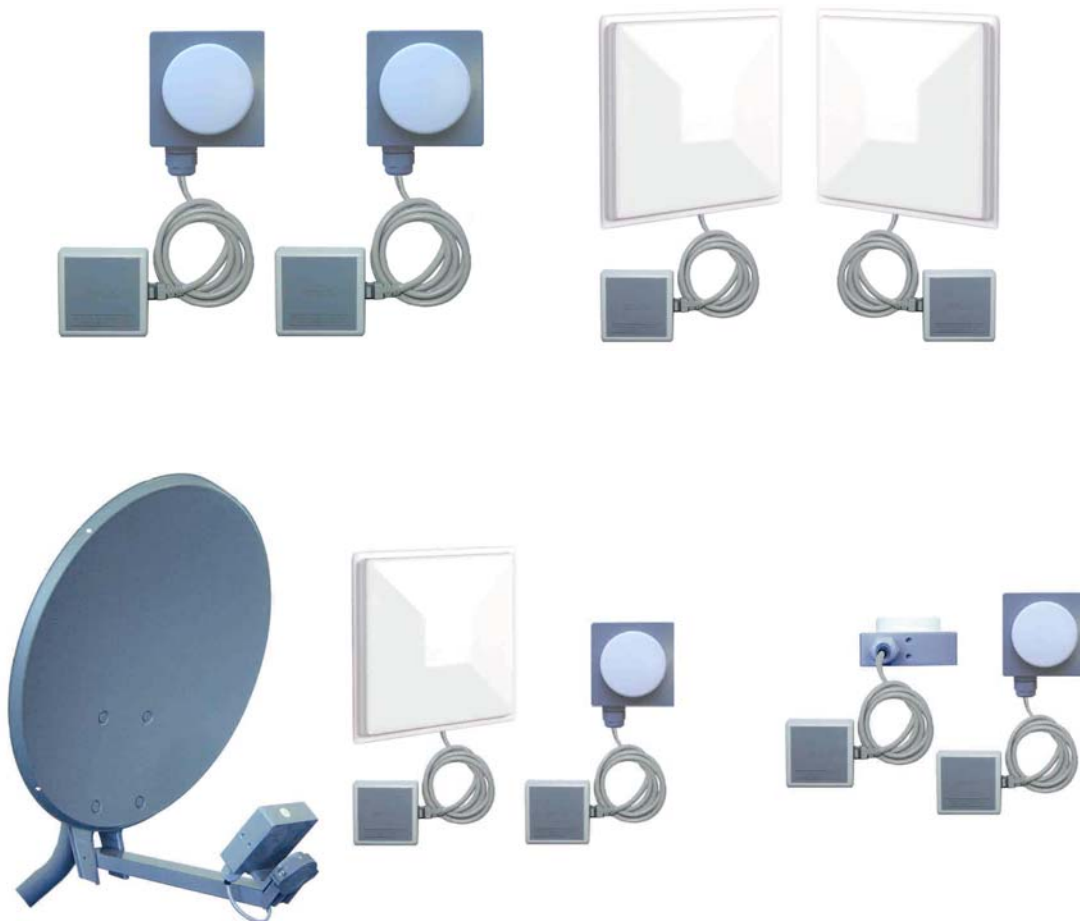


OPERATIONS MANUAL

MiniLink® Wireless Ethernet Systems



MicroTek Electronics, Inc.
25691 Atlantic Ocean Drive, Suite B-3; Lake Forest, CA 92630
Information Hotline **888-36-MICRO**
www.microtekelectronics.com

IMPORTANT SAFETY INSTRUCTION

For your protection, please read and observe all safety instructions before operating this system and keep this sheet and any additional instructions for future reference.

INSTALLATION & USE

OBSERVE WARNINGS: All warnings in the operating instructions should be carefully followed. Do not make any modifications to the WEM, PIM, or any other MicroTek electronic device, as the unit will no longer comply with FCC regulations and therefore cancel its warranty.

WATER AND MOISTURE: The Wireless Ethernet Modules used in this system are weatherproof provided they are installed in accordance to the mounting details listed on page 7 (or included dish manual for the 30-mile systems). However, further protection or housing is suggested for harsh environments, as moisture damage voids its warranty (as described on page 22). The Power Injection Modules used in this system are NOT weatherproof. None of the modules in this system are waterproof and should never be submerged. Severe electrical shock, personal injury or damage to the equipment may result.

POWER SOURCE: Connect the equipment to a power source only of the type described on the operating instructions or as marked on the equipment. Excessive or insufficient amperage or voltage can cause extended trouble-shooting or even damage that could negate its warranty. The power supplies' cable should not be modified/extended due to the ability to use up to 300 feet of power over Ethernet (see pg 7, part D). In addition, Ethernet cable running from the PIM to the WEM should be kept separated from high-voltage cables and/or transformers.

ATTACHMENTS: Use only MicroTek supplied or recommended Power Injection Modules, Power Supplies, CAT5 Cables and weather seals and plugs.

WHEN NOT IN USE: Unplug the power if the equipment is left unattended or unused for long periods of time or during lightning storms.

REPLACEMENT PARTS: When replacement parts are required, use only replacement parts specified by MicroTek Electronics, Inc. Unauthorized substitutions may result in damage to the system and will void the warranty.

FCC-Required Information Federal Communications Commission Radio Frequency Interference Statement for Class A Digital Devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment is designed to be professionally installed exclusively for fixed point-to-point applications. These products must be controlled due to radio frequency power output levels emitted with special consideration given to antenna placement as it relates to human exposure. Compliance is the responsibility of the installer and user.

Radio Frequency Interface Statement

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

- Reorient or relocate the receiving antenna of the affected radio or television.
- Increase the separation between the equipment and the affected receiver.
- Connect the equipment and the affected receiver to power outlets on separate circuits.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the users authority to operate the equipment. Changes or modifications not expressly approved by MicroTek could void the users authority to operate the equipment.

FCC Output Power Restrictions

The FCC does not require licensing to implement this device. License-free operation in the industrial, scientific, and medical band is documented in FCC Rules Part 15.247. It is the responsibility of the individuals designing and implementing the radio system to assure compliance with any pertinent FCC Rules and Regulations. This device must be professionally installed.

Exposure to Radio Frequency Fields

The Minilink 5.8WES is designed to operate at 5.8 GHz with up to 50 Watts EIRP maximum transmit power. This level of RF energy is above the Maximum Permissible Exposure (MPE) levels specified in FCC OET65:97-01. The following precautions must be taken during installation of this equipment:

- The installed antenna must not be located in a manner that allows exposure of the general population to the direct beam path of the antenna at a distance less than 1 Meter. Installation on towers, masts, or rooftops not accessible to the general population is recommended; or
- Mount the antenna in a manner that prevents any personnel from entering the area within 1 Meter from the front of the antenna.
- It is recommended that the installer place radio frequency hazard warnings signs on the barrier that prevents access to the antenna.
- During installation and alignment of the antenna, do not stand in front of the antenna assembly.
- During installation and alignment of the antenna, do not handle or touch the front of the antenna.

These simple precautions must be taken to prevent general population and installation personnel from exposure to RF energy in excess of specified MPE levels.

Industry Canada Restrictions

This device is in compliance with the applicable sections of the Industry Canada RSS-210 Spectrum Management and Telecommunications Radio Standard Specification that governs Low Power License-Exempt Radiocommunication Devices. Specifically, the output EIRP of this device relative to antenna gain is factory set to ensure compliance with section 6.2.2(q1)(iv)(g).

In addition, it is noted for all users that high power radars are allocated as primary users (meaning they have priority) of the 5250-5350 MHz and 5650-5850 MHz frequency bands and these radars could cause interference and/or damage to LELAN devices such as are covered by this manual.

Environmental Limitations of FCC License-Free Wireless Devices

MicroTek products are engineered to the highest standards and designed to work in a variety of wireless applications and environments. A wireless environment includes not only a particular site in which the product is installed but also the installation itself and any extra materials that might be necessary to complete the wireless project. Due to the fact that environments and installations differ from site to site, MicroTek cannot control the variables required to ensure an ideal environment. Therefore, it is not possible to guarantee a successful application based on a drawing, application note, quote or other type of material that MicroTek may provide. Should a quote, drawing, etc. be made available, it is based on the performance of the WES product in an ideal environment with clear line-of-sight, absence of 5 GHz interference and/or frequency multi-path reflection. Therefore, MicroTek cannot be held responsible should the products not operate as desired or should additional products be required to complete a project. In addition, should a particular environment restrict the usage of the MiniLink WES in any way, MicroTek offers a thirty (30) day return policy from date of original shipment (see page 3).

FCC REGULATORY ALERT

Regulatory Alert

As of July 20, 2007, a new FCC regulation has gone into effect which impacts operators of the U-NII band in the United States. As a result of this regulatory change, several MicroTek products are affected. The new FCC regulation impacts the sale of wireless equipment in the 5.25-5.35 GHz band. The regulation states that all devices imported and marketed after the July 20th, 2007 deadline must support radar detection as specified by the FCC in the 5.25-5.35 GHz band.

MicroTek Electronics Product Changes

To comply with FCC regulation, MicroTek has disabled the 5.25-5.35 GHz band. The following products are still available but will only support operation in the 5.725-5.85 GHz ISM band.

