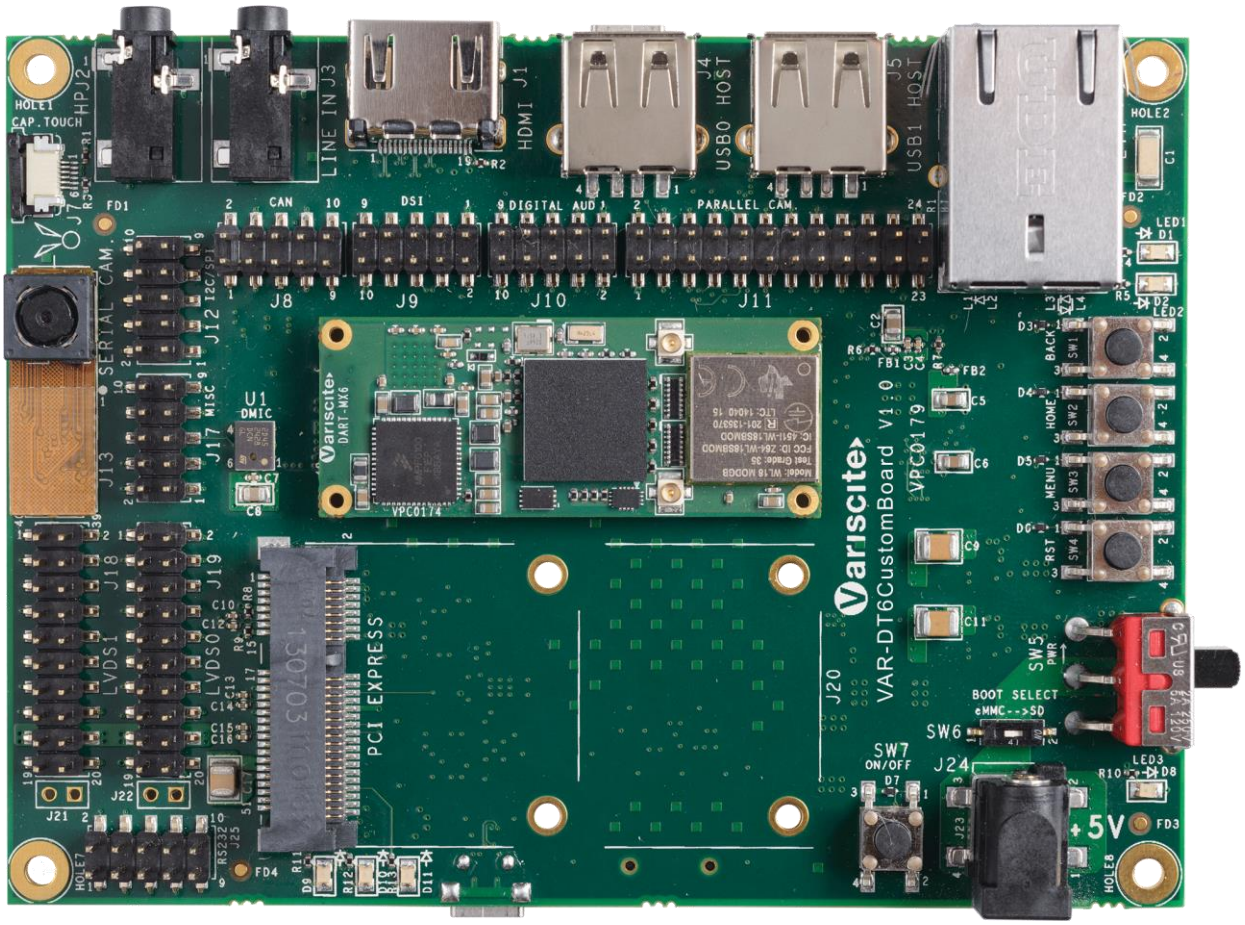
VARISCITE LTD

VAR-DT6CustomBoard Datasheet

Carrier-board for the DART-MX6

V 1.1



Variscite Ltd.
4, Hamelacha st.
Lod.
P.O.B 1121
Airport City, 70100
ISRAEL
Phone +972 (9) 9562910 • Fax +972 (9) 9589477

Revision History

Revision	Date	Notes
1.0	22/04/2015	Initial
1.1	19/05/2015	1) Parallel camera P/N change -Updated section 2.3.7 2) Boot strap notes -Updated section 2.3.8 3) SW7 function- Updated section 2.4.3.3 4) Updated mechanical drawing

Table of Contents

List of Tables

1 Overview

This chapter gives an overview of the VAR-DT6CustomBoard.

1.1 General Information

The VAR-DT6CustomBoard is a complete development board, utilizing all of the DART-MX6 System-on-Module's features. It is assembled with large variety of user and debug interfaces enabling it to serve as both a complete development kit or as a stand-alone end-product.

1.1.1 Supporting Variscite products

- DART-MX6
- 7" Capacitive touch LCD

1.1.2 Supporting O.S

- Linux BSP
- Android

1.1.3 Additional information

Board schematics as well as mechanical CAD data base is available to download at www.variscite.com,

For further information contact Variscite support at mailto:support@variscite.com.

