BASEBoard

**4 MEGABYTE
MEMORY BOARD
FOR THE AMIGA A500**

Manual

EXPANSION
SYSTEMS

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Manual Revision 6.0

OVERVIEW

Congratulations on choosing the BASEboard from Expansion Systems. We believe it to be the finest memory board available for the Amiga 500. While the A500 has all the processing power of the A2000 it does not have enough internal memory to take full advantage of those features. The standard Commodore A501 expansion RAM board is limited to 512K. The BASEboard in its standard configuration allows you to add up to 4 megabytes of memory. The addition of the EXRAM daughter board will provide another 2 megabytes for a total of 6 megabytes. Expanding your memory over the amount provided by the A501 will allow you to more thoroughly utilize the Amigas multi-tasking operating system. You will be able to use the more sophisticated and larger programs found in the desk top publishing, music and video categories. You will also be able to use these programs out of a RAM disk experiencing significant speed increases in operation. All of this is obtained internally, out of sight, while the external expansion bus free for other devices. Truly giving you A2000 power at A500 prices.

GETTING STARTED

Contents of the Package...
Please be sure that you have received a complete BASEboard unit, consisting of the following:

    This manual.
    A gary board with 20 pin cable.
    A memory board.
    BASEboard Workbench 1.3 boot disk.
    Warranty registration card.

Registration..
Fill out the registration form and return it to the address printed on the face of the card.

Conventions Used in this
Manual..
The use of a box surrounding the copy indicates important information.

"Quotes" are used to designate what is to be typed in the CLI or Shell window. The words are to be typed WITHOUT the quote marks.

The word megabyte - mb and jumper - JP are used interchangeably.

INTRODUCTION

This manual contains all that is required to install the BASEboard. It covers the many variations of the Amiga 500 being shipped around the world today. The installation should go quickly as you only need a portion of the information provided in this manual for your specific situation. The average installation takes about 30 to 45 minutes and does not require any soldering or unusual work that cannot be done by the average user. The software installation is icon driven and auto-installed. The manual also contains information associated with the BASEboard like how to install a fatter agnus. This and other special situations are the only instances where you may want to consider the help of an experienced technician.

This manual also also provides some Amiga DOS information to help in using and enjoying your BASEboard. This information includes how to form a RAD or RAM disk, set your clock, benefits and limitations of the agnus chip, useful commands and a glossary.

Memory Board cont.
summary of this information can be found in the Configuration Summary on page X.
The memory board must be installed from below in the 56 pin A501 socket. If you
are installing a fatter agnus at the same time refer to the section Installing a
Fatter Agnus. Clip the plastic standoff pins from the plastic cover and
reinstall the plastic cover door.

The Gary Board...
Find the gary chip on the mother board. The gary chip is a 48 pin I.C. part #
5719 and is located directly behind the hard drive. It is labeled gary on the
mother board. Carefully remove this chip with a flat screwdriver being careful
not to bend any pins. Take the gary chipand install it in the 48 pin gary
socket on the BASEboard's gary board. Install the gary board into the gary
socket on the mother board. BE EXTREMELY CAREFUL OF THE GARY BOARDS PINS on the
rear of the gary board as they are very fragile. These pins are small so they
do not damage the gary socket. Align them very carefully with the 20 pin cable
towards the front of the machine and press down firmly. Set the plastic jumper
to fat or fatter matching both the agnus that is installed and the memory board.
Set the Kickstart jumper to the Kickstart installed (#315093-02 = KS 1.3 and
315093-01 = KS 1.2). The Kickstart chip can be found directly to the right of
the 68000 processor chip. Connect the 20 pin cable to the memory board.

Final Assembly and Test..
Reattach the keyboard. Check all the floppy drive cables and connectors to be
sure that they were not shaken loose during the installation procedure. It is a
good idea to check your system before putting it back together. Being careful
not to have any tools laying on the inside of the computer, boot your Amiga with
the BASEboard boot disk. If all the memory is there then reinstall the plastic
top of the Amiga and all of its screws. If you have any problems refer to the
detailed installation instructions below or the Trouble Shooting Guide.

                        INSTALLING THE BASEBOARD

Setting the Jumpers..
On the gary board and memory board there are small black plastic jumpers that
fit over metal pins. The user can easily change these by pulling them straight
up with a pair of needle nosed plyers or your fingers. These jumpers are used
to configure the BASEboard to the different versions of the Amiga 500 being
shipped around the world. This flexibility also allows you to upgrade your
Amiga and not worry that your memory will be obsolete.

On the Amiga 500 mother board there are also jumpers. The jumpers on the mother
board do not always have to be changed. They are a different style and called
solder jumpers. They are not as easy to modify as it requires cutting traces
and soldering bridges between two pads to make a connection. These pads are
located directly on the surface of the mother board. If you have to modify a
solder jumper and have some experience in this area you might attempt to make
the changes. But if you do not it is always better to have an experienced
technician perform the work. If you remove the cover and take these instrucions
to any technician they should be able to perform the work.

A summary of the jumper positions can be found in the Configuration Summary.

