
PREMESSA

FLX03 SO FAR (BEFORE MAY 2022)

- **Rifacciamo il punto di cosa e come bisogna installare su flx03 per riprodurre il setup di B161 e SR1**
 - Sono entrambi setup apparentemente in cui si possono runnare scan ...

- itkpix@flx03.le.infn.it

- Il filesystem:

- Afs / no nfs
 - Sotto home 96G liberi

- Installazioni attuali:

- Sotto /home/atlas

- tdaq/[tdaq-09-02-01](#) - nota che sotto /home/ c'e' il tar dell'installazione atlas-tdaq-921.tar.gz
 - tdaq-common/[tdaq-common-04-02-01](#)
 - [sw/lcg/](#)

Inoltre c'e' una /home/atlas-910 che si riferisce a una installazione di tdaq-09-01-00; buttare ?
13 G potenzialmente da liberare

- Sotto /home/itkpix

- itk-felix-sw (da <https://gitlab.cern.ch/itk-felix-sw/itk-felix-sw>) non sappiamo quale versione c'era originariamente, ma ora e' aggiornata (per errore) alla master
 - Nota la versione master richiede tdaq-09-04-00, non disponibile su flx03; setup.sh patched per chiedere [tdaq-09-02-01](#)

FLX03 SO FAR (BEFORE MAY 2022)

- itkpix@flx03.le.infn.it
 - Installazioni attuali:
 - Sotto /home/itkpix/itk-felix-sw
 - **RD53Emulator** (da <https://gitlab.cern.ch/itk-felix-sw/RD53Emulator>)
 - **Itk-monitor** da <https://gitlab.cern.ch/itk-felix-sw/itk-monitor>
 - Sw di Alessandra per istanziare un ISdictionary legato a una partizione IPC (inter-process communication)
 - **Itk-monitor-opc-server** (da <ssh://git@gitlab.cern.ch:7999/itk-felix-sw/itk-monitor-opc-server.git> Not found by browsing <https://gitlab.cern.ch/itk-felix-sw>) - da Alessandra & co
 - **ipc/ipc_root.ref un unico file ...**

FROM DEC 2021 GENOVA DAQ/DCS WORKSHOP

Jira Firmware and software updates for YARR/pixel users

- From P.Morettini (dic 2021 <https://indico.cern.ch/event/1097890/>)
 - Ambiente di compilazione (comune a DAQ e DCS): include tdaq e lcg
 - Le versioni proposte sono diverse da quelle su flx03, ma l'ambiente e' identico (non basato su cvmfs)
 - Installazione software FELIX
 - `git clone ssh://git@gitlab.cern.ch:7999/atlas-tdaq-felix/software`
 - Installazione firmware FELIX
 - Installazione sw Yarr
 - Istruzioni suggerite:
 - <https://cds.cern.ch/record/2690124/files/ATL-COM-DAQ-2019-160.pdf> (Argonne, M. Trovato & co)
 - <https://ade-pixel-group.web.cern.ch/Felix/rd53a-tests.php> (SR1, Carlos & co)
- Felix releases:
 - <https://atlas-project-felix.web.cern.ch/atlas-project-felix/user/releases.html>

STATUS JUNE 6TH 2022

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - *software* =====>>> *Felix sw*
 - *YARR* =====>>> *YARR daq applications*
 - *itk-felix-sw* =====>>> *Carlos & co daq applications*
 - *felix-driver* =====>>> *collecting driver for FLX-712*
 - *downloadedFirmware* =====>>> *collecting fw for FLX-712*

- Driver seems to be installed correctly, 2 PCI interfaces seen
- FW loaded, and recognised
- Felix card started; minimal diagnostic tools (flx-info) shows coherent fw and PCI cards
- Elink configuration done (no diagnostics, but no complains) following instructions

NEXT steps:

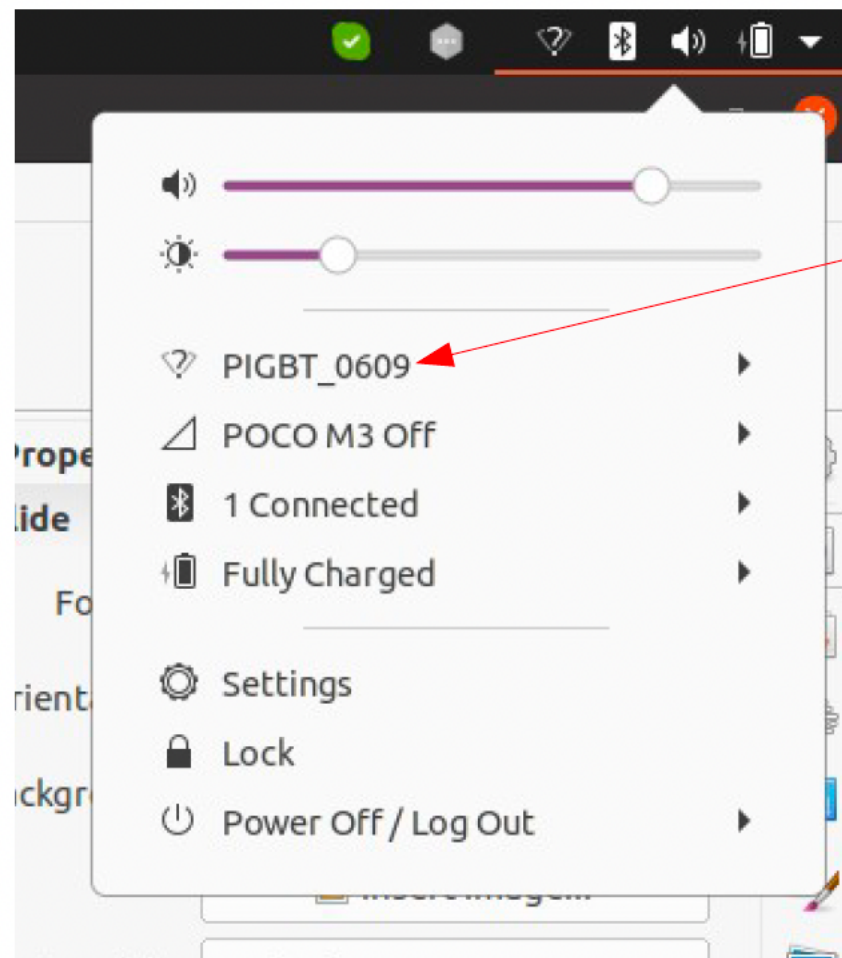
- configure IpGBT Done
- RD53a Voltage trimming
- Start Felix core Done
- Try scans

