# **RSTS PROFESSIONAL**

#### Volume 4, Number 4



August 1982 \$1000/issue, \$3500/year

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**REMOTE SYSTEMS** 

#### DYNAMICALLY

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RSTSPROFESSIONAL

## From the editors. . .

#### **AUTHOR. AUTHOR!**

Dave Mallery I had an insight recently while hanging around the press room at the Atlantic City COMDEX show. The room was populated with an unfamiliar breed — reporters. They were going on about how thay had been cruising the show floor 'getting stories' from various exhibitors. One reporter was especially vivid in his description of how the people in one booth had been falling all over each other to give him a demo and how he had curtly dismissed their efforts as unworthy of his attention.

My first reaction was: 'Boy, Carl, we ought to hire one of those. . .! Then I realized that we would start sounding like all the other magazines in the business because 90% of their content is banged out by those slick journalists using pure marketing hokum as input and slick formula as output. 'a tale told by a computer. . .'

Our magazines are really YOUR magazines. We do not employ a single professional writer or reporter. If you don't like our content, then do something about it. Most of our 'regular' contributors never dreamed that they would be publishing frequently. There's lots of room for you-over a hundred pages a month.

The RSTS pro was born in a SIG meeting in the Spring 1979 DECUS at New Orleans. Every time I look back at Vol 1, Number 1, I am amazed:

a) that it happened at all

b) how good some of the articles are.

When you look at Vol. 1, Number 1 of the Dec Pro, you will notice that we have learned something about publishing; that we have learned how to sell advertising; and that we have developed some financial strength; but I am still amazed:

a) that it happened at all

b) how good some of the articles are.

#### HOME COMPUTER

Carl B. Marbach

At last. A home computer that is a real computer. It even runs RSTS. Maybe that is what makes it the first machine I am willing to call a 'home computer'. The new MICRO-11 package just announced by DEC is what some of us have been waiting for. (Look for my article in the next issue.) It is also something some of us (Apple, TRS-80, PET ?) have been hoping would never happen: It did.

What is a 'home computer'? I will continue by asking, 'what is a mini-computer'? I would guess that a 'home computer' is a micro computer that can be bought for the home, or for home use (play?). That would mean it has to be cheap, small, reliable, use ordinary power and require no special environment. I won't tell you what a mini-computer is because I don't know anymore (I used to know). So DEC has a real 'home computer' - not a micro, a 'home computer'. It is sort of a micro because it does use an 11/23, but it isn't really a micro because it doesn't use the new T-11 chip (PDP 11 on a chip).

It is not inexpensive, but probably affordable as a 'home computer' at just about \$10,000 complete. A friend of mine has about \$6,000 in his Apple and it isn't close to this in anything except game playing. . . oh yes, Apple and Atari win when it comes to games, but they lose big because they DON'T RUN RSTS. Add a VT-101 to this package and you have a real 10MB disk and 256K memory RSTS/E system! RSTS!

I recently read an article about what operating system was to become the 'standard' for the new 16 bit micro's. Was it to be CP/M-8 6 or PC-DOS or XENIX? I think not. It might be RSTS. In five years there will be two giants in 'personal computers': IBM and DEC. The others will go the way of Texas Instruments watches, Singer POS terminals, Xerox computers and other extinct species. These 'personal computers' will rule the roost of cheap software (you get what you pay for) and games. You want to play GAMES and do some computing? Buy a 'personal computer'. If you want a computer to do real commercial type work, manage your home finances, run budget models, follow the stock market, pay your bills, do word processing, teach the kids programming and have the full functions of a computer, you'll need a 'home computer'.

Are the micro based 'personal computers' friendly? Try one, it won't say "please say hello". Do they have RECORD I/O. OR RMS? How about TECO or EDT? GRIPE doesn't exist? Horrors! Is there a BATCH, or SPOOL? Can you run BACKUP or SAVER? Is there a REORDR and can they spell UTILTY? Did someone explain how the disks are organized, and how you can optimize them? Is there a SYSTAT or VT5DPY, and can you LOCK-11? When was the last time your system was down because of a bug in RSTS? Does the documentation take up a full bookshelf and change colors every year? Can a program written for a \$500,000 computer run on yours?

I hope my kids learn programming on a system whose lineage included a 28K computer that served 4 users in a school. That PDP 11/20 has grown to a \$500,000 128 terminal 11/70 and now to a \$10,000 'home computer'. What will be the "standard" 16 bit operating system? I'm using it right now, on my very own 'home computer': a PDP-11 running RSTS.

PLEASE SAY HELLO.



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CIRCLE 88 ON READER CARD

# LETTERS to the RSTS Pro.

Send letters to: Letters to the RSTS Pro, P.O. Box 361, Ft. Washington, PA 19034-0361.

Dear Readers of the RSTS PROFESSIONAL:

The RSTS PROFESSIONAL was started by Carl Marbach and R. David Mallery a few years ago to fill a void left by the RSTS SIG newsletter, doing a better job than the SIG newsletter had done in recent memory. They recognized that the 'commercial free' environment enforced by DECUS tends to stifle the enthusiasm of the users.

I would, however, like to express my concern at what I perceive to be a lack of editorial policy in the RSTS PROFESSIONAL. To me, the RSTS PRO-FESSIONAL exists to provide a forum for the free exchange of good solid accurate technical information in a relatively commercial free environment. (Making Carl & Dave a few bucks in the process.)

I don't care for the commercially stifling environment provided by DECUS, but I care for selfserving sales literature masquerading as technical articles less.

Prime examples of what I mean are: "Que.11 User's Guide," "Conpax," "DEC Data Security, The Software Encryption Solution," and "Scrnio/ 11 and Vidio/11." The last article being a particularly blatant example. (Maybe DECUS isn't so bad after all.)

I feel that articles like these seriously damage the professional image of the magazine. (In our neck of the woods, it is referred to as the RSTS UN-PROFESSIONAL!) I sincerely hope I'm not the only one who feels that these types of articles have no place in a 'professional' journal.

OK, now that I've vented some of my frustration, what do I propose? Carl and Dave are smart business people who respond to market pressures. They realize that if they don't fill the void, someone else will. So please, exert some pressure, write a letter expressing your opinion on what you want your magazine to be.

Collectively, we can exert a tremendous force to determine the future of the RSTS PROFES-SIONAL. Let's make it something we can all be proud to be a part of.

In closing, Carl and Dave, thanks for having the insight to fill the need for a viable communications medium between RSTS users. Keep up the good work of disseminating information to the masses. Sincerely, Steven L. Edwards

Vice President, Technical Services Software Techniques, Inc.

Dear Steve: We have always had a policy about 'commercial' articles. It is: "Your article should (must) teach as well as sell!"

Sometimes, they err on the selling side. I have rejected a few.

Yes, this is your magazine. Carl and I have repeated this statement till we are hoarse.

I cannot write more than one quality article a year.

If you guys (not you, Steve, but the rest) want your magazine to be the journal it ought to be, then you help by getting that article you always wanted to write WRITTEN!

I promise to publish it for you and pay for the privilege.

Meanwhile, the policy stated above stands. The PRO is a commercial venture. We sell advertising. Our page count = F (ad count).

I will promise to be more picky with the 'com-

mercial' articles. As long as I have pages to fill, I will always give preference to non-commercial material. As long as our policy is in force, I will print 'commercial' pieces that teach.

I really appreciate your letter. I hope every reader gets its message! Thanks for your help.

- Dave

I would like to inform your readers that the articles entitled 'CCLMAN' [June 1982, v.4,#3, p.18] and 'CB' (this issue, p.8) are fully functional and debugged programs.

Updated sources of these programs incorporating many enhancements are available from me directly by sending a blank tape and \$15.00 FOR BOTH PROGRAMS.

The enhancements made are as follows:

CCLMAN - V1.3 - User may now leave line number portion of CCL command off which will default to a value of '0', which is chain to top of program.

CP - V1.8 - a) A command / CLOSE, / OPEN is now implemented which will allow privileged users to open and close CB from non-privileged users.

b) A command / XEQ is now implemented allowing a background job to be executed while in CB. Example: T19 / XEQ SY/A

This will display to the user a SYSTAT of active jobs WHILE STILL EXECUTING CB!!! c) A command / CALL is now implemented

allowing a set message to be set to a specific terminal.

d) A CB help file is now available

- and many others

Thank you for publishing this letter.

Philip Hunt Columbus, Ohio

At one of the RSTS sessions during the Atlanta US Spring DECUS symposium, a user made a very good suggestion for an enhancement to the error handling package. As DEC seemed unenthusiastic, and I also share the same concern, I decided to try to do it myself. This note shares my success with any other interested RSTS users.

Paul DeBenedictis, Systems Manager **Educational Communications** Upstate Medical Center, Syracuse, NY See Paul's article "Selective Clearing of Logged

Errors" in this issue, p.34.

This is in regard to Joe Doyle's article on the DECWORD/DP freebie [v.4, #2, April 1982, p.11]. The only hardware I expected in the package was the keyboard. If you look at the line feed and backslash key tops carefully, you will see that they are molded for the rows on which they are placed. Someone did not just manage to do it wrong they planned it that way. Also, the cardboard keyboard was the same way.

I found no indication that the advanced video option was coming - that was a surprise. The switch settings seemed to resemble those already set, by one interpretation of the positions, so I did not bother them. I followed the instructions exactly, replacing an old AVO as Joe did. But mine worked fine. This AVO also somehow switches the meaning of the linefeed and backslash keys, so the keyboard, as shipped, is right!

I gave my old AVO to a friend in another depart-

ment, who could not make it work. Two of the new standoffs broke, so perhaps a good connection was not made.

The software was intended to interface with the main DECWORD menu, and apparently just exists when the menu is not there to chain to. Therefore, it does not reset terminal characteristics. Include on its logical device a program WPSMEN which resets the desired terminal characteristics. WPSCBT will chain to it at line 30010.

A word processing specialist here went through CBT as an evaluation for a replacement or upgrade for a Lanier system. She did not like the Ruler in the WPS system, as it seemed too difficult to change (call it up, space out to the points to change, insert or delete the character(s), store the new Ruler, activate it and return to what you were doing). Anyone have experience with this?

> Samuel B. Belk Allied-General Nuclear Services Barnwell, SC

Just a few notes on the response to my article on DEC WORD. Thanks for all the cards, letters and phone calls. It has been great exchanging ideas. One of the more interesting occurences had us trading our DEC Word keypad to a DCB Word user for a normal VT100 keypad. This was then enhanced with the WORD-11 VT100 keycaps that Richard Marino of DPD sent me. (Yes, VT100 keycaps are now available.)

Special thanks must go to Steve S. of Washington, Pa. (Because of my poor phone manners I never did get a spelling of his last name. - Sorry Steve.) Steve is an ex-pinball machine repairman who now is into computers. He said he experienced the same graphic display on his screen that I did when he tried his AVO option. He applied past experience and took a careful look at the board. He noticed that the plastic supports were longer on the new AVO than on another AVO he had. He took off the supports, mounted the AVO, and it worked. I tried the idea with my AVO. It worked. Thanks Steve!

Joe [Doyle]

I currently program a PDP 11/44 with 1.25 Mbytes of memory and I am keen to experiment with the data caching facility with a view to keeping large data files memory resident. Is there any RSTS buff out there who can tell me,

a) the algorithm used for searching Xbuf?

b) whether a file marked for replacement is only replaced when all other Xbuf is filled?

c) will such a marked file be 'found' if requested before it is physically overwritten?

I will be pleased to hear from anyone with data caching experience.

> Yours hopefully, John Mulholland "Norend" Dunmore Village, by Airth Stirlingshire, Scotland

P.S. Great magazine, but how about a jobs section!!

As a newcomer to RSTS I found many of the RSTS sessions at the 1982 Spring DECUS, in Atlanta, very helpful. Having been a user of both Digital hardware and other software systems for a number of years has helped a great deal in the transfer to RSTS. However, I find the area that is taking the longest to master is the internals of ... continued on page 79

# BEFORE you add memory (or anything else) to increase system performance



# **You should add DOPTER!**

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#### For More Information

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CIRCLE 108 ON READER CARD

## **CB** — **CITIZENS BAND RADIO EMULATOR VERSION 01.03**

By Philip Hunt, O.L.F.B.P., 6400 E. Broad Street, Columbus, Ohio 43213

#### **Description:**

CB is a very versatile program running in 2K of user space that will allow any users on the system to communicate with each other as they would on a citizen's band radio.

A 'Talk' channel is used to send messages to anyone currently 'Monitoring' that channel. A user may monitor any or all of the 40 'channels' available, but may only talk on one.

Commands are defined to allow the user to change talk channels, monitor and unmonitor channels, list users by user or by channel, set 'Restricted' messages that will only be received if the sender and receiver (or receivers) have the same password set, etc.

#### **Program Entry:**

When the user enters the program, he must enter a 12 character 'handle' that will be transmitted everytime he sends a message. The prompt for sending messages is a 'T' with the channel number you are currently talking on included, example: 'T19>' would mean you are currently talking on channel #19. If an extra bracket ('>') is included in the prompt, it would indicate that the user has a password set for his messages and that only people with the same password will receive them. For entry by CCL, see CCL/LOGGED-OUT formats.

As noticed, anything not beginning with a '/' is sent to other users on the users current TALK channel. The slash indicates a command entry.

Note: If a blank line is entered i.e.; a carriage return is struck with no items on the line AT ALL, CB will print its' version number and return for more commands/ messages.

#### **Commands:**

/TALK Chnl#

This command will change the channel the user is currently transmitting on. When the user first enters CB, the channel will be set to 19. Valid channels are 01-40; any other entry will give an error message. The channel that is set for Talk will cause all messages sent to be received by any user currently monitoring that channel unless a password has been set (See /RESTRICT). Note: when changing Talk channels, the previously set Talk channel will still be marked for monitor.

/MONITOR Chnl#,Chnl#,...,Chnl#

This command will allow the user to monitor multiple channels. When the user first signs into CB, he will only be monitoring channel 19. Valid channels are 01-40; any other entry will cause an error message for that channel, but all other entries on the command line will be processed. If the channel number is entered as negative, then the channel specified will be 'UNMONITORED'. Note: You cannot unmonitor your current TALK channel.

#### /RESTRICT nnnnnn

Restrict allows a user to set a password up to 6 characters long. When a password is set, the user's messages will only be sent to other users monitoring the channel who have the same password set. This allows private messages to be sent. Note: Privileged users can obtain Restrict passwords (See /List) and can receive Restrict messages (See /Spy). Messages with this set will have the word 'SECRET' appended to the message (See Message Formats).

/BROADCAST [Chnl#] Message Text

This command will allow a user to send a message to any valid channel ignoring the user's password protection. If channel is specified, then the message will be sent to that channel; otherwise, the message will go to your current Talk channel. This command is useful if you would like to send one message to everyone on your channel, but want to keep most of your messages 'Private'.

/CALL Kb#

This command will send a message to the specified terminal currently NOT running CB, to request that he do run CB. The message sent is of the form:

\*\*CB-User: Handle - Please enter CB on Channel #n\*\*

NOTE: If the specified job is already in CB, an error message is generated and the message is not sent. /TIME

This command will display the current date and time. This is useful when using CB for an extended period of time.

/KB

KB will toggle a bit in the user flag word allowing him to receive KB numbers when a message is received by him (See Message Formats). The default for this is 'OFF'.

/PPN

PPN will toggle a bit in the user flag word allowing him to receive user PPN numbers when a message is received by him (See Message Formats). The default for this is 'OFF'.

/JOB

JOB will toggle a bit in the user flag word allowing him to recieve JOB numbers when a message is received by him (See Message Formats). The default for this is 'OFF'.

#### /UPPER

Toggles the user flag word informing CB to start



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#### /LIST [Job#]

List all users currently using CB. A list of their TALK channel, channels they are monitoring, their 'Handles', Job #, KB #, User PPN and JOB attributes (See Attributes) are listed. If you are currently privileged, then any currently set Restrict password is also printed. Note: If Job# is entered, then the listing will be only for that Job#.

#### /WATCH [Chnl#]

This command will give a list of users currently monitoring a channel. Their KB#, Job #, Handles and Job attributes are printed. If Chnl# is not entered, then the list will be entered for the current Talk channel. Note: If /Watch is entered as a CCL command, then a Chnl# MUST be specified (See CCL/LOGGED-OUT formats).

#### /HELP

Prints a Help message for CB. It is very similar to the reference card in format.

#### /EXIT (†Z, †C)

Exit CB. Note: 1Z and 1C act as if an /EXIT command has been entered.

#### \* \* Privileged ONLY commands: \* \*

These commands, when executed by a nonprivileged user, will generate an error message, and NOT be executed.

/SPY

Toggles a bit in the user job attributes that allows a privileged user to receive Restrict messages even though he might have no password or a different password set. The default is 'OFF'. A message received by /SPY being set will have '+ SPY + ' appended to it.

#### /CLEAR Job#

Clear the job specified from CB and kill the job. A check is made to be sure the job specified is in CB. A message is sent to the JOB (Unless detached) informing him that his job has been killed, and all users receive the 'Leaving CB' message with the phrase '(Involuntarily)' appended to it (See Message Formats). THIS COMMAND SHOULD BE USED TO KILL A CB JOB, NOT THE 'UTILTY' COMMAND OR THE CB LIBRARY WILL BECOME CORRUPTED !!!

#### /DETACH

Detach from current Keyboard. This allows a user to change keyboards or leave CB for a while without having to exit and then enter CB again.

#### /ALL text

Send a message to ALL CB users on all channels, the message part usually displayed as 'Cxx' or 'Bxx' indicating channel number is replaced by the string 'OPR'

#### Attributes:

Job attributes associate special processing modes with a specific job. Special modes cause different forms of the broadcast header to be displayed upon receiving a message. The mode or attributes set cause different information to be displayed (See Message Formats).

#### Message Formats:

Messages received are displayed in different formats depending on the Job attributes set. See below for description.



#### System Messages

CB system messages are also sent when a user enters or exits CB. The format for CB system messages is:

\*\* << < Message Text>>> \*\*

CB data requests are not preceded by the '\*\*' characters. The format for CB data requests is:

< Request message > ? — Answer in response—

A complete list of possible messages/requests follows: %Initializing CBLIB Resident Library

This is an informative message that the resident common library has just been loaded and is being initialized to empty by the first user requesting CB. It will also occur if the internal /CLR option when Handle requested is invoked.

What is your 'Handle' ?

CB is requesting the 12 character phrase to call your CB job when sending a message.

%%DEBUG MODE ENABLED

The internal option /DBG has been invoked. This will allow a programmer to see the internal workings of CB for debug purposes.

#### \*\*CB-Vx.xx\*\*

If in talk mode, and a carriage return only is entered, CB will display its version number x.xx where this represents a number.

\* \* Now talking on channel xx

A /TALK command has been executed and all future transmissions will occur on channel xx until another /TALK command is executed.

#### \* \* All channels except xx reset\* \*

A '/MON -' has been executed, resetting all channels currently being monitored. The channel xx is your current Talk channel and has not been reset.

\* \* Now monitoring channels:

xx,yy,zz...,nn



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When a /MONITOR command is executed, a display of all channels currently being monitored is shown.

No users on this channel

A /WATCH command has been executed in which no users are currently using the channel specified. No users

A /LIST command has been executed, and there currently are no users on CB.

Really CLEAR job # xx ?

A /CLEAR command has been executed, and the specified job 'xx' is currently using CB. This is a request to verify that you will kill that job.

#### /CLEAR aborted!

A /CLEAR has been executed, and anything but 'Y' has been entered to the verification request. The specified job has NOT been killed.

\*\*!!Your Job has just been KILLED by the operator!!\*\* A /CLEAR has been executed by an operator; kill this user's job.

\* \* Job # xx has been CLEARed \* \*

A /CLEAR has been executed and job xx has been cleared from CB and killed off the system.

\*\*CB—User: HANDLE—Please enter CB on Channel # xx\*\*

A /CALL command has been executed by a CB user transmitting under the name 'HANDLE' and currently transmitting on channel # xx. That user would like the user on the receiving job to enter CB and talk to him.

\* \* Request sent\* \*

A /CALL has been executed successfully and a message has been sent to the specified keyboard.

\* \*KB numbers will be printed \* \* The /KB toggle has been set allowing a user to receive KB numbers on messages transmitted.

\* \* KB numbers will not be printed \* \*

The /KB toggle has been reset.

\* \* SPY mode in enabled \* \*

The privileged /SPY has been set. This allows messages normally requiring a /RESTRICT password to be transmitted to this operator job even though no /RESTRICT is set for the operator.

\* \* SPY mode is disabled \* \*

The privileged /SPY has been reset. \* \* PPN numbers will be printed \* \*

The /PPN toggle has been set allowing a user to receive PPN numbers on messages transmitted.

\* \* PPN numbers will not be printed \* \*

The /PPN toggle has been reset. \* \* UPPER CASE only will be printed \* \*

The /UPPER toggle has been set. This allows a given user to send and receive in only UPPER CASE. Normal system messages though are not translated.

- \* \* UPPER/LOWER case will be printed \* \* The /UPPER toggle has been reset.
- \* \* JOB numbers will be printed \* \* The /JOB toggle has been set, allowing a user to receive job numbers along with messages.

- \*\*JOB numbers will not be printed\*\*
  - The /JOB toggle has been reset.
- \* \* Your Password has been set\* \*

A /RESTRICT command with a specified password has been successfully executed.

\* \* Password has been turned off\* \*

A /RESTRICT with no password has been executed, resetting any previously specified password.

\* \* Detaching from terminal \* \*

A privileged /DETACH has been executed, detaching a CB job from its' terminal.

\* \* dd-mmm-yy at hh:mm xm\*\*

A /TIME has been executed showing the current Date (DD-MMM-YY) and Time (HH:MM xM).

#### Error Messages

CB error messages are printed when an error is encountered in the execution of a CB command. Their format is as follows:

\*\*??< < Error Message Text??\*\*

A complete list of possible error messages follows: \*\*??You may not talk LOGGED-OUT??\*\*

CB has been entered as a logged out command with a specified Handle. A logged-out user may only execute certain commands, but may not talk through Cb unless they login first.

\* \* ?? Invalid [CCL] command, Type '/HELP'??\* \*

An illegal command has been entered. Certain valid commands are invalid during CCL entry and these will be flagged with the 'CCL' specified in the message.

\* \* ??Please enter up to 12 characters??\* \*

This message will occur if you enter more than 12 characters for your user Handle.

- \* \*??That 'Handle' is IN-USE by Job #xx—Try again??\* \* A user entered a valid Handle to CB, but it is in use currently by job xx.
- \* \* ??Illegal TALK channel??\* \*

A bad channel number was entered on a /TALK command, i.e.; /TALK 42 or /TALK C.

- \* \* ??Illegal Channel??\* \* A bad channel number was entered on a /BROAD-CAST command.
- \* \* ?? Already monitoring channel xx??\* \* A /MONITOR xx command was executed, but the

user is already monitoring the channel xx specified. \* \*??Not monitoring channel xx??\* \*

A /MONITOR -xx command was executing trying to UNMONITOR the channel xx, but the user is not currently monitoring that channel.

- \* \* ??Illegal MONITOR channel 'xx'??\* \* A /MONITOR xx command was executed with xx being a bad channel number, i.e. /MONITOR 42 or /MONITOR C.
- \* \* ??Cannot UNMONITOR your TALK channel??\* \* A /MONITOR command was entered with the users current TALK channel specififed for UN-MONITOR. This is illegal.

\* \* ??Illegal channel specified ?? \* \*



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CIRCLE 58 ON READER CARD

A /WATCH command was executed with a bad channel number specified.

\* \* ??Illegal user number specified ?? \* \*

A /LIST xx was specified with an illegal job number xx specified.

\* \* ??Illegal Job number??\* \*

A /CLEAR command was entered with a bad job number.i.e /CLEAR 67 or /CLEAR C. Job numbers may only be 1-63.

\* \* ??Job specified not in CB??\* \*

A /CLEAR was entered with as valid job number, but that job is currently not using CB, therefore, it cannot be CLEARED.

\* \* ??Bad KB number specified ??\* \*

A /CALL xx command was entered with a bad Keyboard number, it could be out of range 0-127 or it might not exist on the system.

\* \* ??KB specified already in CB??\*

A /CALL was entered with a valid keyboard number, but that keyboard is already using CB, so a /CALL would not be appropriate.

\* \*??Nothing to send??\* \*

A /ALL command was executed with no message specified to send to all users.

\* \*??Password too long??\* \*

A /RESTRICT password may only be 6 characters long. The password must be shortened and reentered.

\* \* ??Privileged operation ?? \* \*

The specified command is legal but is a privileged command and the current user is not privileged. ([1,\*]).

??FNOPEN.POSITION-NO OPENINGS

A fatal system error has occured, CB tries to recover by executing a /EXIT but recovery might not be complete. This error should never occur.

?CB—FATAL ERROR -< Error Text> AT xxxxx

A fatal system error has occurred, CB tries to recover by executing a /EXIT but recovery might not be complete. This error should never occur.

#### Sign-On/Off Messages

When a new user signs on to CB, all current CB users receive a message informing them of that fact. The CB signon messages appear as follows:

\*\*New User—Job #xx (HANDLE) has signed on to CB\*\* = The new user's job number Where: xx

Where: HANDLE = The new user's Handle

When a CB user signs off of CB, all current CB users receive a message informing them a user has left CB. The CB sign-off message appears as follows:

\* \* User #xx (HANDLE) is [leaving] CB [(Involuntarily)] \* \*

[ABORTING from]

= The user's job number Where: xx

Where: HANDLE = The user's Handle

The message will contain either 'leaving' or 'ABORTING from' depending on the conditions of the user's exit. The 'ABORTING from' means a system error has occurred in that user's CB job and the library 'CBLIB' may or may not be corrupt. The 'ABORTING from' message should never occur and it has not occurred since release V0.01. Due to improved recovery, even if it occurs, there is very little chance that it will affect any user but the one listed.

The '(Involuntarily)' part is only transmitted if the user is being KILLed by the operator with the /CLEAR command.

When the /CALL command is used, the following message is sent to the keyboard specified:

\*\* CB-User: HANDLE - Please enter CB on Channel # yy\*\* Where: HANDLE = The handle of the user using

/CALL

= The channel that user is curуу rently Transmitting on.

#### CCL/LOGGED-OUT Formats:

CB can be set up by the operator to be called by CCL for certain functions (see Installation for installation instructions). Commands that are valid through CCL are:

- /LIST - list jobs on CCL
- /WATCH n Watch jobs on a certain channel. Note: For CCL, channel number MUST be specified.
- /HELP - Display help message
- /CLEAR xx PRIV-Clear a job from CB, user must be privileged to do this.
- /TIME - Display current Date/Time

CB may also be entered with the HANDLE in place of the command. Example:

**CB LONESTAR** 

will enter you into CB with the handle set to 'LONESTAR'.

Note: If CB is set up to be entered logged-out (see Installation), all CCL commands are valid EXCEPT entering CB with a 'handle' set, which gives an error message.

#### Installation:

CB is designed to be executed by many users at a time. Therefore, the following method will allow CB to use the least amount of user memory possible, while sharing the code/ data areas that are non-volatile.

CB requires certain options be present in the RSTS environment to execute:

A) Resident library support be present

B) RSX monitor emulation be present in the monitor

If either of these options is not present, then CB will not run correctly. NONE OF THE FOLLOWING STEPS SHOULD GENERATE AN ERROR, IF THEY DO, A PROBLEM HAS DEVELOPED THAT MUST BE SOLVED BEFORE PRO-CEEDING!!!

1) Obtain the following files:

CB.B2S, CB.CMP, CB.CMD, CBLIB.MAC, ST2NM.MAC

If the command files are not available, the following files may be entered under the names specified:

\*\*CB.CMP\*\*

\*\*CB.CMD\*\*

CB,CB = CB,ST2NM,LB:BP2COM CB/MU,CB = CB,ST2NM,LB:BP2COM/LB TASK = CBBAD TASK = ...CB... UNITS = 12RESLIB = LB:CBLIB/RW UNITS = 1211 11

# Don't

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| HA<br>6 Pear                  | MILTON RENTA                           | LS<br>07401                     |
|-------------------------------|--|---------------------------------|
| PLEASE RUSH<br>FOLLOWING SYST | ME A QUOTATION B<br>TEM: CIRCLE ONE ON | ASED ON THE<br>NLY IN EACH LINE |
| PROCESSOR                     | 11/23 11/24 11/34 11/                  | 44 VAX11/730, 750, 780          |
| DISKS                         | RX02 RL01 RL02 RK07 F                  | RM02 RM80 RM05 RP07             |
| OPERATING SYSTEM              | RT11 RSX11M RSTS/E V                   | AX/VMS CTS                      |
| SOFTWARE                      | WORD PROCESSING DBM:<br>GRAPHICS OTHER | S ACCOUNTING                    |
| RENTAL                        | 6 Months 12 Mon                        | nths 18 Months                  |
| Name                          |  |                                 |
| Position                      |  |                                 |
| Company                       |  |                                 |
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- 2) Macro assemble ST2NM: RUN \$MAC MAC>ST2NM = ST2NM
- MAC > 1ZCompile CB using Basic-Plus 2:
  - **RUN \$BASIC2** OLD CB.B2S COM/OBJ/LINE/CHAIN
- TKB the resulting file: TKB @CB.CMP
- 5) Look at the Task Builder map (CB.MAP) for the section marked BP20TS, all names under this section will be built into CBLIB, the communications library. This causes all the BP2 code segments to be shareable. The names you find under the section above will be used later. SAVE THE MAP ON HARD-COPY!!
- Macro assemble the communications library:

RUN \$MAC MAC>CBLIB=CBLIB MAC>1Z

7) Enter a file named CBLIB.CMD consisting of the following:

```
CBLIB/-HD/PLCBLIB.CBLIB = CBLIB
LB:BP2COM/LB:??????
LB:BP2COM/LB:??????
LB:BP2COM/LB:??????
          ...
LB:BP2COM/LB:RQLCB
LB:BP2COM/LB:SAVRG
```

Note: These ?????? are to be replaced by the names found in step 05 above. There are about 60 of them all starting with '\$' EXCEPT the last TWO. NOTE: These MUST be entered in the same order as found on your CB.MAP from Step 05

11 8) TKB the library using the edited file from step 07 with

the following:

TKB @CBLIB.CMD

PAR = CBLIB:060000:110000

STACK = 0

9) Run RESSTB which is distributed on your BP2 installation tape.

RUN RESSTB

ENTER FILE SPECIFICATION FOR RESIDENT LIBRARY? CBLIB ENTER 3 CHARACTER CCL/MCR NAME ? BP2 THE PSECT FOR YOUR LIBRARY IS BASOTS. Note: Always enter BP2 whether or not that is the CCL name for your BP2 compilier.

Run MAKSIL to turn it into a resident library:

RUN \$MAKSIL Resident Library name ? CBLIB Task-Built Resident Library input file < CBLIB.TSK> ? < CR> Include symbol table (Yes/No) < Yes>? < CR> Symbol table input file < CBLIB.STB>? < CR> Resident Library output file < CBLIB.LIB> ?< CR> CBLIB built in XX K-words, YYY symbols in directory CBLIB.TSK renamed to CBLIB.TSK < 40> Note: XX above is 10 or 11 depending on BP2 compiler used, YYY should be a relatively large number (100-800).

Move CBLIB.LIB, CBLIB.STB, CBLIB.OBJ to LB: PIP LB: <40> = CBLIB.OBJ.CBLIB.LIB.CBLIB.STB

UT ADD LIBRARY LB:CBLIB < 0 > / ADDR:xxx/RW/STAY

(xxx = memory address to located library, it is site-dependent, The <0> allows writing to the library).

Note: The /RW is important as it allows the communication between jobs by specifying the library is Read/Write and not Readonly.

If the library is not made permanent with the /STAY shown above, when there are no CB users and your system starts swapping, CBLIB will leave memory, causing the first new CB user to get a message stating the library is being re-initialized. This will not hurt anything, but may be annoying.

If the library is not ADDed with a protection code of <0>, then PROTECTION VIOLATION errors will occur when running CB.

13) Task build to CB program again using CB.CMD this time:

TKB @CB.CMD

14) Run MAKSIL to turn it into a resident library: RUN \$MAKSIL

Resident Library name ? CBCODE Task-Built Resident Library input file < CBLIB.TSK > ? CB.TSK Include symbol table (Yes/No) < Yes>? NO Resident Library output file < CB.LIB> ? CB.TSK CBCODE built in 2 K-words, 0 symbols in directory CB.TSK renamed to CB.TSK < 104>

15) Move CB.TSK to execution account: Move CBCODE.LIB TO LB: PIP LB: = CBCODE.LIB

PIP [PPN] < 232 > = CB.TSK

Note: [PPN] is the project, programmer that the task will execute from. Program MUST be set privileged (i.e. <232>)!!

FILES: CB.B2S.CB.OBJ.ST2NM.MAC.ST2NM.OBJ CB.CMP.CB.CMD may now be removed if space is needed.

16) Add the second resident library CBCODE: UT ADD LIBRARY LB:CBCODE/ADDR:xxx

(xxx = memory address to located library, it is site-dependent).

17) \*\*OPTIONAL\*\*

Add CCL to allow CB to run direct (See CCL Format): UT ADD CCL CB-=[PPN]CB.TSK;PRIV 30000 Note: [PPN] is from step 15 above.

18) \*\*OPTIONAL\*\*

CB can also be entered from LOGIN by entering a statement into LOGIN.BAS and recompiling it into \$. The statement follows:

32256 DATA CB, "[PPN]CB",2,4 This allows all commands that CCL entry allows except entry to CB with a specified handle. Note: [PPN] is from step 15 above.

19) Execute CB by CCL or otherwise. A SYSTAT of the job should show "...CB.." as the jobname. If 'CB' or 'CBBAD' is the jobname, 1 or more installation steps were skipped. INSTALL CB again or it will not run correctly!!

NOTE: In the RSTS/E V7.1 environment, a CB user's terminal MUST have 'NO GAG' set or CB will not send any messages to his terminal.

#### Sample Run of CB:

A sample run of CB demonstrating most commands in regular as well as CCL formats follows:

# IF GOES W LSI-11, PDP-11, VAX-11\*

Dilog offers the widest range of single board DEC emulating disc and magnetic tape controllers for LSI-11, 11/2, 11/23, PDP-11 and VAX-11 compatibility.

This growing family includes over 20 software transparent disc and tape products: WINCHESTER AND BACKUP SOLUTIONS FOR MOST APPLICATIONS

DISC-51/4," 8" or 14" WINCHESTER/SMD/CMD/LARK/ CARTRIDGE/FLOPPY controllers with RX02, RK05, RL01/RL02, RP02/RP03, RK06/RK07 and RM02/RM05 emulations and features like 22-bit addressing, 32 or 56-bit ECC, universal formatting (allows you to mix drive types on the same controller without hardware modification), and automatic media flaw compensation.

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#### **NEW VAX-11/PDP-11 CONTROLLERS**

- DU 132 TS-11 emulating coupler with expanded buffering for streaming or conventional 1/2" industry standard magnetic tape drives. One coupler can accommodate up to 4 drives at speeds to 125 ips, and you get dual density 800/1600BPI as an added feature. RT, RSX, RSTS and VMS software compatibility.
- DU 215 RK06/07 emulating SMD disc controller with 56-bit ECC, universal formatting, optimal device for Winchester and CMD applications. RSX, RSTS and VMS software compatibility.
- DU 218 RM02/05 emulating SMD disc controller for SMD and Winchester applications with full software transparency under RSX and RSTS as well as Media compatibility when used with 80 and 300 MB SMD (CDC 9762/9766) compatible disc drives

#### **NEW LSI-11 CONTROLLERS**

- DQ 212/215 SMD interface. Universal formatting allows mixing or matching two 8" or 14" drives with different characteristics and without component changes for up to 220 MB of software transparent formatted capacity. 56-bit ECC, RP02/03 or RK06/07 emulations.
- DQ 444 CDC FINCH interface. Intelligent uP module mixes any two drives of this class with universal formatting. RL01/02 emulations. Built-in drive capacity expansion handling.

