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ATMega128_v2

A plug-on processor board.

**A general purpose plug-on board.
Most processor pins are accessible from the main-
board on which it is plugged. It contains two
RS232 converters and a connector for an LCD.**

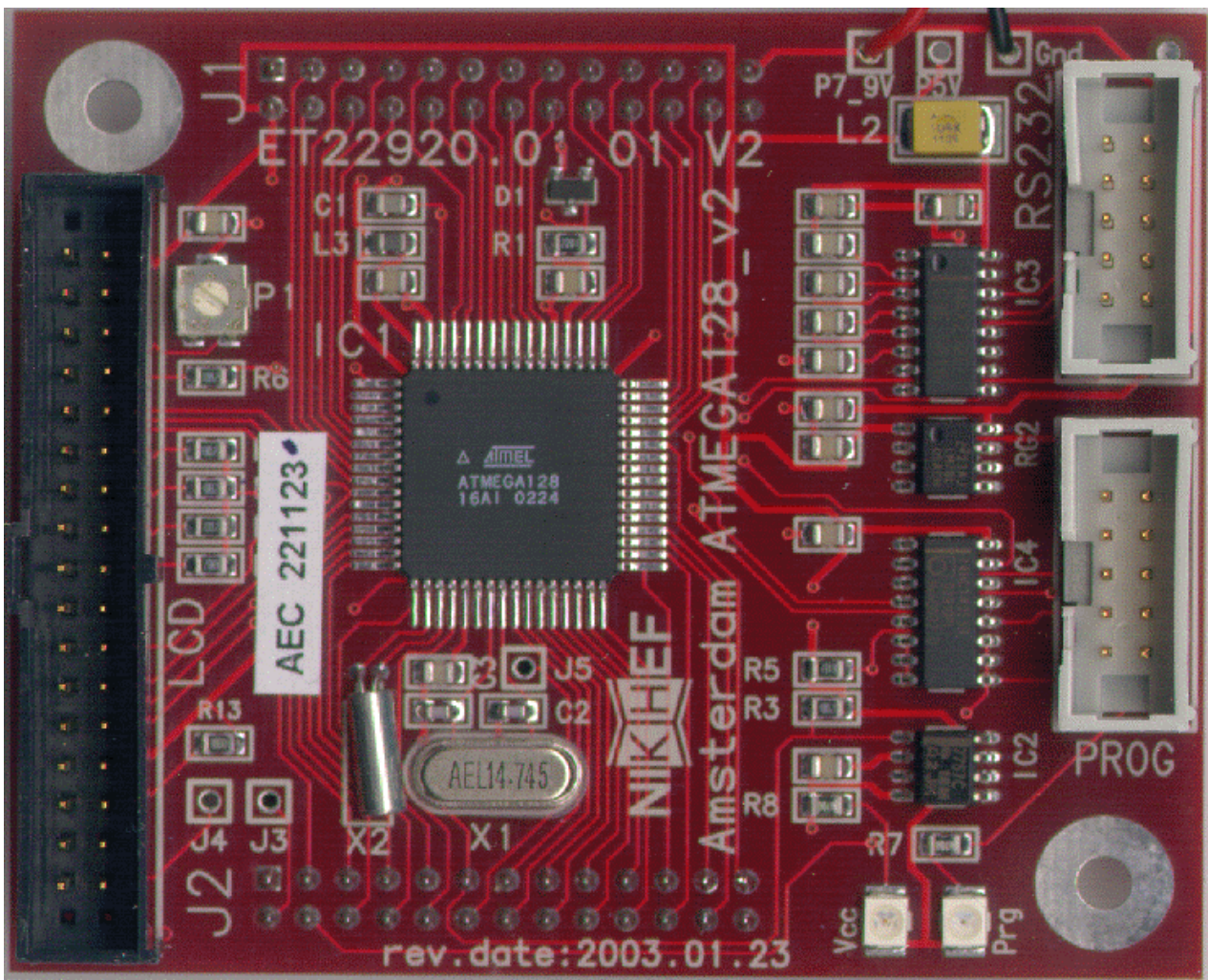
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<http://www.nikhef.nl/pub/departments/et/misc/atmega128/atmega128.html>

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Specifications

Board size: 76 * 64 mm.

Processor ATMega128-16AI, Atmel documentation (5 MB):

http://www.nikhef.nl/pub/departments/et/misc/atmega128/atmega128_dat.pdf

Crystal: 14.7456 MHz.

