

user documentation

TFT/HB057RU41F08-N101

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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:

- IBM-PC, PC/AT, PS/2 trademarks of IBM Corporation
- I²C trademark of Philips Corporation
- CFast trademark of SanDisk Corporation
- PC/104 trademark of PC/104 Consortium

1.2. Contents of this Documentation

This document addresses to system integrators, programmers and instructed installation and maintenance personal working with the system. It provides all information needed to install and use the TFT/HB057RU41F08-N101 system.

1.3. Additional Products and Documents

1.3.1. Software Products

The following software products are useful together with the TFT/HB057RU41F08-N101 system:

- IPC/IOCOMSW-1A: Sample program code and utilities for x86 based PC/104 systems

1.3.2. Documents

The following additional documents are useful for correct installation and operation of the TFT/HB057RU41F08-N101 system:

- DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-AxxxE systems.
- DOC/IPC_IOCOMSW: User Documentation for programming examples and utilities

The following documents are useful for additional information about PC/104 and IEEE 996.1:

- PC/104 Specification Version 2.3
- IEEE 996: IEEE standard document 'Personal Computer Bus Standard'
- IEEE 996.1: IEEE standard document 'Compact Embedded-PC Modules'
- ISBN 0-929392-15-9: 'ISA & EISA, Theory and Operation' by Edward Solari (Annabooks, San Diego)

The PC/104 Specification may be downloaded from the Internet (see address below).

- PC/104 Consortium
www.pc104.org

The IEEE standard documents may be ordered directly from the IEEE or any standards document distributor (see addresses below).

- IEEE Standards Department
www.ieee.org
- Global Engineering Documents
www.global.ihs.com

1.4. Items delivered

The TFT/HB057RU41F08-N101 comes without external cabling and power supply. These additional items must be ordered separately and installed according to the respective user documentations.

1.5. Installation

The installation of the TFT/HB057RU41F08-N101 system is described in chapter 4 of this documentation.

1.6. Safety Recommendations and Warnings

1.6.1. General safety recommendations

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 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 9). 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.

1.6.2. Safety warnings

Do not operate this product outside of the recommended operating conditions according to the technical data specified in paragraph 5.

Do not touch the surface of this product without precaution, it may be hot and burn your skin. Cool it down before touching.

Do not touch any connector unless you have verified that no dangerous voltage is around. Disconnect cabling first.

Do not open any part of the enclosure while power is applied.

Do not try to repair any defective product by yourself. There is no replaceable service part inside.

Do not open the service cover unless you are instructed and entitled to do this. The service cover is intended for inserting the CFast Software storage card on initial operation of the product by an instructed person only.

Use an overload protected power supply to prevent damage in case of a short inside the system.

1.7. 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 and the warranty is not applicable.

1.8. Life Cycle Information

1.8.1. Transportation and Storage

During transportation and storage the products must be in their original packing. The original packing contains an antistatic bag and shock-absorbing material. 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.

1.8.2. Assembly and Installation

Observe the EMI-precautions against static discharge. Carefully read the assembly and installation documentation (see chapter 4) before unpacking the products. Make sure that you have all the necessary items ready (including all the small parts). Follow the assembly guidelines in chapter 4 strictly.

The installation procedures must be strictly observed. Note that deviations from the installation guidelines may result in degraded operational reliability or in unfavorable EM-radiation or EM-susceptibility.

1.8.3. Operation

The operating environment must guarantee the environmental parameters (temperature, power supply, etc.) specified in the technical specification section of the product manuals.

The main functionality of the TFT/HB057RU41F08-N101 system is defined by the application programs running on the processor board. The application programs are not part of the delivery by Syslogic but are defined, developed and tested by the customer or a system-integrator for each specific application. Refer to the respective documentation for more information.

1.8.4. Maintenance and Repair

The TFT/HB057RU41F08-N101 system features error- and malfunction-detection circuitry. Diagnostic information gathered is transferred to the applications software where it can be used. In the rare case of a hardware-failure or malfunction, the complete system should be exchanged. The faulty system must be returned to the factory for repair. Please use whenever possible the original packing for return of the product (EMI and mechanical protection).

1.8.5. Disposal and WEEE

The product TFT/HB057RU41F08-A104 is not designed ready for operation for the end-user and is not intended for consumer applications. Therefore the Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) is not applicable. But users should still dispose the product properly at the end of life.

The product contains a multitude of elements and must be disposed like computer parts. Packaging not needed anymore must be fairly disposed or be returned for disposal to the manufacturer or distributor. The wrapping contains the following materials: Cardboard box and transportation protection.

