HAMPLUS

MBD-8G

Antenna Switch Controller

Operation Manual

V. 1.1

HAMPLUS

http://www.hamplus.com

MBD-8G

Automatic Antenna Switch Controller

MBD-8G is an intelligent controller compatible with all eight-antenna switches manufactured by Hamplus. It has a band decoder to receive the information coming from the connected radio equipment. In addition to antenna switching, the **MBD-8G** also offers seven frequency-driven **GPOs** (**G**eneral **P**urpose **O**utput), one **Band Data BCD Output**, one output to command **Band Pass Filter**, **12 GPOs** to automate the operation with Top Beam's Waller Flag receiving antenna. The **MBD-8G** also commands the **RS-24** and **RS-44** Rotator switches. There are four ways that antennas and enabled rotators can be selected; 1) manually by the front panel of the **MBD-8G**, 2) manually by frequency or band change on the front panel of the transceiver, 3) automatically by frequency or band change by the remotely controlled transceiver, or 4) automatically by a remotely controlled personal computer via **RS-232** serial port to the **MBD-8G**.

On the front panel is a set of eight illuminated push buttons for manual selection of antennas, eight “Busy” LEDs to indicate which antennas are in use by other **MBD-8G** Controllers, four LEDs to indicate rotator selection, one LED to indicate when the radio is transmitting, one LED to indicate the controller is in "Split Antenna" mode and one LED to indicate when the **MBD-8G** is connected to +13.8 Vdc power.

Functions and operation

1- Startup (after all cable connections are made to switches, controllers and transceivers)

Powering the **MBD-8G** will energize the antenna switch relay for the previously, manually selected antenna. Or, when connected to a transceiver, the controller will check the frequency or band the transceiver has selected and will immediately trigger and light the push button switch of the last antenna selected at that frequency or on that band. If connected, the rotator switcher, or other external equipment that is programmed using the **GPO** outputs, the **MBD-8G** will select the last used devices.

2- Activation of the antennas

To choose any antenna, just press the corresponding push button. When the push button is pressed, it changes the state of the antenna switch control line that activates the corresponding antenna relay on the **AS-81**, **AS-82F**, **AS-84F** or **AS-86F** Antenna Switch. It also activates the selected rotator for that antenna through one of the Rotator Switches, model **RS-24 or RS-28,** if used. Antenna and rotator switching are reported on the Busy Net network so the other **MBD-8G** busy and rotator red LEDs signal, not allowing any other **MBD-8G** to switch to any antenna and rotator already in use. Any conflict is signaled on the front panel of the **MBD-8G** by blinking the push button LED for two seconds, and the rotator LED with short and continuous flashes every second. The rotator signal remains as long as there is a conflict.

3- Split Antenna Mode

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

***Procedure to enter SPLIT mode*:**

A- First select the transmission antenna.

B- Then press and hold the PTT of the radio and press the desired antenna push button for reception for two seconds. The push button will blink to confirm that the setting has been made. Then release the push button and the PTT. From this point the Split LED on the panel will be lit indicating that it is working with two antennas.

Immediately after programming the Split mode, perform the function test by pressing and releasing the PTT of the radio and observing the push buttons of the **MBD-8G** that should alternate between the chosen antennas.

To exit Split mode simply change the radio band or press the transmit antenna push button.

4- Permanent Split Mode

Permanent Split is used with antenna(s) connected to the switch that are exclusively for reception. When we select an antenna configured for permanent Split on the keyboard of the **MBD-8G** the Split mode is automatically activated. This way we guarantee the use of the receiving antenna only in reception. This procedure must be duplicated on all controllers connected to the same antenna switch that has receive only antenna(s) connected.

Procedure to configure Permanent Split mode:

A- First choose a transmission antenna.

B- Then press and hold the PTT of the radio and press the desired antenna push button for reception for a little more than ten seconds. Notice the flashing of the push buttons that will confirm the acceptance of the programming.

To undo this setting, first make sure that the Split LED is not lit. Then, while holding down the PTT, press the desired push button for ten seconds. It is the same process used when programming was done.

5- Rotor Switch

The **MBD-8G** can also command a Hamplus model **RS-24,** or **RS-44** rotator switch. With this equipment it is possible to use one rotator controller to read and control up to 4 rotators. The **RS-24** is suitable for stations with up to two transceivers and **RS-44** for stations with up to four transceivers.

Procedure to configure the Rotator Switch

1- **First step-** Press the antenna button that will receive the configuration for five seconds. At this moment the buttons Ant1, Ant2, Ant3 and Ant8 start to flash.
2- **Second step-** Press the **Ant1 Button** to enter the **Rotor selection mode**
3- **Third step-** Press the **Ant1 button** to choose **Rotor 1**, **Ant2 Button** to choose **Rotor 2**, **Ant3 Button** to choose **Rotor 3** or **Ant4 Button** to choose **Rotor 4**
4- **Fourth step-** Press **Ant8 button** to save your choice and exit the mode configuration.

6- CMD Out (#7) (GPO = General Purpose Output)

These commands are available on the DB-9 **Com Out** connector at the rear of the **MBD-8G.**

a- Commands activated by frequency

Frequency-activated **GPOs** are typically used to trigger the tuning box for shortened antennas that use "high Q" coils. The trigger points of the **GPOs** must be chosen to obtain the best possible **SWR** curve. This procedure is only possible when the radio is connected to the **MBD-8G** in CI-V mode (Icom) or in RS-232 mode for other brands.

Procedure to configure the GPOs by frequency:

1- **First step-** Press the antenna button that will receive the configuration for five seconds. At this moment the buttons Ant1, Ant2, Ant3 and Ant8 start to flash.
2- **Second step-** Press the **Ant2 Button** to enter frequency-activated GPOs (CMD Out)
3- **Third step-** Start at the beginning of the band and find the best tuning point, then press the **Ant1** Button to activate **CMD1**. Raise the frequency on the radio and find the next tuning point then press the **Ant2** button to activate the **CMD2**. Repeat this procedure for the next available tuning points on your antenna. The **MBD-8G** has a maximum of seven **CMD**s.
4- **Fourth step-** Press **Ant8 button** to save your choice and exit the mode configuration.

b- Commands Activated by Band

The band activated commands (**GPO**s) were created to reduce the influence of the transmission antennas on the receiving antennas when they are very close.
Its function is to disconnect the transmitting antenna during reception and connect it as soon as it receives the **Send** command.

Procedure to configure GPOs by band:

1- **First step-** Press the antenna button that will receive the configuration for five seconds. At this moment the buttons Ant1, Ant2, Ant3 and Ant8 start to flash.
2- **Second step-** Press the **Ant3 Button** to enter band-activated GPOs (CMD Out)
3- **Third step-** Place the radio in the desired band and choose a GPO that is not yet in use, then press the **Ant** Button to activate **CMD**. The **MBD-8G** has seven **GPO**s commands that are chosen from the buttons **Ant1** to **Ant7**.
Each **Band** triggers only one **GPO**.
4- **Fourth step-** Press **Ant8 button** to save your choice and exit the mode configuration.

7- Communication with Icom, Yaesu, Kenwood, Elecraft K-3, Flex Radio via RS-232 and BCD

To use the MBD-8G's automation functions, it must communicate with the radio. For ICOM brand radios, we use the CI-V protocol (MBD-8G CI-V port). With this protocol all the features described above will be able to work. For the equipment of the YAESU brand we use the band data information, which allows all configurations except the activation of the GPOs by frequency. For those of the brand Kenwood, Flex Radio and Elecraft K3 the protocol used is by the RS-232 communication port that allows use of all functions of the MBD-8G.

Protocol and Baud rate

- Icom radios CI-V Baud rate 19,200
- Yaesu radios Band Data BCD
- Kenwood, Elecraft, Flex radio, RS-232 Baud rate 9,600

Elecraft K3 can use **Band Data** or **RS-232** with Kenwood protocol

8- Band Data Table

BCD Band Data

Band	Frequency			BCD
160 m	0.0	to	2.9 MHz	0001
80 m	3.0	to	4.8 MHz	0010
60 m	4.9	to	5.9 MHz	0000
40 m	6.0	to	8.9 MHz	0011
30 m	9.0	to	12.9MHZ	0100
20 m	13.0	to	16.9 MHz	0101
17 m	17.0	to	18.9 MHz	0110
15 m	19.0	to	22.9 MHz	0111
12 m	23.0	to	25.9MHz	1000
10 m	26.0	to	34.9 MHz	1001
6 m	35.0	to	54.9 MHz	1010

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

Band 1 from 0 to 400KHz**, Band 2** from 400KHz to 540KHz, **Band 3** from 540KHz to 1.6 MHz**, Band** 4 from 1.6 to 1.8 MHz, **Band 5** from 1.8 to 2.0 MHz, **Band 6** from 2.0 to 3.5 MHZ, **Band 7** From 3.5 to 4.0 MHz, **Band 8** from 4.0 to 5.4 MHz, **Band 9** from 5.4 to 7.0 MHz, **Band 10** from 7.0 to 7.3 MHz, **Band 11** from 7.3 to 8.0 MHz, **Band 12** from 8.0 to 11.0 MHz, **Band 13** from 11.0 MHz to 15.0 MHz, **Band 14** from 15.0 MHz to 20.0 MHz, **Band 15**from 20.0 MHz to 22.0 MHz, **Band 16** from 22.0 MHz to 25.0 MHz, **Band 17** from 25.0 MHz to 28.0 MHz, **Band 18** from 28.0 MHz to 30.0 MHz, **Band 19** from 30.0 MHz to 60.0 MHz, **Band 20** from 60.0 MHz to 143.5.0 MHz, **Band 21** from 143.5 MHz to 144.4 MHz, **Band 22** from 144.4 MHz to 148.0 MHz, **Band 23** from 148.0 MHz to 225.0 MHz, **Band 24** from 225.0 MHz to 430.0 MHz, **Band 25** from 430.0 MHz to 450.0 MHz, **Band 26** Above 450 MHz

9- Antenna memory per band

The **MBD-8G** has a memory for each of the eight antennas so that whenever an antenna is selected this memory registers the band selected by the Radio. With each band change in the radio the **MBD-8G** will activate the last antenna that was used in that band.

Note: The setting mode is only possible when the Radio is properly connected to the **MBD-8G.**

10- Connectors description (connector # on rear panel image)

a- Band Data Out (#3)

The DB-9 **Band Data Out** connector on the rear of the **MBD-8G** provides a Band Data output that matches the frequency of the radio that is connected. When the **MBD-8G** receives the band information from the Band Data, this same information will be passed to the Band Data Out connector. When receiving the information through Frequency the conversion to Band Data will be done according to the table in item 8.

DB-9 Band Data Out connector

Pins	Function
1	Band Data A
2	Band Data B
3	Band Data C
4	Band Data D
5	+ 13.8 Vdc
6	nc
7	nc
8	GND
9	nc

b- Bandpasser Out (#2)

The DB-9 **To Bandpasser** connector on the rear of the **MBD-8G** is designed to control bandpass filters. It sends + 13.8 Vdc to the bandpass filter relays. They are commands for 160m, 80m, 40m, 20m, 15m, 10m.

