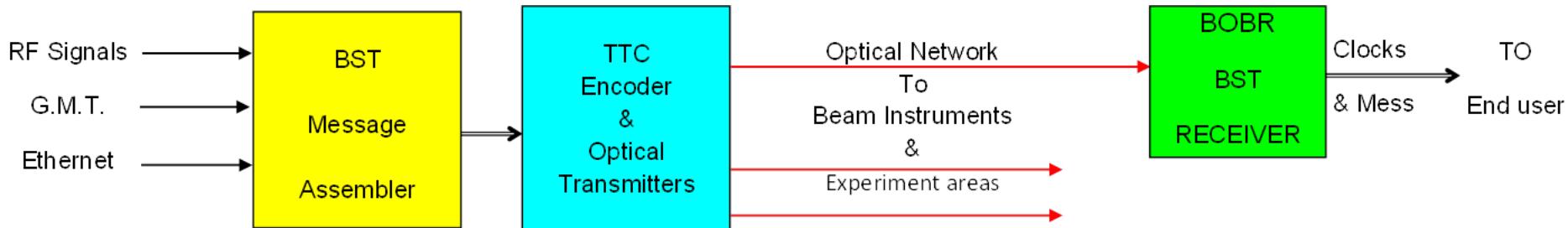


Beam Synchronous Timing (BST)

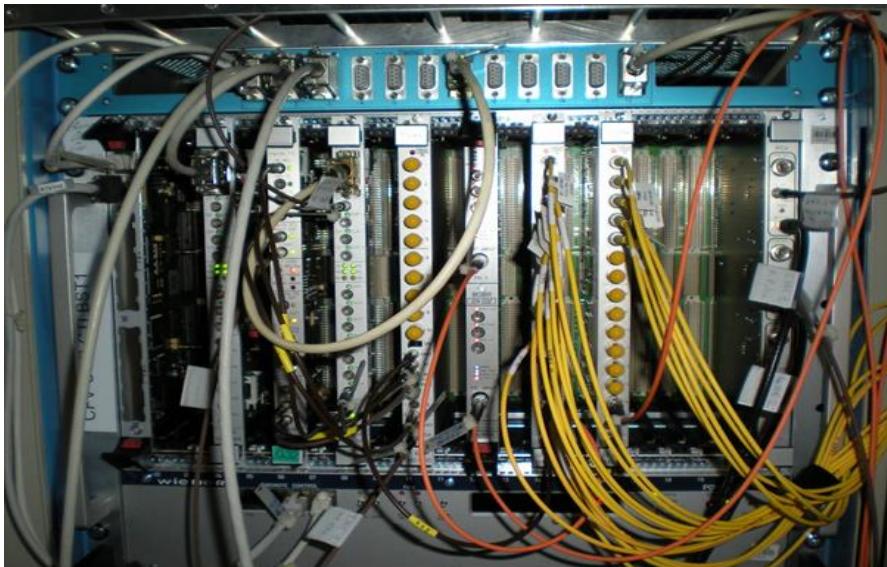
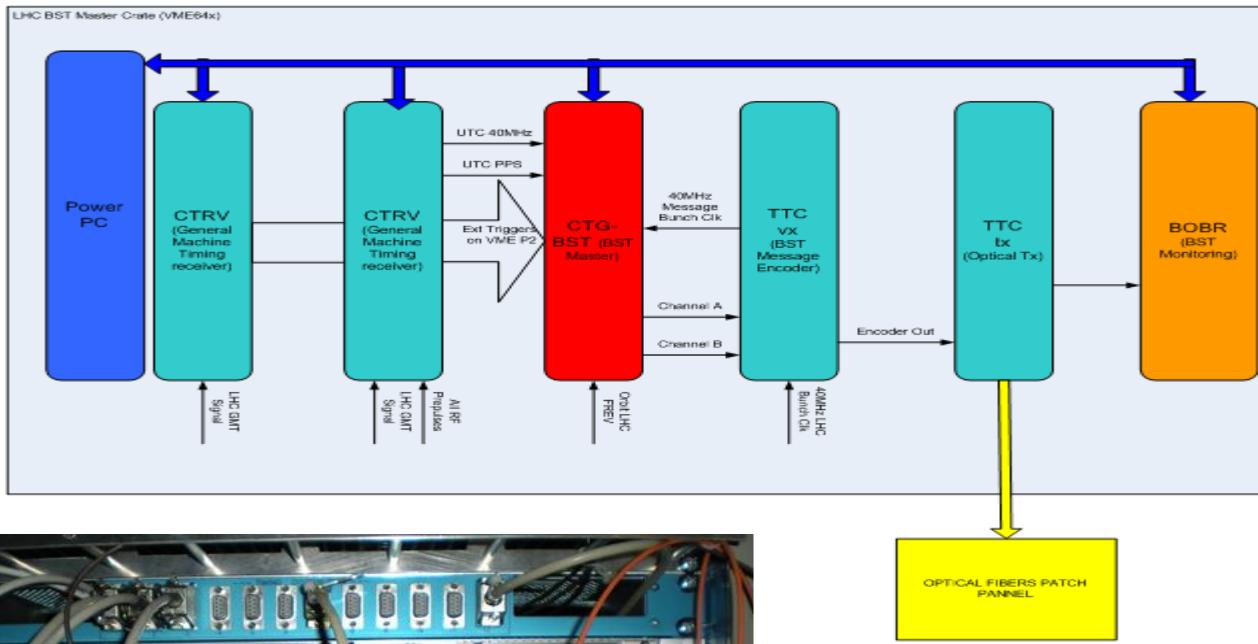
- Short Description
- Status
- New Design
- Future