Materials	Description
Front Glass	Safety glass
Front Touch	Glass, Plastic, Copper
Front frame	Metal /AlMg 4.5 Mn
Hoods	Galvanized sheet steel
Mounting plates	Galvanized sheet steel
TFT Display with LED Backlight	Glass, Copper, Steel, Plastics etc.
PCB Printed Circuits Boards	Copper, Plastics etc.

Tab. 1 Disposal Materials

1.8.6. RoHS

The product TFT/HB057RU41F08-A101 is designed and produced according to the Restriction of Hazardous Substances (RoHS) Directive (2011/65/EC).

1.8.7. EMC

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

2 Product Description

2.1. Explanation of Symbols

2.1.1. 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.

2.1.2. 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!

This is an instruction that must be observed in order to ensure protection in time from dangers during and at the time of the operation of 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.

Tab. 2 List of Warning Pictograms

2.1.3. Information pictograms indicate the following:

This is important information about the product or the relevant section of the document. This section requires the particular attention of the reader.



The "Information" pictogram has the following meaning:

Indicates important and instructional information.

Tab. 3 List of Information Pictograms

2.2. Features

The TFT/HB057RU41F08-N101 system is an x86 based industrial resistive Touch Panel which offers the following main features:

- 5.7" resistive Touchscreen
- 5.7" TFT Display, Resolution 640x480pixel
- Vortex86DX2 processor
- 1 GB RAM
- Passive cooling system

For full feature list of the main board see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-Axxx systems (Configuration IPC/M41F08-A101E).

3 Hardware Description

3.1. Overview

For details regarding the main board see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-Axxx systems (Configuration IPC/M41F08-A101E).