RS232 via 2 * 5 pin connector, flat cable connection to standard DB9 (female) connector. It can be used with hardware handshake or a second RS232 port.

Programming via 2 * 5 pin connector from STK200/300 programmer (LED indication).

Two 26-pin connectors on the back of the board to connect to the main board (spaced 1.7 inch).

Connector for LCD display (or remaining port pins).

Power supply: 5 V or 7 to 9 V.

On board power-up reset.

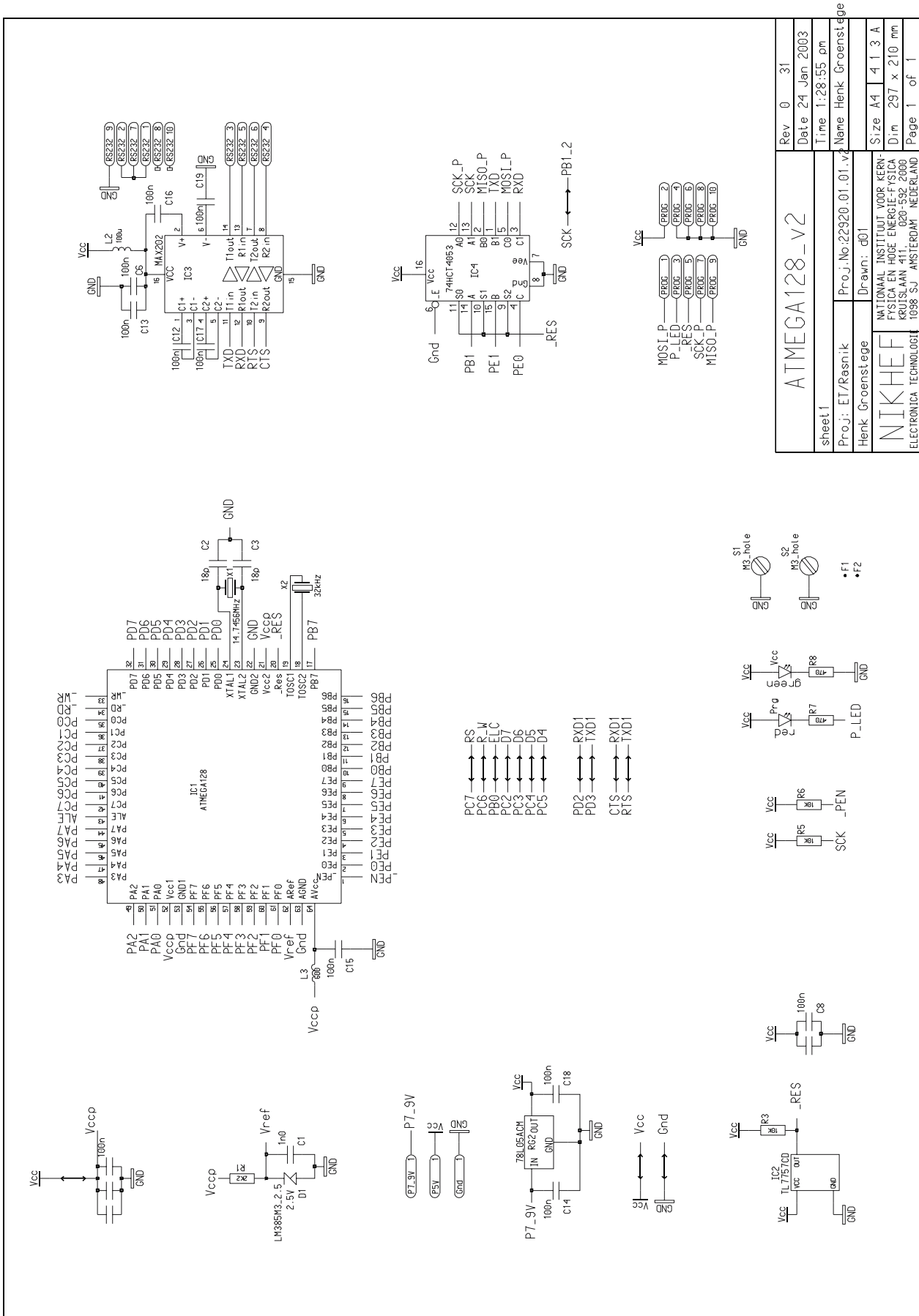
32 kHz watch crystal for a real time clock.