DB-9 To Bandpasser connector

Pins	Band	Frequency	Function
1	20 m	13.0 to 16.9 MHz	On +13.8Vdc
2	40 m	6.0 to 8.9 MHz	On +13.8Vdc
3	80 m	3.0 to 4.8 MHz	On +13.8Vdc
4	160 m	0.0 to 2.9 MHz	On +13.8Vdc
5	---------	----------	GND
6	---------	----------	
7	---------	----------	Bypass On +13.8Vdc
8	10 m	26.0 to 34.9 MHz	On +13.8Vdc
9	15 m	19.0 to 22.9 MHz	On +13.8Vdc

All control pins are Active High + 13.8 Vdc

c- TOPBEAM Waller Flag (#5)

The **HD-15** connector labeled **TB WF** on the rear of the **MBD-8G** provides power (+ 13.8 Vdc) and the controls for activating the filters of the **Waller Flag** receiving antenna control box. The commands follow the Band data table or the Radio frequency.

HD-15 TB WF connector

Pins	Band	Frequency	Data	Function
1	160 m	0.0 to 2.9 MHz	0001	On Active Low
2	80 m CW	3.4 to 3.59MHz	0010	On Active Low
3	80 m SSB	3.6 to 4.8 MHZ	0010	On Active Low
4	40 m	6.0 to 8.9 MHz	0011	On Active Low
5	30 m	9.0 to 12.9MHz	0100	On Active Low
6 and 7	--------	----------	------	+ 13.8vVdc
8	--------	----------	------	PTT
9 and 10	--------	----------	------	GND
11	--------	----------	------	RTX On Active Low
12	--------	----------	------	RX1 On Active Low
13	--------	----------	------	RX2 On Active Low
14	--------	----------	------	RX3 On Active Low
15	--------	----------	------	RX4 On Active Low

d- DB-9 To Radio Connector (#8)

This connector receives power from the Radio (+ 13.8 Vdc), the transmit command (PTT) and the data for frequency reading via RS-232 and Band reading via Band Data BCD.

DB-9 To Radio Connector

Pins	Function
1	+13.8V In
2	RXD
3	TXD
4	PTT In
5	GND
6	BCD 1
7	BCD 2
8	BCD 3
9	BCD 4

e- DB-25 To Switch Connector (#1)

DB-25 connector on the rear of the **MBD-8G** provides the commands for driving eight Antennas and four Rotators

DB-25 To Switch Connector

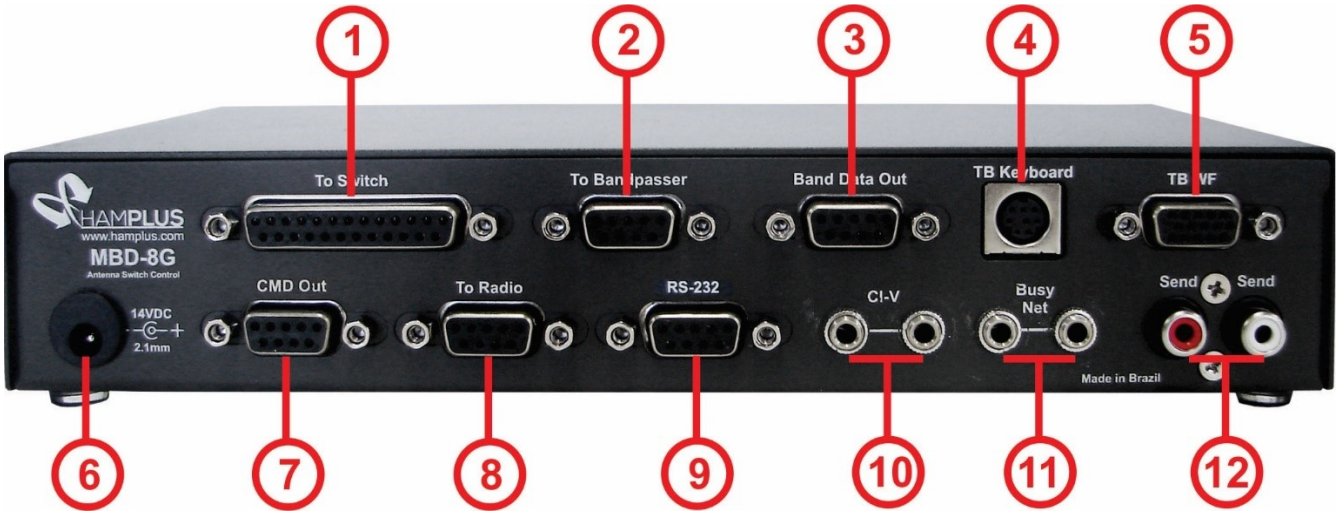
Pins	Function	Pins	Function	Pins	Function
1	Ant 1	10	GND	18	Rotator 1
2	Ant 2	11	nc	19	Rotator 2
3	Ant 3	12	nc	20	Rotator 3
4	Ant 4	13	Expansion	21	Rotator 4
5	Ant 5	14	Rotator 1	22	nc
6	Ant 6	15	Rotator 2	23	nc
7	Ant 7	16	Rotator 3	24	nc
8	Ant 8	17	Rotator 4	25	GND
9	+ 12v				

f- DB-9 RS-232 connector (#9)

The DB-9 connector identified as **RS-232** on the back of the **MBD-8G** provides connection to Computers at a speed of **19200 baud**.

