PXIeCOMe
Production Test Suite
User Manual

Revision 1.1

Revision Table

Revision	Date	Author	Comments
1.0	19/09/2022	INCAA Computers BV	Initial version
1.1	15/12/2022	INCAA Computers BV	Added BIOS update description and procedures for the COMe-bTL6 with ATM as preferred BIOS. Updated PXIeCOMe board image to a picture of EDA-04509-V1-0. Added a section regarding jumper SW1.

Table of contents

Introduction

This document describes the methods for the automatic testing, using the Production Test Suite (PTS), of the PXIeCOMe (PXIe controller COM Express based carrier). It consists of the instruction for the installation of Linux (CentOS Stream 8) which is used as the test environment, including all necessary tools and modules. And also describes the tests which are intended to check the functional operation of all the interfaces and devices as part of the PXIeCOMe v0 prototypes.
Although the PXIeCOMe is designed as carrier board for any COM Express basic type 6 processor boards, during the tests the PXIeCOMe is equipped with a Kontron COMe-bCL6. The complete assembly of the PXIeCOMe carrier board with the attached COMe-bCL6, heatsink and front is referred to as the PXIeCOMe.
More information regarding the PXIeCOMe can be found here:
https://www.ohwr.org/project/pxie-ctl-comexpress/wikis/home

- Compliance with COM Express basic Pin-out type 6
- Compliance with PXIe standard for 3U system slot
- PCIe lane designed to meet PCIe GEN 3 specification
- 16x PCIe lanes routed to the 4 link configuration PXIe backplane connector
- PXI trigger controller (Xilinx XC7A50T-1FTG256C FPGA)
- Possibility to install a full size mSATA SSD (supports mini mSATA)
- 1x RS232 port DSUB9 connector
- 4x USB 2.0
- 2x USB 3.0
- 1x 10/100/1000 Ethernet LAN
- 1x DisplayPort
- 1x SMB PXI trigger line

STANDARDS AND DOCUMENTS

COM Express

The COM Express specification defines a family of Computer On Module (COM) single board computers. The requested COM Express Basic form factor and type 6 pin out have been defined in PIGMG COM.0 R2.0 and R3.0.
The standard is available via https://www.picmg.org/.
The freely available COM Express design Guide Rev 2.0 is also available at this site:
https://www.picmg.org/wp-content/uploads/PICMG_COMDG_2.0-RELEASED-2013-12-061.pdf

PXI and PXI Express

The PXI and PXI Express specifications are created by the PXI Systems Alliance and are defined in “PXI-1 Hardware Specification Rev. 2.3” and “PXI-5 PXI Express Hardware Specification Rev. 1.1”.
The standards are available for download at http://www.pxisa.org/.
The PXI standard defines the interface for the extension of CompactPCI for instrumentation applications. The PXI Express standard adds an extra set of features to be used within CompactPCI Express.

CompactPCI and CompactPCI Express

The CompactPCI (PICMG 2.0 R3.0) and CompactPCI Express (PICMG EXP.0 R2.0) standards are, like COM Express, created by PIGMG and are available via https://www.picmg.org/.

SATA and mSATA

The specification of SATA and the mSATA module (Serial ATA Revision 3.4) is created by the Serial ATA International Organization and is available via https://sata-io.org/. The mSATA module is part of the specification as of ‘Serial ATA Revision 3.1’.

INSTALLATION

Installing Linux CentOS Stream 8

The mSATA SSD, which will be used to test the PXIeCOMe, should be prepared by installing Linux CentOS Stream 8 on it. For this a validated PXIeCOMe board can be use, but when no validated PXIeCOMe boards are available a COM Express type 6 carrier board can also be used. When the carrier board isn't mSATA capable (like with the Kontron COMe Eval Carrier T6) the mSATA SSD should be connected via a SATA to mSATA converter, or a USB to mSATA converter.

1. Download CentOS Stream 8 DVD ISO version, like `CentOS-Stream-8-x86_64-20220816-dvd1.iso`
2. Use a program like balenaEtcher (Portable) to create a bootable image of this ISO on a USB stick.
3. Prepare the COM Express carrier so that is can be used for the installation of Linux. So attach power supply, keyboard, mouse, display and the network.
4. Insert the mSATA SSD in the mSATA connector, or use a SATA to mSATA converter, or a USB to mSATA converter to make the SSD part of the system.
5. Connect the CentOS Stream 8 ISO USB stick to a USB 3.0 port of the COM Express carrier and boot the system.
6. Change the BIOS setup of the COMe-bCL6 or COMe-bTL6 so that the USB stick is used as boot device.
7. The CentOS Stream 8 installation process is booted and now some configuration should be made
   - **Welcome**
     - Select a language like English and English (United States).
   - **System**
     - Installation Destination: select the mSATA SSD and reclaim space when asked.
     - KDUMP: do not change
     - Network & Host Name: Enable the Ethernet connection and change the Host Name to an appropriate value, like PXIeCOMe-test.
     - Security Policy: do not change
   - **Localization**
     - Keyboard: select an appropriate keyboard
     - Language Support: select the appropriate language support.
     - Time & Date: select the appropriate region, and enable 'Network Time'.
   - **Software**
     - Installation Source: do not change (Local media).
     - Software Selection: Workstation.
   - **User settings**
     - Root Password: do not change
     - User Creation: enter the user name '**user**' and the password '**baraka**' and check both 'Make this user administrator' and 'Require a password to use this account'.

