AM335x Industrial Communication Engine (ICE) EVM HW User Guide

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Introduction

This document provides the design information on the AM335x processor based ICE EVM (TMDXICE3359) to the users. ICE stands for Industrial communications Engine. This EVM can be used to evaluate industrial communication protocols based on AM335x.

Description

The low-cost ICE EVM can be used for evaluation and development of industrial communication type applications. It has been equipped with a TI AM3359 processor and a defined set of features to allow the user to experience specifically industrial communication solutions using serial or Ethernet based interfaces. It is not intended as a generic development platform as some of the features and interfaces supplied by the AM335x are not accessible from the ICE board. Using standard interfaces, the ICE board may interface to other processors or systems and act as a communication gateway in this case. In addition it can directly operate as a standard remote I/O system or simple sensor connected to an industrial communication network. The embedded emulation logic allows emulation and debug using standard development tools such as TI's Code Composer Studio by just using the supplied USB cable.

It is not intended for use in end products. All of the design information is freely available and can be used as the basis for the development of an AM335x based product.

EVM System View

The ICE EVM board has dimensions of 3.550" x 2.750 ". The Top and the Bottom side views of the AM335x ICE 1.0 EVM are shown in the pictures provided below.

Top view

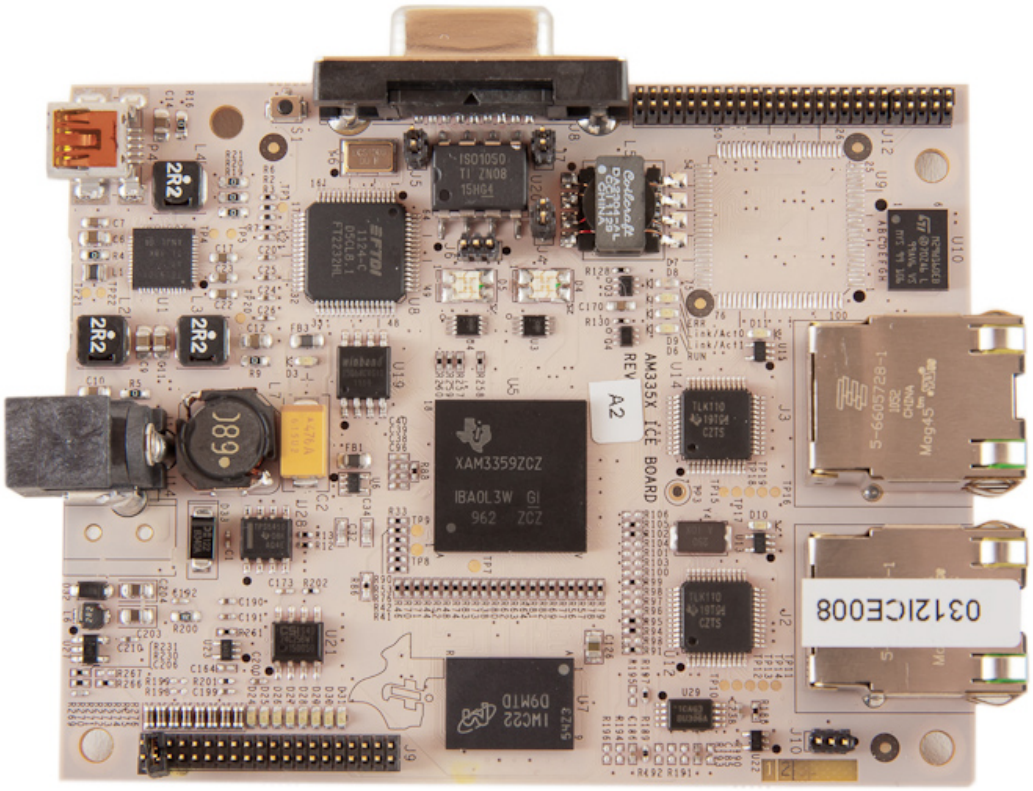

Figure 1: AM335x ICE 1.0 EVM Top view

Bottom view

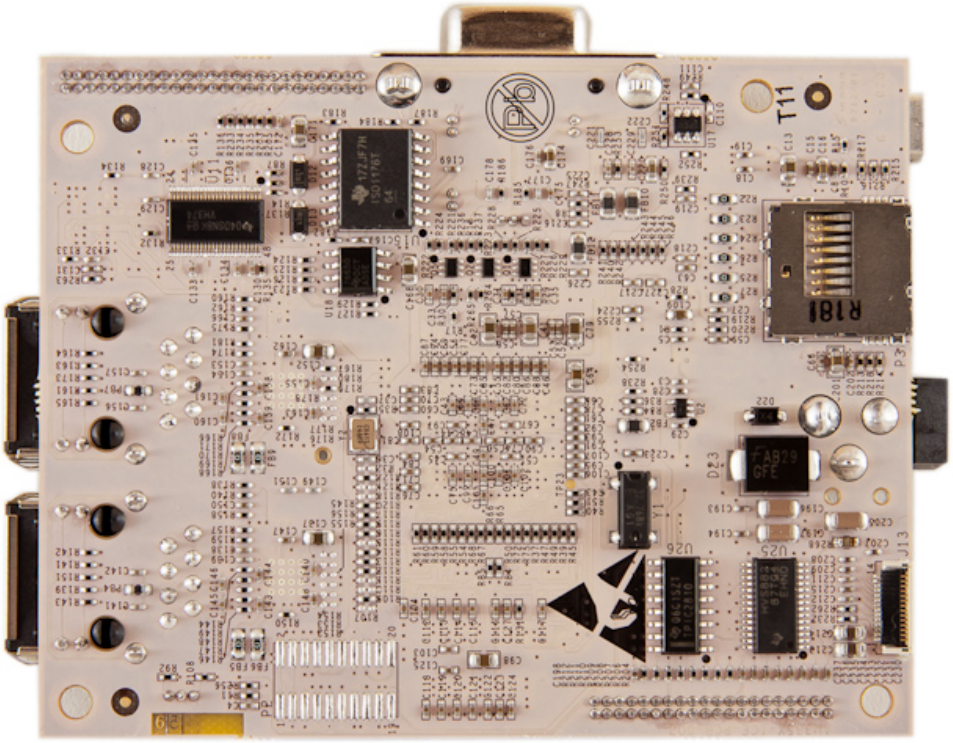

Figure 2: AM335x ICE 1.0 EVM Bottom View

Schematics/Design Files

- HW Documentation [1] - Schematics, Design Files, and other related HW Documentation

Functional Block Diagram of AM335x ICE 1.0 EVM

AM335x ICE V1.0 EVM Functional Block Descriptions

This section describes about the major functional blocks of the AM335x ICE V1.0 EVM System. The Functional block diagram of the AM335x ICE 1.0 EVM is shown below.

