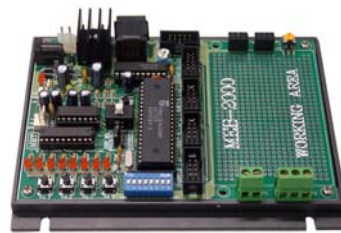


# USER'S MANUAL

## MEB-2000/MEB-2000P

MEB-2000



MEB-2000P



The MEB-2000 series is an embedded board for In-System programming (MCS-51). There is a basic digital I/O such as LED-Logic monitor, DIP switch include in the board With the basic I/O the user program can be easy to testing. Otherwise this board can support MCU for AT89S8252/AT89S53 by Atmel and P89C51RD2 by Philips too. The MEB-2000 series are separate into 2 version as below.

MEB-2000 : Embedded microcontroller with working area for user interfece circuit.

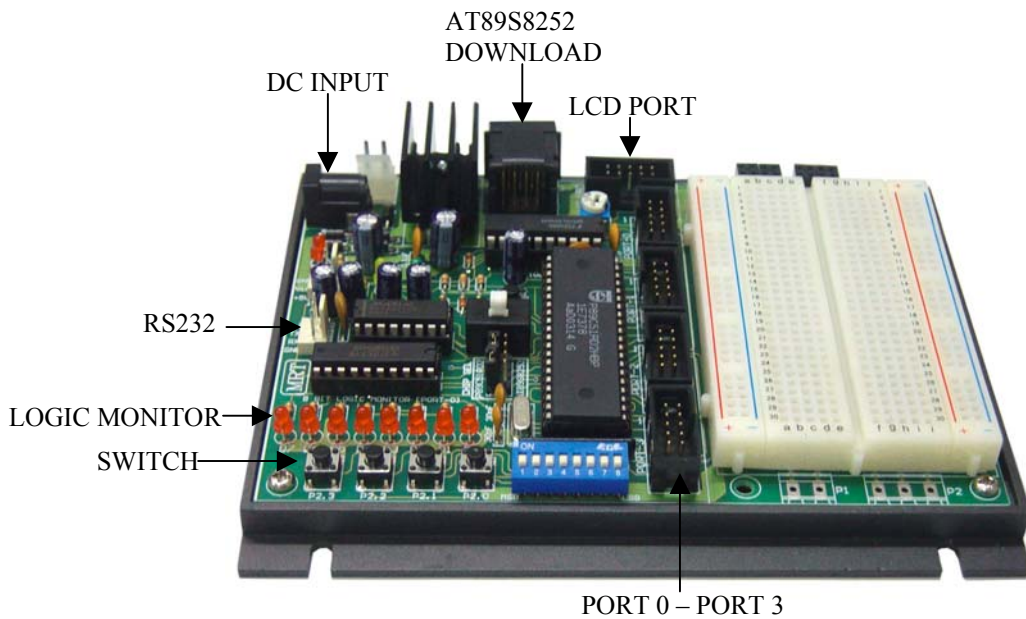
MEB-2000P : Embedded microcontroller with protoboard for easy to experiment the interface circuit.

### **Specification**

- Support microcontroller for In-System Programming.
  - AT89S53, 12 KB Flash memory
  - AT89S8252, 8 KB Flash memory, 2 KB EEPROM
  - P89C51RD2, 64 KB Flash memory, 1 KB RAM
- System X-TAL is 11.0592 MHz
- 8 Bit Logic monitor direct connected to PORT-0
- 8 Bit DIP switch and 4 bit PB switch direct connected to PORT-2
- Program / RUN mode selector switch with LED indicator.
- LCD port ( 4 Bit interface configulation )
- Direct MCU port ( P0-P3 ) with IDC-10 connector
- RS-232C serial communication port
- There is a bridge diode circuit at the power supply input. To prevent the damage of missing polarity connection.
- Downloader software support for windows 95/98/ME/2000 and XP
- For MEB-2000 version
  - Working area pad about 600 points.
  - Free 10 k $\Omega$  variable resistor
  - Free terminal block for 2 Pin and 3 Pin

