5.3 CP340, CP360, CP380 and CP382

5.3.1 General Information

The CP340, CP360, CP380 and CP382 are high-performance CPUs for the B&R SYSTEM 2005. The CPUs are operated in the main rack directly beside the power supply module. They require two or three slots.

It is equipped with one or three insert slots for aPCI interface modules, a Compact Flash interface for CF memory cards and a floating point unit. An RS232 programming interface, a USB interface and a 10/100 BASE-T ETHERNET interface are available.

The aPCI insert slot for interface modules makes it possible to connect the CPUs to different bus and network systems.

The Compact Flash interface allows the size of the memory to be adjusted to suit different memory requirements of many diverse applications.

The CPUs are especially useful for applications where lower cycle times are required, very large amounts of data must be processed or for applications using the FPU.

5.3.2 Order Data



CP340, CP360, CP380



CP382

Model Number	Short Description
	CPU
3CP340.60-1	2005 CPU, x86 233 Intel-compatible, 16 MB DRAM, 512 KB SRAM, exchangeable application memory: Compact Flash, 1 insert slot for aPCI modules, 1 USB interface, 1 RS232 interface, 1 Ethernet interface 100 Base-T. Program memory must be ordered separately.
3CP360.60-1 [1]	2005 CPU, Pentium 266, 32 MB DRAM, 512 KB SRAM, exchangeable application memory: Compact Flash, 1 insert slot for aPCI modules, 1 USB interface, 1 RS232 interface, 1 Ethernet interface 100 Base-T. Program memory must be ordered separately.
3CP380.60-1	2005 CPU, Pentium III 500, 64 MB DRAM, 512 KB SRAM, exchangeable application memory: Compact Flash, 1 insert slot for aPCI modules, 1 USB, 1 RS232 interface, 1 Ethernet interface 100 Base-T. Program memory must be ordered separately.
3CP382.60-1	2005 CPU, Pentium III 500, 64 MB DRAM, 512 KB SRAM, exchangeable application memory: Compact Flash, 3 insert slots for aPCI modules, 1 USB, 1 RS232 interface, 1 Ethernet interface 100 Base-T. Program memory must be ordered separately.
	Program Memory [2]
5CFCRD.0032-01	Compact Flash 32 MB ATA/IDE SanDisk
5CFCRD.0064-01	Compact Flash 64 MB ATA/IDE SanDisk
5CFCRD.0128-01	Compact Flash 128 MB TrueIDE SanDisk
5CFCRD.0256-01	Compact Flash 256 MB ATA/IDE SanDisk
5CFCRD.0512-01	Compact Flash 512 MB ATA/IDE SanDisk
	Accessories
0G0001.00-090	Cable PC <-> PLC/PW, RS232, online cable

Table 55: CP340, CP360, CP380 and CP382 order data

1) This CPU replaces the 3CP360.60-2. The 3CP360.60-1 has one additional USB interface.
2) Program memory is required to operate the CPUs. It is not included with the delivery of the CPUs, instead it must be ordered as an accessory.

5.3.3 Technical Data

Product ID	CP340	CP360	CP380	CP382
General Information				
C-UL-US Listed	Yes			
B&R ID Code	---			
Module Type	B&R 2005 CPU			
Slot Main Rack Expansion Rack	3 + 4 No			3 - 5 No
Power Consumption 5 V 24 V Total, without memory card and without interface module	Max. 4.5 W Max. 1 W Max. 5.5 W	Max. 11 W Max. 3 W Max. 14 W	Max. 13 W Max. 3 W Max. 16 W	Max. 13 W Max. 4 W Max. 17 W
Processor Section				
Clock Frequency	233 MHz	266 MHz	500 MHz	
Typical Instruction Cycle Time	0.038 µs	0.02 µs	0.012 µs	
Data and Program Code L1 Cache	16 KB	2 x 16 KB	2 x 16 KB	
L2 Cache	---	512 KB	256 KB	
Standard Memory RAM User RAM	16 MB DRAM 496 KB SRAM	32 MB DRAM 496 KB SRAM	64 MB DRAM 496 KB SRAM	
Remanent Variables	32 KB	256 KB		
FPU	Yes			
Integrated I/O processor	Processes I/O data points in the background			
Data Buffering Lithium Battery Battery Monitoring	At least 3 years Yes			
Peripheral				
Compact Flash Interface Connection Memory Size	1 ATA / True IDE 32 MB to 512 MB (as of 07/2003)			
Real-time Clock Resolution	Nonvolatile 1 s			
Reset Button	Yes			
Status Display	LEDs			
Insert slots for aPCI interface modules IF7xx	1			3

