

DLP5530PROJTGQ1EVM Evaluation Module



ABSTRACT

The DLP5530PROJTGQ1EVM Evaluation Module (EVM) is a complete electronic and optical subsystem designed to control and interface with the DLP5530-Q1 chipset. The DLP5530-Q1 chipset consists of the DLP5530-Q1, the DLPC230-Q1, and the TPS99000-Q1. This chipset is combined with illumination and projection optics, RGB LEDs, and a photodiode and can be used to develop an automotive grade projector for applications such as windshield cluster display and transparent window displays where a holographic optical element (HOE) is used as the screen technology. This EVM uses narrow band LED illumination designed to work more efficiently with HOE films. This projector offers high brightness and high contrast of up to 2000:1 in a compact package of about 1 liter. It is made of robust metal housing and uses all glass optical elements, but these could potentially be traded for more cost effective plastic options in a production design.

The DLP5530PROJTGQ1EVM is not a production design. It is intended for evaluation only.



Figure 1-1. The DLP5530PROJTGQ1EVM

The DLP5530Q1EVM electronics EVM pairs with 3 different optical module configurations, all available as standalone EVMs. The different options are listed below in [Table 1-1](#).

Table 1-1. Optical Module EVM Descriptions

EVM Part Number	Typical Application	Key Features
DLP5530PGUQ1EVM	Head up display	Short throw distance for creating HUD images on a diffuser screen
DLP5530PROJQ1EVM	Full color transparent window display	Variable throw distance for creating large images of scalable sizes
DLP5530PROJTGQ1EVM	Holographic cluster display	Direct green LED for narrow band illumination of holographic optical elements



This design incorporates HDMI® technology.

Table of Contents

1 User Guide Overview	3
1.1 What is in the DLP5530PROJTGQ1EVM EVM	3
1.2 Specifications	7
2 Quick Start	9
2.1 Kit Assembly Instructions	9
2.2 Software Installation	10
2.3 Powering-Up EVM	10
2.4 Connecting EVM to the DLPC230-Q1 Control Program	10
2.5 Steps to Reprogram the Onboard Flash Memory	11
3 Optical Engine Specifications	12
4 REACH Compliance	14
5 Revision History	14

List of Figures

Figure 1-1. The DLP5530PROJTGQ1EVM	1
Figure 1-1. DLP5530PROJTGQ1EVM Controller PCB	3
Figure 1-2. DLP5530PROJTGQ1EVM Illumination Driver PCB	5
Figure 1-3. EVM Cables	6
Figure 2-1. EVM Cable Connections	9
Figure 2-2. Connecting to the DLPC230-Q1 Using the DLPC230-Q1 Automotive Control Program	10
Figure 2-3. DLPC230-Q1 Automotive Control Program Communication Settings	11
Figure 3-1. DLP5530PROJTGQ1EVM Optical Module	12

List of Tables

Table 1-1. Optical Module EVM Descriptions	1
Table 1-1. Controller PCB Ports	4
Table 1-2. Controller LED Indicators	4
Table 1-3. Controller PCB Switches	4
Table 1-4. Illumination Driver PCB Ports	5
Table 1-5. Illumination Driver Header Pins	6
Table 1-6. EVM Cables	6
Table 1-7. Electrical Specifications	7
Table 1-8. EVM Components Which are Not Rated for –40°C to 105°C	7
Table 1-9. Typical Timing for Supported Source Resolutions	8
Table 3-1. Optical Module Specifications	12
Table 3-2. Included LEDs	12
Table 4-1. Optical Engine SVHC Components	14

Trademarks

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1 User Guide Overview

This user's guide presents an overview and general description of the DLP5530PROJTGQ1EVM and provides first steps for getting started using the EVM.

1.1 What is in the DLP5530PROJTGQ1EVM EVM

The DLP5530PROJTGQ1EVM consists of a controller PCB, an illumination driver PCB, cables, and a USB to SPI adapter. It also includes an optical module designed to combine with the electronic subsystem for evaluation of a fully functioning projector in an automotive setting.

