

AM-1077-MS



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AM-1077

RF Power Amplifier

Operator/Technical Manual

Datron World Communications Inc.
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Change Description

Date of Revision	Revision Letter	Description of Changes	Pages Affected
01/08	J	Update cover Update parts list AM1077PA, AM1077PAB Update parts list AM1077-TBA2 Add parts list AM77CONV-A Update parts list AM77CONVPC, AM77CONVHS	Cover Page 5-13 Page 5-25 Page 6-11 Page 6-11 Page 6-12

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- b. Name of dealer or supplier of the equipment.
- c. Detailed explanation of problem.
- d. Return shipping instructions.
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- b. Include a letter with the following information:
 1. Part number
 2. Serial number and model of equipment
 3. Date of installation

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expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment.
1/95

Safety Considerations

This product and manual must be thoroughly understood before attempting installation and operation. To do so without proper knowledge can result in equipment failure and bodily injury.

Caution: Before applying ac power, be sure that the equipment has been properly configured for the available line voltage. Attempted operation at the wrong voltage can result in damage and voids the warranty. See the manuals section on installation. DO NOT operate equipment with cover removed.

Earth Ground: All Datron products are supplied with a standard, 3-wire, grounded ac plug. DO NOT attempt to disable the ground terminal by using 2-wire adapters of any type. Any disconnection of the equipment ground causes a potential shock hazard that could result in personal injury. DO NOT operate any equipment until a suitable ground has been established. Consult the manual section on grounding.

Servicing: Trained personnel should only carry out servicing. To avoid electric shock, DO NOT open the case unless qualified to do so.

Various measurements and adjustments described in this manual are performed in ac power applied and the protective covers removed. Capacitors (particularly the large power supply electrolytics) can remain charged for a considerable time after the unit has been shut off. Use particular care when working around them, as a short circuit can release sufficient energy to cause damage to the equipment and possible injury.

To protect against fire hazard, always replace line fuses with ones of the same current rating and type (normal delay, slow-blow, etc.). DO NOT use higher value replacements in an attempt to prevent fuse failure. If fuses are failing repeatedly this indicates a probable defect in the equipment that needs attention.

Use only genuine Datron factory parts for full performance and safety of this product.



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CHAPTER 1

INTRODUCTION

1.1 AM-1077

The AM-1077 is an RF power amplifier designed to boost the output power of the PRC1077 transceiver from 5W to 50W in the 30 MHz to 87.975 MHz frequency range and can be used in mobile and fixed base applications. The AM-1077 integrates with the PRC1077 by automatically responding to RF input signals when the amplifier is turned on. The AM-1077 also works with the AN/PRC-77 or equivalent transceiver.

The AM-1077 is encased in a rugged, lightweight, shock resistant, moisture proof chassis.

The AM-1077 includes the following features:

- 50W output power
- 30 MHz to 87.975 MHz frequency range
- Harmonic filter switching
- PTT keying



1.2 Specifications

Note: All specifications subject to change without notice or obligation.

Characteristic	Description
Electrical	
Frequency Range	30 MHz to 87.975 MHz
Power Output	50W \pm 1 dB
Duty Cycle	Continuous to 90° C heat sink temperature. Amplifier automatically bypassed when heat sink temperature exceeds 90° C.
Input RF Power	2W to 5W, 2W provides 50W output. RF overdrive up to 5W does not damage amplifier.
Primary Power	28 Vdc at 7A nominal
Harmonic Suppression	-55 dB typical, 50 dB minimum
Output Protection	Open and short circuit protection at antenna terminals
Connectors Input RF Output RF Input DC power	BNC; 2W to 5W BNC; 50W Front panel (2-pin) or rear of case (3-pin)
DC Input Fuse	10A
Mechanical	
Weight	3.63 kg (8 lbs.)
Size (HWD)	10 cm x 28 cm x 28 cm (2.4 in. x 11.0 in. x 11.0 in.)
Environmental	
Temperature Operating Storage	-40° C to +60° C (ambient) -55° C to +85° C
Shock, Vibration, Humidity, Salt Spray, Immersion	Per applicable test conditions and methods defined in MIL-STD-810D

CHAPTER 2

INSTALLATION

2.1 Compatible Equipment

The AM-1077 is electrically and mechanically compatible with the following equipment.

- PRC1077 transceiver
- AN/PRC-77 transceiver
- MT-1077 mobile mount
- U.S. Army OA3633 mobile mount with MT1029
- 4242-MK2 broadband vehicular antenna
- U.S. Army AS1729 vehicular antenna

The AM-1077 is designed as a 50W RF power amplifier for the PRC1077 transceiver, however, it can also work with any transceiver capable of outputting a minimum of 2W into 50 ohms through the 30 MHz to 87.975 MHz frequency range. The AM-1077 does not require any external control logic.

CAUTION: The following installation procedures require the operator to remove the protective cap from the PRC1077's accessory connector J3. Make sure the protective cap is attached to the PRC1077 front panel by a tether so it does not get lost. The protective cap contains an internal jumper that completes the 12V path to the radio when using battery power.

If the PRC1077 needs to be converted from a mobile or fixed base to a manpack configuration with the BB-LA6 battery installed, the radio must have the protective cap in place to operate. When the PRC1077 is installed in the MT-1077, the MT-1077 provides the 12 Vdc supply to the PRC1077 through the C991949 cable.

2.2 Configurations

The AM-1077 can be integrated into the following 50W system configurations:

- 24 Vdc 50W portable/mobile system with the PS1077 power supply
- 12 Vdc 50W mobile system using the MT-1077-12 mobile mount.
- 24 Vdc 50W mobile system using the MT-1077-24 mobile mount

- 24 Vdc 50W mobile system using the OA3633 mobile mount with the MT1029 shock mount
- 110/220 VAC 50W fixed base station using the UPF7000A-12/28

Note: 12 Vdc configurations must include the AM1077CONV 12 Vdc to 28 Vdc converter discussed in Chapter 6.

2.2.1 24V 50W Portable/ Mobile System

The 24 Vdc 50W portable/mobile system includes the following components:

- AM-1077 RF power amplifier
- PS1077 24/12 Vdc power supply
- PRC1077 or AN/PRC-77 transceiver
- 4242-MK2 antenna
- C991575 RF cable
- C991577 antenna cable

The portable/mobile system uses the PS1077 24 Vdc to 12 Vdc power supply that supplies 12V to the PRC1077 and 24V to the AM-1077. The PS1077 attaches to the back of the PRC1077 and AM-1077. The DC power cable is included with the PS1077.

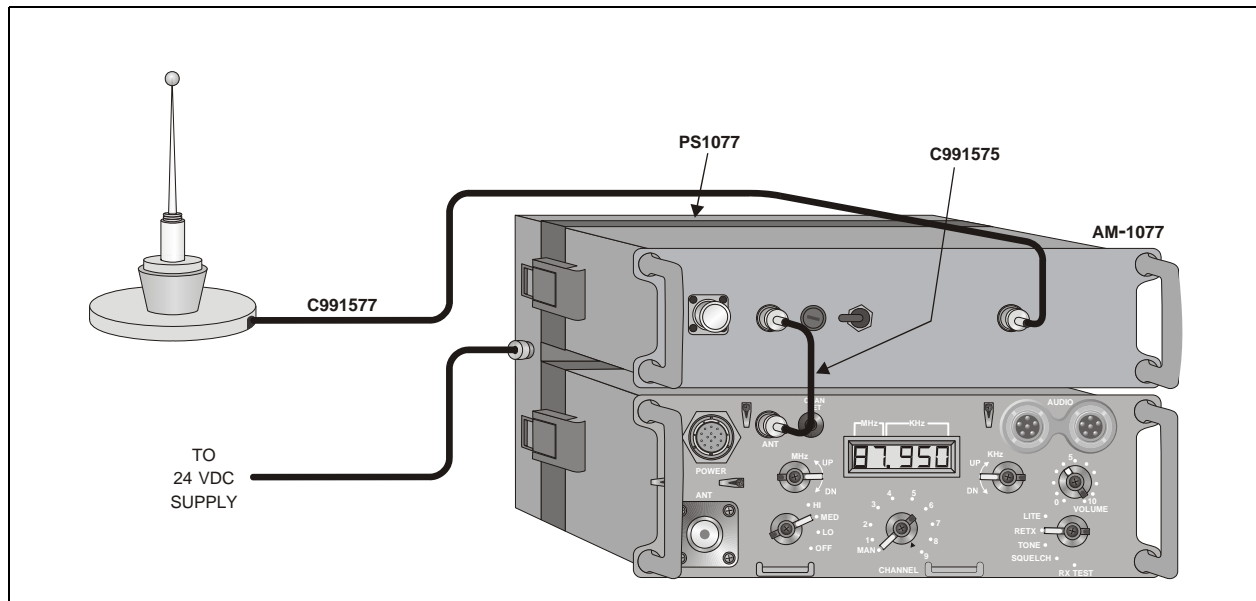


Figure 2-1 24 Vdc 50W Portable/Mobile System with the PS1077

To integrate the AM-1077 into the 24 Vdc 50W portable/mobile system (refer to Figure 2-1 on page 2-2):

1. Install the bottom section of the PS1077 to the back of the PRC1077.
2. Install the AM-1077 to the top section of the PS1077.

3. Connect the C991575 cable to the PRC1077 50 ohm BNC **ANT** connector and to the AM-1077 RF IN connector.
4. Connect the C991577 cable to the AM-1077 50 ohm **RF OUT** connector and to the antenna.
5. Connect the PS1077 DC power cable to a 24 Vdc power source.

2.2.2 12 Vdc 50W Mobile System

The 24 Vdc 50W mobile system includes the following components:

- AM-1077 RF power amplifier
- AM1077CONV 12 Vdc to 28 Vdc power converter
- PRC1077 or AN/PRC-77 transceiver
- MT-1077-12 mobile mount
- 4242-MK2 antenna
- C991575 RF cable
- C991577 antenna cable
- C991580 DC power cable
- C991658 DC power cable
- C991949 DC power cable

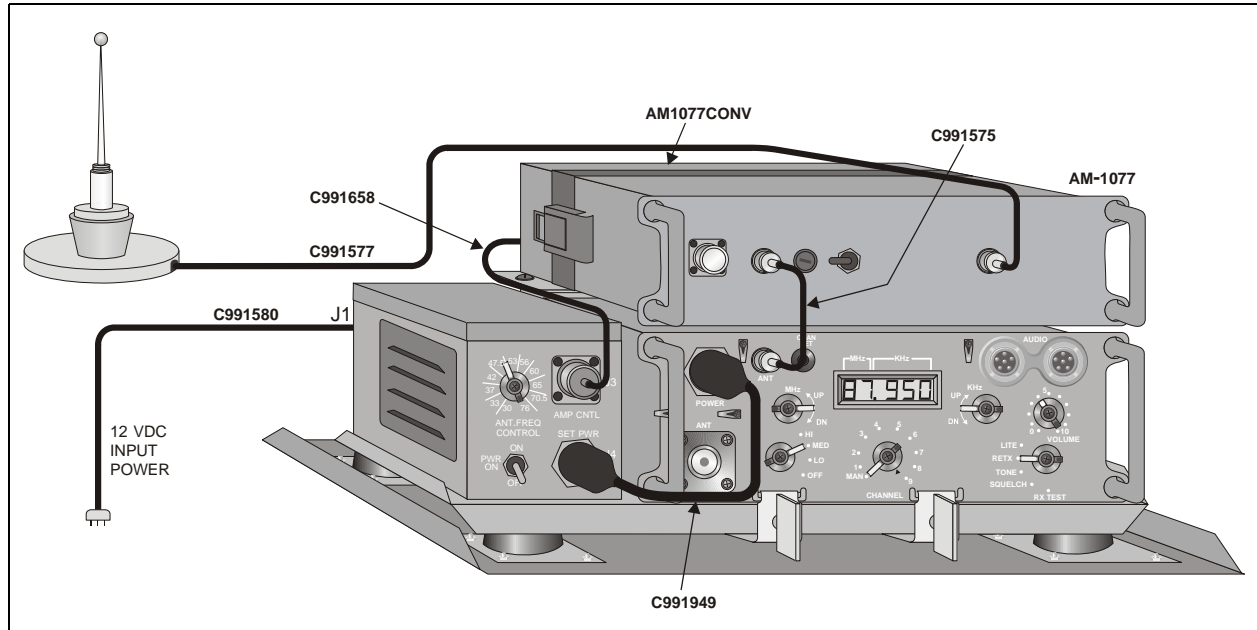


Figure 2-2 12 Vdc 50W Mobile System with the MT-1077-12

To integrate the AM-1077 into a 12 Vdc 50W mobile system (refer to Figure 2-2 above):

1. Slide the PRC1077 onto the MT-1077-12 and clamp it in place with the two front mounting clamps.
2. Install the AM1077CONV to the back of the AM-1077.
3. Position the AM-1077 on top of the PRC1077. Tilt the front of the AM-1077 up slightly and slide the AM1077CONV rear mount flange on to the three screws on the MT-1077-12 rear flange. Install the two handle clamps to the front panel handles to secure the AM-1077 to the PRC1077.
4. Tighten the three mount clamp screws on the MT-1077-12 rear flange to secure the PRC1077 and AM-1077 in place.
5. Connect the C991658 cable to the AM1077CONV **DC POWER INPUT** connector and to the MT-1077-12 AMP CNTL connector (J3).
6. On the PRC1077, remove the protective cap from the **POWER** connector (refer to the Caution on page 2-1). Connect the C991949 cable to the PRC1077 **POWER** connector and to the MT-1077-12 connector (J4).
7. Connect the C991575 cable from the PRC1077 50 ohm BNC **ANT** connector to the AM-1077 **RF IN** connector.
8. Connect the C991577 cable to the AM-1077 50 ohm **RF OUT** connector and to the antenna.
9. Connect the C991580 cable to the MT-1077-12 J1 connector (on backside), then to a 12 Vdc power source.

2.2.3 24 Vdc 50W Mobile System

The 24 Vdc 50W mobile system includes the following components:

- AM-1077 RF power amplifier
- AM1077ADPT adapter (empty box)
- PRC1077 or AN/PRC-77 transceiver
- MT-1077-24 mobile mount
- 4242-MK2 antenna
- C991575 RF power cable
- C991577 antenna cable
- C991579 DC power cable
- C991580 DC power cable
- C991580 DC power cable
- C991949 DC power to transceiver cable

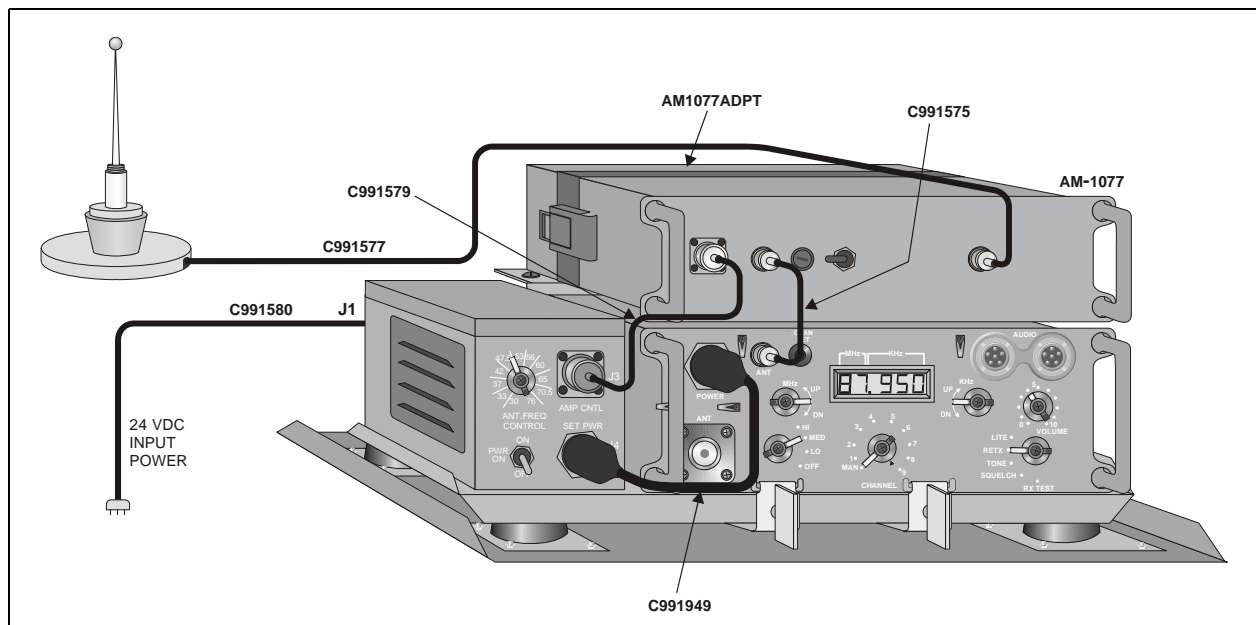


Figure 2-3 24 Vdc 50W Mobile System with the MT-1077-24

To integrate the AM-1077 into a 24 Vdc 50W mobile system (refer to Figure 2-3 above):

1. Slide the PRC1077 onto the MT-1077-24 and clamp it in place with the two front mounting clamps.
2. Install the AM1077ADPT to the back of the AM-1077. The AM-1077ADPT is an empty case that attaches to the back of the AM-1077 so the amplifier can be secured to the MT1077-24.
3. Position the AM-1077 on top of the PRC1077. Tilt the front of the AM-1077 up slightly and slide the AM1077ADPT rear mount flange onto

the three screws on the MT-1077-24 rear flange. Install the two handle clamps to the front-panel handles to secure the AM-1077 to the PRC1077.

