User Manual
ECA20-MH Adapter Board



Chengdu Ebyte Electronic Technology Co.,Ltd.

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1. Introduction

1.1. Brief Introduction

The ECA20-MH series adapter board is designed based on the GSV1172 chip of Keystone Kurien, it supports MIPI DSI signal to HDMI signal, and it is suitable for converting MIPI signal to HDMI signal of EBYTE ECB30, ECB31, ECB32, ECB33 series products. Maximum resolution support 4K@30Hz, the product comes with firmware, can be used directly, without secondary development, easy to use. Adapter board leads to UART and JTAG signals to facilitate late debugging and burning program.

1. HDMI 1.4b standard;
2. in line with HDCP 1.4;
3. HDMI data rate of up to 9Gbps (TMDS 3Gbps/3 channels);
4. DDC/HPD/CEC pin 5V withstand voltage;
5. support for the use of the D-PHY interface to receive the MIPI DSI-2 v2.0 version;
6. support for the 2.5G bps 1/2/3/4-channel MIPI D-PHY input

1.2. Basic parameters

1. Display input interface: 4-lane MIPI-DSI;
2. Display output interface: HDMI 1.4;
3. Debugging interface: UART, JTAG;
4. resolution:1920*1080P@60Hz;
5. Size of the adapter board: 45*34*15mm;
6. Operating temperature: -40℃~85℃;
7. Storage temperature: -40℃~125℃;

1.3. Electrical parameters

1. MIPI display input connector: 26Pin, 0.5mm pitch, FPC lower contact connector;
2. HDMI display output connector: standard 19Pin HDMI-A connector;
3. debugging connector: 10Pin 2.54mm row of pins, not installed;
4. power consumption: 0.5W;

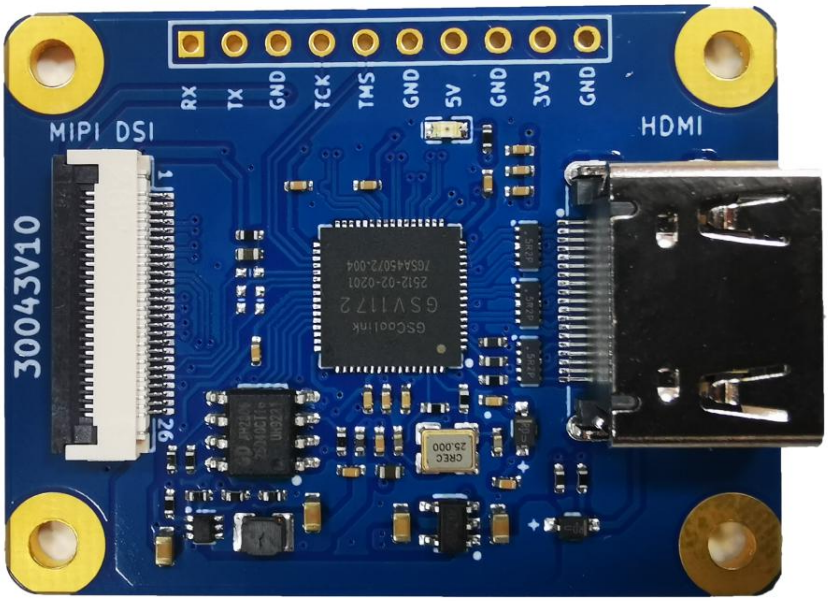
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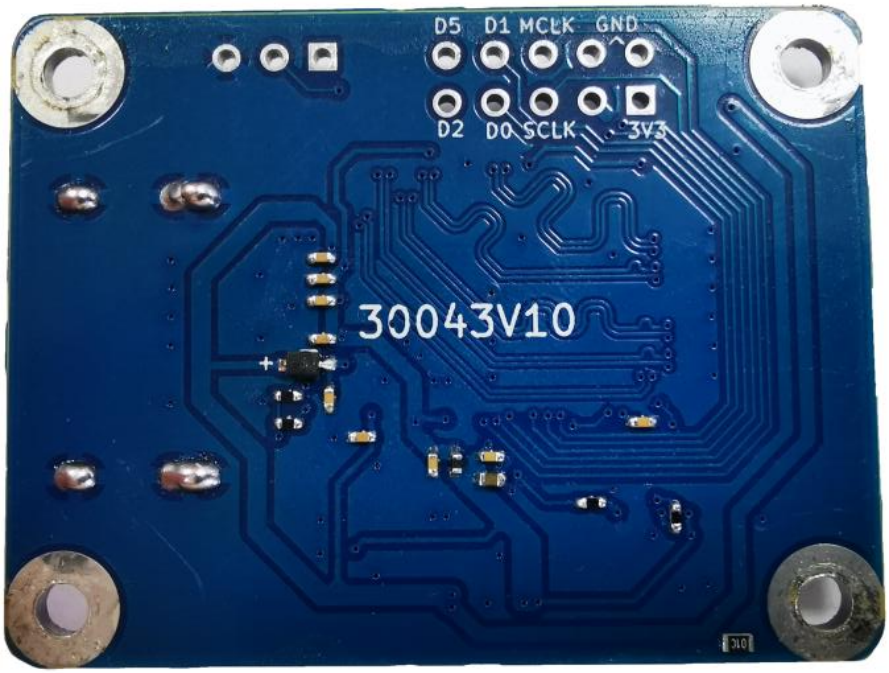
2. Instructions for use

