



CNC System

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**Revisions**

<b>Version</b>	<b>Date</b>	<b>Additions and changes</b>	<b>Initials</b>
V 1.0	27.04.2010	First edition	Pa

## Hardware description

The **andronic 3060** is a compact CNC multiprocessor system with HMI and NC computer and an integrated Soft PLC in one housing. Both computer systems communicate together via fast PCIe to PCIe bridge that is integrated on the common bus backplane.

High functional security by using selected industrial PC components, the standardized digital SERCOS interface and the current field bus systems like EtherCAT, Profibus or CANopen as interface to all I/O periphery devices present the openness and flexibility of the control system.

The principal item of the andronic 3060 are two powerful Intel® processors. One processor is responsible only for the control kernel (NC computer) and the other for the user interface (HMI computer).



### HMI computer

The **HMI computer** contains an Intel® Celeron® M plug-in CPU with integrated Ethernet, VGA, DVI and D1E controller. The EtherCAT or Profibus interface enables the connection to the operating panel and further I/O units. Besides the internal hard disk, several USB interfaces for the connection of external devices like CD/DVD-ROM or USB cams are available.

### NC computer

The **NC computer** contains as well an Intel® Celeron® M plug-in CPU and a new developed NC multifunction card (NCM2) as communication processor between the drive units and the control with all necessary connections. Besides the fast I/O interface and the handwheel interfaces the NCM2 card has up to two SERCOS interfaces available.

## Block diagram

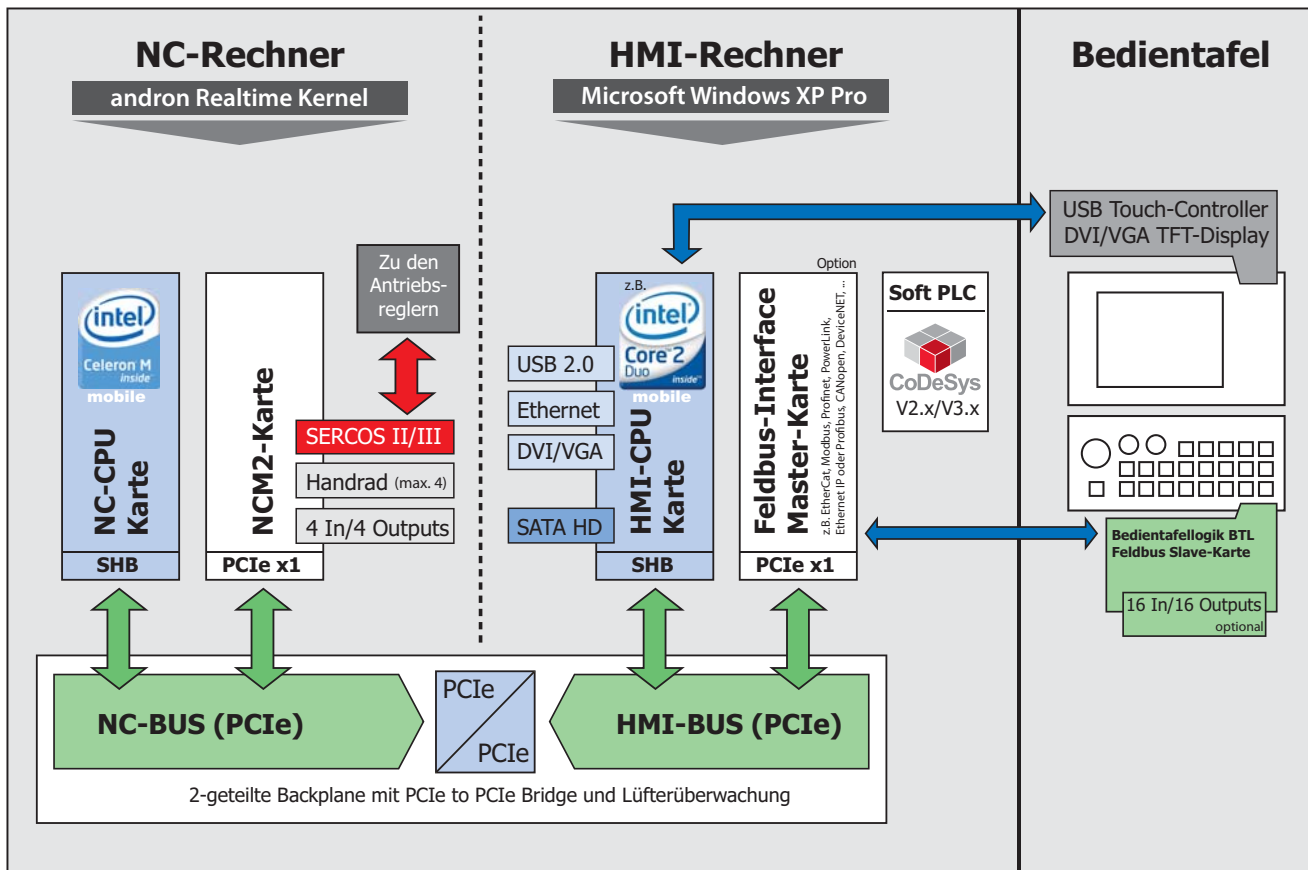


Illustration: Block diagram of the andronic 3060

## PC boards of the control

- **PCI express backplane** with PCIe to PCIe bridge and fan control
- **HMI CPU card** with Intel processor and all standard interfaces as USB, SATA, VGA, DVI, Ethernet, ... (option - EtherCAT)
- **Fieldbus interface card** (option) Profibus-DP, CANopen or DeviceNET for the I/O units
- **NC CPU card** with Intel processor
- **NC multifunction card NCM2** with interfaces for SERCOS II/III, up to 4 handwheels, fast I/O inputs und further interfaces for special requirements

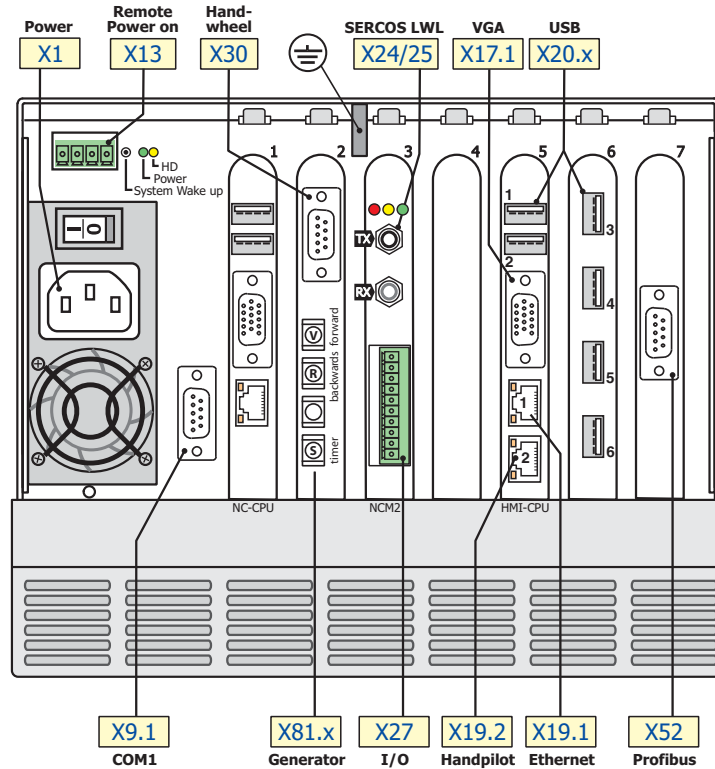
Connection overview of the control module

The connection overview with all interfaces of the control is shown outside on the housing cover.



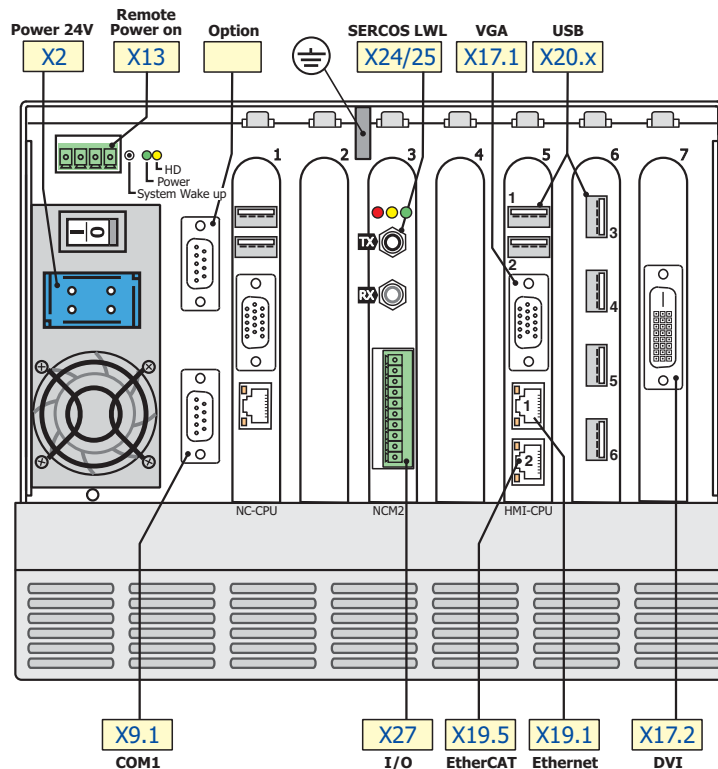
This is an example for an andronic 3060s with 115/230 V AC power supply and interfaces for:

- Profibus-DP
- SERCOS II
- Handwheel
- Eroding generator



This is an example for an andronic 3060s with 24 V DC power supply and interfaces for:

