UNIVERSITY OF MINNESOTA COMPUTER CENTER
Deadstart Systems Newsletter

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Send all comments, criticisms and contributions to the editor: T. W. Lanzatella
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NOTICE OF CHANGES TO THE SYSTEM

Brian Hanson installed the following changes.

1. A problem in LOD processing in CPUMTR left ECS FL erroneously set after certain
    calls. The problem seems to have effected only PASCAL(/GT) for some users.

2. In order to save core in 1AJ, a complex algorithm used for loader selection was
    simplified to assume a dollar sign in the fifth position of the entry point
    name. This change requires that the entry points LDR$ and LDSET$ in Cyber
    Loader be changed to LDR=$ and LDSE$. This change provides enough space in 1AJ
    to restore a level 13 PSR from CDC which corrects a bug in entry point address
    calculation when FWA is specified by the user.

3. Treatment of execute-only files was tightened by prohibiting execute-only file
    loads to a subcontrol point.

4. An alleged bug in LINK processing of REDUCE(-) was repaired.

Marisa Riviere corrected a field length control problem in CALLPRG which resulted
in OUTPUT BUFFER ARGUMENT ERROR if a local Callprg index entry specified a MS
(message) parameter and the current RFL was small enough. Additionally, XMIT
type writeup files should now function.

Tim Salo contributed the following changes.

1. A new source of COMPUSS was installed with resequenced labels.

2. A new common deck, COMPCOC (convert origin code to display code) was installed. This common deck is similar to COMPTID but much simpler to use.

3. DISPOSE was altered to allow the new ASCII disposition code (AA).

4. BATCHIO was altered slightly to accommodate the LQ equipment type in preparation for a ASCII chain on the 512 printer.

5. Field length requirements of program BIN were reduced to 400B from 5000B by removing some old and unused code.

Kevin Matthews contributed the following corrections.

1. B-display processing in DSD was corrected to handle an arbitrary number of control points (up to 27B) and still look reasonably nice.

2. MAGNET processing of E,P - display data was corrected for the case of greater than 15 control points.

3. Code related to the installation of 844 disk drivers (both DI and DJ) had previously been maintained as a single modset on JPL (DJMODS). This code has been functionally separated into two modsets (MSMODS and DJMODS).

4. A correction to 6DI related to error recovery processing was extended to include 6DJ. COMMMSE was also altered to accommodate this change.

5. Kevin repaired a bug in 1RI related to CHKPT/RESTART. This bug caused several crashes in the recent past.

Jeff Drummond altered CONTROL to enforce the correct number of arguments on several CONTROL type statements. Jeff also changed the 026 commands RDIS and RDROP to perform a WRITER instead of a WRITEF on the specified file.

The following changes were produced by Don Mears.

1. Most notably, CP time processing during extended suspended-mode is now working.

2. Several DPT related errors were corrected.

3. A problem in which the next control statement is ignored after a program is *TERMINATED* was fixed.

4. WPL deck CODING, the KRONOS coding conventions, was enhanced to encompass PDP-11 code.

5. The TELEX active user count was again corrected.

6. TELEX idle loop was streamlined, hopefully decreasing CPU utilization.

PROPOSED CHANGES TO THE SYSTEM

TWO COMPASS Proposals - by Jeff Drummond

I. I propose that the MFL= entry point in the COMPASS assembler be changed to a lower value or eliminated. Currently, all COMPASS assemblies require a mini-

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mum of 50100B words CM due to the current MFL= entry point. Several factors can allow a program to assemble in less than 50K ... these include:

a. small program size.
b. not requiring SYSTEXT (S=0) parameter.
c. using ECS to reduce CM requirements.

Several possible solutions exist:

a. make COMPASS "intelligent" and allow it to raise and lower its FL as needed.
b. change the MFL= to a lower value, say, 45000B.

For the present, I would suggest changing the MFL= entry point and study the possibility of making COMPASS manage its own field length. Bill Wells has already done some preliminary work on this.

