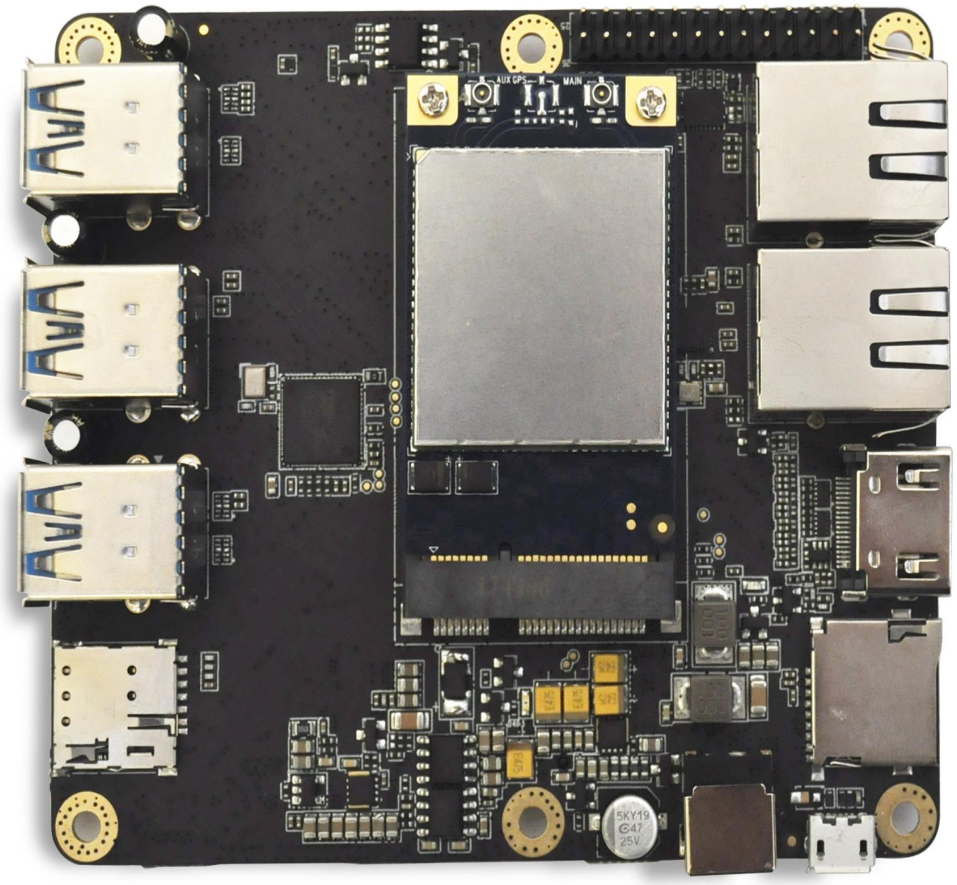
A302 for NVIDIA® Jetson™ TX2/TX1 Users Guide



LEETOP TECHNICAL (SHENZHEN) CO.,LTD

E-mail：leetop@leetop.top

Table of Contents

1.Summary 2

1.1 Brief introduction……4
1.2 Main features ……..4
1.3 Product Overview ……5
1.4 Product information.....5
1.5 Wiring and accessories 5,6

2.Interface 7

2.1 External interface 7

2.2 A302 Detailed description of external interface..... 7
2.2.1 Micro SD（W1） 8
2.2.2 HDMI（W2） 8
2.2.3 Net port（W3/W4） 8
2.2.4 Multifunctional por（W5） 9
2.2.5 Mini-PCIe/mSATA（W6） 10,11
2.2.6 USB 3.0 Type A（W7/W8/W9） 11
2.2.7 SIM Card Slot（W10） 12
2.2.8 DC Power（W11） 12
2.2.9 USB 2.0 OTG（W12） 12
2.2.10FAN CONNECT（W13） 12
2.2.11 NVIDIA ® Jetson™TX2/TX1 （W14） 13
2.2.12 CSI CAMERA （W15/W16/W17） 13
2.2.13 RECOVER KEY （W18） 14
2.2.13 RESET KEY （W19） 14
2.2.1.3POWER KEY （W20） 14

3 .Software /BSP 15

3.1 Configure ……15
3.2 Recovery mode……15

Preface

Disclaimer

The information contained within this user's guide, including but not limited to any product specification, is subject to change without notice.
Leetop 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 Leetop Tech which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

Contact Information

Copyright Notice

The information contained in this document is subject to change without notice. Leetop Tech Inc. shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material. This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Leetop Tech.,Co.

