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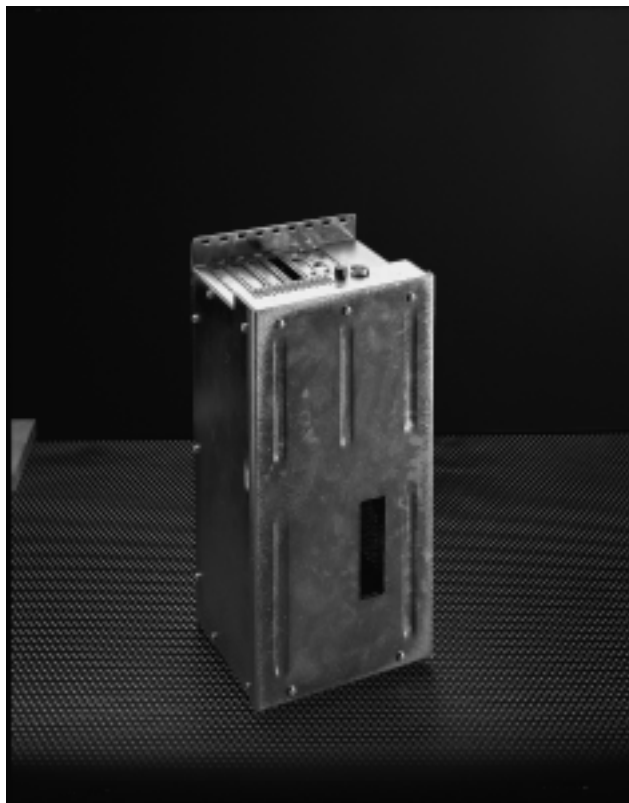
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Overview

The integrated industrial PC C6011 is intended for general use in the field of mechanical engineering and machine technology. Integrated within the control cabinet is a complete PC, including slot CPU, hard disk and diskette drive. The device has been constructed with a passive ISA backplane to give you a free choice of CPU and peripheral cards.

Four long slots are available for applications, and two bays for 3½" drives complete the industrial computer.

The cabinet system makes it possible to install industrial computers quickly and easily in existing cabinets for automation applications, for example, in switch cabinets or control desks. The computer can be completed by adding the industrial keyboard K2001 and the industrial monitor C4211.



CPU:	486 SX, DX, DX2, DX4, AMD 5x86 or Pentium Overdrive
Chipset:	VLSI 82C480
Working memory:	up to 32 MB
Video controller:	Western Digital WD90C24
Video RAM:	1 MB
Diskette drive:	3½" 1.44 MB
Mass storage:	1280 MB IDE hard disk, of which 504 MB can be used under DOS
Interfaces:	2 serial RS232 interfaces 1 parallel Centronics interface I/O Lightbus interface Connection for an external VGA monitor External keyboard 3 available ISA bus slots for full-length cards

Connections

Serial interfaces

RS 232

COM1 - COM2

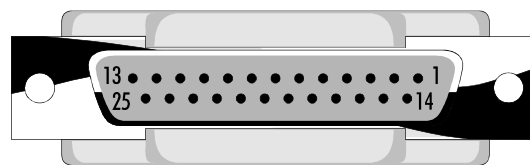
20 mA operation for COM1

Serial interface card

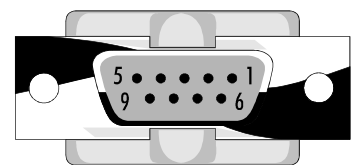
The basic configuration of the industrial PC C6011 has two standard RS 232 serial interfaces, where COM1 leads to a 25-pin SUB-D plug and COM2 to a 9-pin SUB-D plug. The illustration below shows the female end of the necessary SUB-D connections with 9-pin / 25-pin connections. COM1 can also be configured as a 20 mA interface and the pins EI±, SI±, CC1 and CC2 will not be used unless this is the case. Please send your C1230 mainboard back to us if you would like to have the COM1 upgraded for 20 mA operation.

If you need more serial ports, the computer can be fitted with an interface card. In this case there will be four 9-pin SUB-D plugs on the side of the cabinet. The pin assignment of each of these COM ports corresponds to that given in the right-hand table below. The SUB-D plugs are labeled on the computer as COM1 to COM4. All four of the COM ports on the interface card can be switched over from RS232 to 20 mA operation.

For more information on this, refer to the documentation provided with the card. Using an interface card will deactivate the serial interfaces of the C1230 mainboard.



COM1



COM2

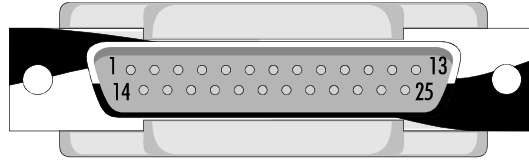
Pin number COM 1	Function
1	n.c.
2	TXD
3	RXD
4	RTS
5	CTS
6	DSR
7	Ground
8	DCD
9	CC1
10	-12 V
11	n.c.
12	EI+
13	SI-
14	CC2
15	n.c.
16	n.c.
17	n.c.
18	n.c.
19	n.c.
20	DTR
21	n.c.
22	RI
23	n.c.
24	EI-
25	SI+

Pin number COM 2	Function
1	DCD
2	RXD
3	TXD
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

Printer
LPT1

Parallel connection

The parallel interface conforms to the Centronics standard and is addressed by the software as LPT1. The illustration below shows the front of the necessary plug with a 25-pin SUB-D male connector.



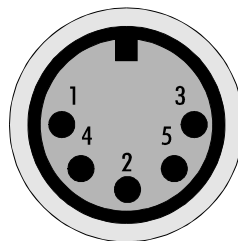
Pin number	Function
1	Strobe
2	Data 0
3	Data 1
4	Data 2
5	Data 3
6	Data 4
7	Data 5
8	Data 6
9	Data 7

Pin number	Function
10	Ack
11	BUSY
12	PE
13	SLCT
14	AUTO FEED XT
15	ERROR
16	INIT
17	SLCT IN
18-25	Ground

Connecting an external keyboard

There is a keyboard connection at the side of the computer. Any AT keyboard can be connected to this. The following illustration shows the 5-pin DIN socket.

Connection for an
external keyboard



Pin number	Function
1	Keyboard Clock
2	Keyboard Data
3	n.c.
4	Ground
5	+5 V

II/O Lightbus connection

II/O Lightbus

The C1230 mainboard contains an II/O Lightbus interface for controlling peripheral modules. The II/O Lightbus consists of an optical transmission ring, the two ends of which are connected to the industrial PC. The plug, which emits red light when the II/O Lightbus is switched on, must be connected to the socket nearest to the VGA connection. This is labeled "IN" in the following illustration. To make this connection you will require optical transmission plugs of type Beckhoff Z1000.



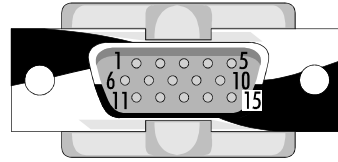
Video

Video connection

A monitor can be attached to the industrial PC C6011.

At the side of the cabinet, on the cover plate of the C1230 mainboard, there is a 15-pin SUB-D female connection for attaching a VGA monitor.

The illustration shows the front of the necessary monitor plug.



Pin number	Function
1	Red
2	Green
3	Blue
4	Monitor ID bit 2
5	Ground
6	Ground red
7	Ground green
8	Ground blue

Pin number	Function
9	Ground (no pin)
10	Sync ground
11	n.c.
12	n.c.
13	Horizontal sync (+)
14	Vertical sync (-)
15	n.c.

Power supply

The industrial PC C6011 can be fitted with a 24 V DC power unit or with a standard 230/115 V, 50/60 Hz PC power unit.

Standard switchable PC power unit for 230/115 V, 50/60 Hz

A standard PC switchable power unit is supplied with 115 or 230 V AC from the cold device socket on the side wall of the PC. Inside the PC, to the right of the power unit, next to the cable outlets, is the switch which changes over from mains power at 230 V AC to 115 V AC. At 115 V the power unit operates at 60 Hz and at 230 V with 50 Hz. With a 115 V power supply the power unit will draw at most 5 A, with a 230 V supply at most 3 A.

24 V DC power unit

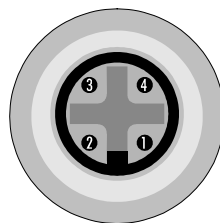
If the industrial PC C6011 is fitted with a 24 V DC power unit there will be a round socket in the side wall of the central computer. The illustration below shows the male end of the necessary BINDER connection of type 99 0430 30 04.