8. Begin installation…
9. Reboot the system
10. Accept the license agreement
11. Finish the configuration…
12. Login…

Installing remote desktop

To access the installation remotely it is possible to control the PXIeCOMe from a different Windows PC.
See also: https://www.enlinux.com/enable-remote-desktop-on-centos/

```
$ sudo yum install epel-release

$ sudo yum install xrdp -y

$ sudo systemctl enable xrdp

$ sudo systemctl start xrdp

$ sudo nano /etc/xrdp/xrdp.ini
```

Add at the end of the file the following line: exec gnome-session
Ctrl-O (Write Out)
Ctrl-X (Exit)

```
$ sudo systemctl restart xrdp
```

Change the firewall to provide access using remote desktop

```
$ sudo firewall-cmd --new-zone=xrdp --permanent

$ sudo firewall-cmd --zone=xrdp --add-port=3389/tcp --permanent
```

Make it accessible from all ip-addresses with the 192.168.x.x range:

```
$ sudo firewall-cmd --zone=xrdp --add-source=192.168.0.0/16 --permanent

$ sudo firewall-cmd --reload
```

The remote desktop access only works when no login session is active on the main display.

Update kernel and packages

To update the kernel and the installed packages to the latest version of CentOS Stream 8 the following instructions were used:

```
$ sudo yum update -y kernel

$ sudo yum update
```

After restart of the system the new kernel can be used.

Installing development packages

To be able to make, compile and install the drivers several other packages need to be installed first.

```
$ sudo yum install make

$ sudo yum install gcc

$ sudo yum install kernel-devel

$ sudo yum install elfutils-libelf-devel
```

Installing Kontron GPIO and i2c

To be able to control the COM Express specific GPIO and I2C interfaces the Kontron Linux PLD Driver needs to be downloaded from the Customer Section at www.kontron.com. Version r34 was downloaded (`kempld-drivers.34.tar.gz`), which is applicable for many versions of Linux, and so the driver for the right Linux kernel version has to be used.

```
$ uname -r
4.18.0-408.el8.x86_64
```

And so the source from the `kempld-drivers.34/kempld-modules-linux_v4.18` has to be used. When compiling the sources for the kempld drivers for the v4.18 kernel as is, will result in some compile errors. To prevent these errors the source has to be updated by simply copying the `kempld-core.c` file from a more recent kernel version implementation of the driver.
Now go to the `kempld-modules-linux_v4.18` directory

```
$ cd Downloads/kempld-drivers.34/kempld-modules-linux_v4.18

$ cp ../kempld-modules-linux_v5.9/kempld-core.c .
```

And make and install the drivers:

```
$ sudo make

$ sudo make install
```

During the make install some SSL errors could be reported, but these can be ignored.

After restart of the system the kempld drivers are available and can be used.
To be able to access the I2C and SMBus ports the following package need to be installed.

```
$ sudo yum install i2c-tools
```

Installing Python

Since the PTS uses python2 it should be installed since CentOS comes standard with python3 only.

```
$ sudo yum install python2

$ sudo alternatives --set python /usr/bin/python2

$ sudo pip2 install pyserial
```

Installing the PXIeCOMe PTS

The PXIeCOMe PTS should be placed in the home directory of the user.
The `pxiecome_pts_v1.0.tar.gz` should be extracted in the home directory of the user.

```
$ tar -zxvf pxiecome_pts_v1.0.tar.gz

$ cd ~/pts

$ cdmod +x pxiecome.sh
```

It can now be started using:

```
$ ./pxiecome.sh
```

Installing Xilinx Vivado

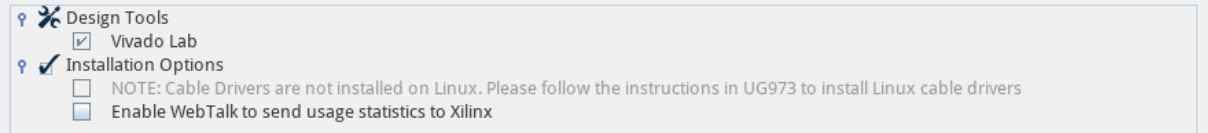
For some of the tests an installation of Xilinx Vivado (Labtools only) is needed. This will be used to test and program the FPGA of the PXIeCOMe.
Download the Vivado Labtools from the Xilinx website. For the PTS the `Xilinx_Vivado_Lab_Lin_2021.1_610_2318.tar.gz` is used. This file is downloaded in the ~/Downloads directory. Extract this tar.gz-file here, which can be done using the Files application and right-clicking on the tar.gz-file and select Extract Here.

Open a Terminal window and start the installation (do not use sudo):

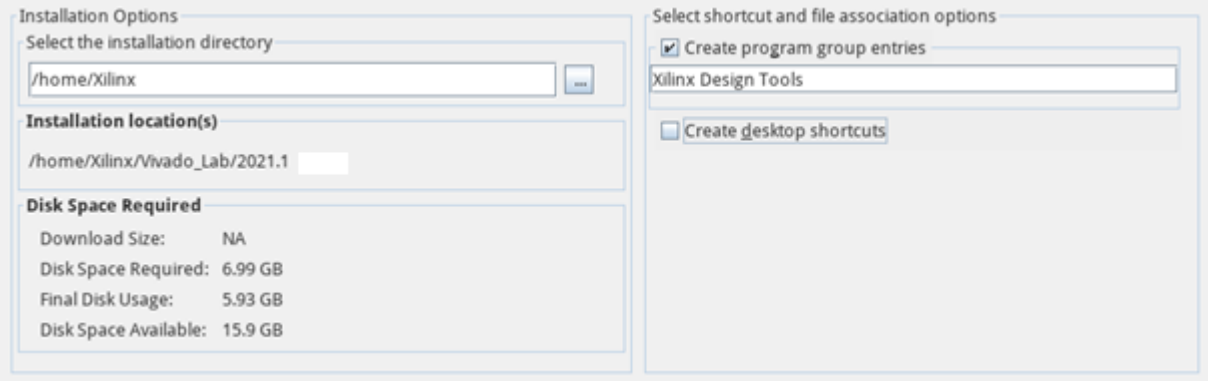
```
$ sudo mkdir /home/Xilinx

$ sudo chmod 777 /home/Xilinx

$ sudo ln -s /home/Xilinx /opt/Xilinx

$ cd Downloads/Xilinx_Vivado_Lab_Lin_2021.1_610_2318
```

```
$ ./xsetup
```