- EtherCAT
- SERCOS II
- DVI



## Connector and interface overview of the andronic controls

X	Interface	Module/card	Connector	Connection
X1	Mains power supply	Power supply	3-pin mains plug	100-240V, 50/60Hz
X2	24V Power Input	Power supply	2-pol. connector	24V Input
X5.1	Parallel interface LPT1	HMI CPU	25-pin SUB-D connector (fem.)	
X9.1	Serial interface COM1	HMI CPU	9-pin SUB-D connector (male)	
X11	Keyboard/Mouse interface	HMI CPU	6-pin PS/2™ connector (fem.)	
X13	RPO Remote-Power-On/Off	RPO adapter	4-pin terminal connector	
X17.1	VGA interface	HMI CPU	15-pin mini SUB-D con. (fem.)	X17.1 ⇔ X60.1
X17.2	DVI interface	HMI CPU	DVI connector (female)	X17.2 ⇔ X60.2
X19.1	Ethernet interface	HMI CPU	RJ-45 connector	
X19.2	Ethernet interface	HMI CPU	RJ-45 connector	
X19.5	EtherCAT interface (andronic3060)	HMI CPU	RJ-45 connector	
X20.x	USB interface	HMI CPU	USB connector (Type A)	
X21	CNC fault	NCM card	2-pin terminal connector	
X22	I/O interface (option)	NCIO card	37-pin SUB-D connector (fem.)	
X23.1	NCM-NCIO BUS	NCM card	9-pin SUB-D connector (female)	
X23.2	NCM-NCIO BUS (option)	NCIO card	9-pin SUB-D connector (male)	X23.2 ⇔ X23.1
X24.1	SERCOS transmitter (TX)	NCM card	Fibre optic connector	
X25.1	SERCOS receiver (RX)	NCM card	Fibre optic connector	
X24.2	SERCOS transmitter (TX)	OPT card	Fibre optic connector	
X25.2	SERCOS receiver (RX)	OPT card	Fibre optic connector	
X26	Keyboard interface	NC CPU	6-pin PS/2™ connector (fem.)	
X27	I/O interface (only andronic 3060)	NCM2 card	10-pin terminal connector	
X30	Handwheel interface	NCM card	9-pin SUB-D connector (male)	to the handwheel
X40.x	4 or 7 USB interfaces	^ANV03/ANV04	USB connector (Typ A)	X40.x ⇔ X63
X41	USB interface (input)	^ANV03/ANV04	USB connector (Typ B)	X41 ⇔ X20.x
X42	ANV04 key pad (USB)	^ANV04	USB connector	
X50	InterBus-S	InterBus-S card	9-pin SUB-D connector (female)	X50 ⇔ X70
X51	Diagnosis interface	InterBus-S card	9-pin SUB-D connector (male)	
X52	Profibus-DP interface	Profibus card	9-pin SUB-D connector (female)	X52 ⇔ X76
X60.1	VGA interface	^ANV03/ANV04	15-pin mini SUB-D con. (fem.)	X60.1 ⇔ X17.1
X60.2	DVI interface	^ANV03/ANV04	DVI connector (female)	X60.2 ⇔ X17.2
X62	Power supply 24V, DC	^ANV03/ANV04	2-pin terminal connector	24V, DC (TFT)
X63	USB Touch controller	^ANV03/ANV04	USB connector (Typ B)	X63 ⇔ X40.x
X70	InterBus-S interface (in)	^ANM013	9-pin SUB-D connector (male)	X70 ⇔ X50
X71	InterBus-S interface (out)	^ANM013	9-pin SUB-D connector (female)	
X72	16 Inputs	^ANM013	2 x 8-pin terminal connector	
X73	16 Outputs	^ANM013	2 x 8-pin terminal connector	
X75.1	Power supply 24V, DC	^ANM013	2-pin terminal connector	24V, DC (BTL)
X75.2	Power supply 24V, DC	^ANV03	2-pin terminal connector	24V, DC (USB)
X76	Profibus-DP interface	^ANM013	9-pin SUB-D connector (female)	X76 ⇔ X52
X80	Handpilot AHP interface	Fibre optic card	RJ-45 connector	X80 ⇔ (AHP)
X81.x	Fibre optic generator interface	Fibre optic card	4x Fibre optic connector	

Survey of hardware components

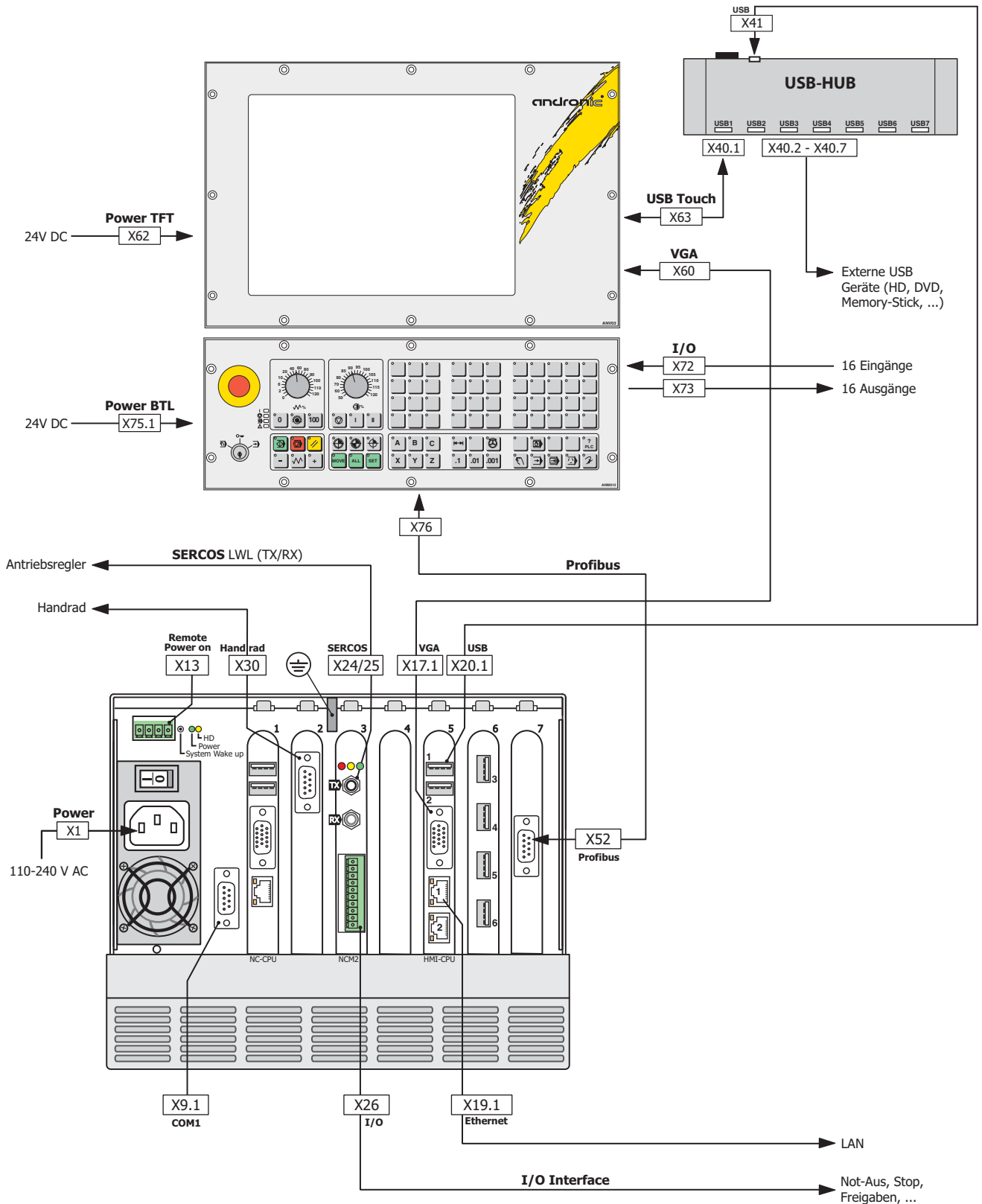
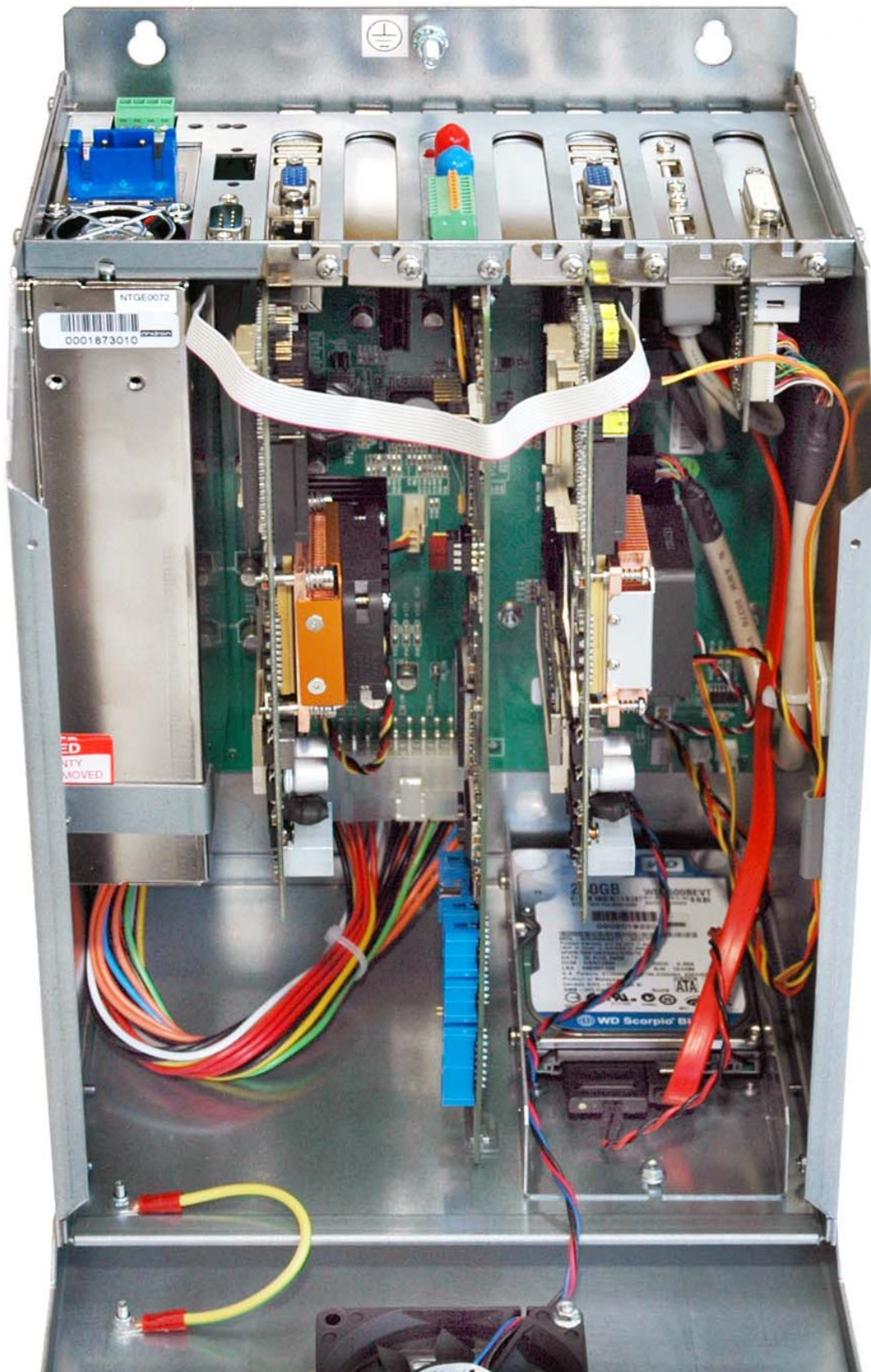


Illustration: Connection survey of the operating panel and the andronic 3060 control

## Control front/inside view



*Illustration: Inside view of the control housing of the andronic 3060S*

Licence sticker, housing fans and card holder



Illustration: Open control module with licence stickers, fans and card holder

On the inside of the housing cover you see:

- Housing fan 12V DC, connected on the backplane fan control unit
- Windows XP Professional licence sticker with product key
- CoDeSys licence sticker with serial number
- Card holder to fix the plug-in boards



The card holder has two different heights depending of the insert direction. Pay attention to the right orientation (imprint 1, 2, 3, 4, top and bottom), if a card holder is falling out. The sticker shows the right order.



