XDP720 Gang Programmer user guide

About this document

Scope and purpose

This document is the user guide for the XDP720 Gang Programmer board. The XDP™ Gang Programmer board is used to program the XDP720-001 devices in offline mode. The board can program up to four devices at the same time and is compatible with XDP720-001 device. This board can be used by the customers doing early validation of the product or have a small production volume.

Intended audience

This document is intended for test engineers and production engineers who program XDP720-001 device with the XDP™ Gang Programmer.

About this product group

Target applications

- Telecom
- Datacenter and computing
- SMPS

Product family

XDP™ is a high-performance digital power controller designed to optimize the IC for the specific applications. They feature digital algorithms for high power efficiency and minimal standby power, digital parameter configuration for increased flexibility and lower development effort, and optimized bill of materials (BoM), making these controllers ideal for a range of applications.

Safety precautions

Note: *Please note the following warnings regarding the hazards associated with development systems.*

Table 1 Safety precautions

	**Caution:** *The programmer board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.*
	**Caution:** *The programming board is shipped with packing materials that need to be removed prior to installation. Failure to remove all packing materials that are unnecessary for system installation may result in overheating or abnormal operating conditions.*

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1 Introduction

XDP720 Gang Programmer provides test and evaluation engineers an easier and efficient way to program up to four XDP™ protection and monitoring devices simultaneously. The XDP™ Gang Programmer supports the following devices:

- XDP720-001

The communication dongle and 22 V voltage supply for the devices are integrated within the Gang Programmer board. This reduces the external connections and only requires a USB connection between the board and the computer running the Gang Programmer GUI.

2 Hardware and software requirements

- XDP720 Gang Programmer board (PRG_XDP730_720_BRD) as shown in Figure 1
- USB-C cable
- XDP™ Gang Programmer

Note: Download the programmer version 1.4.1 or later.

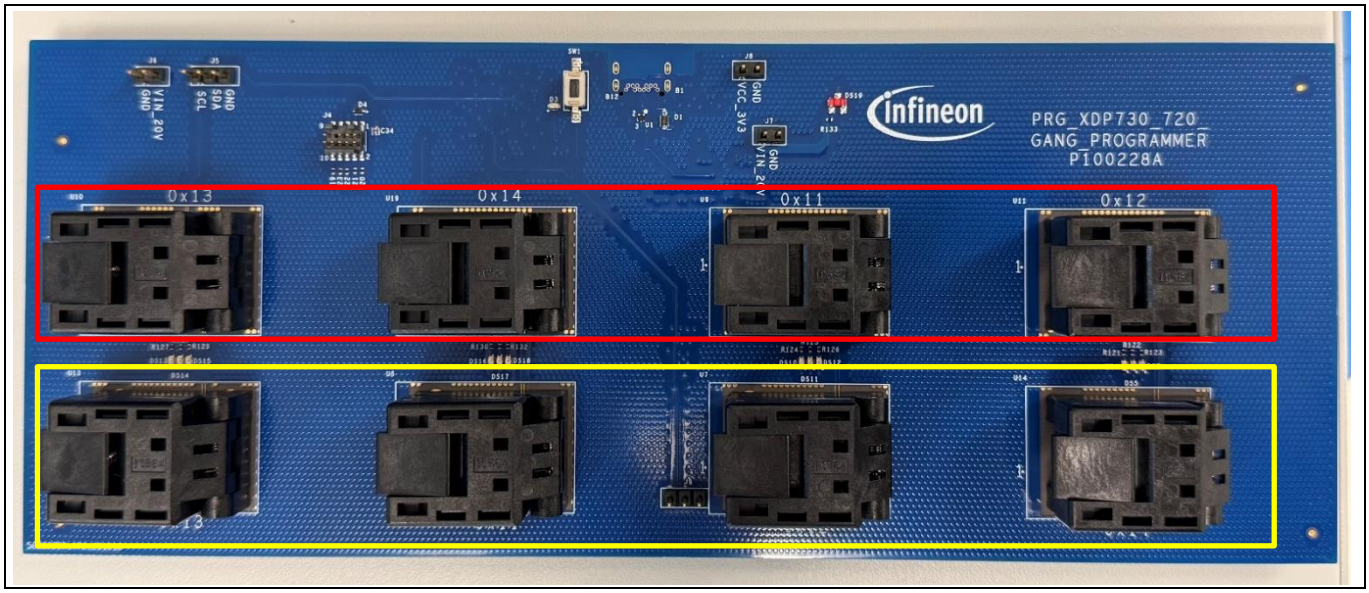


Figure 1 PRG_XDP730_XDP720_BRD Gang Programmer board

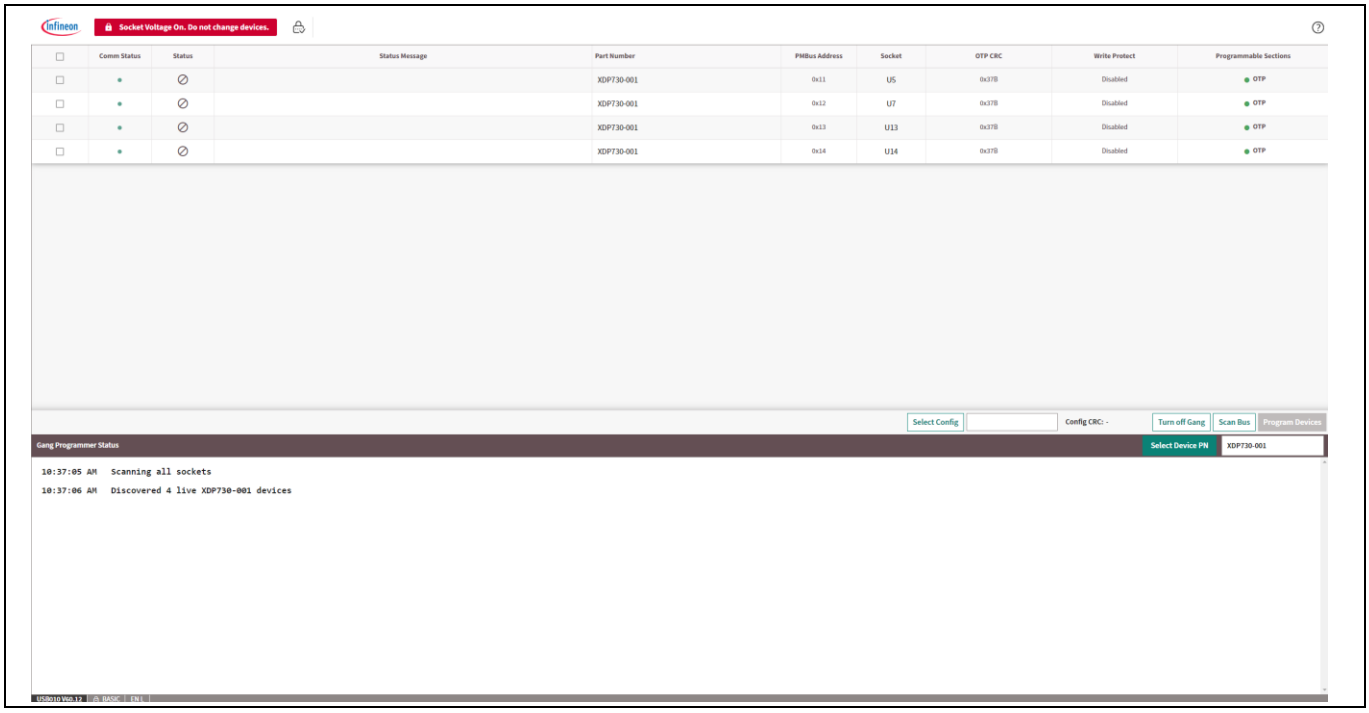


Figure 2 XDP™ Gang Programmer GUI

3 XDP720 Gang Programmer board

3.1 Electrical specifications

- **Input voltage:** 5 V via USB-C
- **Output voltage:** 3.3 V and 22 V generated internally

Note: 20 V is the minimum voltage required to program the XDP720-001 device. For this board, 22 V is selected to provide some margin.

3.2 Ordering code

Table 2 Ordering code for XDP720

Ordering code	No. of sockets installed
Device: XDP720-001	
PRG_XDP720-001_BRD	4
PRG_XDP720-001_BRD_1	1

Individual sockets that can be installed on the boards mentioned in Table 2 can be ordered via ordering code mentioned in Table 3.

Table 3 Ordering code for sockets

Device	Ordering code
XDP720-001	XDP720-001_HS_SOCKET_1

3.3 Block diagram

The XDP720 Gang Programmer block diagram shown in Figure 3 consists of:

- Buck regulator (5 V to 3.3 V): Provides 3.3 V to the PSOC™ 6 MCU within the Gang Programmer board from the USB bus voltage (5 V) from the PC
- Boost regulator (5 V to 22 V): Provides 22 V to XDP720-001 devices from the USB supply from the PC
- PSOC™ 6 MCU: Works as a communication dongle between the host computer running XDP™ Programmer GUI and XDP7xx devices. MCU communicates with XDP7xx devices and LEDs via I2C communication protocol and sends the data to the GUI using USB communication protocol
- Sockets: The board has two rows for mounting the sockets. Row 1 (highlighted in red) is for programming XDP720-001 devices. Row 2 (highlighted in yellow) is for programming XDP730-001 devices as shown in Figure 1
- XDP™ Gang Programmer GUI: Based on the XDP™ Designer platform, which makes it easier to interface with the Gang Programmer board
- USB Type-C connector: Use for communication and powering the board from the host PC