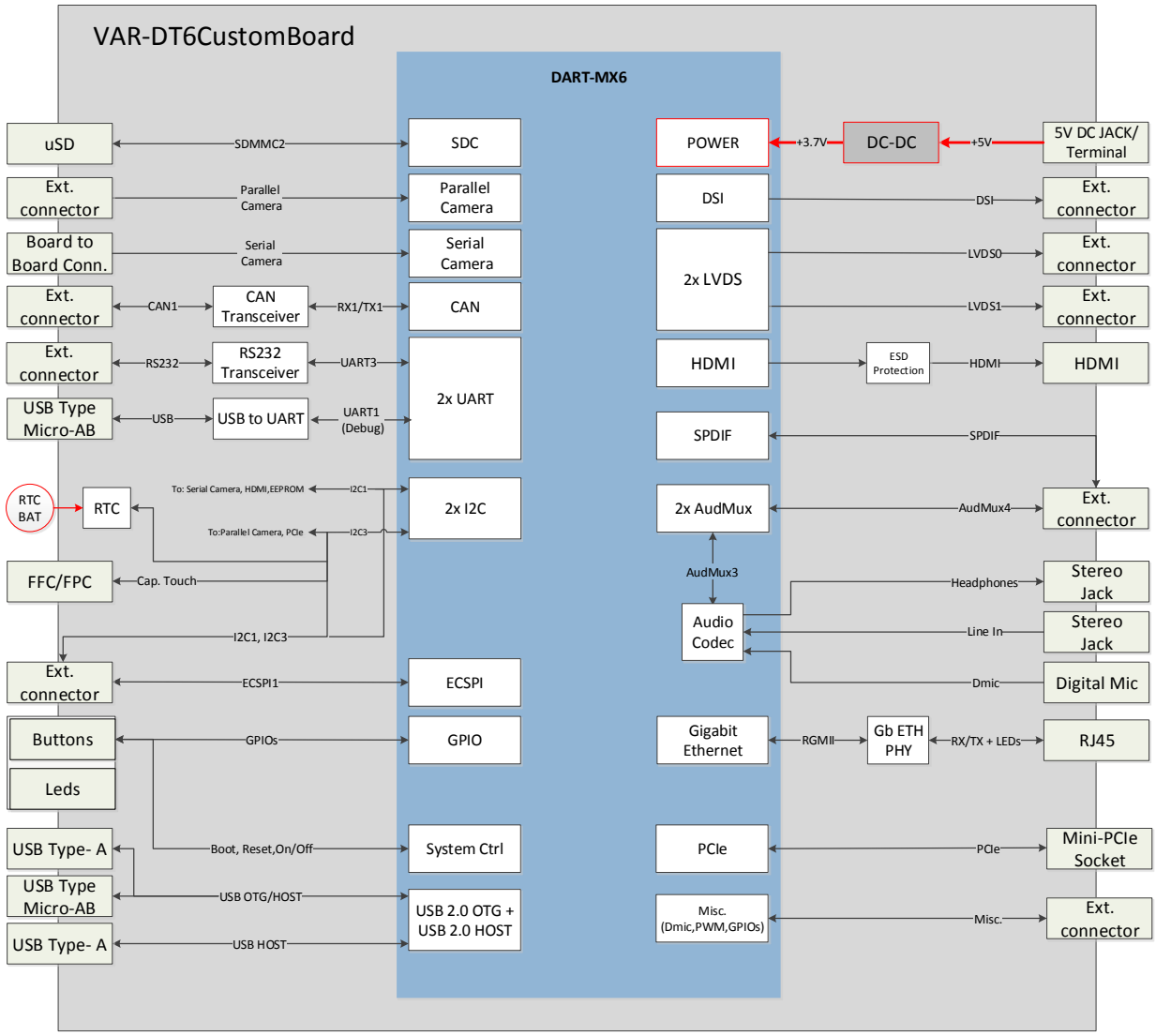
1.2 VAR-DT6CustomBoard features summary

- SO-DIMM 200 PIN socket compatible with the DART-MX6
- Display
  - Dual 24 bit LVDS Interface supporting Variscite's 7" TFT capacitive touch LCD
  - DSI Header
  - HDMI Type A
- Touch panel interface
  - Capacitive - I2C based
- Ethernet
  - 10/100/1000BaseT – RJ45
- Mini PCIe Connector
- USB
  - USB2.0 OTG ,Type Micro AB + Type A (for Host only option)
  - USB2.0 Host Type A
- AUDIO
  - 3.5mm Headphones jack
  - 3.5mm Line in jack
  - Digital Microphone
- µSD-Card slot
- Camera
  - Serial interface - OV5640 MIPI CSI sensor
  - Parallel interface Header
- RS232 (UART3) Header
- CAN Bus
  - 1Mbit CAN bus Header
- Debug
  - USB debug (UART1) - Type Micro AB
- ISL12057 RTC
- Additional
  - Miscellaneous Header
  - Digital Audio Header
  - SPI, I2C Header

