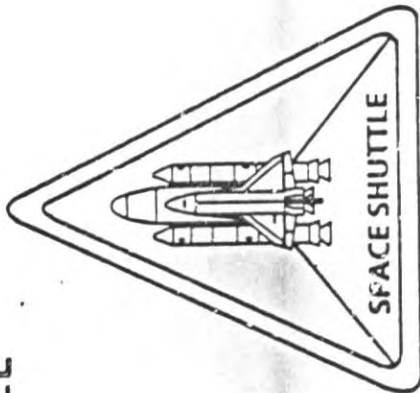


National Space Transportation System

FLIGHT DATA FILE



**ORBIT OPS
CHECKLIST**

STS

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ORB OPS/ALL/GEN B

APU/HYDRAULICS

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APU/
HYD

HYD THERM COND - TERM

SM 87 HYD THERMAL

CAUTION

If CIRC PUMP P (HYD PRESS)
< 100 psia 30 sec after pump
on, CIRC PUMP - OFF

R2 HYD CIRC PUMP 1,2,3 - OFF
2 - ON
Wait 10 sec
R4 HYD LG HYD ISOL VLV 2 - CL
Hold 5 sec, √tb - CL
A12 ✓HYD CIRC PUMP PWR 1 - MNA
2 - MNB
3 - MNC (MNA if Spacelab)
R2 HYD CIRC PUMP 2 - OFF
3 - ON
Wait 10 sec
R4 HYD LG HYD ISOL VLV 3 - CL
Hold 5 sec, √tb - CL
R2 HYD CIRC PUMP 3 - OFF

APU HEATER RECONFIG

A12 APU HTR GAS GEN/FUEL PUMP(three) - B AUTO
LUBE OIL LINE(three) - B AUTO
TK/FU LINE/H2O SYS 1B,2B,3B - AUTO
1A,2A,3A - OFF

HYD ISOL VALVE REPOSITIONING

SM 87 HYD THERMAL

NOTE

HYD LG ISOL VLV 1 should
not be opened on-orbit

CAUTION

If CIRC PUMP P (HYD PRESS)
< 100 psia 30 sec after pump
on, CIRC PUMP - OFF

- R2 HYD CIRC PUMP X - ON
Wait 10 sec
- R4 HYD LG HYD ISOL VLV X - OP(CL)
Hold 5 sec, /tb - OP(CL)
or
HYD MPS/TVC ISOL VLV X - OP(CL)
Hold 5 sec, /tb - OP(CL)
- R2 HYD CIRC PUMP X - GFF

MANUAL CIRC PUMP 2 OPS

- R1 MN BUS TIE A - ON
B - GFF
- R2 HYD CIRC PUMP 2 - ON
Wait 30 min
- R2 HYD CIRC PUMP 2 - OFF
- R1 MN BUS TIE B - ON
A - OFF

COMM/INST

(

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COMM/
INST

COMM/INST

RCD DATA ONLY

C3 ✓S-BD PM CNTL - CMD

SM 1 DPS UTILITY

CRT RTC (RCDR VOICE 1/2 - OFF via GCIL A(B))

ITEM 13 +7 1 0 9 0 1 E E EXEC
(710A 01FF)

CMD - ITEM 14 EXEC

ITEM 13 +7 9 0 9 0 0 5 D EXEC
(790A 005D)

CMD - ITEM 14 EXEC

RTC (OPS RCDR 1(2) RCD SERIAL 128)

ITEM 13 +A 0 8 9 E E E E EXEC
(A08A FFFF)

CMD - ITEM 14 EXEC

ITEM 13 +A 8 8 9 8 6 1 0 EXEC
(A88A 8610)

CMD - ITEM 14 EXEC

SM 76 COMM/RCDR

- ✓NSP RCDR INPUT - DATA
- ✓OPS RCDRS 1(2) MODE - RCD A
- ✓TAPE - RUN

RCD DATA AND VOICE

A1R ✓AUD CTR VOICE RCD SEL CH 1 - ICOM A

 ✓CH 2 - ICOM B

C3 ✓S-BD PM CNTL - CMD

SM 1 DPS UTILITY

CRT RTC (RCDR VOICE 1/2 - ON via GCIL A(B))

ITEM 13 +7 1 0 9 0 1 E E EXEC
(710A 01FF)

CMD - ITEM 14 EXEC

ITEM 13 +7 9 0 9 0 0 5 E EXEC
(790A 005E)

CMD - ITEM 14 EXEC

RTC (OPS RCDR 1(2) RCD SERIAL 192)

ITEM 13 +A 0 8 9 E E E E EXEC
(A08A FFFF)

CMD - ITEM 14 EXEC

ITEM 13 +A 8 8 9 8 0 1 0 EXEC
(A88A 8010)

CMD - ITEM 14 EXEC

SM 76 COMM/RCDR

✓NSP RCDR INPUT - D/VO
✓OPS RCDRS 1(2) MODE - RCD A
✓TAPE - RUN

PS STATUS REPORT RECORDER CONFIG

AIR ✓AUD CTR VOICE RCD SEL CH 1 - ICOM A
✓CH 2 - ICOM B

SM 76 COMM/RCDR

✓NSP RCDR INPUT - D/VO
✓OPS RCDRS 1(2) MODE - RCD A
✓TAPE - RUN
✓ATU ICOM A(B) - T/R

RECORD:

OPS RCDR ___ TRK ___ % TAPE ___ MET ___ start
___ TRK ___ % TAPE ___ MET ___ stop

Monitor % tape - do not RCD when less than
5% or greater than 95%

If no RCDR is running or if not in D/VO:
Perform RCD DATA AND VOICE (POST-SLEEP)

KU-BD ANT DEPLOY

A1U ✓KU PWR - OFF
 CNTL - PNL

R13L ✓ANT DIRECT STO - OFF
 PL BAY MECH PWR SYS (two) - ON
 KU ANT - DPY

When KU ANT tb - DPY (~23-46 sec),
KU ANT - GND

If no DPY, Go to MAL, MECH, 9.5a

PL BAY MECH PWR SYS (two) - OFF

KU-BD ACTIVATION

R15:C cb MNB KU ELEC - c1
 ✓ANT HTR - c1
 ✓CABLE HTR - op
 MNC KU SIG PROC - c1

A1U SIG STRENGTH sel - KU
 ✓SLEW RATE - SLOW
 ✓KU SCAN WARN tb - bp
 ✓TRACK tb - bp
 ✓SEARCH tb - bp
 ✓KU - MAN SLEW
 ✓RADAR OUTPUT - HI
 ✓SIG PROC HDR - TV
 ✓LDR - OPS RCDR
 MODE - RDR PASSIVE
 PWR - ON
 ✓CNTL - PNL

CRT SM ANTENNA
 I/O RESET KU - ITEM 8 EXEC (*)
 ✓SCAN WARN ENA - ITEM 5 (*)

 NOTE
 System warmup takes ~4 min

A2 DIGI-DIS SEL - EL/AZ
 ✓RANGE/ELEVATION - +000.0
 ✓RANGE RATE/AZM - +000.0

 DIGI-DIS SEL - R/R

CRT When warmup complete,
 SELF TEST - ITEM 7 EXEC (*)

A1U When SELF TEST complete (~3 min),
 ✓KU SCAN WARN tb - gray
 ✓TRACK tb - gray
 ✓SEARCH tb - gray

A2 ✓RANGE/ELEVATION - +888.8
 If RANGE/ELEVATION - +333.3, ✓MCC

CRT SELF TEST - ITEM 7 EXEC (no *)

A1U KU MODE - COMM
 KU - GPC DESIG
TAGS Perform TAGS ACTIVATION

TAGS ACTIVATION

TAGS MSTR PWR - ENA

 If TAGS PWR lt - off:

A1U ✓KU CNTL - PNL
TAGS TAGS PWR - ON (mom)

A1U If KU MODE - RDR
 | ✓CNTL - PNL
 If KU MODE - COMM
 CNTL - CMD

✓Mode, Paper, Overtemp Status Lamps off
(within 15 sec)

If JAM/EMPTY lt - on:

ADV - ADV (mom)

Wait 30 sec (software init)

Remove paper sheet from tray

If JAM/EMPTY lt - on:

Perform MAL 2.8a, (MAL, COMM)

If initial TAGS activation:

ADV - ADV (mom)

Repeat to advance 3 pages into tray

Remove and dispose of waste paper

Notify MCC to perform remainder of
config

On MCC call:

✓Top 2 sheets in tray for gray
(exposed) areas

If no gray areas: Notify MCC to xmit
test images

Notify MCC of test page quality

TAGS DEACTIVATION

If all expected msgs not received,
✓MCC

TAGS

If TAGS PAGE IMAGED lt - on:
TAGS ADV - ADV (wait 30 sec)
✓PAGE IMAGED lt - off
If lt remains on:
TAGS ADV - ADV (wait 30 sec)

✓DEV lt - off
If lt remains on, wait
30 additional sec

Check paper tray for msg
If no msg present, ✓MCC and proceed

TAGS MSTR PWR - OFF

KU-BD ANT CABLE POSITIONING

NOTE

If TDRS AOS coordinate
this procedure with MCC

A1U KU CNTL - PNL
KU - MAN SLEW
SLEW RATE - FAST

A2 DIGI-DIS SEL - EL/AZ

A1U SLEW ELEV - as reqd:
A2 RANGE/ELEVATION - $0(\pm 5^\circ)$

A1U SLEW AZM - as reqd:
A2 RANGE RATE/AZM - $0(\pm 5^\circ)$

A1U SLEW ELEV - UP (hold for 14 sec)

If not stowing antenna:
SLEW RATE - SLOW
KU - GPC DESIG
CNTL - CMD

KU-BD ANT STOW

TAGS Perform TAGS DEACTIVATION, then:

R13L DAP: VERN (FREE if in PRI)
A1U ✓PL BAY MECH PWR SYS 1,2 (two) - OFF
✓KU PWR - ON
KU - MAN SLEW
MODE - RDR PASSIVE
CNTL - PNL

A2 ✓DIGI-DIS SEL - EL/AZ

A1U Perform KU-BD ANT CABLE POSITIONING, then:
SLEW RATE - as reqd

A2 SLEW ELEV - as reqd:
RANGE/ELEVATION: $-27.0(\pm 1^\circ)$

A1U SLEW AZM - as reqd:
A2 RANGE RATE/AZM: $-123.0(\pm 1^\circ)$

R13L KU ANT - STO
Wait 50 sec

A2 ✓RANGE/ELEVATION: $-29.0(\pm 1^\circ)$
✓RANGE RATE/AZM: $-125.0(\pm 1^\circ)$

If angles incorrect,
Perform MAL, MECH, 9.5b, then:

R13L PL BAY MECH PWR SYS 1,2 (two) - ON
✓KU ANT tb - STO (~23-46 sec)
If not STO, Perform MAL 9.5b, then:

A1U KU PWR - OFF
R15C cb MNB KU ELEC - op
MNC KU SIG PROC - op

R13L KU ANT - GND

✓KU-BD is within STO envelope

PL BAY MECH PWR SYS 1,2 (two) - OFF

KU-BD MANUAL ACQUISITION (COMM)

1. SETUP

A2
A1U

✓DIGI-DIS SEL - EL/AZ
KU - AUTO TRACK
✓PWR - ON
MODE - COMM
✓SIG PROC HDR - TV
✓LDR - OPS RCDR
CNTL - PNL
✓SIG STRENGTH sel - KU
SLEW RATE - as reqd
✓KU SCAN WARN tb - bp
✓TRACK tb - bp
✓SEARCH tb - bp

2. ANTENNA STEERING

NOTE

ANT will not LOCK/TRACK
when slewing in FAST RATE

CRT

SM ANTENNA

A1U, CRT,
A2

Use SLEW AZM and SLEW ELEV sw as required
to position LOS pointer (□) over target
on CRT

Until ANT EL, AZ angles on pnl A2 are
within 5° of ANT EL, AZ CMD angles on CRT

A1U

KU SEARCH - SEARCH

✓tb - gray

When SIG STRENGTH > 1.0 and
KU TRACK tb - gray (< 3 min),

✓KU SCAN WARN tb - bp

✓SEARCH tb - bp

- * If no track in 3 min, *
- * repeat step 2 once *
- * If still no track, ✓MCC *

KU CNTL - CMD

KU-BD ANT JETTISON

NOTE

Jettison between sunrise
and noon if possible

AUTO MNVR TO -XLV

CRT

GNC UNIV PTG

✓START TIME at least 15 min prior to
sunrise

✓TGT ID: +2

BODY VECT: +2

OM: +0

START TRK - ITEM 19 EXEC (CUR-*)

A6U

DAP: A/AUTO/VERN

CONFIGURE KU FOR JETTISON

A1U

✓KU PWR - OFF

CNTL - PNL

R15

cb MNB KU ELEC - op

ANT HTR - op

CABLE HTR - op

MNC KU SIG PROC - op

A14

✓ANT ARM - SAFE

✓JETT - SAFE

MA73C:A

MCA LGGIC MNC MID 2 - OFF

:B

MNB MID 4 - OFF

ML86B:D

cb MNA PYRO JETT SYS A KU ANT - c1

MNC PYRO JETT SYS B KU ANT - c1

CONFIGURE CCTVs TO MONITOR JETTISON

Perform TV ACT, VTR ACT, TV/VTR (Cue Card)

