



TVU networks

TVU One™

Set Up and Operating Guide

Model - TM1000 v2

(TVU Version 6.0)

Version 0.7

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FCC/CE Compliance

Federal Communications Commission (FCC) Regulation of ENG Mobile Systems

The FCC provides specific policies and procedures related to radio frequency (RF) emissions in mobile and portable devices. The FCC outlines test requirements and specific test procedures based on the type of device. These test requirements and procedures can also cover Specific Absorption Rates (SAR) for RF.

The TVU Transmitter device has always conformed to all applicable FCC regulations covering mobile systems for electronic newsgathering. All required tests for the TVUPack device as outlined in the regulations were performed by a third party testing lab, which issued a certificate of compliance for the TVUPack. The certificate is applicable to both the FCC and CE. Additionally, the data modems used in TVUPack are commercially available off-the-shelf brands and have been FCC and carrier certified.

Supporting documentation demonstrating TVU’s compliance with the applicable FCC regulations is available upon request. Please contact us at +1.650.969.6732 for assistance and questions regarding approved modem cards for use with TVUPack.

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INTRODUCTION

TVU One represents a tremendous leap forward in mobile newsgathering, delivering the same industry-leading transmission resiliency and performance, video picture quality and sub-second latency of a full-size backpack transmitter, but in a more than 90% smaller and ultra lightweight form factor. With TVU One, broadcasters can fully leverage the versatility that a small, lightweight IP video transmitter brings in the field without sacrificing performance, feature functionality or picture quality. To that end, read and follow the simple instructions contained in this guide and you'll be broadcasting in no time!

ABOUT THIS GUIDE

This operational guide provides instruction for setting up the unit and a brief overview of the available components for this transmitter: TVU One TM1000 v2 that's running TVU Version 6.0.

Before you begin setting up the TVU Transmitter, we suggest that you identify the devices you intend to use with the unit including: cameras, cables, power sources, modems and unit accessories. Simply follow the steps contained in this guide to setup your new TVU.

TVU ONE UNIT AND BATTERY SAFETY AND AIRLINE TRAVEL GUIDELINES

CAUTION

- TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL
- To reduce the risk of fire or electric shock and annoying interference, use the recommended accessories only
- This apparatus can be operated at a voltage in the range of 12 - 19 V DC. ONLY USE A TVU NETWORKS SUPPLIED AC ADAPTER WITH THIS UNIT. Important information regarding the supplied AC adapter:
 - The supplied AC adapter is designed to be used with an input voltage in the range of 100-240 V AC
 - Voltages other than 120 V are not intended for U.S.A. and Canada.
 - Operation at a voltage other than 120 V
 - AC may require the use of a different AC plug. Please contact either a local or foreign TVU Networks authorized service center for assistance in selecting an alternate AC plug
- A coin type battery is installed inside of the unit. Do not store the unit in temperatures over 60 °C (140 °F)

- Do not leave the unit in an automobile exposed to direct sunlight for a long period of time with doors and windows closed
- Danger of explosion or fire if battery is mistreated
- Do not leave the battery in an automobile exposed to direct sunlight for a long period of time with doors and windows closed
- Do not disassemble the battery or dispose of it in fire
- Do not store the battery in temperatures over 60°C (140°F)
- Use specified charger
- Replace battery only with same or specified type
- Excessive sound pressure from earphones and headphones can cause hearing loss
- Do not leave the unit in direct contact with the skin for long periods of time when in use. Low temperature burn injuries may be suffered if the high temperature parts of this unit are in direct contact with the skin for long periods of time
- The mains plug of the power supply cord shall remain readily operable
The AC receptacle (mains socket outlet) shall be installed near the equipment and shall be easily accessible
- To completely disconnect this equipment from the AC mains, disconnect the mains plug from the AC receptacle
- In order to maintain adequate ventilation, do not install or place this unit in a bookcase, built-in cabinet or any other confined space. To prevent risk of electric shock or fire hazard due to overheating, ensure that curtains and any other materials do not obstruct the ventilation

WARNING

- To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture
- To reduce the risk of fire or electric shock, keep this equipment away from all liquids. Use and store only in locations which are not exposed to the risk of dripping or splashing liquids, and do not place any liquid containers on top of the equipment

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions
5. Do not use this apparatus near water
6. Clean only with dry cloth
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus
11. Only use attachments/accessories specified by the manufacturer
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over
13. Unplug this apparatus during lightning storms or when unused for long periods of time
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped

AC Adapter

The rating plate is on the underside of the AC Adapter.

Disconnect the AC mains plug from the AC mains socket when not in use.

Use Only TVU Networks Supplied or Authorized Batteries/Chargers

This device is designed to be used only with TVU Networks supplied batteries. Use only TVU Networks supplied devices/chargers to charge the supplied batteries. To see a list of qualified external batteries to use with this device, please contact TVU Networks. Use of non-qualified batteries with this system may cause damage to the unit or possibly fire.

FAA Regulations

Rechargeable and non-rechargeable lithium batteries, cell phone batteries, laptop batteries, external batteries, portable rechargers, spare (uninstalled) lithium ion and lithium metal batteries must be carried in **carry-on baggage only**. When a carry-on bag is checked at the gate or at planeside, all spare lithium batteries must be removed from the bag and kept with the passenger in the aircraft cabin. The battery terminals must be protected from short circuit.

This covers spare lithium metal and spare rechargeable lithium ion batteries for personal electronics such as cameras, cell phones, laptop computers, tablets, watches, calculators, etc. This also includes external battery chargers (portable rechargers) containing a lithium ion battery.

Size limits

Lithium metal (non-rechargeable) batteries are limited to 2 grams of lithium per battery. Lithium ion (rechargeable) batteries are limited to a rating of 100 watt hours (Wh) per battery. These limits allow for nearly all types of lithium batteries used by the average person in their electronic devices. With airline approval, passengers may also carry up to two spare larger lithium ion batteries (101-160 watt hours). This size covers the larger after-market extended-life laptop computer batteries and some larger batteries used in professional audio/visual equipment.

Quantity limits

None for most batteries – but batteries must be for use by the passenger. Batteries carried for further sale or distribution (vendor samples, etc.) are prohibited. There is a limit of two spare batteries per person for the larger lithium ion batteries described above (101-160 watt hours per battery).

Batteries must be protected from damage.

Battery terminals (usually the ends) must be protected from short circuit (i.e., the terminals must not come in contact with other metal). Methods include: leaving the batteries in their retail packaging, covering battery terminals with tape, using a battery case, using a battery sleeve in a camera bag, or putting them snugly in a plastic bag or protective pouch.

See the regulation: [49 CFR 175.10\(a\)\(18\)](#)

Tip: Newer lithium ion batteries have the watt hour (Wh) rating marked on them. To calculate watt hours, multiply the battery voltage by the Amp hours (Ah). To learn more about lithium batteries, their restrictions, and how to tell what size they are, go to <http://SafeTravel.dot.gov>

Refer to the link below for International Air Transport Association (IATA) regulations and information regarding airline travel with lithium batteries:

http://www.iata.org/whatwedo/cargo/dgr/Documents/LithiumBattery_PassengerFlyer.jpg

Additional Airline Travel Information

When traveling, the TM1000 v2's onboard battery should be removed from the unit to prevent accidental power on. The onboard battery terminals should be protected to prevent accidental short circuit. Protect the onboard battery terminals by placing them in a plastic bag or covering the battery terminals with electrical tape.

TVU onboard batteries should always be transported as carry-on baggage. It should never be transported in the cargo hold.

TVU ONE TRANSMITTER COMPONENTS

The TVU One TM1000 v2 transmitter in Figure 1 is comprised of the encoder, internal battery, and embedded modems.



Figure 1 TVU One TM1000 v2

Standard components for the TVU Transmitter include:

- ✓ TVU One with H.265 (Includes encoder, internal battery and embedded modems)
- ✓ Power supply (AC Adaptor)
- ✓ 5GHz Wi-Fi
- ✓ 5GHz Hotspot

Optional components for the TVU One include:

- SIM cards
- AC car adapter
- Universal adaptor
- 3 in 1 antenna
- Unmanned plane
- External modems

Note: If any component is missing, please contact TVU Networks Customer Support at support@tvunetworks.com or +1.650.440.4812.

TVU One TM1000 v2 Transmitter Operational Indicators

This section describes each component of the TVU One TM1000 v2 system. Weighing just 2.2 lbs/1.0 kg, the TM1000 v2 transmitter fits easily in the average person's hand. TM1000 v2 comes with a multipurpose carrying case for easy use in the field. The unit is an all-in-one solution that includes an internal battery as well as embedded LTE modems, H.265 encoder, Wi-Fi and hotspot. Additionally, any Wi-Fi ready wireless camera can connect wirelessly to TM1000 v2 for untethered HD quality live transmission.

TVU One TM1000 v2 Transmitter

The transmitter is the central component of the TVU One system. The transmitter handles video capturing, video encoding and transmission, modem management and dialing, and status/monitoring of the system.

LCD Display and Power Indicator

Simply press the power button **(A)** to turn on the TVU One transmitter. The button turns green when transmitter is powered on (Figure 2). The LCD screen **(B)** displays configuration and status information for connected modems as well as video input and transmission. When a video input is connected, an input preview is displayed on the LCD.



Figure 2 TM1000 v2 Front panel LCD display and power button

The LCD screen is a touch screen and users can control various aspects of the transmission from the LCD preview screen including bitrate and latency. For more information regarding the functions of the LCD screen, see pg. 11.

Encoder Side Panel View

Figure 3 shows the input / output connections on the TM1000 v2 transmitter and each input / out is described in Table 1.

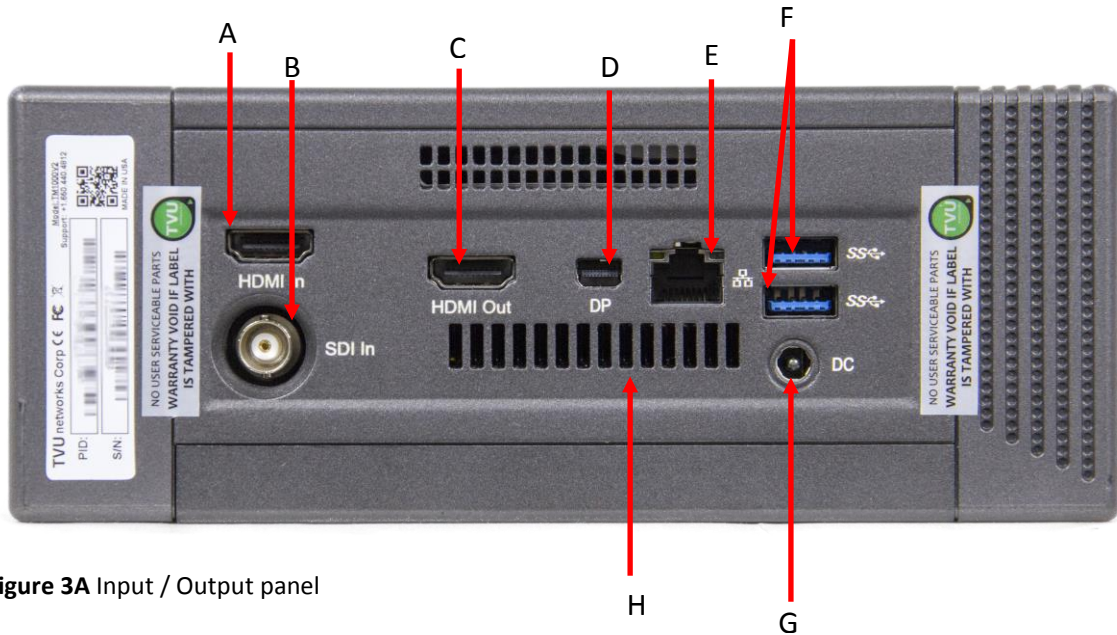


Figure 3A Input / Output panel

Label	Connection	TVU One Input / Output Description
A	HDMI IN	Connect valid HDMI input (PAL, NTSC, 720p or 1080i)
B	SDI IN	Connect Valid SDI input (PAL, NTSC, 720p or 1080i)
C	HDMI Out	Displays preview screen on a separate monitor
D	Display Port Out	Displays preview screen on a separate monitor
E	Ethernet input	LAN connection
F	USB Slots (Spare)	Spare USB slot for connection of USB Dongle (for file upload or system update), USB keyboard, etc.
G	DC Input	Custom DC Power Input
H	Vent	Do not block

Table 1

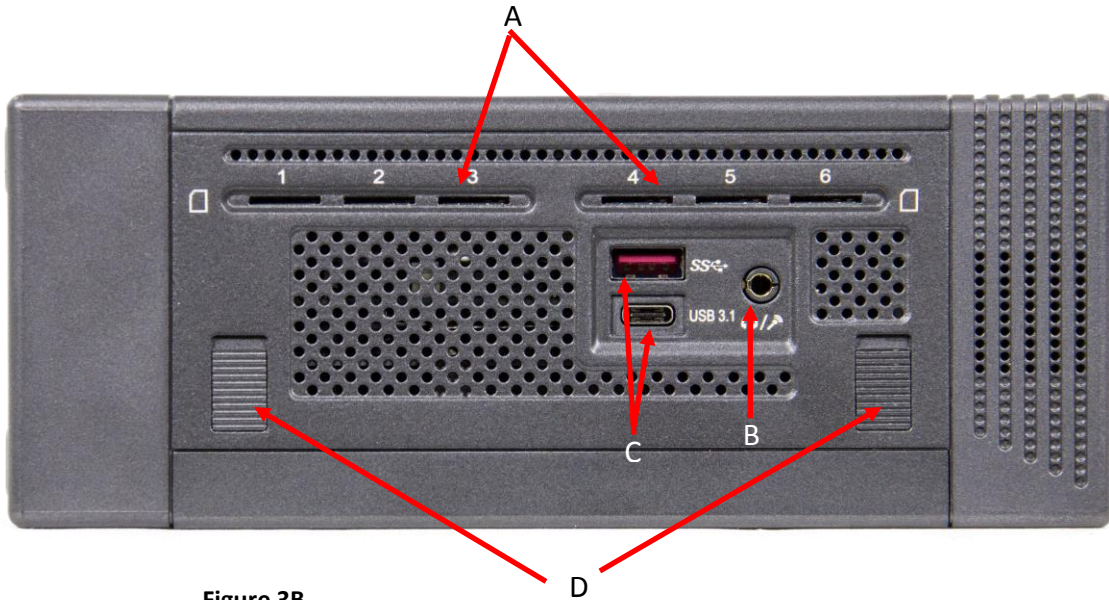


Figure 3B

Label	Connection	TVU One Input / Output Description
A	Embedded Modems	SIM card slots 1-6
B	VOIP output	Audio component – 3.5 mm mini audio output jack
C	USB Slots (Spare)	Spare USB slots (including a Type-C slot) for connection of USB Dongle (for file upload or system update), USB keyboard, etc
D	Battery Release	Internal battery release latches

Table 2

TVU ONE TM1000 v2 SETUP TIPS

Internal Battery

The TVU One TM1000 v2 internal battery is designed to fit within the transmitter unit, but it can also be easily removed. Complete battery power management for the TVU One system is available on the LCD touch screen as well as on the Receiver interface.

