

# Array Solutions' SixPak User's Manual



## Congratulations !

You have selected one of the finest, most reliable and fastest antenna switches on the market to automate and select antennas for your DX, communications, or contesting requirements. Please contact us if you have any question. Also please send a picture and description of your station showing the SixPak, and I will add it to our Users Group page. The SixPak has two components: a relay matrix and a control box, there are several options for the controller.

The relay matrix allows the selection of any 6 antennas by 2 radios or feedlines. Its lockout circuitry prevents both radios from selecting the same antenna. (The 6x1 type of SixPak is now replaced by our RatPak remote 6 way antenna switch.)

The usual set-up has one SixPak dual rotary control box, which is manually operated from the radios positions. The control box for the 6x2 contains two rotary switches and 12 LEDs, so the operator can see which antennas are selected.

## Set-up

The SixPak can be set up inside or outside the shack. Inside setup of the SixPak is accomplished by wiring **two 6-wire cables (rotor cable will work) or just use two cables with a total of 13 conductors inside** from the terminal strips of the SixPak to the terminal strips in the control box. Wire the control box before you assemble the circuit board to the box. It will be much easier this way. Radio A is the terminal strip on the left of the box, and radio B is the terminal strip on the right of the box. The terminal strips are silk-screen labeled for the 10 to 160 meter bands.

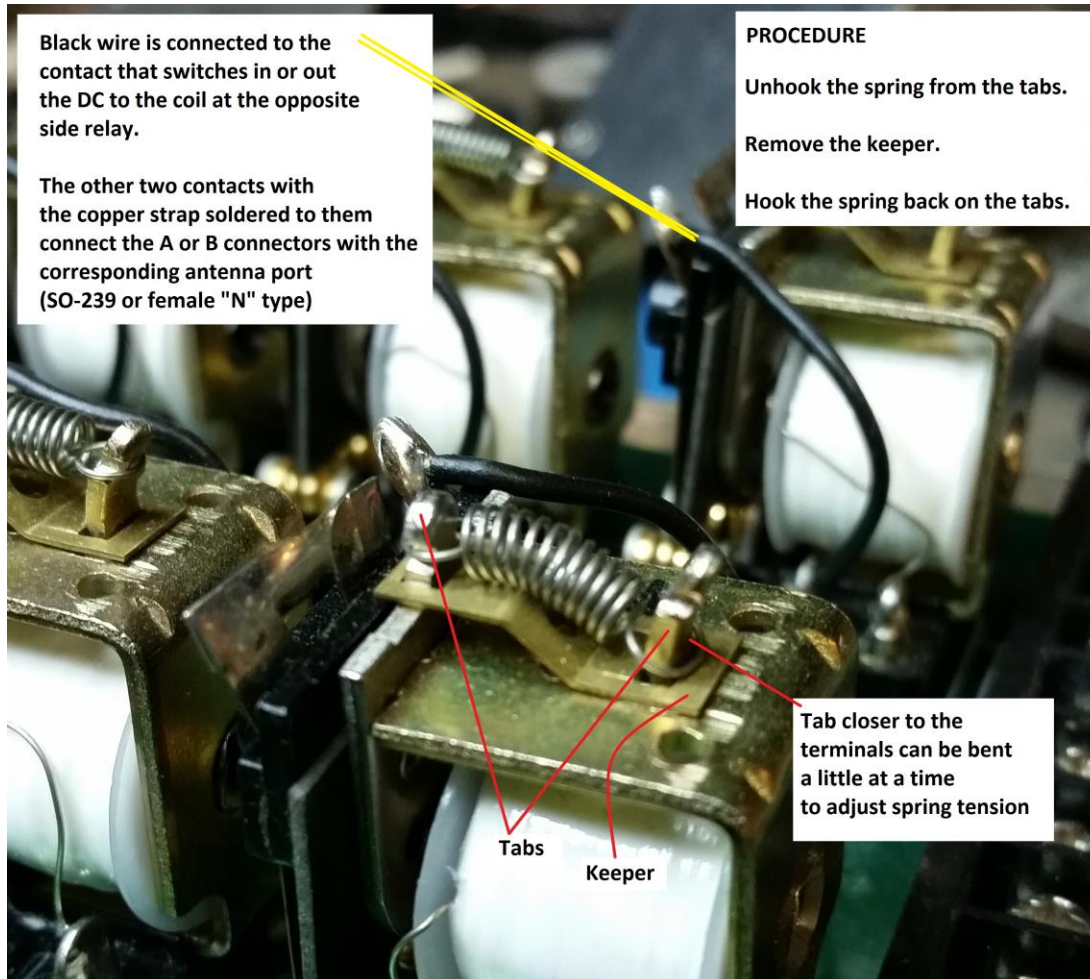
The other end of the cable should be connected to the terminal strip on the SixPak relay matrix circuit board. It's terminal strips are labeled A10 through A160 and B10 through B160. Other bands can be substituted. **TIP - put a plug like a Cinch™ Jones Plug on your cables so you can disconnect them during thunder storms.**

The SixPak has four have four #6 hardware screws to fasten the cover to the circuit board tray. The dual rotary controller box has two. Just remove the screws to access the inside of the boxes.

