

## Broadcast Multi Channel Video Encoder and Mux



### About the Product

The Multi Channel Video Encoder and Multiplexer (MCVE) provides a cost effective means to enable a TV station to convert multiple analog video and audio feeds into single ASI stream. The encoder can process one high definition (HD) channel or four standard definition channels (NTSC) with a variety of configurations. With a simple connection to a modulator, you are ready to begin broadcasting. In addition, multi channel preview is available via the DVI output connector on the front panel of the unit.

### Setup and Configuration

The encoder accepts analog (composite) and digital inputs (HD-SDI and SD-SDI). Analog audio inputs are also available. All inputs can be found on the rear panel of the unit.

The encoder is configured through an integrated Web Interface using any Internet browser. The Ethernet port can also be used to program PSIP data.

### Package Contents

- Multi Channel Video Encoder
- Power Cable
- Quick Start Guide
- Screw Terminal Audio Connectors (Qty. 4)

## Understanding the Front Panel

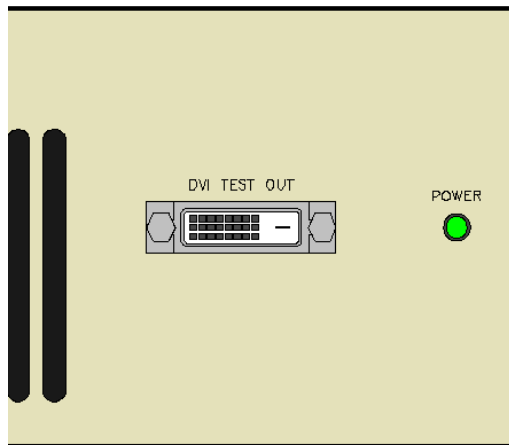


### Connectors on the Front Panel

#### **Test DVI Out - Live preview**

This connector allows the user to connect the MCVE to a DVI capable (720p) display device.

The Multi-Channel Video Encoder has a live preview of all channels for the current mode. This feature requires an external monitor/TV with a DVI port. The display must be capable of at least 1280x720 (natively or by scaling) resolution. This feature is always enabled, so additional configuration is not necessary.



The live preview displays post-processed video and channel specific information for quick reference. Video/Audio PIDs, Video Source (Analog/Digital), Audio stream (AC-3/None), Video Format, and current Video Bit rate are available in the display.

The live preview feature is solely intended to be a monitoring tool and should not be used for any other purpose. Also, the live preview feature is a video-only preview, no dedicated audio outputs are provided.

#### **Power**

The Power LED gives the current status of the unit. The LED will be green if the unit is powered and operational. If the LED is red, the unit has entered a thermal shutdown state. If the LED is not lit, the unit is off or unpowered.

#### **Environmental**

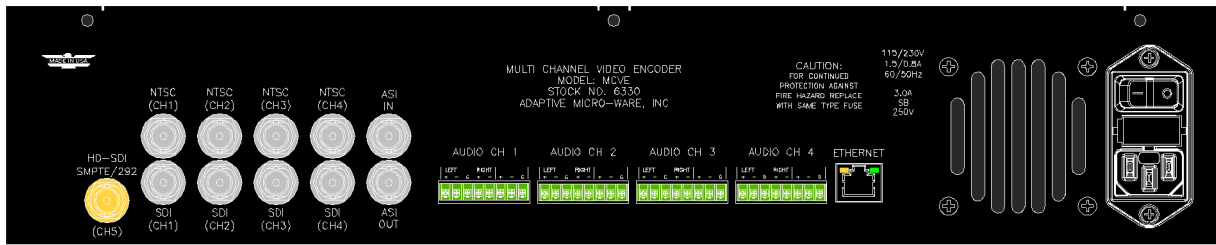
Operating temperature: 0°C (32°F) to 50°C (122°F) ambient

Storage temperature: -30°C (-22°F) to 80°C (176°F)

Powered Unit Thermal Shutdown 65°C (~150°F)

Humidity, operating and storage: 95% non-condensing

## Understanding the Back Panel



### Video Connectors



#### HD-SDI SMPTE/292

This BNC input is compatible with HD-SDI sources with output resolutions of 720p and 1080i.

#### NTSC (CH1, CH2, CH3, CH4)

These BNC inputs are capable of receiving analog (composite) video sources.

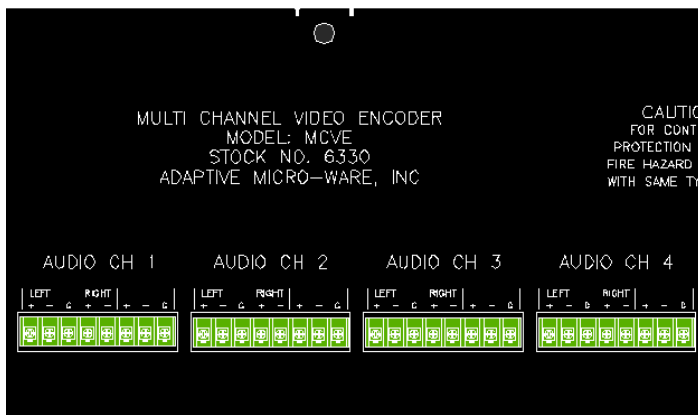
#### SDI (CH1, CH2, CH3, CH4)

These BNC inputs are capable of receiving digital video (480i) and digital audio.