1.1.1 Controller PCB

The controller PCB shown in [Figure 1-1](#) includes the DLP5530-Q1 DMD, the DLPC230-Q1 DMD Controller, and the TPS99000-Q1. It supports video inputs from either a micro HDMI® or OpenLDI interface and provides the formatting and control to display the video on the DLP5530-Q1 DMD. The EVM can be controlled with either a SPI or an I²C interface. The SPI or I²C interface can also be used to reprogram the serial Flash that is used to store DLPC230-Q1 software and configuration. An optional second SPI port is provided for monitoring the TPS99000-Q1. The EVM has an external photodiode input that is used to control white point and brightness over a wide dimming range. An optional second photodiode input is also provided. The EVM includes a flex interface to control and monitor the illumination driver PCB. It also provides an optional interface for thermistors on the red, green and blue illuminator PCBs that can be used to monitor the temperatures of the illuminators.

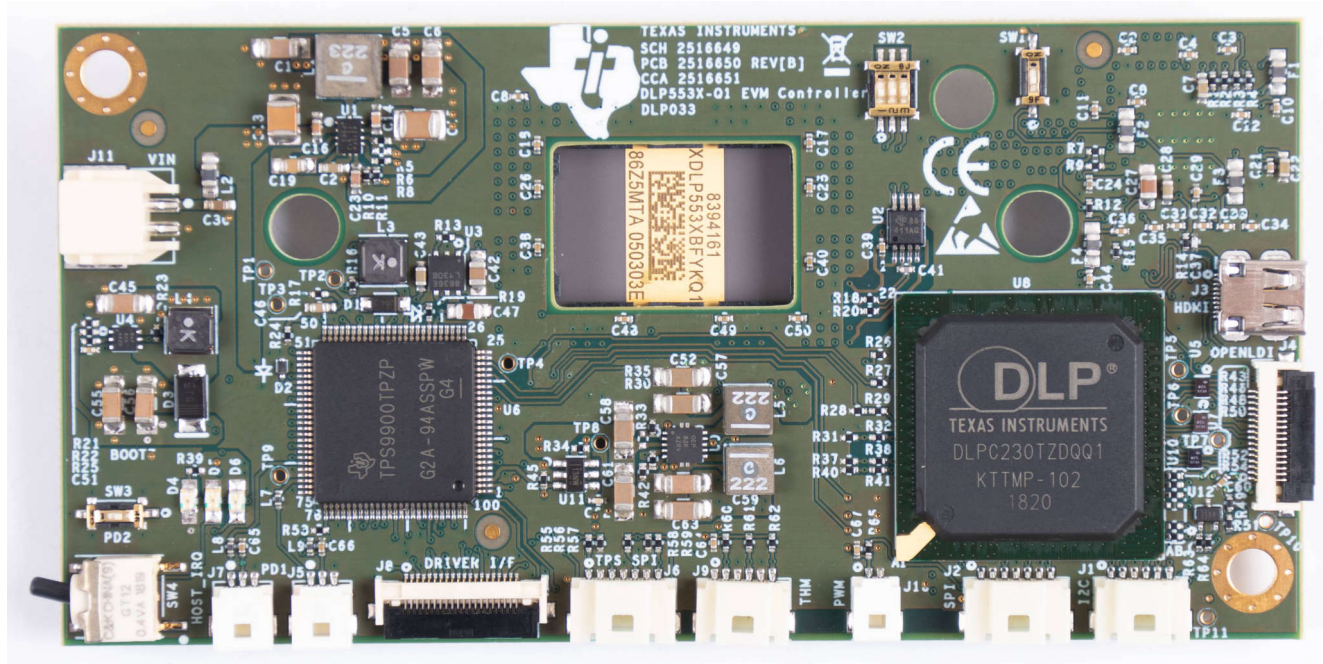


Figure 1-1. DLP5530PROJTGQ1EVM Controller PCB

The controller PCB contains the ports listed in [Table 1-1](#). Indicator LEDs are listed in [Table 1-2](#).

Table 1-1. Controller PCB Ports

SCHEMATIC REFERENCE	FUNCTION
J1	Host I ² C, PROJ_ON, HOLD_BOOT, HOST_IRQ
J2	Host SPI
J3	Micro HDMI
J4	OpenLDI (Flex connector)
J5	Photodiode 1
J6	TPS99000-Q1 SPI Debug
J7	Photodiode 2
J8	HUD Driver Interface
J9	LED Thermistor
J10	Fan PWM output ⁽¹⁾
J11	Formatter Controller Power

(1) Port unused for RGB display applications. Cable not provided.

