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MIT Instrumentation Laboratory

DG Memo No. 571
- Revision ~~A~~ B

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TO: Distribution

FROM: R. A. Larson, J. C. Dunbar

DATE: ~~10 January 1966~~ 19 MAY 1966

SUBJECT: A Summary of DSKY Displays for Programs and Routines for AS 204 — extracted from R507

MIT Instrumentation Laboratory

DG Memo No. 571
(Revision A)

DEFINITIONS* FOR
APOLLO COMPUTER LOGIC CHECKLIST INTERFACE

VG - Magnitude of the velocity to be gained by the thrusting maneuver. In ft/sec to nearest ft/sec.

VI - Inertial velocity. In ft/sec to nearest ft/sec.

DELTA V INS - Total Delta V required for orbital insertion. If a two burn insertion is required, it includes both burns. In ft/sec to nearest ft/sec.

DELTA V REQUIRED - SPS Delta V required to accomplish maneuver. In ft/sec to nearest ft/sec.

DELTA VM - Measured Delta V along SC + X axis starting from zero at start of display. In ft/sec to nearest ft/sec.

DELTA V RSS - The RSS magnitude of Delta V measured. In ft/sec to nearest ft/sec.

DELTA V (SCS) - AGC calculated value of velocity to be set into Delta V remaining counter. In ft/sec to nearest ft/sec.

DELTA V ALLOWABLE - Maximum amount of Delta V to be used. In ft/sec to nearest ft/sec.

DELTA V TAILOFF - SPS engine Delta V after receipt of engine off command. In ft/sec to nearest ft/sec.

DELTA V DIFF - Magnitude of the difference between the velocity state vector before and after incorporation of the landmark sighting data. In ft/sec to nearest ft/sec.

* From MIT flight crew procedures work group.

T GIM LOC - Time to gimbal lock if local vertical is started now. In minutes and seconds to nearest second.

TFF - Time of free fall to 300,000 ft altitude above mean equatorial radius. In minutes and seconds to nearest second. Max. reading is 59 59.

TG - Time to go to engine cut off. In minutes and seconds to nearest second.

TTI - Time to go to SPS ignition. In min and sec (1 register) to nearest sec or hrs, min, and sec (3 registers) dependent on program to nearest .01 sec.

TIG - Time of SPS ignition (GET). In hrs, min, sec to nearest .01 sec.

T MARK - Time of mark (GET), in hrs, min, sec to nearest .01 sec.

PER - Period of desired orbit. In hrs, min, sec to nearest .01 sec.

DELTA T BURN - Desired SPS burn time. In min and sec to nearest sec.

T MAX DEC - First time of arrival (GET) at maximum orbital declination after a specified time (GET). In hrs, min, sec to nearest .01 sec.

T PERM IG - Earliest possible time (GET) of SPS ignition. In hrs, min, sec to nearest .01 sec.

T PERM LONG - Earliest permissable time (GET) of next arrival at the specified longitude. In hrs, min, sec to nearest .01 sec.

T PERM DEC - Earliest permissable time (GET) of next time of orbit maximum declination. In hrs, min, sec to nearest .01 sec.

T LAT LONG - Time (GET) at which LAT and LONG of vehicle position is desired. In hrs, min, sec to nearest .01 sec.

T LONG - Time (GET) at which vehicle will be at specified longitude. In hrs, min, sec to nearest .01 sec.

GET - Ground elapsed time measured from lift off. In hrs, min, sec to nearest .01 sec.

ALT - Altitude of desired orbit above mean equatorial radius at the specified ground point. In nautical miles to nearest .01 NM. This value should be zero if circular orbit is desired.

IND ALT - Computed altitude above mean equatorial radius. In nautical miles to nearest .1 NM.

H - Vehicle altitude above the launch pad. In nautical miles to nearest .1 NM.

PERIGEE ALT - Altitude of perigee above the mean equatorial radius. In nautical miles to nearest .1 NM.

APOGEE ALT - Altitude of apogee above the mean equatorial radius. In nautical miles to nearest .1 NM.

