

5 FAQ

5.1 How to check if the O-RU is booted up and running normally?

RU's console log shows the following.

```
Latch later 1pps time=1427f8f7 swi4010=1427f8f7 xran_sec=1427f8f4 acc_diff[1]=0 hps_sec=1602777637 cur_sec=0 PA_ON  
TDD  
curr dBFS of ORx = 0 0 912 11910  
mean dBFS of ORx = 0 0 65535 65535 count=1 1 0 0  
10R: sec=1 hps=1602777638 64b=0 65to128=1 total=1 uni=0 uni>1158=0 multi=1 crc_err=0  
10T: sec=1 hps=1602777638 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=1 start=0 adj=0 rstcnt=0
```

- i. When “Latch xxx 1pps” strings are shown, the O-RU has got synchronization with a GM/BC and finished the initialization.
- ii. Value definition:
 - 10R...means number of packets received from BBU.
 - 10T...means number of packets transmitted to BBU.
 - 64b: number of packets with size 64 bytes.
 - 65to128: number of packets with size between 65 bytes to 128 bytes.
 - uni>1158: number of packets with size greater than 1158.
 - total: total number of packets.
 - uni: number of uni-casting packets.
 - multi: number of multi-casting packets.
 - crc_err: number of packets with CRC error.
 - state = 1 : RU is waiting for the 1st c-plane message.
 - state = 2 : RU had received the 1st c-plane and started working.

5.2 Log “xran 10GbE is not ready... d6fff000” is normal or abnormal?

No. Please check 10GbE connectivity and make sure 10GbE is linkup at DU server.

5.3 Why does RU's log seem not aligned?

Usually, it indicates PTP signal quality is not good. Please check the GM's quality with GPS satellites.

5.4 Can I add Switch between O-RU and GM?

Yes. But, please make sure Switch supports IEEE 1588 PTPv2.

5.5 Can I add a Switch to connect O-RU and O-DU?

Yes. Please make sure following items:

- iii. The L2 switch should support VLAN with tag.
- iv. Those ports (connected to BBU and RU) should be in trunk mode
- v. Both VLAN 1 and VLAN 2 should be in those trunk ports
- vi. Should keep VLAN tag in those ports (DO NOT set untag)
- vii. Enable jumbo frames. Set frame size more than 9000 Bytes.

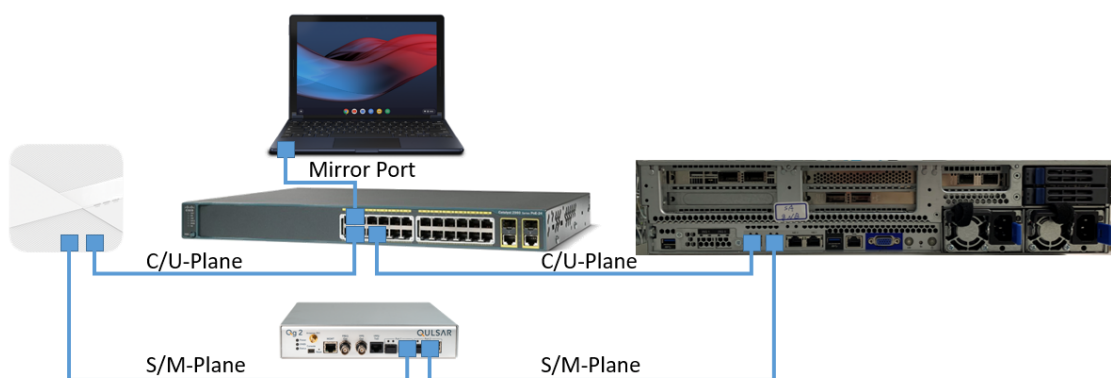


Figure 36 O-RU O-DU connectivity with Switch and GM

5.6 How to enable Auto boot up.?

If you want to make RU running when reboot without re-execute [4.1.2 RPQN O-RU setting](#) Step.6 and Step.7, please add below lines into `/home/root/test/test.sh` to configure IP and launch CU plane:

```
if [ $(tty) = "/dev/ttyS0" ]; then
    ./set_port.sh 100 # 100 depends on your subnet setting
    ./init_rrh_config_enable_cuplane
fi
```

- viii. How to change configuration after enabling auto boot up?
 - If you **can** remote SSH to O-RU with account/passwd : root/root
 - a. Make changes in **RRHconfig_xran.xml**.
 - b. Running **/home/root/test/reboot.sh**
 - If you **can not** remote SSH to RRH, you can
 - a. Connect to O-RU via the USB Serial Port.
 - b. Unplug Power cord and plug again.
 - c. Once the prompt shown, press “**Ctrl+C**” to stop the running process.
 - d. Make changes in **RRHconfig_xran.xml**.
 - e. Running **/home/root/test/reboot.sh**
- ix. How to disable auto boot up?
 - Just remove or mark the above command in **/home/root/test/test.sh**.

