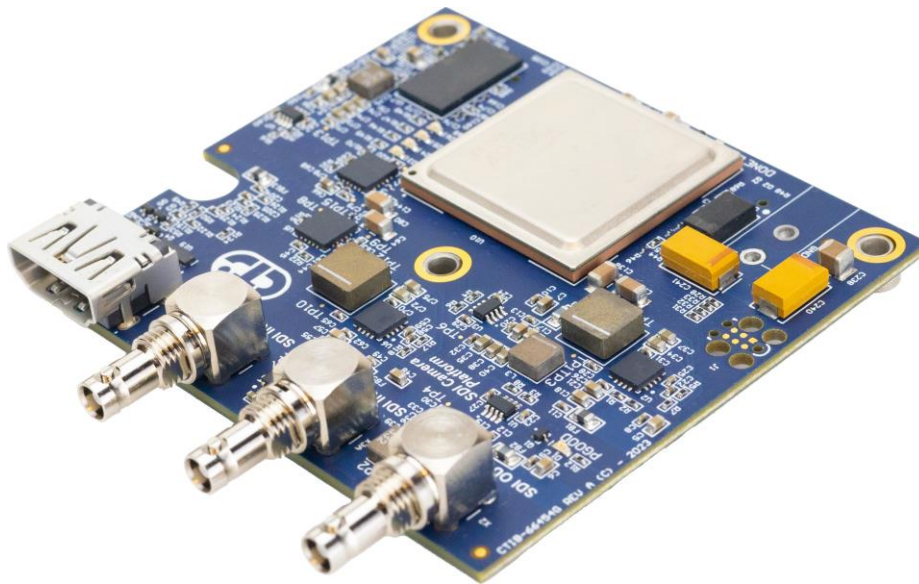




**Connect Tech Inc.**  
Embedded Computing Experts

# USERS GUIDE



## NVIDIA® Jetson™ SDI Vision Platform

CTIM-00094 Revision 0.00 2024-01-10



CONNECT TECH  
[www.connecttech.com](http://www.connecttech.com)  
[support@connecttech.com](mailto:support@connecttech.com)

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## PREFACE

### Disclaimer

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Connect Tech assumes no liability for any damages incurred directly or indirectly from any technical or typographical errors or omissions contained herein or for discrepancies between the product and the user’s guide.

### Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Support resources are available 24 hours a day, 7 days a week on our website at: <https://connecttech.com/support/resource-center/>. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

### Contact Information

Contact Information	
<b>Mail/Courier</b>	Connect Tech Inc. Technical Support 489 Clair Rd. W. Guelph, Ontario Canada N1L 0H7
<b>Contact Information</b>	<a href="mailto:sales@connecttech.com">sales@connecttech.com</a> <a href="mailto:support@connecttech.com">support@connecttech.com</a> <a href="http://www.connecttech.com">www.connecttech.com</a>  Toll Free: 800-426-8979 (North America only) Telephone: +1-519-836-1291 Facsimile: 519-836-4878 (on-line 24 hours)
<b>Support</b>	Please go to the <a href="#">Connect Tech Resource Center</a> for product manuals, installation guides, device drivers, BSPs and technical tips.  Submit your <a href="#">technical support questions</a> to our support engineers. Technical Support representatives are available Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time.

## Limited Product Warranty

Connect Tech Inc. provides a one year Warranty for this product. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non-Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. Limited Warranty is only valid over the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract the Warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

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## ESD Warning



Electronic components and circuits are sensitive to ElectroStatic Discharge (ESD). When handling any circuit board assemblies including Connect Tech COM Express carrier assemblies, it is recommended that ESD safety precautions be observed. ESD safe best practices include, but are not limited to:

- Leaving circuit boards in their antistatic packaging until they are ready to be installed.
- Using a grounded wrist strap when handling circuit boards, at a minimum you should touch a grounded metal object to dissipate any static charge that may be present on you.
- Only handling circuit boards in ESD safe areas, which may include ESD floor and table mats, wrist strap stations and ESD safe lab coats.
- Avoiding handling circuit boards in carpeted areas.
- Try to handle the board by the edges, avoiding contact with components.

