
MBS

(Multi Branch System)

The General Purpose Data Acquisition System at GSI
A short Introduction
Some New Developments

MBS homepage: <http://www-w2k.gsi.de/daq/>

Manpower

5 Engineers and Technicians are working fulltime for DAQ Electronics

6 Developers are working fulltime on DAQ Software

at GANIL

**at GSI: 3.0x Developers: Digital Electronics: J.Hoffmann
(-Therapie)**

**Embedded Software: W.Ott
(-ZKS, -Therapie)**

MBS: N.Kurz

Some Facts about MBS

- **General Purpose DAQ System**
- **Scalable from Single-Crate Systems up to hierarchically structured Multi-Branch Systems**
- **> 48 Systems running (66 installed) at GSI. Standard DAQ at GSI**
- **> 50 Systems running (73 installed) outside GSI**
- **Entirely written in C; Started in 1993; Continuously developed**
- **Based on „UNIX like“ Real Time Operating System LynxOS**
- **Support for CAMAC, VME, VXI and FASTBUS**
- **Supported Processor Platforms:**

| | |
|-----------------------|----------------|
| CVC | (CAMAC) |
| E7, RIO2, RIO3 | (VME) |
| PC | |
- **Data Transport via all address mapped buses and TCP/IP (10, 100, 1000 Mb/s)**

Some more Facts

- **GSI Trigger Module is mandatory: Master, Slave; 15 Trigger In, Dead Time Out, Sub-Systems distance > 150 m, etc**
- **GSI Time Stamp Module is optional: Master, Slave, 20 ns resolution, Single Hit, > 150 m, etc**

User has to provide:

- **ASCII setup files to specify hardware topology of the MBS DAQ System**
- **User Readout Function to specify actions for initialisation and readout on triggers**

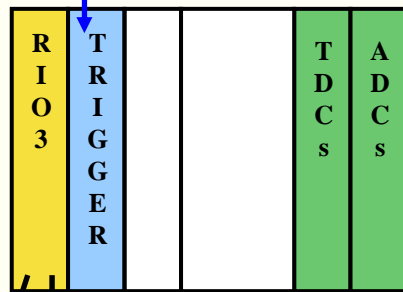
Templates and help available

-
- **Robustness**
 - **Standard electronics, boards (VME, CAMAC, ...)**
 - **One Realtime Operating systems for all platforms**
 - **"Simple" User application interface**
 - **Concentrate on functionality and not on colours**

MBS Single Processor System (Hardware View)

GSI Trigger Module:

15 Trigger Inputs,
Conversion Time setting
Dead Time output



VME Speed:

Single cycle: 5 MB/s
VME Block D32: 15 MB/s
VME Block D64: 25 MB/s

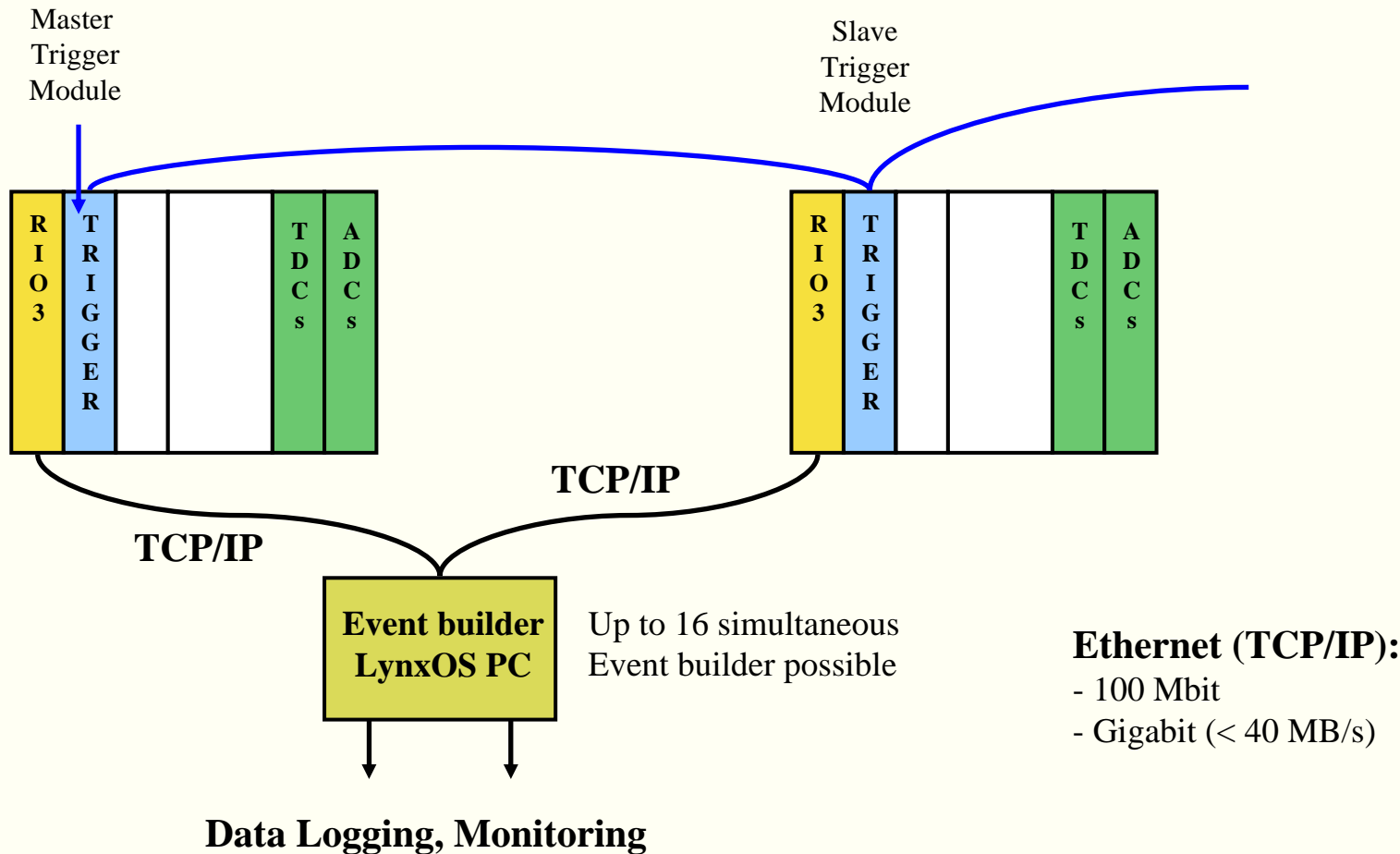
Data Monitoring: via TCP/IP sockets: **Go4, ROOT, GOOSY, PAW, LEA**

