YUV2QAM

Dual Channel HD/SD Component YUV Encoder with QAM Modulator

USER GUIDE

Firmware version 1.02.00

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Trademarks & Copyrights

Adtec Digital Support & Service

Technical Support and Customer Service includes troubleshooting product/system functional operations concerning Adtec equipment, embedded systems and single device issues; Service Order generation, processing and tracking; Warranty claim processing; and on-site system evaluation and maintenance. Technical Support plans do not include customer training programs. Programs incorporating customer training are defined in the Training Services Policy. Customer Services technicians provide limited instruction during a support call/email/fax in order to facilitate checking for proper equipment operation.

Telephone and Email Support

- Telephone: 615-256-6619 ext. 166
- Email: support@adtecinc.com
- Internet: http://adtecdigital.com/support/support-request

Adtec Digital offers telephone, email and fax support, warranty and service related inquiries during normal business hours: 9:00am to 5:00pm Central Standard Time (CST), Monday through Friday, holidays excepted. Support Requests can also be submitted on-line.
All inquiries will be processed in the order in which they are received and by the criteria outlined in the Call Response Order. Inquiries and inquiry responses made after 5:00 PM (CST) weekdays, Saturday, Sunday or on an Adtec-recognized holiday will be processed the next business day in the order received.

Callers on hold and returned calls will be prioritized by the following criteria:

- Priority-24 Subscription Customers
- Standard-Priority Subscription Customers
- All customers that have purchased Installation & Training, within 90 days of the installation.
- Adtec Certified Operators (ACO)
- Limited Level Support, Warranty & Service Requests
- Multi-device system installations that have purchased Installation & Training from Adtec
- Distributors
- System Integrators
- Multi-device systems
- Single device users

Preparing for Support

To help expedite the troubleshooting process, please be prepared to provide the following information to the support representative:

- Product(s) affected: Please provide a list of the Adtec Products involved including the Revision Number for each affected product.
- Description of the Problem: Please include a detailed description of the problem. Include the approximate time and day the problem occurred, the spot ID of the material being inserted and what the operator reported about the incident. It is also helpful to note any recent changes to the system. More information is always better than too little information.
- Your Contact Data: Please include contact information so we can reach you to discuss how to fix the problem, additional troubleshooting steps that are required or to gather more complete information regarding the problem. Please include your facility name (or call letters), your name, title, email address, telephone number, hours of work, and other contact persons if you are not available.

Advanced Support Plans

In addition to our basic Inquiry Response Policy, Adtec offers two advanced levels of priority inquiry support: Standard-Priority and Priority-24. The Standard-Priority & Priority-24 plans provide guaranteed* response times with the Priority-24 plan offering after hours and holiday support. Standard-Priority support is included with the Adtec Certified Operator (ACO) training. Contact Adtec Sales to upgrade your current support plan.

Standard-Priority Support Plan

Customers can improve upon our normal call processing times and can expedite inquiry support responses through our subscription Standard-Priority service plan. Under this plan all telephone inquiries are guaranteed* a telephone response of no more than 4 hours after they are received (within the designated hours of operation). Telephone inquiries received by 4:00 PM (CST) on weekdays- excluding Adtec holidays- are guaranteed a same-day telephone response. However, inquiry responses may be made after hours until 8:00 PM (CST). Email and fax inquiries are limited in scope to normal business hours, excluding holidays. Standard-Priority customers are entitled to a 10% discount on site visit and training charges after the initial system/product installation and training. Standard-Priority customers also receive a 3-day turnaround time guarantee* on warranty and non-warranty repairs on Adtec manufactured equipment, excluding Studio Encoders.

Priority - 24 Support Plan (24 Hour)

In addition to our Standard-Support plan, after hours, weekend and holiday support is available with the Priority-24 support plan. This plan is a subscription only service available for service inquiries 24 hours a day, 7 days a week. All telephone inquiries are guaranteed* a telephone response time of no more than 2 hours. Email and fax inquiries are limited in scope to normal business hours, excluding holidays. Calls after 5:00 PM will be forwarded to a Customer Services representative on call. Priority-24 customers are entitled to a 25% discount on site visit and training charges, after the initial system/product installation and training. Priority-24 customers also receive a 1- day turnaround time guarantee* on

warranty and non-warranty repairs on Adtec-manufactured equipment, excluding Studio Encoders.

Plan Comparisons

Feature/ Plan Name	Priority-24	Standard Priority	Limited
Hours	24 Hours/Day; 7 Days/Week	9:00 AM – 5:00 PM, (U.S.Central Standard Time), Excludes Weekends & Holidays	
Call Response Time	Same day- 2 hours (1st in order of call list)	Same Day: 4 Hours (2nd in order of call list)	48 Hours
Discounted Site Visits	25%	10%	None
Discounted Training	25%	10%	None
Repair Service	Guaranteed* 1 Day Turnaround	3 Day Turnaround	None

* A one-month free service extension will be awarded if Adtec fails to meet its service

Electrical Device Compliance Notices

Safety Warnings and Cautions

For your safety and the proper operation of the device:

- This unit must be installed and serviced by suitably qualified personnel only.
- Do not break the warranty seals on the device or open the lid. Only approved service technicians are permitted to service this equipment.
- Disconnect all power before servicing the unit.
- Do not expose this device to rain or other moisture. Clean only with a dry cloth.
- If not installed in an equipment rack, install the product securely on a stable surface.
- Install the product in a protected location where no on can step or trip over the supply cord, and where the supply cord will not be damaged.
- If a system is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature.
- Consideration should be given to installing the unit in an environment compatible with the maximum recommended ambient temperature of 50 degrees Celcius (122 degrees Fahrenheit).
- Install the unit in a rack so that the amount of airflow required for safe operation is not compromised.
    - The recommended clearance on the top and sides of the unit is at least ½ " (one half inch/one centimeter).
- Mounting of the unit in a rack should be such that no hazardous condition is achieved due to uneven mechanical loading.
- Use only a grounded electrical outlet when connecting the unit to a power source.
- Reliable earth grounding of rack-mount equipment should be maintained.
    - Particular attention should be given to supply connection other than direct connections to the branch circuit (e.g., use of power strips).

Compliance Notices

FCC

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this device not expressly approved by Adtec Digital could void the user's authority to operate the equipment.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions:(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

European Union EMC Directive Conformance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Adtec Digital cannot accept responsibility for any failure to satisfy the protection requirements resulting from a user modification of the product. This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / EN 55022.

Chapter 1 - Overview

Product Introduction

The YUV2QAM is a two-channel High and Standard definition MPEG 2 distribution encoder supporting ATSC and DVB QAM, ASI and IP distribution platforms.

It inherits Adtec's broadcast quality compression, advanced feature set, service performance and reliability in the new dense two-channel platform targeted towards broadcasters, cable and IP compression applications.

The device automatically detects video and audio from two sources (combination of HD and SD acceptable), encodes, multiplexes and send them back out as one combined TS via IP, ASI or optional QAM. Closed captioning and support for Emergency Alert (EAS) are standard.

YUV2QAM Dual Channel YUV SD and HD MPEG2 Encoder with ASI, GigE. Auto detects two channels of high definition video and PCM or Compressed Dolby audio via RCA Component and YUV inputs. Encodes video to HD MPEG 2 Transport Stream, passes Dolby audio (AC3 or 5.1) or encodes PCM to Dolby AC3 per ATSC A52 or MPEG 1 Layer 2 audio, creates MPTS, and outputs ASI and GigE concurrently. Supports ATSC A69 PSIP and DVB-SI ETSI EN 300 468 service information, closed captioning per CEA 608 via composite video input with up-conversion to CEA 708 Digital captions internally and EAS + QAM Modulator – Adds ability to modulate QAM Annex A or B, and output RF simultaneously with ASI and GigE.

