills, Wisconsin 53551
14655	Cornell Dubilier Electronics Division, Federal Pacific Electric Company, 150 Avenue L, Newark, New Jersey 07101
15513	Data Display Products, P O Box 91072, 5428 West 104th St., Los Angeles, Ca 90009
32171	Modutec Inc., 18 Marshall St., Norwalk, Ct 06854
33062	Ferronics Incorporated, 60 North Lincoln Road, East Rochester, New York 14445
34361	Omron Electronics Inc., 432 Toyama Road, Sunnyvale, Ca 94086
35005	Dale Electronics Canada Limited, 18 Howden Road, Scarborough, Ontario
35104	Bach Simpson Limited 1255 Brydges Street, London, Ontario, Canada, N6A 4G7
36002	Dale Electronics Canada Limited, PO Box 5484, 1255 Brydges Street, London, Ontario, Canada, N6A 4L6

Table 7-1 Manufacturers' Code to Address Index (Continued)

37338	Nautical Electronic Laboratories Ltd, Hackett's Cove, Halifax County, Nova Scotia, Canada B0J 3J0
37903	Siemens Electric Ltd., 7300 Trans Canada Highway, Pointe Clare, Quebec, H9R 107
44655	Ohmite Manufacturing Co., 3601 West Howard Street, Skokie, Illinois 60076
50434	Hewlett Packard Company, 640 Page Mill Road, Palo Alto, California 94304
52769	Sprague-Goodman Electronics Inc., 134 Fulton Avenue, Garden City Park, NY 11040
56289	Sprague Electric Company, 87 Marshall Street, North Adams, Massachusetts 01247
56699	Hepco/Electra Inc., 6071 St. Andrews Rd., Columbia, SC 29210
57739	Sigma Instruments Canada Ltd., 55 Six Point Road, Toronto, Ontario, Canada M8Z 2X3
70903	Belden Corporation, 200 South Batavia Avenue, Geneva, Illinois 60134
71279	Midland-Ross Corp., Cambion Division, One Alewife Place, Cambridge, Ma 02140
71400	Bussman Manufacturing Division, McGraw-Edison Company, 502 Earth City Plaza, Earth City, Missouri 63045
71785	TRW Incorporated, 1501 Morse Avenue, Elk Grove Village, Illinois 60007
72982	Erie Technological Products Inc, 644 West 12th Street, Erie, Pennsylvania 16512
73168	Walter Kidde & Company Inc., Fenwall Division, 400 main Street, Ashland, Ma 01721
73631	Curtis Instruments Inc., Helipot Division. 2500 Harbour Blvd., Fullerton, California 92634
73831	Hammond Manufacturing Co. Ltd, 394 Edinburgh Road North, Guelph, Ontario, Canada
73949	Guardian Electric Mfg. Co., 1550 W Carroll Avenue, Chicago, Il 60607
74970	E F Johnson, 299 10th Avenue SW, Waseca, Minnesota 56093
75042	TRW Electronic Components, IRC Fixed Resistor Division, 401 North Broad Street, Philadelphia, Pennsylvania 19108
75915	Littlefuse Incorporated, 800 East Northwest Highway, Des Plaines, Illinois 60016
77342	Potter and Brumfield Division, AMF Incorporated, 200 Richland Creek Drive, Princeton, Indiana 47670
78290	Struthers Dunn Inc., Lambs Road, Pittman, NJ 08071

Table 7-1 Manufacturers' Code to Address Index (Continued)

80207	Unimax Switch Corp., Ives Road, Wallingsford, Ct 06492
80294	Bourns Incorporated, Instrument Division, 6135 Magnolia Avenue, Riverside, California 92506
81073	Grayhill Incorporated PO box 373 561 Hillgrove Avenue La Grange, Illinois 60525
81483	International Rectifier, 9220 Sunset Boulevard, Box 2321, Terminal Annex, Los Angeles, California 90054
82389	Switchcraft Inc., Subsidiary of Ratheon Co., 5555 N Elstron Avenue, Chicago, Il 60630
82877	Rotron Inc., 7-9 Hasbrouk Lane, Woodstock, New York 12498
83003	VARO Incorporated, PO Box 401426, 2203 Walnut Street, Garland, Texas 75040
89473	General Electric Distributing Corp., 1 River Road, Schenactady, New York 12305
91506	Augat Incorporated, PO Box 779, 633 Perry Avenue, Attleboro, Massachusetts 02703
99800	American Precision Industries Delevan Division, 270 Quaker Road, East Aurora, NY 14052

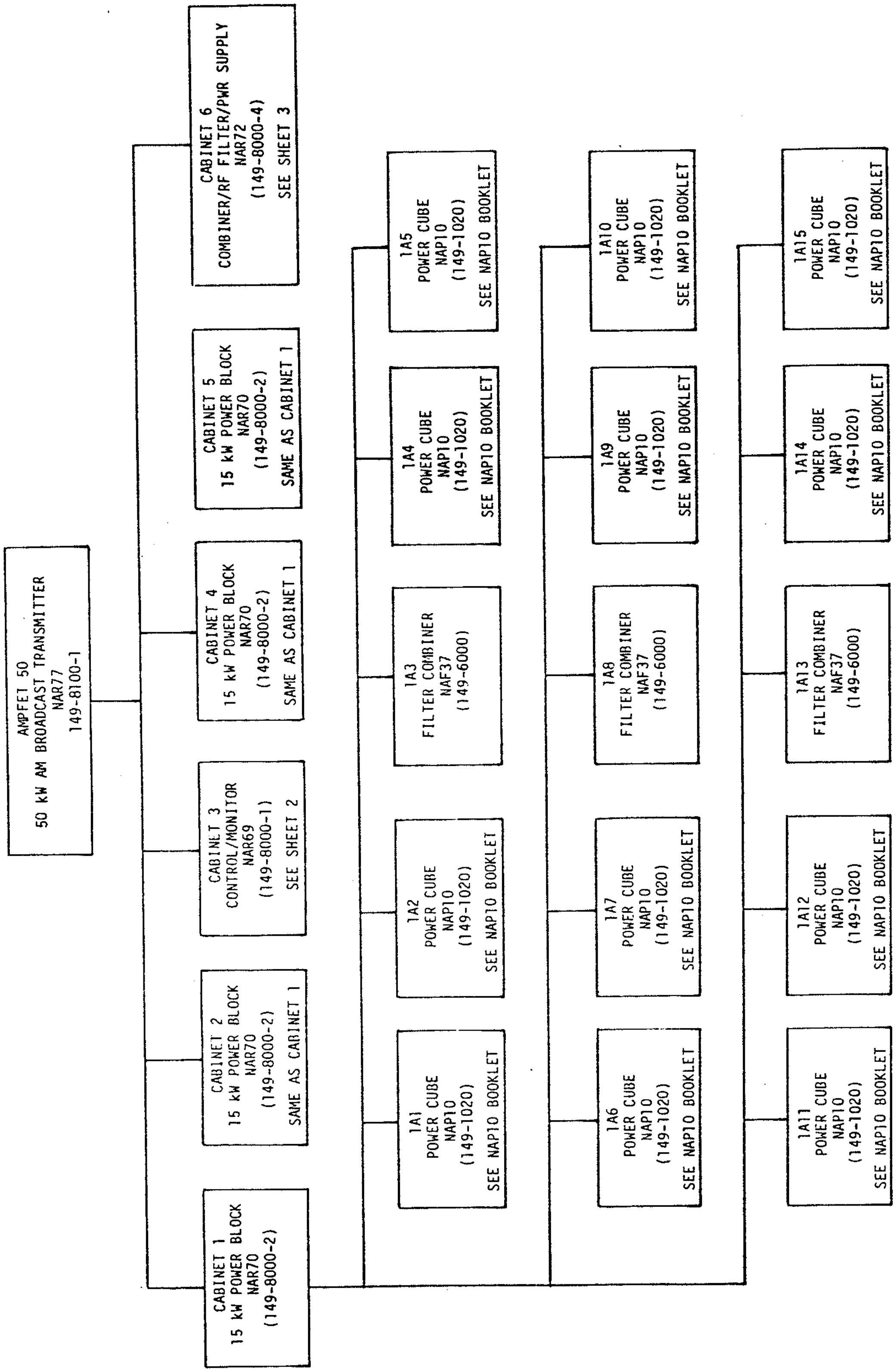

Figure 7-1 AMPFET 50 Family Tree (Sheet 1 of 3)

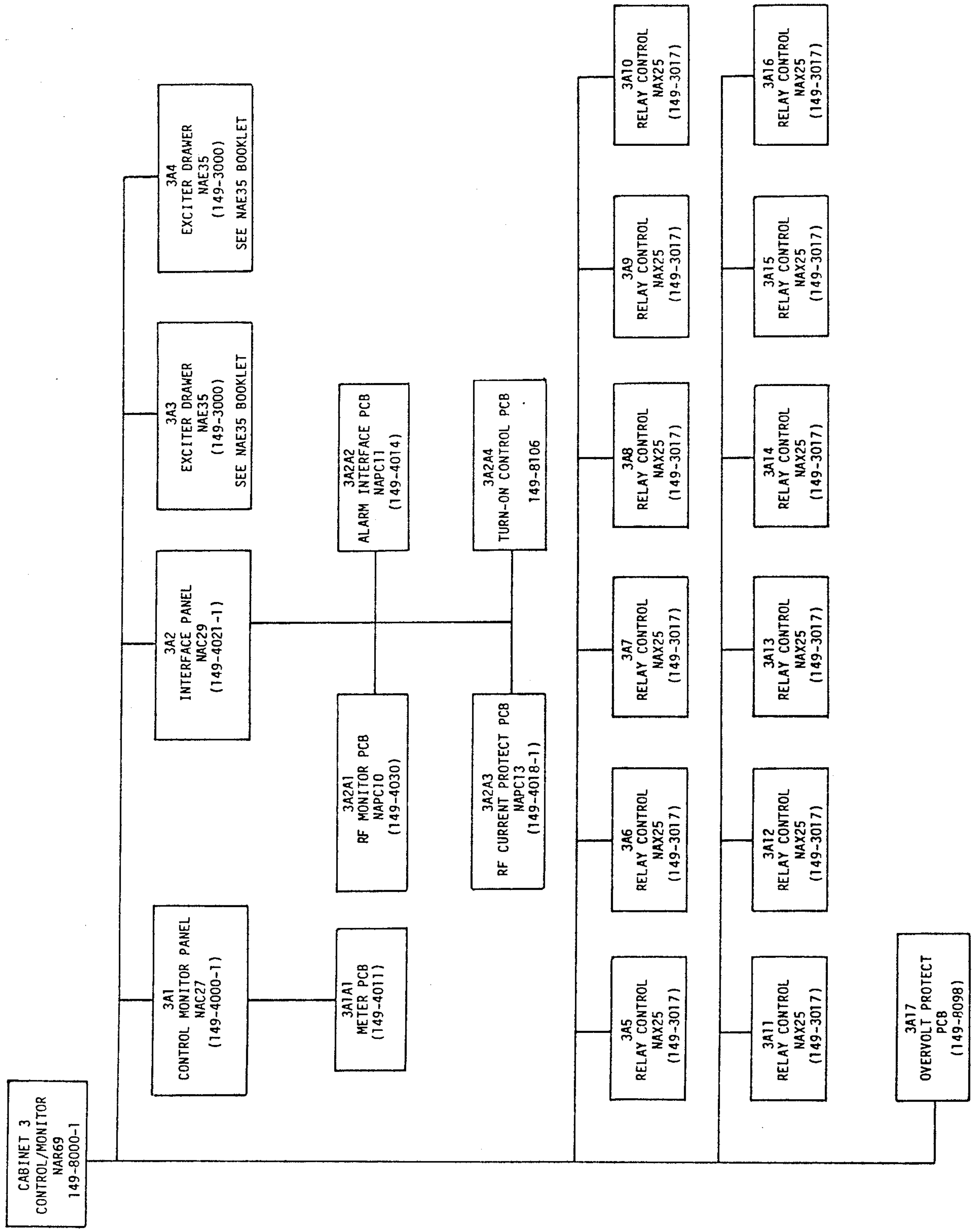

Figure 7-1 AMPFET 50 Family Tree (Sheet 2 of 3)

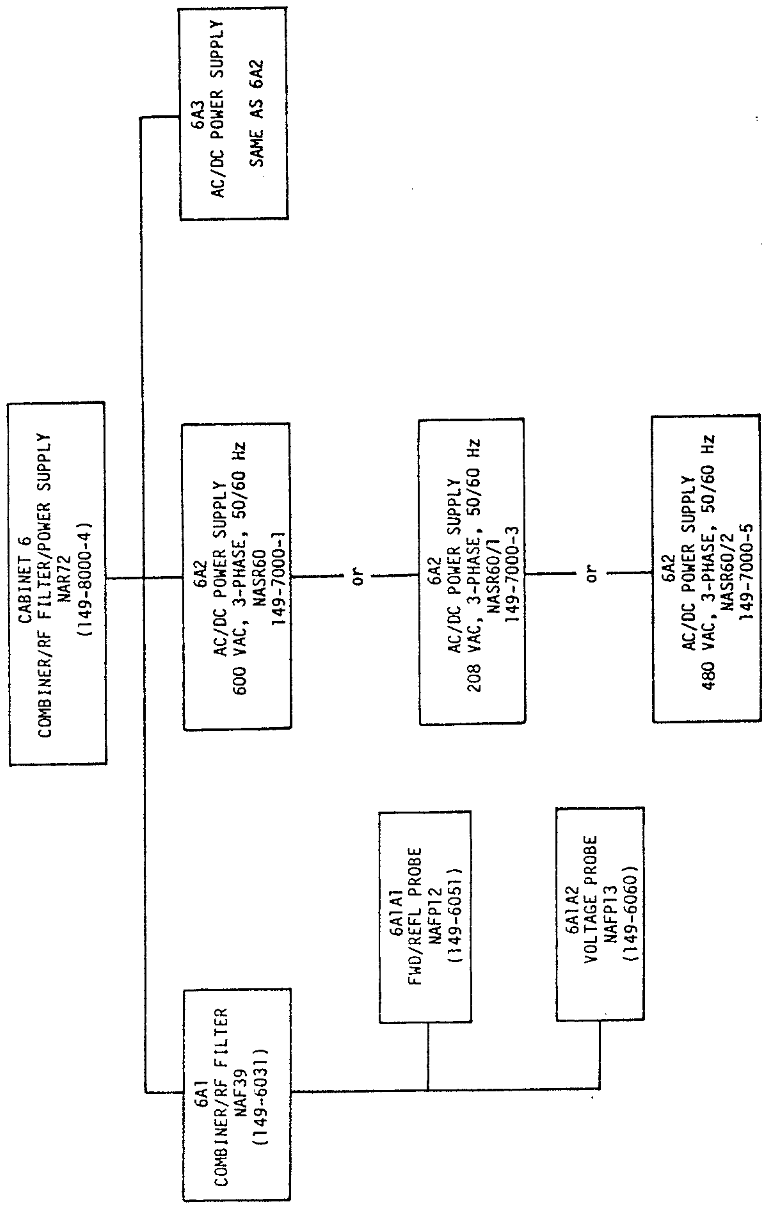

Figure 7-1 AMPFET 50 Family Tree (Sheet 3 of 3)

Table 7-2 Reference Designation Index

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
-	AM Broadcast Transmitter, 50 kW	AMPFET 50	149-8100-1
1	Cabinet, 15 kW Power Block	NAR70	149-8000-2
$ 1A1	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A2	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
¢ 1A3	Quad Combiner/Filter (535-578 kHz)	NAF37/1	See table 7-3
¢ 1A3	Quad Combiner/Filter (578-638 kHz)	NAF37/2	See table 7-4
¢ 1A3	Quad Combiner/Filter (638-703 kHz)	NAF37/3	See table 7-5
¢ 1A3	Quad Combiner/Filter (703-772 kHz)	NAF37/4	See table 7-6
¢ 1A3	Quad Combiner/Filter (772-849 kHz)	NAF37/5	See table 7-7
¢ 1A3	Quad Combiner/Filter (849-935 kHz)	NAF37/6	See table 7-8
¢ 1A3	Quad Combiner/Filter (935-1031 kHz)	NAF37/7	See table 7-9
¢ 1A3	Quad Combiner/Filter (1031-1126 kHz)	NAF37/8	See table 7-10
¢ 1A3	Quad Combiner/Filter (1126-1226 kHz)	NAF37/9	See table 7-11
¢ 1A3	Quad Combiner/Filter (1226-1346 kHz)	NAF37/10	See table 7-12
¢ 1A3	Quad Combiner/Filter (1346-1471 kHz)	NAF37/11	See table 7-13
¢ 1A3	Quad Combiner/Filter (1471-1605 kHz)	NAF37/12	See table 7-14
$ 1A4	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A5	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A6	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A7	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
1A8	Same as 1A3		
$ 1A9	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A10	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A11	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A12	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
1A13	Same as 1A3		
$ 1A14	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 1A15	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
1E1	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1E2	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1E3	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1E4	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1E5	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1E6	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
1F1	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
1F2	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
1F3	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
1K1	Relay, 24Vdc Coil	KAP05	1315-4C-24D
1P1	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P2	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P3	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P4	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P5	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P6	Connector, RF Coaxial, Phono, Plug	JS01	3507
1P7	Cord and Connector Assembly	ZA14	428056
1P8	Cord and Connector Assembly	ZA14	428056
1P9	Cord and Connector Assembly	ZA14	428056
1P10	Cord and Connector Assembly	ZA14	428056

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1P11	Cord and Connector Assembly	ZA14	428056
1P12	Cord and Connector Assembly	ZA14	428056
1P13	Cord and Connector Assembly	ZA14	428056
1P14	Cord and Connector Assembly	ZA14	428056
1P15	Cord and Connector Assembly	ZA14	428056
1P16	Cord and Connector Assembly	ZA14	428056
1P17	Cord and Connector Assembly	ZA14	428056
1P18	Cord and Connector Assembly	ZA14	428056
1TB1	Terminal Block, Barrier, 6-terminal	JC01	6-140
1W1	Cable Assembly	149-8057	149-8057
1W1P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
1W1P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
1W2	Same as 1W1		
1W3	Cable Assembly	149-8057-1	149-8057-1
1W3P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
1W3P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
1W4	Same as 1W3		
1W5	Same as 1W1		
1W6	Same as 1W1		
1W7	Same as 1W3		
1W8	Same as 1W3		
1W9	Same as 1W1		
1W10	Same as 1W1		
1W11	Same as 1W3		
1W12	Same as 1W3		
1XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
1XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
1XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
1XK1	Relay Socket	KA19	1310-1ST
2	Cabinet, 15 kW Power Block	NAR70	149-8000-2
$ 2A1	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A2	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
2A3	Same as 1A3		
$ 2A4	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A5	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A6	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A7	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
2A8	Same as 1A3		
$ 2A9	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A10	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A11	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A12	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
2A13	Same as 1A3		
$ 2A14	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 2A15	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
2E1	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
2E2	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
2E3	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
2E4	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
2E5	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
2E6	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
2F1	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
2F2	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
2F3	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
2K1	Relay, 24Vdc Coil	KAP05	1315-4C-24D
2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P2	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P3	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P4	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P5	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P6	Connector, RF Coaxial, Phono, Plug	JS01	3507
2P7	Cord and Connector Assembly	ZA14	428056
2P8	Cord and Connector Assembly	ZA14	428056
2P9	Cord and Connector Assembly	ZA14	428056
2P10	Cord and Connector Assembly	ZA14	428056
2P11	Cord and Connector Assembly	ZA14	428056
2P12	Cord and Connector Assembly	ZA14	428056
2P13	Cord and Connector Assembly	ZA14	428056
2P14	Cord and Connector Assembly	ZA14	428056
2P15	Cord and Connector Assembly	ZA14	428056
2P16	Cord and Connector Assembly	ZA14	428056
2P17	Cord and Connector Assembly	ZA14	428056
2P18	Cord and Connector Assembly	ZA14	428056
2TB1	Terminal Block, Barrier, 6-terminal	JC01	6-140
2W1	Cable Assembly	149-8057	149-8057
2W1P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
2W1P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
2W2	Same as 2W1		
2W3	Cable Assembly	149-8057-1	149-8057-1
2W3P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
2W3P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
2W4	Same as 2W3		
2W5	Same as 2W1		
2W6	Same as 2W1		
2W7	Same as 2W3		
2W8	Same as 2W3		
2W9	Same as 2W1		
2W10	Same as 2W1		
2W11	Same as 2W3		
2W12	Same as 2W3		
2XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
2XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
2XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
2XK1	Relay Socket	KA19	1310-1ST

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3	Cabinet, Control/Monitor, 50 kW	NAR69	149-8000-1
3A1	Control/Monitor Panel Assembly	NAC27	149-4000-1
3A1A1	Meter PCB Assembly	149-4011	149-4011
3A1A1R1	Resistor, Film, 12K ohms, 2% 1/2W	RD08	RL20S123G
3A1A1R2	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A1A1R3	Resistor, Variable, 100 ohms, 1/2W	RW24	63P101T000
3A1A1R4	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A1DS1	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS2	Diode, Light Emitting, Green	QK12	5082-4992
3A1DS3	Diode, Light Emitting, Amber	QK14	5082-4592
3A1DS4	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS5	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS6	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS7	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS8	Diode, Light Emitting, Red	QK13	5082-4693
3A1DS9	Diode, Light Emitting, Red	QK13	5082-4693
3A1J1	Connector Assembly, Socket, 36-pin	149-1086-2	149-1086-2
3A1M1	Meter, FORWARD POWER	MD03	149-4009
3A1M2	Meter, DC SUPPLY VOLTS	MD06	149-4010
3A1M3	Meter, DC SUPPLY CURRENT	MD05	T4BA1-DAA-500
3A1M4	Meter, REFLECTED POWER	MD04	T2BA1-DMA-001
3A1R1	Resistor, Film, 1000 ohms, 2% 1/2	RAP09	RL20S102G
3A1R2	Resistor, Film, 1000 ohms, 2% 1/2	RAP09	RL20S102G
3A1R3	Resistor, Film, 1000 ohms, 2% 1/2	RAP09	RL20S102G
3A1R4	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
3A1S1	Switch, Toggle, 1PST	SCP01	8381K108
3A1S2	Switch, Toggle 4PDT	SA23	SF4GCY191
3A1S3	Switch, Rotary, Non-shorting	SA32	T206
3A1S4	Switch, Toggle, 2PDT	SCP03	8373K107
3A1S5	Switch, Rotary, Non-shorting	SA32	T206
3A1S6	Switch Assembly, 2PDT	SCP09	SA42SDW1
3A1XDS1	Socket, LED	QK25	PS-200-B
3A1XDS2	Socket, LED	QK25	PS-200-B
3A1XDS3	Socket, LED	QK25	PS-200-B
3A1XDS4	Socket, LED	QK25	PS-200-B
3A1XDS5	Socket, LED	QK25	PS-200-B
3A1XDS6	Socket, LED	QK25	PS-200-B
3A1XDS7	Socket, LED	QK25	PS-200-B
3A1XDS8	Socket, LED	QK25	PS-200-B
3A1XDS9	Socket, LED	QK25	PS-200-B
3A2	Interface Panel Assembly	NAC29	149-4021-1
3A2A1	RF Monitor PCB Assembly	NAPC10	149-4030
3A2A1CR1	Diode, Zener, 33V	QL24	1N4752
3A2A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A1J2	Connector, RF Coaxial, BNC, Bulkhead	JDP26	UG1094/U
3A2A1J3	MTA, Square Post Header Assy, 4-pin	JU20	640383-4
3A2A1K1	Relay, 24Vdc	KB16	HE721C2400
3A2A1K2	Relay, 24Vdc	KB16	HE721C2400

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A1Q1	Transistor, NPN	QAP06	2N2222
3A2A1Q2	Transistor, PNP	QAP09	2N2907
3A2A1Q3	Transistor, PNP	QAP09	2N2907
3A2A1Q4	Transistor, NPN	QAP06	2N2222
3A2A1R1	Resistor, Variable, 100 ohms, 2W	RV41	3852A-162-101A
3A2A1R2	Resistor, Variable, 100 ohms, 2W	RV41	3852A-162-101A
3A2A1R3	Resistor, Variable, 100 ohms, 2W	RV41	3852A-162-101A
3A2A1R4	Resistor, Film, 18K ohms, 2% 1/2W	RAP14	RL20S183G
3A2A1R5	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A1R6	Resistor, Film, 100 ohms, 2% 1/2W	RAP05	RL20S101G
3A2A1R7	Resistor, Film, 18K ohms, 2% 1/2W	RAP14	RL20S183G
3A2A1R8	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A1XK1	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A1XK2	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A2	Alarm Interface PCB Assembly	NAPC11	149-4014
3A2A2C1	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A2C2	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A2C3	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A2C4	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A2C5	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A2C6	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A2C7	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A2C8	Capacitor, Tantalum, 6.8uF 10%, 35V	CCP19	CSR13F685KM
3A2A2C9	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A2CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR6	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR7	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR8	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR9	Diode, Zener, 56V	QL25	1N4758
3A2A2CR10	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR11	Diode, Zener, 56V	QL25	1N4758
3A2A2CR12	Diode, Zener, 56V	QL25	1N4758
3A2A2CR13	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR14	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR15	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR16	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR17	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR18	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR19	Diode, Zener, 56V	QL25	1N4758
3A2A2CR20	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR21	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2CR22	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A2J1	MTA, Square Post Header Assy, 12-pin	JU21	1-640383-2
3A2A2J2	MTA, Square Post Header Assy, 12-pin	JU21	1-640383-2

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A2J3	MTA, Square Post Header Assy, 12-pin	JU21	1-640383-2
3A2A2L1	Toroid	LY09	11-122-B
3A2A2L2	Toroid	LY09	11-122-B
3A2A2L3	Toroid	LY09	11-122-B
3A2A2L4	Toroid	LY09	11-122-B
3A2A2L5	Toroid	LY09	11-122-B
3A2A2Q1	Transistor, PNP	QAP09	2N2907
3A2A2Q2	Transistor, NPN	QI09	2N5681
3A2A2Q3	Transistor, PNP	QAP09	2N2907
3A2A2Q4	Transistor, NPN	QI09	2N5681
3A2A2Q5	Transistor, PNP	QAP09	2N2907
3A2A2Q6	Transistor, NPN	QI09	2N5681
3A2A2Q7	Transistor, PNP	QAP09	2N2907
3A2A2Q8	Transistor, NPN	QI09	2N5681
3A2A2Q9	Not Used		
3A2A2Q10	Transistor, NPN	QI09	2N5681
3A2A2Q11	Transistor, NPN	QI09	2N5681
3A2A2Q12	Transistor, NPN	QI09	2N5681
3A2A2Q13	Not Used		
3A2A2Q14	Not Used		
3A2A2Q15	Not Used		
3A2A2Q16	Not Used		
3A2A2Q17	Transistor, Field Effect, N Channel	QAP18	IRFF130
3A2A2R1	Resistor, Film, 20 ohms, 2% 1/2W	RS31	RL20S200G
3A2A2R2	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R3	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R4	Resistor, Film, 20 ohms, 2% 1/2W	RS31	RL20S200G
3A2A2R5	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R6	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R7	Resistor, Film, 20 ohms, 2% 1/2W	RS31	RL20S200G
3A2A2R8	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R9	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R10	Resistor, Film, 20 ohms, 2% 1/2W	RS31	RL20S200G
3A2A2R11	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R12	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R13	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R14	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R15	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R16	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R17	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R18	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R19	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R20	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R21	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R22	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R23	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R24	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R25	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A2R26	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R27	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A2R28	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R29	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2R30	Resistor, Film, 330K ohms, 2% 1/2W	RAP19	RL20S334G
3A2A2R31	Resistor, Film, 330K ohms, 2% 1/2W	RAP19	RL20S334G
3A2A2R32	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R33	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R34	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A2R35	Resistor, Comp, 1.0M ohms, 5% 1/2W	RF31	RC20GF105J
3A2A2R36	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A2R37	Resistor, Film, 33K ohms, 2% 1/2W	RAP15	RL20S333G
3A2A2R38	Resistor, Comp, 1.0M ohms, 5% 1/2W	RF31	RC20GF105J
3A2A2R39	Resistor, Comp, 560K ohms, 5% 1/2W	RF28	RC20GF564J
3A2A2R40	Resistor, Comp, 1.0M ohms, 5% 1/2W	RF31	RC20GF105J
3A2A2R41	Resistor, Film, 1000 ohms, 2% 1/2W	RAP09	RL20S102G
3A2A2U1	IC, CMOS, Quad, 2-input NOR Gates	UB01	MC14001BAL
3A2A2U2	IC, CMOS, Quad, 2-input NOR Gates	UB01	MC14001BAL
3A2A2U3	IC, Operational Amplifiers, Quad	UC16	MC3303L
3A2A2XU1	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A2XU2	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A2XU3	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A3	RF Protection Threshold PCB Assembly	NAPC13	149-4018-1
3A2A3C1	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A3C2	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A3C3	Not Used		
3A2A3C4	Capacitor, Ceramic, 0.001uF 10%, 200V	CCG01	CKR05BX102KL
3A2A3C5	Capacitor, Ceramic, 0.001uF 10%, 200V	CCG01	CKR05BX102KL
3A2A3C6	Capacitor, Ceramic, 0.022uF 10%, 100V	CCG05	CKR06BX223KL
3A2A3C7	Capacitor, Ceramic, 0.01uF 10%, 100V	CCG04	CKR05BX103KL
3A2A3C8	Capacitor, Ceramic, 0.01uF 10%, 100V	CCG04	CKR05BX103KL
3A2A3C9	Capacitor, Ceramic, 0.22uF 10%, 50V	CCG08	CKR06BX224KL
3A2A3CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR6	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR7	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR8	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A3CR9	Diode, Zener, 12.0V, 400mW, 10%	QG08	1N759
3A2A3J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J4	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J6	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J7	Connector, RF Coaxial, Phono, Jack	JS02	3505F

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A3J8	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J9	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J10	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J11	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J12	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J13	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3J14	MTA, Square Post Header Assy, 4-pin	JU20	640383-4
3A2A3J15	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2A3L1	Toroid	LY09	11-122-B
3A2A3L2	Toroid	LY09	11-122-B
3A2A3Q1	Transistor, NPN	QE10	2N3227
3A2A3Q2	Transistor, NPN	QE10	2N3227
3A2A3Q3	Transistor, NPN	QE10	2N3227
3A2A3Q4	Transistor, NPN	QE10	2N3227
3A2A3Q5	Transistor, NPN	QE10	2N3227
3A2A3Q6	Transistor, NPN	QE10	2N3227
3A2A3R1	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R2	Resistor, Film, 330 ohms, 2% 1/2W	RAP07	RL20S331G
3A2A3R3	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A2A3R4	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A2A3R5	Resistor, Film, 18K ohms, 2% 1/2W	RAP14	RL20S183G
3A2A3R6	Resistor, Film, 18K ohms, 2% 1/2W	RAP14	RL20S183G
3A2A3R7	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A2A3R8	Resistor, Film, 68K ohms, 2% 1/2W	RD17	RL20S683G
3A2A3R9	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R10	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R11	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R12	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R13	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R14	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A2A3R15	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A3R16	Resistor, Film, 270K ohms, 2% 1/2W	RD24	RL20S274G
3A2A3R17	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A3R18	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A3R19	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A2A3R20	Resistor, Film, 5600 ohms, 2% 1/2W	RAP12	RL20S562G
3A2A3R21	Resistor, Film, 270 ohms, 2% 1/2W	RC30	RL20S271G
3A2A3R22	Resistor, Film, 2700 ohms, 2% 1/2W	RC42	RL20S272G
3A2A3R23	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A2A3R24	Resistor, Film, 270K ohms, 2% 1/2W	RD24	RL20S274G
3A2A3R25	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A3R26	Resistor, Film, 33K ohms, 2% 1/2W	RAP15	RL20S333G
3A2A3R27	Not Used		
3A2A3R28	Resistor, Film, 3.74K ohms, 1% 1/2W	RZ01	RN60D3741F
3A2A3S1	Switch, DIP, 1-way, 2PST	SC39	78F01
3A2A3S2	Switch, DIP, 1-way, 2PST	SC39	78F01
3A2A3U1	IC, Operational Amplifiers, Quad	UC16	MC3303L
3A2A3U2	IC, CMOS, Quad, 2-input Exclusive OR	UB09	MC14070BAL