Data Logging:

- Tape Drives
- Local Disks
- NFS Disks
- Remote Disks (RFIO, TCP/IP)
- Tape Robot (RFIO, TCP/IP)

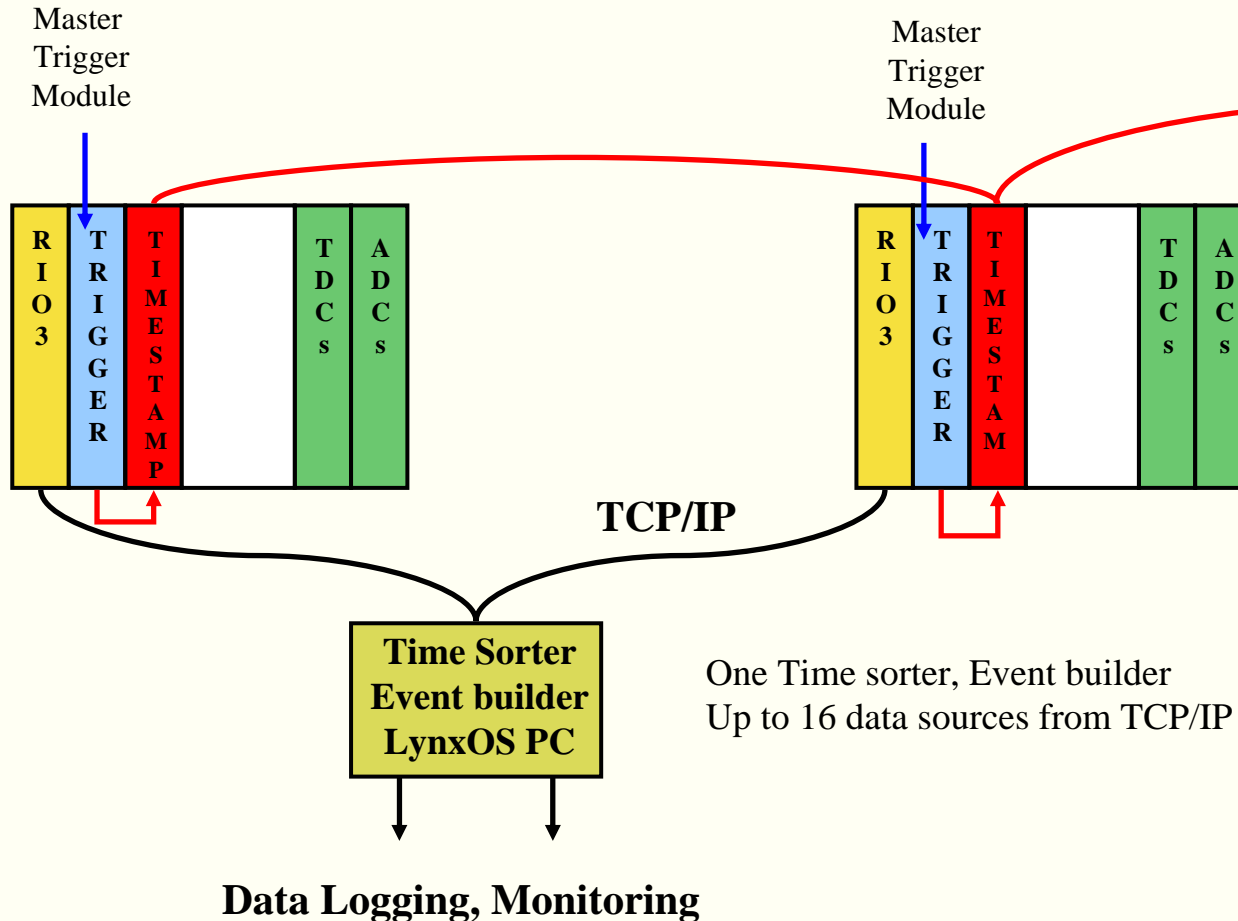
MBS Multi Processor System (Trigger Synchronization)

