# HARNESS THE POTENTIAL OF LIVE REMOTE PRODUCTION

Capitalize on the potential of remote production for extensive event coverage from anywhere in the world. Take advantage of multiple solution options to ensure seamless live broadcasting.

## Portable

### TVU RPS One

- Delivers wireless studio and cloud remote production (REMI) using cellular connectivity
- Fully synchronized multi-camera transmission at sub-second latency
- Only product in its class that supports six embedded 5G 3GPP Release 16, sub-6 GHz modems
- Integrated end-to-end cloud-based live video production from the field to distribution Ultra
- Lightweight, battery powered design for go-anywhere operation

### TVU Timelock

- For untethered remote production applications usingcellular connectivity.
- Synchronize multiple TVU One transmitters andreceivers together.
- Camera operators are free to roam the productionspace with no attached cables.
- Control multiple devices with fixed,low latency from asingle Command Center GUI.

## Rackmount

### TVU RPS

- For fixed remote production applications using wired,private or commodity,internet connections.
- Fully synchronized transmission of up to six SDIsources two return feeds.
- Transcontinental latency-as low as 0.5 seconds.
- VLAN tunnel provides peripheral connectivity betweenthe studio and the field.
- Aggregates multiple wired links for greater bandwidthand redundancy.
- Outputs independent SRT or permits TVU ISSPmonitoring of IP streams.

### TVU RPS Link Encoder

- Suitable for remote production applications using wireless or wired commodity internet.
- Aggregates multiple cellular, satellite and ethernet connections for greater bandwidth and redundancy.
- Fully synchronized transmission of up to six SDI sources + two return feeds.
- Glass-to-glass latency as low as 500ms.
- VLAN tunnel provides peripheral connectivity between the studio and the field.

# TVU RPS

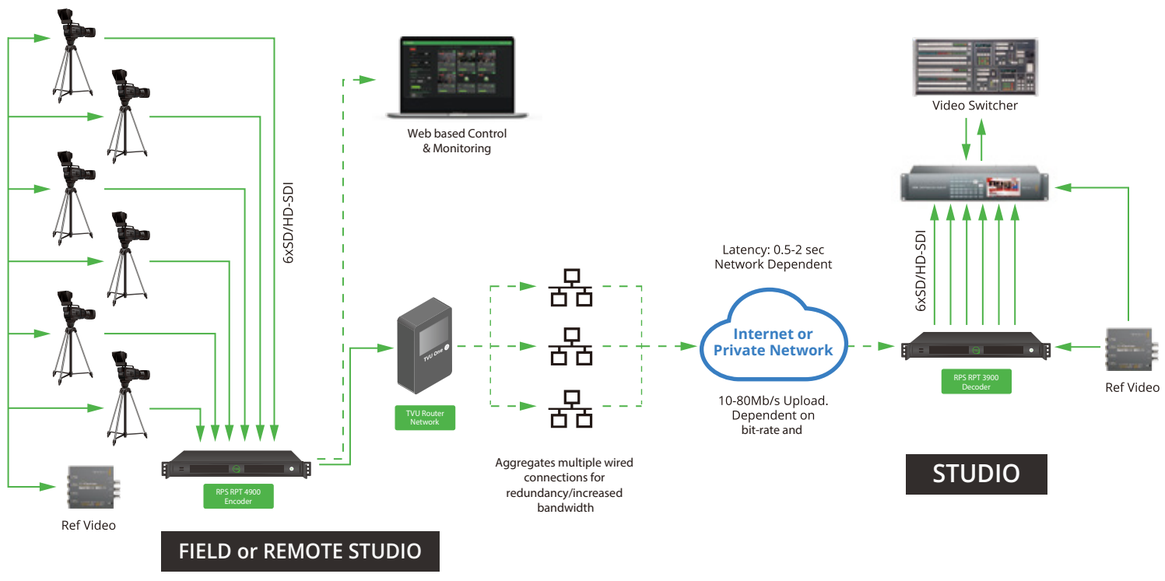
## Frame accurate multi-camera REMI at-home production over IP

With a 1RU encoder at the venue and a separate decoder at the remote studio, RPS transmits up to six fully frame synchronized HD sources from a remote location to your studio, allowing you to use your existing production equipment to produce a remote live event. TVU RPS also supports up to two HD return video feeds, 16 audio channels per input, delivers sub-second latency down to 0.5 seconds and features H264 or HEVC CBR or VBR encoding for efficient data use over commodity internet.


