

**F<sup>2</sup>MC-8FX FAMILY**  
8-BIT MICROCONTROLLER  
**MB95390 SERIES**

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**EV BOARD MB2146-441-E**

SETUP GUIDE



## Revision History

Date	Author	Change of Records
2010-04-21	Kevin Wang	V1.0, new

## PREFACE

Thank you for purchasing the F2MC-8FX Family EV board: MB2146-441-E.

This product is an EV board for F2MC-8FX MB95390 Series MCU, which comes with MB2146-08-E (F2MC-8FX Family MB95390 Series BGM Adapter), MB2146-441-E, and F2MC-8L/8FX Family SOFTUNE Professional Pack Evaluation Version.

This manual explains how to use the EV board. Be sure to read this manual before using the product. For mass production/evaluation MCUs for this product, consult with sales representatives or support representatives.

### ■ Handling and Use

Handling and use of this product and notes regarding its safe use are described in the manuals for products bundled with the EV board.

Follow the instructions in the manuals to use this product.

Keep this manual at hand so that you can refer to it anytime during use of this product.

### ■ Notice on this Document

All information included in this document is current as of the date it is issued.

Such information is subject to change without any prior notice.

Please confirm the latest relevant information with the sales representatives.

■ **Caution of the Products Described in this Document**

The following precautions apply to the product described in this manual.



Indicates a potentially hazardous situation which, if not avoided appropriately, could result in death or serious injury and/or a fault in the user's system.

<b>Electric shock, Damage</b>	Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault.
<b>Electric shock, Damage</b>	Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault.



Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to lose software resources and other properties such as data, if the device is not used appropriately.

<b>Cuts, Damage</b>	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.
<b>Cuts</b>	The product contains sharp edges that are left unavoidably exposed, such as jumper plugs. Handle the product with due care not to get injured with such pointed parts.
<b>Damage</b>	Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.
<b>Damage</b>	Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.
<b>Damage</b>	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
<b>Damage</b>	To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge and any static electricity from your body.
<b>Damage</b>	Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.
<b>Damage</b>	Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
<b>Damage</b>	Because the structure of the MCU socket does not allow an evaluation MCU to be mounted in the incorrect orientation, be very careful of the orientation of the evaluation MCU when mounting it. Inserting the evaluation MCU in the wrong orientation may damage the MCU, causing the MCU to become faulty.
<b>Damage</b>	Because the product has no casing, it is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them in case of for the re-shipment of the product.

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## CONTENTS

<b>REVISION HISTORY</b> .....	<b>2</b>
<b>PREFACE</b> .....	<b>1</b>
■ Handling and Use .....	1
■ Notice on this Document.....	1
■ Caution of the Products Described in this Document .....	2
<b>CONTENTS</b> .....	<b>4</b>
<b>1 BGMA MANUAL</b> .....	<b>5</b>
1.1 BGMA Overview.....	5
1.2 Function List.....	5
1.3 IDC10 Interface Description .....	6
1.4 BGMA USB Configuration.....	6
1.5 LED Description .....	8
<b>2 EV BOARD INTRODUCTION</b> .....	<b>10</b>
2.1 EV Board Overview.....	10
2.2 Function List.....	11
2.3 EV Board Schematic.....	12
2.4 HW Module Description .....	13
2.4.1 Power Module .....	13
2.4.2 BGMA Interface.....	13
2.4.3 Test Pin .....	13
2.4.4 Connector.....	13
<b>3 DEVELOPMENT PLATFORM QUICK START</b> .....	<b>14</b>
3.1 Tools Setup Sequence.....	14
3.2 Open Project and Start Debug .....	14

# 1 BGMA Manual

This chapter gives introduction on how to set up BGMA.

## 1.1 BGMA Overview

Below is a close look of MB95390 Series BGMA. The part number is MB2146-08-E. It provides a debugging platform for the MB95390 Series MCU in a small size of 55.7mm (W) X127mm (D) X30mm (H).

