

## CLEARSY Safety Platform SAFETY COMPUTER BOARD

Safety computer board



# Safety computer board

## SYSTEM DESCRIPTION

The safety computer board is a small single board computer intended to be used as a modular component for the realization of safety critical systems. For deployment the vital computer board can be attached to a mother board through micro pitch 1.27mm directly soldered or mounted on a connector. The mother board usually contains all the vital and non-vital interfaces with the other equipment.

As the Clearsy Safety platform's calculator, the safety computer board includes all the hardware and software required to achieve a level of safety compatible with a SIL4 level for the management of interfaces and the realization of calculation in line with product performance.

## GENERAL

<b><u>Name</u></b>	Safety computer board (CS0)
<b><u>Safety level</u></b>	- SIL4 according to CENELEC EN50128-EN50129
<b><u>MCU chipset</u></b>	PIC32MX795F512L (from Microchip)
<b><u>MCU internal peripherals available</u></b>	<ul style="list-style-type: none"><li>- 13x Analog inputs</li><li>- 19x Change notification Inputs</li><li>- 5x Capture inputs</li><li>- 6x Outputs Compare</li><li>- 5x External Interrupt pins</li><li>- 63x Bidirectional I/O ports</li><li>- 2x Input ports</li><li>- 4x UARTs</li><li>- 2x SPIs</li><li>- 4x I<sup>2</sup>Cs</li><li>- 2x Comparators</li><li>- 1x Parallel Master Port</li><li>- 1x USB</li><li>- 2x CAN</li><li>- 1x Ethernet (RMII interface)</li></ul>
<b><u>Operating temperature</u></b>	-40°C/+85°C
<b><u>Environmental (EMC/EMI)</u></b>	Qualification to be performed on the final integrated product.
<b><u>Environmental</u></b>	RoHS and Reach compliant
<b><u>Environmental (vibration/shock)</u></b>	Ready against EN50125-3 – final qualification to be performed on the integrated hardware

MECHANICAL

<u>Overall dimension</u>	72.5 x 45 x 12 mm
<u>Mounting hole</u>	4 x M3
<u>Weight of the module</u>	20 g

ABSOLUTE RATINGS

<u>Name</u>	<u>Min</u>	<u>Typ</u>	<u>Max</u>	<u>Unit</u>
<u>Voltage for the system</u>	3	3.3	3.6	Volt DC

POWER CONSUMPTION

<u>Name</u>	<u>Min</u>	<u>Typ</u>	<u>Max</u>	<u>Unit</u>
<u>Power consumption of the vital computer board</u>	-	-	2	Watt