- For MEB-2000P version

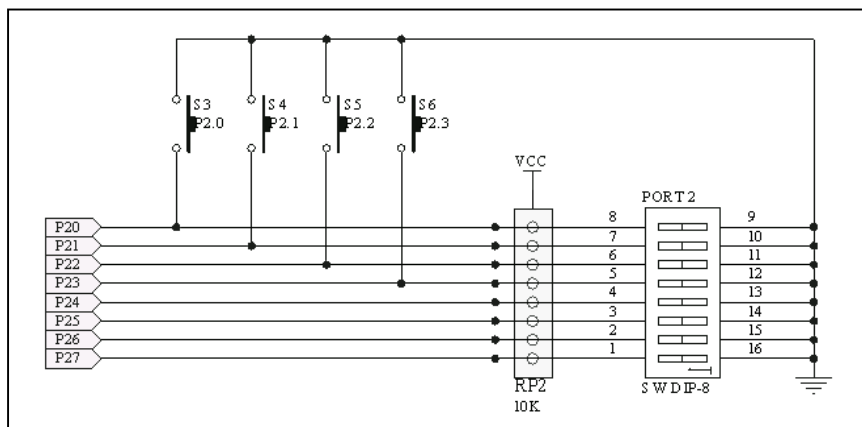
- 2" x 3" protoboard
- Power supply socket (+5 V, GND ) for experiment with protoboard.



**MEB-2000P**

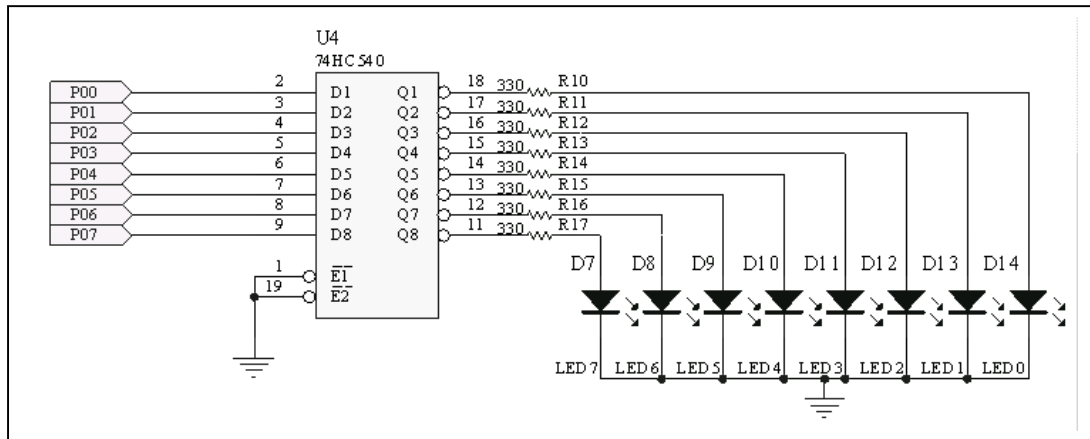
**Push button & DIP switch**

There are direct connect to PORT-2 of MCU. The circuit are configuration for active low input ( ON = Logic “0” , OFF = Logic “1” )



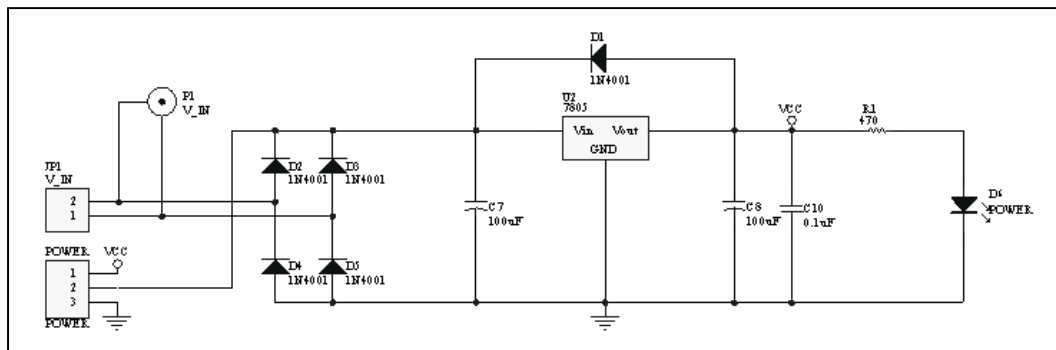
## Logic Monitor

The 8 bit logic monitor is a digital tools for monitoring the logic status. There are connecting to PORT-0 of MCU. The circuit is design with inverting buffer (74HC540) to prevent to loading effect on the MCU port. So the user interface circuit can be connecting with out regard the loading effect from logic monitor circuit.



