QUICK START GUIDE
MediaStar 796 IP Multi-Mux Installation Guide

The 796 IP Multi-Mux is an IP network gateway device that provides a secure interface between an IPTV service provider's IP delivery network and a customer's internal network.

TV services delivered to the customer's premises as unencrypted IP MPEG transport streams are AES encrypted by the 796, before being securely passed onto the customer's IP network. The MediaStar system then manages the distribution of the encrypted IPTV services to displays and PCs throughout the customer's estate.

The IPTV service provider typically provides a bouquet of TV services to the customers premises as MPEG2 transport streams via a fiber or cat5 network connection. This feed will go into a standard network switch (via an SFP adapter), onto a restricted access Input VLAN.

The same switch will also be configured with an Output VLAN, which can pass the encrypted streams on to the rest of the customer's network. The 796 unit will be plugged into a single network port that has been configured as a Trunked port with access to both the Input and Output VLANs.

The 796 will take in the IPTV streams from the service provider, encrypt them, re-address them, and then transmit them onto the

What's in the box:
• 796 IP Multi-Mux Blade
• CAT5 Patch cable

Output VLAN. The streams are then distributed across the customer's LAN to displays with MediaStar 782 media players, or to PCs running MediaStar Portal software, which will decrypt and display the live TV pictures.

The 796 unit is configured via webpage configuration menus. These menus can be password protected and access from the Service Providers Input VLAN can be firewalled off if required. The control of stream access can reside exclusively with the Service Provider or Customer if required.

The 796 has a routing table which is used to specify the IP address of incoming streams on the input VLAN and the IP multicast stream addresses that will be used on the Output VLAN. The AES encryption key can be specified in the configuration menus, or it can be set by the Media Manager software.

The incoming IPTV streams from the 796 will be shown in the MediaStar software as 'standard' live streaming media icons, which can be simply 'dragged' onto display or PC/MAC portal page icons to deploy the content.

Installation

This IP Multi-Mux unit should only be used in a MediaStar 770 rack or a 769 Single 'Blade' chassis that has been fully installed in accordance with its safety instructions. There are no user serviceable parts within this module. Refer all servicing to qualified service personnel.

The 796 IP Multi-Mux 'Blade' may be installed in a 769 chassis or 770 rack with the power on or off. If the 770 rack is to be powered down to install a new module, please remember that all video/audio services being provided by the equipment in that rack will be lost while it is powered off. Electrical static discharge precautions should be taken when handling the 'Blade'.

To install the 796 'Blade' in a 770 rack or a 769 single 'Blade' chassis, do the following:

1. Remove the existing front panel blanking plate(s) on the 770 rack. This is done by unscrewing the finger-screw fasteners. Retain this blanking plate in case the Multi-Mux module is removed from the rack in the future.

2. Carefully align the top and bottom edges of the 'Blade's printed circuit board (PCB) into the plastic rack slides, and gently push it in. As the module reaches the back of the 770 rack, the plastic aperture cover on the rear of the rack will be pushed off by the 'Blade's HDMI connector. Collect the discarded aperture cover and dispose of it correctly. If the rack or chassis is powered up, the new module will power up as it is pushed in. If the rack has been powered down, repower it now. The status LED on the front of the Multi-Mux will show orange, then flashing orange as it boots. After a few seconds, the LCD panel will show the boot up progress of the unit, then its operational status.

3. Tighten the finger screw fasteners to hold the module in the rack/chassis.

4. Set the unit's IP address, using the front panel display and buttons as described below. Only use IP address details that have been supplied by your network administrator. Each MediaStar 'Blade' device is preconfigured with a non-VLAN static IP address of 172.21.51.210. This will need to be re-configured, so it is not in conflict with other MediaStar equipment. Use the front panel LCD and push buttons to set the correct IP address settings (described below).

Please note, the IP Multi-Mux has three separate IP addresses. The first is a non-VLAN IP address, i.e., an IP address which can be reached by non-VLAN tagged IP traffic on a 'normal' network access port. Start the configuration of the unit using this IP address. There is also an Input VLAN IP address and an Output VLAN IP address. These are used to communicate with the unit via the Input (service provider facing) and Output (customer facing) VLANS. Each IP address must be on a different subnet.

Press the front panel UP or DOWN buttons to move through the LCD menu options. Press the OK button to select a menu or confirm a change. Press the UP and DOWN buttons together to move back up a menu level (or allow it to time-out). Pressing the UP, DOWN and OK buttons for 5 seconds will reset the Multi-Mux unit.

