

UNIVERSITY OF MINNESOTA COMPUTER CENTER  
Deadstart Systems Newsletter

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NOTICE OF CHANGES TO THE SYSTEM

NOS Changes

The following changes become effective on Thursday, 22 February.

Tom Lanzatella repaired an error in the recently installed ABRC message processing in ITA. The error caused garbage job names in several account file messages if LOWRATE was in effect. Tom also altered modset HISTORY to document a standardized mod naming convention. The purpose of this change was to deal with the occasions when we receive code from CDC as TWX code or critical code. This code is usually installed as a JPL modset with the modname received from CDC. The mod is then almost indistinguishable from stock code causing some confusion for individuals who have to alter the modset. The new document is required reading for everybody who modifies the system. A copy will be posted at Lauderdale.

John Larsen contributed a version of the new CDC utility NOTE (see DSN 5, 1 p. 2). Until we actually convert to Release 4 of NOS, the program will reside on MPLNOS.

Kevin Matthews installed the following changes.

- 1) The installation of a MMF status word was completed except for a small change to OEF.
- 2) Kevin installed his proposed change to the formula used to convert SRU index to SRU limit (see DSN 5, 3 p. 14).

- 3) The U of M word in the FET for queue files was moved from FET +5 to FET +10. This word holds bin number, MID and a host of flags. Most individuals who maintain application packages which manipulate queue files should have been contacted personally.
- 4) Program MODVAL was corrected so that a proper password is set when in creation mode. This error resulted from the recent installation of password hashing.

Don Mears installed utility program from CDC which uses the console to simulate a TELEX terminal session (CTS is the name of the utility). Don also installed extensive changes to LKT the link test utility.

Tim Salo installed a utility to simulate a 6674 (called U74) which will be used during the development of the new IMPORT package. Site 2H was added to SUPIO and timing code was added to LHS to help determine line utilization. Additionally, Tim added code to LSU which functions the PDP-11 seven times after receiving a zero status from the link. This code was added recently as a temporary solution to the problem of false zero status from the link.

Tim Hoffmann repaired LAJ to leave secure memory set before calling the loader. Tim also repaired a residual error in his new DUMPPF feature which allows reloading CDC dump tapes with DUMPPF.

Hesung Byun corrected errors in the local common decks COMCUDD and COMCUOD (unpack decimal/octal digits) discovered by Steve Reisman. The routines fall into an infinite loop if a blank entry is passed. Hesung also reinstated the UFM function which causes the smallest tape job in the system to be rolled in if all tape jobs are rolled out. This scheduling feature helps to keep tape jobs moving through execution when the queues are very full. The feature can be enabled or disabled with PMS bit 14.

Marisa Riviere corrected a small error in RFM related to date processing in determining file age. Marisa also installed a temporary kludge in RFM to get around the current bug in PFILES which leaves bit 59 of the user control word always set.

Bill Sackett repaired a timing problem in LRO which was clearing the FNT entry for a primary file even though LRO was recalling itself because of a track limit or FNT full situation.

Brad Blasing installed a memory saving change to PFILES. The change causes PFILES to not request large buffers when catlisting only one file. Brad also repaired a notable error in PFILES wherein a RETAIN command followed immediately by a CHANGE command resulted in RANDOM INDEX ERROR (huh?).

Steve Collins installed his proposed change to PASSWOR. The command PASSWOR (OLDPW,NEWPW/UN=...) will now work only if OLDPW is correct or null (see DSN 4, 22 p. 182).

#### KRONOS Changes

The following changes become effective on Thursday, 22 February.

Steve Collins installed changes to PASSWOR as described above.

PROPOSED CHANGES TO THE SYSTEM

MULTI and NOS - by S. A. Reisman

I would like to install MULTI into NOS at level 485. For the time being it will only be available during system time while we investigate such things as system stability and job accounting.

