Integration of a Specific Hardware through HTTP-server

MOPGF111

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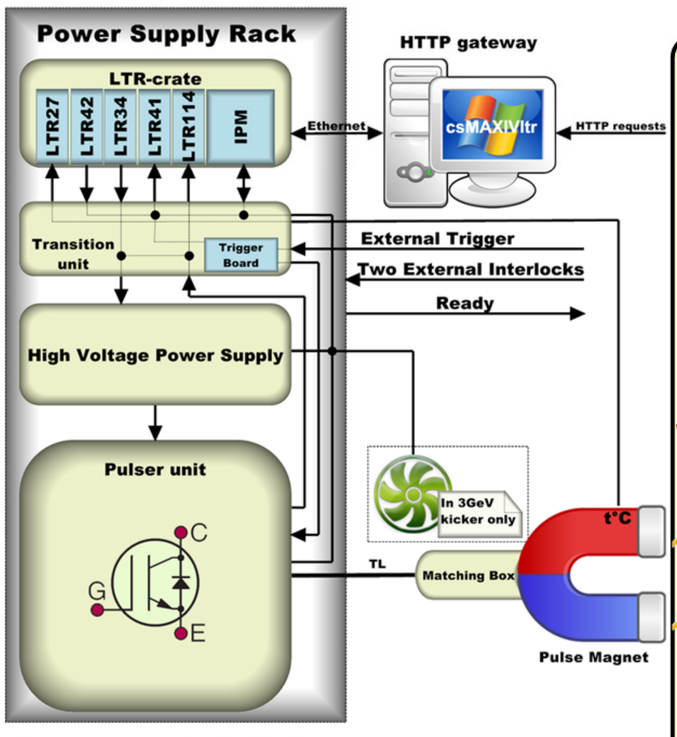

General PPS structure

MAX IV and Solaris are new synchrotrons third generation. MAX IV synchrotron consist of 1.5 GeV storage ring, 3.0 GeV storage ring and linac. Structure of storage rings contains several pulse magnets (kicker and pinger). Control system of pulse power supplies based on LTR crate with several modules (ADC, DAC, input/output registers etc.). LTR crate is product Russian firm L-CARD. In order to communicate with crate native LTR-server is used. LTR-server is a Windows application based on use of sockets. Control system of MAX IV and Solaris uses TANGO. For integration LTR-crates in final structure, special software gateway (csMAXIVltr) is used. This gateway is a set of several specific Windows applications implemented by using Qt5 libraries. Gateway allow communicating TANGO- server with crate through built-in HTTP-server.

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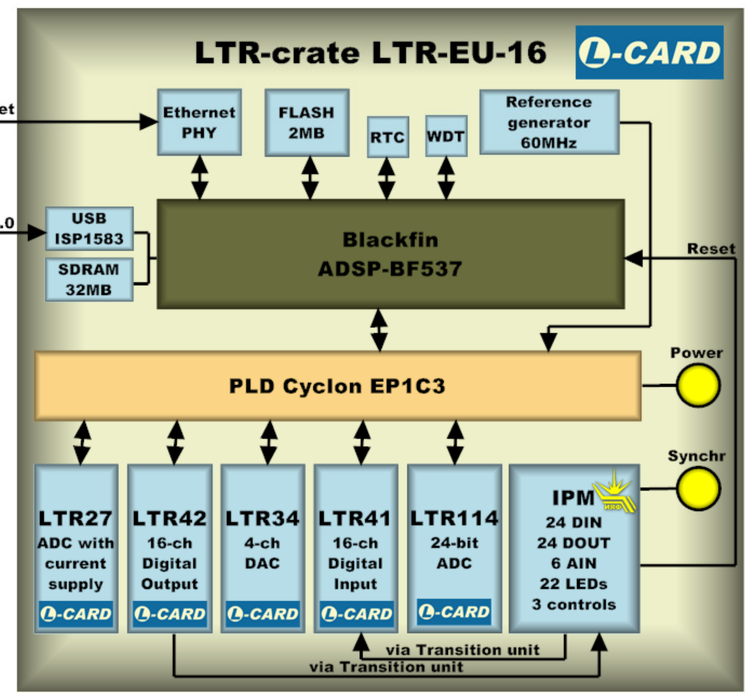
<u>Pulse Power Supply Specification</u>

Peak Current up to 4 kA
Pulse Length 600 ns
Pulse Amplitude Stability ±0.1%
Timing Jitter <±5ns
Repetition Frequency 10Hz

