

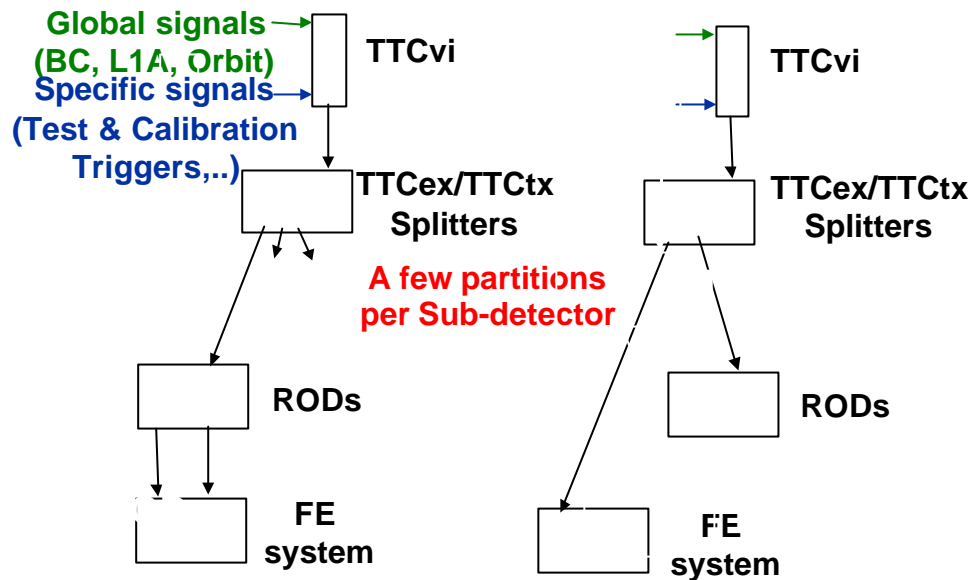
# TTC in ATLAS

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- ◆ **Partition definition**
- ◆ **Connection to the Central Trigger Processor**
- ◆ **TTC in the experiment**
  - Number of partitions
  - Number of TTCrx
  - Number of TTCex
  - Number of TTCvi
- ◆ **TTC for tests**

# Partition (1)

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- ◆ **Several partition per sub-system**
  - independent commissioning
  - tests
  - calibration
- ◆ **A TTC partition consists of:**
  - TTCvi
  - One or several TTCex
  - Receivers (TTCrx)
- ◆ **Associated with a read-out (DAQ) partition**
  - dead-time handling

# Partition (2)

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## ◆ Two modes of running

- Global
- Stand-alone
  - » can group several partitions

## ◆ When in “global”

- L1A from the CTP
- Timing referenced to Orbit signal

## ◆ Global mode

- Synchronisation
  - » BCR and ECR
- Private triggers
  - » Sharing of the gaps by the CTP
  - » One gap modulo 16 allocated to each sub-system
  - » Trigger signals to the CTP
- Test / monitoring triggers
  - » CTP provides a pre-pulse signal
  - » About 3  $\mu$ s before a L1A is forced
  - » Each system to provide test / calibration signals to the front-end

## ◆ Stand-alone

- Sub-systems to provide L1A to the TTCvi
- Sub-systems to take care of the dead-time

# Connection to the CTP

## Usage of B-Go signals

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- ◆ **Electrical ECL single ended signal for L1A**
- ◆ **Differential ECL for trigger-type**
  - Consider LVDS?
- ◆ **NIM ECR signal**
- ◆ **1 B-Go associated to BCR**
- ◆ **1 B-Go associated to ECR**
- ◆ **2 available for private use**

# TTC in the experiment

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- ◆ All hardware (TTCvi, TTCex, fibers) provided by the Level-1 trigger team
- ◆ Number of partition paid:
  - Sub-systems may add some at their own expense

