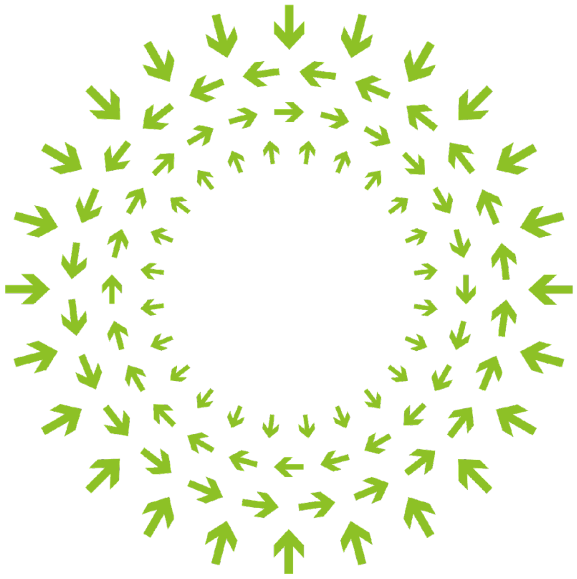

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OCP-TAP

Receiver Carrier Board (RCB)

Form-Factor

Version 1.0

Hardware Specification

Authors: OCP-TAP Group

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1. Overview

The Receiver Carrier Board (RCB) is a GNSS receiver module that provides PPS output and the TOD to the Time Card.

The OCP-TAP RCB form factor standardizes the dimensions, layout and connectivity of modular GNSS receivers for OCP-TAP Time Cards.
A standard modular RCB Form Factor allows Time Card customers to interchange and upgrade GNSS receivers with ease, and lets manufacturers an easier path to release new and improved GNSS receiver that are compatible with OCP-TAP Time Cards.

The RCB Form Factor can lead to a faster pace of innovation and development as manufacturers can focus on creating new components rather than iterating on the Time Servers, Time Cards and NICs for each new product or revision.

Figure 1 - Time-Card with RCB

Figure 2 - Receiver Carrier Board (RCB)

1.1. Acronyms

Abbreviation	Definition
GNSS	Global Navigation Satellite System
RCB	Receiver Carrier Board
TAP	Time Appliance Project
PPS	Pulse Per Second
ToD	Time of Day
NIC	Network Interface Card
PTP	Precision Time Protocol

2. Scope

This document defines the technical details for base specification for Receiver Carrier Board (RCB). Any supplier seeking OCP recognition for a hardware product based on this Specification must be 100% compliant with all features or requirements described.

3. License

3.1. Open Web Foundation (OWF) CLA

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Notes:

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3.2. Acknowledgements

The OCP-TAP RCB specification is the outcome of a collaborative effort of OCP-TAP members and contributors.

OCP-TAP would like to acknowledge the following members and companies for their contributions

- Charlie Ferreira, Furuno Electric
- Tomasz Widomski, Elproma
- Wim Rouwet, NXP
- Jos Prakash Arakkaparambil Vacko, u-blox
- Samuli Pietilä, u-blox
- Nobuyasu Shiga, Individual Contributor
- Ahmad Byagowi, Meta
- Armando Julies Pinales, Meta
- Julian St. James, Meta
- Elad Wind, NVIDIA

4. Compliance with OCP Tenets

The RCB Form Factor complies to the following OCP (4 out of 5) tenets.
The ideals behind open sourcing stipulate that everyone benefits when we share and work together. Any open-source project is designed to promote sharing of design elements with peers and to help them understand and adopt those contributions.

4.1. Openness

The RCB takes one step into modularity of the OCP-TAP Time-Card, by allowing a modular interchangeable GNSS receivers to be easily provisioned into Time Cards.
This standard modular form factor allows for more vendors to drive their innovation and make time-aware data centers ubiquitous

4.2. Efficiency

With this modularity Time-Cards functionality such as hold-over and precision can be designed and qualified separately from the GNSS receiver, and allow for parallel technological cycles to happen simultaneously. Technical improvements in the RCB do not mandate a change in the Time Card.

4.3. Impact

The RCB improves the time-to-market advantage of GNSS innovations, such as the ability to add support for new constellations, for dual-band constellation receivers, and more.

4.4. Scale

With the interest generated around Time Card standard, we expect multiple vendors to design and obtain product recognition (OCP Accepted™ or OCP Inspired™) for a thriving marketplace of Time-Cards and RCBs at scale.

4.5. Sustainability

Flexibility in TAP reduces unnecessary waste by upgrading instead of replacing

5. Physical Specifications

The RCB module footprint, I/O and mechanical requirements are defined for interoperability with the OCP-TAP Time-Card specification.

The RCB consists of a 67.25 mm x 31.75 mm PCB.