4. Tighten the three mount clamp screws on the MT-1077-24 rear flange to secure the PRC1077 in place.
5. Connect the C991579 cable to the AM-1077 **DC POWER INPUT** connector and to the MT-1077-24 AMP CNTL connector (J3).
6. On the PRC1077, remove the protective cap from the **POWER** connector (refer to the Caution on page 2-1). Connect the C991949 cable to the PRC1077 **POWER** connector and to the MT-1077-24 connector (J4).
7. Connect the C991577 cable to the AM-1077 50 ohm **RF OUT** connector and to the antenna.
8. Connect the C991575 cable from the PRC1077 50 ohm BNC **ANT** connector to the AM-1077 **RF IN** connector.
9. Connect the C991580 cable to the MT-1077-24 J1 connector (on backside), then to a 24 Vdc power source.

The 12 Vdc and 24 Vdc Mobile systems can also use the MT1029 military shock mount with the OA3633 military radio mount. This configuration replaces the C991949 cable with the C991576. It also replaces the C991579 cable with the C991581. Refer to Figure 2-4 below.

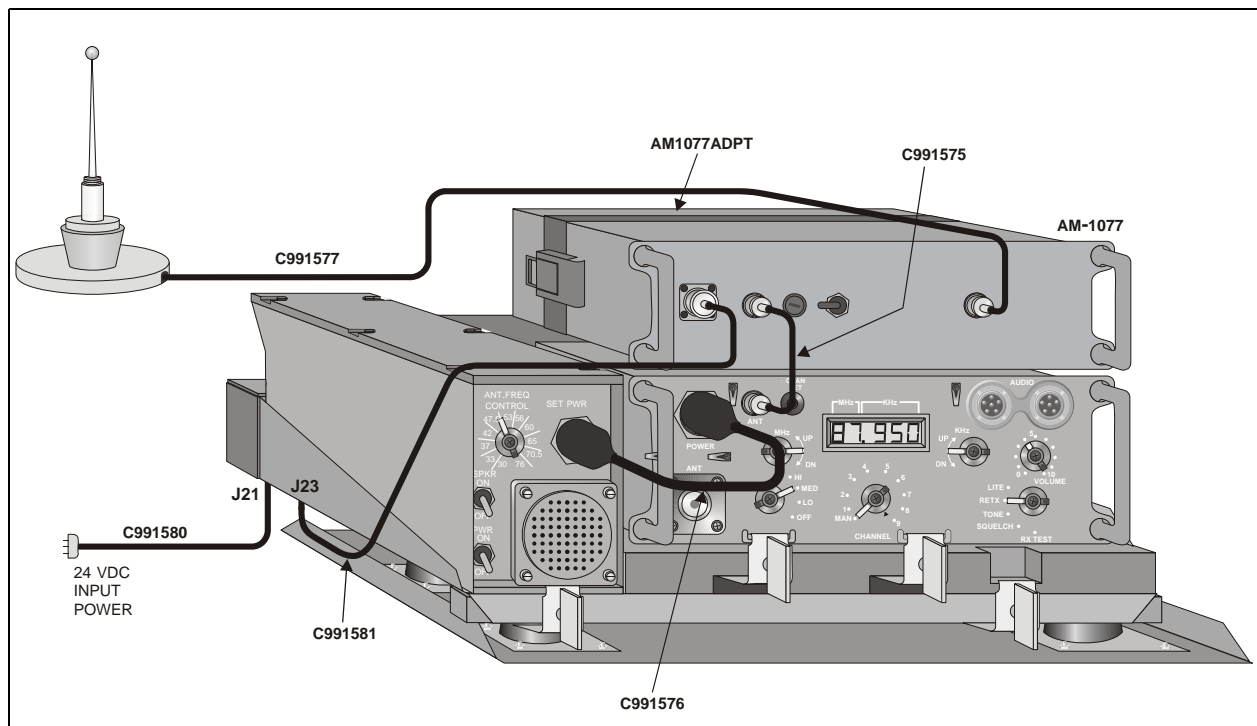


Figure 2-4 24 Vdc 50W Mobile System with the MT1029 and OA3633

**2.2.4
12V 50W
Fixed Base
System**

The 12 Vdc 50W mobile system installation includes the following components (refer to Figure 2-5 on page 2-8):

- AM-1077 50W RF power amplifier
- PRC1077 transceiver
- MT-1077-12 mobile mount
- AM1077CONV 12 Vdc to 28 Vdc power converter
- 4242-MK2 antenna
- UPF7000A-12 220/110VAC to 12 Vdc converter
- C991575 PRC1077 to AM-1077 RF amplifier RF cable
- C991577 antenna cable
- C991580 DC power cable
- C991658 DC power to AM1077CONV power cable
- C991949 DC power to transceiver cable
- C992034 AC power cable (110 VAC) or C992139 AC power cable (220 VAC)

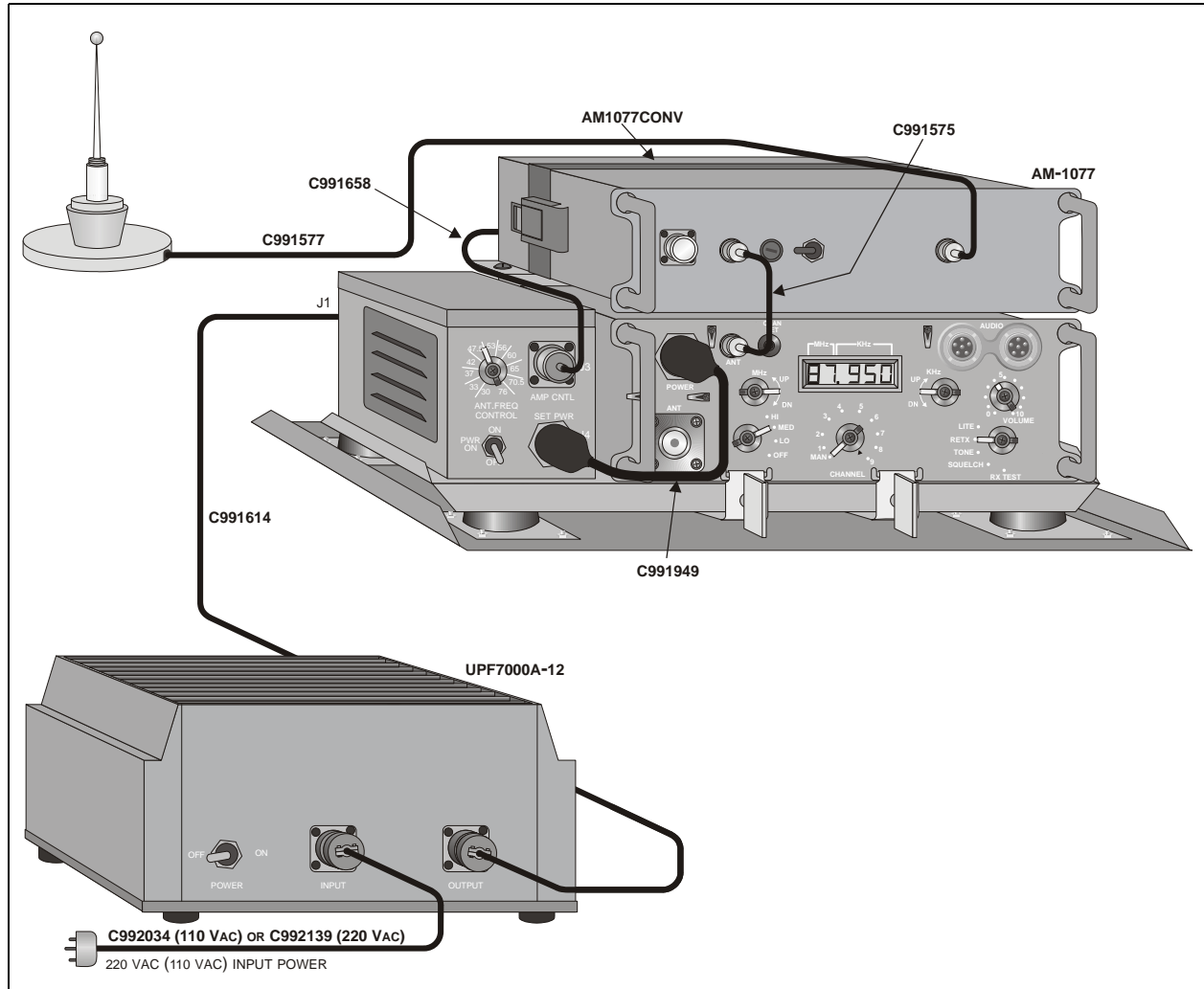


Figure 2-5 12 Vdc 50W Fixed Base System

To integrate the AM-1077 into a 12 Vdc 50W fixed base system (refer to Figure 2-5 above):

1. Slide the PRC1077 onto the MT-1077-12 and clamp it in place with the two front mounting clamps.
2. Install the AM1077CONV to the back of the AM-1077 case.
3. Position the AM-1077 on top of the PRC1077. Tilt the front of the AM-1077 up slightly and slide the AM1077CONV rear mount flange onto the three screws on the MT-1077-12 rear flange. Install the two handle clamps to the front-panel handles to secure the AM-1077 to the PRC1077.
4. Tighten the three mount clamp screws on the MT-1077-12 rear flange to secure the PRC1077 in place.
5. Connect the C991658 cable to the AM1077CONV **DC POWER INPUT** connector and to the MT-1077-12 **AMP CNTL** connector (J3).

6. On the PRC1077, remove the protective cap from the **POWER** connector (refer to the Caution on page 2-1). Connect the C991949 cable to the PRC1077 **POWER** connector and to the MT-1077-12 connector (J4).
7. Connect the C991575 cable from the PRC1077 50 ohm BNC **ANT** connector to the AM-1077 **RF IN** connector.
8. Connect the C991577 cable to the AM-1077 50 ohm **RF OUT** connector and to the antenna.
9. Connect the C991614 cable to the MT-1077-12 J1 connector (on back), then to the UPF7000A-12 **OUTPUT** connector.
10. Connect the C992139 (for 220 VAC) or C992034 (for 110 VAC) cable to the UPF7000A-12 **INPUT** connector, then to either a 220 VAC or 110 VAC power source.

2.2.5 24 Vdc 50W Fixed Base System

The 50W 24 Vdc fixed base system includes the following components (refer to Figure 2-6 on page 2-10):

- AM-1077 50W RF power amplifier
- PRC1077 transceiver
- MT-1077-24 mobile mount
- AM1077ADPT adapter (empty box)
- 4242-MK2 antenna
- UPF7000A-28 220/110Vac to 28 Vdc converter
- C991575 PRC1077 to AM-1077 RF amplifier RF cable
- C991577 cable antenna cable
- C991579 DC power to AM-1077 RF amplifier cable
- C991580 DC power cable
- C991949 DC power to transceiver cable
- C992034 AC power cable (110 VAC) or C992139 AC power cable (220 VAC)

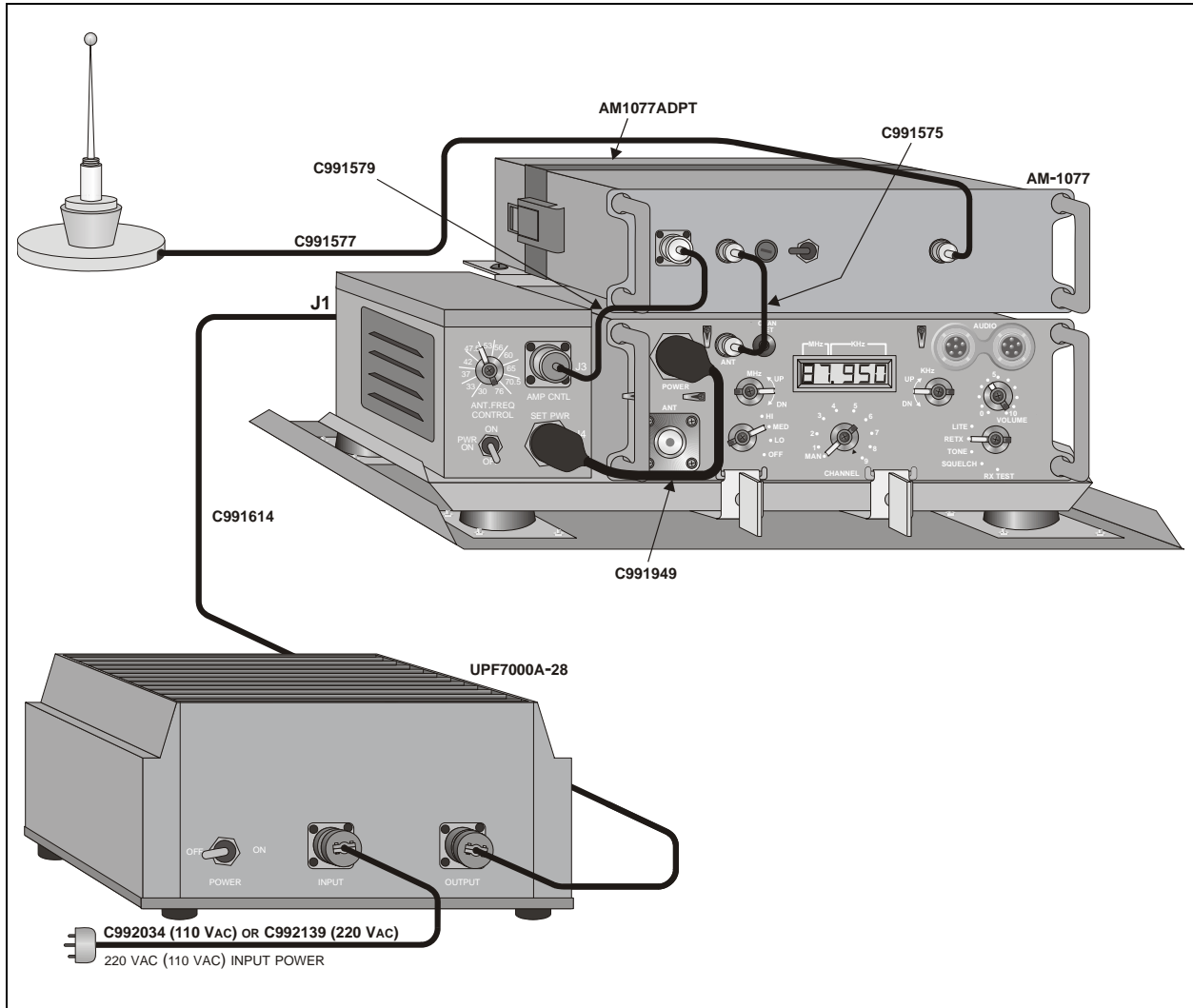


Figure 2-6 24 Vdc 50W Fixed Base System

To integrate the AM-1077 into a 24 Vdc 50W fixed base system (refer to Figure 2-6 above):

1. Slide the PRC1077 onto the MT-1077-24 and clamp it in place with the two front mounting clamps.
2. Install the AM1077ADPT to the back of the AM-1077. The AM-1077ADPT is an empty case that attaches to the back of the AM-1077 so the amplifier can be secured to the MT-1077-24.
3. Position the AM-1077 on top of the PRC1077. Tilt the front of the AM-1077 up slightly and slide the AM1077ADPT rear mount flange onto the three screws on the MT-1077-24 rear flange. Install the two handle clamps to the front-panel handles to secure the AM-1077 to the PRC1077.
4. Tighten the three mount clamp screws on the MT-1077-24 rear flange to secure the PRC1077 in place.

