

TFT/HMI150-06F1

TFT/PAN150-S1

Document Ordercode: DOC/TFT_HMI150-E



Revision	Date	Author	Modification
1.0	24.07.2007	S.Wyss	Preliminary
1.1	11.09.2007	S.Wyss	added sealing gasket info
1.2	12.10.2007	S.Wyss	added optional products

Contents

1 System Overview	5
1.1. Main Product Features	5
2 Temperature Control	6
2.1. Temperature Control & Heating	6
2.2. Internal vs. External Temperature	6
2.3. OSD Temperature Item	7
3 Brightness Control	8
3.1. How Max. Brightness affects Lifetime	8
3.2. User Presence Detector	9
3.3. Automatic Brightness	9
3.4. Optional Brightness Knob (Potentiometer)	9
3.5. Brightness Control Flowchart	10
3.6. Setting Up the User Presence Detector	11
3.6.1. Recommendations	11
4 Industrial PC (HMI150 only)	12
4.1. Processor Board	12
4.2. System BIOS	12
4.3. Service Cover Plate	12
5 On-screen Display	13
5.1. OSD buttons	13
5.2. OSD layout	14
5.2.1. Main Page	14
5.2.2. Image Adjust Page	14
5.2.3. Colors Page	15
5.2.4. Sensor Control Page	15
5.2.5. Advanced Page	16
5.2.6. Information Page	17
6 Housing & Connectors	18
6.1. Required Tools (not included)	18
6.2. Device Housing (Backside View)	18
6.3. Connector Cover Plate Removal	18
6.4. Connector Layout	19
6.4.1. TFT/HMI150-06F1 Connectors	19
6.4.2. TFT/PAN150-S1 Connectors	19
6.4.3. Power Supply Connector	20
6.4.4. Potentiometer Connector Layout	20

7 Touch Screen	21
7.1. Specification	21
8 Input Video Modes	22
8.1. Supported Video Modes	22
8.2. Supported Video Input Synchronization	22
9 Mechanical Dimensions	23
10 Installation & Mounting Options	25
10.1. Mounting Options	25
10.1.1. Frontside Mounting	25
10.1.2. Flat Mounting with Notch	25
10.1.3. Frontside Mounting with Angles or Mounting Frame	25
10.1.4. Flat Mounting with Angles or Mounting Frame	26
10.2. Sealing Gasket	26
11 Optional Components	27
11.1. Brightness Potentiometer	27
11.2. Mounting Frame	27
11.3. Hard Disk	27
11.4. Power Supply	27
12 Device Specifications	28
13 References	29
14 Product Errata & Revision History	30
14.1. Hardware	30
14.2. Errata (known malfunctions)	30
15 Manufacturer Information	31
15.1. Contact	31
15.2. Warranty	31
List of Tables	
TABLE 1 –POWER SUPPLY CONNECTOR (4-PIN)	20
TABLE 2 –POTENTIOMETER CONNECTOR	20
TABLE 3 –TOUCH SCREEN CHARACTERISTICS	21
TABLE 4 – VIDEO MODES	22
TABLE 5 –DEVICE SPECIFICATIONS	28
TABLE 6 – HARDWARE REVISION STATE	30
TABLE 7 – ERRATA LIST	30

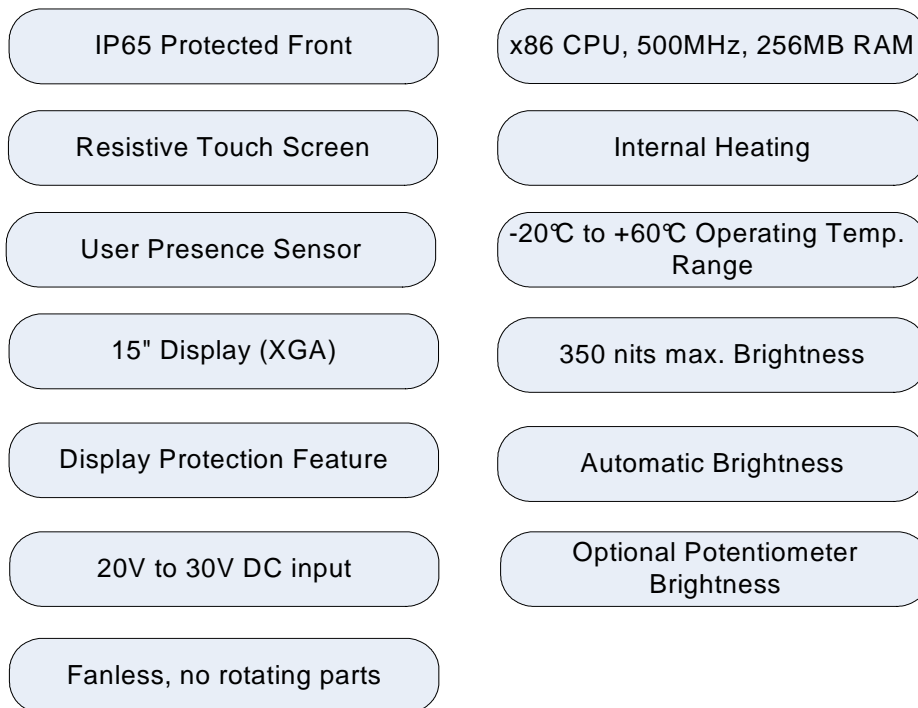
List of Figures

FIGURE 1 – INTERNAL VS. EXTERNAL TEMPERATURE	6
FIGURE 2 – MAX. BRIGHTENSS VS. TIME	8
FIGURE 3 – BRIGHTNESS CONTROL	10
FIGURE 4 – SERVICE OF BATTERY AND COMPACT FLASH CARD	12
FIGURE 5 – OSD PUSHBUTTONS	13
FIGURE 6 – CONNECTOR COVER PLATE	18
FIGURE 7 – TFT/HMI150-06F1 CONNECTORS	19
FIGURE 8 – TFT/PAN150-S1 CONNECTORS	19

1 System Overview

1.1. Main Product Features

The *TFT/HMI150-06FI* (short HMI150) industrial panel PC is a fully self contained PC-compatible computer with integrated 15" TFT display and resistive touchscreen designed for use in extreme and harsh environments. It features special temperature and light sensors to enhance display application domain and lifetime.



