AMK

AMKASYN

VARIABLE SPEED DRIVES

Control panel AB-110C
Description

2397.E Part No.

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1 General

This manual is intended for project engineers, users and installers of the control panel AB110C. It should serve the project engineer and user as reference manual. The installer should be provided with all data necessary for the installation.

The control panel is usually used in conjunction with a total system. For this reason the standards, safety and accident prevention regulations applicable for the relevant application must be observed without fail by the project engineer, user and installer. The operator of the automation system is responsible for compliance with these regulations.

2 Safety instructions

Observe the listed safety instructions for your own safety and the safety of others. The safety instructions indicate possible hazards to you and provide you with information how you can avoid hazardous situations.

The perfect operation of the control panel AB110C can be guaranteed only when the existing regulations are complied with.

The control panel AB 110C is used only as part of a total system. The operator of a machine system is responsible for complying with the safety and accident prevention regulations applicable for the special application.

The safety and accident prevention regulations specific to the application must be observed in project planning. EMERGENCY SHUTDOWN devices according to EN 60204 IEC 204 must remain effective in all operating modes of the machine installation. An undefined restart of the system must not occur.

Errors occurring in the machine system which can cause material damage or personal injury must be dealt with by additional external devices. These devices must also guarantee a safe operating state in the case of an error. Such devices are electromechanical safety switches, mechanical interlocks etc., for instance (see pr EN 954-1, Estimating risk).
Never execute or initiate safety-relevant functions using the control panel.

Exclude uncontrolled restarts by appropriate programming.

CAUTION! For the protection of persons and of the control panel AB110C, the power supply must be disconnected before opening the device.

3 System overview

3.1 Areas of application

The AB110C is an industrial PC system. It is the customized solution for the operation of the AZ-MC1 control system through a serial RS422 interface in conjunction with the AMK NC operating software "AB-PNC". However, the system is open for general industrial PC applications.

3.2 Scope of supply

3.2.1 Basic equipment

Industrial PC:

- CPU- module — 486DX2-80MHz with FLASH-BIOS
- Screen — 10.4“ (260mm diagonal) TFT colour display (VGA 640x480), antiglare glass pane
- Keyboard — Membrane, in total 46 short-stroke keys, Input for external keyboard
- DRAM memory — 4MB
- Storage media — 1MB FLASH disk boot drive with MSDOS6.22
Floppy disk drive 3.5“, 1.44MB capacity
- Interfaces — 1xRS232C serial, 1xRS422A serial, 1x LPT1 parallel
- Slots — 3 free 16-bit ISA-BUS slots for short PC plug-in cards
- Card holder
- Power supply: — 150-230V, 47..64Hz
- Temperature range — Operating temperature 10..40°C
Storage temperature -20..45° C
- Relative humidity: — 80% without condensation

Housing:

- Computer housing — Sheet steel galvanized; all connections are accessible at the back / on the side.
- Dimensions (WxHxD): — incl. front panel: 398x298x190 mm
- Dimensions (WxHxD): — Switchgear cabinet cutout for installation: 370x270x186 mm

3.2.2 Options

• Storage media	**AB-FL4**	4MB Compact-FLASH disk	[1][2]
	AB-FL10	10MB Compact-FLASH disk	[1]
• Software	**AB-PNC**	AZ-MC1 operating software	
• Accessories	**AB-MB1**	Front surround as customer-specific machine control panel	
	AB-TS1	AMK-PC membrane keyboard with 85 short-stroke keys Dimensions (WxHxD) 398x149x45 mm Switchgear cabinet cutout for installation: Dimensions (WxHxD) 370x121x45 mm	
	AB-K1	RS422 connection cable AB110C - AZ-MC1 5m long	
	AB-K03	Fibre optic cable-PC card for networked NC systems	

[1] One of these options will be required in addition to the basic equipment
[2] Default option

3.2.3 Options in preparation

• Storage media	**AB-HD**	Hard disk 3.5“, capacity 520MB installed oscillation damped	[1]
	AB-FL15	15MB Compact-FLASH disk	[1]
	AB-FDE	External floppy disk drive with parallel port connection	
• Accessories	**AB-HG1**	Manual control device	
• I/O modules	**AB-CAN1**	PC-CAN card for I/O module	
	AB-EA24	CAN I/O module with 24 bin. inputs / 10 outputs	