Trigger Bus: Up to 16 trigger modules, Up to ~200 m

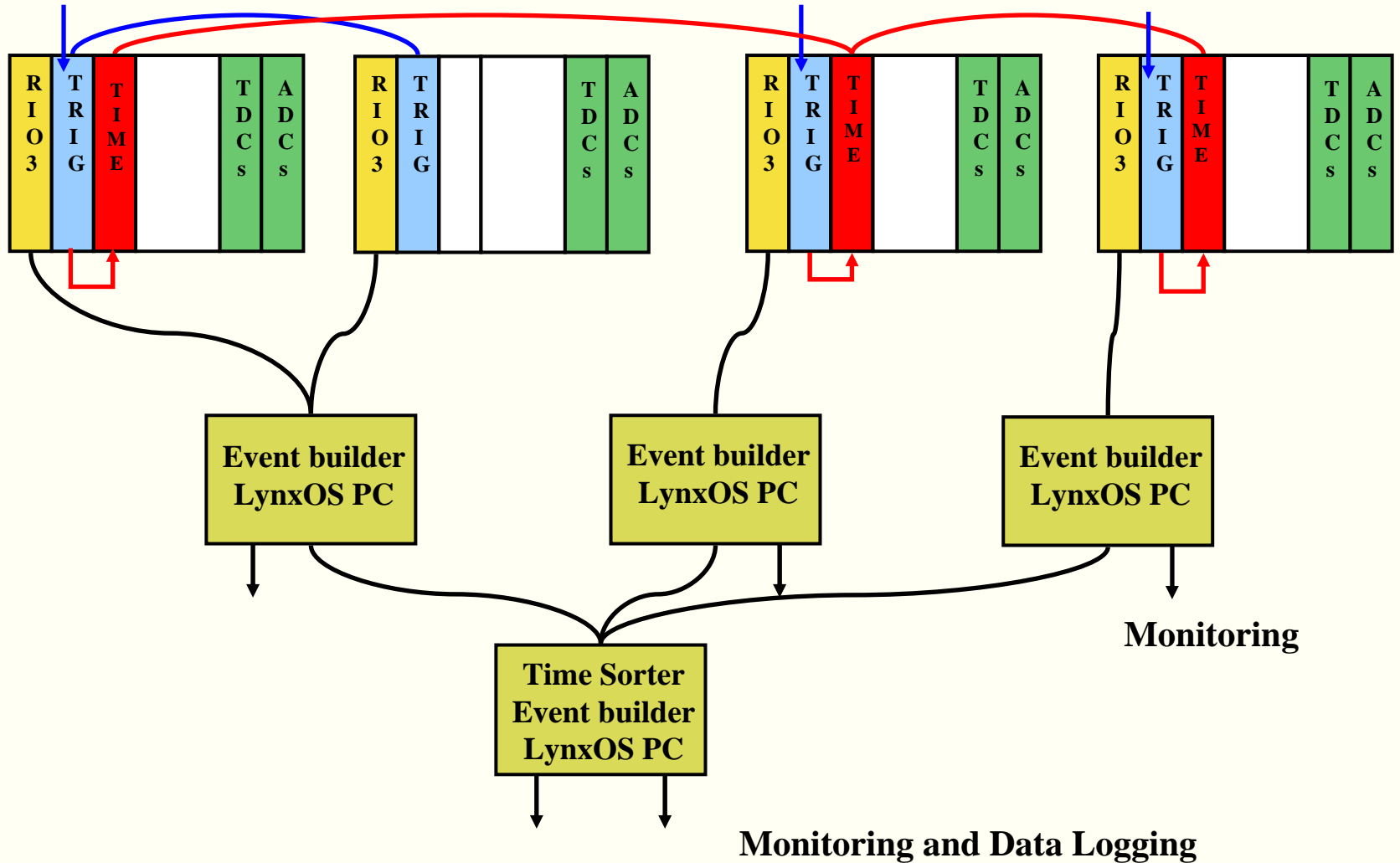


MBS Multi Processor System (Time Stamp Synchronization)

