

VM820B10A Datasheet



1 Introduction

The VM820B10A is an intelligent display module that incorporates Bridgetek's DP-1011-02A 10.1-inch high-brightness IPS LCD panel with a resolution of 1280 × 800. When driven at full brightness, the panel can achieve up to 1000 cd/m². The display is equipped with a capacitive touch panel and supports up to 5-point multi-touch operation.

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

The baseboard includes an onboard LED backlight driver, as well as an integrated audio DAC and stereo speaker amplifiers capable of delivering output of up to 1 W into 8 Ω speakers.

Header and FPC connectors are provided as I/O interfaces, enabling connection to microcontrollers and peripherals via Single or Quad Serial Peripheral Interface (SPI/QSPI).

1.1 Features

- Integrated Bridgetek [DP-1011-02A](#) 10.1-inch LCD with a 1280 × 800 resolution
- Capacitive touch panel supporting multi-touch operation (up to 5 touch points)
- Incorporates the [MN820](#) mini module, featuring the [BT820B](#) Embedded Video Engine and 1 Gbit of DDR3L memory
- Integrated LED backlight driver for LCD backlight control
- Onboard 1 Gbit NAND Flash memory
- MicroSD card socket for expandable storage
- Supports stereo audio output capable of driving 8 Ω speakers at up to 1 W
- Single-channel LVDS display interface
- SPI/QSPI host interface accessible via a 16-pin header or 20-pin FPC connector
- Wide input voltage ranges from 5 V to 18 V

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2 Part Number/Ordering Information

Part No.	Description
VM820B10A	BT820B Module, with Quad SPI host connector, 10.1-inch 1280*800 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 VM820B10A Module

The VM820B10A module comprises a baseboard with an integrated MN820-BT820 mini module, assembled with a 10.1-inch LCD display featuring a capacitive touch panel, as shown in Figure 1 and Figure 2.

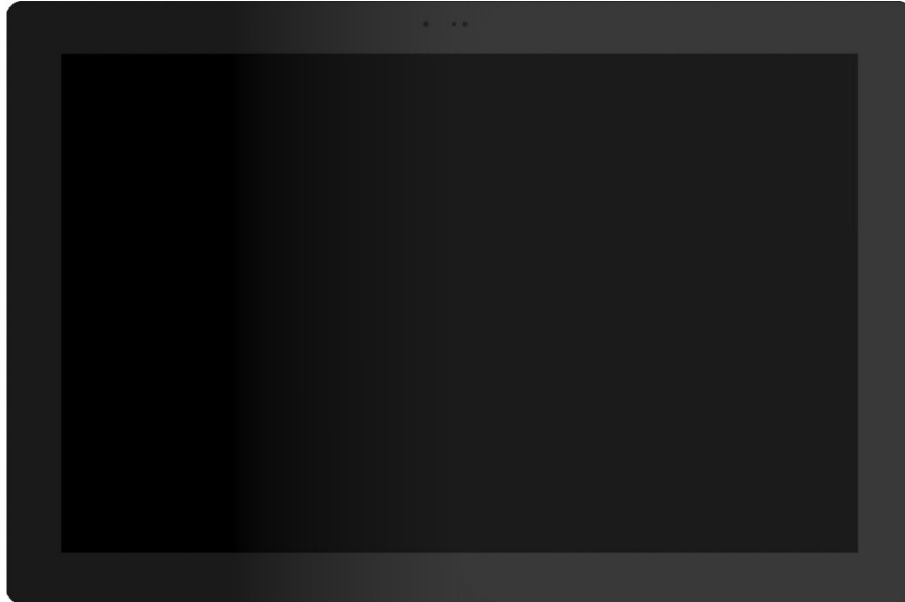


Figure 1 - VM820B10A Module - Front View

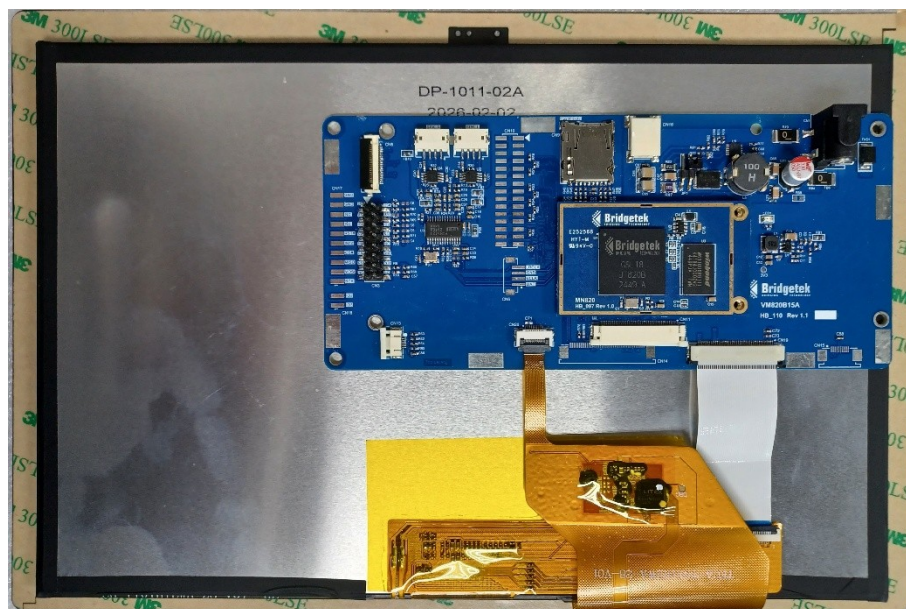


Figure 2 - VM820B10A Module - Back View

3.2 VM820B10A Baseboard

The VM820B10A baseboard module features single-sided component placement and has assembled dimensions of 150 mm (L) × 67.5 mm (W) × 14.1 mm (H).

