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HC(S)08-System for Development and Training

Overview

V 0.3 (Draft English)

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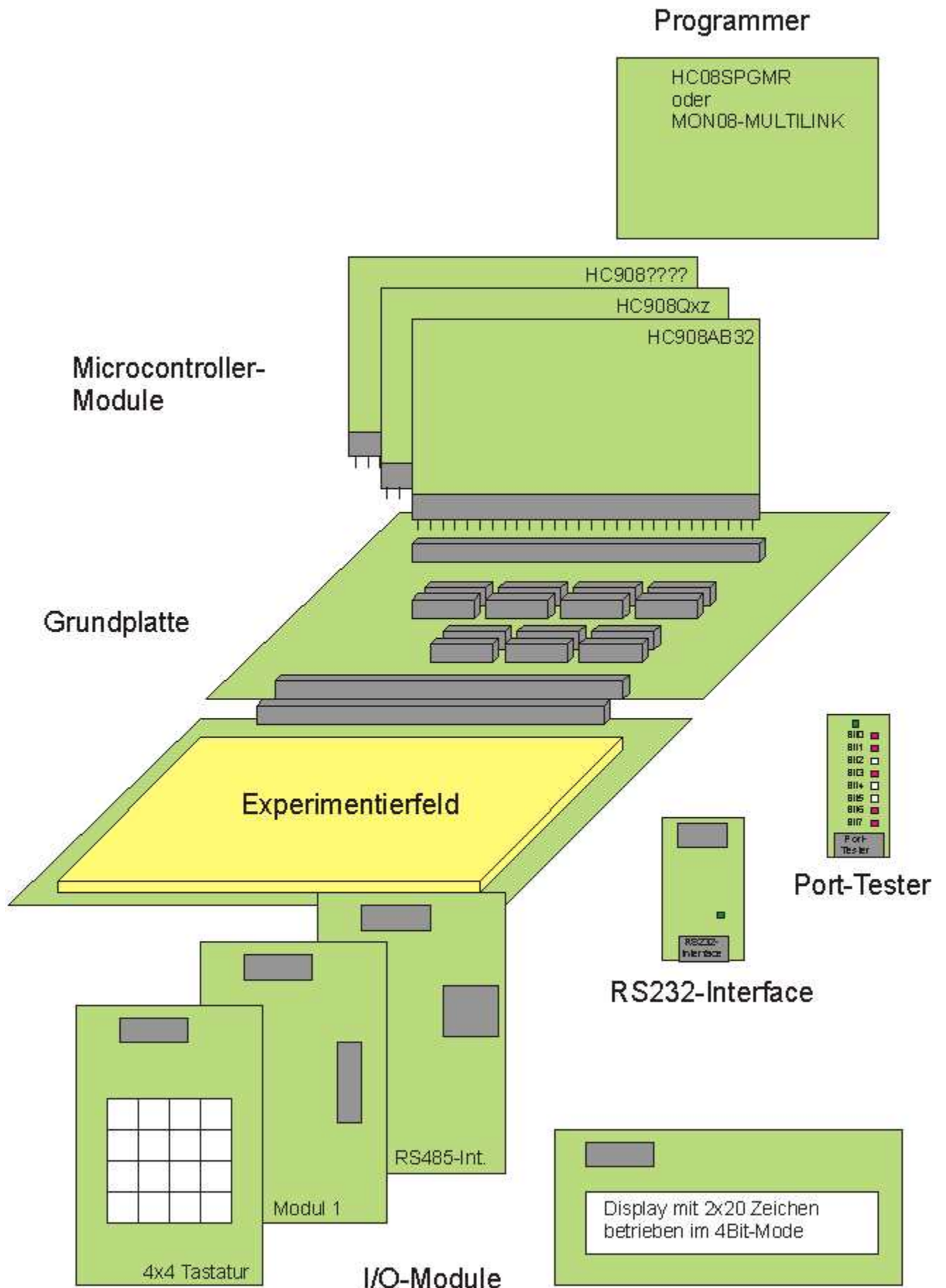
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Components

