

AGC INFORMATION SERIES  
ERRATA SHEET 17-7  
25 March 1966

1. Remove title page and insert new title page attached.
2. Remove pages 17-41/17-42 and insert new pages 17-41/17-42 attached.
3. Remove pages 17-45/17-46 and insert new pages 17-45/17-46 attached.
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APOLLO GUIDANCE COMPUTER

Information Series

ISSUE 17

KEYRUPT, UPRUPT, MARK  
AND DSKY FUNCTIONS

FR-2-117

14 August 1964

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TABLE 17-7

## NOUN DEFINITIONS

Code	Object	Description
00	-----	Not in use.
01	Fractional data stored or to be loaded at a location to be specified. (dec. max. $\pm .99999$ )	Upon entering these nouns, the Verb and Noun displays start to flash and the operator has to enter the five character octal address (of any location in E or FF memory) which is then displayed in display register R3 and stored in register NOUNADD. The flashing ceases after the address has been entered. These nouns are used primarily with load, display, or monitor verbs.
02	Whole data (integer) stored or to be loaded at a location to be specified. (dec. max. $\pm 16383$ )	
03	Angular data (in degrees) stored or to be loaded at a location to be specified. (dec. max. $\pm 359.99$ )	
04	Time (in hours) stored or to be loaded at a location to be specified. (dec. max. $+ 745.65$ )	
05	Time (in seconds) stored or to be loaded at a location to be specified. (dec. max. $+ 999.99$ )	
06	Gyro data (in degrees) stored or to be loaded at a location to be specified. (dec. max. $+ 9.9999$ )	
07	Optics data (in degrees) stored or to be loaded at a location to be specified. (dec. max range I $+ 179.99$ range II $+ 89.999$ Range is selected from bit 13 of WASOPSET	

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TABLE 17-7

## NOUN DEFINITIONS (cont)

Code	Object	Description
10 through 14	Spare	
15	Increment Machine Address	Increments previously stored machine address [ c(NOUNADD) ] by one.
16	Time in seconds $\triangle 1$	Refers to time counters TIME1 and TIME2 (0035 and 0036) for time data given in seconds. If decimal displaying or monitoring is desired, the time is given up to a maximum of 999.99 seconds.
17	Time in hours $\triangle 1$	Refers to time counters TIME1 and TIME2 (0035 and 0036) for time data given in hours. If decimal displaying or monitoring is desired, the time is given up to a maximum of 745.65 hours.
20	IMU CDU angles in degrees $\triangle 1$	Refers to counters CDUX, CDUY, and CDUZ (0047 through 0051). If decimal displaying or monitoring is desired, the angles are given up to a maximum of $\pm 359.99$ degrees.
21	PIPA's $\triangle 1$	Refers to the number of PIPA counts contained in counters PIPAX, PIPAY, and PIPAZ (0044 through 0046). If decimal displaying or monitoring is desired, the number of counts is given up to a maximum of $\pm 16383$ .

TABLE 17-7

## NOUN DEFINITIONS (cont)

Code	Object	Description
27 (cont)		is greater than 0. If location 1567 is loaded with a quantity less than minus zero, then Self Check is executed indefinitely with c(NEWJOB) being checked about every 2 msec. If loaded with a quantity greater than plus zero, then Self Check is done N times where N is the number loaded into location 1567. After Self Check has been done N times and if the c(NEWJOB) still equals 00000, the program proceeds as mentioned above since the contents of SMODE equal 00000.
30	Star Numbers $\triangle_3$	Refers to registers DSPTEM1, DSPTEM1+1, and DSPTEM1+2 (0627 through 0631). Preceding the use of VERB 51 (Please Mark, see table 17-4), these locations should have been loaded with the coded numbers of the stars to be marked. This Noun is primarily used for displaying the Star Number of interest to the operator. If decimal displaying, monitoring, or loading is desired, this number may be given up to a maximum of + 16383.
31	Failreg $\triangle_1$ $\triangle_3$	Refers to the FAILREG register (0756). The contents of FAILREG consist of a coded number referring to the type of failure that occurred. This register is loaded by the ALARM and ABORT routines. This noun is primarily used for displaying the system failure conditions where a coded number will be displayed (in octal) in register R1 representing the failure condition.