Press the DOWN BUTTON to move to the IP Settings menu and press OK to enter the menu. Press DOWN then OK to select the static IP address settings. Press OK to edit the current static IP address. Use the UP or DOWN buttons to select the appropriate digit and press OK to set it. The next digit can then be edited in the same way. It is not possible to move back to a previous digit. Press UP and DOWN together to abort the input if necessary. Once the last digit is entered, the IP address is checked and then applied. The IP netmask, gateway and DNS server can be set in the same way.

If a DHCP allocated IP address is required, navigate the menus to the IP Settings – DHCP menu and press OK to select DHCP. The display will show the allocated IP address details once a lease has been obtained. If required, the MAC address of the unit can be found under the Unit Details/ MAC Address menu, or on the label on the bottom face of the unit.

5. Plug the IP Multi-Mux into an access (non-VLAN) network port using the CAT5 patch cable supplied.

It will auto-negotiate up to a 1000 Mbps link with the network switch.

6. Connect to the Multi-Mux's LAN-Caster's configuration web pages using a PC/MAC and Web browser software (e.g. Edge, Chrome or Firefox), by entering the Multi-Mux's IP address into the browser's address bar. Click through any warnings and the Multi-Mux's specification page will then be shown.

7. On the Network Setup page configure the Input and Output VLAN IDs and the IP addresses used to access the Multi-Mux's configuration web pages from each VLAN. The Non-VLAN Management interface will show the IP address of the unit you setup from the front panel earlier, and you are currently using to configure this unit.

Set the number of the Input VLAN ID (service provider side) and the Output VLAN ID (customer LAN side). These will be the same values that your network switch VLANs are configured with.

NOTE: Specifying VLAN ID number 0 is a special value that means the Multi-Mux will access the input or output streams from a 'standard' un-trunked network port. Using VLAN ID 1 is not recommended.

The unit requires an IP address to be set on the Input VLAN and the Output VLAN to access the network streams and provide access to the configuration web pages. Enter the Multi-Mux's IP address details in the Stream Input VLAN interface and Stream Output VLAN interface sections. The IP addresses of the Multi-Mux on the non-trunked and the Input and Output VLANS must each be on a separate IP subnet.

To completely isolate the Multi-Mux unit from all Service Provider side (Input VLAN) network communications (except the incoming streams), check the Input VLAN Firewall checkbox.

A password can be applied (see below) to the web page configuration menus. The password must then be entered before any settings pages can be accessed. The Multi-Mux's Status page can be accessed without a password, so information about the operation of the unit is always accessible.

The Web mode control allows the user to determine whether HTTP and HTTPS, or only HTTPS only can be used to access the configuration web pages. The MM setting (default) allows this mode to be set by the Media Manager software, so it is consistent with the rest of the system.

NOTE: The Multi-Mux should now be connected to a trunked network port with access to both the Input and Output VLANs. Further browser communications with the unit will now use the IP address configured for either the Input or Output VLAN, depending upon which VLAN your computer is connected to.

8. Click on the Date/Time page link on the left-hand side panel and set up an NTP time server that will be accessible when the unit is in use. The time is used to time-stamp event messages in the Event Log, which will assist debugging if required. If no local time server is available, the internet based pool.ntp.org server is recommended. Ensure the Multi-Mux's network settings have been configured to allow it access to the internet to access this time server.

9. Click on the Routing page link on the left-hand side panel to configure the IP stream settings. Up to 20 incoming streams can be configured on each Multi-Mux blade. If more incoming streams are required, then multiple Multi-Mux units can be used.

For each incoming stream:
a) Enter the name of the incoming stream in the field adjacent to the route number. This will show as the name of the media icon for this stream in Media Manager.

b) Click on the Enable checkbox to enable the processing of the stream specified in the route. If this is unchecked, the incoming stream specified will not be processed.

c) In the Source field, specify the multicast IP address and port number of the incoming stream on the Input VLAN. The UDP multicast address must be in the range of 224.0.0.0 to 239.255.255.255. The service provider will provide this information.

d) Click on the 🟧 icon to specify the IP address of the device sending the UDP multicast stream. Only properly formatted MPEG2-TS data packets that are tagged as being sent from a device with this IP address will be processed. This is a security measure to ensure no 'foreign' data packets are passed onto the Output VLAN.

