DLP® LightCrafter™ Display 4710 EVM 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 first steps to get started and shows a detailed description of the onboard LEDs and the main connectors. It gives the user a successful start with their first DLP LightCrafter Display 4710 EVM.

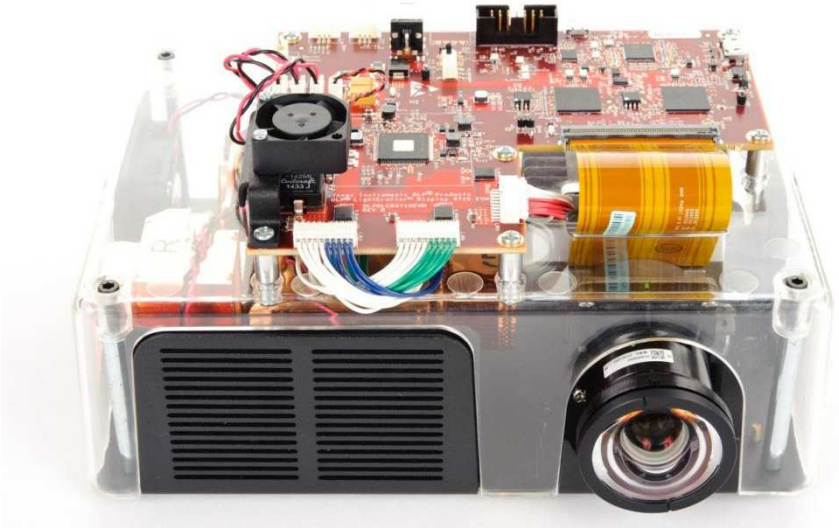

Figure 1. DLP LightCrafter Display 4710 EVM

See *Section 7* for additional documentation.

Topic **Page**

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1 Safety Instructions

WARNING

Internal components may be hot. No user-serviceable parts are inside housing. To minimize risk of personal injury, do not remove cover. Contact TI if internal repairs are required.

WARNING

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

WARNING

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

CAUTION

Observe handling precautions. Electrostatic sensitive devices.

2 What is in the LightCrafter Display 4710 EVM

The DLP LightCrafter Display module consists of three subsystems:

- Light engine – includes the optics, red, green, and blue LEDs, and a 1920 × 1080 (1080p) DMD capable of 460 lumens out-of-the-box.
- Driver board – includes the DLP chipset comprising of DLPC3439 controller and DLPA3005 PMIC/LED driver.
- System board – includes MSP430, ITE HDMI receiver, USB-serial bridge controller, and several connectors for external inputs (HDMI, USB, and others).