- During installation disable the WebTalk feature:



- Accept the license agreements.
- Select the local installation directory within the home directory.:



- Install the tools.

```
$ cd
/opt/Xilinx/Vivado_Lab/2021.1/data/xicom/cable_drivers/lin64/install_script/install_d
rivers

$ sudo ./install_drivers

$ sudo ln -s /lib64/libtinfo.so.6.1 /lib64/libtinfo.so.5
```

In this way the Vivado Labtools and the download cable drivers have been installed.

- Restart the system.

Installing BIOS files

The PCI Express backplanes are defined in two types of configurations (See also PXI-5 PXI Express Hardware Specification Rev. 1.1 section 4.10.2).

- 2 link configuration: 1x PCIe x8 (8 lanes) link plus 1x PCIe x16 (16 lanes) link.
- 4 link configuration: 4x PCIs x4 (4 lanes) link.

The PXIeCOMe is designed to interface with a PXI Express backplane using the 4 link configuration only.
The COMe-bCL6 and the COMe-BTL6 are 4 link configuration capable but needs a BIOS update to `BCL6R113_2x4.bin` for the COMe-bCL6 and `BTL6R901_2x4.bin` or `BTL6R110_2x4.bin`

for the COMe-bTL6. This BIOS file defines the PCIe lanes 0 to 7 as two 4 lane links. This BIOS file can be found in the Kontron Customer Section on their site or will be provided by CERN.

CERN preferred COMe-bTL6 (with ATM)

To prepare the update of the BIOS of the COMe-bTL6 to `BTL6R901_2x4.bin` or do the following:

- The `BTLR901.zip` file contains the `BTL6R901_2x4` directory. Copy this directory with content to the root directory of both USB 3.0 sticks which will be used during the PTS tests.

COMe-bTL6 (without ATM)

To prepare the update of the BIOS of the COMe-bTL6 to `BTL6R110_2x4.bin` do the following:

- The `BTLR110.zip` file contains the `BTL6R110_2x4` directory. Copy this directory with content to the root directory of both USB 3.0 sticks which will be used during the PTS tests.

COMe-bCL6

To prepare the update of the BIOS of the COMe-bCL6 to `BCL6R113_2x4.bin` do the following:

- The `BCLR113.zip` file contains the `BCL6R113_2x4` directory. Copy this directory with content to the root directory of both USB 3.0 sticks which will be used during the PTS tests.

TEST: PRE-CHECKS

Before starting the test procedures, it is needed to wear an antistatic wrist band to avoid electrostatic issues when handling the boards and the cables.

Assembly

The PXIeCOMe will be subject to the tests in a fully assembled state including a Kontron COMe-bCL6 or COMe-bTL6 board.

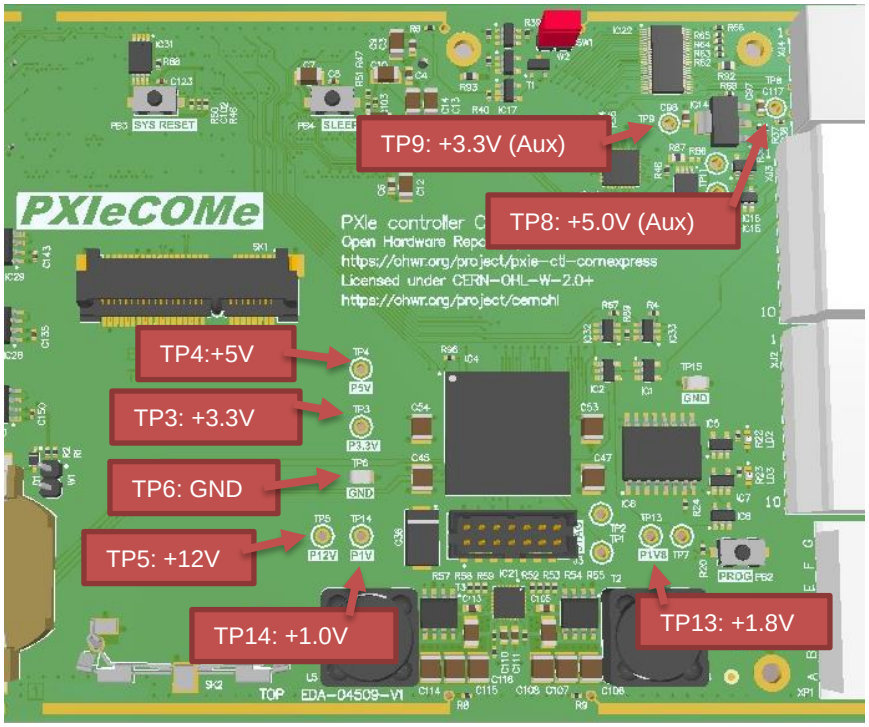
Visual inspection

No special test setup is required since the tests to be carried out are visual inspections and analysis of the board.

