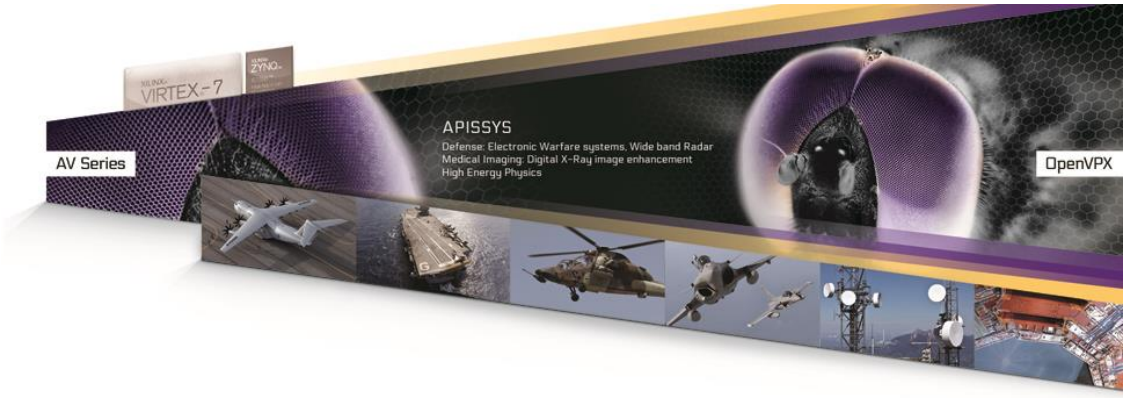
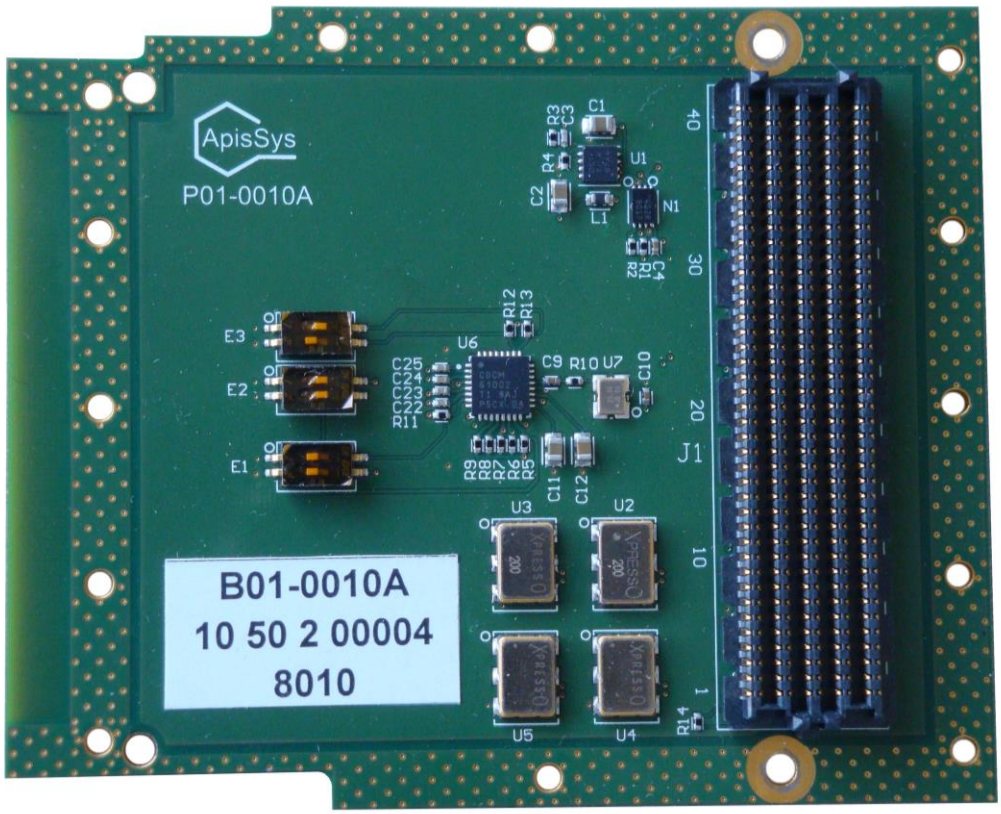