Chapter 2 - Getting Started

Front Panel

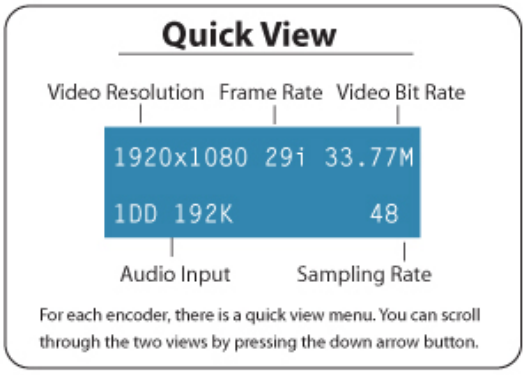
The Function Buttons and Directional Keypad of the YUV2QAM are used to configure and monitor the signal input and output of the device.

Panel Diagram

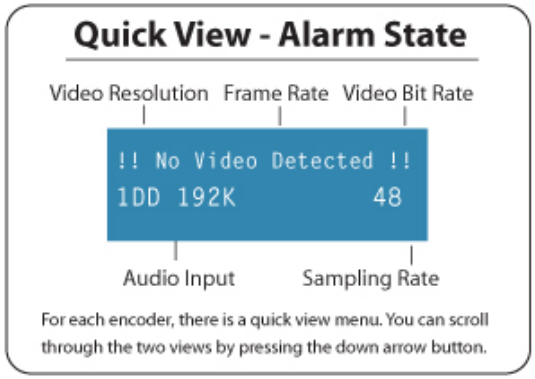
Front Panel LCD

There are 3 states of the front panel LCD.

1) Encoding State: When in normal encoding mode, the LCD will display the following information. Since there are 2 encoders in the product, you can view the status of each by pressing the down button to toggle between 1 & 2.



2) Video Loss State: When video is not detected on the selected input, the LCD will display the following information.



3) Disabled Product State: When the product is in a disabled state, the LCD will relay the following information.

<Insert Disabled Product State image here>

This state is generally only used when a factory restore is performed. If that is the case, note that all of the configurations have been returned to factory defaults including Network configurations. To reapply network configurations simply press the Down arrow when in this state to navigate through the network menu. In the event that you see a similar message followed by a phone number, this indicates that the Temporary keys on the device have expired and you should contact your sales representative.

Transport LED Indicators - Channel 1 & 2

Indicator	Function
Encode	Off - No activity. Idle State Green - Encoding Yellow - Transitioning
Video	Off - No video (audio only) Green - Video detected. Yellow - Format not supported. Red - No video detected.
SD	Green - SD Resolution Detected
HD	Green - 1080i Resolution Detected Yellow - 720p Resolution Detected
EAS	Green - EAS enabled.

QAM Status Indicator LEDs

Indicator	Function
A/B/C	A = 8 MHz B = 6 MHz
256	Default for Annex B, can be selected for Annex A
128	not currently used
64	Optional for Annex B or Annex A

System/Function Status Indicator LEDs

Indicator	Function
Power	Green - Power is on. Off - Power is off
Alarm	Off - no alarm Yellow - minor alarm Red - major alarm
Link	Off - no link detected Green - link active
Busy	Off - no traffic Green Flashing - traffic
EAS	Green - Active, Audio + Video Yellow - Active, audio only

Programming Function Buttons

Control	Function
Mode	Cycles through the available menus
Select	selects a menu or sub-menu
Enter	enter a value placed into a menu field
Escape	return one level within a menu or to the main menu

Directional Keypad

- Arrow keys control the cursor on the LCD display and are used to page through the options in a menu/sub-menu and to place entries in fields.

Unit Security

Rules:

- The YUV2QAM is always logged in on startup.
- If the device has logged out due to accident, or a login duration timer being set (see below), you will need to log back in. To log in from a logged-out status follow the key sequence below.

Step	Action
1	Press <Select>
2	Press <Up> arrow
3	Press <Select>
4	Press <Enter>
5	Press <Right> arrow
6	Press <Enter>

The front panel also has a login duration capability. This setting allows you to specify a time frame in which the unit will automatically log itself out if it receives no control inputs via the front panel or API session.

Possible Values:
0 (Zero): The unit will not auto-log-out
1-9: The number of minutes until log out if no input is received.

System Menu

The following diagram illustrates the structure and flow of the System Menu on the Adtec YUV2QAM device:

Login

Item	Function	Options	API Command
Login	If the front panel is in a 'logged out' state, all configurations are read only. User must login to change values.	N/A	N/A
Login Duration	Specifies the time-out value for automatically logging out of the front panel once a user logs in for security purposes. Setting a time of 0 disables automatic logout capabilities	0 - 9 (minutes)	*.SYSD LDR

Network Sub-menu

Item	Function	Options	API Command
Ethernet IP Address	IP address of unit on your network	user-defined using <left/right arrow> and <select> buttons default is 192.168.10.48	*.SYSD IPA
Ethernet Mask	Defines the unit relative to the rest of your network	user-defined using <left/right arrow> and <select> buttons default is 255.255.255.0	*.SYSD IPM
Ethernet DHCP	Dynamic Host Configuration Protocol; allows the device to self-locate network Ethernet parameters	On (finds own DHCP Address) Off (defaults to last entered IP Address) default is OFF	*.SYSD DHCP
GigE IP Address	route of traffic in/out on IPTV	user-defined using <left/right arrow> and <select> buttons default is 192.168.20.48	*.SYSD IPA eth1
GigE Mask	defines unit relative to the rest of an IPTV network	user-defined using <left/right arrow> and <select> buttons default is 255.255.255.0	*.SYSD IPM eth1
GigE DHCP	Dynamic Host Configuration Protocol; allows mediaHub to self-locate network GigE parameters	On (finds own DHCP Address) Off (defaults to last entered IP Address) default is OFF	*.SYSD DHCP eth1
Gateway IP Address	traffic director for off-LAN resources	user-defined using <left/right arrow> and <select> buttons default is 192.168.10.1	*.SYSD GIP
Stealth IP	security feature that allows only the	user-defined using	*.SYSD SIP

Address	designated Stealth IP Address to communicate with the unit for FTP and other services. This control allows one-point override access to the Stealth IP Address.	<left/right arrow> and <select> buttons	

Time Sub-menu

Item	Function	Options	API Command
Time	specifies system time	user-defined using <left/right arrow> and <select> buttons	*.SYSD TIM
Timezone	specifies time zone unit operates in	user-defined using <left/right arrow> and <select> buttons	*.SYSD TIZ

NTP Sub-menu

Item	Function	Options	API Command
NTP Status	Network Transfer Protocol	Defines whether or not your unit is in sync with the designated NTP server	*.SYSD NIP STATUS
NTP IP Address	IP address for Network Transfer Protocol server	user-defined using <left/right arrow> and <select> buttons; default = 048.130.103.064	*.SYSD NIP

Alarm Sub-menu

Item	Function	Options
Event Record	Log of events outside of operating parameters	scroll up and down to view log items

Com2 Sub-menu

Item	Function	Options	API Command
Com2 Settings	RS-232 terminal monitor for communicating with the internal host motherboard for diagnostics	115200 8 1 NONE 57600 8 1 NONE 38400 8 1 NONE 19200 8 1 NONE 9600 8 1 NONE default is 38400 8 1 None	*.SYSD com2

Features Sub-menu

Item	Function		API Command
Permanent ID	Displays units permanent Product ID.		*.SYSD fea
Temporary ID	Displays units temporary Product ID.		*.SYSD fea
Product ID	Displays the status of the		*.SYSD fea

