EUROPEAN SPALLATION SOURCE

E-pickup
Critical Design Review

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ESS LLRF Critical Design Review, Lund

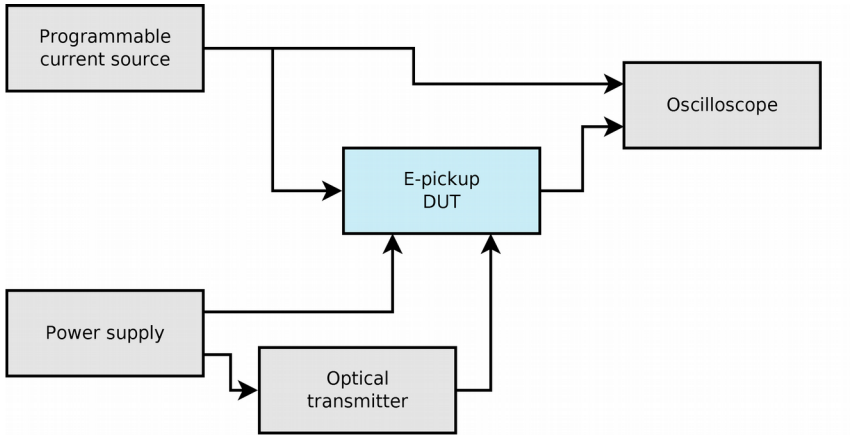
Agenda

- Tests of the prototype
- Device manufacturability
- Procurement, production, delivery
- Planned tests and measurements

Tests of the prototype

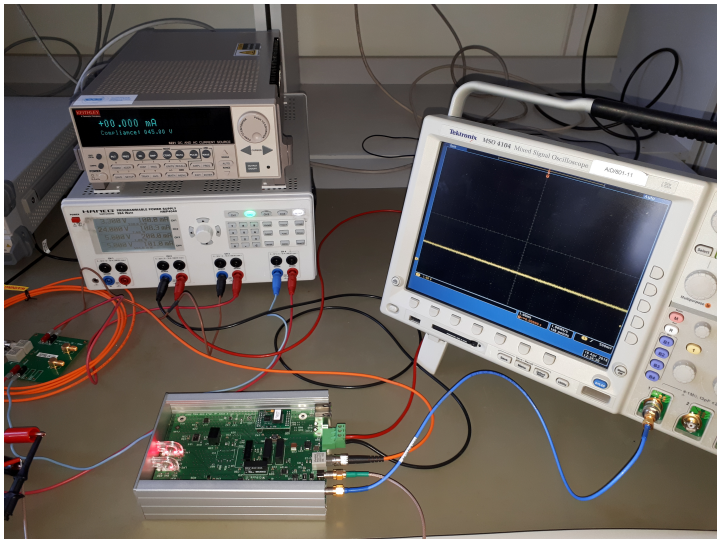
The testing procedure consisted of analysis of analog output signal from e-pickup device:

- the input constant current signal of ±10mA and compliance around +45V
- the optical signal was delivered from evaluation board
- analog output signal was measured using oscilloscope



Results:

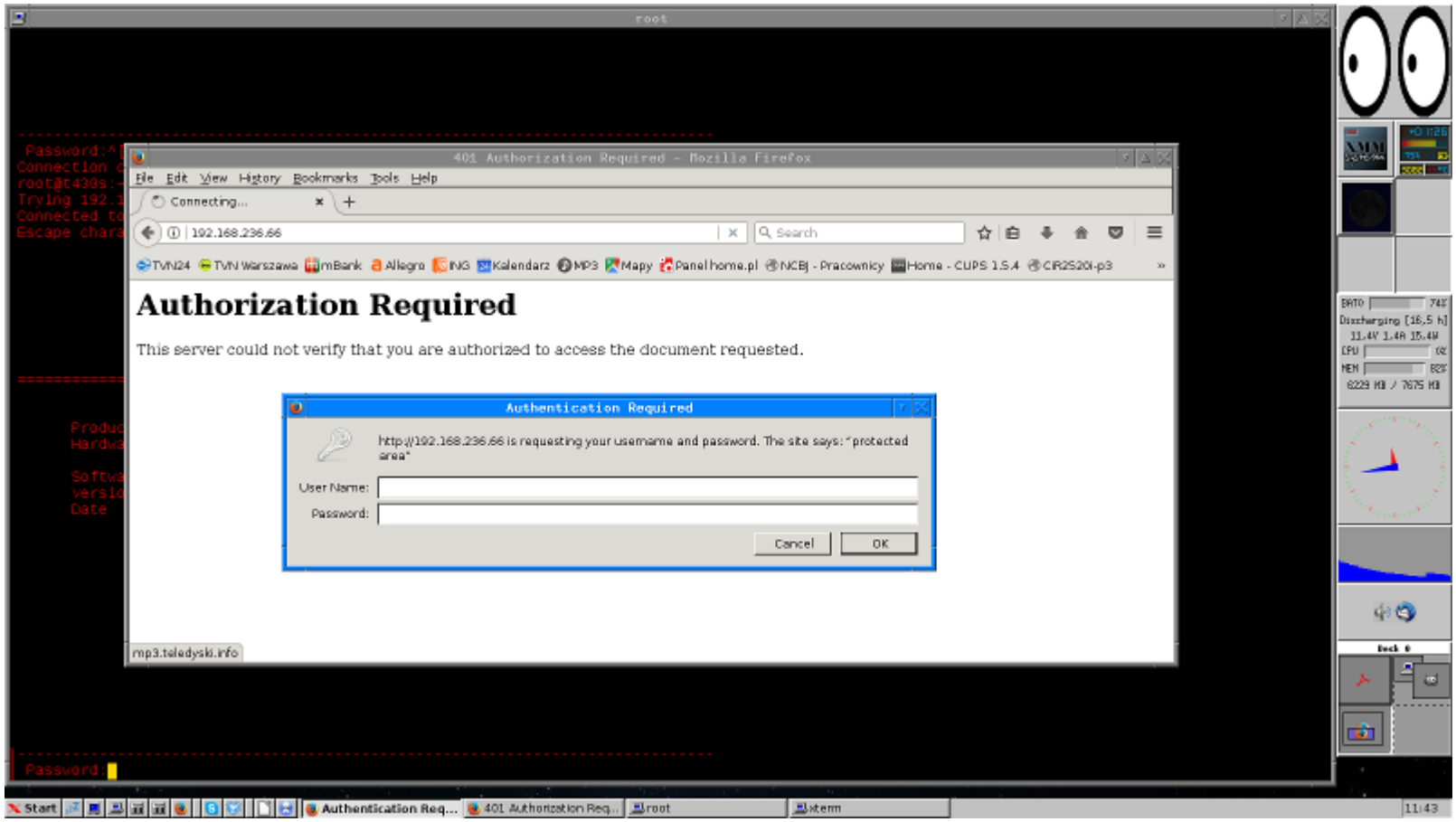
- in principle, the device is working correctly
- analog output is proportional to the input current
- when input signal reaches approximately -4.7mA LED of the interlock=1 is on. Analog output signal is still proportional.
- when operating around input signal 0f -4.7mA, one can observe rapid LEDs blinking indicating two states (interlock=0 and interlock=1) - **We suggest to include the hysteresis on LEDs comparators**
- no additional designing or manufacturing problems
- one can only consider **moving around 10 mostly passive components from bottom to top layer** to help assembly of the boards.