## REVISION HISTORY

Revision	Date	Changes
0.00	2024-01-10	Initial Release

## INTRODUCTION

The NVIDIA® JETSON™ SDI VISION PLATFORM allows for ultra-low hardware latency SDI-to-MIPI CSI-2 conversion, providing a direct ISP ingest path to GPU compute on the NVIDIA® Jetson™ platform without the overhead from other methods such as frame grabbers, USB, or Ethernet packetizing.

Ideal for Edge AI applications in robotics, industrial and public sector, supporting multi-sensor, multi-spectral, electro-optic and infrared (EO/IR) surveillance and targeting systems for ISR and Inference applications across the air, land and maritime domains.

### Product Features and Specifications

Specifications	
SDI Video Inputs	2x 3G-SDI/HD-SDI/SDI (via 2x HD-BNC Connectors)
SDI Video Output	1x 3G-SDI/HD-SDI/SDI (via 1x HD-BNC Connector)
SDI Supported Formats	YUV422 (UYVY) 720p/1080p Up to 60fps 10-bit or 8-bit formats support (*Jetson MIPI only receives 8-bit)
Video Input Path to JETSON	SDI-to-MIPI (via Samtec QTH Connector)
Video Output Path from JETSON	HDMI-to-SDI (via HDMI Type-A Connector)
MIPI CSI-2 Details	Each SDI Input channel will be converted to a 4-lane MIPI CSI-2 v1.3 output per SDI Input (8-lanes total)
Power	+12V Provided via Camera Expansion Connector
Thermal Design Power	TBD
Weight	53 Grams
Mechanical Details	PCBA Dimensions: 67mm x 75mm PCBA Height with Integrated passive heatsink: 17mm
Operating Temperature	-40°C to +85°C
Warranty & Support	1 Year Warranty and Free Technical Support

\*Limited by Jetson Platform

## Part Numbers / Ordering Information

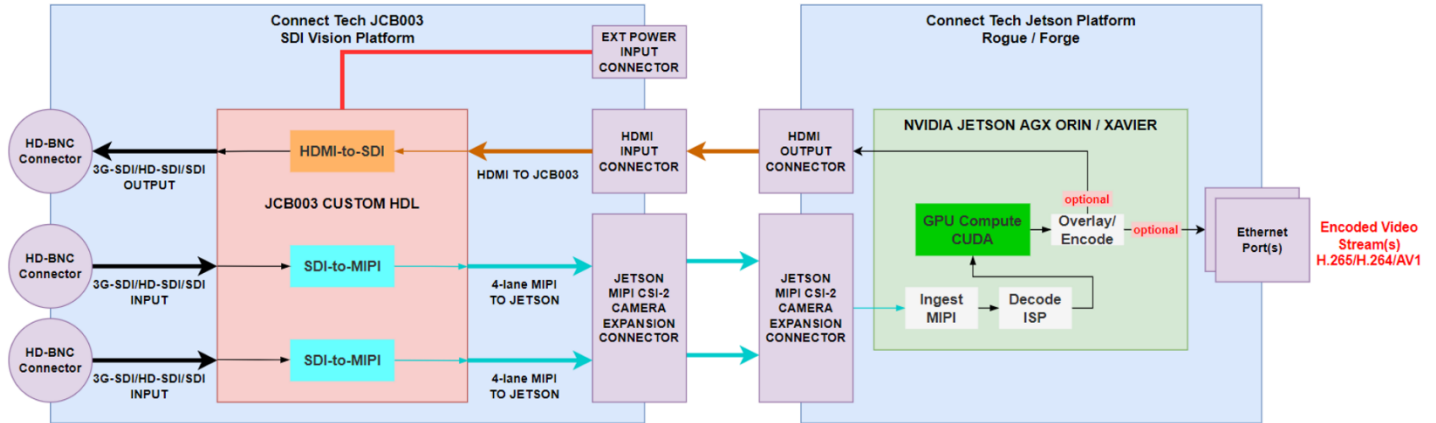
Part Number	
JCB003-01	Standalone Jetson SDI Vision Platform with Heatsink
AGX201-2WV	Forge Integrated Assembly with AGX Orin Module, Stock Heatspreader, 3G-SDI Camera Board (JCB003)
AGX201-331	Forge Integrated Assembly with AGX Orin Module, Heatsink (external airflow required), 3G-SDI Camera Board (JCB003)
AGX201-364	Forge Integrated Assembly with AGX Orin Module, Advanced Active Cooling, 3G-SDI Camera Board (JCB003)
AGX202-2WV	Rogue Orin Integrated Assembly with AGX Orin Module, Stock Heatspreader, 3G-SDI Camera Board (JCB003)
AGX202-331	Rogue Orin Integrated Assembly with AGX Orin Module, Heatsink (external airflow required), 3G-SDI Camera Board (JCB003)
AGX202-364	Rogue Orin Integrated Assembly with AGX Orin Module, Advanced Active Cooling, 3G-SDI Camera Board (JCB003)

