DLP® LightCrafter™ Display 3010 EVM User's Guide

Topic Page

1 DLP® LightCrafter™ Display 3010 EVM Overview

This user's guide presents an overview of the DLP® LightCrafter™ Display 3010 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 push buttons function, the on board LEDs, and the main connectors. It will give the user a successful start with his first DLP LightCrafter Display 3010 evaluation module.

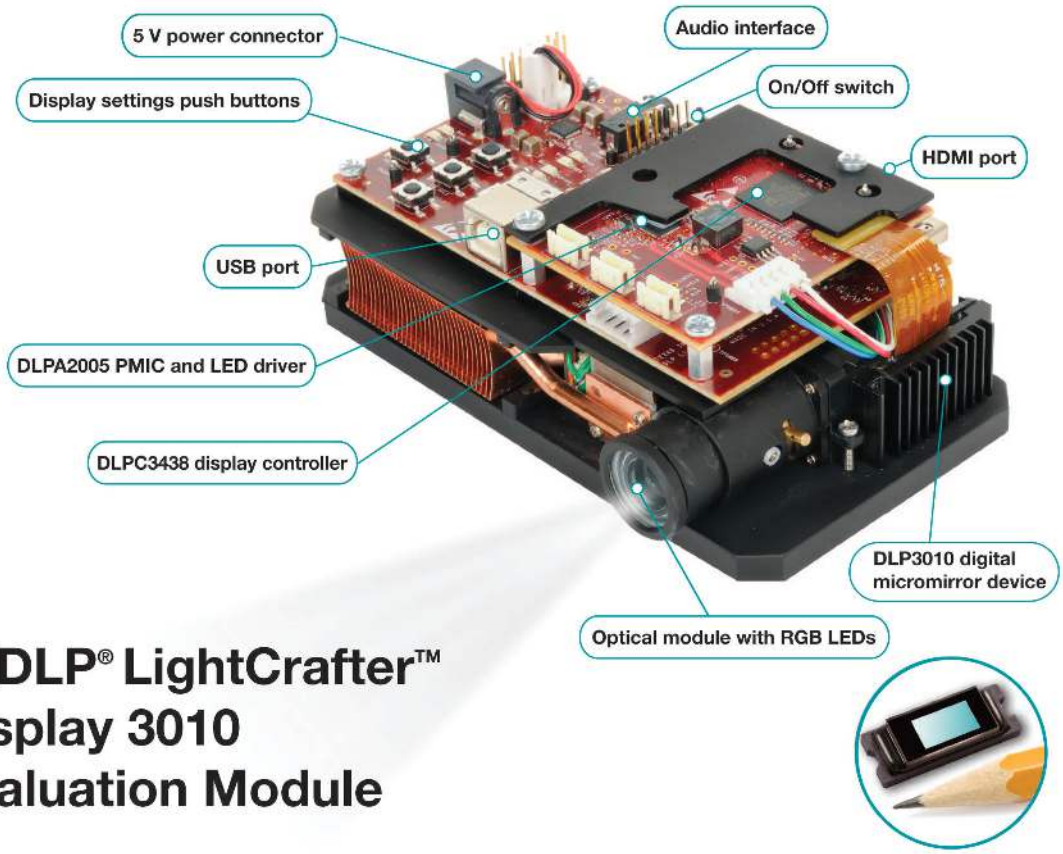

Figure 1. DLP LightCrafter Display Complete EVM

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 3010 EVM and are available at TI.com (www.ti.com).

- DLP3010 (0.3 720p) DMD data sheet (DLPS051)
- DLPC3438 controller data sheet (DLPS035)
- Software Programmer's Guide (DLPU020)
- 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.

3 What is in the LightCrafter Display 3010 EVM?

The DLP LightCrafter Display module consists of three subsystems:

- Light engine – includes the optics, red, green, and blue LEDs, and a 1280 × 720 (720p) DMD capable of 300 lumens out-of-the-box.
- Driver board – includes the DLP chipset comprising of DLPC3438 Controller and DLPA2005 PMIC/LED driver.
- System board – includes MSP430, ITE HDMI receiver, USB-Serial Bridge controller and several connectors for external inputs (HDMI, USB, etc.)