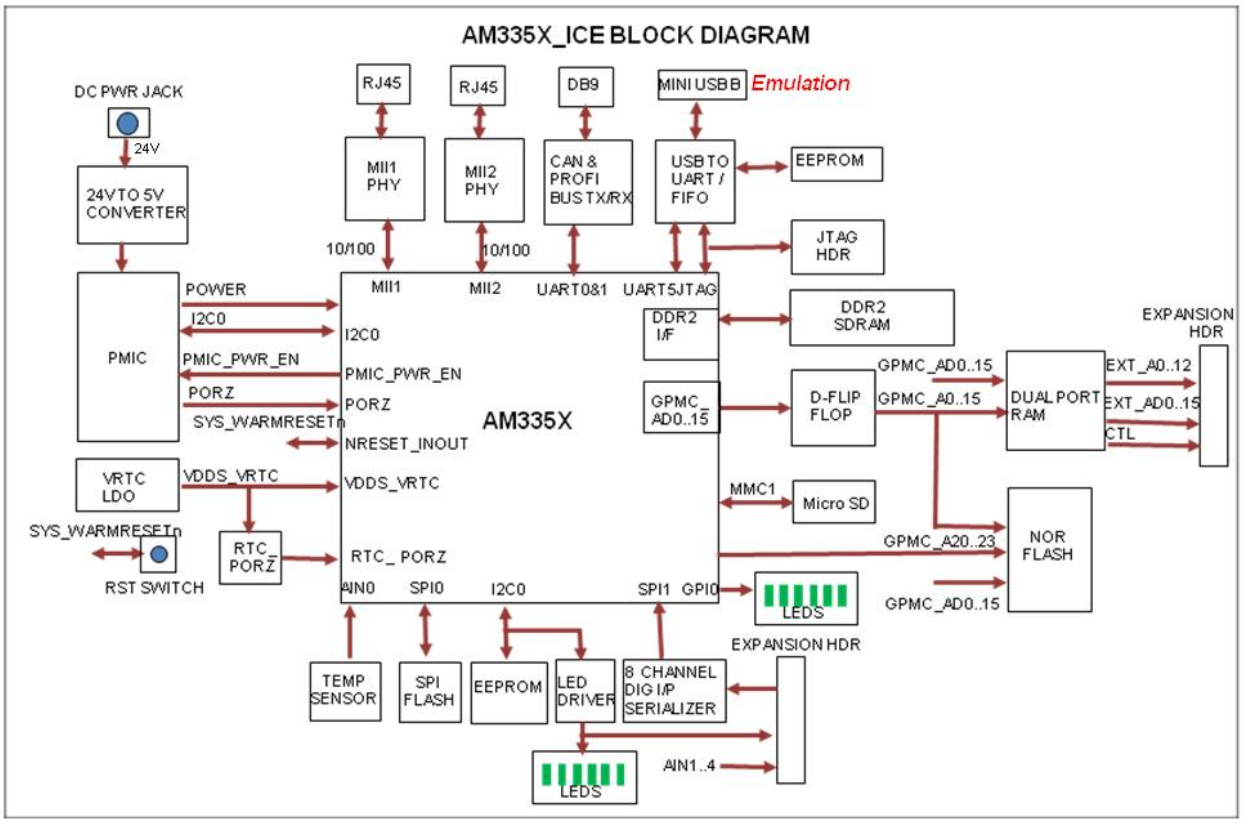

Figure 3: AM335x ICE 1.0 EVM Block Diagram

Processor

The AM3359ZCZ processor is the central processor for this EVM. All the resources on the board surround the AM3359 processor to provide development capabilities for hardware and software. See the AM3359 datasheet and TRM for the details about the processor.

There are system configuration signals, SYSBOOT, that can be set on the EVM to define some startup parameters on the AM335x processor. See the Configuration/Setup section later for more details.

Clocks

The main clock for the processor is derived from a 24MHz crystal. An on-board oscillator in the AM3359 generates the base clock and subsequent module clocks as needed within the AM3359 processor. A 32kHz clock for the RTC on the AM3359 is derived from a 32kHz crystal on board.

Reset Signals

SYS_RESETn is a signal running to several peripherals and AM335x which performs a reset on those peripherals. SYS_WARMRESETn is asserted by a pushbutton on the base board and is used to force a reset of the AM335x. AM335x can also pulldown on the RESET_INOUTn signal to cause the SYS_RESETn line to go active.The RTC_PORZ reset signal for the RTC section is derived using AND Gates.

Power

The power input to the board is from a 24V Power Supply. The 24V power input is converted into 5V to provide power input to the Power Manager TPS65910. The power requirements of the processor are taken care of by the Power Manager IC TPS65910. The Power ON LED "D3" is ON if the VBAT power input to the PMIC is available. The power sequencing requirements of the AM335X processor (see the AM335x datasheet) are handled automatically by the TPS65910A PMIC.

Power Management IC

The AM335x ICE V1.0 EVM uses the TPS65910A power management IC. The I2C0 on AM335x is used to control the TPS65910A PMIC. For AM335x, the following power supplies from the TPS65910A are used.

TPS65910 Power Supply	AM335x Power Rail	Voltage
VAUX2 (300mA)	VDDSHV1,3,5,6 (300mA)	3.3V (rails that are 3.3V)
VMMC (300mA)	VDDSHV4 (60mA) & VDDSHV2	3.3V
VDD2 SMPS (1500mA)	VDD_CORE (1000mA)	1.1V
VDD1 SMPS (1500mA)	VDD_MPU (1500mA)	1.2V
No supply needed	VDD_RTC	1.1V
VRTC	VDDS_RTC (10mA)	1.8V
VIO_SMPS (1000mA)	VDDS_DDR (200mA)	1.8V (or 1.5V for DDR3)
VIO_SMPS (1000mA)	DDR_VREF (10mA)	0.9V
VDAC (150mA)	VDDS (100mA)	1.8V
VDIG2 (300mA)	VDDS_SRAM_CORE_BG (40mA)	1.8V
VDIG2 (300mA)	VDDS_SRAM_MPU_BB (40mA)	1.8V
VDIG2 (300mA)	VDDS_PLL_DDR (25mA)	1.8V
VDIG2 (300mA)	VDDS_PLL_CORE_LCD (25mA)	1.8V
VDIG2 (300mA)	VDDS_PLL_MPU (25mA)	1.8V
VDIG2 (300mA)	VDDS_OSC (10mA)	1.8V
VAUX1 (300mA)	VDDA1P8V_USB0/1 (50mA)	1.8V
VAUX33 (150mA)	VDDA3P3V_USB0/1 (10mA)	3.3V
VAUX33 (150mA)	USB_VBUS0/1	3.3V
VPLL (50mA)	VDDA_ADC	1.8V

