Fujitsu Microelectronics Europe
User Guide

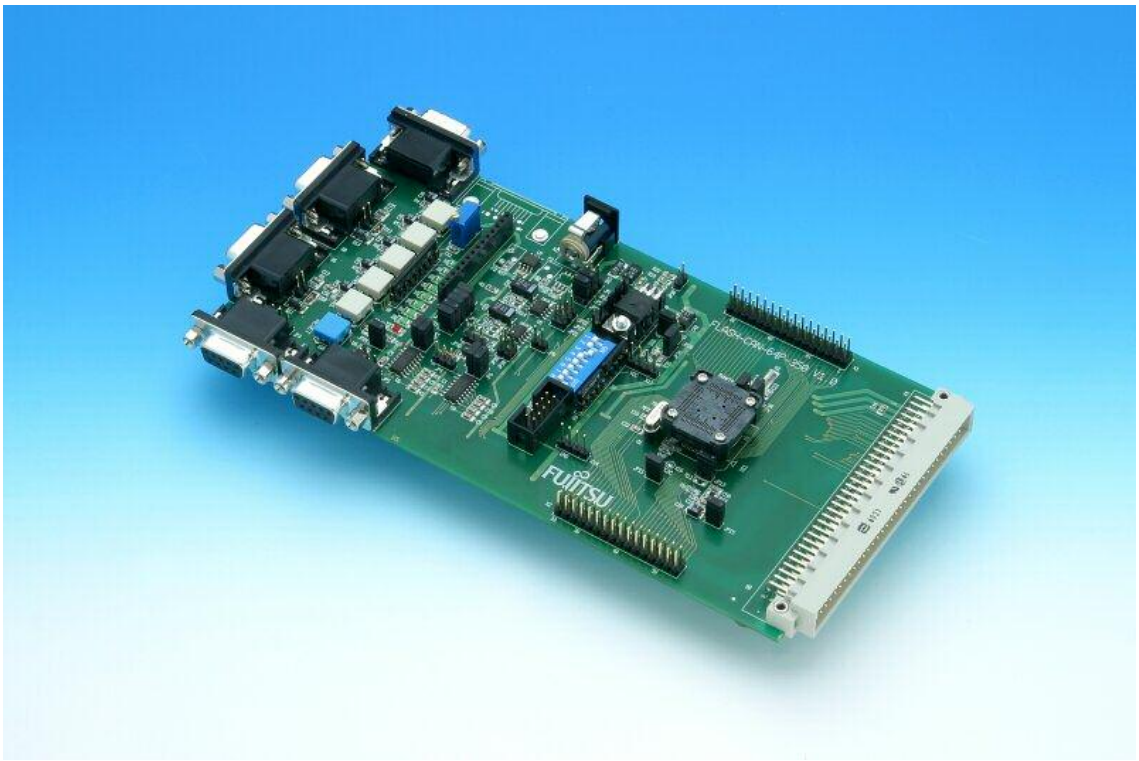
FMEMCU-UG-960008-10

F²MC-16LX/FX FAMILY

EVALUATION BOARD

FLASH-CAN-64P-350-PMC

USER GUIDE



Revision History

Date	Issue
20.06.2007	V1.0, DGo, First Release

This document contains 29 pages.

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1 Contents

2 Overview

2.1 Abstract

The FLASH-CAN-64P-350-PMC is a multifunctional evaluation board for the Fujitsu 16-Bit Flash microcontroller MB90350 and MB96350 Series.

It can be used stand alone for software development and testing or as a simple target board to work with the emulator system.

The board allows the designer immediately to start with the software development before his own final target system is available.

2.2 Features

- Supports FPT-64P-M09 / M23 package
  - MB90350 Series: MB90V350, MB90F35x
  - MB96350 Series: MB96V300, MB96F35x
- 9-12 V unregulated external DC power supply usable
- 3.3 V and 5 V internal power supply, Power-LED
- In-Circuit serial Flash programming
- All resources available for evaluation
- All 64 pins routed to connectors
- 4 MHz main-crystal, 32 kHz subclock-crystal (selectable by jumpers)
- Two UART Interfaces
- Two LIN-Transceivers
- Two High-Speed CAN Transceiver
- 8 User LEDs, optional: alphanumeric standard LC-Display connectable instead of LEDs
- Reset-Button, Reset-LED
- 5 User-buttons configurable for INT10, INT11, TIN1, IN0 and IN1
- 96 pin VG connector

This board must only be used for test applications
in an evaluation laboratory environment.

2.3 General Description

The FLASH-CAN-64P-350-PMC supports 16-Bit Flash microcontrollers of the MB90350 Series and MB96350 Series.

It can be used as a stand alone evaluation board or as a target board for emulator debugger.

The evaluation board supports the following package: FPT-64P-M09 / M23

The board is supplied with a socketed 4 MHz crystal as the main oscillation clock. Using the internal PLL of the µC, internal clock rates up to 56 MHz can be achieved.

Additionally a 32 kHz crystal is mounted for use as a subclock, if this is supported by the device type.

Two separate RS232 transceivers are available to connect the on-chip UART2 and UART3 to 9-pin D-Sub connectors (X3, X5). The transceivers generate the adequate RS232 levels for the receive (RXD) and transmit (TXD) lines. Either the DTR line or the CTS line can be selected with jumpers (JP3, JP4, JP5) to generate a system reset. The RTS signal can be shortcut to CTS using the jumpers JP31 and JP32.

In-circuit-programming (asynchronous) can be done via UART3 (UART"B", X5) using the Burn-In Bootloader of the microcontroller.

Two single-wire LIN-transceivers (TLE6259) are available to connect the on-chip UART2 and UART3 to 9-pin D-Sub connectors (X6, X8). The transceivers generate the adequate levels to drive the bus line in LIN-systems for automotive and industrial applications.

Two high-speed CAN-transceiver (PCA82C250) are available to connect the on-chip CAN-controller to 9-pin D-Sub connectors (X10, X11). The transceivers provides differential transmit and receive capability between CAN-controller and CAN-bus.

If the board is used as an emulator target board, the microcontroller must be removed from the socket and the corresponding probe cable has to be used:

Probe Cable:

MB90350 Series	**MB2147-540**
MB96350 Series	**MB2198-504**

Header Socket: **NQPACK64SB + HQPACK64SB140**

All pins of the microcontroller are connected to the edge connectors X1 and X2 and are directly available to the user. Furthermore, the most important signals are available on the VG96 connector (X4).

The on-board voltage regulator allows the user to connect an unregulated DC input voltage between +9 V to +12 V. In case of any modifications of the board, care should be taken that the total power consumption will not damage the regulator.

There are six push button switches on the board, used for Reset, External Interrupts INT10 and INT11, Trigger for Reload-Timer1 (TIN1), Input-Capture IN0 and IN1.

