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TFT/HB101PU81xxx-C001y

Document Ordercode: DOC/C-Series_Touch-PC
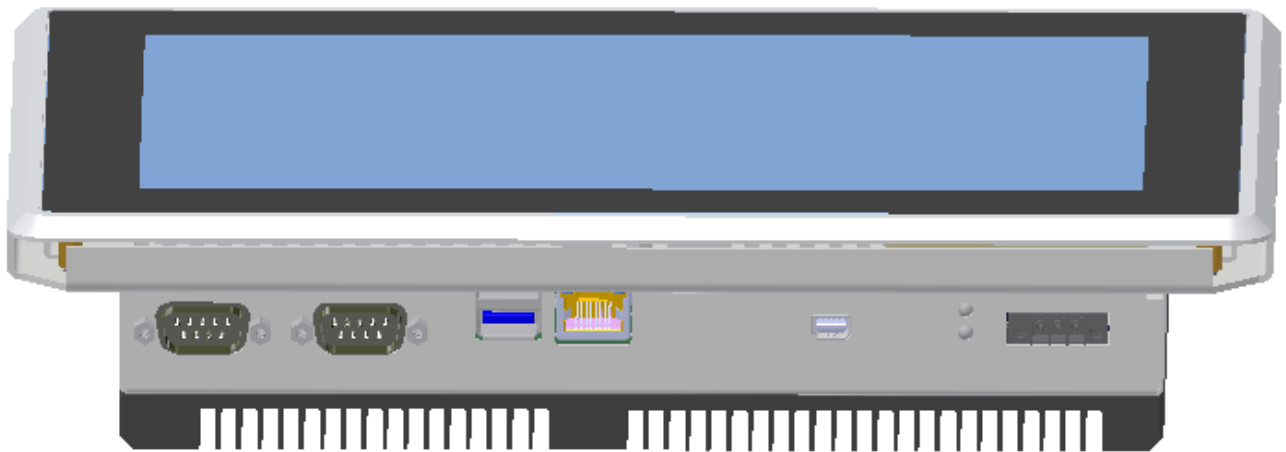
Revision	Date	Author	Modification
0.1	16.11.2018	D. Lagler	Preliminary version
0.2	21.11.2018	D. Lagler	Spelling corrections
0.3	06.03.2019	D. Lagler	Added maintenance part and operating conditions
1.0	08.04.2019	D. Lagler	Added pinout of mPCIe and m.2, defined use cases
1.1	07.06.2019	D. Lagler	Mounting instructions and power consumption revised

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Related Documents

1 Introduction

1.1 General Remarks

The content and presentation of this document has been carefully checked. No responsibility is accepted for any errors or omissions in the documentation.

Note that the documentation for the products is constantly revised and improved. The right to change this documentation at any time without notice is therefore reserved.

Syslogic is grateful for any help referring to errors or for suggestions for improvements.

The following registered trademarks are used:

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SPI	trademark of Motorola
I^{2}C	trademark of Philips Corporation
Intel Atom	trademark of Intel Corporation
Windows Embedded Compact	trademark of Microsoft Corporation
Windows Embedded Standard	trademark of Microsoft Corporation

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1.2 Explanation of Symbols

1.2.1 Danger warnings

The following information is for your personal safety and the prevention of damage to the product described or connected devices.

Safety instructions and warnings for the prevention of danger to the life and health of users or service personnel and for the prevention of damage are highlighted in this document by the pictograms specified below. *Warning* and *Information* pictograms are shown in this document.

1.2.2 Warnings indicate the following:

Death, serious injury or substantial material damage may occur if the related safety measures are not implemented.

The individual *Warning* pictograms have the following meaning:

Attention! General!

Is an instruction that must be observed in order to ensure protection before, while and after using the device. The correct procedure must be observed.

Attention! Electric shock!

Persons may be exposed to dangerous voltages in electrical installations.

There is a danger of electric shock if a live part is touched.

Attention! Observe ESD measures!

Electrostatic discharge may destroy electronic components.

Attention! Hot surfaces

Keep clear of surfaces. They may be hot.

1.2.3 Information pictograms indicate the following:

Important information about the product or the relevant section of the document requiring the particular attention of the reader is marked as followed:

!   Indicates important and instructional information.

1.3 Copyright note

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1.4 Contents of this Documentation

This document addresses to system integrators, programmers and instructed installation and maintenance personal working with the C-Series Touch-PC system. It provides all information needed to configure setup and program the product.

1.5 Additional Products and Documents

1.5.1 Hardware Products

!   The following hardware products are mandatory together with this documentation:

PSU/DT24V60W-3A - 24V Desktop Power Supply 60W - 3 pole
or an equivalent CE-compliant AC/DC power supply

1.5.2 Software Products

There are no additional software products except operating systems:

– Operating Systems: check chapter 5.4 for a list of supported implementations.

1.5.3 Documents

1.6 Items delivered

1.1.1. Built-in version
- 1x TFT/HB101PU81xxx-C001y
- 1x Fixing Frame with M3x6 and M3x8 securing screws
- 1x Power supply connector Weidmüller BCZ 3.81/03/180F SN SW (1792960000)

1.1.2. To be purchased separately
- CE-compliant power supply
  e.g. PSU/DT24V60W-3A - 24V Desktop Power Supply 60W - 3 pole

1.7 Installation

The installation of the system is described in chapter 3 of this documentation.

1.8 Safety Recommendations and Warnings

The products are intended for measurement, control and communications applications in industrial environments. The products must be assembled and installed by specially trained people. The strict observation of the assembly and installation guidelines is mandatory.

The use of the products in systems in which the life or health of persons is directly dependent (e.g. life support systems, patient monitoring systems, etc.) is not allowed.

The use of the products in potentially explosive atmospheres requires additional external protection circuitry which is not provided with the products.

In case of uncertainty or of believed errors in the documentation please immediately contact the manufacturer (address see chapter 7.1). Do not use or install the products if you are in doubt. In any case of misuse of the products, the user is solely liable for the consequences.

1.8.1 General warnings

Important note
Ensure that the power supply is disconnected from the device before working on the device (connecting interfaces, replacing flash cards, batteries, opening the enclosure, etc.).

Important note
The output voltage of the external power supply shall be SELV and shall be limited power source according to clause 2.5 EN 60950-1.
Please read the safety instructions of the power supply before installing/connecting the device.

1.8.2 EMC

Important note
This is a Class A product and not intended to be used in domestic environment. The product may cause electromagnetic interference. Appropriate measures must be taken.

Important note
To fullfill class A of EN55032 and EN55035 a CE-compliant AC/DC power supply must be used. Cable length between power supply and device is limited to 3m.

1.8.3 Electro Static Discharge

Electronic boards are sensitive to Electro-Static Discharge (ESD). Please ensure that the product is handled with care and only in an ESD protected environment. Otherwise a proper operation is not guaranteed.

1.8.4 Battery

Changing batteries

Danger of explosion if the battery is not correctly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

Dispose of used batteries according to the manufacturer's instructions.

Maintenance of battery

Empty batteries may leak.

Never short the battery.

1.8.5 Hot surface

Attention! Hot surfaces

Make sure the device is not hot before mounting or changing the installation. The device may be hot and may cause burs.

1.9 Life Cycle Information

1.9.1 Transportation and Storage

During transportation and storage, the products must be in their original packing. It is recommended, to keep the original packing in case of return of the product to the factory for repair. Note that the packing is recyclable.

1.9.2 Assembly and Installation

Observe the EMI-precautions against static discharge. Carefully read the installation documentation before unpacking the product.
The installation procedures must be strictly observed. Note that deviations from the installation guidelines may result in degraded operational reliability or in unfavourable EM-radiation or EM-susceptibility.

1.9.3 Operation

The operating environment must guarantee the environmental parameters (temperature, power supply, etc.) specified in the technical specification section of this document.
The main functionality of the product is defined by the application program. The application program is not part of the delivery by Syslogic but is defined, developed and tested by the customer or a system-integrator for each specific application. Refer to the respective documentation for more information.

1.9.4 Maintenance and Repair

In the rare case of a product hardware-failure or malfunction, the complete product should be exchanged. The faulty product must be returned to the factory for repair. Please use whenever possible the original packing for return of the product (EMI and mechanical protection).

1.9.5 Disposal

At the end of the lifespan the C-Series Touch-PC products must be properly disposed. C-Series Touch-PC products contain a multitude of elements and must be disposed like computer parts. The C-Series Touch-PC products contain batteries which should be properly disposed.

1.9.6 RoHS

The products of the C-Series Touch-PC family are designed and produced according to the Restriction of Hazardous Substances (RoHS) Directive (2011/65/EU).

1.9.7 WEEE

The products of the C-Series Touch-PC family are not designed ready for operation for the end-user and are not intended for consumer applications. According to Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) Syslogic takes back defective devices for proper disposal at the point of sale.

