

Status of MUV3 CFDs

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Ferrara, Sep 3rd, 2014

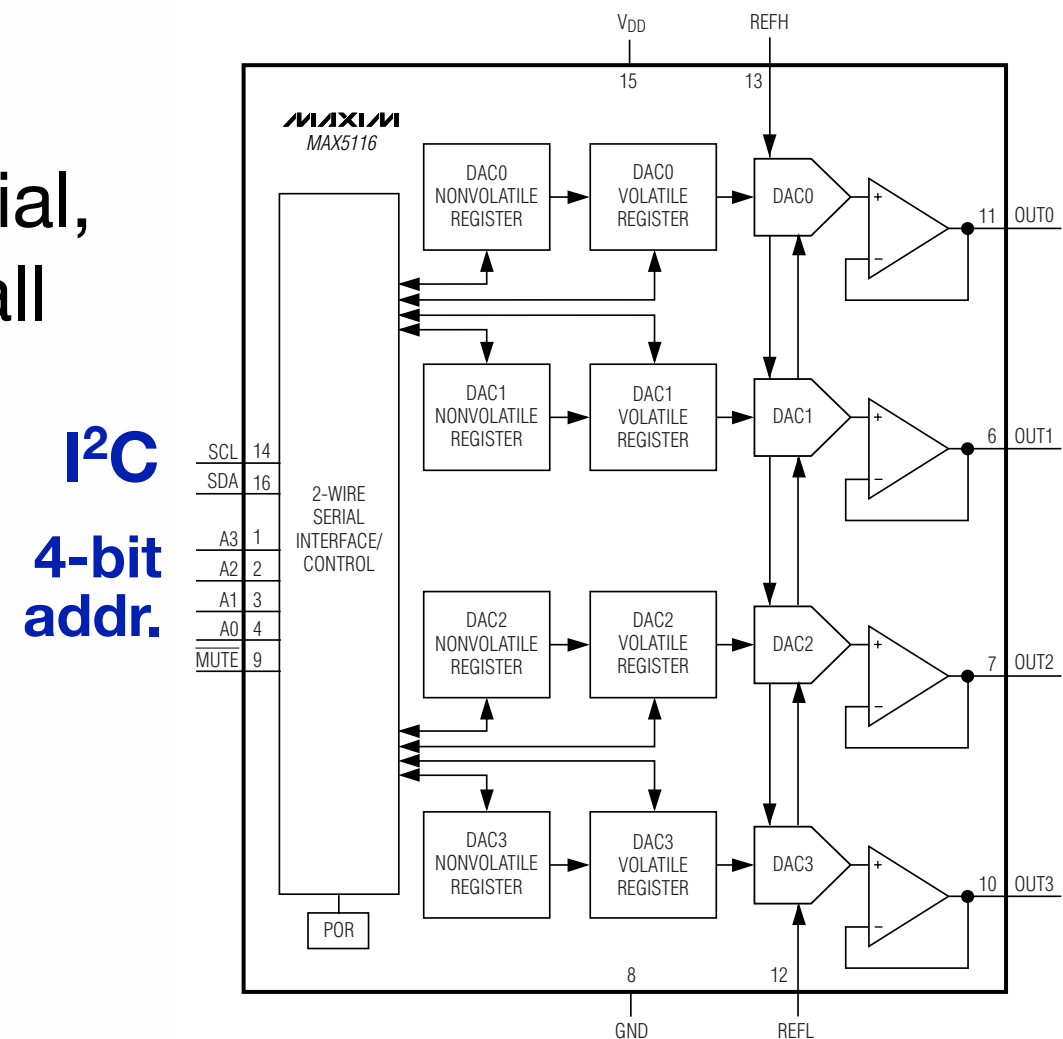
CFD Design (Reminder)

