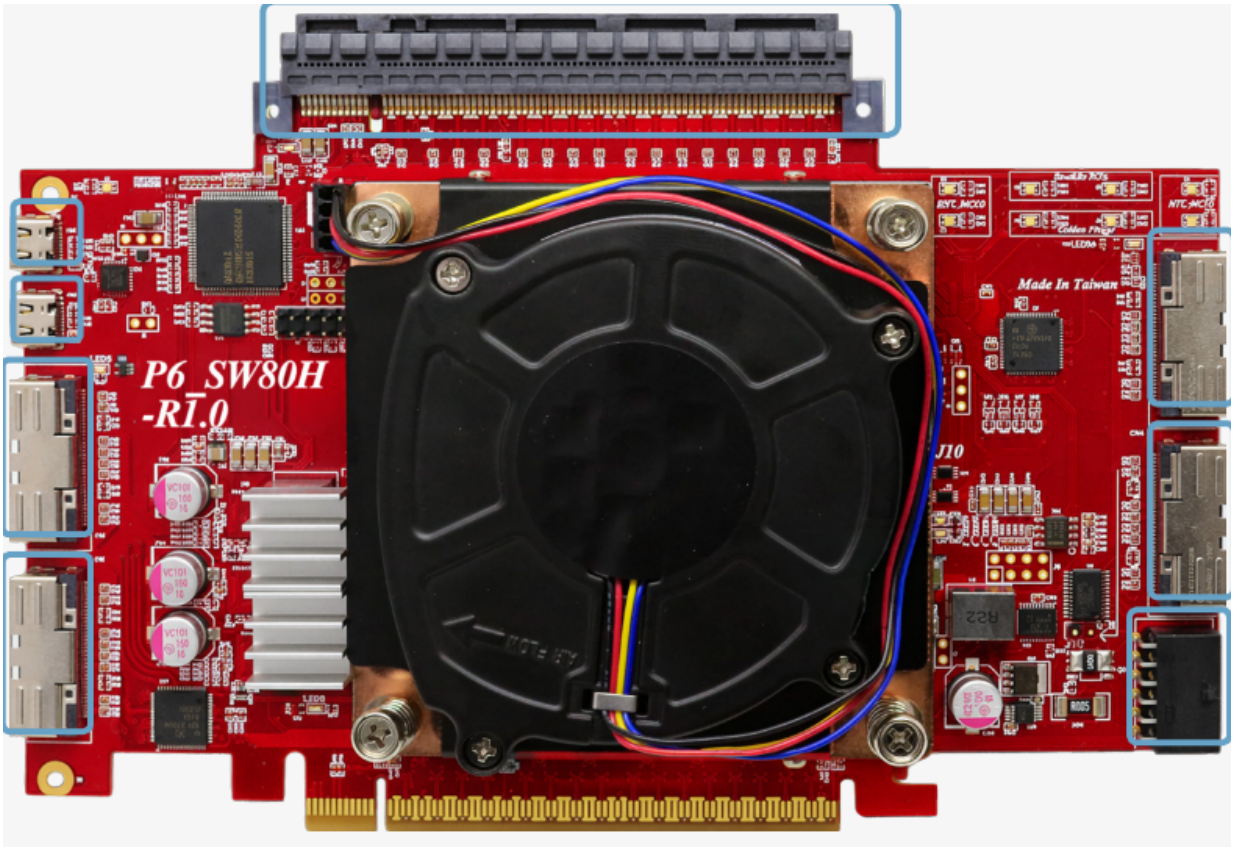
PCIe Gen 6 80-Lane Switch Card

Based on a Broadcom chipset

User Manual

Model PCI6-AD-x16HI-BG6-80



Hardware appearance and markings may vary by board revision.

Windows and Linux installation, serial console operation, configuration and firmware updates.

Read the power and installation instructions before applying power.

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Getting started

Use this guide in order for a first installation

This manual explains how to install the QA Maestro PCIe Gen 6 80-Lane Switch Card and manage it through its USB serial console. It covers the PCI6-AD-x16HI-BG6-80 hardware and the command interface described here. Menu names and console prompts can vary with software and firmware versions.