- General purpose LEDS, Buttons

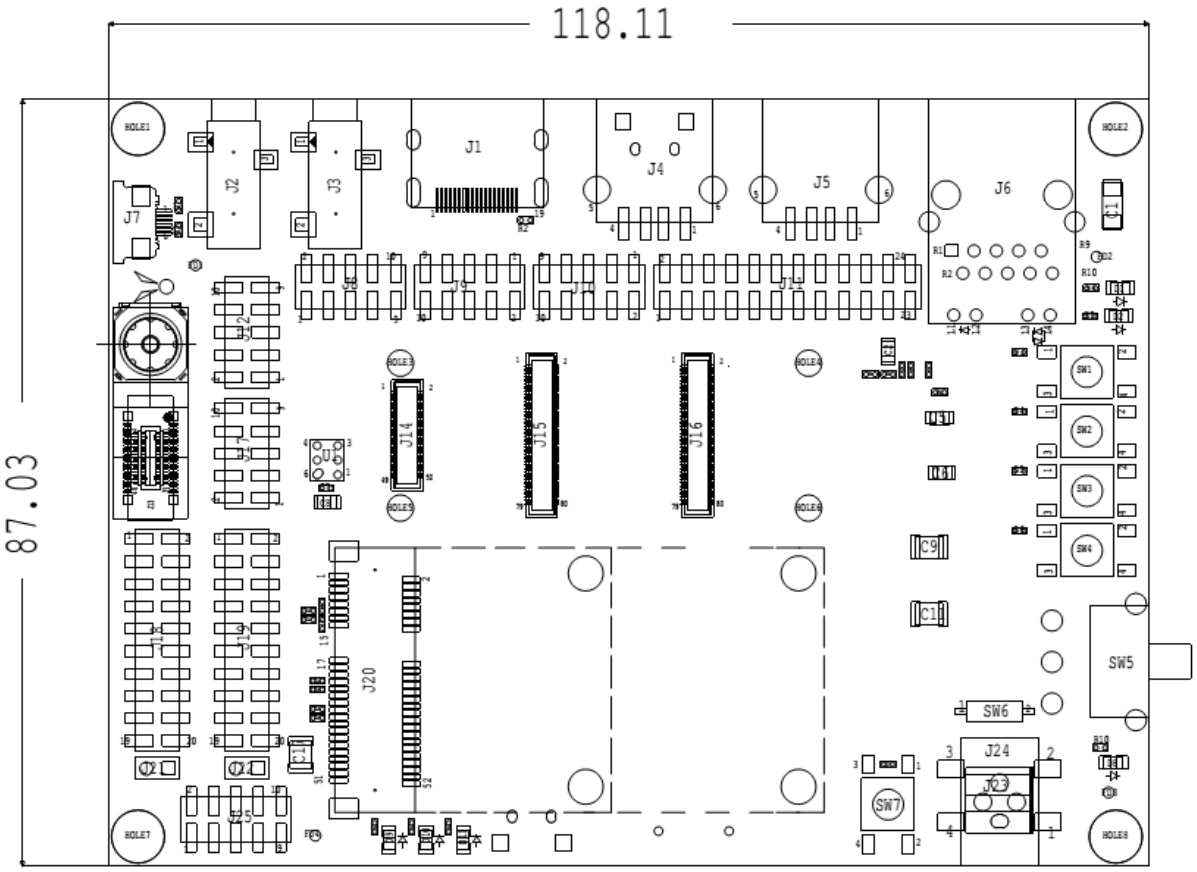
- Power
  - 5V DC Input. - 2.0mm DC jack / 2 pin Terminal Block
  - RTC Backup battery - CR1225 Battery Holder

1.3 Block Diagram



1.4 Board Layout

The VAR-DT6CustomBoard's physical dimensions are 118 x 87 mm.



Detailed CAD files are available for download at www.variscite.com.

1.5 VAR-DT6CustomBoard connectors

The below table lists all available connectors on the VAR-DT6CustomBoard, refer to chapter 2 for a more detailed description and Pin-out of each connector.

Reference	Function	Type
J1	HDMI	HDMI Type A Conn
J2	Headphones	Audio Jack 3.5 mm
J3	Line In	Audio Jack 3.5 mm
J4	USB Host	USB Type A
J5	USB Host	USB Type A
J6	10/100/1000Mbps Port	RJ-45
J7	Capacitive Touch Panel I/F	FFC/FPC 6-pin
J8	CAN Bus	Header SMT 5x2, 2.54mm
J9	DSI	Header SMT 5x2, 2.54mm
J10	Digital Audio	Header SMT 5x2, 2.54mm
J11	Parallel Camera I/F	Header SMT 12x2, 2.54mm
J12	SPI,I2C	Header SMT, 5x2, 2.54mm
J13	Serial Camera sensor OV5640 Conn	Board to Board, 40Pos, 0.5mm
J14	DART-MX6 Connector J1	Board to Board, 50Pos, 0.4mm
J15	DART-MX6 Connector J2	Board to Board, 80Pos, 0.4mm
J16	DART-MX6 Connector J3	Board to Board, 80Pos, 0.4mm
J17	Miscellaneous	Header SMT, 5x2, 2.54mm
J18	LVDS1 (Clock & Data pairs 0-2)	Header SMT, 10x2, 2.54mm
J19	LVDS0 (Clock & Data pairs 0-2)	Header SMT, 10x2, 2.54mm
J20	Mini PCIe Conn	Mini PCIe Conn, 2x26 0.8mm
J21	LVDS1 (Data pair 3)	Header TH, 1x2, 2.54mm
J22	LVDS0 (Data pair 3)	Header TH, 1x2, 2.54mm
J23	Power In	2 Pin Terminal Block
J24	Power In	DC In Jack 2.0 mm
J25	RS232	Header SMT, 5x2, 2.54mm
J100	USB OTG	USB Type micro AB
J101	SD-MMC	uSD Connector
J102	USB Debug	USB Type micro AB
JBT100	RTC Battery Holder	CR1225 Battery Holder

Table 1-1 VAR-DT6CustomBoard connectors

2 Detailed Description

2.1 Overview

This chapter details the VAR-DT6CustomBoard's features and external interfaces, some of which are driven directly by the DART-MX6.
Please refer to the DART-MX6 data sheet for more information regarding those interfaces.

The following list describes this chapter table's column header:

Pin#:
Pin Number of the specific connector

VAR-DT6CustomBoard Signal:
VAR-DT6CustomBoard schematic signal name

Type:
Pin Type & Direction:

- I – In
- O – Out
- DS – Differential Signal
- P – Power
- A – Analog

Description:
Short Pin functionality description

2.2 VAR-DT6CustomBoard Interfaces

2.2.1 DART-MX6

The DART-MX6 features three low profile connectors. Two 80 pin and one 50 pin Board to Board connectors to connect with the DART-MX6 System-om-module. Please refer to the DART-MX6 module data sheet for a complete signal description and pin-out.

2.3 Standard External Interfaces

2.3.1 USB HOST & OTG

The DART-MX6 drives USB Host to a Host Connector and USB OTG to both Host and OTG connectors. For using USB OTG as Host only via Host connector configure it to Host mode by assembling resistor R102 with 0R short resistor.