Eight user-LEDs are connected via a 1K pull up resistor network to Port P30-P37. If these LEDs are not required, than the resistor network can be removed to disconnect the LEDs and to free the port.

Further, take care that the Portpins P00 and P01 are pulled down by N3 (10K). That is important for in-circuit serial programming!

The operating mode of the microcontroller can be selected by the Dip-switch S2.

3 Installation

Remove carefully the board from the shipping carton.

Check first if there are any damages before power on the evaluation board.

For the power supply a DC input voltage of 9 V – 12 V is recommended. The positive voltage (+) must be connected to the centre, and ground (GND) must be connected to the shield of the connector X12!

After power-on, the green power-on LED (D16) should be on. If the LED does not light switch off the power supply and check the default jumper settings.

By default, the evaluation board is equipped with a MB96F356 and the device has been programmed with a test program. So after power-on a running light for the eight user LEDs can be seen. Furthermore, a welcome string is output with 9600 baud on both UART channels (UART"A" / UART"B"). Please use 1:1 cable for the PC-connection.

The in-circuit programming allows the user to program it's own application into the Flash-memory. How to program the Flash memory is described in chapter 4.

If the board is used as an emulator target board, switch off the power supply and remove the microcontroller from the socket. Now the probe cable can be mounted into the socket. Take care of pin 1 marking onto the socket and fix the probe cable with screws.

Do not use other probe cable than MB2198-504 or MB2147-540 only!

Connect the probe cable to the emulation pod. Check all DIP-switch-settings of the evaluation board and the emulation pod.

For the power on sequence the emulator system must be switched on first, after that, switch on the evaluation board. Please look at the corresponding user manuals for the emulator how to set up the emulator system. After the power on the 'Reset'-LED of the emulator must be off and the 'Vcc'-LED must be on.

If the Reset LED is still lighting, check the DIP-switch-settings of the emulator system and the power supply of the evaluation board.

Note:

Some customers experience connectivity problems when connecting the MCU into the socket adapter. Only the small red screwdriver available in your box should be used to connect the cover (HQPACK) onto the socket (NQPACK).

If the four screws are not tightening equally, then it may cause a poor contact.

Do not screw the cover too tight (max 0.054 Nm). If you have connectivity problems then please loosen the screws and tighten again the screws equally.

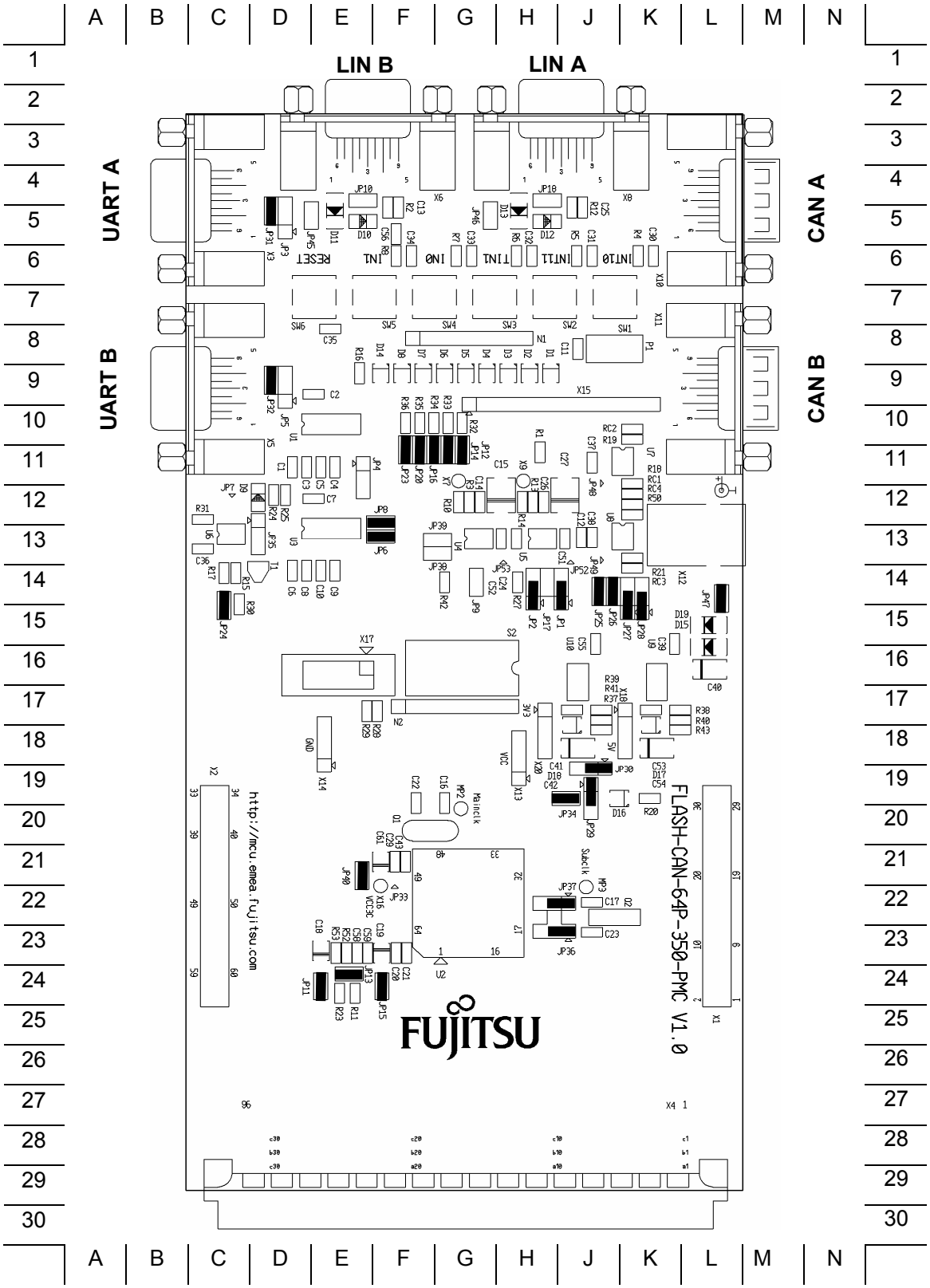
Do not clean NQPACK, YQPACK, and YQSOCKET with steam. Cleaning material will contaminate inside of connector.

4 Jumpers and Switches

This chapter describes all jumpers and switches which can be modified on the evaluation board. The default setting is shown with a grey shaded area. All jumpers and switches are named directly on the board, so it is very easy to set the jumpers according to the features.

