DLP LightCrafter™ Display 4710 EVM Gen2 User's Guide

This user's guide presents an overview of the DLP® LightCrafter™ Display 4710 evaluation module (EVM) and a general description of the main features and functions. It explains the how to get started and provides a detailed description of the on board LEDs as well as the main connectors. (Figure 1).

1 DLP LightCrafter Display 4710 EVM Overview

Figure 1. DLP LightCrafter Display 4710 EVM

In addition to this document, the following documents shown in Section 2 should be used.

2 Applicable Documents

The following documents are applicable to the DLP LightCrafter Display 4710 EVM and are available at ti.com:

- DLP4710 (.47 1080p) DMD data sheet, DLPS056
- DLPC3439 controller data sheet, DLPS057
- DLPA3005 controller data sheet, DLPS071
- Software Programmer's Guide, DLPU035
- DLP LightCrafter Display EVM GUI Tool User's Guide, DLPU021

Visit the DLP and MEMS TI E2E community support forums for assistance.

3 What is in the LightCrafter Display 4710 EVM

The DLP LightCrafter Display module (Figure 2) consists of three subsystems:

1. Light engine – includes the optics, red, green, and blue LEDs, and a 1920 × 1080 (1080p) DMD capable of 600 lumens out-of-the-box.
2. DLP Driver – includes the DLP chipset that consists of the DLPC3439 controller and DLPA3005 PMIC/LED driver.
3. System front end – includes MSP430, ITE HDMI receiver, USB-serial bridge controller and several connectors for external inputs (such as HDMI and USB).