2.3.1.1 USB HOST Connector Pin-out (J5)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	USB_H1_VBUS	P	+5V power supply. 500ma max
2	USB_HOST_DN_C	DSI/O	USB Data Negative
3	USB_HOST_DP_C	DSI/O	USB Data Positive
4	DGND	P	Digital ground

Table 2-1 USB Host Connector Connector Pin-out (J5)

2.3.1.2 USB OTG to HOST Connector Pin-out (J4)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	USB_OTG_VBUS	P	+5V power supply. 500ma max
2	USB_OTG_DM_C	DSI/O	USB Data Negative
3	USB_OTG_DP_C	DSI/O	USB Data Positive
4	DGND	P	Digital ground

Table 2-2 USB OTG to Host Connector Connector Pin-out (J4)

USB OTG to OTG Connector Pin-out (J100)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	USB_OTG_VBUS	P	5V in/out (Client/host)
2	USB_OTG_DM_C	DSI/O	USB Data Negative
3	USB_OTG_DP_C	DSI/O	USB Data Positive
4	USB_OTG_ID	I	USB OTG ID signal (‘1’ - Device mode)
5	DGND	P	Digital ground

Table 2-3 USB OTG to OTG connector Pin-out (J100)

2.3.2 uSD Card

uSD Card interface is driven by the SDMMC2 interface of the of the DART-MX6.

2.3.2.1 uSD card slot Connector Pin-out (J101)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	SDMMC2_DAT2	IO	MMC Parallel Data2
2	SDMMC2_DAT3	IO	MMC Parallel Data3
3	SDMMC2_CMD	IO	MMC command
4	BASE_PER_3V3	P	Peripherals Power supply 3.3V
5	SDMMC2_CLK	O	MMC Clock
6	DGND	P	Digital ground
7	SDMMC2_DAT0	IO	MMC Parallel Data0
8	SDMMC2_DAT1	IO	MMC Parallel Data1
9	SDMMC2_CD	IO	MMC Card Detect
10	DGND	P	Digital ground
11	DGND	P	Digital ground
12	DGND	P	Digital ground
13	DGND	P	Digital ground

Table 2-4 uSD Card slot Connector Pin-out (J101)

2.3.3 Mini PCIe

The DART-MX6 PCI Express interface is exposed by the VAR-DT6CustomBoard through a standard Mini PCI Express connector supporting connection of mini PCI Express expansion cards.

2.3.3.1 Mini PCIe Connector Pin-out (J20)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	PCIE_WAKE_B	I	PCIe wakeup signal
2	BASE_PER_3V3	P	Peripherals Power supply 3.3V
3			
4	DGND	P	Digital Ground
5			
6	BASE_PER_1V5	P	1.5V power supply limited to 300mA
7			
8			
9	DGND	P	Digital Ground
10			
11	PCIE_CREFCLKM	DSO	PCIe Clock pair negative
12			
13	PCIE_CREFCLKP	DSO	PCIe Clock pair positive
14			
15	DGND	P	Digital Ground
16			
17			
18	DGND	P	Digital Ground
19			
20	PCIE_DIS_B	O	PCIe Disable signal
21	DGND	P	Digital Ground
22	PCIE_RESET_B	O	PCIe Reset signal
23	PCIE_CRXM	DSI	PCIe Receive pair negative
24	BASE_PER_3V3	P	Peripherals Power supply 3.3V
25	PCIE_CRXP	DSI	PCIe Receive pair positive
26	DGND	P	Digital Ground
27	DGND	P	Digital Ground
28	BASE_PER_1V5	P	1.5V power supply limited to 300mA
29	DGND	P	Digital Ground
30	I2C3_SCL	O	I2C3 clock signal
31	PCIE_CTXM	DSO	PCIe Transmit pair negative
32	I2C3_SDA	IO	I2C3 data signal
33	PCIE_CTXP	DSO	PCIe Transmit pair positive
34	DGND	P	Digital Ground
35	DGND	P	Digital Ground

36			
37	DGND	P	Digital Ground
38			
39	BASE_PER_3V3	P	Peripherals Power supply 3.3V
40	DGND	P	Digital Ground
41	BASE_PER_3V3	P	Peripherals Power supply 3.3V
42	LED_WWAN_B	I	WWAN LED input
43	DGND	P	Digital Ground
44	LED_WLAN_B	I	WLAN LED input
45			
46	LED_WPAN_B	I	WPAN LED input
47			
48	BASE_PER_1V5	P	1.5V power supply limited to 300mA
49			
50	DGND	P	Digital Ground
51			
52	BASE_PER_3V3	P	Peripherals Power supply 3.3V

Table 2-5 mini PCI Express Connector Pin-out (J20)

2.3.4 Ethernet

The VAR-DT6CustomBoard exposes a Gigabit Ethernet interface to a standard RJ45 Ethernet jack connector with integrated magnetics using an On-Board Gigabit Ethernet PHY driven by the RGMII interface exposed by the DART-MX6.
Please refer to the DART-MX6 datasheet for more information.

2.3.4.1 10/100/1000BaseT RJ45 Connector Pin-out (J6)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
R1	MDI_A+	DSI/O	Bi-directional pair 0 positive
R2	MDI_A-	DSI/O	Bi-directional pair 0 negative
R3	MDI_B+	DSI/O	Bi-directional pair 1 positive
R4	MDI_B-	DSI/O	Bi-directional pair 1 negative
R5	TRCT1	O	Bias capacitor
R6	TRCT2	O	Bias capacitor
R7	MDI_C+	DSI/O	Bi-directional pair 2 positive
R8	MDI_C-	DSI/O	Bi-directional pair 2 negative
R9	MDI_D+	DSI/O	Bi-directional pair 3 positive
R10	MDI_D-	DSI/O	Bi-directional pair 3 negative
L1	LED2	Cathode	PHY LED 2 (see Table 2-6)
L2	BASE_PER_3V3	Anode	Anode of LED 2
L3	BASE_PER_3V3	Anode	Anode of LED 1
L4	LED1	Cathode	PHY LED 1 (see Table 2-6)
SH1	EARTH	P	EARTH
SH2	EARTH	P	EARTH

Table 2-6 10/100/100BaseT RJ45 Connector Pin-out (J6)

LED1	LED2	Status
Off	Off	Link off
Blinking	Off	
On	Off	1G link
On	Blinking	
On	On	Speed OK

Table 2-7 RJ-45 Led configuration

2.3.5 AUDIO

The VAR-DT6CustomBoard features two 3.5mm jacks for audio interfaces.

