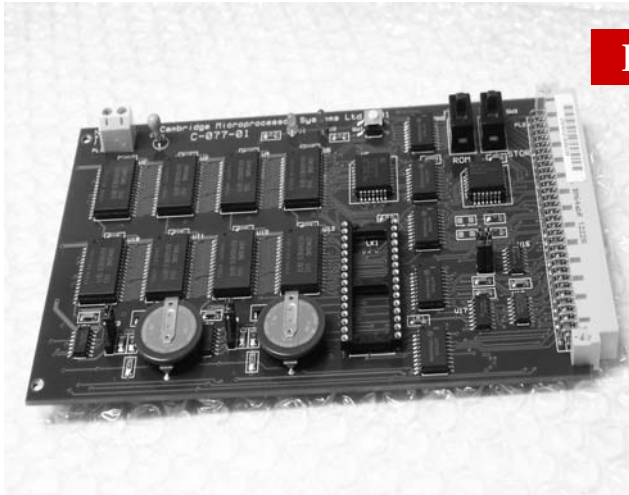


4 / 8M-BYTE STATIC RAM

512K Flash
1M EPROM
upto 8M
Static RAM



The picture shows a 4/8 M-byte Static RAM card with 8MByte SRAM. Actual Size (100 x 160 mm)

FEATURES

- Up to 8 M-bytes Static RAM
- Battery Backup
- Intelligent Memory Detection
- 512 k-bytes of Flash EEPROM (option)
- 1 M-byte of EPROM (option)
- FlashFormatter
- Data Logger
- 8 modes of operation
- Supported in United Kingdom

well as the program memory. The FlashFormatter board is supplied as part of a Multi License Development Pack for the FlashModule product range. If a FlashFormatter is the only feature required, a standard FlashFormatter card will be supplied (please refer to separate product leaflet 'Flash Memory Modules').

The Static RAM expansion adds up to 8 M-bytes of battery backed static RAM to the controller. The RAM card addition is available in two different capacities, 4 M-bytes and 8 M-bytes. The battery backup is provided

by an on board batteries and power supply monitor. While the supply voltage is in excess of 4.5 Volts the static RAMs are powered by the main power supply and they can be accessed. When the supply voltage falls below this limit the static RAM is disabled and powered from the batteries. Data will be retained in the static RAM under battery backup conditions for up to one month. The user using a link on the board can clear all data in the static RAMs. The static RAM expansion makes the ideal addition to the Flash-Module product range for remote data logging. Large amounts of data can be stored in this RAM for collection at a later date. The data can be retrieved either via the serial port or by unplugging the expansion card and plugging it into a master unit attached to a host computer.

The example program over the page shows a typical data logging application where data is logged and time stamped if it is outside a set of predetermined limits. At various limits the controller uses a modem to inform the control station of its status. When the data buffer is nearly full a different message is sent requesting assistance. The program can be used to log 262,140 blocks of data in the standard format shown when using the 8 M-byte expansion board. Using some simple data compression techniques this can be increased to 1,600,000 blocks, which with average data, could be four blocks every minute for a whole year.

DESCRIPTION

The 4/8 M-byte Static RAM expansions are available for use with the Flash-Module product range. They can also be used with other products in the Module product range although they are unable to be used as Formatters with these products. There are a number of combinations of the basic memory expansion card. The expansion card adds an extra 512 k-bytes of Flash EEPROM, up to 1 Mbyte of EPROM and up to 8 M-bytes of static RAM to that already present on the FlashModule controller. The card is fitted with 5 Volt only flash memory and can be powered from a single 5 Volt supply. When one of these products is used with a FlashModule controller the controller can be enabled to detect the amount and type of additional memory and the Minos memory manager is set up accordingly. This feature can be disabled to reduce the start up delay time, while the memory is checked. If the feature is disabled, then the operating system does not know about this memory and it can be used directly from the application program. If the operating system detects the memory expansion operating system functions must be used to make memory claims. All the memory on these expansion cards is accessed with zero wait states. Two visual indicators are fitted to the board. The first shows when power is supplied to the board, the second is a status LED that is used during programming cycles.

A FlashFormatter feature is optionally provided on these cards. This is used to configure the flash memory on the FlashModule controller. The Flash memory can be used to store programs or object code to be programmed into the flash memory fitted to the FlashModule. The EPROM contains the default system settings in case the user corrupts both Flash memories. It can be used to format the Flash EEPROM on a FlashModule for use with the Minos operating system, and so it is only supplied with a multi license copy of Minos. The function of the FlashFormatter is determined by the setting of the option switches when power is first applied. The Flash memory on the Flash-Module can either replace the boot Flash on the FlashModule or extend the size of the Flash memory. The EPROM on the FlashFormatter occupies the same address space as the Flash memory and is selected using a switch. To prevent accidental erasing of the FlashModules Flash EEPROM a secondary switch must be activated before the erasure takes place. The FlashFormatter can be purchased with static RAM fitted as

SPECIFICATION

Flash EEPROM. 512 k-bytes, 8 sectors, 64 k-byte sectors, 5 Volt only, 0 wait states, Boot or expansion.