CCTV MON 1 - A

2 - B

Point CCTVs as reqd

Put new tape in VTR

A7U

✓Lighting - as reqd

A6U FLT CNTRL PWR - ON

✓In jettison att
DAP TRANS: PULSE/PULSE/NORM

If VERN jets avail:
| DAP: A1/INRTL/VERN
If VERN jets not avail:
DAP: B1/INRTL/PRI

Wait until rates damped, then:
DAP: A/FREE/PRI
✓SENSE - as reqd
VTR - PLAY/RCD/RUN

NOTE

After JETT, initiate opening
rate ASAP. Minimize other
THC/RHC inputs

A14 PYRO KU ANT ARM - ARM

Wait 1 sec, then:
PYRO KU ANT JETT - JETT

WHEN JETTISON COMPLETE, TRANSLATE AWAY

THC: +Z, 2 sec (1 fps)
(-X sense: THC dn)
(-Z sense: THC out)

DAP: INRTL

WHEN >100' AWAY, SECOND SEP BURN

SENSE - as reqd
THC: +Z, 2 sec (1 fps)
(-X sense: THC dn)
(-Z sense: THC out)

Maintain visual contact with KU ANT in
OVHD window using RHC

When KU ANT no longer visible, then:

CLEANUP

R11 VTR pb - STOP

GNC UNIV PTG

✓TGT ID: +2

BODY VECT: +3

✓OM: +0

START TRK - ITEM 19 EXEC (CUR-*)

DAP: A1/AUTO/VERN

FLT CNTLR PWR - OFF

A7U ✓Lighting - as reqd

A14 PYRO KU ANT JETT - SAFE
ARM - SAFE

ML86B:D cb MNA PYRO JETT SYS A KU ANT - op
MNC PYRO JETT SYS B KU ANT - op

MA73C:A MCA LOGIC MNC MID 2 - ON
:B MNB MID 4 - ON

TAGS If TAGS MASTER POWER - ENABLE:
Go to TAGS DEACTIVATION

STD S-BD/KU-BD PNL CONFIG

If configuring for TDRS KU-BD:
 Prior to configuring AIL/C3,
 If KU in radar, config for KU COMM
 and perform KU-BD MANUAL ACQUISITION
 (COMM), 2-9

If KU in COMM
 ✓KU TRACK tb - gray
 Else, perform KU-BD MANUAL
 ACQUISITION (COMM), 2-9

		IF STDN(SGLS) <u>S-BD</u>	IF TDRS <u>S-BD</u>	IF TDRS <u>KU-BD</u>
AIL	NSP DATA RATE XMIT - HI	HI	HI	HI
	RCV - LO(HI)	HI	HI	HI
	UPLK DATA - S-BD	S-BD	S-BD	KU
	CODING XMIT - OFF	OFF	ON	OFF
	RCV - OFF	OFF	ON	OFF
	S-BD PM MODE - STDN LO (SGLS)	STDN LO (SGLS)	TDRS DATA	--
C3	S-BD PM CNTL - PNL, CMD	PNL, CMD	PNL, CMD	PNL, CMD

NOTE

If S-BD mode TDRS or STDN HI, xmit
 may be delayed 140 sec for PA warmup.
 Receive not affected

PRE-SLEEP AUD CONFIG

TPNTR config (if reqd):

✓XX AUD PWR - AUD
A/G 2 - T/R, tw - 9
All other LOOPS - OFF
XX AUD XMIT/ICOM MODE - PTT/PTT

✓TPNTR AUD Cable conn to XX CCU outlet
✓TPNTR PWR Cable conn to XX DC UTIL PWR &
PWR - ON
All other AUD PNLs config for A/G 2 - OFF

06 UHF MODE - as reqd

FLIGHT DECK/MIDDECK AUD CONFIG

Perform STD HANDHELD MIC/SPEAKER CONFIG,
2-16, then:

SPKR BOX CHECKOUT

M042F MIDDECK SPKR AUD PWR - AUD
Set off alert tone and adjust Bypass Tone
volume as reqd
CRT PWR (CRT left in STBY) - ON (then), STBY

MIDDECK SPKR AUD PWR - OFF
Perform comm check w/GND using flt deck
handheld mic
MIDDECK SPKR AUD PWR - AUD/TONE

A13 OS AUD SPKR PWR - OFF
Perform comm check w/GND using middeck
handheld mic
OS AUD SPKR PWR - SPKR

NOTE

If during sleep period, SM ALERT
is annunciated with no fault msg,
MCC has no command capability.
✓MCC. If no joy, perform COMM LOST
(OPCL, COMM)

POST-SLEEP AUD CONFIG

06 ✓UHF MODE - as reqd

If handheld mic/speaker operation:
Perform STD HANDHELD MIC/SPEAKER
CONFIG, 2-16

If VLHS/HIU operation:
Perform STD VLHS/HIU CONFIG
(NO SPEAKER), 2-17

If WCCS operation:

NOTE

More than one crewmember per WCCS
channel will cause intermittent
loss of comm. Turn unused WCCS
leg units OFF

Perform STD VLHS/HIU CONFIG
(NO SPEAKER), 2-17

STD HANDHELD MIC/SPEAKER CONFIG

NOTE

For PRE-SLEEP AUD CONFIG, MS(OS*)
A/G 2, and MIDDECK SPKR AUD A/G 2
switches should remain off.

* indicates OV102

FLIGHT DECK CONFIG

R10(A13*)	MS(OS*) AUD PWR	- AUD/TONE
	A/G 1	- T/R, tw-2
	A/G 2	- RCV, tw-2
	A/A	- T/R, tw-2
	ICOM A,B (two)	- RCV, tw-2
	XMIT/ICOM MODE	- PTT/PTT
A13	OS AUD SPKR PWR	- SPKR
	MSTR SPKR VOL	- 8
A11	MS(OS*) COMM CCU PWR	- ON
A2	MIC LEVEL	- fully ccw
	A11 WCCS leg units	- off

MIDDECK CONFIG

M042F	MIDDECK SPKR AUD A/G 1	- T/R, tw-2
	A/G 2	- RCV, tw-2
	A/A	- T/R, tw-2
	ICOM A,B (two)	- RCV, tw-2
	XMIT/ICOM MODE	- PTT/PTT
	SPKR PWR	- SPKR
	MSTR SPKR VOL	- 8
M039M	MIDDECK COMM CCU PWR	- ON
M029J	MIC LEVEL	- fully ccw
	A11 WCCS leg units	- off

STD VLHS/HIU CONFIG (NO SPEAKER)

XX	XX AUD PWR	- AUD/TONE
	A/G 1	- T/R, tw-2
	A/G 2	- RCV, tw-2
	A/A	- T/R, tw-2
	ICOM A,B (two)	- T/R, tw-2
	XMIT/ICOM MODE	- PTT/VOX
XX	CCU PWR	- ON
A13	OS AUD SPKR PWR	- OFF
	MSTR SPKR VOL	- MIN
A2	MIC LEVEL	- FULLY CCW
M042F	MIDDECK SPKR AUD TONES	- ACCU/BYPASS
	SPKR PWR	- OFF
	MSTR SPKR VOL	- min
M029J	MIC LEVEL	- fully ccw

NOTE

Unused audio loops either RCV or OFF.
 Unused VLHS comm systems either dis-
 connected or CCU PWR OFF and HIU VOL 0

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CREW SYSTEMS

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CREW
SYS

PRE-SLEEP ACTIVITY

FLIGHT DECK ACTIVITY LIST

IMU ALIGNMENT:

Mnvr to IMU Align Att as scheduled per FLT PLN
Perform IMU ALIGN - S TRK (GNC), 7-2,
then:
Return to FLT PLN ATT

NOTE

Do not perform fuel cell purge or water dumps during IMU alignment

~~ECLS SUPPLY WATER DUMP~~
CRYO HEATER/MANF VLV Config per MCC

CREW
SYS

David

3. DPS, SM CHECKPOINT INITIATE

CRT

4. ✓ CRT MAJ FUNC - one SM, one GNC

5. CRT TIMER FOR WAKE UP

6. ALERT TONE DURATION

L1

David

7. CAB TEMP - adj rotary as reqd

8. POWERDOWN:
CRTs (one GNC-OFF, one SM-OFF)
Perform ERR LOG reset:

GNC O GPC MEMORY

SM O GPC MEMORY

C3

BFC CRT DISP - ON
SEL - CRT X
X - STBY

C2

✓ PWR OFF:
 TV MON
 CAMERAS
 PWR CONTR UNIT
 PWR
 VTR
 PLB LIGHTS
 DDUs (one ON, if reqd)

- ✓ ~~9. COMM/INST, KU-BD ANT CABLE POSITIONING~~ ✓
- ✓ 10. WINDOW SHADES/FILTERS ✓
- ✓ 11. LIGHTING ✓
- ✓ 014:F, 12. Primary RJD DRIVER (eight) - OFF ✓
 ✓ 015:F,
 ✓ 016:F

MIDDECK ACTIVITY LIST

- ✓ ~~1. FOOD PREP/POST (Cue Card)~~ ✓
- ✓ ~~2. CO2 ABSORBER REPLACEMENT (Cue Card)~~ ✓
- ✓ 3. HOUSEKEEPING ✓
- ✓ 4. WCS CLEANING (Cue Card, URINE COLLECTION) ✓
- ✓ 5. SET UP EQUIPMENT FOR NEXT DAY'S ACTIVITIES ✓
- ✓ 6. PWR OFF:
 FOOD WARMER (Non-Gallery flights)
 TV PWR ✓
- ✓ 7. MISSION NOTES ✓
- ✓ ~~N/A~~ 8. COMM/INST, PRE-SLEEP AUD CONFIG ✓
- ✓ 9. LIGHTING ✓
- ✓ 10. EMPTY TAGS PAPER TRAY ✓

POST-SLEEP ACTIVITY

MIDDECK ACTIVITY LIST

1. LIGHTING (minimize if in GROUP B(C) PWRDN) ✓
2. CO2 ABSORBER REPLACEMENT (Cue Card) ✓
3. MESSAGE REVIEW ✓
4. COMM/INST. POST-SLEEP AUD CONFIG ✓
5. If FD2:
M032M ✓
✓ LEH 02 5 vlv - CL
Insert 02 Bleed Orifice Assembly into
LEH 02 5 QD
C7 ✓
✓ LEH 02 5 vlv - OP
✓ LEH 02 SPLY 1,2 vlvs - OP ✓
M032M If Entry day:
LEH 02 5 vlv - CL
Remove and stow 02 Bleed Orifice
~~LEH 02 5 vlv - R~~
6. FOOD PREP/POST (Cue Card) ✓
7. HOUSEKEEPING ✓

FLIGHT DECK ACTIVITY LIST

1. LIGHTING (minimize if in GROUP B(C) PWRDN) ✓
2. WINDOW SHADES/FILTERS ✓
3. COMM/INST. KU-BD ANT CABLE POSITIONING ✓
4. CRTs (three) - ON (use only one CRT if in GROUP B(C) PWRDN) ✓
5. BFC CRT DISP - OFF ✓
6. ALERT TONE DURATION ✓

✓ LI ✓ 7. CAB TEMP - adj rotary as reqd
If Entry day:
CAB TEMP - full COOL
Wait 20 min
CAB TEMP CNTLR - OFF

✓ 8. If planned: Perform I'CNST L(R) OMS to
RCS (ORB PKT, RCS), then: ✓

✓ 014:F, ✓ 9. Primary RJD DRIVER (eight) - ON (OFF if
015:F, in GROUP B(C) PWRDN) ✓
016:F

✓ 10. IMU ALIGNMENT:
Mnvr to IMU Aflight Att as scheduled per
FLT PLN
Perform GNC, IMU ALIGN - S TRK, then:
Return to FLT PLN ATT

NOTE

Do not perform fuel cell
purge or water dumps during
IMU Alignment

* ~~11. EPS, SUPPLY WATER DUMP
CRYO HEATER/MANF VLV config per MCC~~

* ✓ 12. EPS, CRYO O2 TK HTR SNSR CK

CPA OPS

1. Destow CPA
2. Selector sw - SCAN (2-min warmup)
3. Log middeck readings for each sensor
4. Selector sw - OFF
5. Restow CPA

DATA LOG

MET	LOCATION	DATA READINGS, ppm	REMARKS
__/__:__		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
__/__:__		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
__/__:__		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
__/__:__		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
__/__:__		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	

MET	LOCATION	DATA READINGS, ppm	REMARKS
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	
/:--		1. CO ____ 2. HCN ____ 3. HF ____ 4. HC1 ____	

MET	LOCATION	DATA READINGS, ppm	REMARKS
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	
/:--		1. CO _____ 2. HCN _____ 3. HF _____ 4. HC1 _____	

DPS

SINGLE G2 GPC OPS..... 4-2
DUAL G2 GPC OPS..... 4-4
G2 TO G8 TRANSITION..... 4-5
G8 TO G2 TRANSITION..... 4-6
SM OPS TRANSITION..... 4-8
CHECKPOINT INITIATE..... 4-9

DPS

SINGLE G2 GPC OPS

1. If RNDZ NAV enabled:
Perform G2 TO G8 TRANSITION, step 3, 4-5,
then:

2. FORM SINGLE G2 GPC SET
If MM202: GNC, OPS 201 PRO
GNC 0 GPC MEMORY
CONFIG - ITEM 1 +2 EXEC
Assign MC 2 per table →
/DOWNLIST GPC, ITEM 44 - 1
GNC, OPS 201 PRO