XDP720 Gang Programmer board

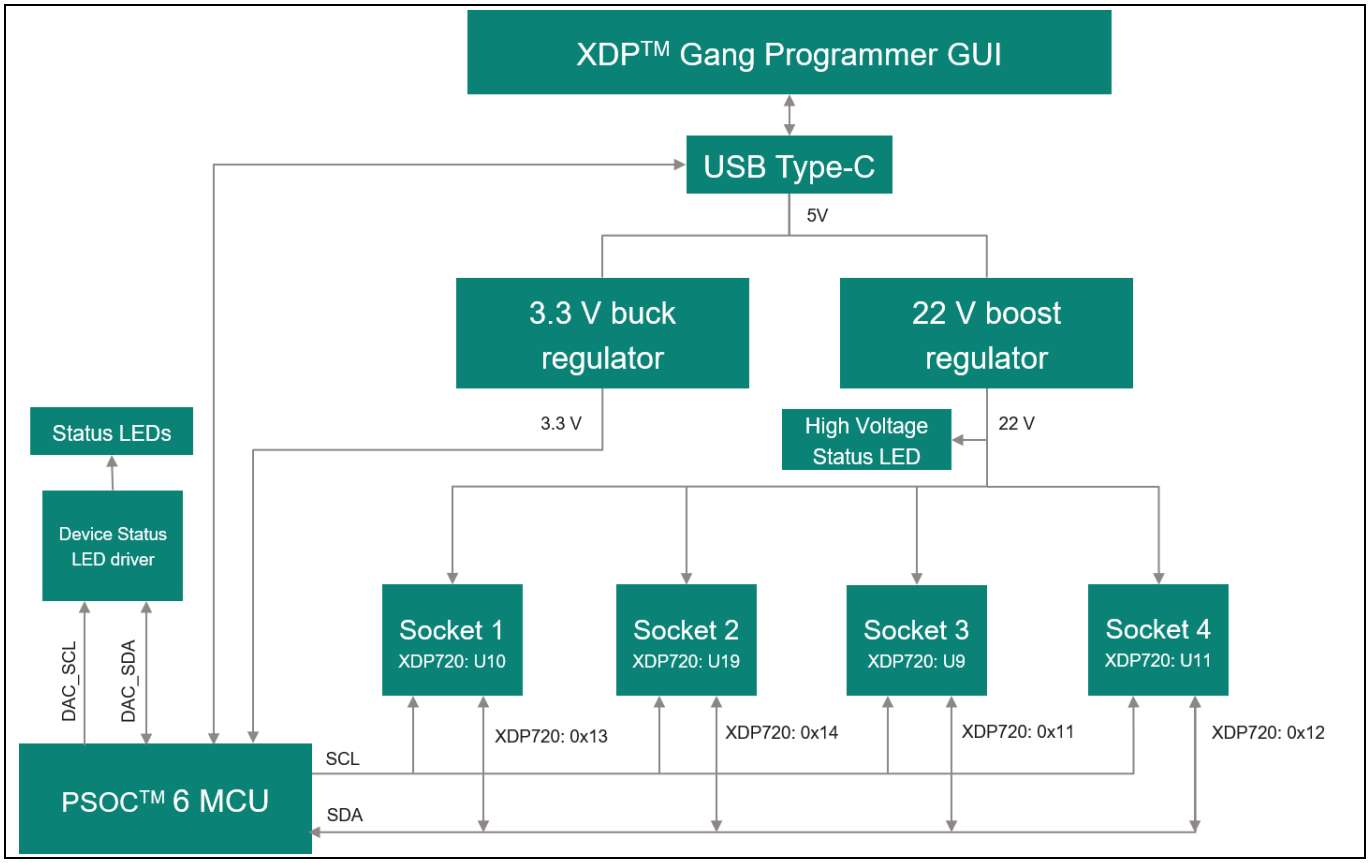


Figure 3 XDP720 programmer board block diagram

3.4 XDP720 Gang Programmer board schematics

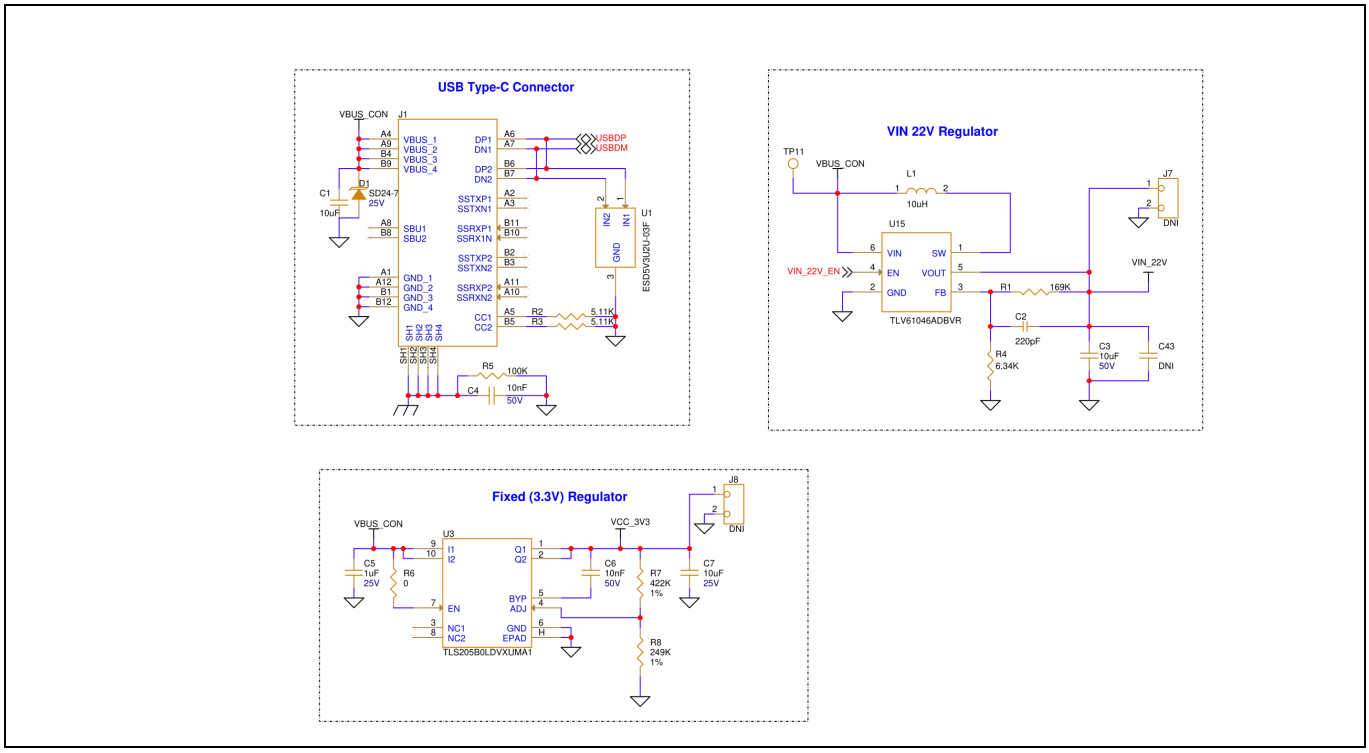


Figure 4 Schematics for voltage regulator

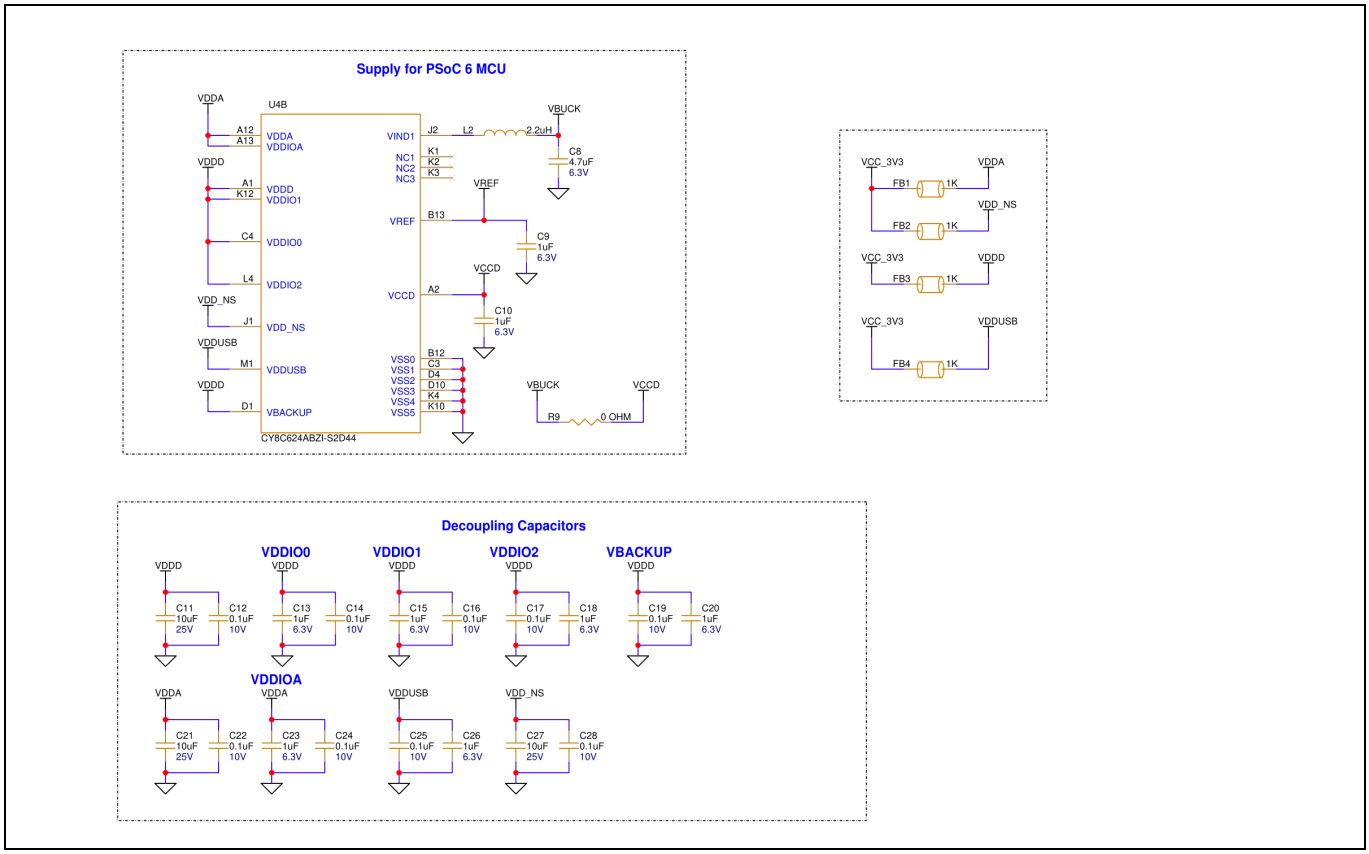


Figure 5 Schematics for PSOC™ 6 power

XDP720 Gang Programmer board

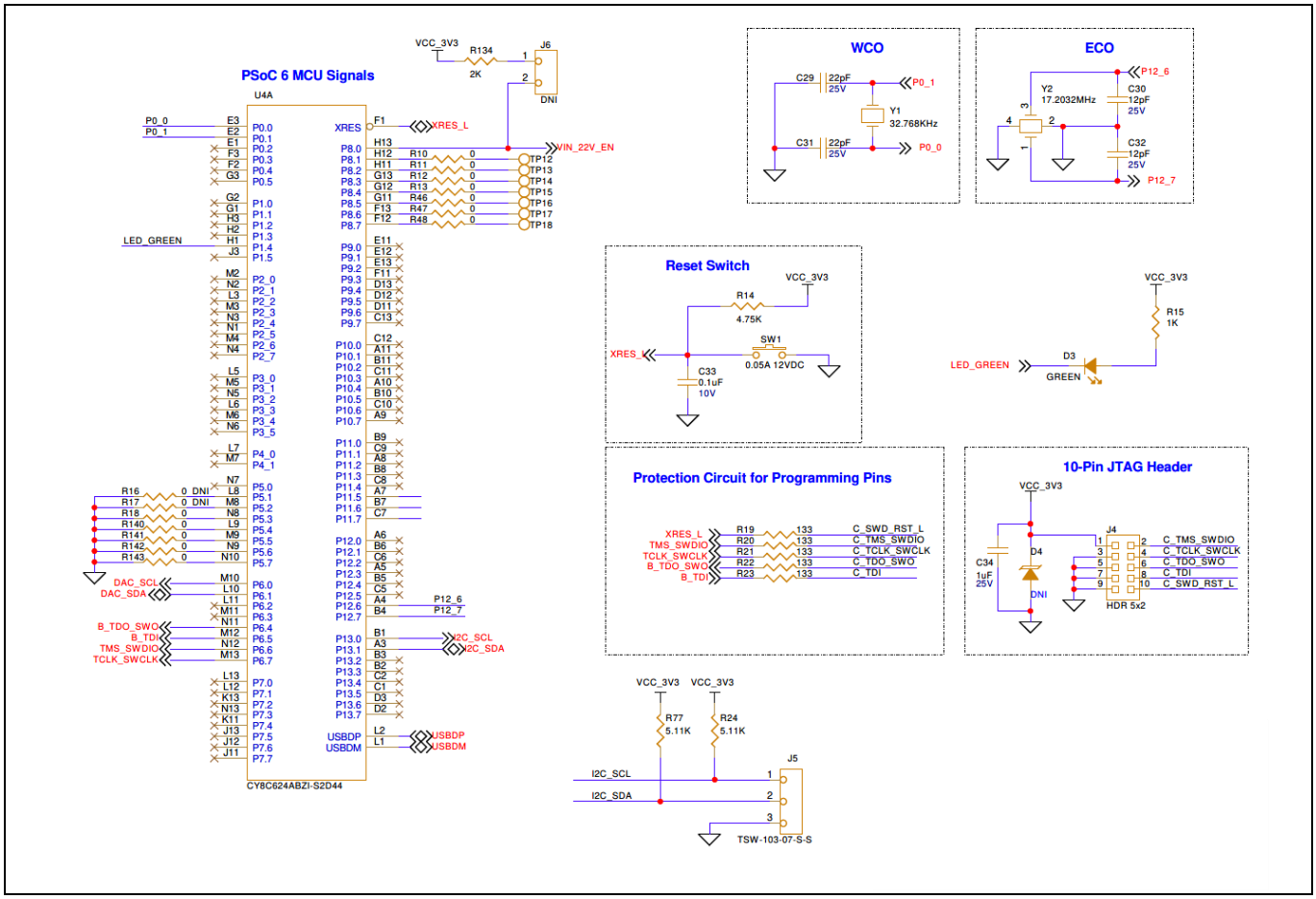


Figure 6 Schematics for PSOC™ 6 signals

XDP720 Gang Programmer board

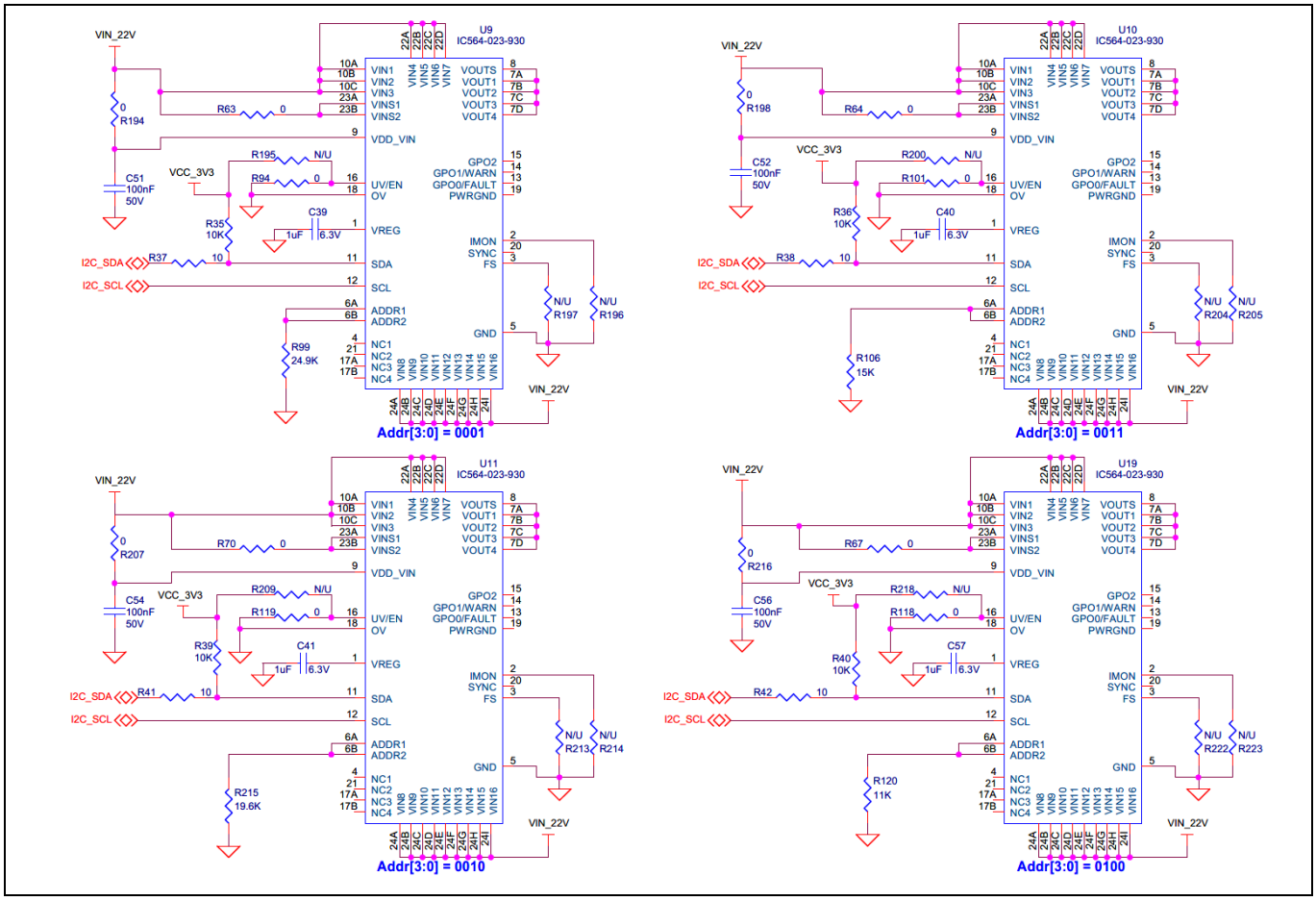


Figure 7 Schematics for XDP720-001 sockets

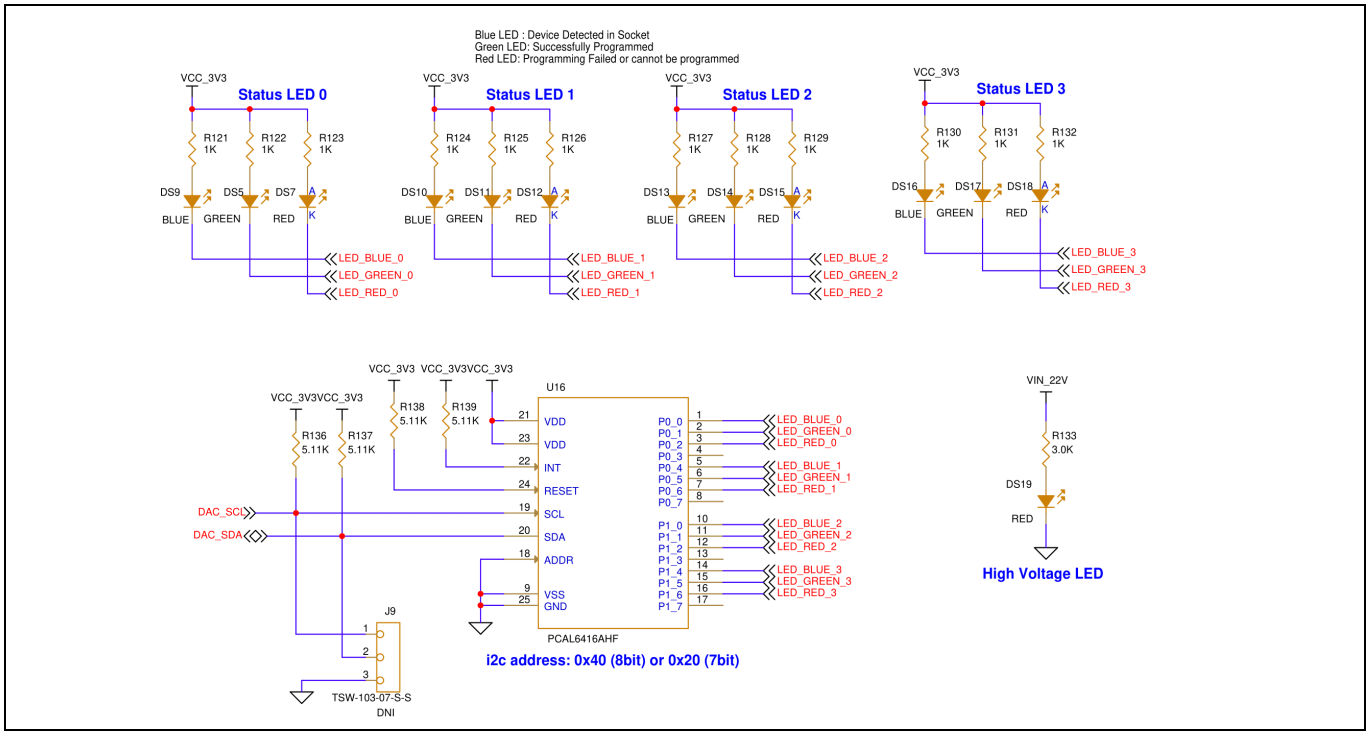


