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Spec No: 002-05048

Spec Title: AN205048 - F2MC-16LX Family, DevKit16 MCU540 CPU Module Board

Replaced By: NONE

AN205048

F²MC-16LX Family, Devkit16 MCU540 CPU Module Board

This application note describes how to modify the DevKit16 MCU540 CPU board to use the MB90550 or MB90580 series.

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1 Introduction

The DevKit16 MCU540 CPU module board is supposed to support MB90540/545 series.

Following will describe how to modify the board to use the MB90550 or MB90580 series.

2 DevKit16 MCU540 CPU module board

The MCU540 CPU board is supposed to use with MB90540/545 series.

The board can be used for MB90F543G/GS, MB90F546G/GS and MB90F548G/GS series without any modifications.

When using MB90F583 or MB90F553 some Hardware changes must be done!

Note:

Different Softune Workbench Monitor Debugger must be used therefore.

Important:

Before modifying the CPU board, program first the Monitor Debugger into the MAIN board.

The current version of the DevKit16 Flash-Programming tool (ver. 1.4) doesn't support MB90550 or MB90580 series. Until a new version is available, program the Monitor Debugger while using MB90F543 chip, which is inside the delivery package.

3 Modifications

3.1 Original connection for MB90540/545 series

When using MB90F553A or MB90F583B:

Following connections must be cut at the CPU board:

- For the MB90F543 series the Pin 69 is the INT0 pin. This Pin69 is connected to the Pin C22 of the Interface Bus. Open this connection at the Interface Bus Pin C22.

- The UART is routed also to different Pins.

For MB90F543: The MB90F543 series include two UART's.

UART0:	Pin18 SOT0	connected to	Pin A12 of the Interface Bus
	Pin19 SCK0	connected to	Pin B12 of the Interface Bus
	Pin20 SIN0	connected to	Pin C12 of the Interface Bus

Cut the connections at the Pins A12, B12 and C12 of the Interface Bus.

UART1:	Pin24 SOT1	connected to	Pin A13 of the Interface Bus
	Pin22 SCK1	connected to	Pin B13 of the Interface Bus
	Pin21 SIN1	connected to	Pin C13 of the Interface Bus

Cut the connections at the Pins A13, B13 and C13 of the Interface Bus.

- The Reload Timer 1 of MB90F543 series is mapped to the DevKit16-MAIN board.

  Pin 67 TIN1 to B16 of the Interface Bus.

  Pin 68 TOT1 to B17 of the Interface Bus

Cut these connections at the Interface Bus Pin's.

When using MB90F553A:

Remove subclock (32.768KHz) X2 and Capacitors C8 and C9 at the CPU board.

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3.2 Changes for MB90550 series

MB90F553A:

Following connections to the Interface Bus must be done by wire:

The MB90F553A series is using Pin 47 for INT0.

Connect Pin 47 of the MCU with PIN C22 of the Interface Bus.

The MB90F553A series include one UART.

Depending which UART at the MAIN board should be used connect the Pins to the Interface Bus.

SOT	connect to	A12 of the Interface Bus (UART0 of DevKit16 Main board)
SCK	connect to	B12 of the Interface Bus
SIN	connect to	C12 of the Interface Bus

Second possibility:

SOT	connect to	A13 of Interface Bus (UART1 of DevKit16 Mainboard)
SCK	connect to	B13 of Interface Bus
SIN	connect to	C13 of Interface Bus

Reload Timer 1:

Pin 60 TIN1	connect to	B16 of the Interface Bus
Pin 62 TOT1	connect to	B17 of the Interface Bus

PPG0 and PPG1:

Pin 69 PPG0	connect to	C15 of the Interface Bus
Pin 70 PPG1	connect to	A16 of the Interface Bus

Subclock:

Because the MB90550 series do not include a second clock, remove the sub-clock (32.768KHz) X2 and Capacitors C8 and C9 at the CPU board.

