THE mini-tasker

DECUS
RT-11 SIG NEWSLETTER

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Contributions to the newsletter should be sent to:

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## FROM THE CHAIRMAN

### 1977 SPRING DECUS SYMPOSIUM AT BOSTON

The 1977 Spring DECUS Symposium will give the RT-11 user an opportunity to exchange information on state-of-the-art hardware and software techniques

There will be 15 sessions directly concerned with RT-11. There will be a presentation by DIGITAL on DECNET/RT as well as a RT-11 Product Panel. User papers include a new time sharing executive and a symmetric list processor for RT-11, as well as applications in areas ranging from physiology and behavioral science to job shop production control. Users will provide a tutorial for Structured Programming in BASIC and one for applying TECO to modify and extend BASIC/RT-11. The TECO Tutorial promises to provide self-documenting update techniques applicable to a much wider range of program development.

A number of RT-11 users will present papers in other areas, such as Graphics and Data Acquisition. RT-11 users who have RSX-11 systems will find an opportunity to discuss their needs at the RT/RSX-11 User Panel. There will also be many papers by those using RT-11 as a task on RSX-11 systems. One session will be devoted to the DECUS Library on PDP-11's. There will

be a Hardware Hints and Kinks session for those users who are willing to improve the reliability, predictability and serviceability of their hardware. There will be presentations by DIGITAL including Laboratory Data Products, new hardware, languages and utilities, DECNET and Field Service.

At the RT-11 SIG Meeting we will solicit user needs and DIGITAL plans, and interact with DIGITAL management and development people to help guide RT-11 product development and support. We will attempt to improve SIG effectiveness at the local level and in the interim between symposia. The planning will begin for the Fall DECUS Symposium to be held in San Diego.

Come to the Symposium and meet other users with the same hardware and applications. Establish continuing communications with these users throughout the year. Avoid reinvention of the wheel.

RT TASK UNDER RSX-11

The RT-11 task under RSX-11M has been documented and cleaned up by a number of user installations. Now DEC is interested in possibly re-implementing it as a supported product. I have stopped distributing the now obsolete version obtained from DEC. Distribution of a new version will begin at the Boston DECUS. At the moment it is not clear which version should be the standard, who should distribute it, and how it will be supported. It is clear that there will be a standard supported version distributed with documentation.

TECO LIVES

Teco is in the DECUS Library with a manual for RT-11. Catalog number is 11-288.

SURVEY

Survey forms will be available at Boston DECUS. They will also be published in the next issue of the Minitasker.

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## SIGS

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TECH SIG

Douglas Sinclair of DEC Educational Services is interested in the formation of a Tech SIG for users interested in hardware.

LSI-11 and 11/03

There is interest in the formation of a new SIG which would serve the specific needs of LSI-11 users. Interested persons may contact:

Wilber R. Boykin
NASA Johnson Space Center/SC4
Houston, TX 77058
(713) 483-5311

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ADDITIONAL NOTES FROM LAS VEGAS

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13-DEC-76

FROM: FRED I. MAGEE
TO: DISTRIBUTION

RE: SESSION F4.1 AND F4.2, RT-11 HIGH LEVEL COMMAND LANGUAGE
FALL DECUS AT LAS VEGAS, NEVADA 12/6/76

SO THAT PDP11 USERS WHO DID NOT HAVE THE OPPORTUNITY TO ATTEND THE FALL DECUS CAN HAVE SOME FEEDBACK, THIS REPORT IS BEING GENERATED. OTHER MEETINGS WILL BE COVERED IN LATER MEMORANDA.

A COPY OF THIS MEMORANDUM IS BEING RELEASED TO THE RT11 SIG CHAIRMAN FOR POSSIBLE USE IN THE SIG NEWSLETTER.

ATTACHED IS A REDUCED XEROX COPY OF THE SLIDES USED IN THE PRESENTATION. IT IS BELIEVED THAT THESE SLIDES ARE ESSENTIALLY SELF EXPLANATORY. EDITORIAL COMMENT WILL BE ADDED--GIVING SOME OF THE ADDITIONAL FLAVOR OF THE MEETING.

THE REFERENCE TO DIGITAL COMMAND LANGUAGE STANDARD (DCLS) WAS ADDED AS ONE OF MY NOTES ON SLIDE 1. USERS OF THE CONCISE COMMAND LANGUAGE (CCL) FROM THE OS/8 OPERATING SYSTEM, AND USERS OF THE CONCISE COMMAND LANGUAGE ON THE PDP10--AND POSSIBLY USERS OF OTHER DEC OPERATING SYSTEMS WILL NEED TO NOTE ESPECIALLY THE REVERSAL OF THE POSITIONS OF SOURCE AND DESTINATION FILE NAMES IN THE COMMAND STREAM.

A GOOD EXAMPLE TO STUDY, FOR THIS NEW CONCEPT IS TO READ THE SLIDE (NO 7) ON PROMPTING. NOTE HERE, THE MACHINE WILL PROMPT THE USER FOR NEEDED INPUT INFORMATION IF ONLY THE COMMAND WORD COPY IS WRITTEN. THE EXAMPLE MAKES IT CLEAR THAT THE SOURCE IS A.MAC AND IS CLEARLY STATED IN THE LAST STATEMENT ON THIS SLIDE --

COMMAND IS COMPLETE, SYSTEM EXECUTES: COPY A.MAC B.MAC

AS A GENERAL COMMENT, THE SWITCHES PREVIOUSLY IMPLEMENTED ARE STILL IMPLEMENTED. THERE MAY BE ADDITIONS. FOR EXAMPLE, NOTE ON SLIDE 9 THAT THE / OWNER: 200,200 SWITCH HAS BEEN ADDED FOR THE COPY COMMAND--WHICH INVOKES A COMMAND IN PIP.

REGARDING THE COMMAND "DIFFERENTIATE" ON SLIDE 16.
IF THIS SEEMS TO BE A STRANGE REPLACEMENT FOR "SRCCOM", WELL, THE OBJECTIVE IS TO ALLOW ANY OF THESE COMMANDS TO BE CALLED WITH THE FIRST 4-CHARACTERS IN THE NAME. THERE WERE JUST TOO MANY OTHER COMMANDS STARTING WITH "COMP" TO ALLOW USE OF THE WORD "COMPARE" FOR THIS COMMAND.

