1 General information

Based on state-of-the-art Intel Celeron processor technology, the X20 CPUs cover a wide spectrum of demands. They can be implemented in solutions ranging from standard applications to those requiring the highest levels of performance.

The x86 100MHz-compatible X20CP1483 is the entry-level X20 CPU. With an optimum price/performance ratio, it has the same basic features as all of the larger CPUs.

USB and Ethernet are included in every CPU. In addition, every CPU has a POWERLINK connection for real-time communication. In addition, there are up to three multi-purpose slots for additional interface modules.

- Intel Celeron 650/400/266 Performance with additional I/O processor
- Entry-level CPU is Intel x86 100MHz-compatible with additional I/O processor
- Ethernet, POWERLINK V1/V2 and USB onboard
- Modular expansion of interfaces
- CompactFlash as removable application memory
- Fan-free or exchangeable fan
- Extremely compact
### Model number and Short description

#### CPUs

<table>
<thead>
<tr>
<th>Model number</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X20CP1483</td>
<td>X20 CPU, x86 100 MHz Intel compatible, 32 MB DRAM, 128 kB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1483-1</td>
<td>X20 CPU, x86 100 MHz Intel compatible, 64 MB DRAM, 128 kB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1484</td>
<td>X20 CPU, Celeron 266 compatible, 32 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1484-1</td>
<td>X20 CPU, Celeron 266 compatible, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1485</td>
<td>X20 CPU, Celeron 400, 32 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1485-1</td>
<td>X20 CPU, Celeron 400, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP1486</td>
<td>X20 CPU, Celeron 550, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 1 insert slot for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
</tbody>
</table>

#### Required accessories

<table>
<thead>
<tr>
<th>CompactFlash</th>
</tr>
</thead>
<tbody>
<tr>
<td>0CFCRD.0128E.01</td>
</tr>
<tr>
<td>0CFCRD.0512E.01</td>
</tr>
<tr>
<td>5CFCRD.0064-03</td>
</tr>
<tr>
<td>5CFCRD.0128-03</td>
</tr>
<tr>
<td>5CFCRD.016G-06</td>
</tr>
<tr>
<td>5CFCRD.0256-03</td>
</tr>
<tr>
<td>5CFCRD.0512-03</td>
</tr>
<tr>
<td>5CFCRD.1024-03</td>
</tr>
<tr>
<td>5CFCRD.2048-03</td>
</tr>
<tr>
<td>5CFCRD.2048-06</td>
</tr>
<tr>
<td>5CFCRD.4096-03</td>
</tr>
<tr>
<td>5CFCRD.4096-06</td>
</tr>
<tr>
<td>5CFCRD.8192-03</td>
</tr>
<tr>
<td>5CFCRD.8192-06</td>
</tr>
</tbody>
</table>

#### Optional accessories

<table>
<thead>
<tr>
<th>Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>0AC201.91</td>
</tr>
<tr>
<td>4A0006.00-000</td>
</tr>
</tbody>
</table>

Table 1: X20CP1483, X20CP1483-1, X20CP1484, X20CP1484-1, X20CP1485, X20CP1485-1, X20CP1486 - Order data
### Included in delivery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A0006.00-000</td>
<td>Backup battery (see also section 21 “Changing the Lithium battery” on page 21)</td>
</tr>
<tr>
<td>-</td>
<td>Interface module slot covers</td>
</tr>
<tr>
<td>X20AC0SR1</td>
<td>X20 locking plate (right)</td>
</tr>
<tr>
<td>X20TB12</td>
<td>X20 terminal block, 12-pin, 24 V coded</td>
</tr>
</tbody>
</table>

Table 2: X20 CPUs - Contents of delivery
X20CP148x and X20CP348x

3 Technical data - X20CP148x

<table>
<thead>
<tr>
<th>Product ID</th>
<th>X20CP1483</th>
<th>X20CP1483-1</th>
<th>X20CP1484</th>
<th>X20CP1484-1</th>
<th>X20CP1485</th>
<th>X20CP1485-1</th>
<th>X20CP1486</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short description</td>
<td>Interfaces</td>
<td>1x RS232, 1x Ethernet, 1x POWERLINK V1/V2, 2x USB, 1x X2X Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System module</td>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General information

<table>
<thead>
<tr>
<th>Cooling</th>
<th>Fan-free</th>
</tr>
</thead>
<tbody>
<tr>
<td>B&amp;R ID code</td>
<td>0xA239 0xAEC5 0x23A5 0xAAABE 0x1F18 0xA2AB 0x2164</td>
</tr>
<tr>
<td>Status indicators</td>
<td>CPU function, overtemperature, Ethernet, POWERLINK, CompactFlash, battery</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Battery, Yes, using status LED and software status</td>
</tr>
<tr>
<td></td>
<td>CPU function, Yes, with status LED</td>
</tr>
<tr>
<td></td>
<td>CompactFlash, Yes, with status LED</td>
</tr>
<tr>
<td></td>
<td>Ethernet, Yes, with status LED</td>
</tr>
<tr>
<td></td>
<td>POWERLINK, Yes, with status LED</td>
</tr>
<tr>
<td></td>
<td>Overtemperature, Yes, with status LED</td>
</tr>
<tr>
<td>Fan diagnostics</td>
<td>Yes, with software status</td>
</tr>
<tr>
<td>ACOPOS capability</td>
<td>Yes</td>
</tr>
<tr>
<td>Visual Components capability</td>
<td>Yes</td>
</tr>
<tr>
<td>Power consumption - Without memory card, interface module and USB</td>
<td>6.0 W 10.5 W 13.5 W</td>
</tr>
</tbody>
</table>
| Internal power consumption of the X2X Link and I/O supply \(^1\) | Bus 1.42 W  
|                          | i/O internal 0.6 W |
| Additional power dissipation caused by the actuators (resistive) [W] | - |