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#### page 18

RSTSPROFESSIONALRSTSPROFESSIONA SY/L Resident Libraries: Name Prot A RMSRES < 42> [ Users Acct Size Comments Perm, Addr:873 Perm, Addr:853 Perm, Addr:827 1 0.1 23K 9 1 0,1 ED2 < 42> 208 CBCODE < 42> < 0> 8K 0 1,11 10K CBLIB 0 Perm. Addr:835. R/W BASICS ( 42) 0,1 86 0 Perm, Addr:845 CB - V01.03 RSTS V7.1-11 C OLFBP 11/70 What is your 'Handle' ? TEST PERSON T19>/LI Current CB User list: #24 [1,10] P2J20 TEST PERSON Talk: 19 Att: None Mon: 19 T19> \*\*New User - Job #15 (PHIL) has signed on to CB\*\* Current CB User list: #15 [1,10] KB020: PHIL Talk: 19 Att: None Mon: 19 #24 [1,10] P2J20 TEST PERSON Talk: 19 Att: None Mon: 19 [[PHIL/C19]] HELLO TEST PERSON T19>HELLO PHIL T19>/WA 19 Users on Channel # 19 #24 [1,10] #15 [1,10] P2J20 TEST PERSON Monitor, Talk Monitor, Talk KB020: PHIL T19>/JO JOB numbers will be printed T19>/KB KB numbers will be printed T19>/PP PPN numbers will be printed [[KB020:[1.10](15)PHIL/C19]] HOW DOES THIS REAF T19>LETS GO TO CHANNEL 23 T19> [[KB020:[1,10](15)PHIL/C19]] OK, LETS [[KB020:[1,10](15)PHIL/C19]] GO T19>/TALK 23 \*\*Now talking on channel 23 T23>/WA 23 Users on Channel # 23 #24 [1,10] P2J20 TEST PERSON Monitor, Talk T23>/WATCH 19 Users on Channel # 19 #24 [1,10] #15 [1,10] P2J20 TEST PERSON Monitor KB020: PHIL Monitor, Talk T23>/TIME \*\*16-Mar-82 at 12:33 PM\*\* T23> \*\*CB - V01.03\*\* T23>/WA Users on Channel # 23 P2J20 TEST PERSON Monitor, Talk #24 [1,10] #15 [1,10] KB020: PHIL Monitor, Talk [[KB020:[1,10](15)PHIL/C23]] IM AM HEREIIIIII T23>/MON \*\*Now monitoring channels: 19 23 T23>/MON -19 Now monitoring channels: 23 T23>LETS GET SECRET USING YOUR LAST NAME T23>/RES PLOMPR \*\*Your Password has been set\*\* T23>> [[KB020:[1,10](15)PHIL/C23]] OK, SOUNDS GOOD T23>>/WA 23 Users on Channel # 23 #24 [1,10] #15 [1,10] Monitor, Talk, PSWD Monitor, Talk, PSWD P2.120 TEST PERSON KB020: PHIL T23>>I AM DONE T23>>/WA 19 Users on Channel # 19 #15 [1,10] KB020: PHIL Monitor T23>>/LIST Current CB User list: #15 [1,10] KB020: PHIL Talk: 23 Att: PSWD PERSON Mon: 19 23 #24 [1,10] P2J20 TEST PERSON Talk: 23 Att: JOB KB PPN PSWD

Mon: 23

T23>> SECRET[[KB020:[1,10](15)PHIL/C23]] I AM LEAVING SEE YOU LATER T23>>OK. BYE T23>> \*\*User #15 (PHIL) is leaving CB\*\* T23>>/EX Ready CB/LI Current CB User list: No users Ready CB/G \*\*Invalid CCL command, Type '/HELP'\*\* Ready CB/WA 19 Users on Channel # 19 No Users on this channel Ready CB/CL 19 \*\*??Specified job not in CB??\*\* CB PHILZ T19>/LT Current CB User list: #24 [1,10] P2J20 PHIL2 Talk: 19 Att: None Mon: 19 T19>/EX Ready 'CB Command Reference Card - V01.03' CB Commands are: CE Commands are: //TALK n - Change talk channel to 'n'. This is the channel that you 'Transmit' on. /MONITOR n,m,..z - Monitor All channels specified If negative, Unmonitor channel. If negative, With no number, then Unmonitor ALL channels (Except TALK) /RESTRICT xxxxx - Restrict sending message to any JOB having 'xxxxx' as it's internal password, If no argument, then turn off password /BROADCAST nn Text- Allows a message to be sent to everyone even if a password is set. This allows a user to send text to everyone without having to reset his password, send agin. If 'nn' is included, then message is sent on channel fnn, else it is sent on the users' normal talk channel. /CALL Kbnf - Send a message to specified terminal /CALL Kbn# - Sent ormal talk channel.
 /CALL Kbn# - Send a message to specified terminal requesting that they enter CB
 /SPY (PRIV) - Allows operator to recieve Restricted messages without knowing PASSWORDS
 /CLEAR n (PRIV) - Clear out job specified by 'n'. This removes job from tables and KILLs job off system (Logs out).
 /DETACH (PRIV) - Detach from the current terminal /ALL Txt (PRIV) - Detach from the current terminal /ALL Txt (PRIV) - Detage to all CB users.
 /TIME - Display current Date/Time.
 /KB - Toggle FB on message switch
 /JOB - Toggle JOB on message switch
 /UPPER - Toggle Upper/Lower Translation switch
 /LIST [n] - List current users on CB. loggle upper/Lower Translation switch
List current users on CB.
If 'n' is specified, then list only that user
List all users WATCHING channel 'n' If 'n' is not entered, then all users on current talk channel are shown.
This message /LIST [n] /WATCH [n] /HELP - This message /EXIT - Exit CB Note: <sup>2</sup>Z and <sup>2</sup>C act like '/EXIT' was entered All commands may be abbreviated to 2 letters. Note: More complete descriptions of each command can be found in the documentation for CB.

#### **Ouestions or comments:**

PERSON

Questions or comments about CB? You may write or call directly to the following address: Philip Hunt, O.L.F.B.P., 6400 E. Broad Street, Columbus, Ohio 43213, (614) 863-3473.

A tape containing all command files, source code and documentation is available, send a tape and \$15.00 to the ... continued on page 20 above address.

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H-1580

RSTSPROFESSIONALRSTSPROFESSIONA [4.8] CB.82S 10 PROGRAM: CB PHILIP HUNT (OLFBP) AUTHOR : INITIAL DATE: 02/26/82 EDIT: V01.03 EDIT DATE: 03/30/82 CB allows any user on a RSTS/E system to communicate with any other user on the same system through an emulation of a citizens' band radio. Each user has a 'HANDLE' that is transmitted along with any messages intended for another user monitoring the same channel. Multiple users may be monitoring any or all CB channels. There are 40 channels for communication as well special modes to send/recieve only upper case, send messages only to people knowing a changeable password, etc. There are special options that allow a privileged user to detach from a keyboard, kill a CB job, send messages to all users on CB, etc. CB uses 2 resident libraries and uses only 2K of user space to allow many CB jobs from using a large amount of memory. 1----- & 15 MODIFICATION HISTORY 16 Date 022782 Edit Reason BY v00.01 Test version. pjh Original Issue. Put BP2 threads into CBLIB. 030182 v01.00 pjh 030282 v01.00a pjh Put object code into CBCODE. & Add /CALL,/TIME commands. & 030582 v01.01 pjh 032582 v01.02 pjh Fix /CLEAR for kill on current job number. Add ST2NM macro code for conversions to speed up. 033082 v01.03 pjh RSTS Professional Release 1-----20 VARIABLE DEFINITIONS 21 - User reponse holder var ANS\$ - /WATCH any usr for msg flg & - Def argument Utility var & ANY.USERS% ARGE Def argument Utility var &
 Def argument Utility var &
 FNBRODCAST Mag channel hld &
 FNBRODCAST Typ:/B,/C,/OPR &
 FNBRODCAST send type flag &
 Hold variable for bit set & ARG1% ARG1\$ BCST.CHNL\$ BCST.TYPE\$ BFLAG% BITS BRDCST% Channel to send on /BROAD Currently parsed password
CBLIE - User /Res Pswrds
CBLIB - User progmmr nos.
CBLIB - User project nos. CB.PASS\$ CB.PASS\$(63)=6 CB. PROG\$ (63) CB.PROJ\$(63) CCL.ENTRY% CHANNEL\$(40)=64 CB entered as CCL flag CBLIB - All CB chnls array \_ Hold Utility Variable CHHN\$ Channel # hold var as int% & Channel # hold var as str\$ & CHN% CHN \$ CLR% /CLR internal command flag Index on Command type User entered Command/Msg CM% CMD\$ COMMON.IN.USE% COMMON.INIT% CBLIB - Common locked flag & CBLIB - Common initialized & CR/LF Hold string Put Channel hold variable CRLF\$ CSTRG\$ CTRL.C.TRAP\$ CTYP\$ SYS Call reciever \$ Command entered (2 lettrs) CXX% DEBUG% Index Utility Variable DEPUG on flag /DETACH SYS call revr Hold Utility Variable DETACH\$ DUMMY Hold Utility Variable & Hold Utility Variable & Used for Msg Snd/Rev CVT\$\$ & /LIST command utility var & DUMMY\$ DUMMY2% EDIT.VAL% ENS SYS Call array holder SYS Call array holder Hold Utility Variable Hold Utility Variable FIP%(30) FIP2%(30) FLAG% FLAGS% CBLIB - User handles FNBROADCAST\$ hold msg\$ HANDLE\$(63)=12 HLD. ARG\$ HNDL\$ Accepted HANDLE\$ Handle entered as CCL flag & HNDL . ENTEREDS Utility Variable 1% Utility Variable Utility Variable 12% 11% -2

| 1  |  |  |   |
|----|--|--|---|
| 1  | JBNO%  | - Utility Variable   | &                                       |
|    | JBNUMS   | - Utility Variable<br>- FNBROADCAST\$ usr.job\$ as \$  | &<br>&                                  |
| 1  | JOB.FLAGS\$(63)  | - CBLIB - User job attrbutes   | &                                       |
| 1  | JOB.OPT\$<br>KB\$  | - FNKB.NUMBER\$ hold kb dcder  | 8                                       |
| 1  | KB\$   | - /LIST formatted kb# hold   | &                                       |
| !  | KB.OPTS<br>KB.SNDS   | - FNBROADCAST\$ kb# to snd to  | α<br>&                                  |
| 1  | KBN%   | - FNKB.NUMBER\$ kb# decoded  | *                                       |
| 1  | KBN\$  | - FNBROADCAST\$ - Utility Var  | a<br>&                                  |
| 1  | KILL.JOB\$   | - /CLEAR kill job sys rovr   | &                                       |
|    | LOGGED.OUT%  | - Curr user not logged in  | 22                                      |
| 1  | MSG\$  | - FNBROADCAST\$ - msg to send  | *                                       |
|    | ONE.USERS  | - /LIST no user flags  | *                                       |
|    | OPNX\$   | - Utility Variable   | &                                       |
|    | OTHER. POSS  | - Utility Variable   | &<br>&                                  |
|    | OUSRX%   | - Utility Variable   | &                                       |
|    | PPN%   | - Initial current user ppn<br>- ENBROADCAST\$ ppn formatted  | *                                       |
|    | PPN.OPT\$  | - /PPN opt bits value  | 8                                       |
|    | PS\$   | - Utility Variable   | &<br>&                                  |
|    | RUNNING.IN.ERRORS  | - A Fatal error occured flag   | å                                       |
|    | SECRET.OPT%  | - /RESTRICT opt bits value   | &<br>2                                  |
|    | SEND.MSG\$   | - Send msg SYS call revr   | &                                       |
|    | SND.HDR\$  | - FNBROADCAST\$ hdr build var  | *                                       |
|    | ST\$   | - /LIST start position   | &                                       |
|    | ST\$(64)   | - CHANNEL\$() array decoder  | 8                                       |
|    | TALK\$   | - Current usr talk chnl hold   | &                                       |
|    | TALK.CHAN\$(63)  | - CBLIB - User talk channels   | *                                       |
|    | UFLAG\$  | - User attribute flag hold   | &                                       |
|    | UPPER.OPT%   | - Upper case only opt bits   | *                                       |
|    | USER.POS\$   | - FNUSER.POS% utility var  | å                                       |
|    | USER. PROGS  | - Current user progmmr #   | &<br>2                                  |
|    | USR#   | - Utility Hold Variable  | *                                       |
|    | USRX\$   | - Utility hold Variable  | *                                       |
|    | VERSION\$  | - CB Version number  | &                                       |
|    | WX\$   | - Utility Index Variable   | *                                       |
|    | XXXS   | - Utility Index Variable   | &                                       |
|    | Y\$<br>YY\$  | - Utility Index Variable   | *                                       |
|    | ***  |  | *                                       |
|    |  |  | α                                       |
|    |  |  | *                                       |
|    | USER-DEFINE  | D FUNCTIONS  | *                                       |
|    |  |  | α                                       |
|    |  |  |   |
|    |  | Presdenat to a channel fund  | å<br>2                                  |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )  | - Broadcast to a channel func<br>- Display 2-digit no, ldng Os   | &<br>&<br>&                             |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNGET.CHAN\$( )   | - Broadcast to a channel func<br>- Display 2-digit no, ldng Os<br>- Get a chnl \$ to int array<br>- Format a VB number   | * * * *                                 |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNGET.CHAN\$( )<br>FNKB.NUMBER\$( )<br>FNLDCK.COMMON\$  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> </ul>   | ***                                     |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNGET.CHAN\$( )<br>FNLCH.CHAN\$( )<br>FNLCCK.COMMON\$<br>FNLOCK.COMMON\$  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> </ul>   | ******                                  |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNKB.NUMBER\$( )<br>FNLOCK.COMMON\$<br>FNLOCK.COMMON\$<br>FNOPEN.POSITION\$( )<br>FNOPT.CHAN\$( )  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock chlib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> </ul>   | * * * * * * * *                         |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCBT.CHAN\$()<br>FNLOCK.COMMON\$<br>FNLOCK.COMMON\$<br>FNOPEN.POSITION\$()<br>FNUTLCHAN\$()<br>FNUUTCHAN\$()   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> </ul>   | * * * * * * * * * *                     |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNKB.NUMBER\$( )<br>FNLOCK.COMMON\$<br>FNODFEN.POSITION\$( )<br>FNUTLCHAN\$( )<br>FNUTLCHAN\$( )<br>FNUNLOCK.COMMON\$<br>FNUSER.POSITION\$   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock chlib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | * * * * * * * * * *                     |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNKB.NUMBER\$( )<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$( )<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | * * * * * * * * * * * * *               |
|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNKB.NUMBER\$( )<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$( )<br>FNUTLCHAN\$( )<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | · ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNKB.NUMBER\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUNLOCK.COMMON\$<br>FNUSER.POSITION\$  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | * * * * * * * * * * * * * * * *         |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNKB.NUMBER\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>F | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | **************************              |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNKB.NUMBER\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$()<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNCER.POSITION\$   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | · · · · · · · · · · · · · · · · · · ·   |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNKB.NUMBER\$()<br>FNLOCK.COMMON\$<br>FNOTHER.POSITION\$()<br>FNUNLOCK.COMMON\$<br>FNUULCHAN\$()<br>FNUULCK.COMMON\$<br>COMMON A RES<br>COLLIST<br>COMMON TO HIST   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul>  | *** ****                                |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNNEN.UMBER\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>F | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng Os</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> </ul>   | <b>***</b>                              |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNED.CK.CAMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCK.COMMON\$<br>FNUUSER.POSITION\$<br>COMMON A R E<br>COMMON IN USE\$<br>COMMON  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> </ul>  | ************                            |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNUTC.CHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>COMMON IN A R E<br>COMMON IN A R E<br>COMMON IN IN<br>CHANNEL\$(40)=64<br>HANDL\$(63)=12<br>TALK.CHAN\$(63)  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common int flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> </ul>   | *****                                   |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>COMMON IN A R E<br>COMMON IN A R E<br>COMMON IN IN<br>CHANNEL\$(40)=64<br>HANDLE\$(63)=12<br>TALK.CHAN\$(63)<br>CB.PROJ\$(63)   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIE.LIB <ul> <li>Lock common flag</li> <li>Common int flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> </ul>  | *******                                 |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>COMMON IN A R E<br>COMMON IN US\$<br>COMMON IN   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIE.LIB <ul> <li>Lock common flag</li> <li>Common int flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User job attributes Tbl</li> </ul>   | ************                            |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLOCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>COMMON IN A R E<br>COMMON IN US\$<br>COMMON I   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIE.LIB <ul> <li>Lock common flag</li> <li>Common int flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User /RESTRICT Passwrds</li> </ul>   | 基基基基基基基基基基基基基基基基基基基基基基基基基基基基基基基基        |
|    | <pre>FNBROADCAST\$( ) FNCHAN\$( ) FNCHAN\$( ) FNCHAN\$( ) FNLCK.CCMMON\$ FNLOCK.CCMMON\$ FNUTC.HAN\$( ) FNUTLCHAN\$( ) FNUTLCHAN\$( ) FNUTLCK.COMMON\$ FNUUSER.POSITION\$ COMMON_INIT\$ CHAN\$(C) COLLIST COMMON_INIT\$ CHAN\$L\$(40)=64 HANDL\$(63)=12 TALK.CHAN\$(63) CB.PROJ\$(63) CB.PROJ\$(63) CB.PROJ\$(63) CB.PAOJ\$(63) CB.PAOJ\$(63) CB.PAOJ\$(63)=6 </pre>   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Handle Table</li> <li>User progent number Tbl</li> <li>User job attributes Tbl</li> <li>User /RESTRICT Passwrds</li> </ul>  | 基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基基        |
|    | <pre>FNBROADCAST\$( ) FNCHAN\$( ) FNCHAN\$( ) FNCHAN\$( ) FNLOCK.CCMMON\$ FNLOCK.CCMMON\$ FNUTLCHAN\$( ) FNUTLCHAN\$( ) FNUTLCHAN\$( ) FNUTLCHAN\$( ) FNUTLCK.COMMON\$ COMMON_IN_USE\$ COMMON_IN_USE\$</pre>   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng Os</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User job attributes Tbl</li> <li>User /RESTRICT Passwrds</li> </ul>   | 基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基基基       |
|    | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>FNUTLCHAN\$()<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>COMMON_IN_USE\$<br>CO  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng Os</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User /RESTRICT Passwrds</li> </ul>  | 基基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基基基基基    |
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|    | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNLOCK.COMMON\$<br>FNOTHER.POSITION\$( )<br>FNUTLCHAN\$( )<br>COMMON IN A R E .<br>COMMON IN A R E .<br>COMMON IN US\$<br>COMMON IN IN\$<br>CHANNE1\$(40)=64<br>HANDL2\$(63)=12<br>TALK.CHAN\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)=6<br>S U B P R O G R A M S   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng 0s</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Fransmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User job attributes Tbl</li> <li>User /RESTRICT Passwrds</li> </ul>   | 基基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基 基基基基   |
| ST | FNBROADCAST\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNCHAN\$( )<br>FNLCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$( )<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>COMMON IN A R E .<br>CBLIST<br>COMMON IN A R E .<br>CBLIST<br>COMMON IN A R E .<br>CBLIST<br>COMMON IN IN\$<br>CBLIST<br>COMMON IN IN\$<br>CBLIST<br>COMMON INIT\$<br>CHANNEL\$(40)=64<br>HANDLE\$(63)=12<br>TALK.CHAN\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(6   | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng Os</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User job attributes Tbl</li> <li>User /RESTRICT Passwrds</li> </ul> C A L L E D BRAY(64) TO ST\$ VARIABLE   | 基基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基基基基基基基  |
| ST | FNBROADCAST\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNCHAN\$()<br>FNLCK.CCMMON\$<br>FNLOCK.CCMMON\$<br>FNOTHER.POSITION\$()<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>FNUNLOCK.COMMON\$<br>COMMON IN A R E .<br>CBLIST<br>COMMON IN A R E .<br>CBLIST<br>COMMON INIT\$<br>CHANNEL\$(40)=64<br>HANDL\$(63)=12<br>TALK.CHAN\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(63)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PRO\$(53)<br>CB.PR  | <ul> <li>Broadcast to a channel func</li> <li>Display 2-digit no, ldng Os</li> <li>Get a chnl \$ to int array</li> <li>Format a KB number</li> <li>Lock cblib common area</li> <li>Find open position in chnl</li> <li>Find user in a channel</li> <li>Put a chnl int array to \$</li> <li>Unlock cblib common area</li> <li>Find curr user in a channel</li> </ul> A S COMMON DATA AREA IN CBLIB.LIB <ul> <li>Lock common flag</li> <li>Common init flag</li> <li>40 channel user table</li> <li>User Transmit Chnl Tbl</li> <li>User project number Tbl</li> <li>User job attributes Tbl</li> <li>User /RESTRICT Passwrds</li> </ul> C A L L E D RRAY(64) TO ST\$ VARIABLE ANDE ANDE ANDE ANDE ANDE ANDE ANDE ANDE | 基基基基基基基基基基基基基 医基基基 医基基基基基基基基基基基基基基基基基基  |

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| 60                      | I<br>RESIDENT LIBRARIES USED   |  | D                                       | EC  |
|-------------------------|--|--|---|---|
| 61                      | CBLIB .LIB/RO - COMMON DATA AREA/BP2 THREADS<br>CBCODE.LIB/RW - OBJECT CODE EXECUTED BY BP2 THREADS  |  | DEC                                     | C 1200 BAUD PRINTERS  |
|                         | ]  |  |   |   |
| 100                     | COMMON (CBLIST)<br>COMMON.IN.USE\$,<br>COMMON.INIT\$,<br>CHANNEL\$(40\$)=64\$,<br>HANDLE\$(53\$)=12\$,<br>TALK.CHAN\$(63\$),<br>CB.PRO\$(63\$),<br>CB.PRO\$(63\$),<br>JOB.FLAG\$\$(63\$),<br>CB.PASS\$(63\$)=6\$   | ND NEW * F   | LA12<br>LA12<br>LA12                    | D-AA         EIA, KSR, Keyboard Only         \$ 1,995           D-BA         EIA, Keyboard & Keypad, KSR         2,075           D-BA         Receive Only         1,795  |
|                         | ICOMMON DATA AREA FORMAT:<br>COMMON.IN.USE\$ = WHETHER ANOTHER CB JOB<br>HAS THE COMMON LOCKED FOR UPDATE<br>0=NO, ANY OTHER VALUE = YES<br>(COMMON.INI\$ = WHETHER COMMON HAS BEEN<br>INITIALIZED, IF YES = 378% ELSE GARBAGE<br>CHANNEL\$() = ALL CHANNEL\$, PACKED JOB<br>NUMBERS CURRENTLY MONITORING THIS CHAN<br>CHANNEL\$() = ALL JOB USING CB HANDLES<br>HANDLE\$() = ALL JOBS USING CB HANDLES<br>HANDLE\$() = ALL JOBS USING CB CURRENT<br>CHANNEL \$() = ALL JOBS USING CB CURRENT<br>CHANNEL \$() = ALL JOBS USING CB CURRENT<br>CHANNEL THEY ARE TALKING ON<br>CB.PROJ\$() = CURRENT OPTIONS A CB USER HAS<br>SET, CURRENTLY DEFINED ARE:<br>BIT 0 ON = PRINT PPN WHEN<br>GETTING A MESSAGE<br>BIT 2 ON = PRINT JOB WHEN<br>GETTING A MESSAGE | ULL 90 DAY WARRANTY  | C.<br>M<br>614<br>BR                    | ASH PRICES • IN STOCK<br>IMMEDIATE DELIVERY<br>• CALL SONJA OR LAURIE AT:<br>• (614) 889-0810<br>• SCHERER'S<br>INI COMPUTER MART<br>• 5 Dolan Place Dublin, Ohio 43017<br>• AND NEW*WARRANTY*ATD<br>CIRCLE 104 ON READER CARD  |
|                         | SECRET PASSWORD SET<br>SECRET PASSWORD SET<br>BIT 4 ON = SPY BIT SET. A PFIV<br>USER MAY RCV MESSAGES<br>RESTRICTED WITHOUT<br>KNOWING PASSWORD<br>BIT 5 ON = PRINT TO TERM IN UPR<br>CASE ONLY<br>BIT 6 TO 15 - NOT USED<br>CB.PASS\$() = PASSWORD MULTIPLE USERS<br>MUST ENTER TO RECIEVE SECRET<br>MESSAGES   | α & & & & & & & & & & & & & & & & & & &  | \<br>1======<br>1<br>1<br>1             | COMMON.IN.USE\$=0\$ IUNLOCK CORE &<br>GOTO 1000 IF (CCL.ENTRY\$<>0\$) AND (HNDL.ENTERED\$=0\$) &<br>GOTO 230 IF LOGGED.OUT\$ ICANT ENTR NOT LOGED IN<br>ACCEPT USER ID UNLESS CCL ENTERED. CHECK FOR 'HIDDEN'<br>OPTIONS. '/DBG'= DEBUG, '/CLR' = FORCE CBLIB INIT<br>LINPUT "What is your 'Handle' ";HNDL\$<br>UNLESS (CCL.ENTRY\$=-1\$) AND<br>CCL ENTRY\$=-1\$) AND                                    |
| 110<br>\<br>!           | I<br>ON ERROR GOTO 19000<br>DIM FIP\$(30\$),FIP2\$(30\$),ST\$(64\$)<br>DEFINE JOB.FLAGS\$() BITS:<br>PPN.OPT\$ = 1\$<br>KB.OPT\$ = 2\$<br>JOB.OPT\$ = 4\$  | 4 & & & & & & & & & & & & & & & & & & &  | ~ | CCL.ENTRY\$=0\$<br>HNDL.ENTERED\$=-(\$)<br>A<br>HNDL.ENTERED\$=0\$<br>II\$= INSTR(1\$,HNDL\$,"/DBG") IDEBUG MODE, HIDDEN<br>CLR\$=INSTR(1\$,HNDL\$,"/CLR") ICLEAR LIB HIDDEN FUNC<br>A<br>CLR\$=0\$ IF USER.PROJ\$<>1\$<br>CLR\$=0\$ IF USER.PROJ\$<>1\$<br>CLR\$=1\$ THEN<br>COMMON.INIT\$=0\$<br>GOTO 120<br>A<br>CHNL.ENTERED\$=-(\$)<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A<br>A |
| \<br>\<br>!=====        | SECRET.OPT\$ = 8\$<br>SPY.OPT\$ = 16\$<br>UPPER.OPT\$ = 32\$<br>DEFINE CURRENT USER ITEMS:   | &<br>&<br>&<br>&<br>&  | 205<br>\<br>\<br>\                      | DEBUG\$=0\$ & & & & & & & & & & & & & & & & & & &   |
| \<br>\<br> <br> ======  | USER.JOB\$=(PEEK(518\$) AND 255\$)/2\$ IGET JOBNO<br>PPN\$=PEEK(PEEK(520\$)+8\$)+24\$) IGET PPN<br>USER.PROJ\$=SWAP\$(PPN\$) AND 255\$<br>USER.PROG\$= PPN\$ AND 255\$<br>PRINT HEADER, PROGRAM IDENTIFICATION (IF NEEDED)   | a<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>&<br>& | 210<br>\<br>\<br>\<br>215               | GOTO 215 IF HNDL\$="" OR LEN(HNDL\$)>12\$ &<br>FOR X\$=1\$ TO 63\$ &<br>GOTO 220 IF HNDL\$=HANDLE\$(X\$) &<br>NEXT X\$ &<br>GOTO 300 &<br>PRINT "**Please enter up to 12 characters**.CUB\$(7\$) &  |
|                         | VERSION\$ = "01.03"<br>PRINT "CB - V";VERSION\$,ERT\$(0\$) UNLESS CCL.ENTRY\$<br>PRINT UNLESS CCL.ENTRY\$  | &<br>&<br>&  | 220                                     | GOTO 200 & PRINT "##??That 'Handle' is IN-USE by Job #";X\$;  |
| 1=====                  |  | α  | 1                                       | " - Try again??**";CHR\$(7%) &<br>GOTO 200 &  |
| 120<br>!=====<br>!<br>! | GOTO 200 IF COMMON.INIT\$=378\$ INORMAL<br>INITIALIZE RESIDENT LIBRARY IF THIS IS THE FIRST USER<br>SINCE LIBRARY WAS LOADED   | &<br>&<br>&<br>&<br>&  | 230<br>\<br>!=====                      | PRINT "##??You may not talk LOGGED-OUT??##";CHR\$(7\$)         &           GOTO 32700         &   |
| ~ ~ ~ ~                 | PRINT "\$Initializing CBLIB Resident Library"<br>PRINT<br>COMMON.IN.USE\$=USER.JOB\$ 1JUST IN CASE<br>CHANNEL\$(X\$)=STRINC\$(64\$,0\$)<br>FOR X\$=0\$ TO 40\$   | &<br>&<br>&<br>&   | 300<br>!<br>!<br>!                      | SETUP THE USER ITEMS FOR THIS RUN , DEFAULTS= &<br>TALK ON CHANNEL 19, MONITOR 19, NO FLAGS SET &<br>**TELL THE WORLD WE ARE HERE**<br>&  |
| ~~~~                    | FUR X\$=0\$ TO 63\$<br>CB.PROG\$(X\$)=0\$<br>CB.PROJ\$(X\$)=0\$<br>TALK.CHAN\$(X\$)=0\$<br>JOB.FLAG\$(X\$)=0\$   | &<br>&<br>&<br>&   | ×<br>×                                  | PRINT         &           DUMMY≸=FNLOCK.COMMON≸         &           CTRL.C.TRAP\$=SYS(CHR\$(6\$)+CHR\$(-7\$))         &           DUMMY2\$=FNGET.CHAN\$(0\$)         &  |
| ~ ~ ~                   | HANDLE\$(X\$)=""<br>CB.PASS\$=""<br>NEXT X\$<br>COMMON.INIT≸=378\$ ISET INIT FLAG  | &<br>&<br>&<br>&   |   | DUMMY\$=FROPEN.POSITION\$         &           ST\$(DUMMY\$) = USER.JOB\$         1SETUP IN CUR USER LIST           DUMMY2\$=FNPUT.CHAN\$(0\$)         &           &         &   |

| 1           | DUMMY2\$=FNGET.CHAN\$(19\$)<br>DUMMY\$=FNOPEN.POSITION\$                |   | *                         |
|-------------|---|---|---------------------------|
| 1           | ST\$(DUMMY\$) = USER.JOB\$<br>DUMMY2\$=FNPUT.CHAN\$(19\$)               | SETUP CHAN 19 MONITOR                   | *                         |
| 1           | HNDL\$=CVT\$\$(HNDL\$,1285)   |   | &<br>&                    |
| 1           | HANDLE\$(USER.JOB\$)=HNDL\$   |   | 4                         |
| Ň           | CB.PROJ\$(USER.JOB\$)=USER.PROJ\$                                       |   | &                         |
| ~           | CB.PROG\$(USER.JOB\$)=USER.PROG\$<br>CB.PASS\$(USER.JOB\$)=""           |   | 8                         |
| ١           | TALK.CHAN%(USER.JOB%)=19%   | TALK TO 19 FIRST                        | *                         |
| 1           | DUMMY\$ = FNUNLOCK.COMMON\$<br>CMD\$="**New User - Job #"+NUM1\$(U      | SER.JOB\$)+" ("+HNDL\$+                 | 8                         |
| \<br>1===== | ") has signed on to CB**"<br>DUMMY\$=FNBROADCAST\$(0\$,CMD\$,-1\$)      | Itell everyone                          | ***                       |
| 500         |   |   | r                         |
| 1           | PROMPT THE CURRENT USER WITH HIS  | TALK CHANNEL NUMBER                     | &                         |
| 1           | ADD AN EXTRA '>' IF HE HAS A PASS<br>ACCEPT COMMAND OR MESSAGE, IF IT   | WORD SET<br>BEGINS WITH '/',            | 8                         |
| 1           | THEN ASSUME IT IS A PROGRAM COMMA                                       | ND                                      | *                         |
|             | PRINT "T"+FNCHAN\$(TALK.CHAN\$(USER                                     | .JOB%))+">";                            | &                         |
| 1           | PRINT ">"; IF JOB.FLAGS\$(USER.JOB<br>OPEN " KB:" AS FILE 1\$           | %) AND SECRET.OPT%                      | 8                         |
| 1           | LINPUT #1%, CMD\$   |   | &                         |
| ì           | EDIT.VAL%=8%  |   | 8                         |
| 1           | EDIT.VAL\$=40\$ IF JOB.FLAGS\$(USER.<br>CMD\$=CVT\$\$(CMD\$.EDIT.VAL\$) | JOB\$) AND UPPER.OPT\$<br>INO LDNG SPCS | *                         |
| N           | GOTO 1000 IF LEFT(CMD\$,1)="/"  | I COMMAND                               | &                         |
| `           | PRINT "**CB - V";VERSION\$  | ;"##" ISO GIVE VERS                     | &<br>&                    |
| \           | GOTO 500  | IAND GET MORE                           | &<br>&                    |
| 600         | INCREACE TO BROADCAST   |   |                           |
| 1           | DUMMY#=FNBROADCAST#(TALK.CHAN#(US                                       | ER.JOB%),CMD\$,0%)                      | &                         |
| 1           | GOTO 500  |   | &                         |
| 1000        | ICOMMAND<br>CTYP\$=CVT\$\$(MID(CMD\$,2\$,2\$),32\$)                     | lcmd in upper case                      | &<br>&                    |
| 1           | CTYP\$=LEFT(CMD\$,2\$) IF CCL.ENTRY\$                                   |   | &                         |
| `           | CTYP\$=CVT\$\$(CTYP\$,-1%)<br>CTYP\$="LI" IF CTYP\$="L" IALLOW LT       | ST                                      | &                         |
| Ň           | CTYP\$="HE" IF CTYP\$="H" 1HELP   | TO BE ONE LTR ENTRIES                   | &                         |
| 1           | CTYP\$=""##" IF CTYP\$="^" ISNEAKY                                      | )=".")<br>TO TRY ON CCL ENTRY           | &<br>&                    |
| 1           | VALID\$="TA.BR.MO.WA.LI.HE.CL.EX.C.<br>VALID\$="^^.^^WA.LI.HE.CL.^^.    | A.KB.SP.PP.UP.AL.JO.RE.DE.T.            | & "I<br>& "I<br>& "I<br>& |
|             | CMG_TNSTD(10 UNITD& CTVD&)  | THEOR TE LEGAL                          | å                         |
| 1           | CM%=INT(CM%/3%)+1% IF CM%   | DFFSET COMMAND                          | &                         |
| 1           | GOTO 1010 IF CM%<br>TYP\$=""  |   | &<br>&                    |
| 1           | TYP\$="CCL " IF CCL.ENTRY% 1:<br>PRINT "##22Invalid "+TYP\$+"common     | SAY CCL PROBLEM                         | &<br>&                    |
| 1           | GOTO 32700 IF CCL.ENTRY<br>GOTO 500                                     | , ijpe /ibbi ii                         | &<br>&                    |
| 1010        | 1DO DISPATCH, GO BACK FOR MORE  |   | &                         |
| 1           | STRT.ARG%=INSTR(1%,CMD\$,"")<br>ON CM% GOSUB 2000,2800,3000,3800,       | 4000,5000,5500,6000,                    | &<br>&                    |
|             | 6500,7000,7500,8000,8500,   | 8900,9000,9500,9800,                    | &<br>&                    |
| Υ           | GOTO 32700 IF CCL.ENTRYS  |   | &                         |
| 1=====      | GOTO 500  |   | &<br>&                    |
| 2000        |   |   | &                         |
| !           | ##TALK COMMAND##  |   | &                         |
| 1           | GOTO 2500 IF STRT.A   | RG\$=0\$                                | &                         |
| \           | CMD\$=RIGHT(CMD\$,STRT.ARG\$+1\$)                                       |   | &                         |
| \           | GOTO 2700 IF TALK\$<1\$ OR TALK\$>40                                    | ٤                                       | å                         |
| 2020        | DUMMY\$=FNLOCK.COMMON\$<br>TALK.CHAN\$(USER.JOB\$)=TALK\$               |   | &<br>&                    |
| Ň           | DUMMY2%=FNGET.CHAN%(TALK%)  |   | &                         |
| 1           | ST%(DUMMY%)=USER.JOB%   |   | &                         |
| 1           | DUMMY2\$=FNPUT.CHAN\$(TALK\$)<br>DUMMY\$=FNUNLOCK.COMMON\$              |   | &<br>&                    |
| 2500        | PRINT "##Now talking on channel "                                       |   | å                         |
| 1           | FNCHAN\$(T)<br>RETURN   | ALK.CHAN\$(USER.JOB\$))                 | &<br>&                    |
| 2700        | PRINT CHR\$(7%):"###??Tilegal TAIK                                      | channel??###                            | å                         |
| 1           | RETURN  |   | &                         |
| 145555      |   |   | α                         |
| 2800<br>1   | **BROADCAST COMMAND**   |   | &<br>&                    |
| 1           | GOTO 2950 IF STRT ARCE-OF   | ITLLEGAL TE NO ARC                      | &<br>&                    |
| ١.          | BRDCST\$=TALK.CHAN\$(USER.JOB\$)  | IASSUME STD CHN                         | &                         |

|                     | 12\$=INSTR(STRT.ARG\$+1\$,CMD\$," ")       1CHN TYPED?         GOTO 2810 IF 12\$=0\$       INO CHN SPECFD         CHN\$=MID(CMD\$,STRT.ARG\$+1\$,12\$-STRT.ARG\$-1\$)       IGET CHNL         BRDCST\$=VAL(CHN\$)       ISAVE IT         STRT.ARG\$=12\$       ILETS DO IT | 888         |
|---------------------|--|-------------|
| 2810<br>\<br>\<br>\ | MSG\$=RIGHT(CMD\$,STRT.ARG\$+1\$)  <br>GOTO 2950 IF BRDCST\$<1\$ OR BRDCST\$>40\$  ILLEGAL, SORRY<br>DUMMY\$=FNBROADCAST\$(BRDCST\$,MSG\$,1\$)  ISEND, NO PSWD<br>RETURN   | 8 8 8       |
| 2950<br>\           | PRINT "**??Illegal Channel??**";CHR\$(7\$)<br>RETURN   | &<br>&<br>& |
| 3000                |  | L           |
| 1                   | ##MONITOR COMMAND##  | 8           |
| N N                 | GOTO 3500 IF STRT.ARG\$=0\$ 11LLEGAL IF NO ARG<br>CMD\$=RIGHT(CMD\$,STRT.ARG\$+1\$)<br>DUMMY\$=FNLOCK.COMMON\$   | *           |
| 3010                | GOTO 3400 IF CMD\$=""  | &           |
| N N                 | 125=1N31K(1, CMD, ", ")<br>CHN\$=CMD\$   | å           |
| 1                   | GOTO 3050 IF 12%=0% INO MORE<br>INO MORE<br>IMUST BE LAST ONE  | &<br>&      |
| 1                   | CHN\$=LEFT(CMD\$,I2\$-1\$)<br>CMD\$=RIGHT(CMD\$,I2\$+1\$)  | å<br>&      |
| 3050                | GOTO 3100 IF CHN\$="-"   | \$          |
| 1                   | CHN\$=ABS(VAL(CHN\$))<br>GOTO 3700 IF CHN\$=0\$ OR CHN\$>40\$  | 8<br>8      |
| ١                   | GOTO 3110 IF INSTR(1\$, CHN\$, "-") IDELETE  | \$          |
| 3060<br>\<br>\      | DUMMY2\$=FNGET.CHAN\$(CHN\$)<br>DUMMY\$=FNUSER.POSITION\$<br>IF DUMMY\$<>~1\$ THEN   | ***         |
|                     | FNCHAN\$(CHN\$);"??##"   | å           |
| 1                   | GOTO 3010 Ido another  | å           |
| 3070                | DUMMY\$=FNOPEN.POSITION\$<br>ST\$(DUMMY\$)=USER.JOB\$  | &<br>&      |
| 1                   | DUMMY2\$=FNPUT.CHAN\$(CHN\$)<br>GOTO 3010  | *           |
| 3100<br>\           | FOR WX\$=1\$ TO 40\$<br>GOTO 3105 IF WX\$=TALK.CHAN\$(USER.JOB\$)  | 882         |
| \<br>\              | DUMMY2\$=FNGET.CHAN\$(WX\$)  | 8           |
| 1                   | GOTO 3105 IF DUMMY\$=-1\$  | 8           |
| 1                   | ST\$(DUMMY\$)=0\$<br>DUMMY2\$=FNPUT.CHAN\$(WX\$)   | å           |
| 3105                | NEXT WX\$  | &           |
| 1                   | DUMMY\$=FNUNLOCK.COMMON\$<br>PRINT "##All channels except ";   | *           |
| 1                   | TALK.CHAN\$(USER.JOB\$);" reset **"  | 8 &         |
| 1                   | GOTO 3720 IF CHNS_TALK.CHANS(USER.JOBS)  | α<br>&      |
| 1                   | ICANT UNMONITOR TALK CHANNEL   | *           |
| ~                   | DUMMYS=-1% THEN<br>PRINT "##??Not monitoring channel ";  | ***         |
| 1                   | FNCHAN\$(CHN\$);"??**"<br>GOTO 3010 Ido another  | &<br>&      |
| 3120                | ST\$(DUMMY\$)=0\$  | &           |
| N N                 | DUMMY2≸=FNPUT.CHAN\$(CHN\$)<br>GOTO 3010   | &<br>&      |
| 3400                | DUMMY\$=FNUNLOCK.COMMON\$  | å           |
| 3500<br>\           | PRINT "**Now monitoring channels: "<br>MCNT%=0%  | 8 2         |
| Ň                   | FOR X\$=1\$ TO 40\$<br>PRINT MONITOR _ CHANNEL CHECKING-#.V\$  | *           |
|                     | IF DEBUGS  | 8           |
| Ň                   | DUMM12%=FNGET.CHAN%(X%)<br>DUMM1%=FNUSER.POSITION%   | 8           |
| 1                   | GOTO 3550 IF DUMMY\$=-1\$<br>MCNT\$=MCNT\$+1\$   | *           |
| 1                   | PRINT FNCHAN\$(X\$);" ";<br>IF MCNT\$>15\$ THEN  | *           |
| 1                   | MCNT≸=0≸<br>PRINT  | *           |
| 3550                | NEXT XS  | ę.          |
| 1                   | PRINT  | *           |
| 1                   | RETURN   | 8           |
| 3700                | PRINT CHR\$(7%);"##??Illegal MONITOR channel '";<br>CHN\$;"!??##"  | *           |
| /                   | GOTO 3010  | å           |
| 3720                | PRINT CHR\$(7%);"##??Cannot UNMONITOR your "+<br>"TALK channel??##"  | 8ª 8ª       |
| \<br>!======        | GOTO 3010  | &<br>&      |
|                     |  |             |