A 2.5 V reference for the processors' ADC. If RG1 is not installed (using the processors' internal reference) remove R1 also.

Components

Reference	type	Farnell
IC1	ATMEGA128-16AI	(ALCOM)
IC2	TL7757CD	
IC3	MAX202ECSE	639_345
IC4	74HCT4053D	
RG2	78L05ACM	412-429
D1	LM385BYZ_2.5	116-889
Prg	Red LED	LST670
Vcc	Green LED	LGT670
X1	14.7456MHz	638-559
X2	32kHz	103-868 (221-533)
J1, J2	Connector2x13	329-2393
Mating for J1, J2	FCI 76342-313	629-352
PROG, RS232	Connector2x5	468-885
LCD	Connector2x17	468-927
L2	simid03_100u_1812	200-426
L3	L_0805-600ohm	305-6569
P1	potm4mm	514-779
R1	2K2-0805	
R3, R5, R6, R9, R10, R11, R12	10K-0805	
R7, R8	470-0805	
R13	100-0805	
C1	1n0_0805	
C2, C3	18p_0805	
C5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, C19	100n_0805	

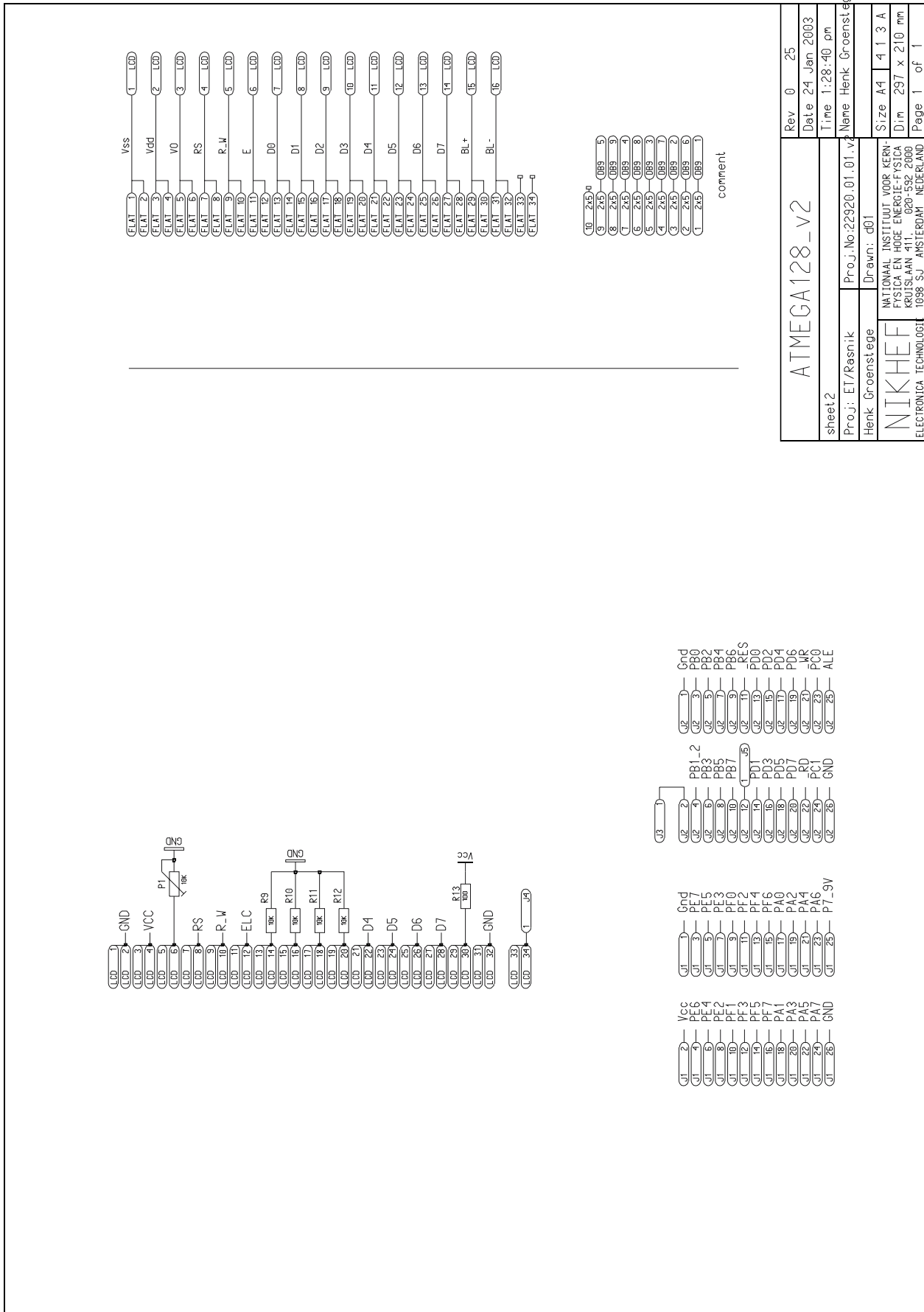
ATMega128 v2



ATMEGA128_v2		Rev_0	31
sheet 1	Proj.: ET/Rasnik	Date	24 Jan 2003
Henk Groenstege	Proj.No.:22920.01.01.v2	Time	1:28:55 om
DRAWN: d01		Name	Henk Groenstege
NATIONAAL INSTITUUT VOOR KERN-FYSICA EN HOOG-ENERGIE-FYSICA KROONSLAAN 1411 020-532 2000 ELECTRONICA TECHNOLOGIE 1098 SJ AMSTERDAM NEDERLAND		Size	A4 4.1 3 A
		Dim	297 x 210 mm
		Page	1 of 1

Figure 1: Schematic

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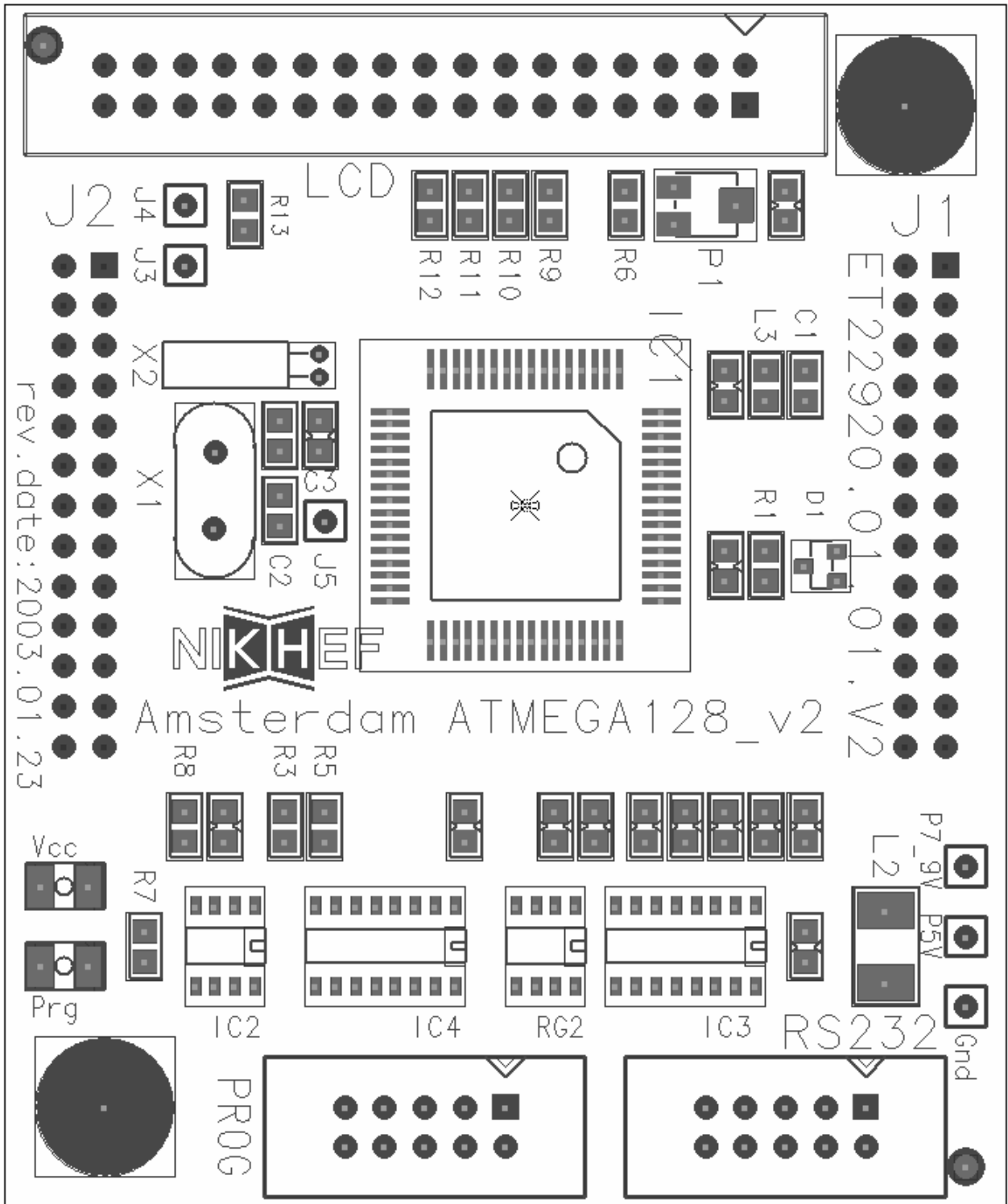


