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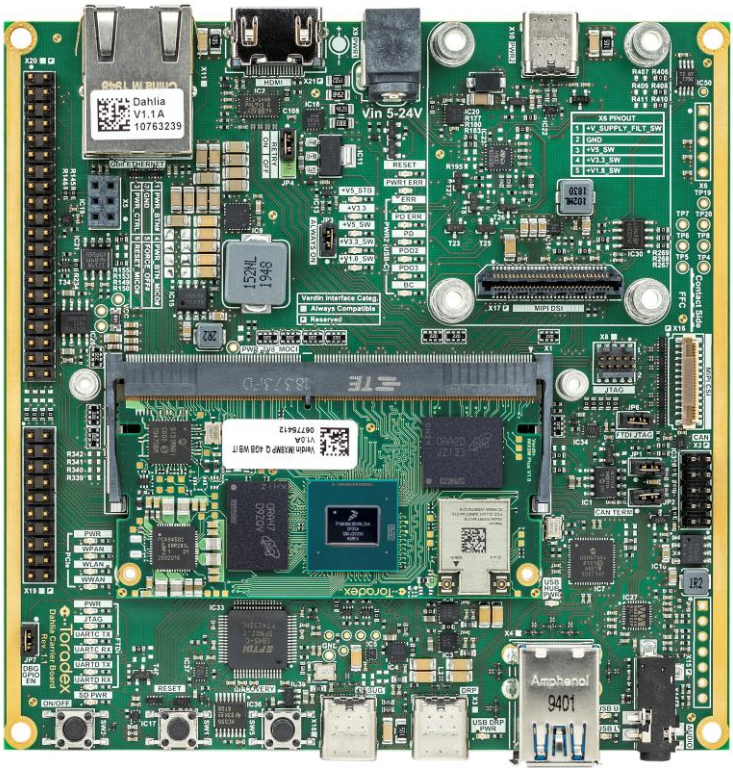
Dahlia

Errata Document



Document Revision History

Date	Doc. Rev.	Notes
2020-04-30	Rev. 0.90	Initial Release
2020-09-09	Rev. 0.91	Errata #1: Removed since Dahlia V1.0A was never released to customers Errata #4: Added
2020-12-11	Rev. 0.92	Errata #4: Add information for Dahlia V1.0C Errata #5: Added
2021-05-18	Rev. 1.00	Errata #6: Added
2021-06-23	Rev. 1.01	Errata #7: Added
2022-01-06	Rev. 1.02	Errata #8: Added
2022-01-10	Rev. 1.03	Errata #9: Added
2022-05-10	Rev. 1.04	Errata #9: Information updated and pictures added
2022-05-16	Rev. 1.05	Errata #10: Added
2022-06-28	Rev. 1.06	Errata #3: Fix version details added to the document
2023-04-28	Rev. 1.07	Errata #11: Added

Overview

Errata #2: HAR-3351 – Unexpected behavior of the Cypress USB-C PD detection chip

Affected Version: **Dahlia V1.0B**

Fixed in: **TBD**

2.1 Customer impact

Depending on the cable used, the board can be turned on, even though the USB power source is not capable of delivering enough power. This may cause the power source USB port to trigger overcurrent protection. The power supplies on the carrier board may trigger undervoltage protection at higher current consumption (e.g., during booting of the module)

2.2 Description

Most USB Type-A to Type-C cables or adapters feature a pull-up resistor between one of the CC pins and the 5V VBUS. A resistor of 56k +/-20% tells the UFP (Upstream Facing Port) that a cable with default USB Power (maximum 0.5A or 0.9A) is plugged in. The Dahlia carrier board is not intended to start from such a USB power source unless the USB BC1.2 circuit detects a charging port.

On the Dahlia carrier board, the Cypress USB-C PD chip is set to request either for 1.5A or 2A from the power source (depending on the jumper JP5 setting). This means it is expected that the VBUS_FET_EN output is not released if only a source with default USB Power is plugged in. However, the chip releases the signal, which means the Dahlia board is turning on even with an improper USB power source.

If a cable is used without pull-up resistors, the circuit works as expected. In this case, Dahlia can only be turned on if the Type-A side is connected to a BC1.2 capable power source.

The investigations on this issue are in progress.

2.3 Workaround

Use the Dahlia Carrier board only with suitable USB power sources. Alternatively, USB Type-A to Type-C cables or adapters without a pull-up resistor on the CC line can be used.

Errata #3: HAR-3302 – System power fail with the Verdin DSI to LVDS Adapter and a display attached

Affected Version: **Dahlia V1.0B**

Fixed in: **Dahlia V1.1A**

3.1 Customer impact

When using Verdin DSI to LVDS Adapter inserted to X17, Carrier Board with the 10.1" LVDS display attached to the adapter will fail if it is powered from the 5V power source.

3.2 Description

The problem is that the display's inrush current is too high when its backlight is getting enabled. When the board is powered from 5V, the display inrush current causes the +V_SUPPLY_FILT power rail on the carrier board to drop below the UVLO limit set by the voltage detection circuits built on IC13. This triggers the KILL# input of the IC10 power button controller, and it shuts down the board power supply.

