

ATXBASE

Mini-ITX Single Board Computer

Reference Guide

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1. Revision Notes

Date	Description
07-Dec-2003	First release
17-Jun-2004	Added detailed description of RS-422/485 modes

2. Introduction

2.1. Highlights

- **Mini-ITX Single Board Computer implemented by an ATXBASE board and a CORE module, either ARM-, 686- or 886CORE**
- **CPU selection according to the CORE module used:**
 - **XScale PXA255 (ARMCORE)**
 - **Geode SCX200 (686CORE)**
 - **Celeron / Pentium III (886CORE)**
- **16 - 512 MB SDRAM, depending on the CORE used**
- **1 - 128 MB Flash Disk**
- **PCI slot**
- **COM1 - 4 with RS232 / RS485 / RS422 / TTL driver options**
- **LPT, GPIO, PS/2 keyboard and mouse interfaces**
- **Host USB ports**
- **Hard and floppy disk interfaces**
- **VGA graphics controller. Connectors for an LCD panel and CRT monitor**
- **Sound I/O (optional)**
- **One to three 10/100BaseT Ethernet ports (optional)**
- **Single or Dual PCMCIA / CardBus slots (optional)**

The **ATXBASE** is a small single board computer of industry standard Mini-ITX form factor. It is implemented by a combination of a CORE module and an ATXBASE board.

The ATXBASE uses either an ARMCORE, 686CORE or 886CORE module to implement most of the provided functions. Several additional functions are implemented on the ATXBASE board itself. Functional content provided by the ATXBASE varies according to the CORE module selected, enabling the flexibility required in a dynamic market where application requirements can change rapidly.

The ATXBASE is of the industry standard Mini-ITX form factor, providing an attractive alternative to many other ITX / ATX cards available in the market.

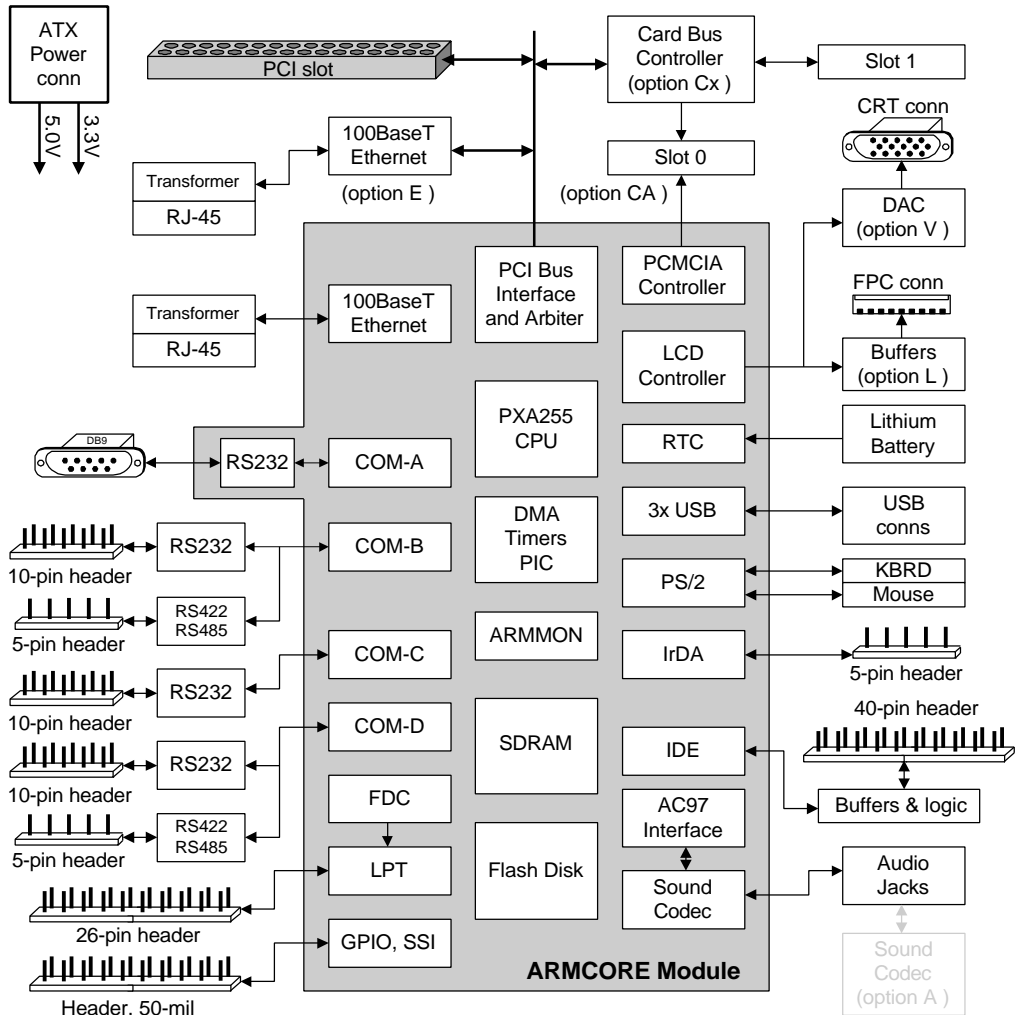
2.2. Features

FEATURES	ATX-ARM	ATX-686	ATX-886
CORE Module Used	ARMCORE	686CORE-M	886CORE
CPU Type	PXA255	Geode	Celeron or Pentium-III
CPU Speed (MHz)	200 - 400	133 - 266	600 - 1260
FPU	-	+	+
MMX	-	+	+
X86 Code Compatibility	-	+	+
DRAM Size (MB)	16 - 64	32 - 128	32 - 512
Flash Disk Size (MB)	1 - 128	1 - 128	16 - 128
LCD Panel Type	STN & TFT	TFT	STN & TFT
Display Res. (max)	1024 x 768	1280 x 1024	1600 x 1200
CRT interface	+	+	+
TV interface	-	+	-
Video Input Port	-	+	-
Display Color (max bpp)	16	16	24
10/100BaseT Ports	2	2	3
COM Ports (max)	4	4	2
RS232 / 422 / 485 levels	+	+	+
LPT (parallel) Port	+	+	+
PS/2 (keyboard & mouse)	+	+	+
USB Ports (host / slave)	2 / 1	3 / 0	2 / 0
PC Card / Card Bus Slots	2	2	2
PCI slot	+	+	+
Floppy interface	+	+	+
Hard Disk interface	+	+	+
General Purpose I/O	30	20	20
Sound (mic & spkr)	+	+	+
O/S Support	Linux VxWorks Win CE	Linux VxWorks Win CE, XP DOS	Linux VxWorks Win XP DOS
Active Power (Watt)	0.4 - 1	2 - 6	25 - 40