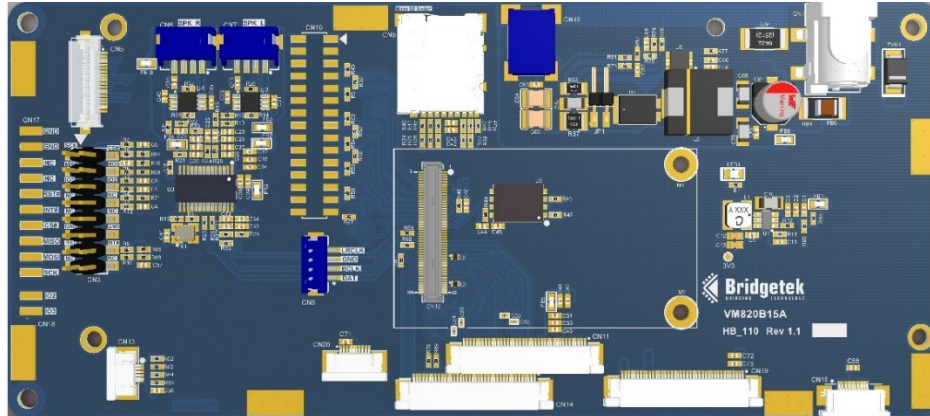


Figure 3 - VM820B10A Base Board PCBA - Front View

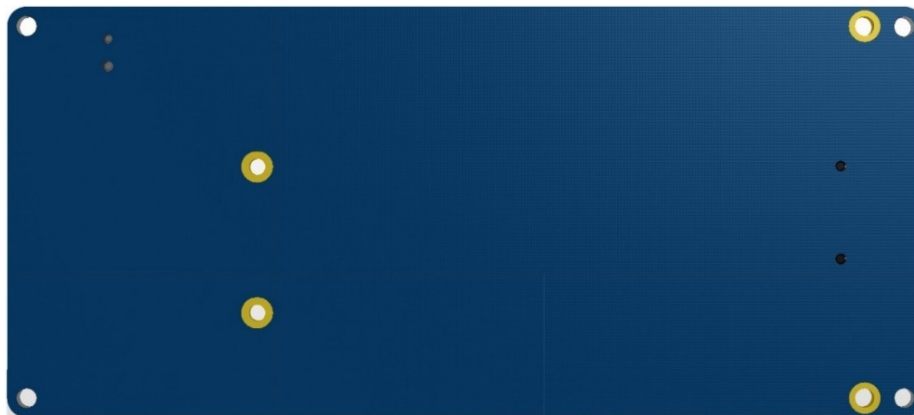


Figure 4 - VM820B10A Base Board PCBA - Back View

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:** Supports an input voltage range of 5V~18V via 2.1mm DC power jack.
- ❖ **Power regulation:** DC-DC converter steps down the input voltage to 3.3V to meet system requirements.
- ❖ **LCD backlight driver:** Supports up to 357mA constant current at a 21V load.
- ❖ **LVDS interface:** Single-channel LVDS transmission via a 40-position FPC connector.
- ❖ **Touch interface:** Capacitive touch support via a 10-position FPC connector.
- ❖ **Host MCU interface:** SPI/QSPI host MCU connection available via a 2 x 8-pin header and a 20-pin FPC connector.
- ❖ **Analog audio output:** Stereo audio delivered through an I²S audio DAC to power amplifiers, with output routed to 4-position connectors for external speakers.

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

3.3 Physical Descriptions

3.3.1 PCB layout

The VM820B10A baseboard is a four-layer FR-4 PCB measuring 150 mm (L) × 67.5 mm (W) × 1.0 mm (T), designed with 100 Ω controlled impedance for both LVDS transmit and receive traces.

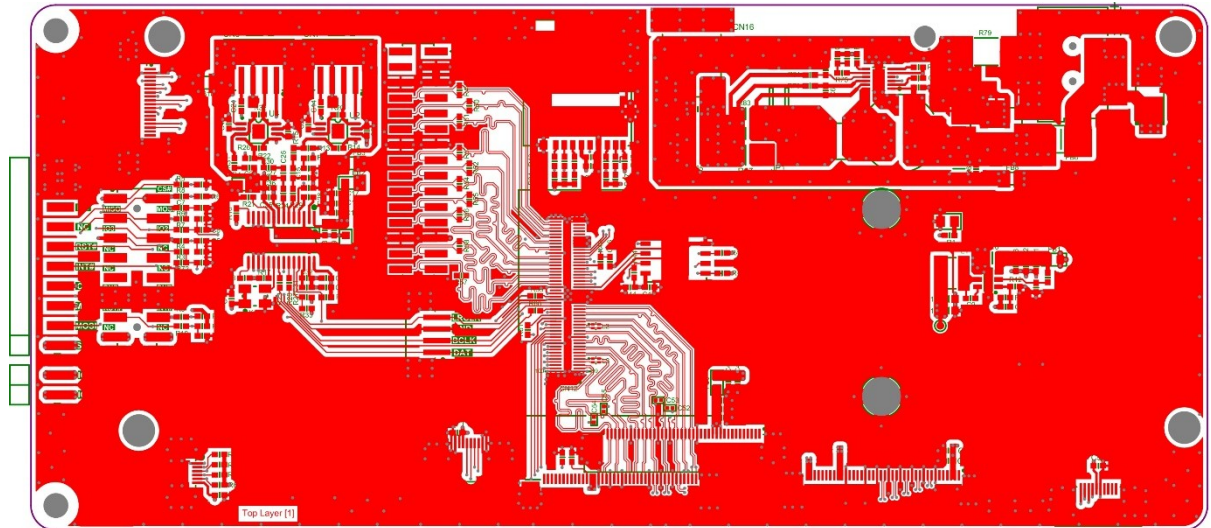


Figure 5 - VM820B10A PCB Top Layer

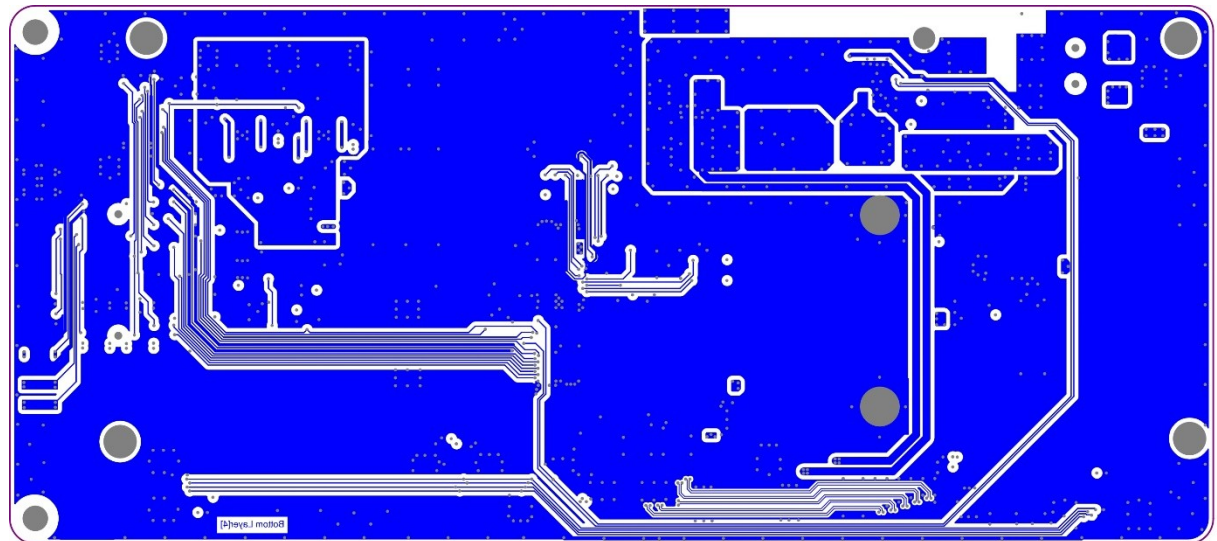


Figure 6 - VM820B10A PCB Bottom Layer

3.3.2 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 18 V.

- **CN3 – SPI/QSPI Interface**

This 16-position, 2.5 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 Input/ output; CN8: Right Input/ 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 is designed to support the dual-channel LVDS interface of Bridgetek's DP-1561-02A LCD panel and is exclusively used on the VM820B15A module.

