TEK MICROCOMPUTER DEVELOPMENT PRODUCTS DIVISION

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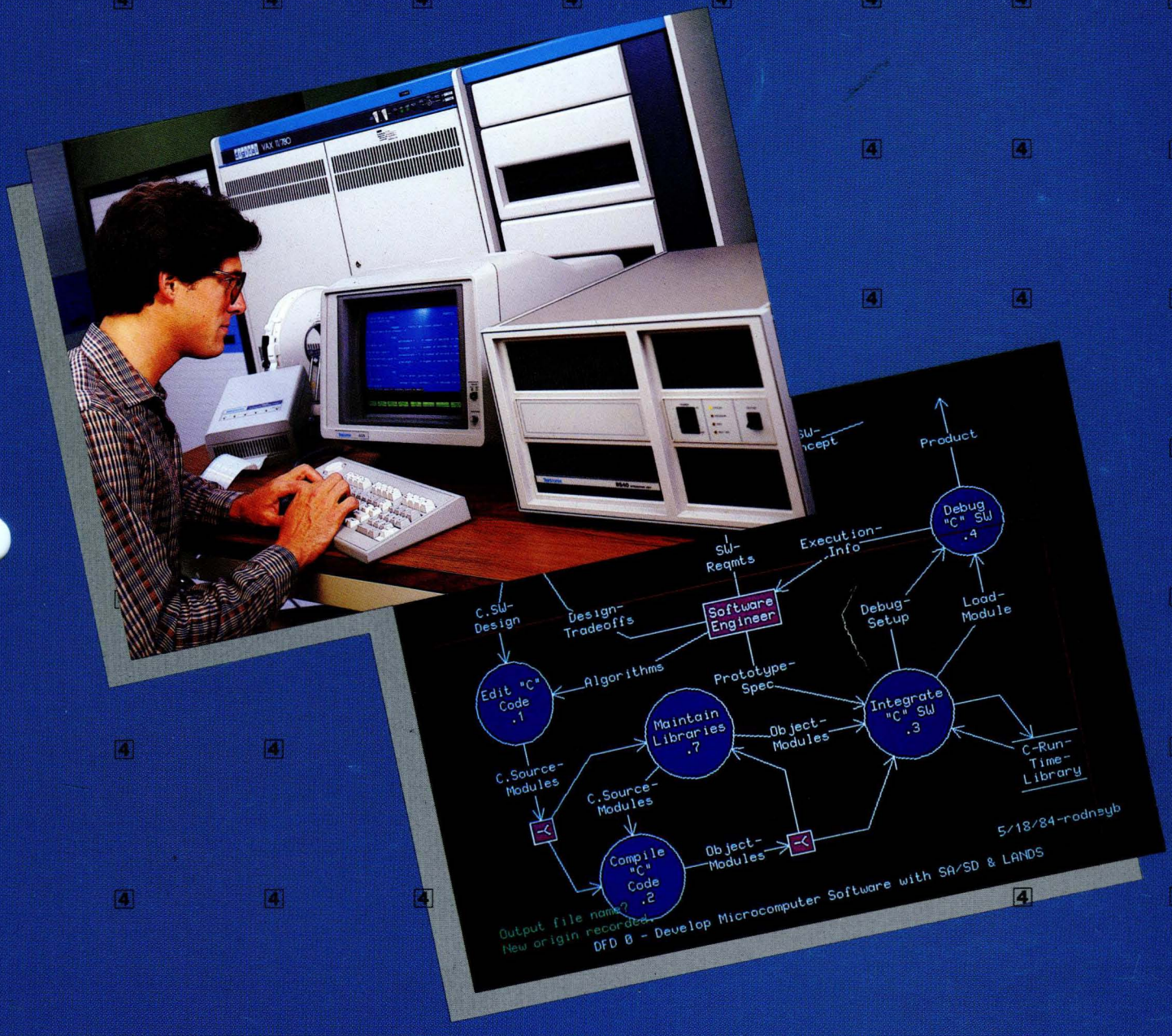
USER GROUP NEWS



DESIGN AUTOMATION GROUP

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FOREWARD

SYSTEMS UPGRADE SECTION

This issue of "USER GROUP NEWS" contains a special "Systems Upgrade" Section. Inside you will find descriptions of many software and hardware upgrades available to MDP customers. This section is intended to be used as a handy reference for all our MDP upgrades.

Both software and hardware options are offered for the Tek 8500 Series, and recent price adjustments have made many of these option even more attractive.

The advantages of using a "universal" development system, as oppposed to using a "dedicated" development system are well documented. Owners of Tektronix' Software Development Tools enjoy a broad spectrum of modestly-priced system upgrade uptions.

In many cases, a modest investment spent to enhance an existing system can mean the difference between a frustrated design team that finishes a project late, and a contented design team that proudly delivers a product on time, and on budget.

If you wish to order or if you have further questions, just contact your Tektronix MDP sales representative for more information.

ABOUT THE "USER GROUP LIBRARY SECTION"

Programs reported in the User Group Library will be available through your Tektronix Applications Engineer. When updates are available, they will be reported in each issue and a separate total listing will be produced annually.

REGISTERED TRADEMARKS

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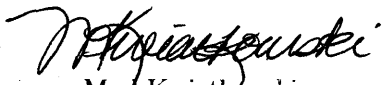
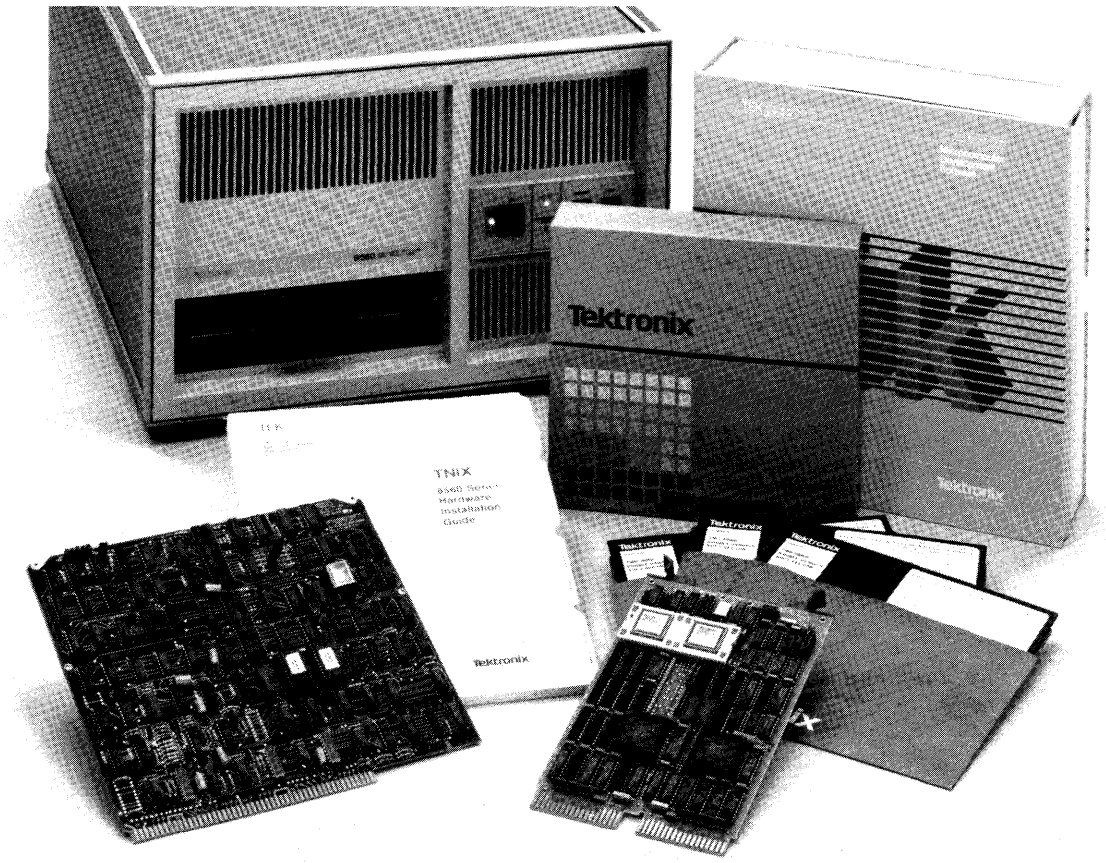


Myra Kwiatkowski

Editor

SYSTEMS UPGRADE SECTION



ENHANCEMENTS TO THE 8560

ENHANCEMENTS TO THE 8560

To increase your development teams productivity and make those project deadlines just a little easier, consider several of the performance upgrades available for the Tektronix 8560 Series Multiuser Software Development Systems (MSDS).

High CPU Performance

- o Option 8560F10 LSI-11/73 CPU -- S/N > B099999
- o Option 8560F11 LSI-11/73 CPU -- S/N < B100000

The 8560 or 8561 MSDS can now be upgraded to include Digital Equipment's high performance microprocessor, the MICRO/J11. This microprocessor has the compute power of an PDP-11/70 and will increase performance in the 8560's by at least a factor of 2. Some stand-alone processes improve by a factor of 4. There are also advantages in going to the J11 besides just compute power. This upgrade faciltates code development for users who are generating large amounts of code. Link time is reduced substantially because processes will no longer be limited to a common 64K memory space for both data and instructions. The MICRO/J11 allocates 64K RAM space for instructions and 64K RAM space for data.

Adding More Users To Your System

- o 8560 Port Upgrade -- Option 8560F03 Total of 8 Ports
- o 8561 Port Upgrade -- Option 8560F08 Total of 4 Ports

This upgrade is straight forward. It's an easy way to improve overall design productivity. As your product development task leads to the integration phase you may want to add ports for those additional 8540 Integration Units that may be needed.

Additional ports allow you to add remote access via a modem or for communications from other hosts to your 8560. Also, you may want to consider adding users -- software evaluation engineers, marketing people, and technical writers to your 8560.

Why? If they're part of your development team and you want higher productivity you can utilize the software tools that are available for the 8560s to facilitate evaluation work. You can develop your product planning documents, engineering specifications, and manuals using the text processing tools available for the 8560 . You can use the mail facility to communicate the status of the various projects groups. TNIX allows you a centralized development environment for all phases of the design project.

Additional Primary Memory

- o Option 8560F05 -- 256k byte Additional Memory
- o Option 8560F06 -- 512k byte Additional Memory

If you have a heavily loaded system and want to improve the overall system efficiency consider the addition of more primary memory to your 8560 system. Since all processes run in primary memory (RAM), performance is affected by the number of processes running. If the number of processes running exceeds the available primary memory, processes are temporarily placed in the swap area of the

hard disk. A swapper routine, executed by the operating system, handles the scheduling of process swapping between memory and the hard disk. By adding more memory you will reduce the incidence of swapping and increase system performance.

Additional Secondary Storage

o Option 8560F09 -- 40M Byte Addtl Hard Disk -- S/N > B099999

o 8503 Expan. Disk -- 35M Byte Addtl Hard Disk -- S/N < B100000

System performance will start to degrade as the file system approaches about 80 percent of the hard disk capacity. The system will have to spend more time searching for free blocks over discontiguous memory on the hard disk. You can get an idea of your hard disk utilization by executing the command 'df'. The value returned is the number of free blocks left on your hard disk. Each block represents 512 bytes. With a file system that has a 2M byte swap space, and you have less than 13,000 blocks for a 35M byte hard disk or 14,800 blocks for the 40M byte hard disk, you are approaching the 80 per cent figure. You may want to consider cleaning some of the files off the disk or the addition of a second hard disk.

GPIB Interface Back-Up Facilities

o Option 8560F04 -- GPIB Interface

This interface is a special purpose IEEE 488 interface intended for 9-track magnetic tape back-up for the 8560 Series Hard Disk. For further information for your particular application, contact your local Tektronix office.

Combined Options

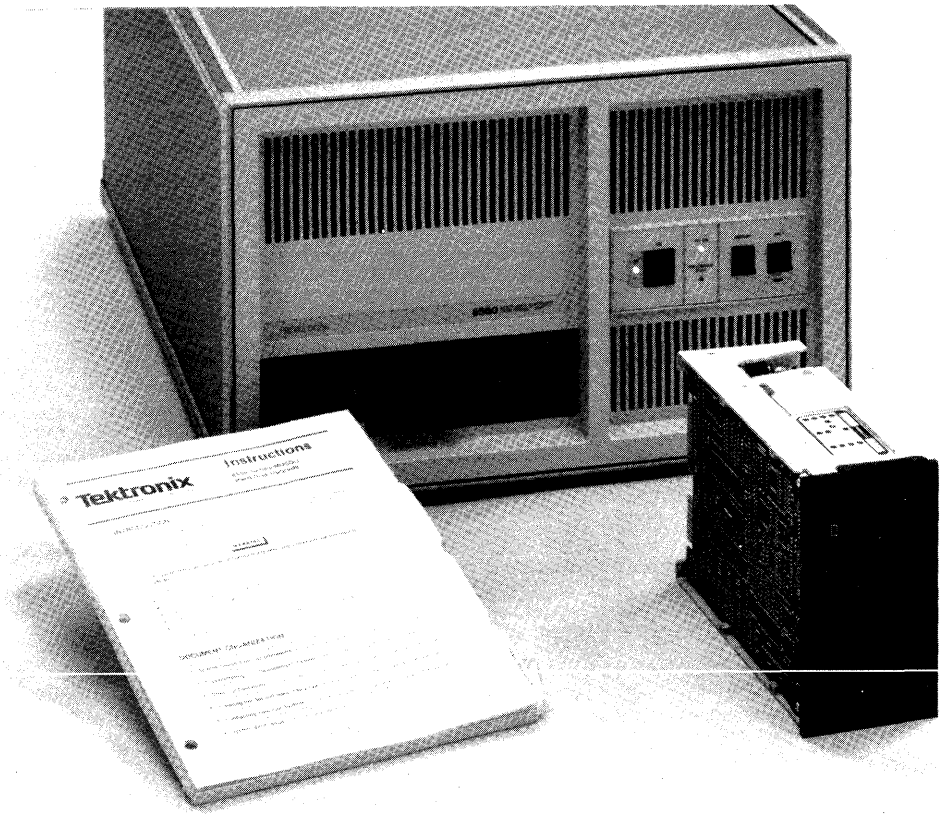
o Option 8561F08 -- Combined 35M byte Hard Disk and 4 Port Upgrade

o Option 8561F09 -- Combined 35M byte Hard Disk and 8 Port Upgrade.

