

Using the DLP4710EVM-LC Light Control Evaluation Module

This user's guide presents an overview of the DLP4710 Light Control evaluation module (EVM) and a general description of the main features and functions. It explains the first steps to get started and provides a detailed description of the on board LEDs and the main connectors. ([Figure 1](#))

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1 DLP4710 Light Control EVM Overview

This DLP4710 Light Control EVM includes an example light engine design composed of TI DLP® electronics and optics along with GUI software to provide a flexible light steering solution with large brightness and resolution for industrial, medical and scientific applications. This EVM features DLP4710, DLPC3479 and DLPA3005 DLP components and offers a compelling combination of resolution, brightness and programmability in a small form factor.

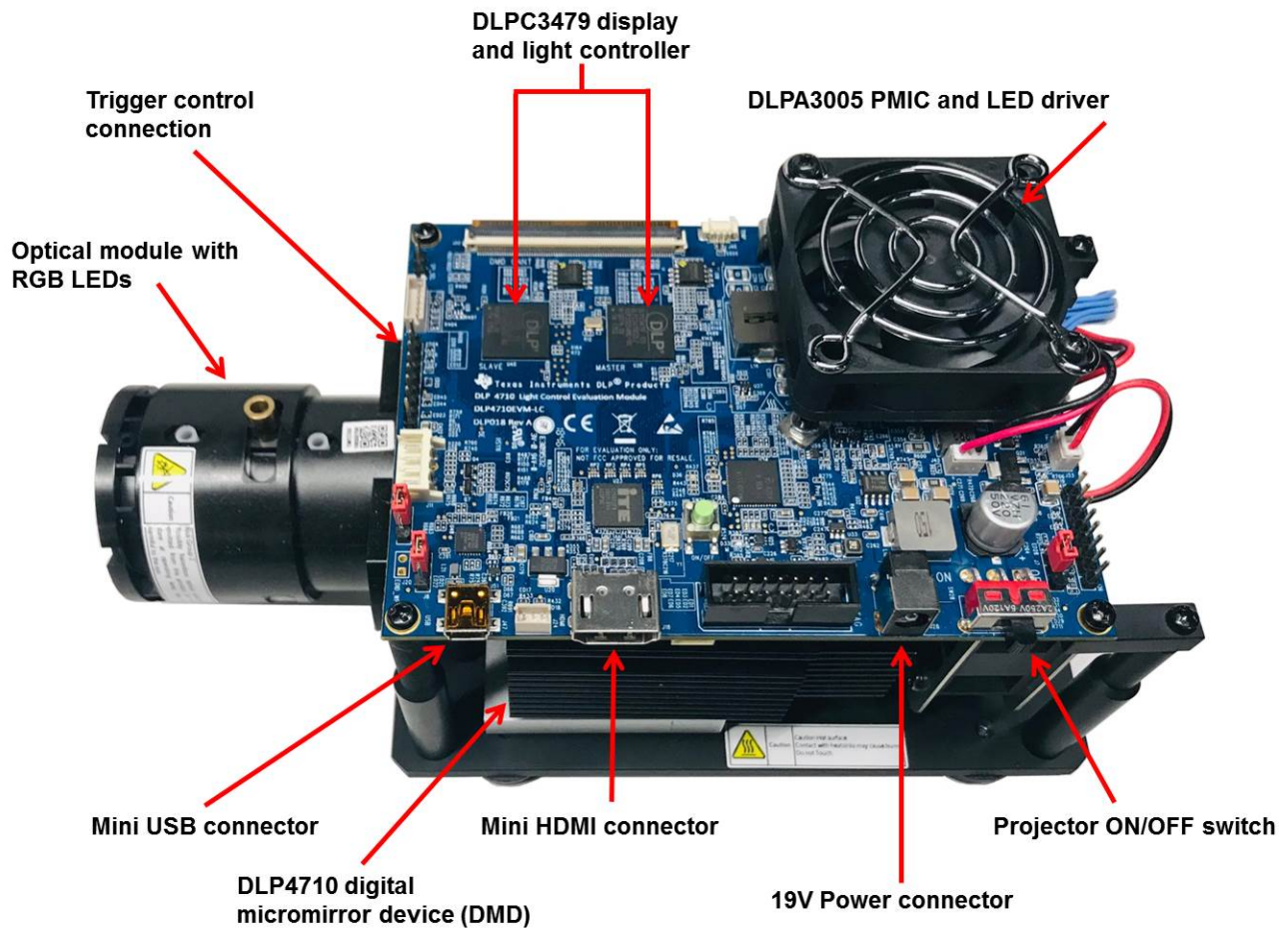


Figure 1. DLP4710 Light Control EVM

See [Section 3](#) for other useful documentation.

2 Safety Instructions

CAUTION



Caution hot surface. Contact may cause burns. Do not touch.

WARNING



Possible hazardous optical radiation emitted from this EVM. Do not stare at the operating lamp. There are no user serviceable parts inside the EVM optical module. Never open the optical module, which can expose a risk group 2 LED which may be harmful to the eye.