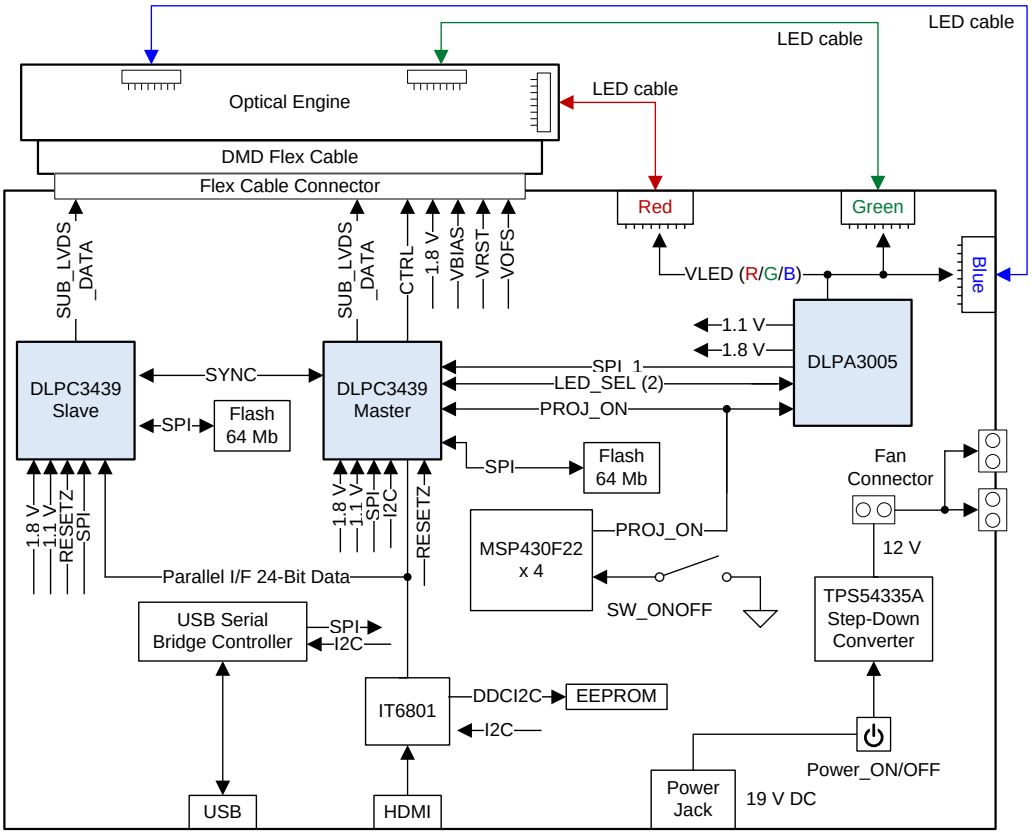

Figure 2. DLP LightCrafter Display EVM Block Diagram

4 Light Engine

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

- 0.47-inch 1080p DMD (DLP4710)
- OSRAM P1W red, green and blue LED
- This light engine interfaces with the EVM using DMD pin mapping **Option 2**. Please refer to the DLPC3439 datasheet for more information about the DMD interface.

Table 1. EVM Optical Engine Parameter Values

Parameter	MIN	TYP	MAX	UNIT
Brightness at Red 12 A , Green 16 A, Blue 16 A, LED current		600		Lum
Red LED current		12		A
Green / Blue LED current		16		A
Brightness uniformity	73%			
Throw ratio		1.39		
Offset		100%		
Focus range (wide)	40		120	inch
Image diagonal size	10		100	inch

5 Quick-Start Procedure

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

1. Power up the DLP LightCrafter Display 4710 EVM by applying an external DC power supply (19 V DC, 4.74 A) to PWR_IN connector (J28).
   External Power Supply Requirements:
   - Output voltage (nom): 19 VDC
   - Output current (max): 4.74 A
   - Efficiency level: V

   TI recommends using an external power supply that complies with applicable regional safety standards (such as UL, CSA, VDE, CCC, and PSE)
2. Move PS_ON/OFF slide switch (SW28) to the ON position.
   +3.3V (D43) and INTZ (D57) LED indicates when 19 V power is applied.
3. Push ON/OFF switch (SW21) to turn on the DLP LightCrafter Display 4710 EVM.
   +3.3V (D43), SYS_ON-OFF (D36), M_IRQ (D33) and S_IRQ (D34) LED will indicate that the DLP LightCrafter Display 4710 EVM is turned on.
4. After the DLP LightCrafter Display 4710 EVM is turned on, the projector will show a DLP LightCrafter Display splash image by default.
5. The focus and zoom of the image can be adjusted on the optical engine (Figure 3).