5. Connect the C991579 cable to the AM-1077 **DC POWER INPUT** connector and to the MT-1077-24 **AMP CNTL** connector (J3).
6. On the PRC1077, remove the protective cap from the **POWER** connector (refer to the Caution on page 2-1). Connect the C991949 cable to the PRC1077 **POWER** connector and to the MT-1077-24 connector (J4).
7. Connect the C991577 cable to the AM-1077 50 ohm **RF OUT** connector and to the antenna.
8. Connect the C991575 cable from the PRC1077 50 ohm BNC **ANT** connector to the AM-1077 **RF IN** connector.
9. Connect the C991614 cable to the MT-1077-24 J1 connector (on back), then to the UPF7000A-28 **OUTPUT** connector.
10. Connect the C992139 (for 220 VAC) or C992034 (for 110 VAC) cable to the UPF7000A-28 **INPUT** connector, then to either a 220 VAC or 110 VAC power source.

CHAPTER 3

OPERATION

The AM-1077 front panel includes two inputs, one output and a power switch.

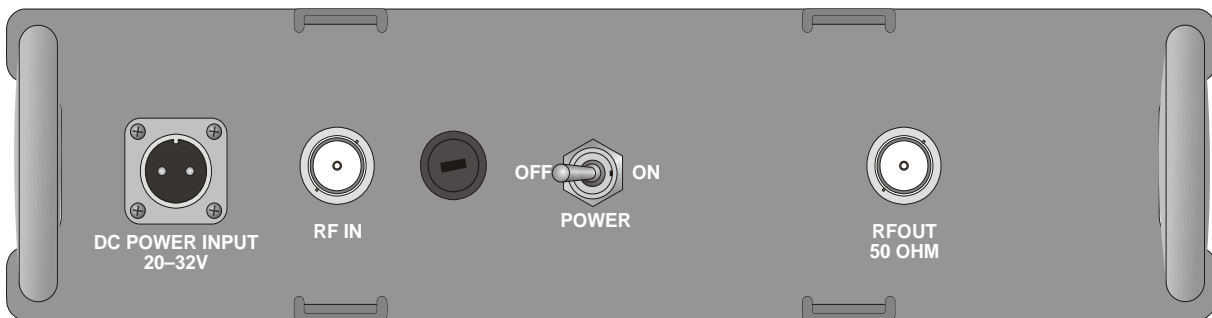


Figure 3-1 AM-1077 Front Panel

Control	Function
POWER switch	Turns power on and off.
RF IN connector	RF drive signal input connector.
RF OUT 50 ohm connector	50 ohm output connector to antenna.
DC INPUT POWER connector	Input connector for 20 Vdc to 32 Vdc power source.
DC power input plug	28 Vdc input connector (on back).

The AM-1077 has a single control device, the power switch. Turning the **POWER** switch on produces a 50W RF power boost to the transceiver output; turning the power switch off removes power amplification. With the **POWER** switch off, the transceiver can still transmit through the AM-1077 at its normal power output.

The AM-1077 only outputs the RF signal to the 50 ohm **RF OUT**. The 50 ohm **RF OUT** port permits high (50W) and low (transceiver output, amplifier power switch turned off) power operation.

The AM-1077 can be operated in low power mode (**POWER** switch turned off).

To perform a frequency change in low power operation:

1. On the PRC1077, change the channel to the desired frequency.
2. Turn the AM-1077 on.

3. Key the handset connected to the PRC1077. The AM-1077 adjusts the tuning network for the selected frequency.
4. Turn the AM-1077 off.

CHAPTER 4

TECHNICAL DESCRIPTION

4.1 General Description

The AM-1077 consists of two major subassemblies, the power amplifier/filter (PA/F) board that includes the PTT relays, RF power amplifier and harmonic filters, and the tuner controller (T/C) board that includes the system logic circuits. Other components include the front panel connectors and switches, and the rear panel auxiliary power connector (refer to Figure 4-1 on page 4-2).

4.1.1 Input DC Power

Turning the front panel **POWER** switch on provides 28 Vdc to the amplifier circuits, however the amplifier and tuner circuits remain inactive until the T/C board receives RF input power from the front panel. Alternately, if the **POWER** switch is turned off and the T/C board receives an RF signal, it passes the signal to the PA/F board, which routes the RF signal directly to the output port without amplification.

4.1.2 Input RF Power

The PA/F board includes two PTT relays that control when the RF signal is released to the power amplifiers and when the output RF power is connected to the antenna. The T/C board does not actuate these relays until the PA/F board receives the RF signal from the transceiver. When the AM-1077 receives an RF signal from the transceiver, an RF detector circuit on the T/C board detects the incoming power and activates the two PTT relays. The T/C board sequences the relays so the PTT output relay closes before the input relay on PTT keydown, and the input relay opens before the output relay on PTT keyup. This sequencing protects the amplifier transistors by ensuring they are connected to a load before receiving an RF signal.

When the AM-1077 initially receives an RF input signal, the T/C board pauses briefly before closing the output PTT relay to allow the onboard frequency counter to determine the frequency of the incoming RF signal. Similar to the PRC1077, the AM-1077 divides the 30 MHz to 87.975 MHz operating frequency range into four harmonic filters.

The T/C board uses the received RF frequency information to select the proper output harmonic filter. Pausing before closing the output PTT relay allows the PA/F board time to connect the proper harmonic filter before the PTT relays are activated.

The AM-1077 includes internal gain control and protective circuits that automatically maintain the RF power output at 50W over the 30 to 87.975 MHz frequency range and protect the AM-1077 against load mismatch, and open and short circuits.

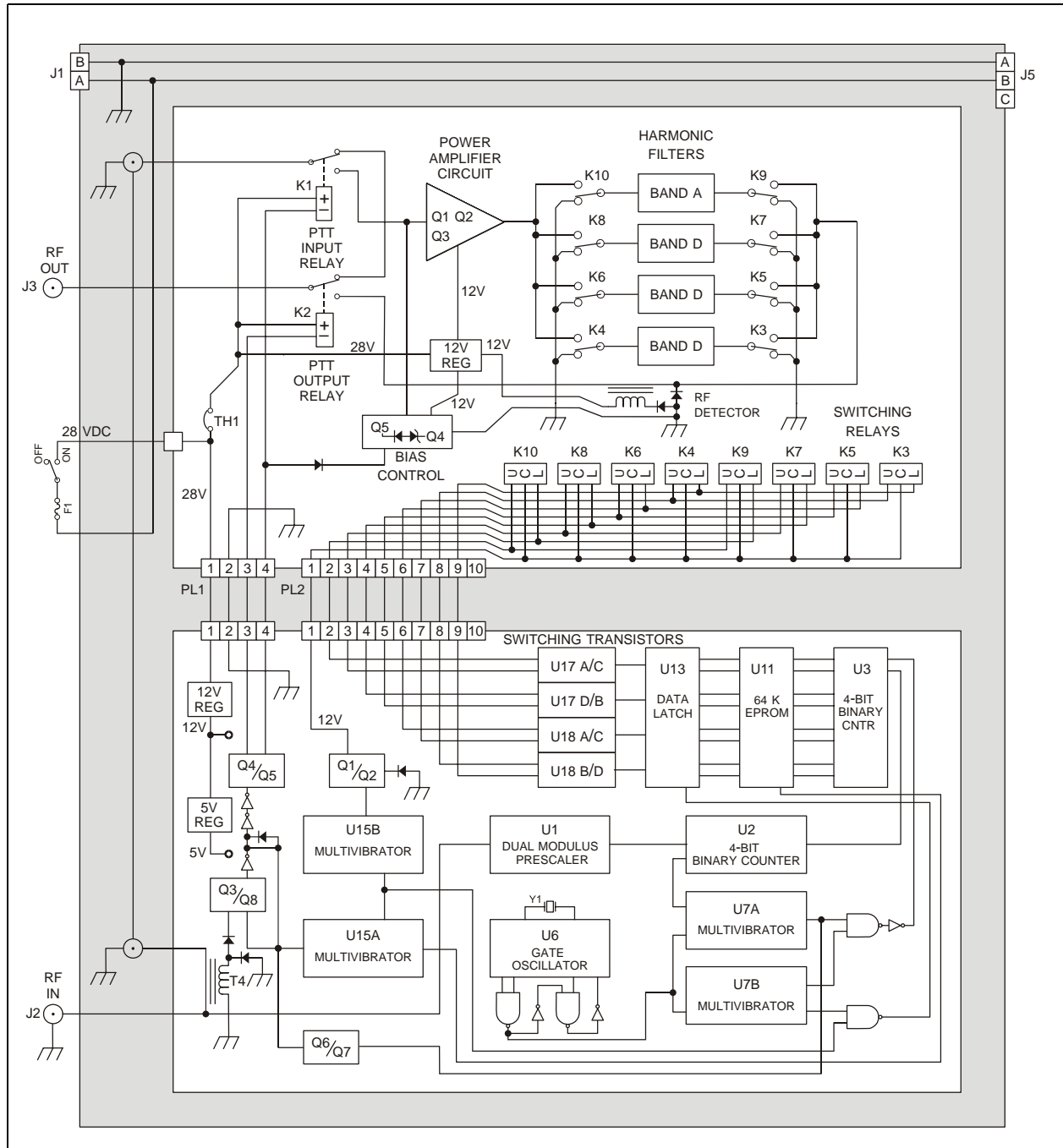


Figure 4-1 AM-1077 Block Diagram

4.2 Power Amplifier and Filter Board

4.2.1 DC Power

The PA/F board contains the RF amplifier circuits and the four harmonic filters. It also includes two PTT relays. The AM-1077 inputs 28 Vdc to the PA/F board through either the front panel **DC POWER INPUT** connector J1, or the rear panel connector J5. The DC power is switched and fused at the front panel. Regulator chip U1 on the PA/F board, reduces the 28 Vdc to 12 Vdc to provide 12V to the power amplifier and bias control transistors. On the T/C board, the 28 Vdc is converted to 12 Vdc for the switching transistors and the latching relays on the PA/F board. The 12 Vdc is converted to 5 Vdc for the digital logic chips. The 5V rail also supplies the PTT relay switching circuitry.

4.2.2 PTT Relay Switching

When the T/C board receives a RF signal, it sequentially enables PTT relays (K2 first, then K1) on the PA/F board to activate from control signals through pins 3 and 4 of the PL1 connector. The PTT relays are controlled through Q4 (K2) and Q5 (K1) on the T/C board. Control circuitry on the T/C board delays the initial PTT relay switching for approximately 20 ms to give it time to connect the correct harmonic filter into the circuit.

4.2.3 Harmonic Filters

The PA/F board provides four harmonic filters:

- Band 1 30 MHz to 39.975 MHz
- Band 2 40 MHz to 51.975 MHz
- Band 3 52 MHz to 67.975 MHz
- Band 4 68 MHz to 87.975 MHz

To select the correct filter, the T/C board samples the input RF drive signal and feeds the signal to a frequency counter, that uses the frequency information to select the correct latching relays on the PA/F board. Each harmonic filter includes two latching relays that switch the filter in or out of the amplifier output circuit. The T/C board sends the relay switching information to the PA/F board through the PL2 connector.

With the correct harmonic filter in circuit, the T/C board activates the PTT relays and routes RF power to the amplifier circuit. A two-stage amplifier circuit controls the bias to the amplifier circuit power FETs.

4.2.4 Power Amplifier Circuit

In the amplifier circuit, power FET Q1 acts as the single-ended driver stage to the amplifier. R6 and C4 with a single-turn wind on the secondary coil of transformer T1 provide the negative feedback for Q1. The driver output is coupled through T1 to power FETs Q2 and Q3 that form the push-pull final amplifier stage. The amplified RF signal goes through transformer T2 to the proper harmonic filter.

4.2.5

Feedback Loop

The PA/F board places current transformer T3 with capacitors C30, C31 and C88 to form a voltage detector at the RF output. The voltage detector, initially adjusted by R23 for a 50W RF output into a 50 ohm load, controls the bias to transistors Q4 and Q5. These transistors control the bias to the power FETs in the amplifier circuit. The voltage detector, working with the bias control transistors, provides a feedback loop that maintains a flat 50W RF output by compensating for gain variations due to frequency, supply voltage, temperature, and input signal level.

4.3 Control Logic Circuitry

The T/C board includes control logic circuits that perform the following functions:

- Sample the RF input signal
- Provide switching information for:
 - PTT relays on the PA/F board
 - Harmonic filter relays on the PA/Filter board
 - Provide the proper sequencing for the PTT relays

4.3.1

DC Input Power

The T/C board receives the 28 Vdc input through the PL1 connector (pin 1). The 28 Vdc input is immediately regulated to 12 Vdc, then regulated to 5 Vdc. The 12 Vdc supply powers the relay-driver circuitry, while the 5 Vdc supplies the high-speed MOS circuits.

4.3.2

RF Input Power

The T/C board receives the input RF signal from the front panel **RF IN** port and samples it at three locations:

- Q8 (through T4)
- U1
- Q3 (through T4)

4.3.3

RF Detection Circuits

When T4 detects the presence of an input signal, it confirms that the signal originated at the transceiver and not at the antenna. The signal from T4 turns on Q8, which acts as an RF direction sensor gate. When Q8 conducts, it enables Q3 by tying the Q3 emitter to ground. The RF input signal biases Q3 on but it cannot conduct unless Q8 is turned on. Q3 drives one-shot multivibrator U15A and PTT relay switching transistor pair Q4/Q5. Multivibrator U15B pin 1 drives Q1 and Q2, which supply the common 12 Vdc to all the relays in the harmonic filter circuits and antenna tuner circuits. U15A pin 5 gates the latch signals to data latch chip U13.

4.3.4**PTT Relay Sequencing**

When Q3 conducts, it biases Q4 on. R17 and C33 form a time delay circuit that delays Q4 turning on by 15 to 20ms. Q4 turns on first, energizing PTT output coil K2B. K2B connects the power amplifier output to the antenna. After Q4 turns on, it turns Q5 on, which energizes PTT input coil K1B. K1B connects the RF power input to the power amplifier input. This sequencing protects the amplifier circuit by ensuring it is connected to the antenna before it connects to input power.

4.3.5**System Clocking**

U6 is a 12-stage ripple carry binary counter that acts as a gate oscillator with a 3204 Hz clock output. U6 drives both halves of the dual one-shot multivibrator U7. U7 pin 4 enables the binary counter U2. U7B pin 12 and U7A pin 13 are gated together to provide the reset signal for ripple counter U3. U7B pin 5 and U15A pin 5 are gated together to provide the latch enable signals for data latch U13.

