

OPERATING AND SERVICE MANUAL

**Universal Interface
Device 47**



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SAFETY NOTICE

Universal Interface Device 47 (UID47) connects two or more power supplies for master/slave configurations or for other user configured applications. Before applying power to the system, verify that the system is configured properly for the specific application and that ratings are not exceeded on any input or output terminal.

Installation and service must be performed only by properly trained and qualified personnel who are aware of dealing with electrical hazards. Ensure that the ac power line ground is properly connected to the power supply chassis. Furthermore, other power grounds, including those connected to application maintenance equipment, must be grounded for both personnel and equipment safety.

Always ensure that facility ac input power is de-energized prior to connecting or disconnecting the input and output power cables.



Caution: While the UID47 is a low voltage device, lethal voltages may be present inside the connecting power supply even when the ac input voltage is disconnected. Only properly trained and qualified personnel should remove covers and access the inside of the power supply.

During normal operation, the operator does not have access to hazardous voltages within the cabinet. Depending on the user's application, high voltages hazardous to human safety may be generated normally on the output terminals of the connecting power supply. Ensure that the output power cables are properly labeled as to the safety hazards and that any inadvertent contact with hazardous voltages is eliminated.

The connecting power supply is designed to be permanently connected to the power source requiring a readily accessible disconnect device incorporated in the fixed wiring.

These operating instructions form an integral part of the equipment and must be available to the operating personnel at all times. All the safety instructions and advice notes are to be followed.

Neither Magna-Power Electronics, Inc. nor any of the associated sales organizations can accept responsibility for personal injury, consequential injury, loss, or damage that results from improper use of the equipment and accessories.

LIMITED WARRANTY

The following is made in lieu of all warranties expressed or implied.

Magna-Power Electronics, Inc. warrants its products to be free of manufacturing defects for a period of two (2) years from date of original shipment from its factory. Magna-Power Electronics, Inc. will repair, replace, or refund the purchase price at its discretion, which upon examination by Magna-Power Electronics, Inc., is determined to be defective in material or workmanship, providing such claimed defective material is returned upon written authorization of Magna-Power Electronics, Inc., freight prepaid.

For products failing within the first 30 days of the warranty period, Magna-Power Electronics, Inc. will return the repaired product at its expense using a standard shipping method; after 30 days of the warranty period, the repaired product will be returned at the customer's expense using the customer's requested shipping method.

Damage due to corrosion, customer alterations, excessive dust, extreme environmental or electrical conditions, and/or misuse will be evaluated upon inspection. If inspection reveals that the cause of damage is not due to materials or workmanship, repair of the product will be treated on a non-warranty basis.

All electrical, commercial supply parts, and items not manufactured by Magna-Power Electronics, Inc. shall carry the warranty of the original manufacturer and no more, but under no circumstances to exceed the warranty period. Replacement parts shall be warranted for a period of 90 days.

Warranty labor shall only apply if the product, assembly, or part is returned to the factory freight prepaid and insured. Damage or breakage while in transit is not covered by this warranty.

Magna-Power Electronics, Inc. assumes no responsibility to Buyer for labor to diagnose and remove defective product and installation of replacement product. Furthermore, Magna-Power Electronics, Inc. is not liable to Buyer or to any third party for consequential or incidental damages under any circumstances, whether due to defect in the product, due to delay or failure of delivery, due to a failure of the product to perform as specified, or for any other reason or cause. Buyer and Magna-Power Electronics, Inc. agree that Buyer's sole remedy and Magna-Power Electronics, Inc.'s sole liability to Buyer is limited to repair, replacement, or refund of the purchase price of the product as described herein, whether Buyer's claim arises out of contract or in tort.

All claims against the warranty shall be the final determination of Magna-Power Electronics, Inc.

CLAIM FOR DAMAGE IN SHIPMENT

This instrument received comprehensive mechanical and electrical inspections before shipment. Immediately upon receipt from the carrier, and before operation, this instrument should be inspected visually for damage caused in shipment. If such inspection reveals internal or external damage in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. When referring to this equipment, always include the model and serial number.