## Power Supply

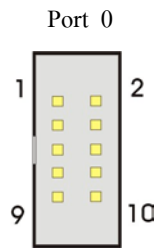
With the bridge diode circuit at the power supply input. The user can be connecting the embedded board with out the regard of the polarity. In the board there is +5 V regulator (7850) for system working voltage. Otherwise this board also prepare 3 pin connector (+5 V/+12 V/GND ) for easy to supply the extension interface board.



## Interface Port

The MEB-2000 series are fully to interface MCU port via the IDC-10 connector. For MEB-2000P version we recommend to used the WIP-20 connecting wire for wiring between IDC-10 connector and protoboard. The pin assignment of each are show below.

## **PORT-0**

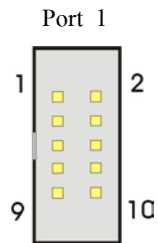


Port-0 Assignment

PIN	NEME	Function connected With CPU
1	P0.0	P0.0/AD 0 I/O Port
2	P0.1	P0.1/AD 1 I/O Port
3	P0.2	P0.2/AD 2 I/O Port
4	P0.3	P0.3/AD 3 I/O Port
5	P0.4	P0.4/AD 4 I/O Port
6	P0.5	P0.5/AD 5 I/O Port
7	P0.6	P0.6/AD 6 I/O Port
8	P0.7	P0.7/AD 7 I/O Port
9	VCC	+VCC
10	GND	GND

Assignment

## **PORT-1**



PIN	NEME	Function connected with CPU
1	P1.0	T2(P1.0) Timer/Counter 2 External Counter
2	P1.1	T2(P1.1) Timer/Counter 2
3	P1.2	EC1(P1.2) External Clock Input to PCA
4	P1.3	CEXO(P1.3) Capture/Compare External I/O
5	P1.4	CEXO(P1.4) Capture/Compare External I/O
6	P1.5	CEXO(P1.5) Capture/Compare External I/O
7	P1.6	CEXO(P1.6) Capture/Compare External I/O
8	P1.7	CEXO(P1.7) Capture/Compare External I/O
9	VCC	+VCC
10	GND	GND

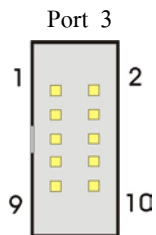
## PORT-2

Port-2Assignment

PIN	NEME	Function connected with CPU
1	P2.0	P2.0/A8 I/O Port
2	P2.1	P2.1/A9 I/O Port
3	P2.2	P2.2/A10 I/O Port
4	P2.3	P2.3/A11 I/O Port
5	P2.4	P2.4/A12 I/O Port
6	P2.5	P2.5/A13 I/O Port
7	P2.6	P2.6/A14 I/O Port
8	P2.7	P2.7/A15 I/O Port
9	VCC	+VCC
10	GND	GND

## PORT-3

Port-3 Assignment



PIN	NEME	Function connected with CPU
1	P3.0	RDX(P3.0) Serial Input Port
2	P3.1	TDX(P3.1) Serial Output Port
3	P3.2	INT0(P3.2) External Interrupt
4	P3.3	INT1(P3.3) External Interrupt
5	P3.4	TO(P3.4) Timer 0 External Input
6	P3.5	T1(P3.5) Timer 1 External Input
7	P3.6	WR(P3.6) External Data Memory Write
8	P3.7	RD(P3.7) External Data Memory Read
9	VCC	+VCC
10	GND	GND

**LCD-PORT** : This port is use for connect to the LCD-Module by 4 bit transfer method to reduce the interface wire and MCU port