*Precision fuse
M 3.15 A*

Above the power supply socket there is a fuse holder containing a moderately slow-blowing 3.15 A precision fuse which is used to safeguard the power supply.

The 24 V DC power unit operates with input voltages in the range 15 V DC to 36 V DC and supplies output current of 5 A at +5 V, 5 A at +12 V, 0.5 A at -12 V and 0.1 A at -5 V.

If the IPC is equipped with an uninterruptible power supply (UPS) its rechargeable battery will also be connected via this socket.



Pin number	Function
1	Power supply +24 V
2	Battery + (only if UPS installed)
3	Power supply ground
4	Battery - (only if UPS installed)

Setup

Operation and basic settings

The BIOS of the industry PC C6011 contains an integrated SETUP program which enables the user to modify the system configuration – to set up the types of drive, the screen mode and the shadow RAM areas. During the boot procedure, the BIOS will then use this data to configure the computer.

The configuration data specified to the SETUP program is stored permanently in a CMOS RAM with battery backup.

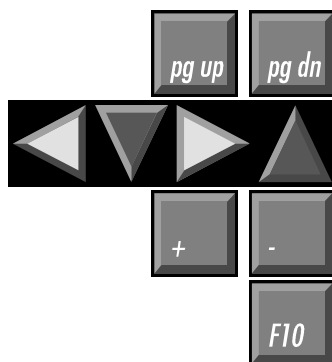
When you start up the computer it will first carry out a self-test. If you wish to call the Setup program, hold down the keys CTRL, ALT and ESC simultaneously while the self-test is in progress.



When you call the Setup program it first displays its Status Page.

Date: 07 Dez 1995 Time: 15:38:14		80486DX2 ISA BIOS (214FL002) Award Software, Inc.			
Drive A:	1.44M, 3½ in.	Base Memory: 640K			
Drive B:	None	Extended Memory: 7168K			
Video:	EGA/UGA	Expanded Memory: 0K			
		Other Memory: 384K			
		Total Memory: 8192K			
Halt On:	All Errors	Default Speed: High			
POST Messages:	Maximize				
Memory Test:	Minimize				
Boot Sequence:	C.A				
Security:	Disabled				
Virus Warning:	Enabled				
Disk 0:	49 <1222Mb>	CYLS.	HEADS	SECTORS	PRECOMP
Disk 1:	None <***Mb>	2484	16	63	None
		0	0	0	0
Alt-F1 for Menu Help		CYLS.		HEADS	SECTORS
Page 01: Status Page		PgDn = Options Page		F10 exits	
				F2 change colors	

If you have difficulty reading the screen you can press F2 to change the colors used for the display.

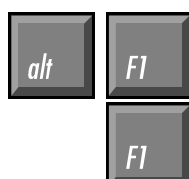


The Setup program has two screen pages; you can use the PageUp and PageDown keys to switch between them.

Use the cursor keys to navigate between the individual selection fields; you can then modify the displayed values using the keys Plus and Minus. In the case of a number field, you can also enter the desired value directly using the number pad.

Press F10 to terminate the Setup program. You will then be asked whether the settings should be stored.

The illustrations in this chapter show the default settings which are set up in the factory.



You can display a list of all the necessary keys for operating the Setup program by simultaneously pressing ALT and F1.

If you press F1 alone, a help text will be displayed for the current menu item. This includes a list of all the possible settings for this item.

Press the PageDown key to get to the Options Page.

Shadow		
»BIOS« : Enabled	D000 : Disabled	E000 : Disabled
»VIDEO«: Enabled	D400 : Disabled	E400 : Disabled
C800 : Disabled	D800 : Disabled	E800 : Disabled
CC00 : Disabled	DC00 : Disabled	EC00 : Disabled

Cache	Speed
Internal cache: Enabled	Default Speed: High Slow Setting: Fast
	Miscellaneous On Board LPT : 378H On Board COM A : 3F8H On Board COM B : 2F8H

Alt-F1 for Menu Help	PgDn = Options Page	F10 exits
Page 02: Options Page		F2 change colors

The diskette drive

Each industrial PC C6011 has a 1.44 MB 3½" diskette drive which is specified as drive A.

Drive A:

DRIVE A: 1.44M, 3½ in.
DRIVE B: None

The hard disk

The Setup program is capable of detecting which hard disks are installed in the computer and entering the appropriate data in the relevant fields. You initiate this automatic detection by activating the line "Disk 0:" and entering "49". Use the Plus and Minus keys or enter the number explicitly and confirm it by pressing Enter.

Disk 0: 49

The status line at the bottom of the screen will then display the message

<Enter> for C: IDE Detection now.

so press Enter as instructed and wait until the values for the hard disk have been entered.

The hard disk which is installed in the C6011 has a capacity of 1222 MB. However, MS-DOS is not able to use more than 504 MB of the disk, and if you call FDISK it will show the size of the disk as 504 MB. Modern operating systems such as Windows NT can use the whole of the 1222 MB.

The FDISK in MS-DOS can partition at most 504 MB of the hard disk.

The interfaces

The industrial PC C6011 is provided with two serial interfaces and one parallel interface. You configure these in the Options Page of the Setup program by setting the entry "On Board COM A" to 3F8H for COM1 and "On Board COM B" to 2F8H for COM2.

On Board COM A
On Board COM B
On Board LPT

The parallel interface must be set to 378H in the Setup program so that it can be addressed as LPT1.

The boot sequence

The entry "Boot Sequence" specifies the order in which drives A and C should be examined for boot sectors.

The possible entries are "C,A" and "A,C".

"Boot Sequence: C,A" has the effect that the computer will first attempt to boot from the hard disk. Only if this is not possible – because there is no hard disk installed, or the hard disk is incorrectly specified in the Setup data, or is not formatted as a system disk – will it look in drive A for a boot diskette. If there is then no boot diskette in drive A this will give rise to an error message. You should specify "Boot Sequence: A,C" if you wish to be able to boot from a diskette occasionally. With this setting, when you start up the system the computer will first look for a boot diskette in drive A. If it fails to find one, the operating system will be started from the hard disk.

Other settings

You can also use the Setup program to set up the date and time, but this is equally possible from DOS using the DATE and TIME commands.

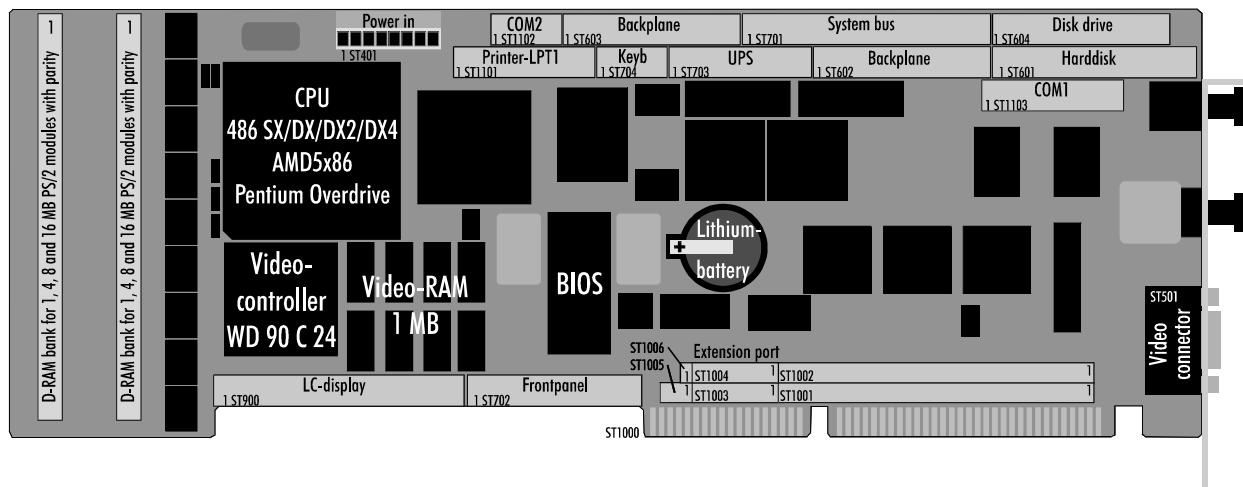
All the remaining settings should be made as shown in the illustrations on the previous pages.

