

# CONTROL UNIVERSAL LTD

11-15 Bush House, Bush Fair, Harlow, Essex, England CM18 6NS  
Tel: Harlow (0279) 31604 or 412043 Telex: 995801-G Reg. in England No. 1497740

Power-on/power-off reset device. This causes the whole system in which the CU-MEM resides to be reset upon power-on. Also, upon power-down the CU-MEM generates a reset. This helps to protect the integrity of the RAM memory during power-down.

Twin-bank arrangement allows the use of two different types of memory on the same card, eg. 8K bytes of RAM plus 16K bytes of EPROM (type 2532), which allows a system to consist of only this card plus the processor card (eg. Cudbit, or Acorn CPU).

Power-down current saving. Certain memory devices (see below) have a power-down pin which reduces the current consumption of the device when addresses within that device are not being called. CU-MEM arranges to profit from this feature wherever possible.

Write Protect Switch. Disables the read/write line so preventing RAM from being overwritten. The switch is on the front of the card and thus can be used when the card is mounted in a rack. It is particularly useful with the battery-backed CMOS version as the card then behaves as if it were filled with ROM/EPROM.

## USE OF CU-MEM

Each socket on CU-MEM can take either a 24 or a 28 pin memory device that conforms to the industry standard on memories. Having selected a memory type to use there are a number of tasks to perform before use. First the choice must be made of the memory area in which the memory devices are to reside. The eight sockets are divided into two banks of four, each of which is controlled by a DIL switch. The DIL switch pack has eight switches labelled 0, 2, 4, 6, 8, A, C, E, which signify memory areas as follows:-

0 : 0000-1FFF    2 : 2000-3FFF    4 : 4000-5FFF    6 : 6000-7FFF  
8 : 8000-9FFF    A : A000-BFFF    C : C000-DFFF    E : E000-FFFF

When the switch relating to a specified memory area is on, the memory devices are enabled when the processor calls up memory in that area. As these are 8K bytes blocks of memory the user would expect to select one switch in each bank with 2K byte devices and two switches in each bank when using 4K byte devices. When using 8K byte devices it should be remembered that eight read-only devices cannot be used (eg. ROM, EPROM) as the processor must have some RAM at least at zero page. Thus the maximum capacity of the CU-MEM is 56K bytes, in which case the 0 switch in each bank must be deselected. Obviously another CU-MEM populated with RAM can be selected at 0 to perform the zero page RAM function.

The next decision relates to the memory type to be used. A table at the top of the circuit diagram overleaf indicates the links that must be made on the option select header for each bank. The two banks may have different types of memory. Finally, the links beside each device (shown on the circuit diagram as pins 20 and 22 must be made in accordance with the memory type chosen.

## POWER-DOWN FEATURE

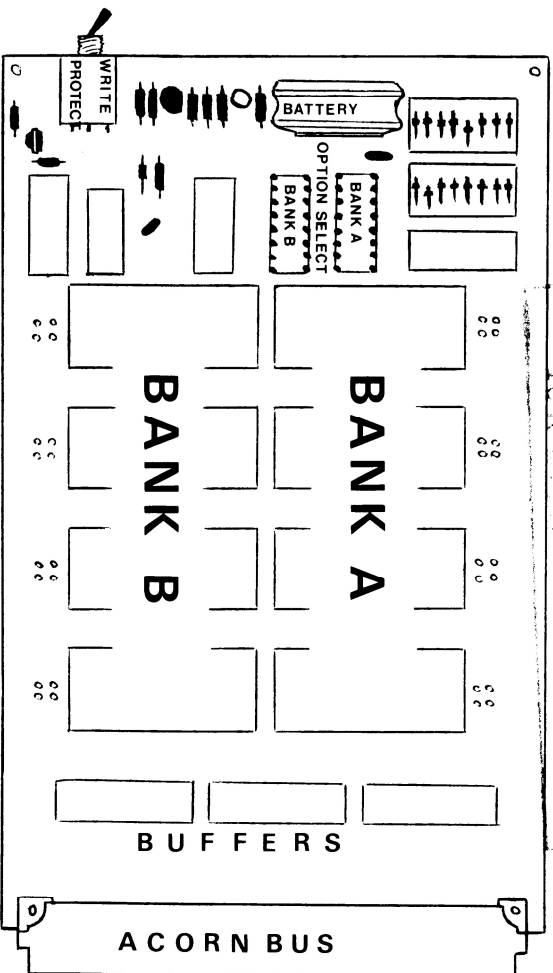
Memory types Intel 2716, 2732, 2816, Hitachi 48016 and Texas 2716 have a power-down feature which considerably reduces power consumption when deselected. When the links have been made in accordance with the instructions above, this feature is automatically employed. However, should the user decide to mix one of these types of memory on one bank with battery-backed CMOS RAM on the other bank, this feature must not be used. The link shown starred on the option select header on the circuit diagram should not be made, otherwise the battery back-up circuit cannot operate correctly.

