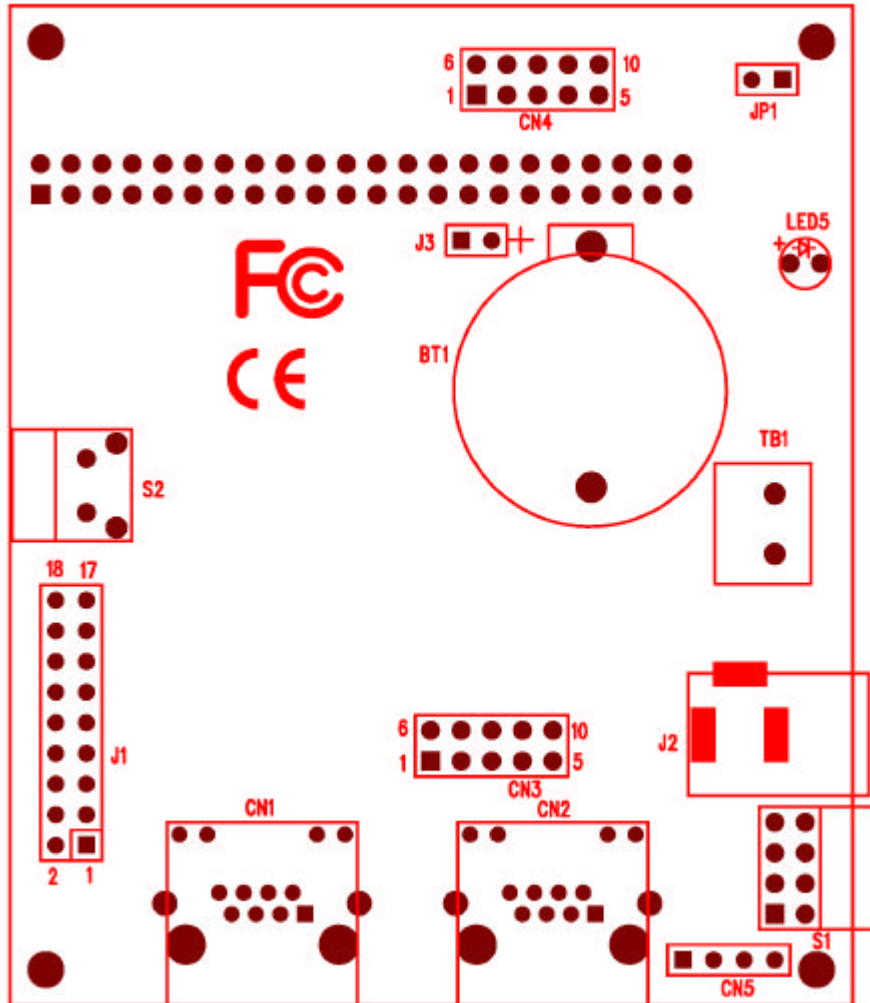


# ARM Industrial Module BASE 711 Hardware Manual



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## General

Nowadays the demands on Microcontrollers are raised. Memory and computing power are the most increased demands. Further the support on networks, especially Ethernet and TCP/IP. Reactions in real time are demanded more and more frequently. At the same time the hardware should remain as compact as possible. And also, licence fees are not desired.

An answer on these requests is the ARM Industrial Module AIM 711 of Vision System GmbH. With dimensions of  $67.6 \times 50 \text{ mm}^2$  it is not even hand plate large. Equipped with a 32 bit RISC processor the module operates under the real time operating system eCos. Two MByte Flash memory offer space for the system, together with the application of the customer, and in addition yet for its data. The SDRAM memory of eight MByte permits extensive operations.

The integrated Ethernet controller permits the connection to a modern 100BaseTx LAN. eCos of course offers support for Ethernet protocols up to TCP/IP. This is freely available software.

To connect existing standard devices, two serial interfaces are available. An asynchronous external bus permits the connection of any additional controllers for special tasks.

In the case of a malfunction, the module simply is to be exchanged. This does not require any special tool. Nevertheless, the SODIMM connector guarantees good contacts to the environment, and a firm fixing.

## Basis board for development

A development board for the AIM 711 is available. This Manual describes this board. It realizes the connections to the power supply as well as Power LED, Ethernet, COM1 and COM2, moreover another serial interface for Debug-output. In addition a battery type CR2032 to backup the real time clock and a Reset-key. Finally the service-connector and the external bus.

