INTRODUCTION

Welcome to the SAGE II Owners' Manual. The SAGE II is a high performance microcomputer oriented toward a single user environment. The SAGE II comes with the powerful UCSD p-System software package including the high level languages Pascal, FORTRAN, and BASIC. Much of this manual pertains to the integration of the SAGE II hardware with the UCSD p-System software. Other software environments are available from SAGE Computer Technology or other independent sources. These optional software packages will generally rely on this manual for a system overview and hardware presentation.

This Owners' Manual is not intended to be a tutorial. If you are new to the small system environment, the references given in the GUIDE TO BOOKS AND MANUALS section will be valuable to you. The information presented in this manual is specific to the SAGE II computer. This manual is packaged along with a series of manuals specifically covering the UCSD p-System software.

Chapters II and III of the SAGE II Owners' Manual present necessary information on getting started with the system and installing the hardware. Users with standard cables and peripherals should easily be able to get their system running with this information. Users preparing their own cables or interfaces should refer to the chapter on Hardware for more detailed interface information.

Chapter IV presents many details on the integration of the SAGE II with the p-System. The first few sections explain how to get the p-System software up and running. The concept of using the extra system RAM area as a device (RAM Disk) is explained. The peripheral assignments and memory allocation are described. The processor specific linkage information for combining assembly code with Pascal (or other p-code) programs is described.

Chapter V describes the utility program, SAGEUTIL, which is used for configuring the I/O system as well as for formatting diskettes and copying bootstraps. The earlier chapters on installation will have already guided the user through specific usages of SAGEUTIL in order to bring up the system.

Chapter VI presents the concept of a SAGE Tool Kit, a series of preprogrammed routines (p-System Units) which may be easily used to take advantage of SAGE II features. Initial Tool Kit Units included are a String Utility package and a Time and Date Utility package. Chapter VII continues the SAGE Tool Kit presentation with a Unit for handling the IEEE 488 bus interface.

One of the major benefits of the UCSD p-System is its program portablility to and from other systems. Chapter VIII presents a set of Computer Intercommunication programs to facilitate moving information between a SAGE II and other computers systems.

Chapter IX presents complete information on the permanently resident software located in the hardware PROMS. These routines provide startup initialization and self test as well as a set of primative drivers for some devices. Also located in PROM is a Debugger program for handling processor detected errors and checking out low level assembly code routines.

Chapter X covers the Basic Input Output System (BIOS) which is a set of peripheral devices drivers. The interface to the BIOS will be of interest to anyone wishing to develope a software environment independent of the p-System.

Chapter XI presents information on the SAGE II hardware implementation. Following this information are appendices containing summary information from the preceeding chapters. Also included is a hardware parts location and set of schematics.

The Owners' Manual concludes with a USUS Membership Application and a SAGE Trouble Reporting Form. USUS, the UCSD p-System Users Society, is a non-profit organization of p-System Users who exchange ideas and programs and promote p-System concepts. The SAGE Trouble Reporting Form is provided to document problems or suggestions for feedback to SAGE.

The SAGE II Owners' Manual is distributed in the first of four binders provided with the SAGE II computer. The first binder also contains the p-System Installation Guide written by Softech Microsystems. The only pertinant information in the Installation Guide for SAGE II users is chapter III on Terminal Handling. Note also that some of the Terminal Handling information is amended by the p-System Supplement for Version IV.1 (chapter IV, Installation Guide Supplement) contained in the third binder.

The second and third binders contain the p-System Users' Manual written by Softech Microsystems. The material in the second binder covers the p-System operating system, the Editors, the Pascal compiler, and the Assemblers. The third binder continues with discussion on the Linker, Segments, Units, and Concurrency as well as covering various Utility routines provided by the p-System. The last half of the third binder contains a p-System Supplement for Version IV.1. This manual contains information on enhancements contained in the IV.1 release as well as documentation on features such as Native Code Generators, Print Spooling, XenoFile, and Turtlegraphics.

The fourth binder contains manuals for the p-System programming languages FORTRAN 77 and BASIC. Also this binder contains a p-System Internal Architecture Guide which covers details on internal implementation of the p-System software.

An Interface Design Package is available from SAGE which contains source listings of the resident PROM program, BIOS, SAGEUTIL, and other utilities. Also included in this package is more detailed hardware information with manuals on the 68000 processor and the system's peripheral control components.

I.1 THE SAGE II- FEATURES AT A GLANCE

The SAGE II is a powerful, fast, small computer system with large system capabilities at a low cost. It was designed to implement high-level languages easily. Here, at a glance, are the features that give the SAGE II the most power-per-price of computers available today.

MC68000 16-bit processor 2 million instructions per second

Multi-color status LED

Sage expansion bus: 16-bit data bus, 24-bit address bus

All input and output is interrupt driven, optionally polled

128K to 512K byte dynamic memory

Byte level parity checking

Real-time clock

Task scheduler

Two RS232-C serial ports

Parallel printer port

IEEE-488 GPIB port

Easy to interface BIOS

DEBUGGER for software development

Choice of 48TPI or 96TPI floppy disk drives

Compact sturdy metal case - weighs under 18 lbs

Quiet 20 CFM fan

Low power requirements (70 watts)

Switching power supply

UCSD p-System Software with Pascal, FORTRAN and BASIC

1 year warranty