AF101

FMC Test Board



Applications

- FMC carrier test

Features

- VITA 57 FMC form factor
- FMC LA, HA and HB differential pairs loopbacks
- FMC DP differential pairs loopbacks
- FMC clock generation
- Air cooled and Conduction cooled rugged versions
- FPGA firmware cores

Overview

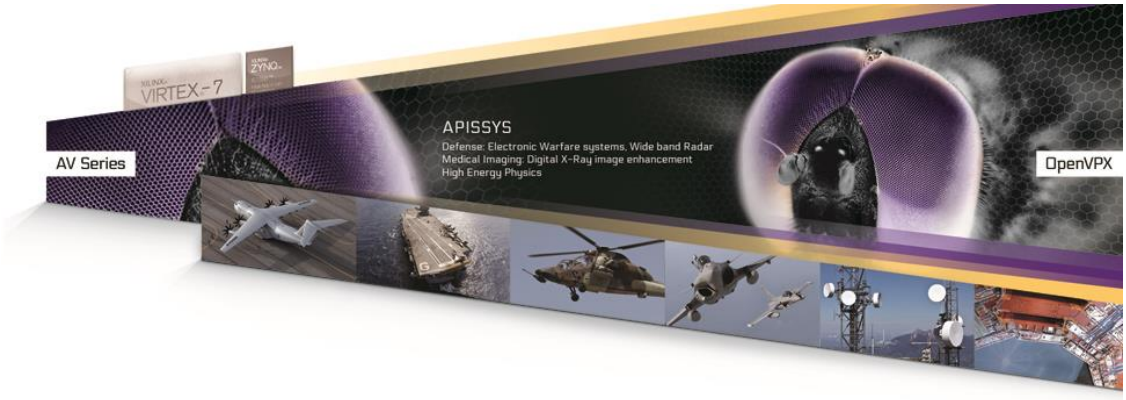
The AF101 is part of ApisSys' range of modular IOs solutions based on the VITA 57, FPGA Mezzanine Card standard.

The AF101 provides FMC carrier developers and assembly facilities with a tool for full characterisation of the FMC interface.

The AF101 features loopbacks on all FMC differential pairs on HPC connectors.

The AF101 provides an on board, user programmable, low jitter clock generator supporting reference clocks as required for PCIe, SATA, SRIO, Fiber Channel, Aurora, Gbit Ethernet or XAUI protocols.

The AF101 provides four on board LVDS oscillators feeding the CLK_M2C and CLK_BIDIR FMC clocks.



FMC interface

The AF101 features a VITA 57 – FMC (FPGA Mezzanine Card) compliant slot.

The AF101 provides Tx to Rx loopbacks on the Multi-gigabit differential pairs DP0 to DP9.

The AF101 provides loopbacks on the LA, HA and HB differentials pairs.

Clocks

The AF101 provides an on-board, user programmable, low jitter clock generator used to provide clock references as required for high speed serial links (Virtex® 6 GTX). The clock frequency on GBTCLK0 and GBTCLK1 can be selected among the following:

- 100 MHz, supporting PCIe gen 1
- 125 MHz, supporting PCIe gen 1, GigE, Aurora and SRIO 1.25 and 2.5 Gbps
- 150 MHz, supporting SATA
- 156.25 MHz, supporting XAUI, SRIO and Aurora 3.125 Gbps
- 250 MHz, supporting PCIe gen 2
- 312.5 MHz, supporting Aurora 5 and 6.25 Gbps

The AF101 provides four on-board LVDS oscillators:

- 200 MHz on CLK0_M2C and CLK2_BIDIR
- 350 MHz on CLK1_M2C and CLK3_BIDIR

Firmware

The AF101 comes with a firmware package which includes VHDL cores allowing control and communication with all AF101 hardware resources.

