Liebert

UPStation$^{®}$ S3 Options
Three Phase
12 kVA to 24 kVA; 50 and 60 Hz

**User
Manual**

Liebert$^{®}$

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IMPORTANT SAFETY INSTRUCTIONS

Save These Instructions.

This manual contains important safety instructions that should be followed during installation and maintenance of the options packages for the UPStation S3 UPS. Before you begin the installation process for any option, we recommend that you read through these safety precautions and read the option installation instructions. Take all necessary safety precautions to protect yourself and the equipment you are about to install.

⚠ WARNING
LETHAL VOLTAGES MAY BE PRESENT WITHIN THIS UNIT EVEN WHEN IT IS APPARENTLY NOT OPERATING. OBSERVE ALL CAUTIONS AND WARNINGS IN THIS MANUAL. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

REFER UNIT TO QUALIFIED SERVICE PERSONNEL IF MAINTENANCE IS REQUIRED. DO NOT WORK ON THIS EQUIPMENT UNLESS YOU ARE FULLY QUALIFIED TO DO SO. NEVER WORK ALONE.

⚠ WARNING
WHEN INSTALLING OPTIONS IN A UPSTATION S3 UPS WITHOUT A MAINTENANCE BYPASS, BE SURE TO DISCONNECT ALL POWER TO THE UPS. REMOVE POWER COMPLETELY FROM THE UPSTATION S3 BY PERFORMING AN ORDERLY SHUTDOWN OF THE UPS LOAD. NEXT, TURN OFF THE BATTERY CIRCUIT BREAKER THEN TURN OFF THE CIRCUIT BREAKER THAT SUPPLIES POWER TO THE UPSTATION S3 AT THE BUILDING FEEDER.

⚠ WARNING
DO NOT BLOCK THE POWER TRAY EXHAUST AREA LOCATED DIRECTLY BELOW THE MOUNTING BRACKET. BLOCKAGE CAN CAUSE SERIOUS DAMAGE TO THE EQUIPMENT. PLAN CABLE ROUTING CAREFULLY USING THE SLOTTED CABLE TRAYS ABOVE AND BELOW THE MOUNTING BRACKETS WHEN POSSIBLE. SECURE LOOSE CABLE WITH THE TIES AND CLAMPS PROVIDED.

⚠ WARNING
WHEN INSTALLING AN OPTIONAL POWER SUPPLY, BE SURE TO DISCONNECT INPUT POWER TO THE UPS AND OPEN THE BATTERY CIRCUIT BREAKER.

⚠ WARNING
WHEN REMOVING POWER FROM THE UPS, ALLOW FIVE MINUTES FOR CAPACITORS TO DISCHARGE BEFORE WORKING ON THE EQUIPMENT.

⚠ CAUTION
This equipment complies with the requirements in Part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause interference to radio and TV reception, requiring the operator to take whatever steps necessary to correct the interference.

⚠ CAUTION
Do not put option control wiring in the same conduit as the UPS input or output power cables. Use the slots in the cable tray to create stress-relief loops for the wires whenever possible.

1.0 INTRODUCTION

The Liebert UPStation S3 uninterruptible power supply (UPS) system protects your valuable equipment, data, and processes from the consequences of disturbances in the utility power source. This UPStation S3 Options User's Manual describes the options available for the UPS and gives detailed installation and operating instructions for each.

To enhance the flexibility and performance of your UPStation S3 UPS, Liebert offers several features and options that can be ordered as standard equipment or purchased separately and field-installed by you or by a qualified Liebert Customer Service and Support technician or Liebert distributor. Options include:

- Power Supply*
- Remote Status Panel
- Programmable Relay Board
- Input Contact Isolator (ICI)*
- DC Ground Fault Detector*
- SNMP (Ethernet or Token Ring)
- Modem

The UPStation S3 cabinet has a dedicated area where option hardware must be installed. A mounting bracket provides five slots designed to accommodate the options for proper and convenient installation. The Remote Status Panel option does not use the mounting bracket for its installation.

Table 1 and the notes below the table summarize the special requirements of each option.

Table 1   Option Requirements

Option	Mounting Slots Required	Logic Connection	Input Contact Isolator Option	Power Supply Option Required
Power Supply*	Yes (if installed separately)	—	—	—
Remote Status Panel	No	—	—	Yes
Programmable Relay (2 boards max.)	Yes (one for each board installed)	1 connection	—	—
Input Contact Isolator (w/ Power Supply)*	Yes	1 connection	—	Included on board
DC Ground Fault Alarm*	Yes	—	1 channel	—
SNMP (Ethernet or Token Ring)	Yes	1 connection	—	—
Internal Modem	Yes	1 connection	—	—

* These options require complete shutdown of the UPS system if installing or already installed. (See **1.1 - Opening the UPStation S3.)** All other options can be installed while the UPS is on bypass.

Notes:
1. You must install a mounting rack if an option you intend to install requires a mounting slot. The mounting rack has five mounting slots.
2. If a DC Ground Fault Detector is installed, an Input Contact Isolator is also required. The Input Contact Isolator has eight input channels and a power supply.
3. The SNMP (Ethernet or Token Ring) and Internal Modem options each use one logic connection. Two logic connections are available, therefore, some option combinations are not possible.
4. Only one logic connection is required for any combination of one or two Programmable Relay boards and/or an Input Contact Isolator.
5. Up to three Remote Status Panels can be connected to an UPStation S3. One Power Supply and a Programmable Relay option are required.
6. Options requiring a Power Supply option can use the power supply mounted on the Input Contact Isolator option if one is installed.

1.1   Opening the UPStation S3

All of the UPStation S3 options require internal access to the unit for installation and wiring purposes. If you intend to install multiple options, we recommend you open the unit once and install all options at the same time. Before you begin the installation process, you must read through these instructions and the installation procedures for each option, taking all necessary safety precautions to protect yourself and the equipment you are about to install.

Figure 1   UPStation S3 Front and Option Area Access
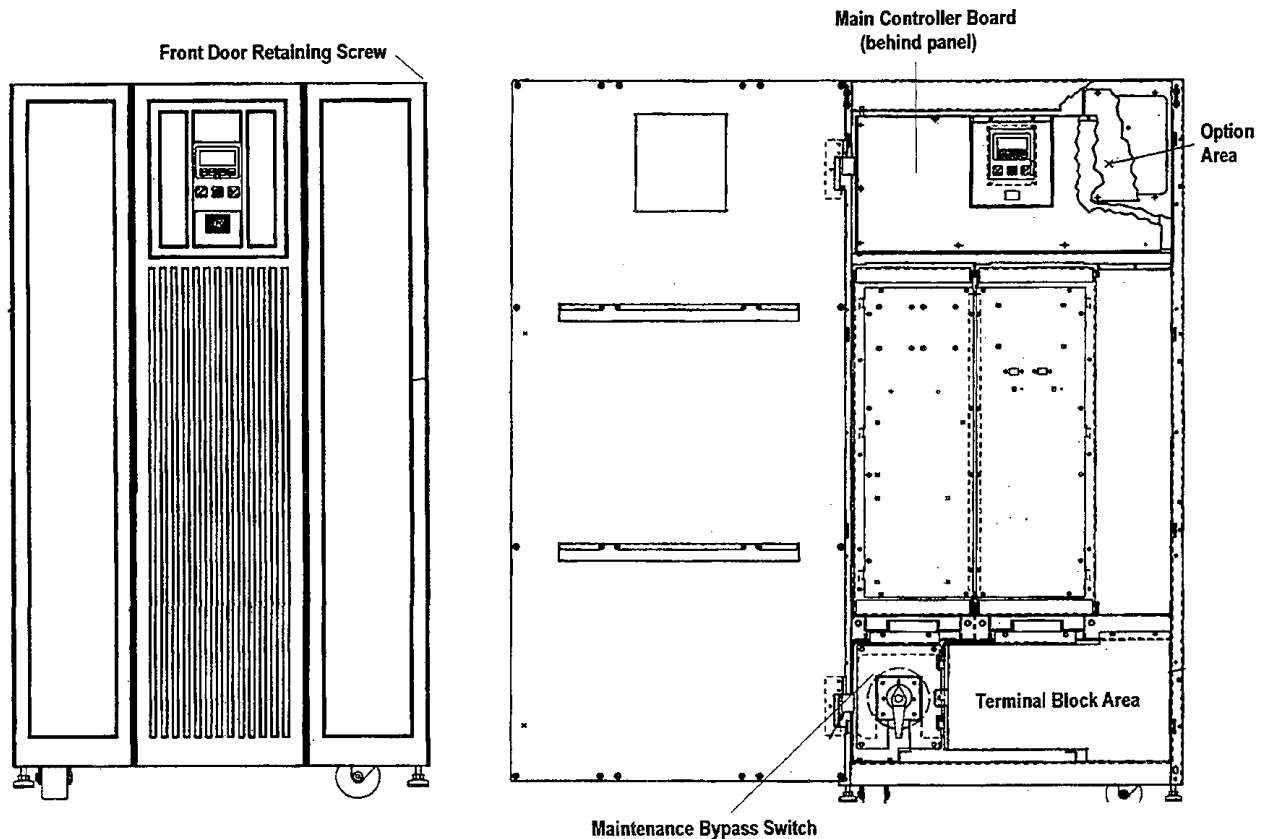
To open the UPS and access the option installation area:

1. Disconnect the battery from the UPS by switching the battery circuit breaker off.

2. Loosen the retaining screw located in the upper right top corner of the UPStation S3 and open the front door on its hinges (see **Figure 1).** If it is more convenient to work with the front door completely removed, lift the door from its hinges, disconnect the grounding strap and lay the door aside while you install options.

3. Set the UPStation S3 to Bypass (if equipped with a Maintenance Bypass Switch), or remove power to units not equipped with a Maintenance Bypass switch.

   For Units With Maintenance Bypass - Locate the Maintenance Bypass Switch behind the front door in the lower left hand corner of the module. Turn the switch from the Maintenance position through to the Bypass position, pausing at each switch position (refer to Section 3.5 of the UPStation S3 User's Manual). With the switch in the Bypass position, power is supplied to the load by the utility; however, power is not supplied to the option installation area in the UPStation S3.

   ⚠ **CAUTION**
   The area adjacent to the Maintenance Bypass switch where the terminal blocks are located will remain energized with line and load voltages.

For Units Without Maintenance Bypass - Remove power completely from the UPStation S3 by performing an orderly shutdown of the UPS load. Next, turn off the circuit breaker that supplies power to the UPStation S3 at the building feeder.

⚠️ **WARNING**

IF YOU ARE INSTALLING A POWER SUPPLY, INPUT CONTACT ISOLATOR, AND/OR DC GROUND FAULT OPTION, OR IF ANY OF THESE OPTIONS HAVE ALREADY BEEN INSTALLED, REMOVE POWER COMPLETELY FROM THE UPSTATION S3 FOLLOWING THE INSTRUCTIONS FOR UNITS WITHOUT MAINTENANCE BYPASS (ABOVE).

4. Allow five (5) minutes for capacitors to discharge.
5. With the front door open, access the main controller and option installation area (see **Figure 1).** To do this, remove the ten screws securing the main controller cover plate. (Do not remove the two screws above the display.) Remove the cover plate and set aside. Then remove the two screws on the right hand side of the main controller assembly which allows the assembly to swing open. Swing open the main controller assembly. This gives access to the option area. Be sure to retain all screws and hardware.

1.2   Installing the Mounting Bracket

Each UPStation S3 option is installed internally or requires another internally-installed option. The option mounting bracket provides for safe and convenient installation and must be installed before you add any other options, even if you only plan to install one option.

With the unit open giving access to the option installation area, install the mounting bracket in the front of the unit as follows:

1. Attach the crossmember supports.
   - Orient the two crossmember supports at the left side of the UPS with the flange facing toward center of the UPS and the support behind the corner posts as shown in **Figure 2.**

Figure 2   Mounting Bracket Installation
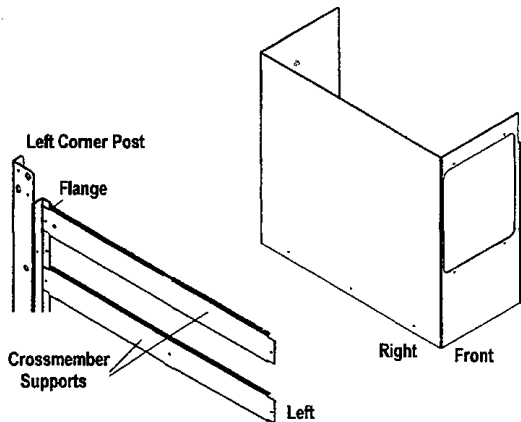
   - Align the holes of the crossmember with the corresponding holes of the UPS corner post and attach the crossmembers at the front and rear of the unit. Four 8-32 x 1/2 thread forming screws are provided with the bracket kit. Mounting holes on the UPS corner post are located four inches and nine inches from the top of the UPS.

2. Attach the three option guides (provided with the bracket kit). The option guides mount to the crossmember supports on the left and to the inside surface of the UPS on the right.
    - Position the top and bottom option guides as shown in **Figure 3.**

Figure 3   Option Guides
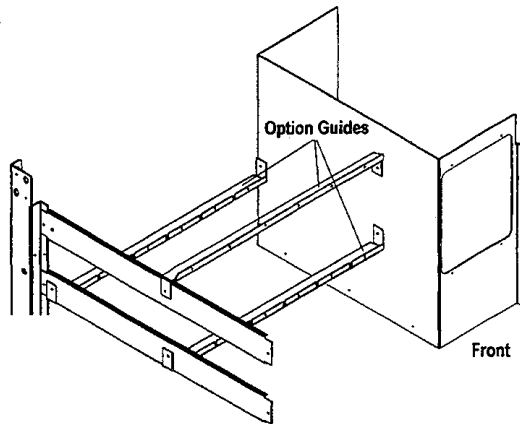
- Attach the option guides on the right and left with the six 8-32 x 1/2 thread forming screws provided with the bracket kit.
3. Attach the cable track and cable track cover.
    - Measure and cut the cable track into two lengths of 18 inches. Do the same for the cable track cover.
    - Apply double-sided adhesive tape to the back of one length of the cable track and press it firmly into place on top of the upper-front option guide as shown in **Figure 4.**

Figure 4   Cable Track
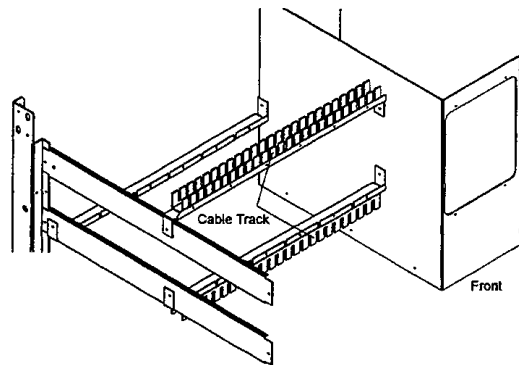
- Apply double-sided adhesive tape to the back of the other length of the cable track and press it firmly into place on bottom of the lower-front option guide as shown in **Figure 4.**

The option mounting bracket is now installed and you are ready to install the UPStation S3 options. To secure an option board in the mounting bracket, slide the assembly into an open slot and secure the option with screws in the top and bottom of the front support. Run all wires through the cable track to the right side of the UPStation S3, then run them down the unit through the conduit along the right panel.

Leave the UPS open and refer to the following sections of this manual for detailed installation and operating instructions for the UPStation S3 options.

1.3 Closing and Restarting the UPStation S3

When all options have been installed, perform the following steps to restore power to the UPStation S3 and its load.

1. Close the swing-out door assembly and replace all screws and protective panels.
2. Reattach the grounding strap and rehang the front door if it was removed.
3. Close the battery breaker.
4. Restore power to the UPStation S3, and the load.

   For units with Maintenance Bypass Switch, return the switch to the Maintenance position, making sure to pause at each position as you move the switch. If the UPS has Auto-restart enabled, it will automatically begin the start-up sequence. The start-up is complete when the screen reads "Normal Operation", "Maintenance". Now turn switch to the UPS position.

   If the UPS has Auto-restart disabled, leave the switch in Maintenance position until screen reads, "Press On To Start". Press ON and wait until screen reads, "Normal Operation", "Maintenance". Now turn switch to the UPS position.

   For units whose power has been disconnected at the building feeder breaker, close the feeder breaker. If Auto-restart is enabled, the UPStation S3 automatically performs the start-up sequence until the display reads "Normal Operation." If Auto-restart is disabled press the ON button.
5. Close the front door and tighten the retaining screw in the upper right-hand corner of the door.
6. Restart loads that were disconnected during the option installation process.

2.0 POWER SUPPLY

2.1 Introduction

The Power Supply is an additional power source that supplies +24 V power to one or more of the Liebert UPStation S3 options. If you have ordered an Input Contact Isolator option, the power supply is mounted on the Input Contact Isolator board at the factory. If you need to field-install a power supply, it can be installed on the Programmable Relay Board. Otherwise, it can be a stand-alone option taking up one slot in the option mounting bracket.

