HD-SDI Video Capture Device

Model 2467

Hardware Manual
Ver. 1.0.0 | March 2020

SENSORAY | embedded electronics

Designed and manufactured in the U.S.A

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Introduction

Model 2467 captures video from SDI or HD-SDI video sources. It has an Ethernet interface. It will overlay and compress resolutions up to 1080p30.

Audio can be extracted from the SDI data, or captured from a microphone or line source. Audio is compressed and multiplexed into a transport stream along with compressed video.
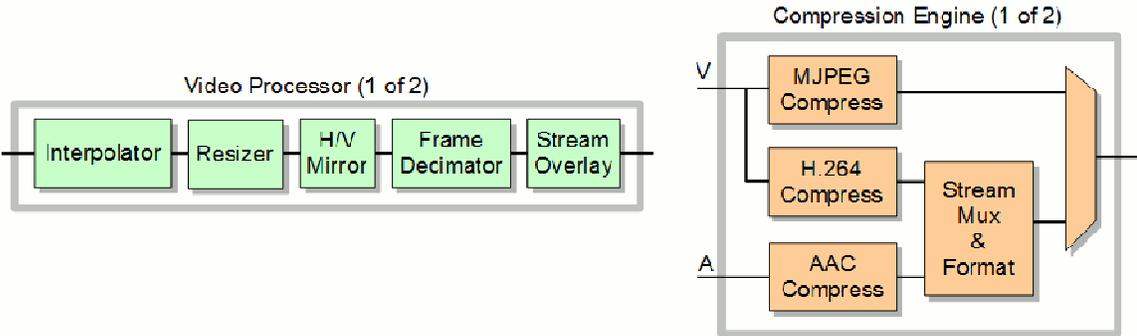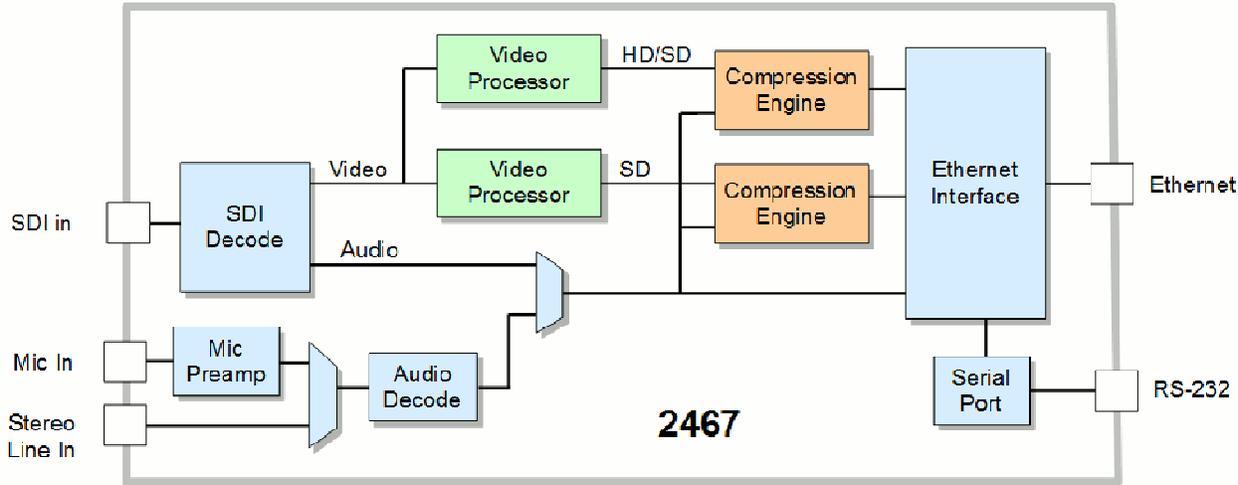
The video processor implements efficient H.264 video compression, producing output data formatted as either MPEG transport stream (MPEG-TS) or in MP4 or AVI file formats. Audio compression is performed using AAC-LC. The stream multiplexer employs high precision hardware timestamps to ensure perfect audio-video sync on players. Snapshot capture is also supported, with MJPEG compression available for both snapshots and AVI streams.

