

# **MARK-IV VHF BROADBAND SIGNAL BOOSTER M4BBDAV**

## **USER'S MANUAL**

**REVISION 0  
SUBMITTED BY:**

**CANAM TECHNOLOGY, INC.**

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## Part 90 Signal Boosters THIS IS A 90.219 CLASS B DEVICE

**WARNING.** This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at [www.fcc.gov/signal-boosters/registration](http://www.fcc.gov/signal-boosters/registration). Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation."



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## Section A. INTRODUCTION

The MARK-IV VHF Broadband Signal Booster (M4BBDAV) is a Class “B” Industrial Signal Booster for FCC Part 90 PLMRS Public Safety Agencies used to operate within range 150-174 MHz for Land Mobile Radio.

This document is the M4BBDAV User's Guide Manual, intended for the Radio Technical Personnel.

This manual is intended to be used with the M4BBDAV Equipment only. It is not to be used with any other equipment unless it is authorized by Canam Technology, Inc.



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Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment”



This document may contain typographical errors and technical inaccuracies. Canam Technology will not accept any liability from the use and misuse of this manual, the information contained within, or the consequences of any actions resulting from the use of this information.



Signal boosters such as the M4BBDAV generate radio signals and, therefore, electromagnetic fields. The technical personnel should have a complete understanding of FCC CFR Title 47 sections 1.1307 and 1.1310. Recommendations are included in this Manual, but they do not substitute the FCC guidelines.

#### M4BBDAV Key Features:

- Broadband Class B Signal Booster, per FCC Part 90.
- Maximum Output Power at the antenna port +37 dBm per carrier.



This device may require the use of antennas for proper functioning, depending on the application. The installation of the antennas should be performed by qualified technical personnel. All antennas should be fixed mounted and physically secured to one location. **The people must be away from the antennas at least 1.0 meters to comply with the RF Human Maximum Permissible Exposure limits, as long as the antenna system gain is lower than 7 dBi.** If greater gain is used the separation should be increased, please refer to the FCC Rules.



If service should be performed on the antenna, please shut down the transmitter or lower its power in order to comply with the maximum permissible exposure.



## Section B. SYSTEM DESCRIPTION

The system houses multi-carrier linear broadband power amplifiers and automatic level control. The amplifiers are designed with special linear characteristics for continuous operation, 100% duty cycle 24 hours/7 days a week. Its modular construction allows easy access to the amplifier modules and power supply.

It has a maximum gain around 60dB across the band. The output power amplifier P1dB Compression point is around 20 Watts (+43 dBm). They also have an automatic gain control range greater than 25dB.

The amplifiers modules are bolted down onto a heat-sink base. These heat sinks have adequate capacity to dissipate five times the maximum anticipated heat being generated by the amplifiers. It is recommended the temperature of the room be maintained below 80° F to assure the longest possible life of the amplifier transistors. The power supply has +28 VDC module for the amplifiers, equipped with over current and over voltage protection among other features. It will immediately drop the supply voltage to prevent damage to other components.

The unit's operational parameters are stored in the non-volatile memory of the embedded controller; this allows the booster to operate on a standalone basis. The built-in Web Server provides a Graphical User Interface (GUI) to ease in remote monitoring & control. Access is obtained via a PC's Web Browser and a TCP/IP connection to the Unit. The system can be connected directly to a PC computer or can be plugged into the local area network.

Some pages shown by the Web Server are the following:

- “Main Status”: depicts status alarm indicators and meters.
- “Main Settings”: is used to configure system-level macro settings.

Never operate the system without adequate Load/Termination on the RF Out port. The Web Server allows to Mute/Un-mute Power Amplifiers in “Main Settings” page. Make sure the power amplifiers are un-muted before start with the test.



## Section C. PHYSICAL OVERVIEW

Figure 1 shows the visual status that the D.U.T. front panel. Table 1 contains a brief explanation.