The different location of the peripherals and the different Device- and Interface Bus pinning is shown in the tables at the end of this document.

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3.3 Changes for MB90580 series

MB90F583B:

Following connection to the Interface bus must be done by wire:

The MB90F583B series is using Pin 47 for INT0.

Connect Pin 47 of the MCU with PIN C22 of the Interface Bus.

The MB90F583B series includes five UART's.

Depending which UART should be used with the MAIN board transceiver connect the Pins to the Interface Bus.

SOTx	connect to	A12 of the Interface Bus	(UART0 of DevKit16 Main board)
SCKx	connect to	B12 of the Interface Bus	
SINx	connect to	C12 of the Interface Bus	

Second possibility:

SOTx	connect to	A13 of the Interface Bus	(UART1 of DevKit16 Mainboard)
SCKx	connect to	B13 of the Interface Bus	
SINx	connect to	C13 of the Interface Bus	

Reload Timer 1:

Pin 68 TIN1	connect to	B16 of the interface Bus
Pin 71 TOT1	connect to	B17 of the Interface Bus

PPG0 and PPG1:

Pin 63 PPG0	connect to	C15 of the Interface Bus
Pin 62 PPG1	connect to	same as MB90540 series, no changes

The different location of the peripherals and the different Device- and Interface Bus pinning is shown in the tables at the end of this document.

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4 MCU540 – layer view

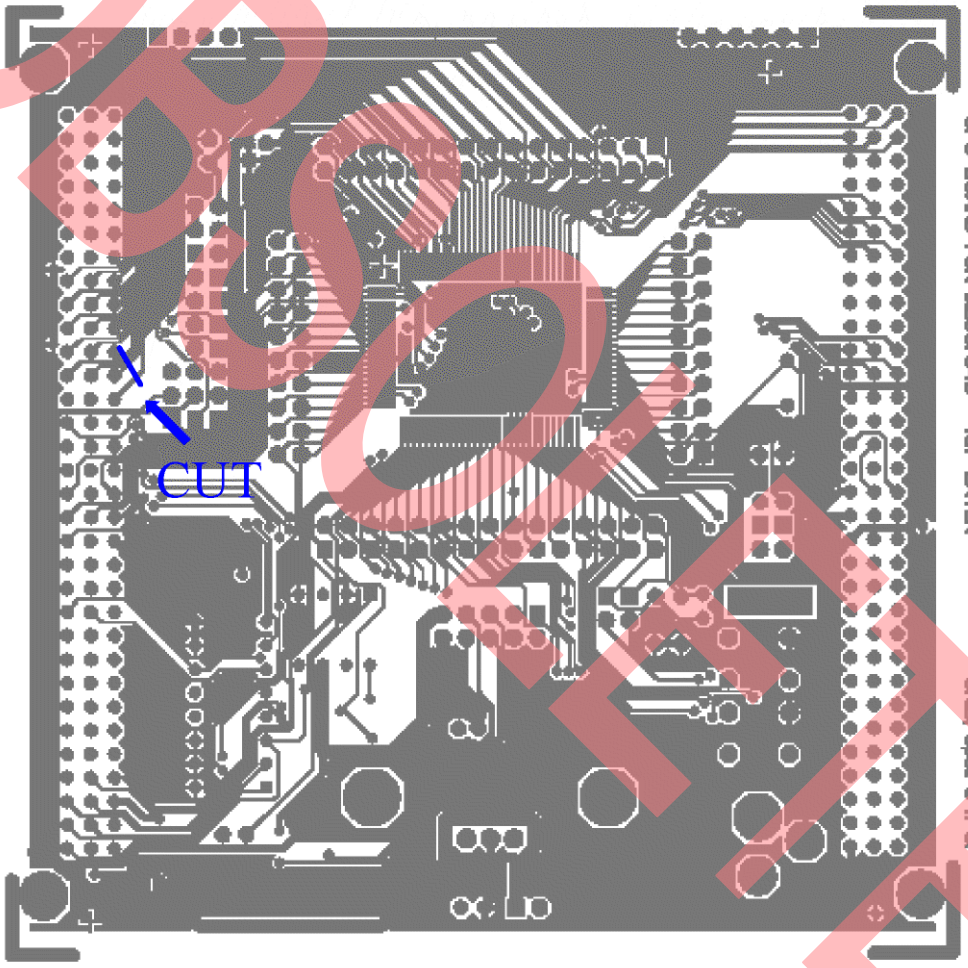
The following pictures show which connections must be cut at the board.

