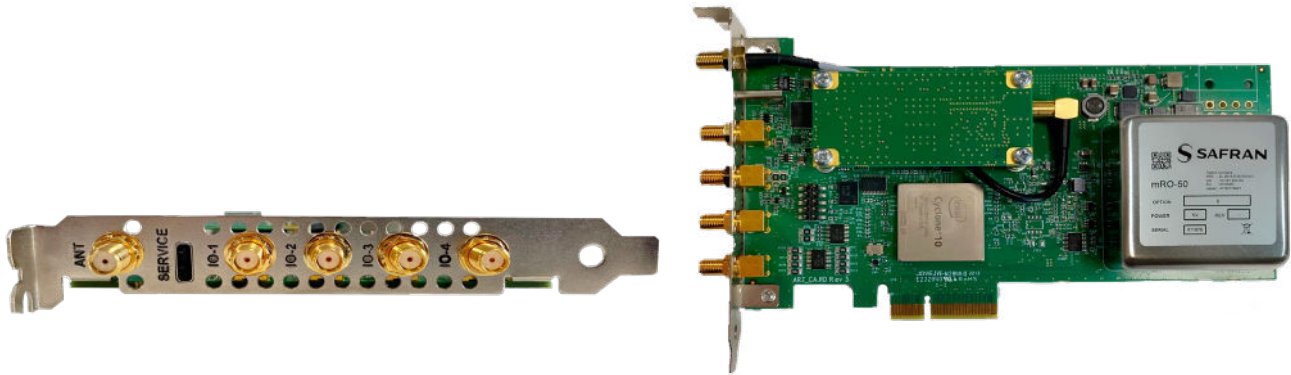


ATOMIC REFERENCE TIME (ART) CARD



The ART Card is the first Timing Card leveraging the small SWaP of the mRO-50 Rubidium oscillator on a PCIe board.

The ART Card has been designed with scalability, future-proofness and seamless integration in mind. Therefore it is fully open-source and operated by an hardware-agnostic monitoring and disciplining software stack.

The ART Card is a proven enabling solution to build your own high performance Network Time Server.

Key Features of the ART Card

- First PCIe card including an atomic time reference from Safran, the mRO-50 and a multi-frequency multi-constellation GNSS receiver.
- PCIe 2.0 x 4 format.
- Open-source software suite including driver, monitoring daemon and disciplining algorithm supported by the community.
- Compatible with existing NTP and PTP implementations.

Time Appliances Project

The Open Compute Project (OCP) initiated a sub-project called Time Appliances Project (TAP) dedicated to time in datacenters. This project aims to provide a platform to bring together, discuss, standardize and share technologies and solutions across industries with the datacenter applications and datacenter network infrastructure as the main interest.

Time appliances project aims to support the development of a PTP profile for datacenter applications and datacenter network infrastructure. This profile will cover time-sensitive applications over OCP-compliant and PTP-aware networking infrastructure such as network switches, network clocks, network interface cards, timing modules & connectors, etc.

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

Technical Specifications

Front Panel Connections

I/O	I/O available	Connector
ANT	GNSS ANTENNA	SMA
SERVICE	UPDATE over USB	USB-C
IO-1	- PPS IN - PPS OUT - Freq OUT	SMA
IO-2	- PPS IN - PPS OUT - Freq IN	SMA
IO-3	- PPS IN - PPS OUT	SMA
IO-4	- PPS IN - PPS OUT	SMA

Signals

Type	ART CARD
1 PPS	TTL level
Frequency	10 MHz Sinewave signal on 50 ohms load 6dBm \pm 2dBm

Environment

Type	ART CARD
Magnetic field sensitivity	$< 1 \times 10^{-10}$ / Gauss
Storage Temperature	-55°C to +85°C
Operating Temperature	-10°C to +60°C
g-tip-over test	2×10^{-10} / g on worst sensitive axis
Approvals	CE Mark approved Conforms to the following Standards: EMC : EN 55032:2015 EN 55035:2017/A11:2020 Limit : Class A Safety : EN 62368-1:2014/AC:2015 Radio Spectrum Efficiency: EN 303 413 V1.1.1

Timing and Frequency Performance

Type	ART CARD
Frequency change within operating temperature range	$\leq 4 \times 10^{-10}$ over -10°C to +60°C
Linear drift measured over minimum 14 days after 3 months operations:	$< 1 \times 10^{-11}$ / day*
Short Term Stability (Allan Deviation): @ 1 s @ 10 s @ 100 s	$\leq 1 \times 10^{-10}$ $\leq 3 \times 10^{-11}$ $\leq 1 \times 10^{-11}$
Phase Noise on 10 MHz Output: @1 Hz @ 4 Hz @ 10 Hz @ 100 Hz @ 1 kHz @ 100 kHz	≤ -60 dBc/Hz ≤ -70 dBc/Hz ≤ -85 dBc/Hz ≤ -110 dBc/Hz ≤ -135 dBc/Hz ≤ -140 dBc/Hz
Frequency retrace (in stable temperature, gravity, pressure and magnetic field conditions)	$< 1 \times 10^{-10}$ within 1 h after 24 h off
Warm-up time	Lock < 2 minutes at over the full temperature range
Holdover (At constant temperature and after 48 hours GNSS disciplining)	2 μ s after one day

Ordering Information

Type	ART CARD
Designation	ART Card
P/N	1002893
Support and documentation	https://github.com/Orolia2s/art-card-board

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BY TRUST**



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