LAT - Latitude. Plus is north. In degrees to nearest .01 deg.

LONG - Longitude. Plus is east. In degrees to nearest .01 deg.

DEC - Declination. In degrees to nearest .01 deg.

AZ - Azimuth. In degrees to nearest .01 deg.

MAX DEC - The first maximum declination of the orbit after a specified time (GET). In degrees to nearest .01 degree.

LAT SPLASH - Latitude of desired splash point. In degrees to nearest .01 degree. + is North.

LONG SPLASH - Longitude of desired splash point. In degrees to nearest .01 degree. + is East.

DELTA P - Magnitude of the difference between the position state vector before and after incorporation of the landmark sighting data. In nautical miles to nearest .1 NM.

DELTA R - Miss distance along ground track from discrete recovery area for free fall and entry. Assumes up lift equal to .17 times drag and no out of plane force during entry. Polarity indicates overshoot (+) or undershoot (-) of recovery area. In nautical miles to nearest .1 NM.

G - Present G. In G's to nearest .1G.

G MAX - Max predicted G for free fall and entry at bank angle of 60 deg (L/D max=.34). In G's to nearest .1G.

STAR ANGLE DIFF - Difference between actual and indicated angles between star vector #1 and star vector #2. In degrees to nearest .01 degree.

X GYRO, Y GYRO, Z GYRO - Gyro torquing angles. The angle through which each gyro must be torqued to complete the fine alignment. All angles in degrees to nearest .001 degree.

GAMMA I - Inertial flight path angle: angle between inertial velocity and the local horizontal. In degrees to nearest .01 degree.

BETA - Commanded bank angle. In degrees to nearest .01 deg.

PITCH ANGLE - Angle measured positively going up from forward local horizontal to SC X align. In degrees to nearest .01 degree. +00001 (in R2) for heads up or -00001 for heads down.

SHAFT - Optics shaft angle. In degrees to nearest .001 deg.

TRUNNION - Optics trunnion angle. In degrees to nearest .001 deg.

OG ROLL - Outer gimbal angle. In degrees to nearest .01 deg.

IG PITCH - Inner gimbal angle. In degrees to nearest .01 deg.

MG YAW - Middle gimbal angle. In degrees to nearest .01 deg.

PITCH TRIM and YAW TRIM - SPS engine bell trim angles at ignition from data taken from fuel loading charts and vehicle fuel gauges. In degrees to nearest .01 deg.

DISPLAY	UNITS	REMARKS
Program 11		
V16 N40		
R1 - GAMMA I	xxx.xx DEG	Monitor launch
R2 - VI	xxxxx. Ft/sec	
R3 - H PAD	xxxx.x NM	
Program 12		
V 16 N41		
R1 - G MAX	xxxx.x G	Monitor launch
R2 - PERIGEE ALT	xxxx.x NM	
R3 - TFF	xx-xx MIN-SEC	
FL V 16 N42		Request Proceed
R1 - DELTA R	xxxx.x NM	Monitor Launch
R2 - PERIGEE ALT	xxxx.x NM	
R3 - TFF	xx-xx MIN-SEC	
DO R34		orbital parameter display
Program 17		
V16 N40		
R1 - GAMMA I	xxx.xx DEG	To monitor abort
R2 - VI	xxxxx. Ft/sec	parameter
R3 - H	xxxx.x NM	
Program 21		
FL V24 N06		Load pitch angle and heads up or down
FL V16 N36		Request proceed
R1 - T GIM LOC	xx-xx MIN-SEC	
DO RI		Att. control mode check
DO R21		Attitude maneuver