- **6U VME board** with **16 input channels** on a single board.
 - In total 20 boards for 296 channels.
- **Output: 32 channel LVDS → TDCB**
 - Two boards, one upon the other: 2×16 inputs & 1×32 outputs.
Implement same delay time from CFD to Output for each channel.
- **Delays for CFDs** will be done with **delay cables** as for old boards.
- **No potentiometers** but **Digital-to-Analog converters (DACs)**.
 - adjustment by a USB interface via an FTDI chip for USB ↔ I²C
(Raspberry Pi via connectors on front panel).
- **Two additional outputs** (each 8 channels ECL, ribbon cable):
 - **Coincidence (AND)** of two consecutive channels (MUV3 cells).
 - **Mean time** of two consecutive channels (New CHOD tiles).
 - *practically all design decisions taken.*

Digital-to-Analog Converters (Reminder)

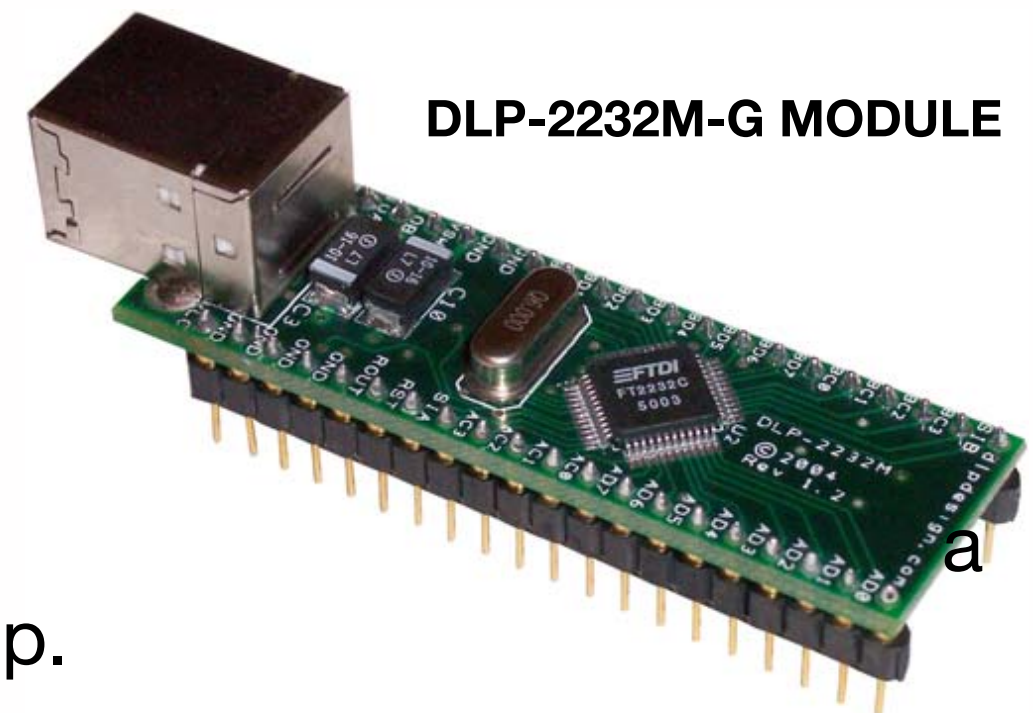
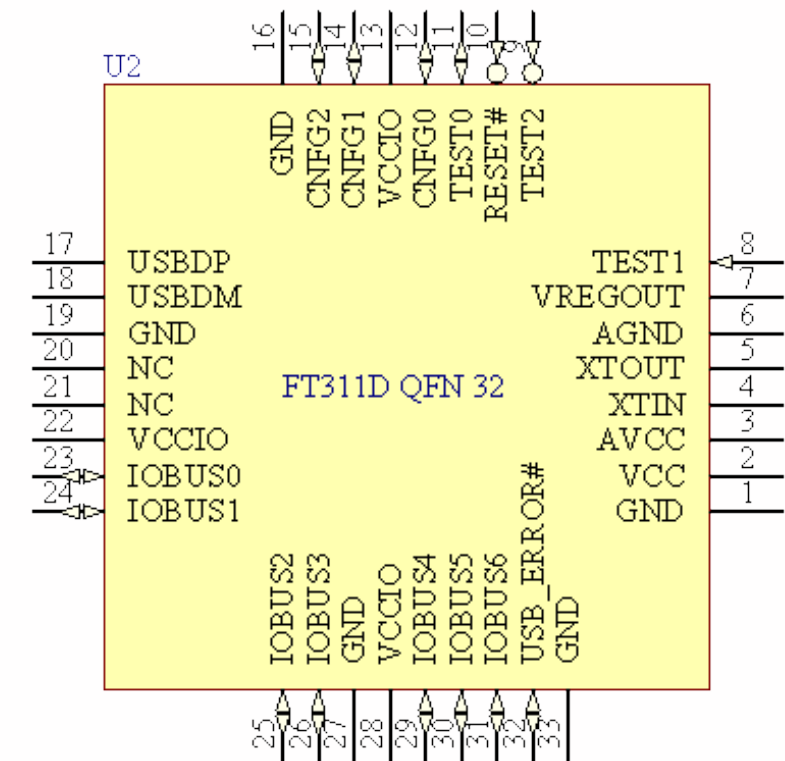
- Decided to use **DACs (MAX5116, quad, 8-bit)** instead of potentiometers (easier to handle, smaller package, ...).
- Replacement of two potentiometers trivial, the third (output pulse width) needed a small schematics change.
- In total: 2 boards × 16 chan. × 3 DACs = **96 DACs / double board.**
- Control of DACs via I²C bus and a **single USB ↔ I²C FTDI chip.**