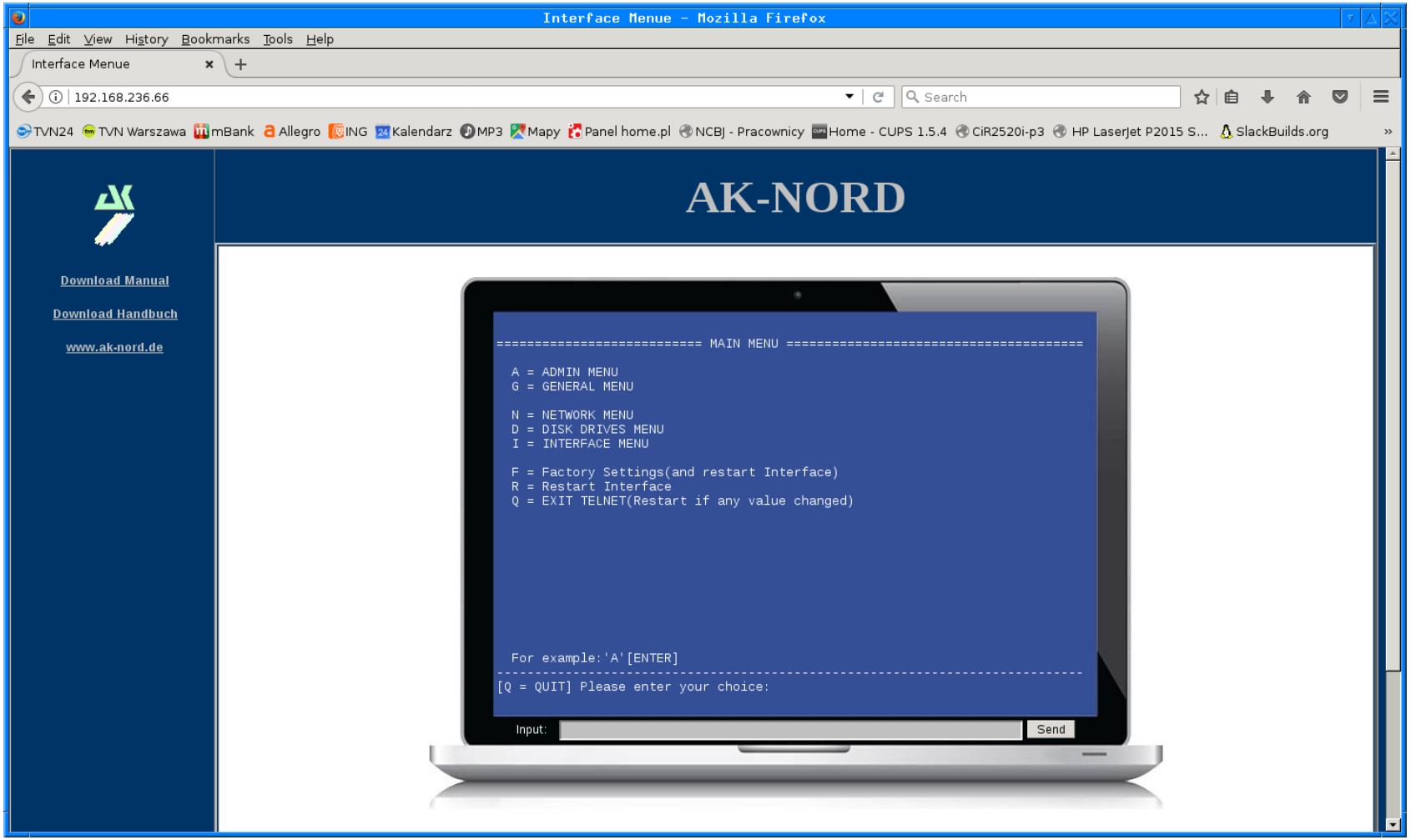
Network configuration

```
root@t430s:~# nmap 192.168.236.66

Starting Nmap 7.12 ( https://nmap.org ) at 2018-01-16 11:37 CET
mass_dns: warning: Unable to determine any DNS servers. Reverse DNS is disabled. Try using --system-dns or specify valid servers with --dns-
servers
Nmap scan report for 192.168.236.66
Host is up (0.0038s latency).
Not shown: 987 closed ports
PORT      STATE SERVICE
21/tcp    open  ftp
23/tcp    open  telnet
80/tcp    open  http
443/tcp   open  https
515/tcp   open  printer
990/tcp   open  ftps
1002/tcp  open  windows-icfw
3000/tcp  open  ppp
3001/tcp  open  nessus
9100/tcp  open  jetdirect
9101/tcp  open  jetdirect
10001/tcp open  scp-config
10002/tcp open  documentum
MAC Address: 08:BB:CC:05:D2:62 (Ak-nord EDV Vertriebsges. mbH)

Nmap done: 1 IP address (1 host up) scanned in 0.29 seconds
```

Network configuration



Network access



Network access

```
root@t430s:~# telnet 192.168.236.66
Trying 192.168.236.66...
Connected to 192.168.236.66.
Escape character is '^]'.




========================== PASSWORD MENU ==================================


      Product           = DEVICE SERVER
      Hardware          = XT-PICO-SXL-EF-02

      Software          = AK-STACK-XXL/SXL-EF
      Version           = 1.8.5
      Date              = 03.03.2017




--------------------------------------------------------------------------
 Password:
```

Device manufacturability

Manufacturability of the device was checked:

- all components that are utilized in the design were available
- no long lead times
- reasonable MOQ (minimum order quantity)
- PCB is manufacturable in Euro Circuit company, that is able to produce printed circuit board with provided stackup
- mechanical enclosure drawings were not provided, that's why its availability was not validated

Procurement, production, delivery

- analysis of the changes made to the device schematics and PCB layout (if any) **[0.5 month]**
- verification of the production files, including GERBER production files of the PCB, pick and place file for automatic components placement, bill of materials and assembly drawings of the PCB **[0.5 month]**
- call for tender for PCB production and assembly **[1 month]**
- call for tender for mechanical enclosure manufacturing and delivery **[1 month]**
- production of elements in external companies **[2 months]**
- visual inspection of delivered elements of the device **[0.25 month]**
- DC electrical measurements of delivered PCBs **[0.25 month]**
- assembly of the devices **[2 month]**
- functional tests of devices **[2 month]**
- delivery to ESS partner **[1 month]**

Planned tests and measurements

Following tests and measurements are foreseen to be performed by PEG:

- on components delivered from external manufacturers:
  - visual inspection of delivered elements of the device:
    - PCB manufacturing defects;
    - components placement on PCB;
    - soldering quality check;
    - mechanical enclosure manufacturing defects.
  - DC electrical measurements of delivered PCBs:
    - PCB connection to power supply;
    - measurements of low voltages generated on device, when powered on;
- on assembled devices:
  - visual inspection of assembled devices.
- automated functional tests of devices connected to test setup:
  - Ethernet communication with XT-Pico;
  - complete tests of functions embedded in XT-Pico firmware;
  - analog output signal analysis.

Results of all completed tests and measurements will be contained in final manufacturing report.

The End

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Thank You for Your Attention !