

ECONORAM Xa^{T.M.}

ABOUT THE ECONORAM Xa

Congratulations on your purchase of the Econoram Xa, a 32 x 8 memory board designed specifically for electrical and mechanical compatibility with the IEEE bus standard. The S 100 bus systems are professional level machines used in commercial, industrial, and scientific applications. Because of the bus oriented architecture, S 100 machines provide superior performance without the built in obsolescence of other systems. We believe that this board with the rest of the S-100 portion of the Compupro family is one of the best boards available for that bus.

We recommend that the parts in this kit be checked against the part list for completeness and that these instructions be read through carefully before starting. All IC sockets and disc bypass capacitors are soldered into place on the board, so the tedious work in putting the kit together has already been done. Completion of the assembly should take from one to four hours, depending on previous assembly experience, and upon completion, you will discover - as thousands of satisfied ECONORAM owners have discovered -- the pleasure of using a fine memory board that just works, and works.

As the first company to nationally offer memory kits to computer hobbyists and professionals, we again thank you for choosing ECONORAM Xa...welcome to the club.

TECHNICAL OVERVIEW

This board incorporates proven static memory technology. There are currently two popular types of memory being used in products such as this: static and dynamic. Static memories are the overwhelming choice in applications where speed, complexity, ease of use and reliability must all be considered...there is no refresh slowdown, the CPU is freed from the drudgery of caretaking the memory, and techniques such as direct memory access (DMA) are far more reliable and easier to implement.

The individual memory ICs used on this board are grouped together to form two 16K x 8 blocks of memory. Each of these 16K blocks can be started on any 4K boundary by setting the dipswitch (no jumpers required). Additional features include a write protect switch and an enable switch for each block, write strobe selection switches for use in systems with or without MWRITE strobe 24 bit extended addressing with disable switch for memory expansion beyond 64K, thorough capacitor bypassing of supply lines to suppress transients plus on-board regulation and heat-sinking for reliably cool operation. All this and sockets for all ICs go onto a double-sided, solder-masked printed circuit board with a complete component-layout legend.

USING ECONORAM Xa

16K BLOCK ADDRESSING

Each 16K block on this board can be set to start on any 4K boundary in the currently addressed 64K page. The starting address of the board is set by adding the switch value indicated on the diagram below. If the starting address is 52K or greater, the remaining memory that would exist beyond 64K is wrapped around to 0K. For example, if a block is addressed to start at 56K, then there would be 8K from 56K to 64K and 8K from 0K to 8K.

SWITCH S ²									
BLOCK	BLOCK B				BLOCK A				
SWITCH POSITION	1	2	3	4	5	6	7	8	ON = VALUE
SWITCH VALUE	32K	16K	8K	4K	32K	16K	8K	4K	OFF = 0

SWITCH POSITION AND SETTING

BLOCK A	5	6	7	8	STARTING ADDRESS
BLOCK B	1	2	3	4	
	OFF	OFF	OFF	OFF	0K + 0K + 0K + 0K = 0K
	OFF	OFF	OFF	ON	0K + 0K + 0K + 4K = 4K
	OFF	OFF	ON	OFF	0K + 0K + 8K + 0K = 8K
	OFF	OFF	ON	ON	0K + 0K + 8K + 4K = 12K
	OFF	ON	OFF	OFF	0K + 16K + 0K + 0K = 16K
	OFF	ON	OFF	ON	0K + 16K + 0K + 4K = 20K
	OFF	ON	ON	OFF	0K + 16K + 8K + 0K = 24K
	OFF	ON	ON	ON	0K + 16K + 8K + 4K = 28K
	ON	OFF	OFF	OFF	32K + 0K + 0K + 0K = 32K
	ON	OFF	OFF	ON	32K + 0K + 0K + 4K = 36K
	ON	OFF	ON	OFF	32K + 0K + 8K + 0K = 40K
	ON	OFF	ON	ON	32K + 0K + 8K + 4K = 44K
	ON	ON	OFF	OFF	32K + 16K + 0K + 0K = 48K
	ON	ON	OFF	ON	32K + 16K + 0K + 4K = 52K
	ON	ON	ON	OFF	32K + 16K + 8K + 0K = 56K
	ON	ON	ON	ON	32K + 16K + 8K + 4K = 60K

