MBD-8 Release

The **MBD-8E** is a remote controller compatible with all 8-antenna switchers made by Hamplus. It has a band decoder that receives the information from the radio equipment connected to it. In addition to antenna switching, the MBD-8E also offers three GPO outputs to be used for external equipment control.

On the front panel it has a set of eight illuminated pushbuttons for antenna selection, eight busy LEDs to indicate which antennas are in use by other switchers, four LEDs to indicate the rotor selection, one LED to indicate when the radio is transmitting (Send), one LED to indicate the "Split Antenna" mode and one LED to indicate the Power On status.

Functions and operation

1 – Startup

When the MBD-8E is turned on, it switches to the last antenna that was previously used. Then, being connected to the radio, it will find out in what frequency or band it is and immediately switches to the last antenna used in that band.

In case a certain rotor or the activation of other external equipment was programmed through the GPO outputs, the MBD-8E puts them on the previously programmed position.

2 – Antenna Selection

To select any of your antennas, simply press the corresponding pushbutton. The pushbutton becomes illuminated and switches the status of the external drive pin (it lowers the output pin that activates the corresponding antenna relay and drives the selected antenna rotor, if any).

The switching of the antennas and the corresponding rotor are reported to port CI-V2, so that other MBD-8E can signal the red LEDs of the "busy" line (antenna busy) and of the rotor, not allowing any other MBD-8E of the system to switch to an antenna and/or rotor already in use. The front panel of the MBD-8E indicates that type of conflict, blinking the pushbutton LED for 1.5 seconds and

of the rotor with short and continuous flashes in a 1 second interval. The rotor signaling remains as long as there is a conflict.

3 – <u>Split Antenna Mode</u>

This mode allows operation with two antennas, one for transmission and one for reception.

Procedure to enter the SPLIT mode:

a- First select the transmission antenna.

b- Then, while pressing and holding the PTT of the radio, press the pushbutton of the desired reception antenna for two seconds. The pushbutton will light up shortly confirming that the programming has been accepted. Then the pushbutton can be released. From now on, the front panel LED (Split) remains on indicating that it is working with two antennas, and the switching between the two antennas will occur when changing from reception to transmission and vice-versa. Following the Split mode programming make a test run by pressing and releasing the PTT of the radio, and watch the MBD-8E pushbuttons which should alternate between the selected antennas.

To exit the Split mode, just change the band of the radio or press any pushbutton for two seconds

4 – <u>Permanent Split Mode</u>

The Permanent Split Mode may be used with exclusive receiving antenna(s). When selecting an antenna configured for **Permanent Split** mode on the MBD-8E front panel, the **Split** mode is automatically activated and the selected antenna will be defined for reception. Thus, this mode does not allow an exclusive receiving antenna to be used during transmission.

Procedure for Permanent Split Mode setup:

a- First, select the transmission antenna.

b- Then, press the PTT of the radio and while holding it, press the pushbutton of the desired receiving antenna for little more than ten seconds. Watch the fast flash of the pushbutton that confirms the acceptance of the programming.

c- To undo this setup, first make sure that the Split LED is not illuminated. Then, while holding the PTT, press the desired pushbutton for ten seconds. It is the same procedure used during the programming mode.

d- All input and output configurations on the MBD-8E are signaled by flashing of the pushbuttons.

5 – <u>Activation of the GPOs to tune a JD or similar antenna</u>

GPOs are used to switch the tuning boxes of "high Q" antennas. The point where the activation will be made depends on the operating frequency received by the communication between the MBD-8E and the radio. These points are defined by the user on the pushbuttons of the MBD-8E. To configure the activation points, select initially the antenna in question on the front panel pushbuttons.

This procedure can only be made when the radio is connected to the MBD-8E in the CI-V mode (Icom) or RS-232.

Configuration of the GPOs

Press the **pushbutton** of the selected antenna for **5 seconds** to enter the **Configuration** mode. The confirmation will be given visually, and only the pushbutton of antenna eight will be flashing.

