

V4r3

Technical Data

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1. Features

V4r3 is a microcontroller based on the ARM9 architecture.

Features:

- Atmel AT91SAM9263 CPU (Arm 926EJ-S Core, 200MHz)
- 128 MiB SDRAM (2 banks 32bit/100MHz)
- 2 MiB battery backed static RAM
- 4 MiB serial Dataflash
- 64 MiB NAND Flash
- Socket for memory cards

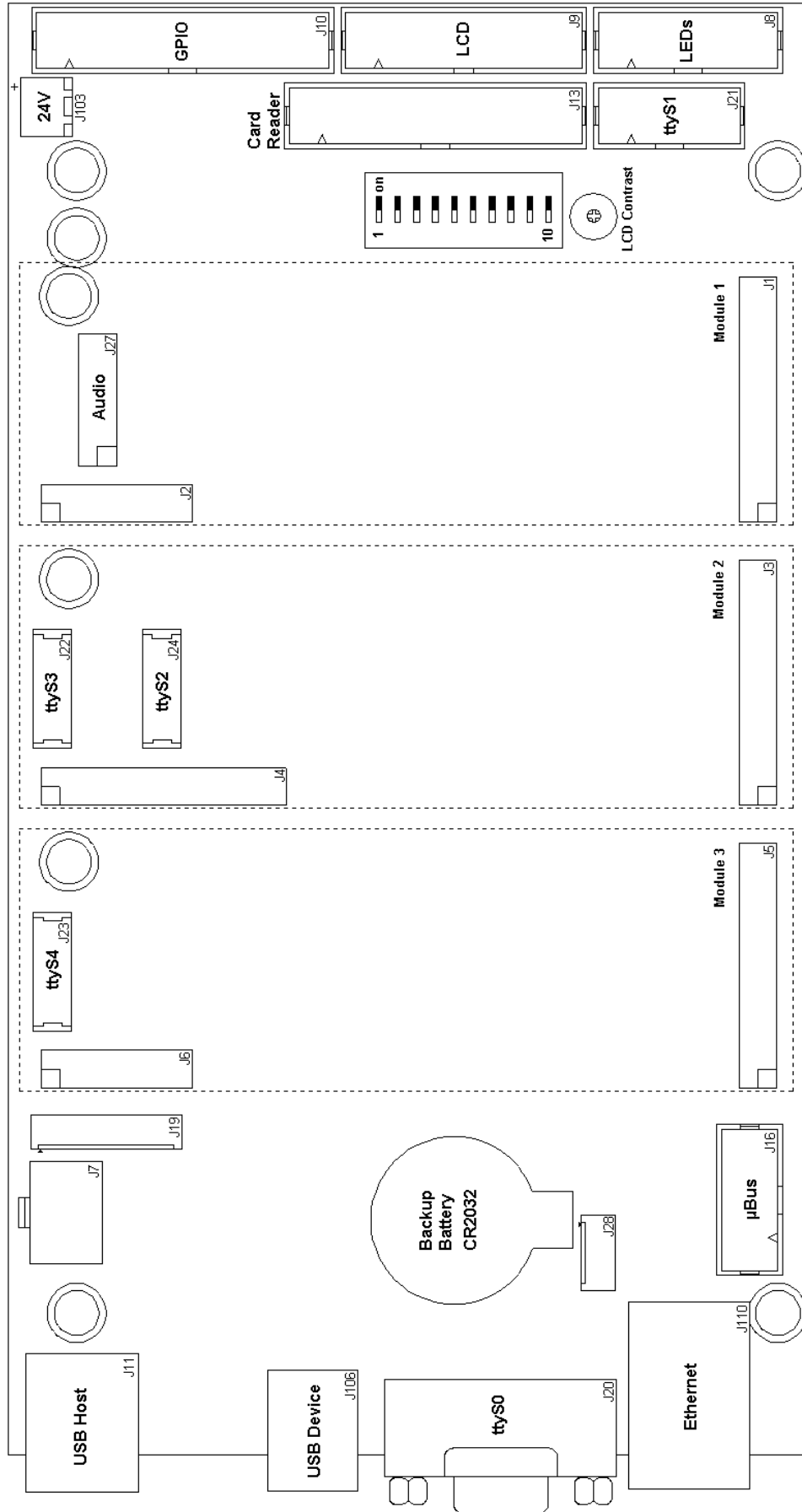
Interfaces:

