FUJITSU

CMOS 8-BIT SINGLE-CHIP FLEXIBLE MICROCONTROLLER

MB89710 SERIES

PRELIMINARY

Notice: This is not a final speci-
fication. Some parametric limits
are subject to change.

TM209-A879: September 1987

DESCRIPTION

The Fujitsu MB89710 Series Flexible Microcontrollers
are the new generation CMOS 8-bit single-chip micro-
controllers, which have powerful architecture and
efficient instruction set designed for high speed
real time controller applications.

The MB89713/89715 are designed based on a highly
efficient 16-bit CPU core with 8-bit data bus
(called F^2MC^{TM}-8 family CPU core) that has an effi-
instruction set and high speed nested interrupt
capability.

The MB89713/89715 provide a set of basic resources:
an 8K x 8 bits/16K x 8 bits mask ROM(program memory)
a 260 x 8 bits/516 x 8 bits static RAM (data memory)
53 I/O lines (five 8-bit, two 5-bit, and one 3-bit
parallel ports), a watchdog timer, eleven-source
three-programmable-priority-level nested interrupt,
and an 8MHz clock generator.

In addition to these features, they have another of
specific resources: Real Time I/O ports (4 inputs
and 4 outputs), PWM/Timer module configured as 8
bits x 2 channels or 16 bits x one channel, a UART
module with full-duplex serial communication capabil-
ity, and a serial interface for I/O expansion.

The high performance realized by these features is
usefule for high speed real time control applications
such as printers, lap-top personal computer, fac-
simile machines, copy machines, automoble meters, and
survo controllers.

The MB89713/89715 are fabricated by the silicon-gate
CMOS process, and packaged in a 64-pin plastic shrink
DIP (suffix -P) or a 64-pin plastic QFP (suffix -PF).
They operate with a single +5V power supply and a
clock of at most 8MHz. The instruction execution time
is at least 5μs at 8MHz clock.

In addition to these mask ROM versions, the external
ROM versions, MB89T713/89T715, the piggyback evalua-
tion devices, MB89PV713/89PV715, and OTP/EPROM ver-
sions are provided for users' efficient development.

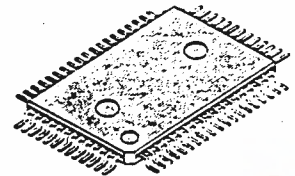Also, development tools are supported.

F^2MC (Fujitsu Flexible Micro Controller) is a trade-
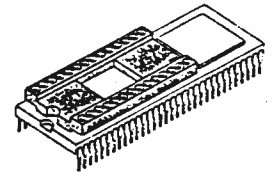
MB89713P/MB89715P
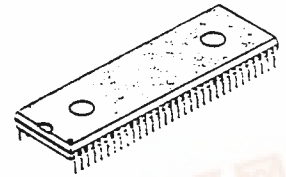
**64-PIN PLASTIC SHRINK DIP
(DIP-64P-M01)**

MB89713PF/MB89715PF

**64-PIN PLASTIC QFP
(FPT-64P-M01)**

MB89PV713C/MB89PV715C

**64-PIN CERAMIC DIP MODULE
(MDIP-64C-P01)**

MB89PV713CF/MB89PV715CF

T.B.D.

**64-PIN CERAMIC QFP MODULE
(MQP-64C-P01)**

This device contains circuitry to
protect the inputs against damage
due to high static voltages or elec-
tric fields. However, it is advised
that normal precautions be taken to

FEATURES

- F^{2}MC™-8 Family CPU Core:

  * 16-Bit Architecture
  * 8-Bit Data Bus
  * 64K x 8 Bit Internal Program/Data Memory Space
  * 128K x 8 Bit External Data Memory Space
  * Memory Mapped I/O
  * Powerful and Compact Instruction Set
    - Bit and Word Operations, Multiply and Divide
  * Instruction Count - 135
  * Instruction Execution Time - Min 0.5μs at 8MHz Clock

- Basic Resources:

  * ROM - 8K x 8 Bits (MB89713), 16K x 8 Bits (MB89715)
  * RAM - 260 x 8 Bits (MB89713), 516 x 8 Bits (MB89715)
  * I/O - 53 Ports: Push-Pull Buffered Ports - 43; Open-Drain Buffered Ports - 8
  * Watchdog Timer
  * Power-On Reset
  * Interrupt - 11 Sources (including 3 External Interrupt Inputs), Nested,
    3 Programmable Priority Levels, High Speed (2μs at 8MHz),
  * Standby   - Halt Mode, Stop Mode
  * Intel Type Bus Interface for External Memory and I/O Access
  * Clock Generator - 8MHz

- Specific Resources:

  * Real Time I/O - 4 Output Compare Channels and 4 Input Capture Channels
  * PWM/Timer - 8 Bitz x 2 Channel or 16 Bits x 1 Channel
  * A/D Converter - 8 Bits x 8 Channels
  * UART - One Channel, Full-Duplex and Double Buffering
  * Serial Interface for I/O Expansion - One Channel

- Single +5V Power Supply, -40°C to +85°C, Max 8MHz Clock

- Process - Silicon-Gate CMOS Technology

- Package - 64-Pin Plastic Shrink DIP, 64-Pin Plastic QFP

- Development Support Devices:

  * Piggyback Evaluation Devices - MB89PV713, MB89PV715
  * External ROM Devices   - MB89T713, MB89T715
  * OTP/EPROM Devices   - MB89P713, MB89W715

- Development Support Tools:

  * Host Machine   - IBM PC/XT, PC/AT, or Equivalents
  * Software Tools - C Compiler, Macro Assembler, Linker/Library Manger
  * Hardware Tools - In-Circuit Emulator (MB2120 Series + Host Emulator)

F^{2}MC is a trademark of FUJITSU LIMITED.

Feature	MB89713	MB89715
Data bus width	8-bits	8-bits
Address bus width	16-bits	16-bits
ROM	8K bytes	16K bytes
RAM	260 bytes	516 bytes
Direct access memory address	64KB Main Memory (ROM/RAM, ext memory) plus 64K byte banks of Data Memory	
Interrupt sources	10 internal/3 external	
Priority levels	3 plus NMI	
Timers/counters	1x21 bits/1x16 bits/1x16 or 2x8 bits	
Watchdog timer	1x21 bit	
General purpose I/O	53, selectable in/out/bidirectional	
Serial I/O	1 channel x 8-bits	
Real time I/O	Input capture/output compare	
A/D converter	8 channels/8-bit resolution	
UART	full duplex/synchronous/asynchronous	
PWM	1x16 bits or 2x8 bits	
Standby modes	sleep & stop	
Instruction cycle time	0.5 uS/8 MHz	
Packages	64 pin shrink DIP/quad flat pack	