**Please pay attention to the general connection requirements in this handbook when opening the housing.**

**Industrial PC power supply 230V AC or 24V DC**

The andronic 3060 is available with two different industrial PC power supplies.

The power supply is developed for industrial PC systems. High-quality components guarantee a reliable operation and a long service life in an industrial environment.

**115/230V AC input**

115/230V AC input  
(90...264V AC)

200 Watt  
Art.-No. NTGE0073  
Safety / EMC: TÜV, UL, CE

**24V DC input**

24V DC input  
(20...28V DC)

150 Watt  
Art.-No. NTGE0072  
Safety / EMC: TÜV, UL, CE

Voltages of both power supplies: +3,3V, +5V, +12V, -12V, -5V, +5V<sub>sb</sub>

## PC Boards - PCI-Express Backplane

The principal item of the andronic 3060 control system are two powerful Intel processors communicating with one another via a PCIe-to-PCIe bridge. One processor is responsible only for the control kernel (NC computer) and the other for the user interface (HMI computer).

The new developed PCI-Express backplane was added with some new features compared with the previous PCI backplane.

### Features:

- Two separate PCIe bus systems with each one PIGMG 1.3 half-size slot and two PCIe x1 slots
- internal communication via a fast PCIe to PCIe bridge (PEX8508)
- Power connectors for two harddisks
- Integrated fan speed control for up to four CPU and housing fans
- Remote power ON/OFF logic for external switching on/off the control
- Key for "System Wake Up" function
- LED display for „Power On“ and harddisk

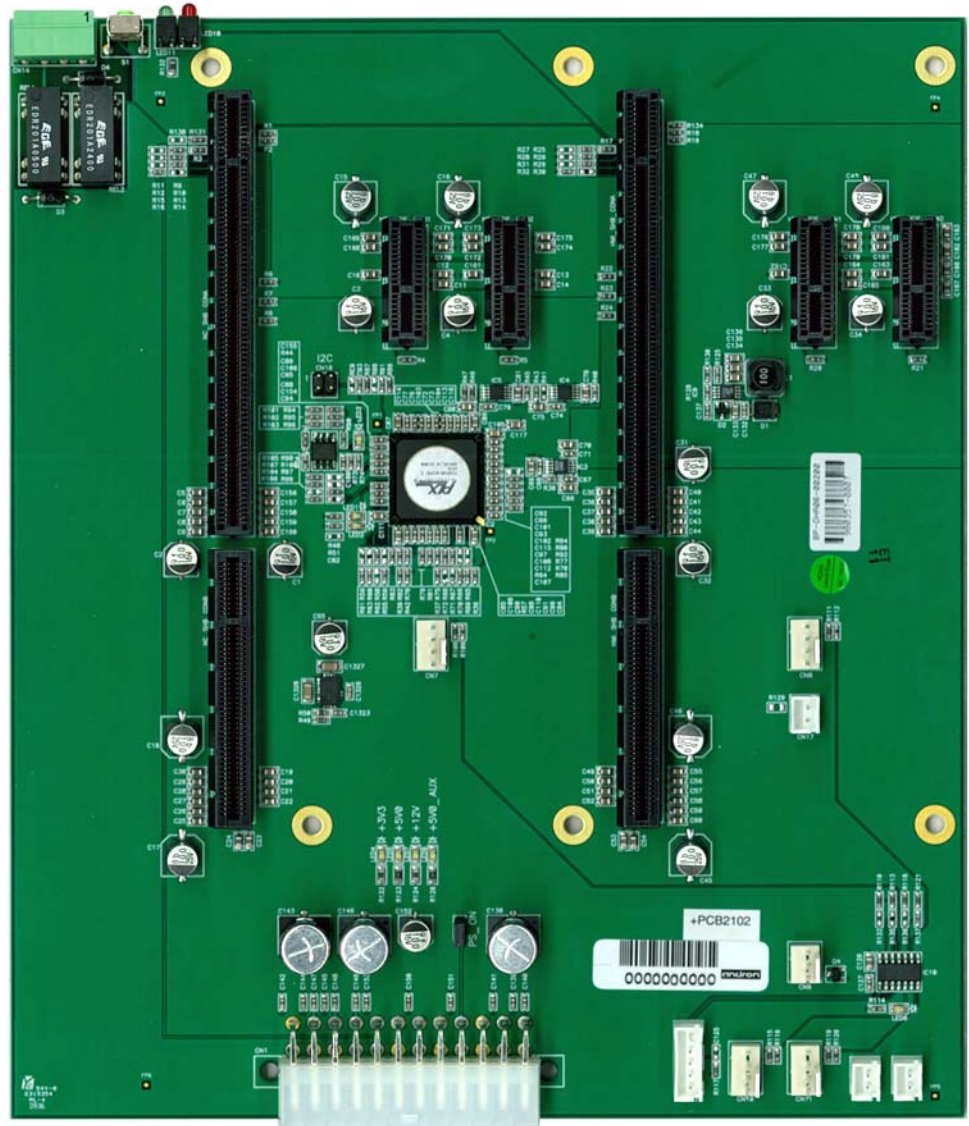
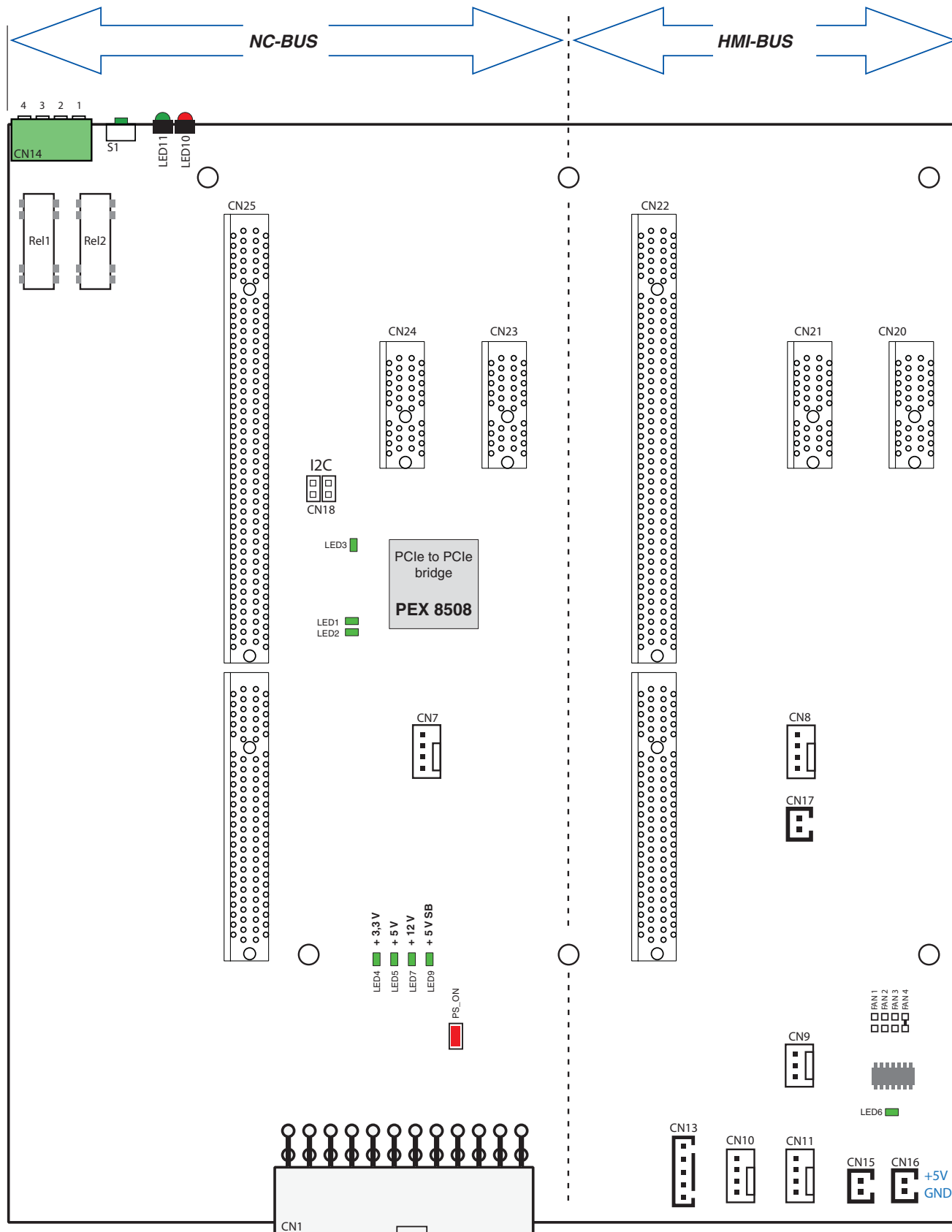