2.3. Block Diagrams

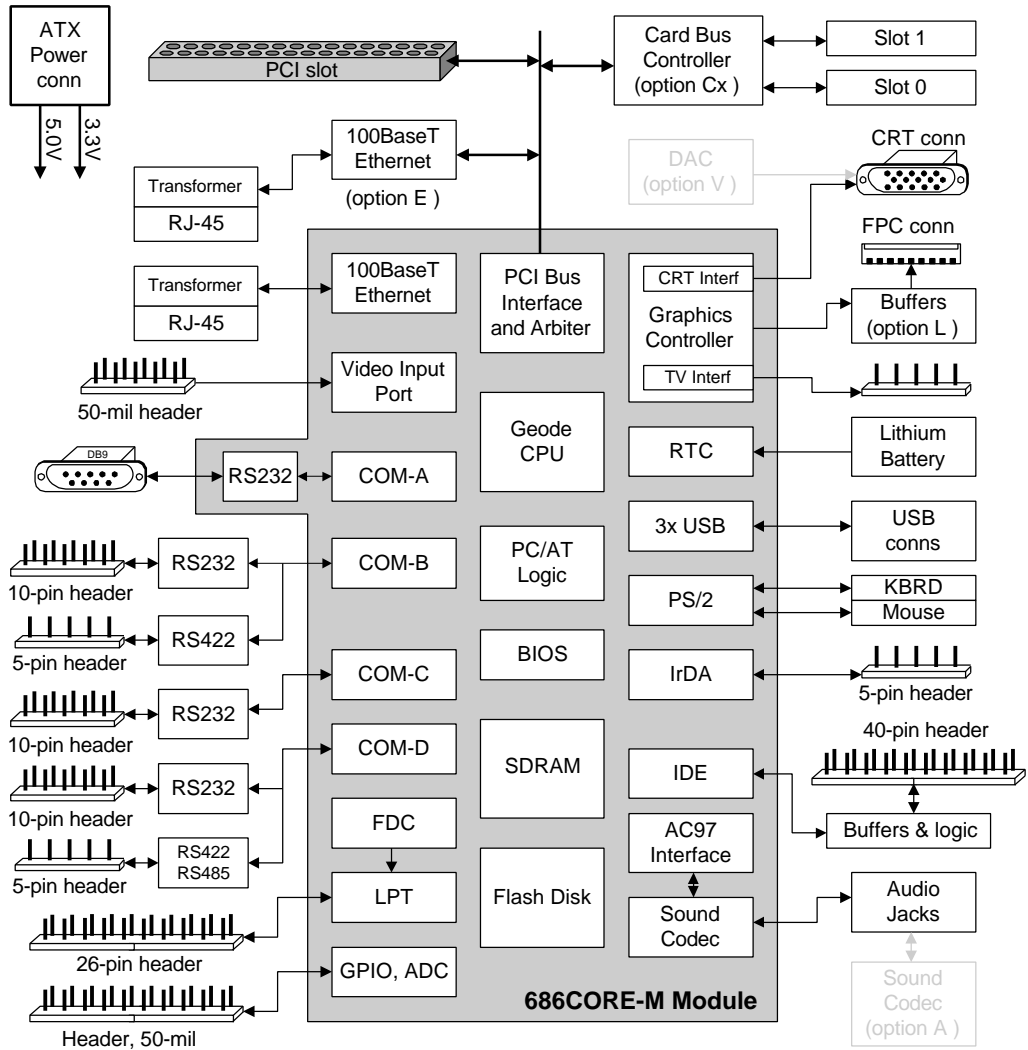
The ATXBASE feature set depends on the CORE module used. Therefore, a separate block diagram is provided for each CORE module.

ATXBASE with ARMCORE



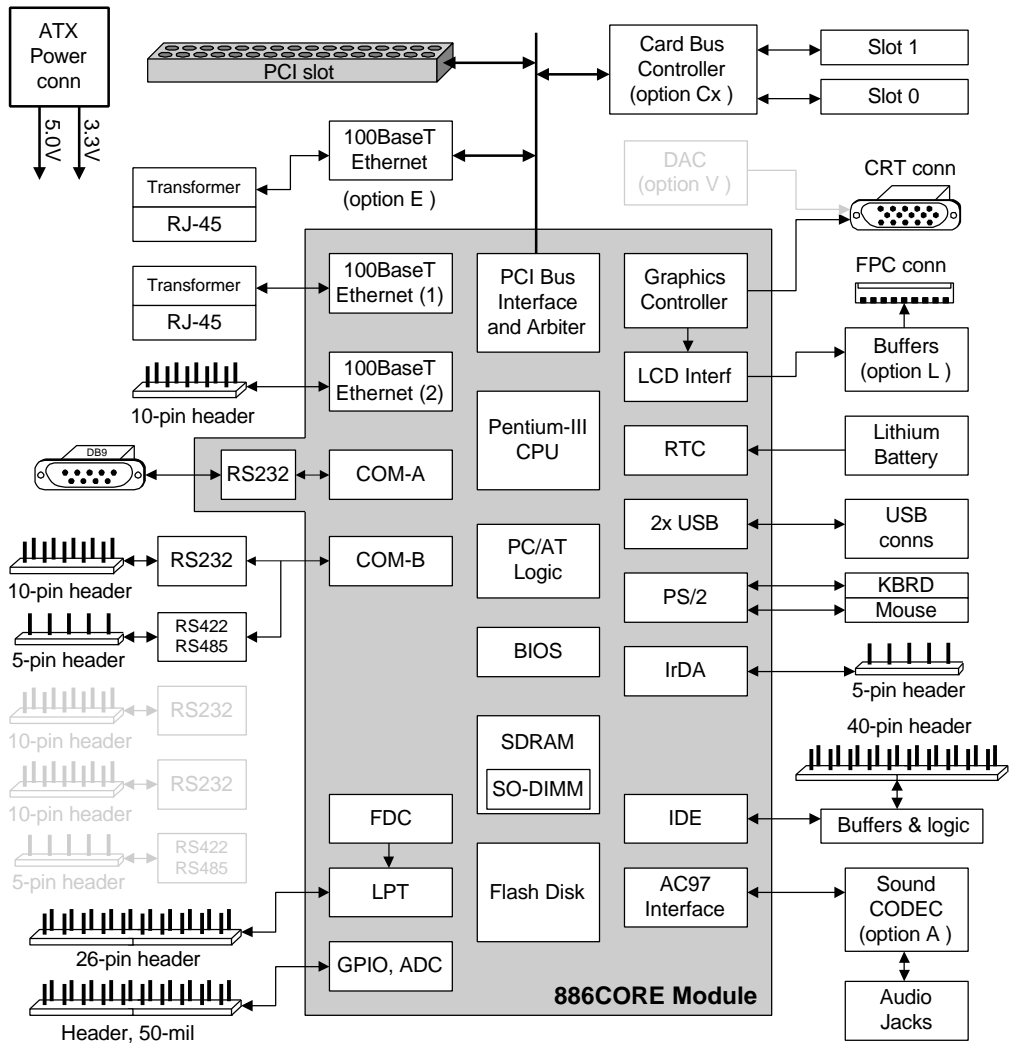
ATXBASE Mini-ITX Single Board Computer

ATXBASE with 686CORE



ATXBASE Mini-ITX Single Board Computer

ATXBASE with 886CORE



3. Connector Description

The ATXBASE uses the attached 686CORE-M / 886CORE / ARMCORE module to implement most of the provided functions. For these functions, the ATXBASE routes the signals from the CORE's miniature connectors to standard connectors. Functional descriptions are therefore provided in the CORE Reference Guide. The section below provides only a description of the external interface connectors. Section 4 provides the specifications of additional functions implemented on the ATXBASE itself.