RETURNING EQUIPMENT

Before returning any equipment to the factory, the following steps should be taken:

1. Contact our technical service department. Give a full description of the difficulty and include the model and serial number of the unit. On receipt of this information, we will give you service information or shipping instructions.
2. Packaging and method of shipment must be coordinated with the factory to insure safe delivery. All equipment returned for repair require a Return Authorization Number and must be insured. No returns will be accepted without assignment of a Return Authorization Number.
3. For non-warranty repairs, we will submit a cost estimate for your approval before proceeding.

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1.0 GENERAL INFORMATION

1.1 Description

This manual contains operation and maintenance instructions for Magna-Power Electronics' Universal Interface Device 47 (UID47). The UID47 allows users to connect power supplies for master/slave parallel or series operation or allows connections to external control circuitry with easy access screw terminals.

1.2 Features

The UID47 is a general purpose device for connection to Magna-Power Electronics' XR Series III, TS Series IV, MS Series IV, and MT Series VI power supplies. The device contains the necessary circuitry for configuring power supplies for master/slave parallel or series operation. Master/slave parallel operation allows two or more power supplies to equally share output current when connected together. Master/slave series operation allows two or more power supplies to equally share output voltage when connected together.

The UID47 can be used as an interface for connecting control and monitoring lines to external circuitry. It also contains an area on the printed circuit board for interconnecting wires and placing components for specific user applications.

1.3 IEC Symbols Used in Manual

The following IEC symbols are used in this manual.




Caution, risk of electric shock



Caution, risk of danger



Protective conductor terminal

3  Three-phase alternating current

1.4 Power Requirements

None

1.5 Specifications

The following specifications describe the published operational characteristics of the UID47.

UID47 connectors, see figure 1.1 for details:

JR1,2,3: 37 pin D-subminiature, female

JR4: 10 pin plug connector

Size: 1.210"H x 7.140"W x 4.010"D, see figure 1.2 for details.

Weight: 6.54 oz.

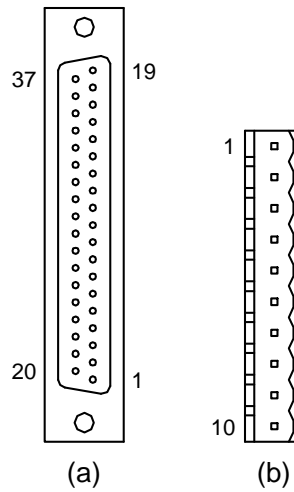


Figure 1.1 UID47 connectors (a) JR1,2,3 and (b) JS4
(viewed from UID47)