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| **WATCH (USERS ON A SPECIFIC CHANNEL)** &  | 050   |
|--|---|
| GOTO 3900 IF (STRT.ARG≸=0\$) AND (CCL.ENTRY≸=-1\$) &<br>GOTO 3805 IF STRT.ARG\$<>0\$ &         | DEC   |
| CHN≸=TALK.CHAN≸(USER.JOB\$) &<br>GOTO 3807 &   | DEC CRT'S                                   |
| CMD\$=RIGHT(CMD\$,STRT.ARG\$+1\$) &<br>CHN\$=VAL(CMD\$) &                                      | VT101-AA EIA, Non Upgradeable \$ 995        |
| GOTO 3900 IF CHN\$<=0\$ OR CHN\$>40\$ &<br>DUMMY2\$=FNGET.CHAN\$(CHN\$) &<br>ANY.USERS\$=0\$ & | VT131-AA w/AV0, PC0, & Screen Editing 1,575 |
| PRINT &  | <b>VT100-AA</b> . EIA 1.375                 |
| FOR CXX\$=1\$ TO 63\$ & & & & & & & & & & & & & & & & & & &                                    | VT132-AA . AVO, Screen Editing 1,450        |
| GOTO 3850 IF KBN\$="ILL:" &<br>PRINT "#";NUM1\$(USR\$);TAB(6\$); &                             | ■ CASH PRICES ● IN STOCK                    |

GOTO 3900 GOTO 3805 CHNS-TALK . GOTO 3807 CMD\$=RIGHT 3805 CHN%=VAL(C 3807 GOTO 3900 DUMMY2%=FN ANY. USERS% PRINT "User PRINT 3810 FOR CXX%=19 GOTO 3850 USR#=ST#(C) KBN\$=FNKB. GOTO 3850 IF KBN\$="ILL:"
PRINT "#";NUM1\$(USR\$);TAB(6\$); "[";NUM1\$(CB.PROJ\$(USR\$))+","+ NUM1\$(CB.PROG\$(USR\$));"]";TAB(18\$); \* KBN\$;TAB(27\$); CVT\$\$(HANDLE\$(USR\$),128\$);TAB(46\$); CVT\$\$(IARPLOC, PRINT "Monitor"; PRINT ", Talk"; IF TALK.CHAN\$(USR\$)=CHN\$ PRINT ", PSWD"; IF (JOB.FLAGS\$(USR\$) AND SECRET.OPT\$) AND (TALK.CHAN\$(USR\$)=CHN\$) ANY. USERS# =- 19 3850 NEXT CXXS PRINT "No Users on this channel" IF ANY.USERS\$=0\$ PRINT RETURN 3900 PRINT "##??Illegal channel specified??##";CHR\$(7%) RETURN & 4000 ##LIST (USERS) COMMAND## ST%=1% EN%=63% ONE.USER#=0% GOTO 4010 IF STRT.ARG%=0% ICHK IF WE HAVE ARG =VAL(RIGHT(CMD\$,STRT.ARG\$+1\$)) CNS=STS GOTO 4600 IF EN%<1% OR EN%>63% ONE.USER#=-1% 4010 PRINT "Current CB User list:" UNLESS ONE.USER# ANY.USERS\$=0\$ PRINT DUMMYS=FNLOCK.COMMONS FOR X%=ST% TO EN% GOTO 4500 IF CB.PROJ\$(X\$)=0\$ KB\$=FNKB.NUMBER\$(X%) GOTO 4500 IF KB\$="ILL:" ANY. USERS#=-1% PRINT "#"+FNCHAN\$(X\$);" ["+NUM1\$(CB.PROJ\$(X\$))+ ","+NUM1\$(CB.PROG\$(X\$))+"]"; TAB(14\$);KB\$;TAB(21\$); CVT\$\$(HANDLE\$(X\$),128\$);TAB(34\$); "Talk: "; FNCHAN\$(TALK.CHAN\$(X\$));
PRINT TAB(43\$);"Att: "; PRINT TAB(43%); "Att: "; FLAGS\$ = JOB.FLAGS\$(X%) PRINT "JOB "; IF FLAGS\$ AND JOB.OPT\$ PRINT "KB "; IF FLAGS\$ AND PR.OPT\$ PRINT "PPN"; IF FLAGS\$ AND PPN.OPT\$ PRINT "PSWD "; IF FLAGS\$ AND SECRET.OPT\$ PRINT "NOP"; IF FLAGS\$ AND UPPER.OPT\$ PRINT "NOPE"; IF FLAGS\$ AND UPPER.OPT\$ PRINT TAB(73%); CVT\$\$(CB.PASS\$(X\$).-1\$); IF (((JOB.FLAGS%(X%) AND SECRET. OPT%) <>0%) AND (DEBUG\$ <>0\$) OR (USER. PROJS=1%) PRINT PRINT TAB(16%);"Mon: "; MCNT%=0% FOR Y%=1% TO 40% DUMMY2%=FNGET.CHAN%(Y%) OTHER.USER%=FNOTHER.POSITION%(X%) GOTO 4050 IF OTHER.USER%=-1% ! INOT ON CHAN PRINT FNCHAN\$(Y%);" "; MCNT%=MCNT%+1% IF MCNT%>15% THEN MCNT\$=0% PRINT \ PRINT TAB(21%); 4050 NEXT Y% PRINT

3800

4500

NEXT X%

PRINT

RETURN

DUMMY%=FNUNLOCK.COMMON%

PRINT "No users " IF ANY.USERS%=0%

SCHERER'S -**MINI COMPUTER MART** AN 6145 Dolan Place Dublin, Ohio 43017 BRAND NEW\*WARRANTY\*ATD CIRCLE 105 ON READER CARD PRINT "##??Illegal user number specified??##";CHR\$(7%) 4600 RETURN ................. 5000 \*\*HELP COMMAND\*\* PRINT "CB - V":VERSION\$:" Commands are:" PRINT PRINT "/TALK n - Change talk channel to 'n'." PRINT This is the channel that you " PRTNt. 'Transmit' on." Monitor All channels specified" PRINT "/MONITOR n,m,..z -PRINT " If negative, Unmonitor channel." 2 If negative, With no number, then" & If negative, with no number, then" & Unmonitor ALL channels (Except TALK)" & Restrict sending message to" & any JOB having 'xxxxx' as" & it's internal password, If no" & PRINT PRTNT \* PRINT "/RESTRICT XXXXXX -PRINT " PRINT PRINT " argument, then turn off password" & PRINT "/BROADCAST nn Text- Allows a message to be sent to everyone" & Allows a message to be sent to everyone" & even if a password is set. This allows a" & user to send text to everyone without" & having to reset his password, send a " & message and then set the password again." & If 'nn' is included, then message is sent" & on channel #nn, else it is sent on the" & users' normal talk channel." & PRINT " PRINT PRINT " PRINT PRINT PRINT PRINT # PRINT "/CALL Kbn# - Send a message to specified terminal"& PRINT requesting that they enter CB." IF USER.PROJ\$=1\$ THEN 5005 PRINT "/SPY (PRIV) - Allows operator to recieve Restricted" & messages without knowing PASSWORDS." & PRINT " PRINT "/CLEAR n (PRIV) - Clear out job specified by 'n'." & PRINT " This removes job from tables and" & PRINT " KILLs job off system (Logs out)." & PRINT "/DETACH (PRIV) - Detach from the current terminal." PRINT "/ALL Txt (PRIV) - Send a message to ALL users on CB." & Toggle KB on message switch"
 Toggle PPN on message switch"
 Toggle JOB on message switch" PRINT "/KB PRINT "/PPN 5010 PRINT "/JOB PRINT "/TIME - Display current Date/Time" PRINT "/UPPER - Translate all incoming/outgoing" message characters to UPPER CASE." & - List current users on CB." & PRINT PRINT "/LIST [n] PRINT " If 'n' is specified, then list" only that user" PRINT List all users WATCHING channel 'n'" & If 'n' is not entered, then all" & users on current talk channel are" PRINT "/WATCH [n] PRINT " PRINT PRINT

IMMEDIATE DELIVER Y

CALL SONJA OR LAURIE AT: -

- (614) 889-0810 -

PRINT " PRINT "/HELP This message PRINT "/EXIT - Exit CB" PRINT PRINT "Note: "Z and "C act like '/EXIT' was entered" PRINT All commands may be abbreviated to 2 letters." 2 PRINT

shown."

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| \<br> =====    | RETURN  | & 65<br>& !         | 500          | **CALL COMMAND**  |
|----------------|---|---------------------|--------------|---|
| 5500           | **CLEAR JOB COMMAND (PRIV)**  | & 1<br>& 1          |              | Send message of form:<br>'**CB - User: Handle - Please enter CB on Channel #n**'  |
| 1              | GOTO 8950 IF USER.PROJ\$<>1\$ IPRIV FUNCTION ONLY<br>GOTO 5720 IF STRT.ARG\$=0\$ IWE MUST HAVE AN ARG<br>CMTd-FICHT(CMTd STRT ARG\$=1\$)  | & !<br>&<br>&<br>&  |              | GOTO 6600 IF STRT.ARG\$=0\$ INOTHING SPECIFIED<br>ST\$=VAL(RIGHT(CMD\$,STRT.ARG\$+1\$))<br>GOTO 6600 IF ST\$<0\$ OF ST\$>1275   |
| 1              | GOTO 5720 IF JENUMS(1) OR JENUMS>635  | & \<br>&            |              | DUMMY2\$=FNGET.CHAN\$(0\$)  |
| ~              | DUMMYS=FNLOCK.COMMON\$<br>DUMMYS=FNCFT.chaN\$(0\$)<br>OTHER.USEN\$=FNOTHER.POSITION\$(JBNUM\$) IUSER ON CB????<br>DUMMYS=DUMUNCOK.COMPANY | ά 65<br>& \<br>& \  | 510          | FOR X\$=1\$ T0 63\$<br>GOT0 6550 IF ST≸(X\$)=0\$ INO JOB THERE<br>KB\$=FNKB.NUMBER\$(ST\$(X\$)) IOET JOB KB<br>COMP (COD U DINK (X\$)) IOET JOB KB                        |
| 1              | GOTO 5730 IF OTHER USER¥=1\$ INO, CANT KILL<br>PRINT "Really CLEAR job #";JBNUM\$;  | & 65                | 550          | NEXT X\$  |
|                | INPUT ANS\$<br>GOTO 5502 IF CVT\$\$(LEFT(ANS\$,1\$),-1\$)="Y"<br>PRINT "/CLEAR aborted!"<br>RFTURN  | α \<br>&<br>&       |              | MSUS=CHRS(/\$)+***CB - USEP: "+<br>CVT\$\$(HANDLE\$(USER.JOB\$),16\$)+" - "+<br>"Please enter CB on Channel # "+<br>NUM1\$(TALK.CHAN\$(USER.JOB\$))+"**"                  |
| 5502<br>\<br>\ | KB\$=FNKB.NUMBER\$(JBNUM\$)<br>GOTO 5504 IF KB\$="ILL:"<br>KB.SND≰=FIP2\$(4\$)  | & \\<br>& &<br>& .  |              | MSG\$=CHR\$(13\$)+CHR\$(10\$)+MSG\$+CHR\$(13\$)+CHR\$(10\$)+CHR\$(7\$)<br>SEND.MSG\$ = SYS(CHR\$(6\$)+CHR\$(-5\$)+<br>CHR\$(ST\$)+MSG\$)<br>FRINT "##Request sent###<br>8 |
| 1              | GOTO 5504 IF KB.SND\$<0\$<br>OR KB.SND\$127≸ IDETACHED IN CB?? - NO SEND<br>CRIF\$=CHR\$(13\$)-CHR\$(13\$)+CHR\$(10\$)-CHR\$(10\$)        | & \<br>& \<br>&     |              | PRINT & & RETURN & &  |
| Ň              | MSG\$=CRLF\$+<br>"**!IYour Job has just been KILLED "+<br>"by the operator!!**"+  | & 66<br>& \<br>&    | 600          | PRINT "##??Bad KB number specified??##" &<br>RETURN &   |
| ١              | CHR\$(7\$)+CHR\$(7\$)+CHLF\$<br>SEND.KILL.MSG\$=SYS(CHR\$(6\$)+CHR\$(-5\$)+CHR\$(KB.SND\$)+<br>MSG\$)                                     | & 66<br>& \<br>& 1: | 620<br>===== | PRINT "##??KB specified already in CB??### 8<br>RETURN 8  |
| 5504<br>\      | FIP\$(0\$)=30\$<br>FIP\$(XXX\$)=0\$ FOR XXX\$=1\$ TO 30\$   | & 70<br>& 1         | 000          | **KB TOGGLE COMMAND**   |
| 1              | FIF(3)=0%<br>FIF(2)=0%<br>FIF(3)=JMUM%  | & \<br>& \          |              | DUMMYS=FNLOCK.COMMON\$<br>JOB_FLAGS\$(USER.JOB\$)=JOB_FLAGS\$(USER.JOB\$) XOR KB.OPT\$  |
|                | FIP\$(27\$)=0\$<br>FIP\$(26\$)=255<br>CHANGE FIP\$ TO KILLJOB\$   | α (<br>& (          |              | DURNISER NURLOCK.COMMONS AND KB.OPT\$) THEN<br>PRINT "**KB numbers will be printed**"   |
| 1              | KILL.JOBSSIGNILL.JOBS<br>IF WE ARE KILLING OURSELVES, WE MUST ALLOW<br>US TO DELETE CHANNEL INFO BEFORE WE DIE                            | a<br>&<br>&         | 010          | PRINT "**KB numbers will not be printed**"  |
| 5506           | DUMMY#=FNLOCK.COMMON#   | & 1:                | ======       | 8   |
| 1              | TALK.CHANS(JBNUMS)=05<br>CB.PROGS(JBNUMS)=05  | & 75                | 500          | ð   |
| 1              | CB.PRCJ\$(JBNUM\$)=0\$  | & 1                 |              | **SPY TOGGLE COMMAND** 8<br>ALLOW A PRTY USER TO WATCH RESTRICTED MESSAGES 8  |
| 1              | JOB.FLAGS%(JENUM%)=0%<br>CB.PASS\$(JENUM%)=""   | & 1<br>& 1          |              | ALLOW A FRIV OSEN TO WATCH RESTRICTED INDEXADO  |
| 1              | HNDL\$=CVT\$\$(HANDLE\$(JBNUM\$),128\$)   | &                   |              | GOTO 8950 IF USER.PROJ\$<>1\$   |
| 1              | HANDLE\$(JBNUM\$)=""<br>FOR YX\$=0\$ TO 40\$  | & \<br>& \          |              | JOB.FLAGS\$(USER.JOB\$)=JOB.FLAGS\$(USER.JOB\$) XOR   |
| 1              | DUMMY2%=FNGET.CHAN%(YX%)  | 4                   |              | SPY.OPT\$   |
| 1              | OTHER.USER≸=FNOTHER.POSITION≸(JBNUM\$)<br>ST≸(OTHER.USER≸)=O≸ UNLESS OTHER.USER≸=-1≸<br>DUMMY2≸=FNPUT.CHAN\$(YX\$) UNLESS OTHER.USER≸=-1≸ | & \<br>& \<br>&     |              | DUMMIS=FRUNLOK.CUMMON≸<br>IF (JOB.FLACS%(USER.JOB%) AND SPY.OPT≸) THEN<br>PRINT "**SPY mode is enabled**"   |
| 1              | NEXT YX\$<br>CMD\$=""##USer #"+NUM1\$(JBNUM\$)+" ("+HNDL\$+")"+<br>" is leaving CB (Involuntarily)**"                                     | &<br>&<br>&         |              | ELSE PRINT "**SPY mode is disabled**"   |
| 1              | DUMMY\$=FNUNLOCK.COMMON\$<br>DUMMY\$=FNBROADCAST\$(0\$,CMD\$,-1\$)  | & 75<br>& 1         | 510          | RETURN  |
| 5550<br>\<br>\ | PRINT "®#Job #";JBNUM≸;" has been CLEARed®#"<br>KILL.JOB\$=SYS(KILL.JOB\$) IF JBNUM≸=USER.JOB≸<br>RETURN                                  | & 80<br>& !<br>& !  | 000          | **PFN toggle COMMAND**  |
| 5720           | PRINT "##??Illegal Job number??##";CHR\$(7≸)<br>RETURN  | & \<br>&            |              | DUMMYS=FALOCK.COMMONS<br>JOB.FLAGS\$(USER.JOB\$)=JOB.FLAGS\$(USER.JOB\$)<br>XOR PPN.OPT\$   |
| 5730<br>\      | PRINT "##??Job specified not in CB??###;CHR\$(7\$)<br>RETURN  | & \<br>&            |              | DUMMYS_FRUNLOCK.COMMONS<br>IF (JOB.FLACS%(USER.JOB%) AND PPN.OPT%) THEN<br>PRINT "**PPN numbers will be printed**"  |
|                |   | &<br>•              |              | ELSE PRINT "##PPN numbers will not be printed###  |
| 1              | ##EXIT COMMAND (^Z OR ^C TOO)##   | & 1                 | 010<br>===== | RETURN 8  |
| 1              | <pre>**ANY FATAL OR WEIRD ERRORS COME HERE TOO**</pre>  | & 81                | 500          |   |
| 1              |   | & <u>1</u>          | 500          | ##UPPER CASE toggle COMMAND##   |
| \              | TALK.CHAN% (USER.JOB%)=0%   | α !<br>&            |              | DUMMY#=FNLOCK.COMMON#   |
| 1              | CB.PROJ\$(USER.JOB\$)=0\$<br>CB.PROJ\$(USER.JOB\$)=0\$  | α<br>& \            |              | JOB.FLAGS\$(USER.JOB\$)=JOB.FLAGS\$(USER.JOB\$)   |
| 1              | JOB.FLAGS%(USER.JOB%)=0%  | *                   |              | DUMMY\$=FNUNLOCK.COMMON\$   |
| 1              | HNDL\$=CVT\$\$(HANDLE\$(USER.JOB\$),128\$)  | ۵<br>٤              |              | IF (JOB.FLAGS%(USER.JOB%) AND UPPER.OPT%) THEN<br>PRINT "##UPPER CASE only will be printed**"   |
| 1              | HANDLE\$(USER.JOB\$)=""   | &<br>2              |              | ELSE BETTE HENDER HANDER  |
| 1              | DUMMY2%=FNGET.CHAN%(YX%)  | &                   |              | FRINT "**UFFEH/LUWER case be printed**"   |
| 1              | DUMMYS=FNUSER.POSITIONS   | & 85<br>*           | 510          | RETURN  |
| 1              | DUMMY2%=FNPUT.CHAN%(YX%) UNLESS DUMMY%=-1%  | &                   |              | {   |
| 1              | NEXT YX#  | & 81                | 900          |   |
| ì              | TYP\$="AEORTING from" IF RUNNING.IN.ERROR\$   | & I                 |              | **ALL (BHOADCAST) COMMAND**   |
| 1              | CMD\$="##User #"+NUM1\$(USER.JOB\$)+" ("+HNDL\$+")"+<br>" is "+TYP\$+" CR##"  | &<br>&              |              | GOTO 8950 IF USER.PROJ\$<>1\$ IPRIV FUNCTION  |
| 1              | DUMMY#=FNUNLOCK.COMMON#   | &                   |              | GOTO 5940 IF STRT.ARG%=0%<br>MSG\$=RIGHT(CMD\$,STRT.ARG%+1%)  |
| 1              | DUMMY\$=FNBROADCAST\$(0\$,CMD\$,-1\$)   | *                   |              | DUMMY#=FNBROADCAST#(0%,MSG\$,2%) ISEND IT   |
| 1              | GOTO 32700  | 8                   |              | RETORN  |
| 1=====         |   | 8                   | 940          | PRINT "##??Nothing to send??##";CHR\$(7%)   |

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| \                   | RETURN   |                       |        |   | C 200                              |
|---------------------|--|-----------------------|--------|---|------------------------------------|
| 8950<br>\<br>!===== | PRIUR **//Frivileged Operation/fr;Cuna()   |                       |        | DEC BA  | UD PRINTERS                        |
| 9000<br>I           | **JOB toggle COMMAND**   |                       |        | LA34-AA EIA w/Form  | s <b>\$ 8</b>                      |
| 1                   | DUMMY\$_FNLOCK.COMMON\$<br>JOB.FLAGS\$(USER.JOB\$)=JOB.FLAGS\$(USER.JOB\$)   | RAP                   |        | LA34-RA EIA, Receive  | e Only 8                           |
| 1                   | DUMMYS=FNUNLOCK.COMMONS<br>IF (JOR.FLAGS\$(USER.JOB\$) AND JOB.OPT\$) THEN   |                       |        | LA38-GA EIA, KP & T   | ractor <b>1.0</b>                  |
|                     | ELSE PRINT "**JOB numbers will be printed**"   | IEW                   |        | LA38-HA EIA, KP, Tra  | actor & Stand 1.1                  |
| 9010<br>!=====      | RETURN   | *                     |        | LA38-AA EIA, KP, FO   | rms & Tractor <b>1.1</b>           |
| 9500<br>I           | **RESTRICT (PASSWORD) COMMAND**  |                       |        | CASH PRIC   | ES • INSTOCI                       |
| 1                   | GOTO 9700 IF STRT.ARG\$=0\$ ITURN OFF PSWRD &<br>PSt-CUTtt(CMDt.STRT.ARG\$+1\$)1\$) &  | 90                    |        | IMMEDIA   | TE DELIVER Y                       |
| 1                   | GOTO 9710 IF LEN(PS\$)>6\$ 8   |                       |        | CALL SONJ   | A OR LAURIE AT: -                  |
| 1                   | CB.PASS\$(USER.JOB\$)=PS\$<br>JOB.FLAGS\$(USER.JOB\$)=JOB.FLAGS\$(USER.JOB\$)<br>OR SECRET.OPT\$                                       | AY                    |        | (614)   | 889-0810                           |
| 1                   | DUMMY\$=FNUNLOCK.COMMON\$<br>PRINT "#"Your Password has been set""<br>Print  | NAF                   |        | SCH   | ERER'S                             |
| 9700                | DUMMY\$=FNLOCK.COMMON\$  | RA                    |        | MINI COM  | DIITED MADI                        |
| 1                   | CB.PASS\$(USER.JOB\$)=""<br>BITS\$= -1\$ XOR SECRET.OPT\$ IFORCE ONLY 1 BIT OFF<br>BITS\$= -1\$ XOR SECRET.OPT\$ IFORCE ONLY 1 BIT OFF | TN                    |        | MINI CUM  | FUIER MARI                         |
| 1                   | JOB.FLAGS%(USER.JOB%)=JOB.FLAGS%(USER.JOB%) AND DIIS%  | <b>⊢</b> ≺            |        | 6145 Dolan Place  | Dublin, Ohio 430                   |
| 1                   | RETURN   |                       |        | BRAND NEW*W   | ARRANTY*ATD                        |
| 9710<br>\<br>!===== | PRINT "##??Password too long??##";CHR\$(7≸)<br>RETURN  |                       |        | CIRCLE 106 0  | N READER CARD                      |
| 9800                |  | 10                    | 0005   | NEXT OPNXS  | NO ODENTNOSE                       |
| 1                   | **DFTACH (PRIV) COMMAND**  |                       |        | RUNNING.IN.ERROR\$ = -1\$   | ITRY TO /EXIT                      |
| 1                   | GOTO 8950 IF USER.PROJS<>15<br>PRINT   |                       | 0010   | ENOPEN POSITIONS - OPEN POS   | 4                                  |
| 1                   | PRINT "**Detaching from terminal**" PRINT  |                       | 5010   | PRINT "OPEN.POSITION FOUND  | = ";OPEN.POS% IF DEBUG%            |
| 1                   | PRINT<br>DETACH\$=SYS(CHR\$(6\$)+CHR\$(7\$))   | 1<br>1                |        |   |                                    |
| 1=====              | RETURN   | x<br><u>k</u> 1(<br>l | 0020   | DEF FNUSER.POSITION\$<br>FIND A USER JOB SLO<br>IF NOT FOUND, RETUR | T IN THE ST\$() ARRAY<br>NS -1     |
| 1                   | **TIME FUNCTION**  |                       |        | PRINT "FNUSER.POSITIONS" IF   | DEBUG\$                            |
| 1                   | PRINT "###+DATE\$(0%)+" at "+TIME\$(0%)+"##"   |                       |        | IF ST%(USRX%)=USER.   | JOB% THEN                          |
| 1                   | RETURN   | ι<br>4                |        | GOTO 10040  |                                    |
| 10000               |  | 10<br>& \             | 0030   | NEXT USRX%<br>USER.POS%=-1%   | IUSER NOT FOUND-LEGAL              |
| 1                   | ***USER DEFINED FUNCTIONS***   | & 10                  | 0040   | FNUSER.POSITIONS = USER.POS   | STATION .ISED DOSE                 |
| 1                   | DEF FNLOCK.COMMON%<br>LOCK THE COMMON AREA SO OTHER USERS CANNOT   | & ``<br>&             |        | ENEND   | IF DEBUG\$                         |
| 1                   | UPDATE WHILE WE ARE<br>PRINT "LOCK.COMMON\$" IF DEBUG\$  | & 1:                  |        |   |                                    |
| 10001               | SLEEP 1% IF COMMON.IN.USE%<>USER.JOB%  | & 10<br>• I           | 0042   | DEF FNOTHER.POSITION\$(ARG\$)<br>FIND ALTERNATE USER                | S JOB SLOT IN ST%() ARRAY          |
| 1                   | GOTO 10001 IF COMMON.IN.USE%<>USE%   | α 1<br>& .            |        | RETURNS -1 IF NOT F<br>PRINT "FNOTHER. POSITIONS". A                | OUND<br>RG\$ IF DEBUG\$            |
| 1                   | AND COMMON.IN.USE%<>0%<br>COMMON.IN.USE%=USER.JOB%   | &                     |        | FOR OUSRX#=1% TO 63%  | THEN                               |
|                     | UNLESS COMMON.IN.USE%<>USER.JOB%<br>AND COMMON.IN.USE%<>0%   | &<br>&                |        | OTHER.POS%=   | OUSRX\$                            |
| 1                   | GOTO 10001 IF COMMON.IN.USE\$<>USER.JOB\$<br>AND COMMON.IN.USE\$<>0\$  | &<br>&                | no kik | NEXT OURDER   |                                    |
| 1                   | PRINT "LOCK.COMMON% FINISHED" IF DEBUG%<br>FNEND   | &                     | 0044   | OTHER.POS%=-1%  | IUSER NOT FOUND-LEGAL              |
| !=====              |  | & 10<br>& \           | 0046   | FNOTHER.POSITIONS = OTHER.P<br>PRINT "FNOTHERPOSITION - FO          | OS%<br>UND POSITION ";OTHER.POS%   |
| 10003<br>!          | DEF FNUNLOCK.COMMON\$<br>UNLOCK THE COMMON AREA, WHEN WE ARE FINISHED  | &                     |        | FNEND   |                                    |
| 1                   | PRINT "UNLOCK.COMMON\$" IF DEBUG\$<br>COMMON.IN.USE\$=0\$ IF COMMON.IN.USE\$=USER.JOB\$  | &<br>& 11             | 0050   | DEF FNCHAN\$(ABC4)  |                                    |
| \<br>!=====         | FNEND  | & !<br>&              |        | PRINT A NUMBER (USU   | ALLY CHANNEL #) LEADING            |
|                     |  | &                     |        | PRINT "FNCHANS", ARGS IF DE   | BUG \$                             |
| 10004               | DEF FNOPEN.POSITION#   | &                     |        | CHHN\$="0"+CHHN\$ IF ARG\$<10\$                                     |                                    |
| 1                   | FIND OPEN POSITION IN ST\$() ARRAY FOR THIS<br>JOB   | & \<br>& \            |        | FNCHAN\$=CHHN\$<br>FNEND  |                                    |
| 1                   | FRINT "FNOPEN.POSITION%" IF DEBUG%<br>FOR OPNX%=1% TO 63%  | & !:<br>&             |        |   |                                    |
| 1                   | IF ST\$(OPNX\$)=0\$ THEN<br>OPEN.POS\$=OPNX\$  | & 10<br>& I           | 0100   | DEF FNBROADCAST\$(ARG1\$,ARG1<br>BROADCAST A MESSAGE                | \$,BFLAG\$)<br>TO ALL USERS ON THE |
| 1                   | GOTO 10010   | & I                   |        | CHANNEL SPECIFIED B   | V ARGIE TE FLACE TS SET            |



&

CHANNEL SPECIFIED BY ARG1%, IF FLAG% IS SET,

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page 26 August 1982 RSTSPROFESSIONALRSTSPROFESSIONA CHANGE ST% TO CHANNEL \$ (ARG%) (IN MACRO) THEN DO NOT APPEND A HEADER BFLAG% VALUES: CSTRG\$= CHANNEL\$(ARG\$) 0 =SEND WITH HEADER -1=SEND NO HEADER (SYS MSG) IMAKE NON-LOCAL CALL NM2ST BY REF (CSTRG\$, ST%()) CHANNEL\$(ARG\$) = CSTRG\$ ITO CALL IPUT BACK HERE 1 =BYPASS PASSWRD CHECKS 2 =ALL CMD (/OPR, NOT /Cnn) FNEND \ FNENU 1====== PRINT "FNBROADCAST\$ "; ARG1\$, ARG1\$, FLAG\$ IF DEBUG\$ 10300 DEF FNKB.NUMBER\$(JBNO\$) HLD.ARG\$=ARG1\$ KB\$=FNKB.NUMBER\$(USER.JOB\$) FORMAT A KE NUMBER AS TO DET OR PSEUDO OR REGULAR, IF NO KB ON JENO≸ SPECIFIED, RETURNS 'ILL:' KB%=FIP2%(4%) JOB\$=NUM1\$(USER.JOB\$) PPN\$="["+NUM1\$(USER.PROJ\$)+","+NUM1\$(USER.PROG\$)+"]" KBN\$="ILL:" CHANGE SYS(CHR\$(6\$)+CHR\$(26\$)+CHR\$(JBNO\$)+CHR\$(0\$)) UFLAG\$=JOB.FLAGS\$(USER.JOB\$) PS\$=((UFLAG\$ AND SECRET.OPT\$) <> 0\$) TO FIP2% KBN%=FIP2%(4%) PS%=0% IF (BFLAG%=1%) OR (BFLAG%=2%) KBN\$="Det" IUSER DOING BROADCAST GOTO 10350 IF KBN\$<0\$ OR KBN\$>127\$ GOTO 10330 IF FIP2\$(5\$)<>0\$ IDET JOB IPSEUDO KB DUMMY2\$=FNGET.CHAN%(ANG1;) FOR CXX\$=1\$ TO 63\$ INO JOB GOTO 10200 IF ST\$(CXX\$)=0\$ INO JOB PRINT "LOOKUP OF JOB ";CXX\$ IF DEBUG\$ KBS\$=FNKB.NUMBER\$(ST\$(CXX\$)) PRINT "KB OF ACTIVE CB JOB ";FIP2\$(4\$) IF DEBUG\$ DUMMY2%=FNGET.CHAN%(ARG1%) 10110 KBN\$=NUM1\$(KBN%) KBN\$="KB"+LEFT("000",3%-LEN(KBN\$))+KBN\$+":" INO JOB SLOT GOTO 10350

10330

10350

1======

19000

GOTO 10200 IF KBN\$="ILL:"

GOTO 10200 IF KB.SND\$<0\$

GOTO 10200 IF KB.SND%=KB% AND DEBUG%=0%

KB.SND%=FIP2%(4%)

FNKB.NUMBER\$=KBN\$

FNEND

KBN\$="P"+NUM1\$(KBN%-1%)+"J"+FNCHAN\$((FIP2%(5%)-1%)/2%)

\*\*ERRORS SECTION\*\* OR KB.SND\$>127\$ IDETACHED IN CB?? - NO SEND FLAGS\$ = JOB.FLAGS\$(ST\$(CXX\$)) IGET FLAG WORD DUMMY\$=SYS(CHR\$(0%)) RESUME 20000 IF ERL=28\$ RESUME 6000 IF ERL=500 AND ERR=11 RESUME 4600 IF ERL=4000 ARG1 \$=HLD. ARG\$ ARG1\$=CVT\$\$(ARG1\$,32%) IF FLAGS% AND UPPER. OPTS GOTO 10200 IF ((FLAGS\$ AND SECRET.OPT\$)=0\$) AND ((FLAG\$ AND SPY.OPT\$)=0\$) AND (PS\$<>0\$) SEND RESTR, RCV, NO GOTO 10200 IF ((FLAG\$ AND SECRET.OPT\$)<>0\$) RESUME 10350 IF ERL=10300 RESUME 2700 IF ERL=2010 RESUME 3700 IF ERL=3050 RESUME 2810 IF ERL=2800 AND (PS\$<>0\$) AND ((FLAGS\$ AND SPY.OPT\$)<>16\$) RESUME 3900 IF ERL=3805 RESUME 5720 IF ERL=5500 RESUME 5506 IF ERL=5504 RESUME 6600 IF (ERL=6500) OR (ERL=6550) AND (CB.PASS\$(USER.JOB\$) <> CB.PASS\$(ST%(CXX%))) PRINT "BROADCAST - PSWRDS '"; CB.PASS\$(USER.JOB\$);"', "; "'";CB.PASS\$(ST\$(CXX\$));"'" RESUME 32700 IF ERL=200 AND ERR=11 19900 PRINT "?CB - FATAL ERROR -";ERT\$(ERR);" AT ";ERL RUNNING.IN.ERROR% = -1% "FLAGS SEND/RCV ";UFLAG\$,FLAGS\$ IF DEBUG\$ RESUME 6000 ITRY TO /EXIT SND.HDR\$="[[" SND.HDR\$=SND.HDR\$+KB\$ IF FLAGS% AND KB.OPT% SND.HDR\$=SND.HDR\$+PPN\$ IF FLAGS\$ AND PPN.OPT\$ SND.HDR\$=SND.HDR\$+"("+JOB\$+")" ICTRL/C TRAP REENABLE BEFORE EXIT 20000 DUMMY\$=SYS(CHR\$(6\$)+CHR\$(-7\$)) IF FLAGS% AND JOB.OPT% BCST.TYPE\$="C" ICHANNEL GOTO 6000 IEXIT BCST.TYPE\$="0" IB BFLAG\$=1\$ IBROADCAST BCST.TYPE\$="0" IB BFLAG\$=1\$ IBROADCAST BCST.CHNL\$="/"+BCST.TYPE\$+FNCHAN\$(ARG1\$) BCST.CHNL\$="/OPR" IF BFLAG\$=2\$ !ALL COMMAND ..... 30000 \*\*\*CCL ENTRY POINT\*\*\* SND.HDR\$=SND.HDR\$+ CVT\$\$(HANDLE\$(USER.JOB\$),128%)+ CMD\$=SYS(CHR\$(7)) SND.HDR\$=" #IF (BFLAG\$= -1\$) SND.HDR\$=" IF (BFLAG\$= -1\$) I\$=INSTR(1\$,CMD\$,"/") IF IS THEN CMD\$=CVT\$\$(RIGHT(CMD\$,1\$+1\$),16\$+32\$+64\$) CCL.ENTRYS =- 1% HNDL.ENTERED%=0% GOTO 10 I\$=INSTR(1\$,CMD\$," ") GOTO 10 IF I\$=0\$ HNDL\$=RIGHT(CMD\$,I\$+1\$) 30010 SEND.MSG\$=SYS(CHR\$(6%)+CHR\$(-5%)-CHR\$(KB.SND%)+MSG\$) CCL.ENTRYS =- 1% HNDL.ENTEREDS =- 1% 10200 NEXT CXXS GOTO 10 10210 FNEND 32000 \*\*\*LOGIN ENTRY POINT\*\*\* DEF FNGET.CHAN%(ARG%) 10250 CHANGE CHANNEL\$(ARG\$) TO ST\$ (IN MACRO) ILETS CHECK THIS LATER LOGGED.OUTS =- 1% ITREAT JUST LIKE CCL GOTO 30000 CALL ST2NM BY REF (CHANNEL\$(ARG\$). ST\$()) ...... FNEND 32700 ICLOSE-UP PROCESSING 2 

10260 DEF FNPUT. CHANS(ARGS) 32767 END Word On Track Systems Provides: Processing\* **On Track**  Sales At your Service VAX/VMS, RSTS/E, RSX-11M Systems, Inc. convenience! Installation P.O. Box 245 Demonstrations At your Ambler, PA 19002-0245 Training \*Word-11 by office! (215) 542-7133 Data Processing Design, Inc. Consulting 181 W. Orangethorp Avenue Placentia, CA 92670 CIRCLE 13 ON READER CARD

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#### EDITORS' NOTE

David Spencer of Infinity Software has written several RSTS Real-Time Games. When used "stand alone" they offer realistic performance. Here are two differing opinions on how they are:

# RSTS GAMES: ONE MAN'S (BOY'S) OPINION

By Bill Marbach

David Spencer and Atari have two things in common. They both make electronic games, and they both work hard on them. However, only David Spencer's games are challenging enough to make you want to come back again and again.

