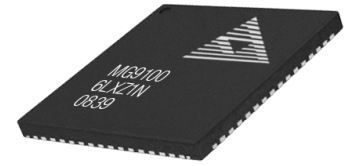# MG9100 NVMe SSD Universal Backplane Management (UBM) Controller for NVMe/SATA/SAS Backplanes

The MG9100 UBM Controller from American Megatrends is a low-cost, small footprint solution for enclosure management of single and dual-ported NVMe SSD Backplanes as well as traditional SAS/SATA backplanes. A single MG9100 controller supports up to 8 drives, while a maximum of 32 drives are supported when four MG9100 controllers are cascaded together.

The AMI MG9100 enables the world's leading enterprise system builders and data center solution providers to design low-cost, robust backplane solutions for U.2/U.3 NVMe, SAS and SATA-based storage subsystems.

The AMI MG9100 helps optimize backplane layouts with the latest enclosure management technologies. This highly integrated and space-optimized chip is available in compact QFN-64 package (9mm x 9mm) and supports all the features needed in a modern, state-of-the-art SAS/SATA/NVMe backplane. This chip can also manage backplanes with a combination of SAS/SATA and NVMe SSDs.

BENEFITS

The MG9100 ships ready to use, with no firmware or programming required at power-on. Its firmware is upgradable through SMBus™ from the host BMC. Communication with the UBM controller on the host with two UBM SMBus buses on the MG9100 is done through the Universal Backplane Management (UBM) protocol. Legacy protocols such as SGPIO (SFF-8485), BMC, VPP/SHP are also supported by the MG910 for LED management of NVMe and SAS/SATA drives.

Developed to reduce latency and provide faster CPU to data storage device performance, NVMe (Non-Volatile Memory Express) is a scalable, high performance specification for accessing solid state drives (SSDs) attached directly to the PCI Express bus. The MG9100 leverages the signals on the NVMe/SAS/SATA drive connector (SFF-8639) to detect drive presence, type, and activity.

LED management of NVMe SSDs is done either through UBM SMBus or through Host Hot-Plug VPP or SHP SMBus. For SAS/SATA drives, this is done through the SGPIO (SFF-8485) specification. Optionally, LED management can also be done with proprietary BMC SMBus commands.

The MG9100 backplane controller also supports 2-LED and 3-LED IBPI blinking patterns, along with many pre-defined custom LED blinking patterns. Custom blinking patterns can also be downloaded through the BMC SMBus.

The MG9100 provides power disable/device sleep outputs for SAS/SATA & NVMe drives. It can also issue PCIe resets to individual dual-ported PCIe/NVMe SSDs, when such a command is received from the host.

HIGHLIGHTS:

- Supports U.2 and U.3 Drives
- Supports UBM enclosure management through Dual/Quad UBM SMBus from UBM controller on the host
- Supports enclosure management of direct-attached PCIe/NVMe SSDs connected to Intel®/AMD CPU0 & CPU1 through dual VPP/SHP SMBus
- Enclosure management of PCIe/NVMe SSDs connected to Avago/Microsemi PCIe switches
- Supports 2 channels of SGPIO (SFF-8485) bus for enclosure management of SAS/SATA drives
- Supports IBPI specification (SFF-8489)
- Supports optional enclosure management of NVMe/SATA/SAS drives through BMC SMBus
- Supports activity and status LEDs for each drive
    - Both 2-LED and 3-LED blinking supported for up to 8 drives
    - Separate LEDs for activity, locate & fail drive states
    - Supports preloaded and downloadable custom LED blinking patterns
    - Supports global act and global fail LEDs
    - Support for up to 32 drives with four MG9100 controllers
- Power disable support for SAS/SATA/NVMe drives
- Supply range: 3.3V +/- 5%
- Small QFN-64 Package with 9 mm x 9 mm pin outline
- Ships ready to use, no firmware or programming required
- Firmware upgradeable through SMBus from host BMC
- Diagnostics and FW upgrade tools available for Windows & Linux

MG9XX BACKPLANE CONTROLLER SERIES FROM AMI

The Backplane Controller series from AMI provide LED and drive management for SAS/SATA/U.2 & U.3 NVMe drives. They provide exceptional flexibility and require minimal board real estate, making them a perfect fit for numerous applications. A wide selection of reference designs and development tools are available to help speed the design process.

AMI's Backplane Controller series work with any HBA supporting SGPIO (SFF-8485) and/or SES-2 protocol over I2C. These Backplane Controllers can be flashed or upgraded via SMBus from the motherboard BMC, or USB, depending on the model.

MG9xxx COMPARISON CHART

The matrix below compares the key features of the MG9xxx Backplane Controller series from AMI. For more detail on individual Backplane Controllers, see the individual MG9xxx Backplane Controller product page on our ami.com website and download the product Data Sheet for the full product specification.

Features	MG9100	MG9098	MG9094	MG9081	MG9085A
Drives	8 U.2/U.3 NVMe/SAS/SATA	8 U.2 NVMe/SAS/ SATA	8 SAS/SATA	8 SAS/SATA	6 SAS/SATA
UBM Channels	Yes, 2/4	No	No	No	No
PCIe Hot-plug SMBus Support	Yes	Yes	No	No	No
VPP/SHP Platform Support	Yes	Yes	No	No	No
SAS Power Disable	Yes	Yes	No	No	No
NVMe/SAS Drive Detect	Yes	Yes	No	No	No
SGPIO Channels	2	2	2	2	1
SGPIO Configurations	32	32	44	30	4
SES-2 (Legacy I2C based)	No	No	No	Yes	Yes
BMC Access through SMBus	Yes	Yes	Yes	No	No
IPMI	No	No	No	Yes	No
IBPI	Yes	Yes	Yes	Yes	Yes
Ready LED Support	Yes	Yes	Yes	Yes	Yes
Global Act & Fail LED	Yes	Yes	Yes	Yes	Yes
USB	No	No	No	Yes	Yes
Internal Voltage Regulator	No	No	Yes	Yes	Yes
Internal Crystal	Yes	Yes	Yes	Yes	Yes
Package	QFN-64	QFN-64	TQFP-48	TQFP-48	LQFP-32

For more information: https://ami.com/products/backplanes-and-enclosure-management

American Megatrends