



# **AW58103HTS AW58103HTM**

## **MANUAL ADDENDUM**

**5.8 GHz Outdoor 100 Mbps  
Wireless 3-Port Ethernet  
Subscriber Unit and Mesh Node Radios**

*Industrial-grade, long-range wireless Ethernet systems*

**AvaLAN**  
WIRELESS

Thank you for your purchase of this member of the 5.8 GHz Outdoor 100 Mbps family of wireless Ethernet radios.

The AW58103HTS is a radio with a dual flat panel high gain directional antenna and a built in 802.3af Power Over Ethernet 3-port switch. This allows you to place a wireless Ethernet drop at a location and provide power and data connections for up to three Ethernet devices. 48 VDC power is provided to the three devices via unused wires in their data cables. Multiple AW58103HTS radios can serve as a Subscriber Units (clients) in conjunction with an AW58100HTA. Except for the power and data distribution provided by the switch, the AW58103HTS is functionally identical to the AW58100HTS. For configuration and testing information, refer to the AW58100HTS manual attached to this Addendum.

In similar fashion, the AW58103HTM is a radio that is functionally identical to the AW58100HTM Mesh Node with the addition of the 802.3af POE switch. For configuration and testing information, refer to the AW58100HTS manual attached to this Addendum.

The AW58103HTS includes:

- (1) AW58103HTS Subscriber Unit Radio
- (1) Heavy Duty Pole-mount Bracket
- (1) Power Over Ethernet Injector
- (1) 48 VDC 0.5A Power Supply

The AW58103HTM includes:

- (1) AW58100HTM Mesh Node Radio
- (1) Heavy Duty Pole-mount Bracket
- (1) Power Over Ethernet Injector
- (1) 48 VDC 0.5A Power Supply

If you have any questions when configuring your AvaLAN system, the best place to get answers is to visit [www.avalanwireless.com](http://www.avalanwireless.com). You will also find the latest updates there. If more assistance is needed, send email to [support@avalanwireless.com](mailto:support@avalanwireless.com).

To speak to a live technician, please call technical support at the number below during normal business hours.

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Revision 07.23.2012

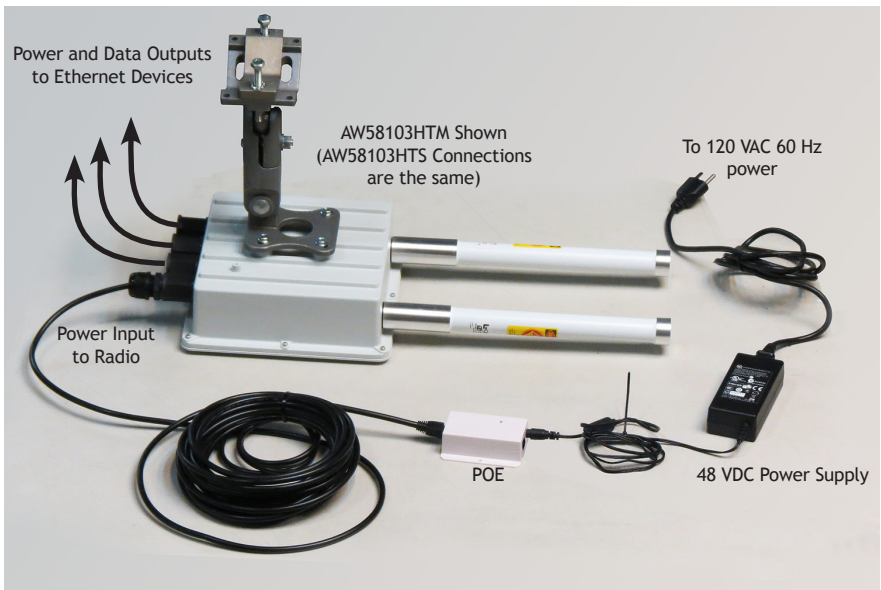
125A Castle Drive  
Madison, AL 35758

Sales: (866) 533-6216  
Technical Support: (650) 384-0000  
Customer Service: (650) 641-3011  
Fax: (650) 249-3591

Disregard the power connection information in the attached manual in the Quick Start Guide and Physical Setup sections, using the information below instead.