BST - Short description

- Broadcast timing signals & messages required to synchronize acquisition systems with beam.
- Use the 40MHz & Orbit Turn-clock provided by the RF system.
- A message is produced by BST-Master every revolution period.
- Distribution to the experiments and BI over optical networks by using TTC components. (TTCex, TT Cv x, TT Ctx, TT Crx)
- The BST Receiver (BOBR) is the interface to the end users installed in each VME beam instrumentation crates .



BST - Master



3 x VME Crates:

- LHC Ring 1
- LHC Ring 2
- SPS

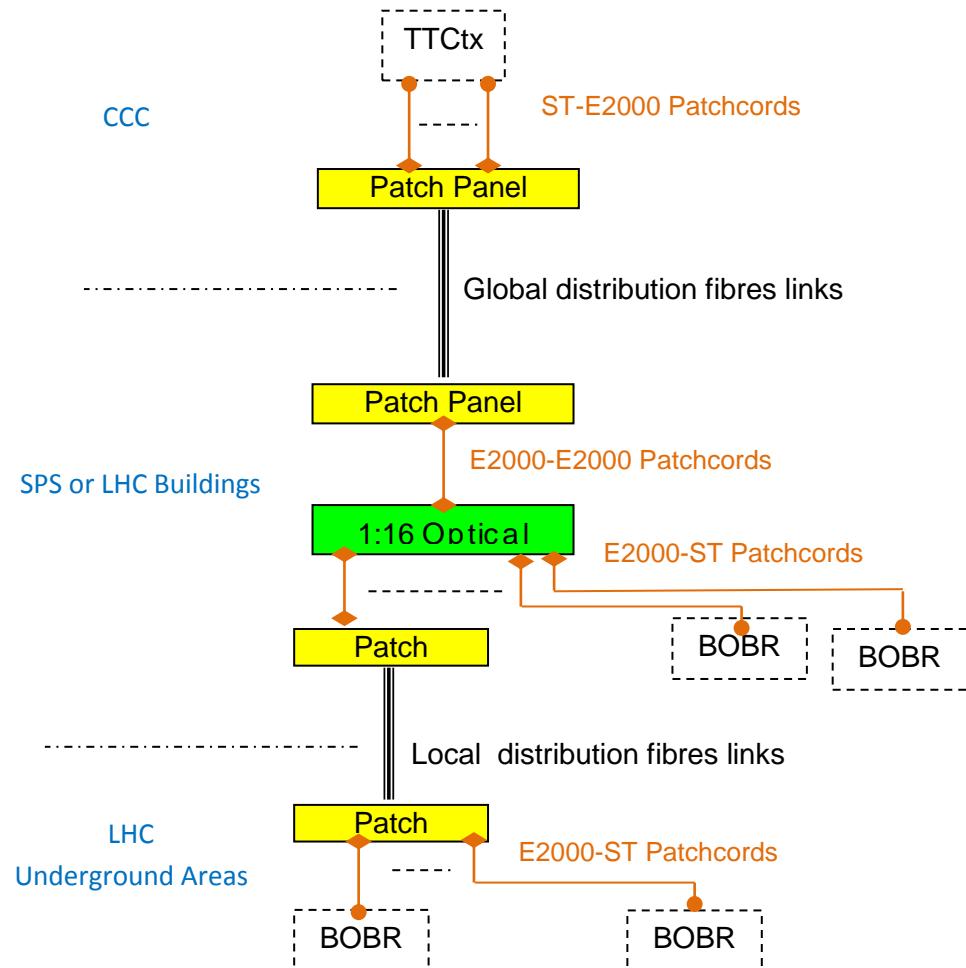
BST - Optical Distribution

End Users:
(EA, BI, Labos)