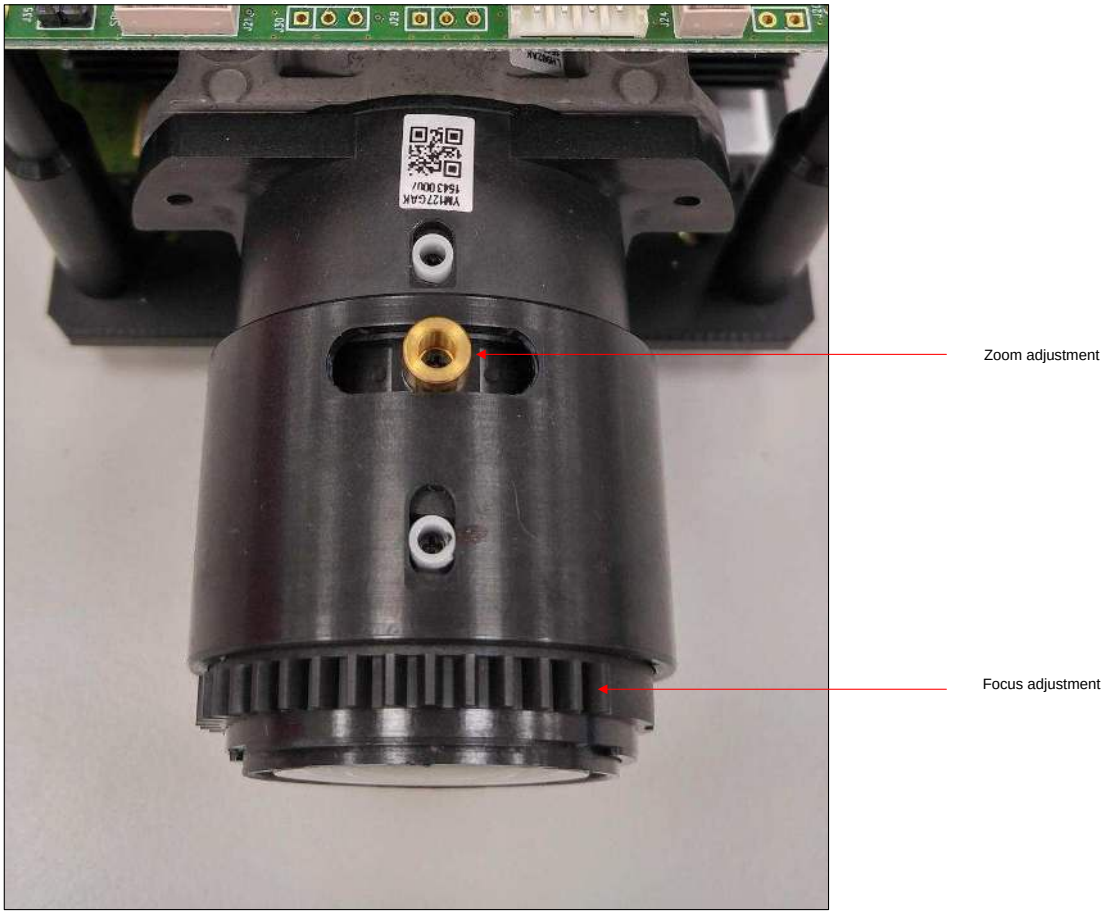

Figure 3. Optical Engine With Focus and Zoom Adjustment

6. Connect USB to the LightCrafter Display 4710 EVM and open the GUI for 4710 EVM on your computer. Then you can communicate to the EVM over the GUI software. If needed, please connect an HDMI source to the EVM.
7. When turning off the projector, push ON/OFF switch (SW21) and then move slide switch (SW28) to the OFF position before removing the power cable.
   IMPORTANT NOTE: To avoid potential damage to the DMD, it is required to turn off the projector with the above sequence before disconnecting the power.
8. There are eleven LED indicators on the DLP LightCrafter Display 4710 EVM (Table 2):

Table 2. LEDs on the DLP LightCrafter Display 4710 EVM

Location	Name	Description
D33	M_IRQ	LED OFF during DLPC3439_Master boots LED ON when DLPC3439_Master boot-up process is completed and ready to receive commands
D34	S_IRQ	LED OFF during DLPC3439_Slave boots LED ON when DLPC3439_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 DLPC3439 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 DLPC3439 over I2C

6 Connectors, Headers, and Switch Description

Table 3. List of Installed Connectors on the 4710 EVM Board

Location	Name	Description
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
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	Reserved
SW21	ON/OFF	Projector ON/OFF Switch
SW28	PS_ON/OFF	Power Supply ON/OFF Switch

7 EVM Setup

The DLP LightCrafter Display 4710 EVM is comprised of the DLP4710 (.47 1080p) DMD, DLPC3439 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 engine) are included on one board. The locations of the named parts are shown in Figure 4.