FELIX READOUT

For this week

- *Next: configure IpGBT*

Programming the VLDB+ with PiGBT



Connect to the PiGBT WiFi

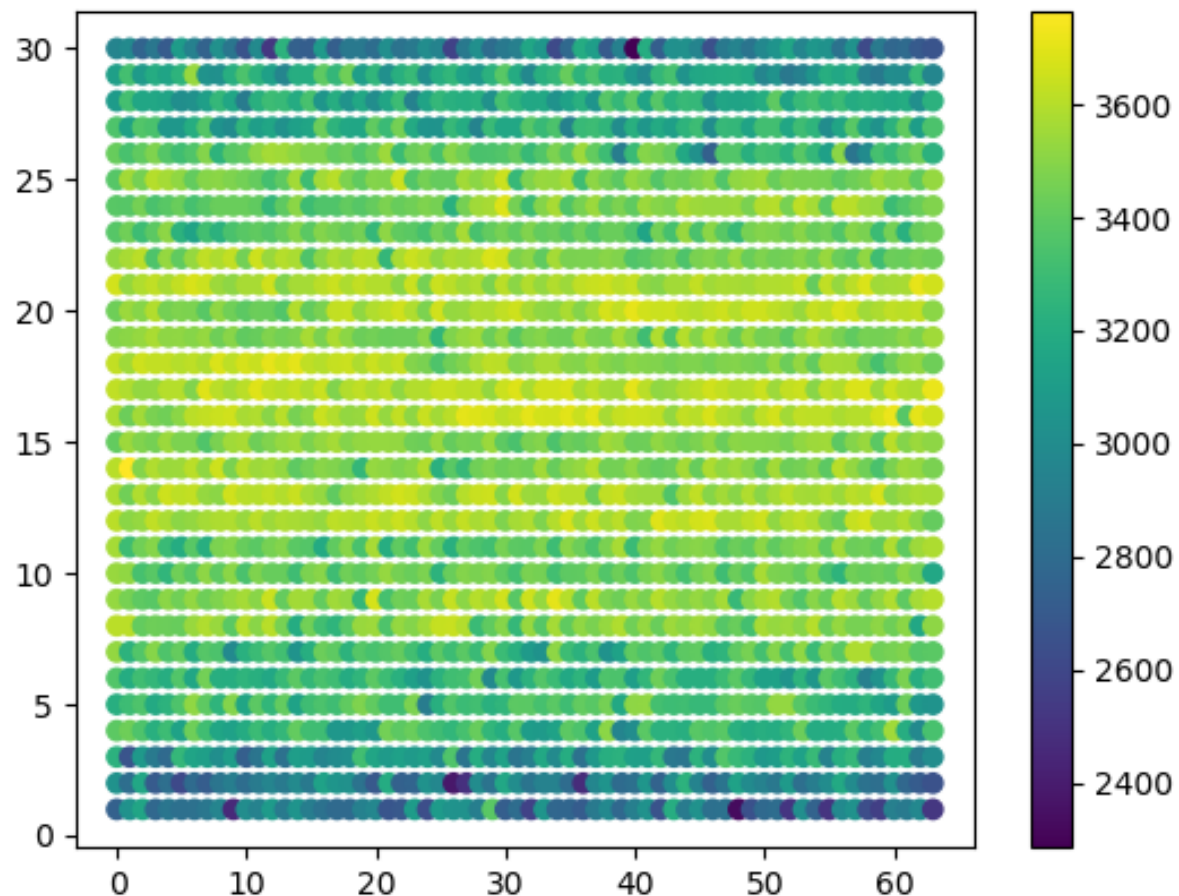
Any other way ???

Instruction on how to configure
VLBD+ available (EJS + AP)

- Voltage trimming / start felix-core / run scans

CONFIGURING LPGBT

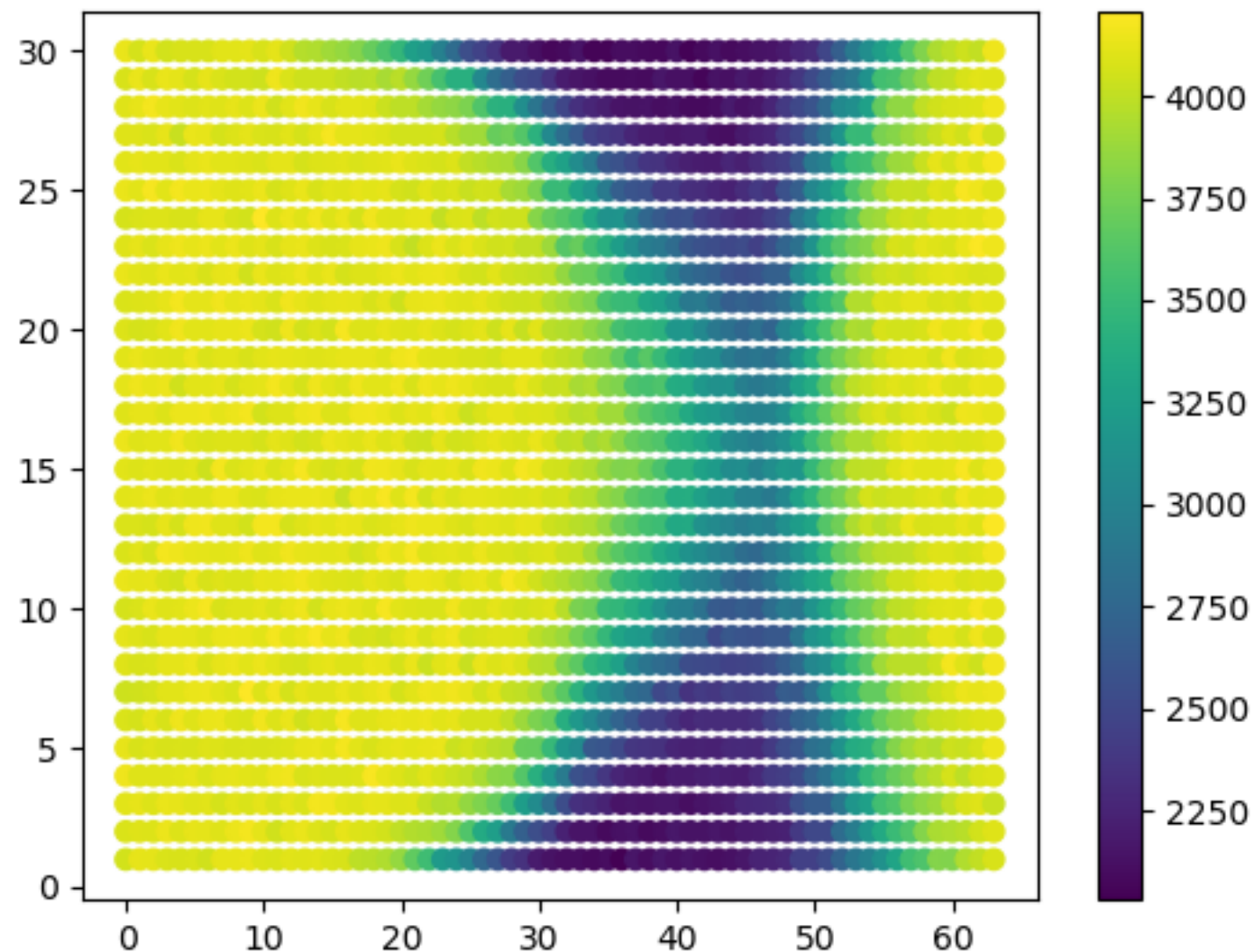
- Following info in <https://pigbt.web.cern.ch/manual/index.html>
- <http://193.206.152.72:8080>
- Info on <https://lpGBT-support.web.cern.ch/t/status-wait-pll-lock-wait-vdd-higher-than-0v90/752/12>