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 VM820B10A 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 N
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 N
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 N
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 signal
17	VCC3V3	P	3.3V output power supply
18	LVDS_RX0_CLK_P	I	LVDS RX odd channel clock differential P signal
19	VCC3V3	P	3.3V output power supply
20	LVDS_RX0_D3_N	I	LVDS RX odd channel data bit 3 differential N
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 N
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 P
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 N
31	SD_CLK	O	SD Card: Serial clock output
32	LVDS_RX1_D1_P	I	LVDS RX even channel data bit 1 differential P
33	SD_CMD	I/O	SD Card: Command signal
34	LVDS_RX1_D2_N	I	LVDS RX even channel data bit 2 differential N
35	SPIM_MOSI	I/O	SPI flash MOSI line
36	LVDS_RX1_D2_P	I	LVDS RX even channel data bit 2 differential P
37	SPIM_MISO	I/O	SPI flash MISO line
38	LVDS_RX1_CLK_N	I	LVDS RX even channel clock differential N signal
39	SPIM_IO3	I/O	SPI flash IO3 line
40	LVDS_RX1_CLK_P	I	LVDS RX even channel clock differential P signal
41	SPIM_IO2	I/O	SPI flash IO2 line
42	LVDS_RX1_D3_N	I	LVDS RX even channel data bit 3 differential N
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 P
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 N
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 N
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 N
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 signal
70	GPIO2	I/O	General purpose IO 2
71	LVDS_TX0_CLK_P	O	LVDS TX odd channel clock differential P signal
72	GPIO4	I/O	General purpose IO 4
73	LVDS_TX0_D3_N	O	LVDS TX odd channel data bit 3 differential N
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 N
80	CTP_RST	O	Reset to capacitive touch panel
81	LVDS_TX1_D0_P	O	LVDS TX even channel data bit 0 differential P
82	GND	P	Ground
83	LVDS_TX1_D1_N	O	LVDS TX even channel data bit 1 differential N
84	SPIS_MISO	I/O	SPI data line 1
85	LVDS_TX1_D1_P	O	LVDS TX even channel data bit 1 differential P
86	SPIS_SCLK	I	SPI clock input
87	LVDS_TX1_D2_N	O	LVDS TX even channel data bit 2 differential N
88	SPIS_SS_N	I	SPI slave select input
89	LVDS_TX1_D2_P	O	LVDS TX even channel data bit 2 differential P
90	SPIS_MOSI	I/O	SPI data line 0
91	LVDS_TX1_CLK_N	O	LVDS TX even channel clock differential N signal
92	SPIS_IO3	I/O	SPI data line 3
93	LVDS_TX1_CLK_P	O	LVDS TX even channel clock differential P signal
94	SPIS_IO2	I/O	SPI data line 2
95	LVDS_TX1_D3_N	O	LVDS TX even channel data bit 3 differential N
96	INT_N	OD/O	Interrupt to host, active low
97	LVDS_TX1_D3_P	O	LVDS TX even channel data bit 3 differential P
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 for DP-1561-02A panel's 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, supplies 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
9	LVDS_TX0_D0_P	O	LVDS TX odd channel data bit 0 differential P
10	GND	P	Ground
11	LVDS_TX0_D1_N	O	LVDS TX odd channel data bit 1 differential N
12	LVDS_TX0_D1_P	O	LVDS TX odd channel data bit 1 differential P
13	GND	P	Ground
14	LVDS_TX0_D2_N	O	LVDS TX odd channel data bit 2 differential N
15	LVDS_TX0_D2_P	O	LVDS TX odd channel data bit 2 differential P
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
21	LVDS_TX0_D3_P	O	LVDS TX odd channel data bit 3 differential P
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 - CN19 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 - CN20 Pinout

- **JP1 – Backlight Brightness Select**

This jumper selects between backlight brightness levels.