4.1 Jumper Overview

Jumper	Description / Function	Type	Default	Coordinates
JP1	UART A (TXD) / LIN A (TXD)	Jumper 3 pol	1-2	H15
JP2	UART A (RXD) / LIN A (RXD)	Jumper 3 pol	1-2	H15
JP3	DTR/RTS A	Jumper 3 pol	open	D5
JP4	RESET UART A/B	Jumper 3 pol	open	E11
JP5	DTR/RTS B	Jumper 3 pol	open	D9
JP6	UART B (RXD)	Jumper 2 pol	closed	F13
JP7	Reset Direct / Delay	solder-Jumper	1-2	C12
JP8	UART B (TXD)	Jumper 2 pol	closed	F12
JP9	LIN B enable	Jumper 2 pol	open	H14
JP10	Master-Mode B	Jumper 2 pol	open	E5
JP11	AVcc	Jumper 2 pol	closed	E24
JP12	SW INT10	Jumper 2 pol	closed	G11
JP13	AVcc=AVRH	Jumper 2 pol	closed	E24
JP14	SW INT11	Jumper 2 pol	closed	G11
JP15	AVss	Jumper 2 pol	closed	F24
JP16	SW TIN1	Jumper 2 pol	closed	F11
JP17	LIN A enable	Jumper 2 pol	open	H15
JP18	Master-Mode A	Jumper 2 pol	open	H4
JP20	SW IN0	Jumper 2 pol	closed	F11
JP23	SW IN1	Jumper 2 pol	closed	F11
JP24	RESET	Jumper 2 pol	closed	C15
JP25	CAN A (TXD)	Jumper 2 pol	closed	J15
JP26	CAN A (RXD)	Jumper 2 pol	closed	J15
JP27	CAN B (TX) / LED D4	Jumper 3 pol	1-2	K15
JP28	CAN B (RX) / LED D3	Jumper 3 pol	1-2	K15
JP29	int/ext VCC	Jumper 3 pol	1-2	J19
JP30	5V/3V3	Jumper 3 pol	1-2	J19
JP31	RTS-CTS A	Jumper 2 pol	closed	D5
JP32	RTS-CTS B	Jumper 2 pol	closed	D9
JP33	C-Pin to MCU VCC	sold-Jumper	open	F21
JP34	MCU_VCC	Jumper 2pol	closed	J19
JP35	Reset inverter	Jumper 3 pol	open	D12
JP36	X0A select	Jumper 3 pol	1-4	J23
JP37	X1A select	Jumper 3 pol	1-2	J22
JP38	LIN B (RXD)	Jumper 2 pol	open	F13
JP39	LIN B (TXD)	Jumper 2 pol	open	F13
JP40	C-Pin	Jumper 2 pol	closed	E21
JP45	LIN VBAT B	Jumper 2 pol	open	D5
JP46	LIN VBAT A	Jumper 2 pol	open	G5
JP47	Power	Jumper 2 pol	closed	L14
JP48	CAN transceiver A VCC 3V3 / 5V	solder-Jumper	1-2	J12
JP49	CAN transceiver B VCC 3V3 / 5V	solder-Jumper	1-2	J13
JP52	LIN TLE6259 (2-3) / TLE7259 (1-2)	solder-Jumper	1-2	J13
JP53	LIN TLE6259 (2-3) / TLE7259 (1-2)	solder-Jumper	1-2	G13

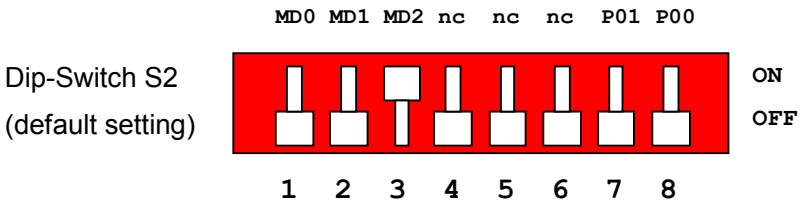


4.2 Operating-Mode (S2)

The DIP-switch S2 is used to set the operating mode of the µC.
Ensure that the mode pin settings correspond to the operation-mode of the application.
For more detailed information please check the Hardware-Manual of the microcontroller.

DIP switch	Setting	Logical value
S2/1 (MD0)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/2 (MD1)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/3 (MD2)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/4	not connected (OFF)	
S2/5	not connected (OFF)	
S2/6	not connected (OFF)	
S2/7 (P01)	ON (closed)	1 (high)
	OFF (open)	0 (low)
S2/8 (P00)	ON (closed)	1 (high)
	OFF (open)	0 (low)

Default: MD0, 1, 2 = 1 1 0 P00, P01 = 0 0
By default, the Single Chip Run-Mode is selected.



4.3 Power Supply Voltage (JP: 29, 34)

Vcc and GND (Vss) are both connected to the edge-connector (X4) in order to supply additional circuitry. However, if the current requirements exceed the maximum ratings of the on board voltage regulator LM317T, the board also can be powered externally via the edge-connector. In that case, take care of the input-voltage. Neither a voltage regulation nor an over-voltage-protection does exist for an external power-supply.

JP29 Power Supply selection
In case that the board is powered via the VG-connector (X4), a regulated 5 V power source has to be used.

JP34 This Jumper is used to connect the Vcc supply voltage to the µC.
Connecting an Ampere-meter allows measuring of the power-supply-current of the microcontroller (Icc).

Jumper	Setting	Description
JP29 (Vcc)	1 - 2	On-board voltage regulation
	2 - 3	External power-supply from X4 pin 1
JP34 (MCUVcc)	ON (closed)	Power supply Vcc connected to µC
	OFF (open)	Disconnected from Power supply Vcc

Default: JP29 = 1-2, JP34 = closed,

By default, the on-board Voltage regulation is used and the microcontroller is powered.

4.4 Analogue Power Supply Voltage (JP: 11, 13, 15)

The power supply as well as the positive reference voltage for the A/D-converter can be provided internally or externally.

JP11, JP15 connect power supply voltages (AVcc and AVss)

JP13 connect reference voltages (AVRH to AVcc)

Jumper	Setting	Description
JP11 (AVcc)	ON (closed)	AVcc is connected to Vcc
	OFF (open)	AVcc is disconnected from Vcc
JP13 (AVRH)	ON (closed)	AVRH is connected to AVcc
	OFF (open)	AVRH defined by resistor network*1
JP15 (AVss)	ON (closed)	AVss is connected to GND
	OFF (open)	AVss is disconnected from GND

*1 By default the resistor network (R11 and R23) is not mounted on the board

Default: JP11, JP13 and JP15 are closed

By default, the A/D-converter supply and reverence voltage is +5 V.

Note:

If JP11 and J15 are open, the user has to supply an adequate analogue voltage supply (AVcc and AVss) to the A/D-converter.

If JP13 is open, the resistors R11 and R23 define AVRH.

By default the resistor network (R11 and R23) is not mounted on the board.

4.5 Subclock (JP: 36, 37)

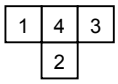
Some devices like e.g. MB90F352 support a 32 kHz subclock (X0A, X1A), other devices like MB90FxxxS do not support a subclock but will offer additional port-pins (P40, P41) instead.

Please check the related datasheet.