## Workflow

- TVU RPS can transit from one encoder to a single decoder or two decoders simultaneously (for redundancy and different workflows) or from the encoder to TVU Producer for purely cloud based production.
- User-friendly web-based interface grants control over all aspects of transmission, including encode bit-rate and latency settings, and provides a low-latency preview of all six channels.
- Ultra-low latency preview in 4-ch. mode allows effective control of remote cameras.
- Provides up to two low-latency return video feeds from the studio back out to the encoder in the field.
- VLAN tunnel allows you to extend IP studio peripherals such as camera tally, intercom, CCU or other setups out to the field.
- TVU RPS encoders can be installed in the field behind networks firewalls and only require outbound internet connectivity with no special port forwarding required even for return video feeds.
- TVU RPS sessions can be controlled completely in the cloud using TVU Command Center, using the locally host web interface on the encoder or using a mouse/keyboard and local HDMI monitor.
- It is possible to aggregate up to two separate links on the encoder and decoder, for increased bandwidth and/or redundancy.
- TVU RPS can deliver fiber-like reliability by aggregating multiple independent commodity Internet connections. All connections are used simultaneously, load balanced and provides automated rollover redundancy.
- TVU RPS outputs independent SRT or permits TVU ISSP monitoring of IP streams of each channel at the decoder, enabling the distribution of ISO feeds for monitoring or distribution without needing to re-encode the SDI outputs.

## Workflow diagram for TVU RPS




## Technical Specifications*

| | |
|---|---|
| Model | VS3500 |
| Form Factor | 1RU Rack-Mount Chassis |
| OS | Linux |
| Encoder | 6 Channel Version: 6 primary (H264 or HEVC), 4:2:0 CBR/VBR, 2 x Return Video Feeds with 16 channel embedded audio support per channel and preview<br>4 Channel Version: 6 primary (H264 or HEVC), 4:2:0 CBR/VBR, 2 x Return Video Feeds with 16 channel embedded audio support per channel and preview |
| Video Resolutions | SD/HD - SDI (1080-50i/59.94i, 1080p50/59.94 support* ,720-50p/59.94p, NTSC/PAL) * can only support 4-channels live with no preview on the 6 channel version |
| Video Inputs | 6-ch version SD/HD-SDI 1.0/2.3 DIN connectors: Ports 1-6 utilized for primary transmission and Ports 7-8 used for return video<br>4-ch version SD/HD-SDI BNC connectors: Ports 1-4 utilized for primary transmission and Ports 3-4 used for return video( if applicable) |
| Genlock Input (Decoder) | Ref: 1.0/2.3 DIN, BB or Tri level (BNC adapter included) |
| Transmission Protocol | Inverse Statmux + |
| Network Interface | 2 independent 10/100/1000 BASE-T RJ45 Ethernet ports (one for VLAN and one for WAN),<br>2 x USB 2.0, 2USB 3.0 |
| Display | HDMI and VGA |
| USB Ports | 2x USB 3.0; 2x USB 2.0 |
| Ethernet | 2x 1 GigE Ethernet ports (WAN+VLAN) |
| Power Source | 100-240V ~/3.5A 47Hz-63Hz |
| Dimensions | 16.92in (430mm)L x 10.39in (264mm)W x 1.77in (45mm)H |
| Weight | 9.56lbs (4.34 kg) |
| Operating Temperatures | 32F - 89.6F; 0C - 32C |
| Power Supply | Single or optional Dual |

## Key Features

- Supports up to six fully synchronized transmission.
- Dependable, fixed low latency transmission over standard commodity wired Internet connections.
- Multiple encode behaviors to suit virtually any CBR, VBR and VBR with Channel Priority modes.
- Connect production peripherals such as IP talkback, CCU, remote camera control, tally and more from the studio to the field using the VLAN tunnel.
- Supports up to two high quality return feeds.
- Ultra Low latency web preview allows for effective control of remote cameras.

