



Trizeps VII SX V1R1 – Datasheet 0.9.3

1.0 Introduction

The Trizeps VII SX module is powered by the Freescale™ i.MX 6SoloX processor. This features Freescale's advanced implementation of the single ARM Cortex –A9 core, which operates at speeds up to 800 MHz, in addition to the ARM Cortex-M4 core, which operates at speeds of up to 227 MHz. This type of heterogeneous multicore architecture provides greater levels of system integration, smart low-power system awareness, and a fast real-time responsiveness. The i.MX 6SoloX includes a GPU processor capable of supporting 2D and 3D operations, a wide range of display and connectivity options, and integrated power management.

1.1 Features and Interfaces

Main features of Trizeps VII SX

Processor:

Freescale i.MX 6SoloX up to 800 MHz

Memory:

Up to 1 GByte LVDDR3 800MHz

Storage:

µSD 4 GB (option up to 32 GB) or
eMMC 4 GB (option up to 64 GB)

Wireless:

WLAN 802.11 a/b/g/n Dual-band Wi-Fi
Bluetooth 3.0+HS (High Speed)
Bluetooth 2.1+EDR (Enhanced Data Rate)

Power:

PMIC to generate internal and external voltages
Li-ion battery-charger (assembly option)

Dimensions:

(Length x Width x Height): 67.6 x 36.7 x 8.0 mm

Interfaces / Signals accessible over SODIMM or HS connector

Display interfaces:

- LVDS
- LCD 24 bit RGB

Camera interface:

- 8 bit parallel camera
- Analog camera interface

Ethernet:

- Onboard 10/100 Mbit RMII PHY
- 10/100/1000 Mbit RGMII

Audio Codec:

- AC'97 Audio Codec with 4/5 wires resistive touch
- 4 x 12 Bit ADC (2 x comparator inputs for battery monitoring)
- Line-in, Mic-in, Speaker-out, Headphone out

Interfaces:

- | | |
|------------------------|-------------|
| • USB 2.0 Host and OTG | • 3 x UARTs |
| • 2 x FlexCAN | • 2 x I2C |
| • 2 x 4 bit wide SDIO | • 2 x SPI |
| • RTC | • GPIOs |
| • SPDIF | • PWM |

2 Pinout information and description

All significant signals are accessible via the 200-pin SODIMM socket like previous Trizeps modules before. Additional high-speed interfaces are accessible to the new 60 pin FX11 connector. For detailed information about pinmux options and compatibility to previous Trizeps versions, please refer to the actual "sodimm200_standard" excel file in the service area of our website:

<http://www.keith-koep.com/service/doku.php/service>

We recommend the 200 pin SODIMM connector by Tyco Electronics with the part number 1376408-1 and the 60 pin FX11 connector by Hirose with the part number FX11A-60S/6-SV(71).

J1: SODIMM200 Connector (primary function)

Signal	Pin	Pin	Signal
MIC_OUT	1	2	AD3
MIC_GND	3	4	AD2
LINEIN_L	5	6	AD1
LINEIN_R	7	8	AD0
AUDIO_GND	9	10	AUDIO_AVDD
AUDIO_GND	11	12	AUDIO_AVDD
HEADPHONE_GND	13	14	TSPX
HEADPHONE_L	15	16	TSMX
HEADPHONE_R	17	18	TSPY
UART3_RXD	19	20	TSMY
UART3_TXD	21	22	
UART1_DTR	23	24	(ENET_RESET_N)
UART1_CTS	25	26	RESET_IN_N
UART1_RTS	27	28	(SPEAKER_R)
UART1_DSR	29	30	(SPEAKER_L)
UART1_DCD	31	32	UART2_CTS
UART1_RXD	33	34	UART2_RTS
UART1_TXD	35	36	UART2_RXD
UART1_RI	37	38	UART2_TXD
GND	39	40	+3V3
GND	41	42	+3V3
SPIN43	43	44	LCD_ENABLE
SPIN45	45	46	LCD_DATA07
SD2_CLK	47	48	LCD_DATA09
CSI_DATA0	49	50	LCD_DATA11
SD2_DATA3	51	52	LCD_DATA12
CSI_DATA1	53	54	LCD_DATA13
SPIN55	55	56	LCD_PCLK
CSI_DATA2	57	58	LCD_DATA03
SD2_CARDDTECT	59	60	LCD_DATA02
CSI_DATA3	61	62	LCD_DATA08
CSI_DATA4	63	64	LCD_DATA15
CSI_DATA5	65	66	LCD_DATA14
CSI_DATA6	67	68	LCD_HSYNC
SPIN69	69	70	LCD_DATA01
CSI_DATA7	71	72	LCD_DATA05

SPIN73	73	74	LCD_DATA10
SPIN75	75	76	LCD_DATA00
SPIN77	77	78	LCD_DATA04
SPIN79	79	80	LCD_DATA06
SD2_DATA1	81	82	LCD_VSYNC
GND	83	84	+3V3
SD2_DATA2	85	86	CSI_VSYNC
RESET_OUT_N	87	88	CSI_MCLK
EIM_WE	89	90	CSI_PCLK
EIM_OE	91	92	CSI_HSYNC
SPIN93	93	94	I2C1_SCL
EIM_WAIT	95	96	I2C1_SDA
CAN1_RX	97	98	SPIN98
CAN1_TX	99	100	SPIN100
CAN2_RX	101	102	SPIN102
CAN2_TX	103	104	SPIN104
(CODEC_IRQ)	105	106	SPIN106
EIM_CS0	107	108	+3V3
GND	109	110	PMIC_GPIO0
EIM_A00	111	112	PMIC_GPIO1
EIM_A01	113	114	PMIC_GPIO2
EIM_A02	115	116	PMIC_GPIO3
EIM_A03	117	118	
EIM_A04	119	120	
EIM_A05	121	122	
EIM_A06	123	124	
EIM_A07	125	126	EIM_EB0
USB_OTG1_PWR	127	128	EIM_EB1
USB_OTG2_PWR	129	130	PMIC_INT_N
USB_OTG2_OC	131	132	
USB_OTG1_OC	133	134	
USB_OTG1_VBUS	135	136	
USB_OTG1_ID	137	138	
USB_OTG1_DP	139	140	
USB_OTG1_DN	141	142	
USB_OTG2_DP	143	144	
USB_OTG2_DN	145	146	BT_PCM_IN
GND	147	148	+3V3
EIM_D00	149	150	LCD_DATA16
EIM_D01	151	152	LCD_DATA17
EIM_D02	153	154	PCIE_WAKE_N
EIM_D03	155	156	VGEN_LDO
EIM_D04	157	158	PCIE_CLKP
EIM_D05	159	160	PCIE_CLKN
EIM_D06	161	162	PCIE_TXP
EIM_D07	163	164	PCIE_TXN
EIM_D08	165	166	PCIE_RXP
EIM_D09	167	168	PCIE_RXN
EIM_D10	169	170	LCD_DATA21
EIM_D11	171	172	LCD_DATA20
EIM_D12	173	174	LCD_DATA19

EIM_D13	175	176	LCD_DATA18
EIM_D14	177	178	LCD_DATA23
EIM_D15	179	180	LCD_DATA22
GND	181	182	+3V3
ENET1_LINK_N	183	184	BT_PCM_OUT
9ENET1_SPEED_N	185	186	BT_PCM_CLK
ENET1_TRD1-	187	188	BT_PCM_SYNC
ENET1_TRD1+	189	190	SD2_CMD
GND	191	192	SD2_DATA0
ENET1_TRD2-	193	194	I2C2_SDA
ENET1_TRD2+	195	196	I2C2_SCL
GND	197	198	+3V3
GND	199	200	RTC_LICELL

Pins not assigned to a signal are not connected on Trizeps VII SX.