3.2. Dimensions

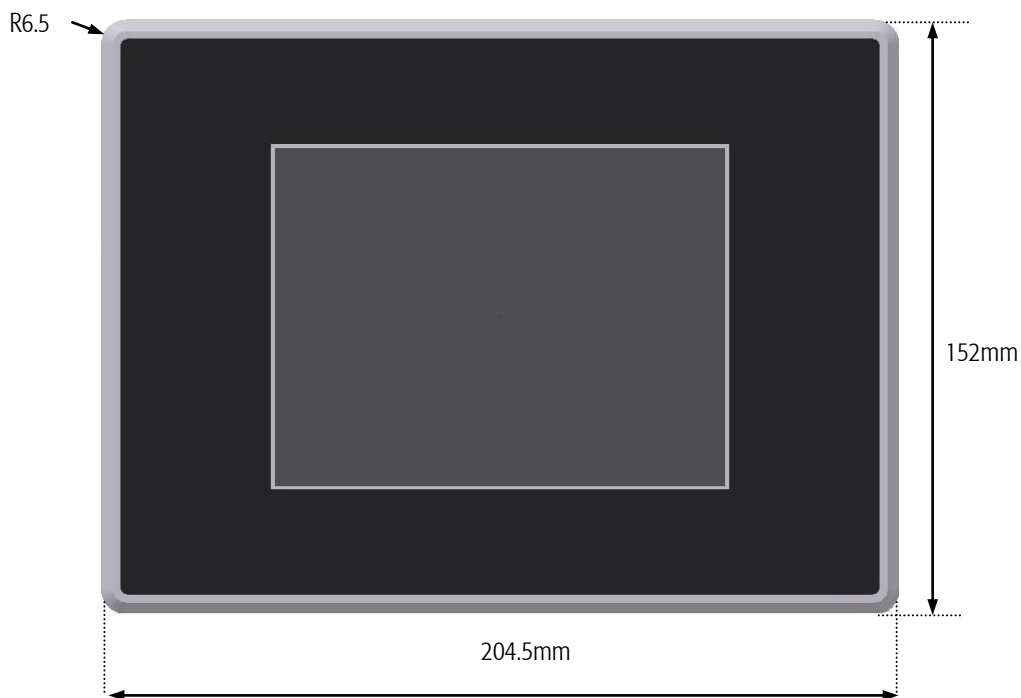


Fig. 1 Front Dimensions

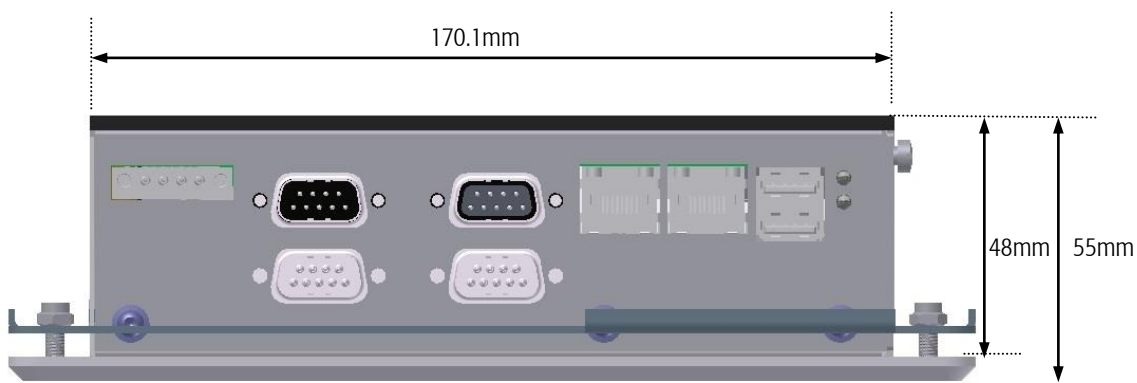


Fig. 2 Chassis Dimensions

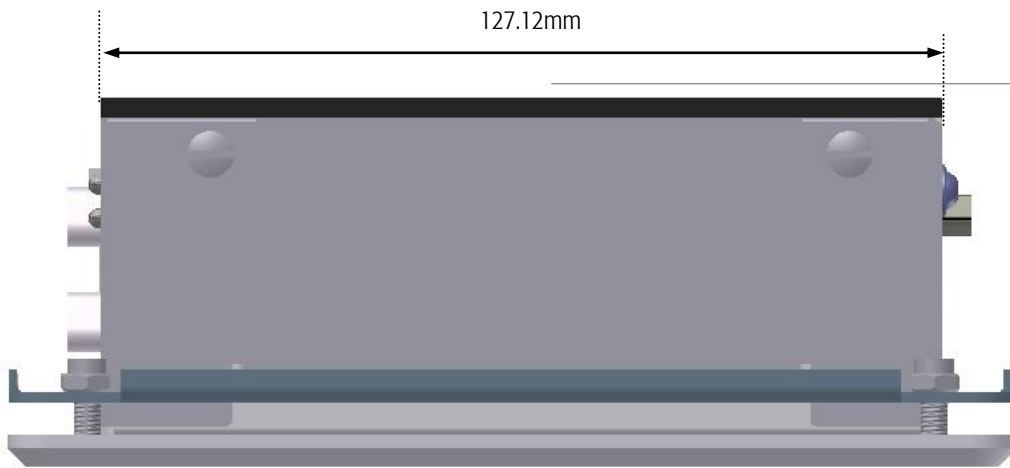


Fig. 3 Chassis Dimensions

3.3. Interfaces

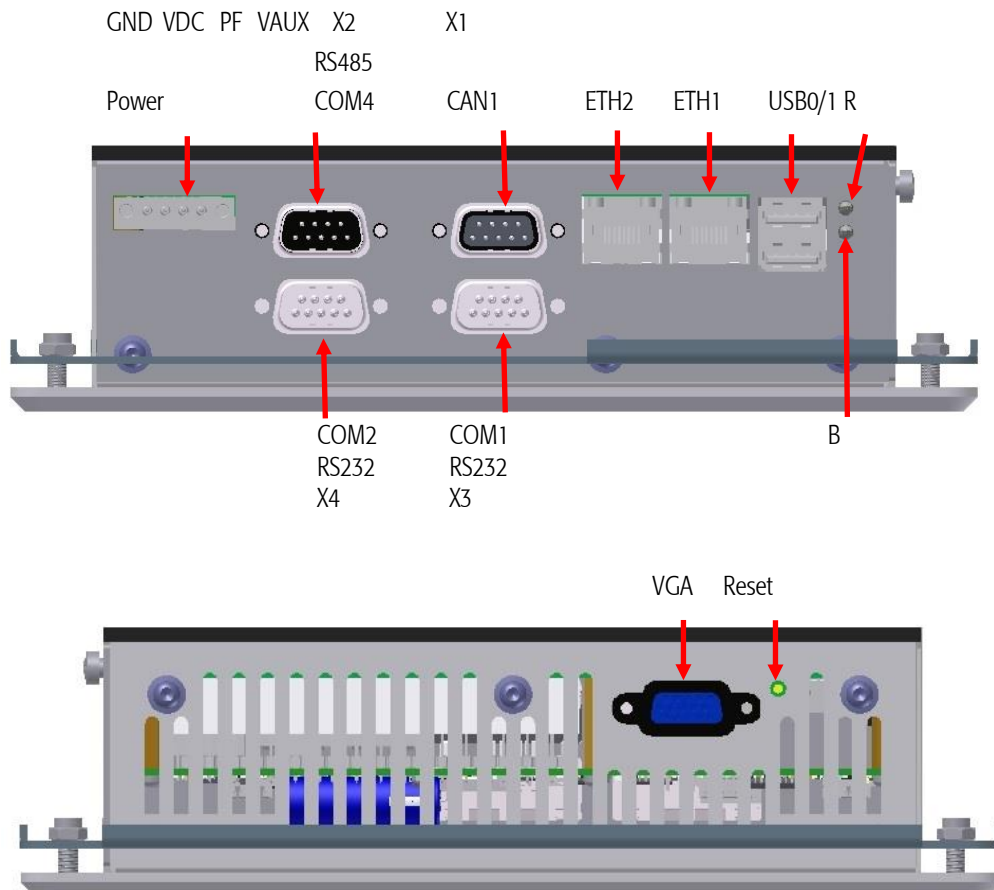


Fig. 4 Interfaces

3.4. Mounting

3.4.1. Wall mounting

The desired mounting place must have a cut out regarding the following drawing.
The maximum thickness of the material must not exceed 4mm.

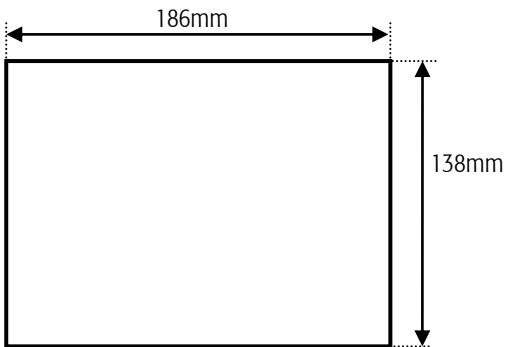


Fig. 5 Wall mounting cutout dimensions



Mounting Angle:

Mounting Angle must be 90°

Cooling Space:

To ensure cooling leave at least 10cm of free space around product.

Electrical Earthing:

Product must be properly electrical earthed.

- Remove the four nuts highlighted in red and then remove the mounting frame.

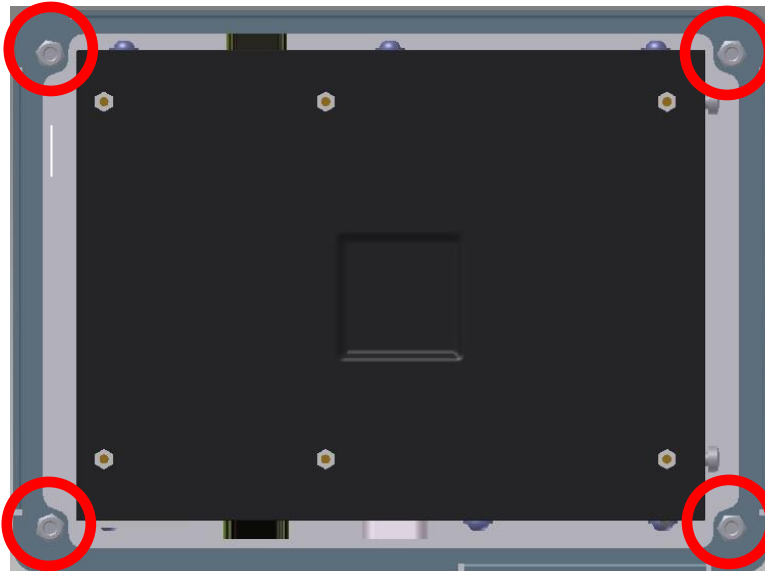


Fig. 6 Wall mounting frame removal

- Insert the touch panel from the front into the cut out and make sure that the sealing fits properly.
- Reattach the mounting frame and fix it into place by reattaching the nuts removed before. (maximum torque: 1.0Nm)
- The product is now installed properly.