- TTL-RGB interface for TFT or OLED displays up to 1024x768
- 4-wire touch screen interface
- 10/100 Ethernet Auto MDI-X
- 2 x USB Host ports
- 1 x USB Device port
- TWI-port (I²C compatible)
- Five RS232 ports (Two with full modem control, three with RTS/CTS only)
- MDB port (Industry standard coin changer and bill validator interface)
- Teratronik μ Bus port (Drives external Relay and Input/Output interfaces)
- Drives two industry standard alphanumeric LCD Displays
- Digital IO port (5 x TTL out, 4 x TTL in, 5 Volts)
- LED port (6 x LED output)
- Magstripe reader port
- Audio connector with 1W mono speaker driver, microphone in, stereo line-in, line-out and call-button input

2. Views

2.1 *Connector overview*

The next page shows an overview of all connectors on the V4 Controller.



3. Connector descriptions

3.1 J8 – LED Port

Uses a 14pin 0,1“ header. The pinout is compatible to the MAKWCR V3.

<i>Pin</i>	<i>J8</i>	
1	SKIN0	Input, low active, pulled up to 5V
2	SKIN1	
3	+24V	
4	+5V	
5	BUZZER	Supports piezo buzzer to GND
6	GND	
7	SKLED2	LED to 5V, resistor on board
8	SKLED5	LED to 5V, NO RESISTOR
9	SKLED3	LED to 5V, resistor on board
10	SKLED0	
11	SKLED1	
12	SKLED4	
13	SKIN2	Input, low active, pulled up to 5V
14	SKIN3	

3.2 J9 – Alphanumeric LCD

Uses a 20pin 0,1“ header. The pinout is compatible to the MAKWCR V3.

<i>Pin</i>	<i>J9</i>	<i>Pin</i>	<i>J9</i>
1	GND	11	D4
2	+5V	12	D5
3	Contrast Voltage	13	D6
4	RS	14	D7
5	GND (R/W)	15	+5V
6	E1	16	LIGHT
7	GND (D0)	17	+5V
8	GND (D1)	18	LIGHT
9	GND (D2)	19	
10	GND (D3)	20	E2

Notes:

- The display is driven in 4bit mode.
- E1 is the first, E2 is the second display chip select.
- No data is being read from the display. R/W is connected to GND.
- Pins 16+18 are driven low through 5Ω to power the backlight.

3.3 J10 – GPIO

Uses a 26pin 0,1“ header. The pinout is compatible to the MAKWCR V3.

<i>Pin</i>	<i>J10</i>	<i>Pin</i>	<i>J10</i>
1	External Battery 3V	14	+24V
2	SKOUT3	15	GND
3	SKOUT4	16	no pin
4	SKOUT2	17	GND
5	SKIN1	18	GND
6	SKOUT0	19	+24V
7	SKIN0	20	+24V
8	SKOUT1	21	GND
9	SKIN2	22	+24V
10	SKIN3	23	GND
11	(+5V)	24	+24V
12	(+5V)	25	GND
13	+24V	26	+24V

Notes:

Pins 11+12 are bridged, but not connected to anything on the V4 Controller. These pins were used to feed +5V to the MAKWCR V3 and are no longer used by the V4.

This connector can be used to feed +24V Power to the V4 controller.

Alternatively, the +24V power may also be provided via the power connector J103.

Power input to the V4 by any other means is not supported.

3.4 J11 - USB host port

USB-A double jack using standard pinout.

Hardware includes built-in overload protection that can switch off each port separately.

3.5 J13 – Card reader

Uses a 26pin 0,1“ header. The pinout is similar to an Omron/Leadus MBR/MCR card reader. With specific adaptors, other readers can be connected, too.

