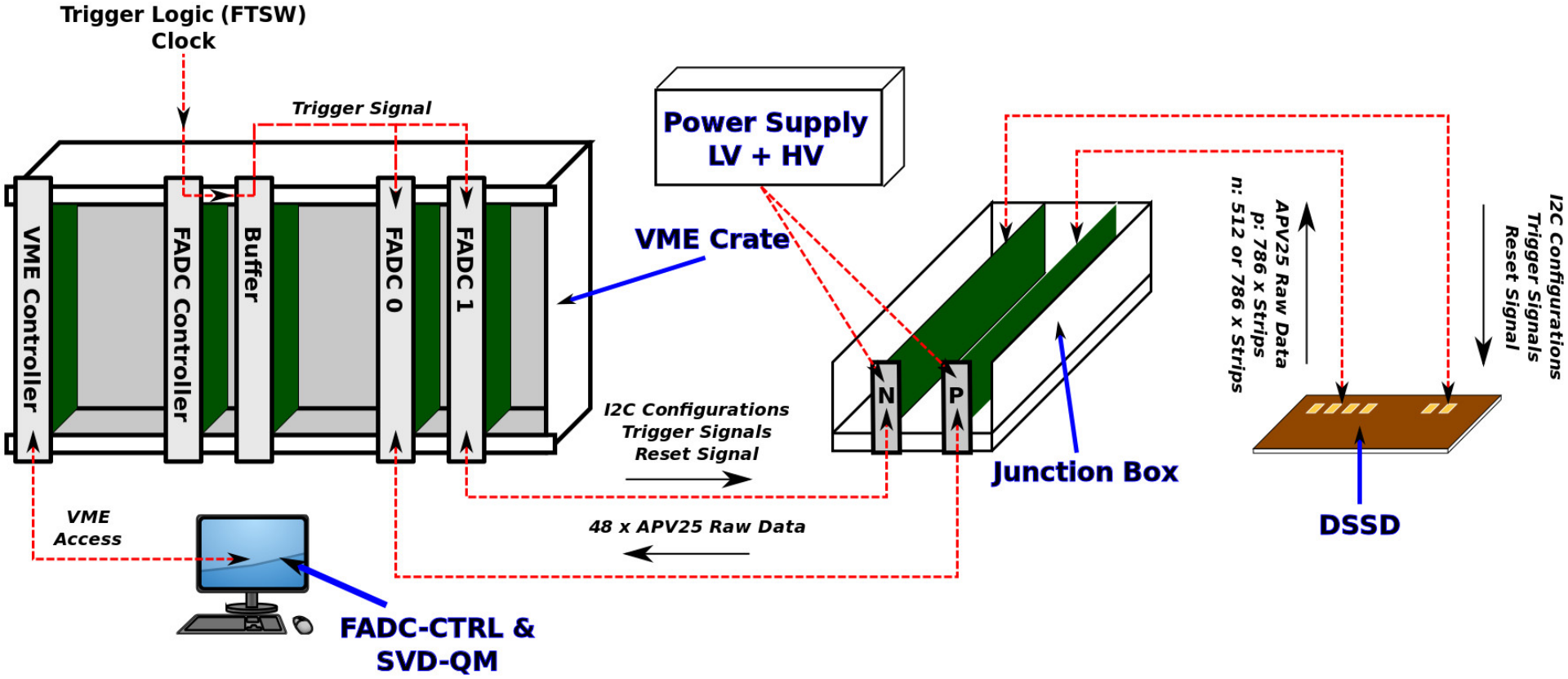
FADC System Slow Control

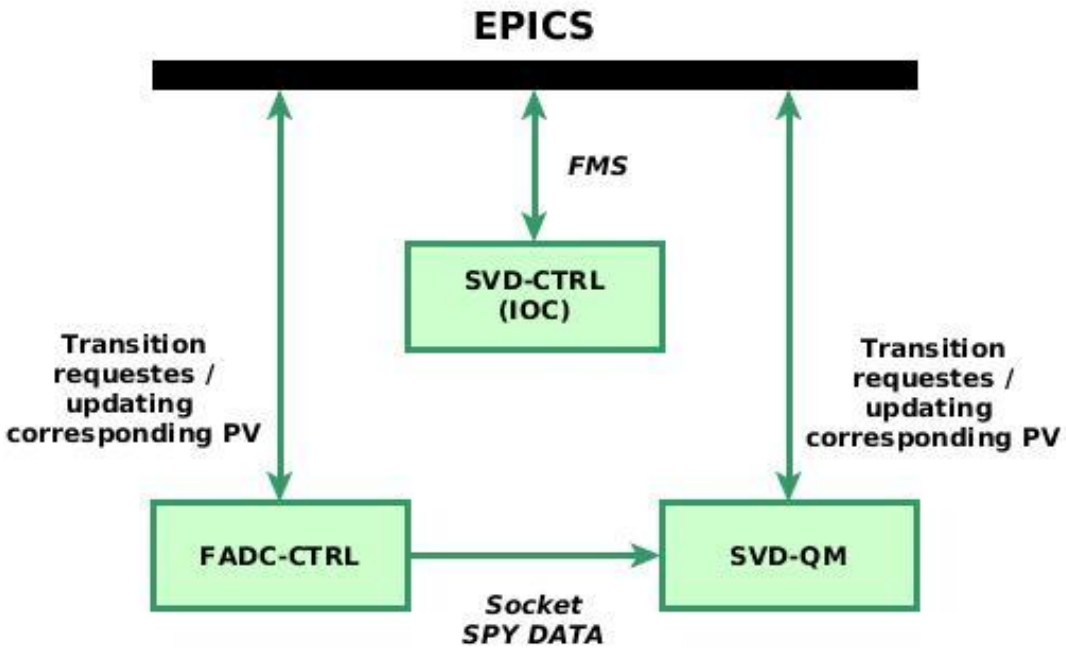
FADC-CTRL & SVD-QM:
Current State

H. Yin

FADC readout chain



EPICS interface