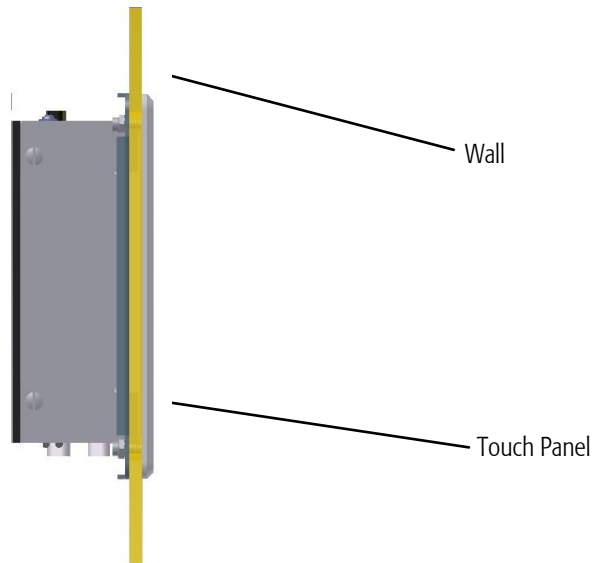


Fig. 7 Wall mounting

3.4.2. VESA mounting

- For VESA mounting the VESA mounting Frame option MEC/FG1265 must be installed.
- Use M4 screws.
- The whole deepness in VESA mounting frame is 4mm. Do not exceed this dimension.
- Dimensions of VESA mounting points are as following:

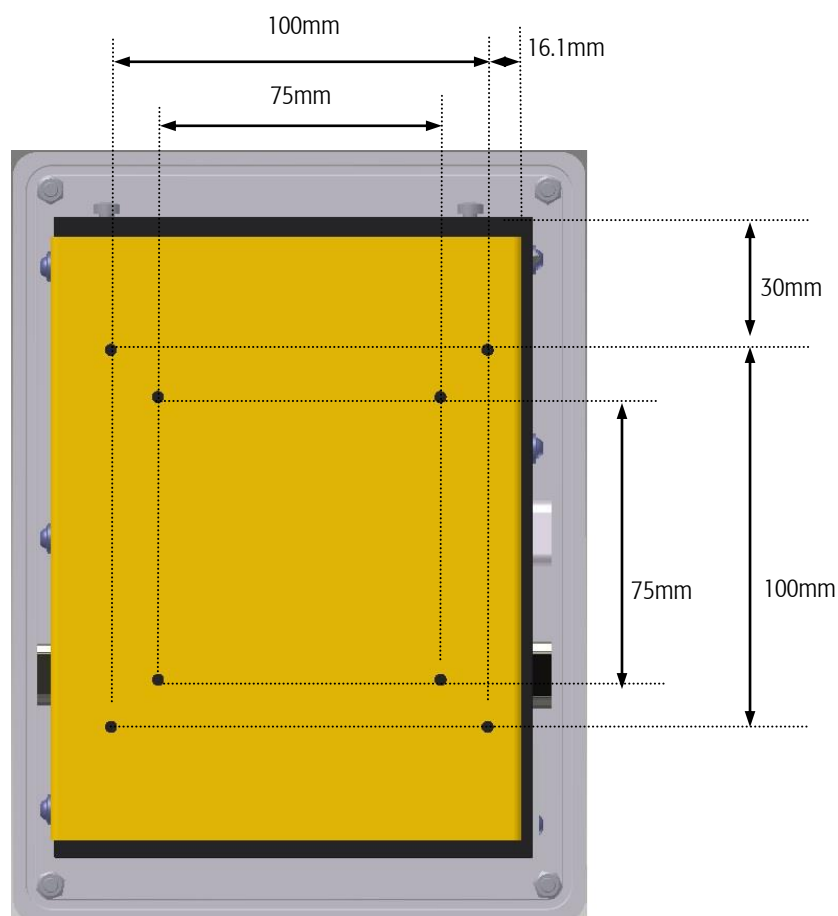


Fig. 8 VESA mounting dimensions



Mounting Angle:

Mounting Angle must be $90^\circ \pm 15^\circ$

Cooling Space:

To ensure cooling leave at least 10cm of free space around product.

Electrical Earthing:

Product must be properly electrical earthed.

3.4.3. Service Cover

- To remove the service cover remove the two knurled screws highlighted in red and remove the cover.

