

# **MARK-IV VHF NARROWBAND SIGNAL BOOSTER**

## **USER'S MANUAL**

**REVISION 0  
SUBMITTED BY:**

**CANAM TECHNOLOGY, INC.**

**May, 2011**

## I. TABLE OF CONTENTS

I. TABLE OF CONTENTS .....	2
II. TABLE OF FIGURES.....	2
III. INTRODUCTION .....	3
Section A. System Description .....	3
IV. QUICK START .....	5
Section A. Physical Overview .....	5
Section B. Start - up.....	7
B.1 Accessing D.U.T. Web Server .....	7
B.1.1 Connect D.U.T to P.C computer using a crossover cable .....	7
B.1.2 Connect D.U.T to local area network .....	8
B.2 Using and setting up D.U.T.....	9
Section C. RF Connections.....	11
C.1 Connecting the RF Out Port .....	11
C.2 Connecting the RF In Port .....	11

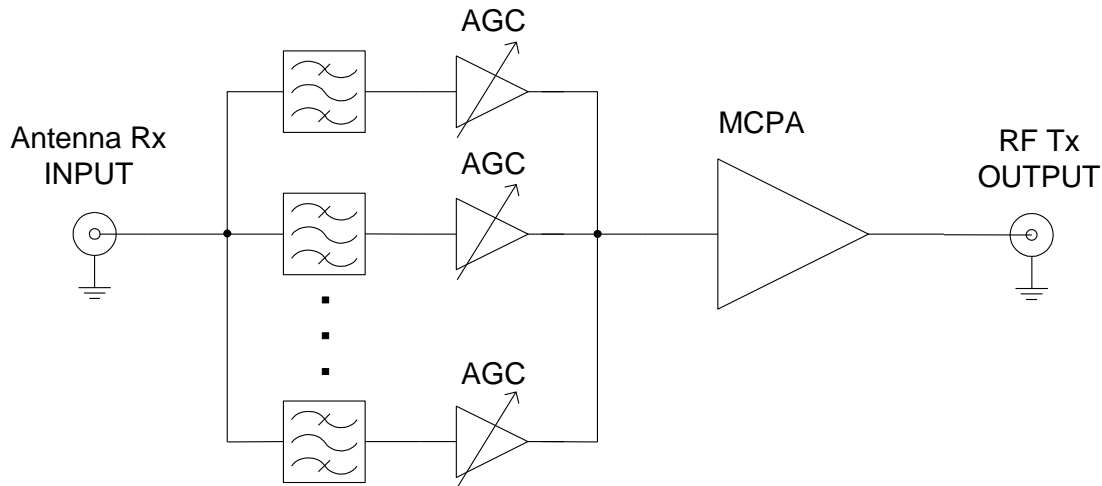
## II. TABLE OF FIGURES

Figure 1 – VHF Narrowband Signal Booster Basic Block Diagram.....	3
Figure 2 - Front Panel details .....	5
Table 1 – Front Panel details .....	5
Figure 3 - Rear Panel details. ....	6
Table 2 – Rear Panel details.....	6
Figure 4 – D.U.T. connected directly to PC computer.....	7
Figure 5 - D.U.T. connected into local area network.....	8
Table 3 – Frequency ranges for filters .....	9
Table 4 – Current programmed filter center frequencies .....	9

## III. INTRODUCTION

### Section A. System Description

This system (D.U.T.) is a VHF Narrowband Signal Booster to operate within range 150-174MHz for Land Mobile radio FCC Part 90.



**Figure 1 – VHF Narrowband Signal Booster Basic Block Diagram**

The system features six or more programmable frequency narrowband filters. The desired operation frequencies must be configured using built-in Web Server.

Programmable Individual Rx Threshold level (Squelch) per filter allows transmission if the probe signal is greater than configured Squelch.

