

# **General Notes**



## General UniFLEX™ Information

### I. General Information

The UniFLEX™ Operating System (UniFLEX is a trademark of Technical Systems Consultants, Inc.) is a state of the art operating system for microcomputers. The system's design has been influenced primarily by two other operating systems, FLEX™ and UNIX™ (UNIX is a trademark of Bell Laboratories). UniFLEX retains the flexibility and ease of use of FLEX while incorporating some of the widely accepted structures of UNIX.

UniFLEX is a true multi-tasking, multi-user operating system. Each user communicates with the system through a terminal and may execute any of the available system programs. This implies that one user may be running the text editor while another is running BASIC while still another is running the C compiler. Not only may different users run different programs simultaneously, but one user may be running several programs at a time. For example, a compiler run on one file could be started, while making changes in another file with the editor. The system would inform the user when the compilation is completed.

Each user must 'log in' before being permitted to use the system. The log in process requires the user to enter his user name, followed by a password. The system checks the validity of the password, and if accepted, the system command language program (the 'shell') is run. Full system accounting is supported by UniFLEX which will keep track of user log-in and log-out times, as well as the user's utilization of system resources. This is ideal for an educational environment since individual student's system time can be closely accounted for.

UniFLEX is a very complete operating system and has no practical limitations built into the software, almost all of them are hardware imposed. It supports a hierarchical file system allowing file sizes up to one billion bytes and disk capacities of over eight billion bytes. All files are fully protected. A user may read, write, or execute protect files on an individual basis. All system I/O is device independent since I/O devices and files are treated in an identical fashion. Any combination of interrupt driven devices may be attached to the system. A sample system configuration might have a ninety megabyte disk, a thirty megabyte disk, two eight inch floppies, a parallel driven printer, and eight user terminals. Any running task may initiate another task in an asynchronous manner. Inter-task communication is also supported. Task swapping may take place on those systems incorporating an appropriate swapping device. In real time applications, where swapping may be detrimental, it is possible to lock a task in main memory.

The user's main connection with the system is through the command language. This is the vehicle for inputting commands to the system. It supports a wide variety of features including parameter passing and various types of name pattern matching. Input to the command language may be from the terminal or from any file (including other devices). This enables very complex command files to be created and run at will.

The overall design of UniFLEX is geared toward the larger microcomputer systems. It is our opinion that small systems deserve small, compact operating systems (such as FLEX) while larger systems require much more sophistication. UniFLEX will be for the upcoming generation of microcomputers which support massive amounts of main and secondary memory. Not only is the 6809 supported with this system, but also the future 68000 based machines.

We will not claim that UniFLEX is the 'ultimate' operating system. It is impossible to create a program such as an operating system with which no one can find fault. We do feel, however, that UniFLEX does represent the state-of-the-art in operating systems and incorporates as many 'large system' features as is practical without losing the friendliness of the smaller system.

## II. Documentation Description

The UniFLEX documents contained in this volume cover all aspects of the operating system. A brief description of each follows.

### A. Introduction to UniFLEX

This manual is oriented towards the beginning user of UniFLEX. It provides enough information for the novice to start using the operating system efficiently. Topics such as system login and logoff are covered, as well as an introduction to a wide variety of system commands and features.

### B. UniFLEX Utility Commands

All of the standard UniFLEX commands are described in detail. The command's syntax, use, and examples are all given. The commands are arranged alphabetically for easy reference.

### C. UniFLEX Text Editor

The UniFLEX text editor is probably used more than any other program. This manual contains a tutorial on the editor as well as a complete description of all editor commands and features. The tutorial should be read by all system beginners.

#### D. UniFLEX 6809 Assembler

The assembler language programmers will want to make use of this manual. It describes all of the features and capabilities of the 6809 absolute assembler. The assembler supports macros and conditional assembly.

#### E. The UniFLEX Operating System

A general overview of UniFLEX is presented in this document. A discussion of the file system structure, task structure, and system features is included. This is recommended reading for those desiring more information on the details of the operating system.

#### F. Introduction to UniFLEX System Calls

This manual describes the system interface at the assembler level. System call structure, system errors, and system definition files are all described. All of the UniFLEX system calls are completely defined and appear in alphabetical order for easy reference.

#### G. UniFLEX Programmer's Guide

This is essential reading for those writing programs which need to interface with the system. Examples are given for most of the system calls. File manipulation, task control, and program interrupts are some of the topics discussed.

#### H. System Manager's Guide

Each UniFLEX installation requires a 'system manager'. This person is responsible for general system administration and maintenance. This guide covers most of this person's responsibilities as well as details of system startup and shutdown.

#### I. System Configuration Guide

This manual gives complete details for adding new device drivers to the standard operating system. Information is also provided which allows various system parameters to be 'fine tuned' or adjusted for the particular local environment.

#### J. System Maintenance Guide

System maintenance is crucial anytime many people are making use of an operating system. This guide covers disk repair, validity checks, system backups, and crash recovery. This is not for the novice.

## K. Miscellaneous UniFLEX Documents

This is a catch all and should be used for the variety of UniFLEX notes which will likely appear in the future. Those with maintenance will occasionally receive 'Product Bulletins' which may be conveniently filed in this section.

## III. Acknowledgements

UniFLEX is a result of various motivations. The FLEX™ Operating System (FLEX is a trademark of Technical Systems Consultants, Inc.), a standard in the field for 6800 and 6809 microcomputers, was certainly an influence. Monitoring its many years of use has given us insight into the needs and wants of microcomputer users. The UNIX™ Operating System (UNIX is a trademark of Bell Laboratories) was a major influence on the design of UniFLEX. The structure of 'pipes', 'forks', and most of the other internal features of the operating system were modeled after those of UNIX. UNIX has been around for over a decade and has proven to be a solid design. UniFLEX does offer a few 'improvements' not found in UNIX systems. One of these, which is quite important in this day of complex data base management systems, is the file record 'lock' mechanism.

The UniFLEX Text Editor is a descendent of the FLEX editor which is a model of the editor, 'QED', in wide use at Purdue University. The editor has proven to be very 'usable' and continues to be our standard editing package.

Finally we would like to point out that UniFLEX would not be currently possible if it were not for Motorola, the great people who made the 6809 possible, and for Southwest Technical Products, who first determined that 16 address lines were just not enough!