Grinn Test Add-on for Synaptics Coralboard

1 Description

Grinn Test Add-on is an add-on board that connects to Synaptics® Coralboard™ through the 22-pin DSI connector J2 and the pogo contacts J3, J4 and J6–J44. It is intended for test and bring-up and combines a four-lane DSI-to-HDMI path, a two-port USB 2.0 hub with an on-board USB-to-UART bridge, I^2C-controlled indicators and a buzzer, and current monitoring for selected power rails. It mounts below the Synaptics® Coralboard™ on four integrated standoffs.

The board provides an HDMI receptacle J1, a 22-pin DSI connector J2 and a USB-C receptacle J5. Spring pogo contacts expose USB, UART, boot, reset and current-measurement connections.

2 Applications

- Visual and audible status signalling
- Display pipeline development
- Firmware development and debugging through the USB-to-UART bridge
- Current consumption evaluation

3 Features

- LT9611 four-lane DSI-to-HDMI converter
- HDMI, DSI and USB-C connectors
- USB2422 two-port USB 2.0 hub
- CP2102N-A02 USB-to-UART bridge
- FXL6408 I^2C I/O expander
- Red, yellow, green and blue LEDs and a 5 V buzzer
- Four INA4230 current-shunt monitors
- 73.5 mm × 68.2 mm board outline

