Pseudo Random Binary Sequence

Pseudo Random Binary Sequence (PRBS) feature allows users to perform data integrity checks on their encapsulated packet data payloads using a pseudo-random bit stream pattern. PRBS generates a bit pattern and sends it to the peer router that uses this feature to detect if the sent bit pattern is intact or not.

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The Pseudo Random Binary Sequence (PRBS) feature allows you to perform data integrity checks between the NCS1014 trunk links and client links without enabling the actual client traffic.

PRBS supports:

- Trunk PRBS(coherentDSPCtrl)
- Client PRBS(HundredGigECtrlr and FourHundredGigECtrlr)

You must enable the PRBS feature on both the transmitting and receiving NCS 1014 trunk ports. The transmitting trunk port generates a bit pattern and sends it to the peer NCS 1014 device. The device detects if the sent bit pattern is received.

You can configure PRBS on the NCS 1014 trunk port and client port for the NCS1K4-2.4T-K9 card.

- **Source mode —** The NCS 1014 at trunk port generates PRBS signal on the line continuously as per the configured PRBS pattern.
- **Sink mode —** The NCS 1014 at trunk port gets locked to the ingress signal according to the configured pattern, analyzes and reports the errors.
- **Source-Sink mode —** The NCS 1014 at trunk port acts as both the PRBS transmitter and receiver, that is, it generates PRBS signal as per the configured pattern, and also gets locked to the ingress signal with the same pattern, and reports the errors.

Trunk PRBS

NCS 1014 trunk port supports the following PRBS patterns:

- **PRBS31** — Sequence length is from 2^31 -1 bits
- **PRBS23** — Sequence length is from 2^23 -1 bits
- **PRBS15** — Sequence length is from 2^15 -1 bits
- **PRBS7** — Sequence length is from 2^7 -1 bits.

Note NCS1K4-2.4T-K9 Interoperability for ethernet PRBS PN23 pattern is not supported.

Configuring Trunk PRBS on NCS1K4-2.4T-K9

Use the following sample configuration to configure PRBS trunk mode on the NCS1K4-2.4T-K9:

```
RP/0/RP0/CPU0:ios(config)#controller CoherentDSP0/0/0/7
RP/0/RP0/CPU0:ios(config-CoDSP)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-CoDSP)#prbs mode source-sink pattern pn15
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
Wed Nov 15 18:11:55.450 UTC
```

Table 1: Feature History

Feature Name	Release Information	Description
Cumulative PRBS on CoherentDSP controllers	Cisco IOS XR Release 24.3.1	The cumulative PRBS (Pseudo-Random Binary Sequence) on CoherentDSP controllers enhances troubleshooting capabilities between the trunk ports. Show coherentDSP R/S/I/P prbs-details command output now includes the newly supported fields.

Use the following sample configuration to display PRBS details:

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/7 prbs-details
Wed Nov 15 18:13:35.210 UTC

----------------------PRBS details------------------
PRBS Test               : Enable
PRBS Mode               : Source-Sink
PRBS Pattern            : PN15
PRBS Status             : Locked
PRBS Lock Time(in seconds)      : 37
PRBS Bit Errors                 : 0
PRBS Found Count                : 1
PRBS Lost Count                 : 0
PRBS Configured Time            : 11 Feb 00:20:43 (719 seconds elapsed)
PRBS First Lock Established Time: 11 Feb 00:32:05 (37 seconds elapsed)
Result Summary                  : PASS
```

The Result Summary will display PASS if the PRBS bit errors are 0 and the PRBS elapsed lock time is equal to the elapsed first lock established time.

Use `clear controller coherentDSP 0/0/0/7 prbs-details` to clear the counters.

Use the following sample configuration to display cumulative count of PRBS bit errors in the 15-min sampling interval:

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/7 pm current 15-min prbs
Wed Nov 15 18:19:10.308 UTC

 PRBS in the current interval [18:15:00 - 18:19:10 Wed Nov 15 2023]

 PRBS current bucket type : Valid

 EBC          : 0           Threshold : 0         TCA(enable)  : NO
 FOUND-COUNT  : 0           Threshold : 0         TCA(enable)  : NO
 LOST-COUNT   : 0           Threshold : 0         TCA(enable)  : NO

 FOUND-AT-TS  : NULL
 LOST-AT-TS   : NULL

 CONFIG-PTRN  : PRBS_PATTERN_PN15
 STATUS       : LOCKED

Last clearing of "show controllers OTU" counters never
```

