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COLOSSUS Memo #72

To: Distribution
From: M. Hamilton
Date: 18 July 1968
Subject: COLOSSUS Revision 221

Revision 221 was BAD with 2 cusses.

Major Changes Incorporated into Revision 221

- 1) DYNDISP in P40 has been changed to check for the contents of NVWORD1 before going to REGODSP in CLOCKJOB. Previously it was possible to go to the REGODSP call with a zero for the verb and noun. This resulted in a CLEAN DSP terminating on the return location of the last flashing display.
- 2) When R32 was changed over to P76 a bug was introduced. The state vector update in P76 was restarted via group 4. However INTWAKE does a group 2 phase change and P76 does an INTWAKE. The result was that both restart groups ended up at GOTOPPOOH and ABORTED with a 1502 ABORT. This bug was fixed by having P76 do an INTWAKE1 instead of an INTWAKE.
- 3) The erasable conflict between R52 erasables and P03 erasables was fixed by changing P03 to use less erasables for restarts.
- 4) OPTIONX, the new erasable set aside for extended verb 82 was moved out of the midcourse area to allow V82 during midcourse. OPTIONX now shares with DSPTEMX, the extended verb display temporary register.
- 5) NOUPFLAG was deleted since it is no longer needed by R32.
- 6) VONE', a vector in verb 82 was moved out of the midcourse erasable area to allow V82 to be done during midcourse. These 6 erasables take up 6 new unused locations in EBANK4. END-E4 was moved to go along with this change.
- 7) END-E5 was defined incorrectly. It was fixed by setting it equal to QMIN.

- 8) P76 erasables were moved out of the extended verb area and into an area to share with the P30 erasables.
- 9) The erasable X1INPUT was deleted since it is no longer used.
- 10) PCN #487 was implemented to change N92 to N94 in R23 since R52 displays N92.
- 11) R22 no longer checks for the NOUPFLAG now that R32 has been changed to P76.
- 12) A fix was put into V56 (kill P20) to do a STOPRATE and to disable the optics.
- 13) A change was put into SXTMARK to allow the terminate of V51 during P03 to re-establish P02. Previously the terminate response ended up at GOTOPOOH. (PCN #493)
- 14) A lead was added to the V1 calculations in HUNTEST if L/D is negative. This will improve the performance of UPCONTROL. (PCN #485)
- 15) PCR #220 was implemented in ENTRY. The following changes were made:
 - A. FIRSTIME logic has been deleted. Previously a bad reference trajectory solution could have occurred with the old logic.
 - B. The equation for computing Q2 was changed to modify the predicted range to be flown in final phase.
 - C. Logic was added to prevent the reference L/D from going to a negative value. This change will protect against a negative square root.
 - D. In the ballistic phase the test for cycling to final phase is based on Q7F instead of Q7. This will reduce the expected target miss.
- 16) Bit 3 of RCSFLAGS was turned on too late sometimes and resulted in initial calls to NEEDLER sending out a garbage pulse train. This bug was fixed by moving the setting of this bit above the call to NEEDLER.
- 17) V82 now does a N12 display for the OPTION code instead of a N06 display. This prevents the erasable conflict which resulted when V82 displayed N06 during a time when a mission program was also displaying N06. Noun 12 was added for this change. (PCN #490)
- 18) A new noun 94 was added to display SHAFT and TRUNNION for R23 (See change no. 10 above).
- 19) Z1 is now initialized on the first pass for the optics stop test in T4RUPT.

Known Problems in Revision 221

- 1) V47 and V66 do interpretive in a NOVAC. These extended verbs require a FINDVAC.
- * 2) D1 (DP) should be added to the pad loaded erasable area for P37 (PCN #442).
- * 3) RPVAR (DP) should be changed from a constant to a pad loaded erasable and S22WSUBL (SP) should be changed from a temporary to a pad loaded erasable for P22 (PCR #128).
- * 4) DVTHRESH (DP) should be a padloaded erasable for the engine fail routine in P40.
- 5) Several program writeups are obsolete.
- 6) Some extended verbs have mark displays and normal displays mixed. If a normal display occurs after a mark display the bit 1 of FLAGWRD4 which is set by a mark display will lock out a normal display.
- 7) PINBALL does not wake up displays sleeping due to astronaut use on any loads. Either a change should be made to PINBALL or ASTRONAUT decks will have to be changed.
- 8) The polynomial fit for T(X) in TFF should be changed to include a wider hyperbolic range.
- 9) Timing of the LAMBERT calculations in the targetting program is increased by a factor of 4 when R52 in P20 is going in the background.
- 10) The timing of the vehicle tracking during COAS marking is different than the timing of vehicle tracking during OPTICS marking.
- 11) The pad loaded erasables 22LMBD and WLMK should be deleted.

Potential Problems

- 1) GOTOPOOH and V37 both do ULAGEOFF via INITSUB. It has been said that the RCS jets will blow up if they are turned off too soon. If this is the case ULAGEOFF should not be done in INITSUB.
- 2) If a coarse align is made to a middle gimbal angle of 65° followed by V42 driving into gimbal lock, a keyed in monitor freezes for a while (STL).
- 3) A restartable CLEANDSP exists in R56 without a CAF ZERO before the TC BANKCALL.

Statistical Summary for COLOSSUS 221

1) Number of modification changes	18
2) Number of cards	175
3) Total fixed memory changes	+5

Versions of COLOSSUS

<u>Rev.</u>	<u>Version</u>	<u>Testing Area</u>
220	V83COL	V83 with less VACS
220	DAMNCOL	Fix for T4RUPT
208	HUGHEXEC	New executive

* The programs involved should be changed to conform to these new erasable