4.3.6**Clocking Failure Protection**

The system clock oscillator Y1 drives the binary counter U6, which drives U7A. U7A outputs a series of pulses to turn Q6 on and off. This keeps capacitor C52 discharged which keeps Q7 turned off. If the system clock fails, C52 charges, causing Q7 to turn on. This keeps C33 discharged, preventing Q4 from turning on. In case the system clock fails, this circuit prevents the PTT relays from closing, protecting the power amplifier circuit.

4.3.7**Frequency Counter**

Dual modulus prescaler U1 divides the RF input by 64 and outputs it to binary counter U2, which provides a clock for ripple counter U3. These form the frequency counter that provide frequency data to the EPROM U11.

U3 supplies the counted frequency data in binary form to EPROM's U11. The output of U11 provides the switching information for the harmonic filter latching relay drivers U17 and U18.

CHAPTER 5

MAINTENANCE

This chapter discusses maintenance procedures including preventive maintenance and general troubleshooting procedures. No special tools or test equipment are required.

5.1 Preventive Maintenance

Preventive maintenance is the systematic equipment inspection and servicing to prevent problems, reduce downtime, and ensure the equipment remains serviceable.

For general maintenance use the following rule of thumb: If the equipment is used daily, clean it daily; if the equipment is in storage, clean it weekly and check the equipment before it is placed into operation, during operation and after shutdown.

The following preventive maintenance checklist is for the AM1077 only, and in no way alters the preventive maintenance instructions for the companion transceiver.

Check	Description
Completeness	Check that the equipment is complete with all accessories.
Cleanliness	Check that equipment is clean and free of dirt, dust, corrosion, grease and fungus. Remove fungus, grease and ground-in dirt using a cloth dampened with trichlorethylene. Remove dust and dirt from connectors and clean the panel using a soft clean cloth. CAUTION: TRICHTHLORETHANE fumes are toxic. Make sure the area of use has adequate ventilation. Exposure to open flame converts TRICHTHLORETHANE to a highly toxic and dangerous gas.

Check	Description
Preservation	Check surfaces for evidence of rust or corrosion; remove and spot paint bare surfaces. When paint on the amplifier is damaged, prevent corrosion by touching up the damaged areas. Use solvent and #0000 sandpaper to clean the surface until the exposed bare metal is bright and smooth. Then use a small brush to paint the damaged area. To reletter any damaged markings, use a small stiff wire to scratch out the engraved area, scraping until all loose paint is removed. Use solvent to wash out engraved letters, dry with lint-free cloth and refill letters using white paint per specification.
Gaskets	Check gaskets for moisture, oil saturation and brittleness. Make sure they are not broken, cracked, loose, pinched, mismatched or missing sections.
Mountings	Check all hardware (nuts, bolts, washers, etc.) to ensure they are correctly positioned and properly tightened.
Connections	Check all plugs and receptacles to ensure they are clean, intact, and that all connections are tight and properly connected.
Controls	Check the mechanical action of all controls to ensure they are smooth and free of all internal binding.

5.2 Troubleshooting

If the AM-1077 is not operating properly, the first thing to do is to isolate the fault to one of the following system components:

- Power source
- Antenna
- Transceiver
- Interconnecting cables
- Amplifier

Use the following check list to isolate the fault.

Fault	Action
Cables connected wrong	Check system installation diagram.
Worn, broken or disconnected cables or plugs	Check cables for continuity and shorts.
Grounded or broken antenna or antenna cable	Check antenna or antenna cable and replace if necessary.

Fault	Action
Defective transceiver	Replace the transceiver.
Low supply voltage	Measure input DC power to amplifier.
Incorrect setting of transceiver controls.	Refer to transceiver operator manual and make necessary corrections.

If the power source, antenna, and transceiver check out satisfactorily, and the interconnecting cables are in good condition and properly installed, the AM1077 is probably defective and should be referred to the next higher maintenance level.

The level of maintenance that can be performed on the AM1077 depends on the tools, test equipment and skill level of the repair technician. Only qualified personnel with suitable tools and test equipment should attempt to repair the amplifier.

To troubleshoot and repair the AM1077, it must be partially disassembled. Take care when disassembling and assembling mechanical parts. To avoid affecting circuit performance, do not change the location of wires.

5.2.1 Case Removal

1. Position the AM1077 with the front panel facing down.
2. Remove the four captive screws that join the front panel to the case.
3. Place the AM1077 with the top of the case facing up and remove the four seal screws from the top of the case.
4. Separate the case from the front panel/chassis assembly.

5.2.2 Circuitry Access

1. Lift the heat sink assembly up and rotate it toward the front of the chassis. The PA/Filter board assembly should now be facing out. Access is now available to both boards, with the Tuner/Control board mounted on the bottom of the chassis facing up and the PA/Filter board hinged backward sitting on the chassis facing the rear of the amplifier.
2. Visually inspect the inside of the amplifier for obvious defects such as burnt components or loose wires.
3. Check for shorts by measuring the impedance across the circuit side of the 28V line on the power switch.

4. Switch the power on and check the following points for primary power distribution.

Board	Test Point	Voltage
PA/Filter	PL1 pin 4	28 Vdc
PA/Filter	Q1, Q2, Q3 drain	28 Vdc
PA/Filter	U1-output	12 Vdc
Tuner/Controller	U5-output	12 Vdc
Tuner/Controller	U4-output	5 Vdc

5. Check the following points on the PA/Filter board in standby (unkeyed) mode.

Test Point	Voltage
Q1-gate	0.7 Vdc
Q2, Q3-gate	0.4 Vdc
Q5-base	0.7 Vdc
PL1 pin 3	24 Vdc

6. Check the following points on the T/C board in standby mode.

Test Point	Voltage
U1 pin 3	5 Vdc
U1 pin 5	3.3 Vdc
U1 pin 6	3.0 Vdc
U9 pins 3,4,14	5 Vdc
U9 pin 15	0 Vdc
Q4-collector	0 Vdc

7. In addition to the test points in step 6, verify the DC voltage input levels and ground pins to all integrated circuits as indicated on the schematic (refer to Figure 5-6 on page 5-21 and Figure 5-7 on page 5-23).
8. If all standby levels appear to be correct, activate the amplifier circuit by applying 2W of RF input drive at 30 MHz to the **RF IN** connector on the front panel.

Note: Before applying the RF drive, disconnect the coaxial cable running between the Tuner/Control board and the PA/Filter board at the PA/Filter end. Then terminate the cable in a 50 ohm load. This allows you to key the AM1077 without driving the power amplifier.

9. After RF drive is applied, make the following measurements to the power amplifier/filter board.

Test Point	Voltage
Q1-gate	5.4 Vdc
Q2,Q3-gate	4.1 Vdc
Q5-base	0
PL1 pin 3	0
PL2 pin 1	12 Vdc
PL2 pins 3,4,5,6,7,8	12 Vdc
PL2-9	0

10. Make the following measurements to the T/C board.

Test Point	Voltage
U7 pin 13	See Figure 5-1 B
U8 pin 5	See Figure 5-1 A
U7 pin 12	See Figure 5-1 A
U8 pin 4	See Figure 5-1 B
U9 pin 14	0.1 Vdc
U9 pin 15	5 Vdc
U9 pin 4	0 Vdc
U9 pin 2	5 Vdc
Q4-collector	2.2 Vdc

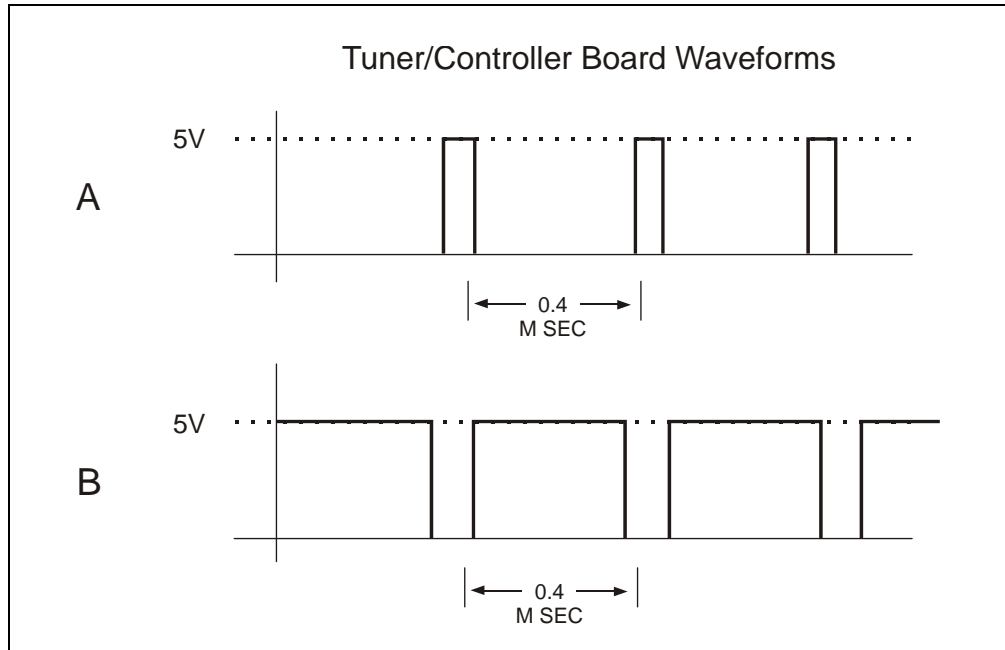


Figure 5-1 Test Point Voltages

The Information obtained from these measurements should isolate the fault to a specific location (either the PA/F board, the T/C board, or interconnect wiring). Replace the faulty board with a spare board to get the AM-1077 back in operation quickly. Repair the faulty board as soon as possible.

Use the schematics and component location diagrams provided in conjunction with the board test point data above to troubleshoot and repair the faulty board.

REV	ECN	DESCRIPTION	DATE	APPR
D	AM1077-124	REDRAWN,ADD RFPWR SW	22NOV94	
E	AM1077-133	D32 WAS D1,C93 WAS C2	11SEP96	
F	ECO 04-0291	REPL CB1 W/S2 AND F1	01SEP04	
G	ECO 06-0351	REMOVE TUNER	09MAR07	

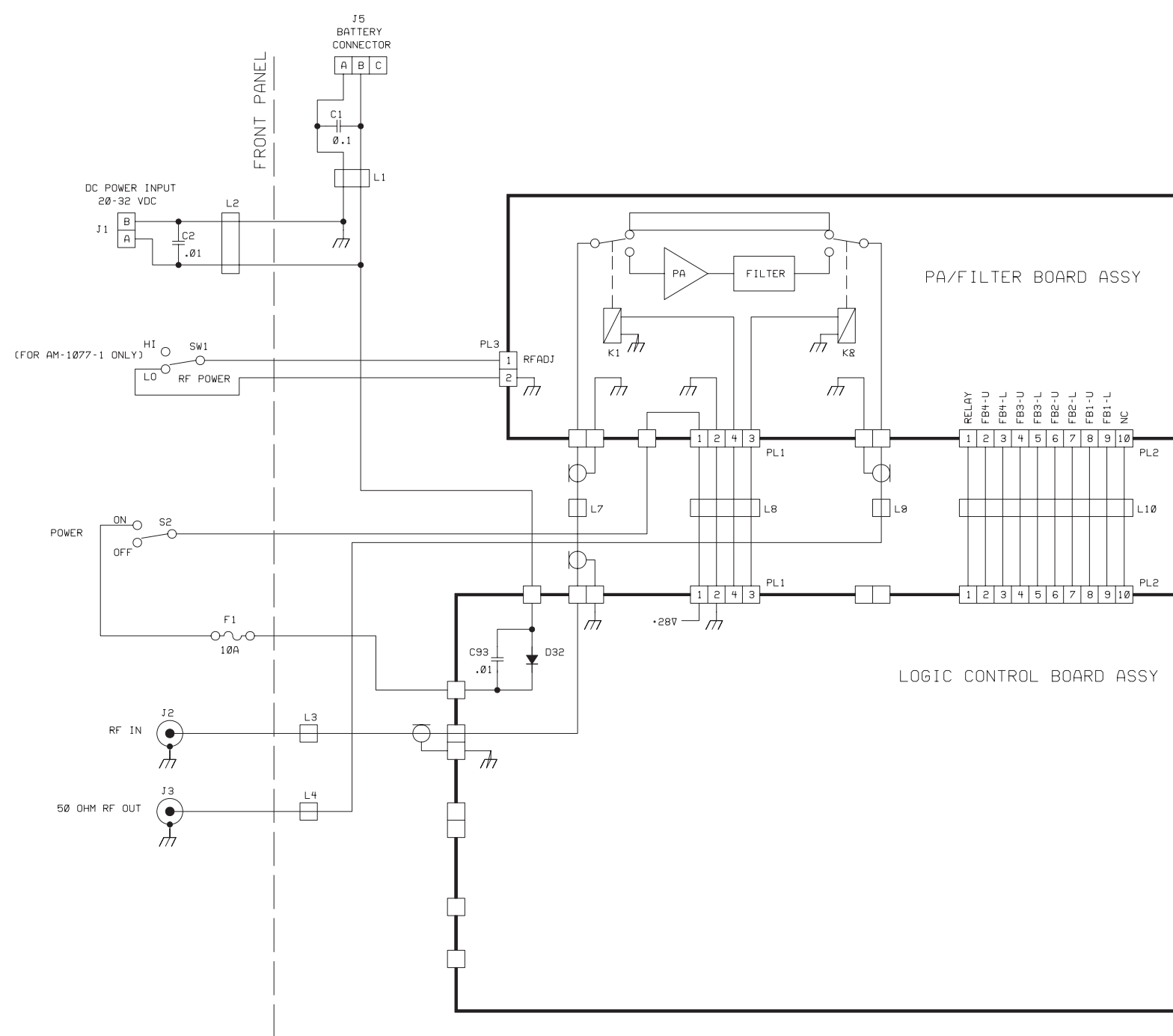


Figure 5-2
AM-1077 Mainframe
Schematic Diagram
(990981 Rev. G)

5-7

AM-1077-MS

DATRON DATRON WORLD COMMUNICATIONS INC.			
TITLE: AM1077 MAINFRAME			
SIZE: C	DRAWN: SATEL	DRAWING NUMBER: 990981	REV.: G
SCALE:	DATE:	SHEET 1 OF 1	

