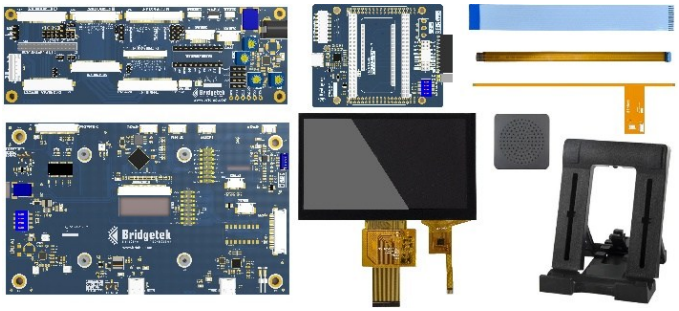
EVE IC Development Kits Datasheet



1 Introduction

Bridgetek IC Development Kit Solutions are comprehensive evaluation platforms developed to help engineers assess, prototype, and accelerate the integration of Bridgetek display technologies. Paired with compatible LCD panels, these kits simplify the evaluation of Bridgetek's Embedded Video Engine (EVE) graphics controllers, enabling faster development cycles and reducing overall system integration effort.

A range of five kit configurations is available, each designed to showcase different generations of EVE devices across various display sizes, resolutions, and LCD panel types within Bridgetek's display portfolio. This flexibility allows developers to efficiently evaluate EVE performance in multiple application scenarios and operating conditions.

Each kit is delivered as a complete, ready-to-use hardware platform, typically including an EVE-based development module, a matched LCD panel, and a host interface solution such as a microcontroller module or bridge interface. All necessary interconnects, speakers and supporting accessories are included to ensure quick setup and seamless evaluation.

These kits provide practical reference platforms for hardware verification, graphical user interface development, and system performance testing. By offering a fully integrated and pre-validated solution, Bridgetek IC Development Kit Solutions help streamline the product development process and support a faster transition from evaluation to production.

1.1 Features

- Features Bridgetek's Embedded Video Engine (EVE) graphics controllers
- Includes integrated LCD display panels
- Includes capacitive or resistive touch panels
- Supplied with bridging interface for connection to a computer (via USB) or microcontroller module
- Includes external speaker for kits without onboard audio speaker
- Supplied with LCD stands for large-format display panels
- Delivered with a complete set of interconnect cables and supporting accessories
- Supported by Bridgetek software toolchains with preconfigured environments for fast and simplified setup and installation

2 Part Number/Ordering Information

Part No.	Description
IDK-FT810-43A	Bridgetek FT810 IC Development Kit with 4.3-inch display 480 × 272px, Resistive touchscreen.
IDK-BT816-50A	Bridgetek BT816 IC Development Kit with 5.0-inch display 800 x 480px, Resistive touchscreen.
IDK-BT817-70A	Bridgetek BT817 IC Development Kit with 7.0-inch display 800 x 480px, Capacitive touchscreen.
IDK-BT817-101A	Bridgetek BT817 IC Development Kit with 10.1-inch display 1280 x 800px, Capacitive touchscreen.
IDK-BT820-101A	Bridgetek BT820 IC Development Kit with 10.1-inch display 1920 x 1200px, Capacitive touchscreen.

Table 1 - Kits Part Number/Ordering Information

Refer to Table 3 for a detailed list of kit contents.

Part No.	Description
MM2040EV	The MM2040EV PICO Adapter board features a Raspberry Pi Pico module (RP2040) as the main MCU. It integrates a 10+2 pin header to enable control and communication with BRT EVE chips used in EVE development modules.
MM900EV-LITE	FT900 module featuring the FT32 32-bit microcontroller with embedded 256 kB flash memory, 64 kB data RAM, and 256 kB program memory. The module supports SD 3.0 and USB 2.0 Device functionality and includes multiple interface pin headers and connectors to enable flexible connectivity, evaluation, and embedded system development.
MM930LITE	FT930 module featuring the FT32 32-bit microcontroller with embedded 128 kB flash memory, 32kB data RAM, and 128 kB program memory. The module also includes 8 MB embedded flash storage and supports SD 3.0 and USB 2.0 Device functionality. Multiple interface pin headers and connectors are provided to support flexible connectivity and facilitate embedded system development, evaluation, and prototyping.

Table 2 - Accessories Part Number/Ordering Information

Table of Contents

3 Kit Contents

This section provides an overview of each kit solution and its included components. Table 3 summarizes the items supplied with each kit package.

	Description
IDK-FT810-43A	
1	DP-0431-11A 4.3-inch 480 × 272 TFT-LCD module with resistive touch
2	VM810C50A-N-FT810 credit card development module
3	MM4222-QSPI bridge board with support for MCU modules
4	USB Type-A to Type-C cable, 1 meter
5	10-pin 2.54 mm pitch single-row right-angle header
IDK-BT816-50A	
1	DP-0501-11A 5.0-inch 800 × 480 TFT-LCD module with resistive touch
2	VM816C50A-N-BT816 credit card development module
3	MM4222-QSPI bridge board with support for MCU modules
4	USB Type-A to Type-C cable, 1 meter
5	CleO Speaker with enclosure, 8 Ω / 1 W
IDK-BT817-70A	
1	DP-0701-01A 7-inch 800 × 480 TFT-LCD module with capacitive touch
2	ME817EV-BT817 development module
3	VA-1001-01A Universal LCD adaptor package
4	10-position extension cable
5	USB Type-A to Type-C cable, 1 meter
6	CleO Speaker with enclosure, 8 Ω / 1 W
7	Black LCD stand, dimensions 15 cm × 13 cm
IDK-BT817-101A	
1	DP-1011-02A 10.1-inch 1280 × 800 TFT-LCD module with capacitive touch
2	ME817EV-BT817 development module
3	40-pin flex cable, 0.5 mm pitch, opposite-side contacts, 15 cm
4	USB Type-A to Type-C cable, 1 meter
5	CleO Speaker with enclosure, 8 Ω / 1 W
6	Black LCD stand, dimensions 15 cm × 13 cm
IDK-BT820-101A	
1	DP-1012-01A 10.1-inch 1920 × 1200 TFT-LCD module with capacitive touch
2	VM820C-BT820 credit card development module
3	VA-1002-01A VM820C CTP interface adaptor
4	45-pin flex cable, 0.5 mm pitch, opposite-side contacts, 20 cm
5	USB Type-A to Type-C cable, 1 meter
6	Black LCD stand, dimensions 15 cm × 13 cm

Table 3 - Kit Contents

3.1 IDK-FT810-43A

The IDK-FT810-43A is an IC development kit featuring Bridgetek's display panel DP-0431-11A, a 4.3-inch 480 × 272 TFT LCD with resistive touch support. It is built around the VM810C50A-N module, which integrates the Bridgetek FT810 EVE graphics controller to deliver optimized graphical user interface performance and efficient display handling.

For rapid prototyping, the kit includes the MM4222-QSPI bridge board, which provides high-speed USB-to-QSPI connectivity for seamless host communication. The integrated 10+2-pin housing enables connection to Bridgetek EVE development boards via SPI/QSPI mode. The bridge board also supports expansion with MCU boards such as STM32 NUCLEO-F401RE, ESP32-S3 Feather, and WeAct STM32H743VIT6, enabling flexible system integration and direct control of the EVE device.