CONFIG GPC	2	10000
STR 1	1	
2	1	
3	1	
4	1	
PL 1/2	0	
CRT 1	1	
2	1	
3	0	
4	1	
L 1	0	
2	0	
MM 1	1	
2	1	

3. FREEZE DRY GPC 2 (G2 FD)
CRTLX MAJ FUNC - PL
GPC/CRT2/X EXEC
X: PL GPC MEMORY
CONFIG - ITEM 45 +2 EXEC
GPC - ITEM 46 +2 EXEC
STORE - ITEM 47 EXEC
Store complete when MC = 02
(~30 sec)

- 06 GPC MODE 2 - STBY(tb-bp), then HALT
- STBY(tb-RUN)
- HALT(tb-bp)

4. CONFIGURE STAR TRKRS
GNC 22 S TRK/COAS CNTL
S TRK -Y, -Z: STAR TRK - ITEM 3,4 EXEC (*)
GNC 21 IMU ALIGN
RESUME

DPS

5. CLEAR SOFTWARE FAIL VOTES

ON MCC GO

GNC 0 GPC MEMORY

ITEM 48 EXEC

SM 0 GPC MEMORY

ITEM 48 EXEC

6. If resuming RNDZ NAV TRACKING:
Perform G8 TO G2 TRANSITION, step 3, 4-6

DUAL G2 GPC OPS

1. If RNDZ NAV enabled:
Perform G2 TO G8 TRANSITION, step 3, 4-5,
then:

2. CONFIGURE G2 FD GPC FOR SET EXPANSION

✓AV BAY 2 FAN A(B) - ON

06

✓GPC MODE 2 - HALT
✓OUTPUT 2 - NORM
✓PWR 2 - ON
MODE 2 - STBY(tb-RUN), then RUN

3. FORM DUAL G2 GPC SET

If MM202: GNC, OPS 201 PRO

GNC 0 GPC MEMORY

CRT

CONFIG - ITEM 1 +2 EXEC
Assign MC 2 per table
GNC, OPS 201 PRO

CONFIG GPC	2	12000
STR 1	1	1
2	2	2
3	1	1
4	2	2
PL 1/2	0	0
CRT 1	1	1
2	2	2
3	0	0
4	2	2
L 1	0	0
2	0	0
MM 1	1	1
2	2	2

4. CONFIGURE STAR TRKRS

GNC 22 S TRK/COAS CNTL

S TRK -Y, -Z: STAR TRK - ITEM 3,4 EXEC (*)

GNC 21 IMU ALIGN

RESUME

5. If resuming RNDZ NAV TRACKING:
Perform G8 TO G2 TRANSITION, step 3, 4-6

G2 TO G8 TRANSITION

SM 62 PCMMU/PL COMM

161

1. If FORMAT ID not 103/161, then:
LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)
FORMAT ID: 103/161

GNC 0 GPC MEMORY

2. CONFIG - ITEM 1 +8 EXEC
Modify MC 8 per MC 8 CONFIG TABLE

If 2 GNC GPCs

MC 8		CONFIG TABLE
CONFIG	8	12000
GPC		
STR	1	1
	2	2
	3	1
	4	2
PL 1/2		0
CRT	1	1
	2	2
	3	0
	4	2
L	1	0
	2	0
MM	1	1
	2	2

If 1 GNC GPC

MC 8		CONFIG TABLE
CONFIG	8	10000
GPC		
STR	1	1
	2	1
	3	1
	4	1
PL 1/2		0
CRT	1	1
	2	1
	3	0
	4	1
L	1	0
	2	0
MM	1	1
	2	1

3. If RNDZ NAV enabled and
UNIV PTG in TRK with TGT ID = 1:
DAP: FREE

UNIV PTG

CNCL - ITEM 21 EXEC

C3
CRT

4. /cb ADTA (four) - c1

014:E,
015:E,
016:E

08

/MLS (three) - ON
GNC, OPS 801 PRO

G8 TO G2 TRANSITION

SM 62 PCMMU/PL COMM

all

1. If FORMAT ID 103/161 not appropriate, load desired PCMMU FORMAT (ORB OPS FS, COMM/INST)

GNC 0 GPC MEMORY

2. **CRT** CONFIG - ITEM 1 +2 EXEC
Modify MC 2 per MC 2 CONFIG TABLE

If 2 GNC GPCs

MC 2 CONFIG TABLE	
CONFIG GPC	2
	12000
STR 1	1
2	2
3	1
4	2
PL 1/2	0
CRT 1	1
2	2
3	0
4	2
L 1	0
2	0
MM 1	1
2	2

If 1 GNC GPC

MC 2 CONFIG TABLE	
CONFIG GPC	2
	10000
STR 1	1
2	1
3	1
4	1
PL 1/2	0
CRT 1	1
2	1
3	0
4	1
L 1	0
2	0
MM 1	1
2	1

GNC, OPS 201 PRO

3. If RESUMING RNDZ NAV TRACKING:
If RNDZ OPS, go to RNDZ NAV RECOVERY (RNDZ, CONTINGENCY OPERATIONS)
Following MCC Uplink of TGT SV,

GNC 33 REL NAV

RNDZ NAV ENA - ITEM 1 EXEC (*)

GNC UNIV PTG

TRK - ITEM 19 EXEC (cur-*)
DAP: B/AUTO/VERN, PRI as reqd
ROT: DISC/DISC/DISC

GNC 22 S TRK/COAS CNTL

4. S TRK -Y,-Z: STAR TRK - ITEM 3,4 EXEC (*)

GNC 21 IMU ALIGN

RESUME

If in OPS 8 for other than FCS C/O:

/cb ADTA (four) - op

/MLS (three) - OFF

014:E,
015:E,
016:E
08

don't do

SM OPS TRANSITION

1. If reqd,
Perform SM CHECKPOINT INITIATE
GNC 1 DPS UTILITY
✓CKPT RETRV ENA - ITEM 12 (*)
2. Perform PL DPS RECONFIG, Secure (PL SYS, REF DATA) or SL MDM LINK DISABLE, SSR-11 (SLP(M) MAL, CDMS), then:
3. If reqd,
LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

4. If S2 to S4

CONFIG	5
GPC	00040
STR 1	0
2	0
3	0
4	0
PL 1/2	4
CRT 1	4
2	4
3	0
4	4
L 1	4
2	0
MM 1	4
2	4

SM, OPS 401 PRO

If S4 to S2

CONFIG	4
GPC	00040
STR 1	0
2	0
3	0
4	0
PL 1/2	4
CRT 1	4
2	4
3	0
4	4
L 1	4
2	0
MM 1	4
2	4

SM, OPS 201 PRO

5. ✓ **X: SM ANTENNA**

XX: SM 1 DPS UTILITY

UL CNTL AUTO - ITEM 35 EXEC (*)

6. If RMS onboard and MCIU pwr'd, turn on MCIU I/O and cancel safing
SM 94 PDRS CONTROL (MA, C/W GPC DATA 1t-on)
Item 5 EXEC (*)
SAFING - CANCEL (tb-bp)
✓C/W GPC DATA 1t - off
7. Perform PL DPS RECONFIG, Recovery (PL SYS, REF DATA) or REENABLE SL MDM LINKS, SSR-10 (SLP(M) MAL, CDMS)

SM CHECKPOINT INITIATE

015:F ✓MMU 2 - ON

X: SM 1 DPS UTILITY

MMU 2 ASSIGN:

SM - ITEM 4 EXEC (*)

X: SM 60 TABLE MAINT

✓SM COMM BUFF - 'RDY'

INITIATE - ITEM 18 EXEC

✓Update of CHECKPT TIME

✓STATUS - 'GOOD'

If in GROUP B(C) PWRDN, MMU 2 - OFF

Repeat procedures with MMU 1

After CHECKPT done:

X: SM 1 DPS UTILITY

✓CHECKPT RETRV ENA - ITEM 12 EXEC (*)

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ECLS

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ECLS

SUPPLY WATER DUMP

1. DUMP PREP

NOTE

If PASS SM avail, monitor temps and QTY; otherwise, dump only when MCC is avail to monitor.

If no comm: QTY of approx 200% among TKs A,B,C,D is reqd for deorbit/entry FES usage.

Crew may reset SM alert limits to annunciate end of dump.

If part of TKA and all of TKB is to be dumped:

- set TKB QTY LL to -10 to preclude nuisance alarm
- do not reset LL or dump TKA QTY less than 80

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O SUPPLY QTY A	0620410	25.0	
B	0620420	10.0	
C	0620548	45.0	99.0
D	0620544		

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O SUPPLY NOZ T A	0620440	90	250
B	0620439	90	250

nm - 41156

If only TKB is to be dumped or part of TKA and all of TKB will be dumped:

NOTE

If dumping only part of TKA and all of TKB the configuration is set up to empty TKB and then start dumping TKA through TKB

R12L

✓SPLY H2O XOVR VLV - CL (tb-CL)
✓TKA OUTLET - CL (tb-CL)
✓TKB OUTLET - OP (tb-OP)
Go to step 2

If TKB and TKD will be dumped together:

NOTE

If dumping TKB and TKD together, the configuration will isolate TKC to preserve it for possible EVA usage

ML31C
R12L

SPLY H2O TKC INLET - CL (tb-CL)
OUTLET - CL (tb-CL)
✓TKA OUTLET - CL (tb-CL)
✓TKB OUTLET - OP (tb-OP)
✓TKD OUTLET - OP (tb-OP)
XOVR VLV - OP (tb-OP)

2. DUMP INITIATION

SM 66 ENVIRONMENT

CRT ✓H2O SUPPLY DMP LN T ≥ 65

ML868:A * If DMP LN T < 65, enable 2nd heater: *
* cb MNB(MNA) H2O LINE HTR B(A) - c1 *

R12L ✓SPLY H2O DUMP ISOL VLV - OP (tb-OP)
VLV ENA/NOZ HTR - ON
✓VLV - CL (tb-CL)

CRT When H2O SUPPLY NOZ T A,B (two) exceed
100 (~5 min), cont

R12L SPLY H2O DUMP VLV - OP (tb-OP)

CRT ✓H2O SUPPLY QTY A(B,C,D) - decr
(-1-2% per min)

If 'S66 H2O', H2O SUPPLY NOZ T A,B (two)
< 90, terminate dump immediately

NOTE

If dump is terminated for H2O SUPPLY
NOZ T < 90, ✓MCC about dumping supply
water through FES or through waste
water nozzle to make ullage for fuel
cell product water

3. DUMP TERMINATION

R12L
CRT

SPLY H2O DUMP VLV - CL (tb-CL)
/H2O SUPPLY QTY A(B,C,D) - not decr

- * If H2O SUPPLY QTY A(B,C,D) decr, *
- * Cycle H2O SUPPLY DUMP VLV *
- * If not successful, *
- * H2O DUMP ISOL VLV - CL (tb-CL) *

R12L
CRT

SPLY H2O DUMP VLV ENA/NOZ HTR - OFF
/tb - bp
/H2O SUPPLY NOZ T A,B (two) - not incr

ML86B:A

- * If H2O SUPPLY NOZ T A,B (two) incr: *
- * cb MNC SUPPLY H2O DUMP VLV/NOZ *
- * HTR - op *

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O SUPPLY NOZ T A B	0620440	-82	250
	0620439	-82	250

NOTE

If H2O SUPPLY QTY limits were reset to annunciate end of dump, leave limits at annunciation value

SUPPLY WATER DUMP USING FES

NOTE

If PASS SM avail, monitor tank QTY; otherwise, monitor dump time provided by MCC

Approximately 8%/hr net Supply water used by this method

1. DUMP PREP

Crew may reset SM alert limits to annunciate end of dump if desired

If TKA to be dumped, do not dump TKA QTY less than 80 and set TKB QTY LL to -10 to preclude nuisance alarm

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O SUPPLY QTY A	0620410	25.0	
B	0620420	10.0	

R12L ✓SPLY H2O XOVR VLV tb - ~~ct~~ OP

2. DUMP INITIATION

L1 RAD CNTLR OUT TEMP - HI
 If FES not activated,
 O1 When EVAP OUT T -50 degF,
 L1 FLASH EVAP CNTLR PRI A - ON
 After one min,
 ✓EVAP OUT T -39 degF

3. DUMP TERMINATION

L1

RAD CNTLR OUT TEMP - NORM
FLASH EVAP CNTLR, PRI A - OFF

01

If FES reqd: *let RAD OUT T dec to ~38*
When EVAP OUT T < 40 degF *evap out T inc to 50*

L1

FLASH EVAP CNTLR PRI A - ON *evap out T dec to < 45*

If H2O SUPPLY QTY limits were reset to
annunciate end of dump, leave limits at
annunciation value

WASTE WATER DUMP

1. DUMP PREP

NOTE

If PASS SM avail, monitor temps and QTY; otherwise, dump only when MCC avail to monitor.