REGARDING SLIDE 25 THE COMPILE COMMAND, AND THE COMPILE QUALIFIERS OR SWITCHES. THE 25A SLIDE EQUIVALENT DID NOT GET REPRODUCED IN THE HANDOUT. MY COPYING WAS JUST TOO SLOW TO GET ALL THE SWITCHES COPIED--BUT HERE ARE SOME OF THEM:

| | | | |
|---|---|---|---|
| /F4P | /FORTRAN | /MACRO | /DIBOL |
| /LIST (MACRO) | /ENABLE:X(MACRO) | /DISABLE:X(MACRO) | /CROSSREFERENCE |
| /ALPHABETIZE | /ON DEBUG | /EXTEND | /STATISTICS |

THIS IS ONLY A PARTIAL LIST.

THE INDIRECT COMMAND FILES STARTING AT SLIDE 30

THE INDIRECT COMMAND FILES WILL GIVE A MUCH CLEANER MECHANISM FOR RUNNING BATCH TYPE COMMAND SEQUENCES. BATCH WILL BE MAINTAINED (AT LEAST THE $RT11 CALLING MODE--THE ONLY ONE THAT APPEARS TO SUPPORT ALL SWITCHES FOR A SUPPORTED PROGRAM) FOR THOSE USERS WHO MUST MAINTAIN A LOG OF THE BATCH TRANSACTIONS.

# RT-11

# High Level Command Language

Digital Command Language Standard

Monitor Disk Image Did Grow! Disk Size.

DCLS Adds 15-20 Words

No Provisions to Protect Files on Disk



## Commands

File Maintenance

COPY DELETE RENAME

General Utility

PRINT TYPE DUMP

DIRECTORY DIFFERENTIATE

Volume Maintenance

SQUEEZE INITIALIZE

System Utility

INSTALL REMOVE BOOT

SHOW DEVICES



## Commands

Program Development

EDIT LINK RUN

Languages

BASIC DIBOL FOCAL

FORTRAN MACRO

COMPILE



## Command Format

Command[/Qualifiers] Parameter1 ... Parameter

Parameters { File-Specification[/Qualifier
Option-Name[:Option-Value] }

## Examples

Fortran Main, Subr

Link Main, Subr

Macro/List Defin + Root, Over

Copy A.mac+B.mac C.mac

## QUALIFIERS

- COMMAND QUALIFIERS - APPLY ACROSS CMD.

COPY/ASCII *.MAC *.NEW

- FILE QUALIFIERS - APPLY TO SINGLE FILE

COPY A.MAC DT1:B.MAC/DOS



## ABBREVIATIONS

- QUALIFIERS - NEED ONLY MINIMUM UNIQUE STRING (MAX = 4 CHARACTERS)

- COMMANDS - MINIMUM UNIQUE STRING WITH FOLLOWING EXCEPTIONS:

R = V02C "R" COMMAND
B = V02C "B" COMMAND
E = V02C "E" COMMAND
D = V02C "D" COMMAND



## PROMPTING

- SYSTEM KNOWS WHEN USER OMITS A REQUIRED COMMAND PARAMETER AND WILL PROMPT USER TO SUPPLY IT UNTIL COMMAND IS COMPLETE

EXAMPLE: COPY COMMAND REQUIRES INPUT & OUTPUT

USER TYPES: COPY ↵ (↵ = CAR. RTN.
SYS. RESPONDS: FROM?
USER TYPES: A.MAC ↵
SYS. RESPONDS: TO?
USER TYPES: B.MAC ↵

COMMAND IS COMPLETE, SYSTEM EXECUTES:
COPY A.MAC B.MAC



## COPY

- SUPPORTS WILD CARDS - *
- HANDLES RT, DOS, TOPS-10 DEVICES
- SUPPORTS QUERY MODE FOR WILD CARDS
- COPIES MONITOR BOOTSTRAPS
- COPIES DEVICE TO DEVICE (FAST IMAGE COPY)

FORMAT: COPY INPUT OUTPUT
PROMPTS: FROM?
TO?

EXAMPLES: COPY A.MAC+B.MAC C.MAC
COPY A.MAC,B.MAC DT1:*.*
COPY/ASCII FOO.MAC DT0:FAH.MAC/DOS

## COPY QUALIFIERS

/QUERY
/CONCATENATE
/IGNORE
/ASCII
/BINARY
/IMAGE
/ALLOCATION: SIZE
/SYSTEM
/BAD
/BOOT
/DEVICE
/TOPS
/DOS
/OWNER: 2¢¢,2¢¢

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## DELETE

- SUPPORTS WILD CARDS - *
- HANDLES RT, DOS DEVICES
- SUPPORTS QUERY MODE FOR WILD CARDS

FORMAT: DELETE INPUT

PROMPT: FILE?

EXAMPLES: DELETE/QUERY *.OBJ
DELETE DT2: A.MAC/DOS

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## RENAME

- SUPPORTS WILD CARDS - *
- SUPPORTS QUERY MODE FOR WILD CARD

FORMAT: RENAME INPUT OUTPUT

PROMPTS: FROM?
TO?

EXAMPLES: RENAME/QUERY *.MAC *.OLD

(11) (7)

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## DIRECTORY

- SUPPORTS WILD CARD, WILD CHARACTER - *
- SUPPORTS REVERSE WILD CARDS
- PRINTS MULTI-COLUMN DIRECTORIES
- SORTS DIRECTORIES BY: FILENAME, EXTENSION, DATE, SIZE
- LISTS DELETED FILES, FILES PER SEGMENT
- LISTS DOS AND TOPS-10 DIRECTORIES

FORMAT: DIRECTORY INPUT-LIST

PROMPTS: NONE - DEFAULTS TO DK: DIRECTORY

EXAMPLES: DIRECTORY/PRINTER FOO.*
DIRECTORY/EXCLUDE *.SYS
DIRECTORY/COLUMNS:5 A%B.*

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## DIRECTORY QUALIFIERS

/BLOCKS
/BRIEF
/FAST
/FULL
/PRINTER
/TERMINAL
/OUTPUT:file
/SUMMARY
/COLUMNS:n
/ORDER:sortname
/EXCLUDE
/ALPHABETIZE
/OCTAL
/DATE
/SINCE
/BEFORE
/FREE
/DOS
/TOPS
/OWNER:uic
/DELETED
/REVERSE
/BEGIN
/ALLOCATION



## PRINT - TYPE

- SUPPORT WILD CARDS - *
- PRINT LISTS FILES ON LINEPRINTER
- TYPE LISTS FILES ON TERMINAL
- BOTH SUPPORT QUERY MODE FOR WILD CA

FORMAT: PRINT INPUT-LIST
TYPE INPUT-LIST

PROMPT: FILE?