2.2 Installing the Power Supply Option

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install. Observe all warnings and cautions listed in the front of this manual when wiring the power supply option.

> ⚠️ **WARNING**
>
> **WHEN INSTALLING THE POWER SUPPLY IN AN UPSTATION S3 UPS (WITH OR WITHOUT MAINTENANCE BYPASS):**
>
> 1. **BE SURE TO DISCONNECT ALL UTILITY POWER TO THE UPS.**
> 2. **DISCONNECT THE BATTERY FROM THE UPS BY SWITCHING THE BATTERY CIRCUIT BREAKER OFF.**
> 3. **TURN THE BREAKER OFF UPSTREAM OF THE UPS.**
> 4. **WAIT 5 MINUTES FOR CAPACITORS TO DISCHARGE.**
>
> **FOLLOW THE INSTRUCTIONS GIVEN IN 1.0 - INTRODUCTION OF THIS MANUAL.**

2.2.1 Connect the Power Supply to an UPStation S3 Option Board

1. If you are using the power supply with a Programmable Relay/Remote Status Panel combination, or if you need the power supply for another option, mount the power supply to the Programmable Relay option as shown in **Figure 5.**

Figure 5   Mounting the Power Supply Option
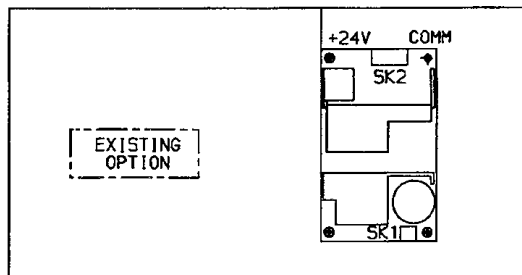
2. Install the power supply terminal block (supplied with the power supply option) to the front of the option plate. Refer to **Figure 6.**

Figure 6   Power Supply Option and Power Supply Terminal Block
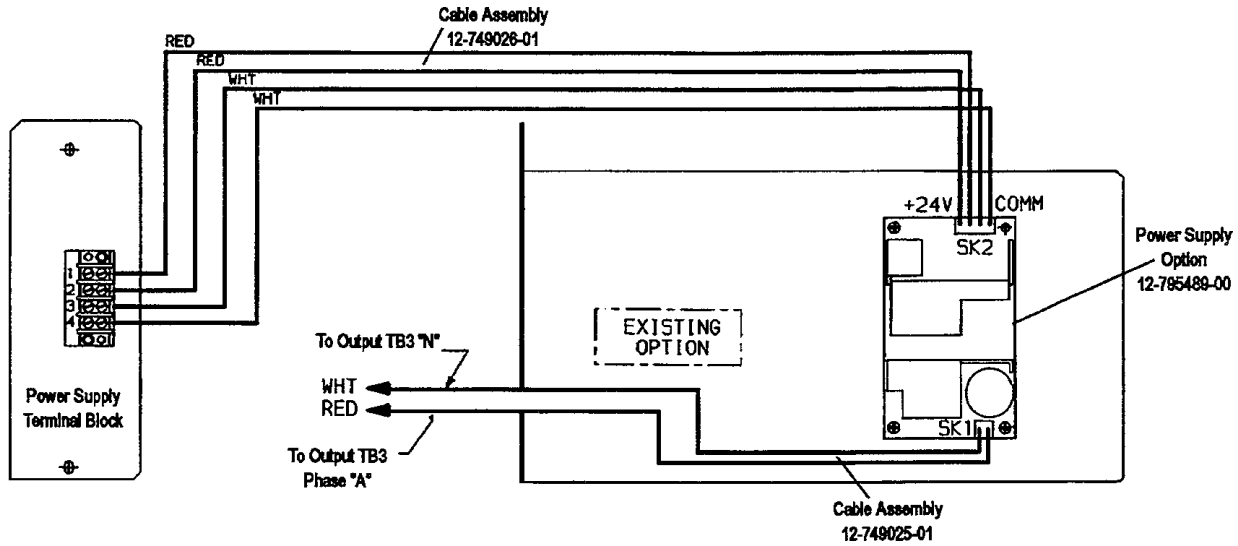
3. Connect the 6-pin end of cable assembly 12-749026-01 to the DC output connector (SK2) on the Power Supply option. Refer to **Figure 6.**
4. Connect the red wires of cable assembly 12-749026-01 to the connector locations labeled 1 and 2 on the power supply terminal block.
5. Connect the white wires of cable assembly 12-749026-01 to the connector locations labeled 3 and 4 on the power supply terminal block.
6. Connect the 3-pin end of the cable assembly 12-749025-01 to AC input connector (SK1) on the Power Supply option. Refer to **Figure 6.**
7. Guide the other end of cable assembly 12-749025-01 out through the grommet in the front of the option panel as shown in **Figure 7.** Do not make any connections with these ends at this time.
8. Insert this assembly into one of the open option slots and secure as described in **1.0 - Introduction.**

Figure 7   UPS (Output) Terminal Block Cable Routing and Wiring Connections
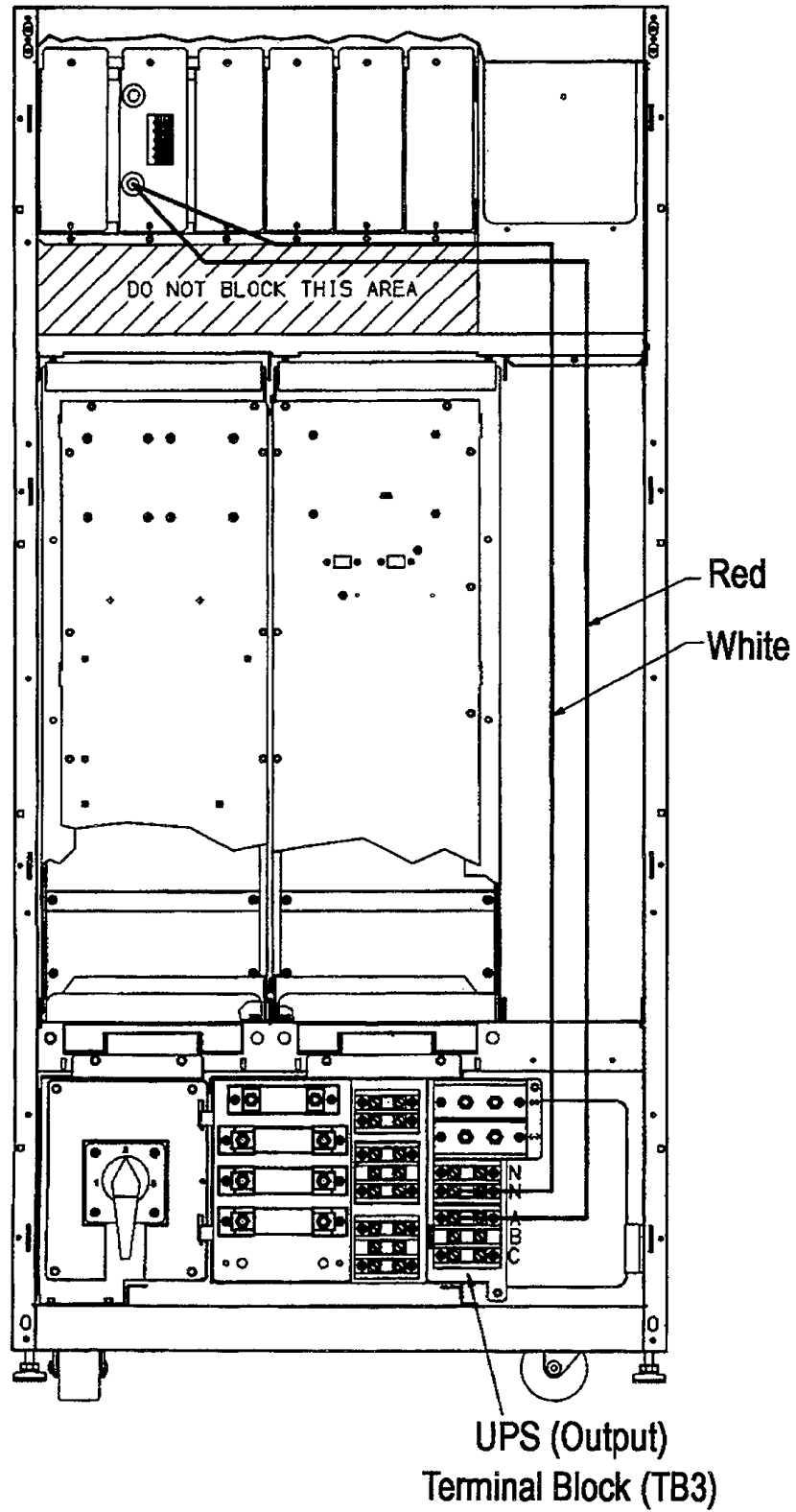
2.2.2   Output Terminal Block Wiring Connections

Please refer to **Figure 7** when making the wiring connections to the UPS (output) terminal block.

⚠️ **WARNING**
WHEN INSTALLING THE POWER SUPPLY IN AN UPSTATION S3
UPS (WITH OR WITHOUT MAINTENANCE BYPASS):

1. **BE SURE TO DISCONNECT ALL UTILITY POWER TO THE**
   UPS.
2. **DISCONNECT THE BATTERY FROM THE UPS BY**
   SWITCHING THE BATTERY CIRCUIT BREAKER OFF.
3. **TURN THE BREAKER OFF UPSTREAM OF THE UPS.**
4. **WAIT 5 MINUTES FOR CAPACITORS TO DISCHARGE.**
   FOLLOW THE INSTRUCTIONS GIVEN IN 1.0 - INTRODUCTION
   OF THIS MANUAL.

1. Connect the red wire of cable assembly 12-749025-01 (from the AC input connector (SK1) on the Power Supply option) to Phase A of the UPS (output) terminal block.
2. Connect the white wire of cable assembly 12-749025-01 (from the AC input connector (SK1) on the Power Supply option) to neutral connector on the UPS (output) terminal block.

The Power Supply option is now installed. To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

3.0 REMOTE STATUS PANEL

3.1 Introduction

The Liebert Remote Status Panel (RSP) uses LED lighted status indicators that let you monitor activity at the UPS. The RSP includes LED indicators for:

- Load on UPS (Green LED)
- Battery Discharge Alarm (Red LED)
- Low Battery Reserve Alarm (Red LED)
- Load on Bypass Alarm (Red LED)
- UPS Alarm Condition (Red LED)
- New Alarm Condition (Red LED)

The RSP also includes:

- An Audible Alarm
- Lamp Test/Reset Pushbutton to test the LED indicators
- Audio Reset Pushbutton to silence an audible alarm

The Remote Status Panel is an external option and must be installed on a wall or column within 500 feet of the UPStation S3. The enclosure is NEMA Type 1. The panel interfaces with the UPS through control wiring between terminal strips on the Programmable Relay Board and the Remote Status Panel.

3.2   Installing the Remote Status Panel

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install.

The Remote Status Panel option cannot stand alone. It requires a Programmable Relay Board and a Power Supply. It can use the power supply that comes mounted on the Input Contact Isolator option (if you have that option installed). Otherwise, a power supply can be installed on the Programmable Relay Board. If the Programmable Relay Board with Power Supply and/or the Input Contact Isolator option is not installed, please do so at this time. (See **2.0 - Power Supply, 4.0 - Programmable Relay Board,** and **5.0 - Input Contact Isolator** for installation instructions.)

3.2.1   Installation Instructions

Observe all warnings and cautions listed in the front of this manual when wiring the Remote Status Panel option:

1. Mount the Remote Status Panel in a convenient location such as on a wall or column near the UPS. The RSP should not be mounted more than 500 feet from the UPS.
2. Open the UPStation S3 and access the option mounting area as described in **1.1 - Opening the UPStation S3.**
3. Make the appropriate customer connections between the Power Supply, Programmable Relay, and Remote Status Panel as shown in **Figure 8.** Use #14 AWG stranded tinned copper wire.

Figure 8   Wiring Connections
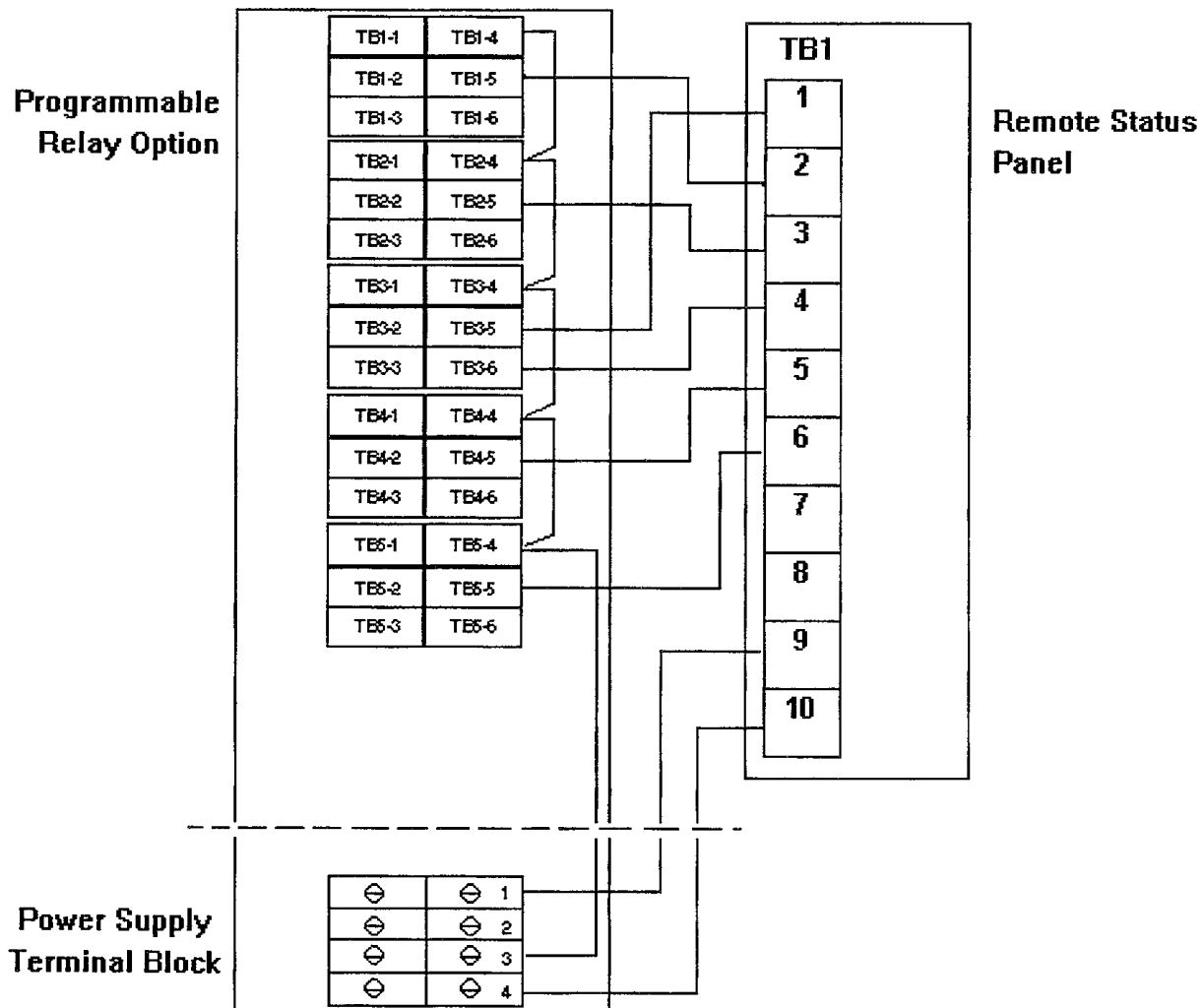
Table 2 shows relay contact definitions for the RSP.

Table 2   Remote Status Panel Customer Connections (Factory Setup)

From Programmable Relay Board	To Remote Status Panel	Signal Name
TB1-1 TB1-4 TB1-2 TB1-5 TB1-3 TB1-6	TB1-2	Load on Battery Common Load on Battery, N.O. Load on Battery, N.C.
TB2-1 TB2-4 TB2-2 TB2-5 TB2-3 TB2-6	TB1-3	Low Battery, Common Low Battery, N.O. Low Battery, N.C.
TB3-1 TB3-4 TB3-2 TB3-5 TB3-3 TB3-6	TB1-1 TB1-4	Load on UPS/Bypass, Common Load on UPS, N.O. Load on Bypass, N.C.
TB4-1 TB4-4 TB4-2 TB4-5 TB4-3 TB4-6	TB1-5	Summary Alarm, Common Summary Alarm, N.O. Summary Alarm, N.C.
TB5-1 TB5-4 TB5-2 TB5-5 TB5-3 TB5-6	TB1-6	New Alarm, Common New Alarm, N.O. New Alarm, N.C.
TB6-1 TB6-4 TB6-2 TB6-5 TB6-3 TB6-6		Common N.O. N.C.
TB7-1 TB7-4 TB7-2 TB7-5 TB7-3 TB7-6		Common N.O. N.C.
TB8-1 TB8-4 TB8-2 TB8-5 TB8-3 TB8-6		Common N.O. N.C.

