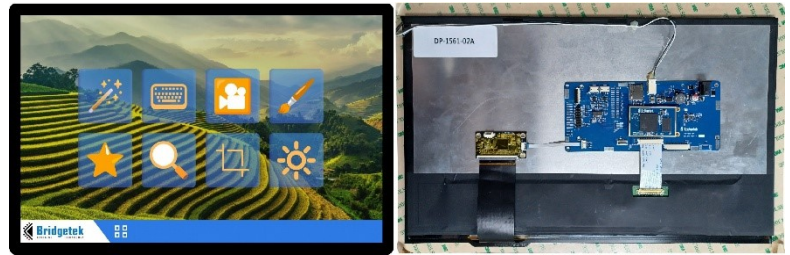


VM820B15A Datasheet



1 Introduction

The VM820B15A is an intelligent display module featuring a 15.6-inch high-brightness IPS panel with 1920×1080 resolution and a projected capacitive (PCAP) touch interface.

The module comprises a baseboard that integrates the MN820 mini-System-on-Module (SoM), which includes Bridgetek's latest Embedded Video Engine BT820B and 1Gbit of DDR3L memory.

The baseboard includes an onboard LED backlight driver capable of driving the DP-1561-02A LCD panel to 860 cd/m². An integrated audio DAC and speaker amplifiers provide stereo output of up to 1 W into 8 Ω speakers.

A variety of I/O connectors are available on the baseboard, enabling seamless communication with external microcontrollers and peripherals via the Single or Quad Serial Peripheral Interface (SPI/ QSPI).

1.1 Features

- Includes MN820 mini module with BT820B Embedded Video Engine
- Integrated 1 Gbit DDR3L memory
- 15.6-inch LCD with 1920 × 1080 resolution and brightness up to 860 cd/m²
- Supports multi-touch (up to 5 points) via projected capacitive (PCAP) touch panel
- Dual-channel LVDS display interface
- Built-in LED driver for LCD backlight control
- 1 Gbit onboard NAND Flash memory
- MicroSD card socket for expandable storage
- Supports stereo audio output
- SPI/QSPI host interface accessible via 16-pin header or 20-pin FPC connector
- Supports a wide input voltage range from 5V to 24V

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2 Part Number/Ordering Information

Part No.	Description
VM820B15A	BT820B Module, with Quad SPI host connector, 15.6-inch 1920*1080 TFT LCD capacitive touch panel preinstalled, MN820 mini module included.

Table 1 - Part Number/Ordering Information

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3 Hardware Description

3.1 VM820B15A Baseboard

The VM820B15A baseboard module features single-sided component placement and has assembled dimensions of 150 mm (L) × 67.5 mm (W) × 14.1 mm (H).

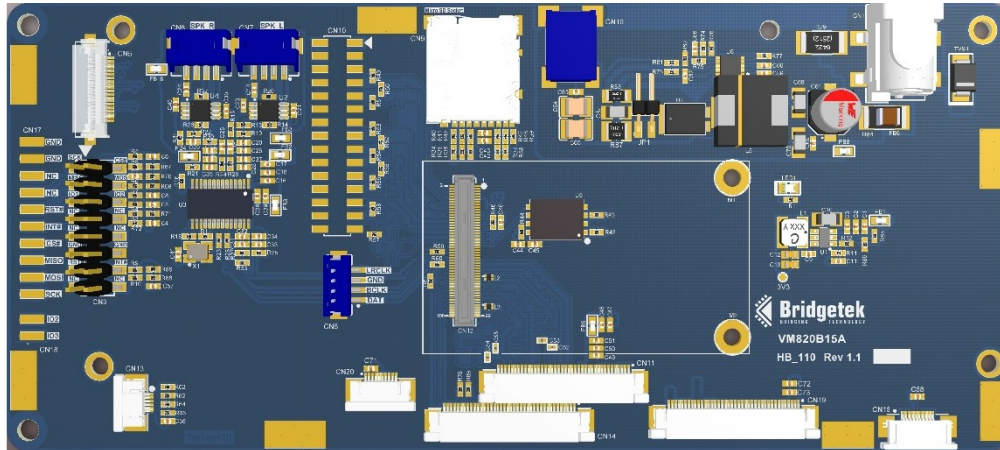


Figure 1 - VM820B15A Base Board PCBA - Front View

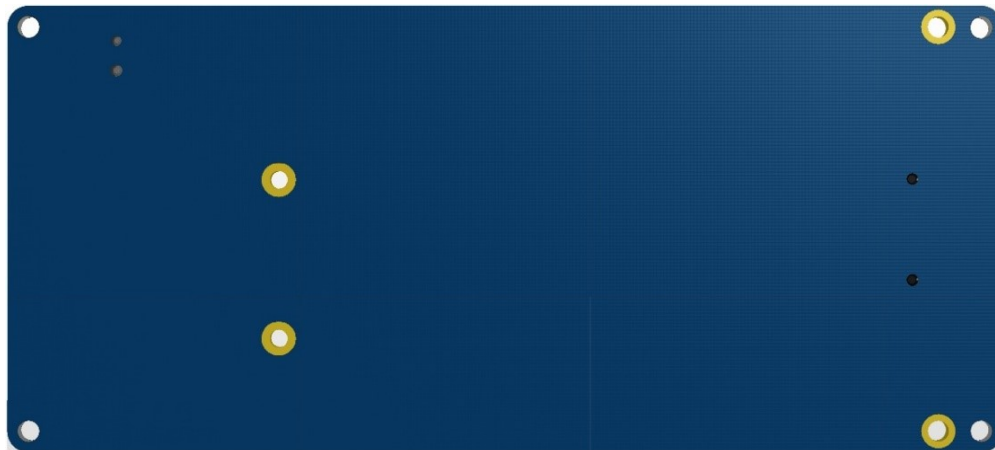


Figure 2 - VM820B15A Base Board PCBA - Back View

3.1.1 VM820B15A Key Features

- ❖ **High-speed connection:** 100-position board-to-board receptacle for interfacing with the MN820 SoM.
- ❖ **Memory:** Integrated 1Gbit NAND Flash memory.
- ❖ **Storage:** Micro-SD card slot for additional storage needs.
- ❖ **Power supply options:** Accepts input power supply of range 5V~24V via 2.1mm DC power jack.
- ❖ **Power regulation:** DC-DC converter steps down input power to 3.3V for system requirements.
- ❖ **LCD backlight driver:** Supports up to 476mA constant current at 33V load.
- ❖ **LVDS transmission:** Dual-channel LVDS transmission interface through a 40-position FPC connector.
- ❖ **Touch support:** Supports capacitive touch via 6-position FPC connector.
- ❖ **Host MCU interface:** SPI/QSPI host MCU connection available via a 2x8pin header and 20-pin FPC connector.

- ❖ **Analog audio output:** Stereo audio delivered via I²S audio DAC to power amplifiers, with output routed to 4-position sockets for external speakers.

Refer to the [MN820 BT820B Mini Module Datasheet](#) for detailed hardware specifications of the MN820.

3.2 Physical Descriptions

3.2.1 PCB layout

The VM820B15A baseboard is a four-layer FR-4 PCB measuring 150 mm (L) × 67.5 mm (W) × 1.0 mm (T), designed with 100-ohm controlled impedance for both LVDS transmit and receive traces.