Das HC(S)08 system consists of different components like:

- Hardware
with different modules
- Software Development System
with assembler, programmer, in circuit debugger und simulator
- Software Modules
- Training System
with examples and tutorials for different levels
(also useful for developers to learn how the different sub systems of the HC(S) family are working)
- Schema Layout Program
with schematic modules of the hardware
- Links and info for the PCB production
- Links and info for buying components
- Documentation im pdf-Format

Hardware *2.Generation with improved Pinout!*



The hardware of the HC(S)08 Development system consists of different modules. The concept of these modules are simple and they can be bought as PCB only, kit or assembled module.

The Base

The base allows the easy connection of the different microcontroller in- or outputs. The outputs are organized in 8bit ports with bit0...bit7, VCC_IO and GND. every port has a 10 pin connector for attaching other modules like stepper motor interface, keyboard or LCD display. There is also a 10 pin socket so the user can easily measure each single bit. The power for the system can be taken from the USB-Bus or via programmer. There is the possibility to add a module on the base for the 3.3V power requirements of the HCS family.

Microcontroller Modules

HC08Qxz

The HC08Qxz module is designed for the Q family. There is a 8pin and a 16pin socket on the module so the user can operate the HC908QY1, QY2 and QY4 controllers as well as the HC908QT1, QT2 or QT4 model. For programming purposes there is a 16pin header for the connection of a MON8 compatible programmer like MONLINK located on the board.

HC08AB32

The HC08AB32PK module is designed for the HC908AB32 microcontroller. The user can select the clock source either from a quartz or an oscillator. All the ports are available on a socket or on the header. For programming purposes there is a 16pin header for the connection of a MON8 compatible programmer like MONLINK located on the board.

We have planned to design the following microcontroller modules:

- HCS08GB60
- HCS08RC08
-
-

I/O Modules

Port Tester

The Port Tester is a simple tool to indicate the state of the bits of a port. The module fits in the port socket and indicates with 8 LEDs if the bits are low or high. A green LED indicates the presence of VCC_IO.

4x4 Keyboard

The 16 switches in form of a matrix can be used for interacting with the microcontroller. The existing software module allows the detection of the key(s) pressed and the debouncing.

LCD Display

The LCD display module allows to output information to the user. It uses the 4bit mode. With only 7bits the user can operate the display. The software allows to send single characters as well as strings and attributes to the display.

RS232-Interface

This simple level shifter allows to connect an ordinary RS232 interface to the SCI of the microcontroller. The module can be configured as modem or PC. Tx and Rx are ready to use

other signals can be wired on the jumper field.

RS485 Interface

Interface for level shifting (5V to RS485). With this module the user can create a communication bus for sending and receiving information from several units.

Experiment PCB

On the experiment field the user can build up their own circuits. There are soldering pads or as an option there is a field with contact strips. To connect external signals there are two 4mm headers, one BNC connector and two test points for the probes.