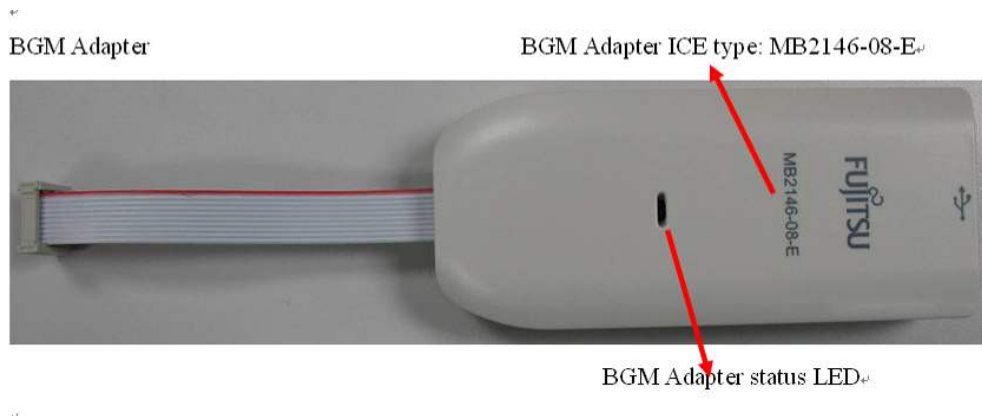


Figure 1.1-1 BGMA overview

## 1.2 Function List

ID	Function description	Remarks
1	Support MB95390 Series MCU	MCU MAX machine clock: 16.25 MHz MCU power voltage: 2.8 V ~ 5.5 V
2	Break pointer	256 software breakpoints
3	USB interface to PC/SOFTUNE	Compatible with USB protocol version 1.1
4	1-Line UART interface to the MB95390 Series MCU	The Baud rate is 62,500 bps
5	Support the MCU flash programming for engineering development	The programming and reading speed is about 800 B/S.

### 1.3 IDC10 Interface Description

Pin Number	Pin Name	Description
1	UVCC	Target MCU V <sub>CC</sub>
2	GND	Target MCU V <sub>SS</sub>
3	RSTIN	Target MCU reset input
4	RSTOUT	Target MCU reset output
5	RSV	Reserved
6	RSV	Reserved
7	RSV	Reserved
8	DBG	Target MCU debugging pin
9	RSV	Reserved
10	RSV	Reserved

### 1.4 BGMA USB Configuration

The BGMA is provided with a USB cable. Connect the BGMA to PC with the USB cable. If the connection is right, the following window will pop up. Follow the instructions displayed, and then click **Next**.



Figure 1.4-1 Install BGMA in Windows (1)



Select **Install from a list or specific location (Advanced)**, then click **Next**.

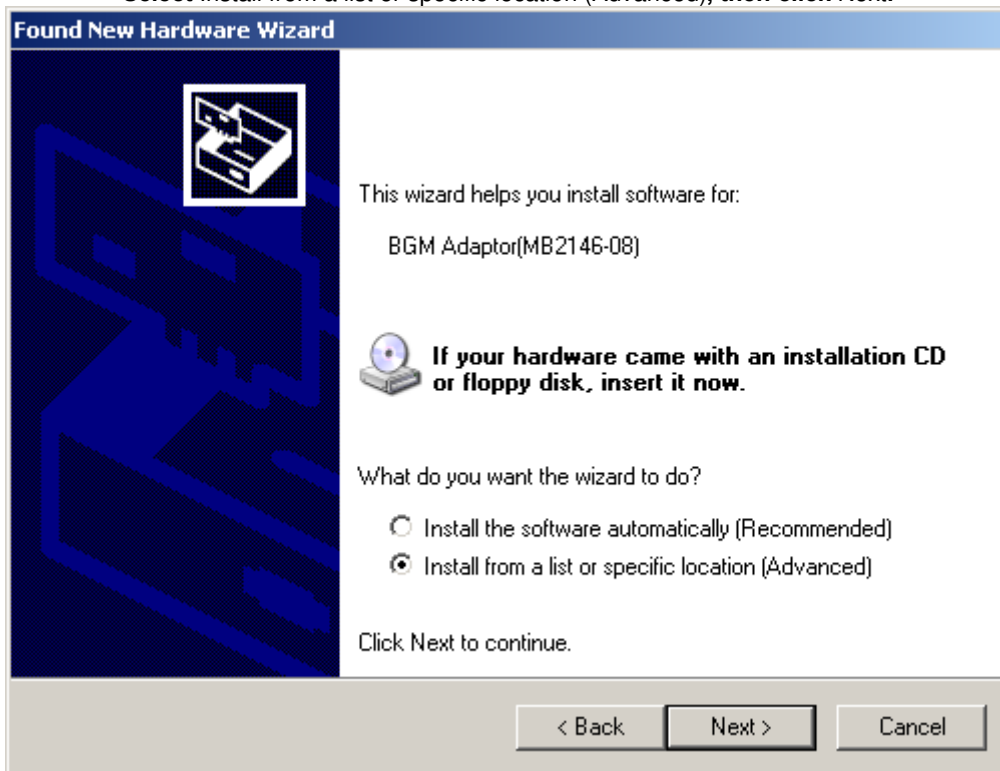


Figure 1.4-2 Install BGMA in Windows (2)

Select **...Drivers** from the folder where SOFTUNE is installed, then click **Next**.

