Data sheet

SOMAT XR

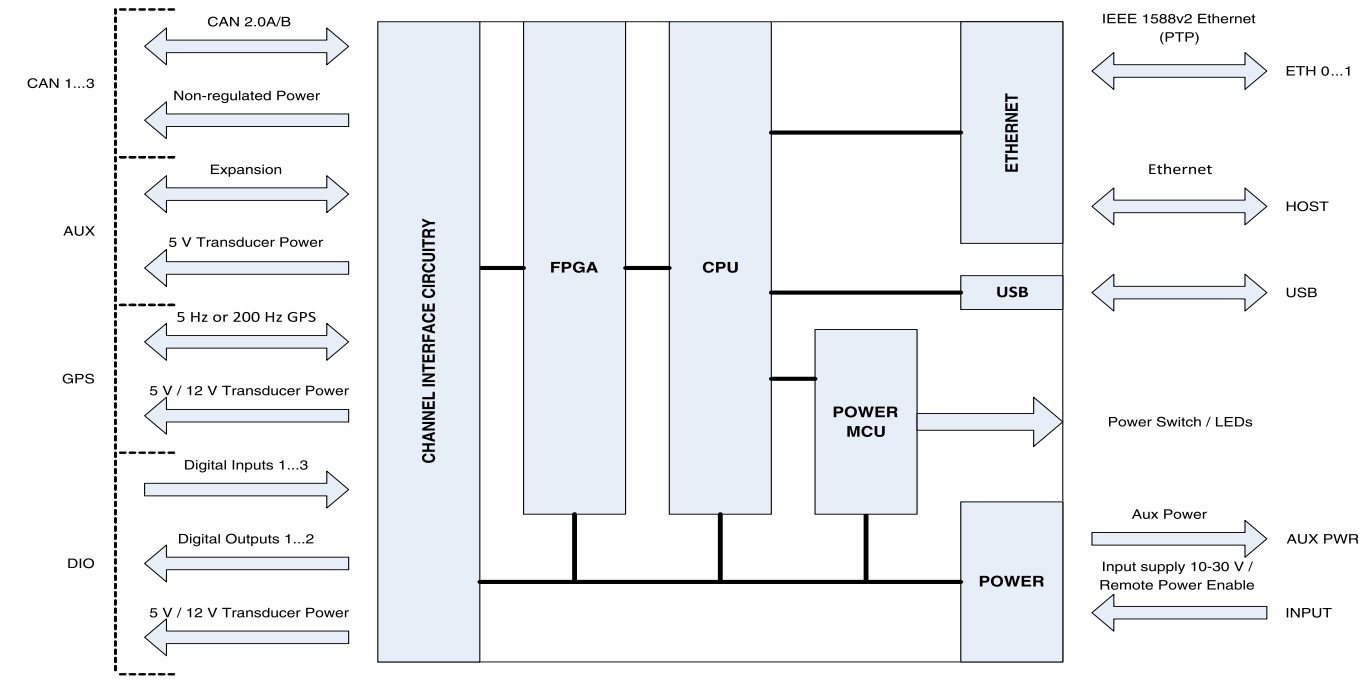
CX23-R

SomatXR Data Processor

Special Features

- Rugged, mobile data acquisition in a flexible, modular system
- Waterproof, dustproof, shockproof
- Operating temperature of -40 to 80 °C
- Secure web-based user interface
- Integrated signal interfaces including one DIO, three CAN, one GPS and one AUX
- SATA data storage in SIE format™
- On-board data processing including computed channels and Somat DataModes™
- Configurable data visualizations with high update rates

Block diagram



Specifications CX23-R

General Specifications		
Data storage capacity (SATA)	GB	64
storage file type	-	SIE
Processing features	-	auto power fail test restart, storage full protection
Power button (push contact)	-	power on/off switch, password and IP address reset control
Input power supply	-	-
voltage range	V_{DC}	10 ... 30
current (maximum)	A	10
over voltage/reverse voltage protection	-	-
Power ports	-	-
INPUT	-	main DC input
AUX PWR	-	remote power enable connection to power 2 MX module system
Power consumption (without CAN or AUX PWR power) [1]	W	15
Ethernet	-	10Base-T/100Base-TX/1000Base-T
protocol	-	TCP/IPv6 or TCP/IPv4
connection	-	M12 X-code shielded twisted pair cable (CAT-5E)
crossover	-	Auto MDI/-X
maximum cable length	m	95 at -40 °C, 85 at 20 °C, 75 at 75 °C [2]
Ethernet ports	-	-
HOST	-	connection to PC, router or WiFi device
ETHERNET 1	-	connection to MX or EX23-R module
ETHERNET 2	-	connection to MX module [3]
Precision timing protocol (PTP) (expansion module ports)	-	Version 2 (IEEE 1588)
device type	-	ordinary clock
protocol	-	IPv6 multicast
accuracy	ns	<200
USB 2.0	-	for future expansion

[1] Power consumption measurements include the efficiency of the power supply.

