

# IW-RS216-07 HYBRID BACKPLANE

## USER MANUAL

**P/N : 2RAKVI009200**

**Model : IW-RS216-07 15mm 2BAY HYBRID BACKPLANE-V**  
**MODULE**

Version : V1.0

## Revision History

| Version | Changes          | Date       |
|---------|------------------|------------|
| V1.0    | Official Release | 2021/05/25 |
|         |                  |            |
|         |                  |            |
|         |                  |            |

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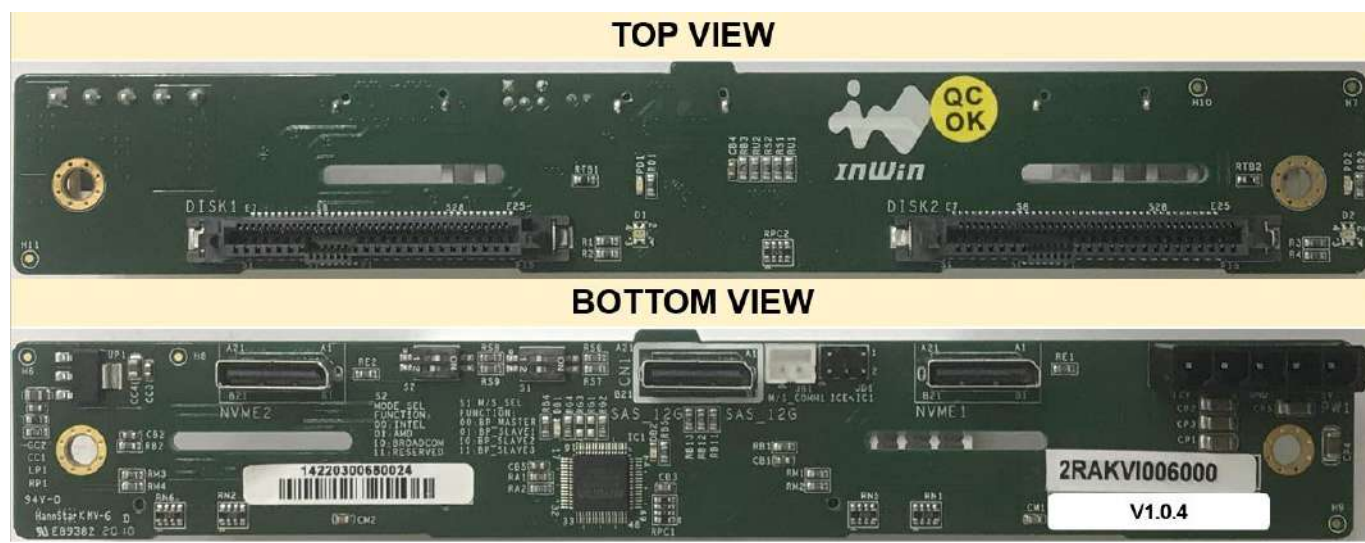
## Overview

InWin backplanes (without Expander) are high performance and cost effective solution for supporting Intel Purley platform by adding NVMe support.

The passive backplanes support state-of-the-art SAS3 12Gbps HDD/SSD and also backward compatible with SAS 6Gbps, SATA 6Gbps and SATA 3Gbps HDD/SSD. The backplane supports NVMe SSD through OcuLink x4 connectors.