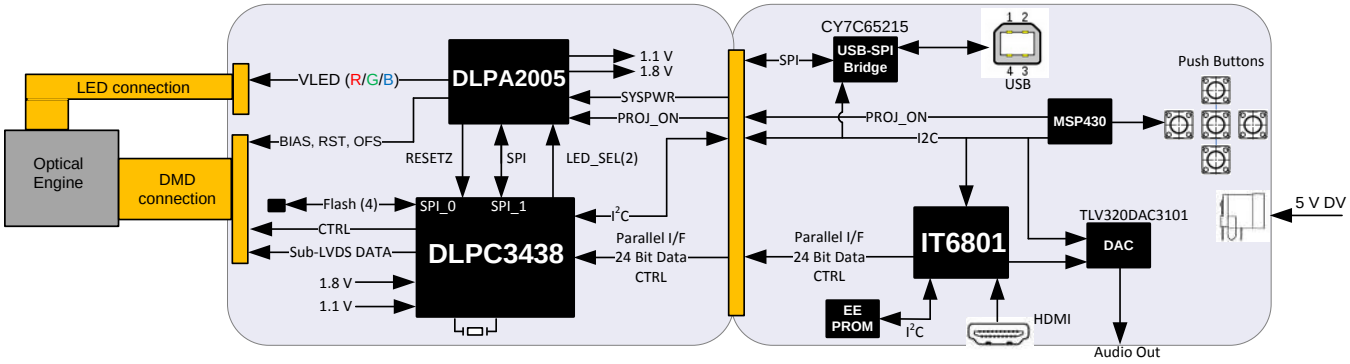

Figure 2. DLP LightCrafter Display EVM Block Diagram

4 Light Engine

The optical engine in the EVM is developed by eProtech and is production ready.

The light engine consists of the following components:

- 0.3-inch 720p DMD (DLP3010)
- OSRAM red, green and blue LED

Table 1. Optical Engine Specifications

PARAMETER	MIN	TYP	MAX	UNIT
Brightness		125		Lum
LED Current		2.4		A
Brightness Uniformity	75%			
Throw Ratio		1.2		
Offset		100%		
Focus Range	5		50	inch
Image Diagonal Size	5		50	inch

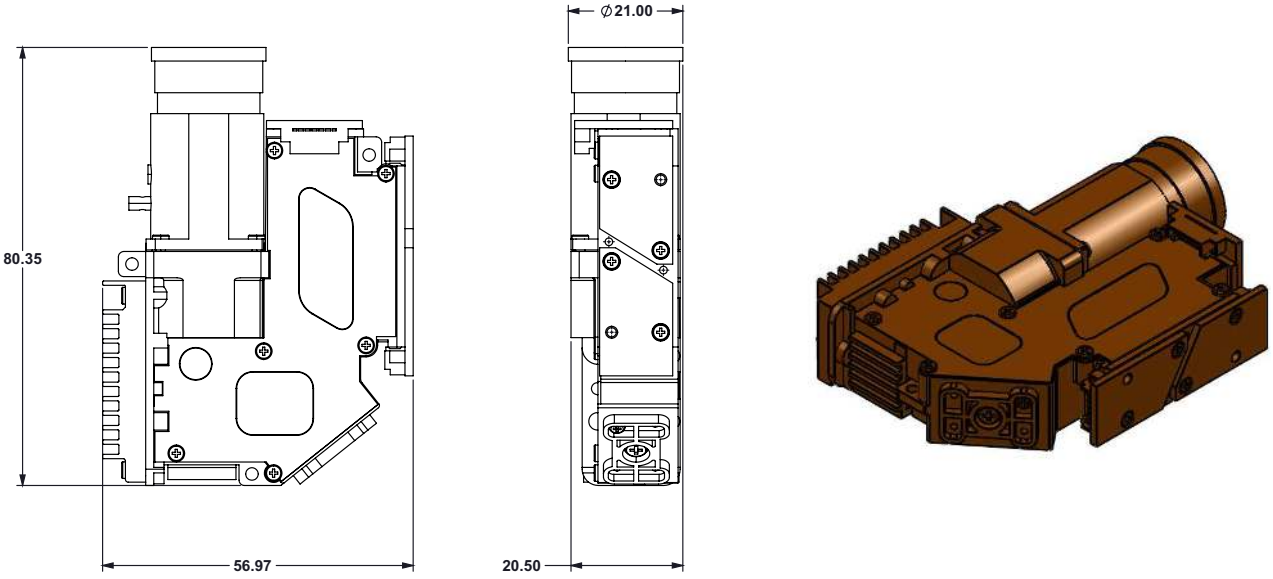

Figure 3.

5 Quick-Start Procedure

This quick-start assumes default conditions as shipped.

