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PRENTICE COMPUTER CENTRE

MINI/MICRO NEWSLETTER

Contents

authorization: Director of the Centre

1.0 Words From the Gurus

"It is better to meet a mother bear robbed of her cubs than a fool busy with some stupid project".

Hebrew Proverb

"Doing a NETGEN is like getting married - you must consider the consequences before you answer the questions".

RSX/IAS Network Generation Manual

2.0 PDP11 Software News

Documentation

In addition to the list published last newsletter the following manuals are available from the Hawken Batch Station.

BLISS-11	$4.00
PDP11 Programming Card	$1.00
PDP11/04/34/45/55/60 Processor Handbook	$7.50
Unix Programmers	$9.00
Unix Documents	$7.00

The following items have been ordered:
RT11 V3B documentation kits, RT11 reference cards, PDP11 TECO Users Guides, RSX11M Task Builder Manuals, VT55 Programming Manuals, DECGRAPHIC-11 FORTRAN programming manual, RSX11M Utilities Procedures Manuals, RSX11M Operators Procedures Manuals, RSX11M Beginners Guides, MACRO-11 Reference Manuals, and PDP11 Programming Fundamentals Handbooks, UNIX manuals.

Arthur Hartwig ext. 3021

General CLINK Description

The meeting of the PDP-11 User Group on July the 11th discussed the Computer Centre's proposals for network development as published in the Computer Centre Newsletter No. 229. Some users present felt that the Newsletter was too technical and some clarification was requested. The purpose of this article is to describe in simple terms one of the options open to RT-11 and RSX-11 users who wish to be connected to the PDP 10 in the near future.

As was stated in the Newsletter, the standard network software available from DEC is not yet adequate to meet current user requirements but the Centre has acquired several items of software from other sources which are available for use in the interim.

An immediately useful product is CLINK(Communications LINK).

CLINK allows a remote PDP 11 running RSX-11 or RT-11 F/B to connect to the DEC 10 over an asynchronous line and provides virtual terminal and file transfer capability.

Virtual Terminal capability means that a user at a terminal normally connected to a PDP 11 can log on to the DEC 10 and do any work that he could normally do if his terminal was permanently connected to the 10. He can do this by running a program called TEN on the remote RSX-11 or RT-11 system. This places the remote terminal in virtual terminal mode and he may then log in in the normal manner to a PPN on the 10.

If the user wishes to transfer files between his 11 and the 10, then while he is logged in to the 10 in virtual terminal mode he must run a program on the 10 called CLINK which will prompt with a "/" for the file specifications. ie-

.R MXI:CLINK

/10TO11 output filespec = input filespec

or

/11TO10 output filespec = input filespec

where 'filespec' is any file specification in DEC 10, RSX or RT-11 format, and 'output filespec=' may be omitted if the output file is to have the same name and extension as the input file.

When the work on the 10 is complete the user should log off as usual, then type three control-c's to exit from virtual terminal mode and return control to RT-11 and RSX-11.

Under RSX-11, TEN is a small (<1k words) non-resident task which calls on a larger (9.6k words) task called CLINK if file transfers are requested.

Under RT-11 F/B, there is one 7k program called TEN to perform both functions which can run as either a forground or background program.

If a 1200 bit per second line is used then TEN uses about 10% of available processor time and a 300 block file takes about 30 to 40 minutes to transfer.

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PDP-11's running CLINK may connect to either the KA10 or the KL10 through a normal terminal line interface. CLINK contains some of the DECnet protocol software to assure error free transmission of files but does not assume that DECnet is implemented on the 10 or the 11.

CLINK has been written specifically for the PDP-11 user who has an occasional need to access PDP 10 facilities. It is fairly simple to implement and requires minimum resources and consequently there are some apparent constraints. For instance it will only allow one PDP 11 user at a time, although the 10 can support several PDP-11's concurrently.

CLINK has been written to use DL11 asynchronous line interfaces for both the PDP 11 terminal and the line to the 10. The console terminal in a standard RT-11 or RSX-11 system is connected via a DL11 anyway so it can be used to run CLINK, but a separate DL11 is still required for the line. A terminal connected via a DZ11 cannot run CLINK without extensive modification to the software.

Once a job, such as a file transfer, has been initiated on the 10 from a remote 11, then the user cannot use that terminal for any other purpose until the job is finished.

CLINK has extensive terminal display options which provide information about the files it is transferring and generally about what it is doing. Therefore a PDP 10 log file is not required or produced.