- Headphone
- Line in

The Headphones signals are driven by the DART-MX6, while the Line in signals are driven to the DART-MX6. The VAR-DT6CustomBoard also features an on-board stereo Digital Microphone (section 2.4.1).
Please refer to the DART-MX6 data sheet for complete audio codec information.

2.3.5.1 Headphone jack Connector Pin-out (J2)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DGND	AP	Audio Ground
2	HPLOUT_C	AO	Headphone out left
3	HPROUT_C	AO	Headphone out right

Table 2-8 Headphone Jack Connector Pin-out (J2)

2.3.5.2 Line In jack Connector Pin-out (J3)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DGND	AP	Audio Ground
2	LINEIN1_LP_C	AI	Line in Left input
3	LINEIN1_RP_C	AI	Line in Right input

Table 2-9 Line In Jack Connector Pin-out (J3)

2.3.6 RS232 -DTE

The DART-MX6 exports the 4 line UART3 interface to the VAR-DT6CustomBoard, Which are driven by an on-board RS232 Transceiver and exported to a standard 10 pin Header. This connector serves as a DTE interface for connecting third party DCE devices.

2.3.6.1 RS232 Connector Pin- out (J25)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1			
2	RS232_RX	I	UART3 Receive
3	RS232_TX	O	UART3 Transmit
4	BASE_PER_3V3	P	Peripherals Power supply 3.3V
5	DGND	P	Digital Ground
6			

7	RS232_RTS	O	UART3 CTS
8	RS232_CTS	I	UART3 RTS
9			
10			

Table 2-10 RS232 Connector Pin-out (J25)

2.3.7 Serial Camera

The VAR-DT6CustomBoard hosts a MIPI CSI camera sensor OmniVision OV5640 driven by the DART-MX6. The on board camera connector is a Panasonic conn socket 40POS 0.4mm, AXK7L40227G suggest camera mating connector is Panasonic conn header, AXK8L40125BG.

2.3.7.1 Serial Camera Connector Pin-out (J13)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DGND	P	Digital Ground
2	DGND	P	Digital Ground
3			
4	BASE_PER_2V8	P	Camera Power supply 2.8V
5	I2C_A_SDA_18	IO	Sensor I2C Data
6	VIO_1V8	P	Auto Focus Power down
7	I2C_A_SCL_18	O	Sensor I2C Clock
8	BASE_PER_2V8	P	Camera Power supply 2.8V
9	VIO_1V8	P	Sensor reset
10	I2C_A_SDA_18	IO	Auto Focus I2C Data
11			
12	I2C_A_SCL_18	O	Auto Focus I2C Clock
13			
14			
15			
16	CSI_D1P	DSI	Camera Data 1 Positive
17	DGND	P	Sensor Power Down
18	CSI_D1M	DSI	Camera Data 1 Negative
19			
20	DGND	P	Digital Ground
21			
22	CSI_CLK0P	DSI	Camera Clock Positive
23			
24	CSI_CLK0M	DSI	Camera Clock Negative
25			
26	DGND	P	Digital Ground
27			
28	CSI_D0P	DSI	Camera Data 0 Positive
29			

Pin #	VAR-DT6CustomBoard Signal	Type	Description
30	CSI_D0M	DSI	Camera Data 0 Negative
31			
32	DGND	P	Digital Ground
33			
34	MIPI_CSI-2_CLK_18	O	Camera Clock
35			
36			
37			
38	VIO_1V8	P	Camera Power supply 1.8V
39			
40	DGND	P	Digital Ground

Table 2-11 Serial Camera Connector Pin-out (J13)

2.3.8 Parallel Camera Interface (J11)

The VAR-DT6CustomBoard exposes a 16 bit Parallel camera interface routed directly to the processor's CSI1 pins.

2.3.8.1 Parallel Camera Connector Pin-Out (J11)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	I2C3_SCL	O	I2C3 clock signal
3	CSI1_DATA_EN	O	Camera enable[3]
4	I2C3_SDA	IO	I2C3 data signal
5	CSI1_DATA5	I	Camera Data 5 signal[3]
6	CSI1_PIXCLK	I	Camera Pixel Clock signal[3]
7	CSI1_DATA6	I	Camera Data 6 signal[3]
8	CSI1_DATA15	I	Camera Data 15 signal[1]
9	CSI1_DATA7	I	Camera Data 7 signal[3]
10	CSI1_DATA16	I	Camera Data 16 signal[1]
11	CSI1_DATA8	I	Camera Data 8 signal[3]
12	CSI1_DATA17	I	Camera Data 17 signal[3]
13	CSI1_DATA9	I	Camera Data 9 signal[3]
14	CSI1_DATA18	I	Camera Data 18 signal[3]
15	CSI1_DATA10	I	Camera Data 10 signal[3]
16	CSI1_DATA19	I	Camera Data 19 signal[3]
17	CSI1_DATA11	I	Camera Data 11 signal[3]
18	CSI1_DATA4/BT_CFG1_5	I	Camera Data 4 signal/ BT_CFG1_5[2]
19	CSI1_DATA12	I	Camera Data 12 signal[3]
20	CSI1_HSYNCH/BT_CFG2_3	I	Camera Hsync signal/ BT_CFG2_3[2], [3]

Pin #	VAR-DT6CustomBoard Signal	Type	Description
21	CSI1_DATA13	I	Camera Data 13 signal[3]
22	CSI1_VSYNC/BT_CFG2_4	I	Camera Vsync signal/ BT_CFG2_4 [2]
23	CSI1_DATA14	I	Camera Data 14 signal[3]
24	DGND	P	Digital Ground

Table 2-12 Parallel Camera Connector Pin-out (J11)

Note:
[1] Pin is being latched at boot.
[2] Pin is being latched at boot to determine boot sequence. Refer to DART-MX6 datasheet for more details.
[3] Pin is being latched at boot and requires 10k Pull-Down. Please refer to VAR-DT6CustomBoard schematics for reference.