Pin names in brackets indicate that this signal is associated with a mounting option. Contact Keith & Koep for details.

J2: FX11 B2B Connector

Signal	Pin	Pin	Signal
RGMII2_RXC	1	2	VBAT
RGMII2_TD3	3	4	VBAT
RGMII2_RD2	5	6	VBAT
RGMII2_RD1	7	8	VBAT
RGMII2_RD0	9	10	VBAT
GND	11	12	GND
RGMII2_TD0	13	14	VBAT
RGMII2_TX_CTL	15	16	VBAT
RGMII2_TXC	17	18	VBAT_GND
RGMII2_RX_CTL	19	20	VBAT_GND
RGMII2_TD2	21	22	VBAT_GND
RGMII2_RD3	23	24	VBAT_GND
RGMII2_TD1	25	26	VBAT_GND
ENET_MDC	27	28	VBAT_GND
ENET_MDIO	29	30	VBAT_GND
ENET_REFCLK_50MHZ	31	32	VBAT_THERM
GND	33	34	GND
LVDS_DATA_1N	35	36	(VSY5)
LVDS_DATA_1P	37	38	(VSY5)
LVDS_DATA_0P	39	40	(VSY5)
LVDS_DATA_0N	41	42	(VSY5)
LVDS_CLKN	43	44	VIN_5V
LVDS_CLKP	45	46	VIN_5V
LVDS_DATA_2P	47	48	VIN_5V
LVDS_DATA_2N	49	50	VIN_5V
LVDS_DATA_3P	51	52	VIN_5V
LVDS_DATA_3N	53	54	VIN_5V
GND	55	56	GND
(VDD_RGMII)	57	58	VIN_5V
-	59	60	VIN_5V

-	61	62	-
VADC_IN2	63	64	VADC_IN0
VADC_IN3	65	66	VADC_IN1
GND	67	68	GND

Pins not assigned to a signal are not connected on Trizeps VII SX.

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J74: JTAG Connector

This flex-cable-connector uses the Keith & Koep JTAG connector standard. An adapter to Multi-ICE pin-header is available.

Pin	Signal
1	+3V3
2	GND
3	JTAG_TMS
4	JTAG_TRST_N
5	JTAG_TCK
6	JTAG_TDO
7	JTAG_TDI
8	JTAG_SRST_N

2.1 Pin-Mux Information

Several pins are GPIOs which may be configured for different functions by software.

Please check with the processor datasheet for additional pin-mux information.

The enumeration of interfaces on the SODIMM does not necessarily need to match the one used by the processor; i.e. J1-19 UART3_RXD is the standard COM3: of the Keith & Koep SODIMM200-standard, but is routed to UART2_RX of the i.MX6 SoloX processor.

PIN	Name	Mux1	Mux2	Mux3	Mux4
J1-19	UART3_RXD	UART2_RX			GPIO1_7
J1-21	UART3_TXD	UART2_TX			GPIO1_6
J1-23	UART1_DTR				GPIO2_6
J1-25	UART1_CTS	UART1_RTS			GPIO2_8
J1-27	UART1_RTS	UART1_CTS			GPIO2_9
J1-29	UART1_DSR	UART1_DSR			GPIO2_4
J1-31	UART1_DCD	UART1_DCD			GPIO2_1
J1-33	UART1_RXD	UART1_RX			GPIO1_5
J1-35	UART1_TXD	UART1_TX			GPIO1_4
J1-37	UART1_RI	UART1_RI			GPIO2_0
J1-43	SPIN43				GPIO2_19
J1-45	SPIN45				GPIO2_14
J1-47	SD2_CLK	SD2_CLK			GPIO6_6
J1-49	CSI_DATA0	CSI1_DATA2	AUD6_TXC		GPIO1_14
J1-51	SD2_DATA3	SD2_DATA3			GPIO6_11
J1-53	CSI_DATA1	CSI1_DATA3	AUD6_TXFS		GPIO1_15
J1-55	SPIN55				GPIO5_8
J1-57	CSI_DATA2	CSI1_DATA4			GPIO1_16
J1-59	SD2_CARDDetect				GPIO5_9
J1-61	CSI_DATA3	CSI1_DATA5			GPIO1_17
J1-63	CSI_DATA4	CSI1_DATA6			GPIO1_18
J1-65	CSI_DATA5	CSI1_DATA7			GPIO1_19
J1-67	CSI_DATA6	CSI1_DATA8			GPIO1_20
J1-69	SPIN69	PWM1	USBH_STROBE		GPIO7_11
J1-71	CSI_DATA7	CSI1_DATA9			GPIO1_21
J1-73	SPIN73				GPIO3_27
J1-75	SPIN75	PWM2	USBH_DATA		GPIO7_10
J1-77	SPIN77	PWM4			GPIO1_13
J1-79	SPIN79				GPIO4_1
J1-81	SD2_DATA1	SD2_DATA1	UART4_RX/TX		GPIO6_9
J1-85	SD2_DATA2	SD2_DATA2	UART6_RX/TX		GPIO6_10
J1-89	EIM_WE	EIM_RW			GPIO4_12
J1-91	EIM_OE	EIM_OE			GPIO4_2
J1-93	SPIN93				GPIO4_3
J1-95	EIM_WAIT	EIM_WAIT			GPIO4_14
J1-97	CAN1_RX	CAN1_RX	SD3_DATA7		GPIO7_9
J1-99	CAN1_TX	CAN1_TX	SD3_DATA5		GPIO7_7
J1-101	CAN2_RX	CAN2_RX	SD3_DATA4		GPIO7_6
J1-103	CAN2_TX	CAN2_TX	SD3_DATA6		GPIO7_8
J1-105	(CODEC_IRQ)		SD3_DATA1		GPIO7_3