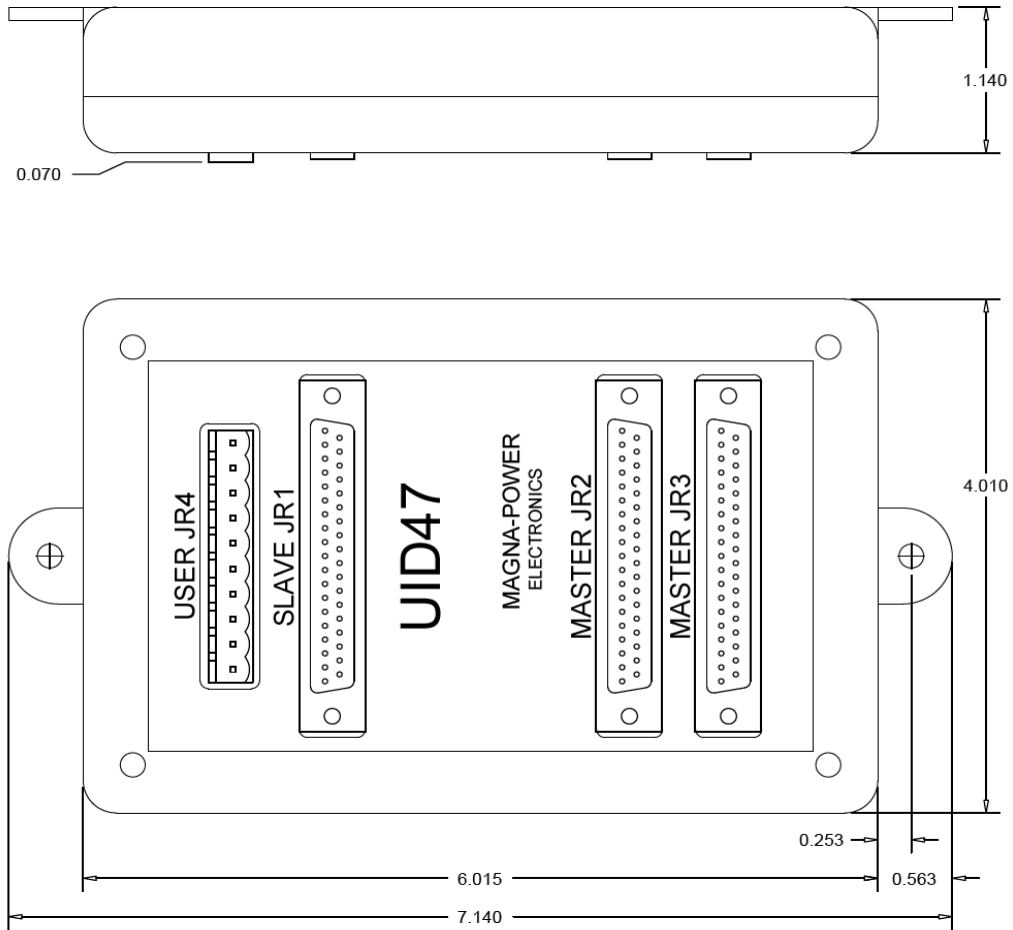


Figure 1.2 UID47 Enclosure

2.0 INSTALLATION AND OPERATION

2.1 General

The UID47 is a general purpose device for connection between Magna-Power Electronics XR Series III, TS Series IV, MS Series IV, and MT Series IV power supplies and user devices.

Figure 2.1 shows the electrical circuit of the UID47 and figure 2.2 shows jumpers connections for master/slave parallel and series operation. The following sections describe how to use the device for master/slave parallel and series operation and for custom applications.



Caution: As shipped, the UID47 is configured for master/slave parallel operation.

2.2 Master/Slave Parallel Operation

Two or more Magna-Power Electronics' power supplies can be connected in parallel to obtain a total output current greater than that available from one power supply. The total output current is the sum of the output currents of the individual power supplies. Each power supply can be turned on or off separately.

Master/slave parallel operation permits equal current sharing under all load conditions and allows complete control of output current from one master power supply.

To configure the power supplies for master/slave parallel operation, disconnect power to the power supplies and connect all units and loads in parallel as shown in Figure 2.3. Remove the cover of the UID47 and set the jumpers settings according to Figure 2.2 for master/slave parallel configuration. This is the factory default setting. Replace the cover and connect a 37-conductor male to male cable from connector JS1 of the master power supply to connector JR2 of the UID47. Connect a second 37-conductor male to male cable from connector JS1 of the slave power supply to connector JR1 of the UID47.

The jumper settings perform the following functions:

1. Jumper connection between terminals 25,26 connects the slave power supplies current monitoring outputs, ISO, to the master power supply current monitoring input, ISI. This allows the current of all slave power supplies to be summed along with that of the master power supply.
2. Jumper connection between terminals 23,24 connects the control lines between the master and slave power supplies. Command of the control line is automatically selected with the jumper connections.