4. Run the lead wires from the relay board contacts out through one of the three conduit exit plates located at the top-right side of the unit. The most convenient conduit exit plate is near the front of the UPS (just above the main controller door).

5. Attach the wires from the programmable relay board terminals 1, 2, and 3 **or** terminals 4, 5, and 6 to the RSP as shown in **Figure 8** and **Table 2.**

6. If you plan to install additional options, mount and wire them at this time. If no additional options are to be installed, follow the instructions given in **1.3 - Closing and Restarting the UPStation S3.**

The Remote Status Panel option is now installed. You should record and retain the Remote Status Panel configuration in case this information is needed for service.

To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

3.3   Operating Instructions

Because the main function of the Remote Status Panel option is to report the status of the load and the UPS, this section describes how to interpret the LED indicators when they are lit in response to a condition at the load or UPS.

This section also provides brief instruction on using the Lamp Test/Reset pushbutton and the Audio Reset pushbutton.

3.3.1   The Remote Status Panel

The Remote Status Panel itself is not actually operated as much as it is interpreted. When lit, you can interpret the LED indicators as follows:

- **Load on UPS (Green LED) -** indicates that the load is fully protected and no alarm conditions are present. The UPS is supplying uninterrupted power to the load.
- **Battery Discharge Alarm (Red LED) -** indicates that the battery is providing power to the UPS.
- **Low Battery Reserve Alarm (Red LED) -** indicates that the battery capacity is low and has reached the low-battery alarm setting.
- **Load on Bypass Alarm (Red LED) -** indicates that power to the load is bypassing the UPS. The UPS is no longer supplying power to the load.
- **UPS Alarm Condition (Red LED) -** indicates that an alarm situation has occurred at the UPS.
- **New Alarm Condition (Red LED) -** indicates that a second alarm condition has occurred at the UPS. The New Alarm Condition LED lights when the UPS Alarm Condition LED has been triggered and has not been reset.

3.3.2   The Lamp Test/Reset Pushbutton

The Lamp Test/Reset pushbutton is used to verify that each LED indicator is in working condition and to reset an LED indicator that has been triggered by a condition at the load or UPS.

To test the LEDs, with all LEDs unlit, press the Lamp Test/Reset pushbutton. This lights all of the LED indicators for visual inspection. If an LED indicator does not respond to the lamp test, contact your Liebert representative for assistance.

To reset an activated LED, simply press the Lamp Test/Reset pushbutton after you have received and corrected the associated alarm condition.

3.3.3   Audio Reset Pushbutton

The Audio Reset pushbutton is used to silence an audible alarm that has been triggered and reset the alarm to activate on the next alarm condition.

To reset the audible alarm, simply press the pushbutton after you have received and corrected the present alarm condition.

4.0 PROGRAMMABLE RELAY BOARD

4.1 Introduction

The Liebert UPStation S3 programmable relay option lets you configure the "dry contact" interfaces on the relay board to provide notification of particular events at the UPS. With the programmable relay, you decide which events or UPS states are assigned to the contacts on the relay board. If you do not wish to customize the interface, you can set the programmable relay to the default settings for the IBM AS/400® or the Liebert Remote Status Panel interface.

The programmable relay uses eight double-pole, double-throw (DPDT) relays that are tied to external circuits to give immediate feedback. Each relay contact has an associated "event list" that affects the closure of the relay. You can include up to nine definitions, or events, in the list that controls the relay.

Each contact is rated for 0.6 amps at 125 VAC or 2 amps at 30 VDC and is electrically isolated from the UPS electronics and other contact sets.

You can install one or two programmable relay option boards, depending on your needs and the number of events or UPS states you wish to assign. The following sections describe how to install and configure the programmable relay option for the Liebert UPStation S3.

4.2 Installing the Programmable Relay Option

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install. Observe all warnings and cautions listed in the front of this manual when wiring the Programmable Relay option.

4.2.1 Mounting Instructions

NOTE
If you plan to use the Programmable Relay option with a Remote Status Panel, install the Power Supply option onto the Programmable Relay option at this time according to the instructions given in 3.0 - Remote Status Panel.

1. Open the UPStation S3 and access the option mounting area as described in **1.1 - Opening the UPStation S3.**
2. Mount and secure the Programmable Relay Board assembly in an open option slot as described in **1.2 - Installing the Mounting Bracket.**

4.2.2 Internal Wiring Connections
1. Attach one end of the cable assembly 12-793687-01 to either J6 or J7, or to the main controller board and pass the cable through the adjacent slot. Refer to **Figure 9.**

NOTE
If two Programmable Relay boards are installed, remove the JP1 jumper on Board B.

NOTE
If you purchased two Programmable Relay Boards, you will have an extra jumper cable 12-793687-01.

Figure 9   Programmable Relay Board Internal Wiring Connections
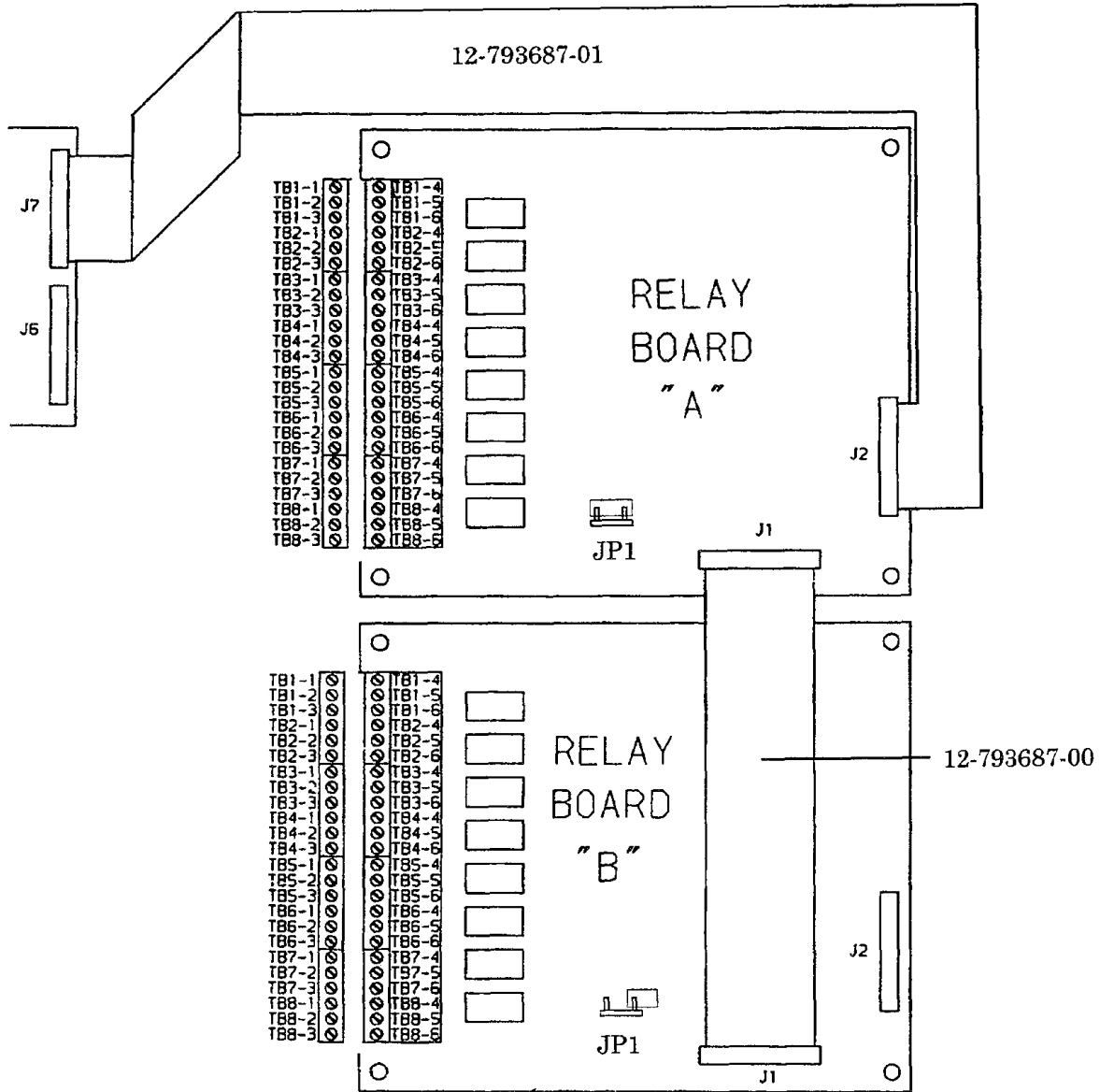
2. Direct the cable across the back of the door (using the retaining clips), across the left inside surface of the UPS, and around to the back of the Programmable Relay Board.

3. Connect the cable 12-793687-01 from connector J6 or J7 on the main controller board to connector J2 on the Programmable Relay Board. Refer to **Figure 9.**

4. Verify that the jumper JP1 is installed to configure the Programmable Relay Board as Relay Board A.

5. If a second programmable relay board will be installed, remove the jumper JP1 from the second board to configure it as Relay Board B, and mount Relay Board B in a slot adjacent to Relay Board A. You may need to move another option to free an adjacent slot.

6. Connect the cable 12-793687-00 from connector J1 on Programmable Relay Board A to connector J1 on Programmable Relay Board B (if a second relay board is used).

7. Recheck all connections making sure that the cables are connected securely and that the long cable is routed neatly out of the way as directed in **Step 2.**

4.2.3 External Connections

1. Connect lead wires to the removable end of the plug connector for the Programmable Relay Board(s) using #14 AWG stranded tinned copper wire. Be sure to run the lead wires in an individual, rigid, steel conduit.

2. Route the lead wires from the Programmable Relay Board, into the slotted cable tray, and out to the right through one of the conduit exit plates located at the top-right side of the unit or along the cable channel to a lower conduit.

> ⚠ **CAUTION**
> **Do not put option wiring in the same conduit as the UPS input or output power cables.**

3. Make all necessary connections to customer-supplied equipment. Refer to **Figure 9** and **Table 3, Table 4,** and **Table 5.**

Table 3   Remote Status Panel Customer Connections (Factory Setup)

Relay Board Contacts		Signal Name
TB1-1	TB1-4	Load on Battery Common
TB1-2	TB1-5	Load on Battery, N.O.
TB1-3	TB1-6	Load on Battery, N.C.
TB2-1	TB2-4	Low Battery, Common
TB2-2	TB2-5	Low Battery, N.O.
TB2-3	TB2-6	Low Battery, N.C.
TB3-1	TB3-4	Load on UPS/Bypass, Common
TB3-2	TB3-5	Load on UPS, N.O.
TB3-3	TB3-6	Load on Bypass, N.C.
TB4-1	TB4-4	Summary Alarm, Common
TB4-2	TB4-5	Summary Alarm, N.O.
TB4-3	TB4-6	Summary Alarm, N.C.
TB5-1	TB5-4	New Alarm, Common
TB5-2	TB5-5	New Alarm, N.O.
TB5-3	TB5-6	New Alarm, N.C.
TB6-1	TB6-4	Common
TB6-2	TB6-5	N.O.
TB6-3	TB6-6	N.C.
TB7-1	TB7-4	Common
TB7-2	TB7-5	N.O.
TB7-3	TB7-6	N.C.
TB8-1	TB8-4	Common
TB8-2	TB8-5	N.O.
TB8-3	TB8-6	N.C.

N.O. = Normally Open
N.C. = Normally Closed

Table 4 Wiring Connections, AS/400 Interface Option

Program the Alarm Relay Board Connects as per below, and connect the AS/400 option accordingly. Jumper the common terminals on the alarm relay option as applicable.

- TB1-1, TB2-1, TB3-1, TB4-1
- TB1-4, TB2-4, TB3-4, TB4-4
- TB5-1, TB6-1, TB7-1, TB8-1
- TB5-4, TB6-4, TB7-4, TB8-4

Case – 1		
From Alarm Relay Board		To IBM AS/400®
TB1-1		Green (Comm)
TB1-2		Black (on UPS)
TB2-1		
TB2-2		Brown (on Bypass)
TB3-1		
TB3-2		Wht (Utility Failed)
TB4-1		
TB4-2		Red (Low Battery)

Case – 2		
From Alarm Relay Board		To IBM AS/400®
TB1-4		Green (Comm)
TB1-5		Black (on UPS)
TB2-4		
TB2-5		Brown (on Bypass)
TB3-4		
TB3-5		Wht (Utility Failed)
TB4-4		
TB4-5		Red (Low Battery)

Case – 3		
From Alarm Relay Board		To IBM AS/400®
TB5-1		Green (Comm)
TB5-2		Black (on UPS)
TB6-1		
TB6-2		Brown (on Bypass)
TB7-1		
TB7-2		Wht (Utility Failed)
TB8-1		
TB8-2		Red (Low Battery)

Case – 4		
From Alarm Relay Board		To IBM AS/400®
TB5-4		Green (Comm)
TB5-5		Black (on UPS)
TB6-4		
TB6-5		Brown (on Bypass)
TB7-4		
TB7-5		Wht (Utility Failed)
TB8-4		
TB8-5		Red (Low Battery)

Table 5   User Programmable Customer Connections

Relay Board Contacts		Signal Name
TB1-1 TB1-2 TB1-3	TB1-4 TB1-5 TB1-6	Relay 1, Common Relay 1, N.O. Relay 1, N.C.
TB2-1 TB2-2 TB2-3	TB2-4 TB2-5 TB2-6	Relay 2, Common Relay 2, N.O. Relay 2, N.C.
TB3-1 TB3-2 TB3-3	TB3-4 TB3-5 TB3-6	Relay 3, Common Relay 3, N.O. Relay 3, N.C.
TB4-1 TB4-2 TB4-3	TB4-4 TB4-5 TB4-6	Relay 4, Common Relay 4, N.O. Relay 4, N.C.
TB5-1 TB5-2 TB5-3	TB5-4 TB5-5 TB5-6	Relay 5, Common Relay 5, N.O. Relay 5, N.C.
TB6-1 TB6-2 TB6-3	TB6-4 TB6-5 TB6-6	Relay 6, Common Relay 6, N.O. Relay 6, N.C.
TB7-1 TB7-2 TB7-3	TB7-4 TB7-5 TB7-6	Relay 7, Common Relay 7, N.O. Relay 7, N.C.
TB8-1 TB8-2 TB8-3	TB8-4 TB8-5 TB8-6	Relay 8, Common Relay 8, N.O. Relay 8, N.C.

N.O. = Normally Open
N.C. = Normally Closed

4.3 Operating Instructions

The Programmable Relay option is configured through Main Menu item 6, Programmable Output Contacts.

As you work through the contact configuration process, the following keys apply wherever you are in the menu structure:

- The right arrow scrolls forward through a list
- The left arrow scrolls backward through a list
- The Enter key selects the displayed option
- The Escape key brings you back one level in the menu structure and does not save any contact assignments. Pressing Escape several times will eventually return you to the S3 Main Menu.

To configure the programmable relay board:

1. Apply power to the UPStation S3 and wait until the UPS has completed its power-up sequence and start-up testing procedure.
2. When the display reads **Normal Operation,** press the right arrow to access the Main Menu.
3. From the Main Menu, press the right arrow until item **6. Programmable Output Contacts** is displayed. Press Enter to access the programmable output contacts.

    The Programmable Output Contacts menu item has three functions that allow you to:
    - Configure the relay contact assignments to your own specifications
    - Review the current assignment for each contact
    - Return the contacts to one of the factory default settings (Liebert Remote Status Panel or IBM AS/400®).

4.3.1 Configure the Relay Contacts

The Programming menu item lets you configure an assignment to each contact on the relay board(s).

Three sub-menus let you configure the contact including:

- Selecting an event field
- Selecting an event group
- Selecting event conditions

Once configured, the UPS checks continuously the status of the items defined for each contact and updates the state of the relay.
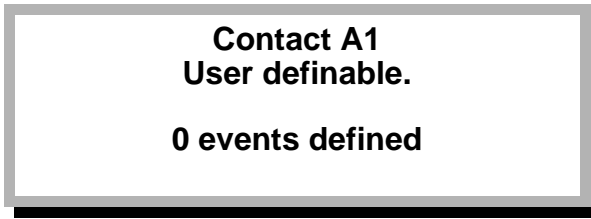
NOTE
*You must erase any existing factory default settings before you can manually assign the individual contacts on the Programmable Relay Board. This is done through the Factory Setups option. Select Contact Board A 1-8 User Defined as described below in **4.3.3 - Reset the Contacts to Factory Default Settings.***
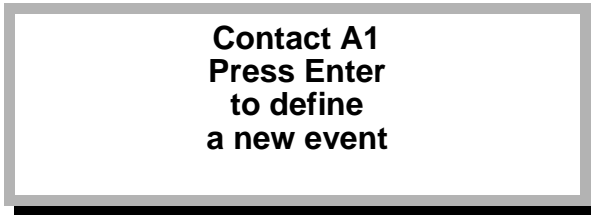
To configure User Programmable Relay contacts:

1. Press Enter at item **A. Programming** under Main Menu item **6. Programmable Output Contacts.** The UPS displays an event list summary for contact A1:
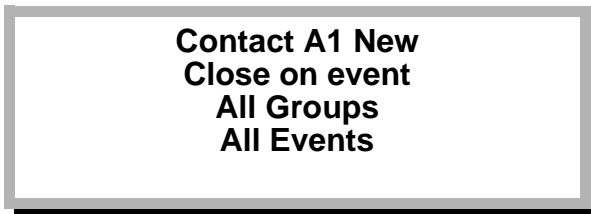
```
          Contact A1
          User definable.

          0 events defined
```

2. Press Enter to continue. The UPS displays the "Define a New Event" screen:

```
          Contact A1
          Press Enter
          to define
          a new event
```

3. Press Enter to display the "New Event Definition" screen:

```
          Contact A1 New
          Close on event
          All Groups
          All Events
```

This screen has three fields that you will configure in the following steps. The first field **(Close on event** in the example above) flashes to indicate that it can be modified.