Figure 8 Schematics for LEDs

3.1 Gang Programmer board layout

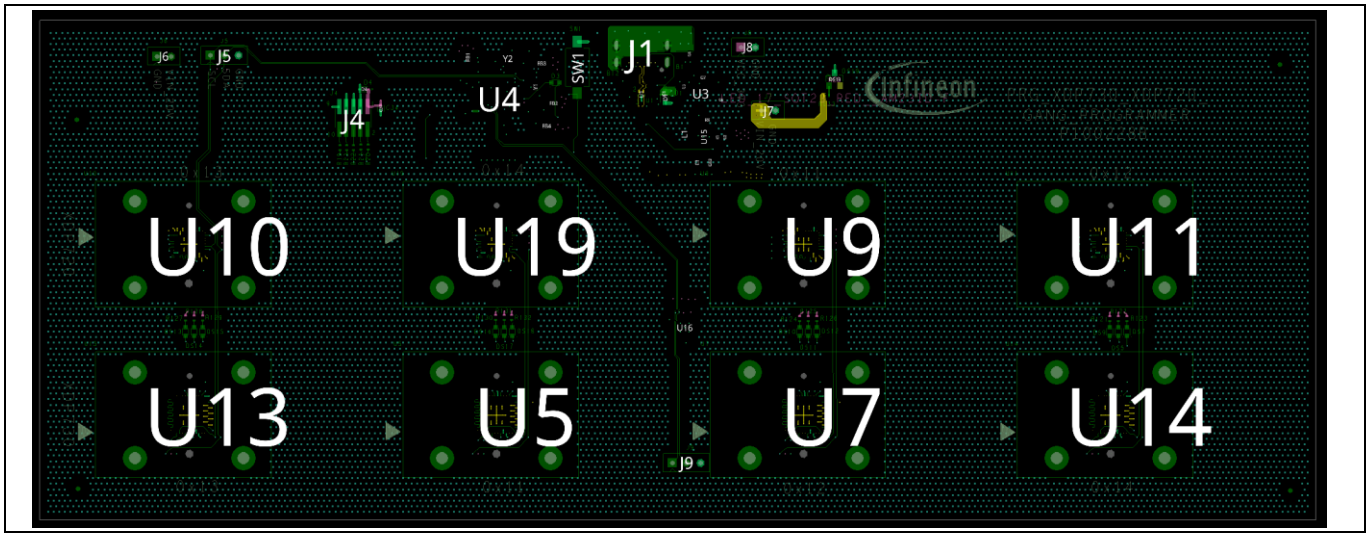


Figure 9 Top layer layout of main PCB

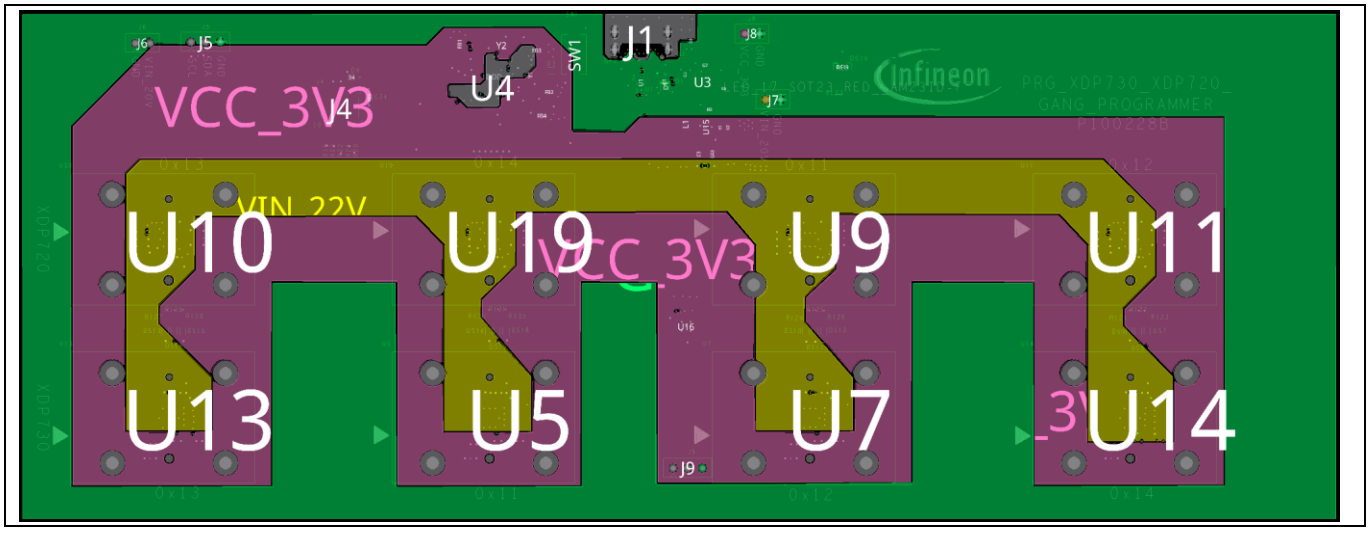


Figure 10 Mid 1 layer (V_{CC}) layout of main PCB

XDP720 Gang Programmer board

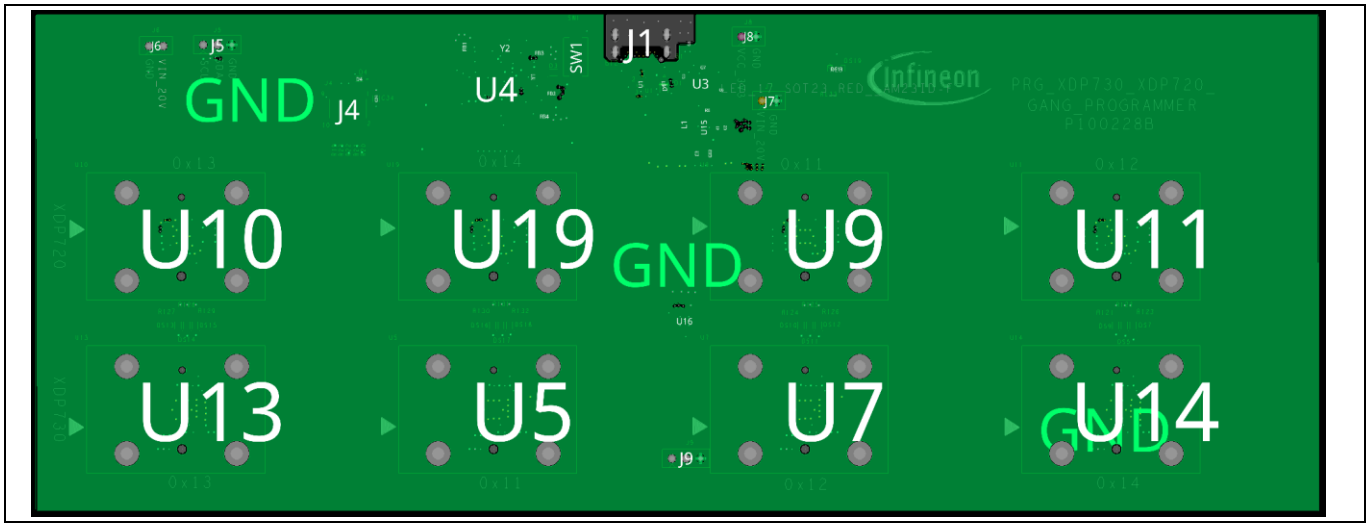


Figure 11 Mid 2 layer (GND) layout of main PCB

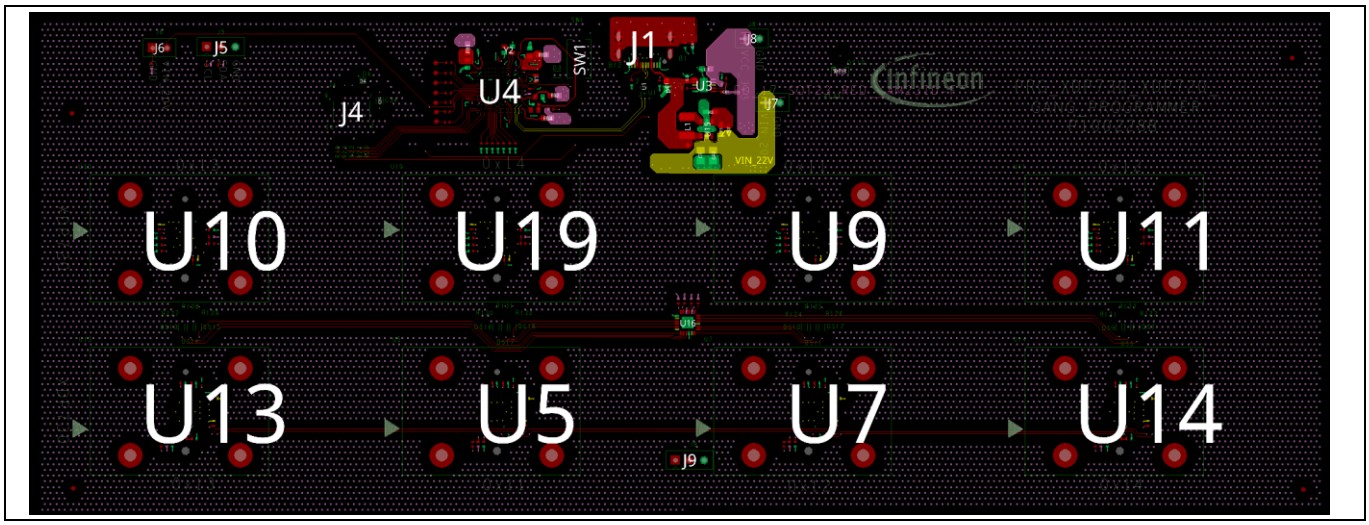


Figure 12 Bottom layer layout of main PCB

4 Board setup and programming

4.1 Set up the board

1. Connect the USB cable between the board and the host PC
   The green LED starts flashing indicating that the board is powered