Kit Contents:

1. 4.3-inch 480×272 TFT LCD module with resistive touch
2. VM810C50A-N–FT810 development module
3. MM4222-QSPI USB-to-QSPI bridge board
4. USB Type-A to Type-C cable (1 m)
5. 10-pin 2.54 mm right-angle header

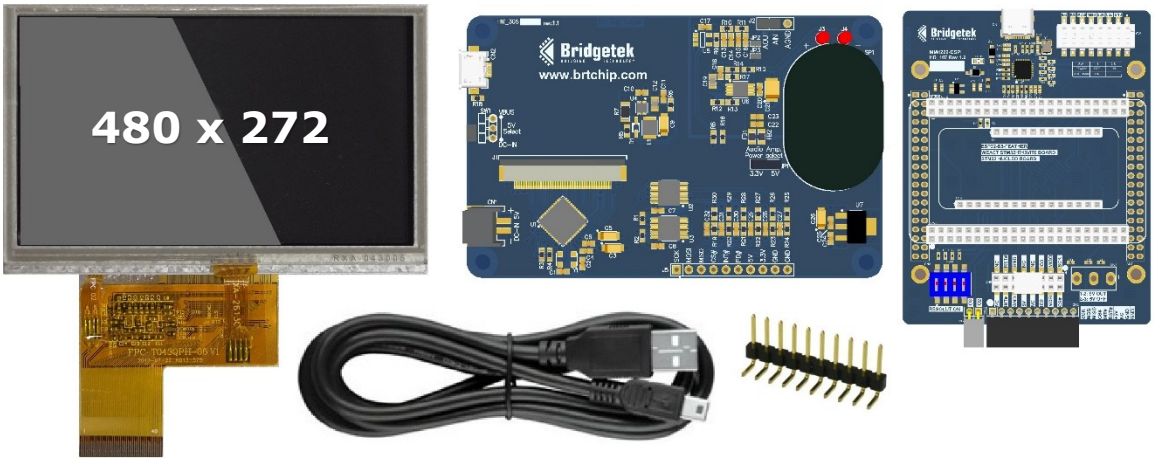


Figure 1 - IDK-FT810-43A IC Development Kit

3.2 IDK-BT816-50A

The IDK-BT816-50A integrated Bridgetek's TFT panel DP-0501-11A, a 5.0-inch 800 × 480 resolution display with resistive touch support. It is built around the VM816C50A-N EVE development module, which integrates Bridgetek's BT816Q graphics controller and includes 16 MB of NOR Flash memory for graphics asset storage.

For simplified development and PC connectivity, the kit includes the MM4222-QSPI USB-to-QSPI bridge. It also supports MCU expansion via boards such as STM32 NUCLEO-F401RE, ESP32-S3 Feather, and WeAct STM32H743VIT6, enabling flexible system integration and direct control of the EVE device.

As no onboard speaker is provided, an external 8Ω/ 1W CleO Speaker is included to support full audio functionality, allowing complete testing and evaluation of the BT816's audio capabilities.

Kit Contents:

1. 5.0-inch 800×480 TFT LCD module with resistive touch
2. VM816C50A-N-BT816 development module
3. MM4222-QSPI USB-to-QSPI bridge board
4. USB Type-A to Type-C cable (1 m)
5. 8 Ω/ 1W CleO speaker with enclosure

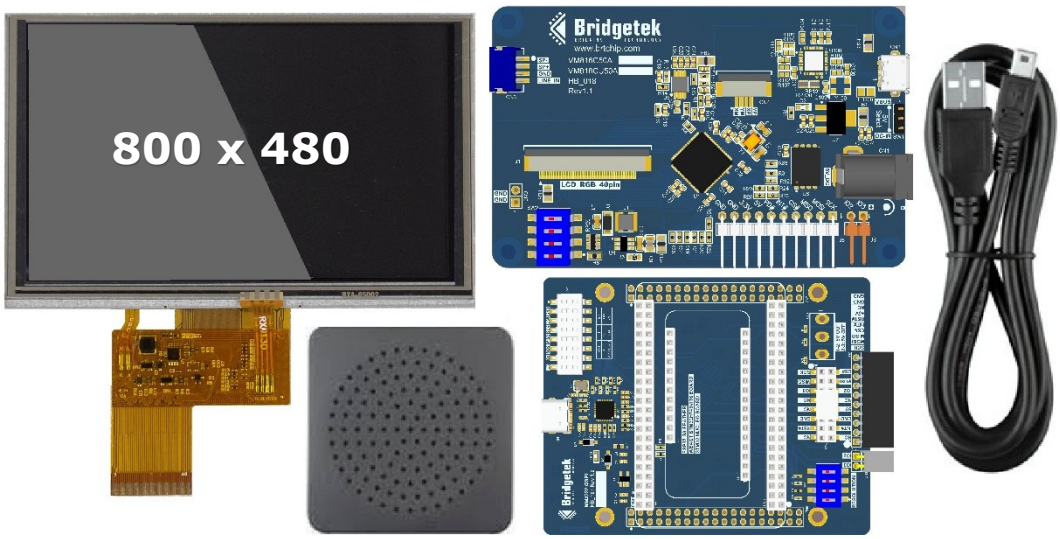


Figure 2 - IDK-BT816-50A IC Development Kit

3.3 IDK-BT817-70A

The IDK-BT817-70A development kit features Bridgetek's display panel DP-0701-01A, a 7-inch 800 × 480 TFT-LCD with capacitive touch using the FocalTech FT5426 controller. It is built around the ME817EV module with the BT817Q EVE graphics controller and includes 16 MB of NOR Flash memory for graphics asset storage. The ME817EV also integrates the FT4222-QSPI USB-to-QSPI bridge, eliminating the need for an external host interface. The development board further supports external MCU operation in SPI/QSPI master mode via an integrated 8×2-pin header, selectable through DIP switches.

To simplify panel integration, the kit includes a universal adapter board that matches the ME817EV power output to the LCD's specific requirements, along with a 10-pin extension cable to connect the touch flex cable to the ME817EV socket.

Since no onboard speaker is provided, an external 8Ω, 1W CleO Speaker is included to support full audio evaluation of the BT817Q's capabilities. The kit also includes an adjustable LCD stand to enhance viewing comfort during development and testing.

Kit Contents:

1. 7.0-inch 800×480 TFT LCD module with capacitive touch
2. ME817EV-BT817 development module
3. Universal LCD adapter package
4. 10-pin extension cable.
5. USB Type-A to Type-C cable (1 m)
6. 8Ω/ 1W CleO speaker with enclosure
7. LCD stand (black, 15 cm × 13 cm)

Figure 3 - IDK-BT817-70A IC Development Kit

3.4 IDK-BT817-101A

The IDK-BT817-101A features the DP-1011-02A display module, a 10.1-inch 1280 × 800 TFT-LCD with capacitive touch, powered by the Ilitek ILI2132 controller. The kit is built around the ME817EV module, which incorporates the BT817Q EVE graphics controller and includes 16 MB of NOR Flash memory for graphics asset storage. With an integrated FT4222-QSPI USB bridge, the board connects directly to a PC, eliminating the need for an additional host controller. The development board also supports external MCU operation in SPI/QSPI master mode via an integrated 8×2-pin header, with mode selection controlled through DIP switches.

To support full evaluation of the BT817Q's audio capabilities, an external 8Ω, 1W CleO Speaker is included. In addition, the package includes an adjustable LCD stand to improve viewing angle and enhance comfort during development and testing.