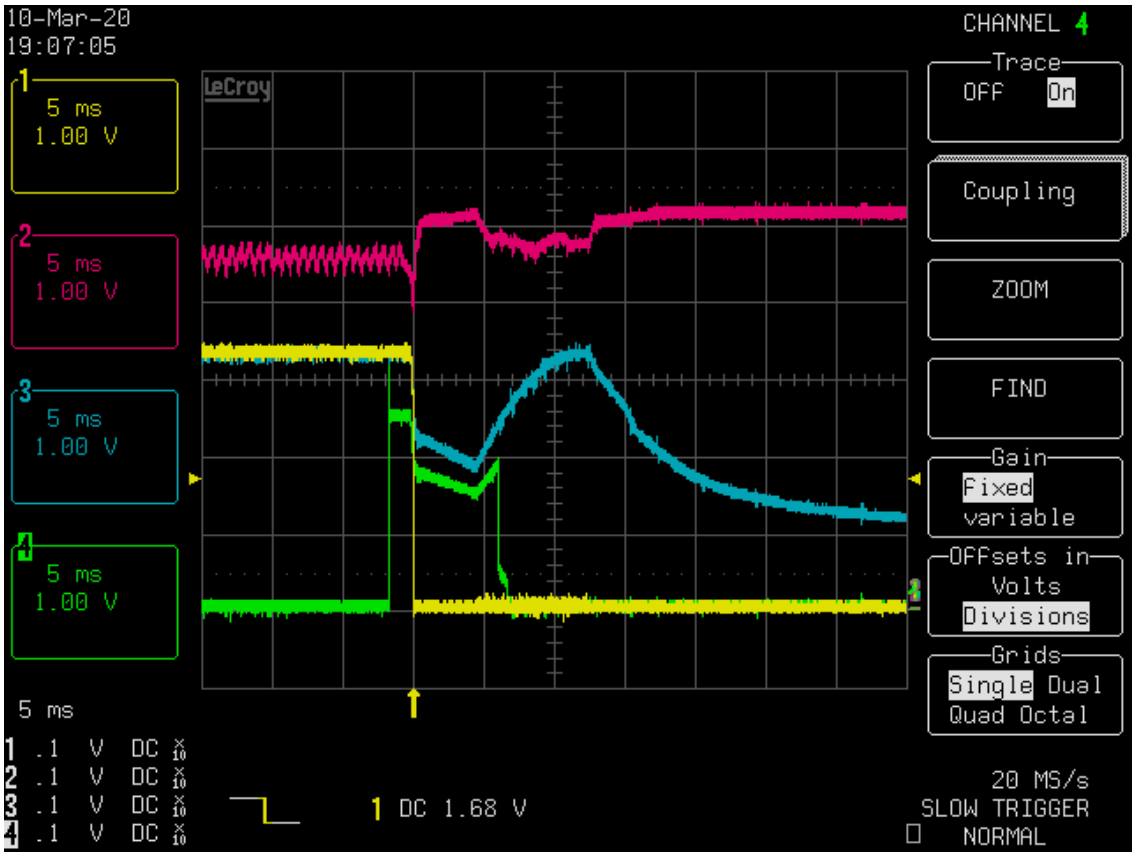


Figure 1. KILL# gets triggered when the backlight is enabled
CH1: KILL#, CH2: +V_SUPPLY_FILT, CH3: +V3.3, CH4: LVDS_DSI_1_BLK_EN

3.3 Workaround

To use the Dahlia board with the 10.1" LVDS display and to avoid the unexpected board turn-off, follow the recommendations below:

- Use USB-C PD power supplies with at least 9V or power the board over the barrel connector with at least 9V
- Use a good USB cable. The quality of the cables has an impact on the +V_SUPPLY_FILT voltage stability

Errata #4: HAR-3672 – CTRL_FORCE_OFF_MOCI# has pull-down instead of a pull-up resistor

Affected Version: **Dahlia V1.0B**

Fixed in: **Dahlia V1.0C (workaround added)**
Dahlia V1.1A

4.1 Customer impact

In combination with a newer Verdin module, the power gets killed 512ms after the power button is pressed. The same happens if there is no module present on the carrier board.

4.2 Description

The CTRL_FORCE_OFF_MOCI# input on the Dahlia carrier board features a 1MΩ pull-down resistor instead of a pull-up resistor. In the Verdin family definition, the CTRL_FORCE_OFF_MOCI# signal is specified as an open-drain signal that is 5V tolerant. The pull-up resistor is supposed to be on the carrier board. Without this pull-up resistor, the CTRL_FORCE_OFF_MOCI# remains low and therefore is asserted all the time.

The CTRL_FORCE_OFF_MOCI# signal is permanently pulling down the kill input of the power button IC LTC2954 (IC10). The LTC2954 ignores the kill input for the first 512ms after turning it on. After this internal timer is expired, the kill signal will power off the system. This means pressing the Dahlia carrier board's power button will turn on the power only for 512ms. The power does not remain on.

Older Verdin modules such as the Verdin iMX8M Mini V1.0 are actively driving the CTRL_FORCE_OFF_MOCI# signal high. Therefore, the missing pull-up on the Dahlia does not create an issue. However, this behavior of the module is not according to the Verdin standard. Therefore, newer modules updated the CTRL_FORCE_OFF_MOCI# signal type to open-drain with no pull-up resistor on the module.