These options upgrade the Tektronix 8561 Multiuser Software Development Unit. These upgrades will increase the Hard Disk capacity and the number of system ports.

Summary

Tektronix' local field support can help with any questions on the above listed upgrades. They also provide Application Engineering support, if desired. Contact your local field office for more information.



40M Byte Hard Disk (Option 8560F09)

Joe Morabito Application Engineer

AUXILIARY SOFTWARE PACKAGE FOR THE 8560

Tektronix provides several optional class C software packages to further enhance the TNIX operating system. These tools are invaluable to those who want to gain the full power of a UNIX-based environment.

Option 8560U03 Auxiliary Utilities Package

The Auxiliary Utilities Package is a set of commands that are quite useful for doing general software development work on the 8560. The following article describes the tools included in the Auxiliary Package.

1. Time/Productivity Management

- at -- execute commands at a later time

  At creates a copy of the named file to be used as input to sh at a later specified time. This usually is a script to handle some things that can be done at night. These would include backups, mail transfers, long compiles or assemblies, or line printing. It improves your productivity by having a system that you can literally use 24 hours a day.

- cal -- print calendar

  Cal prints a calendar for a specified year. If a month is specified, a calendar just for that month is printed.

- calendar -- reminder service

  Calendar consults the file 'calendar' in the current directory, and prints out lines that contain today's or tomorrow's date anywhere in the line. When an argument is present, calendar does it's job for every user who has a file 'calendar' in his login directory, and sends him any positive results by mail. Normally, this is done each night under the control of cron.

2. File or Text Manipulation

- awk -- pattern scanning and processing

  Awk scans each input file for lines that match any of a set of patterns specified. With each pattern there can be an associated action that will be performed, when a line of a file matches the pattern. The set of patterns may appear literally or in a file. This is used to manipulate data, and/or perform specific editing functions including routing of information to multiple files, database manipulations or extractions.

- rev -- reverse lines of a file

  Rev copies the named files to the standard output, reversing the order of characters in every line. If no file is specified, the standard input is copied.

- sed -- stream editor

  Sed copies the named files (standard input default) to the standard output, with the output edited according to specified parameters. Sed performs most of the functions of ed, and contains conditional edit program controls.

- split -- split a file into pieces

  Split reads a file, and then writes it in pieces, as many as necessary, onto a set of output files.

- diff3 -- 3-way differential file comparison

  Diff3 compares three versions of a file, and publishes disagreeing ranges of text.

- file -- determine file type

  File performs a series of tests on each argument in an attempt to classify it. If an argument appears to be ascii, file examines the first 512 bytes and tries to guess its language.

- sum -- sum and count blocks in a file

  Sum calculates and prints a 16-bit checksum for the named file, and also prints the number of blocks in the file. It is typically used to look for bad blocks or to validate a file communicated

over some transmission line.

- basename -- strip filename prefixes and suffixes from a string

  Basename deletes any prefix ending in "/", and the suffix if present in string from string, and prints the result on the standard output.

- tsort -- topological sort

  Tsort produces on the standard output, a totally ordered list of items, consistent with a partial ordering of items mentioned in the input file. If no file is specified, the standard input is understood. This is useful in generating ordered libraries for single pass linking.

- prep -- prepare text for statistical processing

  Prep reads each file in sequence, and writes it on the standard output, one 'word' to a line. A word is a string of alphabetic characters, and embedded apostrophes delimited by space or punctuation. Hyphenated words are broken apart; hyphens at the end of lines are removed, and the hyphenated parts are joined. Strings of digits are discarded.

- bc -- arbitrary-precision arithmetic language

  Bc is an interactive processor for a language which resembles C, but provides variable precision arithmetic.

- crypt -- encode/decode

  Crypt encrypts/decrypts files to prevent unwanted access. The password is a key that selects a particular transformation. If no password is given, crypt demands a key from the terminal and turns off printing while the key is being typed in.

- join -- relational database operator

  Join forms, on the standard output, a join of the two relations specified by the lines of file1 and file2.

- m4 -- macro processor

  M4 is a macro processor intended as a front end for Ratfor, C, and other languages.

- tar -- tape archiver
- dd -- convert and copy a file

3. Mathematical SW Tools

- units -- conversion program

  Units converts quantities expressed in various standard scales to their equivalents in other scales.

- dc -- desk calculator

  Dc is an arbitrary precision arithmetic package. Ordinarily it operates on decimal integers, but one may specify an input base, output base, and a number of fractional digits to be maintained. The overall structure of dc is a stacking (reverse Polish) calculator.

  Additional math software tools include:

- factor -- factor a number, generate large primes
- plot -- graphics filters

- spline -- interpolate smooth curve
- primes -- factor a number
- graph -- draw a graph

4. Secret Mail

- xsend -- Send secret mail
- xget -- Receive secret mail
- enroll -- enables user for secret mail

These commands implement a secure communication channel. It is like mail, but no one can read the messages except the intended recipient. A message announcing the receipt of secret mail is also sent by ordinary mail.

Joe Morabito Application Engineer

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NATIVE SOFTWARE PACKAGE FOR THE 8560

Tektronix provides several optional class C software packages to further enhance the TNIX operating system. These tools are invaluable to those who want to gain the full power of a UNIX-based environment.

OPTION 8560U02 Native Programming Package

The Native Programming Package is available for users who want to develop programs that run on the 8560. There are two processors available for the 8560; either the Digital Equipment PDP 11/23 or the PDP 11/73. The package includes programming languages to develop native code for both processors, and utilities to improve productivity.

- adb -- debugger

  Adb is a general purpose debugging program. It may be used to examine files and/or to provide a controlled environment for the execution of TNIX programs.

- ar -- archive and library maintainer

  Ar maintains groups of files combined into a single archive file. Its main use is to create and update library files as used by the loader. It can be used though for any similar purpose.

- arcv -- convert archives to new format

  Arcv converts archive files (see ar) from 6th edition to 7th edition format. The conversion is done in place, and the command refuses to alter a file not in old archive format.

- as -- assembler

  As is the TNIX assembler.

Native Programming Package (Option 8560U02)

- bas -- basic

  Bas is an interpeter, a dialect of Basic.

- cb -- C program beautifier

  Cb places a copy of the C program, from the standard input on the standard output, with spacing and indentation that displays the structure of the program.

- cc -- C compiler

  Cc is the TNIX C compiler.

- join -- relational database operator

  Join forms, on the standard output, a join of the two relations specified by the lines of file1 and file2.

- ld -- loader

  Ld combines several object programs into one, resolves external references, and searches

libraries. In the simplest case several object files are given, and ld combines them, producing an object module which can be either executed or become the input for a further ld run.

- lex -- generator of lexical analysis programs

  Lex generates programs to be used in simple lexical analysis of text. The input files contain regular expressions to be searched for, and actions written in C to be executed when expressions are found. A 'C' source program is generated to be compiled using cc.

- lint -- a C program verifier

  Lint attempts to detect features of the C program files which are likely to be bugs, or non-portable, or wasteful. It also checks the type usage of the program more strictly than the compilers. Among the things which are currently found are unreachable statements, loops not entered at the top, automatic variables declared and not used, and logical expressions whose value is constant. Moreover, the usage of functions is checked to find functions which return values in some places, and not in others, functions called with varying numbers of arguments, and functions whose values are not used.

- lorder -- find ordering relation for an object library

  The input is one or more object or library archive (see ar) files. The standard output is a list of pairs of object file names, meaning that the first file of the pair refers to external identifiers defined in the second.

- nm -- print name list

  Nm prints the name list (symbol table) of each object file in the argument list. If an argument is an archive, a listing for each object file in the archive will be produced. If no file is given, the symbols in a.out are listed.

- prof -- display profile data

  Prof interprets the file mon.out produced by the monitor sub-routine. Under default modes, the symbol table in the named object file is read, and correlated with the mon.out profile file. For each external symbol the percentage of time spent executing between that symbol and the next, is printed together with the number of times that routine was called, and the time per call.

- ranlib -- convert archives to random libraries

  Ranlib converts each archive to a form which can be loaded more rapidly by the loader, by adding a table of contents named __.SYMDEF to the beginning of the archive.

- sed -- stream editor

  Sed copies the named files to the standard output with the output edited according to specified parameters. Sed performs most of the functions of ed and contains conditional edit program controls.

- size -- size of an object file

  Size prints the number of bytes required by the text, data, and bss portions, and their sum of each object-file argument.

- strip -- remove symbols and relocation bits

  Strip removes the symbol table, and relocation bits ordinarily attached to the output of the assembler and loader. This is useful to save space after a program has been debugged.

- tsort -- topological sort

  Tsort produces on the standard output, a totally ordered list of items consistent with a partial ordering of items mentioned in the input file.

- yacc -- yet another compiler-compiler

  Yacc converts a context-free grammar into a set of tables for a simple automaton, which executes an LR parsing algorithm.

Joe Morabito Application Engineer

TEXT PROCESSING PACKAGE ENHANCES 8560 SERIES

Tektronix provides several optional class C software packages to further enhance the TNIX operating system. These tools are invaluable to those who want to gain the full power of a working UNIX-like environment.

Option 8560U01 ---- Text Processing Package

Virtually every phase of engineering depends on documentation. Engineers may spend up to half their time producing documents. Keeping documentation current is also a tedious task. The 8560's TNIX operating system provides text processing tools that make it easy for you to build -- and maintain -- reliable, well-formatted documentation. Product proposals, engineering design specifications, and technical reports become a lot easier to develop and maintain with the text processing package. The following list briefly describes programs that are contained in the text processing package.

troff, nroff	-- text formatting and typesetting
sed	-- stream editor
spell	-- find spelling errors
tbl	-- format tables for nroff or troff
ptx	-- permuted index
pubindex	-- make inverted bibliographic index
lookbib, refer	-- find and insert literature references in documents
col	-- filter reverse line feeds
deroff	-- remove nroff, troff, tbl, eqn constructs
eqn, neqn, checkeq	-- typeset mathematics
look	-- find lines in a sorted list
tc	-- phototypesetter simulator

Joe Morabito Application Engineer

INTER-SYSTEM COMMUNICATIONS PACKAGE FOR THE 8560

Tektronix provides several optional class C software packages to further enhance the TNIX operating system. These tools are invaluable to those who want to gain the full power of a UNIX-based environment.

Option 8560U05 UNICOM : Communications Package

UNICOM is a software package that permits communications and resource-sharing between connected TNIX--TNIX and UNIX--TNIX systems. Systems may be connected through a cable or through telephone lines using a modem and an autodialer. Networking is possible; each system may be connected to one or more systems, which in turn may be connected to other systems. The following list briefly describes the programs that are contained in the UNICOM Software Package.

cu	-- call a UNIX or TNIX system
mail	-- send or receive mail among users
uuclean	-- remove unused uucp files
uucp	-- copy files between directly connected UNIX or TNIX systems
uuname	-- list remote systems directly connected to your system
uux	-- execute commands on other directly connected systems
uuphone	-- UUCP phone dialing program