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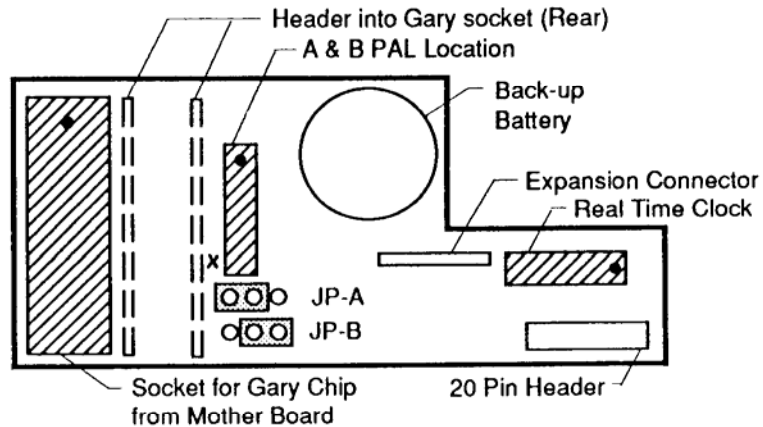
Diagram A
Top View of Gary Board

- Header into Gary socket (Rear)
- A & B PAL Location
- Back-up Battery
- Expansion Connector
- Real Time Clock
- JP-A
- JP-B
- Socket for Gary Chip from Mother Board
- 20 Pin Header

Diagram B
Gary Board Jumper Settings
All Revisions of the Mother Board

FTR O 1   1.3 O 4
     O 2   O 5
FAT O 3   1.2 O 6

Jumper B   Jumper A

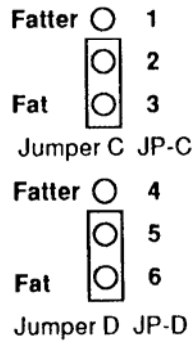| Mode	Jumper	Connect Pins	
Fat	B	2 & 3	Shown
Fatter	B	1 & 2	
K.S. 1.3	A	4 & 5	Shown
K.S. 1.2	A	5 & 6	Less Than 1.5 MB
K.S. 1.2	A	4 & 5	More Than 2.0 MB
DISABLE	A	None	

Disable
Some very early programs would not work with fast memory. To use these
programs you must turn off (disable) the fast memory on the BASEboard. To turn
off the memory you just remove the jumper pin JP-A on the gary board as
indicated in Diagram A. A switch can be installed if this is a recurring
situation. This can be done by using pin 5 as the pole with pins 4 and 6 the ON
and OFF positions depending on your version Kickstart.

Attention Kickstart 1.2 users.
If you have a Kickstart 1.2 and have less than 1.5mb installed place the jumper
in the 1.2 position and cRam will add the memory to the system. If you have
2.0mb or over installed, place the jumper in the 1.3 position (even though you
have a Kickstart 1.2) and 1.8mb of the memory will EXEC-configure and 256K will
be added by cRam. You are still required to install the first 2mb of memory in
the EXEC rows. In other words the first 512K must be put in row 2 then 6 then 3
and 7 as before. Kickstart 1.2 will not work with fatter agnus.

!!! IMPORTANT: !!! Be VERY CAREFUL when handling the gary board. The pins that are on the bottom of the board are very fragile.

Diagram C
Memory Board Jumper Settings
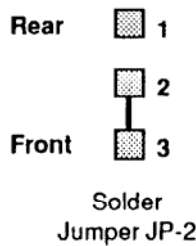### All Revisions of the Mother Board

Fatter ◯ 1

▢ 2

Fat ▢ 3

Jumper C JP-C

Fatter ◯ 4

▢ 5

Fat ▢ 6

Jumper D JP-D

		Connect	
Mode	Jumper	Pins	
Fat	JP-C	2 & 3	Shown
	JP-D	5 & 6	Shown
Fatter	JP-C	1 & 2	
	JP-D	4 & 5	

Set the two jumpers on the memory board per the above Diagram C based on the agnus chip that is installed in your machine.

Diagram D
JP-2 Jumper Positions
All Revisions of the Mother Board

Rear ▨ 1

▨ 2

Front ▨ 3

Solder
Jumper JP-2

	Pin Status		
Agnus	Connected	Disconnected	
Fat	2 & 3	1 & 2	Shown
Fatter *	1 & 2	2 & 3	
Fatter **	2 & Gary Bd	1 & 3	

* Using a standard BASEboard with A PAL
**Using the special B PAL. Connect pin 2 of JP-2 to Contiguous Pad on Gary Board with a wire.

You can find the JP-2 solder jumper just to the right of the 68000 CPU chip and just above the Kickstart chip located on the left side of the machine. It consists of three square silver pads on the mother board. Commodore has shipped a varied array of A500 machines using a combination of mother board revisions, agnus chips and JP-2 settings. Be very sure that the setting of JP-2 matches the agnus chip installed and the jumper settings on the BASEboard. Diagram C shows the proper settings for JP-2. This information is also required when installing the memory and cRam program.

If you have a fatter agnus installed and JP-2 set for fat and you wish to take advantage of the extra chip RAM you may modify the JP-2. See the section, Special Revision 6 Mother Board, in this manual for your options.

Diagram E

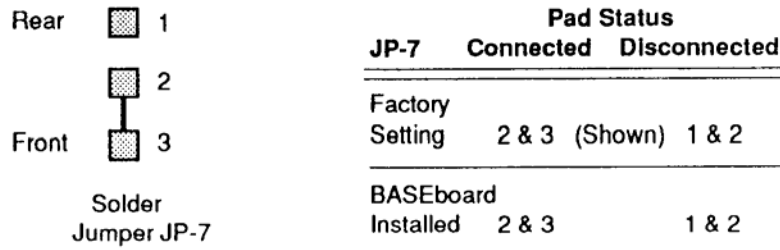### JP-3 Jumper Positions
Revision 6 Mother Boards Only