My favorite David Spencer game is called SUBS. This game takes extraordinary hand eye coordination and a little bit of luck. The object is to hit the enemy before he hits you by using only radar and keen eyesight.

In INVADE your objective is to stop the little alien attackers from landing or hitting you. The tempo of this game is very slow making this game the easiest of them all.

The last game is PACKER. We all know it as Pac-Man. However, this game is just as good as Pac-Man. This game even has an intermission where you can watch a little show. This game is very much like the real Pac-Man, and could show up ATARI any day.

When you compare the two you see ATARI has better color, sound, action, and graphics. However, David Spencer's games take more skill than Atari games which are usually easy. So David Spencer keep up the good work.

> Overall Grade 1-10 David Spencer — 9.3 Atari — 8.5

# NO CAUSE FOR EXCITEMENT

By Joel Schwartz, M.D.

The other day I got an excited call from our beloved editor telling me there were new games on the computer. The urgency in his voice caused me to have only two helpings of dessert instead of the usual three and I rushed right over to see them.

The first one I played was called PACKER. This is a realtime RSTS/E game for VT100-type terminals. The instructions tell you that until recently you have been employed as a packer in a robot manufacturing plant. However, there was an accident which caused robots to rebel and it is your mission, if you decide to take it, to deactivate the robots loose in the plant or be killed. My advice is to pass up the mission. I wish I had. This game is really a poor copy of the popular arcade game PAC-MAN. I really don't know if graphics can be done with the finesse that they are done on the smaller home computers, but being chased by an A and eating a @ so I can then chase and eat a A,B,C or D on a black and white screen with no sound effects just doesn't do very much for me. It's like driving in a Mercedes and then trying to get excited over driving in a Honda.

The second game I played was INVADE. You guessed it, this game was the main frames answer to the arcade game SPACE INVADERS. The object of the game for those of you who have been in hibernation for three years is to destroy the incoming wave of alien invaders without being killed by the bombs they drop. My objections were the same for this game. No graphics, no sound, no color, no fun.

The final game I played was called SUBS. This was billed as a real-time warfare game for two players on individual terminals. The two users compete against each other by attempting to destroy the other's submarine. Although the graphics were also poor on this game, it did have some unique features which made it worth playing. The monitor was divided into a bigger screen and a smaller one. The latter was a sonar screen used to locate the general vicinity of your opponent while the former was used to maneuver your sub close enough to your enemy to destroy him with your torpedoes. I liked the idea of a two terminal interactive game with a human opponent instead of pitting your skill against the computer.

On my way out Carl asked me how I liked them. I didn't want to hurt his feelings (he is extremely sensitive) so I told him they were great, and it was only because of the lateness of the hour (it was about eight-thirty) that I had to leave. I hope he doesn't read my article!

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# TYPE

By W. Franklin Mitchell, Jr., Computer Operations Supervisor Erskine College, Due West, South Carolina 29639

The addition of TYPE to Erskine's RSTS system has made the task of running a small college on a small computer somewhat better. TYPE is a program system that transfers information from a disk file to a user's terminal using a very small amount of main memory. All TYPErs share a 1K (words) run-time system and each TYPEr's job size is 1K. TYPE uses a 1,024 byte disk buffer.

A very large portion of the data processing at Erskine produces some kind of printable disk file such as reports, labels, program listings, etc. TYPE was created to lessen the impact of many users moving the contents of these files to printing terminals. TYPE also allows users to do new things.

In the beginning, all users used PIP to print reports on terminals such as LA-12Os and LA-36s. Ten simultaneous file dumpers using PIP occupy at least 164K words of main memory. The first version of TYPE was written in BASIC-PLUS. Ten TYPErs in BASIC-PLUS occupy 20K (not counting the always present BASIC run-time system). As options and enhancements were added, the size of the BASIC-PLUS version of TYPE began to grow. Finally, TYPE was put into assembly language and worked into its own run-time system. Ten TYPErs now occupy only 11K of main memory!

#### **TYPE User's Guide**

The following TYPE help message shows the features built into TYPE:

File specs may contain wildcards. Several files may be listed together if they are separated by commas. Any switches apply to all files listed together. Switches must go on the end. Legal switches are

- /F output form feed 1st
- /R no "Ready" once done
- /x x copies, where x is a digit 2-9
- /N file name is printed 1st
- /Q query mode
- /B binary mode

Multiple switches may be used (e.g. /F/R)

The /F switch allows a user on a printing terminal with forms control to use one page for log in, listing directories, etc. and to form feed to the top of the next form for file output.

The /R switch suppresses BASIC-PLUS's "Ready" once TYPE is done.

TYPE will print x copies of all files specified if it finds a slash followed by a single digit 2 to 9. For example,

| TY JUNK.LST/3     | -prints 3 copies of JUNK.LST            |
|-------------------|---|
| TY A.LST, B.LST/2 | -prints 2 copies of A.LST followed by 2 |
|                   | copies of B.LST                         |

The /N switch prefaces each copy of each file printed with the name of the file.

The /Q query mode is like the /Q or /IN switch of better known file transfer programs.

The /B switch makes TYPE send the data in a file to a user's terminal in binary mode. This is useful when you want tab characters to remain tab characters (not groups of spaces), ESCapes to stay ESCapes (not dollar signs), etc. /B automatically sets /R. This mode can be used to send text that contains LA-120 "change the character size" escape sequencies.

The following examples demonstrate some happenings that are perhaps strange but expected:

| TY C.LST,C.LST/9    | -prints 18 copies of C.LST               |
|---------------------|--|
| TY Z.TXT/3/5        | -prints 5 copies of Z.TXT, earlier /3 is |
|                     | ignored                                  |
| TY A.LST/2, B.LST/3 | -prints 3 copies of A.LST only, "/"      |
|                     | terminates file spec scan. Switches      |
|                     | must be last!                            |
| If WORK.BAC has     | a protection code with bit 64 set (run   |
| only),              |  |
| TY WORK.BAC         | -prints nothing.                         |
| If RIDICU.LAS has   | a file size greater than 65,535 blocks,  |
| TY RIDICU.LAS       | -will not work properly. No attempt      |
|                     | has been made to treat this as an er-    |

#### **TYPE** installation

Installing TYPE on your system is very simple. A contiguous copy of TYPE.RTS must be placed in account [0,1], two other files are created in the TYPE account (the TYPE account can be any account on any disk), and the ADD TYPE and add CCL commands must be added to both your running system and to your start up files. (The CCL can be something other than TYPE if desired.)

ror.

## WRITING A RUN-TIME SYSTEM (or, Happiness in the HISEG)

By Bob 'Macro Man' Meyer

Now that you've been reading this column for many months, and I know you've been keying in & testing all the neat little programs I've been publishing, it's time for a treat. This issue, not only are we going to write some more Macro code, we're gonna write a run-time system. A sample rts is included with this article; if you key it in as printed and assemble as instructed, it should work on your system. Keep in mind that its sole purpose in life is to demonstrate how to make an rts from scratch, and therefore has very little market value (in other words, if your caught playing with this thing on the job, you might not have one. . .). First I'll attempt to describe what a run-time system is, then I'll explain how to use OSCAR.RTS, the program in the example.

#### What is a Run-Time System?

A run-time system is basically a Macro program that has been linked to run at the high end of the user's address space (thus the term HISEG). If the rts is written with reentrance in mind, it can be made read-only (the monitor & memory managment hardware will enforce this) and shared by any number of users. This proves to be very economical on small systems where memory is limited; only one copy of a program need be resident for any number of users to access that program. As you're probably aware, that's how Basic-Plus is implemented; a read-only sharable interpreter & keyboard monitor (among other things) that can be used by many folks for many different applications, but only ties up 16K of memory at most. The low segment, or LOSEG, is the actual user job image: variables, instructions, buffer space, (push-pop code in the case of Basic-Plus) or in some cases, just raw data, depending on the run-time system.

#### The Psudeo-Vector region.

This 'vector' area is actually a block of words at the very end of the user job image. Each word contains an address of an entry point into the run-time system. The monitor accesses the psudeo-vectors so that the run-time system can be given control in the case of certain events; some of these events are shown below with their respective PV entry point names (see the code at the end of the example program for the PV layout (or refer to COMMON.MAC)).

| Event   | PV entry point used |
|---|---------------------|
| User runs a program NAMEd to this rts.            | P.RUN               |
| User SWitches to this rts.                        | P.NEW               |
| User types 1C.                                    | P.CC                |
| Some code accesses an odd memory address (with    |                     |
| a WORD instruction).                              | P.BAD               |
| Some user types 2 1C's before we get time to ser- |                     |
| vice the first one.                               | P.2CC               |
|   |                     |



As you can see, the vector region has many uses, and provides the monitor with a path into the run-time system for a number of situations. If the coding is done carefully, the rts can become VERY secure, as even the wise-guy typing several control-C's in succession can't ever get past the P.2CC entry point until we decide what to do with him. The psudeo-vector region is the primary difference between a run-time system and an resident library; a reslib has no psudeo-vectors.

#### Assembling & Task building the example RTS.

Assembling the demo rts is really no big deal. The code requires no outside help, with the exception of the PRINT module included in Figure 2. The following commands will assemble the required modules:

| RUN \$MAC         |
|-------------------|
| MAC>OSCAR = OSCAR |
| MAC>PRINT = PRINT |
| MAC>1Z            |

#### Task building is a bit more complicated.

As I stated previously in the article, the monitor requires that the rts has its pseudo-vector region at the very ... continued on page 54 Send for a membership application to one of the addresses listed.

State that you want to join the RSTS SIG

ALRSTSPROFESSIONALRSTSPROFESSIONALRSTS HOW TO JOIN DECUS Tell them that you received this information in the **RSTS Professional. Australian Chapter DECUS AUSTRALIA** P.O. Box 384 Chatswood **NSW 2067** Australia

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•G/21/V<cr>

# SELECTIVE CLEARING OF LOGGED ERRORS

By Paul DeBenedictis Educational Communications Upstate Medical Center Syracuse, NY 13210

When a device goes bad, it may generate lots of errors in a short time. If you want to log errors for the device after it has been repaired, you normally must re-initialize the entire error log file, even though it contains entries for other errors which you may wish to retain in order to monitor your system. The following patch to ERRDIS.BAS (V7.0) allows you to delete ALL entries for a specific device after you prepare a FULL report for errors for that device, if you tell ERRDIS that you wish to ZERO the error file. All error records for the type of device that you specify will be erased even if the report is for a specific range of dates. All ERRDIS messages are updated to reflect this option. Note that if you delete the records for a disk error, you simultaneously delete all BAD BLOCK errors for the same device. Thus, your hard copy report should include all BAD BLOCK errors if you erase the errors for a disk. The required patch, which may be applied manually with \$CPATCH, is shown at right.

To retain bad block records, a more complicated check for which records to skip on the new line 12065 is needed. Since bad blocks are a symptom of a head crash, I have assumed that I usually will want to delete these records when I clear error records for a specific disk type. A more reasonable modification might be to delete only those errors which fall in a specified range of dates, but this would complicate the patch considerably.

21<tab><tab>PROGRAM<tab><tab>: ERRDIS<cr> (tab)1 UMC MOD(tab)21-MAY-82<tab)CLEAR SPECIFIC ERROR TYPE &<er>
<tab)ELSE<tab)/G/ELSE<tab)/V<cr>
<tab)ELSE<tab)GOTO 19010 &<cr>
</tab)ELSE<tab)GOTO 19010 &<cr>
</tab)ELSE</tab)GOTO 19010 &<cr>
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\*I<cr> <tab>\<tab>ZERO\$=ZERO\$ AND SWAP\$(REPRT\$)+ER.COD\$ IF &<cr> <tab><tab><tab>REPRT\$=70\$ AND ER.COD\$>=0\$ &<cr> IF ZEROS < 15 &<cr> IF ZERO\$ < 1\$ &<cr>
 <tab>\ctab>PRINT #7\$, C\$;HID(SUBT\$,2\$,INSIR(1\$,SUBT\$," ")-1\$);"Errors"; &<cr>
 <tab>\ctab>PRINT #7\$,C\$;HID(SUBT\$,2\$,INSIR(1\$,SUBT\$," ")-1\$);"Errors"; &<cr>
 <tab>\ctab>PRINT #7\$,C\$;esc>#V<cr>
 <tab>\ctab>PRINT #7\$, esc>#V<cr>
 <tab>\ctab>PRINT #7\$," will ";\$\$;"be Zeroed upon completion" &<cr>
 #H/10100</tab>PRINT #7\$," will ";\$\$;"be Zeroed upon completion" &<cr>
 #H/10100</tab>PRINT #7\$," will ";\$\$;"be Zeroed upon completion" &<cr>
 #H/10100</tab>PRINT #7\$," will P;\$\$;"be Zeroed upon completion" &<cr>
 #I/ 000</tab>PRINT #1000</tab>PRINT #1000</tab>PRINT #1000</tab>PRINT #1000</tab<PRINT #10000</td> 12030<tab>GET #5%. RECORD 1% &<cr> 12050<tab>!<tab>DELETE SPECIFIC RECORDS &<cr> 12090<tab>CLOSE 5\$,6\$ &<cr> <tab>\ RETURN &<cr <esc>\*EX<cr>
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#### DEAR RSTS MAN:

We are attempting to support a remote line printer run as a spooled device off a DH through asynch/ synch converter to modem and vice versa at the other end. It works fine except that since the printer is a serial device, if it is turned off, anything sent to it drops into the bit bucket. We solve(?) this by turning off the spooler at night before the batch processing starts. My question is: is there any way that we can allow a non-privleged user at the remote site to bring up the spooler in the morning without having to wait for someone at the host to arrive. We have tried changing the protection levels without much success as we don't want to compromise the system security, and we don't want to give privileges to the users at the remote location for the same reason.

Any ideas you might have would be appreciated. Thanks for listen-SPIDL. ing. Dear SPIDL: There is a way in QUE-11 V2.2 to load or unload a

form in a remote printer from non privlege. Sorry about the DEC package.

#### **DEAR RSTS MAN:**

First I would like to thank you for the great magazine and the Carl and Dave shows at the spring DECUS symposia.

I have a question that even DEC technical support won't (can't) answer. I would like to create a .TMP file and have it deleted by LOGOUT. The system programs (i.e. EDT) seem to do it fine. Is there a bit set somewhere in the UFD that users can access or is it just some more RSTS magic?

Also, an article for consideration might be one concerning dynamic job scheduling. The DECUS session on the subject really got me excited. If anyone happens to have

a copy of the handouts at this session. I would certainly appreciate a copy of them.

#### Jim Carrigan Logon Systems

Dear Jim: System programs know the full name of the TMP file they create. They just 'kill' the file e.g.: KILL 'TMP' + NUM1\$(job.num%) + '.TMP'.

#### DEAR RSTS MAN:

I am looking for a set of BASIC+2 or MACRO subroutines that will facilitate the handling of records with large numbers of variable length fields. It does not appear feasible in my application (because of the number of variable length fields in a record) to store each of these fields as separate records sharing a common control field as in a relational DBMS. Although I am capable of writing such a set of subroutines, I don't want to re-invent the wheel. Any ideas?

Dave Smith

Dear Variable: The RSTS Man doesn't use variable length fields, but we know someone who does! Look for a feature length article in the next issue (we hope). Meanwhile we invite our readers to reply.

#### DEAR RSTS MAN:

We currently have a PDP 11/34A computer running RSTS/E V7.0 supporting 12 to 14 terminals, comprised of a mixture of both local and remote lines. Currently we have 460 Mbytes of disk storage provided by a mixture of CDC 9762 and CDC 9766 drives interfaced via a Xylogics controller. We are in the final stages of development of two new application packages we feel will significantly increase our customer base. As a result we are starting to contemplate the possibility of having to upgrade our system. Can you offer some thoughts on the relative speed and job capacity of PDP 11/34A's, PDP 11/44's and PDP 11/70's and the relative pros and cons of upgrading from a PDP 11/34A to either of these other systems.

Thanks for your suggestions and comments.

Jerry C. Forshee

Computer Systems Analyst Green & Co., Inc.

Dear Jerry: Both the 44 & 70 when properly configured with at least 1



The "RSTS Pro" Staff

## -EDITING SYSTEMS

David Spencer, Infinity Software Corporation

### MISCELLANEOUS ITEMS

In this issue, I have four items of interest. First is documentation on the "mysterious" VT100 escape sequences. Next, for those who hate uppercase prompts, patches to change the Basic Plus II compiler and BP2COM prompts from "BASIC2" to "Basic2". Also, some useful patches for the BACKUP package. And last, a small and efficient TECO.INI file for those who are tired of all the overkill that the DEC supplied version performs.

#### 1.0 "Unknown" VT100 escape sequences

The VT100 terminal has some undocumented escape sequence "features". To invoke one of these features, set your VT100 in ANSI mode and send "<esc>[nq", where:

| <esc></esc> | is an | escape | with | parity | (Chr\$(1 | (55%)) |
|-------------|-------|--------|------|--------|----------|--------|
|-------------|-------|--------|------|--------|----------|--------|

- [ is a bracket character
- n is one of the numbers in the next figure
- q is the lower case letter "q"

These sequences seem to work on a stock VT100, with AVO, and with the printer option. I haven't been able to test VT101 series yet to see if it works on them. All VT100 emulators I have seen DO NOT perform these sequences.

The following figure lists the escape sequence number and what they do. Those sequences that light LEDs do not seem to affect the terminal's operation in any way, contrary to what the lights might say.

- 1. 133 Lights L3
- 2. 134 Lights L4
- 3. 135 nothing(?)
- 4. 136 Alarm bell
- 5. 137 Fast repeat key mode, even some control keys!
- 6. 138 Turns off "On Line" and lights "Local"
- 7. 139 Lights "KBD Locked"
- 8. 140 Lights L1
- 9. 141 Lights L2
- 10. 142 Lights L3
- 11. 143 Lights L4
- 12. 144 nothing(?)
- 13. 145 Alarm bell

The numbers 146 to 254 continue to repeat the sequence by nines over and over, as partially shown above. Anything from 255 and up turns off the "On Line" LED and turns on the "Local" LED. 2.0 Changing the BASIC2 prompt

In previous versions of Basic Plus II, DEC made it easy to change your prompt to mixed case. With version 1.6, this was prevented. The following ONLPAT command file will change the "BASIC2" prompt to a more appealing "Basic2".

! Change the compiler prompt to "Basic2"

 File to patch? \$BASIC2.TSK

 Base address? 26:660

 Offset address? 0

 Base Offset Old New?

 000660 000000 040502 ? "BA + 20000

 000660 000002 044523 ? "SI + 20040

 000660 000004 031103 ? "C2 + 40

 000660 000006 000000 ? 1C

! Change the keyboard monitor prompt to "Basic2"

File to patch? [0,1]BP2COM.RTS Base address? ..RDY Offset address? 10 Base Offset Old New? 164466 000010 040502 ? "BA + 20000 164466 000012 044523 ? "SI + 20040 164466 000014 031103 ? "C2 + 40 164466 000016 005015 ? 1C

#### 3.0 Useful BACKUP patches

In the following figures, I have listed three very useful patches to the BACKUP package. All of these patches are intended to be installed after the application of the current patch kit. These patches were developed for the version 7.0 BACKUP package, but they also work on the version 7.1 copies as well.

#### BACKTO

BACKTO normally opens files mode zero. If BACKTO doesn't have write access, it prints the "data unreliable" message. ("?Protection violation" causes a re-open mode 4096.)

One of our clients has some very large data-base files that are opened in shared update mode. Their problem is sometimes when BACKUP is being done BACKTO will open one of the files when no one is using it. Chugging smoothly along, BACKTO keeps the file opened mode zero. This prevents ANY production job from opening that file until BACKUP is finished with it.

The following patch forces BACKTO to always open files in read-regardless mode (4096). This way, access to data files will never be denied. The disadvantage is the loss of the "data unreliable" checking. This, I think, is a small price to pay.

This patch, and the next two, can be applied with the CPATCH program.

RSTSPROFESSIONALRSTSPROFESSIONA

```
#G/2/V<cr>
2!<tab>FROGRAM<tab><tab>: BACKTO.BAS<cr>
#H/M9$=2048$/V<cr>
<tab>M9$=2048$ &<cr>
#I/+4096$/V<cr>
<tab>M9$=2048$ &<cr>
#I/+4096$/V<cr>
<tab>M9$=2048$ &<cr>
#I/+096$/V<cr>
<tab</tab<table>
```

#### BACFRM

Often, I use BACKUP to transport files from one system to another. Sometimes I find a lot of space is wasted on small files when the disk clustersize of the output system is smaller than the input system. The happens because BACKUP has the "feature" of retaining clustersizes. The following patch creates files using the current pack clustersize by disabling the clustersize stored by BACKUP.

#G/2/V<cr>
2!<tab><tab>FROGRAK<tab><tab>: BACFRM.BAS<cr>
#L/CL:"+/V<cr>
<tab><tab>Ctab>(tab)(185)) IF (205 AND 20485) &<cr>
\*2d/2/-DV<cr>
<tab>Ctab>Ccs=C\$+"/CL:"+NUM1\$(205(P05,185)) IF (05 AND 20485) &<cr>
\*EX<cr>
\*EX

#### BACDIR

The performance of the BACKUP package can be helped considerably by compiling it against Basic Plus II (or CSPCOM). If this done, then you have gained some extra address space to add code to increase further the performance of some of the BACKUP components.

The following patch for BACDIR opens its files with a large recordsize. This large buffer reduces disk accesses and greatly improves BACDIR's elapsed time.

```
#H/2!/V(cr)
2!<tab><tab>FROGRAM<tab><tab>: BACDIR.BAS<cr>*H/1040<tab>/V<cr>
1040<tab>TO=TIME(0$) &<cr>
#G/OPEN W$/V<cr>
<tab> OPEN W$ FOR INPUT AS FILE 1$ &<cr>
*AI<cr>
<tab><tab>.RECORDSIZE 4096% &<cr>
<esc>*V<cr><tab> Z$=SYS(PRIV.ON$) &<cr>
*G/OPEN W$ FOR INPUT/V<cr>
<tab> OPEN W$ FOR INPUT AS FILE 2% &<cr>
 AI(cr>
  <tab><tab>,RECORDSIZE 4096$ &<cr>
  <esc>*V<cr>
<tab> M%=12% &<cr>
#H/15010<tab>/V<cr>
15010<tab>0N ERROR GOTO 15100 &<cr>
#G/OPEN FNU$/V<cr>
<tab><tab>OPEN FNU$(P3%,N$,4224%,4096%) FOR INPUT AS FILE M% &<cr>
#AI<cr>
<tab><tab><tab>,RECORDSIZE 4096% &<cr>
<esc>#V<cr>
<tab><tab>Z$=SYS(PRIV.OFF$) &<er)
*EX<cr>
```

#### 4.0 Simple TECO.INI file

Below is a TECO initializer file modeled on the one supplied by DEC. It prints the version of TECO, job number, keyboard number, account logged into, date, time, and command to enter TECO. This initializer loads the VTEDIT macro by default. (Use of the "/NOVT" switch disables loading).

This simplified code is patterned directly from the source TECO.INS found on the distribution tape, but without all the silly messages, file-type checking, and other timewasting junk. I will admit it's cute, but it gets old when you're waiting for VTEDIT to load.

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- SUBS Locate and sink your opponent's submarine before he sinks you.
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Awarded to editor Carl Marbach at the May 1982 New York LUG Meeting by the folks from The NY LUG.

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| TECC initializer (TECO.INI)  |
|--|
| i i  |
| 1 *************************************  |
| Q-regs used:   |
| 1 % Exit flags: !  |
| 1 \$ Scratch !   |
| $\begin{array}{c} 2 & \text{EI bits to clear;} \\ +4 => \text{ No lower case } \\ 2 & \text{Constant on the states} \end{array}$ |
| 1 3 \$ /NOVT flag  |
| 1 1  |
| ! Insert /VT if not found !  |
| [3 @:S\$/NOVT\$"S ^SD < 0A"A D > ' -1U3<br>  @:S\$/VT\$"= @:S\$ \$"S R   ZJ ' @I\$/VTEDIT<br>'                                   |
| I Save registers, buffer !   |
| HX3 HK [1 [2   |
| ! Display version, job, KB, PPn !  |
| J 24< 1301\$\$ 1001\$\$ >  |
| J 8L 1:W/2-12< @I≴ \$ ><br>@I≴TECO Version ≸ EO\ -1W<br>2L 1:W/2-14< @I≸ \$ ><br>@I≸Job \$ 0EJ\                                  |
| €I\$, KB\$ 1EJ\<br>€I\$:[\$ 2EJ/256\ €I\$,\$ 2EJ&255\ €I\$]\$ J -1W  |
| ! What time is it? !   |
| 1440- <sup>^</sup> HU1 Q1/60U2 Q2#40+Q1U1  |
| ! AM, PM, noon, or midnight? !   |
| @^U1\$ AM\$<br>Q1-1200"= @^U1\$ M\$ '<br>Q1-1200"> Q1-1200U1 @^U1\$ PM\$ '   |
| Q1-100 "< Q1+120001 '<br>16L 1:W/2-9< @I\$ \$ ><br>Q1+10000\ 2R @I\$:\$ 3R -D ::@FS\$0\$ \$"S R ' 5C G1                          |
| ! Figure out the month !   |
| -2L 1:W/2-15< @I\$ \$ ><br>^B/1000U2 ^B-(Q2#1000)U1<br>Q1-32"< @I\$ January \$ @0!FOUND! '                                       |
| Q1-31U1 Q1-29"< @I\$ February \$ @0!FOUND! '<br>Q1-28U1 Q2+2/4#4-02-2"= 01-1U1   |
| Q1"= 29U1 @I% February % @O!FOUND! ' '<br>Q1-32"< @I% March % @O!FOUND! '  |
| Q1-31U1 Q1-31"< @I\$ April \$ @O!FOUND! '<br>Q1-30U1 Q1-32"< @I\$ May \$ @O!FOUND! '   |
| Q1-31U1 Q1-31"< @I\$ June \$ @0!FOUND! '<br>Q1-30U1 Q1-32"< @I\$ July \$ @0!FOUND! '   |
| Q1-31U1 Q1-32"< @I\$ August \$ @0!FOUND! '<br>Q1-31U1 Q1-31"< @I\$ September \$ @0!FOUND! '                                      |
| Q1-30U1 Q1-32"< @I\$ October \$ @OIFOUND! '<br>Q1-31U1 Q1-31"< @I\$ November \$ @OIFOUND! '<br>Q1-30U1 @I\$ December \$          |
| !FOUND!<br>Q1\ @I≸, ≸ Q2+1970\ J -1₩   |
| ! Display command !  |
| €I≸Command: ≸ G3 -1W   |
| Q3"= 4L @I\$Loading VTEDIT macro≸ -2L -1W ' '  |
| ! Restore registers, buffer !  |
| !EXIT!<br>]2 ]1 HK G3 ]3   |
| 5.0 Closing notes  |

That concludes this issue. If you have any suggestions for items that you would like to see covered in this space editing or otherwise — please feel free to contact me either directly or through the RSTS Pro. Until next issue, have a good edit.

## **RSTS/E SOFTWARE PACKAGES**

- KDSS, a multi-terminal key-to-disk data entry system. (Also available for RSX-11M.)
- **TAM**, a multi-terminal screen-handling facility for transaction-processing applications. (Also available for RSX-11M.)
- **FSORT3,** a very fast sort. Directly sorts RSTS/E files containing up to 16 million keys or records. Up to 70 times as fast as the RSTS-11 Sort package in CPU time.
- SELECT, a convenient, very quick package for extracting records that meet user-specified selection criteria.
- **BSC/DV**, a device driver for the DEC DV11 synchronous multiplexer that handles most bisynchronous protocols.

- COLINK, a package that links two RSTS/E systems together using DMC11s. Supports file transfers, virtual terminals, and across-thelink task communication.
- DIALUP, a package that uses an asynchronous terminal line to link a local RSTS/E system to a remote computer system. Supports file transfers, virtual terminals, and dial-out through a DN11.
- (The performance-critical portions of the first five packages are implemented in assembly language for efficiency.)

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CIRCLE 29 ON READER CARD

#### CORRECTION! CORRECTION! CORRECTION! CORRECTION! CORRECTION!

The following section was inadvertently omitted from "The Disk Inversion Map" by Michael H. Koplitz [RSTS PROFESSIONAL, v. 4, no. 3, June 1982, p. 37].

In addition, we have reprinted Mr. Koplitz' sample map, enlarged for clarity.

| 1**  | ***********************                                       |
|------|---|
| 11*  |   |
| 11*  | THIS PROGRAM WAS WRITTEN BY M H KOPLITZ                       |
| 11*  |   |
| 11*  | THIS PROGRAM WILL GATHER THE UFD DATA NEEDED FOR A FULL DISK  |
| 11*  | REPORT-   |
| 11*  |   |
| 11** | *****   |
|      |   |
| 010  | DIM #1%,MFD% (3583%,7%)                                       |
| 1    | DIM #2%-UFD% (3583%,7%)                                       |
| 1    | X = SYS (CHR\$ (6%) + CHR\$ (-7%))                            |
| 1    | DCS% = 8% IDIMENSION VIRTUAL ARRAYS                           |
| 1    | SET UP C TRAP   |
| 11** | ***************************************                       |
| 11*  |   |
| 11*  | NOTE THAT THE DOSS MUST BE SET UP PRIOR TO RUNNING THE        |
| 11*  | PROGRAM. THE DCS& HERE IS FOR AN RPO6.                        |
| 11*  | DCS% IS THE DEVICE CLUSTER SIZE AND IS HARDWARE DEPENDENT.    |
| 11*  |   |
| 11*  | IF ONE HAS SEVERAL DIFFERENT DISK DRIVES THE DCS& VALUE COULD |
| 11*  | INPUTED AS PART OF THE JOB STREAM.                            |
| 11*  |   |
| 11*1 | *****************   |
|      |   |

| <pre>020 ON ERROR GOTO 32000</pre>   |                    |   |                                |
|--|--------------------|---|--------------------------------|
| 030 PRINT "MAPUFD V2.1 Full disk map"<br>PRINT IPRINT BANNER.<br>035 INPUT "Device"; DEVICE\$ IGET DEVICE TO EXAMINE<br>040 OPEN "MAPUFD.DAT"<br>FOR OUTPUT AS FILE #10%<br>10PEN OUTPUT.FILE\$ FOR OUTPUT<br>080 OPEN "(1,1)"+DEVICE\$<br>FOR INPUT AS FILE #1%,<br>MODE 8192% IOPEN THE MFD READ ONLY<br>090 PCS% = 16%<br>CS% = 16%<br>CS% = 16%<br>CS% = 16%<br>DISK.CLUSTER<br>DISK.CLUSTER\$<br>= N(MFD%(31%,X%) - 1%)<br>* DCS%/PCS%<br>DISK.CLUSTER\$<br>= NUM1\$(DISK.CLUSTER)<br>DISK.CLUSTER\$<br>+ DISK.CLUSTER\$<br>V DISK.CLUSTER\$<br>+ DISK.CLUSTER\$<br>+ DISK.CLUSTER\$<br>V DISK.CLUSTER\$<br>+ DISK.CLUSTER\$<br>+ TISK.CLUSTER\$<br>V OUTPUT\$ = DISK.CLUSTER\$<br>V OUTPUT\$ = DISK.CLUSTER\$<br>V OUTPUT\$ = OUTPUT\$<br>+ SPACE\$(50%-LEN(OUTPUT\$)) | 020                | ON ERROR GOTO 32000   | !ERROR FLAGGING SET UP         |
| <pre>035 INPUT "Device";DEVICE\$ IGET DEVICE TO EXAMINE 040 OPEN "MAPUPD.DAT"</pre>  | 030<br>\           | PRINT "MAPUFD V2.1 Full disk m<br>PRINT   | ap"<br>!PRINT BANNER.          |
| <pre>040 OPEN "MAPUFD.DAT"<br/>FOR OUTPUT AS FILE #10%<br/>10PEN OUTPUT.FILE\$ FOR OUTPUT<br/>080 OPEN "[1,1]"+DEVICE\$<br/>FOR INPUT AS FILE #1%,<br/>MODE 8192% 10PEN THE MFD READ ONLY<br/>090 PCS% = 16%<br/>\CS% = 16%<br/>\CS% = 16%<br/>\FOR X% = 1% TO 7%<br/>\DISK.CLUSTER<br/>= (MFD% (31%,X%) - 1%)<br/>* DCS%/PCS%<br/>\DISK.CLUSTER\$<br/>= NUM1\$ (DISK.CLUSTER)<br/>DISK.CLUSTER\$<br/>STRING\$ ((5-LEN (DISK.CLUSTER\$))<br/>,48%)<br/>+ DISK.CLUSTER\$<br/>\OUTPUT\$ = DISK.CLUSTER\$<br/>\OUTPUT\$ = DISK.CLUSTER\$<br/>\OUTPUT\$ = OUTPUT\$<br/>+ SPACE\$ (50%-LEN (OUTPUT\$))</pre>  | 035                | INPUT "Device";DEVICE\$   | IGET DEVICE TO EXAMINE         |
| 080 OPEN "[1,1]"+DEVICES<br>FOR INPUT AS FILE #1%,<br>MODE 8192% IOPEN THE MFD READ ONLY<br>090 PCS% = 16%<br>CS% = 16%<br>DISK.CLUSTER<br>= (MFD%(31%,X%) - 1%)<br>* DCS%/PCS%<br>DISK.CLUSTER\$<br>= NUM1\$(DISK.CLUSTER)<br>DISK.CLUSTER\$<br>STRING\$((5-LEN(DISK.CLUSTER)))<br>,40%)<br>+ DISK.CLUSTER\$<br>OUTPUT\$ = DISK.CLUSTER\$ + ","<br>+ "(0, 0]**MFD***,"<br>+ NUM1\$(MFD%(31%,0%))<br>OUTPUT\$ = OUTPUT\$<br>+ SPACE\$(50%-LEN(OUTPUT\$))   | 040                | OPEN "MAPUFD.DAT"<br>FOR OUTPUT AS FILE #10%  | 10PEN OUTPUT.FILE\$ FOR OUTPUT |
| 090 PCS% = 16%<br>CS% = 16%<br>POR X% = 1% TO 7%<br>IDISK.CLUSTER<br>= (MFD%(31%,X%) - 1%)<br>* DCS%/PCS%<br>DISK.CLUSTER%<br>= NUM1%(DISK.CLUSTER)<br>DISK.CLUSTER%<br>STRING%(C5-LEN(DISK.CLUSTER\$))<br>,48%)<br>+ DISK.CLUSTER%<br>V OUTPUT\$ = DISK.CLUSTER\$ + ","<br>+ "[0, 0]***MFD***,"<br>+ NUM1%(MFD%(31%,0%))<br>V OUTPUT\$ = OUTPUT\$<br>+ SPACE%(50%-LEN(OUTPUT\$))  | 080                | OPEN "[1,1]"+DEVICE\$<br>FOR INPUT AS FILE #1%,<br>MODE 8192%   | IOPEN THE MFD READ ONLY        |
| + "[ 0, 0]***MED***,"<br>+ NUM1\$(MED&(31%,0%))<br>\ OUTPUT\$ = OUTPUT\$<br>+ SPACE\$(50%-LEN(OUTPUT\$))   | 090<br>\<br>\<br>\ | PCS% = 16%<br>CS% = 16%<br>FOR X% = 1% TO 7%<br>DISK.CLUSTER<br>= (MED%(31%,X%) - 1%)<br>* DCS%/PCS%<br>DISK.CLUSTER%<br>= NUM1%(DISK.CLUSTER)<br>DISK.CLUSTER%<br>;,40%)<br>+ DISK.CLUSTER%<br>OUTPUT% = DISK.CLUSTER% + "," | )                              |
|  | 1                  | + "[0, 0]***MED***,"<br>+ NUM1\$(MED*(31*,0*))<br>OUTPUT\$ = OUTPUT\$<br>+ SPACE\$(50*-LEN(OUTPUT   | (\$))                          |

#### \* \* FULL DISK MAP \* \* \*

| CLUST RANGE | FILE NAME        | CLUST RANGE | FILE NAME         | CLUST RANGE FILE NAME    | CLUST RANGE FILE NAME       |
|-------------|------------------|-------------|-------------------|--------------------------|-----------------------------|
|             |                  |             |                   |                          |                             |
| 0 - 6       | [ 0,0]***MFD***  | 7- 55       | ####FREE####      | 56 - 56 [ 1,1 ]DIBOLR.ST | B 57 - 58 [ 1,1 ]DIBOLR.TSK |
| 59- 59      | [ 1,1]DBRTKB.CMD | 60- 60      | [ 1,1 ]DBRSRN.ODL | 61 - 27805 ****FREE***   | 27806-27806 ****END****     |