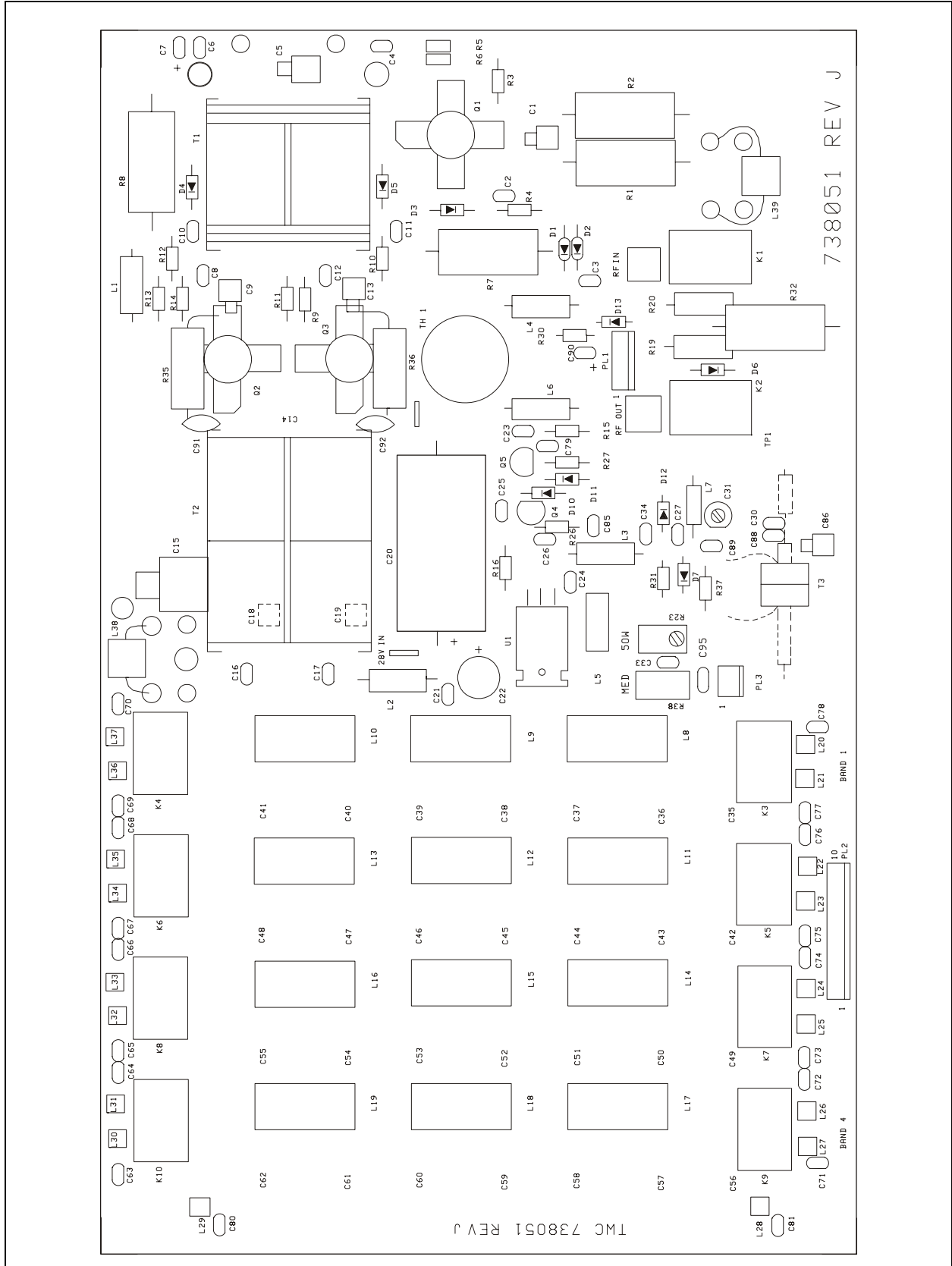
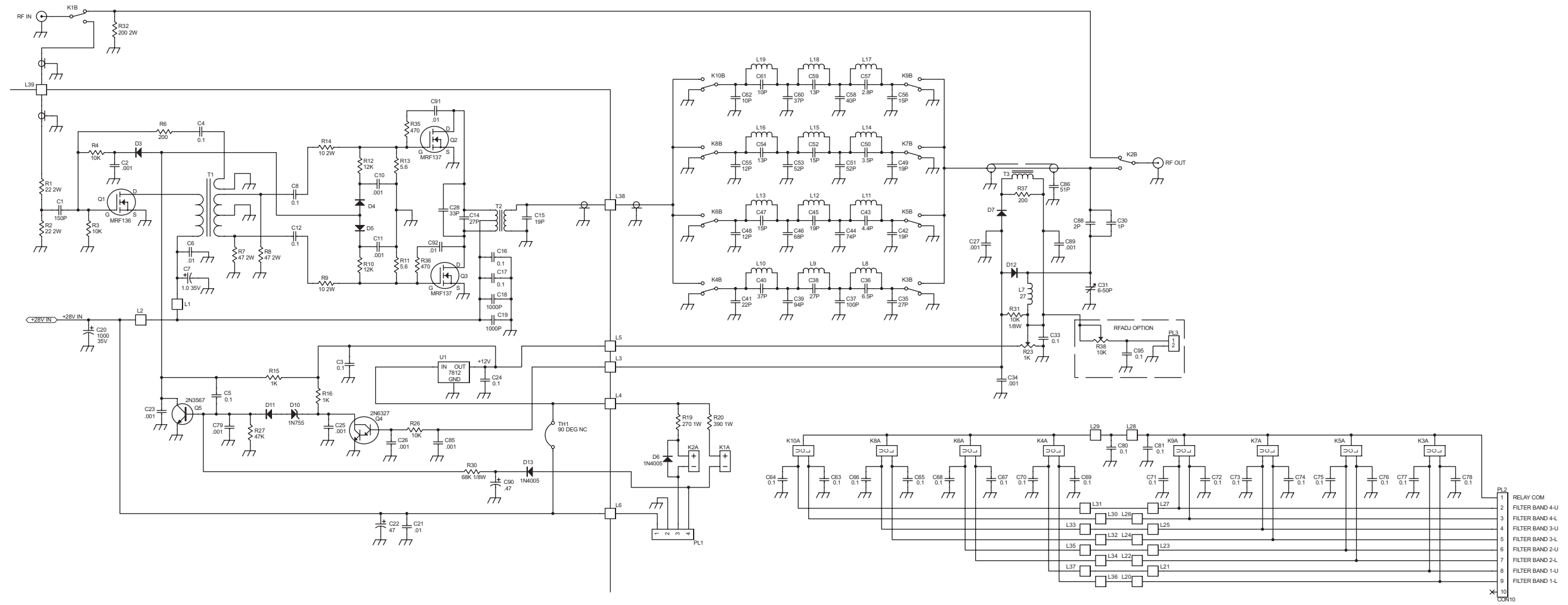


Figure 5-3 Power Amplifier/Filter Board Component Locations (738051 Rev. J)

REV	ECN	DESCRIPTION	DATE	APPR
K	AM1077-194	REDRAWN, ADD RF ADJ OPTION	11-23-04	
L	AM1077-190	CH9 DIR. NOW DR.	03-23-05	
M	AM1077-128	C35 WAS C91	04-18-05	
N	99-0287	REVISED PER ECO	TW 09/17/04	
P	00-0457	REVISED PER ECO	TW	
R	05-0271	R3 WAS 12K, C14 WAS 51P	BB 8/29/05	
S	05-0377	C40 WAS 22P, C35 WAS 27P, ADDED C15	BB 10-31-05	
T	ECO 05-0453	DEL. C9, C13, C93, C94 Added C28	BB 12-15-05	



4 INDUCTANCE IS IN MICROHENRYS
 3 DIODES ARE 1N4148
 2 CAPACITANCE IS IN MICROFARADS
 1 RESISTANCE IS IN OHMS
 NOTES: UNLESS OTHERWISE SPECIFIED

Figure 5-4
 Power Amplifier/Filter
 Schematic Diagram
 (990980 Rev. T)

		3030 Enterprise Ct. Vista, CA 92083 (760)587-1500
Title: Schematic AM1077 PA/FILTER BD.		
Size: D Appr:	Drawn: A.MARTINEZ Date: 04-11-97	Drawing Number: 990980 Rev: T
File: Date: 18-Sep-2006 Time: 16:00:02 Sheet: 1 of 1		

Table 5-1 Power Amplifier Board Parts List (AM1077PA Rev. T)

Designator	Part Number	Description
C28	227330	CAP,33PF 5% 300V MC MICA MINI
C91	211103	CAP,0.01 MF 500V DISC
C92	211103	CAP,0.01 MF 500V DISC
Q1	310102	XISTOR,MFET,MRF136,RF,15W,*SS*
Q2	310010	TRANSISTOR, MA-COM MRF137
Q3	310010	TRANSISTOR, MA-COM MRF137
R35	155471	RES 470 OHM 2W 5% FP MTL FILM
R36	155471	RES 470 OHM 2W 5% FP MTL FILM
TH1	560025	THERMOSTAT, 90 C N/C.187 STU

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
C1	227151	CAP,150PF 5% 300V MC MICA MINI
C10	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C11	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C12	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C15	226190	CAP, 19PF TEFLON MC 500V 5%
C16	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C17	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C18	218102	CAP,1000PF 500V CHIP CER
C19	218102	CAP,1000PF 500V CHIP CER
C2	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C20	232102-1	CAP,1K MF 35V ELECT AXL
C21	214103	CAP,C,0.01U,50,10%,X,RA,.1SP
C22	234470	CAP,47MF 35V ELECT VRT
C23	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C24	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C25	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C26	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C27	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C3	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C30	210010	CAP,1PF NPO 50V.25P 0.1LS DSK
C31	261600	CAP,6-50PF,TRIMMER,GREEN

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
C33	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C34	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C35	226270	CAP, 27PF TEFLON MC 500V 5%
C36	226065	CAP, 6.5PF TEFLON MC 500V 5%
C37	226101	CAP, 100PF MC MICA 500V 5%
C38	226270	CAP, 27PF TEFLON MC 500V 5%
C39	226940	CAP, 94PF MC MICA 500V 5%
C4	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C40	226370	CAP, 37PF MC MICA/TF 500V 5%
C41	226220	CAP, 22PF TEFLON MC 500V 5%
C42	226190	CAP, 19PF TEFLON MC 500V 5%
C43	226044	CAP, 4.4PF TEFLON MC 500V 5%
C44	226740	CAP, 74PF MC MICA 500V 5%
C45	226190	CAP, 19PF TEFLON MC 500V 5%
C46	226680	CAP, 68PF MC MICA 500V 5%
C47	226150	CAP, 15PF TEFLON MC 500V 5%
C48	226120	CAP, 12PF TEFLON MC 500V 5%
C49	226190	CAP, 19PF TEFLON MC 500V 5%
C5	021104000	CAP, 0.1UF X7R 25V 5% 0805
C50	226035	CAP, 3.5PF TEFLON MC 500V 5%
C51	226520	CAP, 52PF MC MICA 500V 5%
C52	226150	CAP, 15PF TEFLON MC 500V 5%
C53	226520	CAP, 52PF MC MICA 500V 5%
C54	226130	CAP, 13PF TEFLON MC 500V 5%
C55	226120	CAP, 12PF TEFLON MC 500V 5%
C56	226150	CAP, 15PF TEFLON MC 500V 5%
C57	226028	CAP, 2.8PF TEFLON MC 500V 5%
C58	226400	CAP, 40PF MC MICA/TF 500V 5%
C59	226130	CAP, 13PF TEFLON MC 500V 5%
C6	214103	CAP,C,0.01U,50,10%,X,RA,,1SP
C60	226370	CAP, 37PF MC MICA/TF 500V 5%
C61	226100	CAP, 10PF TEFLON MC 500V 5%
C62	226100	CAP, 10PF TEFLON MC 500V 5%

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
C63	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C64	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C65	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C66	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C67	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C68	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C69	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C7	241010	CAP,1.0 MF DIP TANTALUM
C70	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C71	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C72	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C73	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C74	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C75	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C76	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C77	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C78	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C79	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C8	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C80	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C81	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C85	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C86	227510	CAP,51PF 5% 300V MC MICA MINI
C88	210020	CAP,2PF NPO 50V.25P 0.1LS DSK
C89	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C90	241047	CAP,0.47MF 35V DIP TANT
C95	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
D10	320255	DIODE,ZENER 7.5V 1N755
D11	320002	DIODE, 1N4148/1N4150 DO-35
D12	320002	DIODE, 1N4148/1N4150 DO-35
D13	320101	DIODE, 1N4005 1A 600V DO-41
D3	320002	DIODE, 1N4148/1N4150 DO-35
D4	320002	DIODE, 1N4148/1N4150 DO-35

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
D5	320002	DIODE, 1N4148/1N4150 DO-35
D6	320101	DIODE, 1N4005 1A 600V DO-41
D7	320002	DIODE, 1N4148/1N4150 DO-35
IN	610511	CONNECTOR SMB PC JACK
K1	540067	RELAY, NON-LATCH SEALED DS1E
K10	540066	RELAY, LATCHSEAL
K2	540067	RELAY, NON-LATCH SEALED DS1E
K3	540066	RELAY, LATCHSEAL
K4	540066	RELAY, LATCHSEAL
K5	540066	RELAY, LATCHSEAL
K6	540066	RELAY, LATCHSEAL
K7	540066	RELAY, LATCHSEAL
K8	540066	RELAY, LATCHSEAL
K9	540066	RELAY, LATCHSEAL
L1	490202	BEAD 2673021801
L10	459150	AIR COIL, 7T#16AWG
L11	459151	AIR COIL, 7T#16AWG
L12	459152	AIR COIL, 7T#16AWG
L13	459052	IND ASY,6T#16GA 5/16 ANT CLK
L14	459115	IND ASSY, 7T#16GA 1/4 ANTICLK
L15	459061	IND ASY,8T#16GA 7/32 ANTICLK
L16	459053	IND ASY,6T#16GA 15/14 ANT CLK
L17	459057	IND ASSY,7T#16GA 7/32 ANT CLK
L18	459053	IND ASY,6T#16GA 15/14 ANT CLK
L19	459054	IND ASY,6T#16GA 13/64 ANT CLK
L2	490202	BEAD 2673021801
L20	490201	BEAD FERRITE SHIELD 73 MAT.
L21	490201	BEAD FERRITE SHIELD 73 MAT.
L22	490201	BEAD FERRITE SHIELD 73 MAT.
L23	490201	BEAD FERRITE SHIELD 73 MAT.
L24	490201	BEAD FERRITE SHIELD 73 MAT.
L25	490201	BEAD FERRITE SHIELD 73 MAT.
L26	490201	BEAD FERRITE SHIELD 73 MAT.