## Use Cases

**Sports -** TVU RPS helps cover multi camera sporting events economically. It also helps in covering multiple events with the same production crew back to back. Just send cameras and camera operators into the field and contribute synchronized camera feeds via IP over the conventional internet back to their in-house control room for switching, and the addition of graphics, effects, text and other production elements. Entire production crew is no longer needed on site.

**News -** When important stories happen away from the studio, TVU RPS plays an important role in making it possible to deliver that same professional, high-quality broadcast to its audience. Be it covering an event/ morning shows from multiple cameras or management and control from a remote studio RPS can help.

**Media Production -** Conducting a talk show at the same time as an award show has never been that easy and cost effective. RPS helped to reliably transport video from one location to another, yielding professional-level results while still making economic sense.

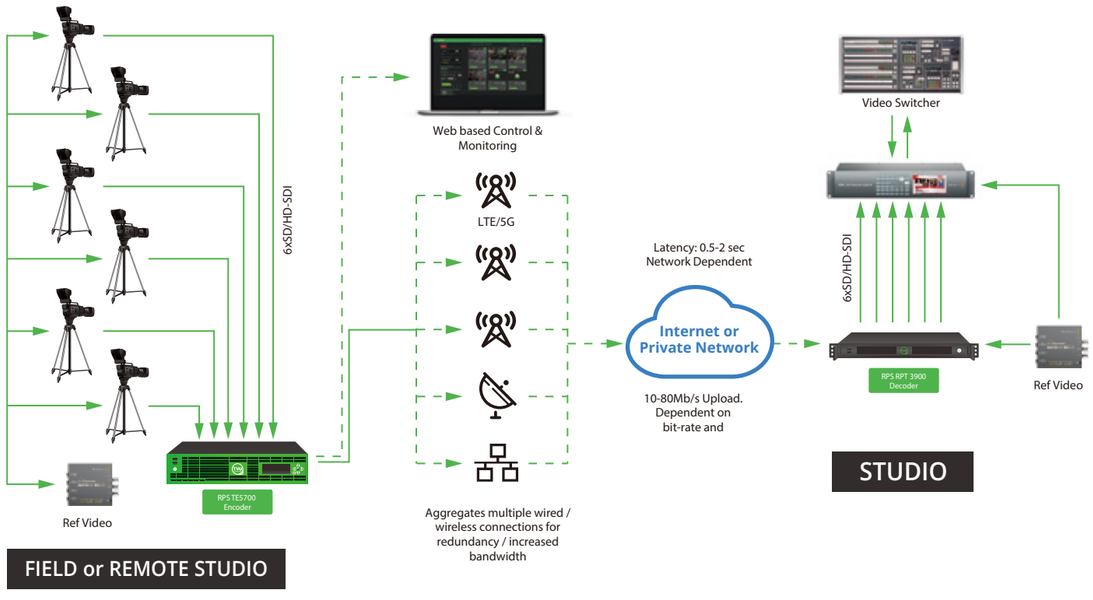
# TVU RPS Link Encoder

The TVU RPS Link Encoder provides multi-camera, synchronized remote production capability using IS+ and aggregating up to 12 connections. This includes embedded 5G/LTE modems, WIFI, Ethernet or satellite.

