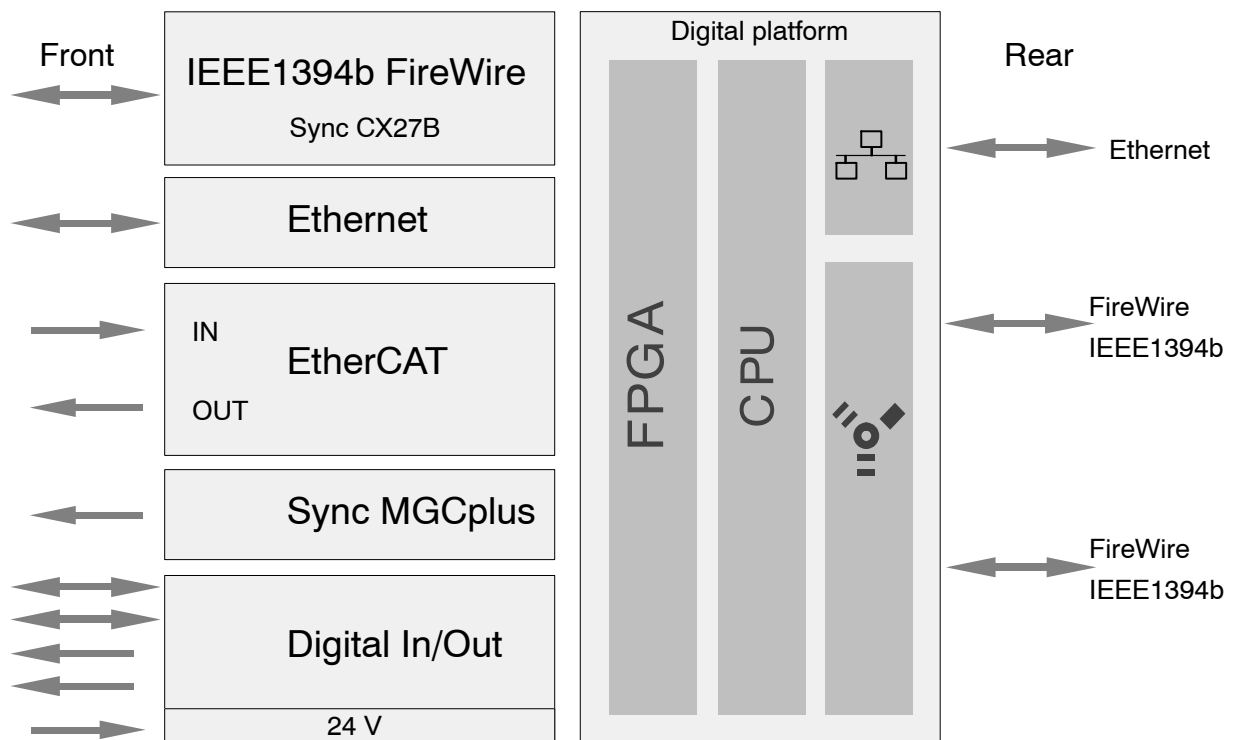# QUANTUM**X**

CX27B

Gateway module

Special features

- **Gateway module between QuantumX measurement modules and Ethernet/EtherCAT®**
- **EtherCAT real-time fieldbus (IN/OUT)**
- **2 Ethernet TCP/IP (front/rear)**
- **2 digital I/Os each**
- **External synchronization via EtherCAT®, PTP, NTP or FireWire**