2.3.9 LVDS

The VAR-DT6CustomBoard exposes a dual 4 data lane LVDS interface driven by the DART-MX6. For both LVDS0, LVDS1, balanced Clock and Data pairs 0-2 are routed to a standard 20 pin Header while Data pair 3 is routed to a 2 pin Header for Optional connection. Variscite's standard 7" Capacitive touch LCD screen, by default, connects to LVDS1 20 Pin Header.

2.3.9.1 LVDS1 (Clock & Data pairs 0-2) Connector Pin-out (J18)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	BASE_PER_3V3	P	Peripherals Power supply 3.3V
3	DGND	P	Digital ground
4	DGND	P	Digital ground
5	LVDS1_TX0_N	DSO	LVDS lane 0, negative signal
6	LVDS1_TX0_P	DSO	LVDS lane 0, positive signal
7	DGND	P	Digital ground
8	LVDS1_TX1_N	DSO	LVDS lane 1, negative signal
9	LVDS1_TX1_P	DSO	LVDS lane 1, positive signal
10	DGND	P	Digital ground
11	LVDS1_TX2_N	DSO	LVDS lane 2, negative signal
12	LVDS1_TX2_P	DSO	LVDS lane 2, positive signal
13	DGND	P	Digital ground
14	LVDS1_CLK_N	DSO	LVDS clock, negative signal
15	LVDS1_CLK_P	DSO	LVDS clock, positive signal
16	DGND	P	Digital ground
17	VCC_5V	P	VLED +5V Power supply

Pin #	VAR-DT6CustomBoard Signal	Type	Description
18	VCC_5V	P	VLED +5V Power supply
19	PWM_BACKLIGHTEN	O	Backlight brightness control
20	DGND	P	Digital ground

Table 2-13 LVDS1 (Clock & Data Pairs 0-2) Connector Pin-out (J18)

2.3.9.2 LVDS1 (Data pair 3) Connector Pin-out (J21)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	LVDS1_TX3_N	DSO	LVDS lane 3, negative signal
2	LVDS1_TX3_P	DSO	LVDS lane 3, positive signal

Table 2-14 LVDS1 (Data Pair 3) Connector Pin-out (J21)

2.3.9.3 LVDS0 Connector Pin-out (J19)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	BASE_PER_3V3	P	Peripherals Power supply 3.3V
3	DGND	P	Digital ground
4	DGND	P	Digital ground
5	LVDS0_TX0_N	DSO	LVDS lane 0, negative signal
6	LVDS0_TX0_P	DSO	LVDS lane 0, positive signal
7	DGND	P	Digital ground
8	LVDS0_TX1_N	DSO	LVDS lane 1, negative signal
9	LVDS0_TX1_P	DSO	LVDS lane 1, positive signal
10	DGND	P	Digital ground
11	LVDS0_TX2_N	DSO	LVDS lane 2, negative signal
12	LVDS0_TX2_P	DSO	LVDS lane 2, positive signal
13	DGND	P	Digital ground
14	LVDS0_CLK_N	DSO	LVDS clock, negative signal
15	LVDS0_CLK_P	DSO	LVDS clock, positive signal
16	DGND	P	Digital ground
17	VCC_5V	P	VLED +5V Power supply
18	VCC_5V	P	VLED +5V Power supply
19	PWM_BACKLIGHTEN	O	Backlight brightness control
20	DGND	P	Digital ground

Table 2-15 LVDS0 (Clock & Data Pairs 0-2) Connector Pin-out (J19)

2.3.9.4 LVDS0 (Data pair 3) Connector Pin-out (J22)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	LVDS0_TX3_N	DSO	LVDS lane 3, negative signal
2	LVDS0_TX3_P	DSO	LVDS lane 3, positive signal

Table 2-16 LVDS0 (Data Pair 3) Connector Pin-out (J22)

2.3.10 Capacitive Touch

The DART-MX6 provides a capacitive Touch interface exposed to a FFC/FPC connector for connecting to Variscite's standard 7" Capacitive touch LCD screen.

2.3.10.1 Capacitive Touch Panel Connector Pin-out (J7)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	RESET	O	Reset signal
2	I2C3_SDA	IO	I2C3 data signal
3	I2C3_SCL	O	I2C3 clock signal
4	GPIO_5_17	I	Interrupt signal connected to GPIO1[4]
5	BASE_PER_3V3	P	Peripherals Power supply 3.3V
6	DGND	P	Digital ground
7	DGND	P	Digital ground
8	DGND	P	Digital ground

Table 2-17 Capacitive Touch Panel Connector Pin-out (J7)

2.3.11 HDMI

The VAR-DT6CustomBoard features an HDMI connector to interface with an external monitor. HDMI signals are driven by the DART-MX6.

2.3.11.1 HDMI Connector Pin-out (J1)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	HDMI_D2P	DSO	HDMI Data 2 positive
2	DGND	P	Digital ground
3	HDMI_D2M	DSO	HDMI Data 2 negative
4	HDMI_D1P	DSO	HDMI Data 1 positive
5	DGND	P	Digital ground
6	HDMI_D1M	DSO	HDMI Data 1 negative
7	HDMI_D0P	DSO	HDMI Data 0 positive
8	DGND	P	Digital ground
9	HDMI_D0M	DSO	HDMI Data 0 negative

10	HDMI_CLKP	DSO	HDMI Clock positive
11	DGND	P	Digital ground
12	HDMI_CLKM	DSO	HDMI Clock negative
13	HDMICONN_CEC	IO	CEC signal
14			
15	HDMICONN_SCL	O	HDMI I2C Data
16	HDMICONN_SDA	IO	HDMI I2C Clock
17	DGND	P	Digital ground
18	5V_HDMI	P	+5V Power supply
19	HDMICONN_HPD	I	Hot Plug detect signal

Table 2-18 HDMI Connector Pin-out (J1)

2.3.12 DSI

The DART-MX6 exports the DSI interface a high performance serial interconnect bus for mobile applications connecting display system to the host system.
The signals are exported to a standard 10 pin Header.