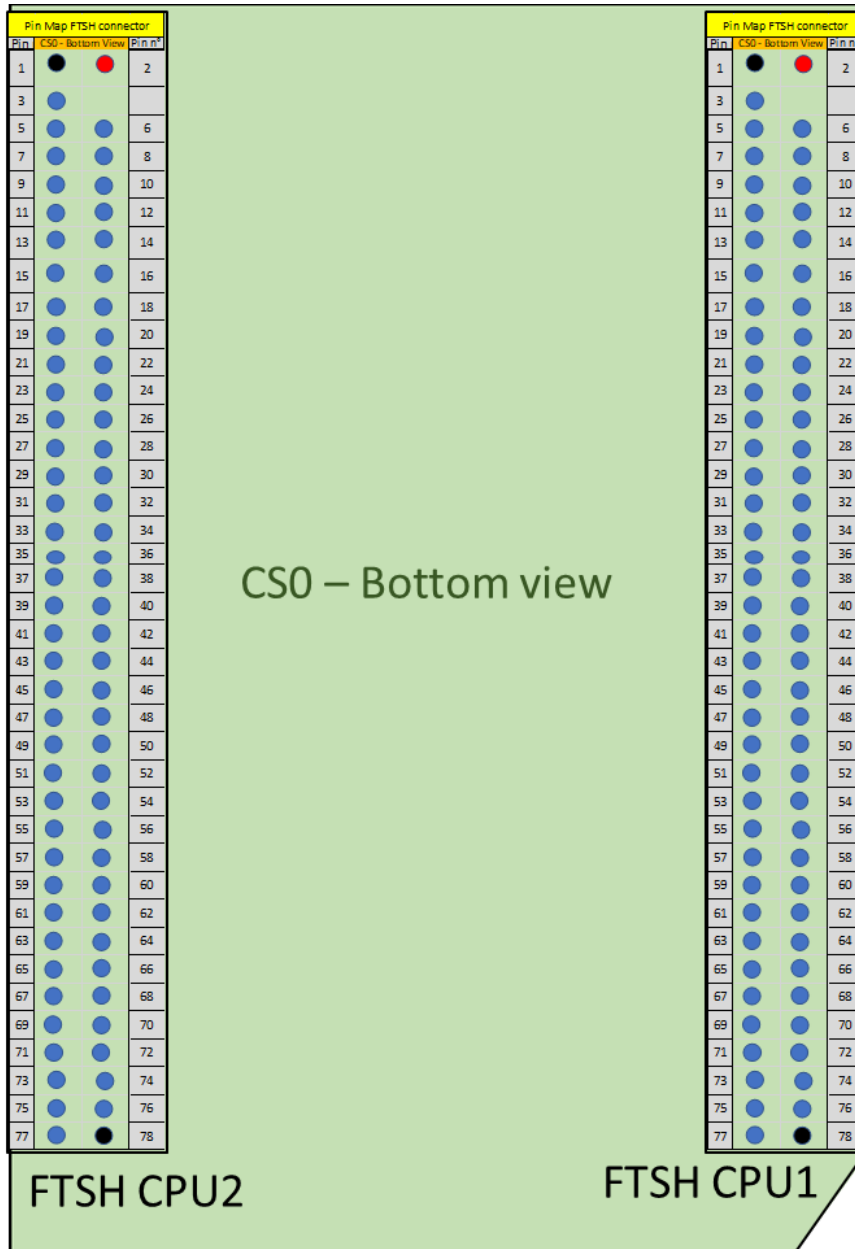
EXTERNAL CONNECTIONS

<u>Programming</u>	MicroChip TCP2030 footprint connector
<u>Maintenance link</u>	Serial link by default on Pin 36 and 37 of FTSH connector
<u>Connection with the motherboard</u>	FTSH connector

MAINTENANCE FEATURE

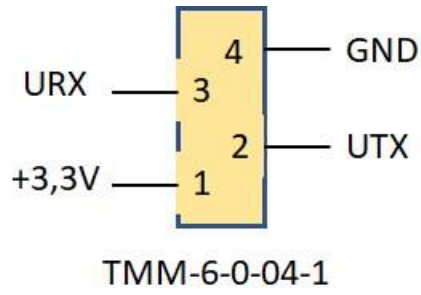
<u>Logging capability</u>	1Kbits non-volatile memory per PIC (EEPROM)
<u>MTBF (FIDES based)</u> <u>40°C</u>	>= 12 x 106 h
<u>Maintenance link</u>	Serial link by default
<u>Connection with the motherboard</u>	FTSH Connector