DISPLAY	UNITS	REMARKS
Program 22		
FL V50 N25		Please perform
R1 - 00011		manual optics positioning
DO R28 (if desired)		Auto optics positioning
DO R27		Sighting mark
FL V06 N75		Request proceed
R1 DELTA P	xxxxx. Ft	
R2 DELTA V	xxxxx. Ft/sec	
Program 23		
FL V51		Request MARK
FL V06 N57		
R1 - SHAFT ANGLE	xxx.xx DEG	To transmit data
R2 - TRUNNION ANGLE	xxx.xx DEG	on down TLM
FL V06 N34		
R1 - T MARK HRS	xxxxx. HRS	
R2 - T MARK MIN	xxxxx. MIN	
R3 - T MARK SEC	xxx.xx SEC	
Program 27		
V05 N31		
R1 - 00410		Program alarm if P27 not allowed
FL V21 N01		Request data load
R1 - BLANK		
R2 - BLANK		
R3 - UPADR		(Repeated as required)
FL V21 N02		Request octal identifier to
R1 - BLANK		load corrected data
R2 - BLANK		
R3 - UPADR		(Repeated as required)

DISPLAY	UNITS	REMARKS
Program 31		
DO R35		Prethrust orbit change data load
FL V06 N45		Request proceed or exit
R1 - PERIGEE ALT	xxxx.x NM	To evaluate data
R2 - APOGEE ALT	xxxx.x NM	
R3 - DELTA V REQD	xxxxx. Ft/sec	
FL V06 N35		Request proceed
R1 - TTI HRS	xxxxx. HRS	To set DET
R2 - TTI MIN	xxxxx. MIN	
R3 - TTI SEC	xxx.xx SEC	
DO R31		Backup Delta V Counter
FL V50 N07		Please perform or exit
R1 - 00051		Select P51
FL V06 N17		Request proceed or exit
R1 OG ROLL	xxx.xx DEG	To evaluate IG angle
R2 IG PITCH	xxx.xx DEG	
R3 MG YAW	xxx.xx DEG	
DO R1		Att. control mode check
DO R21		Att. maneuver
FL V50 N07		Please perform
R1 - 00041		Select P41

DISPLAY	UNITS	REMARKS
Program 32		
DO R36		Prethrust return to earth data load
FL V06 N34		Request proceed
R1 - TIG HRS	xxxxx. HRS	To evaluate data
R2 - TIG MIN	xxxxx. MIN	
R3 - TIG SEC	xxx. xx SEC	
FL V06 N47		Request proceed or exit
R1 - GAMMA I	xxx. xx DEG	Data coordination
R2 - DELTA R	xxxx. x NM	with ground
FL V06 N35		Request proceed
R1 - TTI HRS	xxxxx. HRS	To update DET
R2 - TTI MIN	xxxxx. MIN	
R3 - TTI SEC	xxx. xx SEC	
FL V50 N07		Please perform or exit
R1 - 00051		Select P51
FL V06 N17		Request proceed or exit
R1 - OG ROLL	xxx. xx DEG	To evaluate IG angle
R2 - IG PITCH	xxx. xx DEG	
R3 - MG YAW	xxx. xx DEG	
DO R1		Att. cont. mode ck.
DO R21		Att. maneuver
FL V50 N07		Please perform
R1 - 00042		

DISPLAY	UNITS	REMARKS
Program 33		
DO R33		Prethrust SPS MIN IMPULSE
FL V06 N45		Request proceed
R1 - APOGEE ALT	xxxx.x NM	Evaluate data
R2 - PERIGEE ALT	xxxx.x NM	
R3 - DELTA V REQD	xxxxx. Ft/sec	
FL V06 N35		Request proceed
R1 - TTI HRS	xxxxx. HRS	Evaluate data
R2 - TTI MIN	xxxxx. MIN	
R3 - TTI SEC	xxx.xx SEC	
DO R 31		Backup Delta V Counter
FLV50 N07		Please perform or exit
R1 - 00051		Select P51
FL V06 N17		Request proceed or exit
R1 OG ROLL	xxx.xx DEG	To evaluate IG angle
R2 IG PITCH	xxx.xx DEG	
R3 MG YAW	xxx.xx DEG	
DO R1		Att. control mode check
DO R21		Att. maneuver
FL V50 N07		Please perform
R1 - 00043		Select P43

