

Zenith User Manual

v1.2

April 2013

A new concept in wireless video

Zenith is a digital wireless video system that works with SDI video formats up to 3G 1080 60p.

The Zenith uses a H.264 encoder and decoder system which is transported over 802.11n and similar propriety protocols at 900MHz 2/3/5/24GHz.

It's radically different than traditional COFDM systems and a basic IT background and knowledge of IP Ethernet networking is needed to configure the system.

One main advantage of Zenith is that it can transport the video over standard network protocols. It will take time to get used to, so reasonable training and testing time is needed. Once done, an almost limitless coverage area can be achieved by using relatively inexpensive 802.11n hardware. One big advantage of Zenith is that you can configure inexpensive repeater stations to bounce signals around corners that would be cost prohibitive in traditional microwave systems.

Zenith is made up for 4 main parts.

- **Encoder - encodes the video and packetizes it into IP.**
- **Encoder radio sends the IP packet over the air**
- **AP radio receives the IP packet over the air and connects to the decoder**
- **Decoder - converts the IP information back to video and audio.**

Each of the above devices in the network can be viewed, controlled and configured via its IP address via a web browser so you will need a laptop to configure the system.

As standard, Zenith uses 192.168.0.XXX as its IP range but if needed this can be changed.

Basic configuration

First you will need to manually set a IP in your laptop. Google search 'how to setup a static ip address on windows 7' or 'how to setup a static ip address on a Mac' if you don't know how to do this. 192.168.0.123 is a good number to use.

Zenith uses the following user and passwords as default.

User: **ubnt**.

Password: **ubnt**.

These can be changed if needed.

Each individual hardware component we be assigned an IP address at the factor and will be displayed on the units as 192.168.0.XXX. To access each hardware device, simply type in the IP address that's written on the unit into a web browser. We recommend you set a bookmark for each IP address for easy monitoring and so that you do not to have to remember the IP address in the future.

Software that you can use:

Any web browser like Chrome or Window Explorer

<http://www.ubnt.com/support/downloads/utilities>

<http://www.tallsoft.com/pingmonitor.htm>

Transmitter LED indicators

The LEDs on the transmitter show

Power to the unit

SDI signal present

Data flow

RF Signal strength

Receiver LED indicators

The LEDs on the transmitter show

Power to the unit

SDI signal present

Data flow

LAN connections

Configuring the transmitter locally

The transmitter has 2 power switches that allow both the encoder and radio to be switch on/off individually. This is used when plugging into the RG45 on the transmitter. Turn off the device if you do not require access.

If using an external radio (for example a dish antennas) via the RJ45 on the transmitter, you must turn off the internal radio.

Encoder settings

We recommend only changing the following parameters on the encoder. All other settings will degrade performance and may also stop operation.

Stream control

Video Bitrate(Mbps) Set between 1-30

Audio Streaming - Mono, Stereo, off.

Note: Each audio stream uses 1.5M so if it's not needed best turn it off or use mono if only sending one channel.

System configuration

IP address - this is the encoders IP address

Peer IP - the decoders IP address which will be used to decoder this encoders video

Every time you change a setting you need to click 'Submit' to take effect.

To save click 'Save changes', 'Save' and 'Save' again.

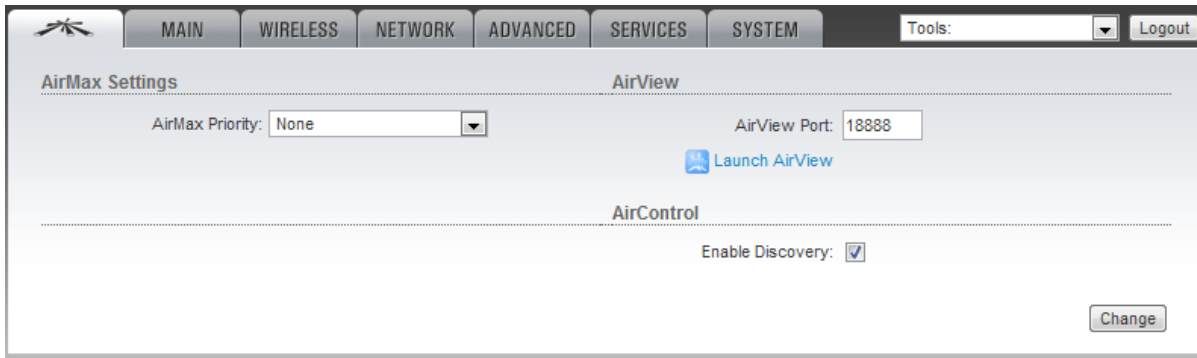
AP in Receiver Radio

User: **ubnt.**

Password: **ubnt.**

Turn on Airmax if only using Ubiquiti hardware.