HELP facilities are extensive and well structured - users should have no troubles with running CLINK.

For example:-

```
.R MXI:CLINK
/HELP
    CLINK is a  file transfer program.  It will use an  ordinary dial-up
    asynchronous telephone line to send both text and  binary information
    between the DECsystem-10 and a PDP-11 running RSX-11M or RT-11 F/B.

The HELP information is  divided by  topics.  To get HELP for a
specific topic, type

    HELP topicname

For example, for help with a CLINK error message, first type

    HELP ERROR

For a list of interesting help topics, type HELP *.
/HELP *
```

Try the following phrases after the word HELP as a CLINK command.
You may abbreviate the word HELP to the letter H but you must type
the help topic phrase in full.
Commands
Remote Commands
Virtual Terminal
Switches
Filenames
Error
Miscellaneous

The topics listed above will get you to all of the HELP that there
is. If you would like to "zoom" to a particular help phrase that you
have seen before, you can get a list by typing HELP **.
/HELP FILENAMES

The filenames that CLINK accepts are in the same format that the
system on which the file is stored normally accepts filenames.

Type one of the following HELP phrases (after the word HELP, of
course):
DEC-10 FILENAME
RSX FILENAME
RT FILENAME
/HELP RT FILENAME

RT-11 filenames are specified as follows:

device:name.typ

device: device name (2 characters) and unit number (0-1
        octal digits), defaults to DK0: if omitted

name: filename (1-6 RAD50 characters), defaults to null
        if omitted

typ: file type (1-3 RAD50 characters), defaults to
        null if omitted

For example:

DX1:RAMBLE.SAV
/HELP COMMANDS

CLINK Commands are entered after a prompt of a slash (/). The
commands direct CLINK to take some action. Each command may be
abbreviated to the smallest number of unique characters when it is
used as a command (not now).

For more information, type HELP and one of the following:

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```
10TO11
11TO10
STORE
RETRIEVE
DISPLAY
DECIDE
QUIT
SWITCH.INI
Indirect Commands
Initial Commands
Debugging Commands
```

An example of a file transfer:-

.R TEN   (to RT-11 - creates a virtual terminal)

.LOG [200,150]   (log on to the TEN in the usual way)

  etc.

.R MXI:CLINK   (to the TEN)

NIH CLINK
DEC-10/TOPS-10 CLINK 2.0.0.0 TALKING WITH
RT-11/RT-11 CLINK 2.0.0.0

                                (CLINK identifies the operating system at
                                both ends)

/11TO10 DSKB:ELE.MAP[250,150]=RK2:TEN.MAP

                                (the user enters the details of the file to
                                be transferred from the 11 to the 10 and
                                renamed)

DSKB:ELE.MAP[250,150]<==RK2:TEN.MAP -- 9216 bytes, about 1.7 minutes

                                (CLINK determines the size of the file to be
                                transferred and estimates the time to
                                transfer it at 1200 bits per second)

9 8 7 6 5 4 3 2 1 0.   (CLINK counts down in units of 1k bytes as
                                the transfer takes place; the numbers
                                indicate the number of k bytes to go)

112 bytes /second; 9216 bytes(18 records) in 1.3 minutes

                                (the file has been transferred and it
                                actually took 1.3 minutes)

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/Q   (prompt for the next file but Quit to exit
                                    from CLINK)

K/F   (to log off from the TEN)

    etc.

.^C^C^C   (to return to RT-11)

    Other statistics and status information may be printed if required,
or all dialogue may be suppressed.

    More complete documentation on CLINK is available in CLINK.DOC on
DOC:.

                                    John Barker

CLINK now available

    CLINK is now functioning under RT11 (as a background job only)
and RSX11M.   The only hardware requirements above a standard system
are a DL11 (any type) to drive a terminal line to the DEC10.   CLINK
works on both the KA10 and KL10. The terminal line to the DEC10
should have a speed of at least 300 baud but preferably 1200.   All
the time estimates that CLINK makes are based on a line speed of 1200
baud.

    The operating system facilities required to use CLINK are:

    1. RT11: timer support (included in FB and XM
        monitors, SYSGEN option for SJ monitors), the
        interrupt vectors used by the DL11 for the line
        to the DEC10 must not have been specified as
        device vectors at SYSGEN time.

    2. RSX11M: the data base for the drivers LR:,
        LX:, and VT: must be built into the executive.
        This will necessitate rebuilding the operating
        system.

Under RSX11M a number of techniques can be used to vary the size
of the CLINK task used for file transfers. The figure of 9.6K
words quoted earlier is the maximum size.   In addition to the
task the 3 drivers when loaded occupy less than 1K words.

    Users desiring to implement CLINK on their systems should
contact me.

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FILTRN not supported

FILTRN was a program written to perform file transfers between RT11 and the DEC10. It was distributed to some departments who had an immediate need for file-transfer facilities. However there were a number of deficiencies in it. Now that CLINK has become available, since it offers all the facilities of FILTRN (and more besides) and doesn't have any of the deficiencies known to exist in FILTRN, FILTRN will no longer be supported. Users are warned that they use it at their own risk.

Arthur Hartwig ext. 3021

RSX11M PASCAL now available

Both the "BSM" and Swedish PASCAL compilers mentioned in the previous newsletter are now available. Users desiring to obtain this software should ring Bryan Claire or me.

Arthur Hartwig ext. 3021

3.0 Terminal Supplies

Supplies of ribbons and paper for TTY model 43 are to be available from the central store. Please contact the store before placing outside orders.

4.0 PDP11 Users Group News

(i) "The UNIX Operating System"

The next meeting of the PDP11 Users Group will be the first of a pair of discussions on operating systems. This meeting will feature a talk by Robert Buckley of the Department of Computer Science, on the UNIX operating system, developed by Bell Laboratories and now enthusiastically adopted by Universities throughout the world.

The UNIX system offers a number of radical features not found in other operating systems, and this meeting is

essential for any user running or considering a multi-user installation. The system will be demonstrated on the Computer Science Departments PDP11 after the meeting.

Meeting date: Wednesday 27 September at 2.00pm
     Location: Room 214, Hawken Building

(ii) "The RSX-11M Operating System"

For users considering only the standard DEC operating system, the second meeting will be a talk by Bryan Claire, of the Prentice Computer Centre, on the RSX-11M system, its features and requirements.

Meeting Date: Wednesday 4 October at 2.00pm
     Location: Room 214, Hawken Building.

Both meetings will be followed by discussion of any hardware or software topics of interest to mini-computer users.

Al. Henderson
Secretary ext. 3003

5.0 Interprocessor Communications

Part 1 DMC11s and DDCMP

The DMC11 is a high speed synchronous communications interface for PDP11 systems (excluding the PDP11/03).

The interface consists of two hex high modules (ie. two full backplane slots required), one module being a high speed bipolar microprocessor and the other a line unit with an EIA RS-232C interface.

Line speeds of up to 1 Mb/s are possible depending on the line unit and microprocessor combination used. However the maximum line speed for use into the Prentice Computer Centre KL10 will be considerably less than 1 Mb/s.

The DMC11 operation is via NPR (Non Processor Request - the DEC term for Direct Memory Access - DMA). All messages between DMC11s are taken from or assembled into PDP11 memory via NPRs and the PDP11 interrupted only when transfers are complete or particular error conditions occur thus imposing minimum overhead on the PDP11.

Up to seven messages to be transmitted can be queued by the

DMC11 as well as seven receive buffers. After initialisation, to transmit a message, the PDP11 need only supply the bus address of the message and the byte count to the DMC11. Similarly, for reception the PDP11 need only supply a buffer address and size.

The DMC11 formats a message to be transmitted according to DDCMP protocol (Digital Data Communications Message Protocol) implemented in ROM on the DMC11 microprocessor module.

DDCMP is DECs message protocol and supports both synchronous (DMC11, DUP11 etc.) and asynchronous communication (DL11 etc.) unlike protocols such as SDLC, BiSync and others which support only synchronous communications. The function of DDCMP is (amongst other things) to provide a means of identifying messages (destination, source, type of message) and error detection.

Error handling is by retransmission, ie. if an error is detected in a message (cyclic redundancy check (CRC) or format error) a NAK (Negative Acknowledge) is returned by the receiving DMC11 in place of an ACK (Acknowledge) causing the source DMC11 to retransmit the message a number of times up to an error threshold level at which stage the PDP11 is interrupted. Hence occasional retransmissions are transparent to the PDP11 in effect transforming an error-prone physical link into an error-free logical link.

It is this error free link provided by DDCMP which is the building block for DECNET high level protocol links.

To be continued.

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