## Key Features

- △ IP based peripherals including talkback system, tally lights, and remote cameras have full connectivity via VLAN tunnel
- △ Latency over commodity internet as low as 500ms
- △ Compatible with the existing TVU RPS hardware decoder
- △ Lego like interconnection with TVU's complete Cloud Production ecosystem
- △ Low latency source preview (200-300ms) for remote camera operation
- △ H264 or HEVC encoding up to 15Mb/s per channel (VBR and CBR)
- △ RPS can be controlled and monitored using its built-in web interface or via TVU Command Center

## Workflow diagram for TVU RPS Link Encoder




## Technical Specifications*

| | |
|---|---|
| Model | TE5700 |
| Form Factor | 2RU Rack-Mount Chassis |
| OS | Linux |
| Encoder | 6 channel version: 6 primary (H264 or HEVC), 4:2:0 CBR/VBR, Return video feeds with 16 channel embedded audio support per channel and preview.<br>4 channel version: 4 primary (H264 or HEVC), 4:2:0 CBR/VBR, Return video feeds with 16 channel embedded audio support per channel and preview. |
| Video Resolutions | SD/HD - SDI (1080-50i/59.94i, 1080p50/59.94 support* ,720-50p/59.94p, NTSC/PAL) * can only support 4-channels live with no preview on the 6 channel version |
| Video Inputs | 6-ch version SD/HD-SDI 1.0/2.3 DIN connectors: Ports 1-6 utilized for primary transmission and Ports 7-8 used for return video<br>4-ch version SD/HD-SDI BNC connectors: Ports 1-4 utilized for primary transmission and Ports 3-4 used for return video( if applicable) |
| Genlock Input (Decoder) | Ref: 1.0/2.3 DIN, BB or Tri level (BNC adapter included) |
| Transmission Protocol | Inverse Statmux + |
| Network Interface | 2x GigE Ethernet |
| Display | HDMI and VGA |
| Embedded Modems | Up to 6 5G/LTE/4G/3G modems with external SMA antenna ports. System ships standard with high-gain external antennas |
| USB Ports | 3 x USB 3.0; 4 x USB 2.0 |
| WiFi/Hotspot | 2 x Built in 2.4/5GHz Wifi connections for WAN connectivity and internal HotSpot use. Ships standard with external antennas |
| Ethernet | 2 x GigE Ethernet |
| Power Source | 100-240V ~/3.5A 47Hz-63Hz |
| Dimensions | 2U, 16.9"x3.5"x15.3" |
| Weight | 8.6kg |
| Operating Temperatures | 0°C to 35°C |
| Power Supply | Dual |

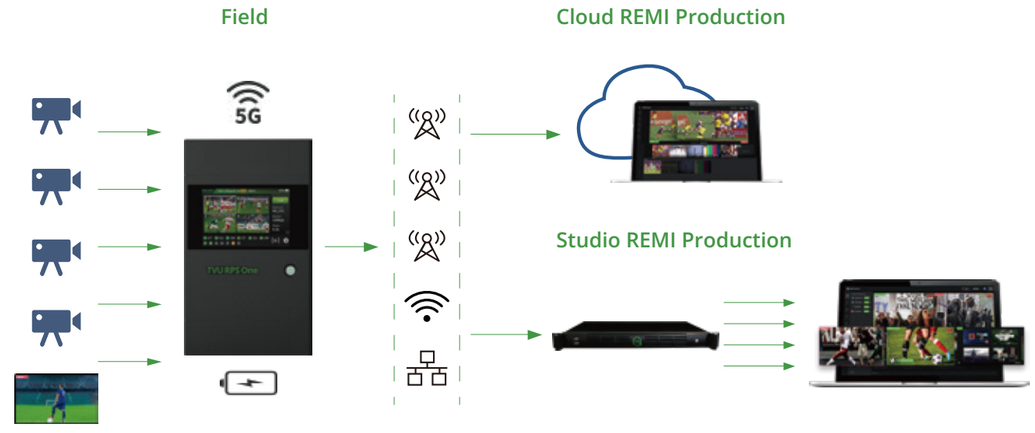
# TVU RPS One

The TVU RPS One is a hybrid cloud and studio remote production solution. For broadcasters looking for the ultimate in wireless portable REMI production, RPS One is the go-to answer for synchronized frame accurate multi-camera transmission with 5G modems. This lightweight backpack style unit aggregates multiple cellular connections to deliver high quality end-to-end cloud-based or on-premise live video production with sub-second latency.