1 ▦━━▦ 3

2 ▦━━▢ 4

Solder
Jumper JP-3

	Pin Status	
	Connected	Disconnected
Factory Setting	1 & 3 (Shown)	
	2 & 4 (Shown)	
BASEboard Installed	1 & 3	2 & 4
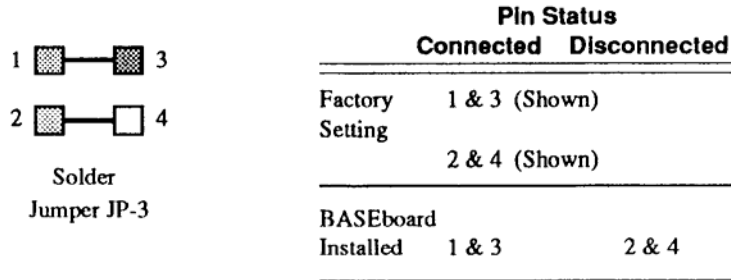
The JP-3 jumper exists on revision 6 mother boards only and is located just above the memory chips in the center and toward the front. Look for the A500 that is silkscreened on the board. It is under the last zero and a little to the right. It is used only if the Amiga has 1mb installed on the mother board. This jumper must be set to disconnect 512K of the memory on the mother board and replace it with 512K on the BASEboard. This will not effect the amount of agnus chip memory. It will still be 1mb but some must come from the BASEboard. If the memory chips are socketed or can be removed they can be used in the BASEboard. When installing the BASEboard the trace between position 2 and 4 must be cut and positions 1 and 3 are to be left alone.

Diagram F

JP-7 Jumper Positions
Revision 6 Mother Boards Only

Rear ▦ 1

▦ 2

Front ▦ 3

Solder
Jumper JP-7

JP-7	Pad Status	
	Connected	Disconnected
Factory Setting	2 & 3 (Shown)	1 & 2
BASEboard Installed	2 & 3	1 & 2

Jumper JP-7 exists on revision 6 mother boards only. This jumper is located directly in front of the 56 pin connector. It is used to redirect the EXRAM signal to the gary chip or tie it to ground. Positions 2 and 3 are connected from the factory. This jumper will not need to be changed from the factory setting when installing a BASEboard.

Diagram G
Top View of RAM Board as Installed
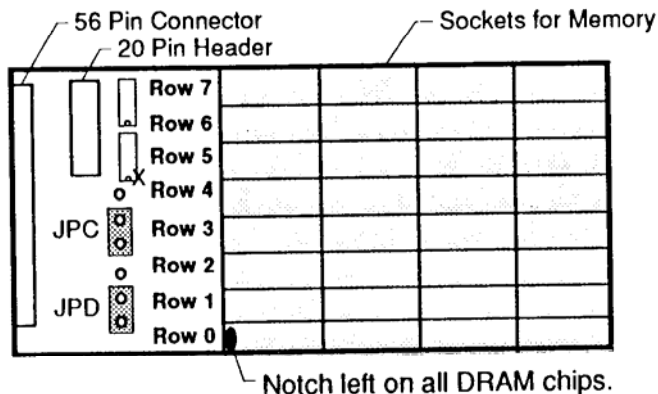
INSTALLING THE MEMORY..

Diagram G shows where the RAM chips are to be installed. The rows are
numbered on the board row 0 to 7. Each row contains 4 chips. RAM chips will be
added per the Fat and Fatter Agnus instructions below. Kickstart 1.2 users see
Attention Kickstart 1.2 Users on page 5 and Incremental RAM Installation below
in this manual.

The BASEboard uses 256X4 dual inline package (DIP) DRAM in speeds of 80ns (ns =
NanoSecond) to 120ns. You will save money using 100ns to 120ns DRAM chips but
because the memory board is a 4 layer board 80ns will also work. Also specify
CMOS (see-moss) type memory. Most of the memory on the market is CMOS, but it
is advisable to ask when ordering.

!!!IMPORTANT!!! The memory chips can be permanently damaged if
installed incorrectly. Make sure the memory chips are installed
with pin 1 (and the notch) of the chip facing left per Diagram G.

INCREMENTAL RAM INSTALLATION

Using Fat
Agnus...
If using Kickstart 1.3, you can install RAM (left to right) in increments of
512K or 4 chips at a time. Each set of 4 chips is a bank or row per Diagram G.
Make sure the jumpers on the Gary and RAM board are set properly.

Incremental RAM Installation cont.
Start by installing the first 512K or one row of 4 chips into Row 2 first. If you are installing a total of 1mb then the second 512K goes into row 6. If 1.5mb then row 3 and 2.0mb row 7. Remember that the 8 rows are numbered 0 to 7. After the first 2mb is installed then the next 2mb in increments of 512K can be installed into any of the open rows.

This allows for the maximum amount of RAM that gets Exec-configured at power up and does not require the cRam program. To use all the memory you mus. run the cRam program if you are installing more than 3 banks of 4 chips (1.5mb).

If you are using Kickstart 1.2 be sure that your gary board Kickstart jumper is set to 1.2. You may then install as little as 512K and it must go into row 2. If you are installi.g 1mb then row 6 and 1.5mb in row 3. If you are going to install 2.0mb of memory (or more) which is 4 rows, move the Kickstart jumper back to the 1.3 position (yes, even if you have Kickstart 1.2) and install the next 4 chips in row 7. This is to take advantage of a maximum of 1.8mb of EXEC-configured memory. Any additional chips may be installed in any row. If you have 2.0mb installed per .he above instructions and you boot with a standard Workbench 1.3 you will get (approximately) 2.2mb at the top of the screen and 2.5mb if you use the cRam program.

Using Fatter Agnus...
Using Kickstart 1.3 you can install RAM in increments of 4 chips (left to right) at a time. This is 512k of RAM per bank, (or row per Diagram 6). Make sure the jumpers on the gary board, RAM board and JP-2 on the A500 are set properly. If you have a revision 5 mother board and you have or will install a fatter agnus do not cut pin 32. See Installing a fatter agnus in this manual. If you have a revision 6 motherboard leave jumper JP-7 as shipped from the factory.