The *TFT/PAN150-S1* (short PAN150) is an industrial display panel with touch screen but no x86 PC included.

Note:

Unless otherwise noted, the following descriptions concerning the HMI150 do also apply for the PAN150 product.

2 Temperature Control

2.1. Temperature Control & Heating

The built-in temperature control circuit monitors the temperature with a total of five temperature sensors inside the HMI150. It takes some actions depending on the current measured temperature situation:

- activates the heating to increase backlight lifetime if temperature is low.
- switches the TFT display off if temperature is too high or too low.
- delays power-on of CPU module (once running, CPU will never be switched off).

2.2. Internal vs. External Temperature

The HMI150 has a heating that is automatically enabled by the thermostat if the internal housing temperature falls below a certain temperature level. Please note that the external ambient temperature might be different from the internal housing temperature of the device.

When powering the device at e.g. -20°C temperature, the heating will start but the cpu and display might be still in “off” state because it is too cold inside the housing (see figure 5). After some warm-up time, the display and cpu are in full operational state, the internal housing temperature will be $\sim 0^{\circ}\text{C}$.

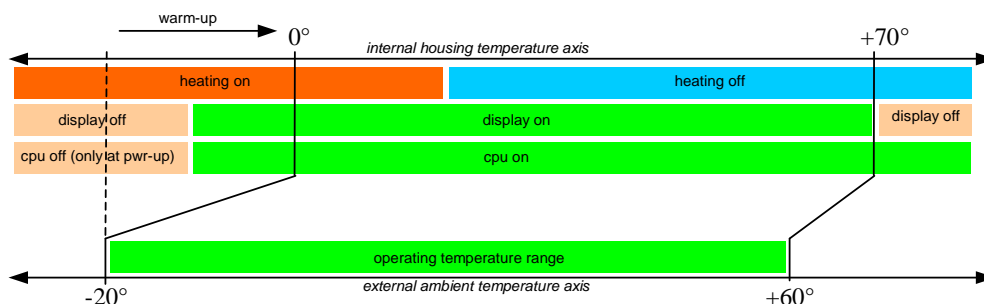


Figure 1 - Internal vs. External Temperature

From now on, the display or cpu will not switch off anymore in the full specified ambient temperature range of -20°C to $+60^{\circ}\text{C}$. The temperature drop between internal housing temperature and external ambient is typically 10°C in operational state with no heating. The heating will provide another 10°C temperature drop. The heating (if active) will draw additional power of ~ 8.5 to 23 Watts depending on the input voltage (44 Ohms heating resistor is directly connected to the unregulated input voltage). The heating can not be disabled by the operator. It is a processor independent module.



Note:

At power-up, the display and cpu might not be functional at cold temperatures (-20°C) until a warm-up time of at least 30 minutes has elapsed.

2.3. OSD Temperature Item

The electronic board temperature is displayed in the OSD menu (Information page, OSD item [7.4]). Please note that this is neither the internal housing temperature nor the external ambient temperature. This temperature display is merely used by the manufacturer as a factory test.

3 Brightness Control

3.1. How Max. Brightness affects Lifetime

The HMI150 has backlight tubes and the maximum brightness of the display will decrease in time. This is heavily influenced by the steady brightness level that is set up. The following graph is taken from Microsemi [1] research labs and shows the max. brightness vs. operational time curve of a tube that is connected to a digital dimming inverter.

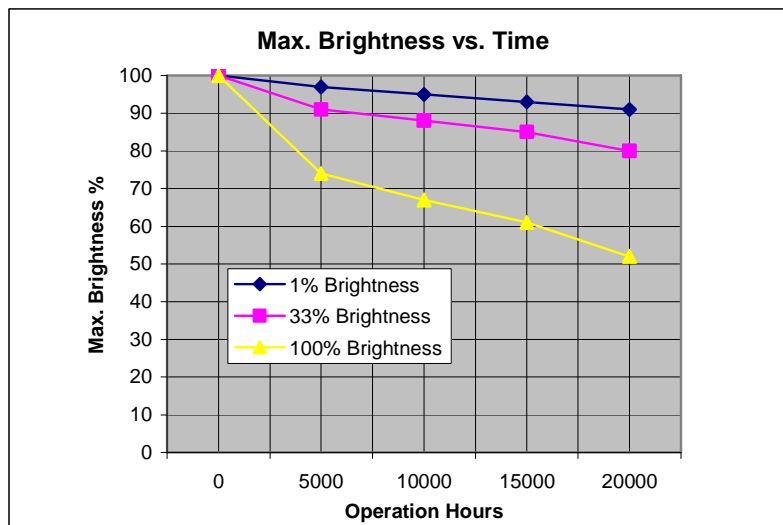


Figure 2 – Max. Brightness vs. Time

Operating the display always at 100% brightness level decreases the display brightness dramatically.

The HMI150 has 3 brightness control features that affect the display brightness:

- User Presence Detector
- Automatic Brightness Sensor
- Optional Brightness Knob (Potentiometer)

Note:

Using the brightness control features of the HMI150 is recommended and will enhance display lifetime.

3.2. User Presence Detector



The HMI150 has a built-in presence detector that detects the user of the HMI150 standing in front of the device. The detection is based on the reflection of infrared light and the sensor can be configured in sensitivity within a distance range of ~1m to 3m dependent on the materials involved into the light reflection.

Note:

The user presence detector (infrared reflector) is almost immune against constant ambient light sources (even at the infrared wavelengths).

The backlight lamp lifetime of the HMI150 is typically limited to 50'000 operational hours at full brightness. The presence sensor can dim the TFT backlight when no user is in front of the device and thus can dramatically improve the overall lifetime of the device.

3.3. Automatic Brightness



The ambient light sensor of the HMI150 can be used to automatically adjust the brightness of the display to the ambient light situation. The brightness of the TFT will be automatically increased to improve readability of the display if there is an intense light source present. The brightness will be decreased in abstruse ambient light conditions to improve the lifetime of the backlight lamp.

Note:

The brightness sensor is a new technology light sensor with spectral response that emulates the human eye. It can adjust the display brightness so that the user of the panel feels the same brightness independent of the current ambient light situation.

3.4. Optional Brightness Knob (Potentiometer)



There is an optional brightness control knob (Potentiometer) that can be mounted in your application (e.g. in the mounting wall) to enable the user of the display to adjust the brightness. Order code is TFT/POT002.