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What you need

A compatible host system, approved MCIO cables and endpoints, a correctly sized power supply with the appropriate CN8 power cable, a USB data cable for CN7, and a Windows or Linux computer with a serial terminal. Obtain any required firmware files from QA Maestro.

First connection checklist

1. Read the power requirements and install the card with all power removed.

2. Check the fan and CN8 power connection, then apply power.

3. Connect USB to CN7 and open the serial console at 115200 baud, 8N1, with no flow control.

4. Run ver, lsd, showmode and showport. Confirm the expected configuration and link status before running workloads.

Commands in code blocks are typed at the card prompt unless the block is identified as a Linux shell command. Do not type the prompt itself.

Power and installation

Connect auxiliary power before operating the card

POWER REQUIREMENT: The card requires 80-150 W during operation. CN8 auxiliary power is required. Insufficient power can cause hardware damage.

Item	Requirement
Card auxiliary input	Connect the 12VHPWR input at CN8.
Independent power supply	Minimum 12 V, 20 A / 300 W supply rating.
Combined host system supply	Minimum 800 W for the system including the host card and motherboard.

The independent supply ratings above are reproduced as specified for this hardware; 12 V at 20 A equals 240 W. Use a supply that satisfies both the stated current minimum and the stated 300 W rating. System components and endpoints can require a larger supply than the baseline rating.

Installation sequence

1. Shut down the host and remove power from the host, card and attached endpoints. Follow normal ESD handling practices.

2. Install the card in a compatible PCIe slot and secure it mechanically. Do not force the connector.

3. Connect the required MCIO or straddle PCIe endpoints using approved cables and the intended lane configuration.

4. Connect the appropriate power cable to CN8 and fully seat it. Confirm that the J6 fan power connection is secure and airflow is unobstructed.

5. Check all connections before restoring power. Open the console and inspect lsd and showport before starting a workload.

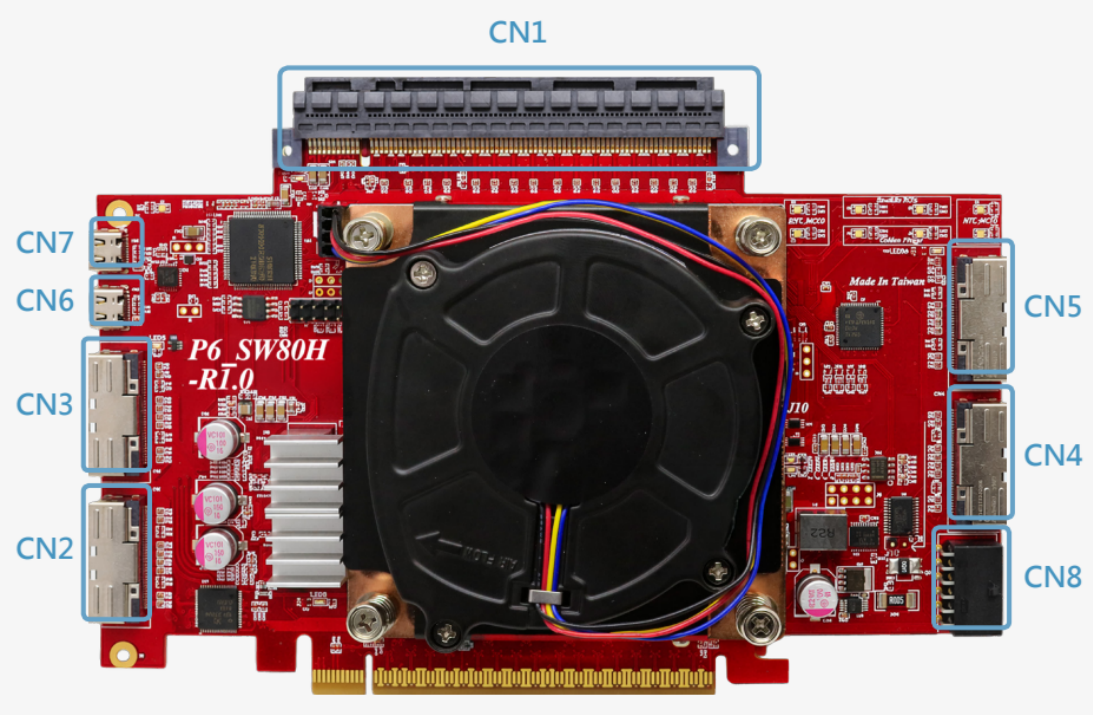
Power cycling

After an SBR mode change or firmware update, completely remove and restore power to the host card. A software reboot or swreset is not a substitute for this step. Stop host I/O and shut down the system before removing power.

