



## ABSTRACT

TI's DLP® technology offers the highest resolution available for automotive headlight applications and it's fully programmable. With more than one million addressable pixels per headlight, DLP technology exceeds the resolution of existing adaptive driving beam (ADB) technologies by several orders of magnitude. Automakers and Tier-1 suppliers can use this new programmable ADB solution to maximize brightness for drivers while minimizing the glare of oncoming traffic and reflections from high-gloss traffic signs. DLP technology works with any light source, including LED and laser illumination, and gives designers more precise light distribution on the road, with customizable beam patterns controlled by programmable software. Automakers and Tier-1 suppliers can partially or fully dim individual pixels with this solution, paving the way for the creation of headlight systems that allow drivers to keep their highbeams on in any condition.

The DLP5531-Q1 Electronics Evaluation Module (EVM) allows for evaluation of the DLP5531-Q1 chipset. This module brings together a set of components including the DLP5531-Q1, the DLPC230-Q1, and the TPS99000-Q1 to provide an efficient system for evaluation of high resolution headlight technology. When combined with optics, an input video source, and a computer or other means of control, the evaluation module can be used in a laboratory setting to demonstrate features such as:

- Adaptive Driving Beams
- Glare-Free Beam Steering
- Reflective Traffic Sign Dimming
- Pedestrian Dimming
- Symbol Projection
- OEM Branding



This design incorporates HDMI® technology.

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### Trademarks

DLP® is a registered trademark of Texas Instruments.

All trademarks are the property of their respective owners.

The terms HDMI, HDMI High-Definition Multimedia Interface, HDMI trade dress, and the HDMI Logos are trademarks or registered trademarks of HDMI Licensing Administrator Inc.

## 1 DLP5531-Q1 Electronics EVM Overview

This user's guide presents an overview of the DLP5531-Q1 Electronics EVM and a general description of the main features and functions. It will also provide first steps for getting started as well as a description of system functions and configurations.

### 1.1 What is in the DLP5531-Q1 Electronics EVM

The DLP5531-Q1 Electronics EVM consists of two subsystems:

- **Formatter Board** — Includes the DLP5531-Q1 DMD, the DLPC230-Q1 DMD Controller, and the TPS99000-Q1.
- **Illumination Driver Board** — Includes illumination drivers and provides power to the formatter board.

### 1.1.1 Formatter Board

The formatter board contains the following ports and switches, see [Figure 1-1](#).

**Table 1-1. Formatter Board Ports**

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

(1) Port unused for headlight application. Cable not provided.

**Table 1-2. Formatter Board Switches**

SCHEMATIC REFERENCE / SIGNAL NUMBER	FUNCTION
SW1 (1)	Spread Spectrum Enable Off: Disabled On: Enabled
SW1 (2)	Test Point 2 <b>Must be set to OFF position</b>
SW2 (1)	Host Port Checksum Select Off: CRC On: Checksum
SW2 (2)	Host Interface Select Off: Host SPI On: Host I <sup>2</sup> 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 to the left in <a href="#">Figure 1-1</a>

**Table 1-3. Formatter Board LED Indicators**

SCHEMATIC REFERENCE	FUNCTION
D6 (Green)	Input power to Formatter Board (from LED Driver Board) Off: No power connected On: Power connected
D7 (Green)	PROJ_ON Off: System Off On: System On
D8 (Red)	HOST_IRQ Off: Interrupt not asserted On: Interrupt asserted

