

# Workman 40M Antenna Stick: 3-Band Conversion

: Used with Icom 703 HFpack

By: WA3WSJ/pm

I just love to operate pedestrian mobile from anywhere I can hike, drive, bike, ski or crawl. So I put together a very nice Icom 703 Plus HFpack.



I did have one self-imposed limiting prerequisite - the counterpoise drag wire could not be any longer than fifteen feet. I have found that a longer drag wire just gets caught on to many objects around me as I walk through brush, cars etc. I also did not want change my drag wire for each band and carry the wires around as I walk the countryside etc. One counterpoise wire for 20m, 30m and 40m is a must for me.

I decided to use Workman Antenna Sticks because they are cheap at around \$13 each and lightweight. But, I needed to change antenna sticks every time I wanted to operate on a different band. Having this restriction, severely limited how far I could walk away from my truck as this is where I have the other antenna sticks.

I then took a Workman 40M Antenna Stick and proceeded to add turns on the top loading coil



for 40m CW. After tuning the stick for cw, I found that it needed approximately 2 5/8" of additional wire turns to the top turn of the stick to resonate at around 7.100mhz. I suspect that the added turns were needed due to the short counterpoise wire. By adding the extra turns, I now can operate the 40m band from 7.030 mhz to around 7.150 mhz. Since I operate mainly on CW, this portion of the band is fine for me.

The picture to the left shows how I added the some turns.

Next I proceeded to install taps on for the 30m and 20m bands. Hoping to have one antenna stick for 40m, 30m and 20m and only have to move a jumper to change bands on the antenna. After finding the tap points for 30m and then 20m, I installed small loops so I can attach a jumper wire to change bands. To form the jumper loop I used large paper clip wire to form the loop and then soldered it to the coil wire.

Here's where the taps ended up on the stick. Starting at the bottom of the stick where the top threads start, I placed my first paperclip connector at 22" up. I next placed another connector at 26.5" up from the start point. Now I added my top connector at 39.0" up from the starting point. To operate 20m just jump the top and bottom connectors. To operate 30m just jump the top and middle connectors. On 40m no jumper is used.



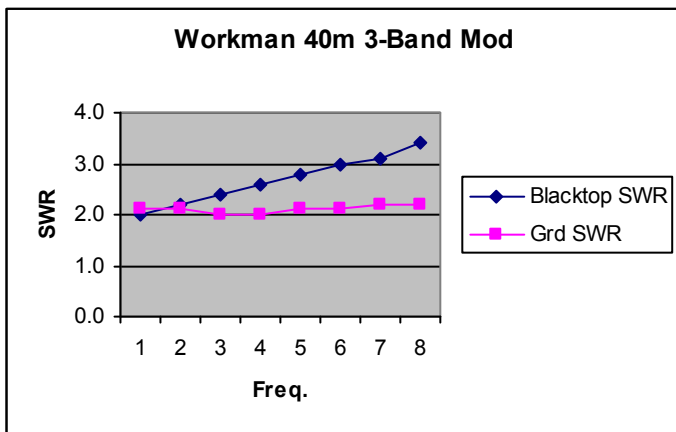
The overall length of the Workman 40M HF Stick Antenna is 7' - 10". I measured the height above ground or HAG to be about five feet. This is where the stick attaches to my ALICE Frame which is on my back. This means the top of the antenna is almost thirteen feet above ground level. I tried to stay around ten feet, but this is the lowest I could get without additional loading and further compromising antenna performance.

My counterpoise drag wire measures 14' - 9" and is just about the proper length to use to hike around here in Pennsylvania. Again, If you try to use a 33 foot drag wire, be aware that you'll need wide open spaces with few or no obstructions in your walking-path. Just walking by a parked-car will present a problem with a thirty-foot drag wire as the wire could easily get caught under a tire -hi! This brings up a good point. Make sure your drag wire can pull away from the ground connection! If your drag wire gets caught, you want it to pull off the pack etc. I use an alligator clip to attach my drag wire to the ALICE pack.

I've had it pull off only a few times, but it saved the wire from breaking off!

So, after finding the resonate point of 7.085 mhz on 40m, 10.100 mhz on 30m and 14.125 mhz on 20m, I installed my loops on the loading coil. I could have found closer resonate points to where I want to operate, but these are close enough for me. So, how much bandwidth do I have to operate on these three bands? Well, that seems to vary according to what type of material you are walking on -hi!

For testing purposes I used only two types of materials. I usually walk on blacktop or ground so these are the two ground materials used for my testing. On 40m, 30m and 20m bands it appears that actual ground, that is soil with grass on top seemed to work best. Look below for the charts of each band tested listing frequency vs SWR on blacktop and dirt covered with grass.

