



## Expanded Troubleshooting Guide: DB42

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### I ---- Intro

The DB42 switches the feed point on 20 m through 6 m from Normal to 180 Modes and for 30 m, 40 m. The default condition (no relay signals) is 20 m through 6 m 180 mode. This presents several challenges when troubleshooting because we are switching the feed point to different elements than you would expect and the software and hardware reflect definitions from other antennas.

You should always have the manual present when trouble shooting the DB42.

### 1 ---- Element usage on different bands

The DB42 has 3 elements that switch between Driven and passive. Each of these elements have relays to do the switching along with the coax switch which connects the coax to the correct element.

The Default condition with no Relay switch signals present is the 180 mode 20 m through 6 m.

So when you switch the controller off when the antenna is in any other mode it will stop working because the feed point will switch to the 20 m 180 mode.

In 20 m through 6 m normal direction the elements are as they are named on the boom and in the Create Modify mode Reflector (REF), Driver (DVR), Director 1(DIR1), Director 2 (DIR2) and Director 3 (DIR3).

In the 20 m 180 Mode the elements are used as follows REF= DIR3, DVR=DIR2, DIR1=DIR1, DIR2=DVR (driven element) and DIR3=REF

On both 30 m and 40 m Normal, Bid and 180 Modes REF=REF, DIR1=DVR (driven element) and DIR3=DIR

### 2 ---- Antenna out of calibration after using 40 m

40 m uses REF, DIR1 and DIR3 if the SWR changes on the higher bands after using 40 m this indicates one of these elements is not fully extending.

Make sure you are using the correct power supply for the DB42, if you have a remote driver the high power supply goes at the remote board.

Make sure the firmware in your controller is the latest version.



## DB42 (Continued)

To isolate which element is out of calibration set the antenna to 20 m, check the SWR and record it. Then use the Create Modify mode to set the Reflector to its minimum length and back to their original length, along the way check the SWR occasionally to make sure it changes.

After the element is back to its original length again, if the SWR is different than before then the element was out of calibration. Small difference like 0.1 is considered normal.

Repeat test for the DIR1 and DIR3.

There can be several reasons for the element getting out of calibration, check loop element trouble shooting.

3 ---- SWR high in 40 m 180 mode but not Normal mode. Or the other way around

Since the DB42 is a symmetrical 3 element on 40 m the SWR should be the same in the Normal mode as the 180 mode. If it is different then there is a problem with one of the three elements most likely ether REF or DIR3.

The most reliable way to figure out which one is to use create modify mode and look at the SWR.

Make sure the Driven element is at the Default length when doing the test.

Start by making both the REF and DIR3 short, around 700 inches

Next take REF and extend it, the SWR should start coming down as the element becomes the same length and slightly longer than the Driven element (DIR1)

Put REF back to 700 inches and repeat the test for the DIR3.

4 ---- High SWR some bands

If the SWR is good on some bands but not others there can be many causes.

With the SteppIR it is a general rule if it works on the lowest band of operation then it should work on the rest of the bands. The DB42 is not quite that simple but this still holds true if you consider how the antenna switching is working.

If the DB42 has good SWR Normal and 180 on 40 m then 30 m should also be good.

If the DB42 has good SWR Normal and 180 on 20 m then the antenna should be working on 17 m through 6 m also.

If the SWR is greater than 4:1 it generally means the Driven Element has problems or is not connected.

If the high SWR follows how the coax switch 20 m-6 m, Normal to 180, 20 m-6 m to 40 m, or 30 m it could be a problem with switching the driven element.

If the SWR is high on a single band but less than 2:1 then the problem could be a interaction with nearby objects.

Do to the configuration of the antenna you can verify all 5 elements are working by keeping the following in mind:



## DB42 (Continued)

1. DVR must work to have a good SWR on Normal Mode 20 m through 6 m.
2. DIR2 must work to have a good SWR on 180 Mode 20 m through 6 m.
3. DIR1 must work to get a good SWR 40M Normal Mode.
4. Reflector is best checked on 40 m Normal mode.
5. DIR3 is best checked on 40 m 180 mode.

