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COLOSSUS Memo #64

To: Distribution
From: M. Hamilton
Date: 14 June 1968
Subject: COLOSSUS Revisions 213 and 214

Revision 214 was

Major Changes Incorporated into Revisions 213 and 214

- 1) All of the remaining users of FLAGUP and FLAGDOWN have been changed to use UPFLAG and DOWNFLAG. The Display routines still use a subset of FLAGUP and FLAGDOWN.
- 2) NOUPFLAG is now reset in INITSUB, the initialization subroutine used by V37 and GOTOPOOH.
- 3) The Q storage in INITVEL was changed from RTRN to NORMEX to allow restarts in P31 for LUMINARY to operate correctly. To conform with this change the Q storage in S34/35.2 was changed from NORMEX to SUBEXIT.
- 5) A fix went into ENTRY to move the tag P61.2 to the correct place in order that the correction of TTE for lapsed time is actually exercised.
- 6) CLEARMRK was called at the wrong place in R56. This bug was fixed.
- 7) Changes went into the RCS DAP to set the filter gain index, ATTKALMN, to -1 during high rate manual and auto maneuvers, -2 during translations LEM off, -3 during translations LEM on. If rotations and translations occur simultaneously, translation settings take precedence. Under all other conditions (except filter initialization) ATTKALMN is set to zero. This change corrects the current situation where under certain conditions ATTKALMN will not be reset to zero.
- 8) ADVTRACK was fixed to look at STARCODE instead of STARCODE +1 for the number of advanced revolutions.
- 9) The erasables LAST30 and MSGCNT in the inbit scanner storage were deleted since they aren't used.

- 10) NN1 was moved from the P37 storage which shared with CRS61.1 since P34 displays N55 with NN1 in R1 and P20 calls CRS61.1. NN1 is now equal to DELVEET3 in the P30-P40 storage. P37 changed its NN1 references to NN1A in order to keep this erasable in the same location for EDIT index purposes.
- 11) P22 now resets the RNDVZFLG which means that P22 kills P20. This change is necessary since P22 uses restart group 2 which is one of P20's restart groups. Any V37 selection after P22 would restart along with the new program whatever was in group 2 for P22. Now that this change has been made, P20 can be killed by selecting V56, P00, P22, P23, V36 and P20 if P20 was in the mode lights.
- 12) P01 called ESTIMS with LONGCALL, but ESTIMS is a JOB. This bug was fixed by changing the LONGCALL call to GOESTIMS.
- 13) A change was put into IMU calibration to set PERFDLAY +1 to a one and PERFDLAY to zero. This will prevent the necessity of loading them from the Launch Load tape.
- 14) A change was put into TPI SEARCH to set its own UPDATFLG and TRACKFLG since AVFLAGA and AVFLAGP no longer set it.
- 15) A fix was made to R22 to test the NOUPFLAG when it tests the UPDATFLG.
- 16) Several obsolete flags were deleted from COLOSSUS. They are VINHFLG, P25FLAG, RRNBSW, BURNFLAG, ENG1FLAG, ASUMVEHF, ITER1SW, GUESSSW, SCHOPTN, ACMODFLG, LOSCMFLG, AUTMANSW, NOTHROTL, NOSOLNSW, NOSOFLAG, S32.1F1, S32.1F2, S32.1F3A, S32.1F3B, GODAPGO, MUNFLAG, ABDPSFLG, NAUTOFLG, KILLMON1, KILLMON2, ASCNTFLG, ATTFLAG, MANUFLAG, TTMODESW, P22FLAG, RTECONDP, RTEJOBON.
- 17) A PHASCHNG was added to P23 to prevent re-entry into R60 if a restart occurs after R60 has been completed.
- 18) A push list overlay was fixed in DELRSPL. TFF/TRIG uses 36D which is stored by an earlier routine and AUGEKUGL destroyed it.
- 19) A bug was fixed by adding an INHINT to TWIDDLE.
- 20) Two INHINTS before a NOVAC call were deleted in R21 and R23 since NOVAC does its own INHINT.
- 21) The value of roll acceleration was changed to the flight test observed value in the ENTRY DAP.
- ** 22) The values of IFAILINH and IM30INIR were changed in the hardware restart coding. This change will prevent an IMU CDU ZERO from occurring automatically at any time. Previously a CDU ZERO occurred during a restart if the IMUSE bit was reset. This change will cure the maneuver problems which occurred with a restart during such times as V49, P23, etc. With this change the IMUSE bit and its coding are obsolete