JP36: defines usage of Pin 19 (X0A/P40)

JP37: defines usage of Pin 20 (X1A/P41)

Pin-out JP36:



Jumper	Setting	Description
JP36 (X0A/P40)	1-4	Pin 19 is connected to the 32kHz Subclock (X0A)
	2-4	Pin 19 is used as P40 and is connected to X1-19 and X4-A16
	3-4	Pin 19 is connected to GND (in case that subclock-device is used, but no 32kHz crystal is connected)
JP37 (X1A/P41)	1-2	Pin 20 is connected to the 32kHz Subclock (X1A)
	2-3	Pin 20 is used as P41 and is connected to X1-20 and X4-A17

Default: JP36: 1-4, JP37: 1-2

By default, the 32 kHz subclock-crystal is connected to the microcontroller.

4.6 UART"A" (JP: 1, 2, 31)

One RS232-transceiver can be connected to UART2.

JP1, JP2 connects UART2 to the RS232-transceiver (U1, X3)
or to the LIN-transceiver (U5, X8)

JP31 Some Flash-programming-Tools needs a connection between CTS and RTS

Jumper	Setting	Description
JP1 (UART"A"TxD)	1-2	SOT2 is connected to RS232-transceiver
	2-3	SOT2 is connected to LIN-transceiver A
JP2 (UART"A"RxD)	1-2	SIN2 is connected to RS232-transceiver
	2-3	SIN2 is connected to LIN-transceiver A
JP31 (RTS-CTS)	ON (closed)	RTS and CTS is shortcut on X3
	OFF (open)	RTS and CTS is not shortcut on X3

Default: JP1=1-2, JP2=1-2, JP31 = closed

By default, UART2 is used as UART"A".

4.7 UART"B" (JP: 6, 8, 32)

One RS232-transceiver can be connected to UART3.

JP6, JP8 connects UART3 to the RS232-transceiver (U3, X5)

JP32 Some Flash-programming-Tools needs a connection between CTS and RTS

Jumper	Setting	Description
JP6 (UART"B"RxD)	ON (closed)	SIN3 is connected to RS232-Transceiver
	OFF (open)	SIN3 is disconnected from RS232-Transceiver
JP8 (UART"B"TxD)	ON (closed)	SOT3 is connected to RS232-Transceiver
	OFF (open)	SOT3 is disconnected from RS232-Transceiver
JP31 (RTS-CTS)	ON (closed)	RTS and CTS is shortcut on X5
	OFF (open)	RTS and CTS is not shortcut on X5

Default: JP6=closed, JP8=closed, JP32 = closed

By default, UART3 is used as UART"B".

4.8 LIN"A" (JP: 17, 18)

One LIN-transceiver can be used with UART2. (Also refer to section 4.6)

JP17 enable LIN-Transceiver A

JP18 LIN Master-mode

Jumper	Setting	Description
JP17 (LIN enable)	open	LIN-transceiver is disabled
	closed	LIN-transceiver is enabled
JP18 (LIN Master)	open	LIN Slave-mode
	closed	LIN Master-mode

Default: JP17=open, JP18=open

By default, UART2 is not used as LIN-interface.

4.9 LIN"B" (JP: 9, 10, 38, 39)

One LIN-transceiver can be used with UART8.

JP9 enable LIN-Transceiver B

JP10 LIN Master-mode

JP38, JP39 connects UART8 to the LIN-transceiver (U4, X6)

Jumper	Setting	Description
JP9 (LIN enable)	open	LIN-transceiver is disabled
	closed	LIN-transceiver is enabled
JP10 (LIN Master)	open	LIN Slave-mode
	closed	LIN Master-mode
JP38 (LIN"B"RXD)	open	SIN8 is disconnected from LIN-Transceiver
	closed	SIN8 is connected to LIN-Transceiver
JP39 (LIN"B"TXD)	open	SOT8 is disconnected from LIN-Transceiver
	closed	SOT8 is connected to LIN-Transceiver

Default: JP9=open, JP10=open, JP38=open, JP39=open

By default, UART8 is not used as LIN-interface.

4.10 CAN“A” (JP: 25, 26)

One high-speed CAN-transceiver can be connected to CAN1.

JP25, JP26 connects the CAN1-Port to the CAN-transceiver (U7, X10).
If the CAN interface is not used, the jumpers should be left open.

Jumper	Setting	Description
JP25 (TX1)	Open	TX1 is disconnected from CAN-Transceiver (U7, X10)
	Closed	TX1 is connected to CAN-Transceiver (U7, X10)
JP26 (RX1)	Open	RX1 is disconnected from CAN-Transceiver (U7, X10)
	Closed	RX1 is connected to CAN-Transceiver (U7, X10)

Default: JP25=closed, JP26=closed

By default, the CAN”A”-transceiver is connected to CAN1 of the microcontroller

4.11 CAN“B” (JP: 27, 28)

For the MB96350 Series one high-speed CAN-transceiver can be connected to CAN2.

JP27, JP28 connects the CAN2-Port to the CAN-transceiver (U8, X11).
Using CAN2 will disconnect LED D3 and D4.

Jumper	Setting	Description
JP27 (TX2)	1-2	Pin 57 (P33) is connected to LED D4
	2-3	TX2 is connected to CAN-Transceiver (U8, X11)
JP28 (RX2)	1-2	Pin 56 (P32) is connected to LED D3
	2-3	RX2 is connected to CAN-Transceiver (U8, X11)

Default: JP27=1-2, JP28=1-2

By default, LED D3 and D4 are connected to Port P32 and P33 of the microcontroller.

4.12 Reset-Generation (JP: 3, 4, 5, 24, 35)

Additional to the internal Power-On-Reset the microcontroller can be reset by an external Reset-circuit (Voltage-Monitor) and by the UARTs, too.

JP3, JP5 As well the DTR-line as the RTS-Line of UART"A" or UART"B" can be used to generate a system-reset.

JP4 This jumper selects whether the DTR/RTS line from UART"A" or UART"B" will generate a system-reset.

JP24 open this jumper if no external Reset shall be generated.
In this case only the internal reset is active (e.g.: power-on)

JP35 The polarity of the DTR/RTS line can be invert by this jumper.
Remove the jumper in order to disable the reset logic.

Jumper	Setting	Description
JP3 (DTR / RTS "A")	1-2	DTR of UART"A" is selected
	2-3	RTS of UART"A" is selected
JP4 (UART"A"/"B")	1-2	UART"A" is used to generate Reset
	2-3	UART"B" is used to generate Reset
JP5 (DTR / RTS "B")	1-2	DTR of UART"B" is selected
	2-3	RTS of UART"B" is selected
JP24 (Main Reset)	closed	external Reset generation is active
	open	no external Reset generation
JP35 (Polarity)	1-2	No polarity inversion for the DTR/RTS signal
	2-3	Polarity inversion for the DTR/RTS signal

Default: JP24=closed, JP4, JP5 and JP35 are not set

By default, the external Reset generation is active. The Reset by UART is disabled.