Crew may reset SM alert limits to annunciate end of dump

CAUTION

Dumping waste TK1 QTY below 5% can cause bellows damage

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O WASTE QTY 1	0620540		99
NOZ T A	0620520	60	250
B	0620519	60	250

2. DUMP INITIATION

SM 66 ENVIRONMENT

- CRT H2O WASTE DMP LN T > 50
- * If H2O WASTE DMP LN T ≤ 50, *
 - * enable 2nd heater: *
- ML86B:A * cb MNB(MNA) H2O LINE HTR B(A) - c1 *
- ML31C WASTE H2O DUMP VLV ENA/NOZ HTR - ON
 VLV - CL (tb-CL)
- CRT When H2O WASTE NOZ T A,B (two) exceed 250
 (~10 min), cont
- ML31C WASTE H2O TK1 VLV - OP (tb-OP)
 DUMP ISOL VLV - OP (tb-OP)
 VLV - OP (tb-OP)

CRT /H2O WASTE QTY 1 - decr (-1-2% per min)
/NOZ T A,B (two) - not incr

ML31C If 'S66 H2O', H2O WASTE NOZ T A(B) '+' then,
WASTE H2O DUMP VLV - CL (tb-CL)
CRT When H2O WASTE NOZ T A,B (two) exceeds
250 (-8 min), cont
ML31C WASTE H2O DUMP VLV - OP (tb-OP)

3. DUMP TERMINATION 13 min

ML31C WASTE H2O DUMP VLV - CL (tb-CL)
CRT /QTY 1 - not decr

* If H2O QTY 1 decr: *
* Cycle waste dump vlv, if not *
* successful, *
ML31C * WASTE H2O DUMP ISOL VLV - CL *
* (tb-CL) *

CRT When H2O WASTE NOZ T A,B (two) exceeds 250
(-8 min), cont

ML31C WASTE H2O DUMP VLV ENA/NOZ HTR - OFF
/tb - bp

* If H2O WASTE NOZ T A,B (two) incr: *
ML86B:A * cb MNA WASTE H2O DUMP VLV/NOZ *
* HTR - op *

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O WASTE NOZ T A	0620520	82	250
B	0620519	82	250

NOTE

If H2O WASTE QTY limits were reset to
annunciate end of dump, leave limits at
annunciation value

CABIN TEMP CONTROL SM 88 APU/ENVIRON THERM

CREW ACTION	Δ TEMP degF EXPECTED
√MCC	
Implement ECLS SSR-6 CABIN EQUIP PWRDN -----	} 1 to 9 degF
√H2O LOOP 2(1) ICH FLOW 950 -----	
(L1) FLOW PROP VLV LOOP 2 - ICH -----	} 8 degF
(Check with MCC for payload impact)	} 1 degF
FLOW PROP VLV LOOP 1 - ICH -----	} 4 degF
(√MCC for payload impact)	
(MD44F) CAB TEMP CNTLR vlv - FULL COOL -----	} 6 degF
- 2/3 COOL -----	
- 1/3 COOL -----	
- FULL HEAT -----	
(L1) FLOW PROP VLV LOOP 1 - PL -----	} 4 degF
2 - PL -----	} 1 degF
H2O LOOP 2 BYP MAN - DECR until H2O LOOP 2 ICH FLOW MAX -----	} 8 degF
(C2) Pwrup one or two CRTs as reqd -----	} 5 degF
(L1) H2O PUMP LOOP 1 - ON, B -----	
H2O LOOP 1,2 BYP MAN - DECR until H2O LOOP 1,2 ICH FLOW MAX	
FLASH EVAP CNTLR PRI A,B - OFF SEC - OFF	
√MCC	

ECLSS REDUNDANT COMPONENT C/O

NOTE

Throughout checkout, ignore alerts associated with switching to redundant components and note any discrepancies in the operation of redundant components. The ΔP values in parentheses corresponds to a 10.2 psia cabin environment

SM 66 ENVIRONMENT

L1 IMU FAN B - OFF
A - ON

CRT \checkmark IMU FAN ΔP - ~~~4.3~~ (3.2) ~ 4.5
L1 IMU FAN A - OFF
C - ON

CRT \checkmark IMU FAN ΔP - ~~~4.3~~ (3.2) ~ 1.5
L1 IMU FAN C - OFF
B - ON
CAB FAN A - OFF
B - ON

CRT \checkmark CAB FAN ΔP - ~~6.0~~ (4.3) ~ 5.8
L1 CAB FAN B - OFF
A - ON
AV BAY 1 FAN B - OFF
A - ON
2 FAN A - OFF
B - ON
3 FAN B - OFF
A - ON

CRT \checkmark AV BAY FAN ΔP 1 - ~~~3.5~~ (2.6) ~ 3.8
2 - ~~~3.5~~ (2.6) ~ 3.8
3 - ~~~4.3~~ (3.3) ~ 3.9

L1 AV BAY 1 FAN A - OFF
B - ON
2 FAN B - OFF
A - ON
3 FAN A - OFF
B - ON

SM 88 APU/ENVIRON THERM

L1 FREON PUMP LOOP 1 - A
CRT If FLOW PROP VLV LOOP 1 tb - ICH
| ✓FREON LOOP FREON FLOW > 2000
L1 If FLOW PROP VLV LOOP 1 tb - PL HX
CRT | ✓FREON LOOP FREON FLOW > 1350
L1 FREON PUMP LOOP 2 - A
CRT If FLOW PROP VLV LOOP 2 tb - ICH
| ✓FREON LOOP FREON FLOW > 2000
L1 If FLOW PROP VLV LOOP 2 tb - PL HX
CRT | ✓FREON LOOP FREON FLOW > 1350
L1 FREON PUMP LOOP 1 - B
Wait 3 sec
FREON PUMP LOOP 2 - B
CRT H2O PUMP LOOP 1 (two) - ON, A
L1 | ✓LOOP 1 ICH FLOW > 900
| BYP MODE - MAN
| MAN - DECR (hold 5 sec)
CRT ✓H2O LOOP 1 ICH FLOW - incr
L1 | BYP MAN - INCR (until ICH FLOW
| ~950)
H2O PUMP LOOP 1 (two) - GPC, B
| ✓LOOP 2 BYP MODE - MAN
| MAN - DECR (hold 5 sec)
CRT ✓H2O LOOP 2 ICH FLOW - incr
L1 | BYP MAN - INCR (until ICH FLOW
| ~950)

RAD BYPASS/FES C/O

- 1. DAP: ^{B2} ~~B~~/AUTO/~~P~~
~~ALT~~
- R12L 2. ✓ SPLY H2O XOVR VLV - OP (tb-OP)
- L1 3. FLASH EVAP CNTLR PRI A - OFF
B - OFF
SEC (two) - A SPLY, ON 29.35
/HI LOAD DUCT HTR - B 2.30
EVAP - ENA 31.65
- 4. RAD BYP VLV MODE (two) - MAN (32.0)
MAN SEL (two) - BYP
(tb-BYP ~3 sec)
- reify* RAD CNTLR LOOP (two) - OFF 29.35
After 2.5 min, 32.05 2.30
O1 HI ~~load~~ ✓ FREON EVAP OUT TEMP 1nd - 62° ± 2 degF 57.05
- L1 5. HI LOAD EVAP - OFF ✓
After 2.5 min, 34.35
O1 ✓ FREON EVAP OUT TEMP 1nd - 62° ± 2 degF *topping OK*
- L1 6. HI LOAD EVAP - ENA
- 7. FLASH EVAP CNTLR SEC (two) - A SPLY, OFF 34.55
PRI B - ON 2:30
reify After 2.5 min, 36.85
FES *B* ✓ FREON EVAP OUT TEMP 1nd - 39° ± 1 degF 37.25
- L11 8. ✓ FLOW PRDOP VLV LOOP 1,22 (two) tbb - ICFH
- 9. RAD CNTLR OUT TEMP - NORM

on B Fes

8 20 19 15

RAD STOW/DEPLOY

1. STOW RADIATORS

If RMS uncradled:

NOTE

PORT RAD and LAT 7-12, and
STBD LAT 1-6 will operate
single motor

R13L ✓RAD LAT CNTL SYS (two) - OFF (tb-REL)
✓CNTL SYS (two) - OFF (tb-DPY)

PL BAY MECH PWR SYS (two) - ON
RAD CNTL SYS (two) - STO (concurrently)
(✓tb-bp ~40 sec, STO)
- OFF

* If tb not bp after 10 sec or if tb *
* not STO in 40 sec & no motion *
* determined visually: *

R13L * RAD CNTL SYS (two) - OFF *
* Go to MAL, MECH, 9.2b or 9.2d (Stbd) *
* or MECH, 9.2f or 9.2h (Port) *

RAD LAT CNTL SYS (two) - LAT (concurrently)
(tb-bp ~25 sec, LAT)
- OFF

PL BAY MECH PWR SYS (two) - OFF

SINGLE RAD OPS

NOTE

Freon Loop 1 goes through PORT RAD and
Freon Loop 2 goes through STBD RAD

(Open MA73C:C&D MCA LOGIC PWR AC cbs for failed RAD)

<u>STBD RAD cbs</u>	<u>PORT RAD cbs</u>
AC1MID3	AC1MID1
AC2MID2	AC2MID4
AC3MID2	AC3MID4

2. DEPLOY RADIATORS

If RMS uncradled:

✓MCC for priority of RAD deploy/RMS ops
If MCC not avail and RADs must be
deployed immediately, continue ops

NOTE

PORT RAD and LAT 7-12, and STBD
LAT 1-6 will operate single motor

R13L

✓RAD LAT CNTL SYS (two) - OFF (tb-LAT)
✓CNTL SYS (two) - OFF (tb-STO)

Zero Timer

PL BAY MECH PWR SYS (two) - ON

RAD LAT CNTL SYS (two) - REL (concurrently),
start Timer
(✓tb-bp ~25 sec, REL)
- OFF

CNTL SYS (two) - DPY (concurrently)
(✓tb-bp ~40 sec, DPY)
- OFF

- * If either RAD deploys in > 40 sec, *
- * stop, ✓MCC *
- * If either RAD tb not bp after 10 *
- * sec, stow and latch RADs *
- * Redeploy only good RAD (ref table *
- * pg 5-14) *

Verify Stbd & Port RAD panels are deployed &
stabilized

PL BAY MECH PWR SYS (two) - OFF

PCS 1(2) CONFIG

If FDI.

S66 ENVIRONMENT

CRT,01 Report cabin pressure (two) to MCC
M010W 14.7 CAB REG INLET SYS 1(2) vlv - OP
SYS 2(1) vlv - CL

02 REG INLET SYS 1(2) vlv - OP
SYS 2(1) vlv - CL

H2O TK N2 REG INLET SYS 1(2) vlv - OP
SYS 2(1) vlv - CL

✓ISOL SYS 1,2 vlv (two) - OP
✓PPO2 CNTLR SYS 1,2 (two) - NORM
✓N2 XOVFR vlv - CL

L2 ✓02 SYS 1,2 SPLY (two) - ctr (tb-OP)
✓XOVR SYS 1,2 (two) - OP
✓N2 SYS 1,2 SPLY (two) - ctr (tb-OP)
✓REG INLET (two) - ctr (tb-OP)
✓02/N2 CNTLR VLV SYS 1(2) - AUTO
SYS 2(1) - CL

01 ✓02/N2 FLOW sel - SYS 1(2) 02
✓PPO2 sel - SNSR A(B)

VENT SAFING

014:D ✓cb MNA CAB VENT - op
✓VENT ISOL - op

TOPPING FES DEACTIVATION

L1 FLASH EVAP CNTLR PRI A,B - OFF
SEC - OFF

Wait 30 min,

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
EVAP TEMP TOPPING AFT	0631802	-10	
FWD	0631801	-10	
L DUCT	0631800	-10	
NOZ	0631878	-10	
R DUCT	0631810	-10	
NOZ	0631879	-10	

TOP EVAP HTR DUCT - OFF
NOZ (L,R) - OFF

TOPPING FES STARTUP

L1 /TOP EVAP HTR DUCT - A(B,C)
 /NOZ (L,R) - A(B) AUTO

* If htrs were off, wait 90 min, *
 * then: *

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
EVAP TEMP TOPPING AFT	0631802	100	
FWD	0631801	100	
L DUCT	0631800	50	
NOZ	0631878	40	
R DUCT	0631810	50	
NOZ	0631879	40	

01
 L1
 01
 L1

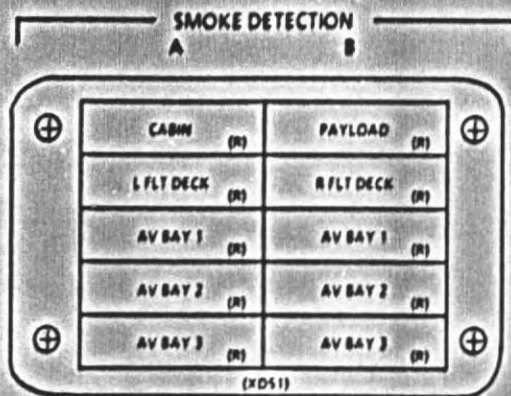
If FREON EVAP OUT TEMP > 41 and ≤ 47 degF:
 RAD CNTLR OUT TEMP - HI
 When FREON EVAP OUT TEMP = 50° ± 2 degF,
 RAD CNTLR OUT TEMP - NORM, then
 immediately:

FLASH EVAP CNTLR PRI A(B) - ON

01
 L1

If FREON EVAP OUT TEMP ≤ 41 or > 47 degF:
 FLASH EVAP CNTLR PRI A(B) - ON

SMOKE DETN CKT TEST



NOTE

If any SMOKE DETN lt fails to illum (ex PAYLOAD), open and close associated cb (Pnl 014, 015, or 016) and repeat test on that CKT allowing 60 sec