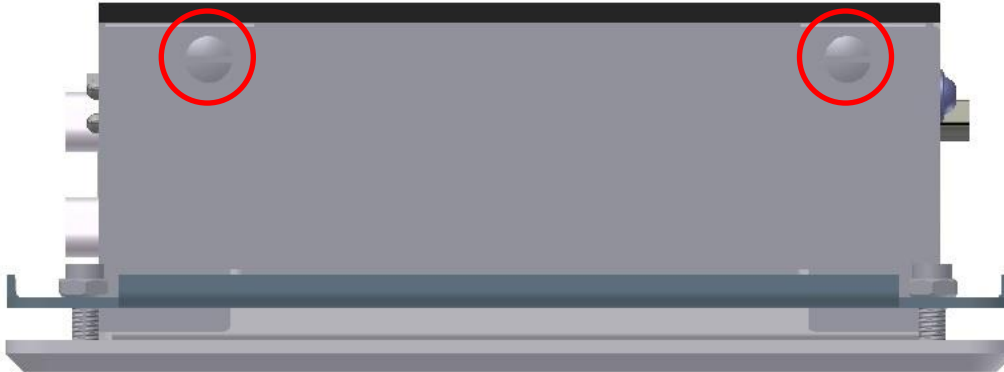


Fig. 9 Service Cover

- After removing the cover the Battery and the CFast slot are accessible.
- Please install the Service Cover before operating the touch panel.

3.5. Peripheral Devices

3.5.1. Interfaces and Peripheral Devices

For details regarding the Interfaces and Peripheral Devices see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-AxxxE systems (Configuration IPC/M41F08-A101E).

3.5.2. Power supply interface

TFT/HB057RU41F08-N101 is powered by a non-isolated, integrated power supply which generates all the necessary voltages.

The power must be connected using the following mating connector:

Weidmueller BCZ 3.81/04/180F SN SW (Ordercode 1792970000).

The mating connector can be ordered directly at your local Weidmueller distributor.

Pin Number	Signal	Remarks
1	+24VDC_AUX	Auxiliary power supply
2	Power Fail/Remote on/off	Power fail input
3	+24VDC	+9V..+30V DC
4	GND	

Tab. 4 Power supply connector

To operate the external power supply has to be connected to the pins 3 (+24VDC) and 4 (GND) of the connector.

3.5.3. USB Interface

The USB interface uses a standard USB A type connector.

USB0		USB1	
Pin Number	Signal	Pin Number	Signal
1	VBUS	1	VBUS
2	D-	2	D-
3	D+	3	D+
4	GND	4	GND

Tab. 5 USB Interface

3.5.4. CAN Interfaces

The connector is a standard male D-SUB 9 Pin connector and is labeled X1. Termination resistors must be added externally!

Pin Number	Signal	Pin Number	Signal
1	no connection	6	no connection
2	CAN Low	7	CAN High
3	CAN Ground	8	no connection
4	no connection	9	no connection
5	no connection		

Tab. 6 CAN interface

3.5.5. Ethernet LAN Interface

The first Ethernet interface (ETH1) uses the standard RJ45 connector ETH1 on the front for 100Ω shielded or unshielded Twisted Pair cabling.

Pin Number	Signal	Remarks
1	TX+	
2	TX-	
3	RX+	
4-5	line termination	
6	RX-	
7-8	line termination	

Tab. 7 Ethernet ETH1 Interface

The second Ethernet (ETH2) interface use the standard RJ45 Gigabit connector ETH2 on the front for 100Ω shielded or unshielded Twisted Pair cabling.

Pin Number	Signal	Remarks
1	MD0+	
2	MD0-	
3	MD1+	
4	MD2+	
5	MD2-	
6	MD1-	
7	MD3+	
8	MD3-	

Tab. 8 Ethernet ETH2 Interface

3.5.6. Serial Ports

RS232 Ports COM1 (X3) and COM2 (X4) have a male D-SUB 9 Pin connector at the device.

Pin Number	Signal	Pin Number	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND		

Tab. 9 Serial Ports COM1/2 (RS232)

Insulated RS485 Port COM4 (X2) has a male D-SUB 9 Pin connector at the device.

Pin Number	Signal	Pin Number	Signal
1	no connection	6	no connection
2	RX-	7	RX+
3	TX-	8	TX+
4	no connection	9	no connection
5	RGND		

Tab. 10 Full duplex RS485 ports (default)

Pin Number	Signal	Pin Number	Signal
1	no connection	6	no connection
2	no connection	7	no connection
3	DATA-	8	DATA+
4	no connection	9	no connection
5	RGND		

Tab. 11 Half duplex RS485 ports (configuration option)



To configure half duplex mode the device must be opened!
 Please make sure that the device is neither running nor connected to power and observe ESD precautions before opening.
 For details regarding the configuration settings see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-AxxxE systems (Configuration IPC/M41F08-A101E).

3.5.7. VGA Interface

The VGA signals are available on the high density DSUB15 connector for direct connection of VGA compatible monitors. The controller uses the standard VGA register interface. All configurations are done by software (BIOS, VGA-BIOS).