5.7 What is the power-on sequence to bring up the Radio?

- Bring up from power off
 - i. stop O-DU
 - ii. power on O-RU
 - iii. `./init_rrh_config_enable_cuplane`
 - iv. wait PTP lock at O-RU
 - v. start O-DU
- restart O-RU
 - i. stop O-DU
 - ii. power down O-RU
 - iii. power up O-RU
 - iv. `./init_rrh_config_enable_cuplane`
 - v. wait PTP lock at O-RU
 - vi. start O-DU

5.8 How to separate PTP log from console log?

- (console) boot up RPQN
- (console) set S/M-plane IP address
`./set_port.sh 17`
- (BBU or PC/NB) SSH connect to S/M-plane IP address
`ssh -oCiphers=aes128-ctr root@O-RU IP` (disable OAM)
`ssh -p 830 root@O-RU IP` (ever enabled OAM)
After v1.4.12q.524, it needs the password “**123456**” for non-OAM and “**cj/6c93zj4g4d;**” for OAM.
- (ssh terminal) initial C/U-plane
`./init_rrh_config_enable_cuplane`

- o (ssh terminal) kill ptp4l process
 `pkill ptp4l`
- o (ssh terminal) start ptp4l
 `/usr/linuxptp/ptp4l -i eth0 -smf /usr/linuxptp/configs/user_gen.cfg -l 6`
- o (ssh terminal) After the C/U-plane is initialized, we can check the ptp4l log from SSH terminal.

5.9 Which firmware version matches the FlexRAN version?

- o Support FlexRAN version

RPQN firmware version	FlexRAN version
v1.4.14q.524	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.4.13q.524	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.4.12q.524	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.3.10q.521	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.3.8q.52	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.2.7q.52	20.11(enable FCN_ADAPT and patch from Intel), 21.03(enable FCN_ADAPT)
v1.2.6q.432	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)
v1.1.5q.432	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)
v1.1.4q.432	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)
v1.0.3q.432	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)
v1.0.3q.431	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)
v1.0.2q.431	20.11(enable FCN_ADAPT), 21.03(enable FCN_ADAPT and FCN_1_2_6_EARLIER)

Note: For RU firmware v1.2.7q.52 and later, the PRACH interface is changed. If you use FlexRAN 20.11, you should add patch from Intel for the PRACH interface. If you don't add the correct patch to 20.11, the FlexRAN will not receive PRACH from RU.

5.10 Which prach format does RU support?

RU only supports short prach format **B4**.

5.11 How to calculate Tx power?

RRH_TX_ATTENUATION = 30.0, 30.0, 30.0, 30.0 -> output power is 0dBm per port

RRH_TX_ATTENUATION = 20.0, 20.0, 20.0, 20.0 -> output power is 10dBm per port
Antenna gain is 5dBi

5.12 How to disable/enable DPD?

Disable DPD: RRH_RF_GENERAL_CTRL = 0x0, 0x0, 0x0, 0x0

Enable DPD: RRH_RF_GENERAL_CTRL = 0x3, 0x0, 0x0, 0x0

Note: the setting is affected for all 4 ports.

6 Troubleshooting

6.1 Why DU can not receive any data from RU?

Please check following items:

- Check PTP is synced and GM's quality. You may need to check GM's status with satellites, O-RU's log and O-DU's log.
- Check the 10GbE interface in the DU server is linked up.
- Check the 10GbE interface in the DU server is running at 10Gb speed
- Check connectivity, make sure SFP+ module is actually inserted into the cage of the connector in the DU server.
- Check O-RU's log for xRAN packet:
 - If log does not contains "xRan: log.....", it means O-RU does not receive any C-Plane packet from O-DU.
 - Sometimes, it was caused by PTP sync issue.

```
xRAN: log=0 toD(1) sec=656 tick=4009 smp_cnt=0f115740 pkt_en=0f115740 c_arr=00000000 lpps=cc6e5744 f2t_en=d3c134bc jesd_en=d3c156fc  
diff: sec=656 tick=4009 c_arr_vs_lpps=10000000us f2t_vs_lpps=7040884us jesd_vs_lpps=7040884us  
Cmsg1_p0: 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000  
c_kpi: total=26 early=26 on=26 late=26 dropTci=26 dropPort=26 dropSeet=26  
40R: idx=0 tick=4009 total=26 uni=1 64b=0 65to128=26 uni>1158=0 multi=25 fcs_err=0 cplane=00000100
```

- Please run an Intel sample app to make sure O-RU is working properly.

