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Application Note FAN9207

KAB-M20SD-01 MIPI DSI 20-Pin Adapter Board User Guide

This user guide provides detailed information on using the KAB-M20SD-01 MIPI DSI 20-Pin Adapter Board.

Contents

Hardware Layout5

Backlight Voltage Adjustment7

Additional Information10

LCD Handling Precautions11

Disclaimer11

Revision History11

List of Tables

Table 1: KAB-M20SD-01 Electrical Specifications.....4

List of Figures

Figure 1: KAB-M20SD-01 Top Side4

Figure 2: KAB-M20SD-01 Bottom Side4

Figure 3: Detailed View of the Adapter Board Bottom5

Figure 4: Detailed View of the Adapter Board Top6

Figure 5: Jumper Wire Connected between R14 and L1.....7

Figure 6: Power Supply Connections and Measurement Test Points8

Figure 7: Potentiometer Adjustment8

Figure 8: Multimeter Reading of Backlight Voltage9

Figure 9: MIPI Display Connections.....9

Figure 10: E35RD-MW420-C Display, KAB-M20SD-01 Adapter, and STM32 Development Board Demo10

KAB-M20SD-01 MIPI DSI 20-pin Adapter Board User Guide

The KAB-M20SD-01 MIPI DSI 20-pin Adapter Board helps users with their application development by providing the ability to prototype with Focus LCDs 20-pin MIPI DSI displays. The Adapter Board allows the quick connection of a MIPI display with a series of STM32 Discovery boards. This eases the burden of developing applications with MIPI displays.

This guide will demonstrate how to set the backlight voltage, connect a MIPI display, and how to connect to an STM32 Discovery board.

Table 1: KAB-M20SD-01 Electrical Specifications

Specification	Symbol	Minimum	Maximum
Backlight Voltage Setting	V	9.0	25.0
Backlight Current, Continuous	mA	20	800
Backlight Current, Peak ₁	A		1.0

Note 1: Peak – square wave, 50% duty cycle, 100kHz @ 70°C



Figure 1: KAB-M20SD-01 Top Side

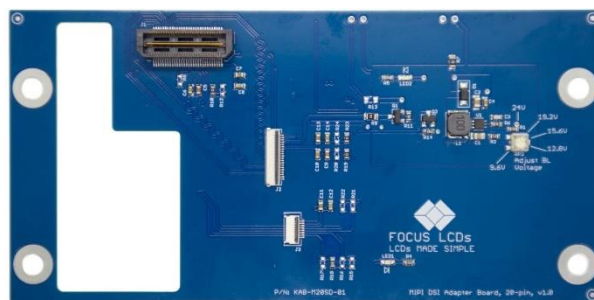


Figure 2: KAB-M20SD-01 Bottom Side

Hardware Layout

The KAB-M20SD-01 Adapter Board is designed around Focus LCDs 20-pin MIPI DSI TFT displays. The images below show the locations of the main components and connections on the Adapter Board. The first image shows the connections to the display and development board.