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A3XU1	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A3XU2	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A4	On/Off Control PCB Assembly	149-8106	149-8106
3A2A4C1	Capacitor, Tantalum, 6.8uF 10%, 35V	CCP19	CSR13F685KM
3A2A4C2	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A4C3	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A4CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4J1	MTA, Square Post Header Assy, 4-pin	JU20	640383-4
3A2A4L1	Toroid	LY09	11-122-B
3A2A4L2	Toroid	LY09	11-122-B
3A2A4R1	Resistor, Comp, 2.2M ohms, 5% 1/2W	RF35	RC20GF225J
3A2A4R2	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A4R3	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A4U1	IC, Operational Amplifiers, Dual	UL12	TL082IJG
3A2A4XU1	Socket, Integrated Circuit, 8-pin	UC01	640463-1
3A2C1	Capacitor, Mica, 1800pF 2% 500V	CB40	CM06FD182G03
3A2C2	Capacitor, Mica, 1800pF 2% 500V	CB40	CM06FD182G03
3A2C3	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C4	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C5	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C6	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C7	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C8	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C9	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C10	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C11	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C12	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C13	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C14	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C15	Capacitor, Plastic, 20uF 10%, 200V	CNP37	735P206X9200ZVL
3A2C16	Capacitor, Plastic, 20uF 10%, 200V	CNP37	735P206X9200ZVL
3A2CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR6	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR7	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR8	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2F1	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F2	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F3	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F4	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F5	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F6	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2F7	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F8	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F9	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F10	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F11	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F12	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2J1	Connector Assembly, Socket, 9-pin	149-1083	149-1083
3A2J2	Connector Assembly, Plug, 9-pin	149-1083-1	149-1083-1
3A2J3	Connector Assembly, Socket, 23-pin	149-1086	149-1086
3A2J4	Connector Assembly, Socket, 22-pin	149-1086-1	149-1086-1
3A2J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2J6	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2K1	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K2	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K3	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K4	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K5	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K6	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K7	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K8	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2L1	Inductor, 1353uH	149-4028	149-4028
3A2P1	Connector Assembly, Plug, 36-pin	149-1085-2	149-1085-2
3A2P2	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P3	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P4	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P5	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2P6	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2P7	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2R1	Resistor, Film, 680 ohms, 2% 1/2W	RC35	RL20S681G
3A2R2	Resistor, Film, 680 ohms, 2% 1/2W	RC35	RL20S681G
3A2S1	Switch, 1PDT	SA14	8816K9
3A2S2	Switch, 1PDT	SA14	8816K9
3A2S3	Switch, 1PDT	SA14	8816K9
3A2S4	Switch, 1PDT	SA14	8816K9
3A2S5	Switch, 1PDT	SA14	8816K9
3A2S6	Switch, 1PDT	SA14	8816K9
3A2S7	Switch, 1PDT	SA14	8816K9
3A2S8	Switch, 1PDT	SA14	8816K9
3A2S9	Switch, 1PDT	SA14	8816K9
3A2S10	Switch, 1PDT	SA14	8816K9
3A2S11	Switch, 1PDT	SA14	8816K9
3A2S12	Switch, 1PDT	SA14	8816K9
3A2T1	Transformer, Audio	TC18	850G
3A2TB1	Terminal Block, Barrier, 22-terminal	JR18	GFT22
3A2XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF4	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2A3XU1	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A3XU2	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A2A4	On/Off Control PCB Assembly	149-8106	149-8106
3A2A4C1	Capacitor, Tantalum, 6.8uF 10%, 35V	CCP19	CSR13F685KM
3A2A4C2	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A2A4C3	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A2A4CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2A4J1	MTA, Square Post Header Assy, 4-pin	JU20	640383-4
3A2A4L1	Toroid	LY09	11-122-B
3A2A4L2	Toroid	LY09	11-122-B
3A2A4R1	Resistor, Comp, 2.2M ohms, 5% 1/2W	RF35	RC20GF225J
3A2A4R2	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A4R3	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A2A4U1	IC, Operational Amplifiers, Dual	UL12	TL082IJG
3A2A4XU1	Socket, Integrated Circuit, 8-pin	UC01	640463-1
3A2C1	Capacitor, Mica, 1800pF 2% 500V	CB40	CM06FD182G03
3A2C2	Capacitor, Mica, 1800pF 2% 500V	CB40	CM06FD182G03
3A2C3	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C4	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C5	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C6	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C7	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C8	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C9	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C10	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C11	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C12	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C13	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C14	Capacitor, Plastic, 2.2uF 20%, 250V	CNP38	52003225M
3A2C15	Capacitor, Plastic, 20uF 10%, 200V	CNP37	735P206X9200ZVL
3A2C16	Capacitor, Plastic, 20uF 10%, 200V	CNP37	735P206X9200ZVL
3A2CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR6	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR7	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2CR8	Diode, General Purpose, Small Signal	QAP29	1N4938
3A2F1	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F2	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F3	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F4	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F5	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F6	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2F7	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F8	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F9	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F10	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F11	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2F12	Fuse, 2.5A, 250V, Dual Element,Type MDA	FB30	MDA2 1/2
3A2J1	Connector Assembly, Socket, 9-pin	149-1083	149-1083
3A2J2	Connector Assembly, Plug, 9-pin	149-1083-1	149-1083-1
3A2J3	Connector Assembly, Socket, 23-pin	149-1086	149-1086
3A2J4	Connector Assembly, Socket, 22-pin	149-1086-1	149-1086-1
3A2J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2J6	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A2K1	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K2	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K3	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K4	Relay, 24Vdc Coil	KAP12	1515-3C-24D
3A2K5	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K6	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K7	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2K8	Relay, Latching, 24Vdc Coil	KAP03	MY2K-UA-DC24
3A2L1	Inductor, 1353uH	149-4028	149-4028
3A2P1	Connector Assembly, Plug, 36-pin	149-1085-2	149-1085-2
3A2P2	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P3	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P4	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A2P5	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2P6	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2P7	MTA, Closed End Housing, 4-pin, 22 AWG	JU01	640433-4
3A2R1	Resistor, Film, 680 ohms, 2% 1/2W	RC35	RL20S681G
3A2R2	Resistor, Film, 680 ohms, 2% 1/2W	RC35	RL20S681G
3A2S1	Switch, 1PDT	SA14	8816K9
3A2S2	Switch, 1PDT	SA14	8816K9
3A2S3	Switch, 1PDT	SA14	8816K9
3A2S4	Switch, 1PDT	SA14	8816K9
3A2S5	Switch, 1PDT	SA14	8816K9
3A2S6	Switch, 1PDT	SA14	8816K9
3A2S7	Switch, 1PDT	SA14	8816K9
3A2S8	Switch, 1PDT	SA14	8816K9
3A2S9	Switch, 1PDT	SA14	8816K9
3A2S10	Switch, 1PDT	SA14	8816K9
3A2S11	Switch, 1PDT	SA14	8816K9
3A2S12	Switch, 1PDT	SA14	8816K9
3A2T1	Transformer, Audio	TC18	850G
3A2TB1	Terminal Block, Barrier, 22-terminal	JR18	GFT22
3A2XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF4	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A2XF5	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF6	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF7	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF8	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF9	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF10	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF11	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XF12	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
3A2XK1	Relay Socket	KAP15	1510-1ST
3A2XK2	Relay Socket	KAP15	1510-1ST
3A2XK3	Relay Socket	KAP15	1510-1ST
3A2XK4	Relay Socket	KAP15	1510-1ST
3A2XK5	Relay Socket	KA19	1310-1ST
3A2XK6	Relay Socket	KA19	1310-1ST
3A2XK7	Relay Socket	KA19	1310-1ST
3A2XK8	Relay Socket	KA19	1310-1ST
$ 3A3	Exciter Drawer Assembly	NAE35	149-3000
$ 3A4	Exciter Drawer Assembly	NAE35	149-3000
3A5	Relay Control Panel Assembly	NAX25	149-8017
3A5A1	Relay Control Panel PCB Assembly	149-8020	149-8020
3A5A1C1	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A5A1C2	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A5A1C3	Capacitor, Tantalum, 1.0uF 10%, 50V	CCP24	CSR13G105KM
3A5A1C4	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A5A1C5	Capacitor, Ceramic, 0.1uF 10%, 100V	CCG07	CKR06BX104KL
3A5A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
3A5A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
3A5A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
3A5A1CR4	Diode, Zener, 4.7V, 1W 10%	QL22	1N4732
3A5A1CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
3A5A1DS1	Diode, Light Emitting, Red	QK13	5082-4693
3A5A1J1	MTA, Square Post Header Assy, 12-pin	JU21	1-640383-2
3A5A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A5A1K1	Relay, DIP Reed, 12V, 1/2 Amp	KAP23	JWD171-14
3A5A1L1	Toroid	LY09	11-122-B
3A5A1Q1	Transistor, PNP	QB11	2N5416
3A5A1Q2	Transistor, NPN, Power, High Voltage	QB06	2N3440
3A5A1Q3	Transistor, NPN	QAP06	2N2222
3A5A1Q4	Transistor, PNP	QAP09	2N2907
3A5A1R1	Resistor, Film, 150K ohms, 1% 1/2W	RZ02	RN60D1503F
3A5A1R2	Resistor, Film, 137K ohms, 1% 1/2W	RY25	RN60D1373F
3A5A1R4	Resistor, Film, 56K ohms, 2% 1/2W	RAP16	RL20S563G
3A5A1R5	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
3A5A1R6	Resistor, Film, 10K ohms, 1% 1/2W	RZ10	RN60D1002F
3A5A1R7	Resistor, Comp, 1.8M ohms, 5% 1/2W	RF34	RC20GF185J
3A5A1R8	Resistor, Film, 3300 ohms, 2% 1/2W	RAP11	RL20S332G
3A5A1R9	Resistor, Film, 100K ohms, 2% 1/2W	RAP17	RL20S104G
3A5A1R10	Resistor, Film, 18K ohms, 2% 1/2W	RAP14	RL20S183G

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A5A1R11	Resistor, Film, 560 ohms, 2% 1/2W	RAP08	RL20S561G
3A5A1R12	Resistor, Film, 33K ohms, 2% 1/2W	RAP15	RL20S333G
3A5A1R13	Resistor, Film, 33K ohms, 2% 1/2W	RAP15	RL20S333G
3A5A1R14	Resistor, Film, 33K ohms, 2% 1/2W	RAP15	RL20S333G
3A5A1R15	Resistor, Film, 47K ohms, 2% 1/2W	RD15	RL20S473G
3A5A1R16	Resistor, Film, 39K ohms, 2% 1/2W	RD14	RL20S393G
3A5A1R17	Resistor, Film, 10K ohms, 1% 1/2W	RZ10	RN60D1002F
3A5A1R18	Resistor, Comp, 1.0M ohms, 5% 1/2W	RF31	RC20GF105J
3A5A1S1	Switch, DIP, 1-way, 2PST	SC39	78F01
3A5A1U1	IC, CMOS, Quad, 2-input NOR Gates	UB01	MC14001BAL
3A5A1U2	IC, Operational Amplifiers, Dual	UL12	TL082IJG
3A5A1XU1	Socket, Integrated Circuit, 14-pin	UC02	640357-1
3A5A1XU2	Socket, Integrated Circuit, 8-pin	UC01	640463-1
3A5F1	Fuse, 40A, 300V	FC39	SC40
3A5F2	Fuse, 40A, 300V	FC39	SC40
3A5F3	Fuse, 40A, 300V	FC39	SC40
3A5F4	Fuse, 40A, 300V	FC39	SC40
3A5J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
3A5K1	Relay, DPST-NO, 24Vdc, 30 Amp	KAP39	425BXX-24Vdc
3A5K2	Relay, DPST-NO, 24Vdc, 30 Amp	KAP39	425BXX-24Vdc
3A5P1	MTA, Closed End Housing, 12-pin, 22 AWG	JU03	1-640433-2
3A5R1	Resistor, Wirewound, 9 ohms, 10% 140W	RS22	HLZ140 9.0 Ohms-10%
3A5R2	Resistor, Wirewound, 220 ohms, 5% 3W	RS34	CW-2B 220 ohms
3A5T1	Transformer, RF	149-8028	149-8028
3A5TB1	Terminal Block, Barrier, 3-terminal	JC31	3-140Y
3A5TB2	Terminal Block, Barrier, 8-terminal	JB23	8-140Y
3A6	Same as 3A5		
3A7	Same as 3A5		
3A8	Same as 3A5		
3A9	Same as 3A5		
3A10	Same as 3A5		
3A11	Same as 3A5		
3A12	Same as 3A5		
3A13	Same as 3A5		
3A14	Same as 3A5		
3A15	Same as 3A5		
3A16	Same as 3A5		
3A17	Overvoltage Protection PCB Assembly	149-8098	149-8098
3A17CR1	Diode, Zener, 5.6V, 1.5W, 10%	QH35	1N5919A
3A17DS1	Diode, Light Emitting, Red	QK13	5082-4693
3A17J1	MTA, Square Post Header Assy, 4-pin	JU20	640383-4
3A17K1	Relay, 24Vdc Coil	KAP24	1345-1B-24D
3A17Q1	Transistor, NPN, Power, High Voltage	QB06	2N3440
3A17R1	Resistor, Wirewound, 5000 ohms, 5% 3W	RS30	5843
3A17R2	Resistor, Variable, 100 ohms, 1/2W	RW24	63P101T000
3A17R3	Resistor, Film, 360 ohms, 2% 1/2W	RK01	RL20S361G
3A17R4	Resistor, Film, 12K ohms, 2% 1/2W	RD08	RL20S123G

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3A18	Transient Clipper Assembly	149-8122-1	149-8122-1
3A18C1	Capacitor, Plastic, 0.47uF 10%, 250V	CNP15	52003474K
3A18C2	Capacitor, Plastic, 0.47uF 10%, 250V	CNP15	52003474K
3A18CR1	Diode, Power Rectifier, 6A	QK15	1N5811
3A18CR2	Diode, Power Rectifier, 6A	QK15	1N5811
3A18CR3	Diode, Zener, 100V, 1.5W, 2%	QL20	1N5949C
3A18CR4	Diode, Power Rectifier, 6A	QK15	1N5811
3A18CR5	Diode, Power Rectifier, 6A	QK15	1N5811
3A18R1	Resistor, Film, 27K ohms, 2% 1/2W	RD12	RL20S273G
3A18R2	Resistor, Film, 27K ohms, 2% 1/2W	RD12	RL20S273G
3B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
3E1	Shunt strap	149-8066-1	149-8066-1
3E2	Shunt strap	149-8066-1	149-8066-1
3F1	Fuse, 20A, 250V, Time-Delay	FB41	MDA20
3F2	Fuse, 20A, 250V, Time-Delay	FB41	MDA20
3F3	Fuse, 20A, 250V, Time-Delay	FB41	MDA20
3L1	Inductor, Choke, 0.63 mH	TC38	149-8030
3L2	Inductor, Choke, 0.63 mH	TC38	149-8030
3L3	Inductor, Choke, 0.63 mH	TC38	149-8030
3L4	Inductor, Choke, 0.63 mH	TC38	149-8030
3L5	Inductor, Choke, 0.63 mH	TC38	149-8030
3L6	Inductor, Choke, 0.63 mH	TC38	149-8030
3L7	Inductor, Choke, 0.63 mH	TC38	149-8030
3L8	Inductor, Choke, 0.63 mH	TC38	149-8030
3L9	Inductor, Choke, 0.63 mH	TC38	149-8030
3L10	Inductor, Choke, 0.63 mH	TC38	149-8030
3L11	Inductor, Choke, 0.63 mH	TC38	149-8030
3L12	Inductor, Choke, 0.63 mH	TC38	149-8030
3P1	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3P2	Connector Assembly, Socket, 9-pin	149-1082-1	149-1082-1
3P3	Connector Assembly, Plug, 23-pin	149-1085	149-1085
3P4	Connector Assembly, Plug, 22-pin	149-1085-1	149-1085-1
3P5	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3P6	Connector Assembly, Socket, 9-pin	149-1082-1	149-1082-1
3P7	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3P8	Connector Assembly, Socket, 9-pin	149-1082-1	149-1082-1
3P9	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P10	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P11	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P12	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P13	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P14	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P15	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P16	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P17	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P18	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P19	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P20	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P21	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3P22	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P23	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P24	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P25	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P26	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P27	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P28	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P29	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P30	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P31	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P32	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P33	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P34	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P35	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P36	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P37	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P38	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P39	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P40	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P41	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P42	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P43	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P44	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P45	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P46	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P47	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P48	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P49	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P50	Connector, Tip, White	JN14	105-0301-001
3P51	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P52	Connector, RF Coaxial, Phono, Plug	JS01	3507
3P53	Cord, Line Assembly	JN25	17250
3P54	Cord, Line Assembly	JN25	17250
3P55	MTA, Closed end Housing, 4-pin, 20 AWG	JU05	640432-4
3P56	Cord and Connector Assembly	ZA14	428056
3R1	Resistor, Current Shunt, 50mV, 500A	RT01	06508
3R2	Resistor, Current Shunt, 50mV, 500A	RT01	06508
3R3	Resistor, Current Shunt, 50mV, 500A	RT01	06508
3R4	Resistor, Current Shunt, 50mV, 500A	RT01	06508
3S1	Switch, Interlock	SC15	11TL6-4
3TB1	Terminal Block, Barrier, 6-terminal	JC01	6-140
3TB2	Terminal Block, Barrier, 6-terminal	JC01	6-140
3TB3	Terminal Block, Barrier, 10-terminal	JB09	10-140
3TB4	Terminal Block, Barrier, 2-terminal	JB01	2-140
3TB5	Terminal Block, Barrier, 4-terminal	JB03	4-140
3TB6	Terminal Block, Barrier, 6-terminal	JC01	6-140
3TB7	Terminal Block, Barrier, 6-terminal	JC01	6-140
3TB8	Terminal Block, Barrier, 10-terminal	JB09	10-140
3TB9	Terminal Block, Barrier, 2-terminal	JB01	2-140

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
3TB10	Terminal Block, Barrier, 6-terminal	JB07	6-140Y
3U1	Diode, Pair Assembly, (-Ve) 400V, 15A	UL28	R704A
3W1	Cable Duct Assembly	149-8053	149-8053
3W1P1	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W1P2	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W1P3	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W1P4	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W2	Cable Duct Assembly	149-8053-1	149-8053-1
3W2P1	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W2P2	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W2P3	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W2P4	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W3	Same as 3W1		
3W4	Same as 3W2		
3W5	Same as 3W1		
3W6	Same as 3W2		
3W7	Cable Duct Assembly	149-8053-2	149-8053-2
3W7P1	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W7P2	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W7P3	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W7P4	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W8	Cable Duct Assembly	149-8053-3	149-8053-3
3W8P1	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W8P2	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W8P3	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W8P4	Connector Assembly, Plug, 9-pin	149-1082	149-1082
3W9	Same as 3W7		
3W10	Same as 3W8		
3W11	Same as 3W7		
3W12	Same as 3W8		
3XF1	Fuse Block, 1 Pole, Type 3AG	FA26	357001
3XF2/3	Fuse Block, 2 Pole, Type 3AG	FA25	357002
4	Cabinet, 15 kW Power Block	NAR70	149-8000-2
$ 4A1	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A2	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
4A3	Same as 1A3		
$ 4A4	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A5	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A6	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A7	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
4A8	Same as 1A3		
$ 4A9	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A10	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A11	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A12	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
4A13	Same as 1A3		
$ 4A14	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 4A15	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
4E1	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4E2	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4E3	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4E4	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4E5	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4E6	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
4F1	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
4F2	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
4F3	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
4K1	Relay, 24Vdc Coil	KAP05	1315-4C-24D
4P1	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P2	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P3	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P4	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P5	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P6	Connector, RF Coaxial, Phono, Plug	JS01	3507
4P7	Cord and Connector Assembly	ZA14	428056
4P8	Cord and Connector Assembly	ZA14	428056
4P9	Cord and Connector Assembly	ZA14	428056
4P10	Cord and Connector Assembly	ZA14	428056
4P11	Cord and Connector Assembly	ZA14	428056
4P12	Cord and Connector Assembly	ZA14	428056
4P13	Cord and Connector Assembly	ZA14	428056
4P14	Cord and Connector Assembly	ZA14	428056
4P15	Cord and Connector Assembly	ZA14	428056
4P16	Cord and Connector Assembly	ZA14	428056
4P17	Cord and Connector Assembly	ZA14	428056
4P18	Cord and Connector Assembly	ZA14	428056
4TB1	Terminal Block, Barrier, 6-terminal	JC01	6-140
4W1	Cable Assembly	149-8057	149-8057
4W1P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
4W1P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
4W2	Same as 4W1		
4W3	Cable Assembly	149-8057-1	149-8057-1
4W3P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
4W3P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
4W4	Same as 4W3		
4W5	Same as 4W1		
4W6	Same as 4W1		
4W7	Same as 4W3		
4W8	Same as 4W3		
4W9	Same as 4W1		
4W10	Same as 4W1		
4W11	Same as 4W3		
4W12	Same as 4W3		
4XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
4XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
4XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
4XK1	Relay Socket	KA19	1310-1ST
5	Cabinet, 15 kW Power Block	NAR70	149-8000-2
$ 5A1	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A2	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
5A3	Same as 1A3		
$ 5A4	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A5	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A6	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A7	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
5A8	Same as 1A3		
$ 5A9	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A10	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A11	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A12	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
5A13	Same as 1A3		
$ 5A14	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
$ 5A15	Power Amplifier Subsystem, 1.25 kW	NAP10	149-1020
5E1	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5E2	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5E3	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5E4	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5E5	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5E6	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
5F1	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
5F2	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
5F3	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
5K1	Relay, 24Vdc Coil	KAP05	1315-4C-24D
5P1	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P2	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P3	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P4	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P5	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P6	Connector, RF Coaxial, Phono, Plug	JS01	3507
5P7	Cord and Connector Assembly	ZA14	428056
5P8	Cord and Connector Assembly	ZA14	428056
5P9	Cord and Connector Assembly	ZA14	428056
5P10	Cord and Connector Assembly	ZA14	428056
5P11	Cord and Connector Assembly	ZA14	428056
5P12	Cord and Connector Assembly	ZA14	428056
5P13	Cord and Connector Assembly	ZA14	428056
5P14	Cord and Connector Assembly	ZA14	428056
5P15	Cord and Connector Assembly	ZA14	428056
5P16	Cord and Connector Assembly	ZA14	428056
5P17	Cord and Connector Assembly	ZA14	428056
5P18	Cord and Connector Assembly	ZA14	428056
5TB1	Terminal Block, Barrier, 6-terminal	JC01	6-140
5W1	Cable Assembly	149-8057	149-8057
5W1P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
5W1P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
5W2	Same as 5W1		
5W3	Cable Assembly	149-8057-1	149-8057-1
5W3P1	Connector Assembly, Plug, 2-pin	149-1080	149-1080
5W3P2	Connector Assembly, Plug, 2-pin	149-1080	149-1080
5W4	Same as 5W3		
5W5	Same as 5W1		
5W6	Same as 5W1		
5W7	Same as 5W3		
5W8	Same as 5W3		
5W9	Same as 5W1		
5W10	Same as 5W1		
5W11	Same as 5W3		
5W12	Same as 5W3		
5XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
5XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
5XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
5XK1	Relay Socket	KA19	1310-1ST
6	Cabinet, Rf Filter/Power Supply, 50 kW	NAR72	149-8000-4
¢ 6A1	Combiner/Rf Filter (535-578 kHz)	NAF39/1	See table 7-3
¢ 6A1	Combiner/Rf Filter (578-638 kHz)	NAF39/2	See table 7-4
¢ 6A1	Combiner/Rf Filter (638-703 kHz)	NAF39/3	See table 7-5
¢ 6A1	Combiner/Rf Filter (703-772 kHz)	NAF39/4	See table 7-6
¢ 6A1	Combiner/Rf Filter (772-849 kHz)	NAF39/5	See table 7-7
¢ 6A1	Combiner/Rf Filter (849-935 kHz)	NAF39/6	See table 7-8
¢ 6A1	Combiner/Rf Filter (935-1031 kHz)	NAF39/7	See table 7-9
¢ 6A1	Combiner/Rf Filter (1031-1126 kHz)	NAF39/8	See table 7-10
¢ 6A1	Combiner/Rf Filter (1126-1226 kHz)	NAF39/9	See table 7-11
¢ 6A1	Combiner/Rf Filter (1226-1346 kHz)	NAF39/10	See table 7-12
¢ 6A1	Combiner/Rf Filter (1346-1471 kHz)	NAF39/11	See table 7-13
¢ 6A1	Combiner/Rf Filter (1471-1605 kHz)	NAF39/12	See table 7-14
# 6A2	AC/DC Power Supply, 600Vac, 3-phase	NASR60	149-7000-1
% 6A2	AC/DC Power Supply, 208Vac, 3-phase	NASR60/1	149-7000-3
* 6A2	AC/DC Power Supply, 480Vac, 3-phase	NASR60/2	149-7000-5
6A2A1	Rectifier Assy, 3-Phase, 400V 1000A	149-7017	149-7017
6A2A1CR1	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR2	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR3	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR4	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR5	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR6	Diode, Power, 300A	QL08	IR300U40R
6A2A1CR7	Diode, Power, 300A	QL09	IR300U40
6A2A1CR8	Diode, Power, 300A	QL09	IR300U40
6A2A1CR9	Diode, Power, 300A	QL09	IR300U40
6A2A1CR10	Diode, Power, 300A	QL09	IR300U40
6A2A1CR11	Diode, Power, 300A	QL09	IR300U40
6A2A1CR12	Diode, Power, 300A	QL09	IR300U40
6A2A1RV1	Varistor	QI15	Z21L331

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A2A1RV2	Varistor	QI15	Z21L331
6A2A1RV3	Varistor	QI15	Z21L331
6A2A1RV4	Varistor	QI15	Z21L331
6A2A1RV5	Varistor	QI15	Z21L331
6A2A1RV6	Varistor	QI15	Z21L331
6A2J1	Jack, Tip, Violet, Teflon	J020	450-4355-1-0317
6A2J2	Jack, Tip, Violet, Teflon	J020	450-4355-1-0317
6A2J3	Jack, Tip, Violet, Teflon	J020	450-4355-1-0317
6A2R1	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
6A2R2	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
6A2R3	Resistor, Film, 10K ohms, 2% 1/2W	RAP13	RL20S103G
6A2R4	Resistor, Wirewound, 100 ohms, 5% 130W	RWP07	HL130-100 Ohms-5%
% 6A2T1	Transformer, 208Vac, 3-phase, 50/60 Hz	TC24	149-8034
# 6A2T1	Transformer, 600Vac, 3-phase, 50/60 Hz	TC25	149-8035
* 6A2T1	Transformer, 480Vac, 3-phase, 50/60 Hz	TC27	149-8037
6A3	Same As A2		
6B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B3	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B4	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B5	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B6	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B7	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6B8	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6CR5	Diode, General Purpose, Small Signal	QAP29	1N4938
6CR6	Diode, General Purpose, Small Signal	QAP29	1N4938
6DS1	Diode, Light Emitting, Green	QK12	5082-4992
6DS2	Diode, Light Emitting, Green	QK12	5082-4992
6DS3	Diode, Light Emitting, Green	QK12	5082-4992
6DS4	Diode, Light Emitting, Green	QK12	5082-4992
6DS5	Diode, Light Emitting, Green	QK12	5082-4992
6DS6	Diode, Light Emitting, Green	QK12	5082-4992
6E1	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
6E2	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
6E3	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
6E4	Lug, Crimp, Joint, 18-12 AWG	HAM37	JN418-212-C
6F1	Fuse, 10A, 250V, Slo-Blo, Type 3AB	FB35	326010
6F2	Fuse, 10A, 250V, Slo-Blo, Type 3AB	FB35	326010
6F3	Fuse, 2A, 250V, Slo-Blo, Type 3AB	FB25	323002
6F4	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
6F5	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	FB21	3231.5
6K1	Relay, 24Vdc Coil	KAP05	1315-4C-24D
6P1	Cord and Connector Assembly	ZA14	428056
6P2	Cord and Connector Assembly	ZA14	428056

Table 7-2 Reference Designation Index (continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6P3	Cord and Connector Assembly	ZA14	428056
6P4	Cord and Connector Assembly	ZA14	428056
6P5	Cord and Connector Assembly	ZA14	428056
6P6	Cord and Connector Assembly	ZA14	428056
6P7	Cord and Connector Assembly	ZA14	428056
6P8	Cord and Connector Assembly	ZA14	428056
6P9	Cord and Connector Assembly	ZA14	428056
6P10	Cord and Connector Assembly	ZA14	428056
6P11	Connector, Tip, White	JN14	105-0301-001
6P12	Connector, Tip, White	JN14	105-0301-001
6P13	Connector, Tip, White	JN14	105-0301-001
6P14	Connector, Tip, White	JN14	105-0301-001
6P15	Connector, Tip, White	JN14	105-0301-001
6P16	Connector, Tip, White	JN14	105-0301-001
6S1	Switch, Interlock	SC15	11TL6-4
6S2	Switch, Interlock	SC15	11TL6-4
6S3	Switch Therm, NC, 10A, 120Vac	SC36	30000-48
6TB1	Terminal Block, Barrier, 8-terminal	JB05	8-140
6TB2	Terminal Block, Barrier, 6-terminal	JC01	6-140
6XDS1	Socket, LED	QK25	PS-200-B
6XDS2	Socket, LED	QK25	PS-200-B
6XDS3	Socket, LED	QK25	PS-200-B
6XDS4	Socket, LED	QK25	PS-200-B
6XDS5	Socket, LED	QK25	PS-200-B
6XDS6	Socket, LED	QK25	PS-200-B
6XF1	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
6XF2	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
6XF3	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
6XF4	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
6XF5	Fuseholder, Panel, Type 3AG Fuse	BAP30	342012A
6XK1	Relay Socket	KA19	1310-1ST

¢ Denotes part is frequency dependent. Determine carrier frequency of transmitter and refer to tables 7-3 thru 7-14.

$ Denotes parts for this assembly not included in this index. Refer to appropriate module booklet for breakdown.

# Denotes used when ac power source is 3-phase, 600V rms, 50/60 Hz

% Denotes used when ac power source is 3-phase, 208V rms, 50/60 Hz

* Denotes used when ac power source is 3-phase, 480V rms, 50/60 Hz

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Table 7-3 Frequency Dependent Ref Des Index (535-578 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (535-578 kHz)	NAF37/1	149-6000-1
1A3C1	Capacitor, Mica, 10000pF 5%, 4000V	CU33	29140B103J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-1	149-6016-1
1A3L2	Inductor	149-6016-1	149-6016-1
1A3L3	Inductor	149-6016-1	149-6016-1
1A3L4	Inductor	149-6016-1	149-6016-1
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (535-578 kHz)	NAF39/1	149-6031-1
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (530-822 kHz)	NAFP13/1	149-6060-1
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 7.5-18.0uH	LV09	4000-21
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-3 Frequency Dependent Ref Des Index (535-578 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 7500pF 5%, 10 000V	CU08	293100B752J00
6A1C2	Capacitor, Mica, 7500pF 5%, 10 000V	CU08	293100B752J00
6A1C3	Capacitor, Mica, 7500pF 5%, 10 000V	CU08	293100B752J00
6A1C4	Capacitor, Mica, 7500pF 5%, 10 000V	CU08	293100B752J00
6A1C5	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C6	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C7	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C8	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C9	Capacitor, Mica, 2000pF 5%, 15 000V	CU28	293150B202J00
6A1C10	Capacitor, Mica, 15000pF 5%, 5 000V	CU40	29350B153J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-1	149-6080-1
6A1L2	Coil, Tuning, RF	149-6080-1	149-6080-1
6A1L3	Coil, Tuning, RF	149-6080-1	149-6080-1
6A1L4	Coil, Tuning, RF	149-6080-1	149-6080-1
6A1L5	Coil, Tuning, RF	149-6083-1	149-6083-1
6A1L6	Coil, Tuning, RF	149-6086-1	149-6086-1
6A1L7	Coil, Tuning, RF	149-6089-1	149-6089-1

Table 7-4 Frequency Dependent Ref Des Index (578-638 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (578-638 kHz)	NAF37/2	149-6000-2
1A3C1	Capacitor, Mica, 9100pF 5%, 4000V	CU24	29140B912J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-2	149-6016-2
1A3L2	Inductor	149-6016-2	149-6016-2
1A3L3	Inductor	149-6016-2	149-6016-2
1A3L4	Inductor	149-6016-2	149-6016-2
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (578-638 kHz)	NAF39/2	149-6031-2
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (530-822 kHz)	NAFP13/1	149-6060-1
6A1A2C1	Capacitor, Ceramic, 50pF ±10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 7.5-18.0uH	LV09	4000-21
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-4 Frequency Dependent Ref Des Index (578-638 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 6800pF 5%, 10 000V	CU14	293100B682J00
6A1C2	Capacitor, Mica, 6800pF 5%, 10 000V	CU14	293100B682J00
6A1C3	Capacitor, Mica, 6800pF 5%, 10 000V	CU14	293100B682J00
6A1C4	Capacitor, Mica, 6800pF 5%, 10 000V	CU14	293100B682J00
6A1C5	Capacitor, Mica, 1600pF 5%, 15 000V	CU29	293150B162J00
6A1C6	Capacitor, Mica, 1600pF 5%, 15 000V	CU29	293150B162J00
6A1C7	Capacitor, Mica, 1600pF 5%, 15 000V	CU29	293150B162J00
6A1C8	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C9	Capacitor, Mica, 1800pF 5%, 15 000V	CU27	293150B182J00
6A1C10	Capacitor, Mica, 13000pF 5%, 5 000V	CU41	29350B133J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-2	149-6080-2
6A1L2	Coil, Tuning, RF	149-6080-2	149-6080-2
6A1L3	Coil, Tuning, RF	149-6080-2	149-6080-2
6A1L4	Coil, Tuning, RF	149-6080-2	149-6080-2
6A1L5	Coil, Tuning, RF	149-6083-2	149-6083-2
6A1L6	Coil, Tuning, RF	149-6086-2	149-6086-2
6A1L7	Coil, Tuning, RF	149-6089-2	149-6089-2

Table 7-5 Frequency Dependent Ref Des Index (638-703 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (638-703 kHz)	NAF37/3	149-6000-3
1A3C1	Capacitor, Mica, 8200pF 5%, 4000V	CU15	29140B822J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-3	149-6016-3
1A3L2	Inductor	149-6016-3	149-6016-3
1A3L3	Inductor	149-6016-3	149-6016-3
1A3L4	Inductor	149-6016-3	149-6016-3
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (638-703 kHz)	NAF39/3	149-6031-3
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (530-822 kHz)	NAFP13/1	149-6060-1
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 7.5-18.0uH	LV09	4000-21
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-5 Frequency Dependent Ref Des Index (638-703 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 6200pF 5%, 10 000V	CU22	293100B622J00
6A1C2	Capacitor, Mica, 6200pF 5%, 10 000V	CU22	293100B622J00
6A1C3	Capacitor, Mica, 6200pF 5%, 10 000V	CU22	293100B622J00
6A1C4	Capacitor, Mica, 6200pF 5%, 10 000V	CU22	293100B622J00
6A1C5	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C6	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C7	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C8	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C9	Capacitor, Mica, 1600pF 5%, 15 000V	CU29	293150B162J00
6A1C10	Capacitor, Mica, 12000pF 5%, 5 000V	CU42	29350B123J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-3	149-6080-3
6A1L2	Coil, Tuning, RF	149-6080-3	149-6080-3
6A1L3	Coil, Tuning, RF	149-6080-3	149-6080-3
6A1L4	Coil, Tuning, RF	149-6080-3	149-6080-3
6A1L5	Coil, Tuning, RF	149-6083-3	149-6083-3
6A1L6	Coil, Tuning, RF	149-6086-3	149-6086-3
6A1L7	Coil, Tuning, RF	149-6089-3	149-6089-3

Table 7-6 Frequency Dependent Ref Des Index (703-772 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (703-772 kHz)	NAF37/4	149-6000-4
1A3C1	Capacitor, Mica, 7500pF 5%, 4000V	CU01	29140B752J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-4	149-6016-4
1A3L2	Inductor	149-6016-4	149-6016-4
1A3L3	Inductor	149-6016-4	149-6016-4
1A3L4	Inductor	149-6016-4	149-6016-4
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (703-772 kHz)	NAF39/4	149-6031-4
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (530-822 kHz)	NAFP13/1	149-6060-1
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 7.5-18.0uH	LV09	4000-21
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-6 Frequency Dependent Ref Des Index (703-772 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 5600pF 5%, 10 000V	CU16	293100B562J00
6A1C2	Capacitor, Mica, 5600pF 5%, 10 000V	CU16	293100B562J00
6A1C3	Capacitor, Mica, 5600pF 5%, 10 000V	CU16	293100B562J00
6A1C4	Capacitor, Mica, 5600pF 5%, 10 000V	CU16	293100B562J00
6A1C5	Capacitor, Mica, 1300pF 5%, 15 000V	CU35	293150B132J00
6A1C6	Capacitor, Mica, 1300pF 5%, 15 000V	CU35	293150B132J00
6A1C7	Capacitor, Mica, 1300pF 5%, 15 000V	CU35	293150B132J00
6A1C8	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C9	Capacitor, Mica, 1500pF 5%, 15 000V	CU34	293150B152J00
6A1C10	Capacitor, Mica, 11000pF 5%, 8 000V	CV01	29380B113J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-4	149-6080-4
6A1L2	Coil, Tuning, RF	149-6080-4	149-6080-4
6A1L3	Coil, Tuning, RF	149-6080-4	149-6080-4
6A1L4	Coil, Tuning, RF	149-6080-4	149-6080-4
6A1L5	Coil, Tuning, RF	149-6083-4	149-6083-4
6A1L6	Coil, Tuning, RF	149-6086-4	149-6086-4
6A1L7	Coil, Tuning, RF	149-6089-4	149-6089-4

Table 7-7 Frequency Dependent Ref Des Index (772-849 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (772-849 kHz)	NAF37/5	149-6000-5
1A3C1	Capacitor, Mica, 6800pF 5%, 4000V	CU02	29140B682J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-5	149-6016-5
1A3L2	Inductor	149-6016-5	149-6016-5
1A3L3	Inductor	149-6016-5	149-6016-5
1A3L4	Inductor	149-6016-5	149-6016-5
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (772-849 kHz)	NAF39/5	149-6031-5
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (750-1300 kHz)	NAFP13/2	149-6060-2
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 3.0-9.0uH	LV07	4000-17
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-7 Frequency Dependent Ref Des Index (772-849 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 100 ohms, 2% 1/2W	RAP05	RL20S101G
6A1A2R2	Resistor, Film, 100 ohms, 2% 1/2W	RAP05	RL20S101G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 5100pF 5%, 10 000V	CU17	293100B512J00
6A1C2	Capacitor, Mica, 5100pF 5%, 10 000V	CU17	293100B512J00
6A1C3	Capacitor, Mica, 5100pF 5%, 10 000V	CU17	293100B512J00
6A1C4	Capacitor, Mica, 5100pF 5%, 10 000V	CU17	293100B512J00
6A1C5	Capacitor, Mica, 1200pF 5%, 15 000V	CU36	293150B122J00
6A1C6	Capacitor, Mica, 1200pF 5%, 15 000V	CU36	293150B122J00
6A1C7	Capacitor, Mica, 1200pF 5%, 15 000V	CU36	293150B122J00
6A1C8	Capacitor, Mica, 1300pF 5%, 15 000V	CU35	293150B132J00
6A1C9	Capacitor, Mica, 1300pF 5%, 15 000V	CU35	293150B132J00
6A1C10	Capacitor, Mica, 10000pF 5%, 8 000V	CV02	29380B103J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-5	149-6080-5
6A1L2	Coil, Tuning, RF	149-6080-5	149-6080-5
6A1L3	Coil, Tuning, RF	149-6080-5	149-6080-5
6A1L4	Coil, Tuning, RF	149-6080-5	149-6080-5
6A1L5	Coil, Tuning, RF	149-6083-5	149-6083-5
6A1L6	Coil, Tuning, RF	149-6086-5	149-6086-5
6A1L7	Coil, Tuning, RF	149-6089-5	149-6089-5