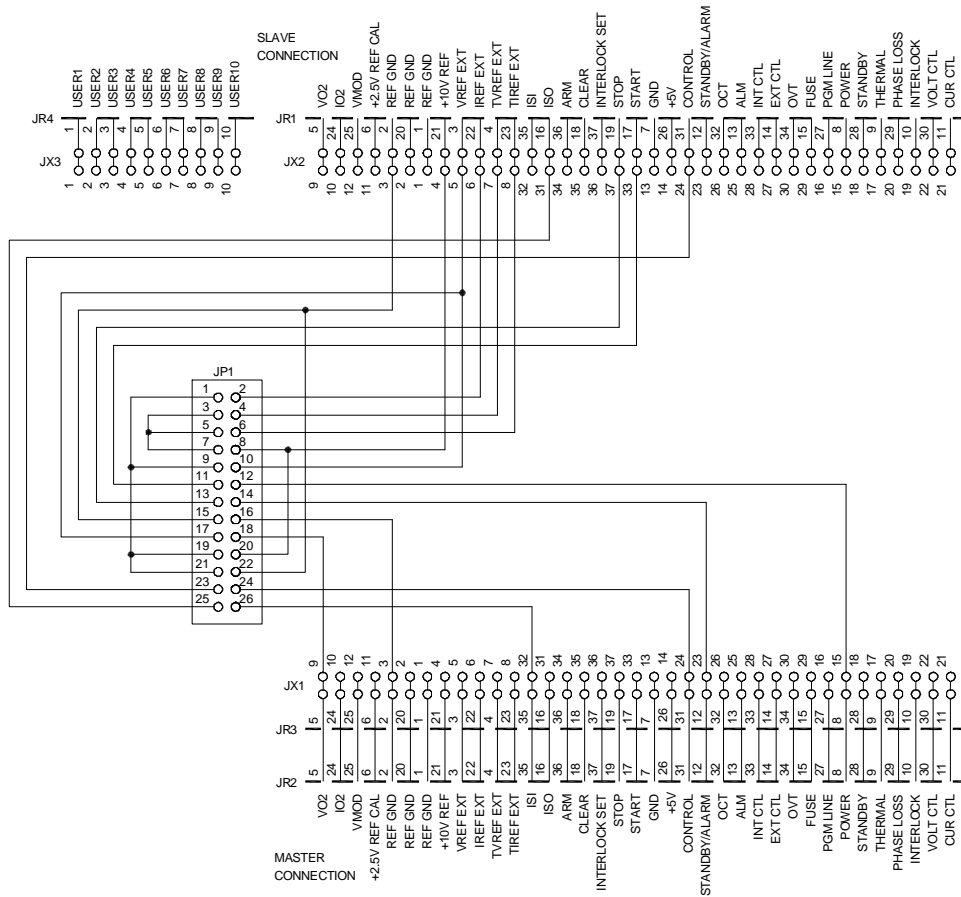


Figure 2.1 Schematic of UID47

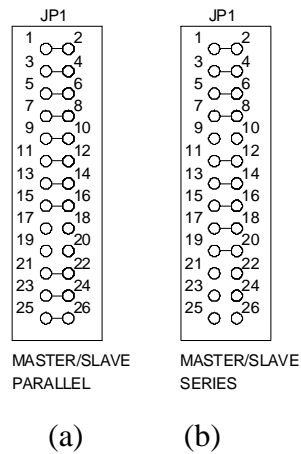


Figure 2.2 Jumper JP1 settings for (a) master/slave parallel and (b) master/slave series

3. Jumper connection between terminals 1,2; 9,10; 15,16 sets the external voltage and current set points to zero. This enables control of the slave power supplies from the master power supply.
4. Jumper connection between terminals 11,12 connects the power output digital control line of the master power supply to the start digital control line of the slave power supplies. This connection causes slave units to turn on when the master unit is turned on.
5. Jumper connection between terminals 13,14 connects the standby/alm digital control line of the master power supply to the stop digital control line of the slave power supplies. This connection causes the slaves units to turn off when the master unit is turned off or when a diagnostic condition appears.
6. Jumper connections between terminals 3,4; 5,6; 7,8 set the slave voltage trip and over current trip set points just beyond full scale values.

The slave power supplies must be configured for external program input. The master unit can be configured for rotary, keypad, external program, or remote input. Refer to the power supply manual for setting the configuration commands.

Three or more parallel connected power supplies can be interconnected by applying additional UID47 units; one UID47 is required for every slave power supply. As illustrated in figure 2.3 for two slave power supplies, follow the previous instructions plus connect an additional 37-conductor male to male cable from JS1 of the second slave power supply to JR1 of the second UID47. Connect a 37-conductor male to male cable between connector JR3 and JR2 of the two UID47 units. Interconnecting UID47 units routes master control and monitoring signals to all of the slave power supplies.

