SoM-950AX

User Manual

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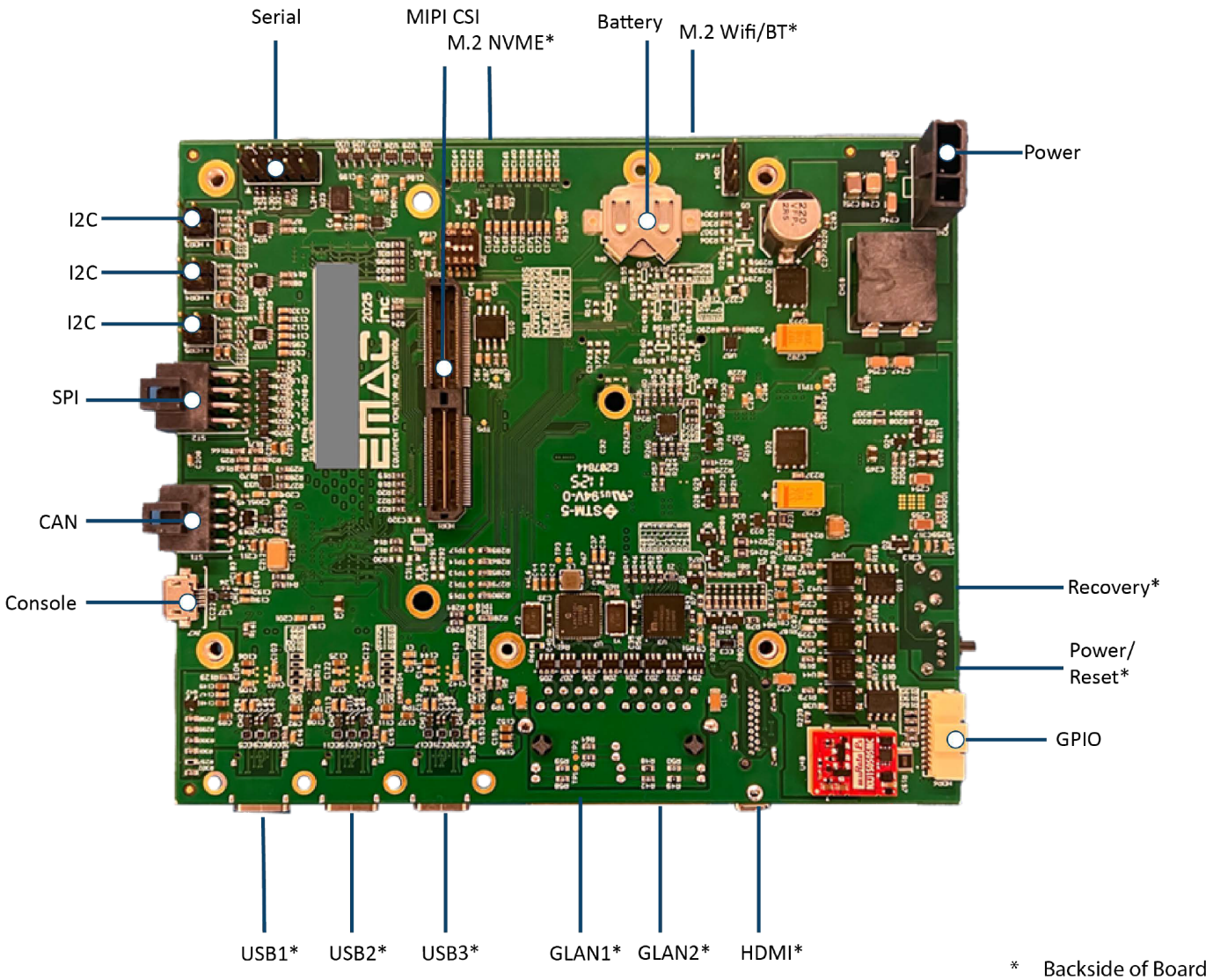
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1 Introduction

Bring your next-gen products to life with the world's most powerful AI computers for energy-efficient autonomous machines. NVIDIA® Jetson Orin™ AGX modules give you up to 275 trillion operations per second (TOPS) and 8X the performance of the last generation for multiple concurrent AI inference pipelines, plus high-speed interface support for multiple sensors. With seven different modules based on the same architecture–from the entry-level Jetson Orin Nano™ to the highest-performance Jetson AGX Orin™– this is the ideal family for a new age of robotics.

The SOM-950AX NVIDIA AGX Orin Carrier board brings the Orin AGX to life allowing access to a wide range of interfaces including: 3x USB 3.2 Type-C ports, Dual-Gigabit LAN ports, M.2 2280 M-Key NVMe slot for storage and an M.2 2230 E-Key slot for expansion. The SOM-950AX Carrier for Jetson AGX Orin™ is a compact sized full-featured carrier board specifically designed for commercially deployable platforms.



