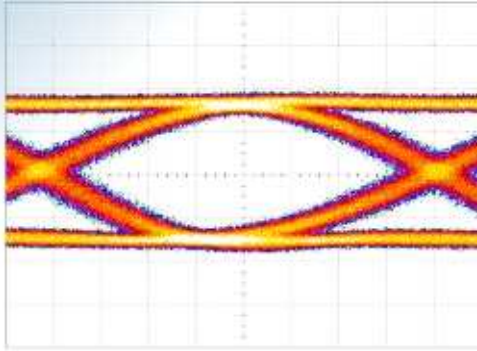




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# Brief description

## HUB20

### preliminary





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## 1. Application range

The component HUB20 is used for the interconnection of VME-systems and PCs via an optical fiber (OF). It is necessary, if more than two systems should be connected.

VME-systems and PCs can be combined in any order as long as the sum of 20 systems is not exceeded.

The data exchange between the systems is made in a synchronous manner according to the principle of reflective memory. The synchronous clock is 1ms and given by the HUB20.

## 2. Mounting

The component HUB20 is composed by the following parts.

- magazine with backplane and power supply
- Controller board
- One until five transceiver boards

### 2.1. Magazine

The magazine is made of anodized aluminium with dimensions of 270 x 266 x 242 mm. It is suited for assembling in 19"-racks and contains a backplane for the interconnection of the controller board and the transceiver board(s). Furthermore it contains the power supply for the electronic. The latter have wide range inputs. That's why they are suited for 110V and 220V-mains.

### 2.2. Controller board

The controller board is responsible for the following tasks:

- Storing and distribution of the system configuration
- Arbitration of the data ports
- Userinterface
- Storing and programming of the FPGA-configuration

**The controller board is to insert in the most left slot.**

To every interconnection component (PCILWL, VMELWL) is allocated a certain area of the dual port RAM (DPR). The contents of these areas are transmitted by every interconnection component to all others. Therefore the DPRs of all interconnection components contain the same data after a short delay. The definition of these DPR areas and other control data are summarized by the term "system configuration". The system configuration is loaded over the user interface into the controller board. After every power on or reset of the controller board the system configuration is transmitted to all interconnection components over the data ports (see chapter 2.3).



The transmission of data without collision over the backplane is ensured by arbitration of data ports. That means that data ports having received data request the access to the backplane at the controller board to transmit their data to all other data ports. Only one of the data ports has the right of access at the same time.

The user interface is made as a serial service interface connected to a normal DSUB09-connector. It is possible to load system and FPGA-configuration, to read versions and status information. For that purpose a normal terminal program on a PC can be used. The interface parameters are: 38400, 8, E, 1.

The component HUB20 contains several programmable logic circuits (FPGAs). The configuration data of the FPGAs are stored on the controller board. The user has the possibility to alter the configuration data on necessity. One reason could be for instance the alternation of the speed of the data transmission or of the synchronous clock. The FPGA-configuration is loaded into the FPGAs after system start.

### **2.3. Transceiver board**

The transceiver board is responsible for the data exchange with the interconnection components (VMELWL, PCILWL). Every transceiver board has four data ports. Depending on the number of systems to be connected one until five transceiver boards can be plugged. Therefore the connection of up to 20 systems is possible. Every data port has a receive buffer of 4kByte. Therefore it is possible to store one data package with maximal size. After granting the access to the backplane by the controller board the data port sends the received data package to all other data ports. These will transmit it via optical fiber ports to their interconnection component.

The transceiver boards are plugged right from the controller board.

## **3. Functional description**

The component HUB20 transmits a special data package cyclically with 1ms time-lag over the OF-ports to all interconnection components. This forces the interconnection components to transmit their data packages to the HUB20. These data packages contain the data of the areas of the DPR allocated by the system configuration. Every data port transmits the data package received to all other data ports. These will transmit it to their system connected. Therefore every DPR of the systems connected contains the same data after a short delay.

The system configuration has to ensure that the areas of the DPR of different connected systems do not overlap.

## **4. Size of data packages and data rate**

The size of the data packages of a connection component is limited to 4096 bytes. 4060 bytes of user data remains after subtracting the protocol overhead.

Depending on the configuration and the number of systems connected the maximum data rate is about 12 to 16kByte/ms at receiver side.



## 5. Data connection

A multimode optical fiber is used for the data connection. It is operated with 250MBaud fully duplex. A gross data rate of 200MBaud remains because of the 8 to 10bit coding/decoding achieved by the SERDES-devices. SFP-modules are used as transceiver devices.