UniFLEX™
Operating
System

technical systems
consultants, inc.

Documentation Changes for Release 12 of UniFLEX®
Technical Systems Consultants, Inc.
August 1, 1985

This package of documentation contains the changes necessary to bring
the manual for your UniFLEX Operating System up-to-date. Replace the
existing documentation for the "devcheck" command with the attached
document, and add the documentation for the "crt_termcap" command to the
manual.

Documentation Changes for X.11 Releases of UniFLEX®
Technical Systems Consultants, Inc.
December 3, 1984

This package of documentation contains the changes necessary to bring
the manual for your UniFLEX Operating System up-to-date. Replace the
existing documentation for the "diskrepair" and "ttyset" commands with
the attached documents, and add the documentation for the "badblocks"
command to the manual.

Please note the following limitations:

1. The "badblocks" command does not work with a CDS hard
   disk because the program that formats the CDS does not
   create a bad-blocks file. For information on how to
   handle bad blocks on a CDS disk, contact Southwest
   Technical Products.
2. The new capabilities of the "ttyset" command are only
   functional with certain kinds of hardware. Most systems
   allow you to adjust data bits, stop bits, and parity.
   Some systems allow you to adjust the baud rate as well.
   However, UOS-S04 and UOS-S12-5+ systems do not currently
   support the adjustment of any of these parameters.

   If you own a system from Pennywise Peripherals, consult
   the manual supplied by the manufacturer for information
   on adjusting the configuration of the terminals.

Documentation Changes for Release 13 of UniFLEX®
Technical Systems Consultants, Inc.
May 15, 1986

This package of documentation contains the changes necessary to bring
the manual for your UniFLEX Operating System up-to-date. Add the
documentation for the "kermit" and "tune" commands to the documentation
for the UniFLEX Utility Commands.

Documentation Changes for Releases 3.13, 4.13, and 5.13 of UniFLEX®
Technical Systems Consultants, Inc.
May 15, 1986

This package of documentation contains the changes necessary to bring
the manual for an S3, S4, or S5 system up-to-date. Replace the existing
documentation for the "formatfd" command with the attached document.

Documentation Changes for X.11 Releases of UniFLEX®
Technical Systems Consultants, Inc.
December 3, 1984

This package of documentation contains the changes necessary to bring the manual for your UniFLEX Operating System up-to-date. Replace the existing documentation for the "diskrepair" and "ttyset" commands with the attached documents, and add the documentation for the "badblocks" command to the manual.

Please note the following limitations:

1. The "badblocks" command does not work with a CDS hard disk because the program that formats the CDS does not create a bad-blocks file. For information on how to handle bad blocks on a CDS disk, contact Southwest Technical Products.

2. The new capabilities of the "ttyset" command are only functional with certain kinds of hardware. Most systems allow you to adjust data bits, stop bits, and parity. Some systems allow you to adjust the baud rate as well. However, UOS-S04 and UOS-S12-5+ systems do not currently support the adjustment of any of these parameters.

    If you own a system from Pennywise Peripherals, consult the manual supplied by the manufacturer for information on adjusting the configuration of the terminals.

Documentation Changes for X.10 Releases of UniFLEX™
Technical Systems Consultants, Inc.
April 27, 1984

This package of documentation contains the changes necessary to bring your UniFLEX manual up-to-date. The attached sheets are all either revised or additional documentation for the "UniFLEX Utility Commands" and "Introduction to UniFLEX System Calls" portions of the UniFLEX manual. Discard all existing documentation relating to the included commands and system calls, and replace them by the enclosed documents.

XON/XOFF

In previous releases output to terminals could be stopped and started only with the "escape" key. The X.10 versions of UniFLEX support XON/XOFF protocol for starting and stopping output both to terminals and to serial printers. The XON/XOFF feature prevents UniFLEX from overdriving terminals or printers which support this protocol.

By default, UniFLEX brings the terminals up with XON/XOFF disabled. You must specifically enable XON/XOFF by using the new version of the "ttyset" command. It is possible to have both "escape" and XON/XOFF processing enabled. A related feature is the "any" argument to the "ttyset" command. When the "any" feature is enabled, typing any character restarts output which has been stopped by an "escape" or XOFF.

MODIFICATIONS TO DMF-3 CONTROLLER BOARD

SWTPc versions of UniFLEX which utilize the DMF-3 disk controller (version UOS-S03, or 3.10, and version UOS-S04, or 4.10) require some special consideration for this update.

A. You must upgrade the DMF-3 controller board in order to use this release of UniFLEX. The procedure for upgrading the DMF-3 board is given in SWTPc Application Notice #176, which is attached to this document for your convenience. If you do not make this revision, the current version (3.10 or 4.10) cannot be properly booted. After you make the revision, you can boot the current version and all previous versions of UniFLEX. Do not attempt to upgrade to the new version of UniFLEX until the revision to the DMF-3 has been made. If you are not comfortable modifying your hardware, have your dealer do it for you. If, for some reason, you are unable to modify your DMF-3 immediately and you do not have sufficient backup copies of the previous release of UniFLEX to support you until the modification can be made, give us a call.