Do not connect or disconnect card power, PCIe or MCIO connections while energized unless the complete system has an explicitly supported hot-plug procedure.

Connectors and cooling

Identify the management port before connecting USB



Connector locations viewed from the component side.

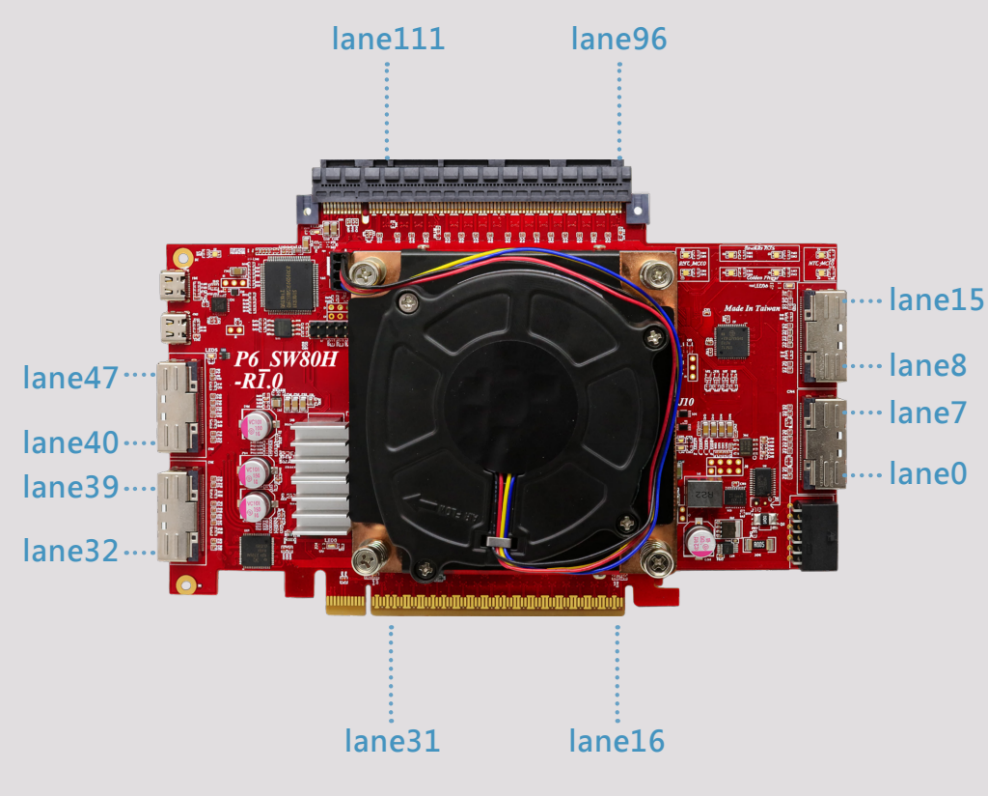
Reference	Function
CN1	Straddle PCIe x16 connector
CN2, CN3	MCIO x8 connectors on the left side of the illustrated board
CN4, CN5	MCIO x8 connectors on the right side of the illustrated board
CN6	Broadcom SDB/SMART service port
CN7	MCU management port; USB serial console
CN8	12VHPWR auxiliary power input
J6	Fan power connection

Use CN7 for the procedures in this guide. CN6 is a separate service interface and is not the MCU serial console.

Keep the heatsink and fan clear of cables and obstructions. Use lsd to inspect the reported temperature, fan speed and power telemetry. Contact QA Maestro if the fan is not operating or telemetry indicates an error.

Lane mapping

Use the board orientation shown below



Lane identifiers on the adapter card.