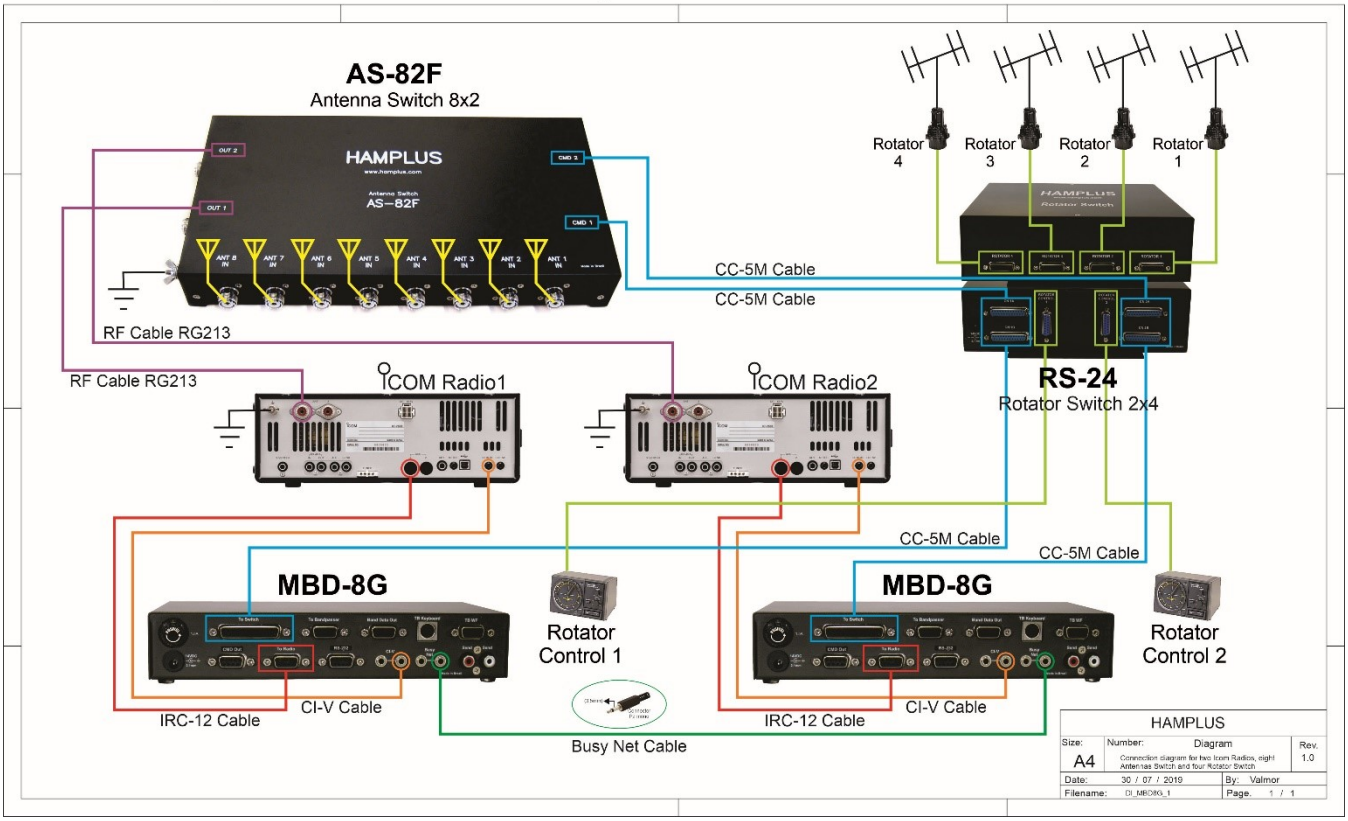
DB-9 RS-232 connector

Pins	Function
1	NC
2	**RXD**
3	**TXD**
4	NC
5	**GND**
6	NC
7	NC
8	NC
9	NC

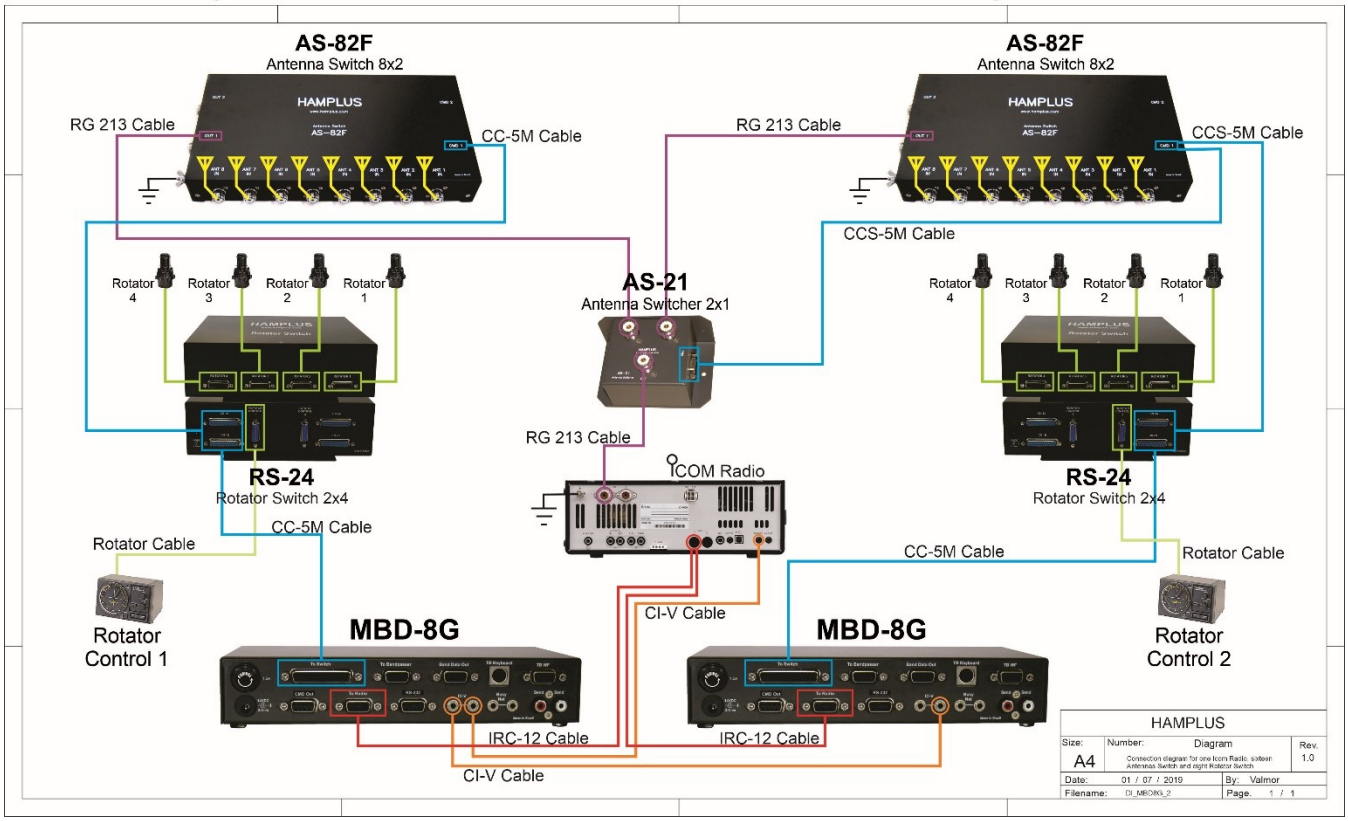


1- To Switch	Output Commands to Antenna Switch and Rotator Switch
2- To Bandpasser	Output Commands for Bandpass Filter
3- Band Data Out	Band Data Output (BCD)
4- TB Key Board	Output for Key Board Antenna TopBeam Receiver Waller Flag
5- TB WF	Connects to the PFIU of the receiving antenna TopBeam Waller Flag
6- AUX. Power Supply	Auxiliary Power Input (13.8 Vdc)
7-CMD Out	GPOs Out (special commands triggered by frequency or band)
8- To Radio	Input Power, Band Data, RS-232 and PTT from Radio
9- RS-232	Communication with PC Com port
10- CI-V	Communication with Icom radios via CI-V port
11- Busy Net	Busy Network for indication of antennas in use
12- Send	Auxiliary input and pass-through output for PTT (Send)

Connection diagram for two Icom Radios, eight Antennas Switch and four Rotator Switch



Connection diagram for one Icom Radio, sixteen Antennas Switch and eight Rotator Switch



Connection diagram of the Hamplus MDB-8G with Bandpass Filter - Model - DXE-419.

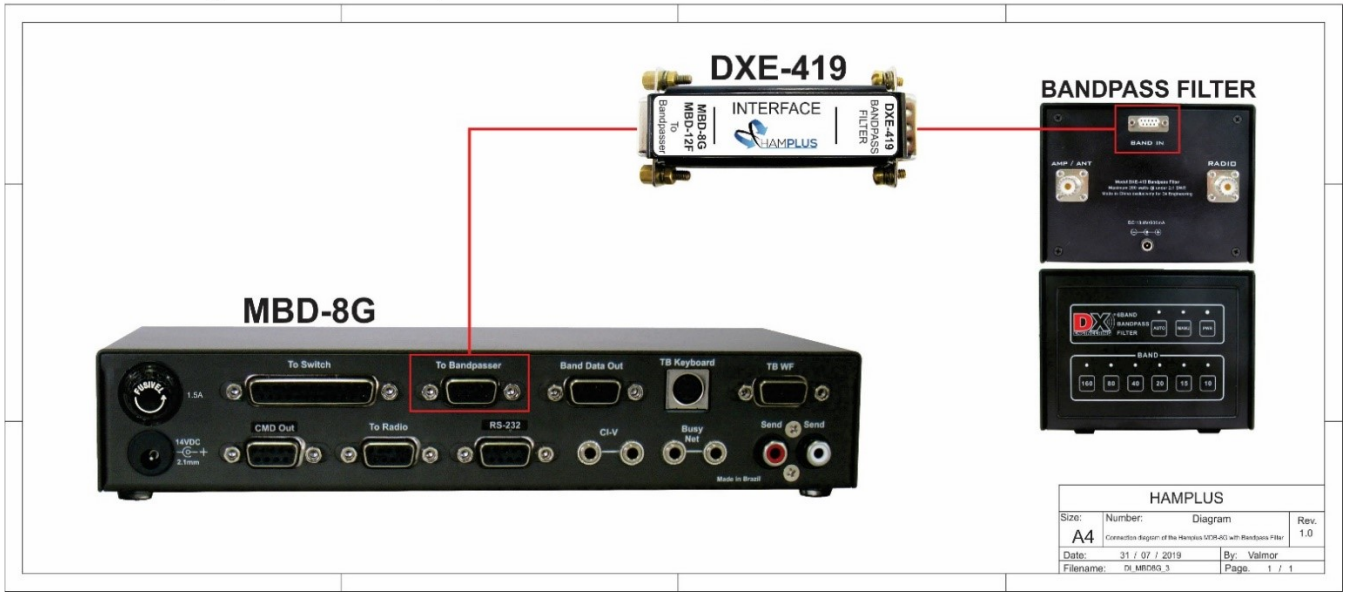
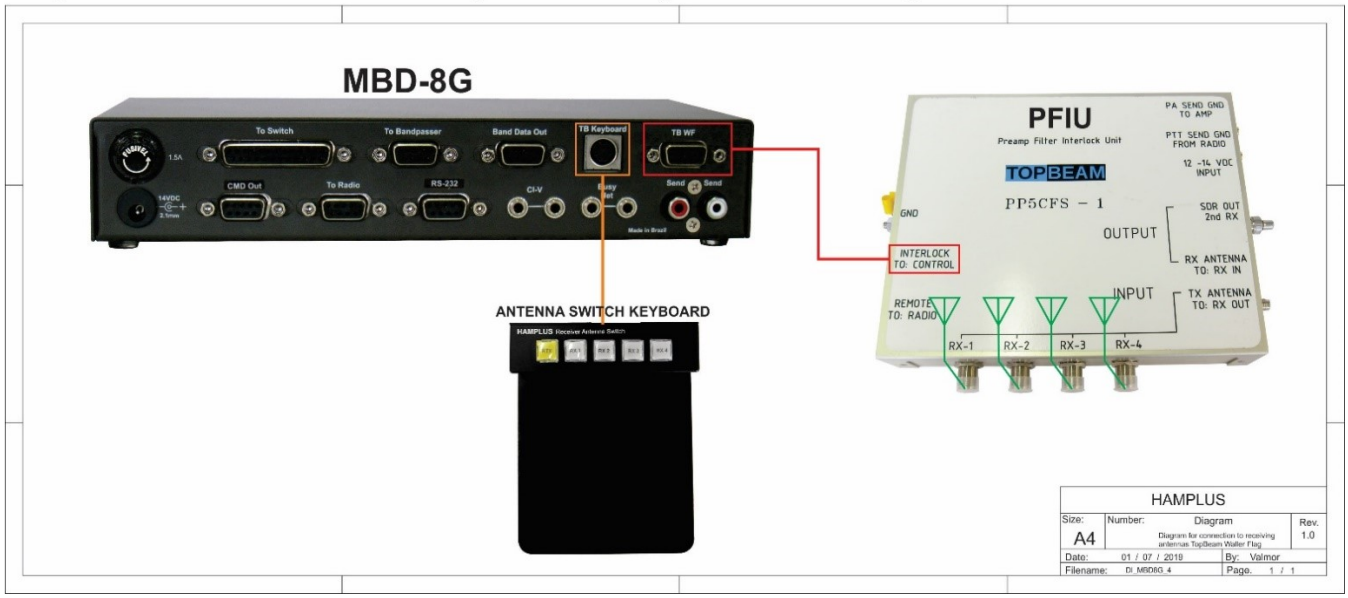


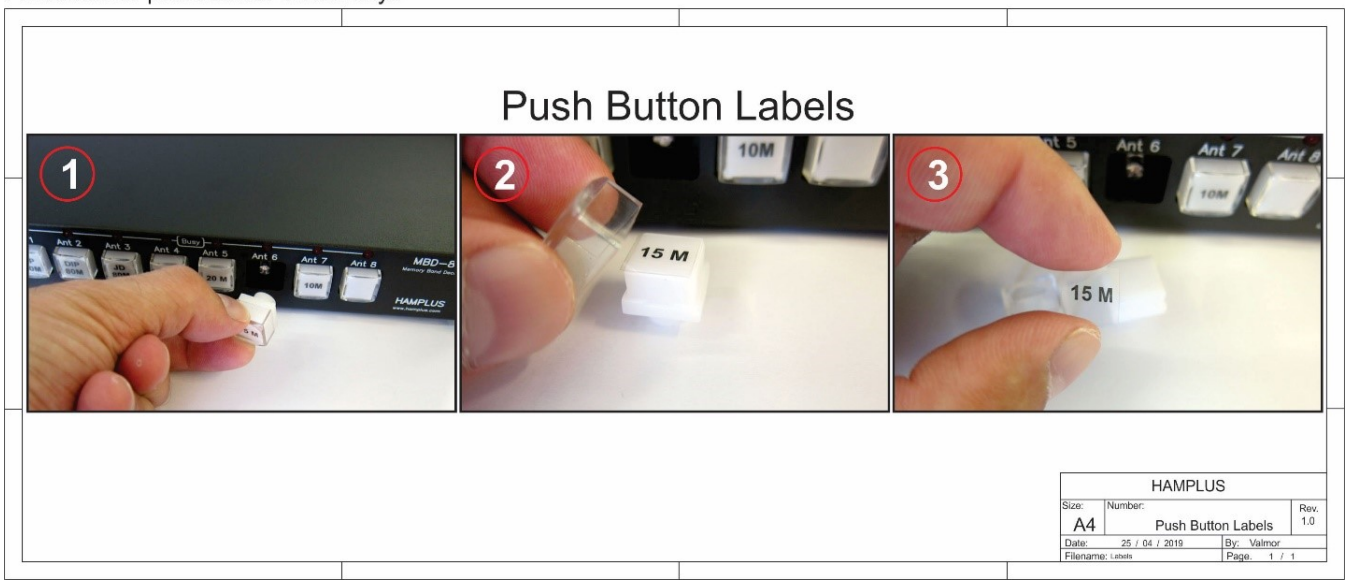
Diagram for connection to receiving antennas TopBeam Waller Flag



