

Ralph Allen Engineering Co.

FORNCETT END NORWICH

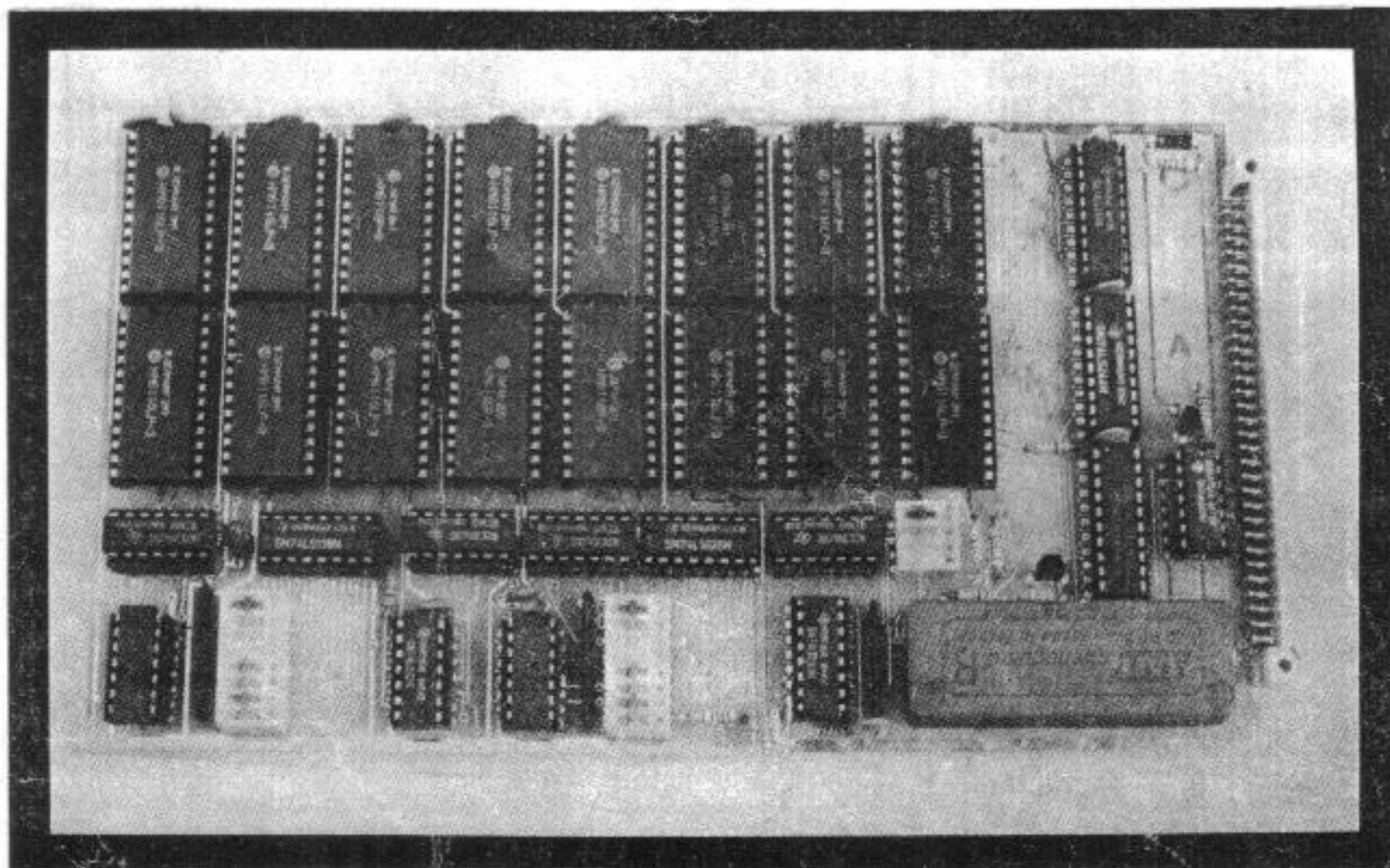
NORFOLK ENGLAND

Reg. No. 1711588

TEL: BUNWELL (095389) 420

V.A.T. No. 353 2120 00

* * * 32K EPROM-RAM CARD * * *



This board is designed to operate in a standard 6502 or our 6809 Tangerine system rack. It is memory mapped and can be switch set to start on any 4k memory block and then give 32k of continuous memory, any 2k can be switch disabled and the board can be permanently enabled or page enabled by one wire link, it honours I/O & Ram inhibit signals, it will except 6116 rams, or 2716 eproms in any socket and they can be freely mixed in any order there are no links needed to change from one to the other just insert them as required.