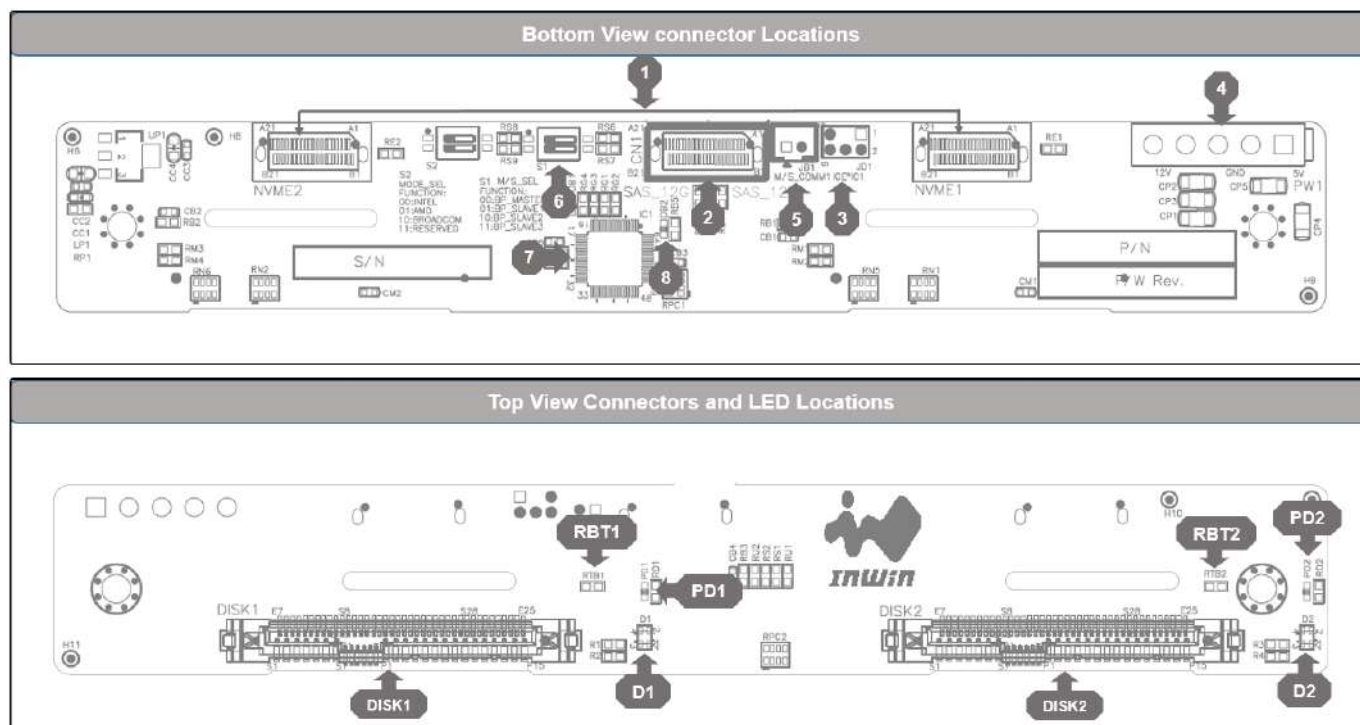
Basically, one single SFF-8643 miniSAS connector can support up to 4 disk bays. 2 of them are so called Hybrid that further support NVMe SSD via Oculink x4 connectors.

## Physical Outlook



[illegible]

