


MCT070HDMI-A	800 x 480	HDMI Interface	TFT Module
<b>Specification</b>			
Version: 4		Date: 16/08/2018	
<b>Revision</b>			
1	13/11/2017	First issue	
2	30/01/2018	Modify temperature.	
3	11/06/2018	Modify PCB & Electrical Characteristics	
4	16/08/2018	Add LED life time	

Display Features			
Display Size	7.0"		
Resolution	800 x 480		
VGA Size	WVGA		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	5V		
Interface	HDMI		
Brightness	460 cd/m <sup>2</sup>		
Touchscreen	CTP		
Module Size	165.00 x 100.00 x 24.70mm		
Operating Temperature	-20°C ~ +70°C		
Pinout	50 - Way		
		Box Quantity	Weight / Display
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\* - For full design functionality, please use this specification in conjunction with the TFP401 specification. (Provided Separately)

Display Accessories	
Part Number	Description
MCIB-HDMI/HDMI	Male To Male HDMI Connector

Optional Variants	
Appearances	Voltage
Capacitive Touch Panel Resistive Touch Panel	



# Summary

TFT 7.0" is a TN transmissive type color active matrix TFT liquid crystal display that uses amorphous silicon TFT as switching devices. This module is composed of a TFT\_LCD module. It is usually designed for industrial application and this module follows RoHs.

## Troubleshooting

### Introduction

Our range of Midas HDMI displays with direct connectivity to Raspberry Pi are compatible with all models up to Raspberry Pi 3 Model B. However, for the latest version of Raspberry Pi 3 Model B+ there is a minor compatibility issue. Fortunately we have an easy fix for this, and here we will show you everything you need to know.

### The Issue

All the boards on our Midas HDMI displays have a 5V to 3.3V regulator for supplying various components on the board when only 5V is supplied. Raspberry Pi boards also have a similar regulator, but unfortunately there seems to be a conflict between the two regulators when both display and Raspberry Pi are connected.

### The Solution

To solve this issue, you simply remove the 3.3V regulator by de-soldering it from our board. On the 5" displays (MCT050HDMI) this component is labelled "U5". For the 7" (MCT070HDMI) and 10.1" (MCT101HDMI) displays the component is labelled "U6". After removing this component, the display will work with all Raspberry Pi versions including models B and B+.

In order to remove this component, first apply a reasonable amount of solder between the three parallel pins until they are all connected together. The top individual pin is already connected to the bottom middle pin, so simply apply heat with the soldering iron on the three connected pins until the solder melts, and then quickly remove the component with a tweezer. Finally remove any excess solder and ensure there is no bridging/connection over the solder pads on the board.

### F.A.Q.

**Q.** Is this solution reversible? Can I put the component back after removing it?

**A.** Yes, this solution is not permanent. If the component has not been damaged by mishandling and was correctly removed, it can then be placed back using a normal soldering procedure.

**Q.** Will this solution damage the board/display?

**A.** This depends on how the procedure is handled. Please ensure that the person applying this method has some experience in soldering components and the correct health & safety procedures are applied. If care is taken, then this should not cause any damage to the board or display.



## General Specifications

- Size: 7.0 inch
- Dot Matrix: 800 x RGBx480(TFT) dots
- Module dimension: 165.0(W) x 100(H) x 24.7(D) mm
- Active area: 154.08 x 85.92 mm
- Dot pitch: 0.0642 x 0.179 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Aspect Ratio: 16:9
- Backlight Type: LED, Normally White
- Interface: HDMI
- With /Without TP: Without TP
- Surface: Anti-Glare

\*Color tone slight changed by temperature and driving voltage.