Illustration: andron PCIe backplane +PCB2102

Overview of the connections and LEDs



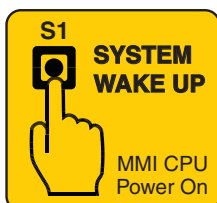
### Connections of the backplane

Name	Interface	Connector	Description
CN1	ATX power connector	24-pin ATX plug	Power supply
CN7	Fan NC CPU	4-pin plug (male)	to the fan of the NC CPU
CN8	Fan HMI CPU	4-pin plug (male)	to the fan of the HMI CPU
CN9	Fan connector HMI CPU card	3-pin plug (male)	Fan connector of the HMI CPU card
CN10	Fan housing 1	4-pin plug (male)	Housing fan 1
CN11	Fan housing 2	4-pin plug (male)	Housing fan 2 (not available)
CN13	LÜF programming	4-pin plug (male)	only for programming!!
CN14	Remote power On/Off	4-pin plug (male)	external power ON-/OFF of the control (see next page)
CN15	HD power 5V SATA	2-pin plug (male)	Connector harddisk 1
CN16	HD power 5V SATA	2-pin plug (male)	Connector harddisk 2
CN17	HD LED - HMI CPU	2-pin plug (male)	HD LED co. of the HMI CPU card for LED10
CN18	I2C programming	4-pin terminal con.	only for programming!!
CN20	PCIe x1	PCIe x1	e.g. for Profibus card
CN21	PCIe x1	PCIe x1	not available
CN22	HMI SMB connector	PICMG 1.3 Half-size	HMI CPU card
CN23	PCIe x1	PCIe x1	NCM2 card
CN24	PCIe x1	PCIe x1	not available
CN25	NC SMB connector	PICMG 1.3 Half-size	NC CPU card

### LEDs of the backplane

Name	Display	Color	Description
LED1		green	Programming PLX bridge controller
LED2		green	Programming PLX bridge controller
LED3		red	Programming PLX bridge controller
LED4	+ 3,3 V voltage	green	Supply voltage backplane
LED5	+ 5 V voltage	green	Supply voltage backplane
LED6		red	Programming fan control
LED7	+ 12 V voltage	green	Supply voltage backplane
LED9	+ 5 V standby voltage	red	Supply voltage backplane
LED10	HD LED	red	LED Harddisk operating
LED11	Power ON	green	LED Power ON

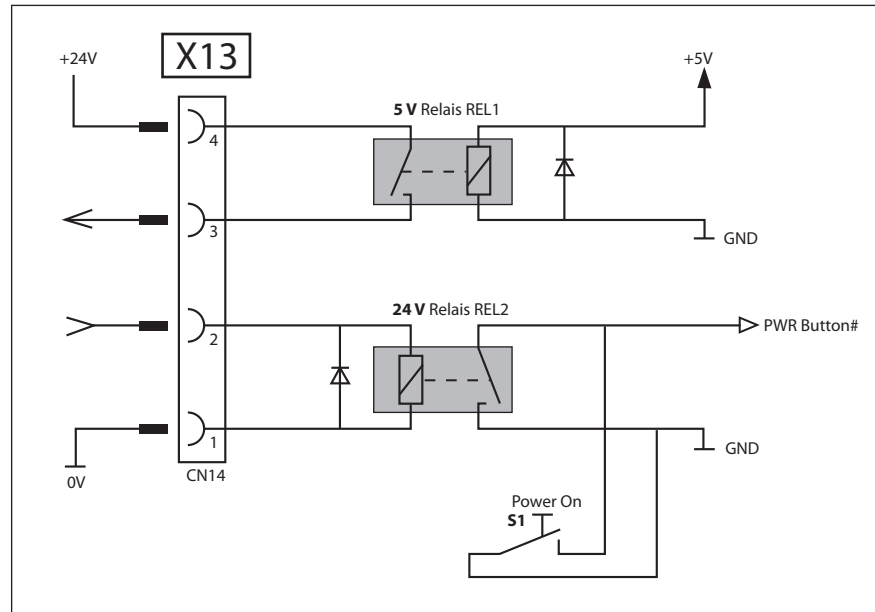
### Backplane key



Name	Description	Explanation
S1	System Wake Up key	Power on key of the HMI CPU card: If the control should not start after an exchange of a hardware component, so press the SYSTEM WAKE UP key on the top side of the control.

**Remote Power ON/OFF logic**

Connector assignment X13 and internal logic of the Remote Power ON/OFF circuit.





*Illustration: Connection and logic for the external power on/off switch of the control*

**PC boards - HMI/NC CPU cards**

**General**

The principal item of the andronic 3060 control system are two powerful Intel processors communicating with one another via a PCIe-to-PCIe bridge. One processor is responsible only for the control kernel (NC computer) and the other for the user interface (HMI computer).

The control contains two similar CPU cards with different performance and equipment:

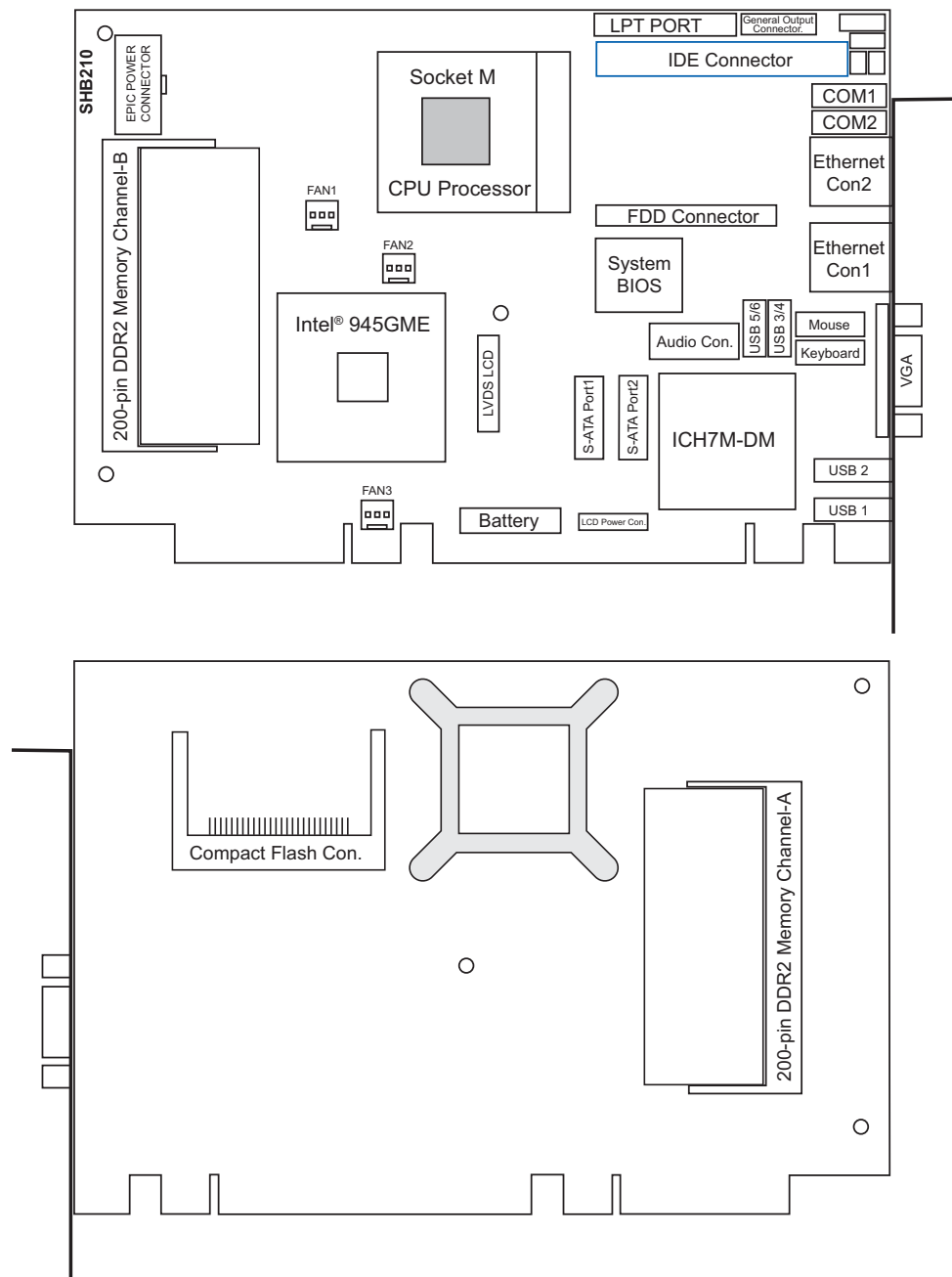
	NC CPU card	HMI CPU card
<b>View</b>		
<b>CPU board</b>	SMB210	SMB210
<b>BUS system</b>	PICMG 1.3 half-size	PICMG 1.3 half-size
<b>Intel® processor</b>	Celeron® M / 1.6 GHz	Celeron® M / 1.6 GHz or Pentium® M / 1.8 GHz (optional)
<b>RAM</b>	512 MB DDR2 SO DIMM	1024 MB DDR2 SO DIMM or 2048 MB DDR2 SO DIMM (opt.)
<b>Interfaces</b>	all DISABLED	<ul style="list-style-type: none"> <li>▪ USB 2.0 (max. 6)</li> <li>▪ VGA, (DVI optional)</li> <li>▪ Ethernet, (2. Ethernet opt.)</li> <li>▪ SATA (max. 2)</li> <li>▪ Serial COM</li> </ul>
<b>BIOS</b>	V14.1	V14.0

### Description of the CPU card - SMB210

The **SMB210** Half-Size single board computer is optimized for an Intel® Socket M processor (Core™2 Duo/Celeron® M), supporting a 533/667 MHz Front Side Bus and the memory can accommodate up to 4 GB DDR2-667 SODIMM. It offers sufficiently performance for high requirements. Furthermore there are all necessary interfaces for the entire periphery onboard.