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System 2000 Utility Programs - by S. A. Reisman

I would like to put up a set of system 2000 utility programs. These programs were written at Florida State University, and they have supplied us with extensive documentation. Here is a summary of the routines:

- BUILDL5 - Takes a flat file as input and builds S2000 loader strings.
- CLEAN - Process data files for S2000, combines multiple records into single record, cleans up messy data.
- CRUNCHB - Processes an S2000 definition for use by subsequent non-S2000 programs.
- S2KEST - A new file-size estimating program which takes an S2000 definition as input.
- S2K/S2KIA - A program which provides a new S2000 calling sequence that allows use of indirect access data files and provides other labor-saving parameters.
- SINPUTB - An interactive program which takes an S2000 definition and builds loader strings by prompting the user for input.
- S2KNPUT - A procedure file which flip-flops between CRUNCHB and SINPUTB.

If you would like to see a copy of the documentation, give John Cosgrove a call.

SYSTEM MAINTENANCE: People and Procedures

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

- 1) The following proposals were rejected or accepted.
  - a) Marisa Riviere's request for guidance about the treatment of RA+64 for CALLPRG loads when the EX parameter is specified on the CALLPRG index entry resulted in the decision that the word should be set with the value of the EX parameter, not the product name as is now the case (see DSN 5, 3 p. 12).
  - b) Tom Lanzatella's proposal to install NOS release 4 (PSR 485) at the end of SSII was accepted (see DSN 5, 3 p. 13).

- c) Kevin Matthews' proposed change to the SRU validation formula was approved (see DSN 5, 3 p. 13).
  - d) Kevin Matthews' proposal to install a new command SETSL was rejected in favor of an alternative suggestion that the stock SETASL and SETJSL commands be changed to accommodate the intended action of SETSL. Since the alternative suggestion is itself debatable, a new proposal will eventually be published (see DSN 5, 3 p. 17).
  - e) Kevin Matthews' proposal to install a default SRU limit was approved. The exact number to be used as a limit (corresponding to a dollar amount) and UCC policy as to credit for jobs which accidentally encounter the limit was left up to the executive committee.
- 2) Larry Liddiard announced that the new Lauderdale offices were complete but we don't know yet who will occupy them. Larry also discussed equipment acquisition over the coming year.
- a) The 885-11 FMD and 7155-1 controller will arrive in July. Initially the disk will be connected to the C74.
  - b) A second 885-12 FMD will arrive in December and will be shared between the C74 and C172.
  - c) The old 607 tape drives will be retired this summer. We are ordering three 677 drives and four 679 drives (I didn't get the exact distribution of this equipment over the mainframes.).

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CALLPRG and Library Tape News - by M. Riviere

On February 15, Dan Germann changed the Cyber Callprg index entry for PLOT31. This change made Callprg retrieve PLOT31 from a direct access file. Also on February 15, Dan introduced CGS, a new fetch type package to be used for Tektronix terminal character generation.

On February 27, Steve Reisman will be modifying the Cyber Callprg index in order to introduce several S2000 aid packages. The names of these packages are BUILDS, CLEAN, CRUNCHB, SINPUTB, S2K, S2KEST, S2KIA and S2KNPUT and they will be introduced as control card callable products. Steve is writing an article in this DSN issue describing and proposing his products and informing about the availability of the products' documentation.

Also on February 27, Kevin McMahon will be introducing a future version of ARTPRIN. The next Callprg and Library Tape modifications will be taking place on March 13. Modifications for that date should be submitted before noon, March 1.

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Future Compass - by B. E. Blasing

Now available via FUTURE,COMPASS is the release 4 PSR 485 Compass assembler. This is the Compass we will be running when we go to release 4. It has the following new features:

- 1) Print density and page size can be specified on the control card (via Form and PS=nn).
- 2) Compass now dynamically manages its field length (as a side effect it seems to use too much field length in doing so).

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#### Letter to the Editor

There was some discussion in the recent DSN about displacing the CP time limit as the standard method by which a user can control the execution of a job. It was proposed to substitute SRU limits.

The invention of SRU's has always seemed to me to be a step backward. The SRU is such an unfortunate combination of active ingredients, that for most of us users the interaction of any one important component is not easy to appreciate. Therefore, to rely on it as a method of controlling separate aspects of a job is just not a very good idea.