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# Interface

## 1. CON5/CON6

Pin No.	Symbol	Function	Remark
1	3.3V	Raspberry Pi:Power 3.3V	
2	5V	Raspberry Pi:Power 5V	
3	GPIO02	Raspberry Pi:GPIO02	
4	5V	Raspberry Pi:Power 5V	
5	GPIO03	Raspberry Pi:GPIO03	
6	GND	Raspberry Pi:GND	
7	GPIO04	Raspberry Pi:GPIO04	
8	GPIO14	Raspberry Pi:GPIO14	
9	GND	Raspberry Pi:GND	
10	GPIO15	Raspberry Pi:GPIO15	
11	GPIO17	Raspberry Pi:GPIO17	
12	GPIO18	Raspberry Pi:GPIO18 (Backlight Enable)	
13	GPIO27	Raspberry Pi:GPIO27	
14	GND	Raspberry Pi:GND	
15	GPIO22	Raspberry Pi:GPIO22	
16	GPIO23	Raspberry Pi:GPIO23	
17	3.3V	Raspberry Pi:3.3V	
18	GPIO24	Raspberry Pi:GPIO24	
19	GPIO10	Raspberry Pi:GPIO10	
20	GND	Raspberry Pi:GND	
21	GPIO09	Raspberry Pi:GPIO09	
22	GPIO25	Raspberry Pi:GPIO25	
23	GPIO11	Raspberry Pi:GPIO11	
24	GPIO08	Raspberry Pi:GPIO08	
25	GND	Raspberry Pi:GND	
26	GPIO07	Raspberry Pi:GPIO07	
27	ID_SD	Raspberry Pi:ID_SD	
28	ID_SC	Raspberry Pi:ID_SC	
29	GPIO05	Raspberry Pi:GPIO05	
30	GND	Raspberry Pi:GND	
31	GPIO06	Raspberry Pi:GPIO06	



32	GPIO12	Raspberry Pi:GPIO12	
33	GPIO13	Raspberry Pi:GPIO13	
34	GND	Raspberry Pi:GND	
35	GPIO19	Raspberry Pi:GPIO19	
36	GPIO16	Raspberry Pi:GPIO16	
37	GPIO26	Raspberry Pi:GPIO26	
38	GPIO20	Raspberry Pi:GPIO20	
39	GND	Raspberry Pi:GND	
40	GPIO21	Raspberry Pi:GPIO21	

## 2. HDMI

Pin No.	Symbol	I/O	Function	Remark
1	Rx2+	I	+LVDS Differential Data Input	
2	GND	P	Ground	
3	Rx2-	I	-LVDS Differential Data Input	
4	Rx1+	I	+LVDS Differential Data Input	
5	GND	P	Ground	
6	Rx1-	I	-LVDS Differential Data Input	
7	Rx0+	I	+LVDS Differential Data Input	
8	GND	P	Ground	
9	Rx0-	I	-LVDS Differential Data Input	
10	RxC+	I	+LVDS Differential Clock Input	
11	GND	P	Ground	
12	RxC-	I	-LVDS Differential Clock Input	
13-14	NC	-	No connection	
15	SCL	I/O	DDC(Data Display Channel) Clock	
16	SDA	I/O	DDC(Data Display Channel) Data	
17	GND	P	Ground	
18	5V	P	Power Supply	
19	Detect	I/O	Hot plug detect	

I: input, O: output, P: Power



### 3. POWER JACK

Pin No.	Symbol	I/O	Function	Remark
1	5V	P	Power Supply	
2	GND	P	Ground	
3	NC		No connection	

### Contour Drawing

POWER JACK	
PIN NO.	SYMBOL
1	5V
2	GND
3	NC

HDMI	
PIN NO.	SYMBOL
1	RX2+
2	GND
3	RX2-
4	RX1+
5	GND
6	RX1-
7	RX0+
8	GND
9	RX0-
10	RXC+
11	GND
12	RXC-
13	NC
14	NC
15	SCL
16	SDA
17	GND
18	5V
19	Detect

CON5/CON6			
Pin	Symbol	Pin	Symbol
1	3.3V	21	GPIO09
2	5V	22	GPIO25
3	GPIO02	23	GPIO11
4	5V	24	GPIO08
5	GPIO03	25	GND
6	GND	26	GPIO07
7	GPIO04	27	ID_SD
8	GPIO14	28	ID_SC
9	GND	29	GPIO05
10	GPIO15	30	GND
11	GPIO17	31	GPIO06
12	GPIO18	32	GPIO12
13	GPIO27	33	GPIO13
14	GND	34	GND
15	GPIO22	35	GPIO19
16	GPIO23	36	GPIO16
17	3.3V	37	GPIO26
18	GPIO24	38	GPIO20
19	GPIO10	39	GND
20	GND	40	GPIO21

2 — 1  
(GND) (5V)

The non-specified tolerance of dimension is  $\pm 0.3\text{mm}$ .



## Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

- Temp.  $\leq 60^{\circ}\text{C}$ , 90% RH MAX. Temp.  $> 60^{\circ}\text{C}$ , Absolute humidity shall be less than 90% RH at  $60^{\circ}\text{C}$

## Electrical Characteristics

Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	4.9	5	5.1	V	-
Supply Current For LCM	IDD	—	—	640	940	mA	Note 1
LED Life Time	—	—	—	50,000	—	Hr	Note 3

Note 1 : This value is test for VDD =5.0V , Ta=25°C only

Note 2 : Display with Raspberry pi the driver power is over USB , first make sure you have a 2A power supply, with a good quality USB cable, a thin wire power cable is no good. Make sure its 24AWG or smaller, shorter USB cables are better too.

Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.



# Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time	Tr	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	10	20	.ms	Note 3
	Tf		-	15	30	.ms	
Contrast ratio	CR	At optimized viewing angle	400	500	-	-	Note 4
Color Chromaticity	White	Wx	0.26	0.31	0.36	-	Note 2,5,6
		Wy	0.28	0.33	0.38	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\Theta_R$	60	70	-	Deg.	Note 1
		$\Theta_L$	60	70	-		
	Ver.	$\Phi_T$	40	50	-		
		$\Phi_B$	60	70	-		
Brightness	-	-	350	460	-	cd/m <sup>2</sup>	Center of display

Ta=25±2°C, IL=180mA

Note 1: Definition of viewing angle

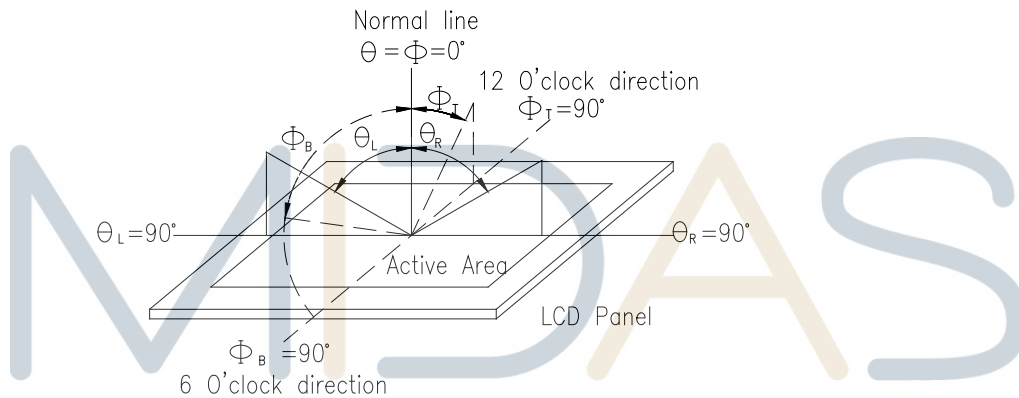


Fig. 8.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

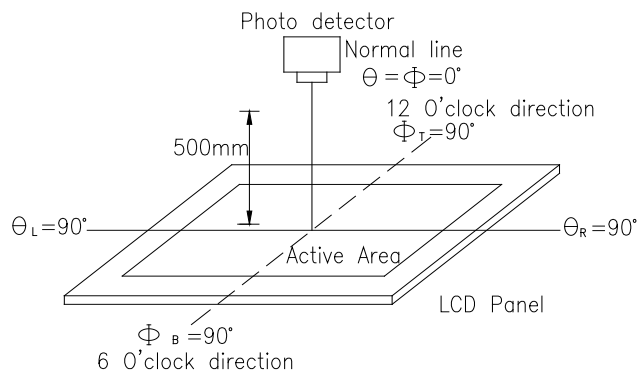


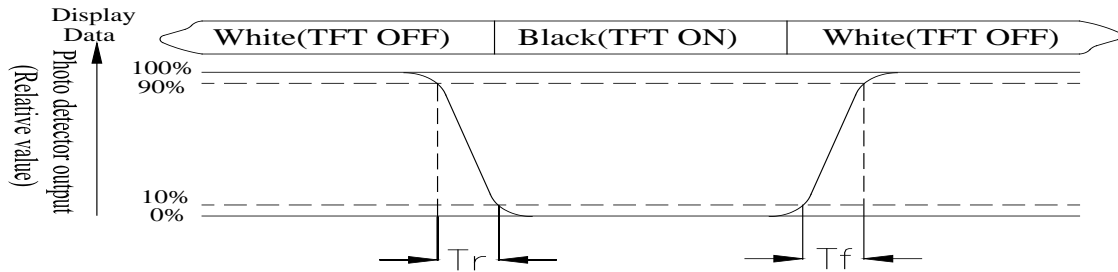
Fig. 8.2. Optical measurement system setup





Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

"±" means that the analog input signal swings in phase with VCOM signal.