Name

Item	Function	Options	API Command
Name	DIsplays and allows editing of the host name		*.SYSD name

Firmware

Item	Function	Options	API Command
Firmware	Displays current version of firmware (read only)		*.SYSD vn

Modulator Menu

Control	Function	Options	API Command
Modulator Encoding	Encoding standards being applied. Annex A is used world-wide; Annex B is used in North America.	Annex A Annex B	*.ECMD# QAM MOD_ENCODING
Modulator Mode	Rate of data transfer within the encode	64 256	*.ECMD# QAM MOD_MODE
Modulator Output Format	Selects between normal and inverted output	Normal Inverted	*.ECMD# QAM MOD_INVERT
UpConversion Channel	Congruent with the new EIA (North America) channel plan - valid range is 2 through 135 inclusive.	text field; values are 2-133	*.ECMD# QAM UPCON_CHANNEL_NUM
UpConversion Power	RF output power in dBmV	45 dBmv to 56 dBmv	*.ECMD# QAM UPCON_POWER_LVL
UpConversion Frequency	Center frequency of the QAM RF output. Direct entry of center frequency corresponding to the new EIA (North America) channel plan will return a valid channel number in the channel field. Entering frequencies that do not correspond to the EIA (North Ameica) channel plan will return a value of (-1) in the channel field, however, the RF output frequency will be as entered. Valid range of frequencies is 50 to 862MHz inclusive.	50 to 862 MHz	*.ECMD# QAM UPCON_OUTPUT_FREQ

Services Menu

Items under the denoted << CH 1 - CH 2 >> parallel menu are unique to each encoder.

Control/Setting	Function	Options	API Command
Tx Mux Rate	Configures the transport stream multiplex rate when operating in Annex A mode. ***This rate is configured automatically when operating in Annex B mode.	1 - 100 Mbit/s	*.ECMD0 TMR
Video Auto Fill	When enabled the encoders bit rate will automatically be adjusted to maximize available bandwidth.	On / Off	*.ECMD0 VAF
	<< CH 1 - CH 2 >>		
Video Rate	Configure each channels video encode rate. *** Video Rate can only be configured when Video Autofill is set to Off.		*.ECMD0 VRT
Short Name	When using ATSC, this field is referred to as Short Name. When using DVB, it is referred to as Service Name.	text field; 7-character limit.	*.ECMD# SNA
Long Name	When using ATSC, this field is referred to as Long Name. When using DVB, it is referred to as Service Provider.	text field; 20-character limit.	*.ECMD# SPR
Major Channel Number	Configures major channel number for ATSC. *** Setting this value to zero will enable single-part channel number mode.	text field; 0-999 available see note below table	*.ECMD# MAJ
Minor Channel Number	Configures minor channel number for ATSC. *** Is the Channel number single-part mode.	text field; 0-999 available	*.ECMD# MIN
Input	Configures the active input type	YUV Composite	*.ECMD# INP
Start Up	Determines whether or not the Channel is active. It is recommended to set this to OFF for single channel mode operation.	On Off	*.ECMD# STU

Note: If using API Commands, you must specify which encoder the command applies to by substituting '0' (for Encoder 1) or '1' (for Encoder 2) in place of the '#' symbol in the commands above. For more information, see the "API Commands" article in this manual.

Audio Menu

This is a parallel menu these parameters are unique to each encoder.

Control	Function	Options	API Command
Input	Selects which audio input will be used.	YUV Analog	*.ECMD# AIN
Mode	Audio Mode can be set to ENCODE (compress the audio) or PASSTHRU (accept compressed Dolby or PCM type bitstream. Passthrough only works if the input is SPDIF.	OFF Encode Passthru	*.ECMD# AMO SEE AMO in API documentation
Type	If the mode is ENCODE, the type can be set to Dolby Digital or MPEG 1 Layer 2 (Musicam). If the mode is set to PASSTHRU, there is support for Dolby Digital. Dolby Digital is required for ATSC applications.	Dolby Digital, Musicam	*. ECMD# AMO SEE AMO in API documentation
Rate	Mpeg1Layer2 32-384 kbit/s Dolbu Digital Encode 56 - 640 kbit/s PASSTHRU - Auto-Detects	32 - 640 kbit/s	*.ECMD# AMO SEE AMO in API documentation
Level	Audio Level can be set in one-decibel increments, with a range of -18 to +8 decibels. Available only in Encode Mode.	-18 - +8 dB	*.ECMD# ALV
Sync	Audio Sync set the audio sync offset. The valid range is +/- 800 milliseconds	+/- 800 ms	*.ECMD# AUS

Note: If using API Commands, you must specify which encoder the command applies to by substituting '0' (for Encoder 1) or '1' (for Encoder 2) in place of the '#' symbol in the commands above. For more information, see the "API Commands" article in this manual.

IP Destinations Menu

Control/Setting	Function	Options	API Command
Mode	Switches multicast function on and off	Off Send	*.ECMD0 MMO #
IP Address	The IP Address of which the Multicast or Unicast is broadcast. Multicast addressing supports the transmission of a single IP datagram to multiple receivers. Valid Multicast addressing range is 224.10.XXX.XXX to 239.XXX.XXX.XXX. Unicast addressing sends a single IP datagram to only one receiver. The Unicast address will be the unique IP of the receiving device.	user-defined; numeric field in format xxx.xxx.xxx.xxx	*.ECMD0 MSI #
Port	port assignment used for transmitting a multicast	user-defined; numeric field	*.ECMD0 MSP #
RTP	allows for sequence numbering and timing for accurate playback.	On Off	*.ECMD0 RTP #
TOS	Type of Service; selects the type of multicast that will forward the packet.	Normal Minimize Cost Maximize Reliability Maximize Throughput Minimize Delay	*.ECMD0 TOS #
TTL	Time-to-Live; specifies the number of iterations or transmissions the packet can undergo before it is discarded	user-defined	*.ECMD0 TTL #
Multicast Connector	sets the physical connector (on the rear of the unit) to use for multicast transmit purposes on the indicated encode channel.	Ethernet !GigE	*.ECMD0 MCN #
FEC Mode	Forward Error Correction; selects on/off. When selected, sends two FEC RTP streams in addition to a source RTP stream enabling a receiver to reconstruct missing packets in the source stream.	On Off Available if RTP selected 'on'	*.ECMD0 FEP #

	The RTP Control (above) must be set to 'on' to enable FEC.		
FEC L	affects the maximum burstpacket loss that can be recovered	4-20	*.ECMD FEP #
FEC D	defines latency involved in burstrecovery	4-20	*.ECMD FEP #
FEC TOSBITS	sets the Type of Service (TOS) bits in the IP header	Normal Minimize Cost Maximize Reliability Maximize Throughput Minimize Delay	*.ECMD0 FEP #
Service Select	Choose which Channel to include in the TSoIP stream. *** Useful if you would like to generate a STPS verses a MPTS. *** SPTS are VBR. The PSIP/PSI will still reflect both services!	ENC1, ENC2, Both	*.ECMD0 MST #

Note: Four IP destinations are available on the product. The '#' denoted in the IP Destinations Commands above are relevant to the four destinations indexed 0 - 3.