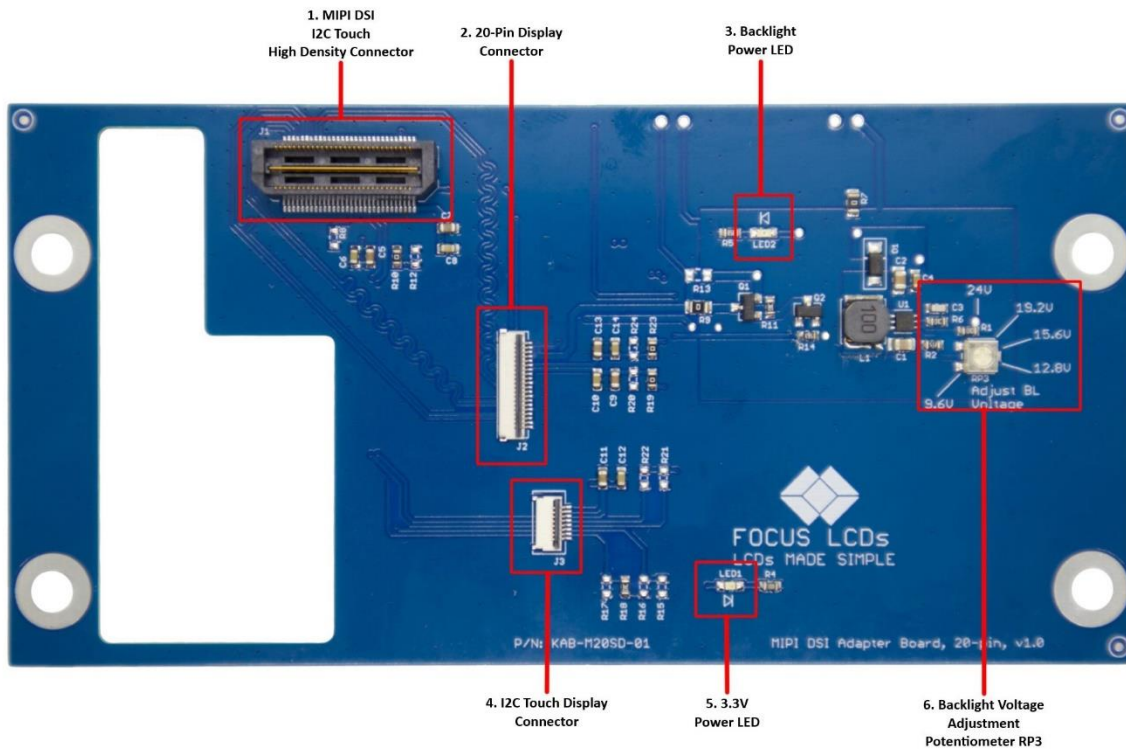


Figure 3: Detailed View of the Adapter Board Bottom

Main Features

1. The MIPI DSI and I2C Touch High-Density connector that plugs into STM32 Discovery boards with MIPI DSI interfaces.
2. The 20-Pin FPC connector for the MIPI DSI interface on the Focus LCDs display.
3. The backlight power on LED. Turns on when power is applied to the backlight SMPS (Switch Mode Power Supply) boost regulator and it is operating within specifications.
4. This is the I2C Touch connector for Focus LCDs display with capacitive touch interfaces.
5. This is the 3.3V main power indicator LED.
6. This is the backlight voltage adjustment potentiometer – RP3.

Shown in the image below, the top of the Adapter Board is where an external 5V supply and Multimeter can be attached for adjusting the backlight voltage. In addition, double sided foam tape can be used to affix the display to the top surface of the Adapter Board.

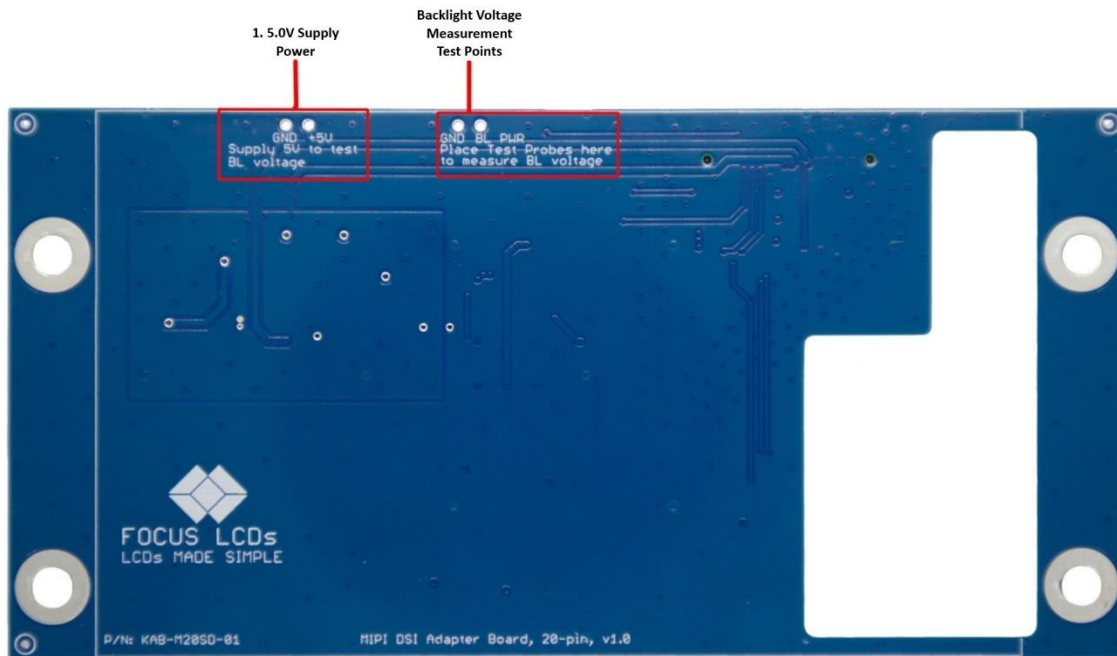


Figure 4: Detailed View of the Adapter Board Top

Main Features:

1. 5V external power supply input for adjusting/testing the backlight voltage output without attaching to a development board.
2. Test points for attaching a multimeter to measure the backlight voltage when adjusting the potentiometer.

