# VMIVME-PS9-80/10

## 500 WATT POWER SUPPLY

### INSTRUCTION MANUAL

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**VME MICROSYSTEMS INTERNATIONAL CORPORATION**
**12090 SOUTH MEMORIAL PARKWAY**
**HUNTSVILLE, AL 35803-3308**
**(205) 880-0444**
**1-800-322-3616**
**FAX NO.: (205) 882-0859**

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## RECORD OF REVISIONS

| REVISION LETTER | DATE | PAGES INVOLVED | CHANGE NUMBER |
|---|---|---|---|
| A | 09/27/94 | Release | 94-0796 |

# VMIC
# SAFETY SUMMARY

**THE FOLLOWING GENERAL SAFETY PRECAUTIONS MUST BE OBSERVED DURING ALL PHASES OF THE OPERATION, SERVICE, AND REPAIR OF THIS PRODUCT. FAILURE TO COMPLY WITH THESE PRECAUTIONS OR WITH SPECIFIC WARNINGS ELSEWHERE IN THIS MANUAL VIOLATES SAFETY STANDARDS OF DESIGN, MANUFACTURE, AND INTENDED USE OF THIS PRODUCT. VME MICROSYSTEMS INTERNATIONAL CORPORATION ASSUMES NO LIABILITY FOR THE CUSTOMER'S FAILURE TO COMPLY WITH THESE REQUIREMENTS.**

## GROUND THE SYSTEM

To minimize shock hazard, the chassis and system cabinet must be connected to an electrical ground. A three-conductor AC power cable should be used. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet.

## DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the system in the presence of flammable gases or fumes. Operation of any electrical system in such an environment constitutes a definite safety hazard.

## KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove product covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

## DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

## DO NOT SUBSTITUTE PARTS OR MODIFY SYSTEM

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to VME Microsystems International Corporation for service and repair to ensure that safety features are maintained.

## DANGEROUS PROCEDURE WARNINGS

Warnings, such as the example below, precede only potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

**WARNING**

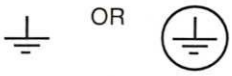
**DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS SYSTEM. USE EXTREME CAUTION WHEN HANDLING, TESTING, AND ADJUSTING.**

# SAFETY SYMBOLS

## GENERAL DEFINITIONS OF SAFETY SYMBOLS USED IN THIS MANUAL

Instruction manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the system.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts are so marked).

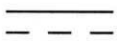



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. Before operating the equipment, terminal marked with this symbol must be connected to ground in the manner described in the installation (operation) manual.


Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

Alternating current (power line).



Direct current (power line).

Alternating or direct current (power line).

**WARNING**

The WARNING sign denotes a hazard. It calls attention to a procedure, a practice, a condition, or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, a practice, a condition, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the system.

NOTE:

The NOTE sign denotes important information. It calls attention to a procedure, a practice, a condition or the like, which is essential to highlight.

# VMIVME-PS9-80/10
# 500 WATT POWER SUPPLY

## TABLE OF CONTENTS

# SECTION 1

# INTRODUCTION

## 1.1 FUNCTIONAL DESCRIPTION

The VMIVME-PS9-80/10 Power Supply is an advanced, high reliability power conversion unit providing high power density. The VMIVME-PS9-80/10 Power Supply meets or exceeds many of today's stringent international safety and EMI standards.

Improvements in electrical, mechanical, and heat transfer technology allow component stresses to be kept well within manufacturer's conservative ratings, ensuring high reliability. Over 100,000 hours Mean Time Between Failure (MTBF)/MIL-HDBK-217.

**NOTE:**

**THE VMIVME-PS9-80/10 POWER SUPPLY MUST HAVE THE VENTILATION INLET AND OUTLET REGION UNOBSTRUCTED. ALWAYS ALLOW FOR PROPER AIRFLOW COOLING OF THE POWER SUPPLY.**

# SECTION 2

# PHYSICAL DESCRIPTION AND SPECIFICATIONS

## 2.1 PHYSICAL DESCRIPTION

The VMIVME-PS9-80/10 Switching Power Supply is made of channeled frame construction, housed on and in an anodized aluminum case. Ventilation cutouts facilitate convection and forced airflow cooling. Mounting of the VMIVME-PS9-80/10 Switching Power Supply is aided by matching predrilled holes for mounting to the side panels at the back of a VMIC chassis. The VMIVME-PS9-80/10 Power Supply is intended for use with stationary equipment only. The VMIVME-PS9-80/10 Power Supply has a deadweight of less than eight pounds.