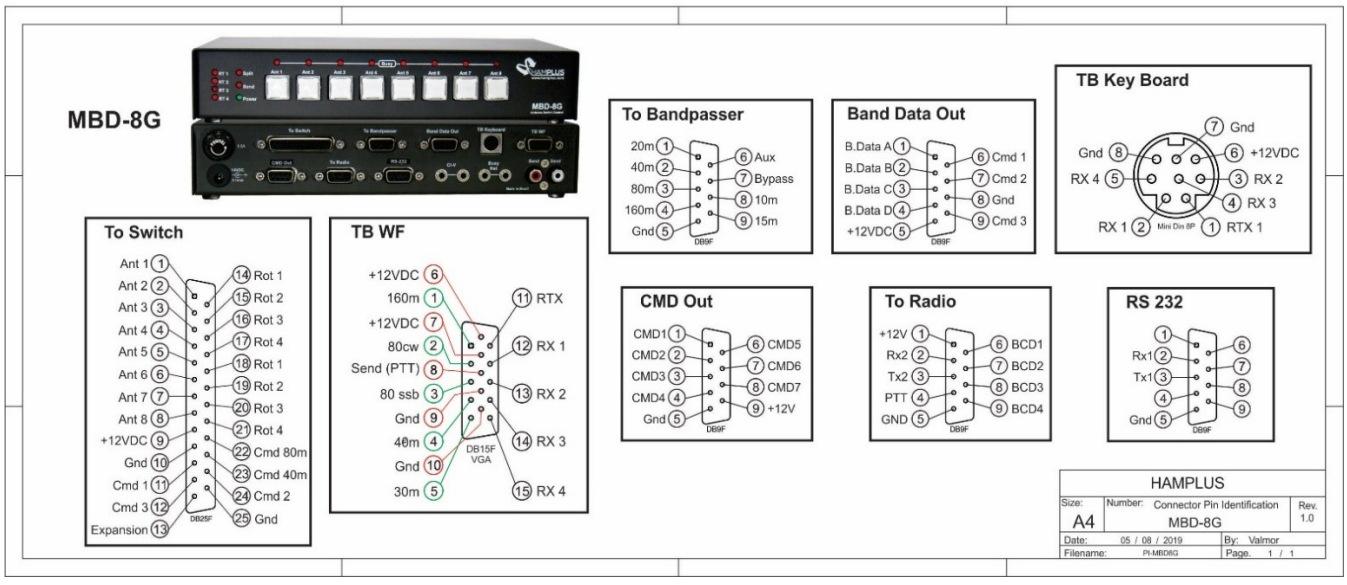
Labels - print on transparent paper with laser printer

160 m	80 m	40 m	20 m	18 m	17 m	15 m	12 m	10 m	6 m	2 m
70 cm	80 m 40 m	20 m 15 m 10 m	MULTI BAND	LOG						

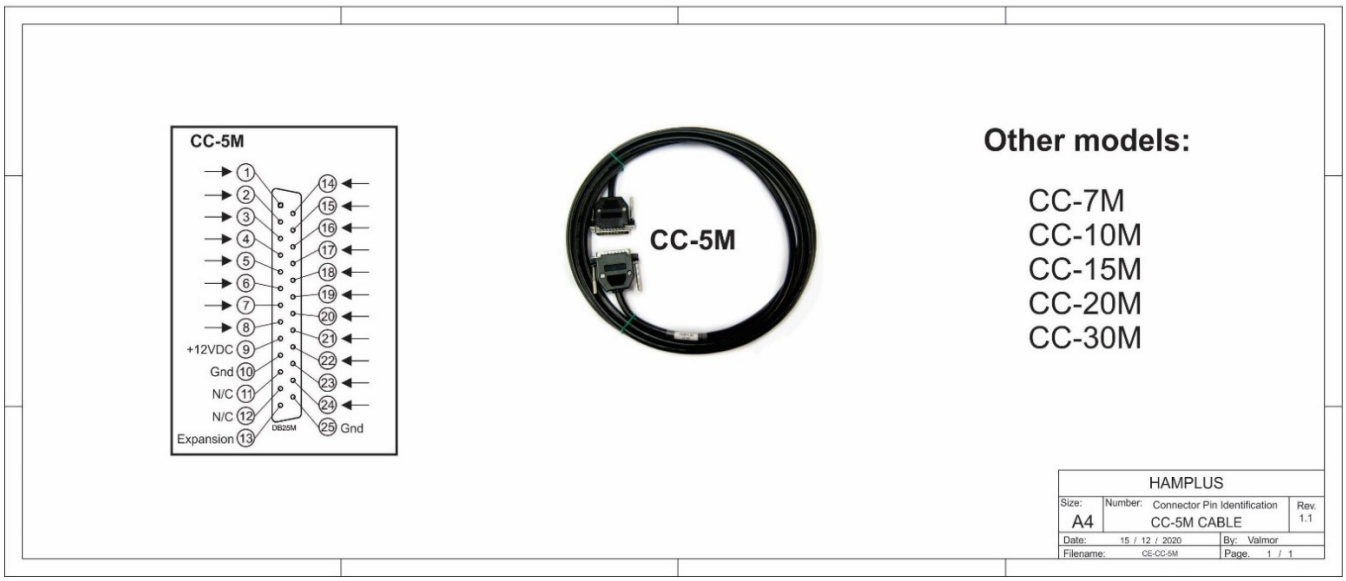
Procedure to place labels on the keys



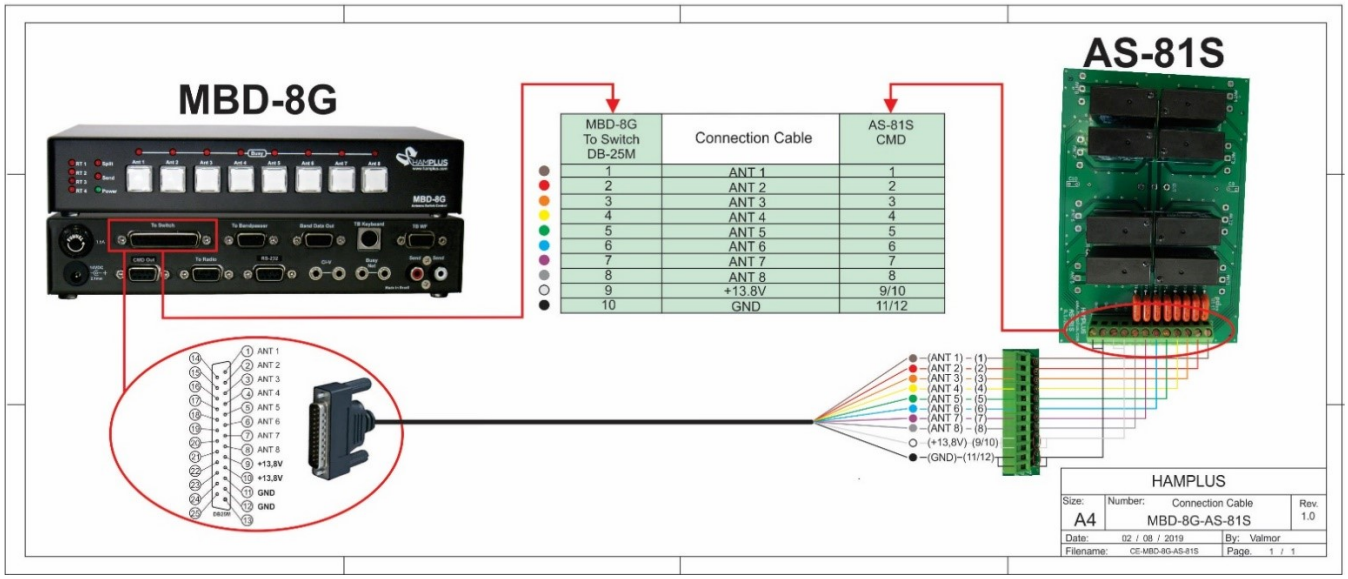
MBD-8G CONNECTOR PIN IDENTIFICATION



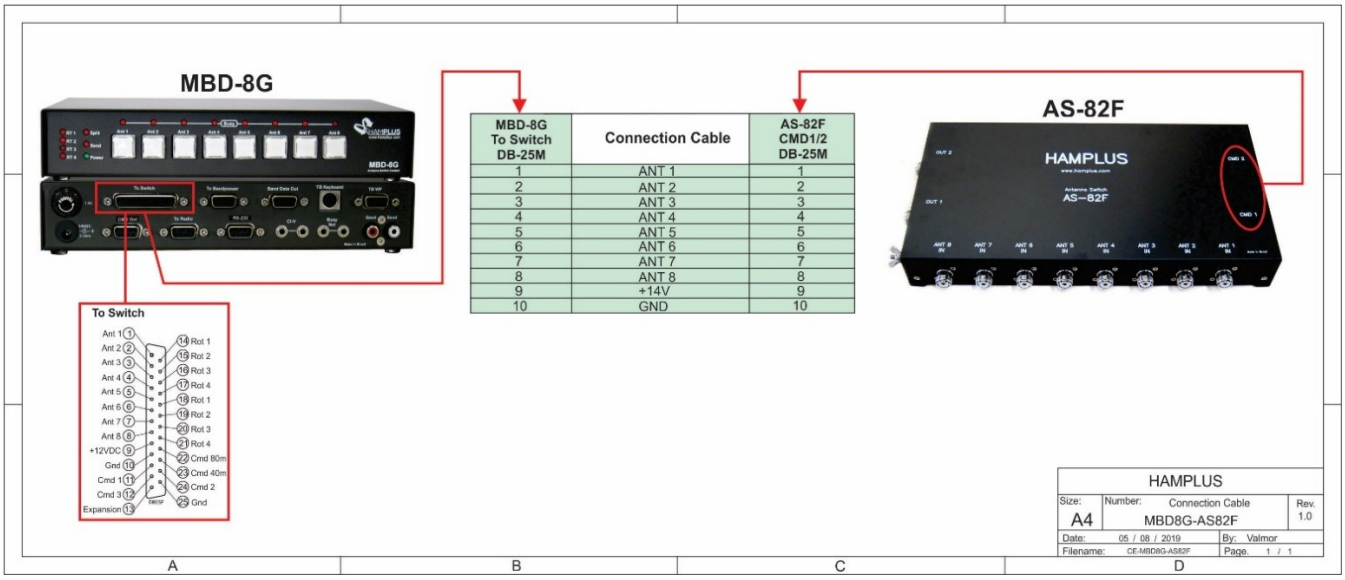
CC-5M CABLE - CONNECTOR PIN IDENTIFICATION



