

Product Review: MFJ-4726/MFJ-4726RC 6-Position Antenna/Transceiver Switch
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Introduction

Many of us have more than one transceiver and more than one antenna, and sometimes selecting the desired rig and antenna can be a messy job. In my case I've been using back-to-back MFJ-1704 4-port coax switches to select between my various radios and antennas. These switches are mounted under my desk to keep the coax clutter reasonable, but I do have to crawl under my desk to flip the switches. But after seeing the new MFJ-4726 remote switch in the latest MFJ catalog, it seemed like there might finally be a convenient, clean and simple answer to my radio/antenna switching problems.

The MFJ-4726

The MFJ-4726 consists of two separate 6-position relay-controlled RF switches mounted in the same box. One switch unit connects any one of six RF inputs to a common output. The other switch unit connects a common input to any one of six RF outputs. So by connecting the common ports together, you can connect any one of six inputs to any one of six outputs as selected by two rotary switches on the front of the unit – 36 input/output combinations in all! All RF connections are made through 1000 volt 16-amp relay contacts, and the de-energized state of all relays shorts the coax center conductors to ground. Therefore all unused inputs and outputs are grounded, and all inputs and outputs are grounded when the MFJ-4726 is turned off or power is removed. All inputs and outputs can also be remotely grounded by applying a ground to another input connector on the MFJ-4726. And, high voltage transient suppressors on both common ports help protect your radios from any voltage spikes that may be induced on an antenna input.

Finally, while the MFJ-4726 provides excellent desk-top control of your transceiver and antenna switching, you can still have quite an unsightly cable mess behind the MFJ-4726. To solve this, MFJ sells the optional MFJ-4726RC unit for remote control of the MFJ-4726. This lets you place the MFJ-4726 main unit under your operating desk, and control all radio and antenna switching with a conveniently located MFJ-4726RC through a pair of user-provided CAT5 cables.

Testing and Using the MFJ-4726

The MFJ-4726 is spec'd at 1500 watts from 1-60 MHz, and "is usable to 150 MHz". With relay contacts rated at 1000 volts peak, the power spec is pretty conservative.

Since $V_{pk} = (2P \times Z \times SWR)^{1/2}$, you can show that at 1500 watts, a feedline/antenna VSWR of 6.67:1 is required before you exceed the relay peak voltage rating. For lower transmit power, the VSWR can obviously be much higher.

But what does "usable to 150 MHz" mean? In the instruction manual, MFJ states that the VSWR at 2-meters may be higher than you would like do to MFJ-4726 internal stray inductances in this band. So the first thing I did was to measure every path combination at 21 MHz, 51 MHz, and 148 MHz. To do this, I connected the two common ports of the

MFJ-4726 together, and then alternately connected my MFJ-259B antenna analyzer across each of the input ports while alternately connecting a precision 50-ohm RF load across all output ports. I found that the worst-case VSWR at 148 MHz was just 1.5:1, and this only occurred on two of the 36 input/output port combinations. All other port combinations had a VSWR of 1.3:1 or better on all frequencies tested, including 148 MHz. I don't have a good way of measuring VSWR at 440 MHz, but I'm pretty sure that 440 MHz is not a viable band for this switch.

Next I checked isolation between on-line and off-line paths through the unit. For this test I used an Array Solutions VNA2180 vector network analyzer. Isolation is important if you have high power on a through path and another transceiver connected to another input on the switch, as you don't want enough energy leaking to the off-line transceiver to cause it damage. The worst case isolation I measured was 43dB on 6 meters and 48 dB on 10 meters. The isolation improves approximately 6dB per octave – i.e. the isolation on 20 meters is 54dB minimum. Depending on your power-level and band, the isolation of the MFJ-4726 might be a concern for you. As an example, I have a 600 watt ALS-600 amplifier. So on 10 meters the power leaked to an off-line transceiver could be 10 milliwatts, or 0.707Vrms (2Vp-p). This improves to 0.35Vrms (1Vp-p) on 20 meters for a 600 watt amplifier. These levels shouldn't cause problems with most transceivers, but this is something you should be aware of – especially if you are running a legal limit amplifier. And you might want additional isolation protection to an off-line transceiver if you use this switch with an amplifier on 6-meters.