## 2.2 MECHANICAL SPECIFICATIONS

The VMIVME-PS9-80/10 Power Supply is mechanically compatible with several VMIC chassis, racks, and other power supplies. The VMIVME-PS9-80/10 Power Supply generates approximately 561 BTU per hour of dissipating heat, depending largely on the line-voltage level and DC loading level of the power supply. DC output stud bolts are size 1/4-20 and should be torqued to 60-inch pounds respectively to ensure low resistance connections.

## 2.3 ELECTRICAL AC SPECIFICATIONS

The VMIVME-PS9-80/10 Power Supply is available for CONTINENTAL power of 220 V ±40 Vrms alternating current of 50 Hz ±3 Hz line frequency or U.S. DOMESTIC power of 110 V ±20 Vrms alternating current of 60 Hz ±3 Hz line frequency.

The VMIVME-PS9-80/10 Power Supply is shipped with the frequency and current limits preset and sealed. Improper adjustments of these controls will cause damage to the power supply and/or the loading circuits. Tampering or alteration of these adjustments is not recommended; refer such adjustments and other servicing to VMIC's factory service.

The VMIVME-PS9-80/10 Power Supply is shipped per customer's order for CONTINENTAL 220 V 50 Hz power line operation or for U.S. DOMESTIC 110 V 60 Hz power line operation. The AC power cord is terminated with a standard NEMA 5-15 type cord cap plug for U.S. DOMESTIC power service. The input AC power cord provided for CONTINENTAL service is not supplied with a cord cap. A cord cap must be furnished by the user.

Efficiency is typically eighty percent (80%). The dielectric withstand voltage is 3,750 Vrms input-to-chassis or 700 VDC output-to-chassis. The AC

input surge protection is 12 ASB internal fuse, soft start inrush AC current is <80 A at 115 VAC or <20 A at 230 VAC. The AC undervoltage has proprietary proportional drive and bias bootstrap protection against damage for undervoltage operation. Brownout protection for DOMESTIC versions is 85 VAC and 170 VAC for CONTINENTAL. Capacitive coupling provides approximately 2 mA to ground at normal line voltage. Thermal powerdown circuits cut off the power supply in case of local overtemperature. The unit resets automatically if excess temperature abates.

**NOTE:**

**PLEASE REFER TO APPENDIX A FOR ASSEMBLY DRAWINGS, PARTS LIST, AND SCHEMATIC.**

## 2.4 ELECTRICAL DC SPECIFICATIONS

The VMIVME-PS9-80/10 Power Supply is electrically compatible with a wide variety of VMIC products. A unique feature of the VMIVME-PS9-80/10 Power Supply is the soft DC start ability that protects critical load circuit components when powering-up a system; thus, prolonging circuit integrity. Stability is .1% over 8 hours after a 30 minute warm-up.

The conversion frequency is around 44 kHz. The DC load regulation is typically one percent (1%) from zero (0) to maximum rated values. The ripple noise is typically 100 mV, .2 percent rms, or 1 percent pp, whichever is greater. The dynamic response peak transient is less than 1 percent for step-load change from 0 to 50 percent or 100 percent maximum ratings. Within 500 µsec, the VMIVME-PS9-80/10 Power Supply DC output voltage regulation tolerance is .1 percent on main output. The DC power sense is +5 V, open sense protected.

The DC sustaining is typically 16 msec after loss of normal AC power, thus minimizing stress to delicate electronic circuits. Recovery time is 500 µsec to recover to within 1 percent of adjusted output. A minimum DC load of 10 percent is required on main output for optimum control and system performance. The maximum DC load is 80 A on 5 V and 10 A on 12 V not to exceed 110 percent per output.

Overvoltage protection is provided. The DC output current overload is protected by foldback current limiting with automatic recovery upon fault removal. DC reverse voltage protection is provided against voltage applied across output terminals up to rated voltage and current. The DC bleed-down is resistive, automatic, and dynamic.