Table 1-2. Controller LED Indicators

SCHEMATIC REFERENCE	FUNCTION
D4 (Green)	Input power to controller (from illumination driver) Off: No power connected On: Power connected
D5 (Green)	PROJ_ON Off: System Off On: System On
D6 (Red)	HOST_IRQ Off: Interrupt not asserted On: Interrupt asserted

The controller PCB switches are listed in [Table 1-3](#). SW4 is a toggle switch for PROJ_ON which is used to turn on and off the electronics. Note that parts of the board are still powered when PROJ_ON is in the off position. SW1, SW2 and SW3 are dip switches that control the states of configuration signals the DLPC230-Q1 reads when it comes out of reset. These switches should be set based on the desired configuration options.

Table 1-3. Controller PCB Switches

SCHEMATIC REFERENCE / SIGNAL NUMBER	FUNCTION
SW1 (1)	Spread Spectrum Enable Off: Disabled On: Enabled
SW2 (1)	Host Port Checksum Select Off: CRC On: Checksum
SW2 (2)	Host Interface Select Off: Host SPI On: Host I ² C
SW2 (3)	Host SPI Mode Off: Mode 0 or 3 On: Mode 1 or 2
SW3	Hold in Boot Off: Do not hold in boot (continue to main application) On: Hold in boot
SW4	PROJ_ON Off: Turn off system On: Turn on system On state is toward the outer edge of the board Figure 1-1

1.1.2 Illumination Driver PCB

The illumination driver PCB shown in [Figure 1-2](#) is controlled and monitored by the controller PCB over a flex cable. Power can be input to the illumination driver from a bench top supply. The illumination driver provides reverse bias protection and supplies power to the controller PCB over a separate cable. The illumination driver PCB regulates the input power to 6.5V or 8V prior to the illumination driver circuitry. The illumination driver has outputs for red, green and blue illuminators. These are typically LEDs, but other possible illuminators can be used. See [Section 1.2.1](#) for input and output specifications of the EVM. Depending on operating conditions, some parts and surfaces of the PCB can be hot.

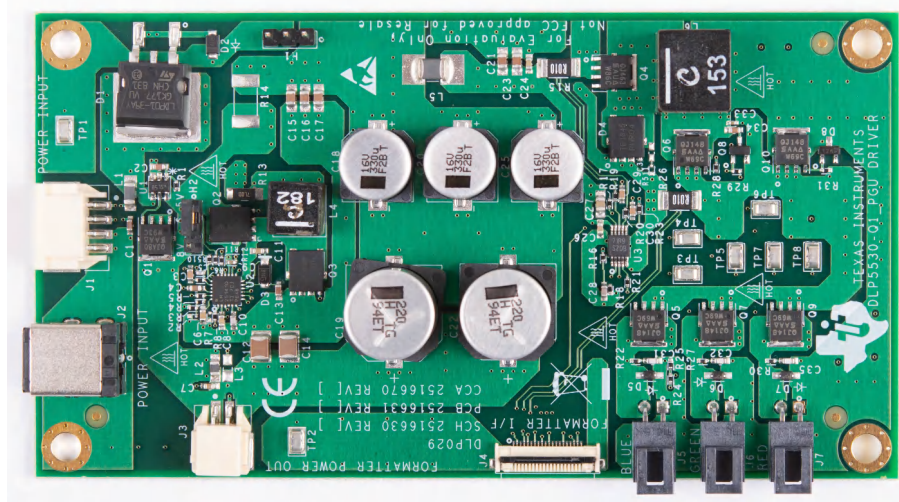


Figure 1-2. DLP5530PROJTGQ1EVM Illumination Driver PCB

The illumination driver PCB contains the ports listed in [Table 1-4](#).

