P522 – AFDX/ARINC-664 Interface PMC

- **Two full duplex AFDX networks**
- **Onboard AFDX End System protocol stack implementation**
- **Interoperable with Airbus and Boeing**
- **DAL-D certifiable FPGA implementation**
- **Onboard CPU for SNMP and ICMP traffic**
- **Host driver with ARINC-653 compliant port API**
- **-40 to +85°C with qualified components**
- **32-bit/33-MHz PMC**

The P522 is a 32bit/33MHz PMC module with AFDX/ ARINC-664 functionality. AFDX is a reliable, high-speed data bus commonly used in airborne applications for sending information between avionics subsystems. Its most important features are high data integrity, redundancy and deterministic behavior.

The P522 meets all AFDX safety and performance requirements, which makes it ideal for safety-critical inflight data transfer. The PMC module supports two full duplex AFDX networks based on standard IEEE 802.3 Ethernet technology and applies protocol stack implementation. Up to 256 fully separated receive VLs and 64 transmit VLs allow for reliable packet transport and bounded transport latency.

The FPGA internal ARM CPU can be used for services to offload host CPU. It is not required to execute the AFDX protocol and is separated from the rest of the AFDX protocol engine. Therefore, this configuration can be used for quite flexible designs, as well as very compact integrated AFDX solutions.

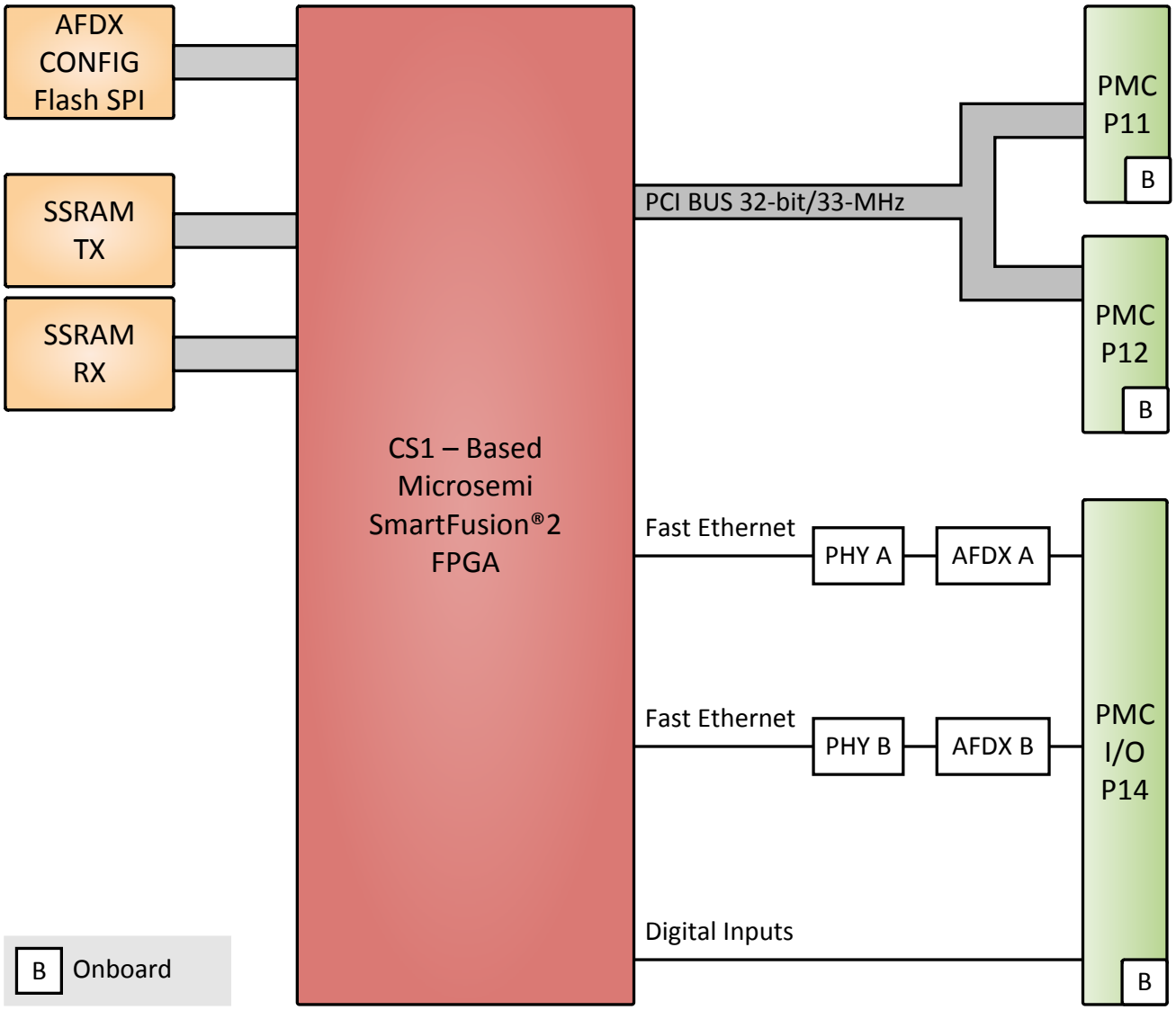
The architecture of the P522 is based on the flash based FPGA CS1, which reduces development costs, secures long-term availability and makes the whole interface very flexible as customized I/O functionality can be added anytime.