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2 Product Description

2.1 Introduction

2.1.1 Benefits of Syslogic`s Projected capacitive touch panels

The product meets all the requirements of state-of-the-art advanced Panel Computer.

The TFT technology makes a wide range of applications possible with a perfect and clear picture on an absolutely flat surface.

A metal housing with a solid front frame and scratch resistant glass protects the device

A robust touch screen technology is used.

The product is an information display and input device providing a front protection of IP65.

The absolutely flat PCT (Projected capacitive Touch) touch panel offers the latest Multi-Touch technology. PCT Touch Screen can be used with fingers or with special capacitive touch or thin latex gloves. The touchscreen is self-calibrating.

The device is reliably during long periods of use and requires little care and maintenance.

The product is available for long term.

2.1.2 Intended use of Projected Capacitive Touch Panels

The Projected Capacitive Touch Panel is designed for:

− Visualization and process control

− General control and automation tasks

− Industrial use

− For multi-media systems

− Operation in the ambient conditions specified in the technical data

This device description is designed as a reference guide for the installation, connection, operation and maintenance of all versions of the Projected Capacitive Panel, and also provides all the relevant technical data.

2.2 Device Variants

The Projected capacitive touch panels are available in the following versions:

Standard temperature

Order code	Flat screen	Mounting type	Memory	CPU	Flash
TFT/HB101PU81G13-C001S	10.1" WXGA	Flush mounting	2GB	Intel x5-E3930 dual core 1.8GHz	64GB
TFT/HB101PU81H18-C001S	10.1" WXGA	Flush mounting	4GB	Intel x5-E3940 quad core 1.8GHz	64GB
TFT/HB101PU81I20-C001S	10.1" WXGA	Flush mounting	8GB	Intel x7-E3950 quad core 2.0GHz	64GB

Tab. 1   Projected capacitive touch panel versions

Extended temperature

Order code	Flat screen	Mounting type	Memory	CPU	Flash
TFT/HB101PU81G13-C001E	10.1" WXGA	Flush mounting	2GB	Intel x5-E3930 dual core 1.8GHz	64GB
TFT/HB101PU81H18-C001E	10.1" WXGA	Flush mounting	4GB	Intel x5-E3940 quad core 1.8GHz	64GB
TFT/HB101PU81I20-C001E	10.1" WXGA	Flush mounting	8GB	Intel x7-E3950 quad core 2.0GHz	64GB

2.3 Accessories

The following accessories are not necessarily supplied with the device. These parts could be ordered additionally or downloaded under www.syslogic.com:

Accessories		
Order code	**Type designation**	**Description**
TouchDriver	Touch driver software	Built-in touch driver software for Windows / Linux / Android
PSU/DT24V60W-3A	Power supply	24V Desktop Power Supply 60W - 3 pole

Tab. 2   **Projected capacitive touch panel accessories**

2.4 Features

2.4.1 TFT/HB101PU81xxx-C001y
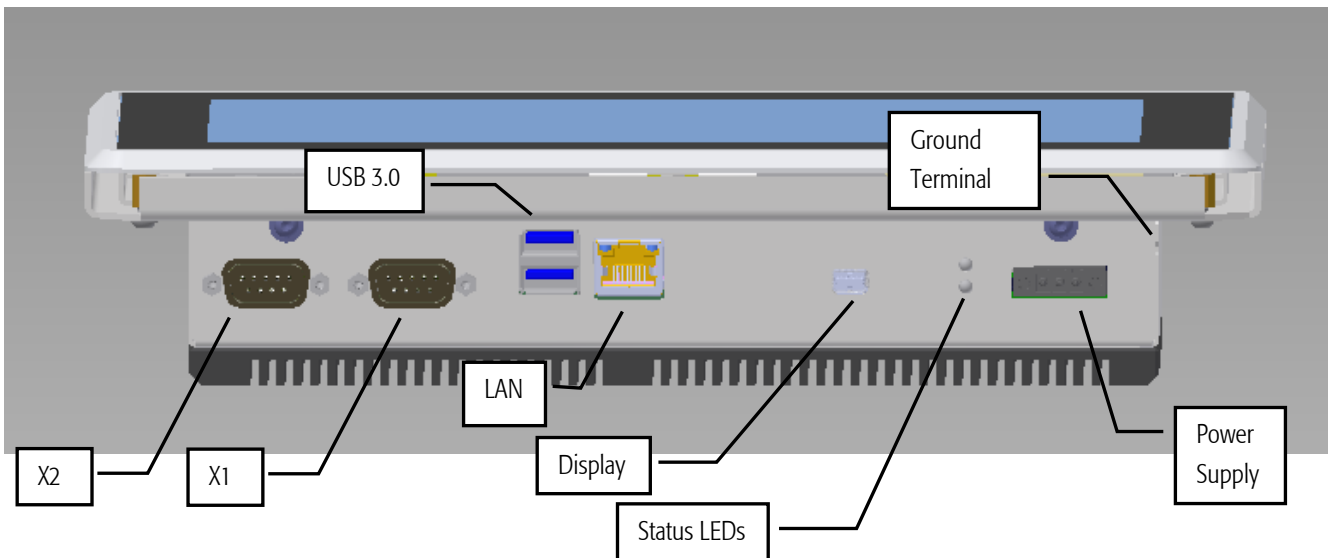
Fig. 1   **TFT/HB101PU81xxx-C001y (Front)**
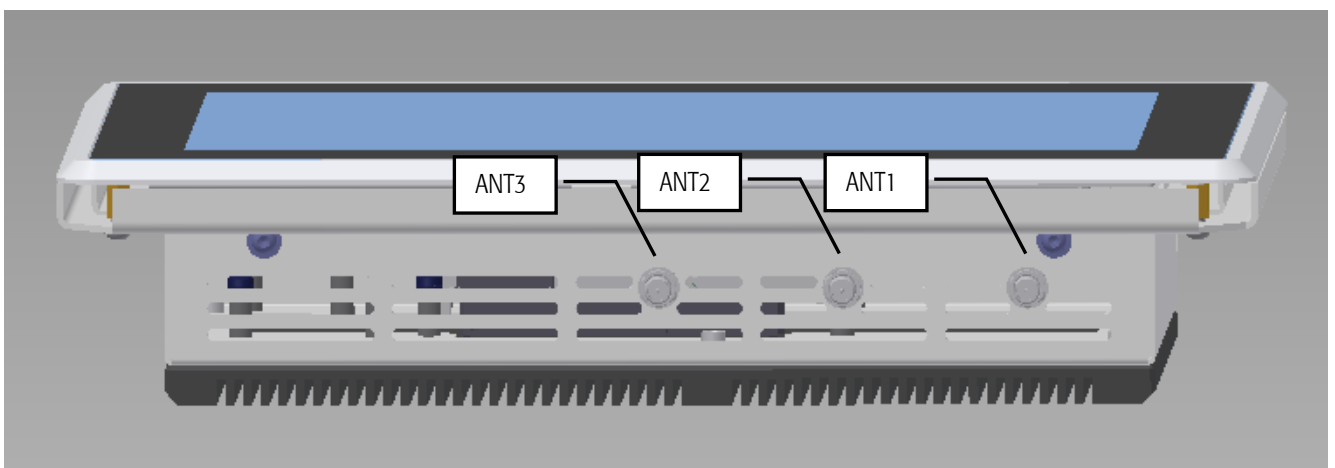
Fig. 2   **TFT/HB101PU81xxx-C001y (Back)**

2.4.2 Power supply

The processor and its peripherals are powered by a non-isolated, integrated power supply which generates all the necessary voltages.

Device Connection

Weidmueller BCZ 3.81/03/180F SN BK (Ordercode 1792960000)

Power Supply requirements:

- The power supply used must fulfil CE and safety normative according to the application.
- Always use a short circuit protected power supply.
- Do not use power supplies wires or cables longer than 3m.

Pin	Signal	Marking	Remarks
1	NC		
2	+24VDC	VDC	
3	GND	GND	GND (/shield)

Tab. 3   Power supply connector (1x3 pin)

2.4.3 X1 (only on selected products)

X1 can be selected among RS232, RS422 and RS485.

The serial port is asynchronous communication ports with 16C550A-compatible UARTs.

Configure the serial port in the *Super IO* submenu of the *Advanced* menu in the BIOS.

Device Connection

The Serial Port X1 is available on DSUB-9

Pin Number	RS232	RS422 Full Duplex	RS485
1	DCD	TXD+	DATA+
2	RD	TXD-	DATA-
3	TD	RXD+	NC
4	DTR	RXD-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Tab. 4   Serial Port X1

Important Note

Maximum cable length allowed for X1 connection is 2.8 m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI *CE*-certification. Only use high quality industrial devices with sufficient EMI compatibility.

2.4.4 X2 (for future use; only on selected produtcts)

X2 will be used for additional features like CAN or digital I/Os in future products.

Important Note

Maximum cable length allowed for X2 connection is 2.8 m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI "CE"-certification. Only use high quality industrial devices with sufficient EMI compatibility.