- ML WES-2500
- ML WES-2-4
- ML WAP
- ML WAPOM
- ML WSU
- ML WSUP
- ML WSUOM
- ML WES-D
- ML WES-OD
- ML WES-D1-2

MicroTek is currently working on the firmware change necessary to comply with the new FCC regulations which require Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC) for operation in the 5.25-5.35 GHz band.

How Does the FCC Regulation Affect the WES User?

If one WES System is in use and there are no plans to add to the wireless project then it might not affect you at all. However, if you are using two or more systems then you may need to change frequencies according to the available channels. Multiple WES systems set to channels 0, 1 or 2 (all unavailable 5.2/5.3 GHz frequencies) will all be defaulted to channel 3 (available 5745 MHz). The next available frequency in sequence would be channel 4 (5765 MHz). Channels 3 through 7 are all individual frequencies but channels 0-2 are not available.

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COVERED PRODUCTS

<u>PART #</u>	<u>DESCRIPTION</u>
ML WAP	MiniLink 5.8 GHz Wireless Host / Access Point - Directional
ML WAPOM	MiniLink 5.8 GHz Wireless Host / Access Point - Omni-directional
ML WSUOM	MiniLink 5.8 GHz Wireless Client / Subscriber Unit - Omni
ML WSU	MiniLink 5.8 GHz Wireless Client / Subscriber Unit - Standard
ML WSUP	MiniLink 5.8 GHz Wireless Client / Subscriber Unit – 6” x 6” Patch
ML WSUDI	MiniLink 5.8 GHz Wireless Client / Subscriber Unit – 18” Dish
ML WEM	MiniLink 5.8 GHz Wireless Ethernet Module
ML WEMP	MiniLink 5.8 GHz Wireless Ethernet Module w/ 6” patch antenna
ML WEM-30	MiniLink 5.8 GHz Wireless Ethernet Module – 18” Dish

QUICK START PROCEDURES

MicroTek Electronics, Inc. recommends that all equipment be bench tested before being installed onsite. This test will ensure the equipment is functioning properly.

IMPORTANT: SEE NEW FCC REGULATORY ALERT ON PAGE “(iii)”

WIRELESS ETHERNET MODULE SETUP

1. Remove the Host and Client from the box, select frequency via the rotary switch at the side of the unit. (Factory set to channel 0 unless otherwise noted) The channels of each set of Host/Clients must be matched for the radios to communicate with each other. For multi-connect devices, each Client must be set to the same channel as the Host that it will be connected to. If connecting more than one Client to a Host, please see the advanced operation section of this manual for setup.
2. Mount the Client at the remote location. Point the Client as accurately as possible to the point where Host will be mounted.
3. Remove the Power Injection Modules (PIMs) from the box and determine where they will be located for each Host/Client. Total distance between a Host/Client and connected Ethernet device cannot exceed 300 feet (100m). The PIMs can be located anywhere along the 300 feet of CAT5 cable. Connect a standard CAT5 straight through patch cable to the “Ethernet Out” port on each PIM to its corresponding Host/Client. “Ethernet In” port on each PIM should be connected to its respective Ethernet device using a standard CAT5 straight through patch cable. A crossover cable may be needed depending on your Ethernet device.
4. Connect the included power supplies to the “Power In” port on the PIMs and plug the transformers into a standard 110VAC outlet. If the Ethernet devices on each end are connected, powered up and aimed correctly, the “Link Activity”, “Power” and “Signal Level” LEDs will illuminate. If the Ethernet device is not connected the “Power” LED and “Signal Level” LEDs only will illuminate. If the “Signal Level” LED is flashing, reposition the modules to achieve max signal strength. For multi-connect applications, each Client will show a solid green light when connected to a Multipoint Host. A flashing green LED on the Multipoint Host Access Point will indicate the number of Client Subscriber Units to which it is connected.

Note: If a dish is used with the system, assemble the dish and mount the Client/Host in the dish as described in the dish installation instructions. Then position the dish and connect the CAT5 cable as described above.

Trouble Shooting: If the signal level indicator is not fully lit, video does not appear on the screen or you are having other operational difficulties, please visit the trouble-shooting section on page 21 of the operations manual or contact MicroTek toll free at (888) 366-4276 for technical assistance.

PRE-INSTALLATION REMINDERS

The information on the Quick Start Guide is intended for ease of use and application, the following reminders will help to ensure your satisfaction with MicroTek products and service.

1. Read through this manual before bench testing and installation
2. A helpful IP Address Locating tool is available to download from our website at <http://www.microtekelectronics.com/softwaretools.htm>. Download the Locator.exe tool.
3. Perform a bench test incorporating all components of the application
4. Install your MiniLink Wireless Ethernet System
5. Toll-free technical assistance is available Monday through Friday (8-5pm PST) at 888-366-4276

MICROTEK ELECTRONICS RETURN POLICY

MicroTek Electronics wireless products come with a 2-year limited warranty, (see the last page for warranty information) unless otherwise specified. In addition to the 2-year warranty, products may be returned within thirty (30) days of shipment provided the products are in like new condition and in the original packaging. Contact your MicroTek Electronics dealer or distributor to obtain an authorization to return the merchandise for credit.

Return authorizations for repair can be sent directly to Microtek Electronics with a valid RA number. Call MicroTek Electronics to obtain an RA number for repair.

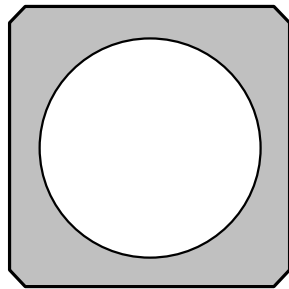
MINILINK WIRELESS ETHERNET SYSTEM (WES)

The MiniLink WES is a plug and play CAT5/Ethernet cable replacement device. It operates in the 5.8 GHz U-NII bands on 5 non-overlapping channels. The WES system enables a wide variety of IP cameras, DVRs, encoders/decoders and web servers to be used across wireless line-of-sight links in ranges of 500 feet to 30 miles. The system operates independent of any network it may be connected to.

MINILINK WIRELESS ETHERNET MODULE (WEM)

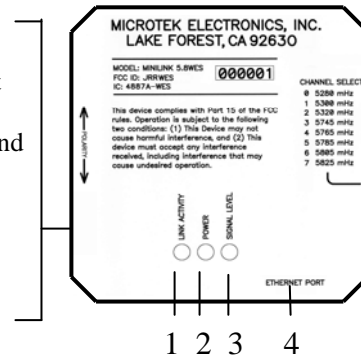
WEM DESCRIPTION

A. FRONT VIEW



B. REAR VIEW

NOTE: Mount Host/Client so that Vertical Ethernet Port is at bottom and use weatherproof caps and plugs for outdoor use as described on pg 7.



1. LINK ACTIVITY LED

Indicates that an Ethernet cable connection between powered Ethernet device & Host or Client has been established.

2. POWER LED

Indicates the Host or Client has power.

3. SIGNAL LEVEL LED

Indicates the signal strength level between Host/Client. On the MP Host AP, indicates the number of connected Clients. Note: This is not an indication of available throughput.

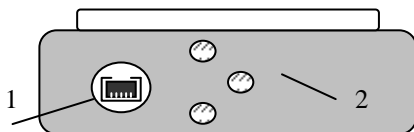
4. ETHERNET PORT

Standard RJ-45 connector. Outdoor use- must be weather protected with supplied strain-relief positioned so the connector is at bottom of the case. Weatherproof strain-relief plug should be tight enough so that it is snug on the cable but not to restrict cable movement.

5. CHANNEL SELECT

Rotary switch for channel selection, factory set to Channel 0. Switch is positioned on the side of the gray case behind the weatherproof plug. *Plug must be resealed after channel change.*

C. BOTTOM VIEW



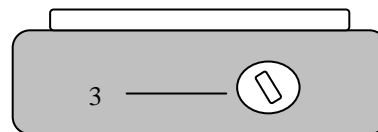
1. ETHERNET PORT

Standard RJ-45 Connector

2. MOUNTING HOLES

(3) ¼ - 20 mounting holes. Two vertical holes for dish L-bracket (ML WES-12 / ML WES-30 / ML WSUDI). Far right hole for black swivel mount.

D. SIDE VIEW



3. ROTARY CHANNEL SELECT SWITCH (REMOVE WEATHERPROOF PLUG)

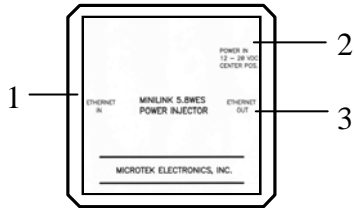
Shows switch settings for channels 0 – 7. **REPLACE (RESEAL) WEATHERPROOF PLUG AFTER CHANNEL SELECT CHANGE AND POWER CYCLE**

POWER INJECTION MODULE (PIM)

Note: The Power Injector Modules are not weatherproof units and must be protected from moisture.