Start by installing the first row of 4 chips into row 0. This is the extra "CHIP RAM" area. You can install the other rows of RAM in any order. The cRam program must be run for any of the fast RAM to be added to the system. With an A PAL you will EXEC-Configure 512K without cRam.

!!!IMPORTANT!!! If you have a Rev. 5 A500 and are installing the BASEboard and a fatter agnus at the same time DO NOT cut pin 32 per Commodore instructions. If the EXRAM signal at pin 32 is not connected you will experience random crashes, will occur hanging on boot up or only see 512K chip RAM if the machine boots.

INSTALLING THE BOARDS
Tools Required..
The only tools required are a number 10 Torx screw driver (a standard Allen wrench will also work but not as well) and a standard slot or flat screw driver.

Open the Case..
1. Make sure power to the A500 is OFF and all cables have been removed.

2. Remove all the Torx screws from the plastic case and lift it from the base. (Note, this will void your Commodore warranty). Depress the plastic case on each side before lifting to release two plastic latches holding the cover.

3. Lift off the Keyboard and set it aside. Note, it is best to immediately reconnect the cable from the keyboard to the circuit board as it is possible to forget its orientation and plug it in backwards.

4. Remove the screws holding the metal shield that covers the inside of the A500. You will also have to bend a couple of metal tabs before lifting off the shield. Be careful, as it has sharp edges.

Gary Board...
5. Next find the gary chip. It is the chip with 48 pins in the middle of the main circuit board labeled 5719 behind the floppy drive. Commodore has also silkscreened the word "gary" on the mother board. Remove this chip.

    !!!IMPORTANT!!! Damage may result if the gary chip is not removed properly.

6. Remove this chip CAREFULLY with a small FLAT blade screwdriver and note the direction of the chip. Pry the chip up from one end and then the other. Do not lift one end up much higher than the other as the pins on the gary chip are very fragile. Be sure to insert the blade tip between the chip and the plastic socket below - NOT between the circuit board and the socket. You may wish to remove the floppy drive or its cable to obtain more working room. Be sure these are properly reinstalled when reassembling the case. THIS IS IMPORTANT. If you do not do this correctly as damage can result.

7. Install the smaller gary board (BB504A) into the empty gary socket. Install this board CAREFULLY with the pins on the bottom of the board going into the gary socket. This should be done while making sure none of the pins bend, or MISS their respective socket positions. Once you are ABSOLUTELY SURE the pins are aligned properly press down firmly. There is a small round can (usually blue) or capacitor under the gary board. It is usually on its side and thus out of the way. If it is not then gently bend it down a little so that it clears the bottom of the gary board.

8. Now re-install the gary chip into the 48 pin empty socket on the gary board. Install the chip with pin one (notch) facing the right. It is important the little notch on one end of the chip is closest to the floppy drive. Make sure none of the pins are bent under the chip or missing the socket holes.

    !!!IMPORTANT!!! Do not bend the small pins on the rear of the gary board. These are very thin and fragile. Your board will have to be sent in for repair if the pins break. We will be glad to make this repair but it is not covered in your warranty.

9. Install the ribbon cable from the 20 pin gary header (shipped installed) to the 20 pin memory header. Press down firmly to insure a good connection.

Memory Board...
10. Plug the large black connector on the memory board (BB504B) into the main pin header (the 56 pins sticking out into an open area) towards the front of the machine. This is the same header that the A501 used. This must be done from the bottom with the top cover off and the plastic bottom cover door removed.

Test and reassemble..
11. Clip the two plastic standoffs from the plastic cover door and install the door under the memory board. The memory board will rest against the latch and create a snug fit. Replace the keyboard, making sure it is properly seated in its brackets. Make sure the connector from the keyboard is installed properly with the black wire to the left as you face the Amiga. Also check to be sure all floppy drive cables have been snugly reseated in their connectors.

12. It is good to test your Amiga at this time to be sure the installation has gone well. Do this by booting your computer with the BASEBoard boot disk provided. Check for any tools or extra screws laying around on the mother board before turning on the power. If there are any problems at this point refer to the Trouble Shooting section of this manual.

13. If all has gone well then replace the metal RF shield covering the main circuit board (you will need to disconnect the keyboard cable again). Now replace the top plastic housing and its screws making sure that the power and drive LED lights fit into their respective hole cutouts in the cover.

14. Once it is totally reassembled test it again by rebooting to be sure we didn't shake anything loose in this final step. We want to know that it works completely assembled and with the standard boot disk before going to the next step. If there is a problem with the next step we at least know our hardware and boot disk are working properly. This makes troubleshooting easier.

INSTALLING THE SOFTWARE

The only software needed to complement the BASEboard is called cRam. This addmems any ram that is not EXEC-configured at power up time. It also checks JP-2 to see if you have a fat or a fatter agnus chip installed and the amount of memory installed.

Auto-Installing cRam ....
The Auto-Install program is for installing cRam onto your current boot disk. It is meant for startup-sequences that are somewhat standard. It will place the cRam command just before "loadWB". If Auto-Install doesn't find "loadWB" it will place cRam just before "endcli". If that is not found then "cRam" is placed as the last line. If your startup-sequence is radically changed then you may have to manually install the cRam program. To do this see Manually Installing cRam below.