#### ASI OUT

This BNC output provides the resulting ATSC compliant transport stream.

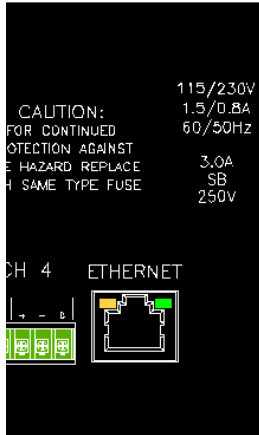
### Audio Connectors



#### AUDIO (CH 1, CH 2, CH 3, CH 4)

These analog audio inputs correspond to the NTSC video inputs. For example, AUDIO CH 1 is the analog audio input for the NTSC (CH1) video input. All analog audio sources must provide a balanced, professional line level (+4dBu).

## Ethernet Connector

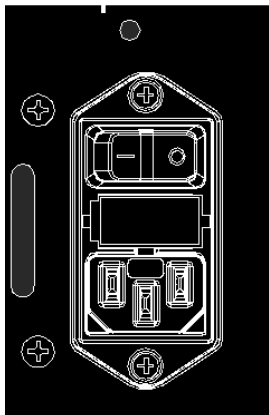


### **ETHERNET**

This 10/100 Ethernet port allows the encoder settings to be configured via the integrated web interface.

- Amber/Power: The unit is powered.
- Green/Link: Link is present.

## Power Connector



The power connector supplies the unit with power from a 115VAC or 230VAC outlet. The unit includes a 3-prong, grounded power cord.

The AC voltage selection switch is located on the side of the unit closest to the power connector. This switch must be in the correct position for the AC supply voltage or the unit may be damaged.

The power switch, located directly above the power cord receptacle, is used to turn the unit on and off.

## Making Connections

### Prerequisites

The unit must be located in a dry, temperature controlled location. Airflow to the unit must not be restricted. Covering the cooling vents may cause the unit to overheat.

There are many connections to be made to the unit, so proper placement is key. The unit will need access to the following connections:

- AC Power (115V/230V)
- Up to four analog and/or digital sources
- ASI receiver for ASI OUT
- Ethernet (RJ-45)

Access to the following connection is optional:

- DVI capable display device

### Connection Steps

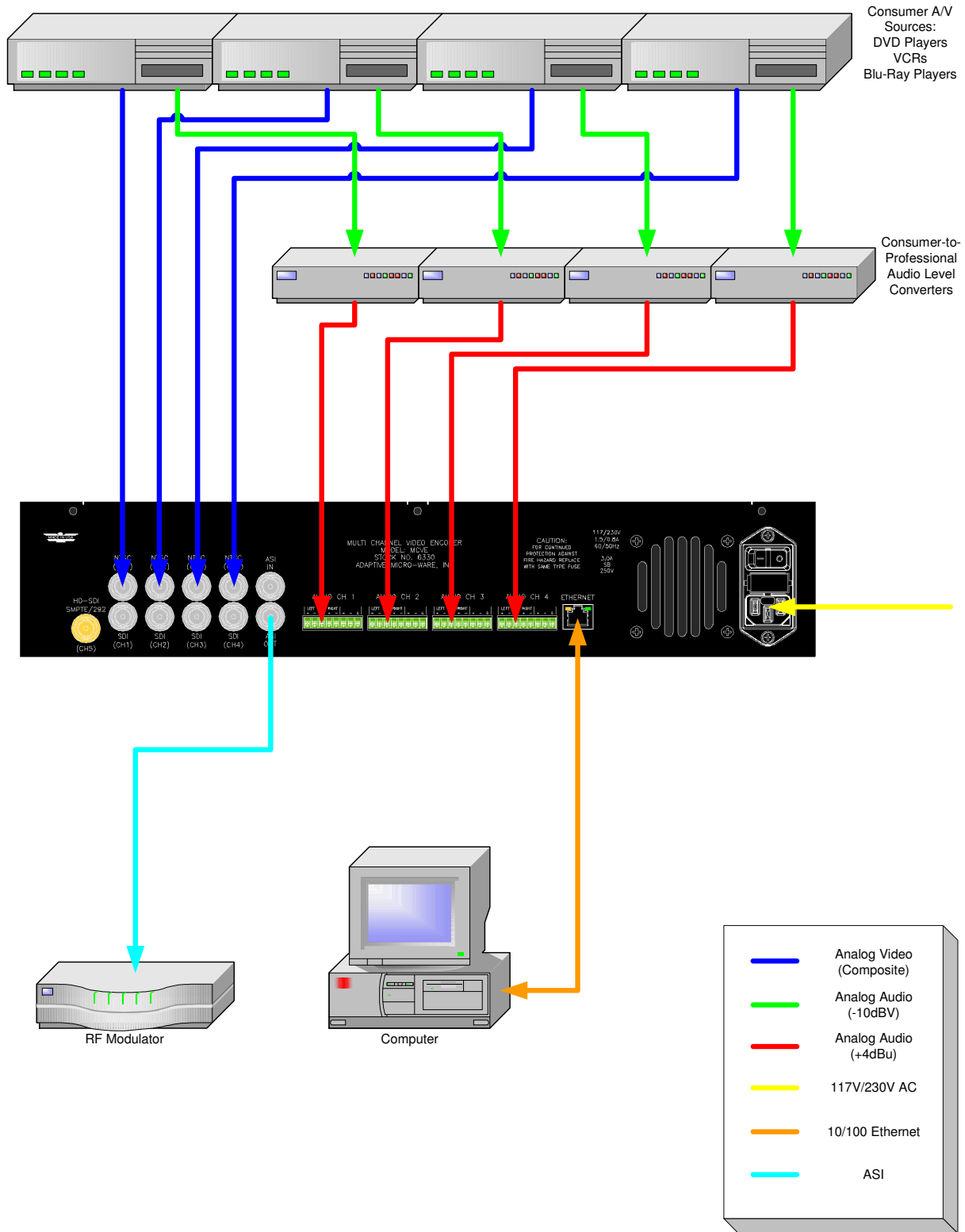
1. Mount the unit securely in a standard 19" rack.