Note:

While a reset signal is asserted the red Reset-LED D14 is lit.

During normal operation, this LED should be off!

If JP35 (Polarity) is set, than JP4 and JP5 have to be set, too.

If the reset LED is steadily on, check the power supply input voltage and the settings for the reset-generation by UART.

4.13 Buttons INT10, INT11, TIN1, IN0, IN1, Reset (JP: 7, 12, 14, 16, 20, 23)

JP7: One Button can be used for manually reset

JP12, JP14: Two push buttons can be used to trigger the ext. interrupts INT10 and INT11

JP16: One button can be used as trigger-input for the Reload-Timer1 (TIN1)

JP20, JP23: Two push buttons can be used for input at Input-Capture 0 / 1 (IN0, IN1)

Jumper	Setting	Description
JP7 (Reset)	1-2	Reset is triggered immediately
	2-3	Reset is triggered delayed
	Open	no connection
JP12 (INT10)	Closed	INT10 is connected to Push-button “INT10”
	Open	no connection to INT10
JP14 (INT11)	Closed	INT11 is connected to Push-button “INT11”
	Open	no connection to INT11
JP16 (TIN1)	Closed	TIN1 is connected to Push-button “TIN1”
	Open	no connection to TIN1
JP20 (IN0)	Closed	IN0 is connected to Push-button “IN0”
	Open	no connection to IN0
JP23 (IN1)	Closed	IN1 is connected to Push-button “IN1”
	Open	no connection to IN1

Default: JP7, JP12, JP14, JP16, JP20, JP23 =closed

By default, INT10, INT11, TIN1, IN0, IN1 and RSTX of the microcontroller are connected to the Push buttons.

5 Programming the internal Flash

All Flash devices have an internal bootloader for asynchronous- as well as synchronous-Flash-programming:

- asynchronous-serial Flash-programming via UART"B"/UART3 (X5)
- synchronous-serial Flash-programming via Serial I/O (SCI3, X17)

5.1 Asynchronous Mode

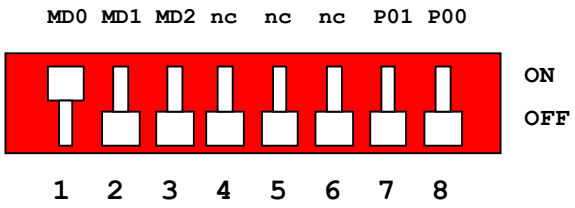
In order to program the Flash-ROM asynchronously via UART3, the tool "Fujitsu Flash MCU Programmer for FMC16LX" can be used to flash MB90350 series devices or the tool "Fujitsu Flash MCU Programmer for FMC16FX" for MB96350 series devices. These tools are available free on the Fujitsu Micros DVD or Web Site (http://mcu.emea.fujitsu.com/: select ▸ Development Tools ▸ Software and Utilities)

The following procedure must be followed to enable Flash Programming:

1. Power off the board
2. Connect the Evaluation Board UART"B" to your serial PC communication port.
   A straight cable connection has to be used.
3. Check the Jumper-settings according to the UART as described in chapter 4.6
4. Configure the mode:

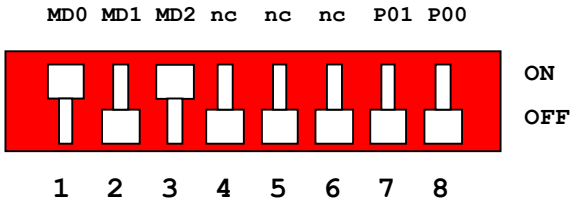
- 16LX Series

  Flash Mode
  Async. 4MHz



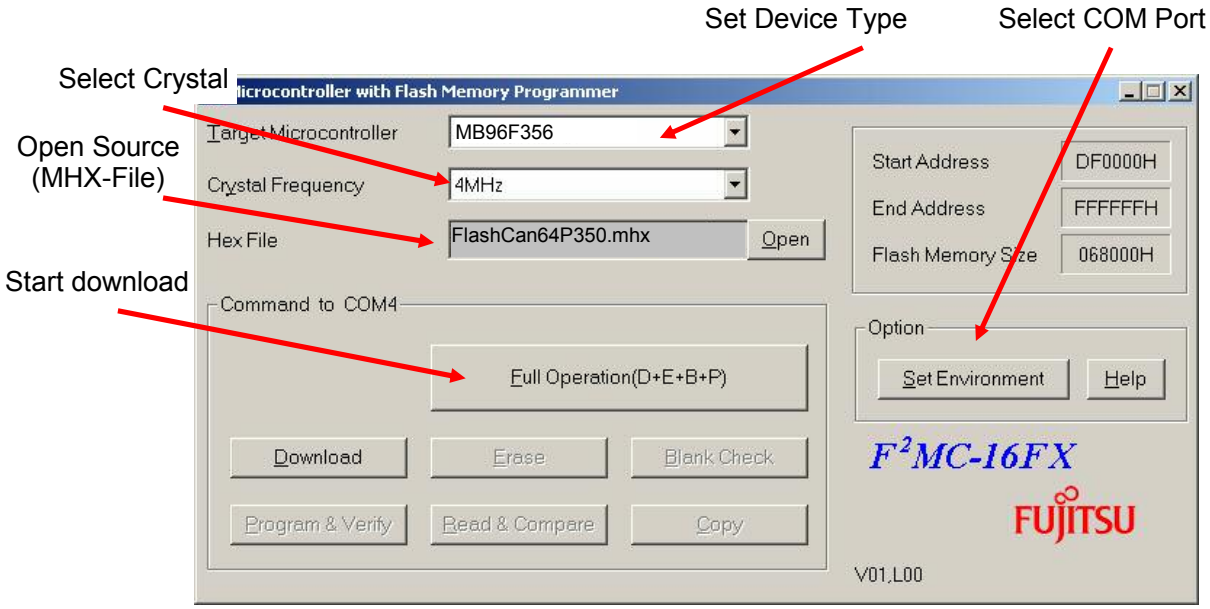
- 16FX Series

  Flash Mode
  Async. 4MHz

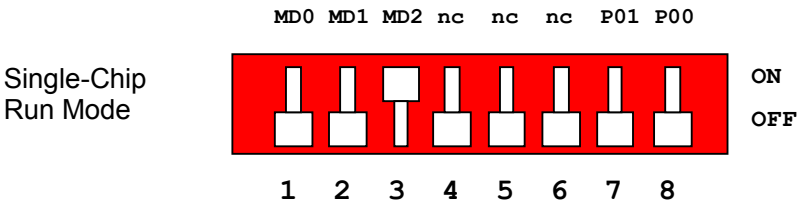


5. Power on the board
6. Check that the Reset LED is off. Otherwise change the DTR polarity (JP35) and check the power supply voltage.