### Electrical isolation

| IF1 - IF2   | Yes |
| IF1 - IF3   | Yes |
| IF1 - IF4   | No |
| IF1 - IF5   | No |
| IF1 - IF6   | Yes |
| IF2 - IF4   | Yes |
| IF2 - IF5   | Yes |
| IF3 - IF4   | Yes |
| IF3 - IF5   | Yes |
| IF4 - IF5   | Yes |
| IF4 - IF6   | No |
| IF5 - IF6   | Yes |
| PLC - IF1   | No |
| PLC - IF2   | Yes |
| PLC - IF3   | Yes |
| PLC - IF4   | No |
| PLC - IF5   | No |
| PLC - IF6   | Yes |

### Certification

| CE          | Yes |
| c-UL-us     | Yes |
| GOST-R      | Yes |

### CPU and X2X Link supply

| Input voltage | 24 V DC - 15% / +20% |
| Input Current | Max. 2.2 A |
| Saving        | Integrated, cannot be exchanged |
| Reverse polarity protection | Yes |

### X2X Link supply output

| Rated output power | 7.0 W |
| Parallel operation  | Yes \(^1\) |
| Redundant operation | Yes |

### Input I/O supply

| Input voltage | 24 V DC - 15% / +20% |
| Saving        | Required line fuse max. 10 A (slow blow) |

### Output I/O supply

| Rated output voltage | 24 VDC |
| Permitted contact load | 10.0 A |

Table 3: X20CP1483, X20CP1483-1, X20CP1484, X20CP1484-1, X20CP1485, X20CP1485-1, X20CP1486 - Technical data
### General supply

<table>
<thead>
<tr>
<th>Product ID</th>
<th>X20CP1483</th>
<th>X20CP1483-1</th>
<th>X20CP1484</th>
<th>X20CP1484-1</th>
<th>X20CP1485</th>
<th>X20CP1485-1</th>
<th>X20CP1486</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status indicators</td>
<td>Overload, operating status, module status, RS232 data transfer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostics</td>
<td>RS232 data transfer: Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module run/error: Yes, using status LED and software status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overload: Yes, using status LED and software status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical isolation</td>
<td>I/O feed - I/O supply: No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPU/X2X Link feed - CPU/X2X Link supply: Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Controller

- **Compact Flash slot**: 1
- **Real-time clock**: Nonvolatile memory, resolution 1 second
- **FPU**: Yes

### Processor

- **Type**
  - x86 100 comp.
  - Celeron 266 comp.
  - Celeron 400
  - Celeron 650
- **L2 cache**: 16 kB
- **L1 cache for data and program code**: 2x 16 Kb

### Integrated I/O processor

- Processes I/O data points in the background

### Modular interface slots

- **Number**: 1

### Remanent variables

<table>
<thead>
<tr>
<th>Max. 32 kB 3)</th>
<th>Max. 64 kB 3)</th>
<th>Max. 256 kB 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ms</td>
<td>800 μs</td>
<td>400 μs</td>
</tr>
<tr>
<td>0.007 μs</td>
<td>200 μs</td>
<td>0.0055 μs</td>
</tr>
<tr>
<td>0.0034 μs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Data Buffering

- **Battery monitoring**: Yes
- **Lithium battery**: At least 3 years

### Standard memory

- **RAM**
  - 32 MB SDRAM
  - 64 MB SDRAM
- **User RAM**
  - 128 kB SRAM 4)
  - 1 MB SRAM 4)
  - 64 MB SDRAM

### Interfaces

#### Interface IF1

- **Type**: RS232
- **Design**: Contact via 12-pin terminal block TB12
- **Transfer rate**: Max. 115.2 kbit/s

#### Interface IF2

- **Type**: Ethernet
- **Design**: Shielded RJ45 port
- **Cable length**: Max. 100 m between two stations (segment length)
- **Transfer rate**: 10/100 Mbit/s

#### Interface IF3

- **Type**: POWERLINK V1/V2
- **Design**: 100 Base-T (ANSI/IEEE 802.3)
- **Cable length**: Max. 100 m between two stations (segment length)
- **Transfer rate**: 100 Mbit/s