Other integrations options are available, please contact [sales@connecttech.com](mailto:sales@connecttech.com)

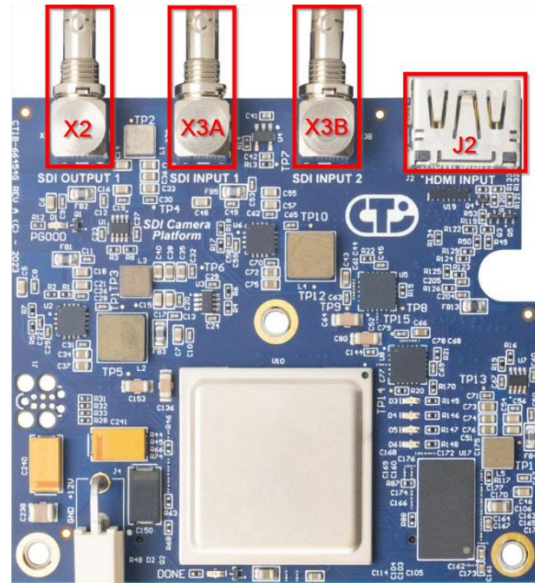
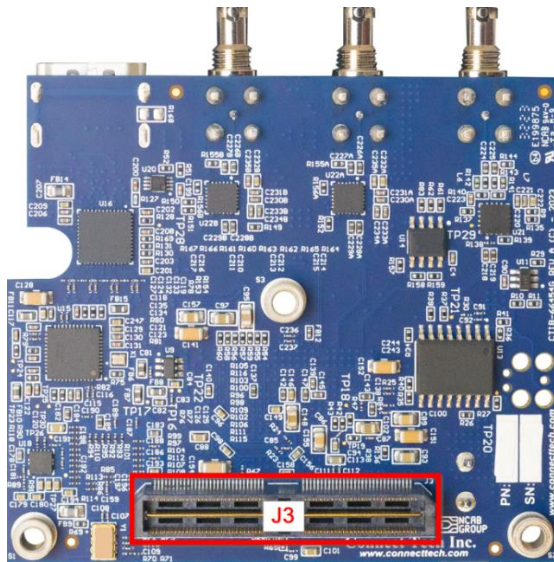


# PRODUCT OVERVIEW

## Block Diagram



## Connector Summary & Locations

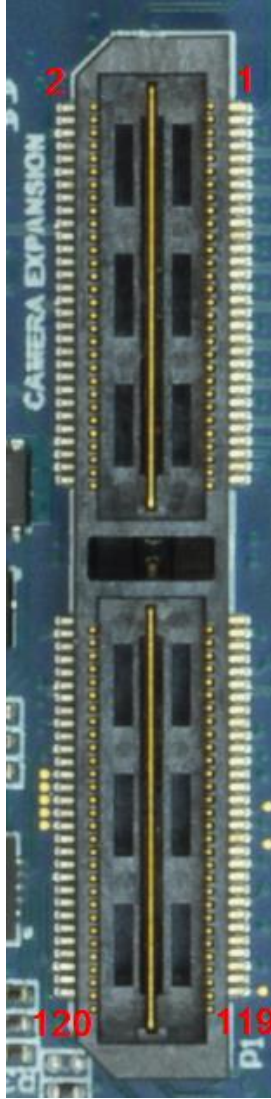


Designator	Description
X2	SDI Output (HD-BNC)
X3A, X3B	SDI Input (HD-BNC)
J2	HDMI Input (Type A HDMI)
J3	MIPI Camera Expansion Connector (Samtec QTH)