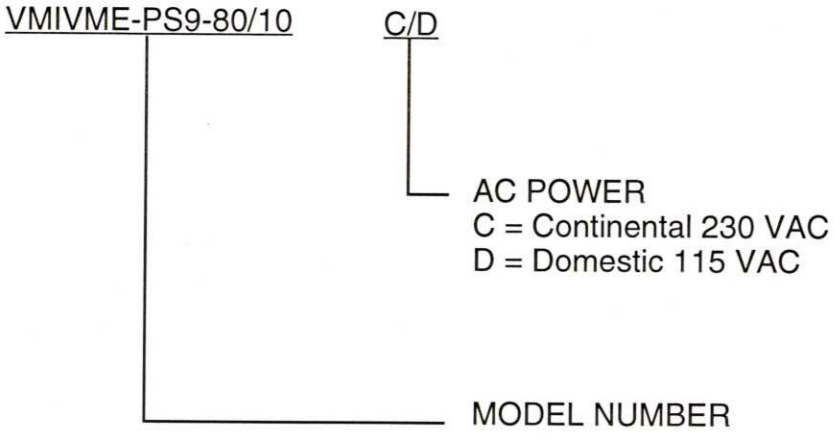
Overtemperature DC power shutdown, and automatic recovery will function when the power supply overheats because of overload endurance, or insufficient cooling air circulation, thus causing heat build-up.

The triple DC output is ±12 V 10 A per output with 2 common returns and a 5 V 80 A output. The combined output power is not to exceed 500 watts total.

## 2.5 ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Safety: | The VMIVME-PS9-80/10 Power Supply meets or exceeds the following specs: UL 1950, UL 478, CSC 22.2 154, IEC 950, IEC 435, VDE 805, 806, and EN 60 950. |
| Shock and Vibration: | MIL-STD-810-D, Method 516.3 Procedure III, Category 1. |
| RFI: | FCC Part 15 Sub J, VDE 0871 Class A. |
| Static Storage: | -40 to 85 °C. |
| Dynamic Operation: | 0 to 50 °C. Derate to 1/2 power at 70 °C. |
| Temperature Coefficient: | .02 percent/°C. |

## 2.6 ORDERING INFORMATION



# SECTION 3

# ADJUSTMENTS

## 3.1 ADJUSTMENTS

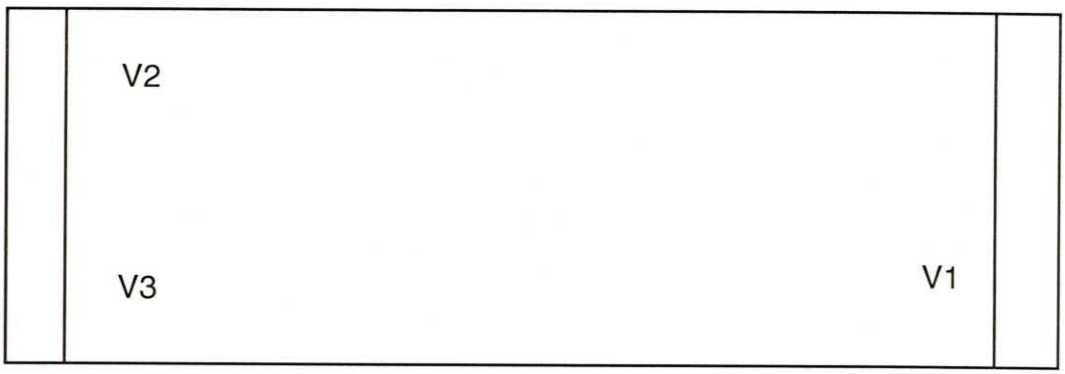
The VMIVME-PS9-80/10 Power Supply is shipped with preadjusted DC voltages set to nominal 5.00 V ±.01 and 12.00 V ±.02. The power supply DC output voltages may be readjusted ±5 percent by the "DC ADJ" pots if needed.

## 3.2 REQUIRED EQUIPMENT, TOOLS, AND TEST POINTS

a. Nonmetallic adjustor, flat-blade screwdriver type
b. Quality digital voltmeter; 3 1/2 digits or better
c. Metering test points are DC-bus tie-point(s) on the backplane