<i>Pin</i>	<i>J13</i>
1	+24V
2	+24V
3	GND
4	GND
5	SKIO9
6	SKIO10
7	SKIO0
8	SKIO1
9	SKIO2
10	Chip Power
11	RDT1
12	RCP1
13	RDT2

<i>Pin</i>	<i>J13</i>
14	RCP2
15	RDT3
16	RCP3
17	+5V
18	
19	No pin
20	SKIO7
21	SKIO3
22	SKIO4
23	SKIO11
24	SKIO5
25	SKIO8
26	GND

3.6 *J16 – μ Bus*

Uses a 10pin 0,1“ header. This connector allows the attachment of eeMIO and/or fpMIO control boards.

<i>J16</i>	<i>Pin</i>	<i>Pin</i>	<i>J16</i>
GND	1	2	RESET
GND	3	4	TRANSMIT
GND	5	6	RECEIVE
GND	7	8	+5V
GND	9	10	+24V

3.7 *J20 – RS232 port ttyS0*

Uses a standard DE9 D-Sub connector with DCE pinout.

<i>Pin</i>	<i>J20</i>
1	
2	TxD (Output from V4)
3	RxD (Input to V4)
4	
5	GND
6	
7	CTS (Input to V4)
8	RTS (Output from V4)
9	

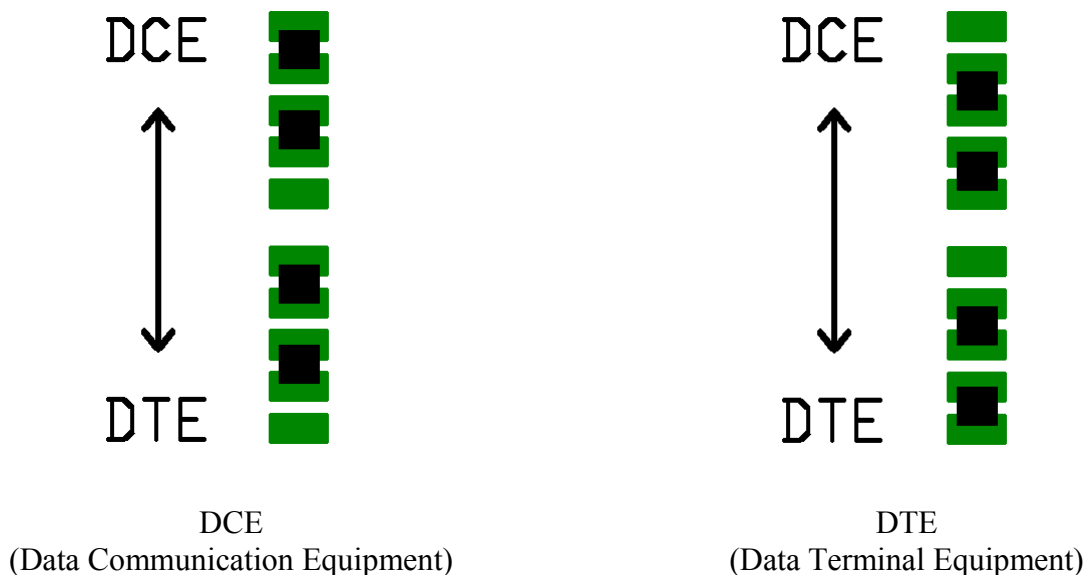
Serial Port ttyS0 is used as the Debug Port. It will report debug messages when the board is started with DIP1 set to on. This connector is wired in DCE mode and will interface directly with a PC.

3.8 J21 – RS232 port ttyS1

Uses a 10pin 0,1“ header. The pinout is configurable between DTE and DCE pinout by means of a set of jumpers at the bottom of the board.

<i>Pin</i>	<i>J21 – DCE</i>	<i>J21 – DTE</i>
1		
2		
3	TxD (Output from V4)	RxD (Input to V4)
4	CTS (Input to V4)	RTS (Output from V4)
5	RxD (Input to V4)	TxD (Output from V4)
6	RTS (Output from V4)	CTS (Input to V4)
7		
8		
9	GND	GND
10	+5V can be provided with a jumper.	

