UDP Debug Data

The current Trigger Processor implementation uses FIFOs to collect debugging data. This data is then sent via Ethernet using a UDP protocol. There are several FIFOs in the design, each collecting a different type of data. The contents of each FIFO are drained in a round-robin fashion. The UDP payload length is dependent on the amount of data in the corresponding FIFO. The current maximum UDP payload length is set to 520 bytes total. This allows for 512 bytes of debug data per UDP packet.

Byte	
0	Type
1	reserved
2	Status
3	UDP Count
4 - 7	Address
8 - end	Data

Header

The first four bytes contain the header information. This includes the packet type, FIFO status, and UDP packet count.

Type

Currently there is 1 type which is FIFO debug Data, represented as 0xF0

Status

This byte contains status information on the FIFO being drained. These bits reflect the state at the point that the last word is being read from the FIFO. Currently two bits are defined. Others will be defined to represent error conditions such as FIFO overflow.

Bit 0 – Empty Flag

Bit 1 – Full Flag

UDP Count

Each time a UDP packet is sent, the UDP Count will be incremented. This can be used to check for missed packets.

Address

The Address of the FIFO being drained.

Data

The data as read from the FIFOs. The definition of the data depends on which FIFO is being read from.

Raw ART Data FIFO

The initial ART data path integration uses the Trigger Processor to collect the raw ADDC GBT packets and send them to a computer via UDP. The format of the data is outlined in the document "Specifications and Implementation of an ART ASIC prototype for the MicroMegas Trigger system of the NSW Detector" S. Martoiu, IFIN-HH Bucharest. The GBT packet option that is implemented in the ADDC is the "Hit-Map" option. Also the document describes the parity as being bits 7:0 where they are in fact bits 47:40 shifting the ARTDATA to bits 39:0.

The ADDC GBT packet is 112 bits wide. These 112 bits will be packed into the UDP Data using 16 bytes of UDP payload space. The 112 ADDC GBT bits will occupy the least significant bits in the 16 byte UDP payload. Since the maximum UDP data size is limited to 512, the number of ADDC GBT packets in this data can be a maximum of 32. The 16 byte GBT packet data will not be split between two UDP packets.

The following is an example of the data portion of a UDP packet containing raw ART data. There are two ADDC GBT packets represented.

```
00069AE5
E43FC342
D2B71FFB
91B5FF74
000C0F1B
00102020
10F1C71C
71FEB0FD
```

Currently the data from two ADDCs is sent to one FIFO address (0x21) This will be changed to use one FIFO per fiber.