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

Table 10 – JP1 Jumper Select

4 Board Schematics

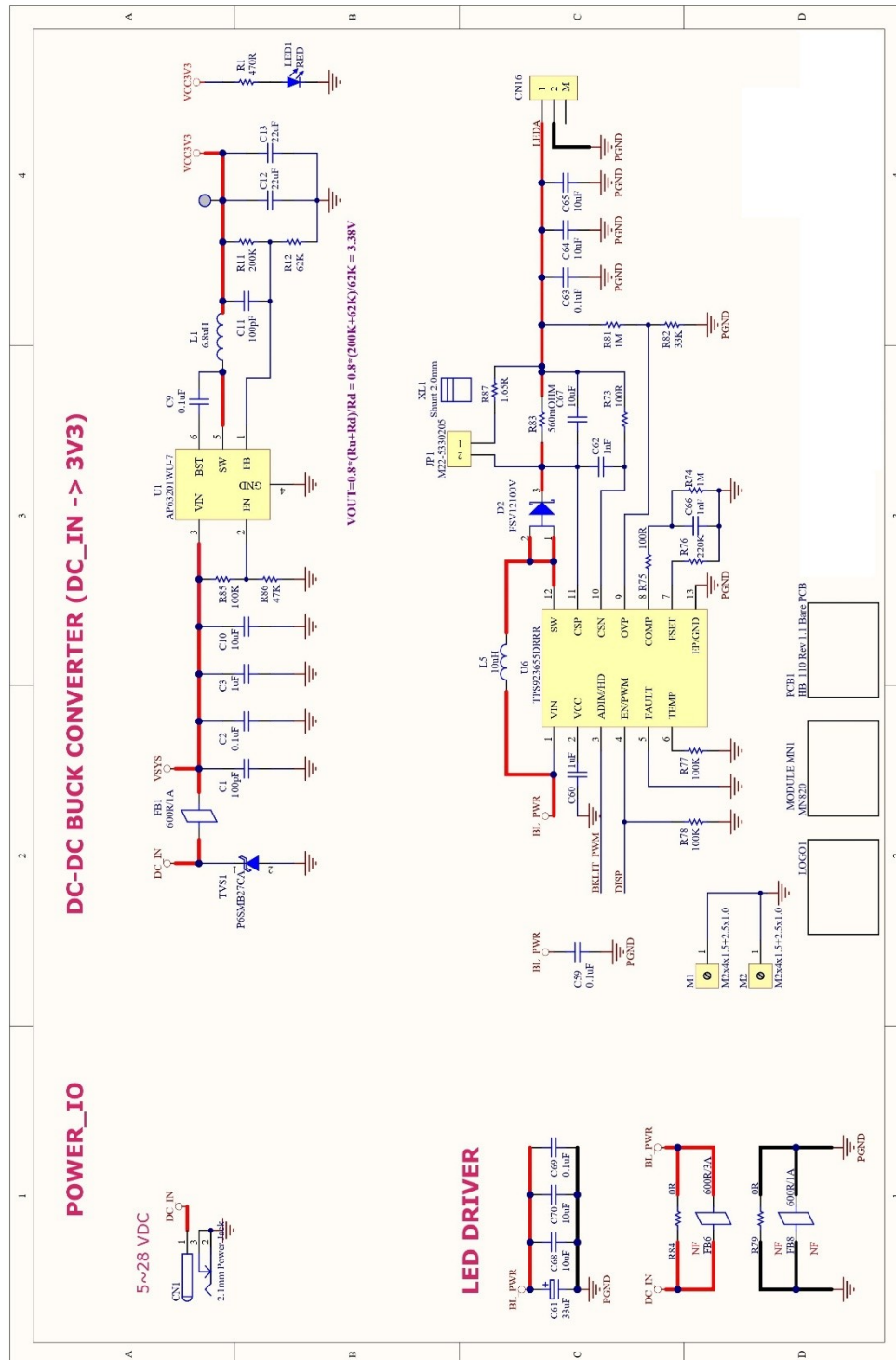
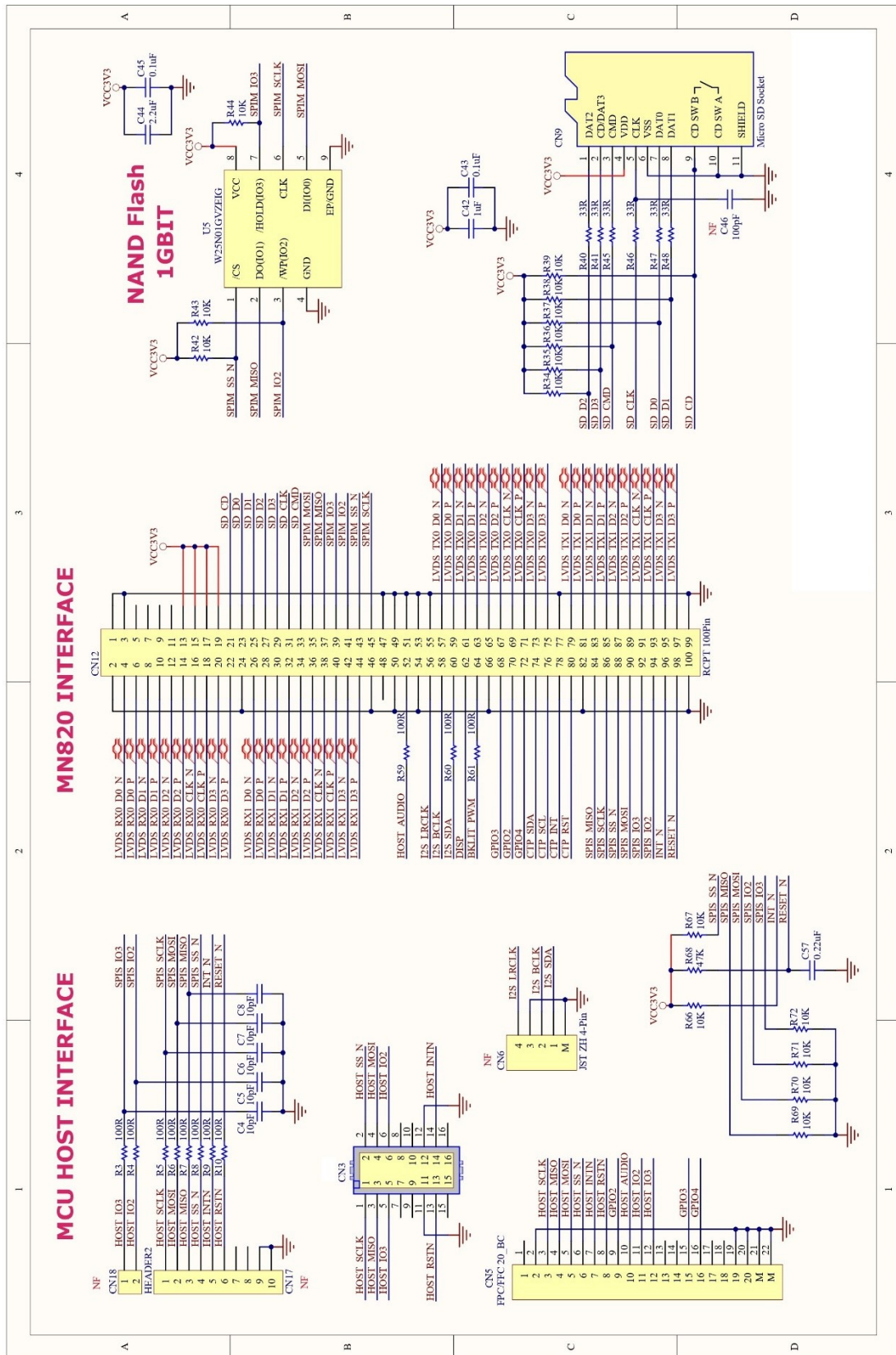