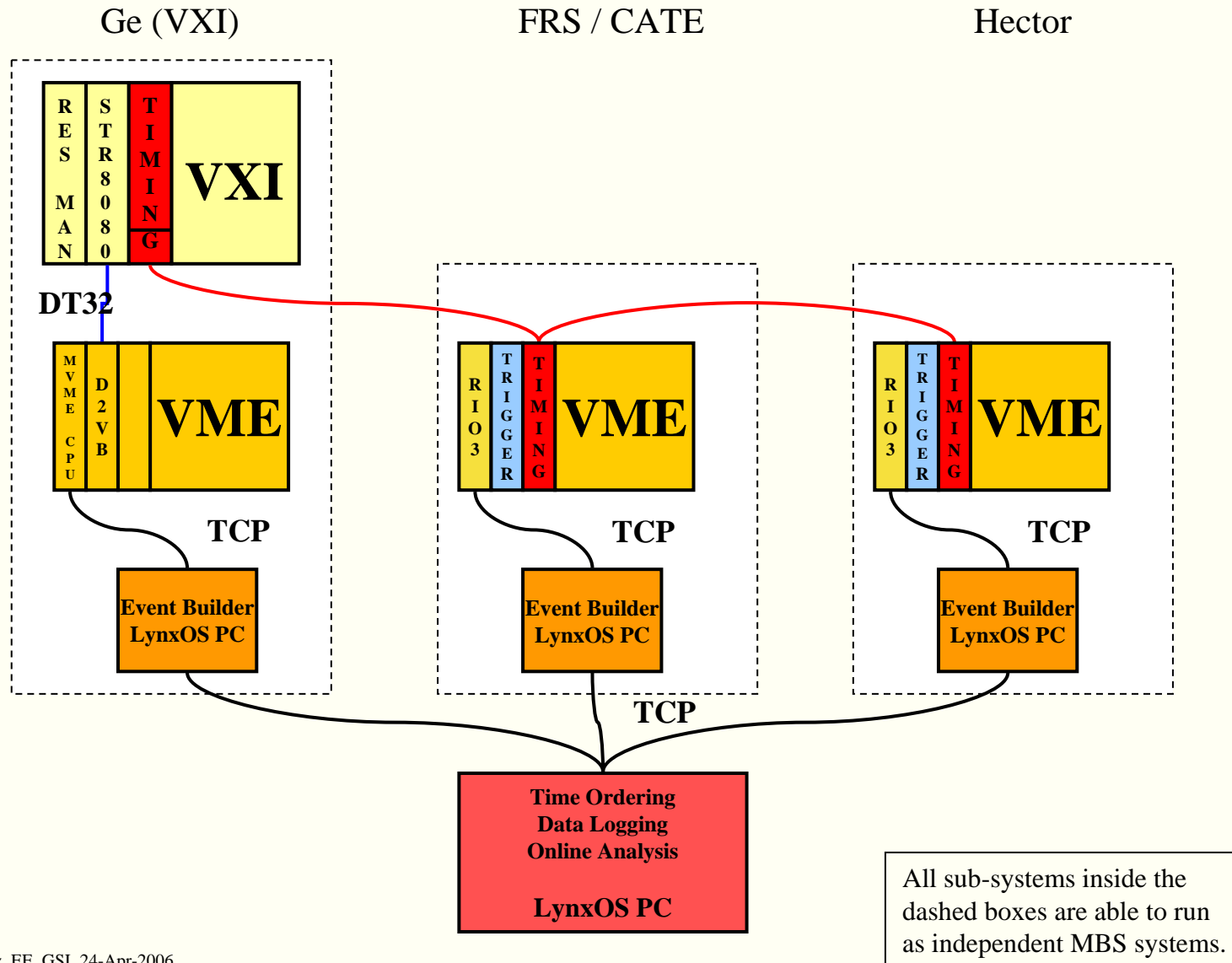
Time Synchronization: Up to 16 Modules,
up to ~200 m,
20 ns resolution