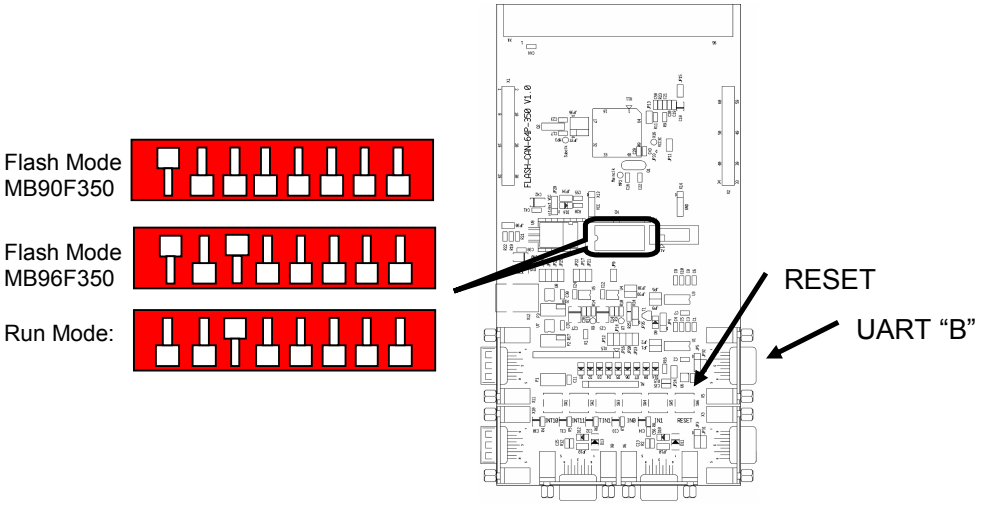
7. Start the tool “Fujitsu Flash MCU Programmer for FMC16LX” for MB90350 Series or “Fujitsu Flash MCU Programmer for FMC16FX” for MB96F350 Series software and follow the instructions:



8. After programming the Flash-ROM, switch off the power supply and set back the mode according to the usage of the application, e.g.:



9. Power on the board. The user application is started directly.



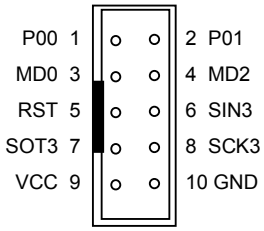
5.2 Synchronous Mode

In order to program the Flash-ROM synchronously via Serial I/O (SCI3) special software has to be used, e.g. Galep-4 from Conitec with a serial adapter. This tool is not available free.

Please contact the following Web Site in order to get more information: http://www.conitec.de

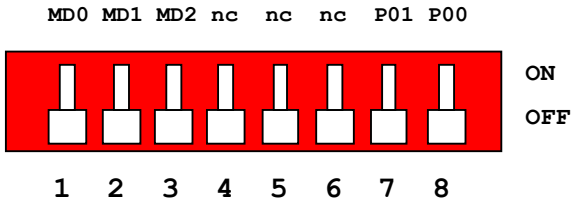
A dedicated Flash programming socket (X17) is provided on the evaluation-board for direct connection to the serial adapter of GalepIV.

X17: Flash programming socket



In case that the Galep-4 with serial adapter is used, all Mode-settings will be done automatically by the Galep-4. This means that all DIP-switch S2 has to be set to the “OFF” position.

When using
Conitec’s Galep-4

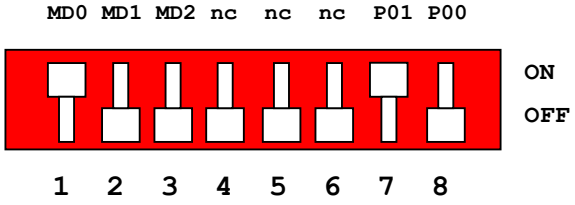


Please refer to the manual of Conitec’s Galep-4 for more information how to program a Flash-device by the synchronous-serial mode.

Note:

In case that another Programming-Tool is used and the Mode-settings have to be done manually then use the following configuration of DIP-switch S2 in order to select the synchronous-serial Flash-programming mode:

synchronous
Boot-Mode

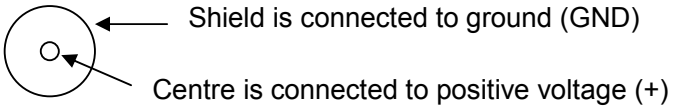


6 Connectors

6.1 Power connector (X12)

The following figure shows the power connection jack X12. This connector is used to connect an external unregulated DC power supply voltage (9 V - 12 V DC) to the evaluation board.

Connector X12:



It is recommended to use 9 V to keep the power dissipation to a minimum. Otherwise, an additional heat sink for the linear voltage regulator might be necessary.

6.2 Edge connector (X1, X2)

All pins of the microcontroller are directly connected to X1 and X2 as follows:

Connector	MCU Pins
X1 (1 – 32)	1 – 32
X2 (33 – 64)	33 – 64

The odd pin numbers are located on the one side and the even pin numbers are located on the other side of the connector.

On the PCB, the corresponding pin numbers of the µC are written next to the connector pins.

6.3 UART"A", UART"B" connector (X3, X5)

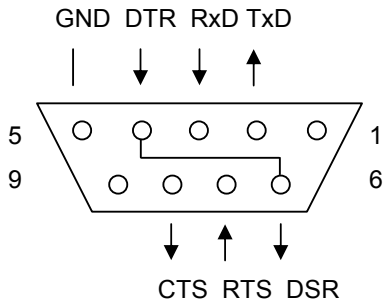
Two 9-pin D-Sub female connectors are used for the serial interface UART"A" and UART"B".

TXD is the transmit output, RXD is the receive input.

The DTR or RTS signal can be used to generate a reset.

Please use 1:1 cable for PC-connection.

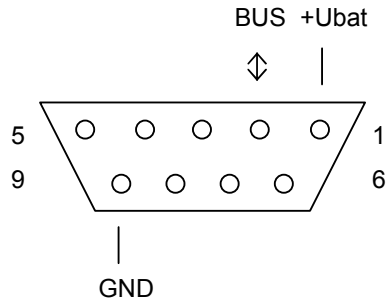
Connectors X3, X5:



6.4 LIN"A", LIN"B" Interface connector (X6, X8)

Two 9-pin D-Sub female connectors are used for the LIN-communication.

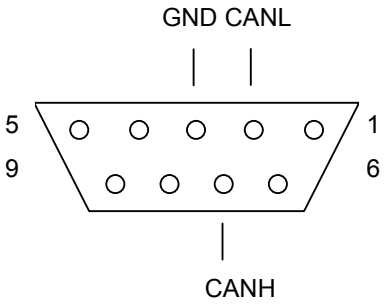
Connectors X6, X8:



6.5 CAN"A", CAN"B" Interface connector (X10, X11)

One 9-pin D-Sub male connector is used for the CAN interface.

