

BES-III off-detector readout electronics for the GEM detector: GEMROC update: spare and ancillary resources development

The CGEM off-detector collaboration
(INFN/University FE, INFN LNF, Uppsala University)

The latest previous update on the GEMROC modules and auxiliary resources was given at the BES-III Italia (virtual) meeting on 6 november 2020 and concerned the status of the GEMROC ancillary modules development.

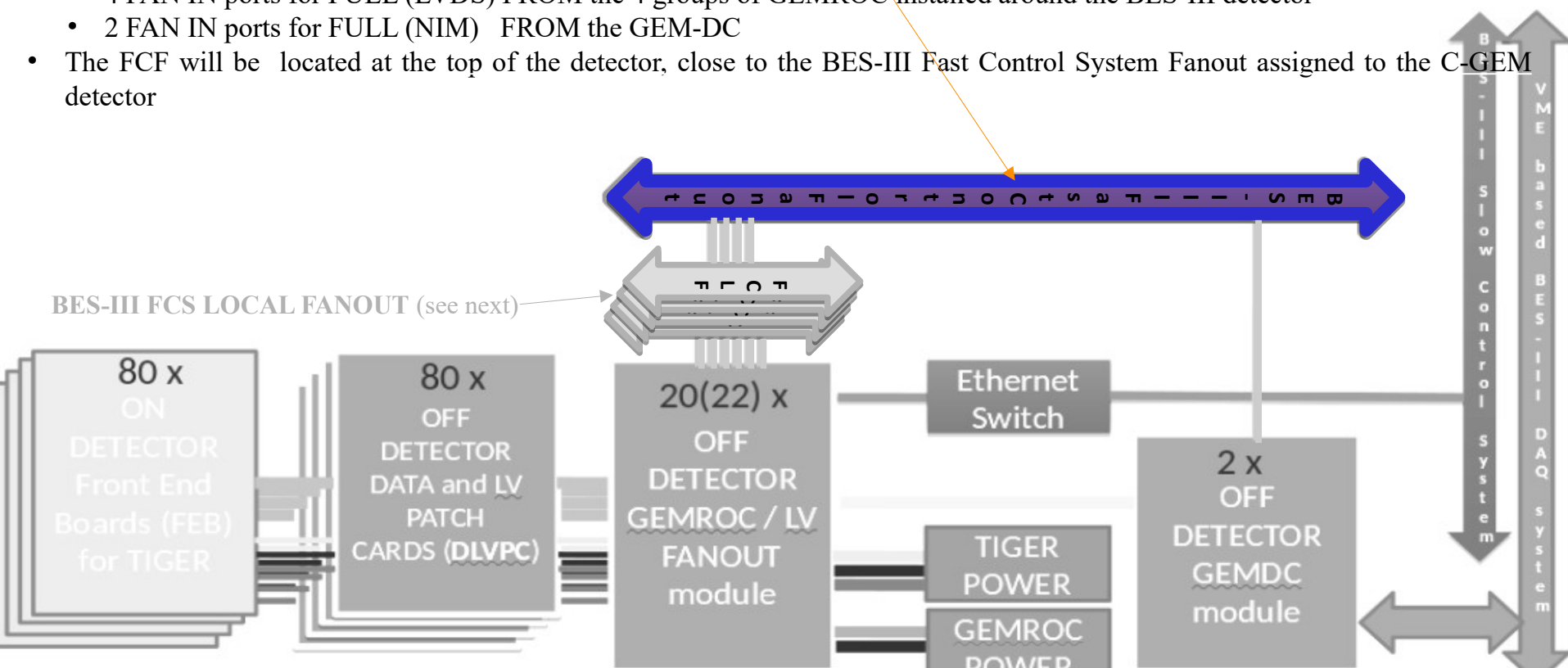
Summary of this report:

- development of the Modular FCS FANOUT system: overview
 - **GEMROC-based FCS SYSTEM FANOUT**
 - **Modular FCS Local FANOUT**
- development of the Modular FCS FANOUT system: status
- outlook

- **development of the modular Fast Control Signals (FCS) FANOUT system**

GEMROC BES-III FC system FANOUT (FCF)