Internal construction

The C1230 mainboard

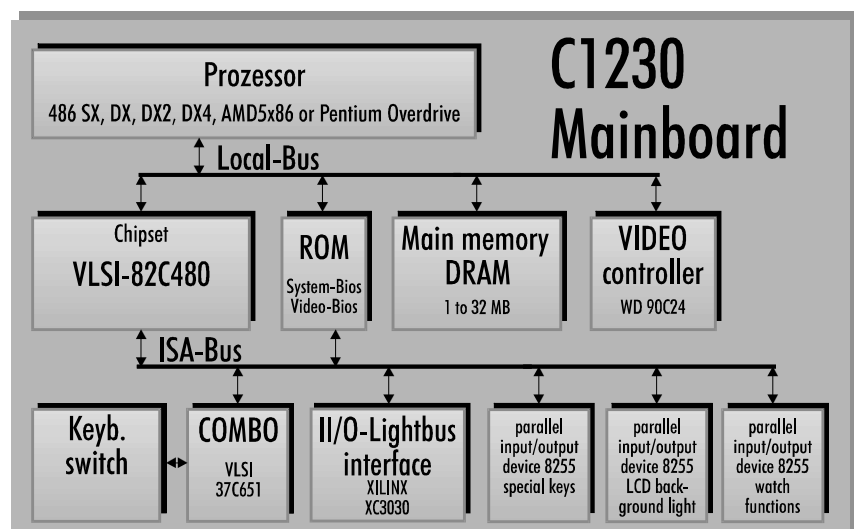
The following components are integrated on the mainboard:

- 486 SX, DX, DX2, DX4, AMD 5x86 or Pentium Overdrive processor
- up to 32 MB DRAM
- Floppy controller and hard disk controller
- 1 parallel interface and 2 serial interfaces
- Video controller including 1 MB video RAM
- LC Display interface
- Keyboard switching
- 3 parallel I/O components
- I/O Lightbus interface



The C1230 mainboard operates with two buses. The local bus connects the processor with the main memory, the ROM – which incorporates the system BIOS and video BIOS in a single component – and the video controller and communicates with the ISA bus via the VLSI chipset. Connected to the ISA bus there is a combo-controller component VLSI 37C651 “COMBO” incorporating a floppy controller and hard disk controller, together with two serial interfaces and a parallel interface. The ISA bus also has three parallel I/O components which switch the LCD backlighting, interrogate special keys on the front panel and carry out a variety of monitoring functions. If you wish to use the functions of the parallel I/O components, your software will have to set and read the components’ registers. All of this is explained in the chapter “Programming”.

Block diagram of the C1230 mainboard



Replacing the lithium battery

If the BIOS data is lost, check the lithium battery

If the data recorded in the BIOS vanishes overnight, you should check the lithium battery. If its voltage has dropped below 2.6 V the battery will have to be replaced.

To replace the lithium battery, bend the retaining bar slightly upwards and remove the battery. When you install the new battery, make sure that the flat side marked with a "+" is uppermost.

The type description for the battery is:

Panasonic 3 V lithium battery BR2325

Type of the lithium battery

Installing additional memory

PS/2 modules

1, 2, 4, 8 or 16 MB

with parity bit

in any order

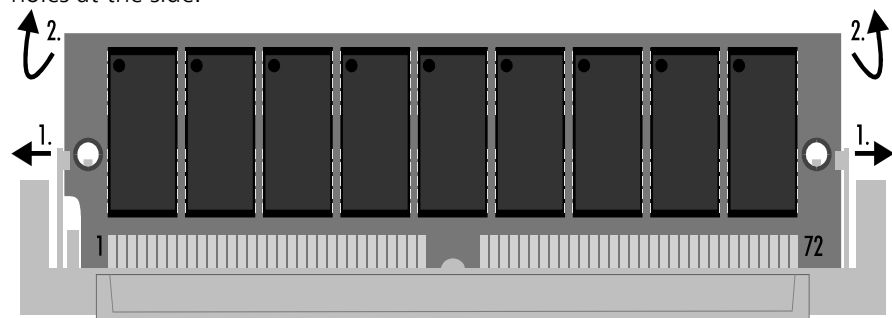
in any combination

Single or double sided

There are two slots on the mainboard for PS/2 SIMM modules, each of which can accommodate one 1, 2, 4, 8 or 16 MB module. You must use modules with parity bits, so that 9 bits are provided for each byte. The two slots may be occupied in any order, you can use any combination of the above modules, and both single-sided and double-sided modules.

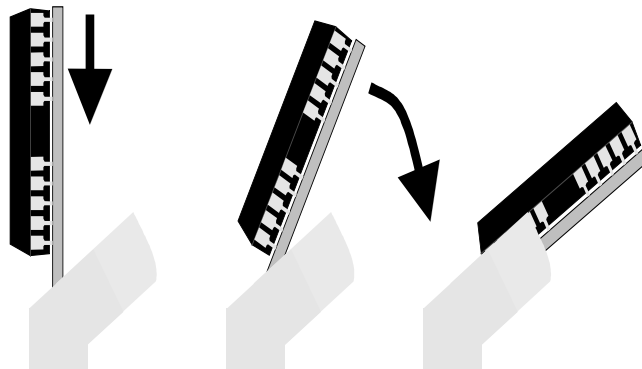
To remove an existing SIMM module, press the retaining tabs right and left outwards, as shown by the arrows 1. on the illustration below, and slide the module forwards far enough to release the catches which are hooked into the holes at the side.

Removing a SIMM module



PS2 SIMM modules can be inserted into the slot in only one direction. Insert the module into the slot with the contact surfaces downwards and then press it in until the retaining tabs at left and right latch into place. Ensure that the module is seated correctly by checking that the catches hook into the holes provided. When the system is switched on it will automatically determine how much memory is available.

Installing a SIMM module



Replacing the processor

You can use a variety of processors on this board:

486 SX 33 MHz, 486 DX 33 MHz, 486 DX2 66 MHz, 486 DX4 100 MHz, AMD5x86 133 MHz or Pentium Overdrive. You will not be able to upgrade to an AMD 5x86 or Pentium Overdrive processor yourself, nor will you be able to exchange one of these processors for a 486. If you wish to carry out such an upgrade, send the C1230 card to us to be modified.

In order to remove the processor you must first remove the heat sink from its holder. Note that the heat sink of a Cyrix CPU is often glued on and cannot be separated from the processor. In this case, take out the processor with its heat sink attached, don't rip the heat sink off. DX2 and DX4 CPUs are fitted with a fan on the heat sink. You can remove this together with the heat sink – you don't need to unscrew it first.

When you have removed the old CPU, lay the retaining frame of the fan underneath the new processor.

There is a mark on the corner of the processor at which Pin 1 is located. You will find a similar marking on the inner edge of the processor socket. Insert the processor into its socket so that the two marked corners are together. Make sure the processor is positioned centrally in the socket.

Apply a thin layer of heat-conducting paste to the processor and the heat sink and then replace the heat sink in its holder, together with its fan.

You will now have to tell the computer which type of processor it has. You do this by means of the jumpers 104, 105 and 106, which you must set as shown in the illustration below. The jumpers are located right next to the processor. Jumpers 301 and 302 at the top left corner of the processor determine the voltage of the power supply to the processor. You must make absolutely certain that these jumpers are set correctly, otherwise the CPU is likely to be ruined. A DX4 100 MHz processor requires a 3.3 V power supply, whereas a DX 33 MHz needs 5 V and the DX2 66 MHz is obtainable in two versions, for 5 V or for 3.3 V. The necessary power supply voltage is printed on the casing.. Don't change any of the other jumpers on the board.