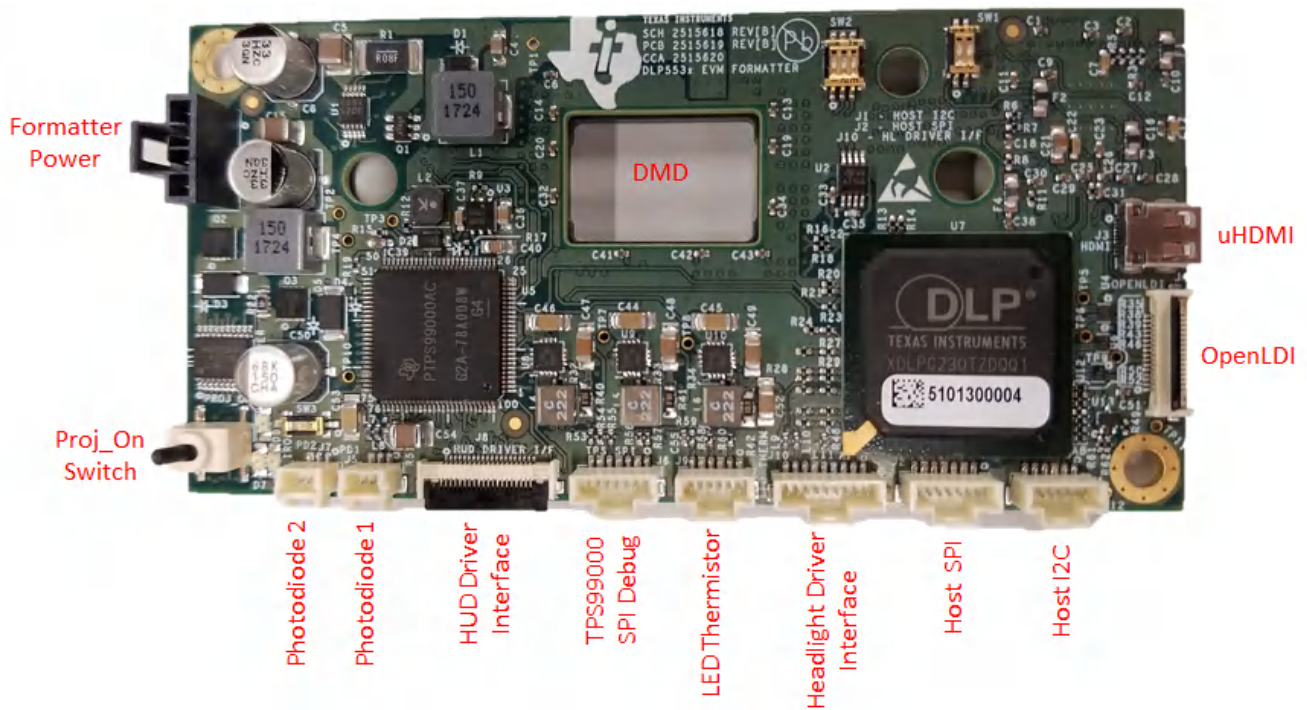


Figure 1-1. DLP5531-Q1 EVM Formatter Board

### 1.1.1.1 LED Driver Board

The headlight LED driver board contains the following ports and switches, see [Figure 1-2](#).