6.2 Recover O-RU

When O-RU is going to a weird state like below phenomenon, please **POWER CYCLE** O-RU.

- 10T state value is jumping 1&2

```

Align: 142027070 142576652 3378 17
10R: sec=2411 hps=1607671657 64b=7588 65to128=0 total=220037 uni=220038 uni>1158=212450 multi=0 crc_err=0
10T: sec=2411 hps=1607671657 64b=0 65to128=0 total=172 uni=0 uni>1158=172 multi=0 crc_err=172 state=2 start=2410 adj=0 rstcnt=0
midMax=47us @ 4010, allMax=58us @ 4010 0a7a8583 0a7a9c65 0a7a899d 0a7a8c36 0a7a9331 2
Latch later 1pps time=0a7b28ec swi4010=0a7b28ec xran_sec=0a7b28e9 acc_diff[6]=-82 hps_sec=1607671657 cur_sec=2411 PA_ON TDD
Align: 142027070 142576652 3378 17
10R: sec=2412 hps=1607671658 64b=3382 65to128=0 total=98072 uni=98072 uni>1158=94690 multi=0 crc_err=0
10T: sec=2412 hps=1607671658 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=1 start=2412 adj=0 rstcnt=0
midMax=61us @ 4010, allMax=73us @ 4010 11cd855a 11cda316 11cd8977 11cd8be5 11cd9627 4
Latch later 1pps time=11ce28ec swi4010=11ce28ec xran_sec=11ce28e9 acc_diff[7]=-82 hps_sec=1607671658 cur_sec=2412 PA_ON TDD
Align: 142027070 142576652 3378 17
10R: sec=2413 hps=1607671659 64b=1038 65to128=0 total=30106 uni=30108 uni>1158=29069 multi=0 crc_err=0
10T: sec=2413 hps=1607671659 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=1 start=2413 adj=0 rstcnt=0
midMax=61us @ 4010, allMax=72us @ 4010 19208556 1920a2eb 19208969 19208bdc 19209631 4
Latch later 1pps time=192128ec swi4010=192128ec xran_sec=192128e9 acc_diff[8]=-82 hps_sec=1607671659 cur_sec=2413 PA_ON TDD
Temperature of RF board is 39 degree Celsius.
Align: 142027070 142576652 3378 17
10R: sec=2414 hps=1607671660 64b=5038 65to128=0 total=146087 uni=146088 uni>1158=141050 multi=0 crc_err=0
10T: sec=2414 hps=1607671660 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=2 start=2413 adj=0 rstcnt=0
midMax=47us @ 4010, allMax=59us @ 4010 20738541 20739c38 20738973 20738c0b 2073930b 2
Latch later 1pps time=207428ec swi4010=207428ec xran_sec=207428e9 acc_diff[9]=-82 hps_sec=1607671660 cur_sec=2414 PA_ON TDD
Align: 142027070 142576652 3378 17
10R: sec=2415 hps=1607671661 64b=2048 65to128=0 total=59384 uni=59385 uni>1158=57337 multi=0 crc_err=0
10T: sec=2415 hps=1607671661 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=1 start=2415 adj=0 rstcnt=0
midMax=61us @ 4010, allMax=72us @ 4010 27c68558 27c6a2f0 27c68975 27c68bb9 27c69600 4
Latch later 1pps time=27c728ec swi4010=27c728ec xran_sec=27c728e9 acc_diff[0]=-82 hps_sec=1607671661 cur_sec=2415 PA_ON TDD
Align: 142027070 142576652 3378 17
10R: sec=2416 hps=1607671662 64b=6048 65to128=0 total=175397 uni=175398 uni>1158=169350 multi=0 crc_err=0
10T: sec=2416 hps=1607671662 64b=0 65to128=0 total=129 uni=0 uni>1158=129 multi=0 crc_err=129 state=2 start=2415 adj=0 rstcnt=0
midMax=47us @ 4010, allMax=58us @ 4010 2f198544 2f199c12 2f198956 2f198c18 2f199315 2
Latch later 1pps time=2f1a28ec swi4010=2f1a28ec xran_sec=2f1a28e9 acc_diff[1]=-82 hps_sec=1607671662 cur_sec=2416 PA_ON TDD

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```

2. O-RU is unresponsive