LCD Port-1 Assignment

PIN	NEME	Function connected with CPU
1	GND	GND
2	VCC	+VCC
3	VEE	VR Adjust the LCD light LCD
4	RS	P1.0 Instruction/Data Select
5	RW	P1.1 Read/Write Data
6	E	P1.2 Enable
7	D4	P1.4 Data Bit 4
8	D5	P1.5 Data Bit 5
9	D6	P1.6 Data Bit 6
10	D7	P1.7 Data Bit 7

## Hardware Setup

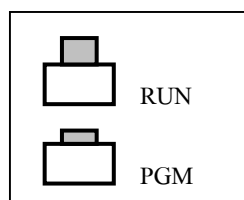
### 1. Chip Select Jumper

To select the in use MCU chip on the embedded board between Atmel (AT89S8252 / AT89S53) and Philips (P89C51RD2). The jumper setting are show below



### 2. Mode Switch

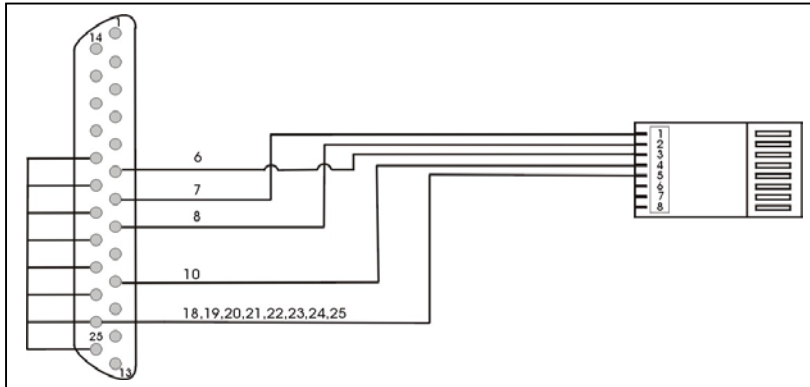
Selector mode switch between program mode and run mode



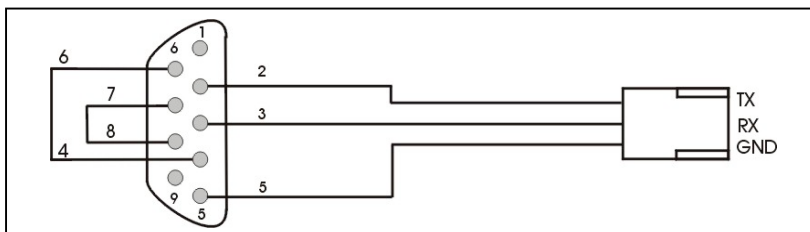
### 3.Download Cable

There are two type of download cable for Atmel microcontroller and Philips microcontroller.

#### 3.1 Atmel microcontroller download cable



Philips microcontroller download cable is same as the RS-232C cable



### Downloader Software

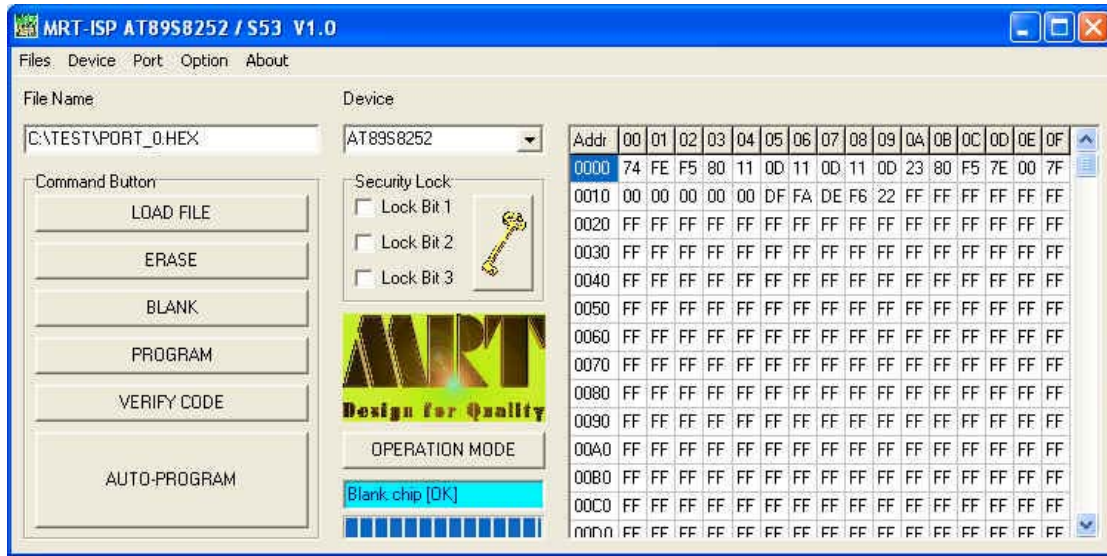
Because the Atmel microcontroller and Philips microcontroller have different way for ISP. So the downloader software also different too. There are two downloader software for MEB-2000 series