## Connector Locations and LED Indicators



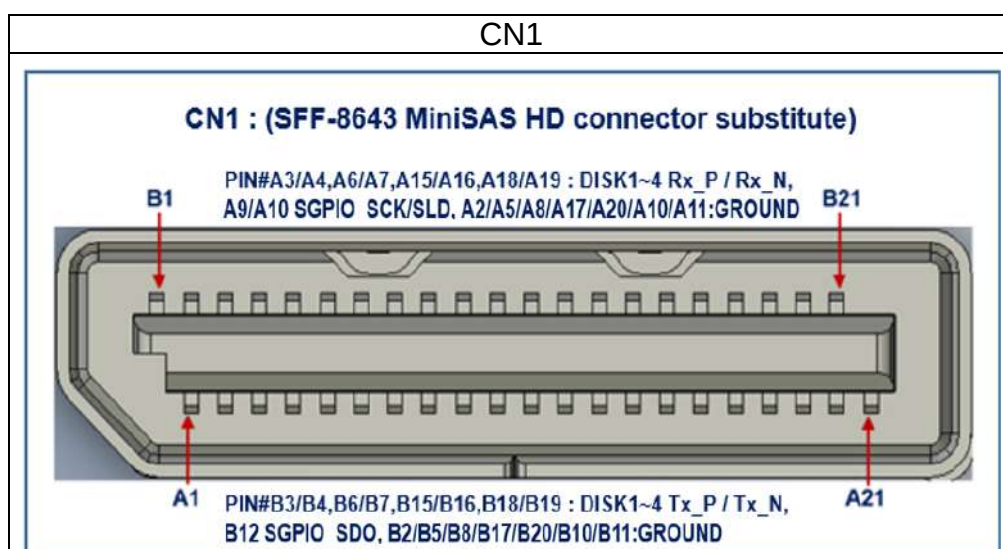
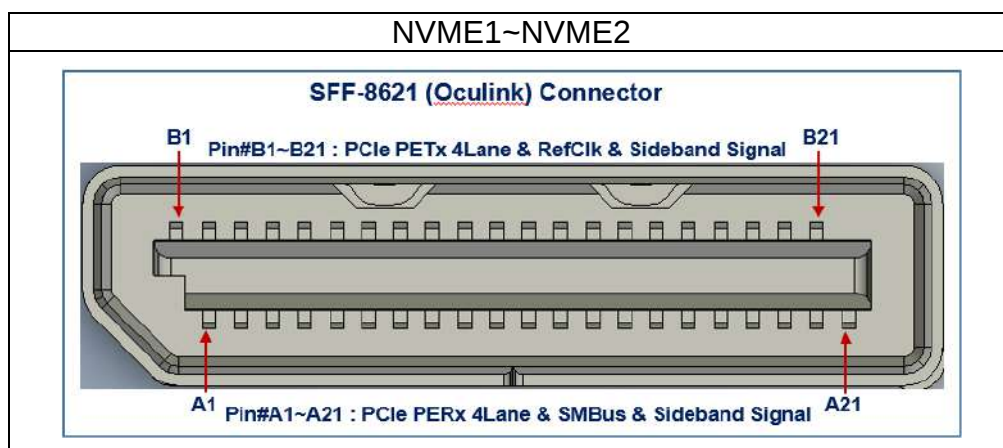
| No | Description                         | No | Description                        |
|----|-------------------------------------|----|------------------------------------|
| 1  | Host facing interface : NVME1~NVME2 | 5  | M/S Communication Connector : JB1  |
| 2  | Host facing interface (SAS3) : CN1  | 6  | M/S BP Selection Switch : S1       |
| 3  | Firmware Programming Header : JD1   | 7  | M058 Micro-controller : IC1        |
| 4  | Main Power Connector : PW1          | 8  | System Failure LED indicator : DB2 |

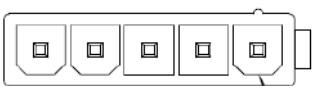
### Connector/ LED Indicators.

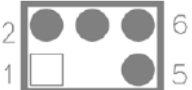
| Location     | SAS/U.2 Drive Number            |
|--------------|---------------------------------|
| DISK1/ DISK2 | SATA/SAS Disk or NVMe SSD #1/#2 |

| Location | Hard Drive Power/Activity/Failure/Locate LEDs |
|----------|-----------------------------------------------|
| PD1/PD2  | DISK1/DISK2 Power LED                         |
| D1/D2    | DISK1/DISK2 Activity/Failure/Locate LED       |

## Connector Pin Definitions.



| PW1                                                                                 | Power 5-Pin Connector |            |
|-------------------------------------------------------------------------------------|-----------------------|------------|
|  | PIN #                 | Definition |
|                                                                                     | 1                     | +12V       |
|                                                                                     | 2 & 3                 | Ground     |
|                                                                                     | 4                     | +5V        |

| JD1                                                                                 | Firmware Programming Connector |            |         |            |
|-------------------------------------------------------------------------------------|--------------------------------|------------|---------|------------|
|  | PIN #                          | Definition | PIN No# | Definition |
|                                                                                     | 2                              | ICE_CLK    | 1       | VCC        |
|                                                                                     | 4                              | ICE_DATA   | 3       | #Key       |
|                                                                                     | 6                              | ICE_RST    | 5       | Ground     |

| JB1                                                                                 | P2.0 2-Pin Connector |            |
|-------------------------------------------------------------------------------------|----------------------|------------|
|  | PIN #                | Definition |
|                                                                                     | 1                    | LINK_CLK   |
|                                                                                     | 2                    | LINK_DAT   |

| S1 M/S Selection                                                                  | Function Description | S1 M/S Selection                                                                   | Function Description |
|-----------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------|----------------------|
|  | 00 : BP_MASTER       |  | 10 : BP_slave2       |
|  | 01 : BP_slave1       |  | 11 : BP_slave3       |