Steppermotor Module

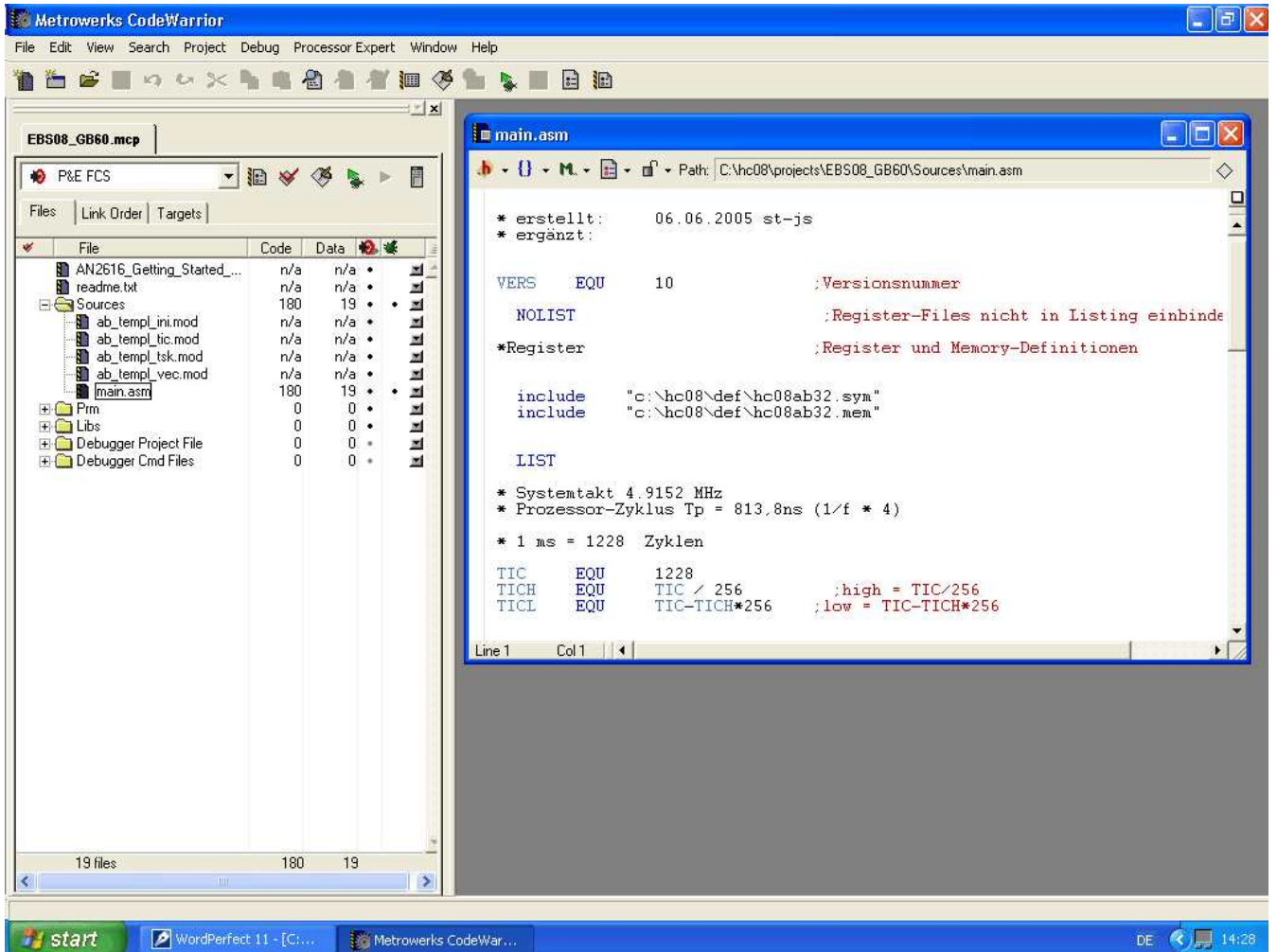
This board drives a simple unipolar stepper motor. The software module can move the motor either in half step, 1 phase or 2 phase mode. There is also the possibility to decrease the motor current with the boost bit.

USB SCI Module

The USB to SCI module allows the direct connection of a microcontroller to a PC with a USB port. The power (5V) is supplied from the USB bus, so that there is no additional power required.

Software Development Environment

For the software development Metrowerks Codewarrior is used. It can be downloaded for free from www.metrowerkc.com. Prepared templates for the EBS08 are available for different microcontrollers. This makes it easy to start with the system.



AB60 IDE

Software Modules

The software modules are helping to develop own programs in a short time. Som of the modules are designed for the use in the **EBS08 operating system**. Those modules are also used in the tutorials. (i.e. the keyboard routine)

Math routines

Addition 16/16bit, addition 32/32bit, multiplication 8/16bit, etc.

