4. INSTALLATION

The MASTR III PS103010 series Switching Power Supply is designed for MASTR III stations with 26VDC Power amplifiers. Before installation verify that the station's RF Power Amplifier is designed to operate with a nominal 24VDC power supply.

Figure 4-1, Figure 4-2, and Figure 4-3 show the front and rear panel views of PS103010V120 and PS103010V240. The power supplies are identical in design, with exception of the front panel service receptacles found only on the PS103010V120.

NOTE

Insure that ventilation holes in the unit are not obstructed when the unit is mounted and Operational.

CAUTION

Ensure that the RF Power Amplifier input voltage rating matches the rating of the Switching Power Supply before installing the unit. Severe damage may occur to the station and the Power Supply if ratings do not match.

WARNING

Always follow general safety practices when working around high voltage or current potentials. Always remove any jewelry and wear safety goggles.

Figure 4-1: Front Panel View, PS103010V120

Figure 4-2: Front Panel View, PS103010V240

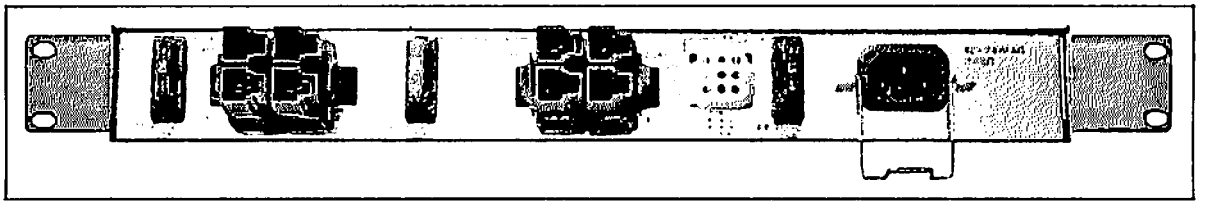

Figure 4-3: Rear Panel View, PS103010V120 and V240

4.1 INSTALLATION PREPARATION

Installation and service is simplified through the use of connectors and common hardware components. During installation L-Brackets are installed to support the rear of the Switching Power Supply. FM103177V1 brackets are used to support the supply in 69" and 83" indoor cabinets, and the Open Rack. FM103177V2 brackets are used to support the supply in 37" indoor cabinets. Determine the type of cabinet and install the appropriate support brackets as shown in Figure 4-4 and Figure 4-5.