II. Additionally, I would like to enhance the COMPASS B-Display message to indicate which PASS it's in and to indicate if any errors have occurred. With the recent mode to allow TELEX users to see their B-Display message, I feel this would be a useful addition.

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A Proposal With No Name - by Jeff Drummond

I would like to propose some changes to the SUI and SUN control statements. Specifically, the addition of an optional packnam parameter. The form of the SUI and SUN control statement would be:

SUI(ui,pn)
                   and
SUN(un,pn)

where   ui= user index
                      un= user number
                      pn= packname, if omitted the current packname is retained, if "0" or a null parameter (e.g., SUI,ui,.) the default pack-name is selected.

The new forms of SUI and SUN would be upward compatible with the present forms and could save thousands of keystrokes on the console. For example:

SUN,YZE6039   SUN,YZE6039,STF.
PACKNAM,STF.   PURGALL,TY=A.
PURGALL,TY=A.
   (before)   (after)

A similar case could be made for a FAMILY parameter, but I would prefer not to make it.

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INITIALIZE Proposal - by K. C. Matthews

On the CYBER 74, the operators initialize equipment 4 and 7 (the 808 and ECS) for every level 0 deadstart, Currently, the INITIALIZE command must be entered from the keyboard, and cannot be in the CMRDECK. We propose that INITIALIZE be allowed in the

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CMRDECK, since this will eliminate the need for two operator entries each morning. It will also reduce the chance of the wrong device being initialized.

The effect of the INITIALIZE can be rescinded by re-entering the EQ= entry. (This is how TEMP and REMOVE are rescinded.) If the INITIALIZE command is on a CMRDECK, it will be ignored for other than level 0 deadstarts. If entered from the keyboard, the command is illegal for other than level 0 deadstarts.

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SYSTEM= Proposal - by K. C. Matthews

This is a redesigned submission of a proposal by R. A. Williams (DSN - Vol 2, No.17, 7 August, 1976). It concerns the selection of devices on which the SYSTEM (deadstart tape plus all SYSEDIT's) reside.

In the stock CDC system, the bottom 6 bits of word 14 of the deadstart panel can select any of equipments 00-05 as system devices. If any of these bits are set, the corresponding equipments are selected as system devices, and the deadstart proceeds without bringing up the CMRDECK deadstart display.

If one wants to bring up the CMRDECK (to make some changes, or just to look at the CMRDECK), the bottom 6 bits of word 14 must be 00. Then no system devices are selected. So one can enter SYSTEM= N1,N2, ..., NN. to select the system devices. The SYSTEM= command can only be entered from the KEYBOARD, and cannot be on the deadstart CMRDECK. This is unfortunate, especially since one must use the SYSTEM= command to select a SYSTEM equipment ordinal which is greater than 5. SYSTEM= command rescinds any previous SYSTEM= commands. The command also fails for equipment numbers greater than 13 (a bug).

We now propose a mod which makes the following changes:

1. The SYSTEM= command is legal from either the CMRDECK or the KEYBOARD. As before, SYSTEM= will rescind the effect of any previous SYSTEM= commands. The mod being proposed also fixes the bug above.

2. If the bottom bits of word 14 are 00, the CMRDECK is displayed. If non-zero, they are saved for use in step 3, and the CMRDECK is not displayed.

3. If there is no SYSTEM= from either the CMRDECK or from the KEYBOARD, then the bottom 6 bits of word 14 select the system devices.

4. As before, if no system device is selected at all, equipment 0 is the system device.

Note that the proposal is upward compatible with the CDC method. If no SYSTEM= appears in the deck, it works exactly like the CDC deadstart. If a SYSTEM= appears in the CMRDECK, the bottom bits of word 14 will only select whether or not the CMRDECK is to be displayed. We would like to implement this change so that operator entry of the system device is no longer needed.

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NOLOOK Proposal - by K. C. Matthews

When REMOVABLE PACKS are enabled, the PP program CMS is called about once a minute. CMS checks the label track for each mass storage device. This is usually how we

find that pack UCC has been wrecked.