NOTE: If the incoming data rate for the route is 0, then check this parameter has been set correctly!

e) In the Destination field, specify the UDP multicast address and port number that this stream will use on the Output VLAN. The corporate LAN administrator should provide this information, as this stream has to be configured for successful routing around the corporate LAN.

f) Enter the destination stream Time-To-Live (TTL) and Differentiated Services Code Point (DSCP) parameters. The TTL parameter is the number of router 'hops' the output stream data packets can make before they are 'destroyed'. If streams don't reach all the output devices or PCs on the corporate network, then this parameter may need to be increased. The DSCP parameter 'tags' the stream data packets so the corporate network switches can be configured to pass these packets before lower priority traffic.

g) Press the Apply button to activate the route. Repeat this routing setup process for the required number of IP streams.

When a route has been activated, the route details will be checked, then the Multi-Mux will use IGMP commands on the Input VLAN to request the multicast IPTV stream. The service provider equipment will then stream the IPTV service to the Multi-Mux unit. The Multi-Mux will then scan the incoming stream for information. The status of the route will be shown in the routing table just below the Source field. If there are errors on a route, a description will be shown here. In normal operation, the incoming stream data rate from the Input VLAN will be shown, with the Outgoing VLAN data rate for the same stream below it. These data rates will normally be the same. The outgoing stream will show AES encryption is active. The Service name field in the route shows the tagged name of the incoming stream (if specified by the service provider).

If the service provider makes a change to the PID identifiers in the incoming multicast streams, this could cause the incoming streams to stop being processed. The user should press the Scan All button at the top of the routing table to get the Multi-Mux to re-check all the streams for new information (PIDs, channel identifiers etc.). All streams will be temporarily disrupted during this scanning process.

10. If required, set an appropriate AES encryption key on the AES Setup page.

NOTE: It is highly recommended that you initially leave the AES encryption key unset. This means a default key (known to all MediaStar hardware and software players) will be used for stream encryption/decryption. If an encryption/decryption key update is subsequently required, then it is recommended that this is done through the Media Manager software which will automatically load new encryption/decryption keys throughout the entire MediaStar system.

11. Use the Set Password menu to protect access to the Multi-Mux's configuration web pages if required. To set a password, you must be using HTTPS to communicate with the unit. This is to ensure the password you are setting is encrypted before being passed across the network.

A password can consist of up to 1000 characters in length and can contain letters, digits, spaces or `!"$%^&*()_-+={}[]:;'@~#<>?,./|\. If a non-numeric password, or a password greater than 14 characters is used, then the password cannot be entered via the LCD front panel. Under these circumstances, settings can still be viewed on the front panel, but changes must be made via the web interface. Setting a blank password will clear the current password.

To set a new password, check the Change password checkbox and enter the current and new passwords. If a password is not currently set, leave the current password field blank. If required, you can also set a time period (number of days) for the password to expire. When the web configuration menus are accessed after that period, the user will be prompted to enter a new password.

Browser based Configuration Menus

The Multi-Mux's web page configuration menus allow the full range of operational parameters to be set. When using the web pages, full contextual help is provided on the right side of the screen. When changes have been made, press the APPLY button at the bottom of the page to ensure these take effect.

Specification - The specification page includes details of the capabilities of the product. Please note that this unit may not have all the options mentioned. The Status page shows all the optional features currently enabled.

Status - Shows the status of the IP Multi-Mux, including the Part number, Serial Number, Unit name (used as a DHCP name identifier), CPU Load, Memory Load, Network Load, IP Address details, Operating and Scanning status, RS232 status, PSU status (when fitted into a suitable equipped 770 rack/769 chassis), network link status, (internal) Temperature, Software versions.

Routing – This is where all the IP routing and stream configuration is specified.

AES Setup – The AES encryption key can be set manually from this menu. However, if this is done, it is up to the user to distribute the same key to all receiving devices and software players. It is highly recommended to use Media Manager to set the site-wide AES encryption key, as it will automatically quickly distribute the new key to all hardware and software receivers in the system.

Date/Time – Set up the NTP time server here (pool.ntp.org recommended).

RS232 Port – Configure the port settings for the IP to RS232 link or for the SIPI command interface.

Network Setup - Allows specification of the Network Connection; VLANS, Static or DHCP addressing, device Hostname, IP Address, Subnet Mask, and Gateway settings. Confirm these with the network administrator before configuring.

Update Locations – This is the URL of the MediaStar http server and folder that the Multi-Mux will look at for software updates and configuration files. It will normally automatically be set by the Media Manager server. The Multi-Mux will only accept new software that has been digitally signed by MediaStar Systems.

Enablement Code – Enter enablement codes here to reconfigure or expand the capabilities of your unit. Details can be obtained from your reseller or MediaStar Systems. Reset checkboxes are also located here.