Joe Morabito Application Engineer

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FASTER IS BETTER

8085 EMULATOR-SYSTEM UPGRADE

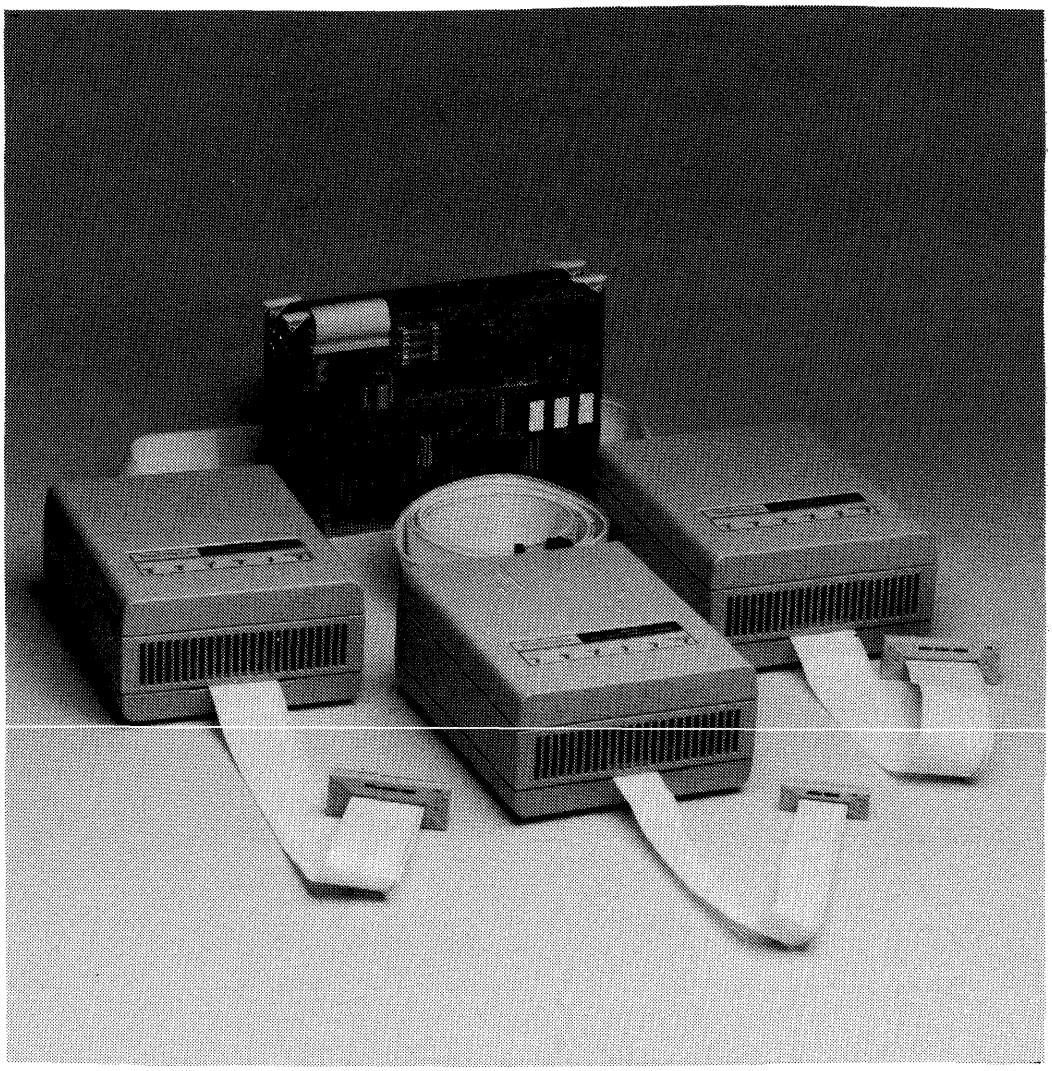
An upgrade is available to increase the maximum operating frequency of the 8085 Emulator and Probe (8300E06/8300P06) from 3.13 MHz (i.e., 6.25 MHz clock) to 5 MHz (i.e., 10.0 MHz clock). The emulator will continue to operate real-time with no wait states in all modes. Note: 5 MHz operation is not supported with the RTPA or the 8002A.

Customers that already have an 8085 Emulator and Probe, can obtain the 5 MHz upgrade via the Board Exchange Program. Basically, under this program, Tektronix will EXCHANGE upgraded 5 MHz 8085 Emulator circuit boards for the customers existing ones. Due to the complexity of installing the 5 MHz option, a component conversion kit is not available for customer or field service installation.

Note: The Board Exchange Program is available through all Tektronix' European subsidiary centers.

NEW CUSTOMERS purchasing an 8085 Emulator and Probe, will receive the 5 MHz version.

To place an order contact your sales engineer or local TEKTRONIX field office.



68XXX Emulator with 68000-A, 68008, and 68010 Prototype Control Probes

CONVERSION PACKAGES, 68000 Emulator to 68XXX Emulator

If your 68000 emulator and probe are more than one year old, the following may interest you. There are several conversion packages available to upgrade the original 68000 Emulator (8300E26) to the 68XXX Emulator (8300E36). The packages will allow customers with the older 68000 emulators to add 68008 and/or 68010 support, without buying a complete new emulator system. These conversion packages implement several other important product improvements.

Here's a summary of what the conversion packages do:

Convert the 68000 Emulator to a 68XXX Emulator.

- - The converted emulator will support the new 68000-A, 68008, and 68010 Probes AND, the upgraded 68000 Probe (8300P26).

Increase the maximum clock frequency on the original 68000 Emulator (8300E26) to 12.5 MHz.

- - The older 68000 Emulators/Probes support 8 MHz, or 10 MHz with Opt 15.

New, improved emulator control software.

- - IMPROVED TTA display!
- - New "short" format option for TRACE ALL display.
  (i.e., instructions only, no register information)

REAL-TIME PERFORMANCE

In general, with the 10 MHz upgrade, the Emulator System can operate real-time with no wait states, in all modes. There is one important exception however, with the Memory Allocation Controller (MAC Board) and LAS Memory installed, it is recommended that one wait state be inserted for mapping into Program Memory. This basically means that code executed out of Program Memory (Mode 1) will run with 1 wait state at 10 MHz. (At 8 MHz there are no wait states.) Without the MAC Board the emulator can operate with no wait states, and the allocation function can be handled with hardwire straps, located on the program memory cards.

The following chart summarizes the various memory configurations and minimum wait state configurations.

Program Memory Configuration	Mapped PROGRAM Memory	Mapped PROTOTYPE Memory
32K Program Memory	0 wait states @ <8.0 MHz 1 wait state @> 8.0 MHz	0 wait states
32K Program Memory + MAC	0 wait states @ <6.3 MHz 1 wait state @ >6.3 MHz	0 wait states
64K/128K Program Memory	0 wait states	0 wait states
64K/128K Program Memory + MAC	0 wait states, <8.5 MHz 1 wait state, >8.5 MHz	0 wait states 0 wait states

Emulator Wait States vs Program Memory Configuration
(68000 Emulator with 10 MHz upgrade)

NOTE: With some user prototype configurations, it may be necessary to strap the emulator for additional wait states to maintain compatibility with slower prototype memory configurations, like ROM or dynamic RAM.

WHAT TO ORDER:

020-1235-00 *	Conversion Kit Converts 68000 8 MHz Emulator to 68XXX Emulator
020-1077-00 *	Conversion Kit Converts 68000 10 MHz Emulator to 68XXX Emulator

020-1255-00 *	Conversion package converts 8 MHz or 10 MHz emulator to 68XXX and upgrades the probe to 12.5 MHz (This one is the most convenient and complete)

*** BOARD EXCHANGE CONVERSIONS**

The package for upgrading the 8 MHz 68000 Emulator to a 68XXX Emulator is also available via the Board Exchange Program. The Board Exchange Program can be used for customers that do not want to install the 020-1235-00 Conversion Kit themselves. **Note:** Customer installation of this kit requires soldering replacement of IC's and other circuit components.

The package to upgrade the 10 MHz 68000 Emulator to a 68XXX Emulator IS NOT available via the Board Exchange Program. The conversion kit (020-1077-00) is easy to install (i.e., board swap), and does not require any soldering.

We reccommend the 020-1255-00 because it is installed by TEKTRONIX personnel and the boards are factory tested.

Wolfgang Takatsch Applications Engineering Manager

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KITS TO MAKE YOUR EQUIPMENT DO MORE

8550 to 8540 CONVERSION KIT

This conversion kit is an economical, and easy way to transform an 8550 into an 8540. The conversion is reversible. Order 020-0953-02 8550 to 8540 conversion kit.

Converts the 8550 into an 8560 workstation.

This means you can use 8550 emulators and debug tools in conjunction with the 8560 and its software tools. The advantage is this configuration uses the high speed communications link (HSI), to communicate with the 8560 and its TNIX multi-user environment.

Two products out of one.

Use the 8501 portion of the 8550 as a stand-alone general purpose computer by installing the RT11/50 operating system package. Then, convert the 8301 into a stand-alone emulation workstation (8540) with an 8560/1/2, a host mainframe (VAX UNIX or VMS), or an IBM PC (ICOM40 is now available for the IBM PC as well as an assortment of assemblers!). Each product can thus be used in separate locations, projects, etc.

Backup and maintenance situations.

If the 8550 disk unit needs servicing, the 8550 emulators and tools would normally be unusable. With this conversion kit, the 8301 portion can be temporarily converted to a usable emulation station.

The 8550 to 8540 conversion kit consists of a System ROM Board with OS/40 firmware installed and user documentation. The conversion process is simple, and can be accomplished or reversed in minutes.

NOTE: Option firmware is not included and must be ordered seperately.

Wolfgang Takatsch Applications Engineering Manager

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ASSORTED ACCESSORIES

Is yours a "company on the move?" If so, you may suddenly find your emulation station (8540) many feet removed from the 8560, and the original 8 foot HSI cable totaly inadequate. Or, perhaps you would like to get away from the noisy printer attached to your 8560. In any case, longer HSI cables are available:

The following are the appropriate part numbers.

012-1009-00 8' HSI cable

012-1008-00 20' HSI cable

012-1007-00 50' HSI cable

012-1010-00 250' HSI cable

012-1064-00 15' RS232 cable (male to male)

012-0757-00 15' RS232 cable (male to female)

68000 DIP TO PGA

Incidentally, while we are on the subject of connecting things, sometimes a little help is needed to "make ends meet." For example, would you rather see a PGA where your 64 pin DIP 68000/10 probe plug is right now? Then you will be happy to know about this adapter:

010-0434-00 68K 64 pin DIP to PGA adapter.

MIL-STD 1750A DIN CONNECTOR

The MDP MIL-STD 1750A probe interface adapter (PIA) with Euro-Card (DIN) connector is especially valuable to users, who must interface with a 1750A circuit board in a sealed unit with access only to the Euro-Card bus connector. The part number is:

010-0438-00 PIA, Euro-Card connector.

68000 PIM

The 68000 prototype impedance matching module may be just what you need. Does your wire wrapped "F" logic based prototype fail when Address Strobe (AS) has a glitch caused by the data lines switching from "FFFF" to "0000" on a back-to-back write bus cycle? A "MOVE.L Dx,(Ax)" would do it if the value moved were "FFFF0000".

The impedance matching module "softens" the blow, and reduces the overall noise induced by the data lines. The part number is:

010-0439-00 68000/10 Proto impedance match module

RACKMOUNT

To save space you may wish to rackmount your 8560/40. No problem, with the rack mounting hardware you get in the rackmount kit:

040-1020-00 8560/40 Rackmount Conversion.

Wolfgang Takatsch Applications Engineering Manager

PRODUCT INFORMATION SECTION

TEKTRONIX' FASTEST EMULATOR SUPPORTS MIL-STD 1750A

WHAT ABOUT CLOCK FREQUENCIES AND BUS FREQUENCIES?

We hear a lot about microprocessor clock rates when it comes to measuring performance. A traditional assumption is that a given microprocessor with a 10 MHz clock rate is faster than another microprocessor with a 5 MHz clock. Chip vendors have reinforced this myth by advertising the input clock frequencies instead of the actual internal clock rate or bus speed. The fact is, the clock rate doesn't tell you much about performance level; a processor with the 5 MHz clock rate could have twice the performance of one with a 10 MHz clock.

In actuality, the real performance or throughput of a microprocessor system is more dependent on the bus band-width or bus frequency. That's because all of the system elements....like the cpu, memory and I/O.....communicate over the bus. The higher the bus frequency, the higher the potential throughput of the system.

Usually, the bus frequency is a derivative of the clock frequency because the clock is used to gate internal processor cycles. For instance, a typical microprocessor with a 4 MHz clock might generate a bus cycle every four clocks. This would translate to a 1 MHz bus frequency.

EMULATOR PERFORMANCE COMPARISON.

Bus frequency also is a critical measure of an emulator's performance. The higher the required bus frequency, the more difficult it is to provide transparent in-circuit (or in-prototype) probing. The emulator must be designed to provide the same level of performance as the actual processor, while still providing all the necessary debugging features that emulators support.

Emulator Performance Comparison

Note 1: The clock frequency for 1750A processors is implementation dependent. The F9450 microprocessor for instance, has a maximum clock frequency of 20 MHz.

Here's a comparison of the performance levels of some of our popular emulator systems.

	Emulator System				
	6800	Z-80	80186	68000-A	1750A
Clock Freq	1 MHz	6 MHz	16 MHz	12.5 MHz	See Note 1
Bus Freq	1 MHz*	2 MHz*	2 MHz*	3.125 MHz*	5 MHz*

* no wait states

THE MIL-STD 1750A EMULATOR SYSTEM; A DESIGN CHALLENGE.

The 1750A emulator had particularly challenging design requirements. Not only did it have to support 5 MHz bus frequencies,....almost twice as fast as our fastest emulator..... it had to be able to connect to the different physical and electrical implementations of MIL-STD 1750A processors. Many of the circuits in the emulator had to be optimized (or eliminated) to minimize delays. Propagation times in the 5 NS range were critical to meeting the 5 MHz performance goal.

Another complication in meeting the 5 MHz goal, was a users prototype is typically a very "noisy" environment. Differentiating between real signals and noise is a classic and difficult problem. Special circuits, like the unique "glitch eater", were developed to mask out the noise generated in the prototype while still allowing high performance emulation support. A good ground return system was also necessary to minimize the noise generated by the high frequency transients. This resulted in a basic technique that separates the ground return paths for each major signal group...data, address, and control. This grounding approach has an additional bonus, because it reduces noise in the embedded system when the emulator isn't connected.

WHAT'S IN THE FUTURE?

As processor bus frequencies continue to increase, in-circuit emulators will become more difficult to design. Bus frequencies of 25 MHz and up are being proposed for some of the new VSLI 1750A implementations. This will obviously require more sophisticated probing techniques.

Work in this area is already underway. Tektronix has a head start too, since much of the technology can be "borrowed" from our expertise in developing the worlds fastest analog oscilloscopes. This same technology is going to help us build the worlds fastest emulators..... now and in the future.

Bill Bevan Military Program Manager

68000 C COMPILER

Version 2 of the 68000 C Compiler (UNIX and VMS) is now available!

Customers with Version 1 will be updated to Version 2. A Business Reply Card was included with the Version 1 shipment to ensure your update. If you did not return your card and have not received your update, contact your local sales representative.