A base design is provided that demonstrates the use of the AF101 and gives users a starting point for firmware development.

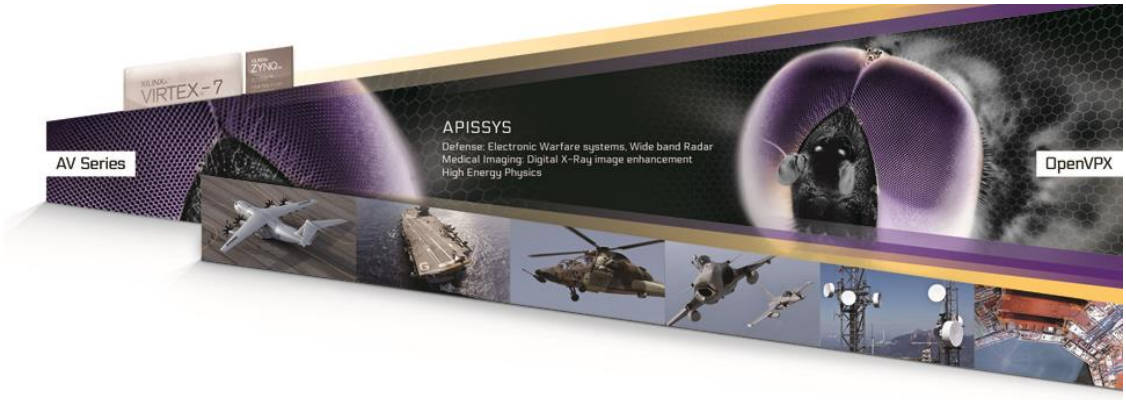
The AF101 firmware package is supported on the Xilinx ISE® 12 design suite and later.

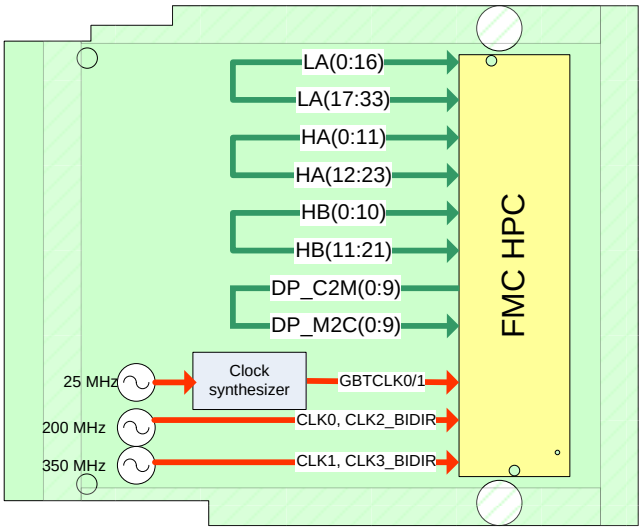
The AF101 firmware package has been fully validated on the AV103 and other ApisSys FMC carrier products.

Ruggedization

The AF101 is delivered in air cooled and conduction cooled standard or rugged versions for used in severe environmental conditions.

Standard VITA 47 supported ruggedization levels are EAC4, EAC6 and ECC3.





Specifications

Reference Clocks

- 100 MHz, supported protocols:
  - PCIe gen 1
- 125 MHz, supported protocols:
  - PCIe gen 1
  - GigE
  - Aurora 1.25 and 2.5 Gbps
  - Aurora 1.25 and 2.5 Gbps
- 150 MHz, supported protocols:
  - SATA
- 156.25 MHz, supported protocols:
  - XAUI 3.125 Gbps
  - SRIO 3.125 Gbps
  - Aurora 3.125 Gbps
- 250 MHz, supported protocols:
  - PCIe gen 2
- 312.25 MHz, supported protocols:
  - Aurora 5 and 6.25 Gbps

Clocks

- 200 MHz LVDS
- 350 MHz LVDS

FMC interface

- HPC:
  - LA(0:16) loopback on LA(17:33)
  - HA(0:11) loopback on HA(12:23)
  - HB(0:10) loopback on HB(11:21)
  - DP_C2M(0:9) loopback on DP_M2C(0:9)