## Hardware Specification

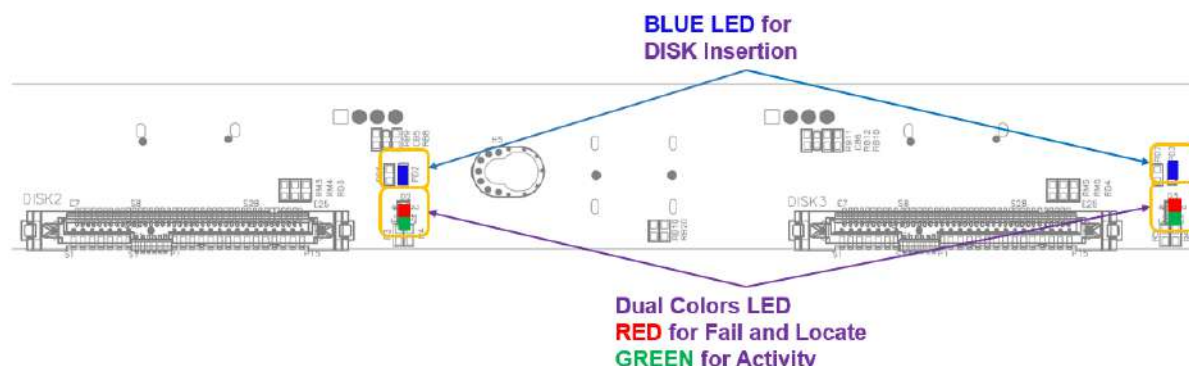
HOST Facing Interface : MiniSAS HD/OCulink

DEVICE Facing Interface : SATA/SAS/NVMe

- Indicator :
  - Power LED PD1~PD2: Steady Blue –(When HDD is resen)
  - Dual color(Green/Red) LED D1~D2 for Hard Disk Drive Status (Activity/Failure/Locate)
    - ◆ Activity LED: Blinking Green (When HDD is Access)
    - ◆ Locate LED : Blinking Red (When HDD Fail or Locate)
    - ◆ Fail LED : Steady Red (When HDD Fail or Locate)
- Environment Control :
  - Temperature Sensor (RTB1/RTB2) Monitor HDD bay inside temperature.
  - M/S Link Connector (JB1) for Synchronous signal connection between two backplane.
  - DB2 (RED LED) for Over-temperature and FAN fail indicator.
- Connector
  - SFF-8621 OCULINK 42PIN Connector \*1 (CN1) (for SAS\_12G HOST Interface)
  - SFF-8621 OCULINK Connector (NVME1~NVME2) for Host Facing Interface (NVMe)
  - SFF-8639 U.2 68PIN Connector (DISK1~DISK2) for SATA/SAS3 Disk or NVMe SSD.
  - P4.2mm Disk Drive Power Connector\*1 (PW1)
- JD1 MCU Programming Header for Programming MCU Firmware
- S1 DIP Switch for Backplane Master/Slave Selection.

## LED Behavior

### Disk Bay LED



Blue LED:

Disk Insertion Indicator –

Turned on whenever disk drive is properly installed.

Green LED:

Activity indicator –

Stay off when idle and blinking (~8 Hz) whenever disk drive is being accessed.

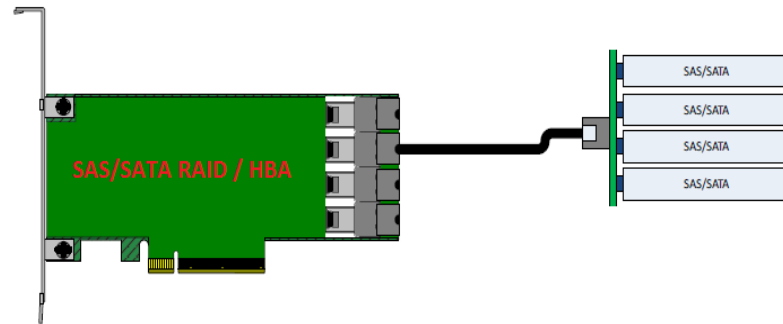
RED LED:

Fail and Locate indicator –

Turned steady on when disk failure occurs. Blinking (1 Hz) when locating Disk, RAID rebuild and RAID consistent check.

