File:	COBRA5282_en.pdf
Location	COBRAXXXX-CD/documentation/boards/COBRA5282/en/
Author:	mihu
Contents:	description of the COBRA5282 Module
Version:	v01.00
Date:	Tue Mar 23 10:00:00 CEST 2004
Licence:	This document is under GNU GPL (see COBRAXXXX-CD/COPYING)

CHANGES

20040323	v01.00 creation (mihu)

COBRA5282 Module

Note: A small note at the beginning for our native English customers: You will easily find out that our English is not perfect. So if you don't understand something, if you have questions or suggestions, please email us so we can improve our documentation! Thanks a lot!

This document describes the structure and the features of the COBRA5282 Module.

Contents:

1 The COBRA5282 Module

The COBRA5282 board is a versatile single board computer module based on the MCF5282 ColdFire® microprocessor. It may be used as a powerful microprocessor based controller in a variety of applications. With the addition of a terminal, it serves as a complete microcomputer system for reference design, development/evaluation, training and educational use. The user only needs a RS-232 cable, a terminal (or a personal computer with terminal emulation software) and power supply to have a fully functional system.

The COBRA5282 Module is delivered with the dBUG ROM monitor. This monitor program allows the loading and the start of programs on the COBRA5282 Module and supports the development and test of user software.

For the specification of the dBug monitor refer to the dBUG User's manual (documentation/coldfire/DBUGBOOK.pdf).

The COBRA5282 Module was constructed in order to be inserted in a user specific application. The user can attach the COBRA5282 Module to his specific board by means of two 36 pin connectors.

2 General description

The COBRA5282 board offers to the user SDRAM, Flash-ROM, a Fast Ethernet interface (10/100 MBit/s), two RS232 interfaces as well as all the embedded features of the MCF5282 processor (Figure 1).

The MCF5282 is a member of the ColdFire microprocessor family of Motorola. It is a 32-Bit processor with a 23-Bit external address bus and a 32-Bit data bus. The processor has eight 32-Bit data registers, eight 32-Bit address registers, a 32-Bit program counter and a 16-Bit status register.

The MCF5282 processor has a System Integration Module, which contains a lot of the functions necessary for the design of a complete system. This includes for example the programmable Chip Select logic, a system protection logic, universal I/Os as well as interrupt logic.