Figure 7 - Power Regulation Circuit


Figure 8 - Memory and Host Interface

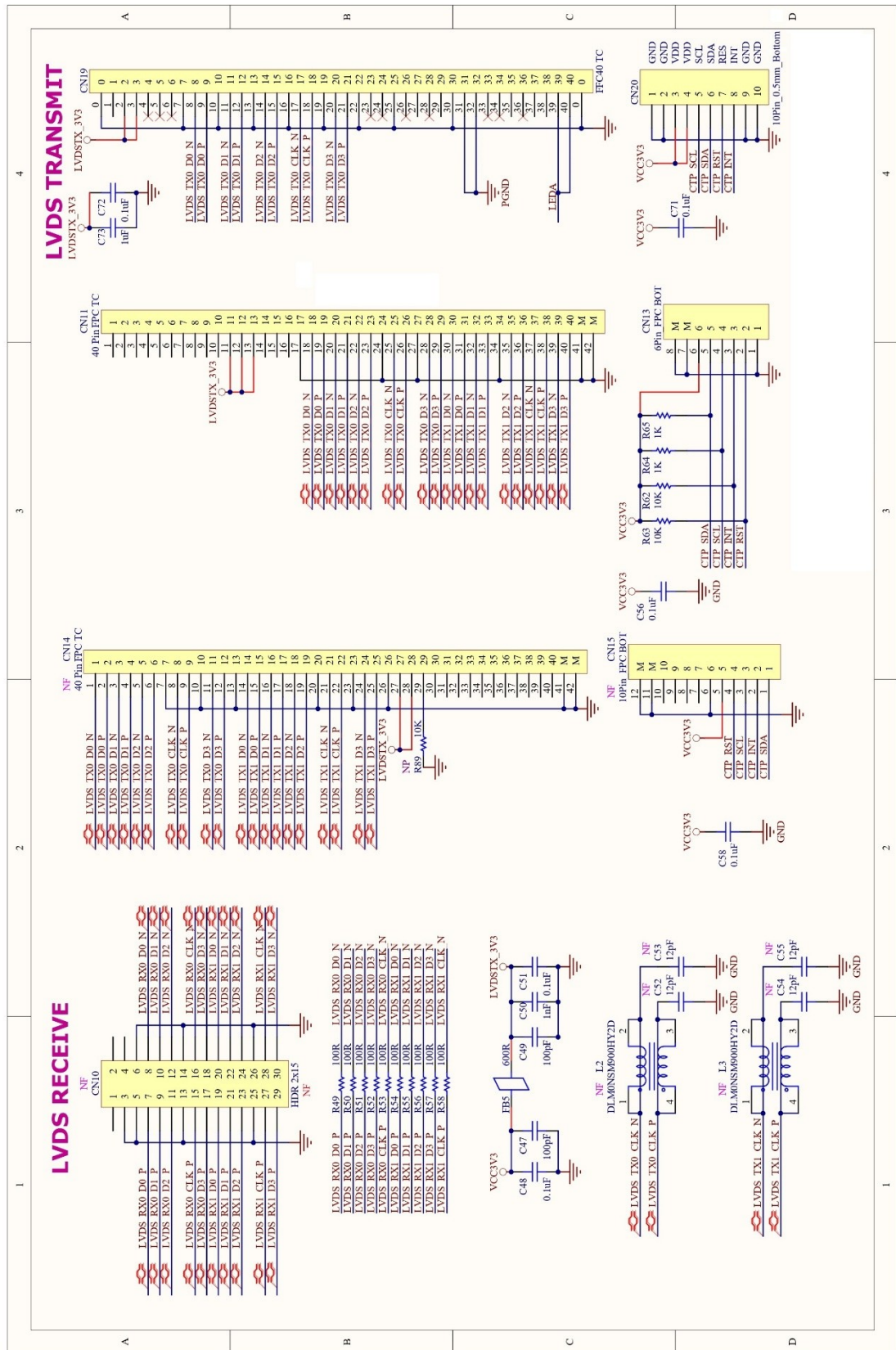


Figure 9 - LVDS Interface

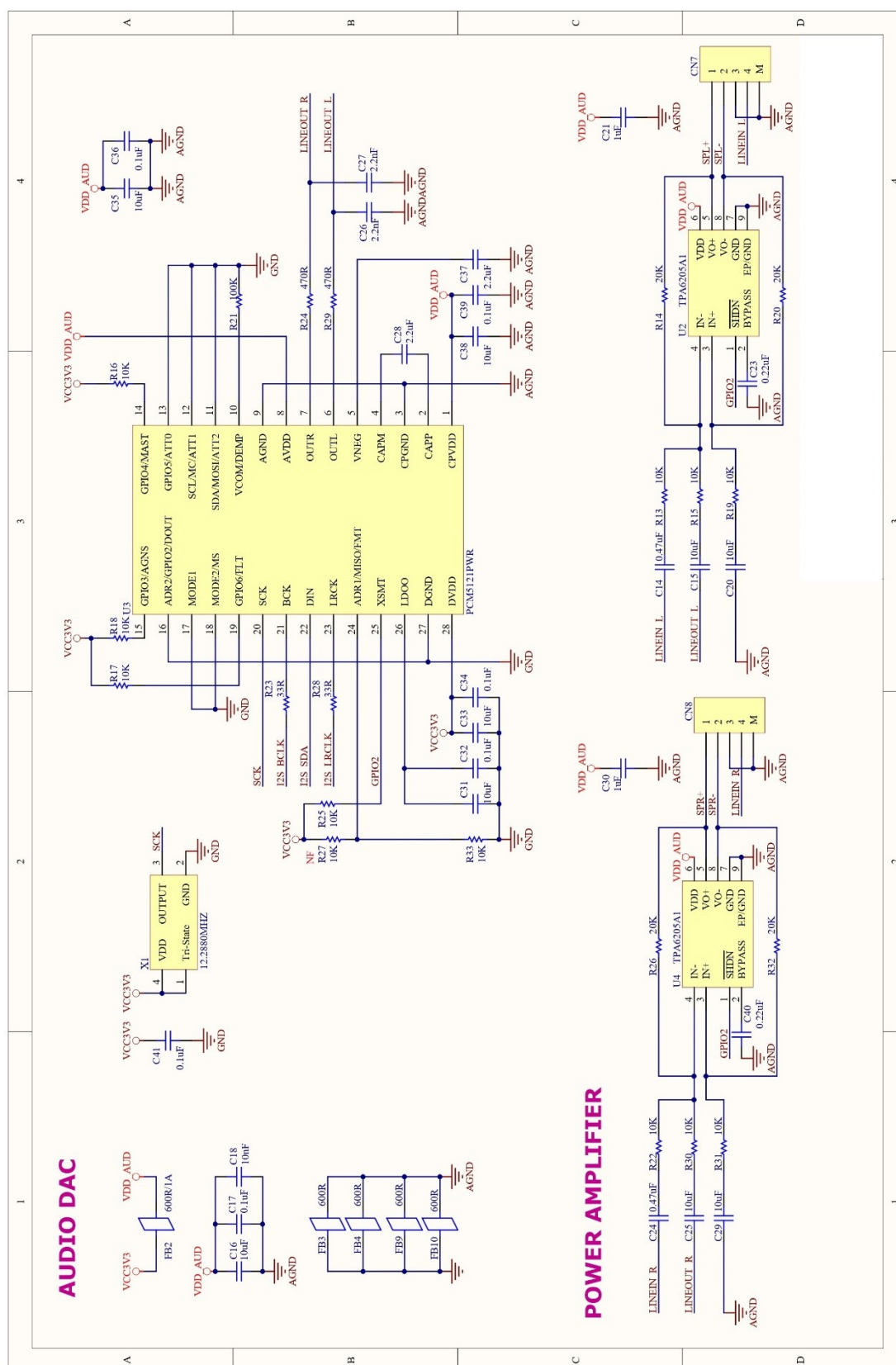


Figure 10 - Audio Circuit

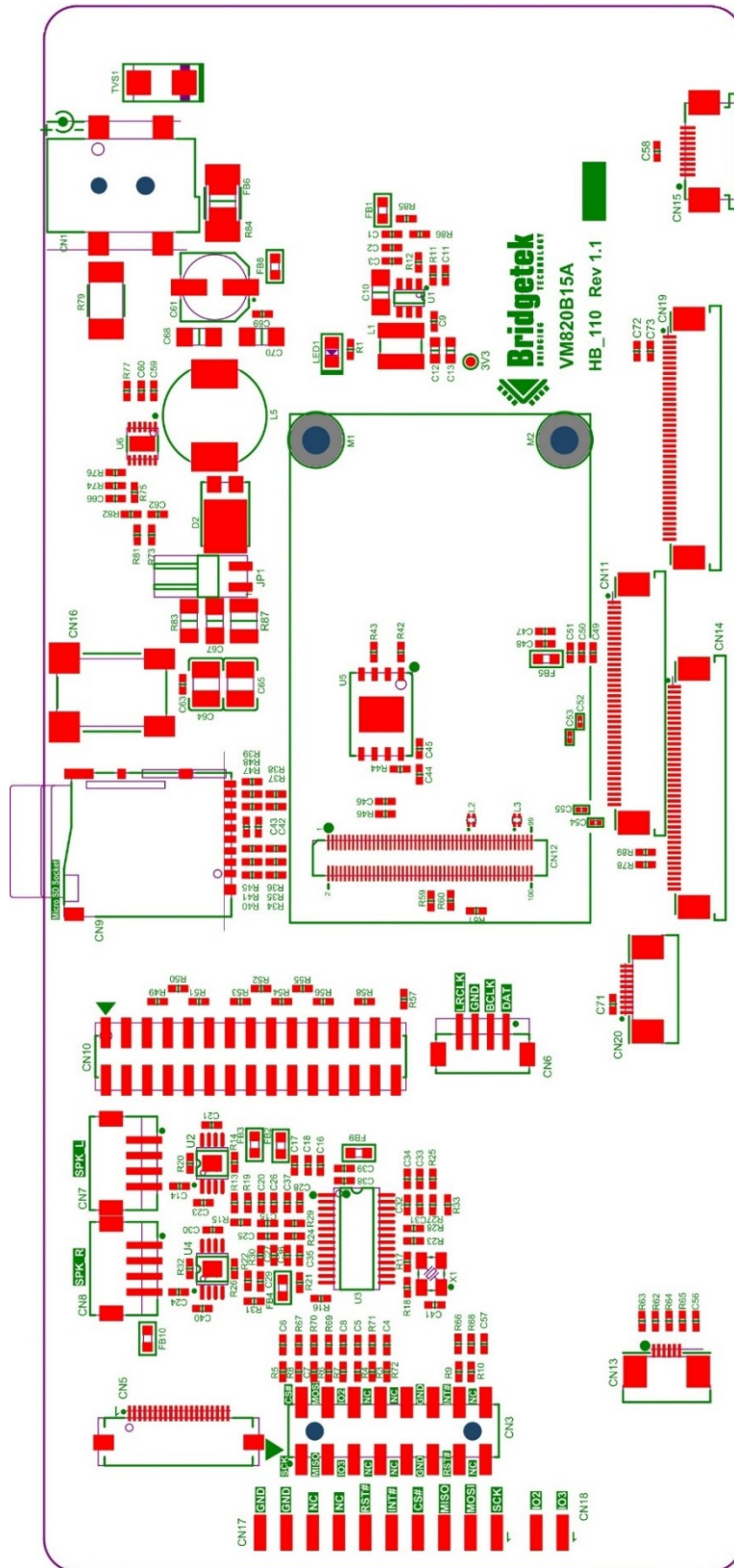


Figure 11 - Assembly Drawing

5 Hardware Configuration

Figure 12 shows the setup of the VM820B10A development module driving the DP-1011-02A LVDS display panel with 8 Ω passive speakers, along with options for different host interfaces.

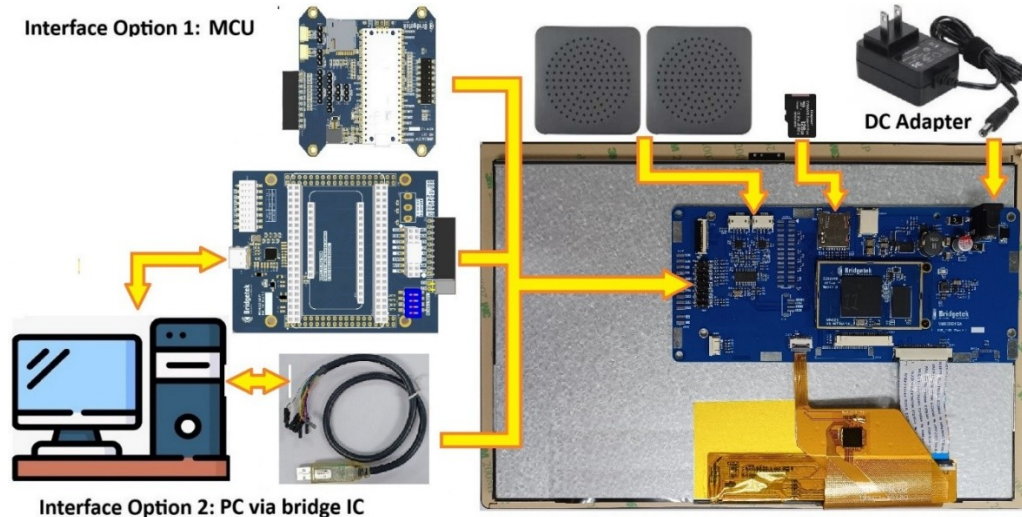


Figure 12 - VM820B10A Hardware Setup

5.1 DP-1011-02A LCD

The DP-1011-02A is a 10.1-inch TFT LCD panel with a resolution of 1280 (H) $\times$ 800 (V), supporting 16.7 million colors via a single-channel LVDS interface and driven by the EK79202 display driver. When configured for full brightness with the PWM drive signal set high, the panel can achieve a luminance of up to 1000 cd/m².

The module also integrates a capacitive touch panel (CTP) controlled by the ILI2132 controller over an I²C interface, delivering smooth and responsive operation with support for up to 5-point multi-touch.

5.2 Input Power Supply

The VM820B10A base board can be powered via a DC input voltage of 5 V to 18 V, with a minimum power rating of **12 W**, through a 2.1mm ID / 5.5 mm OD DC power jack.

This input power supplies the onboard:

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

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

- **Required power rating** – At 5 V, the source must be rated for at least 3 A.
- **Cable voltage drop** – High current draw at low voltage can cause significant voltage to drop across the cable; use a high-quality, low-resistance power cable.
- **Power source quality** – Low-voltage operation results in higher inrush currents; use a high-quality, fast-response DC adapter. Slow-response adapters or PSUs may fail to maintain 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 VM820B10A module incorporates an onboard backlight LED driver based on the Texas Instruments TPS923655DRRR. This device integrates a 150 mΩ MOSFET with a 6.5 A current limit and includes multiple protection features; refer to the [TPS923655](#) datasheet for full details.