Detaching Internal Battery From Encoder

Take the following steps to detach the internal battery from the transmitter:

1. On the side of the TM1000 v2 that is opposite the LCD touch screen, users will find two spring-loaded latches **(A)**(Figure 4). Push up on the latches to release the battery from the back of the TM1000 v2.



Figure 4 Battery latch on encoder

A

Charging the Internal Battery

To charge the internal battery in TVU One, simply connect the provided AC power adapter to the DC input on the unit and plug in the other end of the adapter into an electrical outlet. The battery will then begin to charge. Please note that the battery will charge faster when TVU One is turned off.

Inserting SIM Cards

The TVU One SIM card slots are designed to hold up to six Mini SIM (2FF) cards in six embedded modems. Take the following steps to insert a SIM card into the embedded modem slots on the transmitter:

1. The SIM card slots are spring loaded. Simply push in the desired SIM card into the appropriate slot until it clicks into place.
2. To remove a SIM card, simple push the SIM card in until it clicks and it will pop back out.

TVU One Bag Configuration

The TVU One is designed to be used as a standalone transmitter, or in a bag configuration. The TVU One bag can be worn as a belt pack. Figure 5 is the front of the bag.



Figure 5

The multipurpose carrying case comfortably holds the TVU One while allowing users to easily access the power button, connections and SIM card slots. The touchscreen LCD interface on the TVU One can also be used while the unit is in the bag. Additionally, the mesh sections allow for the essential ventilation of the TVU One unit, so it will not over-heat in the carrying case.

It has the added feature of an extra pouch on the bottom of the bag that holds one external V-Mount or G-Mount battery. The V-Mount or G-Mount battery plate is accessible in the bottom pouch of the bag. The external battery can provide additional power to the TVU One.

The straps on this bag can be configured in a handful of ways, so that users can wear the TVU One case however they feel is most comfortable for them.

TVU ONE TM1000 v2 LCD TOUCH SCREEN

The TVU One TM1000 v2 has an LCD touch screen interface that allows for transmission control while out in the field. When the TVU One is first turned on, the user will see the status display screen (Figure 6).

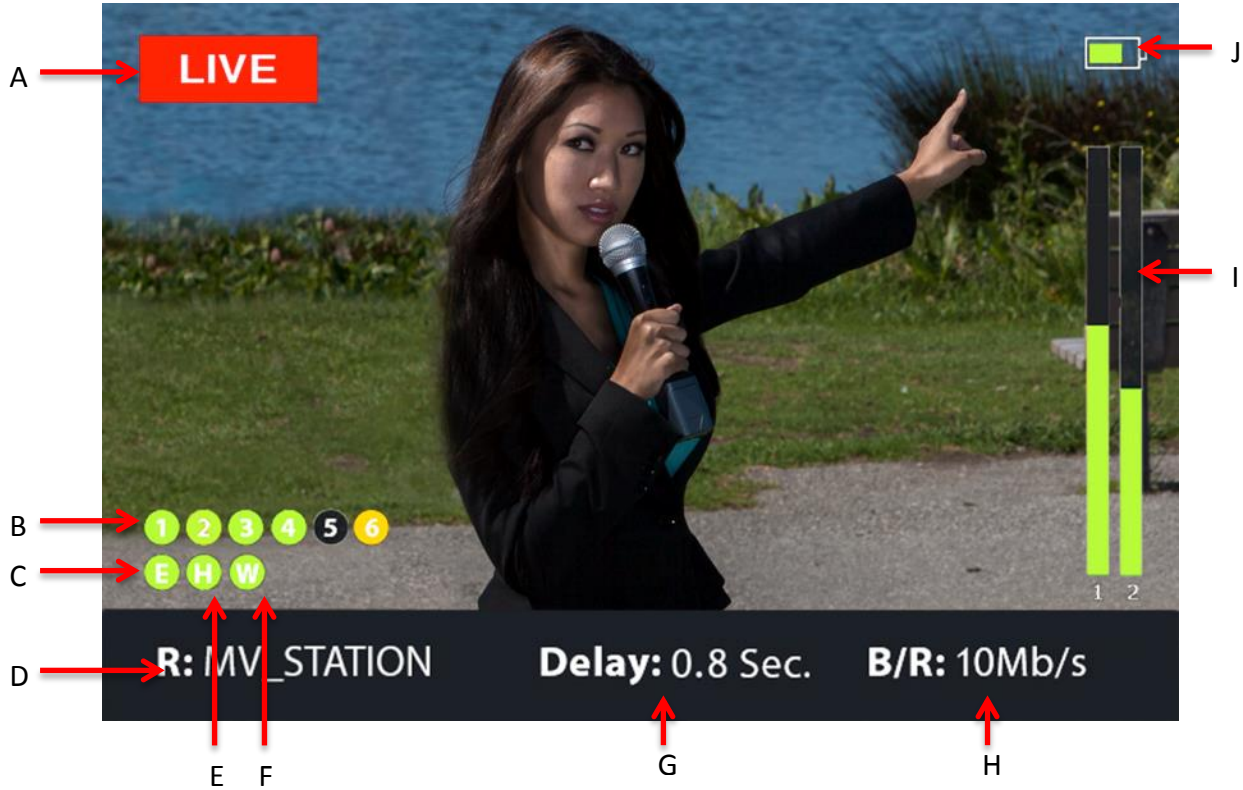


Figure 6

LCD Touchscreen Display

Label	TVU One Transmitter Live Status Screen Description
A	Transmission Status: Displays whether or not the unit is in Live, Online (Standby) or Preview mode
B	Data Card Status Monitor: Shows the current number and status of all data cards connected to the unit. The status of data cards connected to the unit will appear as green, red, orange or gray. Green status indicates that the data card is connected. The orange status indicates that the connection is trying to be reestablished. Red status indicates that the data card is not connected. Gray status indicates there is no card
C	Ethernet Connection: Displays the status of the Ethernet connection
D	Receiver Name: Shows the receiver name to which the unit is transmitting
E	Hotspot Connection: Displays the status of the Hotspot connection
F	Wi-Fi Connection: Displays the status of the Wi-Fi connection
G	Latency Status: Displays the current latency of the transmission
H	Bit Rate Status: Displays the current Bit Rate (B/R)

Label	TVU One Transmitter Live Status Screen Description
I	Audio Input Level Monitor: Dynamically displays the audio input level (DBFS) for the unit with graphical colors
J	Battery Status: Indicates the status of battery

Table 3

TVU ONE TM1000 v2 LCD TOUCH SCREEN OPERATIONAL TIPS

The LCD screen on the TM1000 v2 can be operated with simple taps and swipes of a finger, much like a smartphone that has a touch screen user interface. When accessed, the operational functions and status display interfaces available will appear as a pop-up window or drop down menu that overlays the preview or live video input. Follow these instructions to access all of the features and functions the TM1000 v2 has to offer through its LCD touch screen.

Going Live

To go live from the LCD touch screen, simply touch the center of the screen while the unit is on and connected to a camera source. A pop-up screen will appear (Figure 7). On this screen, users can select the receiver with which they would like to go live. Once a receiver is selected, press the red "Go Live" button.

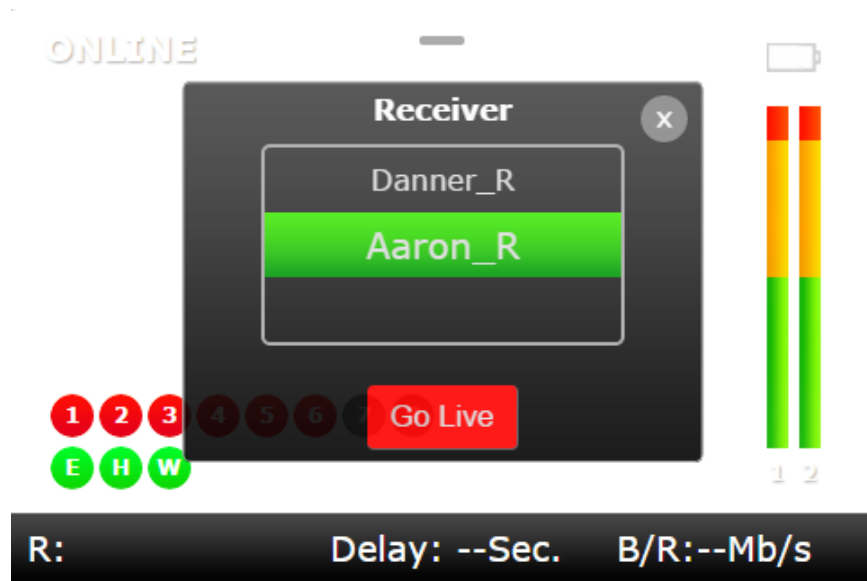


Figure 7

Users will then be instructed to slide a toggle to the right in order to start the live transmission (Figure 8). To exit from this pop-up screen, simply click the "X" in the top right corner.



Figure 8

To stop a live transmission, simply tap the middle of the touch screen and a pop-up screen will appear (Figure 9). A "Stop Live" toggle will appear at the bottom of the page. Slide the toggle from left to right to stop the live transmission.



Figure 9

Present Transmission Modes

To select a preset transmission mode, users can pull down the drop down menu by sliding their finger from the top of the screen to the bottom (A). The "Modes" interface will be displayed (Figure 10). Users can choose between these preset transmission modes:

- **Interview:** Bitrate 2048, delay 2 seconds
- **Normal:** Bitrate 5120 delay 4 seconds
- **Fast Moving:** Bitrate 5120, delay 8 seconds
- **SD:** Bitrate 2048, delay 4 seconds
- **Tapefeed:** Bitrate 10240, delay 10 seconds. This mode is optimized for content with multiple scene changes
- **Custom:** A custom transmission mode set by the receiver

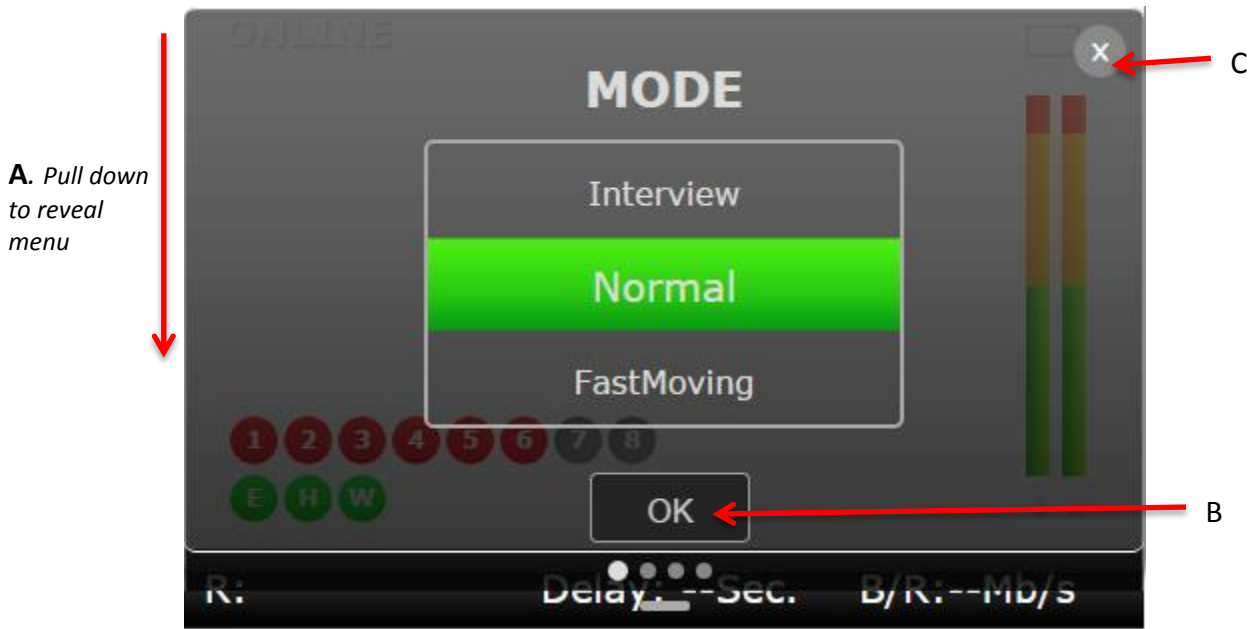


Figure 10

To select a transmission mode, simply scroll through the available options on the touch screen until the desired transmission mode is highlighted in green. Then click "OK" at the bottom of the screen (B). To exit from the drop down menu, simply click the "X" in the top right corner (C).