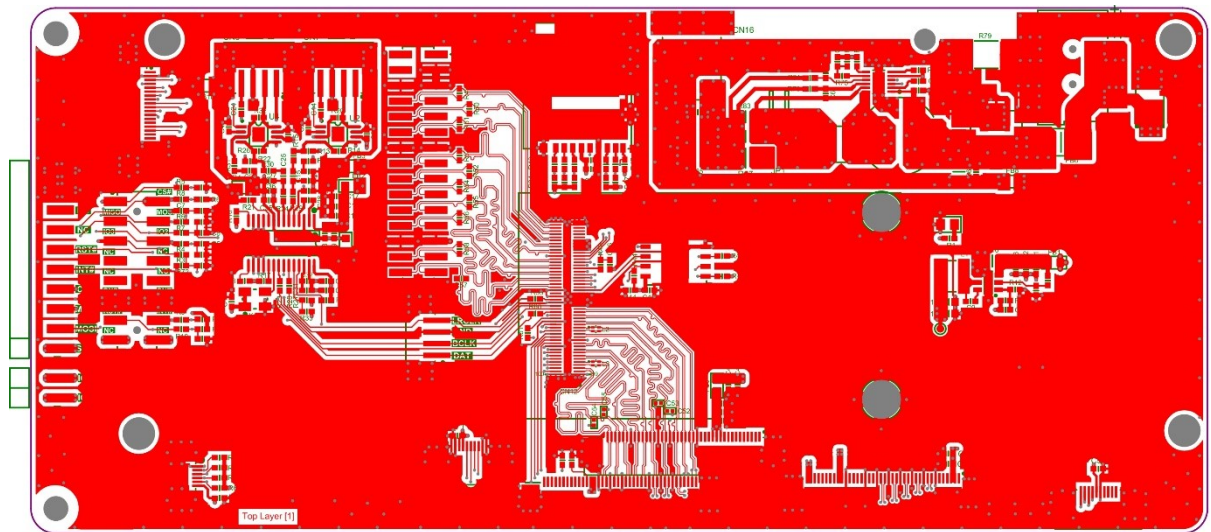


Figure 3 - VM820B15A PCB Top Layer

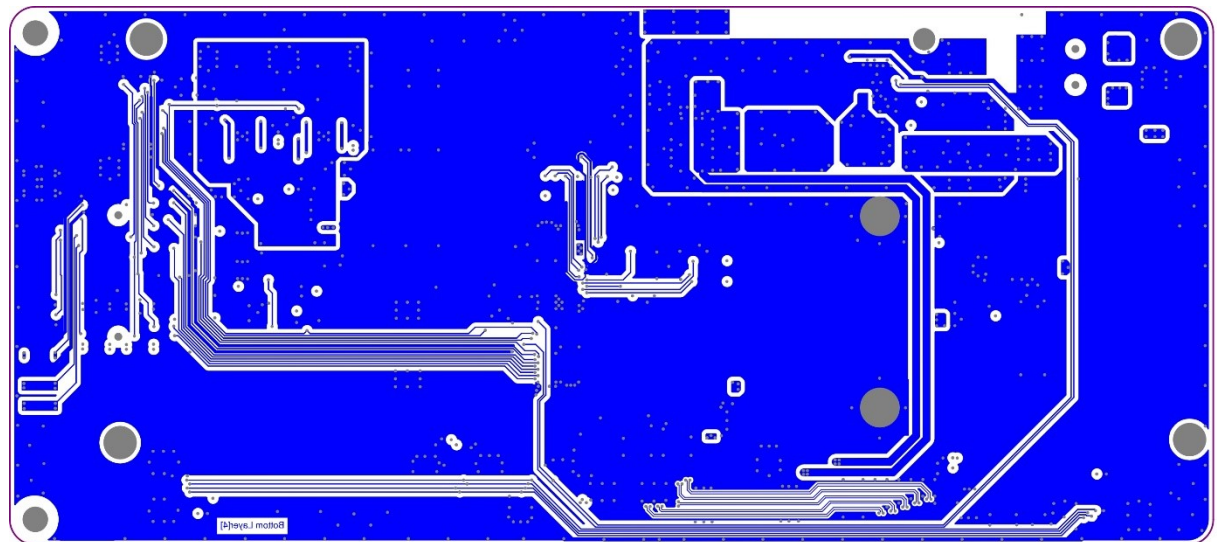


Figure 4 - VM820B15A PCB Bottom Layer

3.2.2 Connectors and Jumpers

Connectors and jumpers are described in the following sections.

- **CN1 – Input Power Source**

2.1 mm DC jack supporting input voltage from 5 V to 24 V.

- **CN3 – SPI/QSPI Interface**

This 16-position, 2.54 mm-pitch header enables the host controller to interface with the EVE device via SPI or QSPI.

Pin No.	Name	Type	Description
1	HOST_SCLK	I	SPI clock input
2	HOST_SS_N	I	SPI chip select input, active low
3	HOST_MISO	I/O	SPI Single mode: SPI MISO output SPI Dual/Quad mode: SPI data line 1
4	HOST_MOSI	I/O	SPI Single mode: SPI MOSI input SPI Dual/Quad mode: SPI data line 0
5	HOST_IO3	I/O	SPI Single mode: General purpose IO 1 SPI Quad mode: SPI data line 3
6	HOST_IO2	I/O	SPI Single mode: General purpose IO 0 SPI Quad mode: SPI data line 2
7	NC	NA	No Connection
8	NC	NA	No Connection
9	NC	NA	No Connection
10	NC	NA	No Connection
11	GND	P	Ground
12	GND	P	Ground
13	HOST_RSTN	I	EVE reset, active low.
14	HOST_INTN	OD	Host interrupt open drain output, active low.
15	NC	NA	No Connection
16	NC	NA	No Connection

Table 2 - CN3 Pinout

- **CN5 – SPI/QSPI Interface**

This 20-position, 0.5 mm-pitch bottom-contact FPC connector enables the host controller to interface with the EVE device via SPI or QSPI .

Pin No.	Name	Type	Description
1	NC	NA	No Connection
2	GND	P	Ground
3	HOST_SCLK	I	SPI Clock input
4	HOST_MISO	I/O	SPI Single mode: SPI MISO output SPI Dual/Quad mode: SPI data line 1
5	HOST_MOSI	I/O	SPI Single mode: SPI MOSI input SPI Dual/Quad mode: SPI data line 0
6	HOST_SS_N	I	SPI slave select input, active low
7	HOST_INTN	OD	Host interrupt open drain output, active low.
8	HOST_RSTN	I	EVE reset, active low.
9	GPIO2	I/O	General purpose I/O pin

10	HOST_AUDIO	O	Audio Sigma-delta left output
11	HOST_IO2	I/O	SPI Single mode: General purpose IO 0 SPI Quad mode: SPI data line 2
12	HOST_IO3	I/O	SPI Single mode: General purpose IO 1 SPI Quad mode: SPI data line 3
13	NC	NA	No Connection
14	NC	NA	No Connection
15	GPIO3	I/O	General purpose I/O pin
16	GPIO4	I/O	General purpose I/O pin
17	NC	NA	No Connection
18	NC	NA	No Connection
19	GND	P	Ground
20	GND	P	Ground

Table 3 - CN5 Pinout

- **CN7/CN8**

These are 4-position 1.5mm pitch R/A connectors that provide stereo audio output for 8Ω / 1W speakers, as well as external audio line-in inputs. CN7: Left output; CN8: Right output.

Pin No.	Name	Type	Description
1	SP+	O	Audio output for speaker
2	SP-	O	Audio output for speaker
3	AGND	P	Analog Ground
4	LINEIN_L/R	I	External audio line-in

Table 4 - CN7/CN8 Pinout

- **CN9 - Micro SD Card Connector**

The onboard Micro SD card socket supports 4-bit SPI mode with automatic card detection.

- **CN11 -LVDS LCD Panel Interface**

This 40-position, 0.5mm pitch top contact FPC connector supports Bridgetek's DP-1561-02A LCD panel with dual channel LVDS interface.

Pin No.	Name	Type	Description
1	NC	NA	No connection
2	NC	NA	No connection
3	NC	NA	No connection
4	NC	NA	No connection
5	NC	NA	No connection
6	NC	NA	No connection
7	NC	NA	No connection
8	NC	NA	No connection
9	NC	NA	No connection
10	NC	NA	No connection
11	LVDSTX_3V3	P	3.3V output power supply
12	LVDSTX_3V3	P	3.3V output power supply
13	LVDSTX_3V3	P	3.3V output power supply

14	NC	NA	No connection
15	NC	NA	No connection
16	NC	NA	No connection
17	GND	P	Ground
18	LVDS_TX0_D0_N	O	LVDS TX odd channel data bit 0 differential N
19	LVDS_TX0_D0_P	O	LVDS TX odd channel data bit 0 differential P
20	LVDS_TX0_D1_N	O	LVDS TX odd channel data bit 1 differential N
21	LVDS_TX0_D1_P	O	LVDS TX odd channel data bit 1 differential P
22	LVDS_TX0_D2_N	O	LVDS TX odd channel data bit 2 differential N
23	LVDS_TX0_D2_P	O	LVDS TX odd channel data bit 2 differential P
24	GND	P	Ground
25	LVDS_TX0_CLK_N	O	LVDS TX odd channel clock differential N signal
26	LVDS_TX0_CLK_P	O	LVDS TX odd channel clock differential P signal
27	GND	P	Ground
28	LVDS_TX0_D3_N	O	LVDS TX odd channel data bit 3 differential N
29	LVDS_TX0_D3_P	O	LVDS TX odd channel data bit 3 differential P
30	LVDS_TX1_D0_N	O	LVDS TX even channel data bit 0 differential N
31	LVDS_TX1_D0_P	O	LVDS TX even channel data bit 0 differential P
32	LVDS_TX1_D1_N	O	LVDS TX even channel data bit 1 differential N
33	LVDS_TX1_D1_P	O	LVDS TX even channel data bit 1 differential P
34	GND	P	Ground
35	LVDS_TX1_D2_N	O	LVDS TX even channel data bit 2 differential N
36	LVDS_TX1_D2_P	O	LVDS TX even channel data bit 2 differential P
37	LVDS_TX1_CLK_N	O	LVDS TX even channel clock differential N signal
38	LVDS_TX1_CLK_P	O	LVDS TX even channel clock differential P signal
39	LVDS_TX1_D3_N	O	LVDS TX even channel data bit 3 differential N
40	LVDS_TX1_D3_P	O	LVDS TX even channel data bit 3 differential P

Table 5 - CN11 Pinout

- CN12 – MN820 Interface Connector**

This 100-position, 0.4mm pitch board-to-board connector serves as the interface between the VM820B15A baseboard and the MN820 SoM module.