EXAMPLES: PRINT/QUERY *.LST
TYPE DEFIN.MAC



## DUMP

- LISTS DEVICE, FILE CONTENTS
- OUTPUTS TO TERMINAL, FILE, LINEPRINTER

FORMAT: DUMP INPUT

PROMPT: DEVICE OR FILE?

EXAMPLES: DUMP FOO.MAC/ONLY:1
DUMP/OUTPUT:DFILE DTØ:/START:6
DUMP/RADSØ FILE.RSØ/ONLY:2



## DIFFERENTIATE

- SOURCE COMPARES 2 FILES
- OUTPUTS TO TERMINAL, FILE, LINEPRINT

FORMAT: DIFFERENTIATE INPUT1, INPUT2

PROMPTS: FILE1?
FILE2?

EXAMPLES: DIF PIP, PIP.OLD
DIF/PRINTER MAYNRD, VEGAS

# INITIALIZE

- ZEROES DEVICE DIRECTORY
- SUPPORTS RT, DOS DEVICES

FORMAT: INITIALIZE DEVICE

PROMPTS: DEVICE?

EXAMPLES: INIT/SEGMENTS:6 RK1:

INIT DT0:/DOS

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# SQUEEZE

- CONSOLIDATES UNUSED SPACE ON DEVICE
- COPIES ONE DEVICE TO ANOTHER, WHILE CONSOLIDATING UNUSED SPACE

FORMAT: SQUEEZE DEVICE

SQUEEZE DEVICE/OUTPUT:DEVICE2

PROMPTS: DEVICE?

EXAMPLES: SQUEEZE RK:

SQUEEZE RK:/OUTPUT:RK1:

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# INSTALL

- INSTALLS DEVICE INTO MONITOR TABLES
- ELIMINATES NEED TO PATCH MONITOR TABLES
- WORKS ON IN-CORE MONITOR
- PLACE IN STARTUP INDIRECT FILE TO MAKE PERMANENT

FORMAT: INSTALL DEVICE

PROMPTS: DEVICE?

EXAMPLES: INSTALL CR

INSTALL DX, LP

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# REMOVE

- REMOVES DEVICE FROM MONITOR TABLES
- ELIMINATES NEED TO PATCH MONITOR TABLES
- WORKS ON IN-CORE MONITOR
- PLACE IN STARTUP INDIRECT FILE TO MAKE PERMANENT
- FREES DEVICE SLOT FOR USE BY INSTALL

FORMAT: REMOVE DEVICE

PROMPTS: DEVICE?

EXAMPLES: REMOVE DT

REMOVE CR, LP

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# SHOW DEVICES

- LISTS DEVICES CURRENTLY IN MONITOR TABLES
- LISTS LOGICAL NAMES ASSIGNED TO DEVICES
- INDICATES HANDLERS LOADED OR RESIDENT
- INDICATES JOB OWNERSHIP OF DEVICES FOR F/B
- WORKS ON IN-CORE MONITOR

FORMAT: SHOW DEVICES

PROMPTS: NONE

EXAMPLE: SHOW DEVICES



# BOOT

- BOOTSTRAPS SPECIFIED DEVICE OR FILE
- NON-DESTRUCTIVE - CAN SWITCH MONITORS WITHOUT CHANGING BOOT BLOCKS ON VOLUME

FORMAT: BOOT DEVICE
BOOT FILE

PROMPTS: DEVICE OR FILE?

EXAMPLES: BOOT RK1:
BOOT RKMNFB



# EDIT

- EDITS EXISTING FILES WITH BACKUP
- CREATES NEW FILES
- INSPECTS FILES WITH NO CHANGES
- ALLOWS SPECIFICATION OF EDITOR TO USE

FORMAT: EDIT FILE

PROMPTS:

EXAMPLES: EDIT A.MAC
EDIT/CREATE NEWFIL.FOR
EDIT/INSPECT NOCHNG.FOR
EDIT/TECO KMON.MAC



# LINK

- LINKS FILES SPECIFIED
- OPTIONALLY GENERATES LINK MAP
- HANDLES DEFAULT OUTPUT FILE NAMES
- OPTIONALLY LINKS ODT W/PROGRAM

FORMAT: LINK INPUT-FILES

PROMPT: FILE?

EXAMPLES: LINK/MAP BOOT, RT11SJ, RK
LINK/EXECUTE:PROG C, D, E
LINK/DEBUG MYPROG

# COMPILE

- SUPPORTS FORTRAN, MACRO, DIBOL
- SUPPORTS SEPARATE OR COMBINED COMPILATIONS
- HANDLES DEFAULT OUTPUT FILE NAMES
- SUPPORTS MACRO, FORTRAN, DIBOL COMPILER OPTION
- DEFAULT LANGUAGE CHANGED BY SET COMMAND

FORMAT: COMPILE INPUT-FILES

PROMPTS:

EXAMPLES: COMPILE A+B

COMPILE DEFIN+ROOT, OVER1, OVER2

COMPILE/FORTRAN MAIN, SUBR

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# BASIC - FOCAL

- KMON COMMAND JUST INVOKES BASIC, FOCAL
- LANGUAGES HAVE OWN SUB-COMMAND LANGUAGE

FORMAT: BASIC

FOCAL

PROMPTS: NONE

EXAMPLES: BASIC

FOCAL

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# MACRO

- SUPPORTS SEPARATE OR COMBINED ASSEMBLIES
- HANDLES DEFAULT OUTAUT FILE NAMES
- SUPPORTS LISTING, ASSEMBLY OPTIONS
- SUPPORTS CROSS REFERENCE

FORMAT: MACRO INPUT-FILES

PROMPTS: FILE?