*Remove heat sink
Not for Cyrix CPUs*

*Remove the fan together
with the heat sink
Pull out the processor
Lay the retaining frame of
the fan underneath*

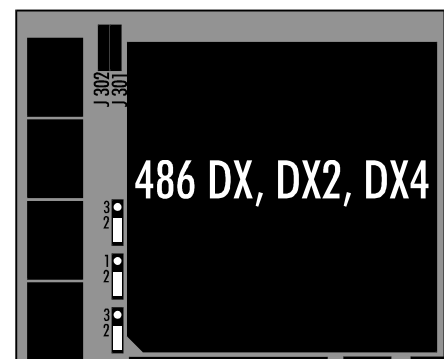
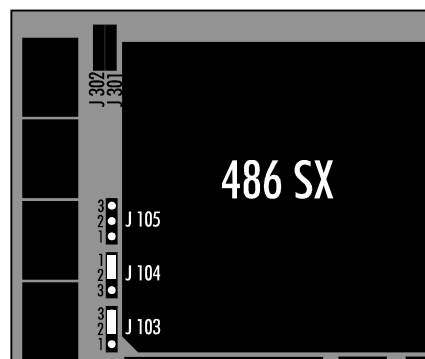
Marked corners together

Heat-conducting paste

Jumper

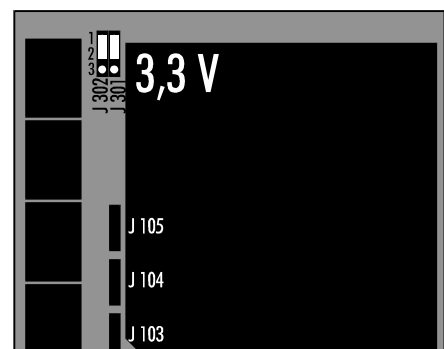
*3.3 V or 5 V power supply
for the processor*

*Jumper settings for 486 SX
and 486 DX, DX2, DX4 CPUs*



*Jumper settings for 5 V CPU
and 3.3 V CPU*

5 V can wreck a 3.3 V CPU!



Mainboard C1230 pin assignment

Pin assignment ST 1000 AT bus	Function
A1	IOCHK#
A2	SD7
A3	SD6
A4	SD5
A5	SD4
A6	SD3
A7	SD2
A8	SD1
A9	SD0
A10	IOCHRDY#
A11	AEN
A12	SA19
A13	SA18
A14	SA17
A15	SA16
A16	SA15
A17	SA14
A18	SA13
A19	SA12
A20	SA11
A21	SA10
A22	SA9
A23	SA8
A24	SA7
A25	SA6
A26	SA5
A27	SA4
A28	SA3
A29	SA2
A30	SA1
A31	SA0
B1	GND
B2	RESETDRV
B3	VCC
B4	IRQ9
B5	-5V
B6	DRQ2
B7	-12V
B8	CARDSLCT#
B9	+12V
B10	GND
B11	SMEMW#
B12	SMEMR#
B13	IOW#
B14	IOR#
B15	DACK3#
B16	DRQ3
B17	DACK1#
B18	DRQ1
B19	REF#

Pin assignment ST 1001 Extension	Function
1	IOCHK#
2	IOCHK#
3	SD7
4	SD7
5	SD6
6	SD6
7	SD5
8	SD5
9	SD4
10	SD4
11	SD3
12	SD3
13	SD2
14	SD2
15	SD1
16	SD1
17	SD0
18	SD0
19	IOCHRDY#
20	IOCHRDY#
21	AEN
22	AEN
23	SA19
24	SA19
25	SA18
26	SA18
27	SA17
28	SA17
29	SA16
30	SA16
31	SA15
32	SA15
33	SA14
34	SA14
35	SA13
36	SA13
37	SA12
38	SA12
39	SA11
40	SA11
41	SA10
42	SA10
43	SA9
44	SA9
45	SA8
46	SA8
47	SA7
48	SA7
49	SA6
50	SA6

Pin assignment ST 1002 Extension	Function
1	+5V
2	GND
3	RESETDRV
4	RESETDRV
5	+5V
6	GND
7	IRQ9
8	IRQ9
9	n.c.
10	-5V
11	DRQ2
12	DRQ2
13	n.c.
14	-12V
15	CARDSLCT#
16	n.c.
17	n.c.
18	+12V
19	+5V
20	GND
21	SMEMW#
22	SMEMW#
23	SMEMR#
24	SMEMR#
25	IOW#
26	IOW#
27	IOR#
28	IOR#
29	DACK3#
30	DACK3#
31	DRQ3
32	DRQ3
33	DACK1#
34	DACK1#
35	DRQ1
36	DRQ1
37	REF#
38	REF#
39	SYSCLK
40	CLK
41	IRQ7
42	IRQ7
43	IRQ6
44	IRQ6
45	IRQ5
46	IRQ5
47	IRQ4
48	IRQ4
49	IRQ3
50	IRQ3

Pin assignment ST 1000 AT bus	Function
B20	SYSCLK
B21	IRQ7
B22	IRQ6
B23	IRQ5
B24	IRQ4
B25	IRQ3
B26	DACK2 #
B27	T/C
B28	BALE
B29	VCC
B30	OSC
B31	GND
C1	SBHE #
C2	LA23
C3	LA22
C4	LA21
C5	LA20
C6	LA19
C7	LA18
C8	LA17
C9	MEMR #
C10	MEMW #

Pin assignment ST 1001 Extension	Function
51	SA5
52	SA5
53	SA4
54	SA4
55	SA3
56	SA3
57	SA2
58	SA2
59	SA1
60	SA1
61	SA0
62	SA0
63	SBHE #
64	SBHE #
65	LA23
66	LA23
67	LA22
68	LA22
69	LA21
70	LA21
71	LA20
72	LA20

Pin assignment ST 1002 Extension	Function
51	DACK2 #
52	DACK2 #
53	T/C
54	T/C
55	BALE
56	BALE
57	+5V
58	GND
59	OSC
60	OSC
61	+5V
62	GND
63	MEMCS16 #
64	MEMCS16 #
65	IOCS16 #
66	IOCS16 #
67	IRQ10
68	IRQ10
69	IRQ11
70	IRQ11
71	IRQ12
72	IRQ12

Pin assignment ST 1000 AT bus	Function
C11	SD8
C12	SD9
C13	SD10
C14	SD11
C15	SD12
C16	SD13
C17	SD14
C18	SD15
D1	MEMCS16
D2	IOCS16
D3	IRQ10
D4	IRQ11
D5	IRQ12
D6	IRQ15
D7	IRQ14
D8	DACK0 #
D9	DRQ0
D10	DACK5 #
D11	DRQ5
D12	DACK6 #
D13	DRQ6
D14	DACK7 #
D15	DRQ7
D16	VCC
D17	MASTER #
D18	GND

Pin assignment ST 1003 Extension	Function
1	LA19
2	LA19
3	LA18
4	LA18
5	LA17
6	LA17
7	MEMR #
8	MEMR #
9	MEMW #
10	MEMW #
11	SD8
12	SD8
13	SD9
14	SD9
15	SD10
16	SD10
17	SD11
18	SD11
19	SD12
20	SD12

Pin assignment ST 1004 Extension	Function
1	IRQ15
2	IRQ15
3	IRQ14
4	IRQ14
5	DACK0 #
6	DACK0 #
7	DRQ0
8	DRQ0
9	DACK5 #
10	DACK5 #
11	DRQ5
12	DRQ5
13	DACK6 #
14	DACK6 #
15	DRQ6
16	DRQ6
17	DACK7 #
18	DACK7 #
19	DRQ7
20	DRQ7

Pin assignment ST 604 Floppy drive	Function
1	GND
2	DENSEL
3	GND
4	n.c.
5	GND
6	n.c.
7	GND
8	INDEX#
9	GND
10	MTR0#
11	GND
12	DS1#
13	GND
14	DS0#
15	GND
16	MTR1#
17	GND
18	DIR#
19	GND
20	STEP#
21	GND
22	WDATA#
23	GND

Pin assignment ST 604 Floppy drive	Function
24	WGATE#
25	GND
26	TRO#
27	GND
28	WRTprt#
29	GND
30	RDATA#
31	GND
32	HDSEL#
33	GND
34	DSKCHG#

Pin assignment ST 1006 Extension	Function
1	MASTER#
2	MASTER#

Pin assignment ST 1005 Extension	Function
1	SD13
2	SD13
3	SD14
4	SD14
5	SD15
6	SD15

Pin assignment ST 601 Harddisk	Function
1	RESET #
2	GND
3	IDED7
4	HD8
5	HD6
6	HD9
7	HD5
8	HD10
9	HD4
10	HD11
11	HD3
12	HD12
13	HD2
14	HD13
15	HD1
16	HD14
17	HD0
18	HD15
19	n.c.
20	n.c.
21	GND
22	GND
23	HLOW #
24	GND
25	HIOR #
26	GND
27	n.c.
28	HBALE
29	n.c.
30	GND
31	IRQ14
32	IOCS16 #
33	HA1
34	n.c.
35	HA0
36	HA2
37	HCS0 #
38	HCS1 #
39	n.c.
40	GND