2.4.5 USB Interface

The C-Series Touch-PC is equipped with two USB 3.0 ports

Device Connection

The USB interface uses a standard A type double USB connector

Important Note

Maximum cable length allowed for USB connection is 3 m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI *CE*-certification. Only use high quality industrial USB devices with sufficient EMI compatibility.
Use shielded cables for maximum EMI protection.
Drawing excessively power might disturb operation.

2.4.6 Ethernet LAN Interface

The C-Series Touch-PC features a Gigabit Ethernet controller having assigned the base address and IRQ at boot time by the BIOS. The Ethernet interface drives two LED's (yellow and green) integrated into the RJ45 connector for status information.
The LAN connector features the Intel I210 Ethernet controller supporting 10/100/1000Mb/s.
No configuration options are available for the Ethernet device.

Device Connection

The Ethernet interface uses the standard RJ45 Gigabit connector on the front for 100Ω shielded or unshielded Twisted Pair cabling.

2.4.7 Display

Beside the integrated touchpanel display an additional monitor can be connected by Mini DP++ (Mini Displayport). Depending on the operating system the displayed image can be copied or split on the two displays.

Device Connection

The Mini Displayport interface uses the standard Mini DP++ connector

Important Note

Maximum cable length allowed for display connection is 3 m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI *CE*-certification. Only use high quality industrial devices with sufficient EMI compatibility.

2.4.8 Frontside Status LEDs

The two colored LEDs on the front side show the following states:

LED	Signal	Remarks
Green up (A)	PWR-LED	When the system's power is on, this LED will light. When the system is in the S1 (POS – Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.
Yellow down (D)	Disk activity	

Tab. 5   Frontside Status LEDs

2.4.9 Antennas (only on selected products)

If the device is equipped with a radiotelecommunication device the respective signals are available on standard SMA or SMA-RP connectors, depending on the radiotelecommunication technology.

> **Important Note**
>
> ! Maximum cable length allowed for antenna connections is 2.8 m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI "CE"-certification. Only use high quality industrial devices with sufficient EMI compatibility.

2.4.10 Internal connectors

SO-DIMM

A memory socket supports up to 8GB 204pin SODIMM DDR3L 1866 MHz

CMOS Battery

The CMOS battery supplies the necessary power required to maintain the CMOS settings and configuration data in the UEFI flash chip. The specified battery type is CR2032(3V, 230mAh). Because the self-discharge of all lithium batteries increases rapidly at high temperatures the battery lifetime decreases by a great amount. To prevent battery leakage scheduled service/replacement is recommended. Please contact the battery manufacturer for further details and calculation assistance for battery lifetime calculation.

Fuse

The main fuse protects the system against destruction in case of high energy distortions on the power line. For replacement, the system must be opened in an ESD protected environment. Only an entitled instructed person is allowed for this operation. Replacement fuse type is Littelfuse 452004.MRL (4A slow-blow).

USB 2.0

The C-Series Touch-PC offers two USB2.0 ports on Micro-Lock Plus headers from Molex. One port is used to connect the touchpanel to the PC board.

USB 6 (P5)		USB 7 (P7)	
Pin	Signal	Pin	Signal
1	VCC	1	VCC
2	USB6-	2	USB7-
3	USB6+	3	USB7+
4	GND	4	GND

Tab. 6   Pinout internal USB ports

m.2 slot

The PC board offers an m.2 B key type 2242 slot (CN8) for connecting SATA or PCIe x2 SSDs and WWAN devices

Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	Full_Card_power_off
7	USB_D+	8	W_Disable1
9	USB_D-	10	GPIO_9/DAS#/LED_1
11	GND	12	
13		14	KEY
15	KEY	16	
17		18	
19		20	NGFF_I2S_1_CLK
21	CONFIG_0	22	NGFF_I2S_1_RXD
23	GPIO	24	NGFF_I2S_1_TXD
25	DPR	26	NGFF_KEY_B_W_DISABLE
27	GND	28	NGFF_I2S_1_FS_R
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	STAT_DEVSLP
39	GND	40	I2C_SCL
41	SATA_RX+[1] (PCIe_RX-)	42	I2C_SDA
43	SATA_RX-[1] (PCIe_RX+)	44	GPIO12
45	GND	46	NC
47	SATA_TX-[1] (PCIe_TX-)	48	NC
49	SATA_TX+[1] (PCIe_TX+)	50	PCIE_RST-
51	GND	52	PCIE_CLKREQ
53	REFCLK-	54	PCIE_WAKE
55	REFCLK+	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	PCIE_RST-	68	SUSCLK
69	+3.3V	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	+3.3V		

Tab. 7   Pinout m.2

> **!**
>
> ### Important Note
> By default, an m.2 2242 flash memory module is mounted on this port

---

[1] By default SATA signals are selected

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mPCIE slot

The PC board offers a mPCIe slot (CN7) for inserting different removable mPCIe cards

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	PCIE_CLKREQ	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PCIE_RST-
23	PCIe_RX-[2] (USB3_TX+)	24	+3.3Vaux
25	PCIe_RX+[2] (USB3_TX-)	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIe_TX-[2] (USB3_RX+)	32	SMB_DATA
33	PCIe_TX+[2] (USB3_RX-)	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3V	40	GND
41	+3.3V	42	LED_WWAN
43	GND	44	LED_WLAN
45	NC	46	LED_WPAN
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+3.3V

Tab. 8   Pinout mPCIe

2.5   Touch Screen

The devices use an Ilitek Ili2511 chipset.

2.5.1   Basic functions of the touch screen

The touch screen operates using the PCT (Projected Capacitive Touch) technology.
Therefore, the touch must be manipulated using fingers, thin latex or special gloves or pens/styluses that are made for use with capacitive touch panels.
Depending on the driver version and Operating System the PCT touch supports Multi-touch up to 5 points. Which means you can operate the touch screen with more than one finger for drawing or selecting.

2.6   Display brightness

Display brightness can be manipulated by using the driver interfaces in the operating system.
For further details on manipulating display brightness refer to the manual of the operating system.

---

[2] By default PCIe signals are selected

2.7   Maintenance

To replace the battery, fuse or data storage it is required to open the device.

Shutdown the system and disconnect from power supply and all other connections

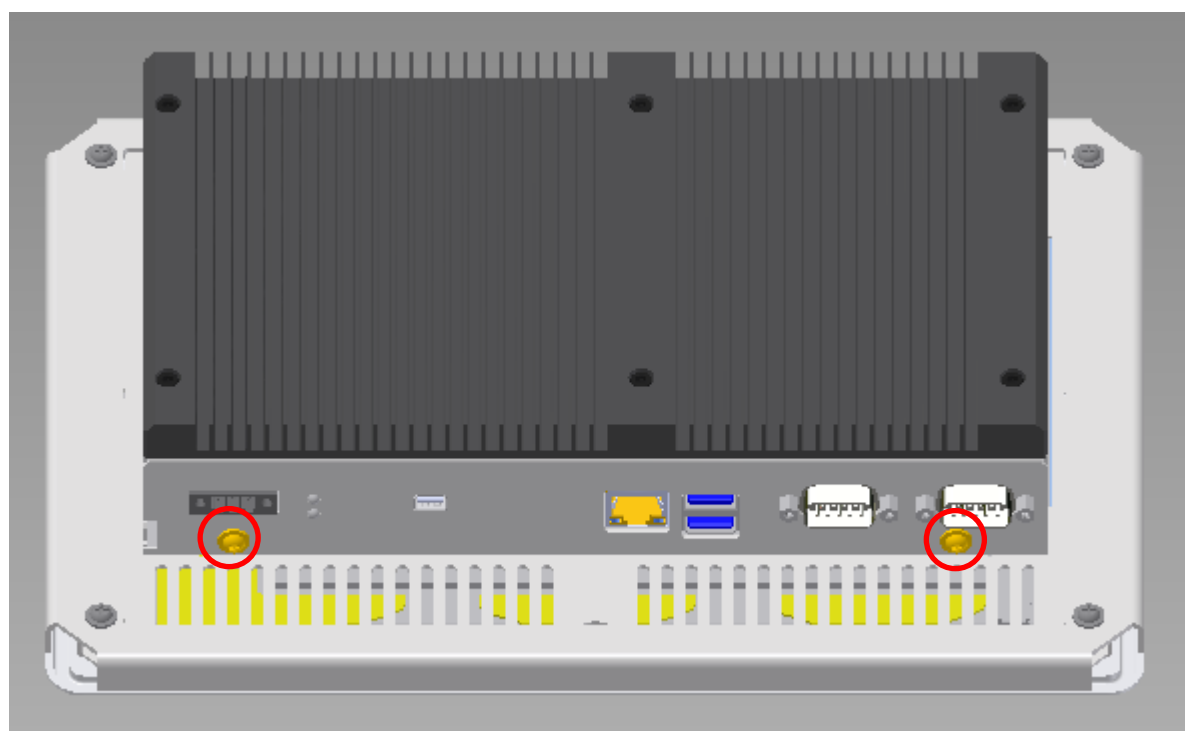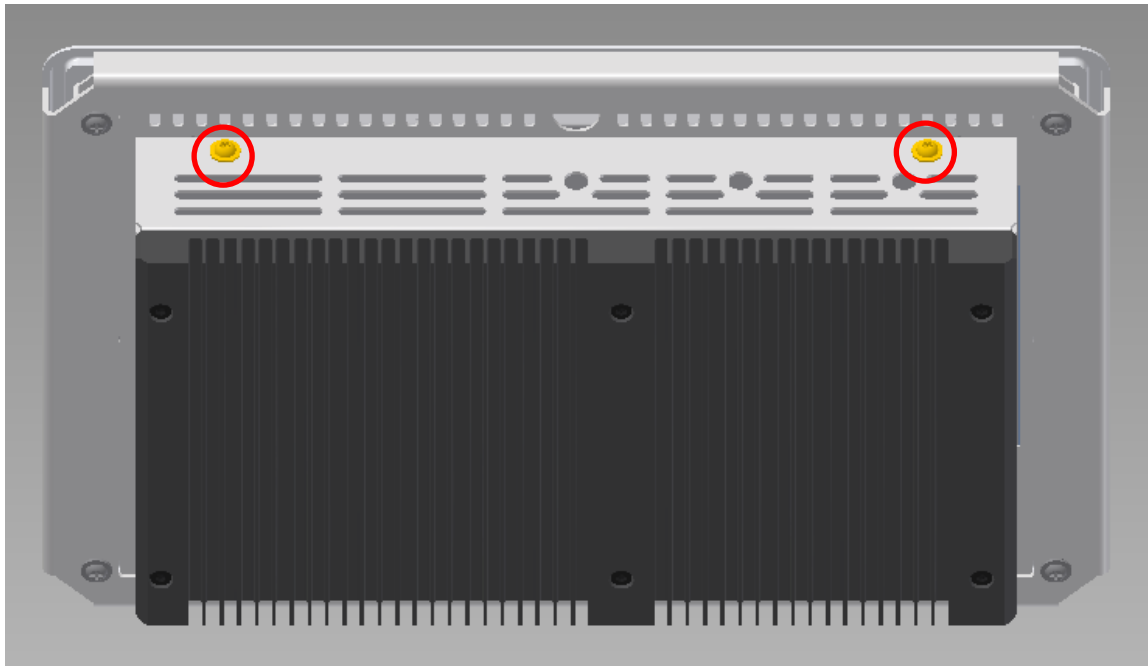Make sure the device has cooled down to room temperature

