

AMC Fast Timing System x2timer



FYSIKUM

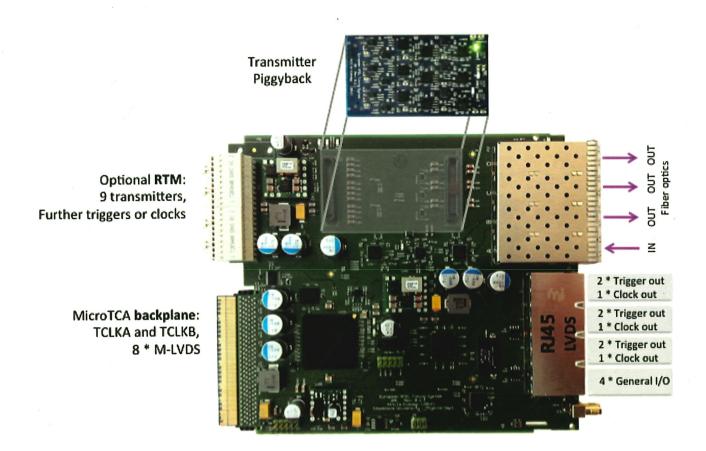
Features:

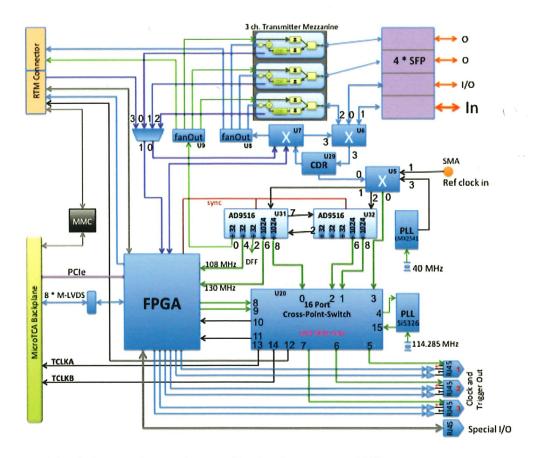
- Can be used as a transmitter or receiver module
- Delivers precision clocks on TCLKA and TCLKB
- Provides triggers, gates, clocks or data on M-LVDS ports 17 - 20
- 3 RJ45 outputs on front with 2 triggers and one precision clock as LVDS signals
- Trigger position: 0 .. 160ms delay, 1ns resolution
- Trigger width: 0 .. 160ms, 10ns resolution
- Up to 255 trigger event numbers
- Precision clocks: 2.5 .. 650MHz
- · Optional RTM with up to 9 additional triggers
- · Optional RTM with up to 9 fiber links
- Clock and trigger jitter: ~10ps RMS
- Transmitter is implemented on a piggyback with 3 channels
- Transmitter has a micro controller with link length compensation to cancel temperature drifts of the fiber optical links

The timing system is designed to be used in large installation like the XFEL in Hamburg. But it can be used in a single stand-alone setup as well. Clocks and triggers are programmed and generated on a master module and distributed in a multi-star topology. All triggers within the whole system are synchronized with a jitter of about 10ps.

In addition to the distribution of triggers and clocks the system is able to distribute data words and tables on its fiber distribution. A precision 1.3GHz clock with modulated data is used on the fiber links. Receivers can recover the clock an data. Synchronized dividers are used to generate local clocks at the receivers. The receiver has 23 programmable outputs:

- Trigger with delay
- Immediate or delayed trigger events
- Gates between trigger events
- · Slow clocks
- Two different slow data protocols
- · Fast data protocol

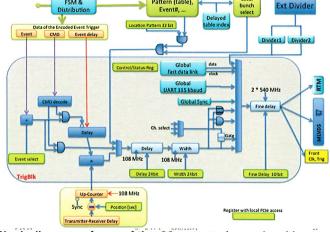




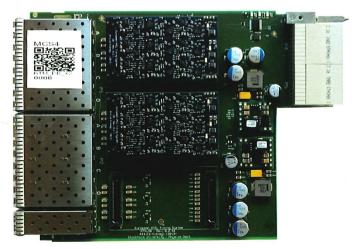
Block diagram of the timing receiver and transmitter hardware on an AMC.

Optional RTMs:

- Up to 9 drift compensated transmitter outputs on SFP modules. Design is ready and in operation.
- 9 triggers and clocks on LVDS (RJ45 plugs) and LEMO connectors. Three of these outputs will provide a ps shift of the falling and leading edges. This RTM is in design and will be available Q1 2014.



Block diagram of one of the 23 output channels with selectable data sources.



RTM with up to 9 transmitter channels on mezzanines (2 piggybacks are shown).

Preliminary version: 5. 12. 2013