Combining Trigger – and Time Stamp Synchronization

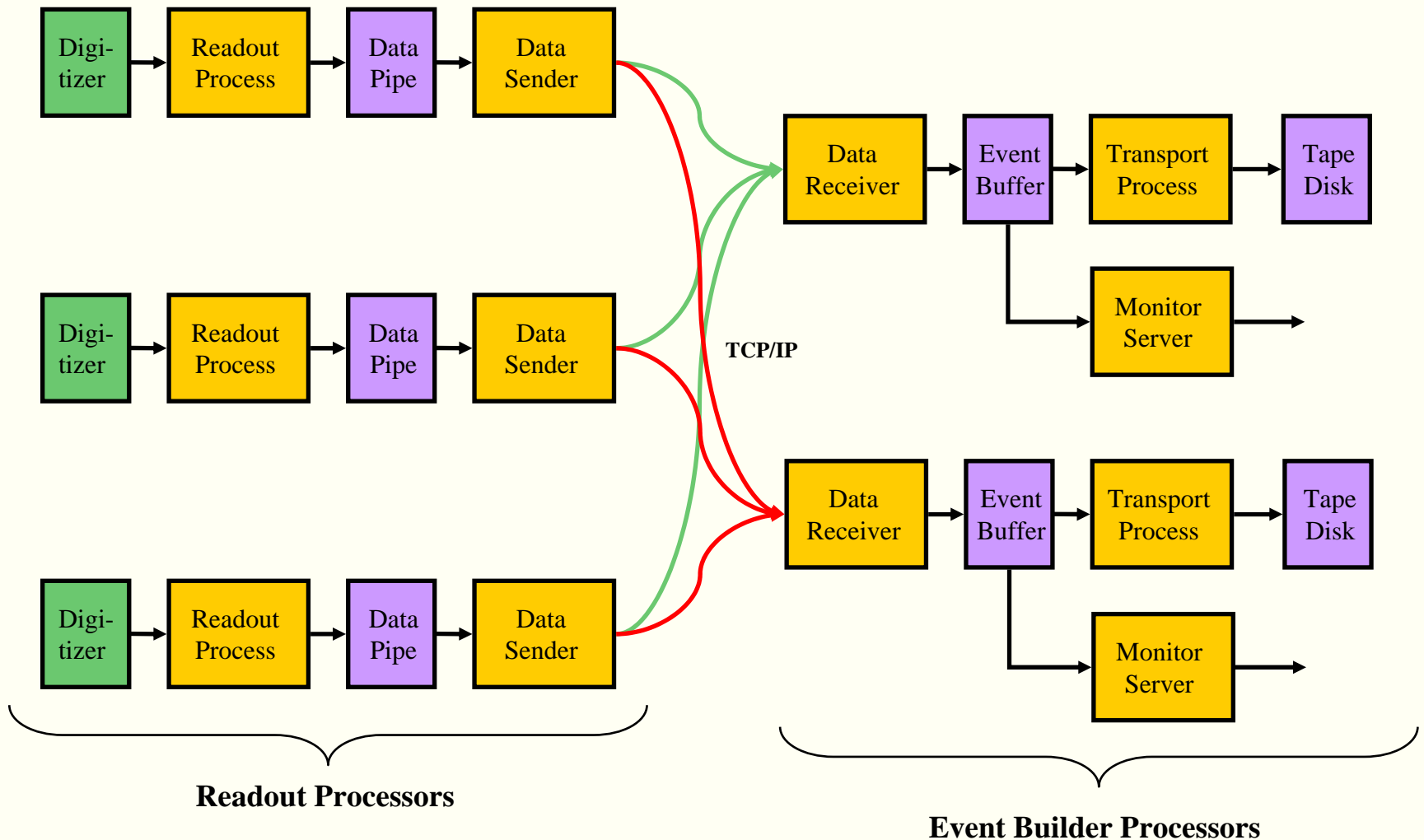


Example: RISING MBS Topology

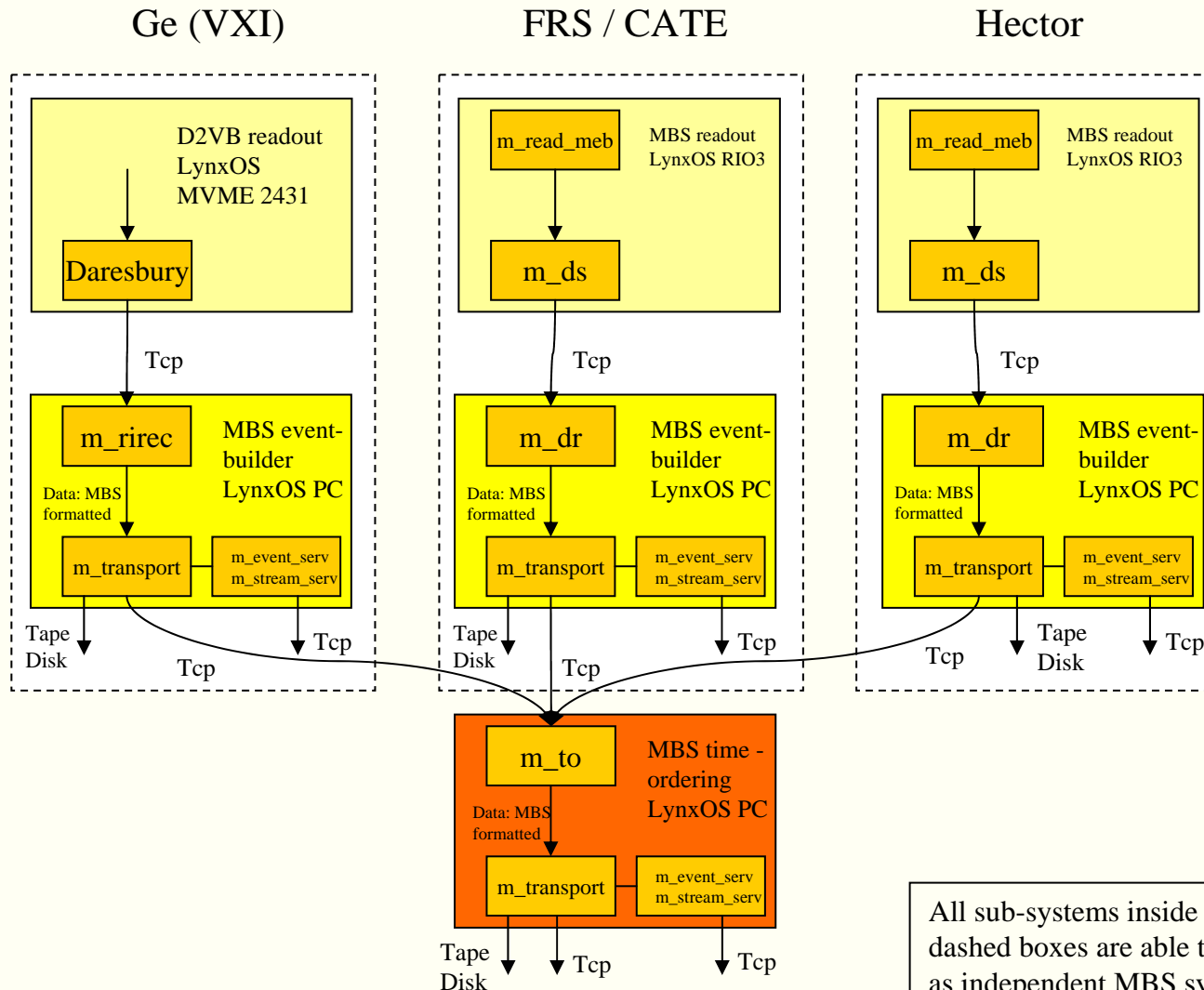