CONFIGURING LPGBT

- After sorting out the problems (connector VTX+ ME unplugged)

Useful info in
<https://lpgbt-support.web.cern.ch/t/status-wait-pll-lock-wait-vdd-higher-than-0v90/752>



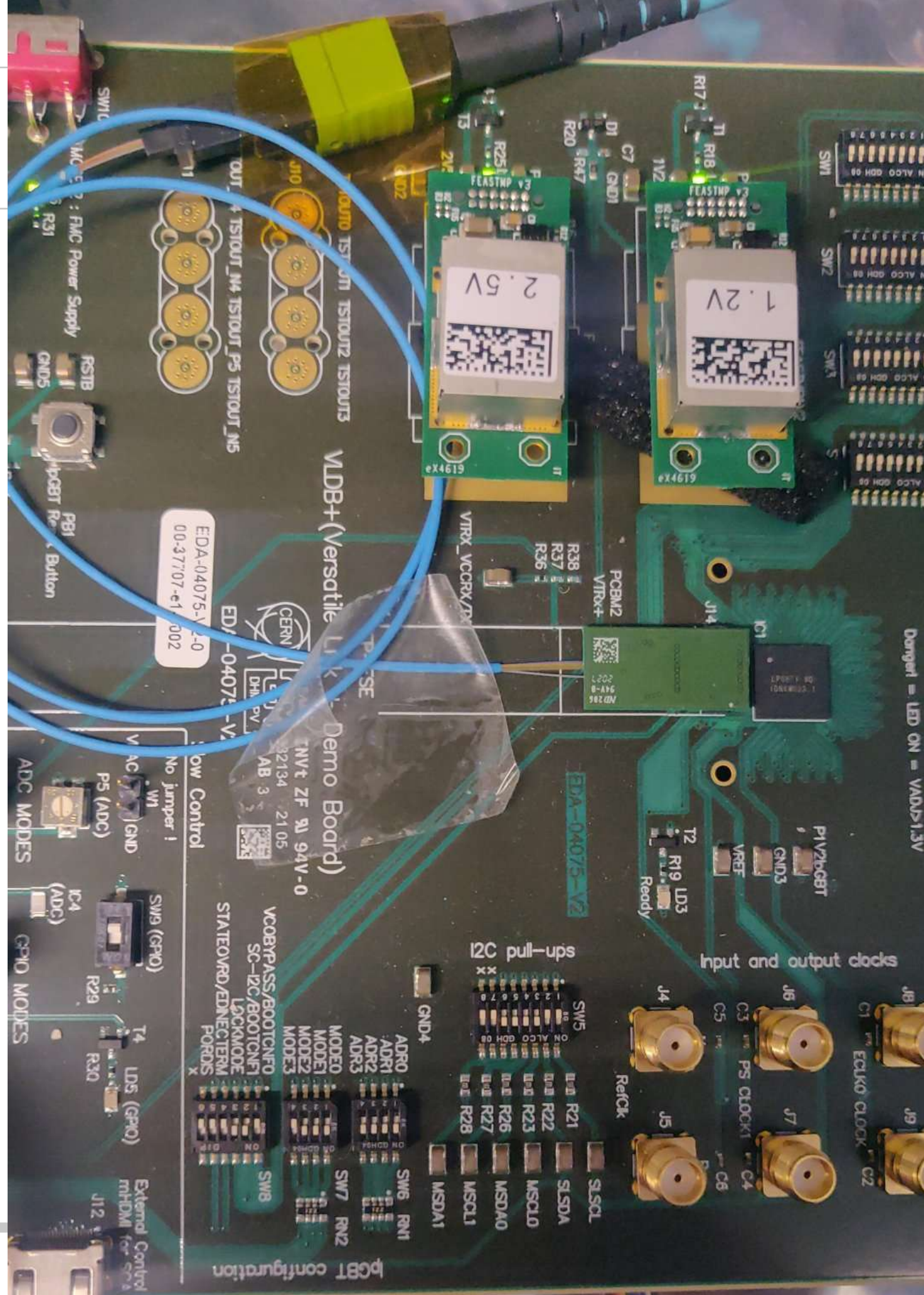
HARDWARE SETUP - MAY 2022

$12V, I_{\text{limit}} = 1A$

$12V,$
 $I_{\text{limit}} = 1A$

V fornita da un unico canale,
Assorbimento 0.34 A [tra 0.33 e 0.48]