Marilyn Hanson Marketing Product Line Mgr

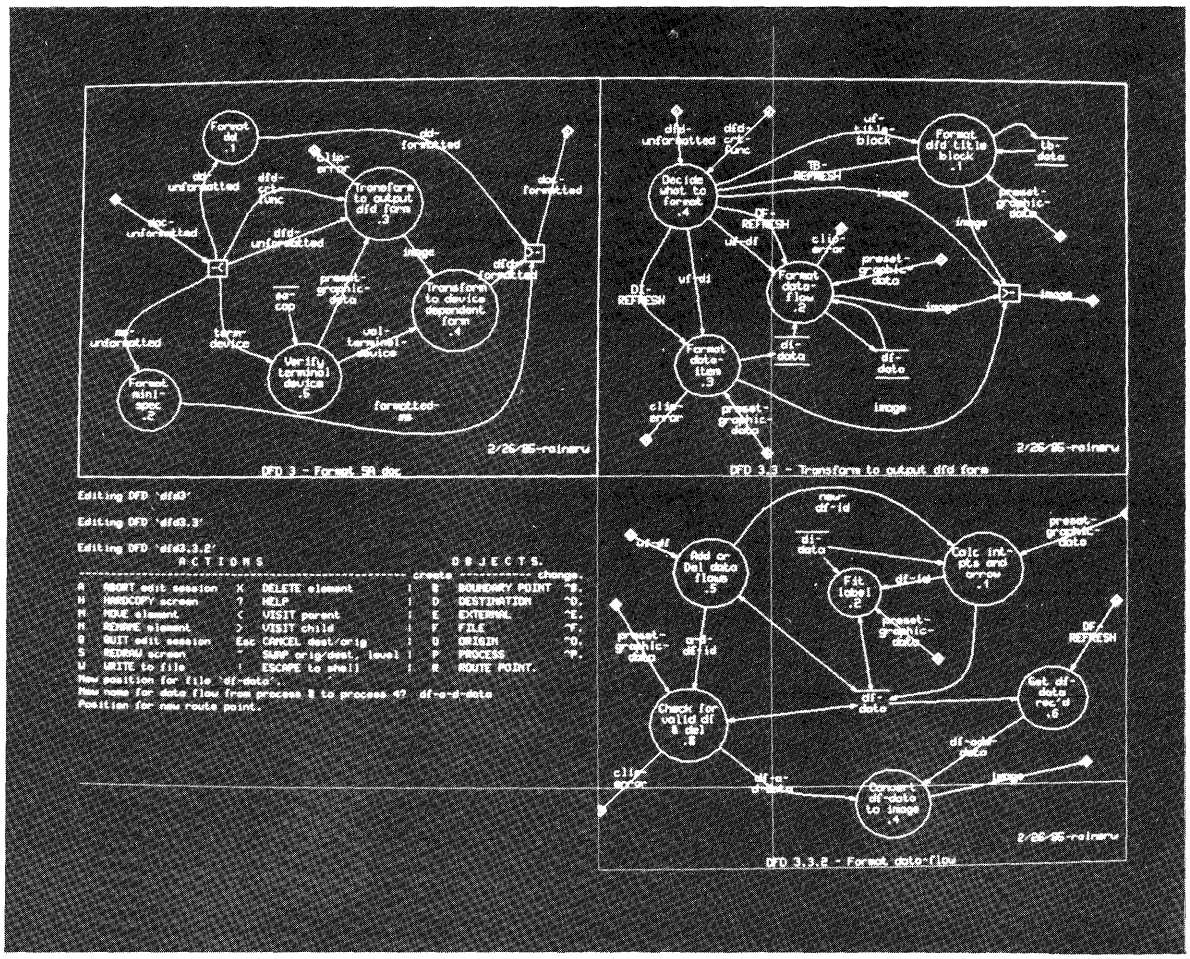
STRUCTURED ANALYSIS TOOLS FOR VMS

SA Tools for VMS is orderable. SA Tools supports Structured Analysis, a graphic method of requirements analysis and system specification, with:

- On-line graphics editing with Tek color graphic terminals.
- Automatic evaluation and correction of the SA System Specification.
- Professional hard copy on a variety of peripheral devices.
- Software for VAX VMS, VAX UNIX, and Tek 856X S/W Development Station.

The VMS version is like the existing UNIX version. See the following page for details of these differences:

- The dataflow diagram editor is enhanced to modify diagrams more easily.
- Child DFDs are created with parent dataflows (DD) included.
- The DFD editor can show multiple DFDs on the screen of Tek 4107/9 and 4115B terminals.
- Minor enhancements affect data dictionary tools, **SACAP**, and version control.
- VMS presents some limitations and makes using combinations of tools more difficult.
- Hard copies from the VAX, on-line help, ColorKey+, and invocation style are different.



Combined Tool Use. SA Tools can be used in combination with one another and with VMS commands to perform more complex specification tasks. For example, the **SA/LIST/DF** and **SA/LOOKDD** commands can be used with the VMS **SORT** command to view the DD definitions for all dataflows of a DFD.

Configuration. SA Tools runs on VAX VMS Version 3.4. It should also run on later releases of Version 3, which DEC states are upward compatible. SA Tools use Tek graphics terminals, the 410X line is recommended. Tek 469X color copiers make DFD hard copies from the terminal, the 4692 is recommended. Laser printers that are 4010/14 compatible (e.g., from Imagen) make DFD hard copies from the VAX. Edit mini-specs with any VMS text editor, MDP's C and Pascal LDE are recommended for writing pseudo-code.

Publicity. EDN will publish an SA article in March.

Addendum to Software Product Description (SPD) #61W-5633. SA Tools for VAX VMS is like the version for VAX/UNIX specified in the S/W Product Description (SPD). *This addendum states specifically how each section of that SPD is different for VAX VMS.*

SA TOOLS FUNCTIONS

Editing. The Data Flow Diagram (DFD) editor commands can create, label, move, *change*, and delete each item on a DFD. When the **visit** command of the DFD editor creates a child DFD, ***parent dataflows are automatically included in the child.*** Also, **visit** can display multiple DFDs on the screen of Tek terminals 4107/9 and 4115B. The shell escape is not available in the DFD editor. The data dictionary (DD) is kept in an internal format, which **SA/EDIT** converts to text for normal editing.

Correction. When the **fix** tool creates a child DFD, *it automatically includes parent dataflows in the child.*

Table 1. SA Tools Functions (new for VMS)

Command	Description
SA/SORT/PNN	Sorts process names by hierarchy number.
SA/PARSEDD	Converts a DD from textual to internal format.

Two SA Tools commands on UNIX are not available on VMS: **dfdtoplot** and **mono**. To produce a monochrome copy of a DFD, use **SA/SHOW/TERM=MONO/COPY**. All SA Tools commands are invoked in the style of VMS command syntax.

Table 2. DFD Editor Commands (new for VMS)

Command	Description
Change	Changes the type (i.e., process, file, external, boundary point) of a data item.
	Changes the origin or destination of a dataflow.
Swap	Exchanges the origin and destination of a dataflow.
	Changes the file level (one- or two- line).
Visit child	Creates DFD with parent dataflows if child doesn't exist.

Table 3. SA/EVAL Checks (new for VMS)

Document	Checked For
DD	Data names that appear in a definition of an entry, but which are not themselves defined.

Table 4. SA/FIX Corrections (new for VMS)

Document	Correction
DFD	Creates DFD, with parent dataflows, if it does not exist.
DD	Adds to the DD those data names that appear in a definition of an entry, but which are not themselves defined.

SOFTWARE PRODUCT DESCRIPTION

Operating Environment. Host. SA Tools run on VAX computers under UNIX and VMS. **Configuration.** Tektronix copiers, such as the 469X Series Color Graphics Copiers, can be connected to Tek 410X terminals to copy DFD. A text editor, such as Tek's C or Pascal Language-Directed Editors for VMS, is required to modify the DD and Mini-Specs.

ORDERING INFORMATION

Nomenclature	Option	Product
STRUCTA	1F	SA Tools for VAX VMS
020-1391-00		Documentation Kit for SA Tools - VMS

Rodney Bell Product Line Manager

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STRUCTURAL ANALYSIS QUESTIONS

SA Tools supports Structural Analysis, a graphical method of requirements analysis and system specification. SA Tools includes a graphic editor for Data Flow Diagrams, evaluation, and fix tools for checking, and updating the spec, and display tools to make copies. Listed below are the answers to questions often asked by our customers.

What if I'm interested in Structured Design, Real-Time SA/SD, or support on other hosts?

These are directions MDP is working on or considering. Communicate your interest in these or other areas to your MDP salesperson. Your needs influence our future products.

Where can I obtain reference books on SA/SD?

Yourdon Press (1-800-223-2452) publishes books on SA/SD topics. You can get copies of the book on which MDP's products are based:

Structured Analysis and System Specification; Tom DeMarco (Available in hardbound form Tek part no. 062-7469-00).

Practical Guide to Structured System Design; Meilir Page-Jones

Why won't SA Tools work with ColorKey+ on VAX UNIX BSD4.2?

SA Tools run on UNIX BSD4.2, but ColorKey+ still runs on UNIX BSD4.1. If you order ColorKey+ to use with SA Tools, contact your MDP salesperson for a preliminary version of ColorKey+ for UNIX BSD4.2.

What is the advantage of using a 4109 over a 4107?

The 4109 has a larger screen for larger diagrams and easier viewing, and RGB output for display through a video monitor.

How can I evaluate SA Tools?

Contact your MDP salesperson for arrangements. Possibilities include: Using a system at your local field office, dialing up a system, on-site one-day trials, talking with current users, or renting an SA system for a few months.

How is SA Tools on VAX UNIX different than on the 856X?

The VAX UNIX version (1) allows more items on a DFD (856X version allows about 90), (2) draws curved data flows (line segments are optional), and (3) may perform better (depending on configuration and system load). Otherwise, the versions are the same.

Is ColorKey+ required to use SA Tools?

No. But it makes SA Tools much easier to learn and for occasional use. ColorKey+ also performs at the push of a button some tasks (e.g., overview of the SA spec) which use several SA Tools and UNIX utilities.

How do SA Tools work with a 4010/4014?

SA Tools work OK, but graphic editing is not as effective as with 410X. ColorKey+ doesn't work with 4010/4014. One difference is using the DFD editor; if the cross-hairs are visible, command characters must be followed by a carriage return. Since these are DVST, another difference is deletes and moves don't really remove the item, rather they mark it with an "X." Redrawing the screen (a DFD editor command) removes the "X" items.

Will SA Tools work with a VT240?

They work in a 4010/14 mode, but with some disadvantages (e.g., the text is very small). Also see question on "working with 4010/4014."

Will SA Tools work with an IBM/PC?

SA Tools do not run on the PC itself. Several companies (e.g., Grafpoint 1-408-446-3925) offer emulators for the PC. With such an emulator, the PC (alias 4105) can use SA Tools running on an attached VAX. Graphics are not as good as with the 410X.

How can I make large diagrams (many processes and flows)?

Use a 4107, specify **TERM=4107s** (a special **sacap** entry with small text), pan to part of the diagram and zoom in to edit. Or use a 4109 or 4115 to further increase diagram size. Or change **sacap** to use even smaller text.

How can I reuse a sub-tree of the SA spec's DFD hierarchy?

The technique is to (1) name and level the top DFD in the sub-tree so it matches parent in the new spec, and (2) renumber the sub-DFDs. In this example, the spec for **dfd3.1** is placed under **dfd4.2**. Ensure the highest-level dfd in the reused part is consistent with it's parent. Keep the lower hierarchy numbers the same: copy the dfd files under new names, (e.g., **dfd3.1, dfd.3.1.1, dfd3.1.2, dfd3.1.3**). With **fixsa**, change all copied dfd's to make the dfd number match the new file name.

How can I determine what parts of the SA spec are unfinished?

Produce an overview (with ColorKey+ or **listpnn dfd* | sort -t. -n | uniq**), redirecting the output for a permanent copy. Notice which processes have neither dfd or ms defined for them.

How can I renumber a DFD?

SA Tools maintain the integrity of process of numbers, (if you want certain processes have certain numbers). Edit the dfd file with a text editor to change the process numbers. The internal DFD format is straightforward, but must remain intact. You must then rename and renumber the lower level dfd files accordingly. (See question on "reusing a sub-tree of an SA spec").

How can I restore a corrupted DFD?

Use a text editor to correct offending parts or recreate with dfd editor. Here's an example of the former. Transferring DFDs to another system may append an extra carriage return at the end of file. DFD editor reports an error "DF or DI expected." Edit the DFD file with a text editor and delete the last blank line. (See question on "editing dfd on a smaller screen").

How can I clear a DFD from a 4107 screen?

On VMS, simply hit the page button; SA Tools clear segments, but not the screen. On TNIX UNIX there are three ways depending on what's needed. Clear segment memory from Setup mode on the terminal by **SGDELETE -1**. On the host create an executable command: **^[%!0^[SK!^[%!1** (^[is escape symbol) - that clears segments; execute this command whenever needed. Place the clear segment string in initialization files of programs that use the graphics area (e.g., **lde.4107.init** or **ace/4107.cfg**). Do not put such a string in the termination string of **sacap** entries: showsa would not work on dfd's.

Can I edit on a smaller screen than it was made on?

Yes. However, DFDs created on a large screen may, when displayed on a smaller one, exceed the screen boundary. DFD editor reports error "x-y coordinate < 0 or > 4096." Display the DFD, notice how far it gets, then edit the dfd with text editor to adjust the coordinate values of the data item to be drawn next, or use an **sacap** with smaller text and move the data items with the dfd editor.

How can I make a monochrome copy on 4695, that looks just like the screen copy?