Block diagram

Specifications

General specifications		
Interfaces (number)		EtherCAT (1) (IN/OUT)
		Ethernet (2)
		IEEE1394b FireWire (2)
Supply voltage range (DC)	V	10 ... 30, nominal (rated) voltage 24V
Power consumption (at 24V)	W	< 7
Ethernet (data link)		10Base-T / 100Base-TX
Protocol/addressing	–	TCP/IP (direct IP address or DHCP)
Connection	–	8P8C plug (RJ-45) with twisted pair cable (CAT-5)
Max. cable length to module	m	100
IEEE1394b FireWire (module synchronization, data link, optional supply voltage)		IEEE 1394b (HBM modules only)
Baud rate	MBaud	400 (approx. 50 MByte/s)
Max. current from module to module	A	1.5
Max. cable length between the nodes	m	5
Max. number of modules connected in series (daisy chain)	–	12 (=11 hops)
Max. number of modules in a IEEE1394b FireWire system (including hubs[1]), backplane)	–	24
Max. chain of hops[2]	–	14
Synchronization options EtherCAT[®3]) IEEE1394b FireWire IEEE1588:2008 (PTPv2), NTP IRIG−B (B000 bis B007; B120 bis B127)		IEEE1394b FireWire (automatically, recommended) via CX27B CX27B to CX27B via front sockets via Ethernet via MX440A- or MX840A input channel
Protection class		III
Degree of protection		IP20
Mechanical tests[4]		
Vibration (30 min)	m/s²	50
Shock (6 ms)	m/s²	350
EMC requirements		according to EN61326
Nominal (rated) temperature range	°C [°F]	−20 °C ... +60 °C [−4 ... +140]
Operating temperature range (no dewing allowed/module not dew-point proof)	°C [°F]	−20 °C ... +65 °C [−4 ... +149]
Storage temperature range	°C [°F]	−40 °C ... +75 °C [−40 ... +167]
Rel. humidity	%	5 ... 95 (non condensing)
Weight, approx.	g	1200
Dimensions, horizontal (H x W x D)	mm	52.5 x 200 x 122 (with case protection) 44 x 174 x 119 (without case protection)

[1] Hub: IEEE1394b FireWire node or distributor

[2] Hop: Transition from module to module/signal conditioning

[3] EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

[4] Mechanical stress is tested according to European Standard EN60068−2−6 for vibrations and EN60068−2−27 for shock. The equipment is subjected to an acceleration of 25 m/s² in a frequency range of 5...65 Hz in all 3 axes. Duration of this vibration test: 30min per axis. The shock test is performed with a nominal acceleration of 200 m/s² for 11 ms, half sine pulse shape, with shocks in each of the 6 possible directions.

Specifications

EtherCAT		
Function		EtherCAT Slave
Interfaces		IEEE 802.3, 100BASE−TX
Input/Output		RJ45 socket, shielded
Cable length (max.)	m	100
Cable type (min. requirement)		Standard CAT5, shielded
EtherCAT communication		
Max. number of cyclical process data (PDOs)		199 (at 1200 Hz update rate)
		100 (at 2400 Hz update rate)
		30 (at 4800 Hz update rate)
Process data configuration		SDO[5], DDF[6] or EEPROM
Profile		CANopen DS404 plus add-ons
Services		SDO read, write, information
Used ASIC		ET1100, Beckhoff
EtherCAT® master layout		Distributed clock, automatic / manual address assignement
Workflow		Use MX Assistant software to activate isochronous mode for the desired signals (in real time) and then connect to the EtherCAT fieldbus. Set addressing (auto−mapping or manual), configure Sync Manager profile.
EtherCAT® master tested		Beckhoff, DT2, IAV, MTS, Instron, Omicron, Open EtherCAT® Linux Stack, Kithara, koenig-pa, acontis, IgH, National Instruments
Slave synchronization		
Distributed clock (DC)		Yes, default=On
System time variation	µs	1
Sync manager, sample rates	Number	3
Latency		
Analog-input to EtherCAT bus	ms	1

[5] Service Data Objects
[6] Device Description File (XML)

Time		
Clock drift		max. 1.2 minutes per month
Time zone (factory settings)		UTC (Universal Time, Coordinated)
Ethernet		
Data rate, max.	Measured values/s	400.000
Digital I/Os		
Number of combined inputs/outputs		4 2 inputs (clamps 1 and 2) 2 outpust (clamps 3 and 4)
Type of connection		screw terminals
LEDs (number)		
input / output state		4
24V-display		1
Cable length (max.)	m	30
Cable type (required with interference)		shielded
Update rate	1/s	19200
Status change of inputs		detection by interrupt
24V voltage input	V	5.5 ... 42
Input signal range		
max. permissible input level	V	42
threshold (average value)	V	2.5
hysteresis	V	approx. 1
Input resistance (nominal)	kΩ	6.9