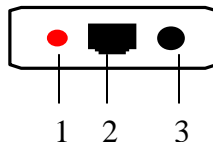
PIM DESCRIPTION

A. TOP VIEW



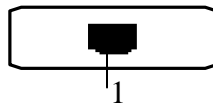
1. ETHERNET IN – Connect to Ethernet device
2. POWER IN – 12-20 VDC Center Positive
3. ETHERNET OUT – Connect to Host/Client

B. RIGHT SIDE VIEW



1. POWER LED – Lit when power is on
2. ETHERNET OUT – Connect to Host/Client
3. POWER IN – Connect to Power Supply

C. LEFT SIDE VIEW

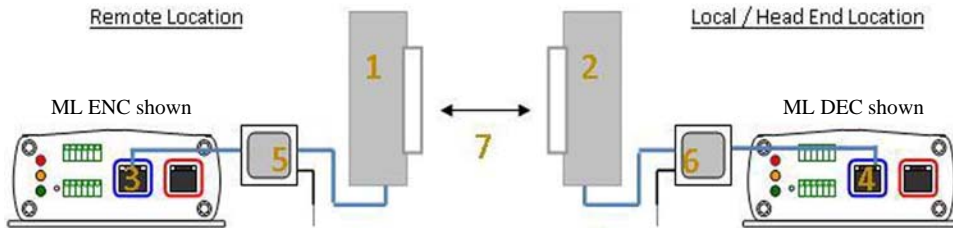


1. ETHERNET IN – Connect to Ethernet device

WES CONNECTION DIAGRAMS

The following wiring schemes represent the configurations that have been tested and verified by MicroTek Electronics based on typical Ethernet wiring solutions. Other wiring configurations could be possible based on the application. A bench test is recommended to verify the designs below.

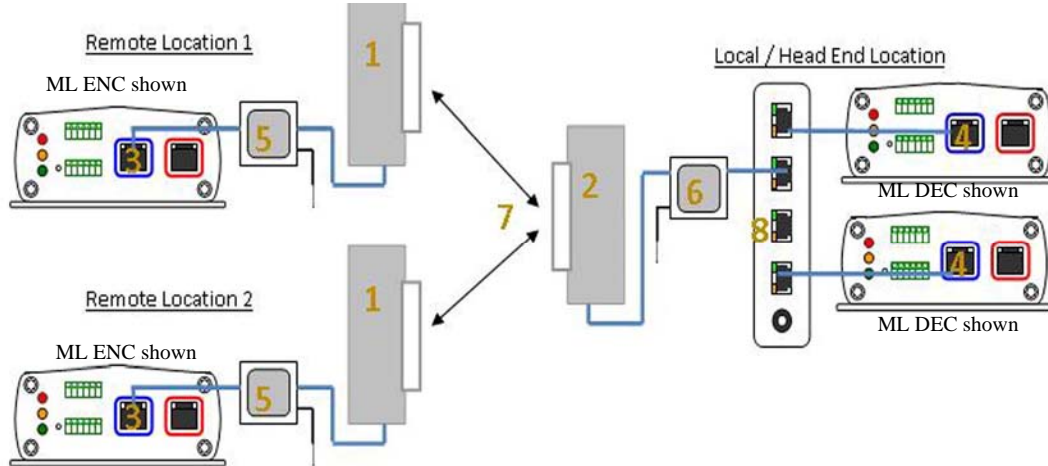
A. POINT-TO-POINT SYSTEM



1. Client Wireless Ethernet Module
2. Host Wireless Ethernet Module
3. Cat5 Connection to Ethernet Device
4. Cat5 Connection to Ethernet Device

5. Power Injection Module Ethernet Out to Client
6. Power Injection Module Ethernet Out to Host
7. Antenna separation of less than max system range, clear line-of-sight

B. MULTI-CONNECT SYSTEM



1. Client Wireless Ethernet Module
2. MP Host Wireless Ethernet Module
3. Cat5 Connection to Ethernet Device
4. Cat5 Connection to Ethernet Device

5. Power Injection Module Ethernet Out to Client
6. Power Injection Module Ethernet Out to Host
7. Antenna separation by 90 Degrees; less than max system range, clear line-of-sight.
8. 4-(or more)-RJ-45-Port Switch (Not a MicroTek product)

Note: The Ethernet/IP device connects to the "Ethernet In" RJ45 Ethernet port on the PIM. Depending on the Ethernet/IP device you are using, a crossover cable may be needed. No cable connection from Host/Client to Ethernet device should exceed 300 feet (100m).

WEM INSTALLATION & OPERATION

A. SELECT CHANNEL

Locate and remove the ½ inch diameter plug at the side of the Host/Client. Select the channel the system will operate on. Each Host/Client pair or group must share the same channel to communicate properly. **Replace the ½ inch diameter plug after the channel has been selected.**

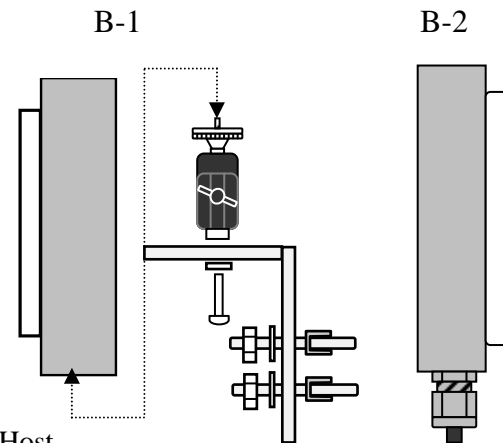
Note: Power to the Host/Client must be cycled for the unit to recognize a new channel.

WEM INSTALLATION & OPERATION (cont'd)

B. MOUNT DIRECTIONAL HOST/CLIENT

Mount the Host/Client with the included wall/pole mount bracket and hardware. Connect the black mounting assembly with adjustment swivel to mounting L-shaped bracket with the ¼ - 20 button head screw. Connect the unit to the mounting assembly using the ¼-20 mounting hole in the case. Position the Host and point it in the direction of the Client (or vice-versa) and tighten the swivel mount. Lock in the antenna upon a *solid* green Signal Level LED on the Client side. The Host may flash if it is a multi-connect Host.

Directional WEM



NOTE: The WEM antenna must be mounted as depicted above (Fig B-1 & B-2) to preserve its weatherproof capability. The RJ-45 port must be protected by the port plug and positioned underneath to prevent moisture pooling. Tighten weatherproof strain-relief so that it is snug, however, the cable should be able to move.

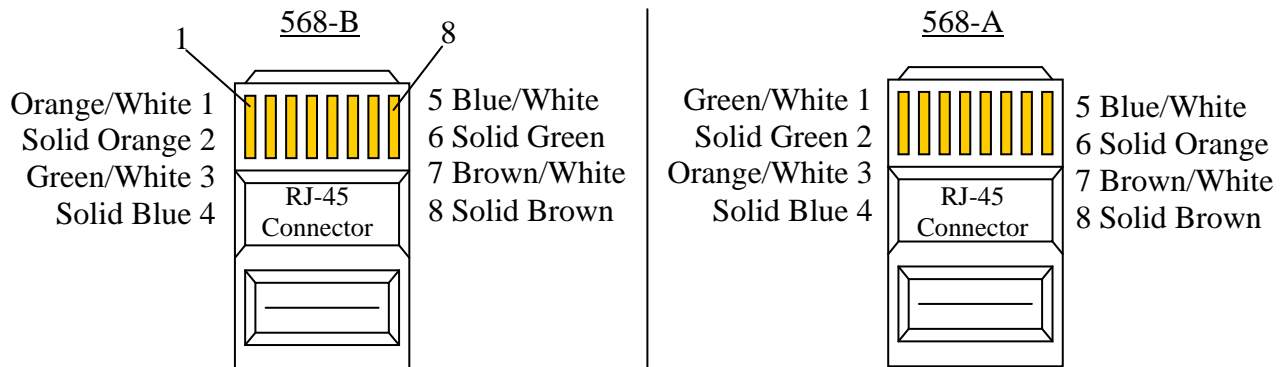
C. MOUNT OMNI-DIRECTIONAL HOST (IF APPLICABLE)

Due to the orientation of the MiniLink Omni-directional Host when mounted, the unit must be kept inside a weatherproof housing. If the Weather Enclosure was purchased from MicroTek then it will come with pole/wall mounting hardware and instructions.

D. CONFIGURE CABLE

Determine the length of CAT5 cable that will be needed and where the PIM will be located. The total cable length from the radio to the Ethernet device cannot exceed 300 feet, however, the PIM can be located anywhere along the 300 feet of cable. The PIM and power supply are not weather proof and must be placed indoors or in an environmental enclosure. On the Host or Client end, feed the CAT5 cable through the supplied weatherproof connector. Crimp an RJ45 CAT5 connector on the end of the cable and configure as a straight-through patch cable.

The Ethernet standard straight-through cable configurations used must be configured to one of the two Ethernet standards (568-A or 568-B) in order for the WES system to operate correctly. Any deviation from one of the two standard configurations can lead to undesired activity so make sure your cables are configured as shown in one of the drawings below:



- Drawings shown with gold pins facing up and RJ-45 clip in rear (clip not shown)

- If 568-B is configured on end of a CAT5 cable and 568-A is configured on the other end, that configuration would be a standard crossover cable.

WEM INSTALLATION & OPERATION (cont'd)

E. CONNECT HOST/CLIENT

Connect the cable to the Host/Client. Slide the cable jacket up to the base of the connector. Slide the weatherproof connector over the cable jacket and screw it into the Host/Client and tighten. Tighten the clamping nut until the CAT5 cable is sealed in the connector. Check the antenna positioning and make sure the Power and Link Activity LEDs are on. The Link Activity indicator, amber LED, will only illuminate if an Ethernet source device is connected and powered up, and the red LED will verify power is being sent over the Ethernet cable. See drawing B-2 (page 7).