* Backside of Board

1.1 Features

- **Compatible with NVIDIA Jetson Orin AGX and Xavier* AGX embedded System On Modules**
  - **NVIDIA 699 pin B2B Connector (* Xavier AGX supported with reduced functionality)**
- **2x 1000BASE-T LAN RJ45 (Gigabit Ethernet)**
- **2x USB 3.2 Type-C Super speed Host ports**
- **1x USB 3.2 Type-C Super speed OTG port**
- **1x USB 2.0 micro (Serial console)**
- **1x HDMI Type A port**
- **8x MIPI-CSI2-LANEor4x MIPI-CSI4-LANE**
- **1x Serial ports (RS232/485)**
- **1x CANFD port**
- **3x I2C ports**
- **1x SPI port with 2 slave selects**
- **8x Isolated GPIO s (4x 5v @ 20mA Outputs & 4x 5v Inputs)**
- **2x Isolated PWM Ports**
- **1x M.2 M-Key 2280 NVMe Card Slot (Gen 4)**
- **1x M.2 E-Key 2230 for Wifi/Bluetooth (Gen 4)**
- **Fan Connector with Tach**
- **Power & Status On-Board LEDS**
- **Battery for Real-Time Clock**
- **Push Button Power, Reset & Recovery Button**
- **+12Vdc to +24Vdc (Molex mini-fit connector)**

2 Hardware

2.1 Specifications

- **SOM:** NVIDIA Jetson Orin AGX and Xavier* AGX embedded System On Modules
- **Flash:** 1x M.2 M-Key 2280 NVMe Card Slot (Gen 4)
- **RAM:** SOM Based
- **eMMC:** SOM Based
- **System Reset:** Reset Button
- **RTC:** SOM Based with 3v 48mAh 12.5mm BR-1225 socketed Battery
- **PWM:** 2x Isolated 5V PWM Ports with 20mA Drive
- **Watchdog Timer:** SOM Based
- **Digital I/O:** 8x Isolated GPIO s (4x 5v @ 20mA Outputs & 4x 5v Inputs)

- **Analog I/O:** None
- **Power:** +12Vdc to +24Vdc (Molex mini-fit connector) @ TBD Amps
- **JTAG:** Yes, available via test points

Video/Camera Interfaces

- **HDMI:** HDMI Type A, 4K 2160p@60Hz port with 1x I2C port
- **CSI:** 8x MIPI-CSI 2-LANE or 4x MIPI-CSI 4-LANE with 3x I2C ports

Serial Interfaces

- **UARTS:** 1x Serial ports (RS232/485) & 1x FTDI Serial to USB Console
- **USB:** 1x USB2.0 micro (Serial console)
  - 1x USB 3.2 Type-C Super speed OTG port
  - 2x USB 3.2 Type-C Super speed Host ports
- **SPI:** 1x Buffered SPI port with 2 slave selects
- **I2C:** 3x Buffered I2C ports
- **CAN:** 1x CAN FD 8MBps port
- **Audio (I2S):** Accessible through the M.2 E-Key 2230 for Wifi/Bluetooth (Gen 4) card slot

Ethernet Interface

- **MAC:** 2x SOM Based
- **PHY:** 2x Microchip 1000 BaseT
- **LEDs:** 2x Link & Activity

Expansion Interfaces

- **M.2 M-Key:** M.2 M-Key 2280 NVMe Card Slot (Gen 4)
- **M.2 E-Key:** M.2 E-Key 2230 for Wifi/Bluetooth Card Slot (Gen 4)
- **CSI:** Nvidia Jetson AGX Orin Camera Expansion Connector

Mechanical and Environmental

- **Dimensions:** 4.375" x 5.125" (111.125mm x 130.175mm)
- **Power Supply Voltage:** +12Vdc to +24Vdc (Molex mini-fit connector)
- **Power Requirements (typical):**
  - 12.0 Volts @ ##00mA (XXX watts)
  - Max current draw during boot process: TBD
  - Idle system: TBD

- **Operating Temperature:** -40 to 85° C (-40 to 185° F) with exceptions*

  (*HDMI Connector -25 to +85C; M.2 Connectors -40 to +80C; Battery; -30 to +85C; Carrier Board Only)

- **Operating Humidity:** 0% ~ 90% relative humidity, non-condensing

2.2 Power Connections

The SOM-950AX receives input power through CN1 and provides Input Filtering and Reverse Polarity Protection. The input voltage can range from +12Vdc to +24Vdc (12V nominal).

Table 1: Power

Connector:	Molex 3-pin single row power header 4.2mm pitch			
	Molex Mini-Fit Max Single Row Receptacle (215913)			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	Vin	CN1	VIN	DC Voltage Input (12Vdc to +24Vdc)
3	Frame_GND	CN1	FRM_GND	Chassis Ground
2	System_GND	CN1	GND	System Ground

2.3 Real-Time Clock

The SOM-950AX provides a 3V battery to back up the Real Time Clock (RTC) that is located on the Orin SOM. The battery is socketed allowing it to be easily replaced. Its location is BH1 and it is of type BR-1225 3v 48mAh 12.5mm.

2.4 On-Board Temperature Sensor

The SOM-950AX provides an Analog Devices ADT7410 Temperature Sensor. Access to the Sensor is via the I2C1 port.

2.5 External Connections

2.5.1 JTAG

Table 2: Processor JTAG

Test Point	Pin Name	Description
TP16	JTAG_TRST	JTAG Reset
TP13	JTAG_TCK	JTAG Clock
TP15	JTAG_TDI	JTAG Serial In
TP14	JTAG_TDO	JTAG Serial Out
TP12	JTAG_TMS	JTAG Test Mode Select

There is no JTAG connector provided. Access is through Test Points on the board using a test fixture.