Pin assignment ST 602 Backplane	Function
1	GND
2	GND
3	PD0
4	PD1
5	PD2
6	PD3
7	PD4
8	PD5
9	PD6
10	PD7
11	BUSY
12	STROBE #
13	SLCT
14	SLCTIN #
15	PE
16	INIT #
17	ERR #
18	AUTOFD #
19	ACK #
20	GND
21	SERCLK
22	DSR1 #
23	RXD1
24	DCD1 #
25	TXD1
26	RI1 #
27	CTS1 #
28	DTR1 #
29	RTS1 #
30	GND
31	RXD2
32	DSR2 #
33	TXD2
34	GND

Pin assignment ST 603 Backplane	Function
1	GND
2	DCD2 #
3	CTS2 #
4	RI2 #
5	RTS2 #
6	DTR2 #
7	LWLSIN #
8	GND
9	LWLSOU
10	LWLSOI
11	GND
12	R
13	GND
14	G
15	GND
16	B
17	GND
18	HSYNC
19	VSYNC
20	RESERVE
21	+5V
22	GND
23	+5V
24	GND
25	+5V
26	GND
27	AUXIO
28	AUXI1
29	AUXO0
30	AUXO1
31	EXTBAT
32	GND
33	GND
34	GND

Pin assignment ST 701 System bus	Function
1	GND
2	GND
3	D0
4	D8
5	D1
6	D9
7	D2
8	D10
9	D3
10	D11
11	D4
12	D12
13	D5
14	D13
15	D6
16	D14
17	D7
18	D15
19	GND
20	GND
21	A0
22	A1
23	A2
24	A3
25	A4
26	A5
27	A6
28	A7
29	BLE#
30	BHE#
31	MEMR#
32	MEMW#
33	GND
34	GND
35	CSK#
36	CSX1#
37	CSX2#
38	CSWD#
39	CSIO#
40	GND
41	PWRGOOD
42	KBCLK-EXT
43	+5v
44	+5v
45	+5v
46	+5v
47	+5v
48	GND
49	KBDATA-EXT
50	GND

Pin assignment ST 702 Front panel	Function
1	PA0
2	PA1
3	PA2
4	PA3
5	PA4
6	PA5
7	PA6
8	PA7
9	PCL0
10	PCL1
11	PCL2
12	PCL3
13	PB0
14	PB1
15	PB2
16	PB3
17	PB4
18	PB5
19	PB6
20	PB7
21	PCH0
22	PCH1
23	PCH2
24	PCH3
25	INTDAT
26	INTCLK
27	+5V
28	+5V
29	+5V
30	+5V
31	GND
32	GND
33	GND
34	GND

Pin assignment ST 703 UPS	Function
1	PA0
2	PA1
3	PA2
4	PA3
5	PA4
6	PA5
7	PA6
8	JUMP
9	PCL0
10	PCL1
11	PCL2
12	PCL3
13	PB0
14	PB1
15	PB2
16	PB3
17	PB4
18	PB5
19	PB6
20	PB7
21	PCH0
22	PCH1
23	PCH2
24	PCH3
25	+5V
26	GND

Pin assignment ST 704 Ext. keyboard	Function
1	KBCLK-EXT
2	KBDATA-EXT
3	+5V
4	+5V
5	+5V
6	+5V
7	GND
8	GND
9	GND
10	GND

Pin assignment ST 900 LC-display	Function
1	FR
2	GND
3	FP
4	GND
5	LP
6	GND
7	n.c.
8	GND
9	XSCLK
10	GND
11	LCD-ENABLE
12	GND
13	UD7
14	GND
15	LD7
16	GND
17	UD6
18	GND
19	LD6
20	+5V
21	+5V
22	+12VSWITCH
23	+12VSWITCH
24	-12V
25	-12V
26	UD5
27	GND
28	LD5
29	GND
30	UD4
31	GND
32	LD4
33	GND
34	UD3
35	GND
36	LD3
37	GND
38	UD2
39	GND
40	LD2
41	GND
42	UD1
43	GND
44	LD1
45	STD17
46	UD8
47	STD16
48	LD8
49	GND
50	PANEL_ON

Pin assignment ST 1101 Printer LPT1	Function
1	STROBE#
2	AUTOFD#
3	PD0
4	ERR#
5	PD1
6	INIT#
7	PD2
8	SLCTIN#
9	PD3
10	GND
11	PD4
12	GND
13	PD5
14	GND
15	PD6
16	GND
17	PD7
18	GND
19	ACK#
20	GND
21	BUSY
22	GND
23	PE
24	GND
25	SLCT
26	GND

Pin assignment ST 401 Power	Function
1	+5V
2	GND
3	+12V
4	GND
5	-12V
6	-5V
7	+HSTRAFO
8	- HSTRAFO

Pin assignment ST 1102 COM2	Function
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	n.c.

Pin assignment ST 1103 COM1	Function
1	n.c.
2	CC2
3	TXD
4	n.c.
5	RXD
6	n.c.
7	RTS
8	n.c.
9	CTS
10	n.c.
11	DSR
12	n.c.
13	GND
14	DTR
15	DCD
16	n.c.
17	CC1
18	RI
19	-12V
20	n.c.
21	n.c.
22	EI-
23	EI+
24	SI+
25	SI-
26	n.c.

Pin assignment ST 501 VGA	Function
1	R
2	G
3	B
4	ID Bit 2
5	GND
6	GND
7	GND
8	GND
9	GND
10	GND
11	n.c.
12	n.c.
13	HSYNC
14	VSYNC
15	n.c.

The power supply

The industrial PC C6011 can be equipped with a 24 V DC power unit or with a standard 230/115 V, 50/60 Hz. PC power unit

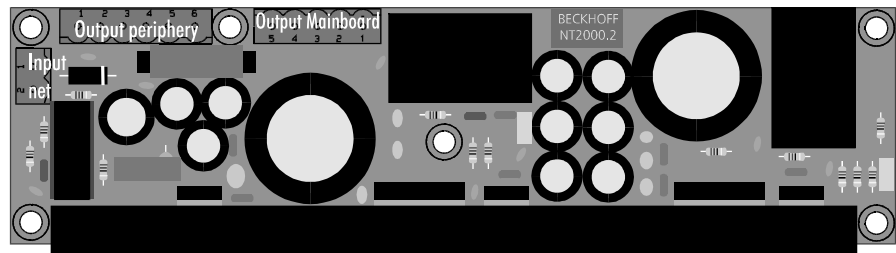
Standard switchable PC power unit for 230/115 V, 50/60 Hz

A standard switchable PC power unit is supplied with 115 or 230 V AC from the cold device socket on the side wall of the PC. Inside the PC, to the right of the power unit, next to the cable outlets, is the switch which changes over from mains power at 230 V AC to 115 V AC. At 115 V the power unit operates at 60 Hz and at 230 V with 50 Hz. With a 115 V power supply the power unit will draw at most 5 A, with a 230 V supply at most 3 A.

Maximum current capacity

Voltages supplied by the 115/230 V power unit	Color of wires	Current capacity	
		minimum	maximum
+5 V	red	2.5 A	15 A
-5 V	white	0	0.5 A
+12 V	yellow	1 A	5.5 A
-12 V	blue	0	0.5 A
GND	black		

24 V power unit



In the case of a BUS with a 24 V DC power unit, there is a power unit board located on the lower cabinet wall of the central computer which smoothes the 24 V power supply and transforms it to the voltages required by the various IPC components.

Output to peripherals	Function
1	+5 V
2	Ground (0 V)
3	+12 V
4	+5 V
5	Ground (0 V)
6	+12 V

Output to mainboard	Function
1	+12 V
2	+5 V
3	Ground (0 V)
4	-5 V
5	-12 V

Input mains	Function
1	+24 V
2	0 V

The hard disk

The industrial PC C6011 is fitted with a 3½" hard disk. This is located in a drive shuttle which is fastened with four screws. To access the screws you will have to open the casing.



Polarity of the ribbon cable

The 40-pin plug of the ribbon cable must be inserted into the socket on the hard disk in such a way that the colored vein of the cable is connected to pin 1 of the socket. Pin 1 is at the side nearest to the power supply plug.