DISPLAY	UNITS	REMARKS
Program 41 and 42		
DO R2		Thrust cont. mode ck.
FL V16 N20		Request proceed
R1 - OG ROLL	xxx. xx DEG	To align AGCU
R2 - IG PITCH	xxx. xx DEG	
R3 - MG YAW	xxx. xx DEG	
V16 N51		
R1 - TTI	xx-xx MIN-SEC	To update DET
R2 - VG	xxxxx. Ft/sec	
R3 - 00000		
DO R37		SPS ignition
V16 N51		
R1 - TG	xx-xx MIN-SEC	To monitor burn
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	
IF P42: V16 N52		
R1 - TG	xx-xx MIN-SEC	To monitor burn
R2 - VG	xxxxx. Ft/sec	
R3 - TFF	xx-xx MIN-SEC	
FL V06 N51 (IF P41)		Request proceed
R1 TG	xx-xx MIN-SEC	To monitor cut-off
R2 VG	xxxxx. Ft/sec	
R3 DELTA VM	xxxxx. Ft/sec	
FLV06 N52 (IF P42)		Request proceed
R1 TG	xx-xx MIN-SEC	To monitor cut off
R2 VG	xxxxx. Ft/sec	
R3 TFF	xx-xx MIN-SEC	
DO R34		Orbital parameter display
IF P42: FL V50 N07		Please perform
R1 - 00001		

DISPLAY	UNITS	REMARKS
Program 43		
DO R2		Thrust control mode check
FL V16 N20		Request proceed
R1 - OG ROLL	xxx.xx DEG	For AGCU align
R2 - IG PITCH	xxx.xx DEG	
R3 - MG YAW	xxx.xx DEG	
V16 N50		
R1 - TTI	xx-xx MIN-SEC	
R2 - DELTA T BURN	xx-xx MIN-SEC	
R3 - 00000		
DO R37		SPS engine ignition
V06 N50		
R1 - TTI	xx-xx MIN-SEC	
R2 - DELTA T BURN	xx-xx MIN-SEC	
R3 - DELTA VM	xxxxx. Ft/sec	
DO R34		Orbit parameter display
Program 46		
FL V50 N25		Please perform
R1 - 00035		Prepare AGC for thrusting
FL V16 N13		Request proceed
R1 DELTA V (RSS)	xxxxx. Ft/sec	
Program 47		
FL V50 N25		Please perform
R1 - 00035		Prepare AGC for thrusting
FL V16 N13		Request proceed
R1 DELTA V (RSS)	xxxxx. Ft/sec	

DISPLAY	UNITS	REMARKS
Program 51		
DO R1		Att. control mode check
FL V50 N25 R1 - 00015		Please perform
DO R27		Sighting mark for star #1
DO R27		Sighting mark for star #2
DO R29		Star data test
Program 52		
V01 N31		Program Alarm if stars not visible
R1 - 402		
DO R4		Common alignment
Program 53		
DO R1		Att. control mode check
DO R25		Coarse align
DO R21		Attitude maneuver
DO R4		Common alignment
FL V50 N07 R1 - 00000		Please perform selection of P00

DISPLAY	UNITS	REMARKS
Program 61		
V05 N31 R1 - 1106		Program alarm for IMU orientation unsatisfactory
FL V16 N53		Request proceed
R1 - G MAX	xxxx.x G	
R2 - TFF	xx-xx MIN-SEC	Set TFF in DET
DO R1		Att. control mode check
DO R21		Attitude maneuver
Program 62		
DO R3		Entry control mode check
FL V50 N25 R1 - 00041		Please perform CM/SM sep.
DO R21		Attitude maneuver
Program 63		
V16 N54		
R1 - BETA	xxx.xx DEG	
R2 - G	xxxx.x G	
R3 - IND ALT	xxxx.x NM	
Program 64		
V16 N54		
R1 - BETA	xxx.xx DEG	Monitor entry
R2 - G	xxx.xx G	
R3 - IND ALT	xxxxx. 10 FT	