We recommend connecting and powering up the units on the bench before deploying in the field, because it is much easier to troubleshoot problems and to adjust the configuration if necessary without having to climb poles to do it. Activate the AW58103HTS or AW58103HTM units one at a time until they can be given distinct IP addresses.

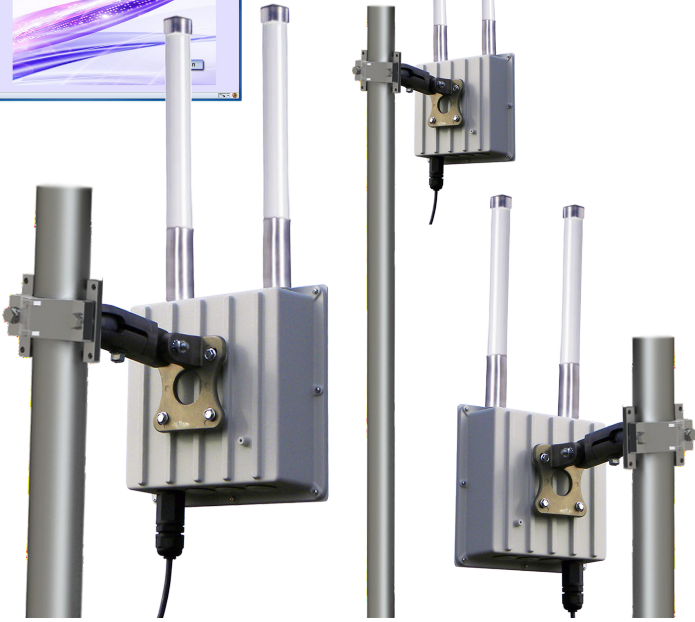
This photo shows how things are connected on the bench:



The main elements to consider are these:

- The Power connection is made to the labeled port (the rightmost one when viewed from the rear) on the radio. This port is used only for power and not data.
- The maximum cable run between the Power Over Ethernet Injector and the radio is 100 feet (30 meters).
- The maximum cable run from the radio to any of the three attached devices is also 100 feet.
- The POE has a “Data In” socket, but it cannot be used to support a fourth device. Nothing should be connected to this socket.
- Total DC power available to the three devices is 25 Watts.





# AW58100HTM

## USER'S MANUAL

**5.8 GHz Outdoor 100 Mbps  
Wireless Ethernet Mesh Node**

*Industrial-grade, long-range wireless Ethernet systems*

AvaLAN  
WIRELESS

Thank you for your purchase of this member of the 5.8 GHz Outdoor 100 Mbps family of wireless Ethernet radios.

The AW58100HTM is a mesh node radio. It features dual omnidirectional antennas and may be used in sets to create a high speed, line-of-sight multipoint-to-multipoint network with 1 Watt EIRP and up to 100 Mbps RF data rate via the latest MIMO technology.

The AW58100HTM includes:

- (1) AW58100HTM Outdoor 100 Mbps Wireless Ethernet Mesh Node Radio
- (1) Heavy Duty Pole-mount Bracket
- (1) AW-POE Power Over Ethernet Injector
- (1) AW-12VPS 12VDC 0.5A Power Supply

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Madison, AL 35758

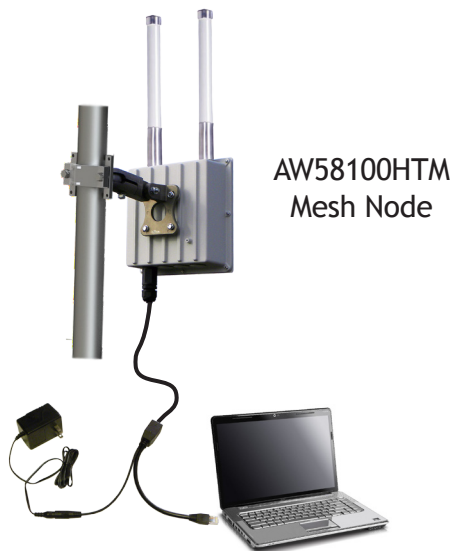
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Fax: (650) 249-3591

## Quick Start Guide

We recommend connecting and powering up each AW58100M unit on the bench before deploying in the field, because it is much easier to troubleshoot problems and to adjust the configuration if necessary without having to climb poles to do it.