Managing the Latency

Access that drop down menu by sliding a finger from the top of the screen to the bottom. Swipe from right to left one time to go to the "Latency" interface (A) (Figure 11). On this page, users can manage the second and sub-second latency. To select the latency, simple scroll through the seconds and sub-seconds until the desired latency is highlighted in green. Then click "OK" on the bottom of the screen (B).

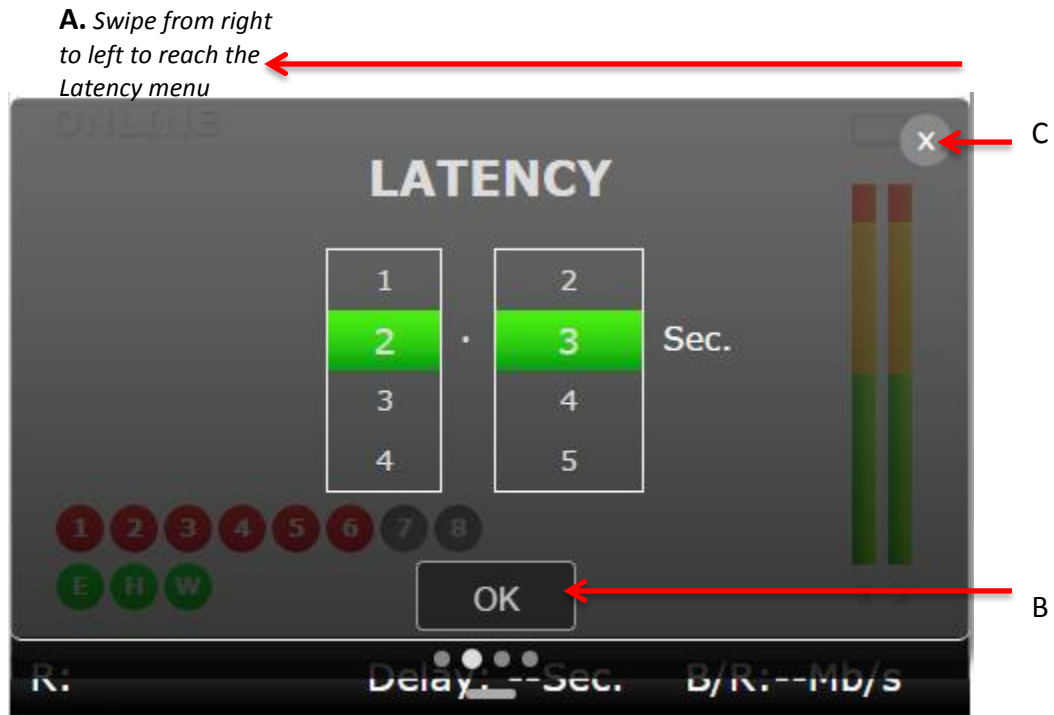


Figure 11

To exit from the drop down menu, simply click the "X" in the top right corner (C).

Switch the video encoder

Access that drop down menu by sliding a finger from the top of the screen to the bottom. Swipe from right to left two times to view the "Encoder Type" monitoring interface (Figure 12). On this page, users can switch between these encoder types:

- **H.265 Interview (A):** Use H.265/HEVC algorithm to encode the video with lowest bitrate.
- **H.265 Fast Motion (B):** Use H.265/HEVC algorithm to encode the video with higher bitrate to ensure the fast moving frames.
- **H.264 (C):** Use H.264/AVC algorithm to encode the video.

Note: A restart is required to take it effective after you click "OK" (D).

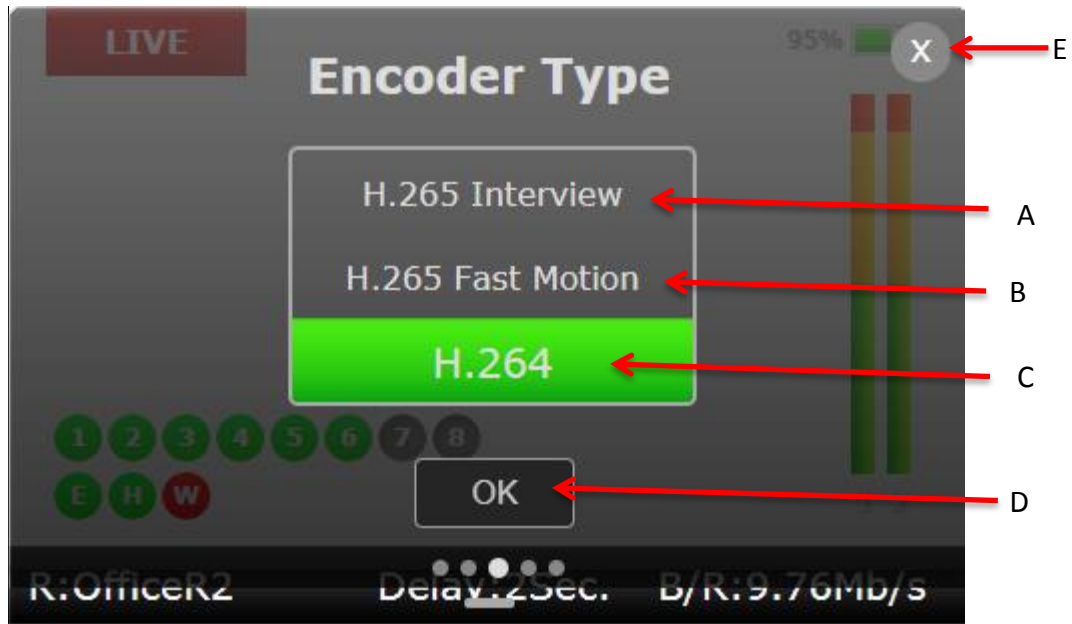


Figure 12

To exit from the drop down menu, simply click the "X" in the top right corner (E).

Data card Monitoring

Access that drop down menu by sliding a finger from the top of the screen to the bottom. Swipe from right to left two times to view the "Modem" monitoring interface (Figure 13). On this page, users can see detailed information for each card within the TVU One unit as well as the Ethernet (A), Hotspot (B), and Wi-Fi connections (C).

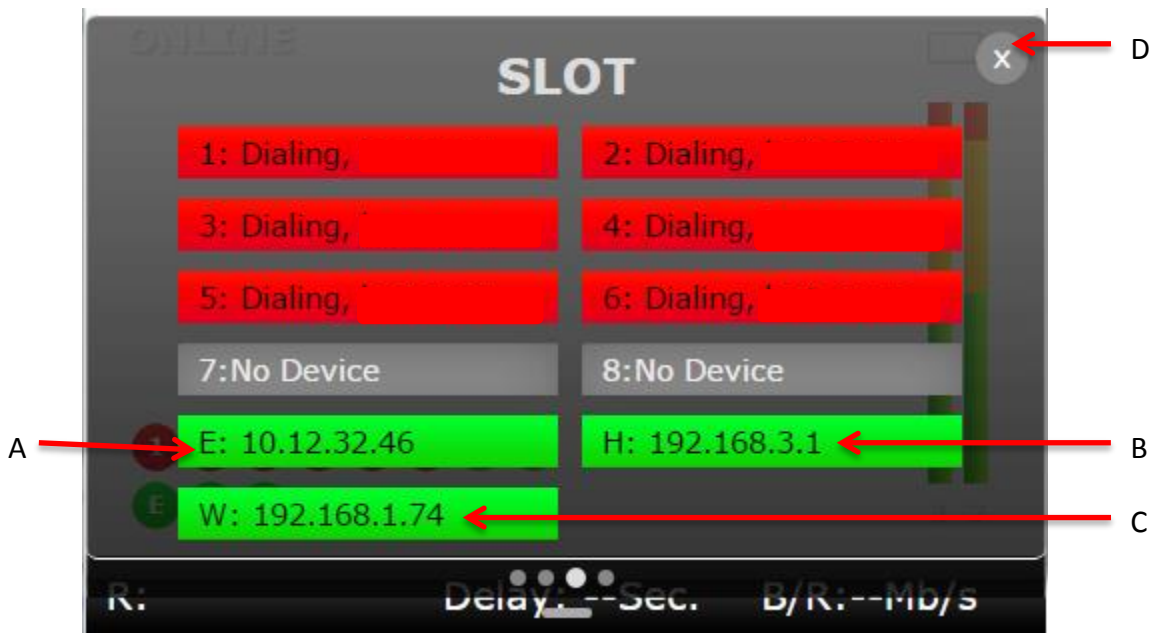


Figure 13

To exit from the drop down menu, simply click the "X" in the top right corner (D).

TVU One TM1000 v2 Unit Information

Access that drop down menu by sliding a finger from the top of the screen to the bottom. Swipe from right to left three times to view the unit information interface (Figure 14). The information displayed on this screen includes its model number, the PeerID number of the unit, and the software version number.

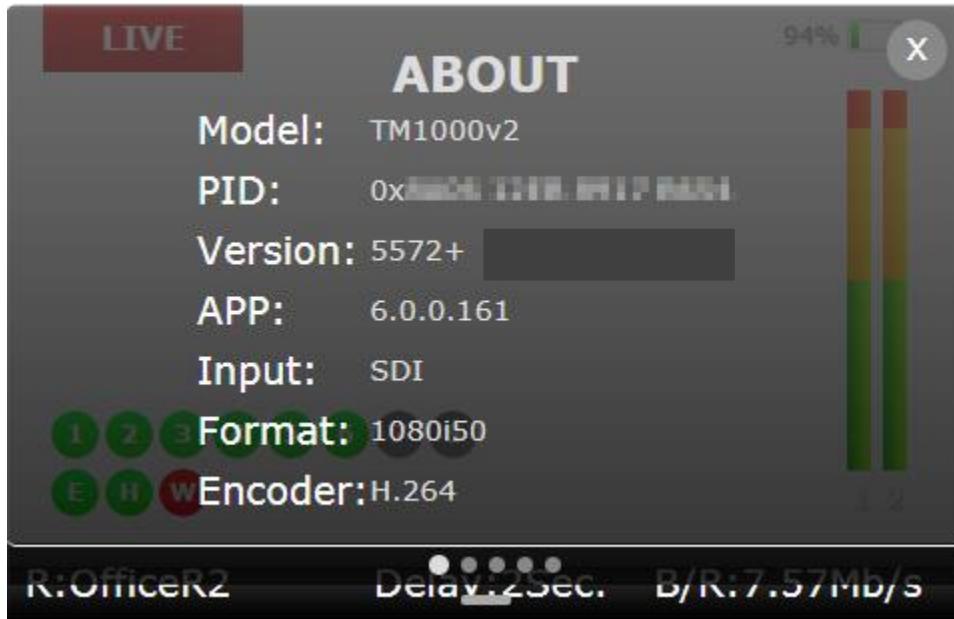


Figure 14

To exit from the drop down menu, simply click the "X" in the top right corner.

Turning Off the TM1000 v2

To turn off the unit, press the power button once. A sliding toggle button will appear on the screen of the TM1000 v2. Slide the toggle from left to right to power down the unit.

TRANSMITTER STATUS MONITORING AND CONTROL FROM THE WEB

From a web browser, the TVU Transmitter status can be monitored and various parts of the transmission can be controlled. This interface can be accessed using a standard web browser connected to the hotspot of the TM1000 v2. See *Configuring the TVU One for Hotspot* (pg. 41) for details on how to connect to the Hotspot.

Note: The images below are examples of how the screen would appear on an iPhone web browser.

TVU Transmitter Status Screen

The Status tab provides system information.