Table 1-4. Illumination Driver PCB Ports

SCHEMATIC REFERENCE	FUNCTION
J1	Input power
J2	Input power (optional)
J3	Controller power
J4	Controller-driver control interface
J5	Blue illumination output - high current output up to 6A, locking and keyed connector
J6	Green illumination output - High current output up to 6A, locking and keyed connector
J7	Red illumination output - High current output up to 6A, locking and keyed connector

The illumination driver PCB contains the headers listed in [Table 1-5](#). H2 selects the illumination drive voltage. Place a jumper across pins 1 and 2 for 6.5V drive. Place a jumper across pins 2 and 3 for 8V drive. Do not hot-swap this jumper, remove or replace only with power disconnected from the board.

Table 1-5. Illumination Driver Header Pins

HEADER	PIN1	PIN2	PIN3
H1	Pre-regulated drive voltage (6.5V or 8V)	GND	GND
H2	Feedback voltage connection for 6.5V drive	Pre-regulator feedback voltage	Feedback voltage connection for 8V drive

1.1.3 EVM Cables

The DLP5530PROJTGQ1EVM kit contains the cables and Cheetah USB to SPI adapter listed in [Table 1-6](#) and shown in [Figure 1-3](#).



Figure 1-3. EVM Cables

Table 1-6. EVM Cables

NAME	REFERENCE	QUANTITY
Input Power Cable	A	1
Cheetah™ SPI Host Adapter	B	1
Host SPI Cable	C	1
Host I²C Cable (Includes PROJ_ON, HOLD_BOOT, HOST_IRQ signals)	D	1
Green Illuminator Power Cable	E	2
Blue Illuminator Power Cable	F	2
Red Illuminator Power Cable	G	2
Photodiode Cable	I	1
Driver to Formatter Controller Power Cable	J	1
Formatter Controller to Driver Control Flex	K	1
Micro HDMI Cable	M	1

1.2 Specifications

1.2.1 Electrical Specifications

Table 1-7. Electrical Specifications

PARAMETER	MIN	NOM	MAX	UNIT
Input				
Voltage	8	12	18	V
Power ⁽¹⁾		12	40	W
LED Pre-Regulator Output				
Voltage		6.5 or 8 ⁽²⁾		V
Illumination Driver Output Load				
Voltage (Per LED Color Output)			7.5	V
Current (Per LED Color Output)			6	A
Temperature				
Operating DMD Temperature ⁽³⁾	–40		105 ⁽⁴⁾	°C

(1) Conditions for nominal power: white balanced LED current up to 6 A, LED forward voltage = 3.5 V, display duty cycle = 90/10.

(2) Pre-regulator output voltage is set by the jumper position of header H2. See [Table 1-5](#).

(3) Care must be taken to ensure that individual components and PCB do not exceed their maximum temperature when driving high-power load.

(4) Some components are only rated to 85°C. Refer to [Table 1-8](#) for a list of these components.

1.2.2 Component Temperature Ratings

The PCB materials and most of the PCB components are rated to operate between –40°C to 105°C, including the DLP5530-Q1, the DLPC230-Q1, and the TPS99000-Q1.

Some components on board, such as switches, connectors, and indicator LEDs, do not meet this temperature rating. The specifications for EVM components which are not rated between –40°C to 105°C are listed in [Table 1-8](#). Please refer to the EVM bill of materials to review the temperature specifications of all components used in the EVM design.

Table 1-8. EVM Components Which are Not Rated for –40°C to 105°C

Board	Reference	Part Number	Manufacturer	Description	Temperature Minimum (°C)	Temperature Maximum (°C)
Controller	D4, D5	LTST-C171KGKT	Lite-On	LED, GREEN 0805	–55	85
Controller	D6	LTST-C171KRKT	Lite-On	LED, RED 0805	–55	85
Controller	J3	685119248123	Würth	CONN MICRO HDMI RIGHT ANGLE	–40	85
Controller	SW1	CVS-02TB	Copal Electronics Inc	SWITCH DIP SLIDE 2-POS 1 MM 6 V	–40	85
Controller	SW2	CVS-03TB	Copal Electronics Inc	SWITCH DIP SLIDE 3-POS 1 MM 6 V	–40	85
Controller	SW3	CVS-01TB	Copal Electronics Inc	SWITCH DIP SLIDE 1-POS 1 MM 6 V	–40	85
Controller	SW4	GT12MSCBE	C&K Comp	SWITCH, SPST, GULL	–30	85
Controller	U5, U7, U10, U503, U504	PCMF2HDMI2SZ	Nexperia	COMMON MODE CHOKE 4LN SMD ESD	–40	85
Controller	U501	TFP401AIPZPRQ1	Texas Instruments	IC PANELBUS DVI RCVR 100-HTQFP	–40	85
Illumination Driver	J2	PJ-082BH	CUI Inc	CONN PWR JACK 2.5X5.5MM SOLDER	–25	85

The controller and illumination driver PCBs have a UL flame rating of 130°C maximum.