Trademark Acknowledgment

Leetop Tech.,Co. acknowledges all trademarks, registered trademarks and/or copyrights referred to in this document as the property of their respective owners. Not listing all possible trademarks or copyright acknowledgments does not constitute a lack of acknowledgment to the rightful owners of the trademarks and copyrights mentioned in this document.

1. Summary

1.1 Brief introduction

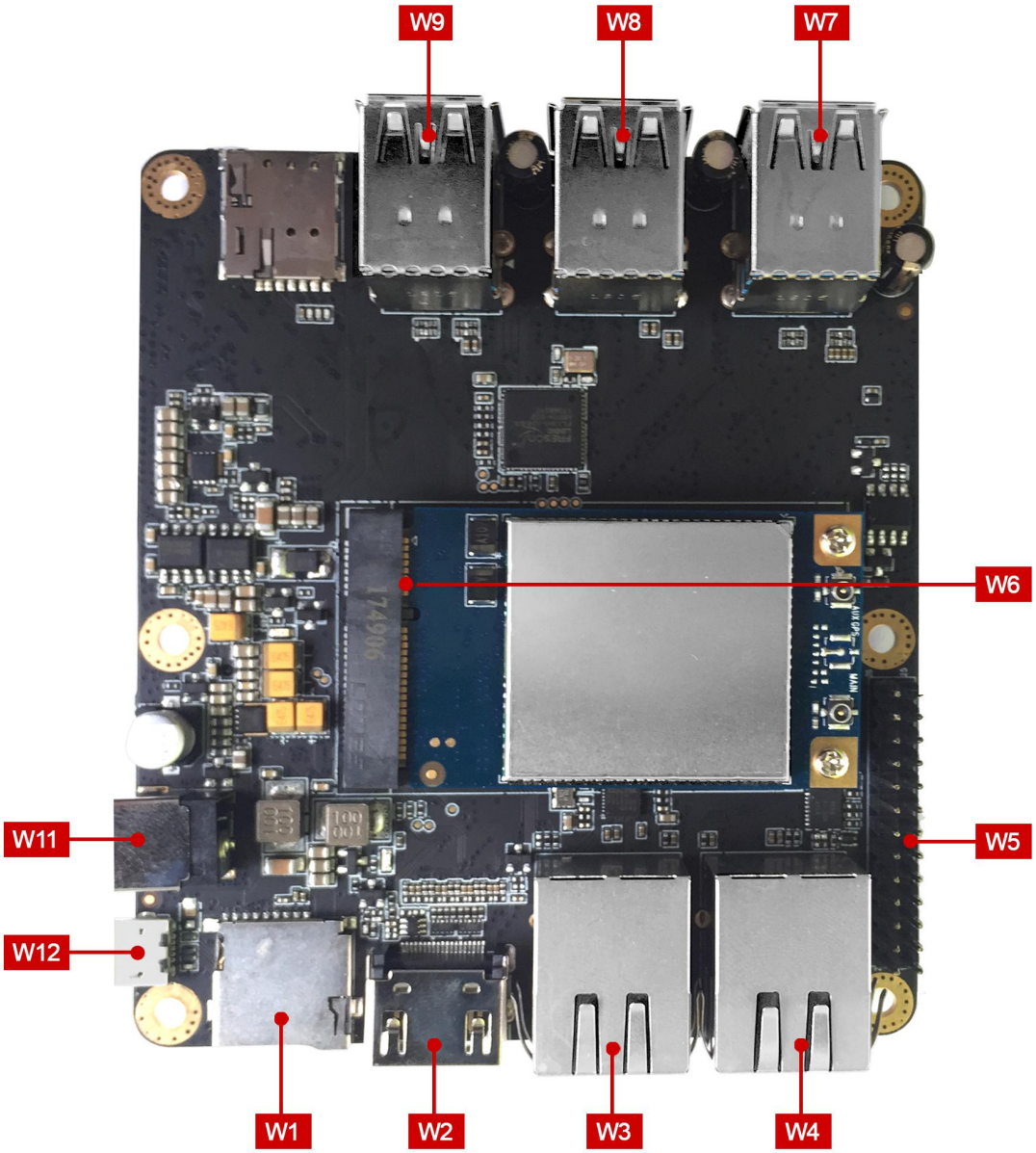
A302 is a high-performance, small size, interface rich to provide high reliability carrier plate with NVIDIA Jetson Tx1/Tx2. The board size is little bigger than the NVIDIA Jetson Tx1/Tx2 module. It provides USB3.0, Gigabit Ethernet, HDMI 2.0, USB 2 (w / OTG function), SATA,Mini-PCIe/mSATA,UART，GPIO，I2C,CAN, Fan and other interfaces.