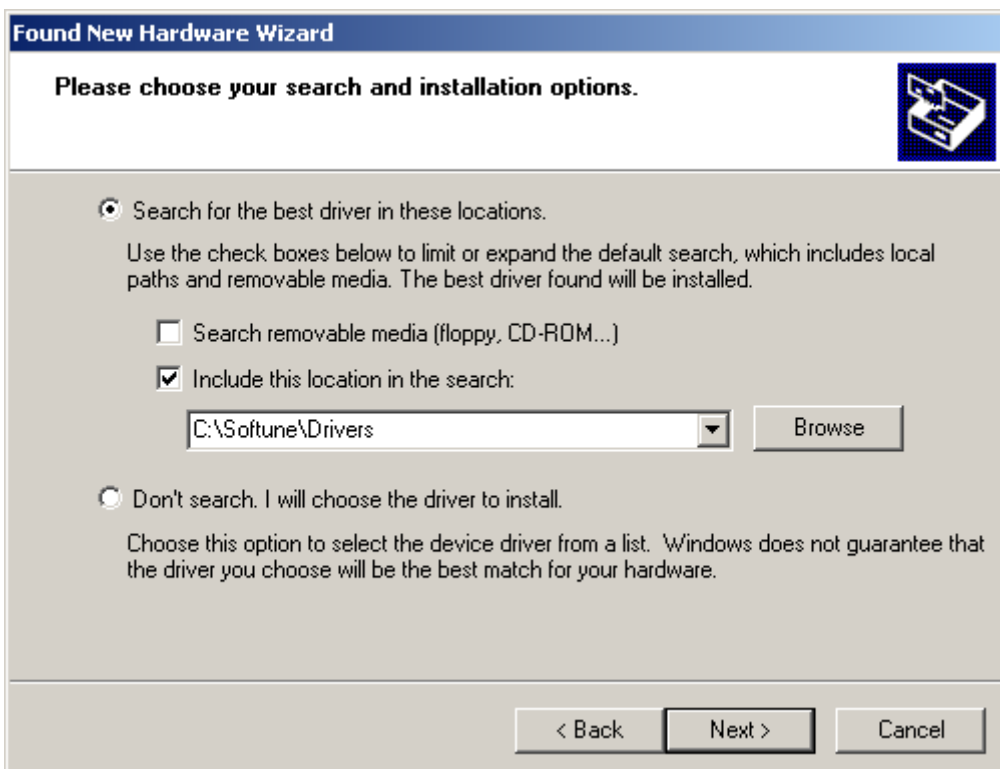


Figure 1.4-3 Install BGMA in Windows (3)

Select **BGMA (MB2146-08)** as displayed below, and then click **Next**.