MBS Multi Processor System, Process View

Example: 3 X 2 MBS System, 3 Readout Processors and 2 Event Builder Processors

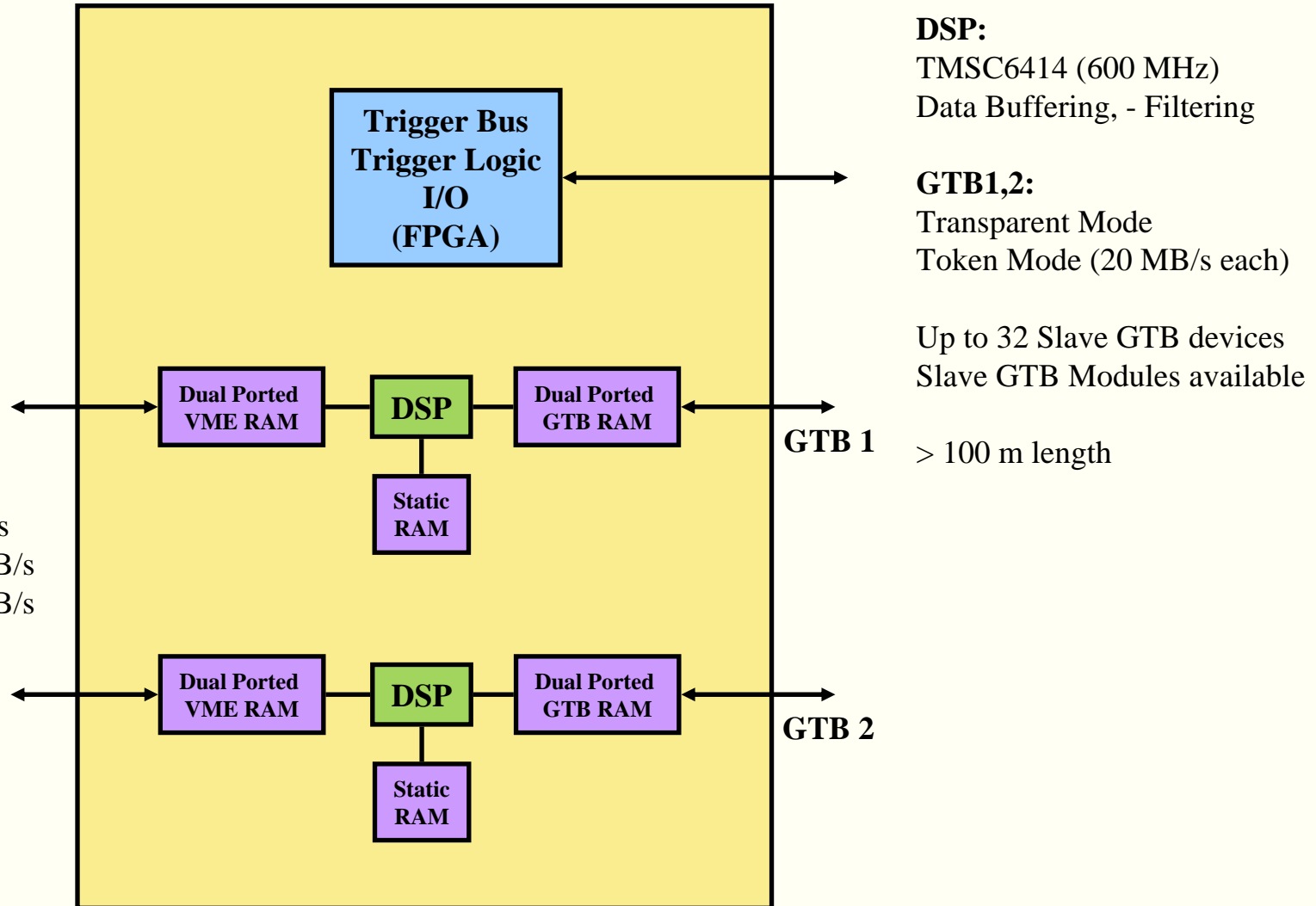


Example: RISING MBS, Process View