CMS also complains if a non-removable mass storage equipment is logically OFF.
This is probably a good idea, since the device may have been turned off accidentally.
Unfortunately, CMS stays around forever complaining about the device. Even if it
is STOPed, another copy of CMS will come in and complain. One can stop this pro-
cess only by disabling removable packs or by turning the equipment on.

Sometimes, we have an equipment which we prefer that CMS would not check at all.
This usually occurs when there is something wrong with the equipment, and Systems
people are attempting to solve the problem. During these times, we would like to
tell CMS to get lost and stop bothering us, without disabling removable packs.

Hence, we propose a NOLOOK bit in the Mass Storage Table (MST) for each device. The
NOLOOK bit will tell CMS not to check the device. NOLOOK will be implemented much
like the TKLIM bit, which tells the system how to treat track limit on each device.

There will be a NOLOOK CMRDECK command.

                    NOLOOK,N1,N2, ...,nn.

will set the NOLOOK bit for equipments N1,N2, ...,nn. The DSD command NOLOOK,N.
will toggle the NOLOOK bit for equipment N.

Unfortunately, as for the TKLIM bit, there is no way to see whether the bit is set
or not without looking in memory with one of the memory displays. This is quite
inelegant, and I hope that someday we can generate a better display for mass
storage equipments. But for now we are asking that this proposal be accepted with-
out a neat way to display the status of the NOLOOK bit.

SYSTEM MAINTENANCE: PEOPLE AND PROCEDURES

Last Week's Systems Group Meeting - by T. W. Lanzatella

1. The following proposals were rejected or accepted.

    a. W. Kaercher's proposal to alter the way that PFM treats permanent file
        purge requests was defeated.

    b. W. Kaercher's proposal to invent a new SYSTEXT symbol defining the FWA of
        ABS type CP programs was defeated. The proposal, however, spurred the
        possibility of resurrecting our old MOMS macro called ENTER which at least
        helped to manage the origin of ABS type CP programs.

    c. Don Mears proposal to employ the bell character as a signal to 1TD to
        suspend output without loss of data was approved (see DSN 3, 16 p. 3).

    d. Don Mears proposal to unify the PDP/11-6676 time-sharing log-in sequence
        (see DSN 3, 16 p. 3) was accepted by the Systems group but due to the
        broad effects, M. Skow and R. Franta were given veto power, Messrs. Skow
        and Franta not having been present to voice their opinions.

        (They later vetoed the proposal, suggesting instead that the change not be
        made until the hardware on the PDP-11 is ready. They also demonstrated that
        the proposed change is totally unnecessary if we allocate some constant

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speed rotaries on the PDP-11. If this were done, the change would be transparent to users on non-autobaud ports. Users could then be gradually moved to the autobaud rotary and informed of the new log-in procedures. - ed)

2. Jerry Larson's article, Operations - Assorted Requests, was discussed at length (see DSN 3, 16, p. 5).

   a. I.A - Leo May claims this bug will be fixed soon.

   b. I.B - Don Mears will have a new version of the PDP-11 plotter driver soon.

   c. I.C - Bill Wells will have to delve into 2TJ in order to repair this.

   d. II.A - This is a nontrivial development project and will be considered as a school year project.

   e. II.B - Tim Salo and Jerry Larson will work on this to determine a consistent method.

   f. II.C - UCC will be removed as a temporary device.

   g. II.D - A definite school year project.

   h. II.E - Bill Elliott will look into this after he returns.

   i. II.F - Complete SWITCH/PURGE messages will appear in the account file soon.

   j. II.G - Very little can be done about long waits for output at Experimental. We will ask R. Franta to check the current divert limits.

   k. II.H - Tim Salo will install the requested banner page changes.

   l. II.I - Tim Salo will install the requested changes to the line printer tests.

   m. II.J - Errors in tape statistics gathering and processing will be repaired by W. J. Elliott when he returns.

   n. II.K - Tim Salo will check into the problem of not checking punch file header cards.

   o. II.L - A queue listing facility will be added to users/DSD.

   p. II.M - Accurate line counts is an open problem, we will look into it.

