ufiSpace

Unifying Cloud & Carrier Networks

N3100-4C

5G Timing Adapter

Installation Guide

Issued Date
17 - July - 2023   **Version: 1.1**

Revision History

Revision	Release Date	Summary of Description	Author
1.0	**17 July 2023**	- **First Draft Release.**	**Winston Lai**

Contents

1. Introduction

The UfiSpace N3100-4C is a 5G timing adapter that delivers accurate and reliable synchronization for COTS (Commercial of the Shelf) servers to address the O-RAN Open Fronthaul requirement.

By offloading the Precision Time Protocol (PTP) stack and servo from the COTS server, the N3100-4C will deliver stringent timing synchronization needed for end-to-end solution in O-RAN infrastructure. Equipped with Stratum 3E OXCO, high performance FPGA and in-house software stack complied with PTP and SyncE standards, N3100-4C provides Class C timing accuracy for various use cases such as 5G O-RAN fronthaul, data centers, High-Frequency Trading (HFT) and industrial automation. With all the software stack running on top of the adapter, it eliminates the extra integration and validation effort and ensures consistent timing performance under heavy DU CPU workload.

The N3100-4C is future-proofed with Intel E-810 controller, 4x 10GE/25GE interfaces, and multiple timing source including GNSS, 1PPS and 10MHz. It provides full timing features supporting Grand Master (T-GM), Boundary Clock (T-BC), and G8275.1 telecom profile and can fulfill O-RAN defined synchronization topology (LLS C1, C2, C3) requirement.

This document describes the command needed for N3100-4C.

Figure 1 N3100-4C

2. Installation

This chapter covers how to install Intel Ethernet adapters.

Overview of the installation:

1. Make sure the operating system is Linux.

2. Insert the adapter(s) in device.

3. Attach the copper or fiber network cable(s).

4. Install software, firmware and drivers, please refer to section 4

2.1 Hardware Compatibility and Requirement

Before installing the adapter, check your system for the following:

- The open PCI Express slot(The system supports PCIe Gen3 and PCIe Gen4 up to x16 lanes)
- Required air flow: 500LFM
- Maximum power consumption: 48W
- Operating Temperature: 0 ℃~ 55 ℃
- Storage Temperature: -40℃~ 65℃
- Transceiver:

Supported Physical Layer Interface		
	25Gbps	10Gbps
DACs	25GBASE-CR	SFP+ Twinax
Optics and AOCs	25GBASE-SR 25GBASE-LR	10GBASE-SR 10GBASE-LR

2.2 Installing the Adapter

One open PCI-Express slot, x4, x8, or x16.

1. Turn off and unplug your computer. Then remove the cover.

CAUTION:

- Turn off and unplug the power before removing the computer's cover. Failure to do so could endanger you or may damage the adapter or computer.
- The adapter is not hot-swappable. Make sure to turn off your computer before plug or unplug the timing adapter

2. Remove the cover bracket from an available slot.
3. Insert the adapter, pushing it into the slot until the adapter is firmly seated. Excessive force could break the connector. Use caution when pressing the board in the slot. (Figure 2)
4. Secure the adapter bracket with a screw. (Figure 3)
5. Replace the computer cover and plug in the power cord.
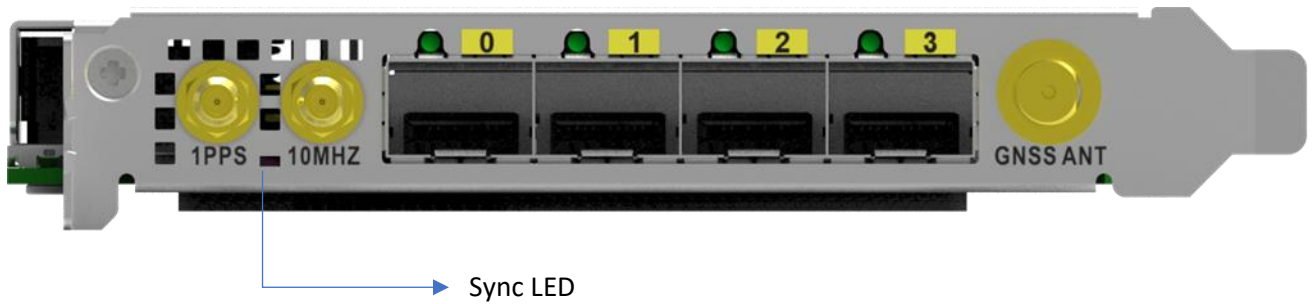6. Power on the computer.