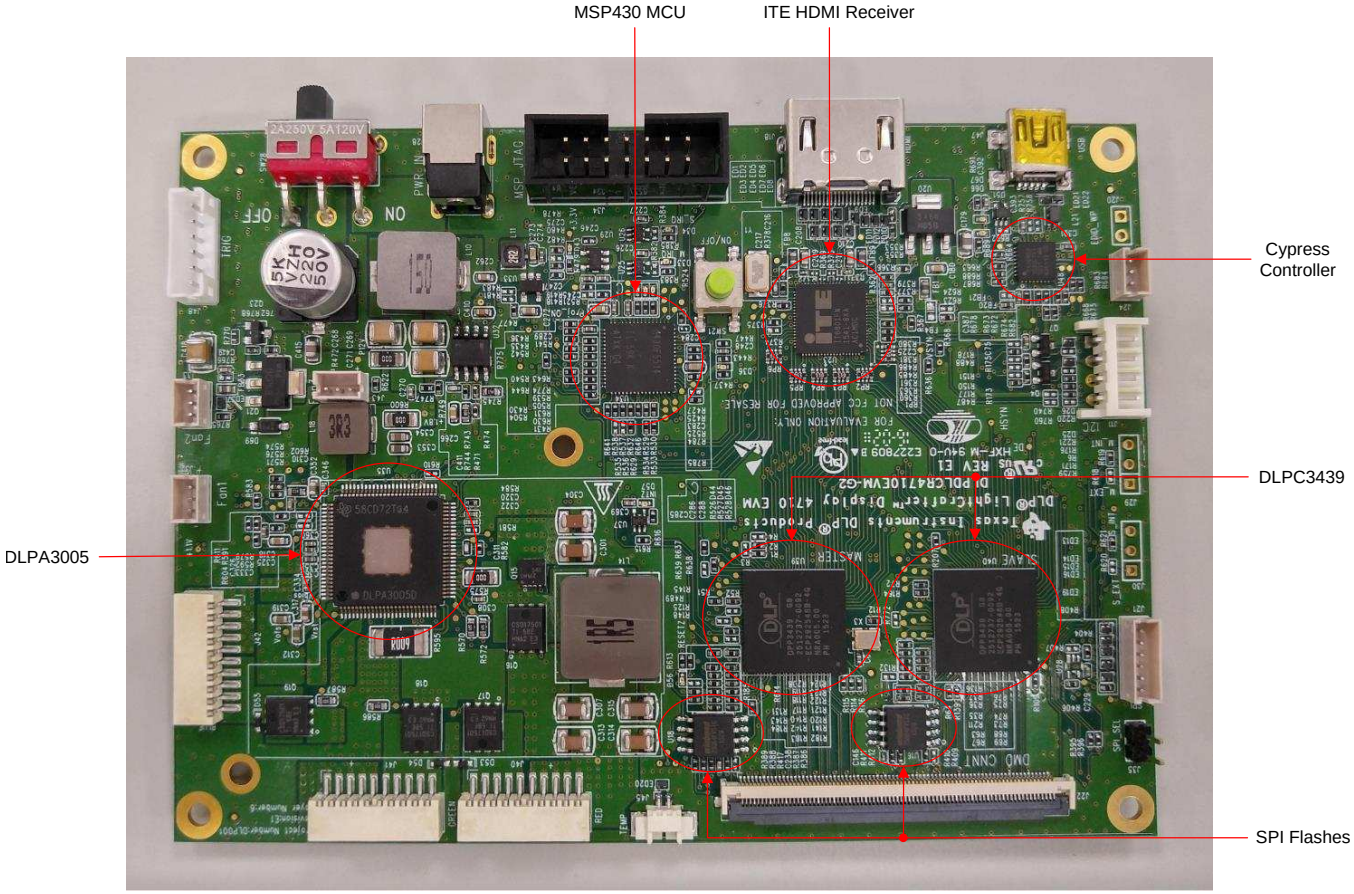

Figure 4. DLP LightCrafter Display 4710 Board

The DLP LightCrafter Display 4710 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 DLP LightCrafter Display 4710 board.

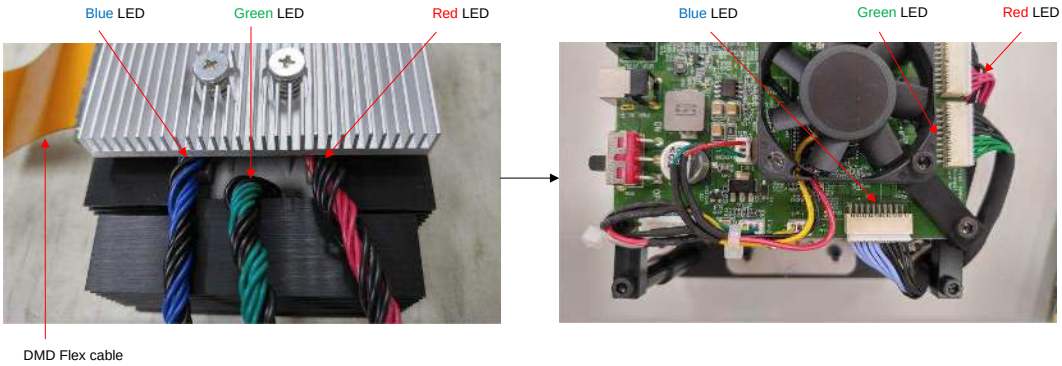

Figure 5. LED Connection

Figure 6 shows the final setup of all parts.

