JETBOX FLOYD-SC™

NVIDIA® Jetson Nano / TX2 NX / Xavier NX System

User Manual

PRELIMINARY

FOR TECHNICAL SUPPORT
PLEASE CONTACT:

Email: support@diamondsystems.com

Contents

1. Important Safe Handling Information 4

2. Introduction & System Configurations 6

2.1 JetBox-FloydSC System Overview 6

2.2 System Configurations 6

3. Functional Overview 7

3.1 Power Supply Specifications 7

3.2 USB Ports 7

3.3 Display 7

3.4 Ethernet Ports 7

3.5 Serial Ports 7

3.6 Digital I/O 7

4. Block Diagram 8

5. Mechanical Drawing 9

5.1 3D STEP Model 9

5.2 2D Drawing 9

6. Connectors, LEDs & Jumper Locations 10

6.1 JetBox-FloydSC Front Panel Call Outs 10

6.2 FloydSC Carrier board Callouts – TOP 11

6.3 FloydSC Carrier board Callouts – BOTTOM 11

7. Jumper Configuration 12

7.1 Digital I/O Configuration 12

7.2 USB2.0 Top Port Host/Device Selection 13

7.3 Serial Ports Configuration 13

8. Connector Pinouts 14

8.1 System Front Panel Connectors 14

8.1.1 Input Power Connector 14

8.1.2 HDMI Port 14

8.1.3 Display Port 14

8.1.4 Ethernet Ports 15

8.1.5 USB2.0 Ports 15

8.1.6 USB3.0 Port 15

8.1.7 Serial Ports 16

8.1.8 Digital I/O 16

8.2 FloydSC Base Board Connectors 16

8.2.1 RTC Battery (J18) 16

8.2.2 Daughter Board Power Feed (J21) 17

8.2.3 Camera (J15,J16,J20) 17

8.2.4 M.2 PCIe Connector (J19) 18

8.2.5 Daughter Board Expansion Connector (J9) 19

8.2.6 Controlled Area Network (J14) 20

8.2.7 Fan Connector (J17) 20

8.2.8 Utility Connector (J12) 20

9. I/O Connector List 21

10. Digital I/O **22**
10.1 Digital I/O Specifications 23
10.2 . Digital I/O Control Software Commands 24
11. Serial Ports **25**
12. Getting Started **26**
13. System Assembly **27**
13.1 Installing the Jetson Module on FloydSC 28
13.2 Installing FloydSC inside the JetBox 29
14. Reprogramming the Embedded Linux Image **30**
14.1 Hardware Setup 30
14.2 Software Setup 31
14.2.1 Flashing Jetson Nano Module 31
14.2.2 Flashing Jetson Xavier NX Module 33
15. Specifications **35**
16. Limited Warranty Policy **36**

1. IMPORTANT SAFE HANDLING INFORMATION

WARNING!

ESD-Sensitive Electronic Equipment

Observe ESD-safe handling procedures when working with this product.

Always use this product in a properly grounded work area and wear appropriate ESD-preventive clothing and/or accessories.

Always store this product in ESD-protective packaging when not in use.

Safe Handling Precautions

Diamond Systems boards are designed with complex circuitry and electronic components that are ESD (Electrostatic Discharge)-sensitive. This increases the likelihood of the boards incurring accidental damage during handling, installation, and connection to other equipment.

It is highly recommended that the following precautionary measures and best practices be observed in sequential order:

- Wear an anti-static Wristband/Strap or/and an antistatic Lab Coat or/and Rubber-soled shoes.
- Spread anti-static mats over the table or work surface or/and anti-static mats on the floor.
- Unpack components and remove them from their anti-static bags only when they are ready to be used.
- Avoid ungrounded surfaces such as plastic, carpets, floors, or tables, in the work area.
- Handle boards by the edges and their metal mounting brackets. Avoid touching components on the boards and the edge connectors that connect to expansion slots.

The following information describes common causes of failure found on boards and components returned to Diamond Systems for repair. It is provided as a guideline to avoid accidental damage.

ESD Damage: This type of damage is typically impossible to detect because there is no visual sign of failure or damage. In this type of damage, the board eventually stops functioning because of some defective components. Usually, the failure can be identified, and the chip can be replaced.

To prevent ESD damage, always follow proper ESD-prevention practices when handling computer boards.

Damage During Handling or Storage: Physical damage on boards also occur due to mishandling. A common observation is that of a screwdriver slipping on the board during installation, causing a gouge on the PCB surface, cutting signal traces or damaging components.

Another common observation is damaged board corners, indicating the board was dropped. This may or may not cause damage to the circuitry, depending on components located near the edges. Most Diamond System boards are designed with a minimum 25 mils clearance between the board edge and component pad. The Ground/power planes are located a minimum of 20 mils from the edge to avoid possible shorting from this type of damage. However, these design rules do not prevent damage in all situations.

Sometimes boards are stored in racks with slots that grip the edge of the board. This is a common practice for board manufacturers. Though Diamond Systems boards are resilient to damages, the components located close to the board edges can be damaged or even knocked off the board if the board lies tilted in the rack.

Diamond Systems recommends that all its boards be stored only in individual ESD-safe packaging units. If multiple boards are stored together, they should be contained in bins with dividers placed between the boards. Do not pile boards on top of each other or cram too many boards within a small location. This can cause damage to connector pins or fragile components.

Damage During Installation on a PC/104 Stack: Damage on boards can also occur while installing the board in a PC/104 Stack A common cause of damage occurs when the connector pins are misaligned with their corresponding interfaces on the stack.

For example, during installation, if a PC/104 board pin-mapping is misaligned/shifted by 1 row or 1 column, it can cause the ±12V power and Ground signal lines on the bus to contact the wrong pins on the board and damage components linked to the data bus lines.

Bent Connector Pins: This type of problem can be resolved by re-bending the pins to their original shape using needle-nose pliers.

The most common cause of a bent connector pin is when the board is pulled off a stack by tugging it at angles from one end of the connector to the other, to release it off the stack. Tugging the board off the stack in this manner can bend the pin(s) significantly.

A similar situation can occur when pulling a ribbon cable off a pin header. If the pins are bent too severely, bending them back can cause them to weaken or break. In this case, the connector must be replaced.

Power Damages: There are various causes of power-specific damages that can occur while handling the board. Some common causes such as –a metal screwdriver tip slipping, or a screw dropping onto the board while it is powered-up, causes a short between a power pin and a signal pin on a component.

These faults can cause over-voltage/power supply problems besides other causes described below.

To avoid such damages, assembly operations must be performed when the system is powered off.

Power Supply Wired Backwards: Diamond Systems power supplies and boards are not designed to withstand a reverse power supply connection. This will destroy almost all ICs connected to the power supply. In this case, the board will likely be irreparable and must be replaced. A chip destroyed by reverse or excessive power will often have a visible hole or show some deformation on the surface due to vaporization inside the package.

Overvoltage on Digital I/O Line: If a Digital I/O signal is connected to a voltage above the maximum specified voltage, the digital circuitry can be damaged. The acceptable voltage range, on most Diamond Systems boards connected to digital I/O signals is 0-5V, with overvoltage protection up to 5.5V (-0.5 to 5.5V). Overvoltage beyond this limit can damage the circuitry.

Other considerations are Logic Signals, which are typically generated between 12V to 24V.

If a Digital I/O Line of 12V to 24V is connected to a 5V logic chip, the chip will be damaged, and the damage could extend to other chips in the circuit.

IMPORTANT! Always check power connections twice before powering up!

2. INTRODUCTION & SYSTEM CONFIGURATIONS

2.1 JetBox-FloydSC System Overview

JetBox-FloydSC is a compact Nvidia Jetson AI computing platform ready to deploy. It includes the Jetson Nano or NX module installed on Diamond Systems FLOYDSC carrier board with a Linux OS installed and preconfigured to support all the I/Os on FloydSC.

The system is available multiple standard module configurations to meet a range of customer needs. The system installed with NVIDA Jetson Nano module supports only 1x Ethernet interface while the system when installed with NVIDIA Jetson Xavier NX module supports 2x Ethernet interfaces.

JetBox-FloydSC features 11-position screw terminal on the front panel to access the Digital I/Os available on the system. The enclosure is DIN rail mountable or can be used in a "tabletop" scenario.

The system is compatible with both 12V and 24V DC power supplies. A 12VDC universal AC adapter is included with the system.

2.2 System Configurations

JetBox-FloydSC utilizes the Floyd-SC BB02 baseboard and is available with three models of Jetson moduls. The architecture of the modules allows for a CAN port and a 2nd Ethernet port with the Xavier NX module:

Feature	***JB-FLDSC-NAO-02***	***JB-FLDSC-TNX-02***	***JB-FLDSC-XNX-02***
Module supported	Nano	TX2 NX	Xavier NX
Gigabit Ethernet	1	1	**2**
USB 3.0	1	1	1
USB 2.0	2	2	2
Serial ports	1 RS-232 + 1 RS-232/485	1 RS-232 + 1 RS-232/485	1 RS-232 + 1 RS-232/485
Display	1 HDMI + 1 DP	1 HDMI + 1 DP	1 HDMI + 1 DP
Storage / Expansion socket	M.2 M-Key 2242 / 2280 dual footprint	M.2 M-Key 2242 / 2280 dual footprint	M.2 M-Key 2242 / 2280 dual footprint
GPIO	8x GPIOs with 3.3V/5V Compatibility	8x GPIOs with 3.3V/5V Compatibility	8x GPIOs with 3.3V/5V Compatibility
CAN	N/A	N/A	1 port (replaces 1 serial port on the front panel)

3. FUNCTIONAL OVERVIEW

3.1 Power Supply Specifications

The JetBox-FloydSC accepts a wide input voltage range of +7V to +24V. Maximum power consumption with either Nano or NX module installed, and all peripherals operating is 35W. The maximum allowable reflected ripple, measured at the voltage input connector is 50 mV p-p. The input power is provided via a barrel jack with 5.5mm OD / 2.5mm ID dimensions (tip positive).

3.2 USB Ports

The JetBox-FloydSC provides 2x USB 2.0 ports and 1x USB 3.0 port.

1. 2x USB 2.0 ports are available on a vertically stacked dual-port USB 2.0 connector.
2. The upper USB 2.0 port (USB0) can be used for programming during recovery mode.
3. 1x USB 3.0 port terminates on an upright right-angle USB 3.0 connector. This connector also supports the USB 2.0 protocol.

The USB signals connected to upright USB3.0 connector is optionally connected to expansion connector using 0 Ohm resistors.

3.3 Display

The JetBox-FloydSC supports two display options:

1. HDMI 2.0a/b video with audio with both Nano and NX modules.
2. DP 1.4 video, audio supported with NX module only.

The HDMI is terminated on an upright HDMI connector & the DP is terminated on a separate upright DP connector.