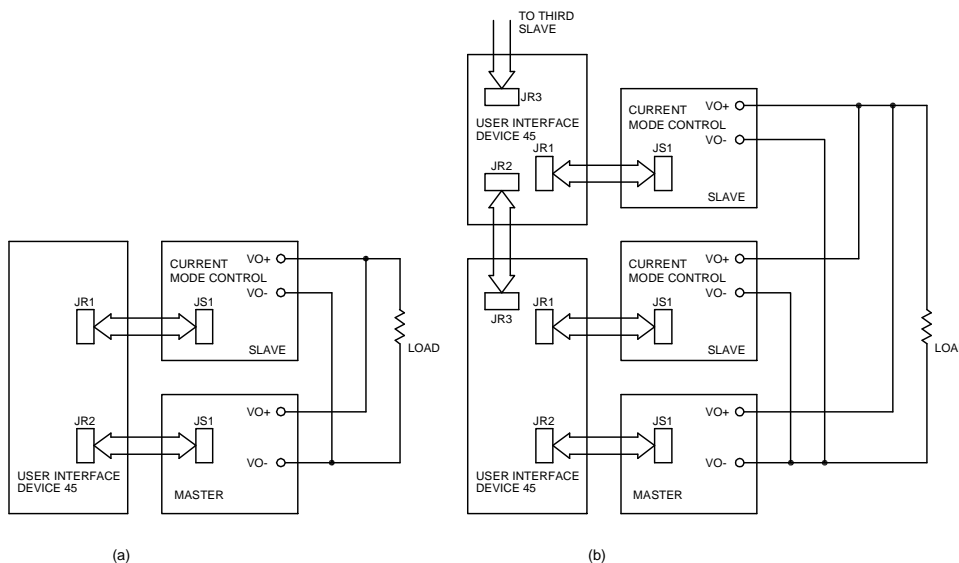


Figure 2.3 Master/slave parallel connection for (a) one or (b) more slave power supplies

2.3 Master/Slave Series Operation

Two or more power supplies can be connected in series to obtain a total output voltage greater than that available from one power supply. The total output voltage is the sum of the output voltage of the individual power supplies. Each power supply can be turned on or off separately.



Caution: Two or more power supplies may be connected in series. For models rated 1000 V or less and regardless of the number of units or the voltage ratings of the series connected power supplies, the voltage potential from any output terminal to chassis ground should not exceed 1000 Vdc. For models rated greater than 1000 V and regardless of the number of units or the voltage ratings of the series connected power supplies, the voltage potential from any output terminal to chassis ground should not exceed $2000 \text{ Vdc} + \text{VO}/2$ where VO is the output voltage of the power supply.

Master/slave series operation permits equal voltage sharing under all load conditions and allows complete control of output voltage from one master power supply.

To configure the power supplies for master/slave series operation, disconnect power to the power supplies and connect all units and loads in series as shown in Figure 2.4. Remove the cover of the UID47 and set the jumpers settings according to Figure 2.2 for master/slave series configuration. Replace the cover and connect a 37-conductor male to male cable from connector JS1 of the master power supply to connector JR2 of the UID47. Connect a second 37-conductor male to male cable from connector JS1 of the slave power supply to connector JR1 of the UID47.

The jumper settings perform the following functions:

1. Jumper connection between terminals 17,18 connects the voltage monitoring voltage, VO2, on the master power supply to the external voltage set point input on the slave power supplies. This makes the slave power supplies operate at the same voltage output as the master power supply
2. Jumper connection between terminals 11,12 connects the power output digital control line of the master power supply to the start digital control line of the slave power supplies. This connection causes the slave units to turn on when the master unit is turned on.
3. Jumper connection between terminals 13,14 connects the standby/alm digital control line of the master power supply to the stop digital control line of the slave power supplies. This connection causes the slave units to turn off when the master unit is turned off or when a diagnostic condition appears.
4. Jumper connections between terminals 1,2; 3,4; 5,6; 7,8; 15,16 set the slave current set point to maximum and the voltage trip and over current trip set points just beyond full scale values.

The slave power supply must be configured for external program input. The master unit can be configured for rotary, keypad, external program, or remote input. Refer to the power supply manual for setting the configuration commands.