Table 7-8 Frequency Dependent Ref Des Index (849-935 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (849-935 kHz)	NAF37/6	149-6000-6
1A3C1	Capacitor, Mica, 6200pF 5%, 4000V	CU03	29140B622J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-6	149-6016-6
1A3L2	Inductor	149-6016-6	149-6016-6
1A3L3	Inductor	149-6016-6	149-6016-6
1A3L4	Inductor	149-6016-6	149-6016-6
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (849-935 kHz)	NAF39/6	149-6031-6
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (750-1300 kHz)	NAFP13/2	149-6060-2
6A1A2C1	Capacitor, Ceramic, 50pF ±10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 3.0-9.0uH	LV07	4000-17
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-8 Frequency Dependent Ref Des Index (849-935 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 4700pF 5%, 10 000V	CU18	293100B472J00
6A1C2	Capacitor, Mica, 4700pF 5%, 10 000V	CU18	293100B472J00
6A1C3	Capacitor, Mica, 4700pF 5%, 10 000V	CU18	293100B472J00
6A1C4	Capacitor, Mica, 4700pF 5%, 10 000V	CU18	293100B472J00
6A1C5	Capacitor, Mica, 1100pF 5%, 20 000V	CU37	293200B112J00
6A1C6	Capacitor, Mica, 1100pF 5%, 20 000V	CU37	293200B112J00
6A1C7	Capacitor, Mica, 1100pF 5%, 20 000V	CU37	293200B112J00
6A1C8	Capacitor, Mica, 1200pF 5%, 15 000V	CU36	293150B122J00
6A1C9	Capacitor, Mica, 1200pF 5%, 15 000V	CU36	293150B122J00
6A1C10	Capacitor, Mica, 9100pF 5%, 8 000V	CV03	29380B912J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-6	149-6080-6
6A1L2	Coil, Tuning, RF	149-6080-6	149-6080-6
6A1L3	Coil, Tuning, RF	149-6080-6	149-6080-6
6A1L4	Coil, Tuning, RF	149-6080-6	149-6080-6
6A1L5	Coil, Tuning, RF	149-6083-6	149-6083-6
6A1L6	Coil, Tuning, RF	149-6086-6	149-6086-6
6A1L7	Coil, Tuning, RF	149-6089-6	149-6089-6

Table 7-9 Frequency Dependent Ref Des Index (935-1031 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (935-1031 kHz)	NAF37/7	149-6000-7
1A3C1	Capacitor, Mica, 5600pF 5%, 4000V	CYP15	29140B562J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-7	149-6016-7
1A3L2	Inductor	149-6016-7	149-6016-7
1A3L3	Inductor	149-6016-7	149-6016-7
1A3L4	Inductor	149-6016-7	149-6016-7
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (935-1031 kHz)	NAF39/7	149-6031-7
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (750-1300 kHz)	NAFP13/2	149-6060-2
6A1A2C1	Capacitor, Ceramic, 50pF ±10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 3.0-9.0uH	LV07	4000-17
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-9 Frequency Dependent Ref Des Index (935-1031 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 4300pF 5%, 12 000V	CU19	293120B432J00
6A1C2	Capacitor, Mica, 4300pF 5%, 12 000V	CU19	293120B432J00
6A1C3	Capacitor, Mica, 4300pF 5%, 12 000V	CU19	293120B432J00
6A1C4	Capacitor, Mica, 4300pF 5%, 12 000V	CU19	293120B432J00
6A1C5	Capacitor, Mica, 1000pF 5%, 20 000V	CU11	293200B102J00
6A1C6	Capacitor, Mica, 1000pF 5%, 20 000V	CU11	293200B102J00
6A1C7	Capacitor, Mica, 1000pF 5%, 20 000V	CU11	293200B102J00
6A1C8	Capacitor, Mica, 1100pF 5%, 20 000V	CU37	293200B112J00
6A1C9	Capacitor, Mica, 1100pF 5%, 20 000V	CU37	293200B112J00
6A1C10	Capacitor, Mica, 8200pF 5%, 10 000V	CV04	293100B822J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-7	149-6080-7
6A1L2	Coil, Tuning, RF	149-6080-7	149-6080-7
6A1L3	Coil, Tuning, RF	149-6080-7	149-6080-7
6A1L4	Coil, Tuning, RF	149-6080-7	149-6080-7
6A1L5	Coil, Tuning, RF	149-6083-7	149-6083-7
6A1L6	Coil, Tuning, RF	149-6086-7	149-6086-7
6A1L7	Coil, Tuning, RF	149-6089-7	149-6089-7

Table 7-10 Frequency Dependent Ref Des Index (1031-1126 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (1031-1126 kHz)	NAF37/8	149-6000-8
1A3C1	Capacitor, Mica, 5100pF 5%, 4000V	CU13	29140B512J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-8	149-6016-8
1A3L2	Inductor	149-6016-8	149-6016-8
1A3L3	Inductor	149-6016-8	149-6016-8
1A3L4	Inductor	149-6016-8	149-6016-8
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (1031-1126 kHz)	NAF39/8	149-6031-8
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (750-1300 kHz)	NAFP13/2	149-6060-2
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 3.0-9.0uH	LV07	4000-17
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-10 Frequency Dependent Ref Des Index (1031-1126 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 3900pF 5%, 12 000V	CU12	293120B392J00
6A1C2	Capacitor, Mica, 3900pF 5%, 12 000V	CU12	293120B392J00
6A1C3	Capacitor, Mica, 3900pF 5%, 12 000V	CU12	293120B392J00
6A1C4	Capacitor, Mica, 3900pF 5%, 12 000V	CU12	293120B392J00
6A1C5	Capacitor, Mica, 910pF 5%, 20 000V	CU10	293200B911J00
6A1C6	Capacitor, Mica, 910pF 5%, 20 000V	CU10	293200B911J00
6A1C7	Capacitor, Mica, 910pF 5%, 20 000V	CU10	293200B911J00
6A1C8	Capacitor, Mica, 1000pF 5%, 20 000V	CU11	293200B102J00
6A1C9	Capacitor, Mica, 1000pF 5%, 20 000V	CU11	293200B102J00
6A1C10	Capacitor, Mica, 7500pF 5%, 10 000V	CU08	293100B752J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-8	149-6080-8
6A1L2	Coil, Tuning, RF	149-6080-8	149-6080-8
6A1L3	Coil, Tuning, RF	149-6080-8	149-6080-8
6A1L4	Coil, Tuning, RF	149-6080-8	149-6080-8
6A1L5	Coil, Tuning, RF	149-6083-8	149-6083-8
6A1L6	Coil, Tuning, RF	149-6086-8	149-6086-8
6A1L7	Coil, Tuning, RF	149-6089-8	149-6089-8

Table 7-11 Frequency Dependent Ref Des Index (1126-1226 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (1126-1226 kHz)	NAF37/9	149-6000-9
1A3C1	Capacitor, Mica, 4700pF 5%, 6000V	CYP14	29160B472J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-9	149-6016-9
1A3L2	Inductor	149-6016-9	149-6016-9
1A3L3	Inductor	149-6016-9	149-6016-9
1A3L4	Inductor	149-6016-9	149-6016-9
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (1126-1226 kHz)	NAF39/9	149-6031-9
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (750-1300 kHz)	NAFP13/2	149-6060-2
6A1A2C1	Capacitor, Ceramic, 50pF ±10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 3.0-9.0uH	LV07	4000-17
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-11 Frequency Dependent Ref Des Index (1126-1226 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 3600pF 5%, 12 000V	CU25	293120B362J00
6A1C2	Capacitor, Mica, 3600pF 5%, 12 000V	CU25	293120B362J00
6A1C3	Capacitor, Mica, 3600pF 5%, 12 000V	CU25	293120B362J00
6A1C4	Capacitor, Mica, 3600pF 5%, 12 000V	CU25	293120B362J00
6A1C5	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C6	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C7	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C8	Capacitor, Mica, 910pF 5%, 20 000V	CU10	293200B911J00
6A1C9	Capacitor, Mica, 910pF 5%, 20 000V	CU10	293200B911J00
6A1C10	Capacitor, Mica, 6800pF 5%, 10 000V	CU14	293100B682J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-9	149-6080-9
6A1L2	Coil, Tuning, RF	149-6080-9	149-6080-9
6A1L3	Coil, Tuning, RF	149-6080-9	149-6080-9
6A1L4	Coil, Tuning, RF	149-6080-9	149-6080-9
6A1L5	Coil, Tuning, RF	149-6083-9	149-6083-9
6A1L6	Coil, Tuning, RF	149-6086-9	149-6086-9
6A1L7	Coil, Tuning, RF	149-6089-9	149-6089-9

Table 7-12 Frequency Dependent Ref Des Index (1226-1346 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (1226-1346 kHz)	NAF37/10	149-6000-10
1A3C1	Capacitor, Mica, 4300pF 5%, 6000V	CU06	29160B432J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-10	149-6016-10
1A3L2	Inductor	149-6016-10	149-6016-10
1A3L3	Inductor	149-6016-10	149-6016-10
1A3L4	Inductor	149-6016-10	149-6016-10
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (1226-1346 kHz)	NAF39/10	149-6031-10
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (1186-1974 kHz)	NAFP13/3	149-6060-3
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 1.3-3.6uH	LV05	4000-13
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-12 Frequency Dependent Ref Des Index (1226-1346 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 3300pF 5%, 12 000V	CU31	293120B332J00
6A1C2	Capacitor, Mica, 3300pF 5%, 12 000V	CU31	293120B332J00
6A1C3	Capacitor, Mica, 3300pF 5%, 12 000V	CU31	293120B332J00
6A1C4	Capacitor, Mica, 3300pF 5%, 12 000V	CU31	293120B332J00
6A1C5	Capacitor, Mica, 750pF 5%, 20 000V	CU09	293200B751J00
6A1C6	Capacitor, Mica, 750pF 5%, 20 000V	CU09	293200B751J00
6A1C7	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C8	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C9	Capacitor, Mica, 820pF 5%, 20 000V	CU21	293200B821J00
6A1C10	Capacitor, Mica, 6200pF 5%, 10 000V	CU22	293100B622J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-10	149-6080-10
6A1L2	Coil, Tuning, RF	149-6080-10	149-6080-10
6A1L3	Coil, Tuning, RF	149-6080-10	149-6080-10
6A1L4	Coil, Tuning, RF	149-6080-10	149-6080-10
6A1L5	Coil, Tuning, RF	149-6083-10	149-6083-10
6A1L6	Coil, Tuning, RF	149-6086-10	149-6086-10
6A1L7	Coil, Tuning, RF	149-6089-10	149-6089-10

Table 7-13 Frequency Dependent Ref Des Index (1346-1471 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (1346-1471 kHz)	NAF37/11	149-6000-11
1A3C1	Capacitor, Mica, 3900pF 5%, 6000V	CYP13	2916OB392J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-11	149-6016-11
1A3L2	Inductor	149-6016-11	149-6016-11
1A3L3	Inductor	149-6016-11	149-6016-11
1A3L4	Inductor	149-6016-11	149-6016-11
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (1346-1471 kHz)	NAF39/11	149-6031-11
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (1186-1974 kHz)	NAFP13/3	149-6060-3
6A1A2C1	Capacitor, Ceramic, 50pF $\pm$10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 1.3-3.6uH	LV05	4000-13
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-13 Frequency Dependent Ref Des Index (1346-1471 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 3000pF 5%, 12 000V	CU30	293120B302J00
6A1C2	Capacitor, Mica, 3000pF 5%, 12 000V	CU30	293120B302J00
6A1C3	Capacitor, Mica, 3000pF 5%, 12 000V	CU30	293120B302J00
6A1C4	Capacitor, Mica, 3000pF 5%, 12 000V	CU30	293120B302J00
6A1C5	Capacitor, Mica, 680pF 5%, 20 000V	CU38	293200B681J00
6A1C6	Capacitor, Mica, 680pF 5%, 20 000V	CU38	293200B681J00
6A1C7	Capacitor, Mica, 750pF 5%, 20 000V	CU09	293200B751J00
6A1C8	Capacitor, Mica, 750pF 5%, 20 000V	CU09	293200B751J00
6A1C9	Capacitor, Mica, 750pF 5%, 20 000V	CU09	293200B751J00
6A1C10	Capacitor, Mica, 5600pF 5%, 10 000V	CU16	293100B562J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-11	149-6080-11
6A1L2	Coil, Tuning, RF	149-6080-11	149-6080-11
6A1L3	Coil, Tuning, RF	149-6080-11	149-6080-11
6A1L4	Coil, Tuning, RF	149-6080-11	149-6080-11
6A1L5	Coil, Tuning, RF	149-6083-11	149-6083-11
6A1L6	Coil, Tuning, RF	149-6086-11	149-6086-11
6A1L7	Coil, Tuning, RF	149-6089-11	149-6089-11

Table 7-14 Frequency Dependent Ref Des Index (1471-1605 kHz)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
1A3	Quad Combiner/Filter (1471-1605 kHz)	NAF37/12	149-6000-12
1A3C1	Capacitor, Mica, 3600pF 5%, 12000V	CU20	29160B362J02
1A3J1	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J2	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J3	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J4	Connector Assembly, Socket, 2-pin	149-1081	149-1081
1A3J5	Connector, RF Coaxial, Phono, Jack	JS02	3505F
1A3L1	Inductor	149-6016-12	149-6016-12
1A3L2	Inductor	149-6016-12	149-6016-12
1A3L3	Inductor	149-6016-12	149-6016-12
1A3L4	Inductor	149-6016-12	149-6016-12
1A3R1	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R2	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R3	Resistor, Film, 10 ohms, 2% 1/2W	RAP01	RL20S100G
1A3R4	Resistor, Film, 47 ohms, 2% 1/2W	RC21	RL20S470G
1A3S1	Switch, 1PDT	SA14	8816K9
1A3S2	Switch, 1PDT	SA14	8816K9
1A3S3	Switch, 1PDT	SA14	8816K9
1A3S4	Switch, 1PDT	SA14	8816K9
1A3T1	Transformer	149-6015	149-6015
6A1	Combiner/RF Filter (1471-1605 kHz)	NAF39/12	149-6031-12
6A1A1	Forward/Reflected Power Probe	NAFP12	149-6051
6A1A1C1	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1C2	Capacitor, Mica, 1800pF 2%, 500V	CB40	CM06FD182G03
6A1A1CR1	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR2	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR3	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1CR4	Diode, General Purpose, Small Signal	QAP29	1N4938
6A1A1J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J2	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1J3	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A1L1	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L2	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L3	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1L4	Inductor, Moulded, Shielded, 10000uH	LAP41	SWD10000
6A1A1R1	Resistor, Wirewound, 100 ohms, 5% 55W	RWP01	NHL55-100 Ohms-5%
6A1A1R2	Resistor, Film, 4700 ohms, 2% 1/2W	RD03	RL20S472G
6A1A1R3	Resistor, Film, 6800 ohms, 2% 1/2W	RD05	RL20S682G
6A1A1T1	Transformer	149-6052	149-6052
6A1A2	Output Voltage Probe (1186-1974 kHz)	NAFP13/3	149-6060-3
6A1A2C1	Capacitor, Ceramic, 50pF ±10%, 15,000V	CCG42	CRL857
6A1A2C2	Capacitor, Variable, 1000-2155pF, 500V	CY08	GME51301
6A1A2C3	Capacitor, Mica, 3300pF 2%, 500V	CCD18	CM06FD332G03
6A1A2J1	Connector, RF Coaxial, Phono, Jack	JS02	3505F
6A1A2L1	Inductor, Variable, 1.3-3.6uH	LV05	4000-13
6A1A2L2	Inductor, Moulded, Shielded, 1000uH	LAP39	SWD1000
6A1A2P1	Connector, RF Coaxial, Phono, Plug	JS01	3507

Table 7-14 Frequency Dependent Ref Des Index (1471-1605 kHz) (Continued)

REF DES	NAME OF PART AND DESCRIPTION	NAUTEL'S PART NO.	JAN, MIL OR MFR PART NO.
6A1A2R1	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2R2	Resistor, Film, 33 ohms, 2% 1/2W	RAP03	RL20S330G
6A1A2RV1	Varistor, 60V rms, 0.45 Joules	QI21	V100MA4B
6A1B1	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1B2	Fan, 115V, 50/60Hz, Muffin XL	ZA06	MX2B3-028422
6A1C1	Capacitor, Mica, 2700pF 5%, 12 000V	CU26	293120B272J00
6A1C2	Capacitor, Mica, 2700pF 5%, 12 000V	CU26	293120B272J00
6A1C3	Capacitor, Mica, 2700pF 5%, 12 000V	CU26	293120B272J00
6A1C4	Capacitor, Mica, 2700pF 5%, 12 000V	CU26	293120B272J00
6A1C5	Capacitor, Mica, 620pF 5%, 20 000V	CU39	293200B621J00
6A1C6	Capacitor, Mica, 620pF 5%, 20 000V	CU39	293200B621J00
6A1C7	Capacitor, Mica, 680pF 5%, 20 000V	CU38	293200B681J00
6A1C8	Capacitor, Mica, 680pF 5%, 20 000V	CU38	293200B681J00
6A1C9	Capacitor, Mica, 680pF 5%, 20 000V	CU38	293200B681J00
6A1C10	Capacitor, Mica, 5100pF 5%, 10 000V	CU17	293100B512J00
6A1E1	Spark Gap Assembly	149-6120	149-6120
6A1E2	Bus Bar, Rf Input	149-6074-2	149-6074-2
6A1J1	Output Connector Assembly, 3 1/8" EIA	149-6098-2	149-6098-2
6A1L1	Coil, Tuning, RF	149-6080-12	149-6080-12
6A1L2	Coil, Tuning, RF	149-6080-12	149-6080-12
6A1L3	Coil, Tuning, RF	149-6080-12	149-6080-12
6A1L4	Coil, Tuning, RF	149-6080-12	149-6080-12
6A1L5	Coil, Tuning, RF	149-6083-12	149-6083-12
6A1L6	Coil, Tuning, RF	149-6086-12	149-6086-12
6A1L7	Coil, Tuning, RF	149-6089-12	149-6089-12

Table 7-15 Parts Per Unit Index (No Frequency Dependent Parts)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
AMPFET 50	AM Broadcast Transmitter, 50 kW	149-8100-1	37338	1
149-1080	Connector Assembly, Plug, 2-pin	149-1080	37338	96
149-1081	Connector Assembly, Socket, 2-pin	149-1081	37338	48
149-1082	Connector Assembly, Plug, 9-pin	149-1082	37338	51
149-1082-1	Connector Assembly, Socket, 9-pin	149-1082-1	37338	3
149-1083	Connector Assembly, Socket, 9-pin	149-1083	37338	1
149-1083-1	Connector Assembly, Plug, 9-pin	149-1083-1	37338	1
149-1085	Connector Assembly, Plug, 23-pin	149-1085	37338	1
149-1085-1	Connector Assembly, Plug, 22-pin	149-1085-1	37338	1
149-1085-2	Connector Assembly, Plug, 36-pin	149-1085-2	37338	1
149-1086	Connector Assembly, Socket, 23-pin	149-1086	37338	1
149-1086-1	Connector Assembly, Socket, 22-pin	149-1086-1	37338	1
149-1086-2	Connector Assembly, Socket, 36-pin	149-1086-2	37338	1
149-4011	Meter PCB Assembly	149-4011	37338	1
149-4028	Inductor, 1353uH	149-4028	37338	1
149-6015	Transformer	149-6015	37338	12
149-6052	Transformer	149-6052	37338	1
149-6074-2	Bus Bar, Rf Input	149-6074-2	37338	1
149-6098-2	Output Connector Assembly, 3 1/8" EIA	149-6098-2	37338	1
149-6120	Spark Gap Assembly	149-6120	37338	1
149-7017	Rectifier Assy, 3-Phase, 400V 1000A	149-7017	37338	2
149-8020	Relay Control Panel PCB Assembly	149-8020	37338	12
149-8028	Transformer, RF	149-8028	37338	12
149-8053	Cable Duct Assembly	149-8053	37338	3
149-8053-1	Cable Duct Assembly	149-8053-1	37338	3
149-8053-2	Cable Duct Assembly	149-8053-2	37338	3
149-8053-3	Cable Duct Assembly	149-8053-3	37338	3
149-8057	Cable Assembly	149-8057	37338	24
149-8057-1	Cable Assembly	149-8057-1	37338	24
149-8066-1	Shunt strap	149-8066-1	37338	2
149-8098	Overvoltage Protection PCB Assembly	149-8098	37338	1
149-8106	On/Off Control PCB Assembly	149-8106	37338	1
149-8122-1	Transient Clipper Assembly	149-8122-1	37338	1
BAP30	Fuseholder, Panel, Type 3AG Fuse	342012A	75915	29
CB40	Capacitor, Mica, 1800pF 2% 500V	CM06FD182G03	14655	4
CCD18	Capacitor, Mica, 3300pF 2%, 500V	CM06FD332G03	14655	1
CCG01	Capacitor, Ceramic, 0.001uF 10%, 200V	CKR05BX102KL	56289	2
CCG04	Capacitor, Ceramic, 0.01uF 10%, 100V	CKR05BX103KL	56289	2
CCG05	Capacitor, Ceramic, 0.022uF 10%, 100V	CKR06BX223KL	56289	1
CCG07	Capacitor, Ceramic, 0.1uF 10%, 100V	CKR06BX104KL	56289	42
CCG08	Capacitor, Ceramic, 0.22uF 10%, 50V	CKR06BX224KL	56289	1
CCG42	Capacitor, Ceramic, 50pF ±10%, 15,000V	CRL857	56289	1
CCP19	Capacitor, Tantalum, 6.8uF 10%, 35V	CSR13F685KM	56289	2
CCP24	Capacitor, Tantalum, 1.0uF 10%, 50V	CSR13G105KM	56289	30
CNP15	Capacitor, Plastic, 0.47uF 10%, 250V	52003474K	37903	2
CNP37	Capacitor, Plastic, 20uF 10%, 200V	735P206X9200ZVL	56289	2
CNP38	Capacitor, Plastic, 2.2uF 20%, 250V	52003225M	37903	12
CY08	Capacitor, Variable, 1000-2155pF, 500V	GME51301	52769	1

Table 7-15 Parts Per Unit Index (No Frequency Dependent Parts) (continued)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
FA25	Fuse Block, 2 Pole, Type 3AG	357002	75915	1
FA26	Fuse Block, 1 Pole, Type 3AG	357001	75915	1
FB21	Fuse, 1.5A, 250V, Slo-Blo, Type 3AB	3231.5	75915	14
FB25	Fuse, 2A, 250V, Slo-Blo, Type 3AB	323002	75915	1
FB30	Fuse, 2.5A, 250V, Dual Element,Type MDA	MDA2 1/2	71400	12
FB35	Fuse, 10A, 250V, Slo-Blo, Type 3AB	326010	75915	2
FB41	Fuse, 20A, 250V, Time-Delay	MDA20	71400	3
FC39	Fuse, 40A, 300V	SC40	71400	48
HAM37	Lug, Crimp, Joint, 18-12 AWG	JN418-212-C	06383	28
JB01	Terminal Block, Barrier, 2-terminal	2-140	71785	2
JB03	Terminal Block, Barrier, 4-terminal	4-140	71785	1
JB05	Terminal Block, Barrier, 8-terminal	8-140	71785	1
JB07	Terminal Block, Barrier, 6-terminal	6-140Y	71785	1
JB09	Terminal Block, Barrier, 10-terminal	10-140	71785	2
JB23	Terminal Block, Barrier, 8-terminal	8-140Y	71785	12
JC01	Terminal Block, Barrier, 6-terminal	6-140	71785	9
JC31	Terminal Block, Barrier, 3-terminal	3-140Y	71785	12
JDP26	Connector, RF Coaxial, BNC, Bulkhead	UG1094/U	02660	1
JN14	Connector, Tip, White	105-0301-001	74970	7
JN25	Cord, Line Assembly	17250	70903	2
JO20	Jack, Tip, Violet, Teflon	450-4355-1-0317	71279	6
JR18	Terminal Block, Barrier, 22-terminal	GFT22	73631	1
JS01	Connector, RF Coaxial, Phono, Plug	3507	82389	68
JS02	Connector, RF Coaxial, Phono, Jack	3505F	82389	64
JU01	MTA, Closed End Housing, 4-pin, 22 AWG	640433-4	09482	3
JU03	MTA, Closed End Housing, 12-pin, 22 AWG	1-640433-2	09482	15
JU05	MTA, Closed end Housing, 4-pin, 20 AWG	640432-4	09482	1
JU20	MTA, Square Post Header Assy, 4-pin	640383-4	09482	4
JU21	MTA, Square Post Header Assy, 12-pin	1-640383-2	09482	15
KA19	Relay Socket	1310-1ST	73949	9
KAP03	Relay, Latching, 24Vdc Coil	MY2K-UA-DC24	34361	4
KAP05	Relay, 24Vdc Coil	1315-4C-24D	73949	5
KAP12	Relay, 24Vdc Coil	1515-3C-24D	73949	4
KAP15	Relay Socket	1510-1ST	73949	4
KAP23	Relay, DIP Reed, 12V, 1/2 Amp	JWD171-14	57739	12
KAP24	Relay, 24Vdc Coil	1345-1B-24D	73949	1
KAP39	Relay, DPST-NO, 24Vdc, 30 Amp	425BXX-24Vdc	78290	24
KB16	Relay, 24Vdc	HE721C2400	12617	2
LAP39	Inductor, Moulded, Shielded, 1000uH	SWD1000	00213	1
LAP41	Inductor, Moulded, Shielded, 10000uH	SWD10000	00213	4
LY09	Toroid	11-122-B	33062	21
MD03	Meter, FORWARD POWER	149-4009	32171	1
MD04	Meter, REFLECTED POWER	T2BA1-DMA-001	32171	1
MD05	Meter, DC SUPPLY CURRENT	T4BA1-DAA-500	32171	1
MD06	Meter, DC SUPPLY VOLTS	149-4010	32171	1
NAC27	Control/Monitor Panel Assembly	149-4000-1	37338	1
NAC29	Interface Panel Assembly	149-4021-1	37338	1

Table 7-15 Parts Per Unit Index (No Frequency Dependent Parts) (continued)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
$ NAE35	Exciter Drawer Assembly	149-3000	37338	2
NAFP12	Forward/Reflected Power Probe	149-6051	37338	1
$ NAP10	Power Amplifier Subsystem, 1.25 kW	149-1020	37338	48
NAPC10	RF Monitor PCB Assembly	149-4030	37338	1
NAPC11	Alarm Interface PCB Assembly	149-4014	37338	1
NAPC13	RF Protection Threshold PCB Assembly	149-4018-1	37338	1
NAR69	Cabinet, Control/Monitor, 50 kW	149-8000-1	37338	1
NAR70	Cabinet, 15 kW Power Block	149-8000-2	37338	4
NAR72	Cabinet, Rf Filter/Power Supply, 50 kW	149-8000-4	37338	1
# NASR60	AC/DC Power Supply, 600Vac, 3-phase	149-7000-1	37338	2
% NASR60/1	AC/DC Power Supply, 208Vac, 3-phase	149-7000-3	37338	2
* NASR60/2	AC/DC Power Supply, 480Vac, 3-phase	149-7000-5	37338	2
NAX25	Relay Control Panel Assembly	149-8017	37338	12
QAP06	Transistor, NPN	2N2222	04713	14
QAP09	Transistor, PNP	2N2907	04713	18
QAP18	Transistor, Field Effect, N Channel	IRFF130	81483	1
QAP29	Diode, General Purpose, Small Signal	1N4938	01295	96
QB06	Transistor, NPN, Power, High Voltage	2N3440	04713	13
QB11	Transistor, PNP	2N5416	04713	12
QE10	Transistor, NPN	2N3227	04713	6
QG08	Diode, Zener, 12.0V, 400mW, 10%	1N759	04713	1
QH35	Diode, Zener, 5.6V, 1.5W, 10%	1N5919A	04713	1
QI09	Transistor, NPN	2N5681	04713	7
QI15	Varistor	Z21L331	81483	12
QI21	Varistor, 60V rms, 0.45 Joules	V100MA4B	89473	1
QK12	Diode, Light Emitting, Green	5082-4992	50434	7
QK13	Diode, Light Emitting, Red	5082-4693	50434	20
QK14	Diode, Light Emitting, Amber	5082-4592	50434	1
QK15	Diode, Power Rectifier, 6A	1N5811	04713	4
QK25	Socket, LED	PS-200-B	15513	15
QL08	Diode, Power	IR300U40R	81483	12
QL09	Diode, Power	IR300U40	81483	12
QL20	Diode, Zener, 100V, 1.5W, 2%	1N5949C	04713	1
QL22	Diode, Zener, 4.7V, 1W 10%	1N4732	04713	12
QL24	Diode, Zener, 33V	1N4752	04713	1
QL25	Diode, Zener, 56V	1N4758	04713	4
RAP01	Resistor, Film, 10 ohms, 2% 1/2W	RL20S100G	36002	36
RAP03	Resistor, Film, 33 ohms, 2% 1/2W	RL20S330G	36002	2
RAP05	Resistor, Film, 100 ohms, 2% 1/2W	RL20S101G	36002	1
RAP07	Resistor, Film, 330 ohms, 2% 1/2W	RL20S331G	36002	1
RAP08	Resistor, Film, 560 ohms, 2% 1/2W	RL20S561G	36002	17
RAP09	Resistor, Film, 1000 ohms, 2% 1/2W	RL20S102G	36002	13
RAP11	Resistor, Film, 3300 ohms, 2% 1/2W	RL20S332G	36002	19
RAP12	Resistor, Film, 5600 ohms, 2% 1/2W	RL20S562G	36002	10
RAP13	Resistor, Film, 10K ohms, 2% 1/2W	RL20S103G	36002	35
RAP14	Resistor, Film, 18K ohms, 2% 1/2W	RL20S183G	36002	16
RAP15	Resistor, Film, 33K ohms, 2% 1/2W	RL20S333G	36002	38
RAP16	Resistor, Film, 56K ohms, 2% 1/2W	RL20S563G	36002	12
RAP17	Resistor, Film, 100K ohms, 2% 1/2W	RL20S104G	36002	16

Table 7-15 Parts Per Unit Index (No Frequency Dependent Parts) (continued)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
RAP19	Resistor, Film, 330K ohms, 2% 1/2W	RL20S334G	36002	2
RC21	Resistor, Film, 47 ohms, 2% 1/2W	RL20S470G	36002	12
RC30	Resistor, Film, 270 ohms, 2% 1/2W	RL20S271G	36002	1
RC35	Resistor, Film, 680 ohms, 2% 1/2W	RL20S681G	36002	2
RC42	Resistor, Film, 2700 ohms, 2% 1/2W	RL20S272G	36002	1
RD03	Resistor, Film, 4700 ohms, 2% 1/2W	RL20S472G	36002	1
RD05	Resistor, Film, 6800 ohms, 2% 1/2W	RL20S682G	36002	2
RD08	Resistor, Film, 12K ohms, 2% 1/2W	RL20S123G	36002	2
RD12	Resistor, Film, 27K ohms, 2% 1/2W	RL20S273G	36002	2
RD14	Resistor, Film, 39K ohms, 2% 1/2W	RL20S393G	36002	12
RD15	Resistor, Film, 47K ohms, 2% 1/2W	RL20S473G	36002	12
RD17	Resistor, Film, 68K ohms, 2% 1/2W	RL20S683G	36002	1
RD24	Resistor, Film, 270K ohms, 2% 1/2W	RL20S274G	36002	2
RF28	Resistor, Comp, 560K ohms, 5% 1/2W	RC20GF564J	36002	1
RF31	Resistor, Comp, 1.0M ohms, 5% 1/2W	RC20GF105J	36002	15
RF34	Resistor, Comp, 1.8M ohms, 5% 1/2W	RC20GF185J	36002	12
RF35	Resistor, Comp, 2.2M ohms, 5% 1/2W	RC20GF225J	36002	1
RK01	Resistor, Film, 360 ohms, 2% 1/2W	RL20S361G	36002	1
RS22	Resistor, Wirewound, 9 ohms, 10% 140W	HLZ140 9.0 Ohms-10%	35005	12
RS30	Resistor, Wirewound, 5000 ohms, 5% 3W	5843	44655	1
RS31	Resistor, Film, 20 ohms, 2% 1/2W	RL20S200G	36002	4
RS34	Resistor, Wirewound, 220 ohms, 5% 3W	CW-2B 220 ohms	35005	12
RT01	Resistor, Current Shunt, 50mV, 500A	06508	35104	4
RV41	Resistor, Variable, 100 ohms, 2W	3852A-162-101A	80294	3
RW24	Resistor, Variable, 100 ohms, 1/2W	63P101T000	02111	2
RWP01	Resistor, Wirewound, 100 ohms, 5% 55W	NHL55-100 Ohms-5%	35005	2
RWP07	Resistor, Wirewound, 100 ohms, 5% 130W	HL130-100 Ohms-5%	35005	2
RY25	Resistor, Film, 137K ohms, 1% 1/2W	RN60D1373F	36002	12
RZ01	Resistor, Film, 3.74K ohms, 1% 1/2W	RN60D3741F	36002	1
RZ02	Resistor, Film, 150K ohms, 1% 1/2W	RN60D1503F	36002	12
RZ10	Resistor, Film, 10K ohms, 1% 1/2W	RN60D1002F	36002	24
SA14	Switch, 1PDT	8816K9	08372	60
SA23	Switch, Toggle 4PDT	SF4GCY191	08372	1
SA32	Switch, Rotary, Non-shorting	T206	75042	2
SC15	Switch, Interlock	11TL6-4	80207	3
SC36	Switch Therm, NC, 10A, 120Vac	30000-48	73168	1
SC39	Switch, DIP, 1-way, 2PST	78F01	81073	14
SCP01	Switch, Toggle, 1PST	8381K108	08372	1
SCP03	Switch, Toggle, 2PDT	8373K107	08372	1
SCP09	Switch Assembly, 2PDT	SA42SDW1	08372	1
TC18	Transformer, Audio	850G	73831	1
% TC24	Transformer, 208Vac, 3-phase, 50/60 Hz	149-8034	37338	2
# TC25	Transformer, 600Vac, 3-phase, 50/60 Hz	149-8035	37338	2
* TC27	Transformer, 480Vac, 3-phase, 50/60 Hz	149-8037	37338	2
TC38	Inductor, Choke, 0.63 mH	149-8030	37338	12
UB01	IC, CMOS, Quad, 2-input NOR Gates	MC14001BAL	04713	14
UB09	IC, CMOS, Quad, 2-input Exclusive OR	MC14070BAL	04713	1
UC01	Socket, Integrated Circuit, 8-pin	640463-1	00779	13

Table 7-15 Parts Per Unit Index (No Frequency Dependent Parts) (continued)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
UC02	Socket, Integrated Circuit, 14-pin	640357-1	00779	19
UC16	IC, Operational Amplifiers, Quad	MC3303L	04713	2
UL12	IC, Operational Amplifiers, Dual	TL082IJG	01295	13
UL28	Diode, Pair Assembly, (-Ve) 400V, 15A	R704A	83003	1
ZA06	Fan, 115V, 50/60Hz, Muffin XL	MX2B3-028422	82877	11
ZA14	Cord and Connector Assembly	428056	82877	59

$ Denotes parts for this assembly not included in this index. Refer to appropriate module booklet for breakdown.