2.5.2 I2C

Table 3: I2C (A)

Connector:	Standard 4-pin unshrouded dual row header 0.1” pitch			
Connector Pin#	Pin Name	Connector Ref. Designator	Port Name	Description
1	I2C_GP4_CLK	HDR3	I2C4	Two Wire Serial Interface Clock
3	I2C_GP4_DAT	HDR3	I2C4	Two Wire Serial Interface Data
2	3.3V	HDR3	-	SOM-950AX 3.3V Supply
4	GND	HDR3	-	SOM-950AX System Ground

Table 4: I2C (B)

Connector:	Standard 4-pin unshrouded dual row header 0.1” pitch			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	I2C_GP7_CLK	HDR4	I2C7	Two Wire Serial Interface Clock
3	I2C_GP7_DAT	HDR4	I2C7	Two Wire Serial Interface Data
2	3.3V	HDR4	-	SOM-950AX 3.3V Supply
4	GND	HDR4	-	SOM-950AX System Ground

Table 5: I2C (C)

Connector:	Standard 4-pin unshrouded dual row header 0.1” pitch			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	I2C_GP8_CLK	HDR5	I2C8	Two Wire Serial Interface Clock
3	I2C_GP8_DAT	HDR5	I2C8	Two Wire Serial Interface Data
2	3.3V	HDR5	-	SOM-950AX 3.3V Supply
4	GND	HDR5	-	SOM-950AX System Ground

2.5.3 Ethernet

Table 6: Ethernet (0)

Connector:	Standard 8 pin RJ45 with integrated Magnetics & Status LEDs		
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Description**
L2	ETH0_MDI1_P	JK1A	Gigabit Ethernet 0 MDI1 Interface Pair 1+
L1	ETH0_MDI1_N	JK1A	Gigabit Ethernet 0 MDI1 Interface Pair 1-
L4	ETH0_MDI2_P	JK1A	Gigabit Ethernet 0 MDI2 Interface Pair 1+
L3	ETH0_MDI2_N	JK1A	Gigabit Ethernet 0 MDI2 Interface Pair 1-
L6	ETH0_MDI3_P	JK1A	Gigabit Ethernet 0 MDI1 Interface Pair 1+
L5	ETH0_MDI3_N	JK1A	Gigabit Ethernet 0 MDI1 Interface Pair 1-
L8	ETH0_MDI4_P	JK1A	Gigabit Ethernet 0 MDI2 Interface Pair 1+
L7	ETH0_MDI4_N	JK1A	Gigabit Ethernet 0 MDI2 Interface Pair 1-
L11/L12	ETH0_ACT#_BU	L11/L12	Gigabit Ethernet Activity LED, Active Low
L13/L14	ETH0_LINK#_BU	L13/L14	Gigabit Ethernet Link LED, Active Low

Table 7: Ethernet (1)

Connector:	Standard 8 pin RJ45 with integrated Magnetics & Status LEDs		
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Description**
R2	ETH1_MDI1_P	JK1B	Gigabit Ethernet 1 MDI1 Interface Pair 1+
R1	ETH1_MDI1_N	JK1B	Gigabit Ethernet 1 MDI1 Interface Pair 1-
R4	ETH1_MDI2_P	JK1B	Gigabit Ethernet 1 MDI2 Interface Pair 1+
R3	ETH1_MDI2_N	JK1B	Gigabit Ethernet 1 MDI2 Interface Pair 1-
R6	ETH1_MDI3_P	JK1B	Gigabit Ethernet 1 MDI1 Interface Pair 1+
R5	ETH1_MDI3_N	JK1B	Gigabit Ethernet 1 MDI1 Interface Pair 1-
R8	ETH1_MDI4_P	JK1B	Gigabit Ethernet 1 MDI2 Interface Pair 1+
R7	ETH1_MDI4_N	JK1B	Gigabit Ethernet 1 MDI2 Interface Pair 1-
R11/R12	ETH1_ACT#_BU	R11/R12	Gigabit Ethernet Activity LED, Active Low
R13/R14	ETH1_LINK#_BU	R13/R14	Gigabit Ethernet Link LED, Active Low

2.5.4 USB

Table 8: USB Type C 3.2 OTG (0)

Connector:	Standard Type-C Superspeed USB Connector		
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Description**
A1/B12	GND	JK4	System Ground
A2/B11	USB0_TX1L_P	JK4	USB 0 Super Speed TX1 Data+
A3/B10	USB0_TX1L_N	JK4	USB 0 Super Speed TX1 Data-
A4/B9	USB0 VBUS	JK4	Bus Power
A5/B8	USB0 CCI1/SBU2	JK4	Config Channel/Sideband (NC)
A6/B7	USB0_D_P	JK4	USB 0 Host 2.0 Data+
A7/B6	USB0_D_N	JK4	USB 0 Host 2.0 Data-
A8/B5	USB0 SBU1/CC2	JK4	Sideband (NC)/Config Channel
A9/B4	USB0 VBUS	JK4	Bus Power
A10/B3	USB0_RX2L_N	JK4	USB 0 Super Speed RX2 Data-
A11/B2	USB0_RX2L_P	JK4	USB 0 Super Speed RX2 Data+
A12/B1	GND	JK4	System Ground

Table 9: USB Type C 3.2 Host (1)

Connector:	Standard Type-C Superspeed USB Connector		
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Description**
A1/B12	GND	JK5	System Ground
A2/B11	USB1_TX1L_P	JK5	USB 1 Super Speed TX1 Data+
A3/B10	USB1_TX1L_N	JK5	USB 1 Super Speed TX1 Data-
A4/B9	USB1 VBUS	JK5	Bus Power
A5/B8	USB1 CCI1/SBU2	JK5	Config Channel/Sideband (NC)
A6/B7	USB1_D_P	JK5	USB 1 Host 2.0 Data+
A7/B6	USB1_D_N	JK5	USB 1 Host 2.0 Data-
A8/B5	SBU1/CC2	JK5	Sideband (NC)/Config Channel
A9/B4	USB1 VBUS	JK5	Bus Power
A10/B3	USB1_RX2L_N	JK5	USB 1 Super Speed RX2 Data-
A11/B2	USB1_RX2L_P	JK5	USB 1 Super Speed RX2 Data+
A12/B1	GND	JK5	System Ground