4. Press the right arrow to display the desired action for the contact, then press Enter to select the action. Options include:
   - **Close on event -** causes the contact to change state when the specified event occurs. For example, a normally open contact closes; a normally closed contact opens.
   - **Ignore event -** causes the contact to "ignore" a specific event. This field is useful as a filtering mechanism if, for example, you want the contact to close on all but one or two events of a given group.
   - **Delete Event -** deletes the event from the event list for this contact.

   When you press Enter, the second field (Event Group) flashes to indicate that it can be modified.

5. Press the right arrow to display the desired event group, then press Enter to select the group. Options include:
   - **All Groups -** is a "catch-all" definition that is useful including all or some event groups in the definition.
   - **Input Group -** contains events related to the power input to the UPS
   - **Output Group -** contains events related to the power output from the UPS
   - **Battery Group -** contains events related to the battery
   - **Fault Group -** contains miscellaneous alarms

   When you press Enter, the third field (Event) flashes to indicate that it can be modified.

6. Press the right arrow to display the desired event, then press Enter to select the event. Options vary depending on the event group you selected in **Step 5.** The UPS event options for each group are summarized as follows:

Table 6   Group Event Options

Group	Event Options
All Groups	All Events
Input Group	All Events Utility Failed Bad Bypass Power
Output Group	All Events Load On Load on UPS Load on Bypass UPS Overloaded
Battery Group	All Events Load on Battery Low Battery
Fault Group	All Events Overtemperature New Alarm Alarm Present

For example, to configure relay A1 to close when the battery is low, select Battery Group, Low Battery for output relay contact A1.

When you press Enter after assigning an event, the definition is complete and the UPS saves the definition in permanent memory. The UPS then returns to the Define a New Event screen.

NOTE

A good way to check the wiring or electrical operation of a contact is to configure the contact for Close on event, All Groups, All Events. This will close the contact whenever the power to the UPS is ON. Deleting this event will open the contact.
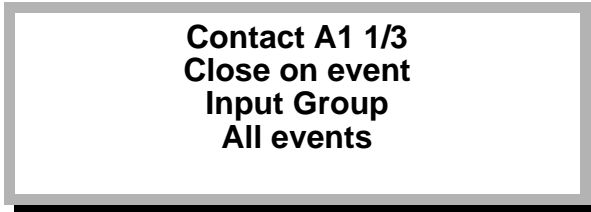
7. Repeat **Steps 3** through **6** to configure another event. You can configure up to nine events for each contact on the Programmable Relay Board.

8. When finished, press Escape several times to return to the Main Menu.

4.3.2 Review the Existing Contact Assignments

This sub-menu item lets you review the current assignment (including factory default settings) for each contact on the relay board(s). The Review feature is a view-only option; you cannot change the contact assignment through this menu option.

1. Press Enter at item **B. Review** under Main Menu item **6. Programmable Output Contacts.** The UPS displays a screen similar to the following that lists the first contact and the first definition of its event list.
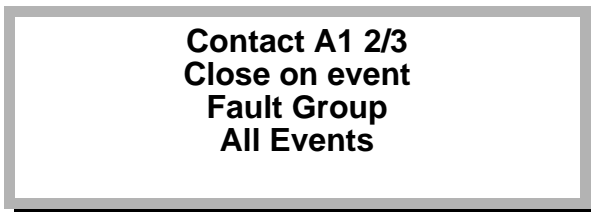
```
Contact A1 1/3
Close on event
Input Group
All events
```

The first line of the display indicates the contact you are viewing (A1) and the event designation (1/3). For the screen shown above, you are viewing the first contact on the first programmable relay board. (If a second programmable relay board is installed, its contacts are designated as B1, etc.) The 1/3 indicates that this contact has three definitions in its event list, and you are viewing the first of three.

The second and subsequent lines show the event definition that is currently configured for this particular contact.

2. Press the right arrow to view the next contact and event list. Another screen similar to the first appears:

```
Contact A1 2/3
Close on event
Fault Group
All Events
```

If contact A1 does not have another event, the UPS displays the second contact and the first definition of its event list. The screen above shows the second definition in the event list for contact A1.

3. Repeat **Step 2** to view each contact and event list that is configured for the Programmable Relay Board(s). Alternately, you can press the left arrow to view the previous contact and event list, or you can press Escape to return to the Main Menu item **6. Programmable Output Contacts.**

4. When you are finished reviewing the output contacts, press Escape to return to the Main Menu.

4.3.3 Reset the Contacts to Factory Default Settings

This sub-menu item lets you reset the contact assignments to the Liebert Remote Status Panel factory default set or the IBM AS/400® factory default set for equipment that use these popular interfaces. You can manually program the relay contacts for these factory default values using menu 6A; however, the Factory Setup feature simplifies this task.

Using two option boards, you can create up to two Liebert Remote Status Panel interfaces or four complete IBM AS/400® interfaces. Because each option board has eight contacts, the IBM AS/400® factory setup can be assigned to contacts 1 through 4 or contacts 5 through 8.

When a factory setup is selected, the contacts used by that setup cannot be programmed manually. The UPS will ignore any manual attempt to change these assignments. Also, when a factory setup is selected, any previously configured assignment for the contact is erased.

1. Press Enter at item **C. Factory Setups** under Main Menu item **6. Programmable Output Contacts.**
2. Press the right arrow key to advance through the list of possible interface assignments. Stop when the desired interface assignment is displayed. Options include:
   - Contact Board A - 1-8 User Defined
   - Contact Board A - 1-4 IBM AS/400®; 5-8 User Defined
   - Contact Board A - 1-5 Remote Status; 6-8 User Defined
   - Contact Board A - 1-4 User Defined; 5-8 IBM AS/400®
   - Contact Board A - 1-4 IBM AS/400®; 5-8 IBM AS/400®

   If a second relay option board is installed, the same options appear for Contact Board B.

Table 7 and **Table 8** define the factory default contact assignments for each interface.

Table 7   IBM AS/400® Contact Definitions

Relay	Signal Name	Description
1 or 5	Load on UPS	N.O. Contact closes when the inverter is carrying the load
2 or 6	Load on Bypass	N.O. Contact closes when the bypass line is carrying the load
3 or 7	Utility Failed	N.O. Contact closes when the input power to the UPS fails and the battery is providing power to the load
4 or 8	Low Battery	N.O. Contact closes when power to the load is being supplied from the battery and the estimated time remaining until shutdown is equal to or less than the low battery alarm setting (see your UPStation S3 User's Manual)

Table 8   Liebert Remote Status Panel Contact Definitions

Relay	Signal Name	Description
1	Load on Battery	N.O. Contact closes when the input power to the UPS fails and the battery is providing power to the load
2	Low Battery	N.O. Contact closes when power to the load is being supplied from the battery and the estimated time remaining until shutdown is equal to or less than the low battery alarm setting
3	Load on UPS/ Load on Bypass	N.O. Contact closes when the inverter is carrying the load N.C. Contact is closed when the load is on bypass
4	Alarm Present (Summary Alarm)	N.O. Contact closes when an alarm message is present at the UPS front panel
5	New Alarm	N.O. Contact closes for 30-45 seconds when a new alarm occurs

3. With the desired interface assignment displayed, press Enter to select that assignment.
4. When finished, press Escape several times to return to the Main Menu.

> **NOTE**
> *Record and retain the Programmable Relay configuration in case this information is needed for service.*

To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

5.0 INPUT CONTACT ISOLATOR

5.1 Introduction

The Input Contact Isolator option is an 8-channel input board which supports eight customer-supplied, non-powered, normally-open contacts. The Input Contact Isolator comes with a factory-installed Power Supply.

When a contact closes, one of the following actions occurs according to how you have configured the contacts. Input Contacts can be configured to cause the UPS to

- Display Warning messages only
- Display Warning messages and initiate dial out call if Modem Option is installed.
- Inhibit battery charge if the load is greater than 0%
- Inhibit battery charge if the load is greater than 25%
- Inhibit battery charge if the load is greater than 50%
- Inhibit battery charge if the load is greater than 75%
- Display ground fault on DC bus message

5.2 Installing the Input Contact Isolator

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install. Observe all warnings and cautions listed in the front of this manual when wiring this option.

⚠️ **WARNING**
WHEN INSTALLING THE POWER SUPPLY IN AN UPSTATION S3 UPS (WITH OR WITHOUT MAINTENANCE BYPASS):

1. **BE SURE TO DISCONNECT ALL UTILITY POWER TO THE UPS.**
2. **DISCONNECT THE BATTERY FROM THE UPS BY SWITCHING THE BATTERY CIRCUIT BREAKER OFF.**
3. **TURN THE BREAKER OFF UPSTREAM OF THE UPS.**
4. **WAIT 5 MINUTES FOR CAPACITORS TO DISCHARGE.**

FOLLOW THE INSTRUCTIONS GIVEN IN 1.0 - INTRODUCTION OF THIS MANUAL.

1. Open the UPStation S3 and access the option mounting area as described in **1.1 - Opening the UPStation S3.**
2. Install the Input Contact Isolator in an open option slot.

⚠️ **WARNING**
BE SURE POWER TO THE LOAD AND TO THE UPS IS DISCONNECTED BEFORE CONTINUING WITH STEP 3.

3. Connect the Input Contact Isolator to the UPS output terminal block (TB3) located at the bottom of the unit. Refer to **Figure 10.**
    - Connect the red wire (power supply) from the Input Contact Isolator option board to the UPS output TB3 Phase A terminal.
    - Connect the white wire from the Input Contact Isolator option board to the UPS output Neutral terminal.

Figure 10 Input Contact Isolator Power Supply Terminal Block Wiring
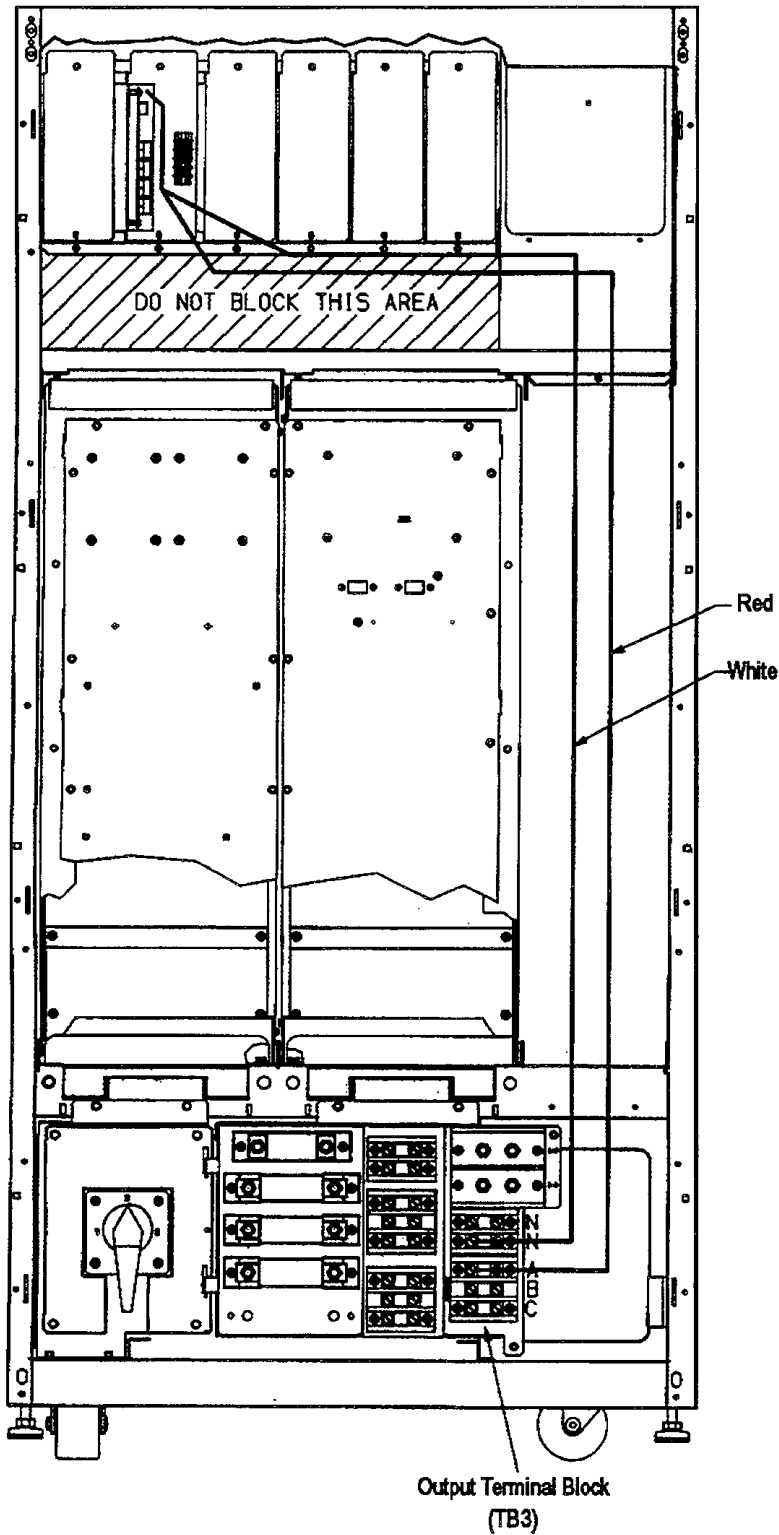
4. Connect the Input Contact Isolator cable assembly 12-793687-01 to the Main Controller Board.
   - If a Programmable Relay Board is not installed, this connection is made directly by connecting the cable assembly 12-793687-01 from Connector J2 on the Input Contact Isolator board to Connector J6 or J7 on the Main Controller Board. Refer to **Figure 11.**
   - If a Programmable Relay board(s) is installed, the connection to Main Controller Board is made indirectly by connecting the cable assembly 12-793687-01 from Connector J1 (if one programmable relay board) or J2 (if two programmable relay boards) on the Input Contact Isolator Board to the Programmable Relay Board(s), then to the Main Controller Board. Refer to **Figure 12.**
5. Make the customer wiring connections as described in **Figure 13.**

The Input Contact Isolator option is now installed. The next section gives operating instructions for the option.