MBD-8G / AS-81S Connection Cable

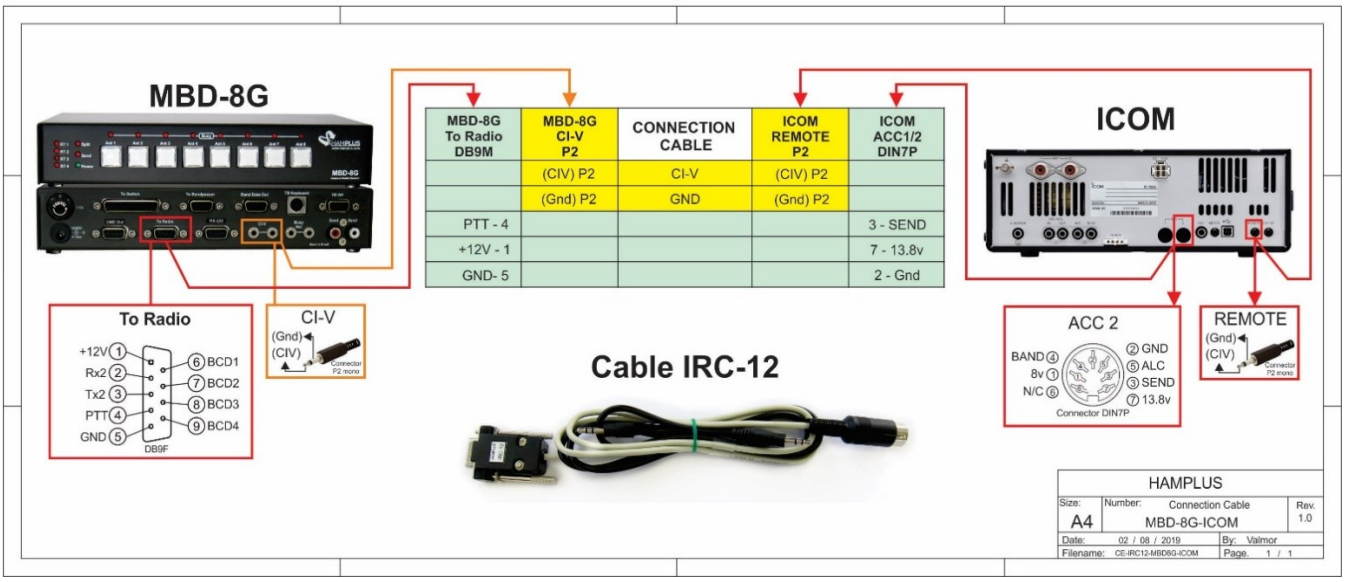


MBD-8G / AS-82F Connection Cable



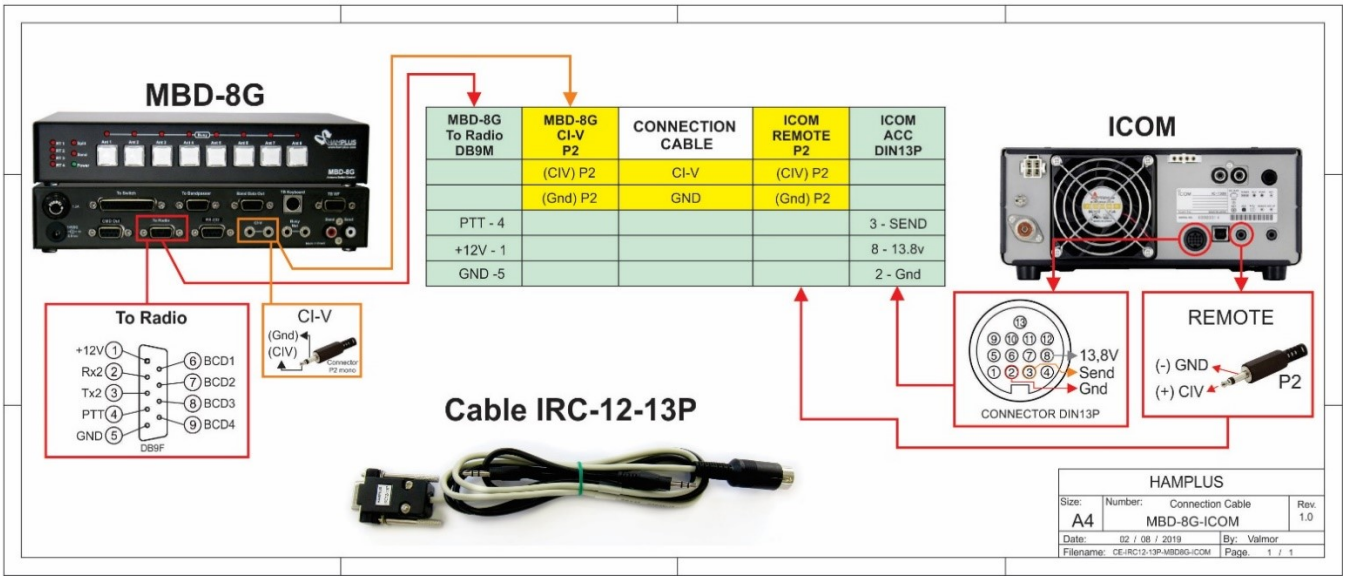
MBD-8G To Switch DB-25M	Connection Cable	AS-82F CMD1/2 DB-25M
1	ANT 1	1
2	ANT 2	2
3	ANT 3	3
4	ANT 4	4
5	ANT 5	5
6	ANT 6	6
7	ANT 7	7
8	ANT 8	8
9	+14V	9
10	GND	10

MBD-8G / ICOM Connection Cable

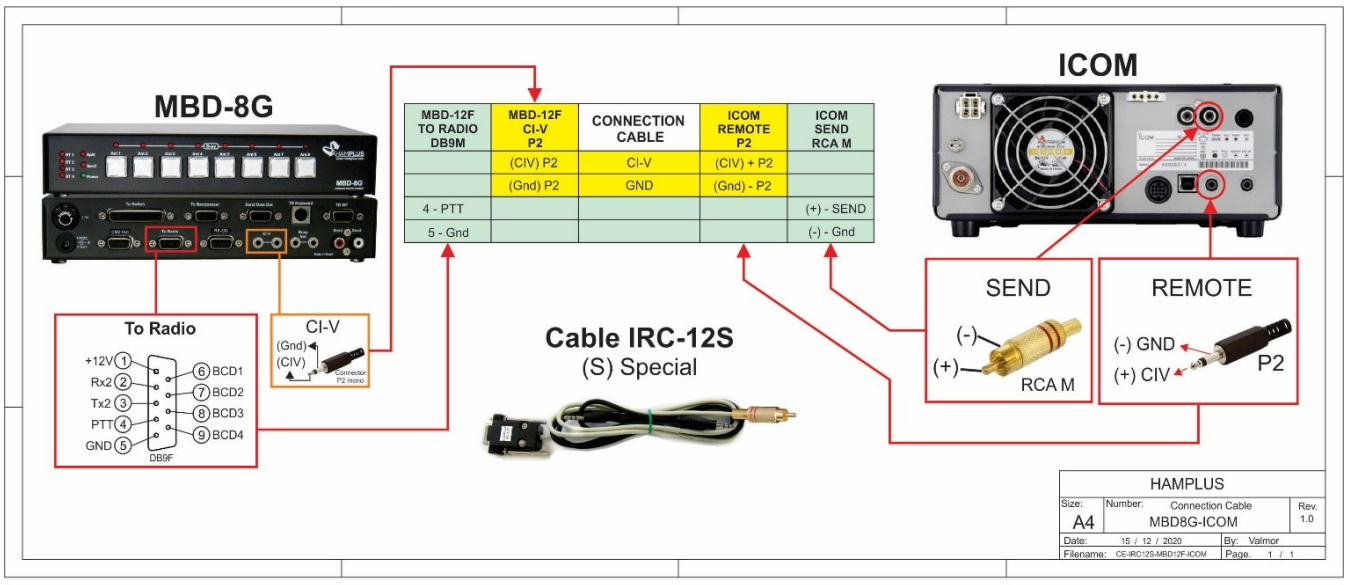


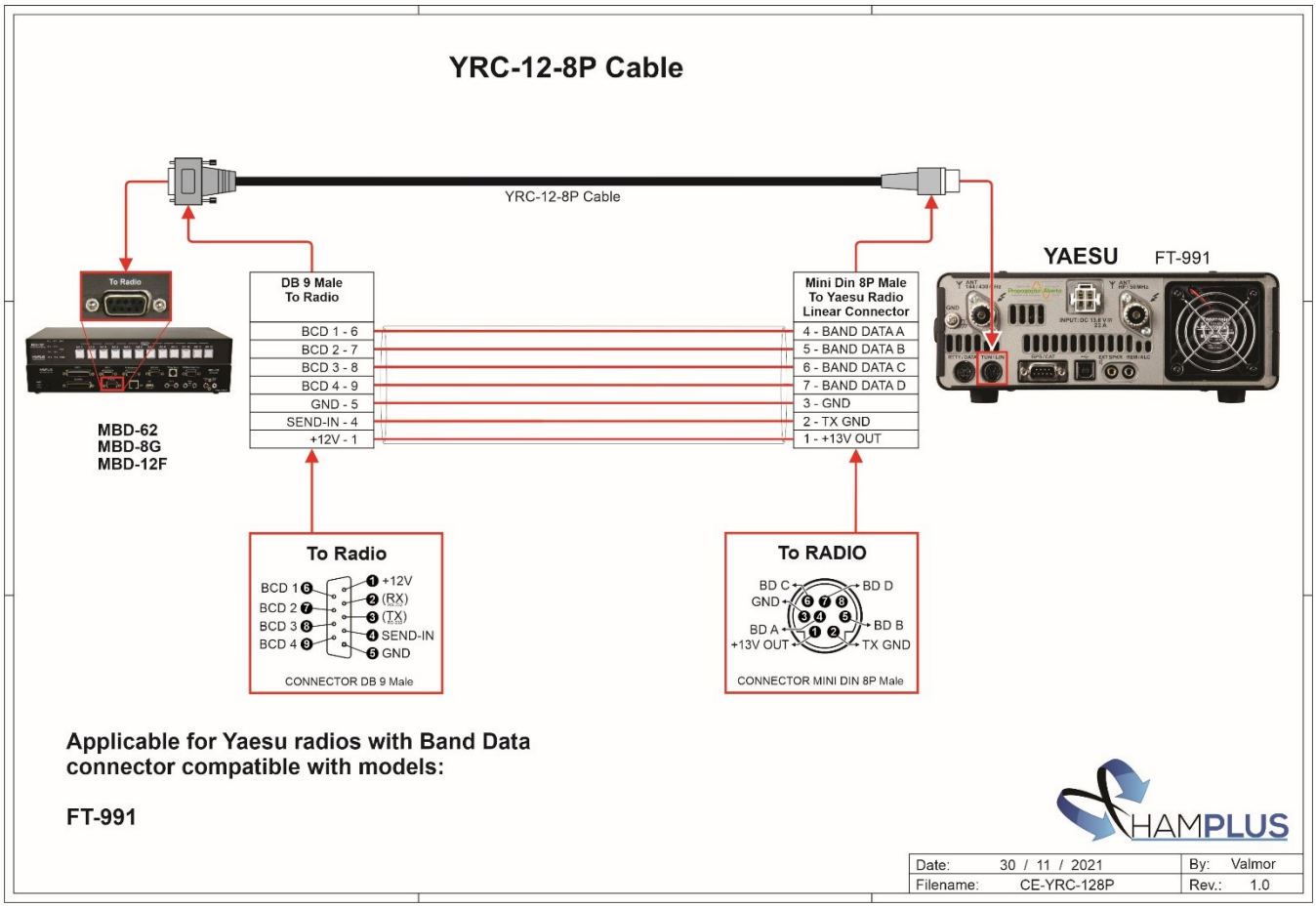
MBD-8G To Radio DB9M	MBD-8G CI-V P2	CONNECTION CABLE	ICOM REMOTE P2	ICOM ACC1/2 DIN7P
	(CIV) P2	CI-V	(CIV) P2	
	(Gnd) P2	GND	(Gnd) P2	
PTT - 4				3 - SEND
+12V - 1				7 - 13.8v
GND- 5				2 - Gnd