- Check the module for completeness.
- Check the module for the solder quality.
- Check the mounting of the mezzanine, front, COMe module and heatsink.

Short circuit check

Every power supply test point should be checked to verify there are no short circuits present between these power supply rails and GND.



TEST: PREPERATION

Auxiliary equipment

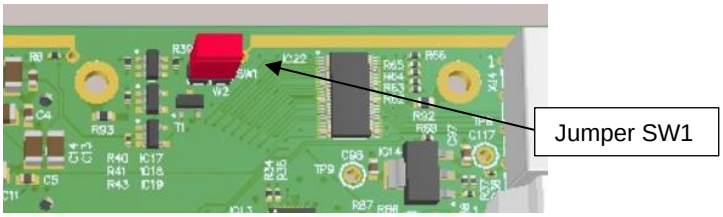
To be able to perform the tests a set of auxiliary cables and equipment is needed, which consists of the following list:

- NI PXIe-1075, 18-Slot PXI Express chassis.
- INCAA Computers CPE-PXCT-19916, PXi Communication Tester, for Peripheral Slot.
- INCAA Computers CPE-PXCT-19917, PXi Communication Tester, for System Timing Slot.
- A display with a DisplayPort interface.
- Full size mSATA SSD containing the CentOS Stream 8 and PTS installation.
- USB mouse
- USB keyboard
- 2x USB 3.0 capable USB stick, like a SanDisk Ultra Flair, or equivalent sized USB stick. These should contain the BIOS update files.
- Xilinx Platform cable USB II (or equivalent) to be controlled using Xilinx Vivado (Labtools).
- USB-Serial adapter, like a Eminent EM1016, Prolific PL2303, or equivalent.
- 2x RS232 DSub9 male to female cable.
- A CAT-5A or CAT-6 Ethernet cable attached to the LAN and internet.
- DisplayPort cable
- SMB to SMB coaxial cable.

Initial test setup

Power supply jumper

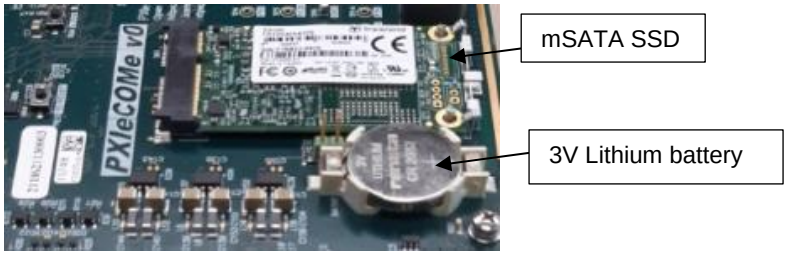
Remove jumper SW1 if present.



When jumper SW1 is placed the power supply of the PXIe chassis is switch on independent of the presence or state of the COMe module.

Lithium battery and mSATA SSD

Insert the lithium battery in its socket and place the mSATA in its socket.



PXIeCOMe in slot 1 and PXCT in slot 2

Insert the PXIeCOMe in slot 1 of the NI PXIe-1075 chassis.

Insert the CPE-PXCT-19916 (for Peripheral Slot) in slot 2.

PXCT in system timing slot

Insert the CPE-PXCT-19917 (for System Timing Slot) in the system timing slot, which is slot 10 of the PXIe-1075.

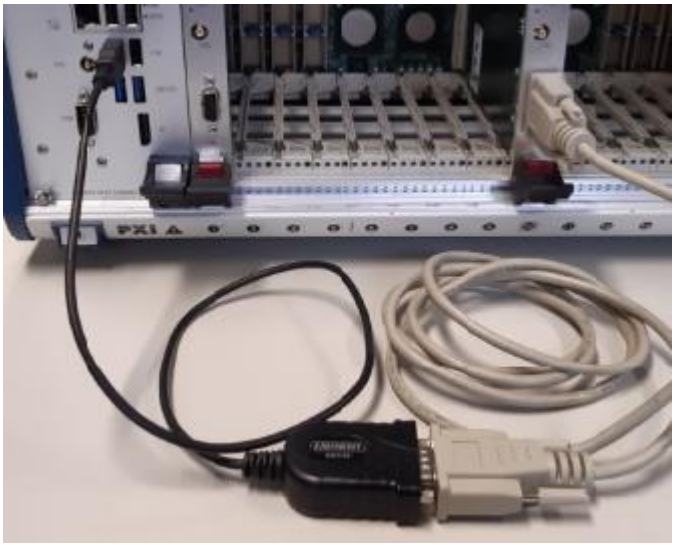
LAN cable

Insert the LAN cable in the RJ45 socket indicated with **LAN**.

USB mouse and keyboard

Insert the USB mouse and USB keyboard in the two USB2.0 connectors next to the RJ45 socket and indicated with **USB**.

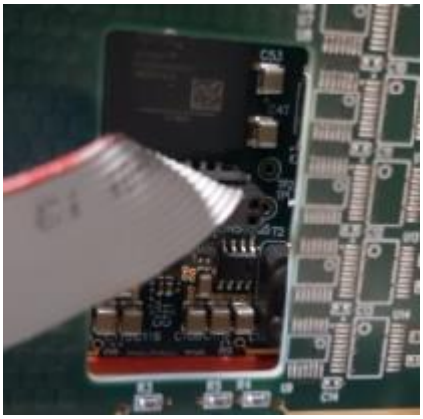
USB Serial to PXCT in system timing slot



Insert the USB Serial adapter cable in the PXIeCOMe USB port, and connect it via a serial cable to the PXCT in the system timing slot.