BLUE: cut these connections

RED: insert these connections

Remove the UART connection to the Interface Bus on Top of the board. This must be done for both series.

Figure 1. Top Layout of MCU540 board

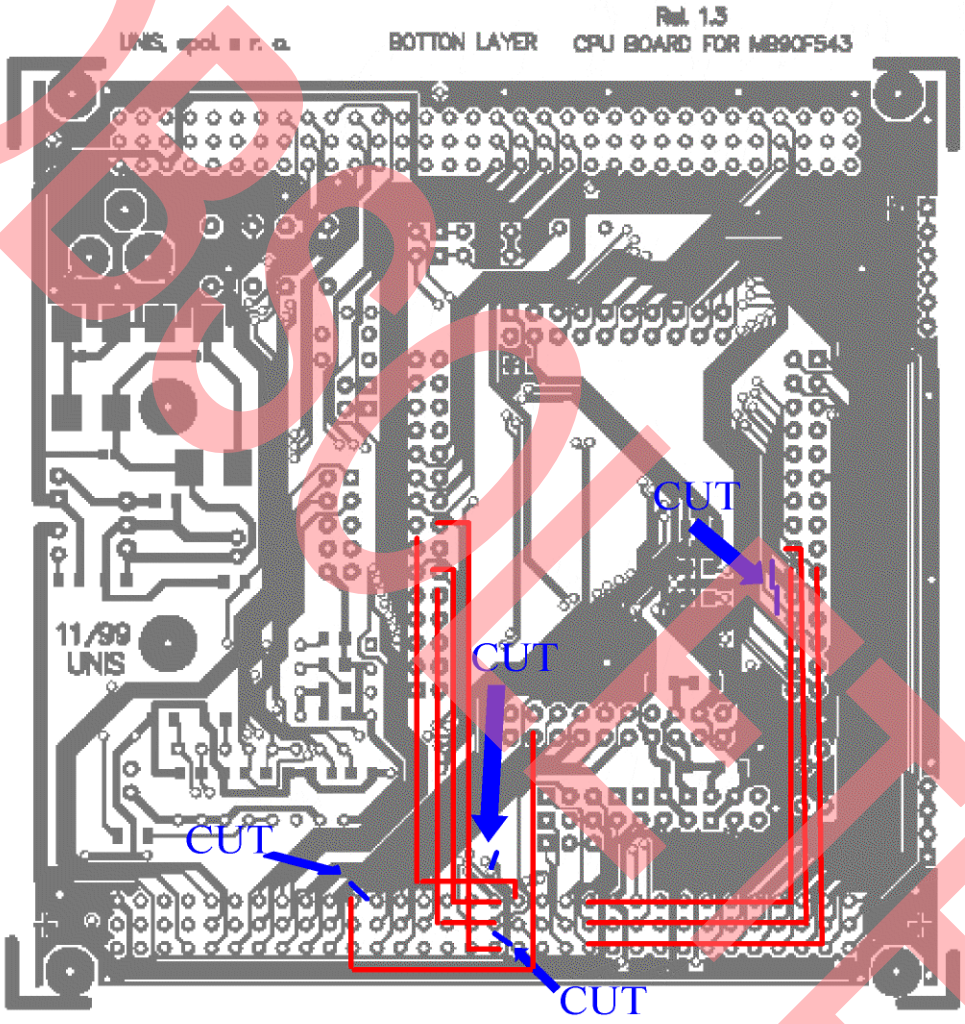


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4.1 MB90550 series

Cut the connection as shown in the picture and insert the new connections.