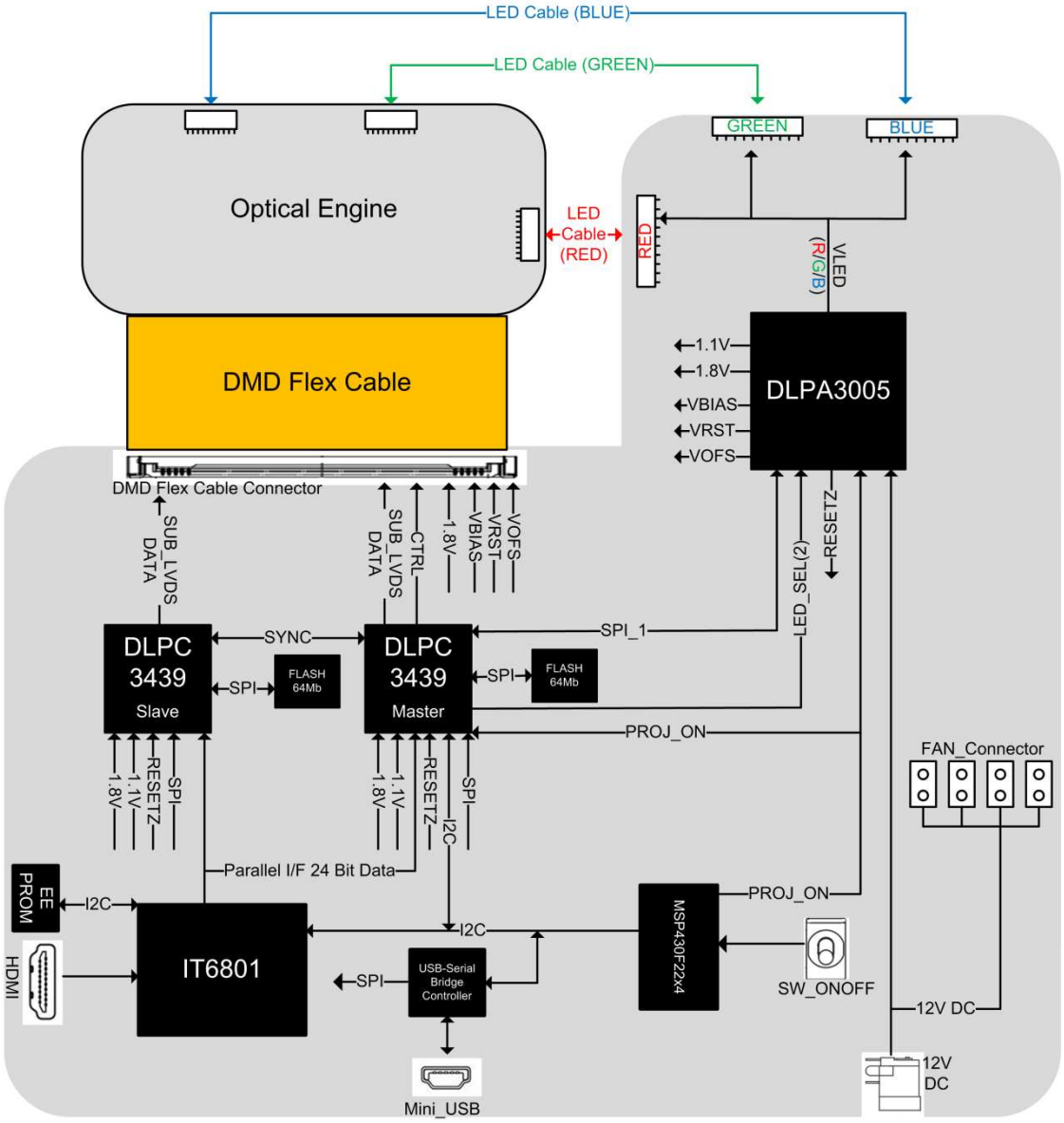

Figure 2. DLP LightCrafter Display EVM Block Diagram

3 Light Engine

The optical engine in the EVM is developed by Qisda 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

Table 1. Optical Engine Specifications

PARAMETER	MIN	TYP	MAX	UNIT
Brightness at 12-A LED current		456		lm
LED current		12		A
Brightness uniformity	73%			
Offset		100%		
Throw Ratio		1.108		
Focus range	30		100	inch

4 Quick-Start Procedure

This quick-start assumes default conditions as shipped.

1. Power up the DLP LightCrafter Display 4710 EVM by applying an external DC power supply (12-V DC, 6.67 A) to the J_PWR connector.
   External power supply requirements:
   - Nominal output voltage: 12 VDC
   - Max output current: 6.67 A
   - Efficiency Level V

   NOTE: TI recommends using an external power supply that complies with applicable regional safety standards such as (by example) UL, CSA, VDE, CCC, PSE, and so forth. The D_12ON LED indicates that 12-V power is applied.
2. Move the SW_MSPONOFF switch to the *on* position to turn the DLP LightCrafter Display 4710 EVM on. D_PROJON LED indicates that the LightCrafter Display 4710 EVM is turned on.
3. After the DLP LightCrafter Display 4710 EVM is turned on; the projector will display a DLP LightCrafter Display splash image by default.
4. The focus of the image can be adjusted on the optical engine.

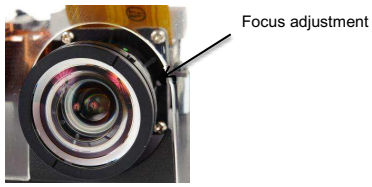

Figure 3. Optical Engine With Focus Adjustment

5. Connect USB to the LightCrafter Display 3010 EVM and open the GUI on your computer. If needed, connect an HDMI source to the EVM and communicate to the EVM through the GUI software.
6. When turning off the projector, turn off the SW_MSPONOFF switch prior to removing the power cable.

CAUTION

To avoid potential damage to the DMD, TI recommends to turn off the projector with the SW_ONOFF before disconnecting the power.