3.5. Brightness Control Flowchart

If enabled, the brightness sensors can influence the resulting display brightness according to the following basic flow chart:

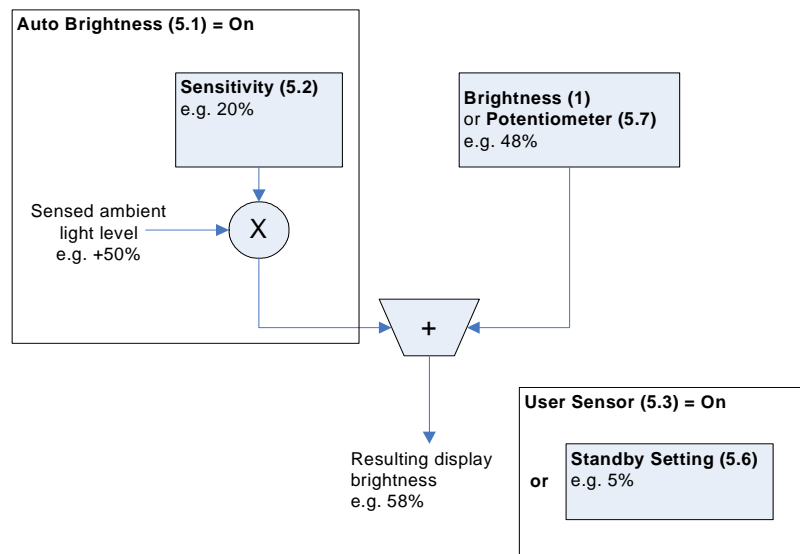


Figure 3 – Brightness Control

The basic brightness setting is *Brightness* [OSD Item 1] which adjusts the display brightness directly if no User Sensor, Auto Brightness or Potentiometer is enabled.

If the *Potentiometer* [OSD 5.7] is enabled, the main *Brightness* [OSD 1] will be overridden by the Potentiometer.

If *Auto Brightness* [OSD 5.1] is enabled the main brightness will further be modified with the sensed ambient light level after scaling it according to “Sensitivity” level [OSD 5.2]. Sensed ambient light level is a value between -100% (dark ambient light) to +100% (very bright ambient light).

Note:

When *Auto Brightness* [OSD 5.1] is enabled, it is recommended to set the default *Brightness* [OSD 1] back to 50% and leave headroom for the brightness variation. When setting the default *Brightness* to 100%, the *Auto Brightness* sensor can not increase the brightness any more.

At last, the resulting display brightness may be completely overridden by the User Sensor [OSD 5.3] with its *Standby Setting* [OSD 5.6] if no user is detected during *Timeout (mins)* [OSD 5.5] minutes. The *Sensitivity* [OSD 5.4] setting of the User Sensor specifies the maximum distance at which a user standing in front of the panel is detected.

3.6. Setting Up the User Presence Detector

You can fine tune the user presence detector to your application needs, i.e. if you have a obstacle (e.g. a wall) at ~ 4m distance from the display, you might want to set up the presence detector to detect users only within a distance of ~ 3m.

The following instructions can be used to set up the presence sensor for such an environment:

1. set *Brightness* [OSD 1] to 100 (%).
2. disable *Auto Brightness* [OSD 5.1].
3. enable *User Sensor* [OSD 5.3].
4. set *Sensitivity* [OSD 5.4] to 32 (ticks). This will set the presence detector for the maximum range.
5. set *Timeout (mins)* [OSD 5.5] to 0. (This will set the brightness to *Standby Setting* brightness immediately if no user is detected).
6. set *Standby Setting* [OSD 5.6] to 0 (%).
7. disable Potentiometer [OSD 5.7].
8. Stand away from the display front, slowly decrease *Sensitivity* [OSD 5.4] until the presence detector display turns dark because the presence detector does not detect the wall obstacle anymore.
9. Test the presence detector by standing in between the obstacle and the front of the display. The display should immediately illuminate.



Note:

Enabling the User Presence Detector will dramatically improve the lifetime of the device and thus is heavily recommended.

3.6.1. Recommendations

- Most important feature for improving display lifetime is the User Presence Detector.
- “Automatic Brightness” can be enabled to prevent e.g. a room intentionally kept dark from bright “noise light” of the display. It also improves display lifetime.

4 Industrial PC (HMI150 only)

4.1. Processor Board

The HMI150 contains the IPC/NETIPC-6ANT processor board from Syslogic, which is a x86 based processor board designed for industrial control systems. It features a 500MHz AMD Geode™ core with a 8-stage pipeline, 64kByte I/D cache and 256MBytes DDR RAM.

For detailed infos on the Processor Board, please consult the processor board manual [1].

4.2. System BIOS

In order to change the BIOS settings (e.g. the boot order) of the processor board you need a USB type keyboard. Plug-in the keyboard in the appropriate USB connector and switch-on the device. Immediately hit and keep pressed the “Del” key to get into the BIOS setting menu.

For detailed infos on the BIOS, please consult the processor board manual [1].

4.3. Service Cover Plate

The processor board has a CompactFlash Type I connector for onboard mountable CompactFlash card which is accessible through the service cover plate of the HMI150. It also has a battery for storing the CMOS Data (BIOS Settings).

For servicing, please remove the service cover plate with a Torx Screwdriver as shown in the following picture.

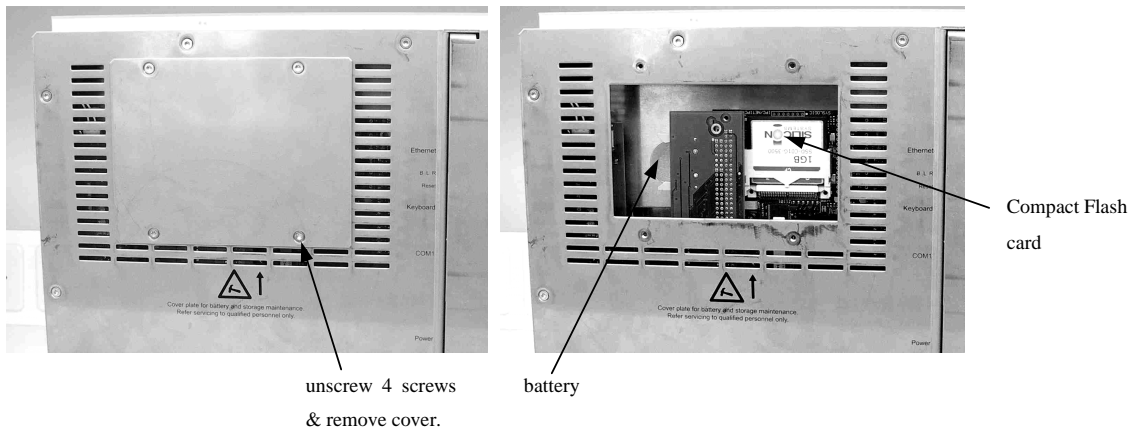


Figure 4 – Service of Battery and Compact Flash card

5 On-screen Display

5.1. OSD buttons

The openings to the buttons for handling the OSD menu are on the back side of the housing. The buttons must be pressed with a pointy item.