Backlight Voltage Adjustment

Adjusting the backlight voltage on the Adapter Board without attaching it to a development board requires the temporary soldering of a jumper wire. The jumper wire must be soldered to one end of R14 opposite the GND test point and one side of L1. The image below shows the exact location of the soldered connections.

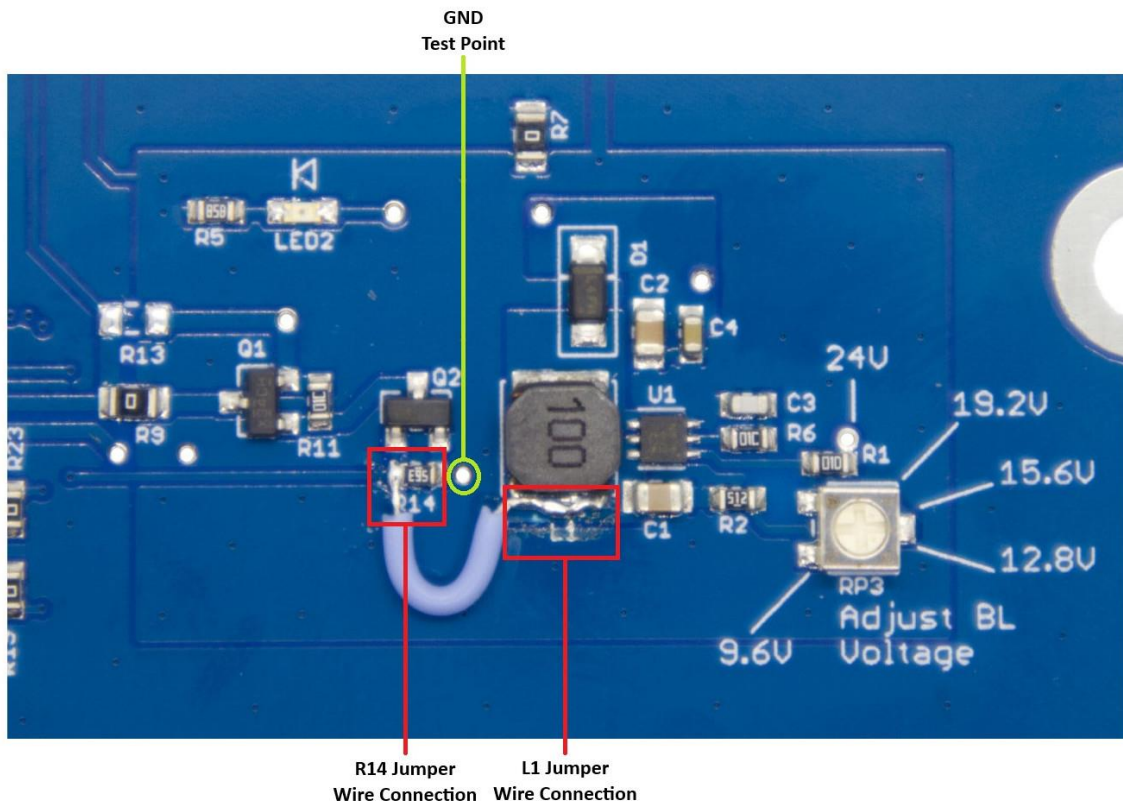


Figure 5: Jumper Wire Connected between R14 and L1

Once the jumper wire is in place, a variable power supply can be attached to the +5V supply input to supply power to the SMPS boost regulator. LED2 will light when the power is applied. Then a multimeter is connected to the backlight measurement test points to monitor the backlight voltage as the potentiometer RP3 is adjusted.