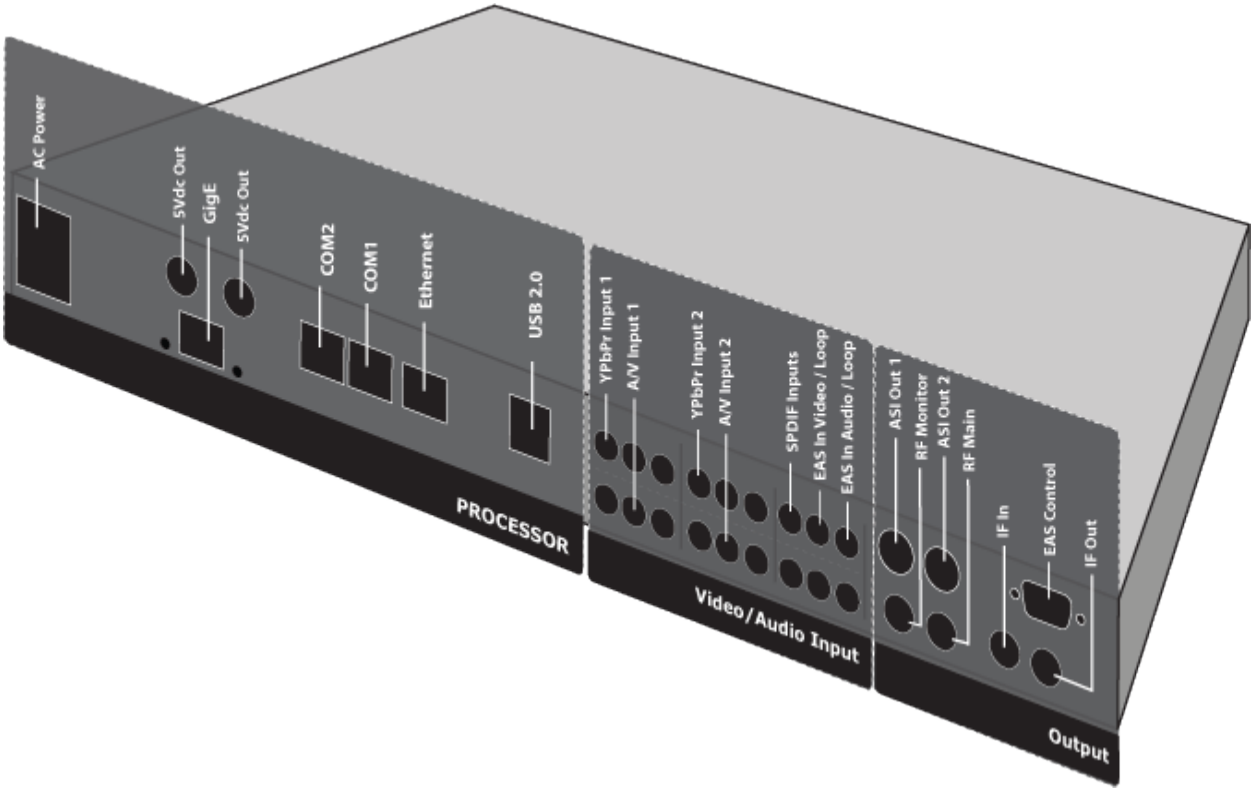
Tables Menu

Control/Setting	Function	Options	API Command
Tables On/Off	select on/off for insertion of tables and select the table standard being used.	-DVB -ATSC -MPEG	*.ECMD TON

Back Panel Diagram

The back panel contains the ports and connection points for the device.

Illustration



Ports and Connections

Processor

Connection	Function
AC Power	AC Power- standard 3-pin plug (70-240 VAC 50-60 Hz), 5Vdc Power (x2) - External Power Only
GigE	GigeE Interface- MPTS Output over RTP/UDP
COM2	API Serial Communication Interface
COM1	Serial Port used for Troubleshooting
Ethernet	10/100 base T-Ethernet interface
USB 2.0	Not currently supported

Video/Audio Input

Connection	Function
RCA YPbPr 1	RCA 75- Ohm Input
A/V Input 1	RCA 75- Ohm Input
RCA YPbPr 2	RCA 75- Ohm Input
A/V Input 2	RCA 75- Ohm Input
EAS In Video	RCA 75- Ohm
EAS In Audio L&R	Vertical single RCA jack

Output

Connection	Function
ASI Out	BNC 75 ohm, Asynchronous Serial Interface (EN 50083-9)
RF Main	F-style RF female jack; freq. 50 to 862 Mhz, 48 dBmV to 55 dBmV in 2.0 db increments
IF In	F-style RF female jack; freq. 44 Mhz
IF Out	F-style RF female jack; freq. 44 Mhz
EAS Control	9-pin interface- to enable EAS, short pin 5 to pin 7

Chapter 3 - Using the Web Application

Introduction

Adtec Digital has deployed a web-based configuration and control software application for our products. The program is optimized to work with the following browser versions:

- Firefox: 3.5 (recommended)
- MS Internet Explorer: 8.0 and higher
- Safari: 3.0 and higher
- Google Chrome: 5.0 and higher

Note for Safari users:

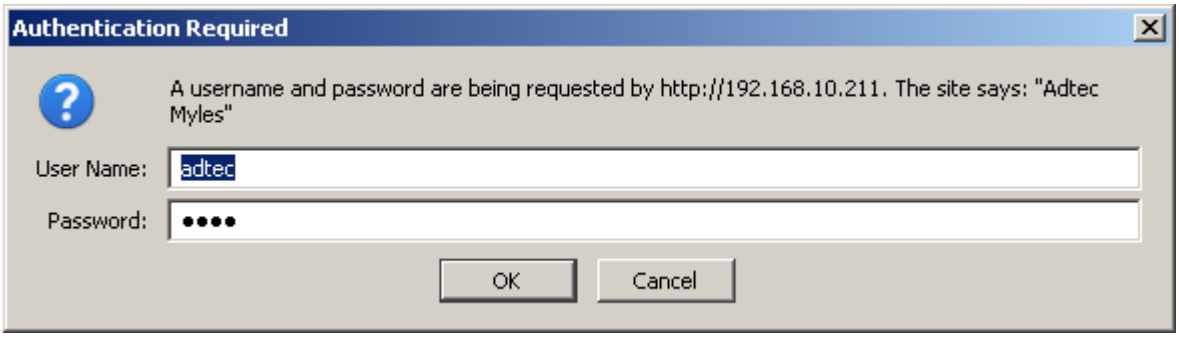
- The program is designed to use the Bonjour Zero Configuration Protocol.
    - When using Safari, click on the " ^^ " symbol to open a networked devices list.
    - Select the device to point the browser to that device's IPA.

Logging In

Access the application by pointing your web browser to the unit's IP address.

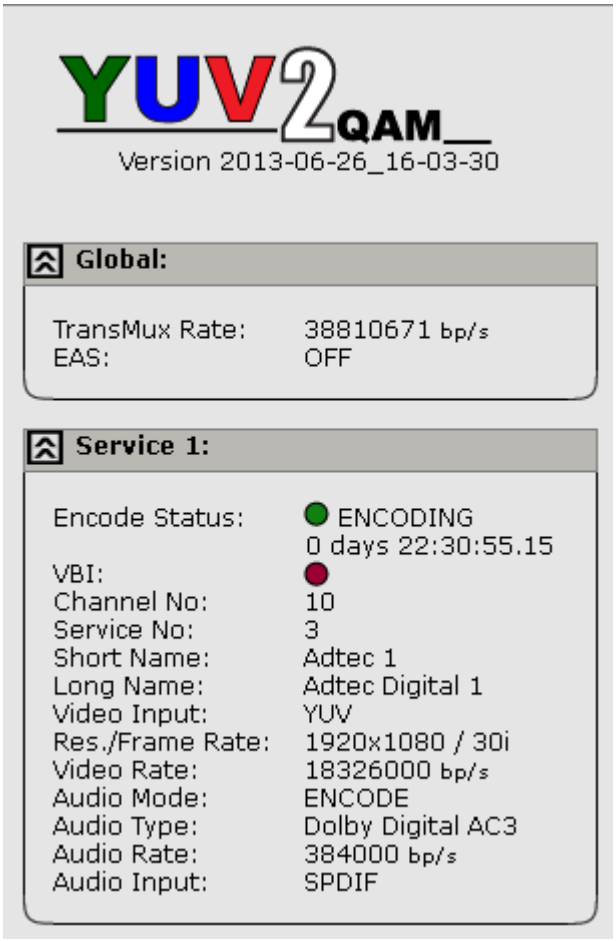
Log in to the application by clicking the Proceed to Login button:

A “Authentication Required” dialog box will appear. Type adtec' in the user name feild and 'none' in password field, then click ok.