The backlight circuit supports two fixed constant-current LED (I_{LED}) settings:

- 476 mA with JP1 fitted
- 357 mA with JP1 open

By default, I_{LED} is set to 357mA (JP1 open) to align with the DP-1011-02A typical backlight current of 360 mA.

Over-voltage protection is configured at 44 V under open-load conditions. The switching frequency can be adjusted between 100 kHz and 2.2 MHz; for this module, it is set to approximately 100 kHz to reduce EMI emission.

5.4 External Host Communication Interface

The VM820B10A 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 on the onboard MN820 mini module is routed to these connectors for communication. As shown in Figure 12, Bridgetek offers 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 FT4222H 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 that supports SPI/QSPI communication via the header or FPC connector.

5.5 Audio Interface

The VM820B10A development module provides stereo audio output. It 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 delivering up to 1 W into 8 Ω speakers. The amplified outputs are routed to dual 4-position headers for stereo speaker connections and support external line-in for audio multiplexing.

5.6 Display Interface

LVDS Output

The VM820B10A development module routes the BT820B single-channel LVDS transmit signals to a 40-position 0.5mm pitch top-contact FPC connector, enabling connection to the DP-1011-02A LCD display panel. The connection is made using a 40-position FPC cable with opposite-side contacts.

LVDS Input

The VM820B10A development module includes a footprint for a 30-position, 2.0 mm-pitch header to support the dual LVDS input interface. The header is not populated; developers must install it if this interface is required.

5.7 Capacitive Touch Panel Interface

The capacitive touch interface is provided via a 10-position, 0.5 mm pitch bottom-contact FPC connector, linking the BT820B I²C interface to the ILI2132 capacitive touch controller on the DP-1011-02A touch panel.

5.8 Memory Storage

The VM820B10A module offers two memory storage options:

- **Onboard NAND Flash:**

The VM820B10A comes with 1 Gbit of onboard QSPI NAND flash memory.