3. Mike Frisch's discussion of the CYBER 80 brought some interesting commentary. See Mike's article later in this issue of the DSN.

4. Larry Liddiard informed us that the old interpreter at Experimental was removed and a discussion on no-smoking in the Lauderdale terminal room led to no decision.

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CALLPRG and LIBRARY Tape News - by M. Riviere

On August 25, Kevin Fjelsted replaced the Callprg entries for DARE, SPICE, LPKODE, MOPS, MAC80 and APEX with new ones in order to include the MF parameters. Kevin also

replaced the current version of APEX with the future version.

On August 29, Kevin McMahon added two new Fetch type products to the index:
ARTPRIN and WEAVE. ARTPRIN is a new art program library development and will
eventually replace ARTPR50 and ARTPR66. WEAVE is a program that models a loom
and allows users to generate patterns on a line printer or plotter before weaving
them.

Also on August 29, Howard Kurs updated the future version of System 2000. This
update brings S2000 to level 2.60B. Also, on September 1, John Cosgrove updated
the current version of the same package bringing it to level 2.40Q. John also
changed System 2000 to be a Callprg account number file instead of a Library file.
Both modifications took place on the Cyber and the 6400. The modifications to
both versions of System 2000 are described by Howard and John in two articles in
the September UCC Newsletter.

On September 1, John changed again the future version of System 2000, bringing it
up to level 2.60C. Several errors are fixed in the new versions.

On September 1, John Cosgrove replaced the binaries for current and future COBOL
and future SORTMRG with versions that he re-edited through MFLPRO in order to add
field length adjustments. John also added an MF parameter on the current COBOL
index entry. With these modifications the addition of a REDUCE(-) statement on
the user's job to preserve the requested RFL for COBOL and SORTMRG jobs is no
longer needed.

Michael Frisch changed several routines and added some new ones on the arithmetic
section of Future FORTRAN. Michael has a detailed description of the modifications
in the September UCC Newsletter. The new routines are PRCON, used for line
printer contouring, RANBIT that generates arrays of random bits and RANT that is
similar to RUN2F, a random number generator, but uses a different method and pro-
duces a different sequence. The modifications of the other routines are mainly
a revision to use PROCER for error processing.

On the 6400 section of the Callprg index Michael Skow introduced a new private
user maintained package, REGHELP, as Fetch type. REGHELP is maintained by
S. Weisberg, from the Applied Statistics Department. REGHELP is the help file
for MULTREG. MULTREG is a multiple regression program and it is already included
as a do type Callprg package on the 6400 section of the index. MULTREG is also
available as Fetch type on the CYBER section. It was introduced by S. Yen on
June, 1977 and announced in the June 21 DSN (Vol. 3, No. 12).

On September 13, MNF will be replaced by its future version. This version is
considerably different from the current one and announcements and documentation
about it have already been made in several UCC Newsletters, Sysnotes and Writeups
(MNF,NEWMNF). The current version of MNF will become past. Some 6400 users may
be affected by the change of the past version since the past 6400 version is now
compatible with the RUN compiler. The versions of MNF to be used on the Cyber and
the 6400 are not completely identical. There are some differences in the opti-
mization sections made in order to allow MNF to run on the 6400 using a smaller
field length. The MNF libraries, however, MSIO and MNFCL, are going to be common
to both computers and will be included on the common section of the Library Tape.

Also on September 13, RUN and RUN23 will be removed from the Callprg index. The
index entries for RUN's associated library/libraries (RUNMINN, Past, SYSLIB, Fetch,
SYSLIB and OLDSYS) will also be removed from the Callprg index. However, two old
versions of SYSLIB (Past and OLDSYS) will remain as Callprg files in order to keep

them available for COBOLX and OLDFT3. A library clean up may be taking place later on in order to remove all the unused sections of these old libraries.

As part of the end-of-the-quarter changes I will be replacing the version of SYSLIB on the Library Tape with a new one updated with the latest versions of the common decks.