If using 6116LP3 ram chips by setting links on the required sockets these selected chips can be battery backed so that they retain their data when the system is turned off or the board removed from the rack. Two of these boards can be set up to give you 64k of static ram/eprom enabling you to remove all of the old memory from the system and greatly reduce the amount of heat generated in the rack as well as reducing the amount of power required to drive it.

This board is also a direct replacement and improvement for the original Tangerine 32K Rom card except that it will not except the 4k eproms that the original would.

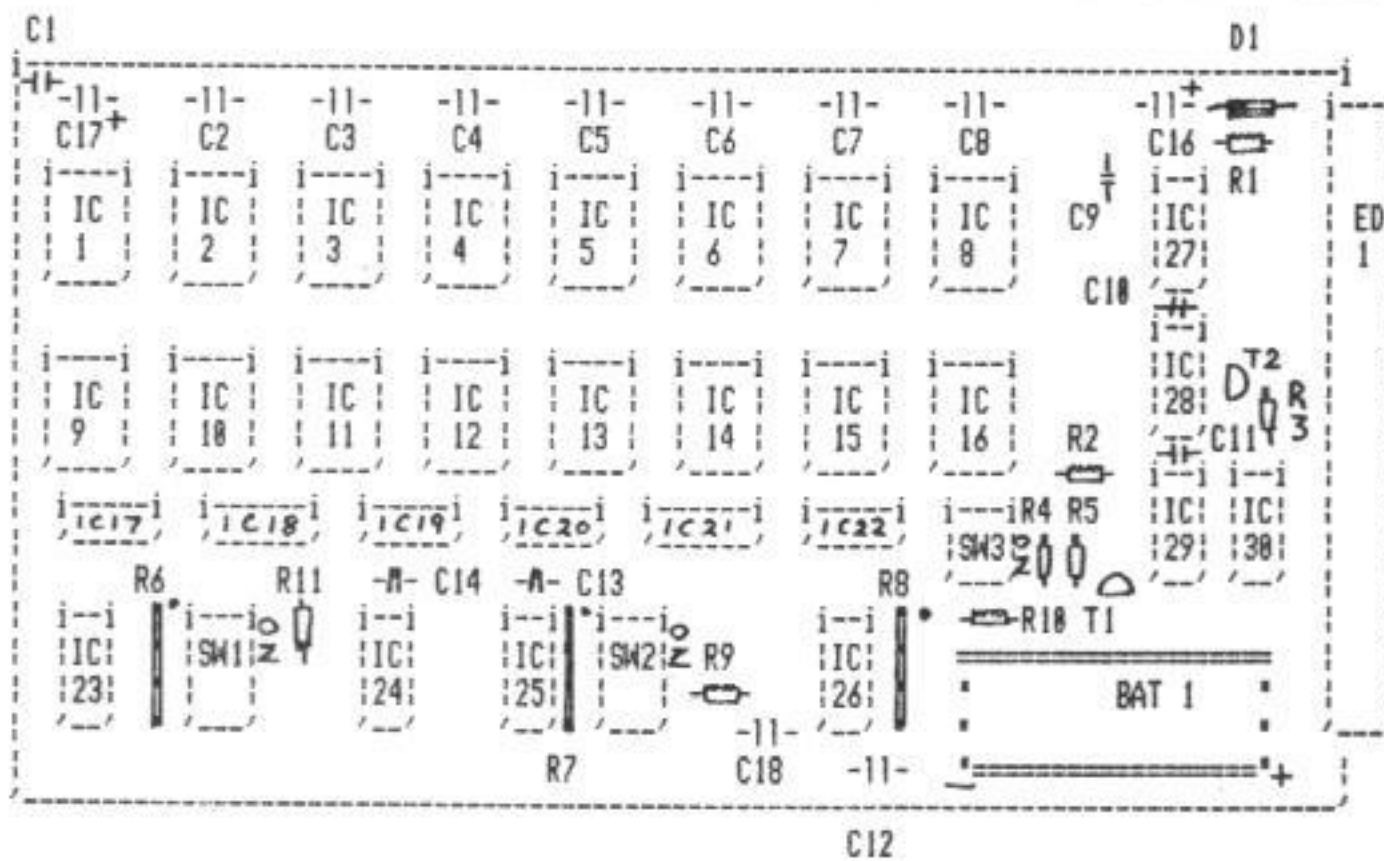
PRICE

£24.50p

BARE
P-C-B + VAT

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*** COMPONENT LIST ***



- IC1-16 6116 RAMS or 2716 EPROMS.
- IC17 74HC32 -14 ✓
- IC18 ✓74LS138-16 ✓
- IC19 74HC32 -14 ✓