EPROM. 512 k-bytes, expandable up to 1 M-byte, 32 pin JEDEC standard, 0 wait states, Boot or expansion, system defaults.

Static RAM. 4 M-bytes or 8 M-bytes, battery backed, 0 wait states

Battery Backup. Dual 3 Volt Vanadium Lithium compound cell, 1 month typical retention, on board power supply monitor/switch.

Size. 100 x 160mm.

Power Supply. Single 5 Volt operation, < 50mA typ.

Environmental. Operating temperature 0 - 70 degC, 0 to 90% relative humidity (non condensing)

4 / 8M-BYTE STATIC RAM



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```
#include <stdio.h>
#include <adio.h>
#include <time.h>
#include <minos.h>
#define HighLimit 0xf0 /* Define upper limit */
#define LowLimit 0xd0 /* Define lower limit */
#define phonenum "atdt0044371876077"
/* Dial string for modem */
#define hangup "ath" /* Modem hangup command */
#define station 232 /* Station number */
FILE *modem; /* Handle for modem */

void sendwarning(int data)
{
    fprintf(modem,phonenum); fflush(modem);
    delay(100);
    /* Dial modem and send message */
    if (data < 262000)
        fprintf(modem,"Station %d has exceeded
        the limits %d times" ,station,data);
    else
        fprintf(modem,"Station %d needs
        attention",station);
    fprintf(modem,hangup);
    fflush(modem);
}

void main(void)
{
    unsigned int *buffer; /* ptr to buffer RAM */
    struct tm time; /* structure to hold time */
    int data, channel, limit_exceeded=0;
    /* initialise buffer start */
    buffer = (unsigned short *) 0x700000;
    adioinit(); /* initialise analogue IO */
    modem = fopen("S2","w+"); /* open path to
    modem */
    /* loop until buffer is full */
    while (limit_exceeded < 262144)
    {
        for( channel=0;channel<8;channel++)
            /* read each channel in turn */
```

```
{
    data = adc(channel); /* read adc & check data */
    if ((data < LowLimit) || (data > HighLimit))
    {
        gettimeofday(&time); /* read the system time */
        toggled(); /* flash Led */
        *buffer = channel;
        *buffer++; /* store channel no */
        *buffer = data;
        *buffer++; /* store data read */
        *buffer = time.tm_hour;
        *buffer++; /* store current time */
        *buffer = time.tm_min; *buffer++;
        *buffer = time.tm_sec; *buffer++;
        *buffer = time.tm_mday; *buffer++;
        /* store current date */
        *buffer = time.tm_mon; *buffer++;
        *buffer = time.tm_year; *buffer++;
        limit_exceeded += 1; /* increment count */
    }
    if (limit_exceeded % 1000 == 0)
        sendwarning(limit_exceeded);
    /* send message to control */
}
delay(100); /* wait for 10 seconds */
}
fprintf(modem,phonenum); fflush(modem);
delay(100);
fprintf(modem,"Station %d shutting down (data
overflow)",station);
fprintf(modem,hangup);
fflush(modem);
fclose(modem); /* close path to modem */
}
```

Note - All boards purchased with 4 or 8 M-bytes of Static RAM will be supplied with the 160 x 100 version of the card (this leaflet). For boards purchased with less than 4 M-bytes of RAM the FlashFormatter card will be supplied, please refer to 'Flash Memory Modules' leaflet for more details.

ORDER CODES

Order Number	Product Name	1 off	100 off
FM-512F	FlashFormatter <i>512 k-byte Flash EEPROM, 1 M-byte EPROM, Multi license Minos</i>	£345	
FM-512F2M	FlashFormatter + 2M SRAM <i>512 k-byte Flash EEPROM, 1 M-byte EPROM, 2 M-byte SRAM, Multi license Minos</i>	£395	
FM-2M	2 M-byte Static RAM Card <i>2 M-byte Static RAM with Battery Backup 100 x 80</i>	£145	£95
FM-512F4M	4 M-byte Static RAM, Formatter Card <i>512 k-byte Flash EEPROM, 1 M-byte EPROM, 4 M-byte SRAM, Multi license Minos</i>	£540	
FM-512F8M	8 M-byte Static RAM, Formatter Card <i>512 k-byte Flash EEPROM, 1 M-byte EPROM, 8 M-byte SRAM, Multi license Minos</i>	£640	
FM-4M	4 M-byte Static RAM Card <i>4 M-byte Static RAM with Battery Backup 100 x 160 mm</i>	£195	£135
FM-8M	8 M-byte Static RAM <i>8 M-byte Static RAM with Battery Backup 100 x 160 mm</i>	£295	£195



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