WARNING



Observe handling precautions. Electrostatic sensitive devices.

WARNING

Always ensure all three fans are running during operation to avoid overheating and ensure reliable operation.

3 Applicable Documents

The following documents are applicable to the DLP4710 Light Control EVM and are available at ti.com:

- DLP4710 (.47 1080p) DMD data sheet, [DLPS056](#)
- DLPC3479 controller data sheet, [DLPS112](#)
- DLPA3005 PMIC and high-current LED driver data sheet, [DLPS071](#)
- Software Programmer's Guide, [DLPU081](#)
- DLP Display and Light Control EVM GUI Tool User's Guide, [DLPU074](#)

If you need assistance, please refer to the DLP TI E2E community support forums.

4 What is in the DLP4710 Light Control EVM ?

The DLP 4710 Light Control (Figure 2) consists of three subsystems:

1. **Optical module** includes the optics, red, green, and blue LEDs, and a 1920 x 1080 (1080p) DMD capable of 600 lumens out-of-the-box.
2. **DLP driver** includes the DLP chipset comprising of the DLPC3479 controller and DLPA3005 PMIC/LED driver. It includes a header to access Trigger IN/OUT signals for camera capture and other system controls.
3. **System front end** includes MSP430, ITE HDMI receiver, USB-Serial Bridge Controller and several connectors for external inputs (such as HDMI and USB).