J1-107	EIM_CS0	EIM_CS0			GPIO4_0
J1-111	EIM_A00	EIM_A00			GPIO4_4
J1-113	EIM_A01	EIM_A01			GPIO4_5
J1-115	EIM_A02	EIM_A02			GPIO4_6
J1-117	EIM_A03	EIM_A03			GPIO4_7
J1-119	EIM_A04	EIM_A04			GPIO4_8
J1-121	EIM_A05	EIM_A05			GPIO4_9
J1-123	EIM_A06	EIM_A06	UART3_RX/TX		GPIO4_10
J1-125	EIM_A07	EIM_A07	UART3_RX/TX	PWM4	GPIO4_11
J1-149	EIM_D00	EIM_D00	QSPI1A_SCLK		GPIO4_21
J1-151	EIM_D01	EIM_D01	QSPI1A_SS0_N		GPIO4_22
J1-153	EIM_D02	EIM_D02	QSPI1A_SS1_N		GPIO4_23
J1-155	EIM_D03	EIM_D03	QSPI1A_DATA3		GPIO4_19
J1-157	EIM_D04	EIM_D04	QSPI1A_DATA2		GPIO4_18
J1-159	EIM_D05	EIM_D05	QSPI1A_DATA1		GPIO4_17
J1-161	EIM_D06	EIM_D06	QSPI1A_DATA0		GPIO4_16
J1-163	EIM_D07	EIM_D07	QSPI1A_DQS		GPIO4_20
J1-165	EIM_D08	EIM_D08	QSPI1B_SCLK		GPIO4_29
J1-167	EIM_D09	EIM_D09	QSPI1B_SS0_N		GPIO4_30
J1-169	EIM_D10	EIM_D10	QSPI1B_SS1_N		GPIO4_31
J1-171	EIM_D11	EIM_D11	QSPI1B_DATA3		GPIO4_27
J1-173	EIM_D12	EIM_D12	QSPI1B_DATA2		GPIO4_26
J1-175	EIM_D13	EIM_D13	QSPI1B_DATA1		GPIO4_25
J1-177	EIM_D14	EIM_D14	QSPI1B_DATA0		GPIO4_24
J1-179	EIM_D15	EIM_D15	QSPI1B_DQS		GPIO4_28
J1-32	UART2_CTS	UART5_RTS			GPIO2_12
J1-34	UART2_RTS	UART5_CTS			GPIO2_17
J1-36	UART2_RXD	UART5_RX			GPIO2_18
J1-38	UART2_TXD	UART5_TX			GPIO2_13
J1-44	LCD_ENABLE	LCD1_ENABLE			GPIO3_25
J1-46	LCD_DATA07	LCD1_DATA07			GPIO3_8
J1-48	LCD_DATA09	LCD1_DATA09			GPIO3_10
J1-50	LCD_DATA11	LCD1_DATA11			GPIO3_12
J1-52	LCD_DATA12	LCD1_DATA12			GPIO3_13
J1-54	LCD_DATA13	LCD1_DATA13			GPIO3_14
J1-56	LCD_PCLK	LCD1_CLK			GPIO3_0
J1-58	LCD_DATA03	LCD1_DATA03			GPIO3_4
J1-60	LCD_DATA02	LCD1_DATA02			GPIO3_3
J1-62	LCD_DATA08	LCD1_DATA08			GPIO3_9
J1-64	LCD_DATA15	LCD1_DATA15			GPIO3_16
J1-66	LCD_DATA14	LCD1_DATA14			GPIO3_15
J1-68	LCD_HSYNC	LCD1_HSYNC			GPIO3_26
J1-70	LCD_DATA01	LCD1_DATA01			GPIO3_2
J1-72	LCD_DATA05	LCD1_DATA05			GPIO3_6
J1-74	LCD_DATA10	LCD1_DATA10			GPIO3_11
J1-76	LCD_DATA00	LCD1_DATA00			GPIO3_1

J1-78	LCD_DATA04	LCD1_DATA04			GPIO3_5
J1-80	LCD_DATA06	LCD1_DATA06			GPIO3_7
J1-82	LCD_VSYNC	LCD1_VSYNC			GPIO3_28
J1-86	CSI_VSYNC	CSI_VSYNC	AUD6_RXD		GPIO1_25
J1-88	CSI_MCLK	CSI_MCLK	UART4_RX/TX		GPIO1_23
J1-90	CSI_PCLK	CSI_PCLK	AUD_MCLK		GPIO1_24
J1-92	CSI_HSYNC	CSI_HSYNC	AUD6_TXD		GPIO1_22
J1-94	I2C1_SCL	I2C1_SCL	SPDIF_LOCK		GPIO1_0
J1-96	I2C1_SDA	I2C1_SDA	SPDIF_SR_CLK		GPIO1_1
J1-98	SPIN98		SD3_DATA2		
J1-100	SPIN100		SD3_DATA3		
J1-102	SPIN102		SD3_CLK		GPIO7_4
J1-104	SPIN104		SD3_CMD		GPIO7_1
J1-106	SPIN106		SD3_DATA0		GPIO7_2
J1-126	EIM_EB0	EIM_EB0			GPIO4_15
J1-128	EIM_EB1	EIM_EB1			GPIO4_13
J1-150	LCD_DATA16	LCD_DATA16			GPIO3_17
J1-152	LCD_DATA17	LCD_DATA17			GPIO3_18
J1-170	LCD_DATA21	LCD_DATA21			GPIO3_22
J1-172	LCD_DATA20	LCD_DATA20	PWM8		GPIO3_21
J1-174	LCD_DATA19	LCD_DATA19			GPIO3_20
J1-176	LCD_DATA18	LCD_DATA18			GPIO3_19
J1-178	LCD_DATA23	LCD_DATA23	PWM5		GPIO3_24
J1-180	LCD_DATA22	LCD_DATA22	PWM6		GPIO3_23
J1-190	SD2_CMD	SD2_CMD			GPIO6_7
J1-192	SD2_DATA0	SD2_DATA0			GPIO6_8

2.2 Electrical Pin-Information

PI: Power Input
 PO: Power Output
 CO: Charger Output

AI: Analog Input
 AO: Analog Output
 ADI: Analog Differential Input
 ADO: Analog Differential Output
 ADIO: Analog Differential Input/Output

DI: Digital Input
 DO: Digital Output
 DIO: Digital Input/Output

PD: Pull-Down (PDp: Pull-Down, Pull-behavior can be changed by software)
 PU: Pull-Up (PUp: Pull-Up, Pull-behavior can be changed by software)