USB to Xilinx download cable

Insert the Xilinx download cable in the USB port and connect the flat cable, through the opening in the PXCT, to the J3 (JTAG) on the PXIeCOMe board.



USB3.0 memory sticks

Insert the two USB3.0 memory sticks in the slots indicated with **USB (SS)**.

SMB trigger cable to PXCT in slot 2

Insert the SMB to SMB cable between the PXIeCOMe **TRIG** port and the PXCT **TRIG** port.

Serial to PXCT in slot 2

Insert the serial cable in the PXIeCOMe, and connect it to the PXCT in slot 2.

DisplayPort

Insert the DisplayPort cable, which should be connected to the display, in the port indicated with **DP**.

TEST: BIOS UPDATES

BIOS update

The BIOS of every COMe module (Kontron COMe-bCL6 or Kontron COMe-bTL6) which is assembled on a PXIeCOMe carrier and shipped as part of the PXIeCOMe assembly should be updated.

Updating CERN preferred COMe-bTL6 (with ATM)

To update the BIOS to `BTL6R901_2x4.bin` do the following:
Start the system and select the `System setup` to enter the BIOS environment. When the system starts in EFI shell mode type `exit` to leave the shell and select `System setup` to enter the BIOS environment.

- Under `ChipSet | PCH-IO Configuration | Security Configuration` change the `BIOS Lock` to `Disabled`.
- Under `Advanced | PCH-FW Configuration | Firmware Update Configuration` change the `ME FW Image Re-flash` to `Enabled`.
- Under `Boot` change the `Boot Option #1` to `UEFI: Built-in EFI Shell`.
- Under `Save & Exit` select `Save Changes and Exit` so the system will boot to the EFI shell.
- Check to see if the USB stick can be accessed as fs0 or fs1. So use
  ```
  > fs0:
  ```
  or
  ```
  > fs1:
  ```
  and
  ```
  > ls
  ```
  to see which disk contains the `BTL6R901_2x4` directory.
- And enter this directory.
  ```
  > cd BTL6R901_2x4
  ```
- Update the BIOS using
  ```
  > flash.nsh
  ```
- Perform a shutdown of the system
  ```
  > reset -s
  ```
- Turn the power supply of the PXIe chassis off, so that also the standby power is turned off. This is needed to use the new BIOS when powered on.

Updating COMe-bTL6 (without ATM)

To update the BIOS to `BTL6R110_2x4.bin` do the following:
Start the system and select the `System setup` to enter the BIOS environment. When the system starts in EFI shell mode type `exit` to leave the shell and select `System setup` to enter the BIOS environment.

- Under `ChipSet | PCH-IO Configuration | Security Configuration` change the `BIOS Lock` to `Disabled`.

- Under Advanced | PCH-FW Configuration | Firmware Update Configuration change the ME FW Image Re-flash to Enabled.
- Under Boot change the Boot Option #1 to UEFI: Built-in EFI Shell.
- Under Save & Exit select Save Changes and Exit so the system will boot to the EFI shell.
- Check to see if the USB stick can be accessed as fs0 or fs1. So use
  ```
  > fs0:
  ```
  or
  ```
  > fs1:
  ```
  and
  ```
  > ls
  ```
  to see which disk contains the BTL6R110_2x4 directory.
- And enter this directory.
  ```
  > cd BTL6R110_2x4
  ```
- Update the BIOS using
  ```
  > flash.nsh
  ```
- Perform a shutdown of the system
  ```
  > reset -s
  ```

Turn the power supply of the PXIe chassis off, so that also the standby power is turned off. This is needed to use the new BIOS when powered on.

Updating COMe-bCL6

To update the BIOS to BCL6R113_2x4.bin do the following:

- Start the system and select the System setup to enter the BIOS environment. When the system starts in EFI shell mode type exit to leave the shell and select System setup to enter the BIOS environment.
- Under ChipSet | PCH-IO Configuration | Security Configuration change the BIOS Lock to disabled.
- Under Boot change the Boot Option #1 to UEFI: Built-in EFI Shell.
- Under Save & Exit select Save Changes and Exit so the system will boot to the EFI shell.
- Check to see if the USB stick can be accessed as fs0 or fs1. So use
  ```
  > fs0:
  ```
  or
  ```
  > fs1:
  ```
  and
  ```
  > ls
  ```
  to see which disk contains the BCL6R113_2x4 directory.
- And enter this directory.
  ```
  > cd BCL6R113_2x4
  ```
- Update the BIOS using
  ```
  > flash.nsh
  ```
- Perform a shutdown of the system
  ```
  > reset -s
  ```
- Turn the power supply of the PXIe chassis off, so that also the standby power is turned off. This is needed to use the new BIOS when powered on.

Changing BIOS

The BIOS settings need to be checked and changed according to the following:

- Turn the power supply of the PXIe chassis on, so the system can start. Since the BIOS has changed, the COMe module needs to scan the system in which it is active.
  For this the system will restart automatically several times before it can be used.
- Select the `System setup` to enter the BIOS environment. When the system starts in EFI shell mode type `exit` to leave the shell and select `System setup` to enter the BIOS environment.
- Under `ChipSet | System Agent (SA) Configuration | PEG Width Configuration` change the `PEG Width Configuration` to `1x8+2x4` or `1x8+2x4 / norm`.
- Under `ChipSet | PCH-IO Configuration | PCI Express Configuration` check that `COMe Lane 1` to `COMe Lane 3` and `COMe Lane 5` to `COMe Lane 7` are set to `Shadowed by x2/x4 port`. If this is not the case the standby power has not been turned off before, or the BIOS has been flashed with a different bin-file.
- Under `Advanced | Serial Port Console Redirection` check that for both `COM0` and `COM1` the `Console Redirection` is set to `Disabled`.
- Under `Boot` check that `Boot Option #1` is set to the CentOS Stream 8 option.
- Under `Save & Exit` select `Save Changes and Exit` so the system will reboot.
- When the system has restarted and shows information like the following:

```
CentOS Stream (4.18.0-408.el8.x86_64) 8
System setup
```

- Select the keyboard up- or down-key so the timer to automatically start booting is stopped.