Individual Automatic Gain Control (AGC) per filter delivers constant output power level per channel (+/- 1 dB) regardless of their input level variations. The maximum output level per filter can be changed with option "Maximum Desired Output Level per filter" in Main Settings page from Web Server (please refer to VHF Narrow band Signal Booster O&M Manual.doc for more details).



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.
- “Filter Settings” contains the settings that can be configured for each filter window.

Never operate the system without adequate Load/Termination on the RF Tx Output. The VHF Narrowband Signal Booster will amplify until 120dB gain any input stimulus greater than Rx Threshold level (Squelch).

The Web Server allows to Mute/Unmute Power Amplifier in “Main Settings” page. Make sure the power amplifier is unmuted before start with the test.

## IV. QUICK START

### Section A. Physical Overview

Figure 2 shows the visual status that the D.U.T. front panel has. A brief explanation is given in Table 1.

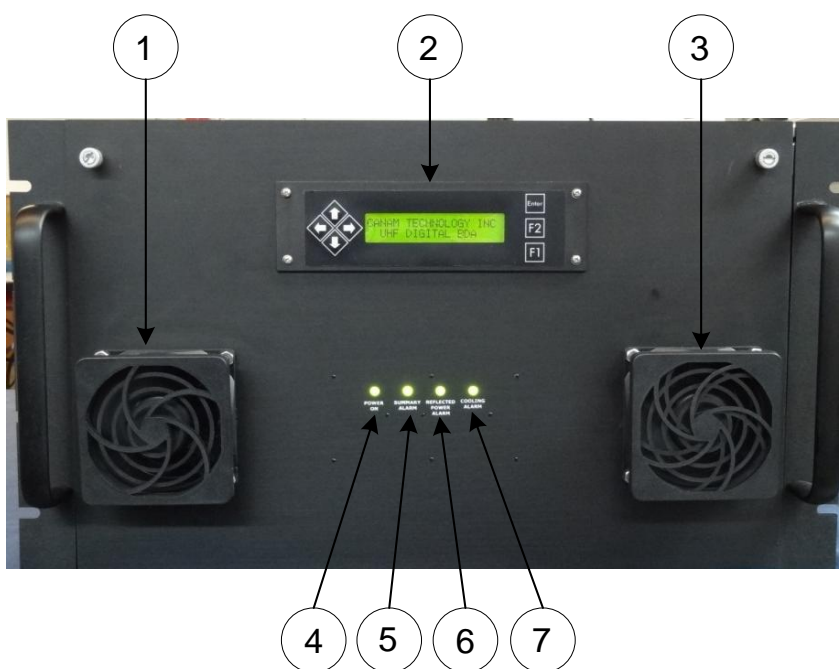


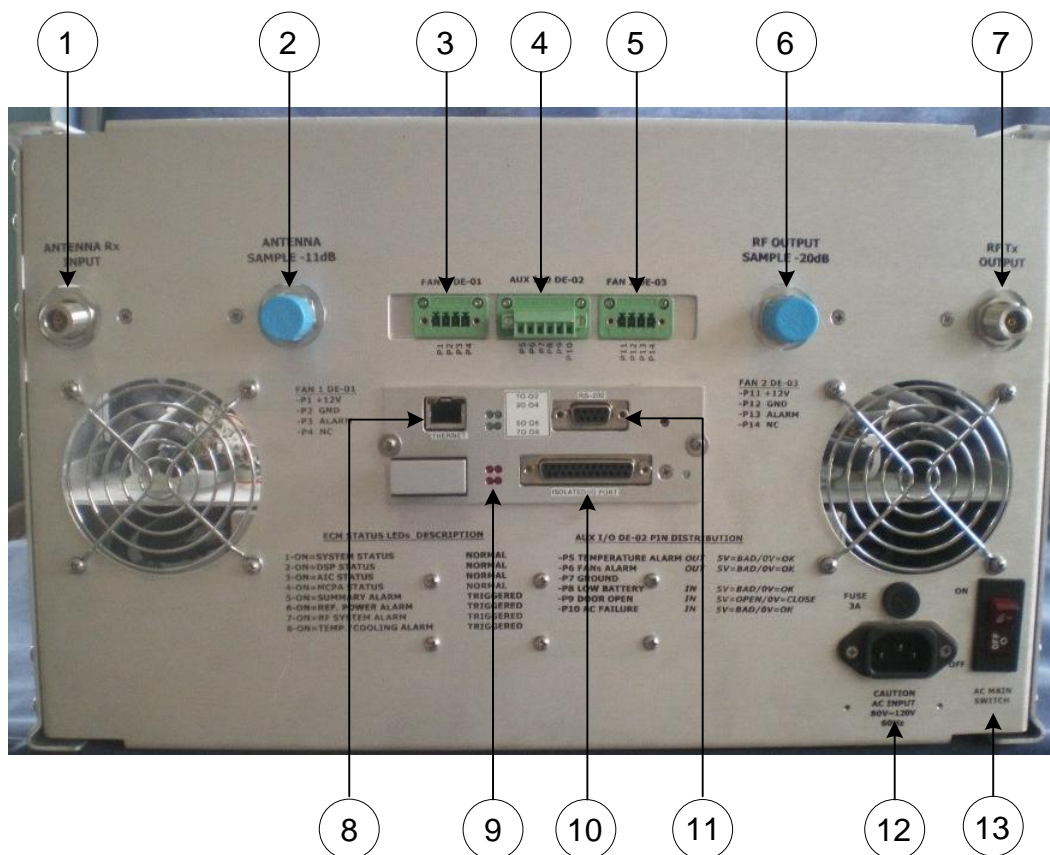
Figure 2 - Front Panel details

Table 1 – Front Panel details

Item	Description
1	Intake fan 1
2	LCD Display/Keypad
3	Intake fan 2
4	Power ON LED (Green = ok, Red = bad)
5	Summary Alarm LED (Green = ok, Red = bad)
6	Reflected Power Alarm LED (Green = ok, Red = bad)
7	Cooling Alarm LED (Green = ok, Red = bad)



Figure 3 shows the connectors and visual status that the D.U.T rear panel has. A brief explanation of each connector is given in Table 2.



**Figure 3 - Rear Panel details.**

**Table 2 – Rear Panel details.**

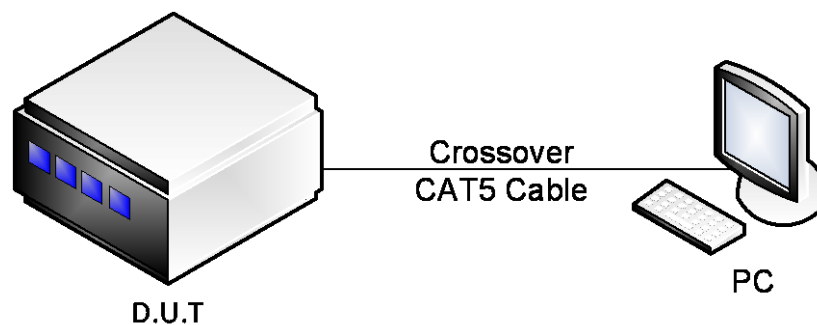
Item	Description
1	Antenna Rx Input
2	NOT USED
3	NOT USED
4	AUX Digital I/O Connector De-02
5	Not Used
6	Not Used
7	RF Tx Input
8	LAN Ethernet Data Port
9	LED Indicators
10	Discrete Digital I/O DB25 Connector
11	RS-232 Serial Port (Factory Debug)
12	AC Input Receptacle
13	AC Mains On/Off Switch