System Requirements

Model 2467 requires a 100Base-TX Ethernet connection. The default Ethernet address is 192.168.24.64, net mask 255.255.0.0.

Software interface

The 2467 is programmable via Ethernet using HTTP (TCP port 80). Setting a configuration parameter uses the POST method, and getting the current value uses GET method. Each parameter has a level of access control, and if user privileges are enabled on the device, Digest Authentication should be used to provide the username and password.

A list of the current parameter settings can be retrieved from the device at `"http://<ip-address>/config.txt"`.

Most programming languages have a HTTP functions built-in or available in a library. For command-line testing `"wget"` or `"curl"` may be used. Here are some examples:

```
wget -q -O- http://192.168.24.64/Video[0].Width

wget -q -O- http://192.168.24.64/Video[0].Height

wget -q -O- --post-
data="Video[0].Width=1920&Video[0].Height=1080"
http://192.168.24.64/controls

wget -q -O- --post-data="UDP[0].State=Start"
http://192.168.24.64/controls

wget -q -O- --post-data="UDP[0].State=Stop"
http://192.168.24.64/controls

wget -q -O- --user=admin --password=password --post-
data="Clock=2015-05-26 9:53:56" http://192.168.24.64/controls
```

To capture a snapshot:
```
wget -O snapshot.jpg http://10.0.24.64/snapshot
```

To download the last snapshot (without taking a new snapshot):
```
wget -O snapshot.jpg http://10.0.24.64/snapshot.jpg
```

```
To set the snapshot quality (range is 10-90):
wget -O- --post-data="Snapshot.JPEGQuality=90"
http://10.0.24.64/controls
```

Connectors

Audio inputs - JP1

Molex 0532610771. Mating part: Molex 0510210700.

Pin	Signal
1	Ground
2	Mic input +
3	Mic input -
4	Ground
5	Line in, right
6	Ground
7	Line in, left

Note: microphone input expects an electret condenser microphone:
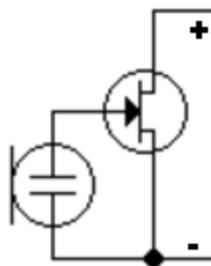
Power - JP2

Molex 0532610671. Mating part: Molex 0510210600.

Pin	Signal
1	+Vin (9-36V DC)
2	Ground
3	Ground
4	Button*
5	Ground
6	GPIO1**

* Configuration mode contact. Connect to Ground to enter Configuration mode (see Network Configuration chapter).

** No specific GPIO functionality is implemented in the firmware. Please contact Sensoray with the requirements.

MicroSD card extension, JP3

Molex 0532610871. Mating part: Molex 0510210800.

Pin	Signal
1	Data2
2	CD/Data3
3	CMD
4	VDD (3.3V)
5	CLK
6	VSS (ground)
7	Data0
8	Data1

Ethernet – JP5

Molex 0532611271. Mating part: Molex 0510211200.

Pin	Signal
1	TX+
2	TX-
3	RX+
4, 5	Not used
6	RX-
7, 8	Not used
9	Shield
10	3.3V (optional LEDs common anode)
11	LED0 (active low, 470 Ohm)
12	LED1 (active low, 470 Ohm)

RS232, USB host, I2C – JP6

Molex 0532611071, mating part: Molex 0510211000.

Pin	Signal
1	RS232 TX

2	RS232 RX
3	Ground
4	I2C SCL
5	I2C SDA
6	Ground
7	Ground
8	USB DM
9	USB DP
10	USB Vbus (output)

Note: No specific RS232 and I2C functionality is implemented. Please contact Sensoray to discuss the requirements.