**CAUTION**



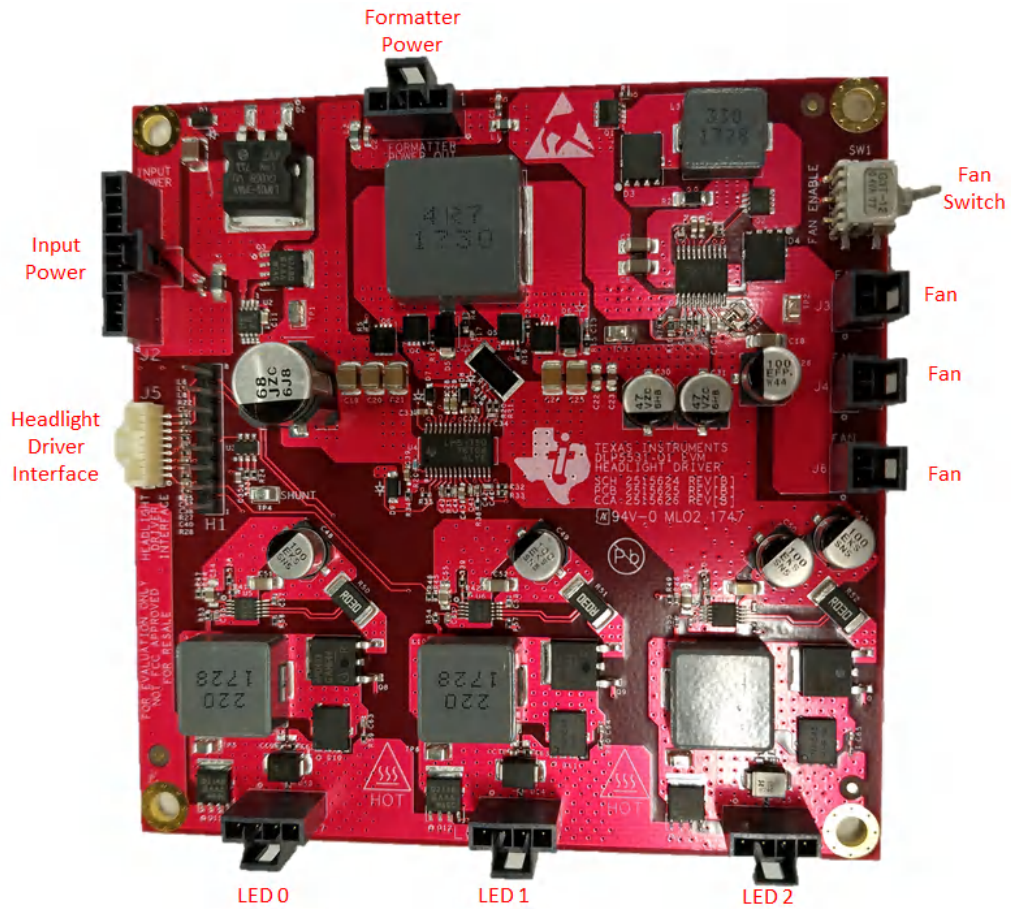
Hot surface. Contact may cause burns. Do not touch!

**Table 1-4. LED Driver Board Ports**

SCHEMATIC REFERENCE	FUNCTION
J1	Formatter Power
J2	Input Power
J3	Fan
J4	Fan
J5	Headlight Driver Interface
J6	Fan
J7	LED 0 - High current output up to 6 A, locking and keyed connector
J8	LED 1 - High current output up to 6 A, locking and keyed connector
J9	LED 2 - High current output up to 6 A, locking and keyed connector

**Table 1-5. LED Driver Board Switches**

SCHEMATIC REFERENCE / SIGNAL NUMBER	FUNCTION
SW1	Fan Enable On position is down in <a href="#">Figure 1-2</a>



**Figure 1-2. DLP5531-Q1 EVM LED Driver Board**



### 1.1.2 Cables

The DLP5531-Q1 Electronics EVM kit contains the following cables, see [Figure 1-3](#).

NAME	REFERENCE	QUANTITY
Cheetah™ SPI Host Adapter	A	1
Host SPI Cable	B	1
Host I <sup>2</sup> C Cable (Includes PROJ_ON, HOLD_BOOT, HOST_IRQ signals)	C	1
Headlight Driver Interface Cable	D	1
LED Power Cable	E	3
Formatter Power Cable	F	1
Input Power Cable	G	1
Micro HDMI Cable	H	1
OpenLDI Flex Cable	I	1
Fan Power Cable	J	3



**Figure 1-3. Cables Included in DLP5531-Q1 Electronics EVM**



## 1.2 Specifications

### 1.2.1 Electrical Specifications

**Table 1-6. Electrical Specifications**

PARAMETER	MIN	NOM	MAX	UNIT
<b>INPUT</b>				
Voltage	8	12	18	V
Power			96	W
<b>LED DRIVER OUTPUT LOAD</b>				
Voltage (Per LED Channel)	3		12	V
Current (Per LED Channel)			6 <sup>(1)</sup>	A
Power (Sum of All LED Channels)			72	W
<b>FAN LOAD</b>				
Voltage		12		V
Current (Sum of All Fan Channels)			1	A
<b>TEMPERATURE</b>				
Operating DMD Temperature <sup>(2)</sup>	-40		105 <sup>(3)</sup>	°C

- (1) 8 A may be used, but care must be taken to ensure that individual components and the PCB do not exceed their maximum temperature.
- (2) Care must be taken to ensure that individual components and PCB do not exceed their maximum temperature when driving high-power load.
- (3) Some components are only rated to 85°C. Refer to [Table 1-7](#) for a list of these components.