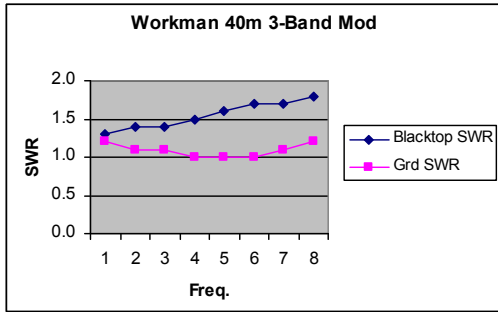


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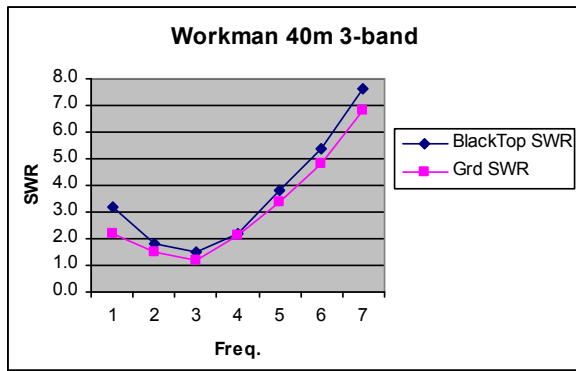
**BlacTop  
SWR**

**Grd  
SWR**

14.000	1.8	1.9
14.050	2.2	2.1
14.100	2.4	2.0
14.150	2.6	2.0
14.200	2.8	2.1
14.250	3.0	2.1
14.300	3.1	2.2
14.350	3.4	2.2



10. 100	1.3	1.2
10.110	1.4	1.1
10.120	1.4	1.1
10.130	1.5	1.0
10.140	1.6	1.0
10.150	1.7	1.0
10.160	1.7	1.1
10.170	1.8	1.2



7.000	3.2	2.2
7.050	1.8	1.5
7.100	1.5	1.2
7.150	2.2	2.1
7.200	3.8	3.4
7.250	5.4	4.8
7.300	7.6	6.8



## HF ANTENNAS

### Power Rated at 250 Watts P.E.P.

These HF antennas are designed to operate over the phone portion of HF bands.

Typical 2:1 VSWR bandwidth is:

75 Meter: 36 KHz.	15 Meter: 200 KHz.
40 Meter: 60 KHz.	12 Meter: 300 KHz.
	10 Meter: 500 KHz.
20 Meter: 150 KHz.	6 Meter: 1000 KHz.
17 Meter: 175 KHz.	

#### **TUNING INSTRUCTIONS:**

Insert the whip into lower section ferrule about four inches (as shown at right) and tighten set screw. Assemble with fiberglass lower section (as shown at left). Install a VSWR meter at the transceiver and apply 10 to 25 watts of power. Adjust the VSWR meter and output frequency for lowest VSWR reading, indicating resonance. If resonant frequency is higher than desired, loosen set screw and extend top whip until desired resonant frequency is found. If resonant frequency is too low, loosen set screw and adjust whip further into lower section. For best possible results, adjustments should be made in small increments.

**CAUTION:** If required, cut off the bottom of the whip to ensure it does not extend down into the coil. Failure to observe this precaution will cause extreme heat damage and void any warranty.

**VSWR** At resonance should be 1.5:1 or less when properly matched. When tuning is complete, tighten set screws securely.

**NOTE:** Bandwidth and VSWR will vary due to mounting location. If your installation has a VSWR over 1.5:1 at resonance, or you need to operate over a greater bandwidth, a tuner may be required.



Handling 250 Watts, these antennas are ideal for most portable and mobile applications. They are light weight and perfect for use with a variety of mounts. I use these sticks on my HFpack because they are light weight and at around \$13.00 each - cheap! I highly recommend the quick disconnect adapter.

Standard Specifications:  
Copper Wire: Heavy Duty

Rod: 3/8" Fiberglass , 250 Watts  
Standard 3/8" Threaded Mount

Average Dimensions:  
6m: 39" base / 19" Whip  
All HF: 49" base / 48" Whip

Workman WHF Series HF Stick Antenna

Bands Available:

- WHF06 - 6 Meters
- WHF10 - 10 Meters
- WHF12 - 12 Meters
- WHF15 - 15 Meters
- WHF17 - 17 Meters
- WHF20 - 20 Meters
- WHF40 - 40 Meters
- WHF75 - 75 Meters

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#### 2.5:1 SWR Measured Bandwidth / Band

20M: 13.800 mhz - 14.440 mhz

30M: 10.000 mhz - 10.300 mhz

40M: 7.095 mhz - 7.280 mhz

6M: 47.800 mhz - 54.400 mhz

Antenna bandwidth was measured with ALICE HFpack on my back using a 15 foot drag counterpoise wire. A SWR figure of 2.5:1 was used because the Icom 703 Plus antenna tuner will only match 3.0:1 or slightly higher.

On 40M I had to add turns near the top of the stick to get it to work on CW. My short counterpoise wire probably is the reason.

One last item to note, my whip length ended up at 46.5" from the top of the metal housing to the top of the stinger or whip.

I operate with this Workman Whip many places and with my Icom 703 Plus internal antenna tuner it works great. For around \$15.00 US, you really can't beat this antenna for pedestrian mobile.

72,  
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