1.2Product Features and Specifications

Feature	A302 Carrier for NVIDIA ® Jetson™ TX2/TX1
Module Compatibility	NVIDIA ® Jetson™ TX2 and Jetson™ TX1
PCB Size / Overall Size	100mm x 87mm (3.937” x 3.425”)
Display	1x HDMI
Ethernet	2x Gigabit Ethernet (10/100/1000)
USB	5x 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
Serial	2x RS-232
Mini-PCIe/mSATA	1x Mini-PCIe (PCIe & USB 2.0) Full Size
SD Card	1x microSD Card Slot
CAN Bus	2x CAN Bus Link
Misc.	2x I2C Link (+3.3V I/O) 1x System Control 4x GPIO
Power Requirements	+12V DC Input @ 8A
Operating Temperature	-40 o C to +85 o C
Weight	100g
Accessories	Cables
Warranty and Support	1 Year Warranty and Free Support

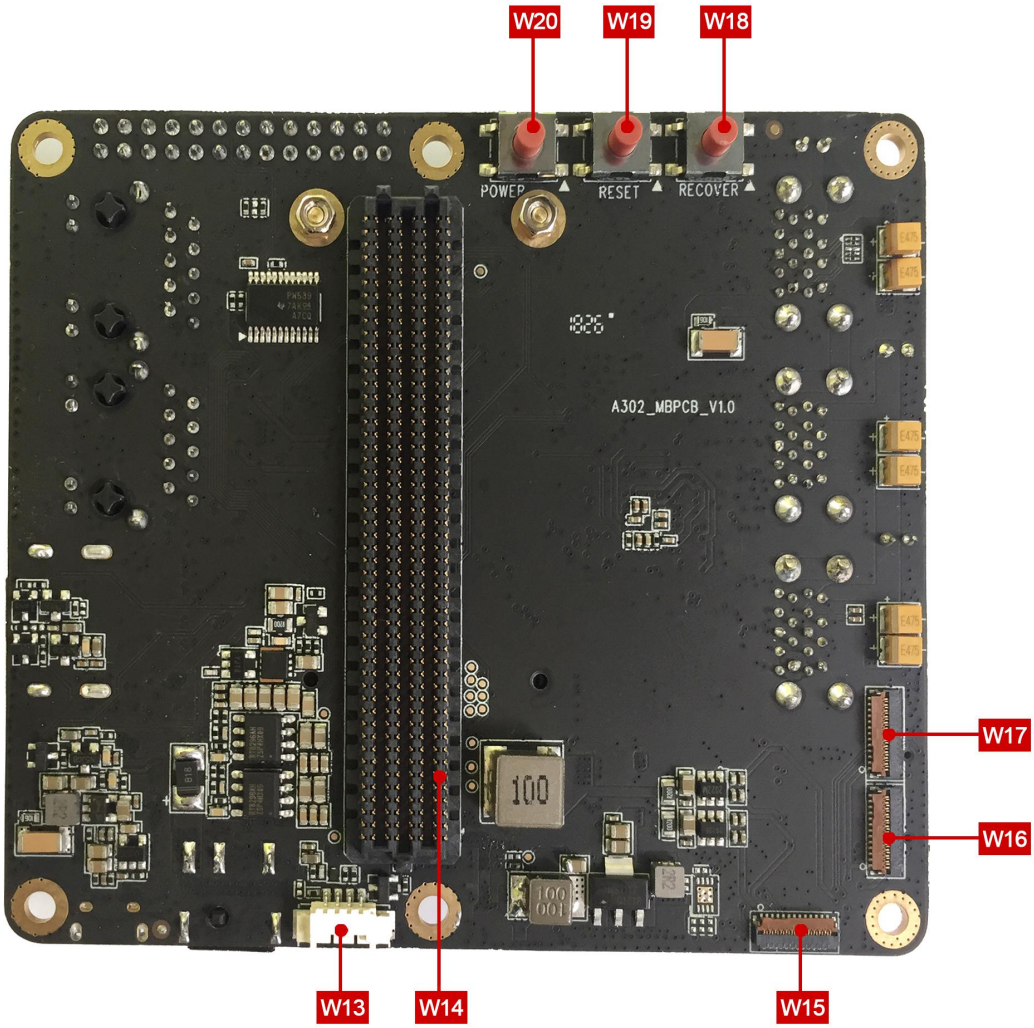
1.3 Product Overview

A302 Interface TOP Diagram:



1.Micro SD（W1）
2.HDMI（W2）
3.Net port（W3/W4）
4.Multifunctional por（W5）
5.Mini-PCIe/mSATA（W6）
6.USB 3.0 Type A（W7/W8/W9）
7.SIM Card Slot（W10）
8.DC Power（W11）
9.USB 2.0 OTG（W12）

A302 Interface BOTTOM Diagram:



10. FAN CONNECT（W13）
11. NVIDIA ® Jetson™TX2/TX1 （W14)
12 CSI CAMERA （W15/W16/W17）
12. RECOVER KEY （W18）
13. RESET KEY （W19）
14.POWER KEY （W20）

1.4 product information

A302 Module optional product model:

Product model	Description
A302	NVIDIA Jetson™®TX1/TX2 Module board
A302-Cable	Complement cable package

1.5 Wiring and accessories