Use ColorKey+ buttons or the **mono** command. Note that this sets **TERM=4010** temporarily so that showsa will display a DFD without color. To get a diagram that appears on the screen, modify the **sacap** entry for 4010 to match that of your terminal. Alternatively, display the dfd, use the terminal's Color Menu to change all panels to transparent and all text to white, and hit **S Copy**.

Rodney Bell Product Line Manager

MDP MANUALS LISTING; EFFECTIVE 2/5/85

MISC USERS	
Simplifying Microcomputer-Based Product Design	062-5812-00
8560 MUSDU Digital Design Lab System Users Manual	070-4550-01
8550 MDL Intel COMM Users Manual; DOS/50 V2	070-4480-00
8560 MUSDU Magnetic Tape Interface Users Manual	070-4586-00
8500 MDL Extended Hex Interface Users Manual	070-4478-00
8500 MDL Series Trigger Trace Analyzer Users Manual	070-3760-01
8500 MDL TTA High-Level Programming Language Usr Manual	070-4947-00
Real-Time Prototype Analyzer Users Manual: DOS/50 V1	070-2785-01
Real-Time Prototype Analyzer Users Manual: DOS/50 V2	070-3922-00
8550 SYSTEM	
8550 MDL System Users Manual; DOS/50 V2	070-3936-00
8550 MDL System Reference Booklet; DOS/50 V2	070-3937-00
8086 Prototype Debug Specifics Users Manual; DOS/50	070-3603-00
8086 Prototype Debug Support Ref Card Usr Manual; DOS/50	070-3604-00
8550 MDL System Users Manual; DOS/50 V1	070-3457-00
8550 MDL System Reference Booklet; DOS/50 V1	070-3458-00
ACE	
8500 MDL ACE Users Manual V1	070-3573-01
8500 MDL ACE Reference Manual V2	070-4361-00
8500 MDL ACE Reference Manual V3, 4105 Edition	070-4726-00
8550 MDL ACE Users Reference Card V1	070-3574-00
8550 MDL ACE Users Booklet V2	070-4363-00
8560 MUSDU ACE Users Booklet V3, 4105 Edition	070-4725-00
8560 MUSDU ACE Users Booklet V2	070-4468-00
C	
C Language-Directed Editor Users Mnl for VAX/UNIX Host	070-5002-00
C Language-Directed Editor Users Mnl for VAX/VMS Host	070-5003-00
C Compiler 68000 Users Manual for VAX/UNIX Host	061-2866-00
C Compiler 68000 Users Manual for VAX/VMS Host	061-2892-00
C Compiler 68000/68010 Users Manual for VAX/UNIX Host	070-4900-00
C Compiler 68000/68010 Users Manual for VAX/VMS Host	070-4901-00
C Debug 68000/68010 User's Manual for VAX/UNIX Host	070-4903-00
COLORKEY+	
ColorKey+ User Interface Users Manual for VAX/UNIX Host	070-5075-00
ColorKey+ User Interface Users Manual for VAX/VMX Host	070-5089-00
EDITORS AND LDE	
8550 MDL Editor V4 User's Manual; DOS/50	070-3571-00
8550 MDL Editor V4 Reference Card; DOS/50	070-3572-00
8560 MUSDU Language-Directed Editor Users Manual	070-4253-00
8560 MUSDU LDE CT8500-Edition Reference Card	070-4249-00
8560 MUSDU LDE 4105 M Edition Reference Card	070-4727-00
8560 MUSDU LDE Template for CT8500 Keybd (4 templates)	070-4622-00
ICCM40	
ICCM40 System Users Manual for VAX/UNIX Host	070-4543-00
ICCM40 System Users Manual for VAX/VMS Host V2	070-4742-01
ICCM40 System Users Manual for IBM PC Host	070-5381-00
MDL/u	
8560 MUSDU MDL/u Compiler Users Manual	070-5061-00
8550 MDL/u Compiler Users Manual; DOS/50	070-3601-00
8550 MDL/u Compiler Reference Booklet; DOS/50	070-3602-00
8550 MDL/u 8080A Compiler Specifics Users Manual; DOS/50	070-3598-00
8550 MDL/u 6800/6802 Compiler Specifics Usr Mnl; DOS/50	070-3599-00

PASCAL

8500 MDL Series Pascal Debug Users Manual	070-4281-00
8560 MUSDU Pascal Debug 8086/8088 Reference Card	070-4283-00
8560 MUSDU Pascal Debug Z8001/Z8002 Reference Card	070-4464-00
8560 MUSDU Pascal Debug 68000 Reference Card	070-4465-01
Pascal Debug 68000/68010 User Manual for VAX/UNIX Host	070-4853-00
Pascal Debug 68000/68010 Reference Bkt for VAX/UNIX Host	061-2954-00
Pascal Debug 68000/68010 Reference Bkt for VAX/UNIX Host	070-5092-00
Pascal Debug 68000/68010 User Manual for VAX/VMS Host	070-4852-00
Pascal Debug 68000/68010 Reference Bkt for VAX/VMS Host	061-2953-00
Pascal Debug 68000/68010 Reference Bkt for VAX/VMS Host	070-5091-00
Pascal Language Reference Manual	070-3880-00
8560 MUSDU Pascal LDE Users Manual 4105M Edition	070-4728-00
Pascal LDE Users Manual for VAX/UNIX Host	070-4852-00
Pascal LDE Users Manual for VAX/VMS Host	070-4854-00
8560 MUSDU Pascal Z8001/Z8002 Compiler Users Manual	070-3876-00
8550 MDL Pascal 8080A/8085A Compiler Usr Mnl V4.0 DOS/50	070-4336-00
8550 MDL Pascal 8086/8088 Compiler Users Manual DOS/50	070-3877-00
8560 MUSDU Pascal 8086/80186 Compiler Users Manual	070-3878-01
Pascal Compiler 8086/80186 Users Manual for VAX/VMX Host	070-5219-00
Pascal Compiler 8086/80186 Users Manual for VAX/UNIX Host	070-5218-00
8560 MUSDU Pascal 68000/68010 Compiler Users Manual	070-3875-01
Pascal Compiler 68000/68010 User Mnl for VAX/UNIX Host	070-4857-00
Pascal Compiler 68000/68010 User Manual for VAX/VMS Host	070-4856-01

RT11/50

8550 MDL RT11/50 Users Mnl Vol 1: System; DOS/50, OS/40	070-4409-00
8550 MDL RT11/50 Users Mnl Vol 2: System; DOS/50, OS/40	070-4410-00
8550 MDL RT11/50 Users Mnl Vol 3: System; DOS/50, OS/40	070-4411-00
8550 MDL RT11/50 Users Vol 4: FORTRAN IV; DOS/50, OS/40	070-4412-00

SA TOOLS

SA Tools Users Manual for 8560 Series and VAX/UNIX Hosts	070-5098-00
SA Tools Reference Card for 8560 Series Host	070-5177-00
SA Tools Reference Booklet for VAX/UNIX Host	070-5099-00

TNIX

8560 MUSDU TNIX V1 System Users Manual	070-3940-00
8560 MUSDU TNIX V1 System Reference Manual	070-3941-00
8560 MUSDU TNIX V1 System Reference Booklet	070-3942-00
8560 MUSDU TNIX V1 3 System Ref Mnl Supplemental Info	070-3211-00
8560 MUSDU TNIX V2 System Users Manual	070-4730-00
8560 MUSDU TNIX V2 System Reference Manual	070-4729-01
8560 MUSDU TNIX V2.1 System Managers Operation Guide	070-5050-00
8560 MUSDU TNIX Text Processing Package	070-4272-00
8560 MUSDU TNIX Native Programming Package	070-4271-00
8560 MUSDU TNIX Auxiliary Utilities Package	070-4270-00
8560 MUSDU TNIX Intel COMM Users Manual	070-4481-00
8560 MUSDU TNIX UNICOM Users Manual	070-4536-00

8540 USERS MANUALS

8540 Integration Unit System Users Manual OS/40 V1	070-3939-00
8540 Integration Unit System Reference Booklet OS/40 V1	070-3992-00
8540 Integration Unit Intel COMM Users Manual OS/40 V1	070-4479-00

1750A

Assembler 1750A Users Manual	061-3023-00
Assembler 8560 Series Host Specifics Users Manual for 1750A Assembler	061-3026-00
Assembler VAX/VMS Host Specifics Users Manual for 1750A Assembler	070-5166-00

Assembler 1750A Reference Booklet IEEE Standard	070-5132-00
Assembler 1750A Reference Booklet MIL-STD	070-5133-01
Assembler 1750A Reference Bkt MIL-STD for VAX/VMS Host	070-5168-00
Assembler 1750A Ref Bkt IEEE Standard for VAX/VMX Host	070-5269-00

ASSEMBLER CORE

Assembler Core Users Mnl for B Series Assemblers (BSAsm)	070-3856-01

HOST SPECIFICS

Assembler VAX/UNIX Host Specifics Users Manual BSAsm	070-4741-00
Assembler VAX/VMS Host Specifics Users Manual BSAsm	070-4740-00
Assembler 8550 Host Specifics Users Manual BSAsm	070-3943-01
Assembler 8560 Host Specifics Users Manual BSAsm	070-3944-01

8550 ASSEMBLER REFERENCE

8550 MDL Z8001/Z8002 Assembler Reference Card	070-3973-00
8550 MDL 6809 Assembler Reference Card	070-4369-00
8550 MDL 68000 Assembler Reference Booklet	070-3974-00
8550 MDL 8051 Assembler Reference Card	070-4364-00
8550 MDL 8086/8088 Assembler Reference Booklet	070-3852-00
8550 MDL 9900/9989 Assembler Reference Card	070-4367-00

8560 ASSEMBLER SPECIFICS

Z80/NSC800 Assembler Specifics Users Manual BSAsm	070-3949-00
1802 Assembler Specifics Users Manual BSAsm	070-4507-00
6800/6801/6802 Assembler Specifics Users Manual BSAsm	070-3947-00
Assembler 7807/7809 Specifics Users Manual BSAam	070-5147-00
Assembler 7810/7811/7816 Specifics Users Manual BSAsm	070-5148-00
Assembler 78C06 Specifics Users Manual BSAsm	070-5146-00
8048/8021/8041A/8022 Assembler Specifics Users BSAsm	070-3955-00
8051 Assembler Specifics Users Manual BSAsm	070-4321-00
8080A/8085A Assembler Specifics Users Manual BSAsm	070-3945-00

8560 ASSEMBLER REFERENCE

8560 MUSDU Z80A Assembler Reference Card	070-3950-00
8560 MUSDU Z8001/Z8002 Assembler Reference Booklet	070-3958-00
8560 MUSDU 1802 Assembler Reference Booklet	070-4506-00
8560 MUSDU 6800/6801/6802 Assembler Reference Card	070-3948-00
8560 MUSDU 6809 Assembler Reference Card	070-3961-00
8560 MUSDU 68000 Assembler Reference Booklet	070-3959-00
8560 MUSDU 7807/7809 Assembler Reference Booklet BSasm	070-5242-00
8560 MUSDU 7810/7811/7816 Assembler Reference Booklet	070-5245-00
8560 MUSDU 78C05/78C06 Assembler Reference Booklet	070-5246-00
8560 MUSDU 8048/8021/8041A/8022 Assembler Ref Card	070-3956-00
8560 MUSDU 8051 Assembler Reference Card	070-4320-00
8560 MUSDU 8080A/8085A Assembler Reference Card	070-3946-00
8560 MUSDU 8086/8088 Assembler Reference Booklet	070-3957-00
8560 MUSDU 9900/9989 Assembler Reference Card	070-4368-00

8550/8560 ASSEMBLER SPECIFICS

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8051 Assembler Specifics Users Manual BSAsm	070-4321-00
6809 Assembler Specifics Users Manual BSAsm	070-3960-00
68000 Assembler Specifics Users Manual BSAsm	070-3855-01
8086/80186 Specifics Users Manual BSAsm	070-3853-01
9900/9989 Assembler Specifics Users Manual BSAsm	070-4373-00
8500 MDL Series Assembler Core Usr Mnl for A Series Asm	070-3575-01

ASSEMBLER SPECIFICS

8550 MDL TMS9900 Assembler Specifics Users Manual	070-3582-00

8550 MDL Z80A Assembler Specifics Users Manual	070-3580-01
8550 MDL Z8000 Assembler Specifics Users Manual	070-3594-00
8550 MDL 1802 Assembler Specifics Users Manual	070-3586-00
8550 MDL 3870/3872/F8 Assembler Specifics Users Manual	070-3584-00
8550 MDL 8048/8021/8041A/8022 Asmbler Specifics Usr Mnl	070-3588-00
8550 MDL 8086/8088 Assembler Specifics Users Manual	070-3592-00
8550 MDL 8080A/8085A Assembler Specifics Users Manual	070-3576-00
8550 MDL 6800/6801/6802 Assembler Specifics Users Manual	070-3578-00
8550 MDL 6809 Assembler Specifics Users Manual	070-3692-00
8550 MDL 68000 Assembler Specifics Users Manual	070-3596-00