Only open the device in an ESD protected area

2.7.1   Opening the device

1.   Loosen the four screws fixing the housing

Tool: Torx screwdriver T10

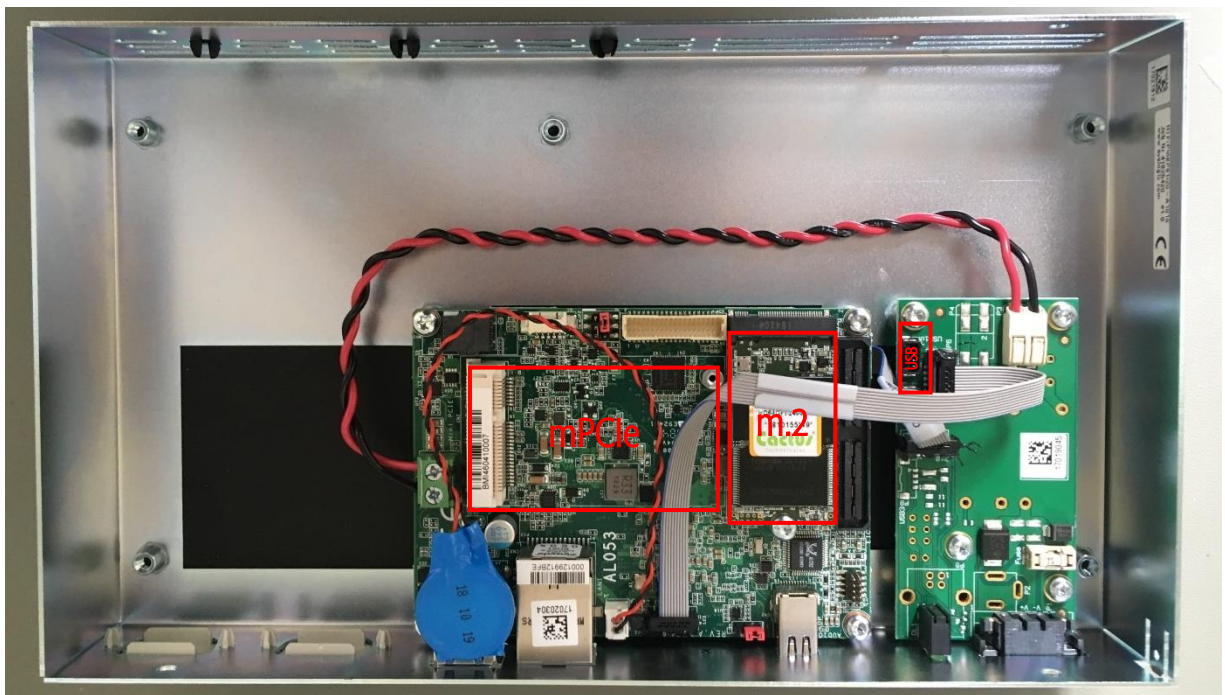2. Carefully remove the PC box

> **!** **Important Note**
>
> Be careful not to tear the cables for display and touch

3. Detach the cables to the display and touch
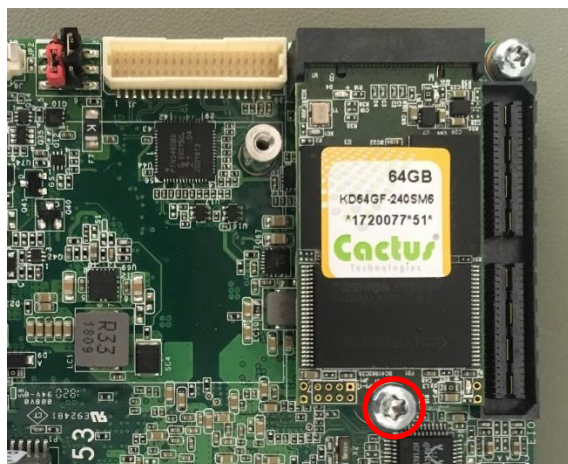
2.7.2 Re-assemble the device

To re-assemble the device, follow 2.7.1 in reverse order

2.7.3 Internal overview

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2.7.4 Replace m.2 flash memory

1. Loosen the screw which holds the m.2 module down
   Tool: Torx Screwdriver T10

2. Slide the m.2 module out of the connector
3. Slide replacement module into to connector, gently push it down and fix it on the board with the screw

> **!** **Important Note**
>
> Only replace with module with correct pinout according to 2.4.10 on page 15

2.7.5 Mount/replace mPCIe module

1. Loosen the screws which hold the mPCIe module down
   Tool: Torx screwdriver T6
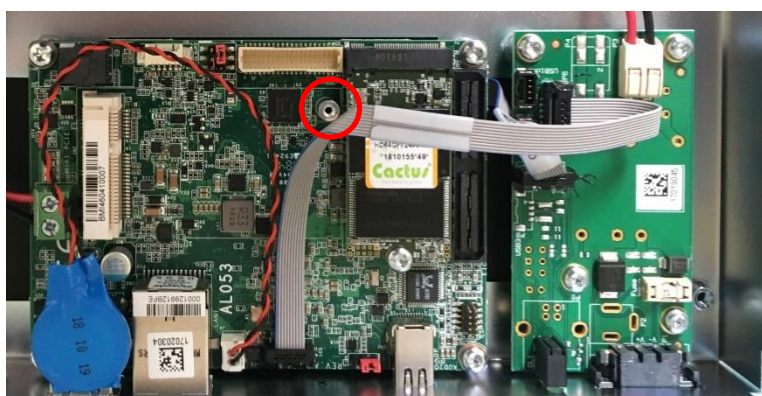
2. Slide old module out and mount new or replacing module
3. Gently push the module down and fix it on the board with the screw (M2)

> **!** **Important Note**
>
> Only replace with module with correct pinout according to 2.4.10 on page 16

2.7.6 Replace CMOS battery

1. Pull battery connector out and gently remove the battery
2. Plug new battery in and fix battery with double-side adhesive on USB connector