3.3 Miscellaneous

EMC compatibility, electrical interference suppression and electrical operating safety tested according to VDE 0871 b. (Remarks: Testing according to new "CE marking" EU standard is currently being performed)

[1] One of these options will be required in addition to the basic equipment
[2] Default option

4 Installation in operating console

- The control panel AB110C is fitted to the operating console from the front with M4x10 countersunk head screws. Installation depth: 186 mm, cutout size: 370x270 mm

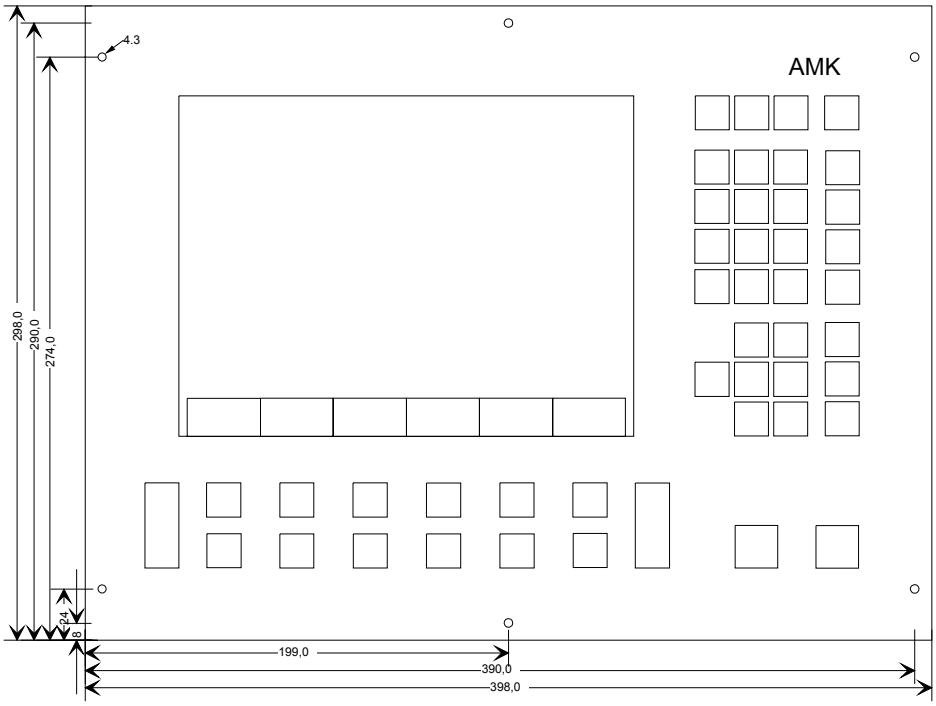


Figure 1: Position of the AB110C mounting holes

- The protection category IP65 is achieved on the front by a flat seal applied to the back of the front panel on installation of the control panel AB110C in a switchboard, control console, etc.
- Maintain a minimum distance of 100mm from power components.
- Always run data and power cables separately to avoid capacitive and inductive coupling.
- The connection cables to the serial and parallel interfaces must be designed as twisted-pair and shielded cables. The connector housing must be metallic or metallized. The shield must be applied on both sides to the connector housing. To avoid faulty contacting and an interruption of the shielding, it must be ensured that the mounting screws of the connectors are firmly tightened.
- All connection cables as well as the power cable can be fixed by means of the cable base with cable ties fitted on the housing.
- The control panel must be connected directly with the PE potential of the drive system by means of the PE bolt fitted to the housing. A highly flexible lead with a cross-section ≥ 10mm² must be used for this purpose. The PE connection must be as short as possible (see Figure 9: Principle of PE wiring, page 14)
- A service door shall be provided on the back of the control console because the floppy disk drive is installed in the back of the control panel.

5 Commissioning

- A power cable with inlet socket is provided on the control panel AB110C for the mains voltage connection. A power cable with protective contact plug 2 m long is included in the scope of supply.
- The mains voltage supply cable to the control panel must be fused with a 1A fuse, trip characteristic slow blow.

