**P3335 Timecard Hardware Interfaces**

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| Date | Author(s) | Comments |
| 2024-05-4 | Doug Arnold | First cut including inputs: GNSS, PPS, 10 MHz, IRIG  Outputs: PPS, pulses, 10 MHz, IRIG  Bidirectional: PCIe, SFP |
| 2024-12-09 | Doug Arnold | Added lists for acronyms, and normative references. Changed PPS to match ITU-T requirements for simple PPS, except connector |

**Add to clause 2 Normative References**

IEC 60169-15:2121, “Radio-frequency connectors - Part 15: Sectional specification - RF coaxial connectors with inner diameter of outer conductor 4,13 mm (0,163 in) with threaded coupling - Characteristic impedance 50 Ω (type SMA)”

IRIG Standard 200-16, “IRIG Serial Time Code Formats”

ITU-T G.703 Amendment 1 (05/2021), “Physical/Electrical Characteristics of Hierarchical

Digital Interfaces”

**Add to subclause 3.1 Definitions**

N/A

**Add to subclause 3.2 Acronyms and Abbreviations**

AM Amplitude Modulated

DCLS Direct Current Level Shift

IRIG Inter-Range Instrumentation Group

PCIe Peripheral Component Interface express

PPS Pulse Per Second

PTM Precise Time Measurement

SFP Small Form-factor Pluggable

SMA Subminiature version A

**Add to Annex A – Bibliography**

N/A

**1.0 Inputs** <editors note: change clause/subclause numbers to fit overall draft>

The time card shall be able to successfully interpret inputs which meet the specifications listed in this clause

**1.1 GNSS receiver**

SMA female connector (50 Ohm), Standard: IEC 60169-15:2121

Antenna power (TBD)

**1.2 Pulse Per Second (PPS)**

Input level into 50 ohms (Low is -0.3 to 0.3V, high is 1.2 to 5.5V)

Tolerate pulse width range of: 100 ns – 500 ms

On-time mark is 50% on rising edge

The maximum rise time (10%-90%) 5 ns. Implementations may accept longer rise times.

SMA female connector (50 Ohm)

**1.3 10 MHZ sine wave**

Specifications TBD

SMA female connector

**1.4 IRIG time code AM sine wave**

2.0-5.5 V peek-to-peek

Signal format conformant to IRIG Standard 200-16

SMA female connector

**1.5 IRIG time code DCLS**

Input level into 50 ohms (Low is -0.3 to 0.3V, high is 1.2 to 5.5V)

Active high required, Configurable active low (optional)

SMA female connector

**2.0 Outputs**

The output signals, if present, shall meet the specifications in this clause.

**2.1 PPS**

This interface shall be implemented

As specified in ITU-T G703 Amendment 1, Clause 19, and Annex A except that the connector shall be an SMA female connector

**2.2 Pulses (optional)**

1 PPS to 1 MPPS (fixed or programable)

Output level into 50 ohms (Low is -0.3 to 0.3V, high is 1.2 to 5.5V)

On-time mark is 50% on rising edge

Available pulse rates are implementation specific

SMA female connector

**2.3 10 MHZ sine wave (optional)**

Specifications TBD

SMA female connector

**2.4 IRIG time code AM sine wave (optional)**

2.0 – 5.5 V peek-to-peek (MARK) into 50 ohms,

Signal format conformant to IRIG Standard 200-16

SMA female connector

**2.5 IRIG time code DCLS (optional)**

Output level into 50 ohms (Low is -0.3 to 0.3V, high is 1.2 to 5.5V)

Signal format conformant to IRIG Standard 200-16

Active high required, Configurable active low (optional)

SMA female connector

**3.0 Bi-directional interfaces**

**3.1 PCIe**

This interface is required when the PCIe mapping is implemented

Any of the standard form factors may be implemented: Full-length, half-length, low-profile

Precise Time Measurement (PTM) support is required

Standards: PCI-SIG PCIe

**3.2 Small Form-factor Pluggable (SFP) (optional)**

TBD: Which SFF interface to call out

Standards: Storage Networking Industry Association SFF committee

**4.0 Alternative connectors (optional)**

Except for the host connector, an implementation may have different connectors, if the manufacturer supplies an adaptor cable to convert to the connectors specified.