**Table 16-1** Number of partitions per subdetector.

Subdetector	Number of partitions	Remarks
Pixels	2	
SCT	4	Barrel right & left, end-cap right & left
TRT	4	Barrel right & left, end-cap right & left
EM liquid-argon calorimeter	4	Barrel right & left, end-cap right & left
Hadronic end-cap calorimeter	2	End-cap right & left
Forward calorimeter	2	End-cap right & left
Tile calorimeter	4	Barrel right & left, extended barrel right & left
TGC	2	End-cap right & left
RPC	2	Barrel right & left
MDT	4	Barrel right & left, end-cap right & left
CSC	2	End-cap right & left
Level-1 calorimeter trigger	1	
Level-1 muon trigger	1	
Level-2/DAQ	1	

- ◆ Total number of partitions: 35

# Partition composition

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- ◆ **Inner tracker stops the TTC at the level of the ROD (back-end)**
  - special protocol to go inside the detector
  - very few TTCrx needed
- ◆ **Calorimeters (Larg & tile) use the TTCrx in the detector**
  - few optical receivers
  - electrical fan-out of the opto-to-electrical converter to TTCrx
- ◆ **Muon detector use the TTCrx on the detector**
  - one receiver per MDT chamber
- ◆ **One partition will consist of**
  - one TTCvi
  - 1 or 2 TTCex (320 destinations; including the modulator)

# Number of TTCrx

System	2001	2002	2003	2004	Spares	Total	TTCrx1	TTCrx2
Pixel						0		
SCT						0		
TRT	10		100			110	110	
LARG	219	2270				2489	272	2217
Tile	140	2700				2840		2840
MDT		10	1200		150	1360		1360
CSC	2		14			16	16	
TGC	12		115		23	150	20	130
RPC	20	100	900			1020		1020
level-1 cal	30	35	315			380	380	
level-1 ctp		10				10	10	
DAQ	20	20				40	40	
<b>Total</b>						<b>8415</b>	848	7567
<b>Mezanine</b>	22		115					

- ◆ **Total number to be ordered: 10000**
  - to have enough spares
- ◆ **TTCrx3.2 (SEE protected) version needed**
- ◆ **Schedule is a problem**
  - Tile calorimeter is producing
- ◆ **Available today:**
  - 1200 TTCrx3.2 and 160 TTCrx3.1
- ◆ **Urgent needs:**
  - A few mezzanines

# Number of TTCvi / TTCex

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## ◆ TTCvi

- Needed: 35
- To be ordered: 40 to 50
- Time scale 2002-2003

## ◆ TTCex

- Needed: 41
- To be ordered: 45 to 50
- Time scale 2002-2003



# TTC for test systems

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- ◆ **In institutes or test beams**
- ◆ **Difficult question:**
  - most of the sub-systems do not yet know how many test stations will be used
  - all of them do not need TTC
- ◆ **Case of OPAL (LTU)**
  - a bit more than 20 modules in the experiment
  - about 80 built
- ◆ **Should be less in ATLAS and already a lot of TTCvi / TTCvx have been bought (32 and 27)**

# Expected support

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## ◆ ASICs

- availability of a test system
- production test
- storage of the spare ASICs in good condition

## ◆ Mezzanines

- get them tested
- availability of extra boards if needed

## ◆ TTCex

- get them tested
- availability of some spares
  - » to replace the spares used in the experiment
- maintenance

## ◆ TTCvi

- get them tested
- availability of modules for testing
  - » renting?
- availability of some spares
  - » to replace the spares used in the experiment
- maintenance organisation

# Summary

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- ◆ **TTC used as is in ATLAS**
- ◆ **Needs in TTCrx reasonably well defined**
  - Unfortunately we have to produce soon
- ◆ **Needs of TTCvi, ex**
  - Reasonably well defined for the pit itself
  - Not yet clear for the extra systems
- ◆ **Some support expected**
  - Chips
    - » Storage of spare chips
    - » Production tests
    - » Mezzanine production
  - TTCvi and TTCex:
    - » procurement
    - » some spares
    - » maintenance organisation
    - » renting?