



**TEP-0500-IMX6UL MODULAR HMI PRODUCT MANUAL**  
**(TEP-0500-IMX6UL)**

**VER. 1.00**

**August 20, 2018**

## REVISION HISTORY

Revision	Date	Originator	Notes
1.00	August 20, 2018	TechNexion	First public release

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## 1. Introduction

### 1.1. General Care and Maintenance

Your device is a product of superior design and craftsmanship and should be treated with care.

The following suggestions will help you.

- Keep the device dry. Precipitation, humidity, and all types of liquids or moisture can contain minerals that will corrode electronic circuits. If your device does get wet, allow it to dry completely.
- Do not use or store the device in dusty or dirty areas. Its parts and electronic components can be damaged.
- Do not store the device in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the device in cold areas. When the device returns to its normal temperature, moisture can form inside the device and damage electronic circuit boards.
- Do not open the device while power is on. Otherwise electrical shock may result.
- Do not drop, knock, or shake the device. Rough handling can break internal circuit boards and fine mechanics.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the device.
- Do not paint the device. Paint can clog the parts and prevent proper operation.
- Unauthorized modifications or attachments could damage the device and may violate regulations governing radio devices.

These suggestions apply equally to your device, battery, charger, or any enhancement. If any device is not working properly, take it to the nearest authorized service facility for service.

Regulatory information



**Disposal of Waste Equipment by Users in Private Household in the European Union**  
This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment

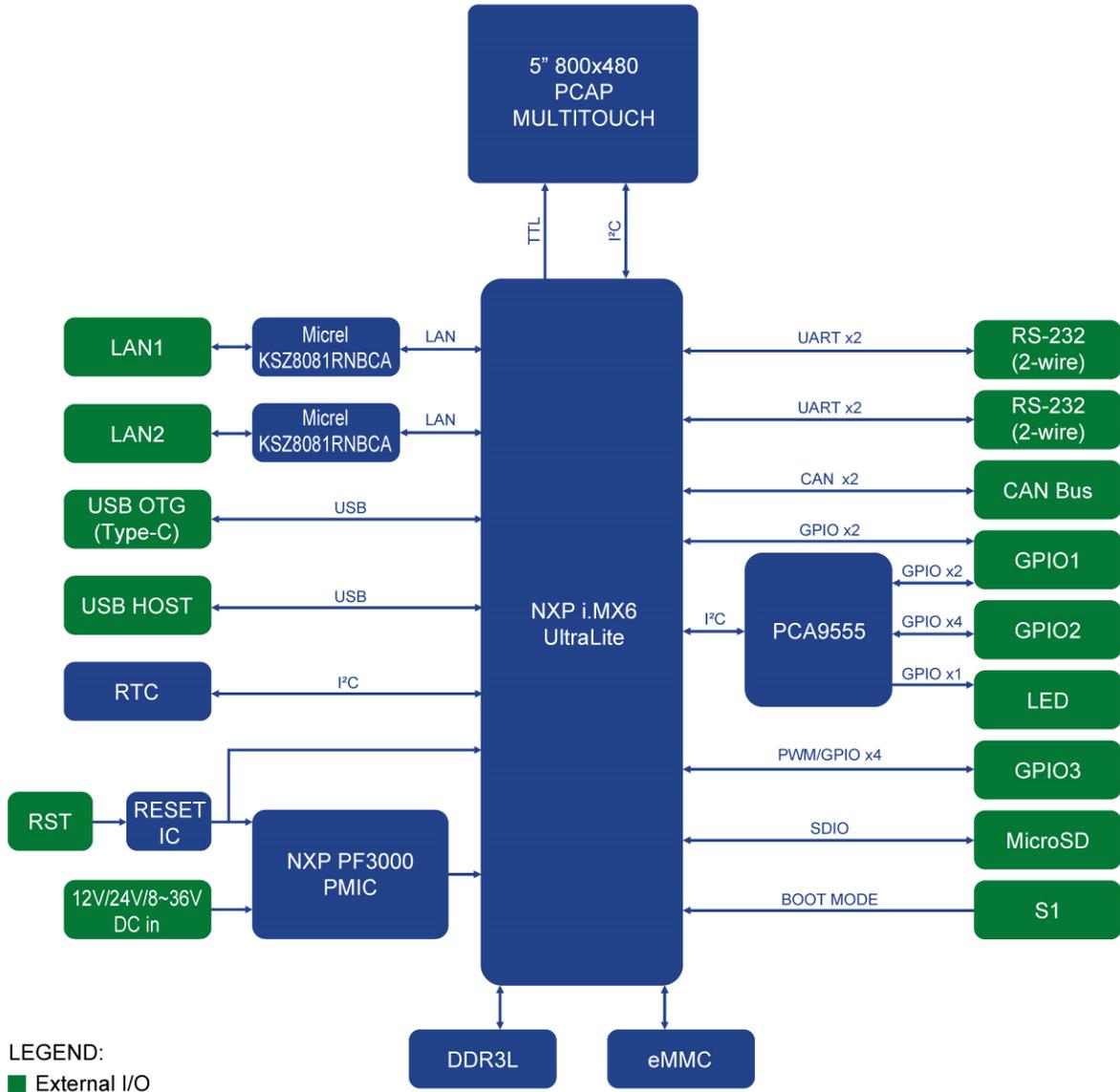
for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.