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
L27	490201	BEAD FERRITE SHIELD 73 MAT.
L28	490201	BEAD FERRITE SHIELD 73 MAT.
L29	490201	BEAD FERRITE SHIELD 73 MAT.
L3	490202	BEAD 2673021801
L30	490201	BEAD FERRITE SHIELD 73 MAT.
L31	490201	BEAD FERRITE SHIELD 73 MAT.
L32	490201	BEAD FERRITE SHIELD 73 MAT.
L33	490201	BEAD FERRITE SHIELD 73 MAT.
L34	490201	BEAD FERRITE SHIELD 73 MAT.
L35	490201	BEAD FERRITE SHIELD 73 MAT.
L36	490201	BEAD FERRITE SHIELD 73 MAT.
L37	490201	BEAD FERRITE SHIELD 73 MAT.
L38	490203	BEAD FERRITE SHIELD 73 MAT.
L4	490202	BEAD 2673021801
L5	490202	BEAD 2673021801
L6	490202	BEAD 2673021801
L7	430013	INDUCTOR, FIXED 27 UHY
L8	459148	AIR COIL, 8T#16AWG
L9	459149	AIR COIL, 8T#16AWG
OUT	610511	CONNECTOR SMB PC JACK
PL1	610148	HEADER,MLX,4PIN,,100,
PL2	610144	HEADER,MLX,10PIN,,100
PL3	610105	HEADER, 1X2 W/LB-LOCK 0.1 TH
Q4	310064	XSTR,2N6427 NPN DARL TO-92
Q5	310003	XSTR, 2N3567 NPN 300MA TO92
R1	153220	RES,22 OHM 2W 5% FP FILM
R10	124123	RES,12K 1/4W 5% CARBON FILM
R11	144562	RES, 5.6K OHM 1W 5% FP MOX
R12	124123	RES,12K 1/4W 5% CARBON FILM
R13	144562	RES, 5.6K OHM 1W 5% FP MOX
R14	153100	RES,10 OHM 2W 5% METAL OX
R15	124102	RES,1K 1/4W 5% CARBON FILM
R16	124102	RES,1K 1/4W 5% CARBON FILM

Table 5-2 Power Amplifier Board Parts List (AM1077PAB Rev. Y)

Designator	Part Number	Description
R19	144271	RES,270 OHM 1W 5% FILM
R2	153220	RES,22 OHM 2W 5% FP FILM
R20	144391	RES,390 OHM 1W 5% FILM
R23	170209	RES,1K 25T TRIMMER
R26	124103	RES,10K 1/4W 5% CARBON FILM
R27	124473	RES,47K 1/4W 5% CARBON FILM
R3	124103	RES,10K 1/4W 5% CARBON FILM
R30	113683	RES,68K 1/8W 5% CARBON FILM
R31	113103	RES,10K 1/8W 5% CARBON FILM
R32	153201	RES,200 OHM 2W 5% FP FILM
R37	124201	RES,200 OHM 1/4W 5% CF
R38	170230	RES,10K TRIMMER
R4	124103	RES,10K 1/4W 5% CARBON FILM
R6	124201	RES,200 OHM 1/4W 5% CF
R7	154470	RES,47 OHM 2W 5% FILM
R8	154470	RES,47 OHM 2W 5% FILM
R9	153100	RES,10 OHM 2W 5% METAL OX
T1	AM1077XF2	INPUT XFOMER ASSEMBLY, T1
T2	AM1077XF1	OUTPUT XFOMER ASSEMBLY, T2
T3	AM1077XF3	CURRENT XFOMER ASSEMBLY, T3
U1	330007	IC,VREG,7812/LM340T,TO220,12V

REV	ECO	DESCRIPTION	DATE	APPR
A	06-0351	REMOVE TUNER OPTION	03-09-07	

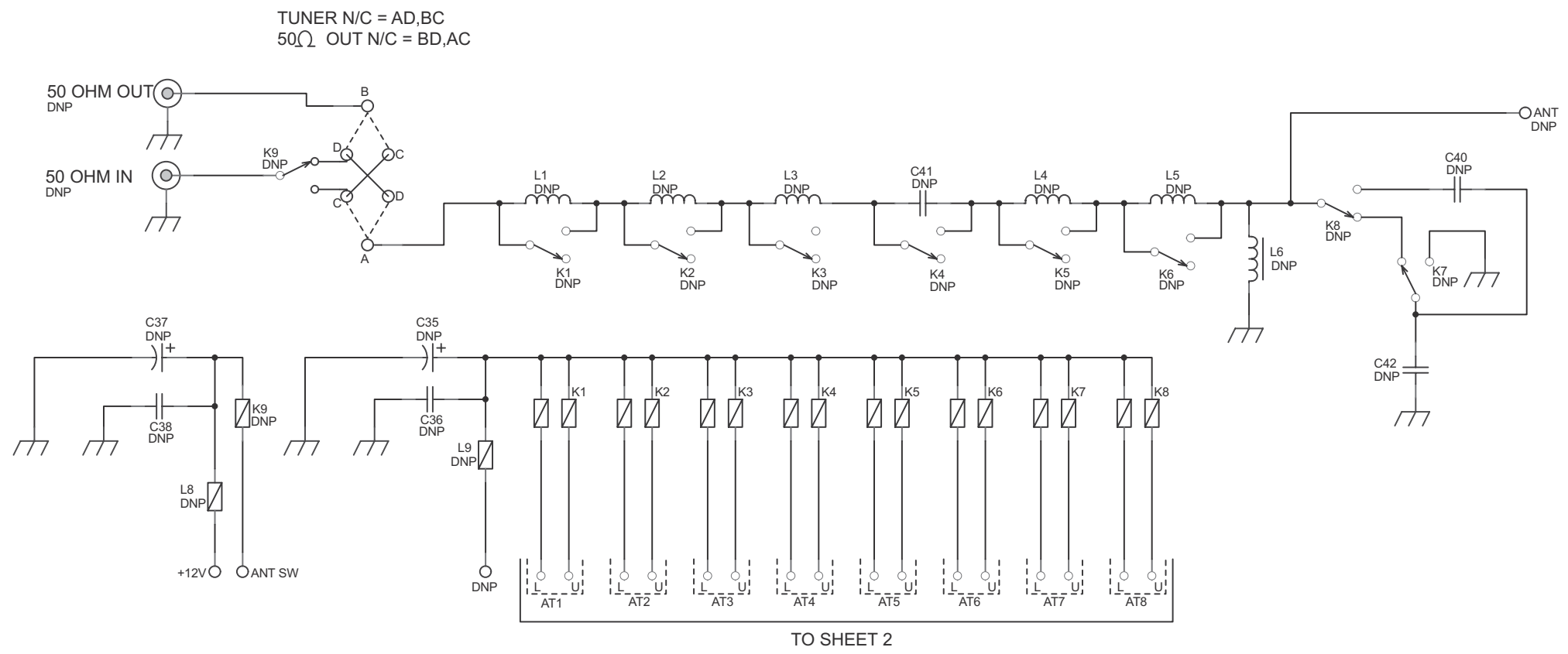
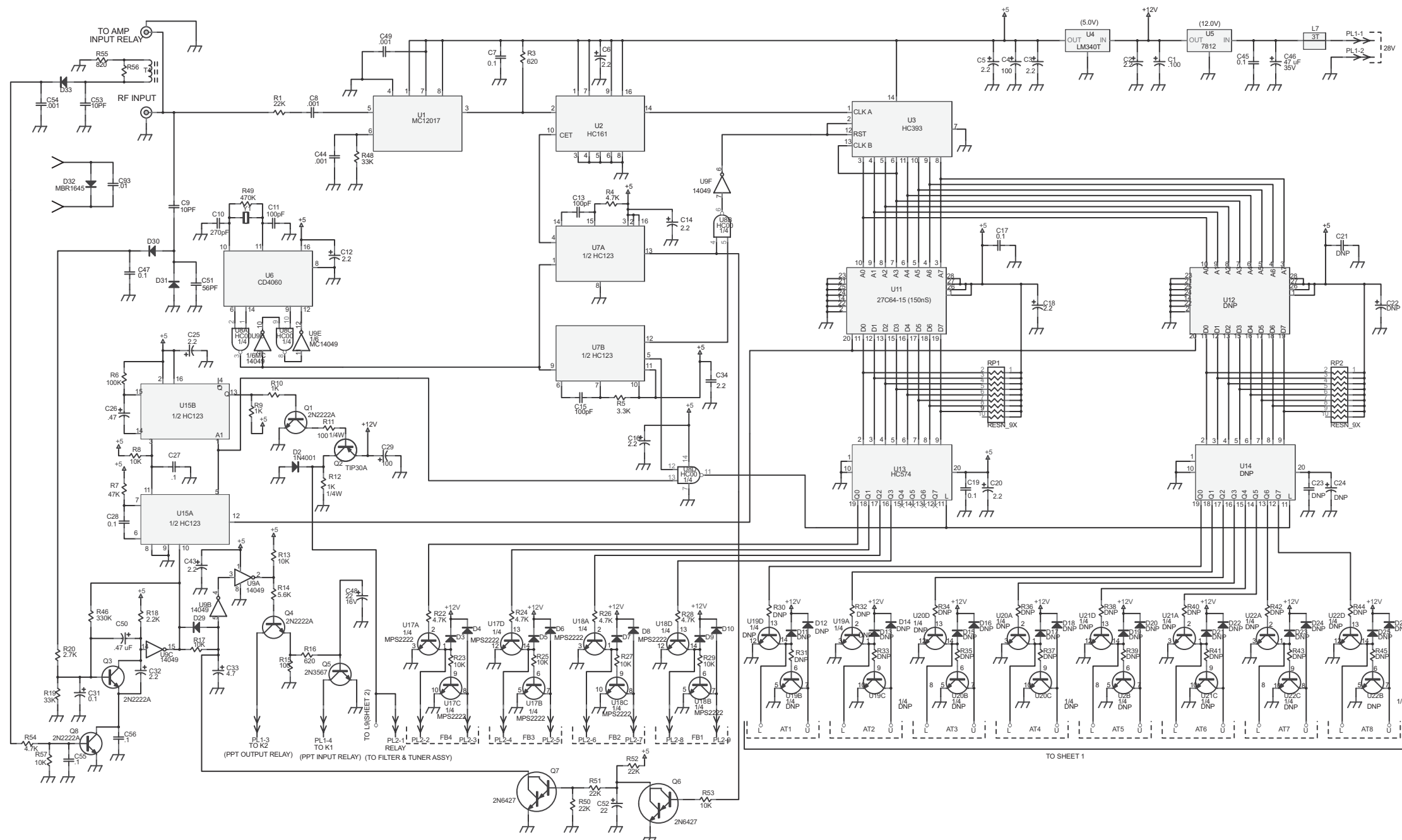


Figure 5-6
ATU2 Tuner Controller
Schematic Diagram
1 of 2
(995067 Rev. A)

5-21

DATRON		3030 Enterprise CT Vista, CA 92023 PH (760)597-1500 FAX (760)597-3777	
DATRON WORLD COMMUNICATIONS INC.			
Title: Schematic			
AM1077-ATU2 TUNER CONTROL			
Size: B	Drawn: R BONDOC	Date: 03-15-07	Drawing Number: 995067
	Appr:	Date:	Rev: A
File: 995067QA1_SH1.SchDoc		Date: 3/15/2007	Time: 10:52:11 AM



NOTES: UNLESS OTHERWISE SPECIFIED
 1. ALL RESISTORS ARE 1/8W 5%.
 2. RESISTANCE IS IN OHMS.
 3. CAPACITANCE IS IN MICROFARADS.
 4. ALL DIODES ARE IN4148/4150.

Figure 5-7
 ATU2 Tuner Controller
 Schematic Diagram
 2 of 2
 (995067 Rev. A)

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
C1	237101	CAP,100MF 16V ELECT VRT
C10	220271	CAP,270PF DM15 MICA
C11	210101	CAP,100PF NPO 50V 5%.2LS DISK
C12	241020	CAP,2.2MF DIP TANTALUM
C13	210101	CAP,100PF NPO 50V 5%.2LS DISK
C14	241020	CAP,2.2MF DIP TANTALUM
C15	210101	CAP,100PF NPO 50V 5%.2LS DISK
C16	241020	CAP,2.2MF DIP TANTALUM
C17	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C18	241020	CAP,2.2MF DIP TANTALUM
C19	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C2	241020	CAP,2.2MF DIP TANTALUM
C20	241020	CAP,2.2MF DIP TANTALUM
C21	DNP	NULL PART, VACANT PCB LOCATION
C22	DNP	NULL PART, VACANT PCB LOCATION
C23	DNP	NULL PART, VACANT PCB LOCATION
C24	DNP	NULL PART, VACANT PCB LOCATION
C25	241020	CAP,2.2MF DIP TANTALUM
C26	241047	CAP,0.47MF 35V DIP TANT
C27	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C28	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C29	237101	CAP,100MF 16V ELECT VRT
C3	241020	CAP,2.2MF DIP TANTALUM
C31	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C32	241020	CAP,2.2MF DIP TANTALUM
C33	241040	CAP,T,4.7UF,16V,20%,RA,.1SP
C34	241020	CAP,2.2MF DIP TANTALUM
C35	DNP	NULL PART, VACANT PCB LOCATION
C36	DNP	NULL PART, VACANT PCB LOCATION
C37	DNP	NULL PART, VACANT PCB LOCATION
C38	DNP	NULL PART, VACANT PCB LOCATION
C4	237101	CAP,100MF 16V ELECT VRT
C40	DNP	NULL PART, VACANT PCB LOCATION

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
C41	DNP	NULL PART, VACANT PCB LOCATION
C42	DNP	NULL PART, VACANT PCB LOCATION
C43	241020	CAP,2.2MF DIP TANTALUM
C44	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C45	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C46	234470	CAP,47MF 35V ELECT VRT
C47	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C48	237220	CAP,22MF 16V ELECT VRT
C49	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C5	241020	CAP,2.2MF DIP TANTALUM
C50	241047	CAP,0.47MF 35V DIP TANT
C51	221560	CAP,56PF 5% DM5 MICA
C52	241226	CAP,T,22UF,25V,20%,RA,.1SP
C53	210100	CAP,10 PF NPO 50V 5% 0.1LS DSK
C54	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C55	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C56	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C6	241020	CAP,2.2MF DIP TANTALUM
C7	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C8	210102	CAP,.001UF Y5P 50V 20% 0.1LS
C9	210100	CAP,10 PF NPO 50V 5% 0.1LS DSK
C93	214103	CAP,C,0.01U,50,10%,X,RA,.1SP
D10	320002	DIODE, 1N4148/1N4150 DO-35
D11	DNP	NULL PART, VACANT PCB LOCATION
D12	DNP	NULL PART, VACANT PCB LOCATION
D13	DNP	NULL PART, VACANT PCB LOCATION
D14	DNP	NULL PART, VACANT PCB LOCATION
D15	DNP	NULL PART, VACANT PCB LOCATION
D16	DNP	NULL PART, VACANT PCB LOCATION
D17	DNP	NULL PART, VACANT PCB LOCATION
D18	DNP	NULL PART, VACANT PCB LOCATION
D19	DNP	NULL PART, VACANT PCB LOCATION
D2	320102	DIODE, 1N4001 1A 50V DO-41

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
D20	DNP	NULL PART, VACANT PCB LOCATION
D21	DNP	NULL PART, VACANT PCB LOCATION
D22	DNP	NULL PART, VACANT PCB LOCATION
D23	DNP	NULL PART, VACANT PCB LOCATION
D24	DNP	NULL PART, VACANT PCB LOCATION
D25	DNP	NULL PART, VACANT PCB LOCATION
D26	DNP	NULL PART, VACANT PCB LOCATION
D29	320002	DIODE, 1N4148/1N4150 DO-35
D3	320002	DIODE, 1N4148/1N4150 DO-35
D30	320002	DIODE, 1N4148/1N4150 DO-35
D31	320002	DIODE, 1N4148/1N4150 DO-35
D32	320126	DIODE, MBR1645 SCHTKY 16A TO220
D32	890099	HEAT SINK TO220 W/O TAB
D33	320002	DIODE, 1N4148/1N4150 DO-35
D4	320002	DIODE, 1N4148/1N4150 DO-35
D5	320002	DIODE, 1N4148/1N4150 DO-35
D6	320002	DIODE, 1N4148/1N4150 DO-35
D7	320002	DIODE, 1N4148/1N4150 DO-35
D8	320002	DIODE, 1N4148/1N4150 DO-35
D9	320002	DIODE, 1N4148/1N4150 DO-35
K1	DNP	NULL PART, VACANT PCB LOCATION
K2	DNP	NULL PART, VACANT PCB LOCATION
K3	DNP	NULL PART, VACANT PCB LOCATION
K4	DNP	NULL PART, VACANT PCB LOCATION
K5	DNP	NULL PART, VACANT PCB LOCATION
K6	DNP	NULL PART, VACANT PCB LOCATION
K7	DNP	NULL PART, VACANT PCB LOCATION
K8	DNP	NULL PART, VACANT PCB LOCATION
K9	DNP	NULL PART, VACANT PCB LOCATION
L1	DNP	NULL PART, VACANT PCB LOCATION
L2	DNP	NULL PART, VACANT PCB LOCATION
L3	DNP	NULL PART, VACANT PCB LOCATION
L4	DNP	NULL PART, VACANT PCB LOCATION

