



CPU Board - Processor and Features

- The processor installed in this version is MSCMXX6XYCM08AA with TrustZone®.

Single ARM® Cortex™-A9 MPCore with:

- 32 Kbyte L1 Instruction Cache
- 32 Kbyte L1 Data Cache
- Private Timer and Watchdog
- Cortex-A9 NEON MPE (Media Processing Engine) Co-processor
- 256 Kbyte unified I/D L2 Cache

Single ARM® Cortex™-M4 with:

- 16 Kbyte L1 Instruction Cache
- 16 Kbyte L1 Data Cache
- 64 Kbyte TCM
- Floating Point Unit (FPU)
- Memory Protection Unit (MPU)

Internal Controllers:

- 1x Gigabit Ethernet MAC Controller
- 1x USB 2.0 OTG Controller (Device only)
- 1x USB 2.0 HOST Controller (Not used)
- 1x CAN 2.0B Controller (Not used)
- 4x UART Controllers (One not used)
- 1x AUDIO Controller I/F I2S (Optional FPGA configurable)
- 4x I2C Bus Controllers (Two not used)
- 1x SPI Bus Controller
- 12 bit A/D Converter (Not used)
- 1x LCD Controller
- 1x CPU 2D/3D Processor
- 1x DIE Temperature Sensor
- JTAG I/F for emulator DEBUG eMMC and Flash programming
- 24 bit - 96 KHZ Multichannels Audio Codec with 2x I2S interfaces

MMI internal Ports:

- 4 Gbyte - 8 bit storage eMMC Memory
- 1x 32 bit LPDDR2 1 Gbyte Memory
- 1x 256 Mb QSPI Nor Flash Memory
- RTC ± 5 ppm accuracy with integrated Crystal and 236 Byte Sram (I2C interface)
- Watch-dog Timer
- JTAG I/F for FPGA debug and programming
- 2x TTL Debug Serial Channels (TX/RX for A9 e M4 Cortex cores)
- 24x TTL Inputs Trigger Schmitt for Keyboard (FPGA controller)
- 1x PWM backlight control for Keyboard (FPGA controller)
- 1x PWM backlight control for Display (FPGA controller)
- 1x VCC enable control for Display (FPGA controller)
- 1x VCC enable control for Backlight Display (FPGA controller)
- 1x 256 Mb Nor Flash SPI Memory (Audio storage wave)
- 2x I2S Audio Codec Interfaces (FPGA controller)

MMI external Ports:

- 1x USB Device 2.0 channel for Debug and Software Configuration (protective cover)
- 1x Ethernet 10Base-T and 100Base-TX (M9 ETH connector)
- 1x RS-422 optoisolated differential channel TX/RX/RTS/CTS controls (M1 RACK connector)
- 2x Audio Analog Inputs with 600 Ω coupling transformer (M1 RACK connector)
- 1x Audio Analog Output with 600 Ω coupling transformer (M1 RACK connector)
- 1x Optoisolated Input Enable Desk Key port (M6 DDS connector)
- 1x Handset port with PTT and HOOK control input switches (M2 PHONE connector)

- 1x Speaker output - 8W RMS at 4 Ω load (M3 SPKR connector)
- 4x Optoisolated Inputs - 6 mA @ +110 Vdc (M5 I/O connector)
- 4x Optoisolated Outputs - 100 mA @ +110 Vdc (M5 I/O connector)
- 1x Ambient Light sensor for brightness control manual/auto
- 24x Hard Keys with backlight control
- 1x Display: 7" TFT size, 800x480 pixel, 262K and 16M colors, 500cd/m² typ., 600:1 CTR typ., 70/70/60/60 typ. Viewing angle.
- 1x Battery Holder for B2032 Lithium Primary Battery Coin - 190 mA/h nominal capacity for RTC back-up

Environment

- Operating Temperature: -25°C \div +70°C (EN 50155:2008-05 T3 class)
- Storage Temperature: -40°C \div +85°C
- Altitude: 1400 m max.

Cooling

- Natural convection

IP Grade

- IP 65 on Front Panel
- IP 4X on Rear Panel

Reliability

- 30800 h @ 45°C (IEC-62380:2004)

Power Supply

- +16.8 Vdc \div +143 Vdc (EN 50155:2008-05 S2 Class) - (M8 PWR connector)
- +14.6 Vdc and +150 Vdc @ 100 mS Transient

Alternatively, the equipment can be powered by the +24 Vdc stabilized voltage from the M1 RACK connector.

- Inrush current limitation
- RFI Filter
- Internal Fusing T4A-250V
- Against reversed polarity
- Power consumption in base configuration: typ. 25W

Dielectric withstand voltage

- 1500 Vdc

Physical Data

- Front dimensions: mm 274x138
- Back dimensions: mm 258x132
- Front panel depth: mm 9
- Depth: mm 45.3
- Weight: < 2 Kg

Basic Software

- LINUX Kernel 4.1.15 with patch RT18
- QT 5.6.1 and GTK 3.18.8 and 2.24.29 graphic libraries

Approval / Compliances

- Governing Standard:
 - Railway Applications: EN 50155:2007
- Environmental compliance:
 - Environmental test: EN60068-2-1:2007
 - Shock & Vibration: IEC 61373:2010
 - Fire/Smoke: EN 45545-2:2013
 - RoHS/RoHS2 and REACH
- EMC (Electromagnetic Compatibility)
 - EM compatibility: EN 50121-3-2:2016
- Safety: EN 60950-1:2006