3.1. PC Card - CardBus / PCMCIA slots (P4, P5)

These 68-pin PC Card slots conform to the CardBus and PCMCIA standards. They include card guides. The ATXBASE can be assembled with either none, one or two PC Card slots. Signal names below are specified for both P4 and P5 slots; however, they are physically connected to separate signal groups of the controller.

The selection of PCMCIA versus CardBus mode is performed automatically under driver control, according to the inserted card type.

Pin	PCMCIA Name	CardBus Name	Pin	PCMCIA Name	CardBus Name
1	GND	GND	35	GND	GND
2	D3	CAD0	36	CD1#	CCD1#
3	D4	CAD1	37	D11	CAD2
4	D5	CAD3	38	D12	CAD4
5	D6	CAD5	39	D13	CAD6
6	D7	CAD7	40	D14	RFU
7	CE1#	CCBE0#	41	D15	CAD8
8	A10	CAD9	42	CE2#	CAD10
9	OE#	CAD11	43	VS1#	CVS1
10	A11	CAD12	44	IOR#	CAD13
11	A9	CAD14	45	IOW#	CAD15
12	A8	CCBE1#	46	A17	CAD16
13	A13	CPAR	47	A18	RFU
14	A14	CPERR#	48	A19	CBLOCK#
15	WE#	CGNT#	49	A20	CSTOP#
16	RDY#/IREQ#	CINT#	50	A21	CDEVSEL#
17	VCC	VCC	51	VCC	VCC
18	VPP1	VPP1	52	VPP2	VPP2
19	A16	CCLK	53	A22	CTRDY#
20	A15	CIRDY#	54	A23	CFRAME#

21	A12	CCBE2#	55	A24	CAD17
22	A7	CAD18	56	A25	CAD19
23	A6	CAD20	57	VS2#	CVS2
24	A5	CAD21	58	RESET	CRST#
25	A4	CAD22	59	WAIT	CSERR#
26	A3	CAD23	60	INPACK#	CREQ#
27	A2	CAD24	61	REG#	CCBE3#
28	A1	CAD25	62	BVD2/SPK	CAUDIO
29	A0	CAD26	63	BVD1/STS	CSTSCHG
30	D0	CAD27	64	D8	CAD28
31	D1	CAD29	65	D9	CAD30
32	D2	RFU	66	D10	CAD31
33	WP/IOIS#	CCLKRUN#	67	CD2#	CCD2#
34	GND	GND	68	GND	GND

PCMCIA slot types: the slots can accommodate all types of PC Cards - Type I, II or III.

3.2. COM1 Connector (P27)

Standard DB9 connector, RS-232 levels

Pin	Name	Pin	Name
1	COM1-DCD	6	COM1-DSR
2	COM1-RXD	7	COM1-RTS
3	COM1-TXD	8	COM1-CTS
4	COM1-DTR	9	COM1-RI
5	GND		

Note

COM1-RI (Ring Indicator) input is not available if a 686CORE is used, because it is not supported by the Geode chipset. This input is tied to GND in the 686CORE.

3.3. PS/2 Keyboard and Mouse Connector (P22)

Standard 2x 6-pin Mini-Din

Pin (PS/2)	Pin (Connector)	Name
1	M1	PS2_MDAT
2	M2	-
3	M3	GND
4	M5	VCC
5	M6	PS2_MCLK
6	M8	-
1	K1	PS2_KDAT
2	K2	-
3	K3	GND
4	K5	VCC
5	K6	PS2_KCLK
6	K8	-

3.4. GPIO, Special Functions and Video Input Header (P18)

High-density connector, 60-pin, 50 mil pitch, 100 mil width

Pin	Name	Pin	Name
01	GPIO0	02	GPIO1
03	GPIO2	04	GPIO3
05	GPIO4	06	GPIO5
07	GPIO6	08	GPIO7
09	GPIO8	10	GPIO9
11	GPIO10	12	GPIO11
13	GPIO12	14	GPIO13
15	GPIO14	16	GPIO15
17	GPIO16	18	GPIO17
19	GPIO18	20	GPIO19
21	GND	22	CLK_OUT
23	GND	24	SPARE10
25	SPARE11	26	SPARE20
27	SPARE21	28	SPARE22
29	SPARE30	30	SPARE31
31	SPARE32	32	SPARE33

33	SPARE34	34	SPARE35
35	SPARE36	36	SPARE37
37	SPARE38	38	GND
39	SSI_DIN	40	SSI_DOUT
41	SSI_DCLK	42	GND
43	VIP_D0	44	VIP_D1
45	VIP_D2	46	VIP_D3
47	VIP_D4	48	VIP_D5
49	VIP_D6	50	VIP_D7
51	VIP_CS	52	VIP_ODD_EVEN
53	GND	54	VIP_CLK
55	GND	56	SPDIF
57	N/C	58	VCC3_3
59	N/C	60	N/C

Note

Specifications of the mating connector for this header is found in CompuLab's website, following the [Developer] >> [586CORE] >> [586BASE - Mating Connectors Specifications] links

3.5. LPT / FDC Header (P25)

2x13, 100 mil header, directly compatible with standard LPT cable/connector. This header is used for two different functions:

1. LPT - Parallel Port
2. FDD - Floppy Disk Drive interface

Selection between these two functions is performed in the BIOS setup. Pin functions change according to the mode selected.

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When used as an LPT, the connector's pin-out is:

Pin	Name	Pin	Name
1	STROBE	2	AUTOFD
3	DATA0	4	ERROR
5	DATA1	6	INIT
7	DATA2	8	SLCTIN
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	-

When used as an FDC, the header's pin-out is:

Pin	Name	Pin	Name
1	(DS0)	2	DENSEL
3	INDEX	4	HDSEL
5	TRK0	6	DIR
7	WP	8	STEP
9	RDATA	10	GND
11	DSKCHG	12	GND
13	MEDIA-ID0	14	GND
15	(MTR0)	16	GND
17	MEDIA-ID1	18	GND
19	DS1	20	GND
21	MTR1	22	GND
23	WDATA	24	GND
25	WGATE	26	-

A ready to use adapter from LPT (26-pin) to FDD (34-pin) connector format is available from CompuLab. Adapter design is published in CompuLab's website in [Developer]>> [586CORE] >> [LPT to FDD Adapter Design].

3.6. IDE – Hard Disk Interface For 686- and 886CORE's (P8)

A standard 40-pin header, directly compatible with an IDE flat cable. This header is used for hard disk interface when ATXBASE is assembled with 686CORE or 886CORE modules. With the ARMCORE module, another header (P9) should be used.

Pin	Name	Pin	Name
1	RESET#	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	-
21	-	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IOCHRDY	28	GND
29	DMAACK#	30	GND
31	IRQ	32	-
33	ADDR1	34	SPARE21
35	ADDR0	36	ADDR2
37	CS0#	38	CS1#
39	DASP#	40	GND

3.7. IDE – Hard Disk Interface For ARMCORE (P9)

A standard 40-pin header, directly compatible with an IDE flat cable. This header is used for hard disk interface when an ATXBASE is assembled with an ARMCORE module. With 686CORE or 886CORE modules, another header (P8) should be used.

