S U P E R

E X P A N D E R   G S

U S E R ´ S   M A N U A L

Credits:

Apple II+, Apple IIe, Apple IIGS, Appleworks, &
PRODOS are trademarks of Apple Computer Inc.

SUPER EXPANDER(tm) GS
1.0 Megabyte RAM Expander Board.
Apple IIgs Only.

Features:

    1. 100% Replacement for Apple 1.0 Meg GS RAM Board.
    2. 100% GS Software Compatible.
    3. User Expandable to 1.0 Megabytes.
       (Uses standard low cost 256Kx1 RAM E.G. 41256-15)
    4. Recognized by Appleworks 2.0 (Desktop to 1149K).
    5. RAM Disk Access Capability.
    6. All IC's socketed.
    7. No Protection Chips (PALS) Used.
    8. One Full Year Warranty.

Package Includes:

    1. SUPER EXPANDER GS Memory Board.
       256K (AGS-256KG-1) *
       512K (AGS-512KG-1) *
       1MEG (AGS-1MGKG-1) *
    3. User's Manual.

    * Depending on the version ordered, one of these boards is
included in the set. All are the same board type with more or less
memory.

LIMITED WARRANTY & LIABILITY!

Your Super Expander GS comes with a limited one year warranty
including parts and labor. This means our parts and labor,
not yours or someone elses parts and labor.

The warranty is for the Super Expander GS board only, and does
not cover direct, indirect, incidental, consequential, or
special damages to any other part of your computer system
that may be caused from the use of the Super Expander .GS. All
liability for such damages, as mentioned above, are at the
risk of the purchaser.

Should your Super Expander GS malfunction within one year from
the date of purchase, return the Super Expander GS, with proof
of purchase, to your authorized dealer.

Your dealer will repair or replace (dealers option) your
Super Expander GS.

Some states do not allow the exclusion or limitation of
implied warranties or liability for incidental or consequen-
tial damages, so the above limitation or exclusion may not
apply to you.

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CHAPTER 1 INTRODUCTION

1.1 General

The Super Expander(tm) GS memory board expands your Apple
GS computer to 1.0 megabytes of auxiliary memory. Standard RAM
included with the board is 256K. The board can be easily
upgraded to 1.0 megabytes using standard market 256K RAM chips.

The RAM board is a 100% replacement for Apple's 1 Megabyte GS
RAM board. All features included with Apple's board are also
included on the Super Expander GS.

There are two features on the Super Expander GS that are not
included on a stock Apple board. One is a socket area to mount
an expansion PC board, should one be available in the future.
Secondly, all IC's are socketed.

The Super Expander GS in addition to being 100% GS software
compatible, can also be set up as a partial or full RAM disk
drive, through the control panel of the GS computer.

Appleworks 2.0 and later versions will automatically recognize
the memory on the Super Expander GS board. A total of 1149K
of desktop space is available with a fully populated Super
Expander GS.

The following user's manual will provide detailed information
for installation and operation of your new Super Expander GS.

1.2 INSTALLATION.

Installation of the Super Expander GS is a relatively simple procedure. However, we recommend you read over this entire section first. Then, once you are familiar with the complete instructions, go over a second time and install the board in your computer.

A FEW WORDS ABOUT STATIC ELECTRICITY!

Static electricity is stored basic energy that anyone can build up by walking across carpeted areas. This static charge can cause damage to your computer. Before installing any new board or peripheral inside your computer, once you have taken the lid off the computer, discharge any static electricity charge you may be carrying by touching the power supply (the large metal box at the inside left of the computer) box.

The following is a step by step procedure for installing your Super Expander GS.

1. Turn off the power to your computer system.

   We'll repeat that for the few poor soles who may have missed it.

   TURN OFF THE POWER TO YOUR COMPUTER SYSTEM!!!

2. Remove the housing lid to allow access to the inside of your computer and access to the peripheral slots.

3. For those that did not read the above, discharge any static electricity by touching the power supply.

Inside the GS computer you will see 8 slots for peripheral boards. There are seven slots together at the rear, and one slot at the right front. This slot is labeled at the right 'MEMORY EXPANSION' on the motherboard.