SVD-CTRL:

Interprets the request issued by NSM2. An internal state machine takes the synchronization of each module into account.

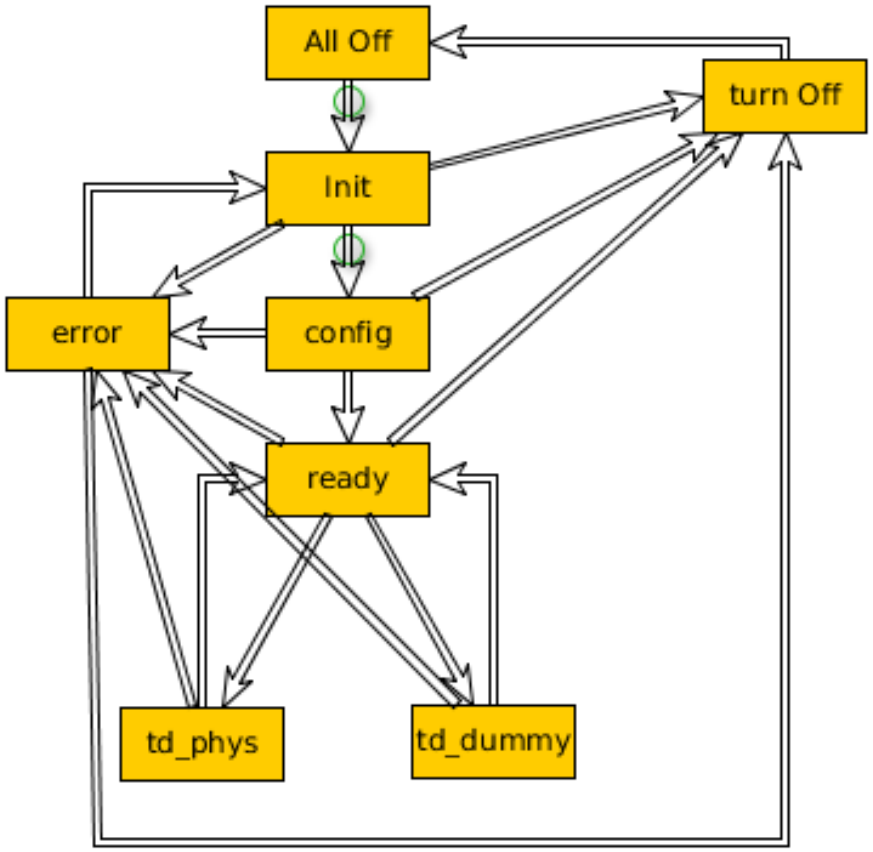
FADC-CTRL:

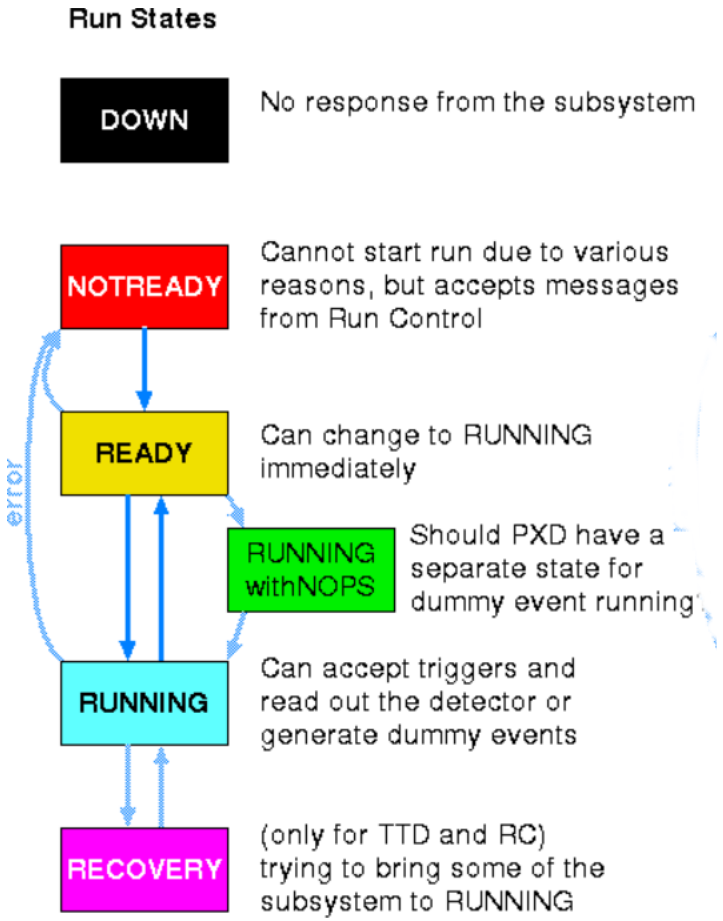
Initiates hardware, takes samples of data (“SPY data”)

SVD-QM:

evaluates the “SPY data” in order to yield configurations needed for other run types.

SVD-CTRL: State Machine





SVD-CTRL FSM (left) delegates the tasks to be performed at each request issued by the global BELLE II run states (right). Figures are taken from Belle II TWiki.

Transition: [Init] -> [Config]

FADC-CTRL:

- Modify all/some configurations
- (Re)set all/some configurations
- Check APV25 I2C to cover the transition from [Config] to [Error].
- (Re)initiate FADCs and FADC Controller board - if required. Restart socket connecting to SVD-QM.

SVD-QM:

- Read all configurations
- Reset Created run type
- Create the corresponding run type and insert it into the control object.
- (Re)set socket.
- (Re)set result container.
- Try to connect

Note: If an error occurs in this stage, the configurations of the corresponding board (FADC or FADC CTRL) is marked with “not uploaded”.

Transition: [Config] -> [Ready]

FADC-CTRL:

- (Re)set APV25 I2C - if required. Trying to reduce necessary time, required by the I2C communication.
- Start accepting incoming socket. (blocking with timeout)
- Wait for connection until timeout.

SVD-QM:

- Start readout data and perform evaluation.

Note: If errors occur this this stage only the corresponding APV25 I2C and/or socket config are marked with “not uploaded”, thus need to be reapplied after optionally changing it during the transition from [Error] to [Init].

