Connect Tech Inc.
Embedded Computing Experts

USERS GUIDE

Cogswell Carrier for NVIDIA® Jetson™ TX2/TX2i

CTIM-00484 Revision 0.09 2022-03-25

NVIDIA ELITE PARTNER

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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 Cogswell 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	2017/03/10	Initial Release
0.01	2017/08/10	Updated to Revision D Board, Added Cable Drawing Links
0.02	2018/03/08	Added GPIO KDB link
0.03	2018/05/11	Added BSP information, pinout corrections
0.04	2018/07/31	Added TX2i compatibility, Added ASG014
0.05	2018/11/29	Added TX2i Power Circuitry Note, Removed ASG014
0.06	2019/03/20	Updated P8 pinout for Rev E+
0.07	2019-04-17	Added HDMI 2.0 support
0.08	2021-10-06	Updated format, Updated address, Removed TX1 references
0.09	2022-03-25	Updated block diagram

INTRODUCTION

Connect Tech's Cogswell Carrier for NVIDIA® Jetson™ TX2/TX2i is ideal for use in Gigabit Ethernet Vision applications. This product provides Gigabit Ethernet channels with built-in Power over Ethernet (POE) sourcing capabilities, ideal for use with GigE Vision cameras.

Cogswell's design includes a total of 5 Gigabit Ethernet Ports. Four of these ports can be used for IEEE 802.3af (POE) 15.4W power sourcing or two of these ports can be used for IEEE 802.3at (POE+) 25.5W power sourcing. Additionally, the Cogswell Carrier also enables HDMI Video, USB 3.0, USB 2.0, USB OTG, Mini-PCIe/mSATA expansion, and two RS-232 Serial Ports.

Product Features and Specifications

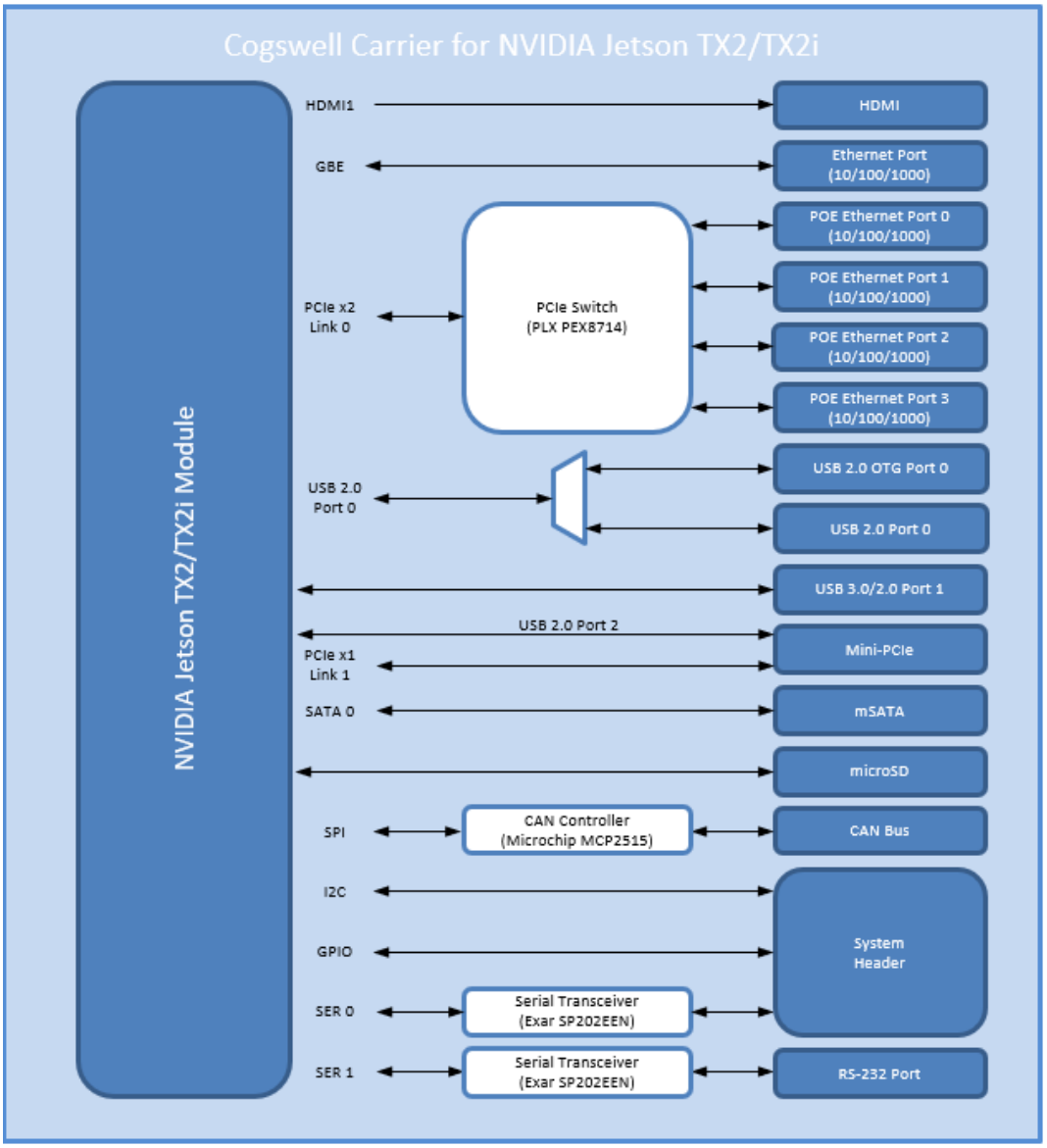
Specifications	
Module Compatibility	NVIDIA® Jetson™ TX2, NVIDIA® Jetson™ TX2i
PCB Size / Overall Size	178mm x 147.5mm (7.0078" x 5.8071") 3D STEP Model: **download here**
Display	1x HDMI (Supports up to HDMI 2.0 UHD 4K [2160p] at 60Hz)
Ethernet	1x Gigabit Ethernet (10/100/1000) 4 x POE Gigabit Ethernet (10/100/1000) 4x IEEE 802.3af (POE) 15.4W or 2x IEEE 802.3aft(POE+) 25.5W
USB	1x USB 3.0 Type A (Integrated USB 2.0) 1x USB 2.0 Type A/1x USB 2.0 OTG Micro-AB 1x USB 2.0 to Mini-PCIe Slot
SATA	1x mSATA Full Size
Audio	HDMI Integrated
Serial	2x RS-232
Mini-PCIe/mSATA	1x Mini-PCIe (PCIe & USB 2.0) Full Size
SD Card	1x microSD Card Slot
CAN Bus	1x CAN Bus Link
Misc.	1x I2C Link (+3.3V I/O) 1x System Control 4x GPIO
Power Requirements	+12V DC Input @ 9.5A No External -48V Required, Carrier Generates its Own POE
Operating Temperature	-40°C to +85°C
Weight	245g
Accessories	Cables
Warranty and Support	1 Year Warranty and Free Support