# Denotes used when ac power source is 3-phase, 600V rms, 50/60 Hz

% Denotes used when ac power source is 3-phase, 208V rms, 50/60 Hz

* Denotes used when ac power source is 3-phase, 480V rms, 50/60 Hz

Table 7-16 Parts per Unit Index - Frequency Dependent Parts (535-578 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/1	Quad Combiner/Filter (535-578 kHz)	149-6000-1	37338	12
NAF39/1	Combiner/RF Filter (535-578 kHz)	149-6031-1	37338	1
NAFP13/1	Output Voltage Probe (530-822 kHz)	149-6060-1	37338	1
149-6016-1	Inductor	149-6016-1	37338	48
149-6080-1	Coil, Tuning, RF	149-6080-1	37338	4
149-6083-1	Coil, Tuning, RF	149-6083-1	37338	1
149-6086-1	Coil, Tuning, RF	149-6086-1	37338	1
149-6089-1	Coil, Tuning, RF	149-6089-1	37338	1
CU08	Capacitor, Mica, 7500pF 5%, 10 000V	293100B752J00	00853	4
CU27	Capacitor, Mica, 1800pF 5%, 15 000V	293150B182J00	00853	4
CU28	Capacitor, Mica, 2000pF 5%, 15 000V	293150B202J00	00853	1
CU33	Capacitor, Mica, 10000pF 5%, 4000V	29140B103J02	00853	12
CU40	Capacitor, Mica, 15000pF 5%, 5 000V	29350B153J00	00853	1
LV09	Inductor, Variable, 7.5-18.0uH	4000-21	99800	1

Table 7-17 Parts per Unit Index - Frequency Dependent Parts (578-638 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/2	Quad Combiner/Filter (578-638 kHz)	149-6000-2	37338	12
NAF39/2	Combiner/RF Filter (578-638 kHz)	149-6031-2	37338	1
NAFP13/1	Output Voltage Probe (530-822 kHz)	149-6060-1	37338	1
149-6016-2	Inductor	149-6016-2	37338	48
149-6080-2	Coil, Tuning, RF	149-6080-2	37338	4
149-6083-2	Coil, Tuning, RF	149-6083-2	37338	1
149-6086-2	Coil, Tuning, RF	149-6086-2	37338	1
149-6089-2	Coil, Tuning, RF	149-6089-2	37338	1
CU14	Capacitor, Mica, 6800pF 5%, 10 000V	293100B682J00	00853	4
CU24	Capacitor, Mica, 9100pF 5%, 4000V	29140B912J02	00853	12
CU27	Capacitor, Mica, 1800pF 5%, 15 000V	293150B182J00	00853	2
CU29	Capacitor, Mica, 1600pF 5%, 15 000V	293150B162J00	00853	3
CU41	Capacitor, Mica, 13000pF 5%, 5 000V	29350B133J00	00853	1
LV09	Inductor, Variable, 7.5-18.0uH	4000-21	99800	1

Table 7-18 Parts per Unit Index - Frequency Dependent Parts (638-703 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/3	Quad Combiner/Filter (638-703 kHz)	149-6000-3	37338	12
NAF39/3	Combiner/RF Filter (638-703 kHz)	149-6031-3	37338	1
NAFP13/1	Output Voltage Probe (530-822 kHz)	149-6060-1	37338	1
149-6016-3	Inductor	149-6016-3	37338	48
149-6080-3	Coil, Tuning, RF	149-6080-3	37338	4
149-6083-3	Coil, Tuning, RF	149-6083-3	37338	1
149-6086-3	Coil, Tuning, RF	149-6086-3	37338	1
149-6089-3	Coil, Tuning, RF	149-6089-3	37338	1
CU15	Capacitor, Mica, 8200pF 5%, 4000V	29140B822J02	00853	12
CU22	Capacitor, Mica, 6200pF 5%, 10 000V	293100B622J00	00853	4
CU29	Capacitor, Mica, 1600pF 5%, 15 000V	293150B162J00	00853	1
CU34	Capacitor, Mica, 1500pF 5%, 15 000V	293150B152J00	00853	4
CU42	Capacitor, Mica, 12000pF 5%, 5 000V	29350B123J00	00853	1
LV09	Inductor, Variable, 7.5-18.0uH	4000-21	99800	1

Table 7-19 Parts per Unit Index - Frequency Dependent Parts (703-772 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/4	Quad Combiner/Filter (703-772 kHz)	149-6000-4	37338	12
NAF39/4	Combiner/RF Filter (703-772 kHz)	149-6031-4	37338	1
NAFP13/1	Output Voltage Probe (530-822 kHz)	149-6060-1	37338	1
149-6016-4	Inductor	149-6016-4	37338	48
149-6080-4	Coil, Tuning, RF	149-6080-4	37338	4
149-6083-4	Coil, Tuning, RF	149-6083-4	37338	1
149-6086-4	Coil, Tuning, RF	149-6086-4	37338	1
149-6089-4	Coil, Tuning, RF	149-6089-4	37338	1
CU01	Capacitor, Mica, 7500pF 5%, 4000V	29140B752J02	00853	12
CU16	Capacitor, Mica, 5600pF 5%, 10 000V	293100B562J00	00853	4
CU34	Capacitor, Mica, 1500pF 5%, 15 000V	293150B152J00	00853	2
CU35	Capacitor, Mica, 1300pF 5%, 15 000V	293150B132J00	00853	3
CV01	Capacitor, Mica, 11000pF 5%, 8 000V	29380B113J00	00853	1
LV09	Inductor, Variable, 7.5-18.0uH	4000-21	99800	1

Table 7-20 Parts per Unit Index - Frequency Dependent Parts (772-849 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/5	Quad Combiner/Filter (772-849 kHz)	149-6000-5	37338	12
NAF39/5	Combiner/RF Filter (772-849 kHz)	149-6031-5	37338	1
NAFP13/2	Output Voltage Probe (750-1300 kHz)	149-6060-2	37338	1
149-6016-5	Inductor	149-6016-5	37338	48
149-6080-5	Coil, Tuning, RF	149-6080-5	37338	4
149-6083-5	Coil, Tuning, RF	149-6083-5	37338	1
149-6086-5	Coil, Tuning, RF	149-6086-5	37338	1
149-6089-5	Coil, Tuning, RF	149-6089-5	37338	1
CU02	Capacitor, Mica, 6800pF 5%, 4000V	29140B682J02	00853	12
CU17	Capacitor, Mica, 5100pF 5%, 10 000V	293100B512J00	00853	4
CU35	Capacitor, Mica, 1300pF 5%, 15 000V	293150B132J00	00853	2
CU36	Capacitor, Mica, 1200pF 5%, 15 000V	293150B122J00	00853	3
CV02	Capacitor, Mica, 10000pF 5%, 8 000V	29380B103J00	00853	1
LV07	Inductor, Variable, 3.0-9.0uH	4000-17	99800	1

Table 7-21 Parts per Unit Index - Frequency Dependent Parts (849-935)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/6	Quad Combiner/Filter (849-935 kHz)	149-6000-6	37338	12
NAF39/6	Combiner/RF Filter (849-935 kHz)	149-6031-6	37338	1
NAFP13/2	Output Voltage Probe (750-1300 kHz)	149-6060-2	37338	1
149-6016-6	Inductor	149-6016-6	37338	48
149-6080-6	Coil, Tuning, RF	149-6080-6	37338	4
149-6083-6	Coil, Tuning, RF	149-6083-6	37338	1
149-6086-6	Coil, Tuning, RF	149-6086-6	37338	1
149-6089-6	Coil, Tuning, RF	149-6089-6	37338	1
CU03	Capacitor, Mica, 6200pF 5%, 4000V	29140B622J02	00853	12
CU18	Capacitor, Mica, 4700pF 5%, 10 000V	293100B472J00	00853	4
CU36	Capacitor, Mica, 1200pF 5%, 15 000V	293150B122J00	00853	2
CU37	Capacitor, Mica, 1100pF 5%, 20 000V	293200B112J00	00853	3
CV03	Capacitor, Mica, 9100pF 5%, 8 000V	29380B912J00	00853	1
LV07	Inductor, Variable, 3.0-9.0uH	4000-17	99800	1

Table 7-22 Parts per Unit Index - Frequency Dependent Parts (935-1031 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/7	Quad Combiner/Filter (935-1031 kHz)	149-6000-7	37338	12
NAF39/7	Combiner/RF Filter (935-1031 kHz)	149-6031-7	37338	1
NAFP13/2	Output Voltage Probe (750-1300 kHz)	149-6060-2	37338	1
149-6016-7	Inductor	149-6016-7	37338	48
149-6080-7	Coil, Tuning, RF	149-6080-7	37338	4
149-6083-7	Coil, Tuning, RF	149-6083-7	37338	1
149-6086-7	Coil, Tuning, RF	149-6086-7	37338	1
149-6089-7	Coil, Tuning, RF	149-6089-7	37338	1
CU11	Capacitor, Mica, 1000pF 5%, 20 000V	293200B102J00	00853	3
CU19	Capacitor, Mica, 4300pF 5%, 12 000V	293120B432J00	00853	4
CU37	Capacitor, Mica, 1100pF 5%, 20 000V	293200B112J00	00853	2
CV04	Capacitor, Mica, 8200pF 5%, 10 000V	293100B822J00	00853	1
CYP15	Capacitor, Mica, 5600pF 5%, 4000V	29140B562J02	00853	12
LV07	Inductor, Variable, 3.0-9.0uH	4000-17	99800	1

Table 7-23 Parts per Unit Index - Frequency Dependent Parts (1031-1126 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/8	Quad Combiner/Filter (1031-1126 kHz)	149-6000-8	37338	12
NAF39/8	Combiner/RF Filter (1031-1126 kHz)	149-6031-8	37338	1
NAFP13/2	Output Voltage Probe (750-1300 kHz)	149-6060-2	37338	1
149-6016-8	Inductor	149-6016-8	37338	48
149-6080-8	Coil, Tuning, RF	149-6080-8	37338	4
149-6083-8	Coil, Tuning, RF	149-6083-8	37338	1
149-6086-8	Coil, Tuning, RF	149-6086-8	37338	1
149-6089-8	Coil, Tuning, RF	149-6089-8	37338	1
CU08	Capacitor, Mica, 7500pF 5%, 10 000V	293100B752J00	00853	1
CU10	Capacitor, Mica, 910pF 5%, 20 000V	293200B911J00	00853	3
CU11	Capacitor, Mica, 1000pF 5%, 20 000V	293200B102J00	00853	2
CU12	Capacitor, Mica, 3900pF 5%, 12 000V	293120B392J00	00853	4
CU13	Capacitor, Mica, 5100pF 5%, 4000V	29140B512J02	00853	12
LV07	Inductor, Variable, 3.0-9.0uH	4000-17	99800	1

Table 7-24 Parts per Unit Index - Frequency Dependent Parts (1126-1226 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/9	Quad Combiner/Filter (1126-1226 kHz)	149-6000-9	37338	12
NAF39/9	Combiner/RF Filter (1126-1226 kHz)	149-6031-9	37338	1
NAFP13/2	Output Voltage Probe (750-1300 kHz)	149-6060-2	37338	1
149-6016-9	Inductor	149-6016-9	37338	48
149-6080-9	Coil, Tuning, RF	149-6080-9	37338	4
149-6083-9	Coil, Tuning, RF	149-6083-9	37338	1
149-6086-9	Coil, Tuning, RF	149-6086-9	37338	1
149-6089-9	Coil, Tuning, RF	149-6089-9	37338	1
CU10	Capacitor, Mica, 910pF 5%, 20 000V	293200B911J00	00853	2
CU14	Capacitor, Mica, 6800pF 5%, 10 000V	293100B682J00	00853	1
CU21	Capacitor, Mica, 820pF 5%, 20 000V	293200B821J00	00853	3
CU25	Capacitor, Mica, 3600pF 5%, 12 000V	293120B362J00	00853	4
CYP14	Capacitor, Mica, 4700pF 5%, 6000V	29160B472J02	00853	12
LV07	Inductor, Variable, 3.0-9.0uH	4000-17	99800	1

Table 7-25 Parts per Unit Index - Frequency Dependent Parts (1226-1346 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/10	Quad Combiner/Filter (1226-1346 kHz)	149-6000-10	37338	12
NAF39/10	Combiner/RF Filter (1226-1346 kHz)	149-6031-10	37338	1
NAFP13/3	Output Voltage Probe (1186-1974 kHz)	149-6060-3	37338	1
149-6016-10	Inductor	149-6016-10	37338	48
149-6080-10	Coil, Tuning, RF	149-6080-10	37338	4
149-6083-10	Coil, Tuning, RF	149-6083-10	37338	1
149-6086-10	Coil, Tuning, RF	149-6086-10	37338	1
149-6089-10	Coil, Tuning, RF	149-6089-10	37338	1
CU06	Capacitor, Mica, 4300pF 5%, 6000V	29160B432J02	00853	12
CU09	Capacitor, Mica, 750pF 5%, 20 000V	293200B751J00	00853	2
CU21	Capacitor, Mica, 820pF 5%, 20 000V	293200B821J00	00853	3
CU22	Capacitor, Mica, 6200pF 5%, 10 000V	293100B622J00	00853	1
CU31	Capacitor, Mica, 3300pF 5%, 12 000V	293120B332J00	00853	4
LV05	Inductor, Variable, 1.3-3.6uH	4000-13	99800	1

Table 7-26 Parts per Unit Index - Frequency Dependent Parts (1346-1471 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/11	Quad Combiner/Filter (1346-1471 kHz)	149-6000-11	37338	12
NAF39/11	Combiner/RF Filter (1346-1471 kHz)	149-6031-11	37338	1
NAFP13/3	Output Voltage Probe (1186-1974 kHz)	149-6060-3	37338	1
149-6016-11	Inductor	149-6016-11	37338	48
149-6080-11	Coil, Tuning, RF	149-6080-11	37338	4
149-6083-11	Coil, Tuning, RF	149-6083-11	37338	1
149-6086-11	Coil, Tuning, RF	149-6086-11	37338	1
149-6089-11	Coil, Tuning, RF	149-6089-11	37338	1
CU09	Capacitor, Mica, 750pF 5%, 20 000V	293200B751J00	00853	3
CU16	Capacitor, Mica, 5600pF 5%, 10 000V	293100B562J00	00853	1
CU30	Capacitor, Mica, 3000pF 5%, 12 000V	293120B302J00	00853	4
CU38	Capacitor, Mica, 680pF 5%, 20 000V	293200B681J00	00853	2
CYP13	Capacitor, Mica, 3900pF 5%, 6000V	29160B392J02	00853	12
LV05	Inductor, Variable, 1.3-3.6uH	4000-13	99800	1

Table 7-27 Parts per Unit Index - Frequency Dependent Parts (1471-1605 kHz)

NAUTEL'S PART NO.	NAME OF PART AND DESCRIPTION	JAN, MIL OR MFR PART NO.	(OEM) MFR CODE	TOTAL IDENT PARTS
NAF37/12	Quad Combiner/Filter (1471-1605 kHz)	149-6000-12	37338	12
NAF39/12	Combiner/RF Filter (1471-1605 kHz)	149-6031-12	37338	1
NAFP13/3	Output Voltage Probe (1186-1974 kHz)	149-6060-3	37338	1
149-6016-12	Inductor	149-6016-12	37338	48
149-6080-12	Coil, Tuning, RF	149-6080-12	37338	4
149-6083-12	Coil, Tuning, RF	149-6083-12	37338	1
149-6086-12	Coil, Tuning, RF	149-6086-12	37338	1
149-6089-12	Coil, Tuning, RF	149-6089-12	37338	1
CU17	Capacitor, Mica, 5100pF 5%, 10 000V	293100B512J00	00853	1
CU20	Capacitor, Mica, 3600pF 5%, 12000V	29160B362J02	00853	12
CU26	Capacitor, Mica, 2700pF 5%, 12 000V	293120B272J00	00853	4
CU38	Capacitor, Mica, 680pF 5%, 20 000V	293200B681J00	00853	3
CU39	Capacitor, Mica, 620pF 5%, 20 000V	293200B621J00	00853	2
LV05	Inductor, Variable, 1.3-3.6uH	4000-13	99800	1

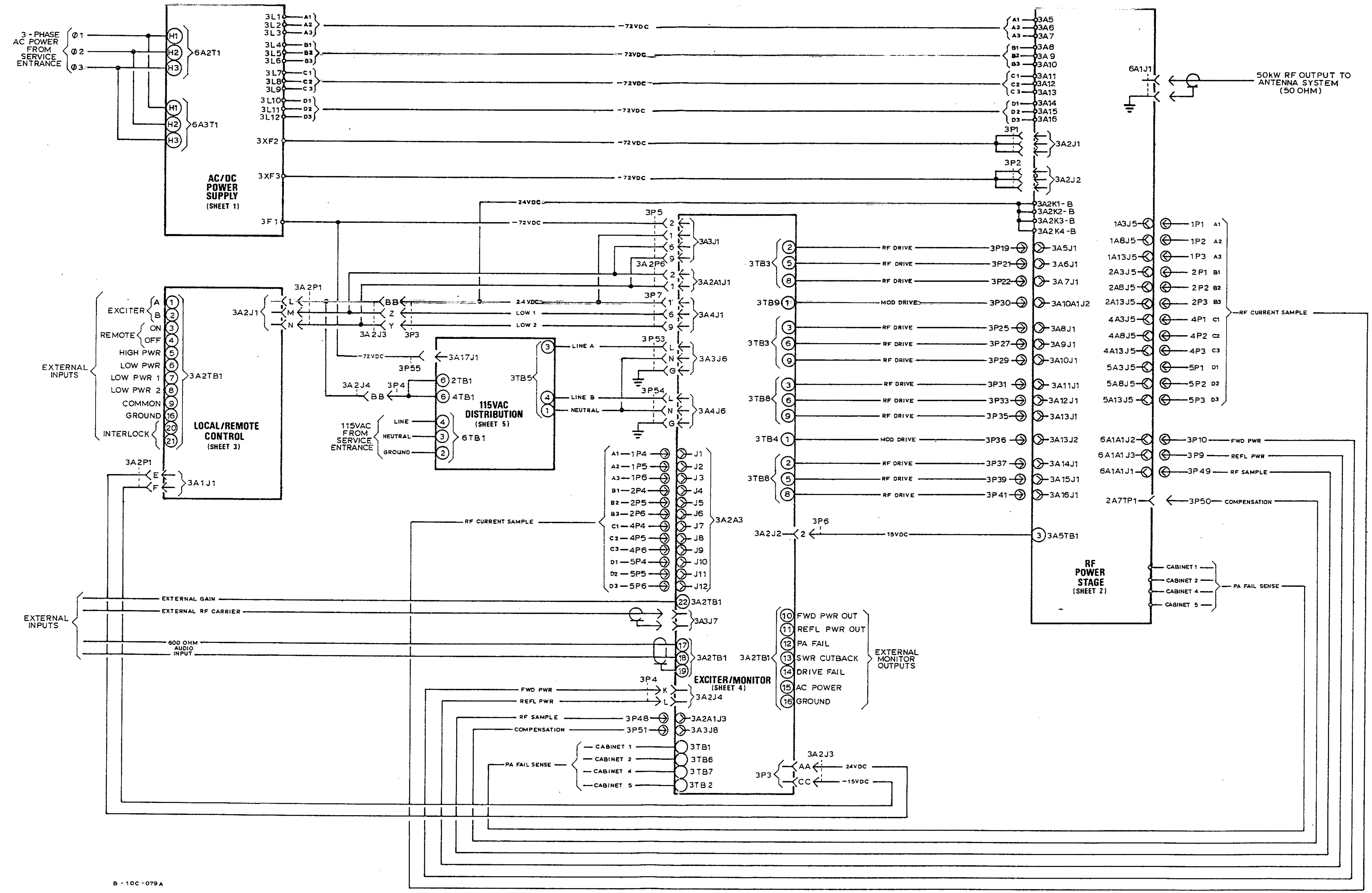


Figure FO-1 Electrical Schematic - AMPFET 50 System Overview

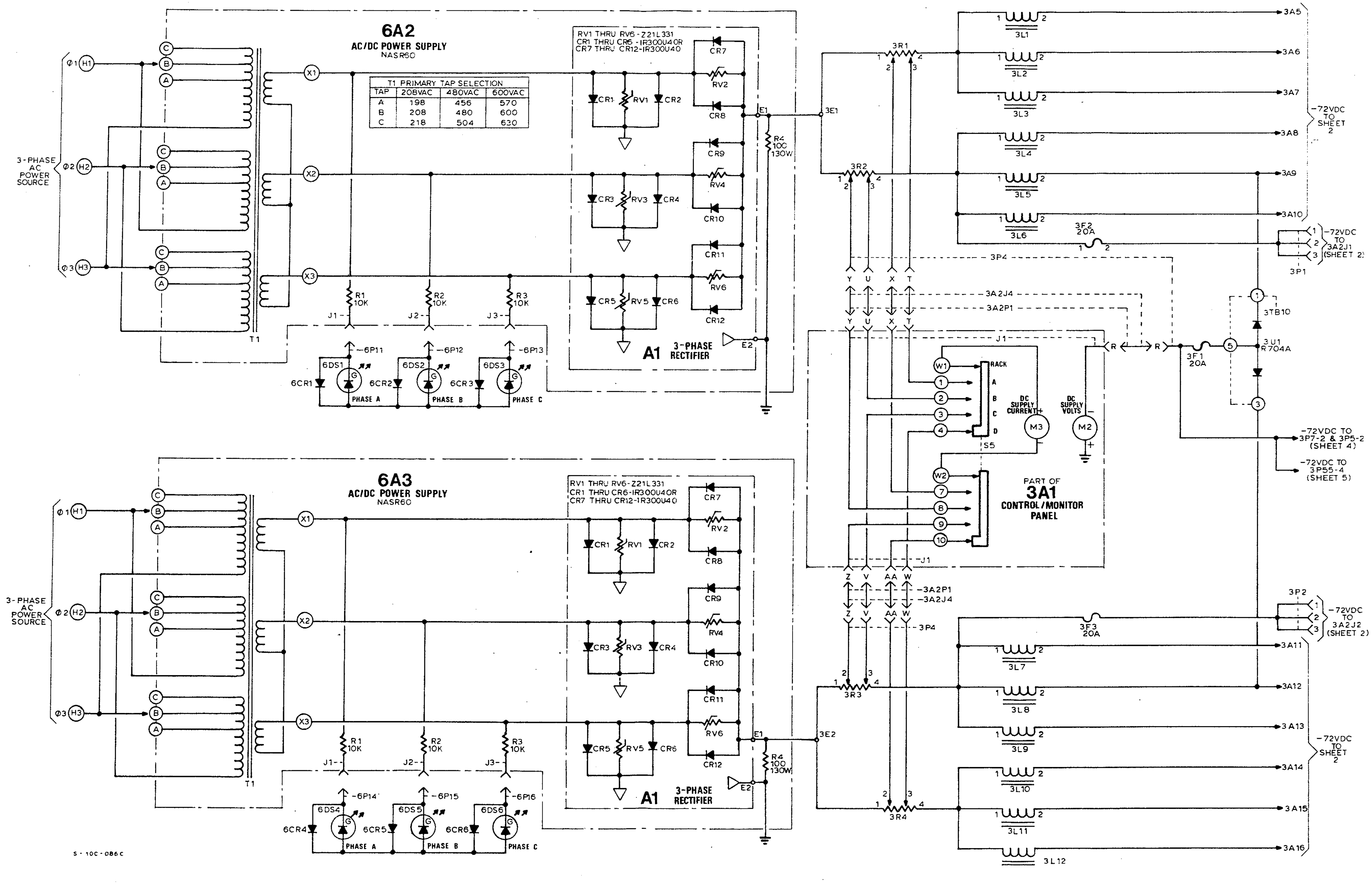


Figure FO-2 Electrical Schematic - AMPFET 50 (Ac/Dc Power Supply) (Sheet 1 of 5)

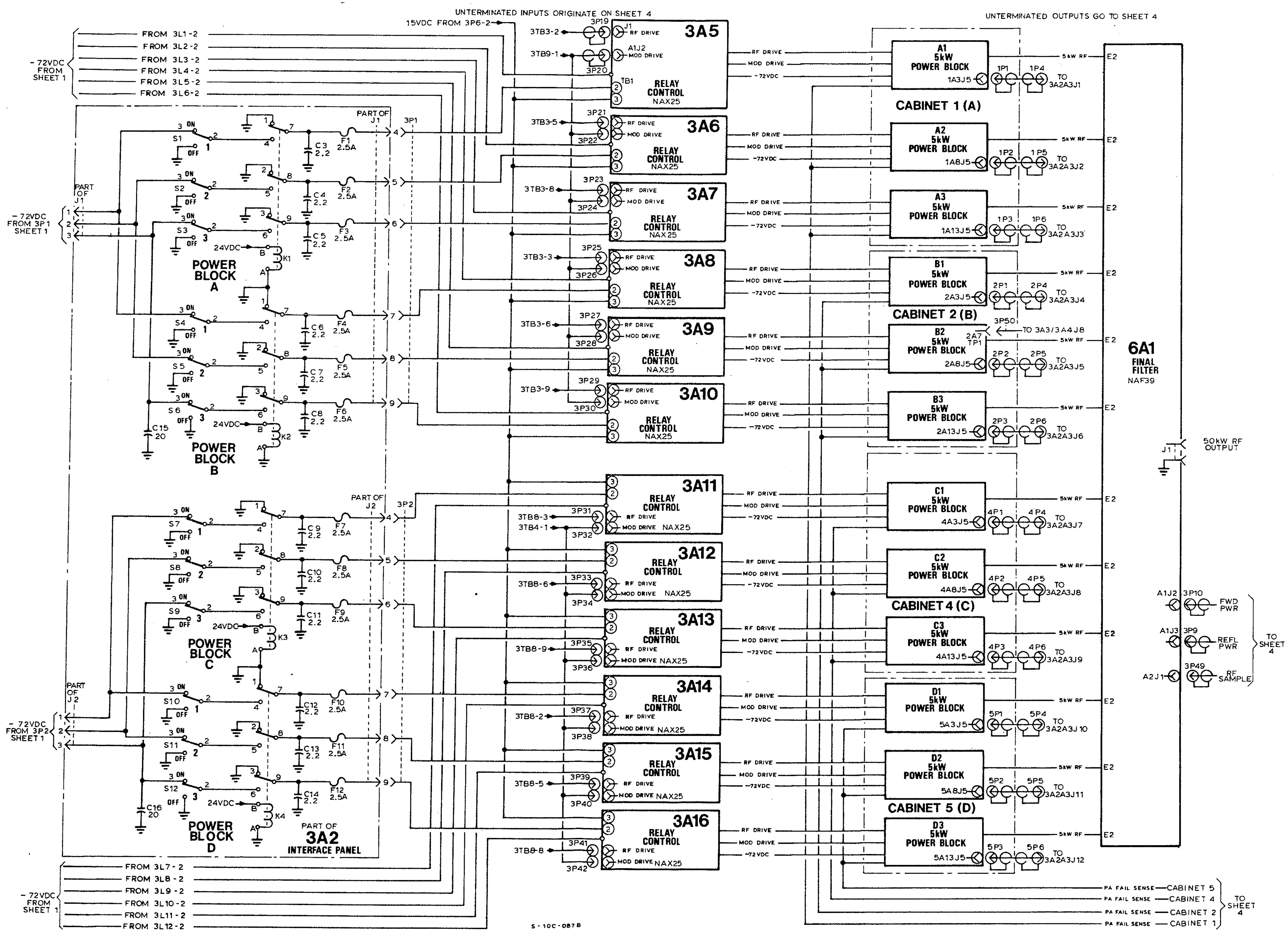


Figure FO-3 Electrical Schematic - AMPFET 50 (Rf Power Section) (Sheet 2 of 5)

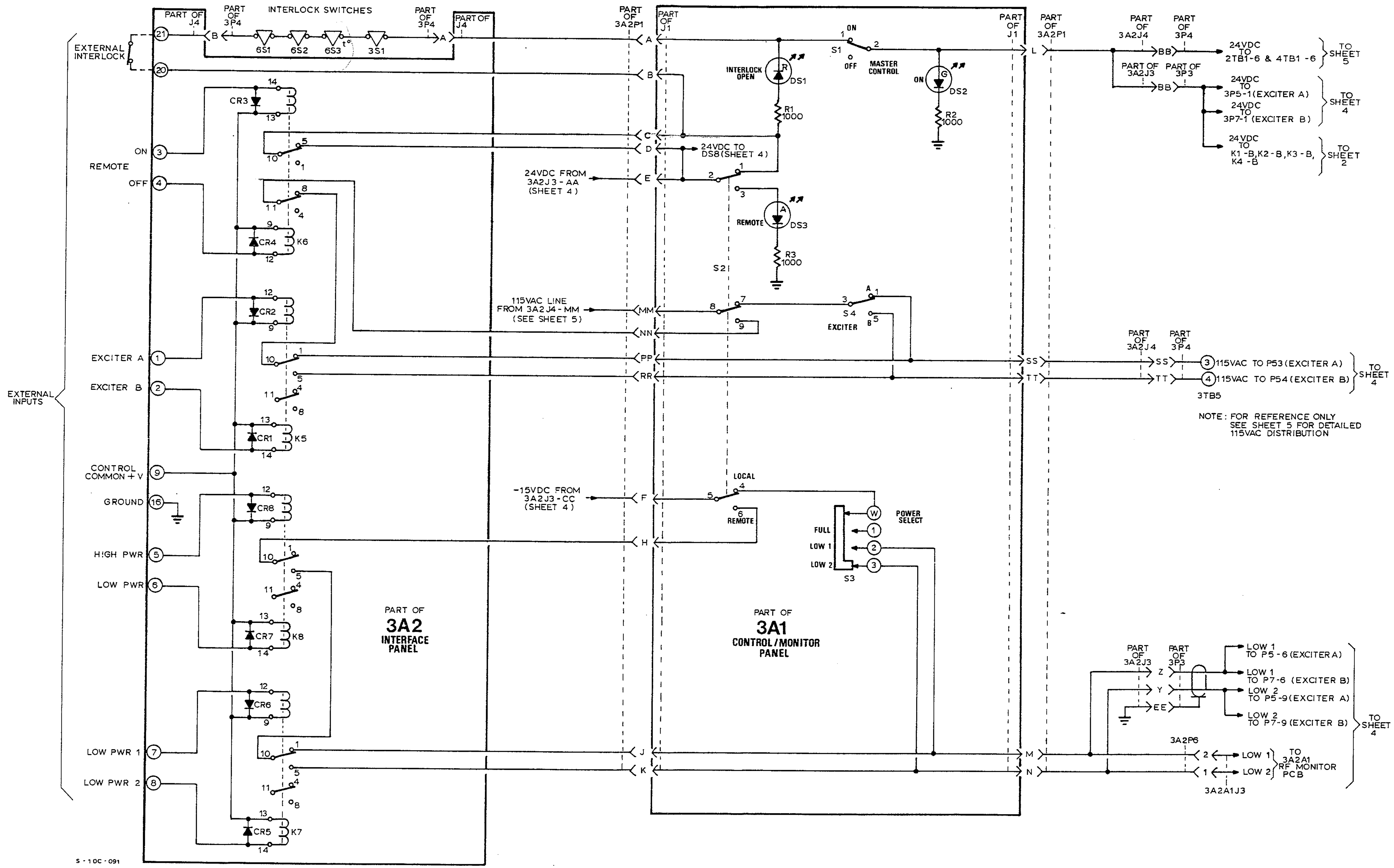


Figure FO-4 Electrical Schematic - AMPFET 50 (Local/Remote Control Section) (Sheet 3 of 5)

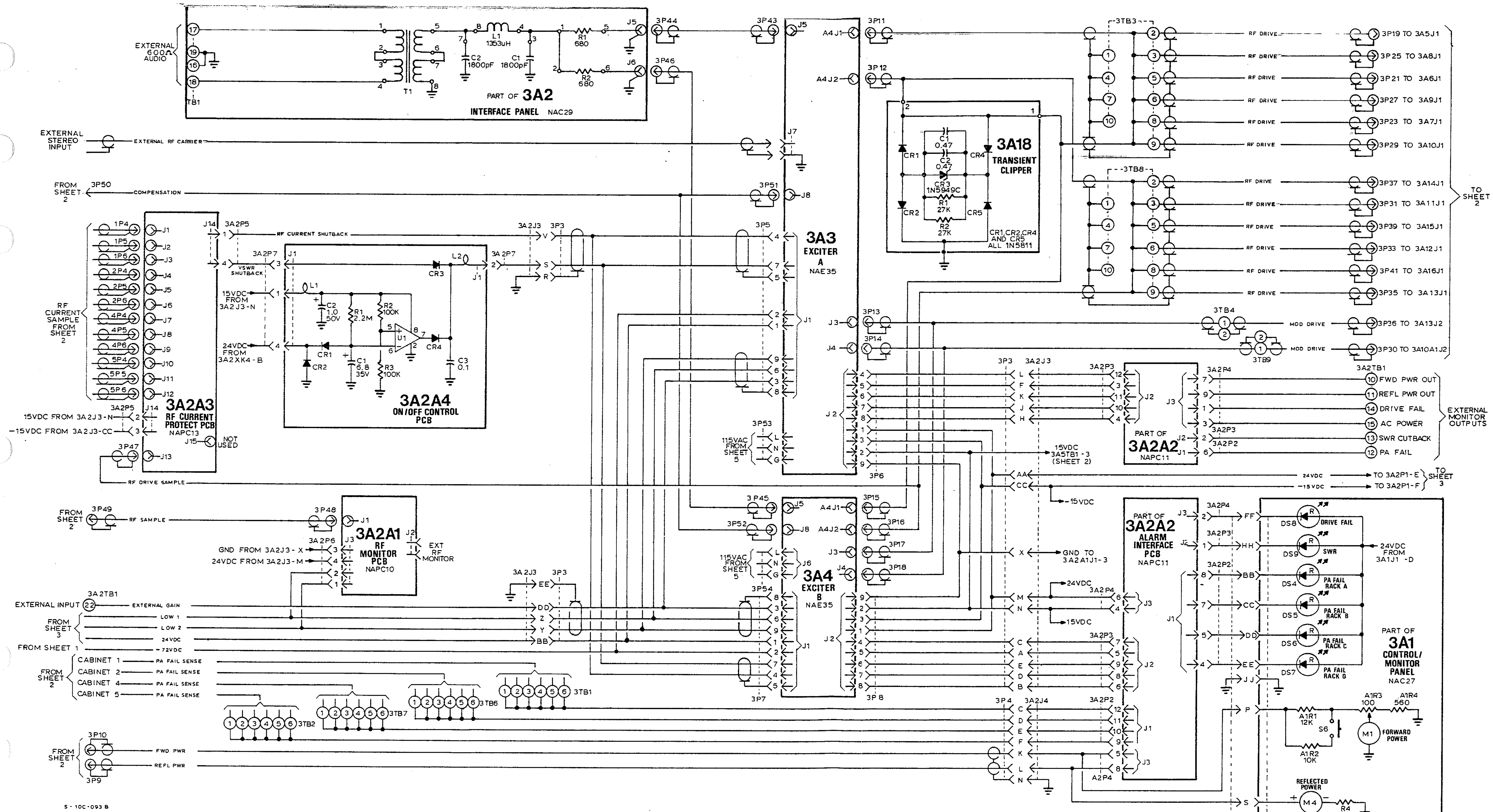


Figure FO-5 Electrical Schematic - AMPFET 50 (Rf Drive/Monitor Section) (Sheet 4 of 5)