- Onboard LAN controller → 2x Gigabit Ethernet 10/100/1000, RJ-45
- Onboard graphic controller with mit 8-224 MB (shared memory), VGA/LVDS interface
- Onboard I/O controller for mouse, keyboard, serial and parallel interface
- Onboard UDMA / IDE / SATA controller
- 6 USB 2.0 Ports (2 are accessible from outside)

### Layout and interfaces



View of the Socket M CPU  
card front/backside



Illustration: Front side of the SHB210 with processor, all interfaces and DDR2 memory slot

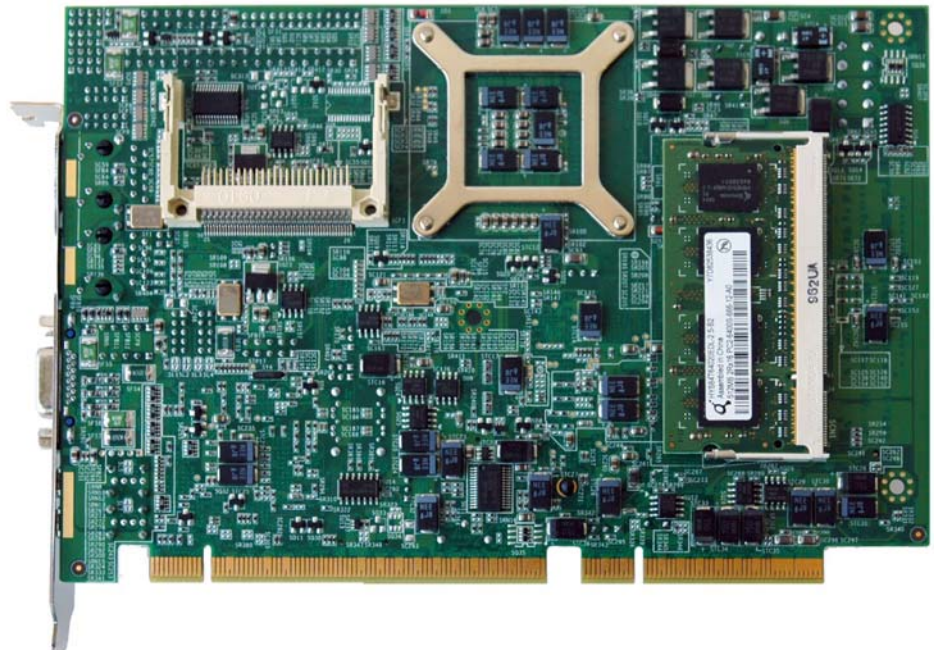


Illustration: Backside of the SHB210 with DDR2 and Compact Flash memory slot

Ordernumber of all CPU cards of the andronic

+	C	X	X	X	X	X	X
---	---	---	---	---	---	---	---

### CPU Type

- M ..... HMI-CPU
- N ..... NC-CPU
- T ..... Transformation-CPU

### CPU / BUS

- 1 ..... LEAD F845G/VE (P4 / PICMG) full-size
- 2 ..... LEAD CI-TSPE (P3 / PCI) half-size
- 3 ..... LEAD IP-4MTP2G (PM/ PICMG) full-size
- 4 ..... LEAD EmCore-i6419VL (PM/ PCI) half-size
- 5 ..... LEAD IPO-2040 (Core2Duo/ PCI) full-size
- 6 ..... DSM 96m4211o (PM/ PICMG) full-size
- 7 ..... DSM SHB210 (PICMG 1.3 halfsize) half-size

### CPU Processor Frequency

- 1 ..... Intel® Celeron® PPGA, 733 MHz
- 2 ..... Intel® Celeron® PPGA, 1.2 GHz
- 3 ..... Intel® Pentium® 4, 2.4 GHz
- 4 ..... Intel® Celeron® M, 1.6 GHz
- 5 ..... Intel® Pentium® M, 1.8 GHz
- 6 ..... Intel® Core2Duo®, 2.66 GHz
- 7 ..... Intel® Celeron® M, 1.3 GHz
- 8 ..... Intel Celeron M 575, 1,73 GHz

### CPU RAM

- 1 ..... 128 MB DIMM
- 2 ..... 256 MB DIMM
- 3 ..... 512 MB DIMM
- 4 ..... 256 MB DDR 266/333
- 5 ..... 512 MB DDR 266/333
- 6 ..... 1024 MB DDR 266/333
- 7 ..... 128 MB DDR 266/333
- 8 ..... 256 MB DDR 400 CL3 PC 3200U
- 9 ..... 256 MB DDR2 SO DIMM
- A ..... 512 MB DDR2 SO DIMM
- B ..... 1024 MB DDR2 SO DIMM

### CPU Interfaces Onboard

- 1 ..... 4x USB, VGA, COM, LPT, Ethernet (Type IP-4MTP2G mit 3-fach Winkel / with triple bracket)
- 2 ..... 2x USB, VGA, COM, LPT, Ethernet
- 3 ..... 2x USB, VGA, COM, LPT, 2x Ethernet
- 4 ..... VGA, COM, LPT, Ethernet
- 5 ..... 4x USB, VGA, COM, LPT, Ethernet
- 6 ..... 4x USB, VGA, DVI, COM, Ethernet
- 7 ..... 4x USB, VGA, DVI, 2x Ethernet
- 8 ..... 2x (4x) USB, VGA/DVI, COM1/2, 2x Ethernet
- N ..... keine

### BIOS Versions

- 1 ..... BIOS V. 7.x D (Typ CI-TSPE)
- 2 ..... BIOS V. 8.x D (Typ F845G/VE)
- 3 ..... BIOS V. 10.x D (Typ IP-4MTP2G) andronic 2060L/HMC600
- 4 ..... BIOS V. 9.x D (Typ IP-4MTP2G) andronic 2000/HMC500
- 5 ..... BIOS V. 11.x D (Typ EmCore-i6419VL)
- 6 ..... BIOS V. 12.x D (Typ IP-4MTP2G) andronic 400/HMC400
- 7 ..... BIOS V. 13.x D (Typ DSM 96m4211o) andronic 2060T
- 8 ..... BIOS V. 14.x D (Typ DSM SHB210) andronic 3060

07.2010

## BIOS V 14.0D default values of the HMI CPU DSM SHB210 (with VGA, LAN, USB, ...)

### Phonix Award BIOS CMOS Setup Utility

### HMI-CPU

> Standard CMOS Features	> PC Health Status
> Advanced BIOS Features	Load andron Defaults
> Advanced Chipset Features	Set Supervisor Password
> Intergrated Peripherals	Set User Password
> Power Management Setup	Save & Exit Setup
> PNP/PCI Configurations	Exit Without Saving

### Standard CMOS Features

Date (mm:dd:yy)	Actual date
Time (hh:mm:ss)	Actual time
> IDE Channel 0 Master	None
> IDE Channel 0 Slave	None
> IDE Channel 1 Master	None
> IDE Channel 1 Slave	None
> IDE Channel 2 Master	WDC WD.... (Hard disk type)
> IDE Channel 2 Slave	None
> IDE Channel 3 Master	None
> IDE Channel 3 Slave	None
Driva A:	None
Halt On:	All, But Keyboard
Base Memory	640K

### Advanced BIOS Features

> CPU Feature	[Press Enter]
> Hard Disk Boot Priority	[Press Enter]
Virus Warning	Disabled
CPU L1 & L2 Cache	Enabled
Quick Power On Self Test	Enabled
First Boot Device	USB-ZIP
Second Boot Device	Hard disk
Third Boot Device	CDROM
Boot Other Device	Enabled
Boot Up Floppy Seek	Disabled
Boot Up NumLock Status	Off
Security Option	Setup
APIC Mode	Enabled
MPS Version Control For OS	1.4
OS Select For DRAM > 64MB	Non-OS2

### CPU Feature

Delay Prior to Thermal	16 Min
Thermal Management	Thermal Monitor 2
C1E Function	Auto
Execute Disable Bit	Enabled

### Hard Disk Boot Priority

1. Ch2 M.	WDC WD....
Bootable Add-in Cards	

### Advanced Chipset Features

PCI Express Port 1	Enabled
PCI Express Port 2	Enabled
PCI Express Port 3	Enabled
PCI Express Port 4	Enabled
PCI Express Port 5	Enabled
PCI Express Port 6	Enabled
PCI-E Compliancy Mode	V1.0a
** VGA Setting **	
PEG/Onchip VGA Control	Auto
On-Chip Frame Buffer Size	8 MB
DVMT Mode	DVMT
DVMT/FIXED Memory Size	224 MB
Boot Display	CRT+LFP
Panel Scaling	Auto
Panel Number	1024x768

## Integrated Peripherals

> OnChip IDE Device	[Press Enter]
> Onboard Device	[Press Enter]
> SuperIO Device	[Press Enter]

### > OnChip IDE Device

IDE HDD Block Mode	Enabled
IDE DMA transfer access	Enabled
On-Chip Primary PCI IDE	Enabled
IDE Primary Master PIO	Auto
IDE Primary Slave PIO	Auto
IDE Primary Master UDMA	Auto
IDE Primary Slave UDMA	Auto
On-Chip Secondary PCI IDE	Enabled
IDE Secondary Master PIO	Auto
IDE Secondary Slave PIO	Auto
IDE Secondary Master UDMA	Auto
IDE Secondary Slave UDMA	Auto
** On-Chip Serial ATA Setting **	
SATA Mode	IDE
On-Chip Serial ATA	Enhanced Mode
SATA PORT Speed Settings	Disabled
PATA IDE Mode	Secondary
SATA Port	P0, P2 is Primary

### > Onboard Device

USB Controller	Enabled
USB 2.0 Controller	Enabled
USB Keyboard Support	Enabled
AC97 Audio	All Disabled

### > SuperIO Device

POWER ON Function	BUTTON ONLY
Onboard FDC Controller	Disabled
Onboard Serial COM 1	3F8/IRQ4
Onboard Serial COM 2	2F8/IRQ3
Onboard Parallel Port	378/IRQ7
Parallel Port Mode	SPP
EPP Mode Select	EPP1.7
ECP Mode USE DMA	3
PWRON After PWR-Fail	On

## Power Management Setup

> PCI Express PM Function	Press Enter
ACPI Function	Enabled
ACPI Suspend Type	S1(POS)
Run VGABIOS if S3 Resume	Auto
Power Management	User Define
Video Off Method	DPMS
Video Off IN Suspend	Yes
Suspend Type	Stop Grant
Suspend Mode	Disabled
HDD Power Down	Disabled
Soft-Off by PWR-BTTN	Instant-Off
Power-On by Ring	Disabled
Resume by Alarm	Disabled
Date(of Month) Alarm	0
Time(hh:mm:ss) Alarm	0 : 0 : 0