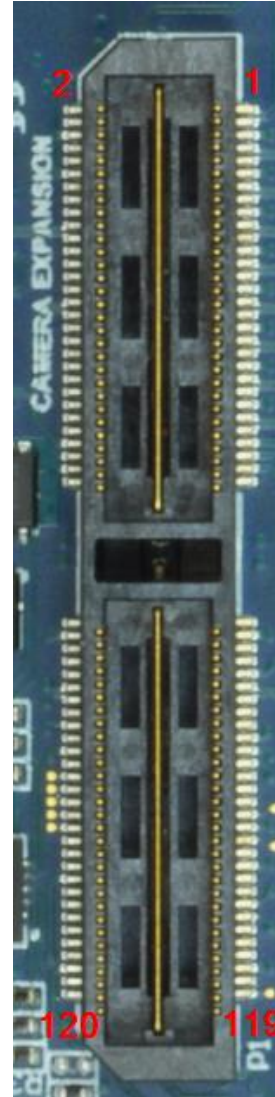


## DETAILED FEATURE DESCRIPTION

### [J3] MIPI Camera Expansion Connector Pinout

Function	8 MIPI CSI-2 Camera Interface			
Location	J3			
Pin	Description	Pin	Description	
1	CSI0_D0_P	2	CSI1_D0_P	
3	CSI0_D0_N	4	CSI1_D0_N	
5	GND	6	GND	
7	CSI0_CLK_P	8	NC	
9	CSI0_CLK_N	10	NC	
11	GND	12	GND	
13	CSI0_D1_P	14	CSI1_D1_P	
15	CSI0_D1_N	16	CSI1_D1_N	
17	GND	18	GND	
19	CSI2_D0_P	20	CSI3_D0_P	
21	CSI2_D0_N	22	CSI3_D0_N	
23	GND	24	GND	
25	CSI2_CLK_P	26	NC	
27	CSI2_CLK_N	28	NC	
29	GND	30	GND	
31	NC	32	NC	
33	NC	33	NC	
35	GND	36	GND	
37	NC	38	NC	
39	NC	40	NC	
41	GND	42	GND	
43	NC	44	NC	
45	NC	46	NC	
47	GND	48	GND	
49	NC	50	NC	
51	NC	52	NC	
53	GND	54	GND	
55	+12V	56	+12V	

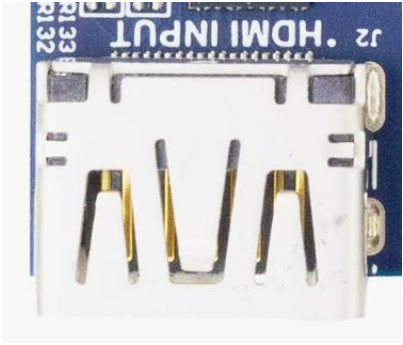
Pin	Description	Pin	Description
57	+12V	58	+12V
59	NC	60	NC
61	NC	62	NC
63	GND	64	GND
65	NC	66	NC
67	NC	68	NC
69	GND	70	GND
71	NC	72	NC
73	NC	74	NC
75	I2C3_SCL	76	NC
77	I2C3_SDA	78	NC
79	GND	80	NC
81	NC	82	NC
83	NC	84	NC
85	NC	86	NC
87	NC	88	NC
89	NC	90	NC
91	NC	92	NC
93	NC	94	NC
95	NC	96	NC
97	NC	98	NC
99	GND	100	GND
101	NC	102	NC
103	NC	104	NC
105	I2C4_SCL	106	NC
107	I2C4_SDA	108	NC
109	NC	110	NC
111	NC	112	NC
113	NC	114	NC
115	GND	116	GND
117	NC	118	NC
119	NC	120	NC



## [J2] HDMI Input (Type A HDMI)

HDMI **INPUT** only. Intended to receive an HDMI signal, convert to SDI then output on SDI output X2 connector.