Kit Contents:

1. 10.1-inch 1280×800 TFT LCD module with capacitive touch
2. ME817EV-BT817 development module
3. 40-pin 0.5 mm pitch flex cable (15 cm)
4. USB Type-A to Type-C cable (1 m)
5. 8Ω/ 1W CleO speaker with enclosure
6. LCD stand (black, 15 cm × 13 cm)

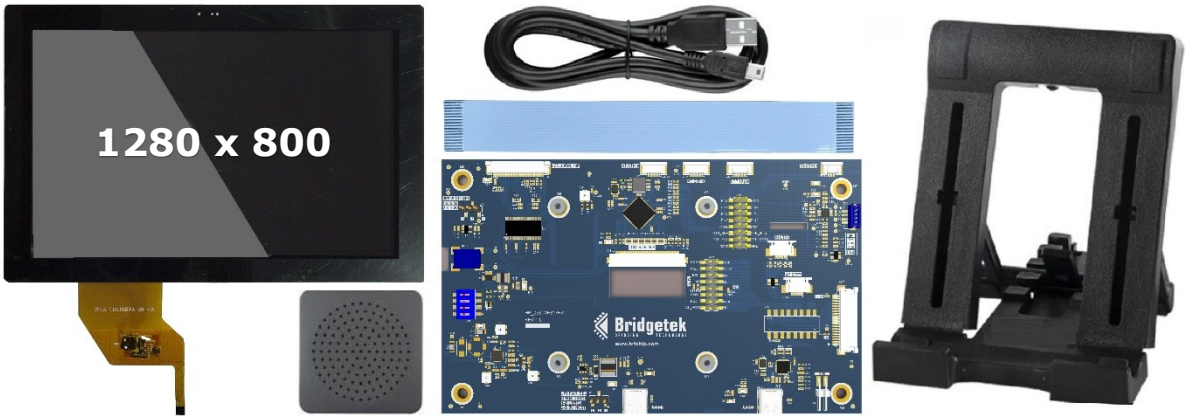


Figure 4 - IDK-BT817-101A IC Development Kit

3.5 IDK-BT820-101A

The IDK-BT820-101A features the DP-1012-01A display unit, a 10.1-inch 1920×1200 TFT LCD with capacitive touch, managed by the Goodix GT911 controller. The system is powered by the VM820C module, which incorporates the BT820B EVE controller, along with 1 Gb of DDR3 memory for system buffering and 128 MB of NAND Flash for graphics asset storage. An SDIO interface is also available for additional memory expansion.

The board includes a built-in FT4222-QSPI USB bridge, enabling direct communication without requiring an external host controller. The kit also comes with the VA-1002-01A capacitive touch adapter and a 45-pin LCD flex cable for board-to-board interconnection.

For audio functionality, the module provides an onboard buzzer for basic alerts and supports external active stereo speakers for enhanced audio output. An adjustable stand is included to ensure improved viewing comfort during development and testing.

Kit Contents:

1. 10.1-inch 1920×1200 TFT LCD module with capacitive touch
2. VM820C-BT820 development module
3. VM820C capacitive touch adapter
4. 45-pin 0.5 mm pitch flex cable (20 cm)

5. USB Type-A to Type-C cable (1 m)
6. LCD stand (black, 15 cm × 13 cm)

Figure 5 - IDK-BT820-101A IC Development Kit

4 Hardware Setup and Configuration

The following section provides an overview of the hardware system configuration for each individual kit solution.

4.1 IDK-FT810-43A

Figure 6 illustrates the hardware setup for the IDK-FT810-43A. Follow the steps below to assemble and configure the kit.

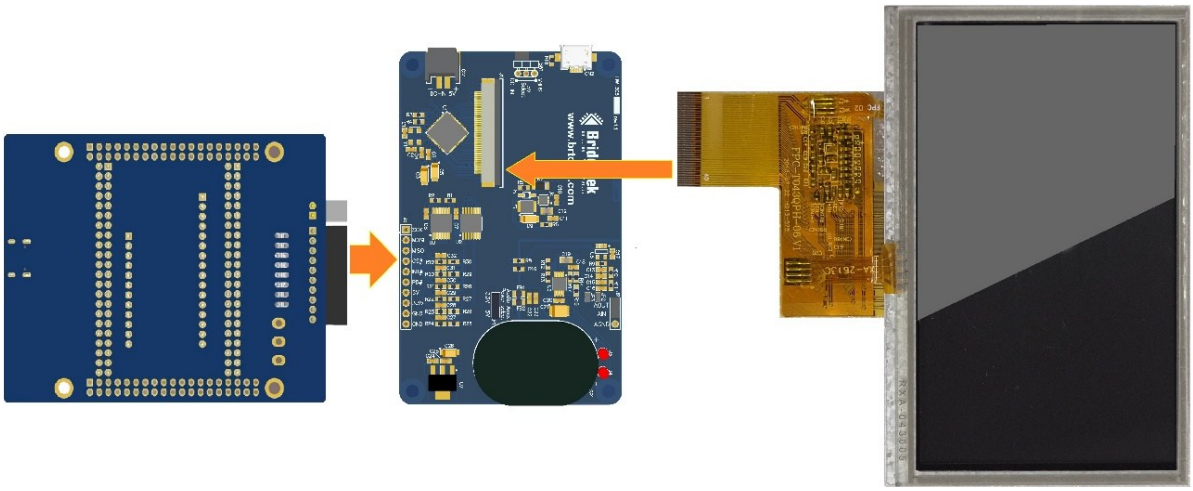


Figure 6 - IDK-FT810-43A Hardware Setup

Jumper / Switch Settings:

1. VM810C50A-N**:** Ensure a jumper is installed on header J2 to short AOUT to AIN, enabling the onboard audio amplifier. By default, JP1 is set to short pins 1–2 (3V3), supplying 3.3 V to the audio amplifier.

2. MM4222-QSPI**:** Set the SW1 8-position DIP switch to route EVE communication through the FT4222 bridge IC by configuring Pin 1 to OFF and Pins 2–8 to ON. Then set the SW3 dual-position switch to position 1–2, allowing system power to be supplied to the EVE development module via the PC USB-C connection.

System Assembly:

1. **LCD Panel:** Insert the LCD flex cable into the JP1 connector, ensuring the contact pads face upward.

2. **Host Controller**: Connect the MM4222-QSPI host controller board to the EVE development module, ensuring correct orientation as shown in the reference diagram.

Connect a USB-C cable from the PC to the MM4222-QSPI bridge board, then launch the EVE software toolchain to evaluate system performance. Figure 7 illustrates the system configuration with code executed via ESD to display an image. The system consumes approximately 1.5 W, which is within the standard USB power range and does not require an external power supply.

Figure 7 - Image Display via ESD Execution

4.2 IDK-BT816-50A

The hardware setup for the IDK-BT816-50A is shown in Figure 8. Follow the steps below for assembly and configuration.