#### Interface IF4

- **Type**: USB 1.1
- **Quantity**: 1
- **Design**: Type A

#### Interface IF5

- **Type**: USB 1.1
- **Quantity**: 1
- **Design**: Type A

#### IF6 interface

- **Type**: X2X Link master
- **Quantity**: 1

### Operating conditions

#### Mounting orientation

- **Horizontal**: Yes
- **Vertical**: Yes

#### Installation at altitudes above sea level

<table>
<thead>
<tr>
<th>0 to 2000 m</th>
<th>No derating</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 2000 m</td>
<td>Reduction of ambient temperature by 0.5°C per 100 m</td>
</tr>
</tbody>
</table>

#### EN 60529 protection

- IP20

### Environmental conditions

- **Temperature**
  - -25 to 60°C (Horizontal)
  - -25 to 50°C (Vertical)
  - -25 to 85°C (Transport)
  - -25 to 70°C (Storage)

#### Operation

<table>
<thead>
<tr>
<th>Horizontal installation</th>
<th>Vertical installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 55°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>0 to 55°C, fanless: 0 to 45°C</td>
<td>0 to 55°C, fanless operation not permitted</td>
</tr>
</tbody>
</table>

**Table 3:** X20CP1483, X20CP1483-1, X20CP1484, X20CP1484-1, X20CP1485, X20CP1485-1, X20CP1486 - Technical data
<table>
<thead>
<tr>
<th>Relative humidity</th>
<th>X20CP1483</th>
<th>X20CP1483-1</th>
<th>X20CP1484</th>
<th>X20CP1484-1</th>
<th>X20CP1485</th>
<th>X20CP1485-1</th>
<th>X20CP1486</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical characteristics**

<table>
<thead>
<tr>
<th>Note</th>
<th>Order application memory (CompactFlash) separately</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Backup battery included in delivery</td>
</tr>
<tr>
<td></td>
<td>X20 locking plate (right) included in delivery</td>
</tr>
<tr>
<td></td>
<td>X20 terminal block (12-pin) included in delivery</td>
</tr>
<tr>
<td></td>
<td>Interface module slot covers included in the delivery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>150 mm</td>
</tr>
<tr>
<td>Height</td>
<td>99 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>85 mm</td>
</tr>
</tbody>
</table>

Table 3: X20CP1483, X20CP1483-1, X20CP1484, X20CP1484-1, X20CP1485, X20CP1485-1, X20CP1486 - Technical data

1) The specified values are maximum values. The exact calculation is available for download as a data sheet with the other module documentation on the B&R homepage.
2) In parallel operation, only 75% of the rated power can be assumed. Please ensure that all parallel operating power supplies are switched on and off simultaneously.
3) Can be configured in Automation Studio
4) Minus the configured remanent variables
4 Order data - X20CP348x

<table>
<thead>
<tr>
<th>Model number</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X20CP3484</td>
<td>X20 CPU, Celeron 266 compatible, 32 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 3 insert slots for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP3484-1</td>
<td>X20 CPU, Celeron 266 compatible, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 3 insert slots for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP3485</td>
<td>X20 CPU, Celeron 400, 32 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 3 insert slots for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP3485-1</td>
<td>X20 CPU, Celeron 400, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 3 insert slots for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
<tr>
<td>X20CP3486</td>
<td>X20 CPU, Celeron 650, 64 MB DRAM, 1 MB SRAM, exchangeable application memory: CompactFlash, 3 insert slots for X20 interface modules, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100 Base-T, 1 POWERLINK V1/V2 interface, incl. power supply module, TB12 terminal block and slot covers, X20AC0SR1 X20 end plate right included, order program memory separately.</td>
</tr>
</tbody>
</table>

Included in delivery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A0006.00-000</td>
<td>Backup battery (see also section 21 &quot;Changing the Lithium battery&quot; on page 21)</td>
</tr>
<tr>
<td>X20AC0SR1</td>
<td>Interface module slot covers</td>
</tr>
<tr>
<td>X20TB12</td>
<td>X20 terminal block, 12-pin, 24 V coded</td>
</tr>
</tbody>
</table>