Table 10: USB Type C 3.2 Host (2)

Connector:	Standard Type-C Superspeed USB Connector		
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Description**
A1/B12	GND	JK6	System Ground
A2/B11	USB2_TX1L_P	JK6	USB 2 Super Speed TX1 Data+
A3/B10	USB2_TX1L_N	JK6	USB 2 Super Speed TX1 Data-
A4/B9	USB2 VBUS	JK6	Bus Power
A5/B8	USB2 CCI1/SBU2	JK6	Config Channel/Sideband (NC)
A6/B7	USB2_D_P	JK6	USB 2 Host 2.0 Data+
A7/B6	USB2_D_N	JK6	USB 2 Host 2.0 Data-
A8/B5	SBU2/CC2	JK6	(NC) Sideband/Config Channel
A9/B4	USB2 VBUS	JK6	Bus Power
A10/B3	USB2_RX2L_N	JK6	USB 2 Super Speed RX2 Data-
A11/B2	USB2_RX2L_P	JK6	USB 2 Super Speed RX2 Data+
A12/B1	GND	JK6	System Ground

Table 11: USB 2.0 Serial Console Host

Connector:	Standard Micro USB Connector			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	VCC	JK7	-	FTDL VCC Out
2	COMUSB_N	JK7	UART3	USB 2.0 Serial Console Host Data-
3	COMUSB_P	JK7	UART3	USB 2.0 Serial Console Host Data+
4	NC	JK7	-	No Connection
5	GND	JK7	-	System Ground

2.5.5 Fan Connector

Table 12: Fan Connector

Connector:	Molex Shrouded Header 4 POS, 1.25mm (Part#: 0533980471)			
Mates With:	Molex Receptacle Housing 4 POS, 1.25mm (Part#: 0510210400)			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**SOM Pin#**	**Description**
1	GND	HDR7	-	System Ground
2	VDD_FAN	HDR7	-	Fan Voltage 5V or 12V default
3	FAN_TACH	HDR7	E54	Fan Tachometer Input
4	FAN_PWM	HDR7	K62	Fan PWM Output

2.5.6 Push Buttons

Table 13: Push Buttons

Pin Name	Connector Ref. Designator	Description
Power On	PB2_TOP	System Power On/Off
System Reset	PB2_BOT	System Reset
Force Recovery	PB1	Force Recovery

2.5.7 LEDS

Table 14: LEDS

LED Name	Connector Ref. Designator	Description
Power On	LD1	Green LED Lit when Power is ON
Prog LED	LD2	Green LED Lit by GPIO03
12V Status	LD3	Blue LED Lit when 12V Power is ON
5V_AO Status	LD4	Green LED Lit when 5V First Power is ON
5V Status	LD5	Green LED Lit when 5V Power is ON
3.3V_AO Status	LD6	Green LED Lit when 3.3V First Power is ON
3.3V Status	LD7	Green LED Lit when 3.3V Power is ON

2.5.8 SPI

Table 15: Serial Peripheral Interface (A)

Connector:	Molex Power Header 8 POS, 2.5mm (Part#: 1053141308)			
Mates With:	Molex Receptacle Housing 8 POS, 2.5mm (Part#: 1053081208)			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
T1	VDD_3V3	ST2	-	System 3.3V Power
B1	SPI3_CLK	ST2	SPI3	Serial Peripheral Interface A, Serial Clock
T2	SPI3_MO	ST2	SPI3	Serial Peripheral Interface A, Master Out Slave In
B2	SPI3_MIS	ST2	SPI3	Serial Peripheral Interface A, Master In Slave Out
T3	SPI3_CS0	ST2	SPI3	Serial Peripheral Interface A, Chip Select 0
B3	SPI3_CS1	ST2	SPI3	Serial Peripheral Interface A, Chip Select 1
T4	GND	ST2	-	System Ground
B4	GND	ST2	-	System Ground

2.5.9 M.2 Sockets

Table 16: NVMe M.2 M-Key Card Slot

Connector	M.2 M-key 2280 1.5mm mating height with M2.5 mounting standoff
Function	**Description**
Ref. Designator	SOK2
Interfaces	Interface is x4 PCIe Gen 4
LEDs	Green Drive Activity LED
Pinout	M.2 Specification M-Key pin assignment
Notes	SATA is not supported (PCIe based devices only)

Table 17: Wifi/Bluetooth M.2 E-Key Card Slot

Connector	M.2 E-Key 2230 1.5mm mating height with M2.5 mounting standoff
Function	**Description**
Ref. Designator	SOK3
Interfaces	I2C, I2S, UART, SDIO
LEDs	None
Pinout	M.2 Specification E-Key pin assignment
Notes	UART, Wifi & BT Disable and Wake signals