## ICLUSTER SIZE

| RSTSPRO | FESSIONALRSTSPROFESSIONALRSTSPROFESSIONALRSTSP                            | ROFESSIONALRSTSPROFESSIONALRSTSPROF         | ESSIONALRSTSP | ROFESSIONALRSTSPROFESSIONALRSTSPROFESSIONALRS                                   | TSPROFESSIONALRSTSPROFESSIONALRSTSP |
|---------|---|---|---------------|---|-------------------------------------|
| 1       | PRINT #10%, OUTPUTS   |   | 510           | LINK% = UFD% (UFD.LINK%,7%)   | RETRIVAL LINK TO SUBROUTINE         |
| 1       | NEXT X%   | IWRITE TO OUTPUT FILE THE<br>I MFD CLUSTERS | 515           | QOSUB 15000<br>UAR.LINK% = LINK%  |                                     |
| 100     | LINK% = MFD% (0%,0%)  | ISET-UP FOR SUBROUTINE                      | `             | GOIO 900 IF UAR LINK = 0.8  | IGET RETRIEVAL ENTRIES              |
| 105     | COSTR 15000   |   | 520           | FOR X% = 1% TO 7%   |                                     |
| /       | MFD.LINK% = LINK%   | IGET FIRST NAME ENTRY, GIVE                 | `             | IF UFD% (UAR.LINK%,X%) = 0%   |                                     |
|         |   | I VALUE OF ARRAY INTO LINK&                 | 1             | UNSIGNED.TEST =   | *))                                 |
|         |   | I INDEX INTO ARRAY                          | 1             | DISK.CLUSTER =  | 577                                 |
| 110     | QOTO 120 IF LINKS = 08  |   | \<br>\        | ((UNSIGNED.TEST-1)*DCS%)/PCS%<br>DISK.CUISTER\$ = NUM1\$(DISK.CUIS              | teres)                              |
| 1       | PROJ& = SWAP& (MFD& (MFD.LINK&, 1%))                                      |   | Ň             | DISK.CLUSTER\$ =  | 100)                                |
| 1       | AND 255%<br>PROG% = MFD% (MFD.LINK%,1%) AND 255%                          |   |               | + DISK.CLUSTER\$  | ),488/                              |
| 1       | UFD.CLUSTER = FNUSI (MFD% (MFD.LINK%,7%))                                 |   | \             |   | IGET RETRIEVAL ENTRIES              |
| ì       | GOTO 1000   |   | 525           | OUTPUT\$ = DISK.CLUSTER\$+","+  |                                     |
|         | IF (MFD%(MFD.LINK%,4%) AND 64%)<br><> 64%                                 |   |               | FILE.NAME\$+","+<br>NUM1\$(CLUSTER.SIZE%)                                       |                                     |
| \       | GOTO 130  | IGET PROG AND PROJ NUMBER                   | ١.            | OUTPUT\$ = OUTPUT\$   |                                     |
|         |   | ! SKIP IF NO FD ENIRI                       | 1             | PRINT #10%,OUTPUT\$   | [\$]]                               |
| 120     | PRINT "END OF PHASE 1"  |   |               | IF INSTR(1%,DISK.CLUST<br>= 0%  | ER\$,".")                           |
| 1       | GOTO 32767  | LEND OF PHASE 1                             |               |   |                                     |
|         |   | IGOIO END OF PROGRAM                        | 1             | NEXT X%   | PRINT OUT RETRIEVAL ENTRIES,        |
| 130     | PROJ = NUM1 (PROJ)  |   |               |   | ! DISK.CLUSTER = ((DCN-1)*DCS)      |
| Ň       | PROG\$ = NUM1\$(PROG\$)   |   |               |   | 1 /100                              |
| 1       | PROG\$ = SPACE\$(3%-LEN(PROG\$))+PROG\$<br>UFD.ACCOUNT\$ = "["+PROJ\$+"," |   | 530           | LINK% = UFD% (UAR.LINK%,0%)<br>GOTO 515   | GET MORE UNTIL ZERO IN LINK&        |
|         | + PROG\$+"]"  | FORMAT THE UFD.ACCOUNT                      |               |   |                                     |
| 140     | LINK% = MFD% (MFD.LINK%,6%)   |   | 900           | GOTO 200  | IGET MORE UFD ENTIRES               |
| 1       | LINK.TO.ACCOUNTING% = LINK%   |   |               |   |                                     |
| 1       | UFD.CLUSTER.SIZE% =<br>MFD%(LINK.TO.ACCOUNTING%.7%)                       | IGET NEXT UFD NAME ENTRY                    | 1000          | LINK = MFD (MFD.LINK, 0)  | IGET NEXT MED                       |
|         |   | ! AND GET ACCOUNTING ENTRY                  | ,             |   |                                     |
| 150     | OPEN UFD.ACCOUNT\$+DEVICE\$   |   | 15000         | ·*************************************  | ******                              |
|         | MODE 8192%  | IOPEN UFD                                   | ~             | 1*<br>1* THIS SECTION CALCULATES A LINK&  |                                     |
| 155     | GOTO 160 IF UFD.ACCOUNTS = "[ 1, 1]"                                      |   | >             | [*<br> ***********************************                                      | ******                              |
| 1       | FOR $X_{\$} = 1$ TO 7 $\$$  |   | 15010         |   |                                     |
| `       | = FNUSI (UFD% (31%,X%))   |   | /             | ENO.MASK = 318 * 168  |                                     |
| 1       | ((DISK.CLUSTER = 1) *DCS)/PC  | CS8   | ~             | UL.BLO% = (SWAP%(LINK%) AND 240%)*2%<br>UL.CLO% = ((LINK% AND CLO.MASK%)/16%)*( | 258                                 |
| 1       | DISK.CLUSTER\$ = (NUMIS(DISK (LUSTER)))                                   |   | N             | UL.ENO% = (LINK% AND ENO.MASK%)/16%   |                                     |
| ١.      | DISK.CLUSTER\$ =<br>STRING\$((5-LEN(DISK.CLUSTER\$))                      | ,48%)                                       | 15050<br>\    | LINK% = UL.BLO% + UL.CLO% + UL.ENO%<br>RETURN                                   |                                     |
| \       | + DISK.CLUSTER\$<br>OUTPUT\$ = DISK.CLUSTER\$+","+                        |   | 15100         | !*****  | *****                               |
|         | UFD.ACCOUNT\$+"**UFD**"+'<br>NUM1\$(UFD.CLUSTER.SIZE%)                    | ',"+  | $\langle$     | 1*<br>1* THIS FUNCTION CONVERTS UNSIGNED INTEGR                                 | ER TO FLOATING PT.                  |
| 1       | OUTPUT = $OUTPUT+ SPACE (50%-LEN (OUTPUT ))$                              |   | $\langle$     | 1*<br>1**********************************                                       | ******                              |
| 1       | PRINT #10%,OUTPUT\$   |   | 15110         | DEE ENUSI (IISINT%)   |                                     |
| ١.      | NEXT X%   | WRITE OUT CLUSTERS THAT ARE                 | \             | USIMP = USIMP   |                                     |
|         |   | ! ACCOUNT IS [1,11] THE MFD.                | ~             | SIMP = USIMP + 65536 IF USINI < 08<br>FNUSI = USIMP                             |                                     |
| 160     | UFD.LINK% = UFD%  | SET UFD LINK                                | 1             | FNEND   |                                     |
| 200     | LINK% = UFD%(UFD.LINK%,0%)  | IPREPARE FOR SUBROUTINE                     | 20040         | RETURN  |                                     |
| 205     | COSTR 15000   |   | 32000         | [*************************************  | *****                               |
| 1       | UFD.LINK% = LINK%   |   | Ň             | I* ERROR SECTION.   |                                     |
| ~       | GOTO 200 IF UFD*(UFD.LINK*,4*) AND 64*<br>GOTO 1000 IF UFD.LINK* = 0*     | IGO GET NEXT LINK                           | ~             | l*<br>!***********************************                                      | ****                                |
|         |   | ISKIP IF MFD ENTRY                          | 32005         | IF ERR = $28$ THEN $32767$  |                                     |
| 210     | FILE.NAMES = UFD.ACCOUNTS+  |   | 22010         | TE EDT $= 150$ much decime 1000   |                                     |
|         | RAD\$ (UFD* (UFD*LINK*, 2%)) +  |   | 32010         |   |                                     |
|         | RAD\$ (UFD% (UFD.LINK%,3%))   | PRINT FILE NAME                             | 32020         | UN ERRUK GUIU U   |                                     |
| 220     | LINK% = UFD% (UFD.LINK%,6%)   |   | 32766         | 14<br>1   |                                     |
| 1       | GOSUB 15000   | ACCOUNTING LINK                             | ~             | 1* EQJ<br>1*  |                                     |
| 220     |   |   | Ň             | · ************************************  | ****                                |
| 2.50    | IF UAA.UFD.LINK% <> 0%  |   | 32767         | CLOSE #1%   |                                     |
| 1       | CLUSTER.SIZE% = 16%<br>IF UAA.UFD.LINK% = 0%                              | ICLUSTER SIZE                               | 1             | CLUSE #2%<br>END  |                                     |

0

()

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## **RSTS/E INTERNALS MANUAL**

The RSTS community has been clamoring for years for a book that details the inner workings of RSTS/E. Well, clamor no more. Michael Mayfield of Northwest Digital Software, and M Systems, the publisher of The RSTS Professional and The DEC Professional Magazines, have teamed up to produce the RSTS/E Monitor Internals Manual.

This manual describes the internal workings and data structures of the RSTS/E monitor. It also notes differences in the internal structures between version 7.1 and earlier versions of the monitor. Future updates will include changes for new versions of the monitor.

Information is available for all levels of users:

- Gain a basic understanding of the workings of the monitor for optimizing system performance.
- Information on disk structures allows recovery of data from corrupted disk packs.
- Special uses of runtime systems and resident libraries allow complex applications to be developed without degrading system performance.
- Write your own custom device drivers for that "foreign" device you need to add but thought you couldn't.

#### CONTENTS:

Chapter 1 describes the structures used by the monitor that are resident on disk. These include the directory structure, disk allocation tables, Save Image Library (SIL) formats, bootstrap formats and bad block mapping.

Chapter 2 describes the tables used within the monitor to control system resources and provide program services. These tables provide job, memory, file and device control, as well as program services such as interjob communication.



Chapter 3 contains information on writing and installing a custom device driver. It describes the entry points and information the driver must provide to the monitor as well as the subroutines and macros the monitor provides for the driver.

Chapter 4 contains information that enhances information already provided by Digital on writing custom resident libraries and runtime systems. It concentrates mainly on non-standard uses of resident libraries and runtime systems to increase system performance and functionality.

Appendix A provides six quick reference foldout charts:

- The directory structure.
- The monitor tables.
- Fixed memory locations and common data structures.
- Monitor subroutines.
- Device driver entry points.
- Device driver macros.

Appendix B provides examples of the peek sequences required to access most of the monitor tables. It also contains an example program that uses many of the monitor tables to display a job and open files status.

Appendix C provides an example device driver.

Appendix D provides an example runtime system that doubles as a menu system for restricting specified users to a menu of options.



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## **TIME SHARING** VMS, FORTRAN, BASIC **& WORD PROCESSING** TRACTIVE PRICING PDP 11 to VAX **Conversion Support** Call Toll Free 800-631-0298 In New Jersey 201-327-1444 Pearl Court, Allendale, N.J. 07401

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\*USER-11 is currently available for DEC computers using the RSTS operating system.

#### **RSTS SITE MANAGEMENT AND APPLICATION DEVELOPMENT TOOLS**

- M/APS a menu/authorization processor and application security system that controls user access to menus and applications programs. Uses DEC's VT series CRTs.
- VT100 ACCOUNTING CALCULATOR a multi-function calculator designed for users of DEC's VT100 CRTs. Options and features beyond the capabilities of the normal Accountant's calculator.
- SOURCE/FILE CROSS-REFERENCE (XREF) XREF provides cross-reference listings which detail the relationship between source files, callable routines, data files and task images.
- □ APC

an automatic password changer that creates meaningful sixcharacter passwords and updates the ACCT.SYS file, allows selective changing of passwords and produces three informative reports.

- KEYBOARD MASTER a system support tool that allows the system support manager to monitor, interact or take control of an interactive session.
- STANDARD SUBROUTINE LIBRARY callable macro-11 routines that perform screen and terminal I/O, cursor positioning and many other necessary program functions, including data conversions.

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a site security feature which encodes ASCII characters and can be incorporated into any application where sensitive data is processed. Also exists as a stand alone program for encoding and decoding entire files.

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CIRCLE 57 ON READER CARD

## 11/74's NOW AVAILABLE

For internal use, the Internal Equipment Group (IEG) has 11/74 CPUs available for internal distribution in the New England area only. The 11/74 is functionally equivalent to the 11/70, supporting the same hardware as well as running the same software. The 11/74 is a viable alternative to the 11/70, and has significant reliability improvements designed in.

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If you are considering upgrading an existing 11/34, 11/40, or 11/45, the 11/74 CPUs and memory are available 8

days after receipt of order (ARO) from the Internal Equipment Group. Delivery for new system orders are dependent upon the availability of additional material on your order.

The internal PDP-11/74 cost and the field service basic monthly charge are the same as for the 11/70.

Any additional questions regarding ordering and delivery can be answered by your IEG Account Representative at DTN 265-1575.



PRIOR TO INTERNAL DECUS SYMPOSIUM, FRED BRASSARD RUNS DIAGNOSTICS OF 11/74.

# The VAX-SCENE

#### Number 9

(RSTS PROFESSIONAL, Vol. 4, No. 4)

August 1982



### **INSIDE:**

□ VAX-11/780 AND VMS



## VAX-11/780 AND VMS

By Michael H. Koplitz

#### THE VAX-11/780 PROCESSOR

The VAX-11/780 processor (see figure A) is a set of hardware logic that performs the operations of a computer system according to the VAX-11 architecture. The integrated components of the processor are: the CPU, including its cache, writable diagnostic control store, floating point accelerator (optional), clocks and console; Main memory and its controllers; Input/output bus adapter; Optional multiport memory; Optional high performance 32-bit interface.

The CPU performs all of the logical and arithmetic operations requested by the computer system. The CPU contains sixteen 32-bit general purpose registers for data manipulation, and the Process Status Longword for controlling the execution states of the CPU.

The CPU also includes 12K bytes of writable diagnostic control store for updating the instruction set microcode. This area is also used for storing microcode diagnostics. The processor can also support 12K of user writeable control store, which the user can use to program the processor in microcode.

The VAX-11/780 console consists of an LSI-11 microcomputer (PDP-11/03) with 16 bytes of read/write memory and 8K bytes of ROM (used for LSI-11 diagnostics and LSI bootstrap), a floppy disk system, a hard copy terminal (LA120) and optional remote diagnostic port (RDC). The operator communicates with the VAX-11/780 via the console with a set of user oriented commands.

The VAX-11/780 memory interconnect (same as synchronized backplane interconnect (SBI)) is the system's internal bus conveying addresses, data, and control information between the processor and memory, and between memory and I/O controllers. The memory interconnect has a cycle time of 200 seconds and can transfer 32 bits each cycle. Data transfers use two consecutive cycles to transfer 64 bits at a time. The maximum memory interconnect transfer rate is 13.3 million bytes/second.

The VAX-11/780 Main Memory consists of MOS RAM integrated circuits with a cycle time of 600 nanoseconds. A memory controller can access a maximum of 4M (4,194,304) bytes. Two memory controllers can be connected to the memory interconnect, yielding a maximum of 8M bytes of physical memory that can be available on the system. The maximum total physical address space is 2 to the 29th power or approximately 512 million bytes. It should be noted that data is fetched from the memory at a rate of 64 bits/access.

The memory controller will buffer a command while it processes another to increase system throughput. Main memory can also be interleaved. The memory system employs error checking and correction that corrects all single bit error and detects all double bit errors.

Memory Cache is the primary cache system for all data coming from memory, including addresses, addresses translations and instructions. The memory cache is an 8K byte, 2 way set associative, write through cache.

The address translation buffer on the VAX-11/780 is a cache of virtual to physical address translations. The cache contains 128 virtual to physical page address translations which are divided into equal sections; 64 system page translations and 64 process page translations. Each section is two-way associative.

The instruction buffer on the VAX-11/780 is eight bytes long and improves CPU performance by prefetching instructions in the instruction stream. The instruction buffer effectively eliminates the time spent by the CPU waiting for instructions to be fetched. The processor interfaces for a MASSBUS peripheral (high speed disks or tape drives) is the MASSBUS adapter. The MASSBUS adapter performs control, arbitration, and buffering functions. Up to four MASSBUS adapters can be connected to the memory interconnect. Each MASSBUS adapter includes its own address/translation map that permits scatter/gather disk transfers. The MASSBUS adapter includes a 32 byte silo data buffer. Data are assembled in 64 bit guadwords (plus parity) to make efficient use of the memory interconnect bandwidth.

All devices other than the high speed disk drives and magnetic tapes are connected to the UNIBUS, an asynchronous bidirectional bus. These devices include all Digital-, and user-developed real-time peripherals. The UNIBUS is connected to the memory interconnect through the UNIBUS adapter. Up to four UNIBUS adapters can be placed on the memory interconnect. The UNIBUS adapter translates an 18 bit UNIBUS address into a 30 bit memory interconnect address. The speed of data paths on the UNIBUS is 1.35 million bytes/second.

#### THE VMS OPERATING SYSTEM VAX/VMS Operating System Overview

VAX/VMS is a general purpose operating system for VAX systems. VMS allows for a high-performance environment for the concurrent execution of multiuser timesharing, batch and real time applications written in BASIC, COBOL, FORTRAN, PASCAL, BLISS, CORAL, PL/1 and assembly language.

VAX/VMS features include memory management, event-driven priority scheduling, shared memory, file and interprocess communications, data protection based on ownership and application groups, user privilege and resource allocation control, and easy-to-use, easily extended command language.

VAX/VMS also includes multijob batch processing, program development tools, extensive file and record management services, programmed system services for process and subprocess control and interprocess communications, common run-time procedure library, and system maintenance utilities.

VAX/VMS also includes the following facilities: Operating system nucleus, including virtual memory manager, swapper, system services, and I/O device driver, user authorization control programs, job initiator, and symbiont manager, account manager, and operator communications manager.

Other special features include error logging and print utility, DCL command interpreter, MCR command interpreter, interactive and batch editors, macro assembler, linker with cross reference, library maintenance utility, common run-time procedure library, symbolic debugger for native programs, RMS, FILES-11, SORT/MERGE utility, user environment package, and software maintenance release update utility.

#### VAX/VMS VIRTUAL MEMORY SYSTEM

VAX/VMS consists of 2\*\*32 (two to the 32nd power) bytes of virtual address space divided into system and process spaces, each of which has 2\*\*31 bytes. Process virtual space is divided into a program region and a control region. The program region contains the image of the job currently being executed. The control region contains information maintained on behalf of the process by the system, and it contains the user stack and the kernel, executive and supervisor mode stacks. Only a small amount of the control region is reserved for the system, the remainder is available to the user.

The virtual memory for a process is subdivided into pages. Each page consists of 512 bytes. The system and user virtual spaces are described in a data structure called the system page table (SPT) which contains one page table entry for each page of system virtual memory. When a virtual page is in memory, the page table entry contains the page frame number needed to map the virtual page to a physical page.

The process's virtual space is described in two page tables: the PO page table for the program region and the P1 page table for the control region. The hardware system base register (SBR) and system length register (SLR) provide the physical address and the length in longwords of the system page table. Given the contents of the SBR and SLR, it is possible to locate all system virtual pages.

Memory management uses page tables as the data base to contain the status and location of virtual pages of processes. A process contains an entry in the appropriate process page table to describe that page and its location.

The following are descriptions of the processes and services performed by VAX/VMS:

#### WORKING SET

The section of pages of a process that need to be in memory, remaining pages are kept on a secondary storage device.

#### **BALANCE SET**

The set of processes that reside in physical memory are termed the balance set. This set of processes has memory requirements that balance with available memory of the system.

#### WORKING SET SWAPPER

The working set swapper is a small process that returns process working sets into the balance sets and removes them from the balance set. The main function of this process is to provide memory residency for the highest priority executable processes so that they may be scheduled for execution.

#### PROCESS SCHEDULING

VAX/VMS operating system defines 32 levels of software for scheduling processes. The lower 16 levels are reserved for normal processes, while the higher 16 levels are reserved for real-time processes. The scheduler makes scheduling using the following policies:

- 1. Maintaining a queue for each state that a process can attain.
- Reacting to system events.

System events are occurrences that causes the status of one or more processes in the system to change.

#### SYSTEM PROCESSES

There are three types of system processes:

- 1. Full process user processes.
- Small process no program region in their virtual address space, they must remain resident in memory when operating, for example the working set swapper is a small process.
- Fork process they are defined by an abbreviated control block. Fork processes execute at software interrupts. An example is a device driver routine.

#### SYSTEM SERVICES

EVENT FLAG SERVICES — Allowing a process to read, wait for, and manipulate event flags.

ASYNCHRONOUS SYSTEM TRAP (AST) SERVICES these traps are for interrupts caused by I/O completions. System services are provided so that a process can control the handling of the ASTs.

LOGICAL NAME SERVICES — generalized technique for maintaining and accessing character string logical names and equivalence name pairs.

I/O SYSTEM SERVICES:

- 1. Perform physical, logical and virtual data I/O operations.
- Format output lines, converting binary numeric values to ASCII strings, substituting variable data in ASCII strings.
- 3. Perform network operations.
- 4. Queue messages to system processes.
- 5. Create mailboxes, which are virtual devices for interprocess communications.

PROCESS CONTROL SERVICES — allows the user to create, delete and control the execution of a process.

TIMER AND TIME CONVERSION SERVICES — schedules events for a particular time of day or after a specified interval of time has elapsed.

CONDITION HANDLING SERVICES — procedures that can be designated to receive control when a hardware or software condition occurs during image execution.

MEMORY MANAGEMENT SERVICES — allows a process to control its own use of virtual and physical memory.

CHANGE MODE SERVICES — alter the access mode of a process to a more privileged mode to execute particular routines.

## INTERPROCESS COMMUNICATIONS AND SYNCHRONIZATION

Interprocess communications can occur using the following methods:

- 1. Shared data base
- 2. Mailboxes
- 3. Shared files

#### VAX/VMS INPUT/OUTPUT

I/O INTERFACES — I/O programming interfaces are RMS (record management services for general purpose file and general processing) and direct I/O processing.

I/O REQUEST PROCESSING — all I/O requests are generated by a Queue I/O (QIO) request system service.

#### VAX/VMS REAL TIME ENVIRONMENT

VAX/VMS has established the following attributes for a real time environment:

- 1. Highly efficient process scheduler providing 16 real time process priorities.
- 2. Rapid process context switching.
- 3. Rapid hardware process of interrupts.
- 4. Interrupts vectored to VAX/VMS device drivers.
- 5. VAX/VMS support of PDP-11 peripherals and facilities to enable users to add support of their own devices.
- Ease of use facilities to provide mapping of the I/O page and connecting to an interrupt.

#### **I/O DRIVERS**

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A VAX/VMS device driver is a set of tables and routines that control I/O operations on a peripheral device interfacing to a VAX system. A VAX/VMS device driver:

- 1. Defines the peripheral driver for the rest of the VAX/VMS operating system.
- Defines the driver for the operating system procedure that maps and loads the driver and its device data base into the system virtual memory.
- 3. Initializes the device (and/or its controller) at system startup time and after a power failure.
- Translates software requests for I/O operations into device specific commands.
- 5. Activates the device.
- 6. Responds to hardware interrupts generated by the device.
- 7. Reports device errors.
- Returns data and status from the device to software.

#### USER ACCOUNT SCHEME

Accounts for each user are used for the following reasons:

- 1. To denote the users of the system.
- To define important relationships among users of the system. For example, groups of users who may share data files.
- 3. To grant some users privileges.
- 4. To set limits on the user of re-usable resources.
- 5. To give user priorities in using the system.

The User Authorization File (UAF) is used to designate the above possibilites. Each user has one record in the UAF. VAX/VMS examines the UAF whenever a process is running to ensure that the user's process can have access to a resource.

- The UAF record contains the following:
- 1. User's identification
  - a. User's name
  - b. Password
  - c. UIC (user identification code)
  - d. Account name
- 2. User's default directory name and default device name

### RSTS/E ON VAX ROSS/V (RSTS/E Operating System Simulator for VAX)

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ROSS/V is a software package, written in VAX-11 MACRO, which provides a RSTS/E monitor environment for programs running in PDP-11 compatibility mode on DEC's VAX-11.

#### **ROSS/V** supports:

- The BASIC-PLUS interactive environment.
- Concurrent use of multiple run-time systems.
- Update mode (multi-user read/write access to shared files.)
- CCL (Concise Command Language) commands.
- An extensive subset of RSTS/E monitor calls.

ROSS/V runs under VMS and interfaces to programs and run-time systems at the RSTS/E monitor call level. ROSS/V makes it possible for DEC PDP-11 RSTS/E users to move many of their applications directly to the VAX with little or no modification and to continue program development on the VAX in the uniquely hospitable RSTS/E environment. Most BASIC-PLUS programs will run under an unmodified BASIC-PLUS run-time system.

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#### ROSS/V is available from:

(Eastern U.S.) Evans Griffiths & Hart, Inc. 55 Waltham Street Lexington, Massachusetts 02173 (617) 861-0670 (Central U.S.) Interactive Information Systems, Inc. 10 Knollcrest Drive Cincinnati, Ohio 45237 (513) 761-0132 CIRCLE 67 ON READER CARD (Western U.S.) Online Data Processing, Inc. N. 637 Hamilton Spokane, Washington 99202 (509) 484-3400

- 3. User's default command interpreter name
- 4. User's allotment of system resources
- 5. User's privileges
- 6. User's base priority

#### DIGITAL COMMAND LANGUAGE (DCL)

DCL is used to request some action to be taken by the operating system. There are many DCL commands so only the format will be discussed.

\$[label:] command-name[qualifier] [parameter-1]...[parameter -n]
where:

- 1. dollar sign \$ must be in position one.
- Brackets indicate and optional value.
- 3. Labels used to transfer flow of control via the GOTO command.
- Command names indicates the action the command is to perform.
- 5. Qualifiers used to modify the default action of a command.
- Parameters either specifies what a command is to use when executing, or further defines the action a command is to take.



console central processor

FIGURE A. VAX-11/780 PROCESSOR

# TIPS & ECHNIQUES

A Column For The Advanced RSTS/E User

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Wef Fleischman, Software Techniques, Inc.

#### **DETERMINING SYS() CALL PRIVILEGES**

One of the most critical responsibilities a system manager confronts daily is protecting the security and integrity of his system. This column will explore a very simple monitoring technique that can help you pinpoint quickly one class of "trap doors": Privileged SYS calls that have been changed to be non-privileged.

The RSTS system manager's job is made easier by protection mechanisms that have been built into RSTS over many years. DEC originally targetted "RSTS" (and some predecessors) for the educational environment where protection from the curious and industrious student was a prime design criterion. Thus began the evolution of one of the most secure operating systems available today, tested by thousands of commercial users besides the generations of ingenious students that exposed numerous "holes" in the RSTS security blanket. Yet, now as your feelings of euphoria start to swell, with all this experience behind you (and your operating system), your confidence will surely be crashed by a repeated security breach. Why do such problems still arise?

Security breachers obviously prefer to maintain a low profile. They cannot use privileged accounts (very often) for fear of being discovered by a simple SYSTAT listing. A short interlude with privilege can allow running the ONLPAT program to modify the RSTS monitor .SIL file. Once the system is subsequently rebooted, any changes become effective (and will remain in your system until your next SYSGEN).

Extensive changes to the .SIL using ONLPAT are very unlikely. However, small changes can be made very quickly and unnoticably such as altering whether or not SYS() calls require privilege. A good example is for the intruder to make the UU.JOB ("create a job") UUO non-privileged. This allows any non-privileged user to run any program he wishes "logged-out". (Logged-out jobs are those that appear as [\*\*,\*\*] in SYSTAT.) These jobs always have privilege due to the JFNOPR bit in their keyword, therefore they have access to any system resources. The system manager can easily check for an alteration of this type and even make it automatically checked on system startup. The rest of this column shows how you can go about it.

When you issue a FIP SYS() call to BASIC-Plus or BASIC-PLUS-2, it is preprocessed and then passed to the RSTS monitor via the .UUO directive. Then the monitor finds an entry in the UUO function dispatch table, UUOTBL, based on byte 2 of the passed string. The dispatch table contains the addresses of the monitor routines which service each SYS() call and also a bit (bit 15) to signify whether or not privileges are required. ONLPAT is quite efficient at locating and changing UUOTBL.

If someone modifies the UUOTBL entry for a privileged SYS() call to become non-privileged, a "trap-door" may be opened in the system.

The BASIC-Plus program UUOLST below is a very simple way of displaying whether or not UUO's are currently set up as privileged. The current setting is compared with the standard setting supplied with the distribution, and an asterisk is printed if a difference is detected.

There are many different ways of accomplishing the same end as UUOLST. It can certainly be implemented to run faster in MACRO or BASIC-Plus-2. You might feel more comfortable just running ONLPAT and displaying the contents of UUOTBL. Whatever your choice, make your procedure less obvious (or less conspicuously named) than "UUOLST" so that you lessen the chance that someone will figure it out and disable it.

For those that are interested, the use of the message send/receive SYS() call to do an .XPEEK is demonstrated in line 2000. If you have a RSTS V7.0 system or earlier, .XPEEK is not available. Just use PEEKs to fetch each word of UUOTBL rather than the single .XPEEK.

You could write a similar program to control system startup and issue UU.DIE if any discrepancies are detected. This is left as an exercise for the reader. Good luck 'til next time.

#### SAMPLE PROGRAM

[4,8] UUOLST.BAS

| 1000 |   | &      |
|------|---|--------|
| 1    | START OF MAIN   | &      |
| 1    |   | &      |
|      | PGM.NAME\$ = "UUOLST"   | 8      |
| 1    | PGM.VERS\$ = "V7.1-01"  | 8      |
| 1    |   | 8      |
| 1    | DEFINE PROGRAM NAME AND VERSION                               | 2      |
| 1    | THIS PROGRAM REQUIRES RSTS/E V7.1                             | &      |
| 1100 |   | 2      |
| 1    | INITIALIZATION  | £      |
| 1    |   | 6      |
|      | CRLF = $CHR$ (13%) + $CHR$ (10%)                              | 2      |
| \    | PRINT #0%, PGM_NAMES + " + PGM_VERSS + " "                    | 6      |
|      | + RIGHT(SYS(CHRS(6%) + CHRS(9%)), $3\%$ )                     | a<br>L |
| 1    | PRINT #0%, "Software Techniques, Inc."                        | £      |
| 1    | · · · · · · · · · · · · · · · · · · ·                         | e a    |
| 1    | SETUP SOME HANDY LITERALS                                     | 2      |
| 1    | IDENTIFY OURSELVES  | &      |
| 1110 |   | £      |
| 1    | MONITOR SIL LOCATIONS   | a<br>c |
| 1    |   | a<br>c |
| 1    | USE THE SONLPAT PROGRAM TO DETERMINE THE DECIMAL VALUE OF THE | C C    |
| 1    | SUDOTE SYMBOL BELOW. THE SONLPAT COMMANDS APP DEVICE THE      | TOW C  |
| 1    | YOU MUST RECOMPLIE THIS PROCRAM AND REDEAT THE DROCEDURE FACE | TTME C |
| i    | YOU INSTALL A NEW MONTOR SIL                                  | IIME & |
| 1    |   | C C    |
| i    | >RUN SONLPAT  | e<br>E |
| 1    | Command file name? (LF)                                       | 2      |
| 1    | File to patch? (LF)   | £      |
| 1    | File found in account [0,1]                                   | â      |
| 1    | Module name? <lf></lf>  | e.     |
| 1    | Base address? 0   | é.     |
| 1    | Offset address? 0   | £      |
|      |   |        |

#### August 1982

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|      | 000000         000000         000106         ? \$UUOTB=         \$           Value         #075072, 31290.         \$         \$           000000         000000         000106         ? °C         \$ |
|------|---|
|      | UUOTBL% = 31290% & & & & & & & & & & & & & & & & & & &  |
|      | SET SUUOTBL VALUES FROM THE .SIL & ALLOCATE AN I/O BUFFER TO RECEIVE .XPEEK DATA &  |
| 000  | MAIN CODE &   |
|      | X\$ = SYS(CHR\$(6%)+CHR\$(22%)+CHR\$(4%)     5       + CHR\$(0%)     5       + CHR\$(UUOTBL%) + CHR\$(SWAP%(UUOTBL%))     5       * STRING\$(4%, 0%)     5  |
|      | + CHR\$(1%) + CHR\$(0%)<br>+ CHR\$(UUOSIZ%) + CHR\$(SWAP%(UUOSIZ%))) &  |
|      | XPEEK AT UUOTBL &   |
| 010  | RESTORE 6<br>PRINT #0%, 6<br>CRLF\$ + "Symbol SYS Privilege? Description" 6<br>+ CRLF\$ + "Symbol SYS Privilege? Current 6  |
|      | + CRLF\$ + "" &   |
|      | FOR N% = UU.MIN% TO UU.MAX% & & & & & & & & & & & & & & & & & & &   |
|      | RESTORE TO BEGINNING OF DATA 6  |
|      | PRINT REPORT HEADER     6       FOR EACH POSSIBLE UUD SUBFUNCTION     6       READ IN ITS STANDARD INFORMATION     6       CONVERT PRIVILEGED CHARACTER TO YES/NO     6                                 |
| 015  | IF FNUUODSP%(N%) AND 1% &<br>THEN PRIV.HERE\$ = "Yes" &   |
|      | ELSE PRIV.HERES = "No" &<br>6<br>CONVERT "PRIVILEGE REQUIRED" BIT TO YES/NO &   |
| 020  |   |
| 020  | IF PRIV.NORMS = PRIV.EERES 5<br>THEN ALEFTS = "" 5<br>ELSE ALEFTS = "*" 5   |
|      | ALERT THE USER IF PRIVILEGE SETTINGS DON'T MATCH .SIL   |
| 030  | PRINT #0%, USING "\ \ ### \ \ \ ! \ "&<br>+ " \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \  |
|      | , UUO.SYMBOL\$ & & & & & & & & & & & & & & & & & & &  |
|      | , PRIV.NORM\$ & & & & & & & & & & & & & & & & & & &   |
|      | , UUO.DESC\$ & & & & & & & & & & & & & & & & & & &  |
|      | GOTO 32767 &  |
|      | EXIT &  |
| 0000 | DATA STATEMENTS 5   |
|      | DATA &  |
|      | "UU.TB3", -29, "N", "MONITOR TABLES PART 3"<br>, "UU.SPL", -28, "N", "ONE-SHOT SPOOLING REQUEST"<br>, "UU.DMP", -27, "P", "ONLINE MONITOR SNAPSHOT"<br>SUBJECT -26, "N", "FILE UTILITY"                 |
|      | , "UU.ATR", -25, "N", "READ/WRITE FILE ATTRIBUTES" &<br>, "UU.CCL", -24, "P", "CCL COMMAND ADD/DELETE" &  |
|      | , ", -23, "P", "RESERVED" 6<br>, ", -22, "P", "RESERVED" 5<br>  |
|      | , ", -20, "P", "RESERVED"<br>, "UU.LOG", -19, "P", "SET NUMBER OF ALLOWED LOGINS" &   |
|      | , "UU.RTS", -18, "P", "RUN-TIME SYSTEM & RESIDENT LIBRARY CONTROL"<br>, "UU.NAM", -17, "N", "SET FILE'S RUN-TIME SYSTEM NAME" &   |
|      | , "UU.DLE", -16, "P", "SPECIAL SHUTUP LOGOUT" &<br>, "UU.ACT", -15, "P", "ACCOUNTING INFORMATION DUMP" &<br>. "UU.DAT", -14, "P", "DATE/TIME CHANCEP" &   |
|      | , "UU.PRI", -13, "P", "PRIORITY, RUN BURST, MAXIMUM CHANGER" & "UU.TB2", -12, "N", "2ND PART OF MONITOR TABLES" &   |
|      | , "UU.BCK", -11, "P", "BACKUP FILE ACCOUNTING CHANGER" &  |
|      | , "UU.FCB", -8, "N", "GET FCB/DDB INFORMATION" &<br>, "UU.FCB", -7, "P", "RESERVED" &   |
|      | , "UU.POK", -6, "P", "POKE MONITOR MEMORY" &<br>, ", -5, "N", "RESERVED" &  |
|      | , " ", -4, "P", "RESERVED" &<br>, "UU.TB1", -3, "N", "IST PART OF MONITOR TABLES" &<br>"UU.TB1", -3, "P", "SET NUMBER OF ALLOWED LOCING TO 1  |
|      | "UU.YLG", -1, "P", "SET NUMBER OF ALLOWED LOGINS TO 1" &<br>"UU.YLG", -1, "P", "SET NUMBER OF ALLOWED LOGINS TO MAXIMUM" &<br>"UU.PAS", +0, "P", "CREATE AN ACCOUNT" &                                  |
|      | , "UU.DLU", +1, "P", "DELETE AN ACCOUNT" &<br>, "UU.CLN", +2, "P", "CLEAN A DISK PACK" &  |
|      | , "UU.MNT", +3, "P", "DISK PACK MOUNT/DISMOUNT" & "UU.LIN", +4, "P", "LOGIN" & "UU.BVE", +5, "P", "LOGIN"   |
|      | , "UU.ATT", +6, "P", "ATTACH"<br>, "UU.DET", +7, "P", "DETACH"<br>s   |
|      | , "UU.CHU", +8, "P", "CHANGE PASSWORD/QUOTA"<br>, "UU.ERR", +9, "N", "GET ERROR MESSAGE TEXT"   |
|      | , "UU.ASS", +10, "N", "ASSIGN" &<br>, "UU.DEA", +11, "N", "DEASSIGN" &  |
|      | , "UU.DAL", +12, "N", "DEASSIGN ALL" &     "UU.ZER", +13, "N", "ZERO DEVICE" &  |
|      | , UU.DLR", +15, "N", "KEAD ACCOUNTING INFORMATION" &<br>"UU.DLR", +15, "N", "GET DIRECTORY INFORMATION" &<br>"UU.TRN", +16, "N", "SET TEDWINAL CURDACTEDITOR"   |
|      | , contrast, stor, a , but investigate CHARACIERIDITCO   |

|      | , "UU.LOK", +17, "N", "WILDCARD DIRECTORY LOOKUP" &                 |
|------|---|
|      | , " ", +18, "P", "RESERVED" &                                       |
|      | , "UU.CHE", +19, "N", "CACHE ENABLE/DISABLE" &                      |
|      | , "UU.CNV", +20, "N", "CONVERT DATE/TIME TO ASCII" &                |
|      | , "UU.SLN", +21, "P", "SET/CLEAR SYSTEM-WIDE LOGICAL NAMES" &       |
|      | , " ", +22, "P", "RESERVED" &                                       |
|      | , "UU.SWP", +23, "P", "ADD/REMOVE SWAP, OVERLAY, ERROR MSG FILES"   |
|      | , "UU.JOB", +24, "P", "JOB CREATION" &                              |
|      | , "UU.PPN", +25, "N", "WILDCARD PPN LOOKUP" &                       |
|      | , "UU.SYS", +26, "N", "RETURN JOB STATUS INFORMATION" &             |
|      | , " ", +27, "N", "RESERVED" &                                       |
|      | , "UU.NME", +28, "N", "NAMED DIRECTORY HOOK"                        |
|      |   |
| 8000 | 8   |
|      | FUNCTIONS   |
|      | 6   |
|      | DEF FNUUODSP%(T%) &   |
|      | FIELD #1%, (T% - UU.MIN%) * 2% AS DUMMY\$, 1% AS X1\$, 1% AS X2\$ & |
|      | FNUUODSP% = ASCII(X1\$) + SWAP%(ASCII(X2\$))                        |
|      | FNEND   |
|      | &   |
|      | FUNCTION TO RETURN UUOTBL ENTRY GIVEN THE UUO SUBFUNCTION           |
|      | EXTRACT DATA FROM .XPEEK BUFFER                                     |
|      | RETURN AN INTEGER &   |

page 53

32767 END

#### **Picture Your Disk Files**



The next time your system is thrashing around, remember this: you could be losing up to 50 percent\* of your performance due to fragmented files.