⚠️ Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
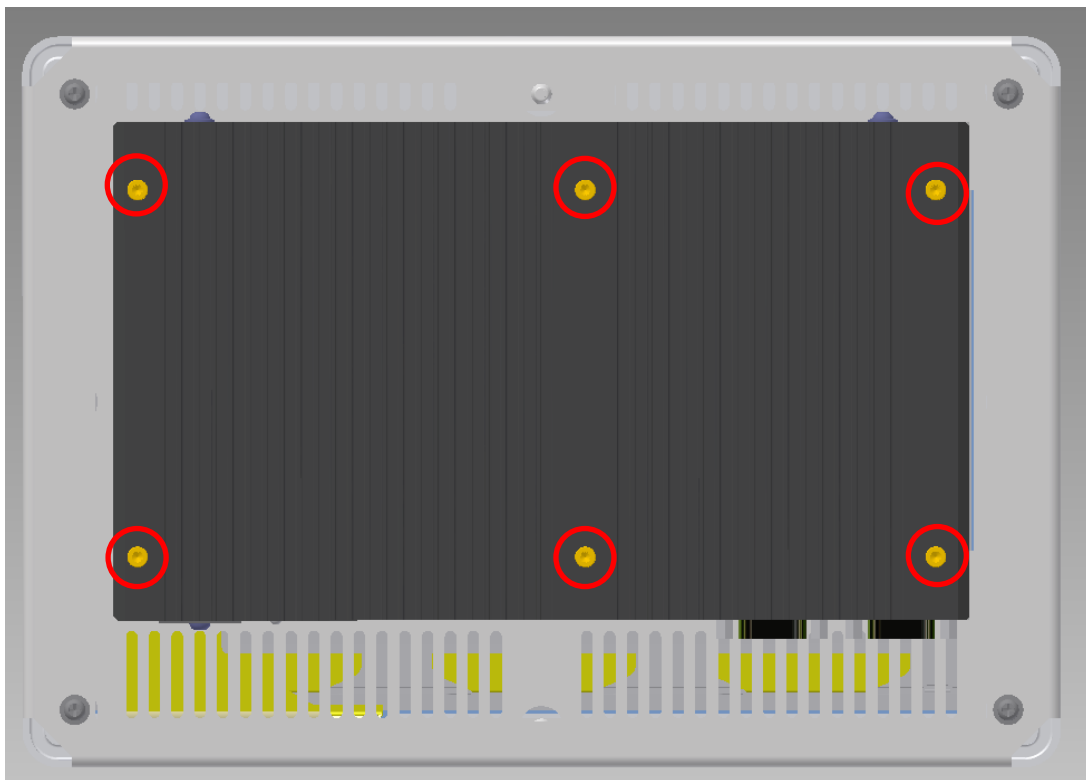
2.7.7 Replace fuse

1. Locate the fuse right behind the power connector
2. Extract with tweezers and replace with same type (Littelfuse 452004.MRL)

2.7.8 Replace SODIMM

1. Loosen the six screws on the back

   Tool: Hexagon socket screw driver number 2

2. Remove the cooling plate

3. Gently push the locking of the connector aside and slide the memory module out of the connector

4. Slide the replacement module into the connector in a slight angle

5. Push the module down holding it on both edges until the locking secures the module firmly

!	**Important Note**
	Only replace with module with correct specifications according to 2.4.10 on page 14

2.7.9   Re-assemble the device (backplate)

To re-assemble the device, follow 2.7.8 in reverse order

If the gap pad on the housing is damaged, replace with a new one according to 2.7.10

Without an intact gap pad proper function of the device cannot be guaranteed!

2.7.10 Replace gap pad

1. Remove transparent foil from the gap pad and place it centred on the CPU
2. Remove the opaque foil just before mounting the cooling case

2.7.11 Cleaning the glass front

For cleaning the glass front please use a soft cloth and a standard glass cleaning detergent.

When cleaning during operation it may happen that input signals are generated.

Prevent the system from unwanted and dangerous actions while the front is being cleaned.

Make sure the device has cooled down to room temperature

2.7.12 Cleaning the metal housing

For cleaning the metal housing please use a soft cloth and a metal polish.

Do not use a coarse scouring cloth, scouring powder or solvent.

Cleaning should only be carried out when the device is switched off!

Make sure the device has cooled down to room temperature

2.7.13 Spare parts

Designation	Type	Order number
Power supply	24V Desktop Power Supply 60W - 3 pole	PSU/DT24V60W-3A
SODIMM DDR3L 2GB	2GB DDR3L 1600 SODIMM	contact sales
SODIMM DDR3L 4GB	4GB DDR3L 1866 SODIMM	contact sales
SODIMM DDR3L 8GB	8GB DDR3L 1866 SODIMM	contact sales
Flash module	M.2 2242 Flash Memory xxGB	KDxxGFy-240SM6
CMOS battery	CR2032 3.0V 225mAh	CPN/CR2032-CAB15A
Thermal Gap Pad	Gap Pad 25x33x1.016mm, 5W/mK	CPN/SILICPAD5-25X33C
Fuse	4A slow-blow	Littelfuse 452004.MRL

3 Installation Description

3.1 Mounting

3.1.1 TFT/HB101PU81xxx-C001y

Mounting the device requires the following steps:

1. The desired mounting place must have a cut out and wall thickness regarding the following overview.

	Front cut out dimensions		Edge radius	Wall thickness
Device #	W [mm]	H [mm]	R [mm]	D [mm]
TFT/HB101PU81xxx-C001y	259 $^{-0/+1}$	178 $^{-0/+1}$	max. 3	1 to 5

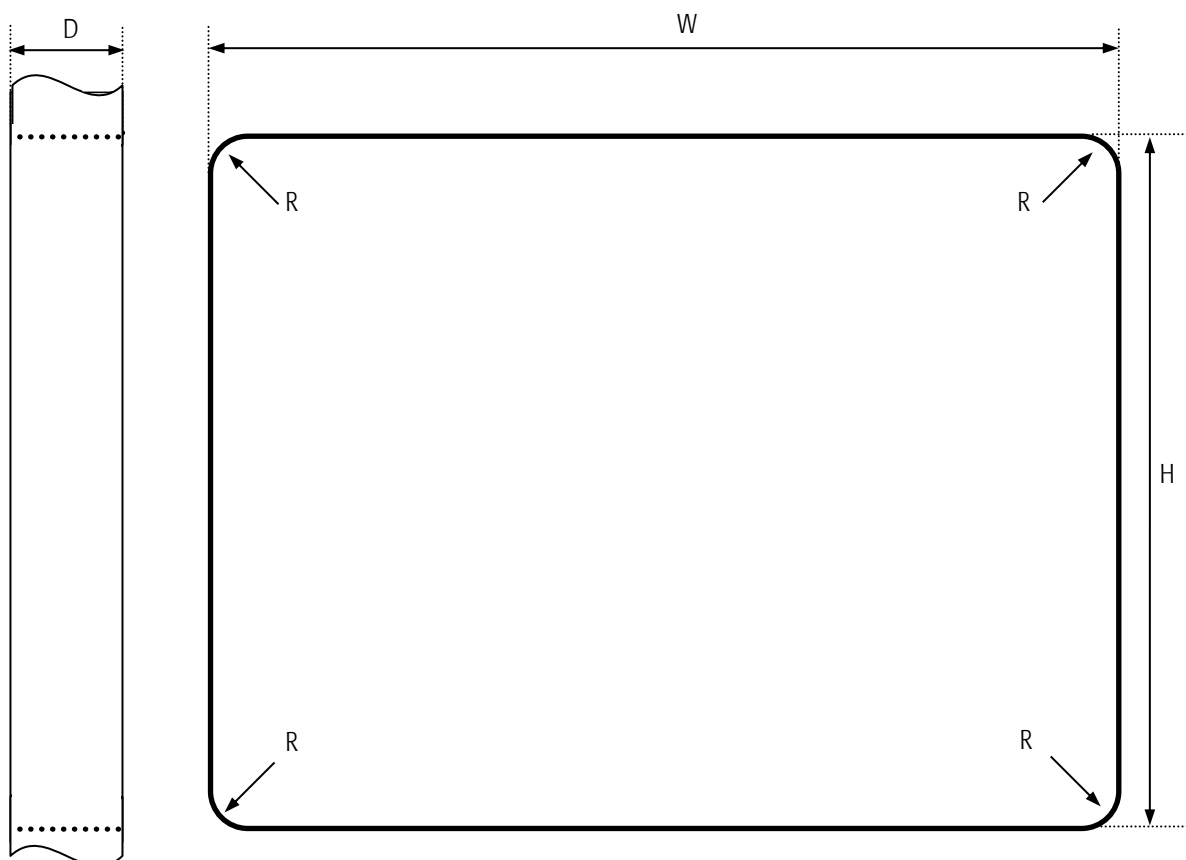Tab. 9　　TFT/HB101PU81xxx-C001y Mounting dimensions

Fig. 3　　Required Cut out HBxxxPU8yyy-zZZZ

⚠ **Mounting Angle:**
Mounting Angle must be 90°
Cooling Space:
To ensure cooling leave enough free space around the product to enable a free air flow

