



CONNECTIVITY SOLUTIONS
On-Board Modules

TECHNICAL DATA **ESX-TC1**



On-Board Module ESX-TC1

The on-board module TC1 allows a cost-effective entry into the STW's world of connectivity and data management solutions. The Linux based module is integrated into the network of the mobile working machine and transmits data either via WiFi or cellular network. The extension with GPS/GLONASS functionality allows logging and transmission of position information. The TC1 comes in a slim but nevertheless robust housing and reaches ingress protection class IP67 thus allowing daily use in tough, mobile environments.

Inexpensive Diversity

With many years of experience with challenging customers and applications in the field of connectivity for mobile working machines, STW defined three standard variants of the on-board module TC1. Each one is perfectly streamlined for the required connectivity in the respective use case. With its excellent price/performance ratio the TC1 suits field studies which require only a few units and series use with high quantities in the same way.

TECHNOLOGY	CUSTOMER BENEFITS
▶ 3 standard variants	▶ Inexpensive due to optimized processes.
▶ On-board connectivity	▶ Integration into on-board vehicle and machine control networks with CAN-Bus and Ethernet; reading of relevant machine data (machine status, operating hours, maintenance warnings).
▶ Wireless connectivity	▶ Tuned with WiFi, cellular communication and GNSS functionality to the respective use case; no unnecessary parts
▶ Cloud connectivity	▶ Prepared for connecting to STW's "machines.cloud" platform; storing of all information regarding machines, configurations, states; easy adaptation to customer's CI. Simple and straightforward connection to other server and cloud platforms.
▶ Robustness	▶ Slim housing, designed for challenging applications in inner and outdoor areas of mobile working machines. Ingress protection class IP67 is achieved when connected.
	▶ Complies with standards for conformity according to CE and E1 marks; conformity with standards of the automotive, agricultural and construction industry; Usable in a temperature range from -30°C to + 60°C

Technical Data

Variants	WiFi	Bluetooth®	2G/3G*	GNSS (GPS/GLONASS)
TC1-WiFi	✓	✓	–	–
TC1-WiFi+	✓	✓	–	✓
TC1-Mobile	–	–	✓	✓

Details of variants

TC1-WiFi	WLAN and Bluetooth with one antenna terminal for external antenna: IEEE 802.11 (a,b,g,n), Bluetooth® 4.0 (2.1+EDR, BLE – Power Class 1.5)
TC1-WiFi+	WLAN, Bluetooth and GNSS with two antenna terminals for external antennas: IEEE 802.11 (a,b,g,n), Bluetooth® 4.0 (2.1+EDR, BLE – Power Class 1.5) GPS/GLONASS
TC1-Mobile	Cellular networks and GNSS with two antenna terminals for external antennas: 2G Quad-Band GSM (850/900/1800/1900 MHz) 3G Five Bands UMTS/HSPA+ (WCDMA/FDD) (850/800, 900, 1900 and 2100 MHz) GPS/GLONASS

Interfaces

CAN	2 x CAN 2.0B (11 bit and 29 bit Identifier), Low- / High-Speed up to 1 Mbit/s
RS232	Serial interface with programmable baud rate up to 115 kbit/s
Ethernet	IEEE 802.3, 10/100 Mbit/s

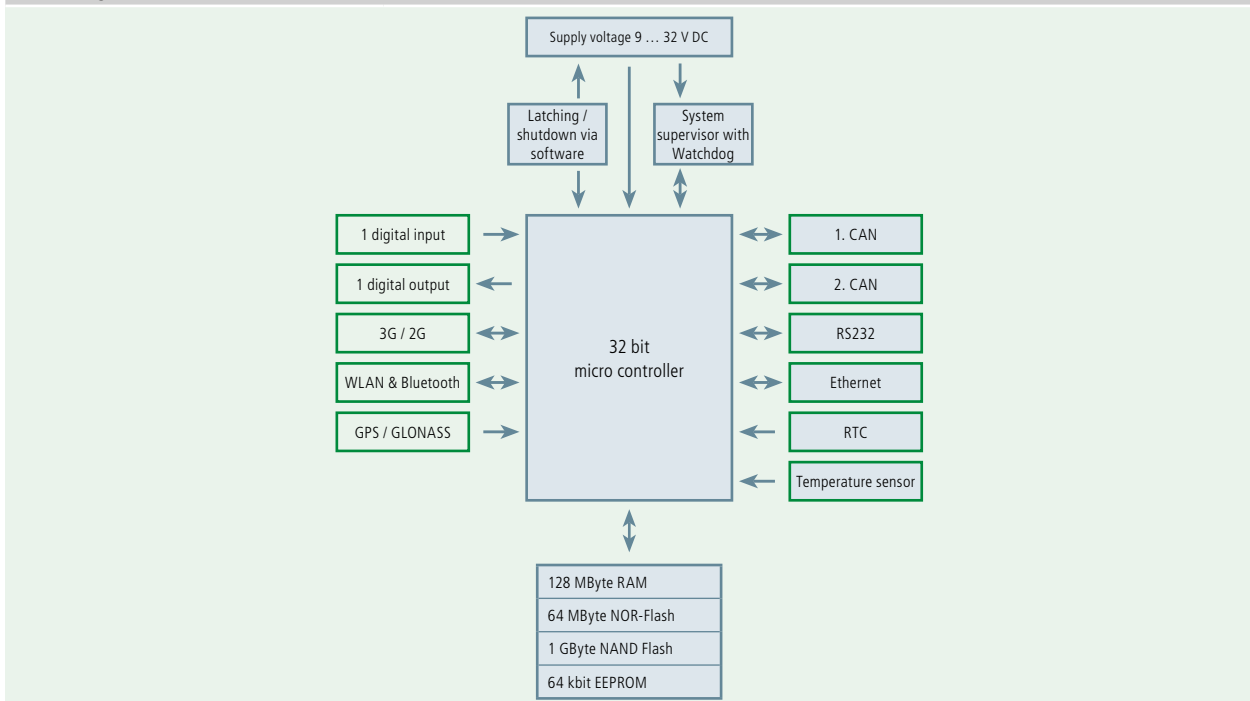
I/Os

1 digital input
1 digital output

*CDMA on request

Processor and memory	
Processor	32 bit controller, MPC5200B 400 MHz
RAM	128 MByte
EEPROM	8 kByte
NAND-Flash	1 GByte
NOR-Flash	64 MByte
Software	
Operating system	Linux operating system, Board Support Package (open source, incl. source code), development environment
System data	
Supply voltage	9 ... 32 V DC
Current consumption	350 mA at 12 V, 200 mA at 24 V
Temperature range	Operating: -30°C ... +60°C (-22°F ... +140°F) housing temperature
Internal temperature sensor	Built-in
Real time clock (RTC)	Gold cap buffered with wakeup function
Connectors	19 pin cable suited plugs (Tyco / AMP) SMA plugs for 1x WiFi or 1x 2G/3G and 1x GNSS
Protection class	IP67 when connected
Dimensions	Approx. 183 mm x 117 mm x 36 mm (7.21" x 4.61" x 1.42")
Weight	0,3 kg (0.67 lbs)
Certificates and approvals	Tests according to standards of the automotive, agricultural and construction machinery industry
	CE conformity
	E1: Use in any type of vehicle with a 12 V or 24 V power supply and battery (-) at the body

Block diagram



Application examples

- ▶ Connecting fleet vehicles to optimize operating hours
- ▶ Forward planning of maintenance and repairs to minimize or avoid unplanned downtime
- ▶ Possibility for remote maintenance e.g. transferring software updates



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