"±" means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.



# Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation  <div style="text-align: center;"> <p style="margin: 0;">-20°C    25°C    70°C</p> <p style="margin: 0;">30min   5min   30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact) ,±800v(air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.



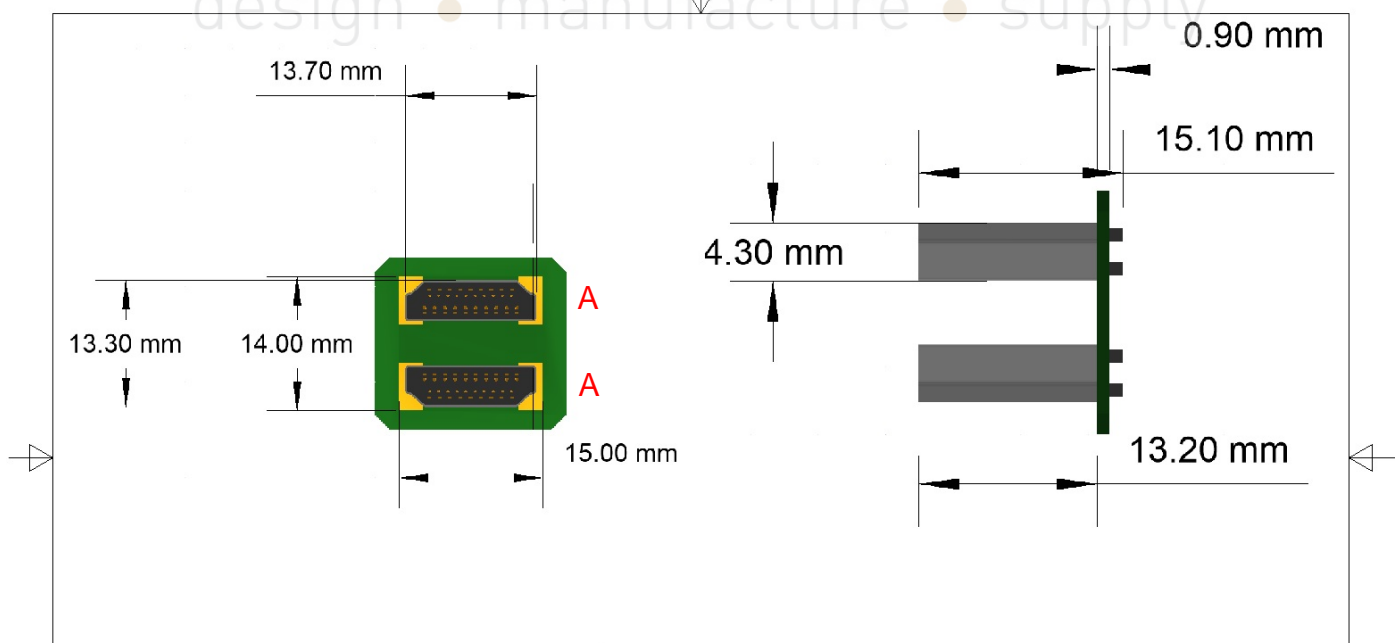
MCIB-HDMI/HDMI		Interconnect Board	
<b>Specification</b>			
Version: 1		Date: 16/04/2018	
<b>Revision</b>			
1	16/04/2018	First Release.	

Compatible Displays	
Part Number	Description
MCT050HDMI-A-RTP	5" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT050HDMI-A-CTP	
MCT070HDMI-B-RTP	7" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT070HDMI-B-CTP	
MCT101HDMI-A-RTP	10.1" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT101HDMI-A-CTP	

Interconnect Board Description	
	Description
A	Male HDMI Connector

# MIDAS

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Allow for +/- 2-3mm  
for all dimensions.

		Midas Components Ltd	
TITLE <b>MCIB-HDMI/HDMI</b>			
SIZE A4	CAGE CODE	DWG NO	REV 1
SCALE 1.5:1	SHEET		