Customer can choose the matching wiring and accessories of the product module.

Matching wiring includes multifunctional line (2x serial port,4x GPIO,2x I2C Link,2x CAN）

2.Interface

2.1 External interface

Table 2-1：A302 Connect implement

Designator	Connector	Description
W1	microSD Slot	MicroSD
W2	HDMI Port	HDMI Right Angle Vertical Connector
W3/W4	NVIDIA ® Jetson™ TX2/TX1 Gigabit Ethernet	RJ45 Gigabit Ethernet Connector (10/100/1000)
W5	Multifunctional por	Header x26
W6	Mini-PCIe/mSATA	PCIE-52PIN
W7/W8/W9	USB 3.0 Type A	USB 3.0 Link 1 Type A Connecto
W10	SIM Card Slot	Mini SIM Card Slot
W11	Power	DC Input Power TE Connector
W12	USB 2.0 OTG	USB 2.0 Link 0 OTG Micro-AB Connector
W13	FAN CONNECT	Picoblade Header
W14	NVIDIA ® Jetson™ TX2/TX1	NVIDIA Jetson™ TX2/TX1 Module Connector
W15/W16W17	CSI CAMERA	
W18	RECOVER KEY	
W19	RESET KEY	
W20	POWER KEY	

2.2 A302 Detailed description of external interface

2.2.1 Micro SD （W1 ）

Table 2-2：W1 Micro SD slot

No.	Signal name	No.	Signal name
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

2.2.2 HDMI （ W2）

Table2-3：W2 HDMI CONNECT

No.	Signal name	No.	Signal name
1	TMDS Data2+	2	TMDS Data2 GND
3	TMDS Data2-	4	TMDS Data1+
5	TMDS Data1 GND	6	TMDS Data1-
7	TMDS Data0+	8	TMDS Data0 GND
9	TMDS Data0-	10	TMDS Clock+
11	TMDS Clock GND	12	TMDS Clock-
13	CEC	14	NC
15	DDC clock	16	DDC data
17	DDC GND	18	+5V
19	Hot Plug Detect		