REFERENCE CARDS

TMS9900 Assembler Reference Card	070-3583-00
Z80A Assembler Reference Card	070-3581-00
Z8000 Assembler Reference Card	070-3595-00
1802 Assembler Reference Card	070-3587-00
3870/3872/F8 Assembler Reference Card	070-3585-00
8048/8021/8041A/8022 Assembler Reference Card	070-3589-00
8080A/8085A Assembler Reference Card	070-3577-00
8086/8088 Assembler Reference Card	070-3593-00
6800/6801/6802 Assembler Reference Card	070-3579-00
6809 Assembler Reference Card	070-3693-00
68000 Assembler Reference Card	070-3597-00
8550 MDL Z80A Emulator Specifics Users Manual: DOS/50 V1	070-3564-00
8500 MDL Z80A Emulator Specifics Users: DOS/50 V2, OS/40	070-3964-01
8500 MDL Z8001/Z8002 Emu Specs Usrs: DOS/50 V2, OS/40	070-3969-00
8550 MDL 1802 Emulator Specifics Users Manual: DOS/50 V1	070-3568-00
8500 MDL 3870/3872/F8 Emu Specs Usrs: DOS/50 V2, OS/40	070-4438-00
8550 MDL 3870/3872/F8 Emulator Specifics Usr: DOS/50 V1	070-3567-00
8500 MDL 6800/6802 Emulator Specifics: DOS/50 V2, OS/40	070-3963-00
8550 MDL 6800/6802 Emulator Specifics Users: DOS/50 V1	070-3563-00
8500 MDL 6801/68120 Emulator Specifics: DOS/50 V2, OS/40	070-3991-00
8500 MDL 6809 Emulator Specifics Usrs: DOS/50 V2, OS/40	070-3971-00
8550 MDL 6809 Emulator Specifics Users Manual: DOS/50 V1	070-3851-00
8500 MDL 68000 Emulator Specifics Usr: DOS/50 V2, OS/40	070-3970-01
8500 MDL 8048/8021/8041A/8022 Emu Spec: DOS/50 V2, OS/40	070-3967-01
8550 MDL 8048/8021/8041A/8022 Emu Specs Users: DOS/50 V1	070-3569-00
8500 MDL 8080A Emulator Specs Users: DOS/50 V2, OS/40	070-3962-00
8550 MDL 8080A Emulator Specifics User Manual: DOS/50 V1	070-3562-00
8500 MDL 8085A Emulator Specs Users: DOS/50 V2, OS/40	070-3966-00
8550 MDL 8085A Emulator Specifics User Manual: DOS/50 V1	070-3566-00
8500 MDL 8086/8087/8088 Emu Specs Usrs: DOS/50 V2, OS/40	070-3968-01
8500 MDL 9900/9989 Emulator Specifics: DOS/50 V2, OS/40	070-3965-00
8500 MDL TMS9900 Emulator Specifics: DOS/50 V2, OS/40	070-4397-00
8550 MDL TMS9900 Emulator Specifics Users Mnl: DOS/50 V1	070-3565-00

PROM PROGRAMMER SPECIFICS: DOS/50, OS/40

8500 MDL 2716/2732 PROM Programmer Specifics Users Mnl	070-3868-00
8500 MDL 2764 PROM Programmer Specifics Users Manual	070-4375-00
8500 MDL 8748/8741A/8749/8755A PROM Progrmr Specfcs Usr	070-3869-00
8500 MDL 8751 PROM Programmer Specifics Users Manual	070-4414-00
8500 MDL 68701 PROM Programmer Specifics Users Manual	070-4413-00

MISC SERVICE

8301 Microprocessor Development Unit Service Manual	070-2976-01

8501 Data Management Unit Service Manual	070-2975-00
8540 Integration Unit Service Manual	070-3920-00
8560 MUSDU GPIB Interface Service Manual	061-2768-00
8560 MUSDU GPIB Interface Service Manual	070-4475-00
8560 MUSDU Service Manual	070-3900-00
8560/8561 MUSDU Service Manual (Preliminary)	061-2807-00
8560/8561 MUSDU Service Manual	070-5066-00
8561 MUSDU Service Manual	070-4759-00
64K/128K Program Memory Service Manual	070-3924-00
Memory Allocation Controller Service Manual	070-3926-00
Real-Time Prototype Analyzer Service Manual	070-2724-01
Trigger Trace Analyzer Service Manual	070-3762-00
Multi-Vendor Emulator Board Service Manual	070-1730-00

EMULATORS

Z80 Emulator Service Manual	070-5159-00
Z80A Emulator Processor Service Manual	070-2715-01
Z8001/Z8002 Emulator Processor Service Manual	070-3772-00
1802 Emulator Processor Service Manual	070-2631-01
3870/3872/F8 Emulator Processor Service Manual	070-2634-01
6500/1 Emulator Processor Service Manual	070-2887-00
68xx Emulator Processor Service Manual	070-3768-00
68xx Emulator Processor Field Modification Sheet	070-4458-00
6800/6802 Emulator Processor Service Manual	070-2354-03
6801/68120 Prototype Control Probe Service Manual	070-3864-00
6809 Prototype Control Probe Service Manual	070-3867-00
6809E Prototype Control Probe Service Supplement	070-4461-00
68000 Emulator Processor Service Manual	070-3770-00
7720 Emulator Service Manual	061-3036-00
8048/8021/8041A/8022 Emulator Processor Service Manual	070-2632-01
8080A Emulator Processor Service Manual	070-2353-03
8085A Emulator Processor Service Manual	070-2716-01
8086/8088 Emulator Processor Service Manual	070-3774-01
80186/80188 Emulator (Serial No. B0 and up) Service Manual	070-4858-00
80186/80188 Emulator (Serial No. B0 through B010299) Service Manual	070-5214-00
9900 Emulator Processor Service Manual	070-2712-01
9900/9989 Emulator Processor Service Manual	070-4157-00
8500 MDL Series 68008 PCP Service Manual	070-4690-00
8500 MDL Series 68000-A and 68010 PCP Service Manual	070-4692-00
8500 MDL 7807/7809 and 7810/7811 PCP Service Manual	070-4996-00
8500 MDL Series NSC800 PCP Service Manual	070-1744-00

PROM PROGRAMMER

PROM Programmer Controller Service Manual	070-3757-00
--2716/2732 PROM Programmer Module Service Manual	070-3758-00
--2764 PROM Programmer Module Service Manual	070-4350-00
--8751 PROM Programmer Module Service Manual	070-4352-00
--8748/etc. PROM Programmer Module Service Manual	070-3759-00
--68701 PROM Programmer Service Manual	070-4351-00

MISC SOFTWARE

8540 Integration Unit EEPROM Patch Info Instr Sheet	070-4287-06
8550 MDL Pascal 8080A/8085A Compiler V4.02 Update Info	070-4591-00
8560 MUSDU User Information Instruction Sheet	070-4679-00

ICOM40 Block Size List for VAX/VMS Software Instr Sheet	070-5243-00
TNIX Revision Disk Instruction Sheet	070-5266-00
MISC HARDWARE	
8500 MDL Series 77P20 PROM Programmer Instruction Sheet	070-4580-00
8560 MUSDU IOA Board Default Jumper Position Instr Sheet	070-5117-00
80186/80188 Emulator Modification 8540 System ROM Board to Accept 27128 ROMS Instruction Sheet	061-3004-00
68xxx Prototype Impedence Module Upgrades Instr Sheet	070-5178-00
INSTALLATION	
8540 Integration Unit COM V4.1 Installation Info Sheet	070-4552-01
8550 MDL RT11/50 Operating System Installation Sheet	070-4404-00
8550 MDL DOS/50 V2.1A Installation Information Sheet	070-4553-01
8560 MUSDU TNIX V2 Installation Info Instruction Sheet	070-4496-02
8560 MUSDU TNIX V2.1 Installation Info Instruction Sheet	070-507-00
UPGRADE INSTALLATION	
856X Hard Disk Drive Upgrade Install Info Instr Sheet	070-5094-00
856X LSI-11/73 Upgrade Install Info Instruction Sheet	070-5095-01
UPGRADE	
8561 MUSDU 4-User Upgrade and Memory Expansion Installation Information Instruction Sheet	070-1623-00
8561 MUSDU 4-User Upgrade and Memory Expansion Option User Information Instruction Sheet	070-4764-00
8561 MUSDU 8-User Upgrade and Memory Expansion Installation Information Instruction Sheet	070-1438-00
8561 MUSDU 8-User Upgrade and Memory Expansion Option User Information Instruction Sheet	070-4770-00
8561 MUSDU 4-User Upgrade Instruction Sheet	070-5179-00
68000 Emulator 8 to 10 MHz Upgrade 020-1076-00	070-4798-00
68000 Emulator Processor Emulator Board EMU2 Upgrade 020-1076-00 Instruction Sheet	070-4833-00
8500 CONVERSION	
8550-to-8540 Option Conversion and 8540-to-8550 Option Conversion Instruction Sheet	070-4437-03
8550-to-8540 Conversion 020-0953-00 Instruction Sheet	070-4447-00
8086-to-8088/8087 Conversion 020-0959-00 Instruct Sheet	070-4561-00
8088-to-8088/8087 Conversion 020-0960-00 Instruct Sheet	070-4562-00
68000 CONVERSION	
68000 Emulator 8 to 10 MHz Conver 020-1076-00 Instr Sht	070-4772-00
68000 to 68xxx Emulator (8300E26 to 8300E36) 8MHz to 12.5MHz Conversion 020-123 Instruction Sheet	070-4988-00
68000 to 68xxx Emulator (8300E26 to 8300E36) 10MHz to to 12.5MHz Conversion 020-107 Instruction Sheet	070-4868-00
68000-A to 68010 Probe (8300P40 to 8300P39) Conversion 020-1079-00 Instruction Sheet	070-5104-00
68010 to 68000-A Probe (8300P39 to 8300P40) Conversion 020-1078-00 Instruction Sheet	070-5105-00
MISC SOFTWARE	
8540 Integration Unit Installation Guide	070-3921-00
8550 MDL GUIDE Installation Manual	070-4402-00
8550 MDL Installation Guide	070-2974-01
8560 MUSDU Installation Guide	070-3899-00
8560/8561 MUSDU Installation Guide	070-4627-00
MISC HARDWARE	
8560 Series MUSDU Hardware Installation Guide	070-5049-00

8503 Disk Expansion Unit Installation Manual	070-4355-00
8560 GPIB Interface Installation Manual	070-4476-00
Memory Allocation Controller Installation Manual	070-3925-00
64K/128K Program Memory Installation Manual	070-3923-00
Trigger Trace Analyzer Installation Manual	070-3761-00
EMULATORS	
68xx Emulator Processor Installation Manual	070-3769-00
EMULATOR/PROTOTYPE CONTROL PROBE	
Z80 Emulator Processor/PCP Installation Manual	070-3665-01
Z8001/Z8002 Emulator Processor/PCP Installation Manual	070-3773-00
1802 Emulator Processor/PCP Installation Manual	070-3667-00
3870/3872/F8 Emulator Processor/PCP Installation Manual	070-3669-00
6800/02 Emulator Processor/PCP Installation Manual	070-3663-00
68000 Emulator Processor/PCP Installation Manual	070-3771-01
8048/8021/8041A/8022 Emulator Proc/PCP Installation Mnl	070-3671-00
8080A Emulator Processor/PCP Installation Manual	070-3664-00
8085A Emulator Processor/PCP Installation Manual	070-3666-00
8086/8088 Emulator Processor/PCP Installation Manual	070-3775-00
9900/9989 Emulator Processor/PCP Installation Manual	070-4158-00
TMS9900 Emulator Processor/PCP Installation Manual	070-3670-00
PROTOTYPE CONTROL PROBE	
6801/68120 Prototype Control Probe Installation Manual	070-3865-00
6809 Prototype Control Probe Installation Manual	070-3866-00
6809E Prototype Control Probe Installation Service Suppl	070-4462-00
PROM PROGRAMMER	
PROM Programmer Controller Installation Manual	070-3903-00
8500 SERIES USERS & INSTALLATION INSTRUCTION MANUALS	
8500 Series 1750A Emulator User and Instal Instr Manual	061-3012-00
8500 Series NSC800 Emulator User and Instal Instr Manual	070-1798-00
8500 Series 7720 Emulator Users and Instal Instr Manual	070-5161-00
8500 Series 7807/7809 and 7810/7811 Emulators Users and Installation Instruction Manual	070-4997-00
8500 Series 78C05/78C06 Emulator Usr and Instl Instr Mnl	070-5164-00
8500 MDL Series 80186/80188 Emulator with Prototype Control Probes Users and Instal Instruction Manual	061-2918-00
8500 MDL Series 80186/80188 Emulator with Prototype Control Probes Users and Instal Instruction Manual	070-4859-00
68xxx Emulator Processor with 68000-A/68008/68010	070-4691-00

Myrl Kwiatkowski MDP Marketing

APPLICATIONS SECTION

RESETTING 4105 DIALOG AREA COLORS

OF INTEREST TO USERS OF THE TEKTRONIX 4105 COLOR TERMINAL: Have you ever displayed a file on your terminal, only to find that it contained characters which re-defined the color indices for your terminal? Here is a suggestion which, while not foolproof, can help quite often. Simply define a prompt string which includes terminal color index commands. Here is the one I use, taken directly from my .profile:

```
PS1="^[%!0^[TD54^[LI703$^[LI133^[%!1 ";export PS1
   +---++----++-----+=+-----++---+=
    |    |    |  |  |    |   a space, part of the prompt
    |    |    |  |  |      return to ANSI mode
    |    |    |  |    set color map to 133
    |    |    |    issue prompt
    |    |      set color map to 703
    |      alternate cursor between color 5 and color 4
     go into TEK mode

          ^[ = escape character
```

Each time the shell issues a prompt, the colors get properly defined on my terminal, and I am assured of a blinking cursor!

Caution: There is a limit to the number of characters which can be defined in a prompt string, so don't try to get too fancy with this approach. Better to create a 'termfix' command which echos the necessary sequence. Also, this does not work while using ColorKey+.