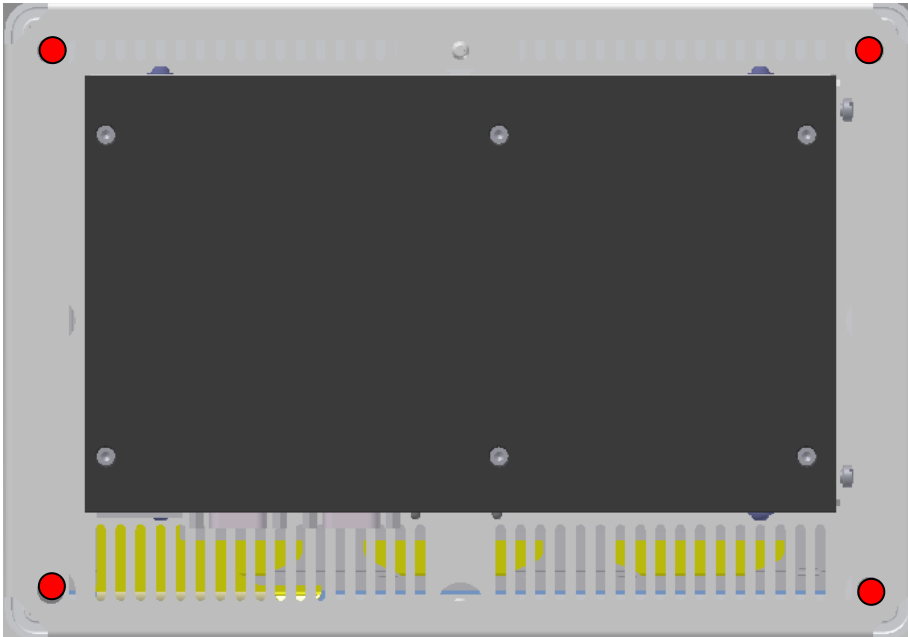2. Remove the screws highlighted in red and then remove the mounting frame.

Fig. 4   Screws to hold the mounting Frame

3. Insert the projected capacitive touch panel from the front into the cut out and make sure that the sealing fits properly.
4. Reattach the mounting frame and fix it into place by reattaching the screws highlighted in red. Required torque: 1.3Nm
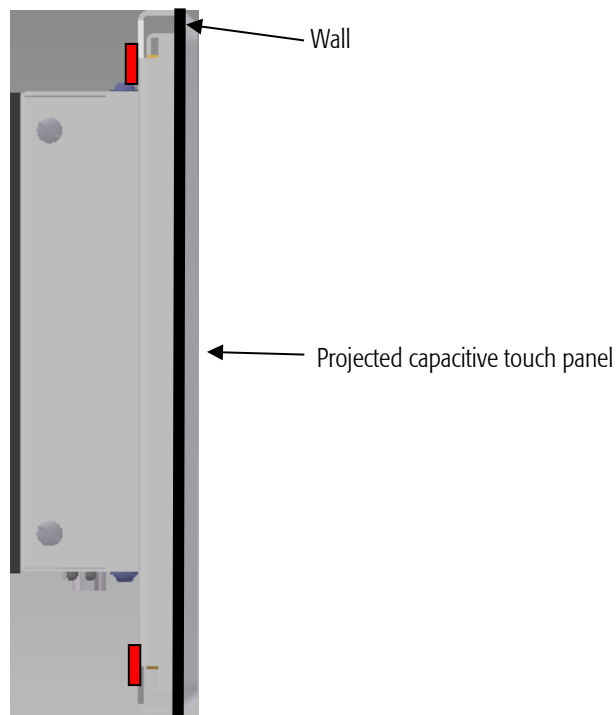5. The product is now installed properly.

Wall

Projected capacitive touch panel

Fig. 5   Fully installed C-Series Touch-PC

3.2 Installation and cabling

3.2.1 Introduction

Installation and cabling of the C-Series Touch-PC system has to be done with great care; the correct cabling is essential for high operational reliability and the correct grounding is necessary for protection and EMC. To meet the requirements of *CE*-certification all cables must be shielded. The enclosure must be connected to ground via the designated fastener (see 4.3 for details).

> **!**
>
> **Important Note**
>
> To meet the requirements of EMI/RFI *CE*-certification, correct mounting, installation and cabling of the C-Series Touch-PC system according to these guidelines is absolutely necessary.

3.2.2 Powering the C-Series Touch-PC System

The *logic supply voltage*, i.e. the power driving the electronic circuits (motherboard and extensions) is internally generated from the 12/24VDC power supply input. Remember that the power supply is non-isolated. The power supply has to be connected according to paragraph 2.4.2 . Maximum allowed cable length between AC/DC power supply and system power input is 3m. If the cable is longer than 3m or routed outside the building, special overvoltage and filtering elements have to be installed to comply with the requirements of EMI/RFI *CE*-certification. When selecting the external power supply, the maximum power dissipation of the system has to be considered.

The C-Series Touch-PC system must only be operated indoors and must be connected to an indoor power supply. Maximum cable length allowed for power supply connection is 3m. If longer cables are used, special overvoltage and filtering elements must be installed to comply with the requirements of EMI/RFI *CE*-certification.

Please make sure that the input voltage does not exceed the recommended operating range otherwise the electronics board could get damaged and correct operation cannot be guaranteed.
Use an overload protected power supply to prevent damage in case of a short inside the system.
The AC/DC power supply must fulfil the requirements for EMI/RFI *CE*-certification.

3.2.3 Cabling the interfaces

Use appropriate cabling for all interfaces. Shielded cabling is required to meet the EMI/EMC limits.

3.2.4 Grounding

The system can be grounded using the designated grounding fastener with appropriate cable end sleeve.

In some cases, it is recommended to connect the shields of the cables to chassis potential at the entry point into the housing cabinet as shown
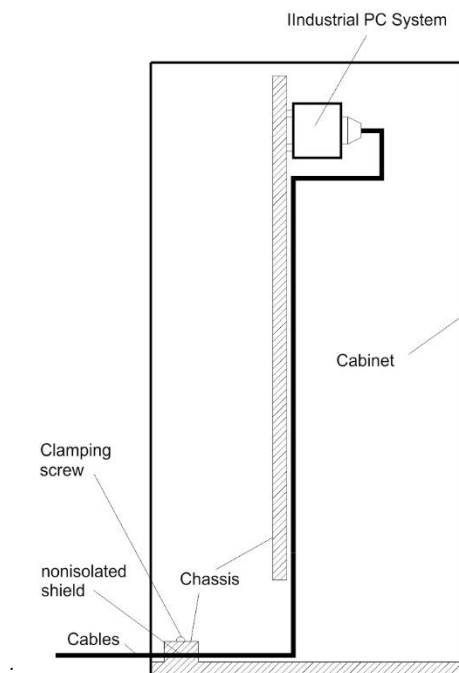
in

Fig. 6. If the cables enter a hermetically closed cabinet, use special 360-degree metal clamps (EMI/RFI protected types which contact to the cable shield).

> ! **Important Note**
> Grounding of the cable's shields using *pig-tail wires* are not recommended because of their high impedance at high frequencies. It is better to clamp the shields onto a grounded copper rail.

Fig. 6   Additional grounding of the cable shields at the entry point of a cabinet

3.2.5 Cabling of communication links

If the communication ports are non-isolated ports, cable shields have to be connected to chassis potential on both sides of the interconnection cable. If the cable is very long, a thick copper wire (10 mm²) for potential adjustment is highly recommended. Fig. 8 shows a non-isolated system with common chassis ground.

Some of the communication ports are galvanically isolated ports. In such cases the shield of the interconnection cable must be wired to chassis potential only on one side of the cable.

Fig. 7 shows an isolated system with independent grounds.