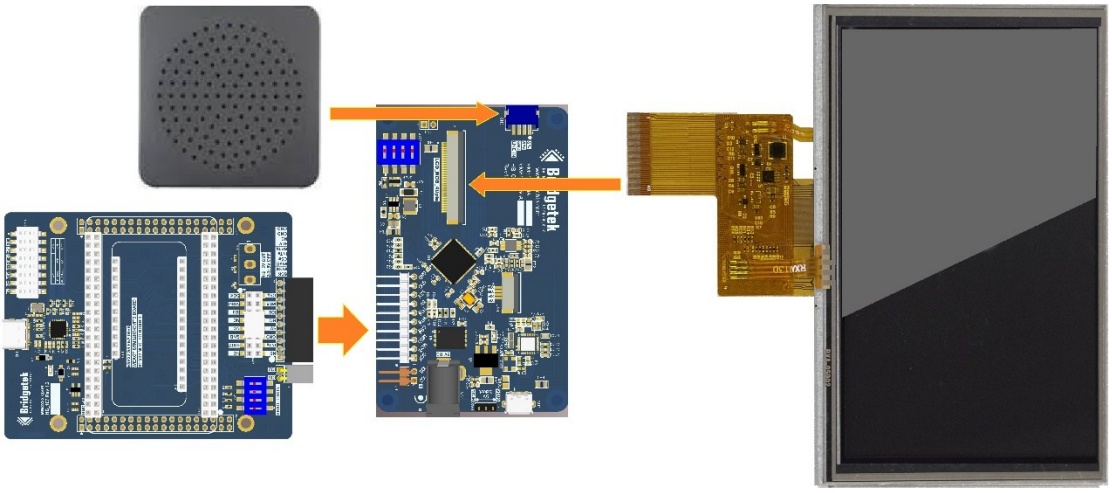


Figure 8 - IDK-BT816-50A Hardware Setup

Jumper/ Switch Settings:

1. VM816C50A-N: Configure the SW2 4-position DIP switch for LED current selection to 2-ON/2-OFF, setting the ILED current to 60 mA.

2. MM4222-QSPI**:** Set the SW1 8-position DIP switch to route EVE communication through the FT4222 bridge IC by configuring Pin 1 to OFF and Pins 2–8 to ON. Then set the SW3 dual-position switch to position 1–2, enabling system power delivery to the EVE development module via the PC USB-C connection.

System Assembly:

1. **LCD Panel:** Insert the LCD flex cable into the JP1 connector, ensuring the contact pads face upward.

2. **Host Controller:** Connect the MM4222-QSPI board to the EVE development board, ensuring correct orientation as shown in the reference diagram.

3. **Audio:** Connect the CleO speaker to the CN3 connector on the EVE development board.

By default, the VM816C50A-N development board drives the LED current at 20 mA when all switches on the SW2 DIP switch are set to OFF. Each switch set to ON increases the LED drive current by 20mA; therefore, setting two switches to ON configures the ILED to 60mA, matching the LCD backlight requirement.

Connect the MM4222-QSPI bridge board to a PC using a USB-C cable, then launch the EVE software toolchains for performance evaluation. Figure 9 illustrates the system configuration while executing code via ESD to render an image. With a power consumption of approximately 2W, the system operates within standard USB power limits and does not require an external power supply.

Figure 9 - Image Display via ESD Execution

4.3 IDK-BT817-70A

Figure 10 shows the hardware configuration for the IDK-BT817-70A. Follow the steps below to assemble the system.

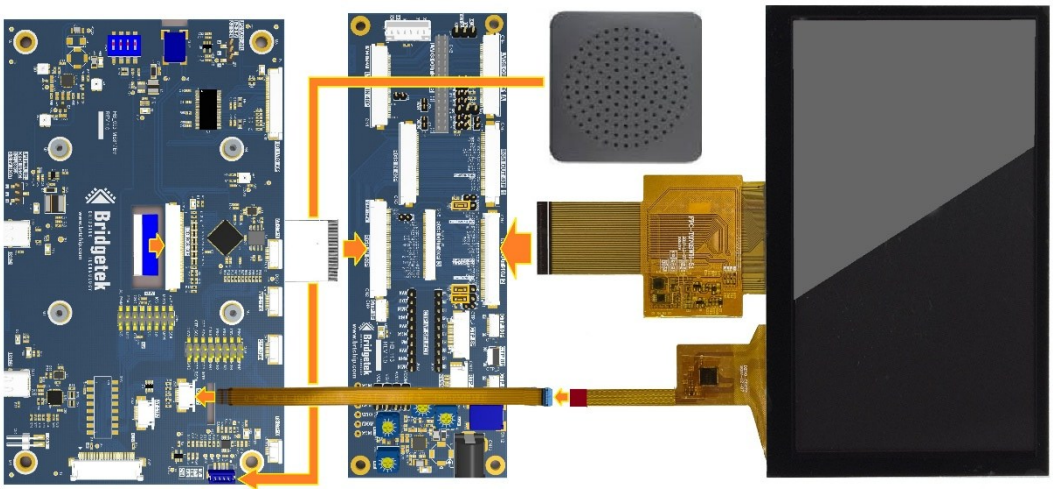


Figure 10 - IDK-BT817-70A Hardware Setup

Jumper/ Switch Settings:

1. Universal LCD Adaptor**:** Set jumpers JP14, JP16, and JP17 to the bottom position to select 3.3 V supply for the LCD panel.

2. ME817EV**:** Configure the 4-position DIP switch SW1 with switch 1 set to ON and switch 3 set to OFF to configure the LED current to 160 mA.
   Set all positions on the 8-position DIP switch SW2 to ON to route EVE communication path to the onboard FT4222 bridge IC.
   Ensure jumper JP1 is set to pins 1-2 to source power from the USBC2 connector.

System Assembly:

1. **Universal LCD Adaptor**: Use the supplied 10 cm, 50-position flex cable (same-side contacts) to connect the EVE development board to the LCD adapter board.
   - *ME817EV side:* Insert one end of the cable into **CN1** with the contact pads facing downward.
   - *Adaptor board side***:** Insert the other end into **CN2** with the contact pads facing upward.

2. **LCD Panel**: Insert the LCD flex cable into connector CN7 on the universal LCD adaptor board with the contact pads facing downward.

3. **Touch Panel**: Insert the touch panel flex cable into the 10P extension cable with the contact pads facing downward.
   Connect the 10P extension cable to connector CN2 on the EVE development board with the contact pads facing upward.

4. **Audio:** Connect the CleO speaker to connector CN4 on the EVE development board.

By default, the ME817EV drives the LED current at 120 mA when all switches on DIP switch SW1 are set to OFF. Each switch set to ON increases the LED drive current by 40mA. Therefore, enabling only one switch configures the LED current to 160mA, which closely matches the LCD backlight requirement of 180 mA.

Connect the USB-C cable from the PC to the USBC2 connector and run the EVE software toolchain for evaluation. Figure 11 illustrates the system configuration with code executed via ESD to display an image. Under this configuration, the system power consumption is approximately 4 W.

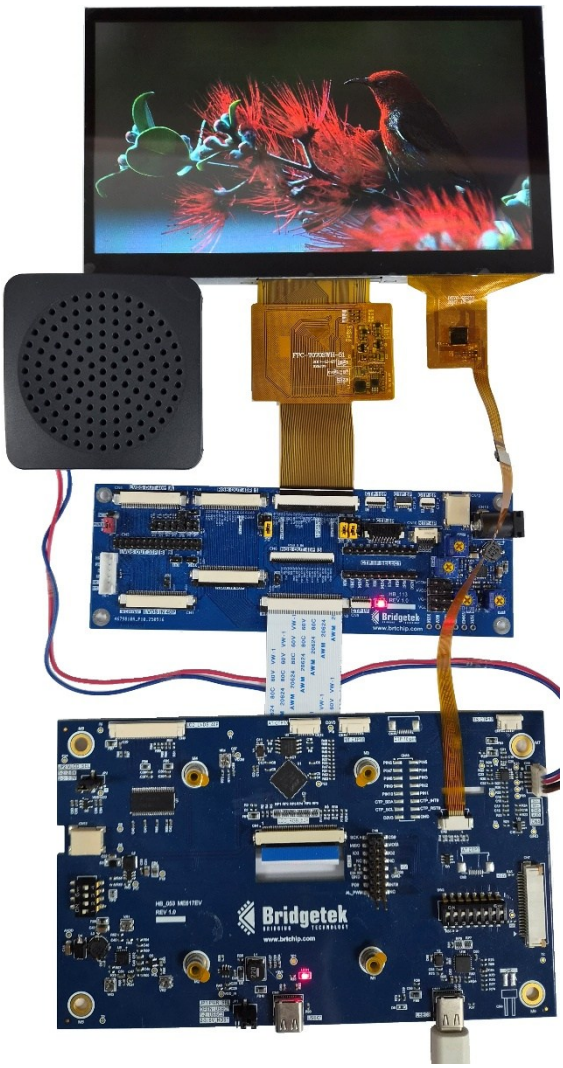


Figure 11 - Image Display via ESD Execution

4.4 IDK-BT817-101A

Figure 12 illustrates the hardware configuration for the IDK-BT817-101A. Follow the steps below to assemble and configure the system.