B. These versions now have built-in drivers for the SWTPc Archive tape unit. The drivers were supplied to us by SWTPc. We have incorporated them into UniFLEX, but we are not assuming responsibility for support of these drivers or the associated

hardware.   IF   YOU   HAVE ANY QUESTIONS ABOUT OR PROBLEMS WITH
THE   ARCHIVE   TAPE   DRIVERS,   CONTACT   SOUTHWEST   TECHNICAL
PRODUCTS. Technical Systems Consultants will refuse any calls
pertaining to the Archive tape unit. It should be noted that
the Archive drivers in version X.10 of UniFLEX require the
latest revision of Archive hardware.   Check with SWTPc to
determine the status of your hardware. Currently, no software
written by Technical Systems Consultants supports or works
with the Archive tape unit.

C. The addition of the archive drivers to these versions of
    UniFLEX caused the size of the UniFLEX task to exceed the
    space allotted to it. For this reason, the new version of
    UniFLEX   cannot simultaneously support all of the SWTPc
    hardware devices which can physically be interfaced to the
    computer.   To solve this problem, several copies of UniFLEX
    are included on the master disk. You should choose the one
    which best suits your hardware. The attached chart of UniFLEX
    configurations shows which versions support which devices (and
    which device is considered to be the root device in each
    version). Once you have selected the appropriate UniFLEX
    file, copy it to your system disk and install it.   Then delete
    any devices in the directory "/dev" which are not supported by
    the copy of UniFLEX you selected.

D. These versions can now treat two 40-megabyte Atasi
    mini-Winchester drives like a single 80-megabyte drive. To
    take advantage of this feature, you must do two things: make
    sure that the drives are jumpered as 0 and 1, and select the
    model name "AT-23046" in the "formatwd1000" command. Logical
    device "/dev/w0" now appears to be a single 80-megabyte
    device. (You can use a similar technique to combine any two
    similar Atasi drives.)

DISKREPAIR

It is apparent that many users do not understand the relationship between
the "diskrepair" utility and the "blockcheck" and "fdncheck" utilities.
"Diskrepair" is intended to replace "blockcheck" and "fdncheck". These
two utilities are still supplied with UniFLEX for compatibility and, more
importantly, because "diskrepair" calls both of them during its execution.
Thus, running "blockcheck" and "fdncheck" just before or after running
"diskrepair" is unnecessary.   Just use "diskrepair"--it performs all of
the checks that "blockcheck" and "fdncheck" do and, in addition, fixes any
problems it finds.

One slight change has been made to "diskrepair" to make it more consistent
with other software from Technical Systems Consultants. It now reports
block numbers in decimal, rather than hexadecimal.

SWTPC MODIFICATION - APPLICATION NOTICE

AN #176

Product: DMF-3
Date: 1/30/84 J.D., W.S.

Archive Modification on DMF-3 Controller Boards

The following modifications MUST be made to the Archive streaming tape circuitry of the DMF-3 controller board in order that future "logical" system backup software will function correctly. It will also be necessary to obtain the new releases of UniFLEX~ and the latest versions of the SWTPC "PDR physical system backup" software as they become available (contact SWTPC for information regarding software updates and version numbers). Present versions of the "PDR physical system backup" software will NOT function correctly once the following modifications have been made.

NOTE: These modifications have already been installed if the DMF-3 board is labeled as "REV D" or higher.

- ON the TOP component side of the board, cut the trace running to pin 19 of IC11 (a 6522A) right at pin 19. This cut is made very close to the IC11 IC socket.

- On the BOTTOM side of the board, attach and solder a short jumper wire from pin 18 of IC11 to pin 19 of IC11.

* - On the TOP side of the board, remove the patch wire connecting pin 16 of IC41 (a 74LS273) to pin 12 of IC33 (a 74LS00).

* - On the TOP side of the board, remove the patch wire connecting pin 19 of IC41 to pin 13 of IC33.

*, - On the TOP side of the board, remove the patch wire connecting pin 11 of IC33 to pin 12 of IC13 (a 74LS08).

- On the TOP side of the board, attach and solder an insulated jumper wire from pin 1 of IC35 (a 74LS74) to pin 9 of IC52 (a 74LS139).

- On the TOP side of the board, attach and solder an insulated jumper wire from pin 2 of IC35 to pin 7 of IC35.

- On the TOP side of the board, attach and solder an insulated jumper wire from pin 3 of IC35 to pin 13 of IC13.

- On the TOP side of the board, attach and solder an insulated jumper wire from pin 4 of IC35 to pin 10 of IC52.