**NOTE:**

**PLEASE REFER TO THE APPENDIX FOR ASSEMBLY DRAWING, PARTS LIST, AND SCHEMATIC.**




DC ADJUSTMENT LOCATION

# SECTION 4

# ACCESSORIES CONFIGURATION AND INSTALLATION

## 4.1 UNPACKING PROCEDURES

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**********
*  CAUTION  *
**********
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**SOME OF THE COMPONENTS ASSEMBLED ON VMIC'S PRODUCTS MAY BE SENSITIVE TO ELECTROSTATIC DISCHARGE AND DAMAGE MAY OCCUR ON BOARDS THAT ARE SUBJECTED TO A HIGH ENERGY ELECTROSTATIC FIELD. UNUSED BOARDS SHOULD BE STORED IN THE SAME PROTECTIVE BOXES IN WHICH THEY WERE SHIPPED. WHEN THE BOARD IS TO BE LAID ON A BENCH FOR CONFIGURING, ETC., IT IS SUGGESTED THAT CONDUCTIVE MATERIAL BE INSERTED UNDER THE BOARD TO PROVIDE A CONDUCTIVE SHUNT. APPROVED ESD PROCEDURES ARE RECOMMENDED WHEN HANDLING VMIC PRODUCTS.**

Upon receipt, any precautions found in the shipping container should be observed. All items should be carefully unpacked and thoroughly inspected for damage that might have occurred during shipment. The product(s) should be checked for broken components, damaged circuit board(s), heat damage, and other visible contamination. All claims arising from shipping damage should be filed with the carrier and a complete report sent to VMIC, together with a request for advice concerning the disposition of the damaged item(s).

## 4.2 PHYSICAL INSTALLATION

### 4.2.1 Installation

The VMIVME-PS9-80/10 Power Supply power module is mounted to the universal mounting chassis. The entire VMIVME-PS9-80/10 Power Supply assembly can be mounted to the back of the VMIC VMEbus standard chassis (Model VMIVME-120 or equivalent). SS 8-32 bolting hardware is provided. Matching No. 8 holes must be drilled by the user to match predrilled mounting holes of the VMIVME-PS9-80/10 Power Supply universal chassis. The VMIVME-PS9-80/10 Power Supply chassis is formed to fit the connector protector protrusions of the VMEbus chassis which provides excellent support for the VMIVME-PS9-80/10 Power Supply. Before drilling the matching holes, remove all of the VMEbus boards from the chassis slots, always exercising good ESD safety procedures when handling PC boards.

Suggestion: Masking tape around and over the spot to be drilled will help contain most of the drilling debris. After securing the VMIVME-PS9-80/10 Power Supply to the chassis, connect the black wires to the DC GND connecting points of the chassis backplane. Connect the remaining wires as required.

## 4.3 BEFORE APPLYING POWER: CHECKLIST

a. Verify that the intended AC power source matches the power specified on the name plate.

b. Verify that the DC polarity is properly connected.

c. Connect the VMIVME-PS9-80/10 Power Supply to the proper AC power as indicated on the input power ID plate located on the back of the universal chassis near the input power connector. With a 3 1/2-digit or better DVM, verify that the DC voltage is correct, then turn the power OFF before inserting the VMEbus boards into their respective locations. (Refer to Section 3 for power supply adjustment procedures.)

d. After inserting the VMEbus boards, turn the AC power ON and verify the DC voltage again. After a five-minute stabilization, the power supply DC adjustment potentiometer can be adjusted to read 5.00 ±.01 V and 12.00 ±.02 V on the DVM.

## 4.4 DC POWER WIRING HARNESS

DC power wiring harness for the VMIVME-PS9-80/10 Power Supply is three each, 10 AWG gauge multistrand wire, nonterminated. Termination must be supplied by the user.

**NOTE:**

**PLEASE REFER TO THE APPENDIX FOR ASSEMBLY DRAWING, PARTS LIST, AND SCHEMATIC.**

# SECTION 5

# MAINTENANCE

## 5.1 MAINTENANCE

This section provides information relative to the care and maintenance of VMIC's products. If the products malfunction, verify the following:

a. Software
b. System configuration
c. Electrical connections
d. Jumper or configuration options
e. Boards are fully inserted into their proper connector location
f. Connector pins are clean and free from contamination
g. No components of adjacent boards are disturbed when inserting or removing the board from the chassis
h. Quality of cables and I/O connections

If the products must be returned, contact VMIC for a Return Material Authorization (RMA) Number. **This RMA Number must be obtained prior to any return.**

## 5.2 MAINTENANCE PRINTS

User-level repairs are not recommended. The appendix to this manual contains drawings and diagrams for reference purposes only.

# APPENDIX A

# ASSEMBLY DRAWINGS, PARTS LIST, CABLE DRAWINGS, LAYOUTS, AND SCHEMATICS