Table 4: X20CP3484, X20CP3484-1, X20CP3485, X20CP3485-1, X20CP3486 - Order data

Table 5: X20 CPUs - Contents of delivery

Data sheet V 2.16
# 5 Technical data - X20CP348x

<table>
<thead>
<tr>
<th>Product ID</th>
<th>X20CP3484</th>
<th>X20CP3484-1</th>
<th>X20CP3485</th>
<th>X20CP3485-1</th>
<th>X20CP3486</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short description</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interfaces</td>
<td>1x RS232, 1x Ethernet, 1x POWERLINK V1/V2, 2x USB, 1x X2X Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System module</td>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fan-free</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B&amp;R ID code</strong></td>
<td>0x23A6</td>
<td>0xAABF</td>
<td>0x2165</td>
<td>0xA2AC</td>
<td>0x1F19</td>
</tr>
<tr>
<td><strong>Status indicators</strong></td>
<td>CPU function, overtemperature, Ethernet, POWERLINK, CompactFlash, battery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diagnostics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>Yes, using status LED and software status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CPU function</strong></td>
<td>Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CompactFlash</strong></td>
<td>Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethernet</strong></td>
<td>Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POWERLINK</strong></td>
<td>Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overtemperature</strong></td>
<td>Yes, with status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fan</strong></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fan diagnostics</strong></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACOPOS capability</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Visual Components capability</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption - Without memory card, interface module and USB</strong></td>
<td>10.5 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Internal power consumption of the X2X Link and I/O supply [1]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bus</strong></td>
<td>1.42 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I/O Internal</strong></td>
<td>0.6 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional power dissipation caused by the actuators (resistive) [W]</strong></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical isolation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF1 - IF2</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF1 - IF3</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF1 - IF4</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF1 - IF5</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF1 - IF6</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF2 - IF4</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF2 - IF5</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF3 - IF4</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF3 - IF5</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF4 - IF5</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF4 - IF6</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IF5 - IF6</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF1</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF2</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF3</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF4</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF5</strong></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLC - IF6</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CE</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>c-UL-us</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GOST-R</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CPU and X2X Link supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input voltage</strong></td>
<td>24 VDC -15% / +20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input Current</strong></td>
<td>Max. 2.2 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Saving</strong></td>
<td>Integrated, cannot be exchanged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>X2X Link supply output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated output power</strong></td>
<td>7.0 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parallel operation</strong></td>
<td>Yes [1]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Redundant operation</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input I/O supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input voltage</strong></td>
<td>24 VDC -15% / +20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Saving</strong></td>
<td>Required line fuse max. 10 A (slow blow)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output I/O supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated output voltage</strong></td>
<td>24 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permitted contact load</strong></td>
<td>10.0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Status indicators</strong></td>
<td>Overload, operating status, module status, RS232 data transfer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: X20CP3484, X20CP3484-1, X20CP3485, X20CP3485-1, X20CP3486 - Technical data
<table>
<thead>
<tr>
<th>Product ID</th>
<th>X20CP3484</th>
<th>X20CP3484-1</th>
<th>X20CP3485</th>
<th>X20CP3485-1</th>
<th>X20CP3486</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnostics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS232 data transfer</td>
<td>Yes, with status LED</td>
<td></td>
<td>Yes, with status LED and software status</td>
<td></td>
<td>Yes, using status LED and software status</td>
</tr>
<tr>
<td>Module run/error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical isolation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O feed - I/O supply</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU/X2X Link feed - CPU/X2X Link supply</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CompactFlash slot</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Nonvolatile memory, resolution 1 second</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FPU</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Celeron 266 comp.</td>
<td>Celeron 400</td>
<td>Celeron 650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2 cache</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1 cache for data and program code</td>
<td>2x 16 Kb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Integrated I/O processor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Processes I/O data points in the background</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Modular interface slots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. 64 kB [^2])</td>
<td>Max. 256 kB [^2])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shortest task class cycle time</strong></td>
<td>800 µs</td>
<td>400 µs</td>
<td>200 µs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Typical instruction cycle time</strong></td>
<td>0.007 µs</td>
<td>0.0055 µs</td>
<td>0.0034 µs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data Buffering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery monitoring</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium battery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Standard memory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>32 MB SDRAM</td>
<td>64 MB SDRAM</td>
<td>32 MB SDRAM</td>
<td>64 MB SDRAM</td>
<td></td>
</tr>
<tr>
<td>User RAM</td>
<td>1 MB SRAM [^4])</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface IF1</td>
<td>RS232</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Contact via 12-pin terminal block TB12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer rate</td>
<td>Max. 115.2 kbit/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface IF2</td>
<td>Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Shielded RJ45 port</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>Max. 100 m between two stations (segment length)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer rate</td>
<td>10/100 Mbit/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface IF3</strong></td>
<td>POWERLINK V1/V2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fieldbus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>100 Base-T (ANSI/IEEE 802.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Shielded RJ45 port</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>Max. 100 m between two stations (segment length)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer rate</td>
<td>100 Mbit/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface IF4</td>
<td>USB 1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Type A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface IF5</td>
<td>USB 1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Type A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IF6 interface</td>
<td>X2X Link master</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating conditions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting orientation</td>
<td>Horizontal</td>
<td>Yes</td>
<td>Vertical</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Installation at altitudes above sea level</td>
<td>No derating</td>
<td>Reduction of ambient temperature by 0.5°C per 100 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 2000 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2000 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental conditions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Operation</td>
<td>0 to 55°C</td>
<td>0 to 55°C, fanless: 0 to 45°C</td>
<td>0 to 55°C, fanless operation not permitted</td>
<td></td>
</tr>
<tr>
<td>Horizontal installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical installation</td>
<td>0 to 50°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>-25 to 70°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>-25 to 70°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: X20CP3484, X20CP3484-1, X20CP3485, X20CP3485-1, X20CP3486 - Technical data
Table 6: X20CP3484, X20CP3484-1, X20CP3485, X20CP3485-1, X20CP3486 - Technical data

