

TRIPOS 3 DISC OPERATING SYSTEM

Tripos is an operating system which has been developed over the last 7 or 8 years at Cambridge University. Tripos 3 is an enhanced implementation of the latest Cambridge University version that has been developed especially for the Microbox 3.

Tripos is a multitasking operating system that is well suited to single user operation (although multiple users are possible). It allows a user to run several programs at once and switch between them as required, all programs may be running simultaneously but the user chooses which task to send keyboard input to.

A hierarchical filesystem is supported with each mounted file system having its own filehandler task. Tripos 3 has enhancements that allow multiple floppy disk volumes to be mounted on a single disk drive with the user being prompted to change the disk as required. The standard file system devices are floppy disk, ramdisk and winchester disk.

The system consists of a kernel which manages task scheduling and message passing between tasks, system tasks like the console handler, command line interpreter, default file system and resident debugger, and device drivers for disk, serial ports, graphics and other I/O devices. More system tasks and device drivers can be added and removed while the system is running. The devices are all interrupt driven and the floppy disk interface is particularly fast.

Commands and programs are loaded in from disk and, in Tripos 3 are left in memory under the control of an "object manager". This has a set upper limit on its memory use (typically 200K) and throws out the least recently used commands when it fills up. This feature is unique to Tripos 3 and greatly enhances the command response time compared with systems that always load commands from floppy disk each time they are used. The object manager can be examined as if it was a disk to see what programs are in memory and how much code space they are taking up. The standard delete command can be used to remove a program from memory but the removal may be delayed if the program is executing at the time. Code is shared so that several tasks can be using one copy of a program or library module.

The 'native' language of Tripos is BCPL in much the same way that the native language of Unix is C. All of the system except the kernel and device drivers is written in BCPL and Tripos 3 comes with a BCPL compiler and a 68000 macro assembler as standard. BCPL is the language that C was developed from and they are closely related. Programmers familiar with C can pick up BCPL in a few days. One big advantage of BCPL running under Tripos is that all the runtime libraries are shared by every task in the system and this saves a great deal of memory and disk space compared to other languages that have to have a copy of the library routines built into every program. Other languages that are available for Tripos include C, ISO Pascal and Fortran 77.

The dominant feature of the Microbox 3 hardware is the Motorola RMS graphics system. This is supported under Tripos 3 by a sophisticated system called VROOMS (Virtual Raster Object Orientated Multidisplay System). This consists of a library of routines that provide a programmer friendly interface to the exceedingly complicated facilities of the RMS devices. The full facilities of the RMS devices is independently available to each task via the concept of a virtual raster. A virtual raster consists of a RAM based copy of the RMS register set plus some extra information and any tables or display memory required. The library routines manipulate the RAM based copy of the registers which is part of the data area of each task. The advantage of this is that each task can have its own graphics screen in any mode that it desires without affecting any other task.

The RMS device driver is sent a message that indicates which is the current virtual raster and during the 50Hz blanking interrupt the RAM based registers are copied to the real registers so that the virtual raster is displayed. The device driver also handles other RMS interrupts and stores registers that change into the RAM based copy.

When the user switches input to go to a different task as part of the normal use of Tripos, the virtual raster for that task becomes the current one. A default text screen is used as the console if there are no virtual rasters on the current task and if the user runs a program that produces a graphics screen it will take over the screen until it finishes or until the user switches to a different task.

The system will in fact cope with multiple virtual rasters on a single task and the user can, in effect, shuffle the order of a stack of screens to decide which to look at. Programs can also manage multiple screens with full control over what is displayed.

Tripos 3 comes with a screen based text editor and an interactive graphics editor that allows objects (i.e. sprites) and characters to be edited. The source code for several example programs is also included.

Price: Tripos 3 operating system with over 40 utilities including:

Line Editor

Screen Editor

Print Formatter

Resident Debug

Macro Assembler

BCPL Compiler

£95 + vat

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Lattice C Compiler

£ 225 + vat