

Pcm4l

Basic Debugging Steps for Renesas PTP Clock Manager Software

Abstract

This is a quickstart guide for debugging the integration of pcm4l (PTP Clock Manager Software) into a system. This testing should not be started until the basic operation of ptp4l has been confirmed. For ptp4l to work correctly, the Linux drivers for both the time stamper and the ClockMatrix driver need to be working correctly. The pcm4l program uses the same interfaces as ptp4l to add more advanced filtering of the time stamps for networks with high PDV.

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1. Important Log Messages from pcm4l

Before starting this analysis, capture the system log with the system connected to a master with no PDV. A direct cable connection is recommended.

The important messages are in the Debug and SyncAnalysis log categories. The source of these message can be Supervisor or Tracker#n. (For a system tracking a single master, only Tracker#0 is seen.) The log level is set in the configuration using **selectionMask**: under the **stdoutLog** category in the JSON configuration file. More information is available in the PTP Clock Manager Software Reference Manual.

1.1 Phase Offset Estimate (Per Master)

This message shows the estimate of the phase difference between the master and this system. (There are multiple sets of these messages when locked to multiple masters with different trackers.) Either value in this message can be used for analysis.

Criteria: For a system directly connected to a master, the peak-to-peak variation of these values (after getting to the lock state) should be less than 100ns. Important: The average of the values cannot be zero.

```
IDT::SyncAnalysis: 1970-01-14 18:47:58 410245412 ns [3, Tracker#0] (3018) [ToD  
| phase] offset estimate (ns): [65.0 | 65.0]
```

1.2 Desired System Frequency Offset Value

This message shows the servo view of offset. The servo uses the stability of this value to determine its lock state.

Criteria: For a system directly connected to a master (no PDV), this value is related to the frequency difference between the local OCXO/TCXO on the system and the master frequency reference.

```
IDT::Debug: 2020-10-08 13:12:00 467514182 ns [2, Supervisor] Accumulated  
correction value = 61.870523709218 ppb
```

1.3 Actual System Frequency Offset Value

This message shows the servo view of offset including any frequency change limiting.

Criteria: For a locked system without PDV, both the required and actual frequency change should be close.

```
IDT::Debug: 2020-10-08 13:12:00 467569143 ns [2, Supervisor] Allowed  
correction = 61.870523709218 ppb
```

1.4 Phase Offset Estimate (System)

This message shows the estimate of the difference between the active master and this system. The value of this message is in seconds.

Criteria: For a system directly connected to a master, the peak-to-peak variation of these values (after getting to the lock state) should be less than 100ns.

```
IDT::Debug: 1970-01-14 18:53:11 466504202 ns [2, Supervisor] Current ToD offset  
observed by Tracker#0 is 0.000000023000
```

1.5 LO State Transitions

This message shows the state of the servo. It goes from Initial to Free Run to Frequency Locked to Time Locked. A normally running system should stay in the Time Locked state.

Criteria: For a system directly connected to a master (no PDV), the servo should transition to the Time Locked state within 3 minutes after starting to lock to the master.

```
IDT::Debug: 2020-10-08 13:12:02 522463991 ns [2, Supervisor] LO state transition:
Frequency Locked --> Time Locked, Trigger event: LO time locked
```

1.6 Phase Offset Estimate (Per Master) for Uplink and Downlink Separately

This message shows the estimate of the phase difference between the master and this system. The system offset combines both directions.

Note: The uplink is from the slave to the master and the downlink to from the master to the slave.

Criteria: For a system directly connected to a master (no PDV), the uplink and download values should add to the phase offset estimate (per master) as previously shown.

```
IDT::Debug: 1970-01-14 18:53:11 466074087 ns [3, Tracker#0] Downlink correction ToD
(us): 2.330000e-01
IDT::Debug: 1970-01-14 18:53:11 466089808 ns [3, Tracker#0] Uplink correction ToD
(us): -1.870000e-01
```

2. References

PTP Clock Manager Software Reference Manual (Software Version 4.0.0)

Note: Contact Renesas Application Engineering for this manual.

3. Revision History

Revision Date	Description of Change
Nov.2.20	Initial release.

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