- The BES-III Fast Control System Fanout (FCF) is a modified GEMROC module which connects to the CLK, L1, L1_CHK, FULL signals from the BES-III Fast Control System Fanout. If it is made programmable it can also generate simulated Fast Control signals
- The FCF will have:
 - 4 FAN OUT ports for CLK, L1, L1_CHK (LVDS) TO the 4 groups of GEMROC installed around the BES-III detector:
 - North East, South East, North West, South West
 - 2 FAN OUT ports for CLK, L1, L1_CHK (NIM) TO the 2 GEM-DC
 - 4 FAN IN ports for FULL (LVDS) FROM the 4 groups of GEMROC installed around the BES-III detector
 - 2 FAN IN ports for FULL (NIM) FROM the GEM-DC
- The FCF will be located at the top of the detector, close to the BES-III Fast Control System Fanout assigned to the C-GEM detector



• development of the modular Fast Control Signals (FCS) FANOUT system

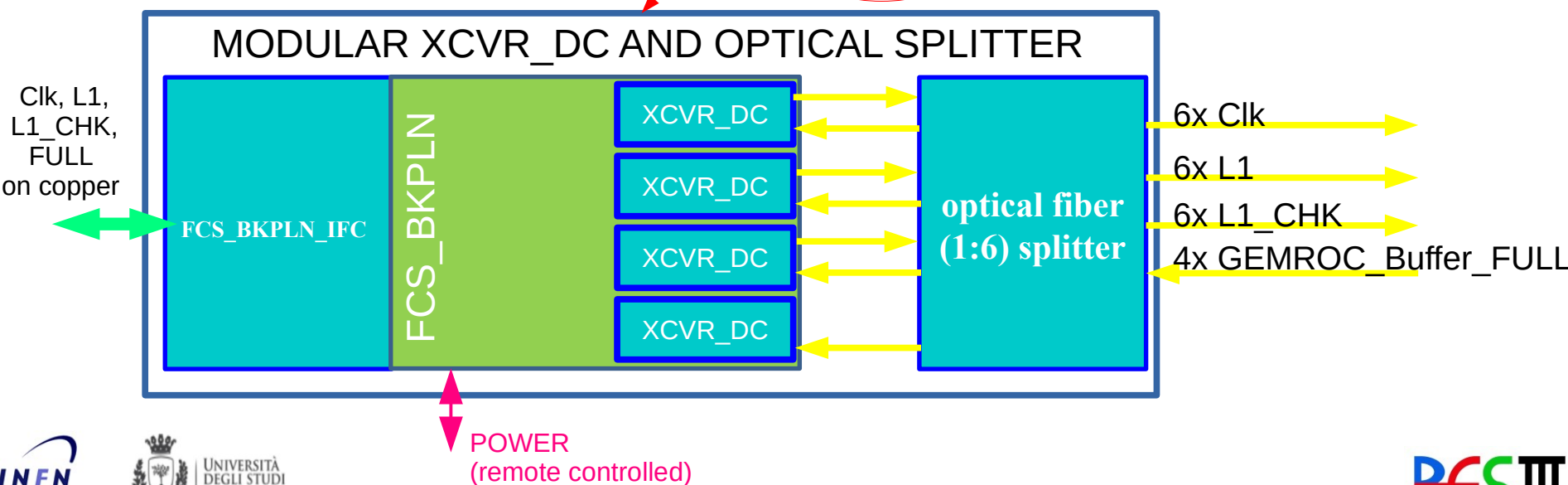
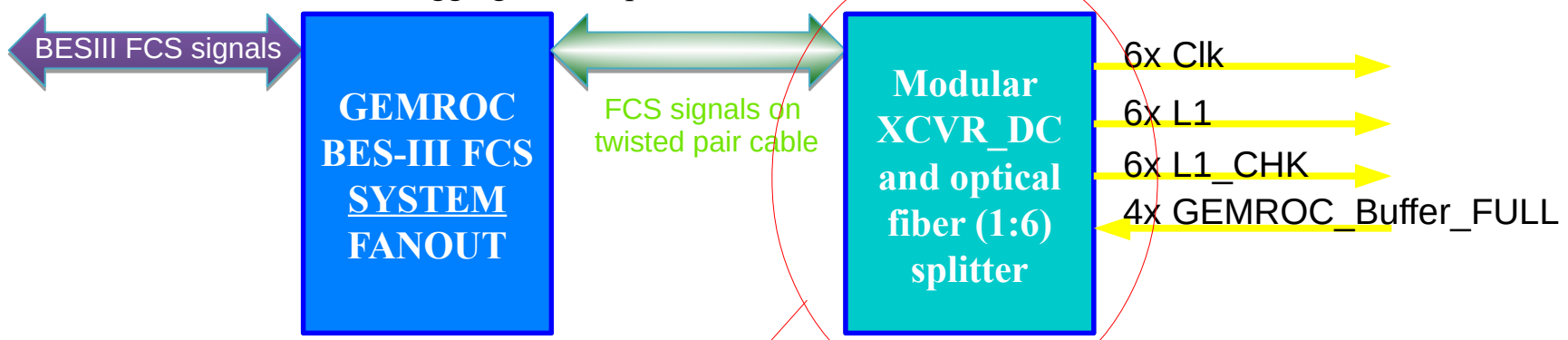
GEMROC-based FCS SYSTEM FANOUT

