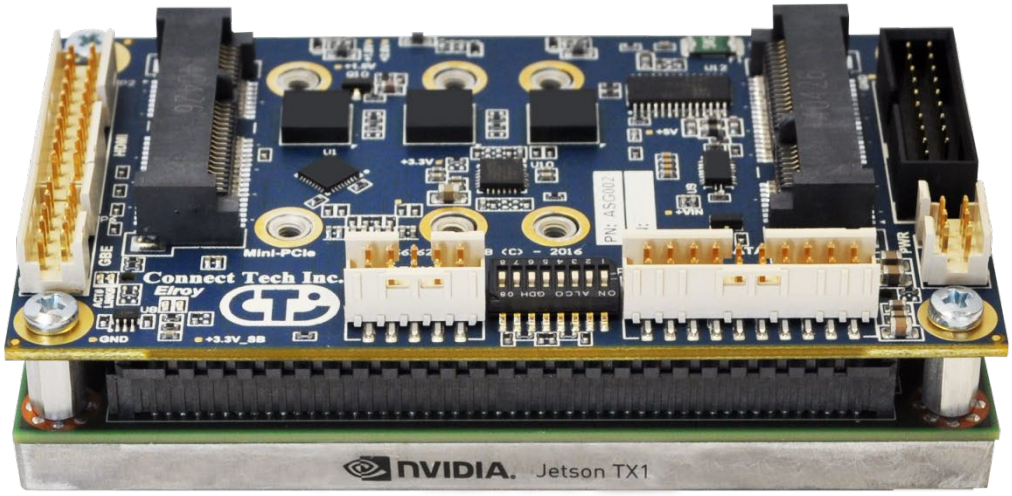
Connect Tech Inc.

Embedded Computing Experts

USERS GUIDE



Elroy Carrier for NVIDIA® Jetson™ TX2/TX2i

CTIM-00465 Revision 0.19 2021-10-05

NVIDIA ELITE PARTNER

CONNECT TECH

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PREFACE

Disclaimer

The information contained within this user's guide, including but not limited to any product specification, is subject to change without notice.

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. Our support section is 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	
Mail/Courier	Connect Tech Inc. Technical Support 489 Clair Rd. W. Guelph, Ontario Canada N1L 0H7
Contact Information	sales@connecttech.com support@connecttech.com www.connecttech.com Toll Free: 800-426-8979 (North America only) Telephone: +1-519-836-1291 Facsimile: 519-836-4878 (on-line 24 hours)
Support	Please go to the Connect Tech Resource Center for product manuals, installation guides, device drivers, BSPs and technical tips. Submit your technical support questions 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 the Elroy Carrier. 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	2016/04/28	Initial Release
0.01	2016/06/13	Added more technical information throughout the document
0.02	2016/07/07	Fixed formatting on thermal section
0.03	2016/10/06	Added information on USB Recovery Mode & fixed minipcie pinout
0.04	2016/10/14	Revised information on USB recovery & added note on video input
0.05	2016/11/16	Updated assembly drawings
0.06	2016/11/24	Added note on power supply, MSG063
0.07	2017/04/18	Updated MSG063 Cable Drawing
0.08	2017/04/24	Added Note on P8, Added tags on mPCIe Pinout table
0.09	2017/05/26	Updated power supplies; added TX2 specs
0.10	2017/08/04	Added cable drawing links, removed drawings from doc

0.11	2017/11/08	Added TX1/TX2 Compatibility information, updated block diagram, updated SW section
0.12	2017/12/06	Updated power specifications
0.13	2018/01/05	Revised cable information
0.14	2018/03/08	Added GPIO KDB link
0.15	2018/07/30	Added TX2i compatibility
0.16	2019/02/20	Added TX2i power circuitry note, pinouts to all photos, P4B to Video Input, notes on CSI connection and SPI lanes
0.17	2019-04-17	Added HDMI 2.0 support
0.18	2019-08-01	P8 pinout correction
0.19	2021-10-05	Updated format, Updated address, Removed TX1 references

INTRODUCTION

Connect Tech's Elroy Carrier for NVIDIA® Jetson™ TX2/TX2i brings a low cost deployable Jetson™ TX2 or TX2i Solution to the market. Designed to match the NVIDIA® Jetson™ TX2 or TX2i module form factor, the Elroy's design includes Dual MIPI CSI-2 Video Inputs, Mini-PCIe/mSATA expansion, Gigabit Ethernet, HDMI Video, USB 3.0 and 2.0, and two Serial Ports for RS-232/485.

All of this is designed for use in a small form factor rugged environment. With locking pin-header connectors, solder in standoffs, and industrial temperature range components, the Elroy is going places.

Product Features and Specifications

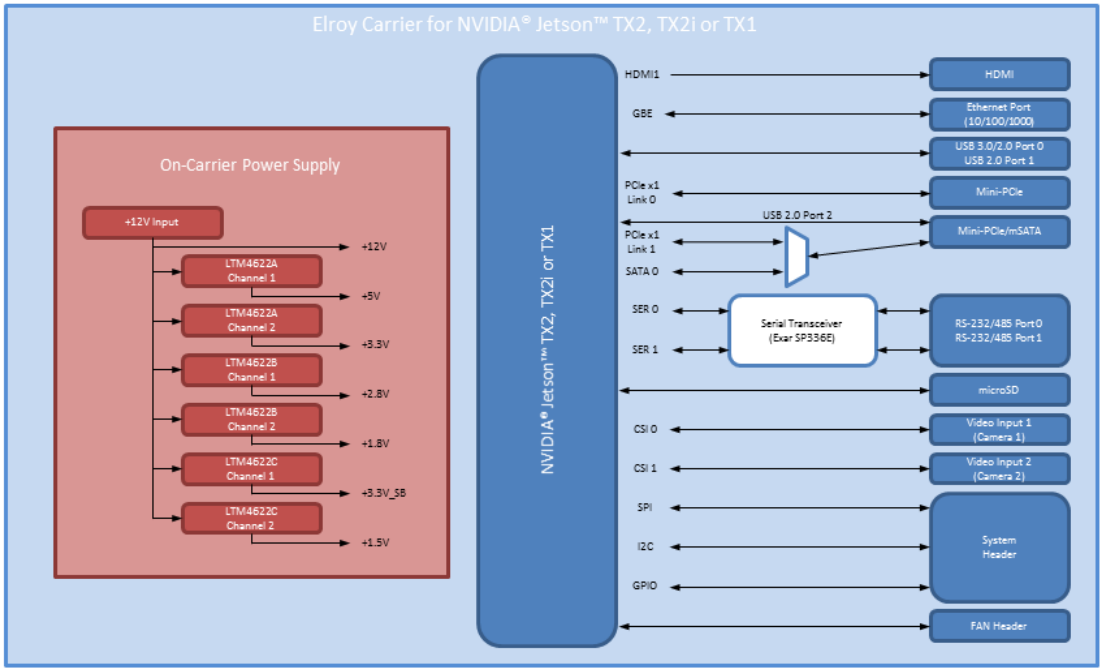
Specifications	
Module Compatibility	NVIDIA® Jetson™ TX2 or TX2i
PCB Size / Overall Size	87mm x 50mm (3.425" x 1.968") 3D STEP Model: **download here**
Display	1x HDMI (Supports up to HDMI 2.0 UHD 4K [2160p] at 60Hz)
Ethernet	1x Gigabit Ethernet (10/100/1000)
USB	1x USB 3.0 (Integrated USB 2.0) 1x USB 2.0
SATA	1x mSATA Half or Full Size (Use of Full Size Removes Secondary Mini-PCIe Slot)
Audio	HDMI Integrated
Serial	2x RS-232/RS-485
Mini-PCIe/mSATA	1x Mini-PCIe/mSATA Half or Full Size (Use of Full Size Removes Secondary Mini-PCIe Slot) 1x Mini-PCIe Half Size
SD Card	1x microSD Card Slot
Video Input	2x 2-Lane MIPI CSI 2.0
Misc.	1x I2C Link 1x SPI Link 1x System Control 4x GPIO
Power Requirements	+9V to +14V DC Input Range
Operating Temperature	-40°C to +85°C
Weight	35g
Accessories	Cable Kit
Warranty and Support	1 Year Warranty and Free Support