After finishing the SWR tests, it was time to connect everything. My transmit sources include a Johnson Ranger/Drake 2B, IC-703, Yaesu MKV/ALS-600, and both the HF/6M and 144/440 MHz outputs of my IC-706MKIIG. On the antenna side I have a Butternut vertical, a MFJ-1775 40-2 meter compact dipole, a Hy-Gain 6M/2M/70cm beam, and a MFJ-267 dummy load/wattmeter. I mounted the MFJ-4726 (Photo A) under my desk so the tangle of coax cables is pretty much out of sight (Photo B).

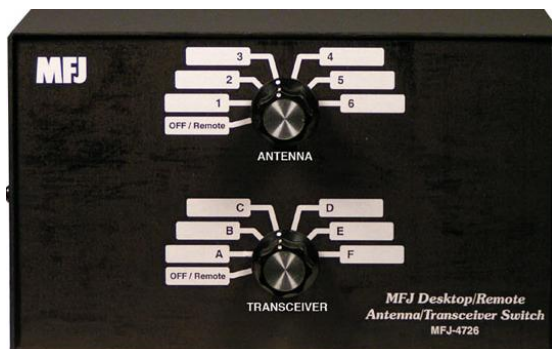


Photo A: The MFJ-4726 main unit

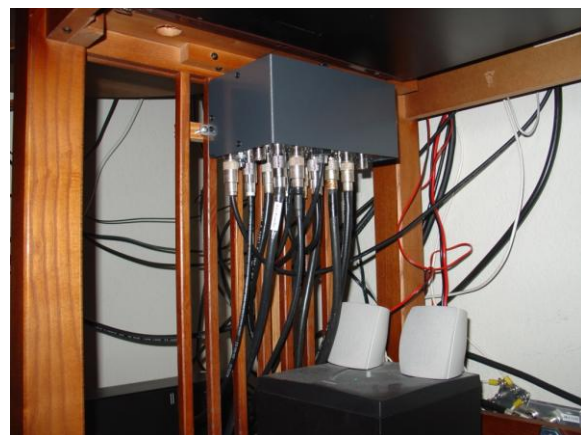


Photo B: MFJ-4726 mounted below the operating desk

Only the MFJ-4726RC remote control unit is visible, and conveniently located at my operating position (see Photos C and D). I used Casio XR-9X “black-on-clear” labeling tape to label the switch positions so I can easily change the labeling in the future.



Photo C: Author's multiple radio station



Photo D: Close-up of the MFJ-4726RC

Once everything was connected, I found operating with the MFJ-4726/4726RC to be a real pleasure! Since I normally operate HF CW, I can now easily switch between my Butternut vertical and MFJ-1775 compact dipole to pick the best antenna for a particular condition. I also like to leave my IC-706MKIIG turned on so I can monitor the 6-meter calling frequency (50.125 MHz). It is now a snap to instantly switch between my MKV and IC-706MKIIG to make quick 6-meter checks on either the MFJ-1775 dipole or to the Hy-Gain beam. Everything happens with just a flip of a MFJ-4726RC switch conveniently located at my operating position!

Conclusion

The MFJ-4726 really simplifies your transceiver/antenna interconnects, as well as providing convenient and easy selection of your various transceivers and antennas. I really like the fact that whenever I turn on my station main power, the last transceiver and antenna selected are on-line, and either can be changed in an instant. And when my main station power is turned off, all the transceiver and antenna ports are automatically grounded. If you have more than one transceiver and more than one antenna, the MFJ-4726/4726RC set-up bears looking into.