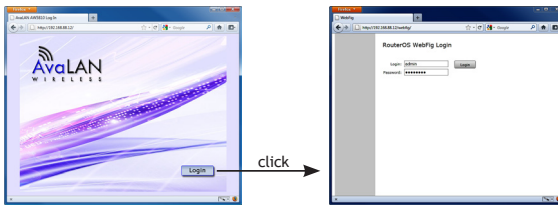
**Step 1. Gather the parts:** In addition to the AvaLAN radio and the accompanying AW-POE Power Over Ethernet Injector and 12VDC power supply, you will need at least one CAT5 cable and a PC with a LAN connection.

**Step 2. Make the connections:** Connect the devices as shown in the diagram. Plug in the AW-12VPS power supply to turn on the radio.

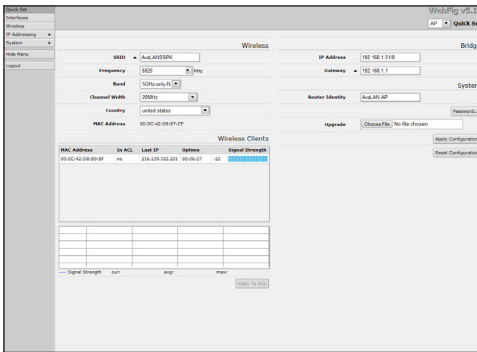


**Step 3.** The default IP address of the radio is written on its product label. This address is 192.168.88.11 with a subnet mask of 255.0.0.0. You must configure your PC's wired LAN port to the same subnet and an IP address different from that of the radio. With this configuration in place, you should be able to use a web browser on your PC to log in to the radio's interface.

**Step 4.** Browse to the Access Point's interface: Enter `http://192.168.88.11` into your web browser's address bar. If you are successful, you will see a login screen like that on the next page. If not, the browser will time out and you will need to double check the IP addresses and subnet masks.



Step 5. Log In to the radio: The default login name is “admin” and the password is “password.” If your login is successful, you should see the “Quick Set” page similar to this:



(You may need to scroll around in the page to see all the elements, particularly if you have a lower resolution monitor or are using Firefox as your browser.)

Step 6. To determine if your wireless mesh network is functioning correctly, you will need to give each AW58100HTM Mesh Node a unique IP address. There is a box near the upper right corner of the “Quick Set” page that displays the current value and allows you to change it. A special notation is used for this entry: Use /x at the end of the IP Address to specify the subnet mask: /8 for 255.0.0.0, /16 for 255.255.0.0, /24 for 255.255.255.0 and /32 for 255.255.255.255. Enter a new IP Address and subnet making sure you will be able to browse to the new address with your computer. Also, make sure that the new IP address is unique on your LAN subnet. Click the “Apply Configuration” button to make the change. Nothing appears to happen, but you have been disconnected and will need to browse to the new IP Address to login again.

Step 7. Repeat the above steps for each Mesh Node in your network, giving them each a unique IP address. You may wish at the same time to perform the other Digital Configuration steps beginning on Page 5. Each radio must have a unique IP address with the other configuration parameters set alike.

Utilizing state of the art MIMO technology, the AW58100HTM achieves very high data rate through a combination of dual spacial streams and higher level OFDM modulation.



The default RF configuration provides a 20 MHz channel bandwidth with 5 selectable non-overlapping channels to choose from. When configured and mounted, the radios operate as a fully-connected peer-to-peer wireless network with automatic path routing and self-healing.