PIN	Name	Type	Voltage	Connected To
J1-1	MIC_OUT	AI	+3V3	WM971xL
J1-3	MIC_GND	GND		WM971xL
J1-5	LINEIN_L	AI	+3V3	WM971xL
J1-7	LINEIN_R	AI	+3V3	WM971xL
J1-9	AUDIO_GND	Analog Audio Gnd		
J1-11	AUDIO_GND			
J1-13	HEADPHONE_GND	AO	AUDIO_AVDD/2	WM971xL
J1-15	HEADPHONE_L	AI	+3V3	WM971xL
J1-17	HEADPHONE_R	AI	+3V3	WM971xL
J1-19	UART3_RXD	DIO	+3V3	i.MX6 SoloX
J1-21	UART3_TXD	DIO	+3V3	i.MX6 SoloX
J1-23	UART1_DTR	DIO	+3V3	i.MX6 SoloX
J1-25	UART1_CTS	DIO	+3V3	i.MX6 SoloX
J1-27	UART1_RTS	DIO	+3V3	i.MX6 SoloX
J1-29	UART1_DSR	DIO	+3V3	i.MX6 SoloX
J1-31	UART1_DCD	DIO	+3V3	i.MX6 SoloX
J1-33	UART1_RXD	DIO	+3V3	i.MX6 SoloX
J1-35	UART1_TXD	DIO	+3V3	i.MX6 SoloX
J1-37	UART1_RI	DIO	+3V3	i.MX6 SoloX
J1-39	GND			
J1-41	GND			
J1-43	SPIN43	DIO	+3V3	i.MX6 SoloX
J1-45	SPIN45	DIO	+3V3	i.MX6 SoloX
J1-47	SD2_CLK	DIO	+3V3	i.MX6 SoloX
J1-49	CSI_DATA0	DIO	+3V3	i.MX6 SoloX
J1-51	SD2_DATA3	DIO	+3V3	i.MX6 SoloX
J1-53	CSI_DATA1	DIO	+3V3	i.MX6 SoloX
J1-55	SPIN55	DIO	+3V3	i.MX6 SoloX
J1-57	CSI_DATA2	DIO	+3V3	i.MX6 SoloX
J1-59	SD2_CARDDetect	DIO	+3V3	i.MX6 SoloX
J1-61	CSI_DATA3	DIO	+3V3	i.MX6 SoloX
J1-63	CSI_DATA4	DIO	+3V3	i.MX6 SoloX
J1-65	CSI_DATA5	DIO	+3V3	i.MX6 SoloX
J1-67	CSI_DATA6	DIO	+3V3	i.MX6 SoloX
J1-69	SPIN69	DIO	+3V3	i.MX6 SoloX
J1-71	CSI_DATA7	DIO	+3V3	i.MX6 SoloX
J1-73	SPIN73	DIO	+3V3	i.MX6 SoloX
J1-75	SPIN75	DIO	+3V3	i.MX6 SoloX
J1-77	SPIN77	DIO	+3V3	i.MX6 SoloX
J1-79	SPIN79	DIO	+3V3	i.MX6 SoloX
J1-81	SD2_DATA1	DIO	+3V3	i.MX6 SoloX
J1-83	GND			
J1-85	SD2_DATA2			
J1-87	RESET_OUT_N	DO	+3V3	i.MX6 SoloX
J1-89	EIM_WE	DIO	+3V3	i.MX6 SoloX
J1-91	EIM_OE	DIO	+3V3	i.MX6 SoloX
J1-93	SPIN93	DIO	+3V3	i.MX6 SoloX
J1-95	EIM_WAIT	DIO	+3V3	i.MX6 SoloX
J1-97	CAN1_RX	DIO	+3V3	i.MX6 SoloX

J1-99	CAN1_TX	DIO	+3V3	i.MX6 SoloX
J1-101	CAN2_RX	DIO	+3V3	i.MX6 SoloX
J1-103	CAN2_TX	DIO	+3V3	i.MX6 SoloX
J1-105	(CODEC_IRQ)	DIO	+3V3	i.MX6 SoloX
J1-107	EIM_CS0	DIO	+3V3	i.MX6 SoloX
J1-109	GND			
J1-111	EIM_A00	DIO	+3V3	i.MX6 SoloX
J1-113	EIM_A01	DIO	+3V3	i.MX6 SoloX
J1-115	EIM_A02	DIO	+3V3	i.MX6 SoloX
J1-117	EIM_A03	DIO	+3V3	i.MX6 SoloX
J1-119	EIM_A04	DIO	+3V3	i.MX6 SoloX
J1-121	EIM_A05	DIO	+3V3	i.MX6 SoloX
J1-123	EIM_A06	DIO	+3V3	i.MX6 SoloX
J1-125	EIM_A07	DIO	+3V3	i.MX6 SoloX
J1-127	USB_OTG_PWR	DO	+3V3	i.MX6 SoloX
J1-129	USB_HOST_PWR	DO	+3V3	i.MX6 SoloX
J1-131	USB_HOST_OC	DI	+3V3	i.MX6 SoloX
J1-133	USB_OTG_OC	DI	+3V3	i.MX6 SoloX
J1-135	USB_OTG_VBUS	AI	+5V	i.MX6 SoloX
J1-137	USB_OTG_ID	DI	+3V3	i.MX6 SoloX
J1-139	USB_OTG_DP	ADIO	+3V3	i.MX6 SoloX
J1-141	USB_OTG_DN	ADIO	+3V3	i.MX6 SoloX
J1-143	USB_HOST_DP	ADIO	+3V3	i.MX6 SoloX
J1-145	USB_HOST_DN	ADIO	+3V3	i.MX6 SoloX
J1-147	GND			
J1-149	EIM_D00	DIO	+3V3	i.MX6 SoloX
J1-151	EIM_D01	DIO	+3V3	i.MX6 SoloX
J1-153	EIM_D02	DIO	+3V3	i.MX6 SoloX
J1-155	EIM_D03	DIO	+3V3	i.MX6 SoloX
J1-157	EIM_D04	DIO	+3V3	i.MX6 SoloX
J1-159	EIM_D05	DIO	+3V3	i.MX6 SoloX
J1-161	EIM_D06	DIO	+3V3	i.MX6 SoloX
J1-163	EIM_D07	DIO	+3V3	i.MX6 SoloX
J1-165	EIM_D08	DIO	+3V3	i.MX6 SoloX
J1-167	EIM_D09	DIO	+3V3	i.MX6 SoloX
J1-169	EIM_D10	DIO	+3V3	i.MX6 SoloX
J1-171	EIM_D11	DIO	+3V3	i.MX6 SoloX
J1-173	EIM_D12	DIO	+3V3	i.MX6 SoloX
J1-175	EIM_D13	DIO	+3V3	i.MX6 SoloX
J1-177	EIM_D14	DIO	+3V3	i.MX6 SoloX
J1-179	EIM_D15	DIO	+3V3	i.MX6 SoloX
J1-181	GND			
J1-183	ENET1_LINK_N	DO	+3V3	LAN8742A
J1-185	ENET1_SPEED_N	DO	+3V3	LAN8742A
J1-187	ENET1_TXN	ADIO	+3V3	LAN8742A
J1-189	ENET1_TXP	ADIO	+3V3	LAN8742A
J1-191	GND			
J1-193	ENET1_RXN	ADIO	+3V3	LAN8742A
J1-195	ENET1_RXP	ADIO	+3V3	LAN8742A
J1-197	GND			
J1-199	GND			