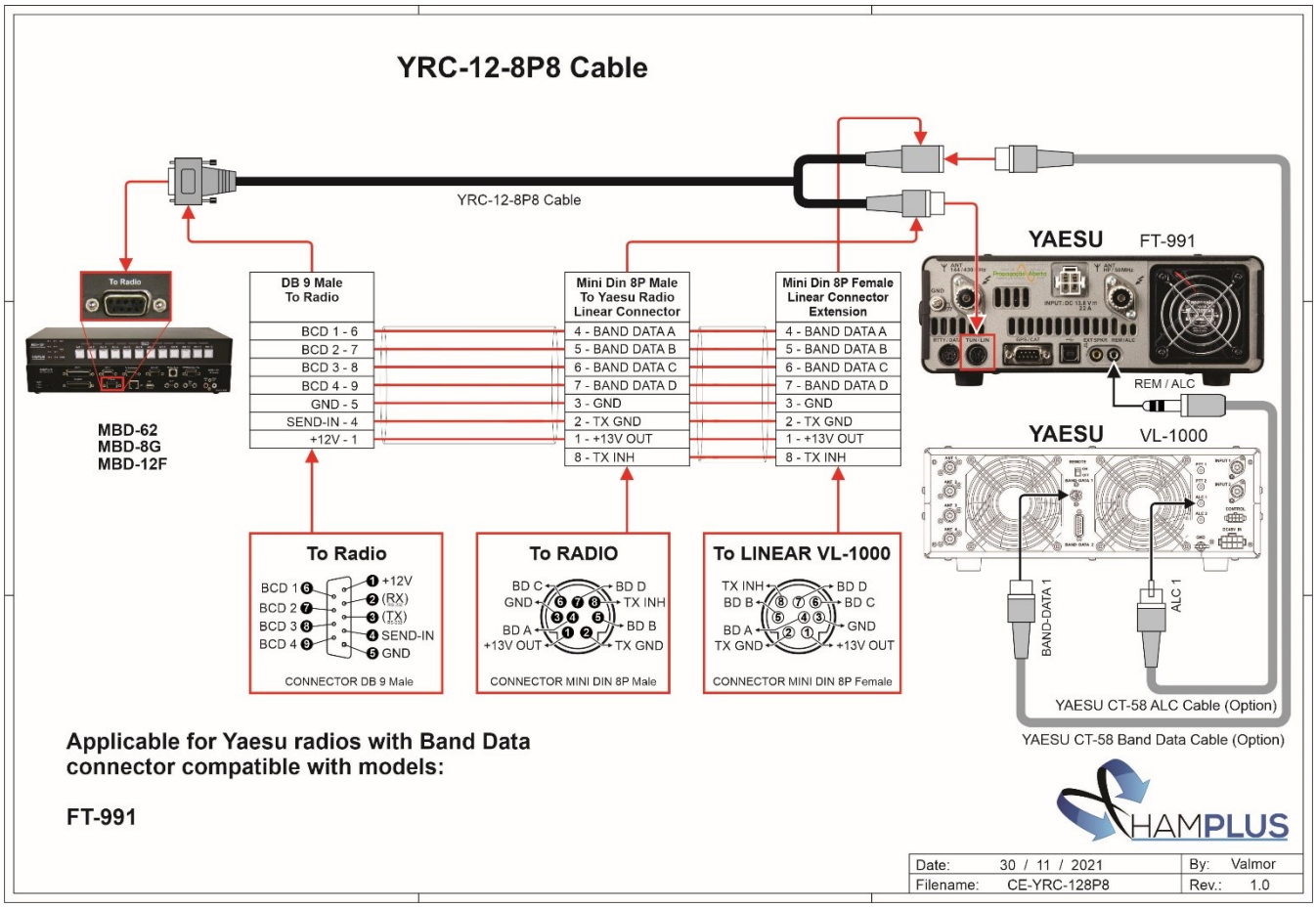
MBD-8G / ICOM Connection Cable

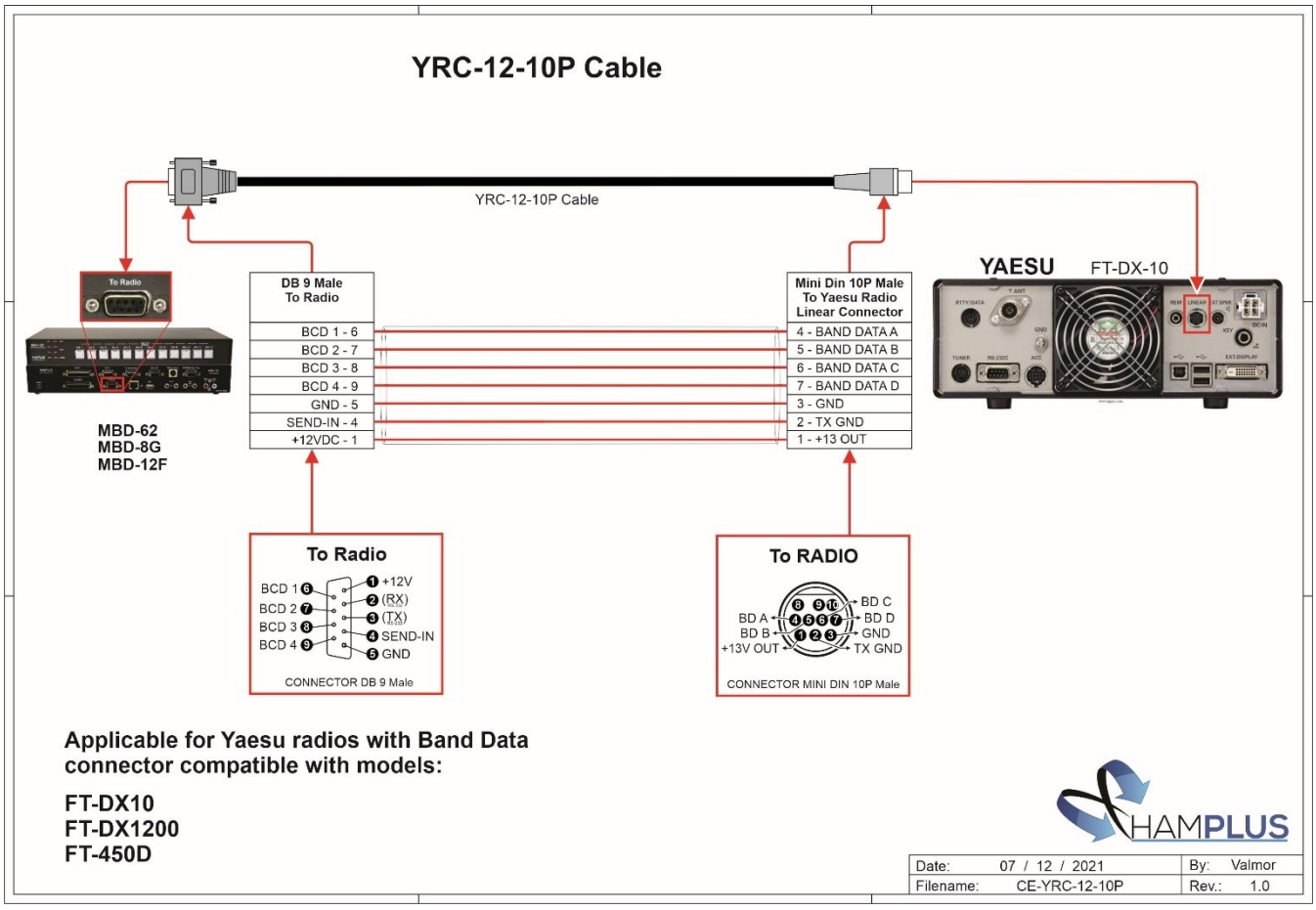


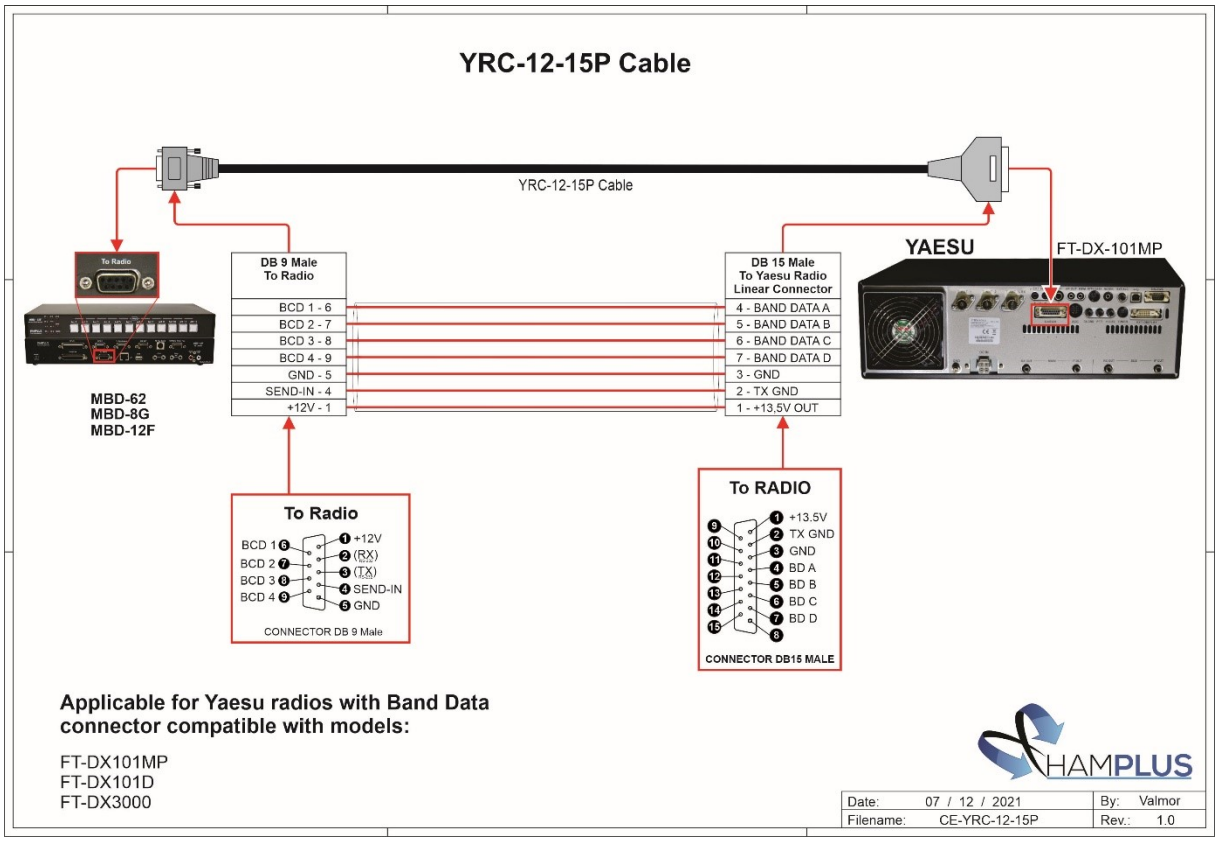
MBD-8G / ICOM Connection Cable

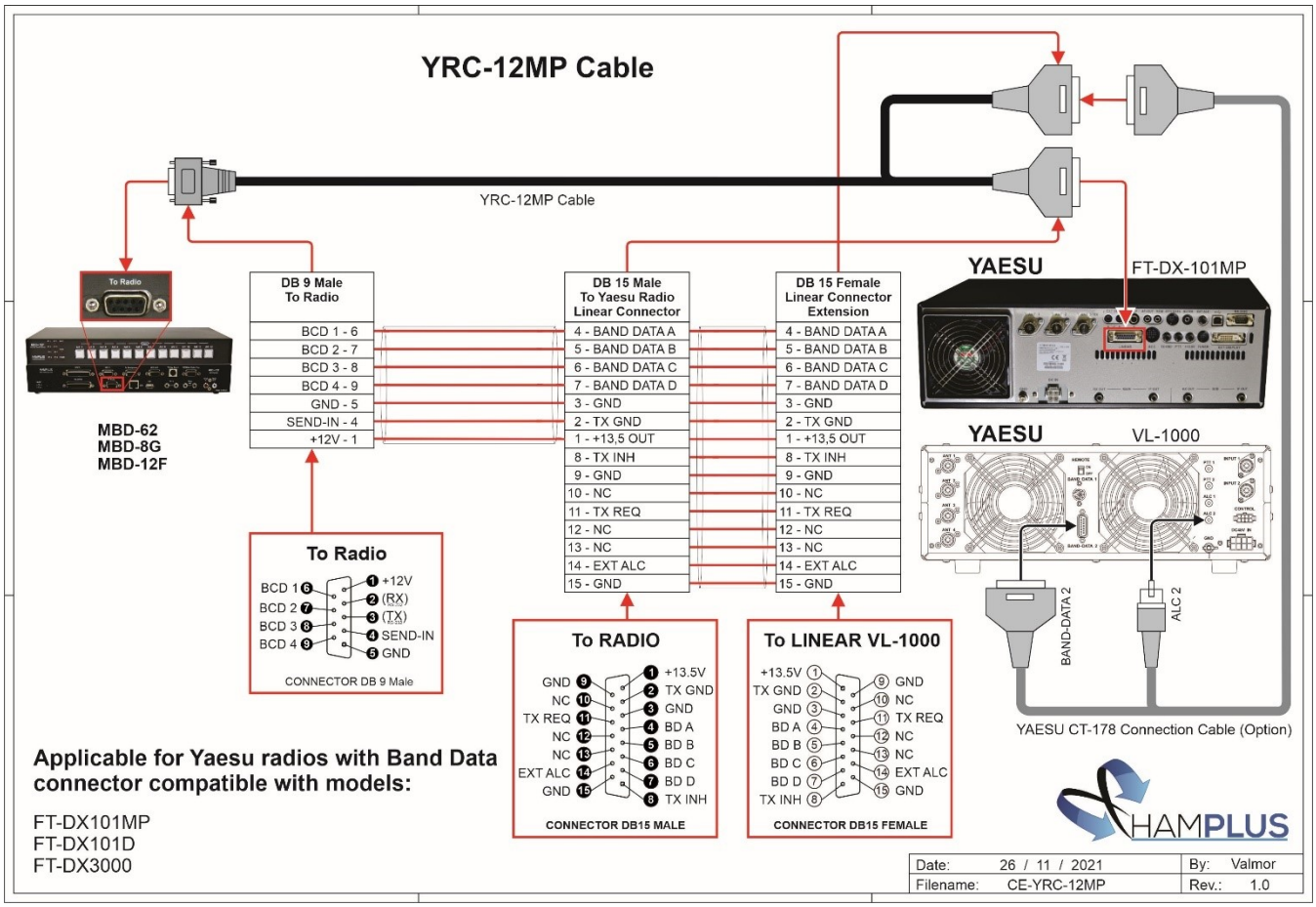



YRC-12-8P Cable
YRC-12-8P Cable
YAESU FT-991
To Radio
DB 9 Male
To Radio
BCD 1 - 6
BCD 2 - 7
BCD 3 - 8
BCD 4 - 9
GND - 5
SEND-IN - 4
+12V - 1
Mini Din 8P Male
To Yaesu Radio
Linear Connector
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13V OUT
MBD-62
MBD-8G
MBD-12F
To Radio
BCD 1
BCD 2
BCD 3
BCD 4
+12V
(RX)
(TX)
SEND-IN
GND
CONNECTOR DB 9 Male
To RADIO
BD C
GND
BD A
+13V OUT
BD D
BD B
TX GND
CONNECTOR MINI DIN 8P Male
Applicable for Yaesu radios with Band Data
connector compatible with models:
FT-991
HAMPLUS
Date: 30 / 11 / 2021
By: Valmor
Filename: CE-YRC-128P
Rev.: 1.0

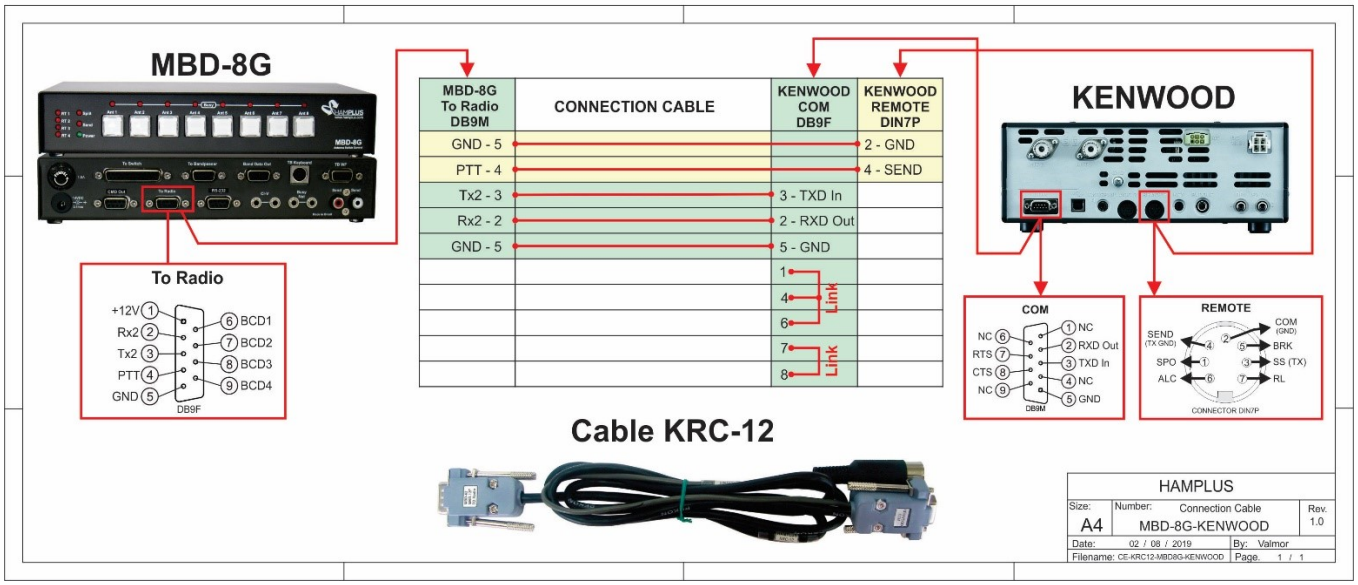

YRC-12-8P8 Cable
YRC-12-8P8 Cable
To Radio
MBD-62
MBD-8G
MBD-12F
DB 9 Male
To Radio
BCD 1 - 6
BCD 2 - 7
BCD 3 - 8
BCD 4 - 9
GND - 5
SEND-IN - 4
+12V - 1
Mini Din 8P Male
To Yaesu Radio
Linear Connector
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13V OUT
8 - TX INH
Mini Din 8P Female
Linear Connector
Extension