Keyboard routine

Scanning of a 4x4 keyboard matrix with decoding of two keys pressed

Operating System with Communication Interface

RS232-ASCII Protocol, LIN-Protocol, MODBUS-Protocol, MIP-Protocol

AD Routine

Analog/Digital-Converter Routine with calculating mean value

LCD Routines

Controlling of Industry Standard LCD Modules

PWM Routines

Generating of PWM pulses

Stepper motor Routines

Controlling of a unipolar Stepper motor for halfstepp, 1-phase, or 2-phase mode

Training System

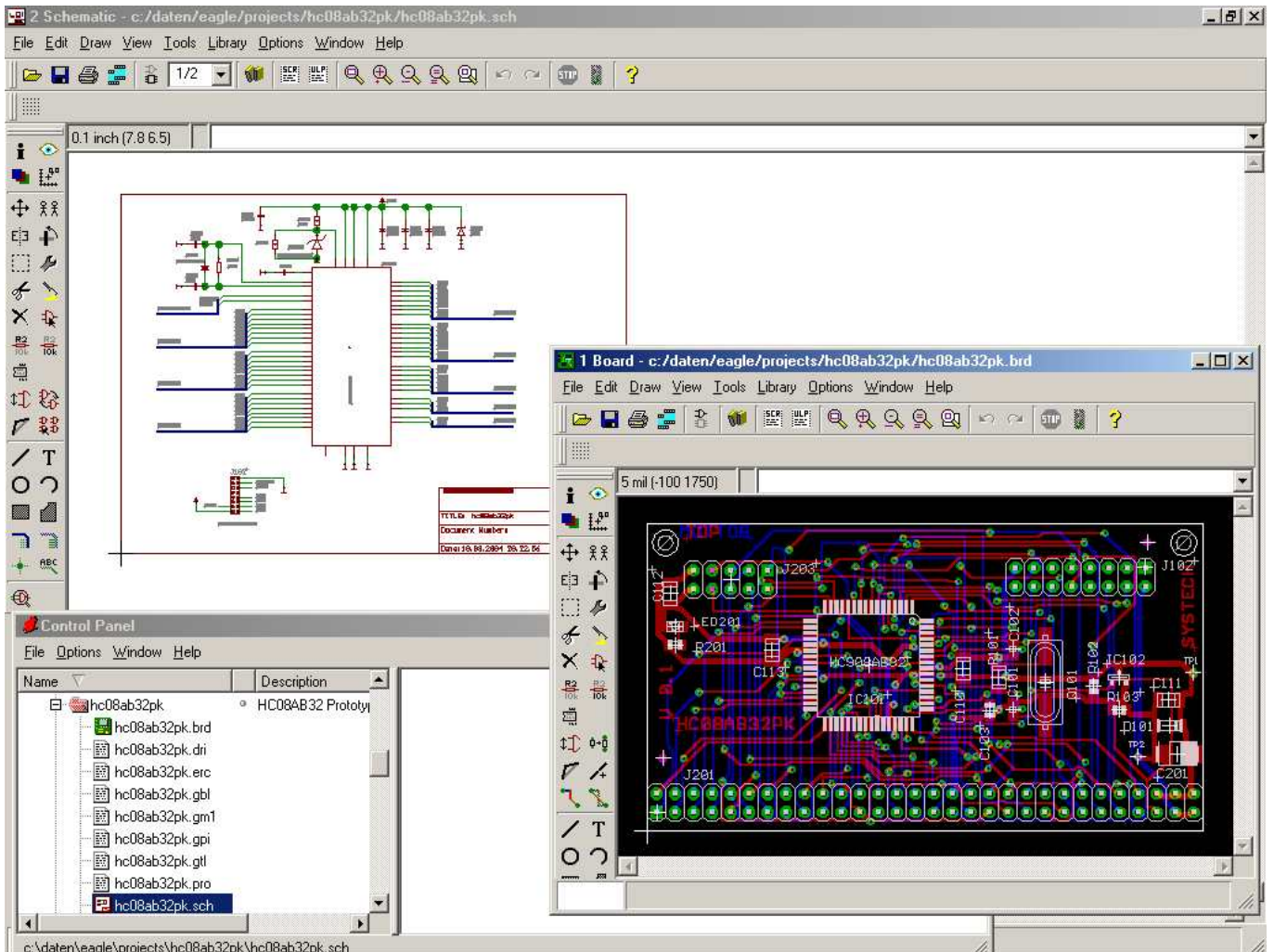
The Training system shall help to understand the HC(S)08 family in an easy way. Users of other HC(S)08 devices will have the possibility to understand other sub systems of the family.