## Physical Setup

1. The factory default digital configuration may be used, except that each radio must be given a unique IP address as described in the Quick Start Guide. You may want to perform the procedures in the next section before mounting the radios in their final locations. Particularly if data security is important, you will likely want to change passwords and encryption keys. If RF interference sources are present, you may want to change the channel frequency or bandwidth.
2. Mount each unit securely using the mounting brackets provided or other means as necessary.
3. The units have two omnidirectional antennas to provide dual RF streams for higher data rates. Each Mesh Node radio needs to be located with no more than a 1/2 mile line-of-sight path to whichever other Mesh Nodes it is intended to link with.
4. Power is provided to the units by means of their Ethernet cables, allowing the power supplies to be located at convenient locations. The included power-over-Ethernet injectors (POE) provide the means for adding DC power to unused wires in the cable (pins 4,5 negative and 7,8 positive). The POE male RJ-45 connector may be plugged into your network router or, at a remote site, your remote data source such as a camera. The female RJ-45 sockets on the POE should be connected via your LAN cable to the AvaLAN radio. Then the AW-12VPS power supply is connected to the P5 socket on the POE and plugged into a 120 VAC source. Each radio is provided with a cable clamping device that allows an RJ45 plug on the cable to pass through and can be tightened down around the cable to provide a weatherproof seal.

## Digital Configuration

These five configuration elements must be set for each radio:

1. IP address/subnet mask
2. User password
3. SSID (Service Set Identifier)
4. Encryption pass phrase
5. Frequency Channel

For a set of Mesh Nodes in a network, the IP addresses must be different and all other configuration parameters must be the same. The following pages will give you step by step instructions for changing these configuration elements.

## Connecting to the radio

1. Digital configuration is done by means of the radio's built in browser interface. The unit should be powered on and connected at least temporarily to a network containing a computer that can run a conventional web browser.
2. Using your web browser, connect to the radio as described in the Quick Start Guide found earlier in this manual.
3. The initial screen after a successful login is "Quick Set":

4. Each screen provides a menu on the left to navigate from section to section. The menu looks like this when sections are expanded:

In addition, many screens "drill down" when an area within the screen is clicked.

In the upper right of the screen is a label that tells you the version of the web interface. If the version number is not the same as shown below, you might want to visit [www.avalanwireless.com](http://www.avalanwireless.com) to see if a newer version of this manual exists before proceeding further.

**WebFig v5.16**

You are cautioned not to use the "back" button on your browser to attempt to move back to earlier screens. If you do, you will be logged out and will need to login again.

## Changing The Configuration - Step by Step

Please remember that if you change the IP Address or User Password and forget their new values, you have locked yourself out of the browser interface. Recovery can be a time-consuming process and will require the help of AvaLAN Technical Support. If you are changing parameters over the RF link (we do not recommend this), be sure to make the remote changes first because the link will be broken if the SSIDs or Security Pass Phrases do not agree.

### 1. Setting the IP Address and subnet mask:

- On the Main Menu at the left side of the browser window, click “IP Addressing”, then click “Set IP/subnet.”
- The current IP Address is shown. Click it to bring up the page that allows you to change it.
- A special notation is used for this entry: Use /x at the end of the IP Address to specify the subnet mask: /8 for 255.0.0.0, /16 for 255.255.0.0, /24 for 255.255.255.0 and /32 for 255.255.255.255. Enter a new IP Address and subnet making sure you will be able to browse to the new address with your computer. Also, make sure that the new IP address is unique on your LAN subnet.

Quick Set	WebFig v5.16
Interfaces	Address <192.168.1.91/8>
Wireless	OK Cancel Apply
IP Addressing	not invalid
Set IP/subnet	Address 192.168.1.91/8
System	Comment
Logout	

- Click “Apply.” Nothing appears to happen, but you have been disconnected and will need to browse to the new IP Address to login again. Note that the IP Address is also visible and may be changed on the “Quick Set” screen.

### 2. Setting the User Password:

- On the Main Menu at the left side of the browser window, click “System”, then click “Password.”
- Enter the old password and the new password twice in the boxes indicated.
- Click the “Change” button.
- Log out and log back in to test.