Specifications

Video Input	
Data rates	270 Mbps, 1.483 Gbps, 1.485 Gbps
Standards	SMPTE 259M(C), SMPTE 292M
Maximum resolution/frame rate	1920x1080p30
Connector	BNC, 75 Ohm
Output video streams	
H.264	High Profile @ Level 3 (MP4, AVI, transport stream)
JPEG	Single snapshots, AVI
Audio inputs	
Stereo line	10 kOhm
Microphone	electret type
Electrical, mechanical and environmental	
Dimensions	27x63 mm (PCB outline, does not include the BNC connector)
Mass	26 g
Operating temperature	-20º to 70º C (active cooling may be required)
Interface	100Base-TX Ethernet
Power	9-36 V DC, 2.5W max

Firmware updates

The firmware update is initiated using web interface. That requires a computer, located on the same network as the 2467. Using any browser connect to the 2467, and select Admin/Update, which will bring up the window that displays the versions of the device's firmware components and the serial number. To update the firmware, choose the file (s2464.fw provided by Sensoray) and press Submit. The firmware update should take about 30 seconds to complete. Do not unplug the device while the firmware update is in process. If a firmware update is interrupted, the device will attempt to load from a backup firmware image. During the update the red LED flashes and update status is displayed in the Firmware Status field of the web page. If the update has completed successfully a message "Firmware result: ok" is displayed in a pop-up window. All device settings are preserved across the firmware update. To reset the all parameters on the device, click the Reset Parameters button. That will reset the network settings as well, but the change to those will take effect only after the power is cycled. This allows setting an IP address different from the default (192.168.24.64) even after parameters reset, if necessary.

Network configuration

Each 2467 is shipped with a default IP address `192.168.24.64` and a netmask `255.255.0.0`. Those settings can be modified using a Web page interface. The unit has to be powered up and connected to the LAN using an Ethernet patch cable, Cat5 or better. The 2467 automatically detects the type of the host interface, so it can be connected both to the computer and to a switch (hub) using the same type of cable.

When DHCP mode is selected, it may be unknown what IP address is given to the device. The IP address may be discovered by querying the router/DHCP server for the hostname.

Depending on the network restrictions one or two steps may be necessary to set a new IP address. First off please make sure that the network mask of the computer that is used to connect to the 2467 is set to `255.255.0.0`. If the network used to configure the unit can not access `192.168.x.x` IP address range, start with Step 1, otherwise go directly to Step 2.

Step 1 - Setting up a temporary IP address

This step is only necessary if the network used to configure the unit can not access the default IP address (`192.168.24.53`). In this case the unit must be switched into the Configuration Mode which allows setting up a *temporary* IP address accessible from the current network. The temporary IP address should be selected such that it is:

1)   accessible on the network;

2)   not already used by any other device on the same network.

First, run ARP on the computer that is connected to the same network with the following command line:

```
arp -s <temporary_address>  08-00-56-ff-ff-ff
```

Please use colons (:) instead of dashes (-) in MAC address on Linux systems.

For example,

```
arp -s 10.135.1.61 08-00-56-ff-ff-ff
```

In Windows either navigate to Start/Run and type the command line in the "Open" box, or start a Command Prompt window and type the command line followed by Enter.

In Linux type the command line in the terminal window at the shell prompt followed by Enter. Please use colons (:) instead of dashes (-) in MAC address.

Note: it is recommended to use a temporary IP address that is different from the target permanent address to be assigned to the unit.

Now switch the 2467 into the Configuration Mode by pressing the configuration button.

Note: you need to wait 15 seconds after the 2467 is powered up before the board is able to switch to Configuration Mode.

Once the 2467 receives a network packet addressed to it, the temporary IP address will be in effect. To send a packet either ping the board or connect to it with a browser. Using an IP address from the example, either run

`ping 10.135.1.61`

or type `http://10.135.1.61` into the address bar of your browser

on the computer connected to the same network as the 2467.

Once the unit is accessible using a temporary IP address, the standard Web page procedure (Step 2) can be used to set up the desired permanent IP address and other settings.

Step 2 – Setting up a permanent IP address

Connect to the unit with a Web browser by typing the unit's temporary IP address in the address field.

Example:

`http://10.135.1.61`

Once the Main Menu page is displayed, select Admin/Network.

Type in the desired permanent IP address and subnet mask values into corresponding fields. Please note that there are 2 static configurations available. Make sure that the one that you need is selected in the "Network mode" list-box before clicking on Submit. Now the unit's new IP address is set. The browser redirects to the new address automatically.

Revision history

Version	Notes
1.0.0, March 2020	Initial release.