To Auto-Install cRam make a back up copy of your current boot disk. Place the BASEboard boot disk in df0: and boot. Open the Workbench window by double clicking the BASEboard icon. In the Workbench window is an icon called "Install". Double click this and a small window will appear on the screen. It will instruct you to place the copy of your current boot disk in drive df0:. Then you will indicate the setting of JP-2 in your machine (see the section Setting the Jumpers, JP-2 Jumper, on page 5) by clicking either fat or fatter. Your done. Boot with your own boot disk and check that the proper amount of memory is available

Manually Installing cRam..
With the BASEboard boot disk in df0: and your normal boot disk in df1: type th following commands:

```
cd df0:
copy df0:c/cRam to df1:c/cRam  (return)
cd df1:  (return)
ed s/startup-sequence  (return)
```

A screen will appear and scroll your curser down to the END of the line just before "loadwb". Hit return and the curser will now be at the beginning of an empty line. Type "cRam" without the quotes and DO NOT hit return. Press the "ESC", "X" and "return" keys in succession. This will write the command "cRam" to your startup-sequence.

If you are auto booting from a hard drive then the changes must be made to the "s" and "c" directories of the hard drive.

Attention revision 6 mother board users. Many revision 6 mother boards were shipped with JP-2 set for fat and have a fatter agnus installed. If you wish to stay with this configuration then the command in the startup-sequence should read "cRam fat" without the quotes. This will force the BASEboard to ignore the conflicting information. See the section "Revision 6 Mother Board Users" on page 14 in this manual.

USING THE BASEBOARD

Programs...
The best kind of memory or peripheral is one that is forgotten. The BASEboard has been proven to be 100% compatible with all Amiga software and hardware placed on the expansion bus or internally in the machine. There may be subtle variations (like assigns, new directories etc.) that each program will require that may have to be addressed. Also, some special programs are more effective with more chip RAM or with larger contiguous blocks of fast memory. These variation can be found in the manual of each program or by contacting the manufacturer. See the section Replacement PAL for Special Users on page 14

Commands...
Avail
Type "avail" without the quotes from Shell or CLI. Avail presents the status of all memory in the system. It will provide information like the amount of chip RAM originally available and the amount currently being used.

FastMemFirst
Required by some (chip memory intensive) programs to work effectively. Makes the system use fast memory whenever possible saving valuable chip RAM. Chip memory is thus saved only for those functions that will not work in any other kind of memory

RAD..
General
The principal feature of a RAD disk is the ability to reboot your machine from the RAD without a Workbench in DF0:. Another is to have the information stored in RAD to still be there when the machine reboots. RAD must reside in EXEC-configured memory thus the RAD cannot be larger than your EXEC-configured memory. When setting up a RAD change your buffmemtype to =4 to use fast and save your chip memory.

Fatter agnus.
When using a RAD with a fatter agnus it is necessary to use the "R" option with "Setpatch" in the startup-sequence this is because Kickstart 1.3 was designed to work with 512K of chip RAM. The line in the startup-sequence should read "c:Setpatch .NIL: R ;patch system" without the quotes. When using a fatter agnus with an A PAL you can create a 75 cylinder RAD disk. RAD must reside in the EXEC-configured memory which is less than 1 megabyte because of the overhead used on boot up. This is plenty of space if you wish to boot from RAD. However, it is not enough space if you wish to use it as a full 79 cylinder RAD disk when using the diskcopy command.

To obtain a full 79 cylinder RAD you will need to install a B PAL on the BASEboard. The B PAL will give you 1.5 megabytes of EXEC-configured memory. When installing a B PAL with a fatter agnus you must add the word fat (even though you have a fatter agnus) to your cRam command in the startup-sequence. Type "cRam fat", without the quotes.

If you are using a fat agnus you will have 1.8mb of memory for your RAD. Follow the instructions in the Commodore Enhancer Software manual page 5-5 and 5-6 for installing a RAD. The addition of "no verify", without the quotes, at the end of the diskcopy instruction in the startup-sequence (CESM page 5-6) will eliminate the requester flashes on boot up.

RAM Disk...
A regular RAM disk does not have the EXEC-configure restrictions of RAD. You
can make a RAM disk as large as the available memory. Using a RAM disk to hold
the FROM disk when doing a diskcopy can save a great deal of time as it is about
four times faster.

TECHNICAL INFORMATION

Installing a Fatter Agnus..
If you wish to install a fatter agnus one can be obtained by calling our office.
To customers in the United States we can also install both the BASEboard and
fatter agnus chip for the user without a dealer.

When installing the fatter agnus on a revision 5 mother board, Commodore asks
you to modify the positions of jumper JP-2 on the mother board. You are also
directed to disconnect the EXRAM signal coming from the 56 pin connector. Both
of these modifications are discussed below.

JP-2 Jumper Positions..
You can find the JP-2 solder jumper just to the right of the 68000 CPU chip
located on the left side of the machine. It consists of three squire silver
pads on the mother board. Pads 2 & 3 are connected from the factory. You must
connect pads 2 & 1 with a solder bridge and cut the trace between pads 3 & 2 as
shown in Diagram D on page 6. The cutting is generally done with an Exacto
knife. The solder bridge is done with a soldering iron. This is an easy two
minute job for the person with this type of experience. In fact, if you are
going to take in your machine to a technician take off the cover. It will save
you money. This is because it take 5 times as much time to remove the cover as
it does to perform the cut or bridge.

!!!IMPORTANT!!! If you lack the experience cutting the trace between pin 2 & 3
on the mother board should be done by an experienced technician. Extreme damage
can result to the computer if other traces are accidentally cut at the same
time. Expansion Systems is not responsible for any damage that may occur while
installing a fatter agnus or BASEboard.