Byron Lunz Customer Support Manager

RUNNING ICOM40/PC OUT OF RAM DRIVE

ICOM40 is a communications package for the IBM/PC that enables the 8540 Integration Unit to be controlled by the IBM/PC. For more information on this product contract your local Tektronix office. This note shows how to run the communication package out of a RAM DRIVE for increased performance.

There are two methods of running ICOM40/PC:

1) Enter "ICOM40 mode" and type in 8540 commands directly.

```
A> ICOM
8540> SEL 80186
8540> D 0 100
etc...
8540> EXIT
A>
```

2) The other method is to preface each 8540 command with "ICOM" into memory, temp files created, and the command executed for each line.

The use of a "RAM Drive" makes this transparent. A RAM Drive uses a portion of memory as a disk drive. Thus accesses to the disk are really accesses to RAM which is very fast. Below is how to use the RAM Drive program (SuperDrive) supplied with the AST memory board on an IBM PC/XT, with one floppy (drive A) and one hard disk (drive C).

1) Install the SuperDrive program and set the switches in the IBM PC as described in the AST Manual.

2) The following batch file will set up your system: This example can be used as a guide for any RAM drive.

```
seticom.bat
-----------
SUPERDRV B:/M+40          Allocate 40K for RAM Drive B:
PATH B:;C:COM ...         Add drive B: to path variable
SET ICOMPATH=B:           Save .tmp files on drive B:
copy ...ICOM.EXE b:       Copy ICOM.exe to drive B:
                          (set path is appropriate)
```

When you type in ICOM the file is loaded from RAM instead of the disk drive. The .tmp files are also stored in RAM causing execution to be about 10 times faster.

There are a number of RAM Drives available on the market. They all work about the same.

Roger Crooks Product Line Manager

HLL - DON'T LEAVE HOME WITHOUT ONE

The most important Tool that an Assembly Level Language Programmer could ever have is A prototype oriented High Level Language, even If all the code implemented in the final product Is generated by Assembly Level Language source code.

A prototype oriented High Level Language allows the assembly language programmer to model the final product and to determine if the original concept and algorithms meet the original requirements and other product objectives.

The HLL modules that comprise the source code then become the specification of the assembly language modules needed. As each module is completed, it can be tested by replacing the HLL module with the new assembly language module at link time. As the modules are verified, they replace the HLL module for subsequent testing. Problems, when they arise, can be easily isolated and fixed.

The HLL generated code allows full functionality testing of the hardware and software concepts. The errors at this level will tend to be basic logic level errors in the description of the erroneous function, since HLL tends to be rather dogmatic about parameter passing, data structures, use of library functions, function calls, etc. Once the problems at this level are resolved with High Level Language Debug tools the orderly conversion to assembly language can occur.

Assembly level problems will now be restricted to a single module, which can easily be debugged since there scope, size, and relationship to other modules is well defined.

If the most inefficient functions are converted first, then the product requirements may well be met with far less then 100% assembly level language implemented. That could drastically reduce overall development time. Who knows, the High Level implementation may be sufficient as is.

No one complains if you are a little ahead of schedule.

John Owens Marketing Information Manager

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HEXADECIMAL AND BINARY DOWNLOADS USING ICOM40

Cross compilers and assemblers produce many different types of files, most of which are compatible with the Tektronix 8540 Integration Unit. This application note will explain how each of these file types can be downloaded into the 8540 Integration Unit using commands available with ICOM40 running on VAX VMS or the IBM/PC. Also discussed are some of the advantages and disadvantages of each type. In the discussion below, the 'RH' (Read Hex) and 'VH' (Vendor Hex) commands are mentioned. 'VH' is available as part of the Extended Hex Interface option for the 8540. It has many improvements over 'RH' and is preferred over 'RH' if the option is available.

TEKTRONIX BINARY FORMAT

This format is the one produced by the Tektronix linkers when they generate a load module with input from Tektronix assembler and compiler products. This format is downloaded with the 8540 'LO' command. The binary format has the advantage of a file being about half the size of the corresponding hexadecimal file, allowing faster downloads. The symbols, if available, can be downloaded using the 8540 'SYMLO' command. Because of these two advantages, the TEKTRONIX BINARY FORMAT is the preferred format for use during downloads to the 8540 Integration Unit.

The following hexadecimal formats are output by many non-Tektronix language products.

STANDARD TEKHEX

This hexadecimal format handles code for 8-bit microprocessors, but has no symbol information. Standard Tekhex can be downloaded using either the 'RH' command or the 'VH' command.

EXTENDED TEKHEX

Extended Tekhex format handles code from 16-bit microprocessors, and has symbol information included. Block sizes can also be larger. In other respects, it is used the same way as Standard Tekhex. Extended Tekhex can be downloaded with 'RH' and 'VH'. If the 'VH' command is used, the symbols will also be downloaded automatically.

INTEL HEXADECIMAL

Intel record types 00 and 01 are supported by 'RH'. Record types 00, 01, 02, and 03 are supported by 'VH'. No symbols are available for use with the 8540 Integration Unit.

MOTOROLA HEXADECIMAL

Motorola record types S0, S1, and S9 are supported by 'RH'. Record types S0, S1, S2, S3, S5, S7, S8, and S9 are supported by 'VH'. No symbols are available for use with the 8540 Integration Unit.

For further information, consult the Extended Hex Interface Users Manual and the 8540 Integration Unit Users Manual.

Roger Crooks Product Line Manager

SOLUTION SOFTWARE CONNECTION

THIRD PARTY SOFTWARE UPDATE

Third Party Software Program

MDP now has in place the four relationships for our Third Party Software business: referrals, joint marketing, distribution, and OEM. We now have the capability to develop the necessary third party relationships to profitably offer complete solutions to our customers' development needs. As there is much to do in each of these areas to take full advantage of the business potential there, we are actively pursuing opportunities in each. Cathy Anderson, 3PS Development Manager, is assuming responsibility for the program, which, henceforth, has the new name "**Solution Software Connection.**"

Distributed S/W Products - International Availability

MDP is now distributing in the U.S., IBM/PC cross-assemblers from Microtec Research, Inc. MDP will soon be distributing Hunter & Ready's VRTX in the U.S. As we work out the issues of pricing, licenses, export control, and support for international distribution, these products will be available in a gradual roll-out. Once resolved, future international availability will occur more quickly.

THIRD PARTY SOFTARE REFERRAL UPDATE:

Cymric Cross-Software

Cymric offers on PDP-11, LSI-11, and VAX hosts cross-assemblers, PASCAL compilers, and simulators for a variety of 8- and 16-bit micros. Some of their products have been demonstrated (sold?) on the 8560. They will be shortly announcing PC-based products. PASCAL is offered for Z80 and 6809; required assemblers are separate. Simulators are offered for 8048, 8051, 8080/5, Z80, 9900, 6502, 6800, 6805, 6809, 7800, 7809/10, and 6301. Assemblers are offered for these micros plus 8086/8, Z8000, 68000, and PDP-11. Cymric offers Tekhex support for downloading to 8540s. They also offer some assemblers which accept the same source syntax as Tektronix assemblers. This may be of interest to customers with 8560 assemblers who also want a VAX or PDP-11 version which Tek doesn't offer. For product information, references, and possible demos contact:

Mark White
Cymric Computer Systems, Inc.
10g Roessler Road
Woburn MA 01801
Phone: (617) 938-0709
Telex: 910 3508158 CYMRIC

C 8086 from Oasys

Oasys, a software vendor of cross-assemblers and programming productivity aids, is now offering a C 8086/186/286 compiler (from Wizard) on VAX (VMS and UNIX), on workstations such as Sun and Masscomp, and on mini's such as Pyramid. They have facilities for pre-execution semantic checking, assembly/linking/loading (100% Intel-compatible), symbolic debugging, simulation, floating point math, performance analysis, and up/down loading to Tek systems. This product may be of interest to customers who want immediate availability of C 8086 on VAX to work with 8540. Or to customers with hosts besides VAX. This product is recommended by at least one mutual customer (with an IBM PC version); it has one of the best benchmark performance of any C 8086. Oasys also offers 68000 cross-software. Oasys handles international sales directly (they have no distributors). For product information, references, and possible demos contact:

Paul Ray
Oasys
60 Aberdeen Ave.
Cambridge MA 02138
Phone: (617) 491-4180

Intel Compatible Software

Caine, Farber, and Gordon (Pasadena, California, (818) 449-3070), Microtec Research (Santa Clara, California (408) 733-2919), and Systems and Software (Costa Mesa, California (714) 241-8650 TWX: 910-695-0125) all offer Intel-compatible software (PLM, assemblers, linker/loaders) on VAX. Their products can be interfaced in various ways to MDP systems. Contact the vendor or MDP Marketing for more information.

R. Bell/C. Anderson Product Line Manager

PRODUCT PERFORMANCE SECTION

MDP BUG BASE

The following product performance reports have been added to or changed in our data base since the last issue of Random Access. We will keep you informed about the progress toward the solutions. We will also try to provide a "work-around" immediately.

Stephen Wood Software Applications Manager

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CANNOT USE MORE TO READ 8540 COMMAND OUTPUT

Configuration

ICOM40 running on a VAX UNIX system. The 8540 is connected to the VAX in the alternate (single line configuration).

Description

When an 8540 command is issued and the resulting output is "piped" into the "more" command, problems occur when the output of the 8540 command exceeds a page of display.

This occurs because the tty port has been placed in "raw" mode to complete the 8540 command. If the output of the 8540 command exceeds one page, the "more" command will attempt to start displaying the text before the 8540 command has completed. Since the port is still in "raw" mode, the output displayed by the "more" command is garbled on the screen, thus, preventing the continue feature (space bar) to work.

Work Around

The work around is for the user to redirect the output of the 8540 command to a file and then use the "more" command on this file.

PROBLEM STARTING UP KSH COLORKEY+

Configuration

8560, 8561, or 8562 with Version 2.1 TNIX specifically, problem in Version 1.0 of the setksh command

Description

The setksh command creates several files in the users $HOME directory which are called and executed via .profile on login. One of these files is '.setTEK'. Within this file is the command 'stty IU >/dev/ttyx '. If the user does not actually have an IU on port x, or if it is turned off when he logs in, his login hangs.

Work Around

Once in this situation, the user must attach and/or power on the 8540 or reboot the 8560 in order to proceed. Possible workarounds are: 1) Manually remove the offending stty command line from the Subsequent setKSH commands, however, will recreate the .setTEK file. 2) Edit out the command which creates the offending line (line #339 in the file /tek/ksh/lib/getiunit). Users using 8550 IUs must then ADD the line to their .setTEK files. 3) Always make sure the 8540 is attached and powered up before logging on.

DATABASEQQ DEFINITION PROBLEM

Configuration

TNIX V2.1A PASCAL 8086 V02.10-00 ICS V02.11-01 ASM V02.04-11 Linker V02.10-00

Description

When ICS generates the linker command file, it defines DATABASEQQ to be the starting address of CONSTANTS_ROM as specified in the ICS source file. If the starting address of GLOBAL_VAR_RAM or HEAP_STACK_RAM is lower than that of CONSTANTS_ROM, linker truncation errors occur and the program will die. This is only a problem when "small data" is specified in the ICS source file.

Work Around

The work around is to edit the linker command file produced by ICS. Changing the definition of DATABASEQQ to the lowest of the starting addresses of CONSTANTS_ROM, GLOBAL_VAR_RAM, or HEAP_STACK_RAM will eliminate this situation.

8086 PDB V1 WILL NOT WORK WITH V2 PASCAL

Configuration

8560 TNIX V2.1A 8086 PASCAL Compiler V02.10-00 8086 PDB V01.11-00

Description

An incompatibility exists when using real constants between the PASCAL Compiler Version 2 and PDB Version 1. When the Version 2 compiler builds debug records for constants of type "real", it assigns a 10 byte value to the constant. PDB is only expecting a 4 byte value. As a result, PDB crashes with a meaningless error: Panic: in proc #20; Stmt out of sequence.

Work Around

A workaround is to define the constant as a VAR of type real and assign a value to it. This situation will also not occur if the module is compiled without the -d (debug) option.

We will be replacing PDB V1 with V2. There will be no mod on V1 planned. PDB V2 will be available after May, 1985.

PLDE LONG LINE PROBLEMS

Configuration

VAX VMS V3.1 or 8560/1 V2.0 with PASCAL Language Directed Editor V1.00-00 and VT100 or 4105

Description

Text lines extending past column 80 on the screen may disrupt the editing display. Examples are: 1) not printing leading tabs in the line following, 2) placing the cursor and text in the wrong locations & lines, 3) not displaying all the characters and 4) over-writing other text on the screen. Even though the display may show garbage, LDE still keeps track of where the cursor is in the file, so the entered commands are obeyed.

80188 JUMPER CONFIGURATION CORRECTION

Configuration

8540, 80188 Emulator and Prototype Control Probe, OS-40 Version 1.0

Description

The jumper positions of P4023 and P6023 are reversed in the documentation. The correct description of the jumpers is as follows.

P4023 is labeled SARDY-CNTRL on the circuit board. P4023 has two positions.
Pins 1 and 2 The SRDY control option is disabled (default).
Pins 2 and 3 The SRDY control option is enabled.

P6023 is labeled ARDY-CNTRL on the circuit board. P6023 has two positions.
Pins 1 and 2 The ARDY control option is disabled (default).
Pins 2 and 3 The ARDY control option is enabled.

Z8000 ICS INITIALIZATION CODE PROBLEM

Configuration

Z8000 ICS and TNIX V2.1 ICS V01.08-00

Description

The initialization code for PASCAL_BEGIN created by ICS is incorrect. There are two statements

```
LDB   FPTRAPQQ,#1D
LDB   FPSWQQ,#0
```

in the initialization code that should be:

```
LD    FPTRAPQQ,#1D
LD    FPSWQQ,#0
```

The first is loading bytes, but FPTRAPQQ and FPSWQQ are both word variables. The symptom of this condition is invalid (sometimes undocumented) run-time error numbers being generated when the code is run.