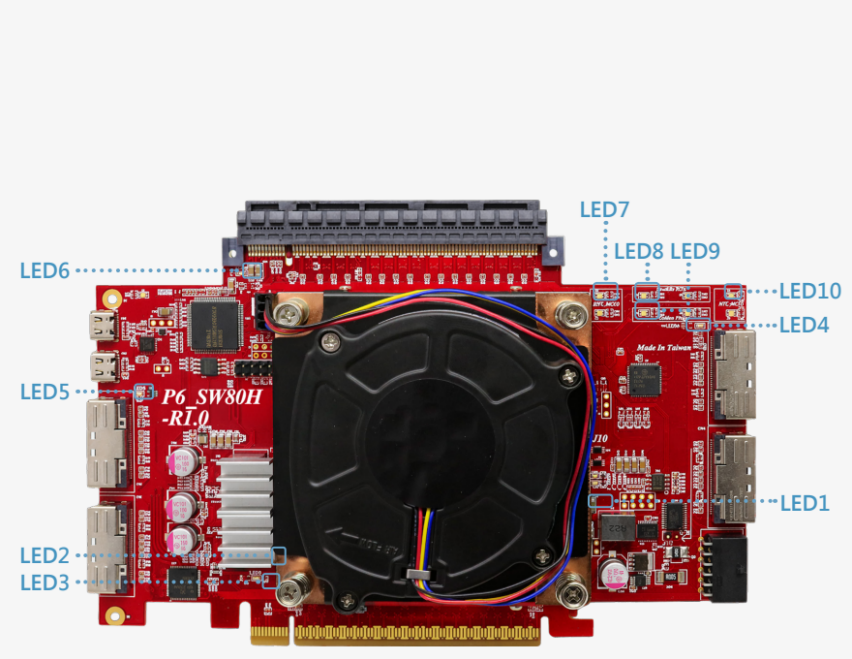
Interface	Lane range
CN1 straddle PCIe	96-111
CN2 left lower MCIO	32-39
CN3 left upper MCIO	40-47
CN4 right lower MCIO	0-7
CN5 right upper MCIO	8-15
PCIe edge connector	16-31

The lane labels identify physical connections. The active link width and clock configuration depend on the selected SBR mode. Check showmode and showport after each configuration change.

Use QA Maestro approved cable assemblies. Request a verified connector pinout from QA Maestro before designing custom cables or adapters.

LED indicators

Confirm negotiated speed and width through the console



LED locations viewed from the component side.

LED	Indication
LED1	SBR system error
LED2	Power on
LED3	PCIe edge connector link status
LED4	Right MCIO link status
LED5	Left MCIO link status
LED6	Straddle PCIe link status
LED7	Left MCIO maximum link width
LED8	Straddle PCIe maximum link width
LED9	PCIe edge connector maximum link width
LED10	Right MCIO maximum link width

For LEDs 3, 4, 5 and 6: steady illumination indicates Gen6; blinking indicates Gen5. Use showport to read the actual negotiated speed and width. Other LED patterns are not defined in this guide.

Windows serial console

Connect with Tera Term through CN7

1 Identify the serial device

Power the card correctly and connect a USB data cable from the computer to CN7. Open Device Manager and expand Ports (COM & LPT). Note the COM port that appears when the card is connected. The port number is system dependent.

Windows 10 normally uses the built-in USB CDC driver for this interface. If the device is unidentified or no COM port appears, check the USB cable and request the appropriate driver from QA Maestro. Do not select a driver solely by a similar product name.

2 Configure Tera Term

1. Install and open Tera Term. Choose a Serial connection and select the COM port identified above.

2. Open Setup > Serial port and apply the settings in the table.

3. Use VT100 terminal emulation where available, then press Enter to obtain the card command prompt.

Parameter	Value
Baud rate	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	None
Terminal emulation	VT100

3 Check the card

```
ver
lsd
showmode
showport
```

The prompt may appear as cmd> or Admin>, depending on firmware. Record the firmware versions, current mode and negotiated links. If characters are unreadable, recheck 115200 baud and 8N1.

For firmware transfers use File > Transfer > XMODEM > Send after issuing the appropriate fdl command. See the firmware update procedure on page 9.