VDD3 SMPS (100mA)	Not Used	-
VIO_SMPS (1000mA)	DDR2 SDRAM (320mA)	1.8V

Table 1: AM335x Power supplies from TPS65910A

Configuration/Setup

Boot Configuration

Various boot configurations can be set using the pull up / down resistor combinations provided on the SYS_BOOT pins (LCD_DATA0..15).Boot configuration pins are latched upon de-assertion of PORz pin. The 3 pin Jumper J10 is used to select the Boot mode sequences as below.

Sysboot(4..0)	AM335x Boot Sequence
11011	XIP w /WAIT (MUX2), UART0, SPI0, MMC0
11001	SPI0, MMC0, EMAC1, UART0

This jumper is used to select between the XIP w /WAIT (MUX2) and the EMAC1 boot options.

I2C Port Address Assignments

Information on I2C address assignments are provided below.

AM335x ICE V1.0 EVM Function	AM335x I2C Port	Address
Baseboard ID memory	I2C0	0x50
AM355x PMIC Control	I2C0	0x2D

Table 2:I2C Bus Addresses

JTAG

The ICE V1.0 EVM supports embedded XDS100V2 USB Emulation through the mini USB-B connector. It also has an optional 20 pin TI JTAG connector to support the Emulation.

Memories Supported

The ICE V1.0 EVM supports on-board memories like DDR2SDRAM, NOR Flash, SPI Flash and Board ID EEPROM. It also supports an SD card socket.

DDR2 SDRAM

The ICE design supports upto 2Gbit (128M x16) of DDR2 SDRAM memory. The Part number for the DDR2 SDRAM memory used is MT47H128M16RT-25E:C. The package used is an 84 ball FBGA package. The locations available for this memory are from 0x8000_0000 to 0xBFFF_FFFF (1GB).

SPI Flash

A 64Mbit, W25Q64 SPI Flash is used in this design. SPI Flash Boot is enabled through this Flash. This flash is connected to the SPI0 port of the processor.

NOR Flash

The ICE V1.0 EVM supports a 16 Mbit (1M x16)Flash Memory from ST (M29W160EB70ZA6E) in a TFBGA48 package. The GPMC port of the AM335x is used to interface with the Flash. A D- flip flop (SN74ALVCH16374DGV) provides the GPMC Address (0..15) interface required by the NOR Flash from the GPMC_AD bus. The locations available for this memory are from 0x0000_0000 to 0x1FFF_FFFF(512 MB).

Board Identity Memory

The board contains a 256 Kb serial EEPROM that contains board specific data which allows the processor to automatically detect which board is connected and the version of that board. Other hardware specific data can be stored on this memory device as well. The part number of the memory device is CAT24C256WI-GT3. See the Configuration/Setup section for details on the data in this memory.

SDMMC1

The SDMMC1 connector is a card socket SCHA5B0200. This is a standard SD/MMC Card type of connector. It is connected to the MMC1 port of the AM335x processor. Check the AM335x data sheet and TRM for supported card types/densities. The Pin assignment is as given below.

Pin No	Memory Card PIN No.
uSD#1	DAT2
uSD#2	CD/DAT3
uSD #3	CMD
uSD #4	VCC
uSD #5	CLK
uSD #6	GND
uSD #7	DAT0
uSD #8	DAT1
uSD #9	GND
uSD #10	CD
uSD #11	GND_SD
uSD #12	GND_SD
uSD #13	GND_SD
uSD #14	GND_SD
uSD #15	GND_SD
uSD #16	GND_SD

Table 3: SDMMC1 Connector Pin Details

10/100 Ethernet PRU Controlled Ports

The ICE V1.0 EVM has two 10/100 Ethernet transceivers (TLK110) interfaced to connectors J2 & J3 . These Ethernet transceivers are connected to the PRU0 & PRU1 units within the AM335x. The reset for the transceivers are driven by the board system reset SYS_RESETn. A 25MHz crystal drives the clock signal for the TLK110. The PHYAD pins are left unconnected for setting the PHY's address on the PRU0 Ethernet so it is by default 0x01. The PHYAD pins on the PRU1 Ethernet are set to 0x02 using pull up / pull down resistors on the PHYAD pins.