The indirect use of SRU's to control overall job cost, however, is worthwhile. This is because of the decision here to use SRUs to charge for computing time/resources/impact. Rather than expect users to refer to or memorize a table of SRU and dollar equivalents, I would like to suggest that the actual limiting parameter be given in dollars themselves. That is very elegant, simple and obvious. As to how these would be encoded into control words, I leave that to your consideration. I would hope for more precision at the lower end (\$1 to 100).

There is one remaining and related thought I have, regarding users and limits on job processes. Since the SRU notion combines too many quantities to be able to permit control over its components, I would encourage you to think of ways to set boundaries on the major aspects of job cost and execution. That is, a user should be able to limit CP time, or mass-storage transfers, just as memory now may be limited. Supply costs for a job necessarily should be limitable. My general principle would be that if a user can be separately charged for an item, then that item should be limitable.

Finally, with respect again to the SRU, I believe that there are some jobs which inherently need to control their CP impact, others need to monitor mass-storage transfers, a few need to watch both. Jobs vary a great deal this way, and I think more need CP control. This control should not be taken away.

Phil Voxland, Director  
Social Sciences Research  
Facilities Center

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Cyber Deadstart Dump Analysis from Monday, 5 February through Saturday, 17 February -  
by K. C. Matthews

Thursday, 8 February

11:30

Both Machines.

ECS errors were reported on all three mainframes. We could not find any bad words in the DSD ECS display, however. The engineers used the Cyber 74 to fix the problem. A level 0 had to be performed on both the 74 and the 172 at 12:15.

Thursday, 15 February

14:22

Cyber 172

The Cyber 172 hung with an exchange package in the first 20 words of memory. This looks like it might have been a hardware error. The exchange package belonged to CPU 1. CPU 1 was assigned to MAGNET. MAGNET appeared to be trying a TIM system request. At the same time, MTR was trying to exchange CP1. This should be O.K. The hardware interlocks should allow only one exchange to take place. We are still investigating this crash.

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6400 Deadstart Dump Analysis (2/5 - 2/18) - by R. A. Williams

<u>Date</u>	<u>Description</u>	<u>Tape</u>
790206	1TA hung on a drop track error when an unreserved track was passed in an FNT entry. While we are not certain, we believe an error Bill Sackett recently found that shows up in FNT and track limit situations may be responsible. Thanks also to Don Mears for help on the analysis of this dump.	DDT-7
790206	1TO hung on DTKM as above, and as a result of the above.	DDT-6

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Telex and Telex PDP11 Crash Analysis - by D. W. Mears

79/01/05 The PDP11 was reloaded because users could not login. The dump showed nothing wrong.

79/01/12 I crashed the PDP11 experimenting with a problem in X-OFF processing. Fixed 79/01/14.

79/01/16 Ports 20 through 37 (Mux 1) on the PDP11 were hung. The problem was fixed by doing a master clear on Mux 1 without taking the PDP11 down. This is probably what the problem was on 79/01/05. Field Engineering swapped some cards between Mux 0 and Mux 1 and the problem has not reoccurred since.

79/01/31 Telex aborted on the Cyber 74. If I received a dump from this, I lost it. I don't know what happened.

79/02/06 Telex on both machines indicated a PDP11 crash at about the same time the Supio link hung the channel (21:00). As far as I can tell, the PDP11 was still running O.K. No dump was taken. I can't figure out what happened. The only possibilities I can think of are: all three links failed at the same time due to some power problem the PDP11 became saturated with interrupts and could not service the Cybers, or possibly an operator made a mistake when trying to reload Supio. None of these seems very likely.