It is planned to integrate the following modules in the training system:

- HC(S)08 courses
- HC(S)08 instruction set description
- Descriptions of sub systems
- Tutorials

Schematic and Layout Program

To simplify the development of the hardware the user needs a easy to handle schematic and layout program. That's why the basic schematics are available for the Layout editor EAGLE. The user can download a free trial/non profit version from www.cadsoft.de . It comes with schematic and layout editor as well as a autorouter. With the CAM interface the user can generate the data for the PCB manufactory or for the milling of the PCB (i.e. with a LPKF unit).



EAGLE Layout Editor

Schematic Templates

To draw the schematics in a efficient way we have prepared templates for most of the modules for the EAGLE layout program.

Print Service

Some PCB manufactures are offering prototypes within a couple of day; they sometimes even use the EAGLE data without the need of Gerber files.

Distributor

Our boards come with the part numbers of distributors (Distrelec until now) so the user can easy order the parts without creating boring BMs.

Appendix

Pinout Port Connector (10 Pin)

1	Px0	2	Px1
3	Px2	4	Px3
5	Px4	6	Px5
7	Px6	8	Px7
9	+5V	10	GND

x stands for: A, B, C, D, E, F

(Attention not all ports are consisting of Px0 .. Px7)

Pinout Interface Connector (72 Pin)

1	/RESET	2	/IRQ
3	PH0	4	PH1
5	PH2	6	PH3
7	PH4	8	PH5
9	PH6	10	PH7
11	PG0	12	PG1
13	PG2	14	PG3
15	PG4	16	PG5
17	PG6	18	PG7
19	PF0	20	PF1
21	PF2	22	PF3
23	PF4	24	PF5
25	PF6	26	PF7
27	PE0	28	PE1
29	PE2	30	PE3
31	PE4	32	PE5
33	PE6	34	PE7
35	VCC_IO	36	GND
37	PD0	38	PD1
39	PD2	40	PD3
41	PD4	42	PD5