2.3.12.1 DSI Connector Pin- out (J9)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2			
3	DSI_D1M	DSO	Negative DSI data 1 differential
4	DSI_D0M	DSO	Negative DSI data 0 differential
5	DSI_D1P	DSO	Positive DSI data 1 differential
6	DSI_D0P	DSO	Positive DSI data 0 differential
7	DSI_CLK0M	DSO	Negative DSI clock differential
8			
9	DSI_CLK0P	DSO	Positive DSI clock differential
10	DGND	P	Digital Ground

Table 2-19 DSI Connector Pin-out (J9)

2.3.13 CAN Bus

The DART-MX6 exports a CAN Bus interface to the VAR-DT6CustomBoard.
The signals are driven by an on-board CAN Bus Transceiver and exported to a standard 10 pin Header.

2.3.13.1 CAN Bus Connector Pin- out (J8)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	CANL1	DSI/O	CAN1 L Differential signal
2	CANH1	DSI/O	CAN1 H Differential signal
3	DGND	P	Digital Ground
4	DGND	P	Digital Ground
5			
6			
7	DGND	P	Digital Ground
8	DGND	P	Digital Ground
9			
10			

Table 2-20 CAN Bus Connector Pin-out (J8)

2.3.14 USB - Debug

The DART-MX6 exposed the debug UART1 interface to the VAR-DT6CustomBoard.The signals are driven by an on-board UART-to-USB Bridge and exposed to a Micro USB connector.

2.3.14.1 USB Debug Connector Pin-out (J102)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DEBUG_VBUS_C	P	5V power input
2	USB_DEBUG_DM_C	DSI/O	USB Data Negative
3	USB_DEBUG_DP_C	DSI/O	USB Data Positive
4	DGND	P	Digital ground
5	DGND	P	Digital ground

Table 2-21 USB Debug Connector Pin-out (J102)

2.3.15 Miscellaneous

The VAR-DT6CustomBoard exports Additional DART-MX6 signals to a standard 10 pin Header.

2.3.15.1 Miscellaneous Header Pin-out (J17)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	PWM_BACKLIGHTEN	O	Backlight brightness control
3	CLKO2	O	Reference Clock 2 signal
4	DMIC_CLK	O	Digital microphone Clock
5	DMIC_DATA	I	Digital microphone Data
6	GPIO1_1	IO	General Purpose Input Output/ PWM2
7			
8			
9	CAM_EN/CSPI1_CS1	IO	Serial Camera Enable/ ECSPI Chip select1
10	DGND	P	Digital Ground

Table 2-22 Miscellaneous Header Pin-out (J17)

2.3.16 I2C/SPI

The VAR-DT6CustomBoard exports the DART-MX6 I2C/SPI signals through a standard 10 pin Header.

2.3.16.1 I2C/SPI Header Pin-out (J12)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	CSPI1_SCLK	O	SPI Clock signal
3	CSPI1_CS0	O	SPI Chip Select 0 signal
4	CSPI1_SIMO	O	SPI SIMO signal
5	I2C3_SCL	O	I2C3 Clock signal
6	CSPI1_SOMI	I	SPI SOMI signal
7	I2C1_SDA	IO	I2C1 Data signal
8	I2C3_SDA	IO	I2C3 Data signal
9	I2C1_SCL	O	I2C1 Clock signal
10	DGND	P	Digital Ground

Table 2-23 I2C/SPI Header Pin-out (J12)

2.3.17 Digital Audio

The VAR-DT6CustomBoard exports the DART-MX6 AUDMUX4 and SPDIF Digital audio interface signals through a standard 10 pin Header. Please refer to DART-MX6 Datasheet for complete interface description.

2.3.17.1 Digital Audio Header Pin-out (J10)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	BASE_PER_3V3	P	Peripherals Power supply 3.3V
2	AUDMUX4_RXC	IO	Receive clock input/output at pin
3	AUDMUX4_TXC	IO	Transmit clock input/output at pin
4	AUDMUX4_RXFS	IO	Receive frame sync input/output at pin
5	AUDMUX4_TXD	IO	Transmit data from pin
6	SPDIF_OUT	O	SPDIF Out Signal
7	AUDMUX4_TXFS	IO	Transmit frame sync input/output at pin
8	SPDIF_IN	I	SPDIF In Signal
9	AUDMUX4_RXD	IO	Receive data at pin
10	DGND	P	Digital Ground

Table 2-24 Digital Audio Header Pin-out (J10)

2.4 User Interfaces

2.4.1 Digital Microphone

U1 is an on board Digital Microphones connected directly to DART-MX6 Digital Audio lines.

2.4.2 LED Indications

2.4.2.1 Power-On LED (D8)

Led D8 indicates that the VCC_5V DC IN power rail of the VAR-DT6CustomBoard is on.

2.4.2.2 GP LEDs (D1, D2)

LEDs D1, D2 are General purpose functionality LEDs controlled by DART-MX6's GPIOs.

2.4.3 Control Buttons

2.4.3.1 User Buttons (SW1, SW2, SW3)

SW1, SW2, and SW3 are User Buttons connected to the DART-MX6' GPIOs for general purpose. In Linux release they serve as Left, Enter, and Right Buttons respectively.
In android release they can serve as Back, Home & Menu Buttons respectively.

2.4.3.2 Boot Select (SW6)

The Boot select switch SW6 sets the DART-MX6's boot source & sequence.
Refer to the DART-MX6 module data sheet for detailed Boot description.