DISPLAY	UNITS	REMARKS
Program 71		
V16 N41		
R1 - G MAX	xxxx.x G	
R2 - PERIGEE ALT	xxxx.x NM	
R3 - TFF	xx-xx MIN-SEC	
DO R1		Att. control mode check
V16 N42		
R1 - DELTA R	xxxx.x NM	
R2 - PERIGEE ALT	xxxx.x NM	
R3 - TFF	xx-xx MIN-SEC	
Program 72		
FL V16 N62		Request proceed or exit
R1 - DELTA R	xxxx.x NM	
R2 - DELTA V INS	xxxxx. Ft/sec	
R3 - TFF	xx-xx MIN-SEC	
POSS FL R2		If contingency orbit feasible
POSS FL R1		If thrusting to discrete recovery area feasible

DISPLAY	UNITS	REMARKS
Program 73		
FL V16 N52		Request proceed
R1 TTI	xx-xx MIN-SEC	To set DET
R2 VG	xxxxx. Ft/sec	
R3 TFF		
DO R21		Attitude maneuver
DO R2		Thrust control mode check
V16 N51		
R1 - TTI	xx-xx MIN-SEC	Recall display
R2 - VG	xxxxx. Ft/sec	
R3 - 00000		
DO R37		SPS engine ignition
V16 N52		
R1 - TG	xx-xx MIN-SEC	Monitor burn
R2 - VG	xxxxx. Ft/sec	
R3 - TFF	xx-xx MIN-SEC	

DISPLAY	UNITS	REMARKS
Program 74		
FL V16 N52		Request proceed
R1 - TTI	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - TFF	xx-xx MIN-SEC	
DO R21		Att. Maneuver
DO R2		Thrust control mode check
V16 N51		
R1 - TTI	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - 00000		
DO R37		SPS ignition
V16 N51		
R1 - TG	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	
FL V06 N51		Request proceed
R1 - TG		
R2 - VG		
R3 - DELTA VM		
DO R34		Orbit parameter display

DISPLAY	UNITS	REMARKS
Program 75		
FL V16 N46		Request proceed
R1 - TTI	xx-xx MIN-SEC	SET DET
R2 - VG	xxxxx. Ft/sec	
R3 - PERIGEE ALT	xxxx.x NM	
FL V06 N70		Request proceed
R1 PITCH TRIM	xxx.xx DEG	Evaluate data
R2 YAW TRIM	xxx.xx DEG	
R3 DELTA V TAILOFF	xxxxx. Ft/sec	
DO R21		Attitude maneuver
DO R2		Thrust control mode check
V16 N51		
R1 - TTI	xx-xx MIN-SEC	Set DET
R2 - VG	xxxxx. Ft/sec	
R3 - 00000		
DO R37		SPS engine ignition
V16 N51		
R1 - TTI	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	
DO R24		Delta V monitor
FL V06 N51		Request proceed
R1 - TG	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	
DO R34		Orbital parameter display

DISPLAY	UNITS	REMARKS
Routine 1		Attitude control mode check
If not in G&N att cont: FL V50 N25 R1 - 00001		 Please perform G&N att cont select
Routine 2		Thrust control mode check
If not in G&N DELTA V: FL V50 N25 R1 - 00002		 Please perform G&N DELTA V mode select
Routine 3		Entry control mode check
FL V50 N25 R1 - 00004		Please perform SCS att control mode select
If not in G&N entry mode FL V50 N25 R1 - 00003		 Please perform G&N entry mode select
Routine 4		Common alignment
DO R25 (IF P52)		Coarse align
DO R28		Auto optics positioning for star #1
DO R27		Sighting mark for star #1
DO R28		Auto optics positioning for star #2
DO R27		Sighting mark for star #2
DO R29		Star data test
DO R30		Fine align
DO R21 (IF not P52)		Attitude maneuver