F. ESTABLISH LINK

Follow above steps, A through E, for both ends of the link to be established. After both ends have been installed and powered up, the green Signal Level LED will illuminate. A solid green LED indicates the radios are communicating at a maximum throughput standard rate of up to 20 Mbps. If the green LED is flashing, the units are communicating at a level less than max signal strength. If this occurs, the units should be repositioned.

B. MULTI-CONNECT SYSTEMS (cont'd)

If you ordered a complete system with multiple Client SUs, they have been pre-configured with IP addresses as follows:

ML WES Modules	ML WES Serial Number	ML WES IP Address	Host AP, Client SU or Point to Point	Channel
Unit 1	05618*	192.168.1.200	WES-2500 HOST**	0
Unit 2	05619*	192.168.1.201	WES-2500 CLIENT**	0
Unit 3	05620*	192.168.1.202	WAP HOST**	0
Unit 4	05621*	192.168.1.203	WSU CLIENT**	0
Unit 5	05622*	192.168.1.205	WSU CLIENT**	0

*Actual serial numbers will be different

**Actual firmware setting may be different

Note: The lowest serial number of the Client you received is pre-configured with IP address 192.168.1.201. The next higher sequential serial number of the Clients that you received will have an IP address of 192.168.1.203, 205, 207 etc. If you ordered an additional Client separate from your original order, the default address will be 192.168.1.201. The IP address in this additional unit will need to be changed manually to the next available IP address before installation. An IP address-numbering table is included in the **SYSTEM INSTALLATION NOTES** section of this manual on page 18. On that table, you can track IP address changes and other notes about your specific application.

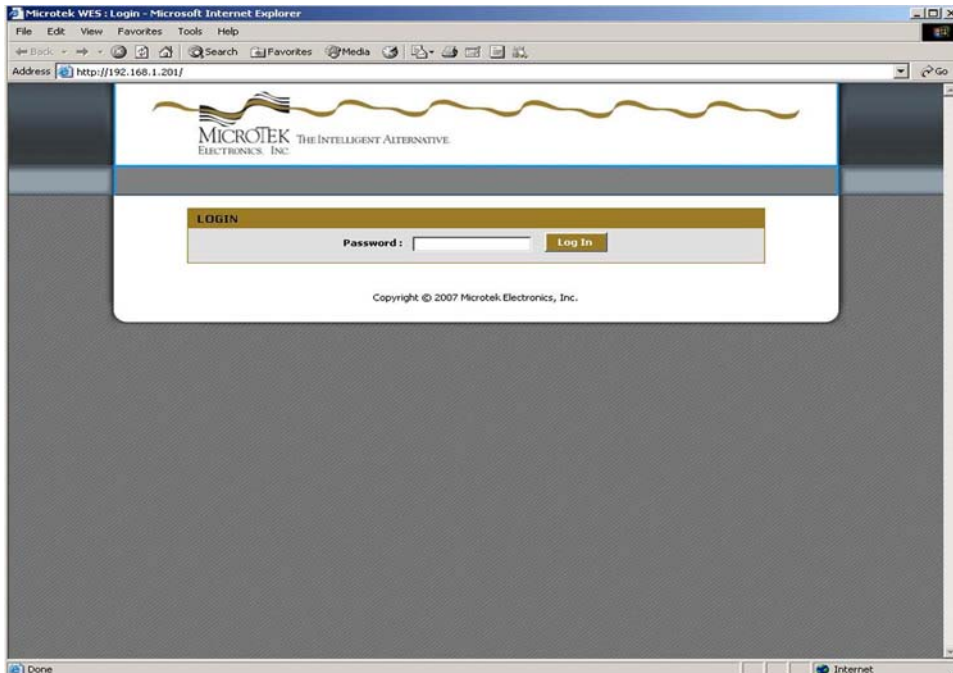
- A software tool is available for free download online on MicroTek Electronics' website at www.microtekelectronics.com/softwaretools.htm that will assist in locating the IP addresses of the Host and Client. This tool can also be used as a diagnostic tool or to make alignment easier. Select the first program listed (locator.exe) and run from a laptop while connected to the "Ethernet In" of the PIM on either the Host or Client end.
- The green LED on a multi-connect Host AP will flash to indicate the number of Client units connected to it. The Client's green LED should remain solid.

WEB PAGES

A. LOGIN

The default password for each Host and Client is admin

Note: The password is case sensitive.

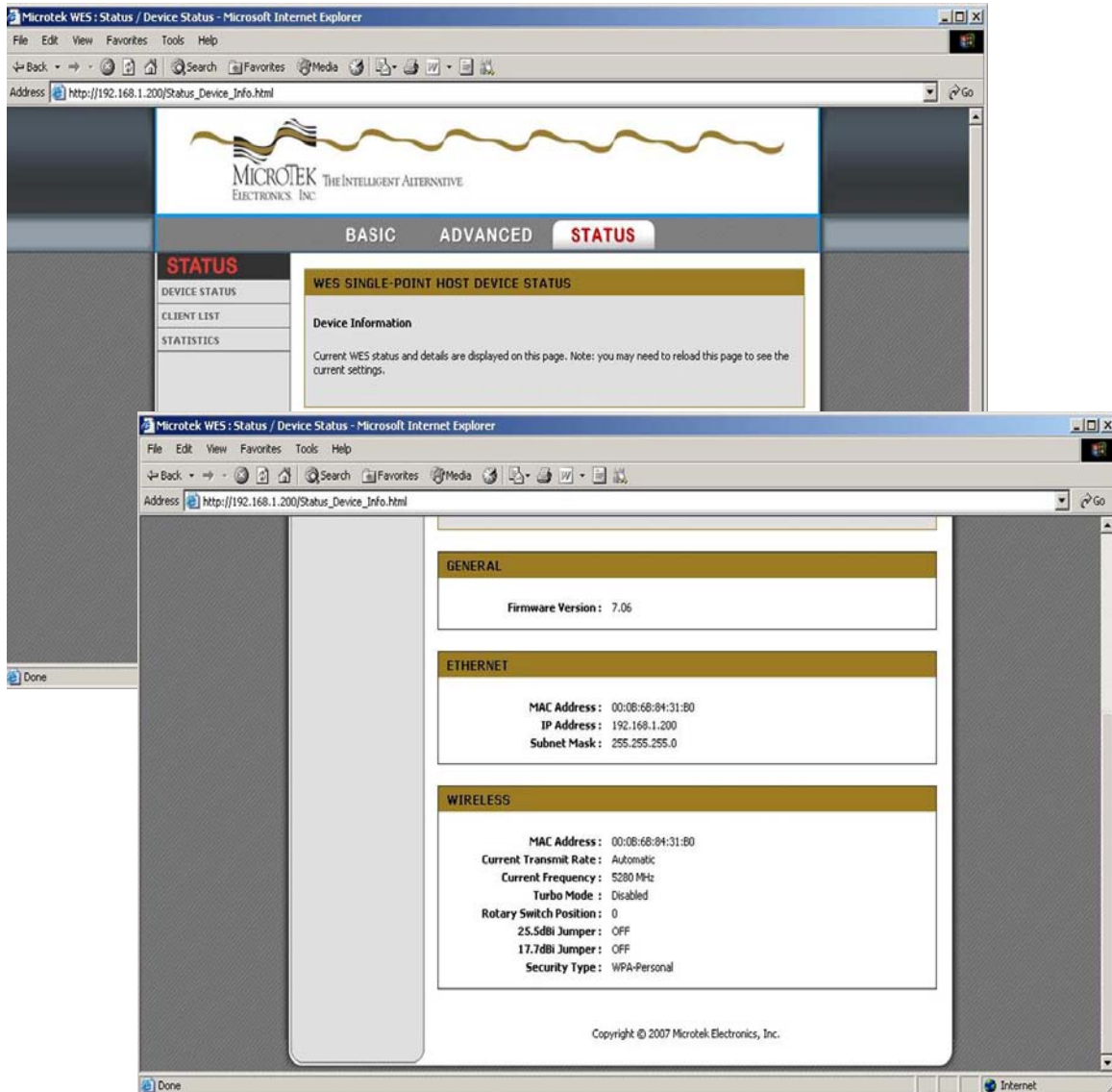


WEB PAGES (cont'd)

B. STATUS – DEVICE STATUS

1. POINT-TO-POINT HOST AP

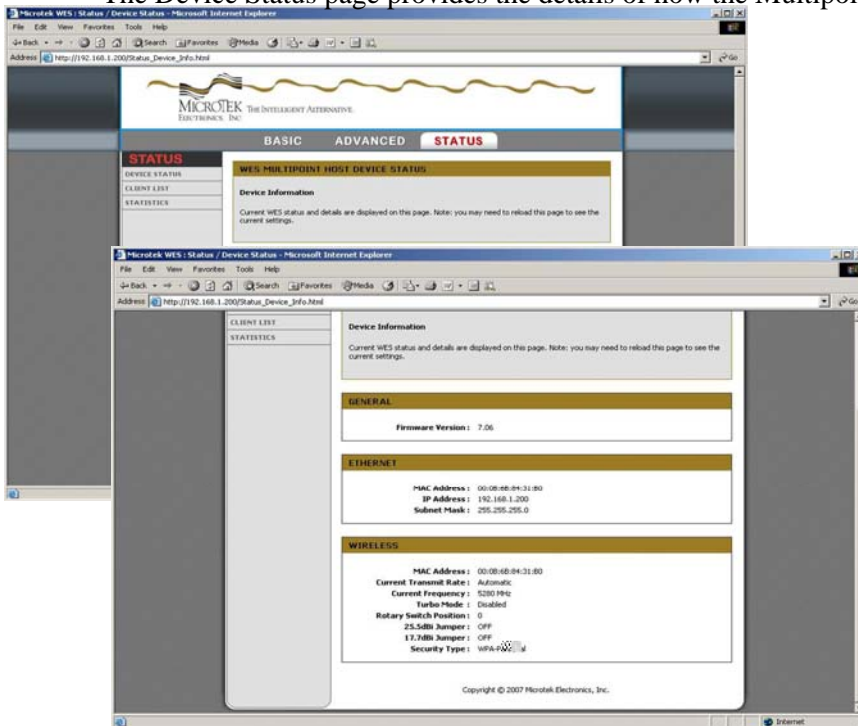
The Device Status page provides the details of how the Single-Point Host is configured. The Access Point Name can be changed on the “Admin” page under the ADVANCED tab but the SSID cannot change. The updated firmware version is as shown: 7.06. One of the two jumper settings may be “on” depending on the range of the system.