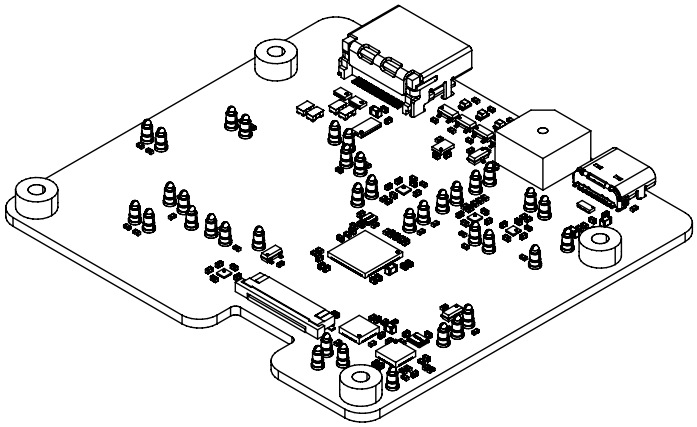


Fig. 1: Test Add-on isometric view

4 Board Views

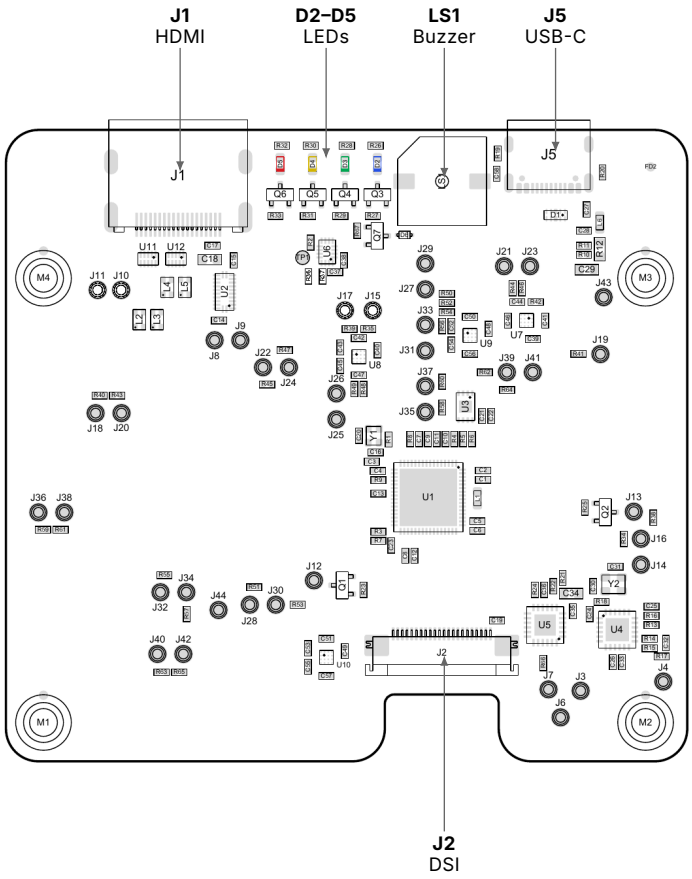


Fig. 2: Top-side components, seen from above

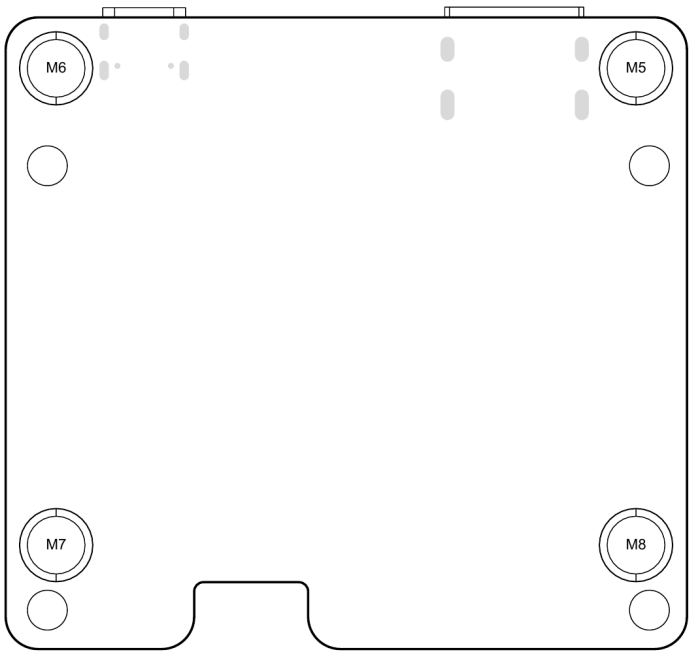


Fig. 3: Bottom side, seen from below

5 Hardware Overview

The main connectors and functional devices are listed below.

Tab. 1: Main connectors and functional devices

Designator	Type	Connection or function
J1	HDMI receptacle	HDMI output from the DSI-to-HDMI path
J2	22-pin ZIF connector	DSI, HDMI control, TW3 and 3.3 V
J5	USB-C receptacle	USB hub upstream port and VBUS input
U1	LT9611	MIPI DSI-to-HDMI converter
U4	USB2422	Two-port USB 2.0 hub
U5	CP2102N-A02	USB-to-UART bridge
U6	FXL6408	I^2C I/O expander
U7–U10	INA4230	Current-shunt monitors
D2–D5	Blue, green, yellow and red LEDs	Expander-controlled indicators
LS1	MLT-9650	Expander-controlled 5 V buzzer

5.1 DSI-to-HDMI Interface (J1, J2, U1)

J2 carries four DSI data pairs, the DSI clock pair, the TW3 control bus, HDMI control signals and 3.3 V. The LT9611 converter U1 produces the HDMI output at J1. Its I^2C address is 0x3B.

The HDMI path also includes the TPD12S016 companion device U2, the CAT24C08 EEPROM U3 at address 0x50, and the U11/U12 ESD and common-mode filter devices.

5.2 USB Hub and UART (J5, U4, U5)

J5 is the upstream USB-C connector for the USB2422 two-port hub U4. Its VBUS connection supplies the 5V0 rail through L6. The USB data lines are connected to the TPD4E05U06 ESD protection array D1.

The first downstream port connects to the CP2102N-A02 USB-to-UART bridge U5. The second downstream port is exposed at J6 and J7. UART transmit, receive and flow-control signals are exposed at J8–J11. The bridge can pull the Synaptics® Coralboard™ USER_BUTTONn and RESET_BUTTONn signals low through Q1 and Q2. These connections use spring contacts J12 and J13, respectively.

5.3 I/O Expander, LEDs and Buzzer (U6)

U6 is an FXL6408 I/O expander on the TW3 bus at address 0x44. It controls the HDMI reset and power-enable signals, four LEDs and LS1.

Tab. 2: I/O expander assignments

U6 pin	Function
GPIO0	HDMI_RSTn
GPIO1	Test point TP1
GPIO2	HDMI_PWR_EN
GPIO3	Red LED D5
GPIO4	Yellow LED D4
GPIO5	Green LED D3
GPIO6	Blue LED D2
GPIO7	Buzzer LS1

D2, D3, D4 and D5 are blue, green, yellow and red LEDs, respectively. The LEDs and buzzer LS1 are supplied from 5 V and use active-high control signals.

5.4 Current Measurements (U7–U10)

U7–U10 are INA4230 current-shunt monitors connected to the TW3 bus. Their addresses, input sources and monitored rails are listed below.

Tab. 3: Current-monitor channel assignments

Channel	Input source	Monitored rail
U7 (I²C address 0x40)		
IN1	J14, J16	VBAT
IN2	J19	VBOOST
IN3	J21, J23	SOM_5V
IN4	R12 (J5–J3)	VUSB_DEVICE
U8 (I²C address 0x45)		
IN1	J15, J17	Not assigned
IN2	J18, J20	20P_1V8
IN3	J22, J24	I3C_1V8
IN4	J25, J26	MB_3V3
U9 (I²C address 0x41)		
IN1	J27, J29	20P_3V3
IN2	J31, J33	20P_5V0
IN3	J35, J37	CSI_3V3
IN4	J39, J41	MB_5V0
U10 (I²C address 0x4D)		
IN1	J28, J30	VUSB_HOST
IN2	J32, J34	SD_3V3
IN3	J36, J38	M2E_3V3
IN4	J40, J42	QWIIC_3V3