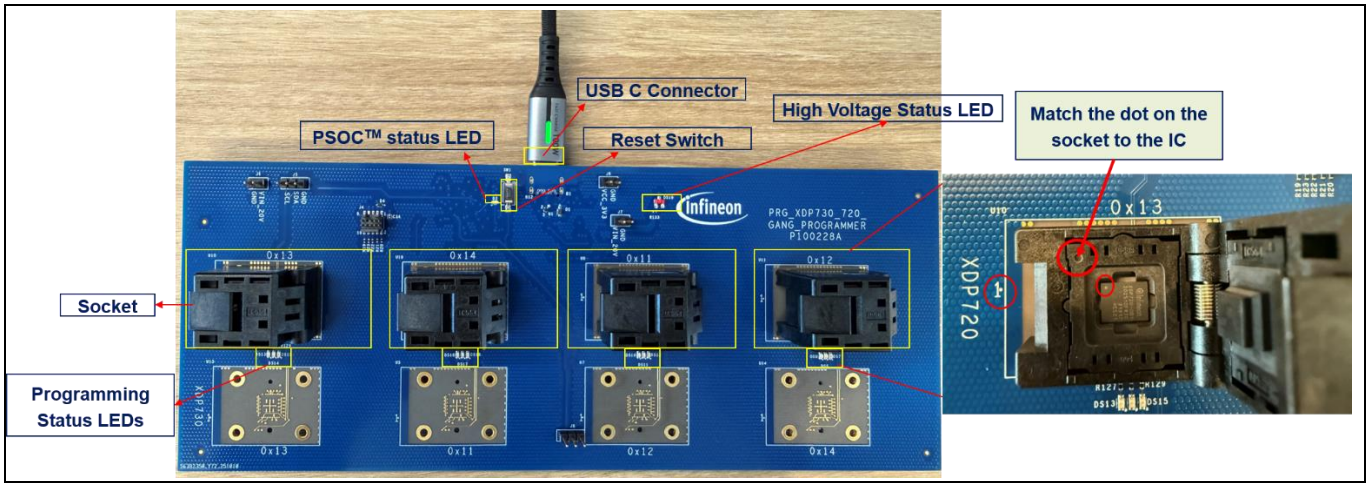


Figure 13 Gang Programmer board set up

4.2 Set up the XDP™ Gang Programmer GUI

1. Open XDP™ Gang Programmer GUI on the host PC



Figure 14 XDP™ Gang Programmer

The green tab on the left-bottom corner should read **USB010 V60.12** indicating that the board is connected to the GUI, as shown in Figure 15.

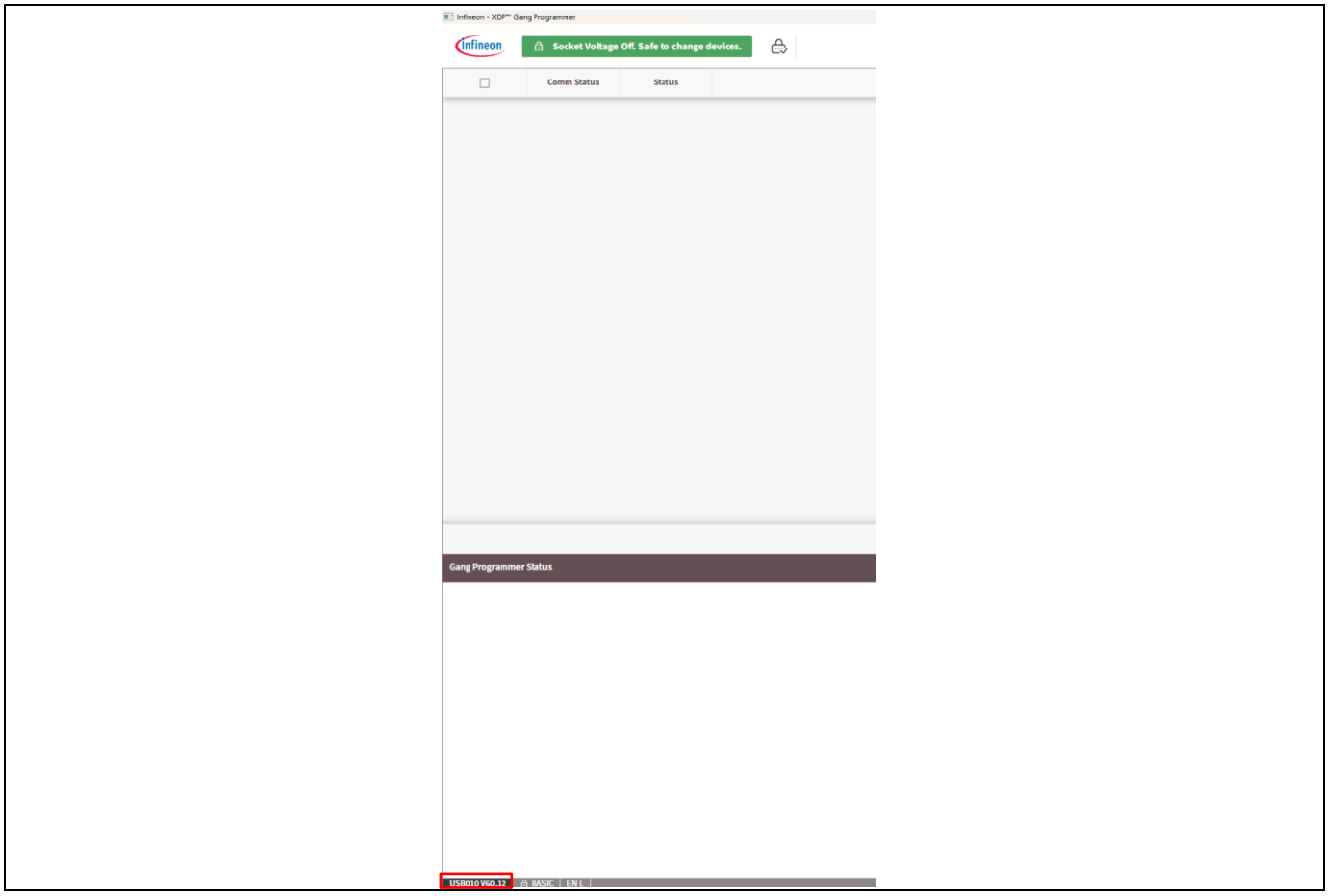


Figure 15 XDP™ Gang Programmer GUI connection with the board

2. Select the required XDP720-001 device from the list and click **Update**

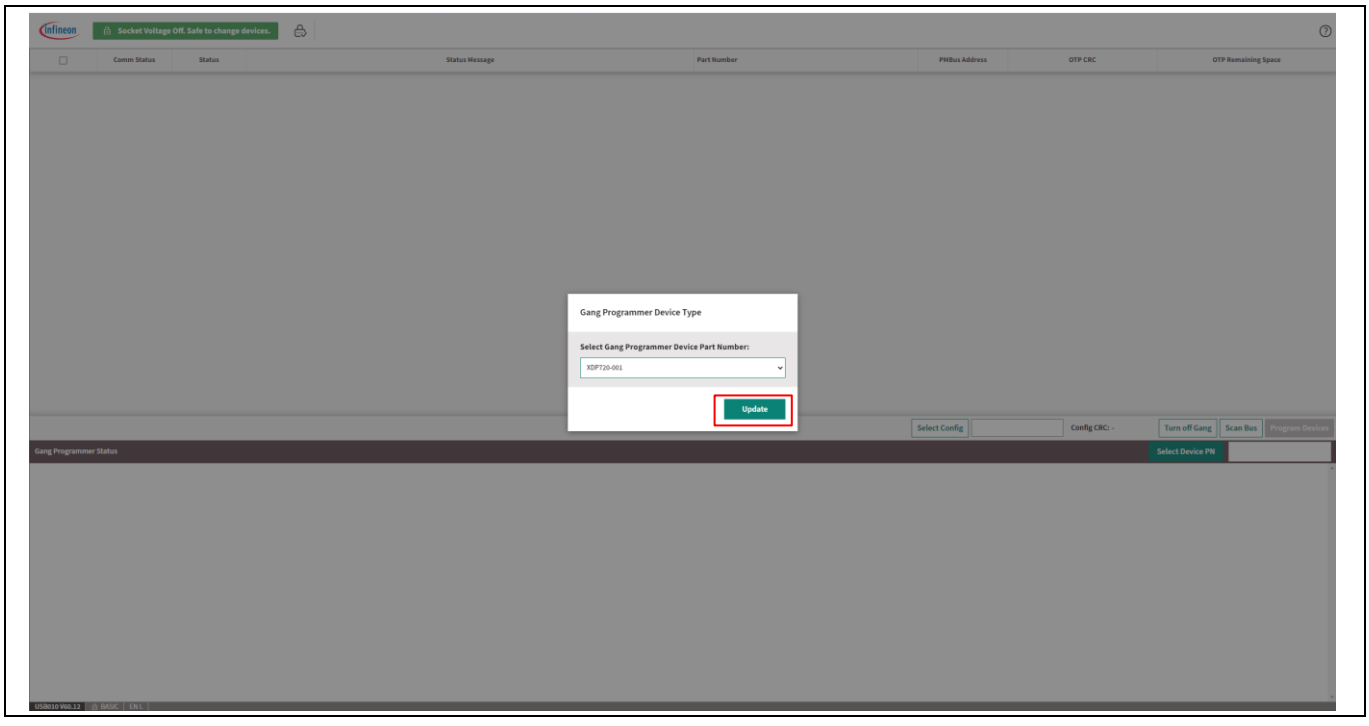


Figure 16 Select the XDP720-001 device

3. Click **Select Config**
   The programming GUI only accepts the file in *.xdp* or *.txt* extensions generated by the XDP™ Designer GUI

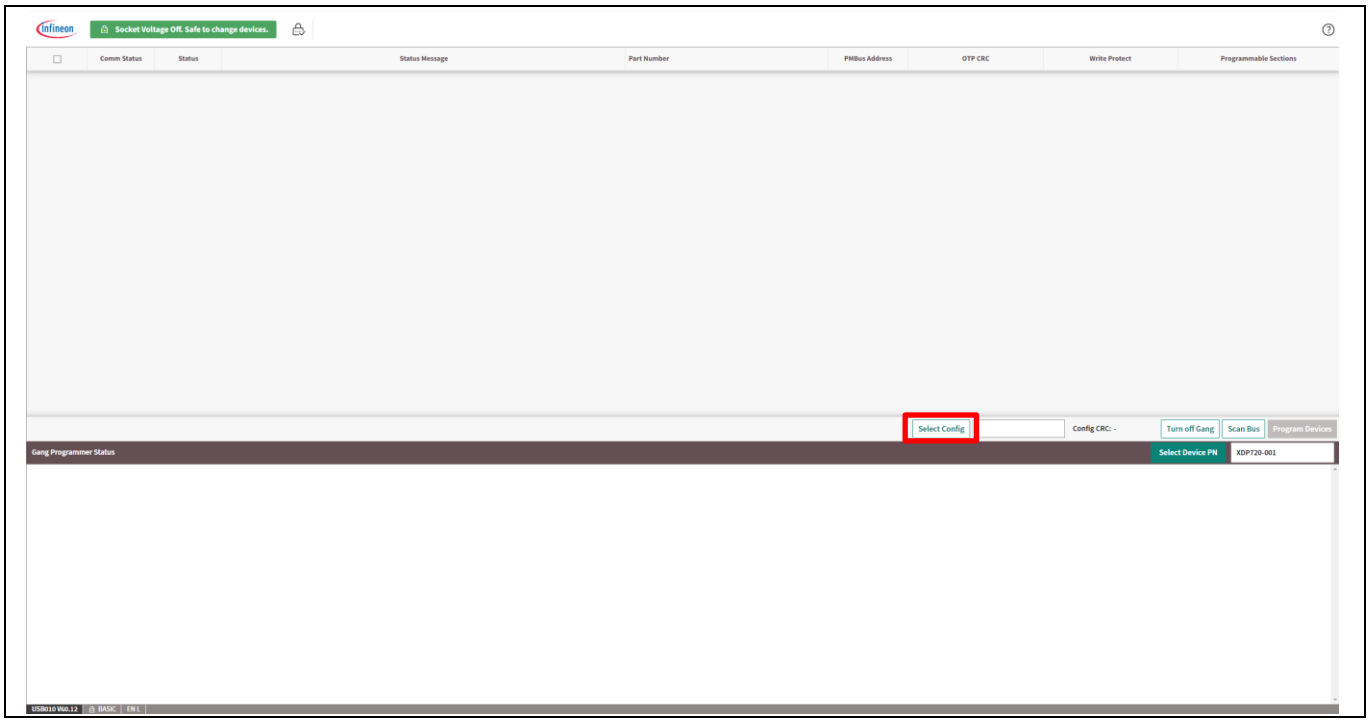


Figure 17 Selecting desired config file

4. Click **Browse** and select the necessary configuration file from your PC
5. Click **Load** to import the config file into the GUI
   An error message appears if the selected configuration file is not compatible with the device, such as when an incorrect device configuration is loaded or when a file with an extension other than *.txt* or *.xdp* is used

Note: The config file only generated by the XDP™ Designer GUI are compatible with the XDP™ Programmer GUI.