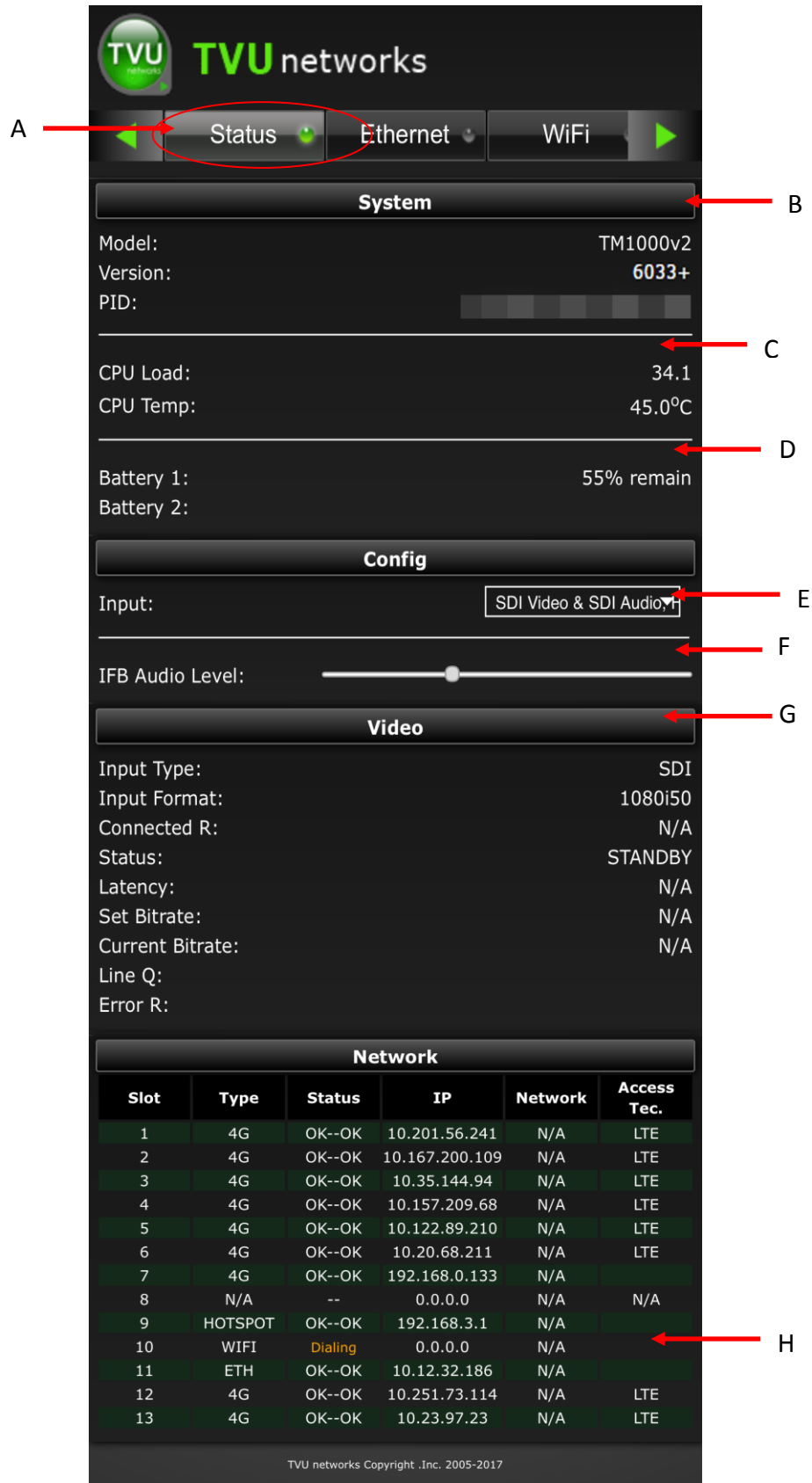


Figure 15 TVU Transmitter Status Screen

Label	TVU Transmitter Status Screen Description
A	Scroll bar that allows users to monitor and control all aspects of a transmission including datacards, Ethernet, Wi-Fi, BGAN, Receiver, and return video feed
B	Information regarding a particular TVU transmitter such as model number, version number, and PID
C	CPU: Current CPU capacity and temperature
D	Battery: Main battery status
E	Input: Input source
F	IFB Audio Level: Change the audio level of the IFB/VoIP function
G	Video: Transmission information and status
H	Network: Modem card information including type, connectivity, and IP address all organized by slot number

Table 4

Ethernet

The Ethernet tab provides configuration and set-up information.

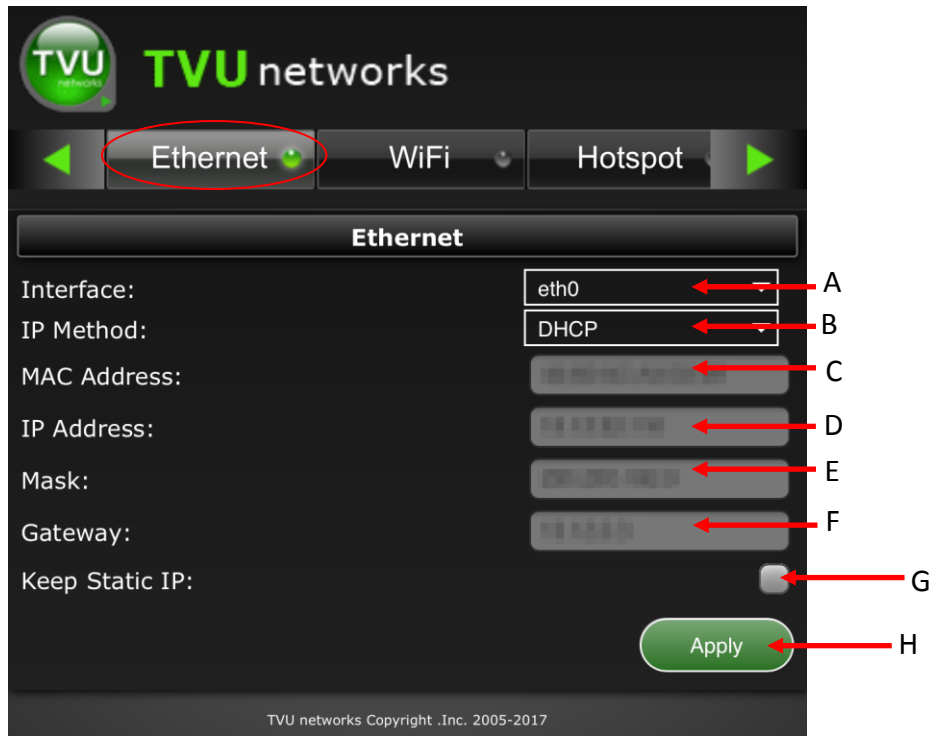


Figure 16

Label	TVU Transmitter Ethernet Status Screen Description
A	Interface: Select either Ethernet or USB from drop-down menu
B	IP Method: Select either Static or DHCP
C	MAC Address: Media access control address

Label	TVU Transmitter Ethernet Status Screen Description
D	IP Address: Entered manually if in Static mode; automatically generated if in DHCP mode
E	Mask: Entered manually if in Static mode; automatically generated if in DHCP mode
F	Gateway: Entered manually if in Static mode; automatically generated if in DHCP mode
G	Keep Static IP: When "Static" is selected from the "IP Method" drop down menu, the check box can be ticked to keep the desired static IP address.
H	Apply: Press "Apply" for the changes to take effect

Table 5

Wi-Fi

The Wi-Fi screen provides configuration information and access to change the Wi-Fi settings. Any modem can be replaced with a Wi-Fi adapter in the TVU transmitter and the TVU Transmitter can support multiple Wi-Fi connections. Each port in the modem module can connect to a USB Wi-Fi modem or a Wi-Fi adapter.

When multiple Wi-Fi adapters are connected in the modem module, the Wi-Fi tab on the web interface will allow the user to scan slots for available Wi-Fi adapters and configure the Wi-Fi login information.

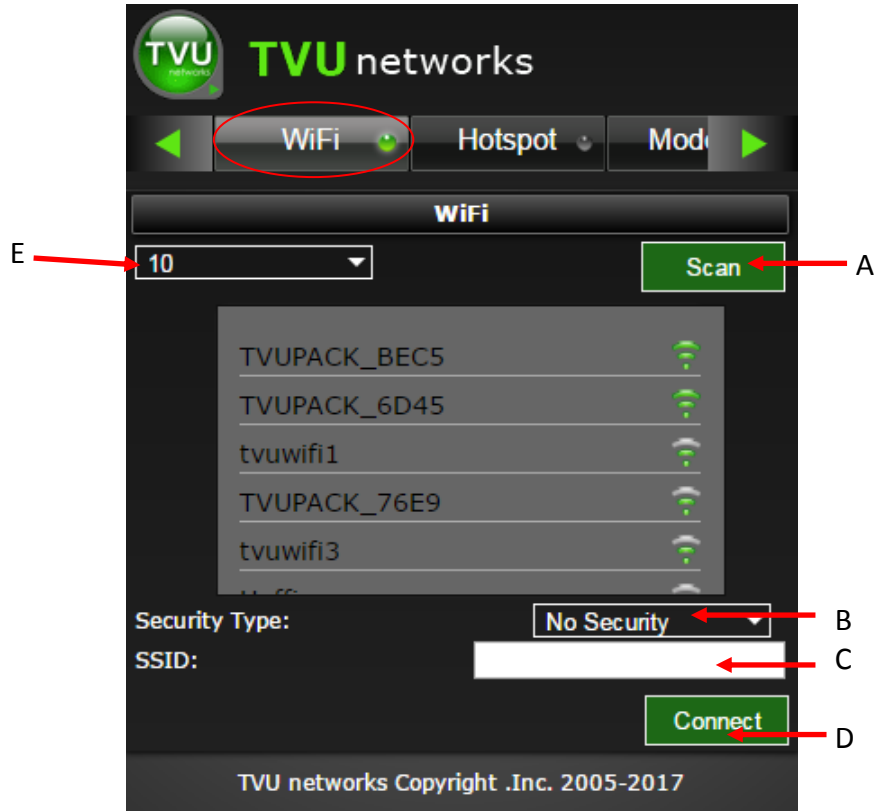


Figure 17

Label	TVU Transmitter Wi-Fi Status Screen Description
A	Scan: Scan for available networks and will display the list of available networks to select from the center box
B	Security Type: Drop down menu displays the security type of the connection
C	SSID: Wireless network name
D	Connect: Press Connect to establish the connection
E	Select the slot with which a modem was replaced with a Wi-Fi adapter

Table 6

Hotspot

The Hotspot tab provides status information on clients connected via the Hotspot. The Hotspot card should always be placed in the USB port on the TVU Transmitter.

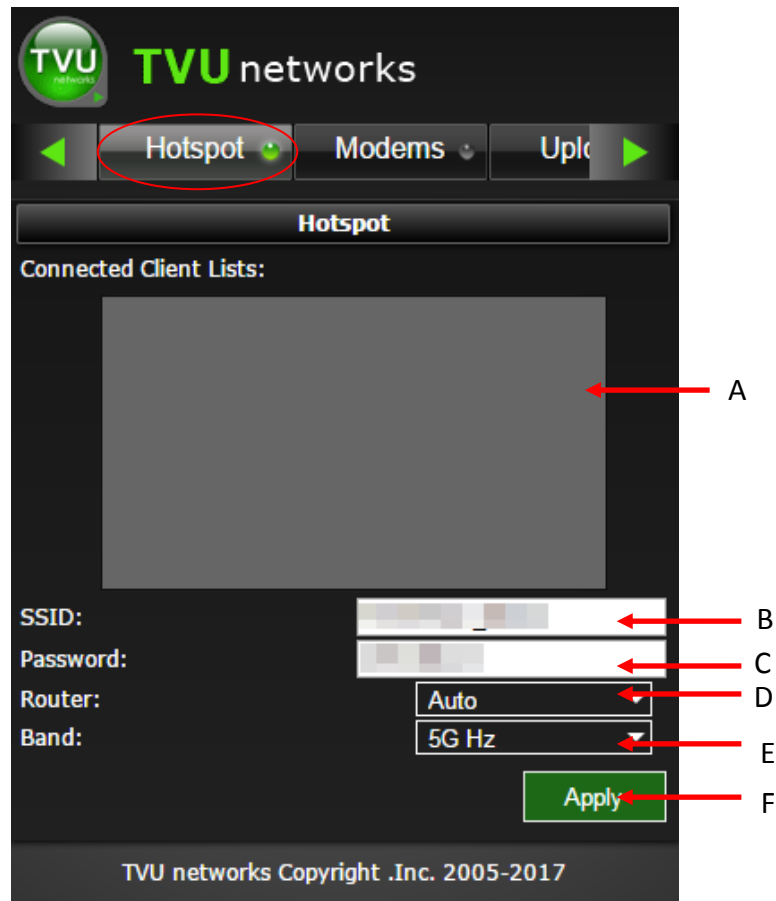


Figure 18

Label	TVU Transmitter Hotspot Status Screen Description
A	Connected Client Lists: Displays list of devices connected via Hotspots
B	SSID: Allows you to customize the Hotspot SSID
C	Password: Allows you to customize Hotspot password (Note: the new password must be 8 characters and does not take effect until the system is rebooted)
D	Route: Choose a specific modem, Wi-Fi network, or Ethernet connection, or choose Auto for the Hotspot to be routed through a random modem connection
E	Band: Option to choose 2.4GHz or 5GHz
F	Apply: Press "Apply" for the changes to take effect

Table 7

Modem

The Modem screen provides modem configuration information. Many cellular data cards are automatically detected by the TM1000 v2 and will self-configure. If this is the case, no further action will be required. If a data card needs to be configured, you can use this tab to configure specific data cards.