PIN MAP FTSH CONNECTOR

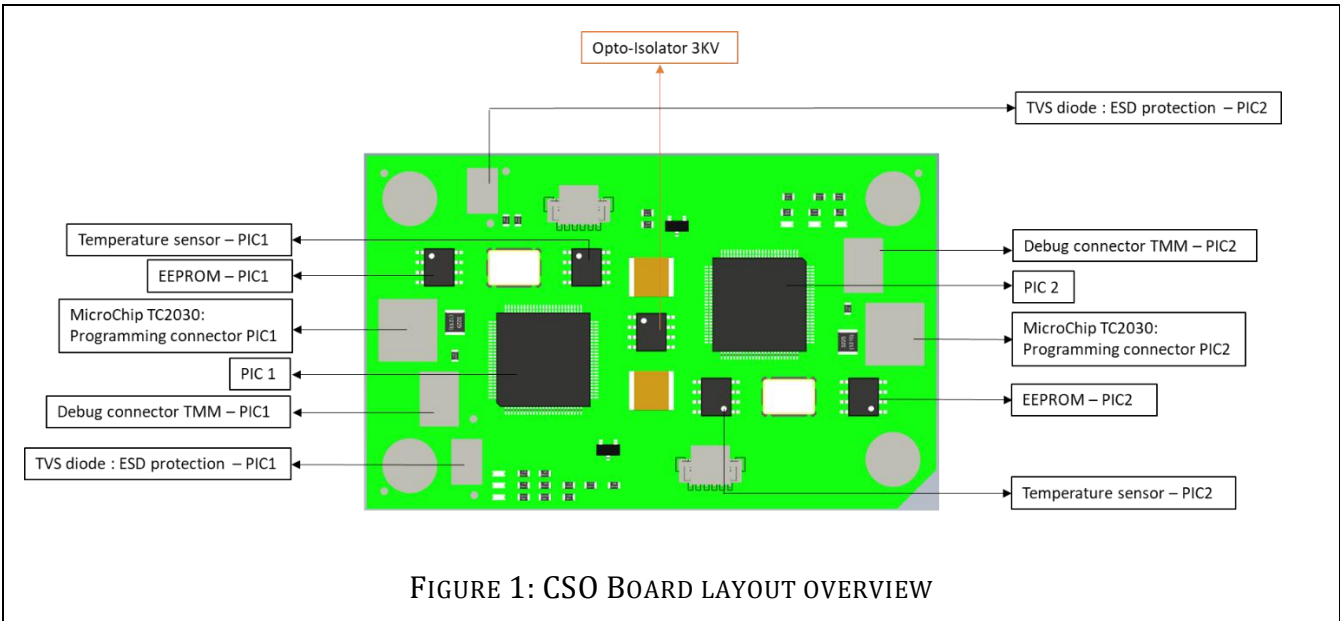


PIC pin number	Pin Name	Pin n°	CS0 bottom view	Pin n°	Pin Name	PIC pin number
15,31,36,45,65,75	GND	1		2	DC POWER 3V3	2,16,30,37,46,54,55,62,86
N/A	Write Protect EEPROM	3		4	EMPTY	N/A
1	AERXERR/RG15 (ETHERNET ERR)	5		6	(Parallel Master port) PMD5/RE5	3
4	PMD6/RE6 (Parallel Master Port)	7		8	(Parallel Maser Port) PMD7/RE7	5
7	T3CK/AC2TX/RC2 (Alternate CAN2) (Timer clk 3)	9		10	(Alternate CAN2) (Timer clk 4) T4CK/AC2RX/RC3	8
9	T5CK/SDI1/RC4 (SPI1) (Timer clk5)	11		12	(Collision ETHERNET, UART6, SPI2) ECOL/SCK2/U6TX/U3RTS/PMA5/CN8/RG6	10
11	ECRS/SDA4/SDI2/U3RX/PMA4/CN9/RG7 (UART3, SPI2)	13		14	(data valid receiver ETHERNET, UART3, I <sup>2</sup> C4, SPI2) ERXDV/AERXDV/ECRSRV/ECRSRV/AECRSRV/SCL4/SDO2/U3TX/PMA3/CN10/RG8	12
14	CN11/RG9/U3CTS/U6RX/SS2/PMA2/ERXCLK/EREFCLK/AERXCLK/AEREDCLK (ETHERNET,PMP2, SPI2, UART6)	15		16	(JTAG test mode) TMS/RA0	17
18	AERXD0/INT1/RE8 (Ethernet0)	17		18	(Ethernet1) AERXD1/INT2/RE9	19
20	AN5/C1IN+/Vbuson/CN7/R85 (Comparator1, USB)	19		20	(Comparator1) AN4/C1IN-/CN6/RB4	21
22	AN3/C2IN+/CN5/RB3 (Comparator2)	21		22	(Comparator2) AN2/C2IN-/CN4/RB2	23
24	PGEC1/AN1/CN3/RB1	23		24	(AN divider bridge for PIC id not mounted) PGED1/ANO/CN2/RB0	25
28	Vref-/CVref-/AERXD2/PMA7/RA9 (Comparator, PMP, ETHERNET alternate2)	25		26	(Comparator, PMP, ETHERNET Alternate3) Vref+/CVref+/AERXD3/PMA6/RA10	29
32	AN8/C1OUT/RB8 (Comparator1)	27		28	(comparator2) AN9/C2OUT/RB9	33
34	AN10/CVrefout/PMA13/RB10 (Comparator, PMP)	29		30	(PMP, ETHERNET) AN11/ERXERR/AETXERR/PMA12/RB11	35
38	TCK/RA1 (JTAG)	31		32	(PMP, ETHERNET0) AN12/ERXD0/AECRS/PMA11/RB12	41
42	AN13/ERXD1/AECOL/PMA10/RB13 (ETHERNET1, PMP10)	33		34	(ETHERNET3, PMP) AN14/ERXD2/AETXD3/PMALH/PMA1/RB14	43