Part Numbers / Ordering Information

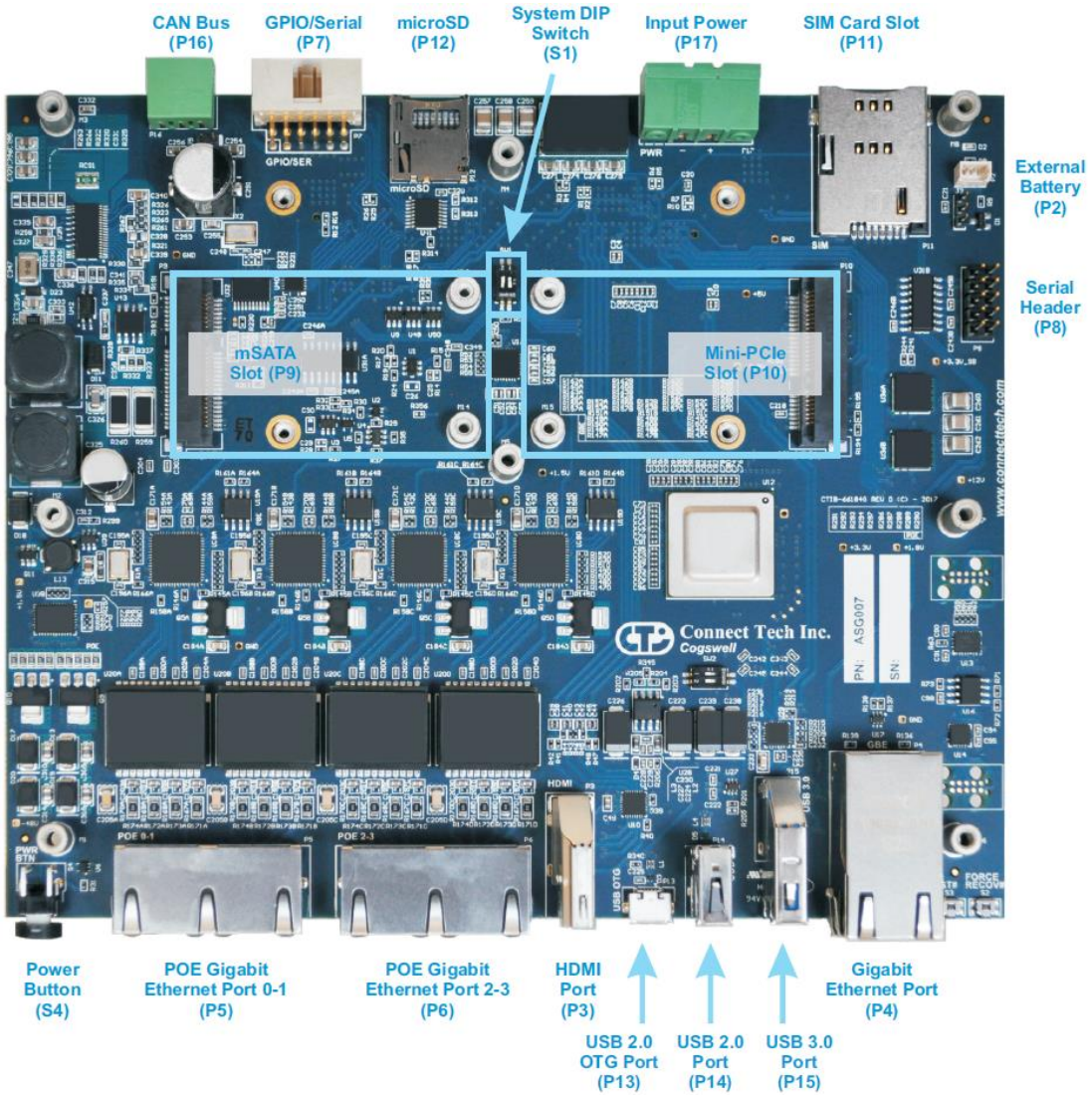
Part Number	
ASG007	Cogswell Carrier for NVIDIA® Jetson™ TX2/TX2i