Function	HDMI Input	
Location	J2	
Type	HDMI Type A	
Connector	Part Number: 1747981-1 Manufacturer: TE Connectivity	
Mating Cable	Standard HDMI cable	
Pinout	As per the HDMI Specification	



## [X2] SDI Output

SDI Output only. Outputs the converted signal from the HDMI connector J2.

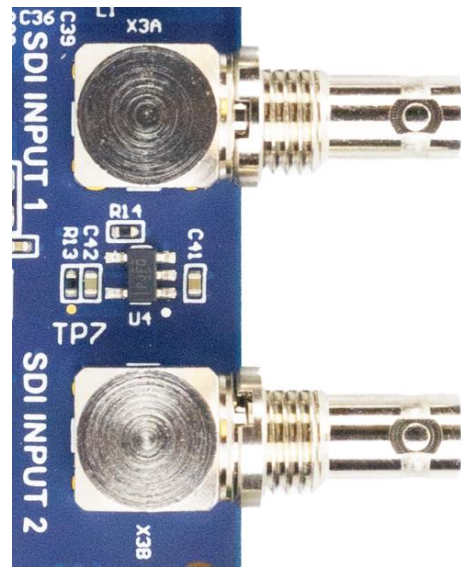
Function	SDI Output	
Location	X2	
Type	HD-BNC Jack	
Connector	Part Number: HDBNC-J-P-GN-RA-BH2 Manufacturer: Samtec	
Mating Cable	HD-BNC Plug	
Pinout	Pin	Description
	1	SDI OUT



## [X3A, X3B] SDI Input

SDI Input only. The SDI Input will be converted into MIPI to be ingested by the Jetson Module.

Function	SDI Output	
Location	X3A, X3B	
Type	HD-BNC Jack	
Connector	Part Number: HDBNC-J-P-GN-RA-BH2 Manufacturer: Samtec	
Mating Cable	HD-BNC Plug	
Pinout	Pin	Description
	1	SDI IN



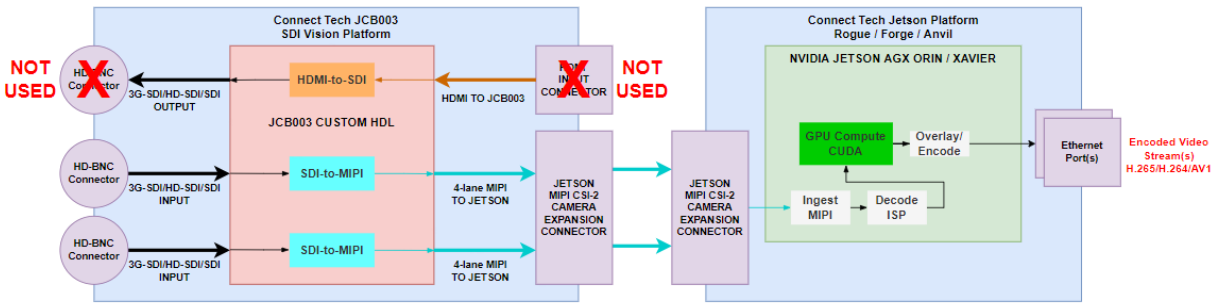
# TYPICAL INSTALLATION AND USAGE

Prior to hardware installation, make sure you have the correct software installed on the Xavier or Orin Module. Installation instructions can be found at <https://connecttech.com/resource-center/kdb373/>.

1. Ensure all external system power supplies are off.
2. Connect camera(s) and cables to the connector(s).
3. Switch ON the Power Supply. DO NOT power up your system by plugging in live power.

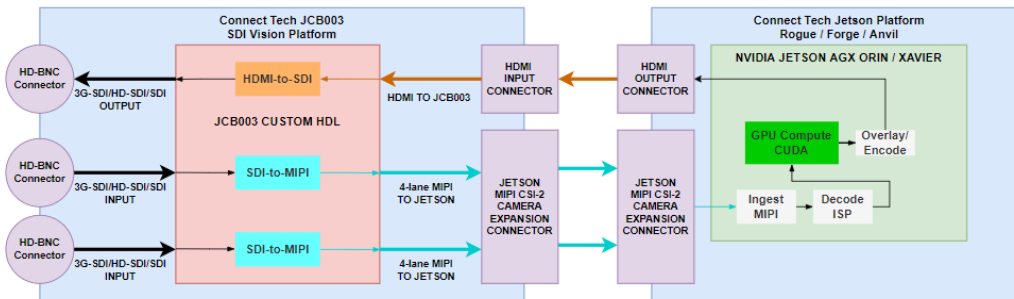
## EXAMPLE USE CASE 1 - SDI VIDEO PROCESSING AND IP ENCODING