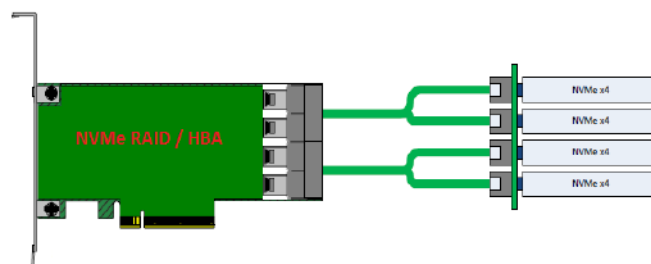
There are 2 parts of LED Management on the backplane. One is for SAS and another is for NVMe. Please note that the disk slots can only accommodate SAS/SATA or NVMe disk at a time since they share the same disk connector.

For SAS application, The LEDs behave by following SGPIO signal coming through sideband bus inside the SFF-8643 cables. Please refer to Section 2 for SGPIO settings. When SGPIO Jumper setting is enabled the LEDs behave according to the SGPIO signals. When SGPIO is disabled, the RED LEDs (for Locate and Fail) do not behave while the GREEN LEDs (for Activity) behave according to the signal from P11 (READY LED) of the disk connectors.



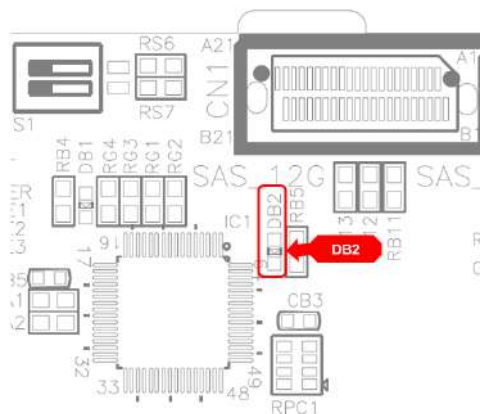
For NVMe application, The LEDs behave according to the VPP over I2C signals from NVMe host controllers through sideband bus of Oculink or SlimSAS cables. Whenever the NVMe host controller support VPP over I2C, the RED LEDs behave Locate, Fail and Rebuild signals following VPP signals on the I2C bus. The Green LEDs (for Activity) behave according to the signal from P11 (Activity) of the disk connectors.

Examples of NVMe connections to Broadcom RAID/HBA controller. Each pair of VPP over I2C signal supports 2 pieces of NVMe disks LED management. The I2C bus is leaded to odd-number NVMe connector (Oculink or SlimSAS) to manage its corresponding and the following NVMe disks. For example, NVMe1 and NVMe2 LED management signal is form NVMe1 connector's sideband I2C bus, NVMe3 and NVMe4 LED management signal is from NVMe3 connector's sideband I2C bus and ...etc.



### System Alarm LED

There is a FAIL LED (DB2) design on the Backplane to indicate Over-Temperature for indicating system fault.



Overheat:

When the system temperature at the backplane area is going beyond 45°C the Temp Fail triggered and Fail LED blinks in 2Hz rate. Goes off when temperature is going under 45°C.

## Firmware Upgrade

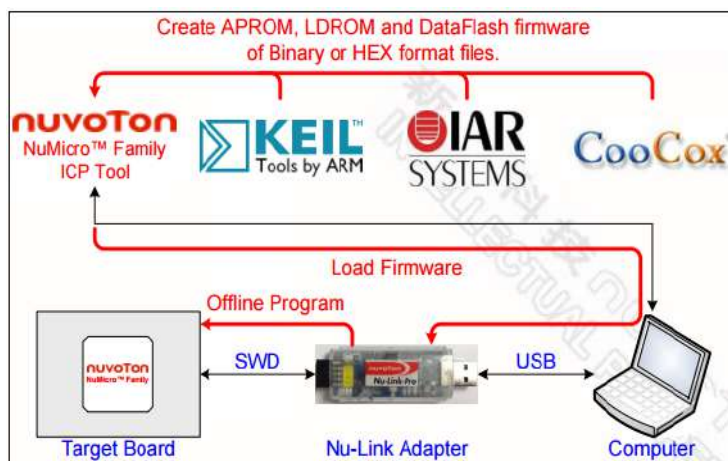
The passive backplanes are planted Nuvoton M058 series MCUs for hosting disk LED indication, Fan speed control and system fail alarm. These MCUs are preprogrammed in manufacturing. In most cases, the MCUs are not required to reprogram unless there is issue needed to fix.