Part Numbers / Ordering Information

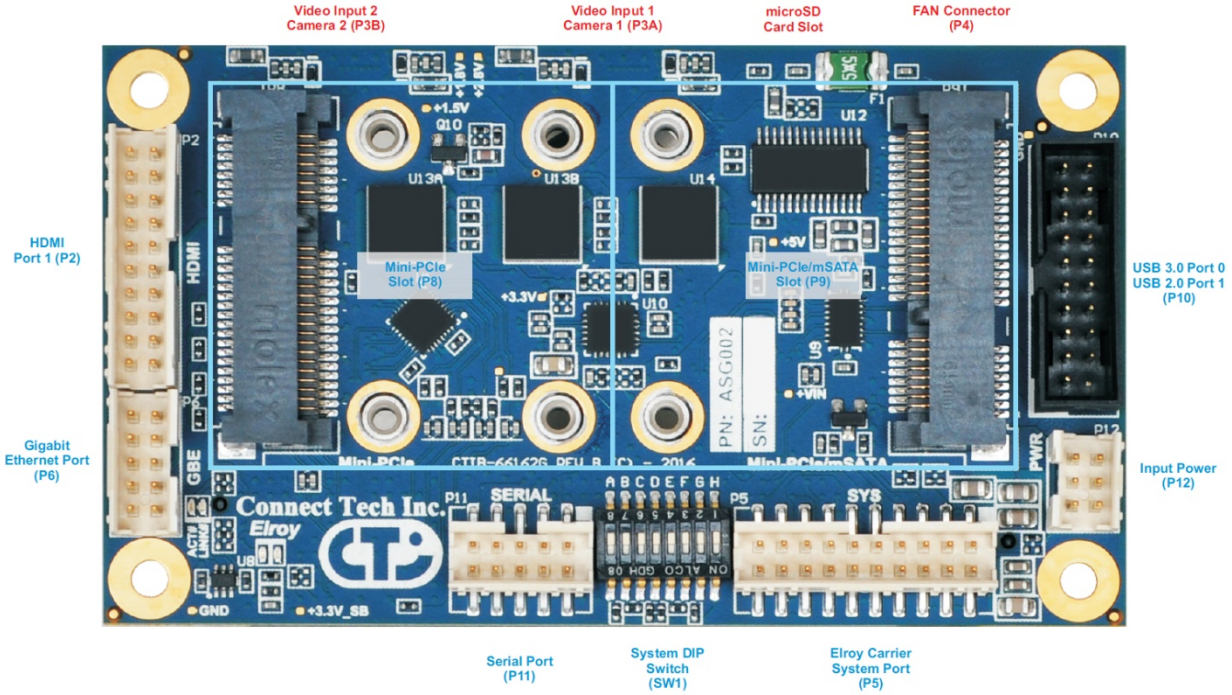
Part Number	
ASG002	Elroy Carrier for NVIDIA® Jetson™ TX2 & TX2i

PRODUCT OVERVIEW

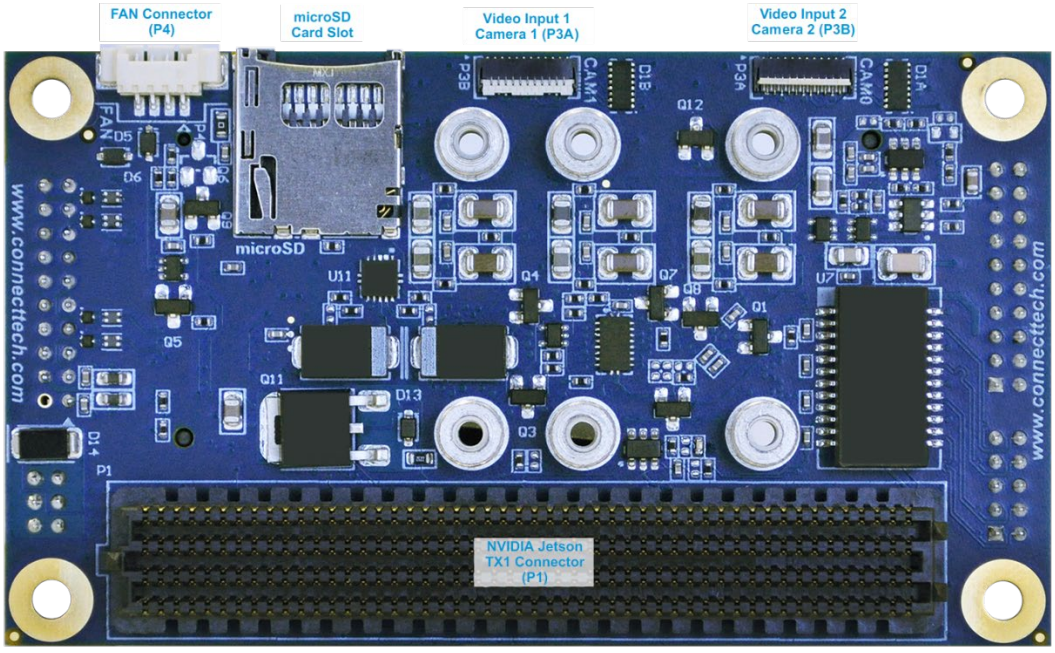
Block Diagram



Connector Locations – Top Side



Connector Locations – Bottom Side



Connector Summary

Designator	Connector	Description
P1	NVIDIA Jetson TX2/TX2i	NVIDIA Jetson TX2/TX2i Module Connector
P2	HDMI Port	HDMI FCI MiniTek Connector
P3A	Video Input 1	MIPI CSI-0 Camera Input Connector
P3B	Video Input 2	MIPI CSI-1 Camera Input Connector
P4	Fan	NVIDIA Jetson TX2/TX2i ACES Fan Connector
P5	System Port	System Port FCI MiniTek Connector
P6	Gigabit Ethernet Port	Gigabit Ethernet (10/100/1000) FCI MiniTek Connector
P7	microSD Card Slot	
P8	Mini-PCIe Slot	Mini-PCIe Half Sized Card Slot
P9	Mini-PCIe/mSATA Slot	Mini-PCIe/mSATA Half or Full Sized Card Slot
P10	USB 2.0/3.0 Ports 0-1	USB 2.0/3.0 Links 0 and 1 Intel Style Locking Connector
P11	Serial	Dual RS-232/RS485 FCI MiniTek Connector
P12	Input Power	Input Power FCI MiniTek Connector