Client PRBS

NCS 1014 client port supports the following PRBS patterns:

- **PRBS31** — Sequence length is from 2^31 -1 bits
- **PRBS23** — Sequence length is from 2^23 -1 bits

Configuring Client PRBS on NCS1K4-2.4T-K9

Use the following sample configuration to configure PRBS client mode on the NCS1K4-2.4T-K9:

```
RP/0/RP0/CPU0:ios(config)#controller fourHundredGigECtrlr 0/0/0/4
RP/0/RP0/CPU0:ios(config-eth-ctrlr)#prbs mode source-sink pattern pn23
RP/0/RP0/CPU0:ios(config-eth-ctrlr)#sec-admin-state maintenance
RP/0/RP0/CPU0:ios(config-eth-ctrlr)#commit
```

Use the following sample configuration to display four hundred gigabit client controllers details:

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/4
Wed Nov 15 18:39:29.478 UTC
Operational data for interface FourHundredGigECtrlr0/0/0/4:

State:
    Administrative state: enabled
    Operational state: Up
    LED state: Green On
    Maintenance: Enabled
    AINS Soak: None
      Total Duration: 0 hour(s) 0 minute(s)
      Remaining Duration: 0 hour(s) 0 minute(s) 0 second(s)
    PRBS:
      Status: Locked
      Mode: Source-sink
      Pattern: PN23
      Direction: Line
```

```
      Framing: Framed
    Laser Squelch: Disabled
    Insert Idle Ingress: Disabled
    Insert Idle Egress: Disabled

Phy:
    Media type: Not known
    Statistics:
        FEC:
            Corrected Codeword Count: 2019127152              Valid: True       Start time:
 17:35:46 Wed Nov 15 2023
            Uncorrected Codeword Count: 6                     Valid: True       Start time:
 17:35:46 Wed Nov 15 2023
        PCS:
            Total BIP errors: 0                               Valid: True       Start time:
 17:35:46 Wed Nov 15 2023
            Total frame errors: 0                             Valid: False      Start time:
 17:35:46 Wed Nov 15 2023
            Total Bad SH: 0                                   Valid: False      Start time:
 17:35:46 Wed Nov 15 2023

Autonegotiation disabled.

Operational values:
    Speed: 400Gbps
    Duplex: Full Duplex
    Flowcontrol: None
    Loopback: Internal
    BER monitoring:
        Not supported
    Forward error correction: Standard (Reed-Solomon)
    Holdoff Time: 0ms
```

Use the following sample configuration to display four hundred gigabit client controller PRBS bit errors in the 15-min sampling interval:

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/4 pm current 15-min prbs
Wed Nov 15 18:48:19.114 UTC

 PRBS in the current interval [18:45:00 - 18:48:19 Wed Nov 15 2023]

 PRBS current bucket type : Valid

 EBC          : 0           Threshold : 0         TCA(enable)   : NO
 FOUND-COUNT  : 0           Threshold : 0         TCA(enable)   : NO
 LOST-COUNT   : 0           Threshold : 0         TCA(enable)   : NO

 FOUND-AT-TS  : NULL
 LOST-AT-TS   : NULL

 CONFIG-PTRN  : PRBS_PATTERN_PN23
 STATUS       : LOCKED

Last clearing of "show controllers ETHERNET" counters never
```