6 Components

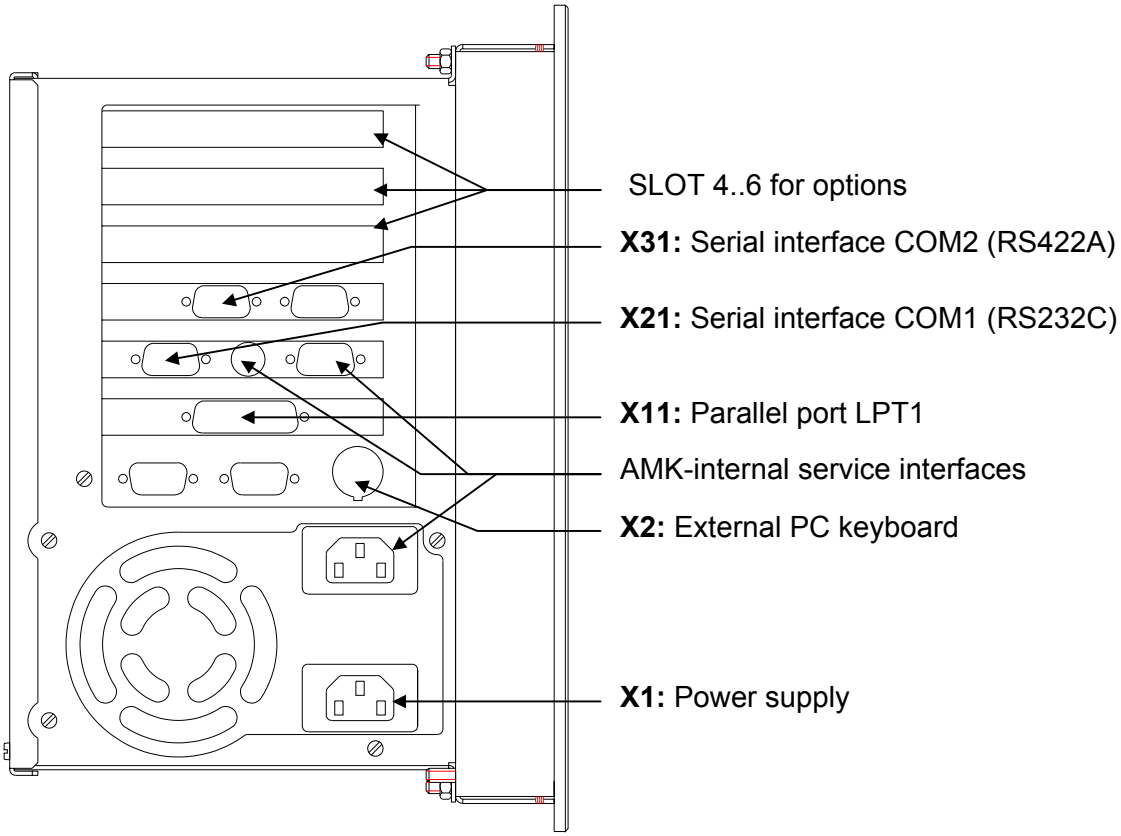
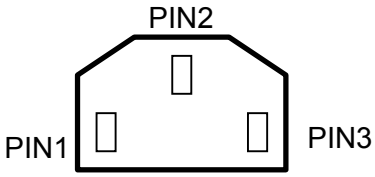


Figure 2: Location of the connections

6.1.1 Power supply connector X1



PIN No.	Signal name
1	N
2	PE
3	L1

Figure 3: Plug connector X1 pin wiring for power inlet plug

6.1.2 Keyboard connection connector X2

Version as 5-pin DIN female connector for standard PC keyboard or membrane keyboard option AB-TS1.
An external keyboard can be connected to the keyboard connection X2. A keyboard gate integrated in the unit permits parallel operation between front membrane keyboard and the externally connected PC keyboard.

6.1.3 Serial interface COM1 connector X21

The serial interface is brought out on the PC board at the connector X21 as 9-pin SUB-D male connector. This interface is set as standard as COM1 interface according to RS232C standard with the basic address 3F8h and the interrupt IRQ 4 and is used as DNC interface by the AMK NC operating software "AB-PNC".