### > PCI Express PM Function

PCI Express PME	Enabled
-----------------	---------

## PNP/PCI Configurations

Init Display First	Onboard
Reset Configuration Data	Enabled
Resources Controlled By	Auto(ESCD)
IRQ Resources	[Press Enter]
PCI/VGA Palette Snoop	Disabled
** PCI Express relative items **	
Maximum Payload Size	128

## BIOS V 14.1D default values of the NC CPU DSM SHB210

## Phonix Award BIOS CMOS Setup Utility

## NC-CPU

> Standard CMOS Features	> PC Health Status
> Advanced BIOS Features	Load andron Defaults
> Advanced Chipset Features	Set Supervisor Password
> Intergrated Peripherals	Set User Password
> Power Management Setup	Save & Exit Setup
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## Standard CMOS Features

Date (mm:dd:yy)	Actual date
Time (hh:mm:ss)	Actual time
> IDE Channel 0 Master	None
> IDE Channel 0 Slave	None
> IDE Channel 1 Master	None
> IDE Channel 1 Slave	None
Driva A:	None
Halt On:	All, But Keyboard
Base Memory	640K

## Advanced BIOS Features

> CPU Feature	[Press Enter]
> Hard Disk Boot Priority	[Press Enter]
Virus Warning	Disabled
CPU L1 & L2 Cache	Enabled
Quick Power On Self Test	Enabled
First Boot Device	Floppy
Second Boot Device	Hard disk
Third Boot Device	CDROM
Boot Other Device	Enabled
Boot Up Floppy Seek	Disabled
Boot Up NumLock Status	Off
Security Option	Setup
APIC Mode	Enabled
MPS Version Control For OS	1.4
OS Select For DRAM > 64MB	Non-OS2

## CPU Feature

Delay Prior to Thermal	16 Min
Thermal Management	Thermal Monitor 2
C1E Function	Auto
Execute Disable Bit	Enabled

## Hard Disk Boot Priority

Bootable Add-in Cards	
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## Advanced Chipset Features

PCI Express Port 1	Enabled
PCI Express Port 2	Enabled
PCI Express Port 3	Enabled
PCI Express Port 4	Enabled
PCI Express Port 5	Enabled
PCI Express Port 6	Enabled
PCI-E Compliancy Mode	V1.0a
** VGA Setting **	
PEG/Onchip VGA Control	Auto
On-Chip Frame Buffer Size	8 MB
DVMT Mode	DVMT
DVMT/FIXED Memory Size	128 MB
Boot Display	Auto
Panel Scaling	Auto
Panel Number	1024x768

## Integrated Peripherals

> OnChip IDE Device	[Press Enter]
> Onboard Device	[Press Enter]
> SuperIO Device	[Press Enter]

### > OnChip IDE Device

IDE HDD Block Mode	Disabled
IDE DMA transfer access	Disabled
On-Chip Primary PCI IDE	Disabled
IDE Primary Master PIO	Auto
IDE Primary Slave PIO	Auto
IDE Primary Master UDMA	Auto
IDE Primary Slave UDMA	Auto
On-Chip Secondary PCI IDE	Disabled
IDE Secondary Master PIO	Auto
IDE Secondary Slave PIO	Auto
IDE Secondary Master UDMA	Auto
IDE Secondary Slave UDMA	Auto
** On-Chip Serial ATA Setting **	
SATA Mode	IDE
On-Chip Serial ATA	Disabled
SATA PORT Speed Settings	Disabled
PATA IDE Mode	Secondary
SATA Port	P0, P2 is Primary

### > Onboard Device

USB Controller	Disabled
USB 2.0 Controller	Enabled
USB Keyboard Support	Enabled
AC97 Audio	All Disabled

### > SuperIO Device

POWER ON Function	BUTTON ONLY
Onboard FDC Controller	Disabled
Onboard Serial COM 1	Disabled
Onboard Serial COM 2	Disabled
Onboard Parallel Port	378/IRQ7
Parallel Port Mode	SPP
EPP Mode Select	EPP1.7
ECP Mode USE DMA	3
PWRON After PWR-Fail	On

## Power Management Setup

> PCI Express PM Function	Press Enter
ACPI Function	Disabled
ACPI Suspend Type	S1(POS)
Run VGABIOS if S3 Resume	Auto
Power Management	User Define
Video Off Method	DPMS
Video Off IN Suspend	Yes
Suspend Type	Stop Grant
Suspend Mode	Disabled
HDD Power Down	Disabled
Soft-Off by PWR-BTTN	Instant-Off
Power-On by Ring	Disabled
Resume by Alarm	Disabled
Date(of Month) Alarm	0
Time(hh:mm:ss) Alarm	0 : 0 : 0

### > PCI Express PM Function

PCI Express PME	Enabled
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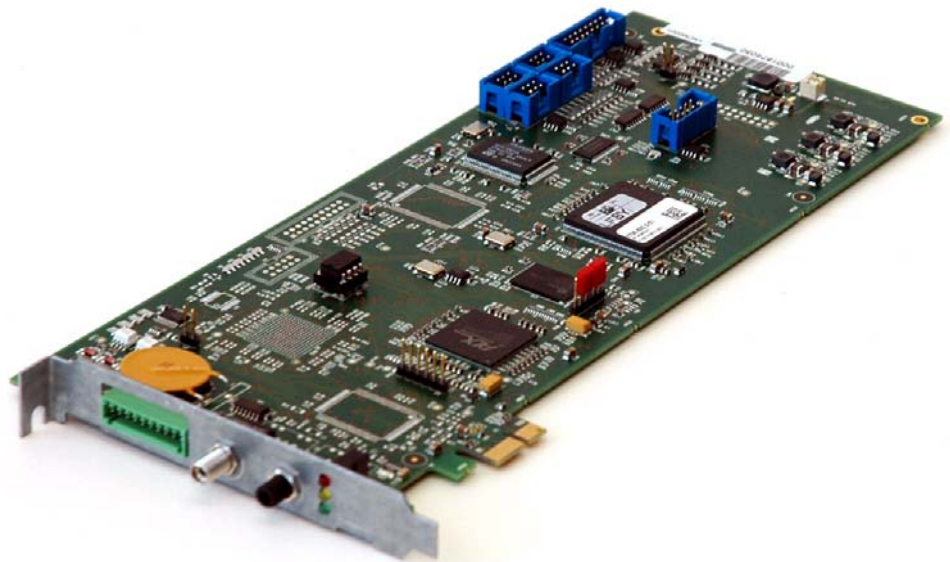
## PNP/PCI Configurations

Init Display First	PCI Slot
Reset Configuration Data	Enabled
Resources Controlled By	Auto(ESCD)
IRQ Resources	[Press Enter]
PCI/VGA Palette Snoop	Disabled
** PCI Express relative items **	
Maximum Payload Size	128

## PC boards - NCM2 card (NC multifunction card II)

### Description

The NC multifunction card II (NCM2) is the principal item of the NC computer. The card has one or two SERCOS interfaces responsible for the drive communication. For storing machine specific data, axes resolution, ramp curves, etc. a flash memory is onboard available. Up to four hand wheel interfaces are integrated on the card too. Further on the card has a fast I/O interface for fast signals as Emergency-Stop, collision, etc.

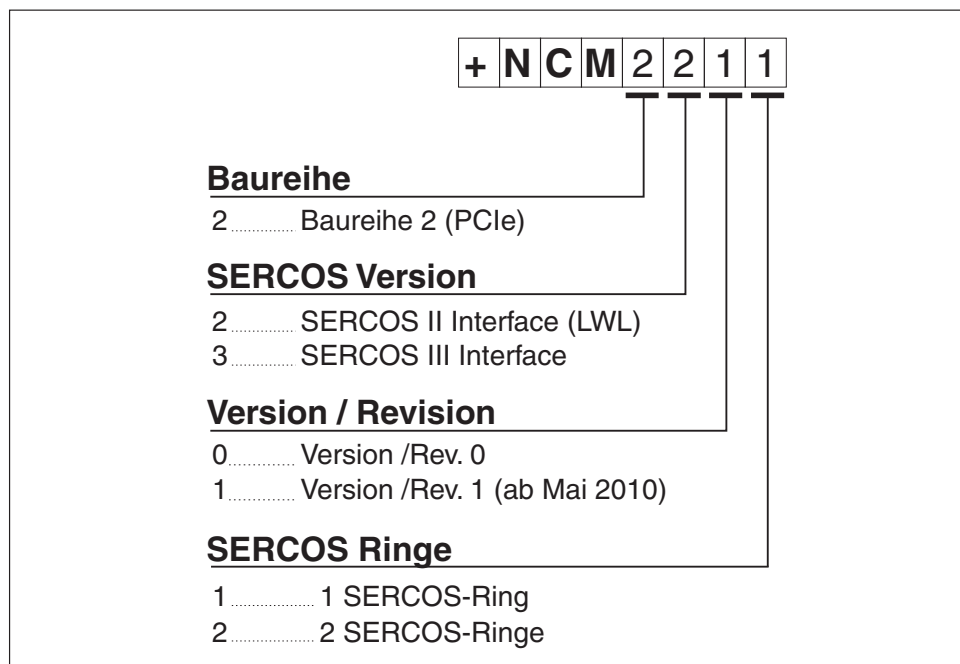


*Illustration: NC multifunction card II with PCIe and SERCOS II interface*

### Features

- PCIe interface
- Plug and play component
- Identification of the card and the version number
- 4 handwheel inputs
- Fibre optic adapter interface to the eroding generator (optional)
- 4 x 24V fast digital inputs, direct process access
- 4 x 24V fast digital outputs, direct process access
- alternative SERCOS interface mounting:
  - one SERCOS-II interface, interface on board
  - one SERCOS-II interface, interface adapter (optional)or
  - one SERCOS-III interface, interface on board
- Loop back function for diagnosis of the SERCOS interface
- FLASH ROM 512 kByte for:
  - BIOS expansion ROM 64 kByte
  - Configuration data
- Programmable write protection for FLASH ROM
- Interrupt logic for SERCOS interfaces
- Diagnosis register
- Further function expansions by using a FPGA