B. STATUS – DEVICE STATUS (cont'd)

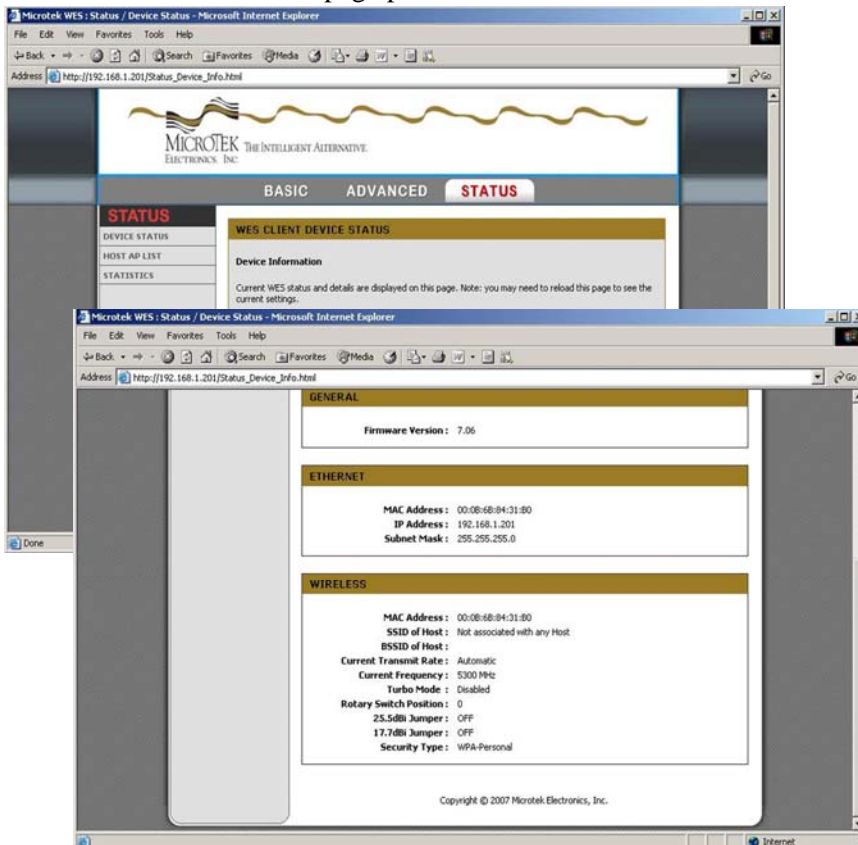
2. MULTI-CONNECT HOST AP

The Device Status page provides the details of how the Multipoint Host is configured.



3. CLIENT SU

The Device Status page provides the details of how the Client is configured.



WEB PAGES (cont'd)

c. STATUS – HOST/CLIENT ASSOCIATION LISTS

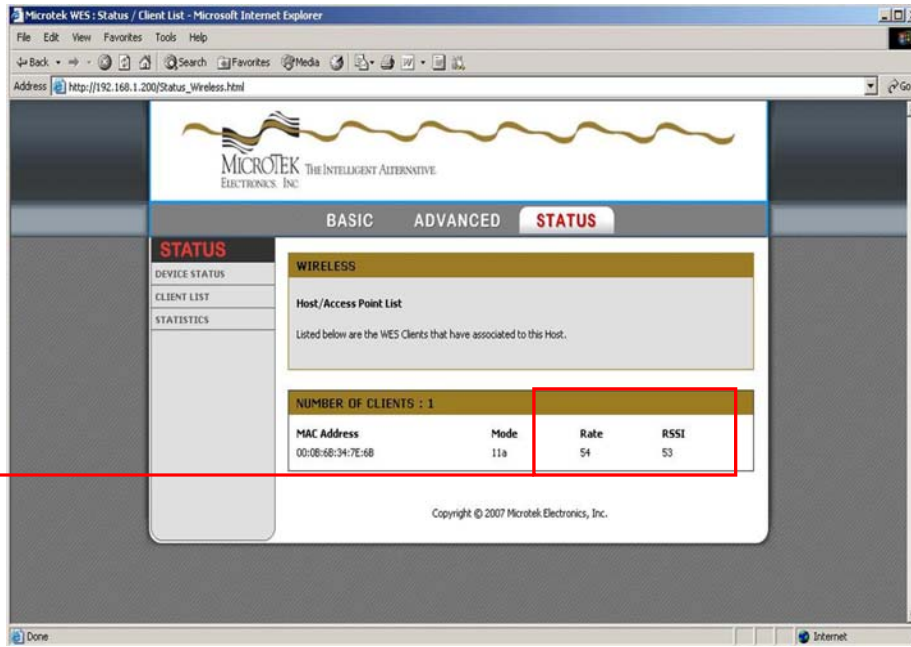
1. POINT-TO-POINT AND MULTI-CONNECT HOST

The Client List page of the Host AP shows the MAC address(s) of the paired or grouped Client SU(s) that are connected to the Host AP. For Point-to-Point systems, one MAC address will be shown. For Multi-connect systems, the Host AP will show all of the Client SU MAC addresses currently

connected. The page will also show the Mode, Rate and RSSI communication information for each connected Client SU.

RSSI=
Received
Signal
Strength
Indicator.

Rate= This is
a snapshot of
the rate in
Megabits/sec
of the last
packet as it
crossed the
link*

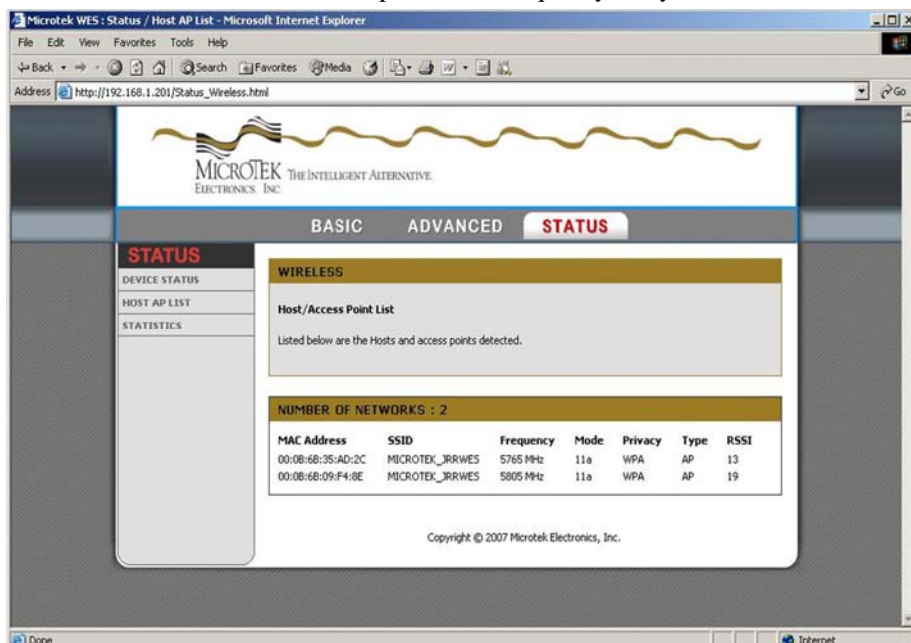


The screenshot shows the 'STATUS' tab of the Microtek WES interface. A table titled 'NUMBER OF CLIENTS : 1' displays the following data:

MAC Address	Mode	Rate	RSSI
00:0B:6B:34:7E:68	11a	54	53

2. CLIENT

The Host AP List page shows the MAC address(s) and SSID of APs that the Client can see. It shows the Frequency, Mode, Encryption Method and RSSI communication information. If an unknown SSID appears, the Client is noticing another 802.11a non-proprietary AP within distance and frequency range of the unit. This is designed to inform the user of frequencies that are occupied by other non-proprietary 802.11a devices so as to transmit using a different available frequency. This is a useful connection tool but it is not a comprehensive frequency analysis for the environment.



The screenshot shows the 'STATUS' tab of the Microtek WES interface. A table titled 'NUMBER OF NETWORKS : 2' displays the following data:

MAC Address	SSID	Frequency	Mode	Privacy	Type	RSSI
00:0B:6B:35:AD:2C	MICROTEK_JRRWES	5765 MHz	11a	WPA	AP	13
00:0B:6B:09:F4:8E	MICROTEK_JRRWES	5805 MHz	11a	WPA	AP	19

* The Rate as shown on these web page snap-shots do not account for roughly 60% of over-head required to operate the system.