3.4 Ethernet Ports

The JetBox-FloydSC is equipped with one or two Gigabit Ethernet ports:

1. (all models) A 10/100/1000 Ethernet port routed from the module.
2. (NX model only) A 10/100/1000 Ethernet port derived from the Intel WGI210IT/Intel I210 PCIe Ethernet controller when used with Xavier/TX2 NX module

Both Ethernet ports are accessed via two RJ-45 jacks. The magnetics needed for these ports are available on the FloydSC carrier. The jacks indicate Link and speed status associated with each port using integrated LEDs.

When a daughterboard is used for expansion, the second Ethernet interface is unavailable since the PCIe Port 1 is utilized by the Daughterboard.

3.5 Serial Ports

The JetBox-FloydSC provides two serial ports, one with jumper selectable RS232 or RS485 protocol modes and one dedicated RS232. Since the serial ports from module are 1.8V complaint, they are level shifted to 3.3V logic before feeding to the transceivers.

3.6 Digital I/O

The JetBox-FloydSC provides 8x digital I/Os , which are individually configurable as an output or input. The digital I/Os are realized using an I2C GPIO expander. The I2C control for the expander is directly fed from the module. This I2C GPIO expander can support both 3.3V and 5V, so a voltage translator is used to between module and I2C GPIO expander. This expander device is accessible on the I2C address 0x22. The IO voltage is selectable using jumper setting refer section 9.1 for Jumper configuration details.

The Digital I/Os are made available on a 11-position 3.5mm screw terminal connector.

4. BLOCK DIAGRAM

Below are the Block Diagrams of the JetBox-FloydSC system with Nano module & the Xavier NX modules. There are two PCIe ports available on the Xavier NX module due to which either an additional Ethernet port can be supported or the Daughterboard Expansion.

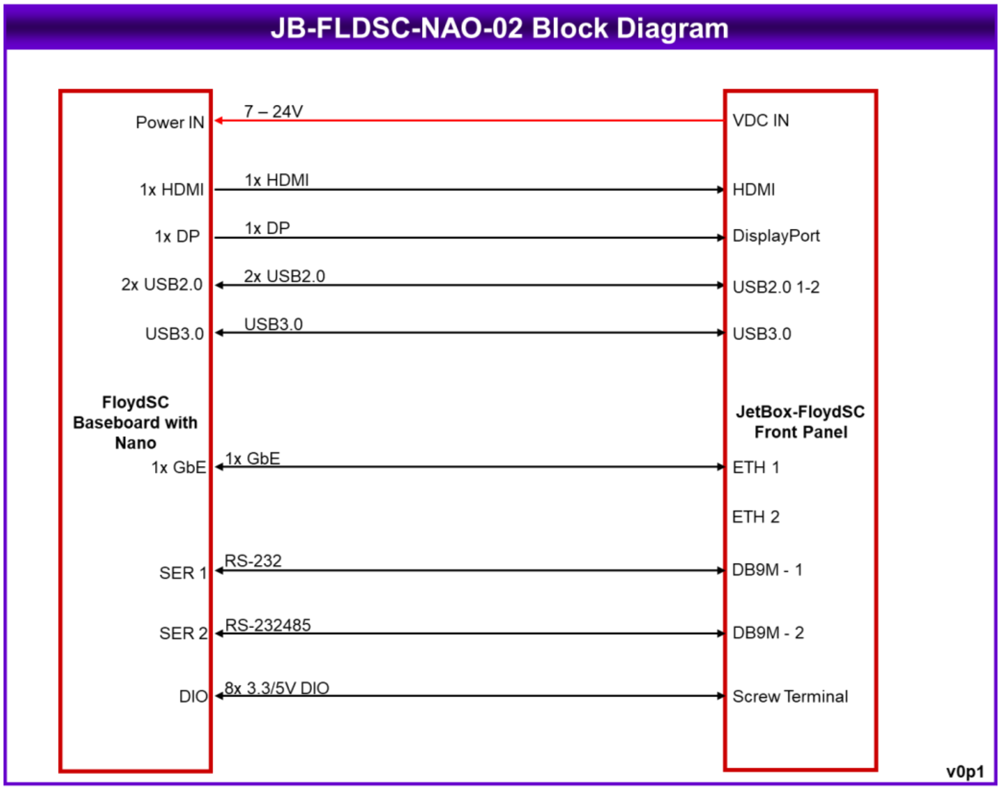

Figure 1 JetBox-FloydSC with Nano module installed & 1x Ethernet port

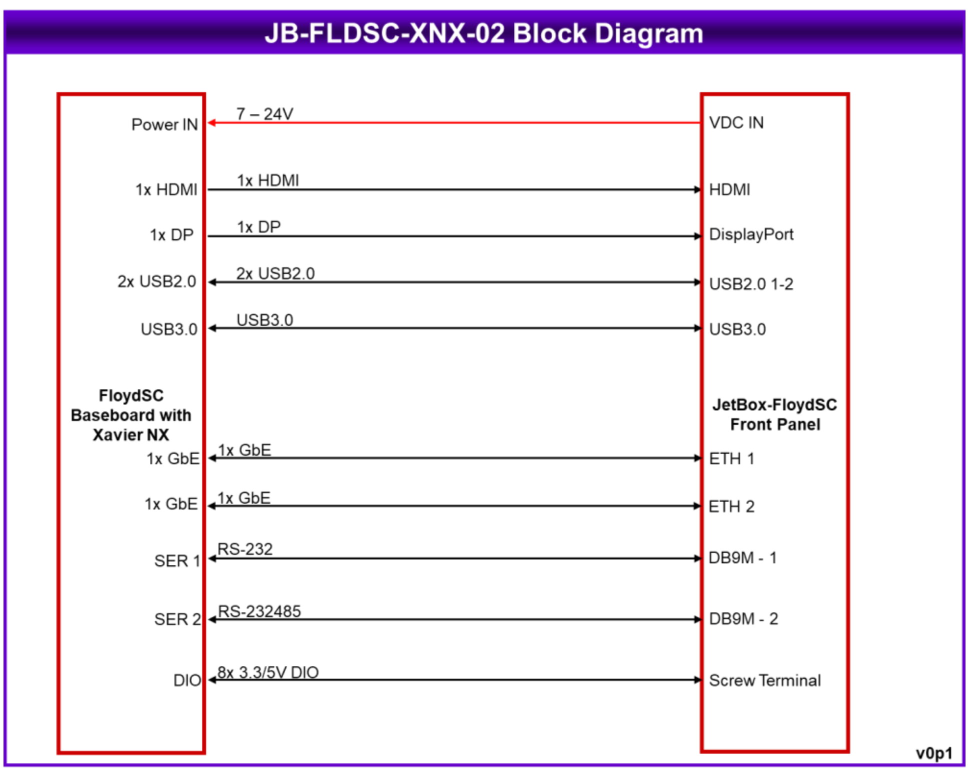

Figure 2 JetBox-FloydSC with Xavier NX module installed & 2x Ethernet ports

5. MECHANICAL DRAWING

5.1 3D STEP Model

The complete product 3D STEP model is available to our customers in the product support page here.

5.2 2D Drawing

All dimensions are in mm.