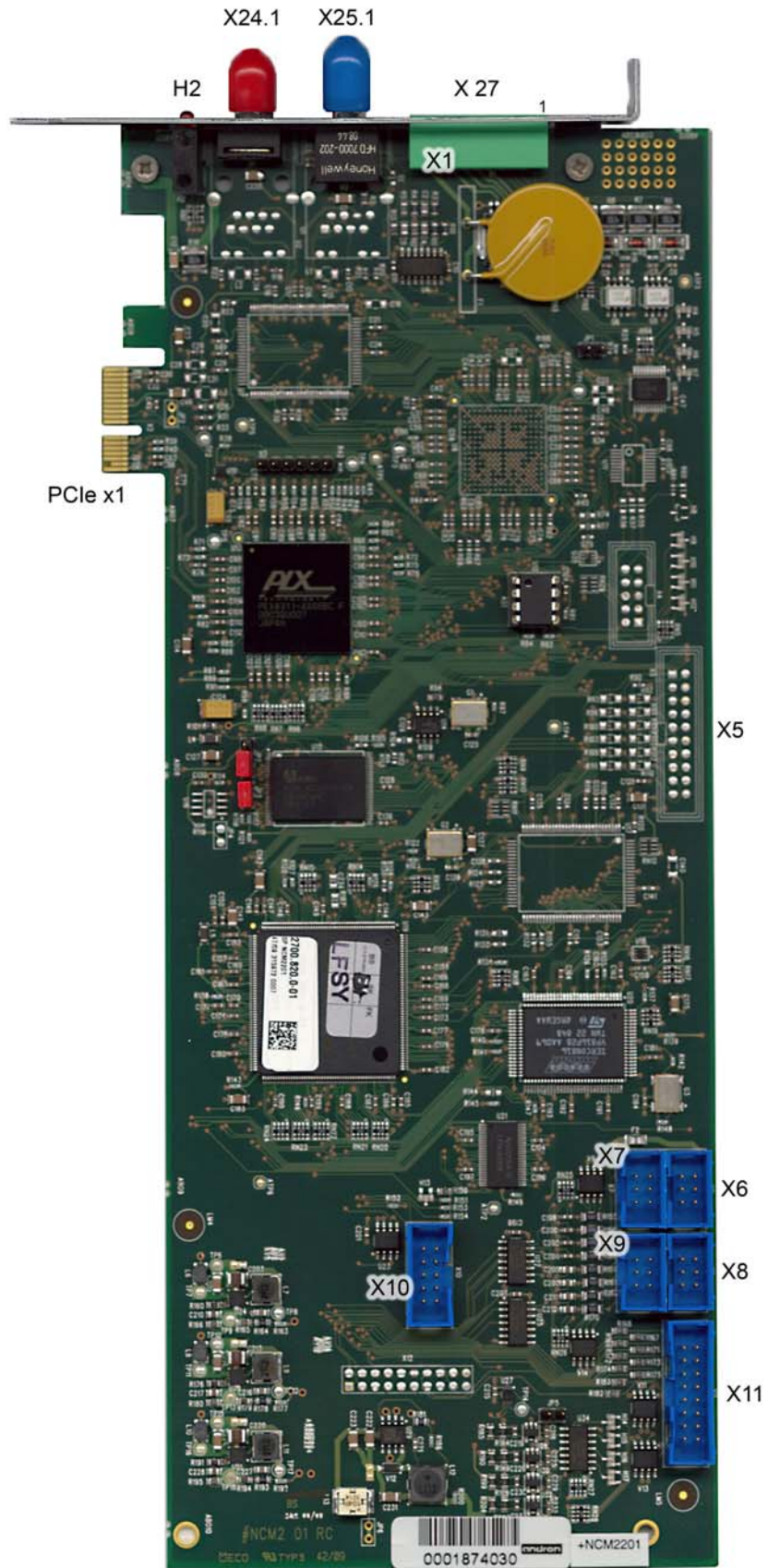
**Order number**



**Overview of the interfaces and LEDs** The NCM2 card has different interfaces depending of the version.

Internal name	Function	External name
X1	I/O interface (4 inputs 24V / 4 outputs 24V) <ul style="list-style-type: none"> <li>➤ Pin1 (D0 in) input – Emergency-Stop</li> <li>➤ Pin2 (D1 in) input - n.a.</li> <li>➤ Pin3 (D2 in) input - Collision</li> <li>➤ Pin4 (D3 in) input - Encoder</li> <li>➤ Pin5 (D0 out) output - n.a.</li> <li>➤ Pin6 (D1 out) output - n.a.</li> <li>➤ Pin7 (D2 out) output - n.a.</li> <li>➤ Pin8 (D3 out) output - n.a.</li> <li>➤ Pin9 - 24V input</li> <li>➤ Pin10 - GND</li> </ul>	X27
X5	Adapter connection for 2 <sup>nd</sup> SERCOS II ring (Option)	X24.2/X25.2
X6	Handwheel 1 (HR1) - <i>Assignment see following page</i>	X30.1
X7	Handwheel 3 (HR3)	X30.2
X8	Handwheel 2 (HR2)	X30.3
X9	Handwheel 4 (HR4)	X30.4
X10	Internal programming interface	
X11	Expansion (ADC/DAC)	
H1	SERCOS II interface (fibre optic) transmitter (TX)	X24.1
H3	SERCOS II interface (fibre optic) receiver (RX)	X25.1
H2	State display SERCOS II - ring 1 <ul style="list-style-type: none"> <li>➤ Green: receive data</li> <li>➤ Yellow: transmit data</li> <li>➤ Red: Distortion or line interruption</li> </ul>	H2

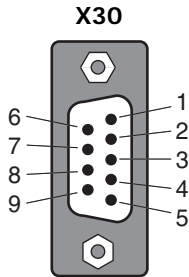
**Interfaces of the NCM2**



*Illustration: NCM2 multiboard with SERCOS II interface*

**Hand wheel interface adapter (Option)**

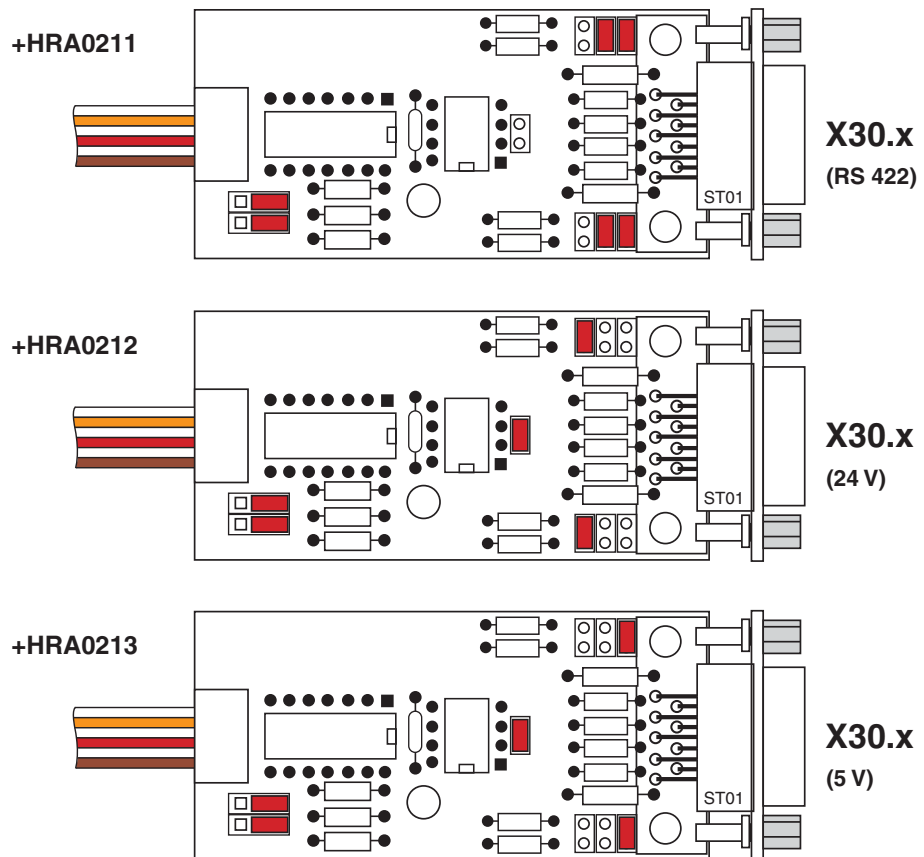
This interface allows the connection of an electronic hand wheel (Manual Pulse Generator). The signals of the NC multifunction card II for the hand wheel interface are converted via the interface adapter +HRA021x. The interface (X30.x) is thus also accessible via a 9-pole SUB-D connector. Because of the different output signals, three interface versions are currently available.



Pin	Handwheel adapter / Signal name		
	+HRA0211	+HRA0212	+HRA0213
	<b>RS 422</b>	<b>24 V</b>	<b>5 V</b>
1	A	A	A
2	A#	GND	GND
3	Shield B	not assigned	not assigned
4	not assigned	not assigned	not assigned
5	not assigned	not assigned	not assigned
6	Shield A	not assigned	not assigned
7	B#	GND	GND
8	B	B	B
9	not assigned	not assigned	not assigned

The power supply for the hand wheel must be provided by an external source.

**Adapter overview**



**SERCOS fibre optic cable**

The SERCOS fibre optic cable connects the NC multifunction card II, resp. the interface adapter, of the NC computer with the drives. The connection is formed as a ring which means that, depending on the number of the drives, a minimum of two SERCOS fibre optic cables are required.

Depending on the place of use, two different cables are available:

- Inside the switch cabinet a fibre optic cable with a diameter of 2.2 mm has to be used.
- Outside the switch cabinet, a sheathed fibre optic cable with a diameter of 6.0 mm having a better resistance to mechanical wear is used.