LHC 1 = 157

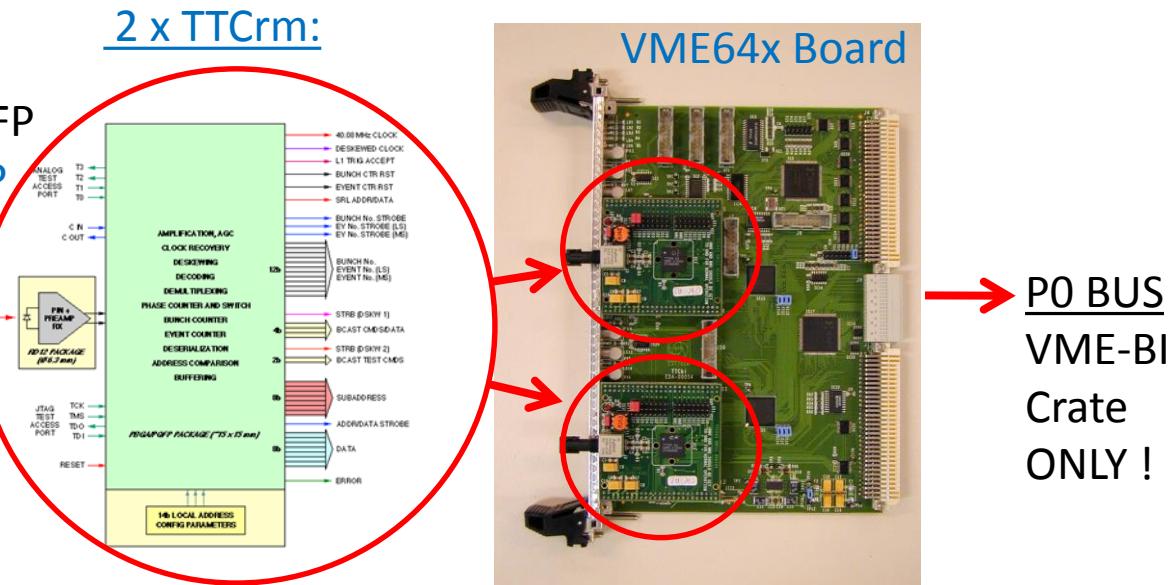
LHC 2 = 156

SPS = 22
+ pre-pulse
by cable!



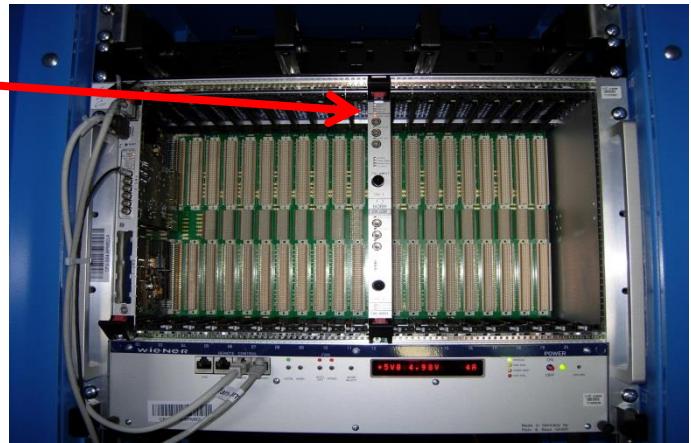
BST - Receiver (BOBR)

- 2 Channels (LHC 1 & 2)
- 40 MHz Bunch-Clock > P0+FP
- Delayed Turn-Clock > P0+FP
- Message > DP RAM.
- 2 x Trigger bytes > P0
- 8 x Bunch selector > P0
- IRQ on specific bytes.
-