Pin	Name	Pin	Name
1	RESET#	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	-
21	-	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IOCHRDY	28	GND
29	-	30	GND
31	IRQ	32	-
33	ADDR1	34	-
35	ADDR0	36	ADDR2
37	CS0#	38	CS1#
39	DASP#	40	GND

3.8. Ethernet Port 1 (P10A)

A standard RJ45 connector in an Ethernet/USB combo module. This connector provides an interface for the first Ethernet port available in a CORE module.

Pin	Name
1	TXD+
2	TXD-
3	RXD+
4	-
5	-
6	RXD-
7	-
8	-

3.9. Ethernet Port 2 (P11A)

A standard RJ45 connector in an Ethernet/USB combo module. This connector provides an interface for an Ethernet port implemented on the ATXBASE board.

Pin	Name
1	TXD+
2	TXD-
3	RXD+
4	-
5	-
6	RXD-
7	-
8	-

3.10. Ethernet Port 3 Header (P12)

The Ethernet Interface Header provides an interface for the second Ethernet port in a CORE module. This is relevant only for the 886CORE, since only it has two Ethernet ports on the module.

Pin	Name	Pin	Name
1	ETH2-LED2	2	ETH2-TXN
3	ETH2-TXP	4	ETH2-LED2
5	ETH2-LED0	6	ETH2-LED1
7	ETH2-RXSHLD	8	ETH2-RXP
9	ETH2-RXN	10	ETH2-RXSHLD

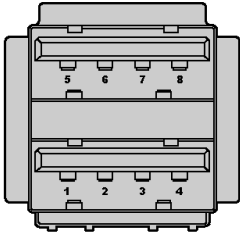
The header is designed for 10-wire flat cable connection. The flat cable connects the header to the RJ-45 interface module, which includes the RJ-45 connector, transformer and activity LED's. An RJ-45 interface module is available from CompuLab.

Routing of Ethernet ports to connectors

ATXBASE connector	Ethernet port source
Connector P10A	ARM / 686 / 886 CORE Ethernet port 1
Connector P11A	ATXBASE on-board Ethernet port
Header P12	886CORE Ethernet port 2

3.11. USB Connector (P10B, P11B)

A standard dual USB Type-A stacked connector. P10B is used for USB01 and USB02 interfaces, P11B is used for USB03 and USB04 interfaces. Refer to the CORE module datasheet in order to see the availability of USB ports, according to the CORE type used.



USB interface 0		USB interface 1	
Pin	Name	Pin	Name
1	VBUS	5	VBUS
2	DN	6	DN
3	DP	7	DP
4	GND	8	GND

3.12. COM3 Header (P13)

A 2x5, 100-mil header compatible with a standard, "flat-cable to DB-9" adapter. RS-232 or TTL levels.

Pin	Name	Pin	Name
1	COM3-DCD	2	COM3-RXD
3	COM3-TXD	4	COM3-DTR
5	GND	6	COM3-DSR
7	COM3-RTS	8	COM3-CTS
9	COM3-RI	10	N/C

3.13. COM2 Header (P14)

A 2x5, 100-mil header compatible with a standard "flat-cable to DB-9" adapter. RS-232 levels.

Pin	Name	Pin	Name
1	COM2-DCD	2	COM2-RXD
3	COM2-TXD	4	COM2-DTR
5	GND	6	COM2-DSR
7	COM2-RTS	8	COM2-CTS
9	COM2-RI	10	N/C

3.14. COM4 Header (P15)

A 2x5, 100-mil header compatible with a standard "flat-cable to DB-9" adapter. RS-232 levels.

Pin	Name	Pin	Name
1	COM4-DCD	2	COM4-RXD
3	COM4-TXD	4	COM4-DTR
5	GND	6	COM4-DSR
7	COM4-RTS	8	COM4-CTS
9	COM4-RI	10	N/C

3.15. COM2 and COM4 RS-422/485 Header (P16)

A 2x5, 100-mil header. RS-422/485 levels.

Pin	Name	Pin	Name
1	COM2-TXP	2	COM4-TXP
3	COM2-TXN	4	COM4-TXN
5	COM2-RXP	6	COM4-RXP
7	COM2-RXN	8	COM4-RXN
9	GND	10	GND

3.16. PCI Slot (P17)

A standard PCI slot, 3.3V type.

All non-obvious connections and unsupported signals are mentioned in notes.

Pin	Name	Notes	Pin	Name	Notes
B1	-12V	-12V of ATX power supply	A1	TRST#	Pullup
B2	TCK	Pulldown	A2	+12V	+12V of ATX power supply
B3	GND		A3	TMS	Pullup
B4	TDO	N/C	A4	TDI	Pullup
B5	+5V		A5	+5V	
B6	+5V		A6	INTA#	
B7	INTB#		A7	INTC#	
B8	INTD#		A8	+5V	
B9	PRSENT#1	N/C	A9	RESERVED	N/C
B10	RESERVED	N/C	A10	VIO	3.3V
B11	PRSENT#2	N/C	A11	RESERVED	N/C
B12	key		A12	key	
B13	key		A13	key	
B14	RESERVED	N/C	A14	3.3Vaux	3.3V
B15	GND		A15	RST#	
B16	CLK		A16	VIO	3.3V
B17	GND		A17	GNT	
B18	REQ#		A18	GND	
B19	VIO	3.3V	A19	PME#	N/C
B20	AD31		A20	AD30	
B21	AD29		A21	+3.3V	
B22	GND		A22	AD28	
B23	AD27		A23	AD26	
B24	AD25		A24	GND	
B25	+3.3V		A25	AD24	
B26	C/BE#3		A26	IDSEL	AD18
B27	AD23		A27	+3.3V	
B28	GND		A28	AD22	
B29	AD21		A29	AD20	
B30	AD19		A30	GND	
B31	+3.3V		A31	AD18	
B32	AD17		A32	AD16	
B33	C/BE#2		A33	+3.3V	

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B34	GND		A34	FRAME#	
B35	IRDY#		A35	GND	
B36	+3.3V		A36	TRDY#	
B37	DEVSEL#		A37	GND	
B38	GND		A38	STOP#	
B39	LOCK#	Pullup	A39	+3.3V	
B40	PERR#		A40	SDONE	Pullup
B41	+3.3V		A41	SBO#	Pullup
B42	SERR#		A42	GND	
B43	+3.3V		A43	PAR	
B44	C/BE#1		A44	AD15	
B45	AD14		A45	+3.3V	
B46	GND		A46	AD13	
B47	AD12		A47	AD11	
B48	AD10		A48	GND	
B49	M66EN	GND	A49	AD9	
B50	GND	5V key	A50	GND	5V key
B51	GND	5V key	A51	GND	5V key
B52	AD8		A52	C/BE#0	
B53	AD7		A53	+3.3V	
B54	+3.3V		A54	AD6	
B55	AD5		A55	AD4	
B56	AD3		A56	GND	
B57	GND		A57	AD2	
B58	AD1		A58	AD0	
B59	VIO	+3.3V	A59	VIO	+3.3V
B60	ACK64#	Pullup	A60	REQ64#	
B61	+5V		A61	+5V	
B62	+5V		A62	+5V	

3.17. CRT VGA Connector (P23)

An HDB15 standard CRT connector

Pin	Name
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	VCC3
10	GND
11	N/C
12	N/C
13	HSYNC
14	VSYNC
15	N/C