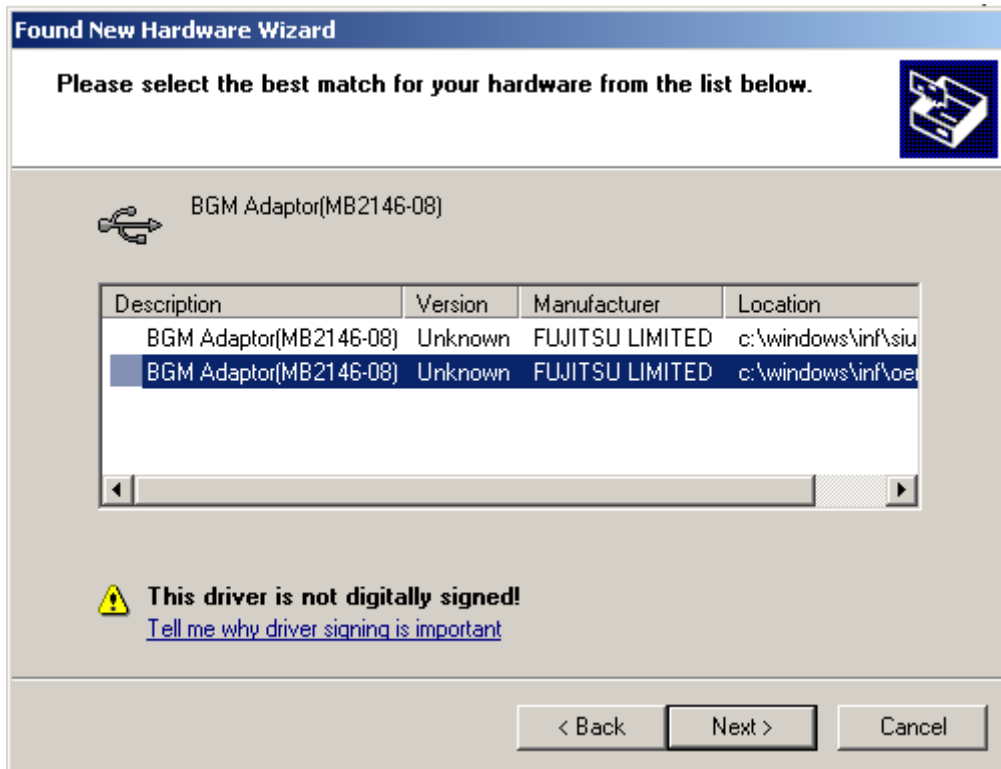


Figure 1.4-4 Install BGMA in Windows (4)

Windows will install the driver automatically. Click **Finish** after the driver has completed the installation normally. Then users can find the BGMA is recognized as MB2146-08 in Windows system.



Figure 1.4-5 BGMA is installed in Windows

## 1.5 LED Description

First, only plug USB cable to PC; check whether the power LED on BGMA turns green. Refer to Figure 1.4-1.



Figure 1.5-1 BGMA Power LED (1)

Second, plug IDC10 cable to the EV board (target MCU board), then turn on EV board. After that, check whether the power LED on the BGMA turns orange. Refer to Figure 1.4-2.

**Orange**

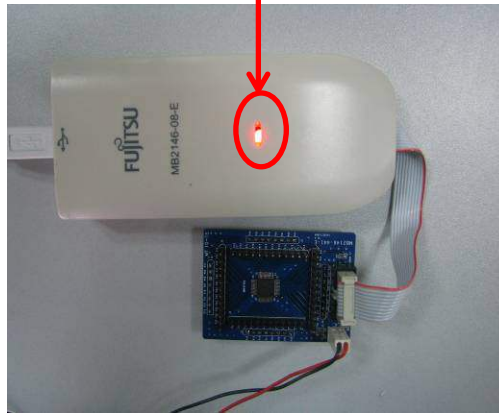


Figure 1.5-2 BGMA Power LED (2)

## 2 EV Board Introduction

### 2.1 EV Board Overview

MB95390 Series EV board provides a user-friendly evaluation platform for the MB95390 Family microcontroller.

MB95390H/390K MCU EV board PN is MB2146-441-E.

Figure 2.1 is a close look of EV board.