### 1.2.2 Component Temperature Ratings

The boards and most of the board components are rated to operate between -40°C to 105°C, including the DLP5531-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 all EVM components which are not rated between -40°C to 105°C are listed in [Table 1-7](#). Please refer to the EVM bill of materials to review the temperature specifications of all components used in the EVM design.

**Table 1-7. EVM Components Which are Not Rated for -40°C to 105°C**

Board	Reference	Part Number	Manufacturer	Description	Temperature Minimum (°C)	Temperature Maximum (°C)
Formatter	D6, D7	LTST-C171KGKT	Lite-On	LED, GREEN 0805	-55	85
Formatter	D8	LTST-C171KRKT	Lite-On	LED, RED 0805	-55	85
Formatter	J3	685119248123	Würth	CONN MICRO HDMI RIGHT ANGLE	-40	85
Formatter	SW1	CVS-02TB	Copal Electronics Inc	SWITCH DIP SLIDE 2-POS 1 MM 6 V	-40	85
Formatter	SW2	CVS-03TB	Copal Electronics Inc	SWITCH DIP SLIDE 3-POS 1 MM 6 V	-40	85
Formatter	SW3	CVS-01TB	Copal Electronics Inc	SWITCH DIP SLIDE 1-POS 1 MM 6 V	-40	85
Formatter	SW4	GT12MSCBE	C&K Comp	SWITCH, SPST, GULL	-30	85
Formatter	U4, U6, U12, U503, U505	PCMF2HDMI2SZ	Nexperia	COMMON MODE CHOKE 4LN SMD ESD	-40	85
Formatter	U504	TFP401AIPZPRQ1	Texas Instruments	IC PANELBUS DVI RCVR 100-HTQFP	-40	85

**Table 1-7. EVM Components Which are Not Rated for –40°C to 105°C (continued)**

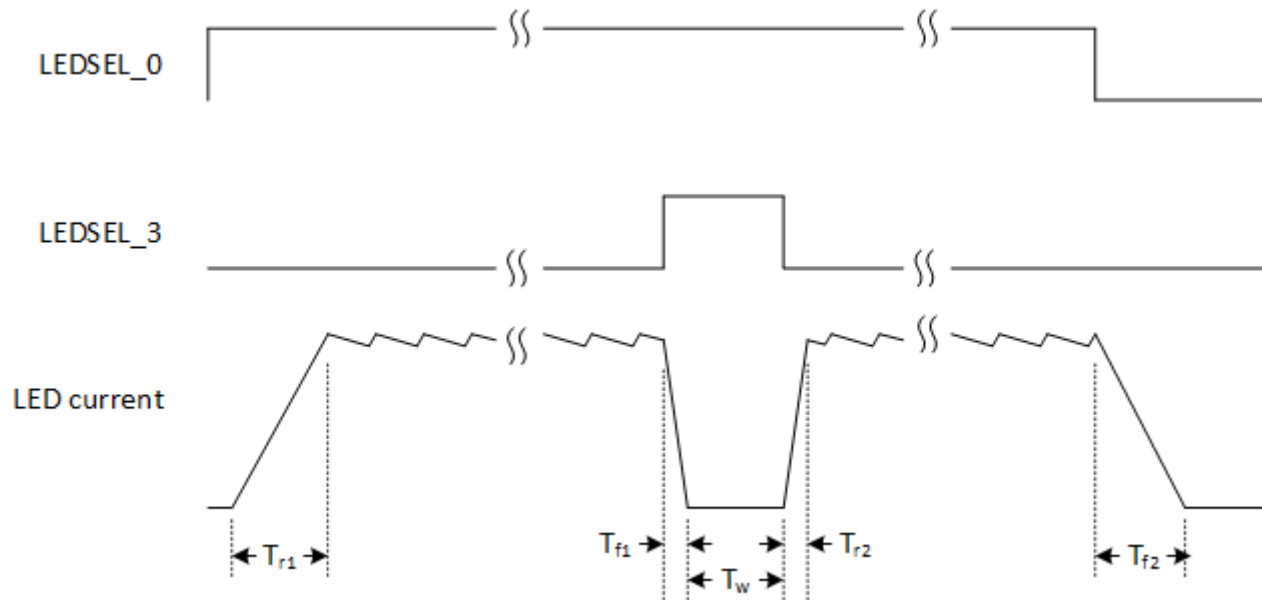
Board	Reference	Part Number	Manufacturer	Description	Temperature Minimum (°C)	Temperature Maximum (°C)
LED Driver	SW1	G3T12AH-R	NKK Switches	SWITCH, SPDT, 28 V, 100 mA	–30	85