3.18. TFT Panel Connector (P19)

A 51-pos FPC connector. Direct interface for certain 640 x 480 TFT panels (such as LP064V1)

Pin	Name
01	LCD-VDD
02	LCD-VDD
03	LCD-R0
04	LCD-R1
05	GND
06	LCD-R2
07	LCD-R3
08	GND
09	LCD-R4
10	LCD-R5
11	GND
12	-
13	-
14	GND

Pin	Name
27	LCD-VDD
28	LCD-VDD
29	LCD-B0
30	LCD-B1
31	GND
32	LCD-B2
33	LCD-B3
34	GND
35	LCD-B4
36	LCD-B5
37	GND
38	-
39	-
40	GND

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15	GND
16	LCD-G0
17	LCD-G1
18	GND
19	LCD-G2
20	LCD-G3
21	GND
22	LCD-G4
23	LCD-G5
24	GND
25	-
26	-

41	GND
42	LCD-HSYNC
43	LCD-VSYNC
44	LCD-DE
45	GND
46	LCD-CLK
47	GND
48	LCD-ENVEE
49	LCD-ENVDD
50	LCD-VDD
51	LCD-VDD

3.19. TFT Panel Connector (P20)

An additional 32-pos connector, for alternative signal arrangement standard. Direct interface for certain 640 x 480 TFT panels (such as LB064V02-A1)

Pin	Name
01	GND
02	GND
03	LCD-VDD
04	LCD-VDD
05	GND
06	LCD-CLK
07	LCD-DE
08	LCD-VSYNC
09	LCD-HSYNC
10	GND
11	LCD-R0
12	LCD-R1
13	LCD-R2
14	LCD-R3
15	LCD-R4
16	LCD-R5
17	GND
18	LCD-G0
19	LCD-G1
20	LCD-G2
21	LCD-G3
22	LCD-G4
23	LCD-G5
24	GND
25	LCD-B0
26	LCD-B1
27	LCD-B2
28	LCD-B3
29	LCD-B4
30	LCD-B5
31	GND
32	GND

3.20. USB, IR and Audio Interface Header (P28)

A 1x26, 100 mil header containing interfaces of several separate functions. Signal pinouts are compatible with standard cables/connectors.

Pin	Name	Description
01	LINE_IN_R	Audio Input
02	GND	
03	GND	
04	LINE_IN_L	
05	VCC_USB3	USB3 interface
06	USB3_N	
07	USB3_P	
08	GND	
09	VCC_USB4	USB4 interface
10	USB4_N	
11	USB4_P	
12	GND	
13	RST_IN	Reset Input
14	GND	
15	VBAT	RTC supply

Pin	Name	Description
16	GND	
17	ATX-PWR	ATX power ctl.
18	SSI_CLK	686CORE
19	SSI_DOUT	FailSafe boot
20	GND	
21	DEBUG0	886CORE FailSafe boot
22	VCC5	IR module interface
23	-	
24	IRDA_RX	
25	GND	
26	IRDA_TX	

Note

VCC_USBx pins have overcurrent protection as required by USB standard specifications.

3.21. PCI Extension (P32)

A standard PCI slot capable of handling only one device. For connecting more than one PCI device to the ATXBASE, PCI Extension signals must be used.

Pin	Name	Notes	Pin	Name	Notes
B1	GND		A1	PCI_GNT1	
B2	PCI_CLK1		A2	GND	
B3	GND		A3	PCI_GNT2	
B4	PCI_REQ#1		A4	GND	
B5	GND		A5	PCI_CLK3	
B6	PCI_CLK2		A6	RISER_ID1	GPIO4
B7	GND		A7	RESERVED	N/C
B8	PCI_REQ#2		A8	RISER_ID2	GPIO5
B9	GND		A9	NOGO	N/C
B10	PC/PCI_DREQ#	N/C	A10	+12V	
B11	PC/PCI_DGNT#	Pullup	A11	+SERIRQ	

3.22. ATX Power Supply Connector (P24)

A standard ATX power connector.

Pin	Name	Pin	Name
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	PS_ON
4	+5.0V	14	+3.3V
5	GND	15	GND
6	+5.0V	16	GND
7	GND	17	GND
8	PWROK	18	-5.0V
9	VCC5ATX	19	+5.0V
10	+12V	20	+5.0V

3.23. Audio Jack (P21)

A standard 2x3.5mm stereo jack. A green jack is used for stereo headphone/speaker output. A magenta jack is used for microphone input.

Headphone/speaker output jack pinout

Pin	Description	Name
1	Body	GND
2	Tip	L-OUT
3	Ring	R-OUT

Microphone input jack pinout

Pin	Description	Name
1	Body	GND
2	Tip	MIC-IN
3	Ring	MIC-VCC

3.24. Power entry header (P34)

A 1x3, 100-mil shrouded header. This header can be used as power supply entry if a low power ARMCORE or 686CORE module is used. For the 886CORE, the ATX power entry must be used.

Pin	Name
1	VCC5
2	VCC3_3
3	GND

3.25. TVOUT header (P26)

A 1x2, 100-mil header.

Pin	Name
1	TVOUT
2	GND

4. Functions Implemented on the ATXBASE Board

Most of the ATXBASE board functions are implemented by the attached CORE module, while the ATXBASE board provides standard connectors and headers. Several additional functions are implemented on the ATXBASE itself. This section describes those functions.

4.1. RS-232 and RS-422/485 Serial Port Drivers

The CORE modules have on-board RS-232 drivers for the COM1 serial port. Other serial ports of the CORE modules have TTL level interface. The ATXBASE adds several driver options for some of the serial ports as specified in the table below. Driver support includes modem control lines.

Port	Level options		
	RS-232	RS-422/485	TTL
COM1	+	-	-
COM2	+	+	-
COM3	+	-	+
COM4	+	+	-
COM5	-	-	+

Notes

1. COM5 is shared with the IR port.
2. RIN (Ring Indicator) is not available for COM1 if a 686CORE is used.
3. With 686CORE, COM2 supports RS-422 but not RS-485.

The interface type of the COM2 and COM4 ports can be selected either individually to the RS-232 or RS-422/485 standard by assembling the appropriate drivers or automatically. If both drivers are assembled, the level selection is done automatically by hardware. If the driver senses a valid RS-232 voltage level on any pin of the RS-232 interface, the RS-232 interface is selected. Otherwise, the RS-422/RS-485 interface is selected.

RS-422 and RS-485 modes

In RS-422/485 modes, TXD outputs of the COM2/4 ports are enabled by RTS2/4 signals. RTS "1" level enables TX output, RTS "0" disables it.

In RS-485 (half duplex) mode, transmit and receive operations are performed on TX lines. To achieve this, user have physically connect RX and TX lines of the serial driver, i.e.

RX+ to TX+ and RX- to TX-. In this case selection between receive and transmit operations is performed by RTS.

In RS-422 (full duplex) mode, transmit and receive operations are performed on separate line pairs. TX output can be always enabled, though qualifying it by RTS has no practical effect on system operation. RX and TX lines should not be connected together as in case of RS-485.

For better understanding of RS-422/485 drivers operation, please refer to ARMBASE design schematics, available following [developer] >> [ARMCORE] (or [686CORE]) >> [Hardware] links in CompuLab's web-site.