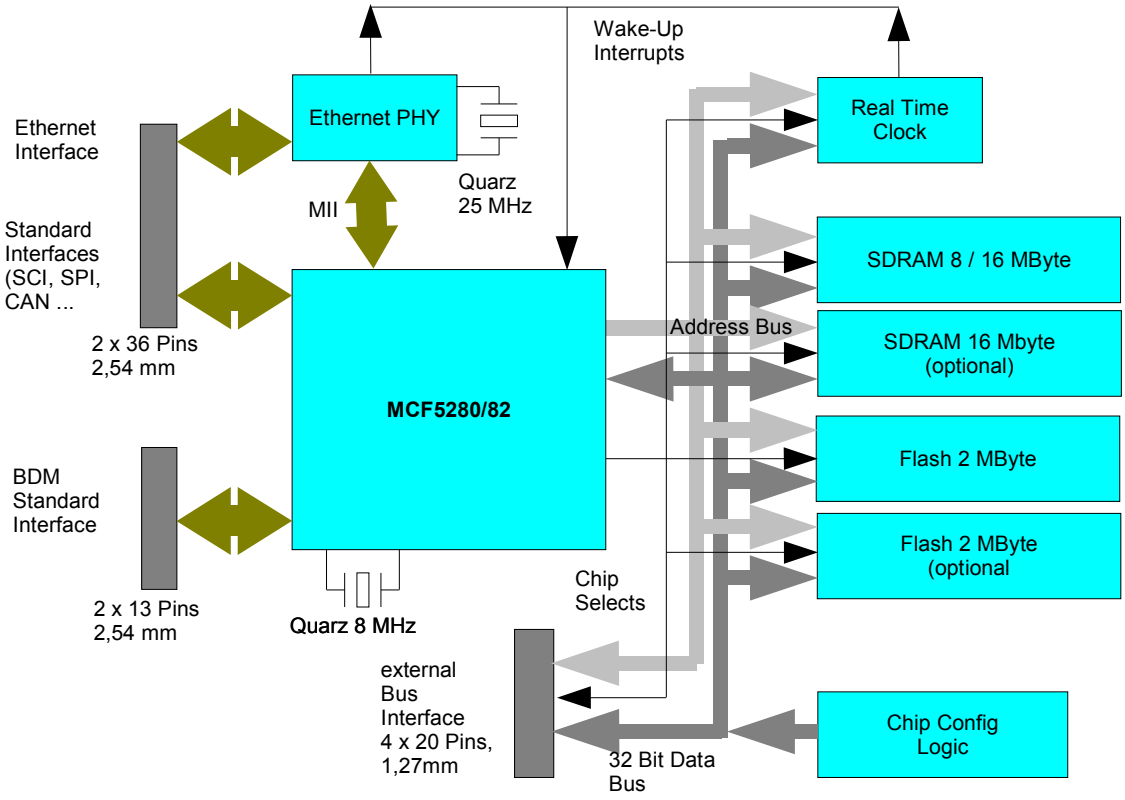

Figure 1 Block diagram of the COBRA5282-Module

Please refer to the MCF5282 User's Manual of Motorola (you can find a version of this document in the file documentation/coldfire/MCF5282 User's Manual.pdf on the CD provided with this Starter Kit).

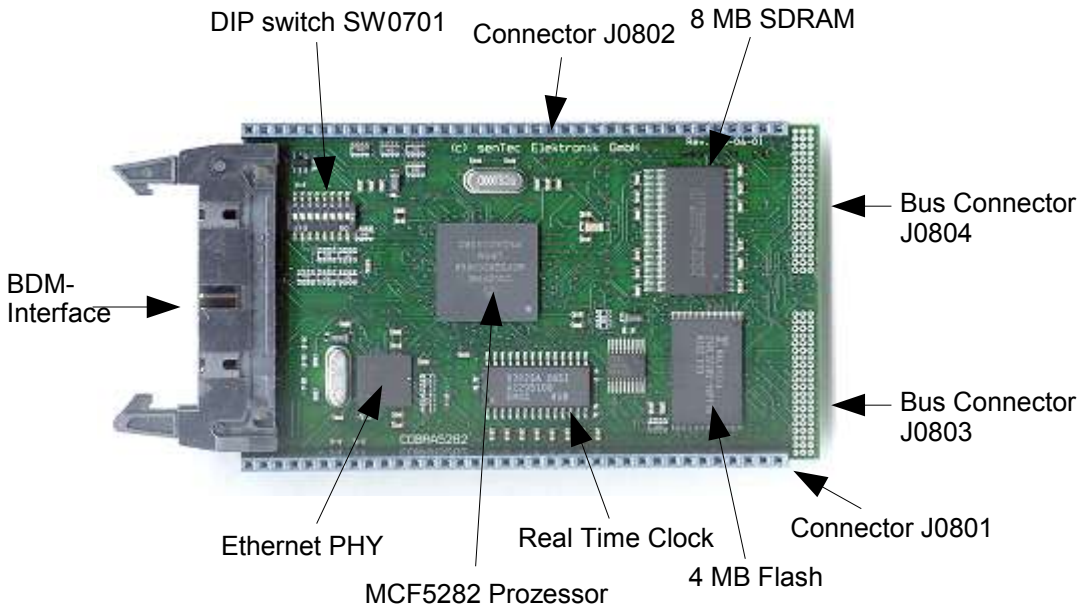

Figure 2 COBRA5282 Module

3 COBRA5282 Memory

The COBRA5282 Module has a 4 MByte Flash memory which is used for nonvolatile storage of both the user programs and the dBUG debugger/monitor in the lower memory area. The 4 MByte Flash memory is 16 Bit wide and is organized as 16 bits x 2M. The MCF5282 microprocessor has 64 kByte internal SRAM, which can be used for storing data or instructions.