- On the TOP side of the board, attach and solder an insulated jumper wire from pin 6 of IC35 to pin 12 of IC13.

- The DMF-3 board should now be labeled "REV D". This completes the modifications.

NOTE: Modification steps flagged with a * describe patches that were installed as part of SWTPC Modification-Application Notice AN #171.

These modifications should be performed only by competent technical personnel familiar with SWTPC equipment.

UniFLEX~ is a trademark of Technical Systems Consultants
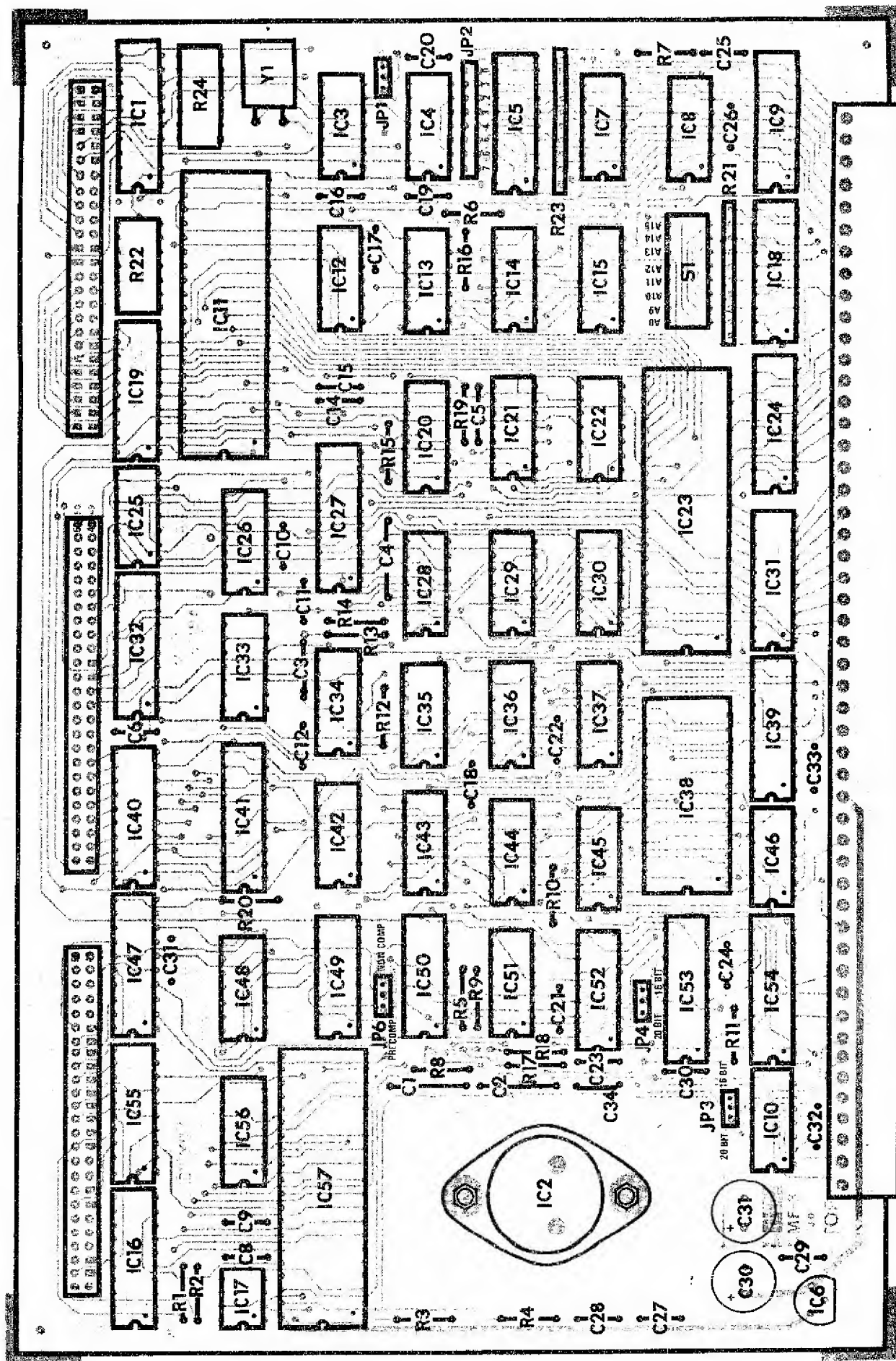
TABLE of SWTPc UniFLEX™ VERSIONS and SUPPORTED HARDWARE

The following table defines the currently supported versions of UniFLEX for SWTPc hardware. Across the top are the four versions which may be purchased. Each version has more than one copy of UniFLEX (as listed down the left side) which support a different set of devices. The "Root" refers to the device which will be used as the root and swapping device for the associated UniFLEX copy. In addition to those listed in the table, all versions of UniFLEX support parallel and serial printers.