To change between DTE/DCE configuration, turn over the board and locate the jumper set next to the connector. There may be two or three jumper sets, depending on the specific serial port.



When wired to a DE9 female connector via flat cable, this serial port connects directly to a PC.

When wired to a DE9 male connector via flat cable, this serial port accepts devices meant to be connected to a PC.

3.9 J24 – RS232 port ttyS2

Uses a MicroMatch connector. Requires AMP/Tyco 215083-10 to connect. The pinout is configurable between DTE and DCE pinout by means of a set of jumpers at the bottom of the board, the same way as done for ttyS1.

<i>Pin</i>	<i>J21 – DCE</i>	<i>J21 – DTE</i>
1		
2		
3	TxD (Output from V4)	RxD (Input to V4)
4	CTS (Input to V4)	RTS (Output from V4)
5	RxD (Input to V4)	TxD (Output from V4)
6	RTS (Output from V4)	CTS (Input to V4)
7		
8		
9	GND	GND
10	+5V can be provided with a jumper.	

3.10 J22, J23 – RS232 ports ttyS3, ttyS4

Uses a MicroMatch connector. Requires AMP/Tyco 215083-10 to connect.

The pinout is configurable between DTE and DCE pinout by means of a set of jumpers at the bottom of the board, the same way as done for ttyS1. Regardless of DTE/DCE setting, the signals DCD and RI are always inputs to the V4.

<i>Pin</i>	<i>J21 – DCE</i>	<i>J21 – DTE</i>
1	DCD (Input to V4)	DCD (Input to V4)
2	DTR (Output from V4)	DSR (Input to V4)
3	TxD (Output from V4)	RxD (Input to V4)
4	CTS (Input to V4)	RTS (Output from V4)
5	RxD (Input to V4)	TxD (Output from V4)
6	RTS (Output from V4)	CTS (Input to V4)
7	DSR (Input to V4)	DTR (Output from V4)
8	RI (Input to V4)	RI (Input to V4)
9	GND	GND
10	+5V can be provided with a jumper.	

3.11 J27 – Audio

Uses a 14pin right angle 0,1“ header.

<i>Pin</i>	<i>J27</i>
1	LINE IN Left
2	LINE IN Right
3	LINE IN GND
4	Speaker
5	Speaker
6	GND
7	MIC
8	CALL
9	GND
10	Reserved
11	Reserved
12	GND
13	LINE OUT Right
14	LINE OUT Left

Notes:

- Connect an 8Ω Speaker to pins 4 and 5. A one Watt amplifier is provided on board.
- For better noise rejection when using LINE IN, connect LINE IN GND to GND at the source end of the cabling.
- Connect an electret microphone between pins 6 and 7. Power to the mic is provided through a 2k7 pull-up to +5V.
- A push button can be connected between pins 8 and 9. It is meant as an intercom call button.

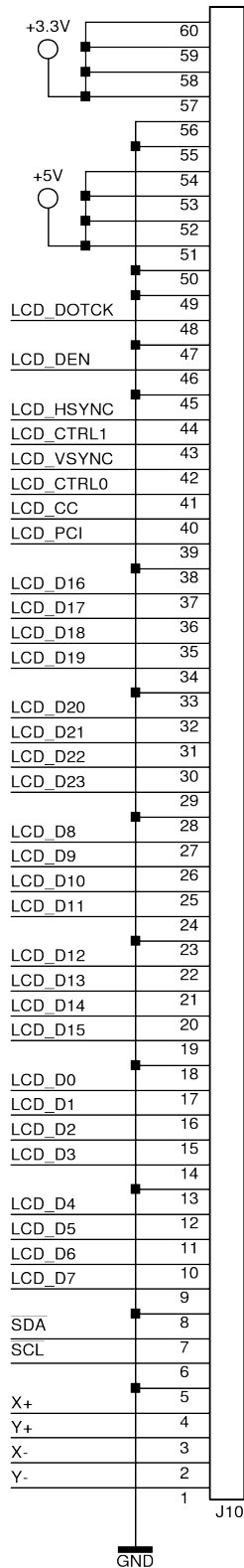
3.12 J103 – Power

Two pin 3.5mm header. Accepts PTR AK1550 jacks.