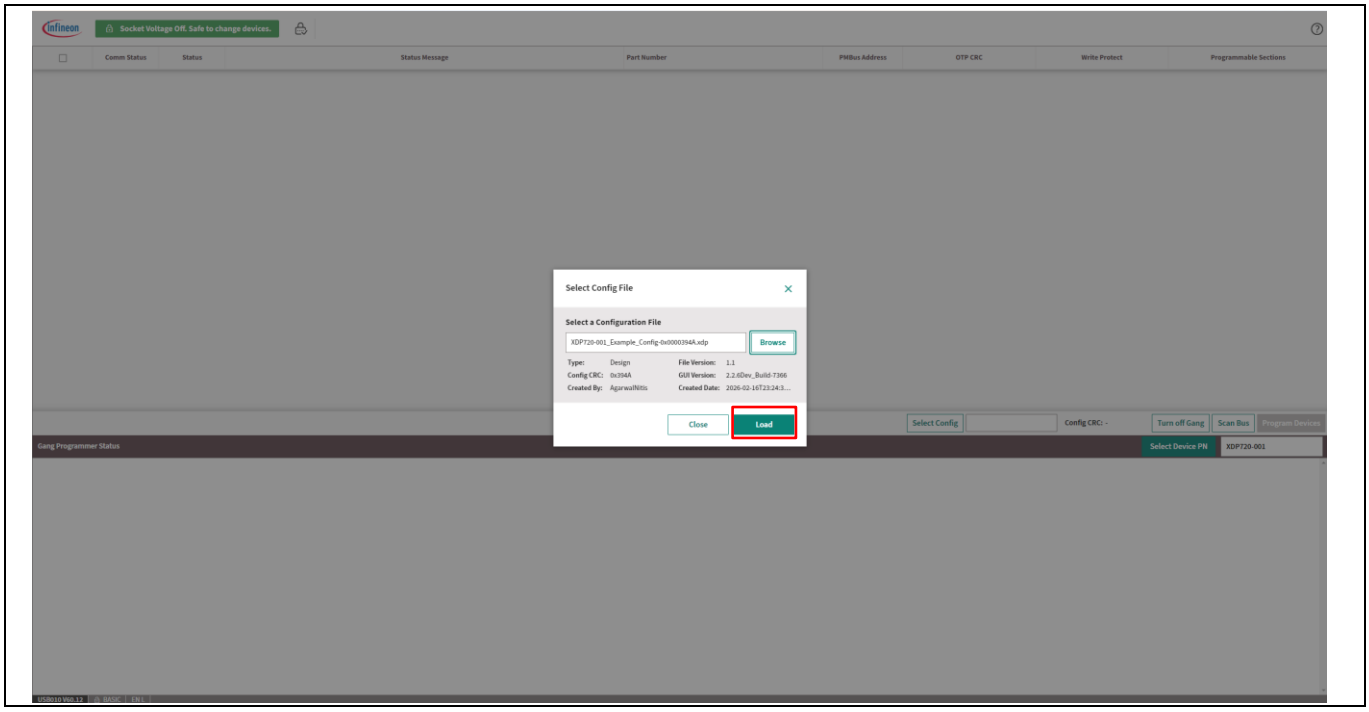


Figure 18 Selecting the required config file

6. After loading the config file, ensure that the message in green appears, as shown in Figure 19
   The socket voltage message in green indicates that the sockets have 0 V and it is safe to install devices

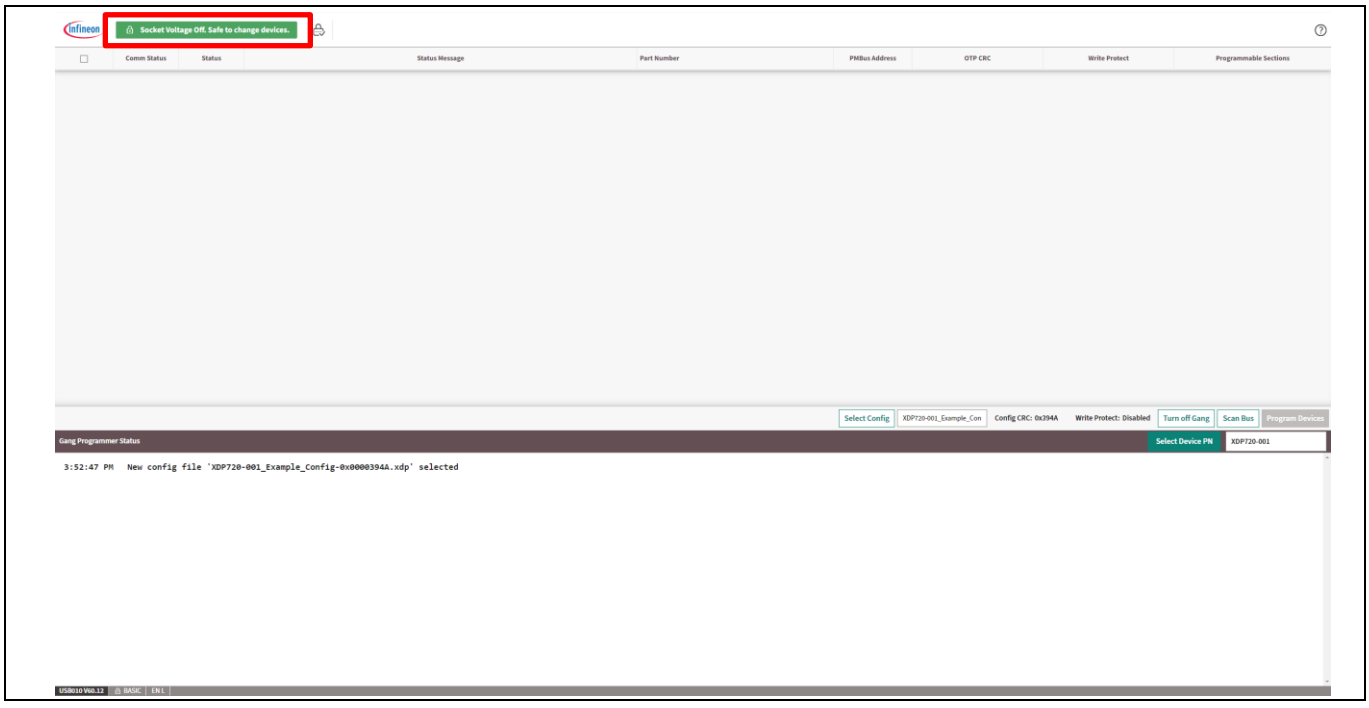


Figure 19 Safe socket voltage message

Install the devices in the correct orientation as shown in Figure 20 by pressing the socket down, placing the device into it, and then carefully releasing the pressure on the socket. Ensure that the pin of the device is not damaged during insertion or removal of IC from the socket. It is advisable to use an ESD safe vacuum suction pen for safe installation and removal of the IC.

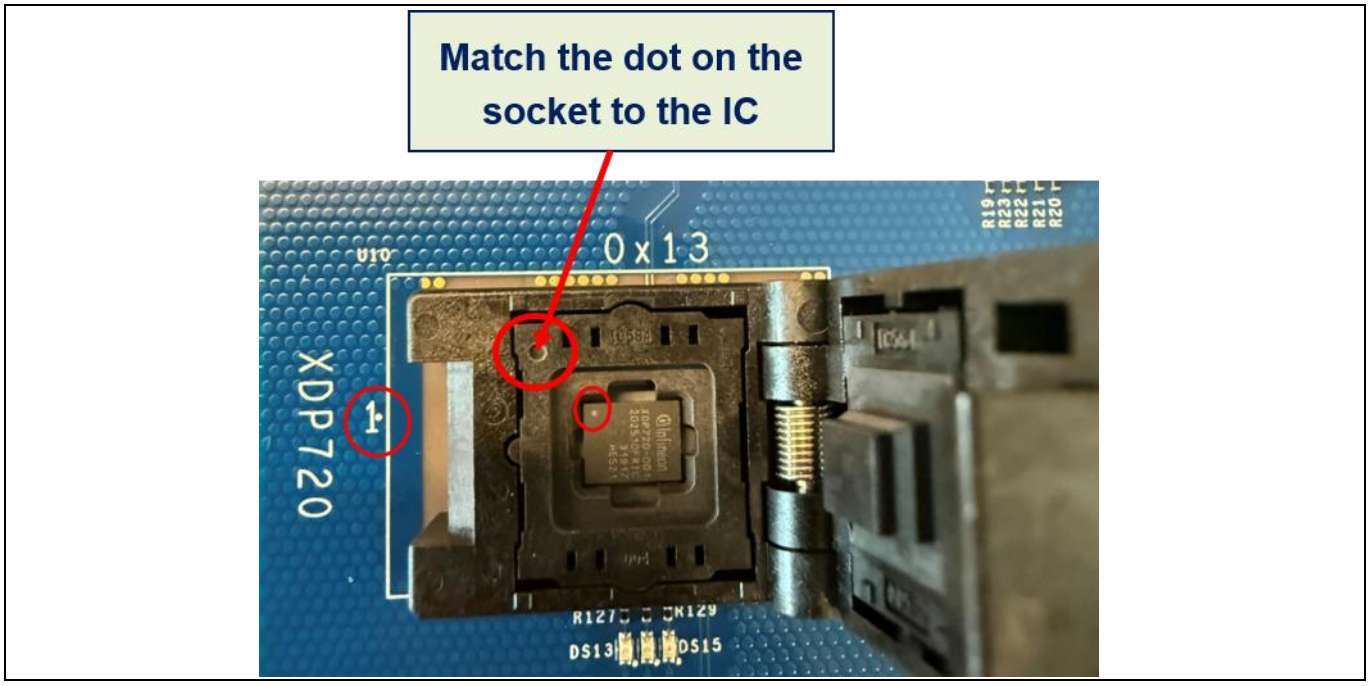


Figure 20 Match the notch with a dot on the IC for correct installation

4.1 Programming the installed devices

4.2.1 Detecting the connected devices

1. Click **Scan Bus** to detect connected devices
   The boost regulator is enabled, which supplies 22 V to the sockets necessary for OTP programming

Attention: ***Do not open the sockets at this stage because it could damage the device and/or the programmer board.***

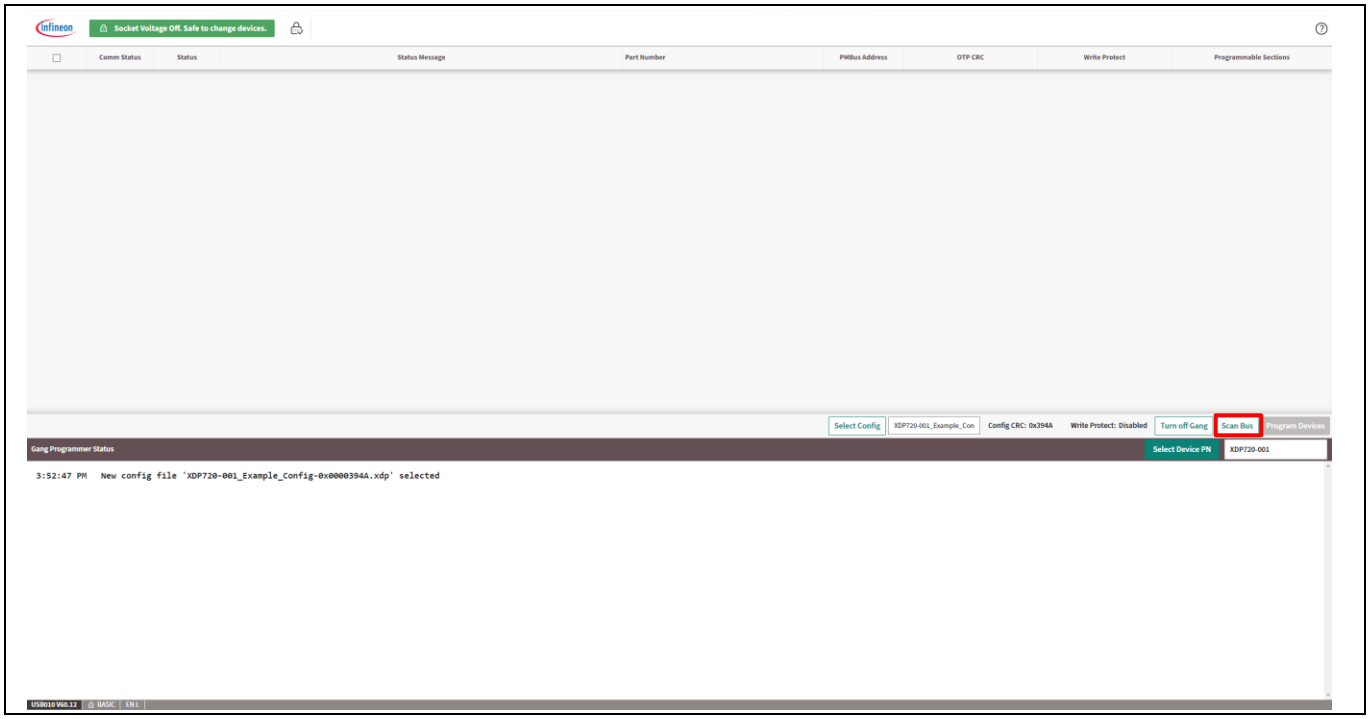


Figure 21 Scanning the bus to detect connected devices

The bus is scanned, and the socket voltage message in red on the top-left corner indicates that the board has a high voltage (22 V) as shown in Figure 22.