44	AN15/ERXD3/AETXD2/OCFB/PMALL/PMA0/CN12/RB15 (ETHERNET3, PMP0)	35		36	(UART4 Connector TMM-6-0-04-1 not mounted) AETXD0/SS3/U4RX/U1CTS/CN20/RD14	47
48	AETXD1/SCK3/U4TX/U1RTS/CN21/RD15 (UART4 Connector TMM-6-0-04-1 not mounted; SPI3 CLK, ETHERNET Alternate1)	37		38	(UART2, I <sup>2</sup> C5, SPI4, SPI5) SDA5/SDI4/U2RX/PMA9/CN17/RF4	49
50	SCL5/SD04/U2TX/PMA8/CN18/RF5 (UART2, I <sup>2</sup> C5, SPI4, SPI5)	39		40	(USB) USBID/RF3	51
52	SDA3/SDI3/U1RX/RF2 (UART1, I <sup>2</sup> C3, SPI3)	41		42	(UART1, I <sup>2</sup> C3, SPI3) SCL3/SDO3/U1TX/RF8	53
56	D-/RG3 (USB)	43		44	(USB) D+/RG2	57
60	TDI/RA4 (JTAG)	45		46	(JTAG) TDO/RA5	61
66	AETXCLK/SCL1/INT3/RA14 (I <sup>2</sup> C1, ETHERNET Alternate clk)	47		48	(I <sup>2</sup> C1, ETHERNET alternate) AETXEN/SDA1/INT4/RA15	67
68	RTCC/EMDIO/AEMDIO/IC1/RD8 (ETHERNET, time alarm)	49		50	(SPI1) SS1/IC2/RD9	69
70	SCK1/IC3/PMCS2/PMA15/RD10 (SPI1, PMP15)	51		52	(ETHERNET, PMP) EMDC/AEMDC/IC4/PMCS1/PMA14/RD11	71
72	SDO1/OC1/INT0/RD0 (SPI1)	53		54	(LOWER POWER OSCILLATOR) SOSCI/CN1/RC13	73
74	SOSCO/T1CK/CN0/RC14 (LOW Power Oscillator)	55		56	OC2/RD1	76
77	OC3/RD2	57		58	OC4/RD3	78
79	ETXD2/IC5/PMD12/RD12 (ETHERNET2, PMP12)	59		60	(ETHERNET3, PMP13) ETXD3/PMD13/CN19/RD13	80
81	OC5/PMWR/CN13/RD4	61		62	(PMP) PMRD/CN14/RD5	82
83	ETXEN/PMD14/CN15/RD6 (ETHERNET, PMP14)	63		64	(ETHERNET TX CLK) ETXCLK/PMD15/CN16/RD7	84
87	C1RX/ETXD1/PMD11/RF0 (CAN1, ETHERNET1)	65		66	(CAN1, ETHERNET0) C1TX/ETXD0/PMD10/RF1	88
89	C2TX/ETXERR/PMD9/RG1 (CAN2, ETHERNET ERR)	67		68	(CAN2, PMP8) C2RX/PMD8/RG0	90
91	TRCLK/RA6	69		70	TRD3/RA7	92
94	PMD1/RE1	71		72	TRD2/RG14	95
96	TRD1/RG12	73		74	TRD0/RG13	97
98	PMD2/RE2	75		76	(PMP3) PMD3/RE3	99
100	PMD4/RE4	77		78	GND	15,31,36,45,65,75

PIN MAP TMM-6-04-01 CONNECTOR

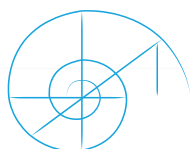


BOARD OVERVIEW



# CLEARSY

Safety Solutions Designer



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