This connector feeds +24V Power to the V4 controller. Alternatively, the +24V power may also be provided via the GPIO connector J10.

Power input to the V4 by any other means is not supported.

3.13 J104 - RGB-TTL display connector



This connector, located at the bottom of the board, provides a full 24-bit RGB-TTL interface.

Supplies +5V and +3.3V for powering the display.

Also provides access to the SDA/SCL TWI-interface and some general purpose ports.

Pinout			Description
DOTCK	PC2	48	Pixel clock
DEN	PC3	46	Data-enable
HSYNC	PC1	44	Horizontal-sync
CTRL1	PE24	43	General purpose
VSYNC	PC0	42	Vertical-sync
CTRL0	PE21	41	General purpose
CC	PB9	40	'ContrastControl' PWM-output for brightness.
PCI	PB29	39	'PowerControlInput' General purpose
D16 - D23	PC20 - PC27		Red
D8 - D15	PC12 - PC19		Green
D0 - D7	PC4 - PC11		Blue
SDA	PB4	7	TWI interface, 3.3V TTL
SCL	PB5	6	
X+	to WM9705 Codec	4	4-wire touch screen
Y+		3	
X-		2	
Y-		1	

3.14 J105 - Socket for memory cards.

This socket, located at the bottom of the board, accepts common memory cards. Compatible with MMC, SD-Card and SDHC.

Note: Due to a bug in the built in ROM of the AT91SAM9263, the board will not start if a SDHC or SDXC card is present inside the socket while the board resets.

The Core4 operating system fully supports SDHC cards up to 32GB if the card is inserted while the system is powered.

3.15 J110 - Ethernet 10/100

This is a standard RJ45 ethernet jack.

This port supports auto MDI-X. You can connect it with a single other device without the need for a switch or a special cable.

3.16 J106 - USB device port

USB-B Jack with standard pinout.