<table>
<thead>
<tr>
<th>Product ID</th>
<th>X20CP3484</th>
<th>X20CP3484-1</th>
<th>X20CP3485</th>
<th>X20CP3485-1</th>
<th>X20CP3486</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%, non-condensing</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>5 to 95%, non-condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>Order application memory (CompactFlash) separately</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Backup battery included in delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X20 locking plate (right) included in delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X20 terminal block (12-pin) included in delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interface module slot covers included in the delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>200 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>99 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>85 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) The specified values are maximum values. The exact calculation is available for download as a data sheet with the other module documentation on the B&R homepage.
2) In parallel operation, only 75% of the rated power can be assumed. Please ensure that all parallel operating power supplies are switched on and off simultaneously.
3) Can be configured in Automation Studio
4) Minus the configured remanent variables
6 X20 CPUs - Status LEDs

<table>
<thead>
<tr>
<th>Image</th>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R/E</td>
<td>Green</td>
<td>On</td>
<td>Application running</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>On</td>
<td></td>
<td>SERVICE mode</td>
</tr>
<tr>
<td></td>
<td>RDY/F</td>
<td>Yellow</td>
<td>On</td>
<td>SERVICE or BOOT mode</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>On</td>
<td></td>
<td>Overtemperature</td>
</tr>
<tr>
<td></td>
<td>S/E</td>
<td>Green/red</td>
<td>Status/Error. The LED states are described in section 6.1 “S/E LED” on page 11.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPL</td>
<td>Green</td>
<td>On</td>
<td>A link to the POWERLINK remote station has been established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Blinking</td>
<td>A link to the POWERLINK remote station has been established. The LED blinks when Ethernet activity is present on the bus.</td>
</tr>
<tr>
<td></td>
<td>ETH</td>
<td>Green</td>
<td>On</td>
<td>A link to the Ethernet remote station has been established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Blinking</td>
<td>A link to the Ethernet remote station has been established. The LED blinks when Ethernet activity is present on the bus.</td>
</tr>
<tr>
<td></td>
<td>CF</td>
<td>Green</td>
<td>On</td>
<td>CompactFlash inserted and detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow</td>
<td>On</td>
<td>CompactFlash read/write access</td>
</tr>
<tr>
<td></td>
<td>DC OK</td>
<td>Yellow</td>
<td>On</td>
<td>CPU power supply OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>On</td>
<td>Backup battery is empty</td>
</tr>
</tbody>
</table>

Table 7: X20 CPUs - CPU status indicator

6.1 S/E LED

The status/error LED is a green/red dual LED. The status LEDs can have different meanings depending on operating mode.

6.1.1 Ethernet mode

In this mode, the interface is operated as an Ethernet interface.

<table>
<thead>
<tr>
<th>Green - status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>Interface operated as Ethernet interface</td>
</tr>
</tbody>
</table>

Table 8: Status/error LED - Ethernet operating mode

6.1.2 POWERLINK V1

<table>
<thead>
<tr>
<th>Status LED</th>
<th>Status of the POWERLINK station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Red</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
</tr>
<tr>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>Blinking</td>
<td>alternately</td>
</tr>
<tr>
<td>Off</td>
<td>Blinking</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>• Switched off</td>
</tr>
<tr>
<td></td>
<td>• Starting up</td>
</tr>
<tr>
<td></td>
<td>• Not correctly configured in Automation Studio</td>
</tr>
<tr>
<td></td>
<td>• Defective</td>
</tr>
</tbody>
</table>

Table 9: Status/error LED - POWERLINK V1 operating mode
6.1.3 POWERLINK V2

<table>
<thead>
<tr>
<th>Red - error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>The module has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: Pre_OPERATIONAL_1, Pre_OPERATIONAL_2, READY_TO_OPERATE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Green</th>
<th>Error</th>
<th>S/E LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The LED blinks red several times immediately after startup. This is not an error.

<table>
<thead>
<tr>
<th>Green - status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Status is in the NOT_ACTIVE state or is: Pre_OPERATIONAL_1, Pre_OPERATIONAL_2, READY_TO_OPERATE</td>
</tr>
</tbody>
</table>

Managing Node (MN)
The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the module goes directly into Pre_OPERATIONAL_1 state (single flash). However, if POWERLINK communication is detected before the time expires, then the MN will not be started.

Controlled Node (CN)
The bus is monitored for POWERLINK frames. If a corresponding frame is not received within the defined time frame (timeout), then the module will directly enter the state BASIC_ETHERNET (flickering). If, however, POWERLINK communication is detected during this time, the module goes directly into the Pre_OPERATIONAL_1 status (single flash).

Green flickering (approx. 10 Hz)
BASIC_ETHERNET Status The status of the module is BASIC_ETHERNET. The interface is operated as an Ethernet TCP/IP interface.

Managing Node (MN)
This status can only be changed by resetting the module.

Controlled Node (CN)
If POWERLINK communication is detected while in this status, the status of the module changes to Pre_OPERATIONAL_1 (single flash).

Single flash (approx. 1 Hz)
PRE_OPERATIONAL_1 Status The status of the module is Pre_OPERATIONAL_1.

Managing Node (MN)
The MN starts the operation of the “reduced cycle”. There is not yet any cyclic communication.

