CCR 20/21 Fnet Repeaters

Features / Application

Fig.: Block diagram of the CCR 20/21 modules

- Repeater function and optical/electrical interface(s)
- CCR 20: one optical fiber interface (for Transmit and Receive respectively)
- CCR 21: three optical fiber interfaces (for Transmit and Receive respectively)
- One BNC socket for connection of 75 Ohm coaxial cable
- Redundant repeater configuration
- Half-duplex transfer
- Connection to in-cabinet Fnet via backplane of rack
- Isolated signal decoupling
- Link length (optical) to max. 2000 m
- Link length (electrical, point-to-point) to max. 500 m
- Local/distant switchover of optical fiber interfaces
- Optical fiber link test from CCR
- Receive/Fault indicator
- Mounting in Melody rack
- Rack size 7 height units / 8 width units
General Introduction

The in-cabinet Fnet connection between the CMCs and the I/O modules is made in the rack by way of the backplane; between the racks it is made by flat cable (twisted pair), jointly for bus lines A and B. CMC 50 can communicate within a cabinet with the maximum number of 44 connectable stations (I/O modules) in the cabinet.

Where a Fnet is to be routed out of the cabinet repeaters, i.e. CCR 20/21, must always be used for electrical isolation, to enable isolated decoupling.

CCR 20/21 are repeaters with electrical and optical interfaces developed specially for use in the Fnet. The repeaters prepare the data so that greater distances can be bridged, for example over optical fiber links. The repeaters are suitable for the following applications:

- Point-to-point connections (optical) to 2000 m
- Optical star configuration with 3 optical fiber links per module
- Point-to-point connections (electrical) to 500 m
- Bus connection between several cabinets (electrical) to 200 m

With optical fibers, standard distances of up to 2000 meters can be bridged. Where the manufacturers select the components (transmitter/receiver) to be used, and with use of laminated cable, it is possible to cover distances of up to 6 km. Request a non-standard version (NL) of the CCR 20/21 for such cases.

The electrical connections normally used, which are endangered by voltage surges resulting from lightning or electromagnetic interference for example, can be replaced by an insensitive optical fiber connection. Another feature of the optical fiber connection is the high-grade electrical isolation between the subsystems, which means no bonding conductors are needed.

Optical links require the following components as standard:

>>> Duplex internal cable (pigtails) / Splice box / External cable / Splice box / Duplex internal cable (pigtails) <<<

The splices are to be executed according to the mounting instructions for optical fibers 30/65-8810-Z1. For shorter distances a Duplex external cable (without splices) can be used.

The optical fiber to use is a graded-index optical waveguide G50/125 with 50 µm core diameter and 125 µm sheath diameter. The wavelength of the light is 850 nm. **62.5 µm fibers must not be used**, because too much light would be injected (receiver over-ranging)! For further details on cable types refer to Technical Information 30/66-8810 "Optical fibers".

Point-to-Point Connections

The Fnet repeaters in the "Master" cabinet (CMC 50 on the Fnet segment) and "Slave" cabinet (only I/O modules on the Fnet segment) are to be interconnected by optical fiber cable or coaxial cable.

For the interconnection of remote stations or entire plant sections, optical fiber links should preferentially be used. They offer link lengths of 2000 meters, with high-grade electrical isolation.

An electrical point-to-point connection with coaxial cable enables bus segments to be coupled over a distance of 500 meters, where optical fiber isolation is not essential (for example swapped-out I/O modules in the same building or a fail-safe system in the adjoining cabinet). The latter case requires an electrical Fnet coupling, that is, over coax cable with CCR 20 and CNR 10 (3 height-measure Contronic E module).

No stations other than the two repeater pairs may be connected to a point-to-point link, as the link would otherwise be classified as a bus segment with a maximum permissible length of 200 meters.

Bus Connection Between Several Cabinets

If, for example, only reserve slots or tiers in other cabinets are available for a system expansion, the I/O modules in the other cabinets can communicate over a Fnet bus link with the master cabinet. The I/O modules in the slave cabinets are each assigned one CCR 20 pair for the link to the higher-order Fnet bus segment. The segment length must not exceed 200 meters. The maximum of 44 stations on the segment has only theoretical value, since other limits are already reached in advance, such as transfer rates, segment lengths etc.
The above structure should, however, remain the exception, as the distribution of I/O modules across several different cabinets means the station is no longer identifiable as such. In contrast to an in-cabinet expansion, implementation of the structure requires a large number of Fnet repeaters.

Optical Star

With a CCR 21 pair an optical star with a maximum of three optical fiber links can be constructed. The number of individual links can be increased by adding further CCR 21s to the same bus segment. Cascading should be avoided, as this involves an accumulation of repeater runtimes.

An optical star in a Fnet must not be directly connected to a second star. This would cause "optical feedback", which blocks the data flow on the bus line.

Fig.: Inadmissible configuration
### Technical Data

| Repeater function: | NRZI  
| - Transmission method | Master/Slave  
| - Bus control | SDLC  
| - Transmission procedure | 375 kBD  
| Coaxial interfaces: |  
| - Characteristic wave impedance | 75 Ohm  
| - Bus length | 200 m (500 m point-to-point)  
| - Termination | BNC  
| Optical fiber interfaces: |  
| - Optical fiber | Graded-index optical waveguide G50/125  
| - Wavelength | 850 nm  
| - Link length | 2000 m (standard)  
| - Termination | F-SMA  
| Power supply: |  
| - Supply voltage | Uv = +20 ... +33 V  
| - Fusing | Glass fuse link 5 * 20  
| | 3.15 A time-lag T 3.15 H  
| Permissible Uv surge voltages: |  
| | 35 V for 1 s  
| | 45 V for 10 ms  
| Current consumption: |  
| | IV = 330 mA (CCR 20) at Uv = 24 V  
| | IV = 590 mA (CCR 21) at Uv = 24 V  
| Power loss: |  
| | PMAX = 8 W (CCR 20)  
| | PMAX = 14 W (CCR 21)  
| Ambient temperature: | 0 ... 50 °C (temperature for module ventilation in rack)  
| General data: |  
| - Required space | 8 width units, 7 height units  
| - Weight | 300 g (CCR 20)  
| | 800 g (CCR 21)  
| Accessories, including: | 1 F-piece, 1 terminator and 2 or 6 caps  

### Ordering Information

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<th>Catalog No.</th>
<th>Description</th>
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<td>CCR 20 Fnet Repeaters</td>
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<tr>
<td>73316-4-0788717</td>
<td>CCR 21 Fnet Repeaters</td>
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