J1-2	AD3	AI	7.5V / (3.3V)	WM971xL / i.MX6 SoloX
J1-4	AD2	AI	7.5V / (3.3V)	WM971xL / i.MX6 SoloX
J1-6	AD1	AI	7.5V / (3.3V)	WM971xL / i.MX6 SoloX
J1-8	AD0	AI	7.5V / (3.3V)	WM971xL / i.MX6 SoloX
J1-10	AUDIO_AVDD	PI	Typ. 3.3V (clean analog voltage)	WM971xL
J1-12	AUDIO_AVDD			
J1-14	TSPX	AIO	3.3V	WM971xL / i.MX6 SoloX
J1-16	TSMX	AIO	3.3V	WM971xL / i.MX6 SoloX
J1-18	TSPY	AIO	3.3V	WM971xL / i.MX6 SoloX
J1-20	TSMY	AIO	3.3V	WM971xL / i.MX6 SoloX
J1-24	(ENET_RESET_N)	DO	+3V3	i.MX6 SoloX
J1-26	RESET_IN_N	AI	+3V3	Reset- Generator
J1-28	SPEAKER_R	AO		WM971xL
J1-30	SPEAKER_L	AO		WM971xL
J1-32	UART2_CTS	DIO	+3V3	i.MX6 SoloX
J1-34	UART2_RTS	DIO	+3V3	i.MX6 SoloX
J1-36	UART2_RXD	DIO	+3V3	i.MX6 SoloX
J1-38	UART2_TXD	DIO	+3V3	i.MX6 SoloX
J1-40	+3V3	PI,PO	Typ. 3.3V	
J1-42	+3V3			
J1-44	LCD_ENABLE	DIO	+3V3	i.MX6 SoloX
J1-46	LCD_DATA07	DIO	+3V3	i.MX6 SoloX
J1-48	LCD_DATA09	DIO	+3V3	i.MX6 SoloX
J1-50	LCD_DATA11	DIO	+3V3	i.MX6 SoloX
J1-52	LCD_DATA12	DIO	+3V3	i.MX6 SoloX
J1-54	LCD_DATA13	DIO	+3V3	i.MX6 SoloX
J1-56	LCD_PCLK	DIO	+3V3	i.MX6 SoloX
J1-58	LCD_DATA03	DIO	+3V3	i.MX6 SoloX
J1-60	LCD_DATA02	DIO	+3V3	i.MX6 SoloX
J1-62	LCD_DATA08	DIO	+3V3	i.MX6 SoloX
J1-64	LCD_DATA15	DIO	+3V3	i.MX6 SoloX
J1-66	LCD_DATA14	DIO	+3V3	i.MX6 SoloX
J1-68	LCD_HSYNC	DIO	+3V3	i.MX6 SoloX
J1-70	LCD_DATA01	DIO	+3V3	i.MX6 SoloX
J1-72	LCD_DATA05	DIO	+3V3	i.MX6 SoloX
J1-74	LCD_DATA10	DIO	+3V3	i.MX6 SoloX
J1-76	LCD_DATA00	DIO	+3V3	i.MX6 SoloX
J1-78	LCD_DATA04	DIO	+3V3	i.MX6 SoloX
J1-80	LCD_DATA06	DIO	+3V3	i.MX6 SoloX
J1-82	LCD_VSYNC	DIO	+3V3	i.MX6 SoloX
J1-84	+3V3	PI,PO	Typ. 3.3V	

J1-86	CSI_VSYNC	DIO	+3V3	i.MX6 SoloX
J1-88	CSI_MCLK	DIO	+3V3	i.MX6 SoloX
J1-90	CSI_PCLK	DIO	+3V3	i.MX6 SoloX
J1-92	CSI_HSYNC	DIO	+3V3	i.MX6 SoloX
J1-94	I2C1_SCL	DIO	+3V3	i.MX6 SoloX
J1-96	I2C1_SDA	DIO	+3V3	i.MX6 SoloX
J1-98	SPIN98	DIO	+3V3	i.MX6 SoloX
J1-100	SPIN100	DIO	+3V3	i.MX6 SoloX
J1-102	SPIN102	DIO	+3V3	i.MX6 SoloX
J1-104	SPIN104	DIO	+3V3	i.MX6 SoloX
J1-106	SPIN106	DIO	+3V3	i.MX6 SoloX
J1-108	+3V3	PI,PO	Typ. 3.3V	
J1-110	PMIC_GPIO0	DIO	+3V3	RN5T618
J1-112	PMIC_GPIO1	DIO	VSYS	RN5T618
J1-114	PMIC_GPIO2	DIO	VSYS	RN5T618
J1-116	PMIC_GPIO3	DIO	VSYS	RN5T618
J1-126	EIM_EB0	DIO	+3V3	i.MX6 SoloX
J1-128	EIM_EB1	DIO	+3V3	i.MX6 SoloX
J1-130	PMIC_INT_N	DO	VSYS	RN5T618
J1-146	BT_PCM_IN	DI	+3V3	SDIO8787
J1-148	+3V3	PI,PO	Typ. 3.3V	
J1-150	LCD_DATA16	DIO	+3V3	i.MX6 SoloX
J1-152	LCD_DATA17	DIO	+3V3	i.MX6 SoloX
J1-154	PCIE_WAKE_N	DIO	+3V3	i.MX6 SoloX
J1-156	VGEN_LDO	PO	Off (0.9V .. 3.5V)	RN5T618
J1-158	PCIE_CLKP	ADIO	2.5V	i.MX6 SoloX
J1-160	PCIE_CLKN	ADIO	2.5V	i.MX6 SoloX
J1-162	PCIE_TXP	ADO	2.5V	i.MX6 SoloX
J1-164	PCIE_TXN	ADO	2.5V	i.MX6 SoloX
J1-166	PCIE_RXP	ADI	2.5V	i.MX6 SoloX
J1-168	PCIE_RXN	ADI	2.5V	i.MX6 SoloX
J1-170	LCD_DATA21	DIO	+3V3	i.MX6 SoloX
J1-172	LCD_DATA20	DIO	+3V3	i.MX6 SoloX
J1-174	LCD_DATA19	DIO	+3V3	i.MX6 SoloX
J1-176	LCD_DATA18	DIO	+3V3	i.MX6 SoloX
J1-178	LCD_DATA23	DIO	+3V3	i.MX6 SoloX
J1-180	LCD_DATA22	DIO	+3V3	i.MX6 SoloX
J1-182	+3V3	PI,PO	Typ. 3.3V	
J1-184	BT_PCM_OUT	DO	+3V3	SDIO8787
J1-186	BT_PCM_CLK	DIO	+3V3	SDIO8787
J1-188	BT_PCM_SYNC	DIO	+3V3	SDIO8787
J1-190	SD2_CMD	DIO	+3V3	i.MX6 SoloX
J1-192	SD2_DATA0	DIO	+3V3	i.MX6 SoloX
J1-194	I2C2_SDA	DO	+3V3	i.MX6 SoloX
J1-196	I2C2_SCL	DIO	+3V3	i.MX6 SoloX
J1-198	+3V3	PI,PO	Typ. 3.3V	
J1-200	RTC_LICELL	PI,PO		
J2-1	RGMII2_RXC	DIO	VDD_RGMII	i.MX6 SoloX
J2-3	RGMII2_TD3	DO	VDD_RGMII	i.MX6 SoloX
J2-5	RGMII2_RD2	DI	VDD_RGMII	i.MX6 SoloX