Remaining transitions:

FADC-CTRL:

[Ready] <-> [td_phys] / [td_dummy]

- Set / remove TRG VETO

[Ready] / [Config] / [Init] -> [Turn off]

- Set TRG VETO
- Close socket connection

SVD-QM:

[Ready] <-> [td_phys] / [td_dummy]

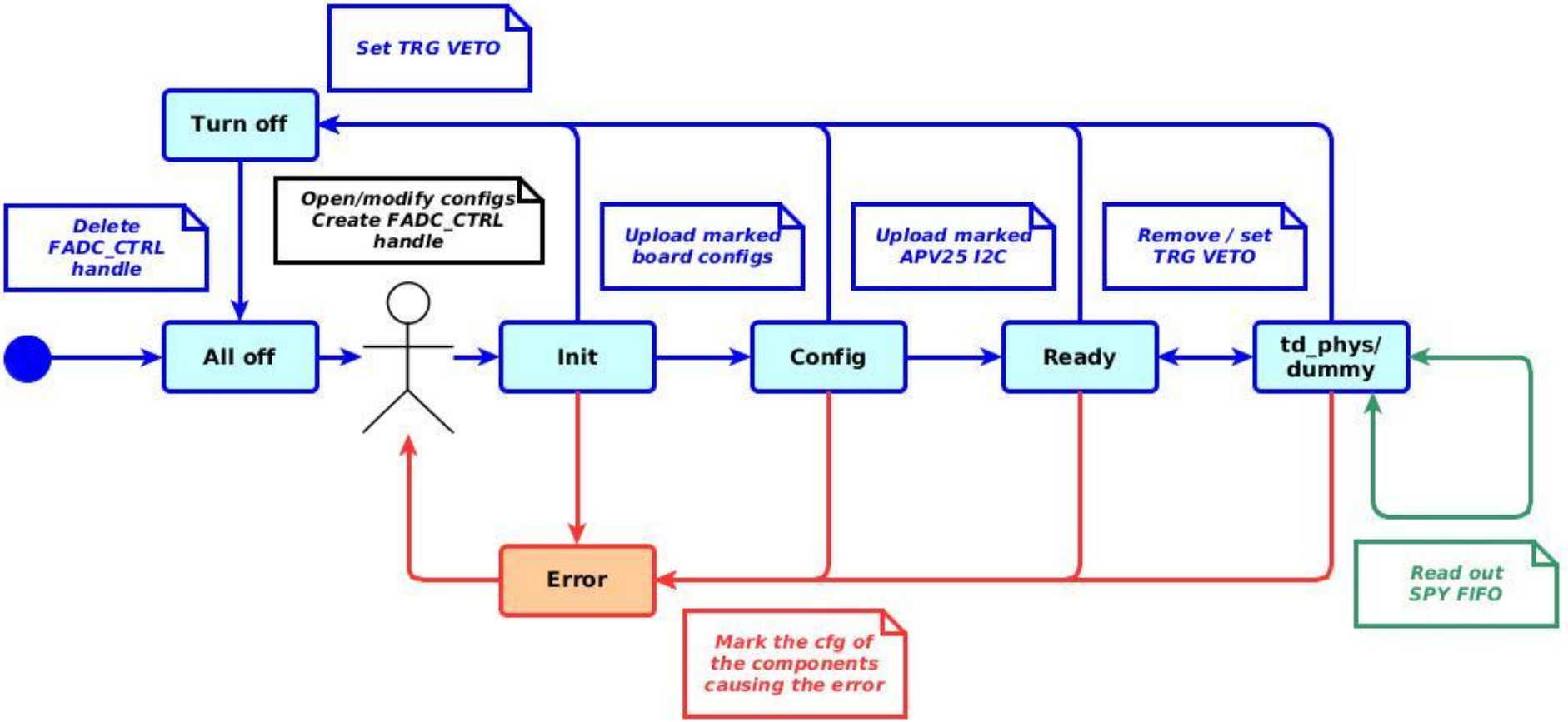
- Stop / resume reading data.

[Ready] / [Config] / [Init] -> [Turn off]

- Close socket connection
- Perform few fits, if needed.