Pin No.	Name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	GND	P	Ground
4	LVDS_RX0_D0_N	I	LVDS RX odd channel data bit 0 differential
5	NC	NA	No Connection
6	LVDS_RX0_D0_P	I	LVDS RX odd channel data bit 0 differential P
7	NC	NA	No Connection
8	LVDS_RX0_D1_N	I	LVDS RX odd channel data bit 1 differential
9	NC	NA	No Connection
10	LVDS_RX0_D1_P	I	LVDS RX odd channel data bit 1 differential P
11	NC	NA	No Connection
12	LVDS_RX0_D2_N	I	LVDS RX odd channel data bit 2 differential

13	VCC3V3	P	3.3V output power supply
14	LVDS_RX0_D2_P	I	LVDS RX odd channel data bit 2 differential P
15	VCC3V3	P	3.3V output power supply
16	LVDS_RX0_CLK_N	I	LVDS RX odd channel clock differential N
17	VCC3V3	P	3.3V output power supply
18	LVDS_RX0_CLK_P	I	LVDS RX odd channel clock differential P
19	VCC3V3	P	3.3V output power supply
20	LVDS_RX0_D3_N	I	LVDS RX odd channel data bit 3 differential
21	SD_CD	I	SD Card: Card Detect
22	LVDS_RX0_D3_P	I	LVDS RX odd channel data bit 3 differential P
23	SD_D0	I/O	SD Card: Data bus line 0
24	GND	P	Ground
25	SD_D1	I/O	SD Card: Data bus line 1
26	LVDS_RX1_D0_N	I	LVDS RX even channel data bit 0 differential
27	SD_D2	I/O	SD Card: Data bus line 2
28	LVDS_RX1_D0_P	I	LVDS RX even channel data bit 0 differential
29	SD_D3	I/O	SD Card: Data bus line 3
30	LVDS_RX1_D1_N	I	LVDS RX even channel data bit 1 differential
31	SD_CLK	O	SD Card: Serial clock output
32	LVDS_RX1_D1_P	I	LVDS RX even channel data bit 1 differential
33	SD_CMD	I/O	SD Card: Command signal
34	LVDS_RX1_D2_N	I	LVDS RX even channel data bit 2 differential
35	SPIM_MOSI	I/O	SPI flash MOSI line
36	LVDS_RX1_D2_P	I	LVDS RX even channel data bit 2 differential
37	SPIM_MISO	I/O	SPI flash MISO line
38	LVDS_RX1_CLK_N	I	LVDS RX even channel clock differential N
39	SPIM_IO3	I/O	SPI flash IO3 line
40	LVDS_RX1_CLK_P	I	LVDS RX even channel clock differential P
41	SPIM_IO2	I/O	SPI flash IO2 line
42	LVDS_RX1_D3_N	I	LVDS RX even channel data bit 3 differential
43	SPIM_SS_N	O	SPI flash chips select output line
44	LVDS_RX1_D3_P	I	LVDS RX even channel data bit 3 differential
45	SPIM_SCLK	O	SPI flash clock output line
46	GND	P	Ground
47	GND	P	Ground
48	NC	NA	No Connection
49	GND	P	Ground
50	GND	P	Ground
51	GND	P	Ground
52	HOST_AUDIO	O	Audio Sigma-delta output
53	GND	P	Ground
54	GND	P	Ground
55	GND	P	Ground
56	I2S_LRCLK	I	I2S left/right clock indicator
57	LVDS_TX0_D0_N	O	LVDS TX odd channel data bit 0 differential
58	I2S_BCLK	I	I2S bit clock

59	LVDS_TX0_D0_P	O	LVDS TX odd channel data bit 0 differential P
60	I2S_SDA	O	I2S serial data output
61	LVDS_TX0_D1_N	O	LVDS TX odd channel data bit 1 differential
62	DISP	O	LCD Display general purpose control signal
63	LVDS_TX0_D1_P	O	LVDS TX odd channel data bit 1 differential P
64	BKLIT_PWM	O	LED backlight brightness PWM control signal
65	LVDS_TX0_D2_N	O	LVDS TX odd channel data bit 2 differential
66	GND	P	Ground
67	LVDS_TX0_D2_P	O	LVDS TX odd channel data bit 2 differential P
68	GPIO3	I/O	General purpose IO 3
69	LVDS_TX0_CLK_N	O	LVDS TX odd channel clock differential N
70	GPIO2	I/O	General purpose IO 2
71	LVDS_TX0_CLK_P	O	LVDS TX odd channel clock differential P
72	GPIO4	I/O	General purpose IO 4
73	LVDS_TX0_D3_N	O	LVDS TX odd channel data bit 3 differential
74	CTP_SDA	I/O	I ² C data line for capacitive touch panel
75	LVDS_TX0_D3_P	O	LVDS TX odd channel data bit 3 differential P
76	CTP_SCL	I/O	I ² C clock line for capacitive touch panel
77	GND	P	Ground
78	CTP_INT	I	Interrupt signal from capacitive touch panel
79	LVDS_TX1_D0_N	O	LVDS TX even channel data bit 0 differential
80	CTP_RST	O	Reset to capacitive touch panel
81	LVDS_TX1_D0_P	O	LVDS TX even channel data bit 0 differential
82	GND	P	Ground
83	LVDS_TX1_D1_N	O	LVDS TX even channel data bit 1 differential
84	SPIS_MISO	I/O	SPI data line 1
85	LVDS_TX1_D1_P	O	LVDS TX even channel data bit 1 differential
86	SPIS_SCLK	I	SPI clock input
87	LVDS_TX1_D2_N	O	LVDS TX even channel data bit 2 differential
88	SPIS_SS_N	I	SPI slave select input
89	LVDS_TX1_D2_P	O	LVDS TX even channel data bit 2 differential
90	SPIS_MOSI	I/O	SPI data line 0
91	LVDS_TX1_CLK_N	O	LVDS TX even channel clock differential N
92	SPIS_IO3	I/O	SPI data line 3
93	LVDS_TX1_CLK_P	O	LVDS TX even channel clock differential P
94	SPIS_IO2	I/O	SPI data line 2
95	LVDS_TX1_D3_N	O	LVDS TX even channel data bit 3 differential
96	INT_N	OD/O	Interrupt to host, active low
97	LVDS_TX1_D3_P	O	LVDS TX even channel data bit 3 differential
98	RESET_N	I	Global reset pin.
99	GND	P	Ground
100	GND	P	Ground

Table 6 - CN12 Pinout

- **CN13 –Capacitive Touch Panel Interface**

This 6-position 0.5mm pitch bottom contact FPC connector provides support to DP-1561-02A LCD panel with capacitive touch function.

Pin No.	Name	Type	Description
1	GND	P	Ground
2	CTP_RST	O	Reset output to CTP
3	CTP_INT	I	Interrupt input from CTP
4	CTP_SCL	I/O	Serial clock
5	CTP_SDA	I/O	Serial data
6	VCC3V3	P	3.3V Output power supply

Table 7 - CN13 Pinout

- **CN16 – Output Power for LED Drivers**

This 2-position, 3.5mm pitch power connector, driven by the onboard LED driver, supply constant current to LED strings. It features a foolproof design that permits insertion in only one orientation, preventing incorrect cable connection.

- **CN19 –LVDS LCD Panel Interface**

This 40-position, 0.5mm pitch top contact FPC connector supports single channel LVDS output interface to Bridgetek's DP-1011-02A LCD panel.

Pin No.	Name	Type	Description
1	NC	NA	No connection
2	LVDSTX_3V3	P	3.3V output power supply
3	LVDSTX_3V3	P	3.3V output power supply
4	NC	NA	No connection
5	NC	NA	No connection
6	NC	NA	No connection
7	GND	P	Ground
8	LVDS_TX0_D0_N	O	LVDS TX odd channel data bit 0 differential N signal
9	LVDS_TX0_D0_P	O	LVDS TX odd channel data bit 0 differential P signal
10	GND	P	Ground
11	LVDS_TX0_D1_N	O	LVDS TX odd channel data bit 1 differential N signal
12	LVDS_TX0_D1_P	O	LVDS TX odd channel data bit 1 differential P signal
13	GND	P	Ground
14	LVDS_TX0_D2_N	O	LVDS TX odd channel data bit 2 differential N signal
15	LVDS_TX0_D2_P	O	LVDS TX odd channel data bit 2 differential P signal
16	GND	P	Ground
17	LVDS_TX0_CLK_N	O	LVDS TX odd channel clock differential N signal
18	LVDS_TX0_CLK_P	O	LVDS TX odd channel clock differential P signal
19	GND	P	Ground
20	LVDS_TX0_D3_N	O	LVDS TX odd channel data bit 3 differential N signal
21	LVDS_TX0_D3_P	O	LVDS TX odd channel data bit 3 differential P signal
22	GND	P	Ground
23	NC	NA	No connection
24	NC	NA	No connection

25	GND	P	Ground
26	NC	NA	No connection
27	NC	NA	No connection
28	NC	NA	No connection
29	NC	NA	No connection
30	GND	P	Ground
31	PGND	P	Ground reference for the LED backlight circuit.
32	PGND	P	Ground reference for the LED backlight circuit.
33	NC	NA	No connection
34	NC	NA	No connection
35	NC	NA	No connection
36	NC	NA	No connection
37	NC	NA	No connection
38	NC	NA	No connection
39	LEDA	P	LED Anode
40	LEDA	P	LED Anode

Table 8 - CN11 Pinout

- CN20 – Capacitive Touch Panel Interface**

This 10-position 0.5mm pitch bottom contact FPC connector provides support to Bridgetek's DP-1011-02A LCD panel capacitive touch function.