DIP Switch Summary & Locations

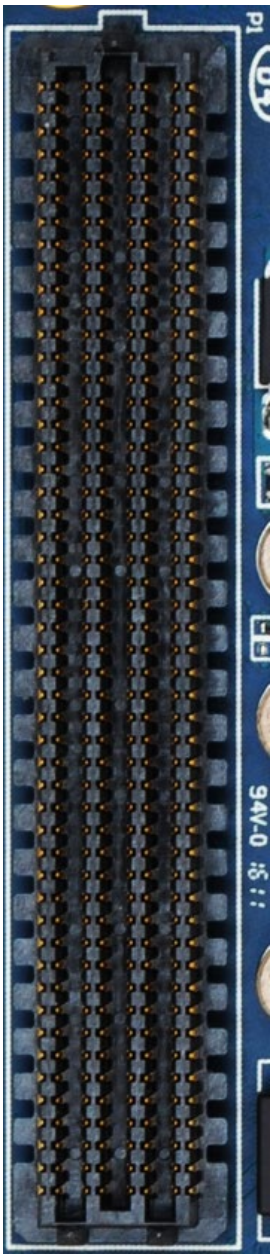
Designator	Function	Description
SW1A	Mini-PCIe/mSATA Selection (P3)	DIP Switch for Selecting Mini-PCIe/mSATA Slot (P3) Operation
SW1B	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1C	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1D	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1E	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1F	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1G	Serial Selection	DIP Switch for Controlling Serial Format and Related Feature
SW1H	Multiple Use Cases	See Jetson™ TX2 or TX2i Compatibility section for information

DETAILED FEATURE DESCRIPTION

Jetson™ TX2/TX2i Board-to-Board Connector

With the NVIDIA Jetson™ TX2/TX2i, the processor and chipset are implemented on the Jetson™ TX2/TX2i Module. This connects to the Elroy Carrier via a Samtec SEARAY™ Board to Board Connector.

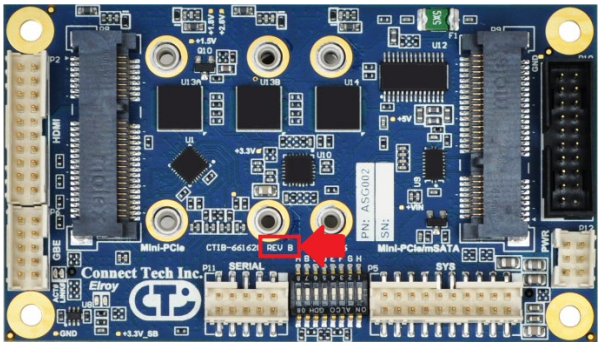
Function	NVIDIA Jetson™ TX2 or TX2i Interface
Location	P1
Type	Samtec SEARAY™ Connector
Carrier Connector P/N	SEAM-50-03.0-S-08-2-A-K-TR (8.0mm stacking height) Manufacturer: Samtec
Mating Connector P/N	SEAF-50-05-S-08-02-A-K (installed on Jetson™ TX2/TX2i) Manufacturer: Samtec
Pinout	Refer to NVIDIA's Jetson™ TX2/TX2i System-on-Module datasheet for pinout details
Standoffs	8.0mm Standoffs Required between NVIDIA Jetson TX2/TX2i Module and Elroy (ASG002) Carrier



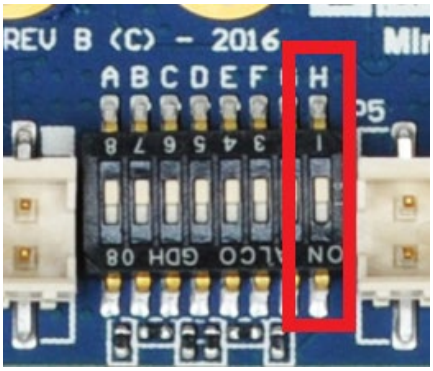
Jetson™ TX2 or TX2i Compatibility

Due to pin-muxing within the Jetson™ TX2 and TX2i modules, the Elroy Carrier features a DIP switch setting that will ensure full compatibility depending on which Jetson™ module you use. This DIP switch setting is only present on board revisions F and later. Elroy Carrier board revisions E and earlier do not offer full Jetson™ TX2 or TX2i compatibility and this DIP switch setting serves a different purpose on revision E and earlier. Please see the table below for more information.

To determine which revision of the Elroy Carrier you have please see the revision label as per the image below.



Function	Jetson™ TX2 or TX2i Select Switch
Location	SW1 – “H” Switch
Type	DIP Switch
Description	**For revisions F and later:** If you are using a Jetson™ TX2/TX2i then leave the “H” switch in the ON position to ensure full compatibility. “H” switch ON = Full Jetson™ TX2/TX2i Support **For revision E and earlier:** DIP Switch for Grounding +3.3V_RTC, which will Ground the VDD_RTC (Pin 50) on the NVIDIA Jetson Module. “H” switch ON = connects +3.3V_RTC to ground For the other switch settings on SW1, please see the Switch Description section of this document.



For further information please see the following notice regarding Astro Carrier compatibility:
http://connecttech.com/resource-center/kdb344-cti-nvidia-jetson-carrier-board-tx2-tx1-compatibility/

Video Input

Function	Video Input/Camera			
Location	P3A, P3B			
Type	Panasonic Flat Flex Cable Connector			
P/N	AYF332335			
Pinout	P4A			
	Pin	Description	Pin	Description
	1	+1.8V	2	+1.8V
	3	GND	4	CSI0_DATA0_P
	5	CSI0_DATA0_N	6	GND
	7	CSI0_CLK_P	8	CSI0_CLK_N
	9	GND	10	CSI0_DATA1_P
	11	CSI0_DATA1_N	12	GND
	13	CAM0_MCLK	14	CAM0_PWR
	15	GND	16	I2C_CAM_DATA
	17	I2C_CAM_CLK	18	CAM0_RST
	19	(NC)	20	GND
	21	+2.8V	22	(NC)
	23	GND		
	P4B			
	Pin	Description	Pin	Description
	1	+1.8V	2	+1.8V
	3	GND	4	CSI1_DATA0_P
	5	CSI1_DATA0_N	6	GND
	7	CSI1_CLK_P	8	CSI1_CLK_N
	9	GND	10	CSI1_DATA1_P
	11	CSI1_DATA1_N	12	GND
	13	CAM1_MCLK	14	CAM1_PWR
	15	GND	16	I2C_GP0_DATA
	17	I2C_GP0_CLK	18	CAM1_RST
	19	(NC)	20	GND
	21	+2.8V	22	(NC)
	23	GND		

Note: This connector can accept cables with contacts facing both up and down. Ensure you are installing the cable correctly by verifying with the pinout above. Failure to do so may damage the carrier. When installing the cable, the pins should be facing the PCB, and the white line on the ribbon should face away from the PCB.