EXRAM Signal..
The EXRAM signal is located on a trace that runs from pin 32 of the 56 pin
connector (CNX) to pin 32 of the gary chip. If you are installing the BASEboard
and the fatter agnus DO NOT cut the trace as recommended by Commodore. If you
have already cut the trace then it must be RECONNECTED. It is usually cut just
above a pad (small silver disk) by the 56 pin connector. On revision 5 mother
boards this pad is located by counting 8 positions down from the top of the
connector (or 3/4 inch). The pad will be the first of several directly to the
left with a trace going up toward the gary chip.

On revision 6 mother boards the EXRAM signal has a jumper JP-7 that makes it
easier to find and cut the trace if required. It is located in the same area as
described above. However, most revision 6 mother boards have fatter agnus chips
installed and this jumper need not be changed when installing a BASEboard.

If reconnecting the trace you may wish to check the continuity of the EXRAM
signal from the gary board to the memory board with an OHM meter. To do this
place one of your probes on the pin designated by an X on the gary board as
shown in Diagram A on page 5. Place your other probe on the memory board at the
pin designated by an X in Diagram G on page 8. On the face of the memory board
you are given several options and they are indicated by a circle with a cross in
the center.

Replacement PAL for Special Users...
Some special programs require 2mb of contiguous memory. These are generally
limited to a few scanner programs, AMAX, and the program Express Paint. Also,
some fatter agnus users will want a RAD that is larger than the available
EXEC-configured memory of 512K. To do this you will need to replace your
standard A PAL with a B PAL. The PAL is a chip that is on the gary board. The
B PAL will give you 1.5mb of EXEC-configured memory for RAD use and fast memory
in 2.0 contiguous chunks. It requires soldering a small wire from the center
position (pin 2) of the solder jumper JP-2 to the Contiguous Agnus on the gary
board. Pin 1 & 3 of JP-2 are left unconnected. It also requires that youchange
the cRam command in the startup-sequence to read "cRam contig" without the
quotes. This chip is 100% downward compatible to all software. The only reason
it is not shipped with every unit is due to the soldering requirement. The B
PAL can be obtained by calling our office. International users contact your
dealer.

w Configuration Summary..
On the facing page is a summary showing some of the many configurations of the
A500 that are being shipped. With this chart you have a summary of the proper
jumper positions, where to install your memory and how much memory you should
have after booting. This is meant as a summary and detailed information will be
found in each of the sections in this manual.

To use the chart, find your machine under Amiga Configuration and then be sure
that your BASEboard jumpers are set as shown under BASEboard Configuration.
Information pertaining to the Configuration chart can be found below.

Definitions are; K.S. = Kickstart, JP = Jumper, Addm = addmem, Config =
configured, Contig = Contiguous.

Assumptions are: 4mb of memory is installed in the BASEboard and you are using
version 1.5 of cRam.

Note: * A wire is attached to pin 2 of JP-2 and is not connected to either pin 1
or 3.

Note: ** If you are a Kickstart 1.2 user See the section Setting the Jumpers,
Attention Kickstart 1.2 users. It will refer to an option to take advantage of
1.8mb of EXEC- configured memory when you install over 1.5mb of
memory.

Note: *** This column assumes cRam 1.6 and indicates the command and the
additional option as entered in the startup-sequence. C = cRam, Fat = cRam
fat, Contig = cRam contig.

Special Revision 6 Mother Boards..
Commodore has been shipping some versions of the Amiga 500 revision 6 mother
boards with a fatter agnus chip installed. If you didn't   open up your
machine you would not know it was there. This is because JP-2 is set in the fat
position. It makes the fatter agnus act like a fat agnus. In the event you
have one of these machines you have the following two options:

Using Fat Agnus: Install your BASEboard leaving the Amiga as it was received
from the factory. Follow the installation instructions for a machine with a fat
agnus. Change the cRam command in your startup-sequence to read "cRam fat",
without the quotes.

Activating Fatter Agnus: Install your BASEboard modifying the Amiga to take
advantage of the fatter agnus. This will require modifying JP-2 to the fatter
position thereby activating the fatter agnus (see Diagram D). Then follow the
installation instructions for a machine with a fatter agnus. No modification of
cRam is necessary.

	Amiga Configuration							BASEboard Configuration					Memory Configuration				
	Mother Board Status							Gary		Memory				------- Fast Memory -------			...	
			Agnus	K.S.	Jumper Settings				Jumper Settings			Install			cRam	EXEC	Contig	cRam
Rev	Mem		I.C.	ROM	JP2	JP3	JP7	PAL	JPA	JPB	JPCD	In rows	Chip		Addm	Config	Blocks	Suffix
Revision 5 with 512K																		
5	.5MB		FAT	1.3	2,3	N/A	N/A	A	1.3	FAT	FAT	26370415	0.5MB		2.2MB	1.8MB	2.0MB	
5	.5MB		FTR	1.3	1,2	N/A	N/A	A	1.3	FTR	FTR	0 Then any row	1.0MB		3.5MB	0.0MB	0.5MB	
Revision 6 with 512K																		
6	.5MB		FTR	1.3	2,3	1,3 2,4	2,3	A	1.3	FAT	FTR	26370415	0.5MB		2.2MB	1.8MB	2.0MB	fat
6	.5MB		FTR	1.3	1,2	1,3 2,4	2,3	A	1.3	FTR	FTR	0 Then any row	1.0MB		3.5MB	0.0MB	0.5MB	
6	.5MB		FTR	1.3	2*	1,3 2,4	2,3	B	1.3	FTR	FTR	05671234	1.0MB		2.0MB	1.5MB	2.0MB	contig
Revision 6 with 1mb																		
6	1.0MB		FTR	1.3	1,2	1,3	2,3	A	1.3	FTR	FTR	0 Then any row	1.0MB		3.5MB	0.0MB	0.5MB	
6	1.0MB		FTR	1.3	2*	1,3	2,3	B	1.3	FTR	FTR	05671234	1.0MB		2.0MB	1.5MB	2.0MB	contig
Kickstart 1.2																		
5	.5MB		FAT	1.2	2,3	N/A	N/A	A	1.2	FAT	FAT	263 Note **	0.5MB		1.5MB	0.0MB	1.5MB	
5	.5MB		FAT	1.2	2,3	N/A	N/A	A	1.3	FAT	FAT	26370415	0.5MB		2.2MB	1.8MB	2.0MB	