EXTENDED ADDRESS SELECTION

The memory on this board may be placed in any of the 256-64K pages that can be addressed by this board. This is accomplished by setting the 64K page address on switch S1 as shown below, and turning X4* (S2-8) to the OFF position.

ADDRESS	A ²³	A ²²	A ²¹	A ²⁰	A ¹⁹	A ¹⁸	A ¹⁷	A ¹⁶	ON = "0"
	1	2	3	4	5	6	7	8	OFF = "1"

NOTE: If using this board in a system that does not have EXTENDED ADDRESSING, the user should remove U12 (25LS2521), turn all positions of S1 to the OFF position, and turn S2-8 (XA*) to the ON position.

BLOCK ENABLE SWITCHES

Each 16K block on this board may be selectively disabled and removed from memory space at any time by turning the appropriate enable switch to the OFF position. For normal operation, the enable switches should be left in the ON position.

	SWITCH NAME	SWITCH POSITION	
BLOCK A	EA	S2-6	ON = ENABLED
BLOCK B	EB	S2-7	OFF = DISABLED

WRITE PROTECT SWITCHES

Each 16K block on this board may be selectively write protected at any time by turning the appropriate write enable switch to the OFF position. This allows the user to read from the RAM, but not to alter its contents. For normal operation, the write enable switches should be left in the ON position.

	SWITCH NAME	SWITCH POSITION	
BLOCK A	WA	S2-4	ON = WRITE ENABLED
BLOCK B	WB	S2-5	OFF = WRITE PROTECTED

MWRITE SELECTION SWITCHES

The MWRITE selection switches should be set as shown below to conform to your system's implementation of the MWRITE line (S-100 bus pin 68).

If your system has.....

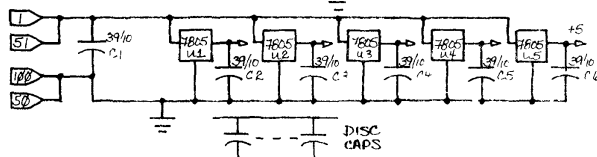
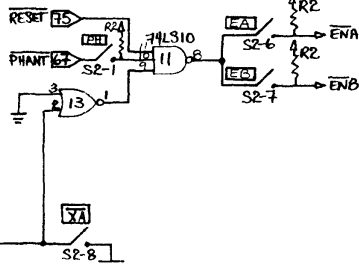
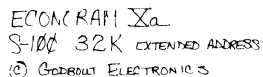
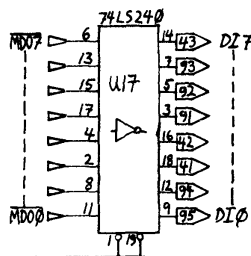
MWRITE IMPLEMENTED: Turn S2-2 (MW) to the ON position, and S2-3 (MG) to the OFF position.

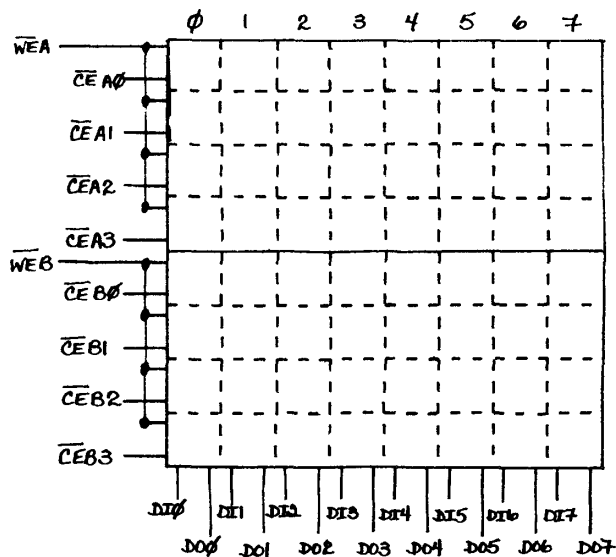
MWRITE NOT IMPLEMENTED: Turn S2-2 (MW) to the OFF position, and S2-3 (MG) to the ON position.