Known Problems in Revision 214

- 1) If a V37 is selected in between the time a DOWNLIST ID and the second word of that list sent out, the list following will belong to the new DOWNLIST contrary to the ID.
- 2) Several flag bits in the erasable area are defined backwards. These are SLOPESW, SOLNSW, RVSW, NORMSW, INFINFLG, ORDERSW, APSESW, and COGAFLAG.
- 3) There are cases when a burn program or R32 could be selected before the incorporation of a mark is finished. When R22 resumes (if after a burn this would be after a V37 selection of P20 or a tracking program) the rest of a mark could be incorporated on the new state vector.
- 4) If the UPDATFLG is off or NOUPFLAG is on the VHF radar read routine which is in an interrupt goes into interpretive.
- 5) THETL in P17 conflicts with RTX1 and RTX2 in INITVEL.
- 6) There are some leftover SETMAXDB's at the end of the burn programs. These should be removed now that V37 and GOTOPOOH restore the deadband to the state last set in R03.
- 7) There is no dynamic V16N85 display in P41. This violates the GSOP. Presently there is a V06N85 display.
- 8) AVGENN turns off group 5 and restores group 2 back to P20 before resetting the V37 flag. If a restart occurs after the resetting of V37FLAG, it could make a V37 selection after that impossible.
- 9) Extended V82 does a V04N06 display and so do P21, P52, P38 and P37. This results in an erasable conflict because both the extended verbs and the normal programs use the same erasables for N06.
- 10) VHFCNTR should be set to zero at the end of R32, at the end of SERVICER and in the initialization of the W-MATRIX for RENDEZVOUS.
- 11) Logic is not in V44 and V45 for the surface flag.
- 12) The comments in the erasable area should be updated.
- 13) During the V01N71 display in R56, R2 and R3 aren't blanked. However, these registers on the same display are blanked in R53 and R51.
- 14) N51 has not been hooked up to PINBALL for R05.
- 15) RTEVGAM, PBIAS and YBIAS (10 words) are now in fixed memory but the GSOP specifies them as erasables.
- 16) MDOT is an erasable in the AGC but specified as fixed in the GSOP.
- 17) 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.
- 18) UNITW should be 4 pad loaded erasables, not 6. The coding would need to be changed to go along with this saving of erasables.

- 19) The two verb lights appear on the DSKY during UPLINK when all displays should be locked out.
- 20) The polynomial fit for T(X) in TFF should be changed to include a wider hyperbolic range.
- 21) The state of all moon flags after a FRESH START in the MOON vicinity should be looked into. Presently they are reset to indicate earth.

Potential Problems

- 1) DOWNRUPTS are lost during burns.
- 2) Most V34 responses on displays in P03 hang up with the DSKY blank and P03 in the mode register when V34 should end up at P02 (STL Run).

* Program Note

- 16) If mode switch is in attitude hold during R55 (gyro torquing routine) the DAP will maneuver the vehicle to follow the platform as it moves.

Statistical Summary for COLOSSUS 214

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| 1) Number of modification changes | 37 |
| 2) Number of cards | 400 |
| 3) Total fixed memory change | +37 |

Versions of COLOSSUS

<u>Rev.</u>	<u>Version</u>	<u>Testing Area</u>
208	HIGHEXEC	Executive
200	BURNCOL	P40s
196	RWSCOL	DAP

* According to some sources there has been much confusion regarding the Program Notes that have been appearing in the COLOSSUS Revision memos. I would like to emphasize at this time that these notes are not official. The purpose of these informal notes is to educate ourselves on the state of the program in order to explain away the unexpected in current program testing. Many of these notes will be deleted due to the fact that a PCN or PCR will result in a coding or GSOP change which will make the note unnecessary. The notes remaining at FACI time will be discussed thoroughly as to whether they are in fact operational notes. At the moment, however, we consider these notes helpful as a means of communicating additional information to those who might be interested.

** Program note no. 14 no longer exists due to this change.