Figure 11 Input Contact Isolator Connections to Main Controller Board (Direct)
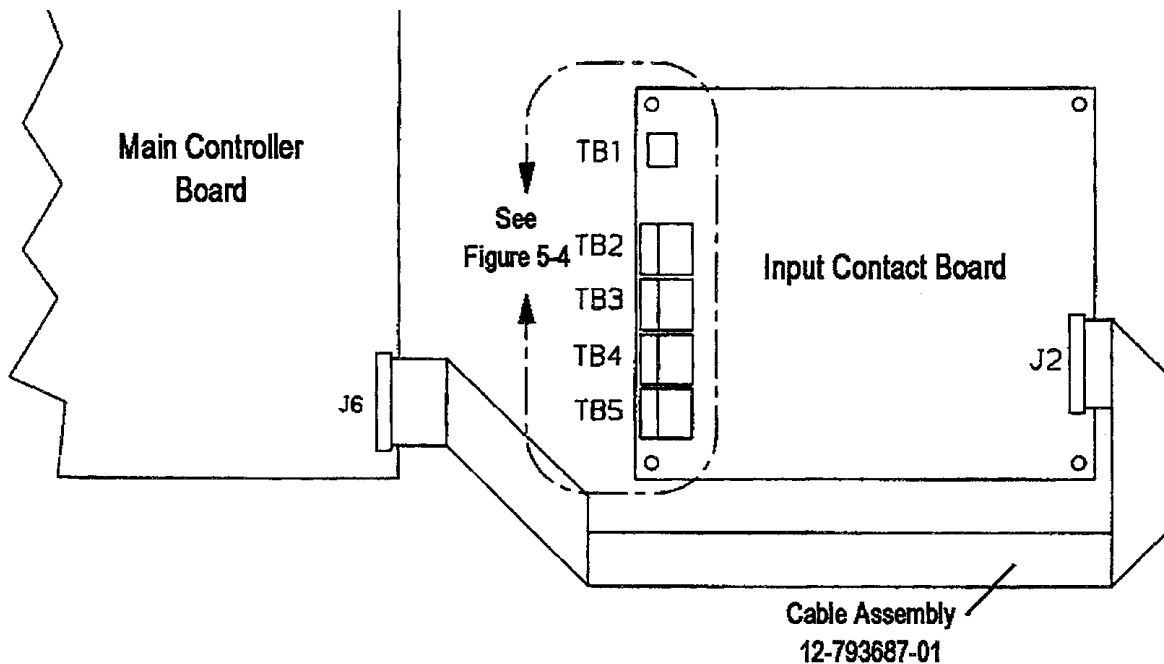
Figure 12 Input Contact Isolator Connection to Main Controller Board (Indirect)

Cable Assembly
12-793687-01

J7

Relay
Board
"A"

JP1

J2

J1

Cable Assembly
12-793687-00

Main Controller
Board

Relay
Board
"B"

JP1

J2

J1

TB1

See
Figure 13

TB2

Input Contact Board

TB3

TB4

J2

J6

TB5

Cable Assembly
12-793687-00

Alternate Connection When Relay
Board "B" Is Not Installed
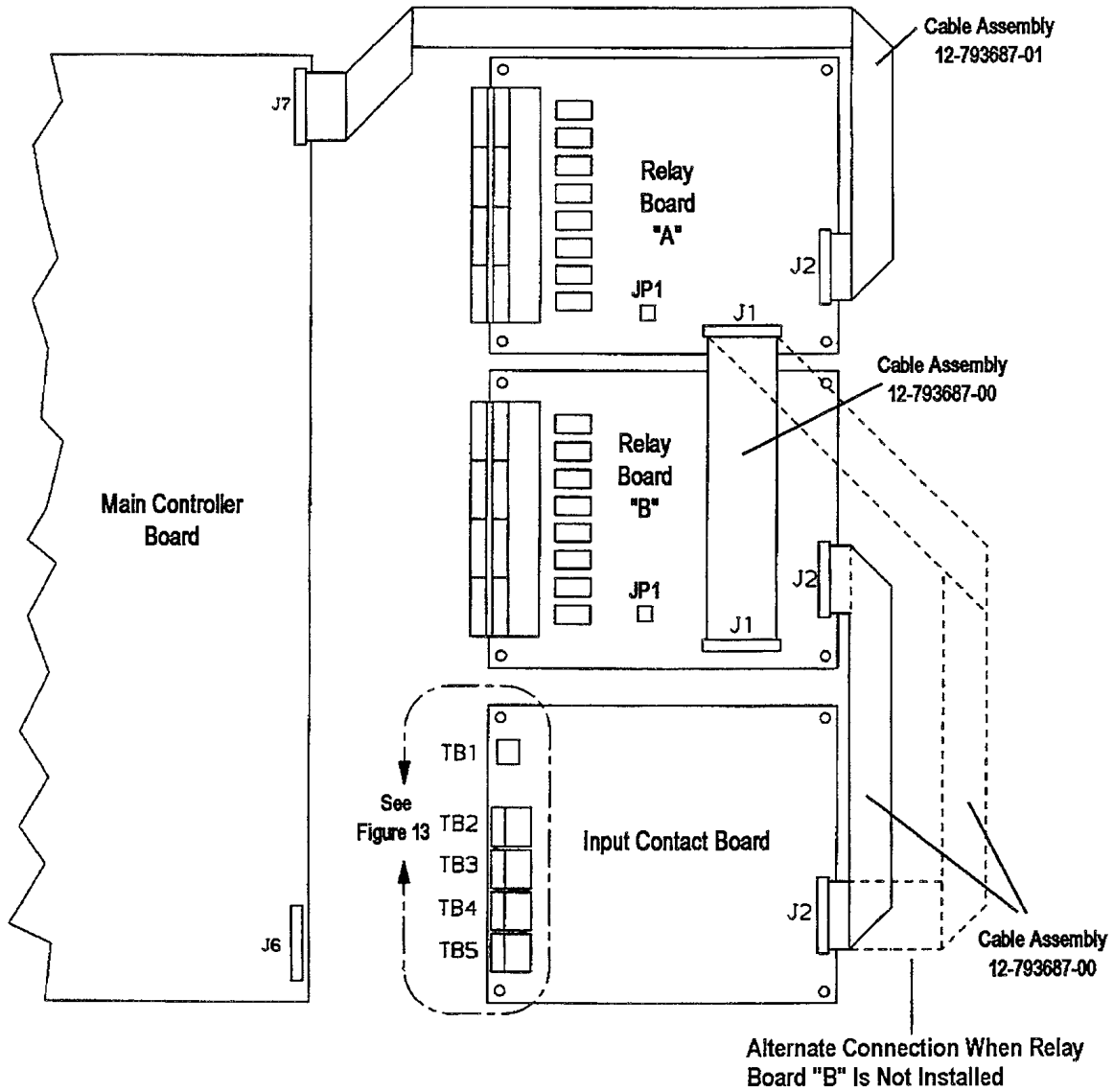
Figure 13 Customer Connections

TB1

Contact 1
Contact 2

TB2

Contact 3
Contact 4

TB3

Contact 5
Contact 6

TB4

Contact 7
Contact 8

TB5
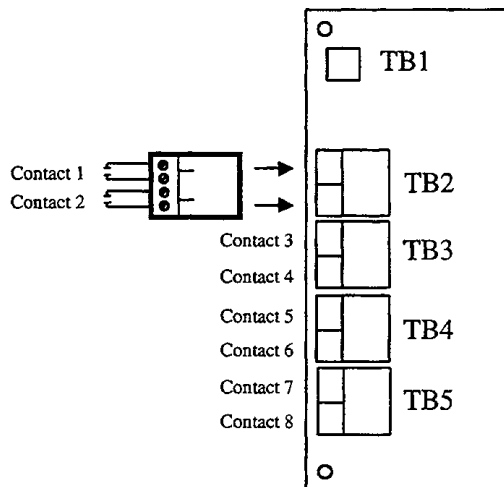
5.3   Operating Instructions

The Input Contact Isolator option is configured through Main Menu item **7. Programmable Input Contacts.**

The Programmable Input Contacts menu item has two functions that allow you to:

- Configure the input contact assignments to your own specifications
- Review the current assignment for each input contact

As you work through the contact configuration process, the following keys apply wherever you are in the menu structure:

- The right arrow scrolls forward through a list
- The left arrow scrolls backward through a list
- The Enter key selects the displayed option
- The Escape key brings you back one level in the menu structure and does not save any contact assignments. Pressing Escape several times will eventually return you to the S3 Main Menu.

5.3.1 Configure Input Contacts

Before configuring the Input Contact Isolator relays, install all other options to be installed at this time and complete the closing and restarting procedure (described in **1.0 - Introduction).**

To configure the Input Contact Isolator relays:

1. Apply power to the UPStation S3 and wait until the UPS has completed its power-up sequence and start-up testing procedure.
2. When the display reads **Normal Operation,** press the right arrow to access the Main Menu.
3. From the Main Menu, press the right arrow until item **7. Programmable Input Contacts** is displayed. Press Enter to access the programmable input contacts.

> **NOTE**
> *You can press Escape at any time to return to the previous menu or screen. Depending on where you are in the configuration process, you may have to press Escape several times to return to the Main Menu.*

4. At the **A. Programming** prompt, press Enter to access the input contact assignment screen.
5. At the **Input Contact x** prompt, press the right arrow to scroll through the list of programmable input contacts (1 through 8). Press Enter when the number of the contact you wish to configure is displayed.
6. Press the right arrow to scroll through the list of possible input contact assignments:
    a. Display Warning Message Only
    b. Display Warning Message + Call
    c. Inhibit Battery Charge: Load >0%
    d. Inhibit Battery Charge: Load >25%
    e. Inhibit Battery Charge: Load >50%
    f. Inhibit Battery Charge: Load >75%
    g. Display Ground Fault Message
    h. Not Assigned (used to skip a particular contact assignment and continue to the next)

> **NOTE**
> *Use of the Selection "Display Warning Message + Call" requires that a Modem MUST be installed and properly configured. See **8.0 - Internal Modem.***

7. With the desired assignment displayed and blinking, press Enter to configure the contact for one of the default settings. When you press Enter after assigning an event, the definition is complete, the UPS saves the definition in permanent memory, and the selection stops blinking. Press Escape to return to the contact assignment screen **(Step 4)** or press the right arrow to continue configuring the remaining contacts in the same manner.

> **NOTE**
> *The default warning message reads "Warning Input contact X." You can change this default warning to unique text that describes the warning more accurately as described in **Step 8.***

8. To configure a contact to display a custom warning message, select the desired contact and press Enter twice. With the text entry cursor blinking, enter a unique message for the input contact as follows:
   a. Press the right arrow to scroll forward or press the left arrow to scroll backward through the text character options to display the first character of the message. Characters include (as scrolling forward) the English alphabet, numeric digits 0 through 9, and a space.

> **NOTE**
> *Scroll backward with the left arrow to access more quickly the space, digits, and letters near the end of the alphabet.*

   b. When the first character is displayed, press Enter to accept it and continue to the second character.
   c. Repeat **Steps a** and **b** until the message is complete. You can enter up to 16 characters.
   d. When the message is complete, enter spaces to the end of the line (up to 16 characters) until the cursor has cycled back to the first character of the message. Press Escape to accept the message.
   e. With the message complete and displayed (not blinking), press the right arrow to continue to the next input contact assignment **(Step 5),** or press Escape to return to the Programming screen **(Step 4).**
9. Repeat **Steps 4** through **7** to configure another input contact.
10. When finished, press Escape several times to return to the Main Menu.

5.3.2 Review the Existing Contact Assignments

This sub-menu item lets you review the current assignment for each input contact on the relay board. The Review feature is a view-only option; you cannot change the contact assignment through this menu option.

To review contact assignments:

1. From the Main Menu, press the right arrow until item **7. Programmable Input Contacts** is displayed. Press Enter to access the programmable input contacts.
2. Press the right arrow once to display the **B. Review** prompt. Press Enter.
3. At the **Input Contact 1** prompt, press the right arrow to scroll through the list of programmable input contacts (1 through 8) and their current assignments.
4. When you are finished reviewing the output contacts, press Escape to return to the Main Menu.

To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** at the back of this manual for option testing procedures.

6.0 DC GROUND FAULT DETECTOR

6.1   Introduction

The DC Ground Fault Detector monitors current through the UPStation S3 battery cables. When a ground fault current is detected from any battery positive (+) or negative (-) terminal to ground, a relay contact is closed. The relay contact information is relayed to the Input Contact Isolator and the ground fault message is displayed on the UPS screen.

The DC Ground Fault Detector requires an Input Contact Isolator with a contact assigned as "Display Ground Fault Message." A +24VDC power supply is included on the Input Contact Isolator to power the DC Ground Fault Detector. The AC output critical power from the UPS supplies input power to the +24VDC power supply.

6.2   Installing the DC Ground Fault Detector

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install. Observe all warnings and cautions listed in the front of this manual when wiring the DC Ground Fault Detector.

> ⚠ **WARNING**
> **BEFORE INSTALLING THIS OPTION, BE SURE TO DISCONNECT ALL POWER SOURCES CONNECTED TO THE UPS. COMPLETELY ISOLATE THE UPS FROM ALL POWER SOURCES BY DOING THE FOLLOWING:**
> **1. TURN THE BREAKER OFF DOWN STREAM OF THE UPS.**
> **2. DISCONNECT THE BATTERY FROM THE UPS BY SWITCHING THE BATTERY CIRCUIT BREAKER OFF.**
> **3. TURN THE BREAKER OFF UPSTREAM OF THE UPS.**
> **4. WAIT 5 MINUTES FOR CAPACITORS TO DISCHARGE.**
> **FOLLOW THE INSTRUCTIONS GIVEN IN 1.0 - INTRODUCTION.**

1. Open the UPStation S3 and access the option mounting area as described in **1.1 - Opening the UPStation S3.**
2. If the Input Contact Isolator option is not installed, do so at this time. Refer to **5.2 - Installing the Input Contact Isolator.**
3. Open the I/O cover located at the lower front of the UPS to access the battery terminals. Remove screws and set cover aside.

> ⚠ **WARNING**
> **BE SURE THE BATTERY TERMINAL BLOCK ON THE LOWER RIGHT HAND SIDE OF THE UPS IS NOT ENERGIZED BEFORE CONTINUING.**

4. Disconnect the two cables currently connected to the battery positive and negative terminals. Pass these cables through the CT ring, entering from the plane side of the CT ring (the side without wires). Reconnect the cables back to the battery positive and negative terminals. Refer to **Figure 14.**
5. Connect one end of a Red/White twisted, loose wire (provided) to the battery positive (red wire) and negative (white wire) terminals as shown in **Figure 14.**
6. Connect one end of the green loose wire (provided) to the ground bus on the lower right side of the UPS. Refer to **Figure 14.**

Figure 14 DC Ground Fault Cable Routing
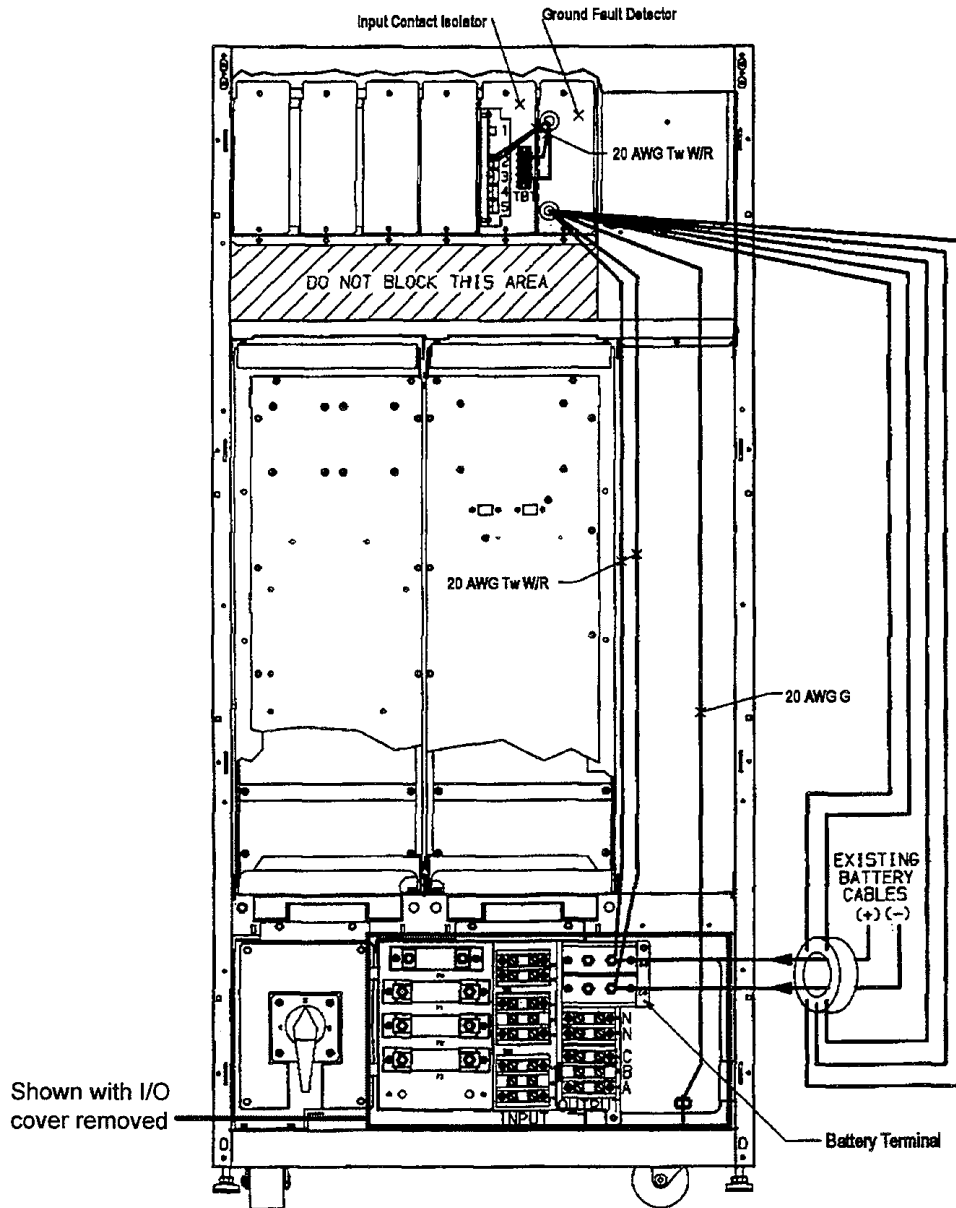
7. Route all eight wires (five from the CT ring, two from the battery terminals, and one from the ground bus) upward to the right side of the UPS to the option mounting area. Refer to **Figure 14.** Pass all eight wires through the bottom hole in the DC Ground Fault Bracket and connect them as shown in **Figure 15.**

   a. Connect the Red/White twisted pair to TB1-1 and TB1-3 on the DC Ground Fault option.
   b. Connect the green wire from the ground bus to TB1-6 on the DC Ground Fault option.
   c. Connect the remaining five wires from the CT ring to the DC Ground Fault option as follows (refer to **Figure 15):**
      · Connect the Orange wire to TB2-6.
      · Connect the Yellow wire to TB2-5.
      · Connect the Black wire to TB2-4.
      · Connect the Wht/Blk wire to TB2-3.
      · Connect the White wire to TB2-2.