Figure 2. Bottom layout of MCU540 board, changes for MB90550 series

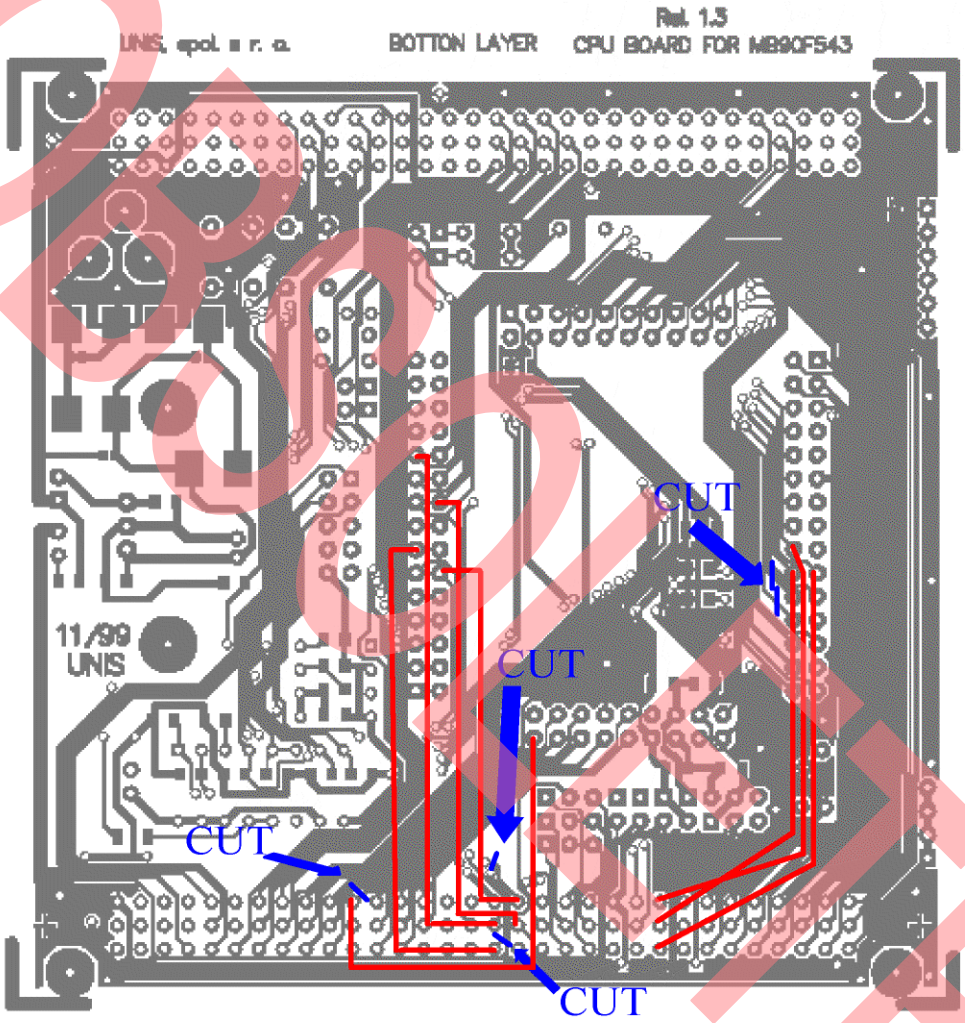


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4.2 MB90580 series

Cut the connection as shown in the picture and insert the new connections.