The DLP5530PROJTGQ1EVM is not a production design. It is intended for evaluation only. The DLP5530PROJTGQ1EVM is only designed to operate at a maximum of 40°C ambient temperature, but with a custom thermal solution the DLP5530-Q1 chipset and accompanying optical engine can be designed to operate at up to 105°C.

1.2.3 Input Video Specifications

The following input video resolutions are supported on the HDMI and OpenLDI interfaces. These input video resolutions are programmed in the Extended Display Identification Data (EDID) EEPROM for the EVM's HDMI interface allowing a connected computer to read the supported resolutions and timing. Note that some computers may not be able to output all of these resolutions, in particular 576 × 288.

- 1152 × 1152
- 1152 × 576
- 576 × 288

The input source timing specified in the EVM's HDMI interface EDID are specified in [Table 1-9](#). These timing parameters are also recommended for the OpenLDI interface.

Table 1-9. Typical Timing for Supported Source Resolutions

Horizontal Resolution	Vertical Resolution	Horizontal Blanking				Vertical Blanking				Vertical Rate (Hz)	Pixel Clock (MHz)
		Total	Sync (Pixel Clocks)	Back Porch (Pixel Clocks)	Front Porch (Pixel Clocks)	Total	Sync (Lines)	Back Porch (Lines)	Front Porch (Lines)		
1152	1152	80	8	32	40	33	8	22	3	60	87.59
1152	576	80	8	32	40	17	8	6	3	60	43.83
576	288	322	8	154	160	181	8	158	15	59.98	25.26

1.2.4 SPI and I²C Timing

For more information on SPI and I²C specifications, see the DLPC230-Q1 data sheet.