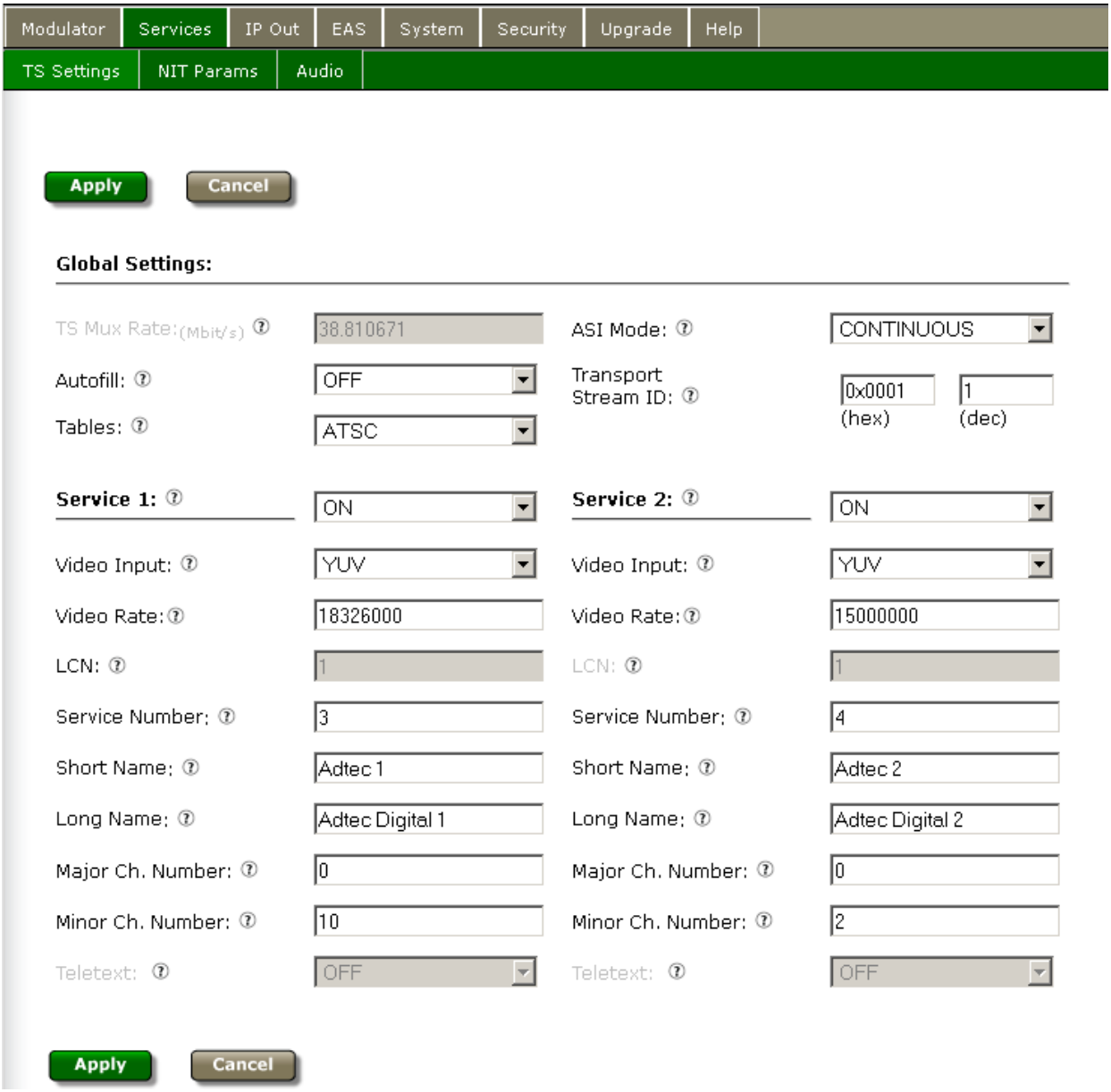


The application has two windows, the Status Window, and the Main window.

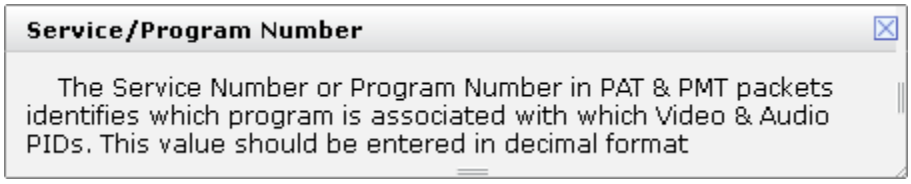
Status Window: The Status Window is fixed on the left-hand side of the screen- it will display regardless of what function is being displayed in the Main Window. The current status parameters of the unit's are always in view and are updated in real time.



Main Window: The Main Window is used to access the device's configurations and operating settings.



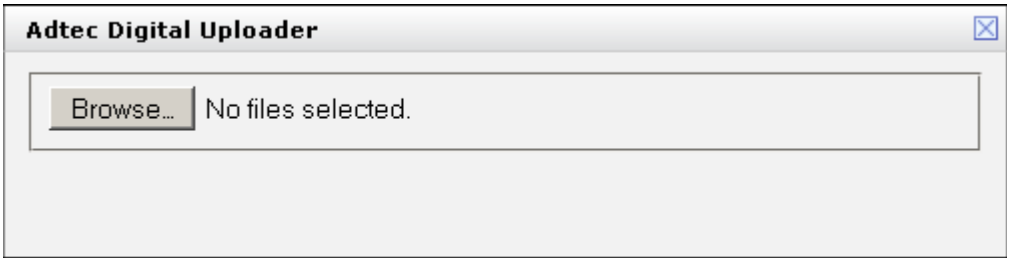
Help Notes: Help blurbs are available for the configurations on each tab; click on the "Question Mark" symbol next to the configuration name for a pop-up screen explaining the control.