Part No. : Version : For SWTPc:	UOS-S01 1.XX S/09	UOS-S02 2.XX S+	UOS-S03 3.XX S/09 w/ DMF3	UOS-S04 4.XX S+ w/ DMF3
uniflex or uniflex-8"	Root=DMF2 CPU =MP09 Disk=DMF2,CDS Misc=MPS2,NEC	Root=DMF2 CPU =MPU1 Disk=DMF2,CDS Misc=MPS2,NEC	Root=DMF3 CPU =MP09 Disk=DMF3,WIN,CDS Misc=MPS2,AT	Root=DMF3 CPU =MPU1 Disk=DMF3,WIN,CDS Misc=MPS4,AT
uniflex1 or uniflex-CDS	Root=CDS CPU =MP09 Disk=DMF2,CDS Misc=MPS2,NEC	Root=CDS CPU =MPU1 Disk=DMF2,CDS Misc=MPS2,NEC	Root=CDS CPU =MP09 Disk=DMF3,CDS Misc=MPS2,NEC,AT	Root=CDS CPU =MPU1 Disk=DMF3,CDS Misc=MPS4,NEC,AT
uniflex2 or uniflex-5"W	N/A	N/A	Root=WIN CPU =MP09 Disk=DMF3,WIN Misc=MPS2,NEC,AT	Root=WIN CPU =MPU1 Disk=DMF3,WIN Misc=MPS4,NEC,AT
uniflex3	N/A	N/A	Root=DMF3 CPU =MP09 Disk=DMF3,WIN Misc=MPS2,NEC,AT	Root=DMF3 CPU =MPU1 Disk=DMF3,WIN Misc=MPS4,NEC,AT
uniflex4	N/A	N/A	Root=CDS CPU =MP09 Disk=DMF3,WIN,CDS Misc=MPS2,AT	Root=CDS CPU =MPU1 Disk=DMF3,WIN,CDS Misc=MPS4,AT
uniflex5	N/A	N/A	Root=WIN CPU =MP09 Disk=DMF3,WIN,CDS Misc=MPS2,AT	Root=WIN CPU =MPU1 Disk=DMF3,WIN,CDS Misc=MPS4,AT

Key to Device Names:

MP09, MPU1 - S/09 & S+ 6809 CPU boards   MPS2, MPS4 - 2 and 4 port serial cards
DMF2, DMF3 - 8" floppy disk units   NEC   - NEC Spinwriter printer
WIN   - Mini-Winchester disk   AT   - Archive Tape drive
CDS   - CDS 14" hard disk

UniFLEX™ HARDWARE SETUP INSTRUCTIONS

For SWTPc S/09 and SWTPc S+ Versions

October 4, 1982

Important Note A

The standard version of UniFLEX for the SWTPc is setup to perform 3 millisecond track seek operations on 8" floppy disk drives. This is compatible with Qume and Remex drives. If your disk drives use slower seek rates, such as Calcomp drives, you will require a special version of UniFLEX. If you do have slower floppy disk drives and the supplied UniFLEX disk packet does not specifically state a seek rate (ie. "6ms seek"), you should return it unopened for a version with slower seek commands.

Important Note B

If questions arise as to whether the particular revisions of hardware you own are compatible with UniFLEX or whether modifications will be required, you should directly contact the hardware manufacturer. They should be able to inform you of compatibility and provide you with modification instructions if required. Their address is:

Southwest Technical Products Corp.
219 West Rhapsody
San Antonio, TX 78216
USA
Phone: (512) 344-0241

I. HARDWARE REQUIREMENTS

The standard version of UniFLEX for SWTPc's S/09 or S+ computer as supplied on the distribution disk requires the following hardware <u>at minimum</u>:

1) S/09 or S+ computer mainframe
2) 6809 cpu card (MP-09B for S/09 or MPU-1 for S+)
3) UniBUG ROM monitor for S/09 or UniBUG II for S+
4) 128K of RAM (ie. one 128K card or two 64K cards)
5) 8" Floppy Disk System (DMF-2 or DMF-3) with at least 1 drive
6) One serial interface card
7) One CRT terminal with lower-case capability

The following optional hardware is also supported:

1) Additional RAM
2) Additional serial interface cards and terminals
3) A serial or parallel interfaced printer (or both)
4) A NEC Spinwriter daisywheel printer from SWTPc
5) SWTPc's CDS-1 or CDS-2 hard disk system
6) SWTPc's DMF-3 Mini Winchester Hard Disk

Details of requirements for this hardware and proper setup of each component follows.

II. SPECIFIC COMPONENT REQUIREMENTS AND JUMPER SETTINGS

In the following descriptions, mention is made of dip switch settings
for various boards. All settings are referred to as "on" or "off" which
corresponds to "closed" or "open" circuits. If no jumper setting is
specified for a particular jumper on a board, it should be assumed that
that jumper setting may be selected by the user without affecting the
operation of UniFLEX. An example is baud rate jumpers.