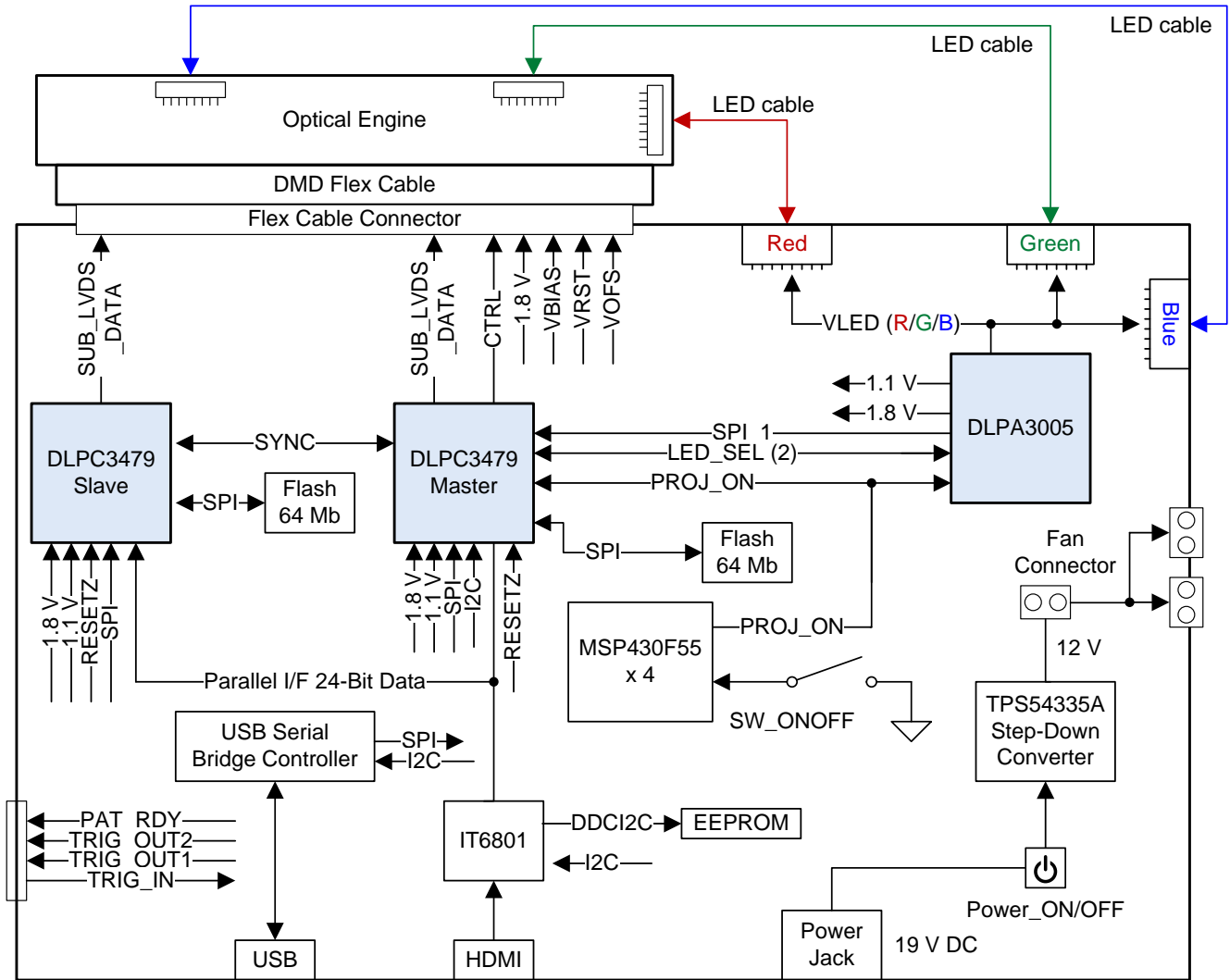


Figure 2. DLP4710 Light Control EVM Block Diagram

5 Optical Module

The optical module in the EVM is developed by Young Optics and is production ready. The optical module consists of the following components:

- 0.47-inch 1080p DMD (DLP4710)
- OSRAM P1W red, green and blue LED
- This optical module interfaces with the EVM using DMD pin mapping **Option 2**. Please refer to the [DLPC3479](#) datasheet for more information about the DMD interface.

Table 1. EVM Optical Module Parameter Values

PARAMETER	MIN	TYP	MAX	UNIT
Brightness at Red 12A / Green 16A / Blue 16A LED current		600		Lum
Red LED Current		12		A
Green / Blue LED Current		16		A
Brightness Uniformity	73%			
Offset		100%		
Focus Range (Wide)	40		120	inch
Image Diagonal Size	10		100	inch
Throw Ratio		1.39		

6 Quick-Start Procedure

This quick-start assumes that the EVM default conditions are as shipped.

1. Power up the DLP4710 Light Control EVM by applying an external DC power supply (19 V DC, 4.74 A) to PWR_IN connector (J28).

External Power Supply Requirements:

- Nom Output Voltage: 19 VDC
- Max Output Current: 4.74 A
- Efficiency Level: V

NOTE: TI recommends using an external power supply that complies with applicable regional safety standards such as UL, CSA, VDE, CCC, PSE, etc.