Table 56: CP340, CP360, CP380 and CP382 technical data

Product ID	CP340	CP360	CP380	CP382
Standard Communication Interfaces				
Application Interface IF1 Electrical Isolation Design Distance Baud Rate	RS232 No 9-pin DSUB plug Max. 15 m / 19200 Baud Max. 115.2 kBaud			
Application Interface IF2 Electrical Isolation Design Distance Baud Rate	ETHERNET Yes RJ45 socket Max. 100 m 10/100 MBaud			
Application Interface IF3	USB Rev. 1.1			
Mechanical Characteristics				
Dimensions	B&R 2005 double-width			B&R 2005 triple width

Table 56: CP340, CP360, CP380 and CP382 technical data (cont.)

5.3.4 Restrictions

Limitation	Replacement
NC Manager software for NC modules NC154 and NC157 are not supported. That means, these NC modules do not function with these CPUs. The NC150 can be used in applications with direct I/O access when the NC Manager is not used.	Direct control of ACOPOS via the CAN interface or ETHERNET Powerlink with the new NC Manager software.
The RIO-Master EX150 is not supported.	CAN IO, ETHERNET Powerlink
The PROFIBUS FMS module NW150 is not supported.	CAN IO, ETHERNET Powerlink
The IF050 communication module is not supported.	IF060
The IF681 interface module is not supported.	ETHERNET Onboard Interface

Table 57: CP340, CP360, CP380 and CP382 limitations

5.3.5 Status LEDs

Image	LED	Description
	READY	CPU is active
	RUN	Application running
	ERROR	SERVICE mode
	BAT CPU	CPU battery empty or not present
	BAT BUS	Bus battery empty or not present
	CF BUSY	Compact Flash BUSY
	CF OK	Compact Flash OK
	100TX	10/100 MBaud ETHERNET
	ACT/LNK	ETHERNET Activity/Link

Table 58: CP340, CP360, CP380 and CP382 Status LEDs

5.3.6 Operational and Connection Elements

The operational elements, display elements, one or three insert slots for aPCI interface modules, the slot for the program memory, the battery compartment and the connection plug for the RS232 interface are all found behind the module door. The RJ45 socket for the ETHERNET interface and the USB interface can be found on the bottom of the module.