4.3 Workaround

Removing R96 disables the CTRL_FORCE_OFF_MOCI# signal on the Dahlia carrier board. However, this disables the "kill-feature" entirely. Therefore, after a shutdown, the main supplies are not turned off. For turning off the main power rails, the power button needs to be pressed for >7s. Besides this inconvenience, the modification is compatible with all Verdin module versions. This workaround is implemented on Dahlia Carrier Board V1.0C.

An alternate workaround is patching a 100kΩ resistor between the signal pin of R98 and the +V5_STB rail. Optionally, R98 can be removed. With this workaround, the "kill-feature" still works. However, this workaround should only be used in combination with a newer Verdin module (e.g. Verdin iMX8M Mini V1.1A, Verdin iMX8M Plus V1.0A) on which the CTRL_FORCE_OFF_MOCI# is an open-drain type. For the older Verdin iMX8M Mini V1.0B module, the CTRL_FORCE_OFF_MOCI# is not 5V tolerant, and the CTRL_FORCE_OFF_MOCI# signal gets also asserted during the reset cycle. This means after the modification, the Dahlia carrier board is not compatible anymore with the Verdin iMX8M Mini V1.0B. Read Errata #13 and Errata #5 of the Verdin iMX8M Mini V1.0B module for more information. The following picture shows one potential implementation of the alternate workaround patch:

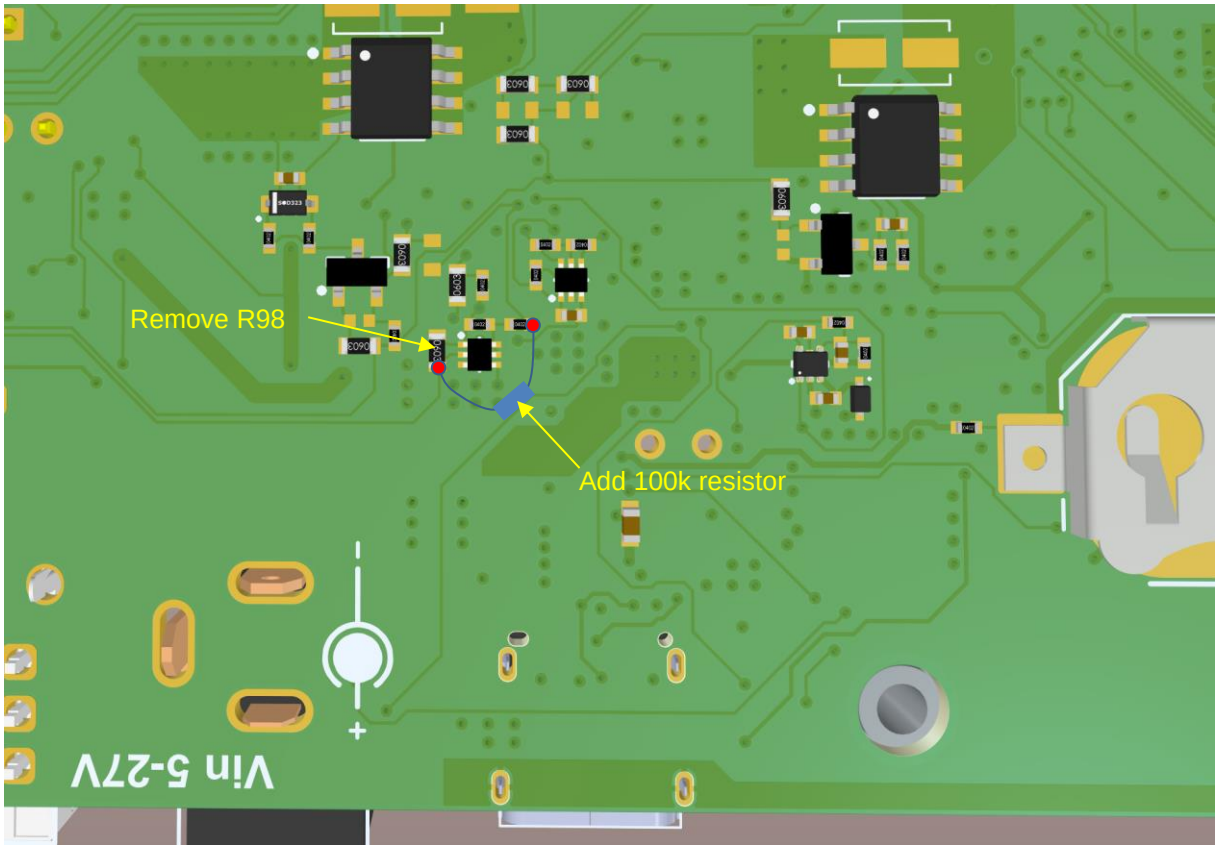


Figure 2. Dahlia Carrier Board CTRL_FORCE_OFF_MOCI# pull-up resistor patch (bottom view, bottom side)

Errata #5: HAR-6255 – CTRL_FORCE_OFF_MOCI# function disabled

Affected Version: **Dahlia V1.0C**

Fixed in: **Dahlia V1.1A**

5.1 Customer impact

The main power rails on the carrier board do not get turned off after a regular shutdown. For turning off the main power rails, the power button needs to be pressed for >7s.