We hereby declare that the product is in compliance with the essential requirements and other relevant provisions of European Directive 2014/53/EU (Directive on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC).

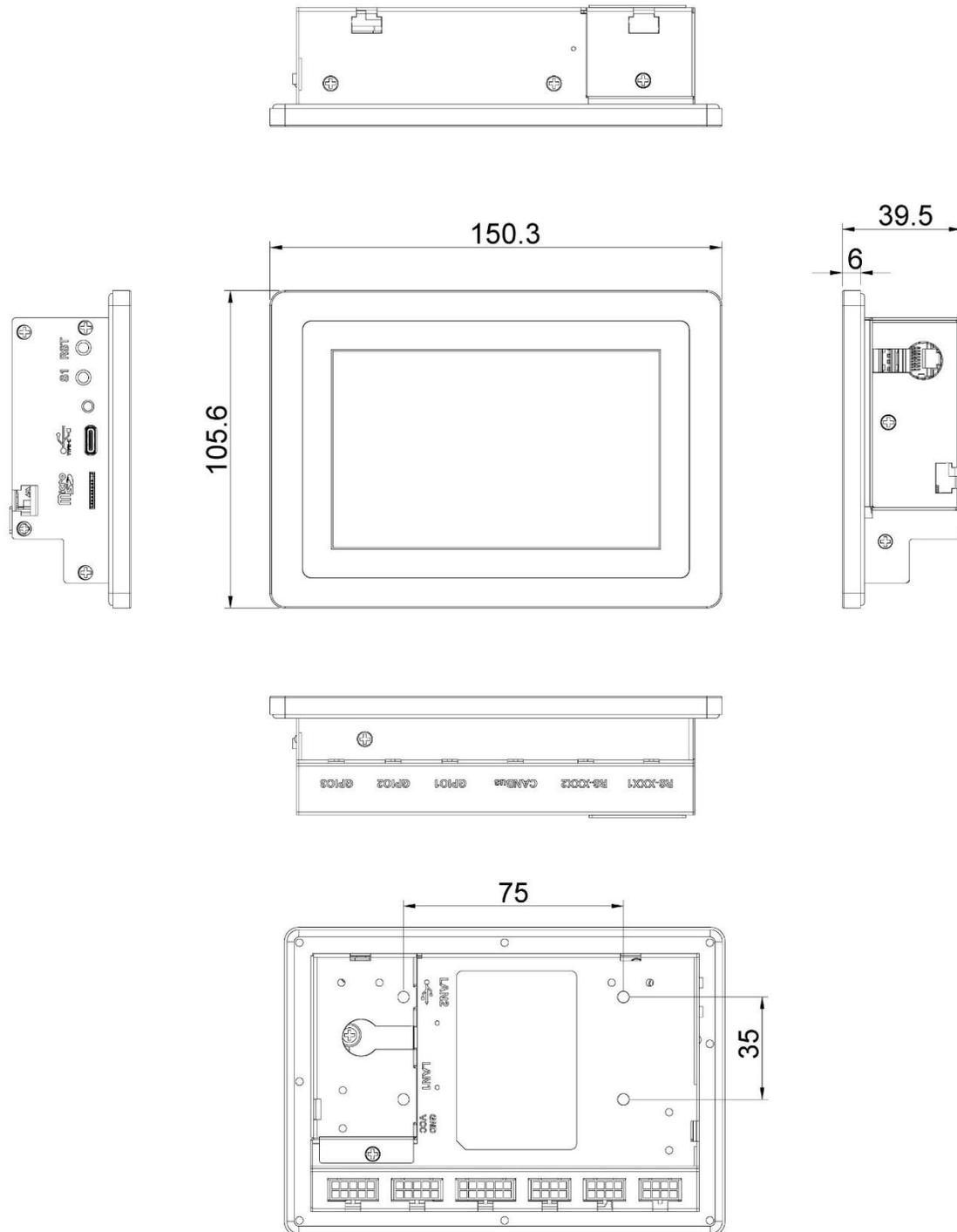
## 2. TEP-0500-IMX6UL Product Overview

### 2.1. Functional Block Diagram



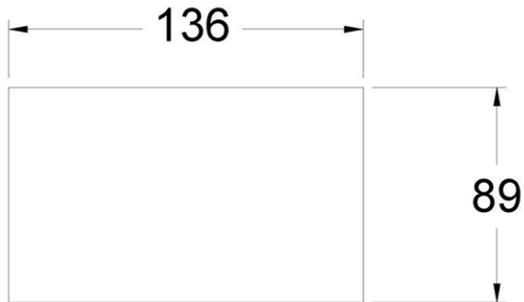
## 2.2. Dimensions

The following figure shows the TEP-0500-IMX6UL dimensions (unit: mm):