PRODUCT OVERVIEW

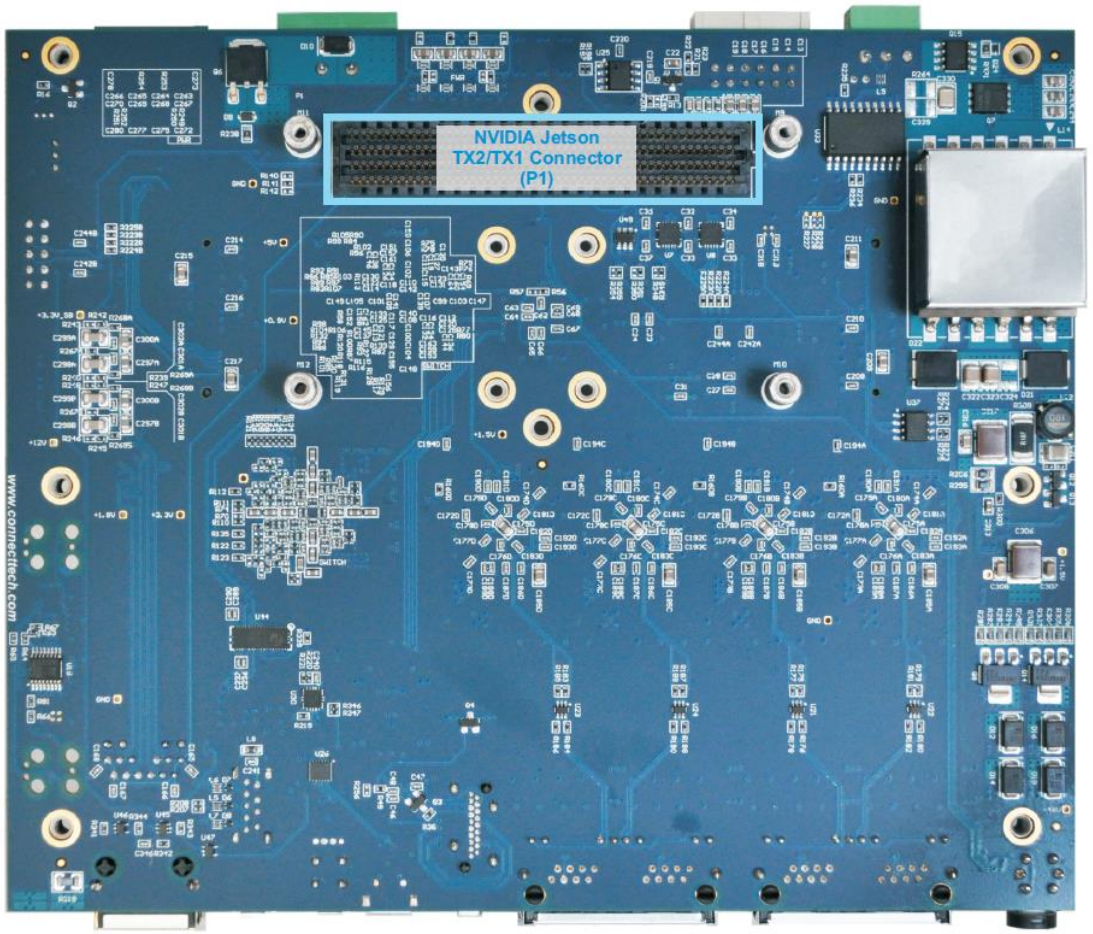
Block Diagram



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	External Battery	External Battery Header
P3	HDMI Port	HDMI Right Angle Vertical Connector
P4	NVIDIA® Jetson™ TX2/TX2i Gigabit Ethernet	RJ45 Gigabit Ethernet Connector (10/100/1000)
P5	POE Gigabit Ethernet Ports 0-1	RJ45 Gigabit Ethernet Connectors (10/100/1000)
P6	POE Gigabit Ethernet Ports 2-3	RJ45 Gigabit Ethernet Connectors (10/100/1000)
P7	GPIO/Serial Port	GPIO/RS-232 Samtec 2x6 Right Angle Header
P8	Serial Port	RS-232 Samtec 2x5 Vertical Header
P9	mSATA Slot	mSATA Full Sized Slot

P10	Mini-PCIe Slot	Mini-PCIe Full Sized Slot
P11	SIM Card Slot	Mini-PCIe SIM Card Slot
P12	microSD Slot	MicroSD Card Slot
P13	USB 2.0 OTG	USB 2.0 Link 0 OTG Micro-AB Connector (USB Link shared with P14)
P14	USB 2.0 Type A	USB 2.0 Link 0 Type A Connector (USB Link shared with P13)
P15	USB 3.0 Type A	USB 3.0 Link 1 Type A Connector
P16	CAN Bus	CAN Bus Header
P17	Power	Input Power TE Connector
P18	PWM Fan	Jetson Module Fan Connector for Active Cooling Solution