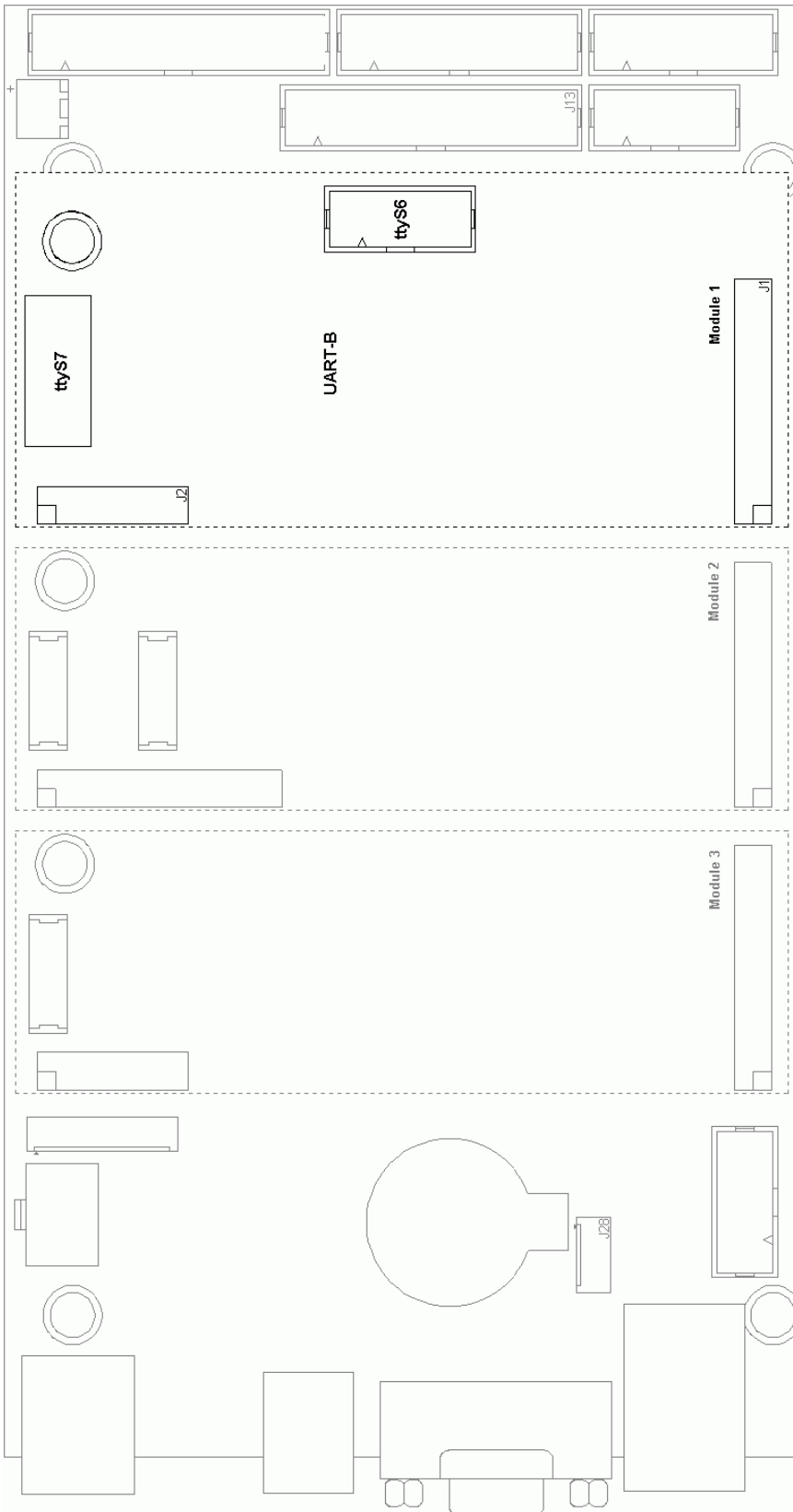
4. Add on modules

The V4 controller can be extended with add-on modules. The three module locations on the V4 controller are almost identical in function, with a few exceptions.

Module location 1 allows the use of wider modules like UART-B, which can overlap over the DIP switch. Module location 2 has a few additional IO ports.

The module connections are signal-compatible with the V3 controller.

4.1 UART-B



This is the same UART-B module that was already used with the MAKWCR V3 Controller.

The module adds two serial ports: One RS232 port and one galvanically isolated RS485 port.

The drawing to the left indicates the device names of the serial ports.

Due to its size, the module can only be installed on location 1, as shown.

Connector pinout of RS232 port on the UART-B Module

Uses a 10pin 0,1" header. The module can be ordered in either DTE or DCE configuration.