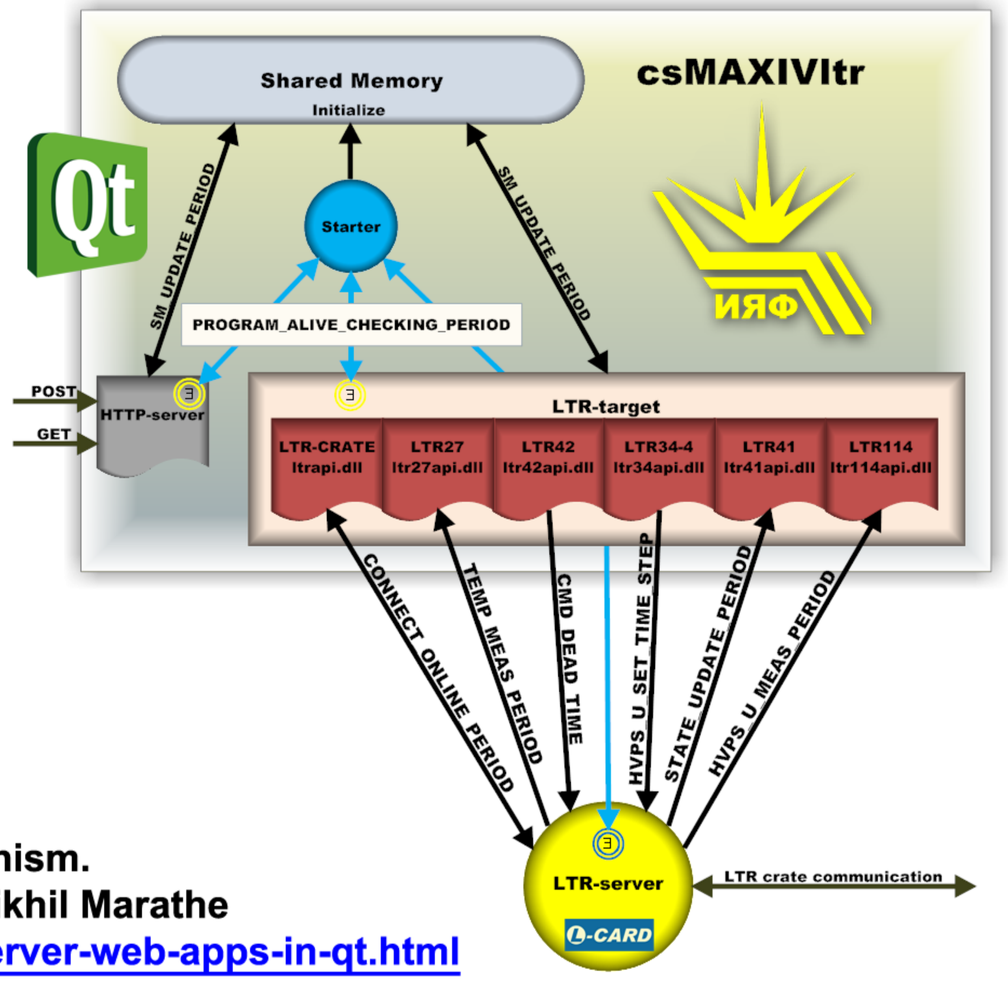


LTR-crate structure

csMAXIVltr software package consists of four components:

- **Starter** - start and control other applications (BINP)
- **LTR-target** - high-level interaction with LTR-crate (BINP)
- **HTTP-server** - communication to the power supply in remote mode (BINP)
- **LTR-server** - low-level interaction with LTR-crate (L-CARD)

csMAXIVltr gateway structure

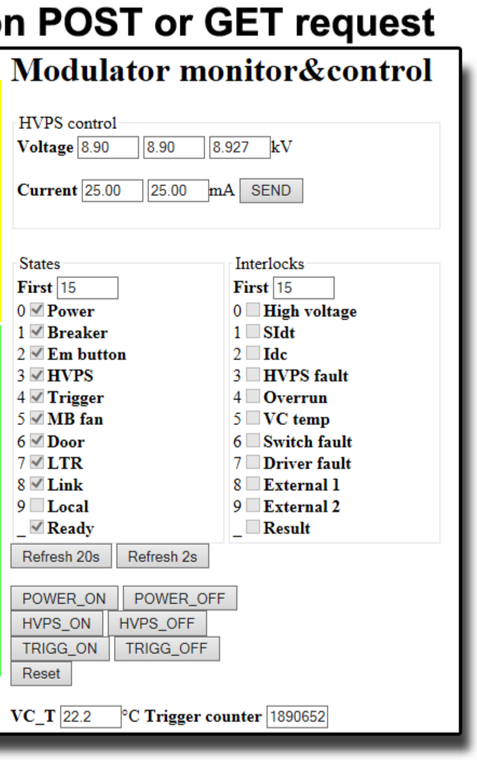


Switch on/off
Reset interlocks
Changing settings
Example: ...&HVPS=ON&SettingHVPS_U=VALUE&...
Read measurements
Read states/interlocks
Changing csMAXIVltr settings:
Write: http:\\x.x.x.x\~PATH??
Read:http:\\x.x.x.x\~PATH=VALUE!