Controlled Node (CN)
In this status, the module can be configured by the MN. The CN waits until it receives an SoC frame and then switches to Pre_OPERATIONAL_2 status (double flash). A lit red LED in this status indicates MN failure.

Double flash (approx. 1 Hz)
PRE_OPERATIONAL_2 Status The status of the module is Pre_OPERATIONAL_2.

Managing Node (MN)
The MN begins with the cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this status.

Controlled Node (CN)
In this status, the module can be configured by the MN. After this, a command changes the status to READY_TO_OPERATE (triple flash). A lit red LED in this state indicates MN failure.

Table 10: Status / Error LED as error LED - POWERLINK V2 operating mode

Table 11: Status / Error LED as status LED - POWERLINK V2 operating mode
### Green - status

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple flash (approx. 1 Hz)</td>
<td>The status of the module is READY_TO_OPERATE.</td>
</tr>
<tr>
<td>READY_TO_OPERATE</td>
<td></td>
</tr>
</tbody>
</table>

**Managing Node (MN)**

Cyclic and asynchronous communication. Received PDO data is ignored.

**Controlled Node (CN)**

The module configuration is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated.

A lit red LED in this state indicates MN failure.

### On operational status

<table>
<thead>
<tr>
<th>Status</th>
<th>The status of the module is OPERATIONAL. PDO Mapping is active and cyclic data is evaluated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATIONAL</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

**Managing Node (MN)**

This status is not possible for the MN.

**Controlled Node (CN)**

No output data is produced and no input data is received. Only the appropriate command from the MN can enter or leave this state.

### Blinking (approx. 2.5 Hz)

<table>
<thead>
<tr>
<th>Status</th>
<th>The status of the module is STOPPED.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOPPED</td>
<td></td>
</tr>
</tbody>
</table>

**Managing Node (MN)**

This status is not possible for the MN.

**Controlled Node (CN)**

No output data is produced and no input data is received. Only the appropriate command from the MN can enter or leave this state.

### Table 11: Status / Error LED as status LED - POWERLINK V2 operating mode

#### 6.2 System failure error codes

Incorrect configuration or defective hardware can cause a system failure error.

The error is displayed via the red error LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds.

<table>
<thead>
<tr>
<th>Error description</th>
<th>Error code displayed by red status LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM errors: The module is defective and must be replaced.</td>
<td>● ● ● - Break ● ● ● - Break</td>
</tr>
<tr>
<td>Hardware errors: The module or a system component is defective and must be replaced.</td>
<td>- ● ● - Break - ● ● - Break</td>
</tr>
</tbody>
</table>

**Legend:**

- .... 150 ms  
- .... 600 ms  
Break .... 2 sec. delay
7 Status LEDs for integrated power supply

<table>
<thead>
<tr>
<th>Image</th>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image](78x654 to 118x745)</td>
<td>r</td>
<td>Green</td>
<td>Off</td>
<td>Module supply not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single flash</td>
<td>Reset mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Blinking</td>
<td>PREOPERATIONAL mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On</td>
<td>RUN mode</td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>Red</td>
<td>Off</td>
<td>Module supply not connected or everything is OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Double flash</td>
<td>LED indicates one of the following states:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• X2X Link power supply is overloaded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• I/O supply too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Input voltage for X2X Link supply too low</td>
</tr>
<tr>
<td></td>
<td>e + r</td>
<td>Steady red / single green flash</td>
<td>Invalid firmware</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Yellow</td>
<td>Off</td>
<td>No RS232 activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On</td>
<td>The LED is on, when data is being sent or received via the RS232 interface</td>
</tr>
<tr>
<td>l</td>
<td>Red</td>
<td>Off</td>
<td>X2X Link supply in the acceptable range</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td>X2X Link power supply is overloaded</td>
<td></td>
</tr>
</tbody>
</table>

Table 13: X20 CPUs - Status indicators for integrated power supply

8 Control and connection elements

X20CP148x

![Diagram](50x809)

Figure 1: X20 CPUs - Operating elements for X20CP1483, X20CP1483-1, X20CP1484, X20CP1484-1, X20CP1485, X20CP1485-1 and X20CP1486

X20CP348x

![Diagram](50x809)

Figure 2: X20 CPUs - Operating elements for X20CP3484, X20CP3484-1, X20CP3485, X20CP3485-1 and X20CP3486
9 Slot for application memory

Program memory is required to operate the CPUs. The program memory is CompactFlash. It is not included with the delivery of the CPUs, instead it must be ordered as an accessory.