Connect the supplied power cord to the power connector on the back of the unit.  
(Note: Ensure the unit is turned off before proceeding.)

Connect all analog and/or digital video sources to the appropriate video input connectors.

2. Connect analog audio sources (if applicable) to the supplied screw terminal audio connectors. Please be sure to connect with wires as shown on the back of the unit. Pay attention to signal polarities and ground for both Left and Right channels.
3. Connect the ASI OUT to the desired destination using a high-quality 75Ω BNC cable. A short run (under 7ft) should be used to minimize interference and signal loss.
4. Connect an Ethernet cable (CAT5 or higher) to the Ethernet connector.
5. (Optional) Connect a DVI capable display device to the DVI output on the unit.

# Example Interconnections



## Accessing the Web Interface

The integrated web interface allows users to quickly customize video encoder settings. The web interface consists of three main sections: Status, Configuration, and Mode. This section explains how to use each configuration page of the Multi-Channel Video Encoder web interface.

The content of many web interface pages will vary depending upon the encoder mode that is set. For example, when in four-channel mode, the Status page will display four separate panes containing information pertaining to four separate SD video channels. However, when the encoder is configured for three-channel mode, the Status page will only contain three panes of information. Other pages function in a similar manner.

## Connecting to an Encoder

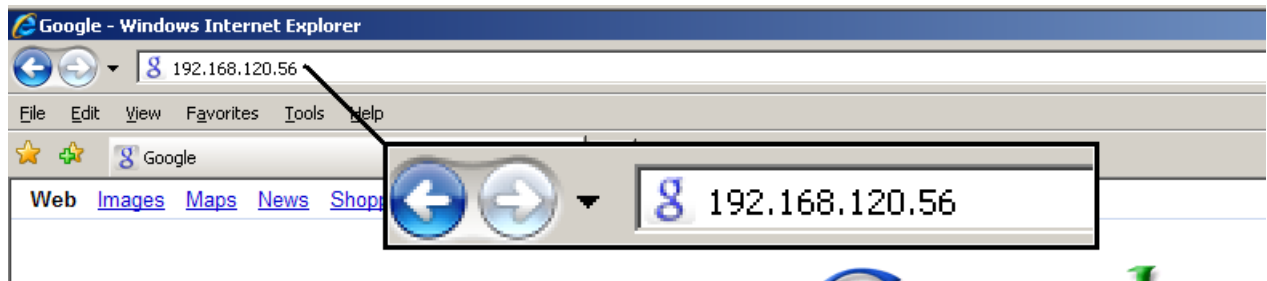
Any standard web browser can be used to connect to the web interface. A unit is reachable by the static IP address to which it has been assigned. Type only the IP address into the address bar of your browser and press the 'Enter' key to initiate the connection process.

The unit has a default Ethernet configuration of the following settings:

- IP Address: 192.168.120.56
- Subnet Mask: 255.255.0.0
- Default Gateway: 192.168.120.1

The computer must have an IP address on the same subnet as the encoder in order to connect to the unit's web interface.