2. Move SW28 (PS_ON/OFF) slide switch to the ON position.
LEDs D43 (+3.3V) and D57 (INTZ) light up to indicate 19 V power is applied.
3. Push ON/OFF switch SW21 to turn on the DLP4710 Light Control EVM.
LEDs D36 (SYS_ON-OFF), D33 (M_IRQ) and D34 (S_IRQ) light up to indicate that the DLP4710 Light Control EVM is turned on.
4. After the DLP4710 Light Control EVM is turned on, a DLP Light Control splash image will be projected.
5. The focus and zoom of the image can be adjusted on the optical module (Figure 3).

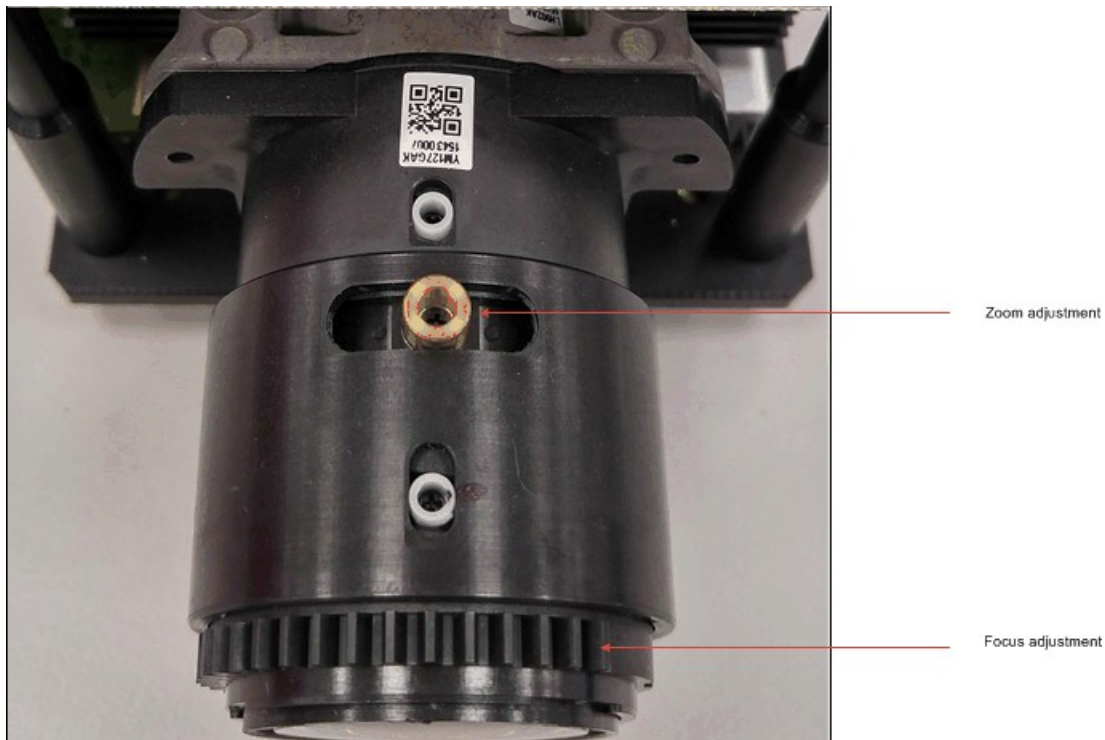


Figure 3. Optical Module With Focus and Zoom Adjustment

6. Connect USB to the DLP4710 Light Control EVM and open the DLP4710 Display and Light Control Graphical User Interface (DLPDLC-GUI) on your computer. If needed, connect an HDMI source to the EVM and provide external video input.
 Note: When providing HDMI input from an external source for Light Control applications, ensure that the external source provides input of resolution 1080p (1920x1080). Some laptops/desktops provide 720p (1280x720) resolution input by default, which can result in broken images in External Pattern Streaming mode, as only 1080p resolution is supported in Light Control modes.
7. Via the GUI the EVM can be set to Video Display Mode or Light Control Modes. Refer to the GUI user's guide for further description.
 Note: Install Jumper J7 on the DLP4710 Light Control EVM to set the needed Trigger IN/OUT voltage on the EVM.
8. When turning off the projector, push ON/OFF switch (SW21) and then move slide switch (SW28) to the OFF position prior to removing the power cable.