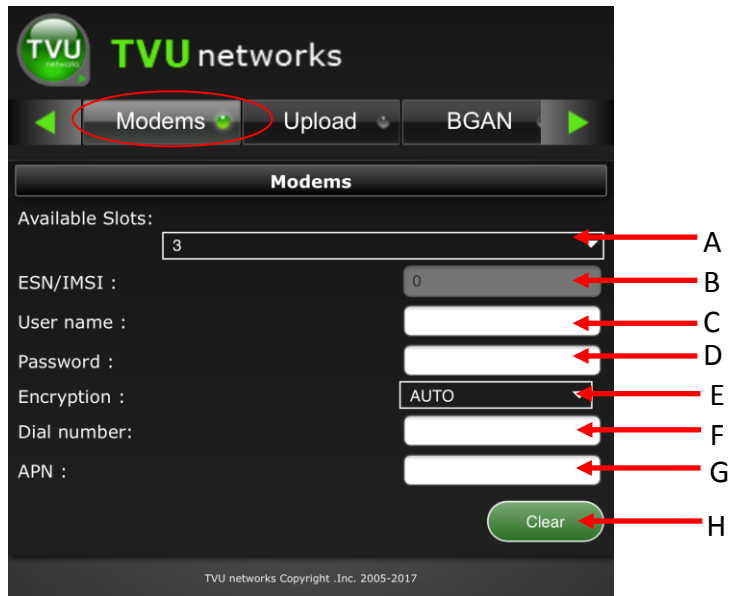


Figure 19

Label	TVU Transmitter Modem Status Screen Description
A	Available Slots: Drop-down list of slots that are available for configuration
B	ESN/IEMI: A modem's unique identification number
C	Username: Obtain carrier user name information from the network carrier
D	Password: Obtain carrier password information from the network carrier
E	Encryption: Select the appropriate encryption standard from the drop-down menu
F	Dial number: Obtain carrier dial information from the network carrier

Label	TVU Transmitter Modem Status Screen Description
G	APN: Obtain APN information from the network carrier
H	Clear: Press to clear all the settings

Table 8

Upload

The Upload screen gives you the ability to assign uploaded files to a particular receiver.



Figure 20

For each file uploaded, choose the specific receiver to which you would like the files to be uploaded from the drop down menu under to the file name **(A)** (Figure 20). Once the receiver is chosen, you can choose to make it the default receiver so that all future files are uploaded to that specific receiver **(B)**. Then hit apply **(C)**. For instructions on uploading files from a TVU Transmitter to the TVU Receiver, see *AutoSync File Transfer Using Wireless Hotspot*, or *Automatic Ingest of USB Memory Stick Content to TVU Transmitter* (pg. 47)

BGAN

The BGAN tab provides BGAN transmission information.



Figure 21

Label	TVU Transmitter BGAN Status Screen Description
A	Device Name: Displays the device name
B	Signal: Displays the signal strength
C	Linked: Indicates if the BGAN is connected
D	Link Type: Indicates the BGAN link type
E	Drop down menu that allows for the selection of a specific streaming class

Table 9

BGAN Configuration

The TM1000 v2 can support BGAN Hughes 9201 for automatic data connections. Follow these steps to set up the auto connection:

1. Set up the BGAN device to **Auto Register Network mode** by LaunchPad.

A. To enable automatic registration, Select **Terminal > AutoStart mode**. The **Configure Auto-Start** screen is displayed:

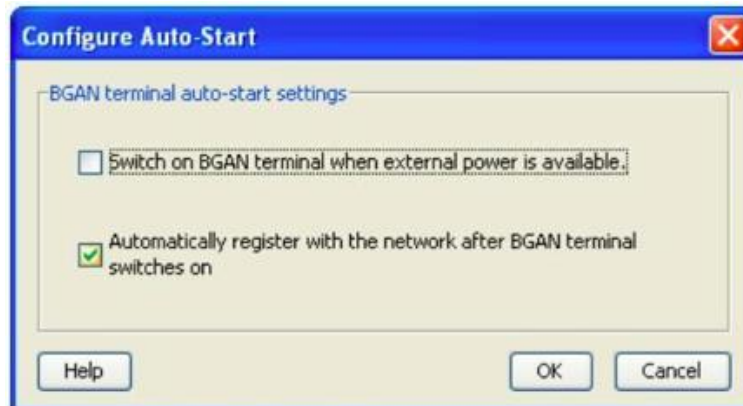


Figure 22

B. Check **Automatically register with the network after BGAN terminal switches on** and then click **OK**. Then power off the BGAN device.

2. Connect the BGAN to the TM1000 v2 by Ethernet cable.
3. Pointing to satellite by the Web UI of the transmitter configuration from iPad or Internet Explorer, for Hughes 9201, it has signal strength indicators on the panel.

Note: You may need to manually adjust the equipment location and orientation in order to confirm the signal strength is greater than 60%.

4. Set the link mode. "X-stream" is the default mode set up by the TM1000 v2 automatically.

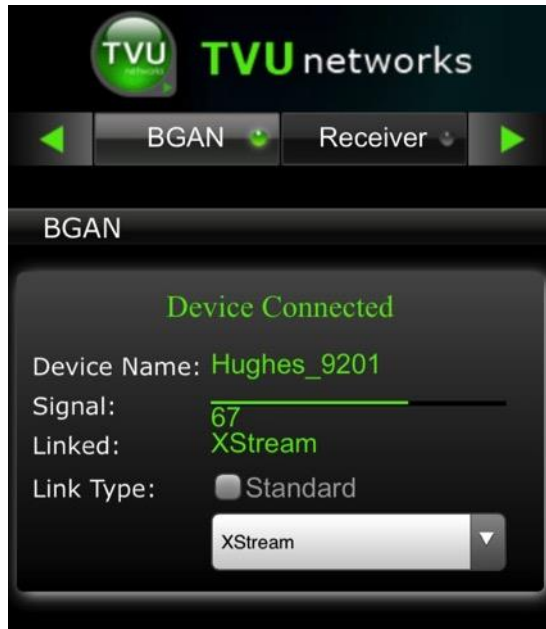


Figure 23

Note: If the interface connected with the BGAN device is consistently yellow and does not change to green after setting up the "Link Type", please check whether the BGAN equipment - when connected to a PC - can work normally with LaunchPad's X-stream mode.

5. Check on the TM1000 v2's screen to make sure the BGAN is connected.
6. Power off the BGAN device to close the connections.

If the BGAN is the only device connected with the receiver, then the receiver will automatically change the bitrate to 80% of the XStream with four seconds of delay at the CBR mode.

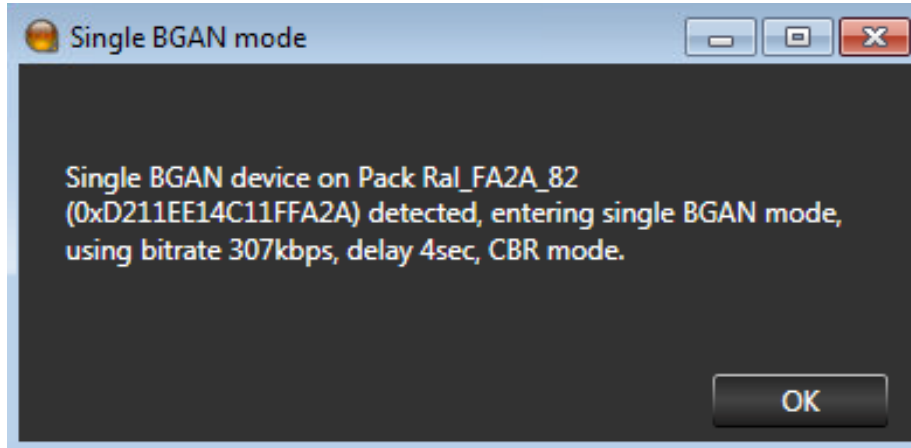


Figure 24

If there is no BGAN connected, the menu will display "No Device Detected" (Figure 25).



Figure 25

Note: If you require additional assistance, please contact TVU Networks Customer Support at +1 650 440 4812.

Receiver Status

This screen displays Line Quality and Error Rate information. Touch the Start/Stop Live button to control the live transmission. You use this screen to control Bit Rate and Delay by entering your data in the respective boxes and touching the **Apply** button to set them. This screen also allows you to choose the operational mode provided in the drop down menu at the bottom of the screen: **Interview, Normal, Fast Moving, SD, Tape Feed and User Definable.**

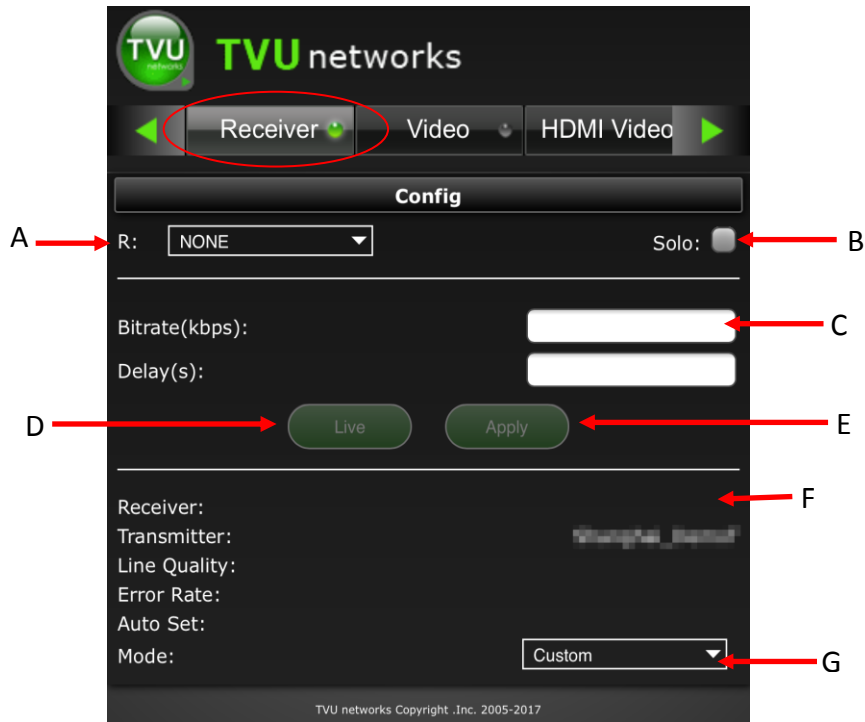


Figure 26 R Status screen

Label	Record Mode: Controls and Functions Description
A	R: Displays receiver name. To view a different available receiver, click the drop down menu to scroll through the options.
B	Solo: When checked, the particular TVU Transmitter will only be shown as "online" on the receiver selected from the drop down menu.
C	Bitrate/Delay: Enter the desired transmission Bitrate and delay(s).
D	Live/Stop Live: Starts and stops the live transmission.
E	Apply: Applies changes made to bitrate, latency, or mode.
F	Displays current TVU Receiver ID, TVU Transmitter ID, Line Quality, Error Rate and Auto Set.
G	Mode: Select an optimized preset bit-rate and latency based on broadcast setting(s) by choosing a different mode.

Table 10

Return Video Feed

This is a feature that can only be used on a TX3200, TX3000 or GX3200 series Transceiver. It will allow the camera operator in the field to have the ability to watch a return video feed from the studio of their TVU Transmitter transmission or from an SDI input on the Transceiver. The return video feed can be sent from the Receiver to the Transmitter when in Live, Online or Standby modes. View the return video feed via the TVU Transmitter Hotspot using any Wi-Fi enabled iOS device with a standard Safari web browser. See *Configuring the TVU One for Hotspot* (pg. 41) for details on how to connect to a Hotspot.

The latency of the return feed or SDI feed is about 3 seconds (under normal conditions) Resolution is 320x240 and includes 2-ch of audio. The return feed / SDI feed is not intended as cue channel, but rather provides those in the field with a confidence monitor or the ability to monitor another source.

The user is able to select which transceiver the return video feed comes from. Use the drop down menu **(A)** to select the desired Transceiver (Figure 27).



Figure 27

Label	TVU Transmitter Video Feedback Status Screen Description
A	Displays available transmitters that can be streamed for video return purposes
B	Pack: Provides a low-res return feed of your TVU transmission for monitoring purposes. Latency of the return feed is less than 3 seconds under normal conditions. You must select the receiver that is currently streaming your Pack from the drop down menu in order to see the feed. You cannot view other TVU Transmitter feeds
C	SDI: Provides a low-res return feed of the SDI input at the Transceiver for monitoring purposes. Latency of the return feed is less than 3 seconds under normal conditions

Table 11

Note: If you require additional assistance, please contact TVU Networks Customer Support at +1 650 440 4812.

HDMI Video

For Version 6.0 or above, you can also view the return video feed via the HDMI Output port from the TM1000 v2.