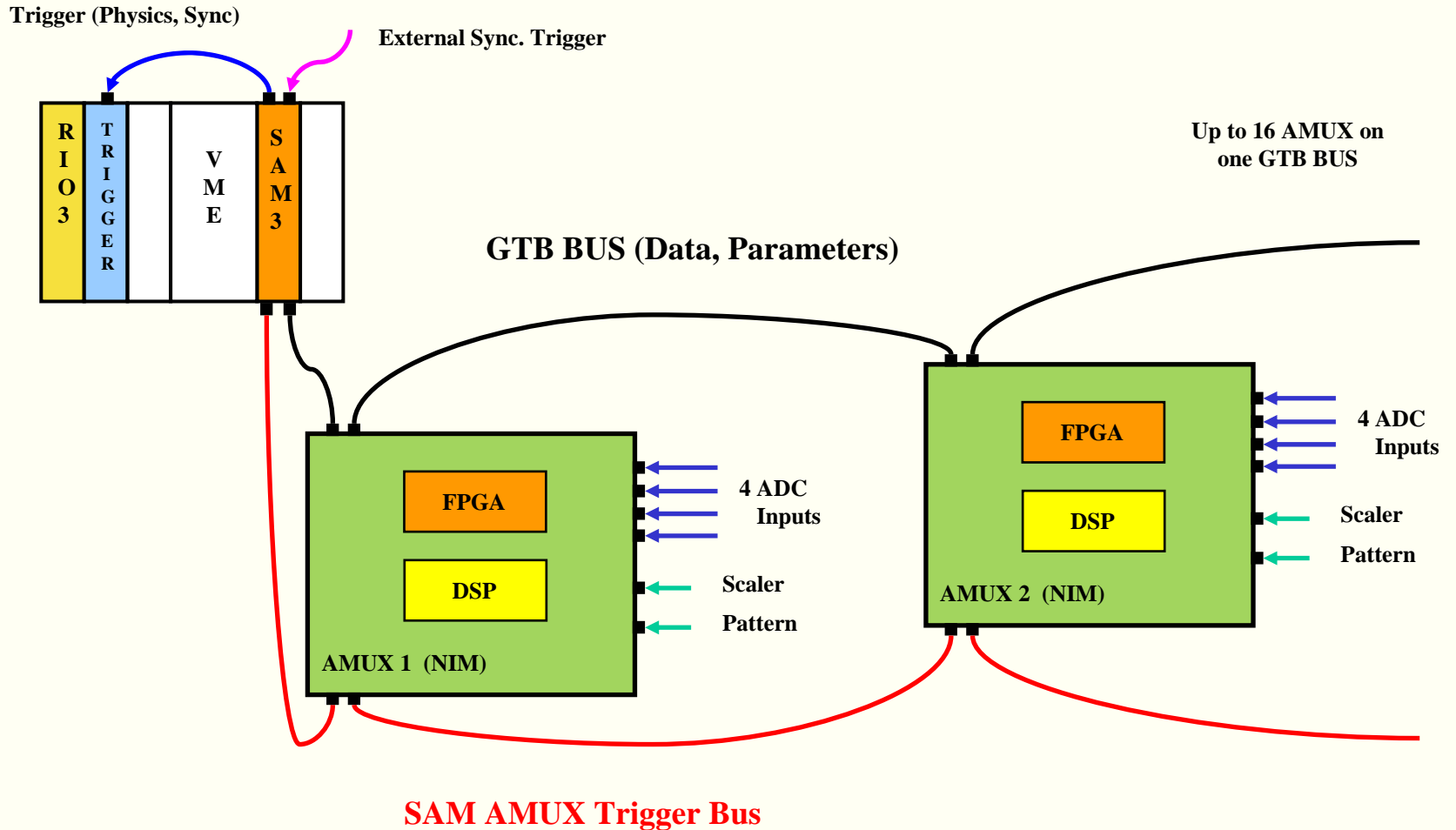


All sub-systems inside the dashed boxes are able to run as independent MBS systems.

The SAM5 VME Module (J.Hoffmann, W.Ott)