The CS1, which can be ordered as an individual chip, can be installed directly onto a large variety of boards to build an AFDX end system, and eliminates the need for an additional module

The PMC module is certifiable to the critical safety level DAL-D, according to the avionics guidelines (DO-254).

The P522 is a PMC I/O mezzanine card suitable for any PMC compliant host carrier board.

Diagram


AFDX CONFIG Flash SPI
SSRAM TX
SSRAM RX
CS1 – Based Microsemi SmartFusion®2 FPGA
PCI BUS 32-bit/33-MHz
PMC P11
B
PMC P12
B
Fast Ethernet
PHY A
AFDX A
Fast Ethernet
PHY B
AFDX B
PMC I/O P14
Digital Inputs
B
B Onboard

Technical Data

AFDX Usage Domain	■ Compatible with Airbus End System Detailed Functional Specification ■ Receive Operation □ Up to 256 virtual reception links (VL) □ Up to 32 ports per VL □ Up to 1024 receive ports in total ■ Transmit Operation □ Up to 64 virtual transmission links (VL) □ Up to 32 ports per VL □ Up to 1023 transmit ports in total □ BAG between 0.1 ms and 204.7 ms in steps of 0.1 ms ■ Support of AFDX Queueing and Sampling Ports as defined in ARINC664-P7 ■ Support of SAP and extended SAP as defined in ARINC664-P7 ■ Support of direct communication via IP layer ■ Support of Management Information Base (MIB) for AFDX and SAP communication as defined in ARINC664-P7
AUX Domain	■ SNMP Agent ■ ICMP Agent ■ Completely independent of host communication
Memory	■ 512k x 36 SSRAM memory □ 4 MB for AFDX receive data □ 4 MB for AFDX transmit data □ FPGA-controlled and ECC/CRC protected ■ 16 MB non-volatile Flash □ For AFDX configuration data □ FPGA-controlled and CRC protected
Onboard Interfaces	■ Ethernet □ Two 10/100Base-T/TX Ethernet channels □ Accessible on the PMC I/O connector ■ Configuration Interfaces □ Software tool for programming AFDX configuration ■ 6 General Purpose Digital Inputs usable for: □ Location indication □ In flight / on ground indication ■ 6 FPGA LEDs
FPGA	■ Complete AFDX protocol implementation ■ SEU immune configuration ■ SNMP and ICMP agents
PMC Characteristics (PCI)	■ Compliant with PCI Specification 2.2 ■ 32-bit/33-MHz, 3.3V V(I/O) ■ CRC-protected transfer of AFDX messages ■ Target
Electrical Specifications	■ Isolation voltage: □ 1500 VAC ■ Supply voltage/power consumption: □ +5 V (-3%/+5%), 650 mA typ.
Mechanical Specifications	■ Dimensions: conforming to IEEE 1386.1 ■ Weight: 62 g (uncoated)

Technical Data

Environmental Specifications	■ Temperature range (operation): □ -40..+85°C (qualified components) □ Airflow: min. 1.0 m/s ■ Temperature range (storage): -55..+85°C ■ Relative humidity (operation): max. 95% non-condensing (only when coated) ■ Relative humidity (storage): max. 95% non-condensing (only when coated) ■ Altitude: -300m to +20,000m ■ Shock: certification according to DO-160 is possible ■ Bump: certification according to DO-160 is possible ■ Vibration (sinusoidal): certification according to DO-160 is possible ■ Conformal coating on request
Reliability	■ MTBF □ 1 104 539 h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ Flammability □ UL 94V-000
EMC	■ Conforming to EN 55022 (radio disturbance), IEC61000-4-2 (ESD) and IEC61000-4-4 (burst)
Software Support	■ Linux ■ For more information on supported operating system versions and drivers see Software.

Up-to-date information, documentation and ordering information: www.men.de/products/p522/

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