Figure 2.

Figure 3.

3. LED indicators

3.1 Front Panel LED

Sync LED

LED Condition	Equipment Status
Sync	
Off	The timing card is not activated or not fully inserted in the PCI Express slot
Solid Green	One of ethernet ports is up and synchronized to timing source
Solid Amber	Ethernet and synchronization link status are down/lost
Blinking Green	Ethernet ports is up but system timing synchronization is disable or in free-run hold over mode
Blinking Amber(1/sec)	System works well including Ethernet port but thermal alert is triggered

Blinking Amber(4/sec)	Thermal NMI event is triggered and all Ethernet ports are disable
Ethernet I/O Port(0~3)	
Off	Cable is not plugged in/No traffic
Blinking Green	25G TX/RX activity
Blinking Amber	10G or less TX/RX activity

4. Driver, Firmware and Related Software

This section describes the driver, firmware and related software installation.

Note: This document is based on CentOS-7(1908); ubuntu 20.04.1 and above. Minimum requirement: ice-1.7.16 driver with 3.20 NVM.

4.1   Driver, Firmware Installation

1. Follow the steps to install/update the driver of the PCIe timing card:
   1.1. Download the source file

   Intel® Network Adapter Driver for E810 Series Devices under Linux*

   1.2. Install the driver

   ```
   # tar zxvf ice-1.7.16.tar.gz

   # cd ice-1.7.16/src/

   # sudo make install
   ```

   1.3. Remove the older version driver:

   ```
   # sudo rmmod ice
   ```

   1.4. Load the new version driver

   ```
   # sudo modprobe ice
   ```

2. Follow the steps to update the firmware of the PCIe timing card:
   2.1. Download the source file:

   Non-Volatile Memory (NVM) Update Utility for Intel® Ethernet Network Adapters E810 Series—Linux*

   2.2. Install the firmware:

```
# tar zxvf E810_NVMUpdatePackage_v3_20_Linux.tar.gz

# cd E810/Linux_x64

# chmod 755 nvmupdate64e

# sudo ./nvmupdate64e
```

    2.3. Follow the prompts to update the NVM image on the desired device.

3. Power cycle the system and check the driver and NVM version:

```
[dell_r750@localhost ~]$ ethtool -i p2p1
driver: ice
version: 1.7.16
firmware-version: 3.20 0x80016da9 1.3146.0
expansion-rom-version:
bus-info: 0000:17:00.0
supports-statistics: yes
supports-test: yes
supports-eeprom-access: yes
supports-register-dump: yes
supports-priv-flags: yes
```

4.2   Related Software Installation

1.   Follow the below steps to install ufi-sync-tool-1.0.0-0:

    1.1. Download the source file:

       ufi-sync-tool-1.0.0-0.x86_64.rpm

       (Please refer to our sales for the username and password to access the file.)

    1.2. Install ufi-sync-tool:

```
# sudo rpm -ivh ufi-sync-tool-1.0.0-0.x86_64.rpm
```

2.   Set the IP address of the E810 interface:

```
# sudo ifconfig p2p1 192.168.176.100
```

3..   Execute ufiCardMgmt on the DU server to access the PCIe timing card:

```
# ufiCardMgmt -s 192.168.176.101
```

For specifics about timing configuration, please refer to UFI Timing Application User Guide.