Three or more series connected power supplies can be interconnected by applying additional UID47 units; one UID47 is required for every slave power supply. As illustrated in figure 2.4 for two slave power supplies, follow the previous instructions plus connect an additional 37-conductor male to male cable from JS1 of the second slave power supply to JR1 of the second UID47. Connect a 37-conductor male to male cable between connector JR3 and JR2 of the two UID47 units. Interconnecting UID47 units routes master control and monitoring signals to all of the slave power supplies.

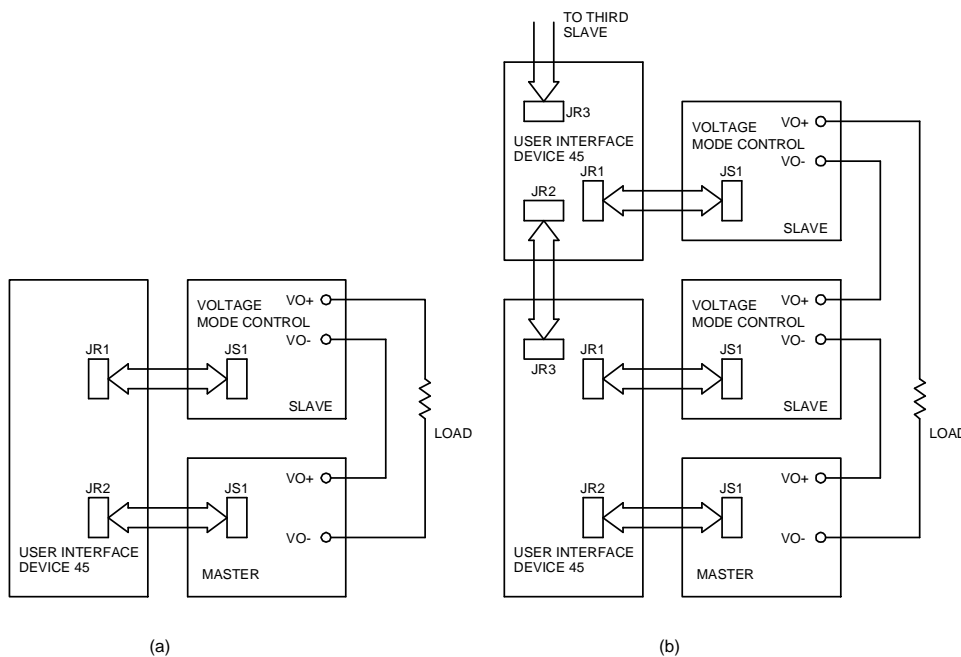


Figure 2.4 Master/slave series connection for (a) one or (b) more slave power supplies

2.4 Custom Configurations

The UID47 permits users to design and implement their own control circuitry to control or monitor the power supply's inputs or outputs. As shown in figure 2.5, the UID47 has a general purpose area on its printed circuit board to configure custom circuitry or to provide interconnections to utilize connector JR4. Table 2.1 shows the interface of master and slave connectors JR1 through JR3 with corresponding pad areas of JX1 and JX2. Connectors JR2 and JR3 are interconnected to allow daisy chain connections for multiple UID47 units.

JR4 is a 10 terminal connector that mates to a screw terminal plug. This connector is user defined

and can be utilized to externally monitor or control power supply functions. Table 2.2 shows the interface of connector JR4 and the corresponding pad area. For example, connecting a wire from terminal 1 of JX3 (USER1) to terminal 15 of JX1 provides a signal to indicate the master power supply is operational.

The multipurpose area in the center of the PCB enables the user to add circuitry within the UID47. The multipurpose area provides sufficient space to add components like or'ing diodes for simultaneously monitoring two diagnostic signals. One example is to connect the anodes of two diodes to the OCT and OVT alarm signal and interconnect the cathodes. This provides a diagnostic signal on either the OCT or OVT alarm signal.