Figure 5 – OSD Pushbuttons

LED is not a button but an opening for the TFT status LED.









The OSD buttons have the following function:

ON/OFF:	This button shuts down / brings up the display.
AUTO:	This button triggers the Autosetup. The display will calibrate itself to the given input signal. This function can also be called from the OSD menu.
FEATURE:	This button is not used (reserved for future enhancements).
SELECT:	This button opens the OSD menu or selects the current feature for adjustment.
UP:	This button moves the selector UP on the menu or adjustment bar.
DOWN:	This button moves the selector DOWN on the menu or adjustment bar.





Press the **SELECT** button and the OSD menu will be displayed on screen. Press **UP** or **DOWN** to navigate within the OSD menu, press **SELECT** again to select any feature for changing the current settings.





5.2. OSD layout

5.2.1. Main Page







<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Contrast	Adjust level of color difference between dark and light colors.	1
	Brightness	Adjust the brightness level of the screen	2
	Image adjust	→ to Image adjust page	3
	Colors	→ to Colors page	4
	Sensor Control	→ to Brightness Control page	5
	Advanced	→ to Advanced Settings page	6
	Factory Presets	→ to Advanced Settings page	7
	Exit	Exit the OSD	8

5.2.2. Image Adjust Page



<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Clock	Adjust level of color difference between dark and light colors.	3.1
	Phase	Adjust the brightness level of the screen	3.2
	H Position	Horizontal screen position adjustment	3.3
	V Position	Vertical screen position adjustment	3.4



	Edge Enhance Type	Select the type of edge enhancement (sharpness of the screen).	3.4
	Edge Enhance Level	→ to Advanced Settings page	3.5
	Autosetup	Automatically center, sharpen, and adjust the clock and phase settings of the screen.	3.6
	Back	Back to main page	3.7

5.2.3. Colors Page









<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Color Mode	The mode in which the screen displays color. Available is Manual, Native, sRGB, and TV.	4.1
	Gamma	Adapts the nonlinear brightness perception of gray colors to the human eye (Manual and TV only).	4.2
	White Temperature	Adjust the color balance level of white light displayed on the screen.	4.3
	Hue	Adjust the hue level of the screen.	4.4
	Saturation	Adjust the saturation level of the screen	4.5
	Back	Back to main page	4.6

5.2.4. Sensor Control Page


<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Auto Brightness On/Off	Enable/disable automatic brightness adjustment.	5.1
	- Sensitivity	Sensitivity of the brightness sensor.	5.2
	User Sensor On/Off	Enable/Disable user presence detection	5.3

	- Sensitivity	Sensitivity of the user presence sensor (~1m to 5m distance)	5.4
	- Timeout (mins)	Timeout in minutes until display shutdown if no user is detected.	5.5
	- Standby Setting	Default brightness in display shutdown state.	5.6
	Potentiometer On/Off	Enable/Disable Potentiometer brightness adjustment.	5.7
	Back	Back to main page	5.8

5.2.5. Advanced Page

<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Auto Size	Automatically adjust the displayed image to the screen.	6.1
	OSD Position	Adjust the position of the OSD on-screen.	6.2
	Half Tone On/Off	Enable/disable a semi-transparent background	6.3
	OSD Timeout	Adjust seconds until the OSD shuts down when inactive.	6.4
	Languages	Select English or French page items.	6.5
	Information	→ to Information page	6.6
	Test Pattern 0	Display several full-screen patterns for testing of the display.	6.7
	Back	Back to main page.	6.8

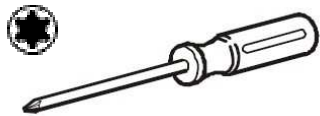
5.2.6. Information Page

<i>Icon</i>	<i>Function</i>	<i>Description</i>	<i>Item</i>
	Sen. Brightness 83 ppc	Display brightness measured by user sensor. Value ranges from 0 to 100.	7.1
	Sen. Presence 0 ppc	Display presence measured by user sensor.	7.2
	Sen. Poti 98 ppc	Display potentiometer setting.	7.3
	Temperature 38 C	Display board level temperature in °C.	7.4
	Lifetime 481h	Display total “on” time of device	7.5
	Back	Back to main page.	7.6

6 Housing & Connectors

6.1. Required Tools (not included)

The following tools are required for installation of the device:



Screw driver: Torx
Size: T10/X10 (M3 Type screw)
Max. Torque: 3.7 Nm

6.2. Device Housing (Backside View)

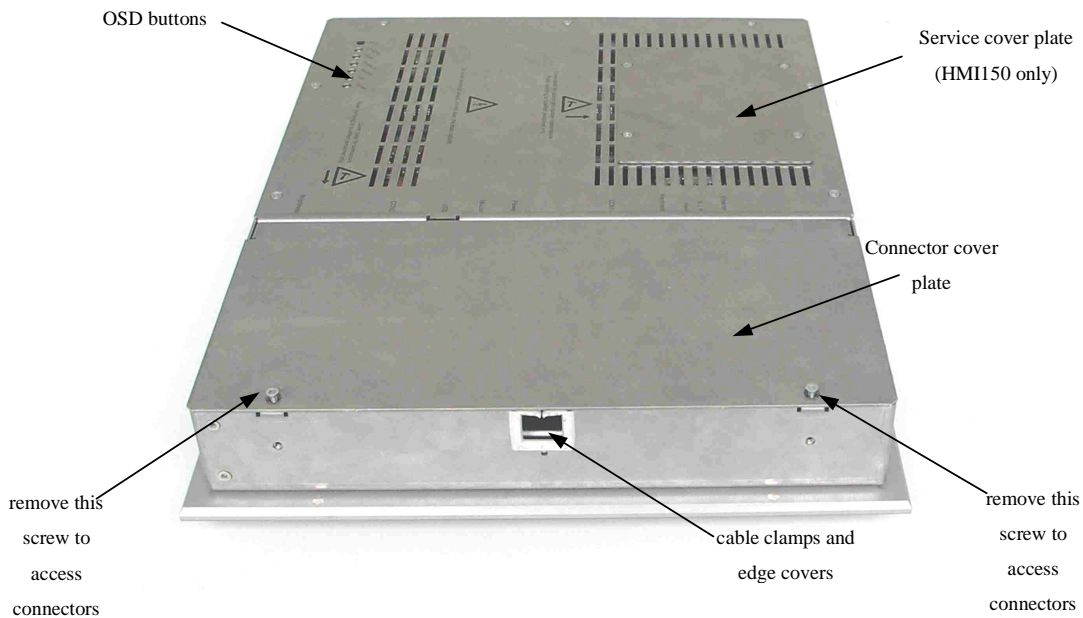


Figure 6 – Connector Cover Plate

6.3. Connector Cover Plate Removal

The device connectors are normally covered with a connector cover plate to protect them from dust and also to cache them from unwanted connector manipulations. You need to remove the cover plate to access the connectors inside the housing. Unscrew the two screws as shown in figure 6.

6.4. Connector Layout

6.4.1. TFT/HMI150-06FI Connectors

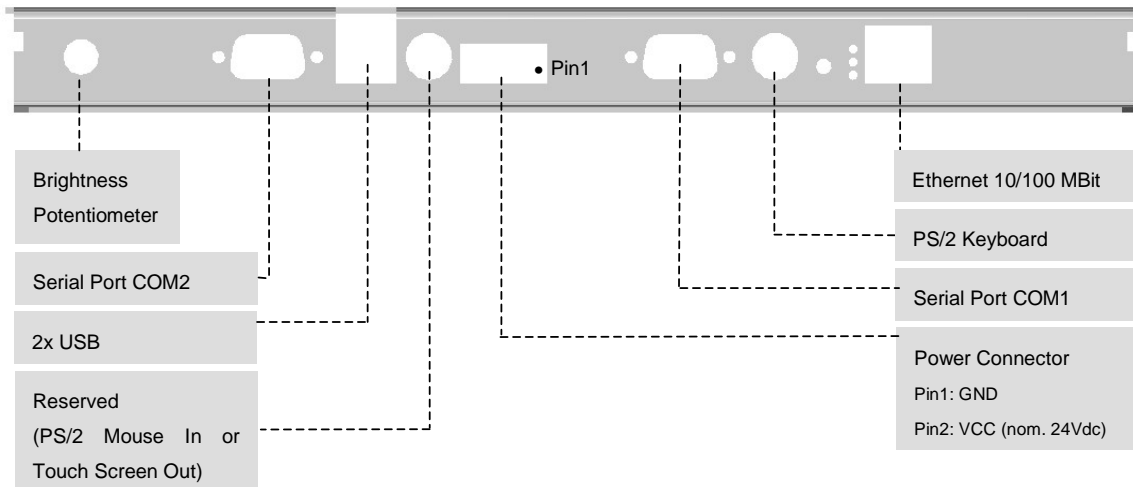


Figure 7 – TFT/HMI150-06FI Connectors

6.4.2. TFT/PAN150-S1 Connectors

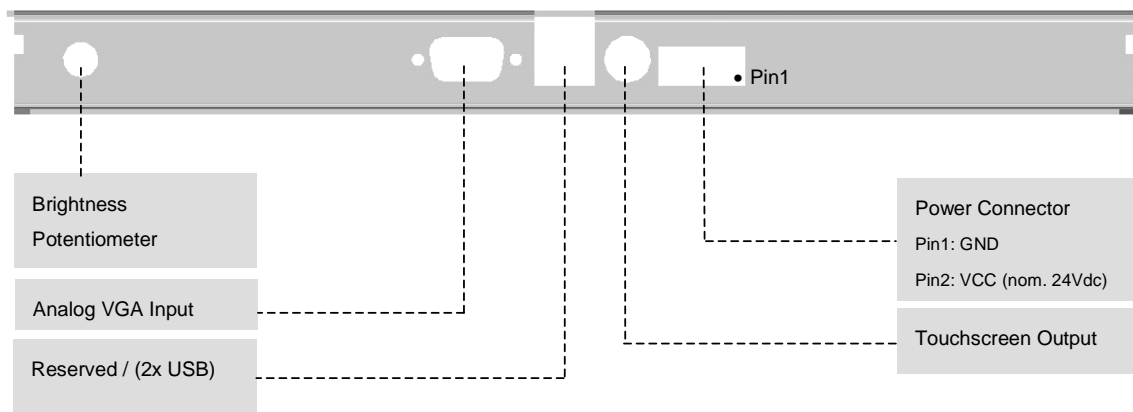


Figure 8 – TFT/PAN150-S1 Connectors

After removing the connector cover plate, the following connectors will show up:

6.4.3. Power Supply Connector

The external 24V input is protected by a diode from reverse polarity and by a fuse from short circuit damage. The input for the external 24Vdc power supply is provided on a **Weidmüller BL 3.5/4F Connector**. The signal layout is compatible with standard PC power supply cabling.

Power Supply Connector (Weidmüller BL 3.5/4F)		
Pin Number	Signal	Remarks
1	GND	
2	+24V	
3	POWERFAIL INPUT	
4	EARTH/HOUSING	

Table 1 –Power Supply Connector (4-Pin)

6.4.4. Potentiometer Connector Layout

The Potentiometer (optional product order code CAB/TFTPOT03-100A) connector is of type “Binder 09-0078-00-03” and has the following layout.