**Information:**
The CompactFlash card cannot be removed during operation.

10 Operating Mode Switch

An operating mode switch is used to set the operating mode.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Operating mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOT</td>
<td>Boot</td>
<td>In this switch position the default B&amp;R Automation Runtime (AR) is started, and the runtime system can be installed using the online interface (B&amp;R Automation Studio). The User Flash is deleted after the download begins.</td>
</tr>
<tr>
<td>RUN</td>
<td>Run</td>
<td>RUN mode</td>
</tr>
<tr>
<td>DIAG</td>
<td>Diagnostics</td>
<td>The CPU boots in diagnostics mode. Program sections in User RAM and User FlashPROM are not initialized. After Diagnostics mode, the CPU always boots with a warm restart.</td>
</tr>
</tbody>
</table>

Table 14: X20 CPUs - Operating modes

11 Reset button

The reset button is located below the USB ports on the bottom of the housing. It can be pressed with any small pointed object (e.g. paper clip). Pressing the reset button triggers a hardware reset, which means:

- All application programs are stopped
- All outputs are set to zero

The PLC then boots into Service mode by default. The boot mode that follows after pressing the reset button can be defined in Automation Studio.
12 CPU supply

A power supply comes integrated in the X20 CPUs. It is equipped with a feed for the CPU, the X2X Link, and the internal I/O supply. The feed to the CPU/X2X Link supply is electrically isolated.

Redundancy of the X2X Link supply possible by parallel operation of multiple supply modules.

Pinout

Figure 5: X20 CPUs - Pinout - Integrated power supply
**Connection examples**

**With two separate supplies**

![Connection example with two separate supplies](image)

Figure 6: X20 CPUs - Connection example with two separate supplies

**With a supply and jumper**

![Connection example with a supply and jumper](image)

Figure 7: X20 CPUs - Connection example with a supply and jumper
13 RS232 interface (IF1)

The RS232 interface is not electrically isolated. It can be used as an online interface for communicating with the programming device.

![Figure 8: X20 CPUs - Pinout - RS232 interface (IF1)](image)

14 Ethernet interface (IF2)

IF2 is an Ethernet interface. The connection is made using a 10/100 BASE-T Twisted Pair RJ45 socket. The INA2000 station number for the Ethernet interface is set with both hex switches.

**Information:**

The Ethernet interface (IF2) is not suited for POWERLINK (see POWERLINK interface IF3).

![Figure 9: X20 CPUs - Ethernet interface (IF2)](image)

### Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TxD</td>
</tr>
<tr>
<td>2</td>
<td>TxD&lt;sub&gt;i&lt;/sub&gt;</td>
</tr>
<tr>
<td>3</td>
<td>RxD</td>
</tr>
<tr>
<td>4</td>
<td>RxD&lt;sub&gt;i&lt;/sub&gt;</td>
</tr>
<tr>
<td>5</td>
<td>Termination</td>
</tr>
<tr>
<td>6</td>
<td>Termination</td>
</tr>
<tr>
<td>7</td>
<td>Termination</td>
</tr>
<tr>
<td>8</td>
<td>Termination</td>
</tr>
</tbody>
</table>

*Table 15: X20 CPUs - Pinout - Ethernet interface (IF2)*
15 POWERLINK interface (IF3)

POWERLINK V1

Station numbers are permitted between 0x00 and 0xFD. The station number can be set using software.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Operation as managing node.</td>
</tr>
<tr>
<td>0x01 - 0xFD</td>
<td>Station number of the POWERLINK station. Operation as controlled node.</td>
</tr>
<tr>
<td>0xFE - 0xFF</td>
<td>Reserved, switch position is not permitted.</td>
</tr>
</tbody>
</table>

Table 16: X20 CPUs - Station number POWERLINK V1

POWERLINK V2

Station numbers are permitted between 0x01 and 0xF0. The station number can be set using software.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Reserved, switch position is not permitted.</td>
</tr>
<tr>
<td>0x01 - 0xEF</td>
<td>Station number of the POWERLINK station. Operation as controlled node.</td>
</tr>
<tr>
<td>0xF0</td>
<td>Operation as managing node.</td>
</tr>
<tr>
<td>0xF1 - 0xFF</td>
<td>Reserved, switch position is not permitted.</td>
</tr>
</tbody>
</table>

Table 17: X20 CPUs - Station number POWERLINK V2

Ethernet mode

Starting with Automation Studio Version V 2.5.3 and with Automation Runtime V 2.90, the interface can be operated as an Ethernet interface.

The INA2000 station number can be set using the B&R Automation Studio software.

Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RxD</td>
</tr>
<tr>
<td>2</td>
<td>RxD_1</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
</tr>
<tr>
<td>4</td>
<td>Termination</td>
</tr>
<tr>
<td>5</td>
<td>Termination</td>
</tr>
<tr>
<td>6</td>
<td>TxD_1</td>
</tr>
<tr>
<td>7</td>
<td>Termination</td>
</tr>
<tr>
<td>8</td>
<td>Termination</td>
</tr>
</tbody>
</table>

Table 18: X20 CPUs - Pinout for POWERLINK interface (IF3)

16 USB ports (IF4 and IF5)

IF4 and IF5 are USB ports. The connection is made using a USB 1.1 interface.

The USB ports can only be used for devices which have been released by B&R (e.g. floppy disk drive, DiskOnKey or dongle).

**Information:**

The USB ports cannot be used as online communication interfaces.
17 Slots for interface modules

The CPUs are equipped with one or three slots for interface modules. The X20 system can be connected to various bus or network systems by selecting the appropriate interface modules.

18 Exchangeable fan

The X20 CPUs CP1486 and CP3486 are delivered with exchangeable fans. Therefore, they can be used throughout the full temperature range from 0 - 55°C. A fan is not necessary up to 45°C. A replacement fan can be ordered using the order number X20AC0EF1.