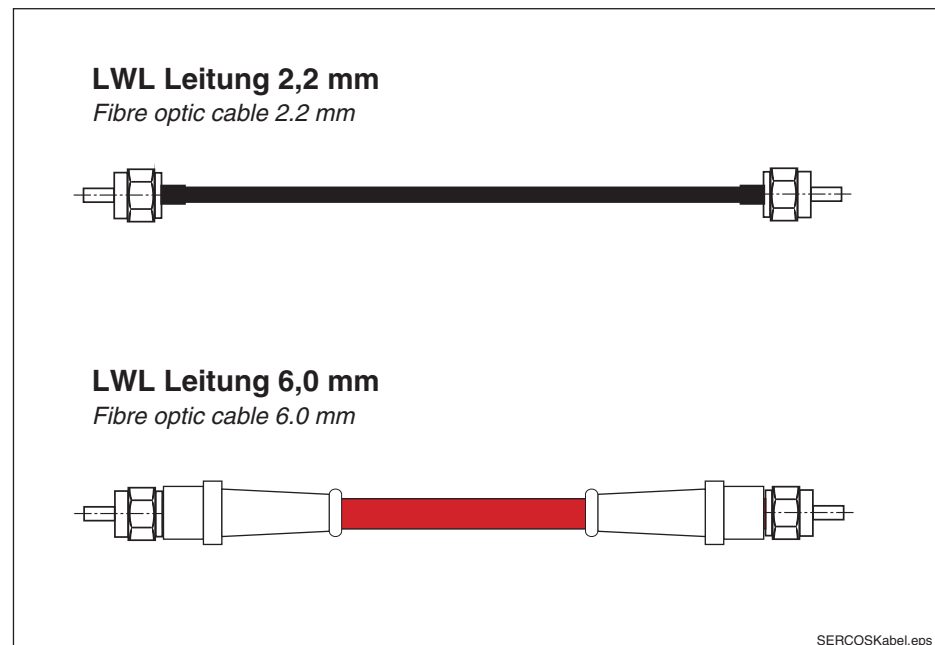


Illustration: Internal and external SERCOS II fibre optic cable

**Cable specification**

Cable length:	max. 20 m
Bending radius:	min. 50 mm
Internal cable:	Ø 2,2 mm
External cable:	Ø 6,0 mm



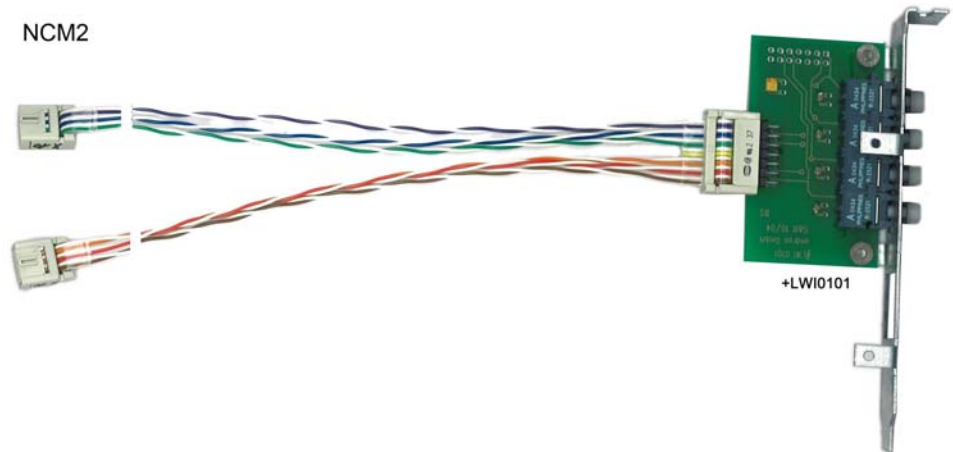
**Attention!**  
 Do not bend the SERCOS fibre optic cable!  
 The bending radius must not be less than 50 mm!

**LWI card with 4 optical inputs**

**General**

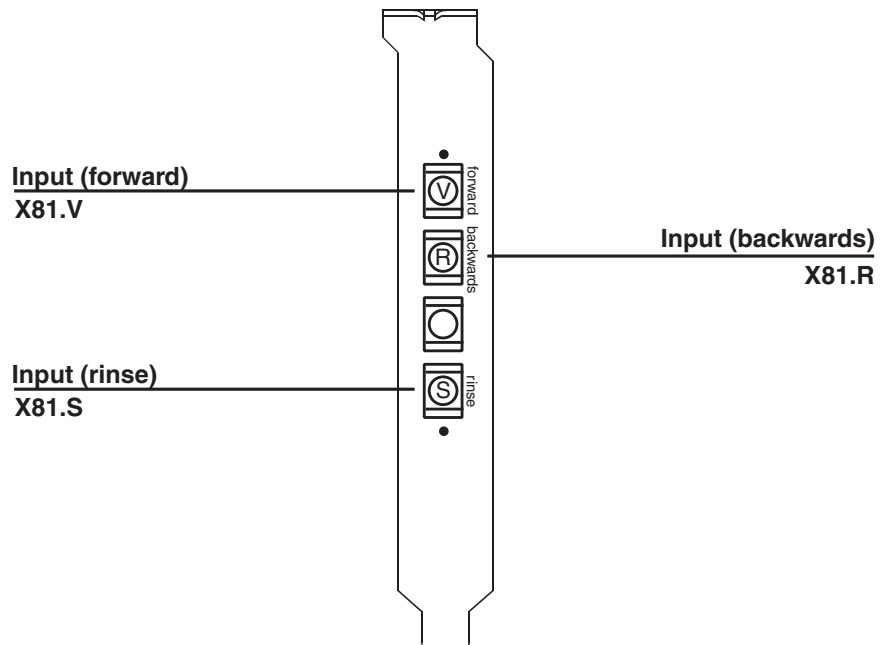
The fibre optic interface card +LWI0101 has four optical inputs. They are linked with the NCM2 card (X7/X9) with two connecting cables. Via this interface for example the signals of an external eroding-generator are entered into the control.

The connection between the LWI card and the NCM2 card occurs with the shown connecting cable, that is a part of the LWI card.



*Illustration: LWI0101 card with connecting cable*

**Mounting bracked LWI**



*Illustration: Mounting bracked of the LWI card without handwheel interface*

## Fieldbus interface card (Profibus-DP, CANopen, DeviceNET,...)

### General

The fieldbus interface card is located on the HMI side of the controller. The card is responsible for the communication between controller and machine operating panel and also for the connection to additional fieldbus devices.

The following interface cards with PCIe BUS are available at the moment:

- Profibus-DP

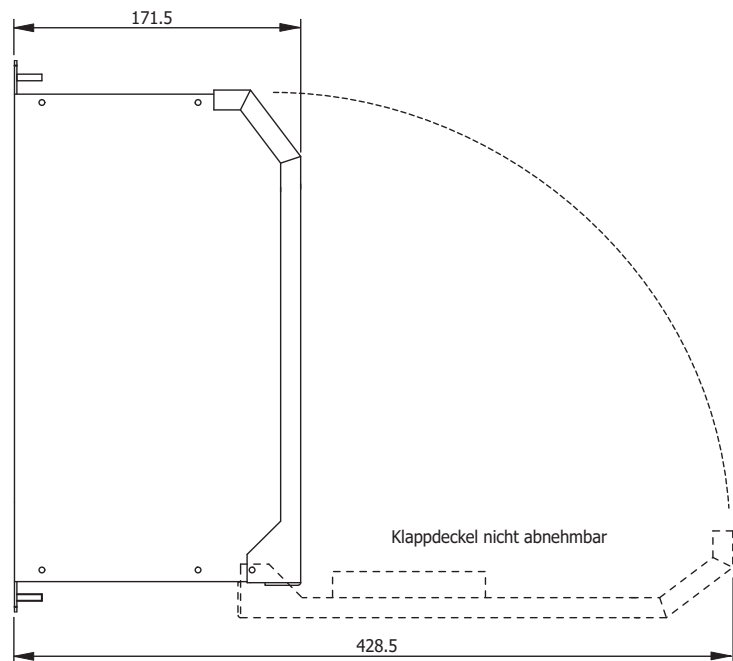
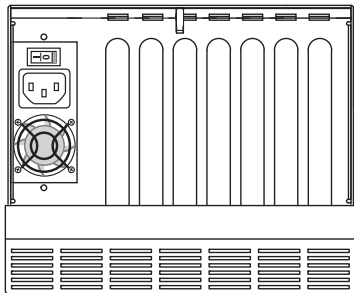
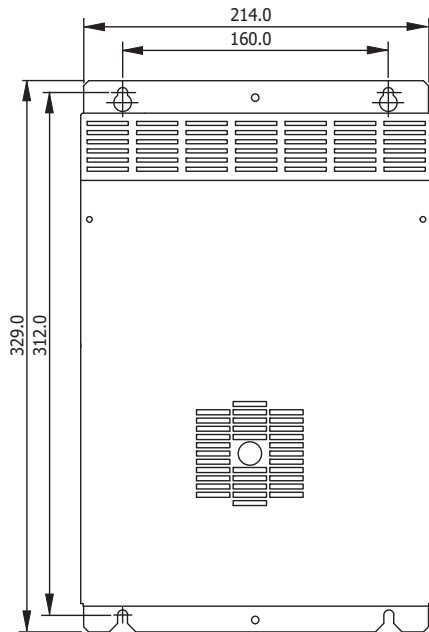


*Illustration: Profibus-DP interface card with PCIe bus (similar illustration)*



By using the **EtherCAT** interface for the connection for the external fieldbus units the fieldbus interface card is not necessary. The second Ethernet interface of the HMI CPU card will become the EtherCAT interface with the corresponding driver.

## Dimensions of the control



## Technical data

HMI computer	andronic 3060s	
CPU card	Half-Size Slot CPU Celeron M / 1.6 GHz or Pentium M / 1.8 GHz 1024/2048 MB RAM Graphic-, Ethernet-, IDE/SATA controller onboard USB 2.0	
Harddisk	250 GB / 2.5 inch / SATA	
PLC	integrated Soft-PLC (CoDeSys)	
I/O interfaces	EtherCAT, Profibus-DP, ...	
OS	Microsoft Windows® XP® Professional	
NC computer		
CPU card	Half-Size Slot CPU Celeron M / 1.6 GHz 512 MB RAM	
NCM2 card	NC multifunction card II	
Interfaces	<ul style="list-style-type: none"> <li>▪ Handwheel</li> <li>▪ I/O interface for : Emerg.-Stop, collision, ...</li> <li>▪ SERCOS II interface (LWL) up to 2 rings</li> <li>▪ SERCOS III interface</li> </ul>	
OS	andron realtime OS	
General		
Protection category	IP 20	
Input voltage	100-240 V AC, 50/60 Hz or 24 V DC	
Power consumption	max. 200 VA	
Temperature range	+5°C ... +45°C	
Dimensions	214 x 329 x 171,5 (WxHxD)	
Operating panels	ANV03/ANV04	ANM013/ANM02
Protection category	IP 64 (front), IP 20	IP 64 (front), IP 20
Input voltage	24 V DC	24 V DC
Power consumption	max. 75 VA	max. 225 VA
Temperature range	+5°C ... +45°C	+5°C ... +45°C