Position	Logic Level	Boot Source
ON	'0'	External (MMC)
OFF	'1'	Internal (eMMC)

Table 2-25 Boot Select modes (SW6)

2.4.3.3 ON/OFF Button (SW7)

The ON/OFF Button supports:
1) Prolonged depress (> 5 sec.) will force an ungraceful hardware shutdown.
2) If the SOM is in the OFF state, momentary depress of button will restart (boot)

2.4.3.4 PWR Switch (SW5)

The Power Switch SW5 Enables/Disables the DC Power input to the VAR-DT6CustomBoard.

2.4.3.5 Reset Button (SW4)

SW4 is the System hardware-reset button.

2.4.4 Power Input

The VAR-DT6CustomBoard is powered by a +5V power supply, connected either through a 2.0 mm power plug or alternatively through a 2 pin Terminal block.

2.4.4.1 DC-in Jack Pin-out (J24)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DGND	P	Digital ground
2	DGND	P	Digital ground
3	PWR_IN	P	+5V power input
4	PWR_IN	P	+5V power input

Table 2-26 DC-in Jack Pin-out (J24)

2.4.4.2 DC-in 2 pin Terminal Block Pin-out (J23)

Pin #	VAR-DT6CustomBoard Signal	Type	Description
1	DGND	P	Digital ground
2	PWR_IN	P	+5V power input

Table 2-27 DC-in 2 pin Terminal Block Pin-out (J23)

2.4.4.3 RTC Backup Battery (JBT100)

The VAR-DT6CustomBoard features JBT100, a CR1225 battery holder for powering the On board ISL12057IUZ RTC Module.

3 Electrical Environmental Specifications

3.1 Absolute maximum electrical specifications

	Min	Max
Main Power supply, DC-IN	-0.3V	6

Table 3-1 Absolute maximum electrical specifications

3.2 Operational electrical specifications

	Min	Max
Main Power supply, DC-IN	4.8V	5.2V

Table 3-2 Operational electrical specifications

4 Environmental specifications

	Min	Max
Commercial operating temperature range	0^0C	+70^0C
MTBF	>10000hrs	
Shock resistance	50G / 20 ms	
Relative humidity, Operational	10%	90%
Relative humidity, Storage	5%	95%
Vibration	20G / 0 - 600 Hz	

Table 4-1 Environmental specifications

5 Legal notice

Variscite LTD ("Variscite") products and services are sold subject to Variscite's terms and conditions of sale, delivery and payment supplied at the time of order acknowledgement.

Variscite warrants performance of its products to the specifications in effect at the date of shipment. Variscite reserves the right to make changes to its products and specifications or to discontinue any product or service without notice. Customers should therefore obtain the latest version of relevant information from Variscite to verify that the information is current.

Testing and other quality control techniques are utilized to the extent Variscite deems necessary to support its warranty.

Specific testing of all parameters of each device is not necessarily performed unless required by law or regulation.

In order to minimize risks associated with customer applications, the customer must use adequate design and operating safeguards to minimize inherent or procedural hazards. Variscite is not liable for applications assistance or customer product design. The customer is solely responsible for its selection and use of Variscite products. Variscite is not liable for such selection or use nor for use of any circuitry other than circuitry entirely embodied in a Variscite product.

Variscite products are not intended for use in life support systems, appliances, nuclear systems or systems where malfunction can reasonably be expected to result in personal injury, death or severe property or environmental damage. Any use of products by the customer for such purposes is at the customer's own risk.

Variscite does not grant any license (express or implied) under any patent right, copyright, mask work right or other intellectual property right of Variscite covering or relating to any combination, machine, or process in which its products or services might be or are used. Any provision or publication of any third party's products or services does not constitute Variscite's approval, license, warranty or endorsement thereof. Any third party trademarks contained in this document belong to the respective third party owner.

Reproduction of information from Variscite datasheets is permissible only if reproduction is without alteration and is accompanied by all associated copyright, proprietary and other notices (including this notice) and conditions. Variscite is not liable for any un-authorized alteration of such information or for any reliance placed thereon.

Any representations made, warranties given, and/or liabilities accepted by any person which differ from those contained in this datasheet or in Variscite's standard terms and conditions of sale, delivery and payment are made, given and/or accepted at that person's own risk. Variscite is not liable for any such representations, warranties or liabilities or for any reliance placed thereon by any person.

6 Warranty terms

Variscite guarantees hardware products against defects in workmanship and material for a period of one (1) year from the date of shipment. Your sole remedy and Variscite's sole liability shall be for Variscite, at its sole discretion, to either repair or replace the defective hardware product at no charge or to refund the purchase price. Shipment costs in both directions are the responsibility of the customer. This warranty is void if the hardware product has been altered or damaged by accident, misuse or abuse.

Disclaimer of Warranty

THIS WARRANTY IS MADE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESSED, OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A SPECIFIC PURPOSE, NON-INFRINGEMENT OR THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION, EXCEPT THE WARRANTY EXPRESSLY STATED HEREIN. THE REMEDIES SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDIES OF ANY PURCHASER WITH RESPECT TO ANY DEFECTIVE PRODUCT.

Limitation on Liability

UNDER NO CIRCUMSTANCES SHALL VARISCITE BE LIABLE FOR ANY LOSS, DAMAGE OR EXPENSE SUFFERED OR INCURRED WITH RESPECT TO ANY DEFECTIVE PRODUCT. IN NO EVENT SHALL VARISCITE BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT YOU MAY SUFFER DIRECTLY OR INDIRECTLY FROM USE OF ANY PRODUCT.

7 Contact information

Headquarters
Variscite LTD
4, Hamelacha st.
Lod.
P.O.B 1121
Airport City, 70100
ISRAEL
Phone +972 (9) 9562910 • Fax +972 (9) 9589477

Tel: +972 (9) 9562910
Fax: +972 (9) 9589477

Sales: sales@variscite.com
Technical support: support@variscite.com

Website: www.variscite.com