J2-7	RGMI2_RD1	DI	VDD_RGMII	i.MX6 SoloX
J2-9	RGMI2_RD0	DI	VDD_RGMII	i.MX6 SoloX
J2-11	GND			
J2-13	RGMI2_TD0	DO	VDD_RGMII	i.MX6 SoloX
J2-15	RGMI2_TX_CTL	DIO	VDD_RGMII	i.MX6 SoloX
J2-17	RGMI2_TXC	DIO	VDD_RGMII	i.MX6 SoloX
J2-19	RGMI2_RX_CTL	DIO	VDD_RGMII	i.MX6 SoloX
J2-21	RGMI2_TD2	DO	VDD_RGMII	i.MX6 SoloX
J2-23	RGMI2_RD3	DI	VDD_RGMII	i.MX6 SoloX
J2-25	RGMI2_TD1	DO	VDD_RGMII	i.MX6 SoloX
J2-27	ENET_MDC	DIO	+3V3	i.MX6 SoloX
J2-29	ENET_MDIO	DIO	+3V3	i.MX6 SoloX
J2-31	ENET_REFCLK_50MHZ	DIO	+3V3	i.MX6 SoloX
J2-33	GND			
J2-35	LVDS_DATA_1N	ADO	2.5V	i.MX6 SoloX
J2-37	LVDS_DATA_1P	ADO	2.5V	i.MX6 SoloX
J2-39	LVDS_DATA_OP	ADO	2.5V	i.MX6 SoloX
J2-41	LVDS_DATA_ON	ADO	2.5V	i.MX6 SoloX
J2-43	LVDS_CLKN	ADO	2.5V	i.MX6 SoloX
J2-45	LVDS_CLKP	ADO	2.5V	i.MX6 SoloX
J2-47	LVDS_DATA_2P	ADO	2.5V	i.MX6 SoloX
J2-49	LVDS_DATA_2N	ADO	2.5V	i.MX6 SoloX
J2-51	LVDS_DATA_3P	ADO	2.5V	i.MX6 SoloX
J2-53	LVDS_DATA_3N	ADO	2.5V	i.MX6 SoloX
J2-55	GND			
J2-57	(VDD_RGMII)	PO	Typ. 2.5V (1.2V, 1.5V)	RN5T618
J2-63	VADC_IN2	AI	+3V3	i.MX6 SoloX
J2-65	VADC_IN3	AI	+3V3	i.MX6 SoloX
J2-67	GND			
J2-2	VBAT	PI,CO	2.7V .. 5.5V	RN5T618
J2-4	VBAT			
J2-6	VBAT			
J2-8	VBAT			
J2-10	VBAT			
J2-12	GND			
J2-14	VBAT	PI,CO	2.7V .. 5.5V	RN5T618
J2-16	VBAT			
J2-18	VBAT_GND			
J2-20	VBAT_GND			
J2-22	VBAT_GND			
J2-24	VBAT_GND			
J2-26	VBAT_GND			
J2-28	VBAT_GND			
J2-30	VBAT_GND			
J2-32	VBAT_THERM	AI		RN5T618
J2-34	GND			
J2-36	VSYS	PO	2.7V .. 5.5V	RN5T618
J2-38	VSYS			
J2-40	VSYS			

J2-42	VSYS			
J2-44	VIN_5V	PI	4.5V .. 5.5V	RN5T618
J2-46	VIN_5V			
J2-48	VIN_5V			
J2-50	VIN_5V			
J2-52	VIN_5V			
J2-54	VIN_5V			
J2-56	GND			
J2-58	VIN_5V	PI	4.5V .. 5.5V	RN5T618
J2-60	VIN_5V			
J2-64	VADC_IN0	AI	+3V3	i.MX6 SoloX
J2-66	VADC_IN1	AI	+3V3	i.MX6 SoloX
J2-68	GND			

3. Interfaces

This chapter includes a short description of all interfaces of the Trizeps VII SX. Please consult the processor datasheet for detailed information.

3.1 Power Supply

There are two main power supply scenarios. +3V3 Input Power on SODIMM or +5V on FX-Connector with power management for battery charging.

Name	Description
VBAT	Main power input. Battery node; input during battery operation, output during charging.
BAT_THERM	Main battery thermistor analog input.
VIN_5V	Main power input
+3V3	Main power input
VGEN_LDO	+1.8V power output (max. <110mA)
VDD_RGMII	+1V2 up to +2V5 power output (optional)

Figure 3-1-1 Application diagram scenario 1: Supply with +5V and battery

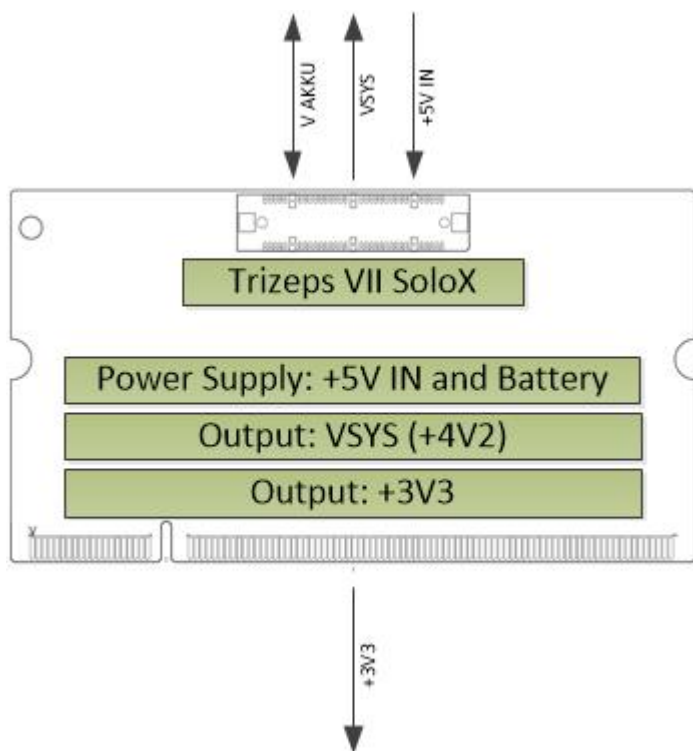
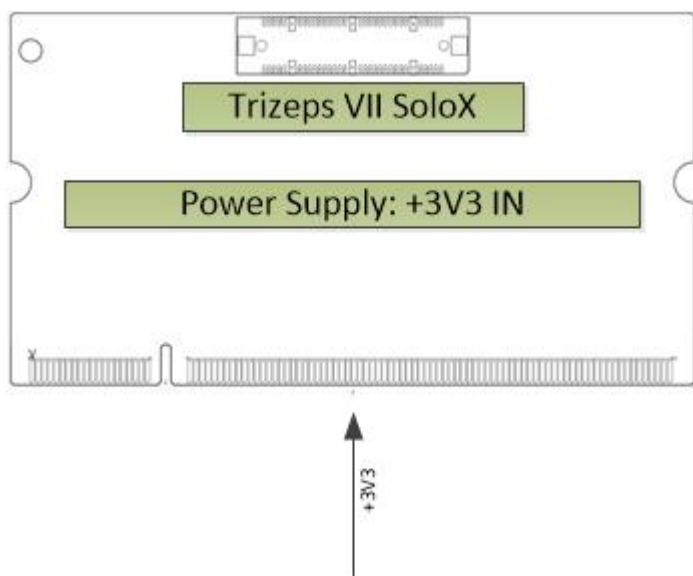