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
L5	DNP	NULL PART, VACANT PCB LOCATION
L6	DNP	NULL PART, VACANT PCB LOCATION
L7	459214	IND ASSY,1T#22 AWG 1-490202
L8	DNP	NULL PART, VACANT PCB LOCATION
L9	DNP	NULL PART, VACANT PCB LOCATION
PL1	610235	HEADER, 1X4 MLX RA+SB LOCK 0.1
PL2	610208	HEADER,1X10 MLX RA+SB LOCK 0.1
Q1	310057	XISTOR,NPN,PN2222A,TO92
Q2	310083	XISTOR,PNP,TIP30C,TO220
Q3	310057	XISTOR,NPN,PN2222A,TO92
Q4	310057	XISTOR,NPN,PN2222A,TO92
Q5	310003	XSTR, 2N3567 NPN 300MA TO92
Q6	310064	XSTR,2N6427 NPN DARL TO-92
Q7	310064	XSTR,2N6427 NPN DARL TO-92
Q8	310057	XISTOR,NPN,PN2222A,TO92
R1	113223	RES,22K 1/8W 5% CARBON FILM
R10	113102	RES, 1K, 1/8W, 5%, CF
R11	124101	RES,100 OHM 1/4W 5% CF
R12	124102	RES,1K 1/4W 5% CARBON FILM
R13	113103	RES,10K 1/8W 5% CARBON FILM
R14	113562	RES,5.6K 1/8W 5% CARBON FILM
R15	113101	RES,100 OHM 1/8W 5% CF
R16	113621	RES,620 OHM 1/8W 5% CF
R17	113103	RES,10K 1/8W 5% CARBON FILM
R18	113222	RES,2.2K 1/8W 5% CARBON FILM
R19	113333	RES,33K 1/8W 5% CARBON FILM
R20	113272	RES,2.7K 1/8W 5% CARBON FILM
R22	113472	RES,4.7K 1/8W 5% CARBON FILM
R23	113103	RES,10K 1/8W 5% CARBON FILM
R24	113472	RES,4.7K 1/8W 5% CARBON FILM
R25	113103	RES,10K 1/8W 5% CARBON FILM
R26	113472	RES,4.7K 1/8W 5% CARBON FILM
R27	113103	RES,10K 1/8W 5% CARBON FILM

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
R28	113472	RES,4.7K 1/8W 5% CARBON FILM
R29	113103	RES,10K 1/8W 5% CARBON FILM
R3	113621	RES,620 OHM 1/8W 5% CF
R30	DNP	NULL PART, VACANT PCB LOCATION
R31	DNP	NULL PART, VACANT PCB LOCATION
R32	DNP	NULL PART, VACANT PCB LOCATION
R33	DNP	NULL PART, VACANT PCB LOCATION
R34	DNP	NULL PART, VACANT PCB LOCATION
R35	DNP	NULL PART, VACANT PCB LOCATION
R36	DNP	NULL PART, VACANT PCB LOCATION
R37	DNP	NULL PART, VACANT PCB LOCATION
R38	DNP	NULL PART, VACANT PCB LOCATION
R39	DNP	NULL PART, VACANT PCB LOCATION
R4	113472	RES,4.7K 1/8W 5% CARBON FILM
R40	DNP	NULL PART, VACANT PCB LOCATION
R41	DNP	NULL PART, VACANT PCB LOCATION
R42	DNP	NULL PART, VACANT PCB LOCATION
R43	DNP	NULL PART, VACANT PCB LOCATION
R44	DNP	NULL PART, VACANT PCB LOCATION
R45	DNP	NULL PART, VACANT PCB LOCATION
R46	113334	RES,330K 1/8W 5% CARBON FILM
R48	113333	RES,33K 1/8W 5% CARBON FILM
R49	113474	RES,470K 1/8W 5% CARBON FILM
R5	113332	RES,3.3K 1/8W 5% CARBON FILM
R50	113223	RES,22K 1/8W 5% CARBON FILM
R51	113223	RES,22K 1/8W 5% CARBON FILM
R52	113223	RES,22K 1/8W 5% CARBON FILM
R53	113103	RES,10K 1/8W 5% CARBON FILM
R54	113472	RES,4.7K 1/8W 5% CARBON FILM
R55	124821	RES,820 OHM 1/4W 5% CF
R56	124222	RES,2.2K 1/4W 5% CARBON FILM
R57	113103	RES,10K 1/8W 5% CARBON FILM
R6	113104	RES,100K 1/8W 5% CARBON FILM

Table 5-3 ATU2 Tuner Controller Parts List (AM1077-TBA2 Rev. B)

Designator	Part Number	Description
R7	113473	RES,47K 1/8W 5% CARBON FILM
R8	113103	RES,10K 1/8W 5% CARBON FILM
R9	113102	RES, 1K, 1/8W, 5%, CF
RP1	182015	RES PACK,10K X 9
RP2	DNP	NULL PART, VACANT PCB LOCATION
T4	459165	XFMR,20T#30 AWG 2-490032
U1	330106	IC MC12017/SC63599P
U11	AM1077A-SW1	AM1077ATU BOARD SOFTWARE
U12	DNP	NULL PART, VACANT PCB LOCATION
U13	330157	IC 74HC574N
U14	DNP	NULL PART, VACANT PCB LOCATION
U15	330306	IC, MC54/74HC123
U17	310101	XSTR, NPN QUAD MPQ2222A DIP14
U18	310101	XSTR, NPN QUAD MPQ2222A DIP14
U19	DNP	NULL PART, VACANT PCB LOCATION
U2	330235	IC 74HC161
U20	DNP	NULL PART, VACANT PCB LOCATION
U21	DNP	NULL PART, VACANT PCB LOCATION
U22	DNP	NULL PART, VACANT PCB LOCATION
U3	330305	IC,74HC393 DBL RIPL CNTR DIP14
U4	330076	IC,VREG,LM340T-5.0,TO220,5V
U5	330007	IC,VREG,7812/LM340T,TO220,12V
U6	330037	IC,CD4060BE 14-B COUNTER DIP16
U7	330306	IC, MC54/74HC123
U8	330307	IC,74HC00N QUAD 2-IN NAND DIP
U9	330080	IC, 4049B HEX INV BUFFER DIP16
XU11	621009	SOCKET, IC DIP-28 SCREW
Y1	363001	RESONATOR CERAMIC 614.4KHZ

CHAPTER 6

AM1077CONV POWER CONVERTER

The AM-1077 RF power amplifier requires a 28 Vdc power source. The AM1077CONV converts a 12 Vdc input to a 28 Vdc output allowing the AM-1077 to operate in a 12V environment. For example, if the AM-1077 is installed in a mobile station with a PRC1077 transceiver mounted on a MT-1077-12 mobile mount, the AM-1077 would require the AM1077CONV power converter to convert the 12 Vdc output from the MT-1077-12 mount to 28 Vdc for the AM-1077.

6.1 Technical Description

The 12V to 28V converter is an energy-storage and transfer type switching power supply. The AM1077CONV includes two power FETs: Q1 and Q2 that turn on and off, a converter control IC U1 that controls when the FETs turn on and off, and a switching coil L2.

When U1 turns Q1 and Q2 on, the magnetic field of the switching coil L2 stores energy. When U1 turns Q1 and Q2 off, the collapsing field of L2 transfers the stored energy to filter capacitors C5 and C6. Diode D1 prevents C5 and C6 from discharging when Q1 and Q2 conduct again.

The converter control IC U1, switches power FETs Q1 and Q2 on and off according to timing capacitor C4, which sets the internal oscillator frequency. U1 pin 5 samples the voltage across C5 at the junction of R2 and R4 and compares this voltage to an internal 1.25 Vdc reference voltage regulator. The output of the internal reference comparator and the timing oscillator are logically ANDed together. If the voltage at pin 5 of U1 is low, the timing oscillator turns Q1 and Q2 on until the voltage at pin 5 of U1 is 1.25V, at which time the reference comparator output turns the FETs off.

U1 controls the off time by sampling the input current across R1 at pin 7. When the voltage differential between pin 7 and pin 6 exceeds 300 mV, the timing oscillator turns off until the voltage differential drops below 300 mV.

6.2 Configurations

The 12V to 28V converter is available in two configurations: the AM1077CONV and the AM77CONV-A. The electronics are the same for both configurations. The differences lie in system usage and cabling requirements.

6.2.1 12 Vdc System Using MT-1077-12

The AM1077CONV is designed for use in a system that uses the MT-1077-12 mobile mount and derives its power from a vehicle with a 12 Vdc electrical system. The vehicle supply voltage connects directly to the MT-1077-12 input power connector J1, through cable C991580. The MT-1077-12 outputs the 12V from its J3 connector to the AM1077CONV input J1 connector through cable C991658. The AM1077CONV 28V output goes directly to the AM-1077 through a plug-in connection between J2 in the AM1077CONV and the input power connector J5 in the rear of the amplifier. Refer to the Figure 6-1 on page 6-3.

6.2.2 12 Vdc System Using MT-1077-24

The AM77CONV-A is designed for use in a system that uses the MT-1077-24 mobile mount and derives its power from a vehicle with a 12 Vdc electrical system. In this case, the vehicle 12V is connected to the AM77CONV-A input J1 connector through cable C991670, and outputs 24V at the AM77CONV-A connector J2 on the rear of the converter. The AM77CONV-A 24V output goes through cable C991671 to the MT-1077-24 24V input connector J1. The MT-1077-24 sends the 24V from its J3 output connector through cable C991579 to the AM-1077 front panel DC power input connector. Refer to the Figure 6-2 on page 6-3.

6.2.3 24 Vdc System Using MT-1077-24

For a system that uses the MT-1077-24 mobile mount and derives its power from a vehicle with a 24 Vdc electrical system, the 24V is routed directly to the MT-1077-24. This configuration replaces the AM77CONV-A with the adapter AM1077ADPT which is just an empty case that allows the AM-1077 to be mounted to the PRC1077. In this configuration, the MT-1077-24 receives the 24V input directly from the vehicle using cable C991580 rather than the AM77CONV-A. This eliminates the use of cables C991670 and C991671. Refer to the Figure 6-3 on page 6-4.