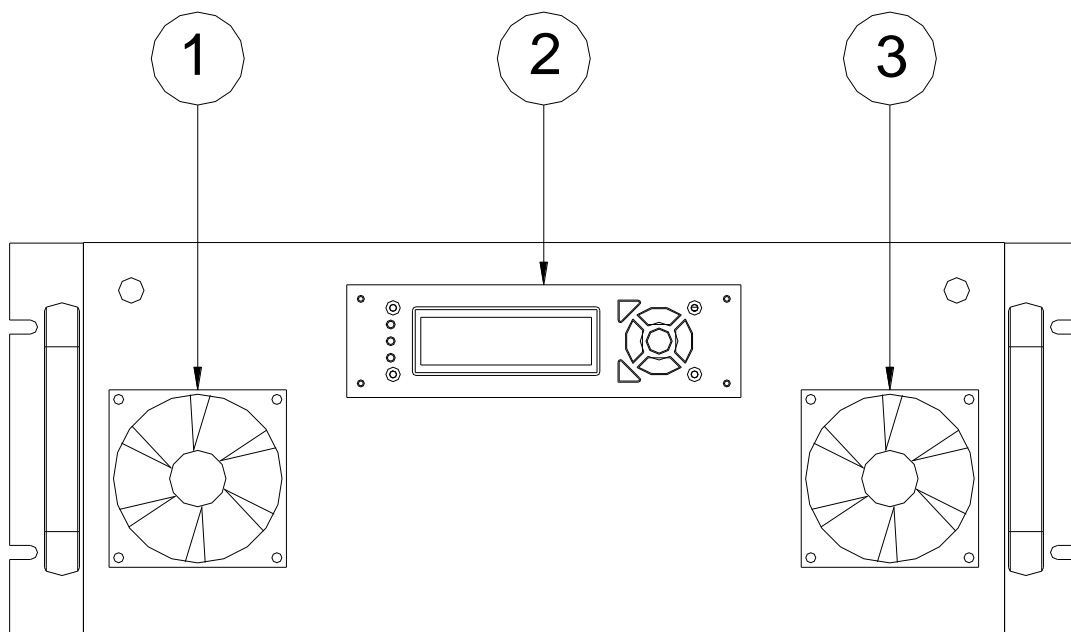
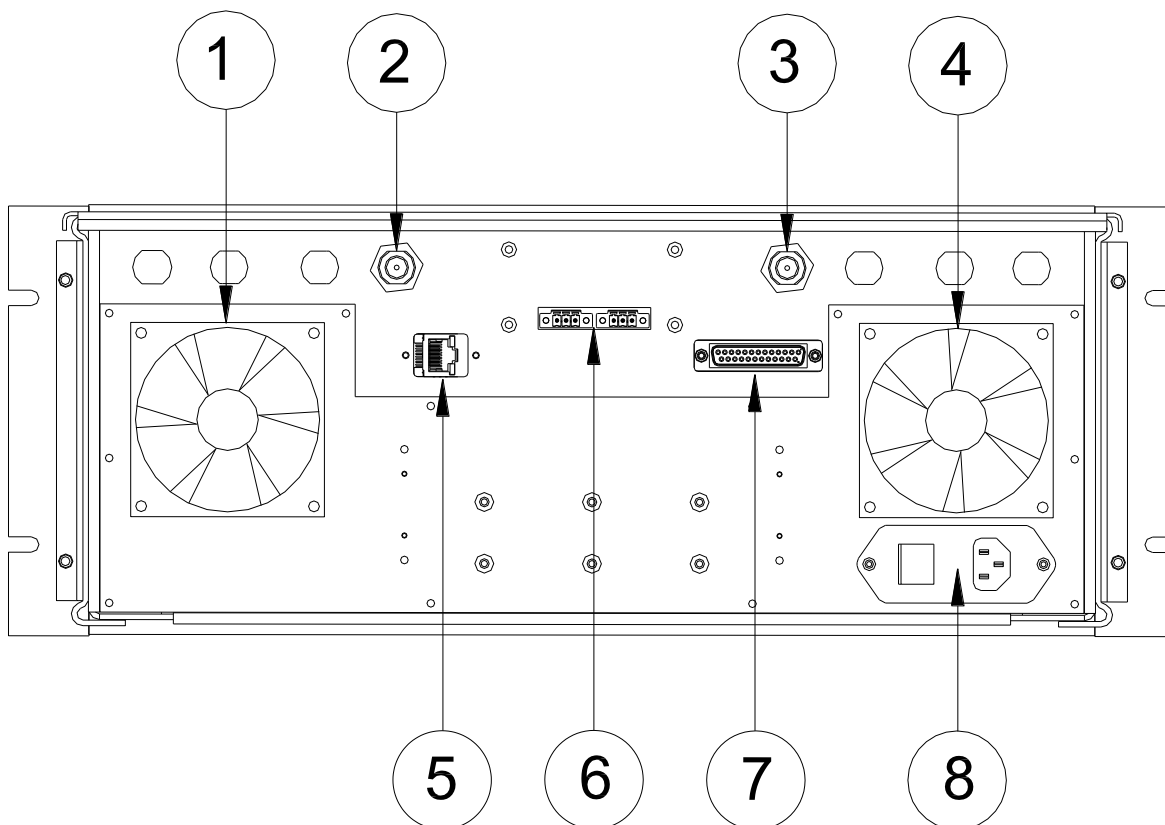


Figure 1 - Front Panel details

Table 1 – Front Panel details

Item	Description
1	AIR INTAKE FAN 1
2	LCD DISPLAY/KEYPAD
3	AIR INTAKE FAN 2

Figure 2 shows the connectors and visual status that the D.U.T rear panel has. Table 2 contains a brief explanation.