**Note: It is important that each encoder's network settings be configured properly before connecting it to a network segment that is shared with other Multi-Channel Video Encoders or devices using static IP addresses. Networking conflicts may occur and could cause connection issues.**

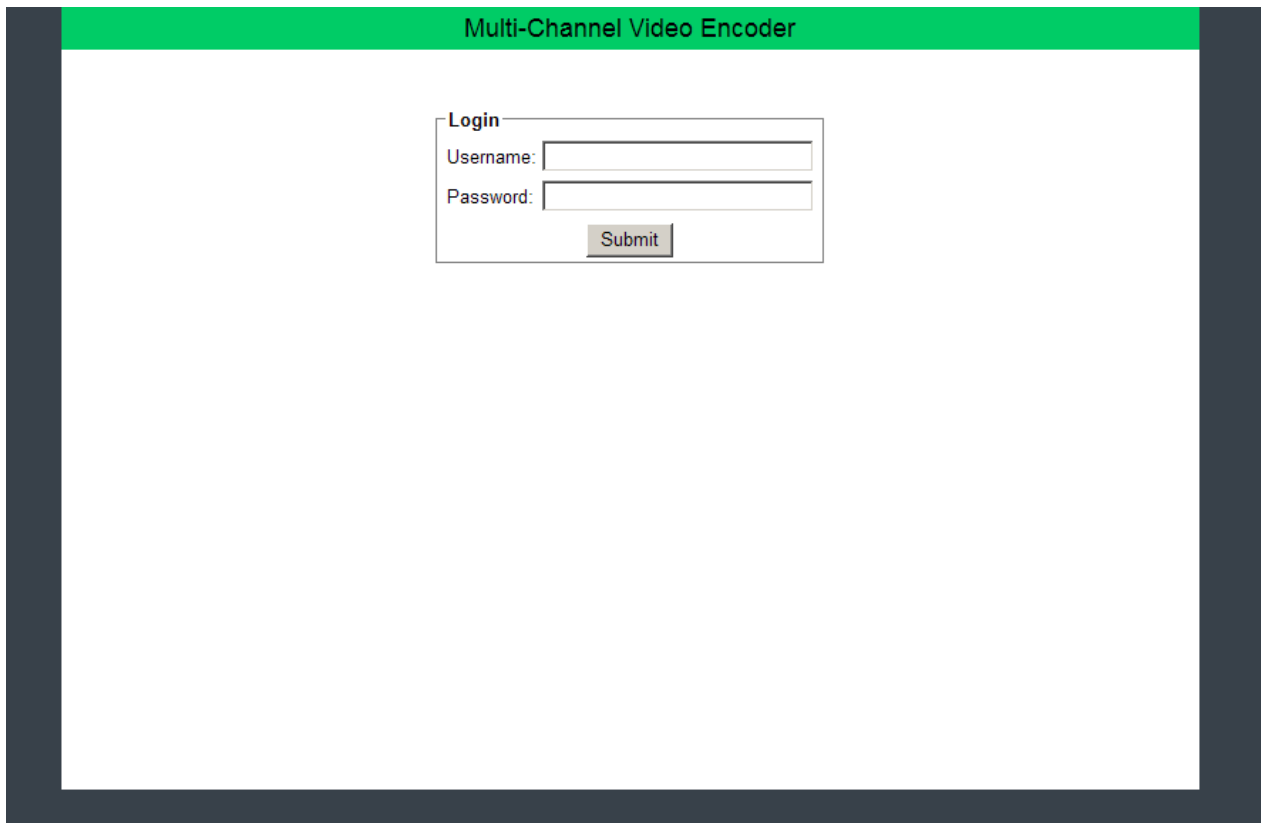


## Login

Once connection to the Multi-Channel Video Encoder has been established, the Login page is displayed. There are two types of users: administrators and guests. Please see the section below labeled 'Network' for a description of users and user rights. The default administrative login is 'admin' and the password is 'pass'. The default guest login is 'guest' and the password is 'pass'.

To log into an encoder, you must type the username and password into the appropriate field. After typing in the required information, press the 'Enter' key or click on the 'Submit' button.

**Note: Cookies must be enabled in your browser in order for pages to be displayed properly. Errors may occur if cookies have been disabled or blocked.**



Multi-Channel Video Encoder

Login

Username:

Password:

## Status

After a successful login, the Status page is displayed. The status page provides a brief overview of the hardware/firmware version, internal operating temperatures and the

status/format of the video sources. The status page information can be updated by clicking the 'Refresh' button.

**Multi-Channel Video Encoder**

|                        |                               |                      |                        |
|------------------------|-------------------------------|----------------------|------------------------|
| <a href="#">Status</a> | <a href="#">Configuration</a> | <a href="#">Mode</a> | <a href="#">Logout</a> |
|------------------------|-------------------------------|----------------------|------------------------|

|                                    |   |
|------------------------------------|---|
| Hardware Version: 12/08/08 Rev. 1  | Internal Temperature 1: 92.9°F (Max: 150°F) |
| Firmware Version: 12/08/08 Build 1 | Internal Temperature 2: 87.5°F (Max: 150°F) |

| SD 1             |            |
|------------------|------------|
| Source Connected | Connected  |
| Source Enabled   | Enabled    |
| Video Resolution | 720x480    |
| Scan Type        | Interlaced |
| Frame Rate       | 29.97 fps  |
| Format           | 480i       |