2.1. Touch screen appearance display

The appearance of the ECA20-MHA1-I adapter board is shown below:



Front view of ECA20-MHA1-I adapter plate



ECA20-MHA1-I Adapter Board Backside Picture

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2.2. MIPI Input Interface Pin Description

The ECA20-MHA1-I adapter board connects to the SBC via a 26P FPC connector cable, with pin numbers 1 and 26 identified by PCB silkscreen.

When installing the cable, please note that the black side is facing up.Pin 1 of the MIPI interface on the single-board computer corresponds to Pin 1 of the adapter module. Ensure correct alignment to prevent reverse connection. Additionally, use a 26-pin FPC cable with reversed orientation when connecting the adapter module to Ebyte's Allwinner series single-board computers.

as shown in the figure below:



ECA20-MHA1-I Adapter Board MIPI Input Interface Diagram

The detailed description of the pins is shown in the table below:

ECA20-MHA1-I Adapter Board MIPI Input Interface Pinout Table

No	Name	instruction	IO level
1	GND	Grounding	0V
2	NC	/	/
3	GND	Grounding	0V
4	DSI_D3N	MIPI Data Differential Signal	1.8V
5	DSI_D3P	MIPI Data Differential Signal	1.8V
6	GND	Ground	0V
7	DSI_D2N	MIPI data differential signal	1.8V
8	DSI_D2P	MIPI data differential signal	1.8V
9	GND	Ground	0V
10	DSI_D0N	MIPI data differential signal	1.8V
11	DSI_D0P	MIPI data differential signal	1.8V
12	GND	Ground	0V
13	DSI_CLKN	MIPI clock differential signal	1.8V
14	DSI_CLKP	MIPI clock differential signal	1.8V
15	GND	Ground	0V
16	DSI_D1N	MIPI data differential signal	1.8V
17	DSI_D1P	MIPI data differential signal	1.8V
18	GND	Ground	0V

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19	NC	/	/
20	NC	/	/
21	DSI_RESET	Adapter Chip Reset Signal	3.3V
22	DSI_TP_SDA	12C Data Signal	3.3V
23	DSI_TP_SCL	12C Clock Signal	3.3V
24	NC	/	/
25	VIN_5V	5V Power Input	5V
26	VIN_5V	5V Power Input	5V

Note:

The reset signal of the GSV1172 converter chip adopts RC circuit reset by default, no software control is needed, if you need to use external input reset, you need to weld R4 resistor on it and then control it with DSI_RESET on pin 21.

Pin 22 and 23 are I2C signals, not used by default, if you need to use I2C to communicate with GSV1172, you need to solder R11 and R12 resistors.

2.3. HDMI Output Interface Pin Descriptions

The HDMI interface uses the standard 19Pin HDMI-A female connector, as defined in the table below:

ECA20-MHA1-I Adapter Board MIPI Input Interface Pinout Table

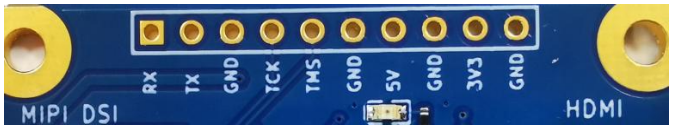
No	Name	Instruction	IO level
1	HDMI_TX2P	HDM data differential signal	1.8V
2	GND	Ground	0V
3	HDMI_TX2N	HDM data differential signal	1.8V
4	HDMI_TX1P	HDM data differential signal	1.8V
5	GND	Ground	0V
6	HDMI_TX1N	HDM data differential signal	1.8V
7	HDMI_TX0P	HDM data differential signal	1.8V
8	GND	Ground	0V
9	HDMI_TX0N	HDM Data Differential Signal	1.8V
10	HDMI_TXCP	HDMI Clock Differential Signal	1.8V
11	GND	Ground	0V
12	HDMI_TXCN	HDMI Clock Differential Signal	1.8V
13	NC	/	/
14	NC	/	/
15	HDMI_SCL	I2C Clock Signal	5V
16	HDMI_SDA	I2C Data Signal	5V
17	GND	Ground	0V
18	VDD_HDMI	5V Power Output	5V
19	HDMI_HPD	HPD Hot Swap Signal	1.8V

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2.4. Debugging interface description

Debugging interface using a 10Pin 2.54mm straight pin interface, because the adapter board factory firmware has been configured, the user can be used directly, usually no need to debug the operation, so the pin is not welded by default, but the product is distributed with a 10Pin 2.54mm straight pin, if the user needs to weld their own. The interface diagram is as follows:



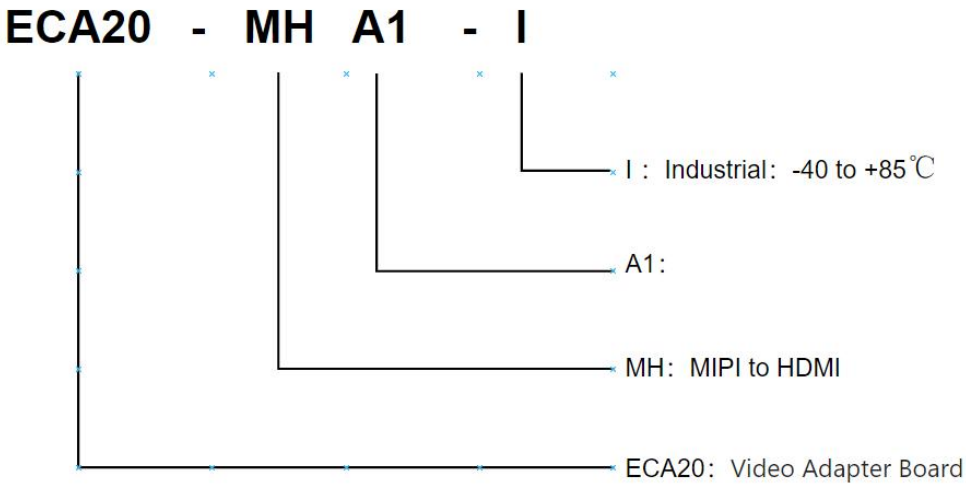
Debugging Interface Diagram

The detailed description of the pins is shown in the table below:

ECA20-MHA1-I Adapter Board Debug Interface Pinout Table

No	Name	Instruction	IO level
1	UART_RX	Debug Serial RX Signal	3V3
2	UART_TX	Debug Serial TX Signal	3V3
3	GND	Ground	0V
4	JTAG_TCK	JTAG Clock Signal	3V3
5	JTAG_TMS	JTAG Chip Select Signal	3V3
6	GND	Ground	0V
7	VIN_5V	5V Power Input	5V
8	GND	Ground	0V
9	VDD_3V3	3.3V IO Pin Level	3V3
10	GND	Ground	0V

2.5. Model description



Product Number Description Chart

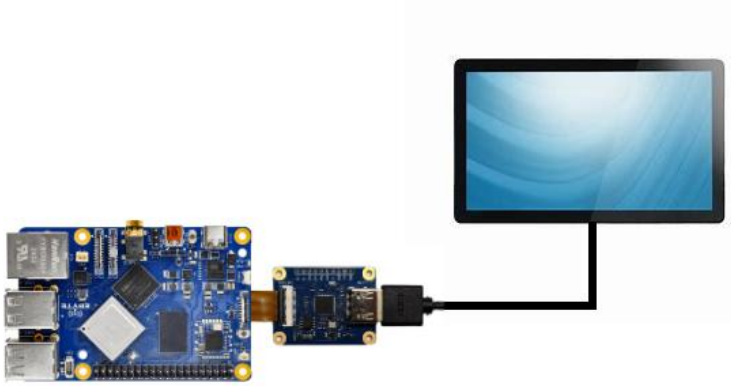
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2.6. Operating instructions

Adapter board products have been burned in the factory default 1920 * 1080P @ 60Hz resolution firmware program, the use of the adapter board before the user's single-board computer needs to be adapted for the adapter board to do the software, the software adaptation method described in 2.6 system migration subsection. After the completion of the software adaptation, the single board and the display can be used after connecting according to the requirements.

