

DATA SHEET

SOMAT^{XR}

MX471C-R

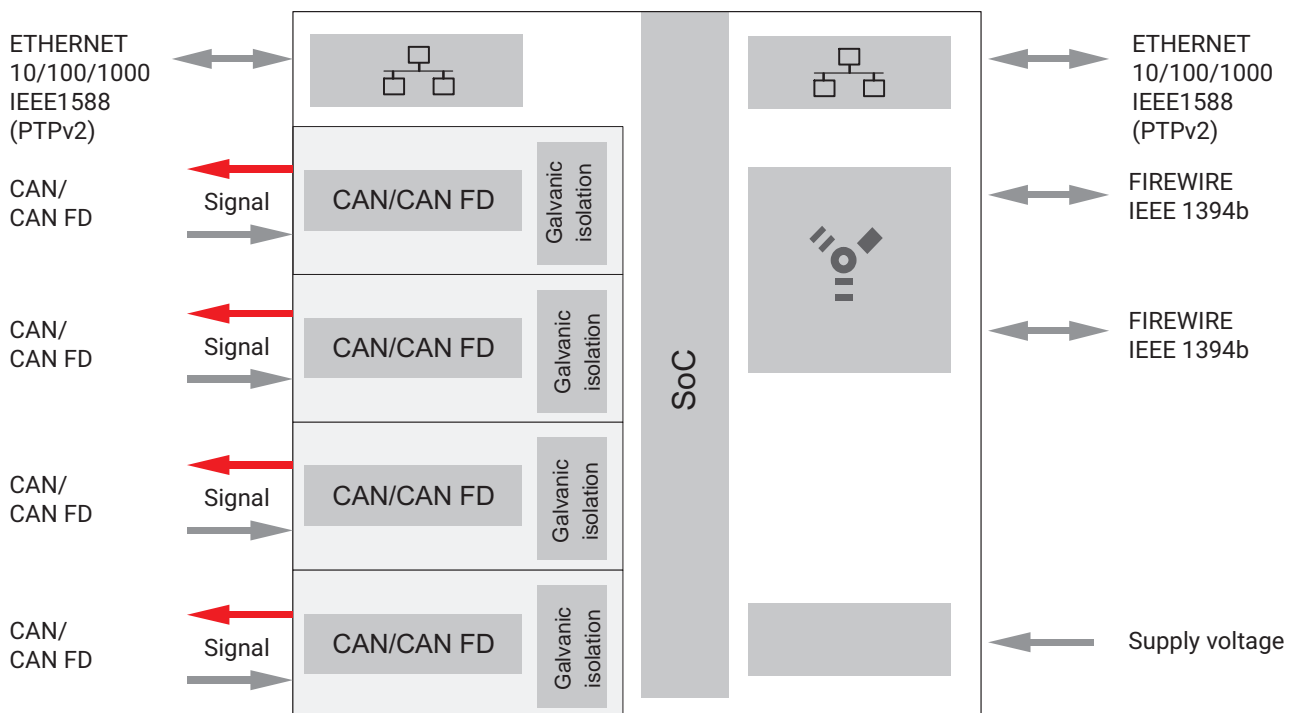
CAN FD module

SPECIAL FEATURES

- Four individually configurable, electrically isolated CAN channels
- Supports CAN FD (ISO 11898-1:2015), CAN 2.0A/B
- Other protocols: SAE J1939, xCP-on-CAN/CAN-FD
- Transmit: Sensor signals of other MX modules, CAN input signals
- Ethernet gateway for connected measurement modules
- For use in harsh environments (impact, vibration, temperature, condensation, moisture)



BLOCK DIAGRAM



SPECIFICATIONS FOR MX471C-R

General specifications		
Number of CAN interfaces		4, galvanically isolated
Supported protocols		CAN 2.0A (11-bit identifier, "base format") CAN 2.0B (29-bit identifier, "extended format") ISO CAN FD 11898-1:2015 CAN Calibration Protocol CCP eXtended Calibration Protocol (xCP-on-CAN) SAE J1939
Bus link		two-wire, to ISO 11898-2
Transducer connection		M12, 5-pin micro connector (CiA DR-303-1) ¹⁾
Supply voltage range (DC)	V	10 ... 30 (nominal (rated) voltage 24 V)
Supply voltage interruption, max. (at 24 V)	ms	5 ²⁾
Power consumption	W	< 6
Ethernet (module synchronization, data link) Protocol/addressing Plug connection Max. cable length to module	– – m	10 / 100 / 1000 TCP/IP (static IP, APIPA or DHCP / IPv4 or IPv6) M12, x coded, 8-pin ¹⁾ 100
FireWire (module synchronization, data link, optional supply voltage) Max. current from module to module Male connector Max. cable length between nodes Max. number of modules connected in series (daisy chain) Max. number of modules in a FireWire system (incl. hubs) ⁴⁾ Max. number of hops	A – m – – –	IEEE 1394b (HBM modules only) 1.5 ODU MINI-SNAP, 8 pins 5 12 (= 11 hops) ³⁾ 24 14
Synchronization options FireWire IEEE1394b Ethernet PTPv2 IEEE1588 Ethernet NTP		FireWire-based synchronization Ethernet-based Precision Time Protocol Ethernet-based Network Time Protocol
Nominal (rated) temperature range	°C [°F]	-40 ... +80 [-40 ... +176] dew point resistant
Storage temperature range	°C [°F]	-40 ... +85 [-40 ... +185]
Relative humidity	%	5 ... 100
Protection class		III ⁵⁾
Equipment protection level		IP65/IP67 to EN 60529 (if M12 sockets are plugged in or have a protective cap)
EMC requirements		As per EN 61326-1
Mechanical tests Vibration Acceleration Duration Frequency Impact Acceleration Pulse duration Number of impacts	 m/s ² min Hz m/s ² ms –	 As per MIL-STD202G, method 204D, test condition C 100 450 5 to 2,000 As per MIL-STD202G, method 213B, test condition B 750 6 18
Max. operating altitude	m	5,000
Dimensions, horizontal (H x W x D)	mm	80 x 205 x 140
Weight, approx.	g	1,800

1) .Tighten plug with a torque of max. 2 Nm

2) Uninterruptible power supply (UPS) available as accessory for longer interruptions.