On the COBRA5282 Module one SDRAM circuit with an access width of 32 bits is contained. In the standard configuration of the COBRA5282 Module 8 MByte SDRAM are equipped, however an extension of up to 32 MByte is possible.

Address area	Signal	Device
$0000.0000 - $04FF.FFFF	dBUG (SDRAM-Target)	SDRAM mit maximum 32 MB
	SDRAM Space	
$1000.0000 - $1000.FFFF	/CS2	Real Time Clock
$2000.0000 - $2000.FFFF	internal SRAM	internal 4096 Byte = 4 kByte
$F000.0000 - $F007.FFFF	internal Flash	
$FFC0.0000 - $FFFF.FFFF	/CS0	4 MByte FLASH, 1. Bank

Table 1 Memory-Mapping of the COBRA5282 Module

In the DBug monitor only CS0 and CS2 are used by the chip selects. If the second Flash bank is equipped, CS1 is used for it. Otherwise, CS1 and CS3 are freely available.
The internal Instruction Cache of the MCF5282 is not-blocking. The size of the cache amounts to 1 kByte. The ROM monitor does not use the Cache, but the programs, which can be loaded using the ROM monitor, can initialize and use the Cache buffer memory.

4 Serial Communikation

The COBRA5282 board has two internal UARTs (UART1 and UART2) with independent Baud rate generators. The signals of the two interfaces use external drivers / receivers, in order to provide RS232 compatibility.
UART1 is the interface, which is used in standard applications for the connection of the terminal (with a baud rate of 19200 Bit/s).
Furthermore the MCF5282 provides an SPI interface, which can be used to address EEPROM or other periphery elements. The SPI signals are routed over the 2x36 pin connectors of the COBRA module.
The MCF5282 offers also a CAN interface. Thus, this interface can be used to communicate with another CAN node. For further information please refer to the document on the CD.

5 On-Board Ethernet

The COBRA5282 Module has on board an Ethernet-Controller, which can work with a speed of 10 MBit/s or 100 MBit/s. The starting configuration of the Ethernet controller is firmly adjusted:

Auto-Negotiantion enable
10BASE-T Half/Full-duplex
100BASE-T Half/Full-duplex

The configuration of the control register of the Ethernet controller can be changed after start up, so that different options than the starting configuration can be used.

The dBUG ROM monitor is programmed in such a way that it is possible for a user to load data in different form over the Ethernet interface into the memory.
Beyond that, the Ethernet interface naturally can be used by all applications, which run on the COBRA5282 Module. Thus, Internet applications like an Embedded Web server can be implemented in a simple manner.

6 DIP switch SW0701

On the COBRA5282-Modul a DIP switch with altogether 8 single switches can be found, with which the module can be configured (see Figure 2).

Switch	Meaning	ON	OFF
1	JTAG EN	JTAG enabled	BDM enabled
2	Mode	Single Chip Mode: the internal memory only is used. The external address- data- and CS-pins ure used as GPIO	Master Mode: the external memory area is used
3	Boot device	internal	external
4	Bootoption	Bootoption 2	Bootoption 1
5	WP0	Flash Bank 0 ist write protected	Flash Bank 0 is not write protected
6	WP1	Flash Bank 1 ist write protected	Flash Bank 1 is not write protected
7	IRQ1	IRQ of the RTC as IRQ1 Coldfire	IRQ of the RTC not used
8	IRQ2	Receive signal of the Ethernet-PHY as IRQ2 Coldfire	Receive Signal of the Ethernet-PHY not used

Table 2: DIP switch SW0701

The pre-installed software provides the following boot options:

Boot option 1: booting dBug

Boot option 2: booting uClinux

7 Mechanical Dimensions and Connectors

The COBRA5282 Module is implemented on a 97mm x 58,4mm printed circuit board. On the COBRA5282 Module two connectors (2 rows of 36 contacts, 2.54mm) are located which serve for the electrical connection of the module with the Carrier Board (see figure 2)