Pin No.	Name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	VCC3V3	P	3.3V Output power supply
4	VCC3V3	P	3.3V Output power supply
5	CTP_SCL	I/O	Serial clock
6	CTP_SDA	I/O	Serial data
7	CTP_RST	O	Reset output to CTP
8	CTP_INT	I	Interrupt input from CTP
9	GND	P	Ground
10	GND	P	Ground

Table 9 - CN13 Pinout

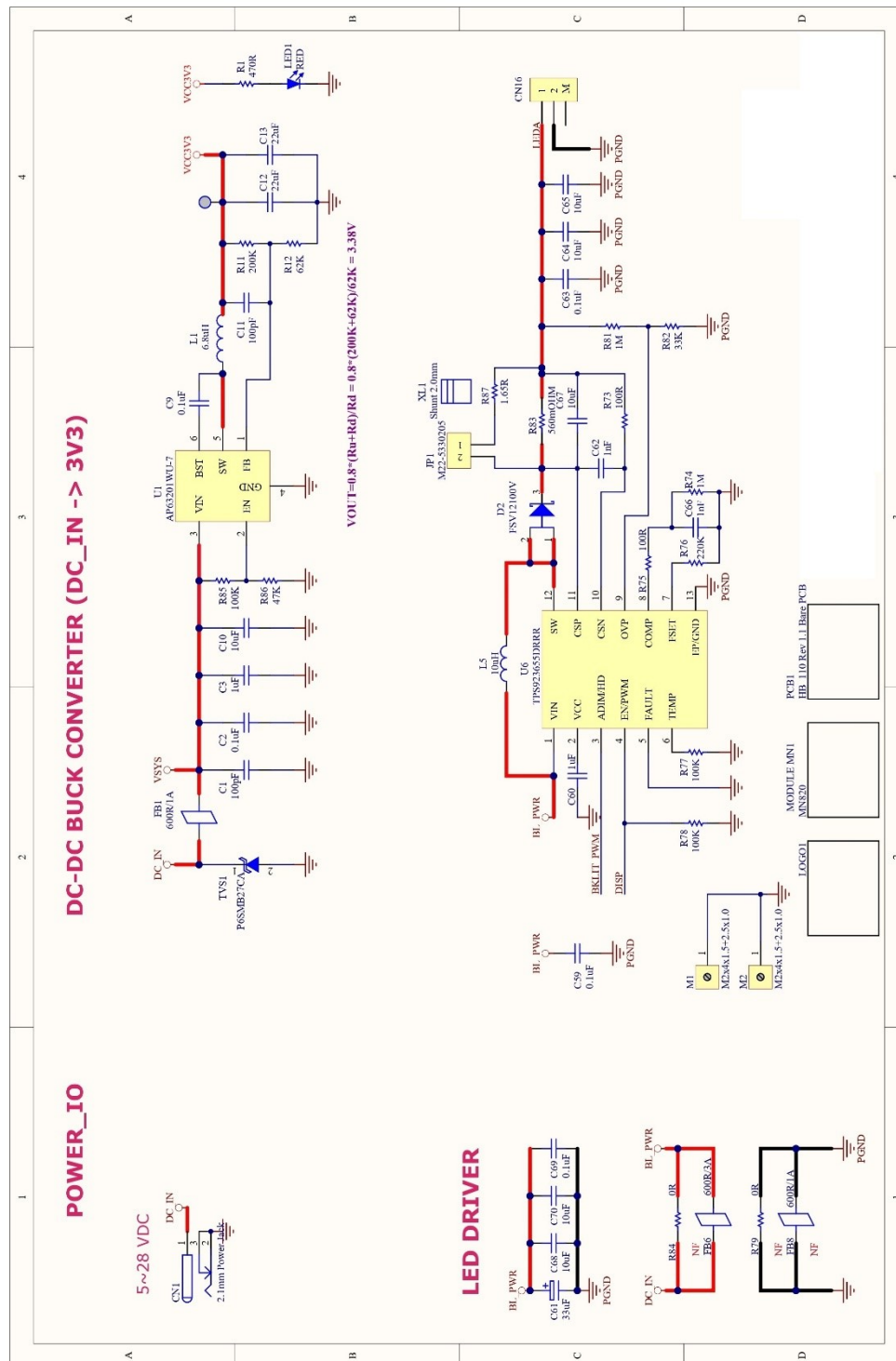
- JP1 – Backlight Brightness Select**

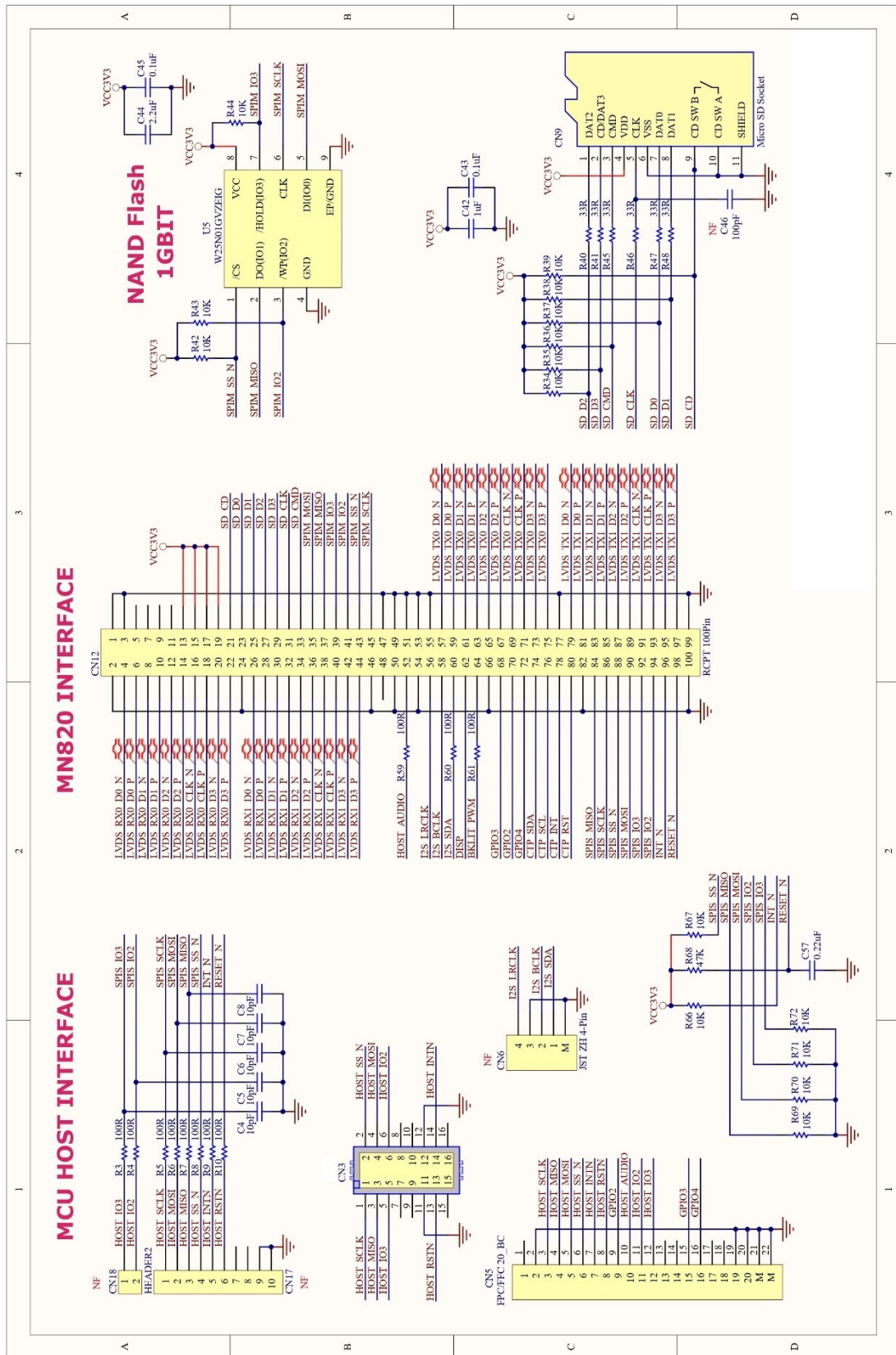
This jumper selects between backlight brightness levels.

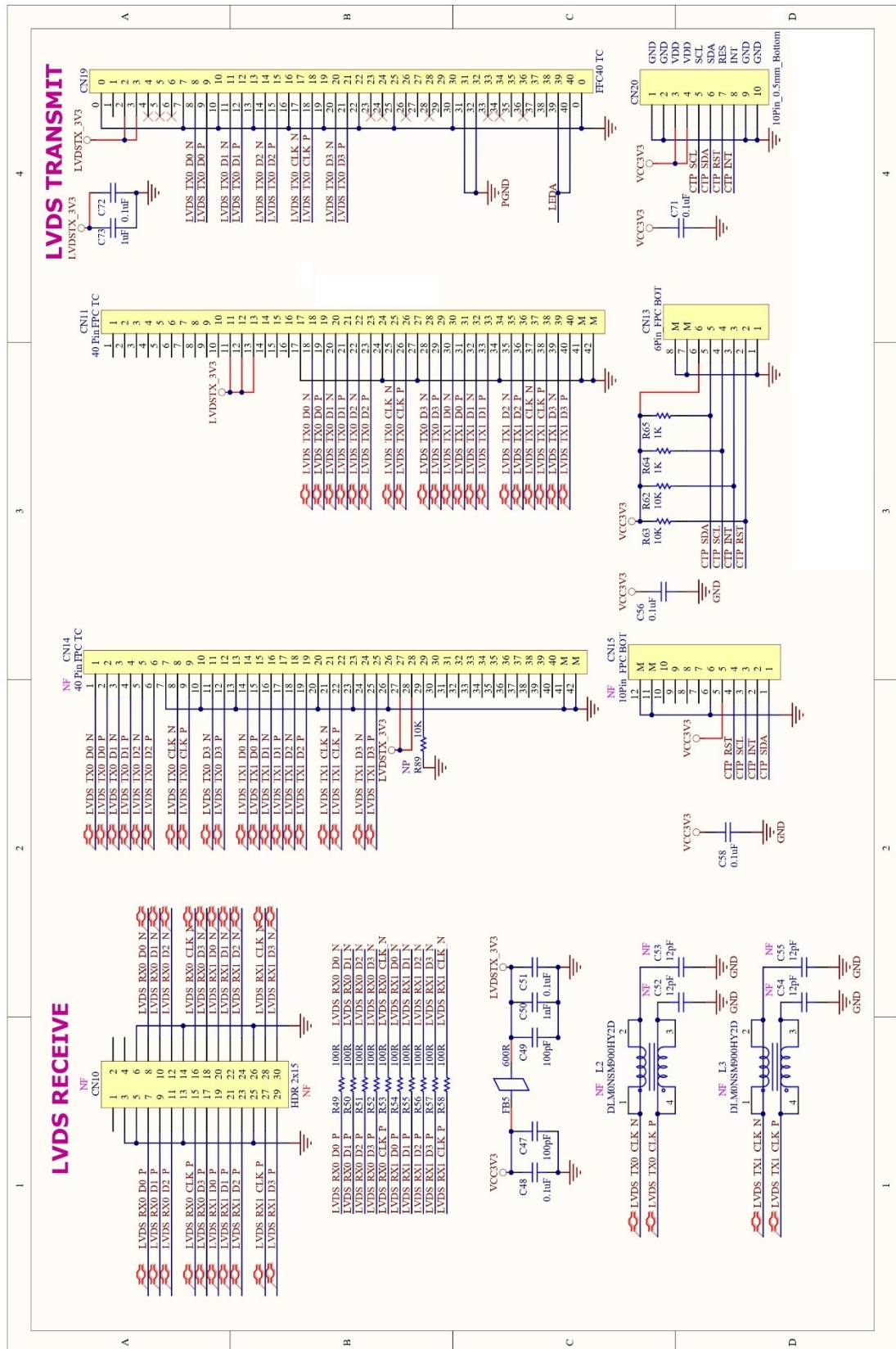
JP1	LED Backlight Current
Shorted	476mA (Default)
Open	357 mA