9-pin D-SUB male connector

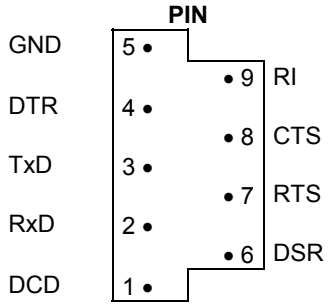


Figure 4: Pin wiring of connector X21

6.1.4 Serial interface COM2 connector X31

The serial interface COM2 is brought out on the RS422A card at the connector X31 as 9-pin SUB-D male connector. The RS422A card is equipped with an interface module (UART) 16C550 with 16Byte FIFO. This combination together with the RS422 standard allows high transmission rates and high protection against interference. This interface is set as standard as COM2 interface with the basic address 2F8h and the interrupt IRQ 3 and is used by the AMK NC operating software "AB-PNC" as interface to the AMK AMKASYN option card AZ-MC1. The signals arriving at X31 are terminated with 120Ω resistors to increase the protection against interference.

9-pin D-SUB male connector:

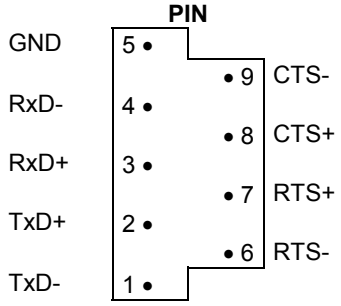


Figure 5: Pin wiring of connector X31

6.2 PC system

To prevent inadvertently changing the system settings (BIOS settings), the setup program is protected with a password on delivery.

6 slots (half-size) are available on the passive ISA-PC bus board.
Standard assignment of the slots on delivery:

- Slot 1/SLOT1: Parallel port
- Slot 2/SLOT2: Slot CPU
- Slot 3/SLOT3: RS422A card
- Slot 4/SLOT4: for options
- Slot 5/SLOT5: for options
- Slot 5/SLOT5: for options

6.3 Power supply unit

- PS2 industrial power supply unit 230W, switchable input voltages
- Dimensions: 150x140x85mm
- Fan control
- Power good signal
- Output data DC OUT: +5V 23A
  +12V 9A
  -5V 0.3A
  -12V 0.5A

6.4 Software

The control panel AB-110C is delivered with the MS-DOS operating system (minimum configuration). The software is set up on the 1MB-FLASH disk.

The presettings of the memory manager EMM386.EXE (e. g. X=E000-EFFF) in the CONFIG.SYS system file must not be changed or removed under any circumstances, otherwise the FLASH disk can no longer be addressed!

6.5 Membrane keyboard AB-TS1 option

- The membrane keyboard option is adapted to the control panel AB110C in front design and dimensions.
- The keyboard layout corresponds to the key assignment of a standard PC keyboard (without keypad)
- The Capslock key does not influence the number row 1..0 in contrast to conventional PC keyboards. Thus convenient production and editing of NC program without switching over between uppercase and lowercase letters is possible, e.g. with the AMK NC operating software "AB-PNC".

6.5.1 Installation of AB-TS1 in the operating console

- The membrane keyboard AB-TS1 is fitted to the operating console at the front with M4x10 countersunk head screws.