1. Power up the DLP LightCrafter™ Display 3010 EVM by applying an external DC power supply (5 V DC, 3.0 A) to the J12 connector. Note: Use an AC-DC switching power supply which accepts 50-60Hz 100-240 VAC inputs, and outputs a nominal 5 VDC at maximum 3-A output current. The PWRON (D16) and SYSPWR (D15) LED will turn on to indicate that 5-V power is applied.
2. Move the SW_ONOFF switch to the ON position to turn on the DLP LightCrafter Display 3010 EVM. When the LightCrafter Display 3010 EVM is turned on, the PROJ_ON LED will turn on.
3. After the DLP LightCrafter Display 3010 EVM is turned on; the projector will default to displaying a DLP LightCrafter Display splash image.
4. The focus of the image can be adjusted on the optical engine.

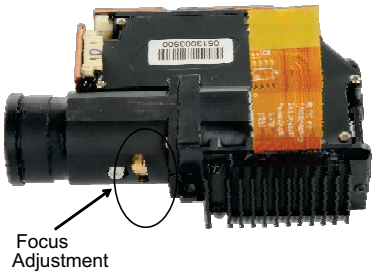

Figure 4. Optical Engine with Focus Adjustment

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 over the GUI software.
6. When turning off the projector, turn off the SW_ONOFF switch prior to removing power cable. Note: To avoid potential damage to the DMD, it is recommended to turn off the projector with the SW_ONOFF before disconnecting the power.

There are ten indicator LEDs on the DLP LightCrafter Display 3010 EVM, and they are defined in Table 2:

Table 2. LEDs on the DLP LightCrafter Display 3010 EVM

LED Reference	Signal Indication	Description
D15	SYSPWR	5-V power applied
D16	PWRON	Regulated 3V3 power on
D7	PROJ_ON	On when Projector is turned on via SW_ONOFF
D6	RESETZ	OFF when Projector is turned on vie SW_ONOFF
D5	HOST_IRQ	ON during DLPC3438 boot OFF when projector is running. Indication of DLPC3438 boot-up completed and ready to receive commands
D9	MSP2	ON when HDMI cable plugged in, and external video detected. OFF when external video is not detected.
D8	ACK	ON when Cypress CY3420 is I2C master OFF when MSP430 is I2C master
D10	REQ	ON when Cypress CY3420 requests the MSP430 to give Cypress master control of the I2C bus
D12	GPIO1	Blinking when PC is communicating to flash over SPI
D14	GPIO0	Blinking when PC is communicating to DLPC3438 over I2C

6 Circuit Description

6.1 Connectors, Switch, and Push Buttons on Main Board

Table 3. Installed Connectors on Main Board

INSTALLED CONNECTORS/HEADERS	DESCRIPTION
J12	Connector for 5-V external power supply interface
J7	Connector for USB cable
J2	Connector for Audio
J4	Connector for HDMI input
J1	MSP430 JTAG Programming interface connector
J13	Connector for the I^2C interface (DevaSys box)
J6	60-pin connector for DLP LightCrafter Display board
J10	Header for 5-V DC power
J11	Header for 5-V DC power
J3	Unsupported
J5	Unsupported

Table 4. Installed Push Buttons and Switch on Main Board

INSTALLED SWITCHES/PUSH BUTTONS	DESCRIPTION
SW1	Projector ON/OFF Switch
PB-UP1	Source Selection • First press: TPG • Second press: HDMI input • Third press: Splash screen
PB-SEL1	Cycle through displaying 7 curtain colors
PB-DOWN1	Flip image N/S or E/W
PB_LEFT1	Cycle 9 different TPG patterns after TPG source selected Cycle 4 different Splash screens after Splash source selected Change of Volume when HDMI input is selected
PB_RIGHT1	Change LED current total 7 steps Change of Volume when HDMI input is selected

6.2 Connectors on DLP LightCrafter Display Board

Table 5. Installed Connectors on the DLP LightCrafter Display Board

INSTALLED SWITCHES/PUSH BUTTONS	DESCRIPTION
J1	Connector for the DMD flex cable
J2	Connector for LED cable
J3	Connector for external temperature sensor (Requires removing R21)
J4	Connector for light sensor
J5	Future use
J6	60-pin connector for DLP LightCrafter Display board

7 EVM Setup

The DLP LightCrafter Display 3010 EVM is composed of three parts:

- Main board
- DLP LightCrafter Display board
- Engine with LED connection and Flex cable

The main board contains the connector for the power supply, a USB connector to communicate to the DLP LightCrafter Display software, HDMI, audio, and the connector for the DLP LightCrafter Display board. The main board also contains a switch to turn on the projector in case the DLP LightCrafter Display board and the engine are connected. Figure 5 shows the main connectors on the main board.