Potentiometer Connector (Binder Series 078)		
Pin Number	Signal	Remarks
1	GND	
2	SENSE	
3	+5V	

Table 2 –Potentiometer Connector

7 Touch Screen

7.1. Specification

General Info	
Type	Analog Resistive Touch Screen
Controller Type	TSHARC-12 (PS/2)
Input Method	Finger, Pen, Glove
Electrical	
Linearity	Less then 1.5% error
Isolation	10MOhms or more @ 25V DC
Chattering Time	Less than 15ms
Mechanical	
Activation Force	Less than 50g
Surface Hardness	3H (Pencil Test) & Hard Coated PET
Impact Resistance	No damage when O9mm stell ball is dropped on the surface from 30cm height at 1 time.
Durability	Hitting: 1'000'000 with O2mm Manuscript Pen, Force 250g, Speed 2 times/sec. Writing: 100'000 ways of 100mm wit O0.8mm Polyacetal Test header, Force 250g, Speed 60mm/sec
Chemical Resistance	
Household Chemicals	Tea, Coffee, Ketchup, Mustard, Vinegar, Beer, Coca-Cola, Red Winde, Cooking Oil, Wisk®, Laundry Detergent, Fantastik®, All Purpose Cleaner, Joy® Dishwashing Liquid, Windex®, Formula 409® Cleaner, Clorox® Bleach (5.25%), Hydrogen Peroxide (3%), Lysol, Ethylic Alcohol, Isopropyl Alcohol.
Industrial Chemicals	Acetone, Methyl Ethyl Ketone (MEK), Toluene, Concentrated Hydrochloric Acid, Naptha, Mineral Spirits, Gasoline, 10W30 Motor Oil, Diesel Fuel, Transmission Fluid, Brake Fluid, Antifreeze, Hydraulic Oil.

Table 3 –Touch Screen Characteristics

8 Input Video Modes

8.1. Supported Video Modes

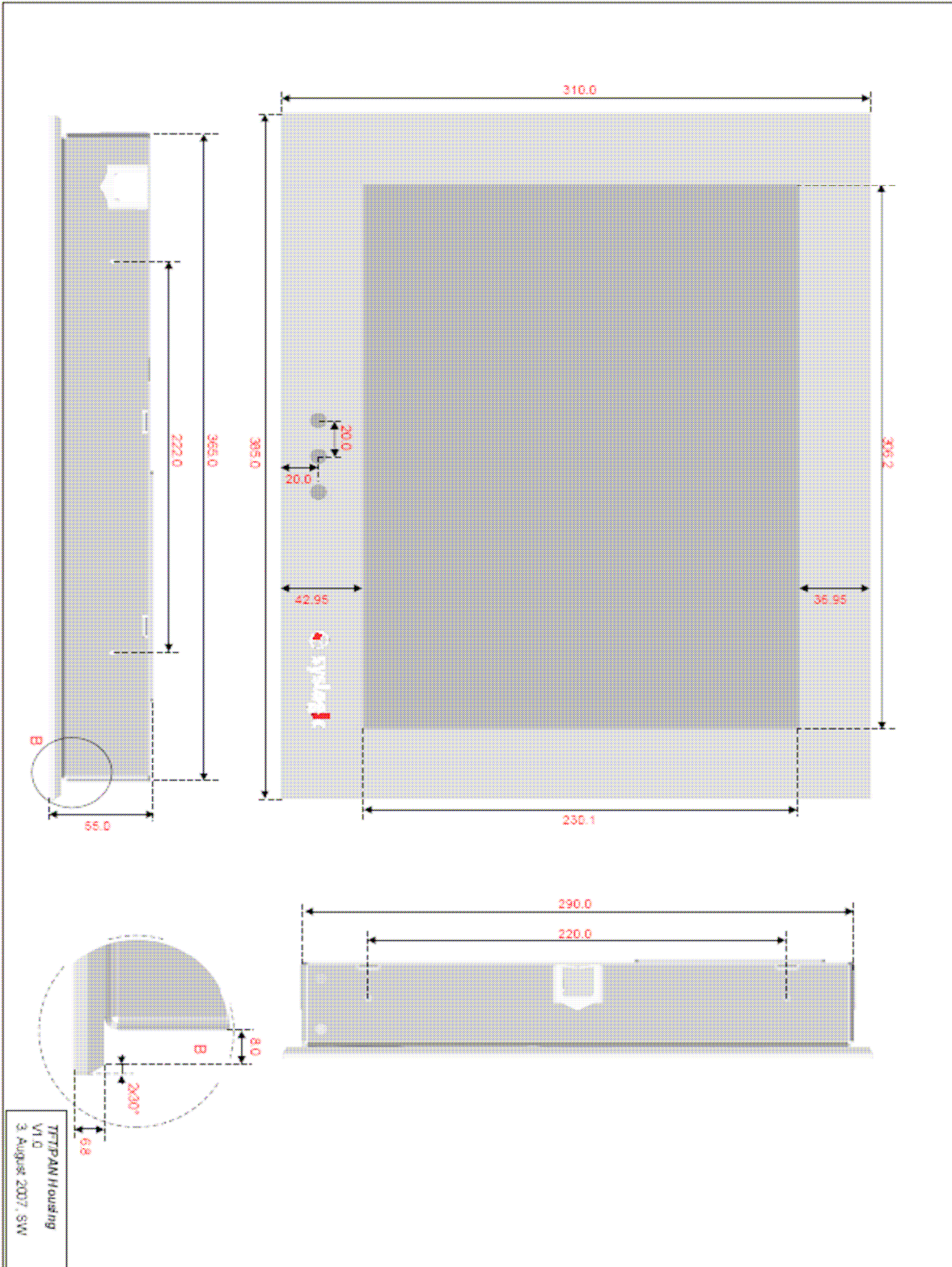
Resolution	Frequency [Hz]	Standard
640 x 480	60	IBM VGA
	67	MAC II
	72	VESA
	75	VESA
	85	VESA
720 x 400	70	IBM VGA
800 x 600	56	VESA
	60	VESA
	72	VESA
	75	VESA
	85	VESA
832 x 624	75	MAC II
1024 x 768	43	IBM 8514A
	60	VESA
	70	VESA
	75	VESA
	85	VESA
1152 x 870	75	MAC II
1280 x 1024	60	VESA
	75	VESA
	85	VESA
1280 x 1280	68	VESA
1600 x 1200	60	VESA
	75	VESA