6 Synaptics® Coralboard™ to Test Add-on Pin Assignment

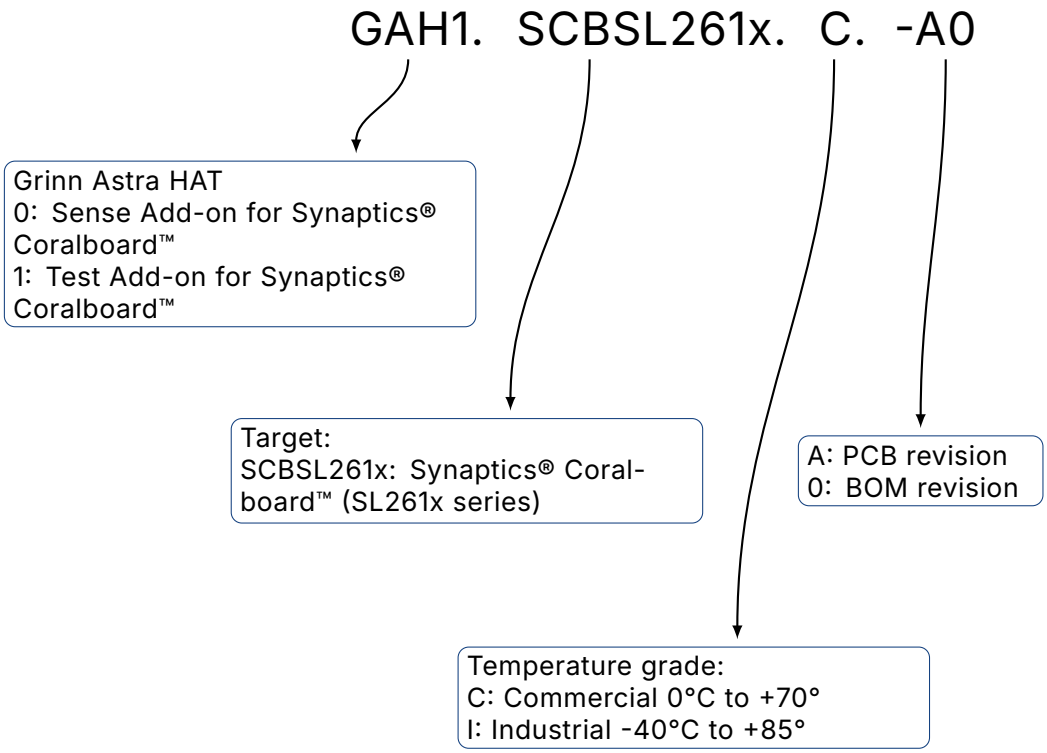
Test Add-on connects to Synaptics® Coralboard™ through the 22-pin DSI connector J2 and spring pogo contacts J3–J44.

The table below lists which Synaptics® Coralboard™ signal serves which function on the add-on board. Check the signal against the Synaptics® Coralboard™ schematic before configuring or driving an interface.

Tab. 4: Host signal assignments

Function on Test Add-on	Synaptics® Coralboard™ signal
DSI-to-HDMI interface (J2)	
DSI data lane 0, pins 2 and 3	`DSI_D0_N`, `DSI_D0_P`
DSI data lane 1, pins 5 and 6	`DSI_D1_N`, `DSI_D1_P`
DSI clock, pins 8 and 9	`DSI_CLK_N`, `DSI_CLK_P`
DSI data lane 2, pins 11 and 12	`DSI_D2_N`, `DSI_D2_P`
DSI data lane 3, pins 14 and 15	`DSI_D3_N`, `DSI_D3_P`
HDMI interrupt, pin 17	`DSI_GPIO0`
HDMI hot-plug detect, pin 18	`DSI_GPIO1`
I^2C control clock, pin 20	`TW3_SCL`
I^2C control data, pin 21	`TW3_SDA`
3.3 V supply, pin 22	`3V3`
Ground, pins 1, 4, 7, 10, 13, 16 and 19	`GND`
USB hub (J3, J4, J6, J7)	
5 V VBUS contact after R12, J3	`VUSB_DEVICE`
Ground contact, J4	`GND`
Second hub port, positive data, J6	`USB_DEVICE.D_P`
Second hub port, negative data, J7	`USB_DEVICE.D_N`
USB-to-UART bridge (J8–J13)	
Transmit from U5 to Synaptics® Coralboard™, J8	`SM_URT0_RXD`
Receive by U5 from Synaptics® Coralboard™, J9	`SM_URT0_TXD`
Request-to-send from U5, J10	`SM_URT0_CTSn`
Clear-to-send to U5, J11	`SM_URT0_RTSn`
Boot-mode control, J12	`USER_BUTTONn`
Reset control, J13	`RESET_BUTTONn`
Current-measurement contacts (J14–J44)	
Current-monitor inputs, J14–J42	See Table 3
Ground reference, J43 and J44	`GND`

7 Ordering Part Number



Revision History

Revision	Date	Description
1.0	2026-08-17	Initial release.



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