EXAMPLES: MACRO MAIN1, MAIN2

MACRO/LIST MAIN+SUBR, OVER1

MACRO/LIST/NOOBJECT MYPROG

MACRO/LIST/SHOW:MEB DEBUG+SUBR

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# FORTRAN

- SUPPORTS SEPARATE OR COMBINED COMPILATIONS
- HANDLES DEFAULT OUTPUT FILE NAMES
- SUPPORTS COMPILER OPTIONS
- SUPPORTS SPECIFICATION OF COMPILER TO USE

FORMAT: FORTRAN INPUT-FILES

PROMPTS: FILE?

EXAMPLES: FORTRAN PATCH0, PAT1, PAT2

FORTRAN

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# DIBOL

- SUPPORTS SEPARATE OR COMBINED COMPILATIONS
- HANDLES DEFAULT OUTPUT FILE NAMES
- SUPPORTS CROSS-REFERENCE
- SUPPORTS COMPILER OPTIONS

FORMAT: DIBOL INPUT-FILES

PROMPTS: FILE?

EXAMPLE: DIBOL/LIST PAYROLL

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# INDIRECT COMMAND FILES

- FORMATTED EXACTLY LIKE TERMINAL INPUT
- UNLIMITED SIZE COMMAND FILES
- MAY BE NESTED 3 DEEP
- OLD AND NEW COMMANDS CAN BE MIXED
- COMMANDS ECHO ON TERMINAL
- USER PROGRAM CAN INVOKE COMMAND FILE OU EXIT
- INVISIBLE IF PROGRAMS USE .CSIGEN/.CSISPC WITH TERMINAL INPUT

FORMAT: @FILE

EXAMPLES: COMPILE @MAKERT

MAKERT.COM → SJ+KMON+USR+RMONSJ+KMOVLY

@CLEAN

CLEAN.COM → R PIP
*.OBJ,*.TMP,*.BAK/D

(REALLY UPARROW^C NOT CTRL <C>)

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EXAMPLE: @BUILD

BUILD.COM → @COMPILE
@LINK

COMPILE.COM → COMPILE/OBJECT:BOOT SJ.BSTRAP
COMPILE/OBJ:RK SJ+SYSDEV+RK
COMPILE/OBJ:RT11SJ SJ+KMON+USR+RMONSJ+OVL

LINK.COM → LINK/EXECUTE:MONITR.SYS BOOT,RT11SJ,RK

# RESTRICTIONS

- @FILE VALID ONLY TO KMON, NOT USR
- .TTYIN WILL NOT TRACK COMMAND FILE

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# GET LINE EMT

- GETS LINES FROM TERMINAL OR COMMAND FILE
- OPTIONAL PROMPT STRING SUPPORTED
- REQUIRES USR

FORMAT: .GTLIN .BFADR[,.PSTRG]

.BFADR - ADDRESS OF BUFFER TO RECEIVE LINE

.PSTRG - ADDRESS OF OPTIONAL PROMPT STRING TO PRINT BEFORE COLLECTING LINE

NEW EMT REQUIRED TO TRACK INDIRECT COMMAND FILES. .TTYIN's WILL ALWAYS GET INPUT FROM TERMINAL - .GETLIN USES TERMINAL OR COMMAND FILE FOR INPUT - .TTYIN SHOULD BE USED WHEN OPERATOR INTERACTION IS DESIRED, E.G. PIP's "DTØ:/Z ARE YOU SURE?"

QUERY SHOULD ACCEPT ANSWER USING .TTYIN

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FROM: FRED I. MAGEE, 2643 SLA
TO: DISTRIBUTION

RE: DECUS DISCUSSION ON RT-11 EXTENDED MEMORY SUPPORT

I HAVE NOT UNDERTAKEN TO WRITE A SUMMARY OF THE DISCUSSION OF THIS TALK GIVEN AT THE FALL DECUS IN LAS VEGAS. THE MATERIAL PRESENTATION MOVED A BIT TOO FAST FOR ME TO GET SUFFICIENT SUPPORTING NOTES.

THE HANDOUT--COPIES OF THE VU GRAPHS-- HAVE BEEN REDUCED SO THAT 4 CAN BE REPORDUCED ON EACH PAGE. THESE ARE FORWARDED IN CASE THEY MAY BE A HELP TO UNDERSTANDING THE SYSTEM AND SOME OF THE DESIGN GOALS.

# RT-11 Extended Memory Support

## Motivation

- RT-11 User Programs Limited To 32K Of Address Space
- Several Products Benefit From Larger Address Space
  - MU/BASIC
  - FORTRAN IV
  - TIME SHARED DIBOL
  - REMOTE

Third Monitor, which supports memory management, Mayby 2k more than present FB monitor possibly less

## Non-Goals

- Linker Support of Resident Overlays in Extended Memory
- RUN or FRUN Into Extended Memory
- Modification of Cusps for Extended Memory
- Segmentation or Paging Support
- Protection Schemes Using KT-11 (13)
- 22 Bit I/O

## Resolution

- Provide Monitor Facilities To:
  - ALLOCATE EXTENDED MEMORY
  - MANAGE KT-11 MAPPING REGISTERS
- Allow Programs To Extend Their Address Space Beyond 32K

## TERMS

- **PROGRAM VIRTUAL ADDRESS SPACE (PVAS):** THE 32K ADDRESSING SPACE AVAILABLE TO A PROGRAM - DETERMINED BY 16-BIT WORD SIZE