CKT TEST A PART 1 *(concentration test)*

- L1 SMOKE DETN CKT TEST - A
 ✓FIRE SUPPR AV BAY pb (three) - lts on
 Wait at least 5 sec (no more than 10 sec)
 SMOKE DETN CKT TEST - OFF
 ✓FIRE SUPPR AV BAY pb (three) - lts off
 ✓SMOKE DETN A lts (five) - on
 ✓Siren - on
- F2 ✓MSTR ALARM lt - on
 pb - off
- L1 SMOKE DETN SHSR - RESET
 ✓Above lights and siren - off

CKT TEST A PART 2 (*rate test*)

SMOKE DETM CKT TEST - A
✓FIRE SUPPR AV BAY pb (three) - 1ts on
✓in 15-25 sec:

SMOKE DETM A 1ts (five) - on
Siren - on
F2 MSTR ALARM 1t - on
MSTR ALARM pb - off
L1 SMOKE DETM CKT TEST - OFF
SNSR - RESET
✓Above lights and siren - off

CKT TEST B PART 1 (*concentration test*)

SMOKE DETM CKT TEST - B
✓FIRE SUPPR AV BAY pb (three) - 1ts on
Wait at least 5 sec (no more than 10 sec)
SMOKE DETM CKT TEST - OFF
✓FIRE SUPPR AV BAY pb (three) - 1ts off
✓SMOKE DETM B 1ts (four) - on (PL 1t off)
✓Siren - on

F2 ✓MSTR ALARM 1t - on
pb - off
L1 SMOKE DETM SNSR - RESET
✓Above lights and siren - off

CKT TEST B PART 2 (*rate test*)

SMOKE DETM CKT TEST - B
✓FIRE SUPPR AV BAY pb (three) - 1ts on
✓in 15-25 sec:
SMOKE DETM B 1ts (four) - on
(PL 1t off)

Siren - on
F2 MSTR ALARM 1t - on
MSTR ALARM pb - off
L1 SMOKE DETM CKT TEST - OFF
SNSR - RESET
✓Above lights and siren - off

SM SYS SUMM 1

CRT

Verify:

	1/A	2/B
SMOKE		
CABIN	-.1 to +.5	
L/R FD	-.1 to +.5	-.1 to +.5
AV BAY 1	-.1 to +.5	-.1 to +.5
2	-.1 to +.5	-.1 to +.5
3	-.1 to +.5	-.1 to +.5

* If limits exceeded, /MCC *

EPS

LAMP TEST..... 6-2
HEATER RECONFIG -
 CONFIG B(CONFIG A) (CIL-RMS HTRS)..... 6-5
FUEL CELL PURGE - AUTO..... 6-6
 - MANUAL..... 6-7
CRYO O2 TK HTR SNSR CK..... 6-8

EPS

LAMP TEST

SMOKE DETECTION
A B

CABIN (R)	PAYLOAD (R)
L FLT DECK (R)	R FLT DECK (R)
AV BAY 1 (R)	AV BAY 1 (R)
AV BAY 2 (R)	AV BAY 2 (R)
AV BAY 3 (R)	AV BAY 3 (R)

(XDS 1)

C/W PANEL

O2 PRESS	H2 PRESS	FUEL CELL REAC (R)	FUEL CELL STACK TEMP	FUEL CELL PUMP
CABIN ATM (R)	O2 HEATER TEMP	MAIN BUS UNDERVOLT (R)	AC VOLTAGE	AC OVERLOAD
FREON LOOP	AV BAY/ CABIN AIR	IMU	FWD RCS (R)	RCS JET
H2O LOOP	RGA/ACCEL	AIR DATA (R)	LEFT RCS (R)	RIGHT RCS (R)
(R)	LEFT RHC (R)	RIGHT/AFT RHC (R)	LEFT OMS (R)	RIGHT OMS (R)
PAYLOAD WARNING (R)	CPC	FCS SATURATION (R)	OMS KIT	OMS TVC (R)
PAYLOAD CAUTION	PRIMARY C/W	FCS CHANNEL	MPS (R)	---
BACKUP C/W ALARM (R)	APU TEMP	APU OVERSPEED	APU UNDERSPEED	HYD PRESS

(34V73A7A2)

EPS

FORWARD STATION

06/08 ANNUN LAMP TEST - L, hold
✓75 lights - illuminated:
(82 lights on OV102)

01	CAM lts	(25)	
F2	MSTR ALARM	(1)	
	Aerodynamic controls	(7)	(9 on OV102)
	EVENT SEQ (OV102)	(5)	
F3 (F2 OV102)	NWS FAIL	(1)	
L1	FIRE SUPPR AV BAY	(3)	
	SMOKE DETN	(10)	
F6	LDG GEAR	(2)	
	ABORT	(1)	
	RCS CMD	(3)	
	RANGE SAFE ARM	(1)	
F7	SM ALERT	(1)	
	C/W panel - partial	(20)	

06/08 ANNUN LAMP TEST - R, hold
✓58 lights - illuminated:
(65 lights on OV102)

F4	MSTR ALARM	(1)	
	Aerodynamic controls	(7)	(9 on OV102)
	EVENT SEQ (OV102)	(5)	
F3 (F4 OV102)	ANTISKID FAIL	(1)	
F8	LDG GEAR	(2)	
F7	MN ENG STAT	(3)	
	C/W panel - partial	(20)	
C3	DAP PANEL	(24)	

MIDDECK (VERIFIED BY SECOND CREWMEMBER)

06(08) ANNUN LAMP TEST - L, hold
MO29J ✓MIC KEY light - illuminated
06(08) ANNUN LAMP TEST - R
MO52J ✓MSTR ALARM light - illuminated

AFT STATION

A6U ANNUN LAMP TEST - L, hold
✓25 lights - illuminated:
DAP PANEL (24)
A2 MIC KEY (1)

A6U ANNUN LAMP TEST - R, hold
✓28 lights - illuminated:
A7U MSTR ALARM (1)
VID IN (13)
OUT (8)
CAMR CMD ALC (3)
GAMMA (3)

C/W STATUS

R13U C/W LAMP TEST - L, hold
✓STATUS lights - illuminated (60)
C/W LAMP TEST - R, hold
✓STATUS lights - illuminated (60)

HEATER RECONFIG - Config B(Config A)

L1 TOP EVAP HTR NOZ (two) - B AUTO(A AUTO)
DUCT - B(A)

L2 FLASH EVAP FDLN HTR A,B SPLY(two) - 2(1)

A12 HYD HTR RUD SPD BK A - OFF(AUTO)
B - AUTO(OFF)
BDY FLP A - OFF(AUTO)
B - AUTO(OFF)
ELEV A - OFF(AUTO)
B - AUTO(OFF)
AFT FUS A - OFF(AUTO)
B - AUTO(OFF)

A14 RCS/OMS HTR FWD RCS - B AUTO(A AUTO)
L POD - A OFF(A AUTO)
- B AUTO(B OFF)
R POD - A OFF(A AUTO)
- B AUTO(B OFF)
OMS CRSFD LINES - OFF(A AUTO)
- B AUTO(OFF)

R12U FC H2O LINE HTR - B AUTO(A AUTO)
RELIEF HTR - B AUTO(A AUTO)

MLB6B:A cb MNA H2O LINE HTR A - op(c1)
MNB H2O LINE HTR B - c1(op)

R2 BLR CNTLR/HTR (three) - B(A)

If both RMS htrs active >>

ABL PORT RMS HTR A - OFF(AUTO)
B - AUTO(OFF)

FUEL CELL PURGE - AUTO, SM 2(4)

CAUTION

Do not purge FC if:

- FC AMPS > 350
- FC is shutdown

Do not init auto purge within:

- 1 hr of any SM OPS transition or
- 3 hr of deorbit burn

R12U

FC PURGE VLV (three) - GPC
HTR - GPC
GPC PURGE SEQ - START
(After tb-gray, hold 3 sec)

If first on-orbit purge, wait 45 min,
then plot FC performance data points
(Cue Card)

- * If any flow '+' alarm, *
- * aff FC PURGE VLV - CL *

FUEL CELL PURGE - MANUAL

1. TURN ON PURGE HEATERS

R12U

FC PURGE HTR - ON

SM 69 FUEL CELLS

CRT

✓PURGE LN O2 T > 69
✓H2 T1 > 79
✓T2 > 40

2. MANUAL PURGE SEQUENCE

NOTE

Fuel cells must be purged separately

CAUTION

Do not purge FC if:

- FC AMPS > 350
- FC is shutdown
- Within 3 hr of deorbit burn

CRT

FC 1(2,3) FLOW O2 - note
H2 - note

R12U

FC PURGE VLV 1(2,3) - OP

CRT

✓FC 1(2,3) FLOW O2 - incr ~3.3 (max)
✓H2 - incr ~0.6 (max)

R12U

- * If any flow '+' alarm, *
- * aff FC PURGE VLV - CL *

Wait 2 min
FC PURGE VLV 1(2,3) - GPC

CRT

✓FC 1(2,3) FLOW O2 - decr ~3.3 (max)
✓H2 - decr ~0.6 (max)

Repeat step 2 for FCs 2 and 3
Wait at least 30 min, then cont

3. TURN OFF PURGE HEATERS

R12U

FC PURGE HTR - GPC

4. If first on-orbit purge, plot FC performance data points (Cue Card)

CRYO O2 TK HTR SNSR CK

SM 68 CRYO SYSTEM

- R1 1. O2 TK1 HTRS (one) - TEST (1 sec)
- CRT 2. ✓HTR CUR SNSR 1A,1B,2A,2B (four) - '+'
Expect 'S68 CRYO O2' msg, ignore msg
- R1 * If HTR CUR SNSR 1A and 2A (1B and *
* 2B) not '+': *
* O2 TK1 HTRS A(B) - OFF, then: *
* If HTRS A(B) was in AUTO: *
* O2 TK1 HTRS B(A) - AUTO *
3. O2 TK1 HTRS (one) - RESET
4. Repeat steps 1-3 for the following:
O2 TK2 HTRS
TK3 HTRS (if 3 or more tks flown)
5. If not OV102 and 4 tks flown, repeat
steps 1-3 for:
CRYO TK4 HTR O2
- A11 If OV102 and 4 or 5 tks flown:
CRYO TK4/5 HTR O2 TK4/5 - TEST (1 sec)
- CRT ✓HTR CUR SNSR TK4 1A,1B,2A,2B (four) - '+'
Expect 'S68 CRYO O2' msg, ignore msg
- A11 * If HTR CUR SNSR 1A and 2A (1B and *
* 2B) not '+': *
* CRYO TK4/5 HTR O2 TK4(TK5) - OFF, *
* then: *
* If TK4(TK5) was in AUTO: *
* O2 TK5(TK4) HTR - AUTO *
- CRYO TK4/5 HTR O2 TK4/5 - RESET
6. Report results to MCC

GNC

IMU ALIGN - S TRK..... 7-2
- ROTATION S TRK: ROLL(PITCH,YAW)..... 7-4
ALIGNMENT - IMU/IMU..... 7-6
S TRK SELF-TEST..... 7-7
COAS CALIBRATION..... 7-8
FCS CHECKOUT..... 7-10
AFT CONTROLLER C/O..... 7-29
OMICRON SPECIFICATION..... 7-30

GNC

IMU ALIGN - STRK, GNC 201, 202, 301

Z Tracker FFT
Y Tracker FF3

1. COLLECT STAR DATA

✓DAP: (A1)(B1) (AUTO) (VER) (PRI)

GNC 22 S TRK/COAS CNTL

CRT

✓S TRK -Y,-Z: STATUS - (no BITE)
SHUTTER - OP

- * If SHUTTER - CL: *
- * ✓Att,MET - correct *
- * Visually verify no bright object *
- * in FOV *
- * After data collected and before *
- * changing attitude return shutter *
- * to AUTO *
- * To open shutter: *
- * MAN OP - ITEM 15(16) EXEC (*) *
- * To return shutter to AUTG: *
- * MAN OP - ITEM 15(16) EXEC (no *) *

If reqd ID - other than 0:
 STAR TRK - ITEM 3,4 EXEC (*)
 Wait for TERM/IDLE (*), then:
 S TABLE CLR - ITEM 20 EXEC
 ✓STAR TRK - ITEM 3,4 (*)

2. VERIFY STAR DATA

✓S TABLE: TRK ID 1,2 - (correct #s) 14,26 91.4
 ANG ERR 1 - $\leq .08$, Rcd ---
 SEL, ITEM 17,18 - (*)

Wait approx 1 min for new IMU ΔANGs

- * If no data after 3 min or bad data: *
- * ✓Att,stars,MET - correct *
- * ✓Rot Rate - $\leq .5^\circ/\text{sec}$ *
- * ✓S TRK -Y,-Z: TRK ID - (correct #s) *
- * ΔANG - < 1.0 *
- * If preceding checks are good: *
- * Perform S TRK SELF-TEST, then; *
- * If both STATUS - ST FAIL: *
- * | Inform MCC before proceeding *
- * If both STATUS - ST PASS: *
- * | Repeat step 1 at new att, stars *
- * If one STATUS - ST PASS: *