Set Password - A password may be set to prevent the unauthorised modification of the unit's configuration. See details in the installation instructions above. If the password gets lost, contact MediaStar for assistance, quoting the serial number of the unit affected.

SNMP – Configure to send SNMP 'event' warning messages, and set-up the servers to send the messages to.

Email Logs – Event logs can be periodically emailed to a recipient. Specify the email server and recipient email address here.

Event Log – This shows a full list of the 'events' that the Multi-Mux has experienced. These include notifications such as loss of streams. Significant messages will also produce an SNMP traps when enabled.

Locator LEDs - Allows the front and rear panel status LEDs to be flashed RED/GREEN from the front panel or web page to help identify the physical Multi-Mux unit in a rack.

Technical Specification

PHYSICAL	129 x 41 x 200 mm, 5" x 1.6" x 7.9", occupies 1 770 Rack slot or a 769 Chassis, 0.6 Kg, 1.3 Lbs.
ENVIRONMENTAL	0°C to 40°C, 32°F - 104°F (enclosure ambient). Internal temperature monitoring via web page.
POWER	17 W (from 770 rack or 769 single 'Blade' chassis)
LAN	RJ45 802.3 100/1000 Base-T Auto MDIX. Static or DHCP IP Addresses. VLAN trunking. TTL and DSCP QoS stream tagging.
NETWORK PROTOCOLS	UDP, TCP, ARP, DHCP, ICMP, IGMP V2/V3, HTTP, Telnet, SNMP, SMTP, DSCP
INPUT STREAMS	Unicast or single-source single program multicast UDP transport streams.
OUTPUT STREAMS	Multiple multicast UDP transport streams with AES encryption.
STREAM HANDLING CAPACITY	20 incoming and 20 outgoing MPEG2-TS multicast streams.
USB	USB 3.0 host port used for keyboard/Mouse, software upgrade via memory stick.
HDMI Output Port	Reserved for future use.
RS232 Port	Rx, Tx, CTS, RTS up to 11,5200 Baud Configured for SIPI external configuration/control OR IP to RS232 bidirectional pass through for external device control.
FRONT PANEL	LCD Display and 3 push buttons for local configuration.
WEB PAGE CONFIGURATION	Configuration web pages for easy setup.
EVENT MONITORING	Key operational warnings reported via SNMP traps sent to third party SNMP manager (MIB available on request). Automatic e-mail of Event log files via external SMTP server.
SOFTWARE	Fully upgradable with ONLY protected MediaStar software from an HTTP server or local USB memory key.
APPROVALS	FCC, CE, RCM, CB, TUV Approved as part of 770 rack or 769 single 'Blade' chassis.

Declaration of Conformity

CE

Cabletime Limited (trading as MediaStar Systems) declares that the products listed below, when installed and operated as described here, conform to the requirements of the directives shown:

Product name: MediaStar IP Multi-Mux
Product part numbers: 796

Directives:

2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS2

The standards applied are:

EN55032:2012/AC 2013	Electromagnetic compatibility of multimedia equipment – Emissions requirements.
EN55024:2010 (including corrigendum June 2011)	Information Technology equipment – Immunity characteristics.
EN61000-3-2:2014	Limits for harmonic current emissions.
EN61000-3-3:2013	Limitation of Voltage changes, voltage fluctuation and flicker
IEC 60950-1:2005 + A1:2009 + A2:2013	Information Technology Equipment. Safety Requirements.
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 UL 60950-1:2007/R:2014-10 CAN/CSA C22.2 No. 60950-1:2007 /A2:2014-10	
IEC 62368-1:2014	Audio/video, information and communication technology equipment Safety Requirements.
EN 62368-1:2014 UL 62368-1/2014 CSA/CAN C22.2 No. 62368-1-14	

CB Certification   Applicable to all CB scheme subscribing territories.

I hereby declare that the products listed here conform to the directives shown above when installed and used according to their respective manuals.

Kgwatts

Keith Watts
Technical Director

September 2021

United States of America

Cabletime Limited (trading as MediaStar Systems) declares 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 Subpart B (15.107, 15.109). 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 communications. 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 device complies with part 15 of the FCC Rules.

Operation is subject to the following conditions:

• This device may not cause harmful interference, and

• This device must accept any interference received, including interference that may cause undesired operation.

Correct Disposal of this Product

This marking on the product, accessories or literature, indicates that the product and its electronic accessories should not be disposed of with other household waste at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

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