THE TESTS

Before starting the test procedures, it is needed to wear an antistatic wrist band to avoid electrostatic issues when handling the boards and the cables.

Test	Short description	User Intervention
Reset	A test of the reset button	Yes
00	Setup of the test system	Yes
01	Check SATA/mSATA and LEDs	Yes
02	Check DisplayPort	No
03	Check LAN	Yes
04	Check USB	Yes
05	Check JTAG	Yes
06	Check Serial (COM)	No
07	Check GPIO	Yes
08	Check I2C and SMBus	No
09	Check PCI Express	No
10	Check PXI	No
11	Check TRIG	No

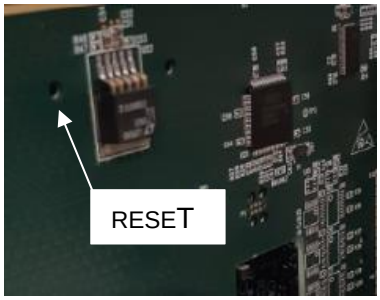
Reset Test

- If the system is not already started and waiting as a result of the procedure to change the BIOS, power-up or restart the system.

  When the system has started and shows information like the following:

  ```
  CentOS Stream (4.18.0-408.el8.x86_64) 8
  System setup
  ```

  Select the keyboard up- or down-key so the timer to automatically start booting is stopped.
- Push the RESET button on the PXIeCOMe PCB. This should reset and restart the system.



PTS Tests

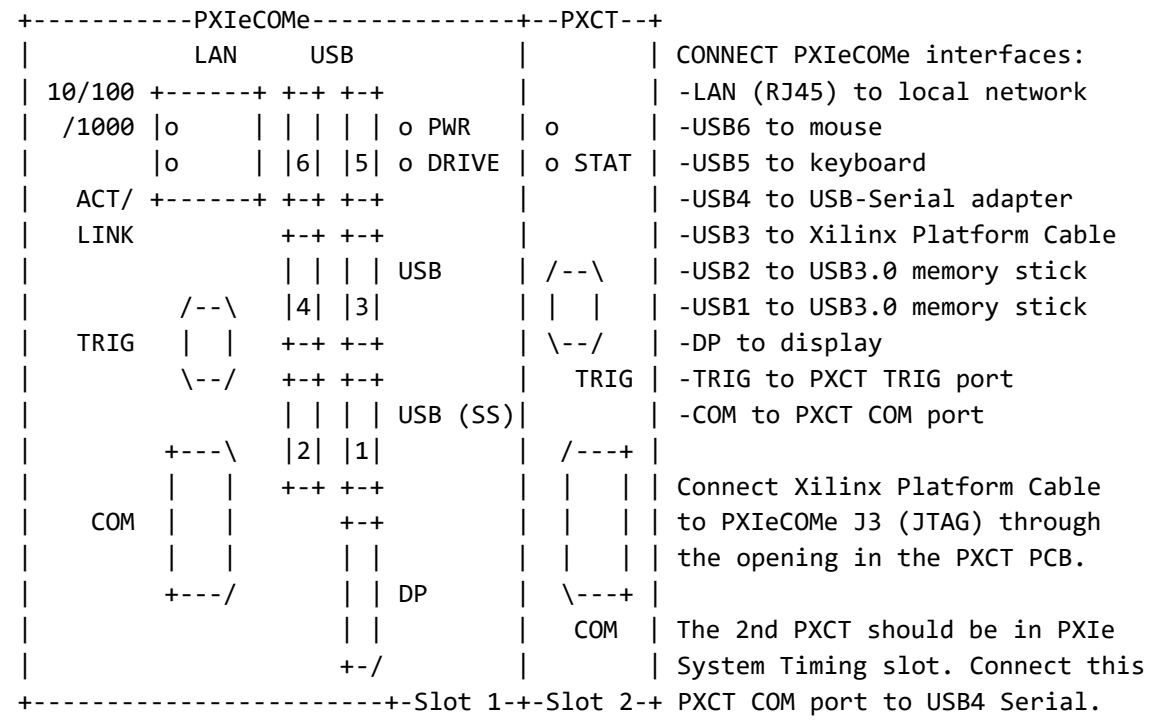
After CentOS has started and the user is logged in

- Open a terminal
- The PTS test can be started using:

```
$ cd pts

$ ./pxiecome.sh
```

Test00 – Setup

This test only shows the basic setup and so how the PXIeCOMe (EUT) should be connected to other devices.



Test01 – Check SATA/mSATA and LEDs

Since the PTS must boot from the PXIeCOMe mSATA SSD, the fact that the system is running already indicated the SATA1 interface is working.
This test logs several ATA device aspects and tests the main front panel LEDS

Test02 – Check DisplayPort

Since the PTS must be started while using a display, mouse and keyboard, the fact that the PTS test can be started while using the display makes it possible to check the DisplayPort.
In case of problems the PTS CentOS system could also be remotely accessed using the LAN interface and Remote Desktop
This test logs several DisplayPort and display aspects.