4.2. Power Supply Options

The ATXBASE has an optional on-board 5V-to-3.3V linear converter. Supply voltage options are:

1. 3.3V only

In this case, the converter is not assembled. This option can be used only if the selected CORE module doesn't require 5V power supply.

2. 3.3V and 5.0V

This option is the same as (1), but it supports all types of low power CORE modules - ARMCORE and 686CORE.

3. 5.0V only

In this case, a 5V-to-3.3V linear converter is assembled on the ATXBASE. Supports all types of low power CORE modules.

4. ATX power

In this case, power is supplied from a standard ATX power supply connected to P24. Supports all types of CORE modules - ARMCORE, 686CORE and 886CORE. For the 886CORE, this is the only valid option.

Bypassing the on-board converter

If 3.3V is applied on the power entry connector, the on-board 5V-to-3.3V converter is disabled automatically to avoid interference with externally applied power.

Power output specifications

5V to 3.3V converter maximum output current: 3 A

Power entry specifications when the power is supplied via the P34 connector:

Power entry pins	Maximum allowed input current	Input tolerance
5.0V	3 A	5 %
3.3V	3 A	5 %

Converter and power entry specifications are designed in excess of ARMCORE / 686CORE and ATXBASE requirements. Maximum current drawn by the 686CORE and ATXBASE together is less than 1.8 A, maximum power consumption is less than 6 watts. The spare power can be used by attached PCI or PCMCIA / CardBus cards.

The following table summarizes the power connection options for the ATXBASE with different CORE modules:

CORE Type	3.3V only	3.3V and 5.0V	5.0V only	ATX power supply P24
	P34	P34	P34	
ARMCORE	w/o Audio and SIO	+	+	+
686CORE	w/o Audio and SIO	+	+	+
886CORE	-	-	-	+

Note: For the 5.0V-only option, a 5V to 3.3V Converter is required on the ATXBASE.

4.3. Dual PC Card Controller and PCMCIA Glue Logic

The ATXBASE implements two different methods of PC Card interface. For 686CORE and 886CORE modules, which do not have an integrated PC Card controller, the ATXBASE provides a controller on-board. For the ARMCORE module, which does have an integrated PCMCIA controller, the ATXBASE provides only simple glue logic required to achieve standard PCMCIA functionality. However, an on-board PC Card controller can be used with the ARMCORE as well.

4.3.1. Dual PC Card Controller

The ATXBASE implements a dual PC Card interface using a TI PCI1420 controller. The PC Card controller and slots are optional, according to the ATXBASE's configuration. The PCI1420 is a high-performance PCI-to-CardBus bridge that supports two independent card sockets compliant with the PC Card standard. The PC Card standard retains the 16-bit PC Card specification (PCMCIA) and defines the new 32-bit PC Card - the CardBus, capable of full 32-bit data transfers at 33 MHz. The ATXBASE supports any combination of PCMCIA and CardBus PC Cards in the two sockets, powered by 5 V or 3.3 V as required. The controller is compliant with the PCI Local Bus Specification and its PCI interface can act as either a PCI master or slave device. PCI bus mastering is initiated during 16-bit PC Card DMA transfers or CardBus PC Card bridging transactions. The controller is also compliant with the latest PCI Bus Power Management Interface Specification.

All PC Card signals are internally buffered to allow hot insertion and removal. The PCI1420 is register-compatible with the Intel 82365SL controller in 16-bit PCMCIA mode. The controller's internal data path logic allows the host to access 8-, 16-, and 32-bit cards using full 32-bit PCI cycles for maximum performance.

The PC Card controller can be disabled in order to allow the functionality of the ARMCORE's integrated PCMCIA controller. See the "Jumpers" section for more information.

Features

- Mix-and-match 5-V/3.3-V 16-bit PC Cards and 3.3-V CardBus Cards
- Two PC Card or CardBus slots with hot insertion and removal
- Dual-slot PC Card power switch
- Burst transfers, 130 MB/s throughput
- Five PCI memory windows and two I/O windows available for each socket
- Two I/O windows and two memory windows available by each CardBus socket
- Intel 82365SL register compatible
- Distributed DMA (DDMA) and PC/PCI DMA
- 16-Bit DMA on both PC Card sockets

The controller is initialized by 686/886 CORE BIOS and supported by all operating system packages provided for the x86CORE / BASE. Currently, this controller is not initialized by the ARMCORE monitor.

4.3.2. PCMCIA logic for ARMCORE

PCMCIA interface logic on the ATXBASE is designed to support single socket 8/16-bit PC-Card functionality, as provided by the PCMCIA controller integrated in the ARMCORE. This is a low-cost option supported only by the ARMCORE.

The PCMCIA interface logic can be disabled in order to allow the functionality of a Dual PC Card controller as mentioned in the previous section. See the "Jumpers" section for more information.

Features

- 5-V/3.3-V 16-bit PC Cards
- Single slot with hot insertion and removal
- Manually selectable supply voltage. See the "Jumpers" section for more information.
- IO and memory transactions supported

4.4. 10/100 Mbit Ethernet Port

The ATXBASE contains one optional 10/100 Mbit Ethernet port. This is in addition to the optional Ethernet port(s) contained in the CORE module. Depending on CORE type, the user can therefore order the ATXBASE + CORE system with none, one, two or three Ethernet ports. The Ethernet interface implemented in the ATXBASE is based on the Realtek RTL8139 MAC/PHY component. In functional terms, it is identical to the Ethernet port available on the 686CORE. Refer to the 686CORE Reference Guide for details.

The Ethernet port's interface to the external world is through a standard RJ45 interface.

Note: When a 686CORE is used with the ATXBASE, the operating system assigns the 686CORE's Ethernet as Port1 and the ATXBASE's Ethernet, Port0.

4.5. LCD Power Switch

The graphics controller is located on the CORE module. The ATXBASE adds one feature for LCD panel support - the power switch. Most LCD panels require proper power sequencing in order to avoid panel damage. The graphics controller of the CORE provides the LCD_VDDEN signal indicating when power should be applied. The LCD power switch circuit of the ATXBASE applies a VDD on LCD interface connector under the control of LCD_VDDEN.

LCD Supply selection: The user can select 3.3V or 5V supply by placing a jumper on [P29.15 — P30.15] for 3.3V or [P30.15 — P31.15] for 5V.

4.6. Audio Codec

The ATXBASE contains audio codec connected to the CORE's AC97 interface. This option is used only for the 886CORE, where audio codec is not included in the module. For the ARMCORE and the 686CORE, which contain audio codec, the ATXBASE's codec must be disconnected from the AC97 bus and from audio outputs. This disconnection is done by four jumpers. Refer to the "Jumpers" section for more information.

Codec Features:

- Stereo output to headphones (50mW max.) or to active speakers.
- Stereo line input (225mV RMS) shared with microphone input. The left channel of the stereo input is connected to microphone input and software is responsible for selecting the correct function.

4.7. ARMCORE IDE Interface

The ATXBASE implements a separate IDE interface for the ARMCORE, using the ARMCORE's local bus. Buffering of data lines is done by PCMCIA logic and chipselects are formed by address decoding of local bus addresses. No DMA support mode is implemented on the ARMCORE IDE interface, but rather only PIO mode.

