

Fanless Embedded Datalogger

CPU module features

The ATX-5485-CPU-02-0 module implements CPU features:

- NXP MCF5485 V4 Coldfire core up to 200 MHz.
- 32 Kbyte Instruction and Data Cache memories (built-in MPU).
- FPU and MMU units (built-in MPU).
- Security Encryption Controller (built-in MPU).
- 32 Kbyte RAM (built-in MPU).
- Watchdog (built-in MPU).
- 32 MByte SDRAM memory 32 bit (default).
- 32 Mbyte Boot Flash memory 16 bit (default).
- 32 Mbyte User Flash memory 16 bit (default).
- RTC with software calibration for accuracy and 256 Kbit NVRAM memory with battery backup.
- Digital Temperature Sensor $\pm 2^{\circ}\text{C}$ accuracy.
- Hardware and Software Watch-dog.
- BDM I/F for emulator DEBUG and Flash CPU programming.
- FPGA custom interfaces.

Nand Flash memory module

- 32 Gbyte – 4x device memory @ 8 bit, MLC cells.
 - Size page: 4096+128 spare bytes (single device memory).
 - Size Block: 512K+16K spare bytes (single device memory).
 - 128 pages for 16384 blocks = 64 Gbit = 8 Gbytes (single device memory).
- The ATX-560-NDF-01-0 module implements Nand Flash memory functionality.

Front panel external ports

- 1x USB type Host 2.0.
- 1x Ethernet 10BaseT and 100Base-TX on RJ45 managed by CPU ETH0 controller, status Led green = Link, status Led yellow = Activity.
- 2x EMD isolated MVB bus interfaces compliant to the IEC 61375 TCN standard with ability to disconnect from the line via relays on 2x DSUB-9 male+female connectors named AUX3 and AUX4.

The ATX-550-MVB-01-1 module implements MVB functionality.

- 1x BACC channels on the DSUB-25 female connector named AUX1 (optional).
- 1x ODO channels on the DSUB-25 female connector named AUX2 (optional).

Rear panel external ports

- 3x Ethernet 10BaseT and 100Base-TX on M12-D connectors named J1-J2-J3. The interfaces are controlled by Managed Switch IEEE 802.3u standard via CPU ETH1 controller.
 - 6x RS-232 optocoupled channels up to 115200 bps:
 - DSUB-9 male upper connector named 232 #1 - TX/RX interface.
 - The 232 #1 serial channel is controlled by CPU UART controller.
 - DSUB-9 male lower connector named 232 #2 - RX only interface (*).
 - DSUB-9 male upper connector named 232 #3 - RX only interface (*).
 - DSUB-9 male lower connector named 232 #4 - RX only interface (*).
 - DSUB-9 male upper connector named 232 #5 - RX only interface (*).
 - DSUB-9 male lower connector named 232 #6 - RX only interface (*).
 - DSUB-9 male upper connector named 232 #5 - RX only interface (*).
 - DSUB-9 male lower connector named 232 #6 - RX only interface (*).
 - 4x CAN bus optocoupled channels up to 1 Mbps:
 - DSUB-9 male upper connector named CAN1 A.
 - DSUB-9 male lower connector named CAN1 B.
 - The CAN1 A and CAN1 B channels are controlled by CPU CAN bus controllers.
 - DSUB-9 male upper connector named CAN2 A (*).
 - DSUB-9 male lower connector named CAN2 B (*).
 - 2x RS-422 optocoupled channels up to 115200 bps:
 - DSUB-25 female upper connector named 422 #1 - RX only interface (*).
 - DSUB-25 female lower connector named 422 #2 - RX only interface (*).
- The ATX-156-FPG-01-0 module implements serial UART controllers (*) and manage two SJA1000T CAN bus controllers (*).

SIM card

- A metal plate on the rear panel protects access to the SIM socket of the 4G/ LTE module.
- Standard SIM card socket and 1.8V/3V SIM card supply.

LED front panel

- POWER ON (green led) = Power applied and main power supply ON.
- LINK (green led) = 4G/LTE module link.
- FAIL (red led) = Diagnostic CPU failure.
- M.FULL (red led) = Nand flash memory full.
- L1, L2, L3, L4 (yellow leds) = User application.