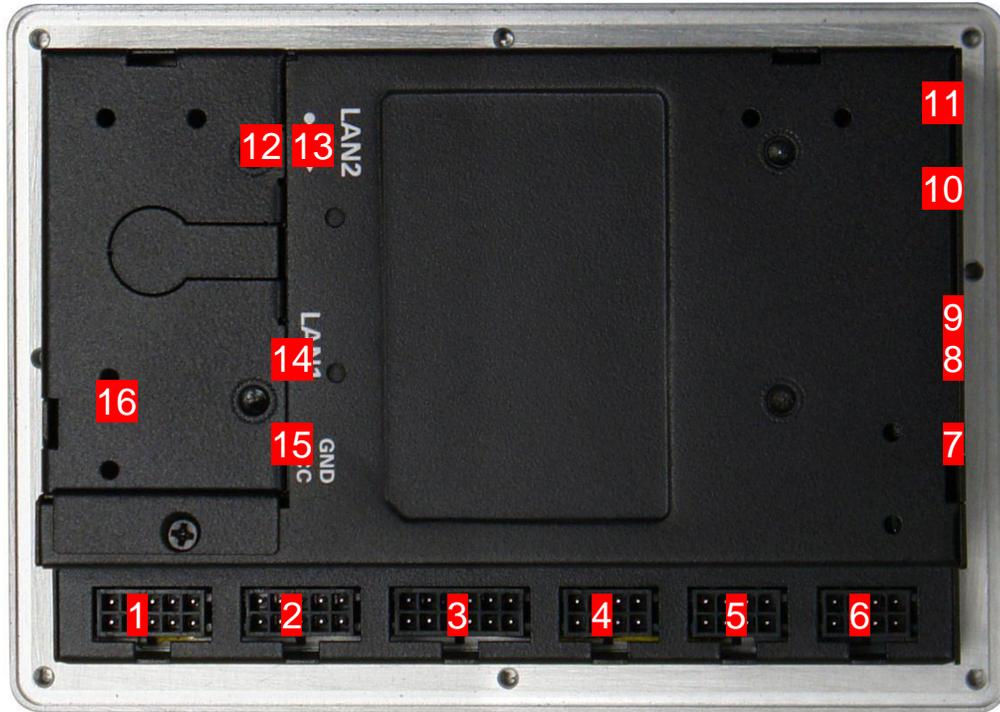
### 2.3. Device Cut-out Dimensions For Mounting Though a Panel

The TEP-0500-IMX6UL can be mounted on the front or the back of the panel. In order to mount it from the front, a nominal rectangular cutout must be made in the panel. The following drawing shows the dimensions of the cut-out area (unit: mm):



## 2.4. External Connectors

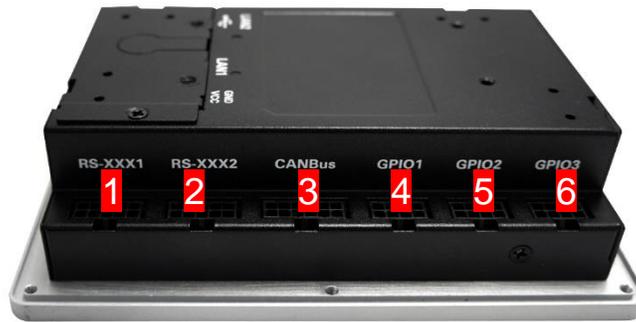
The TEP-0500-IMX6UL has a number of external connectors.  
Rear view:



External Connectors:

No.	Description	No.	Description
1	RS-XXX1 (Serial Port) connector	9	LED Light indicator
2	RS-XXX2 (Serial Port) connector	10	S1 Boot Select button
3	CAN Bus connector	11	Reset button
4	GPIO1 connector	12	USB Host connector
5	GPIO2 connector	13	LAN2 RJ45 connector
6	GPIO3 connector	14	LAN1 RJ45 and PoE (optional) connector
7	MicroSD card slot	15	Power Input connector
8	USB OTG (Type-C) connector	16	Grounding screw

Bottom view:



Right side view:



External Connectors:

No.	Description	No.	Description
1	RS-XXX1 (Serial Port) connector	9	LED Light indicator
2	RS-XXX2 (Serial Port) connector	10	S1 Boot Select button
3	CAN Bus connector	11	Reset button
4	GPIO1 connector	12	USB Host connector
5	GPIO2 connector	13	LAN2 RJ45 connector
6	GPIO3 connector	14	LAN1 RJ45 and PoE (optional) connector
7	MicroSD card slot	15	Power Input connector
8	USB OTG (Type-C) connector	16	Grounding screw

Left side view without side cover:

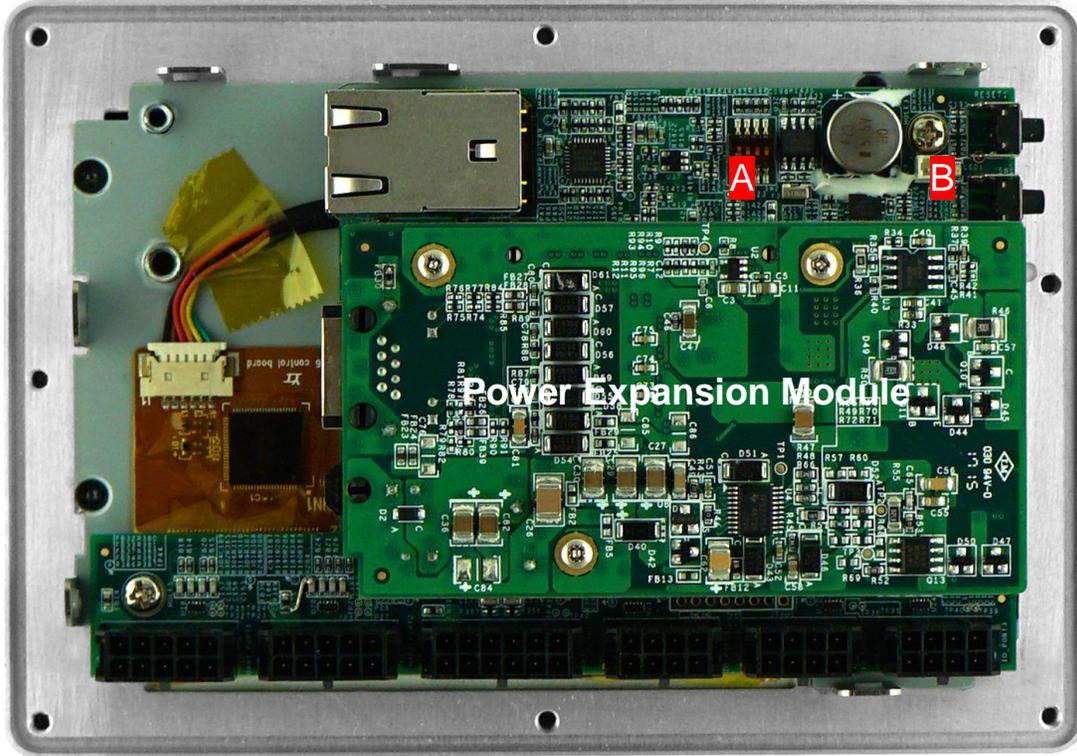


External Connectors:

No.	Description	No.	Description
1	RS-XXX1 (Serial Port) connector	9	LED Light indicator
2	RS-XXX2 (Serial Port) connector	10	S1 Boot Select button
3	CAN Bus connector	11	Reset button
4	GPIO1 connector	12	USB Host connector
5	GPIO2 connector	13	LAN2 RJ45 connector
6	GPIO3 connector	14	LAN1 RJ45 and PoE (optional) connector
7	MicroSD card slot	15	Power Input connector
8	USB OTG (Type-C) connector	16	Grounding screw

## 2.5. Internal Board Connectors

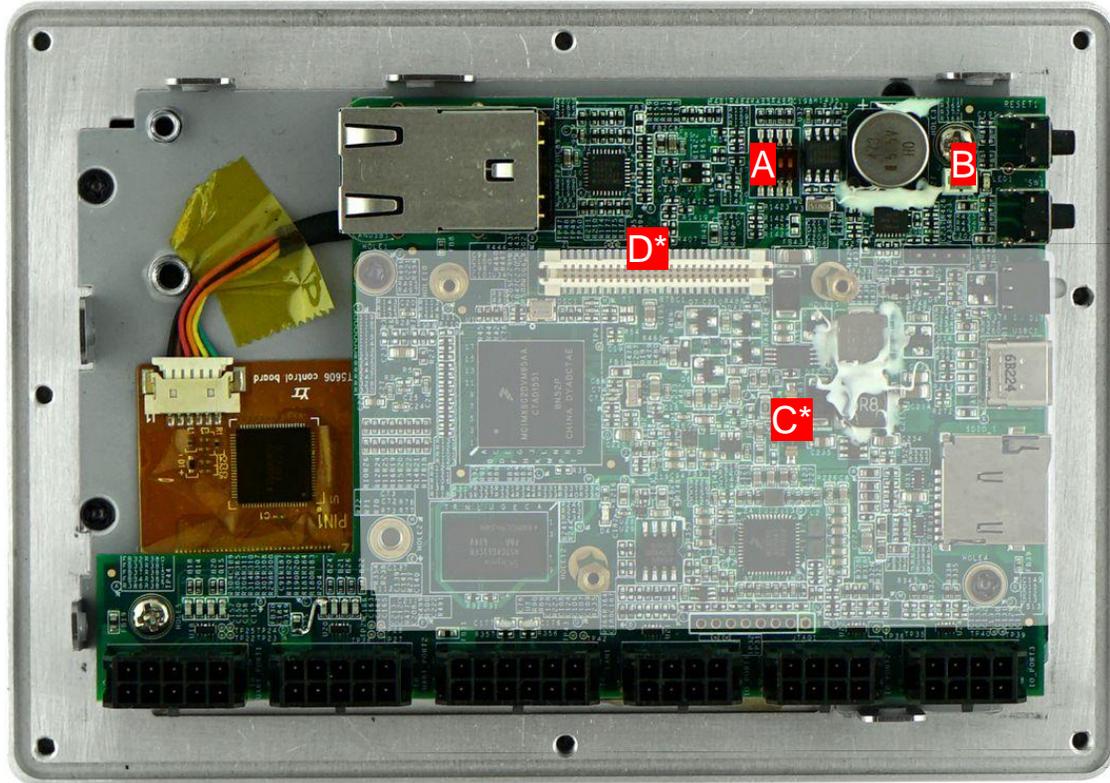
The TEP-0500-IMX6UL has several connectors, switches and internal expansion options. It is necessary to remove the Power Expansion module to access several switches, headers and connectors. Rear view (opened device) with the Power Expansion module:



Internal Connectors and Switches:

No.	Description	No.	Description
A	SW2 Panel switch	B	RTC Battery connector

Rear view (opened device) without the Power Expansion module:



Internal Connectors and Switches:

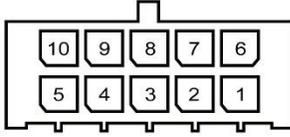
No.	Description	No.	Description
A	SW2 Panel switch	C*	SW3 Panel switch
B	RTC Battery connector	D*	Power Expansion module connector

NOTE: Items marked with \* are accessible only after removing the Power Expansion module.

### 3. External Connectors

#### 3.1. Serial Port Connectors (RS-XXX1/RS-XXX2)

The TEP-0500-IMX6UL has four non-galvanic isolated 2-wire RS-232 serial ports.



RS-XXX1:

Pin #	Signal	Description	Device
1	GND	Ground	
2	SERIAL1A_TXD	Port#1A Transmit data (output)	ttymxc0
3	SERIAL1A_RXD	Port#1A Receive data (input)	ttymxc0
4	NC		
5	NC		
6	GND	Ground	
7	SERIAL1B_TXD	Port#1B Transmit data (output)	ttymxc1
8	SERIAL1B_RXD	Port#1B Receive data (input)	ttymxc1
9	NC		
10	NC		

RS-XXX2:

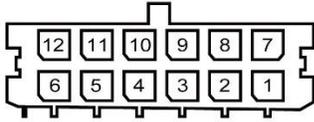
Pin #	Signal	Description	Device
1	GND	Ground	
2	SERIAL2A_TXD	Port#2A Transmit data (output)	ttymxc2
3	SERIAL2A_RXD	Port#2A Receive data (input)	ttymxc2
4	NC		
5	NC		
6	GND	Ground	
7	SERIAL2B_TXD	Port#2B Transmit data (output)	ttymxc3
8	SERIAL2B_RXD	Port#2B Receive data (input)	ttymxc3
9	NC		
10	NC		

Header on TEP-0500-IMX6UL: Molex 43045-1012 (10-pin Micro-Fit 3.0).

Cable receptacle: Molex 43025-1000 (10-pin Micro-Fit 3.0) plug with crimp contact Molex 43030-0007.

### 3.2. CAN Bus Connector (CANBus)

The TEP-0500-IMX6UL has two non-galvanic isolated CAN Bus interfaces.



CANBus:

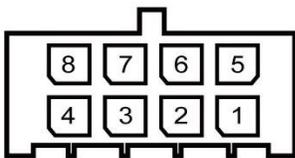
Pin #	Signal	Description	Interface
1	GND_CAN	Ground for CAN	
2	CAN1A_TERM_P	To enable CAN1A Termination, bridge with CAN1A_P	can0
3	CAN1A_P	CAN Bus 1A high (-24~+24V)	can0
4	CAN1A_N	CAN Bus 1A low (-24~+24V)	can0
5	CAN1A_TERM_N	To enable CAN1A Termination, bridge with CAN1A_N	can0
6	NC		
7	GND_CAN	Ground for CAN	
8	CAN1B_TERM_P	To enable CAN1B Termination, bridge with CAN1B_P	can1
9	CAN1B_P	CAN Bus 1B high (-24~+24V)	can1
10	CAN1B_N	CAN Bus 1B low (-24~+24V)	can1
11	CAN1B_TERM_N	To enable CAN1B Termination, bridge with CAN1B_N	can1
12	NC		

Header on TEP-0500-IMX6UL: Molex 43045-1212 (12-pin Micro-Fit 3.0).

Cable receptacle: Molex 43025-1200 (12-pin Micro-Fit 3.0) plug with crimp contact Molex 43030-0007.

### 3.3. Digital I/O Connectors (GPIO1/GPIO2/GPIO3)

The TEP-0500-IMX6UL has three non-galvanic isolated GPIO Expansion headers with the following pinout:



GPIO1:

Pin #	Signal	Description	Voltage			Current Max.	GPIO Kernel	GPIO Bank/IO
			Min.	Typ.	Max.			
1	GPIO1A	DIG_IN1/OUT1	-0.5V	3.3V	6V	0.15mA	12	1_12
2	GPIO1B	DIG_IN2/OUT2	-0.5V	3.3V	6V	0.15mA	13	1_13
3	GND_DIO	Ground for digital I/O						
4	NC							
5	GPIO1C	DIG_IN5/OUT5	-0.5V	3.3V	6V	50mA	500	pca9555_4
6	GPIO1D	DIG_IN5/OUT6	-0.5V	3.3V	6V	50mA	501	pca9555_5
7	VCC_DIO	Supply output for d. I/O		3.3V				
8	NC							