WEB PAGES (cont'd)

D. STATUS – STATISTICS

The Statistics page will indicate the number of transmitted and received data packets versus the number of dropped packets.

The screenshot shows a web browser window titled "Microtek WES : Status / Statistics - Microsoft Internet Explorer". The address bar shows "http://192.168.1.201/Status_Statistics.html". The page features a logo for "MICROTEK ELECTRONICS, INC. THE INTELLIGENT ALTERNATIVE." and navigation tabs for "BASIC", "ADVANCED", and "STATUS". The "STATUS" tab is selected, and a sidebar on the left contains links for "STATUS", "DEVICE STATUS", "HOST AD LIST", and "STATISTICS". The main content area displays "STATISTICS" with three sections: "WES Traffic Stats", "ETHERNET STATISTICS", and "WIRELESS STATISTICS".

ETHERNET STATISTICS	
Sent : 398	Received : 301
TX Packets Dropped : 2	RX Packets Dropped : 0
Collisions : 0	Errors : 0

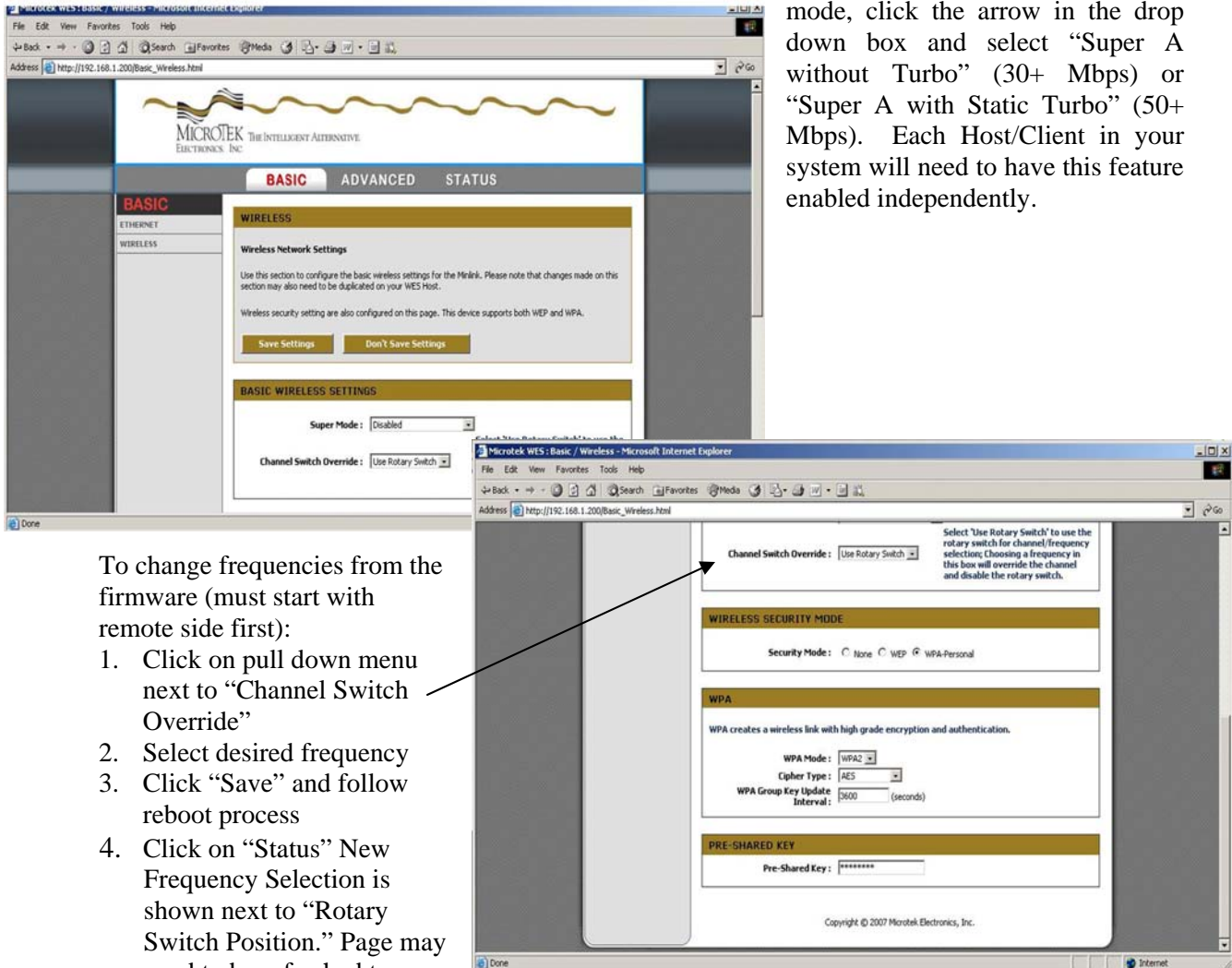
WIRELESS STATISTICS	
Sent : 3923	Received : 576
TX Packets Dropped : 12	Errors : 0

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WEB PAGES (cont'd)

E. BASIC - WIRELESS

The wireless page is used for enabling Super mode. The Super mode combines adjacent channels to provide up to 50+ Mbps of throughput. The channels available in Super mode are: 4 and 6 only. If another channel is selected, Super mode will not be enabled. To enable Super mode, click the arrow in the drop down box and select “Super A without Turbo” (30+ Mbps) or “Super A with Static Turbo” (50+ Mbps). Each Host/Client in your system will need to have this feature enabled independently.



To change frequencies from the firmware (must start with remote side first):

1. Click on pull down menu next to “Channel Switch Override”
2. Select desired frequency
3. Click “Save” and follow reboot process
4. Click on “Status” New Frequency Selection is shown next to “Rotary Switch Position.” Page may need to be refreshed to see this configuration. Current frequency will match on the Client information page if the Host AP is connected.

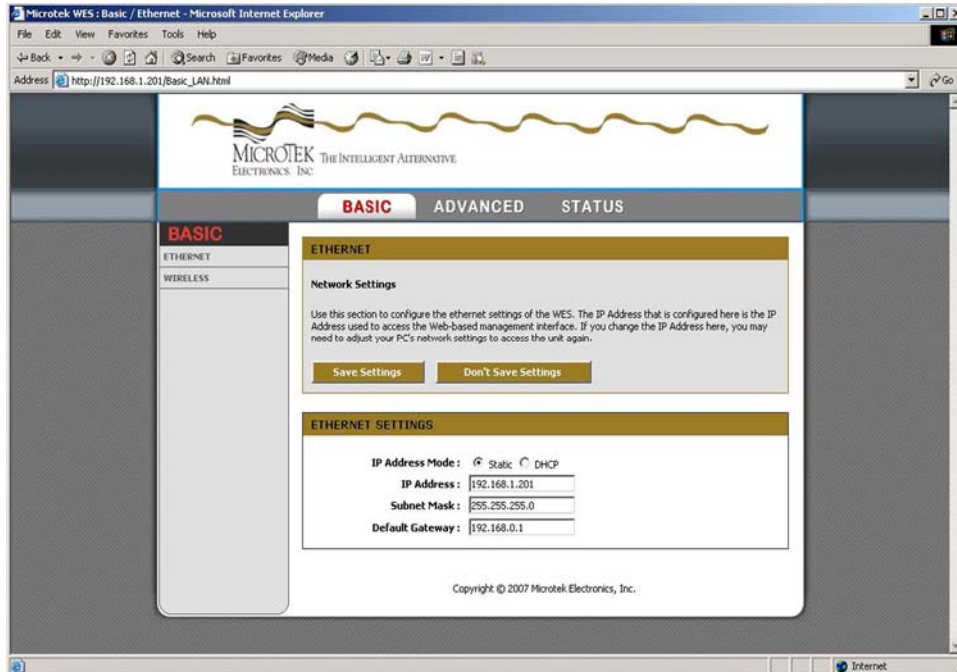
Encryption Method Default:

WPA is the highest grade of encryption available in this system and is enabled at the factory as the default. WPA2, AES and password are the default selections. After updating the settings as desired, click save to update the WEM. Please note that paired or grouped WEMs must have the same settings to operate correctly.