2.5.10 Serial Ports

Table 18: Serial Port A

Connector:	Standard 10-pin unshrouded dual row header 0.1” pitch			
Mates With:	EMAC 10pin Header to Male DB9 Cable (Part#: CAB-35-001-1)			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	RS4xx_TXD-	HD2	UART2	RS4xx Transmit Negative
2	NC	HD2	-	No Connection
3	RS232/4xx_TX	HD2	UART2	RS232/4xx Transmit Positive
4	RS232_RTS	HD2	UART1	RS232 Request To Send
5	RS232/4xx_RX	HD2	UART2	RS232/4xx Receive Positive
6	RS232_CTS	HD2	UART1	RS232 Clear To Send
7	RS4xx_RXD-	HD2	UART2	RS4xx Receive Negative
8	NC	HD2	-	No Connection
9	GND	HD2	-	System Ground
10	NC	HD2	-	No Connection

Table 19: Jumper Switch

Switch#	Pin Name	Connector Ref. Designator	MFG Default	Description
SW1-1	COM CNFG	SW1	ON - RS232	RS232 vs RS4XX Selection
SW1-2	COM CNFG	SW1	ON - RS485	RS422 vs RS485 Selection
SW1-3	TERM	SW1	OFF	RS4xx Termination Selection
SW1-4	BATT	SW1	OFF	RTC Battery Disconnect Selection

2.5.11 CAN

Table 20: CAN A

Connector:	Molex 4 position right angle single row header 2.5mm pitch			
Mates With:	Molex part number 105307-1204			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	VDD_3V3	ST1	-	System 3.3V Power
2	CAN_P	ST2	CAN0_DOUT	Controller Area Network Positive Data
3	CAN_N	ST1	CAN0_DIN	Controller Area Network Negative Data
4	CAN_GND	ST1	-	System Ground
-	CAN_SHDN	-	CAN1_DOUT	Controller Area Network Shutdown
-	CAN_STB	-	CAN1_DIN	Controller Area Network Standby

The SOM-950AX utilizes the TI TCAN3414 CAN Transceiver (see TCAN3414 datasheet for further information and Shutdown and Standby modes).

2.5.12 GPIO

This section provides for the SOM-950AX General Purpose IO section which includes four Isolated Digital Inputs and Outputs as well as two Isolated PWM channels all terminated to a single connector.

Table 21: PWM

Connector:	Molex 12 position right angle single row header 1 mm pitch			
Mates With:	Molex part number 501330-1200			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	VDD_5P0_ISO	HDR6	-	Isolated 5V Power
10	ISO_PWM_01	HDR6	GPIO27	PWM Output 01
11	ISO_PWM_02	HDR6	GPIO35	PWM Output 02
12	ISO_GND	HDR6	-	GPIO Isolated Ground

The PWMs are Isolated 5V output with 20mA drive capability.

Table 22: General Purpose I/O

Connector:	Molex 12 position right angle single row header 1 mm pitch			
Mates	Molex part number 501330-1200			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	VDD_5P0_ISO	HDR6	-	Isolated 5V Power
2	ISO_DIG_OUT_01	HDR6	I2S2_CLK	Isolated Digital Output 01
3	ISO_DIG_OUT_02	HDR6	I2S2_SDOUT	Isolated Digital Output 02
4	ISO_DIG_OUT_03	HDR6	I2S2_SDIN	Isolated Digital Output 03
5	ISO_DIG_OUT_04	HDR6	I2S2_FS	Isolated Digital Output 04
6	ISO_DIG_IN_01	HDR6	I2S1_CLK	Isolated Digital Input 01
7	ISO_DIG_IN_02	HDR6	I2S1_SDOUT	Isolated Digital Input 02
8	ISO_DIG_IN_03	HDR6	I2S1_SDIN	Isolated Digital Input 03
9	ISO_DIG_IN_04	HDR6	I2S1_FS	Isolated Digital Input 04
12	ISO_GND	HDR6	-	GPIO Isolated Ground

The Outputs are Isolated 5V output with 20mA drive capability.

2.5.13 HDMI

Table 23: HDMI

Connector:	Standard HDMI Type A connector			
Mates	Standard HDMI Type A Cable			
Connector Pin#	**Pin Name**	**Connector Ref. Designator**	**Port Name**	**Description**
1	HDMI_D2+	JK3	HDMI_D2_P	HDMI Data Pair D2+
2	D2_Shield	JK3	GND	HDMI D2 Shield
3	HDMI_D2-	JK3	HDMI_D2_N	HDMI Data Pair D2-
4	HDMI_D1+	JK3	HDMI_D1_P	HDMI Data Pair D1+
5	D1_Shield	JK3	GND	HDMI D1 Shield
6	HDMI_D1-	JK3	HDMI_D1_N	HDMI Data Pair D1-
7	HDMI_D0+	JK3	HDMI_D0_P	HDMI Data Pair D0+
8	D0_Shield	JK3	GND	HDMI D0 Shield
9	HDMI_D0-	JK3	HDMI_D0_N	HDMI Data Pair D0-
10	HDMI_CLK+	JK3	HDMI_CK_P	HDMI Clock Pair +
11	CLK_Shield	JK3	GND	HDMI Clock Shield
12	HDMI_CLK-	JK3	HDMI_CK_N	HDMI Clock Pair -
13	HDMI_CEC	JK3	HDMI_CEC	HDMI CEC Communication
14	UTIL	JK3	NC	Reserved Pin
15	HDMI_I2C_SCL	JK3	DP2_AUX_CH_P	HDMI DDC/I2C Serial Clock
16	HDMI_I2C_SDA	JK3	DP2_AUX_CH_N	HDMI DDC/I2C Serial Data
17	GND	JK3	GND	System Ground
18	+5V	JK3	+5V	System 5V Power
19	HDMI_HPD_CON	JK3	DP2_HPD	HDMI Hot Plug Detect