DIP Switch Summary & Locations

Designator	Function	Description
S2	Force Recovery Button	Cogswell System Force Recovery Button (Used for NVIDIA Jetson™ TX2/TX2i System Reprogramming with USB OTG Port)
S3	Reset Button	Cogswell System Reset Push Button
S4	Power Button	Cogswell System Power ON/OFF Button

DIP Switch Summary & Locations

Designator	Function	Description
SW1A	Power Override	Cogswell System Power Override Operation
SW1B	Auto Start Operation	Cogswell System Auto Start Operation
SW2A	NVIDIA® Jetson™ TX2/TX2i Module Selection	NVIDIA Jetson™ TX2/TX2i USB 3.0 MUX Selection
SW2B	USB OTG Mux Control	USB OTG Override Operation Switch

Jumper Summary & Locations

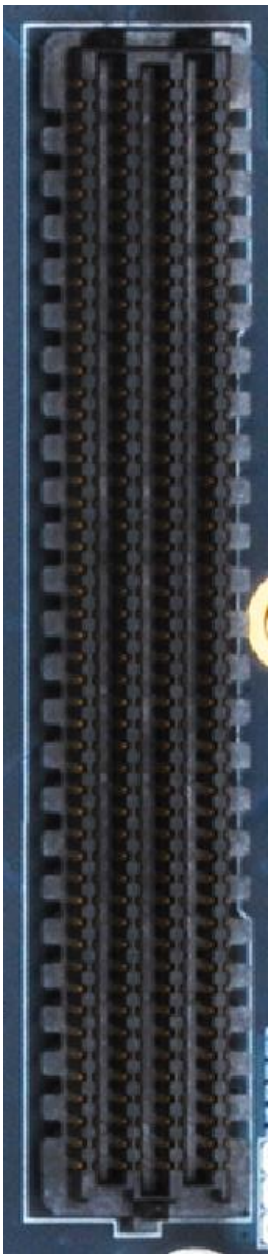
Designator	Function	Description
J2	RTC Battery Enable/Clear	External RTC Battery Enable or Clear
J5	CAN Bus Termination	CAN Bus P to N 120 Ohm Termination

DETAILED FEATURE DESCRIPTION

Jetson™ TX2/TX2i Board-to-Board Connector

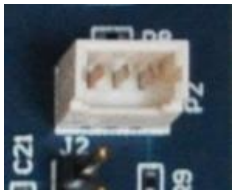
With the NVIDIA® Jetson™ TX2/TX2i, the processor and chipset are implemented on the Jetson™ TX2/TX2i Module. This connects to the Cogswell Carrier via a Samtec SEARAY™ Board to Board Connector.

Function	NVIDIA Jetson™ TX2/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 Cogswell (ASG007) Carrier



External Battery Header

Function	External Battery	
Location	P2	
Type	Molex Picoblade 1x3	
P/N	53047-0310	
Mating	51021-0300	
Pinout	Pin	Description
	1	RTC-BAT
	2	-
	3	GND



HDMI Connector

Function	HDMI Connector			
Location	P3			
Type	TE Connectivity HDMI Right Angle Vertical Connector			
P/N	A35071TR-ND			
Mating	HDMI Type A Plug			
Cable	CBG145			
Pinout	Pin	Description	Pin	Description
	1	TMDS2+	2	GND
	3	TMDS2-	4	TMDS1+
	5	GND	6	TMDS1-
	7	TMDS0+	8	GND
	9	TMDS0-	10	TMDS_CLK+
	11	GND	12	TMDS_CLK-
	13	CEC	14	-
	15	DDC_CLK	16	DDC_DATA
	17	GND	18	+5V
	19	HPD		

Gigabit Ethernet

Function	Gigabit Ethernet			
Location	P4			
Type	RJ-45 Connector			
P/N	1RJMG14-218LNL			
Mating	Any RJ-45 Plug with Cat5/5e/6 Cabling			
Pinout	Pin	Description	Pin	Description
	1	GBE_GND	2	MDI2_N
	3	MDI2_P	4	MDI1_P
	5	MDI1_N	6	GBE_GND
	7	GBE_GND	8	MDI3_P
	9	MDI3_N	10	MDI0_N
	11	MDI0_P	12	GBE_GND
	13	GND	14	ACT#
	15	GND	16	LINK#

POE Gigabit Ethernet

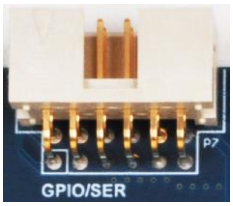
Function	POE Gigabit Ethernet			
Location	P5, P6			
Type	Amphenol Dual RJ-45 Connector			
P/N	RJHSE-5381-02			
Mating	Any RJ-45 Plug with Cat5/5e/6 Cabling			
Pinout	Pin	Description	Pin	Description
	1A	GBEA_MDI0_P	2A	GBEA_MDI0_N
	3A	GBEA_MDI1_P	4A	GBEA_MDI2_P
	5A	GBEA_MDI2_N	6A	GBEA_MDI1_N
	7A	GBEA_MDI3_P	8A	GBEA_MDI3_N
	9A	GBEA_LINK100#	10A	+3.3V
	11A	GBEA_ACT#	12A	+3.3V
	1B	GBEB_MDI0_P	2B	GBEB_MDI0_N
	3B	GBEB_MDI1_P	4B	GBEB_MDI2_P
	5B	GBEB_MDI2_N	6B	GBEB_MDI1_N
	7B	GBEB_MDI3_P	8B	GBEB_MDI3_N

	9B	LINK100#	10B	+3.3V	
	11B	ACT#	12B	+3.3V	

Cogswell hardware Revision E and onward will have increased bandwidth for multiple camera streams. This is due to CTI moving to an alternate Ethernet Chipset (Intel I210 series), the previous revisions A through D have been found to have bandwidth limitations due to the ARM Linux4Tegra Ethernet drivers associated with the Intel 82574. For further details please see the CTIU-00010 Product Change Notification.