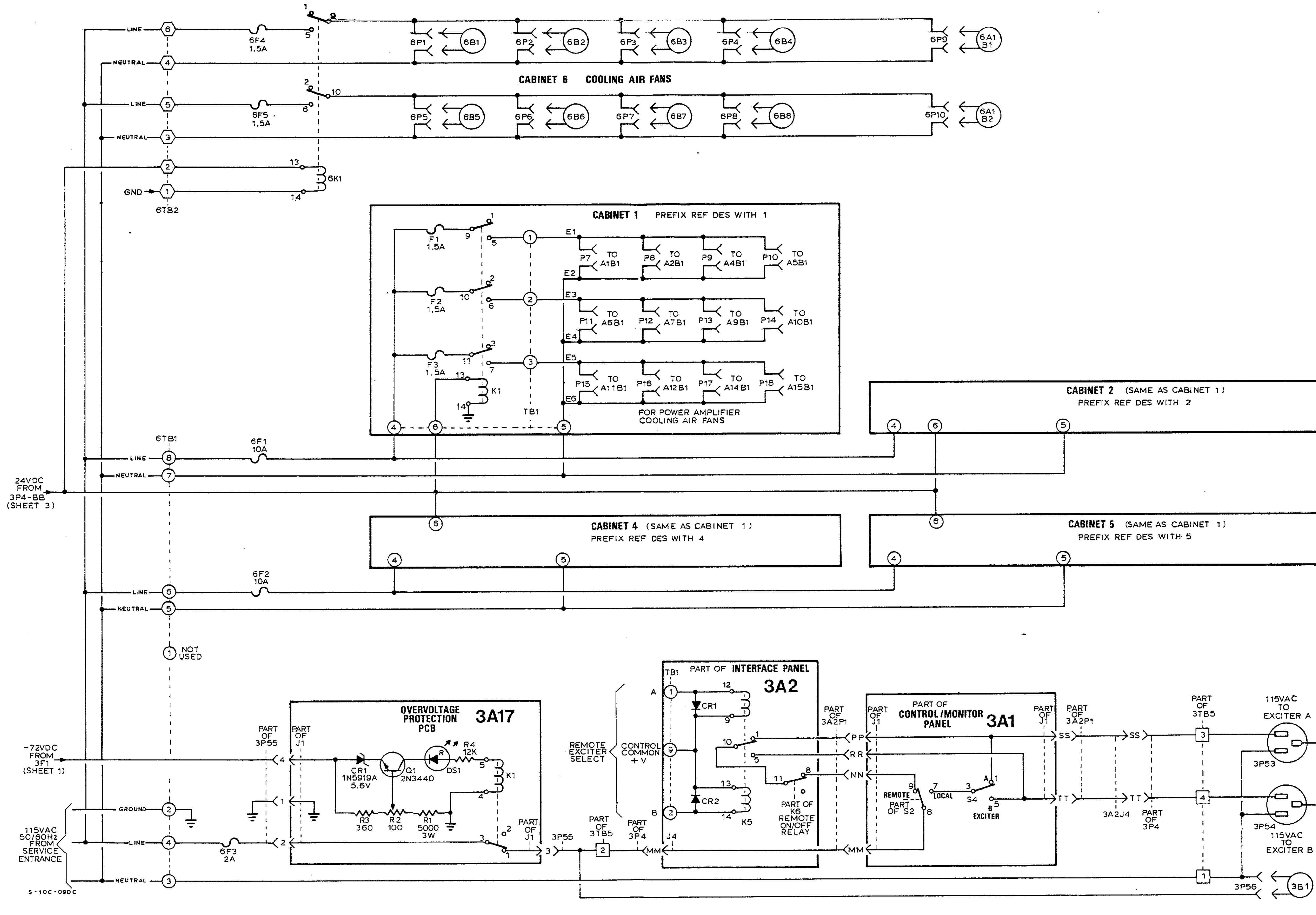


Figure FO-6 Electrical Schematic - AMPFET 50 (115 Vac Power Distribution) (Sheet 5 of 5)

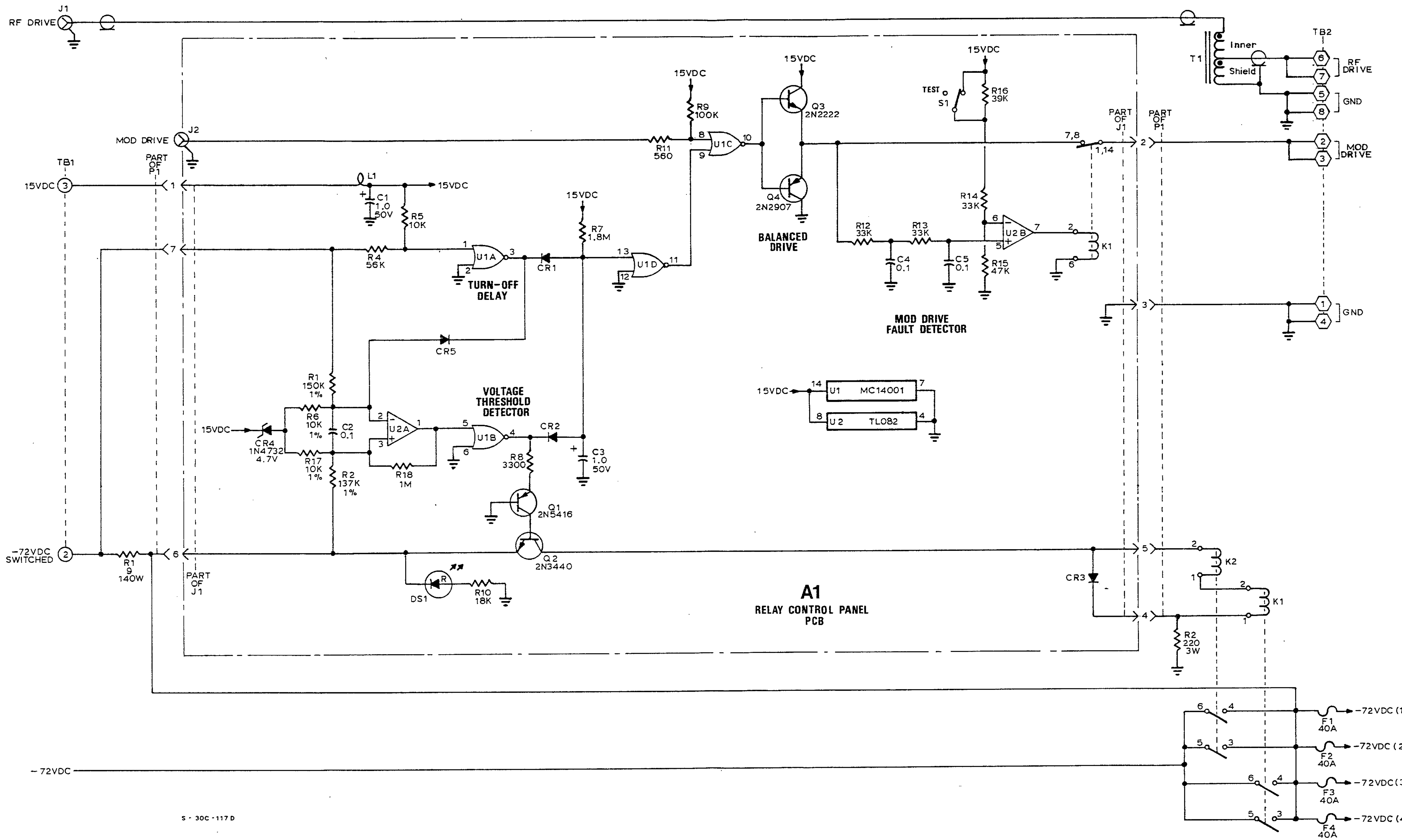


Figure FO-7 Electrical Schematic - NAX25 Relay Control Assembly

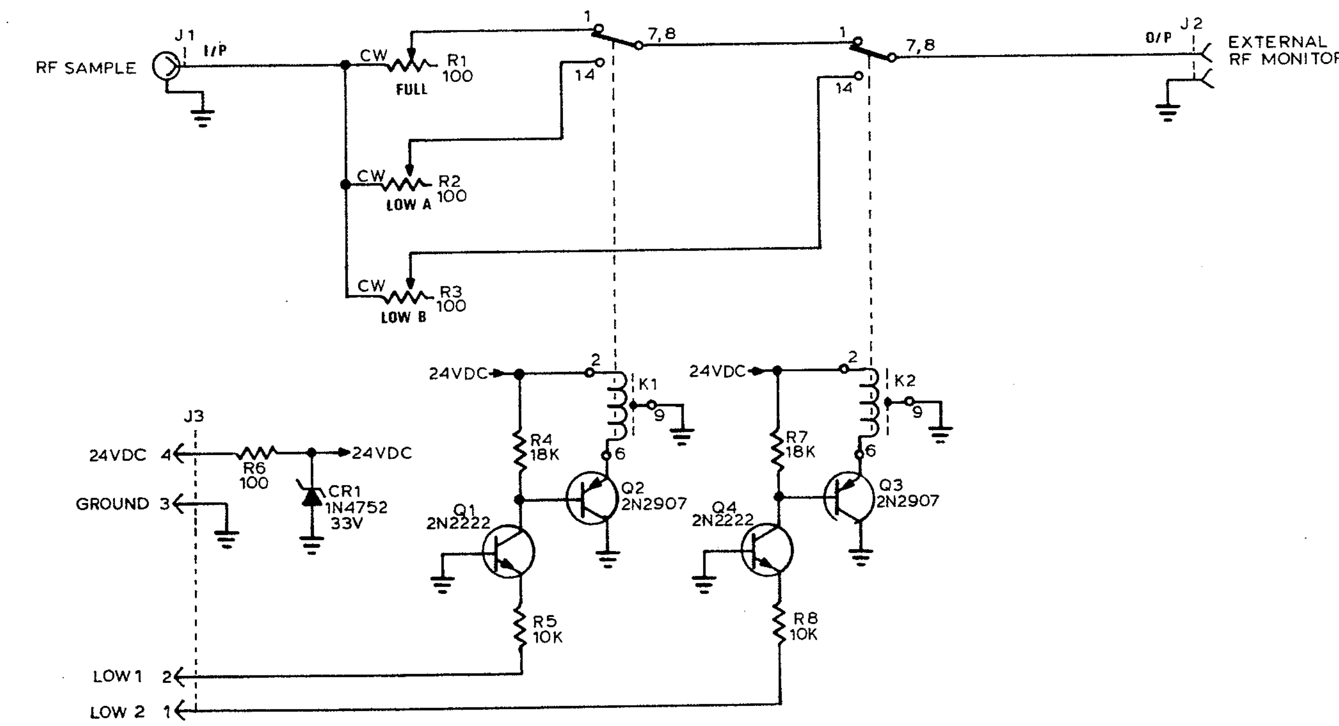


Figure FO-8 Electrical Schematic - NAPC10 Rf Monitor Pcb Assembly

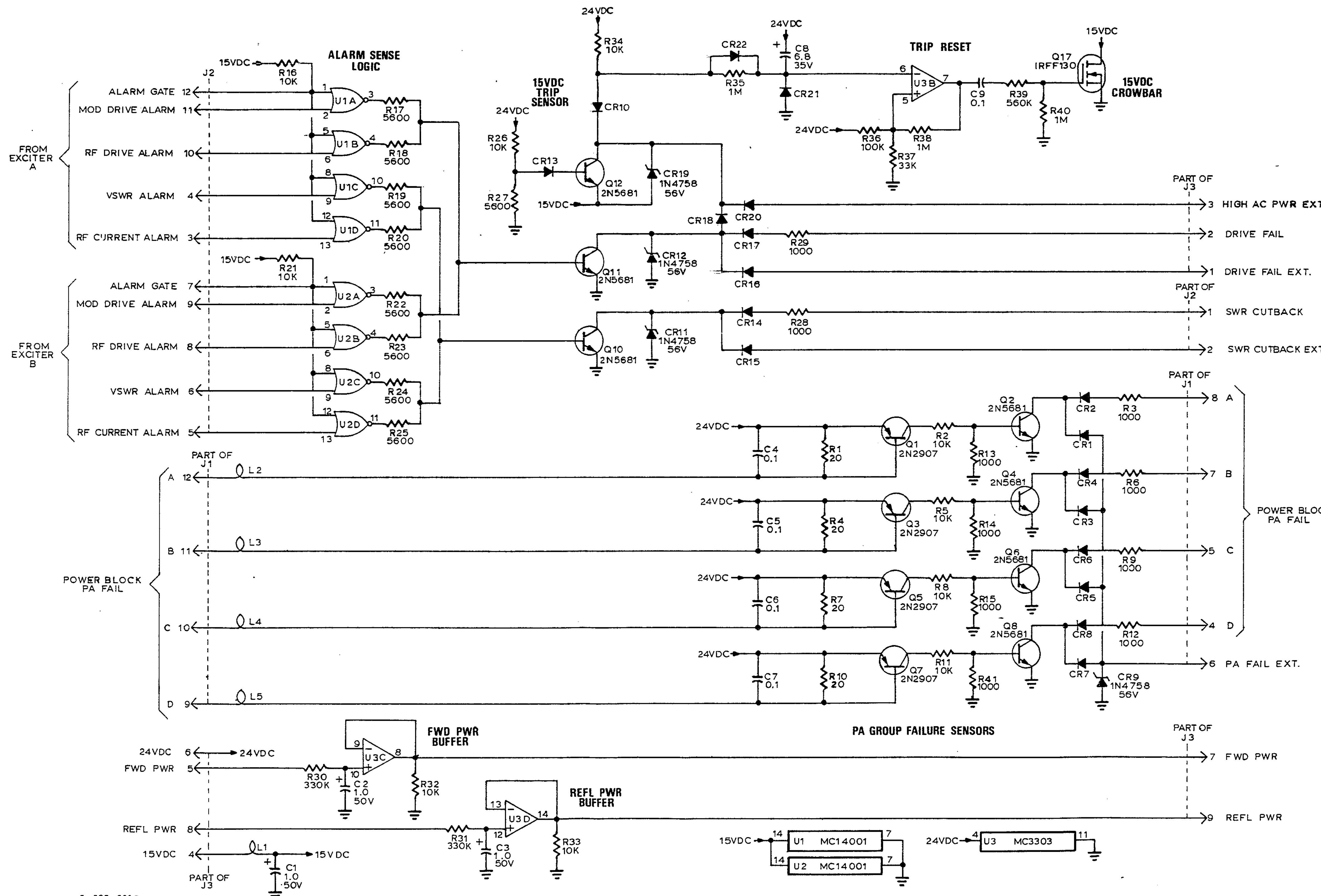


Figure FO-9 Electrical Schematic - NAPC11 Alarm Interface Pcb Assembly

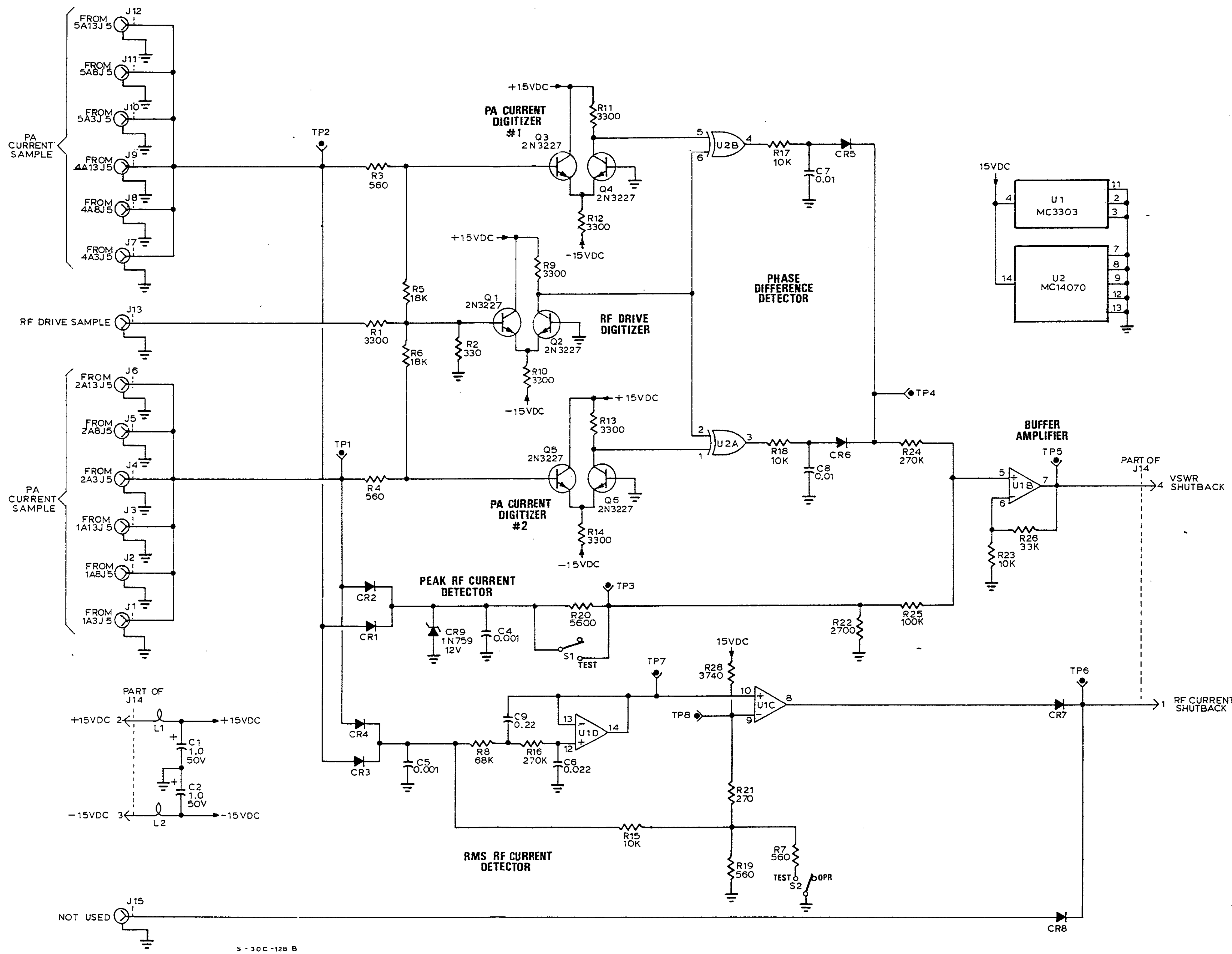
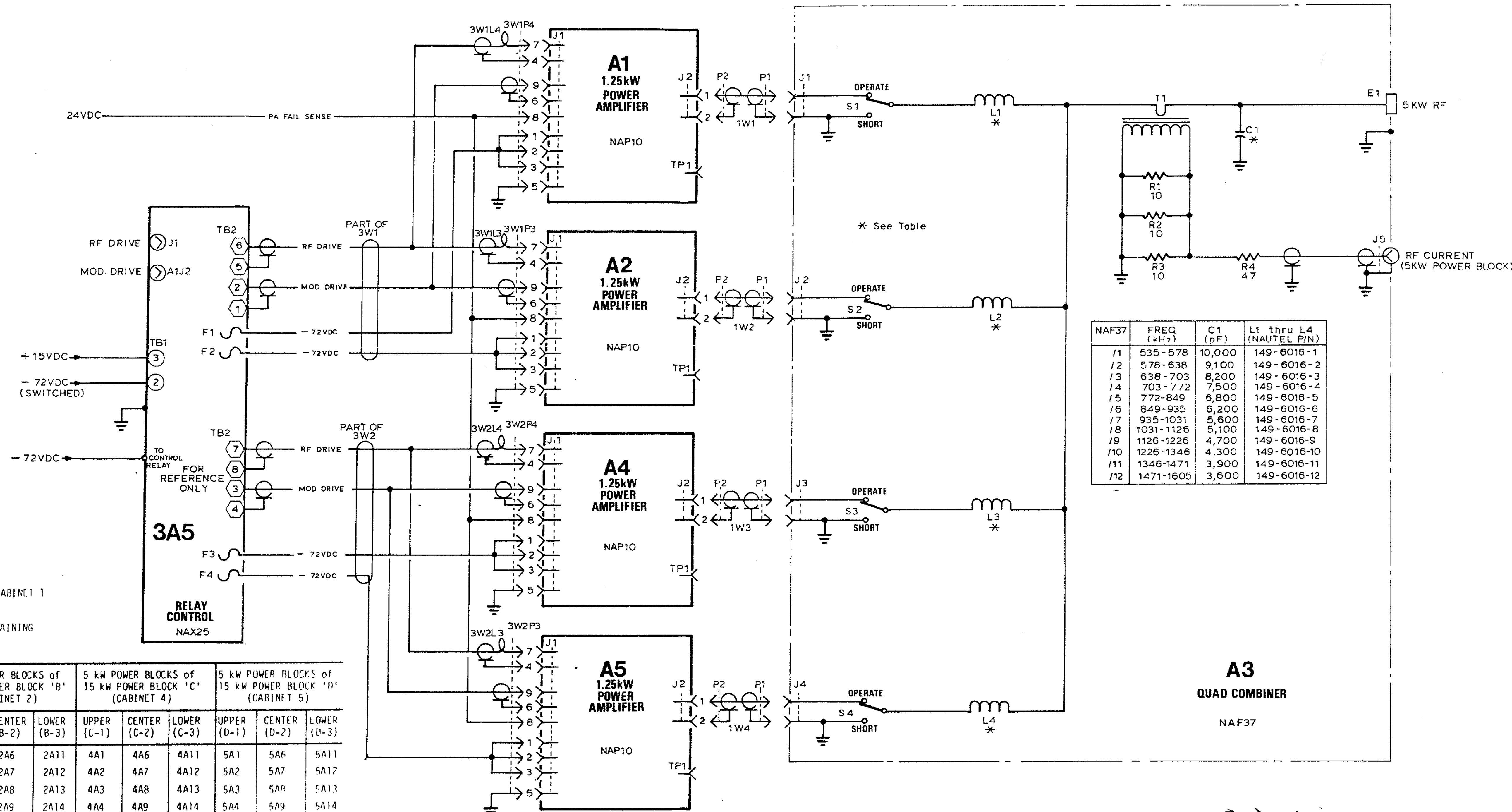


Figure FO-10 Electrical Schematic - NAPC13 Rf Current Protection Pcb Assembly



NAF37	FREQ (kHz)	C1 (pF)	L1 thru L4 (NAUTEL P/N)
/1	535-578	10,000	149-6016-1
/2	578-638	9,100	149-6016-2
/3	638-703	8,200	149-6016-3
/4	703-772	7,500	149-6016-4
/5	772-849	6,800	149-6016-5
/6	849-935	6,200	149-6016-6
/7	935-1031	5,600	149-6016-7
/8	1031-1126	5,100	149-6016-8
/9	1126-1226	4,700	149-6016-9
/10	1226-1346	4,300	149-6016-10
/11	1346-1471	3,900	149-6016-11
/12	1471-1605	3,600	149-6016-12

UPPER 5 kW POWER BLOCK (A-1) OF CABINET 1
(15 kW POWER BLOCK 'A') SHOWN,

REFER TO TABLE FOR REF DES OF REMAINING
5 kW RF POWER BLOCKS.

5 kW POWER BLOCKS of 15 kW POWER BLOCK 'A' (CABINET 1)			5 kW POWER BLOCKS of 15 kW POWER BLOCK 'B' (CABINET 2)			5 kW POWER BLOCKS of 15 kW POWER BLOCK 'C' (CABINET 4)			5 kW POWER BLOCKS of 15 kW POWER BLOCK 'D' (CABINET 5)		
UPPER (A-1)	CENTER (A-2)	LOWER (A-3)	UPPER (B-1)	CENTER (B-2)	LOWER (B-3)	UPPER (C-1)	CENTER (C-2)	LOWER (C-3)	UPPER (D-1)	CENTER (D-2)	LOWER (D-3)
1A1	1A6	1A11	2A1	2A6	2A11	4A1	4A6	4A11	5A1	5A6	5A11
1A2	1A7	1A12	2A2	2A7	2A12	4A2	4A7	4A12	5A2	5A7	5A12
1A3	1A8	1A13	2A3	2A8	2A13	4A3	4A8	4A13	5A3	5A8	5A13
1A4	1A9	1A14	2A4	2A9	2A14	4A4	4A9	4A14	5A4	5A9	5A14
1A5	1A10	1A15	2A5	2A10	2A15	4A5	4A10	4A15	5A5	5A10	5A15
1W1	1W5	1W9	2W1	2W5	2W9	4W1	4W5	4W9	5W1	5W5	5W9
1W2	1W6	1W10	2W2	2W6	2W10	4W2	4W6	4W10	5W2	5W6	5W10
1W3	1W7	1W11	2W3	2W7	2W11	4W3	4W7	4W11	5W3	5W7	5W11
1W4	1W8	1W12	2W4	2W8	2W12	4W4	4W8	4W12	5W4	5W8	5W12
3A5	3A6	3A7	3A8	3A9	3A10	3A11	3A12	3A13	3A14	3A15	3A16
3W1	3W3	3W5	3W1	3W3	3W5	3W7	3W9	3W11	3W7	3W9	3W11
3W1P3	3W3P3	3W5P3	3W1P1	3W3P1	3W5P1	3W7P1	3W9P1	3W11P1	3W7P3	3W9P3	3W11P3
3W1P4	3W3P4	3W5P4	3W1P2	3W3P2	3W5P2	3W7P2	3W9P2	3W11P2	3W7P4	3W9P4	3W11P4
3W2	3W4	3W6	3W2	3W4	3W6	3W8	3W10	3W12	3W8	3W10	3W12
3W2P3	3W4P3	3W6P3	3W2P1	3W4P1	3W6P1	3W8P1	3W10P1	3W12P1	3W8P3	3W10P3	3W12P3
3W2P4	3W4P4	3W6P4	3W2P2	3W4P2	3W6P2	3W8P2	3W10P2	3W12P2	3W8P4	3W10P4	3W12P4

Bismarck
B.C

Figure FO-11 Electrical Schematic - 5 Kilowatt Rf Power Block

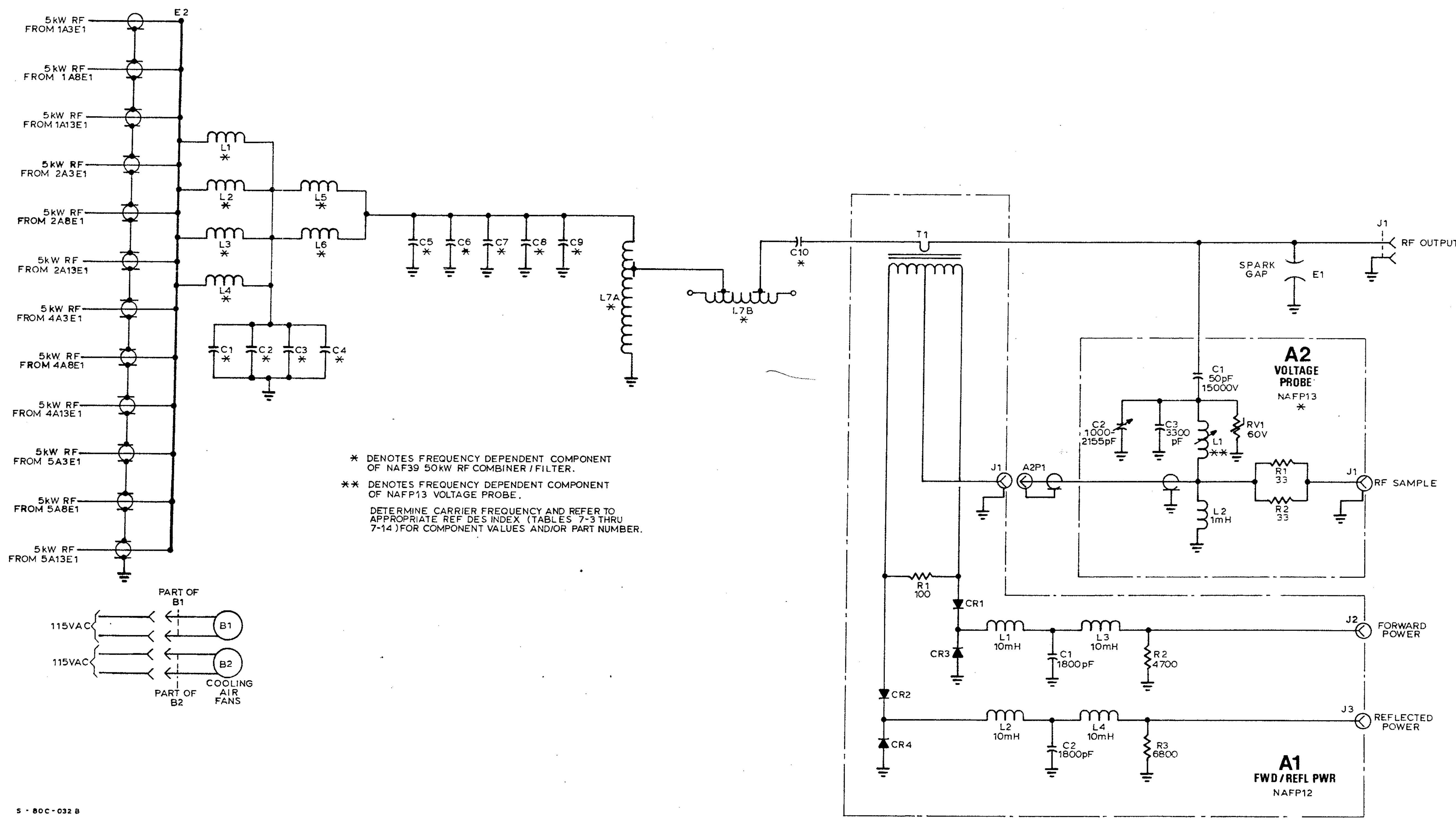


Figure FO-12 Electrical Schematic - NAF39 50 Kilowatt Rf Combiner/Filter

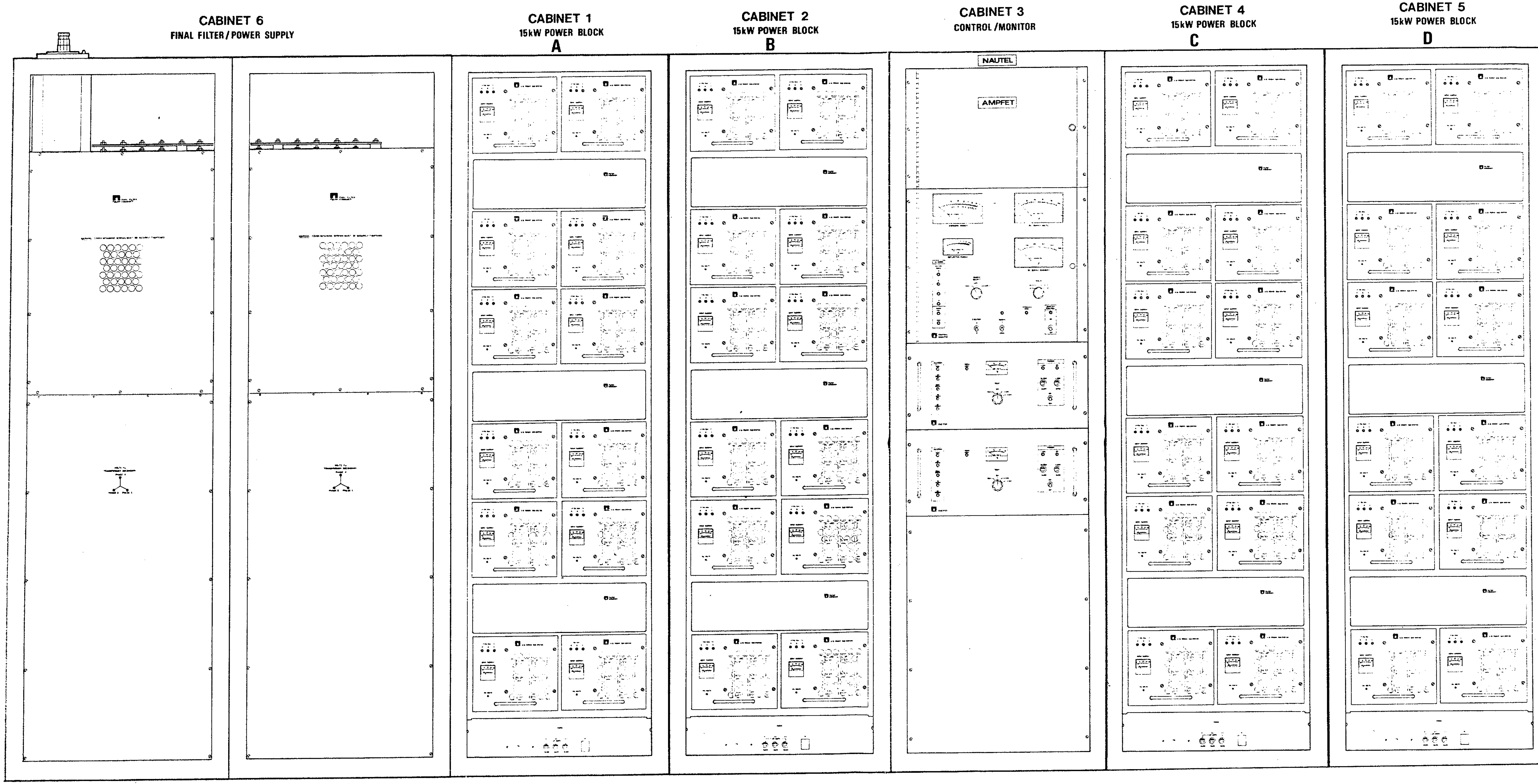


Figure FO-13 Assembly Detail - AMPFET 50 Transmitter (Front View)