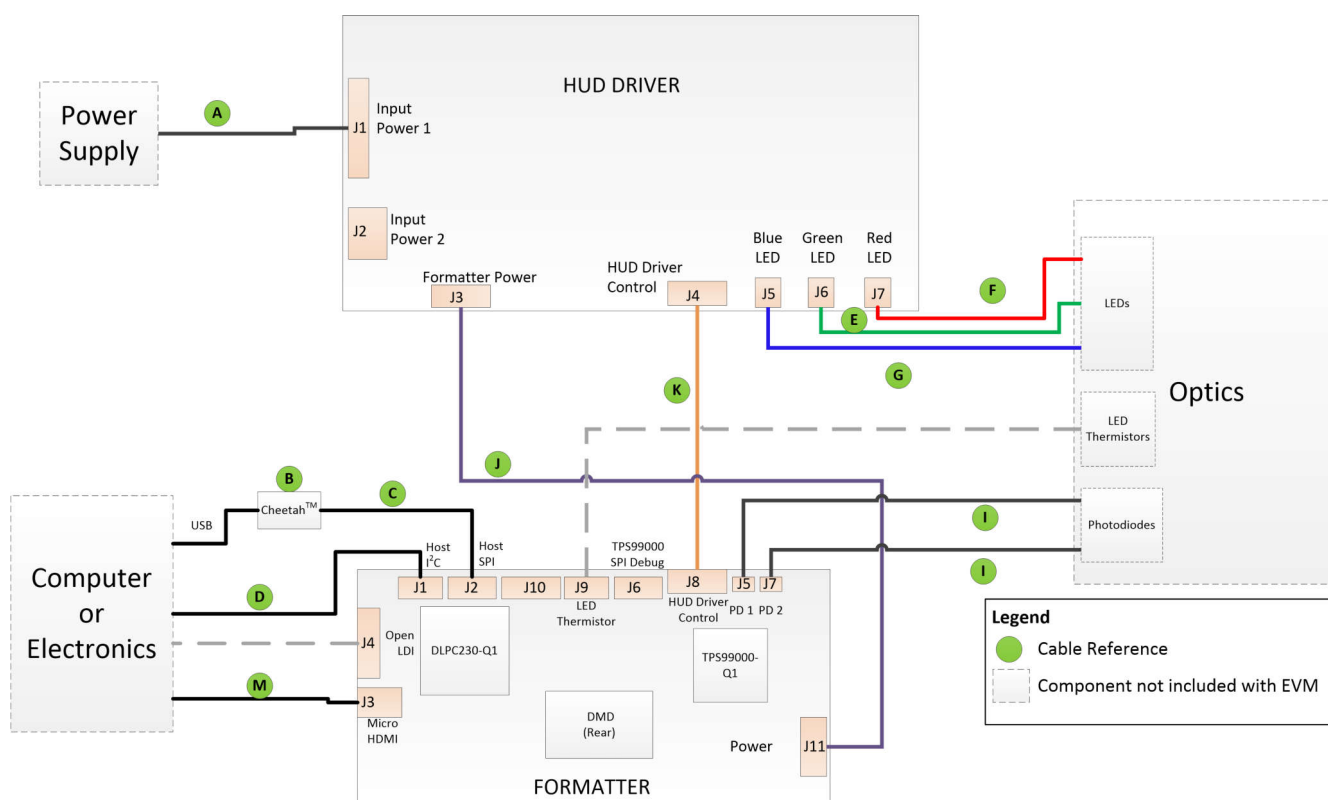
2 Quick Start

Use the following instructions to setup the DLP5530PROJTGQ1EVM and PC.

2.1 Kit Assembly Instructions

A diagram of all connections is shown in [Figure 2-1](#).

1. Connect the controller to driver control interface flex to the controller PCB (J8) and the illumination driver PCB (J4).
2. Connect the host SPI cable to the controller PCB (J2) and the Cheetah adapter. Connect the Cheetah adapter's USB cable to PC.
3. Connect the controller power cable to the controller PCB (J11) and the illumination driver PCB (J3).
4. Connect the blue illumination output cable to the illumination driver PCB (J5) to the blue illuminator in the optics engine.
5. Connect the green illumination output cable to the illumination driver PCB (J6) to the green illuminator in the optics.
6. Connect the red illumination output cable to the illumination driver PCB (J7) to the red illuminator in the optics engine.
7. Connect the photodiode cable to the controller PCB (J5) to a photodiode located in the illumination path of the optics engine.
8. Connect the Micro HDMI cable to the controller PCB (J3). Connect the Micro HDMI cable to PC HDMI port.
9. Connect the power input cable to the illumination driver PCB (J1).



A. Reference letters refer to cables listed in [Table 1-6](#).

Figure 2-1. EVM Cable Connections

2.2 Software Installation

1. Download and install the [DLPC230-Q1 Control Program Lite](#) from ti.com.
2. Install [Total Phase Cheetah USB adapter drivers](#) from the Total Phase website.

2.3 Powering-Up EVM

1. Connect input power cable to a power supply that meets input power specifications defined in [Table 1-7](#). The red wire is the V+ terminal and black wire is the V– terminal.
2. Turn on the supply power. Once powered up, a controller PCB LED indicator (D4) should illuminate green.
3. Turn the PROJ_ON switch (SW4) ON. The ON position is away from the board, and OFF is toward the board. A controller PCB LED indicator (D5) should illuminate green.

2.4 Connecting EVM to the DLPC230-Q1 Control Program

1. Start the DLPC230-Q1 Control Program Lite.
2. On the connection page set the DLPC230-Q1 Host to SPI and select the Cheetah from the drop down menu (see [Figure 2-2](#)). Note, the Cheetah must be connected to computer with USB cable for it to show up in the drop down box.

