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PXIe-5668

Manufacturer: National Instruments

Board Assembly Part Numbers (Refer to Procedure 1 for identification procedure):

Part Number and Revision	Description
153682A-01L or later	PXIe-5624 or PXIe-5624R

Volatile Memory

<i>Target Data</i>	<i>Type</i>	<i>Size</i>	<i>Battery Backup</i>	<i>User¹ Accessible</i>	<i>System Accessible</i>	<i>Sanitization Procedure</i>
FPGA XC7K410T	FPGA Block RAM	28620 Kb	No	Yes	Yes	Cycle Power
Waveform Storage	DRAM	2 GB	No	Yes	Yes	Cycle Power
FPGA Image Memory	SDRAM	128 MB	No	No	Yes	Cycle Power
FPGA Configuration PLD	RAM	74 Kb	No	No	Yes	Cycle Power
Instruction Storage	SRAM	16 Mb	No	Yes	Yes	Cycle Power

Non-Volatile Memory (incl. Media Storage)

<i>Target Data</i>	<i>Type</i>	<i>Size</i>	<i>Battery Backup</i>	<i>User Accessible</i>	<i>System Accessible</i>	<i>Sanitization Procedure</i>
Device Configuration	Flash	64 MB total	No			
• Flash Map		0x40000 bytes		Yes ³	Yes	Procedure 2
• POSC (startup config)		0x40000 bytes		Yes ³	Yes	Procedure 2
• Capability List		0x40000 bytes		Yes ³	Yes	Procedure 2
• Manufacturing Data		0x40000 bytes		Yes ³	Yes	Procedure 2
• External Calibration ²		0x40000 bytes		Yes ³	Yes	Procedure 2
• Self-Calibration ²		0x200000 bytes		Yes ³	Yes	Procedure 2
• Golden Image		0xF40000 bytes		Yes ³	Yes	Procedure 2
• Warmup-Cooldown Image		0xF40000 bytes		Yes ³	Yes	Procedure 2
• User Image 0 (reserved)		0xF40000 bytes		Yes ³	Yes	Procedure 2
• Unpartitioned		0xF00000 bytes		No	Yes	None
FPGA Configuration PLD	Flash	8 KB	No	No	Yes	None

¹ Refer to *Terms and Definitions* section for clarification of *User* and *System Accessible*

² Calibration constants that are stored on the device include information for the device's full operating range. Any implications resulting from partial self-calibration can be eliminated by running the full self-calibration procedure.

³ Partitioned space within the device configuration flash is user-accessible only if the LabVIEW Instrument Design Libraries for IF Digitizers are installed on the system. Otherwise, only the calibration password is user-accessible.

Procedures

Procedure 1 – Board Assembly Part Number Identification:

To determine the Board Assembly Part Number and Revision, refer to the label applied to the surface of your product. The Assembly Part Number should be formatted as “P/N: 153682#-xxL” where “#” is the letter module revision and “xx” is a two-digit numeric specifying variant information.

Procedure 2 - Device Configuration Flash:

When using the PXIe-5624 or PXIe-5624R IF digitizer as a component of a PXIe-5668 or PXIe-5668R vector signal analyzer, you can control the entire vector signal analyzer through NI-RFSA software. By default, NI-RFSA does not require or install the digitizer’s instrument design libraries.

For lower-level control, or to use the PXIe-5624 or PXIe-5624R as a standalone digitizer, you can install the digitizer’s instrument design libraries using a separate installer: the LabVIEW Instrument Design Libraries for IF Digitizers.

Without Instrument Design Libraries

If you do not install the instrument design libraries, the only user-accessible field in the Device Configuration Flash is the calibration password. To clear the calibration password:

1. Open the Measurement & Automation Explorer (MAX).
2. Select the PXIe-5624 or PXIe-5624R.
3. Click the “Change Password” button and enter the old password.
4. Change the password back to the default factory value of “NI”.