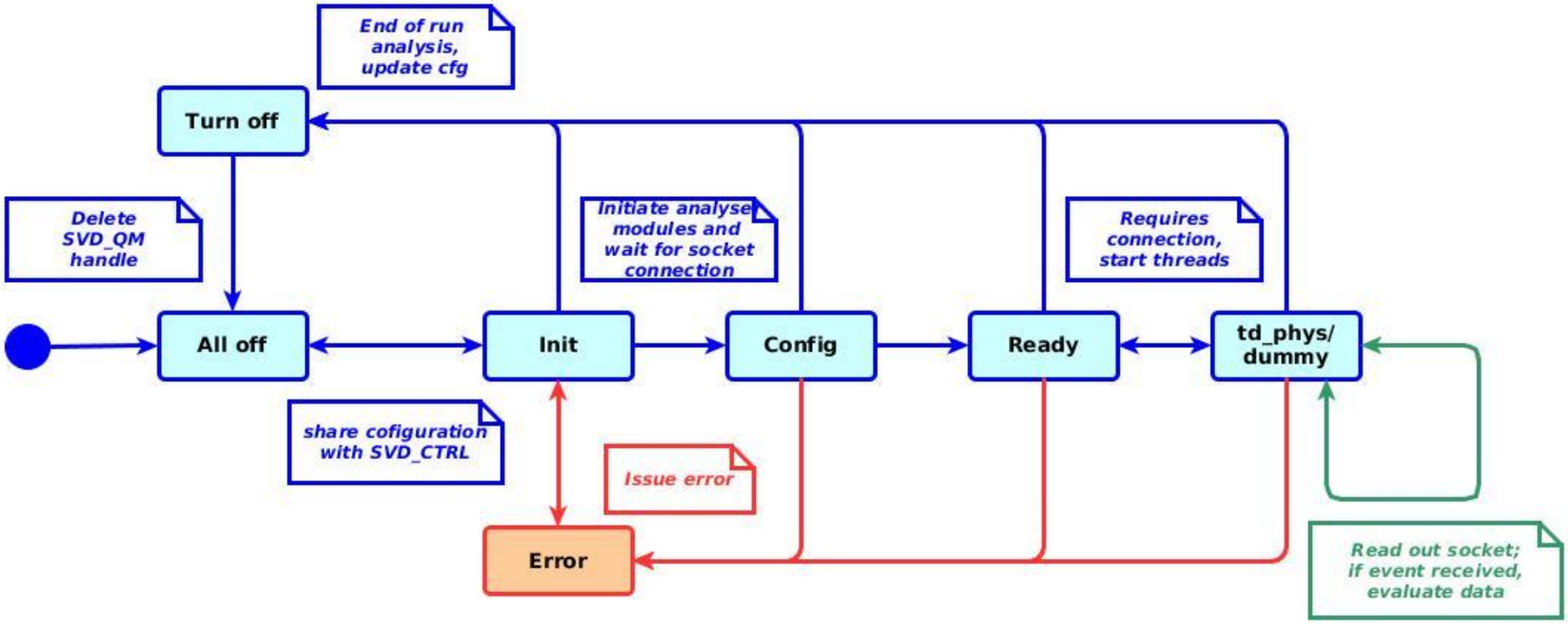
Note: If the transition to [Error] is required, mark the corresponding board / APV25 configuration.

Recap: FADC-CTRL



Summary of tasks performed at each transition. The blue lines mark the transitions w/o error. The red lines are transitions to/from the [Error] state.

Recap: SVD-QM



Summary of tasks performed at each transition. The blue lines mark the transitions w/o error.
The red lines are transitions to/from the [Error] state.

Updating plots and HW states

FADC-CTRL:

- State of all connected FADCs
  - State of the readout data
  - State of the connected DC/DCs
  - etc ...
- State of FADC Controller.

SVD-QM:

- Few plots:
  - Trendline of pedestals over time
  - Hit maps
  - SNR etc

overall few 2D plots.

Current State of SVD-QM and FADC-CTRL

SVD-QM:

- ✓ Pedestal and noise run (raw data)
- ✓ Hardware run (raw data)
- ✓ Preliminary version of C-interface used for debugging w/o updating.
- × missing run types: FIR filter, ADC delay, internal calibration run, sixlet calibration run
- × reading remaining data formats (transparent, zero suppressed)

The development FADC-CTRL has not started yet.

Thank you!