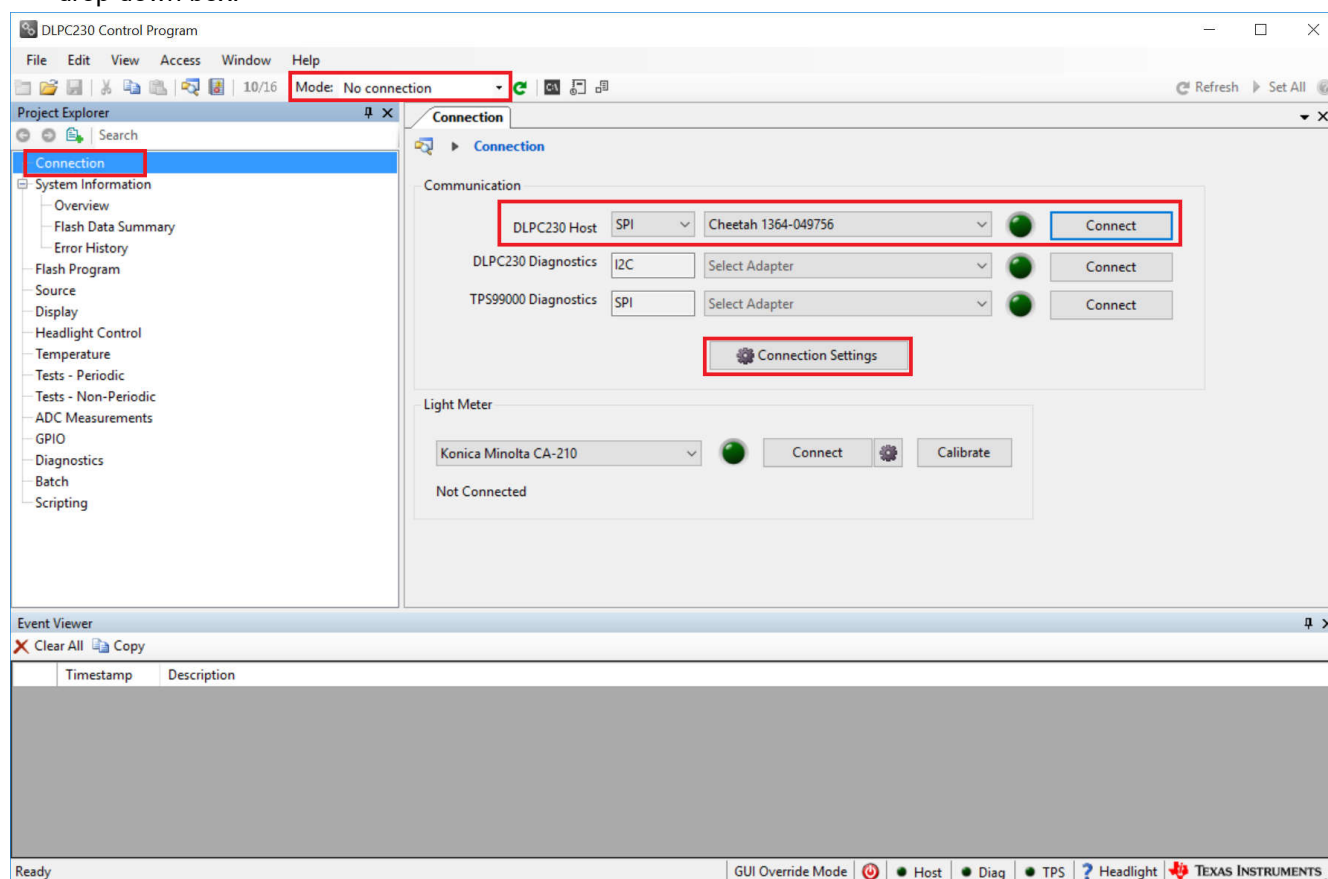


Figure 2-2. Connecting to the DLPC230-Q1 Using the DLPC230-Q1 Automotive Control Program

3. Select "Connection Settings" to confirm the SPI configuration shown in [Figure 2-3](#) matches the controller PCB switch settings described in [Table 1-3](#). Specifically, SPI mode and CRC/Checksum may vary based on switch settings. Press "OK" once configuration is complete.

