PSBA-V5

Technical Guide

Comp-Aid

1 External connections

Pikosystems' Bed Adapter PSBA-V5 is used to control electrical bed functions along with or without the original hand controller supplied with the bed. The hand controller is unplugged from the motor control input of the bed and plugged into the PSBA. The supported connectors are DIN8 (J5&J6), DIN13 (J1&J2), 8-pole and 10-pole RJ connector (J3&J4).

The PSBA is then connected to the motor input with cables included in the PSBA-V5 package. PSBA then needs an external power supply (12V / 0,5A) and an external device to control its functions, for example Pikosystems' PSAR0-RJ receiver. These connections are described in the picture below.
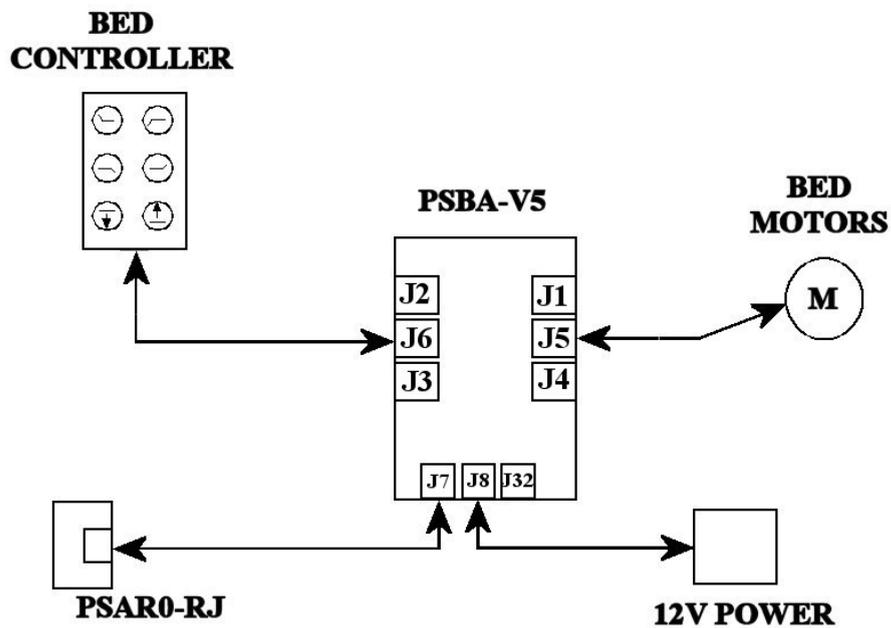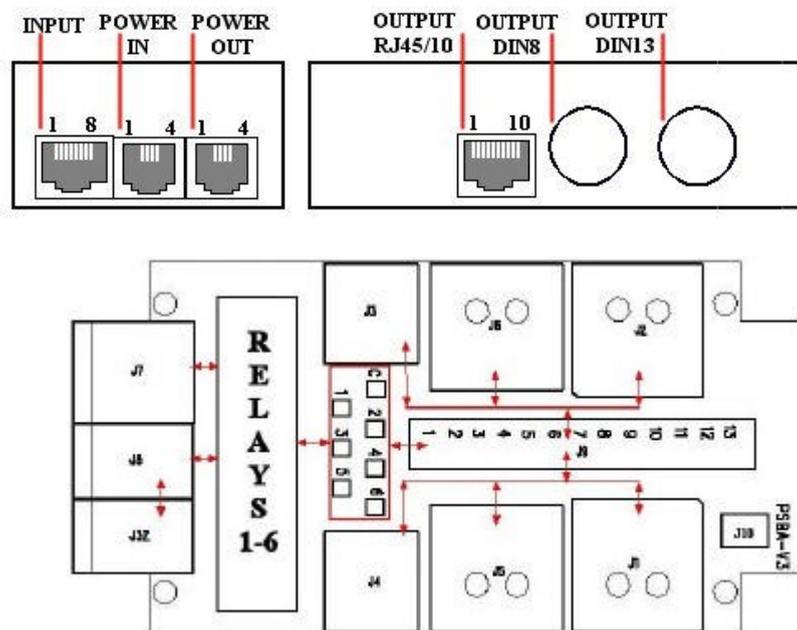
Picture 1   Connecting The PSBA-V5

2 Internal Connections

Connectors from J1 to J6 are connected to each other with 1-to-1 pin correspondence. This is to say that pin 1 on J1 is connected to pin 1 on all the other connector from J2 to J6, pin 2 on J2 is connected to pin 2 on all the others as well and so on. As J1 and J2 have 13 pins, J3 and J4 have 10 pins and J5 and J6 have only 8 pins, J5&J6 are connected to the first 8 pins on J1&J2 and J3&J4 and so on.