Connector X10, X11:

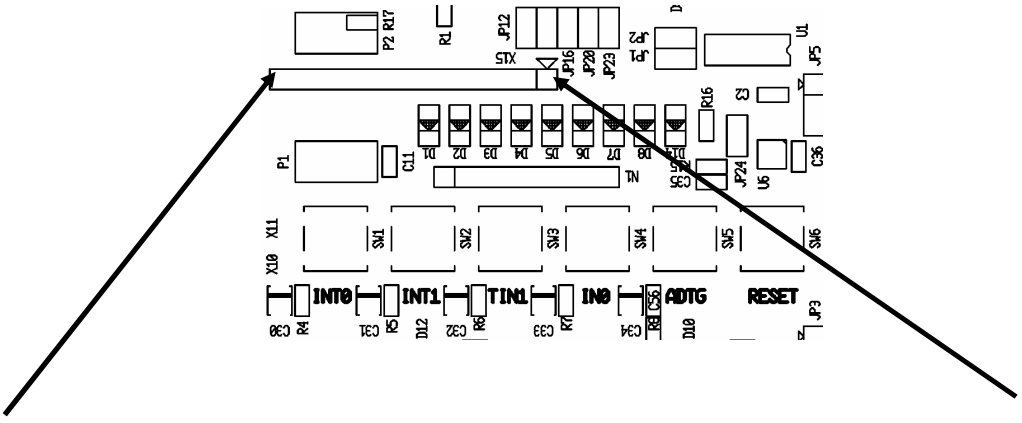


6.6 USER-LEDs & LC-Display (optional)

Eight LEDs are reserved for user-application. In order to disconnect the LEDs from the related microcontroller port, the resistor network N1 can be removed.

Instead of the user-LEDs one alphanumeric LC-Display (optional) can be connected.

The following control-signals are reserved:



	14	13	12	11	10	9	8	7	6	5	4	3	2	1
LCD	D6	D5	D4	D3	-	-	-	-	E	R/W	RS	V0	VCC	GND
LED	D8	D7	D6	D5				D4	D3	D2	D1			
MCU	61	60	59	58				57	56	55	54			
Port	P37	P36	P35	P34				P33	P32	P31	P30			

6.7 VG96 connector (X4)

Connector-Pin cross reference table for MB90350 Series:

MB90350	Description	VG (X4)
1	AVss	-
2	AVRH	-
3	P62/AN2/PPG4(5)	B13
4	P63/AN3/PPG6(7)	C13
5	P64/AN4/PPG8(9)	A14
6	P65/AN5/PPGA(B)	B14
7	P66/AN6/PPGC(D)	C14
8	P67/AN7/PPGE(F)	A15
9	P50/AN8/SIN2	A10
10	P51/AN9/SOT2	B10
11	P52/AN10/SCK2	C10
12	P53/AN11/TIN3	A11
13	P54/AN12/TOT3	B11
14	P55/AN13	C11
15	P56/AN14	A12
16	P42/IN6/RX1/INT9R	A8
17	P43/IN7/TX1	B8
18	Vss	ABC3
19	P40/X0A	(A16)
20	P41/X1A	(A17)
21	MD2	A18
22	MD1	B18
23	MD0	C18
24	P00/AD00/INT8	A26
25	P01/AD01/INT9	B26
26	P02/AD02/INT10	C26
27	P03/AD03/INT11	A27
28	P04/AD04/INT12	B27
29	P05/AD05/INT13	C27
30	P06/AD06/INT14	A28
31	P07/AD07/INT15	B28
32	P10/AD08/TIN1	C28

MB90350	Description	VG (X4)
33	P11/AD09/TOT1	A29
34	P12/AD10/SIN3	B29
35	P13/AD11/SOT3	C29
36	P14/AD12/SCK3	A30
37	P15/AD13	B30
38	P16/AD14	C30
39	P17/AD15	A31
40	P20/A16/PPG9(8)	B31
41	P21/A17/PPGB(A)	C31
42	P22/A18/PPGD(C)	A32
43	P23/A19/PPGF(E)	B32
44	P24/A20/IN0	A4
45	RSTX	A19
46	X1	-
47	X0	-
48	Vss	ABC3
49	Vcc	ABC2
50	C	-
51	P25/A21/IN1/ADTG	B4
52	P44/SDA0/FRCK0	C8
53	P45/SCL0/FRCK1	A9
54	P30/ALE/IN4	B5
55	P31/RDX/IN5	C5
56	P32/WRX/INT10R	A6
57	P33/WRHX	B6
58	P34/HRQ/OUT4	C6
59	P35/HAKX/OUT5	A7
60	P36/RDY/OUT6	B7
61	P37/CLK/OUT7	C7
62	P60/AN0	C12
63	P61/AN1	A13
64	AVcc	-

-	extVCC	ABC1

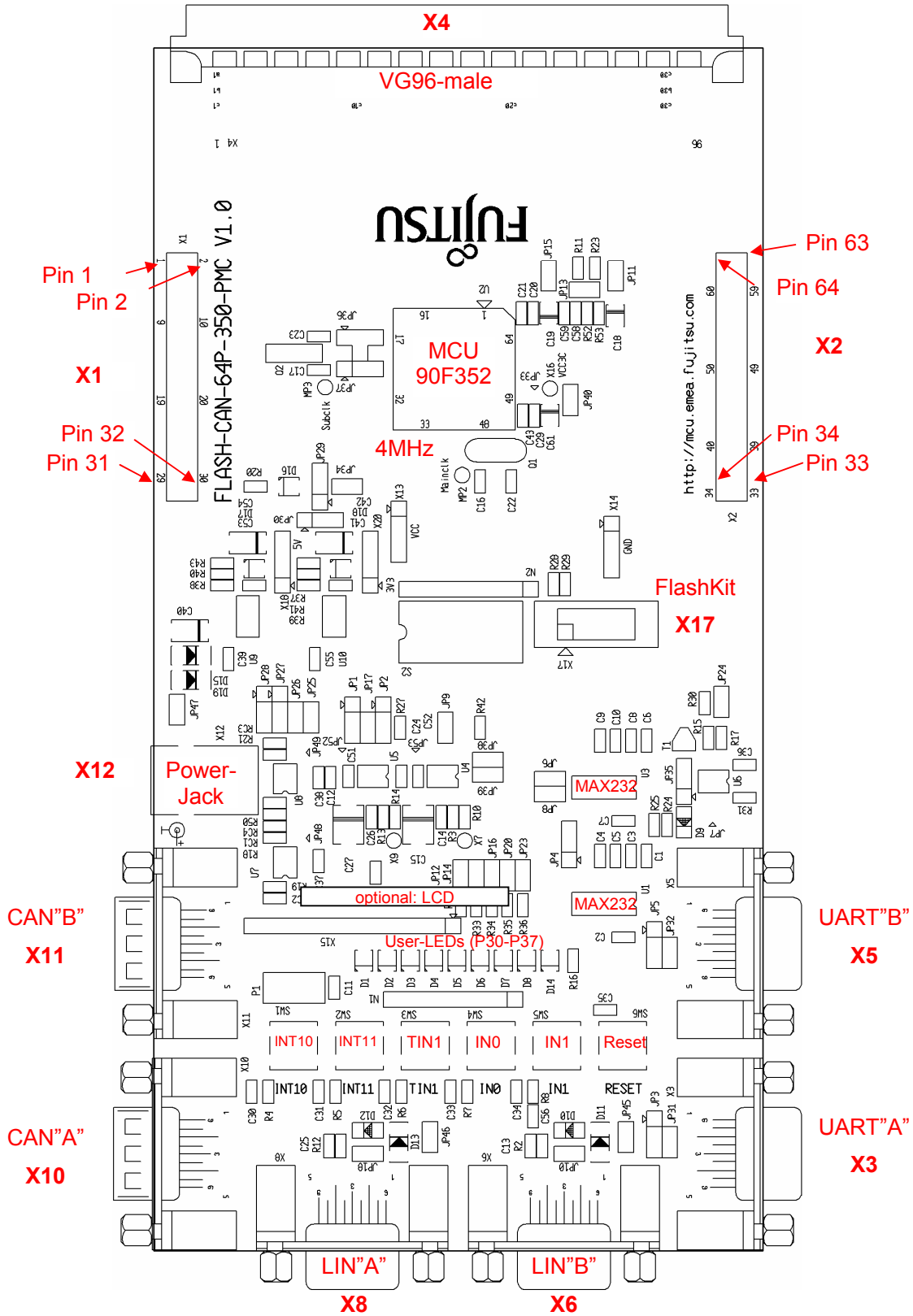
Connector-Pin cross reference table for MB96350 Series:

MB90	Description	VG (X4)
1	AVss	-
2	AVRH	-
3	P62/AN2/PPG2/CS2R	B13
4	P63/AN3/PPG3/CS3R	C13
5	P64/AN4/PPG4/CS4R	A14
6	P65/AN5/PPG5/CS5R	B14
7	P66/AN6/PPG6	C14
8	P67/AN7/PPG7	A15
9	P50/AN8/SIN2/INT3R	A10
10	P51/AN9/SOT2	B10
11	P52/AN10/SCK2	C10
12	P53/AN11/TIN3/WOT	A11
13	P54/AN12/TOT3/INT2R	B11
14	P55/AN13/INT0R/NMIR	C11
15	P56/AN14/INT4R	A12
16	P42/IN6/RX1/INT9R	A8
17	P43/IN7/TX1/TTG7	B8
18	Vss	ABC3
19	P40/X0A	(A16)
20	P41/X1A	(A17)
21	MD2	A18
22	MD1	B18
23	MD0	C18
24	P00/AD00/INT8/SCK7R	A26
25	P01/AD01/INT9/SOT7R	B26
26	P02/AD02/INT10/SIN7R	C26
27	P03/AD03/INT11/SCK8R	A27
28	P04/AD04/INT12/SOT8R	B27
29	P05/AD05/INT13/SIN8R	C27
30	P06/AD06/INT14/PPG10R	A28
31	P07/AD07/INT15/PPG11R	B28
32	P10/AD08/CKOT1/TIN1	C28

MB90	Description	VG (X4)
33	P11/AD09/CKOTX1/TOT1	A29
34	P12/AD10/INT11/SIN3	B29
35	P13/AD11/SOT3	C29
36	P14/AD12/SCK3	A30
37	P15/AD13/SIN2R/INT7R	B30
38	P16/AD14/SOT2R	C30
39	P17/AD15/SCK2R	A31
40	P20/A16/PPG12/CKOT1R	B31
41	P21/A17/PPG13	C31
42	P22/A18/PPG14/CKOT0R	A32
43	P23/A19/PPG15	B32
44	P24/A20/IN0	A4
45	RSTX	A19
46	X1	-
47	X0	-
48	Vss	ABC3
49	Vcc	ABC2
50	C	-
51	P25/A21/IN1/ADTGR	B4
52	P44/SDA0/FRCK0/TIN0R	C8
53	P45/SCL0/FRCK1/TIN2R	A9
54	P30/ALE/IN4/TOT0R	B5
55	P31/RDX/IN5/TOT2R	C5
56	P32/WRX/RX2/INT10R	A6
57	P33/TX2/WRHX	B6
58	P34/HRQ/OUT4	C6
59	P35/HAKX/OUT5	A7
60	P36/RDY/OUT6	B7
61	P37/CLK/OUT7	C7
62	P60/AN0/PPG0/CS0R	C12
63	P61/AN1/PPG1/CS1R	A13
64	AVcc	-

-	extVCC	ABC1

7 Silk-Plot of the Board



8 Related Products

- FLASH-CAN-64P-350-PMC — Evaluation board for MB90350 and MB96350 Series with FPT-64P-M09 or FPT-64P-M23 package
- FLASH-CAN-64P-350-PMC1 — Evaluation board for MB90350 and MB96350 Series with FPT-64P-M24 package
- NQPack64sb — Socket for package FPT-64P-M09/M23 (Tokyo Eletech Corp. www.tetc.co.jp/e_tet.htm)
- HQPack64sb140 — Header for NQPack64sb

16LX Series (MB90350)

- MB2147-01 — Emulator debugger main unit
- MB2147-20 — Emulation adapter
- MB2147-540 — Emulator probe cable for package (FPT-64P-M09 / M23)
- MB90V340xxx — Evaluation chip for MB90340 / 350 / 360 Series
  - MB90V340A-101 — Single-clock version
  - MB90V340A-102 — Dual-clock version
- MB90F352(C) — Flash-Microcontroller with Subclock
- MB90F352(C)S — Flash-Microcontroller without Subclock

16FX Series (MB96350)

- MB2198-01 — Emulator debugger main unit
- MB2198-500 — Emulation adapter
- MB2198-504 — Emulator probe cable for package (FPT-64P-M09 / M23)
- MB96V300 — Evaluation chip for MB96300 Series
- MB96F356RWAPMC — Flash-Microcontroller with Subclock
- MB96F356RSAPMC — Flash-Microcontroller without Subclock

9 Information in the WWW

Information about FUJITSU MICROELECTRONICS Products
can be found on the following Internet pages:

Microcontrollers (8-, 16- and 32bit), Graphics Controllers
Datasheets and Hardware Manuals, Support Tools (Hard- and Software)

http://mcu.emea.fujitsu.com

Linear Products: Power Management, A/D and D/A Converters

http://www.fujitsu.com/emea/services/microelectronics/linears/

Media Products: SAW filters, acoustic resonators and VCOs

http://www.fujitsu.com/emea/services/microelectronics/saw/

For more information about FUJITSU MICROELECTRONICS

http://www.fujitsu.com/emea/services/microelectronics/

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