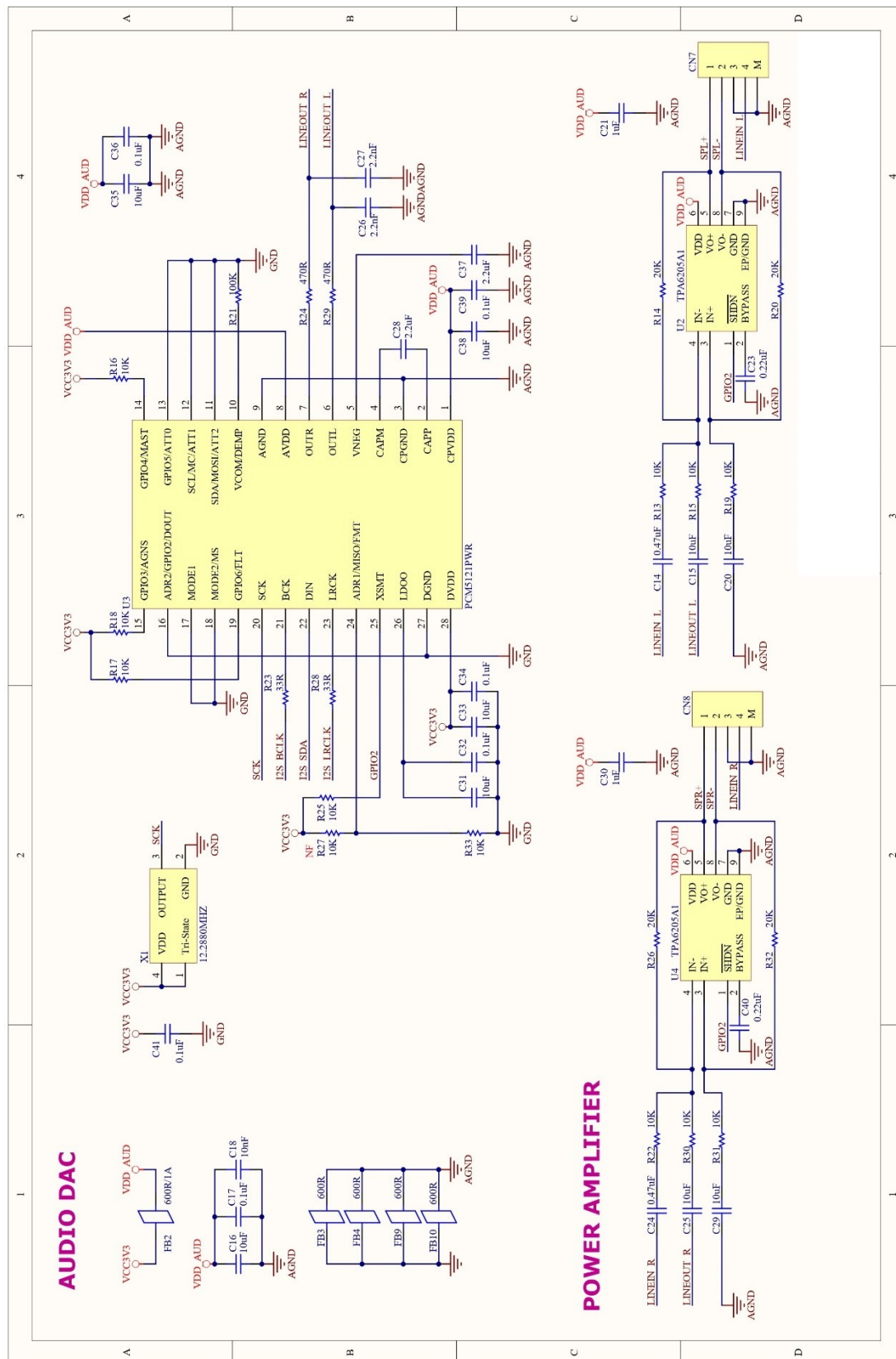
Table 10 – JP1 Jumper Select

4 Board Schematics




Figure 6 - Memory and Host Interface


Figure 7 - LVDS Interface


Figure 8 - Audio Circuit

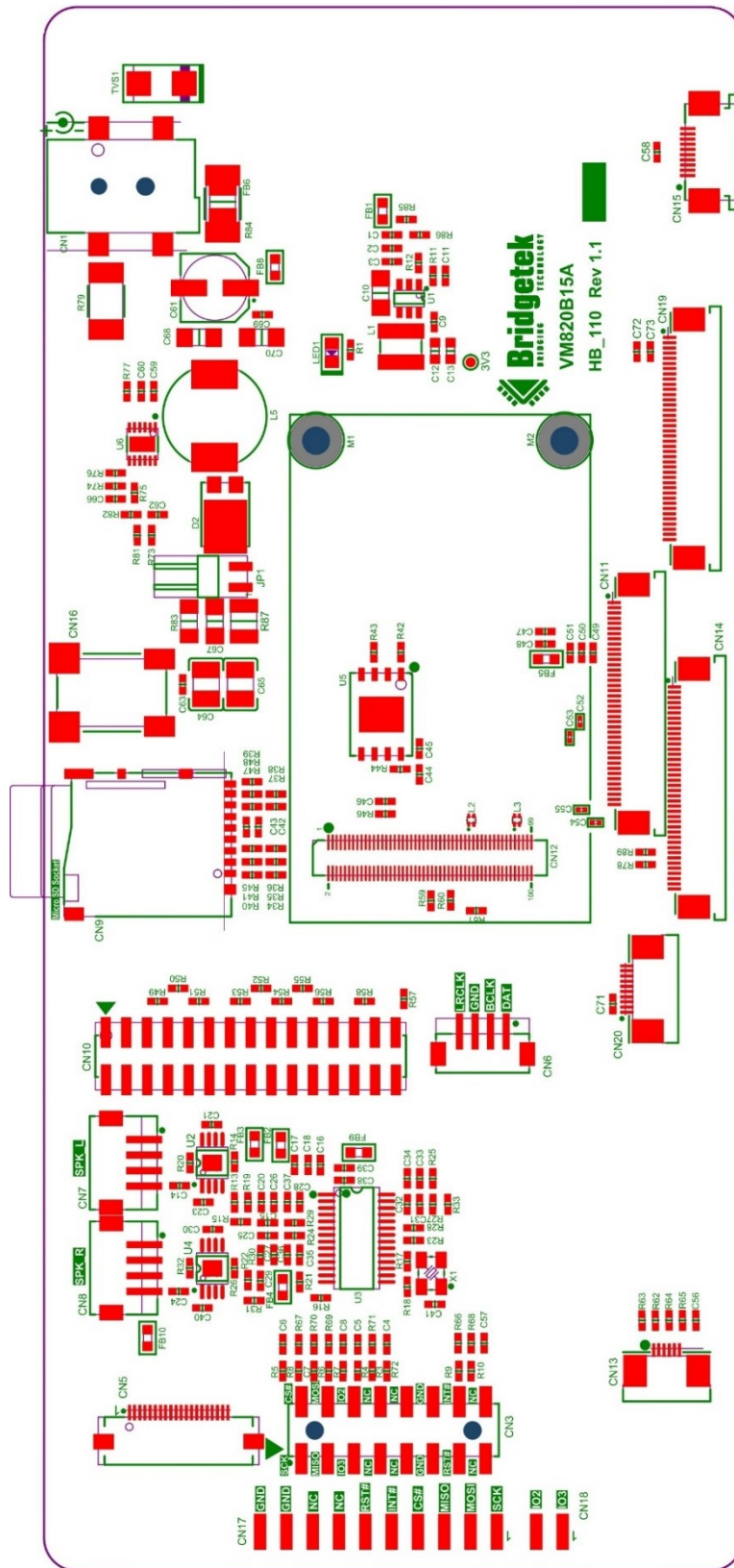


Figure 9 - Assembly Drawing

5 Hardware Configuration

Figure 10 shows the setup of the VM820B15A development module driving the DP-1561-02A LVDS display panel with 8-ohm passive speakers, along with options for different host interfaces.

