

Advanced Micro Devices



**Am9513A/Am9513
System Timing Controller
Technical Manual**

©1990 Advanced Micro Devices

Advanced Micro Devices reserves the right to make changes in its products without notice in order to improve design or performance characteristics.

This publication neither states nor implies any warranty of any kind, including but not limited to implied warranties of merchantability or fitness for a particular application. AMD assumes no responsibility for the use of any circuitry other than the circuitry embodied in an AMD product.

The information in this publication is believed to be accurate in all respects at the time of publication but is subject to change without notice. AMD assumes no responsibility for any errors or omissions and disclaims responsibility for any consequences resulting from the use of the information included herein. Additionally, AMD assumes no responsibility for the functioning of undescribed features or parameters.

TABLE OF CONTENTS

	Page
PREFACE	i
CHAPTER 1 – THE Am9513A/9513	
Introduction	1-1
Functional Description	1-2
Interface Signal Description	1-3
Control Port Registers	1-5
Command Register	1-5
Data Pointer Register	1-5
Prefetch Circuit	1-7
Status Register	1-8
Data Port Registers	1-8
Counter Logic Groups	1-8
Load Register	1-8
Hold Register	1-8
Counter Mode Register	1-8
Alarm Registers and Comparators	1-8
Master Mode Control Options	1-8
Counter Mode Operating Descriptions	1-11
Counter Mode Control Options	1-22
Command Descriptions	1-25
CHAPTER 2 – Am9513A/9513 INTERFACING	
Am9513 – CPU Interfacing	2-1
Clock Generation	2-1
Register Access	2-3
Information Transfer Protocols	2-3
Software Initialization	2-3
Command Initiation	2-3
Setting the Data Pointer Register	2-4
Reading the Status Register	2-6
Reading from the Data Port	2-7
Writing to the Data Port	2-8
CHAPTER 3 – CONCATENATING COUNTERS	3-1
CHAPTER 4 – TIME-OF-DAY COUNTING	
Initializing to Current Time-of-Day	4-1
Reading the Current Time	4-3
Setting the Alarm Time	4-3
Other Time-of-Day Variations	4-3
Am8080A/8085A Time-of-Day Software	4-4
A Cookbook Approach to Time-of-Day Counting	4-7
Settime Software Using Macros	4-9
Console Driven Clock Runs Under CP/M	4-9
CHAPTER 5 – EVENT COUNTING	5-1
CHAPTER 6 – FREQUENCY AND BAUD RATE GENERATION	
Frequency Generation	6-1
Auto Baud Rate Generator	6-3
CHAPTER 7 – ONE-SHOT APPLICATIONS	7-1
CHAPTER 8 – SOFTWARE CONSIDERATIONS AND PROGRAM EXAMPLES	8-1
APPENDICES	
A – Dealing with Metastable Problems	A-1
B – Key to Timing Diagrams	B-1
C – Am9513 Software Definitions	C-1

TABLE OF CONTENTS (Cont.)

D – Am9513 Macro Command Summary	D-1
E – Am9513 Macros for Am8080/Am8085	E-1
F – Am9513 Macros for Z80	F-1
G – Am9513 Macros for Z8000	G-1
H – Am9513 C Definitions	H-1
I – Am9513 Assembler Definitions	I-1

PREFACE

This manual describes the functional operation of the Am9513 System Timing Controller and its typical hardware and software applications.

Due to the complexity of this device, the first two chapters of this book are required reading before attempting to use the device. Detailed timing information is not contained in this manual, it is published in a separate document, called "Am9513 Electrical Specification," and is available from any Advanced Micro Devices Sales Office, representative or franchised distributor or directly from AMD Literature Distribution (MS-82) P.O. Box 3453, Sunnyvale, CA 94088.

The AmZ8073 is functionally identical to the Am9513, but offers timing parameters that are optimized for operation with the AmZ8000* microprocessor.

The Am9513A is a functionally enhanced version of the Am9513, and fully compatible with the Am9513. The new, additional features of this device are pointed out in the text.