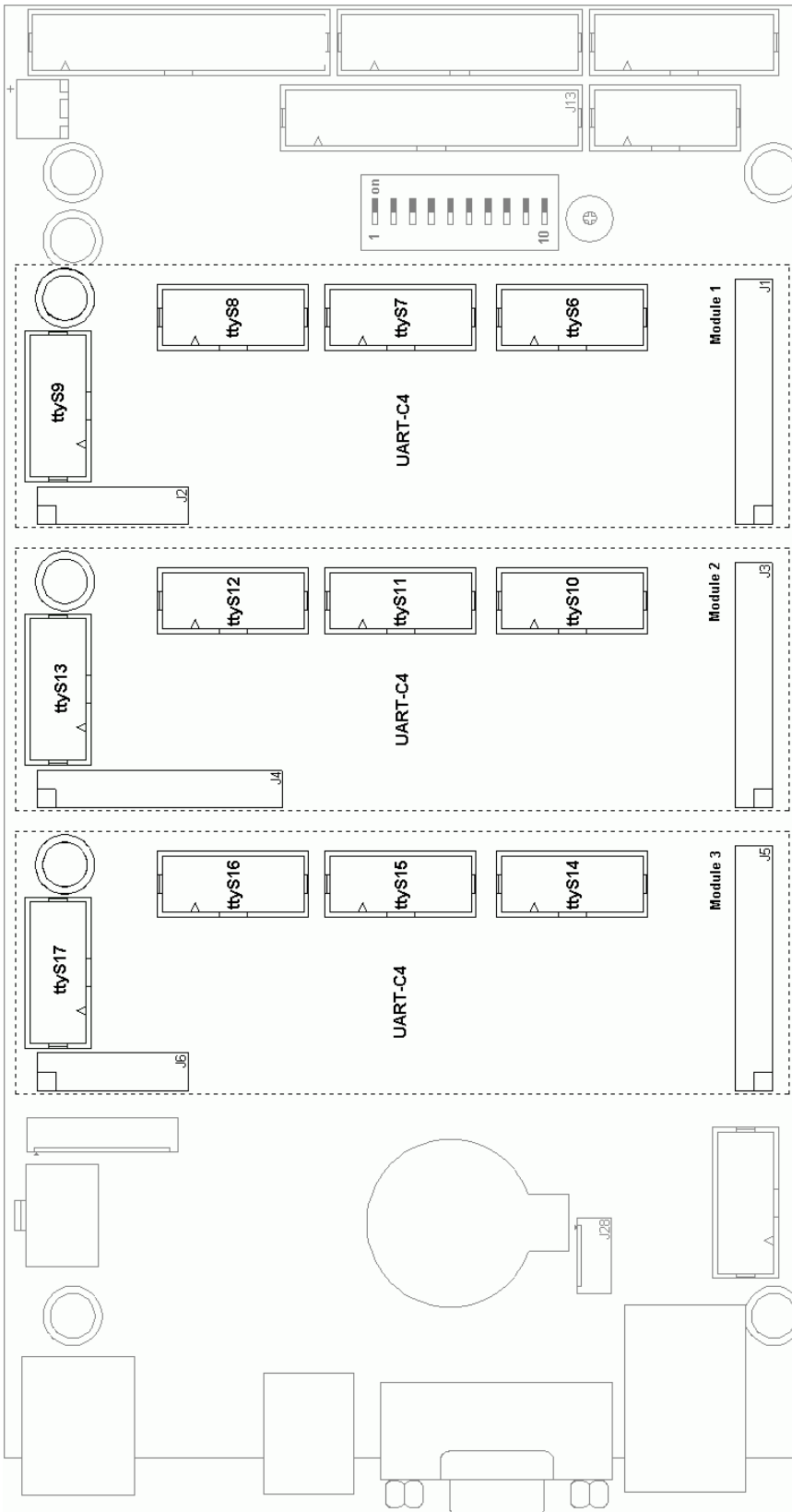
<i>Pin</i>	<i>DCE</i>	<i>DTE</i>
1		
2		
3	TxD (Output from Module)	RxD (Input to Module)
4	CTS (Input to Module)	RTS (Output from Module)
5	RxD (Input to Module)	TxD (Output from Module)
6	RTS (Output from Module)	CTS (Input to Module)
7		
8		
9	GND	GND
10	+5V can be provided with a jumper.	

Connector pinout of RS485 port on the UART-B Module

Use a 5mm pitch RIA screw-terminal. The connector pinout is printed on the module the next to the connector.

<i>Pin</i>	<i>RS485</i>
2	Tx+
3	Tx-
4	Rx+
5	Rx-

4.2 UART-C4



This is the same UART-C4 module that was already used with the MAKWCR V3 Controller.

The module adds four RS232 serial ports.

The drawing to the left indicates the device names of the serial ports for each module location.

Up to three UART-C4 modules may be added.

Connector pinout of the RS232 ports on the UART-C4 Module

Uses a 10pin 0,1" header. The pinout is configurable between DTE and DCE pinout by means of a set of jumpers at the bottom of the board.

<i>Pin</i>	<i>DCE</i>	<i>DTE</i>
1		
2		
3	TxD (Output from Module)	RxD (Input to Module)
4	CTS (Input to Module)	RTS (Output from Module)
5	RxD (Input to Module)	TxD (Output from Module)
6	RTS (Output from Module)	CTS (Input to Module)
7		
8		
9	GND	GND
10	+5V can be provided with a jumper.	