- MRT-ISP : Downloader software for Atmel microcontroller (AT89S8252 / AT89S53)
- WIN-ISP : Downloader software for Philips microcontroller (P89C51RD2)



## MRT-ISP Software

The MRT-ISP software is a downloader program by Micro-Research Technology. This software used for In-System programming of Atmel microcontroller (AT89S8252 / AT89S53). For update the latest version please visit at [www.micro-research.co.th](http://www.micro-research.co.th).



1. **Menu** : this software is base on windows operation. There are software menu as below

1.1 **File** : consist of sub-menu

🔑 **Load Code** : Load program code of standard HEX file format into the buffer.

And display program code on the display buffer windows.

🔑 **Read Chip** : Read program memory from MCU into the software buffer. And

display program code on the display buffer windows.


🔑 **Exit** : Exit from the program


1.2 **Device** : Select the chip to be program. Now support for AT89S8252 and AT89S53.


1.3 **Port** : Select an parallel port for LPT1 or LPT2 which your connected the download cable

1.4 **Option** : There are sub-menu as list below.

🔑 **Program mode** : Switch mode into the program mode

 **RUN Mode** : Switch mode into the RUN mode

 **Auto Run after auto program** : Automatically switch to RUN mode after auto-program operation.

 **Auto Reload File** : Always reload the file or refreshing the new program code before program into the chip.

1.5 **About** : Software information dialog

2.**File Name** : Display the name of file was opened.

3.**Device** : Chip selected


4.**Display buffer** : The windows to display the program code in HEX format from the load code command or read chip command.

5.**Operation mode** : Switch mode button between program mode and RUN mode.

6.**Status bar** : The message bar for indicating the operation sequence of software.

7.**Progress Bar** : Progressive bar indicator


8.**Command Button** : the user can be quick and easy operation with command button as list below.


 **LOAD FILE** : Load program code

 **ERASE** : Erase all data in chip

 **BLANK** : Blank chip checking

 **PROGRAM** : Write program code into Flash memory

 **VERITY CODE** : Verity code between code buffer with flash memory on the chip

 **AUTO-PROGRAM** : Auto execution from ERASE » VERITY CODE » Security Lock

9.**Security Lock** : Select the Lock bit level as your require. The lock bit will be write to the chip with the PROGRAM and AUTO-PROGRAM command.

Otherwise the user can be do laster after programming by the lock key button.

## WIN-ISP Software

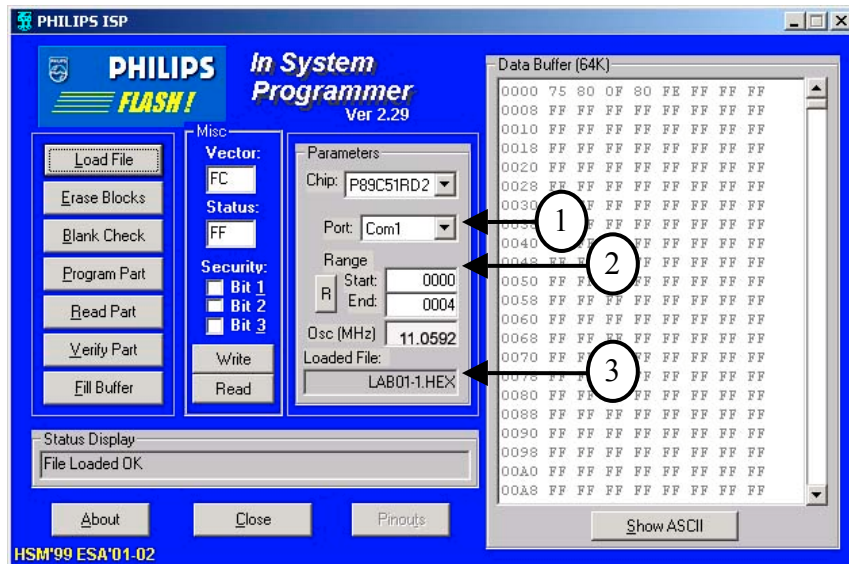
The WIN-ISP software is a downloader program by Philips who was manufacturing the MCU P89C51RD2. The sequence of WIN-ISP operation can be show as below.

