



Application Note

Astra™ Machina Foundation Series – General MIPI DSI LCM Hardware Connection

Abstract: This application note provides guidelines for connecting MIPI DSI LCM displays to the Astra™ Machina Foundation Series. It covers hardware requirements, connection methods, and recommendations for compatible displays to ensure proper integration.

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1. Overview

The Astra™ Machina Foundation Series offers evaluation-ready kits that facilitate quick and straightforward prototyping with the Synaptics SL-Series of embedded Linux® and Android™ processors. Featuring a modular design, these kits include interchangeable core compute modules, a standard I/O board, and daughter cards for connectivity, debugging, and various I/O configurations. Furthermore, the Astra™ Machina Foundation Series is equipped with MIPI DSI interface support.

1.1. Scope

This document offers a general connection diagram for MIPI DSI LCM displays that is applicable to all SL-Series core modules, including SL1680, SL1640, SL1620, and SL2610 series. There are two possible types of connections. The first type involves a direct connection between the MIPI DSI TX and MIPI DSI RX interfaces. The second type may require an adapter to remap the DSI TX signals to the DSI RX signals, depending on the specific MIPI DSI display being used.

This document is focused on the first type of direct connection.

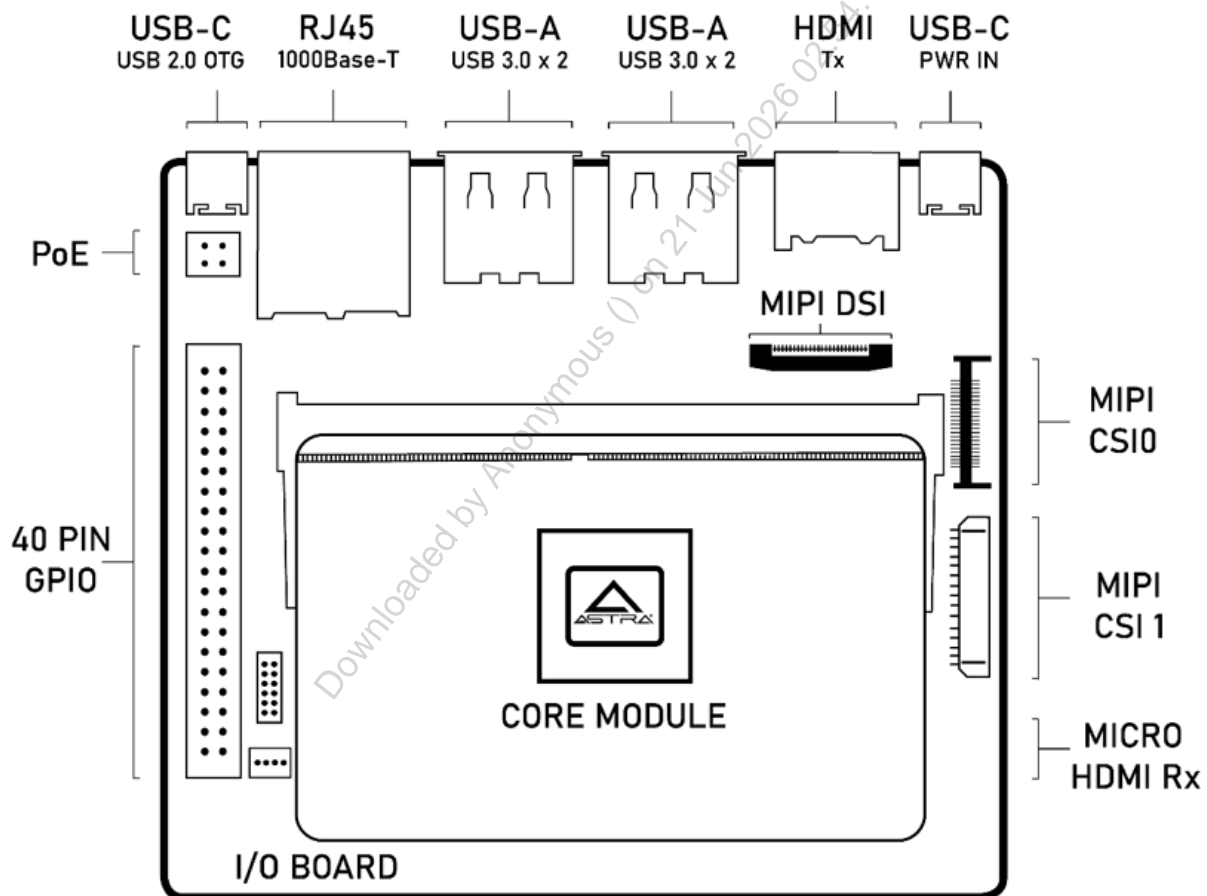
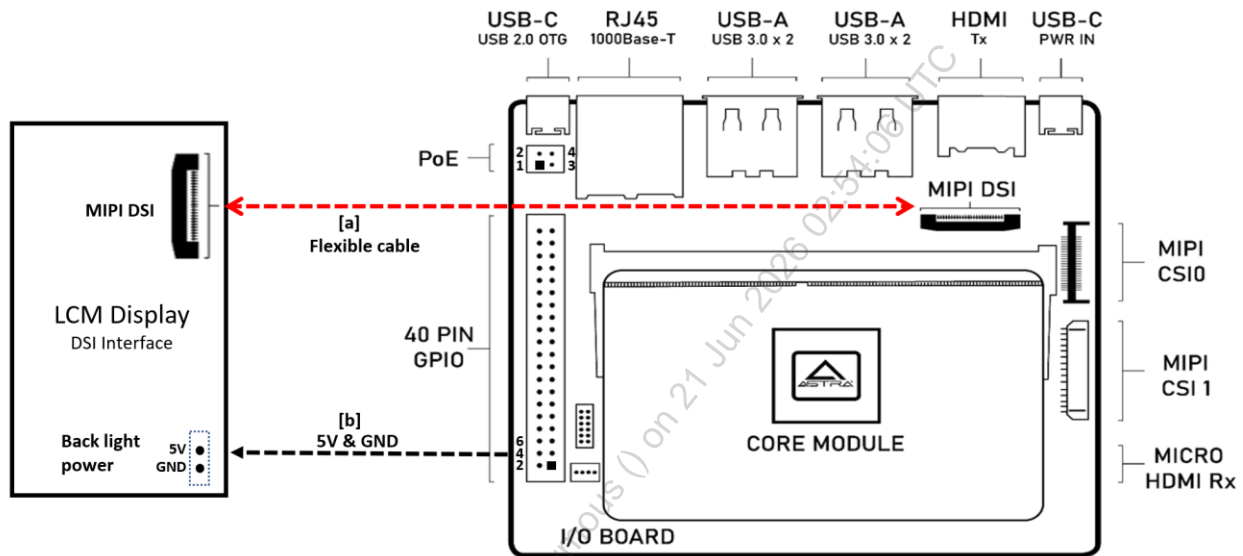