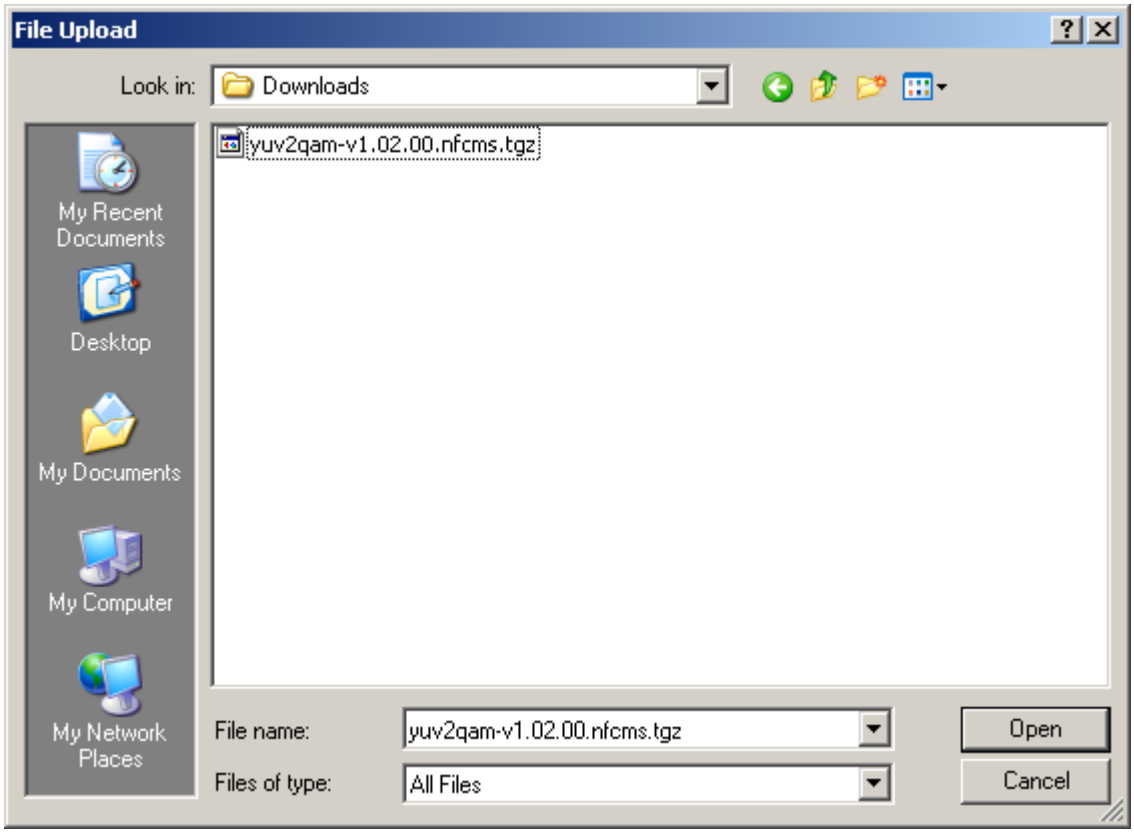
Upgrading your device

To upload new firmware versions, click on the Upload button in the top navigation bar next in between Logs and Log Out.

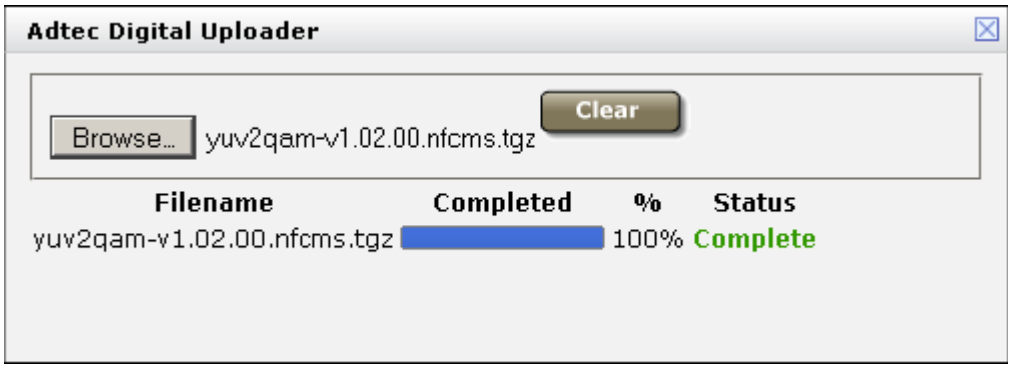
The "Adtec Digital Uploader" window will appear, click Browse button.



The "File Upload" window will appear and allow you to browse to the location where you stored the firmware. Click Open once you have located the firmware package.



Once the upload has completed the you can close the window.



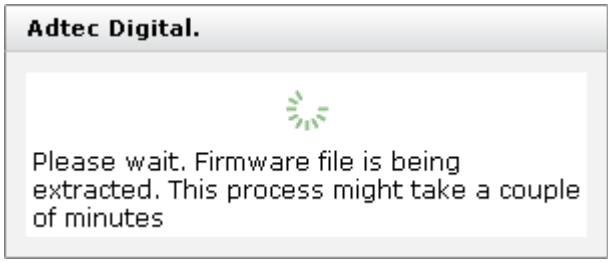
The firmware you just uploaded will appear as "Available Firmware Versions". Click the install button.

You will be prompted "Are you sure that you want to install the selected version".

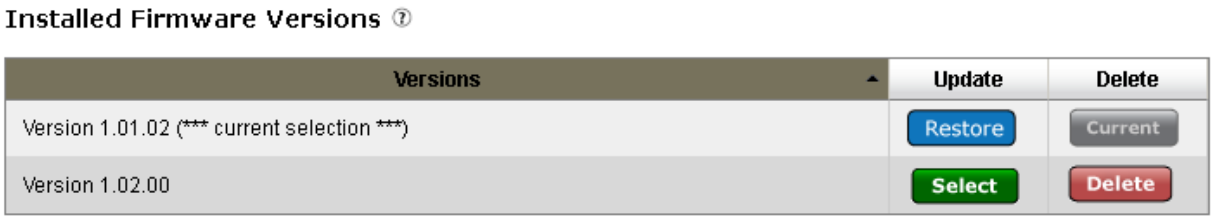
Click 

to install the firmware package.

You will see the following dialogue box while the firmware package is being extracted / installed:



After the firmware has been installed it will be listed in the “Installed Firmware Versions”. Click Select to finalize the upgrade.



You will be prompted “The system will reboot with the selected firmware version. You will lose connectivity for a few minutes” Click OK to finalize the upgrade.

Chapter 4 - How-To Guides

How to Complete a Manual Upgrade

You can upgrade your Adtec device's firmware via built-in web-based application, described in the Upgrade Tab section, or via a Telnet/FTP session, described in this article.
To update your Adtec device 's firmware via a Telnet session, perform the following:

Manual Upgrade Process

Step	Action
1	Obtain the desired firmware version file from www.adtecftp.com note*: Firmware releases are found in the Public Folders -> Firmware -> Release -> section of the website, in a folder marked with the product name. username: adtecftp password: adtecftp2231 note**: Windows Internet Explorer renames adtec firmware file extensions to .gz . When saving please add a t within the extension to read .tgz if IE has renamed your file.
2	Using your favorite FTP client to upload the firmware file to the device. If you are unfamiliar with FTP you may use a 'My Computer' window and type in the address bar, ftp://adtec:none@192.168.10.48 where 192.168.10.48 should be replaced with the IP Address of YOUR device. You may then drag and drop the firmware file into the hd0 folder.
3	Open a Telnet session and enter the IP address of the unit you are going to update. note*: If you are unfamiliar with telnet, open a command prompt window (windows: start -> run.., mac: macintosh hd -> applications -> utilities -> terminal) and type: telnet 192.168.10.48
4	Enter the username as ' adtec ' and the password as ' none '.
5	Enter the following in sequence: *.ECMD stop
6	*.SYSD vrn search - from the results, look for the pathname of recently uploaded firmware file
7	*.SYSD vrn install [pathname of the .tgz file] ex: *.SYSD version install /media/hd0/YUV2QAM-v1.00.12.nfcms.tgz