5.1. Labeling

Labels will contain information about the part number and the serial number.
The serial number indicates the initial time of manufacture.

5.2. I/O

The RCB contains the following I/O interfaces:

1. Time-Card Board Connector
2. Antenna Coax SMA or SMB Connector
3. LED indicators are optional and per vendor's implementation.

5.3. Board Connector – Pinout

8-pin connector plus an optional 8-pins
The Time-Card Board Connector is a standard 8-pin header which holds the main functions of the RCB

1. UART – ToD from the GNSS communication
2. PPS Out

Pin #	Name	Type	Description
1	VCC_ANT	Power	Antenna Power Supply, 3v3 to 5v with Max 100mA
2	VCC	Power	Receiver Power, 3v3 with Max 200mA
3	TXD	Output	UART TDX, LVCMOS
4	RST	Input	Hardware Reset
5	RXD	Input	UART RXD, LVCMOS
6	TP1	Output	Time Pulse (1-PPS recommended), LVCMOS
7	TP2	Output / Input	Time Pulse (output, input, unused or specific), LVCMOS
8	GND	Power	Power Return, Ground

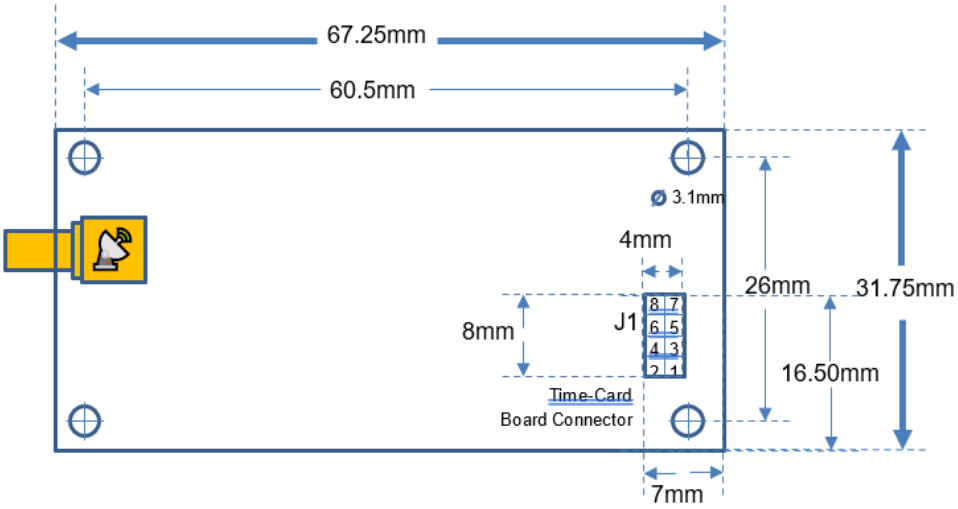
5.4. Foot Print and Layout

This defines the mechanical form factor and layout of the RCB.
Specifically, we call out the placement of

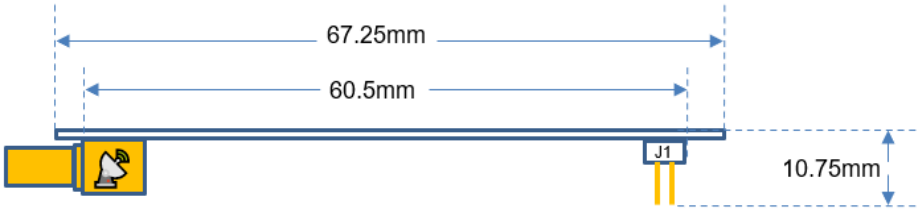
1. Antenna connector [📡]
2. Time-Card Board Connector [J1]
3. Time-Card mounting holes

We call out 4 screw holes [⊕], their locations and dimensions are mandatory. It is required to apply grounded keep-out areas for the screw holes.