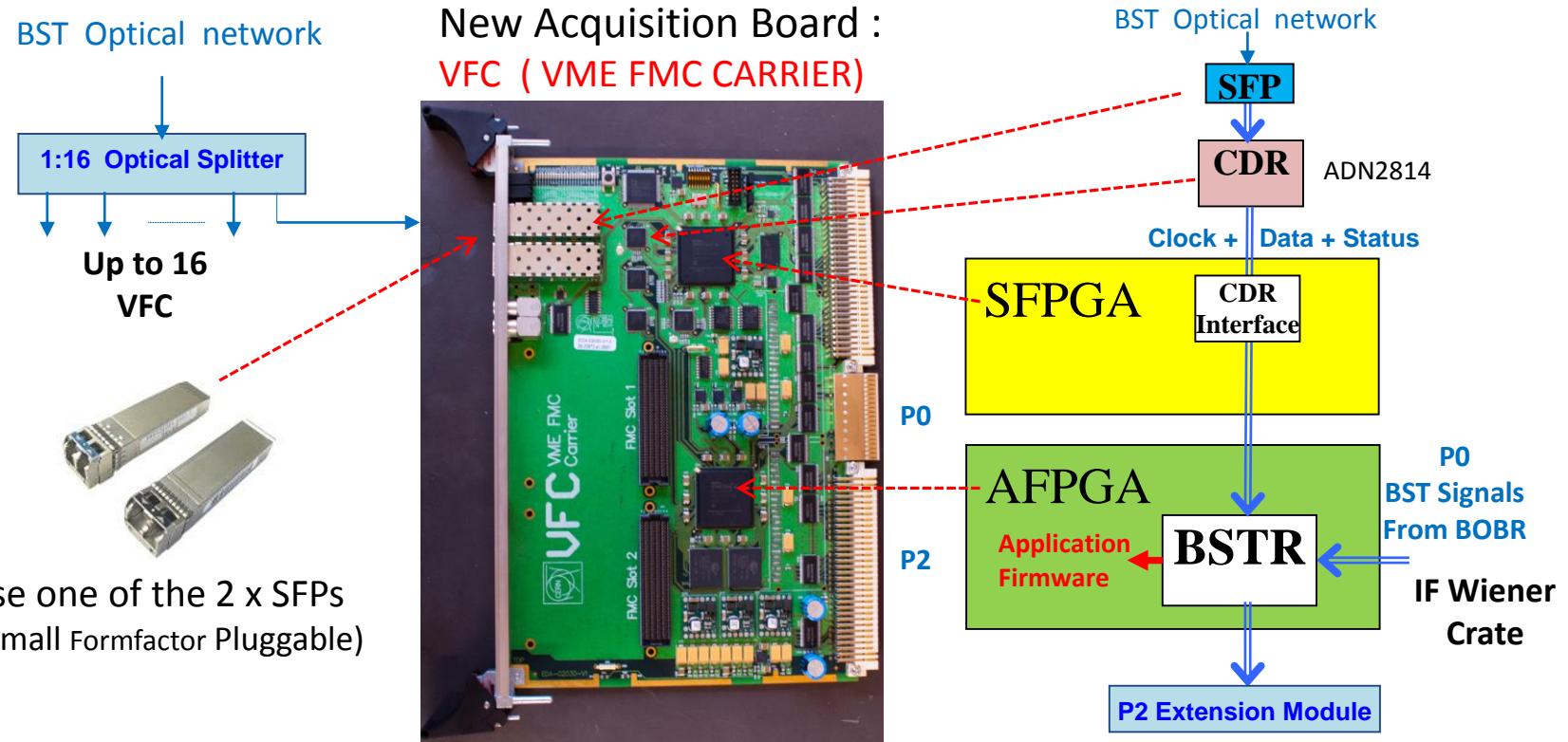


To be plug into VME-BI crate pos 12:

Installation: E.A.= 10
B.I. = 160
Spare = 40



BST- New Design: BSTR implementation in the VFC



BSTR: VHDL package to be put into the Application FPGA.
>> Same functionality as the BOBR module