GPIO/Serial/I2C

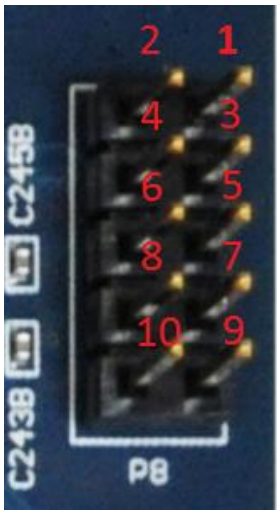
Function	GPIO/Serial/I2C			
Location	P7			
Type	Samtec High-Temp Shrouded Terminal Strip			
P/N	HTSS-106-04-G-D-RA			
Mating	Any 0.1” Pitch Connector			
Cable	CBG258			
Pinout	Pin	Description	Pin	Description
	1	GPIO1	2	GPIO3
	3	GPIO0	4	GPIO2
	5	GND	6	-
	7	GND	8	-
	9	I2C_SDA	10	RS-232_0_RX
	11	I2C_SCL	12	RS-232_0_TX
	The RS232_0 by default is used as a Debug serial port for the TX2/TX2i, to disable console Debug please reference our **KDB** Please reference our **GPIO KDB** for TX2/TX2i values.			



Serial

Function	Serial
Location	P8
Type	Samtec High-Temp Terminal Strip
P/N	TSW-105-07-L-D
Mating	Any 0.1” Pitch Connector
Cable	N/A

Pinout	Pin	Description	Pin	Description
	1	-	2	-
	3	RS-232_1_RTS#	4	RS-232_1_RX
	5	RS-232_1_CTS#	6	RS-232_1_TX
	7	-	8	-
	9	GND	10	-



Mini-PCIe/mSATA Slots

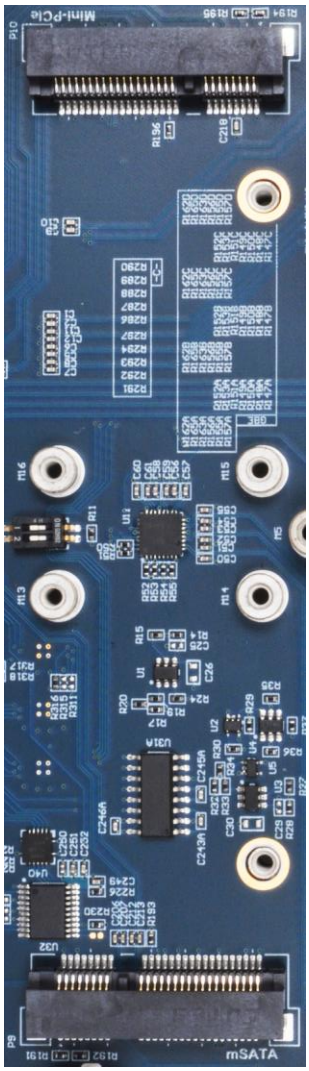
The Cogswell Carrier has a single Mini-PCIe and a single mSATA slot. These slots can accept a Mini-PCIe module or a mSATA SSD module respectively. The Mini-PCIe slot contains a USB 2.0 link as per the Mini-PCIe specification.

Half and Full Length Mini-PCIe/mSATA Module Installation

The Cogswell Carrier is designed with mounting holes to allow for the population of full-length modules. To install a half-length module you must use a Mini-PCIe Half to Full Size Extension Bracket.

Function	Mini-PCIe/mSATA Slots		
Location	P9, P10		
Type	Molex Card Edge Connector		
P/N	48338-0065		
Pinout	Pin	Mini-PCIe Description	mSATA Description
	1	-	-
	2	+3.3V	+3.3V
	3	-	-
	4	GND	GND
	5	-	-
	6	+1.5V	+1.5V
	7	CLKREQ#	-

8	UIM_PWR	-
9	GND	GND
10	UIM_DATA	-
11	PCIe CLK+	-
12	UIM_CLK	-
13	PCIe CLK-	-
14	UIM_RESET	-
15	GND	GND
16	UIM_VPP	-
17	-	-
18	GND	GND
19	-	-
20	W_DISABLE#	-
21	RESV	RESV
22	-	-
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	SMB_CLK	-
31	PCIe TX-	SATA RX-
32	SMB_DATA	-
33	PCIe TX+	SATA RX+
34	GND	GND
35	GND	GND
36	USB D-	-
37	GND	GND
38	USB D+	-
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