Installation depth: 45 mm, cut-out size: 370x121 mm

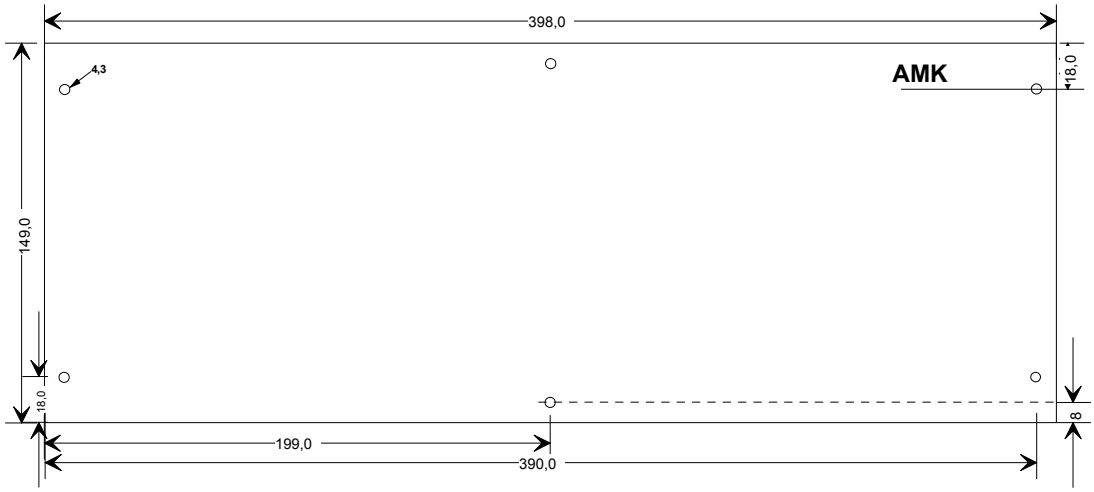


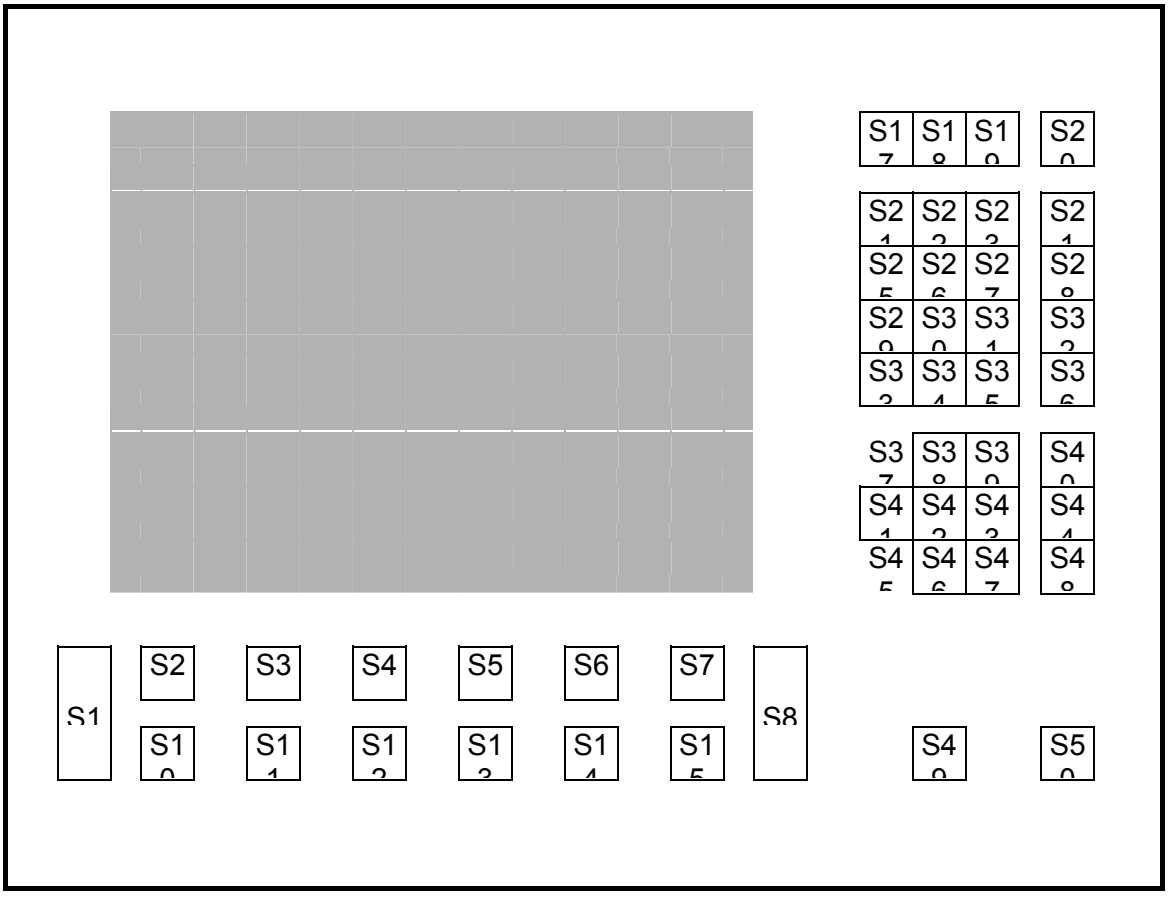
Figure 6: Location of the mounting holes for AB-TS1