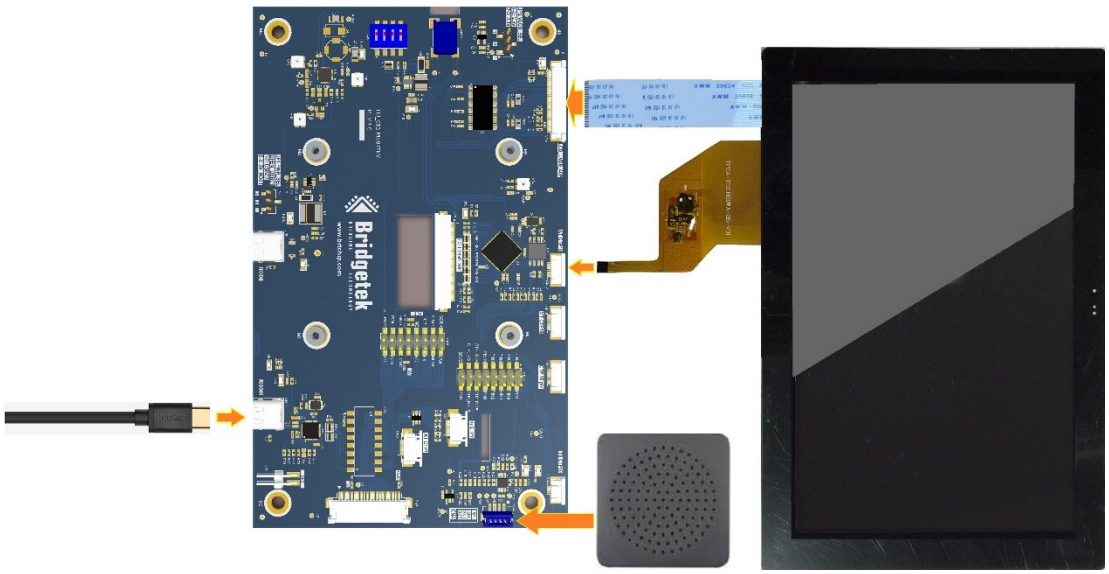


Figure 12 - IDK-BT817-101A Hardware Setup

Jumper / Switch Settings:

1. Configure the 4-position DIP switch SW1 with one switches set to ON and three switches set to OFF to set the LED current to 160 mA.
2. Set jumper on JP2 to position 2-3 to configure VLCD to use the 3.3V power source.
3. Set the positions on the 8-position DIP switch SW2 to ON to route the communication path to the onboard FT4222 bridge IC.
4. Leave jumper on JP1 to position 1-2 to source power from the USBC2 connector.

System Assembly:

1. **LCD Panel**: Insert the 40-position flex cable into the FPC connector on the LCD panel with contact pads facing downward. Then insert the other end of the flex cable into connector CN9 on the EVE development board with the contact pads facing upward.

2. **Touch Panel**: Insert the touch panel flex into connector CN12 with the contact pads facing downward.

3. **Audio:** Connect the CleO speaker to connector CN4 on the EVE development board.

The ME817EV defaults to a 120 mA LED drive current when all switches on DIP switch SW1 are set to OFF. Enabling any single switch increases the LED drive current by 40 mA. Although the panel supports LED current settings from 120 mA to 280 mA, this evaluation uses a 160 mA setting. While lower than the panel's typical 360 mA specification, 160 mA provides sufficient brightness for indoor applications while reducing overall power consumption.

If higher brightness is required, the LED drive current can be increased up to 280 mA, which is the maximum brightness supported by the design. Since power supplied from a PC USB port may not be sufficient at higher LED current settings, an external USB-C power adaptor can be connected to USB connector USBC1 while maintaining communication through USB connector USBC2. In this configuration, ensure that jumper JP1 is left open to select the power source from connector USBC1.

Connect a USB-C cable to the USBC2 connector to provide power and communication, then run the EVE software toolchain to evaluate system performance. Figure 13 illustrates the system configuration with code executed from ESD to render an image. Depending on the LED current,

the system power consumption ranges approximately 4.5 W to 9.5 W when the ILED operates between 120 mA and 280 mA.

Figure 13 - Image Display via ESD Execution

4.5 IDK-BT820-101A

Figure 14 illustrates the hardware configuration of the IDK-BT820-101A. Follow the steps below to assemble and configure the evaluation kit.

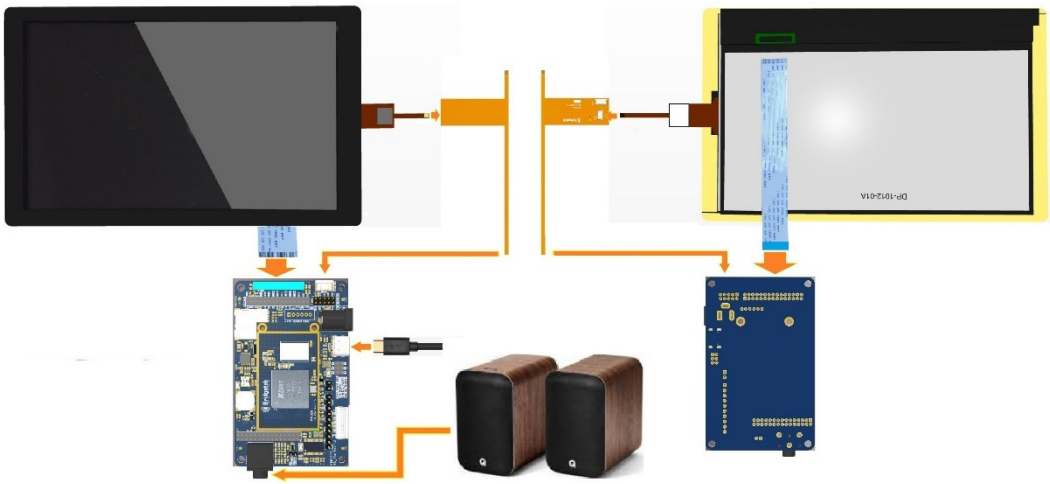


Figure 14 - IDK-BT820-101A Hardware Setup

Jumper/ Switch Settings:

1. Set the jumper on CN12 to pins 1–2 to select the USB-C connector as the input power source.
2. Ensure JP2 is left open to configure the LED current (ILED) to approximately 42 mA.

3. To enable the onboard buzzer, install a jumper on JP1. If an external speaker is preferred, leave JP1 open and connect an active speaker to the audio jack.

System Assembly:

1. **LCD Panel:** Insert the 45-pin flex cable into the LCD panel FPC connector with contact pads facing upwards, then connect the other end to connector CN4 on the development board also with contact pads facing upwards, as shown in the setup diagram.
   Both the LCD panel and development board use compatible FPC connectors with top and bottom contacts, allowing the cable to be inserted with the contact pads facing either upward or downward. Ensure the cable orientation is correct before insertion, as improper orientation may damage the LCD panel.