SIM Card Slot

Function	SIM Card Slot			
Location	P11			
Type	Molex SIM Card Connector			
P/N	0475530001			
Pinout	Pin	Description	Pin	Description
	1	SIM_PWR	2	GND
	3	SIM_RST	4	SIM_VPP
	5	SIM_CLK	6	SIM_DATA
	7	-	8	-

microSD Card Slot

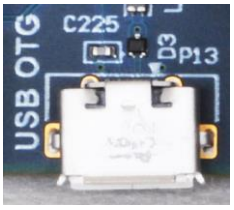
Function	microSD Card Slot			
Location	P12			
Type	Molex microSD Memory Card Connector			
P/N	502570-0893			
Pinout	Pin	Description	Pin	Description
	1	SDIO_DATA2	2	SDIO_DATA3
	3	SDIO_CMD	4	SDIO_VCC
	5	SDIO_CLK	6	GND
	7	SDIO_DATA0	8	SDIO_DATA1
	9	GND	10	SDIO_CD

USB 2.0 OTG and USB 2.0

The NVIDIA® Jetson™ Modules have a single USB 2.0 OTG Port that doubles as a regular USB 2.0 Port. On the Cogswell, this Port is connected to a MUX to allow for both of these functions.

NOTE: Please note that you cannot use both the USB 2.0 OTG Micro-AB Connector and the USB 2.0 Type A Connector at the same time.

Function	USB 2.0 OTG	
Location	P13	
Type	Molex Micro-AB USB Connector	
P/N	47590-0001	
Mating	Any Micro USB 2.0 Plug	
Pinout	Pin	Description
	1	VBUS
	2	DATA-
	3	DATA+
	4	ID
	5	GND
	6	Shield



USB 2.0 OTG Client Mode and USB MUX

To put the Cogswell into Client Mode, the ID Pin on the Micro-AB Connector needs to be pulled high. Most USB Micro-B Cables will do this internally. Once in Client Mode, the Cogswell will connect the OTG USB 2.0 Link to the Micro-AB Connector and disable the USB 2.0 Type A connector using the onboard USB MUX. At this point the Cogswell can be connected to a Host PC for software image flashing. Please refer to the Software / BSP section of the Manual for instructions on how to do this.

Function	USB 2.0	
Location	P14	
Type	Molex Type A USB 2.0 Right Angle Vertical Connector	
P/N	67329-8000	
Mating	Any Type A USB 2.0 Plug	
Pinout	Pin	Description
	1	VBUS
	2	DATA-
	3	DATA+

	4	GND	
	5	Shield	
	6	Shield	

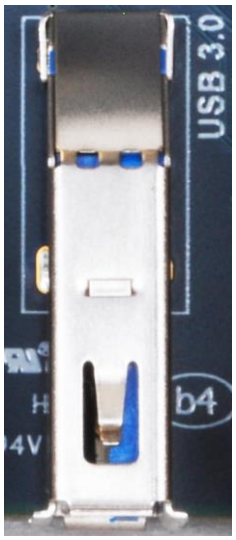
USB 3.0/2.0

The maximum configuration for a NVIDIA® Jetson™ Module allows for one external USB 3.0 Port with an integrated USB 2.0 Port. The USB 3.0 signals are sourced from different locations on the Jetson™ TX2 or TX2i Modules. Use SW2A to select which Module is installed to correctly configure the on-board MUX which will link the Module to the Cogswell USB 3.0 re-driver and connector.

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

NOTE: Please note that USB3.0 support is NOT natively supported by the stock L4T builds. For USB3.0 support users must deploy CTI-L4T BSP

Function	USB 3.0/2.0	
Location	P15	
Type	Molex Type A USB 3.0 Right Angle Vertical Connector	
P/N	48404-0003	
Mating	Any Type A USB 3.0/2.0 Plug	
Pinout	Pin	Description
	1	VBUS
	2	USB2.0_DATA-
	3	USB2.0_DATA+
	4	GND
	5	USB3.0_SSRX-
	6	USB3.0_SSRX+
	7	GND
	8	USB3.0_SSTX-
	9	USB3.0_SSTX+
	10	Shield



CAN Bus

Function	CAN Bus	
Location	P16	
Type	Phoenix Contact Base Strip	
P/N	1897102	
Mating	1840379	
Pinout	Pin	Description
	1	CAN_P
	2	CAN_N
	3	CAN_GND

Power Input

The Cogswell Carrier accepts a single power input to power all on-board devices. A power input of +12V is required for nominal operation.

Function	Power	
Location	P17	
Type	TE Connectivity Shrouded Power Header	
P/N	796864-2	
Mating	796858-2	
Pinout	Pin	Description
	1	+12V
	2	GND

Auto Start

The Cogswell Carrier has an on-board Auto Start Functionality which can be disabled. The NVIDIA Jetson™ Modules require a power button or power pulse to start. The Cogswell Carrier has a power pulse circuit on board to auto start the Module, if the DIP Switch SW1B is correctly set. Otherwise, the NVIDIA Jetson™ TX2/TX2i Module will remain in an OFF state until the Power Button is pressed.

Note: Due to the changes done to the PMIC circuitry of the TX2i Jetson Module the Cogswell Carrier will always remain ON when in AT (Automatic Power ON) and ATX (Push Power button) modes. This will cause the Cogswell 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.

NVIDIA Jetson Fan

Function	PWM Fan	
Location	P18	
Type	Molex PicoBlade Header	
P/N	53261-0471	
Mating	51021-0400	
Pinout	Pin	Description
	1	GND
	2	+5V
	3	TACH
	4	PWM

SWITCH DESCRIPTION

The Cogswell Carrier has two DIP Switch block for various on-board controls.