The pushbuttons 5, 6 and 7 correspond to **GPOs 1, 2 and 3**, respectively. Initially these three pushbuttons are off. Select the first frequency starting from the lowest frequency within the band. Turning the **VFO** of the radio, find the frequency that corresponds to the activation of this first **GPO**. Once the desired frequency was found, press the **pushbutton 5**. The **GPO1** will be marked and the **pushbutton 5** becomes **illuminated**. Advance the frequency by turning the **VFO** to the next desired point and press the **pushbutton 6**, which marks the second activation point (**GPO2**). Repeat the operation and mark the third **GPO** by pressing the **pushbutton 7**. To make a quick test, turn the **VFO** of the radio through all the frequencies of the band and check if the marked pushbuttons light up on the sequence of frequencies that where marked. Within each sequence of frequencies only one pushbutton will light up.

When finished, save the selection and return to the normal operating mode. To do so, simply press the **pushbutton 8**.

6 – <u>Rotor Switching</u>

The MBD-8E can also control a rotor selection box Hamplus model RS-34. This equipment enables the use of a single rotor control to read and control up to 4 rotors. Each RS-34 receives up to three (3) Rotor controllers.

Configuration of Rotors

Enter the configuration mode by pressing the **pushbutton** of the antenna that should be assigned to a particular rotor for **5 seconds**. This makes the MBD-8E enter the setup mode. Then, while in this mode, press the **pushbuttons 1, 2, 3 or 4** to select the rotor for this antenna. Once configured, the **LED** indicator of the rotor turns on. To exit the setup mode, press the **pushbutton 8**. From now on, whenever the associated antenna is in use, the indication of the rotor being used (RT1, RT2, etc.) will light up and the respective rotor will be connected to the rotor controller next to this radio.

7 – <u>Communication with Icom, Yaesu, Kenwood, Elecraft, RS-232 and BCD</u>

To use the automation functions of the MBD-8E, it needs to communicate with the radio. Depending on the brand, this communication will be different. For the ICOM brand we use the CI-V protocol (CI-V port). With this protocol, all the features described above will be functional. For equipment of the YAESU brand we use the "band data" information, that allows all configurations except the activation of high Q antennas, as this requires not only the information of the band, but also the operating frequency. For the Kenwood and Elecraft K3 brand we use the communication protocol through the RS-232 port, that allows the use of all functions of the MBD-8E. The Elecraft K3 also uses de "band data" information, like the Yaesu. In cases where there is no need to control the high Q antenna tuning, this information can be wired to the MBD-8E, leaving the RS-232 connection free for the activation of other peripherals.

8 – <u>Band tables</u>

BCD for Yaesu (also effective for the Elecraft K3)

Band	160m	80m	40m	30m	20m	17m	15m	12m	10m	6m	None
Frequency	1.8	3.5	7	10	14	18	21	24	28	50	NA
Icom Voltage	7.0v to 8.0v	6.0v to 6.5v	5.0v to 5.5v	0.1v to 1.2v	4.0v to 4.5v	3.0v to 3.5v	3.0v to 3.5v	2.0v to 2.5v	2.0v to 2.5v	1.2v to 2.0v	0v
Yaesu Band A	H	L	H	L	H	L	H	L	H	L	L
Yaesu Band B	L	H	H	L	L	H	H	L	L	H	L
Yaesu Band C	L	L	L	H	H	H	H	L	L	L	L
Yaesu Band D	L	L	L	L	L	L	L	H	H	H	L

Band by Frequency for communication via RS-232 and CI-V

Band 1: from 0 to 1.7 MHz, **Band 2**: from 1.7 to 3.0 MHz, **Band 3**: from 3.0 to 5.0 MHz, **Band 4**: from 5.0 to 6.0 MHZ, **Band 5**: from 6.0 to 8.5 MHz, **Band 6**: from 8.5 to 12 MHz, **Band 7**: from 12 to 16 MHz, **Band 8**: from 16 to 18.5 MHz, **Band 9**: from 18.5 to 23 MHz, **Band 10**: from 23 to 27 MHz, **Band 11**: from 27 MHz to 34 MHz, **Band 12**: from 34 to 55 MHz, **Band 13**: over 55 MHz.

Remark: Some equipment is currently being produced with a larger number of frequency segments reported by the BCD. The MBD-8E has a memory for up to 16 different segments, and is fully compatible with any upgrade of the manufacturers.

9 – Memory of antennas per band

The MBD-8E has a nonvolatile memory for each of the eight antennas, so that, whenever an antenna is selected, this memory records the band in which the radio is. Thus, at each band change on the radio, the MBD-8E activates the last antenna that was used in that band.

Remark: The setup mode can only be entered when the radio is properly connected to the MBD-8E.