The Formatter and LED Driver PCBs have a UL flame rating of 130°C maximum.

The DLP5531-Q1 Electronics EVM is not a production design. It is intended for evaluation only.

### 1.2.3 Driver Requirements

The DLP5531-Q1 chipset, used with LED illumination, requires illumination modulation. This illumination modulation turns off the light output during micromirror reset, which improves system contrast. For the system timing specifications of the DLP5531-Q1 Electronics EVM, see [Figure 1-4](#).


**Figure 1-4. DLP5531-Q1 Electronics EVM LED Driver Board Timing Specifications**

The timing specifications are shown in [Table 1-8](#).

**Table 1-8. LED Driver Board Timing Specifications**

PARAMETER	VALUE
$T_{r1}, T_{f2}$	<50 $\mu$ s
$T_{f1}, T_{r2}$	<2 $\mu$ s
$T_w$	minimum = 1 $\mu$ s

### 1.2.4 Video Specifications

The following resolutions are programmed in the Extended Display Identification Data (EDID). Some video sources may not support all resolutions.

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

The input source specifications in the EDID of the EVM are outlined in [Table 1-9](#).

**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

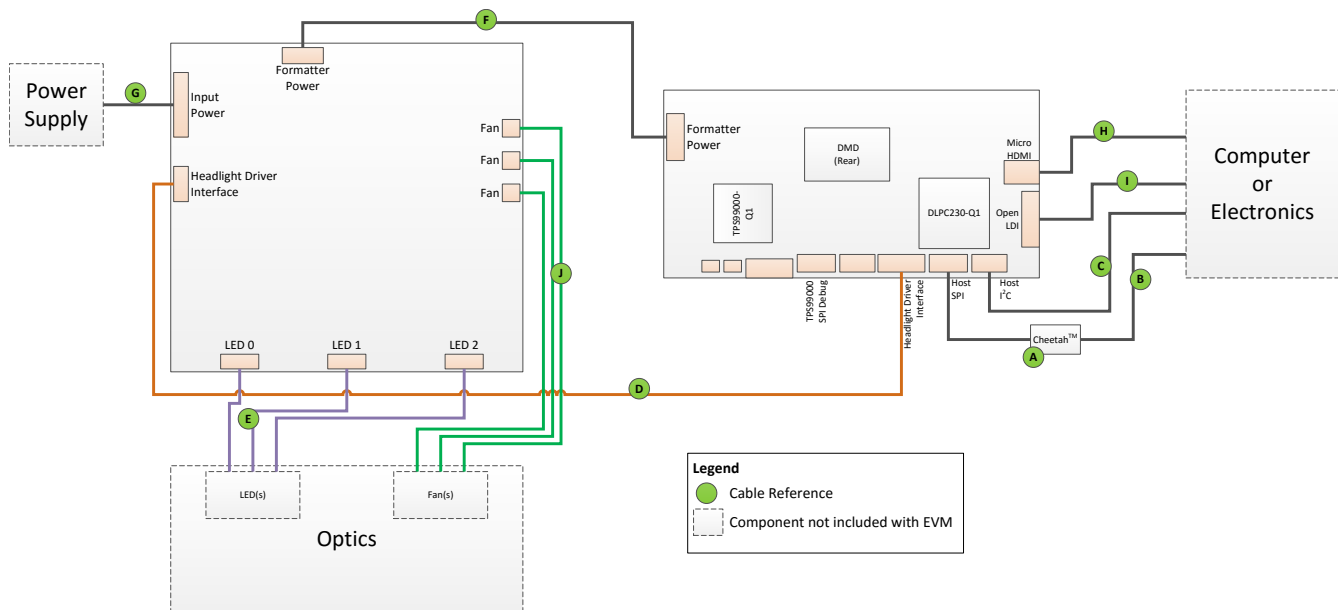
## 2 Quick Start

Use the following instructions to setup your DLP5531-Q1 Electronics EVM and PC.