Attention: ***Whenever the socket voltage message appears, it indicates that the socket has 22 V. Do not press the sockets now. Pressing the sockets could result in damage to the devices or/and the programmer board.***

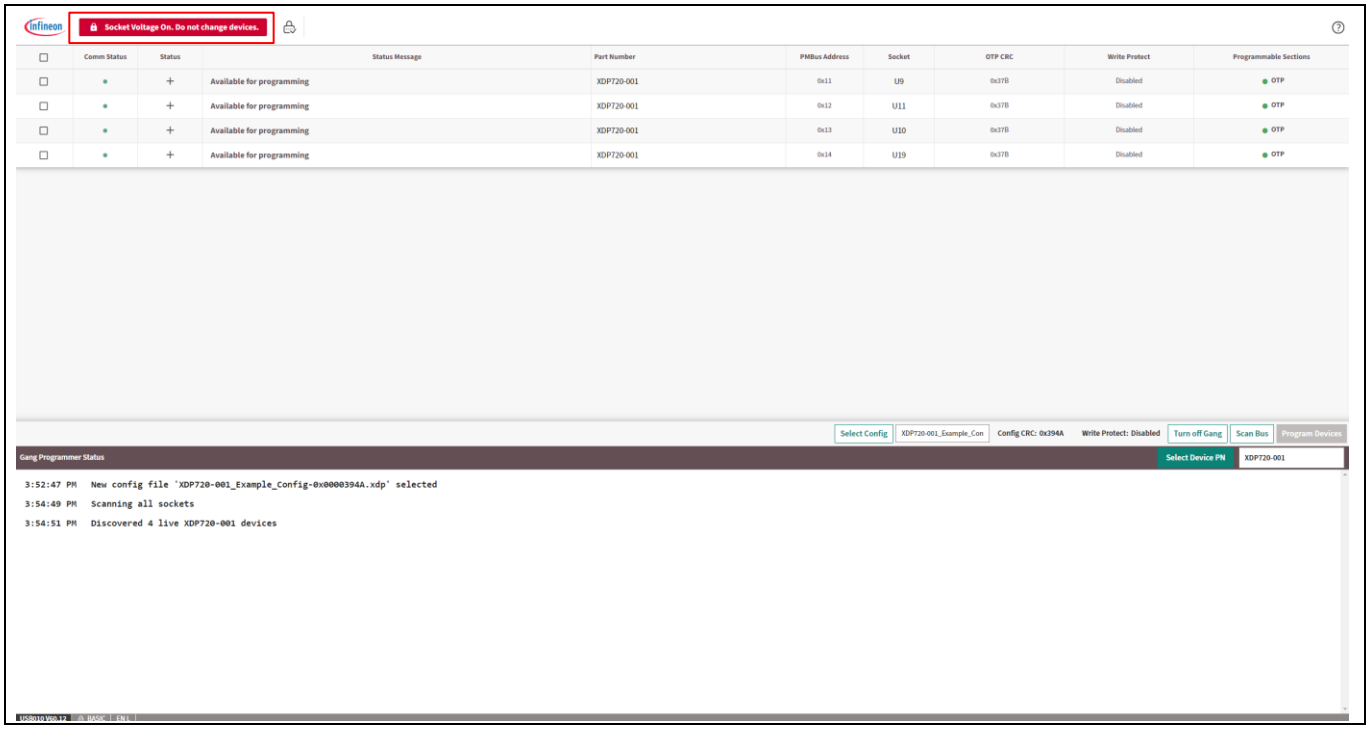


Figure 22 High socket-voltage message

After the scan is complete, the connected devices are listed, as shown in Figure 23.

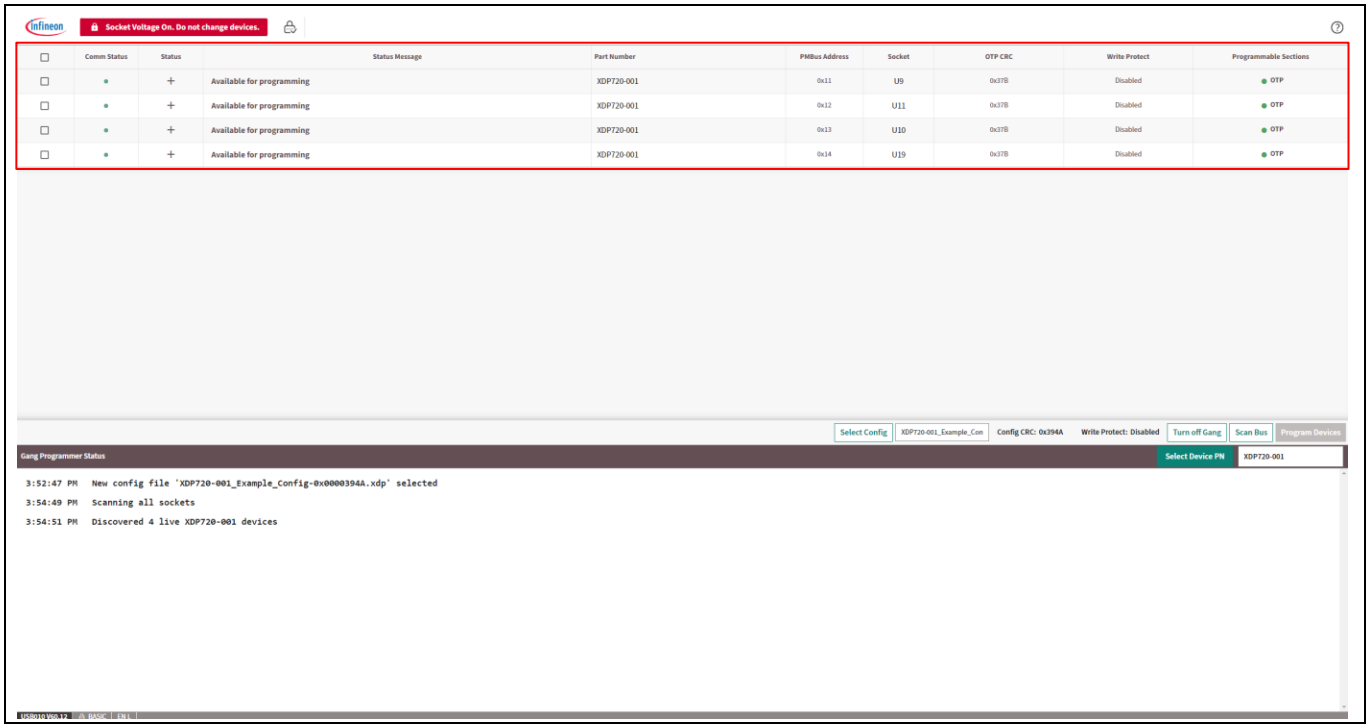


Figure 23 List of connected devices identified after scanning

4.2.2 OTP programming of the connected devices and Write protect status

Figure 24 shows the list of connected devices. The **Status** (**+**) and **Status Message** indicate that the device is available for programming. In **Programmable Sections**, a green indictor next to the One-time programmable (OTP), indicates their availability for programming.

The XDP720-001 devices can be programmed to enable write protection, which prevents users from modifying any write data inside the device. By default, write protection is disabled; however, depending on the configuration, it can be enabled. The configuration file indication is shown in a purple box at the bottom right, which indicates whether the configuration file enables write protection or not.

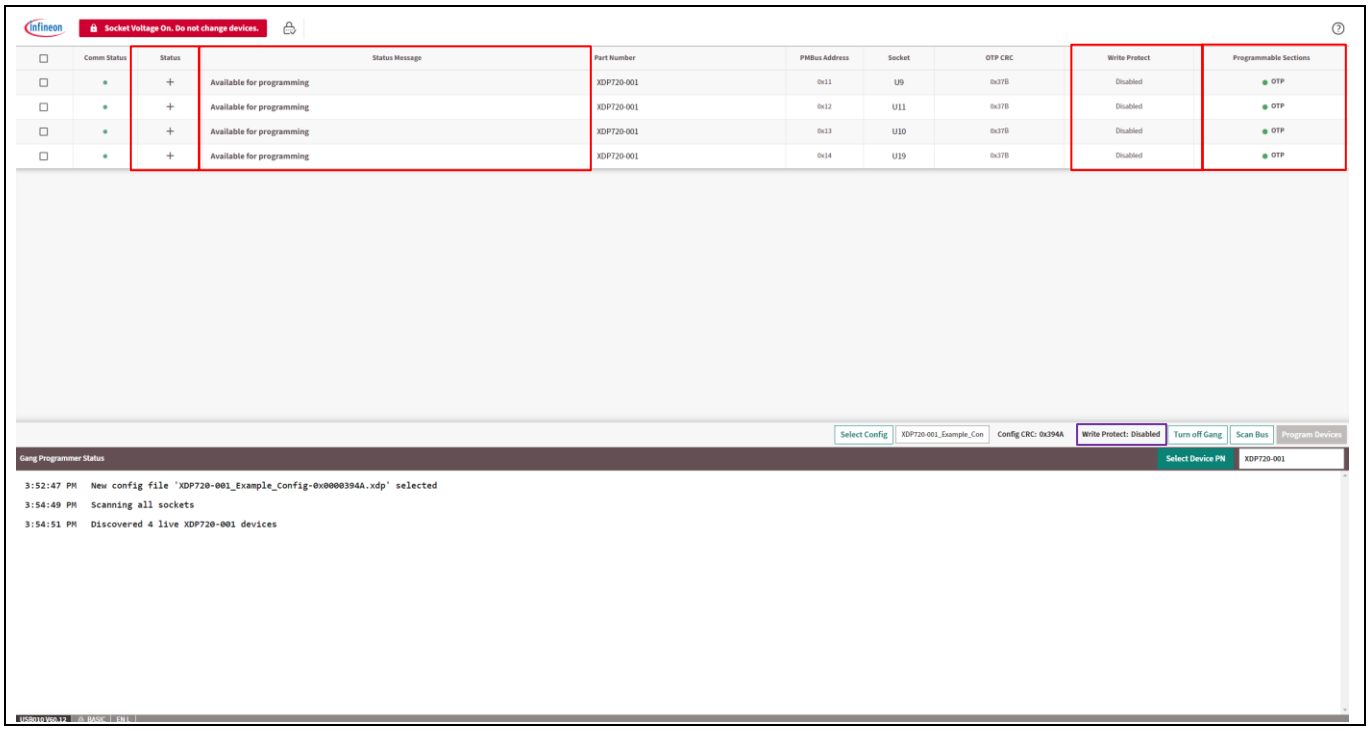


Figure 24 Reading the device status and programmable sections

Figure 25 shows that the red LED is on, indicating that the 22 V rail is active. The blue LEDs indicate that the devices have been identified in the corresponding sockets.

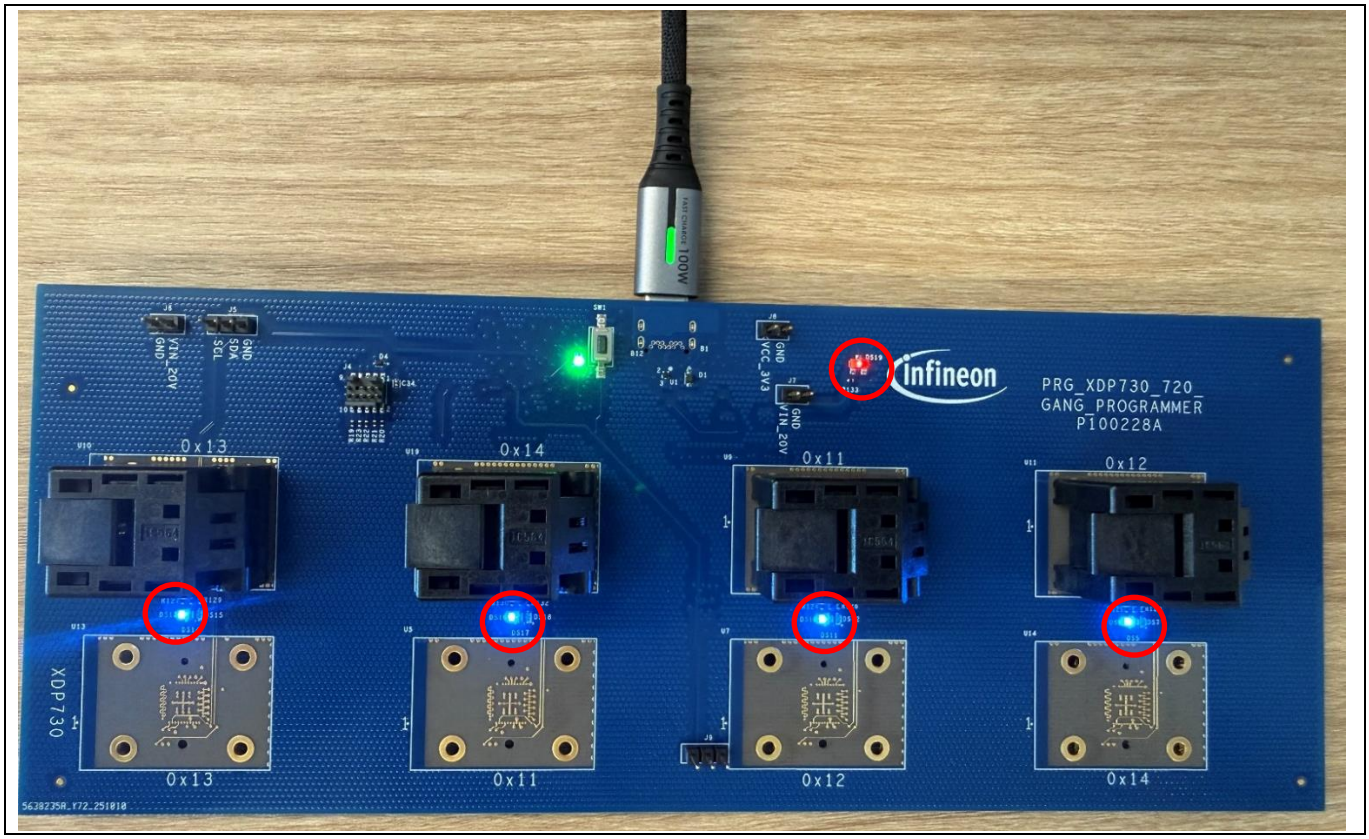


Figure 25 High-voltage LED and device detection LED

2. Select the devices for programming
   The **Status** shows '●' indicating that the device is **Selected for programming**, as shown in Figure 26