The Memory Expansion slot different than the other seven slots in that it has 44 pins. The other seven slots are larger and have 50 pins.

    5. Although the Super Expander GS is actually too long to be installed backwards. For those that may try anyway, the board has an angle cut at the top right edge. When installed correctly, this angled edge will be closest to the keyboard, or front of the housing.

       With this information in mind, install the your Super Expander GS into the memory expansion slot.

    6. Re-install lid to the computer housing.

    7. Restore power to the computer system.

Installation has been completed.

1. To check the Super Expander GS memory, you will
   need to enter the control panel built into the
   GS computer. This is done by holding down the
   OPTION key as you turn the computer on. Then press
   key #1 for "Enter the Control Panel".

2. Use the arrow keys to select RAM DISK then press
   return.

3. Under the RAM disk menu you will see:

   --Largest Selectable: xxxxK

   xxxxK corresponds to the amount of memory on the
   Super Expander GS.

Note: If the xxxxK does not correspond to the amount
      of memory you know to be on the Super Expander
      GS, check the jumper block on the RAM board.
      (See Chapter 2, Section 2.2)

CHAPTER 2 ADDING MEMORY

2.1 Adding Memory to the Super Expander GS

If you already have a 1.0 Megabyte version of the Super
Expander GS, you will not need to read this chapter.

The next page shows an outline drawing of the Super Expander
GS board. In particular the RAM area is divided into four
sections 1,2,3,4. Each section is a set of 8 chips called a
bank or row of memory. You will notice also a jumper block
on the Super Expander GS that must be set each time you
upgrade the memory area.

The Super Expander GS uses 256K X 1 (designated by most of
the RAM manufacturers as 41256-15) for memory expansion.
You must specify that you want "CAS before RAS" refresh.
(See Appendix A for manuf part numbers.) In the Apple En-
vironment it takes 8 chips to make one bank of memory.
This is why each section on the Super Expander GS has 8 RAM
chips or sockets for 8 RAM chips in each row or bank.

256K X 1 RAM chips are purchased by speed. 120 to 150 nano-
seconds are the standard in the industry. Either speed will
work fine in the Super Expander GS. Normally 150 nanosecond
RAM is a little better priced.

Adding memory to the Super Expander GS is a two step process.
One step to install the memory, and one step to set the jumper
block located on the Super Expander GS board.

One rule applies when adding memory to the Super Expander GS.
Each bank by number must be filled before adding memory to
the next bank. That is to say bank 2 must be filled before
adding memory to bank 3. Likewise, bank 2 and bank 3 must be
filled before adding memory to bank 4.

```
*********************************************************
*  ------------------------    ------------------------       *
*  :                     :  :                     :        *
*  :       BANK 1        :  :       BANK 3        :      *
*  :                     :  :                     :       *
*  ------------------------    ------------------------      *
*  ------------------------    ------------------------     *
*  :                     :  :                     :        *
*  :       BANK 2        :  :       BANK 4        :  ooo
*  :                     :  :                     :  ooo JUMPER    *
*  ------------------------    ------------------------      BLOCK    *
*                                                         *
*                                                         *
*********************    *************************          ****
                   * *                          *            *
                   * *                          *************************
                   ***
```

```
        256K = BANK 1
        512K = BANK 1 & BANK 2
        1MEG = ALL 4 BANKS
```

NOTE: Do not populate the Super Expander GS with only 768K.
      The GS computer has trouble reading this memory con-
      figuration, and will not read the memory properly. This
      is a fault with the GS computer NOT the Super Expander
      GS board.

If you install more memory in the Super Expander GS, make sure
you install all the RAM chips in the correct direction, and
insure all pins of the RAM chips are in the sockets.

2.2 Setting the Jumper Block

After you have installed the memory chips, set the jumper
block as described below. If you do not set the jumper block,
the GS computer will not recognize the extra memory you have
added.

Total Memory
on S.E. GS   Set Jumpers
------------   -----------

256K   o   o--o
                      o   o--o

512K   o   o--o
                      o--o   o

1MEG   o--o ,o
                      o--o   o

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CHAPTER 3 OPERATION

3.1 General Information.

Once you plug your Super Expander GS into the GS computer, it is automatically recognized by software programs that use the extra memory.