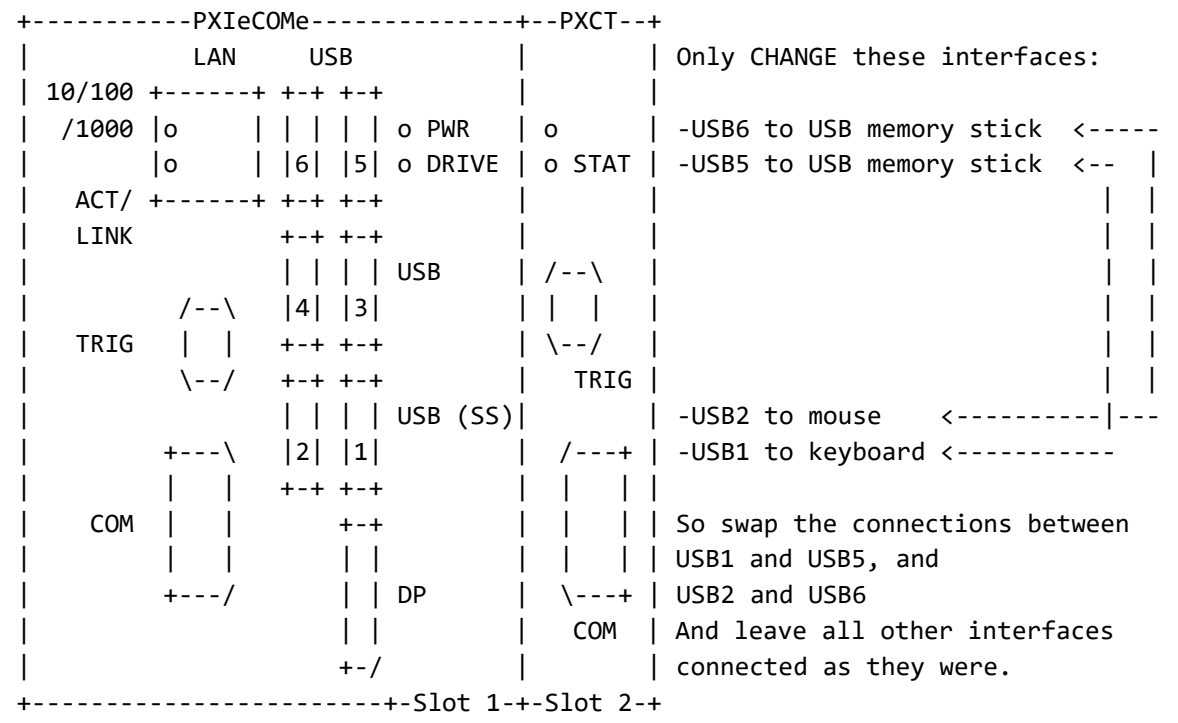
When using a DisplayPort to HDMI or DVI converter cable this test could fail because it detects a HDMI display instead of a DisplayPort display.

Test03 – Check LAN

Check aspects of the LAN interface and perform a simple ping to a remote server.
This test also logs several LAN aspects and tests the LAN RJ45 LEDS

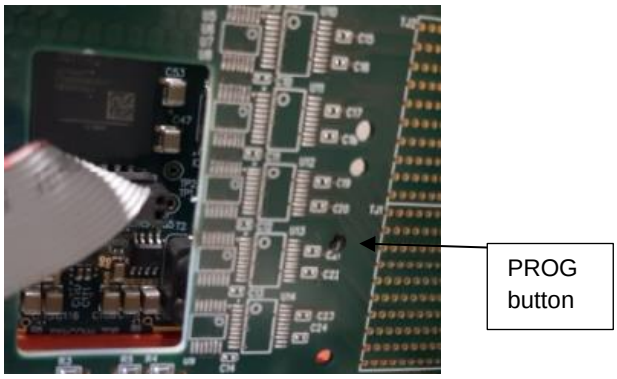
Test04 – Check USB

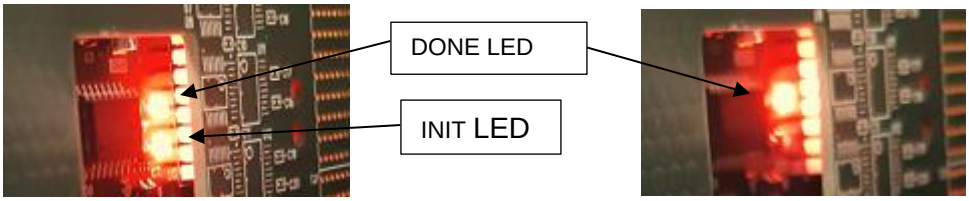
Check the speed of the USB ports. A speed of 5000 Mbps or higher is the indication for the use of the Super Speed TX and RX pairs. A speed of 480 Mbps (High Speed), 12 Mbps (Full Speed) or 1.5 Mbps (Low Speed) is the indication for the use of the D+/D- signal pair.
During the test some front panel USB connection have to be changed to test the USB1.1/2.0 interface lines of the two USB3.0 Super Speed (SS) ports.



Test05 – Check JTAG

Check JTAG by programming the SPI flash of the FPGA. And also check the core temperature of the FPGA in addition to VCCINT and VCCAUX, and tests the DONE and INIT LEDS.