Figure 1



The screenshot displays the Ubiquiti configuration web interface. At the top, there is a navigation menu with tabs for MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, and SYSTEM. To the right of the menu are a 'Tools:' dropdown and a 'Logout' button. The main content area is divided into three sections: 'AirMax Settings', 'AirView', and 'AirControl'. In the 'AirMax Settings' section, the 'AirMax Priority' is set to 'None'. The 'AirView' section shows 'AirView Port' set to '18888' and a 'Launch AirView' button. The 'AirControl' section has 'Enable Discovery' checked. A 'Change' button is located at the bottom right of the configuration area.

Figure 2

The screenshot shows a web-based configuration interface for a wireless device. At the top, there are navigation tabs: MAIN, WIRELESS (selected), NETWORK, ADVANCED, SERVICES, and SYSTEM. To the right of these tabs are 'Tools:' and 'Logout' buttons. The main content area is titled 'Basic Wireless Settings' and contains the following fields:

- Wireless Mode: [?] Access Point
- SSID: BOXX Hide SSID
- Country Code: United Kingdom
- IEEE 802.11 Mode: A/N mixed
- DFS: Enable
- Channel Width: [?] 20 MHz
- Channel Shifting: [?] Disabled
- Frequency, MHz: 5240
- Extension Channel: None
- Frequency List, MHz: Enabled
- Auto Adjust to EIRP Limit:
- Antenna Gain: 0 dBi Cable Loss: 0 dB
- Output Power: 25 dBm
- Max TX Rate, Mbps: MCS 7 - 65 Automatic

Below this section is the 'Wireless Security' section with the following fields:

- Security: WEP
- Authentication Type: Open Shared Key
- WEP Key Length: 64 bit Key Type: HEX
- WEP Key: 1234567890 Key Index: 1
- MAC ACL: Enabled

A 'Change' button is located at the bottom right of the configuration area.

This radio which is set to AP 'Access point' decides the channel frequency used.

Max TX rate should be at least 100% higher than the encoders video bitrate + audio at 1.5M per channel.

Example:

Sending 4.5M video only - Set to 13.5 Auto ticked.

Sending 10M of video and 2CH audio - Set to 26M. Auto ticked.

It's best to tick the hide SSID and don't use any security. However, for a more secure network use WEP.

You can select 'Auto channel' and the AP will decide the best channel.

Channel Width

For SNG 20Mhz is recommended

For higher quality pictures 40Mhz is recommended

Figure 3

The screenshot displays a network configuration web interface with a top navigation bar containing tabs for MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, and SYSTEM. A 'Tools:' dropdown and a 'Logout' button are also present in the top right. The main content area is divided into four sections:

- Network Role:** Contains two dropdown menus: 'Network Mode' set to 'Bridge' and 'Disable Network' set to 'None'.
- Network Settings:** Features radio buttons for 'DHCP' and 'Static' (selected). Below are input fields for 'IP Address' (192.168.0.202), 'Netmask' (255.255.255.0), 'Gateway IP' (192.168.0.1), 'Primary DNS IP', and 'Secondary DNS IP'. An 'MTU' field is set to 1500. There are checkboxes for 'Spanning Tree Protocol' (unchecked) and 'Auto IP Aliasing' (checked). An 'IP Aliases' section includes a 'Configure...' button.
- VLAN Network Settings:** Includes an 'Enable VLAN' checkbox, which is currently unchecked.
- Firewall Settings:** Includes an 'Enable Firewall' checkbox, which is unchecked, and a 'Configure...' button next to it.