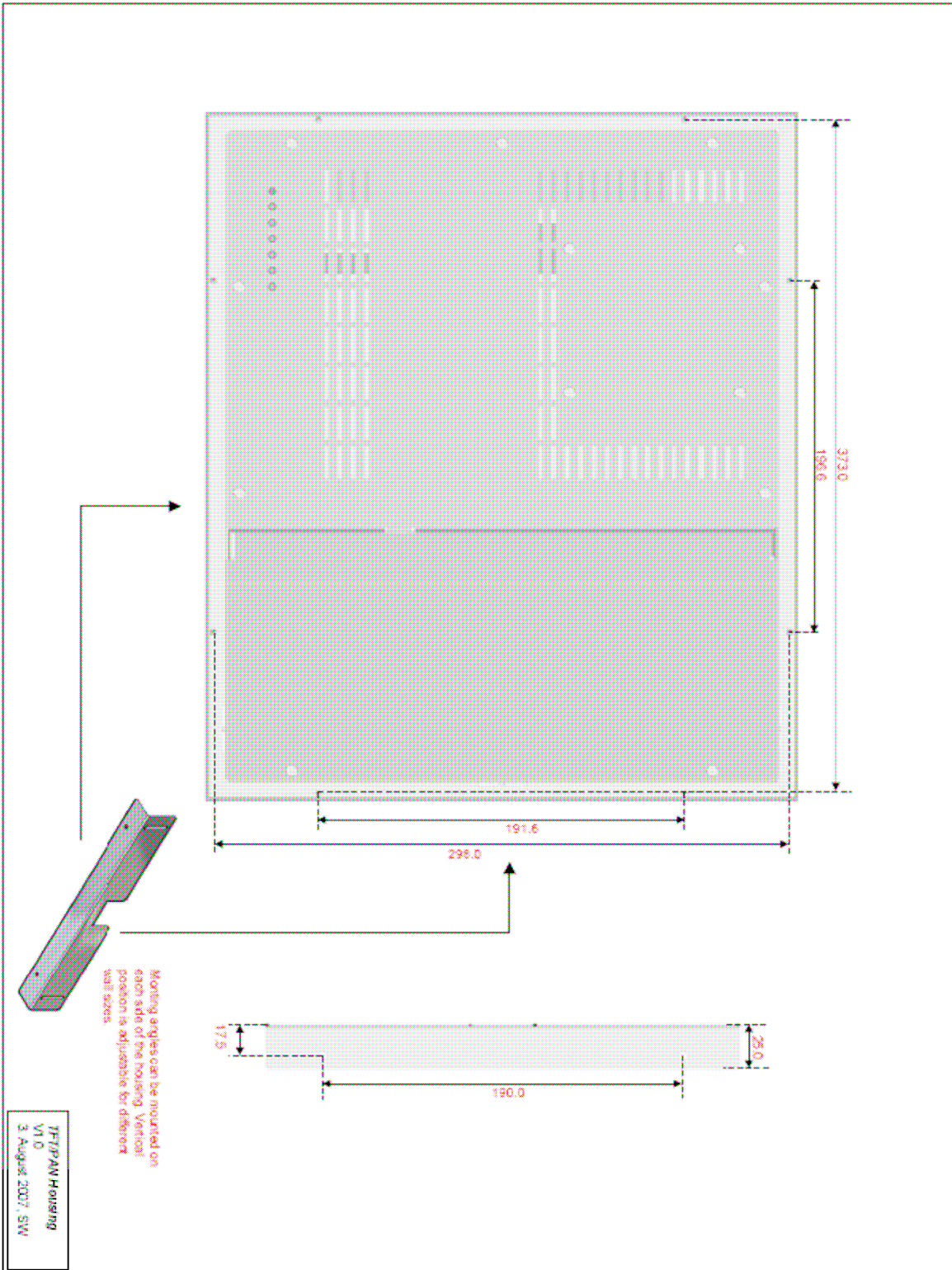
Table 4 – Video Modes

8.2. Supported Video Input Synchronization

- Separate
- Composite
- Sync on green (SOG)

9 Mechanical Dimensions





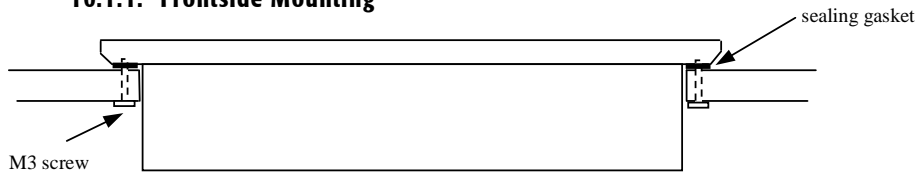
10 Installation & Mounting Options

10.1. Mounting Options

The HMI150 and PAN150 can be mounted with different mounting options. Please see the drawings below for recommended solutions. The specified insertion depth for all screws into the corresponding bushings is:

6mm (6.5 mm max.)

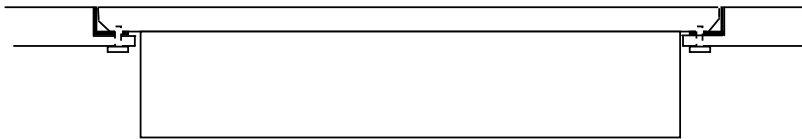
10.1.1. Frontside Mounting



Recommended Wall Cutout Dimension (+/- 1mm):

Cutout: 367 mm x 292 mm (+/- 1mm)

10.1.2. Flat Mounting with Notch

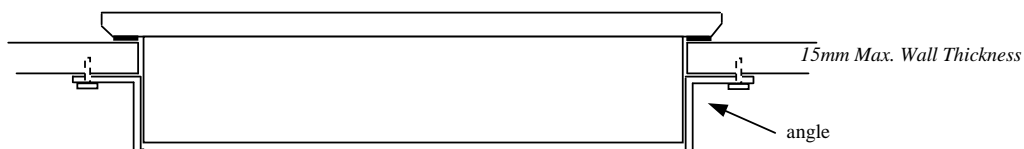


Recommended Wall Cutout Dimension (+/- 1mm):

Cutout: 367 mm x 292 mm

Notch : 387mm x 312 mm

10.1.3. Frontside Mounting with Angles or Mounting Frame

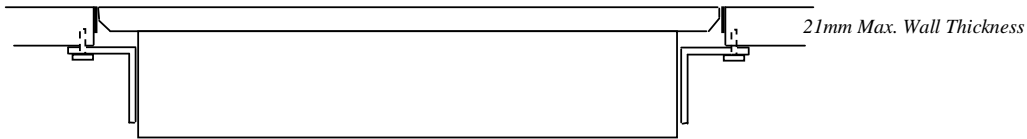


Recommended Wall Cutout Dimension (+/- 1mm):

Cutout: 367 mm x 292 mm (+/- 1mm)

The mounting frame is an optional product (order code TFT/MKIT150-02F).