- The protection category IP65 is achieved on the front by a flat seal applied to the back of the front panel on installation of the membrane keyboard in a switchboard, control console, etc.
- The membrane keyboard must be connected using the PE bolt fitted to the housing with the PE bolt of the control panel AB110C. A highly flexible lead with a cross-section ≥ 10mm² must be used for this purpose. The PE connection must be as short as possible.

7 Appendix

7.1 Front panel

7.1.1 Overview of keys



7.1.2 Key assignment

Designation	Printing	ASCII Code	extended IBM ASCII Code	Designation	Printing	ASCII Code	extended IBM ASCII Code
S1	^	<ESC>		S26	5	5(NUM)	
S2		<F1>		S27	6	6(NUM)	
S3		<F2>		S28	INS	<ins>	
S4		<F3>		S29	1	1(NUM)	
S5		<F4>		S30	2	2(NUM)	
S6		<F5>		S31	3	3(NUM)	
S7		<F6>		S32	DEL	<del>	
S8	>	<F7>		S33	-	-	
S9				S34	0	0(NUM)	
S10			<b1>	S35	.	.	
S11			<b2>	S36	CR	<CR>	
S12			<b3>	S37	n.u.	<Pos1>	
S13			<b4>	S38	↑	<Up>	

Designation	Printing	ASCII Code	extended IBM ASCII Code	Designation	Printing	ASCII Code	extended IBM ASCII Code
S14			<b5>	S39	⇑	<Pup>	
S15			<b6>	S40	HELP		<ba>
S16				S41	←	←	
S17	CORR.		<bd>	S42	∧∨	<Ctrl>	
S18			<be>	S43	→	→	
S19	PANEL		<bf>	S44	M		<bb>
S20	RESET		<c0>	S45	n.u.	<End>	
S21	7	7(NUM)		S46	↓	<Down>	
S22	8	8(NUM)		S47	⇓	<PDwn>	
S23	9	9(NUM)		S48	DISP		>bc>
S24	SEL	<blank>		S49	| 0 |		<b8>
S25	4	4(NUM)		S50	| I |		<b9>

n.u. → not used

7.2 Connection cables

7.2.1 RS422A connection cable

X31 RS-422A		**Cable length max. 1200m**	**z. B. X72 AZ-MC1**	
PIN No.	Signal	twisted-pair cores	PIN No.	Signal
1	TxD-	◄——————►	3	RxD-
2	TxD+	◄——————►	13	RxD+
3	RxD+	◄——————►	12	TxD+
4	RxD-	◄——————►	2	TxD-
5	GND	not used	7	GND
6	RTS-	┌——————┐	4	RTS+
7	RTS+	┐ ┌——————┘	5	CTS+
8	CTS+	└——————┐	14	RTS-
9	CTS-	┘ └——————┘	15	CTS-

Figure 7: RS422A cable

- **Shielding on both sides through connector housing**
- **Twisted pair:** TxD+/TxD-, RxD+/RxD-

7.2.2 RS232C connection cable

X21 RS232-C		Cable length max. 15m	e. g. PC 25-pin SUB-D male	
PIN No.	Signal		PIN No.	Signal
1	DCD		1	PE
2	RxD	◄——————►	2	TxD
3	TxD	◄——————►	3	RxD
4	DTR	——————┐	4	RTS
5	GND	◄——————┘	5	CTS
6	DSR		6	DSR
7	RTS	┐ ——————►	7	GND
8	CTS	┘	8	DCD
9	RI		20	DTR

Figure 8: RS232 "Zero modem cable"