| SD 2             |            |
|------------------|------------|
| Source Connected | Connected  |
| Source Enabled   | Enabled    |
| Video Resolution | 720x480    |
| Scan Type        | Interlaced |
| Frame Rate       | 29.97 fps  |
| Format           | 480i       |

| SD 3             |            |
|------------------|------------|
| Source Connected | Connected  |
| Source Enabled   | Enabled    |
| Video Resolution | 720x480    |
| Scan Type        | Interlaced |
| Frame Rate       | 29.97 fps  |
| Format           | 480i       |

| SD 4             |            |
|------------------|------------|
| Source Connected | Connected  |
| Source Enabled   | Enabled    |
| Video Resolution | 720x480    |
| Scan Type        | Interlaced |
| Frame Rate       | 29.97 fps  |
| Format           | 480i       |

## Configuration

The configuration menu consists of six tabs: Video, Transport, PSIP, Audio, Network and Date/Time. Each tab allows the user to change related encoder settings.

## Video

The Video Configuration page gives the user the ability to individually configure settings on each of the available video channels. Each channel has a variety of configurable settings.

- Video bit rate can be adjusted on a channel-by-channel basis. However, the total bit rate of all video/audio channels (and transport stream overhead) cannot exceed 19.39Mbps.
- Closed Caption processing may be enabled or disabled.
- The video filter may be disabled, or set to one of three filtering levels.
- GOP (Group of Picture) size is configurable between 1 and 120. This means that the first frame in a GOP will be an I-frame and remaining frames will be P-frames.
- All SD channels may be setup for Analog or Digital inputs. However, in all modes containing an HD channel, the 'Input Type' is digital only. All channels, regardless of mode, can be disabled.
- Please see the section labeled "Video Input Channel" for a detailed explanation of this feature.

**Note: Video bit rates are target bit rates. This does not mean the bit rate specified will be met under all conditions. The complexity of the video greatly determines what the minimum video bit rate can be. For example, if a bit rate of 0.0 is entered, the encoder cannot realistically allocate 0 bits for the video stream. In this instance the channel should be disabled if no output is desired. Please take care when selecting video bit rates. Monitoring the video output may be necessary to ensure proper operation.**

| Multi-Channel Video Encoder |  |      |        |         |           |
|-----------------------------|--|------|--------|---------|-----------|
| Status                      | Configuration  | Mode | Logout |         |           |
| Video                       | Transport  | PSIP | Audio  | Network | Date/Time |
| SD 1                        |  |      |        |         |           |
| Bitrate                     | 4.2  | Mbps |        |         |           |
| Closed Caption              | <input checked="" type="radio"/> Enabled <input type="radio"/> Disabled                              |      |        |         |           |
| Video Filter Level          | Disabled ▾   |      |        |         |           |
| GOP Size                    | 15   |      |        |         |           |
| Input Type                  | <input checked="" type="radio"/> Analog <input type="radio"/> Digital <input type="radio"/> Disabled |      |        |         |           |
| Video Input Channel         | 1 ▾  |      |        |         |           |
| SD 2                        |  |      |        |         |           |
| Bitrate                     | 4.2  | Mbps |        |         |           |
| Closed Caption              | <input checked="" type="radio"/> Enabled <input type="radio"/> Disabled                              |      |        |         |           |
| Video Filter Level          | Disabled ▾   |      |        |         |           |
| GOP Size                    | 15   |      |        |         |           |
| Input Type                  | <input checked="" type="radio"/> Analog <input type="radio"/> Digital <input type="radio"/> Disabled |      |        |         |           |
| Video Input Channel         | 2 ▾  |      |        |         |           |
| SD 3                        |  |      |        |         |           |

## Transport

The Transport Configuration page allows user to set: Program numbers, Video Program IDs, Audio Program IDs, Program Map Table (PMT) PIDs as well as Event Information Table (EIT) PIDs. All values must be entered in integer form.

**Note: Some PID values are reserved and cannot be used. PID values must also be unique. Duplicate PID values are not allowed.**

|      | Program # | Video PID | Audio PID | PMT PID |
|------|-----------|-----------|-----------|---------|
| SD 1 | 1         | 49        | 50        | 48      |
| SD 2 | 2         | 65        | 66        | 64      |
| SD 3 | 3         | 81        | 82        | 80      |
| SD 4 | 4         | 97        | 98        | 96      |

| EIT PID A | EIT PID B | EIT PID C | EIT PID D |
|-----------|-----------|-----------|-----------|
| 7424      | 7425      | 7426      | 7427      |

Save

## PSIP

The PSIP Configuration page allows users to set information such as the Transport Stream ID, channel names, and major/minor channel numbers.