Figure 3: PCB layout

Physical locations

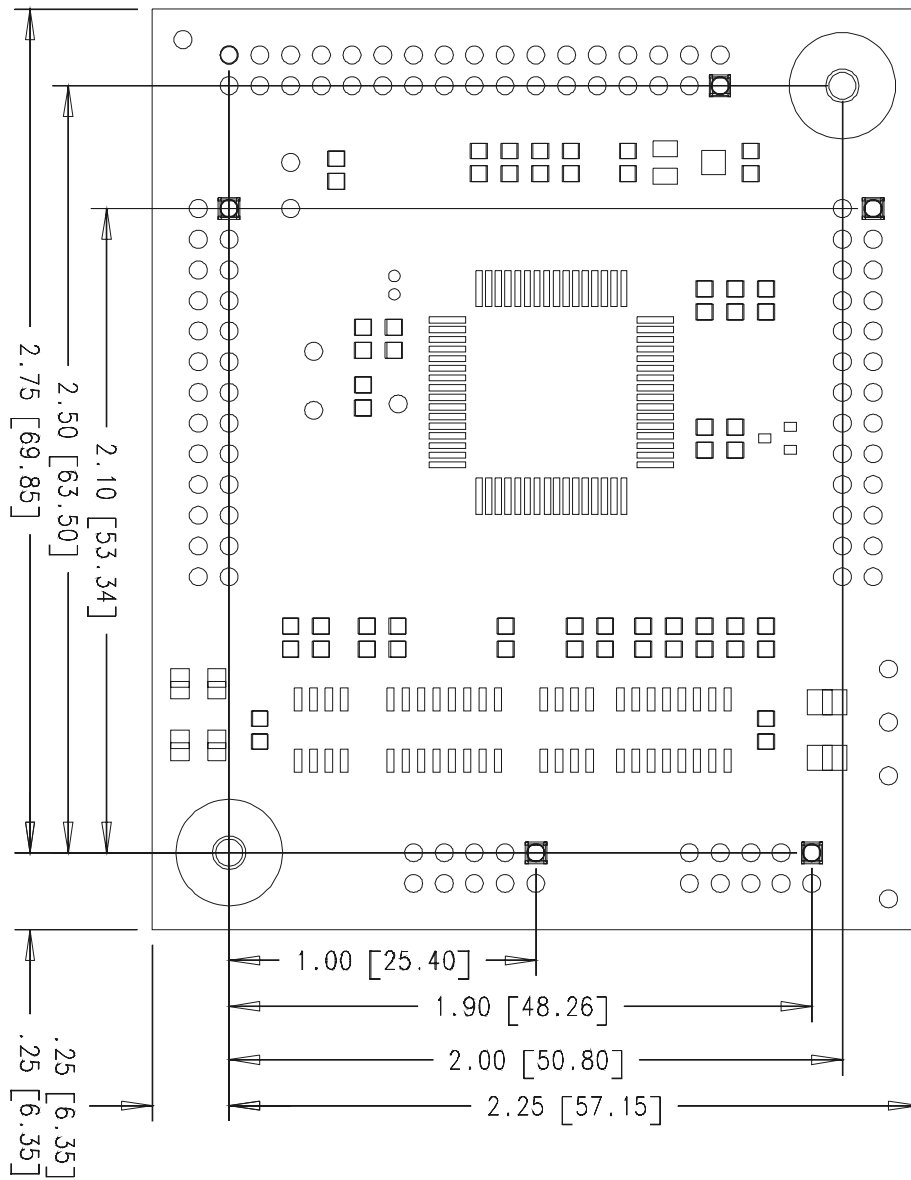


Figure 4: Connector and fixture locations

Pin list

JP1			JP2	
Pin	Function	Alt. function	Function	Alt. function
1	GND		GND	
2	VCC		J3	spare
3	PE7	IC3/INT7	PB0	_SS
4	PE6	T3/INT6	PB1	SCK
5	PE5	OC3C/INT5	PB2	MOSI
6	PE4	OC3B/INT4	PB3	MISO
7	PE3	OC3A/AIN1	PB4	OC0
8	PE2	XCKO/AIN0	PB5	OC1A
9	PF0	ADC0	PB6	OC1B
10	PF1	ADC1	PB7	OC2/OC1C
11	PF2	ADC2	_RES	
12	PF3	ADC3	J5	Spare
13	PF4	ADC4/TCK	PD0	SCL/INT0
14	PF5	ADC5/TMS	PD1	SDA/INT1
15	PF6	ADC6/TDO	PD2	RXD1/INT2
16	PF7	ADC7/TDI	PD3	TXD1/INT3
17	PA0	AD0	PD4	IC1
18	PA1	AD1	PD5	XCK1
19	PA2	AD2	PD6	T1
20	PA3	AD3	PD7	T2
21	PA4	AD4	PG0	_WR
22	PA5	AD5	PG1	_RD
23	PA6	AD6	PC0	A8
24	PA7	AD7	PC1	A9
25	P7_9V		PG2	ALE
26	GND		GND	

LCD	
Pin	signal
1, 2	GND
3, 4	VCC
5, 6	P1
7, 8	RS/PC7
9, 10	R_W/PC6
11, 12	ELC/PB0
13, 14	R9
15, 16	R10
17, 18	R11
19, 20	R12
21, 22	D4/PC5
23, 24	D5/PC4
25, 26	D6/PC3
27, 28	D7/PC2
29, 30	R13
31, 32	GND
33, 34	J4

P1: contrast
R13: back light

RS232	
1	Loop
2	Loop
3	TXD
4	RTS/TXD2
5	RXD
6	CTS/RXD2
7	Loop
8	NC
9	GND
10	NC

Prog	
1	MOSI
2	Vcc
3	P_LED
4	GND
5	RES
6	GND
7	SCK
8	GND
9	MISO
10	GND

Connector remarks

For the alternate function description see the Atmel documentation (link on page 3).

PD2, PD3 can be used to implement hardware handshaking. If they are used to create a second (hardware) serial port the signals from the 2 * 5 pin connector must be externally split to two serial cables.