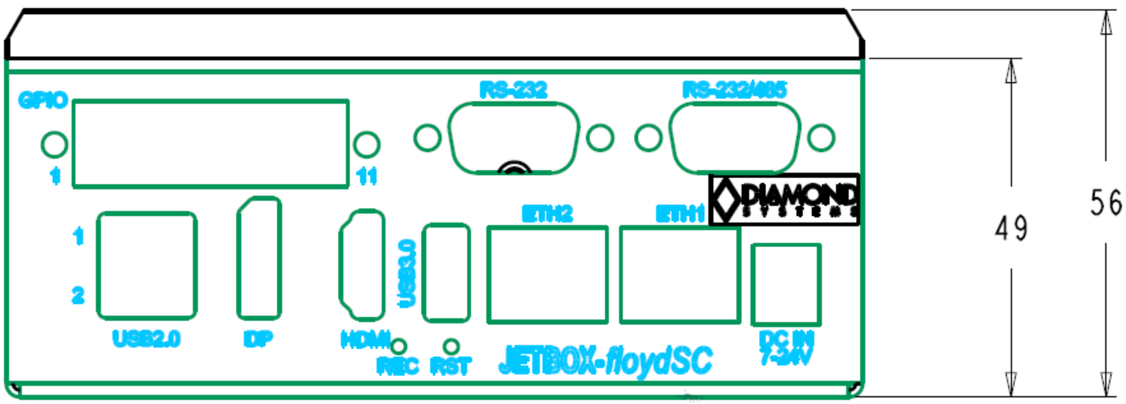

Figure 3 JetBox-FloydSC - Front View

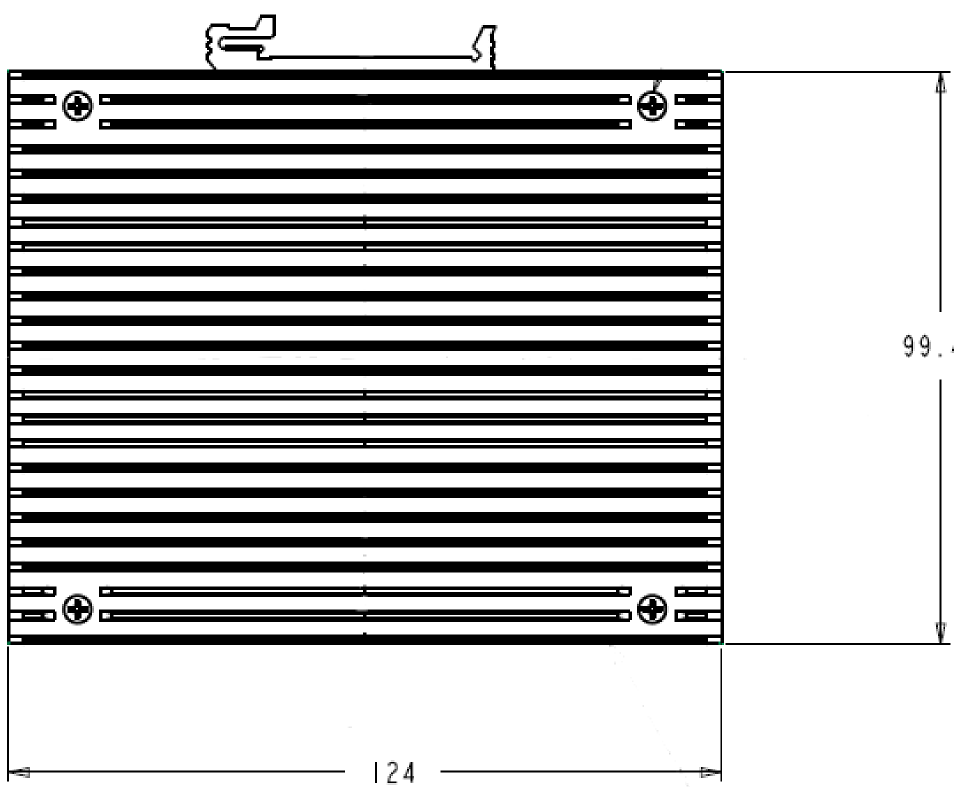

Figure 4 JetBox-FloydSC - Top View

6. CONNECTORS, LEDS & JUMPER LOCATIONS

6.1 JetBox-FloydSC Front Panel Call Outs

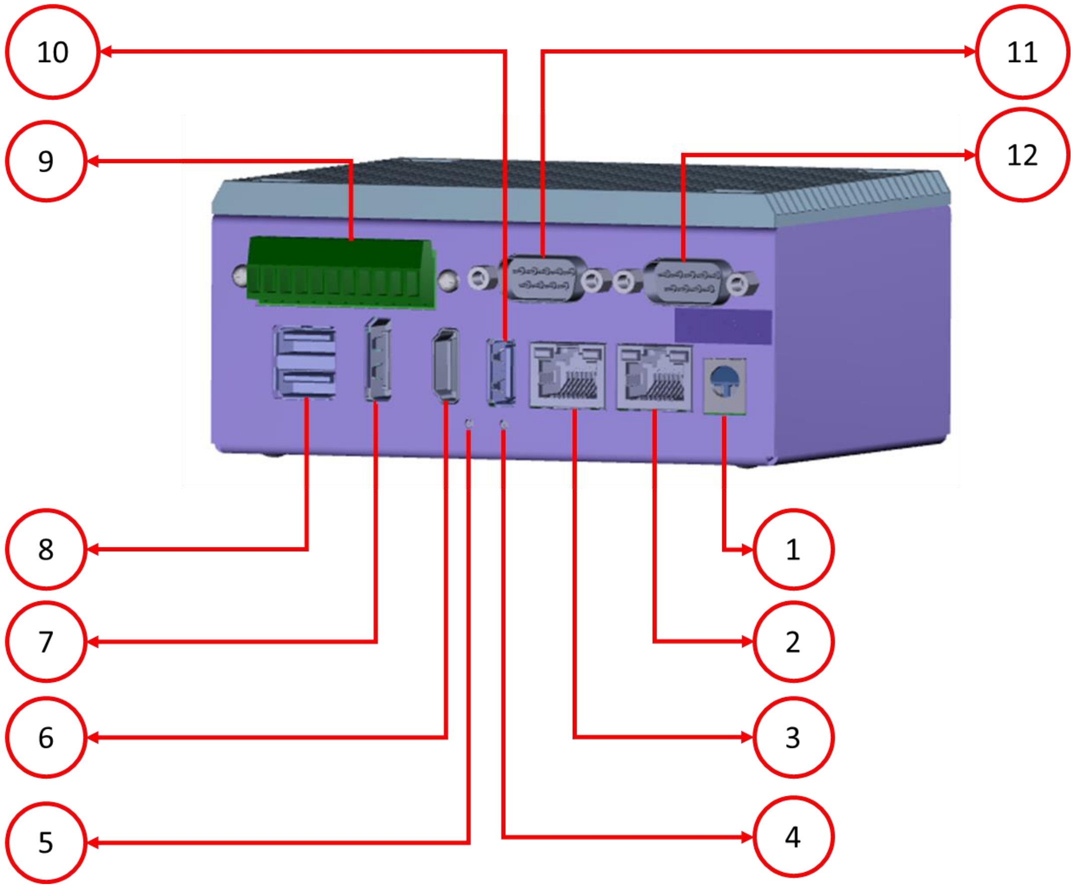

Figure 5 JetBox-FloydSC - Front Panel Call-Outs

Sl No	*Description*
1	Power In, 7 – 24 VDC
2	Ethernet – 1
3	Ethernet – 2
4	Reset Switch
5	Recovery Switch
6	HDMI Port
7	DP Port
8	USB2.0
9	Digital I/O
10	USB3.0
11	RS-232
12	RS-232/RS-485

6.2 FloydSC Carrier board Callouts – TOP

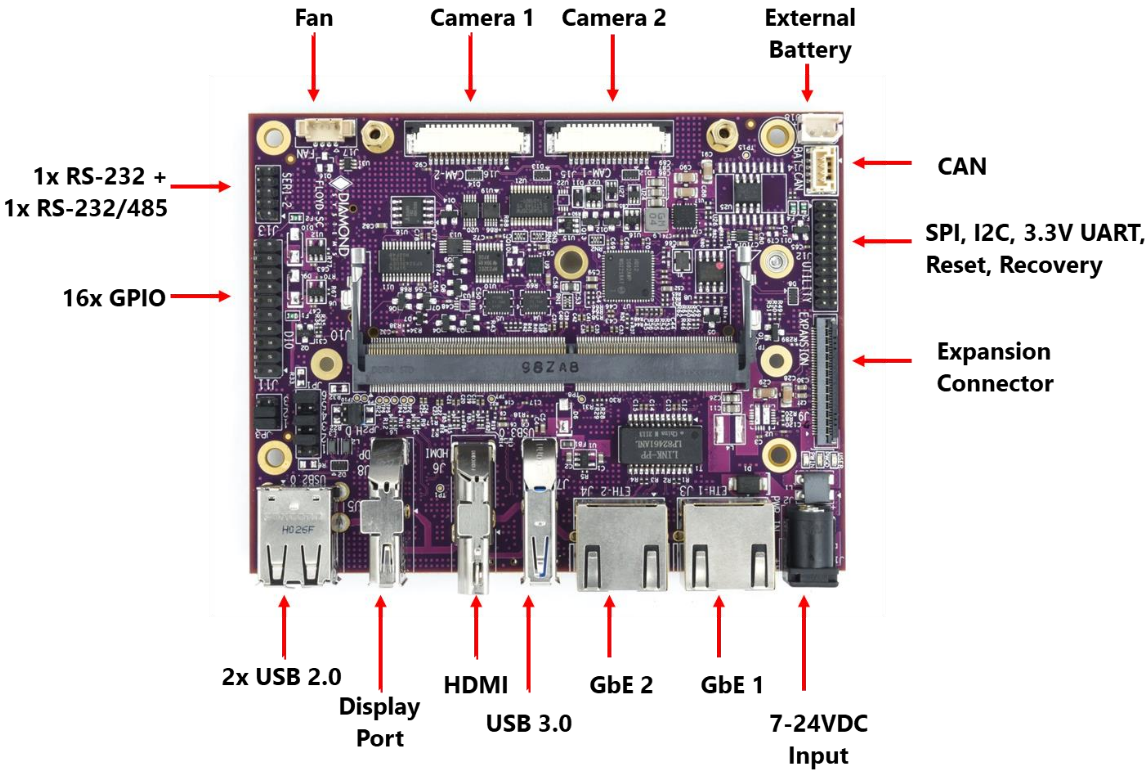

Figure 6 FloydSC Carrier Board – TOP

6.3 FloydSC Carrier board Callouts – BOTTOM

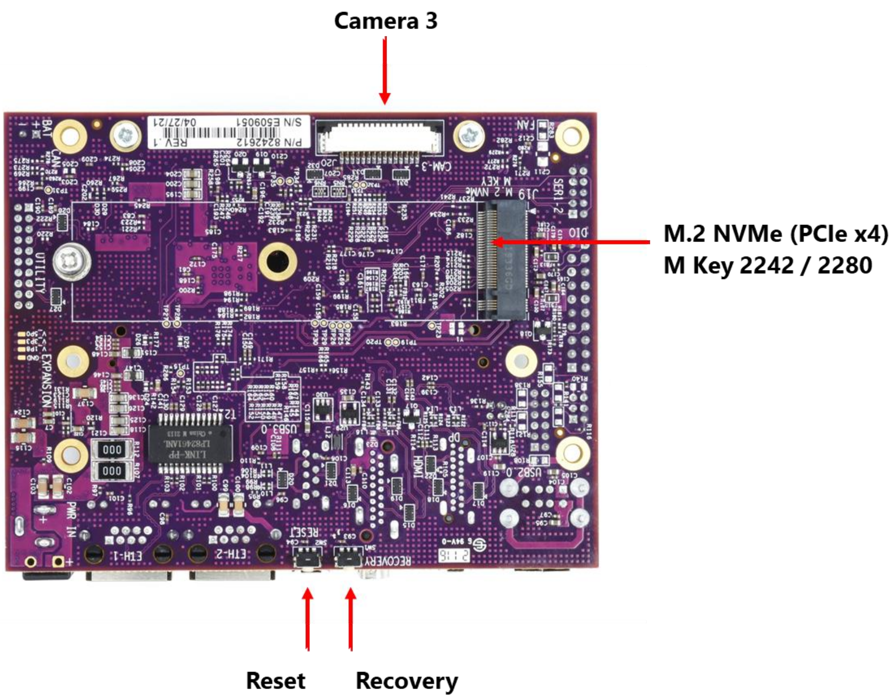

Figure 7 FloydSC Carrier Board - Bottom

7. JUMPER CONFIGURATION

NOTE: *To access the jumpers on the Floyd baseboard, the TOP heat sink plate needs to be removed from the JetBox-FloydSC system.*

The various jumpers for the Jetbox-Floyd provided by the Floyd baseboard are as provided below:

1. JP1: Digital I/O Configuration
2. JP2: USB2.0 Top Port Host/Device Selection
3. JP3: Serial Ports Configuration

7.1 Digital I/O Configuration

Jumpers are provided to enable pull-up/down on the Digital I/Os. By default, the DIOs are pulled down. The configuration is as shown below:

Jumper Position	*Configuration*
1	Enable 3.3/5V pull-up to DIO Port A
2*	**Enable pull-down to DIO Port A**
3	Enable 3.3/5V pull-up to DIO Port B
4*	**Enable pull-down to DIO Port B**
5	Configure DIOs to be 5V compliant
6*	**Configure DIOs to be 3.3V**
***:- Default**	