Device Connection

Pin Number	Signal	Remarks
1	RED	
2	GREEN	
3	BLUE	
4	-	
5	GND	
6	Analog GND	
7	Analog GND	
8	Analog GND	
9	+5V	not fused
10	GND	
11	-	
12	DDC Data	
13	HSYNC	
14	VSYNC	
15	DDC Clock	

Tab. 12 VGA connector (DSUB15HD)



Maximum cable length allowed for VGA connection is 15 m.
 Use high quality shielded VGA cables (with coaxial wires for RGB signals) for maximum EMI protection.

3.5.8. Maximum cable length

The maximum cable length can be taken from the table below:

Device Marking	Interface Type	Cable Length	Shielded
DISPLAY	DVI Display Interface	< 10m	Yes
ETH1	Ethernet 1	> 30m (up to 100)	Yes
ETH2	Ethernet 2	> 30m (up to 100)	Yes
USB0/1	USB0 (bottom) / USB1 (top)	< 5m	Yes
X1	RS232	< 15m	Yes
X2	RS232	< 15m	Yes
X4	RS232	< 15m	Yes
	RS485	> 30m (up to 1200)	Yes
VDC/GND	Input Voltage	< 3m	No
PF	Power Fail	< 3m	No
VAUX	Auxiliary Input Voltage	< 3m	No

Tab. 13 Maximum cable length

Programming Information

3.6. Overview

For details regarding the Programming Information see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-AxxxE systems (Configuration IPC/M41F08-A101E).

3.7. Peripheral Devices

3.7.1. VGA/LCD-Interface

The VGA interface uses the standard PC/AT VGA register set. For detailed programming information please refer to the IBM PC/AT Technical Reference or similar documentation.

Low level programming is handled by the VESA compatible VGA-BIOS.

3.7.2. CFast Interface

The Secondary IDE Channel hosts a SATA controller which serves the CFast socket. It uses the standard PC IDE address decoding when operated in legacy mode.

The CFast card behaves like a standard IDE disk or IDE CompactFlash. The CFast interface uses the standard PC/AT register set. For detailed programming information please refer to the IBM PC/AT Technical Reference, ATA/ATAPI standards (ANSI) or similar documentation.

3.7.3. Serial Ports

The Serial Port interfaces use the standard PC/AT register set. The Serial Port controller is compatible with the standard 16C550A UART with 16 byte receive and transmit FIFO register. For detailed programming information please refer to the IBM PC/AT Technical Reference, the Texas Instruments TL16C550C datasheet or similar documentation.

3.7.4. Ethernet Interface

The Ethernet interface LAN1 uses the RDC R6040 Ethernet Controller. For detailed programming information and drivers check www.syslogic.com and www.dmp.com.tw.

The Ethernet interface LAN2 uses the Intel 82574IT Ethernet Controller. For detailed programming information and drivers check www.intel.com.

3.7.5. USB Interface

The USB interfaces use the standard OHCI/EHCI register set. Legacy support and low level programming is handled by the BIOS and standard OS drivers.

4 Installation and cabling

4.1. Introduction

For details regarding the installation and cabling see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-AxxxE systems (Configuration IPC/M41F08-A101E).

4.2. Powering the System

When selecting the external power supply the maximum power dissipation of the system has to be considered.



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 fulfill the requirements for EMI/RFI "CE"-certification.

4.3. Cabling the interfaces

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

5 Service

5.1. Replaceable Parts

This system contains the following replaceable parts:

- CFast flash card
- Backup battery CPN/CR2450N

To replace the flash card power off the system and remove the service cover. After having unlocked the clip, the flash card may be removed. When inserting a new flash card be sure that it is fully compliant with the CFast standard. Syslogic highly recommends CFast flash cards specified for industrial use by the card manufacturer. Check temperature range and durability to comply with your requirements. Safety warnings and installation guidelines must be followed according to paragraphs 1.6, 1.8 and 4.

6 Technical Data

6.1. Electrical Data



Do not operate the system outside of the recommended operating conditions. Otherwise lifetime and performance will degrade. Operating the system outside of the absolute maximum ratings may damage the hardware.