Specifications (continued)

Output with supply via 24V input		
minimal level, active High, at 100mA load	V	(24V-input voltage value) − 1
nominal current rating	mA	100
short-circuit current (typ.)	mA	700
Internal supply U_{INT}		
voltage (at 10 mA / 0 mA)	V	5.1 min. / 5.9 max.
maximal current rating	mA	10
Output with supply with U_{INT}		
minimal level, at 1mA load current	V	4.5
maximal level, no current	V	5.5
maximal current rating	mA	1

Accessories, to be ordered separately

CX27B accessories		
Article	**Description**	**Order no.**
Power		
AC/DC power pack / 24 V	Input: 100 ... 240 V AC (± 10 %), 1.5 m cable Output: 24 V DC, max. 1.25 A, 2 m cable with ODU plug	1−NTX001
3 m cable − QuantumX supply	3 m cable for voltage supply of QuantumX modules; suitable plug (ODU Medi-Snap S11M08−P04MJGO−5280) at one end and exposed wires at the other.	1−KAB271−3
Communication		
Ethernet cross over cable	Ethernet cross over cable for direct operation between a PC or Notebook and a modul / device, length 2 m, type CAT5+	1−KAB239−2
IEEE1394b FireWire cable (module-to-module)	FireWire connection cable for QuantumX or SomatXR-modules; with matching plugs on both sides. Length 0.2 m/2 m/5 m Note: The cable enables modules to be supplied with power (max. 1.5 A, from the source to the last drain).	1−KAB272−0.2 1−KAB272−2 1−KAB272−5
Mechanic		
Connecting elements for QuantumX modules	Connecting elements (clips) for QuantumX modules; Set comprising 2 case clips including mounting material for fast connection of 2 modules.	1−CASECLIP
Fitting panal for QuantumX modules	Fitting panel for mounting of QuantumX modules using case clips (1−CASECLIP), lashing strap or cable tie. Basic fastening by 4 screws.	1−CASEFIT
QuantumX Backplane (Standard)	QuantumX Backplane − Standard for a maximum of 9 modules; General: − Mounting on wall or control cabinet (19") - Connection of external modules by FireWire possible; - Power supply: 24 V DC / max. 5 A (150 W);	1−BPX001
QuantumX Backplane (Rack)	QuantumX Backplane − Rack for maximum 9 modules; - 19" rack mounting with handles left and right; - Connection of external modules via FireWire possible; - Power supply: 24 V DC / max. 5 A (150 W).	1−BPX002

Accessories, to be ordered separately (continued)

General accessories		
Article	**Description**	**Order No.**
Software and product packages		
catman®AP	Complete package including catman®Easy functionality plus additional modules such as integration of video cameras (EasyVideoCam), complete post-process analysis (EasyMath), automation of recurring processes (EasyScript), offline preparation of measurement projects (EasyPlan) as well as additional functions such as calculating electrical power, special filters, frequency spectrum, etc. More details at www.hbm.com\catman\	1−CATMAN−AP
catman®EASY	The basic software package for measurement data acquisition comprises convenient channel parameterization using TEDS or the sensor database, measurement job parameterization, individual visualization, data storage and reporting.	1−CATMAN−EASY
catman®PostProcess	Post Process edition for visualization, preparation and analysis of measurement data, including many mathematical functions, data export and reporting.	1−CATEASY−PROCESS
LabVIEW™-Treiber[1]	Universal driver from HBM for LabVIEW™.	1−LabVIEW−DRIVER
CANape® driver	QuantumX driver for the software CANape® from Vector Informatik. CANape versions from 10.0 are supported.	1−CANAPE−DRIVER

[1] More drivers and partners at www.hbm.com\quantumX\

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