3) Hop: transition from module to module or signal conditioning/distribution via IEEE1394b FireWire (hub, backplane)

4) Hub: IEEE1394b FireWire node or distributor

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

CAN bus													
Bit rates⁶⁾ (CAN 2.0A, CAN 2.0B, CAN FD arbitration phase)	kBits/s	1000	800	666.6	500	400	250	125	100	50	20	10	
Permissible cable lengths	m	25	50	80	100	100	250	500	600	1000	2500	5000	
Additional bit rates⁶⁾ CAN FD data phase	Mbit/s	4	2.5	2	1.6	1.25	1	0.5					
Bit sequence formats		Motorola Forward MSB, Intel Standard											
Bus terminating impedance (internal; can be connected via software)	Ω	120 (common mode-stabilized, split termination)											
Identifier		11-bit or 29-bit											
Data types		REAL32 and REAL64, BOOL, INT32 and UINT32, INT64 and UINT64											
Receiving raw data stream													
Max. number of messages per port		Unlimited – complete BUS data											
Parameterization		catman											
Receiving decoded signals													
Max. number of input signals per port		128 or 250 ⁷⁾											
CAN signal types for input signal		Standard, mode-dependent, mode signal											
Parameterization		Manually or from CAN database (*.dbc, *.arxml)											
Receiving CCP and XCP on CAN/CAN FD													
Supported protocols		CCP Version 2.1 XCP on CAN Version 1.1 XCP on CAN FD Version 1.1											
Parameterization		*.dbc plus optional *.skb Required step using CANape from Vector Informatik (read *.a2l, generate *.dbc)											
Receiving SAE J1939 signals (no network management/PGN support)													
Parameterization		catman@Easy/AP, via DBC database (full CAN ID is needed, PGN is not sufficient), no network management, multi-packet messages are not supported											
Transmitting CAN messages (dynamic)													
Signal sources		Sensor signals/measured values (MX inputs) CAN signal inputs (CAN gateway) Real-time signals (calculations)											
Parameterization		MX Assistant, including determination of CAN ID and generating *.dbc											
Max. number of messages (IDs) per port		128											
Max. number of different signals per module		200											
Numbers of signals per message		Several signals per message											
Max. number of bytes per message		64											
Message type		CAN or CAN FD											
Transmission type		Timer-controlled (max. 1200/s) On a change of source value (defined delta), isochronous event (with divider) (max. 5000/s)											
Transmitting predefined CAN messages (static)													
CAN messages		Can be used for wake-up, CANopen sensors, OBD-2											
Max. number of messages (IDs) per port		32											
Max. number of bytes per message		8 (CAN) 64 (CAN FD)											
Transmission types		Timer-controlled (max. 1200/s), software control											

⁶⁾ Recommended and tested bit rates

⁷⁾ If catman software is used, only the decoding of max. 128 signals per port is supported.

Performance			
Decoding performance			
Max. signal transmission rate (decoding) per module (without Ethernet gateway functionality)	1/s	250,000	
Max. signal transmission rate (decoding) per module (with Ethernet gateway functionality)	1/s	100,000	
Ethernet gateway performance			
Max. signal transmission rate (Ethernet gateway) per module without CAN functionality	1/s	2,000,000	
Max. signal transmission rate (Ethernet gateway) per module with CAN functionality	1/s	1,000,000	
Typical performance⁸⁾ with catman^{9), 10)}			
Without simultaneous Ethernet gateway functionality		Signal transmission rate (decoding) per module	Signal transmission rate (encoding) per module
Decoding (4 x 128 signals)	1/s	200,000	-
Decoding (1 x 128 signals)	1/s	100,000	-
Decoding (4 x 128 signals) and raw (2 x)	1/s	180,000	-
Decoding (4 x 128 signals) and raw (4 x)	1/s	160,000	-
Decoding (2 x 128 signals) and encoding ¹¹⁾ (2 x 125 signals)	1/s	150,000	100,000
Encoding ¹¹⁾ (4 x 20011) signals)	1/s	-	200,000
With simultaneous Ethernet gateway functionality (1 MS/s)		Signal transmission rate (decoding) per module	Signal transmission rate (encoding) per module
Decoding (4 x 32 signals)	1/s	100,000	-
Decoding (1 x 128 signals)	1/s	100,000	-
Decoding (2 x 64 signals) and raw (2 x)	1/s	80,000	-
Decoding (1 x 100 + 1x 50 signals), raw (2x), and encoding ¹¹⁾ (1x 100 signals)	1/s	60,000	40,000
Encoding ¹¹⁾ (4 x 200 signals)	1/s	-	200,000

8) Test setup: MX471C-R with 7 other MX modules

9) catman settings for data transfer in DAQ job: max. number of measured values per data rate: 12,000; time between two data transfers in ms: 50; timeout for data transfer in ms: 10,000

10) catman only supports decoding of max. 128 signals per port

11) The MX Assistant must be used to parametrize encoding