These images are displayed during the test with the following text diagram:

```
PXCT Board                          |
            (3 openings in the PCB) |
                         |          |
+-------------+            V        |
|             |                     |
|             |        /--\         |
|             |        |  | DONE LED|
|             |        \--/         |
|             |                     |
| (Opening to |        /--\         |
| PXIeCOMe    |        |  | INIT LED|
| module)     |        \--/         |
|             |                     |
|             |      /--\           |
|             |      |  | PROG     | Push the PROG button using
|             |      \--/ button    | a non-conductive rod or shaft.
|             |                     |
|             |                     | Observe the DONE and INIT LEDs.
+-------------+                     |
-------------------------------------/
```

Test06 – Check Serial (COM)

Check the serial communication of the front panel COM port (SER0) and the serial interface to the FPGA (SER1).

Test07 – Check GPIO

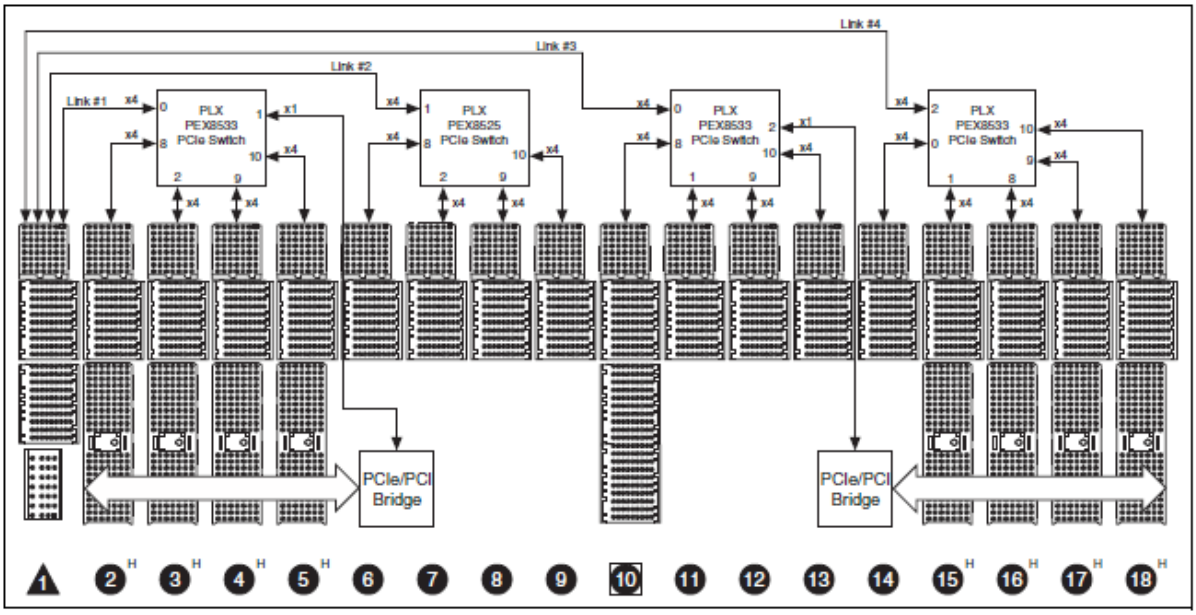
Check the COM Express GPI an GPO signals.

Test08 – Check I2C and SMBus

Check the onboard I2C connection to the flash memory at 0x54. And check the SMBus by reading the PXIe chassis ID EEPROM at 0x52 or a device at 0x2D.
The used PXIe chassis is a NI PXIe-1075, which has the backplane descriptor EEPROM at 0x52 and a backplane clocking CPLD at 0x2D

Test09 – Check PCI Express

Check the interface to the PXIe backplane. This is done by accessing the information regarding the PCI/PCI express devices in the system.
The PXIeCOMe provides four links of 4 lanes to the PXIe backplane. Every link should be connected to a PCIe device like the PEX8525 and PEX8533 (see shell command `lspci`) on the backplane of the NI PXIe-1075. So the link to these PEX8525 and PEX8533 devices should be 4 lanes wide and provide a speed of at least 2.5 GT/s.



Test10 – Check PXI

Check the interface to the PXI backplane using the two PXCT modules and check the PXI_TRIG[7:0], PXI_LBR6, PXI_GA[4:0] and PXI_STAR signals.

Test11 – Check TRIG

Check the interface to the front panel TRIG port using one PXCT module.

End of the tests

Wait for the testing to finish and finally check the results.

In case of error, you can repeat the tests one time more for the same board. If you need to repeat them more times, please report to the responsible of tests at CERN.

Once the results are checked, switch off the machine.

Test wrap up

mSATA SSD

Remove the mSATA SSD so it can be used during the next tests.

Lithium battery

Remove the lithium battery from its socket and provide it with the PXIeCOMe in the original package or a nonconductive bag.

Log files retrieval

When the testing of all the boards has finished, it is needed to deliver all the log files to CERN. To do so, please follow the instructions:
As the log files are written to the mSATA disk which is used during the tests of the boards the mSATA needs to be accessed using the last PXIeCOMe system under test.

1. Plug the provided USB memory stick in one of the PXIeCOMe USB ports.

2. Wait until CentOS automatically mounts the device. Use the file explorer to navigate to **/home/user/pts/log_pxiecome**

3. Select all the .zip files in this folder and copy them to the USB memory stick. To copy them, just right click and select **copy**. Using the file explorer, click on the USB device that appeared on the left column, and copy the .zip files using right click and selecting **paste**.

4. Click on the eject button on the left of the file explorer window and remove the USB memory stick.

5. Transfer the data to another computer with Internet access.

6. Finally, send the email to the responsible of tests at CERN.