5.2 Description

As a workaround for Errata #4, R96 is not assembled anymore on the Dahlia V1.0C carrier board. This disables the CTRL_FORCE_OFF_MOCI# function. This disables the "kill-feature" entirely. Therefore, after a shutdown, the main supplies are not turned off. For turning off the main power rails, the power button needs to be pressed for >7s. Besides this inconvenience, this version of the carrier board is compatible with all Verdin module versions.

5.3 Workaround

Add a 100kΩ resistor between the signal pin of R98 and the +V5_STB rail. Optionally, R98 can be removed. This workaround enables the "kill-feature". However, the modified carrier board should only be used in combination with a newer Verdin module (e.g., Verdin iMX8M Mini V1.1A, Verdin iMX8M Plus V1.0A) on which the CTRL_FORCE_OFF_MOCI# is an open-drain type. For the older Verdin iMX8M Mini V1.0B module, the CTRL_FORCE_OFF_MOCI# is not 5V tolerant, and the CTRL_FORCE_OFF_MOCI# signal gets also asserted during the reset cycle. This means after the modification, the Dahlia carrier board is not compatible anymore with the Verdin iMX8M Mini V1.0B. Read Errata #13 and Errata #5 of the Verdin iMX8M Mini V1.0B module for more information. See also Figure 2 in Errata #4 for the location of R98 and the +V5_STB rail.

Errata #6: HAR-8017 – CSI_1_MCLK Voltage Level is not 3.3V

Affected Version: **Dahlia V1.0B**
Dahlia V1.0C
Dahlia V1.1A

Fixed in: **TBD**

6.1 Customer impact

In case a MIPI CSI-2 camera requires the CSI_1_MCLK signal (pin #12 of X16), and in case it requires this signal to be at 3.3V level, then the current voltage level of the signal won't be compatible with the camera.

6.2 Description

On the MIPI CSI-2 interface used on the Dahlia V1.1A, all of the single-ended signals are at 3.3V level, except for the CSI_1_MCLK signal (pin #12 of X16), which is at 1.8V level.

6.3 Workaround

In case a MIPI CSI-2 camera requires the CSI_1_MCLK signal (pin #12 of X16), and in case it requires this signal to be at 3.3V level, it could be level shifted on custom carrier boards.

Errata #7: HAR-8291 – The LED status signals of the on-module Ethernet PHY are swapped

Affected Version: **Dahlia V1.0B**
Dahlia V1.0C
Dahlia V1.1A

Fixed in: **TBD**

7.1 Customer impact

The roles of the Ethernet link and activity LEDs are swapped (the wrong Ethernet LED is turned on or is blinking).

7.2 Description

The KSZ9131 Ethernet PHY on the Verdin modules has two LED outputs (ETH_1_LED_1 and ETH_1_LED_2) which are used for indicating the link and activity statuses on the bus.
These LEDs are available on pin 235 and 237 of the module edge connector, respectively.
ETH_1_LED_1 (pin 235) is intended to indicate the activity status, while ETH_1_LED_2 (pin 237) is intended to indicate the link status.
On the PCB versions 1.0 and 1.1, these two signals are swapped.
In the next revision of the carrier board PCB, the connections will be corrected.
In the Dahlia Carrier Board datasheet, the corrected connections are shown.

7.3 Workaround

For custom carrier board designs, the correct LED connections should be implemented.
A potential workaround could be flipping the roles and behavior of the LED outputs of the on-module Ethernet PHY in software. However, this is not supported by the related driver.

Errata #8: HAR-8427 – Signal distortion on the audio codec's "Line In" input

Affected Version: **Dahlia V1.0A**
Dahlia V1.0B
Dahlia V1.0C
Dahlia V1.1A

Fixed in: **Dahlia V1.1B**

8.1 Customer impact

The audio signals from the "Line In" input (connector X15) are distorted and the amplitudes of the signals are smaller than intended. There is crosstalk from the "Line In" input (connector X15) to the "Mic In" input (connector X14).

8.2 Description

The 10k pull-down resistors R251 and R254 connected to the pins 26 and 24 of the audio codec (IC28) affect the functionality of the device's internal multiplexers and signal amplifiers. The analog input pins of the audio codec shift the input DC offset to their internal virtual ground VMID. The external pull-down resistors are affecting this DC offset, causing the opening of the internal multiplexer's analog signal switches and the saturation of the amplifier's outputs. This leads to the distortion of the "Line In" signals (only the positive polarity parts of the input signals are recorded) and crosstalk from the "Line In" input to the "Mic In" input.

8.3 Workaround

Remove the pull-down resistors R251 and R254 from the carrier board. This makes the audio codec's "Line In" and "Mic In" inputs work properly.