2.2.3 NET （W3/W4 ）

Table 2-4：W3/W4 RJ-45NET CONNECT

No.	Signal name	No.	Signal name
1	TP0+	2	TP0-
3	TP1+	4	TP2+
5	TP2-	6	TP1-
7	TP3+	8	TP3-

2.2.4 Multifunctional por （W5 ）

Table 2-5：W5 CONNECT Slot

No.	Signal name	No.	Signal name
1	+3.3V	2	+3.3V
3	UART0_TX	4	UART0_RX
5	UART1_TX	6	UART1_RX
7	GPIO8	8	GPIO9
9	GPIO_EXP0_INT	10	GPIO_EXP1_INT
11	I2C_CLK1	12	I2C_DAT1
13	GND	14	5V_OUT
15	CAN1_TX	16	5V_OUT
17	CAN0_TX	18	NC
19	CAN1_RX	20	NC
21	CAN0_RX	22	FORCE_RECOVERY_L
23	I2C_CLK2	24	RESET
25	I2C_DAT2	26	POWER_BUTTON

Notes：
UART0 = /dev/ttyS0 within Linux for Tegra(shakedown test port)
UART0 Conversion to 3.3v logic level by on-board level conversion circuit
UART1 = /dev/ttyTHS2 within Linux for Tegra
UART1 Conversion to 3.3v logic level by on-board level conversion circuit
GPIO8 = sysfs GPIO # 187（TX2==#388）
GPIO9 = sysfs GPIO # 186（TX2==#298）
GPIO_EXP0_INT = sysfs GPIO # 89(TX2==#480)
GPIO_EXP1_INT = sysfs GPIO # 202(TX2==#486)
I2C Bus corresponds into Linux and connected Tegra line

2.2.5 Mini-PCIe/mSATA （W6 ）

Table 2-6：Mini-PCIe/mSATA CONNECT

No.	PCIE Signal name	SATA Signal name
1	WAKE	
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		
17		
18	GND	GND
19		
20	W_DISABLE	
21	RESV	RESV
22	PCIE_RST	
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-	
37	GND	GND
38	USB_D+	
39	+3.3V	+3.3V
40	GND	GND
41	+3.3V	+3.3V
42		
43		
44		
45		
46		
47		
48	+1.5V	+1.5V
49		
50	GND	GND
51		
52	+3.3V	+3.3V

2.2.6 DOUBLE-deck USB3.0 （W7/W8/W9 ）

Table 2-7：W7/W8/W9 USB3.0 CONNECT

No.	Signal name	No.	Signal name
1	VBUS	2	USB 2.0 D-
3	USB 2.0 D+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+	10	VBUS
11	USB 2.0 D-	12	USB 2.0 D+
13	GND	14	SSRX-
15	SSRX+	16	GND
17	SSTX-	18	SSTX+

2.2.7 SIM Card Slot （W10 ）

Table 2-8：W10 SIM Card Slot CONNECT

No.	Signal name	No.	Signal name
1	UIM_PWR	2	UIM_RESET
3	UIM_CLK	4	UIM_DATA
5	GND	6	UIM_PWR

2.2.8 POWER INPUT CONNECT （W11 ）

Table 2-9 W11 POWER DC CONNECT

No.	Signal name	No.	Signal name
1	POWER DC CONNECT		
Input Voltage Range From：+7V TO +19V			

2.2.9 USB-OTG （W12 ）

Table 2-10：W12 USB-OTG CONNECT

No.	Signal name	No.	Signal name
1	VBUS	2	USB 2.0 D-
3	USB 2.0 D+	4	USB ID
5	GND		

Notes:
USB-OTG In host mode, USB ID Pin to float.
USB-OTG For slave mode, USB ID Pin to ground

2.2.10 FAN CONNECT （W13 ）

Table 2-11：W13 FAN CONNECT

No.	Signal name	No.	Signal name
1	GND	2	+5V
3	FAN_TACH	4	FAN_PWM

Special notes: FAN PWM is not a prototype supported equipment in version L4T by speed control. If customer use FAN PWM functionality by speed control that must dispose above Fan PWM by IPCall-BSP supply.
See the Software section of this document for more details.。

2.2.11 Jetson™ TX2/TX1 Board-to-Board Connector （W14 ）

With the NVIDIA ® Jetson™ TX2/TX1, the processor and chipset are implemented on the Jetson™ TX2/TX1 Module. This connects to the Cogswell Carrier via a Samtec SEARAY™ Board to Board Connector.