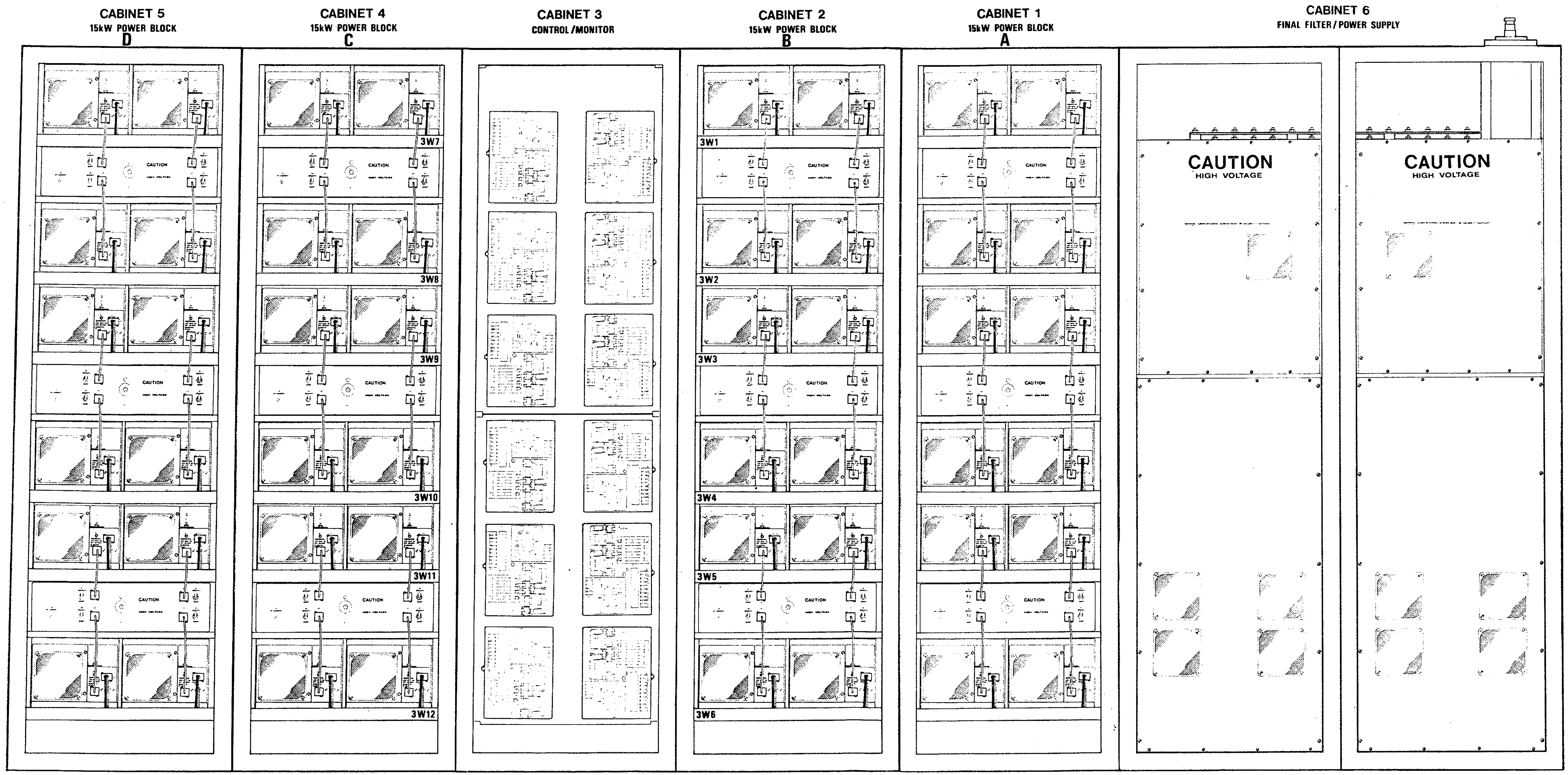
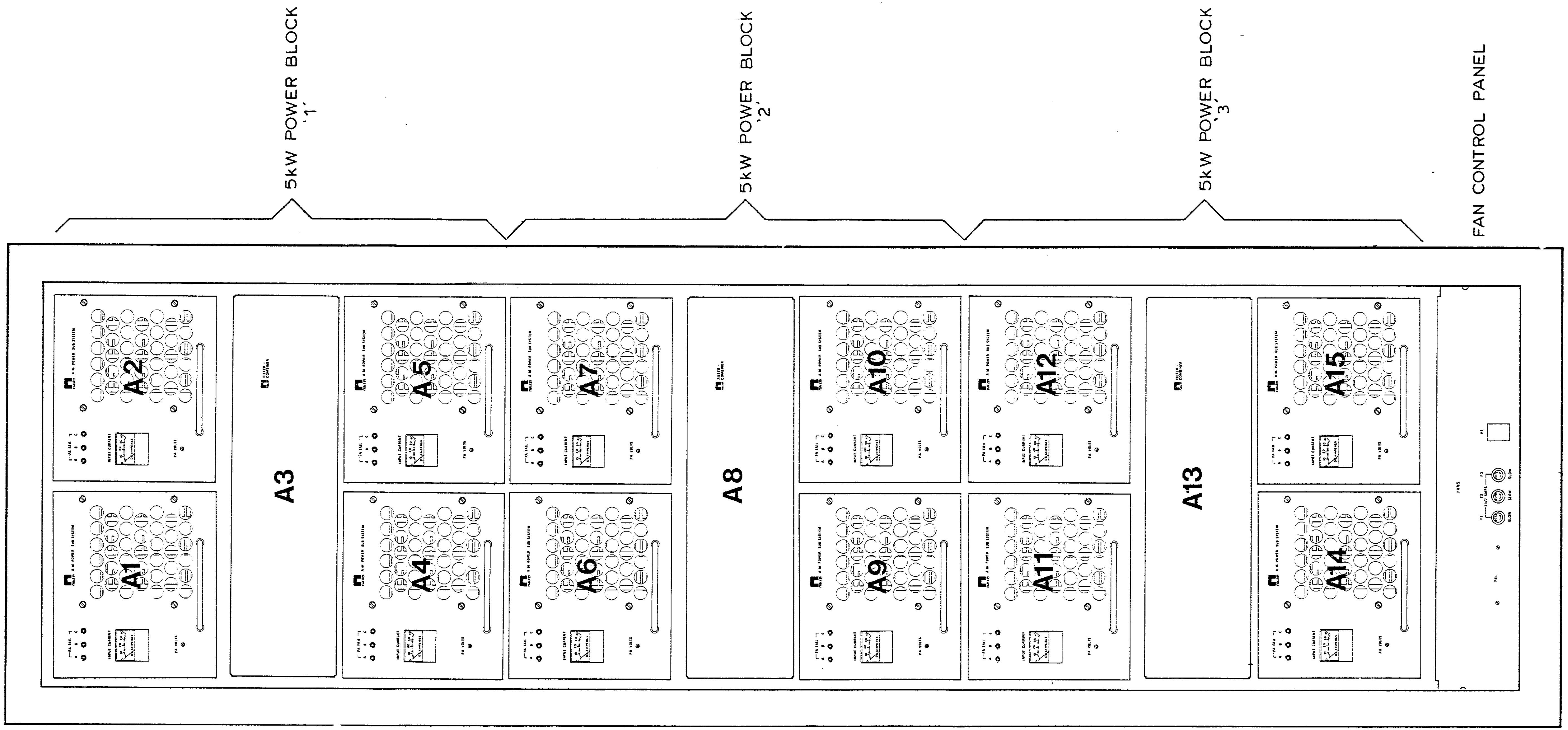


Figure FO-14 Assembly Detail - AMPFET 50 Transmitter (Rear View)



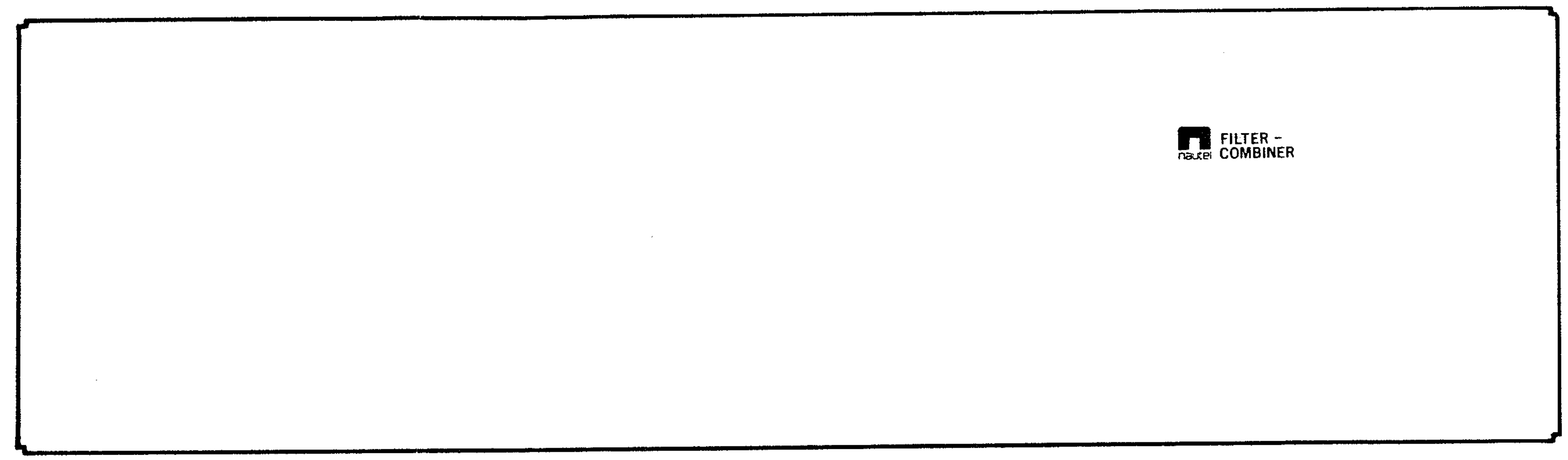
A1, A2, A4, A5, A6, A7, A9, A10, A11, A12, A14, A15 ARE NAP10 AM POWER SUBSYSTEM MODULES

A3, A8, A13 ARE NAF37 QUAD COMBINER/FILTERS

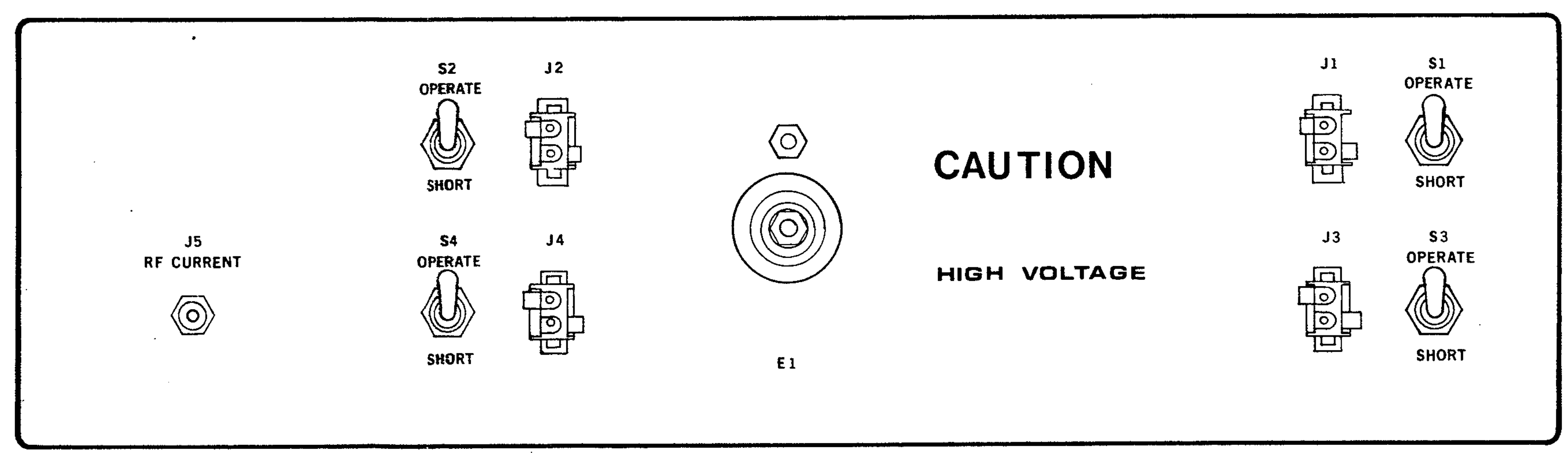
M-20C-101

Figure FO-15 Assembly Detail - NAR70 15 Kilowatt Power Block Cabinet (Front View)

Figure FO-16 Assembly Detail - NAR70 15 Kilowatt Power Block Cabinet (Rear View)



M - 80C - 102



M - 80C - 081

Figure FO-17 Assembly Detail - NAF37 Quad Combiner/Filter (Front/Rear Views)

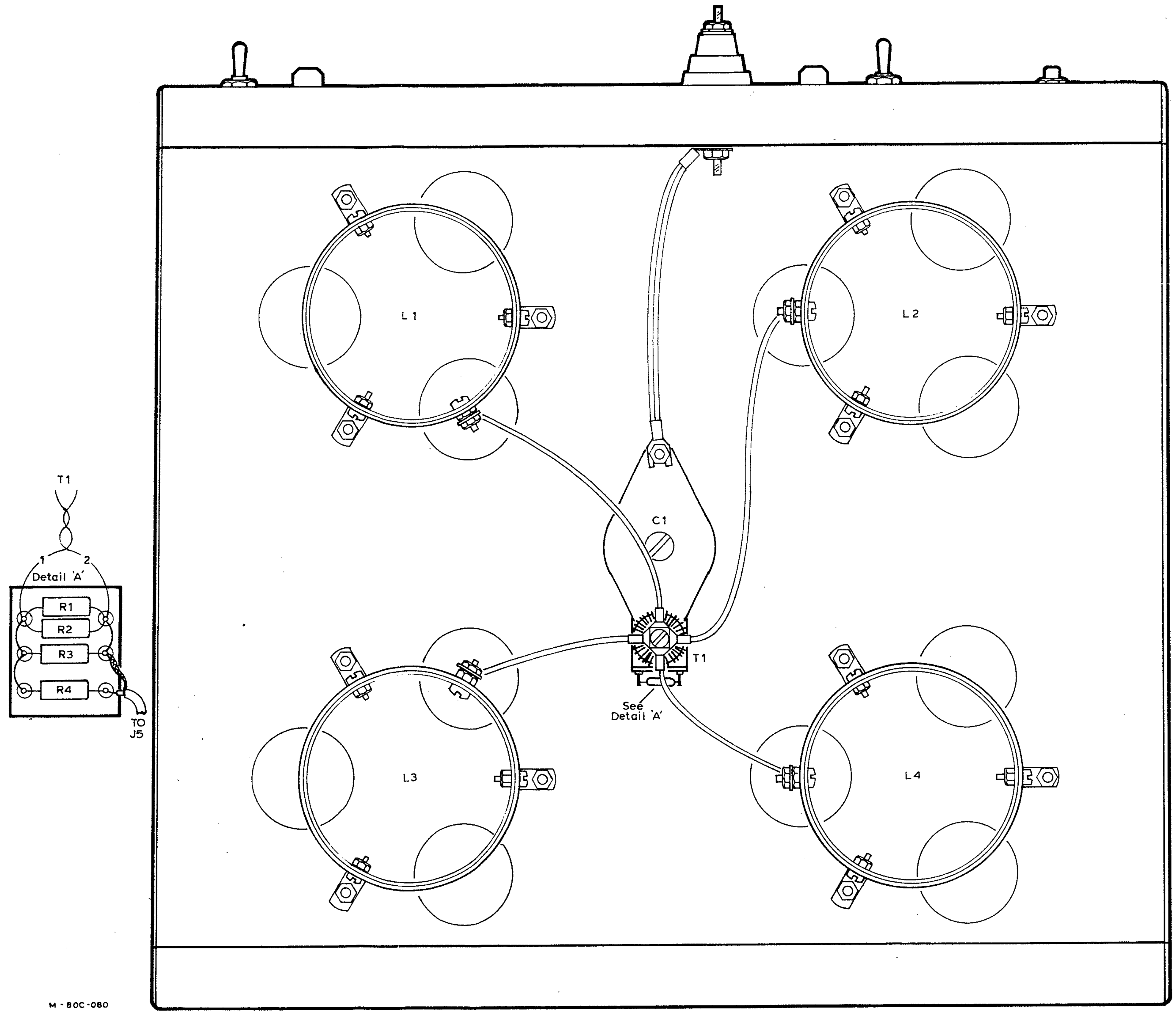


Figure FO-18 Assembly Detail - NAF37 Quad Combiner/Filter (Top View)

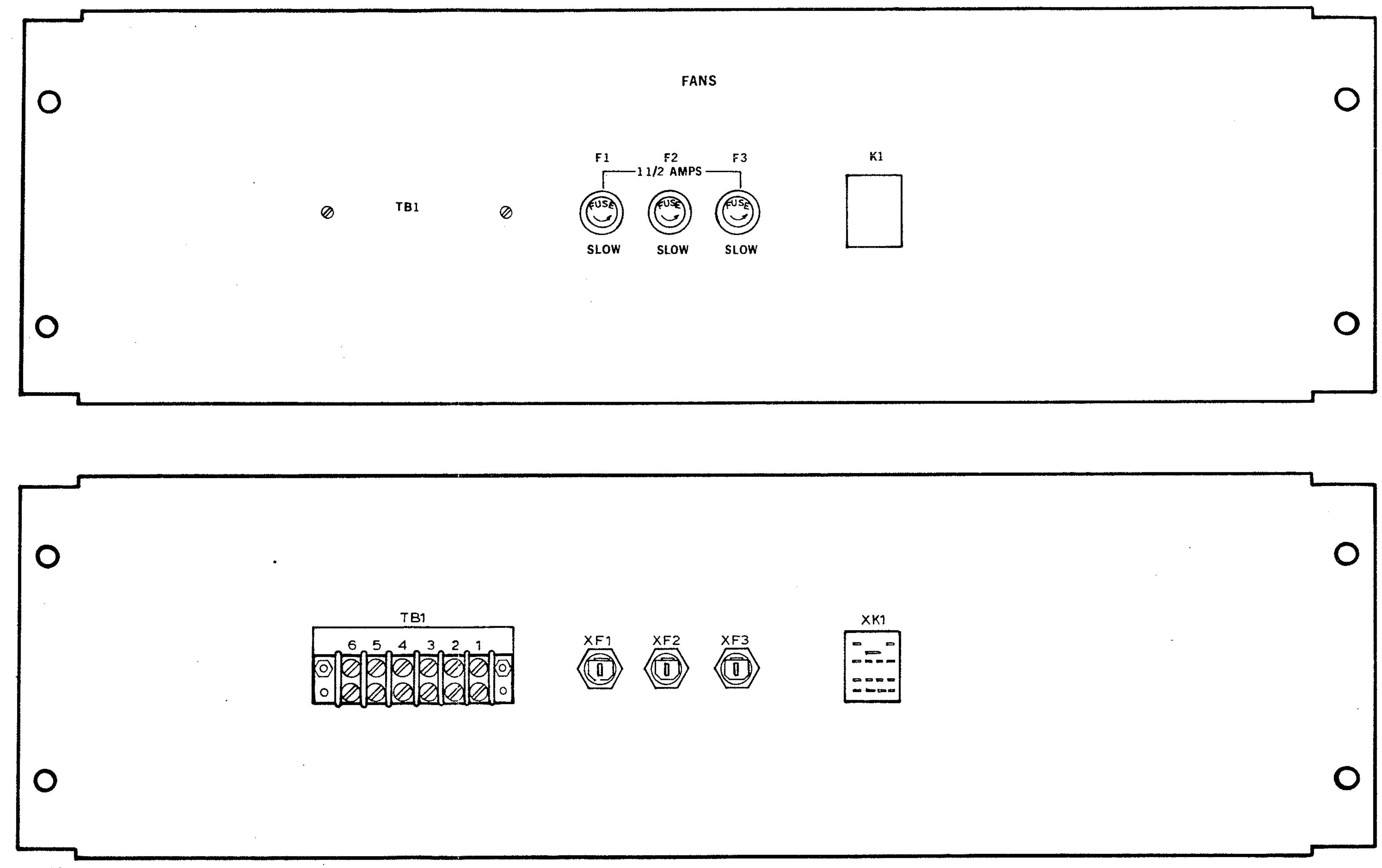


Figure FO-19 Assembly Detail - 15 kW Power Block (NAR70) Fan Control Panel (P/N 149-8047)

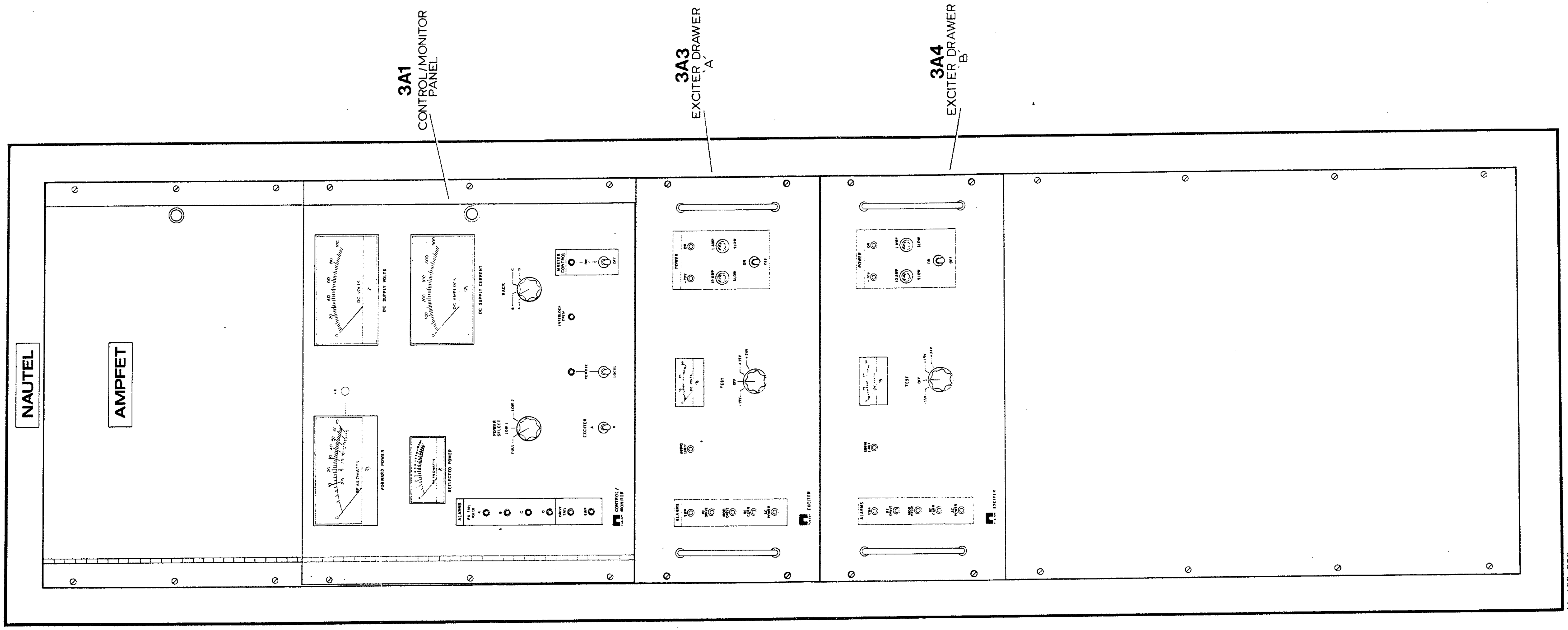


Figure FO-20 Assembly Detail - NAR69 Control/Monitor Cabinet (Front View)

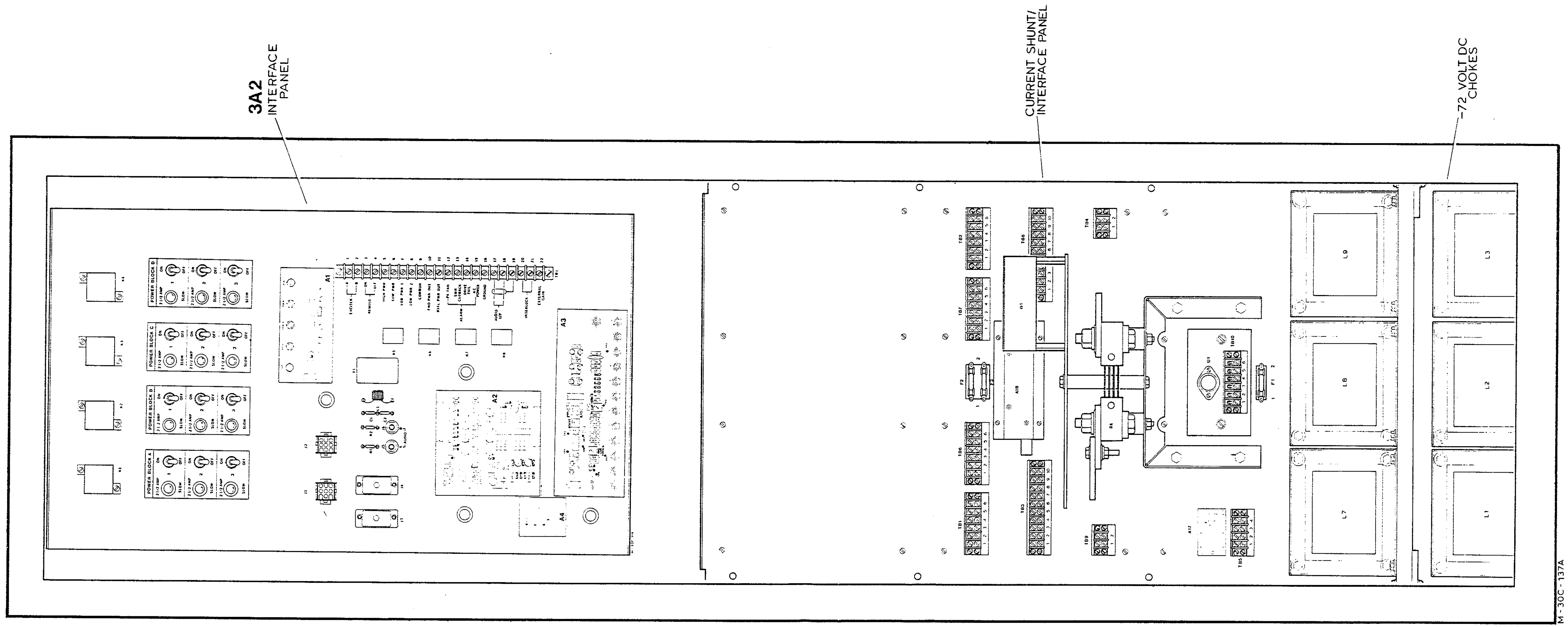
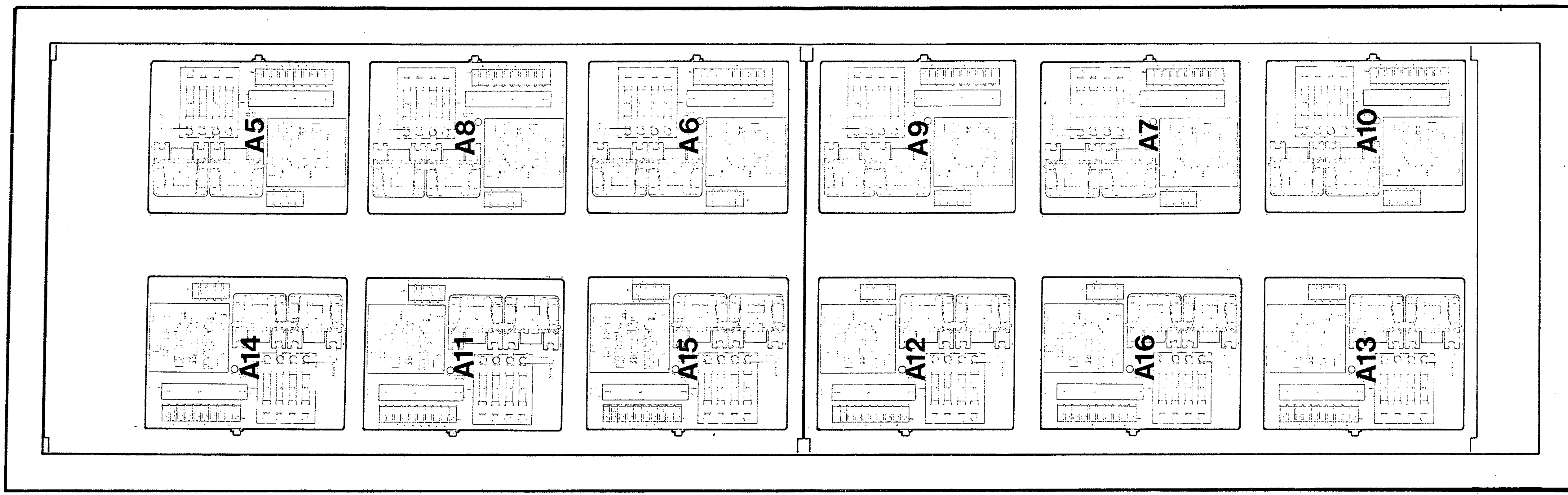


Figure FO-21 Assembly Detail - NAR69 Control/Monitor Cabinet (Interior Front View)



A5 THRU A16 ARE
NAX25
RELAY CONTROLS

M - 30C - 138

Figure FO-22 Assembly Detail - NAR69 Control/Monitor Cabinet (Rear View)

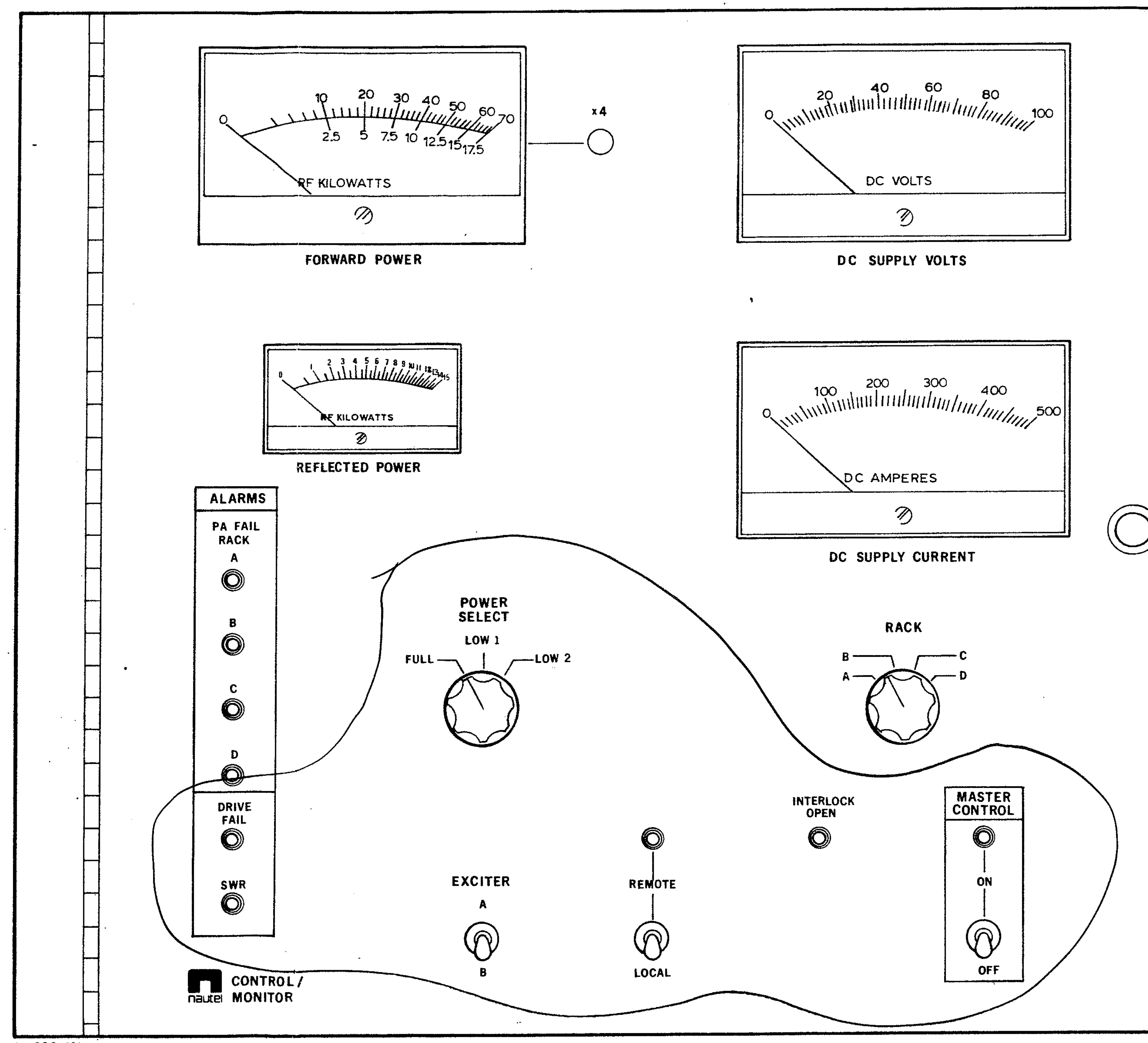
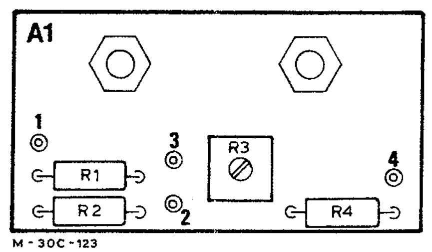


Figure FO-23 Assembly Detail - NAC27 Control/Monitor Panel (Front View)



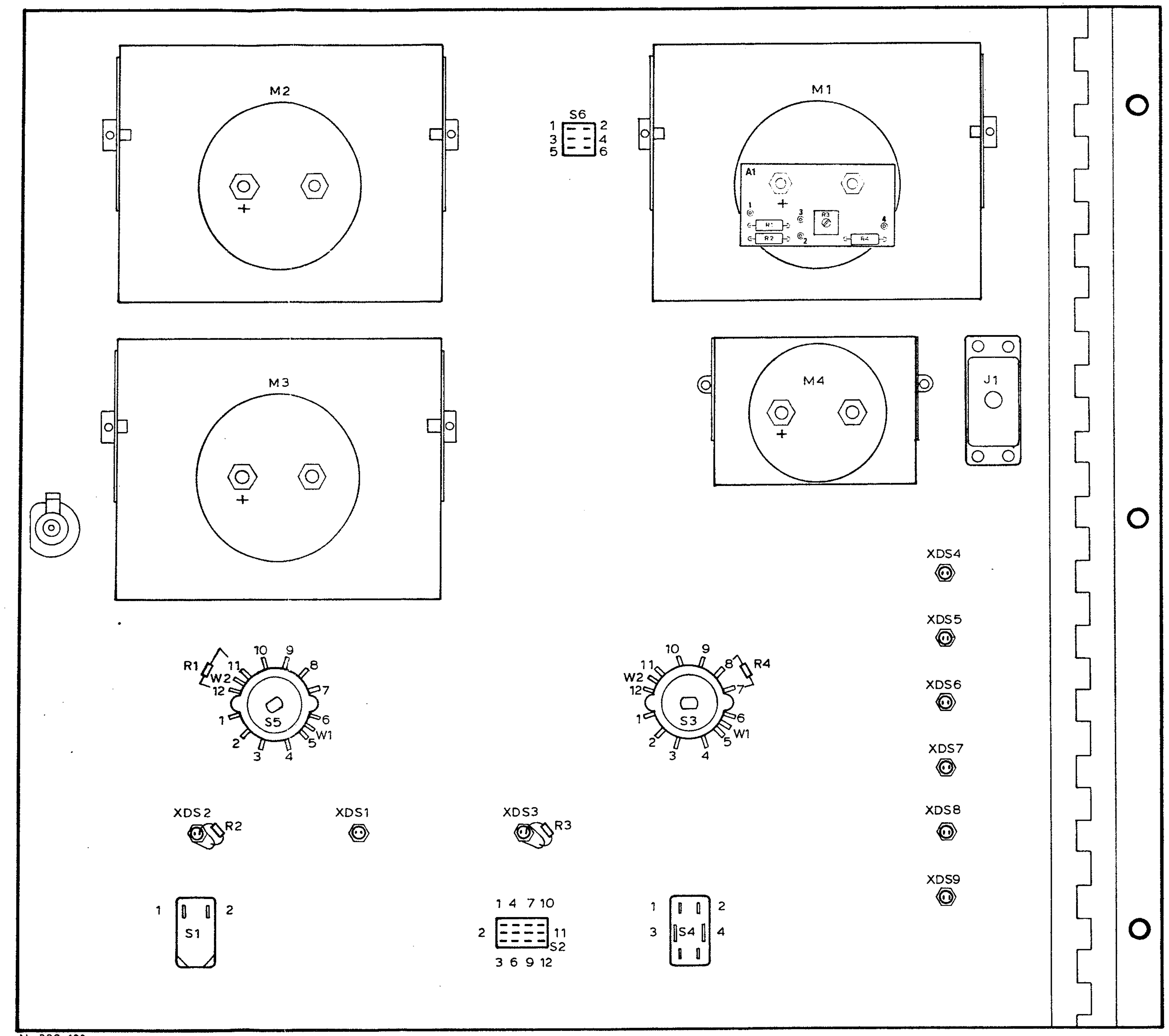


Figure FO-24 Assembly Detail - NAC27 Control/Monitor Panel (Rear View)