CP340, CP360 and CP380

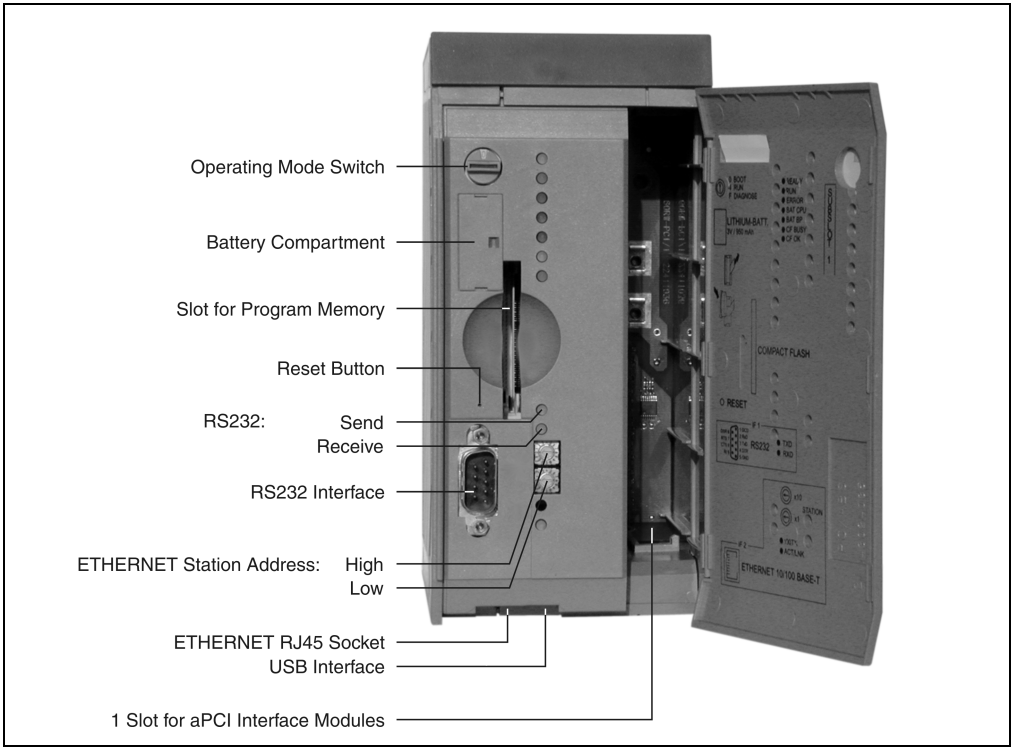


Figure 57: CP340, CP360 and CP380 operational and connection elements

CP382

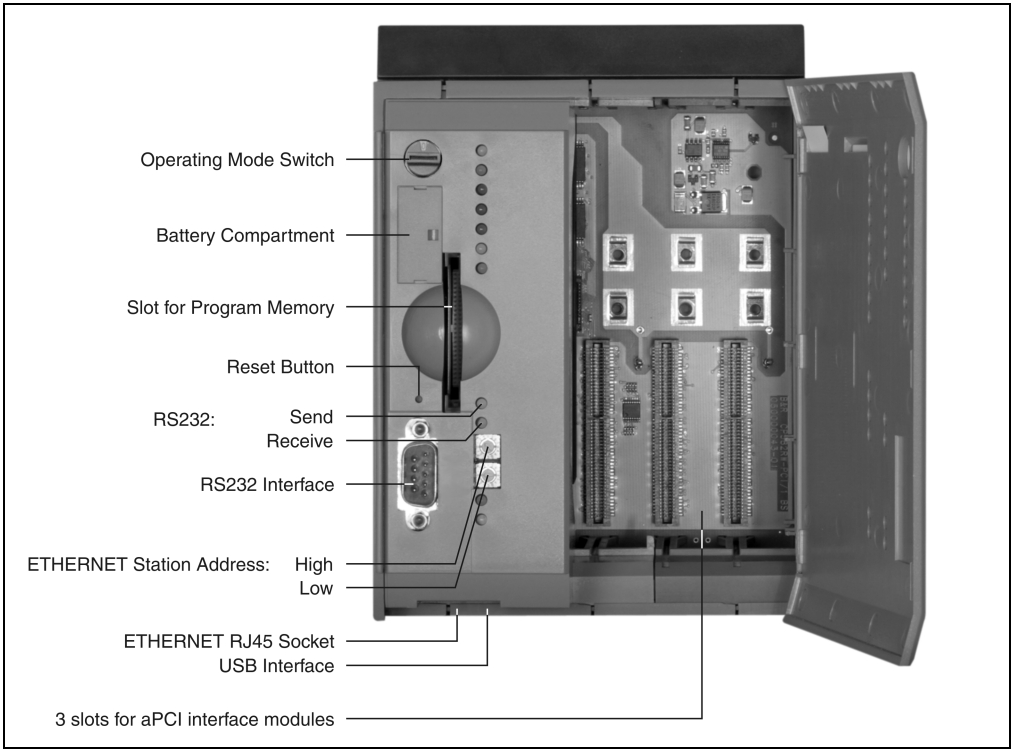


Figure 58: CP382 operational and connection elements

5.3.7 Slot for Program Memory

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

5.3.8 Reset Button

The reset button can be pressed with any small pointed object (e.g. paper clip). The reset button is protected by the module door. Pressing the reset button triggers a hardware reset, which means:

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

The PLC then goes into SERVICE mode.