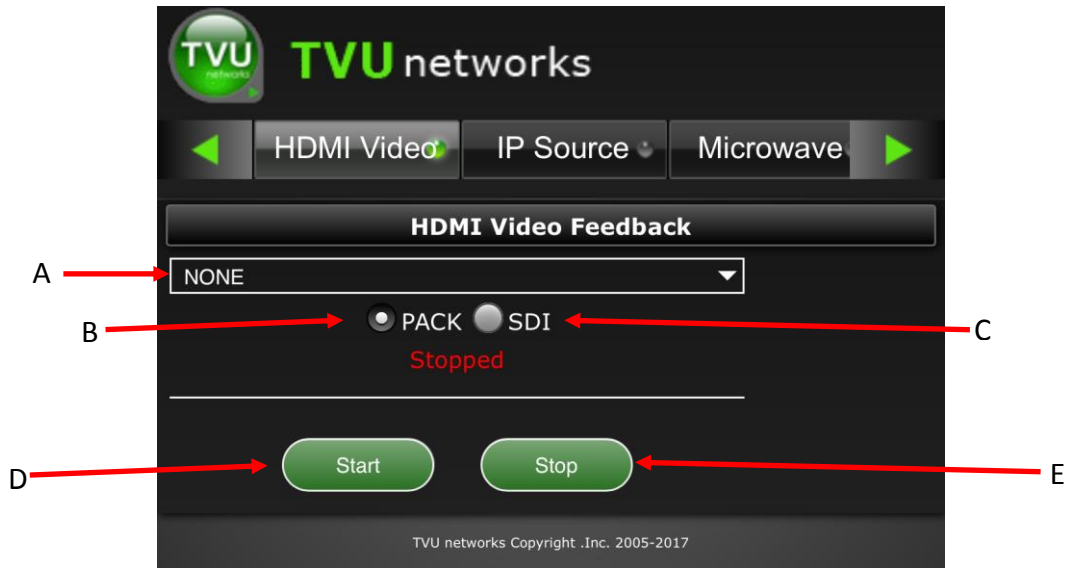


Figure 28

Label	TVU Transmitter Video Feedback Status Screen Description
A	Displays available transmitters that can be streamed for video return purposes
B	Pack: Provides a low-res return feed of your TVU transmission for monitoring purposes. Latency of the return feed is less than 3 seconds under normal conditions. You must select the receiver that is currently streaming your Pack from the drop down menu in order to see the feed. You cannot view other TVU Transmitter feeds
C	SDI: Provides a low-res return feed of the SDI input at the Transceiver for monitoring purposes. Latency of the return feed is less than 3 seconds under normal conditions
D	Start: Start the stream to HDMI out
E	Stop: Stop the stream to HDMI out

Table 12

IP Source

The IP Source tab allows the user to select the source with which to go live. Either select the camera source or select an outside IP source.

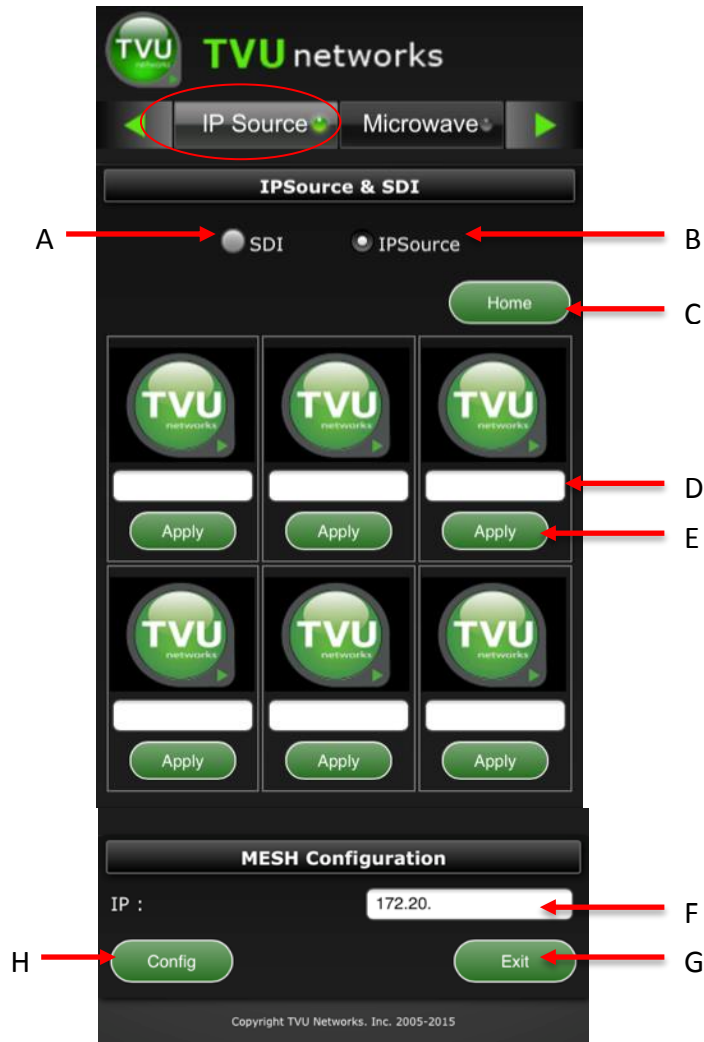


Figure 29

Label	TVU Transmitter IP Source Screen Description
A	SDI: This is the camera source connected to the TVU Transmitter
B	IP Source: Allows users to add an IP source with which to go live
C	Home: Send all IP sources in one matrix picture to TVU Receiver
D	Type in the valid IP address of the source with which you want to go live
E	Apply: Adds the new IP Source
F	MESH Configuration IP: IP address of MIMO MESH connection
G	Exit: Disabled the MIMO MESH connection
H	Config: Configure the MIMO MESH connection

Table 13

Recording

The Recording tab allows users to isolate a specific segment of video with the touch of a button.

Note: The TVU device is always recording when it is powered on and a valid video source is connected.

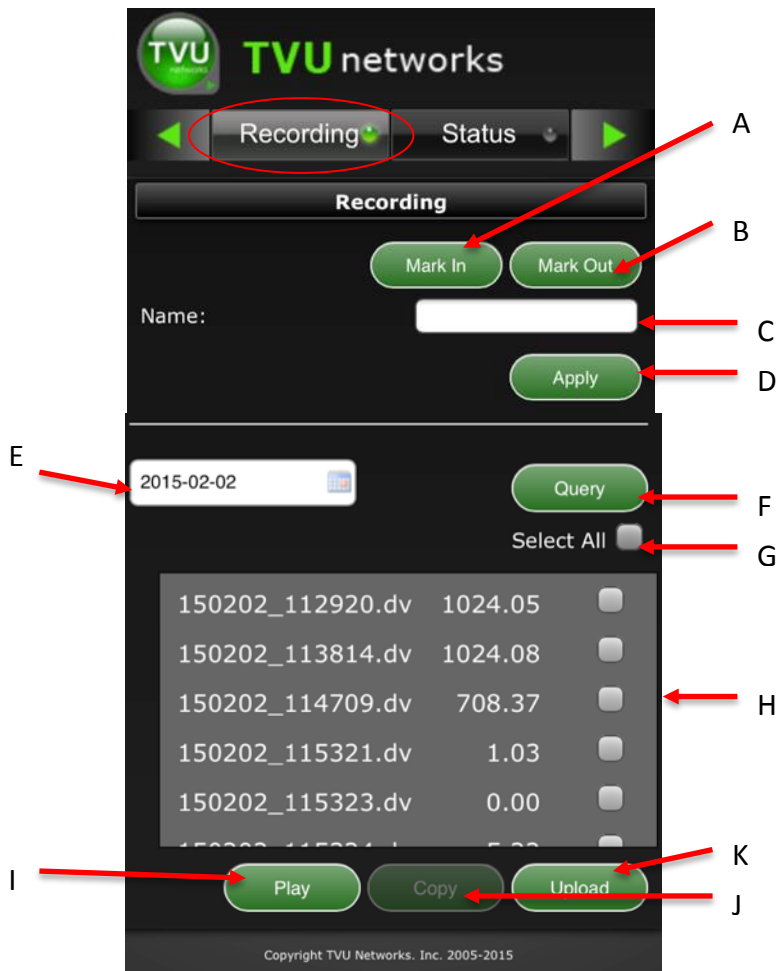


Figure 30

Label	TVU Transmitter Recording Status Screen Description
A	Mark In: Marks the IN point of a segment in the recorded video on the TVU Transmitter.
B	Mark Out: Marks the OUT point of the segment in recorded video on the TVU Transmitter. Note: Once an IN and OUT point are identified, it is possible to play the clip, copy the clip locally to an inserted USB thumb drive, or upload it directly to the selected Receiver.
C	Name: Designate a specific name for the recorded segment
D	Apply: Add the recording to the list below
E	This allows you to search for recordings by date. Simply click on the calendar and select the day of the recording you would like to bring up in the list below.
F	Query: Searches recordings completed on the selected day
G	Select All: Select all of the recordings in the list below

Label	TVU Transmitter Recording Status Screen Description
H	This section displays all the recordings completed on the selected day as well as the size of the file. To select a specific video file, simply click on the check box next the video name
I	Play: Provides for a video preview of the selected clip
J	Copy: Copies the selected clip to a USB stick. USB stick must be plugged into the TVU Transmitter in order for the file to be transferred
K	Upload: The selected clip will be uploaded to the default receiver designated in the "Receiver" tab

Table 14

Alert

Allows users to send messages between TVU Transmitters and TVU Receivers.

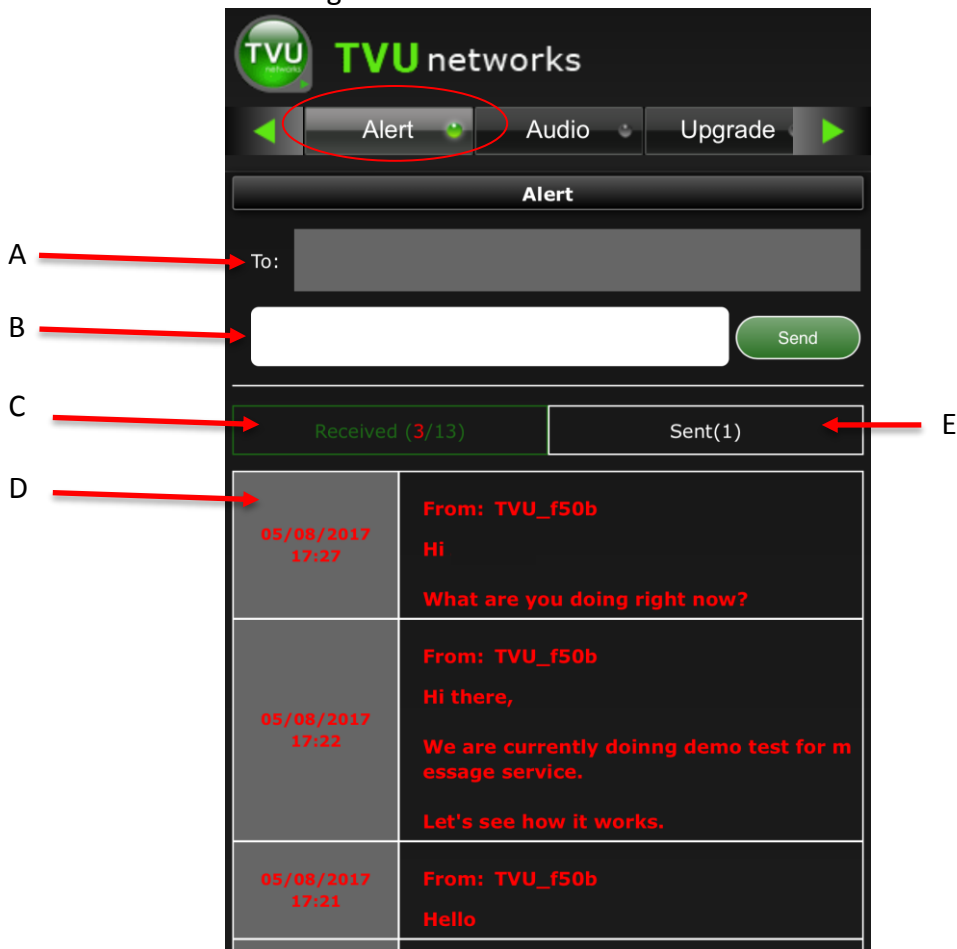


Figure 31

Label	TVU Transmitter IP Source Screen Description
A	To: The recipients which should be TVU Receivers' or Transmitters' PID
B	Message content
C	Received: The tab lists the messages that were received by the unit
D	The detail messages sorting from the latest to the oldest

Label	TVU Transmitter IP Source Screen Description
E	Sent: The tab lists the messages that were sent from this unit

Table 15

Audio Channels

The Audio tab allows users to switch the audio channels between two and four channels.

Note: TVU One TM1000 v2 that's running Version 6.0 allows audio only transmission through the BNC connector, and it's up to 4 channels. By default, the screen will show black screen during the transmission.



Figure 32

Upgrade Firmware

Allow users upgrade to the new firmware version.



Figure 33

Progress download

This is the key to enable or disable the Progressive Download feature. If the TVU Transceiver or TVU Receiver is available, TVU One TM1000 v2 can automatically trigger the immediate upload of a mirror image high-resolution clip from its SSD to the transceiver or receiver by pressing the camcorder's record button. Transceivers or receivers will show the download process.



Figure 34

Configuring SIM Cards via Command Text

Should a supported card require further configuration and you would like to configure the card via command text instead of through the remote web/iPhone page, this may be done by using a USB keyboard to enter the dialing settings. If you require assistance with card configuration, please contact TVU Networks Customer Support.

Make sure that your data cards are securely connected before attempting to configure them. Attach a USB keyboard to one of the USB ports on the side of the TVU One encoder unit. Type the letters "tvu" in lower case and press the Enter key. The TVU LCD screen should now display as indicated below. Your cards are ready to configure. You may also configure the cards using an iPod or wireless mobile smart device. See the *Configuring the TVU One for Hotspot* set up section in this Operating Guide (pg. 41).

```

Press <Enter> to show commands.: ===== Command List =====
SETIP          Set ip for LAN
CARD or ABC    Set datacard
WIRELESS       Set wireless
SOURCE         Set input source
EXIT           Return to main menu
Enter command:

```

Figure 35 Command Screen

Follow instructions on the "Enter command" prompt to configure your data card. Please note all commands are CASE SENSITIVE.