QUANTITY NEEDED:

- 3 pieces of BES-III FCS SYSTEM Fanout:
 - 1 in operation at BES-III
 - 1 for prompt backup at BES-III
 - 1 used for firmware debugging / development

Status:

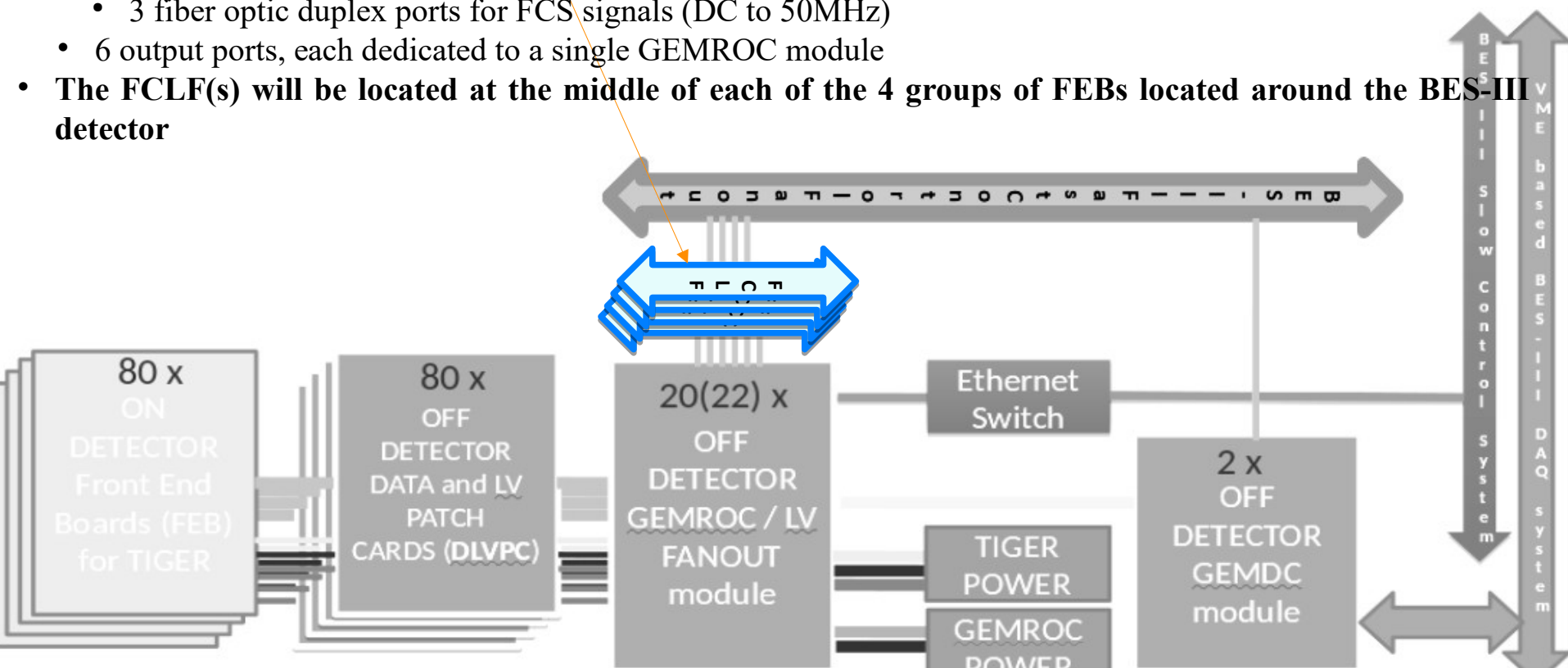
FCS_BKPLN and XCVR delivered



- **development of the modular Fast Control Signals (FCS) FANOUT system**

Modular FCS Local FANOUT

- **The FCS LOCAL Fanout (FCLF) are a LOW COST, non programmable, fanout modules which connects to the CLK, L1, L1_CHK, FULL ports of the GEMROC-based FCS SYSTEM FANOUT.**
- **Four (+ spares) FCLF are needed**
- The FCLF will have:
 - 2 alternatives for the connection to the GEMROC-based FCS SYSTEM FANOUT:
 - 1 “copper” port for LVDS signals carried by a 17- twisted pair, shielded cable (“green cable”), with auxiliary BNC ports for stand-alone operation
 - 3 fiber optic duplex ports for FCS signals (DC to 50MHz)
 - 6 output ports, each dedicated to a single GEMROC module
- **The FCLF(s) will be located at the middle of each of the 4 groups of FEBs located around the BES-III detector**



- development of the modular Fast Control Signals (FCS) FANOUT system

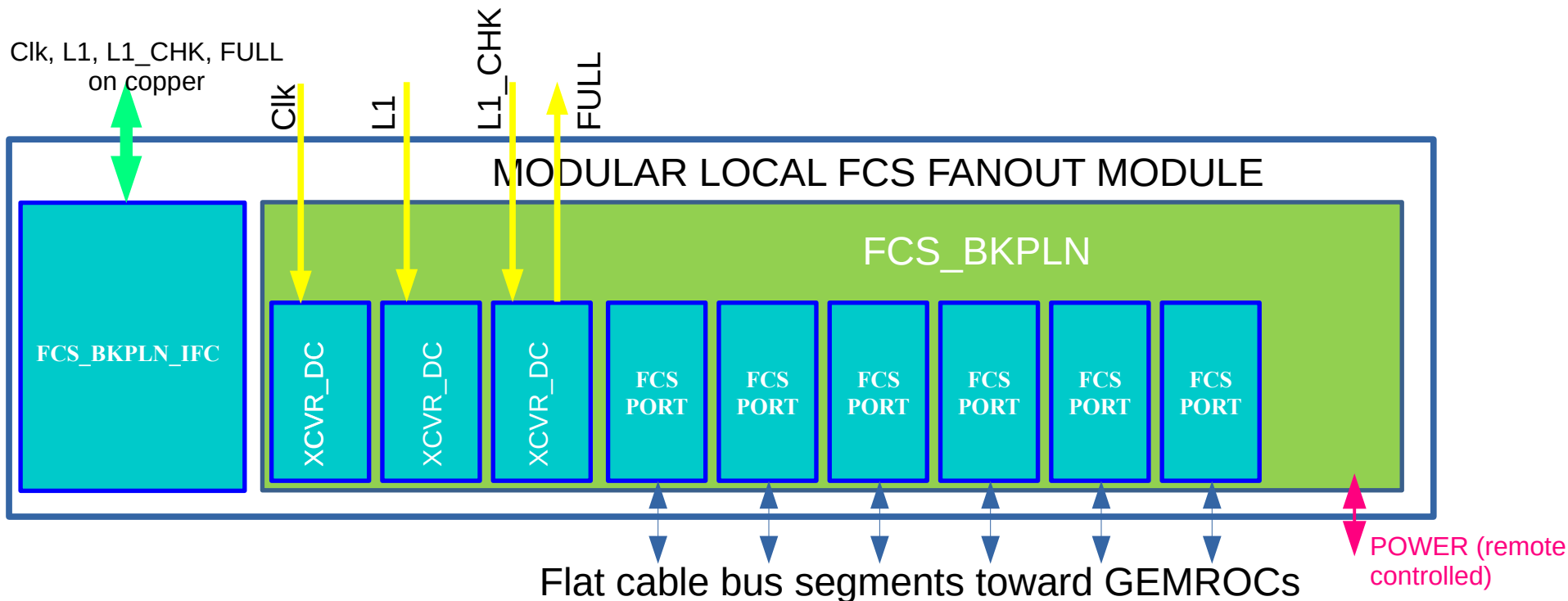
Modular FCS Local FANOUT

QUANTITY NEEDED:

- 6 pieces:
 - 4 in operation at BES-III
 - 1 for prompt backup at BES-III
 - 1 used for firmware debugging / development

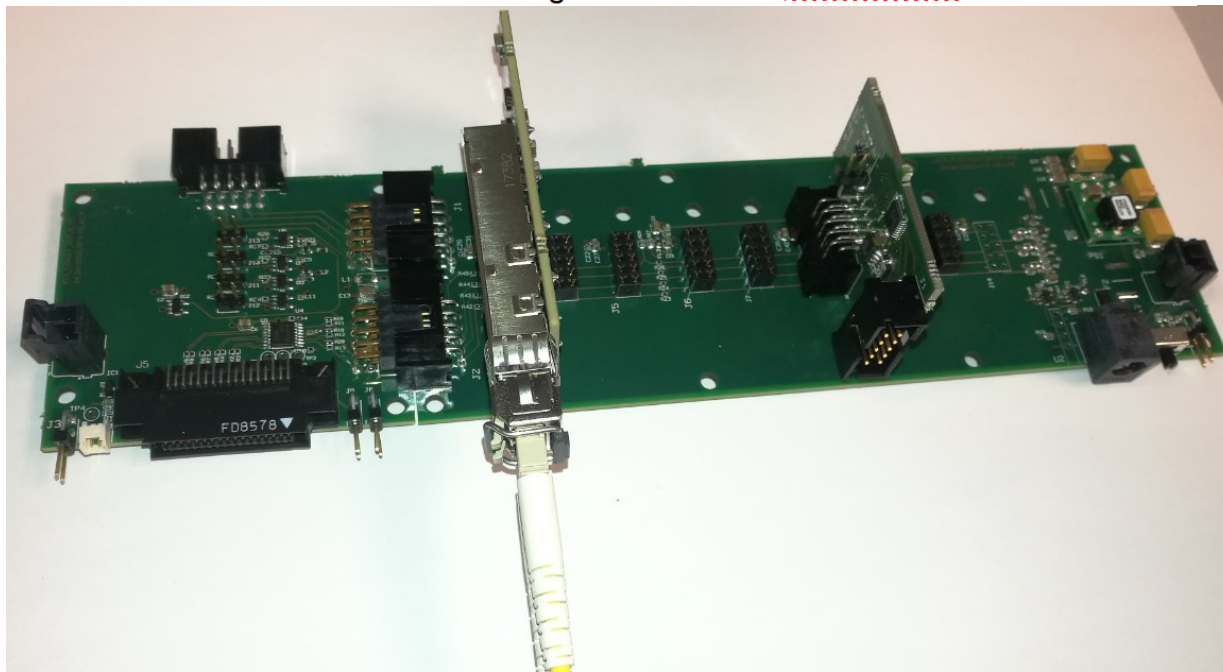
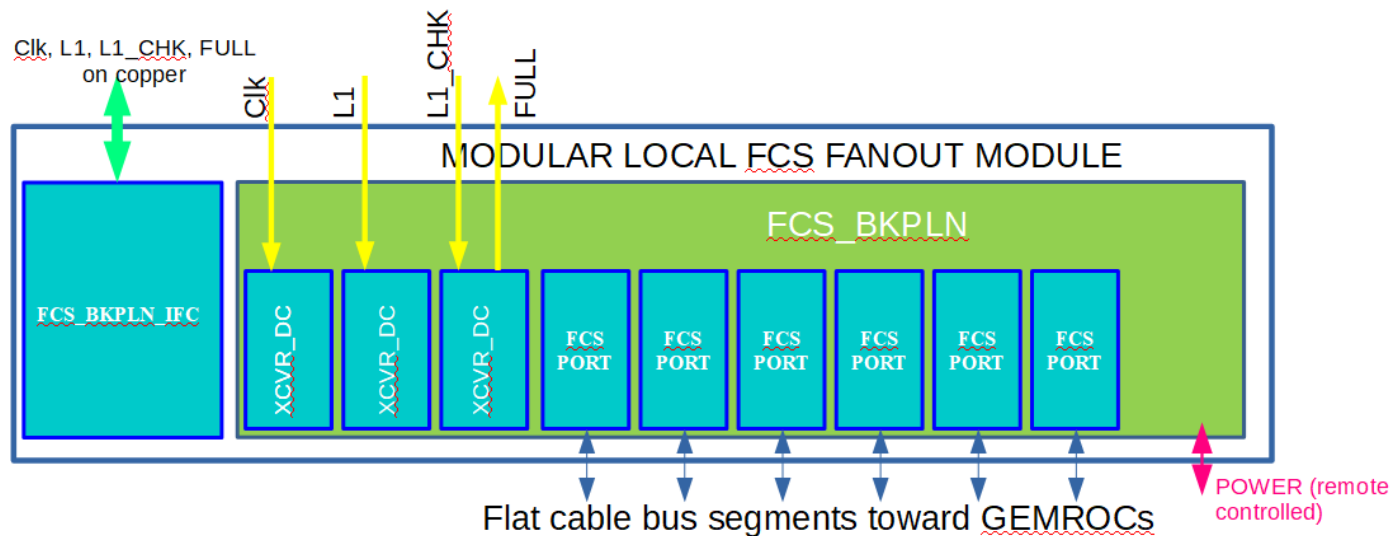
Status:

FCS_BKPLN_IFC,
FCS_BKPLN,
FCS_PORT,
and XCVR delivered



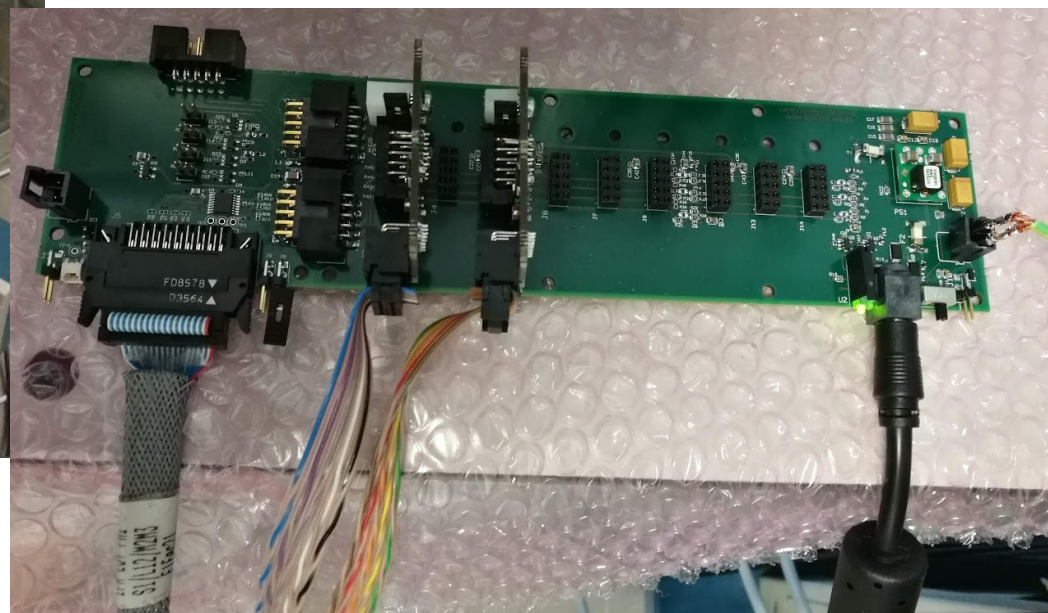
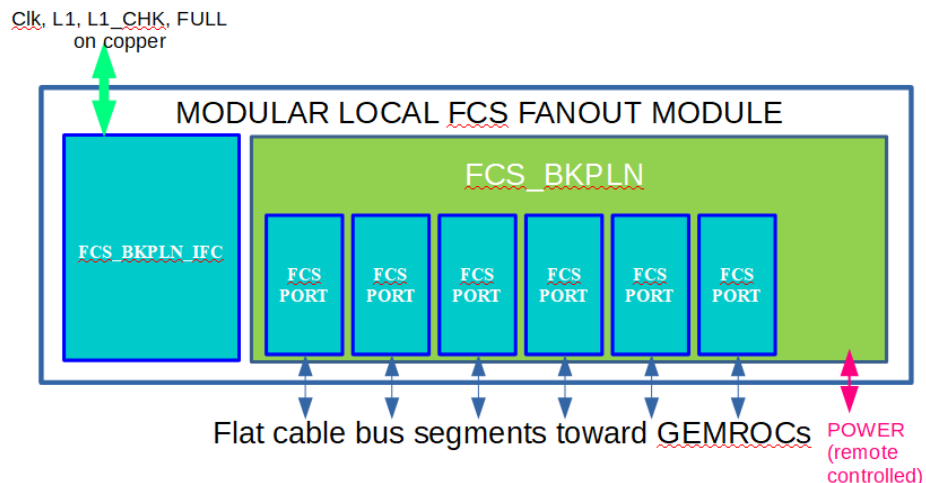
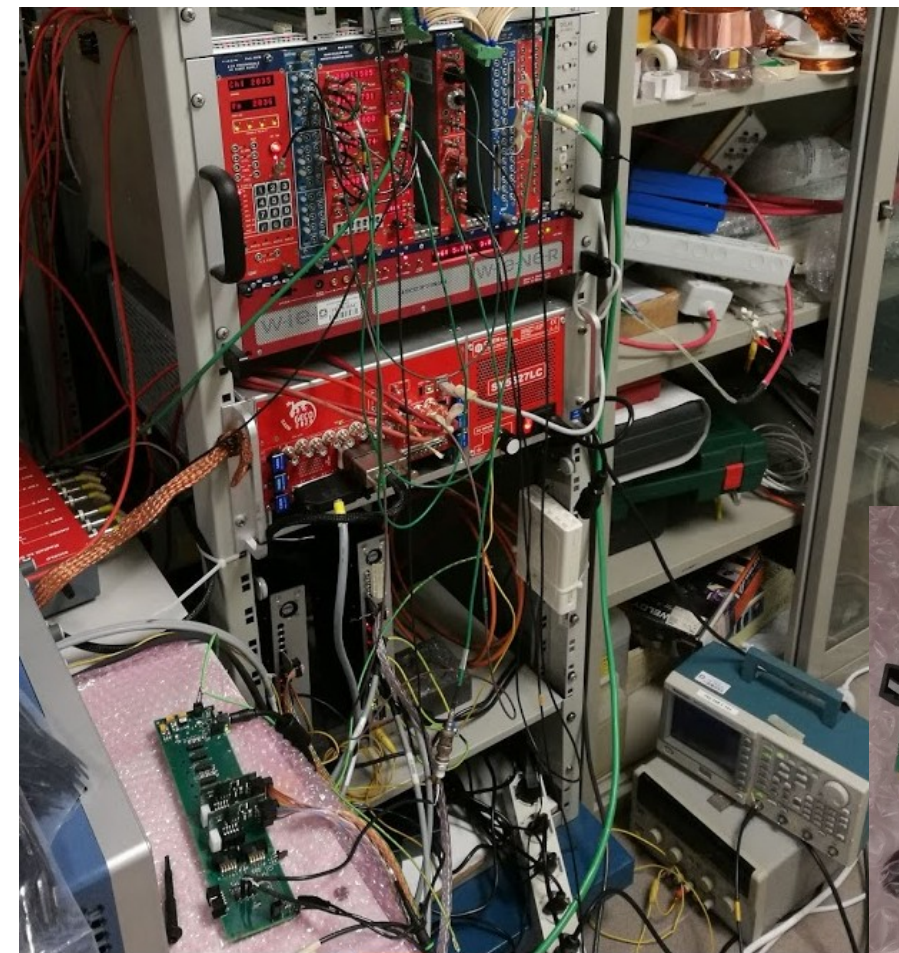
- development of the Modular FCS FANOUT system: status

Modular FCS Local FANOUT applied to the planar GEM setup at INFN-Ferrara:



- development of the Modular FCS FANOUT system: status

Modular FCS Local FANOUT applied to the planar GEM setup at INFN-Ferrara:



The local modular fanout is used to provide FCS signals (clock and trigger) to the 2 GEMROCs modules used in the setup

- **FCS FANOUT System TODO list:**

- setup a GEMROC SYSTEM FANOUT (~ 14 days)
- test the XCVR_DC production modules (~1 day)
- assemble all FCS FANOUT modular components into metal enclosures identical to those used for the GEMROC (~ 4 weeks)