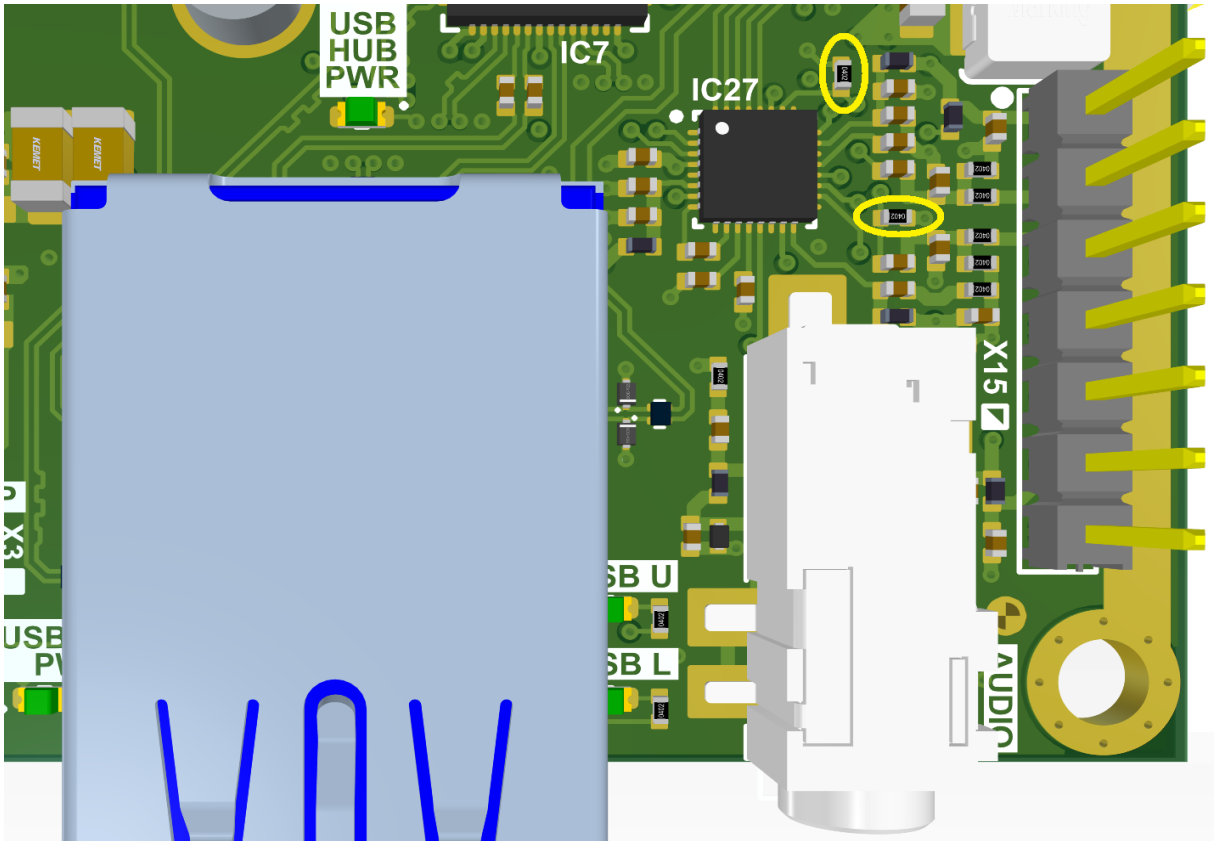


Figure 3. Location of R251 and R254 in the V1.1 version (top view, top side)