- **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	20	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 VM820B10A DC Electrical Characteristics

Parameter		MIN	TYP	MAX	UNIT
DC_IN	Input voltage range	5	12	18	V
VCC3V3	Output voltage range	3.0	3.3	3.6	V
Icc_DCIN_18V *Note	Operating current into 18V DC power jack		0.54		A
Icc_DCIN_12V *Note	Operating current into 12V DC power jack	-	0.88	-	A
Icc_DCIN_5V *Note	Operating current into 5V DC power jack		2.14		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:

The operating current was measured with a test card image displayed and the backlight set to full brightness.

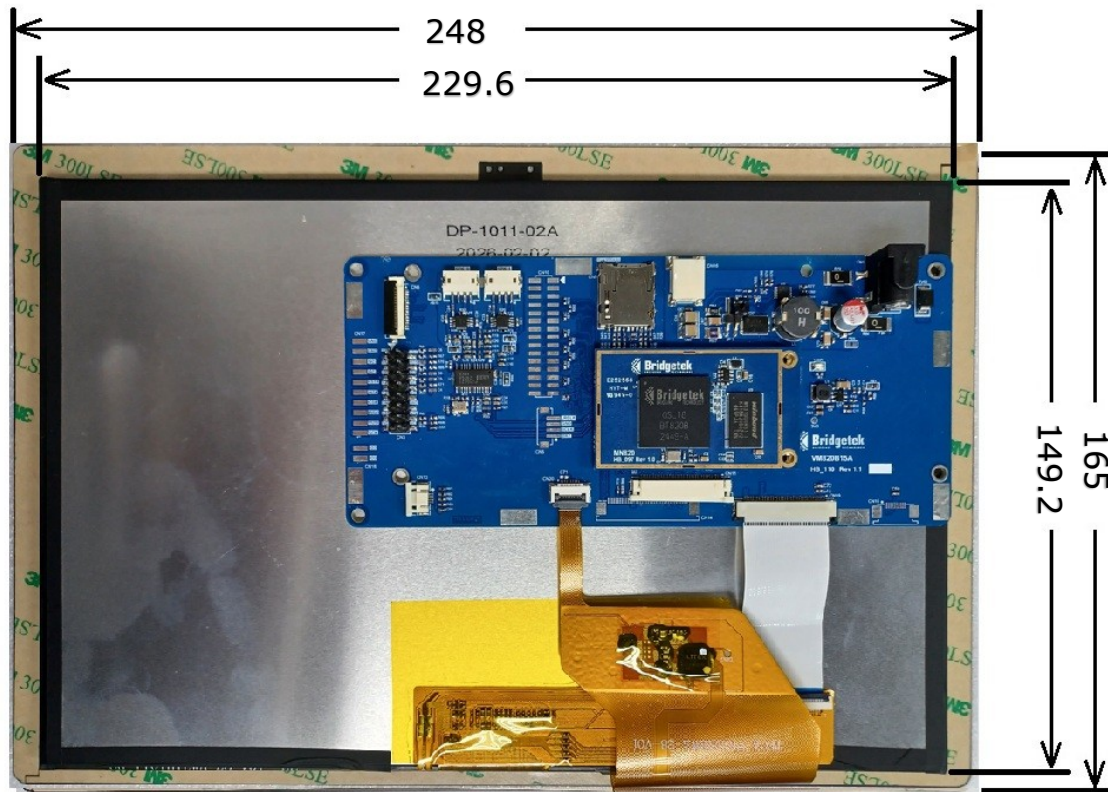
7 LCD Specifications

Refer to the [DP-1011-02A](#) datasheet for detailed LCD panel display specifications and dimensions.

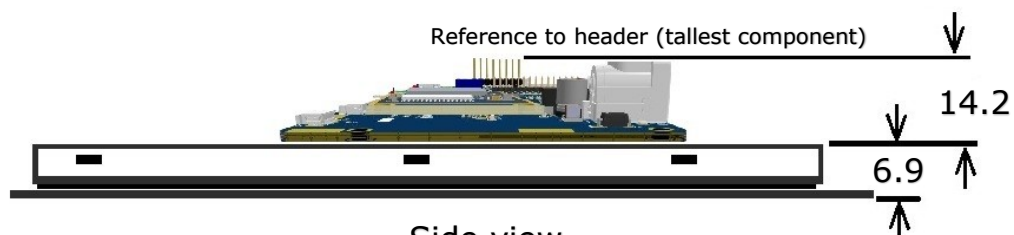
8 Mechanical Dimensions

8.1 VM820B10A Module Dimensions

All dimensions are in mm



Back view



Side view

Figure 13 - VM820B10A Development Module Dimension

Note: User can refer to the [DP-1011-02A](#) datasheet for the panel's detailed mechanical dimensions.