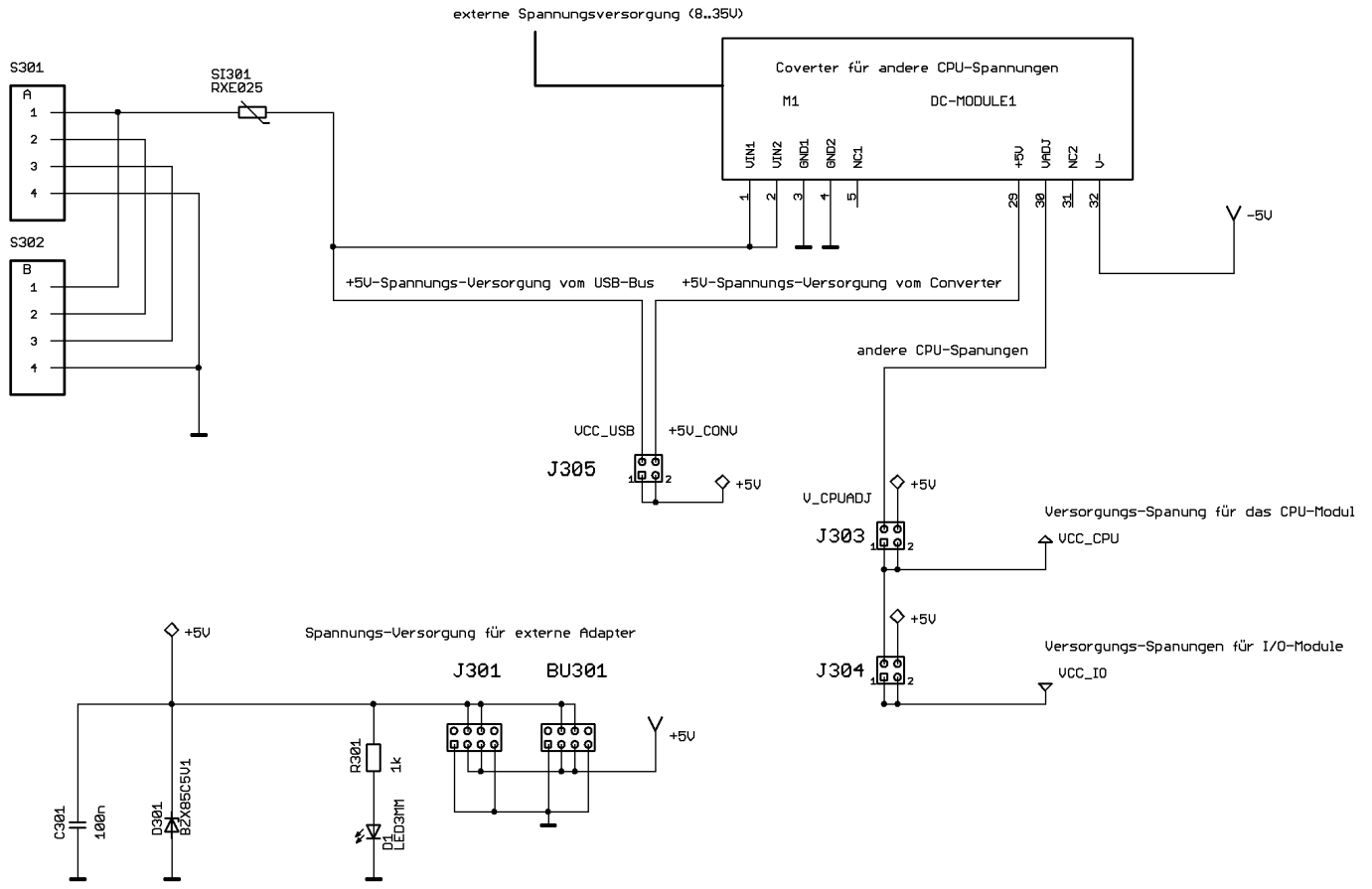
43	PD6	44	PD7
45	PC0	46	PC1
47	PC2	48	PC3
49	PC4	50	PC5
51	PC6	52	PC7
53	PB0	54	PB1
55	PB2	56	PB3
57	PB4	58	PB5
59	PB6	60	PB7
61	PA0	62	PA1
63	PA2	64	PA3
65	PA4	66	PA5
67	PA6	68	PA7
69	+5V	70	GND
71	VCC_CPU	72	-5V

Pinout MON8 Interface

1	--	2	GND
3	--	4	/RESET
5	--	6	/IRQ
7	--	8	--
9	--	10	PA0
11	--	12	PC0
13	OSC1	14	PC1
15	+5V	16	PC3

The Power Distribution on the Base

The Power Concept



Links

Distrelec

www.distrelec.com

Bauteile und mehr

Systech J.Schnyder GmbH

www.systech-gmbh.ch

**Entwicklung von Hard- und Software, Schulungs-Systeme
Layout-Programme**