## Section B. Start - up

### B.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.

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

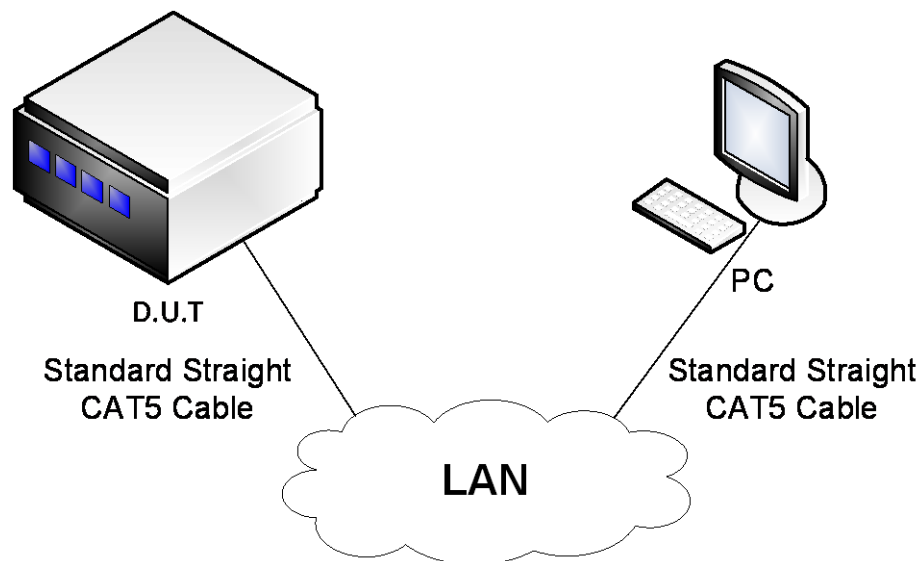


**Figure 4 – D.U.T. connected directly to PC computer.**

1. Use an Ethernet crossover cable for connect equipment directly to a PC computer LAN port (refer to Item #8 in Figure 3).
2. The IP address of the equipment is shown in the LCD display. By default it is 192.168.100.87 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 (<http://192.168.100.87>).
- Login with username = operator, password = operator.

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



**Figure 5 - D.U.T. connected into local area network.**

The following steps are necessary to connect D.UT to LAN:

1. Find out the subnet the PC computer is currently plugged into.
2. Configure D.U.T IP address avoiding conflict with other devices IP addresses. Use procedure in previous section B.1.1.

Please refer to VHF Narrow band Signal Booster O&M Manual for more details.



## B.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 (<http://192.168.100.87>) assigned to the equipment.
  - Login with username = operator, password = operator.
  - The [Main Status](#) page will be displayed if connection available.
2. Go to [Filter Settings](#) page to configure the desired center frequencies following filters distribution in Table 3.

**Table 3 – Frequency ranges for filters**

Frequency Range (MHz)	Assigned Filter Number
Low-end: 150-159	1 and 2
Mid-range: 159-167	3 and 4
High-end: 167-174	5 and 6

For example, the current programmed frequencies are the shown in Table 4.

**Table 4 – Current programmed filter center frequencies**

Filter Number	Frequency (MHz)
1	151.0000
2	151.1000
3	163.1000
4	163.0000
5	173.9000
6	174.0000

- Every frequency to be tested must be enabled. Check/uncheck Tx Enable to enable/disable filters.
- Filters in different frequency range (according to Table 3) **must not** be enabled at same time.
- Press “Apply” button to apply changes.



► innovation in  
REBROADCASTING since 1962

3. Go to [Main Settings](#) page:
  - Verify the "Maximum Desired Output Level per Filter" is +27dBm.
  - Uncheck "Output MCPA Mute" to enable MCPA output.
  - Press "Apply" button to apply changes.



## Section C. RF Connections

### C.1 Connecting the RF Out Port

1. Use a coaxial cable to connect the test instrument to D.U.T. RF Tx Output Port (refer to Item#7 in Figure 3).

### C.2 Connecting the RF In Port

1. Adjust the RF Generator output power to -60 dBm.
2. Adjust the RF Generator frequency to match the frequencies that have been programmed in Table 4.
3. Use a coaxial cable to connect the RF generator output to D.U.T. Antenna Rx Input Port (refer to Item #6 in Figure 3).



(this page intentionally left blank)