[2] Based on shielded cable lengths. Cable lengths up to or over 100 m possible using unshielded solid conductor twisted pair at 25 °C.

[3] For maximum data throughput, do not use the Ethernet 2 port when an EX23-R is connected to Ethernet 1 port.

Specifications CX23-R (Continued)

General Specifications (continued)		
Storage temperature range	°C [°F]	-40 ... +85 [-40 ... +185]
Operating temperature range	°C [°F]	-40 ... +80 [-40 ... +176]
Altitude de-rating	-	-
maximum temperature a 0 m	°C [°F]	+80 [+176]
maximum temperature a 2500 m	°C [°F]	+70 [+158]
maximum temperature a 5000 m	°C [°F]	+55 [+131]
Relative humidity range	%	5 ... 100
Protection class	-	III[4)]
Degree of protection	-	IP65/IP67 per EN 60529
EMC requirements	-	CE conformity test per EN 61326-1:2005
Mechanical test	-	-
Vibration	-	accord. MIL-STD202G, Method 204D, Test condition C
acceleration	m/s^2	100
duration	min	450
frequency	Hz	5 ... 2,000
Shock	-	accord. MIL-STD202G, Method 213B, Test condition B
acceleration	m/s^2	750
pulse duration	ms	6
number of impacts	-	18
Load dump	-	ISO 16750-2:2010 Test B 63 V_{peak}
Dimensions (H x W x D)	mm	80 x 205 x 140
Weight	g [lb]	2,100 [4.63]

[4)] The DC voltage supply must meet the requirements of IEC 60950-1 on a SELV voltage supply.

Specifications CX23-R (Continued)

Internal I/O Specifications		
Sample rates[5)6)]	Samples/s	Decimal: 0.1 ... 100,000 Classic: 0.1 ... 96,000
Digital I/O	-	3 inputs and 2 outputs
connector	-	female 12-pin M12
isolation (signal/ground to chassis)	V	500
transducer power	W	3
transducer voltage	V	0, 5, or 12
voltage accuracy	%	±5
input impedance	Ω	10k
input voltage limit	V	±70
threshold level	mV	-5000 to +5000
threshold resolution	mV	20
output current sink	mA	350
output voltage	V	±60
output update rate	Hz	20 (based on frame rate)
pulse counter modes	-	Pulse Frequency, Pulse Period, Pulse Duty Cycle, Pulse Counts, Pulse Rate, Quadrature Encoder
CAN	-	3 CANs
CAN standards	-	ISO 11898 CAN 2.0A and 2.0B
CAN protocols	-	J1939 (passive listen-only)
connector	-	female 5-pin M12
isolation (signal/ground to chassis)	V	500
baud rates	bps	1M, 800k, 666.6k, 500k, 400k, 250k, 125k, 100k, 50k, 41.6k
termination	Ω	120 or unterminated
CAN supply voltage	V	input voltage - 1
CAN current limit	A	1
GPS	-	1 GPS
connector	-	female 8-pin M12
isolation (signal/ground to chassis)	V	500
transducer power	W	3
transducer voltage	V	0, 5, or 12 (auto selected)
voltage accuracy	%	±5
baud rate	bps	300 ... 1M (default of 38.4k)
compatible with 1-EGPS-5HZ-2	-	NMEA PPS 5 Hz updates
compatible with 1-EGPS-200-B-2/P-2	-	NMEA PPS 200 Hz updates
AUX	-	for future expansion
Status LEDs	-	-
SYNC (blue)	-	state/sync indicator
POWER (green)	-	system power indicator
RUN (yellow)	-	test running (data processing) indicator
ERROR (red)	-	system alert or error
ACT (green)	-	USB activity

[5)] Internal data sources only. For external data sources, refer to the appropriate data sheet.

[6)] Sample rate has no lower limit with use of Down Sampler computed channels.

Specifications CX23-R (Continued)

Data Processing Specifications		
Data sources (internal)	-	1 DIO, 1 GPS, 3 CAN, 1 AUX
Computed channels	-	Signal Calculator, Integrator, Statistics, Directional Velocity, State Mapper, Anomaly Detect, Smoothing Filter, Time Channel, Time Base Shifter, Pulse Frequency, Interactive Trigger, Timed Trigger, Bitmap Trigger, Triggered Latch, Triggered Zero Suppression, Run Stopper, Track, Up Sampler, Down Sampler, Function Generator
Storage modes (Somat DataModes™)	-	Time History, Burst History, Time at Level, Peak Valley, Peak Valley Matrix, Rainflow, Peak Valley Slice, Event Slice, Message Logger, Burst Message Logger
Run-time data visualizations	-	digital gauges, multi-channel plots, frequency spectrum plots