! Important Note

Grounding of the cable's shields using *pig-tail wires* are not recommended because of their high impedance at high frequencies. It is better to clamp the shields onto a grounded copper rail.
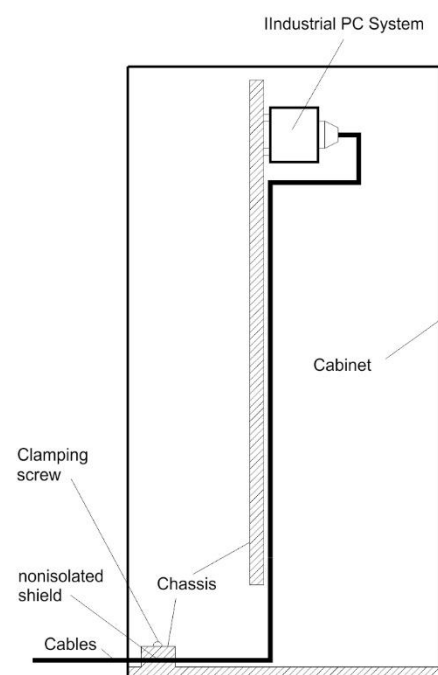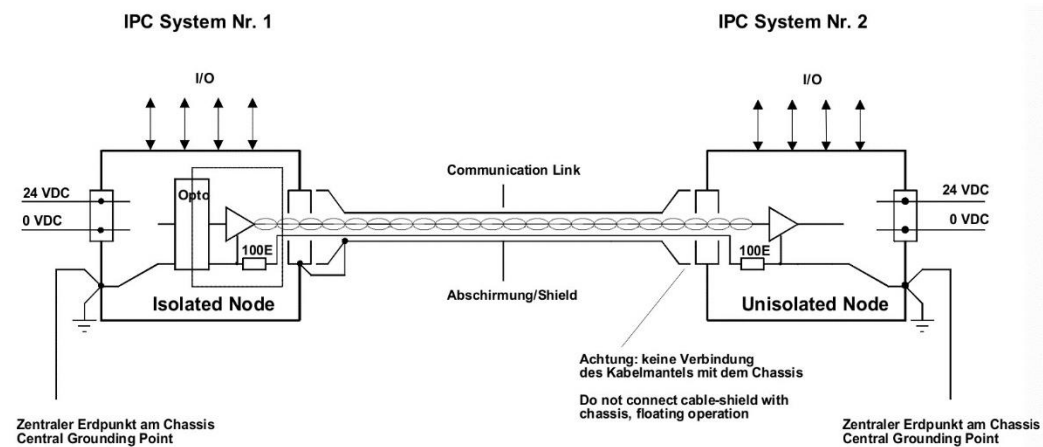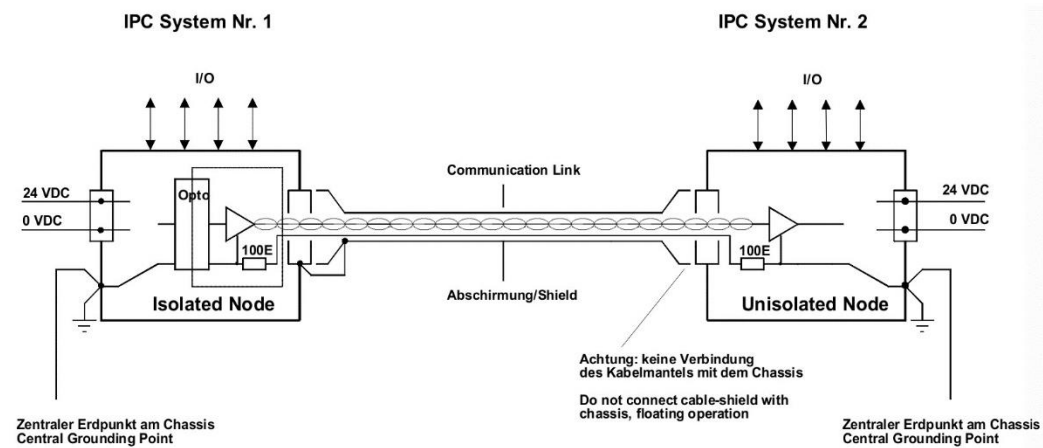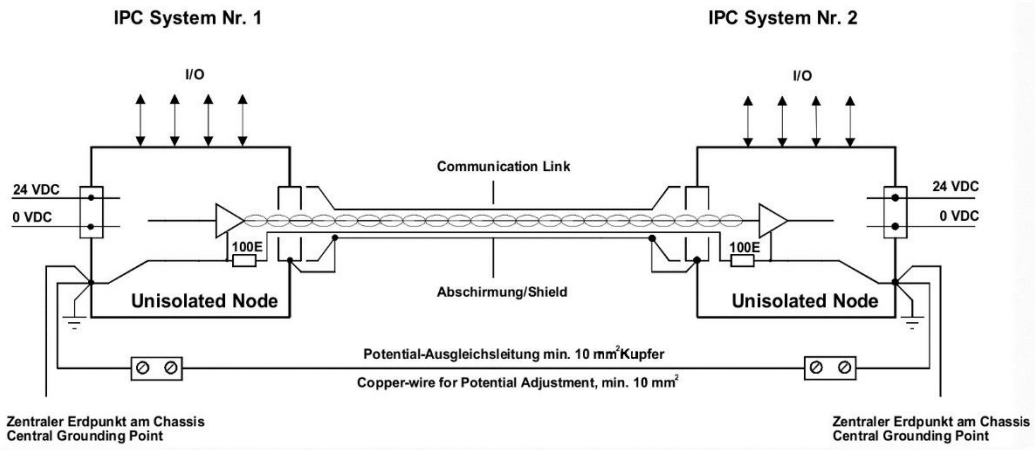

Fig. 7   Isolated communication link

Fig. 8   Non-isolated communication link with common chassis potential

syslogic

4 Technical Data

4.1 General Electrical Data

> **Important Note**
>
> ! Do not operate the C-Series Touch-PC outside of the recommended operating conditions. Otherwise lifetime and performance will degrade. Operating the board and the display outside of the absolute maximum ratings may damage the hardware.

Absolute Maximum Ratings

Parameter	Symbol	min	nom	max	Unit
supply voltage	Vdc	9	12/24	36	VDC
storage temperature range	Tst	-30	25	80	°C
operating temperature range, standard temperature devices	Ta	0		45[3]	°C
operating temperature range, extended temperature devices	Ta	-30[4]		55[3]	°C
operating humidity (not condensing)	Rh	10		90	%

Tab. 10   General Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	min	nom	max	
supply voltage	VDC	12	12/24	24	VDC
operating temperature range	Ta	0	25	40	°C

Tab. 11   General Recommended Operating Conditions

Maximum cable length

Interface	Maximum Length	Comment
Power[5]	<3m	CE conformal AC/DC power supply must be used
X1/X2[5]	<2.8m	
USB 3.0[5]	<3m	
LAN	<100m	
Mini Displayport[5]	<3m	
Antennas[5]	<2.8m	

Tab. 12   Maximum cable length

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[3] Depending on installed CPU and specific use case; see 4.4

[4] Cold start-up: -20°C

[5] Do not connect to lines directly leaving a building without additional safety measures

Electrical Characteristics

(over recommended operating range, unless otherwise noted)

Parameter	Symbol	min	typ	max	Unit
general parameters					
Power Consumption TFT/HB101PU81G13-C001y, Brightness 100%	Ptot	9	16.5	18.5	W
Power Consumption TFT/HB101PU81G13-C001y, Brightness 70%	Ptot	7.5	13.5	15.5	W
Power Consumption TFT/HB101PU81G13-C001y, Brightness 30%	Ptot	4.5	9	12.5	W
Power Consumption TFT/HB101PU81H18-C001y, Brightness 100%	Ptot	12	19.5	21.5	W
Power Consumption TFT/HB101PU81H18-C001y, Brightness 70%	Ptot	10.5	16.5	18.5	W
Power Consumption TFT/HB101PU81H18-C001y, Brightness 30%	Ptot	7.5	12	15.5	W
Power Consumption TFT/HB101PU81I20-C001y, Brightness 100%	Ptot	14.5	22	24	W
Power Consumption TFT/HB101PU81I20-C001y, Brightness 70%	Ptot	13	19	21	W
Power Consumption TFT/HB101PU81I20-C001y, Brightness 30%	Ptot	10	14.5	18	W
RTC backup battery					
Vbatt loading (Vcc=off)	Ibat(off)		4		uA
Vbatt loading (Vcc=on)	Ibat(on)		0.6		uA
Backup time with new CR2032 battery (Ta=25°C)	t(rtcbup)		2.8	5	years
Backup time with new CR2032 battery (Ta=50°C)	t(rtcbup)		1.4		years
Cutoff Voltage			2		V

Tab. 13   General Electrical Characteristics

Switching Characteristics (nominal conditions)

Parameter	Symbol	min	nom	max	
processor clock (TFT/HB101PU81G13-C001y)	fcpu		1.3	1.8	GHz
processor clock (TFT/HB101PU81H18-C001y)	fcpu		1.6	1.8	GHz
processor clock (TFT/HB101PU81I20-C001y)	fcpu		1.6	2.0	GHz
LCD inverter brightness PWM base clock	fpwm		200		Hz

Tab. 14   General Switching Characteristics

4.2   EMI / EMC Specification

The C-Series Touch-PC system fulfils the following standards:

Emission: EN55032 / CISPR 32 Class A

Immunity: EN55035 / CISPR 35 Class A

Important note
This is a Class A product and not intended to be used in domestic environment. The product may cause electromagnetic interference. Appropriate measures must be taken.
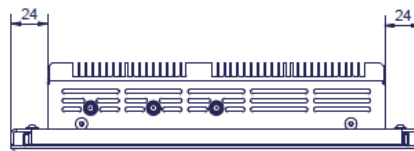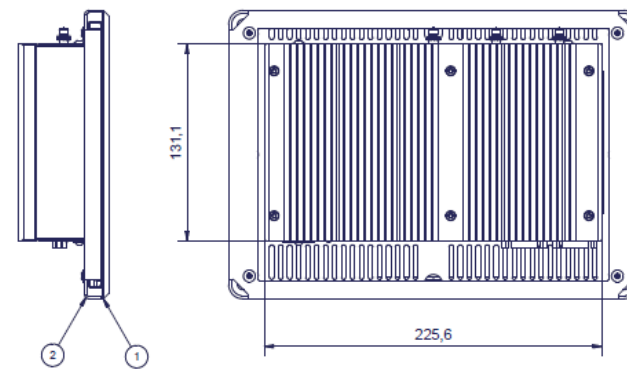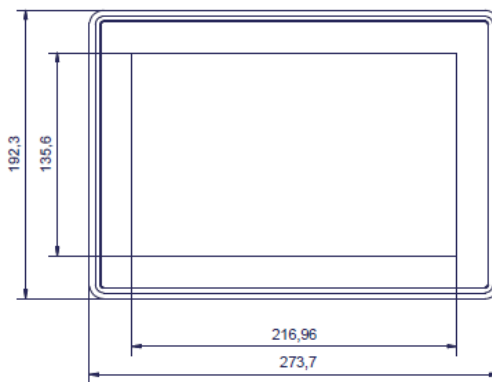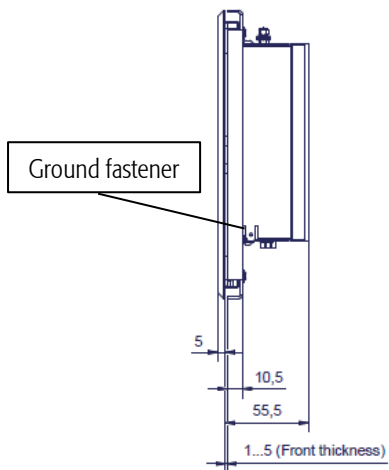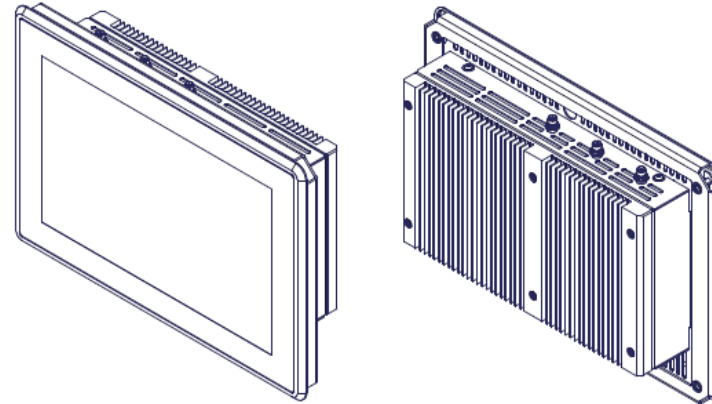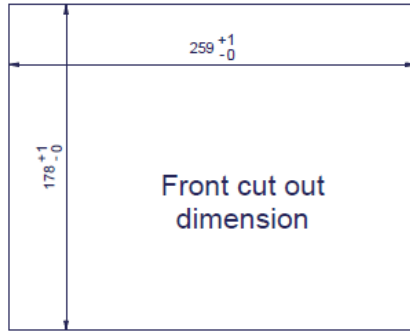
Important note
To fullfill class A of EN55032 and EN55035 a CE-conformal AC/DC power supply must be used. Cable length between power supply and device is limited to 3m.

4.3 Mechanical Data

4.3.1 TFT/HB101PU81xxx-C001y

4.4   Use cases

To give an idea on how to operate the device in good condition several us cases have been defined to help system integrators choose the best way on how to install the C-Series Touch-PC

Mounting position	CPU load	GPU load	Backlight dimming	Display on-time	Airflow through device	max. ambient temperature	
						Std	Ext
90°	100%	100%	100% (~850cd/m^2)	all the time	none	37°C	47°C
90°	40%	20%	100% (~850cd/m^2)	all the time	none	41°C	51°C
90°	30%	20%	50% (~425cd/m^2)	all the time	2.5m/s	45°C	55°C

To ensure proper operation of the device keep inside temperature below 60° (standard temperature) and 70°C (extended temperature), respectively.

Operation at $70^{+0}_{-5}°C$ inside temperature is only possible during 240 consecutive hours.

Important Note

Maximum ambient temperature is highly dependent on mounting, air flow and CPU/GPU load; with the *Intel Thermal Monitoring Technologies* the processor automatically reduces the internal CPU when the critical thermal trip points are reached to prevent damage.

5 Firmware

5.1 Software Structure

The x86 CPU board based system is based on the following software structure:

BIOS (Basic Input/Output System)
- Power On Self Test (POST)
- Initialization of standard peripheral devices
- Boot procedure for the Operating System

OS (Operating System)
- Initialization of additional peripheral devices
- Start procedure for the Application Programs
  Note : Refer to the OS documentation for detailed information

Application Programs
- Initialization of system, communications and external devices
- Start procedure for the Control Tasks
  Note : Refer to the Application Programs documentation for detailed information

5.2 Firmware Functions

The PC board is setup with BIOS firmware. Some standard PC/AT peripheral devices (e.g. Keyboard/Mouse) are directly supported by the BIOS, BIOS extensions and Operating Systems. Some peripheral devices (e.g. Ethernet) are directly supported by standard communication software (e.g. TCP/IP stacks, TCP packet drivers) others need special programming. Please refer to the appropriate documentation for detailed information.

5.3 Application Programming Interface (API)

By default, the system does not contain any special API beside the installed BIOS. Please contact technical support for assistance.

5.4 Supported Operating System

Syslogic offers and supports Windows and Linux Debian operating systems. Please visit www.syslogic.com for the latest releases.

6 Product Revision History

6.1 Hardware

This paragraph lists the different hardware revisions of the C-Series Touch-PC delivered beginning with the first production lot. Note that prototypes are not included and must be returned to factory for upgrade or replacement. All information listed in this document relies on definitive state hardware. Therefore, this information may be incompatible with the prototyping hardware.

> **! Important Note**
>
> This document always covers the newest product revision listed in Tab. 15. Please contact the manufacturer's technical support for upgrade options.

Board Identification (see product label)	Product Revision	Remarks
TFT/HB101PU81G13-C001y	#1.0	
TFT/HB101PU81H18-C001y	#1.0	
TFT/HB101PU81I20-C001y	#1.0	

Tab. 15   Hardware Revision State

6.2 Firmware

This paragraph lists the different firmware versions of the C-Series Touch-PC systems delivered beginning with the first production lot. Note that prototyping boards are not included and must be returned to factory for upgrade or replacement. All information listed in this document relies on definitive state hardware. Therefore, this information may be incompatible with the prototyping board hardware.

Device Identification (see product label)	BIOS Version	Build Date	Remarks
TFT/HB101PU81xxx-C001y	IBIOSAL053-A101_1	09.10.2018	

Tab. 16   Firmware Revision State

6.3   Errata

This paragraph lists some important errata of the current boards to enable workarounds in user software. Additional errata might be present, but a workaround is already implemented in the BIOS. It is important therefore that neither the application software nor the operating systems reprograms the processor chipset's configuration registers.

Note that prototype board errata (boards with revision #0) are not listed here. Contact Syslogic technical support for prototype board information.

Additional errata of the processor chipset can be found at:

https://ark.intel.com

Display flickering	
Problem	Backlight seems to flicker when brightness is decreased
Implication	Reduced user experience
Workaround	Change background image
Correction	ongoing

> **!** **Important Note**
>
> This document always covers the latest product revision listed in Tab. 15
> Please contact the manufacturers technical support for upgrade options.

7   Manufacturer Information

7.1   Contact

Our distributors and system integrators will gladly give you any information about our products and their use. If you want to contact the manufacturer directly, please send an email message containing a short description of your application and your request to the following address or use one of the information or technical support request forms on our internet homepage:

Syslogic Datentechnik AG
Taefernstrasse 28
CH-5405 Baden-Daettwil/Switzerland

e-mail: support@syslogic.com
Web: www.syslogic.com
T: +41 56 200 90 40
F: +41 56 200 90 50

7.2   Warranty

Our products are covered by a world-wide manufacturer's warranty. The warranty period starts at the delivery time from our official distributor to the customer. The duration of the warranty period is specified in the respective product catalogs and the offers. All products carry a date code and a job number for identification. The manufacturing data and deliveries are registered in a high-level Quality Management System.
The warranty covers material and manufacturing defects. All products must be returned via the official distributor to the factory for repair or replacement. The warranty expires immediately if the products are damaged by operation outside of the specified recommended operating conditions. The warranty also expires if the date code or job number listed on the product is altered or rendered unintelligible. The warranty does not include damage due to errors in firmware or software delivered with the products.

7.3   RMA Service

Syslogic offers a Return Material Authorization process to simplify handling of devices that needs to be returned to the manufacturer. Please follow the instructions on our web page: https://www.syslogic.com to get best service.