Pin No	Signal Name	Description
1	ETHER0_RDP	Ethernet Data Rx Positive
2	ETHER0_RDN	Ethernet Data Rx Negative
3	V3_3D_PRUETH0JCK	Power
4	V3_3D_PRUETH0JCK	Power
5	ETHER0_TDP	Ethernet Data Tx Positive
6	ETHER0_TDN	Ethernet Data Tx Negative
7	NC	No Connect
8	GND	Ground
D1	LINK LED Power	Power
D2	LINKLED	Link LED Signal
D3	Active LED Power	Power
D4	ACTLED	Active LED Signal

Table 4: 10/100 PRU Ethernet1 Pin Details

USB

Mini USB-B connector port is connected to the upstream port of the USB to UART converter IC (FT2232L) . This is used for USB to JTAG and USB to UART conversion applications. This USB port can also be used for XDS100V2 emulation .

Pin No	Signal Name	Description
1	USB_DC	USB BUS VOLTAGE
2	USB_DM	USB DATA MINUS
3	USB_DP	USB DATA PLUS
4	USB_ID	USB IDENTIFICATION
5	DGND	Ground

Table 5: USB

CAN/PROFIBUS

The ICE V1.0 EVM has a DB9 female connector for the PROFI/CAN Bus Interfaces (J8) . PR1_UART0 port of AM335x is used for interfacing with the PROFIBUS transceiver ISO1176T & DCAN0 port of the AM335x is used for interfacing with the CAN bus transceiver ISO1050.

Pin No	Signal Name	Description
1	Reserved	Upgrade Path
2	CAN_L	Dominant Low
3	CAN_GND	Ground
4	Reserved	Upgrade Path
5	PROFI_GND	PROFIBUS Ground
6	VPROFI_DB	PROFIBUS voltage
7	CAN_H	Dominant High
8	Profi BusB	PROFIBUS B
9	CAN_V+	Power, Optional

Table 6: CAN/PROFIBUS Connector Pin Details

CAN /PROFIBUS Selection Jumpers

The Jumpers J4,J5,J6 and J7 are used to select between the CAN / PROFI bus. Description of the selection is provided below.

Jumper	Selection
J4	Pins 1 & 2 Short for CAN bus Voltage select
J5	Pins 1 & 2 Short for PROFIBUS Voltage select
J6	Pins 1 & 2 Short for PROFIBUSA select,Pins 2 & 3 Short for CAN Ground select
J7	Pins 1 & 2 Short for PROFIBUS Ground select

Industrial Inputs

For industrial 24v digital inputs, a SN65HVS882 serializer is used to accept standard signals in and allow the AM335x to read them. The Serialized output from the serializer is fed to the SPI1 port of the processor.

EtherCAT LEDs

The EtherCAT LEDs are implemented as 6 LEDs D4-D9.

D4		Tri-color : Red, Green, Blue colours
D5		Tri-color : Red, Green, Blue colours
D6	RUN	green color
D7	ERR	red color
D8	Link/Act 0	green color
D9	Link/Act 1	green color

Industrial Output LEDs

I2C to 8 bit LED driver TPIC2810 is used to drive the eight Industrial output LEDs D24 to D31. The I2C interface is connected to the I2C0 port of the AM335x processor. The 8 LED driver outputs are also driven to the IO Expansion header.All the LEDs are green in color.

Temperature Sensor

The ICE design has a temperature sensor LM94022 on board. The output data from the temperature sensor is fed to the Analog input pin AIN0 of the processor.

Pin Use Description

GPIO Definitions

See the updated pinmux document which shows the use case columns for GPIOs.

Board Expansion Connectors

There are two expansion connectors provided in the ICE board. They are used for HOST and I/O Expansion.

The J12 connector which is used for HOST expansion is a 25x2 header. The Description of the signals are provided below.