10.1.4. Flat Mounting with Angles or Mounting Frame



Recommended Wall Cutout Dimension (+/- 1mm):

Cutout: 387mm x 312 mm

10.2. Sealing Gasket

Syslogic recommends the use of a sealing gasket with UV protection and temperature stability like the GYSO G-540.

GYSO-Dichtband G-540

Type:	one side adhesive, UV protected, elastic PVC gasket, inflammable.
Resistance:	UV, consistent with weak acid and base, fungal decay resistant.
Sealing Spec.:	airproof when compressed 90%, waterproof when compressed 60%.
Temperature Spec.:	-20°C to +80°C (+95°C short time).
Manufacturer:	GYSO (http://www.gyso.ch).
Order Code:	e.g. G-540 30m x 6mm (multiple sizes available).

11 Optional Components

11.1. Brightness Potentiometer

Brightness Potentiometer
order code: TFT/POT002



Potentiometer (knob) with attached cable for external brightness setting. The TFT/POT002 can be mounted anywhere in your application. Cable length is 2m. The potentiometer overrides the brightness setting (OSD menu position 1).

When enabling the brightness potentiometer, the user presence sensor and the brightness sensor are still fully functional.

11.2. Mounting Frame

Mounting Frame
order code: TFT/MKIT150-02F



Instead of mounting the TFT plain or with the delivered angles, there is an optional mounting frame available for sealing of the application when a “flat” mounting style without any wall notch is chosen (see 10.1.4).

11.3. Hard Disk

Hard-Disk
order code: TFT/HDD20G-1A



The optional 20 GByte rugged Hard-Disk (temp. spec. -30°C to $+85^{\circ}\text{C}$) can be mounted instead of the service cover and is an alternative for Compact Flash cards. The assembly of TFT/HDD20G-1A leads to additional 15mm in device housing depth.

11.4. Power Supply

Power-Supply
order code: CPN/SDA24V55W-4



Syslogic offers a power supply for all the TFT/HMI150 family members. Note that this power supply does not support the powerfail features of the TFT/HMI150-06F1® systems.

12 Device Specifications

Parameter	Symbol	min	nom	max	Unit
over recommended operating free-air temperature range T_a					
Absolute Maximum Ratings (failure in compliance may damage the device)					
creepage distance (logic to chassis and PCB border)		1.0			mm
storage temperature range	T_st	-20		+80	°C
Recommended Operating Conditions (failure in compliance may degrade device performance)					
operating free-air temperature range	T_a	-20		+60	°C
input voltage	V_cc	20	24	30	V
Electrical Input Characteristics					
<i>supply current TFT/HMI150-06F1</i>					
V _{cc} =20.0V	I _{cc}		1585 (2)	2475 (3)	mA
V _{cc} =24.0V			1275 (2)	2330 (3)	
V _{cc} =30.0V			1035 (2)	2080 (3)	
<i>supply current TFT/PAN150-S1</i>					
V _{cc} =20.0V	I _{cc}		1300	1900	mA
V _{cc} =24.0V			1035	1850	
V _{cc} =30.0V			845	1700	
Electrical Output Characteristics					
<i>5V nominal output</i>					
USB bus voltage	V_usb	4.75	5.0	5.25	V
max. USB bus supply current (V _{usb} =5V)	I_usb			200	mA
PS/2 bus voltage	V_ps2	4.75	5.0	5.25	V
max. PS/2 bus supply current (V _{ps2} =5V)	I_ps2			150	mA
efficiency	E_5v	70	75		%
Optical Characteristics					
response time (white to black/black to white)	Tr		6/19		ms
max. brightness (with touch screen and front-foil)	Bt		330		cd/m ²
contrast ratio	Ctr	250:1	400:1		

Table 5 –device specifications

- (1) After powerup, the device may not be full functional as the built-in thermostat prevents the TFT panel from being powered on. Heating time constant is approx. 30mins (until full functionality is achieved).
- (2) unloaded device, i.e. no USB, no PS/2, no heating, no optional harddisk, 100% display brightness.
- (3) loaded device, i.e. full USB load, full PS/2 load, heating active, 100% display brightness and optional harddisk mounted (max. Hard-Disk startup current is 1.1 Amps @ 5Volt).

13 References

- [1] **IPC/NETIPC-6A User Documentation**
DOC/IPC_NETIPC6-E, available from Syslogic (www.syslogic.ch)
- [2] **TFT/GPHMI-1A User Documentation**
DOC/TFT_GPHMI-E, available from Syslogic (www.syslogic.ch)
- [3] **IPC/WINXPE-6A Windows XP Embedded Kit**
IPC/WINXPE-6A, available from Syslogic (www.syslogic.ch)

14 Product Errata & Revision History

14.1. Hardware

This paragraph lists the different hardware revisions of the TFT/HMI150-06F1 and TFT/PAN150-S1 devices delivered beginning with the first production lot. Note that prototyping releases 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.

Board Identification (see product label)	Product Revision	Revision ID Register	Remarks
TFT/HMI150-06F1 #1	1	n.a.	Original Release, RoHS compliant
TFT/PAN150-S1 #1	1	n.a.	Original Release, RoHS compliant

Table 6 – hardware revision state

14.2. Errata (known malfunctions)

The following list denotes known errors of the TFT/HMI150-06F1 and the TFT/PAN150-S1 devices.

Board Identification (see product label)	Product Revision	Erratum Nr.	Description
TFT/HMI150-06F1 #1	1	-	-
TFT/PAN150-S1 #1	1	-	-

Table 7 – errata list

15 Manufacturer Information

15.1. 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 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
Täferstrasse 28
CH-5405 Baden-Dättwil / Switzerland

Email: info@syslogic.ch
www: <http://www.syslogic.ch>
Fax: +41 56 200 90 50
Tel: +41 56 200 90 40

Technical support:
support@syslogic.ch

15.2. Warranty

Our products are covered by a world-wide manufacturers 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 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.