GNC

- * ✓TERM/IDLE, ITEM 9(10) - (*) *
- * STAR TRK, GOOD S TRK - ITEM 3(4) EXEC (*) *
- * S TABLE CLR - ITEM 20 EXEC *
- * ✓S TABLE: TRK ID 1 - (correct #) *
- * TERM/IDLE, GOOD S TRK - ITEM 9(10) EXEC (*) *
- * Mvnr to 2nd att, star *
- * STAR TRK, GOOD S TRK - ITEM 3(4) EXEC (*) *
- * Repeat step 2 with good S TRK only *

3. CHECK IMU ΔANGs

GNC 21 IMU ALIGN

CRT

- ✓IMU 1,2,3: STAT - blank
- ✓STAR ALIGN, ITEM 13 - (*)
- ✓ANG 1,2,3: ΔX,ΔY,ΔZ - ≤ .80

Rcd ANG 1 2 3
 ΔX() _ . _ () _ . _ () _ . _
 ΔY() _ . _ () _ . _ () _ . _
 ΔZ() _ . _ () _ . _ () _ . _

- * If ANG ΔX,ΔY or ΔZ > .80 for two or *
- * more IMUs, repeat steps 1,2 and 3 *

CAUTION

If ANG ΔX,ΔY or ΔZ still > .80
 for 2 or more IMUs:
 DO NOT TORQUE PLATFORMS EXCEPT
 UNDER MCC INSTRUCTIONS

4. ALIGN IMUs

- ALIGN IMU 1(2,3) - ITEM 10(11,12) EXEC (*)
- EXEC - ITEM 16 EXEC (*), Rcd MET _/_ _: _ _
- ✓Data transcribed into FLT PLM
- ✓EXEC, ITEM 16 - (no *)

5. S TRK CONFIG VERIFICATION

GNC 22 TRK/COAS CNTL

CRT

- ✓S TRK -Y(-Z): Rcd ID, ITEM 11(12) - 0
- ✓Shutter not MAN OP, ITEM 15,16 - (no *)

6. Report IMU align results

IMU ALIGN - ROTATION S TRK: ROLL (PITCH, YAW)

1. SETUP

DAP: A5/AUTO/VERN
CRT GNC 22 S TRK/COAS CNTL
✓S TRK -Y,-Z: STATUS - (no BITE)
If reqd ID - other than 0:
STAR TRK - ITEM 3(4) EXEC (*)
Wait for TERM/IDLE (*), then:
✓S TABLE CLR, ITEM 20 - (no unwanted data)
STAR TRK - ITEM 3,4 EXEC (*)

2. INITIATE ROTATION AT SUNSET

CRT If in LVLH AUTO TRK attitude:
ADI ATT - LVLH
DAP: A5/LVLH/VERN
DAP ROT: Sel PULSE in desired rot axis
F7/F8 FLT CNTLR PWR - ON

CRT GNC UNIV PTG
F7/F8 Initiate rot about desired axis of
 $0.3^\circ \pm .05^\circ/\text{sec}$ with RHC (multiple pulses)

FLT CNTLR PWR - OFF
After rot between 180° and 270° ,
DAP: A5/AUTO/VERN

CRT If in AUTO inertial attitude:
GNC UNIV PTG
Load appropriate BODY VECT-ITEM 14(15,16)

ITEM	14	15	16
ROLL	1	0	0
PITCH	5	0	90
YAW	5	270	0

ROT - ITEM 20 EXEC (CUR *)

Note time / : / : /
Add 25 min to start time and load as
future start - ITEMS 1,2,3,4
START MNVR - ITEM 18 EXEC (FUT-*)

3. VERIFY STAR DATA

CRT

GNC 22 S TRK/COAS CNTL

Verify $35^\circ < \text{ANG DIF} < 145^\circ$ and ANG ERR
 $\leq .08$ (Rcd) for SEL (*) star pair

If no data after rot:
Perform S TRK SELF-TEST, then:

If both STATUS - ST FAIL:
✓MCC before proceeding

If one or both STATUS - ST PASS:
Repeat procedure at next sunset

4. CHECK IMU ΔANGs

CRT

GNC 21 IMU ALIGN

✓IMU 1,2,3: STAT - blank
✓STAR ALIGN, ITEM 13 - (*)
✓ANG 1,2,3: ΔX,ΔY,ΔZ - $\leq .80$

Rcd ANG 1 2 3
ΔX() () ()
ΔY() () ()
ΔZ() () ()

* If ANG ΔX,ΔY or ΔZ > .80 for two or *
* more IMUs, repeat steps 1 thru 4 *

CAUTION

If ANG ΔX,ΔY or ΔZ still > .80
for 2 or more IMUs:
DO NOT TORQUE PLATFORMS EXCEPT
UNDER MCC INSTRUCTIONS

5. ALIGN IMUs

ALIGN IMU 1(2,3) - ITEM 10(11,12) EXEC (*)
EXEC - ITEM 16 EXEC (*), Rcd MET /- -:--
✓Data transcribed into FLT PLM
✓EXEC, ITEM 16 - (no *)

6. S TRK CONFIG VERIFICATION

GNC 22 S TRK/COAS CNTL

CRT ✓S TRK -Y(-Z): Reqd ID, ITEM 11(12) - 0
✓Shutter not MAM OP, ITEM 15,16 - (no *)

Reconfig to FLT PLM DAP

7. Report IMU align results

IMU ALIGNMENT - IMU/IMU

NOTE

Procedure must be accomplished
in GNC OPS 2 or 3

GNC 21 IMU ALIGN

IMU/IMU - ITEM 14 + ___ EXEC

ΔX() ¹ . _ _ () ² . _ _ () ³ . _ _

ΔY() . _ _ () . _ _ () . _ _

ΔZ() . _ _ () . _ _ () . _ _

ALIGN IMU 1(2,3) - ITEM 10(11,12) EXEC (*)

EXEC - ITEM 16 EXEC (*),

Rcd MET _ / _ -: _ _

NOTE

Align will require 3-6 min

Report IMU align results

VERIFY GOOD IMU/IMU ALIGNMENT

✓EXEC, ITEM 16 - (no *)
IMU/IMU - ITEM 14 +(SAME REF IMU) EXEC
✓IMU 1,2,3 ANG $\Delta X, \Delta Y, \Delta Z < 0.13$

* If ANG $\Delta X, \Delta Y, \Delta Z \geq 0.13, *$
* Report to MCC *

If in GNC OPS 2 or MM 301,
STAR ALIGN - ITEM 13 EXEC (*)

STRK SELF-TEST, GNC 201,202,301

Mnvr to avoid bright objects in both BOSs

GNC 22 S TRK/COAS CNTL

CRT

✓S TRK -Y,-Z: STATUS - (no BITE)
SHUTTER - OP

* If SHUTTER - CL, *

* ITEM 15(16) - EXEC (*) *

* ITEM 15(16) - EXEC (no *) *

SELF-TEST - ITEM 1,2 EXEC (*)
✓S TRK -Y,-Z: SHUTTER - CL
S PRES - (*)
STATUS - BITE (mom)
SHUTTER - OP
STATUS - ST PASS

* If STATUS - ST FAIL, repeat *

* SELF-TEST *

* If still FAIL, use only if directed *

* by MCC *

STAR TRK - ITEM 3,4 EXEC (*)

COAS CALIBRATION, GNC 201

1. COAS CALIBRATION PREP

01(019) COAS - ON
COAS /Barrel Index - FW(OW) 23
/DAP: A/AUTO/VERN

If -Z COAS CAL,SENSE: -Z

Change DAP A,B to A1,B5

GNC 22 S TRK/COAS CNTL

COAS: REQD ID - ITEM 21 + 2 EXEC
POS +X(-Z) - ITEM 26(27) EXEC (+)
CAL MODE - ITEM 24 EXEC (+)

014:E, /cb DDU L(AFT) (two) - c1
015:E,
016:E

F7/F8 FLT CNTLR PWR - ON
(A6U)

2. MARK ON STAR

DAP: A1/INRTL(FREE)/VERN(COARSE CNTL)
B5/INRTL(FREE)/VERN(FINE CNTL)
B5/FREE/PRI(P RCS)

F6 Mvnr to center star in COAS:
(A6U) ATT REF pb - push

NOTE

Repeat mark to ensure Δ BIAS
consistency (3 or more marks)

DAP: A1/AUTO/VERN

3. CALIBRATE COAS AND VERIFY

CRT

Rcd CAL +X(-Z) ΔBIAS:
UPDATE - ITEM 28(29) EXEC, Rcd MET / _ : _ _
✓ΔBIAS goes to zero
Repeat 'MARK ON STAR'
✓ΔBIAS < .12

- * If ΔBIAS > .12, repeat step 3 *
- * If still > .12, /MCC *

4. CLEAN-UP

01(019)
F7/F8
(A6U)

COAS: DES - ITEM 25 EXEC (*)
COAS - OFF
FLT CNTLR PWR - OFF

014:E,
015:E,
016:E

cb DDU L(AFT) (two) - as reqd

✓Data transcribed into FLT PLN

NOTE

If S TRK(s) to be left in
auto star-select mode, go
to IMU ALIGN - S TRK, step 5

Reconfig to FLT PLN DAP

FCS CHECKOUT

DISPLAY/DPS CONFIG

014, RGA (four) - ON
015, cb MNA,B,C ADTA (four) - c1
016 ACCEL 1,2 (two) - c1
MNA,C DDU AFT (two) - op
MNB,C DDU R (two) - c1
If APU will be used:
| ASA (four) - ON
If circ pump will be used:
√ASA (four) - OFF
ACCEL 3,4 (two) - ON
017 ATVC (four) - ON
08 RADAR ALTM (two) - ON
MLS (three) - ON
F6 INST PWR - FLT
F8 INST PWR - ON
F3 TRIM PNL (two) - ON
HUD PWR (two) - ON
F6/F8 HSIs: √off flag - not visible
F8 ADI: √Error needles & Rate pointers -
visible
C3 √FCS CH (four) - AUTO
√DAP: A1/AUTO/VERN

Perform DPS, G2 TO G8 TRANSITION, then:

If using a circ pump for Part 1:
FCS CH 2,3 - OFF
ASA (four) - ON
Go to step 7b, 7-15

ON-ORBIT FCS CHECKOUT, PART 1

NOTE

Only one APU will be used for the FCS C/O. If the APU does not start or MCC advises abbreviated actuator check, a circ pump will be used. Selection of the APU or circ pump will be made real time by the MCC

NOTE

Continue FCS C/O for APU alarms except as follows:

R2

If WB REG PRESS '+':
BLR N2 SPLY - OFF

If OIL OUT P < 25 & GBX P < 5, shut down APU

If APU OVERSPEED or APU UNDERSPEED
Confirmed overspeed or if APU has shutdown

or

If 'S86 APU TEMP' msg:
Overtemp confirmed by APU EGT:
Affected APU OPER - OFF
FUEL TK VLV - CL
✓Shutdn (hyd press)
CNTLR PWR - OFF

If APU shift to HI speed (✓CRT),
shutdown APU

NOTE

Any previously failed actuator channel should be bypassed via ITEM 21 on FCS/DED DIS C/O display prior to APU start (See OPS G8 (ON-ORBIT VEHICLE UTILITY) (DPS DICT, GNC) for ITEM ENTRY values)

1. FCS C/O PREP

C2 Set EVENT TIMER to 00:00, count UP

2. APU PRESTART

APU 2

1: GNC, FCS/DED DIS C/O 2: SM 86 APU/HYD

CRT2 ✓APU, HYD, WB status no '+' or '+'
(except HYD B/U)

R4

R4 ✓HYD LG RET/CIRC VLV - CL

Perform APU/HYD, HYD THERM COND - TERM,
then:

R2 BLR N2 SPLY X - ON
✓PWR (three) - ON
✓CNTLR/HTR (three) - B
✓APU AUTO SHUTDN (three) - ENA
CNTLR PWR X - ON
HYD MN PUMP PRESS X - LO
✓APU SPEED SEL (three) - NORM
✓OPER (three) - OFF
✓FUEL TK VLV (three) - CL
✓cb APU FU TK VLV ENA (six) - cl

Inform MCC: READY FOR APU START

Wait for MCC GO

3. APU START

R2 APU FUEL TK VLV X - OP
✓APU/HYD RDY X tb - gray

* If tb - bp, ✓MCC *

00:00 Start EVENT TIMER
R2 APU OPER X - START/RUN
F8 ✓HYD PRESS Ind X - LOW green
R2 ✓APU/HYD RDY X tb - bp

* If APU did not start: *
 * APU OPER X - INJECTOR COOL *
 * (start watch) *
 * APU AUTO SHUTDN X - INH *
 * At 3.5 min, *
 * APU OPER X - START/RUN *
 * If still no start: *
 * BLR PWR (three) - OFF *
 * APU OPER X - OFF *
 * FUEL TK VLV X - CL *
 * CNTLR PWR X - OFF *
 * HYD MN PUMP PRESS X - NORM *
 * BLR N2 SPLY X - OFF *
 * APU FUEL PUMP/VLV COOL A - AUTO *
 * Go to step 7 *

R2

F8

HYD MN PUMP PRESS X - NORM
 ✓HYD PRESS Ind X - HI green

SM 87 HYD THERMAL

✓SW VLV ELVN (four) - per table
 ✓RUD/SPDBK - per table

If HYD SYS 1	If HYD SYS 2	If HYD SYS 3
1(*)	2(*)	3(*)
1(*)	2(*)	3(*)