Pin No	Signal	Description
1	VDD_3V3	Power 3.3V supply
2	VDD_3V3	Power 3.3V supply
3	NC(EXT_A0)	No Connect (GPMC Address0)
4	NC(EXT_D0)	No Connect (GPMC DATA 0)
5	NC(EXT_A1)	No Connect (GPMC Address 1)
6	NC(EXT_D1)	No Connect (GPMC DATA 1)
7	NC(EXT_A2)	No Connect (GPMC Address 2)
8	NC(EXT_D2)	No Connect (GPMC DATA 2)
9	NC(EXT_A3)	No Connect (GPMC Address 3)
10	NC(EXT_D3)	No Connect (GPMC DATA 3)
11	NC(EXT_A4)	No Connect (GPMC Address 4)
12	NC(EXT_D4)	No Connect (GPMC DATA 4)
13	NC(EXT_A5)	No Connect (GPMC Address 5)

14	NC(EXT_D5)	No Connect (GPMC DATA 5)
15	NC(EXT_A6)	No Connect (GPMC Address 6)
16	NC(EXT_D6)	No Connect (GPMC DATA 6)
17	NC(EXT_A7)	No Connect (GPMC Address 7)
18	NC(EXT_D7)	No Connect (GPMC DATA 7)
19	NC(EXT_A8)	No Connect (GPMC Address 8)
20	NC(EXT_D8)	No Connect (GPMC DATA 8)
21	NC(EXT_A9)	No Connect (GPMC Address 9)
22	NC(EXT_D9)	No Connect (GPMC DATA 9)
23	NC(EXT_A10)	No Connect (GPMC Address 10)
24	NC(EXT_D10)	No Connect (GPMC DATA 10)
25	NC(EXT_A11)	No Connect (GPMC Address 11)
26	NC(EXT_D11)	No Connect (GPMC DATA 11)
27	NC(EXT_A12)	No Connect (GPMC Address 12)
28	NC(EXT_D12)	No Connect (GPMC DATA 12)
29	NC(EXT_BUSYn)	No Connect (Busy Signal)
30	NC(EXT_D13)	No Connect (GPMC DATA 13)
31	NC(EXT_INTn)	No Connect (Interrupt)
32	NC(EXT_D14)	No Connect (GPMC DATA 14)
33	NC(EXT_CSn)	No Connect (Chip Select)
34	NC(EXT_D15)	No Connect (GPMC DATA 15)
35	NC(EXT_WEn)	No Connect (GPMC Write enable)
36	NC(EXT_LBn)	No Connect (Lower Byte)
37	NC(EXT_OEn)	No Connect (Output Enable)
38	NC(EXT_UBn)	No Connect (Upper Byte)
39	UART4_RXD	UART4 Receive
40	UART4_TXD	UART4 Transmit
41	SPI0_D0	SPI0 Data0
42	SPI0_CS1	SPI0 Chip Select 1
43	SPI0_D1	SPI0 Data 1
44	SPI0_SCLK	SPI0 Serial Clock
45	DGND	Ground
46	V24_IN	24V Power In
47	DGND	Ground
48	V24_IN	24V Power In
49	DGND	Ground
50	DGND	Ground

Table 7: AM335x EXP0 Host Connector - J12

Pin No	Signal	Description
1	INDUS INPUT0	Digital Input 0
2	V24_0HVS	24V Power
3	INDUS INPUT1	Digital Input 1
4	V24_0HVS	24V Power
5	INDUS INPUT2	Digital Input 2
6	V24_0HVS	24V Power
7	INDUS INPUT3	Digital Input 3
8	V24_0HVS	24V Power
9	INDUS INPUT4	Digital Input 4
10	V24_0HVS	24V Power
11	INDUS INPUT5	Digital Input 5
12	V24_0HVS	24V Power
13	INDUS INPUT6	Digital Input 6
14	V24_0HVS	24V Power
15	INDUS INPUT7	Digital Input 7
16	V24_0HVS	24V Power
17	DGND	Ground
18	DGND	Ground
19	DRAIN0	Digital Output 0
20	DRAIN1	Digital Output 1
21	DRAIN2	Digital Output 2
22	DRAIN3	Digital Output 3
23	DRAIN4	Digital Output 4
24	DRAIN5	Digital Output 5
25	DRAIN6	Digital Output 6
26	DRAIN7	Digital Output 7
27	V5_0D	5V Power
28	V5_0D	5V Power
29	DGND	Ground
30	DGND	Ground
31	NC	No Connect
32	NC	No Connect
33	GNDA_ADC	Analog Ground
34	GNDA_ADC	Analog Ground
35	AIN1	Analog Input1
36	AIN3	Analog Input3
37	AIN2	Analog Input2
38	AIN4	Analog Input4

39	GNDA_ADC	Analog Ground
40	GNDA_ADC	Analog Ground

Table 8: AM335x EXP1 I/O Connector - J9

LCD

A Passive Matrix monochrome display (light blue color) is supported using the J13 (10051922-1410ELF) connector provided. The connector details for LCD interface are described below.