With Instrument Design Libraries

If you do install the instrument design libraries, the instrument design libraries make all partitioned space in the Device Configuration Flash user-accessible. To clear the flash partition contents, you have two options:

- A. Back up the original contents prior to use and restore the contents after use, or
- B. Overwrite the contents with zeroes, or a data sequence of your choice. **Because option B does not restore a valid backup image taken from the module, this option renders the module inoperable.** See “Option B: Erase Data” for more information.

You can use the VIs of the “ni562xR DriverInterface” library to read and write the user-accessible areas of the Device Configuration Flash. Locate these VIs in directory <LabVIEW>\vi.lib\LabVIEW Targets\FPGA\IF-Digitizers\Driver Interface.

Option A: Save and Restore Original Data

Upon first receiving the device, store a copy of the original or known-good flash partition contents:

1. Open a driver session using the Open Resource Name VI. Provide the resource name from MAX.
2. For each device-configuration partition in the Non-Volatile Memory table, call the Read Raw Bytes VI. Select the partition. Set “offset” to 0 and “byte count” to the partition size in bytes from the table. Note that the table shows partition sizes in hexadecimal.
3. Close the driver session using the Close VI.
4. Save the contents of each partition to disk.

To clear the flash partitions, perform the following steps to restore the saved data:

1. Load the contents of each partition from disk.

2. Open a driver session using the Open Resource Name VI.
3. For each device-configuration partition in the Non-Volatile Memory table, call the Write Raw Bytes VI. Select the partition. Set “offset” equal to 0 and “byte count” to the partition size from the table. Note that the table shows partition sizes in hexadecimal. Set “data” to the partition contents loaded from disk.
4. Close the driver session using the Close VI.

Avoid losing system power or overheating the module into thermal shutdown while writing the partition contents, or your module may be left in an inoperable state. See “*Option B: Erase Data*” for information about inoperable modules.

After you restore the original flash data, the calibration constants might be out of date. Perform a new calibration if desired.

Option B: Erase Data



Caution: The erase procedure renders the module inoperable. That means that after you shut down the module by rebooting the system, losing power, disabling the module in Device Manager, or encountering a thermal or over-power shutdown, you will no longer be able to use or reestablish communication with the module. If you want to use a module again after erasing flash data, contact National Instruments for information about costs and procedures to return the module to the factory for repair.

Take these steps to erase the data in the flash partitions:

1. Open a driver session using the Open Resource Name VI.
2. For each device-configuration partition in the Non-Volatile Memory table, call the Write Raw Bytes VI. Select the partition. Set “offset” equal to 0 and “byte count” to the partition size from the table. Set “data” to an array of 8-bit zero values (0x00) equal in size to the “byte count”.
3. Close the driver session using the Close VI.

Instead of writing 0x00 values, you can write another data pattern or sequence of your choice—for example, 0x00 followed by 0xFF. Because the module will become inoperable when you shut down or reboot, it is important to write your entire sequence at one time.

Terms and Definitions

Cycle Power:

The process of completely removing power from the device and its components and allowing for adequate discharge. This process includes a complete shutdown of the PC and/or chassis containing the device; a reboot is not sufficient for the completion of this process.

Volatile Memory:

Requires power to maintain the stored information. When power is removed from this memory, its contents are lost. This type of memory typically contains application specific data such as capture waveforms.

Non-Volatile Memory:

Power is not required to maintain the stored information. Device retains its contents when power is removed. This type of memory typically contains information necessary to boot, configure, or calibrate the product or may include device power up states.

User Accessible:

The component is read and/or write addressable such that a user can store arbitrary information to the component from the host using a publicly distributed NI tool, such as a Driver API, the System Configuration API, or MAX.

System Accessible:

The component is read and/or write addressable from the host without the need to physically alter the product.

Clearing:

Per *NIST Special Publication 800-88 Revision 1*, “clearing” is a logical technique to sanitize data in all User Accessible storage locations for protection against simple non-invasive data recovery techniques using the same interface available to the user; typically applied through the standard read and write commands to the storage device.

Sanitization:

Per *NIST Special Publication 800-88 Revision 1*, “sanitization” is a process to render access to “Target Data” on the media infeasible for a given level of effort. In this document, clearing is the degree of sanitization described.