2.5.14 CSI

Table 24: CSI Camera HDR1

Connector	Samtec Differential Array Plug 120 POS connector			
Mates	Samtec Receptacle 120 POS connector (QSH-060-01-H-D-A)			
Connector Pin#	Pin Name	Connector Pin#	Pin Name	Description
1	CSI0_D0_P	2	CSI1_D0_P	CSI0/CSI1 D0 Data Pair +
3	CSI0_D0_N	4	CSI1_D0_N	CSI0/CSI1 D0 Data Pair -
5	GND	6	GND	System Ground
7	CSI0_CLK_P	8	CSI1_CLK_P	CSI0/CSI1 CLK Data Pair +
9	CSI0_CLK_N	10	CSI1_CLK_N	CSI0/CSI1 CLK Data Pair -
11	GND	12	GND	System Ground
13	CSI0_D1_P	14	CSI1_D1_P	CSI0/CSI1 D1 Data Pair +
15	CSI0_D1_N	16	CSI1_D1_N	CSI0/CSI1 D1 Data Pair -
17	GND	18	GND	System Ground
19	CSI2_D0_P	20	CSI3_D0_P	CSI2/CSI3 D0 Data Pair +
21	CSI2_D0_N	22	CSI3_D0_N	CSI2/CSI3 D0 Data Pair -
23	GND	24	GND	System Ground
25	CSI2_CLK_P	26	CSI3_CLK_P	CSI2/CSI3 CLK Data Pair +
27	CSI2_CLK_N	28	CSI3_CLK_N	CSI2/CSI3 CLK Data Pair -
29	GND	30	GND	System Ground
31	CSI2_D1_P	32	CSI3_D1_P	CSI2/CSI3 D1 Data Pair +
33	CSI2_D1_N	34	CSI3_D1_N	CSI2/CSI3 D1 Data Pair -
35	GND	36	GND	System Ground
37	CSI4_D0_P	38	CSI6_D0_P	CSI4/CSI6 D0 Data Pair +
39	CSI4_D0_N	40	CSI6_D0_N	CSI4/CSI6 D0 Data Pair -
41	GND	42	GND	System Ground
43	CSI4_CLK_P	44	CSI6_CLK_P	CSI4/CSI6 CLK Data Pair +
45	CSI4_CLK_N	46	CSI6_CLK_N	CSI4/CSI6 CLK Data Pair -
47	GND	48	GND	System Ground
49	CSI4_D1_P	50	CSI6_D1_P	CSI4/CSI6 D1 Data Pair +
51	CSI4_D1_N	52	CSI6_D1_N	CSI4/CSI6 D1 Data Pair -
53	GND	54	GND	System Ground
55	DVDD_CAM_LV	56	DVDD_CAM_LV	Reserved for Low Voltage Supply
57	DVDD_CAM_LV	56	DVDD_CAM_LV	Reserved for Low Voltage Supply
59	CSI5_D0_P	60	CSI7_D0_P	CSI5/CSI7 D0 Data Pair +
61	CSI5_D0_N	62	CSI7_D0_N	CSI5/CSI7 D0 Data Pair -
63	GND	64	GND	System Ground
65	CSI5_CLK_P	66	CSI7_CLK_P	CSI5/CSI7 CLK Data Pair +
67	CSI5_CLK_N	68	CSI7_CLK_N 6	CSI5/CSI7 CLK Data Pair -
69	GND	70	GND	System Ground

71	CSI5_D1_P	**72**	CSI7_D1_P	CSI5/CSI7 D1 Data Pair +
73	CSI5_D1_N	**74**	CSI7_D1_N	CSI5/CSI7 D1 Data Pair -
75	I2C_GP3_CLK	**76**	CAM_ERROR1	Camera I2C Clock/Camera Error #1
77	I2C_GP3_DAT	**78**	CAM_ERROR2	Camera I2C Data/ Camera Error #2
79	GND	**80**	GND	System Ground
81	+2.8V	**82**	+2.8V	2.8V Analog Camera supply
83	+2.8V	**84**	CAM_ERROR3	2.8V Analog Cam supply/Error #3
85	FSYNC1	**86**	CAM_ERROR4	Camera FRSYNC #1/Error #4
87	I2C_GP2_CLK	**88**	CAM_MCLK3	GP I2C #2 Clock/CAM #1 Master Clock
89	I2C_GP2_DAT	**90**	CAM1_PWDN	GP I2C #2 Data/CAM #1 Power Down
91	CAM_MCLK2	**92**	CAM1_RST#	CAM #2 Master Clock/CAM #1 Reset
93	CAM0_PWDN	**94**	CAM_MCLK4	CAM #0 Pwr Down/ CAM #4 Master Clk
95	CAM0_RST#	**96**	FRSYNC4	CAM #0 Reset/Camera FRSYNC #4
97	FRSYNC3	**98**	FRSYNC2	Camera FRSYNC #3/Camera FRSYNC #2
99	GND	**100**	GND	System Ground
101	CAM_TE_RSV	**102**	1.8V	Reserved/ 1.8V Camera supply
103	CAM_INT3	**104**	CAM_INT4	CAM Interrupt #3/ CAM Interrupt #4
105	I2C_GP9_CLK	**106**	CAM_INT2	GP I2C #5 Clock /Camera Interrupt #2
107	I2C_GP9_DAT	**108**	3.3V	GP I2C #5 Data/ 3.3V supply
109	CAM_BL_PWM	**110**	3.3V	CAM Backlight PWM 01/3.3V supply
111	CAM_SPI_SCK	**112**	CAM_SPI_MOSI	CAM SPI1 Clock/CAM SPI1 MOSI
113	CAM_SPI_CS0	**114**	CAM_SPI_MISO	CAM SPI1 CS0/CAM SPI1 MISO
115	GND	**116**	GND	System Ground
117	CAM_INT1	**118**	3.3V	CAM Interrupt #3/3.3V supply
119	CAM_VDD_EN	**120**	3.3V	System power enable/3.3V supply

Note: Only 6 of the CSI2 interfaces can be used at once in a 2-lane configuration. Only 4 interfaces when using a 4-lane configuration.