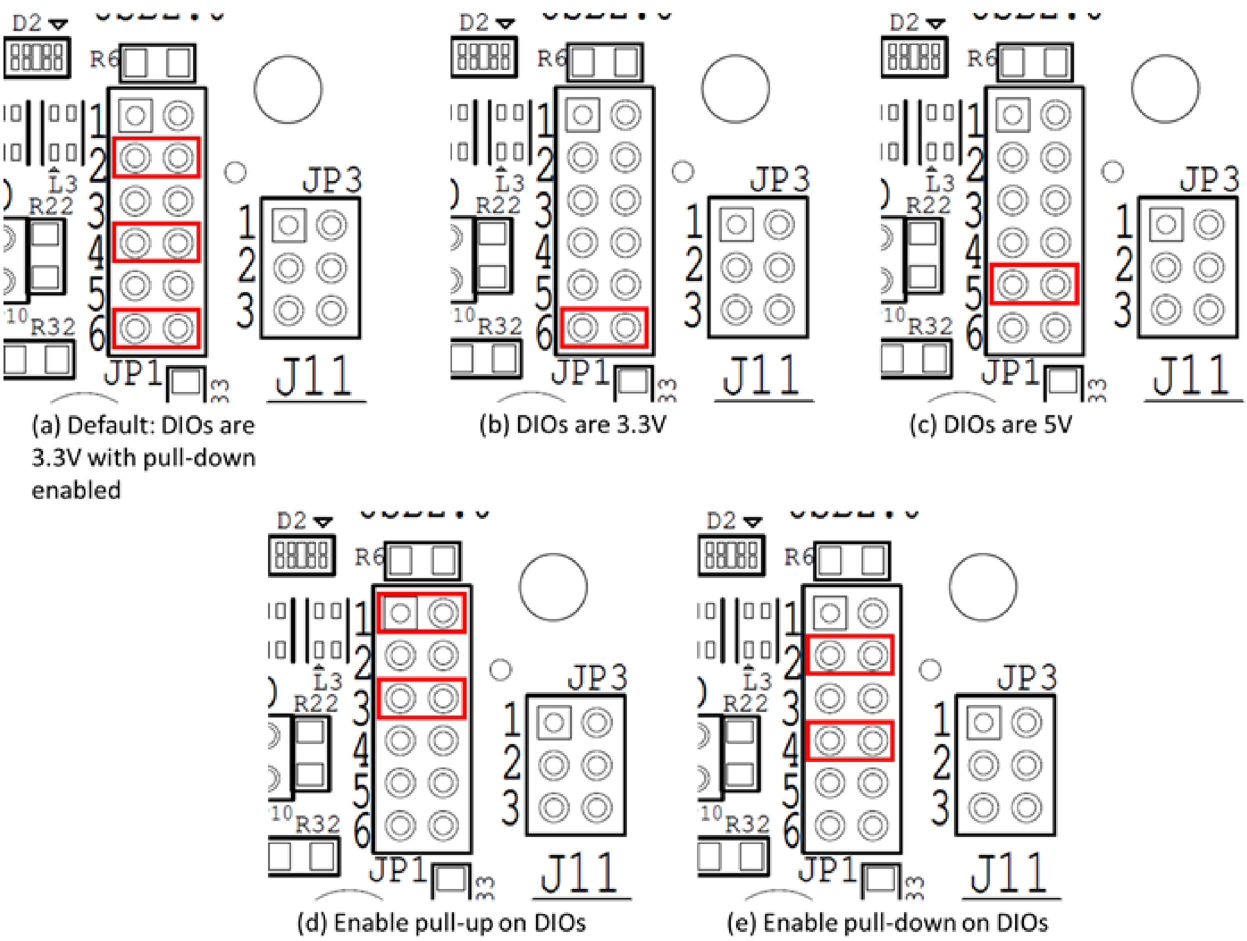

Figure 8 JP1 jumper mount illustrations

7.2 USB2.0 Top Port Host/Device Selection

The USB2.0 Top port of the base board is used as a device in the recovery mode to flash the module and is used as a Host in normal operation. This selection is achieved by changing the jumper positions on JP3 as tabulated below:

Jumper Position	***Configuration***
D	Set USB2.0 port 1 Port as Device for Recovery Mode
H*	**Set USB2.0 port 1 Port as Host in Normal Mode**
***:- Default**	

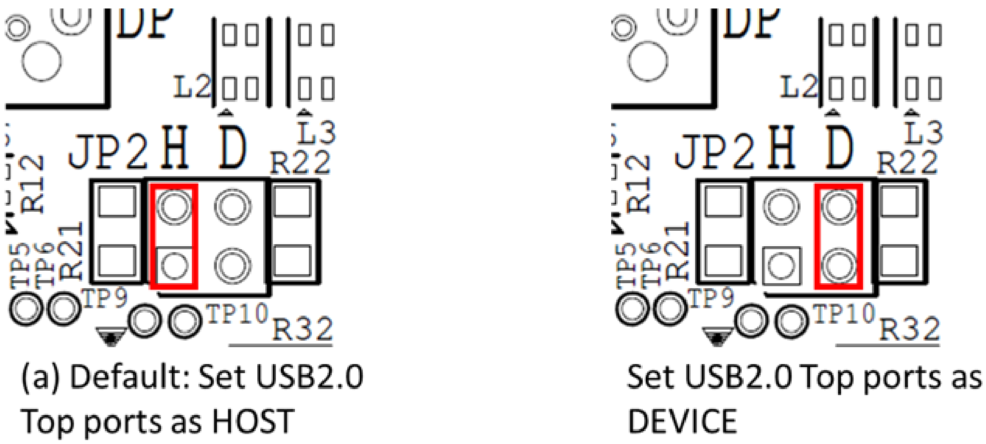

Figure 9 JP2 jumper mount illustrations

7.3 Serial Ports Configuration

The serial port protocol modes can be set with jumpers or with software. The protocol selection must either be done with or with software. If both the jumpers & software are used to set the protocol mode, priority is given to software. The protocol mode selection & termination enable for RS-485 operation mode with jumper is as tabulated below:

Jumper Position	***IN/OUT***	***Configuration***
1	IN	Enable 121E termination for RS-485 mode operation
1	OUT	Disable 121E termination for RS-485 mode operation
2*	**IN**	Set SER 2 in RS-232
3	IN	Set SER 2 in RS-485
***:- Default**		

8. CONNECTOR PINOUTS

8.1 System Front Panel Connectors

8.1.1 Input Power Connector

The system provides a barrel connector for main input power. The connector has a 2.5mm center pin and is intended for use with mating connectors with 2.5mm inner diameter and 5.5mm outer diameter.

Input voltage = +7V to +24V

The connections for the power input connector are Tip = +V and Ring = -V.

Connector Part Number: CUI Devices# PJ-202BH

DSC Mating cable: NA

8.1.2 HDMI Port

The HDMI port is terminated on a standard vertical connector. The connector follows standard HDMI pinout.

D2+	**1**	**2**	D2 Shield
D2-	**3**	**4**	D1+
D1 Shield	**5**	**6**	D1-
D0+	**7**	**8**	D0 Shield
D0-	**9**	**10**	Clock +
Clock Shield	**11**	**12**	Clock -
CEC	**13**	**14**	No Connect
DDC Clock	**15**	**16**	DDC Data
Ground	**17**	**18**	+5V
Hot Plug Detect	**19**		

Connector Part No: Foxconn# QJ3119C-WFB1-4F
DSC Mating cable: Standard HDMI cable

8.1.3 Display Port

DP port is terminated on a standard vertical connector. Connector follows standard DP pinouts as below:

D0+	**1**	**2**	D0 Shield
D0-	**3**	**4**	D1+
D1 Shield	**5**	**6**	D1-
D2+	**7**	**8**	D2 Shield
D2-	**9**	**10**	D3+
D3 Shield	**11**	**12**	D3-
No Connect	**13**	**14**	No Connect
Aux+	**15**	**16**	Ground
Aux-	**17**	**18**	Hot Plug Detect
Ground	**19**	**20**	+3.3V

Connector Part No: Foxconn# 3VD21203-H7U0-4H
DSC Mating cable: Standard DP cable

8.1.4 Ethernet Ports

The ethernet ports are terminated on standard RJ45 connectors that has integrated LEDs. The connectors follow standard TIA/EIA 568B pinouts as below:

1	Data A+	Orange/White
2	Data A-	Orange
3	Data B+	Green / White
4	Data C+	Blue
5	Data C-	Blue / White
6	Data B-	Green
7	Data D+	Brown / White
8	Data D-	Brow

Connector Part No: Link-PP#LPJG101AGNL-1

DSC Mating cable: Standard LAN Cat6 cable

8.1.5 USB2.0 Ports

The system hosts two USB 2.0 ports accessible on a vertically stacked standard USB 2.0 Type A socket that uses standard pinouts as below:

1	+5V
2	D-
3	D+
4	Ground

Connector Part No: Foxconn# UB1112C-8FDH-4F
DSC Mating cable: NA

8.1.6 USB3.0 Port

The system hosts one USB 3.0 ports accessible on an upright standard USB 3.0 socket that uses standard pinouts as below:

+5V	**1**	**9**	SSTX+
D-	**2**	**8**	SSTX-
D+	**3**	**7**	Ground
Ground	**4**	**6**	SSRX+
		5	SSRX-

Connector Part No: Foxconn# UEA3119C-4EB1-4H
DSC Mating cable: NA

8.1.7 Serial Ports

The system provides two serial ports. One of the serial ports is dedicated to RS232 protocol and the second port can be configured to either RS232 or RS485 based on Jumper settings. The pinouts for different protocols are as follows:

RS-232

No Connect	**6**	**1**	No Connect
RTS	**7**	**2**	RX
CTS	**8**	**3**	TX
No Connect	**9**	**4**	No Connect
		5	Ground

RS-485

No Connect	**6**	**1**	No Connect
TX-	**7**	**2**	No Connect
No Connect	**8**	**3**	TX+
No Connect	**9**	**4**	No Connect
		5	Ground

Connector Part No: DB9 Male
DSC Mating cable: Standard DB9 female-to-female cable

8.1.8 Digital I/O

The system provides access to 8 digital I/O pins on the front panel, terminated on a 11-position, 3.5mm pitch screw terminal connector. These digital I/O signals are configurable to 3.3V/5V configurable via jumper settings. The pinouts of the connector are as follows:

1	DIO 0
2	DIO 1
3	DIO 2
4	DIO 3
5	DIO 4
6	DIO 5
7	DIO 6
8	DIO 7
9	+3.3V or +5V
10	Ground
11	Ground

Connector Part No: TE# 1-284414-1
DSC Mating cable: NA

8.2 FloydSC Base Board Connectors

8.2.1 RTC Battery (J18)

The external battery input is intended for a 3V battery.
The pinouts for the RTC Battery connector are specified below.

1	RTC BAT +
2	Ground

Connector Part No: Molex# 0022035025
DSC Mating cable: 6980524

8.2.2 Daughter Board Power Feed (J21)

The connector is used to feed VIN input voltage from the Base Board to the Daughter Board when additional power is required for the Daughter Board. The pinouts for the optional Daughter Board Power feed connector are as shown below:

1	VIN
2	VIN
3	Ground
4	Ground

Connector PN: Molex# 0532610471

Board to Board Cable: Molex# 0151340400

8.2.3 Camera (J15,J16,J20)

The carrier board embeds three identical 15-pin connectors for multiple CSI Camera connectivity. Ribbon cables are used to directly plug the camera modules.