- IC20 74HC32 -14 ✓
- IC21 74LS138-16 ✓
- IC22 74HC32-14 ✓
- IC23 74LS30-14 ✓
- IC24 74LS02-14 ✓
- IC25 ✓74LS30-14 ✓
- IC26 74LS283-16 ✓
- IC27 74LS244-20
- IC28 ✓74LS244-20
- IC29 ✓74LS245-10
- IC30 74LS00-14 ✓
- SW1-2 8 WAY DIL SWITCH
- SW3 ✓4 WAY DIL SWITCH
- T1 BC184 TRANSISTOR
- T2 ✓ BC214L TRANSISTOR
- C1-14 ✓0.1uf DISC
- C15 47uf 6V
- C16 6.8uf 6V
- C17 6.8uf 6V
- C18 ✓n12 CERAMIC

- ✓R1 1K5
- ✓R2 10K
- ✓R3 1K5
- ✓R4 330R
- ✓R5 68R
- ✓R6 1K X 8 SIL (9 PINS)
- ✓R7 1K X 8 SIL (9 PINS)
- ✓R8 1K X 7 SIL (8 PINS)
- ✓R9 200R
- ✓R10 10K
- ✓R11 750R
- BAT, 40RF304 (AVAILABLE FROM US)
- ✓ED1 64/64 EDGE CONNECTOR
VERO 17-3704L
- ✓D1 IN4001 DIOD

* * * CARD MEMORY MAP * * *

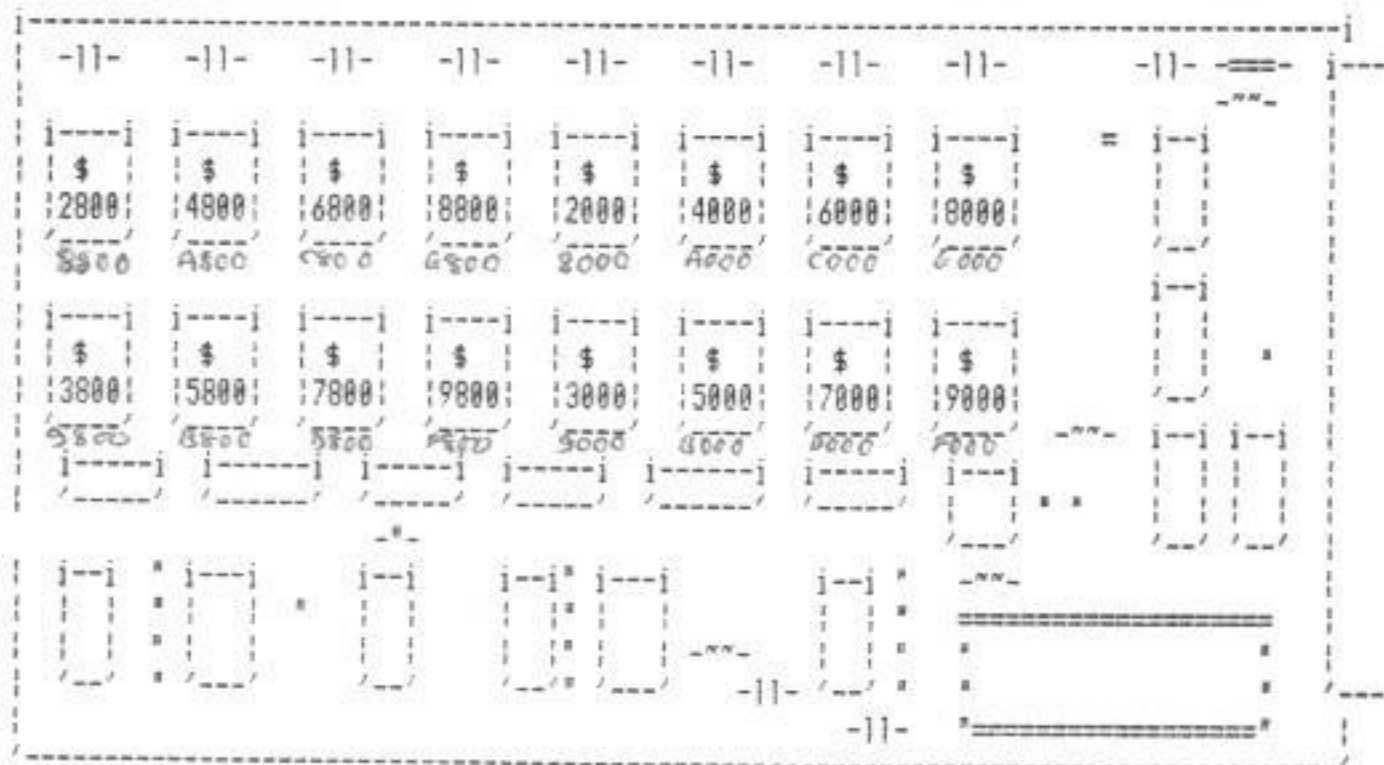
If you are using the card for ram only then the following has no relevance to you, but if Eproms are being used this will need careful study.