To troubleshoot the Driven element switching the following will help:

- 40 m and 30 m greater than 4:1. DIR1 and relay 3 signal (pin 24 of 25 pin connector).
- 20 m through 6 m Normal direction greater than 4:1. DVR and relay signal 2 (pin 23)
- 80 m Greater than 4:1. Relay 1 signal (pin 22)
- 20 m through 6 m 180 direction greater than 4:1. DIR2 and possible problem with relay 1,2,3 (pins 23,24,25)

### 5 ---- Coax switch test

There are 3 relay voltages coming from the SDA100. They go to the Antenna Coax switch, DVR, DIR1, DIR2 and the optional 80 m Balun switch.

The voltages should be as follows measured from Pin 13 on the 25 pin connector.

#### 20 m 180 mode

Pin 22 = 0 VDC  
Pin 23 = 0  
Pin 24 = 0  
Pin 25 = Raw supply voltage, No Connection

#### 20 m Normal

Pin 22 = 0  
Pin 23 = 24- 33 VDC - goes to R2 of coax switch and Blue, brown wires on DVR and DIR2  
Pin 24 = 0  
Pin 25 = Raw supply voltage, No Connection

#### 40 m

Pin 22 = 0  
Pin 23 = 0  
Pin 24 = 24- 33 VDC goes to R3 of coax switch and Blue, brown wires on DIR1  
Pin 25 = Raw supply voltage, No Connection

#### 80 m

Pin 22 = 24- 33 VDC goes to R1 of 80 m balun board.  
Pin 23 = 0  
Pin 24 = 0  
Pin 25 = Raw supply voltage, No Connection



## DB42 (Continued)

Unfortunately most meters will not do a continuity test on the coax switch because of a blocking diode in the switch.

You can measure the resistance of the element relays which can let you know if the cable has continuity.

The resistance between 13 and 24 on 25 pin connector should be approximately 400 ohms on older antennas and 700 ohms on newer ones.

The resistance between 13 and 23 on 25 pin connector should be half of the resistance on pin 24.

If there is a 80M dipole the resistance from pin 13 to pin-22 on the 25 pin connector should be around 530 ohms old relays and 1400 ohms with the new ones.

Newer Coax switch boards have LEDs to indicate if the relay signal is active.

There should always be a short from the Center pin of the coax to the shield caused by our Balun/UNUN.

If the short is missing in one of the 4 possible selections it could indicate a bad coax connection or Relay contact.

### 6 ---- High SWR upper end of 80 m

The original version of firmware for the DB42 uses one point at the bottom of the band and scales it across the entire band.

Unfortunately the SWR will start to climb around 3.8 MHz. About the only solution with this software is to split the difference and let the SWR climb at both the low and high ends of the band.

The newer firmware "Mustang" has scaling points every 100 kHz which solves this problem.

### 7 ---- Create Modify old software

With the DB42 you must know which element is which to effectively adjust the antenna. Also, when we squeezed DIR3 in we lost DONE so you must know how to exit.

To exit create modify mode:

1. Exit length editing mode by pressing select key.
2. When in element select mode press the normal mode key.
3. Use up/down Band keys to select save YES / NO.
4. When desired save mode is flashing press select key.
5. Press the setup key to exit setup mode.

Element names in create modify are used as follows:

7MHz/10MHz under NORM mode

REF -- As REFLECTOR adjustment

D1 -- As DRIVEN adjustment

D3 -- As DIRECTOR adjustment

14MHz---50MHz under NORM mode

REF -- As REFLECTOR adjustment

DVR -- As DRIVEN adjustment

D1 -- As DIRECTOR1 adjustment

D2 -- As DIRECTOR2 adjustment

D3 -- As DIRECTOR3 adjustment



## DB42 (Continued)

7MHz/10MHz under 180 mode  
REF -- As DIRECTOR adjustment  
D1 -- As DRIVEN adjustment  
D3 -- As REFLECTOR adjustment

14MHz---50MHz under 180 mode  
REF -- As DIRECTOR3 adjustment  
DVR -- As DIRECTOR2 adjustment  
D1 -- As DIRECTOR1 adjustment  
D2 -- As DRIVEN adjustment  
D3 -- As REFLECTOR adjustment

8 ---- Connector Junction Box

The Connector Junction Box does not follow the normal sequence with the DB42, the DSUB connector on the connector box matches the back of the controller which would normally make a straight through cable work, this is **not** the case with the DB42.

The back of the controller follows DVR, DIR1, REF, DIR2, and DIR3 but when we get to the connector box it is wired in a different order because of where the 7 pin connectors were placed in the Box.

Please refer to the DB42 manual for additional information.

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