5. Jumpers

The ATXBASE is designed to operate with three types of CORE modules: ARMCORE, 686CORE and 886CORE. Some of the CORE modules' functions are not fully compatible; therefore, configuration jumpers are required. Jumpers are implemented by 3 rows of 100 mil headers, named P29, P30 and P31.

5.1. Jumper Summary

Jumper number	Location (header pins)	Description	Complimentary requirements from other jumpers
1	P29-1 P30-1	If assembled, select 3.3V as V_CORE supply. Required by ARMCORE and 686CORE	Jumpers 5,6,7,8 are off
2	P29-2 P30-2		
3	P29-3 P30-3		
4	P29-4 P30-4		
5	P30-1 P31-1	If assembled, select 5.0V as V_CORE supply. Required by 886CORE	Jumpers 1,2,3,4 are off
6	P30-2 P31-2		
7	P30-3 P31-3		
8	P30-4 P31-4		
9	P29-5 P30-5	3.3V PCMCIA VCC select. If the jumpers are assembled, the VCC supplied to PCMCIA socket A is 3.3V	Relevant only if jumper 11 is on
10	P30-5 P31-5	5V PCMCIA VCC select. If the jumpers are assembled, the VCC supplied to PCMCIA socket A is 5V	Relevant only if jumper 11 is on
11	P29-6 P30-6	Manually controlled VCC for PCMCIA socket A select. Used for the ARMCORE PCMCIA controller	Either jumper 10 or jumper 9 must be on
12	P30-6 P31-6	Software controlled VCC for PCMCIA socket A select. Used for the ATXBASE PC-Card controller	
13	P29-7 P30-7	Manually set VPP = 5V for PCMCIA socket A. Used for the ARMCORE PCMCIA controller	
14	P30-7 P31-7	Software controlled VPP for PCMCIA socket A select. Used for the ATXBASE PC-Card controller	

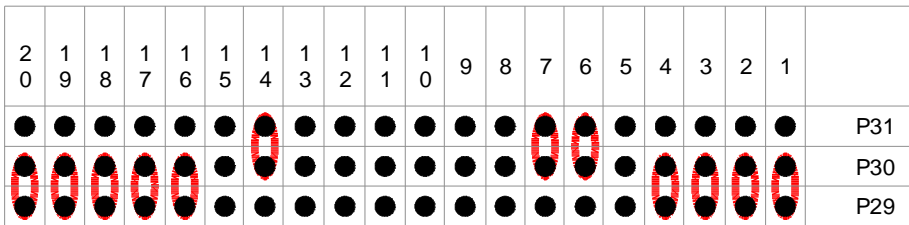
ATXBASE Mini-ITX Single Board Computer

15	P30-9 P31-9	Use ATXBASE audio codec. If the jumpers are assembled, ATXBASE codec will be used.	These jumpers must be off if the CORE module has on-board codec.
16	P30-10 P31-10		
17	P29-10 P29-11		
18	P29-12 P29-13		
19	P30-11 P31-11	PCMCIA logic enable. If the jumpers are off – PCMCIA logic is disabled.	If the jumpers are assembled, jumper 22 must be on also.
20	P30-12 P31-12		
21	P30-13 P31-13		
22	P29-14 P30-14	ATXBASE PC-Card controller disable	
23	P30-14 P31-14	ATXBASE PC-Card controller enable	If the jumper is on, jumpers 19, 20, and 21 must be off.
24	P29-15 P30-15	3.3V VCC_LCD select. If the jumpers are assembled, LCD supply voltage is 3.3V	
25	P30-15 P31-15	5V VCC_LCD select. If the jumpers are assembled, LCD supply voltage is 5V	
26	P29-16 P30-16	CORE module CRT interface select. The jumpers must be on for the 686- and 886CORE.	
27	P29-17 P30-17		
28	P29-18 P30-18		
29	P29-19 P30-19		
30	P29-20 P30-20		
31	P30-16 P31-16	ATXBASE DAC CRT interface select. The jumpers must be on for the ARMCORE.	
32	P30-17 P31-17		
33	P30-18 P31-18		
34	P30-19 P31-19		
35	P30-20 P31-20		

5.2. Sample configurations

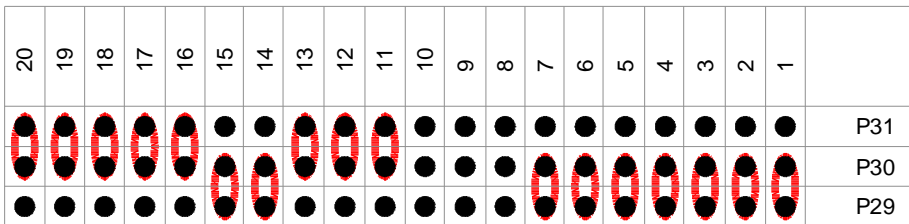
5.2.1. 686CORE

- V_CORE = 3.3V
- 686CORE's audio codec is used
- CORE CRT interface is used
- CardBus controller is enabled
- PCMCIA logic is disabled
- No LCD connected.



5.2.2. ARMCORE

- V_CORE = 3.3V
- ARMCORE's on-board audio codec is used
- CardBus controller is disabled
- PCMCIA logic is enabled, for ARMCORE's on-board controller
- CRT DAC interface is of ATXBASE is enabled
- 3.3V PCMCIA card is used
- 5V VPP is required for PCMCIA card
- 3.3V LCD connected