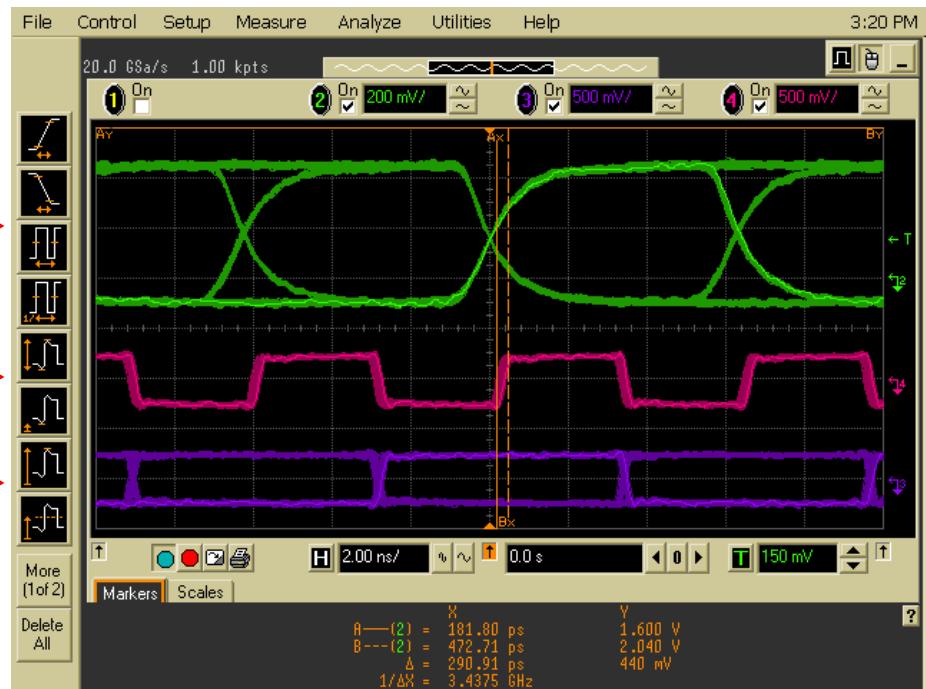
BST- New Design:

- TTC Frame >> Clock & Data Recovery

Biphase Mark TTC Frame
(Sync with the 40 MHz x 4)

160 MHz Recovered Clock

160 Mb/s Recovered Data



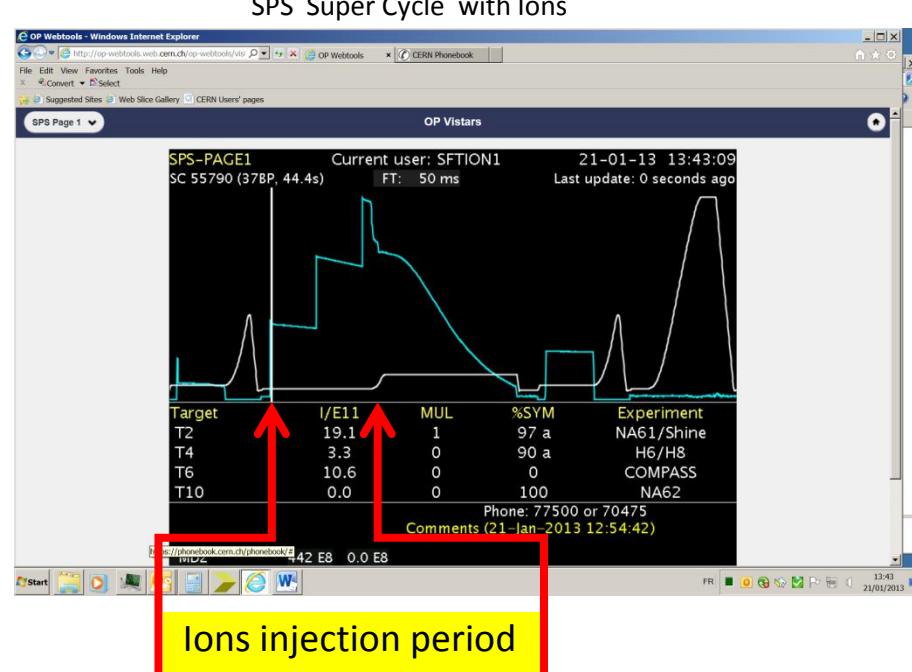
- LHC : Protons & Ions > OK
- SPS : Protons > OK (Except Injection pre-pulse)
- SPS : Ions > Problem during injection phase !

BST- New Design:

- SPS : Ions > Problem during injection phase !



CDR Loss of Lock syncro @ RF switching
=> No BST Message for few ms. when no beam !



Time interval when the CDR is not locked!

Why? : The RF 200M is active only $12.5 \mu s$ over the $23 \mu s$ of the SPS rev.
The other $12.5 \mu s$ the RF switches to a default freq. (~ 198 MHz)

=> No BST Message !
=> Bunch-Clock & Turn-Clock from local osc. (not syncro with beam)

Possible solution: Do not use the 40 M clock directly from the RF 200M / 5
=> Modification at the BST Master level ?

BST – Future ...

- BST-Master (BE-CO)
 - CPU replacement
 - SPS Message restructuration (if needed)
 - SPS synchro for ions ?
 - New design ?
- TTC (Sophie)
 - Support (TTCex, vx ,tx, rx)
 - New design ?
- Optical Network (JJ,Eva, EL-CF)
- BST Receiver
 - BOBR (JJ, after 2014 ?)
 - New design (JJ, Andrea)