### 2.1 Kit Assembly Instructions

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

1. Connect the Headlight Driver Interface cable to the Formatter Board (J10) and the LED Driver Board (J4).
2. Connect the Host SPI cable to the Formatter Board (J2) and the Cheetah adapter. Connect the Cheetah adapter's USB cable to PC.
3. Connect the Formatter Power cable to the Formatter Board (J11) and the LED Driver Board (J1).
4. Connect the LED power cable to any of the LED Driver Board LED ports (J7, J8, J9). Note that some ports may be disabled by flash setting. LED 0 (J7) is used by default.
5. Connect the Fan Power cable to any of the LED Driver Board fan ports (J3, J5, J6). Confirm the fan switch on the LED Driver Board (SW1) is in the ON position.
6. Connect the Micro HDMI cable to the Formatter Board (J3). Connect the Micro HDMI cable to PC HDMI port.
7. Connect the Power Input cable to the LED Driver Board (J2).



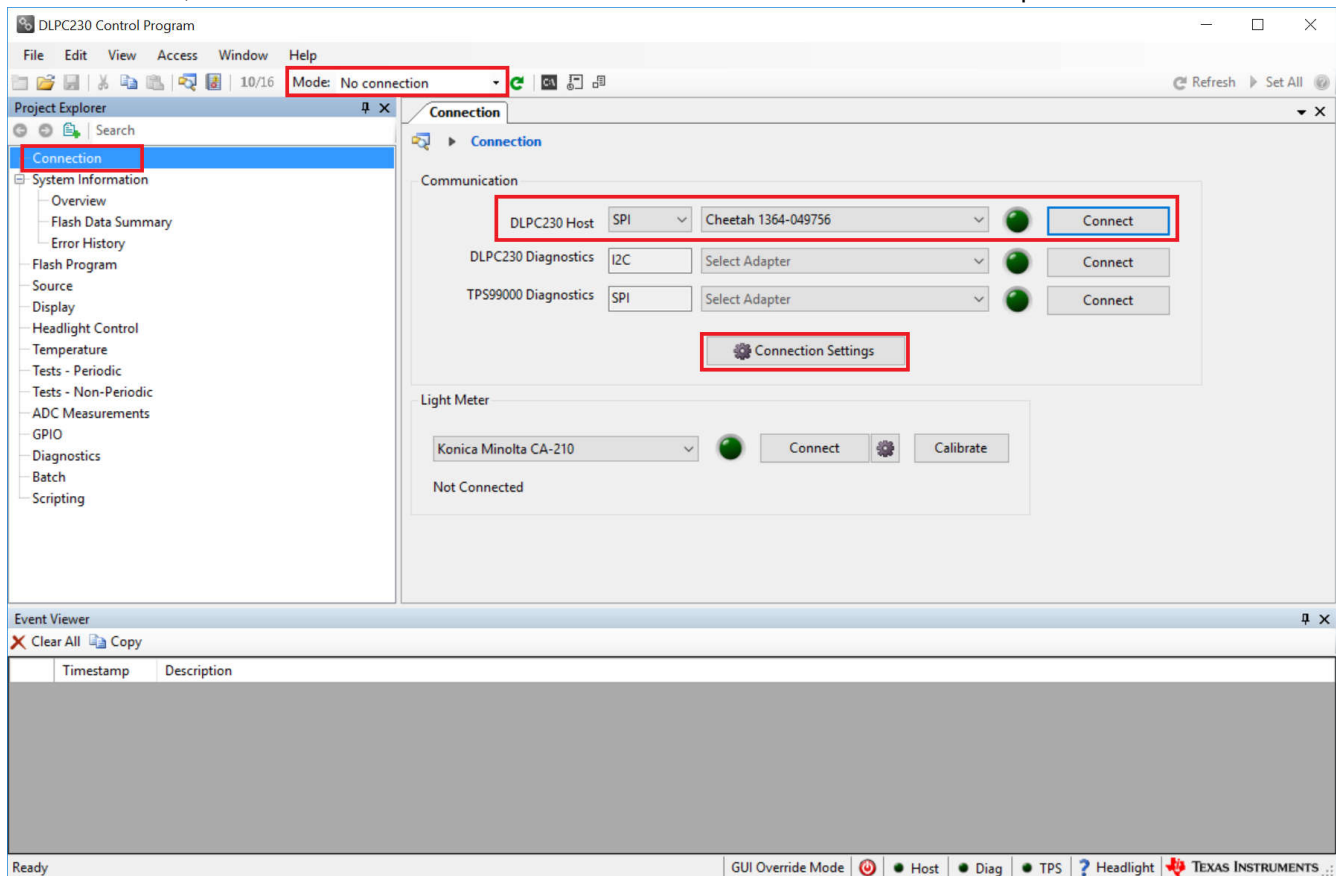
**Figure 2-1. Cable Connections**

## 2.2 Power-Up

1. Connect input power cable to a power supply that meets input power specifications defined in [Section 1.2](#). The red cable for the V+ terminal and black cable for the V– terminal.
2. Turn on the supply power. Once powered up, a Formatter Board LED indicator (D6) should illuminate green.
3. Turn the PROJ\_ON switch (SW4) ON. The ON position is towards the perimeter of the board, and OFF is towards the DMD. A Formatter Board LED indicator (D7) should illuminate green.