The pinouts are as specified below:

J15

1	GND_DIG
2	CSI0_D0_N
3	CSI0_D0_P
4	GND_DIG
5	CSI0_D0_N
6	CSI0_D0_P
7	GND_DIG
8	CSI0_CLK_N
9	CSI0_CLK_P
10	GND_DIG
11	CAM0_PWDN
12	CAM0_MCLK
13	CAM0_I2C_SCL_3P3
14	CAM0_I2C_SDA_3P3
15	V_3P3

J16

1	GND_DIG
2	CSI2_D0_N
3	CSI2_D0_P
4	GND_DIG
5	CSI2_D0_N
6	CSI2_D0_P
7	GND_DIG
8	CSI2_CLK_N
9	CSI2_CLK_P
10	GND_DIG
11	CAM1_PWDN
12	CAM1_MCLK
13	CAM1_I2C_SCL_3P3
14	CAM1_I2C_SDA_3P3
15	V_3P3

J14

1	GND_DIG
2	CSI4_D0_N
3	CSI4_D0_P
4	GND_DIG
5	CSI4_D0_N
6	CSI4_D0_P
7	GND_DIG
8	CSI4_CLK_N
9	CSI4_CLK_P
10	GND_DIG
11	CAM2_PWDN
12	CAM2_MCLK
13	CAM2_I2C_SCL_1P8_E
14	CAM2_I2C_SDA_1P8_E
15	V_3P3

Connector Part No: TE# 1-84952-5

Camera supported: Raspberry Pi Camera Board v2 - 8 Megapixels

Mating cable: FFC Cable included with the camera

8.2.4 M.2 PCIe Connector (J19)

The FloydSC carrier board is equipped with an M.2 PCIe SSD M-keyed connector for 2280 0r 2242 sized modules for storage applications. An M.2 SSD is "keyed" to prevent the insertion of a card connector to an incompatible socket on the board.

x4 PCIe lane available from module is routed directly to M.2 PCIe connector The pinouts of the connector are as shown below:

GND	1	2	3.3V
GND	3	4	3.3V
PETn3	5	6	N/C
PETp3	7	8	N/C
GND	9	10	LED1#
PERn3	11	12	3.3V
PERp3	13	14	3.3V
GND	15	16	3.3V
PETn2	17	18	3.3V
PETp2	19	20	N/C
GND	21	22	N/C
PERn2	23	24	N/C
PERp2	25	26	N/C
GND	27	28	N/C
PETn1	29	30	N/C
PETp1	31	32	N/C
GND	33	34	N/C
PERn1	35	36	N/C
PERp1	37	38	N/C
GND	39	40	N/C
PETn0	41	42	N/C
PETp0	43	44	N/C
GND	45	46	N/C
PERn0	47	48	N/C
PERp0	49	50	PERST#
GND	51	52	CLKREQ#
REFCLKN	53	54	PEWake#
REFCLKP	55	56	N/C
GND	57	58	N/C
	KEY		
N/C	67	68	SUSCLK
PEDET	69	70	3.3V
GND	71	72	3.3V
GND	73	74	3.3V
GND	75		

Connector Part No: Amphenol# 10128798-001RLF

DSC Mating cable: NA

Key: M-Key

Supported Add-on Module: M.2 2280 SSD (W 22 mm x L 80 mm) or M.2 2242 SSD (W 22 mm x L 42 mm)

8.2.5 Daughter Board Expansion Connector (J9)

The FloydSC carrier supports additional interfaces using expansion connector for an optional daughter card. The pinouts of the Daughterboard Expansion connector are as below:

.

Pin	Signal	Pin	Signal
1	Hi-Vin	21	USB2_D_P
2	Hi-Vin	22	GND
3	Hi-Vin	23	USB_SS_TX_P
4	Hi-Vin	24	USB_SS_TX_N
5	Hi-Vin	25	GND
6	Hi-Vin	26	USB_SS_RX_P
7	Hi-Vin	27	USB_SS_RX_N
8	Hi-Vin	28	GND
9	PCIe_RST#	29	PCIe_Clockreq#
10	GND	30	DB_PRESENT#
11	PCIe_NX_TX_P	31	GND
12	PCIe_NX_TX_N	32	SDIO CLK
13	GND	33	SDIO D0
14	PCIe_NX_RX_P	34	SDIO D1
15	PCIe_NX_RX_N	35	SDIO D2
16	GND	36	SDIO D3
17	PCIe_NX_CLK_P	37	SDIO CMD
18	PCIe_NX_CLK_N	38	GND
19	GND	39	SDIO Card Detect
20	USB2_D_N	40	PCIe wake

Connector Part No: Hirose# FH55-40S-0.5SH

DSC Mating Cable PN: 6971400

8.2.6 Controlled Area Network (J14)

Floyd SC model (FLDSC-BB02) implements one CAN bus controller port when integrated with Jetson Xavier NX module. The pinouts of the connector are as given below:

1	Ground
2	CAN Data -
3	CAN Data +
4	Ground

Connector Part No: BM04B-GHS-TBT

DSC Mating cable: 6981182

The CAN cable 6981182 has the near end terminated with the mating connector GHR-04V-S & the far end with a DB9M. When the cable is used to access the CAN port, the DB9M follows the pinouts as shown below:

Ground	**6**	**1**	No Connect
CAN Data+	**7**	**2**	CAN Data-
No Connect	**8**	**3**	Ground
No Connect	**9**	**4**	No Connect
		5	No Connect

8.2.7 Fan Connector (J17)

Active thermal solution is not part of the system. However, to support active solutions, carrier board provides the provision for this with a fan connector. The pinouts for the fan connector are specified below.

1	PWM
2	Tachometer
3	+5V
4	Ground

Connector Part Number: Molex# 0533980471-2

Supported Fan Model: Delta# ASB0305HP-00CP4

8.2.8 Utility Connector (J12)

The carrier board provides access to utility signals on a 2x10 header.

The pinouts for the utility connector are specified below.

+3.3V	**1**	**2**	+5V
Force Off 5V	**3**	**4**	SPI SS 3P3
Force Recovery 1,8V	**5**	**6**	SPI MISO 3P3
Power Button 5V	**7**	**8**	SPI CLK 3P3
Reset 1.8V	**9**	**10**	SPI MOSI 3P3
Ground	**11**	**12**	GND
Debug UART RX 3.3V	**13**	**14**	I2C CLK 3P3
Debug UART TX 3,3V	**15**	**16**	I2C DATA 3P3
Ground	**17**	**18**	Ground
Ground	**19**	**20**	Ground

Connector Part No: 220-97-36GB01

Connector type: 2x10, 2 mm Header

9. I/O CONNECTOR LIST

Function	Manufacturer	Part no.	Description	DSC Mating Cable
Power In	CUI Inc.	PJ-202BH	CONN PWR JACK 2.5X5.5MM SOLDER	NA
Daughter Board Power Feed	Molex	0532610471	CONN HEADER SMD R/A 4POS 1.25MM	TBD
RTC battery	Molex	0022035025	CONN HEADER VERT 2POS 2.5MM	6980524
Fan	Molex	0533980471	CONN HEADER SMD 4POS 1.25MM	NA
GbE (x2)	Link PP	LPJE101AGNL-1	SINGLE PORT RJ45	Standard
HDMI	Foxconn	QJ3119C-WFB1-4F	VERTICAL HDMI STANDARD CONNECTOR	Standard
DP	Foxconn	3VD21203-H7U0-4H	VERTICAL DP STANDARD CONNECTOR	Standard
Camera (x3)	TE	1-84952-5	15-PIN FFC RA SMD	FFC cable
Serial Ports	Pinrex	220-97-36GB01	CONN HEADER VERTICAL 10POS, 2X5 2MM	6981075
USB 3.0	Foxconn	UEA3119C-4EB1-4H	USB 3.0 A TYPE, UPRIGHT, T/H, 9 POS	Standard
USB2.0	Foxconn	UB1112C-8FDH-4F	DUAL USB A TYPE, RIGHT ANGLE, T/H, 8 POS	Standard
Expansion Connector	Hirose	FH55-40S-0.5SH	CONN FFC FPC 0.5MM SMD	6971400
M.2 SSD socket	Amphenol	10128798-005RLF	CONN FEMALE 67POS 0.020 GOLD	NA
Digital IO	Oupiin	2011-2X40G00SD	CONN HEADER R/A 20POS, 2X10 2.54MM	6981330
CAN	JST	BM04B-GHS-TBT(LF)(SN)(N)	CONN HEADER SMD 4POS 1.25MM	6981182
Utility	Pinrex	220-97-36GB01	CONN HEADER R/A 20POS, 2X10 2MM	NA
Module Connector	TE	2309413-1	DDR4 SODIMM 260P 9.2H STD	NA

10. DIGITAL I/O

JetBox-FloydSC system provides 8 GPIOs exposed on the front panel on screw terminals. The pinout numbering of the screw terminals is as shown below:

Figure 10 JetBox-FloydSC DIO Screw Terminal Pin Numbering

The pinouts of the screw terminals are as given below:

1	2	3	4	5	6	7	8	9	10	11
DIO 0	DIO 1	DIO 2	DIO 3	DIO 4	DIO 5	DIO 6	DIO 7	+3.3V or +5V	Ground	Ground

.

The DIOs on the Floyd SC Carrier card is realized using I2C to GPIO expander.

The I2C GPIO expander can be addressed at 0x22 on the I2C bus. The I2C bus number depends upon the module installed as tabulated below:

	NVIDIA Jetson Nano	***NVIDIA Jetson Xavier NX***
I2C Bus Device	/dev/i2c-1	/dev/i2c-8

10.1 Digital I/O Specifications

The DIOs on Floyd SC are 3.3V/5V voltage selectable output compliant tolerant. The logic specifications are as follows:

Device	***PCA9535***
Number of Lines	8
Direction	Programmable bit by bit
Logic Levels	3.3V/5V configurable
Pull resistors	10K ohms +/-1%; Jumper-selectable pull-up/down
Input Voltage Thresholds	
Logic 0	-0.5V min, 0.99V(3.3V VIO), 1.5V(5V VIO) max
Logic 1	2.64V(3.3V VIO)/ 3.5V(5V VIO) min, 5.5V max
Output Voltage Thresholds	
Logic 0	0.0V min; 0.7V max @ 10mA output current
Logic 1	2.5V(3.3V VIO)/4V(5V VIO) min @ -10mA output current; 3.3V/5V max

Since the DIOs are realized with GPIO expanders, the DIOs do not provide any alternate functions but can only be used to drive logic high & logic low.