8.2 VM820B10A Baseboard PCB Dimensions

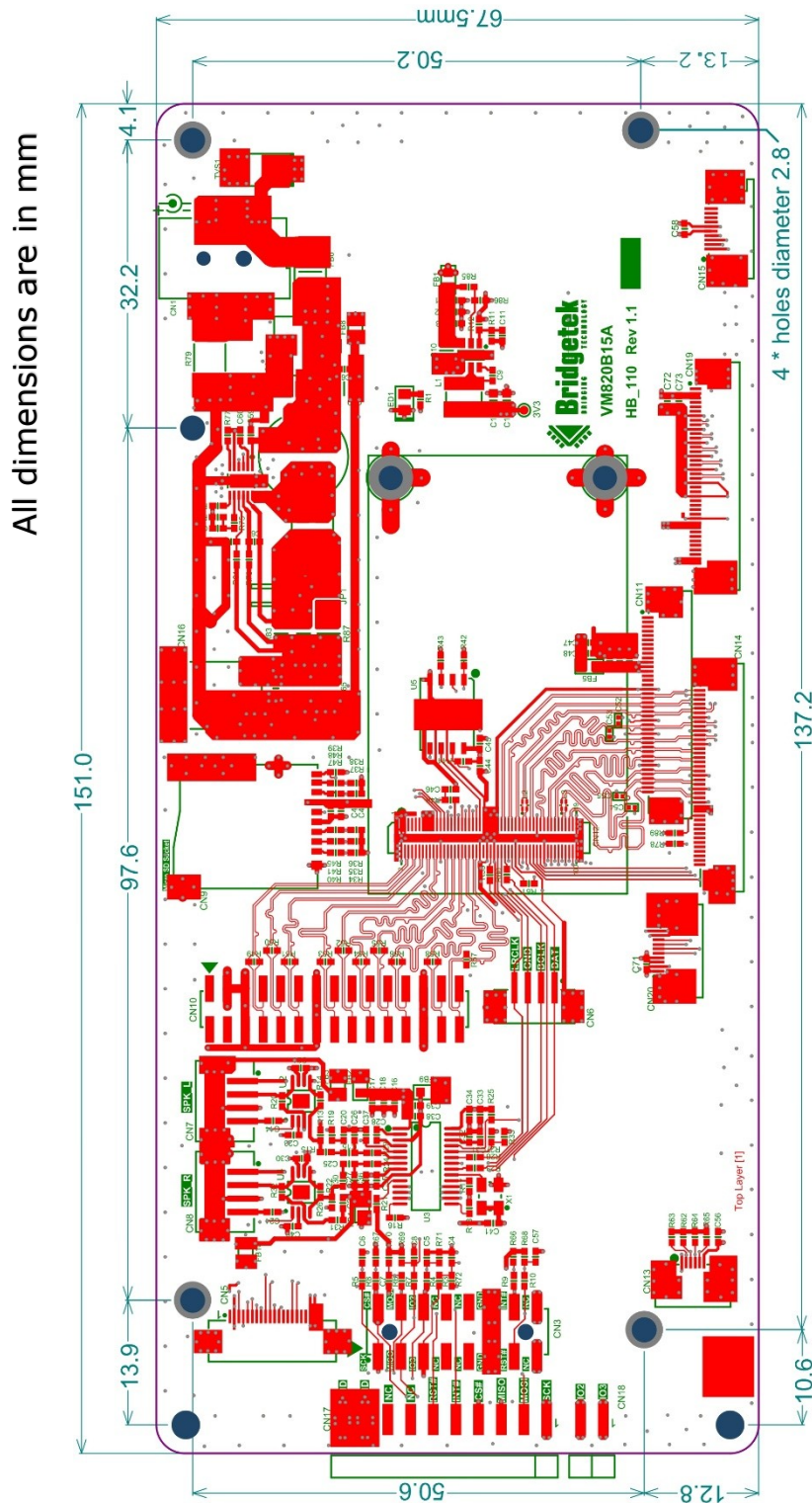


Figure 14 - VM820B10A PCB Dimensions

9 Software Setup Information

EveApps-BT82X is a collection of applications designed for the BT82X Eve Series chip. It includes sample applications developed in ANSI C, with complete source code provided. Download links for EveApps-BT82X and the required supporting software are listed below.

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++ development tools are included.
2. Download and extract the latest EveApps-BT82X package.
3. Launch the sample application **SampleApp_MSVC.sln** located in the SampleApp folder. Figure 15 shows SampleApp_MSVC.sln running in Visual Studio.

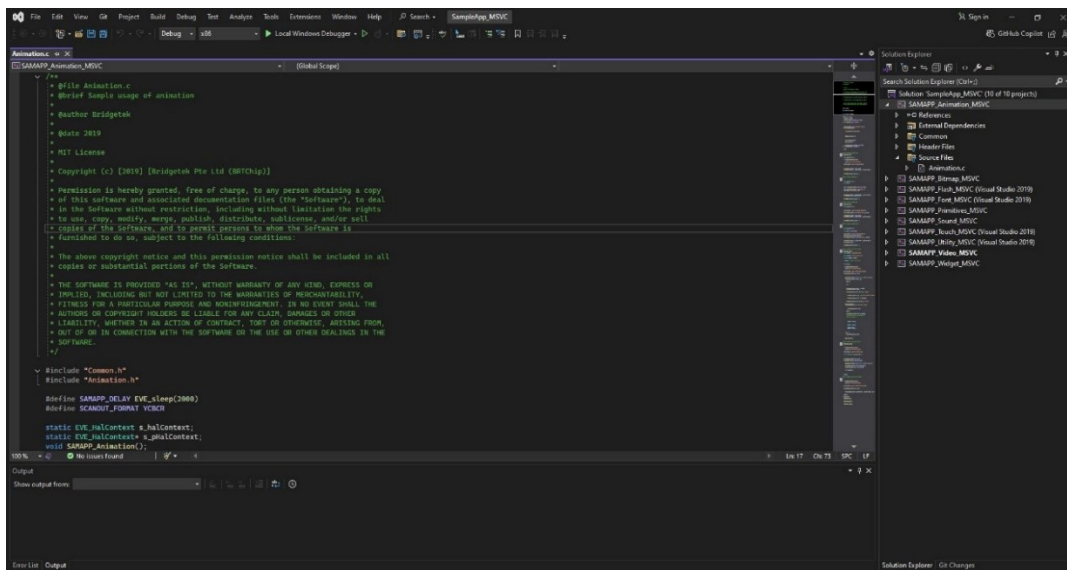


Figure 15 - Running SampleApp_MSVC.sln in Visual Studio

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.

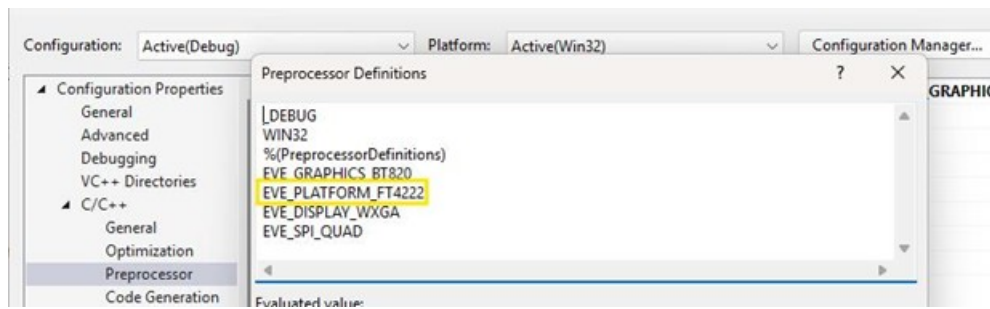


Figure 16 - Communication Interface Set to FT4222H

9.3 Running Sample Codes

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

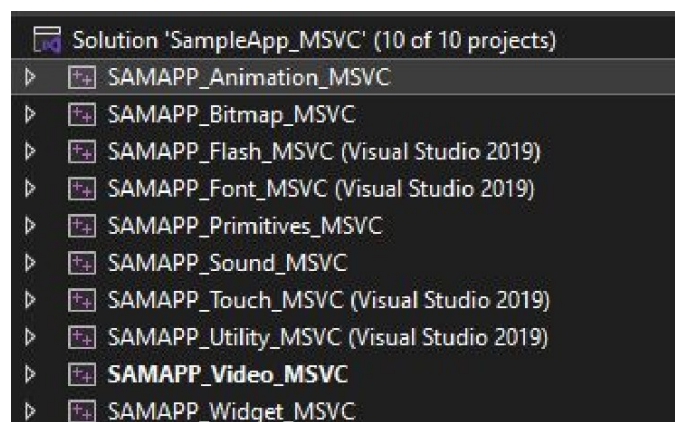
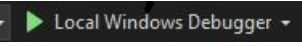


Figure 17 - Available Sample Applications

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-1011-02A Datasheet](#)

[MN820 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
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

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Clearance No.: BRT#268

Product Page: <https://brtchip.com/ic-module/product-category/products/>

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Revision	Changes	Date
Version 1.0	Initial Release	04-02-2026
Version 1.1	<u>Updated Release</u> Removed option for VM820B10A-BK (module with bezel) Changed touch controller IC from ILI2132A-ILI2132 Updated diagrams to match actual LCD panel image (front page, hardware description, hardware configuration, and mechanical dimension) Removed optical specification table and revised brightness specification to 1000cd/m2 max instead of 700 cd/m2 (Introduction and hardware description).	26-02-2026