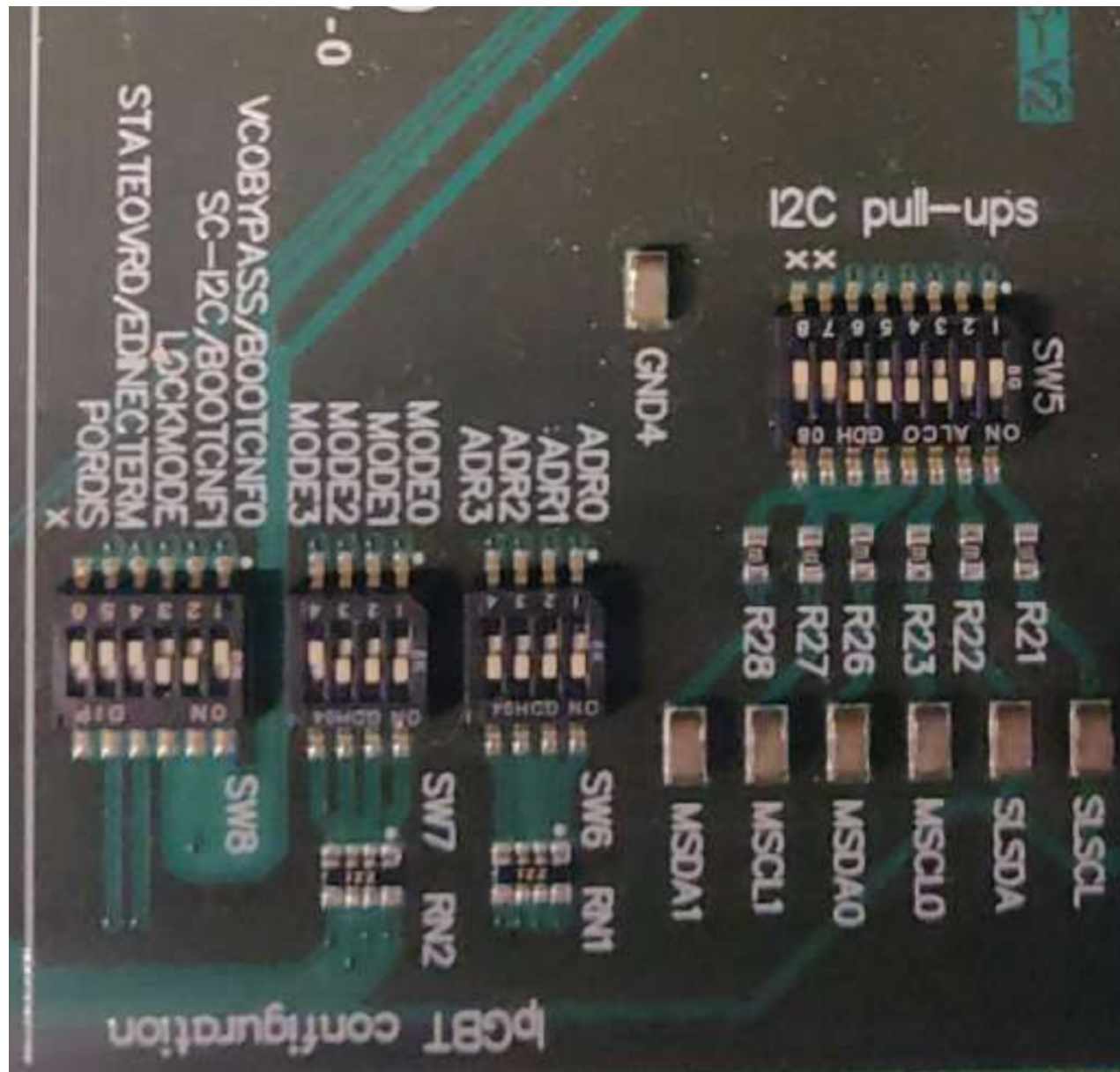
- VLDB+ v2



Genova

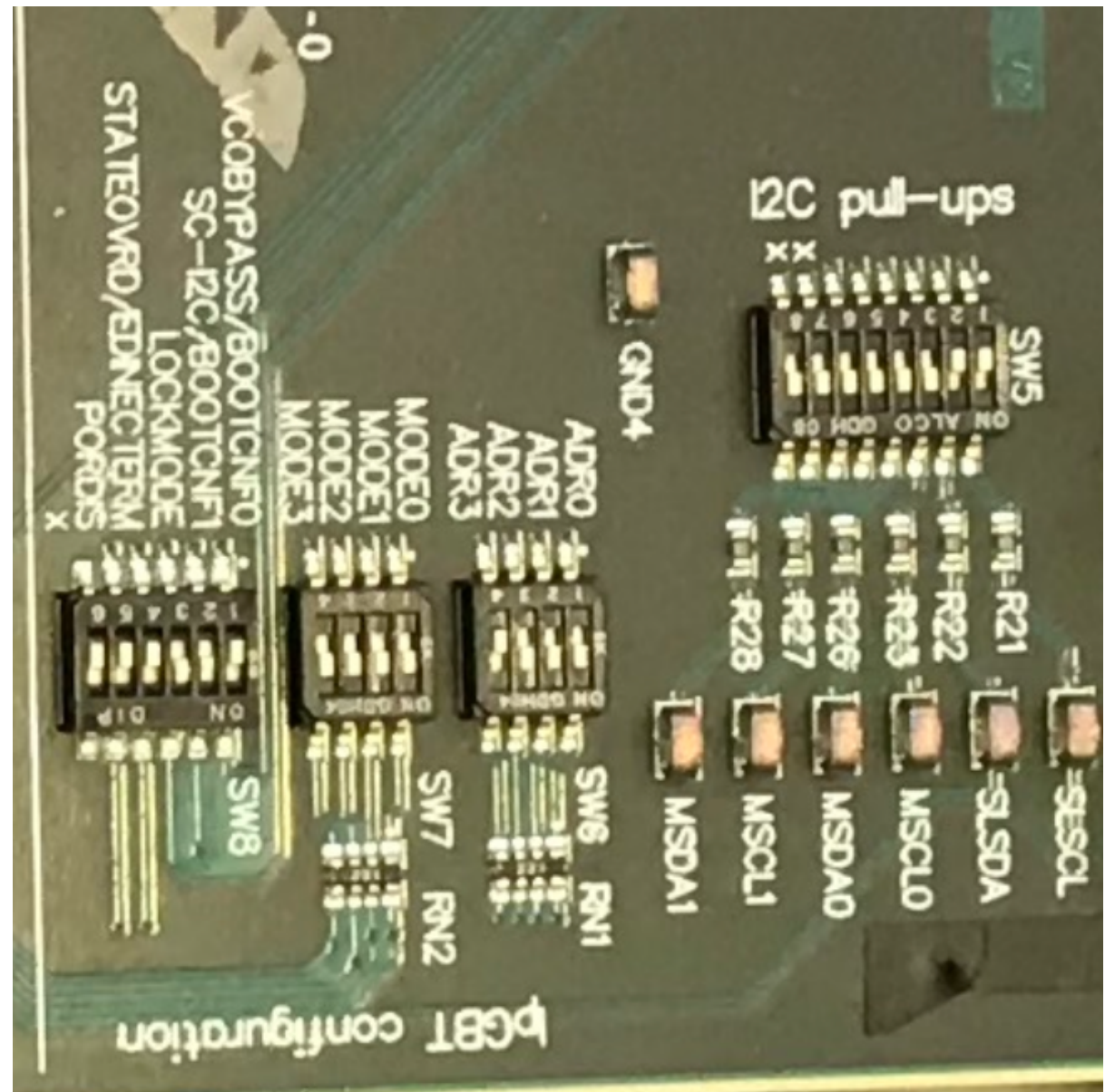
VLDB+ v2

Genova



VLDB+ v2

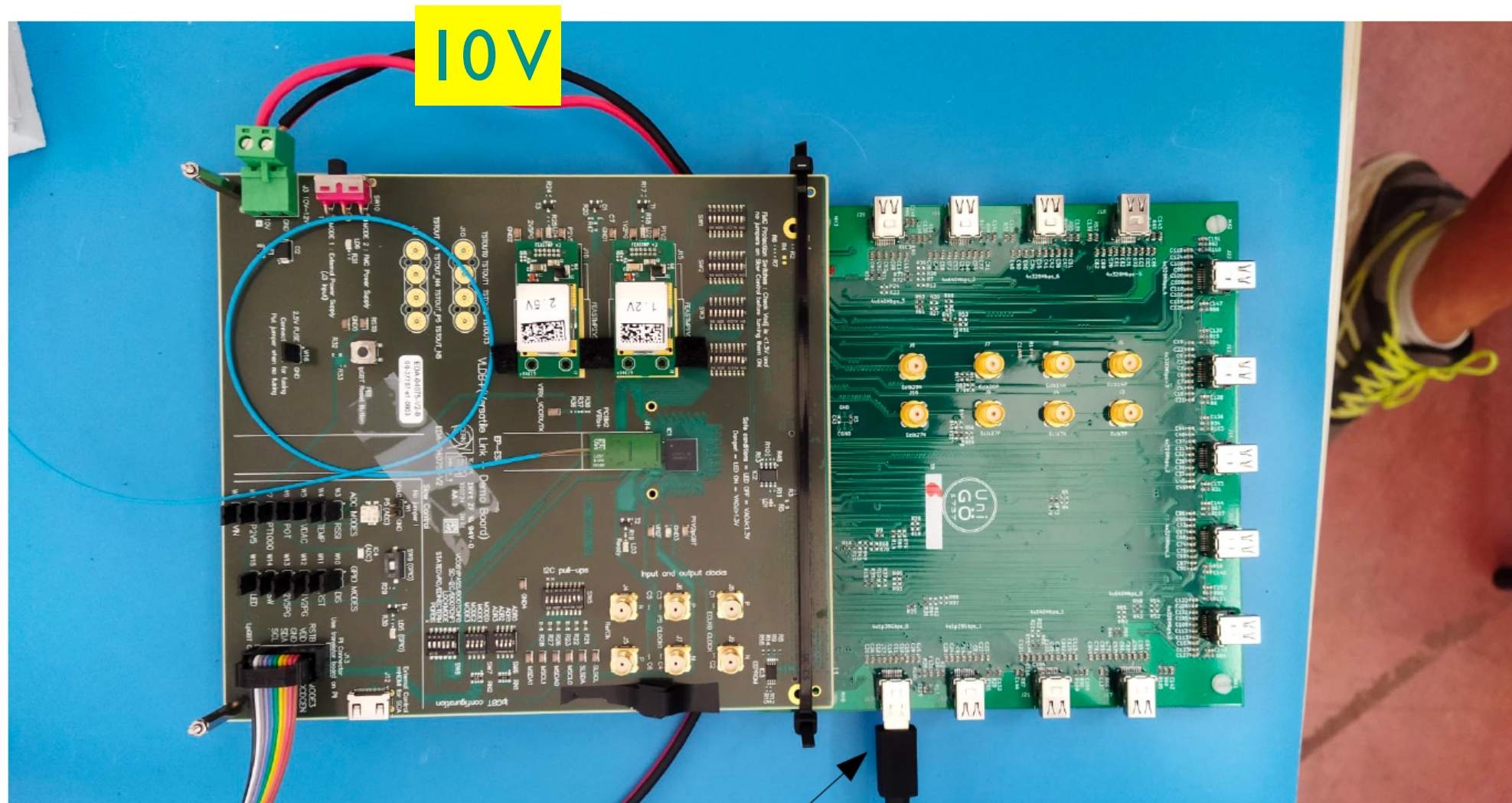
Lecce



VLDB+ v2

HARDWARE SETUP - EJS INSTRUCTIONS

Building the setup



Showing the connection between the VLDB+ and the BOB
Also, notice the connector to the chip