Absolute Maximum Ratings (over free-air temperature range)

Parameter	Symbol	min	nom	max	Unit
power supply voltage	Vcc	-0.5		30	Vdc
isolation RJ45 to logic (AC, 60s, 500m a.s.l., Ta=25°C)		500			Vrms
isolation RJ45 to chassis (AC, 60s, 500m a.s.l., Ta=25°C)		500			Vrms
creepage distances:					
RJ45 to logic		1.0			mm
RJ45 to chassis and PCB boarder		1.0			mm
Operating temperature range (ambient)	Top	-20		60	°C
storage temperature range	Tst	-30		80	°C

Tab. 14 General Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	min	nom	max	Unit
power supply voltage	Vcc	9.0	12/24	30	Vdc
battery backup voltage (Io=100µA)	Vbatt	2.7	3.0	3.3	Vdc
operating free-air temperature range (standard products)	Ta	-20		60	°C

Tab. 15 General Recommended Operating Conditions

Electrical Characteristics

(over recommended operating range, unless otherwise noted)

Parameter	Symbol	min	typ	max	Unit
power supply current (Vcc=24V, no external loads)	Icc		0.33		A
power supply current (Vcc=12V, no external loads)	Icc		0.72		A
full load power dissipation (worst case, no external loads)	Pmax			9	W

Tab. 16 General Electrical Characteristics

6.2. Regulations

6.3. EMI / EMC Specification

- EN 50121-3-2: 2006 + A1: 2008 Railway applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle
- EN 55022 Information technology equipment - Radio disturbance characteristics Limits and methods of measurement
- EN 55024 Information technology equipment – Immunity characteristics - Limits and methods of measurement

6.3.1. Emission

Emission requirements according to 2004/108/EC harmonized standard EN61000-6-2

Test	Standard	Limit
Radiated field	EN 55011:2009+A1:2010 EN 50121-3-2	30 – 230MHz: 40dBuV/m (QP) 230 – 1000MHz: 47dBuV/m (QP)
Radiated field	EN55022:2010+AC2011 EN55022:2010	30 – 230MHz: 40dBuV/m (QP) 230 – 1000MHz: 47dBuV/m (QP) 1000 – 3000MHz: 56dBuV/m (AVG) 3000 – 6000MHz: 60dBuV/m (AVG)
Conducted emission	EN 50121-3-2: 2006 + A1: 2008 EN55022:2010	Mains AC 0.15 – 0.5MHz: 79dBuV (QP) 0.5 – 30MHz: 73dBuV (QP) Telecommunication ports 0.15 – 0.5MHz: 97 to 87dBuV (QP) 0.5 – 30MHz: 87dBuV (QP)

Tab. 17 Emission requirements

6.3.2. Immunity

Immunity requirements according to 2004/108/EC harmonized standard EN61000-6-4

Test	Standard	Limit
Electro-static discharge / ESD	EN61000-4-2:2009, EN50121-3-2, EN55024	6kV contact - direct 6kV contact – indirect 8kV air
RF electromagnetic field 1 kHz, 80% AM	EN61000-4-3:2006 +A1:2008+A2:2010 EN50121-3-2, EN55024	80 – 1000MHz: 20V/m 1.4..2.1GHz: 10V/m 2.1..2.5GHz: 5V/m 2.5..2.7GHz: 1V/m Criterion A
Electrical fast transients / burst 5/50ns	EN61000-4-4:2004+A1:2010 EN50121-3-2, EN55024	2.0kV Criterion A
Surge 1.2/50us	EN61000-4-5:2006 EN50121-3-2, EN55024	DC power : 2kV (line - earth) 1kV (line – line) Criterion B Communication ports : 1kV (shield - earth) Criterion B
Conducted disturbances 1kHz, 80% AM	EN61000-4-6:2009 EN50121-3-2, EN55024	All connections: 0.15 – 80MHz: 10V/m Criterion A

Tab. 18 Immunity requirements



The system is a class A system for industrial applications. It is not indented for use in residential or home applications.

7 Firmware

7.1. Introduction

For details regarding the Firmware see DOC/IPC_M41F08-E: User Documentation of IPC/M41F08-Axxx systems (Configuration IPC/M41F08-A101E).

8 Product Revision History

8.1. Hardware

This paragraph lists the different hardware revisions of the TFT/HB057RU41F08-N101 systems delivered beginning with the first production lot. Note that prototyping systems 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.

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Board Identification (see product label)	Product Revision	Revision ID Register	Remarks
TFT/HB057RU41F08-N101 #1	1	01H	Original Release

Tab. 19 Hardware Revision State

9 Manufacturer Information

9.1. Contact Information

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 a fax or 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, Switzerland

Web: <http://www.syslogic.com>

Email: info@syslogic.com

Technical support: support@syslogic.com

9.2. 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 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 or 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.