1.1 Open the WIN-ISP software

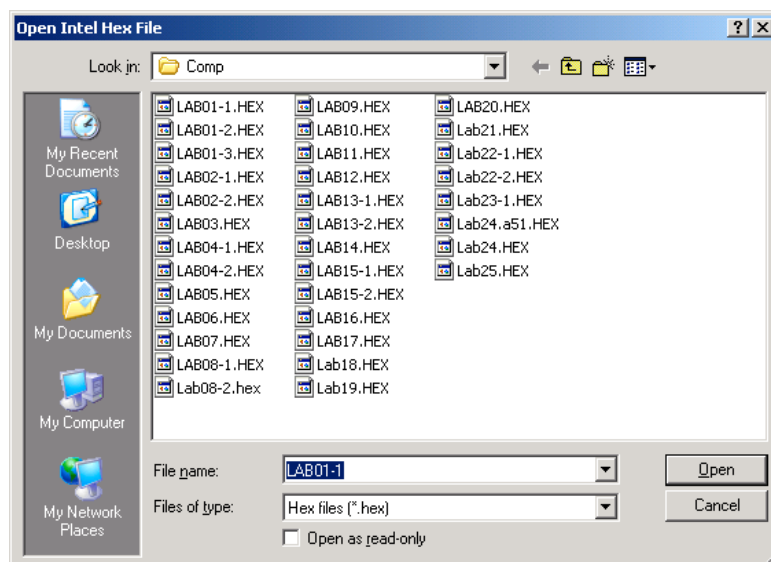


1.2 Specify the three parameter

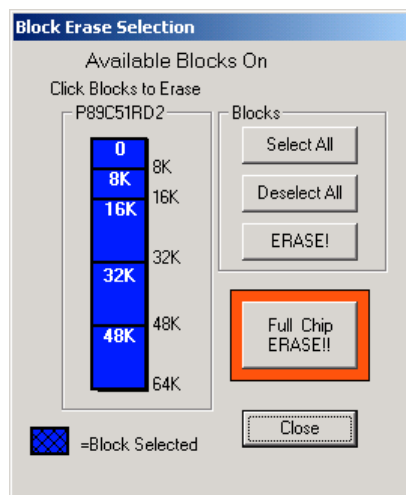
- ① Chip = Programming chip now selected to P89C51RD2
- ② Port = Serial communication port of PC
- ③ OSC (MHz) = The value of X-TAL in embedded board. Specific number in MHz unit



1.3 Click on the **Load File** button to open the program file to be download.



1.4 Before new program can be written the old data must be erase by **Erase Blocks** command button. The user can be specify which program block will be erase.