- A. Type **CARD** and press **Enter**; the "Input slot ID to configure" prompt appears.

```

Enter command:ABC
===== Slot Information =====
Input slot ID to configure:1

```

Figure 36 Slot Input Screen

- B. Enter the slot number and press **Enter**; this example uses slot ID 1.

The "Select your choice" prompt and menu appear. The menu has these choices:

1. Refresh this card
2. Delete configure info of this card
3. Select slot
4. Exit
5. Set/Change dialing instruction of this card

```

===== Slot Information =====
Configured CPIN:
slot ID:5 Ip: Huawei Technologies Co., Ltd. E620 USB Modem
Input slot ID to configure:5
Checking /dev/ttyUSB0 ...
Checking /dev/ttyUSB2 ...
===== MENU <Slot ID:5> =====
1. Refresh this card
2. Delete configure info of this card
3. Select slot <Current slot is:5>
4. Exit
5. Set/Change dialing instruction of this card
<X_S_N:353558046523197 ttyUSB2 SLOT:5 >
<old number: user: password: APN: PPPSEC:>
CSQ:
---- All Dial Information ----
=> X_S_N:353558046523197 <number: user: password: APN: CPIN: PPPSEC:>
Manufacturer: huawei#Model: E1750
V_P_ID:12d1:1001
default_default <number:#777 user: password: APN: CPIN: PPPSEC:>
Select your choice:_
    
```

Figure 37 Slot Information Screen

- C. Select your menu number choice and press **Enter**; this example uses menu item "5: Set/Change dialing instruction of this card."

Note: that the red underlined text on the screen is data input by the user:

```

Select your choice:5
Enter dial number for <X_S_N:353558046523197> OLD VAL:<:>:*99#
Enter user name for <X_S_N:353558046523197> OLD VAL:<:>:card
Enter password for <X_S_N:353558046523197> OLD VAL:<:>:card
Enter APN for <X_S_N:353558046523197> OLD VAL:<:>:3gnet
Enter PPPSECUR for <X_S_N:353558046523197> OLD VAL:<:>:
    
```

Figure 38 User Input Data Screen

- D. If all of your input data is correct, the screen appears as follows:

```

===== MENU <Slot ID:5> =====
1. Refresh this card
2. Delete configure info of this card
3. Select slot <Current slot is:5>
4. Exit
5. Set/Change dialing instruction of this card
<X_S_N:46523197 ttyUSB2 SLOT:5 >
<old number:*99# user:card password:card APN:3gnet PPPSEC:>
CSQ:
---- All Dial Information ----
=> X_S_N:46523197 <number:*99# user:card password:card APN:3gnet CPIN: PPPSEC:>
V_P_ID:12d1:1001
default_default <number:#777 user: password: APN: CPIN: PPPSEC:>
Select your choice:_
    
```

Figure 39 Completed Data Screen

- E. To configure the next data card select menu item 3 and press **Enter**.

Note: The words in RED are the variables that have just been configured. If these are not correct, reconfigure this data card by choosing item "5." Also, some service providers do not have Username, password or APN. If this is the case, continue to press Enter until the "Select your choice" prompt and menu appear.

- F. Select menu item "4. Exit" and press **Enter**.

After exiting the interface the status screen should show the cards dialing and connecting successfully. Your TVU Transmitter is now ready to broadcast live. If the cards do not come online or if you are having difficulty with configuring the data cards, please contact TVU Networks Customer Support for further assistance.

Setting Ethernet IP Connection via Command Text

The TM1000 v2 gigabit Ethernet interface can also be configured via command text. By default the eth0 interface will attempt to lease an IP address through DHCP and no further action will be required. If a static Ethernet address is required, follow these steps.

- A. Start at the menu commands screen.

```

Press <Enter> to show commands.: ===== Command List =====
SETIP          Set ip for LAN
CARD or ABC    Set datacard
WIRELESS       Set wireless
SOURCE         Set input source
EXIT           Return to main menu
Enter command:

```

Figure 40 Command Display

- B. Type **SETIP** on the "Enter Command" prompt and press **Enter**.

```

Enter command:SETIP
----- IPS -----
IF:ppp0 IP: NetMask:
IF:wifi IP:10.12.32.43 NetMask:255.255.192.0
IF:eth0 IP:10.12.32.66 NetMask:255.255.192.0
----- ROUTE -----
221.12.33.227 via 172.27.110.212 dev ppp0
10.64.64.64 dev ppp0 proto kernel scope link src 172.27.110.212
221.12.1.227 via 172.27.110.212 dev ppp0
10.12.0.0/18 dev eth0 proto kernel scope link src 10.12.32.66 metric 1
10.12.0.0/18 dev wifi proto kernel scope link src 10.12.32.43 metric 2
default
    nexthop via 10.12.0.1 dev eth0 weight 1
    nexthop via 10.64.64.64 dev ppp0 weight 1
    nexthop via 10.12.0.1 dev wifi weight 1
=====
Press <CTRL-C> to exit immediately.
input NIC name:(eth0):

```

Figure 41 Set IP Display

- C. During the configuration script hitting enter will accept the existing value or default. Hit enter to accept NIC name eth0.
- Enter IP address
 - Enter subnet mask
 - Enter default gateway
 - Enter DNS server IP address
- D. The next screen shows the status of your connection. If the configuration was done correctly, your entered information should appear under the New Config portion of the screen (The red arrows in the image below indicates where to check for your entered information):

```

Press <CTRL-C> to exit immediately.
input NIC name:(eth0):
input IP address:(192.168.1.20):
input netmask:(255.255.255.0):
input network default gateway:(192.168.1.1):
input DNS server ips:

call /bin/bash setethip.sh "eth0" "192.168.1.20" "255.255.255.0" "192.168.1.1" ""
nameserver 8.8.8.8
nameserver 8.8.8.8
# Generated by NetworkManager
nameserver 10.12.0.250
===== New config =====
----- IPS -----
IF:ppp0  IP:          NetMask:
IF:wifi  IP:10.12.32.43  NetMask:255.255.192.0
IF:eth0  IP:192.168.1.20  NetMask:255.255.255.0
----- ROUTE -----
221.12.33.227 via 172.27.110.212 dev ppp0
10.64.64.64 dev ppp0 proto kernel scope link src 172.27.110.212
221.12.1.227 via 172.27.110.212 dev ppp0
192.168.1.0/24 dev eth0 proto kernel scope link src 192.168.1.20
10.12.0.0/18 dev eth0 proto kernel scope link src 10.12.32.66 metric 1
10.12.0.0/18 dev wifi proto kernel scope link src 10.12.32.43 metric 2
default
  nexthop via 192.168.1.1 dev eth0 weight 1
  nexthop via 10.64.64.64 dev ppp0 weight 1
  nexthop via 10.12.0.1 dev wifi weight 1
Configure again?(y/n)[n]:

```

Figure 42 IP Status Screen

- E. Your Ethernet connection should now be ready to use.

Configuring a Wi-Fi Connection via Command Text

To configure the TVU Transmitter to connect to a wireless network through command text, follow these steps:

1. Make sure the wireless USB card is present on USB slot 10, which is on the side of TVU One encoder unit.
2. Connect a USB keyboard to one of the USB ports on the side of the TVU One encoder unit.
3. From the TVU Transmitter status screen, type "tvu" in lower case and press **Enter** on your keyboard to display commands. Follow these steps to establish a connection:

Note: All typed commands are case sensitive.

- A. Type **WIRELESS** in the command line and press **Enter** to see a list of command options:

```

Enter command:WIRELESS
LIST (L)          List device
CONNECT (C)       Connect
SCAN (S)          Scan device
DISCONNECT (D)   Disconnect
STATUS (ST)      Get status of device.
EXIT (EX)        Exit.
type command:

```

Figure 43 Wireless Command Screen

- B. Type "S" in the command line to scan for active wireless networks in range and press **Enter**.

```

type command:S
                ESSID:"tvunetworks"
                ESSID:"TVU_Networks"
                ESSID:"hailuo-506"
                ESSID:"VITASOY"
                ESSID:"MideaAP2"
                ESSID:"MYSUPA"
                ESSID:"topsports-02"
                ESSID:"lalala_xyz"
                ESSID:"TP-LINK_Corjis"
                ESSID:"topsports-03"
                ESSID:"SEO"
                ESSID:"hhjt22"
LIST (L)          List device
CONNECT (C)       Connect
SCAN (S)          Scan device
DISCONNECT (D)   Disconnect
STATUS (ST)      Get status of device.
EXIT (EX)        Exit.
type command:

```

Figure 44 Active Link Screen

- C. Type "C" in the command line and press **Enter** to connect to an available network. An input screen will appear and prompt you to enter the ESSID, encryption key type, password, and setting for DHCP or static IP address.

```

type command:C
input essid:tvunetworks
input key type.(wpa|wep|wep128|nopass)[wpa]:wpa
input password:xxxxxx
input ip type.(dhcp|static)[dhcp]:
/bin/bash wireless.sh connect essid=tvunetworks key=wpa pass=tvuatc [redacted] dhcp
000;Success
LIST (L)          List device
CONNECT (C)       Connect
SCAN (S)          Scan device
DISCONNECT (D)   Disconnect
STATUS (ST)      Get status of device.
EXIT (EX)        Exit.
type command:

```

Figure 45 Input Screen

Note: ESSID and Password entries are case sensitive.

- D. Enter the information requested on each line and press **Enter**.

In order to complete the set up process and establish your wireless connection, you must exit completely from this screen by entering **EX** for "exit" and pressing **Enter**. When you see the TVU status screen, your wireless connection set up is complete and the status screen should show an IP address in green for the connection called "WIRELESS".

Configuring the TVU One for Hotspot (Optional)

You can use an iPod or smart mobile device for wireless monitoring and control of the TVU transmitter. To do this, you must first join the TVU Transmitter's internal hotspot.

1. Search for the Hotspot on your iPod/smart device. The SSID will be TVUPACK_XXXX where X is the last 4 digits of the TVU Transmitter's PID.
2. Connect to the SSID using your iPod/smart device.
3. **The default password is the last 8 digits of the PID of the TVU Transmitter** (Note: All characters are uppercase).

Note: The password can be changed in WebUI if desired.

4. Once the connection is established, open a web browser and go to <http://192.168.3.1> to see the TM1000 v2 status.

CONTACTING TVU NETWORKS

At TVU networks, we value our customers and are committed to ensuring a high level of satisfaction. Should you ever need assistance with your TVU Transmitter, please contact us at one of our numbers below:

Technical Support:

Phone: +1.650.440.4812

Email: support@tvunetworks.com

Skype: [skype.tvupack](https://www.skype.com/people/skype.tvupack)

Billing Questions:

Phone: +1.650.969.6732

Corporate Address:

857 Maude Avenue

Mountain View, CA 94043

Product Specifications TVU One Transmitter

TVU One Hardware Specifications*

Supported Number of Embedded Modems	6
Supported Number of USB External Modems/Dongles	Up to 4
Includes Inverse StatMux Plus (IS+)	✓
Supports HD/SD-SDI and HDMI video input resolution	✓
Includes embedded 2-channel audio	✓
Includes TVU264 encoder	✓
Supports multiple cellular 3G/4G/LTE data	✓
Supports WiFi, Ethernet, WiMax, Microwave, Ka-band, Ku-band, and BGAN Satellite	✓
Swappable internal battery run time	120 minutes
Includes external interface connectors-SDI, HDMI, USB, Ethernet and IFB	✓
Includes DC input for external battery or AC adapter	✓
Supports external battery source	✓
Encoder hardware dimensions	7.48" x 4.72" x 2.76" / 19cm x 12cm x 7cm
Weight without internal battery	2.2 lbs / 1 kg
Includes multipurpose carrying case with belt and shoulder strap configurations	✓
Operating temperature	0-40 Celsius/32-104 Fahrenheit

*Specifications are subject to change.

TVU One Software Features*

Smart VBR	✓
Wireless Control Using Web Interface	✓
TVU Social	✓
Compatibility with TVU Grid	✓
Compatibility with TVU Booking	✓
Live Record Hours	7
IFB	✓
Autosync	✓
Time Code Marking	✓
Hotspot Internet Access	✓
Metadata Marking	✓
Video Clipping and Download	✓
Return Video Feed	✓
Dual Encoder	✓
GPS Tracking	✓

*Features are subject to change.

Table 16

TVU TR3200 Receiver Technical Specifications*

	TR3200 Specifications
Electrical	Line Voltage: 100-240V AC, 50/60 Hz 5.2-2.6A
Configuration	1RU standard rack mount
Audio/Video Output	BNC – SD/HD – SDI (1080-50i/ 59.94i, 720-50p/59.94p, NTSC/ PAL) w/embedded audio (Optional analog output)
Genlock	BNC – Tri-Level or BB
Display	DVI or HDMI
IFB Input (Optional)	External USB audio input with level control (mic/line), ¼" & XLR
Network I/O	1 independent 10/100/1000 BASE-T RJ45 Ethernet Interface, 2 x USB 2.0, 2 USB 3.0
Dimensions	1.7" x 17.2" x 9.8" 43mm x 437mm x 249mm (HxWxD)
Operating Environment	10-35° C (50-95° F), Humidity 20%

*Specifications are subject to change without notice

Table 17

APPENDIX A: TROUBLESHOOTING VIDEO QUALITY

Troubleshooting Video Quality Using the Status Indicators in Normal and Advanced Modes

The Status counters offer a visual indication of specific technical aspects of the current live session. By interpreting these numbers it is possible for an operator to troubleshoot and optimize the quality of a session.