7. The DLP LightCrafter has 12 indicator LEDs (see Table 2).

Table 2. LEDs on the DLP LightCrafter Display 4710 EVM

LED	INDICATOR DESCRIPTION
D_PROJON	*On* when projector is turned via switch
D_12ON	12-V power applied
D_MSP	*On* when HDMI cable plugged in and external video detected. *Off* when external video is not detected.
D_IRQS	*On* during DLPC3439_Slave boots *Off* when projector is running. Indication of DLPC3439_Slave boot-up completed and ready to receive commands
D_IRQM	*On* during DLPC3439_Master boots *Off* when projector is running. Indication of DLPC3439_Master boot-up completed and ready to receive commands
D_USBTX	Blinking when PC is communicating to DLPC3439 over I^2C
D_USBRX	Blinking when PC is communicating to flash over SPI
D_MSPACK	*On* when Cypress CY3420 is I^2C master *Off* when MSP430 is I^2C master
D_MSPREQ	*On* when Cypress CY3420 requests the MSP430 to give Cypress master control of the I^2C bus
D_GPIO5	Status indication of DLPC3439_Master GPIO5
D_GP5V	*On* when DLPA3005 applies 5 V
D_RSTZ	*On* when DLPC3439 is in RESET

5 Connectors, Headers, and Switch Description

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

INSTALLED CONNECTORS/HEADERS	DESCRIPTION
J_PEDID	Header to program the EDID
JRST	Header to set DLPC3439 in RESET
J_RED	Connector for RED LED cable
J_GRN	Connector for GREEN LED cable
J_BLU	Connector for BLUE LED cable
J_DEV	Connector for the I^2C interface (DevaSys box)
J_FAN1,J_FAN2,J_FAN3,J_FAN4	Connector for 12-V DC power
J_FLEX	Connector for flex cable
J_HDMI	Connector for Mini_HDMI input
J_MSPJTAG	MSP430 JTAG programming interface connector
J_MSPONOFF	Projector ON/OFF switch
SW1	Push-button to request I^2C
J_WPC	Unsupported
J_TMP	Unsupported
J_LABB	Unsupported
J_3DG	Unsupported

6 EVM Setup

The DLP LightCrafter Display 4710 EVM has the DLP4710 chipset comprising of DLP4710 (.47 1080p) DMD, DLPC3439 display controller, DLPA3005 PMIC/LED driver, and supporting components as the Cypress chip, MSP430, and ITE controller all included on one board. Figure 4 shows the locations of these parts. The MSP430 is placed on the bottom of the board and is not shown in Figure 4.