Change	Cancel
<b>Old Password</b>	<input type="text"/>
<b>New Password</b>	<input type="text"/>
<b>Confirm Password</b>	<input type="text"/>

### 3. Setting the SSID:

- On the Main Menu at the left side of the browser window, click “Wireless.” Then click anywhere in the “Wireless\_Radio” row to bring up the “Interface <Wireless\_Radio>” page.
- The second line down in the content table shows the current SSID and provides a text box to change it. Change the SSID to a new value of your choice and click “OK” or “Apply.”
- You will need to browse to the radio’s IP Address and login again after the change.

### 4. Setting the Encryption Pass Phrase:

- On the same page as above for setting the SSID, a box is provided for entering the Encryption Key.

Quick Set	
Interfaces	
Wireless	
IP Addressing	OK Cancel Apply
Set IP/subnet	
System	
Password	
Reboot	
Hide Menu	
Logout	
	Frequency <input type="text" value="5825"/> MHz
	SSID <input type="text" value="AvalANSSPK"/>
	Encryption Key <input type="text" value="....."/>
	Tx/Rx Rate 761.3 kbps / 64.4 kbps
	Tx/Rx Packet Rate 86 p/s / 56 p/s

## 5. Setting the Access Point Frequency Channel and Bandwidth:

- On the Main Menu at the left side of the browser window, click “Quick Set.” This returns you to the page presented after login.

WebFig v5.1.6

AP | Quick Set

Wireless

SSID: AvalAN58100 IP Address: 192.168.1.118

Frequency: 5805 MHz Gateway: 192.168.1.1

Band: 5GHz-only-N

Channel Width: 20MHz Router Identity: AvalAN AP

Country: United States Password: \_\_\_\_\_

MAC Address: 00:0C:42:08:87:C7 Upgrade:  No file chosen

Wireless Clients

MAC Address	In ACL	Last IP	Options	Signal Strength
00:0C:42:08:89:8F	no	194.139.102.201	00:00:27	-22

Apply Configuration  
Reset Configuration

- The default Frequency Channel is 5805 MHz. There are more choices available in the dropdown list than are legal or appropriate for this set of products. Do not change the “Band” dropdown box setting. Please choose from among the frequencies shown in the table on the last page of this manual. Make sure that you choose channels for mesh networks operating in proximity that do not overlap.
- The default Channel Width is 20 MHz, which provides the highest possible data rate. More range can be achieved at the expense of data rate by choosing a narrower Channel Width. Your choices are 5, 10 or 20 MHz.
- Change to the Frequency and Channel Width desired and click “OK” or “Apply.”

## Viewing Status Information

After configuring your AvaLAN radios and establishing links among them, you can use the browser interface to view status and troubleshooting Information. The initial “Quick Set” page will show whether the wireless link is operating and the current signal strength. For more comprehensive information, choose “Wireless” from the Main Menu at the left side of the window. The “Wireless” page leads to most of the useful status information. This page has two tabs, Interfaces and Associations.

Quick Set											
Interfaces											
Wireless											
IP Addressing											
System											
2 Kems											
		▲ Name	Type	L2 MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	Tx Drops	Rx Drops	Tx Err
<input type="checkbox"/>	R	Wireless_Radio	Wireless/Atheros	11N 2290	73.8 kbps	17.4 kbps	9	8	0	0	0
	DR	wds1	WDS	2290	73.8 kbps	17.4 kbps	9	8	0	0	0

1. Interfaces Tab: This provides a list of the interface processes running in this radio. There should be one “Wireless\_Radio” process and a WDS process running for each mesh node that is connected. **(CAUTION! Do not click the little “D” buttons.)** Clicking on the “Wireless\_Radio” line brings up more information:

Quick Set
WebFig v5.1.0

Interfaces

Wireless

IP Addressing

System

Hide Menu

Logout

Interface <Wireless\_Radio>
OK Cancel Apply

Frequency: 5825 MHz

SSID: AvalANSSPK

Encryption Key: \*\*\*\*\*

NV2

Traffic

Tx/Rx Rate: 97.0 kbps / 27.4 kbps

Tx/Rx Packet Rate: 14 p/s / 12 p/s

Tx/Rx Bytes: 482.6 MB / 94.5 MB

Tx/Rx Packets: 767 577 / 647 046

Tx/Rx Drops: 0 / 0

Tx/Rx Errors: 0 / 0

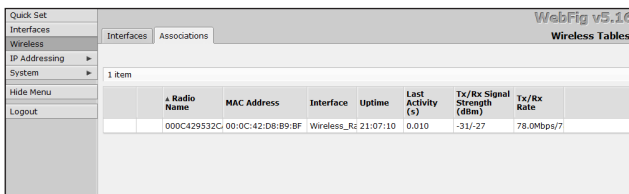
Byte Graph

Packet Graph

This page displays the current RF frequency, the SSID, current transmission rates, amount of data sent and received since last reboot, drops and errors. Also shown are graphs of megabits per second and packets per second during the last five minutes or so. The graphs are well labeled and auto-scale to fit the data. After viewing the status, you may leave the page by clicking “Cancel” or by using the Main Menu. (If you click “OK” or “Apply”, the process will restart and briefly interrupt the data flow.

Back on the “Wireless” page, you can click on a WDS process line to see similar information about traffic with just that particular radio.

2. Associations Tab: This provides a list of radios that are connected, showing their MAC addresses, how long the connection has been up, seconds since last activity, Transmit and receive signal strength in dBm and the transmit and receive data rate in use.



The screenshot shows the 'Wireless Tables' section of the WebFig v5.16 interface. It features a navigation menu on the left with options like 'Quick Set', 'Interfaces', 'Wireless', 'IP Addressing', 'System', 'Hide Menu', and 'Logout'. The main content area is titled 'Wireless Tables' and contains a table with the following data:

Radio Name	MAC Address	Interface	Uptime	Last Activity (s)	Tx/Rx Signal Strength (dBm)	Tx/Rx Rate
000C429532C	00:0C:42:DB:B9:BF	Wireless_Rx	21:07:10	0.010	-31/-27	78.0Mbps/7

Clicking on the white text line brings up detailed status of the remote radio:

This screen is a very tall window with several interesting sections shown on the next page. The top “General” section shows information that may be useful if you contact AvaLAN Technical Support.

The “Signal” section shows transmit and receive signal strength overall and by individual MIMO channel.

The “Statistics” section shows the link transmit and receive rates.

		WebFig v5.1.6	
		AP Client <00:0C:42:D8:B9:BF>	
Close Ping			
General			
Radio Name	000C429532CA		
MAC Address	00:0C:42:D8:B9:BF		
Interface	Wireless_Radio		
Uptime	21:07:41		
RouterOS Version	5.16		
Last IP	216.139.102.201		
Signal			
Last Activity	0.010 s		
Tx/Rx Signal Strength	-20/-32 dBm		
Tx/Rx Signal Strength Ch0	-20/-32 dBm		
Tx/Rx Signal Strength Ch1	-58/-43 dBm		
Signal To Noise	85 dB		
	Rate	Last Measured	
	6Mbps	00:00:00.01	
	9Mbps	20:42:48.76	
	13Mbps	21:06:31.74	
	18Mbps	21:06:12.61	
	24Mbps	21:05:53.84	
	34Mbps	00:00:04.58	
	HT20-3	21:05:31.23	
	HT20-4	00:00:00.08	
	HT20-5	00:00:00.01	
	HT20-6	00:02:16.58	
	HT20-7	00:00:03.52	
Nstreme			
Framing Mode	none		
Framing Limit			
Framing Current Size			
Nstreme	<input type="checkbox"/>		
Statistics			
Tx/Rx Rate	78.0Mbps/78.0Mbps		
Tx/Rx Packets	92.906/74.752		
Tx/Rx Bytes	113.3 MB/12.7 MB		

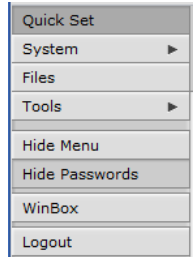
## Advanced Diagnostic Tools

You may want to contact AvalAN Technical Support for more guidance before using the additional tools described in this section.