HDMI Connector

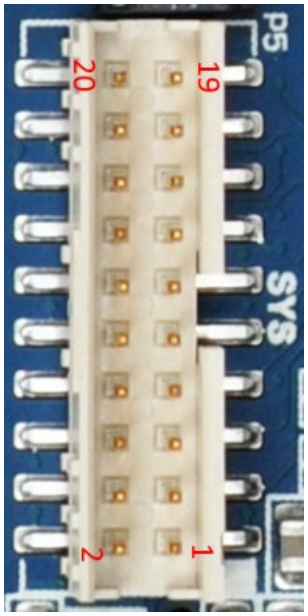
Function	HDMI Connector			
Location	P2			
Type	FCI Minitek Double Row 10 x 2			
P/N	98414-G06-20LF			
Mating	10073599-020LF			
Cable	CBG145			
Pinout	Pin	Description	Pin	Description
	1	TMDS2+	2	TMDS CLK+
	3	TMDS2-	4	TMDS CLK-
	5	GND	6	GND
	7	TMDS1+	8	DDC DATA
	9	TMDS1-	10	DDC CLK
	11	GND	12	GND
	13	TMDS0+	14	Hot Plug Detect
	15	TMDS0-	16	GND
	17	GND	18	GND
	19	+5V	20	HDMI CEC

System

The System header can be used to connect the power button, reset button, and other system status required to monitor the module performance or state. It also allows access to the Jetson TX2/TX2i Module via I2C, SPI (2 lanes), or GPIO.

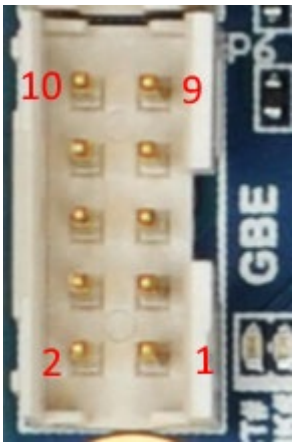
Function	System Connector
Location	P5
Type	FCI Minitek Double Row 10 x 2
P/N	98424-G52-20LF
Mating	10073599-020LF
Cable	CBG116

Pinout	Pin	Description	Pin	Description
	1	+5V	2	+3.3V_SB
	3	SPI_CLK	4	PWRBTN#
	5	SPI_MISO	6	FORCE_RECOV#
	7	SPI_MOSI	8	BATLOW#
	9	SPI_CS0#	10	RESET#
	11	SPI_CS1#	12	GPIO8
	13	RTC_BAT	14	GPIO9
	15	I2C_CLK	16	GPIO_EXP0
	17	I2C_DATA	18	GPIO_EXP1
	19	GND	20	GND
	Please reference our **GPIO KDB** for TX2/TX2i values.			



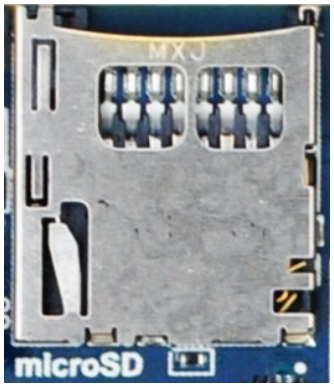
10/100/1000 Ethernet (GBE)

Function	Gigabit Ethernet Connector			
Location	P6			
Type	FCI Minitek Double Row 5 x 2			
P/N	98414-G06-10LF			
Mating	10073599-010LF			
Cable	CBG117			
Pinout	Pin	Description	Pin	Description
	1	MX0-	2	MX0+
	3	MX1-	4	MX1+
	5	SHELL	6	SHELL
	7	MX2-	8	MX2+
	9	MX3-	10	MX3+



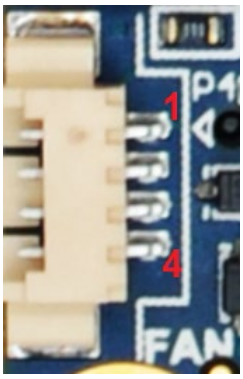
microSD Card Slot

Function	microSD Card Slot			
Location	P7			
Type	Molex microSD Memory Card Connector			
P/N	502570-0893			
Pinout	Pin	Description	Pin	Description
	1	SDIO_DATA2	2	SDIO_DATA3
	3	SDIO_CMD	4	SDIO_VCC
	5	SDIO_CLK	6	GND
	7	SDIO_DATA0	8	SDIO_DATA1
	9	GND	10	SDIO_CD



NVIDIA Jetson TX2/TX2i Fan

Function	NVIDIA Jetson TX2/TX2i Fan Control	
Location	P4	
Type	Molex PicoBlade Header	
P/N	53261-0471	
Mating	51021-0400	
Pinout	Pin	Description
	1	GND
	2	+5V
	3	TACH
	4	PWM



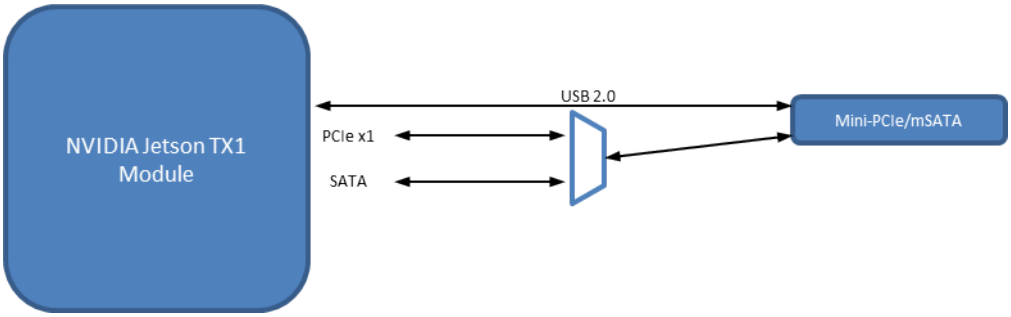
NOTE: Please note that FAN PWM (speed control) is NOT natively supported by the stock L4T builds. To enable PWM functionality (speed control) users must deploy CTI-L4T BSP. Please see the software section of this document for more details.

Mini-PCIe/mSATA Slots

Dual Function Mini-PCIe/mSATA Slots

The Elroy Carrier has a special dual purpose functional Mini-PCIe/mSATA slot (P9). This slot can accept either a Mini-PCIe module or an mSATA SSD module. This slot has circuitry that allows for the selection between connecting PCIe lanes or SATA lanes to the Connector. Finally, the slot also contains a USB 2.0 link as per the Mini-PCIe specification.

See the block diagram for the Mini-PCIe/mSATA switching functionality.



Mini-PCIe/mSATA Switching Functionality Diagram

If a Mini-PCIe Card is placed into the Mini-PCIe/mSATA slot, then the Carrier Control DIP Switch (SW1A) will select the SATA link routed to the Mini-PCIe/mSATA slot to be disconnected.

If however an mSATA Card is placed into the Mini-PCIe/mSATA slot, then the Carrier Control DIP Switch (SW1A) will select the PCIe link routed to the Mini-PCIe/mSATA slot to be disconnected.