**Multi-Channel Video Encoder**

[Status](#)
[Configuration](#)
[Mode](#)
[Logout](#)

[Video](#)
[Transport](#)
[PSIP](#)
[Audio](#)
[Network](#)
[Date/Time](#)

|                     |   |
|---------------------|---|
| Transport Stream ID | 1 |
|---------------------|---|

|      | Channel Name | Major Ch. # | Minor Ch. # |
|------|--------------|-------------|-------------|
| SD 1 |              | 3           | 1           |
| SD 2 |              | 3           | 2           |
| SD 3 |              | 3           | 3           |
| SD 4 |              | 3           | 4           |

[Save](#)

## Audio

The Audio Configuration page allows the user to adjust parameters associated with the Dolby® Digital AC-3 encoded stereo audio. All channels configured with digital inputs must have their respective channel streams configured properly in order to process audio correctly. Typical values are 0 and 1, but this may vary by source. These audio stream settings are ignored for channels configured for analog input. An 'Audio Delay' adjustment is also available to allow compensation for audio/video skew.

Dolby® Digital specific settings are configurable on this page as well. The internal Dolby® Digital encoder can be bypassed for each channel by selecting 'Enable' in the 'Encoder Bypass' section. This allows audio already encoded in Dolby® Digital format to be passed through the encoder without being processed. This can be helpful if a program has Dolby® Digital 2.0 (or 5.1) encoded audio present in the incoming digital stream.

**Multi-Channel Video Encoder**

Status | Configuration | Mode | Logout

Video | Transport | PSIP | Audio | Network | Date/Time

**Digital Audio Control**

|      |                 |                  |             |
|------|-----------------|------------------|-------------|
| SD 1 | Left Channel: 0 | Right Channel: 1 | Delay: 0 ms |
| SD 2 | Left Channel: 0 | Right Channel: 1 | Delay: 0 ms |
| SD 3 | Left Channel: 0 | Right Channel: 1 | Delay: 0 ms |
| SD 4 | Left Channel: 0 | Right Channel: 1 | Delay: 0 ms |

**Audio Service Configuration**

|                   |          |                      |        |
|-------------------|----------|----------------------|--------|
| Data Rate         | 192 kbps | Sample Rate          | 48 kHz |
| Audio Coding Mode | 2/0: L,R | Dialog Normalization | -27 dB |

**Bitstream Information**

|                     |               |
|---------------------|---------------|
| Dolby Surround Mode | Not Indicated |
|---------------------|---------------|

**Preprocessing**

**Dynamic Range Control**

|           |               |
|-----------|---------------|
| Line Mode | Film Standard |
| RF Mode   | Film Standard |

**Input/Output**

|                |   |
|----------------|---|
| Encoder Bypass | <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled |
|----------------|---|

**Audio Service Configuration**

|           |          |             |        |
|-----------|----------|-------------|--------|
| Data Rate | 192 kbps | Sample Rate | 48 kHz |
|-----------|----------|-------------|--------|

## Network

The Network Configuration page gives the user the ability to change the network settings associated with an encoder. A static IP address is required. DHCP is not supported on this device. Please see your network administrator to get the appropriate settings for your network. Usernames and passwords may also be set here. There are two levels of access for this device. Administrators have full control over all available settings. Guests can view all current settings, but have limited settings control.

**Multi-Channel Video Encoder**

[Status](#) | 
 [Configuration](#) | 
 [Mode](#) | 
 [Logout](#)

| Video   | Transport      | PSIP | Audio | Network | Date/Time |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
|---|----------------|------|-------|---------|-----------|-------------------|----------------|-------------|-------------|--------------------|---------------|-----------------|-------|----------------|------|-----------------|-------|----------------|------|
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Static IP Address</td> <td style="padding: 5px;">192.168.120.56</td> </tr> <tr> <td style="padding: 5px;">Subnet Mask</td> <td style="padding: 5px;">255.255.0.0</td> </tr> <tr> <td style="padding: 5px;">Gateway IP Address</td> <td style="padding: 5px;">192.168.120.1</td> </tr> <tr> <td style="padding: 5px;">Admin User Name</td> <td style="padding: 5px;">admin</td> </tr> <tr> <td style="padding: 5px;">Admin Password</td> <td style="padding: 5px;">pass</td> </tr> <tr> <td style="padding: 5px;">Guest User Name</td> <td style="padding: 5px;">guest</td> </tr> <tr> <td style="padding: 5px;">Guest Password</td> <td style="padding: 5px;">pass</td> </tr> </table> |                |      |       |         |           | Static IP Address | 192.168.120.56 | Subnet Mask | 255.255.0.0 | Gateway IP Address | 192.168.120.1 | Admin User Name | admin | Admin Password | pass | Guest User Name | guest | Guest Password | pass |
| Static IP Address   | 192.168.120.56 |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Subnet Mask   | 255.255.0.0    |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Gateway IP Address  | 192.168.120.1  |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Admin User Name   | admin          |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Admin Password  | pass           |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Guest User Name   | guest          |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| Guest Password  | pass           |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |
| <input type="button" value="Save"/>   |                |      |       |         |           |                   |                |             |             |                    |               |                 |       |                |      |                 |       |                |      |