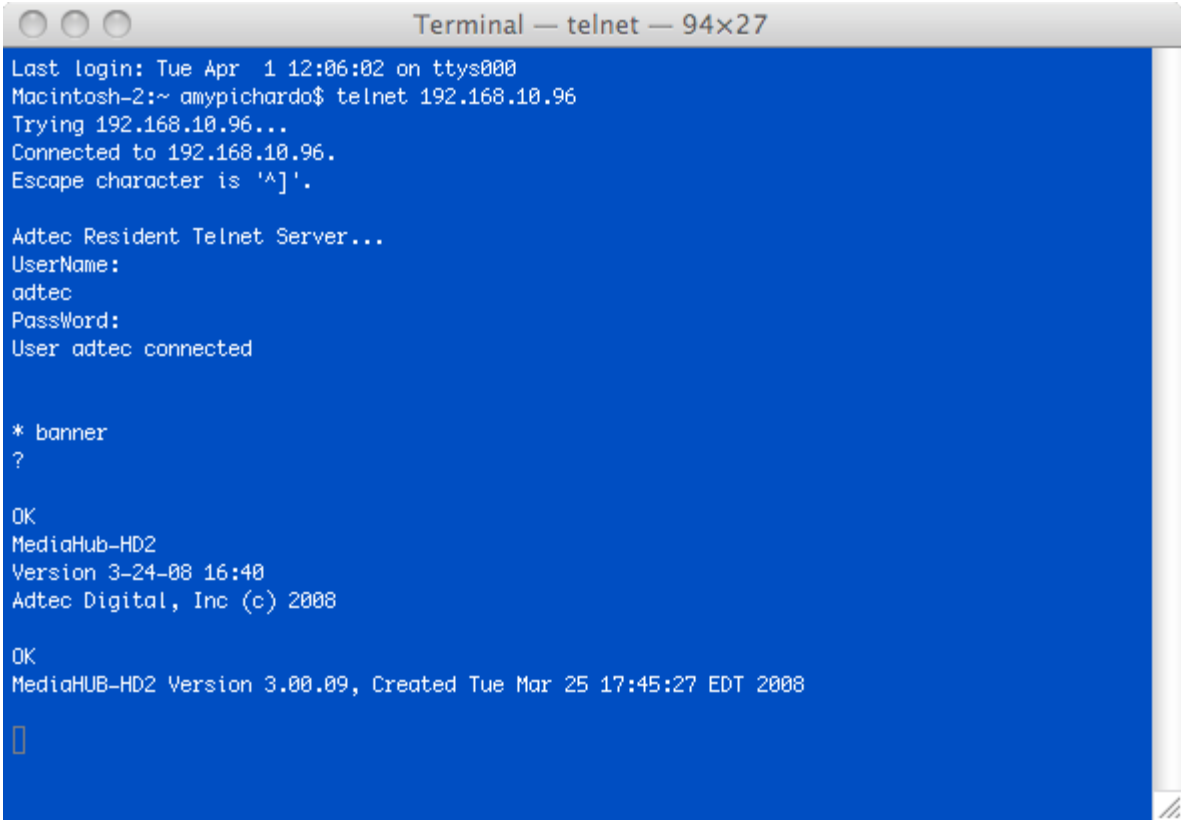
How to Connect via Telnet

* Using Telnet (standard 23 port)* To connect to your device using a terminal session, you will need to set the IP address of the unit. See earlier instructions on setting the IP via the front panel.

Using a terminal window, complete the following:

Step	Action
1	Type 'telnet x.x.x.x' in a terminal window, without quotes, where x.x.x.x is the IP address of the unit.
2	Press <Enter>.
3	When prompted for a username, enter adtec.
4	When prompted for a password, enter none.

Once you see "User 'adtec' connected", the session is open and you may issue API commands to the unit.



For the YUV2QAM device, there are specific commands for the modulator, encoder, and the unit's operating system. Each has a unique way of accepting commands. If using telnet is your preferred method of communication to your device, familiarize yourself with the API commands and their respective command handlers. For more information on this, point your browser to the IPA of your unit and look through the API notes that are described for the device.

How to Connect via FTP

FTP connections can be made to the adtec device using any ftp client.
Host: <ipa of the unit>
Default Username: adtec
Default Password: none
Port: 21
FTP is only useful for collecting logs from the device.

How to Use API Commands

The Adtec YUV2QAM device is unique in that it handles two physical encoders. To accommodate commands for controlling both encoders, you will need to specify which encoder you are working with for each command you issue.
Please make the following adjustments:

- Instead of using *.ECMD as noted the API descriptions, you will need to use.
    - *.ECMD0 to specify the first encoder.
    - *.ECMD1 to specify the second encoder.

Example: (*.ECMD0 TRA) will give you the transport status of the first encoder.

How TMR is Configured

TMR (Transport Stream Mux Rate) is controlled by the modulator's clock.

When in Annex B mode, the rates listed below will be configured and can not be changed.
Annex B QAM 256 the TMR is set to 38.810671 bps.
Annex B QAM 64 the TMR will be set to 26.970186 bps.

When in operating in Annex A mode, the symbol rates are adjustable and that in turn affects the configured TMR. The higher the symbol rate, the higher the data rate.

How Video Rates are Configured

Video rates can be configured manually or automatically. The factory default is to automatically set the video rate based on TMR. This option is referred to as VAF (Video Autofill). VAF determines what the TMR is. It reserves 3.5% for null packets. It detects the video input resolution for each channel. It automatically calculates the required headroom for audio pids. It sets the video bit rate for each channel accordingly to maximise available bandwidth.

SD encode bitrate = 1.00 to 15.00 Mbps
HD encode bit rate = 7.00 to 60.00 Mbps

Example:
TMR is set to 40 Mbps.
Channel 1 has a SD 720x480i source.
Channel 2 has a HD 1920x1080i source.

15.00 Mbps will be allocated to channel 1 because the source is standard definition. 19.10Mbps will be allocated to channel 2 (this is the available band with after VAFs calculation)

If VAF is set to off the video rate can be manually adjusted for each channel. If you configure a channel at a video rate that would cause a egress overflow the VAF logic will constrain the misconfiguration and reconfigure the video rate for both channels.

Example:
TMR is set to 40 Mbps.
Both channels have a HD1920x1080i source.
Both channels audio = 256 kbps
Video fill is set to off.

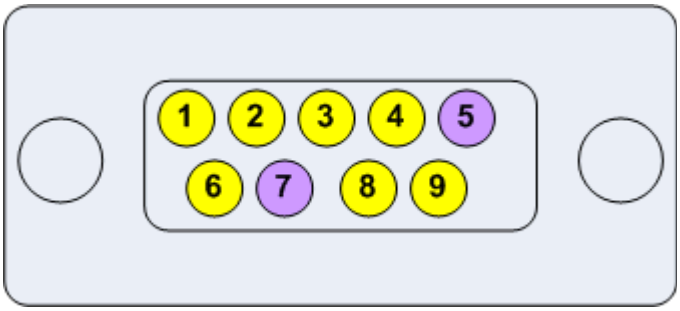
If both encoders are set to 19.10 Mbps and you want to reconfigure them to say 15.00 Mbps for channel 1 and 25.00 Mbps for channel 2. This would cause an egress overflow condition because you have not factored in the 3.5% reserve and bandwidth occupied by audio pids. Even though VAF is set to off it's logic will override the configuration request and constrain the video rates back down to 19.10 Mbps for both channels. To obtain the desired configuration. You would need to recalculate your rates. Then configure channel 1 to 15.00 Mbps then channel 2 to 23.00 Mbps.

How to enable EAS mode

EAS can be enabled from an automation system contact closure or from the webUI EAS tab.

To enable EAS in VIDEO+AUDIO via the 9 Pin GPIO, short pin 5 to pin 7.

EAS GPIO Connector Pinout



To enable EAS mode from the webUI. Click the EAS tab. Select the desired EAS mode, then click the large GO button. To disable EAS mode press the large STOP button.

How to configure Network EAS Triggering

By default the YUV2QAM is configured to send a trigger over the network to all other dual channel encoders (HDMI2QAM, YUV2QAM, or EN-20) to also enter EAS enabled state. This feature can be disabled by unchecking the box next to "Network EAS Triggering" then pressing the apply button on the EAS tab.

Manually Setting Teletext

As of firmware version 1.01.00, Teletext must be manually set on the Adtec YUV2QAM device.

Open a terminal window and enter <telnet xxx.xxx.xxx.xxx>, where xxx.xxx.xxx.xxx is the IP address of your YUV2QAM. Press <Enter>; when prompted, type <Adtec> for the user name, and <none> for the password.