Figure 4

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: [v] Logout

Advanced Wireless Settings

RTS Threshold: Off

Distance: miles (0.6 km)

ACK Timeout: Auto Adjust

Aggregation: Enable

Frames Bytes

Multicast Data: Allow All

Enable Extra Reporting:

Sensitivity Threshold, dBm: Off

Advanced Ethernet Settings

Enable POE Passthrough:

Enable Autonegotiation:

Link Speed, Mbps: [v]

Enable Full Duplex:

Signal LED Thresholds

Signal: Wireless GPS

LED1 LED2

Thresholds, dBm: - -

Traffic Shaping

Enable Traffic Shaping:

Figure 5

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: [v] Logout

Ping Watchdog **SNMP Agent**

Enable Ping Watchdog: Enable SNMP Agent:

IP Address To Ping:

Ping Interval: seconds SNMP Community:

Startup Delay: seconds Contact:

Failure Count To Reboot: Location:

Web Server **SSH Server**

Use Secure Connection (HTTPS): Enable SSH Server:

Secure Server Port: Server Port:

Server Port: Enable Password Authentication:

Session Timeout: minutes Authorized Keys:

Telnet Server **NTP Client**

Enable Telnet Server: Enable NTP Client:

Server Port: NTP Server:

Figure 6

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: [v] Logout

Device **Date Settings**

Device Name: Timezone:

Interface Language: Enable Startup Date:

Startup Date:

System Accounts

Administrator Username: Enable Read-Only Account:

Miscellaneous **Location**

Enable Reset Button: Latitude:

Longitude:

Configuration Management

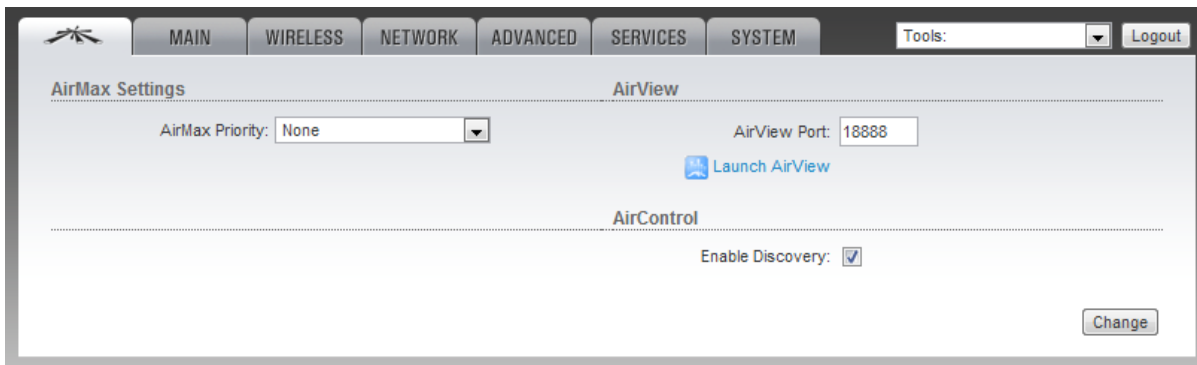
Transmitter Radio

User: **ubnt**

Password: **ubnt**

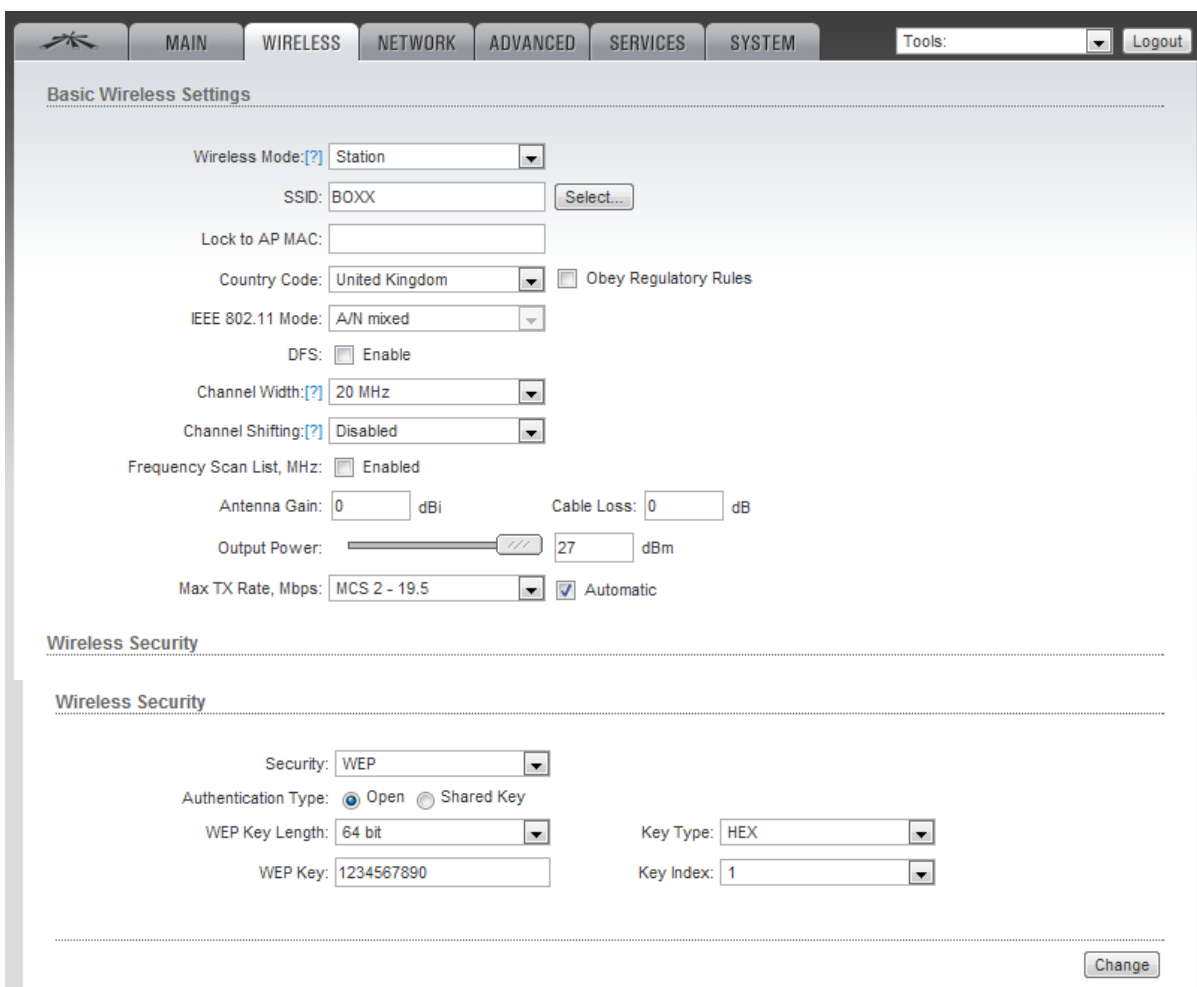
This radio, which is set to 'station', scans all channels and looks for the matching SSID from the 'Access point'

Figure 7



The screenshot shows the 'AirMax Settings' page. At the top, there are navigation tabs: MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, and SYSTEM. A 'Tools:' dropdown menu and a 'Logout' button are in the top right. The page is divided into two sections: 'AirView' and 'AirControl'. In the 'AirView' section, 'AirMax Priority' is set to 'None' and 'AirView Port' is '18888'. There is a 'Launch AirView' button. In the 'AirControl' section, 'Enable Discovery' is checked. A 'Change' button is located at the bottom right.

Figure 8



The screenshot shows the 'Basic Wireless Settings' and 'Wireless Security' pages. The navigation tabs are the same as in Figure 7. The 'Basic Wireless Settings' section includes: 'Wireless Mode' set to 'Station', 'SSID' set to 'BOXX', 'Lock to AP MAC' is empty, 'Country Code' set to 'United Kingdom', 'Obey Regulatory Rules' is unchecked, 'IEEE 802.11 Mode' set to 'A/N mixed', 'DFS' is unchecked, 'Channel Width' set to '20 MHz', 'Channel Shifting' set to 'Disabled', 'Frequency Scan List, MHz' is checked, 'Antenna Gain' is '0 dBi', 'Cable Loss' is '0 dB', 'Output Power' is '27 dBm', and 'Max TX Rate, Mbps' is 'MCS 2 - 19.5' with 'Automatic' checked. The 'Wireless Security' section includes: 'Security' set to 'WEP', 'Authentication Type' set to 'Open', 'WEP Key Length' set to '64 bit', 'WEP Key' set to '1234567890', 'Key Type' set to 'HEX', and 'Key Index' set to '1'. A 'Change' button is at the bottom right.

Set maximum data rate to the same as you have the AP set to and tick 'Auto'.

Set channel width to '20/40 auto'.