At the face of the COBRA5282-Moduls are two further Connectors J0803 and J0804 ((2+1) x of 20 contacts, RM 1.27). If necessary the external address and data bus signals can be accessed at them. In order to ensure greatest possible flexibility, they are however not equipped. For example plug or socket strips can be used according to the following table:

name	*description*	*manufacturer / distributor*
FFMD-20-S-04.00-01-RW	male idc assembly Double End	samtec / DELTRON
FFMD-20-D-04.00-01-RW	male idc assembly Single End	samtec / DELTRON
FTSH-120-01-F-D	pin headers, straight	samtec / DELTRON
SMS-120-01-G-D	sockets, same height as J0801 und J0802	samtec / DELTRON
64504021721	low profile box headers, 90°	Würth Elektronik
62206421121	pin headers, straight	Würth Elektronik
62206420121	pin headers, 90°	Würth Elektronik

Table 3 Connection types of the bus connectors

Since the distance of the connection pins in transverse direction can be differently - 1.27 mm or 2.54 mm - the connections of the second row are present twice:

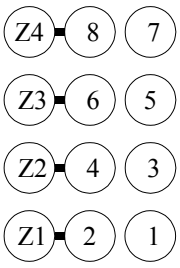

Figure 3 Prinziple J0803 und J0804

The pin allocation of these socket strips mentioned is to be found in table 6 and table 7.

8 Start-up of the COBRA5282 Module

The Starter Kit for the COBRA5282 Module is delivered with a Carrier Board, which delivers voltage supply and provides the most important interfaces. The COBRA5282 Module also can be operated on a customized basis board.

Below you can find a description of the most important points to integrate the COBRA5282 Module into a functioning working environment:

- Make sure that the COBRA5282 Module is placed on the Carrier Board the right way, so that the component side of the COBRA5282 Module points to the top. Make sure that the module is put in the correct way. To check this, please examine the pins of the two 36 pin connectors. On the Carrier Board of the Starter Kit there is a marking which should correspond to the marking of the COBRA5282 Module (a corner is marked with red color).
- (optionally) Install and configure the network card of your PC for communication with the target. Therefore you have to assign an IP address to your network card (for example IP 192.168.100.1).
- Connect the Ethernet interface of the target with the Ethernet interface of the host using a ”Cross-Over” Ethernet cable or standard Ethernet cables and an Ethernet hub.
- Connect the serial RS232 Interfaces of the host PC and the target with a standard serial cable. Please use the configuration: 19200 Baud, 8 data bits, no parity, 1 stop bit, no flow control
- (optionally) If necessary please start a terminal program on the host PC in order to examine the correct configuration of the target.
- Connect the power supply to the target. If you use a Starter Kit board your power supply should deliver 500mA at a voltage of 6V. In the terminal window you should see now the prompt of the dBUG monitor.
- The installation of the hard- and software of the host system is not part of this documentation. Please refer to the manuals of the manufacturer and/or suppliers of the system components.

Nr.	Name	Pin	Function	GPIO
1	GND	Supply Ground		
2	VDD	Supply Voltage		
3	ERD0+	Ethernet 0 Receive +		
4	ERD0-	Ethernet 0 Receive -		
5	ETD0+	Ethernet 0 Transmit +		
6	ETD0-	Ethernet 0 Transmit -		
7	LED_ETH0_D	Ethernet 0 LED Data		
8	LED_ETH0_L	Ethernet 0 LED Link		
9	ERD1+	N.C.		
10	ERD1-	N.C.		
11	ETD1+	N.C.		
12	ETD1-	N.C.		
13	LED_ETH1_D	N.C.		
14	LED_ETH1_L	N.C.		
15	V_BAT	Battery Voltage	power supply of the RTC	
16	V_Special	ADC Voltage	power supply of the ADC	
17	Special0	T3	AN0	PQB0
18	Special1	R2	AN1	PQB1
19	Special2	T2	AN2	PQB2
20	Special3	R1	AN3	PQB3
21	Special4	R4	AN52	PQA0
22	Special5	T4	AN53	PQA1
23	Special6	P3	AN55	PQA2
24	Special7	R3	AN56	PQA3
25	GPIOA0	N13	GPTA0	PTA0
26	GPIOA1	P13	GPTA1	PTA1
27	GPIOA2	R13	GPTA2	PTA2
28	GPIOA3	T13	GPTA3	PTA3
29	GPIOA4	N12	GPTB0	PTB0
30	GPIOA5	P12	GPTB1	PTB1
31	GPIOA6	R12	GPTB2	PTB2
32	GPIOA7	T12	GPTB3	PTB3
33	URXD0	N6	URXD0	PUA1
34	UTXD0	T7	UTXD0	PUA0
35	VDD	Supply Voltage		
36	GND	Supply Ground		