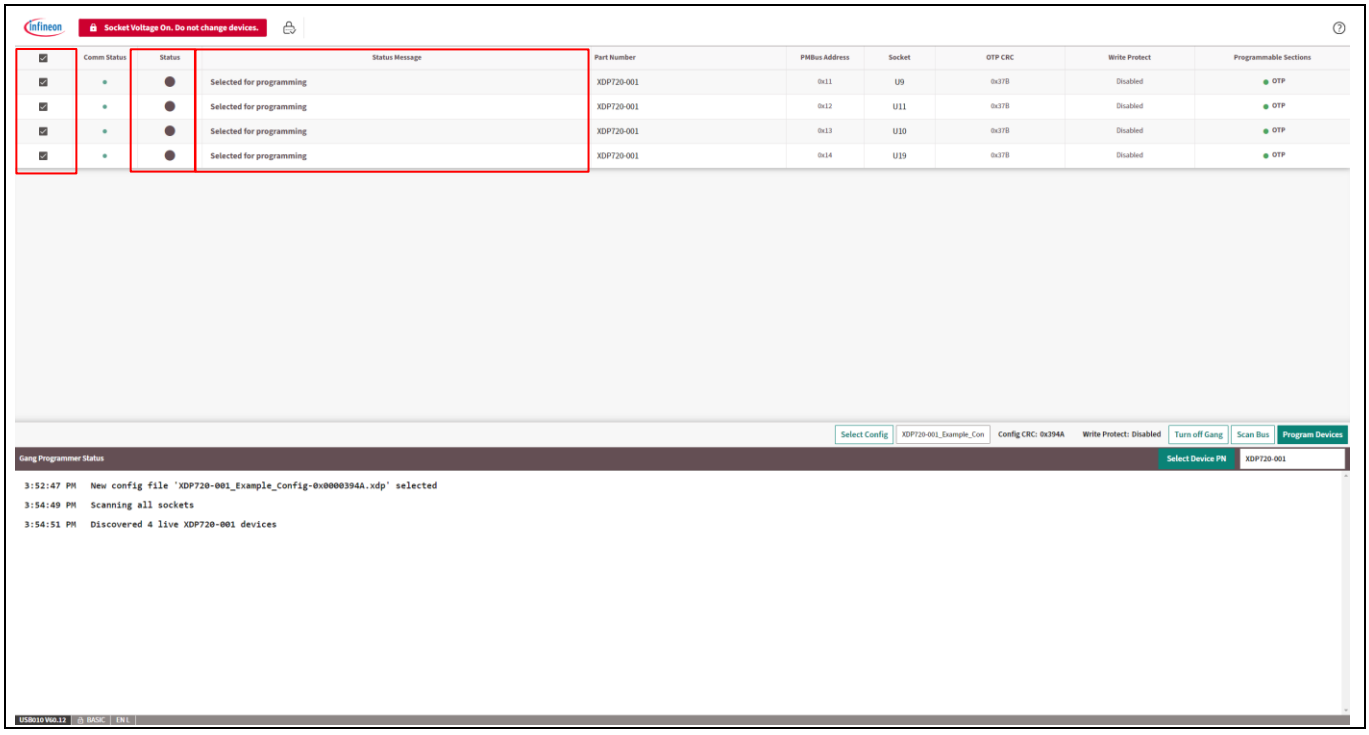


Figure 26 Selecting devices for programming

3. Click **Program Devices**
   The programming starts automatically

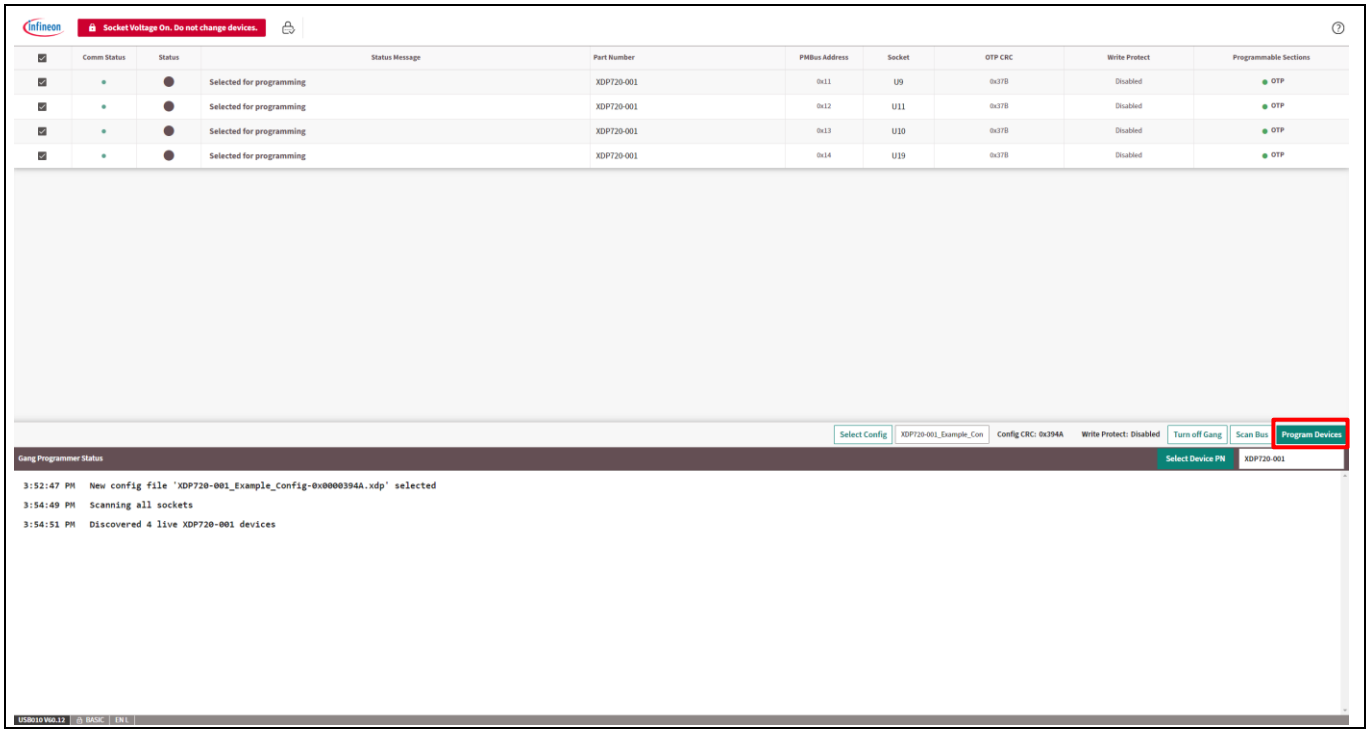


Figure 27 Programming the selected devices

When the programming starts, the **Status** shows three dots, indicating the **Programming config** is in progress. Devices for which programming is completed are highlighted in yellow with the message **Programming successful, pending validation**, as shown in Figure 28.

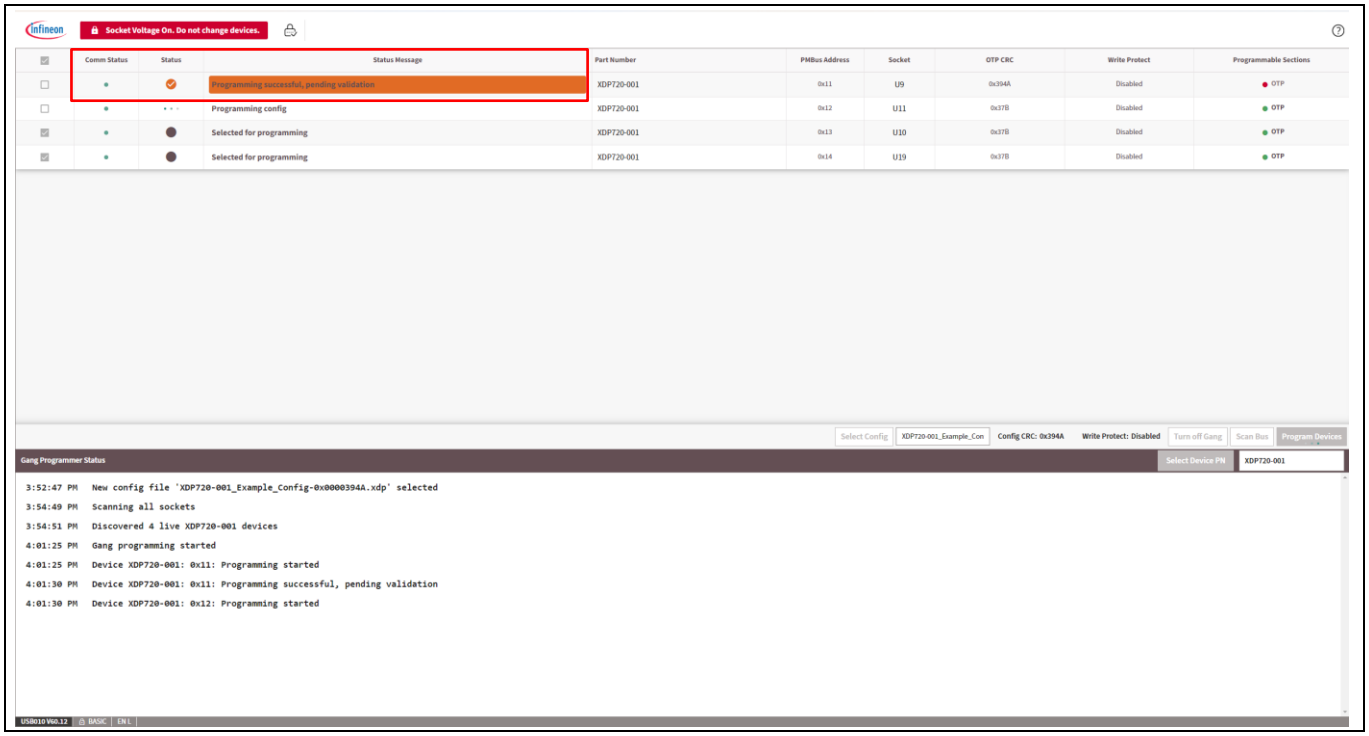


Figure 28 Device status during programming

Board setup and programming

Once all the devices are programmed, the following actions occur:

- The programmer reboots all the devices and validates the programmed configuration
- After the validation is complete, the socket voltage message indicating that the device is programmed correctly appears, as shown in Figure 29
- OTP and SOA appear in red indicating that the device has been programmed and cannot be reprogrammed
- The socket voltage message on the top left turns green indicating that the boost regulator has turned off and it is safe to open the sockets and replace the devices

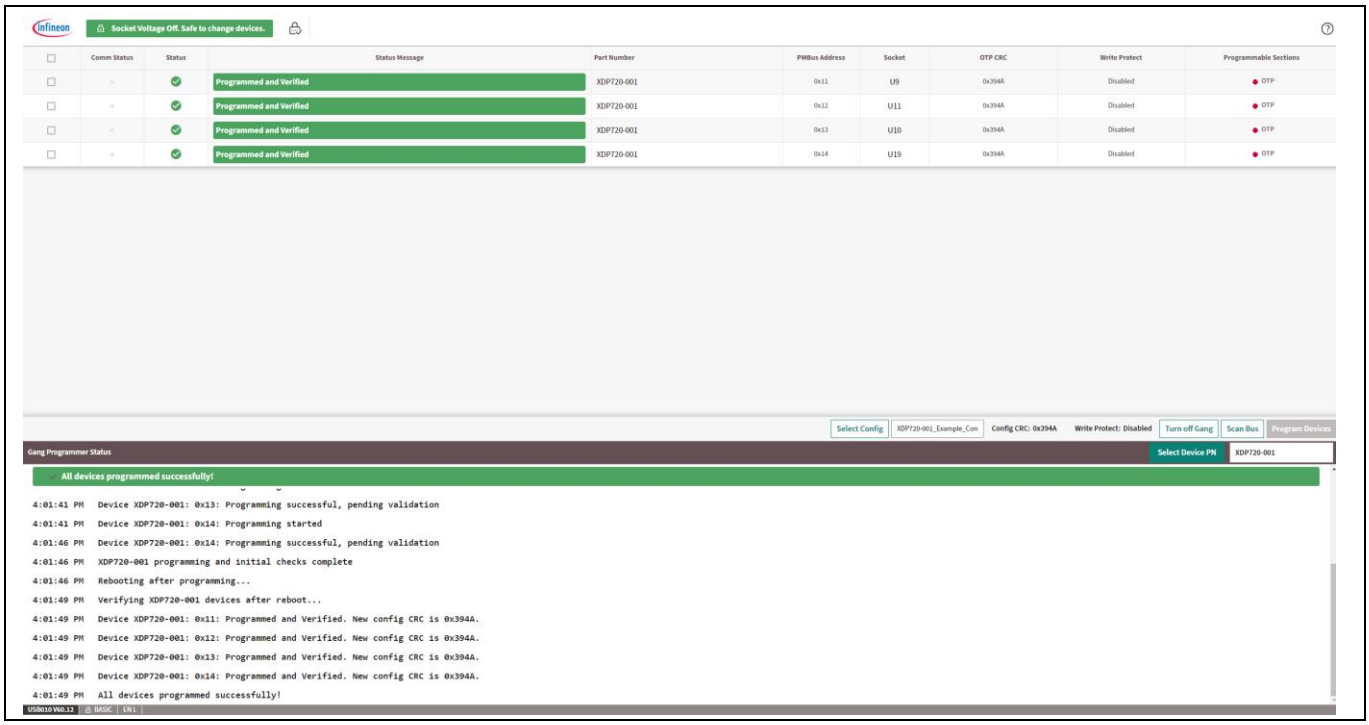


Figure 29 Successful programming of all four devices

- The green LEDs next to the sockets indicate that the programming is successful
- The red LED is off, indicating that it is safe to replace the devices, as shown in Figure 30