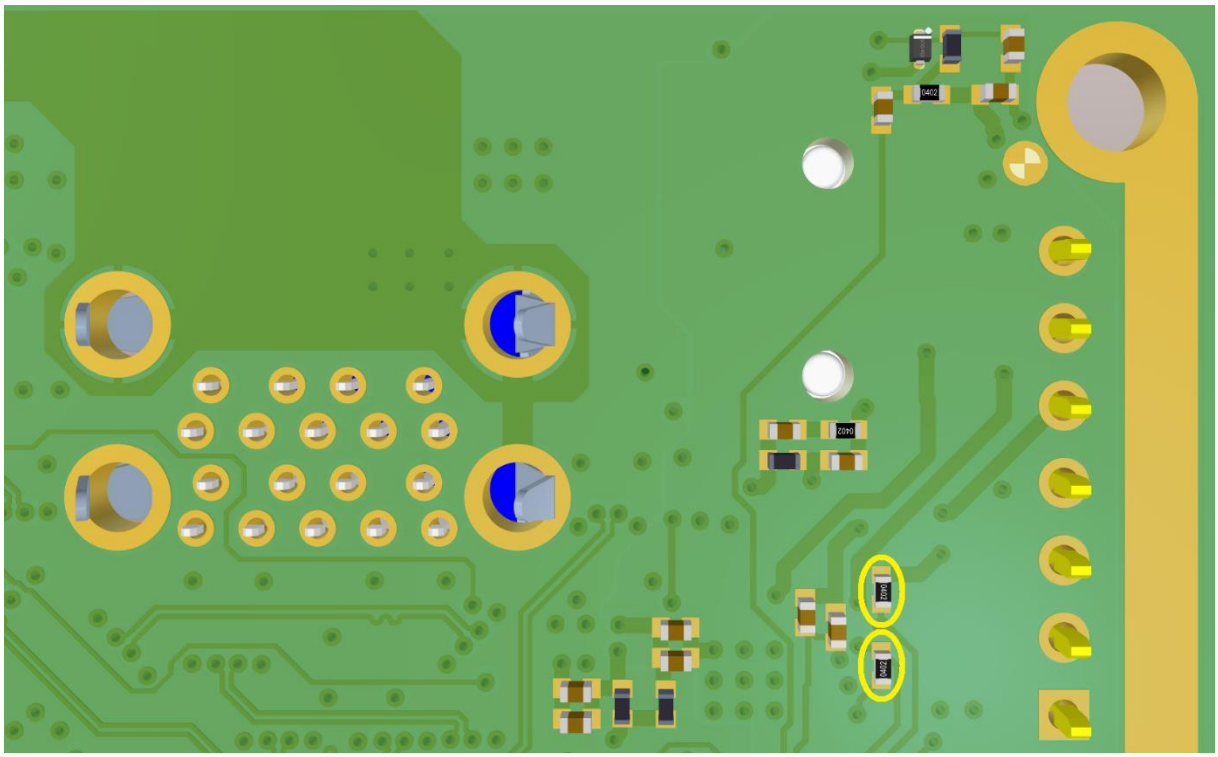


Figure 4. Location of R251 and R254 in the V1.0 version (bottom view, bottom side)

Errata #9: HAR-8814 – The carrier board turns off when a cable is connected to the USB-C FTDI debug connector

Affected Version: **Dahlia V1.0B**
Dahlia V1.0C
Dahlia V1.1A
Dahlia V1.1B

Fixed in: **Dahlia V1.1C**

9.1 Customer impact

The module may reset or turn off, or the carrier board may turn off when a cable is being connected to the USB-C connector of the FTDI debug port while the board is turned on.

9.2 Description

Due to a race condition between the pull-up voltage at the gates of the transistor level shifters, the DBG_PWR_BTN#, DBG_FORCE_OFF#, DBG_RESET#, DBG_RECOVERY#, and the FTDI_JTAG_TRST# signals can get unintentionally triggered when connecting a cable to the USB-C connector of the FTDI debug port. This may reset or shut down the module or shut down the power rails of the carrier board.

9.3 Workaround

Connect the cable to the USB-C connector of the FTDI debug port before powering on the carrier board. As an alternative solution, the resistors R102, R109, R115, R120, and R245 can be replaced with resistors having a resistance of 1MOhm. This slows down the transistor level shifter circuits and makes sure that the power control signals are not triggered when connecting the cable to the USB-C connector of the FTDI debug port. The same improvement is going to be implemented in future versions of the product.