## GPIO2:

Pin #	Signal	Description	Voltage			Current Max.	GPIO Kernel	GPIO Bank/IO
			Min.	Typ.	Max.			
1	GPIO2A	DIG_IN1/OUT1	-0.5V	3.3V	6V	50mA	511	pca9555_15
2	GPIO2B	DIG_IN2/OUT2	-0.5V	3.3V	6V	50mA	508	pca9555_12
3	GND_DIO	Ground for digital I/O						
4	NC							
5	GPIO2C	DIG_IN5/OUT5	-0.5V	3.3V	6V	50mA	509	pca9555_13
6	GPIO2D	DIG_IN5/OUT6	-0.5V	3.3V	6V	50mA	510	pca9555_14
7	VCC_DIO	Supply output for d. I/O		3.3V				
8	NC							

## GPIO3:

Pin #	Signal	Description	Voltage			Current Max.	PWM (default)	GPIO* Kernel	GPIO Bank/IO
			Min.	Typ.	Max.				
1	GPIO3A	ADCI_INO	-0.5V	3.3V				8	1_8
2	GPIO3B	PWM_OUT or DIG_IN2/OUT2	-0.5V	3.3V	3.6V	0.15mA	4	5	1_5
3	GND_DIO	Ground for digital I/O							
4	NC								
5	GPIO3C	PWM_OUT or DIG_IN5/OUT5	-0.5V	3.3V	3.6V	0.15mA	3	4	1_4
6	GPIO3D	PWM_OUT or DIG_IN6/OUT6	-0.5V	3.3V	3.6V	0.15mA	1	9	1_9
7	VCC_DIO	Supply output		3.3V					
8	NC								

NOTE: GPIO3 port is set by default as PWM. GPIO setting requires software modification. Please connect with TechNexion support team for more details.

Header on TEP-0500-IMX6UL: Molex 43045-0812 (8-pin Micro-Fit 3.0).

Cable receptacle: Molex 43025-0800 (8-pin Micro-Fit 3.0) plug with crimp contact Molex 43030-0007.

### 3.4. MicroSD Card Slot

The TEP-0500-IMX6UL features a standard microSD card slot which is connected to the NXP i.MX6UL integrated “Ultra Secured Digital Host Controller” (uSDHC).

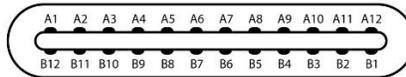
The following main features are supported by uSDHC:

- Compatible with the MMC System Specification version 4.2/4.3/4.4/4.41/5.0.
- Conforms to the SD Host Controller Standard Specification version 3.0.
- Compatible with the SD Memory Card Specification version 3.0 and supports the “Extended Capacity SD Memory Card”.
- Compatible with the SDIO Card Specification version 3.0.
- Supports 1-bit / 4-bit SD and SDIO modes

The MMC/SD/SDIO host controller can support a single MMC / SD / SDIO card or device.

### 3.5. USB OTG (Type-C) Connector

The TEP-0500-IMX6UL has one USB OTG (Type-C) connector (USB 2.0 signals only) that can be used to connect a host computer to the unit for programming and update purposes.



Pin #	Signal	Description	Pin #	Signal	Description
A1	GND	Ground	B1	GND	Ground
A2	NC		B2	NC	
A3	NC		B3	NC	
A4	VBUS	5V Universal Serial Bus Power	B4	VBUSD	5V Universal Serial Bus Power
A5	CC1	OTG detection signal	B5	CC2D	OTG detection signal
A6	USB_D+	USB differential pair signal port 1	B6	USB_D+	USB differential pair signal port 2
A7	USB_D-		B7	USB_D-	
A8	NC		B8	NC	
A9	VBUS	5V Universal Serial Bus Power	B9	VBUSD	5V Universal Serial Bus Power
A10	NC		B10	NC	
A11	NC		B11	NC	
A12	GND	Ground	B12	GND	Ground

### 3.6. LED Light Indicator

The TEP-0500-IMX6UL has one programmable LED Light indicator.

LED #	Color	GPIO No.	GPIO Bank/IO
1	Green	505	pca9555_9

### **3.7. S1 Button**

The TEP-0500-IMX6UL by default boots the unit from internal flash storage (eMMC). By pressing the “S1” button before applying power to the unit and keeping the button pressed for 10 seconds, the unit will boot from an alternative boot media (microSD card).

### **3.8. RST Button**

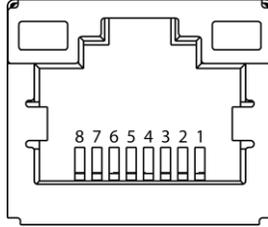
The TEP-0500-IMX6UL features a “RST” button for system reset.

### **3.9. USB Host Connector**

The TEP-0500-IMX6UL has a standard single USB Host connector (USB 2.0 signals only) to connect to a USB peripheral such as a keyboard, mouse, USB storage device or USB hub.