2. **Touch Panel:** As illustrated in Figure 14, connect the touch flex cable from the LCD panel to connector CN3 on the CTP converter board with the contact pads facing downward. Then connect the opposite end of the converter board to connector CN9 on the VM820C, also with the contact pads facing downward.

When JP2 is left open, the VM820C provides an LED drive current of 42 mA, which offers sufficient brightness for indoor use while maintaining low power consumption of approximately 660 mA from a 5 V USB supply. When JP2 is shorted, the LED current (ILED) increases to approximately 154 mA, closely matching the LCD panel requirement of 160 mA. Under this configuration, total current consumption increases to approximately 1.36 A from the 5 V USB supply. Developers requiring higher display brightness may short JP2, provided the connected PC USB supply can support the increased power demand.
If the PC USB port is unable to supply sufficient power, a 12 V DC power adaptor may be used instead. In this case, set jumper CN12 to the center position (Pins 3–4) to select the DC jack as the power source.

Connect a USB-C cable to the USBC connector for communication and run the EVE software toolchain to evaluate system performance. Figure 15 illustrates the system configuration with code executed from ESD to render an image.

Figure 15 - Image Display via ESD Execution

5 LCD Panel Timing Configuration

This section describes the display timing parameters configured for the LCD panels used in each Kit solution. The listed timing settings correspond to the hardware configurations described in the previous sections and have been validated to ensure stable and reliable panel operation under normal evaluation and development conditions.

The parameters include key horizontal and vertical timing settings such as active resolution, sync pulse widths, front and back porch intervals, total cycle counts, and pixel clock frequency required for proper LCD initialization and image rendering. These values serve as reference configurations for system bring-up and software development when using the respective kit solutions.

All LCD panels in these kit configurations operate at a display refresh rate of 60 Hz, which is the standard refresh rate commonly adopted in embedded TFT-LCD applications. Operating at 60 frames per second (FPS) provides smooth graphical performance, stable image rendering, and responsive touch user interface operation while maintaining compatibility with the recommended operating range of the LCD panels.

The LCD timing parameters presented in the following configurations are optimized to keep the vertical cycle (VCYCLE) as low as practical while remaining within the display panel specification limits. Minimizing vertical blanking improves timing efficiency and display responsiveness while maintaining stable panel operation and sufficient synchronization margins.

5.1 IDK-FT810-43A

The display timing parameters for the DP-0431-11A display panel, a 4.3-inch WQVGA LCD with a resolution of 480 × 272, are configured as follows:

System clock = 60MHz

Parameters	Description	Settings	Remarks
Horizontal Timing			
REG_HSIZE	Horizontal display pixel count	480	
REG_HCYCLE	Horizontal total cycle count	601	
REG_HOFFSET	Horizontal display start offset	120	
REG_HSYNC0	Horizontal sync fall offset	0	
REG_HSYNC1	Horizontal sync rise offset	2	
Vertical Timing			
REG_VSIZE	Vertical display line count	272	
REG_VCYCLE	Vertical total cycle count	277	
REG_VOFFSET	Vertical display start offset	4	
REG_VSYNC0	Vertical sync fall offset	0	
REG_VSYNC1	Vertical sync rise offset	2	
Clock Settings			
REG_FREQUENCY	Main clock frequency	60 000 000	
REG_PCLK	PCLK frequency divider	6	Divider 6, PCLK = 10MHz
Signal Settings			
REG_PCLK POL	PCLK polarity	1	
REG_SWIZZLE	RGB signal swizzle	0	
REG_DITHER	Dither enable	1	
REG_OUTBITS	Bit resolution	0	
REG_CSPREAD	Clock spreading enable	1	

Table 4 - DP-0431-11A Display Timing Parameter Settings

5.2 IDK-BT816-50A

The display timing parameters for the DP-0501-11A display panel, a 5-inch WVGA LCD with a resolution of 800 × 480, are configured as follows:

System clock = 72MHz

Parameters	Description	Settings	Remarks
Horizontal Timing			
REG_HSIZE	Horizontal display pixel count	800	
REG_HCYCLE	Horizontal total cycle count	1175	
REG_HOFFSET	Horizontal display start offset	374	
REG_HSYNC0	Horizontal sync fall offset	0	
REG_HSYNC1	Horizontal sync rise offset	2	
Vertical Timing			
REG_VSIZE	Vertical display line count	480	
REG_VCYCLE	Vertical total cycle count	510	
REG_VOFFSET	Vertical display start offset	28	
REG_VSYNC0	Vertical sync fall offset	0	
REG_VSYNC1	Vertical sync rise offset	2	
Clock Settings			
REG_FREQUENCY	Main clock frequency	72 000 000	
REG_PCLK	PCLK frequency divider	2	Divider 2, PCLK = 36MHz
Signal Settings			
REG_PCLK POL	PCLK polarity	1	
REG_SWIZZLE	RGB signal swizzle	0	
REG_DITHER	Dither enable	0	
REG_OUTBITS	Bit resolution	0	
REG_CSPREAD	Clock spreading enable	1	

Table 5 - DP-0501-11A Display Timing Parameter Settings

5.3 IDK-BT817-70A

The display timing parameters for the DP-0701-01A panel, a 7-inch WVGA LCD featuring 800 x 480 resolution, are configured as follows:

System clock = 72MHz

Parameters	Description	Settings	Remarks
Horizontal Timing			
REG_HSIZE	Horizontal display pixel count	800	
REG_HCYCLE	Horizontal total cycle count	1143	
REG_HOFFSET	Horizontal display start offset	342	
REG_HSYNC0	Horizontal sync fall offset	0	
REG_HSYNC1	Horizontal sync rise offset	48	
Vertical Timing			
REG_VSIZE	Vertical display line count	480	
REG_VCYCLE	Vertical total cycle count	524	
REG_VOFFSET	Vertical display start offset	42	
REG_VSYNC0	Vertical sync fall offset	0	
REG_VSYNC1	Vertical sync rise offset	3	
Clock Timing			
REG_FREQUENCY	Main clock frequency	72 000 000	
REG_PCLK	PCLK frequency divider	2	Divider 2, PCLK = 36MHz
REG_PCLK POL	PCLK polarity	1	
REG_SWIZZLE	RGB signal swizzle	0	
REG_DITHER	Dither enable	0	

REG_OUTBITS	Bit resolution	0	
REG_CSPREAD	Clock spreading enable	1	

Table 6 - DP-0701-01A Display Timing Parameter Settings

5.4 IDK-BT817-101A

This kit utilizes the DP-1011-02A panel, a 10.1-inch WXGA LCD featuring 1280 x 800 resolution, configured with the following timing parameters:

System clock = 72MHz

Parameters	Description	Settings	Remarks
Horizontal Timing			
REG_HSIZE	Horizontal display pixel count	1280	
REG_HCYCLE	Horizontal total cycle count	1470	
REG_HOFFSET	Horizontal display start offset	188	
REG_HSYNC0	Horizontal sync fall offset	0	
REG_HSYNC1	Horizontal sync rise offset	4	
Vertical Timing			
REG_VSIZE	Vertical display line count	800	
REG_VCYCLE	Vertical total cycle count	815	
REG_VOFFSET	Vertical display start offset	14	
REG_VSYNC0	Vertical sync fall offset	0	
REG_VSYNC1	Vertical sync rise offset	2	
Clock Timing			
REG_FREQUENCY	Main clock frequency	72 000 000	
REG_PCLK	PCLK frequency divider	1	Divider 1, PCLK source from PLL2
REG_PCLK_FREQ	PLL2 clock frequency	8C1h	Set PLL2=72MHz
Signal Settings			
REG_PCLK POL	PCLK polarity	0	
REG_SWIZZLE	RGB signal swizzle	0	
REG_DITHER	Dither enable	0	
REG_OUTBITS	Bit resolution	0	
REG_CSPREAD	Clock spreading enable	0	