Also as part of the end-of-the-quarter changes the future version of FORTRAN will be replacing the current one.

The next Library Tape and Callprg index modifications will take place on September 22, that is a few days ahead of their usually scheduled date (September 27) in order to accommodate the end-of-the-quarter changes. Requests for modifications should be submitted no later than September 15, by noon.

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Exhortations to the System Programmer - by K. C. Matthews

We have been placing notes on the CYBER 74 console whenever we want the operators to do something out of the ordinary. This works fine, since the operators cannot miss the notes. It looks ugly, however, and there is no record of what notes had been on the console. We would like to try to use the first section, (Section I, Operator Notes) of the CYBER 74 operator guide.

This guide is located on the table behind the CYBER 74 console. To make an entry find the first blank box. Enter the date, your name, and the requested change. Make sure to indicate the effective dates of the change if necessary. You will have to take a sheet out of the protective plastic covers in order to fill it out.

This will result in a neater looking console and Operations will keep a permanent record of our requests. The operators will check this section of the Operators Guide before each deadstart. They will begin doing so on Friday, 9 September. Thank you.

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Liberal Use of REDUCE(-) - by M. Riviere

I have recently discovered that some users are inserting REDUCE(-) command to circumvent the recent limitations imposed on field length allocation.

In principle the usage of the REDUCE(-) card should not be needed in user's jobs for field length adjustments when using Callprg package.

However, not all our Callprg products may already have been modified to match the Loader's modifications.

If you see a user's job that includes a REDUCE(-) card when using CALLPRG packages please check to make sure there is a real need for it.

To check it obtain a catalog of the package. If the catalog's list shows the existence of an MFL= or RFL= entry point that means that the REDUCE(-) card is not any longer necessary.

Some products may not show RFL= or MFL= entry point on the catalog's list but have

internal field length computations and memory requests to obtain the space needed to run. A test run, requested after a very short RFL statement can show if the product includes a field length adjustment capabilities.

If the usage for the REDUCE(-) statement still shows to be needed, please let me know about it. Also inform the programmer in charge of the product.

The usage of the REDUCE(-) card when it is not necessary defeats the Loader's field length modifications that were made in order to utilize, in the most effective way, the computer's available memory.

Let us try to have all our products fitted for this modification before the classes start in order not to build a user's habit of inserting REDUCE(-) cards to fix problems that we should be fixing ourselves.

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More on Long Range Requirements (Cyber 80) - by M. Frisch

At the last Systems meeting, the discussion on this topic came near the end so there was not much time to talk as I had hoped. Perhaps some more time will be available at this week's meeting.

Andy Mickel began the discussion by telling of rumors he has heard from CDC employees that the Cyber 270 (new name) will have 64 bits but will emulate 60-bit machines. The system will use a PASCAL-like language extensively.

I mentioned some of my thoughts on what might be desirable. These included:

> A multi-thousand-port time-sharing system. Larry Liddiard felt this is not a good idea. He mentioned that the Terak Co. plans to have time-sharing on LSI-11 type equipment which will be so cheap that no low-level time-sharing will be needed on big machines. There would still be a need for high-level time-sharing (like interactive graphics).

> A multi-mainframe device, i.e., several different-size mainframes of the same type that could be tied together and be able to access a common super scale mass storage data base. Larry felt that a single large-scale machine is better than multi-mainframe. He noted that the CRAY2 will have a single very large memory and one or more large scale processors that can access it. Somebody mentioned that if the big machine is down, it is hard to have backup available.

> There should only be one operating system. Somebody commented that more than one operating system allows room for competition. I think competition can be good but it's hard on users (and system programmers) to have to contend with more than one system.

> A UNIX-like operating system. I don't know enough about UNIX to know if it is applicable but it has won praise from operating system practitioners--at least in the academic world. At the mention of UNIX, someone mentioned that stack instructions would be nice on a new machine. (Larry says this is essential if there is a PASCAL-programmed operation system.)