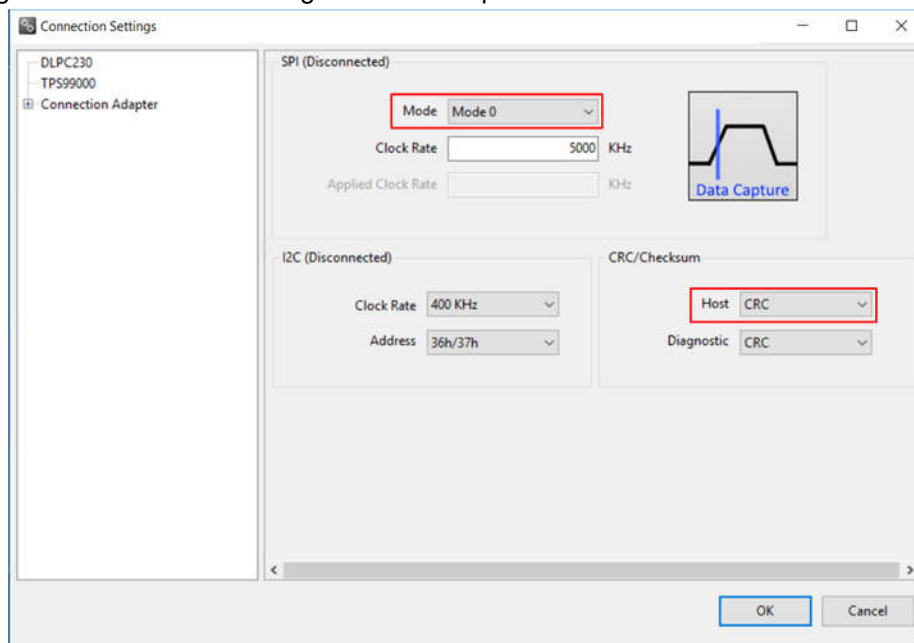


Figure 2-3. DLPC230-Q1 Automotive Control Program Communication Settings

4. Click the Connect button. The green circle next to the Connect button should then light up to indicate that connection was successful to the Cheetah Adapter.

2.5 Steps to Reprogram the Onboard Flash Memory

The DLP5530PROJTGQ1EVM comes with onboard serial Flash that is pre-programmed with software and basic configuration. The software and configuration can be updated by reprogramming the serial Flash with the DLPC230-Q1 Automotive Control Program. Steps to re-program the serial Flash are listed below.

1. Using the DLPC230-Q1 Automotive Control Program, which is connected to the EVM, navigate to the "Flash Program" tab.
2. Using the folder icon, select an Image File (.bin) and open it.
3. Click "Program and Verify Flash Memory."

Note that if the device is in Display mode, it will automatically be switched to Standby during programming.

3 Optical Engine Specifications

The DLP5530PROJTGQ1EVM includes an optical projection system that can be used for windshield cluster applications. The optical specifications are listed in [Table 3-1](#).



Figure 3-1. DLP5530PROJTGQ1EVM Optical Module

Table 3-1. Optical Module Specifications

PARAMETER	MIN	NOM	MAX	UNIT
Luminous flux output	95 lm			lm
Throw ratio		1.80		
Throw distance	355		635	mm
Image width	200		350	mm
f/#		2.6		
MTF		40%		
Optical image offset		100%		
Light uniformity	80%			
FOFO contrast		1800:1		

Table 3-2. Included LEDs

Color	Manufacturer	Part Number
Red	Osram	Q8WP LE A
Green	Osram	Q8WP LE TG
Blue	Osram	Q8WP LE B

CAUTION



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

4 REACH Compliance

In compliance with the Article 33 provision of the EU REACH regulation we are notifying you that this EVM includes component(s) containing at least one Substance of Very High Concern (SVHC) above 0.1%. These uses from Texas Instruments do not exceed 1 ton per year. The SVHC's are:

Table 4-1. Optical Engine SVHC Components

Component Manufacturer	Component Type	Component Part Number	SVHC Substance	SVHC CAS
Changsung Metal Co Ltd.	Aluminum rod	AL2011	Lead	7439-92-1

5 Revision History

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

Changes from Revision * (November 2019) to Revision A (December 2025)	Page
• Updated HDMI trademark information.....	1
• DLPU092 Changed Luminous flux output from 170 to 165 lm.....	12
• DLPU093 Changed Luminous flux output from 100 to 95 lm.....	12

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
 - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
 - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

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東京都新宿区西新宿 6 丁目 2 4 番 1 号
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3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_02.page

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3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 *EVM Use Restrictions and Warnings:*

4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

4.3 *Safety-Related Warnings and Restrictions:*

4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.

4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

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Last updated 10/2025