5.3.9 Operating Mode Switch

The CPUs are equipped with a hex switch which acts as an operating mode switch.

Switch Position	Operating Mode	Description
$0	Boot	In this switch position the default B&R Automation Runtime™ (AR) is started, and the runtime system can be installed using the online interface (B&R Automation Studio™). User Flash is deleted after the download begins.
$4	Run	RUN Mode
$F	Diagnostics	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**.

Table 59: CP340, CP360, CP380 and CP382 operating modes

5.3.10 RS232 Interface (IF1)

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

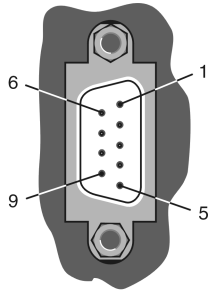
Interface	Description	Pin Assignments		
PG interface RS232  9-pin DSUB plug	The RS232 interface operates as an online interface. Online connection to the PG is achieved using a standard RS232 cable that is available from B&R: Module ID RS232 Cable Model No. 0G0001.00-090 Max. Baud Rate: 115.2 kBaud Max. Cable Length: 15 m		**RS232**	
		1	DCD	Data Carrier Detect
		2	RXD	Receive Signal
		3	TXD	Transmit Signal
		4	DTR	Data Terminal Ready
		5	GND	Ground
		6	DSR	Data Set Ready
		7	RTS	Request To Send
		8	CTS	Clear To Send
		9	RI	Ring Indicator

Table 60: CP340, CP360, CP380 and CP382 RS232 interface (IF1)

5.3.11 ETHERNET Interface (IF2):

IF2 is an ETHERNET interface. The connection is made using a 10/100 BASE-T Twisted Pair RJ45 socket on the bottom of the module.

The INA2000 station number for the ETHERNET interface is set with both hex switches.

Information:

The onboard ETHERNET interface is not suitable for ETHERNET Powerlink.

5.3.12 USB Interface (IF3)

The IF3 is a USB interface. The connection is made using a USB interface for Rev. 1.1 on the bottom of the module.

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

Information:

The USB interface (IF3) cannot be used as an online communication interface.

5.3.13 Insert Slot

The CPUs are equipped with one or three insert slots for aPCI interface modules.

The B&R SYSTEM 2005 can be connected to various bus or network systems using plug-in interface modules.

The following aPCI interface modules can be operated presently in the CPUs:

Module	Description
3IF761.9	aPCI interface module, 1 PROFIBUS DP interface, electrically isolated and network capable, 1 RS232 interface
3IF762.9	aPCI interface module, 1 PROFIBUS DP interface, electrically isolated and network capable, 1 RS422/RS485 interface, electrically isolated and network capable
3IF772.9	aPCI interface module with one RS232 interface and two CAN interfaces
3IF786.9	aPCI interface module, 1 ETHERNET Powerlink interface, manager or controller function, 1 RS232 interface
3IF787.9	aPCI interface module 1 ETHERNET Powerlink interface, manager or controller function, 1 CAN interface , max. 500 kbps, object buffer in send and receive direction, network capable, electrically isolated. Order TB704 terminal blocks separately.
3IF789.9	aPCI interface interface module, 1 ETHERNET Powerlink Schnittstelle, manager or controller function, 1 X2X Link Master interface, electrically isolated. Order TB704 terminal block separately.

Table 61: CP340, CP360, CP380 and CP382 aPCI interface module inserts

5.3.14 Data/Real-time Buffering

The following areas are buffered:

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

Buffering is achieved using a lithium battery in the following order:

1) CPU battery: The battery is in the CPU

2) Bus battery: The backup battery is either in the B&R 2005 rack or in the AC240 battery module

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".

Battery Change Interval

Battery	Change Interval
CPU Battery	The battery should be changed every 4 years. The change interval refers to the average life span and operating conditions and is recommended by B&R. This does not correspond to the maximum buffer duration.
Bus Battery	See the section "Backup Battery" in the sections 2 "Module Racks" and 17.2 "AC240" (Battery Module).

Table 62: CP340, CP360, CP380 and CP382 battery changing intervals