At this point, a general discussion ensued about desirable machine features. I'll do my best to summarize. Larry felt that 8 or 9 bit characters are desirable. He

recommended a 72-bit word as he thinks it is hard to design hardware for a multiple-of-2 size word (e.g., 64). Someone mentioned a transfer-and-set-register instruction. A fast save and restore of all registers was mentioned in contrast to current CDC machines. Integer divide with remainder also being available was suggested. Character-addressing instructions which match with the character set were mentioned. Someone requested that there be no paging, or at least a way to turn it off. A 48-bit coefficient as a minimum, a larger exponent range to make use of the Ew.dEe format specification in the new FORTRAN standard, and easy-to-do extra-precision floating point were mentioned. Software-selectable emulation mode was deemed desirable. Array processing was another feature mentioned. John Cosgrove mentioned INGRESS for data base manipulation and a special purpose data-base processor. Extra-smart controllers and a peripheral processor with more than 4K of 12-bit words were urgently requested. On-line preventive maintenance a la the Amdahl 470 was suggested by Larry. He also requested access to micro instructions via an escape command (like the way the CMU compare move instruction is implemented) which would be helpful for extra-precision multiply commands needed for ALOG,EXP,SIN and COS routines. Someone recommended not emphasizing PL/I and avoiding doing any new work on it. Using previously-written code for this was also recommended.

There were a few more ideas I didn't get a chance to present which I'll list here.

A consistent and well-thought-out Job Control Language including a standard for truly uniform parameter lists.

An operating system language similar to PASCAL rather than COMPASS. CALLPRG and WRITEUP (or similar kinds of packages) and other installation-oriented packages. I'm interested in hearing from our staff as to what changes we have made to standard KRONOS which ought to be in future computer systems.

Well-supported facilities for interactive graphics without degrading the rest of the system. This would be needed for graphics that needs heavy computer power such as partial-differential-equation solution.

As I have mentioned, I am interested in any other ideas you have, especially from members of the executive committee who may have a better idea of what our future needs can be expected to be.

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CYBER 74 Deadstart Analysis - by K. C. Matthews

Monday 22 August - Sunday 4 September

Tuesday, 23 August

22:36   (DD-10)

Someone using a stolen UCC staff user number was experimenting with check-point/restart. He wrecked a word in the control point area part of the checkpoint file in just the right way to cause a PP to be called to control point zero. When a PP drops at control point zero, it messes up some pointers in low core and eventually hangs CPUMTR on a trap we placed there. The low core pointers were messed up enough to require a level 0 deadstart. The checkpoint/restart problem was fixed the next afternoon. I credit the system crash to dumb luck on the thief's part, rather than to any shrewd insight into the system.

Wednesday, 24 August

00:06   (DD-11)

          Same user and problem as above

12:37   (DD-1)

          Same as above.

Thursday, 25 August

14:20   The lights blinked briefly and the system went down. A level 3 should
          have worked, but unfortunately we changed the number of control points
          in the CMRDECK on the tape.   This required a level 0 deadstart.

Monday, 29 August

13:55   While using the DSD N display to look at a file, the system hung.

14:00   (DD-2)

          Same problem as above but a dump was taken this time. The dump reveals
          that most PP's are waiting to get at the disk for EQ11 on channel 30.
          EQ11 is a dual access device and was the system (deadstart) device.
          Each PP was in a driver seek wait monitor function waiting for the
          drive because they were all finding that the unit was reserved, via
          the controller, on channel 30. This could possibly have been a
          hardware problem. It also could have been a software problem caused
          by a failure of the system to release the unit after an I/O operation.
          The problem never came back and we cannot be sure of the cause.

Friday, 2 September

08:00   Drive 7BC (DN30) was bad at deadstart time. We tried to initialize the
          device and reload it, but there were errors even in initialization. The
          engineers found a problem in the controller where drive 7 is accessed.
          The device was then reloaded. Since it was reloaded before any work was
          done for the day, and all files were restored as of 04:00 in the morning,
          no files were lost. But we were down for 2 1/2 hours.