A) 6809 CPU Card

For the S/09 system, the cpu card must be SWTPc's MP-09B model or
later. The SBUG-E monitor ROM must be replaced with a UniBUG ROM.

Jumper	Correct Setting
2S / 3S	3S
110 / BR	BR
BA / BA&BS	BA

The S+ system uses the MPU-1 cpu card which has no jumper settings
relevant to UniFLEX. The UniBUG II ROM is required.

B) MP-ID Card in the Mainframe

The standard SWTPc computer includes an MP-ID card as part of its
mainframe. This card is required by UniFLEX and should be setup
as follows.

Jumper	Correct Setting
NOR / SLOW PER	NOR (except with MP-S4 use SLOW)
56-64 / 48-56	56-64
0-7 select	#0 for S/09, #5 for S+
X1 / X8	X1
EX / INT	INT
PIA IN / PIA OUT	PIA OUT

C) RAM Memory

The system should contain at least 128K of RAM. 4K of this RAM
must be physically addressed at location $00000. The remaining
RAM may be physically addressed to any locations except the upper
8K of each 64K section (of course no memory should overlap).

SWTPc 128K RAM Memory Cards:
If using SWTPc's 128K RAM memory cards, the first 128K card
installed in the system should have the following switch settings.

Dip Switch Number	Correct Setting
1	off
2	off
3	on
4	off
5	off
6	on
7	off

The second 128K RAM memory card installed in the system should
have the following switch settings.

Dip Switch Number	Correct Setting
1	off
2	on
3	off
4	off
5	on
6	off
7	off

D) DMF-2 Disk Controller Board

If using the DMF-2, the controller board must be "Revision A" or
later. Necessary modifications to implement revision A are
available from SWTPc.

Jumper	Correct Setting
HALT / BUS REQ	BUS REQ
UPPER / LOWER	LOWER
BA / BA&BS	BA&BS
IRQ / NORM	IRQ
56K / 32K	56K
MR / NORM	MR
NORM / PRECOMP	PRECOMP
DESEL / SEL	SEL
0-7 select	position #4

E) DMF-3 Disk/Tape Controller Board

The DMF-3 controller board should have the jumper settings shown
below. There are two "20/16" jumpers, and both should be set to
"20".

Jumper	Correct Setting
20 / 16	20
PRECOMP / NON	PRECOMP
5 / 8	8

The dip switch should be configured as follows:

Dip Switch Number	Correct Setting
1 (A8)	on
2 (A9)	on
3 (A10)	on
4 (A11)	on
5 (A12)	off
6 (A13)	off
7 (A14)	off
8 (A15)	off

F) Floppy Disk Drive Units

The floppy disk drive units attached to the controller board are assumed to be capable of 3 millisecond track seek operations. Qume and Remex drives are capable of 3 ms seeks and are directly compatible with the standard version of UniFLEX. If you have Calcomp drives in your system (which are only capable of 6 ms seeks), you will have to have a version of UniFLEX that has been assembled for these slower seeks. If your distribution UniFLEX disk is not marked as being a 6ms version, you should return it to Technical Systems Consultants, Inc, for a 6ms copy.

G) Serial Interface Card(s)

Depending on the version of UniFLEX you have, your system will support either the SWTPc MP-S2 2-port serial cards or the MP-S4 4-port serial cards, but not both. At least one card is required and must be installed in I/O slot #0 (first ACIA addressed at $E000) for the system manager's booting terminal. Additional cards (optional) should be placed in consecutive slots through slot #5 for MP-S2's or slot #4 for MP-S4's. Since each MP-S2 has 2 serial interfaces, this implies a maximum of 12 user terminals in this configuration of UniFLEX. With MP-S4 cards, up to 18 terminals can be supported. Slot #6 has been reserved for the NEC Spinwriter interface. If using MP-S2 interfaces, two serial printers for print spooling may be established by inserting an MP-S2 in I/O slot #7 (ACIA's addressed at $E070 and $E074). If using MP-S4 interfaces, the two printers should be connected to the third and fourth ports on the card in I/O slot #4.

H) Terminal(s)

UniFLEX can support up to 12 user terminals with MP-S2 interfaces and up to 18 with MP-S4 interfaces. The only required terminal is the one used by the system manager to boot UniFLEX and must be a CRT device with lower-case capability. All other terminals can be just about anything but should preferably have lower-case capability. ALL TERMINALS SHOULD BE RUN AT RATES OF 1200 BAUD OR LESS! The importance of this rule must not be overlooked. Running a terminal at 9600 baud in a system such as this, where every character which is input or output causes an interrupt requiring service by the main cpu, creates extreme overhead and greatly reduces the system's efficiency in performing normal processing and disk I/O. This is not a limitation of the operating system, but rather a limitation of the hardware which could only be overcome by some sort of I/O preprocessor. To drive this fact home, consider that one terminal running at 9600 baud creates the same system loading as eight terminals running at 1200 baud. If you don't believe it, try it! Remember, for the best operation of the system overall, keep the terminal speeds as low as possible.