This allows for the following maximum configurations:

A. 1x Full Sized Mini-PCIe Card, with 0x mSATA Card
B. 2x Half Sized Mini-PCIe Cards, with 0x mSATA Card
C. 1x Half Sized Mini-PCIe Card, with 1x Half Sized mSATA Card
D. 0x Mini-PCIe Card, with 1x Full Sized mSATA Card

Carrier Control DIP Switch Selection

Switch Location	Switch ON	Switch OFF
SW1A	Mini-PCIe Slot	mSATA Slot

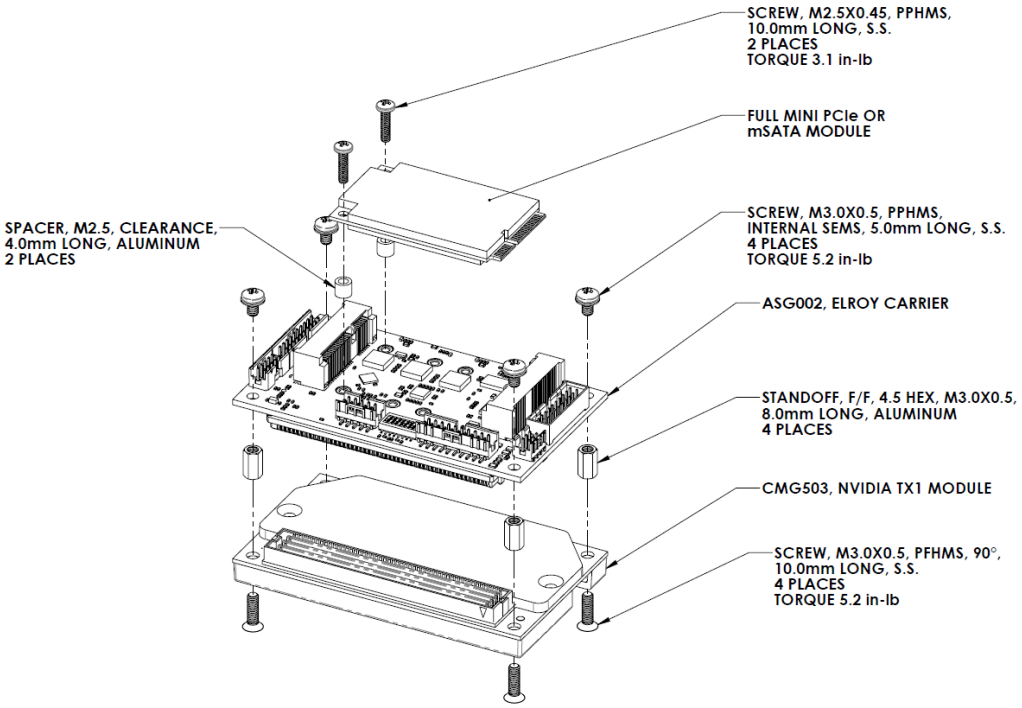
NOTE:

The Mini-PCIe Card slot at P8 does not have USB2.0 capability, as such when using USB devices over this interface the Mini-PCIe/mSATA at P9 must be used.

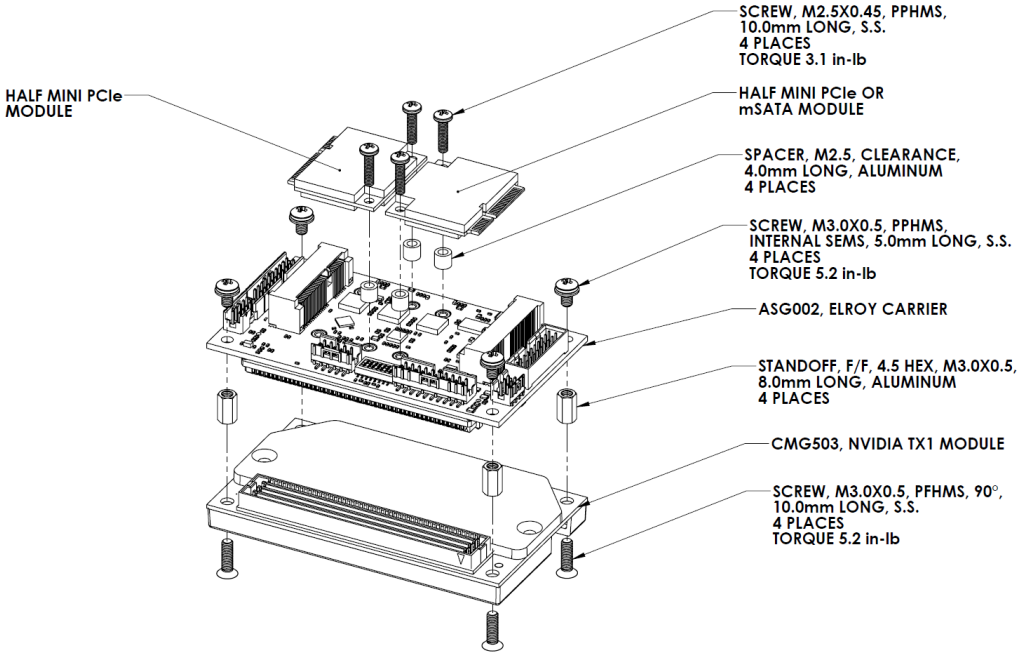
Half and Full Length Mini-PCIe/mSATA Module Installation

The Elroy Carrier is designed with mounting holes to allow for the population of full and half sized modules. To switch between the sizes, simply move the spacers and screws to the appropriate position. See the images below for further information.

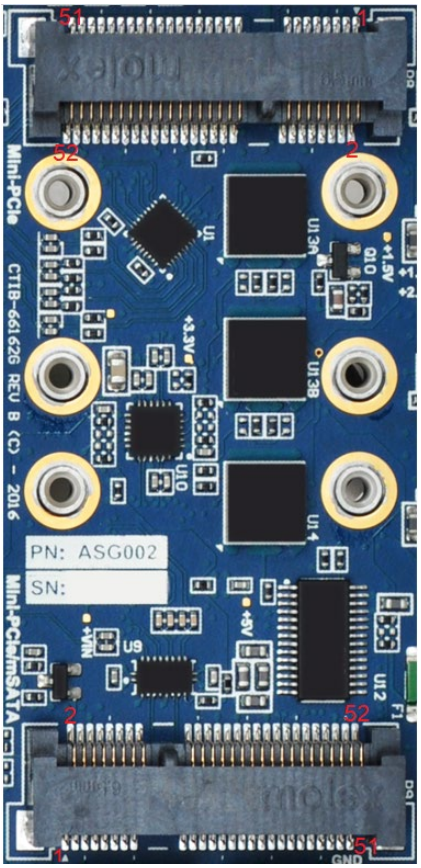
Full-Size Mini-PCIe/mSATA Module installation:



Half-Size Mini-PCIe/mSATA Module installation:



Function	Mini-PCIe/mSATA Slots		
Location	P8, P9		
Type	Molex Card Edge Connector		
P/N	48338-0065		
Pinout	Pin	Mini-PCIe Description	mSATA Description
	1	WAKE#	-
	2	+3.3V	+3.3V
	3	-	-
	4	GND	GND
	5	-	-
	6	+1.5V	+1.5V
	7	CLKREQ#	-
	8	-	-
	9	GND	GND
	10	-	-
	11	PCIe CLK-	-
	12	-	-
	13	PCIe CLK+	-
	14	-	-
	15	GND	GND
	16	-	-
	17	-	-
	18	GND	GND
	19	-	-
	20	W_DISABLE#	-
	21	RESV	RESV
	22	PERST#	-
	23	PCIe RX-	SATA TX+
	24	+3.3V	+3.3V
	25	PCIe RX+	SATA TX-
	26	GND	GND
	27	GND	GND
	28	+1.5V	+1.5V
	29	GND	GND
	30	-	-



	31	PCIe TX-	SATA RX-	
	32	-	-	
	33	PCIe TX+	SATA RX+	
	34	GND	GND	
	35	GND	GND	
	36	USB D- (P9 Only)	-	
	37	GND	GND	
	38	USB D+ (P9 Only)	-	
	39	+3.3V	+3.3V	
	40	GND	GND	
	41	+3.3V	+3.3V	
	42	-	-	
	43	RESV	RESV	
	44	-	-	
	45	-	-	
	46	-	-	
	47	-	-	
	48	+1.5V	+1.5V	
	49	-	-	
	50	GND	GND	
	51	-	-	
	52	+3.3V	+3.3V	

USB 2.0/3.0

The maximum configuration for a NVIDIA Jetson TX2 or TX2i Module allows for one external USB 3.0 Port with an integrated USB 2.0 Port. The USB 3.0 signals are sourced from the Jetson TX2/TX2i Module, and run through a re-driver.