Linux serial console

Connect with minicom and use XMODEM for transfers

1 Install tools and identify the device

Ubuntu / Debian shell commands:

```
sudo apt update
sudo apt install minicom lrzsz
ls -l /dev/serial/by-id/
ls -l /dev/ttyACM* /dev/ttyUSB*
```

Connect the USB data cable to CN7. Compare the device listing before and after connection. A CDC serial interface commonly appears as /dev/ttyACM0; the name can differ. A missing wildcard match only means no device of that type was found. Prefer the matching /dev/serial/by-id/ path when available.

2 Configure the terminal

Launch setup from a Linux shell:

```
minicom -s
```

In Serial port setup, set Serial device to the detected path and Bps/Par/Bits to 115200 8N1. Set both Hardware Flow Control and Software Flow Control to No. Save the setup, then exit setup to enter the terminal. Use VT100 emulation if needed.

If access is denied, inspect the device group using ls -l and ask your administrator to grant serial-port access. On Ubuntu / Debian this is commonly the dialout group; a new login is required after a membership change. Avoid making the serial device world writable.

3 Verify and transfer

Press Enter, then run ver and showport at the card prompt. For an XMODEM upload, first run the required fdl command, then press Ctrl+A followed by S, select xmodem and choose the approved BIN file. Wait for completion. The lrzsz package supplies the external transfer utilities.

Ctrl+A followed by Z opens minicom help. Ctrl+A followed by Q exits without a modem reset. Close other programs using the same serial port.

These are Linux terminal procedures; device naming and permissions depend on the distribution. Validate the connection on the target host before performing an update.

Firmware updates

Update SBR images through the serial console

Before updating, stop all host I/O. Use only the firmware package and target image mapping supplied by QA Maestro for the exact card revision. Maintain stable card power throughout the transfer.

Before you begin

Connect to CN7 at 115200 baud, 8N1, no flow control. Run ver and sysinfo and save the output. Confirm the current firmware version, board identification, release notes and which BIN file belongs to each target. Keep the serial connection open.

SBR update sequence

1. At the card prompt, enter fdl sbr0. Start an XMODEM send of the BIN file specified for sbr0.

2. Wait until the transfer has completed and the card has finished processing it. Follow the package instructions if an additional completion message is required.

3. Enter fdl sbr1. Start an XMODEM send of the BIN file specified for sbr1. Do not assume both targets use the same file.

4. After both uploads complete successfully, shut down and completely power cycle the host card.

5. Reconnect and run ver, showmode, lsd and showport. Confirm firmware identification, mode, telemetry and the expected upstream and downstream link speed and width.

Terminal	How to send the file
Windows / Tera Term	File > Transfer > XMODEM > Send
Linux / minicom	Ctrl+A, then S > xmodem > select the BIN file

Other targets and recovery

The command interface also lists fdl mcu. MCU images and recovery actions are package specific; obtain the matching procedure from QA Maestro before using this target. Do not substitute an SBR image for an MCU image.

If a transfer fails, preserve the terminal log and contact QA Maestro for recovery instructions. Do not interrupt an active write or repeatedly power cycle a card that is still updating.

SBR mode configuration

Configure the link topology through the console

Use setmode to select an SBR mode. A hardware jumper is not used for mode selection on the described board revision. SSC and CC are the clock-mode labels used by the card configuration.

Mode	PCIe edge	Straddle	Left MCIO	Right MCIO
0	x16 (SSC)	x16 (CC)	x16 (CC)	x16 (CC)
1	x16 (SSC)	x16 (CC)	x8 (CC)	x8 (CC)
2	x16 (SSC)	x16 (CC)	x4 (CC)	x4 (CC)
3	x16 (SSC)	x16 (CC)	x2 (CC)	x2 (CC)
4	x16 (SSC)	x16 (CC)	x8 (CC)	x16 (CC)
5	x16 (SSC)	x16 (CC)	x4 (CC)	x16 (CC)
6	x16 (SSC)	x16 (CC)	x16 (CC)	x4 (CC)

Example Select mode 0

```
showmode
setmode 0
```

1. Stop the workload and choose a mode compatible with the attached endpoints and cable configuration.

2. Run setmode followed by the mode number.

3. Shut down and completely power cycle the host card.

4. Reconnect and run showmode and showport to verify the resulting mode and links.

A successful command response does not replace the required power cycle. Do not assume a mode is the factory default; read showmode first.