How to upgrade firmware?

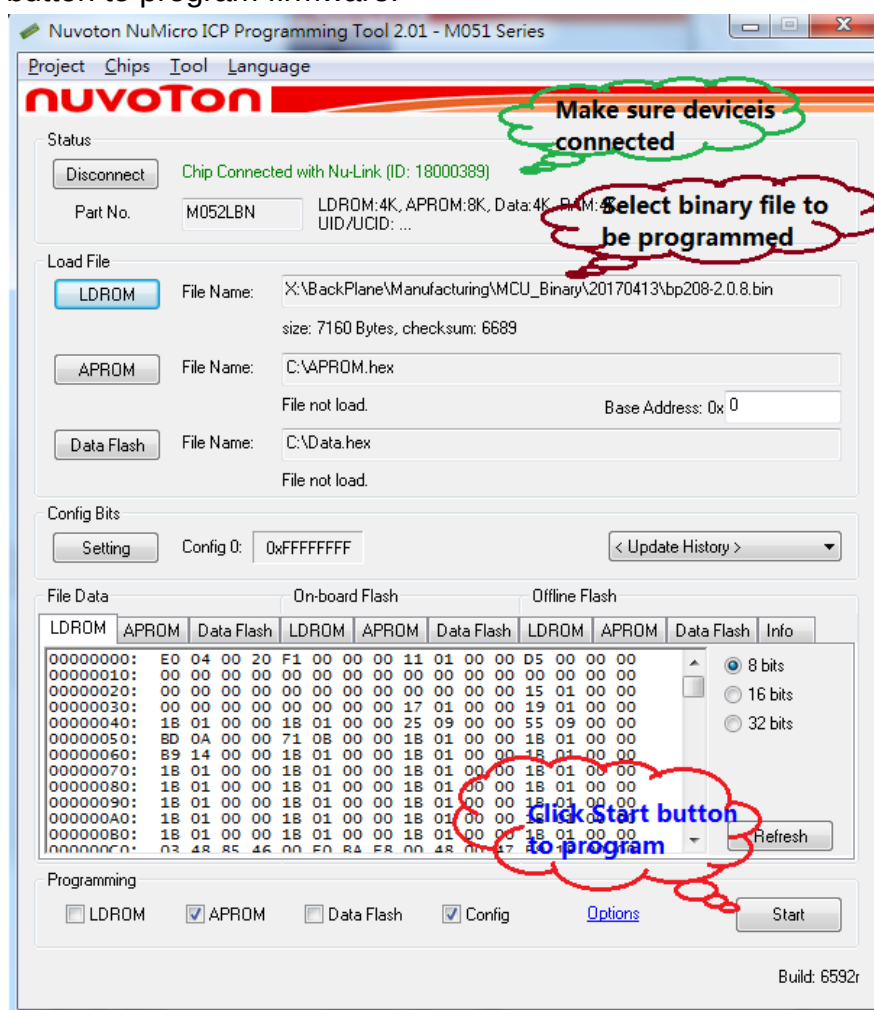
1. Require Nuvoton ARM Cortex-M0 programming tool. Nu-Me or Nu-Link and install Nuvoton ICP Programming tool software.



2. Connect Nu-Link USB end to a host and the SWD end to Backplane ICE connector for each MCU.



3. Make sure device is connected and select the binary file being programmed and then click on Start button to program firmware.



4. Please refer to [http://www.nuvoton.com/resource-files/NuLink\\_Adapter\\_User\\_Manual\\_EN\\_V1.01.pdf](http://www.nuvoton.com/resource-files/NuLink_Adapter_User_Manual_EN_V1.01.pdf) for more details.