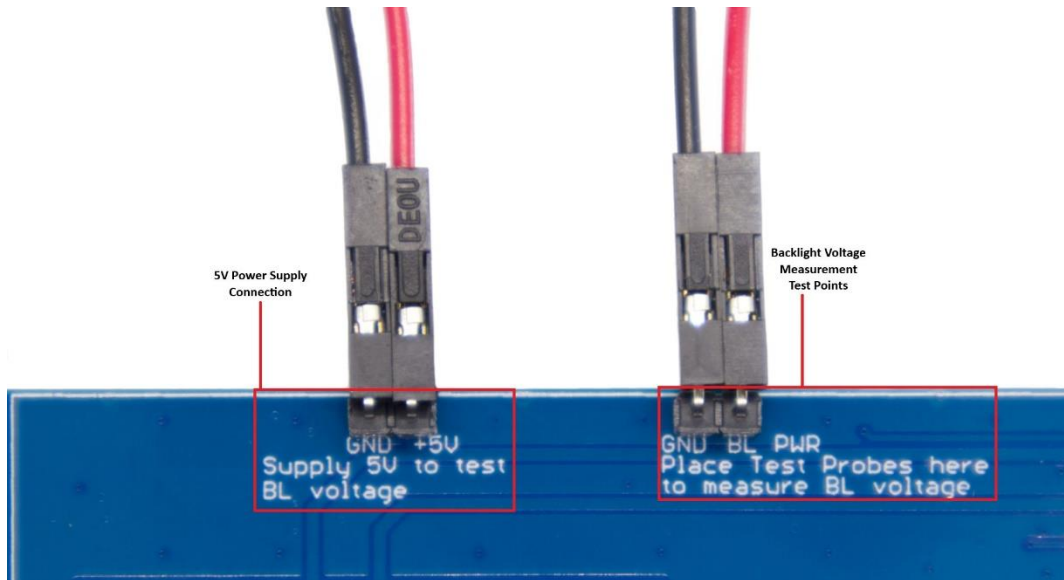


Figure 6: Power Supply Connections and Measurement Test Points

Read the backlight electrical specification in the display specification sheet. Then adjust the potentiometer RP3 so that the multimeter reads a voltage within the range of the specification.

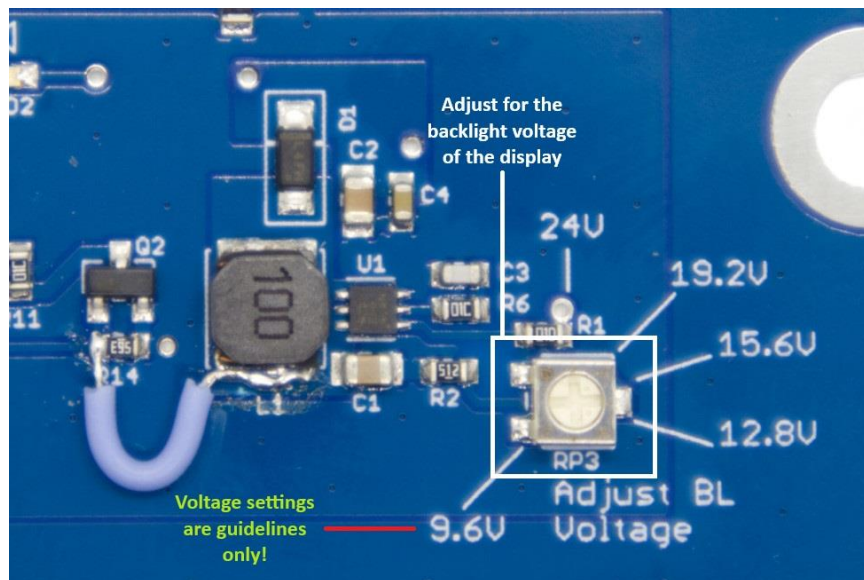


Figure 7: Potentiometer Adjustment

This user guide adjusted the backlight voltage for the E35RD-MW420-C Focus LCDs MIPI DSI TFT Display. The reading on the multimeter was within the specification for that display.

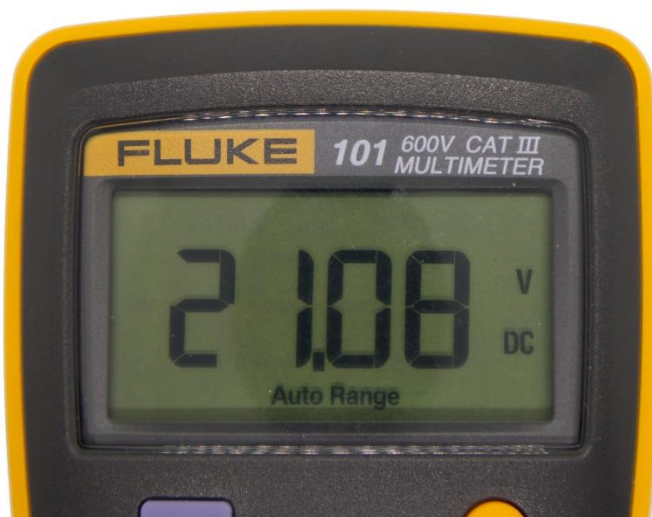


Figure 8: Multimeter Reading of Backlight Voltage

Once the backlight voltage is set the jumper wire, 5V power supply, and multimeter connections should be removed.