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CIRCLE 65 ON READER CARD

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CIRCLE 152 ON READER CARD

#### WRITING A RUN-TIME SYSTEM (or Happiness in the HISEG)

#### . . . continued from page 31

top end of the users address space. One way to do this is as follows: we put the psudeo-vectors in a psect called '.99998'. The faithful task builder (who loves putting psects in alphabetical order) will force this psect to the end of our partition, after all the other rts code. Now we have the vectors at the end of our code, but in order for the rts to work, the last word in the vector region must land at (octal) 177776. This means that the vectors must begin at 177732; so, we put a 'dummy' psect (with nothing in it) just before the psudeovector region. That psect is called '.99997.' Now we can use the EXTSCT (extend section) option of the task builder to force our psudeo-vectors to start at just the right place. Unfortunately, this method requires two task builds; one with an EXTSCT of zero, so we can calculate how much to extend the dummy psect, then another with the EXTSCT option plugged in to actually get the rts to line up. Next the entire mess is run through MAKSIL, which adds a symbol table to the code and through some other black magic, actually builds the rts. Since this task build procedure leaves lots of room for human error (and since I'm quite lazy) I use a system of 2 ATPK command files, and a TECO macro to build the

SAMPLE OUTPUT

| Symbol    | SYS | Privi<br>Norm/C | lege?<br>Curren | t | Description                                |
|-----------|-----|-----------------|-----------------|---|--|
| IIII. TB3 | -29 | No              | No              |   | MONITOR TABLES PART 3                      |
| UU SPL    | -28 | No              | No              |   | ONE-SHOT SPOOLING PROUEST                  |
| UII DMP   | -27 | Vec             | Vec             |   | ONLINE MONITOR SNAPSHOT                    |
| UU FTL    | -26 | Vec             | No              | * | FILE UTILITY                               |
| UU ATD    | -25 | No              | No              |   | DEAD/WDITE FILE ATTEITES                   |
| UU CCI    | -24 | Voc             | NO              |   | COL COMMAND ADD/DELEME                     |
| 00.001    | -29 | res             | res             |   | CCL COMMAND ADD/DELEIE                     |
|           | -23 | ies             | ies             |   | RESERVED                                   |
|           | -22 | res             | res             |   | RESERVED                                   |
|           | -21 | Yes             | Yes             |   | RESERVED                                   |
|           | -20 | Yes             | Yes             |   | RESERVED                                   |
| UU.LOG    | -19 | Yes             | Yes             |   | SET NUMBER OF ALLOWED LOGINS               |
| UU.RTS    | -18 | Yes             | Yes             |   | RUN-TIME SYSTEM & RESIDENT LIBRARY CONTROL |
| UU.NAM    | -17 | No              | No              |   | SET FILE'S RUN-TIME SYSTEM NAME            |
| UU.DIE    | -16 | Yes             | Yes             |   | SPECIAL SHUTUP LOGOUT                      |
| UU.ACT    | -15 | Yes             | Yes             |   | ACCOUNTING INFORMATION DUMP                |
| UU.DAT    | -14 | Yes             | Yes             |   | DATE/TIME CHANGER                          |
| UU.PRI    | -13 | Yes             | Yes             |   | PRIORITY, RUN BURST, MAXIMUM CHANGER       |
| UU.TB2    | -12 | No              | No              |   | 2ND PART OF MONITOR TABLES                 |
| UU.BCK    | -11 | Yes             | Yes             |   | BACKUP FILE ACCOUNTING CHANGER             |
|           | -10 | Yes             | Yes             |   | RESERVED                                   |
| UU.HNG    | -9  | Yes             | Yes             |   | HANGUP/ENABLE A DATASET                    |
| UU.FCB    | -8  | No              | No              |   | GET FCB/DDB INFORMATION                    |
|           | -7  | Yes             | Yes             |   | RESERVED                                   |
| UU.POK    | -6  | Yes             | Yes             |   | POKE MONITOR MEMORY                        |
|           | -5  | Yes             | No              | * | RESERVED                                   |
|           | -4  | Yes             | Yes             |   | RESERVED                                   |
| UU.TB1    | -3  | No              | No              |   | 1ST PART OF MONITOR TABLES                 |
| UU.NLG    | -2  | Yes             | Yes             |   | SET NUMBER OF ALLOWED LOGINS TO 1          |
| UU.YLG    | -1  | Yes             | Yes             |   | SET NUMBER OF ALLOWED LOGINS TO MAXIMUM    |
| IIII PAS  | ô   | Vec             | Vec             |   | CREATE AN ACCOUNT                          |
| UU DLU    | ĩ   | Vec             | Vec             |   | DELETE AN ACCOUNT                          |
| UII CLN   | 2   | Vec             | Vec             |   | CLEAN & DISK DACK                          |
| UII MNT   | 3   | Vec             | Vec             |   | DISK PACK MOUNT/DISMOUNT                   |
| UII LTN   | 4   | Vec             | Vec             |   | LOCIN                                      |
| UU BYE    | 5   | Yes             | Vec             |   | LOGIN                                      |
| ULL ATT   | 6   | Vec             | Vec             |   | A TTACH                                    |
| UU DET    | 7   | Vec             | Vec             |   | DEWACH                                     |
| UII CHII  | 6   | Vec             | Voc             |   | CHANCE DASSWORD (OHOMA                     |
| UU EPP    | 0   | No              | Ne              |   | CER EDDOD MECCACE MEYM                     |
| UU ACC    | 10  | No              | No              |   | SET ERROR MESSAGE TEXT                     |
| 00.A33    | 10  | NO              | NO              |   | ASSIGN                                     |
| UU.DEA    | 11  | NO              | NO              |   | DEASSIGN                                   |
| UU.DAL    | 12  | NO              | NO              |   | DEASSIGN ALL                               |
| UU.ZER    | 13  | NO              | NO              |   | ZERO DEVICE                                |
| UU.RAD    | 14  | No              | NO              |   | READ ACCOUNTING INFORMATION                |
| UU.DIR    | 15  | No              | No              |   | GET DIRECTORY INFORMATION                  |
| UU.TRM    | 16  | No              | No              |   | SET TERMINAL CHARACTERISTICS               |
| UU.LOK    | 17  | No              | No              |   | WILDCARD DIRECTORY LOOKUP                  |
|           | 18  | Yes             | Yes             |   | RESERVED                                   |
| UU.CHE    | 19  | Yes             | No              | * | CACHE ENABLE/DISABLE                       |
| UU.CNV    | 20  | No              | No              |   | CONVERT DATE/TIME TO ASCII                 |
| UU.SLN    | 21  | Yes             | Yes             |   | SET/CLEAR SYSTEM-WIDE LOGICAL NAMES        |
|           | 22  | Yes             | Yes             |   | RESERVED                                   |
| UU.SWP    | 23  | Yes             | Yes             |   | ADD/REMOVE SWAP, OVERLAY, ERROR MSG FILES  |
| UU.JOB    | 24  | Yes             | Yes             |   | JOB CREATION                               |
| UU.PPN    | 25  | No              | No              |   | WILDCARD PPN LOOKUP                        |
| UU.SYS    | 26  | No              | No              |   | RETURN JOB STATUS INFORMATION              |
|           | 27  | No              | No              |   | RESERVED                                   |
| UU.NME    | 28  | No              | No              |   | NAMED DIRECTORY HOOK                       |
|           |     |                 |                 |   |  |

rts. The first command file builds the rts with an EXTSCT of zero, then runs the TECO macro. The TECO guy looks at the TKB map of the rts, finds out where the psudeo-vector psect actually starts, and calculates what the EXTSCT parameter should be for the psudeo-vectors to line up. It then edits the SECOND command file, plugging in the newly figured EX-TSCT value. (Please keep in mind that TECO isn't a supported product. . .) We then execute the second command file to task build the image with the new EXTSCT value, then run it through MAKSIL. Figure 1 shows the first command file, Figure 2 is the TECO macro, Figure 3 is the second command file.

#### Using the rts.

In order to enter the new rts, you can do one of two things; you could SWITCH to it with the switch cusp (or just execute the switch rts sys call), or you could run a program which has been NAMED to that rts. For example:

Ready

SW OSCAR Welcome to OSCAR [Exit] RSTSPROFESSIONALRSTSPROFESSIONA



#### LOTS OF LUCK!



### Software Product Description

Product Name: LOCK-11 Version 2.3

#### Description:

Lock-11 is a security superstructure built upon the standard RSTS password structure that provides the following extensions:

- Full V7.1 support
- USERID implementation for Dial-in, Packet and Concentrators.
- Macro DPY a rewrite of VT5DPY for VT100's, interfaced with security file and featuring a repertoire of 'UT' type commands for system managers
- First release of SAFE-11, a 'menu' environment (KBM/RTS) that keeps non-privileged users where they belong.
- Absolute control of system access by keyboard. Manager may limit any keyboard to certain accounts or groups of accounts and control time as well as day of week access.
- Password knowledge is no longer carte blanche system access. System detects unauthorized use of passwords. Privileged passwords don't work on non-privileged keyboards. Non-privileged passwords work only on specified keyboards.
- Real time system surveillance. Manager specifies a list of alarm keyboards which  $\log$  all infractions and probes as they happen. Opser is not required.
- Auto-login (with or without password) and chain with specified core common contents by KB.
- Manager may establish special priority/burst settings by KB. Manager may establish default output protection code. @ assignment and up to three specific user logicals for each KB. Default RTS is also selectable. All assignments are made at log-in.
- Manager specifies a list of console keyboards from which security file editor may operate.
- Manager may define a KB-specific access-denied message
- Manager may specify number of retries before access-denied and number of access-denied messages before line disable. Hangup on access denied is optional. All above may be specified on a per-kb basis.
- A macro DYNPRI program is included which performs the following functions
- Users may be dispatched into ten separate priority queues, separately tunable on-line. Each queue has ten levels. Queues are selectable by KB.
- DYNPRI detects hibernating jobs and announces the fact on ALARM keyboards. Privileged jobs hibernating cause extra loud and long alarms
- · DYNPRI produces almost no load in operation and runs in 5K words.
- DYNPRI will hold up to fourteen files open for performance purposes.
- DYNPRI will kill hibernating jobs in up to ten [p,\*] or [p,pn]'s

#### Minimum Hardware/Software Required:

Any valid RSTS/E system running Version 7.0 or later. Any version of RSX emulation is needed.

Support: See License Agreement

Installation: User Installed

**Ordering Information:** 

| Available on 9 track 800 or | 1600 BPI | tape. Multiple C | PU discount schedule: |
|-----------------------------|----------|------------------|-----------------------|
| First license               |          |                  | 0% discount           |

- Second thru Fourth license 40% discount
- 70% discount Fifth thru Twentieth license

Licensed users desiring source code for internal use only must execute a separate Program Sources License Agreement. Sources are available at ten times the initial license fee.

#### License Fee

Single CPU license: \$1250.00. Annual maintenance at 12% of current list price.

Contact:

**Dave Mallery** Nationwide Data Dialog 215-364-2800

RSTSPROFESSIONAL RSTSPROFE

or:

PIP JUNK.TSK/RT:OSCAR (any executable program will do for now)

Ready

RUN JUNK.TSK Oscar doesn't RUN programs yet... [Exit]

Ready

Next issue I'll attempt to show how to read the executable code (in this case JUNK.TSK) and even allow it to execute, and how to use the run-time system debugging tool, RTSODT. If you thought ODT was a blessing, wait till you see RTSODT...

Enjoy!



609-298-9127

CIRCLE 84 ON READER CARD

|  |  |  | [1,1]   | 2] 05  | CAR . MAC   |   |
|--|--|--|---|--|---|---|
| .title<br>.ident<br>.enabl   | oscar<br>/1.0/<br>lc   | a demo ru  | n-time syst   | ten  |   |   |
| ;define  | some th  | ings in th   | e loseg   |  | -kl butfer  |   |
| :  | 2000   |  |   |  | , KD Duffer   |   |
| define;  | some di  | rectives &   | rsts locat  | tions  |   |   |
| xrb<br>firqb<br>.exit<br>.write  | ==442<br>==402<br>==10404<br>==10400   | 6<br>4   |   |  | address of xrb;<br>address of firgb;<br>exit directive;<br>write directive  |   |
| ;<br>;detine   | some te  | xt   |   |  |   |   |
| ;<br>.psect<br>newmsg:<br>runmsg:<br>eximsg:   | text<br>.asciz<br>.asciz<br>.asciz   | /Welcome<br>/Oscar do<br>/[Fxit]/<   | to OSCAR/<1<br>sen't RUN p<br>15><12>   | 15><1<br>progra  | 2><br>ams yet/<15><12>  |   |
| .psect<br>new::  | code<br>mov<br>mov<br>call   | #2000,sp<br>#newmsg,r<br>print   | 0   |  | setup user stack<br>point to message t<br>and print it  | o be printed                                |
|  | br   | exit   |   |  | then exit;  |   |
| t un : :   | mov<br>call<br>br  | #runmsg,r<br>print<br>exit   | 0   |  | point to message<br>go print it   |   |
| exit:  | mov<br>call<br>.exit   | <b>∦eximsg,r</b><br>print  | 0   |  |   |   |
| .page<br>.sbttl  | define ;   | pseudo-vec   | tors  |  |   |   |
| ;<br>bits in   | n p.flag   |  |   |  |   |   |
| .asect   | -  | 400  |   |  |   |   |
| PF.KBM:<br>PF.lUS:<br>PF.RW:<br>PF.NER:<br>PF.REM:<br>PF.CSZ:<br>PF.SLA:<br>PF.EMT:  | .BLKB<br>.BLKB<br>.BLKB<br>.BLKB<br>.BLKB<br>.BLKB<br>.BLKB  | · · · · · · · · · · · · · · · · · · ·  | RTS IS A KE<br>RTS ALLOWS<br>RTS WANTS T<br>RTS DOESN'T<br>UNCONDITION<br>RUN SIZE IS<br>(SAVE THE L<br>RTS WANTS E | EYBOAF<br>ONLY<br>TO RUN<br>WAL RI<br>S COMP<br>LOAD A<br>EMT CO   | RD MONITOR<br>1 USER (NO SHARING<br>N MAPPED READ/WRITE<br>F ITS ERRORS LOGGED<br>MOVE FROM MEMORY O<br>PUTED FROM FILE SIZ<br>LODRESS, M.PHYA)<br>DDE IN LOW BYTE AS   | )<br>N EXIT<br>E<br>A PREF1X                |
| .macro   | vector   | at,to<br>ve+at-p.o   | ff  |  |   |   |
| .endm  | vector   |  |   |  |   |   |
| .psect   | .99997   |  |   |  |   |   |
| .psect<br>ve::   | .99998   |  |   |  |   |   |
| o.flag   | ==   | pf.kbm !   | pf.ner  |  | say we're a keyboa<br>and we don't wish   | rd monitor,<br>to log any errors            |
| o.dext<br>o.msiz   |  | ^RBOB<br>1   |   |  | default runnable e<br>minimum size for j  | xtention for this rts<br>obs under this rts |
| o.size   |  | 24.  |   | 1  | maximum size "  |   |
| pvend::  | vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector<br>vector | p.rlag,o.<br>p.dext,o.<br>p.sisiz,o.<br>p.fis,exi<br>p.cras,ex<br>p.strt,ex<br>p.run,run<br>p.bad,exi<br>p.iot,exi<br>p.trap,ex<br>p.trap,ex<br>p.fp,exi<br>p.cc,exit<br>p.size,o. | rlag<br>dext<br>msiz<br>msiz<br>t<br>it<br>it<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t           |  |   |   |
| .asect   |  |  |   |  |   |   |
| •  | BINN   | -1   | INAVATIANT  | WOR  |   |   |
| P.SIZE:<br>P.2CC:<br>P.CC:<br>P.CPP:<br>P.TTAP:<br>P.FMT:<br>P.BAD:<br>P.BAD:<br>P.BAD:<br>P.STRT:<br>P.STRT:<br>P.STRT:<br>P.SIS:<br>P.SIS:<br>P.ISIZ:<br>P.ISIZ:<br>P.DEXT:<br>F.FLAG:<br>F.OFF: | BLKW<br>BLKW<br>BLKW<br>BLKW<br>BLKW<br>BLKW<br>BLKW<br>BLKW   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | MAX SIZE FO<br>ADDRESS OF<br>MIN SIZE FO<br>(HISTORICAL<br>DEFAULT EXE<br>PEFAULT EXE<br>PEFAULT EXE<br>STARTING A  | DR A U<br>2 QUI<br>CONTE<br>@244<br>@30 7<br>@240 7<br>@30 7<br>@14 7<br>BAD E<br>ENTRY<br>A NEW<br>SYSTE<br>@244<br>DR A U<br>)<br>SCUTAE<br>DESCRI<br>TT BAC | CEF SIMAGE IN K<br>CCK CONTROL/C'S<br>COL/C TRAPPING<br>TRAPS (FPP)<br>TRAPS (FPP)<br>TRAPS (NON-MONITOR<br>TRAPS (NON-MONITOR<br>TRAPS (NOT)<br>TRAPS (ODT OF T-BIT<br>TRAPS (ODT OF T-BIT<br>TRAPS (FIS)<br>SER'S IMAGE IN K<br>SER'S IMAGE IN K<br>SLE EXTENSION (FAD5)<br>BING THE FTS<br>SLE EXTENSION (FAD5)<br>BING THE FTS<br>SLOF THESE "VECTOR: | CALL)<br>)<br>RAM<br>0)<br>S"               |
|  | .end   | new  |   |  |   |   |
|  |  |  |   |  |   |   |

**FIGURE 1** 

# Take a look at IRTUS 232

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| NALRST  | SPROFE  | SSIONALRSTSPRO | PESSIONALRSTSPROFESSIONALRSTSP    |
|---------|---------|----------------|-----------------------------------|
|         |         |                | [1,12] PRINT.MAC                  |
| .title  | print   |                |                                   |
| .ldent  | /1.0/   |                |                                   |
| 1       |         |                |                                   |
| print.  | mac     |                |                                   |
| print   | routine | for oscar.rts  |                                   |
| 1       |         |                |                                   |
| ito use | :       |                |                                   |
| 1       | mov     | #string, r0    |                                   |
| 1       | cail    | print          |                                   |
| ;where: |         |                |                                   |
| 1       | string  | is the address | of the asciz string to be printed |
| 1       |         |                |                                   |
| DRACT   | code    |                |                                   |
| .peecc  | BOU     | r1 = (en)      | inet a register                   |
| princit | BOY     | r2.=(sp)       | ior 2                             |
|         | BOY     | r0.r1          | isave pointer to string           |
| 10\$:   | tstb    | (r0)+          | ifind null byte at end of string  |
| 1000    | bne     | 10\$           | find half byce at end of string   |
|         | aub     | r1 r0          | icals length of string            |
|         | BOY     | farb.r2        | point to wrb                      |
|         | mov     | r0.(r2)+       | put in length of string           |
|         | BOV     | r0.(r2)+       | itwice                            |
|         | mov     | r1,(r2)+       | point to string                   |
|         | clr     | (r2)+          | channel to print to               |
|         | clr     | (r2)+          | (lsb block (for disk files)       |
|         | clr     | (r2)+          | ;wait time                        |
|         | clr     | (r2)+          | ;modifiers                        |
|         | .write  |                | ;do the write                     |
|         | mov     | (sp)+,r2       | restore everything                |
|         | mov     | (sp)+,r1       |                                   |
|         | rts     | pc             | return to caller                  |

August 1982

#### FIGURE 2

.end

iprimary tkb cmd file for oscar.rts
i
sallow no errors
mac oscar=oscar
run \$tkb
oscar/-hd,oscar/-wi/ma,oscar=oscar
print
/
extsct=.99997:0
stack=0
par=oscar:160000:20000
//
run oscar.tec
\$\$ oscar2

#### FIGURE 3

[1,12] OSCAR.TEC

iteco macro to align oscar.rts i
iteco macro to align oscar.rts i
iss@`a/Working.../
@er/oscar.map/
5<a>
i@a/.ew EXTSCT is: /
177732-qa ua
qa==
hk
@eb/oscar2.cmd/
y
@s/:t
k
qa\
@i;
/
@ex//
\$\$

#### **FIGURE 4**

Isecondary tkb cmd file for oscar.rts

\$allow no errors
run \$tkb
oscar/-hd,oscar/-wi,oscar=oscar
print

'extsct=.999997:17516
stack=0
par=oscar:160000:20000
//

// \$allow fatal errors ut remove oscar \$allow no errors run \$maksil oscar/rts

no

**FIGURE 5** 





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## THE RSTS CRYSTAL BALL - Part 2

By Michael C. Greenspon, Integral Information Systems, Los Angeles, California

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Welcome once again. This month the Crystal Ball has news of interest to all RSTS programmers, so even if you don't use MACRO-11, read on. I'll be telling you how to use some of the new undocumented monitor features from BASIC. Also, you should be preparing to install RSTS version 7.2, and I have more notes and details on new structures in 7.1 and later.

#### ERRATUM

First, though, I'd like to correct a minor error in the last issue. In the disassembly listing of the .XPEEK code, the comments indicate that .XPEEK cannot be used to examine run-time systems or resident libraries. This is simply a case of "reading the wrong bit" (see the BIT BITWRD(R2),#14). What is really being tested there is non-existent memory or locked out memory. The .XPEEK call will peek at run-time systems and reslibs with no problem, but remember, you must check and make sure that they are resident. Even with such a check, timing problems could pop up, so this is not recommended for heavy use. The best application for .XPEEK is looking at monitor memory and other entities for which residency can be guaranteed. I'll have more on .XPEEK and its uses later in this article.

#### **MONITOR FIXES**

As I mentioned last time, there is a nasty bug in UU.TRM. I was assured at DECUS that the problem was "Fixed in the source in 7.2," however if you will be running 7.1 for any length of time, you may want to install this patch. As far as I know, it causes no problems, and we are currently running 7.1 with it. It is possible that it could conflict with future DEC patches; however, chances are there will be no more patches for V7.1.

Note that the command file installs two patches separately so that ONLPAT won't complain about a patch spanning OVR and another module. ALWAYS install the patch in the order listed. This patch replaces several lines of code which were "... accidentally deleted when the code was edited." The patch is as follows:

| File to patch? <lf><br/>Module name? RSTS</lf> |   |  |  |  |  |  |  |  |
|--|---|--|--|--|--|--|--|--|
| Base address? PATCH                            |   |  |  |  |  |  |  |  |
| dress? < L                                     | .F>   |  |  |  |  |  |  |  |
| Offset   | Old   | New?   |  |  |  |  |  |  |
| 000000   | 000000  | ? MOV!0046   |  |  |  |  |  |  |
| 000002   | 000000  | ? BITB!2761  |  |  |  |  |  |  |
| 000004   | 000000  | ?1   |  |  |  |  |  |  |
| 000006   | 000000  | ? DDJBNO   |  |  |  |  |  |  |
|  | tch? < LF<br>ame? RST<br>ress? PATC<br>dress? < L<br>Offset<br>000000<br>000002<br>000004<br>000006 | tch? < LF ><br>ame? RSTS<br>ress? PATCH<br>dress? < LF ><br>Offset Old<br>000000 000000<br>000002 000000<br>000004 000000<br>000006 000000 |  |  |  |  |  |  |

| 777777     | 000010      | 000000 | ? BNE!22    |
|------------|-------------|--------|-------------|
| 777777     | 000012      | 000000 | ? MOV!0246  |
| 777777     | 000014      | 000000 | ? MOV!0346  |
| 777777     | 000016      | 000000 | ? CLR!00    |
| 20000      | 000020      | 000000 | ? MOVB!6100 |
| min        | 000022      | 000000 | ? DDUNT     |
| 777777     | 000024      | 000000 | ? ASL!00    |
| 777777     | 000026      | 000000 | ? MOV!2737  |
| 777777     | 000030      | 000000 | ? PR5       |
| 777777     | 000032      | 000000 | ? PS        |
| 777777     | 000034      | 000000 | ? JSR!537   |
| 777777     | 000036      | 000000 | ? CALLMI    |
| 777777     | 000040      | 000000 | ? SETPRM    |
| 777777     | 000042      | 000000 | ? KBDAP5    |
| ???????    | 000044      | 000000 | ? MOV!2737  |
| 777777     | 000046      | 000000 | ? PR3       |
| 777777     | 000050      | 000000 | ? PS        |
| 777777     | 000052      | 000000 | ? MOV!2603  |
| 777777     | 000054      | 000000 | ? MOV!2602  |
| 777777     | 000056      | 000000 | ? MOV!2600  |
| ???????    | 000060      | 000000 | ? INCB!64   |
| ???????    | 000062      | 000000 | ? 20        |
| 777777     | 000064      | 000000 | ? RTS!07    |
| 777777     | 000066      | 000000 | ?1C         |
| File to pa | tch? < LF   | >      |             |
| Module n   | ame? OVR    |        |             |
| Base add   | ress? TRM   | 1      |             |
| Offset ad  | Idress? 160 | )      |             |
| Base       | Offset      | Old    | New?        |
| 777777     | 000160      | 105264 | ? JSR!737   |
| 777777     | 000162      | 000020 | ? PATCH     |
| 777777     | 000164      | 001020 | ? 1C        |
|            |             |        |             |

#### MONITOR OVERLAY TABLE

In the last issue, I mentioned the possibility of a monitor overlay table. I have since had the time to play with a running 7.1 system and confirm all of my suspicions about this phantom table. The definitions for the structure can be found in KERNEL.MAC, however I will detail it in a moment. First, a little history and explanation of monitor overlays.

Before version 7.1, modules were made resident or nonresident at link time. The FIP phase was linked before OVR, with any resident modules included. OVR was then linked against FIP's symbol table to resolve module addresses, etc. INIT's load routines loaded all of FIP at startup, and the resident modules along with it.

In 7.1 and later, CONFIG.MAC defines symbols in the form xxxRES where "xxx" is the name of the module to be made resident (SND, DIR, etc.) These symbols are globalized in TBL.MAC, and built into the overlay table at the beginning of the OVR phase. At link time, all modules, whether they are to be memory resident or not, are linked into OVR. All that determines if the module is resident is a bit in the

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overlay table. As I will demonstrate, this bit can be easily changed, and module residency can be modified without doing a new SYSGEN.

As I described in the last issue, startup under 7.1 is quite a bit different, due to the module residency scheme. INIT loads the permanently resident portion of the monitor. When RSTS gains control, it dispatches to an internal FIP function called STA. STA is hidden in the module LOD in the OVR phase. STA scans the overlay table and loads any modules marked as being memory resident.

STA makes no checks for what is normally allowed to be resident, therefore it is possible to make any module resident by patching the table. I brought up a 7.1 system with EVERY module (except LOD, which is only used once) resident, and the system ran just fine. True, I had a 62K monitor, but... In any case, the advantage in making modules other than the standard ones resident is minimal, except in special cases.

The overlay table can be found at the very beginning of OVR (base 2000 octal) and is comprised of a table header, followed by a list of module headers, one per module. Each module header contains the description of each of the overlays contained in the module. (Currently, this is only the length of the overlay.) The exact format is as follows:

#### **Overlay Table Header**

|       | Unser    |   |
|-------|----------|---|
| Octal | Mnemonic | Description                             |
| 0     | OTHFOR   | Format number, currently 0              |
| 2     | OTHREV   | Revision number, currently 0            |
| 4     | OTHSIH   | Table header size, currently 12 octal   |
| 6     | OTHSIM   | Size of each module header, currently 6 |
| 10    | OTHSIO   | Size of each overlay entry, currently 2 |
|       |          |   |

#### Module Header (Immediately follows Overlay Table Header) (Table terminated with a fullword 0)

|       | Offset   |                                   |
|-------|----------|-----------------------------------|
| Octal | Mnemonic | Description                       |
| 0     | OTMNAM   | Module name (RAD50) or 0 for end  |
| 2     | OTMFLG   | Module flag word, see below       |
| 4     | OTMNUM   | Number of overlays in this module |
|       |          |                                   |

#### Overlay Entries (OTMNUM of these immediately follow Module Header)

Offset

Octal Mnemonic

000

Description

O OTOLEN Length of this overlay Currently, there is only one bit defined in OTMFLG. Its name is OTFRES, and, if set, indicates that the module is memory resident. This is the magic bit to toggle. Since the table is rather long, it can be a hassle to use ONLPAT to find the module name. I have written a program called ONLRES (listed at the end of the article) which can be used to change OTFRES for any module in the table.

Please note that although the changes can be made online to the installed SIL, they will not take effect until the RSTSPROFESSIONALRSTSPROFESSIONA

system is re-booted. Also, INIT is likely to give the message "Monitor size has changed from xK to xK." You should go through the TABLE sub-option of DEFAULT and fix up your memory allocation table. If you made your monitor larger (i.e. added resident overlays) INIT will reset the memory table, and you will have to go through DEFAULT.

#### HIDDEN MONITOR CALL

In the last issue, I documented the .XPEEK call, which allows for peeking at blocks of physical memory. Obviously, this is an extremely useful call, however since it is an EMT (as opposed to a UUO subfunction) it cannot be executed directly from BASIC.

While I was peeking through some 7.1 code, I discovered something rather interesting. The .MESAG handler (message send-receive EMT) has a hard-coded compare for a subfunction code of 4. I followed the branch, and guess where it wound up . . . just before the beginning of the .XPEEK code! Two move instructions transfer the physical source address from the FIRQB to the XRB, where .XPEEK expects it. This means that you can XPEEK by executing a .MESAG call. Message send-receive is of course usable from BASIC, and so is XPEEK!

In a conversation with the RSTS developer responsible for .XPEEK, I questioned him as to the hidden .MESAG subfunction. He said he implemented it so that he could easily debug .XPEEK from BASIC. He also added that XPEEK was intended for use by some DECnet utilities, in order to allow for XBUF peeking, and, unofficially, that the call was probably not going to go away in future releases.

The format of the call from BASIC for XPEEK via message send-receive is as follows: (Note that I have attempted to be consistent with the Programming Manual, so please tolerate the description of the first byte of the call  $\ldots$ .)

#### Data Passed:

#### Bytes Meaning

- 1 CHR\$(6%), the SYS call to FIP.
- 2 CHR\$(22%), the send/receive function code
- 3 CHR\$(4%), the .XPEEK subfunction code

4 CHR\$(M%), where M% contains the most significant six bits of the physical address to XPEEK at.

5-6 CHR\$(L%) + CHR\$(SWAP%(L%)), where L% contains the least significant bits of the physical address.

Bytes 4-6 form the physical base address to XPEEK at. This must be an area of memory which exists on the system, and is not locked out. You can only access memory which is in the monitor's MEMLST, therefore you cannot XPEEK at the I/O page. The physical base address is a byte address and may be odd, i.e.

point to the high byte of a word.

7-10 11

12

lanored.

CHR\$(C%), the channel number of the I/O buffer to return the data in.

If C% is between 1 and 12, the system returns the data in the buffer for channel C%. The channel must be open.

Channel 0 can be used for the I/O buffer (not recommended) if 128 is added to the channel number; that is, CHR\$(128% + 0%). In general, CHR\$(128% + C%) allows channels zero through 12 to be used for I/O buffers.

CHR\$(0%) reserved—must be zero.

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CIRCLE 28 ON READER CARD



CIRCLE 42 ON READER CARD

- 13-14
   CHR\$(L%) + CHR\$(SWAP%(L%)), where L% is the count of bytes to XPEEK at, starting from the physical base address in bytes 4-6. The count must be less than or equal to 8064.
   S
  - This count must be an even number. Although bytes 4-6 may be odd, the transfer length must be a multiple of two.
- A count of zero or one will cause unpredictable results. 15-16 CHR\$(O%) + CHR\$(SWAP%(O%)), where O% is the offset from the start of the buffer.

The offset field determines where in the buffer the data will be returned. The offset value is added to the location of the beginning of the buffer. The offset value must be in the range zero through < buffer size > -1.

17-40 CHR\$(0%) reserved—must be zero.

#### Data Returned:

No meaningful data is returned in the parameter string. The data contained in the physical memory locations described by bytes 4-6 and 13-14 will be returned in the I/O buffer passed in byte 11.

| Possible Errors:  |           |
|---|-----------|
| Meaning   | ERR Value |
| PROTECTION VIOLATION<br>The described area of physical memory is<br>non-existent or locked out. Also, the XPEEK<br>subfunction is privileged.                   | 10        |
| ?ILLEGAL BYTE COUNT FOR I/O<br>The count specified in bytes 13-14 is illegal,<br>either because it is odd, or is outside the<br>range of $0 < = L\% < = 8064$ . | 31        |

Note that the call itself requires no I/O channels, etc., but that this is a kludge so that BASIC can define a buffer which the user can access. If you are using this call from BASIC Plus 2, the preferred way is by calling a macro subroutine to do the .XPEEK into a passed string or a PSECT (i.e. a MAPped or COM'd string.)

The .MESAG form of the XPEEK call from macro works (of course!) although it is not recommended since .XPEEK itself could be executed. The arguments are passed in both the FIRQB and the XRB as follows:

|       |                    | FIRQB                                   |    |     |                    |
|-------|--------------------|---|----|-----|--------------------|
| Octal | Offset<br>Mnemonio | 2                                       | 00 | tal | Offset<br>Mnemonic |
| 1     |                    |   | 1  | 0   |                    |
| 3     |                    |   | 1  | 2   |                    |
| 5     | FQSIZM             | MSB of address   func. code=4           | 1  | 4   | FQFIL              |
| 7     |                    | LSW of address                          | 1  | 6   | FQPPN              |
| 11    |                    | /////////////////////////////////////// | 1  | 10  |                    |
|       |                    | 0<br>0                                  | -  |     |                    |
|       |                    | 0                                       | _  |     |                    |
| 37    |                    | /////////////////////////////////////// | 1  | 36  |                    |

The XRB parameters are the same as for .XPEEK, except that XRBLK and XRBLKM are loaded from FQPPN and FQSIZM, and anything passed in these locations in the XRB is ignored.

If you are using XPEEK to examine your own job, other jobs, or portions of the monitor, there are some things you

should know about monitor memory layout. Most of this information can be found in a listing of TBL, which includes KERNEL. Generally, addresses in MEMLST are stored as physical address divided by 100 (octal). Unfortunately, BASIC does not have an ASHC function, and it is extremely clumsy with integers and bit operations. Long word integers in the next release of BP2 will solve this problem, but until then, you might consider coding part or all of your routine in MACRO-11.

#### **VERSION 7.2**

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I still don't have much to tell you about version 7.2 of RSTS, except that you can expect to see some of the things promised but not delivered in 7.1. Probably the biggest item on the list will be clustered library support, although this is not a function of the monitor. Other than that, version 7.2 is really just a maintenance release for 7.1. The internals should be nearly identical.

In Atlanta, DEC announced the first release of a new spooling package which will be distributed with version 7.2. No details yet, sorry. Also, unofficially, according to the RSTS development team, named directories will not be supported any time in the near future.

#### CONCLUSION

I hope you have enjoyed this installment of the RSTS Crystal Ball. I will continue to try to present information which is interesting and useful. In the future, I may be able to answer any technical or semi-technical questions that you send to me. In any case, I would enjoy hearing from you, so if you have any questions, gripes, or suggestions, call or write: Michael C. Greenspon, C/O Integral Information Systems, 9832 Vicar Street, Suite 100, Los Angeles, California 90034, (213) 558-0732

Also, the ONLRES listing is admittedly rather long to key, so if you would like a machine readable copy on magtape, send \$20.00 to IISI (Attn:MCG) and we'll get it out to you. I may decide to throw some other random things of interest on there too, perhaps some monitor feature patches. Please specify 800 or 1600bpi. Until next time, happy hacking!

|                              | [4,8] C  | NLRES.B2S  |
|------------------------------|--|--|
| [MCG]                        |  |  |
|                              | Program:<br>Description:<br>Version:<br>OS Version;  | ONLRES<br>Makes HSTS modules [non]resident<br>X1.0<br>HSTS 7.1-11 [and later]                            |
|                              | Package:<br>Author:<br>Edit date:                    | Internal hacks<br>Michael C. Greenspon<br>02 July 1982   |
| Title t                      | o and ownership                                      | of this software shall at all times re-  |
| The inf<br>notice<br>Informa | 'ormation in thi<br>and should not<br>ation Systems. | ormation Systems.<br>s software is subject to change without<br>be construed as a commitment by Integral |
| This so<br>has no<br>elsewhe | oftware is unrel<br>obligation to<br>re in writing.  | eased and Integral Information Systems<br>o support it at this time, unless stated                       |
|                              |  | · · · · · · · · · · · · · · · · · · ·  |



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And now, the code ...