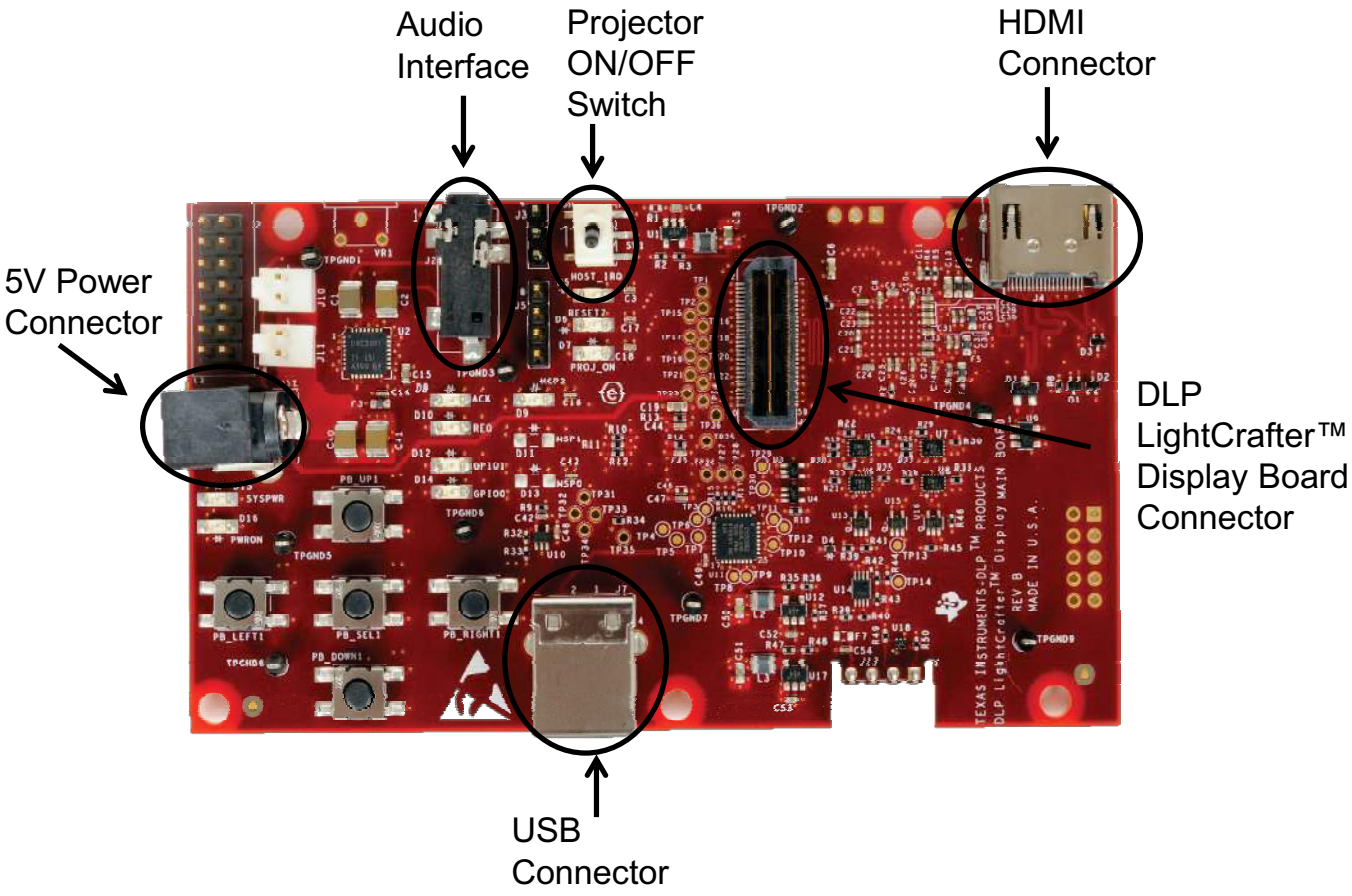

Figure 5. DLP LightCrafter Display Main Board

The DLP LightCrafter Display board has three main connectors: the LED connector, the Flex cable connector, and the main board connector. To connect the main board to the DLP LightCrafter Display board, refer to Figure 6. Note that the main board connector on the DLP LightCrafter Display board is on the bottom, while the LED and Flex cable connectors are on the top.