I) Printers   (Optional)

The standard version of UniFLEX contains device driver routines for one parallel, two serial, and one NEC Spinwriter printers.

The serial printer drivers expect the printers to be connected to
an MP-S2 serial interface card in I/O slot #7 (ACIA's addressed at
$E070 and $E074) or to the third and fourth ports of an MP-S4
serial interface in I/O slot #4.   The parallel printer driver
expects the printer to be connected to the standard parallel port
supplied on the MP-ID card in the S/09 or S+ system. The NEC
Spinwriter is connected to the system via an MP-QP interface card
inserted in slot #6.   Any or all of these printers may be
optionally included in your system hardware.

J) CDS-1 or CDS-2 Hard Disk System   (Optional)

The standard version of UniFLEX for SWTPc includes provisions for
mounting the SWTPc CDS-1 or CDS-2 hard disk into the system. If
you do include the CDS in your system, be certain that you have
installed   a   new   UniFLEX compatible controller ROM on the
controller board found inside the drive cabinet itself. This ROM
is available directly from SWTPc. You may also need to obtain a
hard disk format routine from SWTPc.   The HD controller board
which plugs into the computer should be configured as follows.

Jumper	Correct Setting
HALT / BUS REQ	HALT
BS 00 / BS 09	BS 09
IRQ / FIRQ	IRQ

Dip Switch Number	Correct Setting
1	off
2	on
3	on
4	on
5-8	all off

III. HARDWARE LIMITATIONS

There are certain limitations or characteristics of the system which are
hardware imposed. Some of these points are brought out in other
documents, but are emphasized here so that the novice to UniFLEX will
not expect things which are not feasible due to hardware.

A) System Protection

In the S/09 there is no hardware distinction between a user state
and a system state. This means that the memory mapping registers
are always accessible, even to the user. It is therefore possible
for a user to write into the memory area where those mapping
registers are located (the upper 256 bytes of the 64K address
space) and thereby have access to any memory in the system. The
implications are that a user could read or write any of the RAM in
the system and could very easily wipe out the entire system.
There is simply no way around this lack of protection with the
existing S/09 CPU card.

The S+ system gets around this problem. It is fully protected and no user task should be able to do anything which will crash the system.

B) Swapping on Floppy Disks

UniFLEX permits swapping on any block device with appropriate drivers and formatting routine. In the supplied versions, this implies swapping on either a hard disk or 8" floppy.   Swapping works quite well on the hard disk, but is not at all efficient on floppy disks. They are simply not fast enough for efficient swapping.   It is permitted, however, and does work. In certain environments it may be suitable, and it is certainly better than no swapping at all! Alternatives are to add a hard disk or up the amount of memory in the system such that less swapping is required.

C) Number of Users

There are few real limitations in the UniFLEX software as to the number of users which can be on-line. The main limitation is the speed of the 6809 processor itself. This is not to imply that the 6809 is a slow or inefficient processor, indeed we feel it is the best 8 bit processor on the market. It is just that there is a limit to what an 8 bit microcomputer can do. We have found that many people expect to be able to efficiently run as many as 32 users under UniFLEX when that is really not practical for the 6809 or any 8 bit microprocessor. Many of today's minicomputers do not even support that many users!

We have imposed a limit of 12 users with MP-S2 serial interfaces and 18 users with MP-S4 interfaces. This is essentially all that the motherboard will support and we feel is a typical limit for a useable implementation of UniFLEX. Of course it really depends on what each user is doing, what resources are in the system, and what kind of response times you require.   Certain environments where processor loading is small and where response times are not critical, such as educational or word processing systems, may permit even more users.

It has been our experience that if more than 2 or 3 users are running large tasks which make heavy demands on the system, a minimal configuration is not sufficient. Under these conditions, it is highly recommended that the system include at least 256K of RAM and a hard disk for swapping.

D) Terminal Speeds

As previously pointed out, fast terminal baud rates are murder on the system's efficiency.   The S/09 and currently the S+ do not have I/O preprocessing (we know of no microprocessor based systems that currently do have) which implies that every character which is input or output to a terminal causes an interrupt which requires the user to be mapped out, the operating system mapped in, the character input or output performed, the operating system mapped back out, and the user mapped back in. You can see that

this is a tremendous imposition on the cpu. If several fast
terminals are in use, the cpu will spend most of its time
processing terminal I/O and seldom have a chance to perform actual
processing or disk I/O. By slowing down the terminals you smooth
out the rate of interrupts to the system instead of having bursts
of constant interrupts. This makes output look much smoother and
gives the processor a chance to put in a little time on other ·
tasks. Again, keep the terminal speeds at 1200 baud or lower.