TABLE 17-7

## NOUN DEFINITIONS (cont)

Code	Object	Description
32 through 54	Spare	
55	Optics CDU's $\triangle_2$	Refers to the OCDU counters (00052 and 00053). If displaying or monitoring is desired, the X Optics is given up to a maximum of + 359.99 degrees and the Y Optics is given up to either a maximum of + 179.99 degrees or + 89.999 degrees.
56	Optics CDU's. Time in seconds. $\triangle_2$	Refers to registers DSPTEM1, DSPTEM1+1, and DSPTEM1+2 (0627, 0630, and 0631). Noun 56 is used by internal routines to display the OCDU angles and the time in seconds when an unrequested mark is performed. If decimal displaying, monitoring, or loading is desired, the X Optics angle (0627) may be given up to a maximum of + 359.99 degrees, the Y Optics angle (0630) to either a maximum of + 179.99 degrees or + 89.999 degrees, and time up to a maximum of 999.99 seconds.
57	Desired Optics CDU's $\triangle_2$	Refers to the desired Optics angle registers, DESOPTX (0724) and DESOPTX+1 (DESOPTY, 0725). If decimal displaying, monitoring, or loading is desired, the X Optics angle (0724) may be given up to a maximum of + 359.99 degrees and the Y Optics angle (0725) may be given up to a maximum of either + 179.99 degrees or + 89.999 degrees.

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TABLE 17-7

## NOUN DEFINITIONS (cont)

Code	Object	Description
60	IMU CDUX given in degrees and Time given in seconds. $\triangle_2$	Refers to counter CDUX (0047) and time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, the IMU CDUX angle is given up to a maximum of $\pm 359.99$ degrees and the time is given up to a maximum of 999.99 seconds.
61	IMU CDUY given in degrees and Time given in seconds. $\triangle_2$	Refers to counter CDUY (0050) and time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, the IMU CDUY angle is given up to a maximum of $\pm 359.99$ degrees and the time is given up to a maximum of 999.99 seconds.
62	IMU CDUZ given in degrees and Time given in seconds. $\triangle_2$	Refers to counter CDUZ (0051) and time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, the IMU CDUZ angle is given up to a maximum of $\pm 359.99$ degrees and the time is given up to a maximum of 999.99 seconds.
63	Optics CDUX given in degrees and Time given in seconds. $\triangle_1$ $\triangle_2$	Refers to OPTX counter (0052) and time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, the Optics CDUX angle is given up to a maximum of $\pm 359.99$ degrees and the time is given up to a maximum of 999.99 seconds.

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TABLE 17-7

## NOUN DEFINITIONS (cont)

Code	Object	Description
64	Optics CDUY given in degrees and Time given in seconds. $\triangle 1$ $\triangle 2$	Refers to OPTY counter (0053) and time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, the Optics CDUY angle is given up to a maximum of either + 179.99 degrees or 89.999 degrees, and the time is given up to a maximum of 999.99 seconds.
65	Time given in hours and seconds. $\triangle 1$ $\triangle 2$	Refers to time counters TIME1 and TIME2 (0035 and 0036). If decimal displaying or monitoring is desired, hours will be displayed in R1 up to a maximum of + 745.65 hours and seconds will be displayed in R2 up to a maximum of + 999.99 seconds.
66	System Test Results $\triangle 2$	Refers to registers DSPTEM2, DSPTEM2+1, and DSPTEM2+2 (0632 through 0634). If decimal displaying, monitoring, or loading is desired, the c(DSPTEM2) can be scaled up to a maximum of + 16383, the c(DSPTEM2+1) to a maximum of .99999 and the c(DSPTEM2+2) to a maximum of + 16383.
67	Delta Gyro Angles	Refers to the double precision GYRO angle registers GYROD through GYROD+5 at locations 0715 through 0722. These locations contain the double precision Gyro angles that must be added to the present Gyro angles to give the correct position. If decimal displaying, monitoring, or loading is desired, the angles can be given up to a maximum of $\pm 9.9999$ degrees.