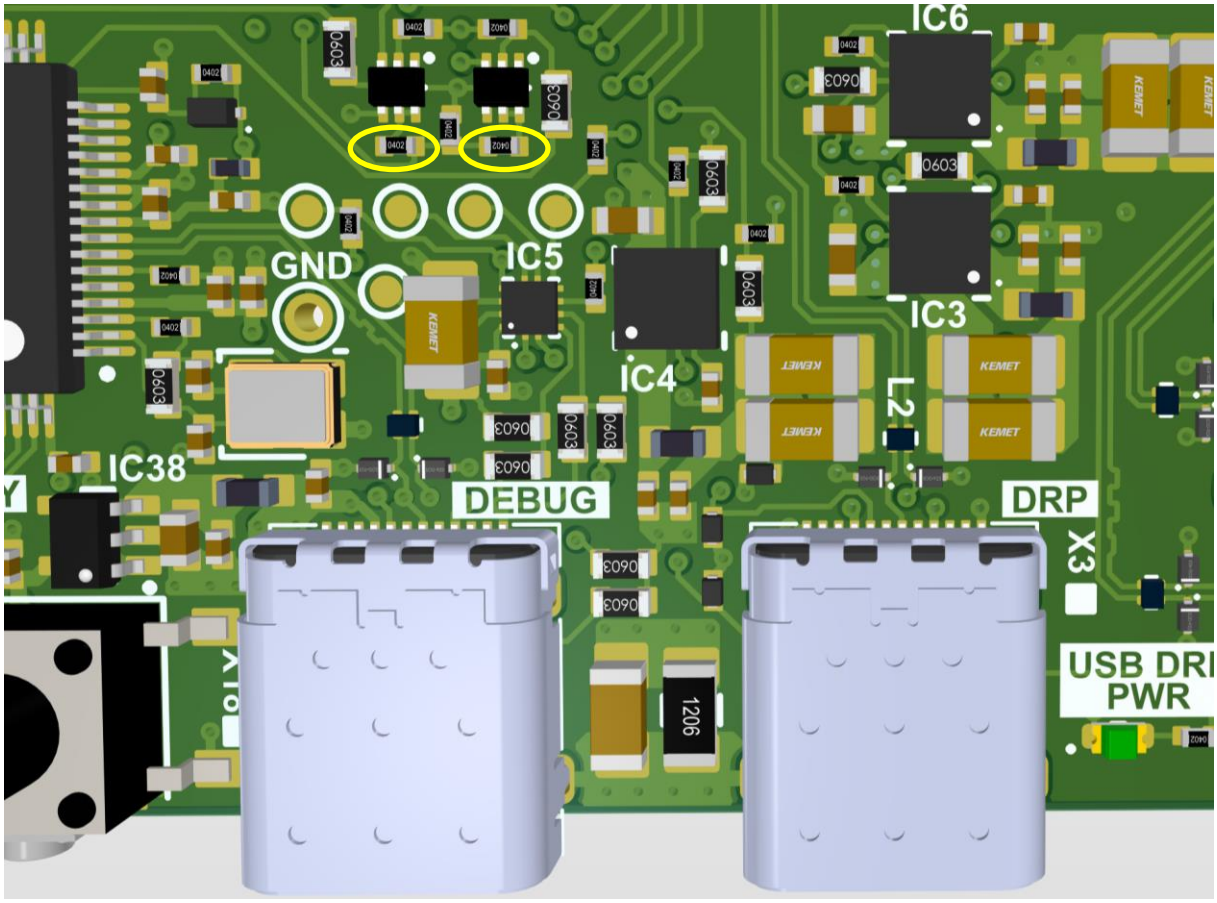


Figure 5. Location of R102 and R120 in the V1.1 version (top view, top side)

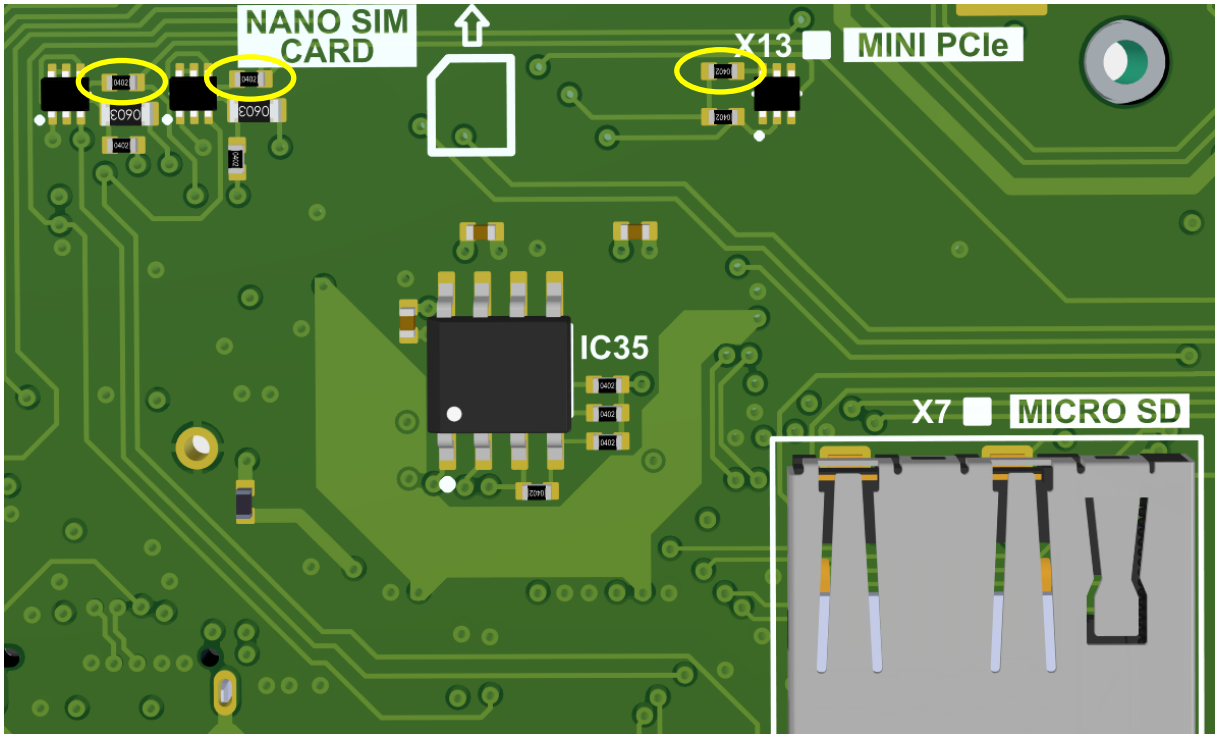


Figure 6. Location of R109, R115, and R245 in the V1.1 version (bottom view, bottom side)

Errata #10: HAR-8935 – The RC element on the PCIe reset signal contributes to violating the PCIe specification

Affected Version: **Dahlia V1.0B**
Dahlia V1.0C
Dahlia V1.1A
Dahlia V1.1B

Fixed in: **Dahlia V1.1C**

10.1 Customer impact

PCIe devices connected to the PCIe interface of the carrier board may not get detected properly or malfunction.

10.2 Description

According to the PCIe specifications, software needs to wait a minimum of 100ms before sending a configuration request to a PCIe device after enabling the power and the clock.

The Verdin specification provides a dedicated reset signal for the PCIe interface (PCIE_1_RESET#). The Dahlia Carrier Board features an RC delay circuit on this signal. This circuit consists of a 10uF capacitor and a 10kOhm pull-up resistor, resulting in a time constant of 100ms. The actual time it takes for the device to get out of the reset state is influenced by the threshold level of the device's reset input and component tolerances as well.

These factors together make the timing unpredictable. Consequently, a PCIe device may still be in the reset state when the driver is sending the first configuration requests. The issue does not necessarily manifest in the case of all potential PCIe devices and can be temperature-dependent as well.

10.3 Workaround

By eliminating the RC delay circuit from the reset signal, the module's reset timing can be fully controlled by the PCI_1_RESET# signal. For achieving that, remove the 10uF capacitor C141. The change prevents the described issue from happening. The change is going to be implemented in future versions of the product.