CAUTION

To avoid potential damage to the DMD, be sure to turn off the projector using the sequence listed in [Section 6](#) before disconnecting the power.

There are eleven LED indicators on the DLP4710 Light Control EVM ([Table 2](#)):

Table 2. DLP4710 Light Control EVM LEDs

Location	Name	Description
D33	M_IRQ	LED OFF during DLPC3479_Master boots LED ON when DLPC3479_Master boot-up process is completed and ready to receive commands
D34	S_IRQ	LED OFF during DLPC3479_Slave boots LED ON when DLPC3479_Slave boot-up process is completed and ready to receive commands
D36	SYS_ON-OFF	LED ON when projector is in normal operation
D43	+3.3V	LED ON when 19 V Power is applied and +3.3 V is working normally
D44	WPC_01	Reserved
D45	WPC_02	Reserved
D46	WPC_03	Reserved
D56	RESETZ	LED ON when DLPC3479 is in RESET
D57	INTZ	LED ON when DMD is in PARK mode
D66	STAT_LED1	LED blinking when PC is communicating to flash over SPI
D67	STAT_LED0	LED blinking when PC is communicating to DLPC3479 over I2C

7 Connectors, Headers, and Switch Description

Table 3. DLP4710 Light Control EVM Installed Connectors

Connector	Name	Description
J7	PWER_SEL	Header for voltage level selection for Trigger-IN/OUT
J8	M_3DR	Connector for selecting 3DR signal usage (Display or Light Control) for DLPC3479 Master
J9	S_3DR	Connector for selecting 3DR signal usage (Display or Light Control) for DLPC3479 Slave
J11	I2C	Connector for the I2C interface (DeVaSys USB-I2C/IO board)
J18	HDMI	Connector for HDMI input
J21	SPI	External SPI Programming interface connector
J22	DMD CNNT	Connector for DMD Flex Cable
J23	Spy-Bi-Wire	MSP430 Spy-Bi-Wire Programming interface connector
J24	WPC	Reserved
J26	Color Sensor	Reserved
J28	PWR_IN	Connector for 19 V DC power
J32	Fan1	Connector for 12 V Fan
J33	Fan2	Connector for 12 V Fan
J34	MSP_JTAG	MSP430 JTAG Programming interface connector
J35	SPI_SEL	Header to select Master/Slave SPI flash for external SPI Programming interface
J36	TSTPT	Header for remaining DLPC3479 test points (not used)
J40	RED	Connector for RED LED cable
J41	GREEN	Connector for GREEN LED cable
J42	BLUE	Connector for BLUE LED cable
J43	Fan3	Connector for 12 V Fan
J45	TEMP	Reserved
J47	Mini_USB	Connector for Cypress USB controller
J48	TRIG	Connector for Trigger In and Trigger Out for Light Control Application
SW21	ON/OFF	Projector ON/OFF Switch
SW28	PS_ON/OFF	Power Supply ON/OFF Switch