Firmware support

- VHDL cores for all hardware resources
- Base design
- Supported by Xilinx ISE 12 and later

Ruggedization

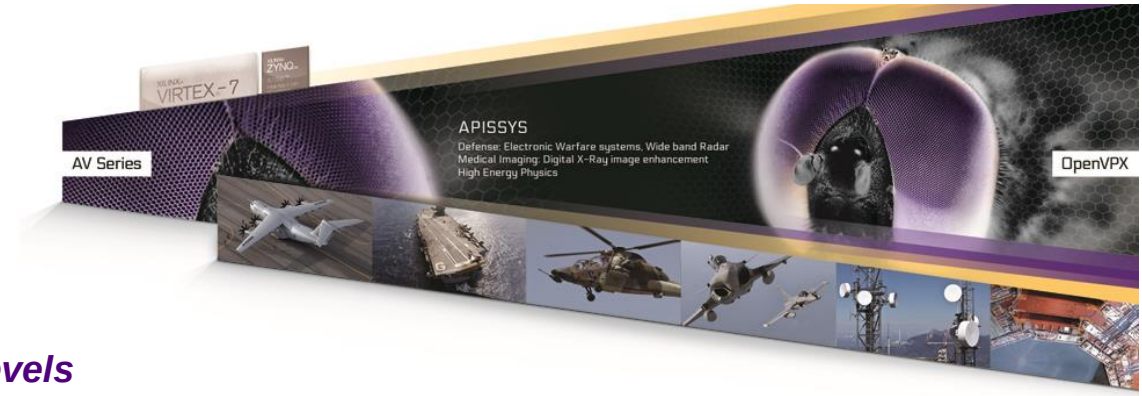
- As per VITA 47:
  - Air cooled : EAC4 and EAC6
  - Conduction cooled : ECC3

Power dissipation

- +12V: 0 A (0W)
- +3.3V: 0.2 A (0.6 W)
- VADJ (2.5V): 0 A (0W)
- +3.3VAUX: < 0.1A

Weight

- Air cooled : 35g
- Conduction cooled : 35g



Ruggedization levels

	Air flow, Standard AS (VITA 47 EAC4)	Air flow, Rugged AR (VITA 47 EAC6)	Conduction Standard CS (VITA 47 ECC3)	Conduction Rugged CR (VITA47 ECC4)
Operating Temperature	0°C to +55°C (1) (8 CFM airflow at sea level)	-40 to +70ºC (1) (8 CFM airflow at sea level)	-40°C to +70°C (Card Edge)	-40°C to +85°C (Card Edge)
Non Operating Temperature	-40°C to +85°C	-50°C to +100°C	-50°C to +100°C	-55°C to +105°C
Operating Vibration (Random)	5Hz - 100Hz +3 dB/octave 100Hz-1kHz = 0.04 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.04 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.1 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.1 g2/Hz 1kHz - 2kHz -6 dB/octave
Operating Shock	20g, 11 millisecond, half-sine	20g, 11 millisecond, half-sine	40g, 11 millisecond, half-sine	40g, 11 millisecond, half-sine
Operating Relative Humidity	0% to 95% non-condensing	0% to 95% non-condensing	0% to 95% non-condensing	0% to 95% non-condensing
Operating Altitude	@ 0 to 10,000 ft with adequate airflow	@ 0 to 30,000 ft with adequate airflow	@ 0 to 30,000 ft	@ 0 to 60,000 ft
Conformal Coating	No	Optional (default acrylic 1B31)	Yes (default acrylic 1B31)	Yes (default acrylic 1B31)

Ordering information

Part Number		A F 101 -	rr
Ruggedization level	Air Standard		AS
	Air Rugged		AR
	Conduction Standard		CS
	Conduction Rugged		CR

Archamps Technopole
60 rue Douglas Engelbart
ABC1, A
F-74160 Archamps - France
Phone: +33 4 50 36 07 58
Fax: +33 4 50 36 05 29

www.apissys.com