F. BASIC – ETHERNET

1. NETWORK SETTINGS

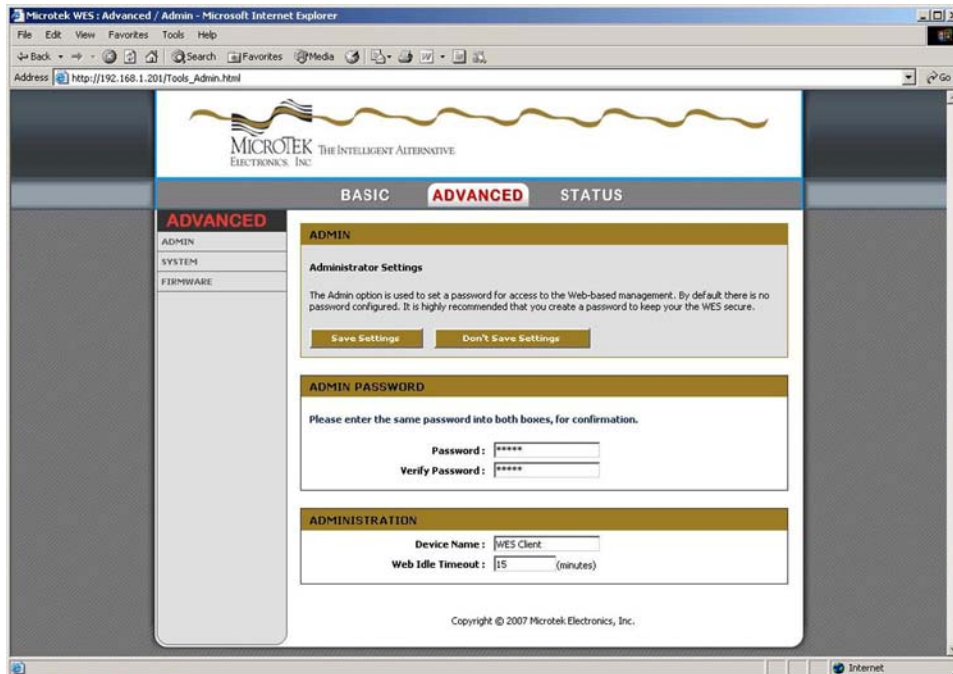
The Network Settings page is used for changing the IP Address, Subnet Mask and or Default Gateway of the Host or Client.



WEB PAGES (cont'd)

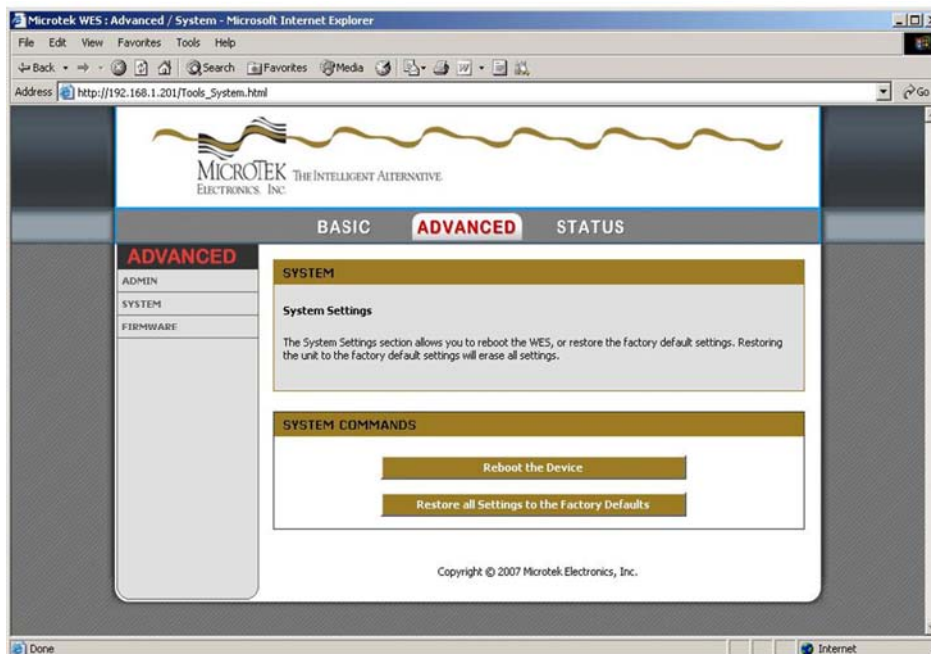
G. ADVANCED – ADMINISTRATION

This section of the Advanced tab is used for changing the password and other administration services for the Host or Client.



H. ADVANCED – SYSTEM

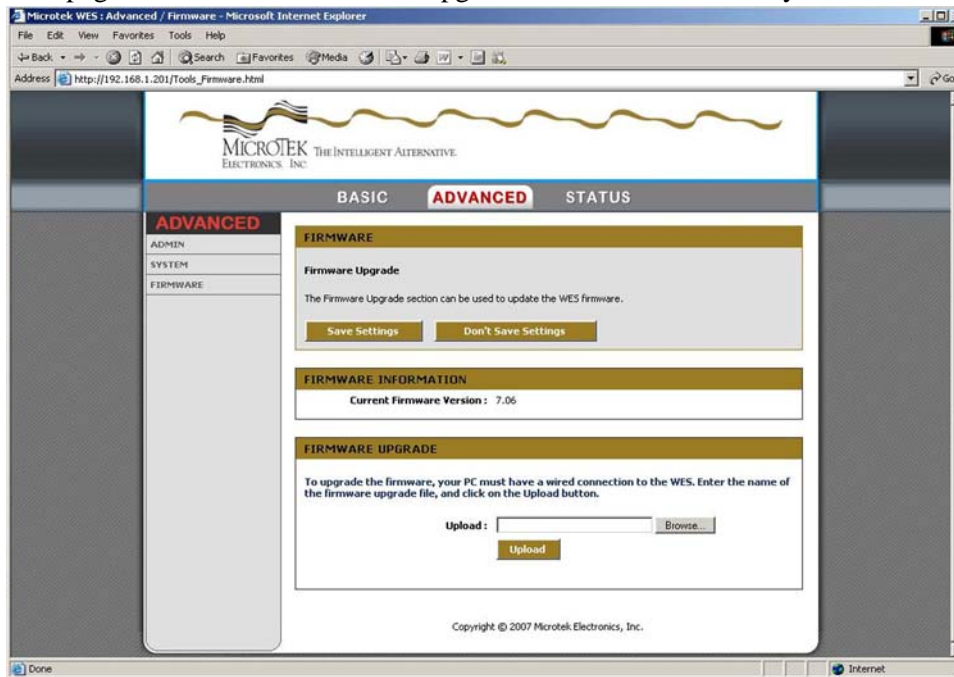
To reboot the system and/or bring it to its default settings, visit the system page of the Advanced tab.



WEB PAGES (cont'd)

I. ADVANCED – FIRMWARE

This page is used to flash firmware upgrades should it be necessary to do so.



SYSTEM INSTALLATION NOTES

A. SYSTEM LOCATION

1. Address: _____
2. Contact: _____
3. Phone Number: _____

B. IP ADDRESS AND SERIAL NUMBERING TABLE FOR CUSTOM APPLICATIONS

Site #1		
Device	Serial Number	IP Address
WEM #1 (point-to-point applications)		
WEM #2 (point-to-point applications)		
Host AP WEM		
Client SU WEM #1		
Client SU WEM #2		
Client SU WEM #3		
Client SU WEM #4		
Client SU WEM #5		
Client SU WEM #6		
Site #2		
Device	Serial Number	IP Address
WEM #1 (point to point applications)		
WEM #2 (point to point applications)		
Host AP WEM		
Client SU WEM #1		
Client SU WEM #2		
Client SU WEM #3		
Client SU WEM #4		
Client SU WEM #5		
Client SU WEM #6		

C. NOTES: _____

If you have any questions regarding the advanced setup of the MiniLink Wireless Ethernet System, please contact MicroTek's Technical Assistance at 888-366-4276 (Monday through Friday 8-5pm PST) or online at www.microtekelectronics.com

WEM SPECIFICATIONS

RF Modules

RF SECTION

Power Output	50 W EIRP @ 5.8 GHz (maximum)
Transmitting Frequency	5.725 – 5.825 GHz (U-NII-3 / ISM)
Channel Capacity	5 non-overlapping channels 5.8 GHz Band - 5745, 5765, 5785, 5805, 5825
Modulation	OFDM
Latency	<10 milliseconds
Sensitivity	-82 dBm for maximum data rate
Polarization	Linear, vertical only
Antenna Type & Gain	Omni, 2.5 dBi Small patch, 7.8 dBi @ 5.8 GHz 6x6 patch, 16.7 dBi @ 5.8 GHz Small patch in 18" dish, 24 dBi @ 5.8 GHz
Beam Width	Omni-360°, Small patch-90°, 6x6" patch-24° & 18" dish-8°
Data Throughput Rate	Up to 20 Mbps - standard mode, 50+ Mbps – Super Mode (2 channels maximum available for Super Mode)
FCC ID	JRRWES
Industry Canada	4887A-WES

MANAGEMENT

Interface	10/100 Base T, half/full duplex, rate auto negotiated (802.3 compliant)
Frequency Selection	Rotary switch – chans 0 – 7 or through software (see pg 13)
Web Browser Interface	User ID/Password, Super Mode, IP Address, WPA2 AES and WEP Encryption
Access Method	Time division duplexing/Time division multiple access (TTD/TDMA)
Protocols Used	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP <i>Network Management HTTP</i>

MECHANICAL

Physical	Environmental, sealed, billet aluminum, powder coated housing with UV stabilized PVC radome
Dimensions	3.6" x 3.6" x 1.75"
Weight	15.2 oz

POWER

Power Requirements	12 - 20 VDC @ 3 W (Reverse voltage protected)
Power Method	Power-over-Ethernet (PoE) via power injector module ("mid-span" compliant – pins 4,5 positive – pins 7,8 ground)
Connector	RJ45 – in and out of power injection box
Cable Specifications	100 Meters (328 Feet) on 24 AWG CAT-5 cable

ENVIRONMENTAL

Humidity	95% non-condensing
Operating Temperature	-20F to +150F

WEM SPECIFICATIONS (cont'd)

Power Injection Module

MECHANICAL

Physical	Plastic housing, not weatherproof
Dimensions	2.6" x 2.6" x 1.1"
Weight	2.5 oz
Interface	2 – RJ45 connectors