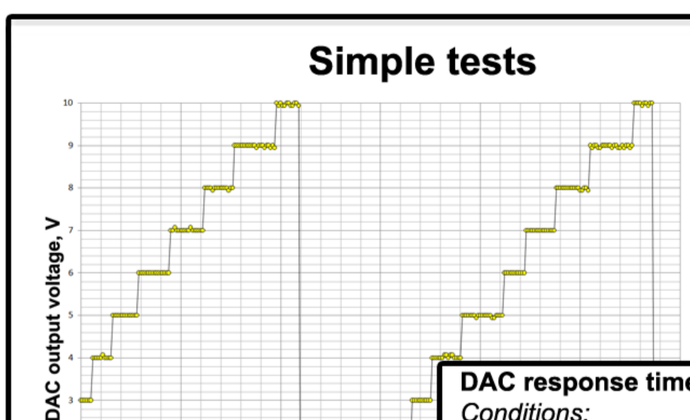
Each module operates in its qthread and communicate with SIGNAL/SLOT mechanism.
HTTP-server based on QHttpServer by Nikhil Marathe
http://blog.nikhilism.com/2011/02/qhttpserver-web-apps-in-qt.html

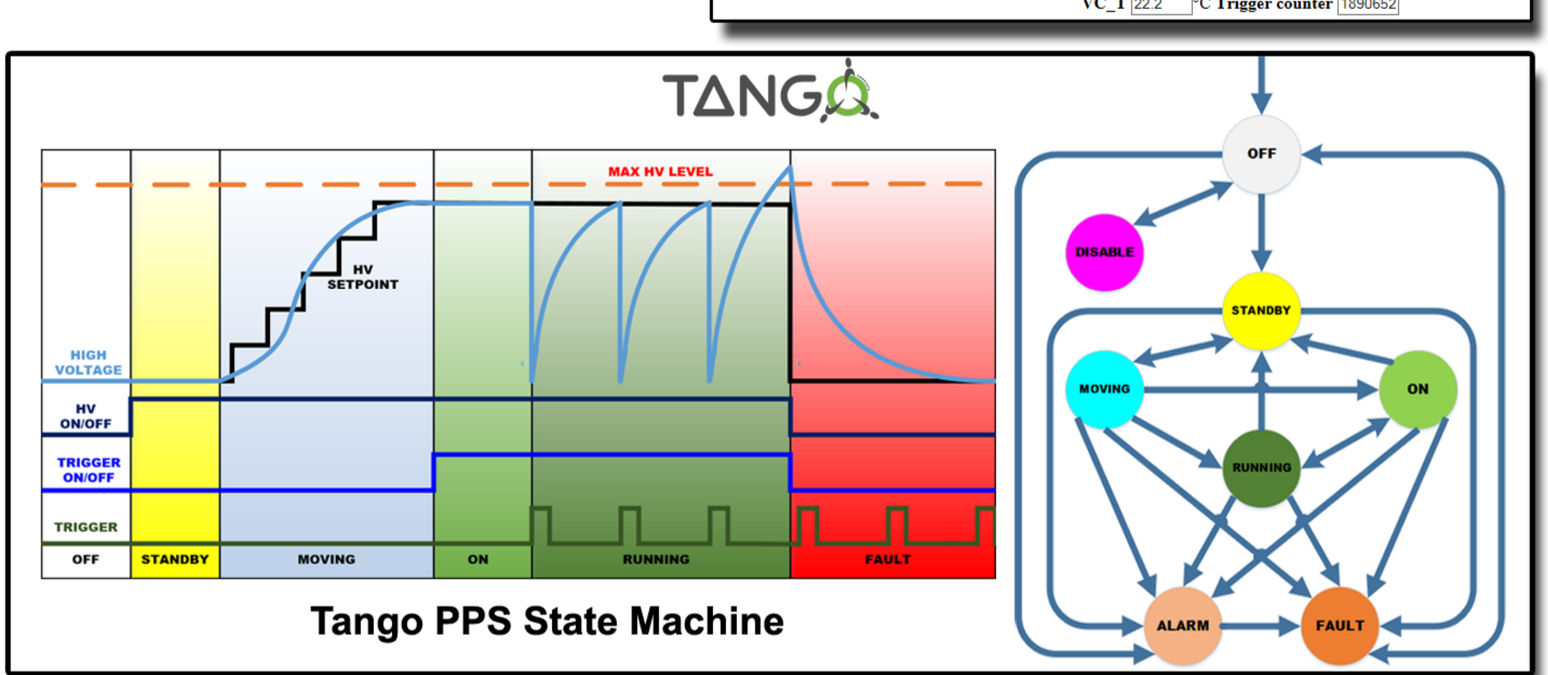
Typical response on POST or GET request

```
<html
<body>
...
</body>
</html>
<!SettingHVPS_U=8.90&
SettingHVPS_I=25.00&
MeasuredHVPS_U=8.927&
MeasuredHVPSUset=8.90&
MeasuredHVPS_Iset=25.00&
MeasuredVC_T=22.2&
State=31741&
Interlocks=60&
TriggerCounter=1890652
```



Left side - browser specific part (yellow); response last line with all parameters (green).
Right side - browser view of "yellow" part which used for debugging and can be disabled.





Tango PPS State Machine