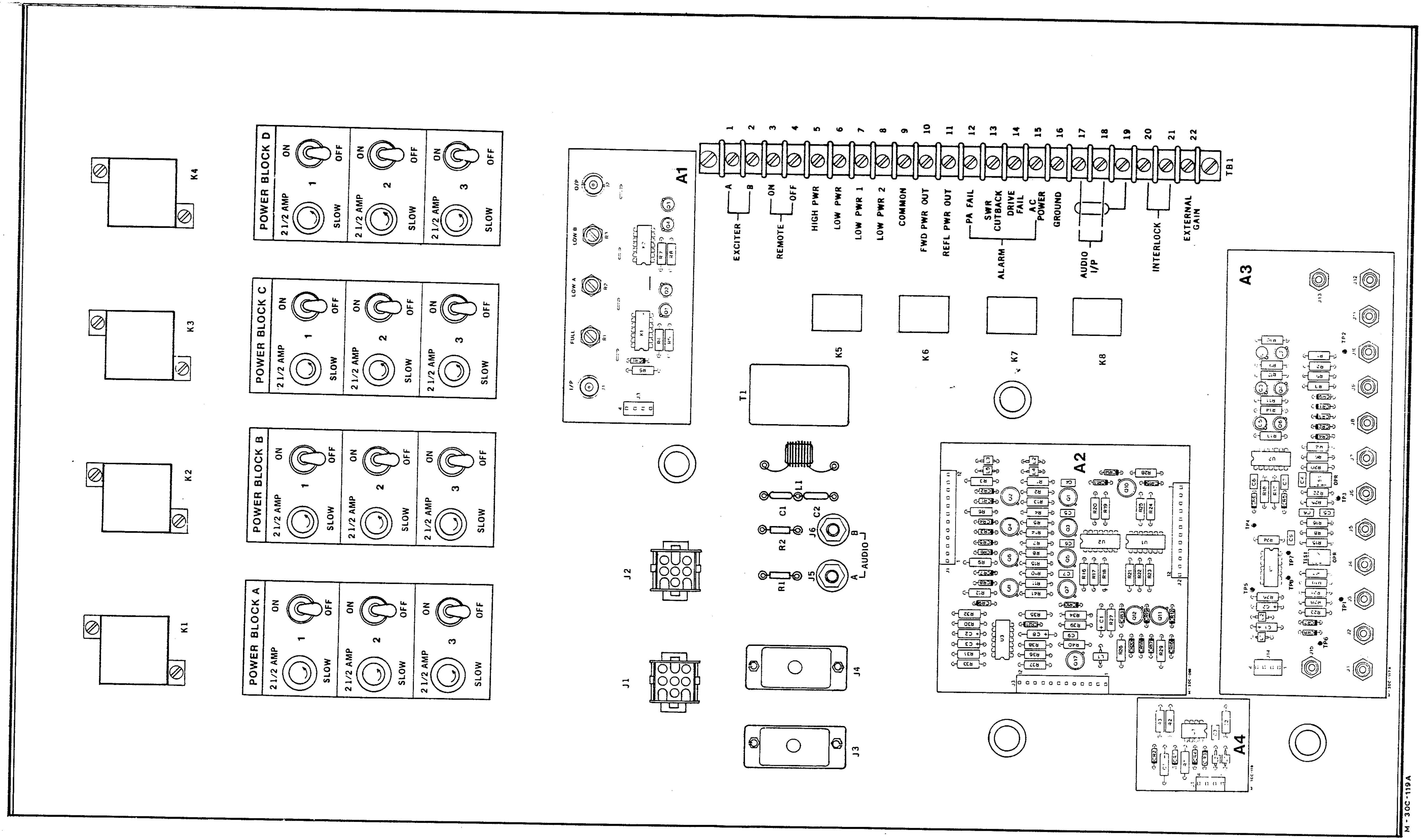


Figure FO-25 Assembly Detail - NAC29 Interface Panel (Front View)

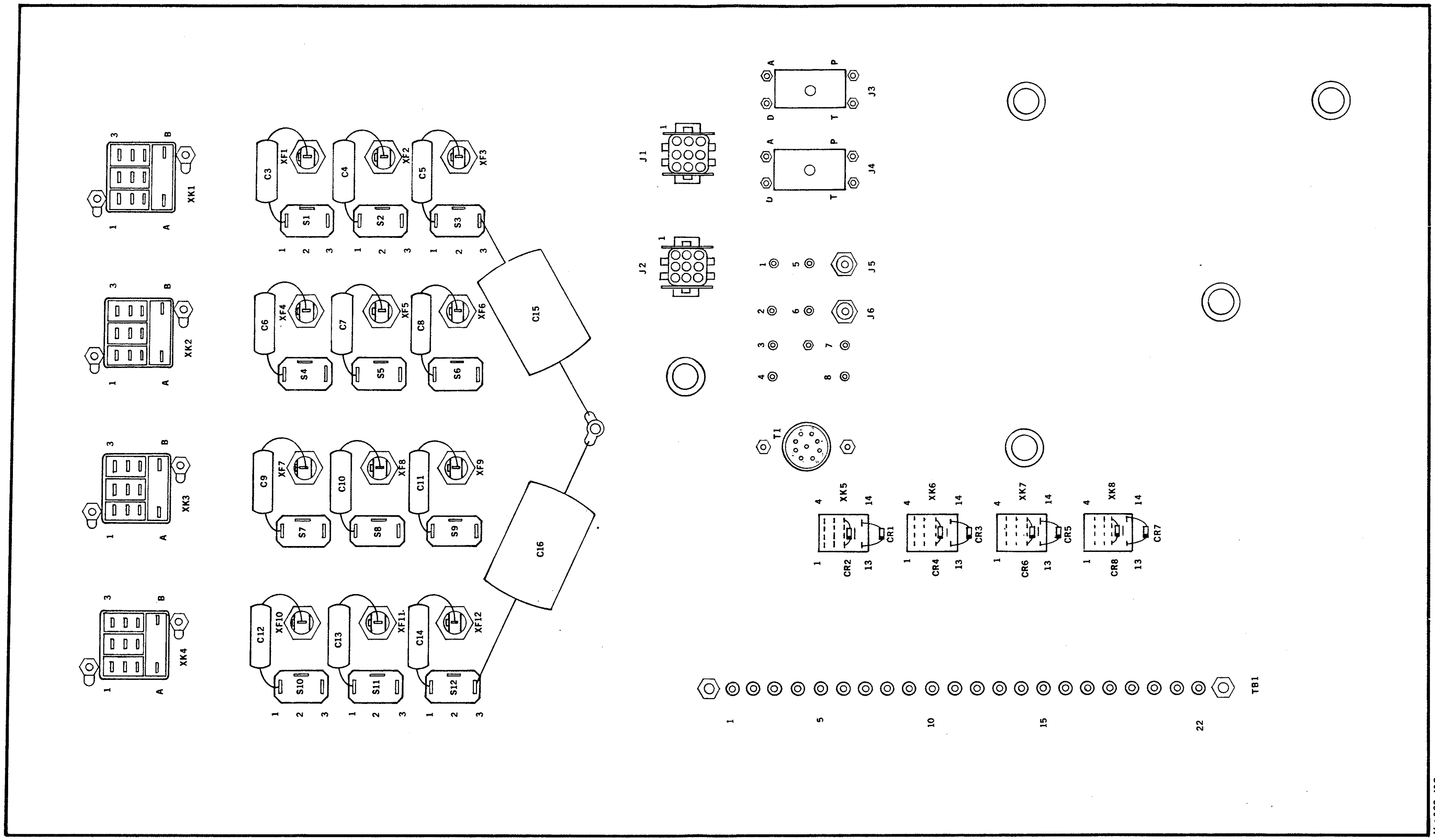


Figure FO-26 Assembly Detail - NAC29 Interface Panel (Rear View)

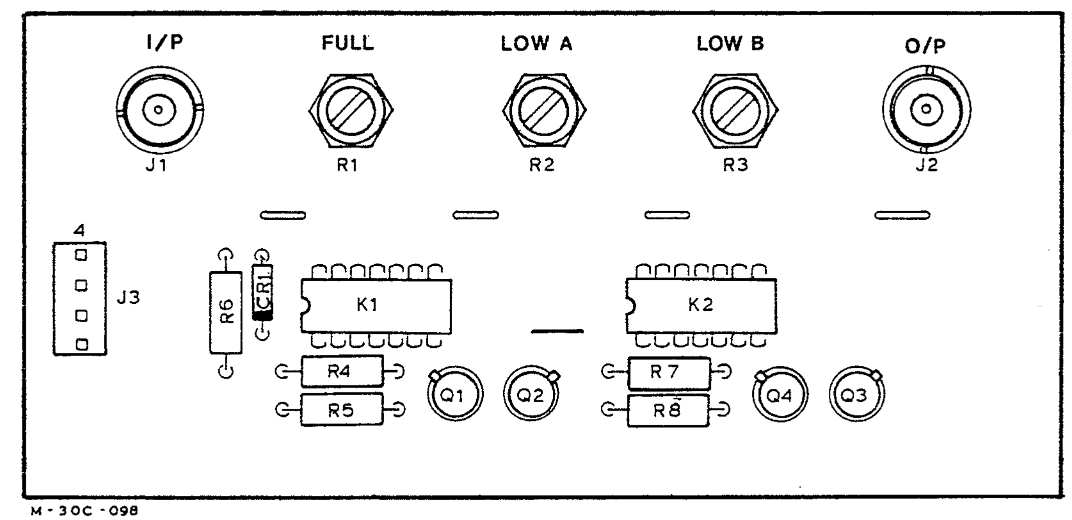


Figure FO-27 Assembly Detail - NAPC10 Rf Monitor Pcb

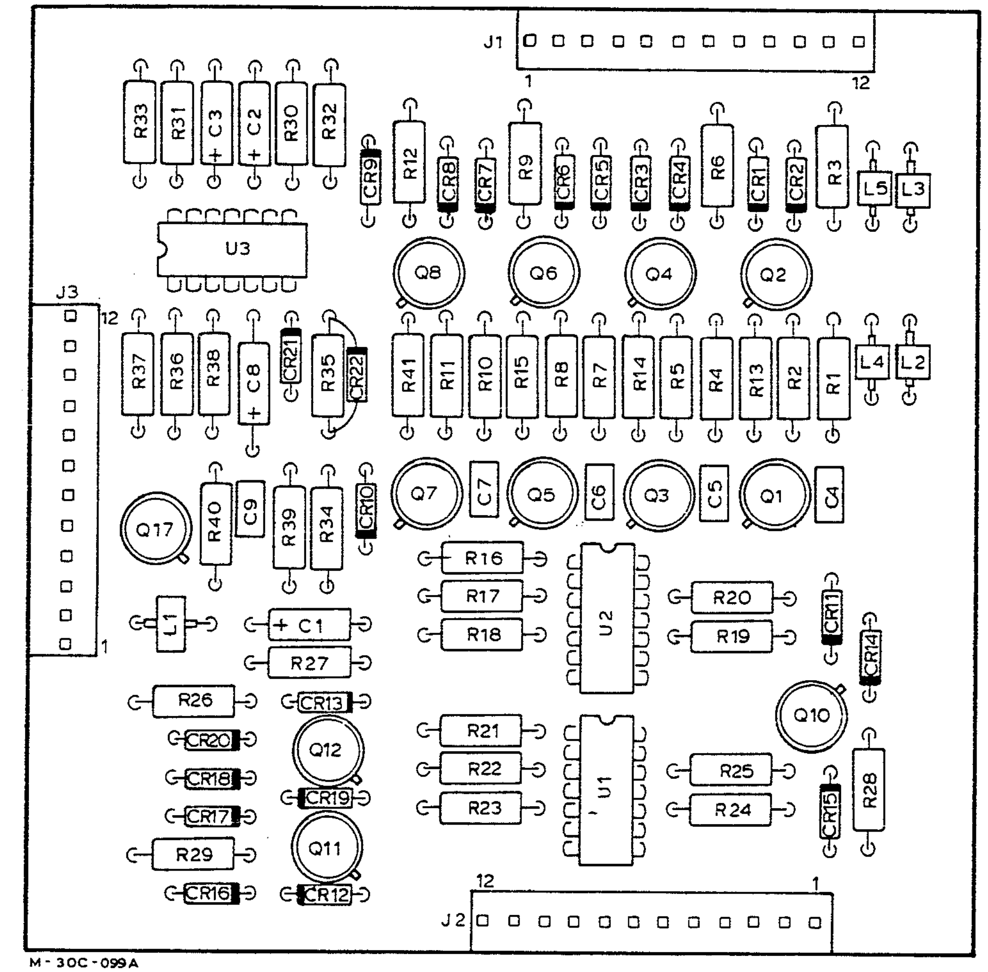


Figure FO-28 Assembly Detail - NAPC11 Interface Pcb

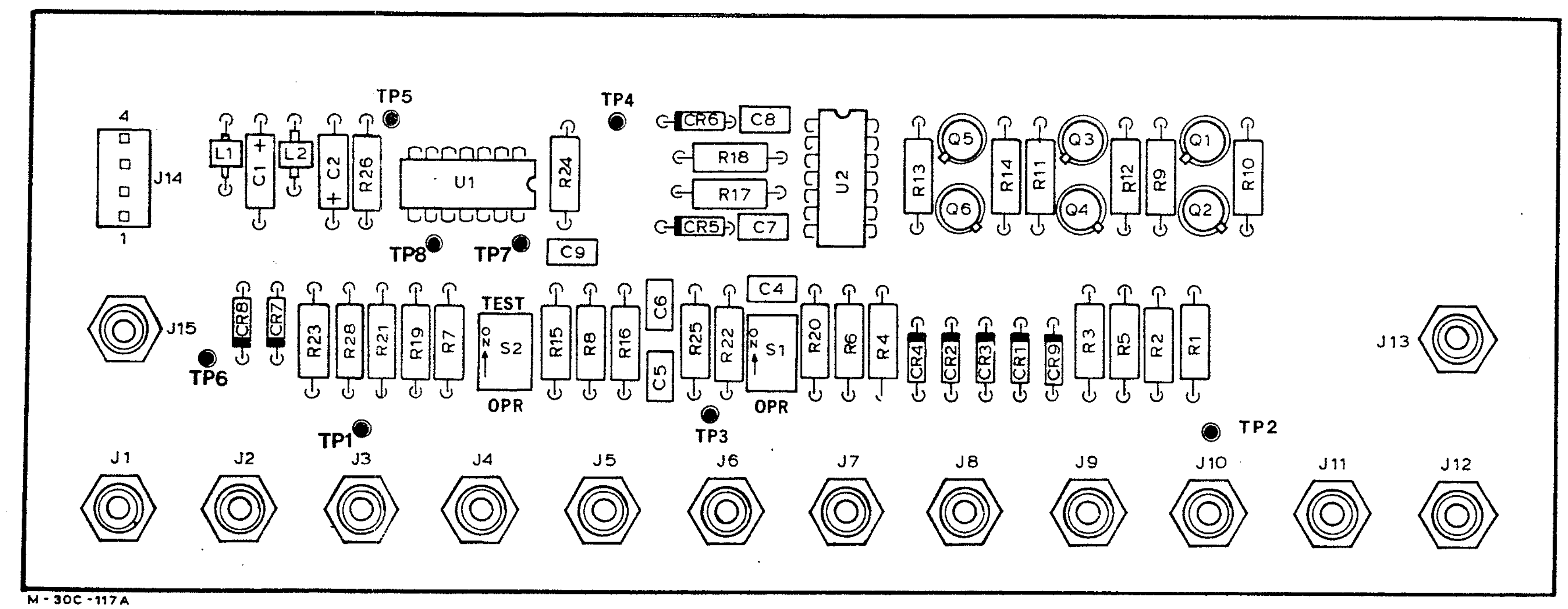


Figure FO-29 Assembly Detail - NAPC13 Rf Current Protection Threshold Pcb

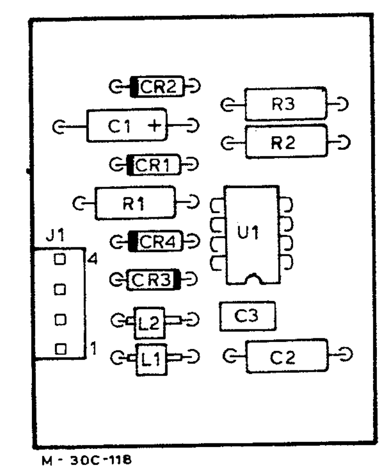


Figure FO-30 Assembly Detail - On/Off Control Pcb (P/N 149-8106)

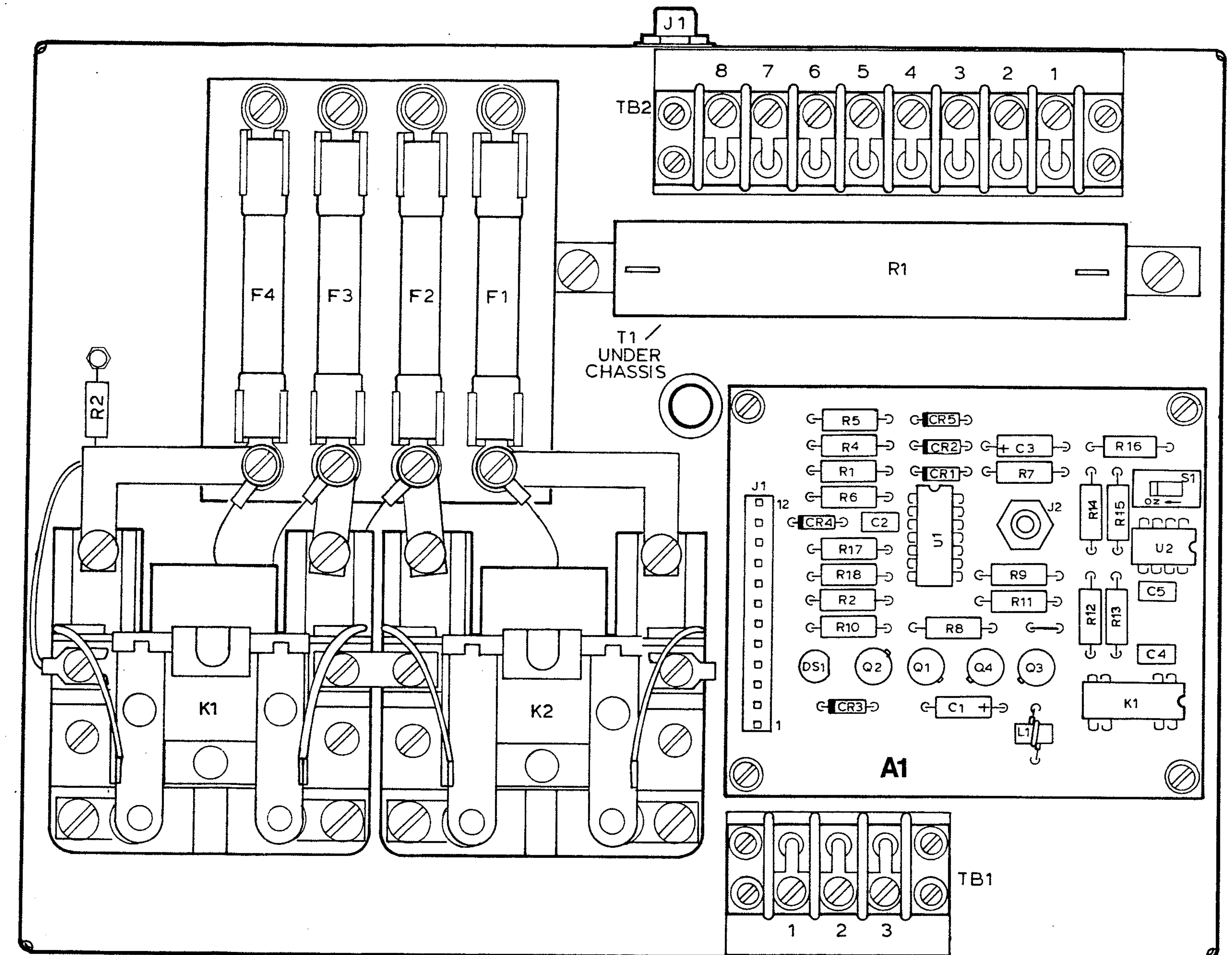


Figure FO-31 Assembly Detail - NAX25 Relay Control Panel

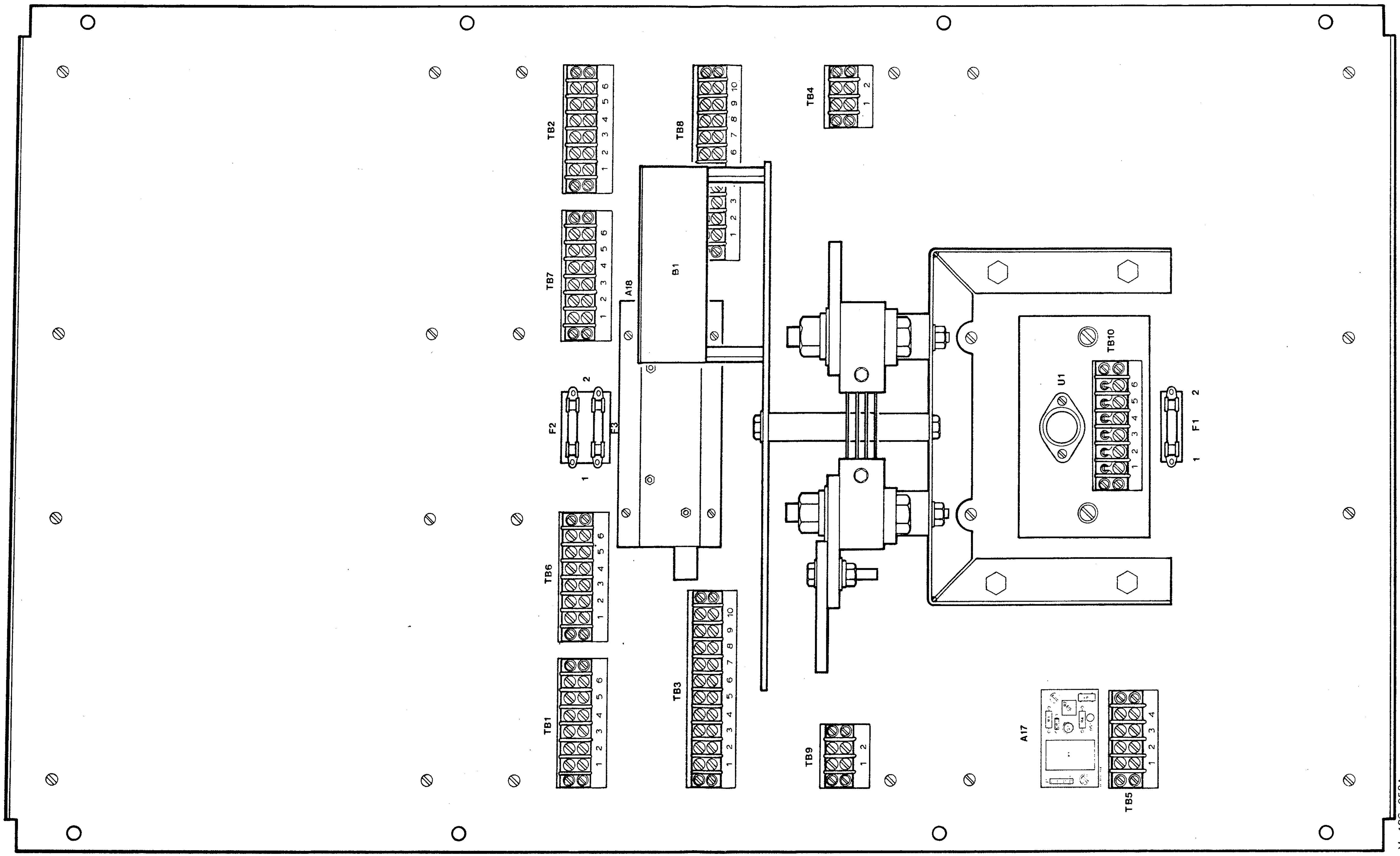


Figure FO-32 Assembly Detail - Current Shunt/Interface Panel Assembly (P/N149-4045/1)

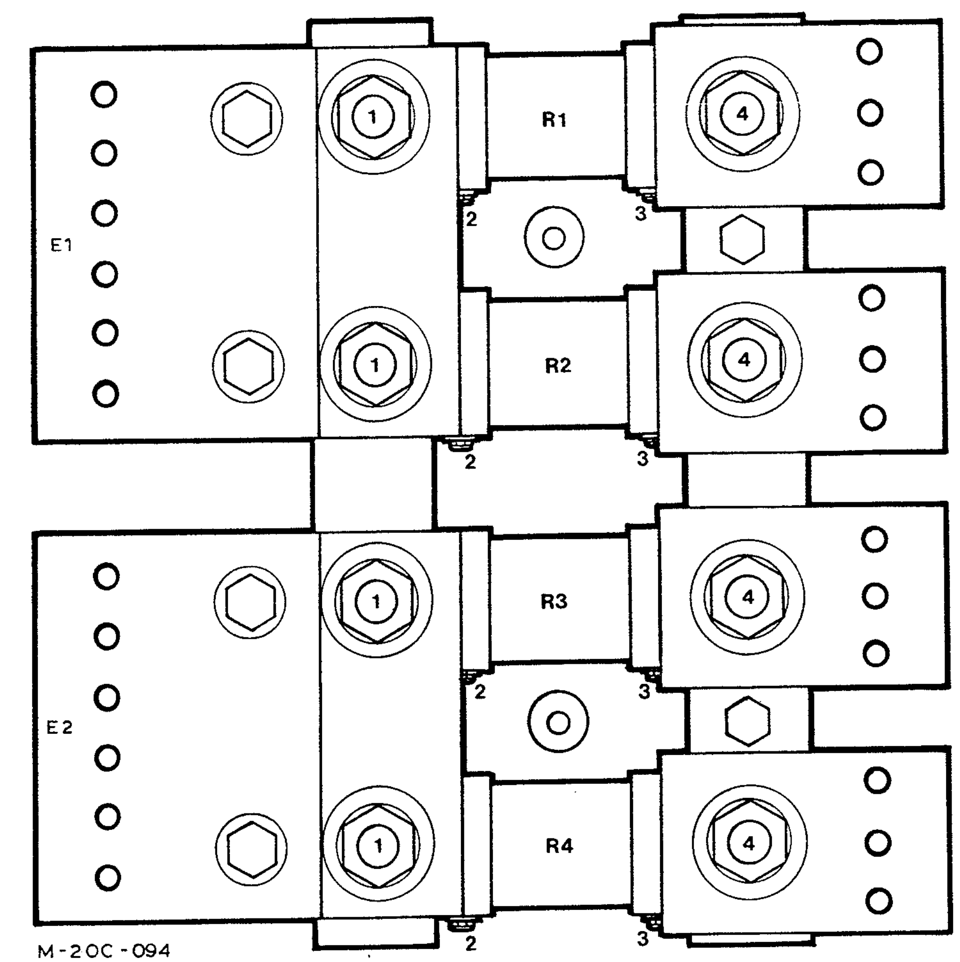


Figure FO-33 Assembly Detail - Current Shunt Resistor Assembly (Top View)

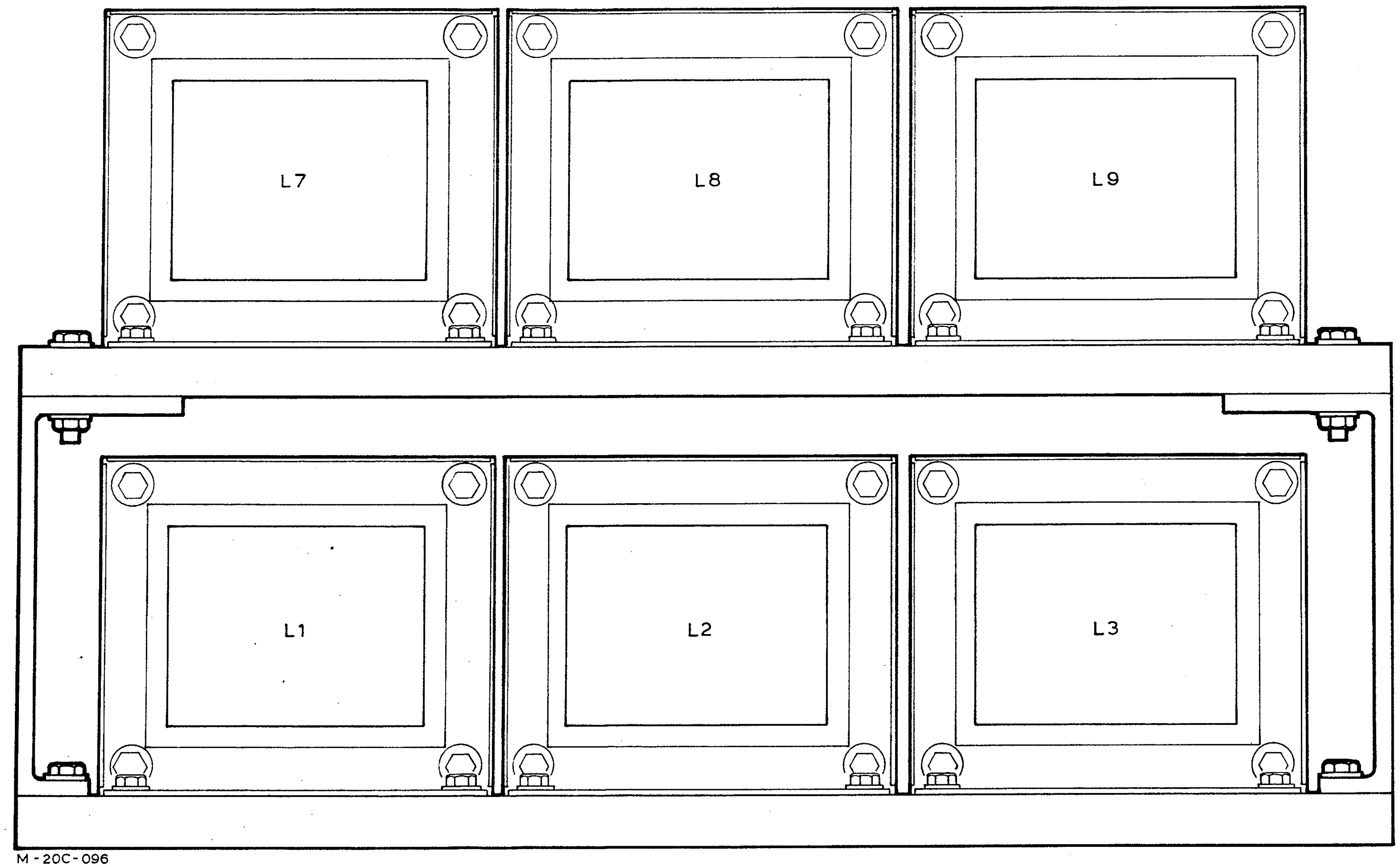


Figure FO-34 Assembly Detail - -72 Vdc Choke Tray (Front View)

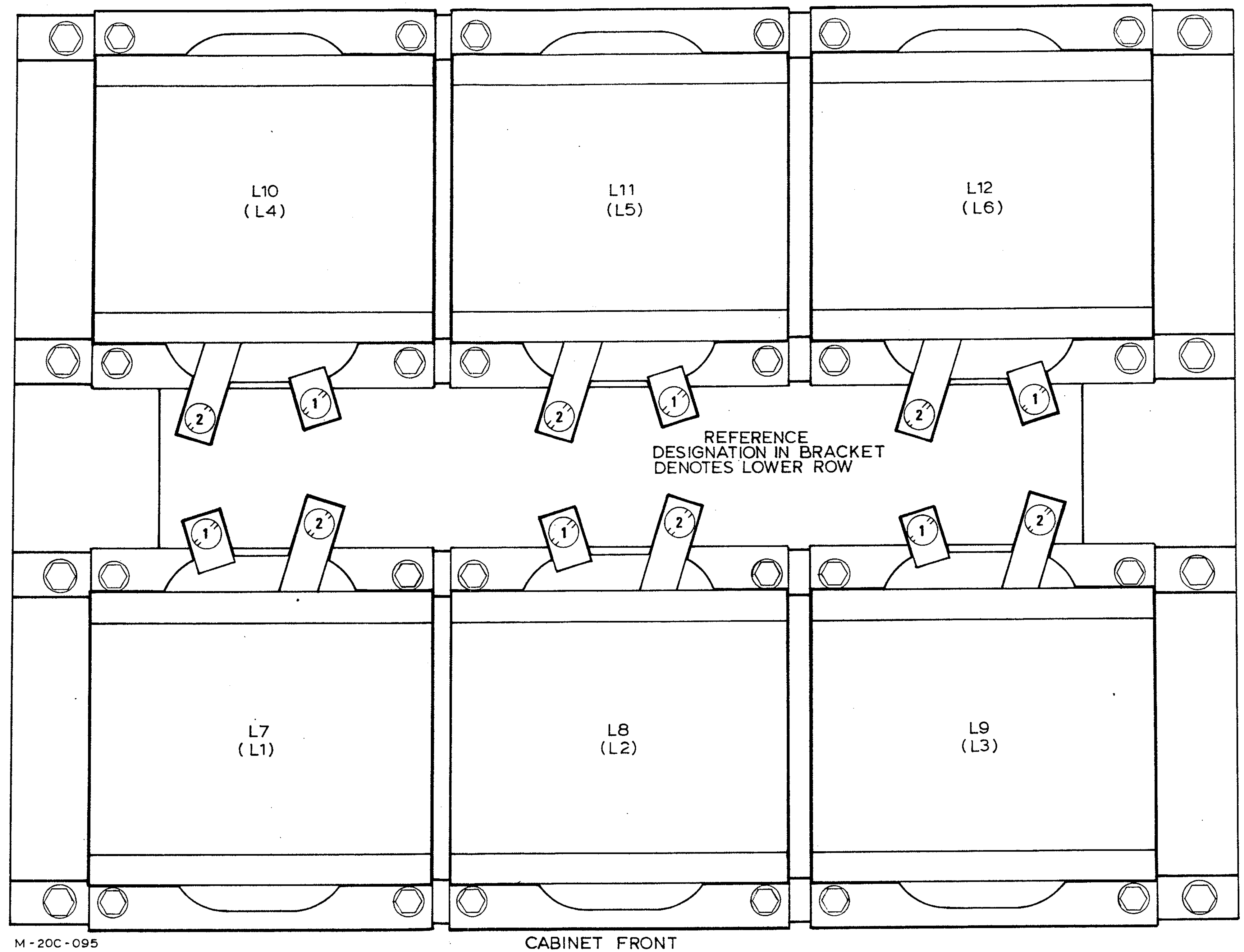
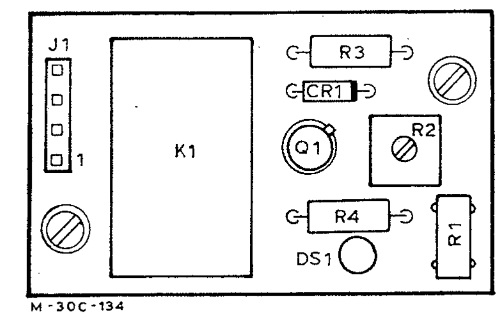


Figure FO-35 Assembly Detail - -72 Vdc Choke Tray (Top View)