Figure 3-1-2 Application diagram scenario 2: Supply with +3V3 only



3.2 Control-Signals

Name	Description
RESET_IN_N	Negated reset input. 0: reset device, 1: normal operation.
RESET_OUT_N	Negated reset output. 0: device in reset, 1: normal operation.

3.2.1 GPIO

GPIO pins may be configured as input or outputs and with pull-up, pull-down, keeper or no pull – behavior. The pins have a programmable drive-current of 2..16mA in 2mA steps.

3.2.2 UART

Baudrate: 75 to 115.200 bps and 4Mbps
 Dara-Bits: 5 to 8 bits
 Stop-Bits: 0.5, 1, 2
 Parity: None, Event, Odd, Space
 Features: Hardware-flow-control (RTS,CTS)

3.2.3 SPI

The serial peripheral interface is a programmable synchronous serial port, which may be used to connect to a multiple of different peripherals. The IO-Ports only define a 4pin SPI with one chip-select. Extra SPI-chip-selects can be found on other GPIOs (see "1.2 Pin-Mux Information").

Speed: up to 50Mhz
 Features: Master only.

3.2.4 I2C

Speed: up to 3.7Mhz
 Features: Master only.
 I²C Specification Version 5.0, October 2012
 Multi-Master, 10bit addressing or HS-mode is not supported.

3.2.5 SD-Card

The SD-Card Interface may be used to connect a SD-Card, eMMC or SDIO-hardware to the Trizeps board.

Name	Description
SD2_CMD	SD-card command output
SD2_CLK	SD-card clock output
SD2_DAT0	SD-card data bit 0
SD2_DAT1	SD-card data bit 1
SD2_DAT2	SD-card data bit 2
SD2_DAT3	SD-card data bit 3
SD2_CD_N	SD-card detect: 0: card inserted, 1: card removed

3.2.6 USB

The Trizeps VII SX got two high-speed USB 2.0 OTG ports which may work as host or as slave.

Name	Description
USB_OTG_VBUS	Connect to VBUS (+5V) of USB-Slave or USB-OTG port. This is a simple GPIO, which is used to detect if the port should work as slave.
USB_OTG_DM	USB HS data minus
USB_OTG_DP	USB HS data plus
USB_OTG_ID	USB OTG ID pin.

Speed: 480Mbps

Features: USB2.0 high-speed.

3.2.7 Display

Name	Description
LVDS_DATA0_N	LVDS data lane 0 – negative
LVDS_DATA0_P	LVDS data lane 0 – positive
LVDS_DATA1_N	LVDS data lane 1 – negative
LVDS_DATA1_P	LVDS data lane 1 – positive
LVDS_DATA2_N	LVDS data lane 2 - negative
LVDS_DATA2_P	LVDS data lane 2 - positive
LVDS_DATA3_N	LVDS data lane 3 – negative
LVDS_DATA3_P	LVDS data lane 3 – positive
LVDS_CLK_N	Display data clock – negative
LVDS_CLK_P	Display data clock – positive
BACKLIGHT_PWM	Backlight PWM (output)
BACKLIGHT_ENABLE	Backlight enable (output)
LCD1_DATA[0...23]	24 bit LCD data lines
LCD1_CLK	LCD data pixel clock
LCD1_HSYNC	LCD data vertical sync
LCD1_VSYNC	LCD data vertical sync
LCD1_EN	LCD data enable signal

3.2.8 Camera

Name	Description
CSI_DATA_0	camera data 0
CSI_DATA_1	camera data 1
CSI_DATA_2	camera data 2
CSI_DATA_3	camera data 3
CSI_DATA_4	camera data 4
CSI_DATA_5	camera data 5
CSI_DATA_6	camera data 6
CSI_DATA_7	camera data 7
CSI_VSYNC	Camera vertical sync
CSI_HSYNC	Camera horizontal sync
CSI_MCLK	Camera master clock
CSI_PIXCLK	Camera pixel clock
VADC_IN0	Video R CR
VADC_IN1	Video G Y
VADC_IN2	Video C CB
VADC_IN3	

3.2.9 JTAG

Name	Description
JTAG_TMS	JTAG mode-select input
JTAG_TRST_N	JTAG reset
JTAG_TCK	JTAG clock input
JTAG_TDO	JTAG data output
JTAG_TDI	JTAG data input
JTAG_SRST_N	JTAG reset for debug

4. Specifications

4.1 Absolute Maximum Ratings

Absolute maximum ratings reflect conditions that the module may be exposed outside of the operating limits, without experiencing immediate functional failure. Functional operation is only expected during the conditions indicated under "Recommended Operating Conditions". Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the module. Exposure to absolute-maximum rated conditions for extended periods may affect device reliability.