The connection of the adapter board is shown in the figure below:



Adapter board connection diagram

2.7. System migration

The first step in porting is to understand the TIMING parameters for that product:

Clock	clock-frequency	148500000 HZ
Horizontal front porch	hback-porch	148
Horizontal active pixels	hactive	1920
Horizontal back porch	hfront-porch	88
Horizontal Sync clock	hsync-len	44
Vertical front porch	vback-porch	36
Vertical active pixels	vactive	1080
Vertical back porch	vfront-porch	4
Vertical Sync Clock	vsync-len	5

Here is an example of a device tree from the ECK32 series, where the main place to configure is its timing:

```
display-timings {
    native-mode = <&timing_dsi0>;
    timing_dsi0: timing@0 {
```

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```
            clock-frequency = <148500000>;
            hback-porch = <148>;
            hactive = <1920>;
            hfront-porch = <88>;
            hsync-len = <44>;
            vback-porch = <36>;
            vactive = <1080>;
            vfront-porch = <4>;
            vsync-len = <5>;

            de-active = <1>;
            vsync-active = <1>;
            hsync-active = <1>;
            pixelclk-active = <1>;
        };
};
```

For Allwinner t113 platform, its timings description is different, you can refer to the following configuration:

```
&lcd0 {
            lcd_dclk_freq           = <149>;

            lcd_x                   = <1920>;
            lcd_y                   = <1080>;

            lcd_hbp                 = <148>;
            lcd_ht                  = <2200>;
            lcd_hspw                = <44>;
            lcd_vbp                 = <36>;
```

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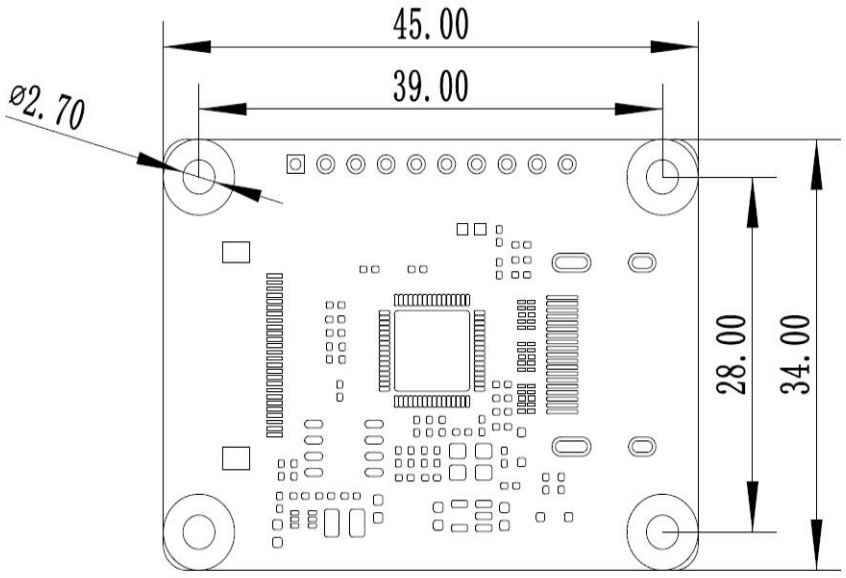
```
            lcd_vt                  = <1957>;
            lcd_vspw                = <5>;
    };
```

Other parts and ordinary MIPI screen is almost the same, only in the sequence configuration of the product and the regular mipi screen is different, this product does not need any sequence configuration. Here is still ECK32 series as an example, listed with the product related part of the configuration:

```
        dsi0_panel: dsi_panel@0 {
            dsi,lanes = <4>;
            panel-init-sequence = [
            ];
            panel-exit-sequence = [
            ];
        };
```

3. Structural dimensions

The structural dimensions are shown in the figure below (unit: mm).
Mounting hole size is M2.5.



Dimensional drawing of adapter plate structure

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4. Reference documents

GSV1172_v0.10.pdf

5. Revision history

revised explanatory table

Version	Revisions	Modify Time	preparation	calibrate	vetting
V1.0	First draft	25-07-30	WJ	WYQ	WFX
V1.1	Update the physical product images	25-09-02	WJ	WYQ	WFX

6. About us

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