You can now control the unit via API commands.

Processing Teletext

The command for enabling and configuring Teletext Processing is ECMD PTX [Mode] [Line_EN].

Modes - there are two modes that can be set as arguments when using the PTX command:

Mode	Argument Value
Off	0
Waveform	1

Line_EN: Which VBI lines the Teletext will ride on must be specified. The notation format for this is "0-0x1ffff", given in hexadecimal form with bitfields.

- Bit positions: specify as follows:
    - d0 = Line 6 (use 0 to disable, 1 to enable)
    - d1 = Line 7 (use 0 to disable, 1 to enable)
    - d2 through d16 corresponds to the remaining VBI lines, with d16 representing Line 22.

Setting Teletext PIDs

The command for Teletext PID settings is ECMD TPI [argument]. There are two arguments associated with this command: PIDx is the hexadecimal PID value. PIDd is the decimal PID value. Available ranges for these settings are:

PIDx Range	PIDd Range
0x0020 - 0x1FFE	32 - 8190

The full command string would read like this: ECMD TPI [PIDx] [PIDd].

This command is documented in the API Guide found on your device. To access this Guide, point a browser session to your device's IP address and this string: media/hd0/media. The API Guide can also be accessed from the "Help" tab of the browser-based UI interface.

Chapter 5 - Appendix

Appendix A - GNU General Public License

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Appendix B - QAM Channels and Frequencies

The bold-faced and shaded listings in this table represent the recommended operating range for this product.

The table reads vertically, from RF Channel 2 to Channel 135.

RF Channel	Center Freq.	RF Channel	Center Freq.	RF Channel	Center Freq.	RF Channel	Center Freq.	RF Channel	Center Freq.
2	57.0	29	255.0	61	447.0	93	639.0	130	831.0
3	63.0	30	261.0	62	453.0	94	645.0	131	837.0
4	69.0	31	267.0	63	459.0	100	651.0	132	843.0
5	79.0	32	273.0	64	465.0	101	657.0	133	849.0
6	85.0	33	279.0	65	471.0	102	663.0	134	855.0
95	93.0	34	285.0	66	477.0	103	669.0	135	861.0
96	99.0	35	291.0	67	483.0	104	675.0		
97	105.0	36	297.0	68	489.0	105	681.0		
98	111.0	37	303.0	69	495.0	106	687.0		
99	117.0	38	309.0	70	501.0	107	693.0		
14	123.0	39	315.0	71	507.0	108	699.0		
15	129.0	40	321.0	72	513.0	109	705.0		
16	135.0	41	327.0	73	519.0	110	711.0		
17	141.0	42	333.0	74	525.0	111	717.0		
18	147.0	43	339.0	75	531.0	112	723.0		
19	153.0	44	345.0	76	537.0	113	729.0		
20	159.0	45	351.0	77	543.0	114	735.0		
21	165.0	46	357.0	78	549.0	115	741.0		
22	171.0	47	363.0	79	555.0	116	747.0		
7	177.0	48	369.0	80	561.0	117	753.0		
8	183.0	49	357.0	81	567.0	118	759.0		
9	189.0	50	381.0	82	573.0	119	765.0		

10	195.0	51	387.0	83	579.0	120	771.0		
11	201.0	52	393.0	84	585.0	121	777.0		
12	207.0	53	399.0	85	591.0	122	783.0		
13	213.0	54	405.0	86	597.0	123	789.0		
23	219.0	55	411.0	87	603.0	124	795.0		
24	225.0	56	417.0	88	609.0	125	801.0		
25	231.0	57	423.0	89	615.0	126	807.0		
26	237.0	58	429.0	90	621.0	127	813.0		
27	243.0	59	435.0	91	627.0	128	819.0		
28	249.0	60	441.0	92	633.0	129	825.0		

Appendix C - Technical Specifications

Encoder Video Profiles
MPEG 2 SD Profile 1: Adaptive Field Frame (AFF) ISO13818-2 MP@ML
MPEG 2 SD Profile 2: AFF ISO13818-2 422P@ML
MPEG 2 HD Profile 2: ISO13818-2 MP@HL (1920 x 1080 or 1280 x 720)

Video Encoding Data Rates (Manual)
MPEG 2 MP@ML SD / 1 Mbs-15 Mbs - NTSC and PAL
MPEG 2 422P@ML SD / 1 Mbs-50 Mbs - NTSC and PAL
MPEG 2 MP@HL / 7 Mbs-59.5 Mbs

Video Encoding Data Rates (Automatic based on QAM Configuration)
720 P: 12-23 Mbs
1080i: 14-25 Mbs
NTSC/PAL: 15Mbs fixed
(HD rates are calculated based on video input resolution, video complexity and QAM target)

Video Input:
Connector: Connector: RCA 75 Ohm:
Interface: RCA YPbPr
SD/HD-YUV Auto frame rate and resolution detection
Connector: Connector: RCA 75 Ohm:
Interface: SD Composite (CVBS) Analog Composite NTSC and PAL

Audio Input:
Connector: Vertical single RCA jack
Interface: RCA unbalanced L+R audio
Supported Audio: (single audio pair per video encoder in two-channel mode)
Dolby Digital 2.0 (AC3) encode
MPEG1 Layer 2 encode
Dolby Digital 2.0 (AC3) passthrough
Dolby 5.1 passthrough

Analog Digital/Closed Captions/VBI VANC

Waveform or Analog (Composite):
Connector: RCA jack 75 Ohm Terminated Input
Closed Captions per CEA-608-C (2005), Closed Captions per DVS-157, Wide Screen Signaling (WSS) per ETSI EN300294 V1.4.1 (2003-04), Teletext per ETSI EN 300 472 V1.3.1 (2003-05)

Waveform Bridging and Conversion of Video User Data
Connector: BNC 75 Ohm Terminated Input
CEA 608 to CEA 708 up-conversion

Caption Bridging: CEA-608 via Composite.
Teletext Bridging: Waveform Teletext via Composite.
WSS Bridging: Waveform WSS via Composite.

Transport Stream User Data Carriage
SCTE 127-2007, ETSI EN 301 775, v1.2.1 (2003-05)

Emergency Alert System (EAS) Input:
EAS Video:
Connector: RCA jack 75Ohm
Interface: Terminated NTSC or PAL D1 Composite Input with loop

EAS Audio:
Connector: Vertical single RCA jack
Interface: mono audio channel with loop

EAS Triggering Interface:
GPI
Web UI
XCP "Network EAS Triggering"

Transport Outputs:
All outputs operate concurrently.

ASI
Connector: BNC x2
ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only).
Physical interface 72 Mbit/s.

Transport Over IP (TSoIP)
Connector: RJ45 x1
ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only).
UDP or RTP encapsulated routes with SMPTE 2022 (COP3 FEC). MPTS or SPTS user definable.

QAM Modulator
Connector: F-style RF female jack
Frequency: 50 to 862 Mhz
QAM Modulation Schemes supported:
- Annex A (8 Mhz)
- Annex B (6 Mhz)

QAM constellations:
- Annex A: 64, 256
- Annex B: 64, 256

Main Power: 45dBmV to 56dBmV, in 1 dBmV increments
MER: 38.0 dB minimum (average).

IF Output Connector: F-style RF female/jack Frequency: Selectable 44 MHz (USA) and 36.125MHz (Europe)

Physical:
Operating Temp.: 0 to +50 °C/+32 to +122°F
Power Supply (nominal): 100 - 240 VAC
Power Consumption (nominal): 33.6 W (120V @ 280mA)
Weight: 6 lbs
Measurements: (H X W X D) 1.73” X 19” X 13.32”

Management::
Front Panel Controls
Browser-based Web Interface
SNMP (limited support)