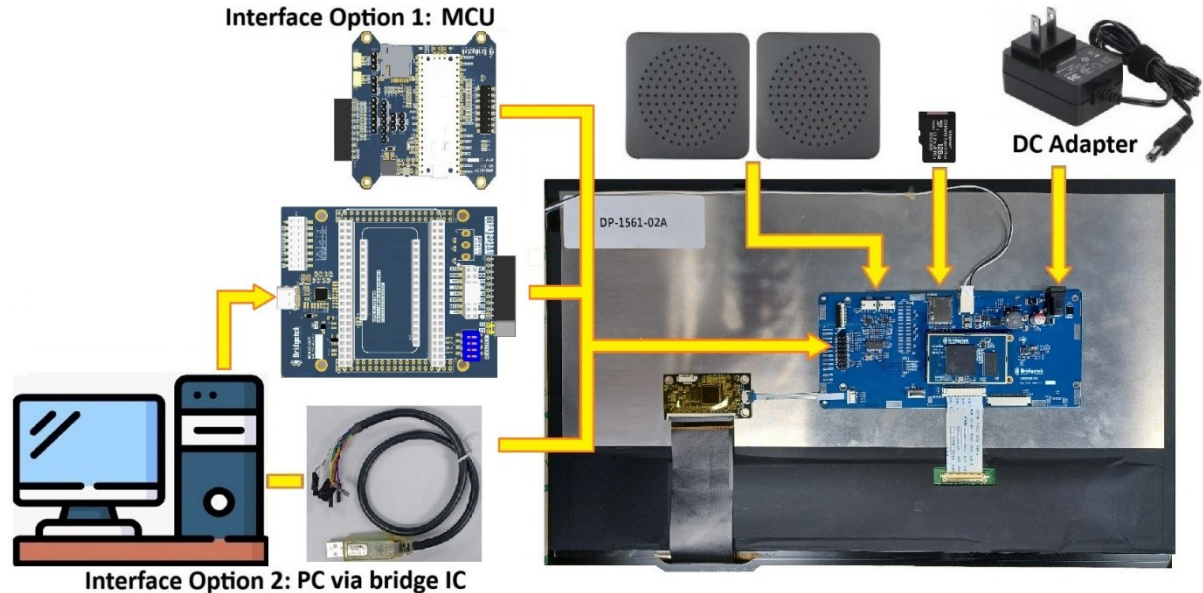


Figure 10 - VM820B15A Hardware Setup

5.1 DP-1561-02A LCD

The DP-1561-02A is a 15.6-inch TFT LCD panel with a resolution of 1920(H) RGB × 1080(V) and support for 16.7M colors. It delivers a luminance of 860 nits with touch. The LCD glass surface features an anti-glare treatment and supports touch sensing with nitrile gloves.

5.2 Input Power Supply

The VM820B15A base board can be powered with a DC input voltage ranging from 5V to 24V with minimum **20W** power rating through a DC power jack (2.1mm ID / 5.5mm OD).

This input power supplies the onboard:

- **DC-DC buck converter** – steps down the voltage to 3.3V for use by the entire system
- **LED backlight driver** – boosts the voltage to drive external LED strings.

When operating from a low-voltage power source (e.g. 5V), note the following:

- **Required power rating** – At 5V, the source must be rated for at least 4A.
- **Cable voltage drop** – High current draw at low supply voltage can cause significant voltage to drop across the cable; use a high-quality, low-resistance power cable.
- **Quality of power source** – Low-voltage operation causes higher inrush currents; use a high-quality, fast-response DC power adapter. Slow-response adapters or PSUs may fail to maintain the voltage, leading to brownouts.
- **Thermal impact** – Be aware of increased heat generation due to high current flow.

For optimal performance, a supply voltage of **12 V or higher** is recommended.

5.3 Backlight LED Current Configuration

The VM820B15A module integrates an onboard backlight LED driver circuit utilizing the Texas Instruments TPS923655DRRR. It integrates a 150mΩ MOSFET with 6.5A current limit and multiple protection features. Refer to the [TPS923655](#) datasheet for details.

This circuit provides two fixed constant-current options:

- 476 mA with JP1 fitted (default)
- 357 mA with JP1 open

Over-voltage protection is set at 44 V under open-load conditions. The switching frequency is configurable from 100 kHz to 2.2 MHz; for this module it is set around 100KHz to reduce EMI emission.

5.4 External Host Communication Interface

The VM820B15A development module provides two connector options—a 20-pin FPC connector and a 16-pin header—for interfacing with an external host PC or MCU. The BT820B QSPI interface is routed to these connectors for communication. As illustrated in Figure 10, Bridgetek provides the following readily available solutions:

- **MM2040EV Pico Adaptor**
Bridgetek offers the MM2040EV Pico Adaptor Board, based on the Raspberry Pi Pico RP2040, as a ready-made MCU solution.
- **MM4222-QSPI Bridge-MCU Adaptor Board**
The [MM4222-QSPI](#) adapter board from Bridgetek is designed for interfacing with Bridgetek evaluation and development modules. It features the FT4222 bridge controller IC, enabling seamless communication between PC and EVE graphics controller IC. The board also provides multiple expansion sockets supporting STM32 and ESP32 microcontroller families and other MCU boards.

Alternatively, developers may use any host MCU of their choice that supports SPI/QSPI communication via the header or FPC connector

5.5 Audio Interface

The VM820B15A development module delivers stereo audio output. The module integrates the Texas Instruments [PCM5121PWR](#) audio DAC to convert BT820B's I2S digital audio output into analog signals, which are then amplified by two [TPA6205A1](#) audio power amplifiers, each capable of delivering approximately 1W into 8-Ω speakers. The amplified outputs are routed to dual 4-position headers for stereo speaker connection, which also support external audio line input for mixing with the BT820B audio output.

5.6 Display Interface

The VM820B15A development module outputs BT820B dual-channel LVDS transmit signals to a 40-position top-contact FPC connector, enabling connection to the DP-1561-02A LCD display panel. The interface is linked via a 40-position flex cable, with an IPEX 20453-#40T plug on one end and gold-finger contacts on the other.

5.7 Capacitive Touch Panel Interface

The capacitive touch interface is provided through a 6-position connector linking the VM820B15A baseboard to the ILI2511C2P2V1 capacitive touch controller board. The connection is made using a 4-inch, 6-position flex cable.

5.8 Memory Storage

The VM820B15A module offers two memory storage options:

- **Onboard NAND Flash:**

The VM820B15A is equipped with 1 Gbit of onboard NAND flash memory, utilizing the W25N01GVZEIG, a QSPI 104MHz 8-WSON chip from Winbond Electronics.

- **SD Micro Card Slot:**

An alternative source of non-volatile memory is the SD micro card slot. Developers can insert an SD card, which is accessible by the EVE through the SDIO interface.

6 Electrical Specifications

6.1 Absolute Maximum Ratings

Item	MIN.	MAX.	Unit	Note
DC_IN	0	28	V	Note 1

Table 11 - Maximum Rating

Note:

1. Permanent damage may occur to the LCD module if beyond this specification.
2. Functional operation should be restricted to the conditions described under normal operating conditions.

6.2 VM820B15A DC Electrical Characteristics

	Parameter	MIN	TYP	MAX	UNIT
DC_IN	Input voltage range	5	12	24	V
VCC3V3	Output voltage range	3.0	3.3	3.6	V
Icc_DCIN_24V *Note	Operating current into 24V DC power jack	-	0.83	-	A
Icc_DCIN_12V *Note	Operating current into 12V DC power jack	-	1.74	-	A
Icc_DCIN_5V *Note	Operating current into 5V DC power jack	-	3.28	-	A
V _{oh}	Output Voltage High	2.4	-	-	V
V _{ol}	Output Voltage Low	-	-	0.4	V
V _{ih}	Input High Voltage	2.0	-	-	V
V _{il}	Input Low Voltage	-	-	0.8	V
T	Operating temperature	-20	-	+70	°C

Table 12 - Operating Voltage and Current

Note:

Operating current was measured using a DC power adapter as the power source, with BL_PWM set at 100% duty cycle (maximum brightness) and a test card image displayed.

7 Optical Specifications

All optical specifications are measured under typical condition (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response Time	Tr+Tf	$\theta=0^\circ$	--	25	30	ms	Note 3
Contrast ratio	CR	$\theta=0^\circ$	700	800	--	--	Note 4
NTSC	%	$\theta=0^\circ$	67%	72%	--	%	C-light
Viewing Angle	Top	$CR \geq 10$	80	85	--	deg.	Note 5
	Bottom				--		
	Left				--		
	Right				--		
Transmittance	Tr	$\theta=0^\circ$	2.79%	3.17%	--	%	w/o APCF & Haze @ PS06W12 V3 (Silicate)
Chromaticity	White	X	$\theta=0^\circ$	0.270	0.300	0.330	@C- Light Note 6
		Y	$\theta=0^\circ$	0.300	0.330	0.360	
	Red	X	$\theta=0^\circ$	0.631	0.661	0.691	
		Y	$\theta=0^\circ$	0.290	0.320	0.350	
	Green	X	$\theta=0^\circ$	0.230	0.260	0.290	
		Y	$\theta=0^\circ$	0.555	0.585	0.615	
	Blue	X	$\theta=0^\circ$	0.109	0.139	0.169	
		Y	$\theta=0^\circ$	0.049	0.079	0.109	
Luminance	L	-	-	860	-	cd/m ²	With touch screen

Table 13 - Optical Specifications

Remark: Above table, all Values are simulated only.

Note 1: Measurement should be performed in the dark room, optically ambient temperature =25°C

Note 2: To be measured on the center area of panel with a field angle of 1°by Topcon luminance meter BM-5, or SR3 or DMS-803 after 10 minutes operation.

Note 3: The Optical features are based on emissive spectrum of the reference light source by CIE1931C-light. The LCD spectrum of transmission must be verified with the reference light-source to achieve the specified optical characteristics.

Note 4: Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 5: Definition of viewing angle: refer to figure as below (FPC direction is at $\psi=90$).