Figure 9

The screenshot displays a web-based network configuration interface. At the top, there is a navigation menu with tabs for MAIN, WIRELESS, NETWORK (which is active), ADVANCED, SERVICES, and SYSTEM. To the right of the menu are a 'Tools:' dropdown and a 'Logout' button. The main content area is divided into four sections:

- Network Role:** Contains two dropdown menus. 'Network Mode' is set to 'Bridge' and 'Disable Network' is set to 'None'.
- Network Settings:** Contains several fields and options:
 - 'Bridge IP Address' has radio buttons for 'DHCP' and 'Static', with 'Static' selected.
 - 'IP Address' is set to '192.168.0.202'.
 - 'Netmask' is set to '255.255.255.0'.
 - 'Gateway IP' is set to '192.168.0.1'.
 - 'Primary DNS IP' and 'Secondary DNS IP' are empty text boxes.
 - 'MTU' is set to '1500'.
 - 'Spanning Tree Protocol' is an unchecked checkbox.
 - 'Auto IP Aliasing' is a checked checkbox.
 - 'IP Aliases' has a 'Configure...' button.
- VLAN Network Settings:** Contains an unchecked checkbox for 'Enable VLAN'.
- Firewall Settings:** Contains an unchecked checkbox for 'Enable Firewall' and a 'Configure...' button.

Figure 10

The screenshot displays a web-based configuration interface for a network device. At the top, there is a navigation menu with tabs for MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, and SYSTEM. The 'ADVANCED' tab is currently selected. To the right of the menu, there is a 'Tools:' dropdown menu and a 'Logout' button.

The main content area is divided into several sections:

- Advanced Wireless Settings:**
 - RTS Threshold: 2346 Off
 - Distance: miles (0.6 km)
 - ACK Timeout: 31 Auto Adjust
 - Aggregation: Enable
 - Frames Bytes
 - Multicast Data: Allow All
 - Enable Extra Reporting:
 - Sensitivity Threshold, dBm: -96 Off
- Advanced Ethernet Settings:**
 - Enable POE Passthrough:
 - Enable Autonegotiation:
 - Link Speed, Mbps: ▾
 - Enable Full Duplex:
- Signal LED Thresholds:**
 - Signal: Wireless GPS
 - LED1 LED2
 - Thresholds, dBm: - -
- Traffic Shaping:**
 - Enable Traffic Shaping:

At the bottom right of the configuration area, there is a 'Change' button.

Figure 11

The screenshot shows the SERVICES configuration page with the following sections and settings:

- Ping Watchdog:**
 - Enable Ping Watchdog:
 - IP Address To Ping: [text input]
 - Ping Interval: 300 seconds
 - Startup Delay: 300 seconds
 - Failure Count To Reboot: 3
- SNMP Agent:**
 - Enable SNMP Agent:
 - SNMP Community: public
 - Contact: [text input]
 - Location: [text input]
- Web Server:**
 - Use Secure Connection (HTTPS):
 - Secure Server Port: 443
 - Server Port: 80
 - Session Timeout: 15 minutes
- SSH Server:**
 - Enable SSH Server:
 - Server Port: 22
 - Enable Password Authentication:
 - Authorized Keys: Edit...
- Telnet Server:**
 - Enable Telnet Server:
 - Server Port: 23
- NTP Client:**
 - Enable NTP Client:
 - NTP Server: [text input]
- Dynamic DNS:** [text input]
- System Log:** [text input]

Figure 12

The screenshot shows the SYSTEM configuration page with the following sections and settings:

- Device:**
 - Device Name: Decoder radio in case
 - Interface Language: English
- Date Settings:**
 - Timezone: (GMT) Western Europe 1
 - Enable Startup Date:
 - Startup Date: [calendar icon]
- System Accounts:**
 - Administrator Username: ubnt
 - Enable Read-Only Account:
- Miscellaneous:**
 - Enable Reset Button:
- Location:**
 - Latitude: 22.832942
 - Longitude: 114.173858
- Configuration Management:**
 - Backup Configuration: Download...
 - Upload Configuration: Choose File No file chosen Upload

Decoder settings

We recommend only changing the following parameters on the decoder. All other setting will degrade performance and may also stop operation.

System configuration

IP address - this is the encoders IP address

Peer IP - the decoders IP address which we be used to decoder this encoders video

Every time you change a setting you need to 'Submit' to take effect.

To save, 'Save changes', 'Save' and 'Save' again.