## Key Features

- Battery-powered
- Aggregates up to 12 cellular/Starlink/Ethernet/WiFi/satellite connections
- Four-channel up to 1080P remote production from any location
- Up to six embedded latest generation Sub 6GHz, 3GPP Release 16, 5G embedded modems that support both NSA and the latest SA networks, including IPv6
- Advanced 5G antenna array for all six 5G modems with support for network slicing
- Supports worldwide 5G, LTE, and 3G bands
- Single channel return video feed
- Sub-second latency (0.5 seconds)
- Resilient Inverse Statmux + (IS+) transmission protocol

## Field to Cloud or On-Prem Production




## TVU RPS One Technical Specifications*

| | |
|---|---|
| Form Factor | Portable backpack |
| OS | TVU 8 |
| Video Resolutions | HD 1080p, 1080i 50/59.94/60, 720p 50/59.94/60<br>SD PAL 625i/50<br>SD NTSC 525i/59.94 |
| Video Inputs | 4 |
| Audio Inputs | Up to 16 channels embedded SDI, 8 channels embedded HDMI |
| Supported Data Connections | Simultaneously aggregates up to 12 data connections including internal/external cellular, WiFi, Ethernet, IP Microwave, Satellite (Ka/Ku/BGAN/Starlink). System includes up to 6 embedded 4G/LTE/5G modems, embedded 2.4/5GHz WiFi, Ethernet, and 4 USB connections for external modem connections |
| Modem Support | 6 embedded LTE/5G |
| Encoding and Compression Standard | H.264 or H.265/HEVC |
| Transmission Protocol | Inverse Statmux + |
| Variable Bit-Rate Encoding | TVU Smart VBR hardware encoder |
| Bit-Rate | 100K-125Mbps |
| Return Video Feed | TVU Producer or SDI input at Server<br>HotSpot stream on the same server |
| Audio Inputs | Up to 16 channels embedded SDI, 8 channels embedded HDMI |
| Recording | Supported, Dual Encoder, Dual encoding on all 4-channels |
| Glass-to-Glass Latency | 0.5 seconds |
| WiFi | Onboard and external 2.4/5GHz |
| Hotspot Enabled | |
| Battery Run Times | Internal - 2 hours; External (PowerPac) - 4 hours |
| Transmitter Controls | One button power-on, onboard monitoring and management, remote monitoring and management using mobile smart device or Command Center web service |
| Storage | Up to 18 hours with 128 SD card |
| SD Card Slot (up to 256G) | 1 card slot |
| Voice Communications | TVU RTIL VoIP or IFB |
| Color Space & Bit Depth | 8bit/10bit 4:2:0 |
| Start Up Time | Less than 30 seconds |
| External Interface Connections | SDI, HDMI, USB, Ethernet, IFB |
| Control Screen Specifications | 3.5 inch, 16:10 LCD Touchscreen |
| Store and Forward Supported | |
| Power Source | A single removable, rechargeable internal battery with an optional external Gold or V-Mount battery |
| Power Consumption | Max 30W |
| DC Input | Right angle Mini Jack DC input that connects to external battery or supplied AC adapter.<br>External power adapter: 11-19V DC |
| Dimensions | 7.87 x 4.72 x 2.76in (200 x 120 x 70mm) |
| Weight | 2.2lbs |
| Operating Temperatures | 0°C to 40°C (32°F to 104°F) |
| Certifications and Compliance | FCC and CE Compliant<br>Anatel Certified |

# TVU Timelock

## Wireless 4K/HDR At-Home remote production over aggregated cellular

TVU Timelock allows completely wireless, untethered remote production. Multiple camera-persons using standard TVU One / TVU One 4K devices transmitting via aggregated cellular can freely roam while covering an event. All TVU One devices and their corresponding receivers are synchronized together allowing production to take place at a remote location.

### Key Features

- Synchronize up to 6 standard TVU One transmitters and 6 TVU receiver channels with a single set latency.
- SDI outputs from TVU Receivers used in a TimeLock session are synchronized.
- Battery power and no tethered cables allows camera people to freely roam.
- Monitor and control a TimeLock session from a single TVU Command Center interface.