The external device connected to the J7 controls the relays inside the PSBA. A specific relay is activated when the corresponding pin on J7 is pulled low (grounded). The relays make a connection between the common node and a control node. Common node is the wire marked with "C" at the centre of the board and each control is a wire marked with a number from 1 to 6.

Each pin on the connector J9 is connected to one of the data lines on the 13 pins of the connectors J1 to J6.

Picture 2   Physical connections on PSBA-V5

3 Pin-Ins and Pin-Outs

PSAR0-RJ is connected to the PSBA with a standard 1-to-1 Ethernet cable, 12V Power with RJ10 cable. Bed controller and Bed motors can be connected to the PSBA with DIN8, DIN13 or 8-pole or 10-pole RJ connector. The pins of these connections are as follows:
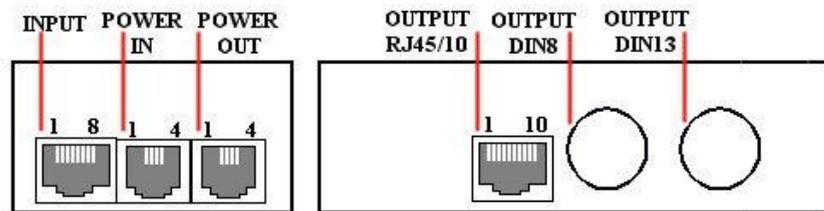
POWER OUT (J32)

PIN	FUNCTION
1	NOT CONNECTED
2	+12V
3	GND
4	NOT CONNECTED

INPUT (J7)

PIN	FUNCTION
1	GND
2	+12V
3	RELAY 1
4	RELAY 2
5	RELAY 3
6	RELAY 4
7	RELAY 5
8	RELAY 6

POWER IN (J8)

PIN	FUNCTION
1	NOT CONNECTED
2	+12V
3	GND
4	+24V

Picture 3   Connectors on PSBA-V5

4 INSTALLING PSBA-V5

In order to use PSBA-V5 as a bed adapter the bed has to be controlled normally by a (hand) controller that creates connections between one common node and one or more control nodes to control the motors. This can be verified from the bed schematics or the manufacturer.

4.1 Determining the Input and Output Pins

The first step in installing the PSBA is to find out the exact pinning of the input (motors) or output (hand controller) for the motors. Sometimes this is described in the technical manual of the bed but quite often the correct pinning has to be measured. The easiest way to do this is to connect the hand controller to the PSBA and then one by one pressing the buttons on the controller. When a button is being held down one can measure the pins connected together for the connector J9. This can be done for example with a multimeter in the "beep" or diode-mode. The connection between pins on the connector is signified by a beep or almost zero resistance between pins. This configuration of pins can be measured for each of the buttons on the hand controller (up to six since PSBA has 6 relays) and in order to use PSBA there has to be a single common node that is shorted in each and every one of the buttons making a connection.

As the connection between hand controller input and motor output signals inside the PSBA is 1-to-1 the hand controller may also contain for example some supply voltage lines. These signals are just passed through the PSBA as long as these lines are not the same as the control nodes.

4.2 Configuring the Internal Wiring

After figuring out the pin configuration of the bed the next step is to configure the internal wiring of the PSBA accordingly. The common node found on the previous phase is connected to the internal wire marked with "C". Then all the control node wires are marked with numbers from "1" to "6" and they should be connected to the control nodes measured in the previous phase as well. It is also possible to use only some of the control nodes and therefore only part of the functions on the bed. Then it is recommended that the ends of the remaining control node wires are isolated from making connection to any of the electrical parts of the PSBA with for example isolation tape.
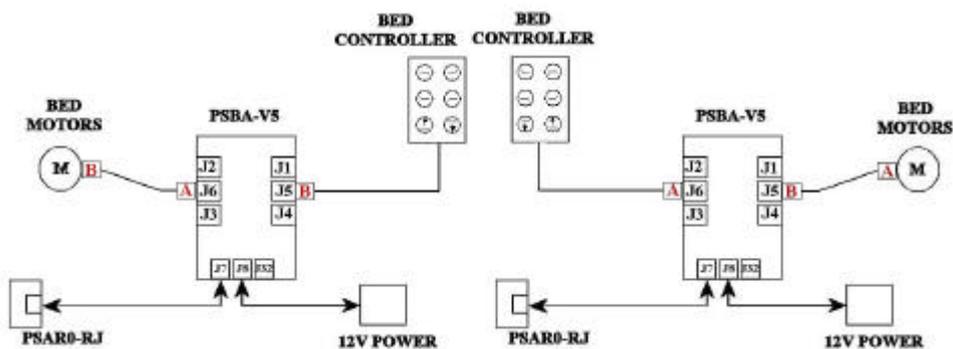
4.3 Connecting the PSBA to the Bed

The PSBA is now ready to be connected to the bed. The hand controller is connected in any of the connectors from J1 to J6 and the cable supplied with the PSBA to it's counterpart on the other side of the PSBA and from there to the motor input of the bed.