The pin connections are standardized so that you can connect any other 3½" IDE hard disk, but when deciding on a disk you should take into consideration the heat resistance and shock resistance that is required for industrial PCs.

If you replace the installed hard disk by a different one you will then have to enter the appropriate data in the Setup program.

Installing a second disk

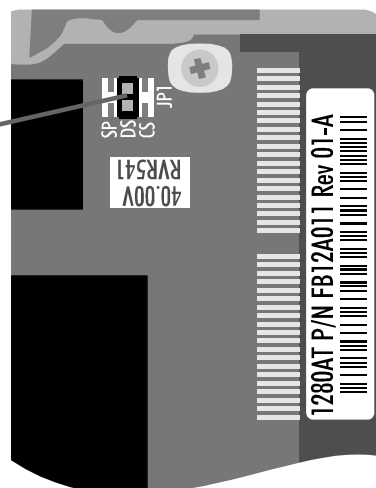
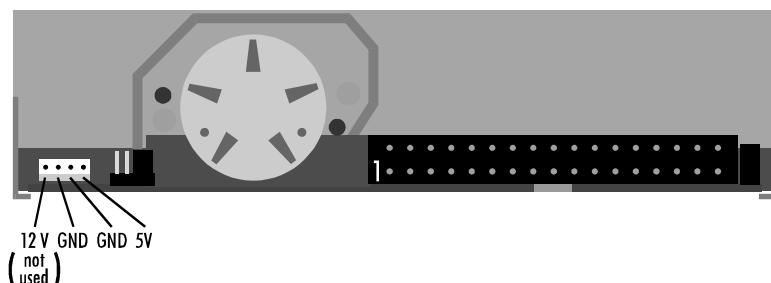
If you subsequently wish to install a second IDE hard disk you will have to modify the jumper settings on the underside of the second disk. Two IDE disks always operate with one as master and one as slave and the master disk is drive C. In the case of the installed Quantum Fireball 1280 AT disk, the jumper settings for single operation and master operation are the same. You will only need to change these settings if this drive is to operate as the slave. The illustration below shows the necessary jumper settings for the Quantum Fireball 1280 AT for both operating modes. To configure other disk drives, please refer to the relevant documentation.

When you have installed the second IDE hard disk you will also have to modify the Setup data. Specify the master hard disk as "Disk 0" and the slave disk as "Disk 1", as described in the chapter "Setup".

Jumper settings for the Quantum FB 1280 AT hard disk

Master or
single drive:
Jumper DS short

Slave drive:
Jumper DS open

**The diskette drive***Polarity of the ribbon cable*

The 34-pin plug of the ribbon cable must be inserted into the socket on the diskette drive in such a way that the colored vein of the cable is connected to pin 1 of the socket. Pin 1 is on the side nearest to the power supply plug.

The pin connections are standardized so that you can connect any other 3½" diskette drive. When you have installed a diskette drive you will then have to enter the appropriate data in the Setup program.

Programming

The parallel I/O component 8255

On the board of the C1230 slot PC there are three parallel input/output components (PIO) of type 8255. One of these is used to interrogate the special keys on the front panel. If your PC does not have these special keys you can use this component for other purposes; the connections for this component lead (TTL-compatibly) to the front panel interface of the C1230 card. The second PIO component can be used to control an uninterruptible power supply; you will need a C2000BAT Beckhoff UPS control board to set this up. The third PIO component is used for monitoring functions, such as measuring the computer's internal temperature and monitoring the state of the lithium battery. Each of these components has three 8 bit ports which can be configured for input or output; this configuration is carried out using the appropriate control register. Each port and each control register is located on one memory address.

The addresses of the three PIO components of the industrial PC

Front panel	Address	LCD lamps	Address	Monitoring functions	Address
Port A	220H	Port A	230H	Port A	240H
Port B	221H	Port B	231H	Port B	241H
Port C	222H	Port C	232H	Port C	242H
Control register	223H	Control register	233H	Control register	243H

*Configuration:
after switching on, write
93H into address 233H and
82H into address 243H .*

In the control register of an 8255 parallel I/O component you specify which ports are to operate as input or output.

Following a reset, and when you first switch on, all the ports operate as input. In order to configure the components on the C1230 slot PC for their normal tasks, write the value 93H into the control register in address 233H and 82H into address 243H. This configuration will be retained until you write different values to these addresses or restart the computer.

If you make use of the front panel component (address range 220H to 223H) you will have to configure it yourself.

In the control register 223H of the parallel input/output component 8255 you set up the mode for the group; on the C1230 slot PC this component is operated exclusively in mode 0. You must specify which ports are to operate as input or output. If you wish to change the mode you must set bit 7 as well. The setting 10000000B=80H configures all the ports for output, and 10011011B=9BH configures them all for input.

The control register of the parallel input/output component 8255							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Group 1				Group 2		
Set mode flag	Select mode		Port A	Port C upper half	Set mode	Port B	Port C lower half
1=active	00 = mode 0 01 = mode 1 1X = mode 2		0=output 1=input	0=output 1=input	0= mode 0 1= mode 1	0=output 1=input	0=output 1=input

Uninterruptible power supply

Uninterruptible power supply

Configure the component

If desired, the industrial PC C6011 can be upgraded to use an uninterruptible power supply, which can uphold the operation of the device for about 15 minutes after a power failure by means of an external rechargeable nickel-cadmium battery. To operate a UPS you will need a C2000BAT control board, which is addressed via the parallel input/output component with address range 230H to 233H. You will have to configure this component by writing the value 93H into the control register at address 233H.

Register	Address	Function
Port A	230H	not used
Port B	231H	read in the state of charge
Port C lower half	232H Bit 0-3	various inputs
Port C upper half	232H Bit 4-7	various outputs
Control register	233H	for this configuration: 10010011B = 93H

Port C							
Address 232H							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OUT				IN			
UPS active/passive	not used	not used	LC Display lighting	External power supply	Battery voltage	not used	Interrogate LCD switch
0 = passive 1 = active			0 = off 1 = on	0 = failed 1 = OK	0 = U < 16 V 1 = U > 16 V		0 = on 1 = off

You can activate monitoring of the external 24 V power supply by setting bit 7 at address 232H, which is port C of the input/output component belonging to the multifunction board.

Once this function has been activated, whenever the external power supply drops below 16 volts, the multifunction board will switch over to battery operation and inform the software of this situation by clearing bit 3 of port C. Depending on its level of charge, the rechargeable nickel-cadmium battery (18 V / 0.65 Ah) can maintain the device for about 15 minutes – which gives the software time to store its data. When all the data has been backed up, the software can then clear bit 7 of port C at address 232H to switch the device off.

If the battery voltage drops below 16 V while the device is operating under emergency power, the software will signal this situation by clearing bit 2 of port C in address 232H.

The battery charger

There is an integrated battery charger which makes sure that the battery is always kept fully charged. The charging current is 1/3 of the capacity, that is, about 230 mA. Depending on the level of charge in the battery, recharging will therefore take up to three hours. Overcharging – which would damage the battery – is prevented by using an integrated charge controller.

Port B of the UPS input/output component carries a signal which gives information about the state of charge.

Port B							
Address 231H							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IN							
charge controller	not used	not used	not used	not used	not used	not used	not used

The signal from the charge controller indicates the state of charge.

The battery charger on the multifunction board is always in one of the following states:

Charge state

Quick load

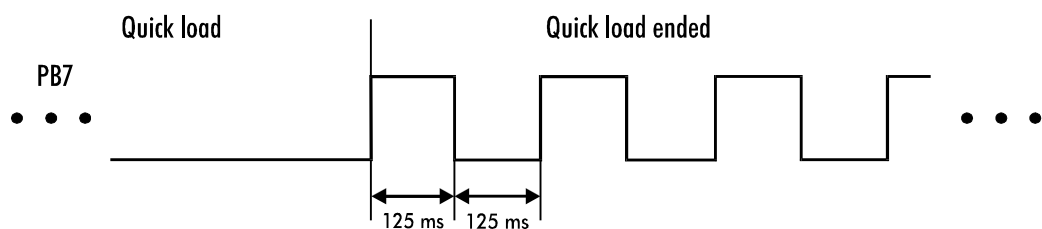
When the system is powered up, provided a rechargeable battery is connected, the charge controller will go into the state Quick load. The battery will be charged at a constant current of about 230 mA. Bit 7 of port B at address 231H will be 0.