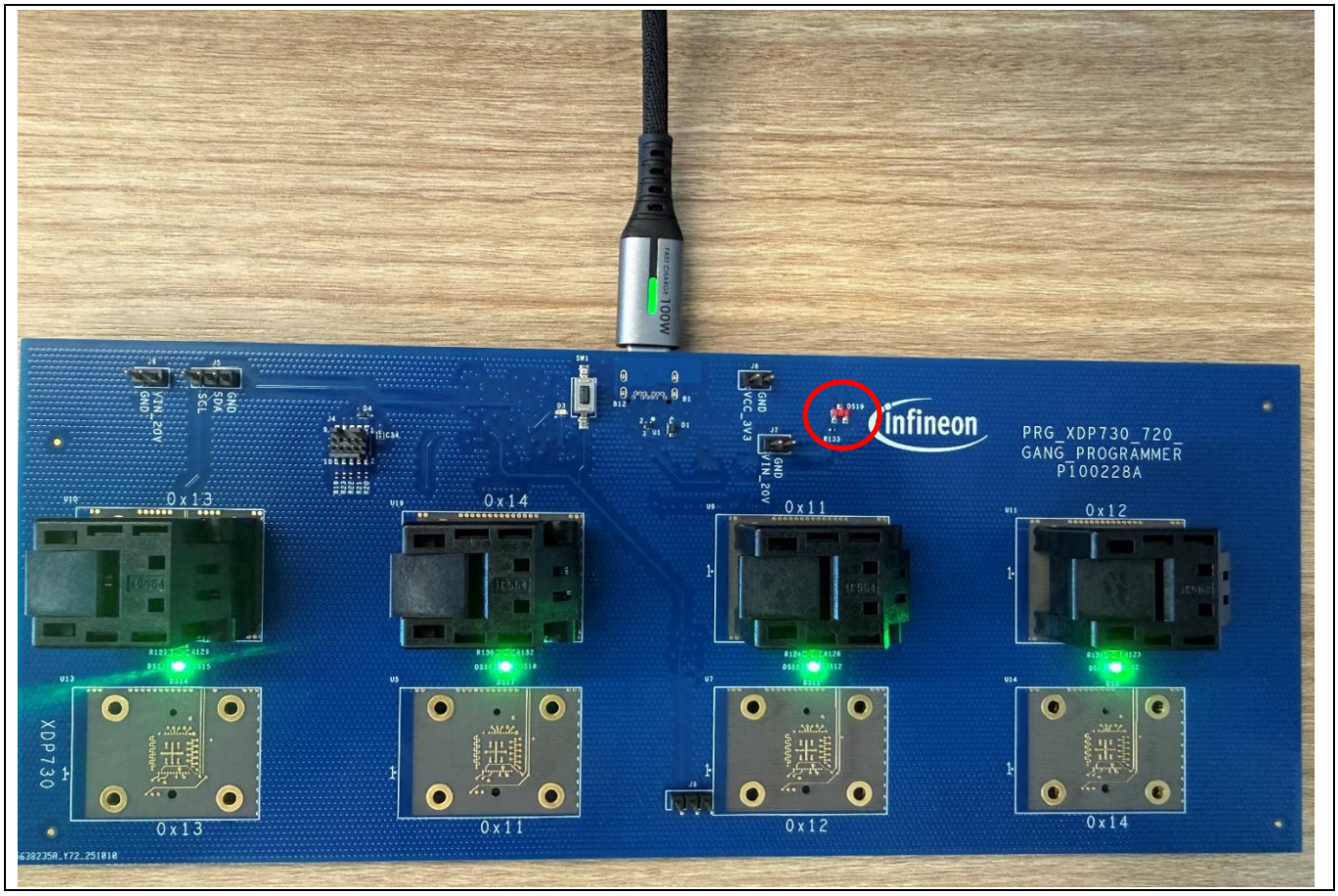


Figure 30 Successful programming of all four devices indicated by green LED

After safely removing the devices from the sockets, new devices can be installed. Ensure that the sockets are securely closed.

4.1.1 Reprogramming devices

If the devices are already programmed (this could occur if the device is left in the socket or if the user installs a pre-programmed device), the GUI prevents them from being programmed again by disabling the device selection button. The **Status** shows '⊘' sign indicating that the **Device already programmed** as shown in Figure 31.

Board setup and programming

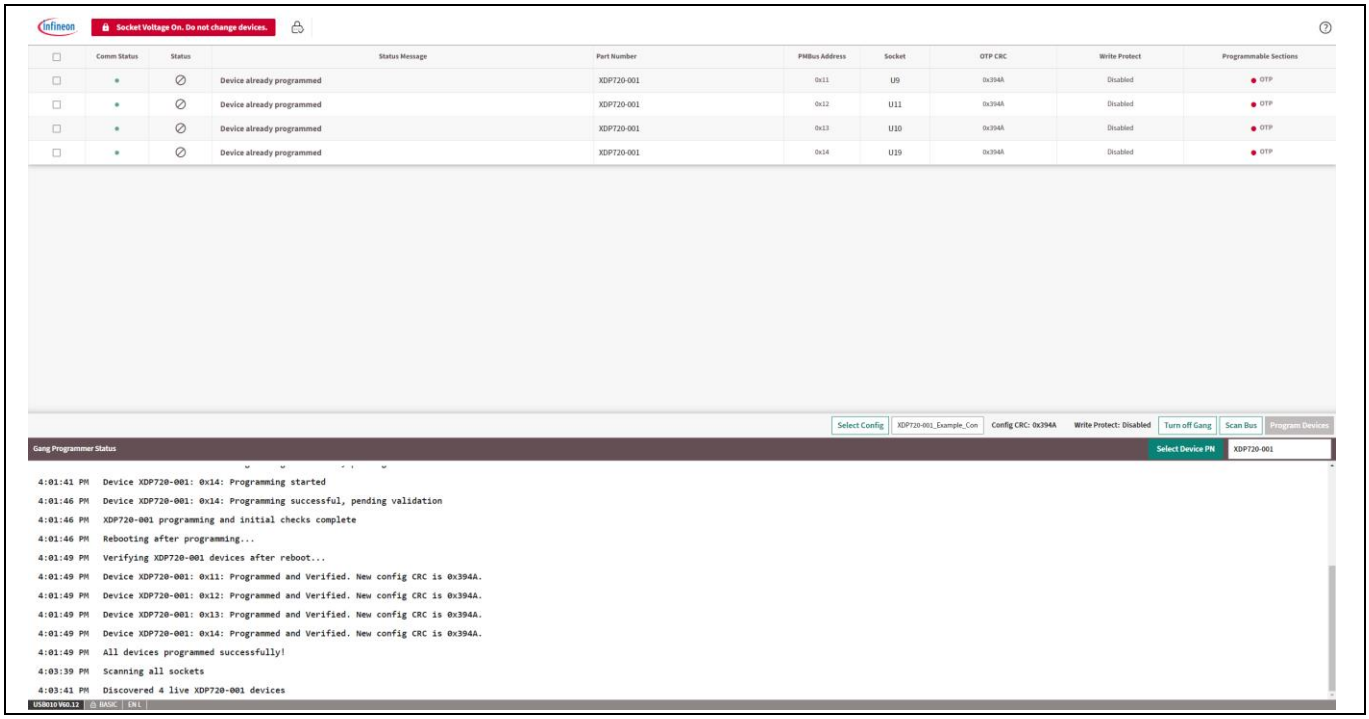


Figure 31 Scanning programmed devices

5 Programming failures due to loss of 22 V

If the voltage supplied by the boost regulator to the connected devices falls below 20 V, the device fails to execute OTP programming, and the GUI displays an error message: “OTP programming has been blocked because of temperature or VIN out of range”. In this case, the voltage should be measured between VIN_20V and GND pins, as shown in Figure 32.

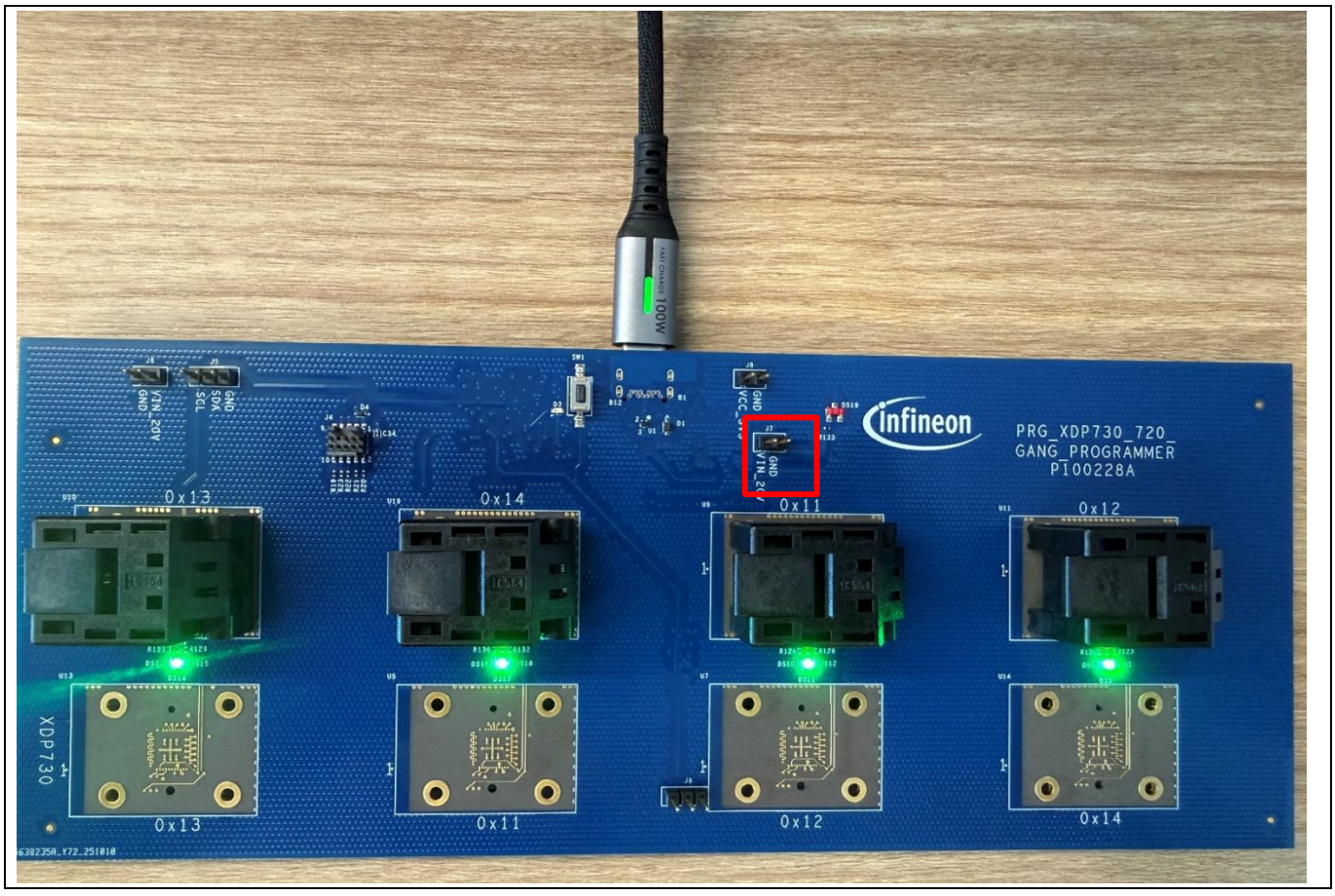


Figure 32 XDP720 Gang Programmer board

References

Contact Infineon Support to obtain these documents.

[1] Infineon Technologies AG: *XDP720-001 hot-swap controller datasheet*

[2] Infineon Technologies AG: *XDP720-001 configuration file translation and programming guide*; Available online

Glossary

BOM
bill of materials

ESD
electrostatic discharge

OTP
one-time programmable

SMPS
switched-mode power supply

Revision history

Document revision	Date	Description of changes
V 1.0	2026-04-17	Initial release

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