8 DLP4710 Light Control Trigger

Table 4. DLP4710 Light Control Trigger ⁽¹⁾

DLPC3479 PIN	J48 PIN CONNECTOR		I/O	FUNCTION
	NO.	DESC		
3DR	5	TRIG_IN	Input	For light control applications: Reserved for external trigger signal (Input). Applicable to internal pattern streaming mode only. The 3DR pin on the DLPC3479 can be used as a 3D left or right reference indicator or as trigger input signal for light control application. A jumper on J8 and J9 has to be set to determine the use case for this pin. For display application: Connect pin 1 and pin 2 of J8 (DLPC3479 Master) and pin 1 and pin 2 of J9 (DLPC3479 Slave) For light control application: Connect pin 2 and pin 3 of J8 (DLPC3479 Master) and pin 2 and pin 3 of J9 (DLPC3479 Slave).
TSTPT_4	7	TRIG_OUT1	Output	TRIG_OUT_1 signal.
GPIO_06	3	PAT_RDY	Output	Pattern ready signal. Applicable to internal pattern streaming mode only.
GPIO_07	4	TRIG_OUT2	Output	TRIG_OUT_2_signal.
GND	1	GND	GND	Ground pin for trigger signals

⁽¹⁾ Install Jumper J7 to set Trigger IN/OUT voltage on the EVM (Jumper is not included by default).
 For 3.3-V signal level: Connect pin 2 and p 3 of J7.
 For 1.8-V signal level : Connect pin 1 and pin 2 of J7.

9 EVM Setup

The DLP4710 Light Control EVM is comprised of the [DLP4710](#) (.47 1080p) DMD, [DLPC3479](#) display controller, [DLPA3005](#) PMIC/LED driver and other supporting components such as the Cypress Controller, the MSP430 MCU and the ITE HDMI Receiver. All of the above components besides the DLP4710 (located in the optical module) are included on the board. The locations of the named parts are shown in [Figure 4](#).