Now connect the MIPI display as shown in the image below. The E35RD-MW420-C display is connected to the KAB-M20SD-01 MIPI Adapter in this example.

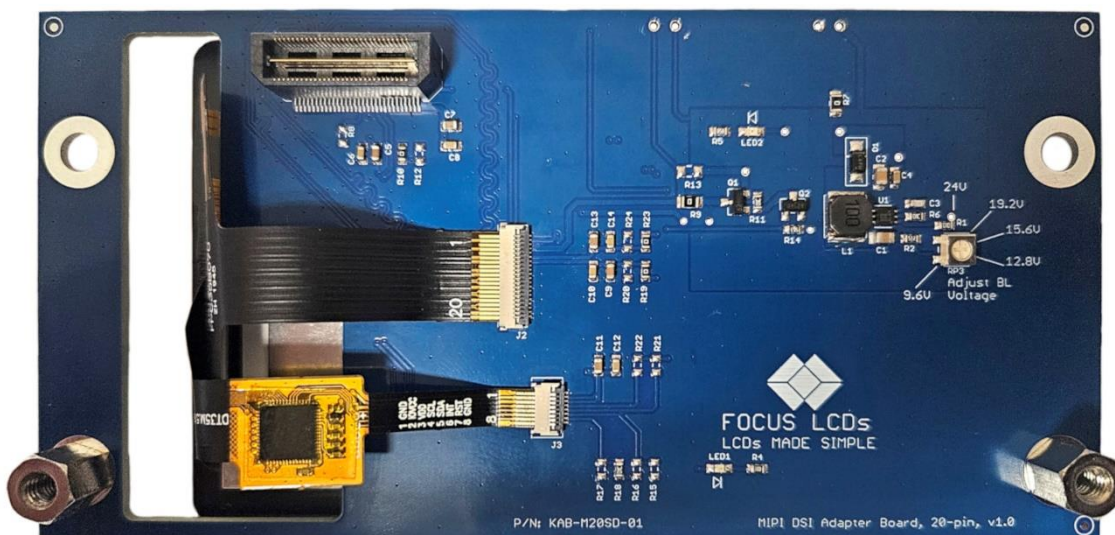


Figure 9: MIPI Display Connections

Then connect the display and adapter to the STM32 Discovery board and load the firmware to activate the display.



Figure 10: E35RD-MW420-C Display, KAB-M20SD-01 Adapter, and STM32 Development Board Demo

Additional Information

The KAB-M20SD-01 Adapter Board, the E35RD-MW420-C, and source code for the demo can be acquired by contacting Focus LCDs.

LCD Handling Precautions

- Do not store the TFT-LCD module in direct sunlight, best stored in a dark place
- Do not leave it exposed to high temperature and high humidity for a long period of time
- Recommended temperature range is 0 to 35 °C, relative humidity should be less than 70%
- Stored modules away from condensation as formation of dewdrops may cause an abnormal operation or failure of the module.
- Protect the module from static discharge
- Do not press or scratch the surface and protect it from physical shock or any force

Disclaimer

Buyers and others who are developing systems that incorporate FocusLCDs products (collectively, “Designers”) understand and agree that Designers remain responsible for using their independent analysis, evaluation, and judgment in designing their applications and that Designers have full and exclusive responsibility to assure the safety of Designers' applications and compliance of their applications (and of all FocusLCDs products used in or for Designers' applications) with all applicable regulations, laws, and other applicable requirements.

Designer represents that, with respect to their applications, Designer has all the necessary expertise to create and implement safeguards that:

- (1) anticipate dangerous consequences of failures
- (2) monitor failures and their consequences, and
- (3) lessen the likelihood of failures that might cause harm and take appropriate actions.

The designer agrees that prior to using or distributing any applications that include FocusLCDs products, the Designer will thoroughly test such applications and the functionality of such FocusLCDs products as used in such applications.

Revision History

Revision	Notes	Date
1.0.0	Initial Version	11/5/2024