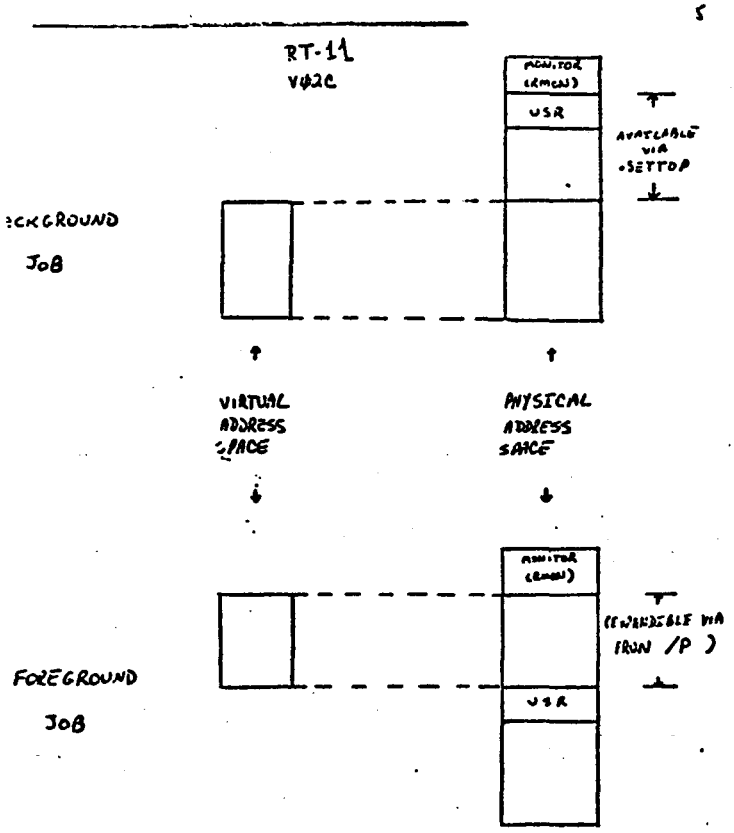
- **REGION:** A CONTIGUOUS SEGMENT OF PHYSICAL MEMORY

- **STATIC REGION:** A FIXED REGION IN THE LOWER 28K OF PHYSICAL MEMORY

- **DYNAMIC REGION:** A REGION LOCATED IN EXTENDED MEMORY AND CREATED BY A PROGRAM VIA AN ALLOCATION REQUEST TO THE MONITOR

- **PROGRAM LOGICAL ADDRESS SPACE (PLAS):** THE SET OF STATIC AND DYNAMIC REGIONS ALLOCATED TO A PROGRAM

(5)




(7)

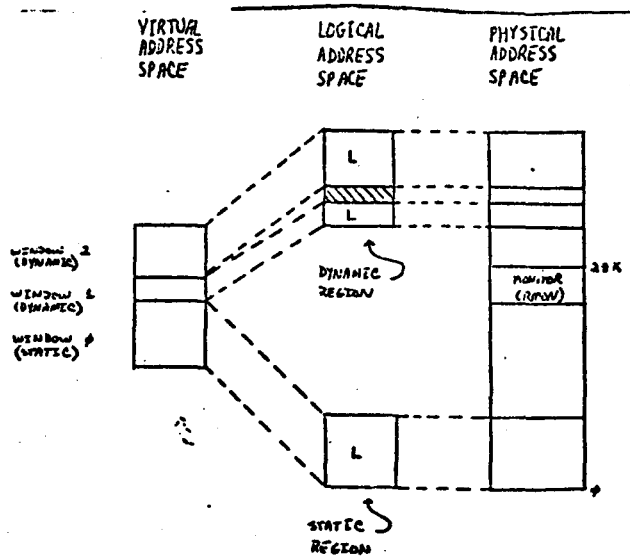
## TERMS

- **WINDOW:** A SEGMENT OF A PROGRAM'S VIRTUAL ADDRESS SPACE WHICH WILL BE MAPPED INTO PART OF A REGION IN THE PROGRAM'S LOGICAL ADDRESS SPACE

- **STATIC WINDOW:** A WINDOW WHICH IS MAPPED INTO THE STATIC REGION AND MAY NOT BE CHANGED BY THE PROGRAM

- **DYNAMIC WINDOW:** A WINDOW WHICH A PROGRAM MAY CHANGE TO MAP A SEGMENT OF ITS VIRTUAL ADDRESS SPACE INTO SPECIFIED REGIONS OF ITS LOGICAL ADDRESS SPACE

(6)




▨ = UNMAPPED, BUT AVAILABLE

(8)

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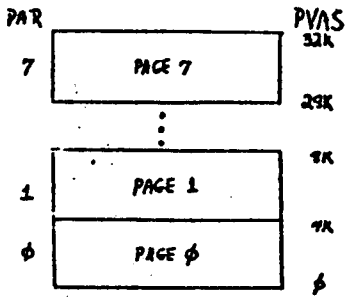
KT11

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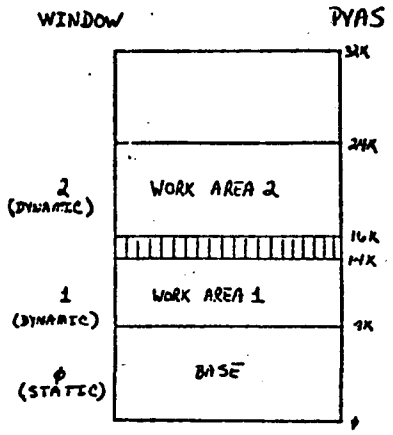
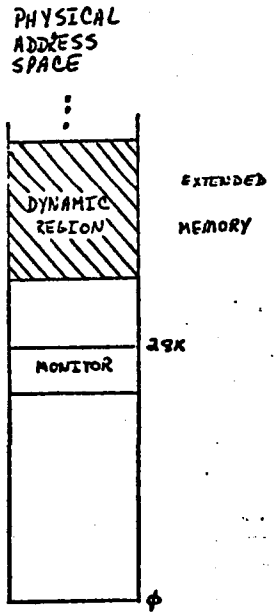
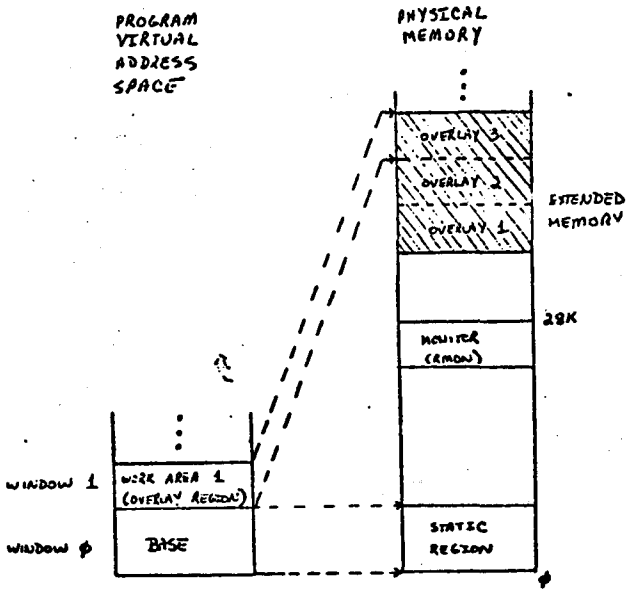