10.2 . Digital I/O Control Software Commands

There are 4 commands to use the DIOs. They are as follows:

1. gpio_util setdir

This command configures the direction of a particular DIO. For example, to set DIO 3 as an input & DIO 4 as an output, follow the command as provided below:

gpio_util setdir 3 in;	// sets DIO 3 as an input
gpio_util setdir 4 out;	// sets DIO 4 as an output

2. gpio_util getdir

This command reads the direction of a particular DIO. For example, to read the direction of DIO 2 (earlier set as an input) & DIO 5 (earlier set as an output), use the command as follows:

gpio_util getdir 2;	//read direction of GPIO port 2
in	// Prints out GPIO port 2 direction
gpio_util getdir 5;	//read direction of GPIO port 5
out	// Prints out GPIO port 2 direction

3. gpio_util setval

This command configures the logic driven to an output. For example, to drive a logic 0 to DIO 2 & a logic 1 to DIO 5, use the command as follows:

gpio_util setval 2 0;	// drives DIO 2 as logic 0
gpio_util setval 5 1;	// drives DIO 5 as logic 1

4. gpio_util getval

This command reads the logic at an input pin. For example, to read the logic value at DIO 6, use the command as follows:

gpio_util getval 6	// reads the logic of DIO 6
0	// prints the logic level of DIO

Total number of allowed GPIO numbers are 1-8.

11. SERIAL PORTS

The serial ports on the Nano & Xavier NX are available at different device IDs. The device IDs are provided as below:

	NVIDIA Jetson Nano	*NVIDIA Jetson Xavier NX*
Serial Port 1	ttyTHS2	ttyTHS1
Serial Port 2	ttyTHS1	ttyTHS0

Protocol selection can be done by setting jumper configuration as per Section 7.3.

The protocol can also be set from software by running the following commands:

sudo prtsel_util rs485; // enable rs485 protocol for SER2

sudo prtsel_util rs232; // enable rs232 protocol for SER2

When the protocol is set to RS485 for SER2 port:

From the transmitter node, it is essential to enable the RTS during transmit & disable it thereafter. Since, the auto RTS feature is not supported on Nvidia serial port drivers, the RTS signals would need to be enabled manually just before transmit & disabled right after the transmission. The following commands are used for these purposes:

On Nano:

sudo rs485_util ttyTHS2 1; // enable RTS for SER 2 to transmit

sudo rs485_util ttyTHS2 0; // disable RTS for SER 2 to receive

sudo rs485_util ttyTHS1 1; // enable RTS for SER 2 to transmit

sudo rs485_util ttyTHS1 0; // disable RTS for SER 2 to receive

On Xavier NX:

sudo rs485_util ttyTHS0 1; // enable RTS for SER 2 to transmit

sudo rs485_util ttyTHS0 0; // disable RTS for SER 2 to receive

sudo rs485_util ttyTHS1 1; // enable RTS for SER 2 to transmit

sudo rs485_util ttyTHS1 0; // disable RTS for SER 2 to receive

NOTE: If both the jumper & the software tries to set the protocol mode of the serial port SER 2, then the software control takes precedence.

12. GETTING STARTED

JetBox-FloydSC is shipped to our customers ready to work out of the box. A 12V DC adapter is included with the JetBox-FloydSC. The Jetson module, included with the JetBox-FloydSC is flashed with the latest BSP. However, it is highly recommended to check the Diamond System Corp website for any updated BSPs at http://www.diamondsystems.com/products/floydsc

To get started with Jetbox-Floyd, a minimum of USB keyboard, USB mouse & an HDMI monitor are required. Refer to the reference set up image provided below:

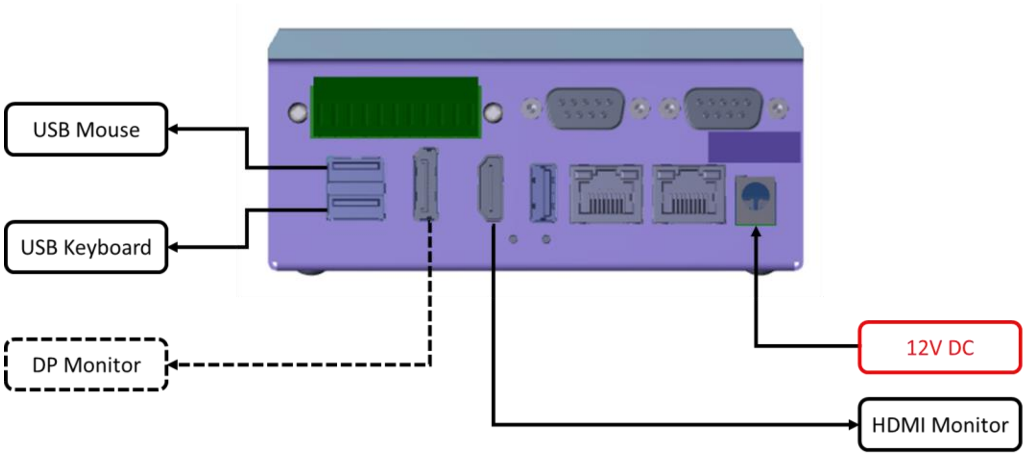

Figure 11 JetBox-FloydSC Typical Set Up

Follow the steps provided below for Jetbox-Floyd connections and booting to OS:

1. Connect the included 12V DC IN on front panel
2. Connect the USB keyboard & mouse to USB2.0 ports on the front panel
3. Connect the HDMI monitor to HDMI port on the front panel. Alternatively, a DP monitor can also be used instead of an HDMI monitor.
4. Ensure that all the connections are intact
5. Power ON the adapter and the module should now boot to OS
6. On the Linux Welcome screen, fill in the basic details like Username, password, date & time
7. The system boots to Ubuntu Desktop. Now, the system is set up & ready for further development

13. SYSTEM ASSEMBLY

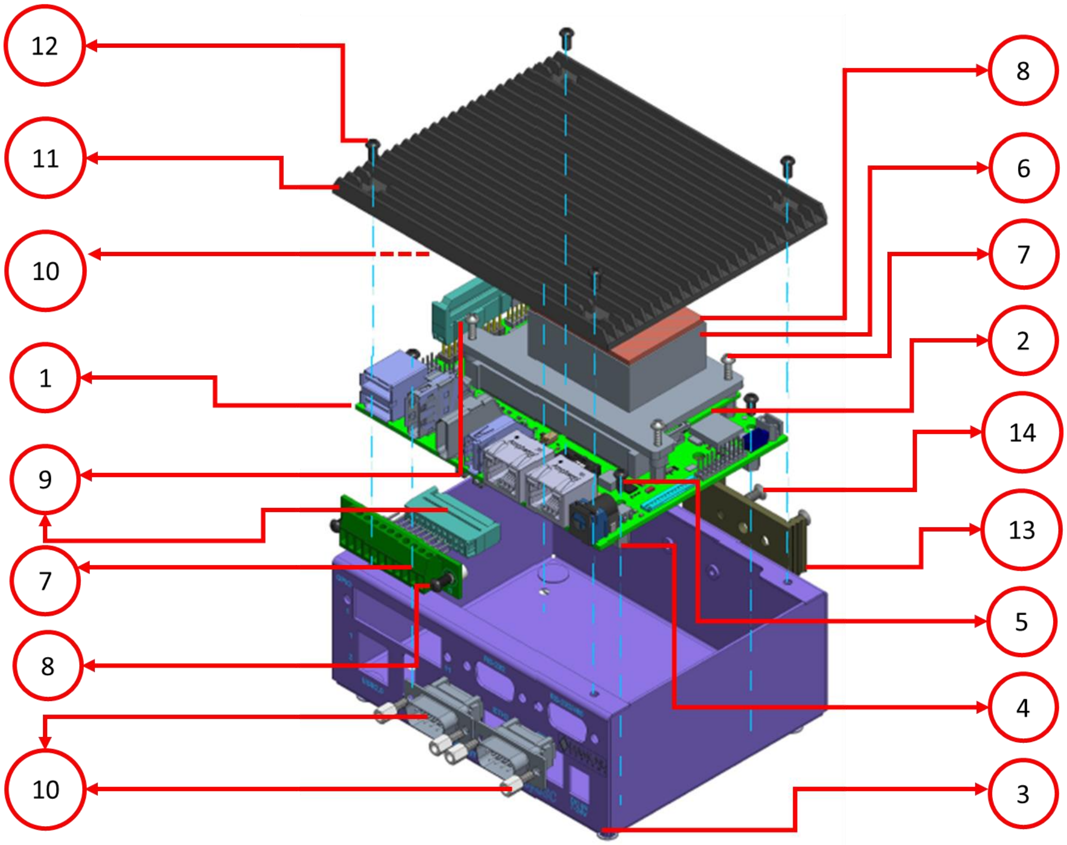

Figure 12 JetBox-FloydSC System Assembly Components

Sl No	*Description*	*Quantity*
1	FloydSC PCB	1
2	Jetson Module	1
3	Flat Head M3 x 6mm Screws	4
4	M3 x 8mm F/F Stand-offs	4
5	Pan Head M3 x 6mm screws	4
6	JetBox-FloydSC Internal Heat Spreader with Thermal Pad*	1
7	Pan Head M2.5 x 10mm screws	4
8	JetBox-FloydSC Top sink Thermal Pad	1
9	DSC Cable# 6981330	1
10	DSC Cable# 6981075	1
11	JetBox-FloydSC Top Heat Sink Cover	1
12	Pan Head M3 x 6mm screws	4
13	DIN Bracket	1
14	Flat Heat M3 x 6mm screws	2

JetBox-FloydSC assembly is basically split into two parts:

1. Installing the Jetson Module on FloydSC
2. Installing FloydSC inside the JetBox

13.1 Installing the Jetson Module on FloydSC

5. If not present on board, install 4x M2.5 x 6.5mm long F/F spacers on board using 4x M2.5 x 4mm pan head screws inserted from the bottom. See illustration.