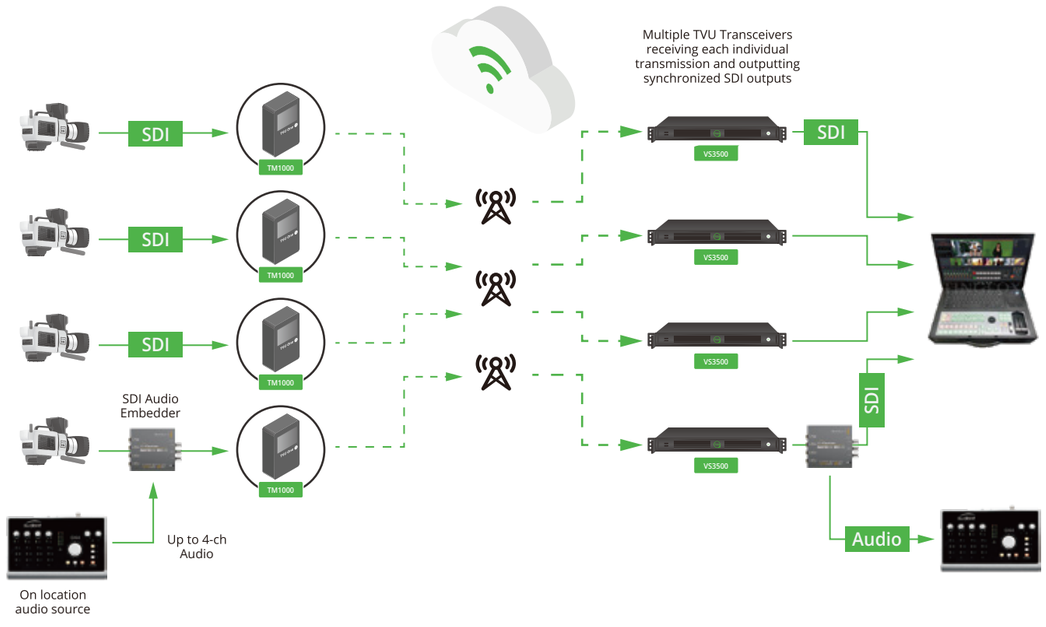
### Use Cases

**Sports -** In sports, things can take a turn in a split second. WIth TVU Timelock, since the camera is not tethered to a cable, it allows the camera operator to freely move around and capture the exact frame that matters.

**Events -** From concerts to parades to fashion shows, many events are best captured at multiple angles to give viewers the full experience. TVU Timelock makes it possible for camera crews to move throughout the venue to capture the intensity and excitement of the event, so people watching on their screens can feel like they are a part of it.

**Live, Multi-camera Television -** Easily setup and transmit a live, multi-camera television program from virtually anywhere or even on the move (e.g. morning show, red-carpet coverage, on location etc. ) without a complex setup or fixed bandwidth requirements.

### Workflow diagram




## Testimonials for TVU Remote Production

**Thiago Perrella**
Engineering and Technology Director at Band

TVU RPS allowed us to provide a dual structure, with reduced cost and equipmment, and better operational management.

**Sergi Galbany**
Operations Director at Al Kamel

TVU RPS completely passed the test and made our demonstration a success.

**Kerry Phelvin**
Technical Production Manager at Sky

The setup was rock solid. TVU RPS system performed flawlessly, moving over 30 terabytes for 16 days.

**Travis Fletcher**
Engineer at Rush Media

Our remote production setup for the WNBA is almost exclusively RPS. We get the maximum amount of channels out of anything we've ever demoed.

**Jake Demoske**
A1 Sound at Rush Media

TVU RPS allows for 16 channels of audio which is amazing in that we can get redundancy from multiple channels over multiple camera paths... this helps us make sure that if one camera goes down or if we lose the feed, that we have redundant backup.

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*Specifications are subject to change.