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Plotter PDP11 Crash Analysis - by D. W. Mears

Plotter PDP11 crash report from 79/01/01 to 79/02/15. There are several known problems with the plotter PDP11 program among them are:

- 1) END and RERUN commands sometimes cause the plotter to hang up. They cause BATCHIO to OFF the plotter and issue a controller hung busy message to the error log. This usually can be fixed by waiting for the last buffer to plot and turning the equipment on in the EST or by using the RESTART command.
- 2) If the plotter is taken off line or goes not ready because of supplies low, sometimes things won't plot after it is made ready again. This usually can be fixed by using the RESTART command.
- 3) Occasionally all the interrupt vectors get zeroed out. This sometimes causes a PP to hang on the channel.
- 4) A garbage plot file will sometimes crash the PDP11. I had a fix for this problem, but I lost it.
- 5) On 78/02/09 the plotter and Supio links were interchanged in an effort to get Supio working. Supio is working now but there have been many plotter crashes since then which are directly attributable to a link malfunction and other crashes which are possibly attributable to the link.

In the following list of crashes, the phrase "Reloaded - reason unknown" is used when the Decwriter output shows that the PDP11 was reloaded, but there is no explanation of the problem in the daily report, HPA output or Decwriter output and no dump was taken.

- 01/03 14:13 Channel 7 hung. Interrupt vectors are zeroed out.
- 01/03 10:27 Plotter went not ready and PDP11 became hung up.
- 01/05 00:58 Same as 01/03, 10:27.
- 01/08 12:57 Same as 01/03, 10:27.
- 01/08 09:38 Interrupt vectors zeroed out.
- 01/09 11:39 Interrupt vectors zeroed out.
- 01/10 13:49 Same as 01/03, 10:27.
- 01/11 09:03 Reloaded - Reason unknown.
- 01/12 08:56 Same as 1/3, 10:27.
- 01/15 12:01 Interrupt vectors zeroed out.
- 01/15 12:51 Interrupt vectors zeroed out.
- 01/16 19:16 Same as 1/3, 10:27.
- 01/17 18:33 Interrupt vectors zeroed out.

01/18 15:11 Same as 1/3, 10:27.  
01/18 17:15 Reloaded - Reason unknown.  
01/18 17:34 Plotter hung up on RERUN command.  
01/18 17:51 Reloaded because time was not set right.  
01/19 16:10 Reloaded - Reason unknown.  
01/20 00:00 Plotter hung up on RERUN.  
01/20 00:56 Same as 1/3, 10:27.  
01/23 00:44 Reloaded - Reason unknown.  
01/23 01:10 Same as 1/3, 10:27.  
01/24 14:00 Plotter hung up on END command.  
01/24 20:53 Plotter hung up on RERUN command.  
01/24 21:27 Plotter hung up on RERUN command.  
01/25 12:40 Plotter hung up on garbage plot file.  
01/25 15:23 Reloaded - reason unknown.  
01/25 15:37 Plotter hung up on RERUN.  
01/25 15:45 Plotter hung up on RERUN.  
01/27 14:16 Same as 1/3, 10:27.  
01/29 16:24 Same as 1/3, 10:27.  
01/30 11:01 Reloaded - Reason unknown.  
02/01 9:20 Same as 1/3, 10:27.  
02/01 15:00 Interrupt vectors zeroed out.  
02/03 10:00 Interrupt vectors zeroed out.  
02/08 14:16 Same as 1/3, 10:27.  
02/08 18:08 Plotter hung up on END command.  
02/09 09:07 Reloaded - Reason unknown.  
02/09 10:10 Junk in PDP memory (Possible link failure).  
02/09 10:35 Link failure.  
02/09 10:43 Link failure.  
02/09 14:48 Link failure.  
02/09 15:46 Link failure.