### Power Supply

Cylindrical connector (J2) and alternatively screw clamp (TB1). The inner pin on the cylindrical connector is plus, and on the screw clamp it is the connection 1. Required is a supply between 6V and 7.5V DC. A regulator on the Basis board then generates the stabilized 5V required for the AIM 711.

The Power LED (LED5) is driven by the AIM 711, and therefore only lights if the module is stuck in.

### Battery

The Clip (BT1) accepts a battery of type CR2032. The housing with the plus pole contacts the clamp. Directly beside it is the connector J3, this is designed for an optional accumulator (instead of the battery). The plus pole is on Pin 2. It is the responsibility of the customer to configure charging of the accumulator by the real time clock. The delivered Firmware does not support this function.

### Ethernet

Standard connector with RJ45 (CN1), the LEDs for Link/Data and 100 Mbit are integrated. The required transformer is also on the basis board.

### COM Debug

An interface (CN4) to connect a serial Debug terminal. Therefore it operates on RS232 level, via a pin connector 2×5.

Connection	2	3	5
Signal	RxD	TxD	GND

If the Service board is used, this interface must be deactivated. This is done by closing the Jumper JP1. An Adapter cable to DB9 male is included.

### COM1

This interface connects on a RJ45-socket (CN2). Two integrated LEDs indicate data transfer for sending and receiving. The driver/receiver to adapt from TTL to RS232 is a SP213E, on the basis board. This interface may be configured to operate with RS422, RS485 or TTL level.

Connection	1	2	3	4	5	6	7	8
Signal 232	RTS	DTR	GND	TxD	RxD	DCD	DSR	CTS
Signal 422		Rx-		Rx+	Tx+	Tx-		
Signal 485					Data+	Data-		

An Adapter cable from RJ45 to DB9 male is included.

When operated with TTL-level, only the LEDs in the RJ45 connector are

actuated. The serial signals are available on the pin connector CN3 (placed behind CN2). The adapter cable for COM Debug can be used here.

Connection	1	2	3	4	5
Signal TTL	DCD	RxD	TxD	DTR	GND
Connection	6	7	8	9	10
Signal TTL	DSR	RTS	CTS	RI	+5V, max. 50mA

To configure the various operation modes of COM1, the switch S1 is used. Even when the table of pin assignment on CN2 only indicates three operation modes, there are substantially more.

Mode	S1	S2	S3	S4		Description
RS-232	ON	ON	ON	ON	RJ45	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	ON	Off	ON	ON	RJ45	Tx+/-, Rx+/-, GND
RS-485	Off	ON	ON	ON	RJ45	Data+/-, GND. Half-Duplex (2 Wire) without Echo, ART (automatic change of data direction)
RS-485 F	Off	ON	ON	Off	RJ45	Tx+/-, Rx+/-, GND. Full-Duplex (4 Wire)
RS-485 W	Off	ON	Off	ON	RJ45	Data+/-, GND. Half-Duplex (2 Wire) with Echo, ART (automatic change of data direction)
RS-485 R	Off	Off	ON	ON	RJ45	Data+/-, GND. Half-Duplex (2 Wire) without Echo, data direction change by RTS
RS-485 D	Off	Off	ON	Off	RJ45	Data+/-, GND. Half-Duplex (2 Wire) without Echo, data direction change by DTR
TTL	Off	Off	Off	Off	10pin	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND, 5V

## COM2

Realized as a pin connector 1×4 (CN5) with TxD, RxD, GND and power supply of 5V. This interface operates with TTL-level.

Connection	1	2	3	4
Signal	+5V, max. 50mA	RxD	GND	TxD

## Service

A connection as a pin connector 2×9 (J1). The main usage is for internal purposes of Vision System GmbH. It permits an access to the S3C4510B by means of JTAG protocol.

Also the serial interface for Debug output can be worn out here, it operates with TTL-level. When this option is used, the connector COM Debug must be deactivated by closing Jumper JP1.

Connection	1	3	5	7	9	11	13	15	17
Signal	DTxD	DRxD	LED0	LED1	LED2	ETCK	ETMS	ETDI	ETDO
Connection	2	4	6	8	10	12	14	16	18
Signal	VDDJ	JRST	JTDI	JTMS	JTCK	JTDO	VDDJ	GND	GND

Vision System GmbH offers a Service board, to change the serial interface DTxD/DRxD/GND to RS232 level, and puts it on a DB9-male connector. This Service board also has three differently coloured LEDs to show status.