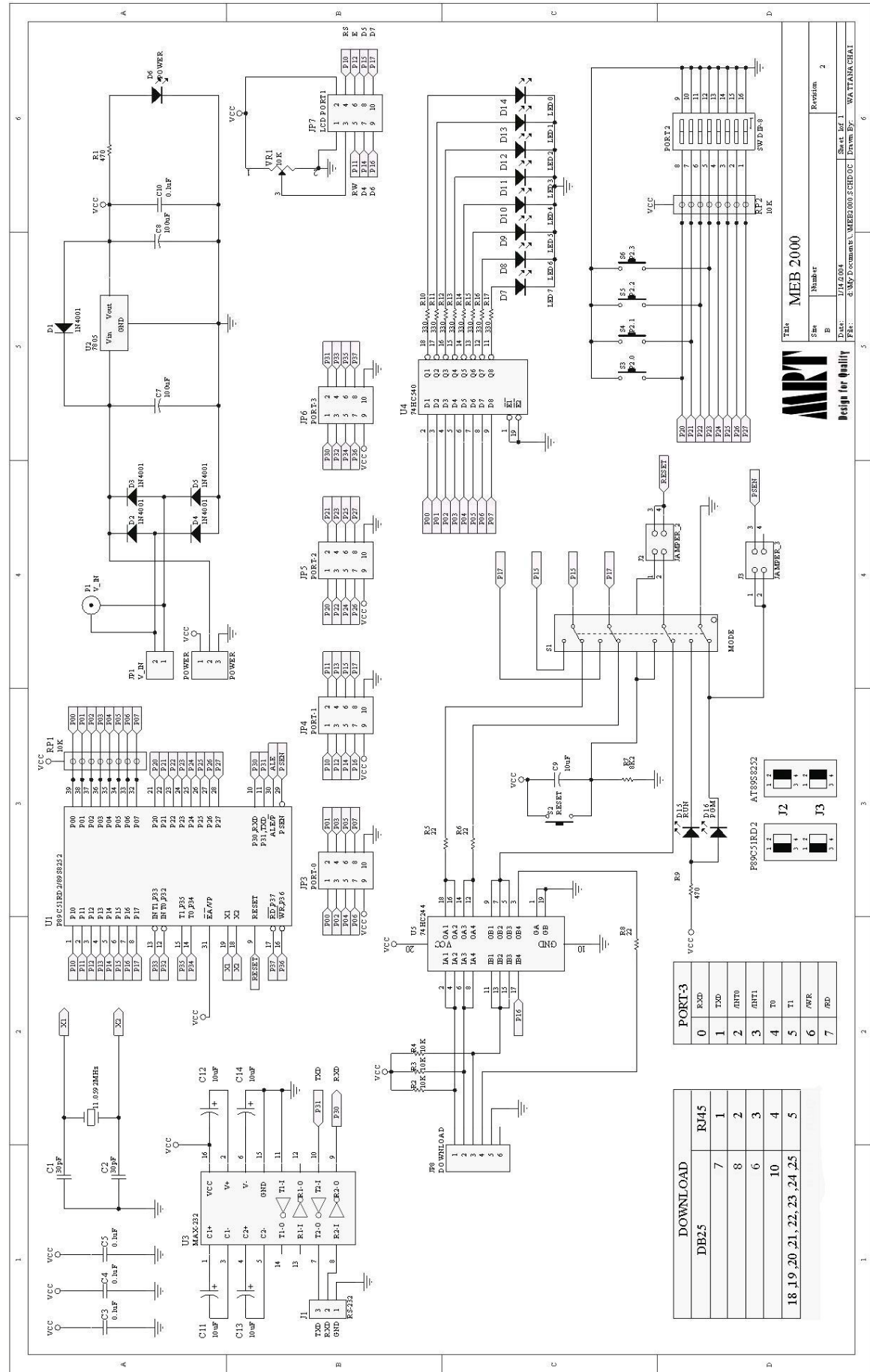


**Note** : For MEB-2000 /2000P the user must prepare the embedded board into programming mode by switch mode into PGM mode and once press the RESET switch again.

1.5 Click on **Program Part** button to program data from buffer into the MCU.

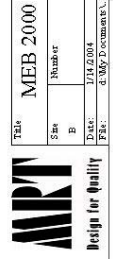
1.6 Program testing or RUNNING by switch mode into the RUN mode then once press the RESET switch.





DOWNLOAD	
DB25	RM45
7	1
8	2
6	3
10	4
18, 19, 20, 21, 22, 23, 24, 25	5

PORT-3	
0	RXD
1	TXD
2	INT0
3	INT1
4	T0
5	T1
6	WR
7	RD



Title		MEB 2000	
Sheet	Number	Sheet	Revision
B	1/M/2004	1 of 1	2
Date:		Drawn By:	
4/M/2004		WATANA CHAI	
File:		MEB2000.SCHDOC	