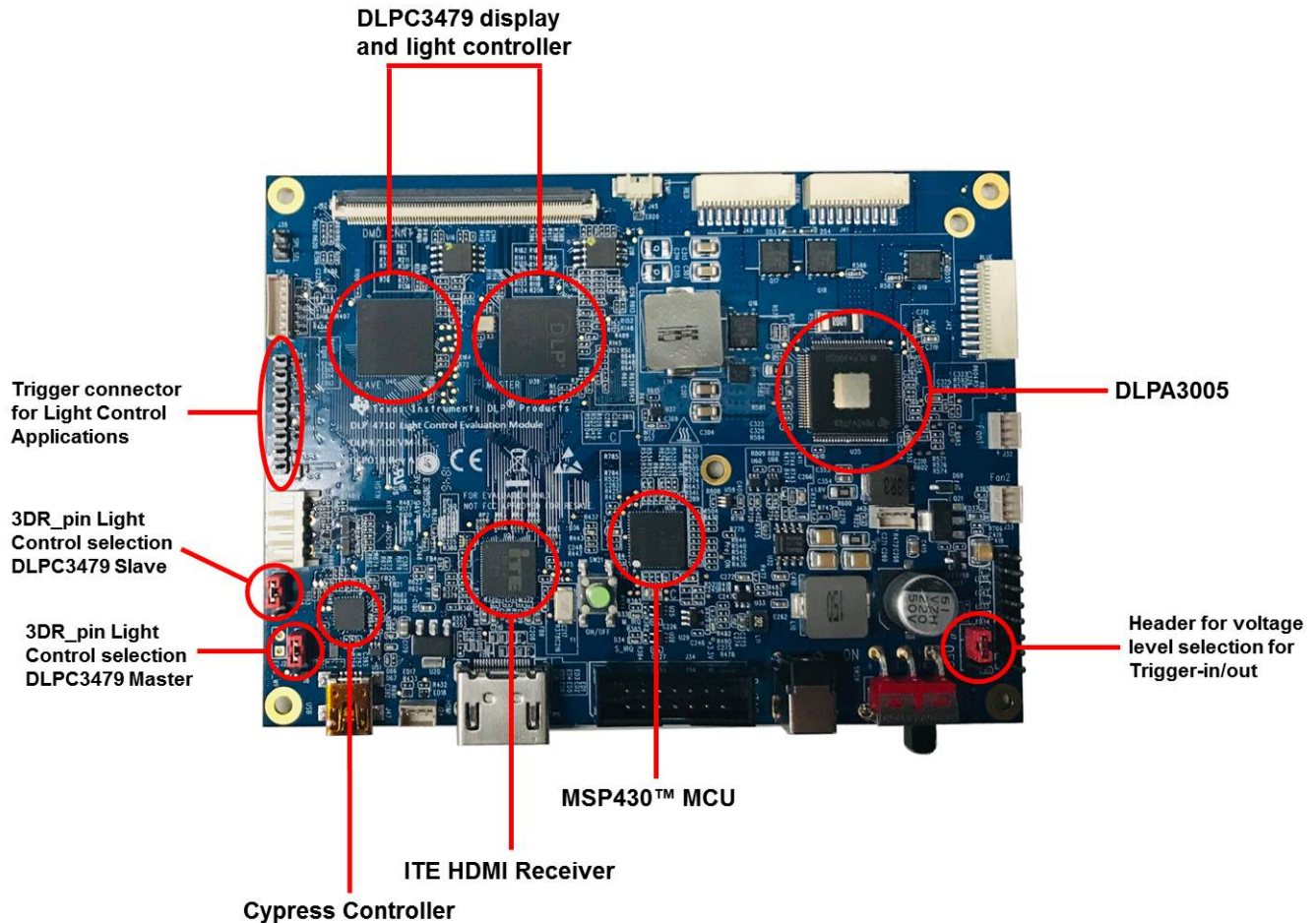


Figure 4. DLP4710 Light Control Board

The DLP4710 Light Control board has one connector for the DMD Flex cable to the 0.47-inch 1080p DMD and three LED connectors for red, green and blue LEDs.

The connectors for each LED are named on the board as well as on the light engine. Please refer to [Figure 5](#) to see the proper setup.

CAUTION

Ensure a good connection between the LED cable and the DMD flex cable to the DLP4710 Light Control EVM board.

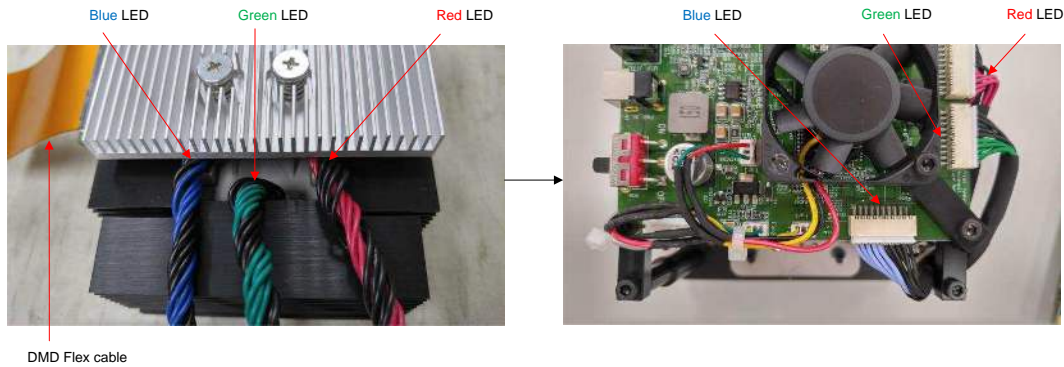


Figure 5. LED Connection

[Figure 6](#) shows the final setup of all parts.