Over current protection, power supply filtering and ESD protection is provided on-board.

Function	USB 2.0/3.0	
Location	P10	
Type	Lotes Co. Ltd Double Row 10 x 2	
P/N	ABA-USB-152-K01	
Cable	CBG131	

Pinout	Pin	Description	Pin	Description
	1	Port A - VBUS	20	KEY
	2	Port A - SSRX-	19	Port B - VBUS
	3	Port A - SSRX+	18	-
	4	GND	17	-
	5	Port A - SSTX-	16	GND
	6	Port A - SSTX+	15	-
	7	GND	14	-
	8	Port A - D-	13	GND
	9	Port A - D+	12	Port B - D-
	10	-	11	Port B - D+

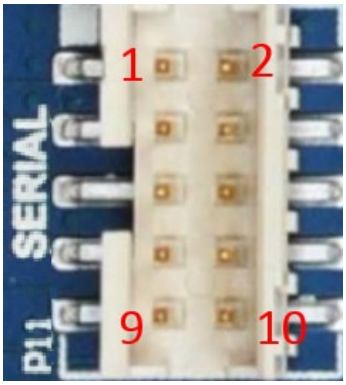
Force USB Recovery Mode

The Elroy carrier supports flashing the TX2/TX2i module over USB 2.0 using Port B. A standard USB-A to USB-A cable is required to connect it to the flashing system. Note that you should leave the USB cable unplugged until after the TX2/TX2i is put into recovery mode.

To flash the TX2/TX2i, first ensure the unit is powered down. Next, connect pins 6 and 20 of the System Header together with a jumper wire, then power on the unit. The jumper wire can be removed after applying power. Connect the USB-A to USB-A cable from a free USB port on the host PC to the USB 2.0 port on the Elroy. The TX2/TX2i can now be flashed using the standard NVIDIA flashing tools.

Serial

Function	Dual Serial (RS-232/RS-485)	
Location	P11	
Type	FCI Minitek Double Row 5 x 2	
P/N	98424-G52-10LF	
Mating	10073599-010LF	
Cable	CBG104	
Pinout	Pin	Description
	1	Serial 0 - RS-232TX/RS-485TX+
	2	Serial 0 - RS-232RX/RS-485RX+
	3	Serial 0 - RS-485TX-
	4	Serial 0 - RS-485RX-
	5	GND



	6	GND	
	7	Serial 1 - RS-232TX/RS-485TX+	
	8	Serial 1 - RS-232RX/RS-485RX+	
	9	Serial 1 - RS-485TX-	
	10	Serial 1 - RS-485RX-	
	UART0 = ttyS0 within Linux for Tegra UART1 = ttyTHS2 within Linux for Tegra Both channels are +/-5.5V RS-232 by default.		

Serial Configuration

Two of the Serial UART links from the Jetson TX2/TX2i Module are routed into an Exar SP336E Transceiver. This enables the various selectable serial outputs (RS-232/RS-485). To configure the setting, the appropriate configuration of the Serial Selection DIP Switch is required. Please refer to the Exar SP336E datasheet for additional details.

Dual RS-232

Switch	Position	Description
G	OFF	Mode 0 Selection - RS-232 Selection
F	OFF	Serial Link 0 - RX+ BIAS
E	OFF	Serial Link 0 - RX- BIAS
D	OFF	Mode 1 Selection - RS-232 Selection
C	OFF	Serial Link 1 - RX+ BIAS
B	OFF	Serial Link 1 – RX- BIAS

Serial 0 RS-232/Serial 1 RS-485

Switch	Position	Description
G	OFF	Mode 0 Selection - RS-232 Selection
F	OFF	Serial Link 0 - RX+ BIAS
E	OFF	Serial Link 0 - RX- BIAS
D	ON	Mode 1 Selection - RS-232 Selection
C	USER	Serial Link 1 - RX+ BIAS
B	USER	Serial Link 1 – RX- BIAS

Dual RS-485

Switch	Position	Description
G	ON	Mode 0 Selection - RS-232 Selection
F	USER	Serial Link 0 - RX+ BIAS
E	USER	Serial Link 0 - RX- BIAS
D	OFF	Mode 1 Selection - RS-232 Selection
C	USER	Serial Link 1 - RX+ BIAS
B	USER	Serial Link 1 – RX- BIAS

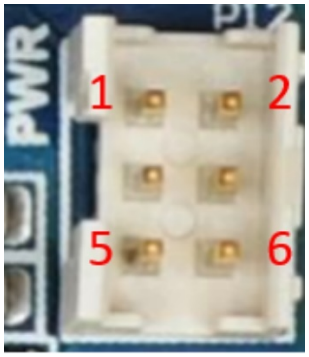
Dual Disable

Switch	Position	Description
G	ON	Mode 0 Selection - RS-232 Selection
F	XX	Serial Link 0 - RX+ BIAS
E	XX	Serial Link 0 - RX- BIAS
D	ON	Mode 1 Selection - RS-232 Selection
C	XX	Serial Link 1 - RX+ BIAS
B	XX	Serial Link 1 – RX- BIAS

Power Input

The Elroy Carrier accepts a single power input to power all on-board devices. A power input range of +9V to +14V is acceptable.

Function	Power	
Location	P11	
Type	FCI Minitek Double Row 3 x 2	
P/N	98414-G06-06LF	
Mating	10073599-006LF	
Cable	CBG112	
Pinout	Pin	Description
	1	GND
	2	GND
	3	GND
	4	+12.0V
	5	+12.0V
	6	+12.0V



Auto Start

The Elroy Carrier has an on-board Auto Start Functionality. The NVIDIA Jetson TX2/TX2i Module requires a power button or power pulse to start. The Elroy Carrier has a power pulse circuit on board to auto start the Jetson TX2/TX2i.

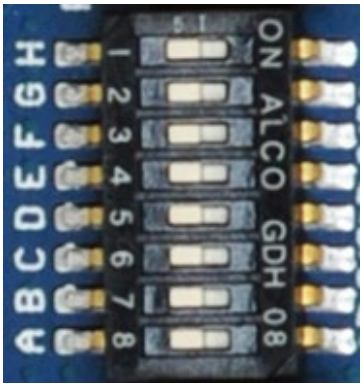
Note: Due to the changes done to the PMIC circuitry of the TX2i Jetson Module the Elroy Carrier will always remain ON when in AT (Automatic Power ON) and ATX (Push Power button) modes. This will cause the Elroy Carrier to automatically power ON when voltage is applied to the system. The system will in addition be unable to shut down in software (Soft Shutdown), due to the characteristics of the TX2i power circuitry as such the system will perform a Reset/Reboot function.

