

1. DESCRIPTION

This microcomputer is a single-chip microcomputer that adopts a high-performance silicon gate CMOS process, and is contained in a 100-pin plastic mold QFP. This single-chip microcomputer is provided with an instruction queue buffer and a data buffer for executing instructions at high speed. The central processing unit runs in a 16-bit parallel processing mode but can be converted into an 8-bit parallel processing mode when necessary. This product has been designed exclusively for video equipment system controls, incorporating a time measuring circuit for VCR servo control, a real-time pattern generating circuit, analog amplifiers, an OSD display circuit, and a data slicer, among its many other peripheral capabilities.

1.1 FEATURES

- Number of basic instructions 103
- Memory size RAM M3776AM8A-XXXGP:2048bytes
M3776AMCA-XXXGP:2560bytes
M3776AMFA-XXXGP:3072bytes
ROM M3776AM8A-XXXGP:64kbytes
M3776AMCA-XXXGP:96kbytes
M3776AMFA-XXXGP:120kbytes
- Instruction execution time
(fastest instruction, 16 MHz high-speed mode) 250 ns
(fastest instruction, 12 MHz double-speed mode)
..... 167 ns
- Single power source
In 16 MHz high-speed mode
(OSD/data slicer off) 4.0 V to 5.5 V
(OSD/data slicer on) 4.75 V to 5.25 V
In 12 MHz double-speed mode
(OSD/data slicer off) 4.0 V to 5.5 V
(OSD/data slicer on) 4.75 V to 5.25 V
In 32 kHz low-speed mode
(OSD/data slicer off) 2.6 V to 5.5 V
- OSD power source 4.75 V to 5.25 V
- Interrupt 23 factors, 6 levels
- 16-bit timer 3
- 8-bit timer 3
- Clock-synchronous serial I/O 2
(one of which can perform automatic 64-byte transfers)
- I²C-Bus interface (single master) 1
- 8-bit A-D converter 1 unit (11 channel inputs)
- 8-bit D-A converter 2
- 12/14-bit PWM 2
- 14-bit PWM 1
- Time measurement circuit (TMT)
One counter for measuring time to generate input signals DRFG, CPFPG, CPPPG, VSYNG, and GEN
One counter for measuring time to generate input signals RLS and RLT
- Remote-control noise filter (majority of 4 samplings)
- Real-time pattern (RTP) generation circuit
Outputs real-time pattern to exterior, RECCTL signal to CTL head control circuit, trigger for start the A-D converter, trigger for starting OSD vertical display

- Amplification circuits
CTL head control circuit, CTL amplifier, CTL schmidt circuit, drum PG circuit, drum FG circuit, capstan FG circuit, capstan FG amplifier circuit
- Pulse duty detection circuit (VISS and VASS signal detection features embedded) Measures PBCTL signal duty ratio.
- Synchronous signal separation circuit
- EOR output feature (HASW, CROT) 2-bit output
- Watchdog timer
- Programmable I/O ports 69
(Ports P00-P06, P10, P11, P15-P17, P2, P4-P7, P84-P87, P9, P10, P110, P111)
- Input ports 10
(Ports P07, P12-P14, P30, P31, P80-P83)
- 4 Embedded clock-generating circuits
Built-in feed-back resistor between XIN-XOUT
Built-in feed-back resistor between XCIN-XCOUT
- CPU double-speed enable (f(XIN) max. 12.0 MHz)
- ROM correction function included
- OSD function
Display characters 32 characters × 16 lines
Kinds of characters Composite Output 254 kinds
RGB Output 285 kinds
Kinds of character sizes 8 kinds
Output method Composite video signal, RGB output (PAL, MPAL, NTSC, NPAL)
Special function Display with background shadow (button display)
On-chip sync correct circuit (AFC)
- Data slicer
On-chip slicer for XDS

1.2 APPLICATION

VCR, TVCR

Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Keep safety first in your circuit designs!

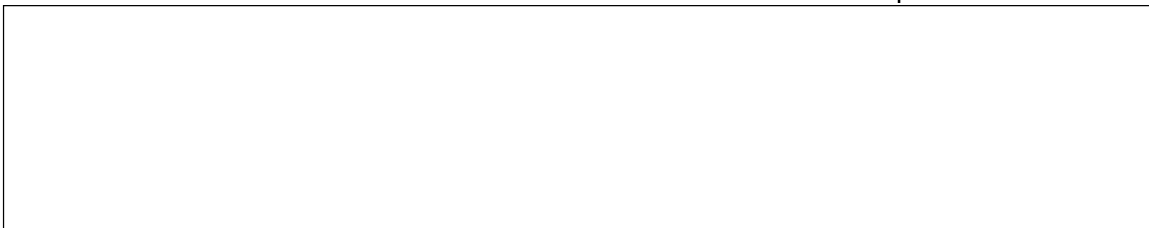
1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corporation product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation or a third party.
2. Renesas Technology Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors.
Renesas Technology Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Renesas Technology Corporation by various means, including the Renesas Technology Corporation Semiconductor home page (<http://www.renesas.com>).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corporation is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corporation for further details on these materials or the products contained therein.

RENESAS

<http://www.renesas.com>



Copyright © 2003, Renesas Technology Corporation, All rights reserved. Printed in Japan.

REVISION DESCRIPTION LIST

M3776AM8A/MCA/MFA-XXXGP

Rev. No.	Revision Description	Rev. date
1.00	First Edition of PDF File	0217