HARDWARE SETUP - EJS INSTRUCTIONS

- In http://www.le.infn.it/~chiodini/allow_listing/itk/daq/DAQFelixVldbSetup.pdf

Programming the VLDB+ with PiGBT



Set voltage to 5V

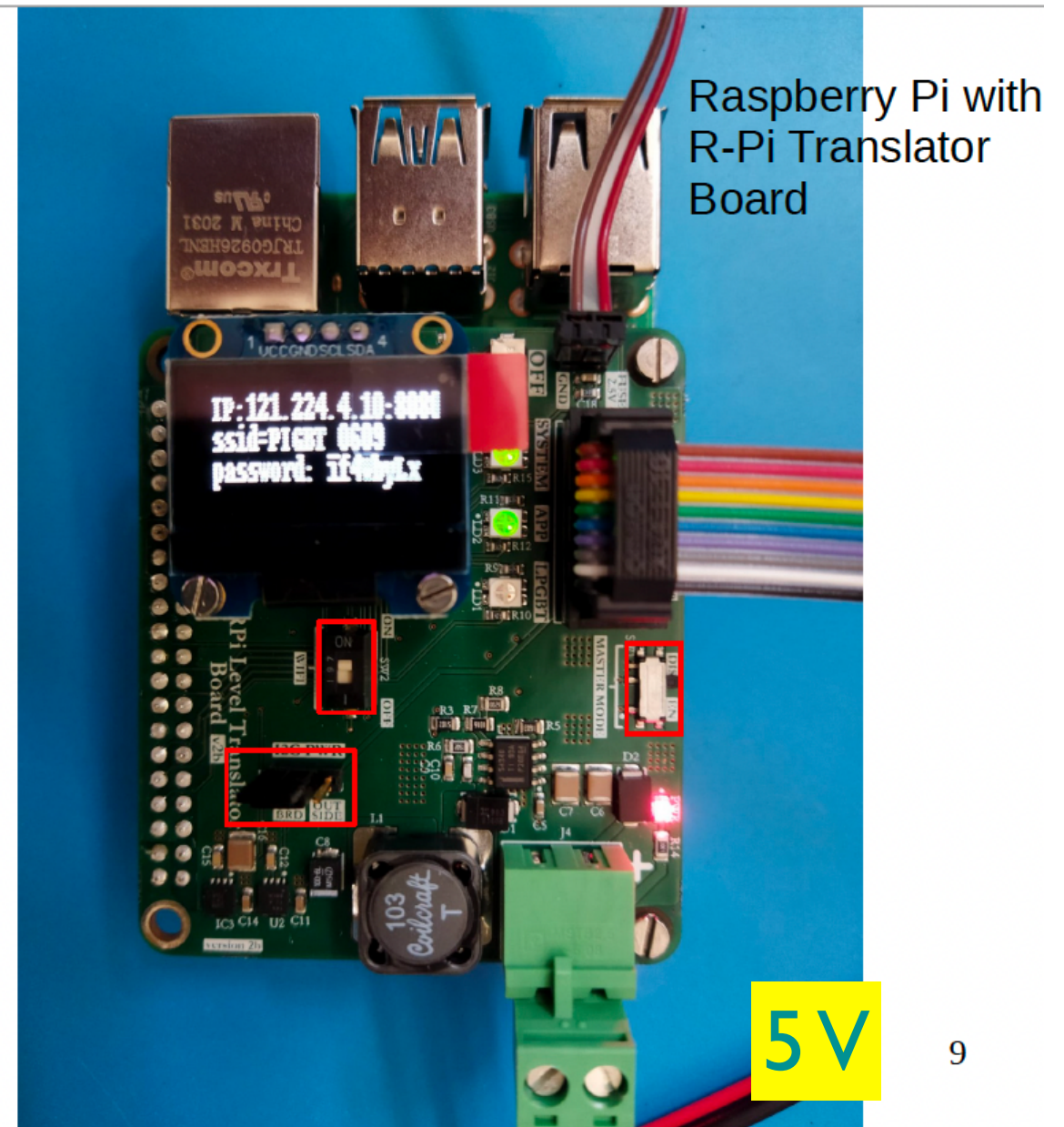
Check the switches and jumper as in figure.

Power up the VLDB+ (10V)

Power up the PiGBT (5V)

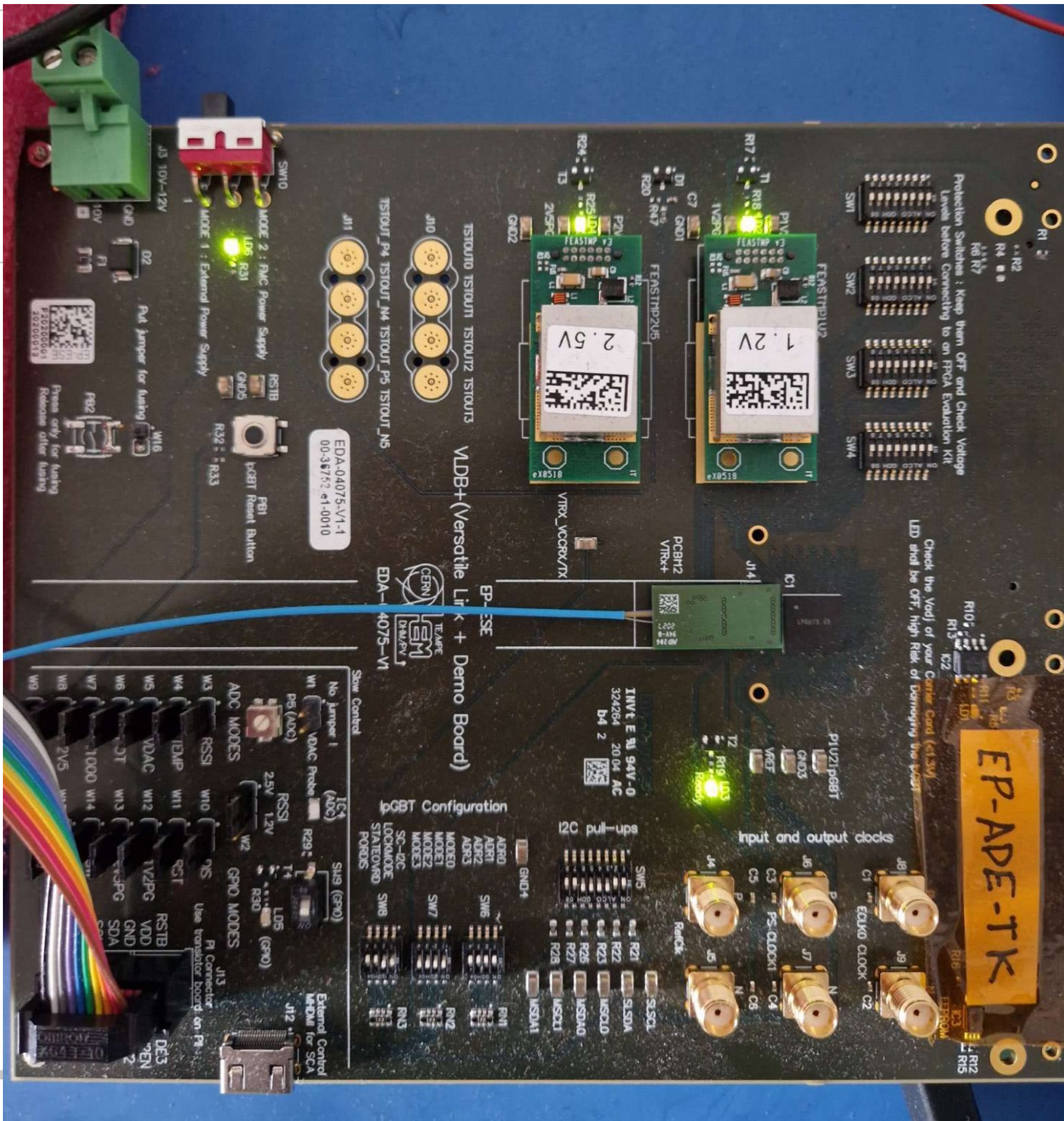
Wait for initialization.