4. AEROSURFACE DRIVE

CRT1

SURF DR START - ITEM 10 EXEC (*)
 Verify all surfaces cycling for 30 sec

NOTE

POS '+' may be indicated
 until HYD SYS is warm

* If FCS CH failure ('+' port status), *
 * reset affected FCS CH: *
 * FCS CH - ORIDE, then *
 * - AUTO *

After 30 sec of aerosurface drive,
 SURF DR STOP - ITEM 11 EXEC (*)
 ✓Surfaces not moving

5. SECONDARY ACTUATOR CHECK (APU)

NOTE

If a port does not bypass during check,
bypass affected port after APU shutdn:
SEC ACT BYPASS - ITEM 21 +X X EXEC
If affected port still does not bypass:
SEC ACT RESET - ITEM 22 +X X EXEC
(See DPS DICT, GNC, OPS G8 for ITEM
ENTRY values)

- CRT1 a. ✓POS STIM ENA, ITEM 20 - (*)
C3 b. ✓FCS CH 1,2,3,4 - AUTO
CRT1 c. SEC ACT CK, CH 1 - ITEM 15 EXEC (*)
d. ✓A11 CH 1 ports bypass ('+')
STOP - ITEM 19 EXEC (*)
C3 e. FCS CH 1 - ORIDE
CRT1 ✓A11 CH 1 ports reset (no '+')
C3 FCS CH 1 - AUTO
f. Repeat steps c thru e for CH 2,3,4
CRT1 g. NEG STIM - ITEM 20 EXEC (no *)
h. Repeat steps b thru f

MS6 61C
6. APU SHUTDOWN

On MCC GO for APU SHUTDN:

- R2 BLR PWR (three) - OFF
APU OPER X - OFF
FUEL TK VLV X - CL
✓Shutdn (hyd press)
CNTLR PWR X - OFF
BLR N2 SPL.Y X - OFF
APU FUEL PUMP/VLV COOL A - AUTO

BLA CNTLR/HTR 2 - B
Perform APU/HYD, HYD THERM COND - ENA, then:
Proceed to part 2

7. CIRC PUMP ACTIVATION

1: GNC, FCS/DED DIS C/O 2: SM 86 APU/HYD

NOTE

OPS 2/8 trans must be performed with ASAs off to avoid AERO DRIVE fault msgs during actuator checks

- 014,015,
016:E
- a. Perform DPS, G8 to G2 TRANSITION, then:
ASA (four) - OFF
- C3
- Perform DPS, G2 to G8 TRANSITION, then:
✓FCS CH 1,4 - AUTO
2,3 - OFF
ASA (four) - ON
- b. If not already performed, APU/HYD, HYD
THERM COND - TERM
- R2
- c. HYD CIRC PUMP X - ON

8. ABBREVIATED SECONDARY ACTUATOR CHECK
(circ pump)

NOTE

If an elevon does not move to the commanded posn, bypass the affected port after the check of all channels.
SEC ACT BYPASS - ITEM 21 +X X EXEC
(See DPS DICT, GNC, OPS G8 for ITEM ENTRY values)

- CRT1
- a. ✓POS STIM ENA, ITEM 20 - (*)
- C3
- b. ✓FCS CH 1,4 - AUTO
✓2,3 - OFF
- CRT2
- c. GNC 42 SWITCH/SURF
✓All elevons move to $U7.5^\circ \pm 0.8^\circ$
- CRT1
- d. SEC ACT CK, CH1 - ITEM 15 EXEC (*)
Wait 5 sec

C3
CRT2

- e. Turn off FCS CH not being checked:
FCS CH (three) - OFF
✓All elevons move to $U1.5^\circ \pm 0.8^\circ$

* If any elevon drives past 0° , turn *
* on all FCS CHs to stop movement *
* FCS CH (four) - AUTO *
* Expect AERO DRIVE msg. Continue *
* procedure and report to MCC *

CRT1

- f. STOP - ITEM 19 EXEC (*)
✓All elevons move to $U7.5^\circ \pm 0.8^\circ$

C3

- g. Config FCS CHs for check of next CH:
(Config switches in sequence shown)

Next CH	FCS CH switches			
	4	1	2	3
2	AUTO	OFF	AUTO	OFF
3	AUTO	OFF	OFF	AUTO
4	AUTO	OFF	OFF	AUTO

- h. Repeat steps d thru g for CHs 2,3,4

9. HYDRAULIC SYSTEM RECONFIGURATION

R2

HYD CIRC PUMP X - OFF
PERFORM APU/HYD, HYD THERM COND - ENA

10. FCS CH RECONFIGURATION

C3

- a. Perform G8 to G2 TRANSITION (DPS), then:
FCS CH 1,2,3 - AUTO
✓4 - AUTO

- b. Perform G2 to G8 TRANSITION (DPS), then:
Continue with Part 2

ON-ORBIT FCS CHECKOUT, PART 2

1. SENSOR TEST - MLS, TAC, RA, AA

NOTE

During MLS/TAC/RA/AA test, deselect LRU for failure indicated:

MLS, TAC, RA, AA - '+' or '+'
or AA - BIAS/NULL limits exceeded
Record values of failures defined

07 TACAN (three) MODE - GPC

2: GNC 40 SENSOR TEST

CRT2 ✓DES: (no *)
✓STAT: blank
✓RNG,AZ,EL: no M
✓Y,Z: dynamic data

CONFIG FOR FREE DRIFT

F6 ADI RATE - LO
DAP: A1/INRTL/VERN
✓R,P,Y rates $0 \pm .1^\circ/\text{sec}$, then:
DAP: FREE

AA BIAS/NULL SHIFT TEST

CRT2 ✓Y,Z within limits: Y -0.5 to +0.5
Z -1.3 to +1.3

MLS,TAC,RA,AA TEST

CRT2 START - ITEM 13 EXEC (*)

NOTE

'*' blanks when test is complete; ✓no '+' or '+'

07 STOP - ITEM 14 EXEC (*)
TACAN (three) MODE - OFF

LIMIT VALUES TABLE			
	RNG	AZ	EL
<i>John</i> MLS	15.0 to 15.4	+,-2.9 to +,-3.1 (+ for 3 sec, then -)	5.9 to 6.1
<i>John</i> TAC	0 TO .5	177.5 to 182.5 NOTE: Values from 182.1 to 182.5 will be displayed as 2.1 to 2.5	
RA	ALT 900 to 1100	<i>David</i>	
AA		Y	Z
		+14.40 to 17.80	+57.70 to 71.10

2. SENSOR TEST - RGA, ADTA

NOTE

During RGA, ADTA test, deselect LRU for failure indicated:

RGA - bias null limits exceeded,
'+' or '+', or SMRD

ADTA - any '+' or '+' except temp ('T')

ADTA BITE - Perform memory read
Record values of failures defined

NOTE

If RGA does not respond to HIGH or LOW TEST or displays a 'SMRD' indication in STAT column:

Null vehicle rates

Maneuver at 0.5°/sec about appropriate axis; monitor RGA data

If RGA responds, self-test circuitry or SMRD circuitry is failed

If no RGA response, deselect sensor

2: GNC 41 RGA/ADTA/RCS

CRT2

✓DES: (no *)

✓STAT: blank

✓R,P,Y: dynamic data

✓PS,PaC,PaU,PaL,T - no M

CONFIG FOR FREE DRIFT

✓DAP: A1/INRTL/VERN

✓R,P,Y rates $0 \pm .1^\circ/\text{sec}$, then:

DAP: FREE

RGA BIAS/NULL SHIFT TEST

CRT2

✓R,P,Y within limits: R -.4 to +.4
 P/Y -.2 to +.2

HIGH TEST

CRT2

TEST HI - ITEM 9 EXEC (*)

(after 10 sec, no *)

✓No '+' or '↓'

If ADTA BITE, read Bite status from GPC Memory (see REF DATA, MAL ADDRESSES, GNC, for addresses), ref ADTA MEMORY READ PROCEDURE

TEST STOP - ITEM 11 EXEC (*)

LOW TEST

TEST LOW - ITEM 10 EXEC (*)
(after 10 sec, no *)

/No '+' or '↓'

If ADTA BITE, read Bite status from GPC
Memory (see REF DATA, MAL ADDRESSES, GNC,
for addresses), ref ADTA MEMORY READ
PROCEDURE

TEST STOP - ITEM 11 EXEC (*)

DAP: A1/AUTO/VERN

- * If ADTA BITE: *
- * ADTA MEMORY READ PROCEDURE *
- * *
- * GNC O GPC MEMORY *
- * DATA - ITEM 20 EXEC (*) *
- * HEX - ITEM 27 EXEC (*) *
- * ADD ID - ITEM 28 +X X X X EXEC *
- * ADTA 1 ADTA 2 ADTA 3 ADTA 4 *
- * XXXX = (1) (2) (3) (4) *
- * If data in actual column (last 3 char) *
- * is not equal to -FDC, -FFB, -FDB or *
- * -FFC, deselect failed ADTA *

HIGH TEST LIMITS				
RGAs	P	Y		
R	+18.8 to +21.2	+9.4 to +10.6	+9.4 to +10.6	
ADTA				
PS	PaC	PaU	PaL	T
.813 to .815	5.473 to 5.477	2.740 to 2.744	1.708 to 1.712	173.56 to 173.70
LOW TEST LIMITS				
RGAs	P	Y		
R	-18.8 to -21.2	-9.4 to -10.6	-9.4 to -10.6	
ADTA				
PS	PaC	PaU	PaL	T
24.887 to 24.889	29.527 to 29.531	21.708 to 21.712	14.713 to 14.717	18.50 to 18.54

3. FCS MODE/CH SWITCH TEST

NOTE

During tests, FCS CH:

Fail op or fail cl - deselect failed contacts

FCS CH OVERRIDE function of a CH with failed contacts may be made operable if at least one good contact is available. Proceed: /MCC when possible.

FCS MODE:

Fail op - 2 op or 1 op/1 cl contacts preclude use of sw

Fail cl - 1st failure, deselect failed contact
2nd failure L(R), deselect all L(R) contacts

ENTRY MODE:

Fail op or cl - 1st, 2nd failure, deselect contact
3rd failure, when in OPS 3,

GNC 51 OVERRIDE

AUTO SEL - ITEM 42
EXEC (*)

2: GNC 42 SWITCH/SURF

NOTE

CRT2

During following tests verify '*' appears except as noted. If '*' remains after releasing pb, contact is failed closed

F7/F8
C3

FLT CNTLR PWR (two) - ON
FCS CH (four) - ORIDE (wait 5 sec)
- AUTO (no *)

F2/F4

PITCH pb - AUTO
- CSS
ROLL/YAW pb - AUTO
- CSS
SPDBK/THROT pb - AUTO
BODY FLAP pb - AUTO
SBTC TAKEOVER pb - push

L2/C3

SURF TEST

Notify MCC if any single surf feedback exceeds average of other three feedbacks by greater than:

Elevons ($\Delta 1.3$ deg)
Rudder ($\Delta 1.2$ deg)
SPD BK ($\Delta 2.2\%$)
BDY FLP ($\Delta 3\%$)

2: GNC 44 SWITCHES

During following switch test, verify '*' appears

L2

ENTRY MODE - LO GAIN
- NO Y JET
- AUTO (no *)

4. CONTROLLER & SWITCH TEST

GO TO 7-24
IF HAVE A
PROBLEM LOOK
AT THIS P.