POWER

Power Requirements	12 VDC 500 mA (wall transformer supplied)
Power-over-Ethernet (PoE)	PoE “mid-span” compliant (pins 4,5 positive – pins 7,8 ground)
Indicator	LED - red
Connectors	DC Jack 2.5 mm x 5.5 mm center positive, 2 – RJ45

ENVIRONMENTAL

Humidity	95% non-condensing
Operating Temperature	-20F to +150F

System Ranges

POINT-TO-POINT SYSTEMS

Up to 2500 Feet	Integral directional patch antennas on both WEMs
Up to 2 Miles	Integral directional 6 x 6 13-dBi patch antennas on both
Up to 12 Miles	Integral directional 6 x 6 13-dBi patch antenna on the Host with integral directional patch antenna in 25 dBi dish antenna on the Client
Up to 30 Miles	Integral directional patch antennas on both WEMs mounted in 25 dBi dish antennas

Distance specifications assume an optimal environment (see pg ii for details)

MULTI-CONNECT SYSTEMS

Up to 500 Feet	Integral omni-directional patch antennas on both the Host AP WEM & Client SU WEM
Up to 1300 Feet	Integral omni-directional patch antenna on the Host AP WEM & integral directional patch antenna(s) on the Client SU WEM(s)
Up to 2500 Feet	Integral directional patch antenna on the Host AP WEM & Client SU WEM(s)
Up to 1 Mile	Integral directional patch antenna on the Host AP WEM & integral directional 6 x 6 13-dBi patch antenna(s) on the Client SU WEM(s)
Up to 6 Miles	Integral directional patch antenna on the Host AP WEM & Client SU WEM(s) – Client SU WEM(s) mounted in 25 dBi dish antenna(s)

Distance specifications assume an optimal environment (see pg ii for details)

*For product improvement, design and specifications are subject to change without notice.

TROUBLE SHOOTING

PROBLEM	SUGGESTION
No Link Activity	<ol style="list-style-type: none"> 1. No power from connected device—make sure the connected Ethernet/IP device is powered. 2. Check all cables and connectors. If the tester shows that all wires are making contact, check the entire length of cable for kinks, cuts, tears or any other cable hindrances. 3. Make sure the cable run between the WEM and Ethernet device is no longer than 300 feet. 4. Make sure the cables being used are straight through (568-B or A configured (see page 7)) and all cable connectors are attached properly. 5. If using an Ethernet hub or fast switch, try a crossover cable between the switch and the Power Injector Module.
No Signal Level LED or Flashing Signal Level LED	<ol style="list-style-type: none"> 1. Check line-of-sight of the WEMs. Verify the WEMs are aimed properly. You should have clear, wide-open line of sight between the WEM modules. 2. Change channels; cycle power. 3. Verify sufficient voltage into each PIM. <p>Note: The Host AP WEM green signal level LED will flash indicating the number of Client SU WEMs it is communicating with. This is normal for this device and should not be confused as lack of signal strength. The green LED on the Client SU WEM should be solid if the Client SU in order to communicate with the Host AP at a full signal strength.</p>
All three solid LEDs but no picture or picture drops out after a period of time	<ol style="list-style-type: none"> 1. Check video at the camera 2. Check wiring into encoders or decoders 3. Try changing channels; cycle power. An uninterruptible power supply (UPS) may be required and is suggested. 4. Connect one WEM directly into a PC or laptop and verify that the IP address is accessible. Check the other WEM(s) the same way, then verify that each IP address is accessible over the wireless link into a PC/laptop. 5. Verify the connected Ethernet/IP device is configured correctly. If in use, encoders and decoders must be paired up correctly.
No Green Signal Level LED (When using the ML WES-30 or ML WES-12)	<ol style="list-style-type: none"> 1. Verify wide-open line-of-sight 2. Re-angle your dish antenna in a <i>downward</i> angle until both LEDs are solid green. 3. Mount the dish(es) higher above ground level and/or above any obstruction.

If you have tried the trouble shooting steps above and the system is still not working correctly, please contact MicroTek at 888-366-4276, Monday through Friday, between the hours of 8:00AM and 5:00PM Pacific Time. One of our technicians will work with you to rectify the problem over the phone.

Thank you,
MicroTek Electronics, Inc.

FAQ

Q. Which unit is the transmitter and which is the receiver?

A. WES systems are bi-directional so it is not critical which of the units is mounted at the receive location (and vice-versa). Typically, however, the 'Host' is located at the receive end and the 'Client' is at the transmit location.

Q. How can I tell whether I received the point-to-point WES system versus the point-to-multipoint WES system?

A. There are a few ways to tell which system you have:

1. Each system box is sealed and labeled with the manufacturer's model number. Point-to-multipoint systems have the following model numbers: ML WES-D, ML WES-OD, ML WES-D1-2, ML WES-D6 or single units: ML WAP, ML WAPOM, ML WSUOM, ML WSU, ML WSUP or ML WSUDI
2. The green Signal Level LED on the Access Point Host (point-to-multipoint systems) will flash to indicate the number of connected Subscriber Client Units with which it is communicating.
3. If the system box is labeled as: ML WES-2500, ML WES-2-4, ML WES-12 or ML WES-30, then the system is a point-to-point system.

Q. Why is one unit labeled as "Host" and the other labeled as "Client"?

A. The latest Version of the WES firmware enables the WEMs to communicate as one Host with either one only or multiple Client, or subscribing, units. A Host unit is only able to communicate with a Client and will not communicate wirelessly with another Host.

Q. What is the Locator Program?

A. A software program is available that will locate IP addresses of individual WES modules connected as a system. This program is helpful in case the internal web browser of the WEMs cannot be accessed. Visit the support section of our website at:

<http://www.microtekelectronics.com/softwaretools.htm> to download this program.

Q. Is it possible to add cameras (or Ethernet devices) to my existing Wireless Ethernet System?

A. The total amount of data that can be transmitted over the wireless system is 20 Mbps (Megabits per second) per channel in standard mode (and 50+ Mbps in super mode). As long as there is useable bandwidth available "over-the-air" in your configuration, more systems can be added to an existing WES system. There are multiple options to do this depending on the environment and application. Contact MicroTek technical support or sales at 888-366-4276 (Weekdays 8am – 5pm PST) or e-mail at your leisure to info@microtekelectronics.com for more information.

Q. What is "super mode"? And, when should super mode be used?

A. Super mode combines bandwidth of adjacent channels to provide 50+ Mbps of throughput. However, enabling this mode limits the number of channels that are available for transmission (2 channels available: 4 & 6). This mode is ideal for multiple cameras transmitting over one WES system or to maximize throughput in a networking application.

WARRANTY INFORMATION

MicroTek Electronics extends the following LIMITED WARRANTY to the original owner/purchaser of this product as follows:

- Two years from the date of initial sale for all wireless products.
 - One year from the date of initial sale for all encoder and decoder products.
- 1) If, within the specified warranty period, this product, or any part or portion thereof, shall prove upon examination by MICROTEK, to be defective in material or workmanship, MICROTEK will repair or replace such part or portion at MICROTEK's option. The warranty period on the repaired or replaced part or portion of this product shall be limited to the unexpired term of the original warranty. The buyer shall be responsible for all shipping and transportation of the product to MICROTEK for any performance under this warranty.
 - 2) Conditions and Exceptions:
 - a) Any accident to this product, any misuse or abuse, alternation, use in modified form, or any attempt to repair this product shall void this warranty. These conditions to the warranty include, but are not limited to, incorrect power connections, physical damage due to mechanical shock, exposure to moisture, and circuit modification.
 - b) SHOULD THIS PRODUCT PROVE DEFECTIVE FOLLOWING PURCHASE, THE BUYER, NOT THE MANUFACTURER, DISTRIBUTOR, OR RETAILER, ASSUMES THE ENTIRE COST OF ALL SERVICING OR REPAIR, EXCEPT AS OTHERWISE PROVIDED BY THE TERMS OF THIS WARRANTY.
 - c) FOR BREACH OF ANY WRITTEN OR IMPLIED WARRANTY ON THIS PRODUCT, THE BUYER IS LIMITED TO THE FOLLOWING DAMAGES. (1) THE COST OF LABOR TO REPAIR OR REPLACE DEFECTIVE PARTS OR PORTIONS OF THIS PRODUCT, AND (2) THE COST OF THE REPAIRED OR REPLACE PARTS OR PORTIONS OF THIS PRODUCT.
 - d) NO OTHER EXPRESSED OR IMPLIED WARRANTIES HAVE BEEN MADE OR WILL BE MADE ON BEHALF OF MICROTEK WITH RESPECT TO THE SALE, REPAIR, INSTALLATION, OPERATION, OR REPLACEMENT OF THIS PRODUCT. MICROTEK DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OF THIS PRODUCT OR ITS FITNESS FOR ANY PURPOSE, AND THE BUYER AGREES THAT THIS PRODUCT IS SOLD "AS IS" AND THAT THE ENTIRE RISK OF QUALITY AND PERFORMANCE OF THIS PRODUCT IS WITH THE BUYER, EXCEPT AS OTHERWISE PROVIDED BY THE TERMS OF THIS WARRANTY.
 - e) Some states/jurisdictions do not allow exclusions or limitations of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.
 - 3) Contact your dealer regarding return authorization for out of warranty repairs and any further product information.

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