Check the resulting configuration

Use showport to inspect the upstream PCIe edge link and all connected downstream links. A disconnected or disabled port need not show an active link. Compare active ports with the selected mode and the intended system topology.

Status and diagnostic commands

Capture these results before requesting support

Command	Purpose
ver	Show card information, MCU firmware and switch firmware versions.
sysinfo	Show system information, including available identity and telemetry data.
lsd	Show switch temperature, fan speed, voltages and sideband modes.
showport	Show upstream PCIe edge and downstream MCIO / straddle link status.
showmode	Show the current SBR mode.
error	Display per-port error counts.

Recommended diagnostic capture

```
ver
sysinfo
lsd
showmode
showport
error
```

Save the actual console output with the date, card serial number, host operating system, cable configuration and endpoint models. Console values and identity strings depend on the installed firmware; this guide does not prescribe sample output values.

Interpreting status

For each connected port, compare negotiated speed and width with the expected topology. Review telemetry and error counts before and after a workload. An example temperature, fan speed or voltage from another card is not a pass/fail limit.

Operating limits and the interpretation of individual error fields depend on hardware and firmware revisions. If a fault is reported or link behavior changes unexpectedly, stop the workload and contact QA Maestro.

Advanced control commands

Use during a planned service window

The following commands can interrupt links, alter clocking or reset hardware. Stop host I/O before use and apply only the settings required for your test or supplied by QA Maestro.

Syntax	Function
mrst [l|r|s|all]	Reset left MCIO, right MCIO, straddle PCIe or all listed downstream interfaces.
clock	Display clock status.
clock [l|r|s] [e|d]	Enable (e) or disable (d) a clock output for the selected interface.
clock [srise5|srise2|srisd]	Select a supported spread-clock control. srise5: 0.5%; srise2: 0.25%. Confirm the srisd behavior with QA Maestro before use.
fmode [lane(0|16|32|96)] [en|dis]	Enable or disable flit mode for a listed lane group.
reset	Reset the system.
swreset	Reset the PCIe switch.

Syntax conventions

A vertical bar separates alternatives; choose one alternative and do not type the brackets or vertical bars. The notation above follows the documented interface. Availability and effects can differ between firmware versions.

After a change

Reconnect to the console if necessary and inspect showmode, showport, lsd and error. Restore the intended configuration before restarting host workloads. Use a complete card power cycle whenever the mode or firmware procedure requires one.

Troubleshooting and support

Resolve connection problems before changing firmware

Symptom	Checks and next action
No COM port or Linux serial device	Confirm card power, a USB data cable and connection to CN7. Try another USB port. Inspect Device Manager or the Linux USB/device log; request driver guidance if the device remains unidentified.
Linux permission denied	Check the serial device owner/group. Obtain serial-port permission from the administrator, then log in again if group membership changed.
Blank console or unreadable text	Check the selected port, 115200 baud, 8N1 and no flow control. Press Enter and close any other program using the port.
XMODEM option missing or transfer fails	On Linux, install lrzsz and check minicom transfer-protocol configuration. Confirm that the card is waiting after the correct fdl command and that the approved BIN file was selected.
Mode does not take effect	Completely power cycle the host card after setmode, then run showmode and showport.
Unexpected speed or link width	Check the selected mode, approved cables, endpoint capability, seating and auxiliary power. Save showport and error output for support.
Fan fault or power error	Stop the workload. Check J6, airflow and CN8 with power removed. Contact QA Maestro if the issue persists.

Contact QA Maestro

QA Maestro Inc.
2003 O'Toole Ave, San Jose, CA 95131 USA
sales@qamaestro.com
https://qamaestro.com

Include the card serial number, firmware versions, operating system, topology, recent changes, reproduction steps and console logs. For update issues, include the firmware package name, target and transfer log.

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Linux terminal reference: Debian minicom(1) documentation, manpages.debian.org/trixie/minicom/minicom.1.en.html.