The radio's browser interface unlocks some additional features if you login as an advanced user instead of the standard user described earlier in this manual. From the browser initial login page, if you enter a user name of "adv\_user" with a password of "passwOrd" (a zero replacing the "o"), you will see and be able to do anything the standard user (user name "admin") can do, plus some additional tasks. Obviously, you can change the password for "adv\_user" and may want to do so for security purposes.



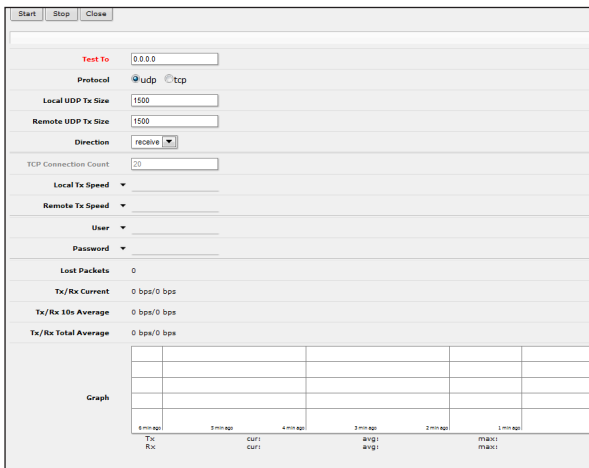
When you log in as the advanced user, the navigation menu looks like this. There are three new tabs:



- Files - Lists the files associated with the web interface of the radio. This information may be useful when contacting AvaLAN Technical Support. You are cautioned not to delete or alter these files without instructions from AvaLAN Technical Support. (It is very easy to render your radio inoperative by doing so.)
- Tools - Four different diagnostic tools are provided here to facilitate troubleshooting and performance optimization.
- WinBox - Downloads a simple finder utility that can be used on Windows-compatible PCs to locate AW58100 family products on your LAN.

**Tools:**

1. Bandwidth Test: This is a tool that will generate a high volume of traffic for a particular radio link and produce a graph of the data rate achieved. The test can only be performed from one radio to another over the wireless link, so enter the IP address of the remote radio you wish to exchange data with. You can also specify the protocol, tcp or udp, and the packet size and data direction.



2. Flood Ping: This tool can be used to generate a continuous string of ping commands to any IP address the radio can see on its subnet. Ping uses ICMP (Internet Control Message Protocol) to request a packet from the target device, waits for a return and then immediately sends another request. You can specify the IP address to ping, the packet count, packet size in bytes and the timeout in milliseconds.

Flood Ping

<b>Flood Ping To</b>	<input type="text" value="0.0.0.0"/>
<b>Packet Count</b>	<input type="text" value="1000"/>
<b>Packet Size</b>	<input type="text" value="1500"/>
<b>Timeout</b>	<input type="text" value="1000"/>
<b>Packets Sent</b>	0
<b>Packets Received</b>	0
<b>Minimum RTT</b>	0
<b>Average RTT</b>	0
<b>Maximum RTT</b>	0

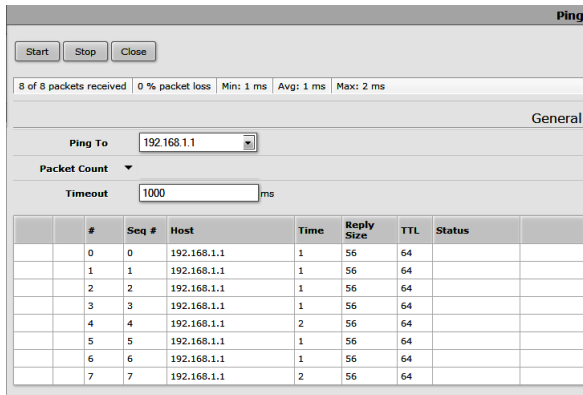
3. IP Scan: The radio will scan a range of addresses (by default, its entire subnet) and report back the MAC address and other information about each device it finds.