8. Install the DC Ground Fault Detector/Input Contact Isolator assembly in two adjacent option slots. Refer to **Figure 14.**

9. Wire the DC Ground Fault Detector to the Power Supply terminal block (TB1) on the Input Contact Isolator. Refer to **Figure 15.**
   a. Connect a red loose wire (provided) from TB2-1 on the DC Ground Fault Detector to TB1-1 on the power supply terminal block.
   b. Connect a white loose wire (provided) from TB3-6 on the DC Ground Fault Detector to TB1-4 on the power supply terminal block.
10. Wire the DC Ground Fault Detector to the Input Contact Isolator. Refer to **Figure 15.**
   a. Connect a red loose wire (provided) from TB3-1 on the DC Ground Fault Detector to TB2-1 on the Input Contact Isolator.
   b. Connect a white loose wire (provided) from TB3-2 on the DC Ground Fault Detector to TB2-2 on the Input Contact Isolator.

Figure 15 DC Ground Fault Wiring Connections
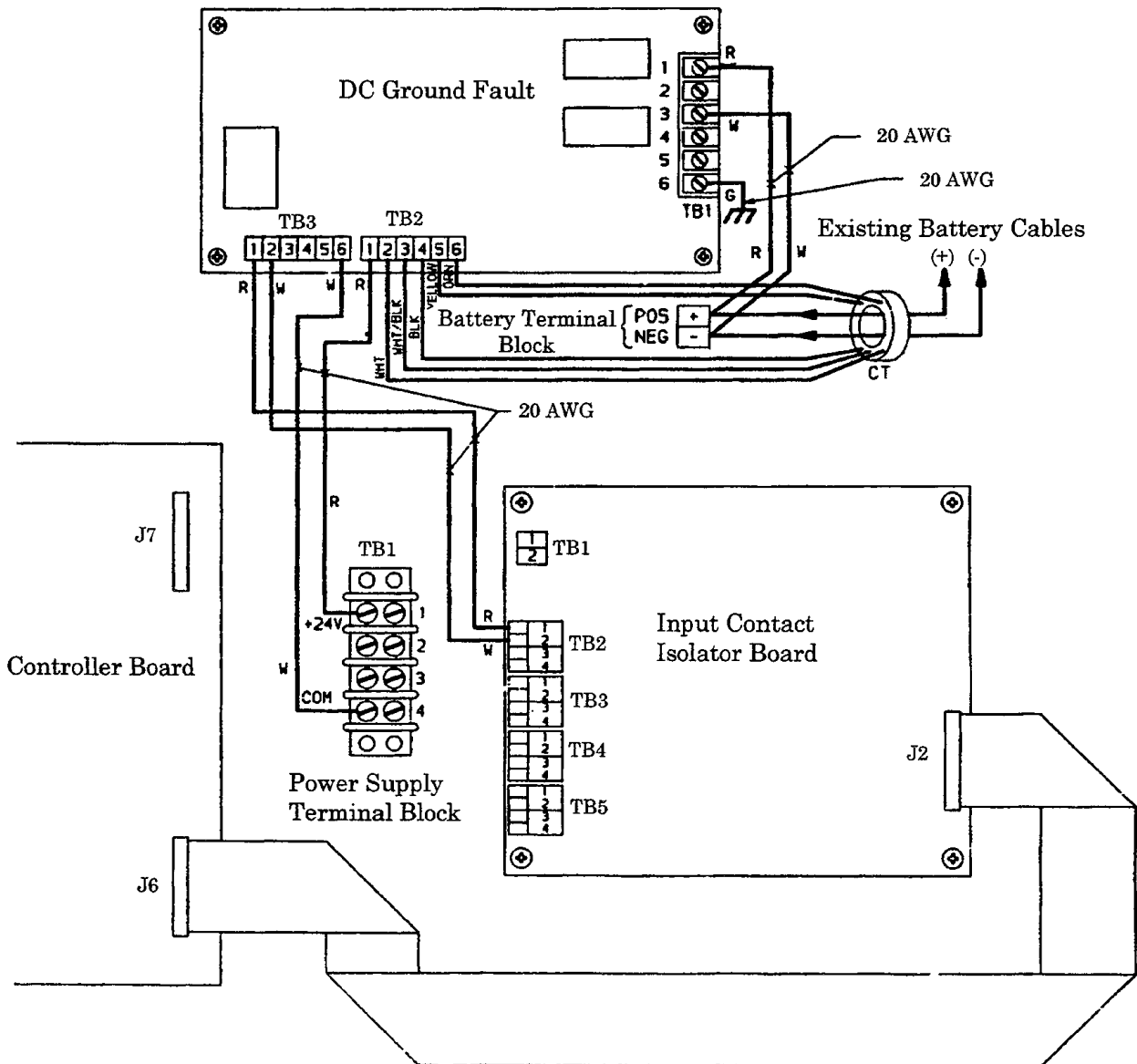
11. Configure the program jumpers on the DC Ground Fault Detector as follows:

Table 9　　Program Jumper Selection

	J1	J2	J3	J4	J5
S3 (208 V)	2-3	2-3	1-2	1-2	3-4 (Normal); 1-2 (Reduced Sensitivity)

The DC Ground Fault Detector option is now installed. To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

6.3　Operating Instructions

The DC Ground Fault Detector does not require operation of itself; however, you must configure Contact #1 on the Input Contact Isolator to display the DC Ground Fault message.

1. Install all other options you intend to at this time, then follow the instructions for closing and restarting the UPStation S3 as described in **1.3 - Closing and Restarting the UPStation S3.**
2. When the display reads **Normal Operation,** press the right arrow to access the Main Menu.
3. From the Main Menu, press the right arrow until item **7. Programmable Input Contacts** is displayed. Press Enter to access the programmable input contacts.
4. At the **Programming Contacts** prompt, press the right arrow to display Contact #1, then press Enter to select it.
5. Press the right arrow to display assignment option **6. Display Ground Fault Message.**

NOTE

You can configure an input contact other than Input Contact #1 for the DC Ground Fault Message. The installation instructions given in this section assume you will use Input Contact #1. If another contact is used, you must rewire TB3-1 and TB3-2 on the DC Ground Fault Detector for the appropriate input contact.

7.0 SNMP FOR ETHERNET AND TOKEN RING SYSTEMS

7.1 Introduction

The Simple Network Management Protocol (SNMP) connects the Liebert UPStation S3 to your network, allowing the network management system to communicate with and control the UPS operation.

A complete UPS Management Information Base (MIB) specific to the UPStation S3 includes all operating parameters that allow the network management system to control the UPS.

7.2 Installation

The SNMP installation procedure is the same for Ethernet and Token Ring and consists of two basic steps:

- Install the SNMP option hardware in the UPS
- Configure the SNMP agent

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install.

Observe all warnings and cautions listed in the front of this manual when wiring the SNMP option.

7.2.1 Installing the SNMP Hardware

1. Open the UPStation S3 and access the option mounting area as described in **1.1 - Opening the UPStation S3.**
2. Install the SNMP board in an open slot.
3. Connect the SNMP cables. Refer to **Figure 16.**
   a. Connect the cable assembly 12-793687-01 from Connector J6 or J7 on the main controller board to Connector J1 on the SNMP Cable Splitter board
   b. Connect the cable assembly 12-793687-00 from Connector J2 on the SNMP Cable Splitter board to Connector J2 on the SNMP board.
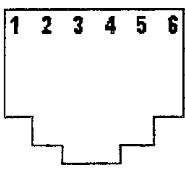
⚠ **WARNING**
DO NOT SWITCH J1 AND J2 ON THE CABLE SPLITTER BOARD.

Figure 16 SNMP Option Wiring Connections - Ethernet and Token Ring
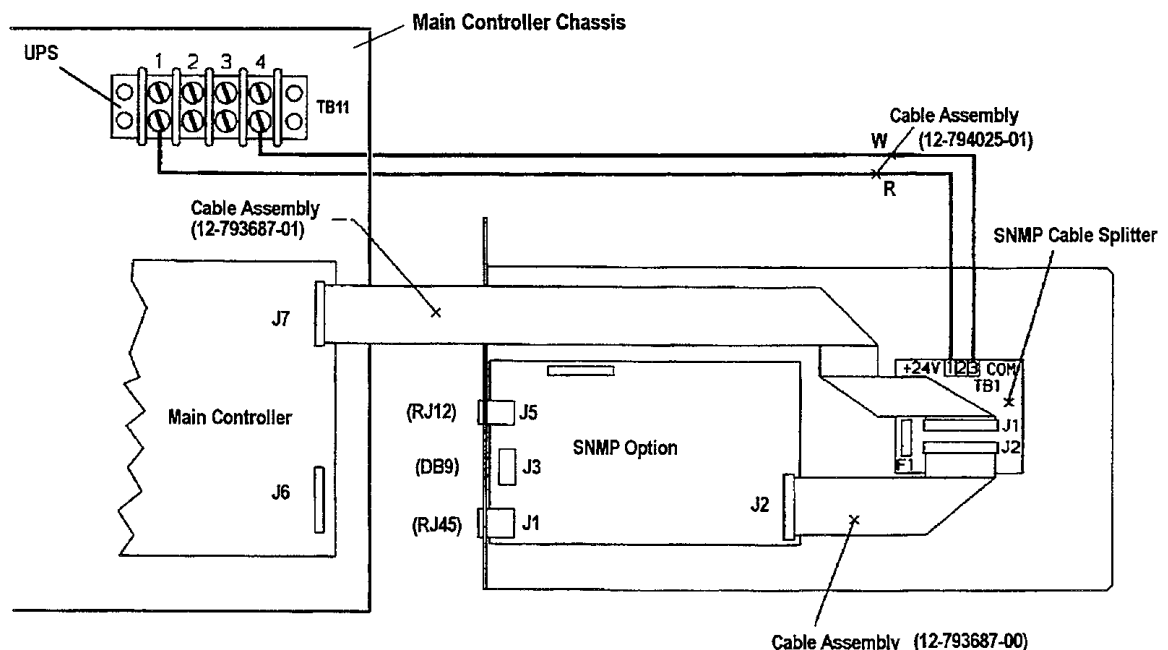
4. Wire the SNMP Cable Splitter assembly to J11 on the UPS. Refer to **Figure 16.**
   a. Install the 3-pin connector of cable assembly 12-749025-01 to TB-1 on the SNMP Cable Splitter assembly.
   b. Connect the Red wire from the free end of the cable 12-794025-01 to TB11-1 located on the main controller chassis on the UPS. You may need to strip the plastic wire coating to expose enough wire to secure under the connector lug.
   c. Connect the White wire from the free end of cable 12-794025-01 to TB11-4 on the UPS. You may need to strip the plastic wire coating to expose enough wire to secure under the connector lug.
5. Connect the SNMP to the network using the jacks and cables included with the SNMP option. An RJ-45 (8-wire) jack is provided for the Ethernet unshielded twisted pair (UTP) 10BASET connection. For Token Ring connections, an STP DB-9S jack is provided for shielded twisted pair connections, and a UTP RJ-45 jack is provided for unshielded twisted pair connections. Also included are an RJ-12 (6-wire) phone jack for external serial port connections (RS-232) used to configure the SNMP Agent, and a cable for the RJ-12 connection.
   a. Bring the network wire into the UPStation S3 and run it to the SNMP option board.
   b. Using the cable provided, connect an ASCII terminal or PC to the RJ-12 jack on the SNMP option. This is a temporary connection that should be disconnected after the SNMP is configured properly.

   The RJ-12 jack wire descriptions are as follows:

RJ-12 6-Wire Phone-Type Jack		
	TxD	Wire 2
	RxD	Wire 3
	SG	Wire 5
	Not connected	Wire 1, 4, 6

   If you are building or using your own cable, do not connect wires 1 and 6.
   If wire 1 or 6 is grounded, you will get a fault error.

   Terminal emulation parameters should be set as follows:
   · 9600 baud
   · No parity
   · 8 data bits
   · 1 stop bit

You are now ready to configure the SNMP option.

7.3   Configuring the SNMP Agent

The SNMP Agent can be configured using either an ASCII terminal or a PC running terminal emulation software. Be sure the terminal emulation parameters are set correctly as indicated previously.

To configure the SNMP Agent:

1. Apply power to the UPStation S3.

    Some networks support the BOOTP function in SNMP. The BOOTP server will provide configuration information for the SNMP. This feature can be enabled or disabled (the factory default is enabled). The SNMP Agent will request a TFTP file with additional instructions on assigning the addresses supported by BOOTP.

    Most networks do not run a BOOTP server and a TFTP server which automatically obtain network configuration information necessary for proper operation.

    If your network does not run a BOOTP server and a TFTP server, the BOOTP function should be disabled (BootP mode: off), and network configuration information must be entered manually. To manually enter the configuration information:

    a. Press Enter on your ASCII terminal or PC after the message **"BOOTP Server has not responded yet"** is displayed on the screen. Allow at least 60 seconds for a system response.

    b. At the **"Do you wish to go to the configuration menu?"** prompt, press Y to access the Configuration menu pre-loaded with the factory defaults **(Table 10 and Table 11).**

Table 10   Ethernet Configuration Menu

Configuration Menu	
Press the key to modify the entry	
-d sysDescr:	Uninitialized
-l sysLocation:	Uninitialized
-o sysContact:	Uninitialized
-n sysName:	Uninitialized
-a snmpEnableAuthenTraps:	Disabled
-i IP Address:	0.0.0.0
-m Net Mask:	0.0.0.0
-r Default Route:	0.0.0.0
-c Display/Modify Communities	
-t Display/Modify Trap Communities	
-b BootP mode: on	
-q Quit without saving configuration	
-x Exit, saving configuration to nonvolatile storage	
Press a key:	

Table 11   Token Ring Configuration Menu

Configuration Menu	
Press the key to modify the entry	
-d sysDescr:	Uninitialized
-l sysLocation:	Uninitialized
-o sysContact:	Uninitialized
-n sysName:	Uninitialized
-a snmpEnableAuthenTraps:	Disabled
-s Ring Speed	16Mbit/second
-i IP Address:	0.0.0.0
-m Net Mask:	0.0.0.0
-r Default Route:	0.0.0.0
-c Display/Modify Communities	
-t Display/Modify Trap Communities	
-b BootP mode: on	
-q Quit without saving configuration	
-x Exit, saving configuration to nonvolatile storage	
Press a key:	

You must enter an IP address and Net Mask for the SNMP Agent to operate.

2. Press "i," then enter the IP address for the SNMP Agent.

3. Press "m," then enter the Net Mask for the SNMP Agent.

4. Press "b," to toggle the BOOTP server "off" if you do not have a BOOTP server. This allows the SNMP to use the configuration information you enter in this screen and start the SNMP automatically each time you power up.

5. Press "x" to save the IP address and Net Mask. Saving these parameters eliminates the need to access the Configuration menu and configure the Agent each time you turn the UPS on. When you press "x," the SNMP Agent restarts automatically using the information you supplied in **Steps 2** and **3.** This is similar to rebooting a computer.

6. After the SNMP Agent has "rebooted", you can press "c" to access the Configuration menu and further modify the SNMP Agent configuration (if necessary).

7. Press the key associated with the parameter you wish to enter or modify, then type the desired value. Press Return when you are finished. If you are modifying communities and traps, a sub-menu is accessed from the Configuration menu by pressing the "c" or "t" key (see **Steps 8** and **9** below).

   · **sysDescr, sysLocation, sysContact,** and **sysName** are user-programmable text strings that give general information.

   · **snmpEnableAuthenTraps** is used to enable or disable the sending of Authentication Failure trap messages to manager stations. Enter "e" to enable or "d" to disable, then press Return.

   · **IP Address** is used to enter the SNMP Agent's IP address in dotted decimal notation (e.g. 126.10.200.3). Type the desired address, then press Return.

   · **Net Mask** is used to enter the Net Mask in dotted decimal notation (e.g. 255.255.128.0). Type the desired Net Mask, then press Return.

   · **Default Route** is used to enter the IP address of the network's default route in dotted decimal notation. Type the desired IP address, then press Return.

8. Press "c" to configure the Communities sub-menu. A menu similar to the following is displayed listing all of the communities currently in the configuration.

Table 12   Communities Configuration Menu

Communities Configuration			
#	IP Address	Priv.	Community
0:	198.30.160.58	write	public
1:	189.160.30.2	write	Supervisor
Enter the number of the community to modify/delete, "a" to add, or "e" to exit			
Command:			

You can:

   · Enter "a" to add a new community, then respond to the on-screen prompts.

   · Enter the entry number from the # column to modify or delete an entry. Then at the prompt, enter "d" to delete the entry, or "m" to modify the entry. Respond to the on-screen prompts.

   · Enter "e" to exit the sub-menu.