SomatXR Module Transducer Overview

Transducer	CX23-R	MX840B-R	MX1615B-R	MX1601B-R	MX1609KB-R	MX411B-R	MX460B-R¶	MX471B-R	EX23-R
Channel count	-	8	16	16	16	4	4	4	10
Sample rate (kS/s)	-	40	20	20	0.6	100	-	-	-
 Strain gage, full bridge six-wire configuration		●	●			●			
 Strain gage, half bridge five-wire configuration		●	●			●			
 Strain gage, quarter bridge three- or four-wire configuration		●*	●			●*			
 Inductive full bridge		●				●			
 Inductive half bridge		●				●			
 LVDT (linear variable differential transformer)		●							
 Piezoresistive transducer		●				●			
 Potentiometric transducer		●	●						
 Voltage, 60 V, 10 V, 100 mV		●	●	●		●			

Transducer	CX23-R	MX840B-R	MX1615B-R	MX1601B-R	MX1609KB-R	MX411B-R	MX460B-R¶	MX471B-R	EX23-R
 Current-fed piezoelectric transducer (IEPE, ICP®)		●†		●†		●†			
 Current, 20 mA		●		●		●			
 Resistance or resistance-based measurements		●	●						
 Resistance thermometer (RTD), PT100 or PT1000		●	●						
 Thermocouple		●‡			●‖				
 Digital input, static	●								
 Digital output, static	●								
 Frequency / pulse counter (timer, TTL)	○	● connectors 5-8					●		
 Incremental encoder (timer, TTL)	○	● connectors 5-8					●		
 Torque / speed		● connectors 5-8					●		
 Passive inductive encoder							●		
 PWM - Pulse width, pulse duration, period duration							●		
 SSI protocol		● connectors 5-8							
 CAN bus	●	● connector 1						● database only	
 GPS	●								

Transducer	CX23-R	MX840B-R	MX1615B-R	MX1601B-R	MX1609KB-R	MX411B-R	MX460B-R¶	MX471B-R	EX23-R
Camera, Axis network cameras	●								●
AUX eDAQ sync	●								
Data recording	●								

* Use quarter bridge adapter 1-SCM-R-SG1000-2, 1-SCM-R-SG120-2 or 1-SCM-R-SG350-2.

† Use ODU 14-pin to BNC adapter 1-KAB430-0.3.

‡ Use thermocouple adapter 1-SCM-R-TCK-2 for K-type, other types need a dedicated adapter.

§ Including support for CCP/XCP-on-CAN (not in combination with CX23-R).

‖ K-type only.

¶ Not yet supported in the CX23-R.

Ordering Options

Ordering Number	Description
CX23-R-64	SomatXR Data Processor, 64 GB Includes: 2 m power cable (KAB2115-2) and 2 m host port Ethernet cable (KAB2106-2)
CX23-R-64-PAKPP	SomatXR Data Processor Package, 64 GB Includes: 120W power supply unit (NTX003-2), 2 m power cable (KAB2115-2), 2 m host port Ethernet cable (KAB2106-2), 0.4 m Ethernet and power cable for connecting one MX module (KAB2100-0.4 & KAB2110-0.4), Cable for connecting digital I/Os (KAB2101-2), 3 cables for connecting CAN sources (3x KAB2109-2), 5Hz GPS receiver including connection cable (EGPS-5HZ-2 & KAB2102-1) and catman PostProcess software from HBM

Detailed Description

The SomatXR family is the next generation in the HBM Somat eDAQ product line of rugged, mobile data acquisition modules. The CX23-R data processor provides significant improvements in data throughput, supports seamless networking and a state of the art web-based interface. The SomatXR system consists of multiple hardware modules allowing for flexible configurations for a variety of applications.

The CX23-R hosts its own secure web interface for intuitive and easy to use test setup, control, monitoring and data visualization interfaces. This server based interface supports multiple users (clients), and the capability to define and apply system access / control restrictions on a per user basis. The CX23-R communicates through standard 10/100/1000 Base-T Ethernet using IPv4 or IPv6.

To manage test data, the CX23-R has the capacity to perform a broad range of on-board data processing. This includes a diverse set of computed channels for defining triggers and gates for the Somat DataModes™ as well as supporting arbitrarily complex mathematically computations.

The CX23-R supports a default “data collect” mode – acting as a simple data logger to get vehicle “shake down tests” up and running quickly. To minimize the need for post-test analysis and to allow for more efficient data storage, the Somat DataModes are available. These provide data storage in easy to define formats including triggered or gated Time History and Time-at-Level (histogram), and triggered Burst History and Burst Message Logger (transient recorder with pre-trigger data collection). The CX23-R module provides adequate storage for single or multiple SIE data files with a built-in 64 GB SATA Drive.

In addition, the CX23-R provides direct data sourcing for six interfaces including one DIO, three CAN, one GPS and one AUX.

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