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13V OUT
8 - TX INH
YAESU FT-991
REM / ALC
YAESU VL-1000
BAND-DATA 1
ALC 1
YAESU CT-58 ALC Cable (Option)
YAESU CT-58 Band Data Cable (Option)
To Radio
BCD 1
BCD 2
BCD 3
BCD 4
+12V
(RX)
(TX)
SEND-IN
GND
CONNECTOR DB 9 Male
To RADIO
BD C
GND
BD A
+13V OUT
BD D
TX INH
BD B
TX GND
CONNECTOR MINI DIN 8P Male
To LINEAR VL-1000
TX INH
BD B
BD A
TX GND
BD D
BD C
GND
+13V OUT
CONNECTOR MINI DIN 8P Female
Applicable for Yaesu radios with Band Data
connector compatible with models:
FT-991
HAMPLUS
Date: 30 / 11 / 2021
By: Valmor
Filename: CE-YRC-128P8
Rev.: 1.0


YRC-12-10P Cable
YRC-12-10P Cable
To Radio
MBD-62
MBD-8G
MBD-12F
DB 9 Male
To Radio
BCD 1 - 6
BCD 2 - 7
BCD 3 - 8
BCD 4 - 9
GND - 5
SEND-IN - 4
+12VDC - 1
Mini Din 10P Male
To Yaesu Radio
Linear Connector
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13 OUT
YAESU
FT-DX-10
To Radio
BCD 1
BCD 2
BCD 3
BCD 4
+12V
(RX)
(TX)
SEND-IN
GND
CONNECTOR DB 9 Male
To RADIO
BD A
BD B
+13V OUT
BD C
BD D
GND
TX GND
CONNECTOR MINI DIN 10P Male
Applicable for Yaesu radios with Band Data
connector compatible with models:
FT-DX10
FT-DX1200
FT-450D
HAMPLUS
Date: 07 / 12 / 2021
By: Valmor
Filename: CE-YRC-12-10P
Rev.: 1.0