August 1982

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Modification history: Ver/Ed By Reason Date 02 July 82 1.0/01 MCG Initial creation . . . . . . . . . . . . . . . . . . . Description: ONLRES is a neat hack based on the monitor overlay scheme in RSTS V7.1 and 7.2 (and later, probably). It allows modules of OVR to be made resident or non-resident after SYSGEN, on-line. Note that the changes will not go into effect until the system is re-booted. Compilation instructions: Simple ... ONLRES is self-contained, so enter BP2 and OLD ONLRES COM/OBJ BUI RUN STKR CONLRES 600 Compile time constants: Various random definitions .DEFINE .EXTENSION\$ .DEFINE .BAD.LOGDEV\$ .DEFINF .FQDEVN\$ I FSS extension specified -16384% ! FSS illegal logical device -256% ! -1 High byte, 0 low byte 22867% ! ASCII word "SY" -256% 22867% .DEFINE .FQDEV.SYT .DEFINE .SIL.IO% .DEFINE .SIL% .DEFINE .IDENT\$ I/O channel for our SIL RAD50 of "SIL" 1% 30772% "Onlres"! Who we are "V7.1-11" ! What version we are .DEFINE .VERSION\$ Bits, offsets, and lengths for overlay table header 1 .DEFINE .OTHFORS 05 ! Offset to format number 2% Revision number .DEFINE .OTHREVS Size of table header .DEFINE .OTHSIHS Size of module header Size of overlay entry Module name DEFINE .OTESIMS 6% .DEFINE .OTHSIO 8% .DEFINE .OTMNAMS 2% DEFINE OTMELGS Flagword Count of overlays in module Set = module is resident Current format number .DEFINE .OTMNUMS .DEFINE .OTFRESS .DEFINE .OTFORS 01 .DEFINE .CTHEVE 09 Currert revision number 860 MAPs and COMMONs: ! Map for simple SYS() calls ! byte by byte MAP (SYSCAL) M\$(29%) = 1% Re-map this into integer words MAP (SYSCAL) M\$(14%) (SYSCAL) Re-map this into one string Map for SIL header block MAP MS 30% (SIL) MAP MAP the WHOLE thing SIL.ALL\$= 5121 (SIL) MAP Count of modules in SIL MODCNTS. Count of modules in SLL Module description blocks Uninteresting space The checksum of the header "SLL" in RAD50 Module description layout MODESC\$(14%) FILL\$ = 26%. h CHKSUMS . R50SILS MAP (SILMOD) NAME 1%. RAD50 module name NAME2%, IDENT1%, two words RAD50 module ident IDENT2%, two words two words Starting block of module - 1 Starting block of STB - 1 Number of symbols STARTS. STB%, SYMBOLS%, Load address of module ADDRESSS. MODSIZS. Module size Nodule transfer address Re-map this mess XFR% (SILMOD) MAP SILMOD\$ = 32% into one string 900 Dimensionless statements: DIM #.SIL.IO%, INIT%(32767%) . ! Virtual array to peek through INIT

PRINT IF CCPOS(0%) I Reset terminal to margin PRINT IF CUPS(US) PRINT : IDENT\$ + HT + .VERSION\$ + HT + HT + "Integral Information Systems" + CR + LF + "Monitor overlay residency changer" I Print our header M\$ = SYS(CHR\$(6\$) + CHR\$(-21\$)) I Drop priv's if we have them for some I strange reason ON ERROR GOTO 10000 I Set standard error trap 1 OPEN "\_SYO:[0,1]INIT.SYS" FOR INPUT AS FILE #.SIL.IO\$, MODE 8192\$ 1 Open up INIT.SYS & find installed SIL POINTER\$ = INIT\$(29\$)/2\$ AND 32767\$ I Get a pointer to the SIL's name Lef a pointer to the SLL' DEFAULT.SIL\$ = EDIT\$(RAD\$(INIT\$(POINTER\$)) + RAD\$(INIT\$(POINTER\$ + 1\$)), -1\$) + ".SIL" ! Convert it to ASCII, etc. 1 1010 CLOSE #.SIL.IOS I Close in case it was open PRINT IF CCPOS(0%) PRINT SIL\$ = "" I Initialize this LEN(SIL\$) ! Units we have a SIL name SIL\$ = FNINPUT\$("Monitor SIL to patch? ", DEFAULT.SIL\$) ! Find out which file to patch LEN(SIL\$) UNTIL PRINT ERT\$(2\$) UNLESS LEN(SIL\$) ١ IF ! Illegal logical device ! Not a valid device PRINT ERT\$(6\$) THEN GOTO 1010 ELSE STATUS AND 255% ! If not a disk IF THEN PRINT "?Device must be disk" GOTO 1010 ! Error if abuser specified non-disk ELSE M%(5%) = .SIL% UNLESS M%(14%) AND .EXTENSION% I Default extension to .SIL if none M\$(11\$) = .FQDEV.SY\$ UNLESS M\$(11\$) I Default to SY: if no device SIL\$ = "\_" + CVT\$\$(SWAP\$(M\$(11\$))) IF M%(2%) IF MS(CS) I Tack on the PPN if we have one OPEN SIL\$ FOR INPUT AS FILE #.SIL.IO≸, MAP SIL I Open the file, finally 1 1020 GET #.SIL.10%, RECORD 1% ! Get the header block ! Zero the checksum = 0% CHECK% 1% = 1% TO 508% STEP 2% FOR CHECK\$ = CHECK\$ XOR SWAP\$(CVT\$\$(MID\$(SIL.ALL\$, I\$, 2\$))) NEXT 1% ! Loop through header and checksum it CHECK% <> CHKSUM% OR IF R50SIL% <> .SIL% ! If checksums don't match or SIL<>SIL PRINT "?Invalid Save Image Library header" GOTO 1010 ! Print an error and go back THEN GOTO 1010 ELSE. FOR MODULES = 0% TO MODENTS - 1% I Loop through the modules in the SIL S1LMOD\$ = MODESC\$(MODULE\$) GOTO 1C30 IF EDIT\$(RAD\$(NAME1\$) + RAD\$(NAME2\$),-1\$) = "OVR" ! Get out if we found OVR NEXT PRINT "?Module OVR not found in SIL" GOTO 1010 ! Print error if OVR not found and loop & LEFT\$(EDIT\$(RAD\$(IDENT1\$)+RAD\$(IDENT2\$),-1\$),4\$) < "07.1" 1030 TF PRINT "?Monitor SIL is pre-version 7.1" THEN GOTO 1010 ! Do our best, without going out of our ! way, to insure that this is a 7.1 or ! later monitor ELSE OVR.BLK% = START% + 1% ! Get starting OVR block number OVR.ADD% = ADDRESS% and load address CURRENT.BLK\$ = 0% IF THEN ELSE OTHSIH\$ = FNWORD\$(OVR.ADD\$ + .OTHSIH\$) ! Get overlay table header size OTHSIN\$ = FNWORD\$(OVR.ADD\$ + .OTHSIM\$) ! Module header size OTHSIO\$ = FNWORD\$(OVR.ADD\$ + .OTHSIO\$) ! and overlay descriptor size 1040 MODULES = FNINPUT\$("Module name? "."") Find out which module she wants to WHILE FNWORD\$(ADDR\$ + .OTMNAM\$) ! Until end of table. 
 OVERLAYS\$ = FNWORD\$(ADDR\$ + .0TMNUM\$)
 I

 I
 Get number of overlays in this module

 LENGTH\$ = 0\$
 I

# BAC mac can do it all!

#### BAC into RTS / BAC into MAC / BAC into BAS

BACmac is a unique software tool, running under RSTS/E, which provides the following conversions:

translation from Basic-Plus "compiled" back to Basic-Plus source code (only the comments will be missing)

■ translation from Basic-Plus into Macro source code, which compiled under RSTS runs faster than Basic-Plus

■ translation from Basic-Plus into Macro source code which may be compiled under RSTS for execution under RT11 — a migration facility

■ translation from Basic-Plus into a RUN-TIME-SYSTEM. Now you can write an RTS in Basic-Plus. The ideal solution to memory thrashing due to "multi-copy" applications programs.

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|          | ١             | LENGTH\$ = LENGTH\$<br>+ FNWORD\$(ADDR\$ + OT<br>FOR I\$ = 0\$ TO | HSIM\$ + I\$ * OTHSIO\$)<br>DVERLAYS\$-1\$     | *      |
|----------|---------------|---|--|--------|
|          |               |   | I Tally up total space requirement             | *      |
|          | 1             | STAT\$ = ""   |  | &      |
|          | 1             | STAT\$ = "non-"   |  | &      |
|          |               | UNLESS FNWORDS(ADDRS  | + .OTMFLG\$) AND .OTFRES\$                     | 8      |
|          |               |   | I Decide if module is resident or not          | \$     |
|          | 1             | NAM\$ = RAD\$(FNWORD\$(ADD)                                       | R\$ + .OTMNAM\$))                              | &      |
|          |               |   | ! Get module name                              | &      |
|          | 1             | GOSUB 1050 IF NAM\$ = MO  | DULE\$   | å      |
|          |               |   | I Ask about changing it if we found            | å .    |
|          |               | PRINT NAME . UT . FNOCT   | I the module (and not doing directory)         | å.     |
|          | 1             | PRINI NARIS + HI + PNOCI  | President "                                    | 2      |
|          |               | + "." + HI + SIAIS +  | (Fe)   | 2      |
|          |               | UNLESS LEN(HODO   | I Print the directory line                     | 2      |
|          |               |   | I unless we aren't doing directory             | 2      |
|          | <b>`</b>      | ADDRS = ADDRS + OTHSTMS   | + OTHSIOS # OVERLAYSS                          | 2      |
|          |               |   | Advance to the next module header              | 2      |
| 1        | NEXT          |   | I Finish up directory printing                 | *      |
| i        | PRINT "?      | Module not found in OVR   | ,  | &      |
| <u>.</u> | UNLES         | S FOUNDS OR LEN(MODULES   | ) = 0\$  | &      |
|          |               |   | ! Error if we didn't find the module           | &      |
|          |               |   | ! (and not doing a directory)                  | &      |
| 1        | GOTO 104      | 0   | ! Re-prompt for module name                    | &      |
|          |               |   |  |        |
| 1050     | FOUND\$ =     | -1%   | ! Now we've found it                           | å      |
| 1        | PRINT "M      | Nodule " + NAM\$ + " cont   | ains "   | \$     |
|          | + NUM         | 11\$(FNWORD\$(ADDR\$ + .OTM                                       | NUM%)) + ". overlay";                          | \$     |
| 1        | PRINT "s      | "; IF FNWORD%(ADDR% + .   | DTMNUM\$) <> 1%                                | &      |
| 1        | PRINT ".      | Total size is " + FNO   | CT\$(LENGTH%)                                  | &      |
|          | + " (         | " + NUM1\$(LENGTH\$) + ".   | ) bytes."                                      | &      |
| 1        | PRINT "M      | Iodule is currently " + :   | STAT\$ + "resident."                           | å      |
|          |               |   | ! Print out status of module                   | å      |
| 1        | MAKRES\$      |   | I JUNK THIS                                    | å      |
| 1        | OTMFLG%       | = FNWORDS(ADDRS + .OIMF   | Log)   | à      |
|          | MANDERA       |   | i det the module llagword                      | 2      |
| 1        | FIAR RESS     | MELOS AND OTERESS   | I being going to make it non-regident          | α<br>L |
|          | IF UI         | HELOP AND . CIFALSP   | I if it is currently resident                  | 2      |
| 1        | RESP& -       |   | i ii it is currenciy resident                  | 2      |
|          | UNTIL         | LEN(RESP\$)   | ! Until we have an answer                      | &      |
|          | 1             | RESP\$ = FNINPUT\$("Make  | module " + MAKRES\$ + "resident? "."YES")      | &      |
|          |               | •   | I Get an answer                                | &      |
|          | 1             | PRINT "Enter YES or <1f   | > to make module " + MAKRES\$                  | &      |
|          |               | + "resident," + CR +  | LF + "or NO to leave module " + STAT\$         | å      |
|          |               | + "resident."   |  | &      |
|          |               | UNLESS LEN(RESP   | \$) ! Print this if abuser hit (cr)            | &      |
| V.       | NEXT          |   |  | 4      |
| 1        | RETURN 1      | IF LEFT $(RESP_{1}) = "N"$  | ! Do nothing if abuser said NO                 | å      |
| 1        | SIL.ALLS      | <pre>= LEFT\$(SIL.ALL\$, OFFSE</pre>                              | T\$) + CVT\$\$(SWAP\$(OTMFLG\$ XOR .OTFRES\$)) | å      |
|          | + RIC         | GHT\$(SIL.ALL\$, OFFSET\$ +                                       | 3%)  | &      |
|          |               |   | I Change status of module (this is a           | &      |
|          |               |   | ! bit of a kludge)                             | &      |
| 1        | PUT #.SI      | IL.10%, RECORD CURRENT.B  | LKS  | å      |
|          | D D D D L D L |   | Write it back                                  | å      |
| 1        | RETURN        |   | I Inat's all                                   | å      |
| 10000    |               |   |  |        |
| 10000    | 1             |   |  | Ċr.    |
|          |               |   |  |        |

CIRCLE 138 ON READER CARD

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|                      | 1<br>1<br>1  | Error t                                      | rapping:  |                         |  |  | **          |
|----------------------|--|--|---|-------------------------|--|--|-------------|
| Λ.                   | RESUME   | 10010  |   |                         | ! Resu   | me to handle the error   | &<br>&      |
| 10010                | IF<br>THEN<br>\<br>ELSE<br>\                           | ERL = 1<br>PRINT E<br>GOTO 10<br>IF<br>THEN  | 0000\$<br>ERT\$(ERR)<br>010<br>ERL = 1<br>GOTO 32 | + " whi<br>5010≸<br>767 | I Erron<br>le tryin<br>I Print<br>I Abuse<br>I Get ( | r reading INIT.SYS<br>g to read INIT.SYS - continuing"<br>t any errors and ignore them<br>er hit <sup>2</sup> Z, etc.<br>put quickly | ***         |
|                      |  | ELSE   | IF  | ERL = 1                 | 0105 1 1   | Error opening SIL  | *           |
|                      |  |  | THEN  | IF<br>THEN              | ERR = 5<br>1 If NO<br>ERROR\$<br>1 Save              | 5\$ AND M\$(2\$) = 0\$<br>DSUCH and no PPN<br>= ERR<br>error for right message   | ***         |
|                      |  |  |   | \<br>\                  | OPEN SI<br>I Try I<br>PRINT                          | L\$ + "[0,1]" FOR INPUT<br>AS FILE #.SIL.IO\$, MAP SIL<br>to open it on [0,1]<br>"File found in account [0,1]"                       | *           |
|                      |  |  |   | \<br>ELSE               | GOTO 10<br>! Say w                                   | 20<br>We found it and go back  | &<br>&<br>& |
|                      |  |  |   | 1                       | PRINT I  | CRT\$(ERR)   | 6<br>6      |
|                      |  |  | FLSE  | ١                       | GOTO 10<br>I Try,                                    | 010<br>try again   | 4           |
|                      |  |  | 1   | IF<br>THEN<br>\<br>ELSE | ERL = 1<br>! Error<br>PRINT !<br>PRINT !<br>GOTO 10  | 020\$<br>reading first block<br>?Null length file?" IF ERR = 11\$<br>RT\$(ERR) UNLESS ERR = 11\$<br>10                               |             |
|                      |  |  |   | V                       | IF<br>THEN<br>\                                      | ERL = 10010\$<br>PRINT ERT\$(ERR) UNLESS ERROR\$<br>PRINT ERT\$(ERROR\$) IF ERROR\$<br>GOTO 1010 ! Error opening SIL                 | 555         |
| 15000                | !<br>!<br>!  | Wizard-                                      | -defined  | function                | s:   |  | 55566       |
| ١.                   | DEF FNI  | NPUT\$(PP                                    | ROMPT\$,DE  | FAULT\$)                | I Retur  | rn line of input from terminal   | 4           |
| 15010<br>\<br>\<br>\ | PRINT I<br>PRINT F<br>GET #09<br>FIELD #<br>IF<br>THEN | F CCPOS(<br>ROMPT\$;<br>0\$, RECC<br>(ASCII( | OS)<br>DUNT AS I<br>I\$) AND                      | \$<br>127\$) =          | ! Reset<br>! Print<br>! Get a<br>! Chop<br>10%       | terminal to left margin<br>our prompt<br>line from the terminal<br>up the buffer   |             |
|                      |  | IF<br>THEN                                   | LEN(DEF<br>FNINPUT                                | AULT\$)<br>\$ = DEFA    | ! If at<br>! exist<br>ULT <b>\$</b> ! 1              | user hit line-feed and defaults d<br>then return the default   | 4           |
|                      |  |  |   |                         |  |  |             |

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## WHY CALL YOUR BANK EVERYDAY?

By Dale L. Bargar, P.O. Box 1162, Frederick, MD 21701

| 1 EXTER | D  | 100 | PRINT CHR\$(12\$)                                    |
|---------|--|-----|--|
| 2       | issess &   |     | \ PRINT 'A = AMOUNT OF LOAN'                         |
|         | AUTHOR: DALE L. BARGAR &   |     | \ PRINT 'N = NUMBER OF PAYMENTS'                     |
|         | DATE: 22-DEC-81 &  |     | V PRINT 'P = PAYMENT PER PERIOD'                     |
|         | VERSION: 2.0   |     | ( FRINI 'A = EXIT PROGRAM'                           |
|         | THE FUNCTION OF THIS PROCEAM IS TO PROVIDE INFORMATION             | 200 | PRINT  |
|         | RELATING TO LOANS AND INTEREST OVER VARYING PERIODS OF TIME &      | 200 | \ INPUT 'ENTER UNKNOWN (A.N.P.X)':X\$                |
|         | I THE AUTHOR OF THIS VERSION OF THIS PROGRAM ASSUMES NO &          |     | X\$ = CVT\$\$(X\$, -1\$)                             |
|         | I RESPONSIBILITY FOR THE USE OR RELIABILITY OF THIS SOFTWARE. &    |     | \ GOTO 3500 IF LEFT(X\$,1\$) = 'X'                   |
|         | issess &   |     |  |
|         | ! This program will permit the user to input ranges of loan &      | 250 | IF INSTR(1%, 'ANP', X\$)=0% THEN 200                 |
|         | ! amounts and interest amounts and receive results based upon &    |     |  |
|         | l a specific loan period.  | 300 | INPUT 'INTEREST PER YEAR IN PERCENT';1\$             |
|         | The user must first specify the unknown which they would like!     |     | $1\phi = 0 \sqrt{1}\phi \sqrt{1}\phi \sqrt{1}\phi$   |
|         | the program to compute for them                                    |     | I.I = 1  |
|         |  |     | $\ 2\% = INSTR(1\%, I\%, '-')$                       |
|         | ! The user must then specify the interest rate per year. A &       |     | \ IF 2% = 0% THEN                                    |
|         | ! single amount may be entered (e.g. 18) or a range of amounts&    |     | S.I, E.I = VAL(I\$) ELSE                             |
|         | ! may also be entered (e.g. 16-20). The program will compute &     |     | S.I = VAL(LEFT(I\$, 2\$-1\$))                        |
|         | ! each of these interest rates against the loan amount specified.& |     | $\langle E.I = VAL(RIGHT(I\$, Z\%+1\%))$             |
|         |  |     | ( INFUT 'INCREMENT PERCENT BY WHAT AMOUNT'; 1.1      |
|         | requests the amount of the loan A single amount may be             | 400 | TE X\$ = 'A' THEN 500                                |
|         | I entered (e.g. 65000.00) or a range of amounts may be entered.    | 400 |  |
|         | (e.g. 65000.00-85000.00). The program will then compute the&       | 450 | INPUT 'AMOUNT OF LOAN'; A\$                          |
|         | ! previously specified interest rate into the loan values. &       |     | A\$ = CVT\$\$(A\$, -1\$)                             |
|         | 1 &  |     | $\ E.FLAG$, S.A, E.A = 0$$                           |
|         | ! The user may requesst the program to compute the interest-to-&   |     | $\langle CNT   = -1   $                              |
|         | ! date on the loan. The program will request which month the &     |     | $(2) = INSTR(1), A_{2}, (-')$                        |
|         | I loan payments began, and then will compute the amount of &       |     | (1F 2) = 0 THEN<br>A - WAL(AC) FISE                  |
|         | Interest paid each year for the life of the loan. This is &        |     | $A = VAL(A\phi) ELSE$ $S A = VAL(IFFT(A\phi, 7g1g))$ |
|         | I purposes.  |     | $\langle E, A = VAL(RIGHT(A$, 2$+1$))$               |
|         | 1  |     |  |
|         | ! The user may specify for the program to list each payment for&   | 500 | IF X\$='N' THEN 650                                  |
|         | ! the life of the loan. This enables the user to see how much&     |     |  |
|         | ! of each payment is going to principal and to interest. &         | 550 | INPUT 'NUMBER OF YEARS'; N                           |
|         |  |     | V SAVE.N = N   |
|         | However it should be noted that TNO TARE should be specified       | 600 | M = 12   |
|         | I for line printers before directions output to them               |     |  |
|         |  | 650 | IF X\$='P' THEN 800                                  |
|         | ! (Note: If using this program for computing home mortgage loans,& |     |  |
|         | ! remember that Taxes and Insurance ARE NOT included. These &      | 700 | INPUT 'PAYMENT FOR PERIOD'; P 8                      |
|         | ! must be added to the monthly payment by the user. &              | 800 |  |
|         | l Hanny Computing  | 800 | INFUL COMPUTE INTEREST-TO-DATE (Y/N)'; YN\$          |
|         | i nappy computing &  |     | (100 + 100) $(100, -10)$                             |
| 50      | PRINT ' ### LOAN-INTEREST RATE PROGRAM ### '                       |     | INPUT 'NO. OF MONTH OF YEAR PAYMENTS STARTI. MONTUR  |
|         | V PRINT &  |     | \ MON% = MONTH%                                      |
|         | \ CONTROL.C\$ = SYS(CHR\$(6\$)+CHR\$(-7\$)) &                      |     |  |
|         | ! ORIGIN OF THIS PROGRAM UNKNOWN - HOWEVER, IT HAS BEEN &          | 810 | PRINT &  |
|         | ! PROVEN ACCURATE WITHIN A DOLLAR OR SO, &                         |     | \ INPUT 'LIST PAYMENTS (Y/N)'; Y\$                   |
|         | I ENTERED BY DLBARGAR 28-DEC-81 &                                  |     | 1 x = CVT\$\$(Y\$, -1\$) & a                         |
| 70      | ONERROR COTO 2250  | 850 | INDUT INITTUT DATA TOL 704                           |
| 10      | CARTAGA GOLO 3520 &  | 050 | $\sqrt{22\$} = CVT\$\$(72\$ -1\%)$                   |
| 80      | X8\$ = '####'+CHR\$(9)+'\$\$###.##'+CHR\$(9)+'\$\$###.##'+ &       |     | \ IF Z2\$='' THEN Z2\$='KB:'                         |
|         | CHR\$(9)+'\$\$####.##' &   |     | C. C             |
|         |  |     | continued on page 70                                 |
|         |  |     | F-3-1-   |

## **DEC** BEST VALUES

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|        |          | ELSE     |                       | 1    | Otherwise, if no default             | α  |   |
|--------|----------|----------|-----------------------|------|--------------------------------------|----|---|
|        |          | 1        | PRINT "Illegal        | ch   | aracter"                             | å  |   |
|        |          | 1        | GOTO 15010            | !    | Print the INIPAT type error and loop | å  |   |
|        | ELSE     |          |                       | 1    | If abuser didn't just hit <lf></lf>  | å  |   |
|        | 1        | FNINPU   | JT\$ = EDIT\$(I\$,-1) | \$)  | I Then return input trimmed up       | å  |   |
| 15020  | PRINT I  | F CCPOS  | S(0%)                 | 1    | Reset margin again if needed         | &  |   |
| \      | FNEND    |          |                       | 1    | That's all for now                   | &  |   |
| 15100  | DEF* FN  | WORDS (A | DDRESS%)              | 1    | Return word at address in module     | &  |   |
| 1      | OFFSET   | = ADDE   | RESSS - OVR. ADDS     | 1    | Compute offset from base address     | &  |   |
| ,      | BLK. OFF | % = OFF  | SET\$ / 512\$         | 1    | Now block offset from base block     | &  |   |
| \<br>\ | OFFSET   | = OFFS   | SETS - BLK. OFFS *    | 51   | 2%                                   | &  |   |
|        |          |          |                       | 1    | Adjust offset to offset within block | &  |   |
| \<br>\ | BLK% =   | OVR.BL   | \$ + BLK.OFF%         | 1    | Form block number to get             | &  |   |
| ```    | GET #.S  | IL. 10%  | RECORD BLK%           | 1    | Get the record                       | &  |   |
|        | UNLE     | SS BLK   | = CURRENT.BLK%        | 1    | If we need to                        | &  |   |
| \      | CURRENT  | BLKS :   | BLK%                  | !    | Set up current block now             | &  |   |
| \<br>\ | FNWORD   | = SWAR   | CVT\$%(MID\$(SIL      | .AL  | L\$, OFFSET\$+1\$,2\$)))             | &  |   |
|        |          |          |                       | 1    | Now return the contents              | &  |   |
| \      | FNEND    |          |                       | 1    | Dat's it (hope ADDRESS% is valid)    | &  |   |
| 15200  | DEF FNC  | CT\$(ARC | 3%)                   | !    | Return octal representation of ARG%  | å  |   |
| \      | TMP\$ =  |          |                       |      |                                      | &  |   |
| \      | TMP\$ =  | CHR\$(() | ARGS AND 75*85 TM     | P\$) | /8% TMP%+48%)+TMP\$                  | &  |   |
|        |          | FOR 1    | CMP\$ = 0\$ TO 5\$    | 1    | Reasonably hairy                     | &  |   |
| 1      | FNOCT\$  | = TMP\$  |                       |      |                                      | \$ |   |
| 1      | FNEND    |          |                       |      |                                      | å  |   |
| 32767  | END      |          |                       | 1    | All good things must come to an end  |    | - |

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August 1982

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&

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&

| 1340 | N3 = N <sup>e</sup> M  | å                 |
|------|--|-------------------|
| 1350 | PRINT #1\$, ' PAYMENT PERIODS='; N3  | 4                 |
| 1370 | <pre>PRINT #1\$,' ';INT(N3/12);'YEARS';<br/>((N3/12)-INT(N3/12))#12;'MONTHS'</pre>   | &<br>&            |
| 1400 | IF X\$<>'P' THEN 2000  | ě                 |
| 1450 | N = N®M<br>\ I = I/M<br>\ B = I+1  | &<br>&<br>&       |
| 1500 | P = INT(A*(I/(1-B^-N))*100+.999)/100   | &                 |
| 2000 | PRINT<br>\ PRINT #1\$,' AMOUNT PER PAYMENT = \$'; INT(P*100+.5)/100<br>\ PRINT #1\$,' INTEREST PER YEAR = ';I3;'\$'<br>\ PRINT #1\$,' TOTAL INTEREST = \$'; INT((P*N-A)*100+.5)/ | ھ<br>ھ<br>100&    |
| 2150 | PRINT<br>\ B=A<br>\ C3\$, ITD, OITD = 0\$  | &<br>&<br>&       |
| 2200 | IF Y\$='Y' THEN<br>PRINT #1\$, 'PAYMENT INTEREST APP TO PRIN BALANCE OF<br>\ PRINT #1\$, ' MONTH INT-TO-DATE'; IF YN\$='Y'<br>\ PRINT #1\$                                       | &<br>PRIN';&<br>& |
| 2250 | L = INT(B <sup>*</sup> I <sup>#</sup> 100+.5)/100<br>\ R = P-L<br>\ B= B-R   | &<br>&<br>&       |
| 2300 | C3\$ = C3\$+1\$<br>\ LNE\$ = LNE\$+1\$   | &<br>&            |
| 2500 | IF Y\$='Y' THEN<br>PRINT #1≸ USING X8\$, C3≸, L, R, B;   | &<br>&            |
| 2510 | IF YN\$='Y' THEN<br>ITD = ITD+L<br>\ PRINT #1\$, CHR\$(9\$);NUM1\$(MONTH\$);CHR\$(9\$);<br>IF Y\$='Y'<br>\ PRINT #15 USING '\$###.###.##'. ITD:                                  | &<br>&<br>&<br>&  |
|      | IF Y\$='Y'<br>MONTH\$ = MONTH\$+1\$<br>MONTH\$ = 1\$ IF MONTH\$ = 13\$<br>IF MONTH\$ = 1\$ THEN  | &<br>&<br>&       |
|      | PRINT #1% IF Y%='Y'<br>PRINT #1%, 'YEARLY INTEREST AFTER PAYMENT NO.<br>C3%; IF Y\$<>'Y'<br>PRINT #1%, TAB(66%);'(';<br>PRINT #1%, USING '\$### ### ##', TTD_OITD-               | &<br>;&<br>&<br>& |
| J    | <pre>PRINT #1\$, ')'; PRINT #1\$ IF Y\$&lt;&gt;'Y' OITD = ITD</pre>  | &<br>&<br>&       |
| 2520 | PRINT #1\$ IF Y\$='Y'<br>\ IF C3\$+1\$ = N3 THEN 2600  | &<br>&            |
| 2530 | IF B < P THEN 2600   | \$                |
| 2550 | IF Y\$='Y' THEN<br>IF LNE\$ = 50\$ THEN<br>PRINT #1\$, CHR\$(12\$);  | &<br>&<br>&       |
| 0560 |  | å                 |
| 2560 | IF 1%='1' THEN<br>IF INT((C3%-50%)/57)=(C3%-50.0)/57.0 THEN<br>PRINT #1\$, CHR\$(12\$);<br>\ GOTO 2200   | &<br>&<br>&       |
| 2580 | GOTO 2250  | å                 |
| 2600 | IF Y\$='Y' THEN<br>PRINT ∲1≸ USING X8\$, C3≸+1≸, B*I, B, O   | &<br>&            |
| 2700 | IF Y\$='Y' THEN<br>PRINT #1\$, ' LAST PAYMENT = ';<br>\ PRINT #1\$ USING '\$\$###.##', INT((B#I+B)#100+.5)/100   | &<br>&<br>&       |
| 3000 | PRINT #1%  | å                 |
| 3100 | IF (S.A<>0\$ AND NOT(E.FLAG\$)) THEN 900 ELSE<br>CLOSE #1\$  | &<br>&            |
| 3110 | NEXT INTR  | å                 |
| 3150 | GOTO 100   | å                 |
| 3250 | IF ERR=28 THEN<br>CONTROL.C\$ = SYS(CHR\$(6\$)+CHR\$(-7\$))<br>\ RESUME 100  | &<br>&<br>&       |
| 3260 | RESUME IF ERR<>48 AND ERR<>51 AND ERR<>53  | å                 |
| 3300 | PRINT CHR\$(7\$);' **LOAN NOT POSSIBLE**'<br>\ PRINT ' (INTEREST PER PERIOD EXCEEDS PAYMENT PER PERIOD)'   | &<br>&            |
| 3500 | END  | &                 |

|      | \ SAVE.1, I = ININ/100<br>\ SAVE.13, I3 = I*100<br>\ MONTH\$ = MON\$   |
|------|--|
| 870  | OPEN Z2\$ AS FILE 1%, MODE 2%  |
| 900  | IF E.FLAG\$ THEN 3100 ELSE<br>IF S.A<>0\$ THEN<br>CM1\$\$ = CM1\$\$+1\$<br>\ A = S.A IF CM1\$\$ = 0\$<br>\ A = S.A+(CM1\$\$1000\$) IF CM1\$>0\$<br>\ MONTH\$\$ = MON\$<br>\ IF A >=E.A THEN<br>E.FLAG\$\$ = -1\$ |
| 950  | I3 = SAVE.I3<br>\ I = SAVE.I<br>\ N = SAVE.N   |
| 1000 | IF X\$<>'A' THEN 1200  |
| 1100 | N = N®M<br>\ I = I/M<br>\ B = I+1  |
| 1120 | N3 = N   |
| 1150 | A = INT(P*((1-B^-N)/I)*100+.5)/100   |
| 1200 | PRINT #1%, CHR\$(12%) IF S.A<>0 OR S.I<>E.I<br>\ PRINT #1%, STRING\$(3%,10%) IF S.A=0<br>\ PRINT #1%, ' AMOUNT OF LOAN = \$';A   |
| 1220 | IF X\$='A' THEN 1350 ELSE<br>IF X\$<>'N' THEN 1340   |
| 1300 | I = I/12<br>\ B = I+1<br>\ N = -(LOG(1-A*(I/P)))/(LOG(B))  |

N1 = NN = INT(N+.999) 1330 N3 = N

1320

\ GOTO 1350
PART



Why simulate a mini computer on a mini computer? After all, far more effective work can be achieved on the real thing. True. But consider novices beginning to understand basic concepts of computing; high-level language programmers getting to appreciate what happens behind the scenes; students of computer science. How can they obtain a smooth, simplified, yet complete introduction to the fundamentals of data processing? SIMINI, a simulation that is clear to follow and straightforward to teach. Displaying on a Visual Display Terminal, the machine actually registers in binary while the program is executing, giving an interesting introduction to the stored program concept, instruction cycles, low-level langauges, boolean logic, representation of information and much more.

Presented in RSTS Professional this month is the first in a three part series describing SIMINI. This month is the index, introduction and specification of SIMINI. The following issue will contain details of use and the Appendices, and the final issue will contain the source listings. The first two parts form a self contained SIMINI user manual.

Much of the work within SIMINI was done some years ago, and grew from seeds planted by Mr. M.C. Williams, Computer Centre Director of Luton College of Higher Education, England. This is being published in order that it may now be of benefit to more people, and I have asked the Editor to send any payments for publishing to Mr. Williams to use as he feels is appropriate to computer education in the Luton area.

#### 1 Introduction

- 1.1 SIMINI Outline
- 1.2 SIMINI Notes on the Design
- 1.3 Uses of SIMINI
- 1.4 SIMINI Guide
- 2. Specification of SIMINI
  - 2.1 Functional Units
  - 2.2 Operating Systems
  - 2.3 System Software 2.3.1 General
    - 2.3.2 Assembler
  - 2.4 The Stack
  - 2.5 C.P.U. Registers 2.5.1 Control Unit 2.5.2 Arithmetic Logic Unit
  - 2.6 Architecture
  - 2.7 Execution Cycle
  - 2.8 Data Representation
    - 2.8.1 Integers
    - 2.8.2 Characters
    - 2.8.3 Instructions
- 3. How to use SIMINI

#### Appendices

- Α. Assembler and O/S Messages
- B.1 Memory Referencing Instructions
- **B.2 Register Referencing Instructions**
- **B.3** Macro Call Instructions
- B.4 **Operating System Commands**
- C. References



CIRCLE 149 ON READER CARD

#### 1.1 SIMINI — Outline

SIMINI is a simulation of the operation of a mini computer. It is designed to be used as a visual aid for teachers of Computer Science.

The "Computer" is a dedicated, single user, singleprogramming, soft machine which has 8 operating system commands and incorporates an easy to use inter-active assembler.

During program execution the machine's registers are displayed in binary on the user's visual display terminal.

Assembled programs may be saved on backing store and program libraries maintained. The contents of store may be dumped out on to the user's terminal, or any other terminal linked to the host computer.

A complementary simulation is MINSIM which is completely compatible and offers a TRACE option but does not require a VDU.

#### 1.2 SIMINI - Notes on the Design

SIMINI is for use as an aid to visually demonstrate machine architecture and as an introduction to assembly level programming. It appears to the user to be a simple singleuser, stand-alone machine. Random Access Memory (RAM) of 512 bytes is adequate to store the largest program that the user could wish to write, within the bounds of the purpose of SIMINI.

SIMINI's "hard-wired" operating system is simple and accepts commands chosen for their similarity to the PDP11 RSTS/E O/S commands (2.2).

The registers provided (2.5) should be sufficient to illustrate most important aspects of machine architecture.

Only integer arithmetic is provided for. This is for two reasons:

- (i) double precision and floating-point would possibly encourage the writing of applications programs instead of merely programming excercises. (Applications programs ought to be written in one of the languages implemented on the host machine.)
- (ii) it could be a good exercise to write floating-point routines in SIMINI assembler. (This would lead to a deeper understanding than could be gained fron any built-in implementation.)

In the interests of simplicity, assembler features such as symbolic addresses and literals are not used.

The assembler is therefore able to assemble line by line, and the stored program is runnable at any given point in time.

Octal numbers are used for addressing in SIMINI assembler, so that program instructions can be compared directly to the displayed register's bit-patterns.

The register instructions (Appendix B.2.), considered more usual, have high order function codes so that all the function codes that are used may appear complete.

The stack mechanism implemented in SIMINI allows the user to gain an understanding of this data structure in a relatively straightforward way.

#### 1.3 Uses of SIMINI

SIMINI is an educational "machine" for teaching some basic areas of computer science.

SIMINI may be used to illustrate:

- Representation of information:

- i. Decimal, octal and binary number representation
- ii. The idea of words, bytes and bits
- iii. Integer representation
- iv. Characters
- v. Instructions
- The stored program concept.
- The instruction cycle the microcode required for one low-level instruction.
- The registers necessary for successful program execution, and the required data pathways.
- Logical operations AND, OR, NOT, XOR
- The basic concepts of an assembler.

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- Low level languages
  - Specifically a one-address order code, but with a range
  - of zero-address order code instructions.
  - arithmetic operations
  - data transfer/manipulation operations
  - transfer of program control
    - unconditional branching
    - conditional branching
    - subroutine calls
  - addressing modes
    - direct
    - indirect
    - indexed
  - indexed indirect
  - the use of a stack
    - subroutine calling
    - data storage
    - arithmetic

SIMINI provides a base to many other areas of computer science including the use of backing store, and high-level language development, etc.