SW1 DIP Switch – Carrier Power Control

Function	NVIDIA Jetson™ TX2/TX2i Power Control			
Location	SW1			
Pinout	Switch	Function		
		Description	ON	OFF
	SW1A	CARRIER_PWR_ON Override	Internal Use	Default
	SW1B	PWR_BTN Auto Start	Enabled	Disabled
	See **Auto Start** Section regarding TX2i			

SW2 DIP Switch – NVIDIA Jetson™ TX2/TX2i Selection and OTG USB Control

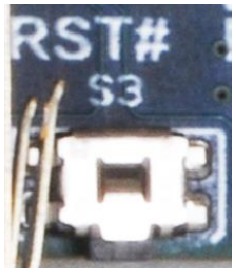
Function	NVIDIA Jetson™ TX2/TX2i Power Control			
Location	SW2			
Pinout	Switch	Function		
		Description	ON	OFF

	SW2A	TX2/TX2i Selection	TX1	TX2/TX2i	
	SW2B	OTG USB Control	Force P13	Default Auto/P14	
	Jetson Mode switches must be used in conjunction with the Connect Tech Board Support Package.				

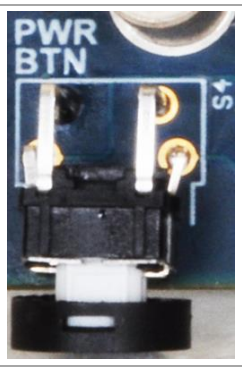
S2 Push Button Switch – Force Recover

Function	NVIDIA Jetson™ TX2/TX2i Force Recover		
Location	S2		
Pinout	Switch	Description	
	S2	FORCE_RECOV# Switch	
	Please see **Force USB Recovery Mode** for more details.		

S3 Push Button Switch – Reset

Function	NVIDIA Jetson™ TX2/TX2i Reset		
Location	S3		
Pinout	Switch	Description	
	S3	RST_IN# Switch	

S4 Push Button Switch – Power Button

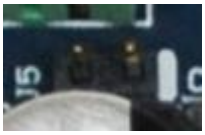
Function	NVIDIA Jetson™ TX2/TX2i Power		
Location	S4		
Pinout	Switch	Description	
	S4	PWR_BTN# Switch	

J2 Jumper – RTC Battery

Function	RTC Battery Enable/Clear	
Location	J2	
Pinout	Position	Description
	UP	RTC Connected to GND
	DOWN	RTC Connected to External RTC Battery

J5 Jumper – CAN Bus

Function	CAN Bus Termination	
Location	J5	
Pinout	Position	Description
	ON	120 Ohm CAN P/N Termination
	OFF	No Termination

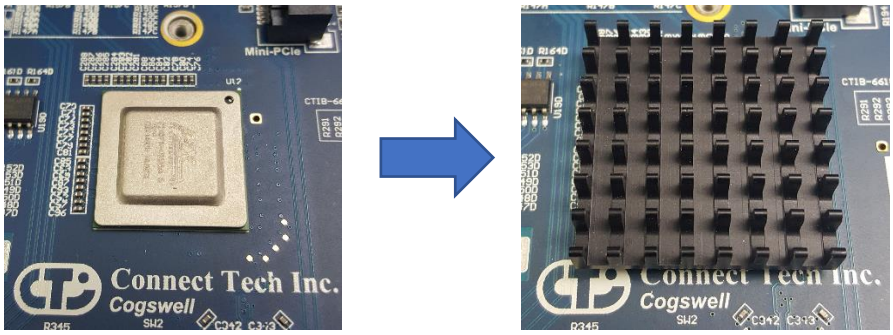


TYPICAL INSTALLATION

1. Ensure all external system power supplies are off.

2. Install the Jetson™ 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 heatsink on the PLX PCIe switch.



4. 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.

5. Connect the Power Cable to the Power Supply.

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

ON-BOARD INDICATOR LEDS

The Cogswell Carrier has 2 on-board indicator LEDs.

LED	Description
S4	PWR
D2	RST_OUT#

CURRENT CONSUMPTION DETAILS

Below are the maximum ratings of the Cogswell Carrier.

Theoretical Maximum	Watts
Theoretical absolute maximum total draw of all functionality on the Cogswell Carrier Board (not including Jetson™ Module)	100

Below are measurements taken with the Cogswell 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 Mini-PCIe 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 Cogswell Carrier only	1
Module installed, booted into Ubuntu, idle	11.2
Module Installed, booted into Ubuntu, running a NVStreamer Demo with a USB camera and 1080p video	22.4
Module Installed, booted into Ubuntu, running a NVStreamer Demo with a USB camera, 4x POE cameras and 1080p video	39

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 also offers a custom BSP to add in additional peripheral support on CTI's Jetson Carrier Boards. In the case of the Cogswell Carrier Board the CTI-L4T will expose software control of most of the carrier interfaces including USB3.0, CAN, PCIe, GPIO and more.

The CTI-L4T can be downloaded directly from Connect Tech here:

https://www.connecttech.com/jetson

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 TX2/TX2i 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 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

Force USB Recovery Mode

The Cogswell Carrier does support USB Force Recovery Mode or USB OTG on the USB 2.0 port. To update the firmware on your NVIDIA Jetson™ Module, mount the module onto the Cogswell and place the system into USB OTG Client Mode. This is done by attaching a USB Micro B Cable/Connector to the Cogswell OTG Port. From there follow the instructions as detailed in the NVIDIA Jetson™ TX2/TX2i Developer Kit User Guide or contact support@connecttech.com.