The LCD connector is mounted on top of the board normally, but not necessarily. Both odd and even pin numbers are used to carry the LCD signals. On the LCD both rows may therefore be short circuited. The board can be connected to a display via a flat-cable. A single row connector can be used at the LCD end of the cable, which is less bulky.

The port pins not found on JP1 and JP2 are found on the LCD connector.

The R_W signal to the LCD should be driven from the processor. Many applications never read the display. It should be set to *write* in that case (PC6 = '0'). When starting using the display set the potentiometer value to app. 2...3 k Ω (to ground) and adjust the contrast when text is displayed.

The _RES signal may pulled low from the main board (10 k Ω pull-up).

Modifications

None so far

Getting started

Great care must be taken when programming the *lock* and *fuse* bits. There is a separate note on this issue: http://www.nikhef.nl/pub/departments/et/misc/atmega128/fuse_lock.pdf

For normal use of the plug-on board, the factory settings of the for most of the lock and fuse bits are fine. A few bits need to be changed:

- The clock selection (default 0001) should be external (fast) crystal: CKSEL = 111X.
- JTAG should be disabled to free the port pins for general use.
- The M103 compatibility mode should be disabled to make full use of the M128 capabilities.

Keep in mind that the Pony-programmer indicates programmed bits (set to zero) with a marked box (✓). BasCom shows the current setting; bit-pattern and meaning. The lock and fuse bits should be programmed before the flash and Eeprom are filled. Tested boards have these bits set properly already.