The display shows the IP address, the name of the WiFi and its password



NOTE: 5V was wrong, see instructions, must be 12V

BI6I VLDB+ v1



Stefania Spagnolo



2022-05-30

LINK ALIGNED

- MPO connector, pins removed =>
 - Lock della IpGBT only with channel 12 from Felix used as transmitter from Felix to VLDB+
- (transmitter) From Felix 12 - 7 to VLDB+
- From Felix 24 - 6 to VLDB+ (transmitter)
-

```
(python_env) [itkpix@flx03 software]$ flx-info LINK  
Card type : FLX-712  
Firmw type: PIXEL
```

```
Link alignment status
```

```
-----  
Channel | 0  1
```

```
-----  
Aligned | YES NO
```

```
Channel | 2  3
```

```
-----  
Aligned | NO  NO
```

EXTRA

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - ***felix-driver*** **====>>> collecting driver for FLX-712**
 - *tdaq_sw_for_Flx-4.9.0-2dkms.noarch.rpm*
 - Latest available version as recommended in https://ade-pixel-group.web.cern.ch/Felix/rd53a-tests.php#check_felix
 - Uninstalled previous one (4.5.0), installed, started

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - ***felix-driver*** **====>>> collecting driver for FLX-712**
 - *tdaq_sw_for_Flx-4.9.0-2dkms.noarch.rpm*
 - Latest available version as recommended in https://ade-pixel-group.web.cern.ch/Felix/rd53a-tests.php#check_felix
 - Uninstalled previous one (4.5.0), installed, started

```
(python_env) [itkpix@flx03 software]$ rpm -qa | grep tdaq
tdaq_sw_for_Flx-4.9.0-2dkms.noarch
```

Driver in use

```
(python_env) [itkpix@flx03 software]$ cat /proc/flx
```

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - **downloadedFirmware =====>>> collecting fw for FLX-712**
 - *FLX712_PIXEL_4CH_CLKSELECT_GIT_phase2-master_FLX-1825_LpGBTAlignment_rm-5.0_2227_220314_07_38.tar.gz*
 - *From the link to a CERNBOX repository on <https://its.cern.ch/jira/browse/FLXUSERS-433>*
 - *Following Ismet suggestions on May 25th, 2022*
 - *Also instructions to use Yarr with this fw and Felix sw on <https://cds.cern.ch/record/2690124/files/ATL-COM-DAQ-2019-160.pdf>*
 - *Loaded with Vivado, disabling the use of debug file*
 - *Vivado (in /home/Xilinx/) is 2017.1 reading debug file in xml format*
 - *Currently (and also for 220314 fw) debug files in json format*
 - **Need Vivado >= 2018.3 =====>>> planning to update to this version**

ITKPIX@FLX03

- **Vivado, how to**

- `ssh -XY root@0`
- `ItkPix1670`
- `Cd /home/Xilinx/`
- `Cd Vivado/2017.1`
- `Source .settings64-vivado.sh`
- `./bin/hw_server &`
- `./bin/vivado &`
 - *Open Hardware manager*
 - *Setup (auto-connect)*
 - *xcku115_0 -> program*
- *Loaded with Vivado, disabling the use of debug file*
 - *Vivado (in /home/Xilinks/) is 2017.1 reading debug file in xml format*
 - *Currently (and also for 220314 fw) debug files in json format*
 - *Need Vivado >= 2018.3 =====>>>> planning to update to this version*

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - **YARR** =====>>> **YARR daq applications**
 - Branch ***devel_rd53a_felixNetio_multichip_rebase*** as recommended in <https://its.cern.ch/jira/browse/FLXUSERS-433>
 - P.Morettini recommendation was `devel_rd53a_felixNetio_multichip_develbase`
 - **NOTE:** *currently installed version does not have locaDB, we may need to move to another version; options are:*
 - `devel_rd53a_felixNetio_multichip_develbase`
 - ***devel_rd53a_felixNetio_multichip_rebase_master***
 - No compilation errors other than
 - *uint8_i was not defined (in LCBUtils.h) sorted out with #include <stdint.h> in LCBUtils.h*

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*

- *itk-felix-sw* =====>>> *Carlos & co daq applications*

- *+itk-monitor*

A.Palazzo IS

- *+itk-monitor-opc-server*

- *+RD53Emulator*

- Git clone from master +

- In the setup.sh file

```
#TDAQPATHS=(/home/atlas /cvmfs/atlas.cern.ch/repo/sw/tdaq)
TDAQPATHS=(/cvmfs/atlas.cern.ch/repo/sw/tdaq)
```

```
#LCGPATHS=(/home/atlas/sw/lcg/releases /cvmfs/sft.cern.ch/lcg/releases)
LCGPATHS=(/cvmfs/sft.cern.ch/lcg/releases)
```

This allows to use the cvmfs installations of tdaq tdaq-common and lcg otherwise present on this server but only for old versions

Chip emulator and scans on
emulated data work fine

IS service read/write works fine

Checks by Alessandra

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*
 - **software** **====>>> Felix sw**

Downloaded from gitlab master branch May 25th 2022
(export REGMAP_VERSION=0x0500,
NOTE: export REGMAP_VERSION=0x0500 added to setup.sh)
Built following README instruction on gitlab,
but x86_64-centos7-gcc11-opt
instead of x86_64-centos7-gcc8-opt (bug in README)