NOTE: If your system leaves MWRITE disconnected or floating, it might be a good idea to ground the line by turning both S2-2 and S2-3 (MW and MG) to the ON position. This should allow all boards using both MWRITE and PWR* to operate properly.

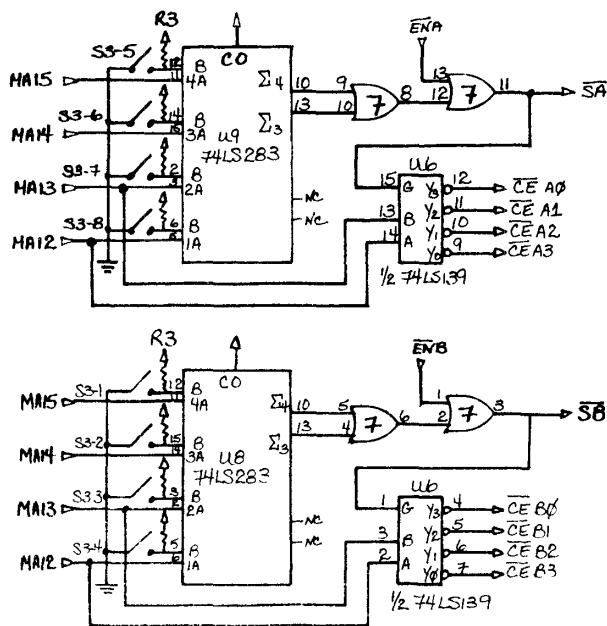
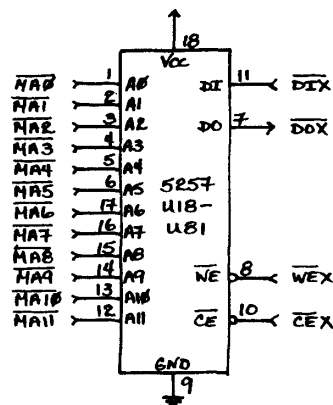
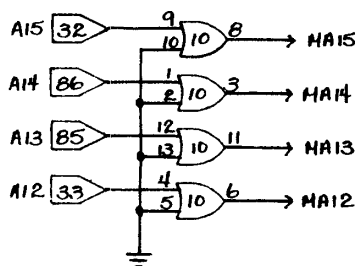
PHANTOM LINE

This board may be disabled by the PHANTOM* line (S-100 bus pin 67) if desired by placing S2-1 (PH) in the ON position. For normal operation unaffected by PHANTOM*, leave S2-1 (PH) in the OFF position.





ARRAY CONSISTS OF
64 (4Kx1) STATIC RAMS
SIMILAR TO MM5257
OR SM00308
U18-U81



PARTS LIST - ECONORAM Xa

(5)	U1-U5	7805
(1)	U6	74LS139
(2)	U7, U10	74LS32
(2)	U8, U9	74LS283
(1)	U11	74LS10
(1)	U12	25LS2521
(1)	U13	74LS02
(2)	U14, U15	74LS04
(1)	U16	81LS96/98
(1)	U17	74LS240
(6)	C1-C6	39µf 10v tant
(3)	R1-R3	S/P Resistor
(2)	S1, S2	8 position DIP Switch
(64)	U18-U81	MM5257 or SM00308