Work Around

The workaround is to change the file /lib/z8000/ics.mc which has that initialization code in it.

80186 EMULATOR CAN CHANGE MEMORY LOCATIONS ERRONEOUSLY

Configuration

8540, OS-40 Version 1.0, QSR 80186 Emulator and Prototype Control Probe

Description

When executing a program that writes a specific pattern and then reads it back with trace all invoked, it was found that memory locations 0008 and 0009 are altered. The problem can be recreated using the following program.

```
                        org     00f0H
00F0        8905        START   MOVW    [DI],AX
00F2        8B05                MOVW    AX,[DI]
00F4        47                  INC     DI
00F5        EBF9                JMP     START
```

Prior to executing the program, DI should be set to 0000H, and AX can be set to 55AAH. When the program is allowed to trace until locations 8 and 9 are accessed, the value that then exists in these locations is incorrect.

The problem is that while in trace mode and the NMI vector area is used for code info (vs. data info) the emulator writes into user program. Tracing a program that uses the NMI vector area for data presents no problems.

80186 EMULATOR CAN HANG ON START-UP

Configuration

8540, OS-40 Version 1.0, QSR 80186 Emulator and Probe

Description

When setting up the Peripheral Control Block of the 80186, it is possible, by using the correct sequence, to hang the system. This condition will occur in mode 0 and when the lmcs register is set for no internal waitstates. The condition results from a delay in the on-board queue flush. The 80186 Emulator simulates the 80186 queue with an on-board queue storage circuit. The flush generated by the on-board queue storage circuit occurs one half clock cycle late. This delay results in the emulators data buffer not being enabled in the correct direction when control is transferred to user code. Invalid data is then presented to the 80186 CPU. Once this has occured it is no longer possible to regain control of the 80186 CPU.

PAS68K (VMS) MATHCK PROBLEM

Configuration

VAX VMS (11/750) V3.6

Description

When PASCAL programs are run with range checking enabled, it is still possible to zero the element beyond the last element of an array. This seems to be due to a problem with MATHCK. Apparently "(*$mathck-*)" range checking and "(*$mathck+*)" does not re-enable it.

Work Around

The workaround is to explicitly re-enable range checking after re-enabling mathck.

8086 ICS (8560) TRUNCATION ERRORS

Configuration

8560 TNIX V2.1A 8086 PASCAL V2 8086 ASM V02.06-16 Linker V02.11-00

Description

The linker produces truncation errors when linking PASCAL modules together with modules produced by ICS. The code produced is correct, the truncation should not have occured. The condition appears to be an assembler base problem. The problem was exhibited by a large PASCAL application program. When ICS defines the 8086 interrupt vector table, the following ASM instruction is used:

```
word init$-codebaseqq
```

If the initial routine is greater than 8000H away from codebaseqq, the truncation error will be produced. In this particular example, the truncation error could be ignored. This bug is serious because there is no way that the user can determine if the truncation error can be ignored.

Work Around

A non-supported version of 8560 8086 ICS is available from MDP Marketing which fixes this problem. Contact Gordon Glather 1-503-629-1714, MDP Marketing.

LAS LINKER UNDER VMS GIVES MEMORY ACCESS VIOLATIONS

Configuration

VMS Linker V02.01-00

Description

If the following linker command file is invoked, a VMS memory access error occurs and the link aborts:

```
-v
-m PCB_RAM=0-0fff
-m RAM_MEM=0-3eff
-L sec=DATA base RAM_MEM
```

The problem seems to be in the linker error handler under VMS; the TNIX and UNIX versions terminate normally. Note: that a memory overlap error occurs on the RAM_MEM definition, which probably leads to the memory access violation. Without the memory overlap there is no access violation.

PDB68K (VMS) INFINITE LOOP PROBLEM

Configuration

TNIX VAX VMS UNIX

Description

The following PASCAL program causes the PDB loader to get hung in an infinite loop.

```
PROGRAM Dummy ;

TYPE
  first_rec = RECORD
    fst_ele : 0..300 ;
    sec_ele : 0..300
  END ;

  second_rec = first_rec ;
```

```
BEGIN

END.
```

Work Around

The workaround is to explicitly define second_rec. This may also be a problem in other PDB's.

CAN'T INITIALIZE KSH THROUGH 8540

Configuration

The system is configured in TERM mode with an 410X series terminal connected to an 8540, which is then connected to an 8560 running TNIX 2.1 and ColorKey+.

Description

The dot profile created by keyshell has a menu section that queries the 410X series terminal to find out if it's a 4105, 4107, 4109. If an 8540 is connected between the terminal and the 8560, the escape sequences that are sent by the 8560 to the 410X do not pass thru the 8540. Because the information never gets back to the 8560 the menu never completes.

Work Around

When asked what terminal you are using, select option 4, 'other'. Then enter 4105 (or 4107, etc.). This problem will be fixed in TNIX 2.1B.

PRODUCT PERFORMANCE REPORT

PRODUCT NOMENCLATURE AND SERIAL NUMBER: Enter the product description and/or order name and serial number, i.e. "ACEDIT OPT. 1A, S/N B010101"

SYSTEM CONFIGURATION AND VERSION NUMBERS: Include version numbers for all involved products and operating system.

IS THIS SOFTWARE COVERED BY SOFTWARE SUBSCRIPTION SERVICE?

DESCRIPTION: Include source, results obtained, and results expected, **on disc or tape**. Please submit the minimum source code required to demonstrate the problem. Complete documentation will enable us to duplicate the problem.

REPORTED BY:

Customer Name _____ Date _____

Company Name _____ Title _____

Company Address _____

Internal Address/Dept _____

City _____ State _____ Zip Code _____

Area code _____ Tel. No. _____ Ext. _____

Send to:
MDP Technical Support Manager
Tektronix Inc
Del. Station 92-635
P.O. Box 4600
Beaverton, Oregon 97075

USER GROUP LIBRARY ABSTRACTS

27256PP - 27256 PROM PROGRAMMER SOURCES

Prom Programmer FW Source
8540 PP Module

MUGL TNIX Vol VI
Tek 8085 asm

Abstract

This directory contains asm modules which, when combined with those from 2764pp (see UGN Vol 3 Issue 1, pg 40), will allow the burning of 27256 proms. All disclaimers set forth in the above article still apply.

Author: Frans de Brabander, Tek Belgium

ATE1240 - 1240 AUTOMATED TEST SYSTEM

Utility
856X

MUGL TNIX Vol VI
C

Abstract

An automated remote control package to allow creation and execution of real-time digital tests for factory product verification and debugging. Targeted at manufacturers of digital products who need to verify real-time performance of their product. Typical prospects are heavy users of large in-circuit or functional board testers. Their primary problem involves isolation of defective boards which have consistently passed board test. Problems frequently include logic gates with sub-standard set-up and hold times, marginal access-time ram, buss crosstalk etc. Most digital products makers are experiencing some of these problems, and are having great difficulty isolating or classifying these failures in an automated way. This package is aimed at verifying the real-time characteristics of a system and detecting and classifying real-time system failures using automatic test techniques.

Author: Tyler Giles, Chicago F. O.

BAUD - REPORTS OR CHANGES 8560 BAUD RATES

Utility MUGL TNIX Vol VI
856X C

Abstract

Baud allows the user to find out or set the printer port baud rates. The first argument is the port number, where 1 refers to /dev/aux1, and 2 refers to /dev/aux2. If no additional argument is given, the current baud rate is reported. If a second argument is given, the baud rate is set to that value. Legal values are: 0, 50, 75, 110, 134, 200, 300, 600, 1200, 1800, 2400, 4800, 9600. The 0 value is used to indicate an external clock. Some caution is suggested. The command should be owned by root, and either run by root or have set-user-id permission. Do not run this program while the port is in use.

Author: Howard Christeller, D. C. Service Center

CHART - CHART HURRICANE PROGRESS

Graphics Utility MUGL TNIX Vol VI
856X Shell Script, C

Abstract

Chart works with a map of the gulf coast states to chart the progress of hurricanes there. The idea is to put up a copy of the map (cat ngc.pic) and then chart the hurricane by supplying the latitude, longitude, and time (24 hour military format) of observation. Chart uses ige(9) to draw a red circle at the specified coor- dinates annotated by the time. Chart also leaves a file in the current directory of the form hhmm.chart where hhmm is the time of observation. The hurricane can then be placed on the map by using the cat(1) com- mand on this file.

Author: Bob Ice, San Antonio F. O.

CLRI - MODIFY TNIX INODES

System Utility MUGL TNIX Vol VI
856X C

Abstract

Clri allows you to convert inode entries from directory type to plain text and vice versa. This comes in handy when you have a directory entry of the form -something. Normally, rm(1) will complain if it sees a filename begin with a dash because it thinks that the dash is a flag for an option to rm(1). Clri can be used in this instance by using clri to change the directory to a plan text file, using an editor or adb to correct the problem, and then converting the file back to a directory.

Author: Bob Ice, San Antonio F. O.

DAILPASS - DAILUP PORT PASSWORD PROGRAM

System Utility MUGL TNIX Vol VI
856X C

Abstract

Dailpass is a program normally included in either the /etc/profile or $HOME/.profile initialization files. Its function is to serve as a second level password protection mechanism for systems that have dialup lines. A list of port numbers provided to Dailpass as arguments represent the ports which are to be treated as dialups. The user loging in to one of these ports is given three attempts to supply the correct password. Should (s)he[it] fail to do so, Dailpass will immediately log him(her[it]) out.

Author: Bob Ice, San Antonio F. O.

DUMPHIST - GIVE DUMP HISTORIES

System Utility MUGL TNIX Vol VI
856X C

Abstract

Dumphist examines the file /etc/ddate and prints the histories of file system dumps. All epoch (0 level dumps) are stored, but only the latest of lower (incremental) level dumps are kept. The output consist of the filesystem, the dump level, and the date.

Author: Bob Ice, San Antonio F. O.

GTIMES - PRINT ACCESS AND MODIFY TIMES

System Utility MUGL TNIX Vol VI
856X C

Abstract

Gtimes will print a header including the filename followed by the last time the file was accessed and the last time the file was modified. Gtimes gets this information from the associated inode and does not update the access time.

Author: Bob Ice, San Antonio F. O.

PAYMENT - PRINT LOAN TABLES

General Utility MUGL TNIX Vol VI
856X C

Abstract

Payment prints a loan amortization table giving the payment number, remaining principal, payed on principal, payed on interest, and amount of payment. At the end of the table, the total amount payed out will be printed as well as the percentage of principal payed.

Author: Bob Ice, San Antonio F. O.

PIX8085 - WATCH 8085 EXECUTE 'ADD B'

Graphics Demo
856X

MUGL TNIX Vol VI
Shell Script, IGE

Abstract

This directory contains pictures showing the inside of the INTEL 8085 uP while executing the instruction : ADD B. These 4105 graphics pictures were created with IGE (Interactive Graphics Editor) A shell script is included which automatically displays each picture. Note: the text is in French, but anyone who can figure out what a 'C' program does can understand this.

Author: Yvon Patte E D F - G D F France

SETWIN - SETS 4105 GRAPHICS WINDOW

Graphics Utility
856X

MUGL TNIX Vol VI
C

Abstract

The setwin commands reduces the dialog area to 5 lines and displays the graphics in (gin) cursor if invoked with no arguments. The user moves the gin cursor to one corner of the desired new window, hits any key (except ESCAPE) and then marks the other corner in the same manner. The program will calculate a rectangle maintaining the standard 4 x 3 aspect ratio and will mark this rectangle with dotted lines on the old drawing.

Author: Bob Ice, San Antonio F. O.

UMODEM - A MINOR BUG FIX

Modem Communications
856X

MUGL TNIX Vol VI
C

Abstract

There is a minor bug in the version of umodem distributed in MUGL Vol 2. The newline processing is not turned off, which fouls up binary transfers. A one line addition to the code which sets the stty flags will fix this. That line is the one with "CRMOD".

Author: Howard Christeller, D. C. Service Center

UPLOAD/DOWNLOAD - 8560-8002 ASCII FILE XFER

Communications Utility
856X

MUGL TNIX Vol VI
C

Abstract

The files in the 'upload' directory allow ASCII file transfers between an 856X and 8002. The two C programs, 'upoad.c' and 'download.c' should be compiled on the local 856x. There are also files 'upload.8002' and 'download.8002' which need to be sent down to the 8002.

Author: Ron Pashby

USERINFO - PRINTS INFO FROM /ETC/PASSWD

System Utility
856X

MUGL TNIX Vol VI
Shell Script

Abstract

Userinfo is a shell script that calls an awk script to extract information from /etc/passwd. The information, printed in tabular form, consist of: user name, password existence, uid, gid, and GCOS (comment) field contents. If there is no password on a user, that fact is highlighted with a red background on a 4105.

Author: Bob Ice, San Antonio F. O.

X4105.A - 4105 TERMINAL LIBRARY

Utility
8560/VAX Host

MUGL TNIX Vol V
C

Abstract

This library is a repackaging and extension to the module developed by Kathy Dagostino for 4105 program development. Programs written using her techniques will compile using this library. The major difference is that the linker/loader will not have to bring in unnecessary modules when using this library. It will create much smaller object code modules.

Author: Kathy Dagostino (library packaging by Bob Ice)

INDEX OF VOLUME 4

TEK MICROCOMPUTER DEVELOPMENT PRODUCTS DIVISION

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