Quality

This is the real time effective bitrate of the transmission. If the system is set to VBR (variable bit rate) mode, this number will fluctuate between the configured maximum bitrate and the lowest bitrate the data connections can currently sustain. The maximum target bitrate is set by either using a preset mode in normal operation, or by using the bitrate slider in advanced mode.

If the system is set to CBR (constant bitrate) this number will stay constant.

Error rate indicators

Error rate 8s. This indicates the percentage of uncorrected errors taken over an 8 second average. The aim is for this number to always be at zero during transmission.

Error rate 1s. This indicates the uncorrected error rate over the last second. The aim is for this number to always be at zero during transmission.

All uncorrected errors can contribute to undesirable video glitches. Any error rate greater than 0 indicates that the data connection is unable to operate cleanly in the current data environment. If attempting to operate in CBR (constant bitrate) mode try either lowering the required bitrate or switching to VBR to allow the system to adapt dynamically to conditions. If the system is already in VBR mode try increasing the delay to allow the error correction system more time to adapt to the network conditions.

Line quality indicators

Line quality shows the current error correction levels required for error free transmission at the configured settings.

Line Quality 8s: This is the level of error correction (as an average over the last 8 seconds) required to sustain clean transmission.

Line Quality 1s: This is the current level of error correction the system is using to sustain a clean transmission.

The TVU Transmitter uses multiple methods of error correction to ensure smooth clean video transmission in very challenging environments. Since the underlying network con-

ditions are always a factor when working over multiple connections simultaneously, some error correction is always required. As a rule in difficult environments, the lower the latency, the more data is required for error correction to sustain a stable video transmission. This error correction, while highly effective, utilizes some of the limited bandwidth that is available in most situations. It is desirable where possible to limit the error correction required as it allows the system bandwidth for extra video quality.

Operational Example 1: TVU Transmitter is being used in a poor data service environment.

In this scenario the receiver is set to Normal VBR mode, but the TVU Transmitter is inside a building with poor data service. The Quality indicator is seen to fluctuate between 2048 and 1000 as the signal strength and available data service varies. This indicates that the TVU Transmitter is using TVU's Inverse Statmux to measure the available bandwidth and maximize throughput on a continuous basis. If the video quality is fluctuating two approaches may be used at the receiver to improve the video output consistency and stability.

Suggestions

- Try increasing the delay in 1s increments to allow the TVU Transmitter extra time to compensate for the dips in available bandwidth.
- Try incrementally reducing the maximum bitrate so the fluctuations between high and low are less noticeable.

Operational Example 2: TVU Transmitter is being used in an environment with excellent data service.

In this scenario the receiver is set to Normal VBR mode and all data cards are performing well. The Quality indicator stays constant at 2048 and rarely fluctuates. Under these conditions it is possible that by switching to advanced mode and either increasing the bitrate (for improved video quality) or lowering the latency (for lower delay) may be practical. No action is required, but the system may be capable of enhanced performance if desired.

Suggestions

- Try increasing the bandwidth in 256k increments until the Quality indicator starts to become unstable and cannot sustain the new setting.
- Try decreasing the delay in 0.2 second increments until the Quality indicator becomes unstable and does not stay consistent at the maximum bitrate.

Operational Example 3: TVU Transmitter is being used in an environment with average data service.

In this scenario the TVU Transmitter is being used in an interview talkback situation. The desire is to minimize latency but the bandwidth available to the system is limited and

the Quality indicator is fluctuating between 750 and 1800. Uncorrected errors are appearing in the video output.

Suggestions

- Try increasing the delay in 0.5 second increments until the uncorrected errors stop appearing.
- If delay is the most important factor, try decreasing the maximum bandwidth in 256k increments until the errors cease.

Operational Example 4:

In this scenario the receiver is set to Interview mode, but the transmitter is inside a building with poor data service. The line quality indicator increases up to approximately 50.00 but the Quality counter is down at 1000 and there are occasional errors. This indicates trouble on the underlying data networks.

Suggestion

- Try increasing the delay in increments of 0.5 seconds to allow the system time to compensate for poor conditions on the cellular network.

APPENDIX B: BIT CENTRAL INTEGRATION (OPTIONAL)

TVU Support will assist with the integration. Once TVU Support has integrated Bit Central with your TVU equipment, set the receiver with the Bit Central configuration as the "Default Receiver" for file upload using ConfigT /TVU Transmitter Web Interface (see pg. 28). This should only have to be set once.

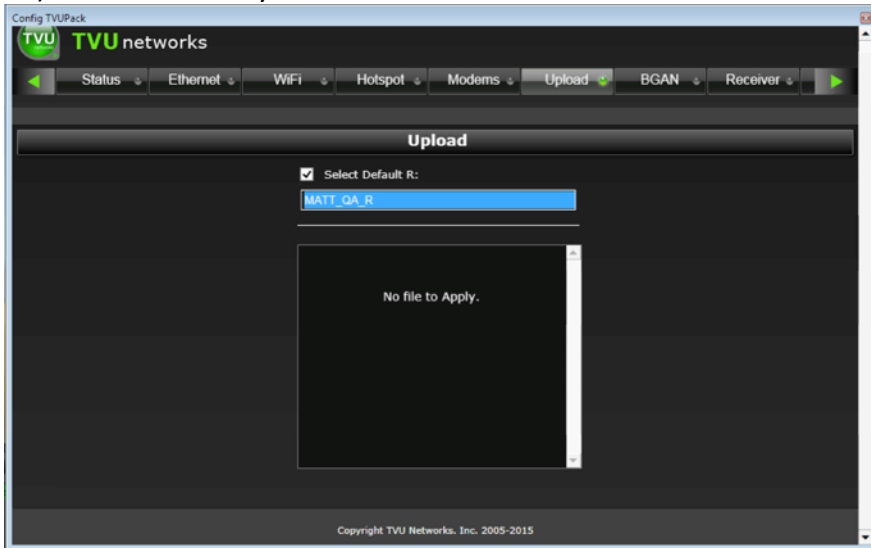


Figure 46

Using the AutoSync feature (either USB or Hotspot – see pg. 47), or the Clip Download function, transfer video files from the Transmitter to the TVU Transceiver. Once files are

received at the Transceiver, they will be automatically ingested into the specified Bit Central server.

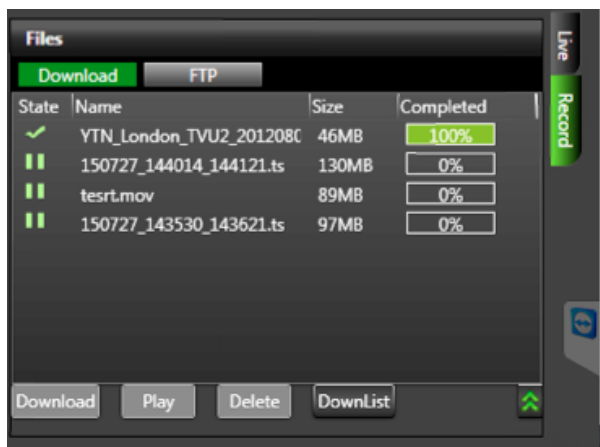


Figure 47

Files must be completely downloaded before they are ingested into the Bit Central server.

APPENDIX C: AUTOSYNC FILE TRANSFER USING WIRELESS HOTSPOT

By using the TVU One transmitter wireless hotspot feature and your laptop, you can automatically send files to the TVU Receiver.

1. Make sure the hotspot is enabled on TVU One.
2. Search for the hotspot on your laptop or smart phone. The SSID will be TVUPACK_XXXX where X is the last 4 digits of the PID of the TVU One.
3. Connect to the SSID.
4. **The password is the last 8 digits of the PID of the TVU One** (Note: All characters are uppercase).
5. Once the connection is established, obtain the IP address in the Connection Details.
6. Open a web browser and enter the IP address.
7. You should see the following: (Figure 48)

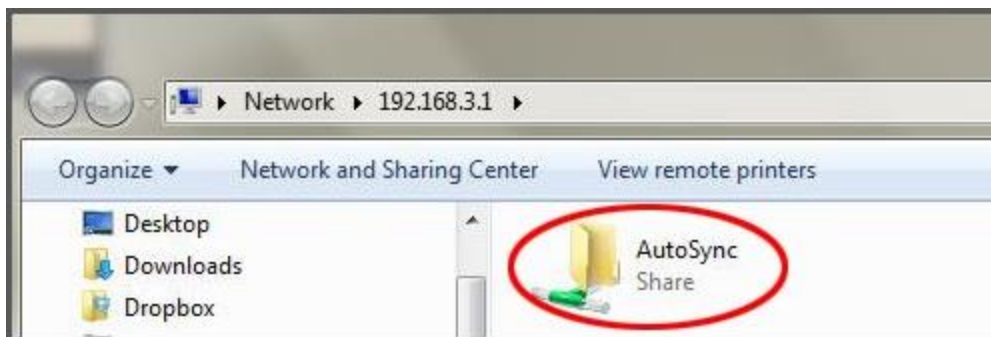


Figure 48 AutoSync screen

8. Drag and drop files to be transferred into the AutoSync folder (Figure 47).

APPENDIX D: AUTOMATIC INGESTION OF USB MEMORY STICK CONTENT TO TVU ONE

You can wirelessly transmit digital content from the TVU One transmitter to the TVU Receiver. To do so, simply place the content on a USB memory stick and then connect the stick to the spare USB port on the TVU One encoder unit. TVU One will auto-detect the memory stick and automatically transfer the contents to its internal SSD hard drive. The content will then be available for wireless transmission to the TVU Receiver. Please note that the supported disk format is FAT32 only.

Take the following steps to transfer content from a USB memory stick to TVU One:

1. Create a directory named "autosyncimport" in the memory stick.
2. Copy the content you want transferred into the "autosyncimport" directory.
3. Plug the memory stick into any to the spare USB port on the TVU One encoder unit.
4. Monitor the status of the file upload on the TVU One's LCD screen. Do not unplug the USB memory stick during the file upload as this may cause the system to malfunction.

APPENDIX E: LOCAL DOWNLOAD OF RECORDED CONTENT TO A USB MEMORY STICK

By connecting a USB memory stick (FAT32 only) to a TVU One transmitter while the video source is disconnected, the entire video content of the last session will be transferred to the memory stick in an NLE compatible format.

Additionally, on the web-based monitoring and controls interface, the Recording tab **(A)** will lists the recorded sessions on the SSD that are available for download (Figure 49).

Users can download any of these sessions to the connected USB memory stick by selecting the desired recording(s) followed by pressing "Copy" **(B)**. Users will be warned if not enough space was available on the memory stick. Additionally, users can preview any recorded content by selecting a clip and pressing "Play" **(C)**.

Note: Playback is only available on iOS devices.

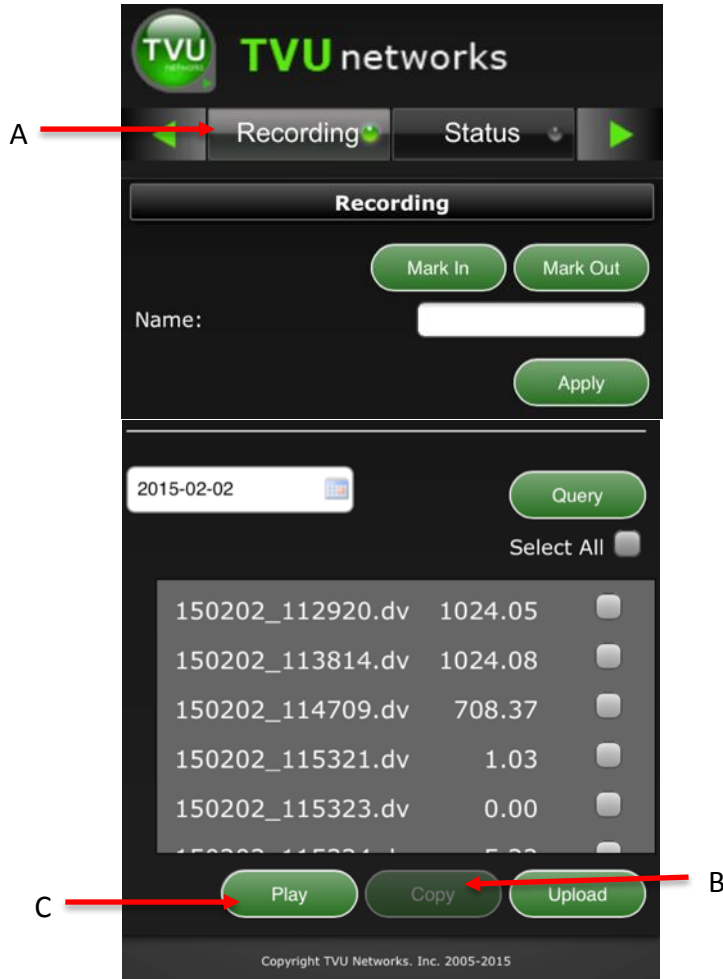


Figure 49

Once a file has been selected to download to the USB, a "Copying" message will appear in the interface while the file is copied and a "Complete" message would appear when finished.

Note: The TVU Transmitter cannot be "live" to use this function.