- **Shielding on both sides through connector housing**

7.3 Schematic circuit diagram of PE wiring

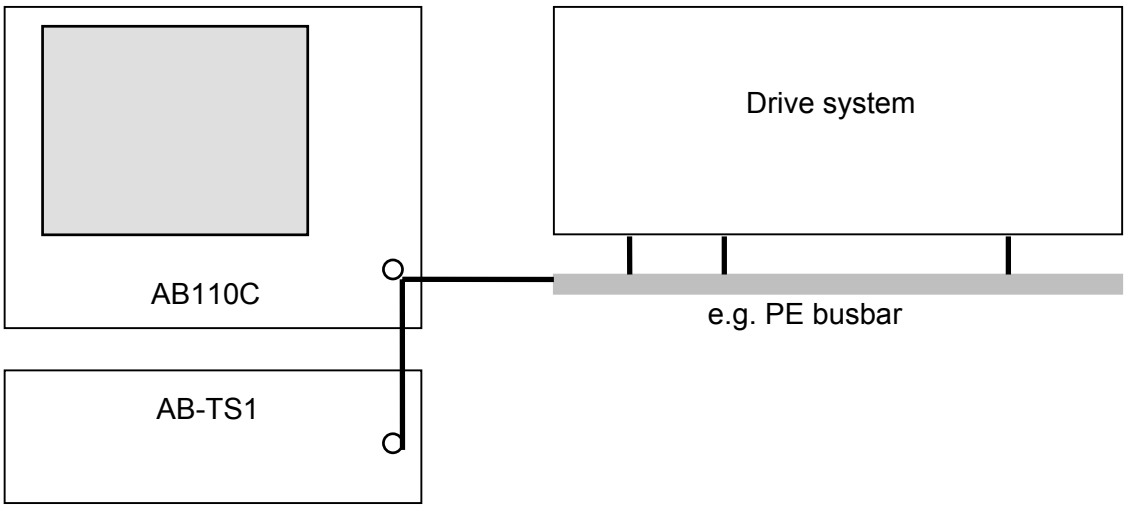


Figure 9: Principle of PE wiring

7.4 System

7.4.1 I/O port addresses

Addresses in HEX	Description
0000-001F	DMA controller #1
0020-0021	Interrupt controller #1
0028-002A	Used by the chip set
0040-0043	Timer
0060 & 0064	Keyboard controller
0070-0071	Real time clock and CMOS-RAM
0081-008F	DMA page register
00A0-00A1	Interrupt controller #2
00C0-00DF	DMA controller #2
00F0-00F1	Co-processor
0100-010F	Control register
0170-017F	HDD controller
020C-020D	BIOS
0278-027F	Parallel port #2
02E8-02EF	Serial interface #4
02F8-02FF	Serial interface #2
0370-0377	FDD controller #2
0378-037F	Parallel port #1
03B0-03DF	Video controller
03E8-03EF	Serial interface #3
03F0-03F7	FDD controller #1
03F8-03FF	Serial interface #1

7.4.2 Interrupt controller

Interrupt	Description
NMI	DRAM Parity Check
IRQ0	Timer 0
IRQ1	Keyboard
IRQ2	Cascaded IRQ8-IRQ15
IRQ3	Serial interface #2
IRQ4	Serial interface #1
IRQ5	Parallel port #2
IRQ6	FDD controller
IRQ7	Parallel port #1
IRQ8	Real time clock
IRQ9	VGA controller
IRQ10	free
IRQ11	free
IRQ12	free (PS/2 mouse support)
IRQ13	Co-processor
IRQ14	HDD controller
IRQ15	free

7.4.3 DMA channels

DMA channels	Description
DRQ0	free
DRQ1	free
DRQ2	FDD controller
DRQ3	free (parallel port, if ECP mode is used)
DRQ4	Cascaded DRQ0-DRQ3
DRQ5	free
DRQ6	free
DRQ7	free

7.4.4 Allocation of the drive letters

Version	Drive A:	Drive B:	Drive C:
Basic equipment	Boot drive 1MB Flash	Floppy drive 1.44MB; 31/2 inch	**Option** e.g. AB-FL4

8 Impressum

Title **Control Panel AB-110C**

Objective **Describes the functionality of the Control Panel AB-110C**

Part-Number **26223**

History

Date
1997/23

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To assure a fast and accurate response to solve customer problems we ask for your cooperation in providing us with the following information:

- Nameplate data
- Software version
- System configuration and application
- Description of problem and presumed cause of failure
- Diagnostic message (error code)

Publisher

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