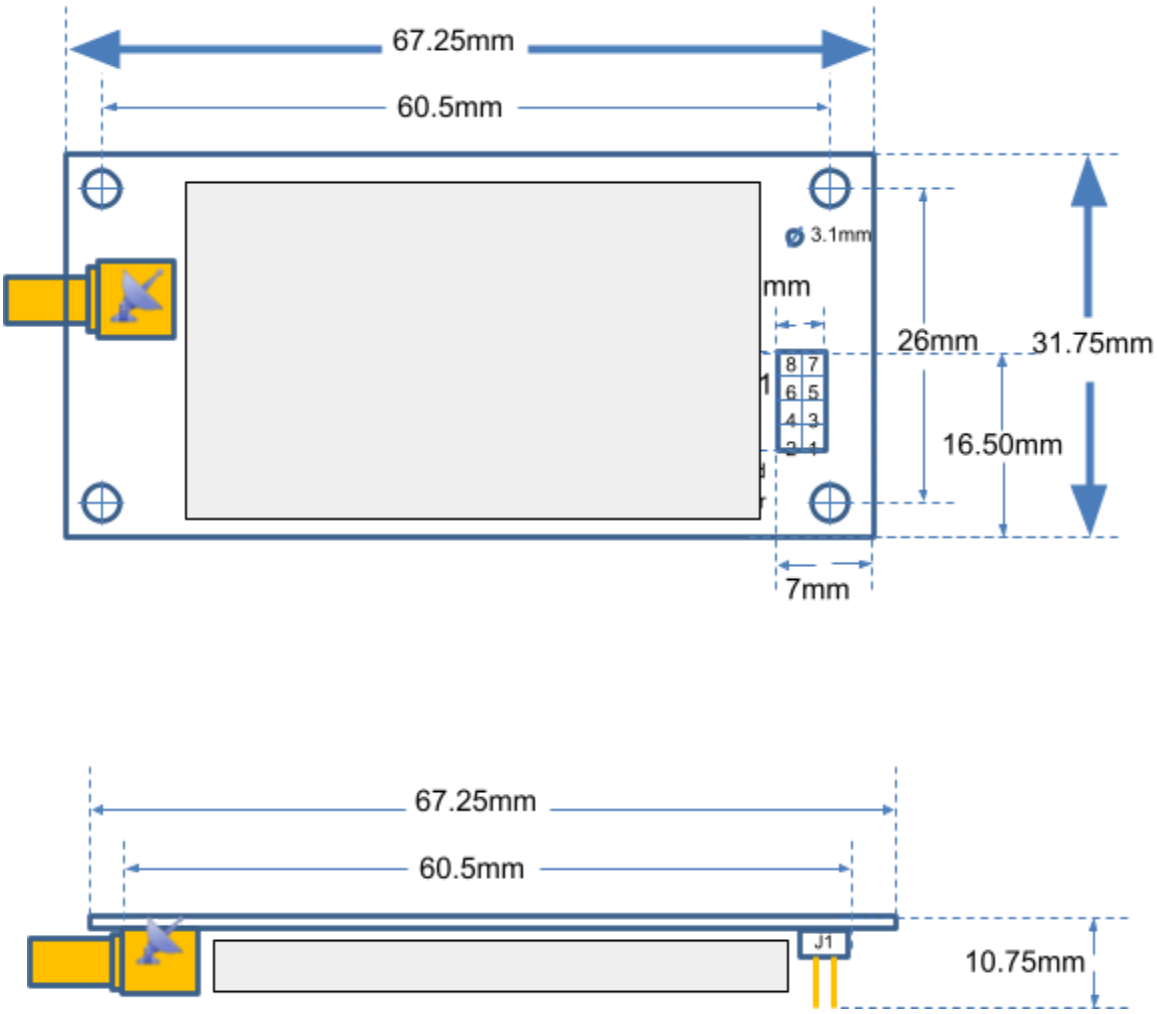
5.4.1. Bottom View



5.4.2. Side View



The grayed zone defines a height-limit that shall not exceed 8 mm, and is meant to allow usability of the real estate on the mating Time Card.



6. Hardware Management

We intentionally leave the hardware management of the RCB for the vendors to define and implement. This will cover programming of the ICs, diagnostics, etc.

7. Version Table

Date	Version #	Author	Description
January 23rd, 2023	0.1	OCP-TAP	First draft
March 1st, 2023	1.0	OCP-TAP	IC Voting

8. References

[1] OCP-TAP Time Card specification and all other related OCP-TAP specs can be found here https://github.com/opencomputeproject/Time-Appliance-Project

[2] Assortments of RCBs

ZED-F9T-10B-01
AA700036037
109102024.0000
NV08C-CSM
V4.1 0616
GPS
GLONASS
GALILEO
ZED-F9T-00B-01
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TRIMBLE
66226-B
Trimble
97975-05
S/N: 2301103026
TRIMBLE 120008-A
Trimble
121238-00
S/N: 2319100203
EUROMA

Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec)

Complete all the checklist items in the table with links to the section where it is described in this spec or an external document .

Item	Status or Details	Link to detailed explanation
Is this contribution entered into the OCP Contribution Portal?	Yes	
Was it approved in the OCP Contribution Portal?	Yes or No	If no, please state reason.
Is there a Supplier(s) that is building a product based on this Spec? (Supplier must be an OCP Solution Provider)	Yes	List Supplier Name(s): working with OCP Comittee on a path to enable Module vendors into the program
Will Supplier(s) have the product available for GENERAL AVAILABILITY within 120 days?	Yes	