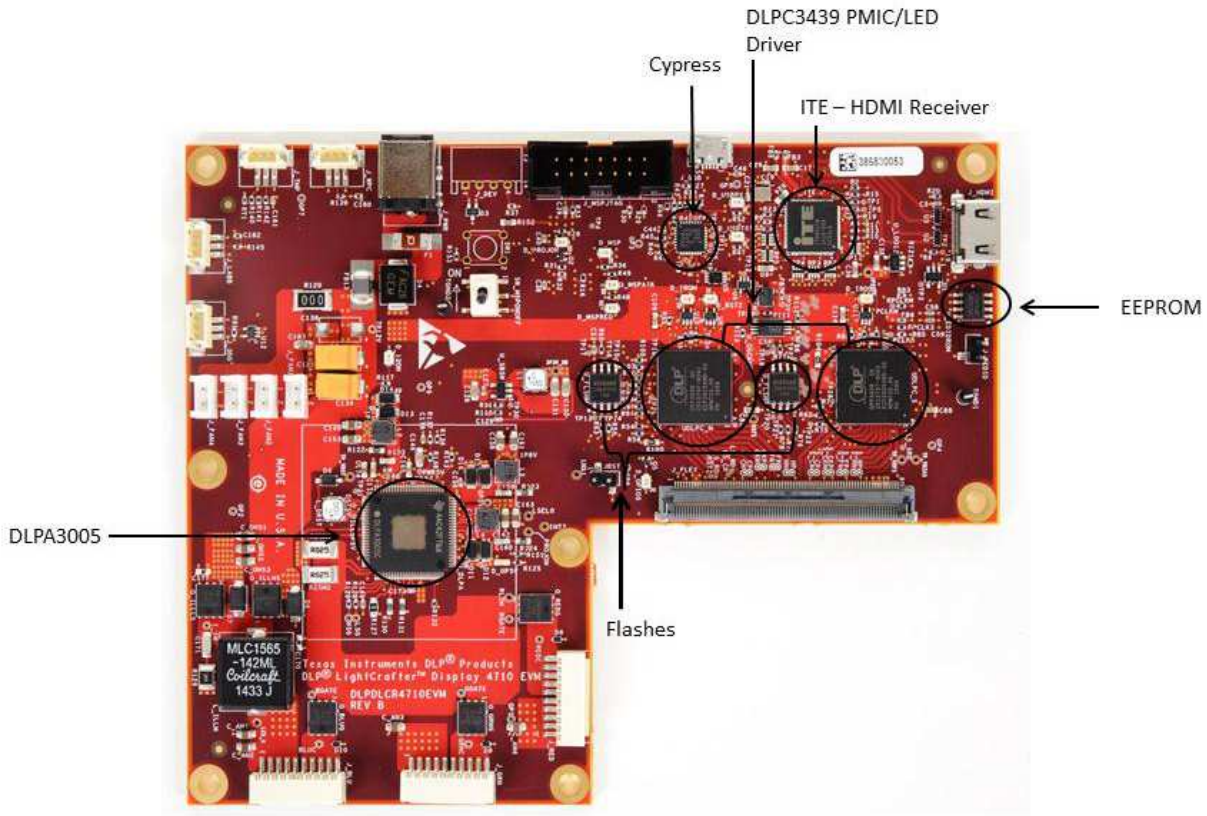

Figure 4. DLP LightCrafter Display 4710 Board

The DLP LightCrafter Display 4710 board has three LED connectors for red, blue, and green, and one connector for the flex cable to the 0.47-inch 1080p DMD. The connectors for each LED are named on the board as well as on the light engine. Refer to Figure 5 to see the proper setup.

NOTE: Ensure a good connection of the flex cable to the DLP LightCrafter Display 4710 board.

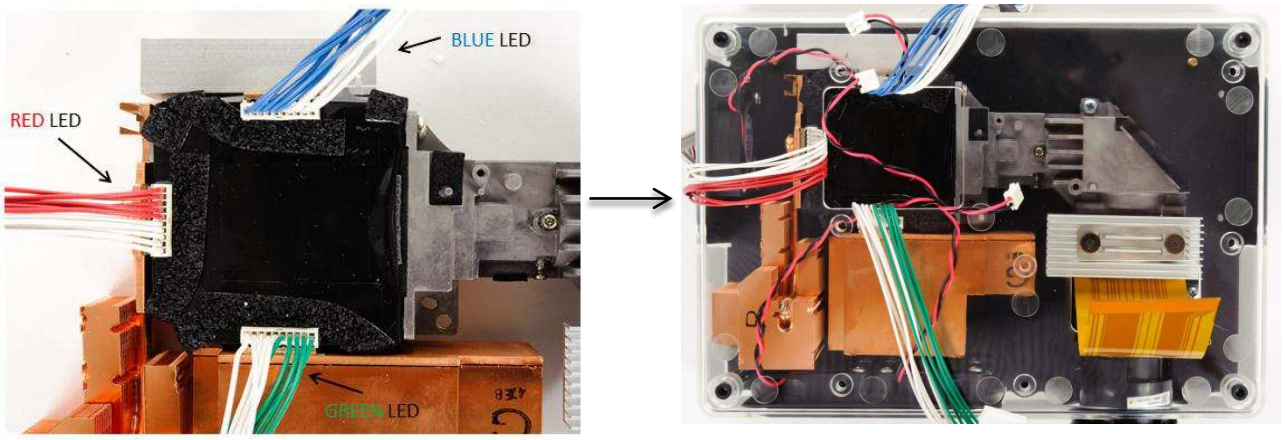

Figure 5. LED Connection

Figure 6 shows the final setup of all parts.

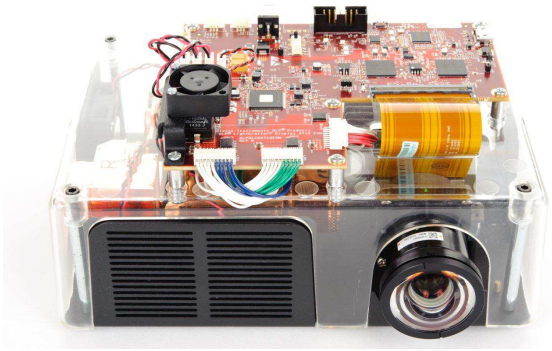

Figure 6. DLP LightCrafter Display 4710 EVM

NOTE: Make sure that everything is setup correctly before continuing. Verify that the flex cable is connected correctly to the LightCrafter Display 4710 board.

7 Applicable Documents

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

- DLP4710 (.47 1080p) DMD data sheet, DLPS056
- DLPC3439 controller data sheet, DLPS057
- DLPA3005 PMIC data sheet, DLPS055
- *DLPC3439 Software Programmer's Guide*, DLPU035
- *DLP LightCrafter Display EVM GUI Tool User's Guide*, DLPU021

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

Revision History

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

Changes from B Revision (July 2016) to C Revision **Page**

- Removed image diagonal size and updated focus range from 5 - 120 inches to 30 - 100 inches in Table 1 5

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

- Corrected DMD resolution to 1080p in Section 3 5

Changes from Original (June 2015) to A Revision **Page**

- Updated EVM block diagram in Figure 2 4
- Added Throw Ratio in Table 1 5

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