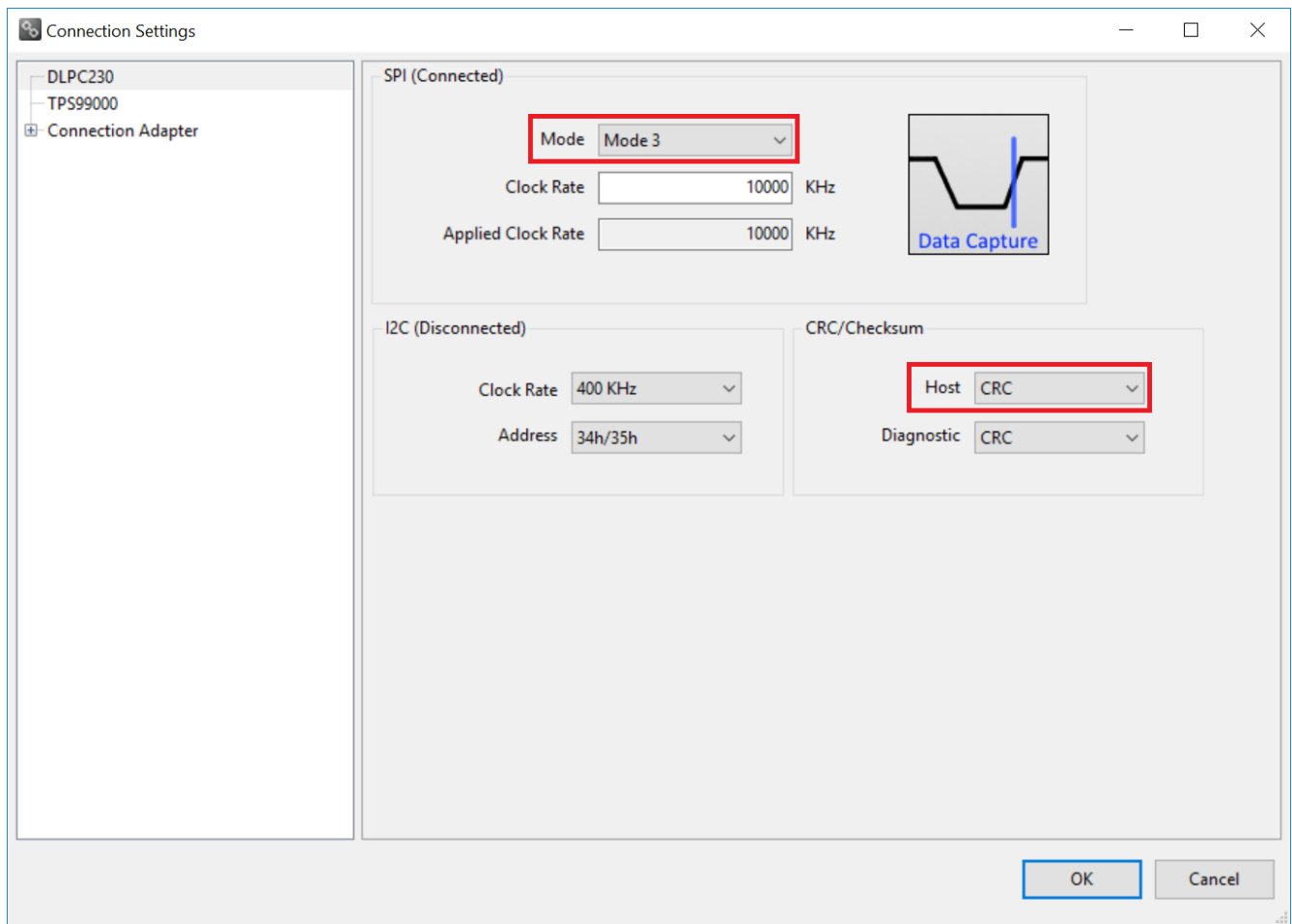
### 2.2.1 Software Setup

1. Download and install the DLPC230-Q1 Control Program (<https://www.ti.com/mysecursoftware>).
2. Install Total Phase Cheetah USB adapter (<http://www.totalphase.com/products/usb-driverswindows>).
3. Use the DLPC230-Q1 Control Program to connect to the system using the Cheetah USB to SPI adapter and turn the system on.
4. To connect, set the DLPC230-Q1 Host to SPI and select the Cheetah from the drop down menu.



**Figure 2-2. Connecting to the DLPC230-Q1 Device Using the DLPC230-Q1 Automotive Control Program #1**

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



**Figure 2-3. Connecting to the DLPC230-Q1 Device Using the DLPC230-Q1 Automotive Control Program #2**

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

### 3 LED Driver

Section 1.2 defines the LED driver load specifications.

The LED brightness can be controlled through PWM output from the DLPC230-Q1. Using the DLPC230-Q1 Automotive Control Program "Headlight Control" tab, the PWM slider bars (PWM0, PWM1, and PWM2) control the current through each LED driver channel. Note that the PWM control may exceed the maximum current specification of some LEDs in certain LED configurations. Table 3-1 provides reference conversions from PWM level to drive current for commonly used current levels.

**Table 3-1. LED PWM Drive Current Conversion Reference**

PWM LEVEL	DRIVE CURRENT (A)
0	See <sup>(1)</sup>
256	2
512	4
768	6
1024	8

- (1) Some current will continue to flow through the LED with a PWM level of 0 and light output may still be visible. To fully remove LED current, the system must be set to standby mode.



## **4 Optics and Mechanics**

Optics and mechanics are not included in the DLP5531-Q1 Electronics EVM.

The EVM includes a heat sink and thermal pad, which are attached to the LED driver board. A DMD heatsink is recommended, but is not included in the DLP5531-Q1 Electronics EVM.

## 5 Programming Flash Steps

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.

## 6 SPI & I<sup>2</sup>C Timing

For more information on SPI and I<sup>2</sup>C specifications, see the DLPC230-Q1 data sheet.

## 7 Revision History

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

<b>Changes from February 28, 2020 to November 30, 2025 (from Revision A (February 2020) to Revision B (November 2025))</b>	<b>Page</b>
• Added HDMI trademark information.....	<a href="#">3</a>

## 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/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/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。

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3.3.3 *Notice for EVMs for Power Line Communication:* Please see [http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_02.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page)

電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。 <https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html>

#### 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.

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- 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.
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