DISPLAY	UNITS	REMARKS
Routine 21		Attitude maneuver
FL V16 N20		Request proceed
R1 - OG ROLL	xxx.xx DEG	present gimbal angles
R2 - IG PITCH	xxx.xx DEG	
R3 - MG YAW	xxx.xx DEG	
FL V06 N17		Request proceed
R1 - OG ROLL	xxx.xx DEG	desired gimbal
R2 - IG PITCH	xxx.xx DEG	angles
R3 - MG YAW	xxx.xx DEG	
FL V50 N25		Please perform
R1 - 00007		attitude trim maneuver enable
Routine 22		
V03 N31		For alarm situation
R1 - 405		Program alarm code

DISPLAY	UNITS	REMARKS
Routine 23		
A. If V65 entered:		
FL V22 N44		Request load longitude
FL V25 N34		Request load T PERM LONG
FL V06 N34		Request proceed
R1 - T LONG	xxxxx. HRS	
R2 - T LONG	xxxxx. MIN	
R3 - T LONG	xxx.xx SEC	
B. If V66 entered:		
FL V25 N34		Request load T LAT LONG
FL V06 N44		
R1 - LAT	xxx.xx DEG	
R2 - LONG	xxx.xx DEG	
R3 - 00000		
C. If V67 entered:		
FL V25 N34		Request load T PERM DEC
FL V06 N44		Request proceed
R1 - NAX DEC	xxx.xx DEG	
R2 - 00000		
R3 - 00000		
FL V06 N34		Request proceed
R1 - T MAX DEC	xxxxx. HRS	
R2 - T MAX DEC	xxxxx. MIN	
R3 - T MAX DEC	xxx.xx SEC	
Routine 24		Delta V Monitor
	No DSKY displays	
Routine 25		Coarse Alignment
	No DSKY displays	
Routine 27		Sighting mark
FL V51		Please mark
FL V21 N30		Load star data
FL V25 N44		Load landmark data

DISPLAY	UNITS	REMARKS
Routine 28		Auto optics positioning
A. If this is P22:		
FL V06 N44		Request proceed
R1 - LAT	xxx.xx DEG	
R2 - LONG	xxx.xx DEG	
R3 - ALT	xxxx.x NM	
B. If this is not P22:		
FL V06 N30		Request proceed
R1 - STAR CODE		
If not in AGC mode:		
FL V50 N25		Please perform
R1 - 00013		switch to AGC mode
If optics angles excessive:		
FL V05 N31		
R1 - 00402		
V16 N57		
R1 - SHAFT	xx.xxx DEG	
R2 - TRUNNION	xx.xxx DEG	
Routine 29		Stardata test
If data good:		
V06 N05		
R1 - STAR ANGLE DIFF	xxx.xx DEG	
If data bad:		
FL V06 N05		Request proceed
R1 - STAR ANGLE DIFF	xxx.xx DEG	

DISPLAY	UNITS	REMARKS
Routine 30		
If data good:		
V06 N67		
R1 - X GYRO	xx.xxx	Data evaluation
R2 - Y GYRO	xx.xxx	
R3 - Z GYRO	xx.xxx	
If data bad:		
FL V06 N67		Request proceed
R1 - X GYRO	xx.xxx	Data evaluation
R2 - Y GYRO	xx.xxx	
R3 - Z GYRO	xx.xxx	
FL V50 N25		Please perform
R1 - 00014		Fine align check
Routine 31		Backup Delta V Counter Display
FL V06 N14		
R1 - DELTA V (SCS)		Request proceed

DISPLAY	UNITS	REMARKS
Routine 33		Minimum impulse data load
FL V06 N34		Request proceed
R1 - TIG - HRS	xxxxx. HRS	
R2 - TIG - MIN	xxxxx. MIN	
R3 - TIG - SEC	xxx.xx SEC	
FL V06 N44		Request proceed
R1 - LAT	xxx.xx DEG	Load parameters
R2 - LONG	xxx.xx DEG	
R3 - ALT	xxxx.x NM	
FL V06 N45		Request proceed
R1 - PER HRS	xxxxx. HRS	Load period of
R2 - PER MIN	xxxxx. MIN	desired orbit
R3 - PER SEC	xxx.xx SEC	
FL V06 N70		Request proceed
R1 - PITCH TRIM	xxx.xx DEG	Load data
R2 - YAW TRIM	xxx.xx DEG	
R3 - DELTA V TAILOFF	xxxxx. Ft/sec	
FL V06 N35		Request proceed
R1 - DELTA T BURN	xxxxx. HRS	Load data
R2 - DELTA T BURN	xxxxx. MIN	
R3 - DELTA T BURN	xxx.xx SEC	