## Date/Time

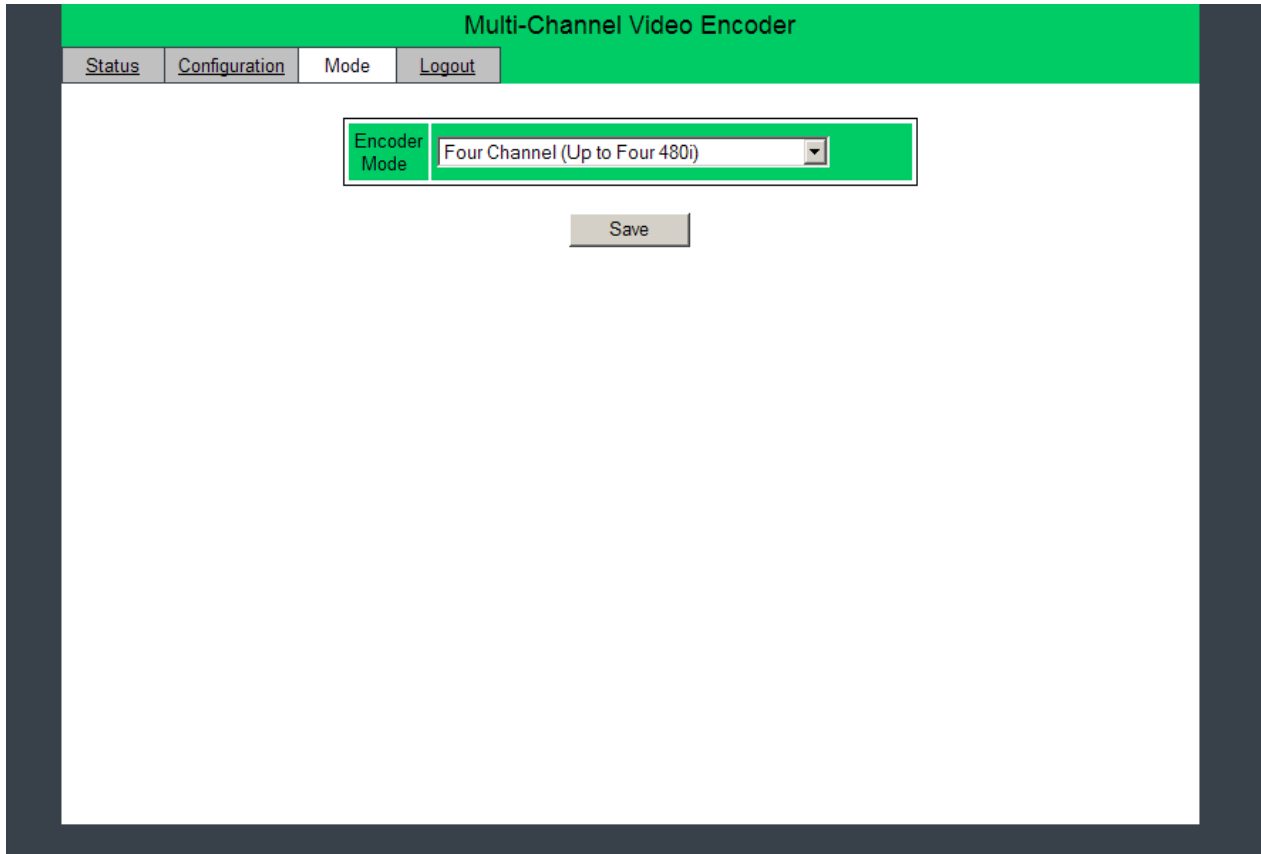
The Date/Time Configuration page allows the user to set the current date and time for the encoder. Having precise settings is critical to remain compliant with ATSC standards. For this reason, automatic time configuration is recommended. However, if an internet connection is not available, the date and time can be set manually. The encoder's current time is displayed for reference. If the encoder is configured to automatically acquire time settings from the Internet, the IP Address of a time server will be required. The time server specified must support the Network Time Protocol (NTP) in order for automatic time acquisition to work properly.

**Note:** It may take several minutes for the Current System Time to update once the settings have changed from manual to automatic or when the system has been powered down for an extended period of time and is configured for automatic time acquisition. Clicking the 'Refresh' button will update the time displayed on the page. If the time fails to update properly after five minutes, validate that the IP address specified in the "Time Server IP" field is correct. Also, check your connection to the Internet and confirm that the 'Gateway IP Address' (on the Network page) is set correctly.