Figure 1. Astra Machina Foundation Series overview

1.2. Accessories hardware items needed

- [a] Astra Machina Foundation Series.
- [b] Waveshare 7inch Capacitive Touch display or equivalent.
- [c] Flexible cable for Raspberry Pi 5, MIPI–DSI 22-pin to 15pin, suitable for DSI Display Screens or equivalent.
- [d] Two-flying wires for power and ground connection from Astra platform to DSI Display module.

1.3. Connection block diagram



Note: The MIPI–DSI connector interface on the I/O board is compatible with Raspberry Pi (RPI).

Figure 2. MIPI DSI interface connection block diagram

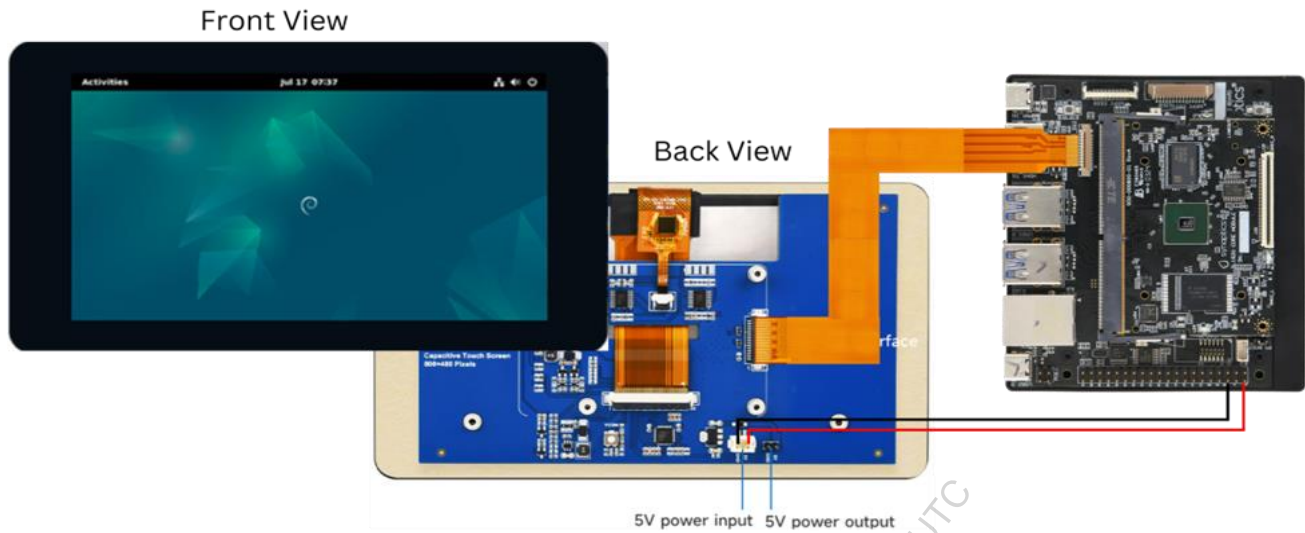


Figure 3. MIPI DSI interface connection overview

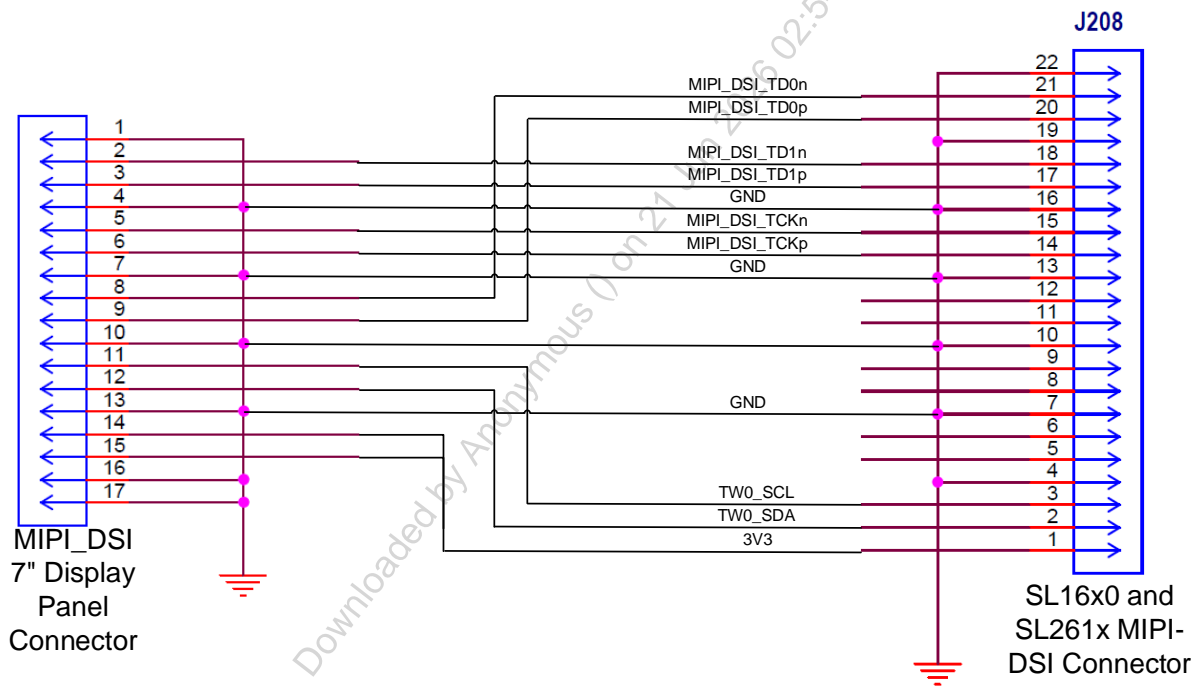


Figure 4. MIPI DSI interface schematic overview

1.4. Making connection

- [a] Connect a flexible cable for Raspberry Pi 5, MIPI-DSI 22-pin to Astra Platform MIPI DSI connector and MIPI-DSI 15-pin to MIPI DSI Display, respectively.
- [b] Connect three jumper wires, each with 1-pin to 1-pin, featuring 100-mil spacing headers on both ends, from J32-4,6 (corresponding to 5V, and GND respectively) on the 40-pin header of the Astra™ Machina Foundation Series to the specified location on the LCM DSI display, as shown in Figure 2 above.

1.5. Basic information MIPI DSI display and accessories

- Waveshare 7-inch Capacitive Touch Display for Raspberry Pi, DSI Interface, 800x480
- Raspberry Pi 5 Official Display Cable 200mm

1.6. LCM MIPI DSI display recommendation and SDK software driver

1.6.1. SDK software driver