If SW3 is set for the card to start from address \$0000 (see switch mapping details)

Then the socket addresses are:

IC5 = \$0000 - \$07FF	IC7 = \$4000 - \$47FF
IC1 = \$0800 - \$0FFF	IC3 = \$4800 - \$4FFF
IC13 = \$1000 - \$17FF	IC15 = \$5000 - \$57FF
IC9 = \$1800 - \$1FFF	IC11 = \$5800 - \$5FFF
IC6 = \$2000 - \$27FF	IC8 = \$6000 - \$67FF
IC2 = \$2800 - \$2FFF	IC4 = \$6800 - \$6FFF
IC14 = \$3000 - \$37FF	IC16 = \$7000 - \$77FF
IC10 = \$3800 - \$3FFF	IC12 = \$7800 - \$7FFF

Therefore if the card was set to run from \$2000 onwards (see switch mapping details) ie replace tanram, then the addresses would be:-



IC5 \$2000 - \$27FF	IC7 \$6000 - \$67FF
IC1 \$2800 - \$2FFF	IC3 \$6800 - \$6FFF
IC13 \$3000 - \$37FF	IC15 \$7000 - \$77FF
IC9 \$3800 - \$3FFF	IC11 \$7800 - \$7FFF
IC6 \$4000 - \$47FF	IC8 \$8000 - \$87FF
IC2 \$4800 - \$4FFF	IC4 \$8800 - \$8FFF
IC14 \$5000 - \$57FF	IC16 \$9000 - \$97FF
IC10 \$5800 - \$5FFF	IC12 \$9800 - \$9FFF

* * * SWITCH POSITIONS * * *

Switches SW1 & SW2 are used for disabling any 2K block ON enables OFF
disables they apply as follows:-

SW1				SW2			
1 =	IC1	\$2800	0800 8800	1 =	IC5	\$2000	0000 8000
2 =	IC9	\$3800	1800 9800	2 =	IC13	\$3000	1000 9000
3 =	IC2	\$4800	2800 A800	3 =	IC6	\$4000	2000 A000
4 =	IC10	\$5800	3800 B800	4 =	IC14	\$5000	3000 B000
5 =	IC3	\$6800	4800 C800	5 =	IC7	\$6000	4000 C000
6 =	IC11	\$7800	5800 D800	6 =	IC15	\$7000	5000 D000
7 =	IC4	\$8800	6800 E800	7 =	IC8	\$8000	6000 E000
8 =	IC12	\$9800	7800 F800	8 =	IC16	\$9000	7000 F000

SW3

This switch sets up the memory start address and is as follows:-

1	2	3	4		CARD START ADDRESS		CARD END ADDRESS
ON	ON	ON	ON	=	\$0000	to	\$7FFF
OFF	OFF	OFF	OFF	=	\$1000	to	\$8FFF
OFF	OFF	ON	OFF	=	\$2000	to	\$9FFF
OFF	OFF	OFF	ON	=	\$3000	to	\$AFFF
OFF	OFF	ON	ON	=	\$4000	to	\$BFFF
ON	OFF	OFF	OFF	=	\$5000	to	\$CFFF
ON	OFF	ON	OFF	=	\$6000	to	\$DFFF
ON	OFF	OFF	ON	=	\$7000	to	\$EFFF
OFF	ON	ON	ON	=	\$8000	to	\$FFFF
OFF	ON	OFF	OFF	=	\$9000	to	\$0FFF
OFF	ON	ON	OFF	=	\$A000	to	\$1FFF
OFF	ON	OFF	ON	=	\$B000	to	\$2FFF
OFF	ON	ON	ON	=	\$C000	to	\$3FFF
ON	ON	OFF	OFF	=	\$D000	to	\$4FFF
ON	ON	ON	OFF	=	\$E000	to	\$5FFF
ON	ON	OFF	ON	=	\$F000	to	\$6FFF

* * * BATTERY BACK UP * * *

If the card is using 6116LP3 Ram chips in any socket (note the LP3 denotes low power the standard type will not do) and you wish to enable that chip to retain its data on power down then you have to make the battery link to that socket, note if you later want to place a 2716 eeprom into that socket you must change the link back or you will quickly drain the battery. Above each socket IC1 to 16 there are 3 plated through holes two of which have a small track joining them. Cut through the link with a sharp knife and solder a small link from the centre of the three holes to the hole that did not originally have a link on it. Note the link on IC16 is opposite to all the rest do to lack of space. DO NOT solder the board whilst power is still applied to it or you will take out the whole computer.