▭ = DISCONTINUITY IN PROGRAM'S VIRTUAL ADDRESS SPACE.

(10)




(11)




▨ - DYNAMIC EXTENDED MEMORY REGION

- - - → - CURRENT WINDOW MAPPING

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## Management of Dynamic Regions

- Regions Located Above 28K
- Programs Have Up To 4 Regions
- Max. Region Size Is 96K

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## Programmed Requests

- Create A Region

  .CRRG .AREA[,.RGADR]

- Deallocate A Region

  .ELRG .AREA[,.RGADR]

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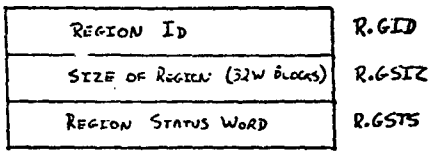
## Region Descriptor Block




Created At Assembly Time By:

.RDBBK .RGSIZ

Offsets, Status Bits Defined By:

.RDBDF

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## Definition of Program Address Windows

- Program Has 32K of PVAS
- Static Window Ø Maps Prog. Base To Low 28K
- Rest of PVAS Available For Dynamic Windows
- Maximum of 7 Dynamic Windows
- Window Size: 32 words - 28K
- Windows Can't Overlap
- Window Starts on 4K Address Boundary

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# Programmed Requests

- Create An Address Window

.CRAW .AREA[,.WADR]

- Eliminate An Address Window

.ELAW .AREA[,.WADR]



# Window Definition Block

| | | Offset in Block |
|---|---|---|
| Base PAR | Window ID | W.NAPR W.NID |
| Base Virtual Address | | W.NBAS |
| Window Size | | W.NSIZ |
| Region ID | | W.NRID |
| Offset into Region | | W.NOFF |
| Length to Map | | W.NLEN |
| Status | | W.NSTS |

Created At Assembly Time By:

.WDBBK .WNAPR,.WNSIZ[,.WNRID,.WNOFF,.WNLEN,.WNSTS]

Offsets, Status Bits Defined By:

.WDBDF



# Mapping Windows Into Regions



# Programmed Requests

- Map A Window

.MAP .AREA[,.WADR]

- Unmap A Window

.UNMAP .AREA[,.WADR]

- Mapping Status

.GMCX .AREA,.WADR

## Additional Monitor Extended Memory Support

Can Issue EMT's From Extended Memory

I/O Supported Within PVAS

- Can unmap buffer once EMT is issued
- Completion routines must stay mapped
- Buffers can't cross region boundary

Foreground And Background Can Access Extended Memory Simultaneously

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## Memory Layout and Mapping

- Monitor In High End of Lower 28K
  - Executes in kernel mode
  - Maps I/O page and lower 28K
  - Kernel vector space is low 256 words
- USR Always Resident
  - Runs in kernel mode
- KMON Is Privileged Background Job
  - Runs in user mode
  - Mapped to I/O page and low 28K like RMON
- Foreground and Background Run in User Mode

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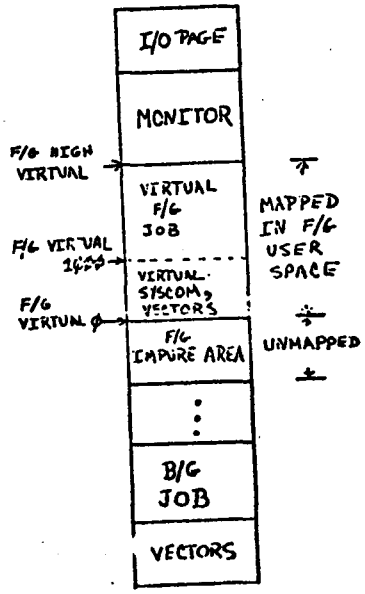
## Two Types of User Mode Mapping

- Privileged (Compatibility) Mapping
  - Default mapping — V02C compatible
  - Full access to vectors, monitor, I/O page
  - Job mapped to I/O page, lower 28K
- Virtual Mapping
  - Full 32K virtual address space
  - No privileged access to monitor, I/O page
  - Job mapped starting at user virtual 0
  - Low 500 bytes - virtual vector, syscom area
  - Window 0 maps: virtual 0 - top of prog. base
  - Virtual space above prog. base can be mapped

(23)




(24)

## RESTRICTIONS

- MEMORY LIMITED TO 128K WORDS
- NO PROGRAM LOADING INTO EXTENDED MEMORY
- RESTRICTIONS ON PROGRAMMED REQUESTS:
  - .CDFN - CHANNEL AREA IN LOW 28K
  - .QSET - QUEUE SPACE IN LOW 28K
  - .SETTOP - ONLY UP TO CURRENT HI VIRTUAL
  - .CNTXSW, .DEVICE - NOT AVAILABLE TO VIRTUAL JOBS
  - .SFPA, .TRPSET - TRAP ADDRESS MUST STAY MAPPED
- COMPLETION ROUTINES MUST STAY MAPPED
- FOUR DYNAMIC MEMORY REGIONS PER PROGRAM
  - EACH REGION ≤ 96K, MULTIPLE OF 32 WORDS
- SEVEN DYNAMIC WINDOWS PER PROGRAM
  - EACH WINDOW ≤ 28K, MULTIPLE OF 32 WORDS
  - ALIGNED ON 4K VIRTUAL ADDRESS BOUNDARY
- INTERRUPT SERVICE ROUTINES IN PRIVILEGED JOBS ONLY
  - MUST RESIDE IN LOW 28K