3 Software

NVIDIA® JetPack™ SDK is the most comprehensive solution for building AI applications. JetPack SDK provides a full development environment for hardware-accelerated AI-at-the-edge development. JetPack SDK includes Jetson Linux Driver Package with bootloader, Linux kernel, Ubuntu desktop environment, and a complete set of libraries for acceleration of GPU computing, multimedia, graphics, and computer vision. It also includes samples, documentation, and developer tools for both host computer and developer kit, and supports higher level SDKs such as DeepStream for streaming video analytics, Isaac for robotics and Riva for conversational AI. EMAC also can provide an Open Embedded Linux Distribution in place of Ubuntu. Contact EMAC for additional information.

ftp://ftp.emacinc.com/EMAC_Linux/NVIDIA/

4 Ideal Flash Instructions

Step 1: Unzip the tarball file

Extract the artifacts by running the following command with root privileges:

- The system images are pre-generated with this release.

```
sudo tar xf deployment_folder.tar.xz
```

Step 2: Load Bootloader, Linux Kernel, and File system to eMMC

To load the BSP to eMMC, Put the device into recovery mode and use this command to flash the AGX Orin:

```
sudo ./flash.sh -r --reuse-uuid emac-agx-orin internal
```

5 Initial Installation

1. Make sure all external system power supplies are off.

2. Install the Jetson AGX Orin Module onto the SOM Connector. 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 application cables. At a minimum these would include:
   a) Power cable to the input power connector on the carrier (CN1)
   b) HDMI video display cable (JK2)
   c) Keyboard and mouse via USB (JK4, JK5 or JK6)