The right is reserved to amend the above information without notice.  
CU-MEM is the copyright property of Control Universal Ltd.

## CONTROL UNIVERSAL LTD

11-15 Bush House, Bush Fair,  
Harlow, Essex, England. CM18 6NS  
Telephone Harlow (0279) 31604 or 412043  
Telex: 995801-G

Local Distributor:-



## CU-MEM UNIVERSAL MEMORY CARRIER

May 1981

CU-MEM is the Universal Memory Carrier made in England by Control Universal Ltd, which will take a wide range of 24 and 28 pin industry standard pin-out memory devices, RAM, ROM, EPROM, EEPROM, and in the case of CMOS RAM battery back-facilities are provided to achieve a non-volatile memory system.

## FEATURES

8 sockets each taking a 24 or 28 pin JEDEC standard pin-out memory device, arranged as two independent banks of four sockets.

Memory types acceptable include:-  
RAM

Mostek 4801 (1K bytes), 4802 (2K bytes),  
Toshiba 2016 (2K bytes), 5516 (2K bytes CMOS suitable for battery back-up)  
Hitachi 6116 (2K bytes CMOS, but not suitable for battery back-up)  
Intel 2816 (2K bytes)

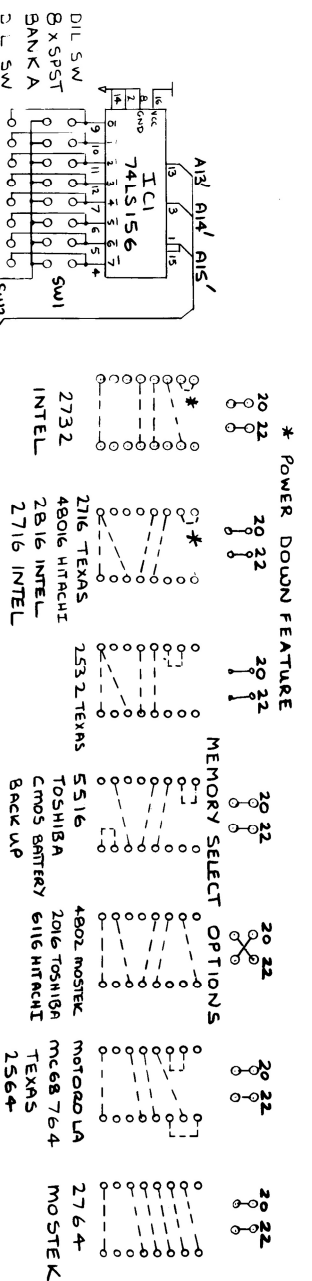
ROM

Rockwell 2316 (2K bytes), 2332 (4K bytes), 2364 (8K bytes)  
EPROM

Texas 2758 (1K bytes), 2516 (2K bytes), 2532 (4K bytes), 2564 (8K bytes)  
EEPROM