Please note that the DIN8 connectors J5 and J6 have a different pin layout on them. The J5 has a "U" shaped layout (TYPE B) where J6 has a layout the shape of a horse shoe (TYPE A). This is because some of the beds used with PSBA have either one of these layouts.
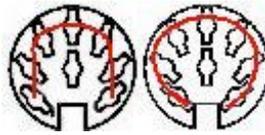
Picture 4   Pin Layout of the J5 and J6

Since the DIN8 cable supplied with the PSBA has "U" shape in the other end and "horse shoe" on the other end, the PSBA can be connected to a bed with either one these shapes in the hand controller and the motor input. This is done by connecting the hand controller to the more suitable connector first and after this connecting the DIN8 cable to the other in such a way that it fits well. This is described in the picture below with the connector types written inside the connector plugs.


Picture 5   Connecting Type A and Type B connector beds

PSBA can also be used with beds that have another kind of connector on the hand controller and that is not directly connectable to the PSBA. This can be done by for example making adapters which have connectors that fit the hand controller and the motor cable on the other end and the PSBA on the other. These cables are not provided by Pikosystems on small quantities.

When the bed and the hand controller have been connected the controlling device for PSBA should be connected next and thus making the power inputs and outputs the last to be connected. After this the installation is complete and the PSBA is ready for testing. If there are any changes that have to be made for example on the internal wiring, it is recommended that the power supply is disconnected before making these changes.

4.4 Using the external output

The PSBA has also the possibility of using one of the relays (K6) as a control relay for an external device for example for a nurse call or an alarm system. When using this relay to control an external device a single soldered short circuit on the card has to be opened. The common node of the PSBA and the bed hand controller is connected to the other pin of the connector J10 and this connecting has to be severed by cutting the connection between the pins described in the picture below.
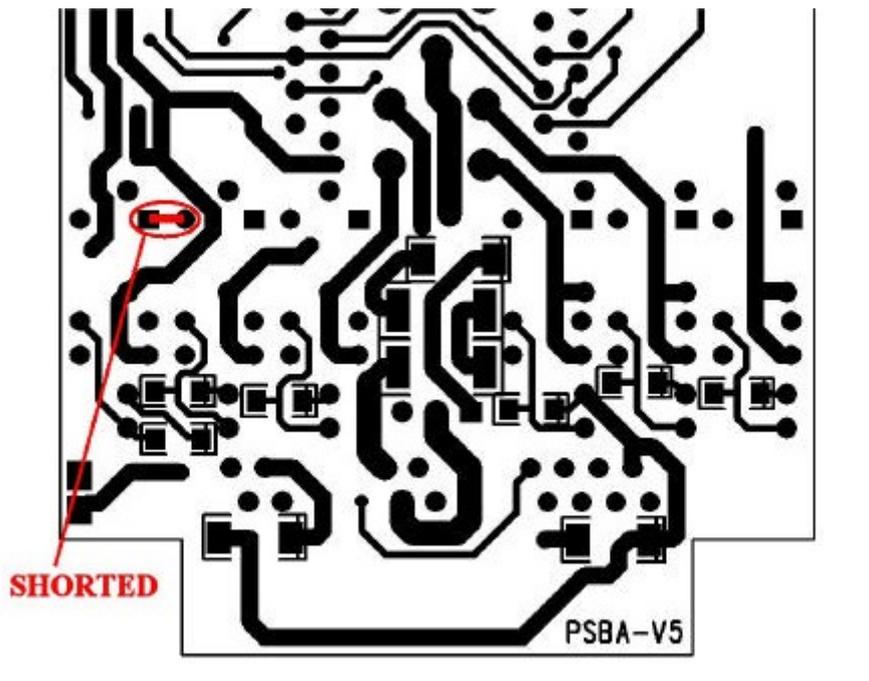
Picture 6   Short Circuit on PCB

After the soldered connection between the pins has been cut the connector J10 can be used to control an external device. The pins act as the common (C) and normally open (NO) relay pins.

5 Electrical Characteristics and Maximum Ratings

POWER INPUT	
SUPPLY VOLTAGE	12V or 24V
SUPPLY CURRENT	0,5A
POWER OUTPUT	
MAXIMUM VOLTAGE OUT	12V
MAXIMUM CURRENT OUT	0,5A
MOTOR OUTPUT	
MAXIMUM MOTOR CONTROL VOLTAGE	24VDC
MAXIMUM MOTOR CONTROL CURRENT	1A

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