## External Bus

The external bus is put on the basis board at a 44 pin connector (JP2). The grid dimension is 2 mm, with the connector mechanically the same as for a 2.5" hard disc.

Name	Pin		Pin	Name
GND	1		2	GND
Data0	3		4	BADDR0
Data1	5		6	BADDR1
Data2	7		8	BADDR2
Data3	9		10	BADDR3
Data4	11		12	BADDR4
Data5	13		14	BADDR5
Data6	15		16	BADDR6
Data7	17		18	BADDR7
GND	19		20	BADDR8
/nBusSelect	21		22	BADDR9
GND	23		24	BADDR10
/nBusWrite	25		26	BADDR11
GND	27		28	BADDR12
/nBusRead	29		30	BADDR13
GND	31		32	BADDR14
GPI0	33		34	GND
GPO0	35		36	/nBusWait
GPI1	37		38	BIRQ0
GPO1	39		40	BIRQ1
I <sup>2</sup> C Data	41		42	I <sup>2</sup> C Clock
VCC	43		44	VCC

## Connection AIM

The development of the AIM 711 targets on a compact module, with a common connector. Therefore all signals and power supplies have been placed on a SODIMM 144 connector. This type of connector is generally known and maintenance friendly. A module is replaced in a few seconds.

### Capabilities

Description	Name	Pin	Pin	Name	Description
	GND	2	1	GND	
	VCC	4	3	VCC	
External data bus D0..D7	D0	6	5	Reset	Reset to the bus
	D1	8	7	A0	External Address bus A0..A13 (16 KB Address range)
	D2	10	9	A1	
	D3	12	11	A2	
	D4	14	13	A3	
	D5	16	15	A4	
	D6	18	17	A5	
	D7	20	19	A6	
	GND	22	21	A7	
Chip Select 0	/CS0	24	23	A8	
	GND	26	25	A9	
External Write	/IOWrite	28	27	A10	
External Read	/IORead	30	29	A11	
	GND	32	31	A12	
Digital In 0	GPI0	34	33	A13	
	GND	36	35	GND	
Digital Out 0	GPO0	38	37	GND	
	GND	40	39	GND	
Digital In 1	GPI1	42	41	/IOWait	Wait signal
	GND	44	43	GND	
Digital Out 1	GPO1	46	45	/IRQ0	External Interrupt sources 0&1
	GND	48	47	/IRQ1	
		50	49	GND	
		52	51		
		54	53		
		56	55		
	VCC	58	57	VCC	
	GND	60	59	GND	
Encoding gap of SO-DIMM 144					
	GND	62	61	GND	
	VCC	64	63	VCC	

		66	65		
		68	67		
		70	69		
	GND	72	71	GND	
Digital Out 2	GPO2	74	73	RxD2	Serial Port (COM2)
Digital Out 3	GPO3	76	75	TxD2	
	GND	78	77	GND	
Serial Port (COM1)	RI1	80	79	DCD1	Serial Port (COM1)
	DTR1	82	81	RxD1	
	CTS1	84	83	TxD1	
	RTS1	86	85	DSR1	
	GND	88	87	Trans1	
		90	89		
		92	91		
		94	93	Link	LED f. Link/Data
Ethernet Tx- Signal	<b>Tx-</b>	96	95		
Ethernet Tx+ Signal	<b>Tx+</b>	98	97		
		100	99	Speed	LED f. 100Mbps
Ethernet Rx+ Signal	<b>Rx+</b>	102	101		
Ethernet Rx- Signal	<b>Rx-</b>	104	103		
		106	105		
		108	107		
		110	109		
		112	111		
		114	113	Pwr LED	To ext. Power LED
	GND	116	115	GND	
Serial Port for Debug	D-TxD	118	117	P0	BIOS Status/Error Codes (LED)
	D-RxD	120	119	P1	
JTAG Connector with Power, Reset and Data-/Control-Signal	VCC-J	122	121	P2	
	JTDI	124	123	ETDI	EPLD Connector with Data-/Control-Signal
	JTMS	126	125	ETMS	
	JTCK	128	127	ETCK	
	JTDO	130	129	ETDO	
	JRST	132	131	VDDD	Ext. 5V supply
Reset from external	/Reset-In	134	133	VCC3	Ext. 3.3V supply
	GND	136	135	VBat	3V Power for RTC
Mass for power supply	GND 5V	138	137	VCC 5V	Stabilized 5V $\pm 5\%$ , 500 mA power supply
		140	139		
		142	141		
		144	143		