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*

- **software** **====>>> Felix sw**

Downloaded from gitlab master branch May 25th 2022

(export REGMAP_VERSION=0x0500,

NOTE: export REGMAP_VERSION=0x0500 added to setup.sh)

Built following README instruction on gitlab,

but x86_64-centos7-gcc11-opt

instead of x86_64-centos7-gcc8-opt (bug in README)

```
[itkpix@flx03 software]$ source setup.sh
```

Setting up FELIX (developer)

Setting up FELIX (developer)

- REGMAP: 0x0500

- BINARY_TAG: x86_64-centos7-gcc11-opt

- LCG_FULL_VERSION: 101

- PYTHON: /cvmfs/sft.cern.ch/lcg/releases/LCG_101/Python/3.9.6/
x86_64-centos7-gcc11-opt/bin/python

FELIX BOARD

- After installing Felix sw

- **INIT card**

- source /home/itkpix/atlas-tdaq-felix/software/setup.sh

- flx-init -c X

- **OK ??**

- **In ATL-COM-DAQ-2019-160**

- flx-init to be run only once,

- Otherways reboot needed

- X = card number, 0 in our setup

```
(python_env) [itkpix@flx03 software]$ flx-init -c X
2022-05-27 15:56:47 Opening card 0 (dev 0)...
2022-05-27 15:56:47 Card type: FLX-712
2022-05-27 15:56:47 Firmware : PIXEL
2022-05-27 15:56:47 Clock   : Local
2022-05-27 15:56:47 FLX soft reset
2022-05-27 15:56:47 Configuring Si5345...
2022-05-27 15:56:47 Si5345 hard reset
2022-05-27 15:56:51 Si5345 configured (525 registers)
2022-05-27 15:56:51 Enabling Si5345 output
2022-05-27 15:56:52 Si5345: LOS register = 0x66
2022-05-27 15:56:52 Si5345: Sticky LOS register = 0xFF
2022-05-27 15:56:52 Si5345: LOL register = 0x0C
2022-05-27 15:56:52 Si5345: Found lock within 1 secs
2022-05-27 15:56:52 Si5345: Sticky LOL register = 0x0C
2022-05-27 15:56:52 Links soft reset
2022-05-27 15:56:52 Setting up links...
2022-05-27 15:56:58 Links set up
2022-05-27 15:56:58 WARNING: 4 channels not aligned
2022-05-27 15:56:58 Resetting MiniPODs...
2022-05-27 15:56:58 NOTE: MINIPOD-TX3 not installed
2022-05-27 15:56:58 NOTE: MINIPOD-TX4 not installed
2022-05-27 15:56:58 NOTE: MINIPOD-RX3 not installed
2022-05-27 15:56:58 NOTE: MINIPOD-RX4 not installed
2022-05-27 15:56:58 MiniPOD resets done
```

ITKPIX@FLX03

- /cvmfs/ installed => tdaq and lcg available from there (any required version)
- Created a new directory to install everything consistently from scratch
 - */home/itkpix/atlas-tdaq-felix*

- **software** =====>>> **Felix sw**

```
[Itkpix@flx03 software]$ flx-info  
Or  
[Itkpix@flx03 software]$ flx-info -c 0
```

Instead

```
[Itkpix@flx03 software]$ flx-info -c 1  
#### -c: card number out-of-range
```

General information

```
-----  
Card type      : FLX-712  
Firmware type  : PIXEL  
Reg Map version : 5.0  
FW version date : 22/03/14 07:38  
GIT tag        : rm-5.0  
GIT commit number : 2227  
GIT hash       : 0x000000008be372f9  
Active F/W partition : 3  
Number of interrupts : 8  
Number of descriptors : 3  
Number of channels  : 2  
Number of endpoints : 2  
GBT Wrapper generated : YES  
MAIN clock source   : LCLK fixed  
Internal PLL Lock   : YES
```

Output of lspci:

```
-----  
07:00.0 Communication controller: CERN/ECP/EDU Device 0428  
08:00.0 Communication controller: CERN/ECP/EDU Device 0427
```

TTC (ADN2814) status

```
-----  
Bit D5=1: No light arriving. Check fiber connection to FLX card  
(Raw value of ADN2814 MISR register: 0x29)
```

good

good

good
Driver
OK

FELIX BOARD

- **Configure the FELIX elinks**

- Elinkconfig (GUI from Felix-sw) does not support IpGBT
- M.Trovato: use config_encoding_decoding.sh (his cernbox, see ATL-COM-DAQ-2019-160)
 - Copied in /home/itkpix/atlas-tdaq-felix/software/flx-firmware-tester/config_encoding_decoding.sh
 - Run with
 - source flx-firmware-tester/config_encoding_decoding.sh 0
 - => card 0
 - => inside: loop over 

```
LINK_MIN=0
LINK_MAX=1 # total channels / 2 - 1 (using 4CH fw => 4/2-1)
DEC_EGROUP_MIN=0
DEC_EGROUP_MAX=6
ENC_EGROUP_MIN=0
ENC_EGROUP_MAX=4
```
 - Set registers
 - **OK, no errors/warnings but also no diagnostics**

CVMFS INSTALLATION

From A. Forte

- `yum install https://ecsft.cern.ch/dist/cvmfs/cvmfs-release/cvmfs-release-latest.noarch.rpm`
- `yum install cvmfs cvmfs-auto-setup cvmfs-init-scripts -y`
- `cvmfs_config chksetup`
- `cvmfs_config setup`

- `cat > /etc/cvmfs/default.local<<EOF`
- `CVMFS_REPOSITORIES=atlas.cern.ch,atlas-condb.cern.ch,atlas-nightlies.cern.ch`
- `CVMFS_CACHE_BASE=/data/cache/cvmfs2`
- `CVMFS_QUOTA_LIMIT=50000`
- `CVMFS_HTTP_PROXY="http://squid.le.infn.it:3128;DIRECT"`
- `CMS_LOCAL_SITE=T1_IT_CNAF`
- `EOF`

- `echo "/cvmfs /etc/auto.cvmfs" >> /etc/auto.master`
- `systemctl restart autofs`

- `cd /cvmfs/atlas.cern.ch`