SDI Video is Captured, Processed by Jetson, Then Encoded for an IP video stream(s) via H.265 (or other)



## EXAMPLE USE CASE 2 - SDI VIDEO PROCESS AND SDI OVERLAY

SDI Video is Captured, Processed by Jetson, transmitted out via HDMI-to-SDI for a final SDI overlay



## SOFTWARE CONFIGURATION

### CTI BSP JetPack Details

Please ensure you are using the latest L4T package from CTI with integrated JCB003 support, BSP packages can be found here:

<http://www.connecttech.com/resource-center/l4t-board-support-packages/>

### GStreamer Pipeline Examples

CTI has created an example script which will allow for video streaming from the JCB003. Download example script here:

[https://connecttech.com/ftp/Drivers/JCB003\\_stream.sh](https://connecttech.com/ftp/Drivers/JCB003_stream.sh)

There is examples to stream directly from SDI cameras via a gst-launch command in 1080p or 720p. As well DRM mode streaming and IP mode streaming.

```
### Standard Stream with Port 0
# Port 0 (/dev/video0) (SDI Input 1, X3A)
# 1080p
# open in window on screen [xvimagesink]
gst-launch-1.0 v4l2src device=/dev/video0 ! "video/x-raw, format=UYVY, height=1080,
width=1920, framerate=60/1" ! nvvidconv ! xvimagesink

### Standard Stream with Port 1
# Port 1 (/dev/video1) (SDI Input 2, X3B)
# 1080p
# open in window on screen [xvimagesink]
gst-launch-1.0 v4l2src device=/dev/video1 ! "video/x-raw, format=UYVY, height=1080,
width=1920, framerate=60/1" ! nvvidconv ! xvimagesink

### Standard Stream in 720p
# Port 0 (/dev/video0) (SDI Input 1, X3A)
# 720p
# open in window on screen [xvimagesink]
gst-launch-1.0 v4l2src device=/dev/video0 ! "video/x-raw, format=UYVY, height=720,
width=1280, framerate=60/1" ! nvvidconv ! xvimagesink
```



```
### DRM Mode Stream
# Port 0 (/dev/video0) (SDI Input 1, X3A)
# 1080p
# DRM Mode [nvidia-drm] (Kills X-Server/GUI, must reboot to get GUI back, must be
run from serial/ssh)
systemctl stop gdm
loginctl terminate-seat seat0
sleep 2
modprobe nvidia-drm modeset=1
sleep 1
gst-launch-1.0 v4l2src device=/dev/video0 ! "video/x-raw, format=UYVY, height=1080,
width=1920, framerate=60/1" ! nvvidconv ! nvidia-drm-nvenc ! nvidia-drm-nvdec
! xvimagesink

### IP Mode Stream
# Port 0 (/dev/video0) (SDI Input 1, X3A)
# 1080p
# Send Video to IP (in this case through Local Loopback [127.0.0.1] on port 5000) via
RTP
gst-launch-1.0 v4l2src device=/dev/video0 ! "video/x-raw, format=UYVY, height=1080,
width=1920, framerate=60/1" ! nvvidconv ! nvv4l2h265enc insert-vui=1 ! h265parse !
rtph265pay config-interval=1 ! udpsink host=127.0.0.1 port=5000

# On destination IP address display video from RTP Source
# In this case, the RTP stream has been sent to Local Loopback (127.0.0.1) so it must
be run on the same machine. You must change the IP in the above command to set the
destination (even though it says host)
gst-launch-1.0 udpsrc port=5000 ! application/x-rtp, media=video, encoding-name=H265
! queue ! rtph265depay ! h265parse ! nvv4l2decoder ! nvidia-drm-nvdec ! xvimagesink
```



# MECHANICAL DRAWINGS & MODELS