SWITCH DESCRIPTION

The Elroy Carrier has a DIP Switch block for various on-board controls.

SW1 DIP Switch – Carrier Control

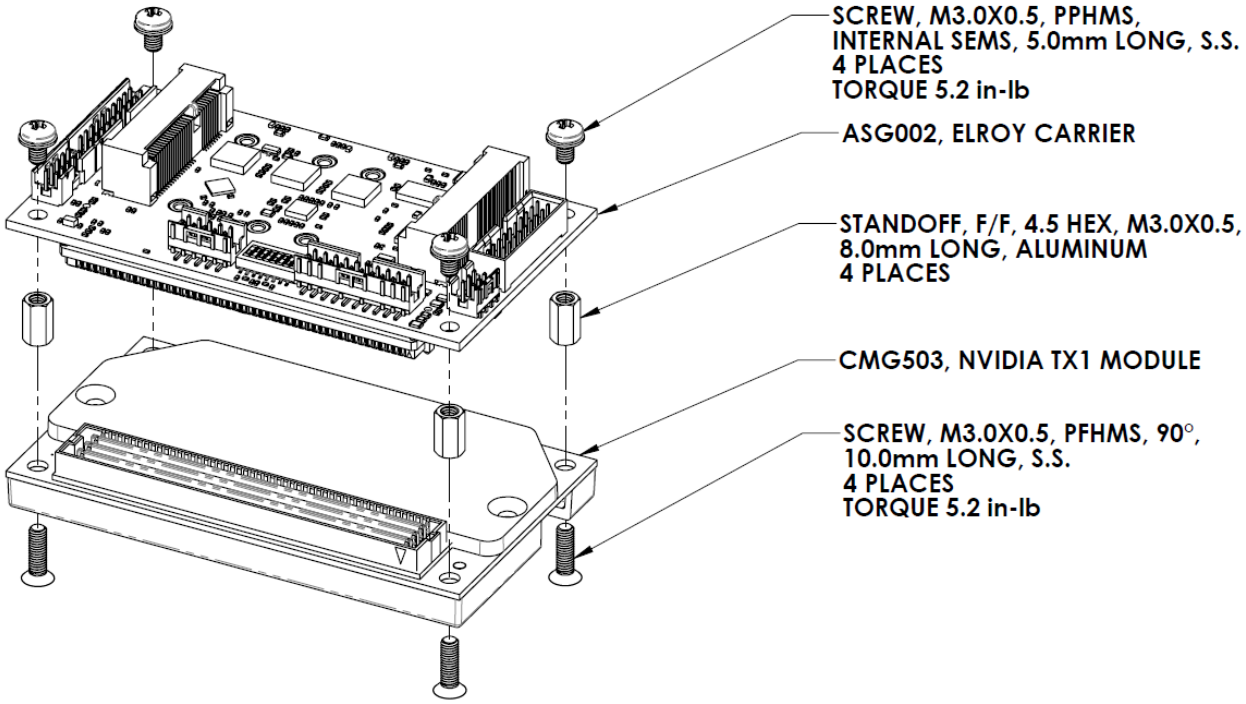
Function	Mini-PCIe/mSATA Selection, Serial Selection, RTC Battery Operation	
Location	SW1	
Pinout	Switch	Description
	SW1A	DIP Switch for Selecting Mini-PCIe/mSATA Slot (P3) Operation
	SW1B	DIP Switches for Controlling Serial Format and Related Features
	SW1C	DIP Switches for Controlling Serial Format and Related Features
	SW1D	DIP Switches for Controlling Serial Format and Related Features
	SW1E	DIP Switches for Controlling Serial Format and Related Features
	SW1F	DIP Switches for Controlling Serial Format and Related Features
	SW1G	DIP Switches for Controlling Serial Format and Related Features
	SW1H	**For revisions F and later:** If you are using a Jetson™ TX2/TX2i then leave the "H" switch in the ON position to ensure full compatibility. "H" switch ON = Full Jetson™ TX2/TX2i Support **For revision E and earlier:** DIP Switch for Grounding +3.3V_RTC, which will Ground the VDD_RTC (Pin 50) on the NVIDIA Jetson Module. "H" switch ON = connects +3.3V_RTC to ground



TYPICAL INSTALLATION

1. Ensure all external system power supplies are off.

2. Install the Jetson TX2 or TX2i Module onto the Samtec SEARAY Connector P1. Be sure to follow the manufacturer's directions for proper installation of mounting hardware, heatsink/heatspreader, and any other applicable requirements from the manufacturer.



3. Install the necessary cables for application. At a minimum these would include:

   a) Power cable to the input power connector
   b) HDMI video display cable
   c) Keyboard and mouse via USB

For additional information on the relevant cables, please see the Cables and Interconnects section of this manual.

4. Connect the Power Cable to the Power Supply

5. Switch ON the Power Supply. DO NOT power up your system by plugging in live power.

POWER SUPPLY

Connect Tech offers 12V 2A power supplies preconfigured for the ASG002. It is supplied by a standard AC line cord and has a cable length of approximately 1.5m. Contact our sales department about the **MSG063 or MSG071** for more details. View the MSG063 drawing.

ON-BOARD INDICATOR LEDS

The Elroy Carrier has 4 on-board indicator LEDs.

LED	Description
D7	GBE ACT#
D8	GBE LINK#
D15	+1.5V
D16	+3.3V_SB

CURRENT CONSUMPTION DETAILS

Below are the maximum ratings of the Elroy Carrier.

Theoretical Maximum	Watts
Theoretical absolute maximum total draw of all functionality on the Elroy Carrier Board (not including TX2/TX2i Module)	7.5

Below are measurements taken with the Elroy Carrier running in various configurations. Some values will change depending on what operation or software is installed. Measurements also include the Jetson™ TX2/TX2i Module. No mSATA or miniPCIe modules were installed while taking these measurements. All measurements were taken in a lab environment with an ambient temperature of 25 degrees Celsius.

Actual Measurements	Watts
Module not installed, power applied to Elroy Carrier only	0.75
Module installed, booted into Ubuntu, idle	6.12
Module Installed, booted into Ubuntu, running a NVStreamer Demo with a USB camera and 1080p video	12.3

SOFTWARE / BSP DETAILS

All Connect Tech NVIDIA Jetson TX2/TX2i based products are built upon a modified Linux for Tegra (L4T) Device Tree that is specific to each CTI product.

WARNING: The hardware configurations of CTI's products differ from that of the NVIDIA supplied evaluation kit. Please review the product documentation and install ONLY the appropriate CTI L4T BSPs. Failure to follow this process could result in non-functional hardware.

Connect Tech's Custom L4T BSP (CTI-L4T)

Connect Tech offers a custom BSP to add additional peripheral support on CTI's Jetson Carrier Boards. The CTI-L4T can be downloaded directly from Connect Tech here:

https://connecttech.com/product/rudi-embedded-system-for-nvidia-jetson-tx2-tx1/

BSPs, supporting documentation and release notes can be found at:
https://www.connecttech.com/jetson

https://connecttech.com/resource-center/cti-l4t-nvidia-jetson-board-support-package-release-notes/

NVIDIA Linux For Tegra (L4T)

The Elroy Carrier Board is designed to be used with the stock **NVIDIA Linux For Tegra (L4T) Builds**. However, the Connect Tech Board Support Package is required for full functionality.