(26)

## RESTRICTIONS (CONT'D)

- USR ALWAYS RESIDENT, NOSWAP
- HANDLERS MUST RESIDE IN LOW 28K
  - ONLY PRIVILEGED JOBS CAN .FETCH HANDLER
  - MUST "LOAD" HANDLER FOR VIRTUAL JOBS

## PROGRAMMED REQUESTS

- EXIT FROM AST SERVICE ROUTINE

  .ASTX

- GET MONITOR FIXED OFFSET

  .GVAL .AREA,.OFFSET

(25)

SPRS

| SYSTEM PROGRAM AND VERSION (OR DOCUMENT) | MONITOR AND VERSION | DATE |
|---|---|---|
| | | February 2, 1977 |

NAME: F. I. Magee Div. 2643
FIRM: Sandia Laboratories KAFB (east)
ADDRESS: Albuquerque, N.M. 87115
ZIP

SUBMITTED BY: Fred I. Magee PHONE: (505) 264-2115
LIST ATTACHMENTS

DEC OFFICE

REPORT TYPE
- ☐ LOGIC/CODING ERROR
- ☒ DOCUMENTATION ERROR
- ☐ SUGGESTION
- ☐ INQUIRY
- ☐ FOR YOUR INFORMATION

PRIORITY
- ☐ LOW
- ☐ STANDARD
- ☒ HIGH

CAN THE PROBLEM BE REPRODUCED AT WILL?
☒ YES ☐ NO

| CPU TYPE | SERIAL NO. | SYSTEM DEVICE | MEMORY SIZE | DISTRIBUTION MEDIUM |
|---|---|---|---|---|
| PDP11/45 | 2037 | RK, RK1, DX, DF, | 48k | DECPACK |

The BASIC/RT-11 extension package Q5830HE (see attached purchase order 56-0777) received 12/14/76 had a BASVT5.SAV file that appeared to function properly when using RT1V 2C monitor on a PDP/10 processor with a VT55 scope and on the PDP11/45 processor using a VT05 scope. The VT55.OBJ file supplied by DEC was not the correct file. (see enclosure 2)

When a user subroutine name was added to FTBL and user routines linked to implement this call to the real time clock, the newly created .SAV file, when called with the .R command, would return to "." level without printing any initialization dialogue. Armed with a map, and BASICH.LST file it was ascertained that under the .R Command, the onceonly code was not entered. A get and start command sequence resulted in proper initialization and the module appeared to run correctly. The user returned to his PDP 11/10 with LPS hardware and its VT55. Further testing on that machine disclosed that the test example for the VCJR call, section 3.2.7 BASIC-11 graphics extensions user's guide Dec-11-LBGEA-A-EXECJTED an unwanted CHF as the first action of statement 170.

Using assembly listings for VT55 BASICH (from sources which we had purchased) it was determined that the subroutine MSG was invoked (suggesting) that the non RTV2 version VT55.OBJ had been included with the software package). Rather than the Rt-11 version which calls the macro from Rt1V 2.(see enclosurs 3-6) Maybe the caps VT55 module doesn's work correctly either! an incorrect start address was stored in the .SAV file by the linkes. A correctly assembled VT55.OBJ (not discussed in your procedures CEVT55.OBJ used to link a .SAV file, the undisired CHF was not executed. Also the proper start address was loaded into the .SAV file by the link program.

There still exists a fault in SETC call which will be another SPR. SETR does function thus our program can be used until a fix is formed.

| SYSTEM PROGRAM AND VERSION (OR DOCUMENT) | MONITOR AND VERSION | DATE |
|---|---|---|
| | RT-11 V02C-0F | February 8, 1977 |

NAME: Fred I. Magee
FIRM: Sandia Laboratories, Division 2643
ADDRESS: Albuquerque, NM
ZIP 87115

SUBMITTED BY: San Trellue
PHONE: 505-264-2115

LIST ATTACHMENTS: See below

DEC OFFICE: Albuquerque, NM

REPORT TYPE
- [ ] LOGIC/CODING ERROR
- [ ] DOCUMENTATION ERROR
- [x] SUGGESTION
- [ ] INQUIRY
- [ ] FOR YOUR INFORMATION

PRIORITY
- [ ] LOW
- [x] STANDARD
- [ ] HIGH

CAN THE PROBLEM BE REPRODUCED AT WILL?
- [x] YES
- [ ] NO

| CPU TYPE | SERIAL NO. | SYSTEM DEVICE | MEMORY SIZE | DISTRIBUTION MEDIUM |
|---|---|---|---|---|
| PDP 11/45 | 2087 | RK05 | 32 K | RK05 |

Problem : RT-11 Batch system will not accept a backslash ( \ ) character in the input stream.

Example : Here at Sandia I write the monthly software patches to RT-11 as Batch jobs. This allows other users to patch their systems without typing in each patch. Many patches require the use of patch and the backslash command is used to open a byte location. In attempting to run such a Batch job the batch system responds with the BC (bad code) fatal error.

Cure : In many instances it is possible to open the word location and input a new word containing the patch byte. The situation could arise, however, when this would not be possible. Currently I run patch, check the appropriate word location, open the byte location, enter the patch, check the word value, reenter the original word value, and then use the correct word value in the batch stream. This is both time consuming and cumbersome. For other instances of using trying to use a backslash it may not be possible to find a way around the problem.