Internal Battery Pack for Shutdown equipment

- 4x 2V Cyclon single cells with sealed lead
- Battery Pack voltage: +8.6 Vdc (Full charged), +7.2 Vdc (Discharged).
- Internal fuse protection: T3.15A-250V.
- With the battery charged, the time to shutdown the system is guaranteed for at least 15 minutes.

The ATX-159-CBT-01-0 module implements battery controller.

The ATX-160-BAT-01-0 module implements battery pack.

Radio module

The ATX-200-GSM-01-0 module implements radio mobile features.

On the module is installed the TELIT LE910C4-EU device with USB 2.0 and TTL 1.8V UART interfaces.

The main features are the following:

- The operating frequencies in GSM850, EGSM900, DCS1800, PCS1900, WCDMA & LTE modes conform to the 3GPP specifications.
- 2G: WCDMA 1800 (B3) and WCDMA 900 (B8) RF bands.
- HSPA+: WCDMA 2100 (B1), WCDMA 1800 (B3), WCDMA 900 (B8) RF bands.
- LTE FDD: LTE 2100 (B1), LTE 1800 (B3), LTE 2600 (B7), LTE 900 (B8), LTE 800 (B20), LTE 700 (B28A) RF bands.
- Output power:
 - 2G (GSM): LB: Class 4 (2W, 33 dBm), Class E2 (0.5W, 27dBm @ EDGE). HB: Class 1(1W, 30 dBm), Class E2 (0.4W, 26 dBm @ EDGE).
 - 3G (WCDMA): Class 3 (0.25W, 24 dBm).
 - 4G (FDD): Class 3 (0.2W, 23 dBm @ 1RB).

Temperature Range

- Operating Temperature: $-25^{\circ}\text{C} \div +70^{\circ}\text{C}$ (EN-50155:2017 OT3)
- Storage Temperature: $-30^{\circ}\text{C} \div +85^{\circ}\text{C}$

IP Grade

- IP 20 (with inserted connectors and protective caps)

Main Power Supply input

- 4 pin circular connector named POWER IN.
 - Power supply range: +16.8 Vdc \div +36 Vdc (EN 50155:2017 S2 Class).
 - Power consumption: < 20 W max. @ +24 Vdc (nominal voltage).
 - Internal fuse protection: T5A-125V.
 - +24 Vdc command pin enable main power supply input.
- The ATX-158-FIL-01-0 module implements filter protection.
- The ATX-152-ALI-01-0 module implements main power switching.

Alternative Power Supply Input

- DC power socket connector named BATTERY PACK IN 19V.
- Battery Pack: +19 Vdc (nominal voltage)/ 3 A, +15 Vdc min.

Physical Data

- 2HE/19" stainless steel Rack.
- Base dimensions: 434 mm x 219 mm x 85.10 mm.
- Front panel dimensions: 482.60 mm x 88.10 mm and thickness: 3 mm.
- Depth handles: 40 mm and Rear panel thickness: 2.5 mm.
- Front and Rear panels material: aluminum alloy.
- Weight: less than 5 Kg.

Basic Software

- MQX Operating System 2.50.

Communication protocols

- TCP/IP, UDP.

Reliability

- 52000 h @ 45°C (IEC 62380:2004-08) without correction factor.

Approval / Compliances

- Backward compatible with the ATX-K043-DLG-02-0 model with the integration of the new 4G radio module.
- Governing Standard: Railway Applications: EN 50155:2017.
- Environmental compliance: Shock & Vibration: EN 61373:2010 + AC:2017. CEI UNI 45545-2:2015.
- EMC (Electromagnetic Compatibility):
 - EM compatibility: EN 50121-3-2:2016 + A1:2019.
 - Radio Spectrum Matters:
 - ETSI EN 301 489-52 V1.2.0 and ETSI EN 301 489-1 V2.2.3.
 - EN 55032:2015 + AC:2016 + A11:2020 + A1:2020
 - CISPR 25:2016 + COR1:2017.
 - Radio Spectrum Matters, Human exposure to electromagnetic fields (EMF): EN 62479:2010, EN 62311:2008.