Figure 3. Bottom Layout of MCU540 board, changes for MB90580 series



COPY

5 Differences of Device Bus

Device Connection PIN	Device Bus			
PIN No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583B
A1	18	SOT0	SCK	SINO
B1	19	SCK0	SOT	SOT0
C1	20	SIN0	SIN	SCK0
A2	24	SOT1	SIN1	SCK1
B2	22	SCK1	SOT1	SOT1
C2	21	SIN1	SCK1	SIN1
A3				
B3				
C3				
A4	69	INT0	PPG0	TIN2/IN2
B4	70	INT1	PPG1	TOT3/IN3
C4	71	INT2	PPG2	TOT1/OUT0
A5	72	INT3	PPG3	TOT2/OUT1
B5	29	INT4	SIN0/SCL0	P72
C5	30	INT5	SDA1	DVRH
A6	31	INT6	SCL1	DVSS
B6	32	INT7	SDA2	P73/DA00
C6	25	SOT2	ADTG	P46/ADTG
A7	26	SCK2	SCK0	P47
B7	28	SIN2	SOT0/SDA0	P71
C7				
A8				
B8				
C8				
A9				
B9				
C9				
A10				
B10				
C10				
A11	47	TIN0	INT0	P80/INT0

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Device Connection PIN	Device Bus			
PIN No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583B
B11	48	TOT0	INT1	P81/INT1
C11		GND		
A12	67	TIN1	OUT0	P90/TINO/IN0
B12	68	TOT1	OUT1	P91/TIN1/IN1
C12				
A13				
B13	53	IN0	INT2	P82/INT2
C13	54	IN1	INT3	P83/INT3
A14	55	IN2	INT4	P84/INT4
B14	56	IN3	INT5	P86/INT5
C14	57	IN4	INT6	P86/INT6
A15	58	IN5	INT7	P87/INT7
B15	59	OUT2/IN6	TIN0	P60/SIN2
C15	60	OUT3/IN7	TIN1	P61/SOT2
A16	65	OUT0	IN2	TX
B16	66	OUT1	IN3	RX
C16		VCC		
A17	59	OUT2/IN6	TIN0	P60/SIN2
B17	60	OUT3/IN7	TIN1	P61/SOT2
C17		AVCC		
A18				
B18				
C18		AGND		
A19				
B19				
C19		GND		
A20				
B20				
C20				
A21				
B21				
C21				
A22	61	PPG0	TOT0	P62/SCK2
B22	62	PPG1	TOT1	P61/SOT2

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Device Connection PIN		Device Bus		
PIN No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583B
C22	63	PPG2	IN0	P64/PPG0
A23	64	PPG3	IN1	P65/CKOT
B23				
C23				
A24	73	TX0	PPG4	P96/PWC
B24	74	RX0	PPG5	P97/POT
C24	75	TX1	PPG6	PA0
A25	76	RX1	PPG7	PA1
B25				
C25				
A26				
B26				
C26				
A27				
B27				
C27				
A28				
B28				
C28				
A29				
B29				
C29				
A30				
B30				
C30		VCC		
A31				
B31				
C31				
A32				
B32				
C32		GND		

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6 Differences of Interface Bus

Device Connection PIN	Interface Bus			
Pin No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583
A1	85	AD00	AD00	AD00
B1	86	AD01	AD01	AD01
C1	87	AD02	AD02	AD02
A2	88	AD03	AD03	AD03
B2	89	AD04	AD04	AD04
C2	90	AD05	AD05	AD05
A3	91	AD06	AD06	AD06
B3	92	AD07	AD07	AD07
C3	93	AD08	AD08	AD08
A4	94	AD09	AD09	AD09
B4	95	AD10	AD10	AD10
C4	96	AD11	AD11	AD11
A5	97	AD12	AD12	AD12
B5	98	AD13	AD13	AD13
C5	99	AD14	AD14	AD14
A6	100	AD15	AD15	AD15
B6	1	A16	A16	A16
C6	2	A17	A17	A17
A7	3	A18	A18	A18
B7	4	A19	A19	A19
C7	5	A20	A20	A20
A8	6	A21	A21	A21
B8	7	A22	A22	A22
C8	8	A23	A23	A23
A9	9	ALE	ALE	ALE
B9	10	\RD	\RD	\RD
C9	12	\WRL	\WRL	\WRL
A10	13	\WRH	\WRH	\WRH
B10	14	HRQ	HRQ	HRQ
C10	15	\HAK	\HAK	\HAK
A11	16	RDY	RDY	RDY
B11	17	CLK	CLK	CLK