### 3.10. Fast Ethernet Interface

The TEP-0500-IMX6UL by default comes with two Fast Ethernet RJ45 connectors. LAN1 connector can support 802.3at Power over Ethernet functionality if configured with the PoE power option (TEP0500-IMX6G-05-Rxx-Exx-**LPOE**-xxxx) by connecting it to an 802.3at compliant PoE switch or power injector.



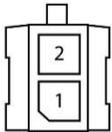
LAN1 / LAN2:

Pin #	100 Mbps	10 Mbps
1	Transmit Data+	Transmit Data+
2	Transmit Data-	Transmit Data-
3	Receive Data+	Receive Data+
4		
5		
6	Receive Data-	Receive Data-
7		
8		

### 3.11. Power Input Connector

The TEP-0500-IMX6UL can be powered either over the DC INPUT connector or PoE over the RJ45 LAN1 port.

NOTE: Do not power the unit by DC input when you apply power over the Power over Ethernet (RJ45)!



Pin #	Signal	Description
1	GND	Ground
2	VCC	DC Voltage input (12V/24V/8~36VDC)

Header on TEP-0500-IMX6UL: Molex 43045-0212 (2-pin Micro-Fit 3.0).

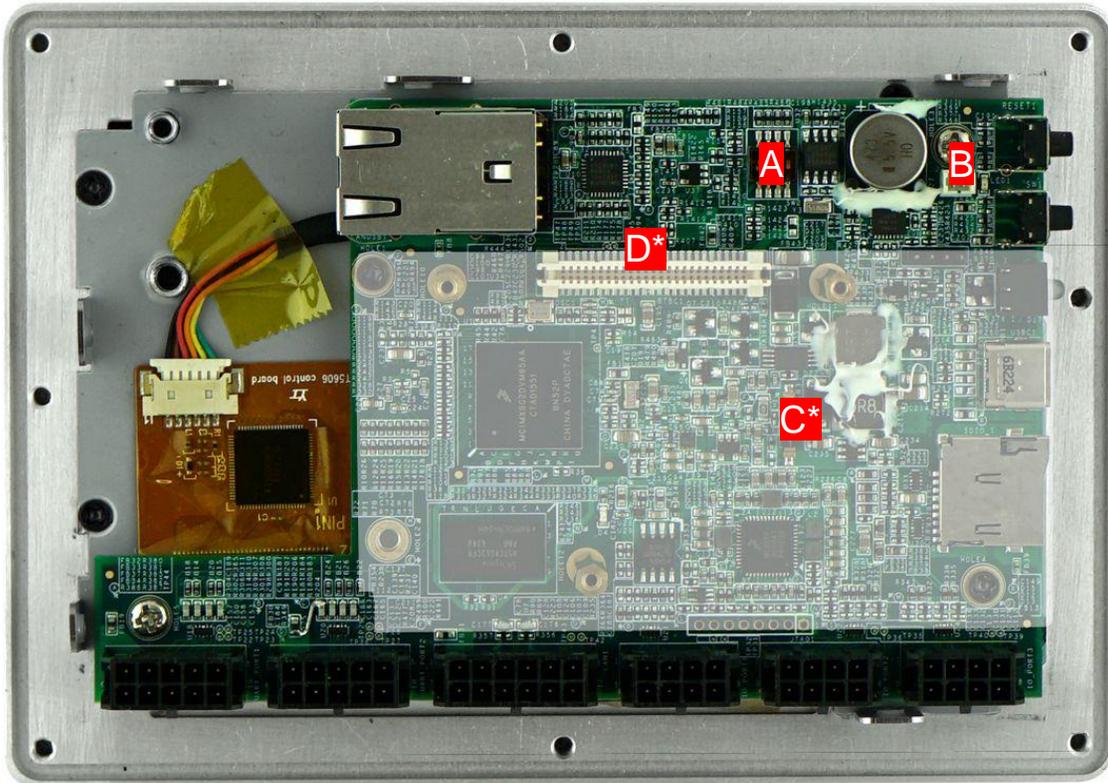
Cable receptacle: Molex 43025-0200 (2-pin Micro-Fit 3.0) plug with crimp contact Molex 43030-0007.

### 3.12. Grounding

The TEP-0500-IMX6UL must always be grounded to the earth. Grounding helps to limit the effects of noise due to electromagnetic interference on the device. The earth connection will have to be done using the grounding screw. The screw for the ground connection is marked with an engraved ground symbol.

## 4. Internal Connectors and Expansion Options

Rear view (opened device) without the Power Expansion module:



Internal Connectors and Switches:

No.	Description	No.	Description
A	SW2 Panel switch	C*	SW3 Panel switch
B	RTC Battery connector	D*	Power Expansion module connector

NOTE: Items marked with \* are accessible only after removing the Power Expansion module.

### 4.1. SW2 Panel Scanning Direction Switch

The TEP-0500-IMX6UL has an internal SW2 Panel Scanning Direction switch (Marked A). Always use the default settings.

Pin #	5" Panel (default)	7" Panel	Description
1-8	ON	OFF	Down to Up
2-7	OFF	OFF	Up do Down
3-6	OFF	OFF	Left to Right
4-5	OFF	OFF	Right to Left

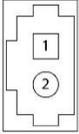
## 4.2. SW3 Panel Backlight Switch

The TEP-0500-IMX6UL has an internal SW3 Panel Backlight switch (Marked D). Always use the default settings.