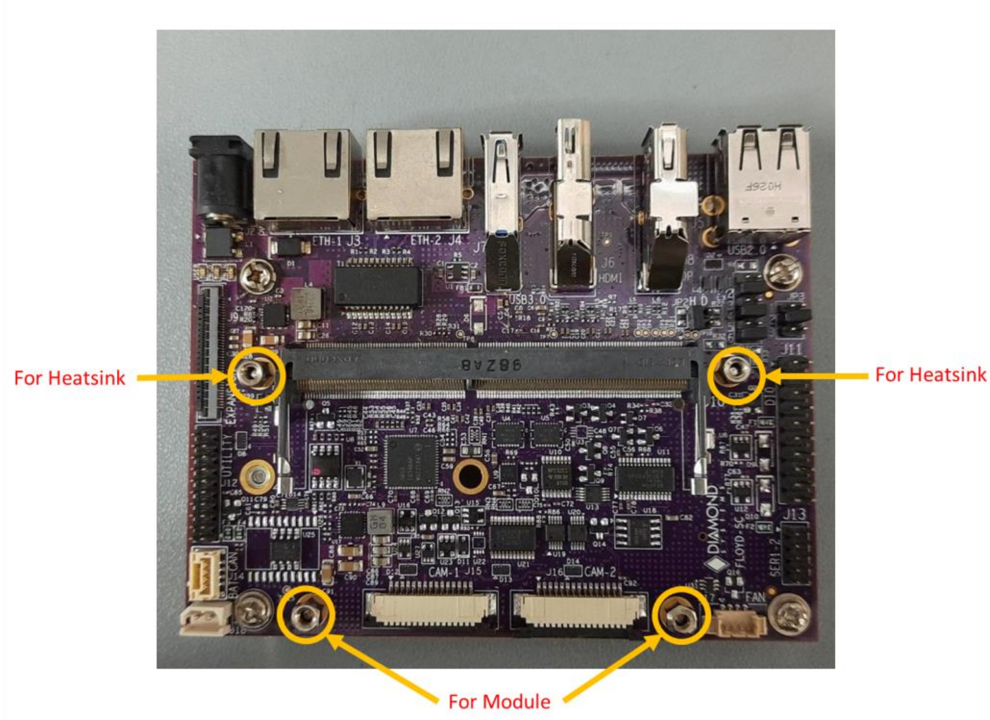

Figure 13 FloydSC Stand-off Locations

6. Insert module into socket at 45-degree angle. See illustration.

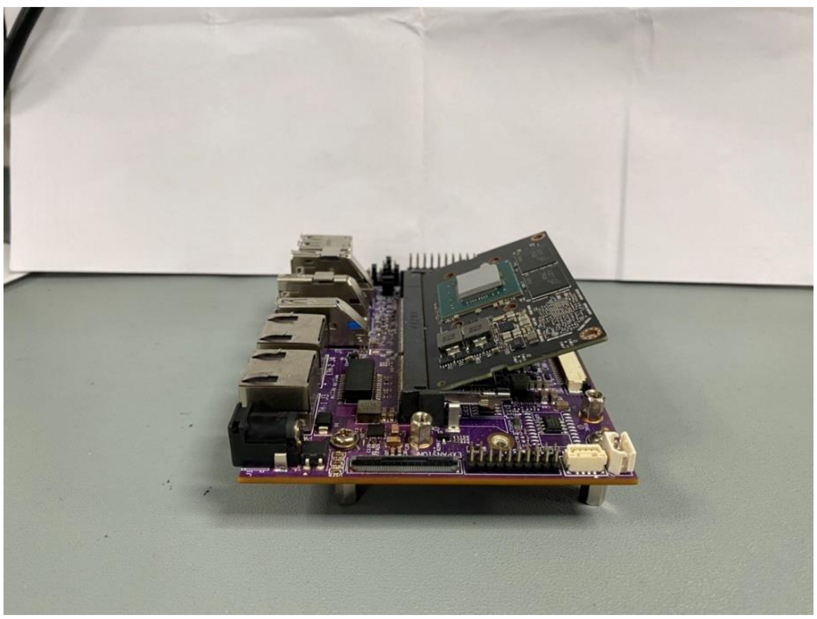

Figure 14 FloydSC Jetson Module Insertion

13.2 Installing FloydSC inside the JetBox

1. Install 4x M3 x 8mm F/F stand-offs at location 4 inside the JetBox enclosure body by inserting 4x M3 x 6mm screws at location 3 from outside the enclosure on its bottom side.
2. Descend the FloydSC with Jetson module into the JetBox & align the board mounting holes with the F/F stand-offs installed at location 4 in the step above.
3. Secure the FloydSC PCB assembly on the JetBox using 4x M3 x 6mm pan head screws at location 5 inserted from the top side of the PCB.
4. Align the internal heat spreader to the previously installed 4x M2.5 x 6.5mm stand-offs. Insert the 4x M2.5 x 10mm at location 7
5. Remove the thermal line from the thermal pad and apply it on the heat spreader at location 8.
6. Install the Screw Terminal PCB to the front panel of the enclosure using 2x M3 x 6mm pan head screws at location 8.
7. Connect one end of the cable DSC# 6981330 at J11 of the FloydSC PCB & the other end to rear side of Screw Terminal PCB at location 9.
8. Connect the cable DSC# 6981075 at J13 of the FloydSC PCB & the DB9M-1 to the RS-232 cut out and the DB9M-2 at the RS-232/485 cut out of the front panel.
9. Align the DIN bracket on the rear side of the enclosure at location 13 and secure the bracket with 2x M3 x 6mm flat head screws at location 14.
10. Finally, cover the entire assembly with the top heat sink cover aligning it to the screw holes at location 11. Secure the heat sink with 4x M3 x 6mm pan head screws at location 12

The fully assembled system looks as below:

14. REPROGRAMMING THE EMBEDDED LINUX IMAGE

Jetson modules run a customized Linux operating system enhanced to work with the multi-core ARM processors and the GPU features unique to the module. The Linux operating system, referred to here as a board support package (BSP), is programmed into the built-in eMMC flash memory on the module. The stock module coming from distribution does not have any software programmed into it and must be programmed prior to use. Diamond offers a separate BSP for both Nano and NX modules running on Floyd SC. These BSPs are based on the NVIDIA stock BSP R32.5.1 for Jetson Nano & Xavier NX respectively released by NVIDIA.

The following is a list of interface feature enhancements added to the stock BSP:

1. Added support and utilities for RS-232/485 serial port interfaces
2. Added utilities for camera connector interfaces, J12, J13, and J14
3. Added USB2.0 port 1 Host mode support
4. Added utility for I2C GPIO expander
5. Added User LED control

The Diamond Systems BSP is released as a compressed tar.gz file, that can be unzipped on an Ubuntu 10/04 Linux Host Machine and flashed onto the Jetson Nano and Xavier Modules.

14.1 Hardware Setup

1. Remove the jumper on JP3 H & mount a jumper on JP3 D
2. Connect 12V input voltage to FloydSC board using connector J2.
3. Hold down the recovery switch (RCVRY) SW3 and then turn on the power supply. Do not release the switch immediately and wait for a few seconds and then release the switch.
4. Connect FloydSC board to a Linux host PC using a Type A2A USB cable on the connector J4, port 1(Top port).

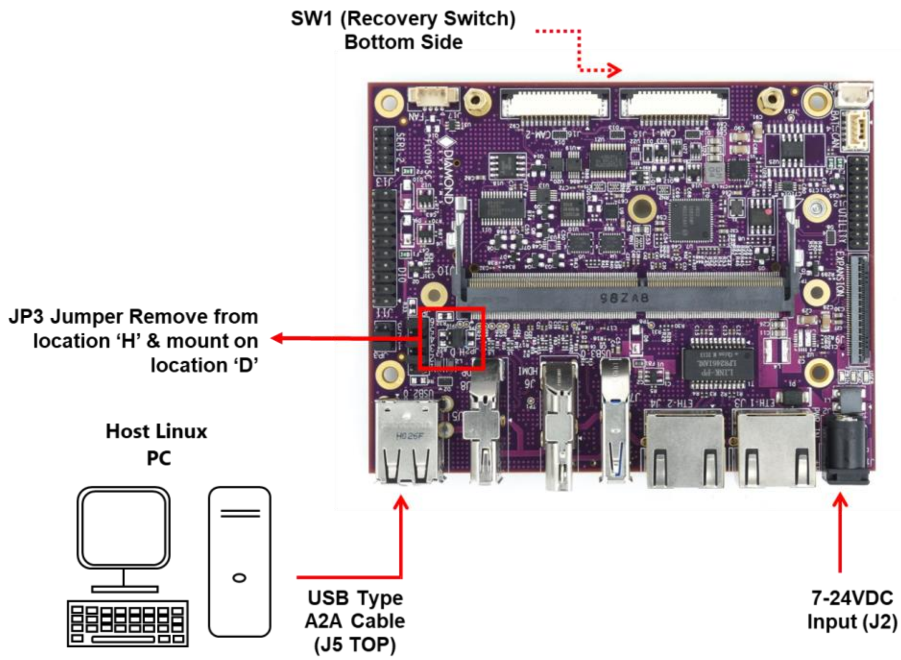

Figure 15 BSP Image Flashing Setup Block Diagram

5. Ensure FloydSC board has entered to recovery mode by issuing the command *'lsusb'* in the terminal on the Linux host PC.
6. If the recovery mode entry is successful, then a device named 'Nvidia Corp.' should be listed. Assure the device detection before proceeding any further.

Figure 16 Recovery Mode Terminal Screen

14.2 Software Setup

Follow the steps provided below corresponding to the installed module.

14.2.1 Flashing Jetson Nano Module

1. Download the BSP Image file dsc-bsp-fsc-nano-release-2.0-20210707.tar.gz, from the FTP site and copy it to a directory on the Linux Host Machine.
   Alternatively, the file may be copied to a different source such as the Desktop.

   Issue the following command to navigate to the directory containing the downloaded file:

   cd ~/Desktop

2. To unzip the copied Image file, issue the following command depicted below:

   sudo tar -pxvzf 8512610_A_BSP_FSC_LNX_4.9.201_AARCH64_NAO_L4T32.5.1_V1.0.tar.gz

It may take a few minutes for the file to unzip.

NOTE: *The tar.gz file name is liable to change according to the version and release date.*

3. To switch to the directory where the file has been extracted. issue the following command as depicted below:

   cd Linux_for_Tegra

4. To flash the Jetson Nano module, issue the following command as depicted below:

   sudo ./flash.sh jetson-nano-emmc mmcblk0p1

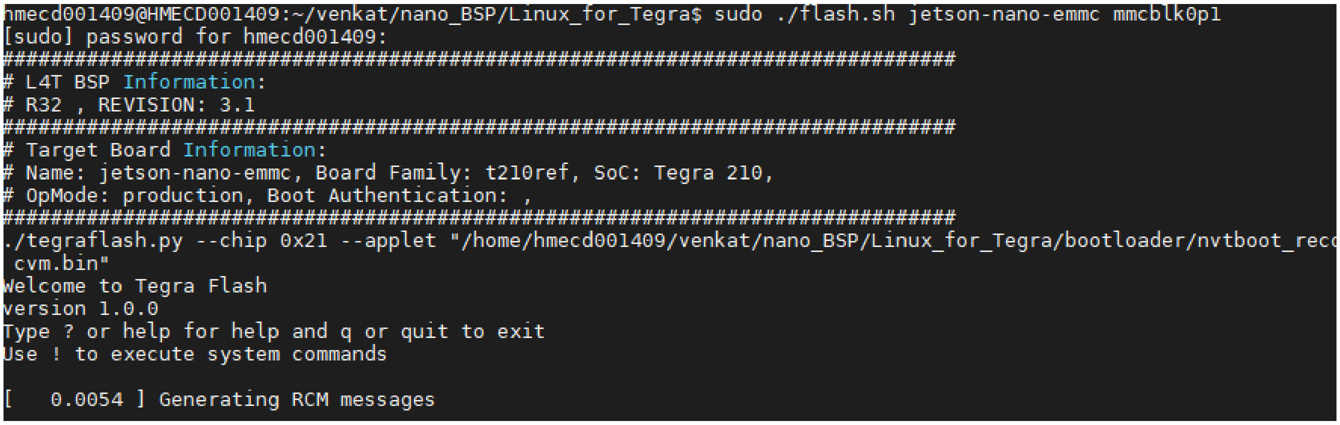

Figure 17 Nano BSP Installation Initiation

Module needs to be configured with user account first time. The user will be asked to enter few details to configure the OS. Once this configuration is done the systems boots to ubuntu desktop.