Table 2.1 CONNECTION INTERFACE DESCRIPTION FOR JR1, JR2, AND JR3

JR1 JR2 JR3	JX1 JX2	Description	JR1 JR2 JR3	JX1 JX2	Description
1	1	REF GND	20	2	REF GND
2	3	REF GND	21	4	+10V REF
3	5	VREF EXT	22	6	IREF EXT
4	7	TVREF EXT	23	8	TIREF EXT
5	9	VO2	24	10	IO2
6	11	+2.5V REF CAL	25	12	VMOD
7	13	GND	26	14	+5V
8	15	POWER	27	16	PGM LINE
9	17	THERMAL	28	18	STANDBY
10	19	INTERLOCK	29	20	PHASE LOSS
11	21	CUR CTL	30	22	VOLT CTL
12	23	STANDBY/ALM	31	24	CONTROL
13	25	ALM	32	26	OCT
14	27	EXT CTL	33	28	INT CTL
15	29	FUSE	34	30	OVT
16	31	ISO	35	32	ISI
17	33	START	36	34	ARM
18	35	CLEAR	37	36	INTERLOCK SET
19	37	STOP			

Table 2.2 CONNECTION INTERFACE DESCRIPTION FOR JR4

JR4	JX3	Description
1	1	USER1
2	2	USER2
3	3	USER3
4	4	USER4
5	5	USER5
6	6	USER6
7	7	USER7
8	8	USER8
9	9	USER9
10	10	USER10

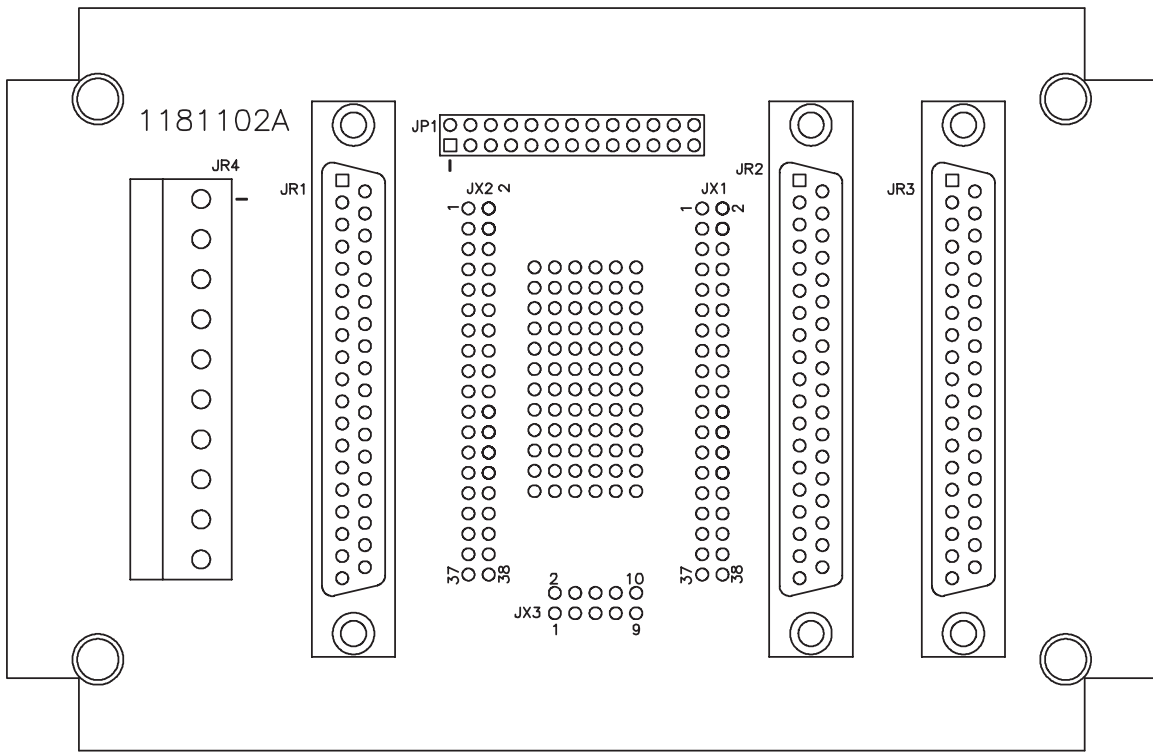


Figure 2.5 Printed circuit board layout of the UID47