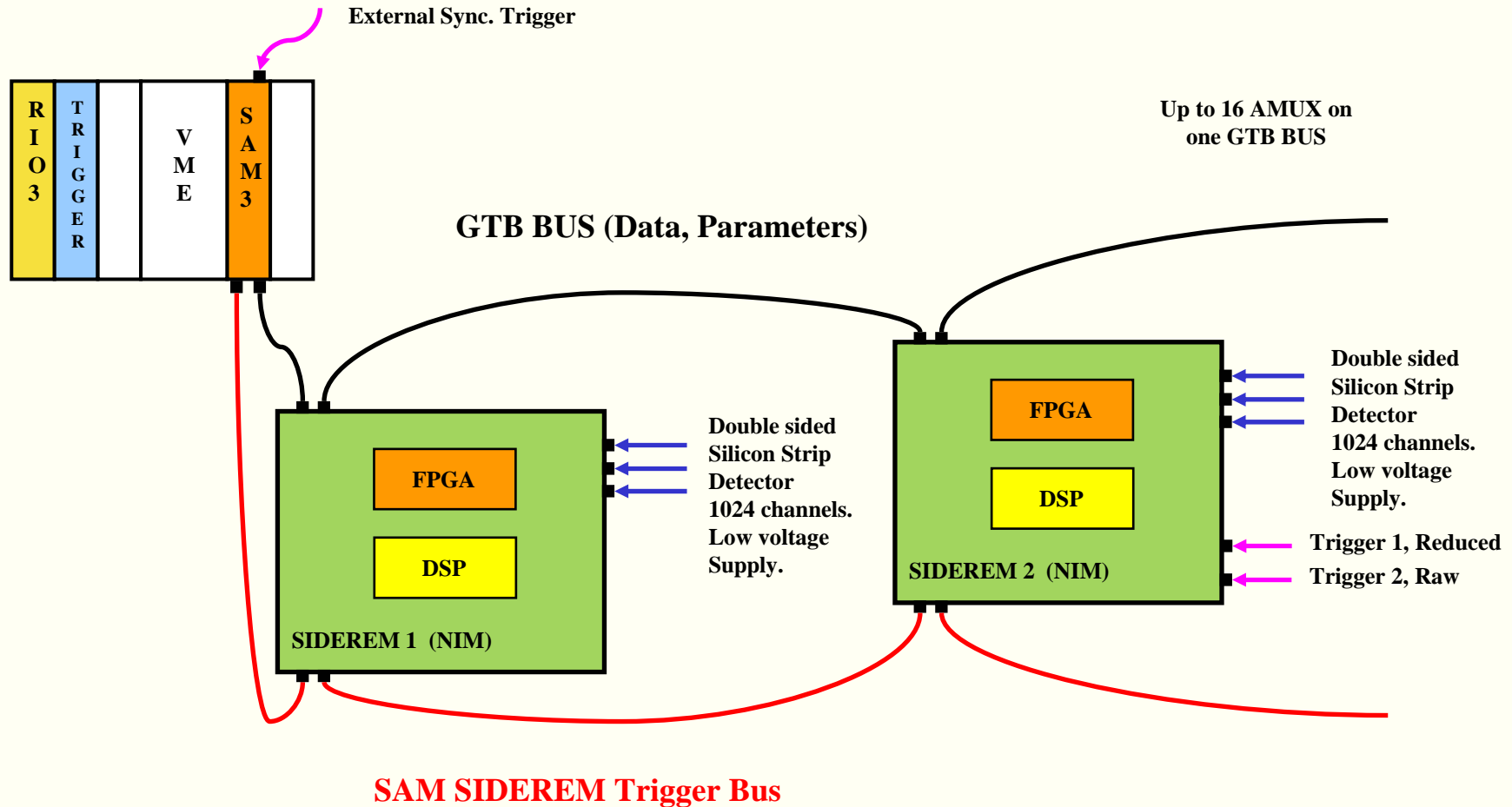


MBS-AMUX System for SHIP



W. Ott
J. Hoffmann

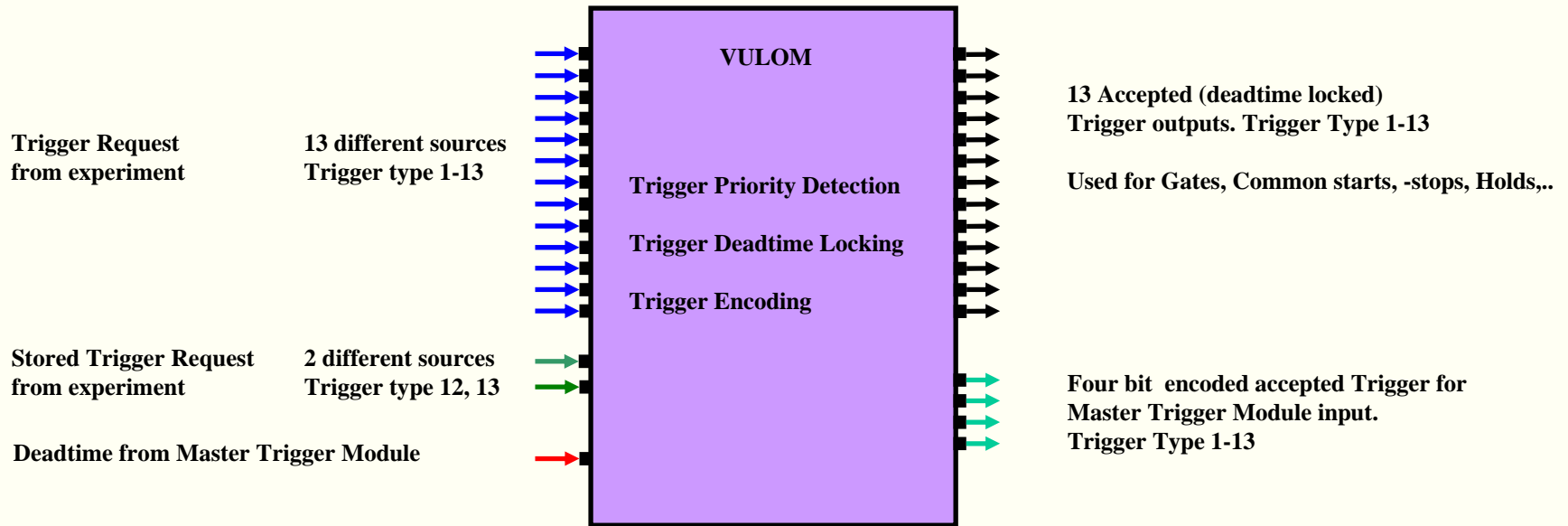
MBS-SIDEREM System for FRS, LAND, R3B



W. Ott
J. Hoffmann

Trigger Treatment with VME Logic Module

VULOM (J.Hoffmann)



- Plans:**
- Register readout, i.e. nr. of triggers in, nr. of accepted triggers
 - Downscaling of triggers
 - ...
 - ...
 - Old NIM Trigger BOX