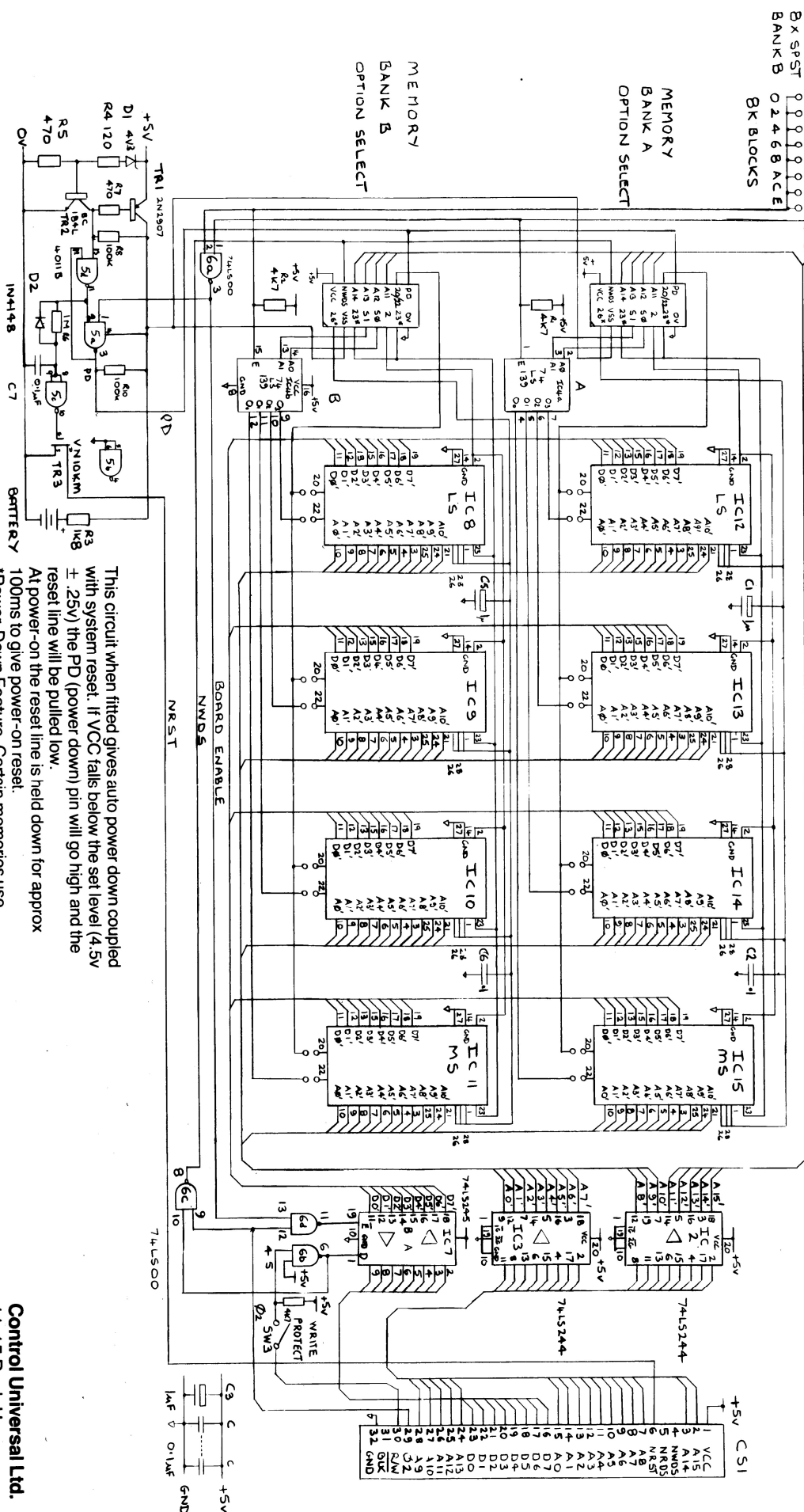
Intel/Mostek 2716 (2K bytes), 2732 (4K bytes), 2764 (8K bytes)  
Hitachi 48016 (2K bytes)

Battery back-up facility allows the use of CMOS RAM type Hitachi 5516. The battery is continuously trickle-charged while the 5v power supply is on, and when fully charged will maintain the integrity of the memory for a considerable period limited only by the life of the battery, as the power consumed in holding up the memory is less than the disconnected battery leakage current.



**NOTES**

- RAMs tend to use pin 20 for CS and must be used in conjunction with RW. Pin 22 is purely OE output enable and can be tied low.
- Some EPROMs use pin 22 for CS and power down and 20 for A11. Hence the provision to swap 20/22 from a common line to a CS function.
- Battery back-up is restricted to the Toshiba 5516 CMOS 2K x 8RAM.



This circuit when fitted gives auto power down coupled with system reset. If VCC falls below the set level (4.5V ± .25V) the PD (power down) pin will go high and the reset line will be pulled low.

At power-on the reset line is held down for approx 100ms to give power-on reset.

\*Power-Down Feature. Certain memories use considerably less power when their power down feature is used. This function is provided in the case of the types starred above. However, this function cannot be used if one block contains CMOS RAM with battery back-up. In this case the power down pin of the memory must be tied low.

**Control Universal Ltd.**  
11-15 Bush House,  
Bush Fair,  
Harlow, Essex  
CM18 6NS  
Tel: Harlow (0279) 31604 or 412043  
Telex: 995801-G