```

Latch later 1pps time=b0db0b50 swi4010=b0db0b50 xran_sec=b0db0b4d acc_diff[1]=-18 hps_sec=107226 cur_sec=371 PA_ON TDD
Align: 205458274 205982732 28502 17
10R: sec=372 hps=107227 64b=2674248 65to128=16 total=40113660 uni=40113656 uni>1158=37439408 multi=16 crc_err=0
10T: sec=372 hps=107227 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=2 start=0 adj=-18 rstcnt=0
midMax=47us @ 4010, allMax=86us @ 4010 b82d67fe b82d7f06 b82d6c12 b82d6eb7 b82d75c3 2
Latch later 1pps time=b82e0b50 swi4010=b82e0b50 xran_sec=b82e0b4d acc_diff[2]=-18 hps_sec=107227 cur_sec=372 PA_ON TDD
Temperature of RF board is 54 degree Celsius.
Trigger M-plane fault_id 28 info (16, 2, 0)
6IFUA .3] In a Align: 205458274 205982732 28502 17
appbsb5ecb31s10ePTlelAlign: 205458274 205982732 28502 17
10R: sec=374 hps=107229 64b=2690248 65to128=16 total=40353650 uni=40353635 uni>1158=37663387 multi=16 crc_err=0
10T: sec=374 hps=107229 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=2 start=0 adj=-18 rstcnt=0
midMax=47us @ 4010, allMax=86us @ 4010 c6d367b5 c6d37eb3 c6d36bd1 c6d36ea4 c6d375a9 2
Latch later 1pps time=c6d40b50 swi4010=c6d40b50 xran_sec=c6d40b4d acc_diff[4]=-18 hps_sec=107229 cur_sec=374 PA_ON TDD
Align: 205458274 205982732 28502 17
10R: sec=375 hps=107230 64b=2698248 65to128=16 total=40473650 uni=40473635 uni>1158=37775387 multi=16 crc_err=0
10T: sec=375 hps=107230 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=2 start=0 adj=-19 rstcnt=0
midMax=47us @ 4010, allMax=85us @ 4010 ce2667a1 ce267ea9 ce266bd0 ce266e74 ce26758d 2
Latch later 1pps time=ce270b4f swi4010=ce270b50 xran_sec=ce270b4d acc_diff[5]=-19 hps_sec=107230 cur_sec=375 PA_ON TDD
Align: 205458274 205982732 28502 17
10R: sec=376 hps=107231 64b=2706248 65to128=16 total=40593650 uni=40593635 uni>1158=37887387 multi=16 crc_err=0
10T: sec=376 hps=107231 64b=0 65to128=0 total=0 uni=0 uni>1158=0 multi=0 crc_err=0 state=2 start=0 adj=-19 rstcnt=0
midMax=47us @ 4010, allMax=85us @ 4010 d57967b6 d5797ea9 d5796bd0 d5796ea1 d5797581 2
Latch later 1pps time=d57a0b4f swi4010=d57a0b4f xran_sec=d57a0b4c acc_diff[6]=-19 hps_sec=107231 cur_sec=376 PA_ON TDD
Temperature of RF board is 54 degree Celsius.
[Uesr

T0ad9025 tx off!
Turn OFF PA/LNA
736.110324] IPI_FROM_CUPLANE

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```

3. There is no "10R" ,"10T" shows in console log after init_rrh_config_enable_cuplane

```
Latch 2nd lpps time=91e727bb curr=938a27da diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=993a27bd curr=a08d27be diff=122880001  
trace_log_idx_g: 0  
Latch 2nd lpps time=a08d27be curr=a7e027c0 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=a7e027c0 curr=af3327c2 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=c52c27c7 curr=cc7f27c9 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=cc7f27c9 curr=d3d227cb diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=d3d227cb curr=db2527cc diff=122880001  
trace_log_idx_g: 0  
Latch 2nd lpps time=db2527cc curr=e27827ce diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=e27827ce curr=e9cb27d0 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=e9cb27d0 curr=f11e27d2 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=f11e27d2 curr=f87127d3 diff=122880001  
trace_log_idx_g: 0  
Latch 2nd lpps time=f87127d3 curr=ffc427d5 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=ffc427d5 curr=071727d7 diff=122880002  
trace_log_idx_g: 0  
Latch 2nd lpps time=071727d7 curr=0e6a27d8 diff=122880001
```