17-361. After program section K&D has been released for internal use, instruction INHINT is executed and the content of register MONSAVE is tested whether or not register GRABLOCK contains 00002. If register MONSAVE contains 00000, indicating Task MONREQ (paragraph 17-362) is not contained in the Waiting List (i. e., there is no Monitor activity within the computer), then a request is made to the Waitlist to schedule Task MONREQ with a 10 msec delay. If register MONSAVE contains a positive quantity, indicating there is monitor activity (although in the suspended state) within the computer, then the request for scheduling Task MONREQ is bypassed. After register MONSAVE is tested and the appropriate action taken, the content of register MPAC (the Verb and Noun code) and the content of register MPAC+1 (the Noun address) is transferred to registers MONSAVE and MONSAVE1 respectively. Then instructions RELINT and TC ENTRET are given. Register ENTRET contains instruction TC ENDOFJOB or TC NVSUBEND.

#### 17-362. Task MONREQ

17-363. Task MONREQ requests the execution of a Job to display the content of one, two, or three locations within the computer. Since Task MONREQ requests rescheduling of itself with a 0.5 sec delay, a monitor function results. A failure of Task MONREQ to request rescheduling terminates the monitor function. The monitor function is terminated if, during the execution of intervening Jobs, a non-CHARIN Job passes the operator/internal interlock which enters a ONE into bit position 15 of register MONSAVE1 or if the operator keys in VERB, 3, 4, and ENTER. If Task MONREQ finds that bit position 15 of register MONSAVE1 contains a ONE, routine KILLMON is executed. Routine KILLMON clears registers MONSAVE and MONSAVE1 and executes instruction TC TASKOVER. If register MONSAVE1 does not contain a ONE in bit position 15, Task MONREQ requests rescheduling of itself after a 0.5 sec delay. A request is then made to the Job Control to Schedule Job MONDO with priority 30<sub>8</sub> and instruction TC TASKOVER is executed.

#### 17-364. Job MONDO

17-365. Job MONDO is terminated immediately if bit position 15 of register MONSAVE1 contains a ONE. (The kill-monitor bit is on.) If the kill-monitor bit is not on, the content of register DSPLOCK is tested. If register DSPLOCK contains a positive quantity, indicating program section K&D is not available for internal use and monitor activity should be suspended, then program control is transferred to

routine MONBUSY. Routine MONBUSY does not perform the requested display; it turns on indicator KEY RLSE, by entering a ONE into bit position 3 of OUT1 and then executes instruction TC ENDOFJOB.

17-366. If register DSPLOCK contains 00000, indicating program section K&D is available for internal use, the Noun code is transferred to register NVTEMP and program control is transferred to routine NVSUBMON. Routine NVSUBMON is a special entrance to routine NVSUB that does not turn on the kill-monitor bit. (Refer to paragraph 17-230.) Since register NVTEMP contains zeros in bit positions 12 through 7, and the Noun code in 6 through 1, routine NVSUB enters the Noun code into register NOUNREG and displays the Noun code in the Noun displays. Thereafter, the Verb code is changed from the monitor Verb to the corresponding display Verb by transferring the content of bit positions 9 through 7 of register MONSAVE to bit positions 3 through 1 of register VERBREG. (Bit positions 15 through 4 of register VERBREG contain zeroes.) Instruction TC PASTEVB is then entered into register ENTRET, the content of bit positions 14 through 1 of register MONSAVE1 is transferred to register NOUNADD, and program control is transferred to routine TESTNN.

17-367. Routine TESTNN decodes the Noun code, obtains the address specified by the Noun, and then transfers control to the corresponding Verb routine. For further details, refer to table 17-11 and to paragraphs 17-265 and 17-266. After the requested display has been completed, instruction TC ENTRET is executed. Since register ENTRET contains instruction TC PASTEVB, routine PASTEVB is executed. Routine PASTEVB transfers the content of bit positions 12 through 7 of registers MONSAVE (the Monitor Verb code) to register NVTEMP and then executes routine NVSUBMON. After this transfer, the content of bit positions 15 through 13 and 6 through 1 of register NVTEMP contain zeroes. Thus, when routine NVSUBMON is executed, the Monitor Verb code is transferred to register VERBREG and displayed in the VERB displays. When program control is transferred back to routine PASTEVB via routine NVSUBEND instruction TC ENDOFJOB is executed.