	Pin	Min	Max	Unit
Supply Voltage	+3V3	-0.3	3.6	V
	VBAT	-0.3	6	V
	VIN_5V	-0.3	7	V
Storage Temperature	T _{Storage}	-40	+100	°C

4.2 ESD Ratings

		Max	Unit
V_(ESD) Electrostatic discharge	Human body model (HBM)	±2000	V
	Charged-device model (CDM)	±500	

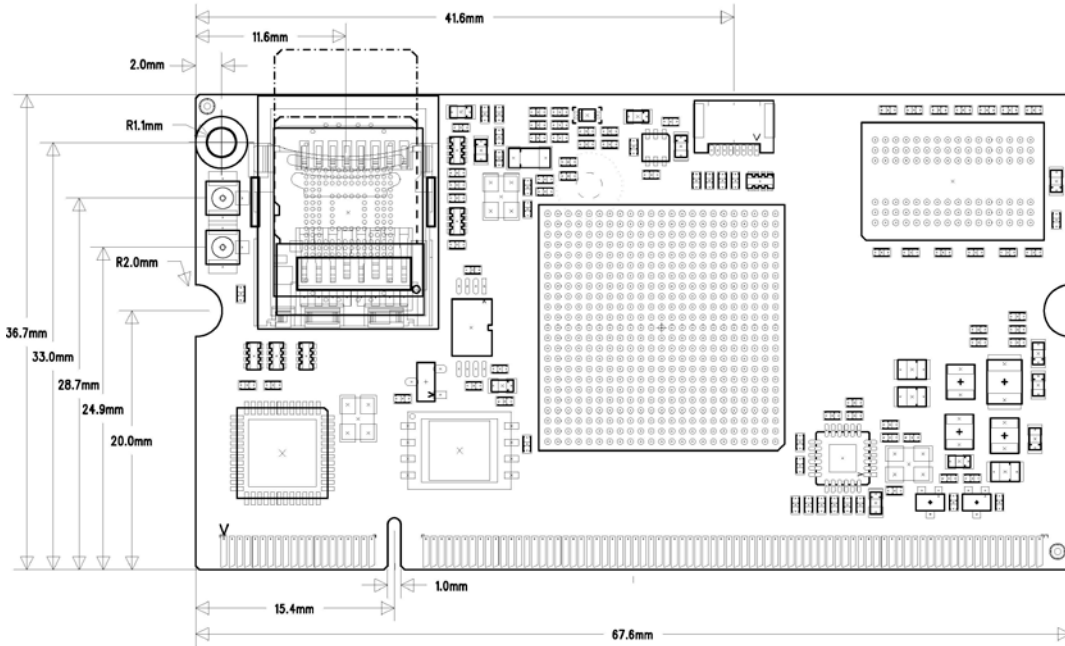
4.3 Recommended Operating Conditions

	Pin	Min	Typ	Max	Unit
Supply Voltage	+3V3	3.1	3.3	3.4	V
	VBAT	3.2	3.6	5.5	V
	VIN_5V	4.5	5.0	5.5	V
Supply current	+3V3			Tbd.	mA
	VBAT			Tbd.	mA
Operating temperature	T _{Case Processor i.MX6 SoloX}	-25		+105	°C
	T _{Ambient Industrial}	-25	+25	+85	
	T _{Ambient Commercial}	0	+25	+85	

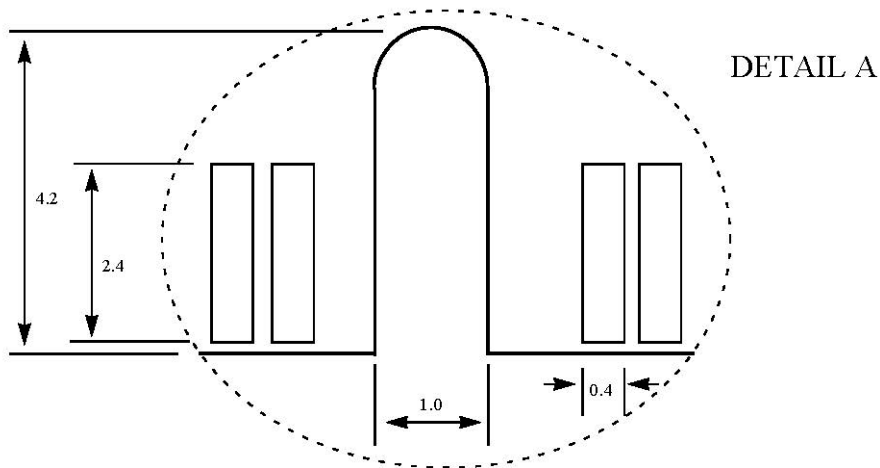
4.4 Electrical Characteristics

Parameter		Min	Max	Unit
V _{IL_3V3}	Low-level input voltage	-	0.3 * (+3V3)	V
V _{IH_3V3}	High-level input voltage	0.7 * (+3V3)	-	V
V _{OH_3V3}	High-level output voltage	(+3V3) – 0.15	-	V
V _{OL_3V3}	Low-level output voltage	-	0.15	V
R _{P_3V3}	Pull-Resistance	22, 47, 100		kΩ
R _{K_1V8}	Keeper-Resistance	105	175	kΩ

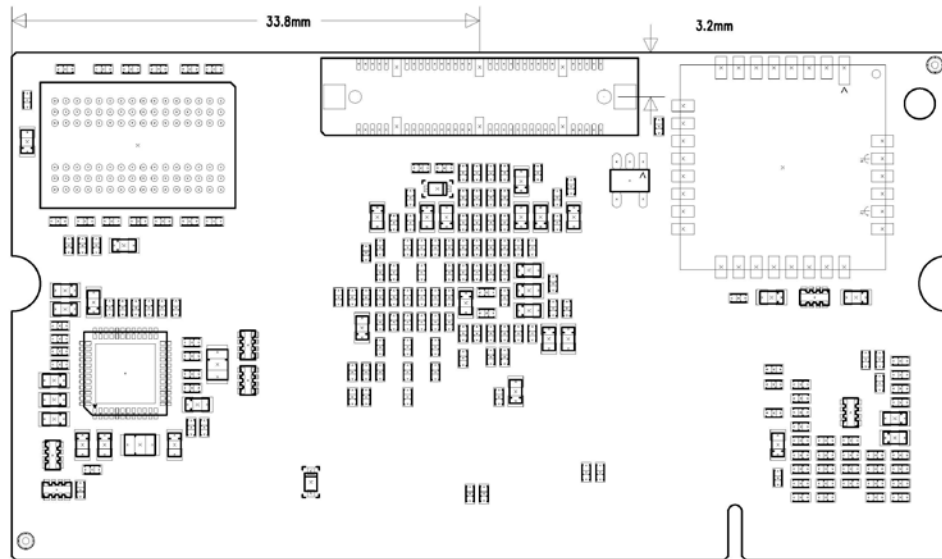
4.5 Mechanical Specification



Dimensions (mm) of the Trizeps VII SX module (top view)



Detail of picture above



Dimension of the Trizeps VII SX module (bottom view)

5.0 Ordercodes for Trizeps VII SX

tbd

6. Important Notice

7. Document History

Rev.	Date	Author	Changes
0.9	28.01.2016	SH	Initial Version.
0.9.1	04.03.2016	VB	Some minor changes on feature page
0.9.2	02.05.2016	VB	Description change in table 2.8 Camera
0.9.3	14.06.2016	VB	Figure 3.1.1 und 3.1.2 added and some minor changes