10/22/90

Configuration Summary

It is generally believed that the revision 6 mother board will eventually come with 1mb installed on the mother board and at that time Commodore will activate the fatter agnus chip. When installing the BASEboard on a 1mb revision 6 version of the mother board you will need to make a JP-3 jumper change. This is an unavoidable situation and will disable 512K of the mother board memory. It will not effect the 1mb of chip memory used by the agnus chip as it will be supplied by the BASEboard and the other 512K on the mother board. If the deactivated memory chips on the mother board are socketed or can be removed they can be used in the BASEboard. To set JP-3 see the section Setting the Jumpers, Diagram E on page 7 in this manual.

Setclock and Date..
To set the battery backed real time clock from CLI, type in current information, without the quotes, using the following format:

"Date 07-Aug-90 12:05" [Return]
"Setclock Opt Save" [Return]

You cannot set the real time clock from preferences.

The battery is easily replaced by pulling it out from under the restraint clip and replacing it with an equivalent type. The battery is a lithium cell and lasts 3 to 5 years.

TROUBLE SHOOTING GUIDE

T = Trouble
A1 = The first of perhaps several possible answers.

T. When booted the machine only shows 512K of memory available.

A1 Check the location or row used when installing the memory. There are specific places the memory must reside to be brought into the system. See the section Installing the Memory on page 8, in this manual or the Configuration Summary.

A2. If you have a revision 5 mother board and a fatter agnus the EXRAM trace may have been cut when it was installed. The BASEboard needs that trace intact. See the section Installing a Fatter Agnus, EXRAM signal on page 13 in this manual.

T. The clock does not keep time when the machine is turned off.

A1 Check to be sure you are setting the real time clock and not the system clock. See the section Setclock and Date on this page and the Glossary on page 17 in this manual.

A2 Pull out the real time clock chip on the gary board with a flat blade screw driver and reseat it in its socket. It is located on the gary board and is part# RTC 62421B Diagram A. If you have some standard contact cleaner, clean the gary socket on the Amiga mother board and the pins that fit into it on the bottom of the gary board. The clock signals must pass through the pins in the gary socket to get to the system. Also clean the RTC 62421B and its socket.

T. There is a blinking red power light when the Amiga power is turned on.

A1 The blinking power light is a general warning that can indicate any one (or more) of several things are not right. This could include something like the monitor cable is not on straight. However, in this case it might be the jumper settings on the gary and memory board. They may not match the Kickstart and agnus chips you are using. See the section Setting the Jumpers Diagram F on page 6 in this manual.

A2 Reseat the gary and memory boards. Clean both connectors and sockets with a contact cleaner.

A3 Check for any bent pins on the memory array. These may be very difficult to find. You may consider pulling all the memory and looking for a bent pin on each chip. Be sure pin one is to the left.

A4 Be sure all internal and external cables and connectors are seated properly. The act of installing the BASEboard might cause you to loosen other things in or on the machine.

T. Blinking floppy drive light.

A1 Check the gary chip for any bent pins and that the gary was inserted with pin one to the right. Check the rear of the gary board for broken pins. Also clean the socket with contact cleaner.

T. Unusual drive behavior.

A1 Check both of the cables on the rear of the drive. Both the board as well as the drive end of the cables.

Q. A program will hang for unusual reasons. When being asked to print, save to disk etc.

A1. If the BASEboard seems to work with a standard Workbench then it is most likely the assigns required by the individual program being used. If you can prove to yourself that the BASEboard works with even one program like a plain Workbench the chances are high that it is a special requirement of that particular software. Check the assigns, fastmem first requirements, availability of printer drivers, path commands etc. The one possible exception to this is a scanner type program where a certain amount of contiguous memory is required. See the section Replacement PAL for special users on page 14.

T. RAD crashes on a warm boot.

A1. Check the installation instructions of RAD in the Commodore Enhancer Software manual. They must be followed exactly.

A2. Any assigns by RAD must reside in EXEC-configured emory to survive a reboot. Memory added by cRam must be added after residency has been established. Place cRam just before loadwb in your startup-sequence.

Questions...

Q = Question
A = Answer

Q. What kind of memory does the BASEboard use?

A. 256X4 DRAM in a DIP package. Works with 80 to 120 nanosecond parts, just get the least expensive as it will not effect performance. The BASEboard works with all types of memory. A TYPICAL number is 44C256AP-80N for Samsung and M514256A-80 for OKI chips. The chips must have 20 pins to work.

Q. Can I boot my game or program without using the Cram program in the startup-sequence?

A. Yes, you will get chip memory and any memory that will exec-configure. If you have a Fat Agnus with 2mb on the BASEboard (rows 2,6,3,7) and you boot with a standard WB 1.3 you will have 2207704 showing on the Workbench screen. If you use cRam it will add 262136 for a total of 2468872. For a Fatter Agnus with 2mb on the BASEboard you will only see 1mb at the top of the screen and it will all be chip memory. Use the above numbers as CLOSE to what you should get. There are many things that can effect the actual number.