Programs that are rehashed from the Apple II+ or IIe for 64K or 128K will not recognize all the memory on the motherboard, much less an extra memory board in the computer. Only software written specifically for the IIGS with extra memory, will recognize a memory board in the memory expansion slot.

Once you have installed and checked out the Super Expander GS with the control panel, the operation of the board under most applications is completely transparent. Nothing special is needed.

3.2 RAM Disk Operation.

A built in feature to the GS computer is RAM disk operation. This means setting up the Super Expander GS as a built in disk drive. A very fast disk drive. The RAM Disk feature will work under PRODOS and PASCAL. IT WILL NOT WORK UNDER DOS 3.3.

An important thing to remember when using a RAM disk is that the information stored on the RAM disk is only temporary. When you turn off the computer, all the files on the RAM disk will disappear. For this reason, always make back ups of the RAM disk on actual diskettes before you turn the computer off. The first time you forget, you'll understand why we warned you.

When setting up the RAM disk, insure that the amount of memory used for the RAM disk does not conflict with other software programs that may use the same memory.

Setting up a RAM disk is very simple using the built in control panel to the GS computer. You can enter the control panel only when you first turn the computer on. Hold the OPTION key down at the same time you turn the GS computer power switch on, then press #1 key. Use the arrow keys to select RAM Disk, then press RETURN.

Once the RAM disk is set up from the control panel, formating, copying, loading, and saving files is identical to the same operations on a physical disk drive, only faster.

Under the RAM Disk menu you have two options only that you can change. Minimum RAM Disk Size and Maximum RAM Disk Size. Setting the minimum RAM Disk size will restrict the amount of memory used by other programs, it will insure that you always have some memory for the RAM disk. Setting the maximum RAM disk size will restrict the amount of memory used for the RAM disk and insure you always have some memory on the Super Expander GS for program use.

If you are not too familiar with working a RAM disk, it is a good idea to start setting the minimum and maximum to the same values. (This is a must for PRODOS versions under 1.2)

Problems can arise if you set the RAM disk size greater than your physical disk drives, if you in turn copy the RAM disk to a physical diskette. For this reason, it is not reasonable to set the RAM disk size greater than the physical disk drive you are using with the GS computer.

Once you have selected the RAM Disk and set the min and max sizes, you can then return to quit on the control panel. Each time you turn the computer on, your setting will automatically be set. You can only change the settings by entering the control panel again.

Selecting the disk drive for the RAM disk is automatic on the GS computer. The RAM disk will be designated SLOT 5, DRIVE 1, if you are not using slot 5 for any peripheral. If you are using slot 5 or have a drive attached to the rear disk drive connector (which is slot 5), then the RAM disk will be auto designated Slot 5, Drive 2. If you have two disk drives at slot 5, the RAM Disk will still be designated Slot 5, drive 2, however, the physical second drive will be redesignated by the GS computer as SLOT 2, Drive 1.

It is not necessary to FORMAT the RAM Disk, unless you plan to use the RAM disk as a startup device. Although setting the RAM disk as the startup device is an available option, for applications it does not work too well, and most users will encounter problems.

The name of the RAM disk is automatically designated by the GS computer as /RAM5.

3.3 APPLEWORKS

Versions of Appleworks below 2.0 will not recognize extra memory in the GS computer. In fact these versions will not even recognize all the memory on the GS motherboard.

Appleworks version 2.0 will see and use the memory on the Super Expander GS. The amount of desktop space available will be determined by the amount of memory on the Super Expander GS, and the amount of memory designated for the RAM disk. For maximum desktop space, reduce the RAM disk min and max sizes to 0K.

APPENDIX A

NICE TO KNOW INFORMATION!

The following RAM chips have been tested successfully on the
Super Expander GS board.

MANUF.	PART #
FUJITSU	MB81256-15
HITACHI	HM50256-15
MITSUBISHI	M5M4256P-15
NEC	D41256C-15
OKI	MSM41256A-15
SAMSUNG	KM41256-15
TOSHIBA	TMM41256-15
T.I.	TMS4256-15