#### 1.4 SIMINI Guide

STACK POINTER 512

RUN

| RUN MINSIM<br>0/s mode         |                                  |          |           |                 |         |           |        |
|--------------------------------|----------------------------------|----------|-----------|-----------------|---------|-----------|--------|
| Would you lik<br>ASSEMBLER FOR | e a command s<br>MATS            | SUMMary  | (Y or N)' | ? Y             |         |           |        |
| STORE ADDRESS                  | MNEMONIC & AI                    | DRESS    |           |                 |         |           |        |
| OF                             | LITERAL                          |          |           |                 |         |           |        |
| Indexed addre<br>Indirect addr | essing is achi<br>ressing is ach | ieved by | y specify | sins (<br>fying | ADDRESS | SX<br>SSI |        |
| Addresses are                  | specified by                     | a 3 di   | isit oct  | al no           | . (000- | -777)     |        |
| MEMORY REFERE                  | ENCING INSTRUC                   | CTIONS   |           |                 |         |           |        |
| 000                            | 001 LDA                          | 002 9    | STO       | 003             | ADD     | 004       | SUR    |
| 005 MUL                        | 006 DIV                          | 007 6    | AND       | 010             | DF:     | 011       | XOR    |
| 012 JMP                        | 013 JANZ                         | 014 .    | JALZ      | 015             | INCH    | 016       | JSR:   |
| 017 CAHE                       | 020 LDX                          | 021 9    | STOX      | 022             | LDPC    | 023       | STPC   |
| 024 JAP                        | 025 JAZ                          | 026 .    | JXNZ      | 027             | JXLZ    | 030       | JXP    |
| 031 JXZ                        | 032 JDV                          | 033 .    | JNDV      | 034             | JSI     | 035       | CXHE   |
| REGISTER INST                  | RUCTIONS                         |          |           |                 |         |           |        |
| 000 STOP                       | 001 CLA                          | 002      | INC       | 003             | DEC     | 004       | ADDS   |
| 005 SUBS                       | 006 SWAR                         | 007 1    | HOP       | 010             | HOPE    | 011       | HOPN   |
| 012 HDPL                       | 013 HOPG                         | 014 1    | NDT       | 015             | NEG     | 016       | INCX   |
| 017 DECX                       | 020 SWAX                         | 021 9    | SWAR      | 022             | ASL     | 023       | ASR    |
| 024 RDR                        | 025 ROL                          | 026 (    | CLV       | 027             | SEV     | 030       | HOPV   |
| 031 CLC                        | 032 SEC                          | 033 1    | HOPC      | 034             | CCV     | 035       | SCV    |
| 036 SWAF                       | 037 PUSH                         | 040 1    | POP       | 041             | RTS     | 042       | MULS   |
| 043 DIVS                       | 044 PACC                         | 045 1    | RACC      | 046             | PSTR    | 047       | RSTR   |
| 050 NLIN                       |                                  |          |           |                 |         |           |        |
| OPERATING SYS                  | STEM COMMANDS                    |          |           |                 |         |           |        |
| RUN NNNN                       | DUM NN                           | SAV )    | XXXXXX    | OLD             | XXXXXX  | APP       | XXXXXX |
| UNS XXXXXX                     | CAT                              | BYE      |           |                 |         |           |        |
| For this summ                  | nary at any ti                   | ime, ty, | Pe 'HELP  | ,               |         |           |        |
| OVE MODE                       |                                  |          |           |                 |         |           |        |
| 7 000 PACC                     |                                  |          |           |                 |         |           |        |
| 2 001 ETD 010                  | 、<br>、                           |          |           |                 |         |           |        |
| 2 001 510 010                  | ,                                |          |           |                 |         |           |        |
| 2 002 KHLL                     | ×                                |          |           |                 |         |           |        |
| 7 003 HDD 010                  | /                                |          |           |                 |         |           |        |
| 7 004 PACC                     |                                  |          |           |                 |         |           |        |
| ? 005 NLIN                     |                                  |          |           |                 |         |           |        |
| ? 006 JANZ 00                  | 00                               |          |           |                 |         |           |        |
| ? 007 STDP                     |                                  |          |           |                 |         |           |        |
| ? DUM                          |                                  |          |           |                 |         |           |        |
| PROGRAM NONAM                  | E.SIM                            |          |           |                 |         |           |        |
| ADDRESS                        | CONTENTS                         |          |           |                 |         |           |        |
| OCTAL                          | DECIMAL                          | CHAR     | B         | INARY           |         | ASSEMBL   | ER     |
| 000                            | 37                               | ' %'     | 0000000   | 00001           | 0101    | RACC      |        |
| 001                            | 4104                             |          | 0001000   | 00000           | 01000   | STD 010   |        |
| 002                            | 37                               | ' %'     | 0000000   | 000010          | 0101    | RACC      |        |
| 003                            | 6152                             | 1 .1     | 0001100   | 00000           | 01000   | ADD 010   |        |
| 004                            | 36                               | ' \$'    | 0000000   | 000010          | 00100   | FACC      |        |
| 005                            | 40                               | 1 (1     | 0000000   | 000010          | 01000   | NLIN      |        |
| 006                            | 22528                            | 'X '     | 0101100   | 00000           | 00000   | IANZ OO   | 0      |

```
? 4
? 5
?
? 5
?
? 1
? -1
0
O/S MODE
? BYE
Control is beins passed from SIMINI to RSTS/E
You may now issue any RSTS command
Ready
```

#### 2. Specification of SIMINI

#### 2.1 Block Diagram of the Main Functional Units



The Central Processing Unit (CPU) includes an Arithmetic Logic Unit (ALU), control unit, registers, and hard wired Operating System (O/S).

The Visual Display Unit (VDU) terminal is used for communication between the O/S and the computer user; and also under program control, between the running stored-program and the user.

Main memory is 512 words of 16-bit semiconductor store.

Backing store is on disc and is used only by the O/S for program library maintenance.

Another terminal may be used by the system for dump program listings under O/S control.

#### The Operating System

When the machine is under direct Operating System control, "O/S MODE" will be displayed upon the VDU on line 15. The O/S will prompt the user with a "?" in the lower left of the VDU screen when it is receptive to user commands. If a command is valid, no message will be cutput. For details of O/P messages see Appendix A. The machine is also in O/S mode when the assembler is being used.

The executive is hardwired, and so does not occupy any main memory.

**Operating System Commands** 

| Command   | Explanation   |
|-----------|---|
| RUN (NNN) | RUN, followed by an optional 3 digit octal<br>address passes control to the stored pro-<br>gram starting execution from address<br>NNN (default 0). |

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tions for PACC, RACC, PSTR, RSTR, NLIN.

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|---------------------------|---|--|--|--|--|
|                           | Note: the Stack Pointer (SP) is initialized<br>as 512. Program execution may be termi-<br>nated by a "STOP" program instruction or<br>by the user with CTRL/C on the keyboard,<br>both of which return control to the O/S.  | UNS XXXXXX   | UNS causes the file of name XXXXXX.SIM<br>to be searched for under the user's<br>account number, and, if located, the file<br>will be unsaved.   |  |  |
| SAV XXXXXX 4              | SAV causes a file of name XXXXXX.SIM to<br>be opened under the user's account<br>number, and all store from 0 to the<br>address pointed to by the SP-1 (and<br>whose contents are non-zero), will be<br>saved on that file. | DUM NNN-NNN  | NN DUM, followed by an optional range of<br>memory locations specified in octal, fol-<br>lowed by an optional 2 digit decimal<br>integer relating to a KB number, gives a<br>core dump. Default is all memory onto the<br>user's terminal. |  |  |
| OLD (XXXXXX)              | XXXXX) OLD causes all store to be cleared. If no file name is specified this will be all that is done. Otherwise a file of name XXXXXX-   |  | CAT will result in a list of all program files<br>with a file extensions of .SIM to be dis-<br>played on the VDU.  |  |  |
|                           | .SIM will be searched for, and, if located, opened and the previously saved program will be restored.   | BYE  | BYE will close down the machine, and return control to RSTS/E.   |  |  |
| APP XXXXXX                | APP causes a file of name XXXXXX.SIM to<br>be searched for, and, if located, opened   | 2.3 System Software  |  |  |  |
|                           | and the previously saved program will have all non-zero locations restored. This  | 2.3.1 General Outline  |  |  |  |
|                           | effectively Appends the file program into store, the file program taking precedence   | SIMINI includes a 512 word "ROM" containing system programs. These are a simple assembler and library instruc- |  |  |  |

#### 2.3.2 Assembler

The assembler reads a line at a time from the terminal and assembles the corresponding machine code instructions. Each line starts with the address in which the instruction is to be located — this address is a 3 digit octal number. The instructions, separated from the location by a space, starts with a mnemonic. if the instruction is memory referencing, then and address part follows separated from the mnemonic by a space. The address, in octal, may be followed by an "X" to indicate indirect addressing and "I" for index modificatin.

Alternatively the instruction part may be a single octal number which directly corresponds to the machine code. This must be introduced by a symbol.

So that decimal numbers and strings of two characters can be loaded into locations, +, – and quote (") symbols are recognized in place of the mnemoic. Plus and minus introduce decimal integers. The quote must be followed by 2 characters and terminating quote.

The structures accepted by the assembler can be summarized by:

NNN — NNN is a 3 digit octal number which specifies a store location into which the following data or instruction is to be loaded. The NNN must be followed by a space and then either:

Examples:

| 001 "AB"<br>002 21 | <ul><li>a) "XX" where X is any ASCII character.</li><li>b) a decimal integer.</li></ul>  |
|--------------------|--|
| 003 #001007        | c) #NNNNN — a 6-digit octal number $\leq 177777$ .   |
| 004 ADD 007        | d) XXXX NNN — a valid Memory Refer-<br>ence Instruction followed by an optional<br>"X" or "I" or "XI" where "X" will cause<br>indexed addressing and "I" will cause indi-<br>rect addressing. (Appendix B.1.). |
| 010 INCX           | e) XXXX — a valid Register Instruction (Appendix B.2.).  |

#### 2.4 The Stack

The stack is used to store the return link (the PC) in the execution of a JSR. (Appendix B.1.), allowing virtually unlimited subroutine nesting.

The stack also allows users to gain an understanding of this data structure. As well as subroutine links other data can be stored on the stack and stack arithmetic can be performed.

The stack is normally stored at the top of the user's 512 words of "RAM" and referenced by the use of a stack pointer register (SP) which points to the most recently stacked item.

When "pushing" onto the stack the pointer is decremented before the accumulator's contents are stored. When "popping" off the stack the accumulator is loaded before incrementing the pointer. The stack expands downwards from location 511. 2.5 C.P.U. Registers

#### 2.5.1 Control Unit

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- PC Program Counter. The PC holds the 16-bit address of the current instruction being fetched from memory. The PC is automatically incremented after the instruction is loaded into the instruction register. When a program jump occurs, a new value is automatically placed in the PC, overriding the incrementer.
- SP Stack Pointer. The stack pointer holds the 16-bit address of the current top of stack located anywhere in main memory; the stack being organized as Last In, First Out (LIFO). Data may be pushed onto or popped from the stack by means of the execution of PUSH and POP instructions.
- X Index Register. The index register is a means by which to modify the address of an operation. The value in the index register is used as a displacement to be applied to the address before the instruction is executed. Instructions are provided for both modifying the contents of the index register and branching conditionally on the value in the index register.
- IR Instruction Register. As each instruction is fetched from memory it is placed in the instruction register and decoded. It is from this decoding that the necessary control signals are generated for data transfer and ALU control.
- MAR Memory Address Register. The memory address register is used to "point" to the address in memory which is next required, whether it be for loading as an instruction, or for loading of storage as data.
- MDR Memory Data Register. The memory data register forms a buffer area between memory and the CPU, and all transfers to and from memory pass through it.

#### 2.5.2 Arithmetic Logic Unit

- ACC Accumulator. The accumulator holds the results of 16-bit arithmetic or logical operations.
- R Remainder Register. The remainder register holds the remainder after a divide operation while the accumulator holds the quotient.
- OV Overflow Flag. Set to indicate specific conditions after either an arithmetic or logical operation.

C — Carry Flag. Set to indicate carry.

## A note of thanks to DEC users and the entire DEC-compatible community...

# You made DEXPO 82 your Show. So we're making DEXPO/West 82 bigger to serve you even better.

You didn't have to participate in DEXPO 82 to benefit from its imiou uun chave to participate in DEALO 02 to benefit non no intermediate success. The strength of the first Show — held last May in Atlanta — assures support for more and bigger DEXPO Shows in the future For DFC users and compatible vendore it more new owner Atianta — assures support for more and bigger UEXFO Snows in the future. For DEC users and compatible vendors, it means new opportunities to meet face-to-face and help shape a prosperous DEC-Both visitors and exhibitors who were at the Show are quick to agree compatible industry.

both visitors and exhibitors who were at the phow are quick to agree that DEXPO is now the single most important event for every member of the DEC compatible computing. And they are looking forward to ar inat DEAFO IS now the single most important event for every member of the DEC-compatible community. And they are looking forward to an even bigger DEXPONNeet 92 wet the Anabeim Convention Conter De of the DEC-compatible community. And they are looking forward to an even bigger DEXPO/West 82 — at the Anaheim Convention Center, December 7.9 This time many DEC users are planning to bring to are of even bigger DEXPO/West 82 — at the Ananeim Convention Center, December 7-9. This time, many DEC users are planning to bring teams of entuer /-7. This time, many DEC users are planning to bring teams of executives to see and compare the latest DEC-compatible hardware, software services and supplies For their part, a large proportion of exhibitors are planning to return it here and product innovations. They'll be joined by

ror men part, a large proportion or exhibitors are planning to return with expanded exhibits and product innovations. They'll be joined by software, services and supplies.

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> Anaheim Convention Center Anaheim, California December 7-9, 1982

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#### 2.6 Architecture



#### 2.7 Execution Cycle





#### 2.8 Data Representation

#### 2.8.1 Integers

An integer is held as a 16-bit 2's complement signed integer in one word of store.

#### 2.8.2 Characters

All characters are represented by their 8-bit ASCII code. Two characters can be stored in one word, instructions being available for byte manipulation.

#### 2.8.3 Instructions

Each instruction is contained in a single 16-bit word, divided as follows:



### Letters to The RSTS PRO

... continued from page 6

RSTS, and tasks that require some sophistication with its internal operation to make proper response or decision, i.e., system generation. As this is my background I found the Monday and Thursday evening "Carl and Dave Shows" at DECUS very helpful, but they didn't go far enough. Some of the handouts were helpful but where do I go if I need more details. How about some articles that cover RSTS internals, or if this has already been published how about a reference list of books or articles, in this or any other publication that can help the newcomer to RSTS.

You two gentlemen have made, and are continuing to make a very significant contribution to the user community with both this publication and your many contributions to DECUS, many thanks from a newcomer!!!

> Sincerely, Jerry C. Forshee Computer Systems Analyst Green & Company Inc, CPAs Bloomington, IN

Welcome to the 'community', Jerry. We are soon going to try to develop a cumulative index of the RSTS PROFESSIONAL. In addition, RSTS internals expert Mike Mayfield has produced a manual (see page 43).

I was just leaving through the back issues of your magazine and I happened to see the reprint of the photograph labeled "How TECO? Why TECO? Can you tell us?" In the the letters to the Editor section. (Dec. 1980, p. 19, v. 2, #4) I realize this is a little late, but I am offering my answer anyway. I will leave it to you to question my honesty but I will assure you I am not copying down the real answer from a later edition, for even if you did print the answer to the puzzle, I would not know for several recent issues were lost.

Answer: It is obvious that the Tampa Electrical Companies truck is stuck! The sign says "Cars Only" and a truck is not a car!

What about it - do I get a shirt?

Yours faithfully, Joseph Yaffee Morgan Equipment Co. Papua, New Guinea

Joseph, 'the TECO affair' lasted several issues (ended June 1981, v.3, #2). Even with that your answer is unique - wrong, but unique. Because of that (and because we wouldn't mind being shown off in New Guinea), we might have sent a shirt but alas we don't know your size.

#### Dear Carl & Dave,

I just read in the June issue of the RSTS Professional your editorials about "break-in artists" playing destructive games, and I quite agree with your evaluation (although I would have used the term "juvenile delinquents" rather than "children").

But tell me . . . how come that one of these "children" has just been added to your list of "contributors"? It occurs to me that you could have used better judgment.

> Sincerely, Paul Koning Raymond, NH

CARL: Since you raised the subject, I might as well vent some of my feelings regarding the "Atlanta Break-in". First, some of the blame must rest on the persons who set up the RSTS demo system so that it could be compromised so easily; some might even argue that this was "entrapment", or making

it so easy to do that doing it was not a crime. Second, while I do not agree with or condone the actions of the breakers, I will defend their right to free speech. I will not publish articles which have no common good or redeeming qualities, and I would argue I have met that goal so far; specifically, all the articles in the June issue are of high quality.

The crime in question was not so much the break-in: it was the malicious things that happened once the "kids" were in. The 'POKING' of the monitor and the ensuing system crash were clearly not in the best interests of anyone at DECUS save the 'breakers' themselves. Clearly they should be reprimanded, and even monitored while at the demo machines, but to censure them would do further disservice to the RSTS community we are trying to serve.

DAVE: I really appreciate your letter. I doubt I can publish it, or any suitable response without a libel suit.

I published the article and will publish the next after agonizing much — it's the sin we hate and not the sinner. The articles are quite good and show an upward trend...

[Want to switch jobs for a few weeks??]

#### **LETTERS** to the **RSTS Pro** . . .

... is your column! Send us your comments, suggestions, photos, or notes of interest to the RSTS community. We'd enjoy hearing from you.



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#### page 80

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DO YOU REMEMBER THIS? (Photo contest, RSTS Professional, Vol. 4, #3, p.101.)



Photo contests appear in the RSTS Professional occasionally and readers have until publication of the next issue to submit their answers. We may, from time to time, limit the number of correct answers eligible to receive prizes.

I am currently engaged in adding a room to my home. In the construction of this room I used some exterior grade plywood to brace the corners of the new room. This plywood has stamped on the back the symbol 'Teco Tested'.

Reference is now (finally) made to the photo contest. Although my 'Teco Tested' item is plywood, the item pictured in the photo appears to be composition board or pressed-wood.

My tee-shirt size is large. Joe Sanders Metrodata Computer Systems, Inc.

Dallas, TX

The photograph shows a piece of Teco Tested particle or chip board.

We enjoy your publication very much and are looking forward to the DEC Professional.

Paul Bates, President RYO Theatre Services Ltd. Toronto, Ontario

Wood products, such as particle board are "Teco Tested." Looks like chip board in the photo. Bill Van Vechten

Hawaii Preparatory Academy Kamoela, HI

P.S. Size Medium T-Shirt. Thanks! Joe, Paul, & Bill,

You are correct, you are the only respondees, you are receiving T-shirts. (We should have asked, "How? Teco Tested?"!)

#### **Dear RSTS Man**

. . . continued from page 36

MB will provide an amazing improvement. The 70, however, will require that you upgrade your controller to Mass Buss compatible level. The 44 will provide you with a good 20-25 job system whereas a 70 should yield 45 jobs. Of course, these are ball-park figures stated in complete ignorance of your application. The improvement you should see first is relief from swapping. Always configure enough memory to hold your job max times your swap max plus monitor, runtime systems and resident libraries (after all, they are practically giving the megabytes away today). The above is true for both 44's & 70's. The next obstacle you hit will be either cpu or disk boundedness. (Note, small buffers are no longer a problem in V7.1.) This will be application dependent. Let's hope that by then, you can afford a second system.

#### DEAR RSTS MAN:

There has been a lot of confusion about why RSTS/E limits programs to 31KW rather than 32KW. The reason for this limitation is quite simple. It's all for the lack of one byte.

Several routines within the monitor need to check that the user's buffer is within his program area. These routines do this by comparing the address just beyond the end of the buffer to the address just beyond the end of the job.

If the job is allowed to be 32KW, its highest legal address is 177777 (octal). Adding one to this number causes an integer overflow and a resulting value of 0. This says that all buffers must end before location 0, an obvious impossibility.

This problem can be corrected. In fact, I think not correcting it before now may have been an oversight on the part of Digital. Most of the routines within the monitor, including memory management and swapping, handle 32KW just fine.

I will work up a patch to RSTS V7.1 to allow handling of 32KW and send it to you for a future issue. Until then, I hope this explanation helps your readers understand the 31KW limitation. Mike Mayfield

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WIGGIT is here on page 39! Keep looking for more Infinity Software games!

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Occasionally we are requested to print news that may be of interest to the RSTS community. We are happy to offer this feature to our readers. We reserve the right to print only as time and space permit. We cannot return photos or manuscripts. Send news releases to: RSTS News Release, P.O. Box 361, Ft. Washington, PA 19034-0361

DEC USERS ATTENDING ANAHEIM DECUS MEETINGS TO GET FREE ADMISSION TO DEXPO/WEST 82, Anaheim Convention Center, Dec. 7-9 Anaheim, CA - Registrants for the DECUS (Digital Equipment Corp. Users Society) Conference to be held in Anaheim next December will be able to use their badges for free registration to the nearby DEXPO/WEST 82 exposition. DEXPO/WEST 82 - The Second National DEC-Compatible Industry Exposition — will be held at the Anaheim Convention Center, December 7-9, 1982. "This policy makes it even easier for DEC users to find the DEC-compatible products and services they need to improve their systems," said Larry Hollander, president of Expoconsul International, Inc., organizers of the DEXPO Show. Nearly 5,000 DEC users are expected to attend the DECUS meetings. "We're making it possible for all of them to visit the Show while they're here," Hollander added. DEXPO/WEST is expected to attract 8,000 DEC users.

At the same time, Hollander announced that demand for exhibit space in the

Show had forced the expansion of DEX-PO/WEST. The new floor plan will make DEXPO/WEST twice the size of the first DEXPO Show held last May. "A good number of returning exhibitors are doubling and tripling the size of their exhibits," Hollander said. "And they are being joined by new exhibitors almost every day." Already the world's biggest exhibition of DEC-compatible hardware, software, services and supplies, DEXPO/ WEST can now accomodate up to 250 exhibitors. Hollander expressed confidence that all space will be taken well before the Show opens.

DEC users and vendors of DECcompatibles can get additional information on DEXPO/WEST 82 and DEXPO/EAST 83 - at the Kiel Auditorium, St. Louis, May 22-24 - by contacting Expoconsul International, Inc., 19 Yeger Road, Cranbury, NJ 08512; tele. (609) 799-1661.

#### NEW ASYNCHRONOUS SERIAL INTER-FACE FOR LSI-11 COMPUTERS, INCORPORATES THREE DIFFERENT INTERFACE CIRCUITS AND PRINTER BUSY DETECTION

Orange, CA — A new asynchronous serial interface for LSI-11 computers, from MDB Systems, Inc., the world's largest independent manufacturer of interface products, offers complete DEC DLV11-F compatibility plus the advantages of a unique "buffer ready" signal capability and RS-422 interface circuitry. The buffer ready monitor increases computer thruput when used with printers that do not provide X-on/X-off protocols, or the software does not monitor these protocols.

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MLSI-DLV11-FX, asynchronous serial interface with EIA RS-232-C, 20 MA current loop and and RS-422 interface from MDB Systems, Inc.

printers such as the TI810, Centronics 704 or Teletype 40 - printers which present the transition of a buffer-full status line from a SPACE (+12VDC) to a MARK (-12VDC) when the printer buffer is full and no further data should be sent. The Buffer Ready circuit allows the printers to be run at maximum speeds with no danger of buffer overrun. The RS-422 capability allows placement of printers, Video Display Terminals or other devices with corresponding circuitry at distances up to 4000 feet from the host computer.

Also unique to the MDB interface is the availability of four levels of priority interrupts (as compared to one level for DEC DLV11-F) which allows the assignment of priority to high speed devices. The MLSI-DLV11-FX offers a serial EIA-RS-232C/CCITT V.24, 20 MA current loop, as well as an RS-422 interface. Baud rates are programmable and switch selectable from 50 to 19.2K baud. Also switch selectable are the Word Character Format, the Address and Interrupt Vectors.

For further information: Jonnda Perry, Director of Marketing Administration, MDB Systems, Inc., 1995 N. Batavia Street, Orange, Calif. 92665.

Price: \$385.00 in single units. Delivery: 3 Days ARO.

#### EEC SYSTEMS ANNOUNCES THE AVAILABILITY OF LEX-11

Wayland, MA - EEC Systems announces the availability of LEX-11, a multi-user word and data processing software package designed for use on DEC PDP-11, LSI-11 and VAX Computers. Designed under the RSTS/E operating system it also runs under the RT-11, RSX-11M. TSX-PLUS, UNIX, IDRIS and VMS in the compatibility mode. The complete system requires only 300 blocks of disk space and can be run on an LSI-11 with 32K of memory. The run-time system uses 8KW of memory and on multi-user systems LEX-11 requires less than 16KW per user. The system is re-entrant and common code has been used whenever possible.

LEX-11 can be used for such tasks as personalized mass mailing, contracts, standard forms, manuals and statistical tables. It can be utilized for invoice production, list processing, generating custom forms and data management. It can also be used in conjunction with a typesetting machine. All operations on LEX-11 have been designed to make things as easy as possible for the user.

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- LEX-11 works the same way for the user on all operating systems

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• Users can define their own menus according to their application requirements

 Other features include graphics, 90,000 word spelling dictionary and list processing.

RSTSPROFESSIONALRSTSPROFESSIONA

EEC Systems specializes in DEC PDP-11 based hardware, and software which runs on the PDP-11 and VAX computers.

For more information contact: Eric Dickman, EEC Systems, 286 Boston Post Rd., Wayland, MA 01778, 617-358-7782.

#### EMULEX, CDC EXPAND PRODUCT SERVICE COVERAGE

Santa Ana, CA - Emulex Corporation and Control Data Corporatio have expanded their third party service agreement to include the Emulex CS11 series of communictions multiplexer products.

Under the original agreement, Control Data's Engineering Services Organization provides complete maintenance and spares stocking for Emulex disk and tape controllers used with Control Data peripheral storage devices on PDP-11 and LSI-11 computer systems made by Digital Equipment Corporation. In the major service areas, maintenance service coverage is available for entire PDP-11 or LSI-11 systems, including the CPU, memory and other options.

This agreement has now been amended to include the CS11 series communications multiplexers made by Emulex. The change is significant because it adds Emulex products which don't involve Control Data Peripherals, according to Phillip (Flip) Begich, Emulex director of national marketing.

'The communications products have been added primarily because of demand from Control Data service customers for them to handle all Emulex products,' Begich said. "Control Data has been doing an excellent job of providing total DEC system service at competitive prices for several years, and a big plus is that they offer maintenance of mixed vendor systems from a single source.'

The Control Data service is available for complete DEC systems in 17 cities around the United States, with another five to be added during the first quarter of 1982. Service for subsystems-only is available in those same cities, with an additional 20 or more cities planned for addition in 1982. Subsystem maintenance of Emulex/Control Data products is also available in Canada, the U.K., and Germany. Control Data also supports Emulex's own System Group for end user installation and service in the United States.

Based in Santa Ana, Emulex Corporation is the leading supplier of disk, tape and communications controllers for use in interfacing a wide variety of peripheral devices to computers made by Digital Equipment Corporation.

INDEPENDENT USERS GROUP HOSTS FALL CONFERENCE AND EXPOSITION Warwick, RI - You will have to be in Boston, Massachusetts on October 4 - 6 to meet the best of the DEC-related community at IRUS '82, a Conference and Exposition for DEC users, sponsored by the

Independent RSTS Users Society (IRUS) and Hardcopy Magazine.

IRUS, a user-run, user-supported organization of RSTS, VAX and other DEC installations, began holding fall conferences three years ago. Due to their success attendance at the conferences has doubled every year. In addition to a seminar program, last year's conference, Access-11, included a large-scale DEC compatible trade show — the very first of its kind — with 20,000 square of exhibition space and an in-depth representation of compatible software, hardware and services. The IRUS tradition continues this fall at the Park Plaza Hotel and Exposition Castle in Boston with an expanded series of seminars, workshops, panel discussions, and an exposition that covers the range of DEC compatible products.

"IRUS '82 is much more than a DECcompatible trade show," explains Monica Collins, chairman of the group. 'IRUS '82 is the one and only conference for the DEC-related community and will offer its participants an unrestricted view of the entire marketplace — ideas and products. The information and contacts made at IRUS '82 will benefit users and vendors alike."

Last fall's successful conference held at the Hartford Civic Center in Connecticut was truly a national event attended by people from 22 states, Canada, England and Israel. The Boston location this October provides vendors access to the heart of the East Coast market, and with an international airport; and extensive accomodation facilities, travel to IRUS '82 from anywhere in the world will be convenient.

The conference includes a program of seminars, workshops, and panel discussions that follow the theme of "Options for the '80s". Topics include technical and managerial concerns and aspects of RSTS, VAX, VAX conversions, the influence of micro-computers on the DEC user, communications and distributed processing for the DEC user and more. Sessions have been planned that compare many of the operating system software available for PDP-11 computers including UNIX.

Monica Collins sums up the goal of the conference: "IRUS has been built on the free flow of information, and it is in that spirit that IRUS '82 will convene the widest variety of informed viewpoints available in the DEC world.'

Some exhibition space is still available. Contact Dame Associates, 51 Church Street, Boston, MA 02116; (617) 482-3596.

Since seminar space is limited, people interested in attending should preregister before September 10th. Contact IRUS '82, 3657 Post Road, Suite 4, Warwick, RI 02886. (401) 738-4430.

#### CALOUT CATCHES ON

Provo, Utah — Clyde Digital Systems, Inc. reports a large and rapidly growing user base of its communication utility program CALOUT. Users report that they are particularly pleased with the ease of use provided by this package. In comparison with products such as DECNET users are also discovering the remarkable cost effectiveness of CALOUT.

With CALOUT a separate license is not required for each correspondant computer. Users license their own computer and then dial up any system they desire. There is no additional costly licensing as with DECNET and similar products. This kind of cost break, together with the powerful file transfer features included from the beginning, are clearly responsible for CALOUT's first choice rating among users today.

User's also note the advantages of CALOUT's unique error detection and correction capability. It is particularly good at handling communication problems that result in data that is dropped or lost in transmission. This is in addition to correcting data that is transmitted in error.

Experience to date with this product indicates a popular misconception about transfer speeds. Basically, a product of this type is only limited in transfer speed by the baud rate of the hardware link employed. DECNET has enjoyed the reputation of fast transfer largely because of the bundling of special high speed hardware with the product. CALOUT may also be used with special high speed hardware for the same speed advantages. Actually speed is found not to be a relevant issue in product comparison.

For further information call or write: Lisa-(801) 224-5306, 3707 N. Canyon Rd., Provo, Utah 84604.

SOFTWARE TECHNIQUES, INC. ANNOUNCES NEW EDITION OF RSTS PERFORMANCE TOOLS

Los Alamitos, CA — Software Techniques, Inc. today announced the latest version of DISKIT, the popular disk management "tool kit" for DEC RSTS users. DISKIT version 5.0 includes 5 software products: • DSU — Disk Structuring Utility optimizes disk directories and improves system performance (often by as much as 35%). DSU also performs fast disk-to-disk backup.

• RDR — High-Speed Directory Re-Order program which improves system performance by reducing the number of disk accesses required to find and retrieve files. RDR is 30 times faster than the DEC-supplied utility REORDR and provides many additional features.

• DIR — Ultra-High Speed Directory utility which searches directories at the rate of 400 files/second. DIR supports all of the functionality of Digital's DIRECT and can be used as a replacement for DIRECT in all applications. In addition, DIR provides a large number of features not found in DIRECT, including powerful tools for improving system security.

• DUS — Disk Utility Subroutines package allows system managers to develop their own special-purpose disk utilities. DUS interfaces to BASIC-PLUS-2 and CSPCOM programs.

• OPEN — Open Files Display Program monitors file accesses on a job-by-job basis.

The major improvements in version 5.0 include new features in DSU, a complete re-write of DIR to improve speed and add significant new features, improved documentation, and the inclusion of RDR.

DISKIT version 5.0 is licensed for single CPUs for a one-time fee of \$1,350 (U.S., quantity 1). Multi-CPU, OEM, educational, and quantity discounts are available. DISKIT is supplied with comprehensive documentation and a 90day warranty.

First shipped over a year ago, DISKIT version 4.0 pioneered RSTS system management utility market. Since its release, DISKIT has sold more copies than all other RSTS disk management utilities combined.

Software Techniques, Inc., headquartered in Los Alamitos, California, is one of the world's leading minicomputer consulting groups. Specializing in Digital's RSTS/E and VMS operating systems, Software Techniques provides products and services world-wide, ranging from business accounting software packages to high-technology consulting services. "C" programming language, C-CALC hs been engineered for optimum machine efficiency and ease of use. C-CALC is extremely user-friendly with an extensive ON-LINE HELP feature and built in training procedure. Even those with little or no computer experience are able to take advantage of computer assisted decision making.

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C-CALC lets you experiment with any number of financial alternatives and determine their results in minutes. Plans can easily be tested, evaluated, and modified. Boardroom quality reports are available in seconds. C-CALC helps you answer "What if" questions with ease, speed, and accuracy.

An added feature of C-CALC is its transportability between most different types of computer systems. If your company has more than one type of computer, data may be easily transported between them. System upgrading poses no problem. C-CALC does not require



Software Technique's, latest version of DISKIT, the disk management "Tool Kit" for DEC RSTS users.

#### INTRODUCING C-CALC — A GREAT IDEA PERFECTED!

Kirkland, WA — First came Personal Software's VISICALC, the first generation of a great idea — an electronic spreadsheet for microcomputers. Then came a variety of spreadsheets adapted to run on some of the "big" machines. Now, DIGITEC Software Design, Incorporated is proud to announce the third and finest generation of electronic spreadsheets — C-CALC, the state of the art!

Written in the extremely CPU-efficient

use of particular terminal types and takes advantage of the characteristics of individual terminals — most terminals may be easily accommodated.

C-CALC offers many advanced features not available in the earlier spreadsheets. Use of 'menus' rather than confusing multi-level function keys makes C-CALC much easier to use. A comprehensive worksheet consolidation feature allows consolidation by label, by entire worksheets, and consolidation of 'percentages' of amounts into other worksheets — great for overall corporate planning. Some of C-CALC's other advanced features are: computed coordinates, support of up to 120 labels, choice of alpha or numeric coordinates, variable column widths, ifthen-else, text is allowed in equations, and cells may be set to blink, bold, or underline on a specified condition. C-CALC's most striking feature is, without a doubt, its speed and CPU efficiency. More users may simultaneously use C-CALC without taxing your system.

All DIGITEC Software Design, Inc. products include a full year of cost free maintenance and extensive customer support. Regular update releases provide our users with a constant source of the most advanced, state-of-the-art products on the market. DIGITEC is currently seeking distributors for all markets. For more information, please contact: DIGITEC Software Design, Inc., 14125 108th Avenue N.E., Kirkland, WA 98033, (206) 821-7507.

ENGLISH COUNTRY HOUSE BECOMES MARKETING AND SUPPORT CENTER Irvine, CA — ABLE Computer has moved its English Marketing and Support Center into a country house about 45 miles west of London. The new center will be the focal point for all sales, service, repair and training in the United Kingdom, Belgium and the Netherlands.

The building was chosen partly for quaintness and location but primarily for size, according to Bob Jones, International Director of Marketing. Jones said, "We really needed the room. We had already outgrown our original office and decided to get excess space now rather than move soon again to accommodate the growth which is anticipated. That's why we bought a two-story brick house with 1500 square feet of floor space on a half-acre lot in the English countryside. This gives us a one hundred and seventyfoot frontage on the A-4 leading into Newbury and offers our customers a real sense of company presence in the United Kingdom.'

Roger Scarlett has been Marketing Manager of the English office for the past two years and will continue in the same capacity at the new facility. Under his direction the building has been remodeled to contain offices, a display area and repair facilities on the first floor and guest quarters on the second. The address is ABLE Computer, ABLE Computer House, London Road, Newbury, Berkshire, England RG13 2QJ. The telephone number is 44 (0635) 32125, and the TELEX is 848715 ABLE G.

ABLE is the world's largest independent supplier of enhancement interfaces for the VAX, PDP-11, System 20 and LSI-11 series of computers. The company manufactuers an extensive line of communications, memory and general-purpose products all of which are hardware compatible with and software transparent to the host machine. They are supported and serviced worldwide with offices and plants located throughout the United States and Canada, as well as England, Germany and Puerto Rico.

#### NEW DMA INTERFACE MODULE WITH USER IMPLEMENTABLE THROTTLE TO OPTIMIZE COMPUTER PERFORMANCE FROM MDB SYSTEMS

Orange, CA — MDB Systems, Inc., the world's largest independent manufacturer of computer interface modules, has developed an improved version of a DR11-W module for DEC Unibus and VAX computers that maintains full operating and diagnositc transparency to DEC software.

The MDB DR11-W has in addition to all of DEC's capabilities, a switch selectable DMA throttle that controls the peak rate problem by allowing optimum data transfer without affecting overall CPU performance.

MDB marketing manager, Stan Margulis says the DMA throttle feature lets the system designer specify the average thru-put rate of the DMA Link or Port so that a smaller CPU can perform the same job as a larger unit, or a user can get more from an existing system.

Another of the unit's features is that it uses on-board self test diagnostics. Micro sequencer driven, the switch selectable test features monitor DMA read/write cycles to and from memory and generates 16 unique data patterns for read/compare testing. Edge mounted LEDs indicate to the user any error conditions.

All operating parameters of the MDB-DR11-W are selectable from edge mounted switches, thereby precluding the powering down of the system to remove the board to change modes or operation. Eight addresses and interrupt vectors are stored in PROM and are independently switch selectable, including DEC recommended assignments.

Bus control and DMA cycle timing are controlled by delay lines for high speed and precise cycle timing.

All of the MDB unique features which are not available on DEC's DR11-W, will assist the user in quick fault isolation and reduce the cost of ownership and maintenance.

The MDB-DR11-W is priced at \$1,500

in single quantities. Delivery of units is scheduled for September.

### RSTS/E: VMS USERS INSPECT BEFORE THEY BUY

Bedford, MA — Clyde Digital Systems has recently announced that by means of its new computer to computer communication software CALOUT, actual product will be transferred to user sites previous to purchase. Through the imaginative use of the CALOUT utility, CDS is attacking historic apprehensions surrounding the acquisition of packaged softwre from non-local vendors.

CDS can transfer the following packages to RSTS/E and VAX users equipped with a dial in line. Serious buyers then have the opportunity to inspect and evaluate these products before a 30 day latch is executed. CALOUT permits user to dial up a second CPU and exchange data files of any kind. CONTRL provides remote interactive training and user support. Complete log file

of season may be kept. DOC makes 4 logical terminals out of 1 physical terminal. Complete log files of each job session may be kept.

IMAGE allows DOC log file to be played back intelligently, one frame at a time.

MONITR records entire dialog of selected job session in a secured log file. This is invisible and unintrusive to users being monitored.

LOCK simplifies and generalizes menu creation. Limits user to authorized menu. Records tasks run.

VAX users please note that CALOUT is the only package presently available on VMS. All others will be announced shortly.

Full support and all necessary documentation is provided to ensure success during and after the approval period.

For detailed information on this offer or for information on how to use CALOUT in similar fashion contact: Clyde Digital Systems, P.O. Box 348, Bedford, MA, (617) 275-6642.



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| T04/C  | Mag tape streamer coupler        | TM11/TU10     |  |
| T04/N  | NRZI mag tape controller         | TM11/TU10     |  |
| T04/D  | Dual density mag tape controller | TM11/TU10     |  |
| T34/C  | Mag tape streamer coupler        | TM11/TU10     |  |
| T34/N  | NRZI mag tape controller         | TM11/TU10     |  |
| T34/D  | Dual density mag tape controller | TM11/TU10     |  |
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| S03/D, S04/D   | 96 MB CMD controller             | RK06          |  |
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