**Figure 2 - Rear Panel details.**

**Table 2 – Rear Panel details.**

Item	Description
1	AIR EXHAUST FAN 1
2	RF IN PORT
3	RF OUT PORT
4	AIR EXHAUST FAN 2
5	ETHERNET 10/100 NETWORK PORT
6	EXHAUST FANS HEADER RECEPTACLES
7	DB-25 I/O CONNECTOR
8	AC POWER "IEC" INLET
13	AC MAINS ON/OFF POWER SWITCH

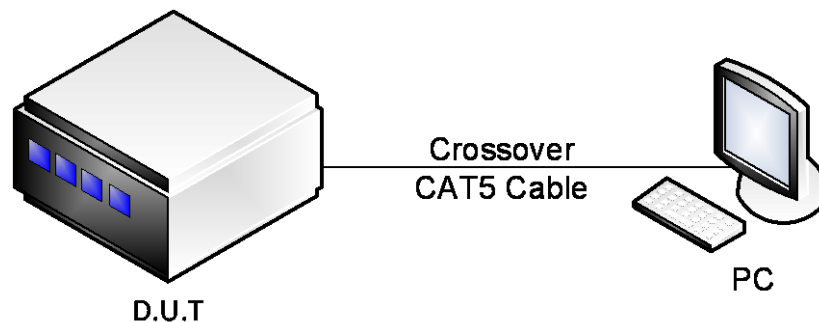


## Section D. START - UP

### D.1 ACCESSING D.U.T. WEB SERVER

The system can be connected to a PC computer using an Ethernet crossover cable or to LAN using an Ethernet straight cable.

#### D.1.1 Connect D.U.T to P.C computer using a crossover cable



**Figure 3 – D.U.T. connected directly to PC computer.**

1. Use an Ethernet crossover cable for connect equipment directly to a PC computer LAN port (refer to Item #5 in Figure 2).
2. The IP address of the equipment is shown in the LCD display. By default it is 192.168.100.75 with Network Mask = 255.255.255.0.
  - To verify IP address press the Down key in LCD Display and Keypad assembly until get IP ADDRESS value.
3. Configure the local computer IP address to allow access to the controller, within the same sub-net.
  - Go to "Star >> Control Panel >>Network Settings".
  - Right-Click on the "Local Area Connection" and choose "Properties".
  - Look for "Internet Protocol" and click "Properties".
  - Select "Use the following IP Address".

- Configure PC computer IP address as 192.168.100.X (X is a value between 0-255) with Network Mask = 255.255.255.0.
  - Default gateway can be same value as IP address.
  - Select "Obtain DNS server address automatically".
4. Open a web browser and access the equipment by typing, in the address bar, the IP address of the equipment.
- Login with username = technician, password = technician.

#### D.1.2 Connect D.U.T to local area network

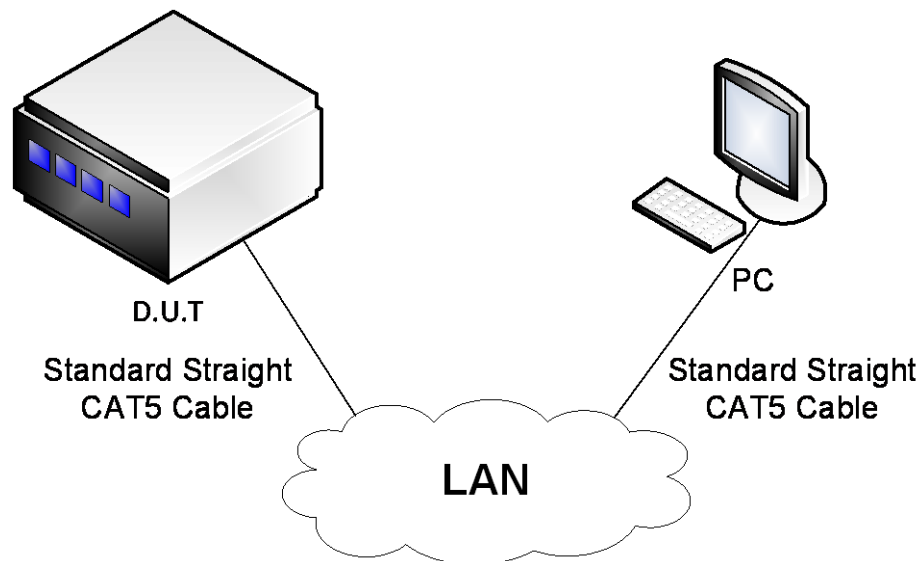


Figure 4 - D.U.T. connected into local area network.

## D.2 USING AND SETTING UP D.U.T

1. Open a web browser and access the equipment by typing, in the address bar, the IP address assigned to the equipment.
  - Login with username = technician, password = technician.
  - The [Main Status](#) page will be displayed if connection available.
2. Go to [Calibration](#) page for:
  - Changing meters calibration and another parameters as sub-system maximum gain and minimum readable for some meters.
3. Go to [Main Settings](#) page for:
  - Enabling/disabling MCPA output per path.
  - Enabling/disabling MCPA ALC and configuring ALC limit level between 30 -37 dBm.
  - Configuring path gain and iALC set-point Level.



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## Section E. RF CONNECTIONS

1. Use a coaxial cable to connect the test instrument input to D.U.T. RF OUT Port (refer to Item #4 in Figure 2).
2. Use a coaxial cable to connect the RF generator output to D.U.T. RF IN Port (refer to Item #1 in Figure 2).



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