* * * LINK DETAILS * * *

There is only one main link on this card that controls whether the board is to be permanently enabled or page selectable, it is marked as LNK 1 on the drawing. If it is made then the card will only respond if the slot that it is plugged into is page enabled, if you are using this card as a 32K Eeprom card to work with our 6809 monitor then this link needs to be made and the card placed into slot 7, see 6809 manual for details.

* * * GENERAL TIPS * * *

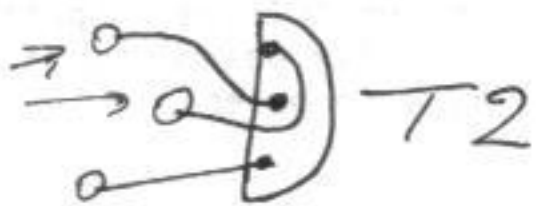
If using two of these cards to obtain 64K of static ram set SW3 1,2,3 & 4 on this will set the card to run from \$0000 to \$7FFF, make link 1, turn all of SW1 & SW2 ON and place the card into slot 0, ie the tanram slot. Remove all of the Ram from Tanex but leave the 1K of Ram on the 6809 or 6502 card. Set card number two to SW3 1 on, 2 off, 3 & 4 on. This set the card to run from \$8000 to \$FFFF break link 1 and turn SW1 8 off, to disable the Ram slot at \$F800 which would otherwise clash with the Monitor eeprom on the 6809 or 6502 card, all the rest of SW1 & SW2 should be turned on, this card can now be placed in any one of the slots from 1 to the Expansion slot.

If another one of these cards are to be used as a 32K Eeprom card in our 6809 system set SW3 1,2,3 & 4, ON this sets the card to run from \$0000 to \$7FFF, you can leave all of SW1 & SW2 ON, make link 1 and place the DATA Eeprom into IC5 socket, the SYNTAX Eeprom into IC1 socket and finally the ASCII Eeprom into IC13 socket. This is different to the 6809 manual for using the original 32K Tangerine card. Should you be using only one of our 32K cards in the Tanram socket and the card is set to run from \$2000 to \$9FFF ie the same start address as Tanram had, then you should set 32K Tangerine Eeprom card as stated in the 6809 manual or if you are using one of our 32K cards still set it as above.

If you are using two of our card for 64K static ram and a 32K Tangerine card in slot 7 with our 6809 system, then change switch G3 on the Tangerine 32K card to all ON this sets the card run from \$0000 to \$7FFF and place the DATA Eeprom into F1, the SYNTAX Eeprom into F2 and the ASCII Eeprom into E1.

There is one track fault on these first boards. To cure, insert T2 as shown below.

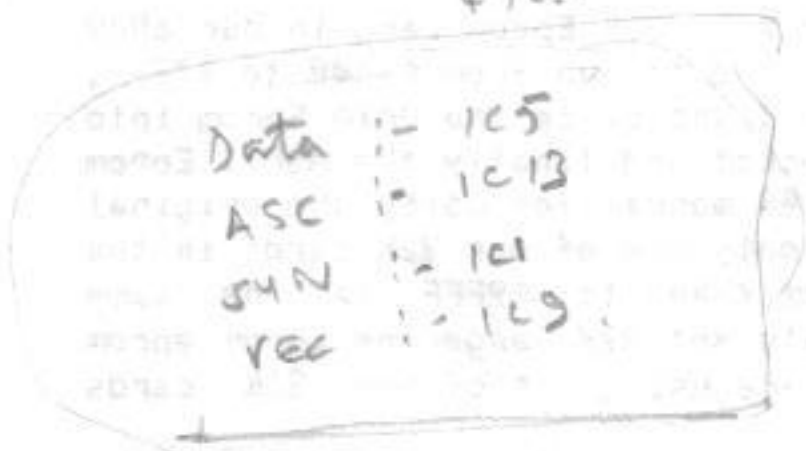
ie these 2 legs need twisting as shown.



Viewed from top.

EPROM / RAM

- 1) OFF
- 2) OFF
- 3) ON
- 4) OFF



FFFF
77
L15
2000