Suggestion : Make the backslash ( \ ) a valid character to the batch subsystem.

| SYSTEM PROGRAM AND VERSION (OR DOCUMENT) | MONITOR AND VERSION | DATE |
|---|---|---|
| LINK V04-04 | RT-11 V02C-02E | 22-Feb-77 |

NAME: Dr. Carl Lowenstein
FIRM: Marine Physical Lab.
Bldg. 106, NUC
ADDRESS: San Diego, CA 92132
ZIP

SUBMITTED BY: Dr. Carl Lowenstein
PHONE: 714-452-2308

LIST ATTACHMENTS: BATCH logs (2), listing & dump (10 pg)

DEC OFFICE: San Diego

REPORT TYPE
- [x] LOGIC/CODING ERROR
- [ ] DOCUMENTATION ERROR
- [ ] SUGGESTION
- [ ] INQUIRY
- [ ] FOR YOUR INFORMATION

PRIORITY
- [ ] LOW
- [x] STANDARD
- [ ] HIGH

CAN THE PROBLEM BE REPRODUCED AT WILL?
- [x] YES
- [ ] NO

| CPU TYPE | SERIAL NO. | SYSTEM DEVICE | MEMORY SIZE | DISTRIBUTION MEDIUM |
|---|---|---|---|---|
| 11/34 | 199 | RK05 | 32k | RK05 |

Problem: 1) REL files with an exact multiple of 256 relocation pointers are not terminated properly, causing the FRUN processor to hang.

2) Non-overlay REL files with an exact multiple of 256 words of program text contain an extra block of non-information.

See attached listing of program TEST, and the associated DUMP of TEST.REL.

Diagnosis: 1) Code at ENDREL:, in root section LINK0, page 14+, does not check to see if space is available in the output buffer before putting out the 177776 terminating flag.

2) Code at 9$:, in overlay section LNKOV3, page 6, allocates space for an overlay ID word even though no overlays are present.

Cure: 1) See attached BATCH log, Patch #2

2) ditto, Patch #4

```
$$$$$$

$JOB/RT11
#TTYIO
#LET L=12

$MESSAGE  PATCH #2 TO LINK V04-04

$MESSAGE  REL FILE TERMINATION PROBLEM

DAT
22-FEB-77

TIM
11:46:03

R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV
*50/    12752   12774
*646/   1662    1673
*1006/  11260   12752
*2102/  12752   12774
*E
```

```
R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV/O

?BOTTOM ADDR WRONG?
*500;B
*
*2204;OR
*
*0,2730/        12777   402
*7210;1R
*
*6:1,3542/      4524    16700
6:1,3544/       51050   166764
6:1,3546/       24464   12703
6:1,3550/       26053   177776
6:1,3552/       51100   4767
6:1,3554/       4465    176264
6:1,3556/       44473   4767
6:1,3560/       20123   176266
6:1,3562/       46102   207
*7216;OR
*
*4:0,24\        101     102
*E

$EOJ
```

```
$$$$$$

$JOB/RT11
#TTYIO
#LET L=12

$MESSAGE  PATCH #4 TO LINK V04-04

$MESSAGE  ELIMINATE GARBAGE BLOCK FROM NON-OVERLAY REL FILES

DAT
22-FEB-77

TIM
11:47:29

R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV
*632/   1401    1410
*E

R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV/O

?BOTTOM ADDR WRONG?
*500;B
*
*7216;1R
*
*4:1,24\        103     104
*7720;1R
*
*4:1,536/       16300   4767
4:1,540/        30      1526
4:1,542/        5200    240
*4:1,2270/      12702   16300
4:1,2272/       1777    30
4:1,2274/       105367  5767
4:1,2276/       172556  167324
4:1,2300/       105722  1401
4:1,2302/       1046    5200
4:1,2304/       105712  207
*E

$EOJ
```

| SYSTEM PROGRAM AND VERSION (OR DOCUMENT) | MONITOR AND VERSION | DATE |
|---|---|---|
| LINK V04-04 | RT-11 V02C-02E | 22-Feb-77 |


NAME: Dr. Carl Lowenstein
FIRM: Marine Physical Lab.
Bldg. 106, NUC
ADDRESS: San Diego, CA 92132
ZIP


DEC OFFICE: San Diego

REPORT TYPE
- ☐ LOGIC/CODING ERROR
- ☐ DOCUMENTATION ERROR
- ☒ SUGGESTION
- ☐ INQUIRY
- ☐ FOR YOUR INFORMATION

PRIORITY
- ☒ LOW
- ☐ STANDARD
- ☐ HIGH


SUBMITTED BY: Dr. Carl Lowenstein PHONE: 714-452-2308


LIST ATTACHMENTS: BATCH log

CAN THE PROBLEM BE REPRODUCED AT WILL? ☒ YES ☐ NO

| CPU TYPE | SERIAL NO. | SYSTEM DEVICE | MEMORY SIZE | DISTRIBUTION MEDIUM |
|---|---|---|---|---|
| 11/34 | 199 | RK05 | 32k | RK05 |

Problem: Unlike most CUSP's, LINK does not open its printed output file (.MAP) with a form feed. Also it ends its printed output with a form feed in the middle of the printed line. Both of these are disturbing to some users and some output terminals.

Cure: Put out a CR,LF,FF at the beginning of the MAP output, and finish up with a CR,LF.
See attached BATCH log Patch #3.

```
$$$$$$

$JOB/RT11
#TTYIO
#LET L=12

$MESSAGE  PATCH #3 TO LINK V04-04

$MESSAGE  BEGIN & END MAP FILE PROPERLY

DAT
22-FEB-77

TIM
11:46:50

R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV
*632/   1375    1401
*E
```

(24)

```
R PATCH

PATCH V01-02

FILE NAME--
LINK.SAV/O

?BOTTOM ADDR WRONG?
*500;B
*
*7216;1R
*
*4:1,0\ 122     15
4:1,1\  124     12
4:1,2\  55      14
4:1,3\  61      122
4:1,4\  61      124
4:1,5\  40      55
4:1,6\  114     61
4:1,7\  111     61
4:1,10\ 116     40
4:1,11\ 113     114
4:1,12\ 40      111
4:1,13\ 40      116
4:1,14\ 40      113
*4:1,24\        102     103
*7720;1R
*
*4:1,1636/      112741  4767
4:1,1640/       14      416
*4:1,2260/      4453    4567
4:1,2262/       41473   171526
4:1,2264/       46101   2124
4:1,2266/       36      207
*E

$EOJ
```

DECUS

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146 MAIN STREET, PK3/E55
MAYNARD, MASSACHUSETTS 01754

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