Table 7 - DP-1011-02A Display Timing Parameter Settings

5.5 IDK-BT820-101A

This kit utilizes the DP-1012-01A panel, a 10.1-inch WUXGA LCD featuring 1920 x 1200 resolution, configured with the following timing parameters:

Parameters	Description	Settings	Remarks
Horizontal Timing			
REG_HSIZE	Horizontal display pixel count	960	
REG_HCYCLE	Horizontal total cycle count	1116	
REG_HOFFSET	Horizontal display start offset	152	
REG_HSYNC0	Horizontal sync fall offset	0	
REG_HSYNC1	Horizontal sync rise offset	8	
Vertical Timing			
REG_VSIZE	Vertical display line count	1200	
REG_VCYCLE	Vertical total cycle count	1244	
REG_VOFFSET	Vertical display start offset	42	
REG_VSYNC0	Vertical sync fall offset	0	
REG_VSYNC1	Vertical sync rise offset	4	
Clock Timing			
SETPLLSP1	PLL multiplication factor	13	Host command, byte 3 Set SYSPLL_NS=13 Note
SETSYSCLKDIV	SYSCLK division factor	6	Host command, byte 3

			Set SYSCLKDIV=6 (DF7) Note
TXCLKDIV [3:0] REG_LVDSTX_PLLCFG	LVDSTX_CLK division factor	2	Register, bit 0-3 Set TXCLKDIV=2 (DF3) Note
CKS [1:0] REG_LVDSTX_PLLCFG	LVDSTX_CLK range select	2	Register, bit 11 and 12 Set LVDXTX clock * 7 >= 400MHz
REG_PCLK POL	PCLK polarity	0	
Signal Settings			
REG_SO_MODE	Scan out pixel mode	3	Set 4 pixel per clock
REG_SO_FORMAT	Scan out format	19	Select RGB8 format
REG_SO_EN	Scan out enable	1	
REG_LVDSTX_EN	LVDSTX channel enable	3	Enable channel 0 and channel 1

Table 8 - DP-1012-01A Display Timing Parameter Settings

Note:

The LVDS clock and system clock are derived from the same PLL source. To achieve the maximum LVDSTX_CLk frequency of 83.2 MHz, configure the system as follows:

- Set the PLL multiplication factor to 13 instead of the default value of 15.
- Configure the system clock divider register (SETSYSCLKDIV) to 6, which applies a division factor of 7 and results in a system clock frequency of 71.31 MHz, as shown in Table 9.
- Configure the LVDS transmit clock divider register (LVDSTXDIV) to 2, which applies a division factor of 3 and results in an LVDS transmit clock frequency of 83.2 MHz, as shown in Table 10.

OSC (MHz)	SYSPLL_NS	Division Factor (SYSCLKDIV+1)	System Clock (MHz)
38.4	**15 (default)**	**8 (default)**	**72.00**
		9	64.00
		12	48.00
		16	36.00
	13	7	71.31
		16	31.20

Table 9 - System Clock Configuration

OSC (MHz)	SYSPLL_NS	Division Factor (TXCLKDIV+1)	LVDSTX clock (MHz)
38.4	15 (default)	4	72.00
		5	57.60
		6	48.00
		7	41.14
		8 (default)	36.00
	13	3	83.20
		4	62.40
		5	49.92
		6	41.60
		7	35.66

Table 10 - LVDS Clock Configuration

Please refer to the BT817Q datasheet, BT820B datasheet and BT820B Programming Guide for additional details on the register settings.

6 Supporting Kit Accessories

In addition to the **MM4222-QSPI** bridge module, Bridgetek offers a range of MCU modules for interfacing with and controlling EVE devices. These modules provide developers with flexible platform options for prototyping and deploying EVE-based systems, depending on application performance, memory, and system integration requirements. Key modules include:

1. MM2040EV – An MCU controller module based on the RP2040 microcontroller featuring a dual-core Arm Cortex-M0+ architecture. The module provides a balance of performance and cost efficiency while supporting a wide range of peripheral interfaces, making it suitable for rapid development and efficient communication with EVE devices in embedded display applications.

2. MM900EV-LITE – A compact module based on Bridgetek's FT900 MCU, which utilizes the FT32 32-bit architecture. It integrates 256 kB of flash memory, 64 kB of data RAM, and 256 kB of program memory. The module is designed for high-performance embedded applications requiring robust processing capability and efficient control of EVE graphics controllers.

3. MM930LITE – A compact MCU module based on Bridgetek's FT930 MCU and FT32 32-bit architecture. It includes 128 kB of flash memory, 32 kB of data RAM, and 128 kB of program memory. Optimized for cost-sensitive and space-constrained applications, the module delivers reliable performance for controlling EVE-based display systems.

These MCU modules serve as alternative processing platforms to the MM4222-QSPI bridge, enabling developers to scale system capability based on application complexity and performance requirements. Refer to Table 2 for part numbers and ordering information.

7 Electrical Specifications

TA = 25°C

Parameter		MIN	TYP	MAX	UNIT	Note
IDK-FT810-43A						
Icc_USBIN_5V	Operating current @ VBUS=5V into USBC connector, ILED=32 mA	-	0.32	-	A	1
IDK-BT816-50A						
Icc_USBIN_5V	Operating current @ VBUS=5V into USBC connector, ILED=60 mA	-	0.48	-	A	2
IDK-BT817-70A						
Icc_USBIN_5V	Operating current @ VBUS=5V into USBC connector, ILED=160 mA	-	0.75	-	A	3
IDK- BT817-101A						
Icc_USBIN_5V	Operating current @ VBUS=5V into USBC connector, ILED=120 mA	-	0.85	-	A	4
	Operating current @ VBUS=5V into USBC connector, ILED=160 mA	-	1.10	-	A	
	Operating current @ VBUS=5V into USBC connector, ILED=200 mA	-	1.45	-	A	
	Operating current @ VBUS=5V into USBC connector, ILED=240 mA	-	1.50	-	A	
	Operating current @ VBUS=5V into USBC connector, ILED=280 mA	-	1.54	-	A	
IDK- BT820-101A						
Icc_USBIN_5V	Operating current @ VBUS=5V into USBC connector, ILED=42 mA	-	0.66	-	A	5
	Operating current @ VBUS=5V into USBC connector, ILED=160 mA	-	1.36	-	A	

Table 11 - Current Consumption

Note 1: Operating current was measured using a 5V USB supply from a PC, with BL_PWM set to 100% duty cycle, ILED at 32 mA (default), displaying a converted JPEG image, and audio disabled.

Note 2: Operating current was measured using a 5V USB supply from a PC, with BL_PWM set to 100% duty cycle, ILED set to 60 mA (default), displaying a converted JPEG image, and audio disabled.

Note 3: Operating current was measured using a 5V USB supply from a PC, with BL_PWM set to 100% duty cycle, ILED set to 160 mA, displaying a converted JPEG image, and audio disabled.

Note 4: Operating current was measured using a 5V power supply, with BL_PWM set to 100% duty cycle, ILED set ranging from 120mA to 280mA, displaying a converted JPEG image, and audio disabled.