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Device Connection PIN	Interface Bus			
Pin No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583
C11		GND	GND	GND
A12	18	P40/SOT0	SCK	SIN0
B12	19	P41/SCK0	SOT	SOT0
C12	20	P42/SIN0	SIN	SCK0
A13	24	P43/SOT1	SIN1	SCK1
B13	22	P44/SCK1	SOT1	SOT1
C13	21	P45/SIN1	SCK1	SIN1
A14	25	P46/SOT2	ADTG	ADTG
B14	26	P47/SCK2	SCK0	P47
C14	28	P50/SIN2	SDA0/SOT0	P71
A15		SDA		
B15		SCL		
C15	61	PPG0	TOT0	SCK2
A16	62	PPG1	TOT1	PPG1
B16	67	TIN1	OUT0	TIN0/IN0
C16		VCC	VCC	
A17	33	ADTG	SCL2	DA01
B17	68	TOT1	OUT1	TIN1/IN1
C17	34	AVCC	AVCC	AVCC
A18	35	AVR+	AVR+	AVR+
B18	36	AVR-	AVR-	AVR-
C18	37	AGND	AGND	AGND
A19	38	AN0	AN0	AN0/SIN3
B19	39	AN1	AN1	AN1/SOT3
C19		GND	GND	GND
A20	40	AN2	AN2	AN2/SCK3
B20	41	AN3	AN3	AN3
C20	43	AN4	AN4	AN4/SIN4
A21	44	AN5	AN5	AN5/SOT4
B21	45	AN6	AN6	AN6/SCK4
C21	46	AN7	AN7	AN7
A22	77	\RST	\RST	\RST
B22	52	\HST	\HST	\HST
C22	69	INT0	PPG0	TIN2/IN2

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Device Connection PIN	Interface Bus			
Pin No.	CPU Pin No.	Function		
		MB90F543	MB90F553A	MB90F583
A23	70	INT1	PPG1	TOT0/IN3
B23	71	INT2	PPG2	TOT1/OUT0
C23	72	INT3	PPG3	TOT2/OUT1
A24	29	INT4	SCL0/SIN0	P72
B24	30	INT5	SDA1	DVRH
C24	31	INT6	SCL1	DVSS
A25	32	INT7	SDA2	DA00
B25	53	IN0	INT2	INT2
C25	54	IN1	INT3	INT3
A26	55	IN2	INT4	INT4
B26	56	IN3	INT5	INT6
C26	59	OUT2/IN6	TIN0	SIN2
A27	60	OUT3/IN7	TIN1	SOT2
B27		NC(SCO)		
C27		NC(SGA)		
A28	73	TX0	PPG4	PWC
B28	74	RX0	PPG5	POT
C28	75	TX1	PA0/OUT2	PA0
A29	76	RX1	PA1/OUT3	PA1
B29	79	X1AJ	PA3	X1AJ
C29	80	X0AJ	PA4/CKOT	X0AJ
A30	82	X0J	X0J	X0J
B30	83	X1J	X1J	X1J
C30		VCC	VCC	VCC
A31	49	MD0	MD0	MD0
B31	50	MD1	MD1	MD1
C31		NC	NC	NC
A32	51	MD2	MD2	MD2
B32		NC	NC	NC
C32		GND	GND	GND

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7 Document History

Document Title: AN205048 - F²MC-16LX Family, DevKit16 MCU540 CPU module board

Document Number: 002-05048

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	-	NOFL	06/05/2001	Initial release
			11/14/2002	new format, typos corrected
*A	5222029	NOFL	04/20/2016	Migrated Spansion Application Note MCU-AN-390045-E-V11 to Cypress format. Tool and product are obsolete.

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