| Multi-Channel Video Encoder                    |               |   |        |         |           |
|--|---------------|---|--------|---------|-----------|
| Status   | Configuration | Mode  | Logout |         |           |
| Video  | Transport     | PSIP  | Audio  | Network | Date/Time |
| Current System Time                            |               | Sun Jan 6 00:13:46 1980   |        |         |           |
| Configuration Method                           |               | <input checked="" type="radio"/> Manual <input type="radio"/> Automatic |        |         |           |
| Time Zone                                      |               | GMT 0:00  |        |         |           |
| Current Date                                   |               | 1 / 1 / 2009  |        |         |           |
| Current Time (24hr)                            |               |   |        |         |           |
| GPS Offset                                     |               | 15 Seconds  |        |         |           |
| Automatically Adjust for Daylight Savings Time |               | <input type="radio"/> Yes <input checked="" type="radio"/> No           |        |         |           |
| DST Start Date (mm/dd/yyyy)                    |               | 3 / 8 / 2009  |        |         |           |
| DST Start Time                                 |               | 2:00 AM   |        |         |           |
| DST End Date (mm/dd/yyyy)                      |               | 11 / 1 / 2009   |        |         |           |
| DST End Time                                   |               | 2:00 AM   |        |         |           |
| Refresh  |               | Save  |        |         |           |

## Mode

There are three modes in which the encoder can be configured. These consist of Single-Channel mode, Three-Channel mode and Four-Channel mode. When the mode is changed, some settings are set to their defaults. These fields are: Input Type, Video Input Channel, Program Number, Channel Name, and Minor Channel Number. These settings may be reconfigured after a mode change. If the total bit rate of all channels exceeds the transport stream bit rate, video and audio bit rates will be reset to their default values.



## Video Input Channel

Any SD input (Analog or Digital) can be routed/duplicated to any other SD output. For example, in 4-channel mode, Channel 1's analog input can be routed to SD 1, SD 2, SD 3, and/or SD 4 (or any other combination). As another example, in 3-channel mode, Channel 4's digital input can be routed to SD 1 and/or SD2. Despite the flexibility of the Multi-Channel Video Encoder's routing capabilities, there are limitations.

An HD source cannot be routed to an SD output.

Only one Input Type can be configured for each channel. For example, if Channel 1's analog input is routed to SD 2, Channel 1's digital input cannot be used as another input.

## Text Field Valid Values

| Name           | Page                | Valid Values                             |
|----------------|---------------------|--|
| Video Bit rate | Video Configuration | Total of all channels < 96% of 19.39Mbps |
| GOP Size       | Video Configuration | 0 to 120                                 |

|                        |                         |  |
|------------------------|-------------------------|--|
| Program Number         | Transport Configuration | 1 to 65535   |
| All PID Values         | Transport Configuration | 48 to 8176   |
| Transport Stream ID    | PSIP Configuration      | 1 to 65535   |
| Channel Name           | PSIP Configuration      | All ASCII Printable Characters (0x20 to 0x7F)<br>7 Characters Maximum  |
| Major Channel Numbers  | PSIP Configuration      | 1 to 99  |
| Minor Channel Numbers  | PSIP Configuration      | 1 to 99  |
| Audio Delay            | Audio Configuration     | -300 to 300 (ms)   |
| IP Addresses           | Network Configuration   | All IP Addresses conforming to standard network address spaces.        |
| Username/Passwords     | Network Configuration   | All ASCII Printable Characters (0x20 to 0x7F)<br>10 Characters Maximum |
| Time Server IP Address | Date/Time Configuration | All IP Addresses conforming to standard network address spaces.        |

## Maximum Connections and Timeout

The Multi-Channel Video Encoder integrated web interface will only allow one concurrent user to be logged in at any given time. During the period when someone is logged in, an error message will be displayed to other users informing them of the condition.

Each page is equipped with a 'Logout' link which will, when clicked by the user that is currently logged in, allow other users to log in. An inactivity timeout period of 5 minutes is in place so that users cannot lock themselves out of an encoder. Additionally, this adds security to the device by requiring a user to log in again after a period of inactivity.

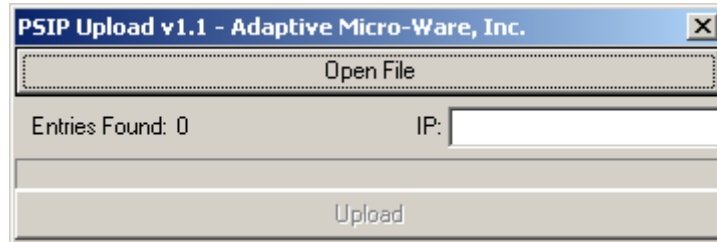
## Loading PSIP data

The Multi-Channel Video Encoder can be loaded with PSIP data via a Windows-based PC configured with the PSIP Upload application.

An example file is included with the installation program. All formatting must be followed in order to correctly upload the PSIP data to the encoder. Only one file may be uploaded to the encoder for the duration that the PSIP data is valid. The file must contain all PSIP information for all channels. If multiple files are uploaded, only the last will be used.

The application supports uploading a maximum of 2500 program entries. An upload may take several minutes to complete depending upon the number of entries.

**Note: Care must be taken when changing the encoder mode after PSIP data has been uploaded to the encoder. PSIP data may need to be corrected and uploaded again to match the new channel configuration. It is the user's responsibility to keep the PSIP data organized to correspond to the actual video.**



**Manufacturer:**

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Fort Wayne In 46818  
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EMAIL: [t.skillicorn@adaptivemicro.com](mailto:t.skillicorn@adaptivemicro.com)

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