Note 5: Operating current was measured using a 5V USB supply from a PC, with BL_PWM set to 100% duty cycle, ILED set to 42 mA and 160 mA respectively, while displaying a converted JPEG image, and audio disabled.

8 Software Setup Information

Bridgetek provides the EVE Toolchain free of charge, offering developers a comprehensive suite of utilities for creating high-quality, responsive graphical user interfaces (GUIs) for EVE-based designs. The toolchain includes EVE Screen Designer (ESD) for rapid GUI development, EVE Screen Editor (ESE) for layout customization, and EVE Asset Builder (EAB) for efficient graphical asset management and conversion.

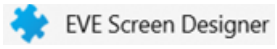
To streamline evaluation, Bridgetek organizes its kit solutions into a structured series within ESD. This approach enables quick selection and configuration, allowing developers to assess system performance and functionality with minimal setup. As a result, different kit solutions can be evaluated in just a few straightforward steps, significantly reducing development time and effort.

8.1 Installing EVE Screen Designer

Developers can download the EVE Screen Designer application here.

8.2 Quick Start Example

The operating example demonstrates steps to setup kit solutions.

1. Double-click the desktop icon 

to launch the ESD application. The Welcome dialog will appear.

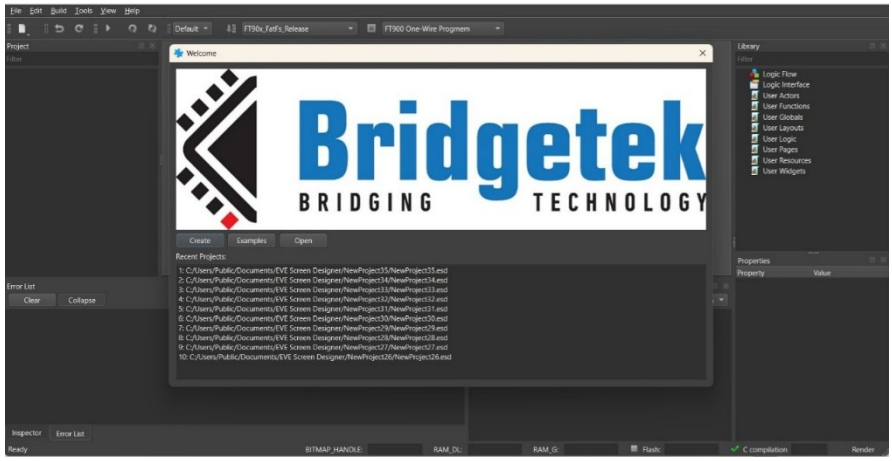


Figure 16 - Welcome Dialog

2. Click the **"Create"** button.

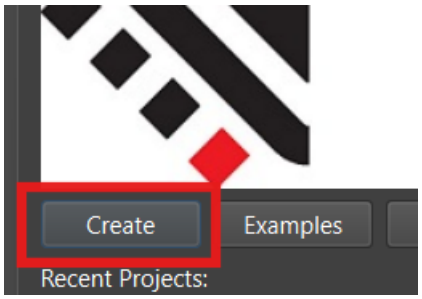


Figure 17 - Create Button

3. A list of available kit solutions will be displayed. Select the appropriate platform and click **OK**.

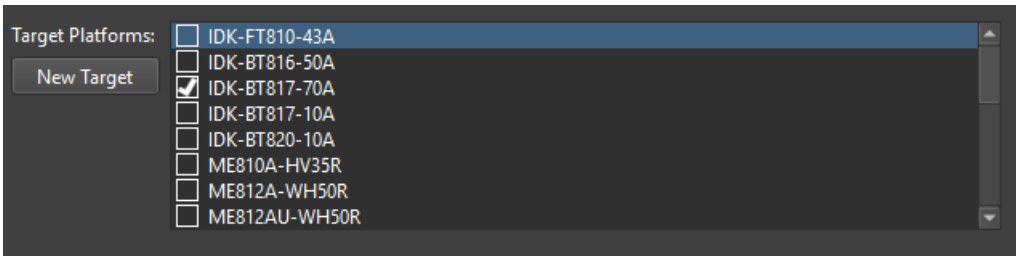


Figure 18 - Kit Platform Selection

4. The application will automatically load the corresponding configuration settings for the selected platform.

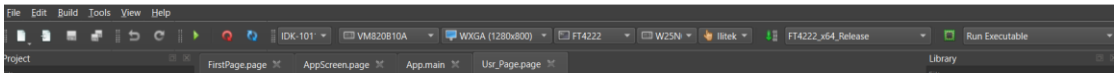


Figure 19 - Platform Setting Loaded

5. Design and create your graphical user interface (GUI), then run it using the **Execute** button.

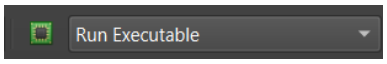


Figure 20 - Execution Button

6. Refer to the ESD documentation link for examples and tutorials on GUI design.

9 Disclaimer Notice – Use of Third-Party Software or Websites

We may recommend use of software or websites that are owned or operated by other companies. We offer or facilitate this recommendation by hyperlinks or other methods to aid your access to the third-party resource. While we endeavour to direct you to helpful, trustworthy resources, we cannot endorse, approve, or guarantee software, information, products, or services provided by or at a third-party resource or track changes in the resource. Thus, we are not responsible for the content or accuracy of any third-party resource or for any loss or damage of any sort resulting from the use of, or for any failure of, products or services provided at or from a third-party resource.

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10 Contact Information

Refer to https://brtchip.com/contact-us/ for contact information.

Distributor and Sales Representatives

Please visit the Distribution Network – IC & Module (brtchip.com) page for the contact details of our distributor(s) and sales representative(s) in your country.

Appendix A – References

Document References

DP-0431-11A

DP-0501-11A

DP-0701-01A

DP-1011-02A

DP-1012-01A

BT817Q datasheet

BT820B Datasheet

BT820B Programming Guide

EVE Screen Designer

Acronyms and Abbreviations

Terms	Description
AC	Alternating Current
CTP	Capacitive Touch Panel
DC	Direct Current
DDR3	Double Data Rate 3 (SDRAM)
EAB	EVE Asset Builder
ESD	EVE Screen Designer
ESE	EVE Screen Editor
EVE	Embedded Video Engine
FPC	Flexible Printed Circuit
GUI	Graphical User Interface
IC	Integrated Circuit
ILED	LED Drive Current
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LVDS	Low Voltage Differential Signaling
MCU	Micro Controller Unit

NAND Flash	"NOT AND" Flash
OVP	Over Voltage Protection
PC	Personal Computer
PWM	Pulse Width Modulation
QSPI	Quad Serial Peripheral Interface
RGB	Red, Green, Blue
SDIO	Secure Digital Input Output
TFT	Thin-Film Transistor
USB	Universal Serial Bus

Appendix B – List of Tables & Figures

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Appendix C – Revision History

Document Title: EVE IC Development Kits Datasheet

Document Reference No.: BRT_000513

Clearance No.: BRT#272

Product Page: https://brtchip.com/product-category/products/

Document Feedback: Send Feedback

Revision	Changes	Date
Version 1.0	Initial Release	05-06-2026
Version 1.1	**Summary of Changes** 1. Replaced DP-1011-01A with DP-1011-02A in IDK-BT817-101A 2. Removed the instruction requiring users to solder the 10pin header on the IDK-FT810-43A. 3. Improved the LCD cable insertion instructions by providing clearer guidance on the correct cable orientation. 4. Section 4.3 IDK-BT817-70A → System Assembly → Point 3 – Touch Panel → corrected the typo in the 10P extension cable description.	03-08-2026