Pin No	Signal	Description
1	V13	Power 13.0V rail
2	VCOMH	Voltage output High
3	IRREF	Current Reference
4	I2C0_SDA	I2C0 Data
5	I2C0_SCL	I2C0 Clock
6	RESn	Power Reset
7	VDD_3V3	Power Supply 3.3V
8	DGND	Ground
9	VBREF	Voltage Reference
10	VBAT_LCD	Power Supply for DC-DC converter
11	C1N	Charge Pump Capacitor1 negative
12	C1P	Charge Pump Capacitor1 positive
13	C2N	Charge Pump Capacitor2 negative
14	C2P	Charge Pump Capacitor2 positive

Table 9:LCD Connector

EVM Important Notice

EVALUATION BOARD/KIT/MODULE (EVM) ADDITIONAL TERMS

Texas Instruments (TI) provides the enclosed Evaluation Board/Kit/Module (EVM) under the following conditions:

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/ kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING LIMITED WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For

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As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules

For EVMs not subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this is strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

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

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

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.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

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

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-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.

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.

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Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

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.

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.

Important Notice for Users of this Product in Japan

This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan!

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

(1) Use this product 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 this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or

(3) Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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電波法施行規則第6条第1項第1号基平成18年3月28日総務省告示第173号定電波暗室等試験設備使用

実験局免許取得後使用

技術基準適合証明取得後使用

本製品上記使用注意譲渡先移転先通知限譲渡移転

上記遵守頂場合電波法罰則適用可能性留意

日本株式会社

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西新宿三井

http://www.tij.co.jp [2]

EVALUATION BOARD/KIT/MODULE (EVM)WARNINGS, RESTRICTIONS AND DISCLAIMERS

For Feasibility Evaluation Only, in Laboratory/Development Environments. Unless otherwise indicated, this EVM is not a finished electrical equipment and not intended for consumer use. It is intended solely for use for preliminary feasibility evaluation in laboratory/development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems and subsystems. It should not be used as all or part of a finished end product.

Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.
2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure 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.
3. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.
4. You will take care of proper disposal and recycling of the EVM's electronic components and packing materials

Certain Instructions. It is important to operate this EVM within the input voltage range of 2.7 V to 5.5 V and the output voltage range of -10 V to 15 V. Exceeding these EVM ratings may cause property damage, personal injury or death. If there are questions concerning these ratings please 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 result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM User's 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, some circuit components may have case temperatures greater than 60°C as long as the input and output are maintained at a normal ambient operating temperature. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during normal operation, please be aware that these devices may be very warm to the touch. As with all electronic evaluation tools, only qualified personnel knowledgeable in electronic measurement and diagnostics normally found in development environments should use these EVMs.

Agreement to Defend, Indemnify and Hold Harmless. You agree to defend, indemnify and hold TI, its licensors and their representatives harmless from and against any and all claims, damages, losses, expenses, costs and liabilities (collectively, "Claims") arising out of or in connection with any use of the EVM that is not in accordance with the terms of the agreement. This obligation shall apply whether Claims arise under law of tort or contract or any other legal theory, and even if the EVM fails to perform as described or expected.

Safety-Critical or Life-Critical Applications. If you intend to evaluate the components for possible use in safety critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, such as devices which are classified as FDA Class III or similar classification, then you must specifically notify TI of such intent and enter into a separate Assurance and Indemnity Agreement.

ANNEX

This Hardware User's Guide is prepared by using the following documents as references.

1. AM335x Sitara ARM Microprocessors TRM (SPRUH73)

References

[1] http://processors.wiki.ti.com/index.php/AM335xBoards#Industrial_Communications_Engine_.28ICE.29_.28AM3359_-_TMDXICE3359.29

[2] http://www.tij.co.jp

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