DISPLAY	UNITS	REMARKS
Routine 34		Orbit parameter display
If not in P42:		
FL V06 N43		Request proceed
R1 - PERIGEE ALT	xxxx.x NM	Evaluate parameters
R2 - APOGEE ALT	xxx.x NM	
R3 - TFF	xx-xx MIN-SEC	
(TFF displayed only if PERIGEE is less than 300,000 ft)		
If PERIGEE is less than 300,000 ft:		
FL V06 N34		Request proceed
R1 T PERIGEE HRS	xxxxx. HRS	
R2 T PERIGEE MIN	xxxxx. MIN	
R3 T PERIGEE SEC	xxx.xx SEC	
If in P42:		
FL V16 N64		Request proceed
R1 LAT SPLASH	xxx.xx DEG	Evaluate parameters
R2 LONG SPLASH	xxx.xx DEG	
R3 TFF	xx-xx MIN-SEC	
Routine 35		Prethrust orbit change load data
FL V06 N34		Request proceed
R1 - TIG HRS	xxxxx. HRS	Load data
R2 - TIG MIN	xxxxx. MIN	
R3 - TIG SEC	xxx.xx SEC	
FL V06 N44		Request proceed
R1 - LAT	xxx.xx DEG	Load data
R2 - LONG	xxx.xx DEG	
R3 - ALT	xxxx.x NM	
FL V06 N45		Request proved
R1 - PER HRS	xxxxx. HRS	Load data
R2 - PER MIN	xxxxx. MIN	
R3 - PER SEC	xx-xx SEC	
FL V06 N70		Request proceed
R1 - PITCH TRIM	xxx.xx DEG	Load data
R2 - YAW TRIM	xxx.xx DEG	
R3 - DELTA V TAILOFF	xxxxx. Ft/sec	

DISPLAY	UNITS	REMARKS
Routine 36		Return to earth data load
FL V06 N44		Request proceed
R1 - LAT SPLASH	xxx.xx DEG	Load data
R2 - LONG SPLASH	xxx.xx DEG	
FL V06 N12		Request proceed
R1 - DELTA V ALLOW	xxxxx. Ft/sec	Load data
R2 - DELTA V TAILOFF	xxxxx. Ft/sec	
FL V06 N70		Request proceed
R1 - PITCH TRIM	xxx.xx DEG	Load data
R2 - YAW TRIM	xxx.xx DEG	
R3 - DELTA V TAILOFF	xxxxx. Ft/sec	
FL V06 N34		Request proceed
R1 - TIG PERM HRS	xxxxx. HRS	Load data
R2 - TIG PERM MIN	xxxxx. MIN	
R3 - TIG PERM SEC	xxx.xx SEC	
Routine 37		SPS Engine Ignition
V16 N51		
R1 - TTI	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	To check ullage
FL V50 N11		Please perform
R1 - TTI	xx-xx MIN-SEC	Perform engine on enable
R2 - VG	xxxxx. Ft/sec	Monitor ignition
R3 - DELTA VM	xxxxx. Ft/sec	

DISPLAY	UNITS	REMARKS
Routine 38		SPS Engine thrust fail
FL V50 N11		Please perform Perform engine on enable
V16 N51		Recalls displays
R1 - TTI	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - DELTA VM	xxxxx. Ft/sec	
or		
V16 N52		
R1 - TG	xx-xx MIN-SEC	
R2 - VG	xxxxx. Ft/sec	
R3 - TFF	xx-xx MIN-SEC	