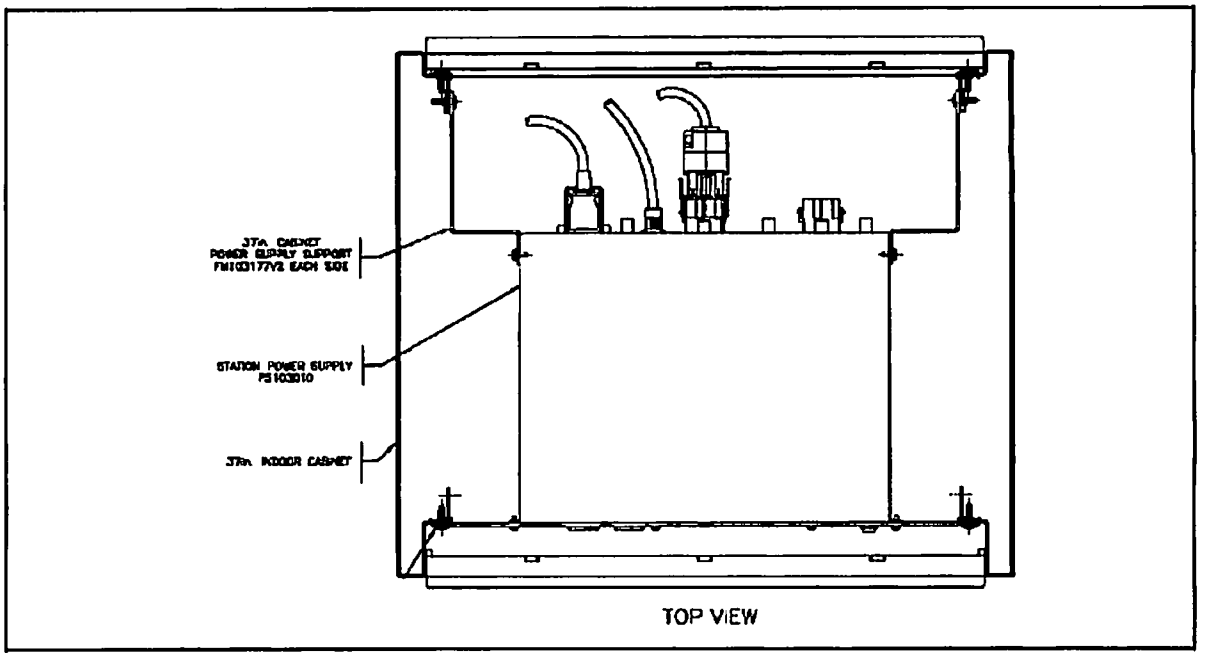

Figure 4-4: Mounting Bracket Configurations, 37" Cabinet

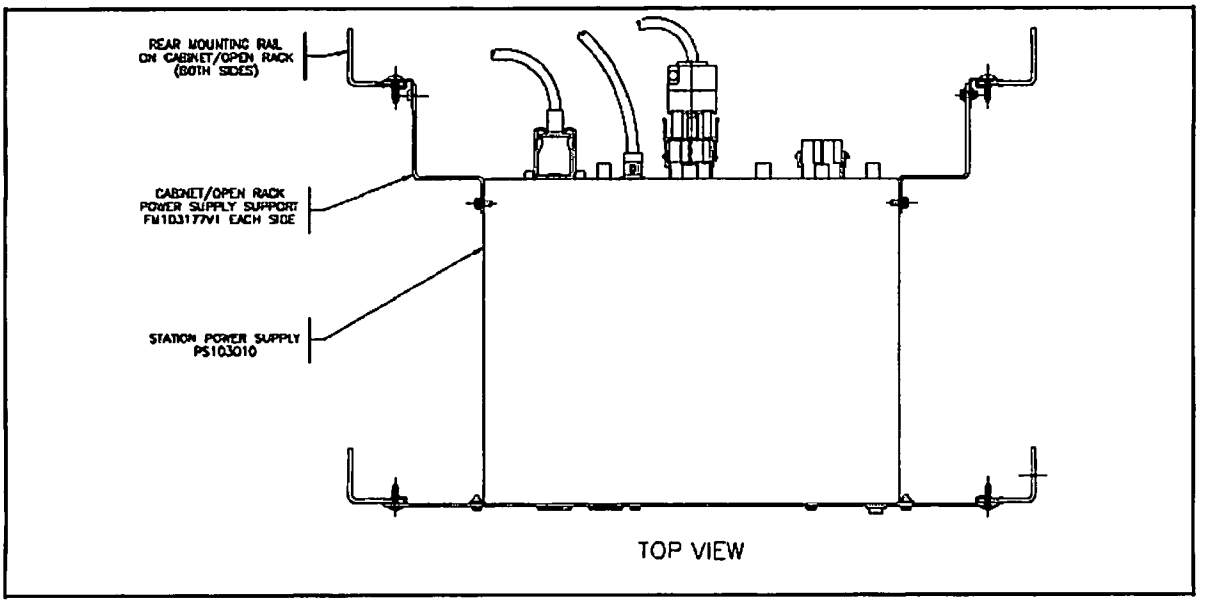

Figure 4-5: Mounting Bracket Configurations, 69/83" Indoor Cabinet and Open Rack

4.2 RACK LOCATION

When locating new equipment in rack mount assemblies it is important to follow all specified installation procedures to achieve proper air flow, wiring harness requirements, and maintain system integrity. Figure 4-6 provides rack mounting information to be followed when replacing the 19A149979P1 power supply with a PS103010V120 Switching Power Supply. The new supply should be mounted to the upper most rack position in the cabinet or open rail station.

New installations should be installed as specified in the product's application assembly instructions.