Accu not connected

The charge controller can detect whether a rechargeable battery is attached or not. If no battery is attached it will set bit 7 in port B at address 231H.

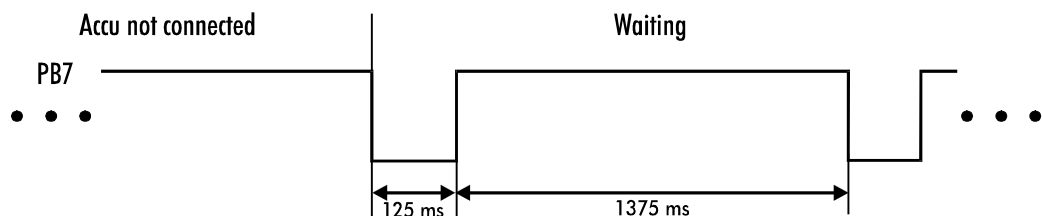
Quick load ended

If the charge controller has terminated the charging process, bit 7 of port B at address 231H will alternate between 0 and 1 with a period of 250 ms.



Waiting

This state will apply when the charge controller is waiting to detect a satisfactory battery voltage, the quick loading process will not be continued until this has been detected. Bit 7 of port B at address 231H alternates between 0 and 1 with a period of 1.5 seconds and a sensor ratio of 1:11.



The monitoring functions

The third input/output component reports on the temperature within the cabinet of the industrial PC and indicates when the lithium battery on the backplane board needs to be replaced.

This component is addressed via the addresses 240H to 243H. Only port B is used here and this will have to be configured as input before you can read any data from address 241H. You should therefore write the value 10000010B = 82H into the control register at address 243H.

Bit 5 is cleared as soon as the terminal voltage of the lithium battery drops below 2.6 V.

If the temperature inside the industrial PC goes above 40°C, bit 3 will be set. If the temperature continues to rise, bits 2, 1 and 0 will then be set one after another, at intervals of 10°C.

Register	Address	Function
Port A	240H	not used
Port B	241H	monitoring functions
Port C lower half	242H Bit 0-3	not used
Port C upper half	242H Bit 4-7	not used
Control register	243H	for this configuration: 10000010B = 82H

Port B							
Address 241H							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IN							
not used	not used	Battery state	not used	Cabinet temperature	Cabinet temperature	Cabinet temperature	Cabinet temperature
		0=U<2.6V 1=U>2.6V		0: $\varnothing$ <70°C 1: $\varnothing$ >70°C	0: $\varnothing$ <60°C 1: $\varnothing$ >60°C	0: $\varnothing$ <50°C 1: $\varnothing$ >50°C	0: $\varnothing$ <40°C 1: $\varnothing$ >40°C

Graphic driver

Windows driver

For the optimal function of Windows it is necessary, to install the graphic driver. The enclosed diskette contains the driver. The application of the Windows own VGA driver brakes the graphic output considerably and can advertise errors in individual cases. To install the driver you have to start the file SETUP in the directory WINDOWS on the diskette.

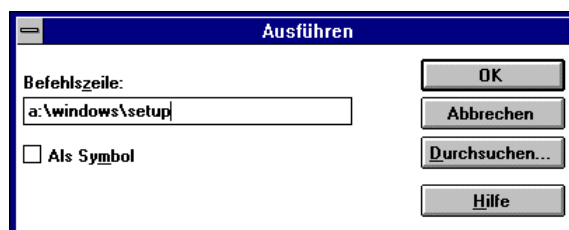
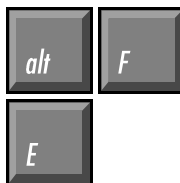
An installation over the Windows own SETUP program is not possible, because thereby Windows will not copy all necessary files onto the hard disk.

The directories on the driver diskette



Start A:\WINDOWS\SETUP by using the file manager or by opening the menu file in the program manager and selecting the order „execute“.

File manager
file - execute

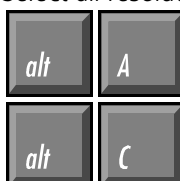


Then the SETUP program will initialise itself and open ultimately following window:

Continue



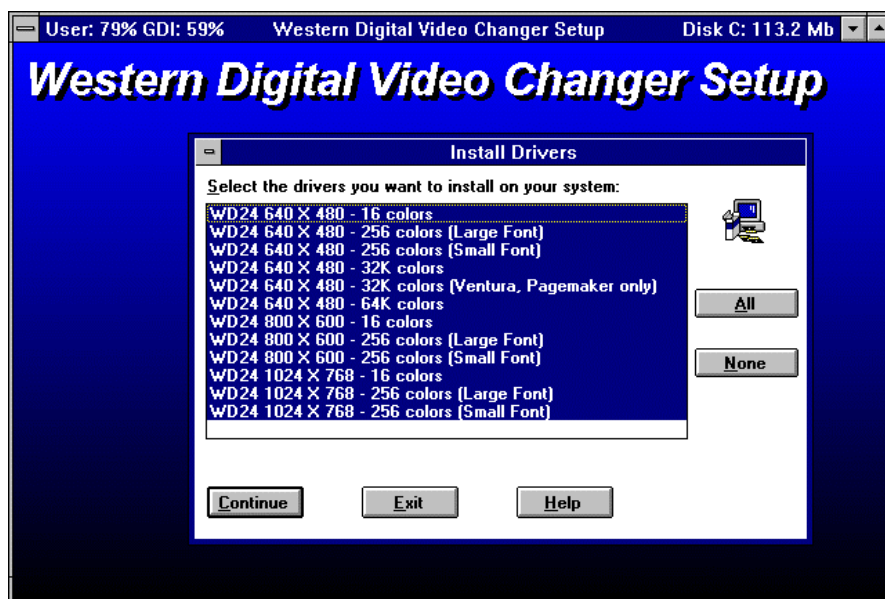
Select all resolutions



Continue

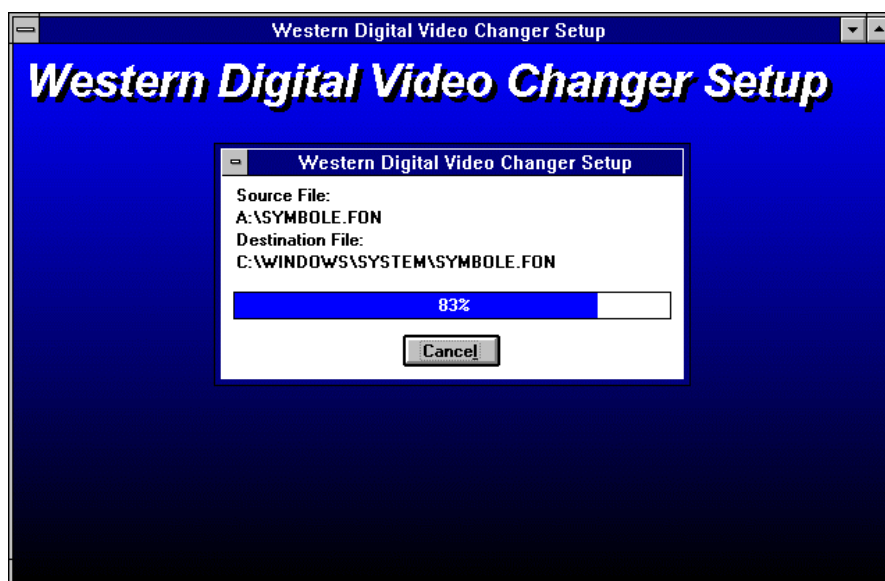
Thereupon a selection appears of possible graphic resolutions. Select all, by a mouse click onto the button "All", or by pressing the keys Alt and A. Then all drivers will be marked blue. With Alt and C or by a mouse click onto the "Continue" button you can start the installation.

Also at a LC-Display with a maximum of 640x480 points you can use a higher resolution as virtual screen.



It takes a few minutes to copy all necessary files from the diskette into the Windows directory of your hard disk. The program makes no additional directory.

The beam shows the progress of the copy process.



The installation is complete.





