

# Array Solutions

## SixPak 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.

The relay matrix allows the selection of any 6 antennas by 2 radios or feedlines. It's lockout circuitry prevents both radios from selecting the same antenna. (The 6X1 type of SixPak is really now replaced by our RATPak remote 6 way antenna switch.)

The usual set-up has one SixPak control box, which is manually operated from the radio position. The control box for the 6X2 contains two rotary switches and 12 LEDs, so the operator can see which antennas are selected.



### SET UP

**6X2** the SixPak can be set up inside or outside the shack. Inside setup of the 6X2 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 and the control switch box have six #6 hardware fasteners to fasten the covers to the circuit board tray. Just remove the screws to access the insides 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 bottom open so the box can allow evaporation of any condensed moisture.

We have had questions as to why I don't ship the switch box assembled. Basically we used to but we had several switches damaged in shipping, and it's easier to use the terminal strips if you don't mount the PCB to the chassis first. It only takes a minute to assemble the PCB to the box. It is a fully assembled and soldered circuit card.

**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.

**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 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 VDC power source available in most amateur radio stations. Current requirements are small 500ma is more than enough.

**Please don't use a wall plug mounted 12V 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 6X2 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. In the 6X1 configuration the feedline goes to the Radio A port. 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 its 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 AUTOMATIC BAND DECODERS

Alpha Power™ DAS units will supply 12V DC relay voltages to the SixPak 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.

Array Solutions band decoders, Micro-ham decoders, W9XT, and 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 to two radios, or six antennas to one radio.
- Safety interlocked to protect your radios
- Saves on hard-line if used on the tower

- High isolation between radios to avoid interference
- Amphenol™ Teflon SO-239, or N connectors for reliability
- Extremely low insertion loss
- Will work to 6 Meters
- Can be controlled from Automatic band decoders with 12V outputs

## SixPak Specifications

Measurement	14Mhz	30Mhz	50Mhz	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	.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 inches 6.5 lbs
Dimensions Control Box				3 X 6 X 3 inches 1 lb