4. Connect the Power Cable to the Power Supply.

5. Set the power supply to the correct voltage (typically 12Vdc)

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

7. Press PB2 (TOP) Power Pushbutton

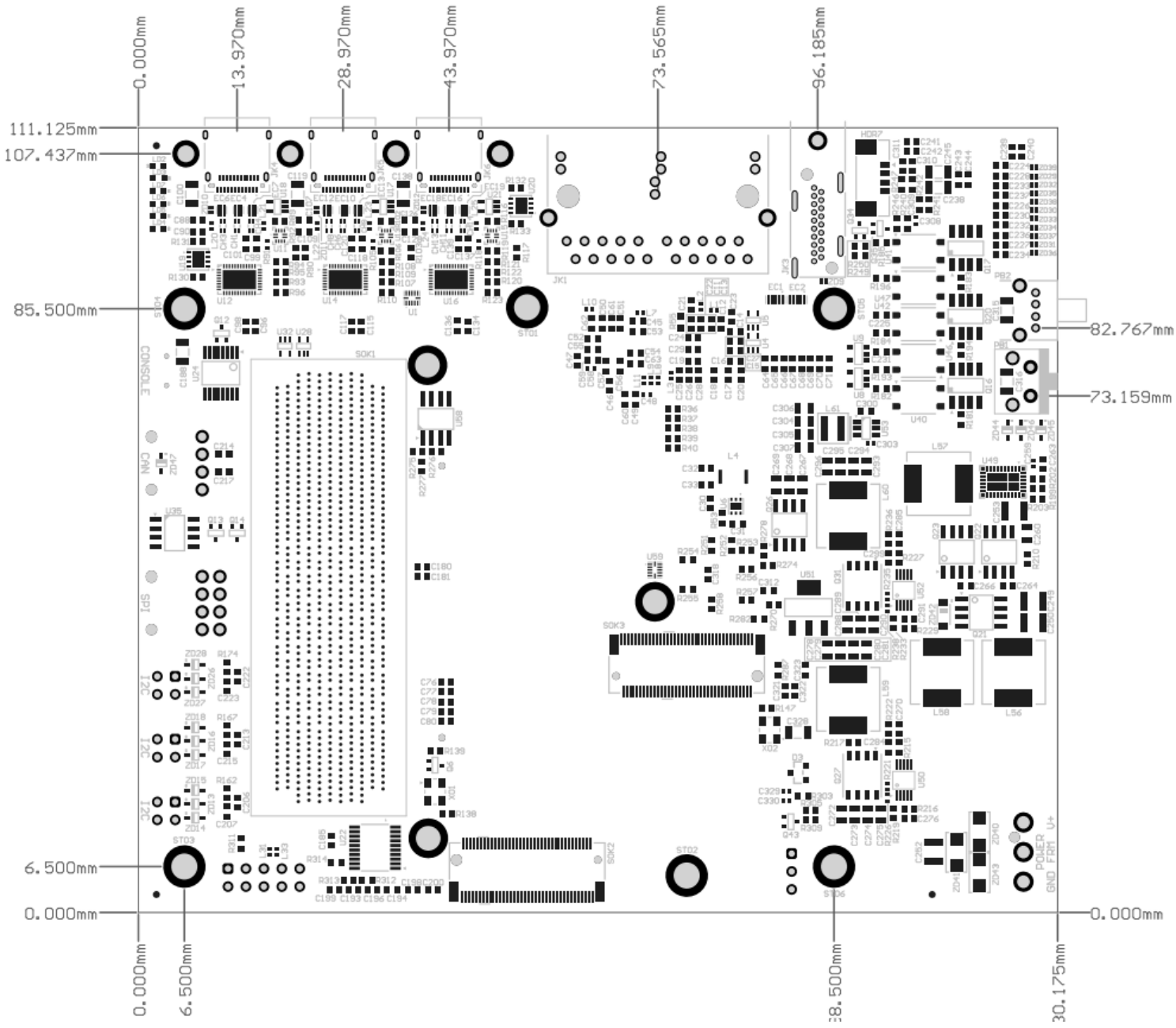
6 Force Recovery Mode

The USB 3.2/OTG Port (JK4) on SOM-950AX can be used to reprogram the Jetson AGX Orin from another host platform running NVIDIA Jetpack

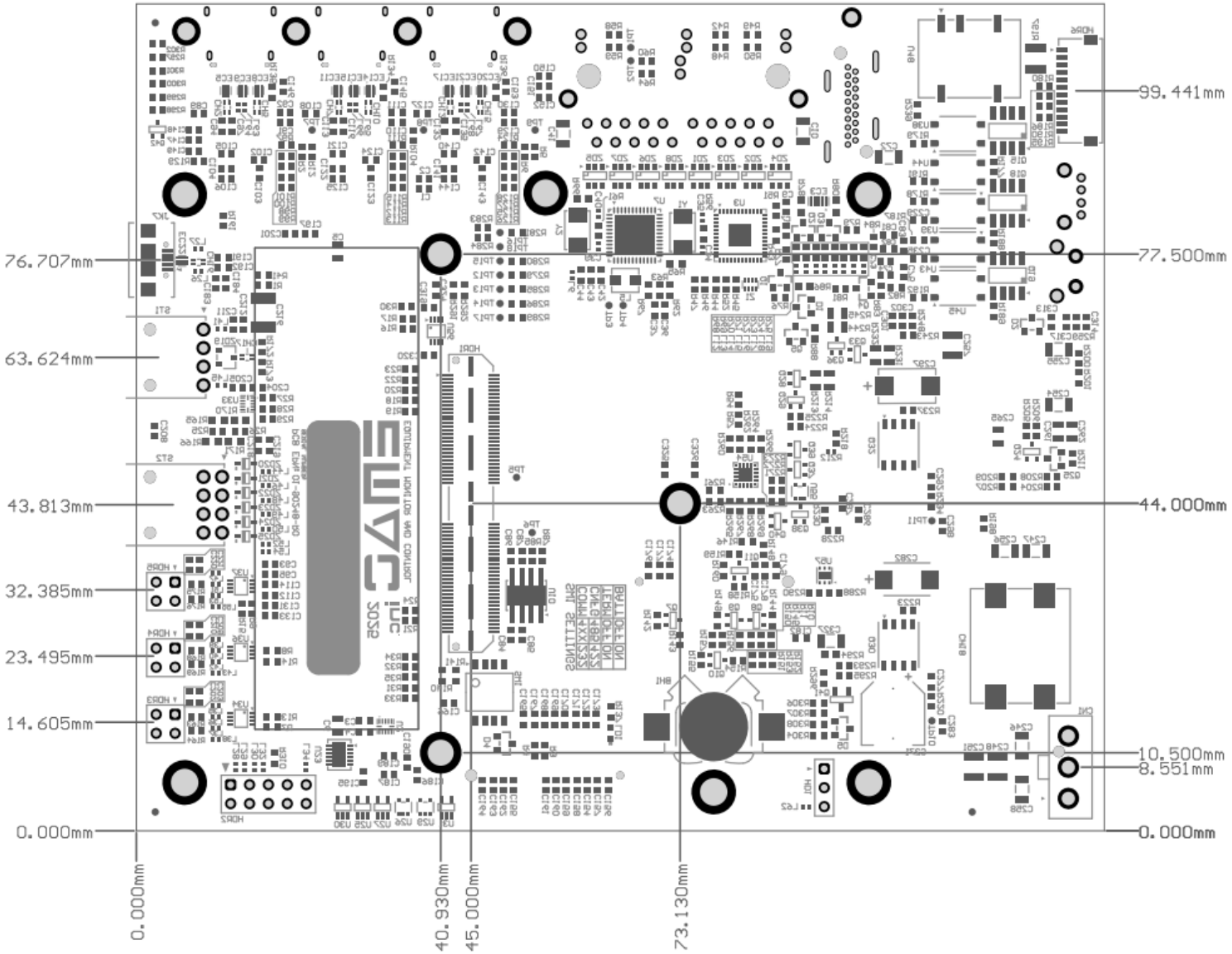
1. Power down the system completely. The system power must be OFF, not in suspend or sleep mode
2. Connect the OTG USB port to another host device that will be supplying the new system file
3. Hold down the Force Recovery Button (PB1) and then power the board
4. After three (3) seconds release the Recovery button
5. The Jetson AGX Orin will show up on the host system USB list as a new NVIDIA target device
6. After successfully updating the system software, power off the system. A clean power up will revert the OTG port back into host mode.

7 Dimensional Drawings

TOP



BOTTOM


99.441mm
77.500mm
76.707mm
63.624mm
44.000mm
43.813mm
32.385mm
23.495mm
14.605mm
10.500mm
8.551mm
0.000mm
0.000mm
0.000mm
40.930mm
45.000mm
73.130mm