If you are adding or modifying an entry, you are prompted to enter:

   · **Community String (Name) -** Enter a text string identifier. Community strings are case sensitive (upper and lower case letters). Be sure to enter the string exactly as it was entered in the network management system.

   · **IP Address -** Enter the IP address of the manager station that is allowed to use this Community.

   · **Privileges -** Enter "r" for Read-only or "w" for Read-write.

When you are finished, the Communities sub-menu redisplays the current communities list. You can repeat **Step 8** (this step) to add or modify another community or manager station, or enter "e" to exit the sub-menu.

9. Press "t" to configure the Trap Communities sub-menu. A menu similar to the following is displayed listing all of the trap communities currently in the configuration.

Table 13   Trap Communities Configuration Menu

Trap Communities Configuration		
#	**IP Address**	**Community**
0:	198.30.160.58	public
1:	189.160.30.2	Supervisor
Enter the number of the Trap Community to modify/delete, "a" to add, or "e" to exit		
Command:		

The Trap Communities sub-menu is virtually identical to the Communities sub-menu. If you are adding or modifying an entry, you will be prompted for the Community String and IP address. This IP address must be set to the network management station's IP address. Privileges (read or read/write) are not valid for the Trap Communities. All other aspects of the Trap Communities sub-menu are the same as the Communities sub-menu.

When you are finished, the Trap Communities sub-menu redisplays the current communities list. You can repeat **Step 9** (this step) to add or modify another community or manager station, or enter "e" to exit the sub-menu.

10. Exit configuration mode. You can:
    - Press "x" to save the new configuration to Flash EPROM (non-volatile memory). If any of the IP addresses have been changed, "x" causes the system to restart using these new parameters.
    - Press "q" to exit without saving the modifications.

Either option exits Configuration Mode and restarts the SNMP Agent. Make sure BootP mode is Off if you have modified the IP Address, Net Mask, or Community String. If On, BootP erases the new settings.

The SNMP option is now installed. To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

8.0   INTERNAL MODEM

8.1   Introduction

The internal modem option allows the Liebert UPStation S3 to communicate with the "outside world" over any standard analog telephone line. This feature makes it possible for someone at a properly equipped remote computer or a "dumb" terminal with a modem (PC compatible or MAC) to be notified automatically when an event requiring attention takes place at the UPS or the load. The modem option also enables the UPS to contact a pager.

The internal modem works with standard analog telephone lines and most standard telephone equipment. The UPS internal modem option will not work with specialized digital (data) telephone lines designed for nonstandard telephone equipment.

The internal modem option offers several communication options. You can configure the UPS to

- Accept incoming calls so a remote computer can connect to the UPS and serve as a monitoring station
- Make outgoing calls to one or two remote computers in an attempt to notify of a pressing alarm condition
- Dial a pager and leave the specific number (maximum 16 digits) for a return call/monitoring session

This flexibility ensures that you or some other responsible person will be contacted when an event occurs that requires notification and/or direct attention. In addition, you can contact the UPS and remotely monitor the status of the UPS and the load.

Depending on how you intend to use the internal modem option, you may need to purchase and install a communication software package. Several packages are available commercially including ProComm® and Telix®. You can even use the Microsoft Windows® Terminal (TERM.EXE) application.

8.2   Installing the Internal Modem Option

Before you begin the installation process, read through these instructions and take all necessary safety precautions to protect yourself and the equipment you are about to install. Observe all warnings and cautions listed in the front of this manual when wiring the modem.

8.2.1   Mounting Instructions

1. Open and de-energize the UPStation S3 as instructed in **1.1 - Opening the UPStation S3.**
2. Set the modem J2 jumpers as follows:

   1—3
   2—4
   6—8

3. Connect one end of the cable assembly 12-793687-01 to Connector J3 on the modem option. See **Figure 17.**
4. Install the modem assembly in an available option slot.
5. Connect the other end of the cable assembly 12-793687-01 to Connector J6 or J7 on the main controller board. See **Figure 17.**
6. Connect your phone line to the Modem option. Use only one of the connector locations labeled J1, J4, or J5.
7. If you do not intend to install additional options at this time, close the UPS and restart it following the instructions in **1.3 - Closing and Restarting the UPStation S3.**

To ensure proper operation, refer to **Appendix A - UPStation S3 Options Testing Procedures** for option testing procedures.

Figure 17 Power Connections to the Modem Board
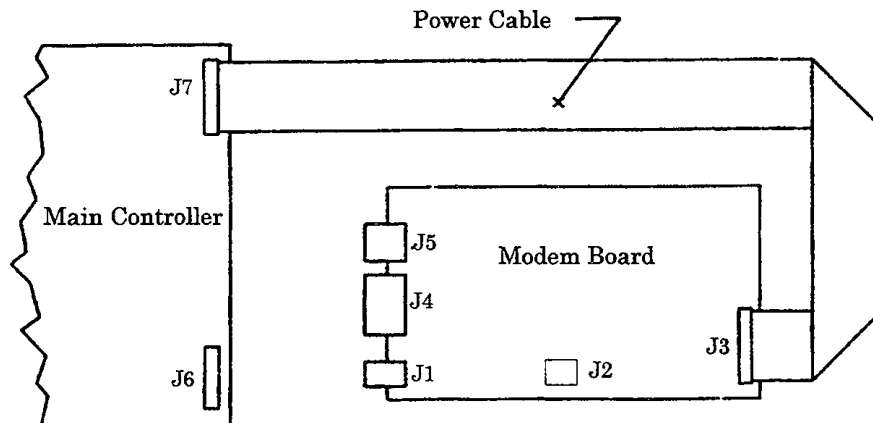
8.3   Operating Instructions

The following sections give the information you need to use the internal modem option for incoming calls and outgoing calls including calls to a pager and calls to another modem. In addition, the operating instructions give details on entering and editing phone numbers and testing the modem.

8.3.1   Configuring the Modem Mode and Call #2 Settings

The Modem Mode setting controls the communications capability of the internal modem. The "Call #2" feature specifies when the modem will dial the second of the two phone numbers. Set the Modem Mode and Call #2 as follows:

1. From the Main Menu, press the right arrow to display **1. Configuration,** then press Enter.
2. At the **1. Configuration** screen, press the right arrow to display **B. Change Settings.** Press Enter.
3. At the **Input Voltage** screen, press the left arrow to display **Advanced Configuration.** Press Enter.
4. At the **Input Wiring** screen, press the right arrow to display the modem configuration screen:

> **Modem Mode: BOTH**
> **Call #2: ALWAYS**
> **Dialout Site ID:**
> **YOUR UPS**

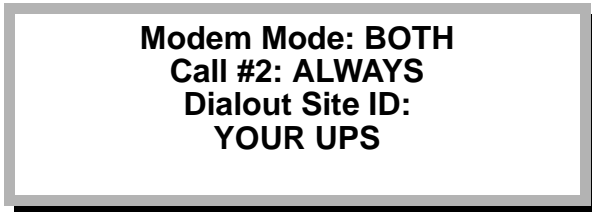5. Press Enter at the Modem Mode Screen and the Modem Mode selection will start blinking. Press the right arrow to display the desired Modem Mode:
    *   **IN -** enables the modem to receive incoming calls only. It cannot make outgoing calls.
    *   **OUT -** enables the modem to make outgoing calls only. It cannot receive incoming calls.
    *   **BOTH -** enables the modem to receive incoming or make outgoing calls.
    *   **OFF -** disables the modem. It cannot receive or make calls for remote communication.
    Press Enter.
6. At the blinking Call #2 selection, press the right arrow to display the desired Call #2 option:
    *   **#1 Fail -** the modem will dial the second number **only** if the first number is a pager **or** if connection to the first number (a modem) was not successful.
    *   **Always -** the modem always calls both phone numbers.
    *   **Never -** the modem will not dial the second number regardless of any other instruction.

    NOTE
    The Modem Mode setting overrides the Call #2 setting. In other words, if the Modem Mode is set to OFF or IN, the Call #2 setting is irrelevant because both of these modem modes disable outgoing calls.

7. Press Enter to accept the displayed option.
8. At the Dial-out Site ID line, enter a description (up to 16 characters) for the location where the UPStation S3 (and modem) are located.
    a. With the cursor blinking, press the right arrow to scroll forward or press the left arrow to scroll backward through the text character options to display the first character of the description. Characters include (as scrolling forward) the English alphabet, numeric digits 0 through 9, and a space. **HINT:** Scroll backward with the left arrow to access more quickly the space, digits, and letters near the end of the alphabet.
    b. When the first character is displayed, press Enter to accept it and continue to the second character.
    c. Repeat **Steps a** and **b** until the description is complete. You can enter up to 16 characters.
    d. When the description is complete, enter spaces to the end of the line (up to 16 characters), then press Enter to accept the text.

8.3.2   Using the Modem for Incoming Calls

The internal modem can receive incoming calls from another modem any time the UPS control logic has power. Almost any ANSI compatible terminal equipped with a modem can call into the UPStation S3 internal modem to monitor activity at the UPS.

The internal modem can also receive incoming calls from a remote computer equipped with a modem and communication software. Most communication software programs (such as ProComm and Microsoft Windows' Terminal application) provide an ANSI terminal emulation mode that can make a call into a modem in an UPStation S3 UPS.

Because a wide variety of terminals and communication software products are available, we cannot provide universally applicable, step-by-step instructions for dialing into the UPStation S3 internal modem from a remote modem. Please consult the documentation that came with your communications software or terminal to find out how to connect to a remote host.

Configuring the Modem to Accept Incoming Calls

Before the internal modem will answer any incoming calls, the Modem Mode setting must be set to either IN or BOTH (see **8.3.1 - Configuring the Modem Mode and Call #2 Settings).** By default, the modem mode is set to OFF.

The modem uses the following communication parameters:

Table 14   Modem Communication Parameters

Data Rate (Baud Rate)	2400
Parity	None
Data Bits	8
Stop Bits	1
Terminal Emulation	ANSI is the most popular emulation; however, some communication software programs will work using VT-51, VT-52, VT-100, or other terminal emulation protocols. Feel free to try other emulations for the best option.

The modem on the remote computer should also be configured with the same communication parameters to ensure accurate data transmission.

Receiving Incoming Calls

The internal modem in an UPStation S3 UPS receives incoming calls just as an online service such as CompuServe or a server on the Internet receives incoming calls. In this case, the UPS is the host and the ANSI terminal (or PC) is the remote unit that receives data as it is transmitted from the UPS. When the remote computer is no longer needed to monitor the UPS, the command to hang up and disconnect is given from the remote computer.

8.3.3 Using the Modem for Outgoing Calls

The modem can also make outgoing calls and initiate communication with a remote computer or terminal. This feature is especially useful when an alarm event requiring immediate attention happens. The UPS can be configured to notify someone about alarm conditions affecting the load or the UPS.

You can configure the modem to dial one or two telephone numbers. Either or both of these telephone numbers can be to another modem or a pager. A "priority system" based on the Modem Mode and Call #2 settings dictates the modem's calling scheme (see **8.3.1 - Configuring the Modem Mode and Call #2 Settings).**

If the Modem Mode is configured as Out or Both, the UPStation S3 internal modem attempts an outgoing call whenever a critical event occurs. The outgoing call initiates a communication link so the UPS can transmit notification to a responsible party. With each event, an ID Code and Delay code are assigned. The ID Code is another number or code that is sent to a pager to identify an event. The Delay code identifies a period of time for which the event must be continuously present before the modem will make an outgoing notification call.

The modem makes an outgoing call on the following events:

Table 15 Modem Dial-Out Events

Message	Event	ID Code	Delay
UPS Dialout test	Dial-out test	0	0
UPS battery test failed	Automatic battery test failed	1	0
UPS event, load on inverter	Alarm event, load is on inverter	2	60 sec
UPS load on battery	Utility outage, load on inverter, battery discharging	3	60 sec
UPS low battery warning	Low battery warning, load is in danger of shutdown	4	0
UPS load on bypass	Load has been transferred to static switch. Overload or other alarm condition present	5	60 sec
UPS shutdown	Load has been shut down	6	0

Entering and Editing Phone Numbers

Before the UPStation S3 internal modem can make an outgoing call to a pager or modem, you must enter the appropriate telephone number(s). Entering and editing telephone numbers is done as follows:

1. From the Main Menu, press the right arrow to display **1. Configuration,** then press Enter.
2. At the **1. Configuration** screen, press the right arrow to display **B. Change Settings.** Press Enter.
3. At the **Input Voltage** screen, press the left arrow to display **Advanced Configuration.** Press Enter.
4. At the **Input Wiring** screen, press the right arrow to display the Phone Number 1 configuration screen:

> **Phone Number 1**
> **000-0000**
> **Pager disabled**
> **Pager Delay: 13**
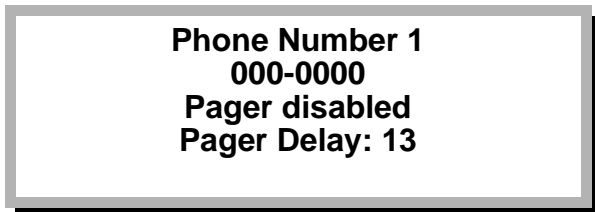
Press Enter.
5. With the cursor blinking at the phone number line, enter the access telephone number (Phone Number 1) for a modem or pager. This is the number the modem will call when dialing out.

If Entering a Modem Access Number

a. Press Enter to move the cursor through the telephone number field. This lets you place the cursor under a particular number if you are editing an existing telephone number.

b. Use the right and left arrows to scroll through the list of characters that can be used in a phone number. The characters given in **Table 16** are available to use in the telephone number. When you press the Enter key at the end of the number, the Pager Disabled line begins to blink.

c. With the third line (Pager Disabled) blinking, press Enter. This configures the access number as a modem number.

If Entering a Pager Access Number

a. Press Enter to move the cursor through the telephone number field. This lets you place the cursor under a particular number if you are editing an existing telephone number.

b. Use the right and left arrows to scroll through the list of characters that can be used in a phone number. The characters given in **Table 16** are available to use in the telephone number. When you press the Enter key at the end of the number, the Pager Disabled line begins to blink.

c. With the third line (Pager Disabled) blinking, press the right or left arrow. Both keys configure the access number as a pager number, and display an edit field where you will enter the pager display number.

NOTE

You can disable the pager mode after you have selected it by pressing the right or left arrow while the cursor is blinking on the first digit of the display number field.

d. At the display-number edit field, press Enter to position the cursor under the digit you wish to configure, then use the right and left arrows to scroll through the list of characters that can be used in a display number. The characters given in **Table 16** are available. Be sure to include any special characters that are needed to transmit the message correctly. The display number can be up to 15 characters long; however, it must end with the # sign.

NOTE

You may want to enter the number of the UPS modem in the display number field so the person with the pager can call the UPS via computer when an event occurs.

e. Press Enter after the last digit of the display number is configured to access the Pager Delay field. The pager delay value represents the number of seconds the modem waits after the last digits of the pager service number are entered before the service gives the cue to enter the display number. The default value is 13 seconds; however, you should experiment and adjust the delay period to the specific pager you are dialing.

f. Change the Pager Delay value by pressing Enter to position the cursor under the digit to change, then use the left and right arrows to change the number.

g. Press Enter when the delay is configured to continue.

6. If a second dial-out number is desired, press the right arrow to display the Phone Number 2 screen and repeat **Step 5** to enter a second telephone number for another remote computer or a pager

The following characters are valid for a telephone number:

Table 16   Telephone Number Characters

Remote Modem and/or Pager Characters	
Character	**Description**
0 - 9	Are the actual digits of the telephone number.
!	Force the modem to perform a "hook flash" (i.e., hang up quickly and release) operation. The hook-flash is sometimes used in office phone systems to signal the local switchboard to listen for special codes to follow.
- ( ) <SPACE>	Make the telephone number more readable. They are ignored by the modem, and can be placed anywhere in the field.
,	Forces the modem to pause 2 seconds before continuing to dial. A comma should be used when you must dial "9" to get an outside line. If the modem must pause for a bit after dialing 9 for an outside line, the complete dial string may looking like this: 9, 555-8243.
W	Causes the modem to wait before continuing. W means "wait for a dial tone."
R	Stands for "Reverse." The R command is a prefix which tells the modem to connect with an originate-only modem. Without the prefix, the UPStation S3 modem may not communicate with an originate-only modem. If used, R must be prefixed to any digits dialed, i.e., R 9, 555-8325.
T, P	Selects tone or pulse dialing. Only one of these can be used in a given number. They are both prefixes, the T stands for tone (i.e., touch tone) and the P stands for pulse. By default, the modem uses tone dialing. If the UPS is connected to a phone line which requires pulse dialing, a P must be prefixed to the number, i.e., P 555-8325.
@	Is used to wait past a recorded voice message that is requesting additional information input such as a recording giving instructions for entering an extension or password. When used, @ commands the modem to wait 5 seconds before continuing to the next part of the dial string.
;	Forces the modem to return to command mode after dialing. Unless you are very familiar with modems, we recommend that you not use this command.
Pager-Only Characters	
Character	**Description**
#	Signifies the end of the number. Most pager service equipment require that the pound symbol be used to terminate an entry.
*	Generates a separator character between fields in the display window. For example, if the pager display string is 555*8325, it appears in the pager window as 555-8325.
?	Holds the event ID code (pager only) before being transmitted to the pager service equipment. (See the Dial-out Events in **Table 15** for the list of ID codes and associated events.) For example, if the modem is dialing a pager because of a battery test failed, the ? character is replaced with the number "1" before transmission. The number 1 then appears in the pager display window at the same location in which it appeared in the pager display number field.