Table 4 Connector J0801

Nr.	Name	Pin	Function	GPIO
1	GND	Supply Ground		
2	VDD	Supply Voltage		
3	"/RSTO	P11	RSTO	
4	"/RSTI	R11	RSTI	
5	"/IRQ1	D15	IRQ1	PNQ1
6	"/IRQ2	D14	IRQ2	PNQ2
7	"/IRQ3	C16	IRQ3	PNQ3
8	"/IRQ4	C15	IRQ4	PNQ4
9	"/IRQ5	C14	IRQ5	PNQ5
10	"/IRQ6	B16	IRQ6	PNQ6
11	"/IRQ7	B15	IRQ7	PNQ7
12	I²C_CL	E15	SCL	PAS0
13	I²C_DA	E14	SDA	PAS1
14	CANTX	E13	CANTX	PAS2
15	CANRX	D16	CANRX	PAS3
16	SPI_DO	F13	DSPISOUT	PQS0
17	SPI_DI	E16	DSPISIN	PQS1
18	SPI_CLK	F14	DSPISCK	PQS2
19	SPI_CS0	G14	DSPICS0	PQS3
20	SPI_CS1	G13	DSPICS2	PQS4
21	SPI_CS2	F16	DSPICS3	PQS5
22	SPI_CS3	F15	DSPICS5	PQS6
23	SPI_CS4	N.C.		
24	SPI_CS5	N.C.		
25	GPIOC0	J13	DTOUT0	PTD0
26	GPIOC1	J14	DTIN0	PTD1
27	GPIOC2	J15	DTOUT1	PTD2
28	GPIOC3	J16	DTIN1	PTD3
29	GPIOC4	K13	DTOUT2	PTC0
30	GPIOC5	K14	DTIN2	PTC1
31	GPIOC6	K15	DTOUT3	PTC2
32	GPIOC7	K16	DTIN3	PTC3
33	URXD1	R7	URXD1	PUA3
34	UTXD1	P7	UTXD1	PUA2
35	VDD	Supply Voltage		
36	GND	Supply Ground		

Table 5 Connector J0802

Nr		*Name*
1		D0
2	Z1	D1
3		D2
4	Z2	D3
5		D4
6	Z3	D5
7		D6
8	Z4	D7
9		D8
10	Z5	D9
11		D10
12	Z6	D11
13		D12
14	Z7	D13
15		D14
16	Z8	D15
17		D16
18	Z9	D17
19		D18
20	Z10	D19
21		D20
22	Z11	D21
23		D22
24	Z12	D23
25		D24
26	Z13	D25
27		D26
28	Z14	D27
29		D28
30	Z15	D29
31		D30
32	Z16	D31
33		GND
34	Z17	GND
35		BS0
36	Z18	BS1
37		BS2
38	Z19	BS3
39		TSIZ0
40	z20	TSIZ1

Table 6 Connector J0803

Nr		*Name*
1		/TS
2	Z1	/TIP
3		/TEA
4	Z2	/TA
5		GND
6	Z3	/RST0
7		CLKOUT
8	Z4	VDD
9		/OE
10	Z5	R/W
11		/CS3
12	Z6	/CS2
13		/CS1
14	Z7	/CS0
15		GND
16	Z8	GND
17		A23
18	Z9	A22
19		A21
20	Z10	A20
21		A19
22	Z11	A18
23		A17
24	Z12	A16
25		A15
26	Z13	A14
27		A13
28	Z14	A12
29		A11
30	Z15	A10
31		A9
32	Z16	A8
33		A7
34	Z17	A6
35		A5
36	Z18	A4
37		A3
38	Z19	A2
39		A1
40	z20	A0

Table 7 Connector J0804