Also take a look at the corners of the SixPak cover if you plan on installing it outside to verify the paint has sealed the corners of the cover. If not, a dab of RTV, or silicon sealant on the inside

should seal it. Leave the space between the edges of the board and the cover box open so the box can allow evaporation or drainage of any condensed moisture.

**Important, Remove Armature keepers** – you will see that under the springs of each relay a small Z bent metal piece. This is an “armature keeper” it prevents the hinging part of the relay from flying off the hinges during shipping. We have noticed that these pieces will sometimes prevent the relays from closing properly. Please remove them by taking the spring off with a small needle nose pliers, slip off the keeper, then put the spring back on.



**Armature keepers removal. Spring tension is adjusted during testing before shipping, it requires experience to do it and normally should not be necessary for the user to adjust the tension.**

**Tri-band beams or a multi-band antenna** on a single feedline: Connect the wires of the bands to the SAME terminal of the SixPak relay matrix corresponding to the connector to which that antenna is attached. The LED will light showing the band being used at the moment; but the second radio will not be able to use the multi-band antenna because the lockout will be in effect.

Route all wires through the rubber grommets and holes in the boxes.

The dual rotary control box has two other terminals: power (marked +12) and ground (GND). Use a two-wire power cable from a very reliable 12-13.8 V DC power source available in most amateur radio stations. Current requirements are small 500 mA is more than enough. **Please don't use a wall plug mounted 12 V DC supply, because a failure or an accidental unplugging would open the antenna relay being used and possibly damage an amplifier.**

Connect a wire or a shield of your 6 wire cable to the GND terminal in the control box and also to the GND terminal in the relay matrix. If mounted outside on your tower, use one or both of the shields in the cable for this purpose. Shielded wire is not necessary and you may use any good quality cable.

Place the SixPak tray inside the cover and use the #6 hardware supplied to attach the tray inside the cover. The lower lip of the cover will help protect the connectors from the elements if mounted outside on the tower. It is to be mounted with the connectors facing down.

Place the control box circuit board into the rotary switch holes and secure with the washers and nuts provided for the rotary switches. The 12 LEDs should line up with the LED holes. Secure the cover of the box with the #6 hardware included.

This completes set-up for the Six-Pak configuration.

For Multi-Single or Multi-two contesting stations where the radios are physically separated it is possible to connect two control boxes in parallel. The LEDs would indicate to the two operators which bands were being used by the other operator. To use in this manner the unused A or B rotary switch would be switched to one of the unused positions. **You may want to tape the unused switches to prevent a mistake during the contest.**

## Antenna and Feedline set-up

Attach the feedlines from the antennas for the 10m to 160m bands to the corresponding RF connectors, on the SixPak's tray. Also attach the single or dual radio feedlines to the RADIO A and RADIO B ports of the SixPak. If the SixPak is mounted outside on the tower, seal the connection with your favorite method of sealing RF connectors. The SixPak cover has slots in its lower lip to accept the galvanized U-bolt supplied for mounting to a tower leg. Mount it with the RF connectors facing down. Even though it's very rugged don't use your SixPak as a foot step on the tower. **Also tape the coax cables to a tower rung or leg to strain relief them.**

## Use of Band Decoders

The BandMaster III will supply 12 V DC to the SixPak relays directly. Just wire these outputs in parallel with the corresponding terminals in the switch box. The rotary switch can be switched out of line by turning the knob to one of the unused 6 positions of the control box. If you have a failure in your decoder you can always go back to manual control with the rotary switch. The Bandmaster IV has no relay drivers and will share the band information from the radio with other controllers suitable for the SixPak (See the Controller Options section)

Array Solutions band decoders, Micro-ham decoders, W9XT, Top Ten Devices and other band decoders can be used to easily drive the SixPak. We even have a special level converter board with isolated relays that can be used to drive a SixPak outside remotely located on a tower.

## Key Benefits

- ❑ Six antennas shared by two radios.
- ❑ Safety interlocked to protect your radios
- ❑ Saves on hard-line if used on the tower
- ❑ High isolation between radios to avoid interference
- ❑ Teflon SO-239, or N connectors for reliability
- ❑ Extremely low insertion loss
- ❑ Will work up to 54 MHz
- ❑ Can be controlled from Automatic band decoders with 12 V DC outputs

## SixPak Controller Options

### Dual Controllers



SixPak Dual Rotary Controller: <https://www.arrayolutions.com/sixpak-dual-rc>



SixPak Dual Push-Button controller: <https://www.arrayolutions.com/sixpak-dual-ctrl>

### To Use this Push Button Controller

1. Wire the Radio 1 and Radio 2 relay drivers to the SixPak
2. Plug in DC power jack to supply 12V DC
3. If you wish to use it with a Band Decoders (BandMaste IVs recommended) daisy chain the ShackLan IV cables thru the BandMaster IV and one to the Push Button

controller. Set up your radio 1 and radio 2 addresses in the BandMaster IVs. Press the Auto buttons to allow the band decoders to take over.