02/09 17:42 Link failure.  
02/09 18:22 Link failure.  
02/09 20:12 Junk in PDP memory (possible link failure).  
02/10 08:17 Same as 1/3, 10:27.  
02/12 10:02 Link failure.  
02/12 16:46 Same as 1/3, 10:27.  
02/12 17:08 Same as 1/3, 10:27.  
02/12 19:02 Link failure.  
02/12 19:32 Link failure.  
02/12 20:04 Link failure.  
02/12 21:25 Link failure.  
02/13 13:32 Link failure.  
02/14 02:00 Reloaded because of garbled messages (possible link failure).  
02/14 23:18 Link failure.  
02/15 03:10 Link failure.  
02/15 08:29 Link failure.  
02/15 10:26 Garbage in PDP11 memory (possible link failure).  
02/15 11:02 Link failure.  
02/15 11:21 Link failure.  
02/15 13:20 Link failure.  
02/15 14:01 Link failure.  
02/15 15:50 Link failure.  
02/15 19:42 Junk in PDP memory (possible link failure).  
02/15 20:50 Link failure.  
02/15 21:18 Link failure.  
02/15 23:48 Link failure.  
02/16 00:11 Garbage in PDP memory (possible link failure).  
02/16 00:46 Link failure.  
02/16 00:51 Link failure.

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RJE Crash Analysis - by L. E. May

Supio/RJE (PDP)/Hardware Changes

- 1/1 SUPIO - Log contains no documentation as to the nature of this modification.
- 1/9 RJE - Adds link diagnosis code and Port T.
- 1/11 RJE - Validate West Bank on Port T and fix buffer problem.
- 1/14 SUPIO - Log contains no documentation as to the nature of this modification.
- 1/15 Hardware - Reset circuit breaker.
- 1/18 SUPIO - New site code validated.
- 1/19 SUPIO - Code not to abort on invalid BST.  
Hardware - Reset cable.
- 1/22 Hardware - Replace channel cards in link.
- 1/23 Hardware - Adjusted voltage and ground.
- 1/24 Hardware - Exchanged CPU and link.
- 1/25 Hardware - Adjusted master sync timing.
- 1/27 RJE - Add diagnostic code.
- 1/30 Hardware - Adjust master sync timing.

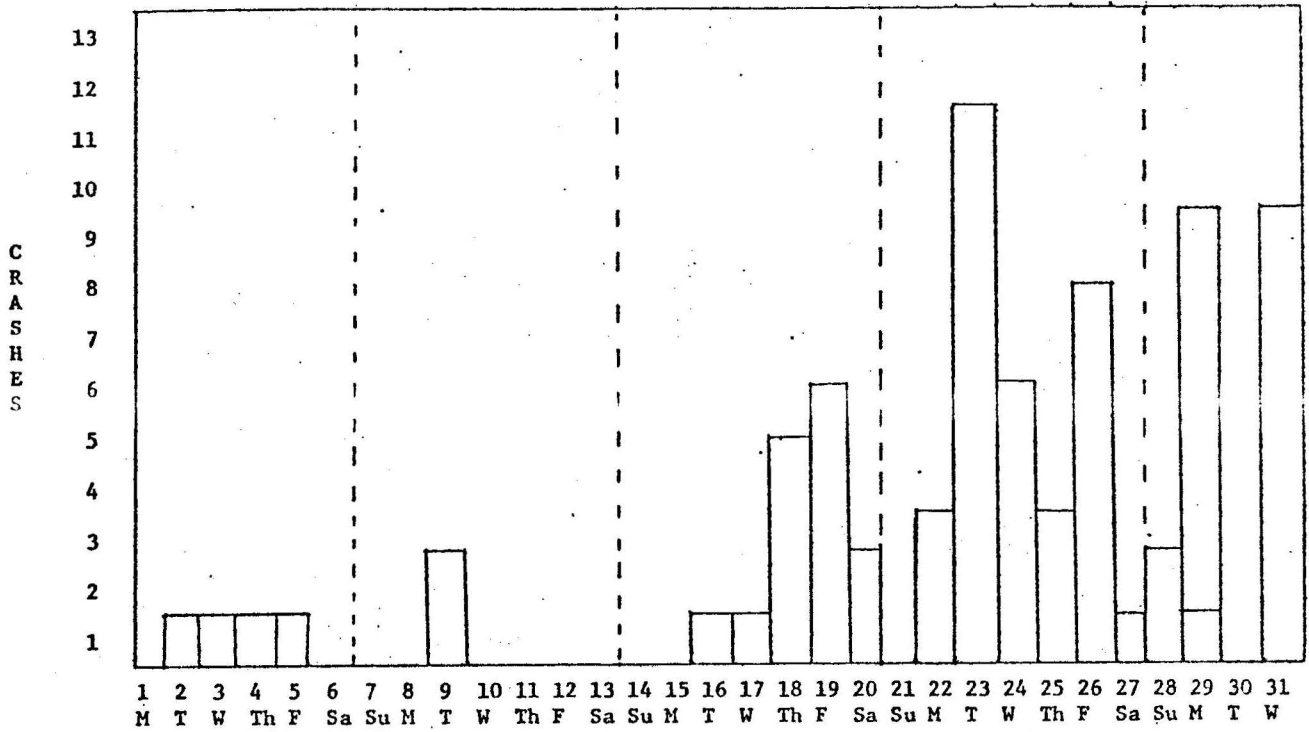
<u>Index</u>	<u>Crashes</u>	<u>Explanation</u>
1	6	SUPIO abort, cause unknown, PDP 11 (RJE) okay.
2	1	RJE abort - software error (buffering for Port T) corrected 79/01/09.
3	3	SUPIO abort - disk error.
4	2	SUPIO abort - EOJ from DDCMP terminal. Problem known for months. Still not corrected.
5	3	RJE abort - memory corrupted because of message processor. Corrected 79/02/18.
6	13	Abort with insufficient data for analysis.
7	5	RJE abort - memory corrupted by SUPIO write.
8	4	RJE abort - communications area changed (link problem).
9	1	RJE abort - circuit breaker.
10	11	RJE abort - memory too badly clobbered/unexplainable.
11	15	RJE abort - NPR transfer after instruction fetch causes CPU micro code to fail - caused by link.