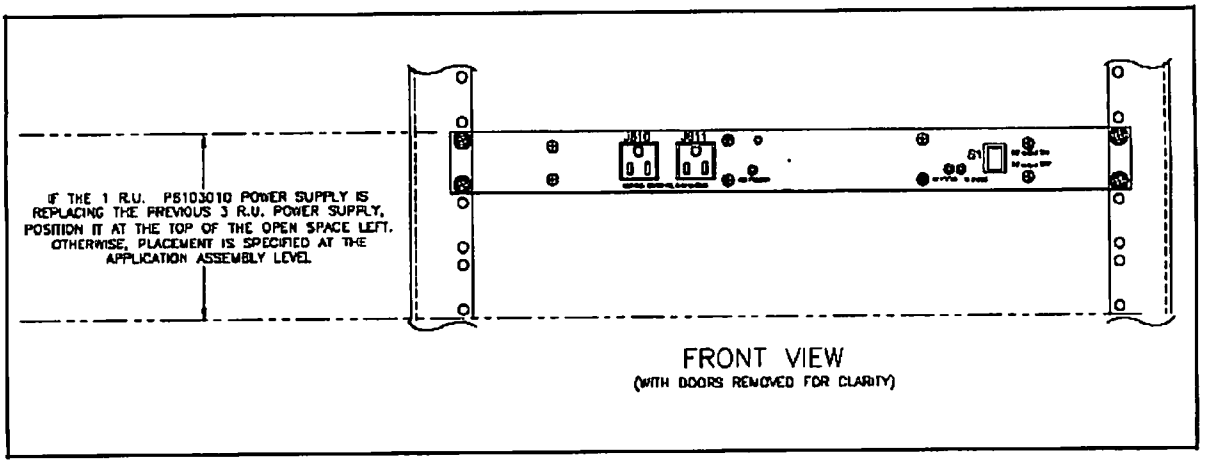

Figure 4-6: Rack Mount Location

4.3 WIRING INSTALLATION

Be sure that the main AC power cord is unplugged from the AC mains and that no AC or DC power is present. Make sure the ON/OFF switch on the front panel is in the OFF position. Determine the proper mounting location for the power supply within the rack (refer to the appropriate base station manual). Attach the cable from the RF Power Amplifier to F801A on the rear panel. Next connect the DC Power Cable from the station T/R shelf to J801 on the rear panel.

If utilizing the battery backup option, install the battery cables to the battery while observing proper polarity of all connections. Route the cables into the station as necessary but do not connect the battery to the power supply at this time. Remember to always follow general safety practices when working around high voltage and current power devices. Always remove any jewelry and wear safety goggles!

The backup battery network is a nominal 24VDC system. DO NOT attempt to connect a battery network rated less than 24VDC nominal. Typically this network of batteries consists of a minimum of two-12VDC batteries connected in series, or four-6VDC batteries connected in series.

Install the AC Power Cord to J802. Do not plug the AC power cord into the AC power source at this time. Be sure all cables are routed to prevent strain and damage to the connectors.

NOTE

Once the Power Supply is mounted, it may be difficult to access the rear panel connections. Ensure that all connections are secure prior to mounting the power supply.

4.4 RACK INSTALLATION

Installation and service is simplified through the use of connectors and common hardware components. After installing the support brackets to the rear of the Switching Power Supply, and connecting all associated wiring, install the power supply assembly into the cabinet as shown on the Assembly Diagram, AA56-HRB 104 26, Sheet 2 and Sheet 3, found in the rear of this manual.

4.5 BATTERY BACKUP

Many choices exist when it comes to choosing the right battery for your specific application. Issues such as life expectancy, required periodic maintenance, Amp-Hour capacity, recharging life cycles and cost are just a few of the factors that go into choosing the right battery for the job.

Three basic varieties of batteries are widely used for battery backup systems; Starting, Deep Cycle and Deep Cycle Marine. Further choices within these types of batteries include Wet Cell, Sealed Cell, Gel Cell, and various low maintenance designs.

