EDOC301

EUROBALL DATA ACQUISITION SYSTEM

Event Number Generation

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Event Number generation within Euroball

Eurogam currently uses one data readout bus (**DT32**) which connects all of its **VXI** crates. By physical arrangement the first data source to be read out during each event is the **Trigger** module and the first data word the Trigger outputs is the **Start Event Token**. The format of **Eurogam** events on the **DT32** bus is defined in the paper by J.Alexander ***DT32** bus specification Version 2 (**EDOC075**)*. The **Start Event Token** contains in its data field the **event number** which is constructed by the **Trigger**. The event number is a 16 bit field which therefore can occupy the 16 bits of the data field of a **Eurogam** data word.

The **Trigger** module broadcasts via the **VXI** backplane various signals which include the **event validation signal** and the **4 least significant bits** of the **trigger event number**. These signals are broadcast by the **Resource Manager** in the **VXI** crate containing the trigger module via an ECL bus to all other resource managers in the system. Each **Resource Manager** then makes them available on the **VXI** backplane of its crate. Thus they are available to every **VXI** module. Other modules (not within **VXI** crates) may if they wish be constructed to have access to the ECL bus and the **event validation signal** is available as an output from every **Resource Manager**.

It is recommended that any module in the system which requires access to the full 16 bit trigger generated event number reconstructs it in the following way.

- A 16 bit counter is maintained within the module
- This counter must be able to be zeroed via the module command interface
- Each time the module sees an event validation signal it increments the counter.
- Each time the counter is incremented the least significant 4 bits of the counter are compared with the 4 bits of the trigger event number which are available.
- If there is an error then the module counter is corrected on the assumption that the trigger information is correct.

If it is required to tag events with an identification number having greater range than 16 bits then a 32 bit identifier can be constructed by maintaining a second 16 bit counter which is a count of the number of carrys from the event number counter. The carry counter should be zeroed whenever the event number counter is zeroed. Since the necessary information is available on the **VXI** backplane it is easily accessible by all **VXI** modules. This avoids the need to modify the trigger to broadcast the event number by more direct means.

It is recommended that all new **VXI** data modules (and existing ones if they can be reprogammed) make available as data items which can be optionally enabled for readout the event number and carry counter generated in this way. It is considered that this will be a valuable diagnostic tool for checking the correct functioning of the crate readout system (particuarly in parallel mode) which can be checked against the event/subevent start token which also contains the event number and the original data output by the trigger as a part of the event.

It is planned that the Cluster card implement this feature and the Clover card will implement this feature when it is modified for parallel readout.