Please consult the Synaptics software support team regarding the availability of the SDK software and the necessary driver prior to beginning hardware development.

1.6.2. LCM MIPI DSI display recommendation

Table 1. MIPI DSI display recommendation

| Item | Panel Vendor | Part Number | Disp. Size (Inch) | Resolution | Driver IC | MIPI Mode | MIPI Channels | Display Mode | Connector Interface | Touch Interface |
|------|--------------|---------------------|-------------------|--------------------|-----------|-----------|---------------|--------------|---------------------|-----------------|
| 1 | Waveshare | HC070TG35057-CO4V01 | 7 | 800 × 3(RGB) × 480 | N/A | Video | 2 ch. | Portrait | 15-Pin FPC | I2C |

2. References

- *Astra Machina Foundation Series Quick Start Guide* (PN: 511-001404-01)
- *Astra Machina SL1640 Developer Kit User Guide* (PN: 511-001405-01)
- *Astra Machina SL1620 Developer Kit User Guide* (PN: 511-001407-01)
- *Astra Machina SL1680 Developer Kit User Guide* (PN: 511-001403-01)
- Astra FAQ → *Astra Machina supported MIPI DSI Display Panel List*:
<https://synacsm.atlassian.net/servicedesk/customer/portal/543/topic/7f84fdc4-c401-461f-afed-238db48690f3/article/84705282>

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3. Revision History

| Revision | Description |
|----------|---|
| A | Initial release |
| B | Minor update to latest template. |
| C | Note added to Figure 2. |
| D | Updated 1.1 Scope to include SL2610 and added link in References (added Astra FAQ). |

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