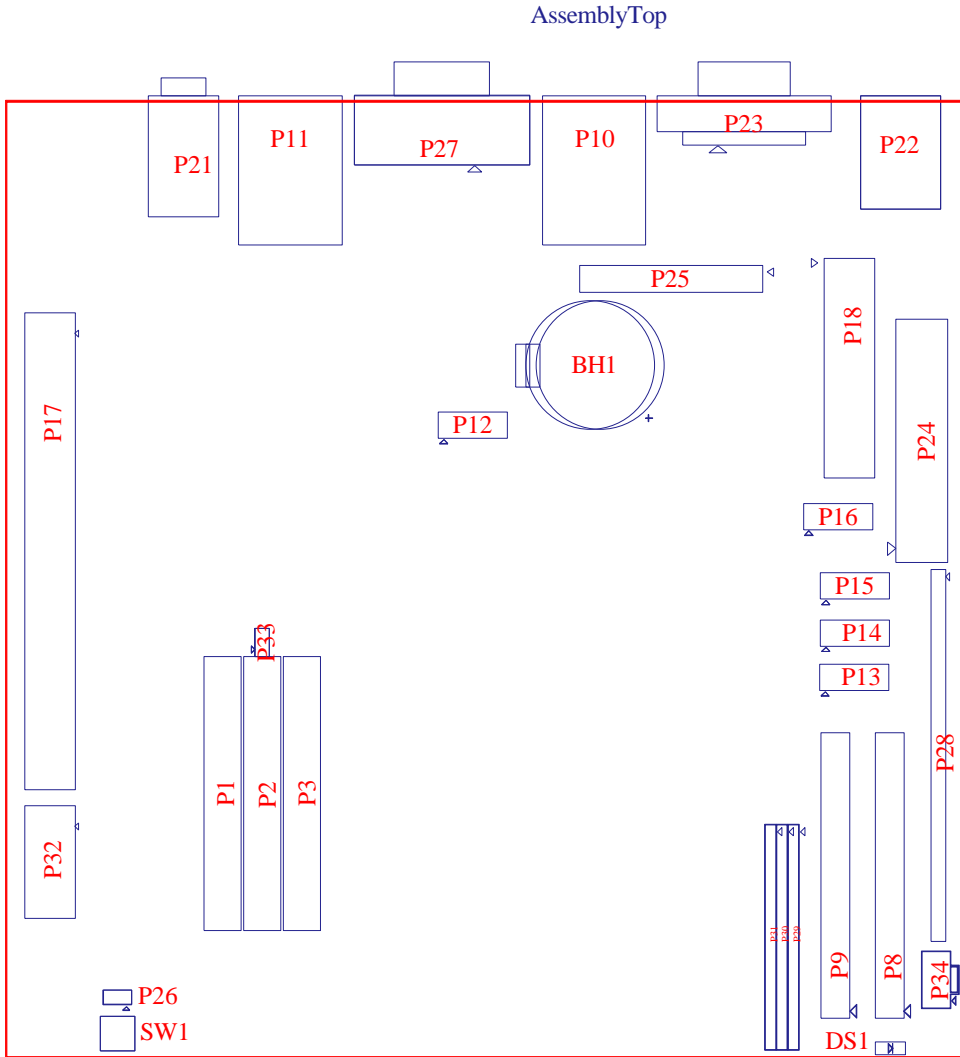
5.2.3. 886CORE

- V_CORE = 5V
- 886CORE doesn't have audio – audio codec of ATXBASE is used
- 886CORE CRT interface is selected
- CardBus controller is enabled
- PCMCIA logic is disabled
- 5V LCD connected.

2	1	1	1	1	1	1	1	1	1	1	9	8	7	6	5	4	3	2	1			
0	9	8	7	6	5	4	3	2	1	0												
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P31
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P30
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P29

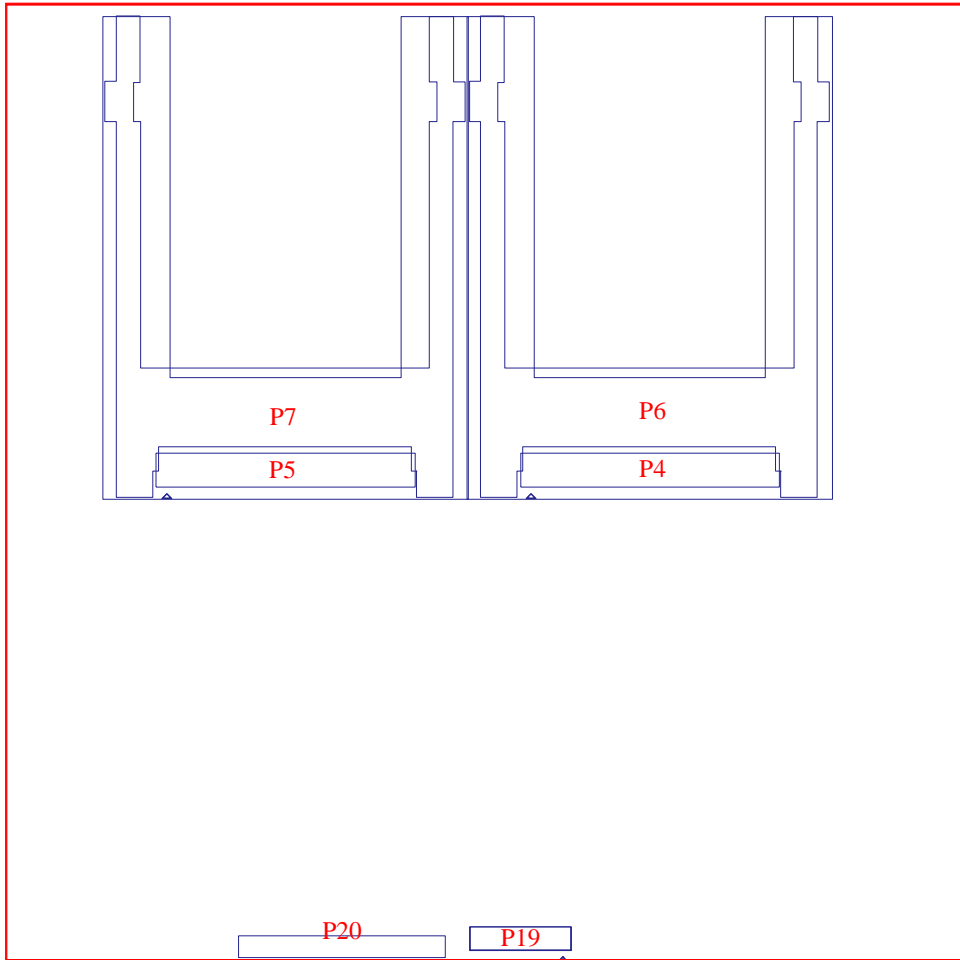
6. Connector Locations

ATXBASE Top side



ATXBASE Bottom side, top view

AssemblyBottom



Reference

P1, P2, P3	CAMI connectors for CORE module
P4+P6	PC-Card socket A
P5+P7	PC-Card socket B
P8	IDE interface for 686 and 886CORE
P9	IDE interface for ARMCORE
P10	CORE Ethernet + USB01 and USB02
P11	ATXBASE Ethernet + USB03 and USB04
P12	Header for second CORE Ethernet port
P14	COM2 RS-232 header
P13	COM3 RS-232 / TTL header
P15	COM4 RS-232 header
P16	COM2 and COM4 RS-422/485 header
P17	PCI slot
P18	GPIO / Video Input Port header
P19	51-pin LCD connector
P20	30-pin LCD connector
P21	Audio jack
P22	PS/2 keyboard and mouse connector
P23	CRT connector
P24	ATX power supply connector
P25	Parallel port header
P26	TVOUT header
P27	COM1 RS-232 connector
P28	USB, IR and audio interface header
P32	PCI extension
P34	Power entry for low-power modules
SW1	Reset button

7. Operating Temperature Ranges

The ATXBASE is available with three options for operating temperature range:

Commercial	0° to 70° C
Extended	-20° to 70° C
Industrial	-40° to 85° C

The cards' manufacturing and certification method for each option is explained in the "Operating Temperature Ranges" section of the 686CORE Reference Guide.

Availability of Industrial temperature range is not limited to certain functions. However, not all components are certified by manufacturers for the industrial temperature grade. The table below lists which functional blocks have components certified by the manufacturer. For more information, refer to the "Operating Temperature Ranges" section of the 686CORE Reference Guide.

Function	Component certification
Ethernet	-
CardBus / PCMCIA	Only ARMCORE PCMCIA
RS-232	+
RS-422/485	+
5V & 12V power supply	+
Video DAC	-
Audio codec	-
Lithium battery (for RTC)	-10° to 85° C
All other functions	According to CORE spec.

The mating CORE module should be ordered for the same or better temperature range. For example, it is useless to have an ATXBASE manufactured for the industrial temp range with a CORE manufactured for commercial temp range. Such a combination is practically limited to the commercial temp range. On the other hand, it is valid to use a CORE manufactured for industrial range while using a ATXBASE manufactured for commercial range, assuming that such an ATXBASE does not contain temperature-dependent functions, as specified in the table above.