Table 2-12: CSI CAMERA CONNECT

Function	NVIDIA Jetson™ TX2/TX1 Interface
Type	Samtec SEARAY™ Connector
Carrier Connector P/N	SEAM-50-03.5-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/TX1) Manufacturer: Samtec
Pinout	Refer to NVIDIA’s Jetson™ TX2/TX1 System-on-Module datasheet for pinout details
Standoffs	8.0mm Standoffs Required between NVIDIA Jetson™ TX2/TX1 Module and A302 Carrie

2.2.12 CSI CAMERA （W15/W16/W17 ）

Table 2-13: CSI CAMERA CONNECT

No.	Signal name	No.	Signal name
1	VCAMA_2.8V	2	GND
3	VCAMD_1.2V	4	VCAM_IO_1.8V
5	VCAM_SDA	6	VCAM_SCL
7	VCAM_PWDN	8	VCAM_AF_2.8V
9	VCAM_RST	10	VCAM_MCLK
11	GND	12	VCAMA_CLK_N
13	VCAMA_CLK_P	14	GND
15	VCAM_A_D0_N	16	VCAM_A_D0_P
17	GND	18	VCAM_A_D1_N
19	VCAM_A_D1_P	20	GND
21	VCAM_B_D0_N	22	VCAM_B_D0_P
23	GND	24	VCAM_B_D1_N
25	VCAM_B_D1_P		

2.2.13 Push-button;

A302 provides four buttons as follows:

1) W18--- (RECOVERY) software download
2) W19---（RESET）reset switch
3) W20----（POWER）power switch

The S1 power switch, when the board is in ATX mode, presses the button system to start, when the system starts, presses the button, and the system enters standby mode. the button is pressed after the system starts, the system is hard shut down after holding the button for 5 seconds. S2 restart button, Press the button system to restart. The S3 recovery button presses the button to enter recovery mode to burn the system image to the TX1/TX2 module through the USB OTG port.

3. Software/BSP

3.1 Configure

NVIDIA Linux For Tegra (L4T)

The board supports native NVIDIA Linux For Tegra（L4T）Builds, and to support HDMI,,Gigabit Ethernet ,(USB 3.0) ,USB OTC, Serial port,GPIO,SD card,I2C bus connect with A302,that can be run directly on A302 without change. Note that native systems do not support PWM mode control fans, and IPCall-BSP must be deployed if customer USE native systems.

LT4 can be downloaded from the following link: **https://developer.nvidia.com/embedded/linux-tegra**

NVIDIA Jetpack for L4T

Jetpack makes a software package released by NVIDIA, including all kinds of software tools needed to develop TX1/TX2 with A302, includes host terminal and target machine side tools. including OS image file, middleware, sample program, document host and target machine, including, etc. Latest release Jetpack running on Ubuntu 14.04 Llinux 64-bit host, customer can download it from the following link:

https://developer.nvidia.com/embedded/jetpack

3.2 Recovery mode

The system can be updated through USB, which needs to enter USB recovery mode. The file system can be used to update by USB recovery mode. And the core, boot loader, BCT update is the same.

Please follow the steps of the software update manual to update the system.

Recovery mode Steps:

1). Turn off system power. Make sure the power is turned off instead of in standby mode.

2). Use the USB micro B to USB Type A link-line link board and host.

3). Power up the system.

4). Keep pressing the recovery button while pressing and releasing the reset button, waiting for 2 seconds to release the recovery button. (Press the power button as needed)

Notes: In USB recovery mode, the system will not start, the serial port will not have debugging information output.