IP Scan

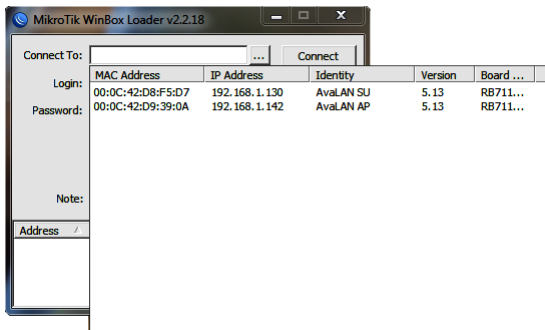
**Address Range** ▼

#	Address	MAC Address	Time (ms)	DNS	SNMP	Netbios
0	192.168.1.1	00:18:E7:F2:7C:CA	3			
1	192.168.1.3	00:1E:58:32:C6:8E	2			
2	192.168.1.142		1			
3	192.168.1.25	00:1D:8A:95:84:13	2			
4	192.168.1.11	00:21:74:00:06:99	4			
5	192.168.1.12	00:21:74:02:44:87	1			
6	192.168.1.13	00:21:74:02:63:13	7			
7	192.168.1.14	00:21:74:00:03:40	7			
8	192.168.1.15	00:21:74:00:14:29	19			
9	192.168.1.16	00:21:74:02:23:26	21			
10	192.168.1.17	00:21:74:02:44:83	16			
11	192.168.1.141	C0:C1:C0:48:57:E7	0			
12	192.168.1.21	00:21:74:03:48:87	3			
13	192.168.1.189	00:16:36:7D:18:45	2			
14	192.168.1.95	00:1D:73:5B:A9:DE	2			
15	192.168.1.130	00:0C:42:D8:FS:D7	2			
16	192.168.1.134	00:09:68:8F:8C:99	0			
17	192.168.1.137	00:24:1D:27:41:AA	2			
18	192.168.1.147	00:23:18:94:68:86	2			

4. Ping: This tool is like the normal Internet ping command and is less disruptive of network traffic than Flood Ping. A request is sent and the time needed for a reply is measured. After an interval, the process is repeated. By default, continuous ping requests are sent until you click "Stop." Or you can specify a count, much like the ping command used in the Windows or Unix command line.



6. WinBox: Clicking this tab will cause your browser to download a utility for installation on your PC (Windows win32 compatibility only). It may be possible to run it on Linux or MAC OSX by using a Windows emulator such as Wine. By clicking the discovery button labeled "...", any AvaLAN AW58100 family products on your LAN will be reported. (You may also see other devices as well if they respond to the CDP protocol used by the utility.) The popup window will show the IP address of each radio and will facilitate logging in if you have lost or forgotten these addresses. This utility has some powerful features that can totally disrupt the functioning of your product. You are not encouraged to experiment or you may need to rely upon AvaLAN Technical Support to restore proper functionality.



## Frequency Channels

Frequency Band	Frequency MHz	Non-overlapping 20 MHz Bandwidth	Non-overlapping 10 MHz Bandwidth	Non-overlapping 5 MHz Bandwidth
802.11a Upper Band (FCC specifies for Outdoor use)	5730			OK
	5735		OK	OK
	5740			OK
	5745	OK	OK	OK
	5750			OK
	5755		OK	OK
	5760			OK
	5765	OK	OK	OK
	5770			OK
	5775		OK	OK
	5780			OK
	5785	OK	OK	OK
	5790			OK
	5795		OK	OK
	5800			OK
	5805	OK - Default	OK	OK
	5810			OK
5815		OK	OK	
ISM Band	5820			OK
	5825	OK	OK	OK
	5830			OK
	5835		OK	OK
	5845			OK

## Limited Warranty

This product is warranted to the original purchaser for normal use for a period of 360 days from the date of purchase. If a defect covered under this warranty occurs, AvaLAN will repair or replace the defective part, at its option, at no cost. This warranty does not cover defects resulting from misuse or modification of the product.

### Compliance Statement ( Part 15.19 )

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

### Warning ( Part 15.21 )

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

### RF Exposure ( OET Bulletin 65 )

To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.

### Information to the User - Part 15.105 (b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.