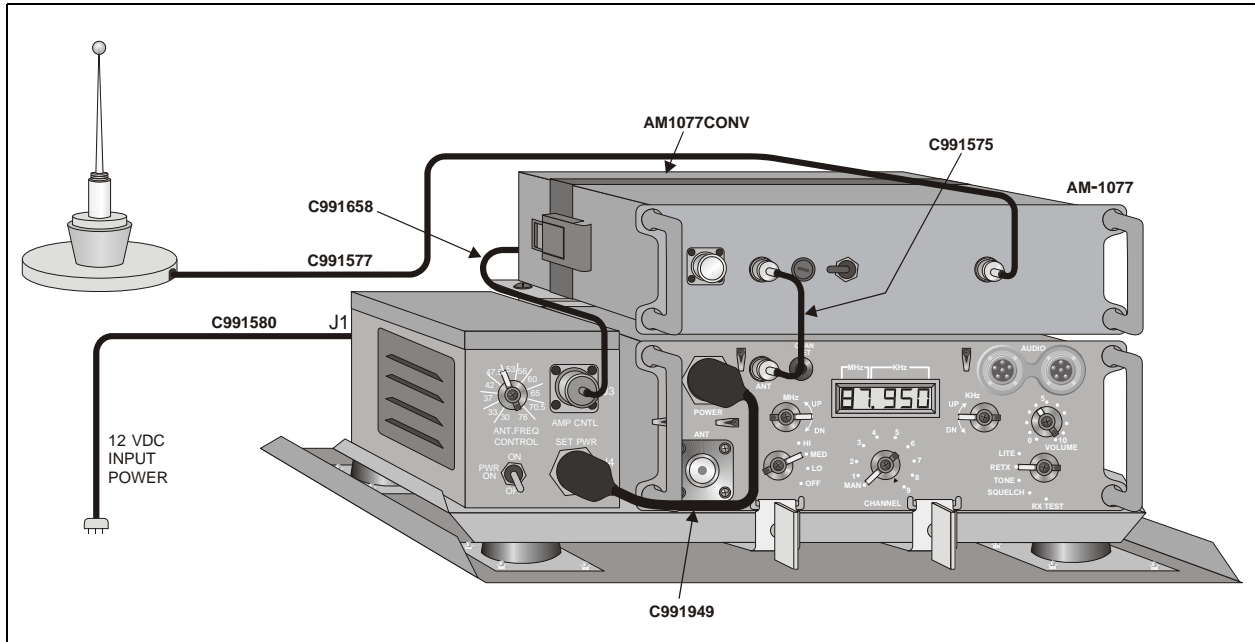


Figure 6-1 12 Vdc System Using the MT-1077-12 and the AM1077CONV

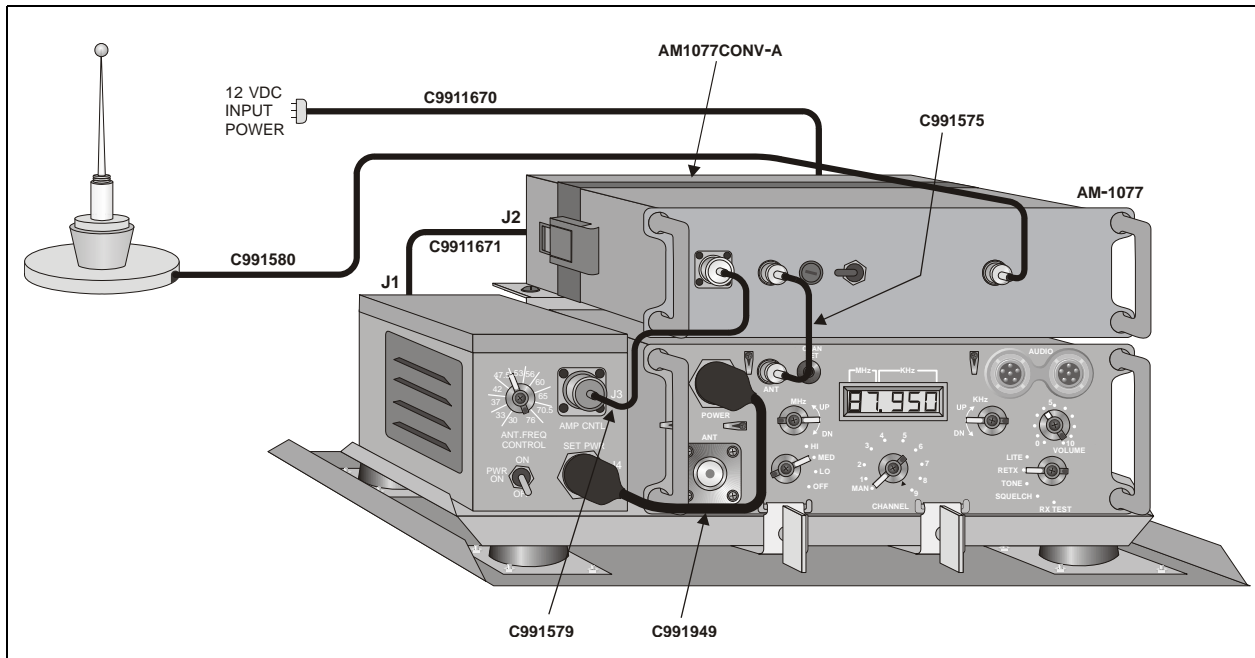


Figure 6-2 12 Vdc System Using the MT-1077-24 and the AM77CONV-A

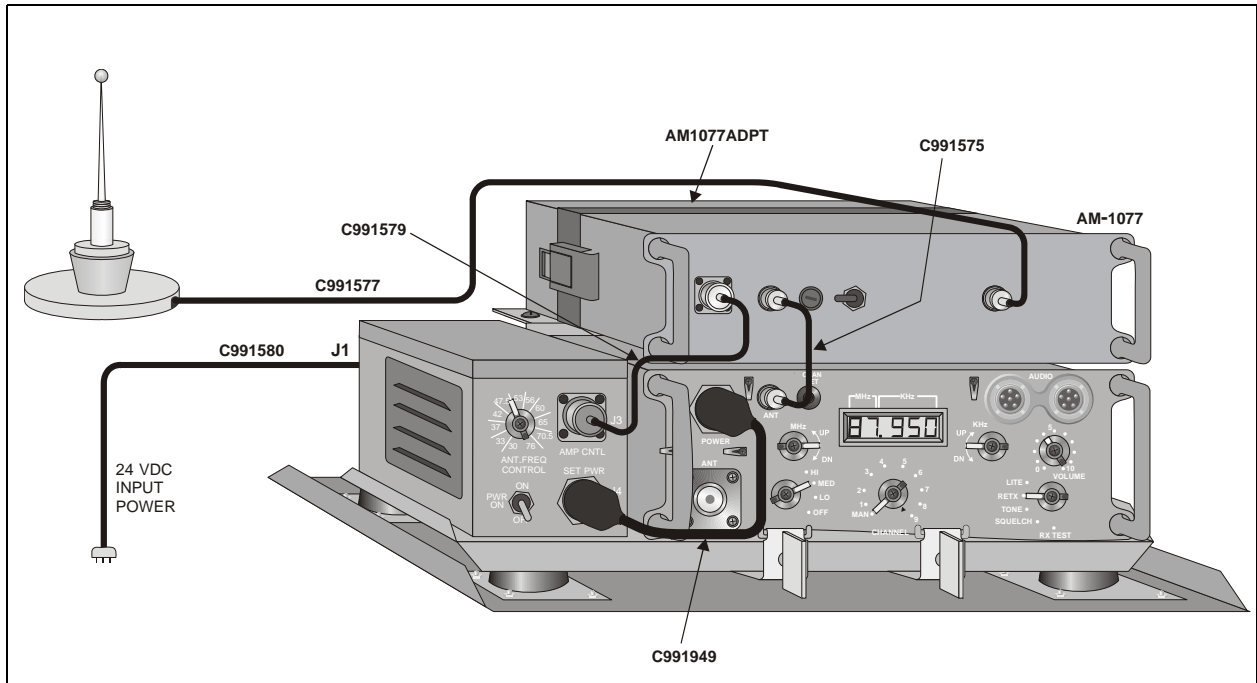


Figure 6-3 24 Vdc System Using the MT-1077-24 and the AM1077ADPT

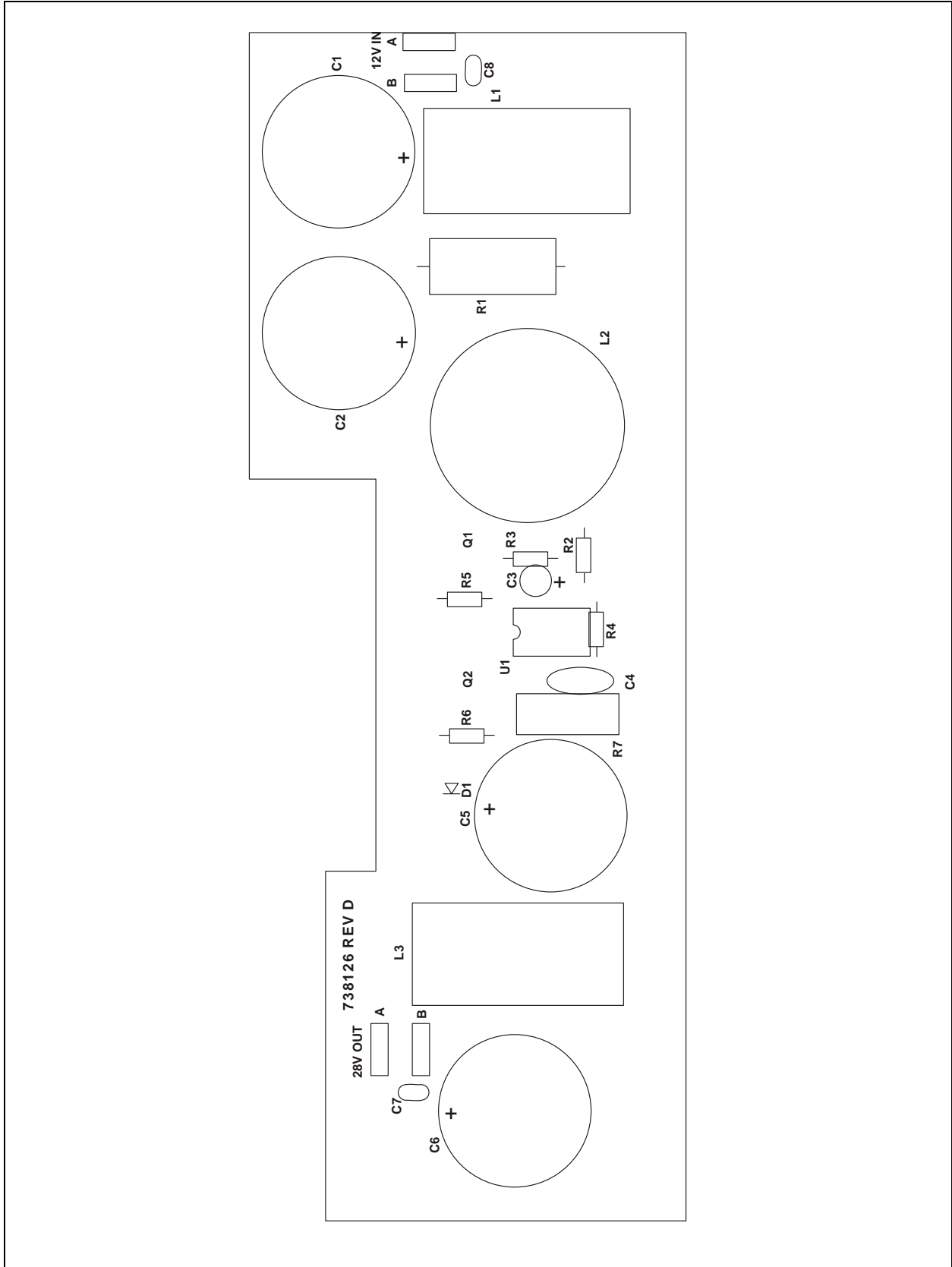
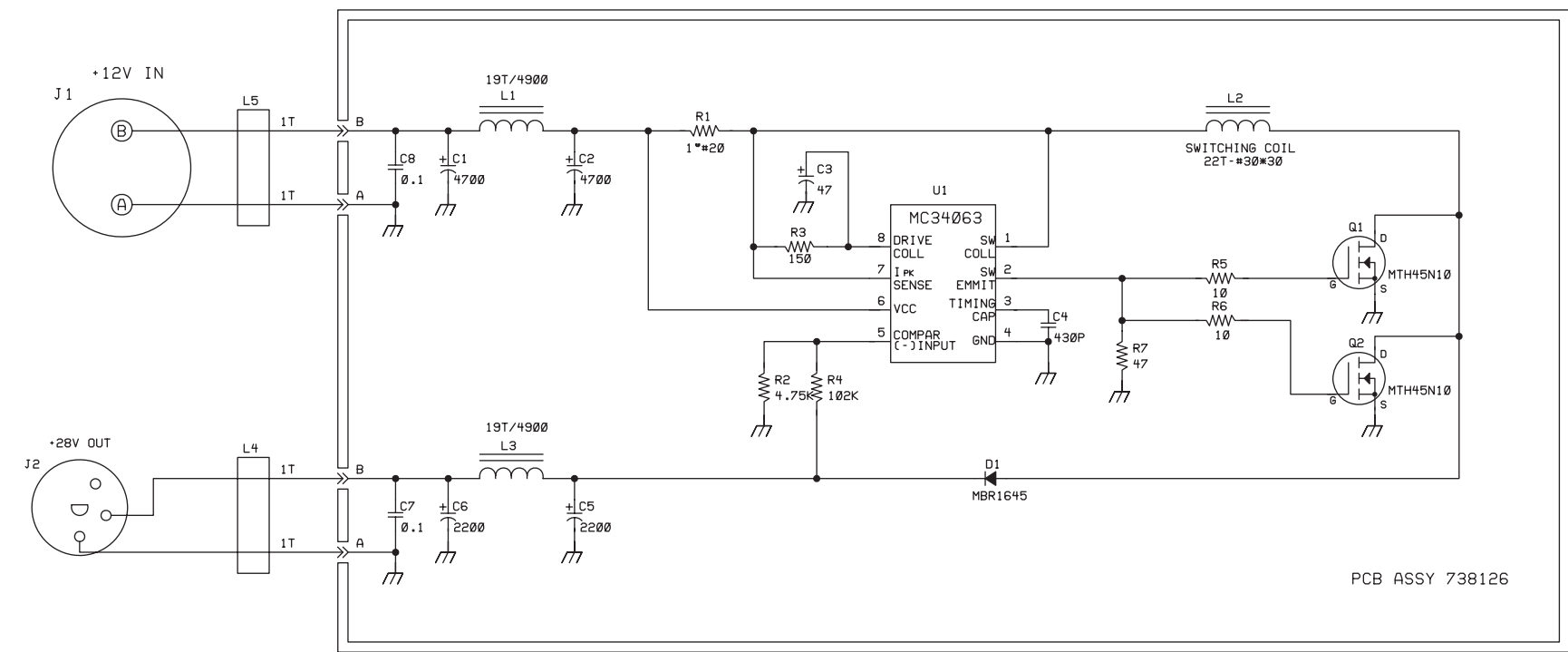


Figure 6-4 AM1077CONV 12V to 24V Converter Components Location (738126 Rev. D)

REV	ECN	DESCRIPTION	DATE	APPR
A	AM1077-055	RELEASED	31MAR89	
B	MISC-212	994038 WAS 991238	11OCT90	
C	AM1077-114	CHANGED Q1, Q2	1APR93	
D	05-0394	R2 WAS 1.2K, R4 WAS 24K	10-26-05	
E	05-0414	R2 WAS 1K, R4 WAS 22K	11-30-05	



994038

4 INDUCTANCE IS IN MICROHENRYS
 3 DIODES ARE 1N4148
 2 CAPACITANCE IS IN MICROFARADS
 1 RESISTANCE IS IN OHMS
 NOTES: UNLESS OTHERWISE SPECIFIED

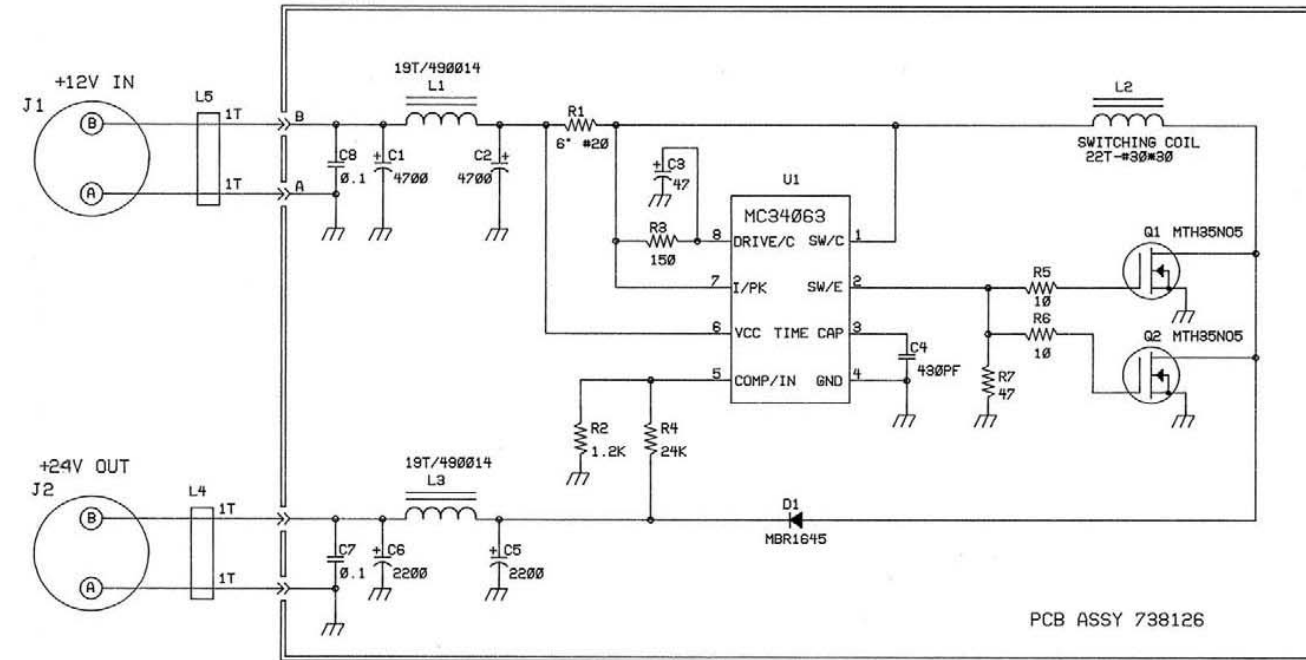
Figure 6-5
 AM1077CONV
 12V to 28V Converter
 Schematic Diagram
 (994038 Rev. E)

6-7

AM-1077-MS

DATRON			
DATRON WORLD COMMUNICATIONS INC.			
TITLE: AM1077 12 TO 28V CONV			
SIZE: C	DRAWN: COBBE	DRAWING NUMBER: 994038	REV.: E
SCALE:	DATE:	SHEET	

REV	ECN	DESCRIPTION	DATE	APPR
A	AM1077-059	+24V WAS +28V. JM	7-27-89	alc
B	MISC-212	994047 WAS 9912471M 10-11-90		



994047

4. INDUCTANCE IS IN MICROHENRYS
3. DIODES ARE 1N4148
2. CAPACITANCE IS IN MICROFARADS
1. RESISTANCE IS IN OHMS

NOTES: UNLESS OTHERWISE SPECIFIED

Figure 6-6
AM77CONV-A
12V to 24V Converter
(994047 Rev. B)

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AM-1077-MS

DATRON DATRON World Communications, Inc			
TITLE: AM77CONV-A			
12 - 28V CONV		M.R.I.	
SIZE: C	DRAWN: COBBE	DRAWING NUMBER: 994047	REV: B
ENGR: <i>alc</i>	DATE: 4/27/89	SHEET	

Table 6-1 AM1077CONV 12V to 28V Converter Parts List (AM1077CONV Rev. N)

Designator	Part Number	Description
L5	490302	BEAD FERRITE SHIELD 43 MAT

Table 6-2 AM77CONV-A 12V to 28V Converter Parts List (AM77CONV-A Rev. H)

Designator	Part Number	Description
C7	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C8	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
J1	613001	CONN,CHAS,2P,MS3102R16-11P
J2	613097	CONN,CHAS,2P,MS3102A10SL-4S
L4	490302	BEAD FERRITE SHIELD 43 MAT
L5	490302	BEAD FERRITE SHIELD 43 MAT

Table 6-3 AM1077CONV(-A) Converter Board Parts List (AM77CONVPC Rev. M)

Designator	Part Number	Description
C1	233472	CAP,A,4700U,35,20%,RA,22X30
C2	233472	CAP,A,4700U,35,20%,RA,22X30
C3	241476	CAP, 47UF TA 20V 20% 0.1LS
C4	220431	CAP,430PF DM15 MICA
C5	233222	CAP,2200U 35V ELECT VRT
C6	233222	CAP,2200U 35V ELECT VRT
C7	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
C8	275104	CAP, 0.1UF X7R 50V 10% 0.1LS
L1	459136	IND ASSY, 19T#16 GA 1-490014
L2	459137	IND ASSY,22T#30 AWG 2-490014
L3	459136	IND ASSY, 19T#16 GA 1-490014
R2	1114751	RES 4.75K 1/8W 1% MF
R3	124151	RES,150 OHM 1/4W 5% CF
R4	1111023	RES,102K 1/8W 1% FILM
R5	124100	RES,10 OHM 1/4W 5% CARBON FILM
R6	124100	RES,10 OHM 1/4W 5% CARBON FILM
R7	154470	RES,47 OHM 2W 5% FILM
U1	330191	IC MC34063PI

Table 6-4 AM1077 Converter Heat Sink Parts List (AM77CONVHS Rev. M)

Designator	Part Number	Description
D1	320126	DIODE,MBR1645 SCHTKY 16A TO220
Q1	310092	XISTOR,MFET,NCH,MTH45N10,*SS*
Q2	310092	XISTOR,MFET,NCH,MTH45N10,*SS*