Enter



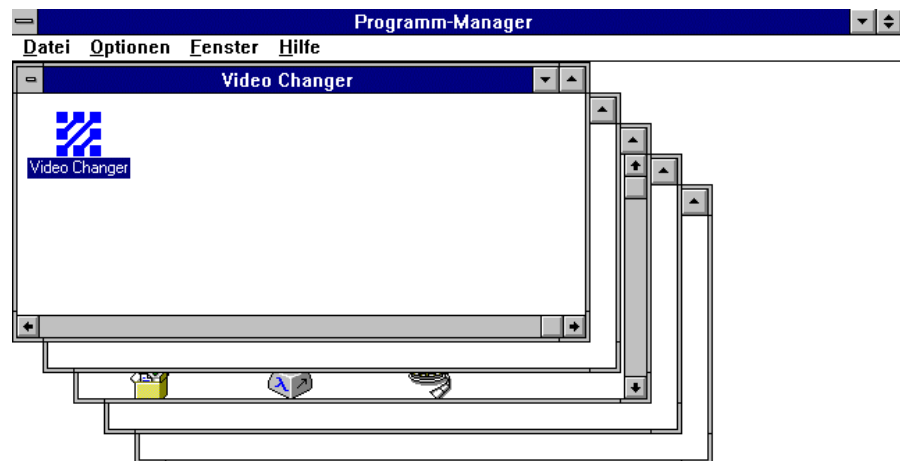
Enter

starts the Video Changer

With the mouse you can put the icon of the Video Changer into an other window and delete the empty window with the Del key.

After successful completion of the copy process you have to press Enter or click onto the OK button to end the SETUP program.

The SETUP program builds a new group in the program manager, which contains the program Video Changer. To start this program you have to click onto the icon doubly. In so far as the program name of the Video Changer is blue, as you can see in the picture, you can press also Enter, to start that program.



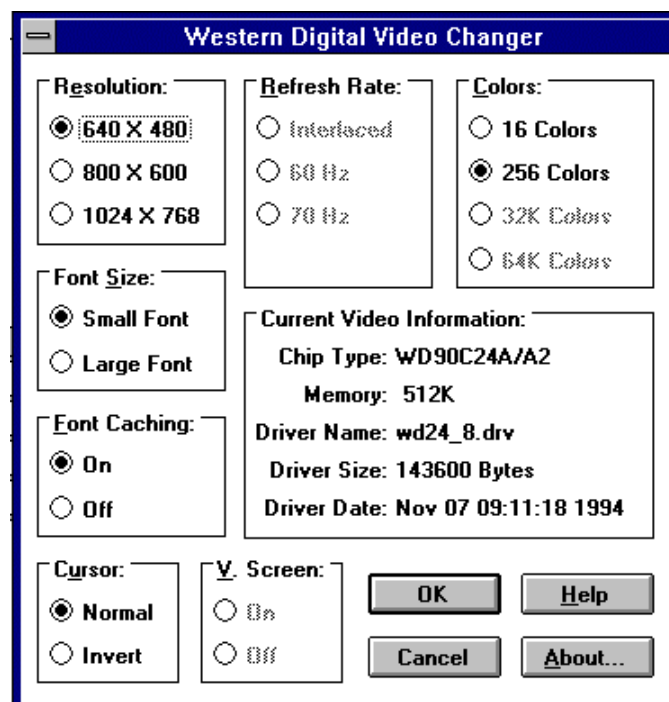
You can get detailed help for the Video Changer with



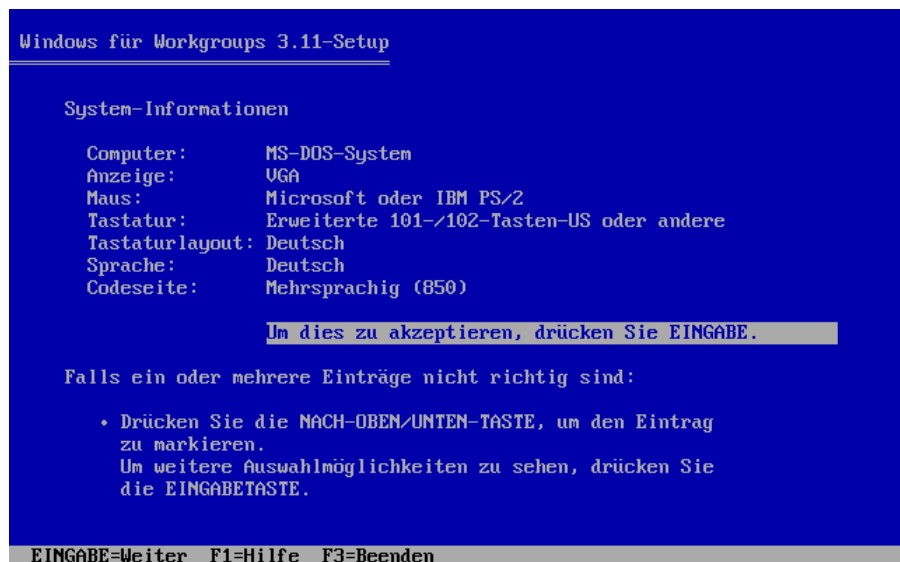
The program Video Changer offers the possibility to switch into different graphic resolutions. You can also choose between two different font sizes, you can accelerate the graphic construction by Font Caching, the mouse cursor can be shown black or white and the depth of the colours is adjustable as well as the picture frequency.

In some resolutions not all options are accessible. You will become detailed information through a click onto the Help button or by pressing Alt and H. After a change of the options you must restart Windows. The Video Changer points you to this in a window. Then you can trigger the restart with a click onto the corresponding button.

The window of the Video Changer



<i>The picture of a LC display is always flicker free.</i>	The LC-display integrated in the industry PC presents a picture in the maximum resolution of 640 x 480 points with 256 colours. Thereby the picture is always flicker free. The adjustable refresh rate refers only to a monitor, which you can connect to the back of the PC. The instruction belonging to your monitor can tell you, with which screens refresh frequency your monitor can work at the desired resolution. The expression "Interlaced" is standing for a frequency of 43,5 Hz.
<i>External monitor</i>	
<i>Virtual screen</i>	You can use also higher resolutions as your monitor or LC-Display indicates. To do so you have to set the switch "V. Screen" for virtual screen to the position "On". A virtual screen always shows only a section of the hole screen. If the mouse cursor touches the edge of the screen, the section will shift in the corresponding direction. The virtual screen function of the driver works on computers with a BIOS from version 10. On older industry PC you have to exchange the BIOS before you can use the virtual screen function. Along with a passive colour LC display, the virtual screen works only in the 16 colours' mode. If you choose a resolution, your Display can not perform, and thereby you have switched off the function of the virtual screen, you will receive the following error message at the next start of Windows:
<i>Error message at Windows start</i>	This display driver does not support your display configuration. Use Windows SETUP to select a different display type.
<i>CD\WINDOWS SETUP</i>	To remove the error, you have to change into the Windows directory under DOS and call up SETUP.



<i>Screen: WD24 640x480x256 (Small Font)</i>	Move the cursor to the field "screen" with the up key. Then press Enter and choose the entry "WD24 640x480x256 (Small Font)". Press Enter again, to accept the selection. After this move the grey beam with the cursor down key on the line „to accept this, press Enter“ and press Enter. The program asks you then, whether you want to install the necessary drivers newly or use the already installed one. Press Enter here, to keep the available drivers. It lasts at least some seconds until you are back to the DOS prompt. After that you can start Windows with "WIN". Then you can start the Video Changer to choose the right resolution.
<i>keep available drivers</i>	
<i>WIN</i>	

Monitor/LC-display switch

The driver diskette contains three programs in the directory UTILITY for the switch between a monitor connected at the back of the Industry PC and the LC display or for the simultaneous use of both.

- CRT.EXE switches the picture exclusively to the external monitor.
- LCD.EXE activates the LC display and deletes the picture of the external monitor.
- SIMUL.EXE shows a picture on both screens.

Operating conditions

Ambient temperature:	0 to 55°C
Humidity:	Max. 95% non-condensing
Shock-proofing:	
Cabinet & chassis:	Vibration: 5G at 10..55Hz Shock resistance: 30G
Diskette drive:	Vibration: 0.5G at 5..500Hz Shock resistance: 5G
Hard disk:	Vibration: 0.5G at 17..500Hz Shock resistance: 10G
Type of fuse:	IP30
24 V DC power unit:	
supplied voltage:	24 V DC permitted variation 15 to 35 V DC
max. amperage:	2 A
230/115 V AC power unit:	
supplied voltage:	Switchable between 115 V 60 Hz 230 V 50 Hz
max. amperage:	5 A at 115 V mains voltage 3 A at 230 V mains voltage