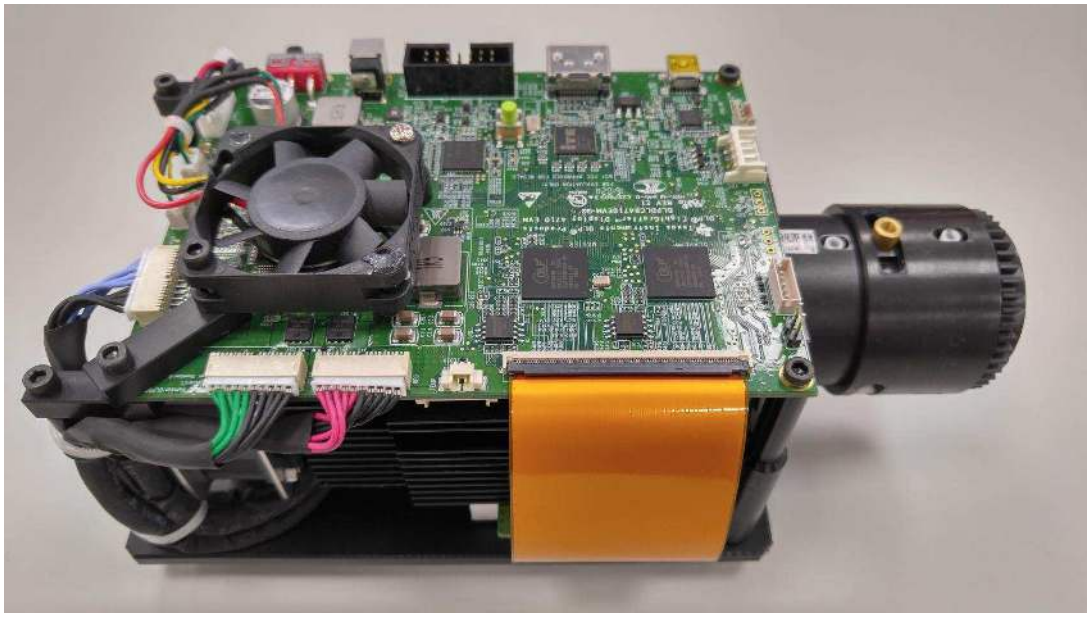

Figure 6. DLP LightCrafter Display 4710 EVM

CAUTION

Make sure all connections are set up correctly before connecting the power! Verify that the DMD flex cable is connected correctly to the LightCrafter Display 4710 board.

8 Safety Instructions

CAUTION

Caution Hot surface.
Contact with heatsinks may cause burns.
Do not touch.

CAUTION

Risk Group 2
Possibly hazardous optical radiation emitted from this product.
Do not stare at operating lamp.
May be harmful to the eye.

ATTENTION

Observe precautions for handling.
ELECTROSTATIC SENSITIVE DEVICES.

Revision History

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

Changes from C Revision (February 2019) to D Revision **Page**

- Updated Figure 2 3
- Changed *Throw ratio* specification to 1.39 (typical) in Table 1 4

Changes from B Revision (October 2015) to C Revision **Page**

- Added pin mapping option description to Section 4 4

Changes from A Revision (September 2016) to B Revision **Page**

- Updated DMD brightness from 460 to 600 lumens in Section 3 3
- Updated Brightness from 456 to 600 lumens in Table 1 4

Changes from Original (September 2016) to A Revision **Page**

- Corrected Light Engine resolution from 180p to 1080p in Section 4 4

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