→ **one USB interface / double board**



FTDI Chip for USB ↔ I²C Interface

- First choice was FTDI FT201X, but overlooked the master/slave interconnection between the FTDI and the DACs.
 - needed to implement another type
 - **FTDI FT311D**
- For testing:
Evaluation board (DLP-2232M-G) connected to prototype.
- Software for DAC control written and tested by Riccardo Aliberti.
- Finally:
Evaluation board replaced with self-made mezzanine for the FTDI chip.



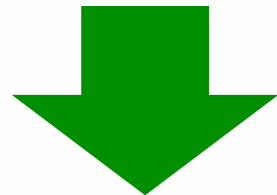
First Prototype

- **First prototype** built in June (at that time still with the wrong FTDI chip) with 4 input channels, each with both potentiometers and DACs. After testing and adjustments potentiometers replaced by fixed resistors and DACs.
- **Tests** done by Riccardo after electrical test & FTDI replacement:
 - Writing and reading to and from the DACs for voltage settings.
 - Using generated pulses (according to MUV3 measurements) to follow the signal pulses through the single CFDs and measure the output and the timings.
 - adjustments of potentiometers for optimum thresholds and time resolution.
 - Due to the little time: No test of coincidence outputs and no tests of all channels and for different input pulses.
- After the tests replacement of evaluation board with own FTDI chip but no thorough tests possible any more.

Prototype Test at CERN

Tests of the prototype at CERN completely unsuccessful:

- Not able to make it work at all: 😞
 - **Electrical problems** (despite of corresponding tests in Mainz).
 - **No connection to the FTDI chip** possible.
- ➔ Board brought back to Mainz.



Conclusions for the 2014 run:

- Will use again the **old AKL CFDs**.
- Needs additional work to fix oscillating channels, also not enough CFDs for all MUV3 channels.
- **Apologies to the MUV3 experts and helper (Luigi, Italo, Jonas)!**

Towards the final CFDs

- **Prototype board** needs again to be fixed, evaluated, and thoroughly tested (including studies of the time resolution).
- Meanwhile the **layout of the final CFD boards** will be finalized (only few parts are still missing in the layout).
- Submit a **full prototype** *after* complete testing of existing prototype (optimistically not before 3 weeks from now).
- **Test of full prototype** in Mainz and possibly at CERN.
- If everything goes well:
Going for operation in the second part of the run (mid November) with non-connected MUV3 channels.

Final CFD Layout

mean timer
(not yet integrated)
UNI-MAINZ
SEPTEMBER 2014

FTDI USB \leftrightarrow I²C interface
(not yet integrated)

32 TDCB outputs

8 coincidence outputs

16 signal inputs