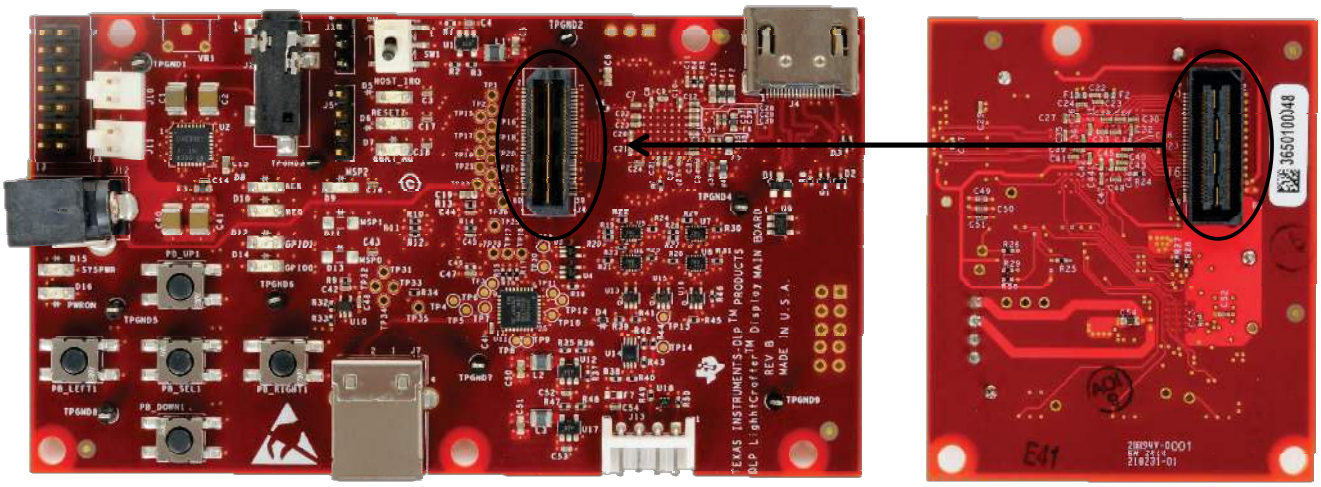

Figure 6. Connection Main Board and DLP LightCrafter Display Board

The board itself and how it connects to the main board is shown in Figure 7.

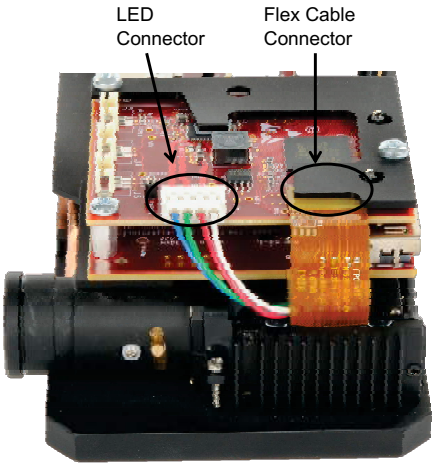

Figure 7. DLP LightCrafter Display

TA LED adapter board is connecting the three LEDs with the LED connector on the DLP LightCrafter Display board. The different connectors for each LED are named on the board as well as on the light engine. Refer to Figure 8 to see the proper setup.

Ensure a good connection of the flex cable to the DLP LightCrafter Display board before turning it on.

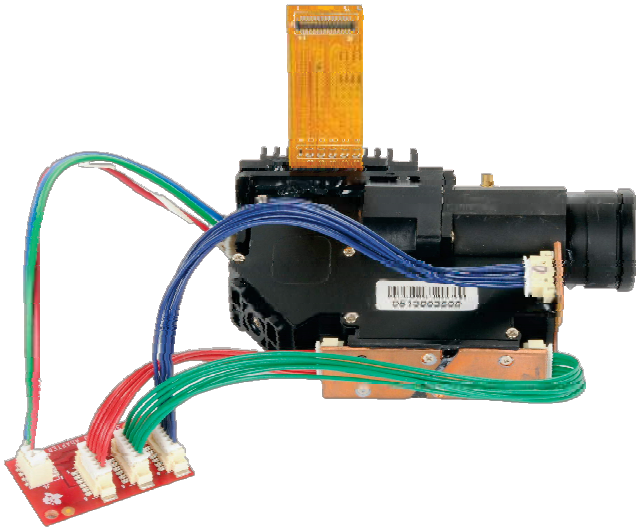

Figure 8. LED Connection

Figure 9 shows the final setup of all parts.

Figure 9. DLP LightCrafter Display Complete EVM

Ensure that everything is setup correctly before continuing! Verify that the flex cable is connected correctly to the LightCrafter Display board.

Revision History

Changes from A Revision (January 2015) to B Revision	Page
• Updated block diagram	3
• Updated Throw Ratio in Table 1	4

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      3.1.1 *Notice applicable to EVMs not FCC-Approved:*

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- *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*

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This device complies with Industry Canada license-exempt RSS standard(s). 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.

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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.

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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

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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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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265