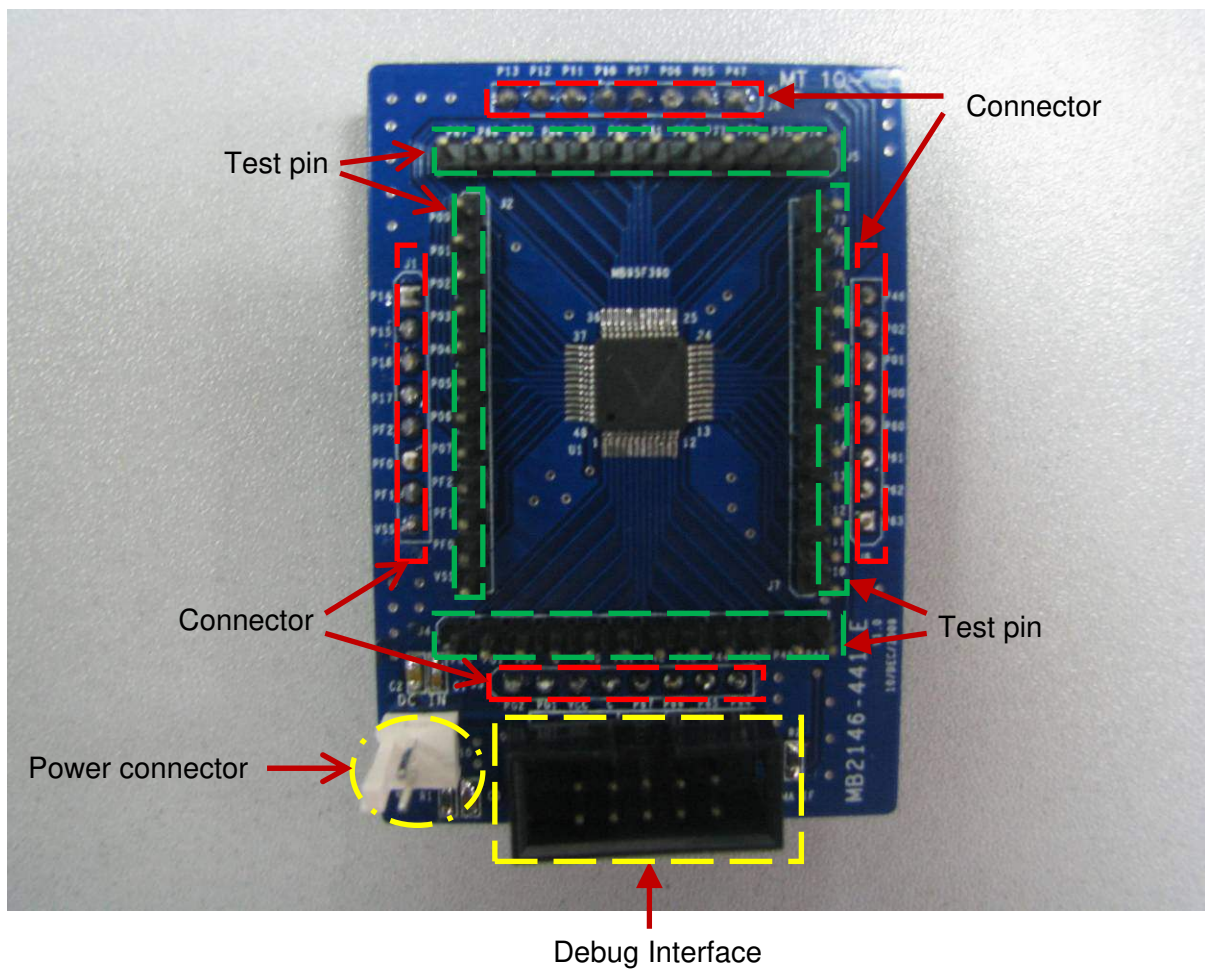


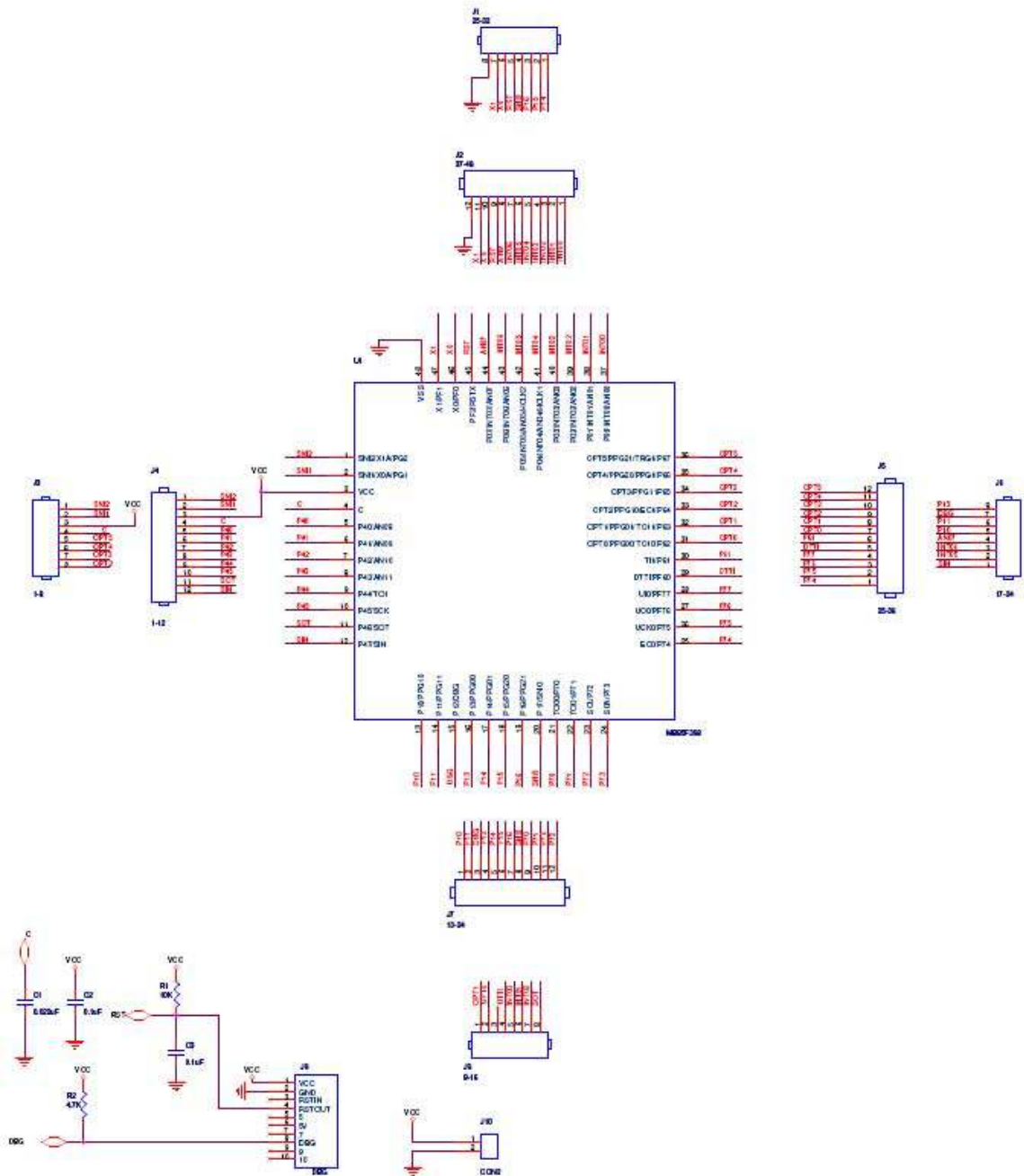
Figure 2.1 EV Board Overview

## 2.2 Function List

The EV-board consists of a board and a sample firmware. The board provides a useful platform for using the MCU and its peripherals. It is a useful development platform together with a BGMA (PN: MB2146-08-E) and a SOFTUNE. It features the following functions,

- ✓ External 5V power IF
- ✓ Provide IDC10 debug interface
- ✓ All MCU ports are easy accessible through test pins
- ✓ Support 120 degree inverter motor driving solution (Should be connected to MB95330 EV board. Refer to PN: MCU-AN-500094-E-10).

### 2.3 EV Board Schematic



## 2.4 HW Module Description

### 2.4.1 Power Module

Input external power supply from outside. Please read the following instructions before using.

Output voltage: 5V

Output Current: 500mA

Connection: Power connector (DC IN)

### 2.4.2 BGMA Interface

To start debugging using a BGMA, users can connect IDC10 socket from the BGMA to BGMA IF on an EV board before power on.

### 2.4.3 Test Pin

All MCU ports are easy accessible through test pins.

### 2.4.4 Connector

The EV board can be connected to MB95330 EV board through the four 8-pin connectors. Then the EV board can support 120 degree inverter motor driving solution.

## 3 Development Platform Quick Start

### 3.1 Tools Setup Sequence

Start the debugging system in the following sequence:

- ✓ Connect a BGMA to the PC using a USB cable, confirm the LED on the BGMA is Green;
- ✓ Connect an EV board to BGMA IDC10 socket;
- ✓ Power on EV board power supply, confirm the LED on the BGMA is orange.

### 3.2 Open Project and Start Debug

Users can start a debug from a PC software SOFTUNE workbench in the following sequence. Here take IO\_TEST project as example.

- ✓ Start the SOFTUNE by selecting **Programs > SOFTUNE V3 > FFMC-8L Family SOFTUNE Workbench** from Start Menu;
- ✓ Click **Open workspace** from **File** Menu in SOFTUNE;
- ✓ Select **IO\_TEST.wsp** in **Open Space** window;
- ✓ Click **Start debug** from **Debug** Menu.

If the entire procedure goes right, a debug will start normally.



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**MCU-AN-500092-E-10**

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**F2MC-8FX Family MB95390 Series**

**EV Board**

**MB2146-441-E**

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