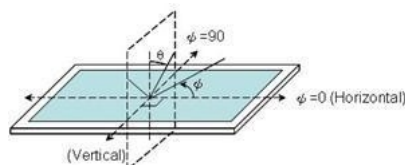


Figure 11 - Viewing Angle

Note 6: The viewing angles are measured at the center area of the panel when all the input terminals of LCD panels are electrically open.

8 Mechanical Dimensions

8.1 DP-1561-02A Dimensions

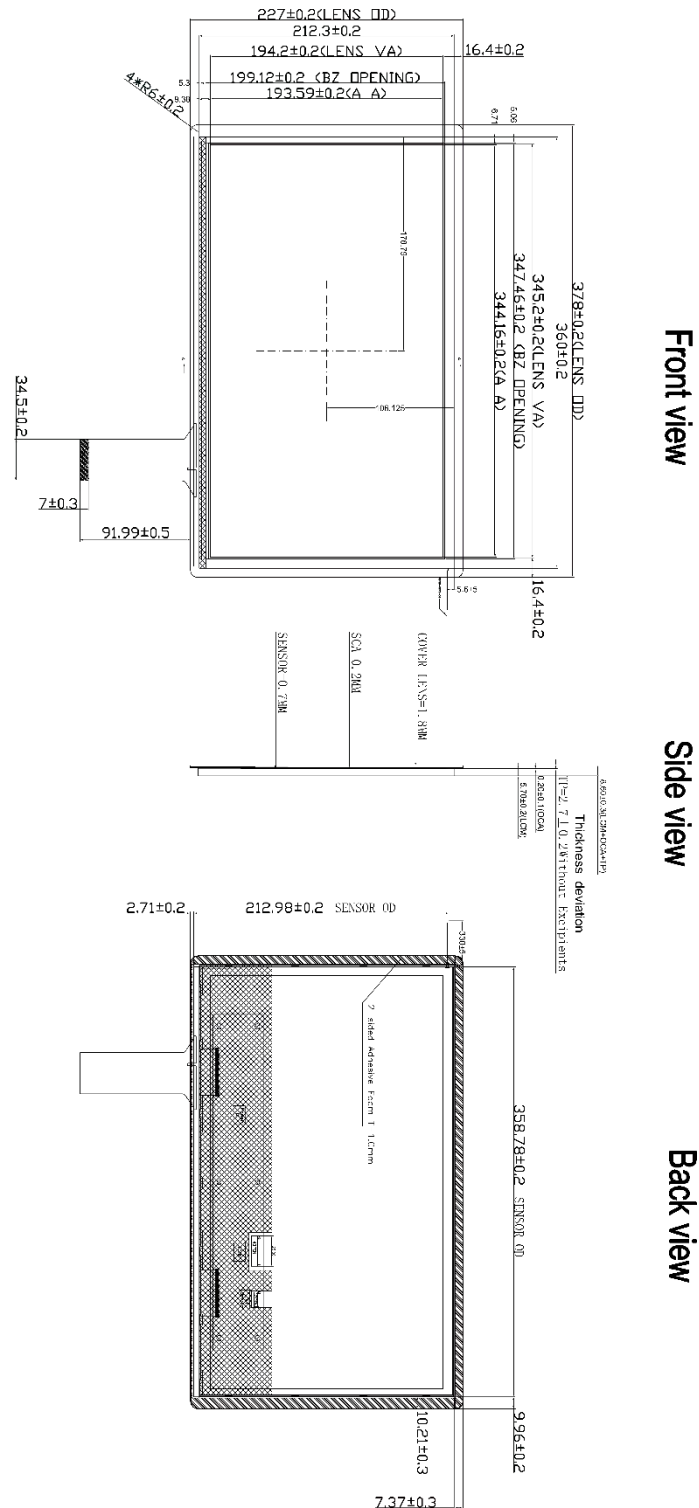
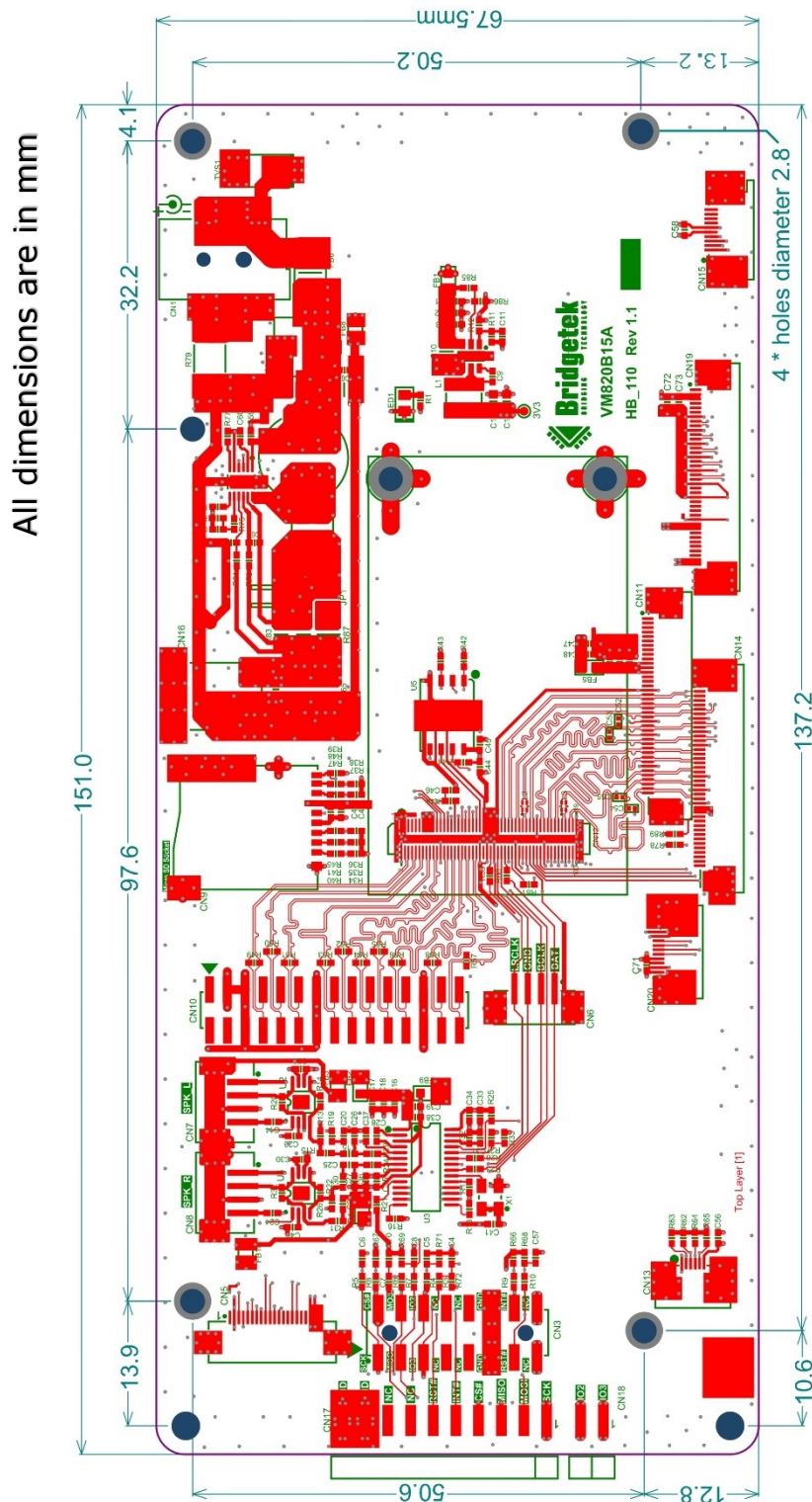