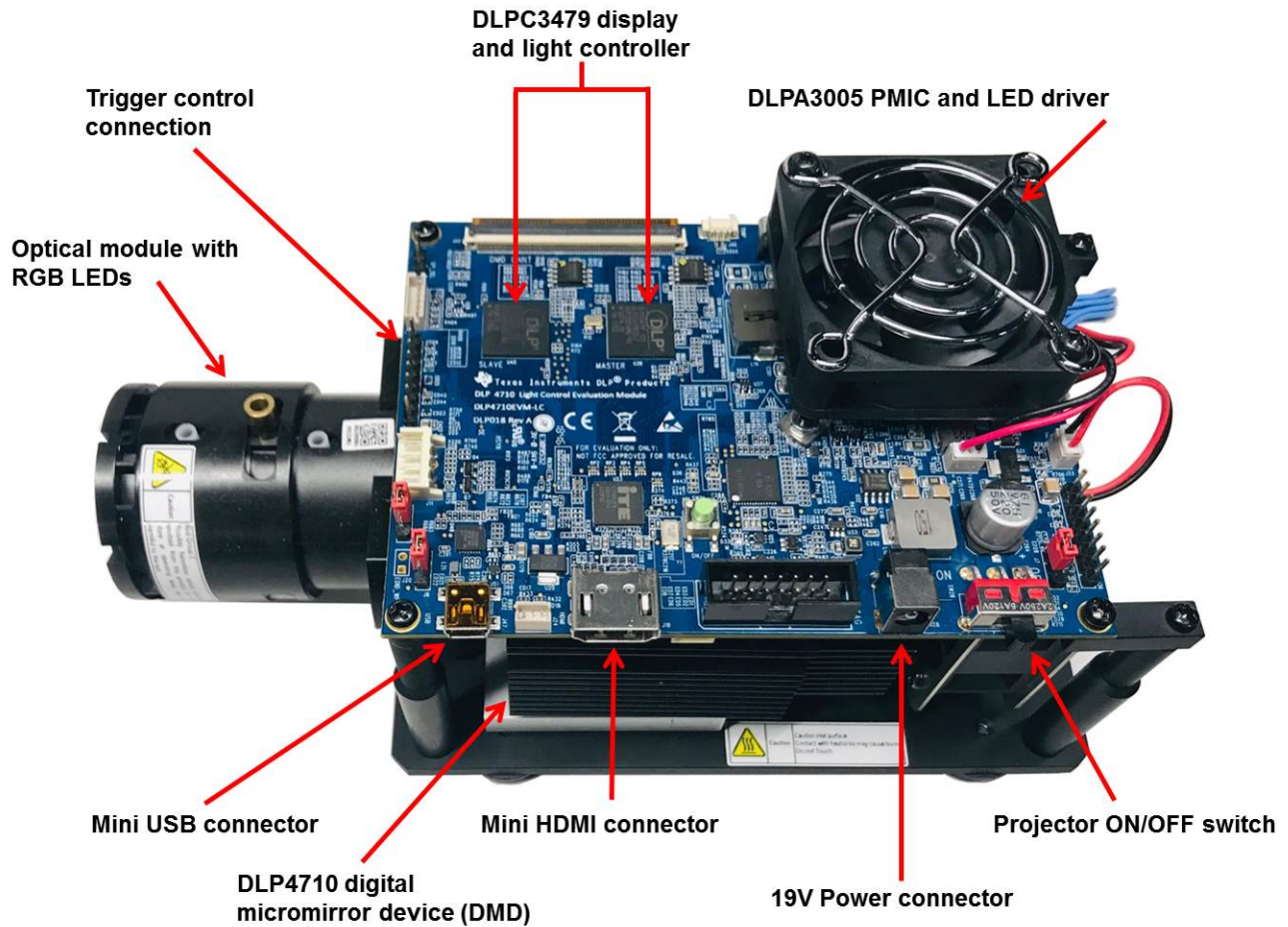


Figure 6. DLP4710 Light Control EVM

CAUTION

Make sure to follow all of the initialization procedures listed in this document before connecting the power. Verify that the DMD flex cable is connected correctly to the DLP4710 Light Control board.

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (February 2019) to A Revision	Page
• Added throw ratio for optical engine	6
• Added note on ensuring 1080p input source resolution for pattern streaming modes	8
• Added ground pin details on connector for LC triggers	10

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