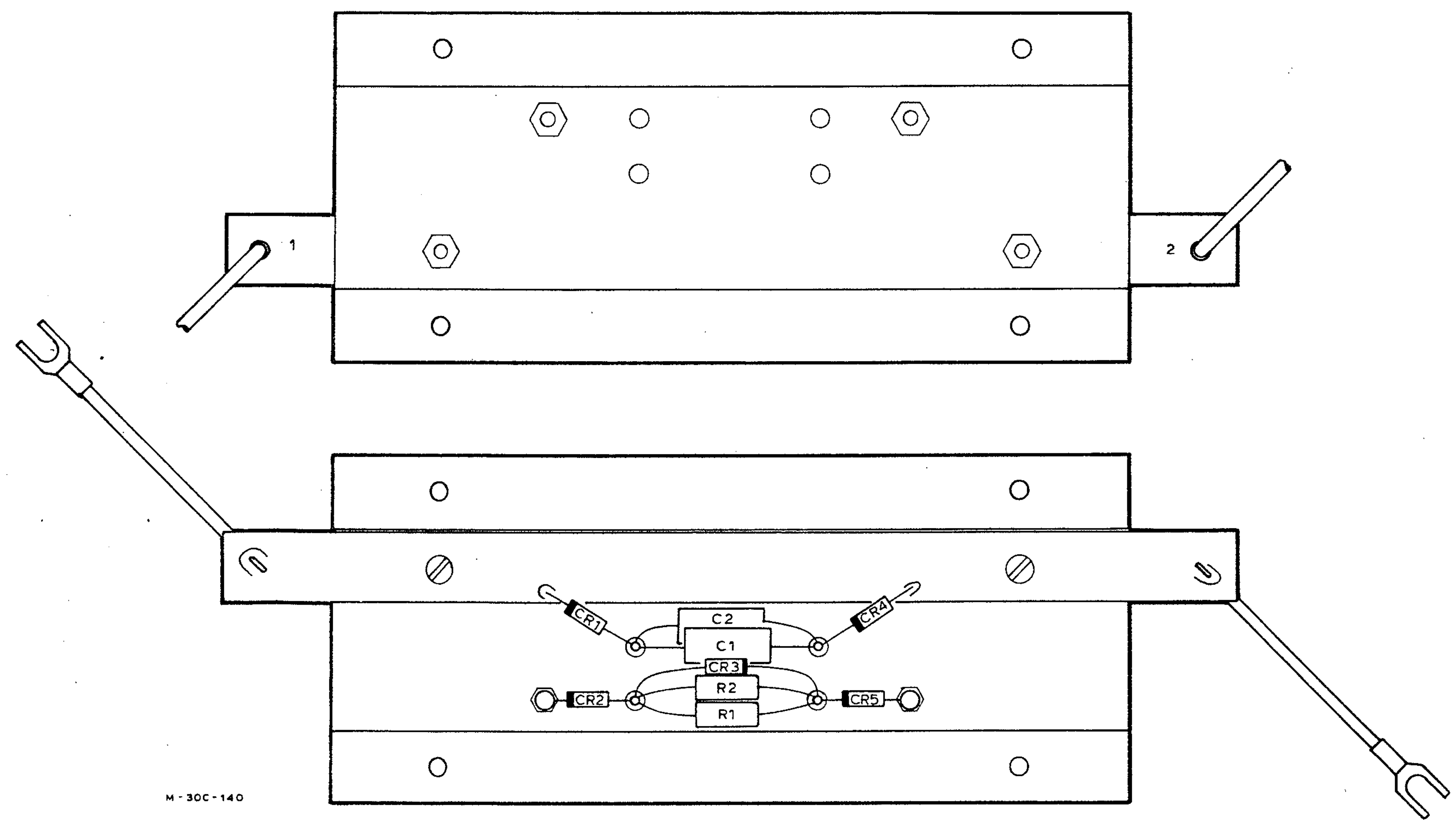


Figure FO-36 Assembly Detail - Overvoltage Protection Pcb (P/N 149-8098) and Transient Clipper Assembly (P/N 149-8122-1)

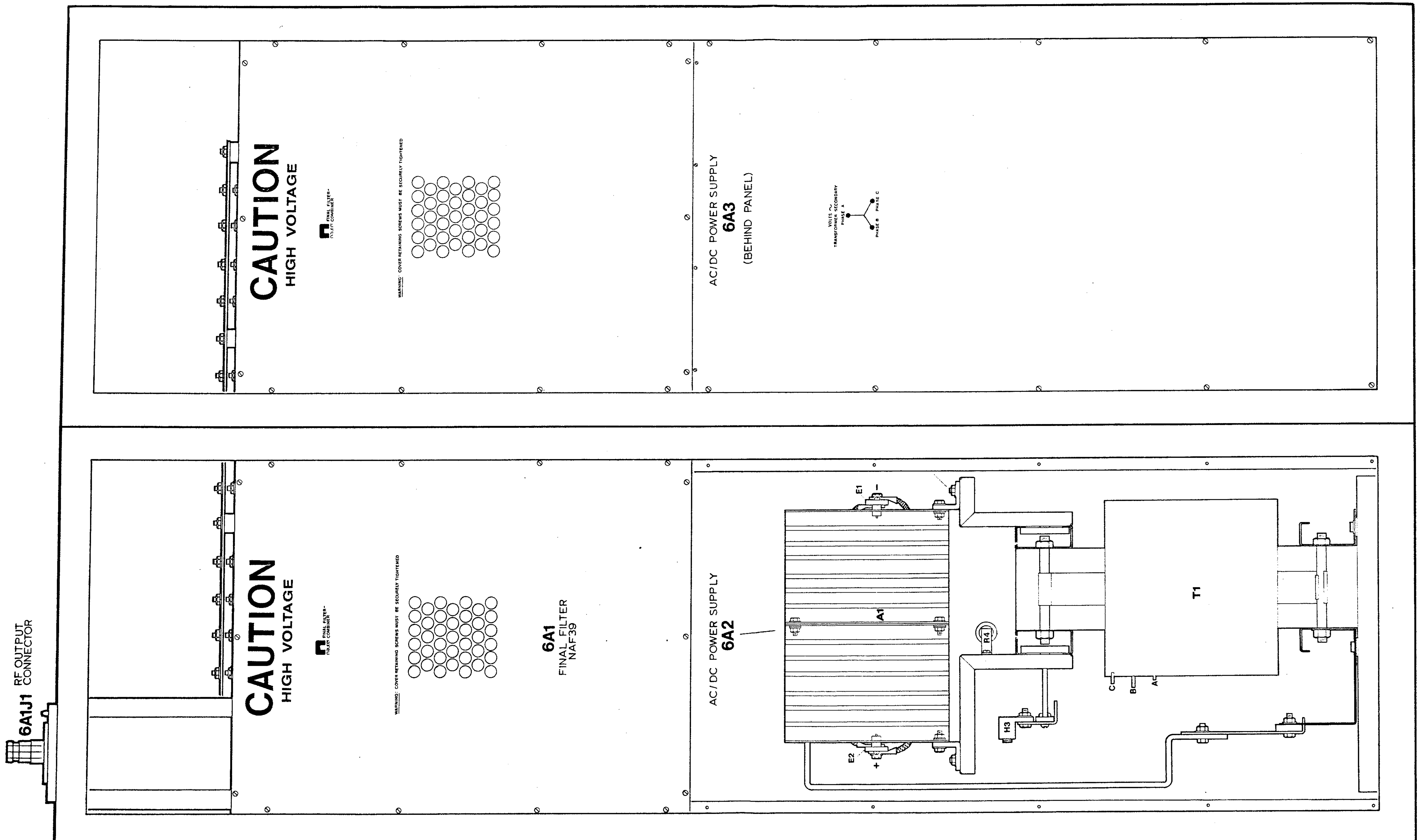


Figure FO-37 Assembly Detail - NAR72 Final Filter/Power Supply Cabinet (Front View)

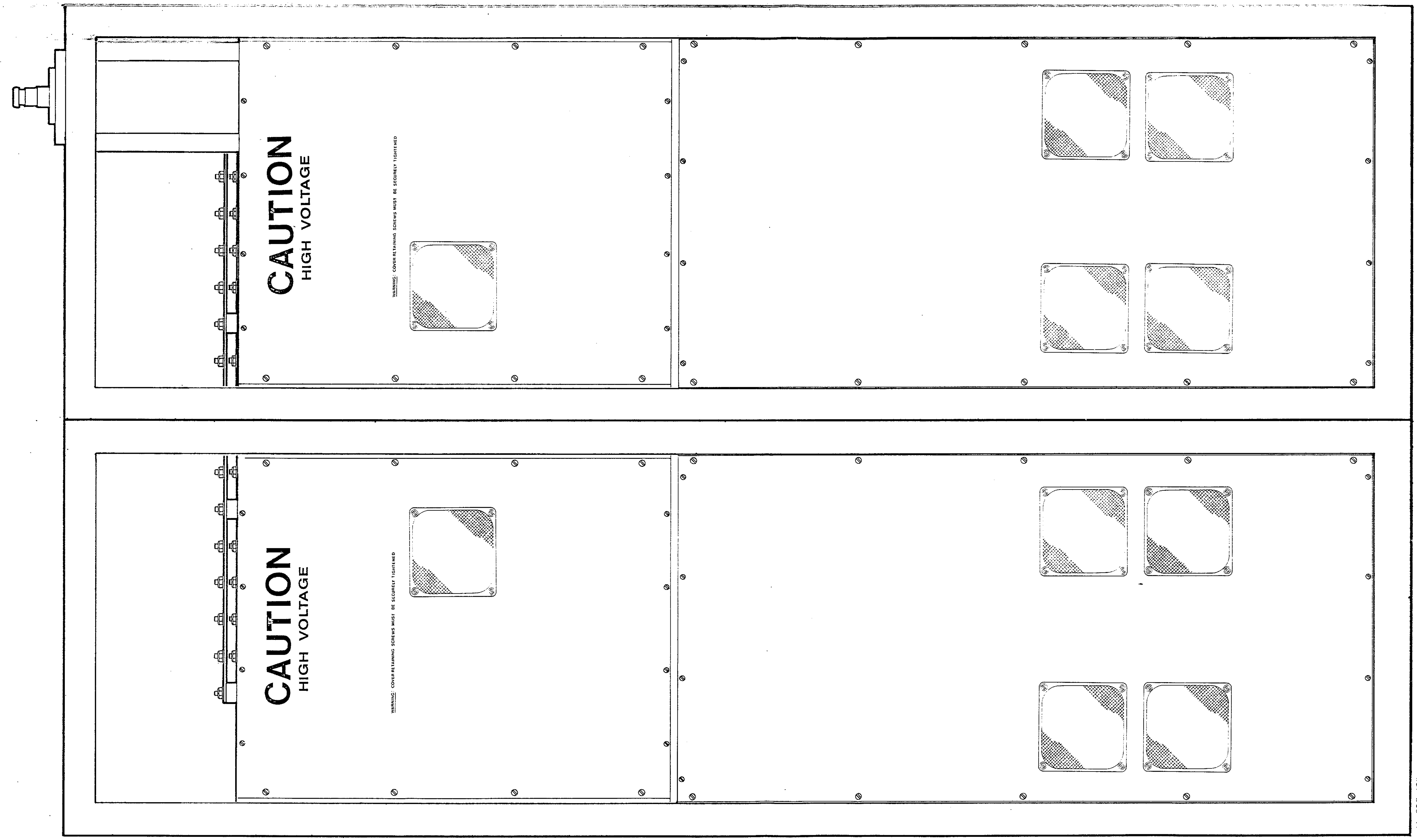


Figure FO-38 Assembly Detail - NAR72 Final Filter/Power Supply Cabinet (Rear View)

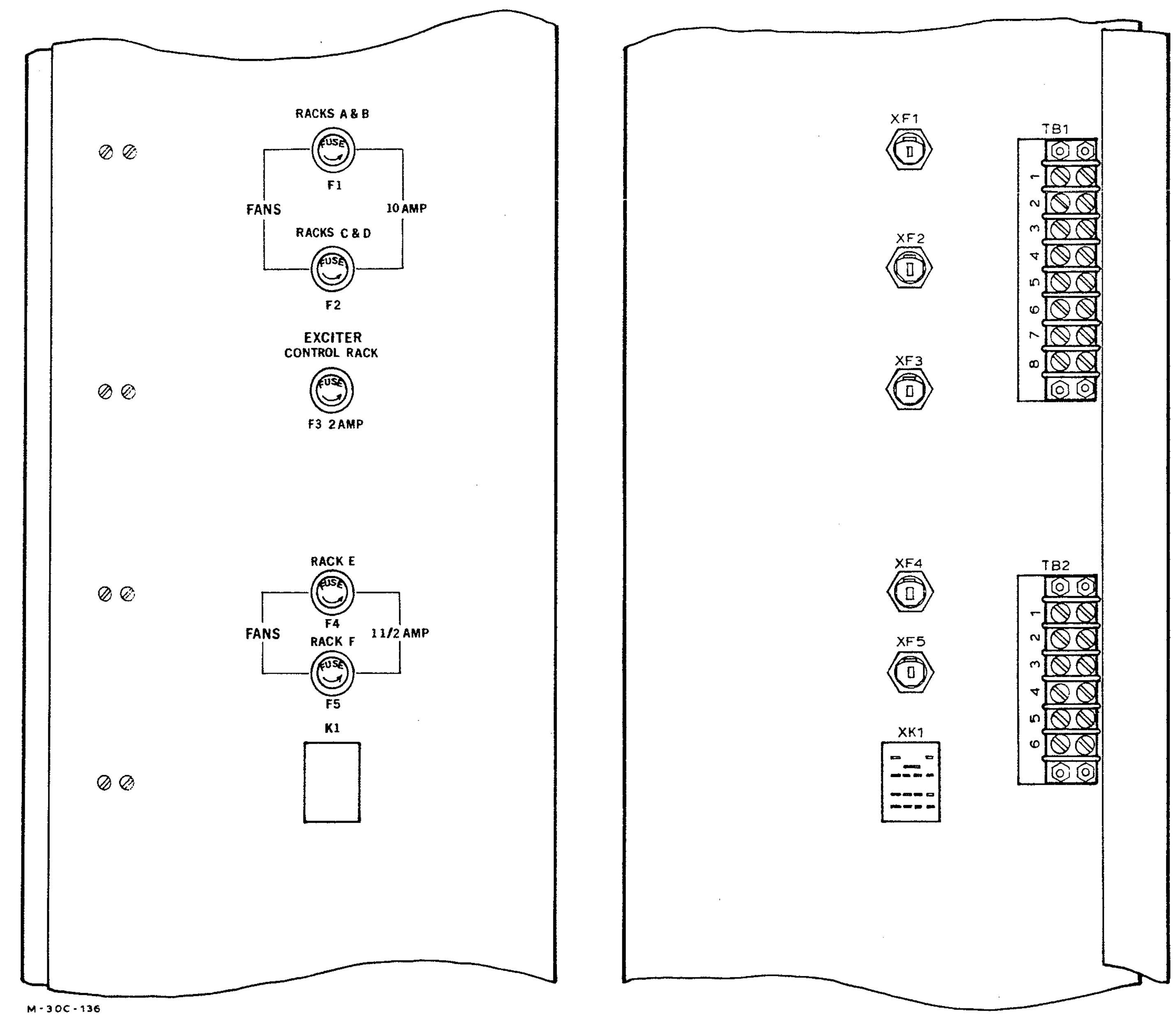


Figure FO-39 Assembly Detail - NAR72 Cabinet Fan Control Panel (P/N 149-8047) (Partial View)

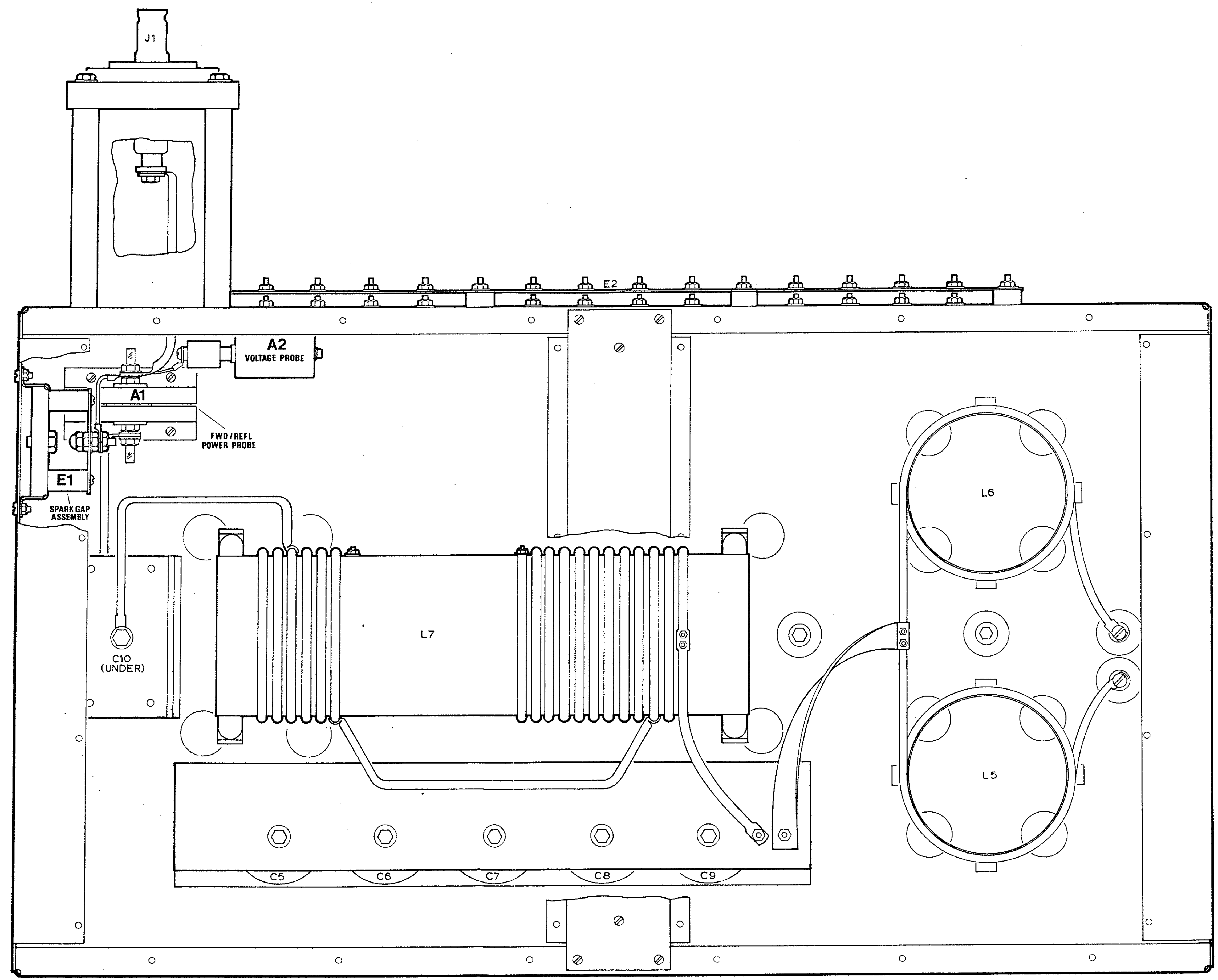


Figure FO-40 Assembly Detail - NAF39 50 Kilowatt Combiner/Final Filter (Front View)

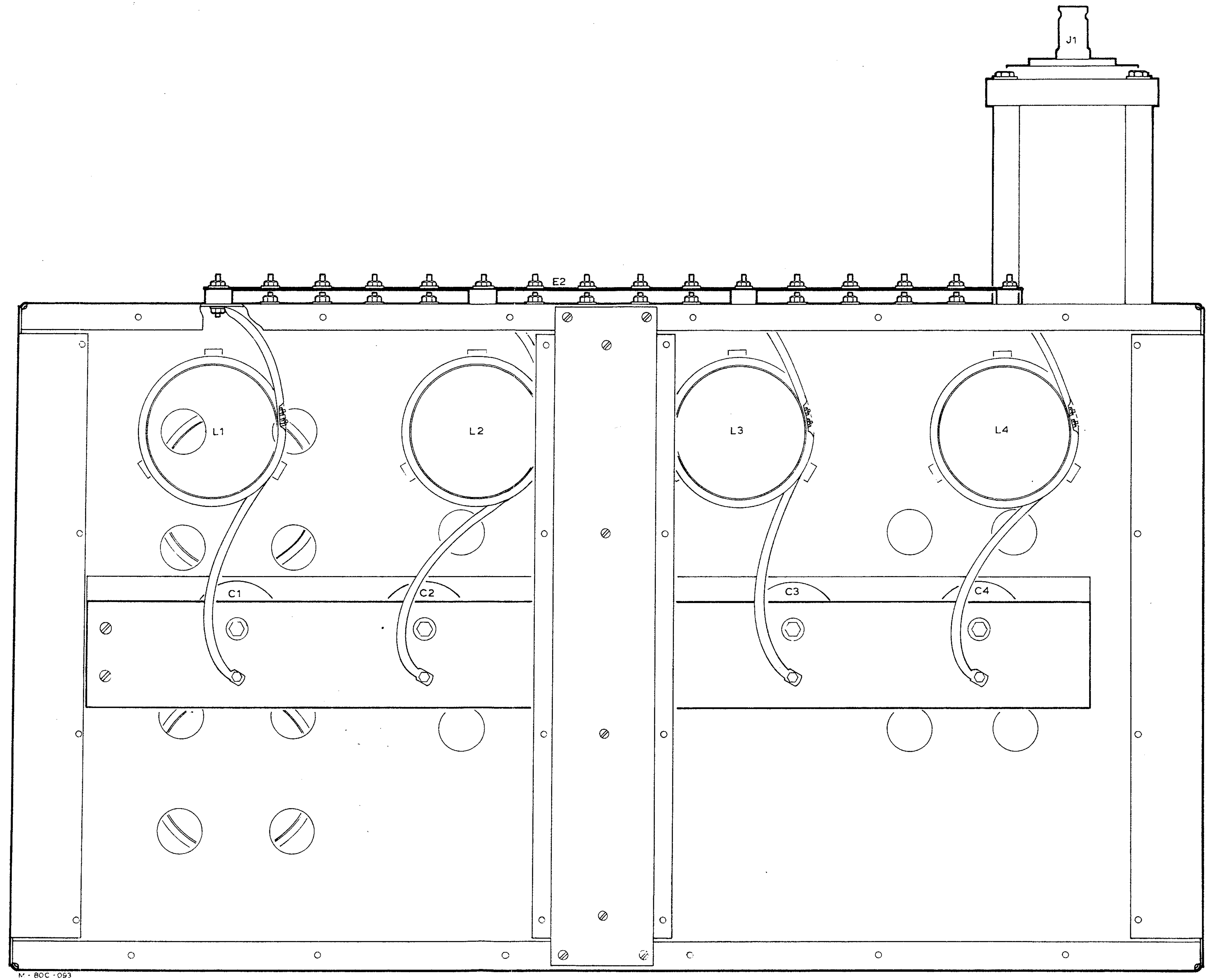


Figure FO-41 Assembly Detail - NAF39 50 Kilowatt Combiner/Final Filter (Rear View)

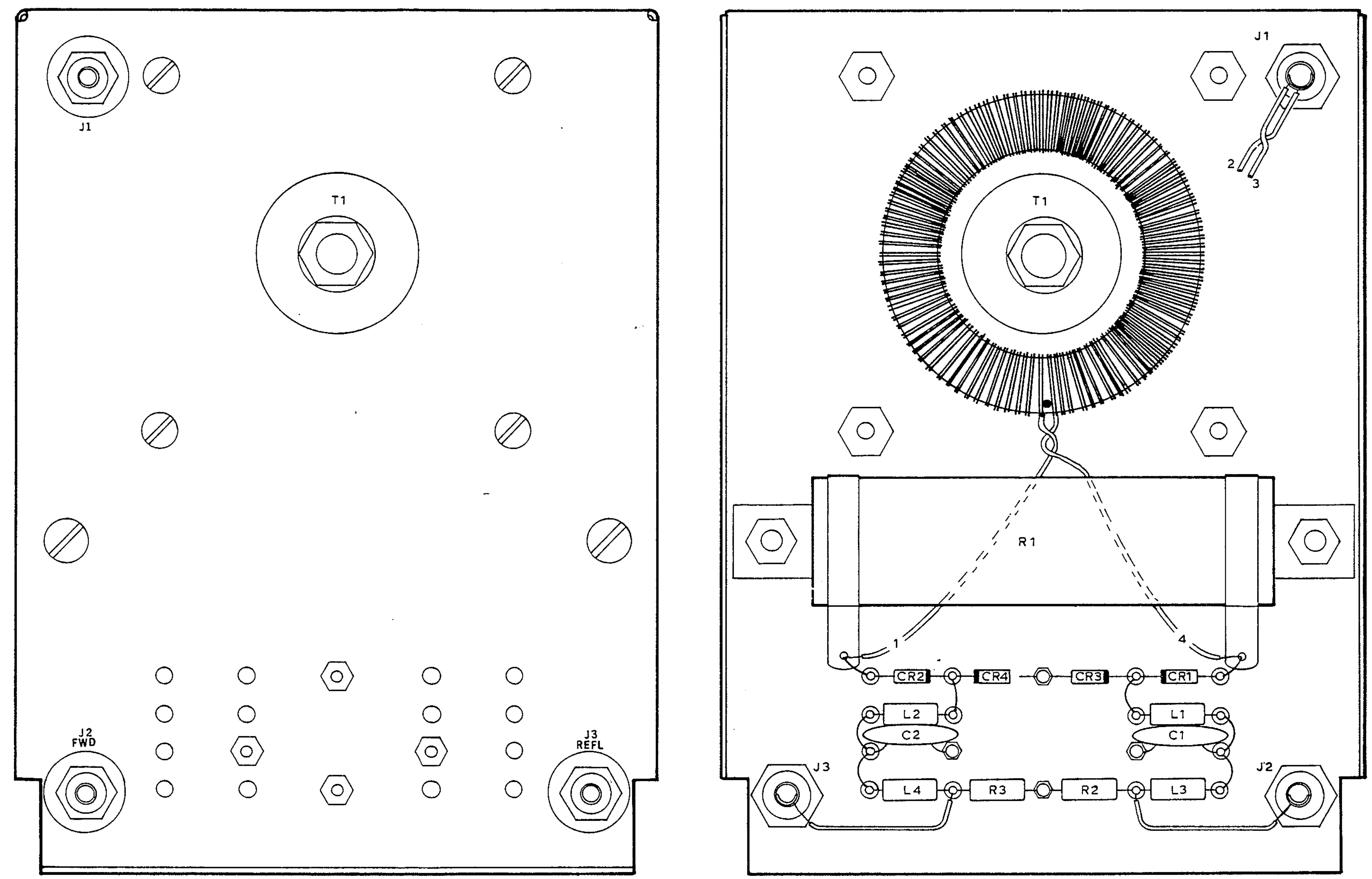


Figure FO-42 Assembly Detail - NAFP12 Forward/reflected Power Probe

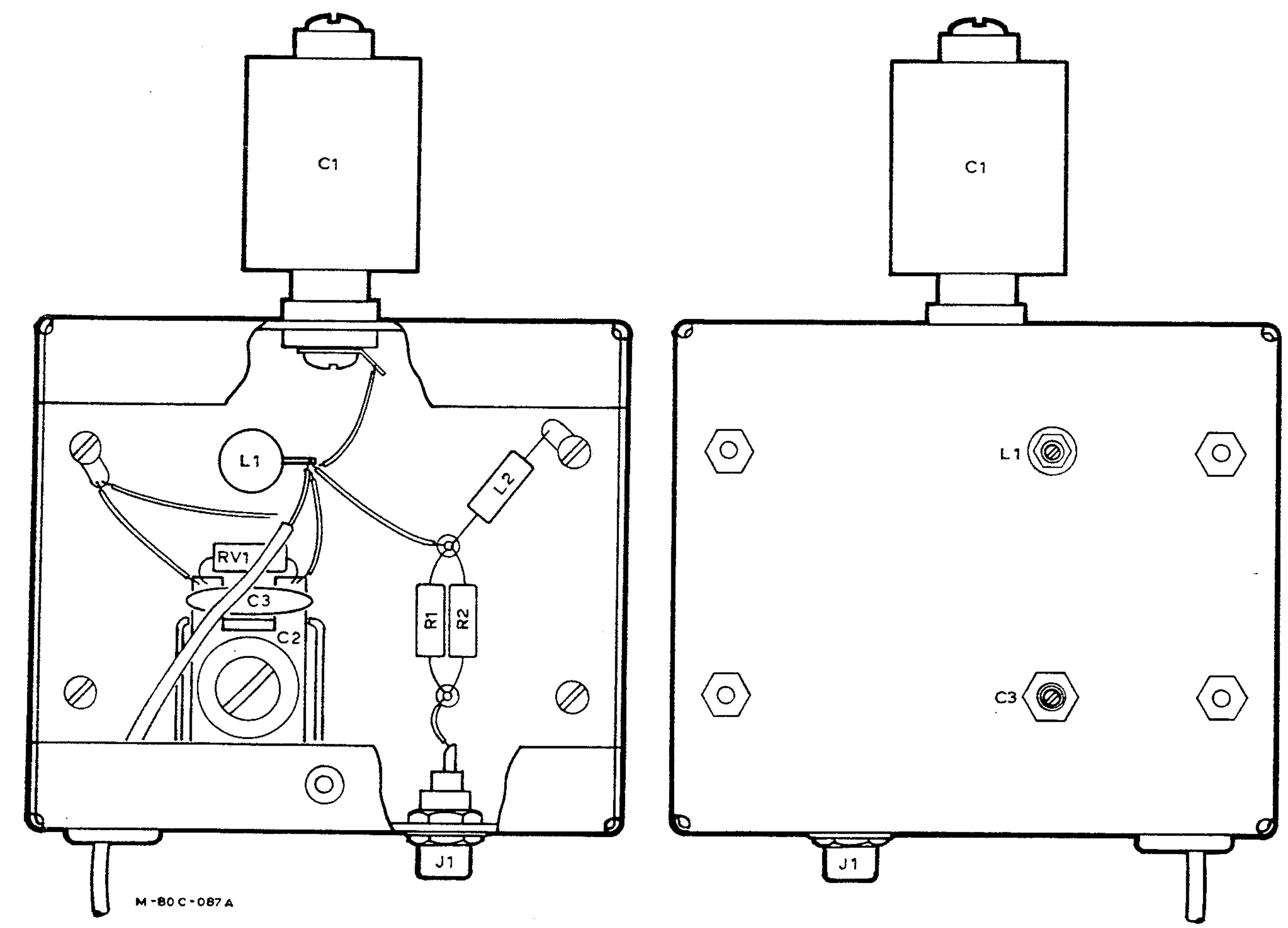


Figure FO-43 Assembly Detail - NAFP13 Output Voltage Probe

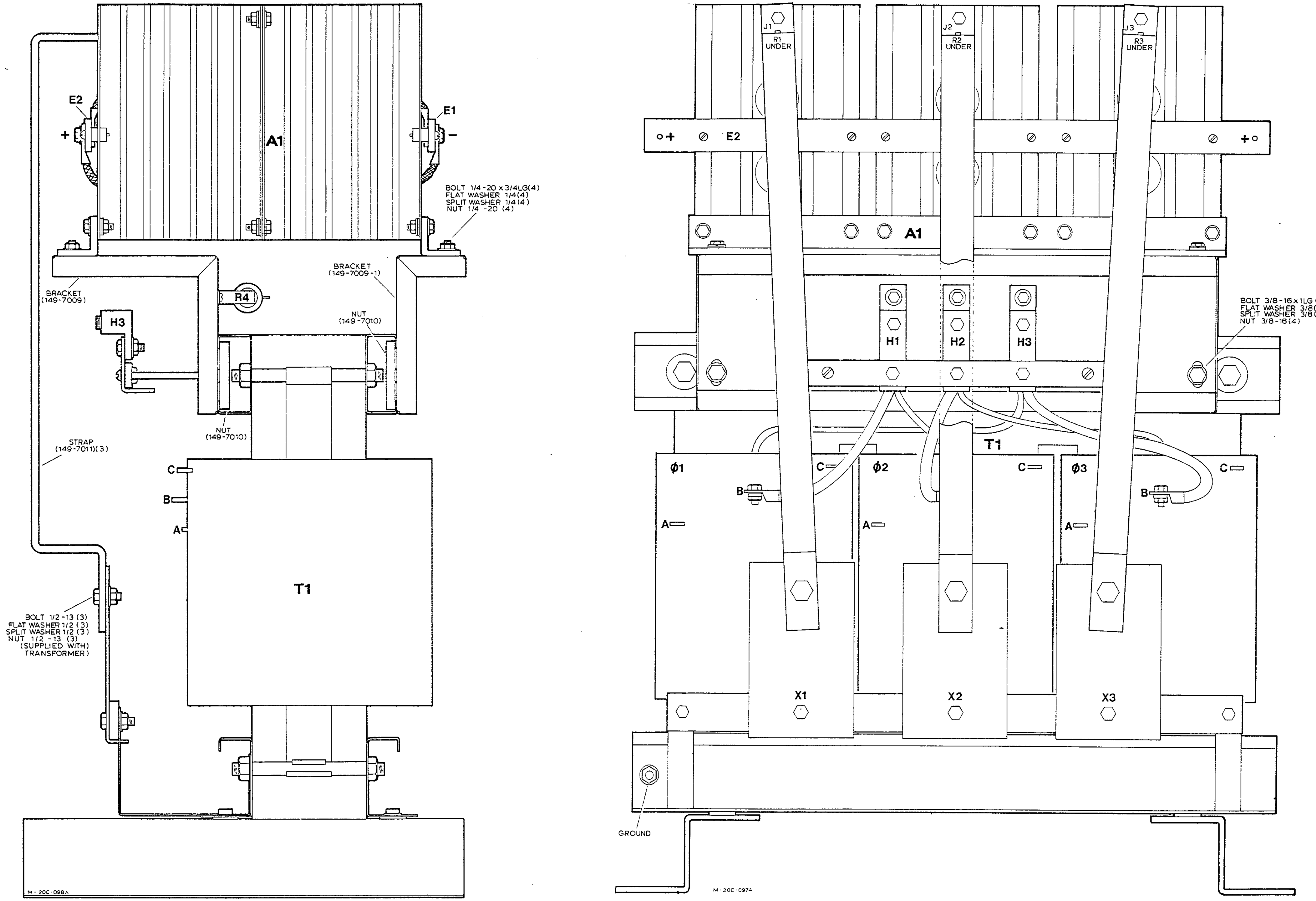


Figure FO-44 Assembly Detail - NASR60 Ac/Dc Power Supply

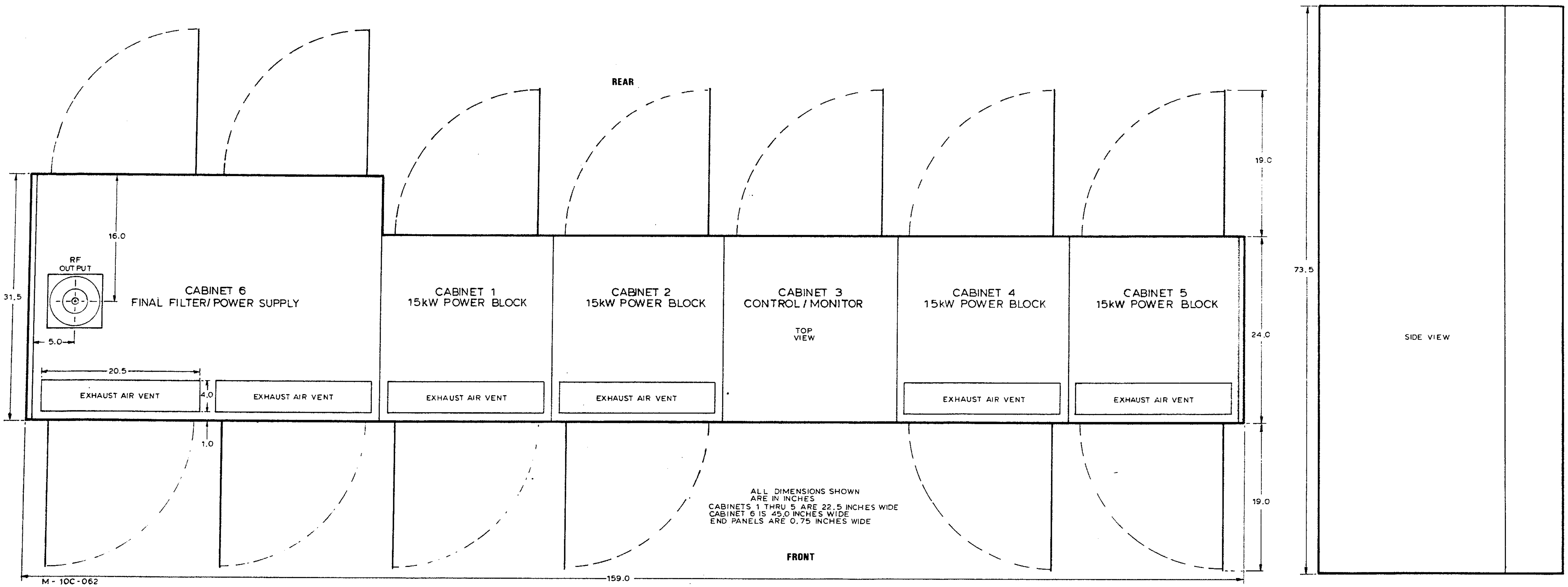


Figure FO-45 Dimensional Information - AMPFET 50 AM Broadcast Transmitter