Changing the fan

1) Press in fan lock with thumb and pull out fan.
2) Insert new fan into CPU until the lock clicks into place.

![Figure 12: X20 CPUs - Tool-free fan replacement](image)

19 Over-temperature shut-off

To prevent damage, a shut-off/reset is triggered when the CPU reaches 100°C.

The following errors are entered in the log book:

<table>
<thead>
<tr>
<th>Error number</th>
<th>Error description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9204</td>
<td>WARNING: System halted because of temperature check</td>
</tr>
<tr>
<td>9210</td>
<td>WARNING: Boot by watchdog or manual reset</td>
</tr>
</tbody>
</table>

Table 19: X20 CPUs - Log book entries for overtemperature shut-off

20 Data / real-time buffering

The CPUs are equipped with a backup battery. The following areas are buffered:

- Remanent variables
- User RAM
- System RAM
- Real-time clock

Battery monitoring

The battery voltage is checked cyclically. The cyclic load test of the battery does not considerably shorten the battery life, instead it gives an early warning of weakened buffer capacity.

The status information "Battery OK" is available from the system library function "BatteryInfo" and the CPU's I/O mapping.

Battery change interval

The battery should be changed every 4 years. The change intervals refer to the average life span and operating conditions and are recommended by B&R. It is not the maximum buffer duration.
21 Changing the Lithium battery

The CPUs are equipped with a lithium battery. The lithium battery is placed in a separate compartment and protected by a cover.

Backup battery data

<table>
<thead>
<tr>
<th>Model number</th>
<th>1 piece</th>
<th>4 pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A0006.00.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0AC201.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short description</td>
<td>Lithium battery, 3 V / 950 mAh, button cell</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 to 60°C</td>
<td></td>
</tr>
<tr>
<td>Storage time</td>
<td>Max. 3 years at 30°C</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0 to 95%, non-condensing</td>
<td></td>
</tr>
</tbody>
</table>

Table 20: X20 CPUs - backup battery data

Important information about the battery exchange

The product design allows the battery to be changed with the PLC switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on. To prevent data loss, the battery must be changed within 1 min. with the power off.

Warning!

The battery must be replaced with a Renata, type CR2477N battery only. Use of another battery may present a risk of fire or explosion.

Battery may explode if handled improperly. Do not recharge, disassemble or dispose of in fire.
Procedure for changing the battery

1. Touch the mounting rail or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.

2. Remove the cover for the lithium battery. To do this, slide the cover down from the CPU.

3. Remove the battery from the holder (do not use pliers or uninsulated tweezers -> risk of short circuiting). The battery should not be held by its edges. **Insulated** tweezers may also be used for removing the battery.

4. Insert the new battery with correct polarity. To do this, the battery is laid with the "+" side up on the right part of the battery holder under the USB port IF4. Then secure the battery in the holder by pressing above the left part of the battery holder.

5. Replace cover.

**Information:**

Lithium batteries are considered hazardous waste. Used batteries should be disposed of appropriately.
22 Programming the system flash

General information
In order for the application project to be executed on the CPU, the Automation Runtime operating system, the system components and the application project must be installed on the CompactFlash card.

Creating a CompactFlash using a USB card reader
The easiest way to perform an initial installation is by creating a fully programmed CompactFlash card using a USB card reader.

1. Creating and configuring a project in Automation Studio
2. In Automation Studio, select Tools / Create CompactFlash
3. In the dialog box that opens, select a CompactFlash card and then generate it
4. Insert the finished CompactFlash into the CPU and turn on the CPU's supply voltage
5. CPU booting

For details about commissioning: See Help system under "Automation Software - Getting Started"

Installation via online connection
The CPUs are delivered with a default B&R Automation Runtime (with limited functions) already installed. This runtime system is started in Boot mode (operating mode switch in the BOOT position or no CompactFlash / invalid CompactFlash inserted). It initializes the Ethernet interface and onboard serial RS232 interface, making it possible to download a new runtime system.

1. Insert the CompactFlash card and switch on the power to the CPU. When the switch is in the BOOT position, a new or invalid CompactFlash card starts the CPU with the default B&R Automation Runtime system.
2. Establish a physical online connection between programming device (PC or industrial PC) and CPU (e.g. over an Ethernet network or via the RS232 interface).
3. Before you can establish an online connection via Ethernet, the CPU must be assigned an IP address. In Automation Studio, go to Online / Settings and click on the Browse Targets button to search for B&R targets on the local network. The CPU should appear on the list. If the CPU hasn't already received an IP address from a DHCP server, right-click on it and select Set IP Parameters from the shortcut menu. In the dialog box that opens you can make all the necessary network configurations temporarily (should be identical to the settings in the project).
4. Configure online connection in B&R Automation Studio. For details about the configuration: See Help system under "Automation Software - Communication - Online communication"
5. Start the download procedure by selecting the Services command from the Project menu. Select Transfer Operating System... from the menu that appears. Now follow the instructions from B&R Automation Studio.