THERMALS DETAILS

The Cogswell 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 Cogswell Carrier Board. The NVIDIA Jetson TX2i matches the Cogswell 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

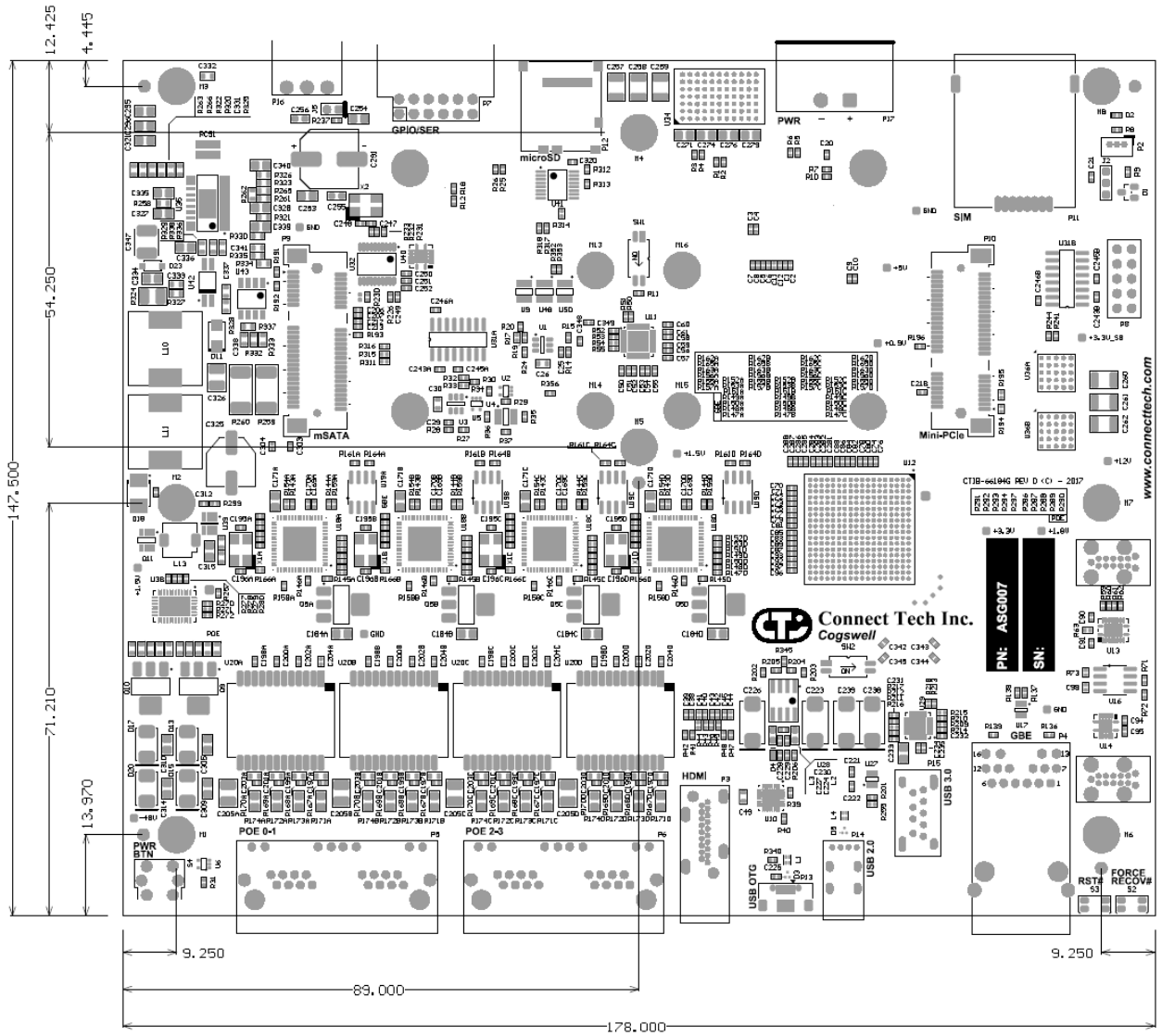
Jetson TX2:
https://developer.nvidia.com/embedded/dlc/jetson-tx2-thermal-design-guide

MECHANICAL DRAWINGS & MODELS

A complete **3D STEP Model** file of Cogswell Carrier can be downloaded here:
https://www.connecttech.com/ftp/3d_models/ASG007_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 Cogswell Carrier cables available.

Cable

Drawing No.	Part No.	Description
CTIC-00048	CAG104	2x5 0.1” IDC to DB-9 cable
OEM	CBG247	Micro USB to USB Type-A Male
CTIC-00597	CBG258	Misc I/O Breakout Cable

Cable drawings are available upon request. Send an email request to: **support@connecttech.com**

POWER SUPPLY

The following table summarizes the Cogswell Carrier power supplies available.

Power Supply

Part No.	Description
MSG074	Universal Power Supply (+12VDC/8.5A) – No Line Cord
MSG078	Universal Power Supply (+12VDC/8.5A) – EU Line Cord
MSG079	Universal Power Supply (+12VDC/8.5A) – NA Line Cord