In general, "Starting" batteries are designed for short duration-high current applications such as when cranking an automobile. This type battery usually suffers a significantly reduced life cycle when "fully discharged" patterns of use occur. "Deep Cycle" batteries are designed to deliver a continuous current supply and survive repeated "fully discharged" patterns. "Deep Cycle Marine" batteries combine the advantages and disadvantages of both Starting and Deep Cycle batteries.

Several general rules can be applied to estimate the charge time of a lead acid battery system. There is almost a 100% conversion of electrical energy to stored chemical energy for the first 80% of a battery's charging capacity. If usable capacity is defined to be at least 80 % of full charge, then the time to reach usable capacity is: $T = 0.8 \times AH/C$, where T is in hours, AH is in Amp-Hours, and C is the average charge rate in amps. To charge the remaining 20 % to a full charge takes longer because the electrical energy is no longer close to 100 % conversion to stored chemical energy. The time to a fully charge a typical battery network can be estimated as, $T = 1.1 \times AH/C$, where again T is in hours, AH is in Amp-Hours, and C is the average charge rate in amps. Using this formula to estimate for a five amp charger, a standard 50 Amp-Hour battery network would recharge in 11 hours.

Estimates can be provided for air time for a MIII station. Assuming a worst case scenario of a 100% transmit duty cycle, the station air time with a 50 Amp-Hour battery would be approximately one hour and considerably longer for a smaller transmit duty cycle.

4.6 TEST

Careful attention should be given to stations utilizing the backup battery option. Before applying power to the power supply, if battery backup is utilized, verify the float voltage required by the battery manufacturer. Battery manufacturers usually specify a specific float voltage with regard to ambient room temperature and other factors. Adjustments should be made in accordance with the data supplied by the battery manufacturer.

A potentiometer for adjusting the float voltage of the battery charging circuit is accessible through an opening in the top cover of the power supply assembly. Adjustments should only be made in accordance with the data supplied by the battery manufacturer. Damage may occur if the float voltage is not set per the battery's manufacturer specifications.

CAUTION

Damage may occur if the float voltage is not set per the battery's manufacturer specifications. DO NOT set the battery float voltage above 26.4VDC unless there is supporting documentation from the battery manufacturer.

The power supply should now be ready to power up and test. Turn on the power supply using the front panel ON/OFF switch. Measurements should be taken at F801A and J801 for proper operation. Detailed descriptions of each connection point can be found in Section 5.2: Adjustments and Connections.

If utilizing battery backup, use an insulated 2mm flat tip tuning tool to adjust the float voltage in accordance with installation data supplied by the battery manufacturer. Then carefully connect the battery to J803. After the battery has had a reasonable charge, cycle test the battery backup by disconnecting the AC power input and check for normal station operation. Reconnect the AC power input and check that the station returns back to normal AC operation.

Also, the two front mounted 120VAC at 4 Amps max AC receptacles are only available on the PS103010V120, and are intended for use only as convenience outlets for service personnel. The use of these outlets for any other purpose is not recommended or supported by the manufacturer.

NOTE

The two front mounted (120VAC version only) service receptacles are only intended for use as convenience outlets for service personnel. Any other use IS NOT recommended.

Also, it is not recommended to use the PS103010V120 in applications above the rated nominal input voltage of 120 VAC. The service receptacles on the front panel are passively connected to the AC input connector via board connections. No over-voltage protection or regulation is provided for the front panel receptacles. Severe damage to equipment connected to the receptacles, and personal injury may occur when the rated input voltage is exceeded.

WARNING

THE PS103010V120 PSU IS ONLY INTENDED FOR 120 VAC OPERATIONS.

DO NOT operate the PS103010V120 above the rated nominal voltage of 120 VAC. Severe damage to equipment connected to the front mounted service receptacles may occur, resulting in possible equipment failures and personal injury.

5. MAINTENANCE

Disassembly and/or field service is not recommended. A tamper-resistant warranty label has been placed on the unit. Opening the unit will damage the label and void the product warranty. The unit should be returned to Harris for factory service. When replacing any component such as power cords, cables, and fuses, be certain to use an identical component.