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



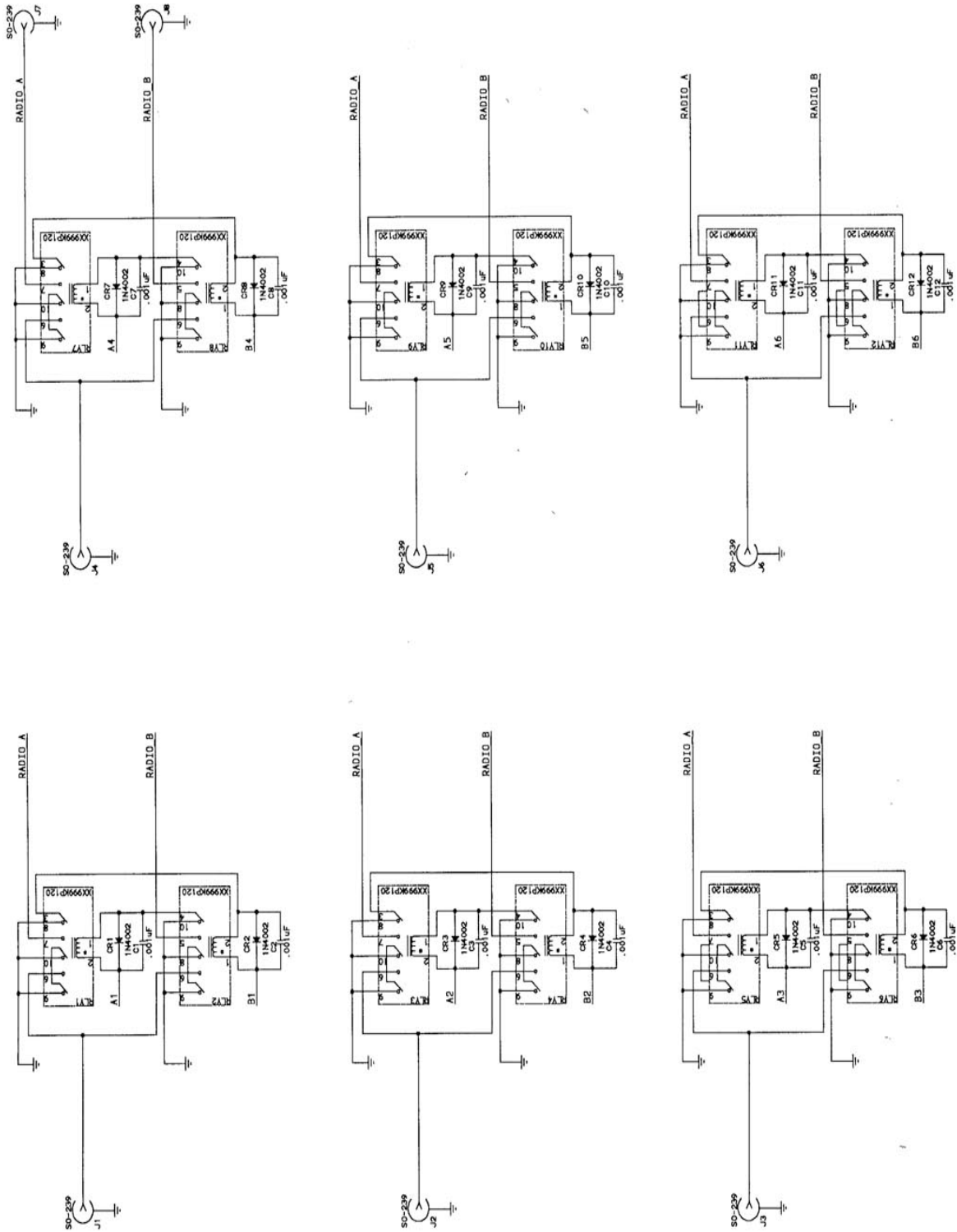
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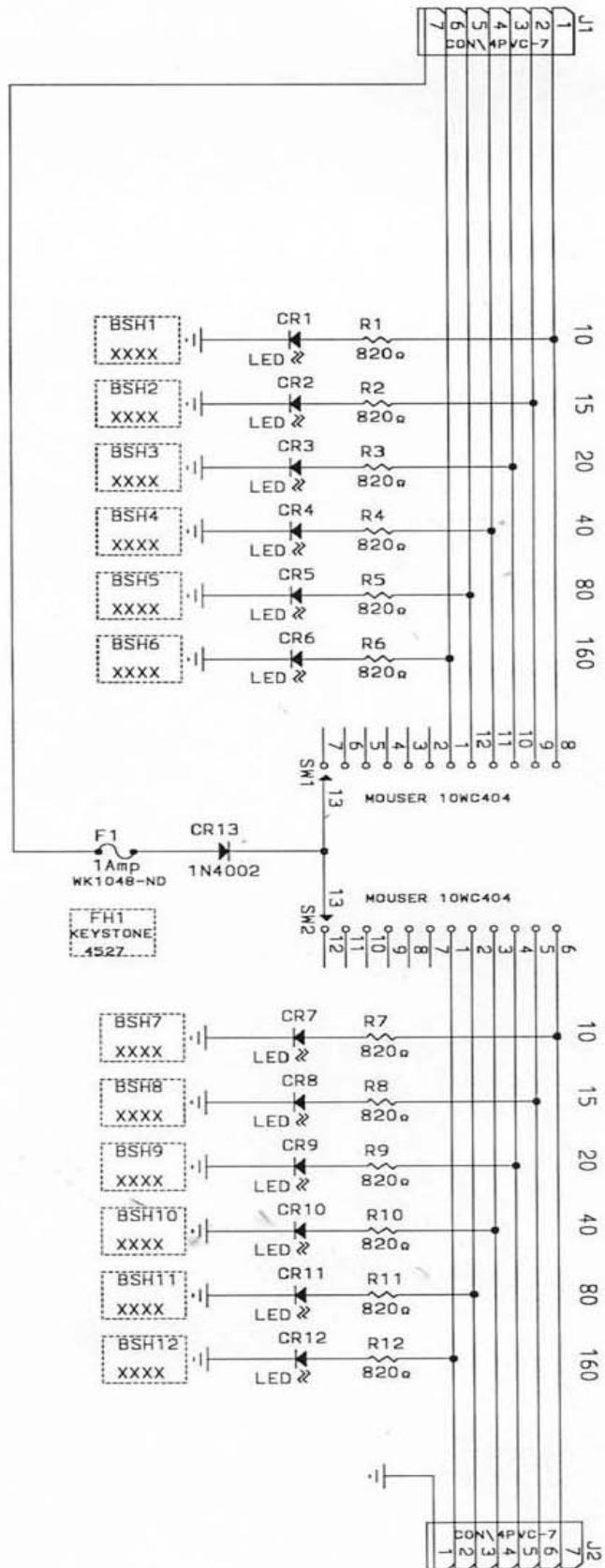
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# Schematic of Relay Box 1





Controller Schematic 1