Calling a Remote Modem

The UPStation S3 modem can make two types of outgoing calls. The first and most reliable type of outgoing call is to another modem. When dialing to a remote terminal with a modem, a person on the receiving end can positively confirm the connection was made and that the message was transmitted successfully.

The UPStation S3 modem communicates with a computer equipped with a modem as follows:

- A dial-out event occurs that triggers the UPStation S3 internal modem to dial out to a remote terminal. If you have entered two numbers to remote terminals, the modem tries the first number up to three times, then tries the second if necessary. If the number rings busy, the modem calls up to 20 times before abandoning the attempt. (Please read **8.3.1 - Configuring the Modem Mode and Call #2 Settings** and **8.3.3 - Using the Modem for Outgoing Calls** for information on the calling sequence and configuring telephone numbers.)
- When the UPStation S3 modem connects with the remote computer, it sends the message "Press <SPACEBAR> to enter terminal mode." One of the following situations occurs:
    - If someone is present at the remote computer and presses the spacebar, the terminal enters "remote panel mode" and the UPS can transmit information about the event that caused the dial-out event.
    - If the remote terminal uses the Emerson Standard Protocol for packet-oriented communication, it can begin data transmission to the UPS.
    - If the UPS does not receive a response to the Press <SPACEBAR> message, it automatically transmits information describing the event that caused the dial-out event.
- When the transmission from the UPS is complete, the UPS sends another Press <SPACEBAR> message. An operator at the remote computer can press the spacebar to continue communications with the UPS. Otherwise, if the UPS receives no further communication from the remote computer within approximately 45 seconds, the UPS modem disconnects and clears the telephone line.

Calling a Pager

The second type of outgoing call the modem can make is to a pager. This type is not always as reliable as calls to another modem because each signal and response cannot be verified by the UPStation S3 modem. It must dial "blindly" and be configured with the proper waiting periods and response codes to ensure accurate data transfer.

Instructions for entering and editing telephone numbers for communication with a pager are given previously in **8.3.3 - Using the Modem for Outgoing Calls.**

Two numbers are required when the modem dials into a pager service:

- The telephone number of the pager service access line (the service number)
- The response number that is displayed in the pager window (the display number)

Connecting and communicating with a pager requires precise timing and correctly configured telephone number strings. The UPStation S3 modem communicates with a pager as follows:

- A dial-out event occurs that triggers the internal modem to dial out to a pager. The dial-out number is the first of the two numbers required by pager services.
- The pager service receives the call and may pause or emit several beeps to indicate that it is ready to receive the display number.
- The modem then transmits the display number that describes the event at the UPS. The display number is the second of the two numbers required by pager services. The modem uses a touch-tone generator to create the tones required by pager services after the call is received.
- When the modem is finished transmitting and has sent the # character indicating the end of the number, the pager service may respond with an acknowledgment message or more beeps.

Because pager services interact with the incoming call, you must configure the dial-out number with the correct amount of space and time delay so the modem pauses correctly while the pager service responds. You must also be sure both numbers contain the appropriate characters to send the correct message. Several special characters are available for use with numbers that will be received by a pager. Special characters are described in **Table 16.**

Calling a Dumb Terminal

# 9.0 APPENDIX A - UPSTATION S3 OPTIONS TESTING PROCEDURES

When all UPStation S3 options are installed, you should test each option to ensure proper operation.

Observe all precautions and warnings listed in the front of this manual.

9.1 Power Supply Option Test Procedure

1. Verify that the Power Supply option is installed correctly (refer to **2.0 - Power Supply).**
2. Connect two 20-Ohm, 50 W load resistors to TB1 on the Power Supply option as follows (see **Figure 18):**
   - From TB1-1 to TB1-4
   - From TB1-2 to TB1-3

Figure 18 Load Resistor Connection
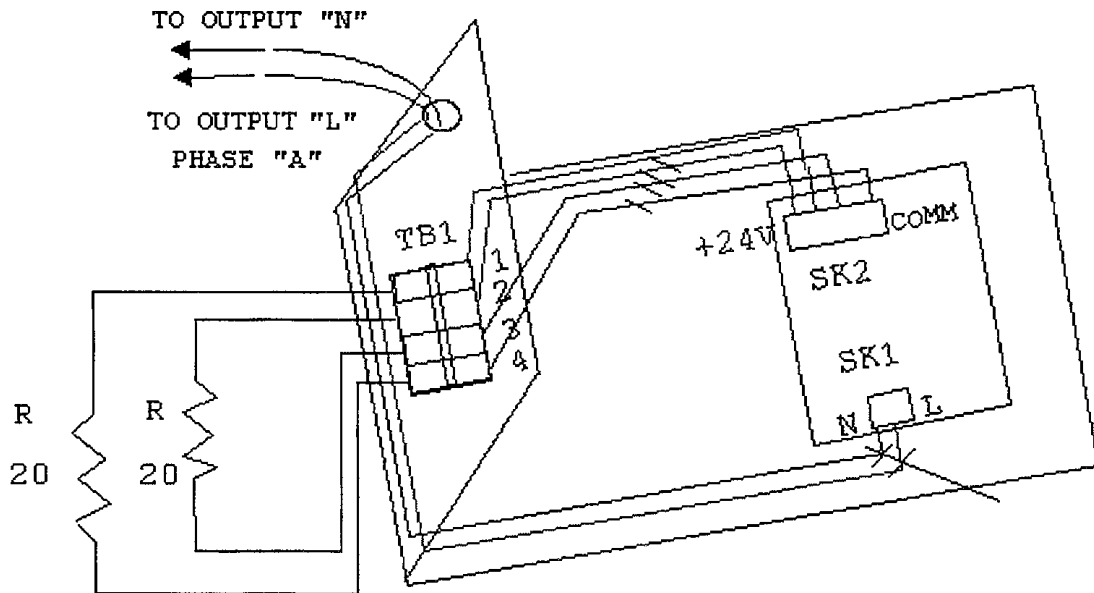
3. Start the UPStation S3.
4. With the UPS running normally, measure the voltage on TB1 and compare with the expected readings:
   - TB1-1 (-) to TB1-4 (+) should measure 24V, ±0.5V
   - TB1-2 (+) to TB1-3 (-) should measure 24V, ±0.5V

If the measured voltages are within the 24V (±0.5V) specification, disconnect the resistors for normal operation.

If the measured voltages are outside the 24V (±0.5V) specification, review **2.0 - Power Supply** and reinstall the Power Supply option.

9.2   Programmable Relay Board Option Test Procedure

The following procedure applies to both Programmable Relay Boards if two are installed.

1. Verify that the Programmable Relay Board is installed correctly (see drawing 83-795886-00 and refer to **4.0 - Programmable Relay Board).**
2. Apply input power to the UPStation S3.
3. Configure the programmable relay output contacts A1 and A8 to "Close on event, Output group, Load on UPS" (refer to **4.0 - Programmable Relay Board).**
4. Start the UPS.
5. With the UPS running normally, verify that the output contacts A1 and A8 on the Programmable Relay Board are closed, indicating that the option is connected and operating correctly.
6. When you have finished testing the Programmable Relay Board(s), stop the test and delete the test configuration for contacts A1 and A8 (refer to **4.0 - Programmable Relay Board).**

9.3 Remote Status Panel Option Test Procedure

The following procedure tests the operation of the Remote Status Panel. This test requires that the Programmable Relay Board connected to the Remote Status Panel be previously tested and operating correctly (refer to **9.2 - Programmable Relay Board Option Test Procedure).**

This test should be performed with the Remote Status Panel and each Programmable Relay Board that is installed (one or two).

1. Verify that the Remote Status Panel option is installed correctly (refer to **3.0 - Remote Status Panel).**
2. Set the relay output contacts 1-5 to the predefined factory default settings (refer to **3.0 - Remote Status Panel).**
3. Connect eight wires from the Remote Status Panel option (being tested) to the Programmable Relay Board (previously tested) as shown in **Figure 19.**

**Figure 19 Remote Status Panel to Programmable Relay - RSP Test Connections**
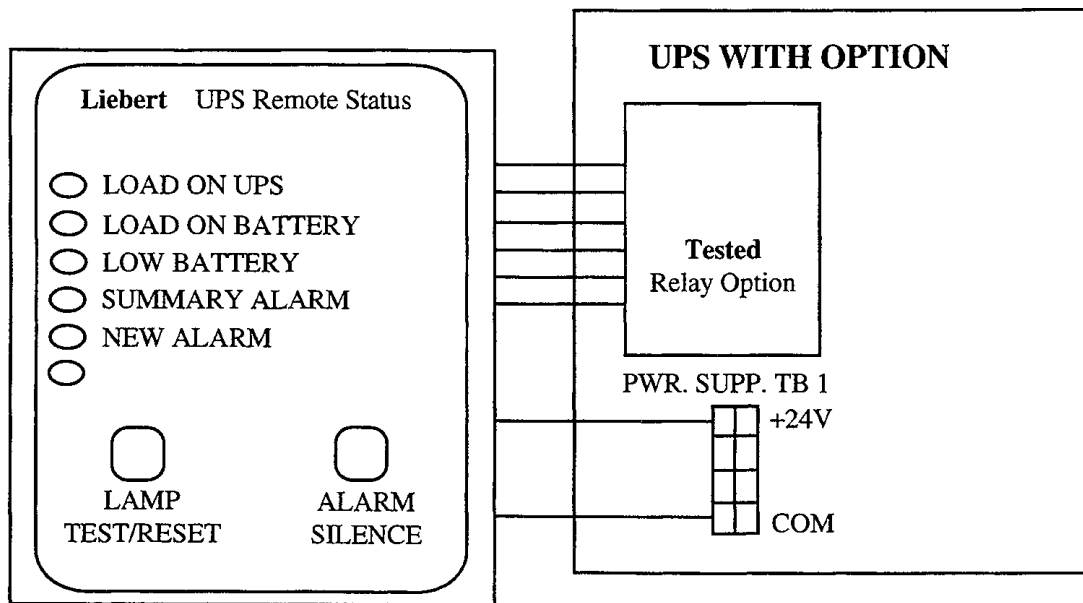
4. Start the UPStation S3.
5. With the UPS running normally, perform the following tests:
   - Verify that only the "Load on UPS" LED is lit on the Remote Status Panel.
   - Disconnect the UPS input power, then verify that the "Load on Battery", "New Alarm", and "Summary Alarm" LEDs are lit.
   - Reconnect the UPS input power, then press the Lamp Test/Reset button. Verify that the "Load on UPS" LED is lit and all other LEDs are unlit.
6. If a second Programmable Relay Board is installed in the UPStation S3, repeat **Steps 1** through **5** to test the Remote Status Panel with the second board.
7. When you have finished testing the Remote Status Panel with all Programmable Relay Boards, stop the test and reconfigure the relay output contacts 1-5 as desired (refer to **4.0 - Programmable Relay Board).**

9.4 Input Contact Isolator Option Test Procedure

1. Verify that the Input Contact Isolator option is installed correctly (refer to **5.0 - Input Contact Isolator).**
2. Connect eight normally open switches to the input contacts as shown in **Figure 20:**

Figure 20 Input Contacts
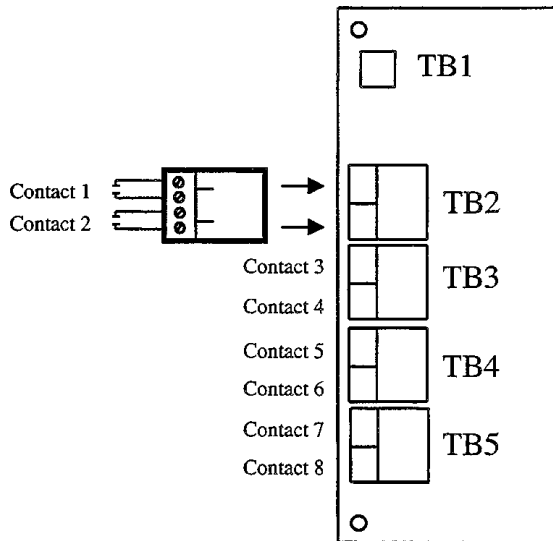
3. Start the UPS.
4. Configure all eight programmable input contacts to "Display warning message only" (refer to **5.0 - Input Contact Isolator).**
5. With the UPS running normally, close Contact 1 and verify that the UPS detected the closure. An alarm indicating Contact 1 is closed should appear on the UPS screen. Open the contact and the alarm should disappear.
6. Repeat **Step 5** for each contact.
7. When you have finished testing each contact, stop the test and reconfigure contacts as desired (refer to **5.0 - Input Contact Isolator).**

9.5　DC Ground Fault Detector Option Test Procedure

The following procedure requires an Input Contact Isolator to be installed and operating correctly (refer to **9.4 - Input Contact Isolator Option Test Procedure).**

1. Verify that the DC Ground Fault Detector option is installed correctly (refer to **6.0 - DC Ground Fault Detector)** and connected to the Input Contact Isolator.
2. Verify that the five CT wires are connected correctly.
3. Configure jumpers J1 through J5 as follows:

    J1—2-3

    J2—2-3

    J3—1-2

    J4—1-2

    J5—3-4 (or 1-2 to reduce sensitivity)
4. Start the UPS.
5. Configure programmable input contact #1 to "Display Ground Fault Message" (refer to **5.0 - Input Contact Isolator).**
6. Using approximately 10 feet of 18 AWG wire, connect one end to the positive terminal of a 24 V variable power supply. Loop the other end through the Ground Fault CT ring in the UPS and connect it through a 1K resistor and an ammeter back to the negative terminal of the power supply. Refer to **Figure 21.**

Figure 21　DC Ground Fault Detector Test Wiring
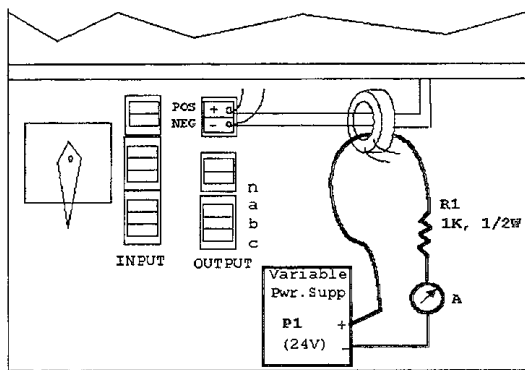
7. Begin raising the voltage on the power supply. The UPS should read "Display Ground Fault Message" when the ammeter reads between 15 and 30 mA. Lower the power supply voltage back to zero.
8. Reverse the current flow through the loop by swapping the positive and negative connections on the power supply terminals, then begin raising the voltage on the power supply. The UPS should read "Display Ground Fault Message" when the ammeter reads between 15 and 30 mA. Lower the power supply voltage back to zero.
9. Stop the test and remove the test wiring.

9.6 Modem Option Test Procedure

Before you begin the Modem option test, be sure you have the following:

- Remote terminal (or a computer with terminal software) configured as 2400 baud, 8 data bits, No stop bits, 1 parity bit, and ANSI emulation.
- Two telephone lines (one connected to the modem in the UPStation S3, the other connected to the modem in the terminal).
- Telephone numbers for both lines.

To test the modem:

1. Verify that the Modem option is installed correctly (refer to **8.0 - Internal Modem).**
2. Make all hardware connections to establish the modem link between the UPStation S3 and the remote terminal.
3. Start the UPS.
4. Configure the Modem Mode to "Both" (refer to **8.0 - Internal Modem).**
5. Configure Phone Number 1 as the phone number for the remote terminal (refer to **8.0 - Internal Modem).**
6. Use the remote terminal to dial the UPS phone number. When the modem answers, the UPStation S3 should communicate with the terminal allowing control of the UPS from the terminal.
7. When modem operation is verified, return to the modem configuration screen and set "Dial Test" to START, then press Enter. This causes the UPS to dial out to the terminal and send a "dial test" message. The Dial Test will automatically switch back to OFF when you press Enter.

End the test by pressing Spacebar to enter terminal mode, or wait for several seconds until the UPS times out and disconnects automatically.

Liebert®

UPStation® S3 Options

Three Phase

12 kVA to 24 kVA; 50 and 60 Hz

Technical Support

U.S.A.	1-800-222-5877
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Netherlands	+00 31 475 503333
E-mail	upstech@liebert.com
Web site	http://www.liebert.com
Worldwide FAX tech support	614-841-5471

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With more than 500,000 installations around the globe, Liebert is the world leader in computer protection systems. Since its founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

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- Power conditioning and UPS with power ranges from 250 VA to more than 1000 kVA.
- Integrated systems that provide both environmental and power protection in a single, flexible package.
- Monitoring and control — on-site or remote — from systems of any size or location

Service and support, through more than 100 service centers around the world, and a 24-hour Customer Response Center.