<u>Index</u>	<u>Crashes</u>	<u>Explanation</u>
12	4	RJE abort - unexplainable single word corruption in instruction area.

### Recommendations

1. In addition to where the backup is kept, SUPPIO mod entries in the NOS log book should contain some explanation to the nature of the change.
2. Daily report entries should be standardized and reflect more meaningful information as to the nature of an abort. E. May will investigate this and submit a procedure to J. Sell.
3. A log should be maintained for hardware changes and corrections. This log should be kept in the same location as the NOS log. E. Edmundson has taken care of this.
4. In many instances the PDP 11 memory (vectors and instruction area) was so badly corrupted that a meaningful analysis wasn't always possible. To avoid this, SUPPIO should check that the LNKBA is set to a reasonable address. Address limits can be communicated through a parameter list that would be passed to SUPPIO upon start up. Flags, buffers, and other memory constructs that change in the execution of the program should be removed from the instruction area and put into work areas. This would allow memory management to protect the instruction area for PDP software errors that would corrupt code and would facilitate the automated corruption check by comparing the memory dump with the source binary. This comparison would be part of the DUMPPDP replacement program written by P. Zechmeister.
5. To provide the best possible service to the users, every effort should be made to keep the SUPPIO-RJE system up and stable. In order to do so, the concept of error recovery should be explored in the area of RJE-SUPIO communications. This means that an isolated non-fatal link failure should not cause us to abort unless some defined threshold of errors has been exceeded. Many of the crashes were a result of SUPPIO proceeding to service a request before the PDP 11 (RJE) responded. This, could be a result of a link problem. Since D. Mears installed correction to SUPPIO on 79/02/09, there have been only three failures in five days. Although this reflects a dramatic improvement over last month, we should continue to improve stability and service to the users without waiting for an emergency state to arise again.
6. To improve the meantime to repair in the case of hardware failures, diagnostic software should be improved and software personnel should try to provide specific information about the failure to the engineers. D. Mears has improved the link test software so that it now finds the problems we have been experiencing.

RJE JANUARY CRASH ANALYSIS



DATE AND DAY - CHANGES BELOW

SUP R CIR C TR	R J E	R J E	SUP R CIR C TR	SUP R CIR C TR	SUP R CIR C TR	LINK FIXED	LINK FIXED	LINK & CIR C TR	LINK ADJUSTMENT	R J E	ADJUST HARDWARE	ADJUST LINK
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