4. If you want to use the unit from a PC plug in the USB cable to the PC. This uses the FTDI driver. Download the Control Center Software and set up to the instructions in this link <http://www.hamation.com/?ControlCenter.html>

Note: The dual controllers are good to use with radios that are installed side by side and the operator(s) can reach the controller. Otherwise, the individual controllers shown below, like the RatMaster, the PushButton or even the Rotary controller for the SixPak can be used at each operating position.



RatPak Rotary Controller: <https://www.arrayolutions.com/ratpak-rc>



RatPak Push Button Controller: <https://www.arrayolutions.com/ratpak-pbc>





**RatMaster, just like the RatPak push button controller but with built-in band decoder:**  
<https://www.arrayradiosolutions.com/ratmaster>

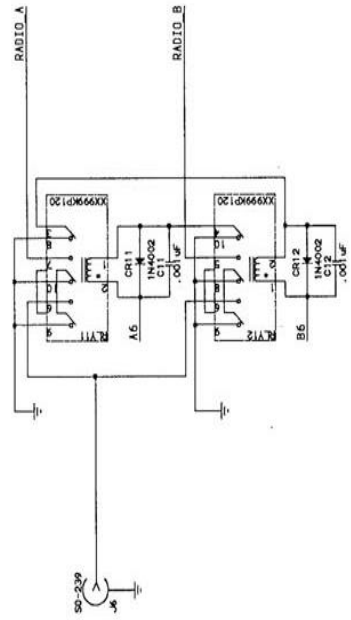
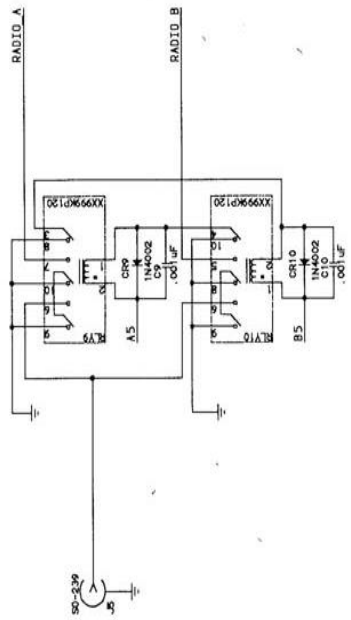
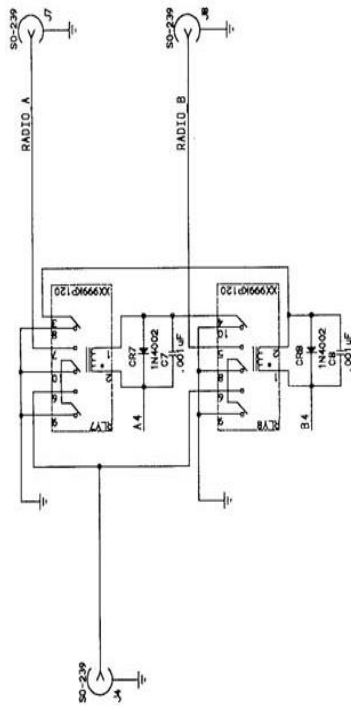
## SixPak Specifications

Measurement	14 MHz	30 MHz	50 MHz	Comment
Radio to Radio Isolation	-82 dB	-80 dB	-77 dB	signal inserted in one port to antenna buss, second radio port measured
Radio to Antenna Isolation	-60 dB	-55 dB	-50 dB	signal connected to antenna on one side, then opened for measurement
Insertion Loss Radio to any Antenna port	.05 dB	.05 dB	0.2 dB	signal inserted into antenna port and measured at radio port
SWR Radio to any Antenna port	1:1	1:1	1.15:1	
Power Rating all modes CW, SSB, RTTY	5 kW	5 kW	3 kW	This measurement is calculated not made
Dimensions Relay Box				11.5" x 6" x 3.5" , 6.5 lb 292 mm x 152.4 mm x 89 mm, 2.95 kg
Dimensions Control Box				3" x 6" x 3" inches, 1 lb 76.2 mm x 152.4 mm x 76.2 mm, 0.454 kg

Measurements made with calibrated HP power source, HP power meter, HP spectrum analyzer. These are typical numbers measured with a production unit.

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# Relay Box Schematics





# Dual Rotary Controller Schematics