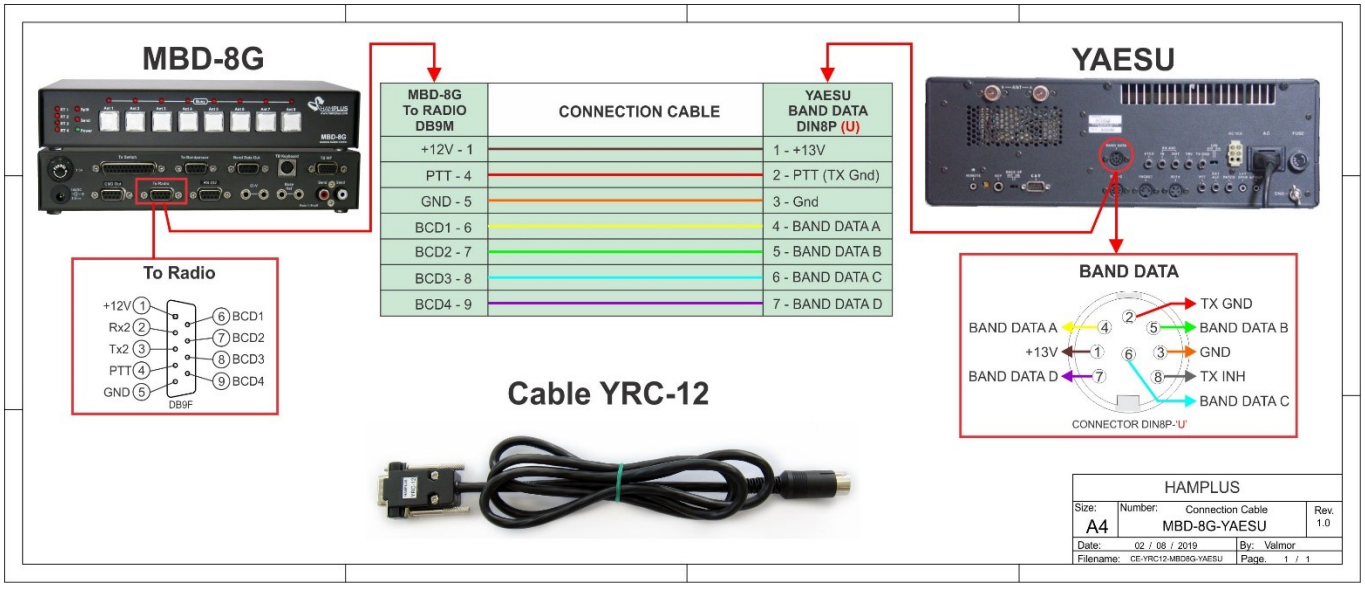

YRC-12-15P Cable
YRC-12-15P Cable
YAESU
FT-DX-101MP
To Radio
MBD-62
MBD-8G
MBD-12F
DB 9 Male
To Radio
BCD 1 - 6
BCD 2 - 7
BCD 3 - 8
BCD 4 - 9
GND - 5
SEND-IN - 4
+12V - 1
DB 15 Male
To Yaesu Radio
Linear Connector
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13,5V OUT
To Radio
BCD 1
BCD 2
BCD 3
BCD 4
+12V
(RX)
(TX)
SEND-IN
GND
CONNECTOR DB 9 Male
To RADIO
+13,5V
TX GND
GND
BD A
BD B
BD C
BD D
CONNECTOR DB15 MALE
Applicable for Yaesu radios with Band Data
connector compatible with models:
FT-DX101MP
FT-DX101D
FT-DX3000
HAMPLUS
Date: 07 / 12 / 2021
By: Valmor
Filename: CE-YRC-12-15P
Rev.: 1.0


YRC-12MP Cable
YRC-12MP Cable
To Radio
MBD-62
MBD-8G
MBD-12F
DB 9 Male
To Radio
BCD 1 - 6
BCD 2 - 7
BCD 3 - 8
BCD 4 - 9
GND - 5
SEND-IN - 4
+12V - 1
DB 15 Male
To Yaesu Radio
Linear Connector
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13,5 OUT
8 - TX INH
9 - GND
10 - NC
11 - TX REQ
12 - NC
13 - NC
14 - EXT ALC
15 - GND
DB 15 Female
Linear Connector
Extension
4 - BAND DATA A
5 - BAND DATA B
6 - BAND DATA C
7 - BAND DATA D
3 - GND
2 - TX GND
1 - +13,5 OUT
8 - TX INH
9 - GND
10 - NC
11 - TX REQ
12 - NC
13 - NC
14 - EXT ALC
15 - GND
YAESU
FT-DX-101MP
YAESU
VL-1000
BAND-DATA 2
ALC 2
YAESU CT-178 Connection Cable (Option)
To Radio
BCD 1 6
BCD 2 7
BCD 3 8
BCD 4 9
+12V
(RX)
(TX)
SEND-IN
GND
CONNECTOR DB 9 Male
To RADIO
GND 9
NC 10
TX REQ 11
NC 12
NC 13
EXT ALC 14
GND 15
+13.5V
TX GND
GND
BD A
BD B
BD C
BD D
TX INH
CONNECTOR DB15 MALE
To LINEAR VL-1000
+13.5V 1
TX GND 2
GND 3
BD A 4
BD B 5
BD C 6
BD D 7
TX INH 8
GND
NC
TX REQ
NC
NC
EXT ALC
GND
CONNECTOR DB15 FEMALE
Applicable for Yaesu radios with Band Data connector compatible with models:
FT-DX101MP
FT-DX101D
FT-DX3000
HAMPLUS
Date: 26 / 11 / 2021
By: Valmor
Filename: CE-YRC-12MP
Rev.: 1.0

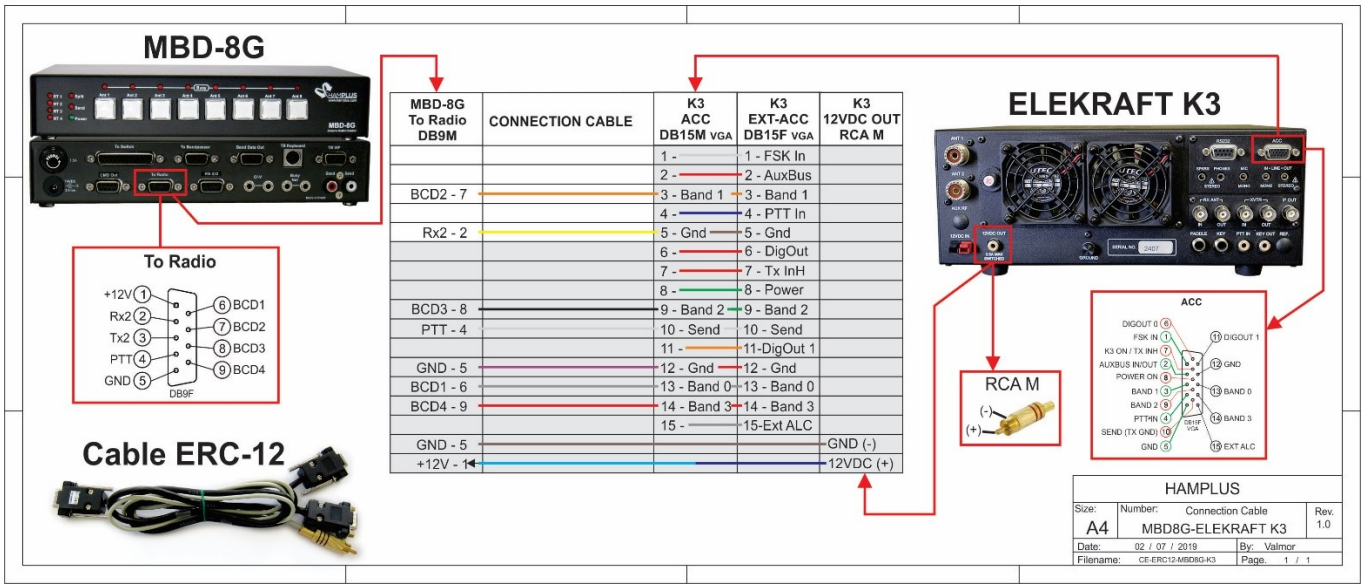
MBD-8G / KENWOOD Connection Cable



MBD-8G / YAESU Connection Cable

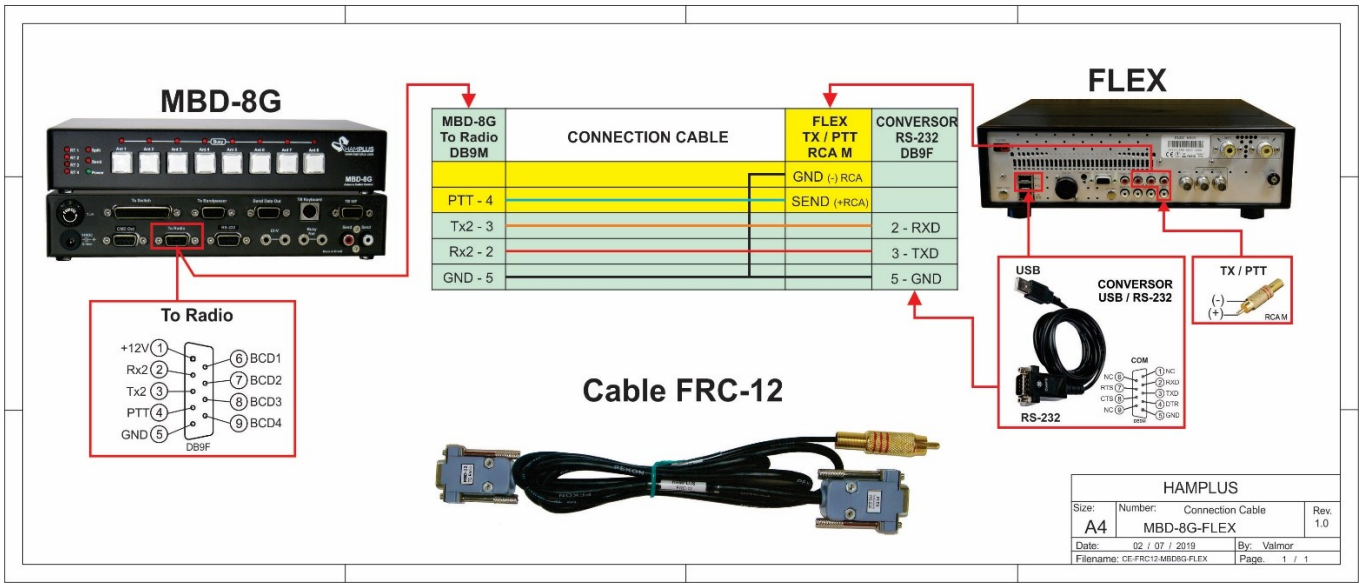


MBD-8G / ELEKRAFT K3 - Connection Cable



MBD-8G To Radio DB9M	CONNECTION CABLE	K3 ACC DB15M VGA	K3 EXT-ACC DB15F VGA	K3 12VDC OUT RCA M
		1 -	1 - FSK In	
		2 -	2 - AuxBus	
BCD2 - 7		3 - Band 1	3 - Band 1	
		4 -	4 - PTT In	
Rx2 - 2		5 - Gnd	5 - Gnd	
		6 -	6 - DigOut	
		7 -	7 - Tx InH	
		8 -	8 - Power	
BCD3 - 8		9 - Band 2	9 - Band 2	
PTT - 4		10 - Send	10 - Send	
		11 -	11-DigOut 1	
GND - 5		12 - Gnd	12 - Gnd	
BCD1 - 6		13 - Band 0	13 - Band 0	
BCD4 - 9		14 - Band 3	14 - Band 3	
		15 -	15-Ext ALC	
GND - 5				GND (-)
+12V - 1				12VDC (+)

MBD-8G / FLEX Connection Cable



MBD-8G To Radio DB9M	CONNECTION CABLE	FLEX TX / PTT RCA M	CONVERSOR RS-232 DB9F
		GND (-) RCA	
PTT - 4		SEND (+RCA)	
Tx2 - 3			2 - RXD
Rx2 - 2			3 - TXD
GND - 5			5 - GND