Alternatively, the delay between releasing the reset and initiating the configuration requests can be increased in the driver. However, this is not the preferred method as this requires modifications to be done to the standard drivers.

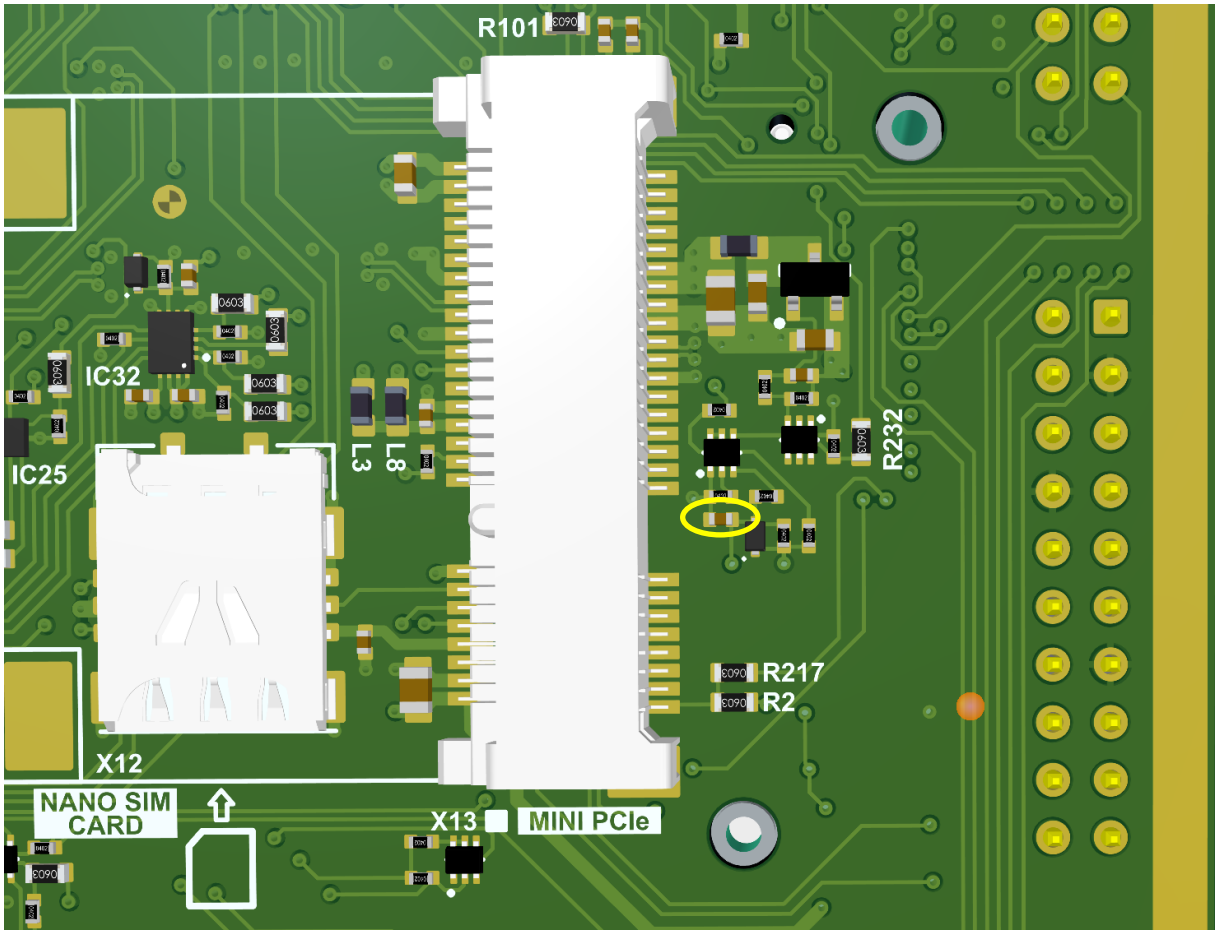


Figure 7. Location of C141 in the V1.1 version (bottom view, bottom side)

Errata #11: HAR-9017 – Overvoltage protection triggered when powering up the Dahlia V1.1

Affected Version: **Dahlia V1.1A**
Dahlia V1.1B
Dahlia V1.1C

Fixed in: **Dahlia V1.1D**

11.1 Customer impact

Hot-plugging a 26.4V power supply to the carrier board may trigger the protection IC (IC18) and prevent the product from powering up.

11.2 Description

The carrier board features a protection IC (IC18) that protects the product from various power-related error scenarios, namely: overvoltage, overcurrent, undervoltage, reverse polarity. In case a power supply providing a voltage (26.4V) near the high threshold of the input voltage range (5V to 24V ±10%) gets hot-plugged to the carrier board, ringing may form at the input of the protection device. The energy is bouncing between the low-ESR capacitors C95 and the capacitors on the switched side (C247, C248, etc..). This may trigger the overcurrent protection, causing the board to not power up. In this case, the protection IC's fault indication LED (LED8) is going to blink to indicate the fault condition.

11.3 Workaround

Unsoldering the capacitor C95 will improve the power hot-plug capability of the product. The issue be resolved in newer versions of the product.