

Section 1 Overview

AVR™ Enhanced RISC Microcontrollers.....	1-1
---	-----

Section 2 AT90S1300

Description	2-3
Pin Configuration.....	2-3
Block Diagram.....	2-4
Pin Descriptions	2-5
AT90S1300 AVR Enhanced RISC Microcontroller CPU.....	2-7
Timer / Counters	2-17
The Watchdog Timer.....	2-20
EEPROM Read/Write Access	2-21
The Analog Comparator.....	2-22
I/O-Ports.....	2-23
Memory Programming.....	2-32
Absolute Maximum Ratings	2-39
DC Characteristics	2-40
External Clock Drive Waveforms	2-41
External Clock Drive.....	2-41
Ordering Information	2-42
AT90S1300 Register Summary	2-43
AT90S1300 Instruction Set Summary.....	2-44

Section 3 AT90S2312

Description	3-3
Pin Configuration.....	3-3
Block Diagram.....	3-4
Pin descriptions.....	3-5
AT90S2312 AVR Enhanced RISC Microcontroller CPU.....	3-7
Timer / Counters	3-24
The Watchdog Timer.....	3-33
EEPROM Read/Write Access	3-34
The UART	3-36
The Analog Comparator.....	3-43
I/O-Ports.....	3-44
Memory Programming.....	3-54

(continued)

Section 3 **AT90S2312 (Continued)**

Absolute Maximum Ratings	3-62
DC Characteristics	3-62
External Clock Drive Waveforms	3-63
External Clock Drive.....	3-63
Ordering Information	3-64
AT90S2312 Register Summary	3-65
AT90S2312 Instruction Set Summary.....	3-66

Section 4 **AT90S8414**

Pin Configurations.....	4-5
Block Diagram.....	4-6
Description	4-7
AT90S8414 AVR RISC Microcontroller CPU	4-10
Timer / Counters	4-29
The Watchdog Timer.....	4-39
EEPROM Read/Write Access	4-40
The Serial Peripheral Interface - SPI	4-41
The UART	4-46
The Analog Comparator.....	4-52
I/O-Ports.....	4-54
Memory Programming.....	4-69
Absolute Maximum Ratings	4-77
DC Characteristics	4-78
AC Characteristics	4-79
External Data Memory Read Cycle	4-80
External Memory Write Cycle.....	4-80
External Clock Drive Waveforms	4-81
External Clock Drive.....	4-81
Ordering Information	4-82
AT90S8414 Register Summary	4-83
AT90S8414 Instruction Set Summary.....	4-84

Section 5 **Instruction Set**

Instruction Set	5-1
-----------------------	-----

Section 6 Development Tools

Development Tools	6-1
IAR Systems EWA90 & ICCA90	6

Section 7 Package Outlines

Standard Package Outlines	7-3
---------------------------------	-----

Section 8 Miscellaneous Information

Atmel Product Guide.....	8-3
Atmel Sales Offices & Operations.....	8-9
Atmel North American Distributors.....	8-11
Atmel North American Representatives.....	8-21
Atmel International Representatives	8-25