Q. Is there a power problem?

A. No, the BASEboard takes about 350 ma which is about the same as the A501. The Baseboard uses CMOS chips which require very little power. One dealer ran 3 Commodore 1010 floppy drives at once without any adverse effects. We have tested it with 2. These are very power hungry drives.

Customer Service Information...
Please fill out the warranty registration form and return it to Expansion Systems quickly. In the event you still have a question or the above information does not solve your problem, check with your dealer or call our customer service number at (415) 651-2890 for assistance. All returns must have an RA# (return authorization number) and a warranty registration form on file before being accepted. Please package your product carefully so that more damage in not encountered. The RA# is issued by customer service.

Warranty
Expansion Systems, warrants this product against defects for a period of one year from the date of original (retail) purchase. Expansion Systems will repair or (at its option) replace this product during the warranty period provided the product has not been damaged by accident, abuse or misuse.

The foregoing constitutes the sole warranty of Expansion Systems and all warranties of merchantability and fitness are hereby excluded to the extent permissible by law; or if such exclusion is prohibited by any federal, state, or municipal law which cannot be preempted, are hereby limited to ONE YEAR from original retail purchase of this product. Incidental or consequential damages resulting from a breach of any applicable express or implied warranties are hereby excluded.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

To obtain warranty service, this product may be returned to the dealer from whom it was purchased or directly to Expansion Systems. Should you need to return the product directly to Expansion Systems you must first call customer service at (415) 656-2890 to obtain a Return Authorization number. All returns must be accompanied by proof of date of original sale and the warranty card must be on file with Expansion Systems.

GLOSSARY
Addmem
A command adding a specific amount memory into the system at a specific address.

Amiga Rev. 5 Motherboard.
The standard version of the Amiga initially shipped in the U.S. The revision number is etched into the mother board and can be found by looking direct.y in front of the floppy drive. It contains 512K of memory on the mother board using 256X1 DRAMs. The revision 5 mother board can use either a 1.1 or 1.2 gary board.

Amiga Rev. 6 Motherboard.
New version being shipped worldwide. Differences include using 256X4 chips on
the mother board and a relayout of the board changing the exact location of some
of the chips including the gary. This mother board will take up to 1mb of
memory but has been shipping with 512K installed. Some versions have also
shipped with a fatter agnus installed but not activated. The revision 6 mother
board must use a 1.2 gary board with a cable.

Auto-Configure
The protocol that Amiga uses to configure expansion cards into the system. Only
cards that are attached to the external expansion bus or are plugged directly
into the 68000 socket will auto-configure.

Chip RAM
Used by the agnus chip to perform all internal DMA functions. Used to display
information on the screen. Also known as display RAM. This memory is limited
to 512K or 1mb depending on the agnus chip that is installed.

Contiguous Memory
Memory whose addresses are physically side by side. Required by some scanner,
CAD and music programs. Check with the software manufacturer if the progra
requires t .s type of memory.

DRAM
Means "Dynamic Random Access Memory". Its a memory chip that comes in many
variations. The BASEboard uses 20 pin 256X4 DRAM chips in DIP packages.

EXEC-configure Memory
EXEC is a package of routines contained in the Amigas Kickstart ROM. The EXEC
supervises memory. EXEC-configured memory is memory that is available to the
operating system immediately upon power-up. This memory is a also known as
Auto-Exec memory.

Fast RAM
Used for all non-internal DMA functions. Stores all other information. Is
limited only by the amount of RAM that the Amiga is able to address.

Fat Agnus
One of the custom chips in the Amiga. It allocates 512K of chip memory to the
system. The part number is 8370 and it is found in the center of the mother
board in a square socket.

Fatter Agnus
One of the custom chips in the Amiga. It allocates 1 megabyte of chip memory to
the system. The part number is 8373 and it is found in the center of the mother
board in a square socket.

Gary Chip
One of the custom ships of the Amiga. The part number is 5719 and is a 48 pin
I.C. It controls the real time clock and the address bus.

Integrated Circuit.
Those little black blocks of plastic with legs on them. Without these little
miracles we would have to use tubes. Remember them? Also known as I.C.s.

Jumper Plastic
A small (black) plastic block used to short two pins together. They can be
found on both the gary and the memory board. Can be removed with a pair of
needle nosed plyers or a small pair of fingers.

Jumper Solder
Square silver pads found etched into the mother board. Commodore uses these to set up configurations. Would have been nice if they had used the removable kind but no such luck this time around. To change a solder jumper one must either cut an existing trace to eliminate a connection or solder a bridge across two pads to create one.

Kickstart ROM
Commodore replaced the Kickstart floppy used on the A1000 and placed all this information in a ROM on the mother board. It is a 48 pin I.C. located directly to the right of the large 68000 CPU chip. The part number of the chip is 315093 with -01 as version 1.2 and -02 as version 1.3.

Megabyte
A unit of measure used in describing memory. Represents one million bytes (or 1000K) of memory. The Amiga comes with one half megabyte (.5mb or 512K) on the other board. Two megabytes of memory is also abbreviated as 2mb.

PAL
Means "Programmed Array Logic". The number of the PAL on the gary board is 16L8 and is a 20 pin I.C.

Real Time Clock
It is the battery backed clock that is found on the BASEboard or the A501. Specifically it is an 18 pin I.C. chip with part number RTC6242. It maintains the real time and date. See the "Setclock and Date" section of this manual as well as below.

System Time Clock.
This is the preferences clock. The system clock is set by using preferences. It can also be set by using the "setclock" command in the startup-sequence when booting.