The front panel ON/OFF switch only disables the DC output voltages. **High Voltages** are present within the Power Supply even with the ON/OFF switch in the OFF position.

Field service is not recommended for this product. To avoid electrical shock disconnect power supply from the AC input power source before removing or replacing any component or assembly. NEVER remove access covers with the AC power cord plugged into an AC source.

5.1 TROUBLESHOOTING

Since field service is not recommended. Troubleshooting should be limited to the isolation of the source of faults, and factory service or power supply replacement where required. The troubleshooting procedure in Table 1 may be helpful in isolating sources of failure, both internal and external to the power supply unit. When a failure has occurred be sure to check associated circuitry for damaged components before applying power to the equipment. Remember to always follow general safety practices when working around high voltage and current power devices. Always remove any jewelry and wear safety goggles!

The design concept of the Switching Power Supply is to provide interruption free performance while protecting both the power supply and supporting equipment thereby limiting the potential for catastrophic failures. The power supply incorporates the latest state-of-the-art design and safety features including under-voltage, over-voltage, and over-current protection circuitry. Understanding these features will aid in the systematic troubleshooting of the entire system.

5.1.1 AC Input Protection

The power supply incorporates an AC Input Under-Voltage protection mode. If the AC input voltage drops within the limits of 65VAC-84VAC the unit should shutdown thereby disabling the output voltages at J801, F801A, and J803. When the AC Input voltage becomes greater than 85 VAC the supply will resume normal operation.

5.1.2 DC Output Protection

The power supply is protected against over-voltage due to possible internal regulation failure. The power supply output will latch "OFF" under this condition. The fault must be removed and the AC power to the station recycled to restore the DC outputs.

5.1.3 Status Signaling (Alarm Output)

Power supply provides a status indicator output. In the event of an AC power or fan failure this output can be used to provide signaling to alarm or status inputs within the MASTR III Base station. This output is designed to provide a positive feedback loop for alarm inputs. An Alarm status condition could also be generated by a loss of loop (wiring connections).

This status indicator output monitors both the AC input and fan status. When proper AC power is present at the AC Input to the power supply, and the speed monitoring circuitry for both fans are satisfied, 26.5VDC will be present at J801-7. When no AC power is present at the AC Input J801-7 has 0VDC present.

The power supply is protected against over-voltage due to internal regulation failure. The output will latch "OFF" under this condition. The fault must be removed and the AC recycled to restore the DC outputs.

5.1.4 Ambient Temperature Protection

Power Supply operation during conditions in excess of the specified ambient temperature may impair the performance of the power supply. The power supply is protected against operating in ambient conditions in excess of the specified ambient ratings. The power supply outputs will latch "OFF" before any damage occurs.

5.2 ADJUSTMENTS AND CONNECTIONS

The 27.2VDC and 13.6VDC power supply sections have no user adjustments. A potentiometer for adjusting the float voltage of the battery charging circuit is accessible through an opening in the top cover of the power supply assembly and can be tuned using an insulated 2mm flat tip tuning tool. Battery manufacturers usually specify a float voltage with regard to ambient room temperature and other factors. Adjustments should be made in accordance with the data supplied by the battery manufacturer.

The rear panel connections are conveniently labeled as shown in Figure 5-1. Refer to the appropriate station manual for specific hookup instructions. All cable restraints and connector latches should be properly utilized to prevent accidental disconnection of cables, and to further reduce unnecessary stress on the cable and connector assemblies. Any cables or connectors showing signs of damage should be promptly replaced to prevent further damage to the power supply or other associated equipment.

5.2.1 27.2VDC Connection (F801A)

Power supply connections F801A-1 (+Positive) and F801A-2 (-Negative) provide a 27.2VDC at 15 amps connection point. This output is typically used to power the RF Power Amplifier in MASTR III Base Stations.

A 30 amp fuse (F2) is used as a secondary safety device in the event that the over-current protection circuit fails to protect the supply and connected equipment. However, the built-in over-current and over-voltage protection circuit is the main protection device for this section of the power supply, and should provide adequate protection from most overload conditions.