IV. SUPPLIED UniFLEX CONFIGURATIONS

There are either two or three versions of UniFLEX supplied on the
distribution diskette. They each contain a different configuration of
the operating system. Before we get into the specifics of these
versions and how to employ them, we must define the various devices
which can be connected to the system and the software drivers for these
devices. All serial and parallel I/O devices are shown based at address
$E000. These are true addresses for the S/09 version, but the S+
version I/O is based at $E400. Thus for the S+ version you must add
$0400 to each address shown to obtain the actual hardware address.

A) UniFLEX Device Drivers

Under UniFLEX, each external I/O device is driven by a set of
software routines called the "device drivers". The device driver
for each I/O device or unit has a unique name given to it.
Actually, these device drivers are treated much like files and are
given names like any file. You can observe them in the directory
"/dev". A list of device drivers supplied in the standard
versions of UniFLEX is given here.

Device Name	Device Description
fd0	8" floppy disk drive #0
fd1	8" floppy disk drive #1
hd0	CDS-1 or CDS-2 hard disk unit
w0	DMF-3 Mini Winchester hard disk
tty00	Serial terminal at $E000
tty01	Second serial terminal
tty02	Third serial terminal
tty03	Fourth serial terminal
.	.
.	.
.	.
ttyXX	Last terminal (XX=11 w/ MP-S2; XX=17 w/ MP-S4)
spr	First serial printer
spr2	Second serial printer
nec	NEC Spinwriter on I/O slot #6
ppr	Parallel printer on MP-ID card

If using MP-S2 serial interfaces, the terminal device drivers
tty00, tty01, tty02, ..., tty11 are for terminals connected to
ACIA's in MP-S2 cards in slots #0-A, #0-B, #1-A, ..., #5-B. If
using MP-S4 interfaces, the first four terminals should be
connected to an MP-S4 in I/O slot #0, the next four in slot #1,
etc. The first terminal (tty00) is the system manager's terminal
and is the one used for booting and while in "single-user mode".
The serial printer drivers (spr and spr2) are for normal serial
printers connected to an MP-S2 serial interface card in I/O slot
#7 or to the last two ports of an MP-S4 in I/O slot #4. The NEC
Spinwriter drivers (nec) are for a Spinwriter interfaced via a
SWTPc MP-QP parallel interface card in I/O slot #6. The parallel
printer driver (ppr) is for a parallel interfaced printer
connected to the PIA output found on the MP-ID card in the S/09
mainframe. The connector on that card is a DB-25 connector and
should be wired as follows.

Signal Description	DB-25 Pin Connection
8 data lines	14-21
STROBE (complemented)	from 22
BUSY (complemented)	into 23

B) Standard UniFLEX Configurations

As mentioned before, there are either two or three versions of
UniFLEX supplied on the distribution diskette. If your version
uses the DMF-2 floppy disk controller, there will be two versions,
one called 'uniflex' and the other 'uniflex1'. If it uses the
DMF-3 disk controller, there will be three versions, each with two
names in the directory (three files but six names). The first is
'uniflex' or 'uniflex8"', the second is 'uniflex1' or
'uniflex-CDS', and the the third is 'uniflex2' or 'uniflex-5"W'.
Each has a different configuration of the operating system. The
difference comes in what disk device will be used as the root
device (the root directory on this disk becomes the root directory
of the system) when you boot the operating system. The file
'uniflex' boots up with the 8" floppy disk drive #0 as the root
device, 'uniflex1' boots up with the CDS hard disk as the root,
and 'uniflex2' boots up with the DMF-3 Mini Winchester hard disk
as the root. These versions are shown in the following table.

	uniflex-8" or uniflex	uniflex-CDS or uniflex1	uniflex-5"W or uniflex2
root device:	fd0	hd0	w0
pipe device:	fd0	hd0	w0
swap device:	fd0	hd0	w0
console terminal:	tty00	tty00	tty00

Currently the user of UniFLEX can only operate under one of these
three setups. At some future time, there will be a configurable
version of UniFLEX which, along with the Configuration Guide, will
allow a user to add his own device drivers into the system and to
setup which devices are used for root, piping, swapping, etc.

Users who have purchased maintenance will automatically receive this version when available. If you have a special need at this time for a different configuration of UniFLEX, you should contact Technical Systems Consultants, Inc, about a custom version. It may also be possible to hire Technical Systems Consultants, Inc, to develop custom device drivers for certain hardware you wish to employ in your system.