NVIDIA's L4T can be downloaded directly from NVIDIA here:
https://developer.nvidia.com/embedded/

NVIDIA Jetpack for L4T

The JetPack for L4T is an on-demand all-in-one package that bundles and installs all software tools required to develop for the NVIDIA's TX2/TX2i Platform with Connect Tech's Jetson Carrier Boards. JetPack includes host and target development tools, APIs and packages (OS images, tools, APIs, middleware, samples, documentation including compiling samples) to enable developers to jump start their development environment for developing with the Jetson Embedded Platform. The latest release of JetPack runs on an Ubuntu 14.04 Linux 64-bit host system and supports both the latest Jetson TX2/TX2i Development Kit and Jetson TK1 Development Kit.

NVIDIA's Jetpack can be downloaded directly from NVIDIA here:
https://developer.nvidia.com/embedded/jetpack

THERMAL DETAILS

The Elroy Carrier Board has an Operating Temperature Range of -40˚C to +85˚C.

However, it is important to note that the NVIDIA Jetson TX2 Modules have its own properties separate to that of the Elroy Carrier Board. The NVIDIA Jetson TX2i matches the Elroy Operating Temperature Range of -40°C to +85°C.

Customer responsibility requires proper implementation of a thermal solution that maintains the TX2/TX2i SoC and Thermal Transfer Plate (TTP) temperatures below the specified temperatures (shown in the tables below) under the maximum thermal load and system conditions for their use case.

Jetson TX2i Thermal Specifications

Parameter	Value	Units
Maximum TTP operating temperature	85	°C
Recommended Tegra X2 operating temperature limit	T.cpu = 95.5	°C
	T.gpu = 95.5	°C
Tegra X2 maximum operating temperature limit	T.cpu = 101	°C
	T.gpu = 101	°C
	T.diode = 110	°C

Jetson TX2 Thermal Specifications

Parameter	Value	Units
Maximum TTP operating temperature	80	°C
Recommended Tegra X2 operating temperature limit	T.cpu = 95.5	°C
	T.gpu = 93.5	°C
Tegra X2 maximum operating temperature limit	T.cpu = 101	°C
	T.gpu = 101	°C

NVIDIA provides complete Thermal Design Guides, which include all of the information required to implement a complete thermal solution for the Jetson TX2 or TX2i Module. The Thermal Design Guides can be downloaded here:

Jetson TX2i:
https://developer.nvidia.com/embedded/dlc/jetson-tx2i-thermal-design-guide

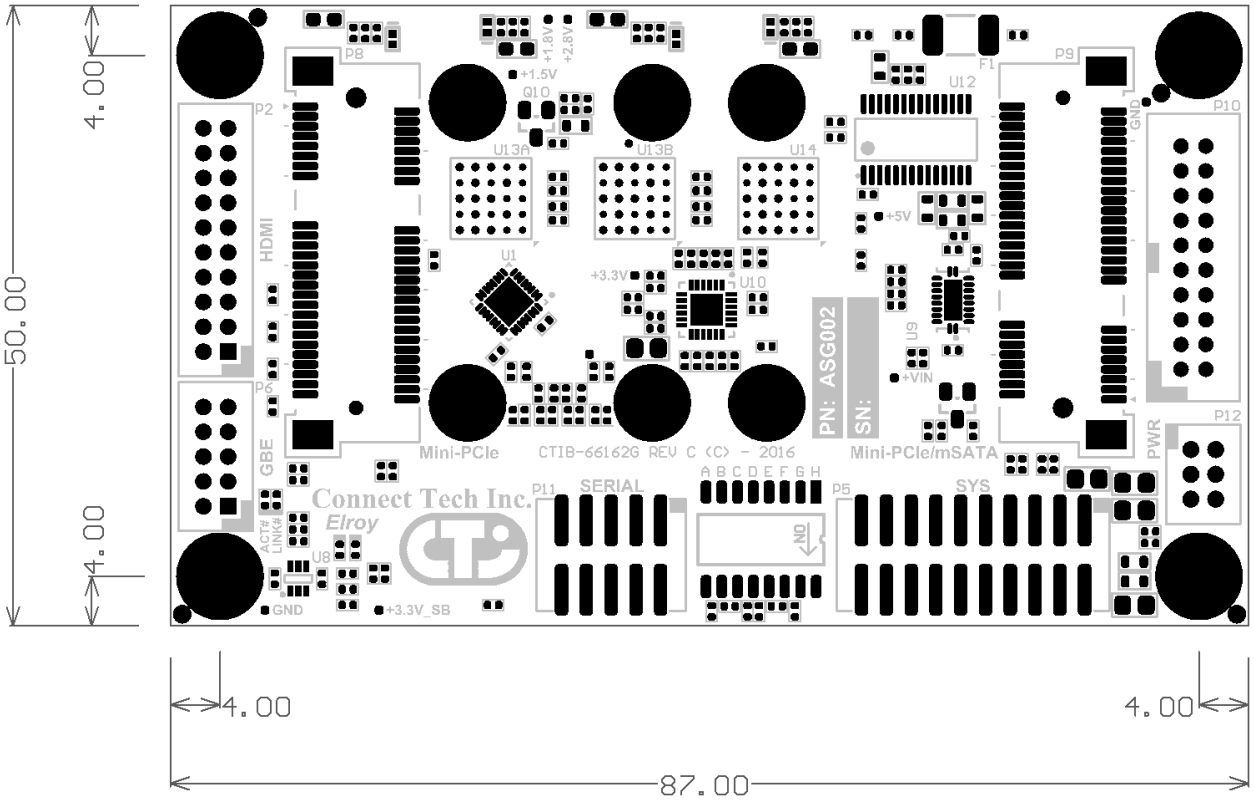
Jetson TX2:
https://developer.nvidia.com/embedded/dlc/jetson-tx2-thermal-design-guide

MECHANICAL DRAWINGS & MODELS

A complete **3D STEP Model** file of Elroy Carrier can be downloaded here:
https://www.connecttech.com/ftp/3d_models/ASG002_3D_MODEL.zip

2D Mechanical Dimensioned Drawing (Top View) - PCB and Mounting Hole Dimension are in mil.

Top View



CABLES

The following table summarizes the Elroy Carrier cables available.

Cable Kits

Drawing No.	Part No.	Description	Full Cable Kit CKG059
CTIC-00430	CBG111	Dual DB9 Panel Mount to 10-Pin MiniTek	1
CTIC-00431	CBG112	Power Cable (Unterminated) to 6-Pin MiniTek	1
CTIC-00435	CBG116	System Cable (Unterminated) to 20-Pin MiniTek	1
CTIC-00433	CBG117	RJ-45 Panel Mount to 10-Pin MiniTek	1
N/A	CBG160	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Inner Exit	1
N/A	CBG287	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Outer Exit	1
N/A	CBG288	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Vertical Exit	1
CTIC-00461	CBG145	HDMI Female Panel Mount to 20-Pin MiniTek	1
CTIC-00571	MSG063	North American Power Supply Unit for Elroy	0
TBD	MSG071	Multi-Region Power Supply Unit for Elroy	0