Pin #	5" Panel (default)	7" Panel
1-2	OFF	ON

## 4.3. RTC Battery Connector

The TEP-0500-IMX6UL has an internal RTC backup battery connector (Marked B).



Pin #	Signal	Description
1	RTC_VCC	3V (connect to standard CR2032 battery)
2	GND	Ground

Header on TEP-0500-IMX6UL: Molex 53047-0210 (1.25mm Pitch PicoBlade Wire-to-Board Header).  
 Cable receptacle: Molex 051021-8602 (1.25mm Pitch PicoBlade Wire-to-Wire and Wire-to-Board Housing)  
 plug with crimp contact Molex 50058-8000.  
 Battery P/N: KTS BCR2032H14.0AM1XB.

## 5. Mounting

This section describes the mounting procedures for TEP-0500-IMX6UL. The material in area of the mounting must provide sufficient strength for safe mounting of this device.

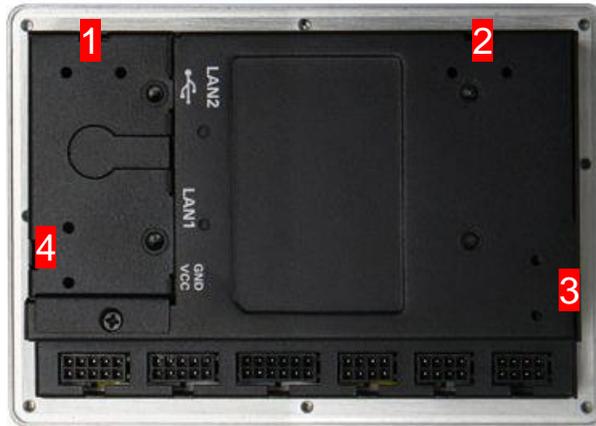
### 5.1. VESA Mounting

The TEP-0500-IMX6UL is compatible with the VESA MIS-C Standard 35\*75mm hole pattern. There are 4 VESA MIS-C (M4) mounting holes on the rear side of the device. M4 screw holes are a depth of 4mm.



## 5.2. Rear Mounting and Mounting Clips Installation

There are 4 mounting clips required for rear mounting.



Please follow the steps below to secure the clips. Prepare mounting hook, post and screw (M3) (Step 1). Locate all removable tabs on the rear side of your device and use pincers or pliers to remove the tabs (Step 2-3). Press the mounting clip into the holes at an angle and slowly straighten it (Step 4-5). Then tighten the screw to the surface (Step 6). Repeat the steps for all clips required to secure your device.



### 5.3. Surface Mounting and O-ring Installation

There are 8 mounting holes (M4) on the rear side of the device required for surface mounting. M4 screws with at least 5mm head-to-tip length are required to secure this device.



Please follow the steps below to properly install the waterproof rubber O-ring. Prepare your device and O-ring (Step 1-2). First, align the O-ring with the groove and press the O-ring into the corners of the O-ring groove (Step 3-4). Then, press it into the center (Step 5). Finally, stretch it uniformly around the O-ring groove (Step 6). Do not pull from one side, and make sure that you stretch it as little as possible.



## 6. Ordering Information

The TEP-0500-IMX6UL is available in several configurations. Please contact your TechNexion sales contact window or distributor for options and availability details.

### 6.1. Custom Part Number Rule

The TEP-0500-IMX6UL can be ordered in custom tailored configuration to meet special application requirements and conditions according to the following custom part number creation rules. Custom part numbers carry minimum order quantities (MOQ). Please connect with your TechNexion distributor or account manager for conditions and availability. Part number format:

**TEP0500-IMX6G-05-Rxx-Exx-Lxxx-xxxx**

Interface	Code	Description
Processor	IMX6G	NXP i.MX6UltraLite
Processor Speed	05	528MHz
Memory	R02	256MB DDR3L
	R05	512MB DDR3L
	R10	1GB DDR3L
Storage	E04	eMMC 4GB
	E08	eMMC 8GB
	EXX	eMMC other capacity
Power Expansion	L112	TXR-P1-12V-LAN1 (12V 3A)
	L130	TXR-P1-1030V-LAN1 (8-36V 5A)
	LPOE	TXR-P1-12V-POE1 (12V 3A) or (PoE 802.3at)
Custom ID	XXXX	Custom Part number ID for customized software loader and special component (BOM)

## 6.2. Standard Package Contents



Item	Partnumber	Description
1	TEP-0500-IMX6UL	5 inch PoE HMI PCAP touch system with NXP i.MX6UL
2	Accessoires	4x mounting hooks
		4x long screws (M3)
		4x mounting posts
		2x rubber cable grommets
		1x rubber O-ring
		1x DC power latch cable (2-pin Micro-Fit 3.0)

NOTE: Pack contents might vary depending on your ordered configuration.

## 7. Important Notice

TechNexion reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TechNexion terms and conditions of sale supplied at the time of order acknowledgment.

TechNexion warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TechNexion standard warranty. Testing and other quality control techniques are used to the extent TechNexion deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

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