Figure 12 - DP-1561-02A Drawing

8.2 VM820B15A Mechanical Dimensions



All dimensions are in mm

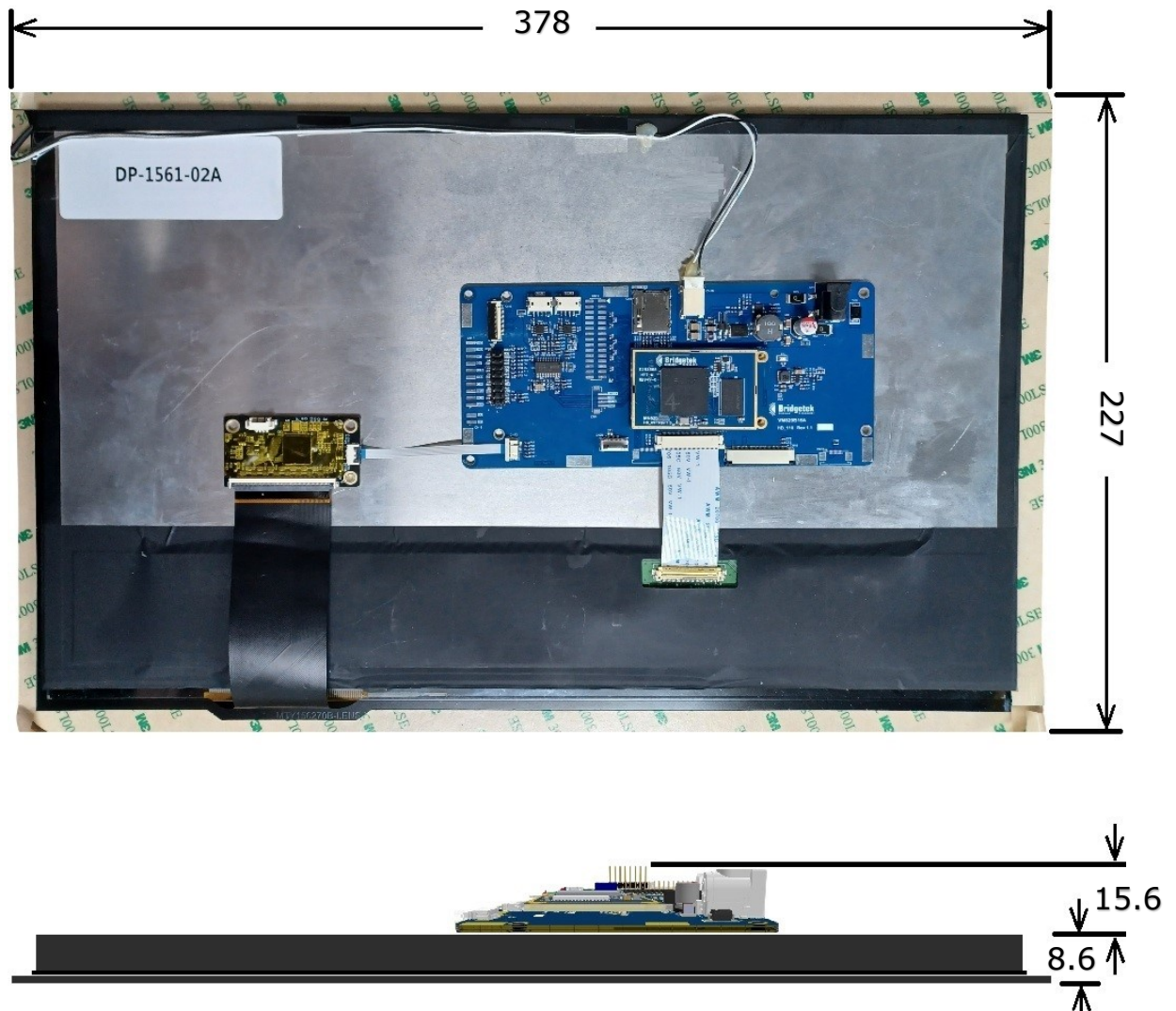


Figure 14 - VM820B15A Development Module Dimension

Note: User can refer to the [DP-1561-02A](#) datasheet for the panel's detailed mechanical dimensions.

9 Software Setup Information

EveApps-BT82X is a collection of applications designed for the BT82X Eve Series chip. It offers sample applications, all developed in ANSI C, with complete source code included. Below are the download links for EveApps-BT82X and the necessary supporting software.

EveApps-BT82X:

- [EveApps-BT82X](#)

Required Supporting Software for EveApps-BT82X:

- [Visual Studio 2019 \(Free Download\)](#)

9.1 Running EveApps-BT82X

1. Download and install **Visual Studio**, ensuring that C/C++ tools are included.
2. Download and extract the latest EveApps-BT82X package.
3. Launch the sample application **SampleApp_MSVC.sln** located under SampleApp folder. Figure 15 demonstrates SampleApp_MSVC.sln being executed in Visual Studio.

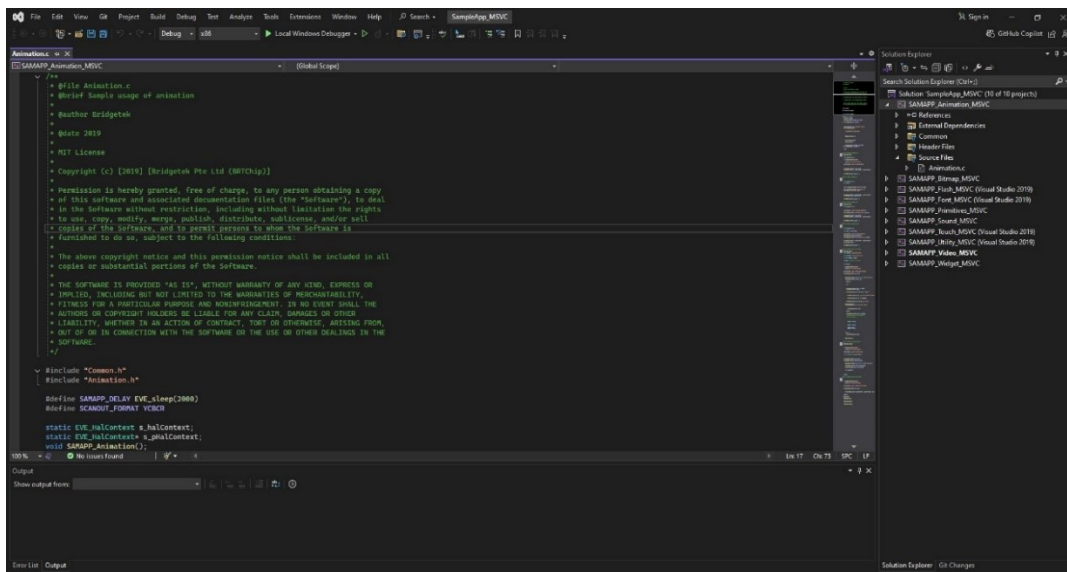


Figure 15 - Running SampleApp_MSVC.sln in Visual Studio

9.2 Configuring the Communication Interface

1. Select desired sample application.
2. Open the project properties by pressing **Alt+Enter** or clicking the  properties icon.
3. Navigate to **Configuration Properties > C/C++ > Preprocessor** and modify the **Preprocessor Definition**:
 - If using FT4222H, set platform to "EVE_PLATFORM_FT4222".
 - If using MPSSE, set platform to "EVE_PLATFORM_MPSSE."
4. Figure 16 shows an example of the communication interface set to FT4222H.

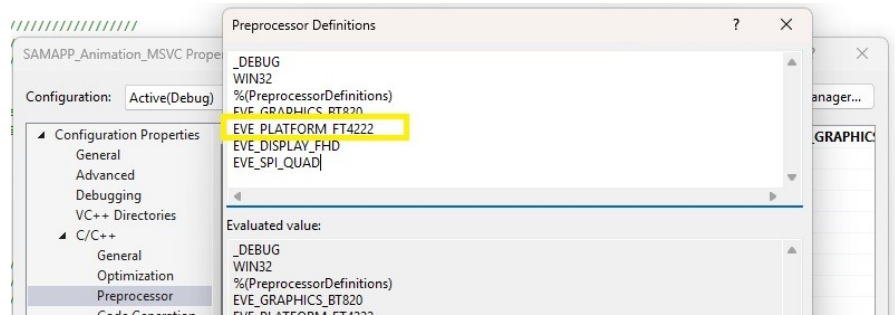


Figure 16 - Communication Interface Set to FT4222H

9.3 Running Sample Codes

1. Choose your preferred sample application (refer to Figure 17).

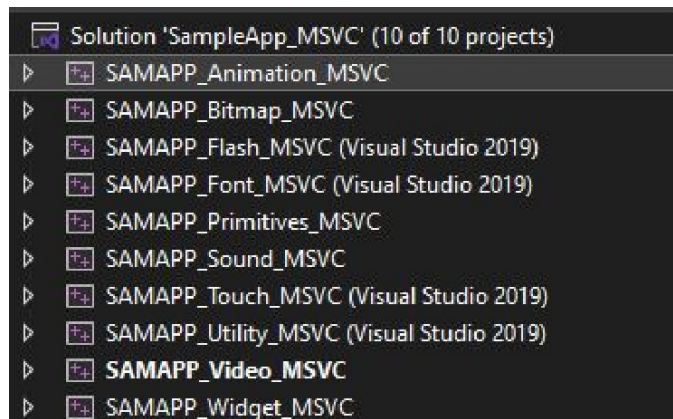


Figure 17 - Available Sample Applications

2. Right-click on the desired application and choose **Set as Startup Project**.
3. Press "F5" or click  icon to build and execute the application.

10 Disclaimer Notice: Use of Third-Party Software or Websites

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11 Contact Information

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Appendix A – References

Document References

[DP-1561-02A Datasheet](#)

[BT820B Datasheet](#)

[TPS923655DRRR](#)

[PCM5121PWR](#)

[TPA6205A1](#)

Acronyms and Abbreviations

Terms	Description
BCLK	Bit Clock
CTP	Capacitive Touch Panel
DAC	Digital Analog Converter
DC	Direct Current
EAB	EVE Asset Builder
EMI	Electromagnetic Interference
EVE	Embedded Video Engine
FPC	Flexible Printed Circuit
GPIO	General Purpose Input Output
IC	Integrated Circuit
ID	Inner Diameter
I ² S	Inter-Integrated Circuit Sound
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LRCLK	Left Right Clock
LVDS	Low Voltage Differential Signaling
MCU	Micro Controller Unit
MPSSE	Multi-Purpose Synchronous Serial Engine

NAND Flash	"NOT AND" Flash
OD	Outer Diameter
OVP	Over Voltage Protection
PC	Personal Computer
PCAP	Projected Capacitive
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembled
PWM	Pulse Width Modulation
QSPI	Quad Serial Peripheral Interface
SD Card	Secure Digital Card
SDIO	Secure Digital Input Output
SoM	System On Module
SPI	Serial Peripheral Interface
TFT	Thin-Film Transistor
USB	Universal Serial Bus

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Appendix C – Revision History

Document Title: VM820B15A Datasheet
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 Product Page: <https://brtchip.com/ic-module/product-category/products/>
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Revision	Changes	Date
Version 1.0	Initial Release	17-09-2025
Version 1.1	Removed Power I/O connector Added support for DP-1011-02A Implemented changes required to meet EMI compliance	19-11-2025
Version 1.2	Updated product image on the first page Change LCD part number/images to DP-1561-02A Removed power support from host I/O, power connectors under section 3.1.1 Updated connectors description under section 3.2.2. Corrected LCD jumper select under section 5.3 Refined host communication description/image (Figure 10) under section 5.4 Updated drawing for module stack-up under section 8.2	27-01-2026