The various configurations of UniFLEX supplied on the distribution disk are normal files. The bootstrap loader has been written to boot up the file named 'uniflex' which implies that you must at least initially boot the "floppy disk" configuration of UniFLEX. Once this has been done, several options are possible. If you have 8" floppies only, you will never need the other versions. If you have a hard disk, you will probably want to run with the hard disk as your root device (run the version called 'uniflex1' or 'uniflex2'). The exact procedure depends on whether or not you use a ROM with the capability of booting the hard disk directly. If you do have hard disk boot capability in your ROM, you will prepare your hard disk with either 'uniflex1' if the CDS or 'uniflex2' if the DMF-3 Mini Winchester copied to it but renamed to 'uniflex' and installed. You may then boot up UniFLEX from the hard disk by simply typing the appropriate command to your monitor. If your ROM does not have the hard disk boot, you will have to prepare a "hard disk boot floppy". This is a UniFLEX formatted disk with nothing but 'uniflex1' or 'uniflex2' copied to it but renamed to 'uniflex' and installed. Now, assuming your hard disk is properly prepared, you may boot the system by inserting the "hard disk boot floppy" in the appropriate drive and using the normal 8 inch floppy boot command in your monitor ROM.

APPENDIX A

TABLE of SWTPc UniFLEX™ VERSIONS and SUPPORTED HARDWARE
October 4, 1982

Part Number: For SWTPc: / Hardware:	UOS-S1 S/09	UOS-S2 S+	UOS-S3 S/09 w/ DMF3	UOS-S4 S+ w/ DMF3
MP-09B	X		X	
MPU-1		X		X
DMF-2	X	X		
DMF-3			X	X
CDS	X	X	X	X
MP-S2	X	X	X	
MP-S4				X
NEC	X	X	X	X
Root/Swap Device for file named:				
uniflex or uniflex-8"	DMF2	DMF2	DMF3	DMF3
uniflex1 or uniflex-CDS	CDS	CDS	CDS	CDS
uniflex2 or uniflex-5"W	N/A	N/A	DMF3 5" Wini	DMF3 5" Wini

IF YOU HAVE PROBLEMS...

If you encounter problems with any of our software products, there are several things you can do to help identify the problem before attempting to contact us.

1. Make sure that you really have a problem. Do you really understand how the program is supposed to work? Have you read the manual thoroughly? Make sure that what you see as a problem is not a documented characteristic of the program.

2. Check out your hardware. Many instances of the "program not working" are due to malfunctioning hardware. In particular, run several passes of your memory diagnostics on all areas of memory, including that portion in which the operating system resides.

   If you have trouble reading the diskette on which the program resides, make sure that your disk drive is in proper alignment; or try to read the disk on more than one drive. If you still can't read It, return it to us for replacement.

3. Try to find the smallest failing case. Try various combinations of statements or commands until you find the fewest that cause the failure to occur. The smaller the test case, the easier it is to track down the problem.

4. Make sure that the problem can be reproduced. Something that happens only once, is, for practical purposes, impossible to find. A failure that can be duplicated at will is easy to track down.

5. If the failing program produces a memory dump on the the file "core", send us a copy of that file.

6. If you find that you do have a legitimate problem or question, we will have to know a lot about your machine configuration. The back of this sheet is a questionnaire which must be completed in its entirety and submitted with your problem. Incomplete forms will be returned, unanswered. If you do not have a maintenance agreement with us for the product with which you are having trouble, you may still submit a problem report, but you might not receive an answer.

The only way to report a problem is through the mail. A telephone call may be quicker, but the person most capable of solving the problem may not be available when you call. A letter can be passed on to the proper expert. When writing, be sure to include as much information as possible, especially a sample failing case, if possible.

UNIFLEX PROBLEM REPORT

1. Model number and serial number of your machine. Include manufacturer's name.

2. Peripherals:

   Type   Port #   Manufacturer

3. Describe any modifications you have made to your hardware. Attach extra sheets if
   necessary.

4. Serial number and release date of the UniFLEX that you are running.

5. Name, serial number, and release date of product that caused the problem.

6. List all configuration changes you have made to UniFLEX, such as number of buffers.
   Attach extra sheets if necessary.

7. Describe, in detail, the problem you experience. Include examples which we can run
   that clearly demonstrate the problem. Attach extra sheets if necessary.

Send this completed sheet along   Your Name and Address:
with any support documentation to:

Problem Investigation Department
Technical Systems Consultants, Inc.
     111 Providence Road
Chapel Hill, North Carolina 27514
USA

This sheet should be used for comments and suggestions for improvements in UniFLEX software and documentation. It should not be used to report errors ("bugs") in a program. For that, use the "UniFLEX Problem Report". However, errors in documentation may be reported with this sheet.

Please indicate to what this suggestion refers.

( ) Suggestion for a new program
( ) Documentation Error/Enhancement/Change
( ) Existing Program Enhancement/Change

What program or manual is this concerned with?

Write your suggestion or comment here. Use extra sheets if necessary. Thank you.

Send this sheet to: Your Name and Address:

Suggestion Department
Technical Systems Consultants, Inc.
    111 Providence Road
Chapel Hill, North Carolina 27514
USA