Warning: *Do not interrupt or interfere with the USB connectivity or the power supply to the carrier board until the flashing procedure is complete*

5. The flashing process will take 15-20 minutes to complete. The system will automatically Reboot when the flashing process is complete.

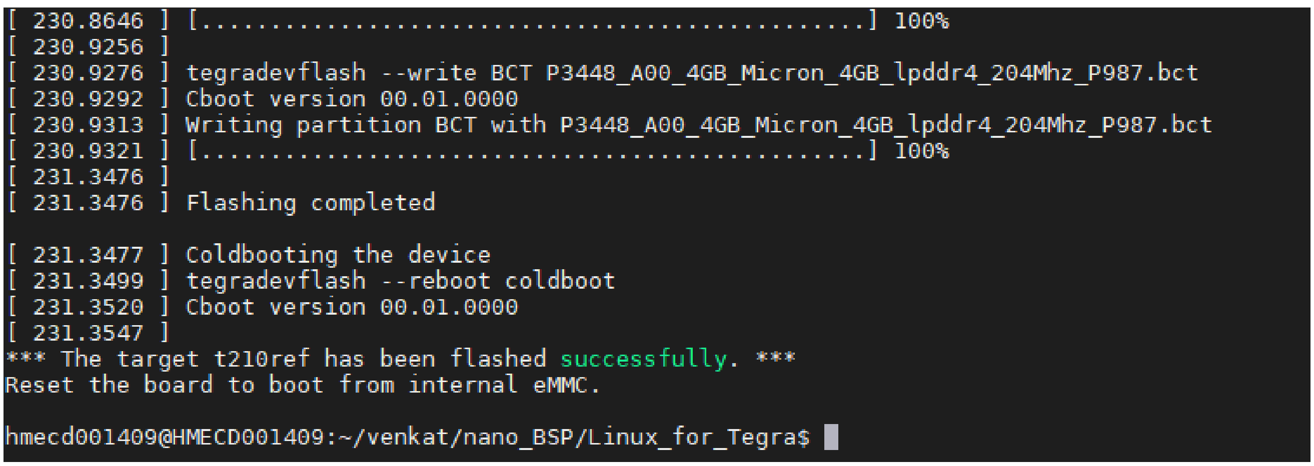

Figure 18 Nano BSP Installation Completion

6. Shutdown the system and remove the recovery mode USB cable connection.
7. Remove the jumper on D from JP2 & mount it on H on JP2 as shown in Section 7.2 to operate the USB2.0 port 1 as a HOST
8. Switch on the power supply; now the system should boot to Linux Desktop

14.2.2 Flashing Jetson Xavier NX Module

1. Download the BSP Image file dsc-fsc-nx-release-2.0-20210707.tar.gz from the FTP site and copy it to a directory on the Linux Host Machine.

Alternatively, the file may be copied to a different source such as the Desktop.

2. Navigate to the directory containing the downloaded file, by using the following command:

cd ~/Desktop

3. To unzip the copied Image file, issue the following command depicted below:

sudo tar -pxvzf 8512611_A_BSP_FSC_LNX_4.9.253_AARCH64_XNX_L4T32.6.1_REV_1.1.tar.gz

It may take a few minutes for the file to unzip.

NOTE: *The tar.gz file name is liable to change according to the version and release date.*

4. To switch to the directory where the file has been extracted, issue the following command as depicted below:

cd Linux_for_Tegra

5. To flash the Jetson Xavier NX Module, issue the following command as depicted below:

sudo ./flash.sh jetson-xavier-nx-devkit-emmc mmcblk0p1

```
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
hm@hm:~/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra$ sudo ./flash.sh jetson-xavier-nx-devkit-emmc mmcblk0p1
[sudo] password for hm:
###############################################################################
# L4T BSP Information:
# R32 , REVISION: 4.3
###############################################################################
# Target Board Information:
# Name: jetson-xavier-nx-devkit-emmc, Board Family: t186ref, SoC: Tegra 194,
# OpMode: production, Boot Authentication: NS,
###############################################################################
copying soft_fuses(/home/hm/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra/bootloader/t186ref/BCT/tegra194-mb1-soft-fuses-l4t.cfg)... done.
./tegraflash.py --chip 0x19 --applet "/home/hm/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra/bootloader/mb1_t194_prod.bin" --skipuid --soft_fuses
tegra194-mb1-soft-fuses-l4t.cfg --bins "mb2_applet nvtboot_applet_t194.bin" --cmd "dump eeprom boardinfo cvm.bin;reboot recovery"
Welcome to Tegra Flash
version 1.0.0
Type ? or help for help and q or quit to exit
Use ! to execute system commands

[   0.0195 ] Generating RCM messages
[   0.0492 ] tegrahost_v2 --chip 0x19 0 --magicid MB1B --appendsigheader /home/hm/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra/bootloader/mb1_t194_prod
zerosbk
[   0.0526 ] Header already present for /home/hm/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra/bootloader/mb1_t194_prod.bin
[   0.0664 ]
```

Figure 19 Xavier NX BSP Installation Initiation

Module needs to be configured with user account first time. The user will be asked to enter few details to configure the OS. Once this configuration is done the systems boots to ubuntu desktop.

Warning: *Do not interrupt or interfere with the USB connectivity or the power supply to the carrier board until the flashing procedure is complete.*

6. The flashing process will take 15-20 minutes to complete. The system will automatically Reboot when the flashing process is complete.

```
[ 434.3121 ] Bootloader version 01.00.0000
[ 434.3139 ] Writing partition MEM_BCT with mem_coldboot_sigheader.bct.encrypt
[ 434.3144 ] [................................................] 100%
[ 435.5906 ]
[ 435.5929 ] tegradevflash_v2 --write MEM_BCT_b mem_coldboot_sigheader.bct.encrypt
[ 435.5950 ] Bootloader version 01.00.0000
[ 435.5971 ] Writing partition MEM_BCT_b with mem_coldboot_sigheader.bct.encrypt
[ 435.5981 ] [................................................] 100%
[ 436.8584 ]
[ 436.8586 ] Flashing completed

[ 436.8587 ] Coldbooting the device
[ 436.8789 ] tegrarcm_v2 --ismb2
[ 436.8836 ]
[ 436.8863 ] tegradevflash_v2 --reboot coldboot
[ 436.8887 ] Bootloader version 01.00.0000
[ 436.8915 ]
*** The target t186ref has been flashed successfully. ***
Reset the board to boot from internal eMMC.

hm@hm:~/BSP/nx/NX_released_BSP/20201022/Linux_for_Tegra$
```

Figure 20 Xavier NX BSP Installation Completion

7. Shutdown the carrier board and remove the recovery mode USB cable connection.
8. Remove the jumper on D from JP2 & mount it on H on JP2 as shown in Section 7.2 to operate the USB2.0 port 1 as a HOST
9. Switch on the power supply; now the system should boot to Linux Desktop

15. SPECIFICATIONS

Features	
Jetson Module	Jetson Nano or Jetson Xavier NX
Cooling Accessory	Integrated heat spreader solution
Display	1x HDMI 2.0a/b 1x Display Port 1.2a *(Module Dependent)*
Camera Interface	3 x2 lane CSI-2 camera interfaces
CAN Interface	1x CAN 2.0 Non-isolated transceiver standard, isolation optional consult factory (*Module dependent*)
Digital I/O	8x Digital IOs obtained through I2C GPIO expander
Ethernet	2x 10/100/1000 Mbps RJ45 with built-in magnetics and LEDs (*Module dependent*)
Mass Storage	1x M.2 2280 or 2242 M-Key x4 Lane PCIe socket
Serial ports	1x RS-232 1x RS-232/485
USB Ports	2x USB 2.0 1x USB 3.0
Utility	Force recovery, Power button, Reset, Debug UART, Force off, I2C (3.3V), SPI (3.3V)
Digital I/O Specifications	
Device	PCA9535PW
Number of Lines	8
Direction	Programmable bit by bit
Logic Levels	3.3V/5V jumper configurable
Pull resistors	10K ohms +/-1%; Jumper-selectable pull-up/down
Input Voltage Thresholds	
Logic 0	-0.5V min, 0.99V(3.3V VIO), 1.5V(5V VIO) max
Logic 1	2.64V(3.3V VIO)/ 3.5V(5V VIO) min, 5.5V max
Output Voltage Thresholds	
Logic 0	0.0V min; 0.7V max @ 10mA output current
Logic 1	2.5V(3.3V VIO)/4V(5V VIO) min @ -10mA output current; 3.3V/5V max
Mechanical and Environmental Properties	
System Input Voltage	7-24VDC; Absolute Max input voltage = 26VDC
FloydSC Carrier Board Dimensions	L 4.33" x W 3.34" (110 mm x 85 mm)
JetBox-FloydSC Dimensions	L 4.88" x W 3.91" x H 2.2" (124mm x 99.48mm x 56mm)
Weight	TBD
Operating Temperature	-25°C to +70°C ambient
RoHS	Compliant

16. LIMITED WARRANTY POLICY

Diamond Systems Corporation warrants that its products will be free from defects and errors in material and workmanship and perform in full accordance with the technical specifications stated in the description of the product for a 2-Year Period from the Date of Shipment.

Unless otherwise stated, Diamond Systems Corporation Limited Warranty Policy covers the following criterion:

- It is extended to the original Purchaser/Consumer.
- Under Terms and Conditions of the Warranty, Diamond Systems Corporation, at its sole discretion, will repair or replace any defective parts or components of its product.
- The product must be returned to Diamond Systems Corporation in the-approved packaging, pre-authorized with a Diamond Systems Corporation-assigned Return Material Authorization (RMA) Number which is referenced on the shipping document.
- The Customer will prepay the shipment cost of the product to the Diamond Systems Corporation designated site.
- Diamond Systems Corporation will prepay the return shipping cost of the repaired or replaced the RMA product.

Diamond Systems Corporation Limited Warranty Policy does not cover product defects or damages incurred due to:

- Attempts by Customer to repair or resolve any product issues without the prior consent of Diamond Systems Corporation.
- Mishandling, misuse, neglect, normal wear, and tear, or accident.
- DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH DIAMOND SYSTEMS CORPORATION PRODUCTS, AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT.

NOTE: THE LIMITED WARRANTY POLICY DOES NOT WARRANT TO REPAIR ANY OR EVERY DIAMOND SYSTEMS CORPORATION PRODUCT.