NOTE

During controller/switch test

THC: One TX(TY,TZ) failed CLOSED -
reselect all contacts
(failed contact last)

One TX(TY,TZ) failed OPEN - reselect
good contacts only

Multi +TX,-TX,+TY,-TY,+TZ,-TZ
failures - reselect good contacts
only

SPDBK L(R): Deselect failed xdcrs
After 2nd L(R) failures, use
other side

RUD PED L(R): One failure - deselect
failed xdcr
Multi L(R) failures -
deselect all L(R) xdcrs

RHC L(R): One xdcr failure - reselect
good xdcrs only
Multi L(R) failures - reselect
good xdcrs L(R) & F7(F8) FLT
CNTLR PWR - OFF

BDY FLP L(R): Fail close, deselect all
L(R) contacts

RHC TRIM L(R): If contact failed open,
deselect failed contact
row, then:
TRIM RHC L(R) - INH, use
other side

PNL TRIM L(R): If contact failed open,
deselect failed contact
row, then:
TRIM PNL L(R) - OFF, use
other side

2: GNC 43 CONTROLLERS

a. THC

CRT2
F5
CRT2

Deselect L THC:
THC L DES - ITEMS 1,2,3 EXEC (*)
L THC - deflect in each axis
✓THC: '+' & '-'
Reselect THC contacts:
THC L - ITEM 1,2,3 EXEC (no *)

b. L SBTC

L SBTC - full aft; $\checkmark > 95\%$
- full fwd; $\checkmark < 15\%$

c. RUDDER/BRAKE *(John then Baker)*

RUD PED - full L; $\checkmark > 87\%$ and ch $\Delta < 9\%$
- full R; $\checkmark > 80\%$ and ch $\Delta < 9\%$
- null; between L 14% and R 4%
BK PED - Depress to verify unrestricted movement (~20 to 25°)

d. L BODY FLAP SWITCH

L2
CRT2

BDY FLP - UP, DN
✓BDY FLP UP, DN - '+'

e. L RHC

Deselect L RHC:
RHC L DES - ITEM 23,24,25 EXEC (*)
L RHC - deflect to hardstop in each axis
✓RHC L: R,P - $> 92\%$
Y - $> 88\%$

Reselect RHC CHs:
RHC L DES - ITEM 23,24,25 EXEC (no *)

f. L RHC TRIM SWITCH

CRT2 L RHC Trim - deflect switch in each axis
✓RHC TRIM L: R - R/L
P - U/D

g. L PANEL TRIM SWITCHES

L2 ROLL TRIM - R, then L
PITCH TRIM - UP, then DN
YAW TRIM - R, then L
CRT2 ✓PNL TRIM L: R, Y - R/L
P - U/D

h. Repeat steps b & d thru g for R
controllers/switches:
RHC R DES - ITEM 26,27,28

5. DEDICATED DISPLAY/HUD CHECK

✓HUD BRT (two) - as reqd
MODE (two) - TEST
✓Brightness
✓Format 'COMPLETE' msg
HUD MODE (two) - NORM

Resume to 801

CRT1 DED DIS FWD - ITEM 1 EXEC (*)
LOW - ITEM 4 EXEC (*)

✓HUD using HUD low value test diagram

F6/F8 ✓Readouts for DATA BUS 1,2,3,4

CRT1 DED DIS HIGH - ITEM 3 EXEC (*)

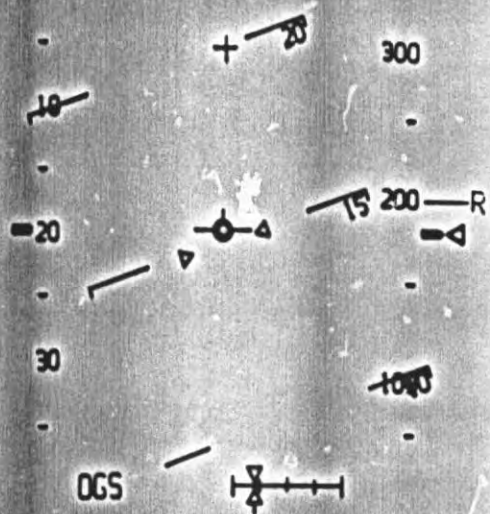
F6/F8 ✓Readouts for DATA BUS 1,2,3,4 and record
deltas

* For ADI failure, consult MCC for *
* possible replacement *

DEDICATED DISPLAY INPUT CHECKOUT VALUES TABLE

	PARAMETER	LOW VALUE	HIGH VALUE
F6/F8 ADI:	R, P, Y ATT	20 deg	300 deg
	R, Y RATE	2 ticks L	3 ticks R
	P RATE	2 ticks D	3 ticks U
	R, Y ATT ERR	2 ticks L	3 ticks R
	P ATT ERR	2 ticks D	3 ticks U
AMI:	ALPHA	+2 deg	+30 deg
	ACCEL	+20 fps ²	+30 fps ²
	M/VEL 20,040	20,000 fps	MACH 3
	EAS	20 kts	300 kts
AVVI:	ALT ACCEL	-2 fps ²	+3 fps ²
	ALT RATE	-200 fps	+300 fps
	ALT	200 ft	+300K ft
	RDR ALT	200 ft	+3000 ft
HSI:	SEL COURSE	200 deg	30 deg
	HEADING	20 deg	300 deg
	PRI BEAR	20 deg	30 deg
	SEC BEAR	200 deg	300 deg
	PRI, SEC MILES	200 nm	3000 nm
	CDI	1 tick L	1 tick R
GSI	1 tick D	1 tick U	
F7	SPI: ELEV	U20 deg	U30 deg
	BDY FLP	20%	30%
	RUD	20 deg L	3 deg R
	AILERON	2 deg L	3 deg R
	SPD BK	20%	30%
	SPD BK CMD	20%	30%

HUD LOW VALUE TEST
 NOTE
 No HUD high value test exists



6. FLAG TEST

CRT1 DED DIS FLAG - ITEM 5 EXEC (*)

FLAG TEST	
Verify flags visible:	
AMI	4
AVVI	4
HSI MILES	2
CDI	1
BRG	1
GSI	1 (pointer stowed)
ADI	1 (rate/err needle stowed)
SPI	1

TEST TERMINATE

CRT1 DED DIS OFF - ITEM 6 EXEC (*)

7. MODE LAMP TEST

TEST START

CRT1 MODE LT ON - ITEM 7 EXEC (*)
F2/F4 ✓PITCH AUTO,CSS 1t (two) - on
 ✓ROLL/YAW AUTO,CSS 1t (two) - on
 ✓SPDBK/THROT AUTO,MAN 1t (two) - on
 ✓BDY FLP AUTO,MAN 1t (two) - on

TEST TERMINATE

CRT1 MODE LT OFF - ITEM 8 EXEC (*)
F7/F8 FLT CNTLR PWR (two) - OFF

DISPLAY/DPS RECONFIG

Perform DPS, G8 TO G2 TRANSITION, then:

F3 TRIM PHL (two) - OFF
 HUD PWR (two) - OFF
F6,F8 INST PWR (two) - OFF
C3 FCS CH (four) - AUTO
08 MLS (three) - OFF
 RADAR ALTM (two) - OFF
014, RGA (four) - OFF
015, cb MNA,B,C ADTA (four) - op
016 ACCEL 1,2 (two) - op
 MNA,C DDU AFT (two) - cl
 MNB,C DDU R (two) - op
 ASA (four) - OFF
 ACCEL 3,4 (two) - OFF
017 ATVC (four) - OFF

AFT CONTROLLER C/O

1. POWER UP

014:E ✓cb MNA DDU AFT - c1
 016:E ✓MNC DDU AFT - c1
 A6U FLT CNTRLR PWR - ON

2. AFT THC

GNC 25 RM ORBIT

Deselect A THC:

THC A DES - ITEM 4,5,6 EXEC (*)

A THC - deflect in each axis

✓THC - '+' & '-'

AFT CONTROLLER C/O						
THC	PUSH	PULL	LEFT	RIGHT	UP	DOWN
DISP	+X	-X	+Z	-Z	-Y	+Y

- * During THC test, *
- * One TX(TY,TZ) failed CLOSED - *
- * reselect all contacts (failed *
- * contact last) *
- * One TX(TY,TZ) failed OPEN - *
- * reselect good contacts only *
- * Multi +TX,-TX,+TY,-TY,+TZ,-TZ *
- * failures - reselect good contacts *
- * only *

Reselect A THC contacts:

THC A DES - ITEM 4,5,6 EXEC (no *)

3. AFT RHC

CRT

Deselect A RHC:

RHC A DES - ITEM 13,14,15 EXEC (*)
A RHC - deflect to hardstop in each axis
✓RHC A: R,P - > 92%
Y - > 88%

- * During RHC test, *
- * One xdcr failure - reselect good *
- * xdcrs only *
- * Multi RHC failures - reselect good *
- * xdcr & A6U FLT CNTLR PWR - OFF *

Reselect RHC CHs:

RHC A DES - ITEM 13,14,15 EXEC (no *)

4. RECONFIG TO NOMINAL

A6U
014:E,
016:E

FLT CNTLR PWR - OFF
AFT DDU PWR - as reqd

OMICRON SPECIFICATION

1. DETERMINE REFERENCE ATTITUDE

Designated body axis pointed toward target (P). Y body axis in same plane as negative angular momentum vector (-A) and P

2. DETERMINE DESIRED ATTITUDE

Rotate clockwise around P (right-hand rule) to desired attitude

OMICRON = angle of rotation around P from reference attitude to desired attitude

NOTE

If P = ±Y body axis, use -Z body axis for reference attitude

MPS

MPS INERT..... 8-2

MPS

8-1

ORB OPS/ALL/GEN B

MPS

MPS INERT

1. INITIALIZATION

R2 MPS PNEU He ISOL - OP
R4 FILL/DRAIN L02,LH2 OUTBD (two) - OP
After 30 min, continue

2. TERMINATION

R4 MPS FILL/DRAIN L02,LH2 OUTBD (two) - CL
Wait 10 sec
R2 MPS FILL/DRAIN L02,LH2 OUTBD (two) - GND
PNEU He ISOL - GPC

OMS

ON-ORBIT OMS BURN..... 9-2

OMS

9-1

ORB OPS/ALL/GEN B

ON-ORBIT OMS BURN

1. OMS BURN PREP

C2
Wedge

Install OMS-2/ORBIT OMS BURNS Cue Cards
(two) and OMS BURN MONITOR Cue Cards
(two) (F6, F8)

CRT

If OPS 2:

1: GNC 20 DAP - ✓DAP Config A1, B1

1: GNC UNIV PTG

CNCL ~ ITEM 21 EXEC

GNC, OPS 202 PRO

1: GNC ORBIT MNVR EXEC

2: GNC SYS SUMM 2

If OPS 3:

GNC, OPS 302 PRO

1: GNC DEORB MNVR EXEC

3: BFS, GNC SYS SUMM 2

F7

✓OMS PRESS He TK L(A) > 640 psia
✓N2 TK L(R) > 564 psia

WARNING

If OMS PRESS not within limits,
do not execute on-orbit burn

2. LOAD TGT DATA

Load TGT DATA per Burn Pad

LOAD - ITEM 22 EXEC

TIMER - ITEM 23 EXEC

✓BURN DATA per Burn Pad

C3

DAP: If OPS 2, B/AUTO/VERN

If OPS 3, AUTO

CRT1

MNVR - ITEM 27 EXEC (*)

3. PERFORM OMS BURN

TIG-4
08

If Xfeed Burn:

- /L(R) OMS TK ISOL (two) - OP (tb-OP)
- /R(L) OMS TK ISOL (two) - CL (tb-CL)
- /L,R OMS XFEED B (two) - OP (tb-OP)

If Straight feed:

- /L,R OMS TK ISOL (four) - OP (tb-OP)

F7/F8
014:E,
015:E,
016:E

- FLT CNTLR PWR (two) - ON
- /cb DDU (six) - c1

Perform OMS-2/ORBIT OMS BURNS
Cue Card, then:

4. OMS POST BURN RECONFIGURATION

CRT1

Perform OMS TVC GMBL CK as reqd

- * If down arrow(s) or Ms, *
- * select good GMBL

F7/F8
014:E,
015:E,
016:E
08

- FLT CNTLR PWR (two) - OFF
- cb DDU (six) - as reqd

L,R OMS He PRESS/VAP ISOL (four) - CL

If feeding ICNCT:

- /L(R) OMS XFEED A - CL (tb-CL)
- B - OP (tb-OP)
- R(L) OMS XFEED (two) - CL (tb-CL)

Otherwise:

- L,R OMS XFEED (four) - CL (tb-CL)
- TK ISOL (four) - OP (tb-OP)

CRT

.....IF OPS 2.....
 . DAP: B/INRTL/VERM :
 . GNC, OPS 201 PRO (/DAP) :

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9-4

ORB OPS/ALL/GEN B

ORBITAL MANEUVER PAD FOR

MINVRATT

R	24
P	25
V	26

AVTOT

TGO

VGO X
VGO Y
VGO Z

()	()	()	()	()	()
()	()	()	()	()	()
()	()	()	()	()	()
()	()	()	()	()	()
()	()	()	()	()	()
()	()	()	()	()	()

HA HP
TGT

()	()	()	()	()	()
()	()	()	()	()	()

OMS BOTH 1
L 2
R 3
RCS SEL 4

--	--	--	--

+ X
- X
MULTI-AXIS

--	--

TV ROLL 5

--	--	--

TRIM LOAD

P	6	()	()	()	()
LY	7	()	()	()	()
RY	8	()	()	()	()

WT 9

--	--	--	--	--	--

TIG 10

--	--	--	--	--	--

PEG 7 TIGTS

AVK	19	()	()	()	()
AVY	20	()	()	()	()
AVZ	21	()	()	()	()

NOTES

OMS GMBL CK:

PRE POST-BURN

RCS FCNCT:

L OMS → RCS
R OMS → RCS
NONE

--	--	--

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS
2 OMS → 1 OMS
1 OMS → RCS
NONE

--	--	--	--

OMS HE REG TEST:
L R OMS HE P/VAP ISOL

GPC OP CL

A		
B		

FOR S TRK PASS:

IMU DES

ORBITAL MANEUVER PAD FOR

MINVR ATT

AVTOT

TGO

VGO X ()

VGO Y ()

VGO Z ()

MA

HP

TGT

NOTES

RCS CORRECT:

L OMS → RCS
R OMS → RCS
NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS
2 OMS → 1 OMS
1 OMS → RCS
NONE

FOR S TRK PASS:

IMU DES

OMS HE REG TEST:
L R OMS HE PVAP ISOL

GPC OP CL

A B

OMS GMBL CK:

PRE

POST - BURIN

L PRI
L SEC
R PRI
R SEC

OMS BOTH 1

L 2
R 3

RCS SEL 4

TV ROLL 5

TRIM LOAD

P 6

LY 7
RY 8

WT 9

TGT 10

PEG 7 TGTS

AVX 19

AVY 20
AVZ 21

MULTI-AXIS

± X
- X

ORBITAL MANEUVER PAD FOR

MANVR ATT

R 24
P 25
Y 26

AVTOT
TGO

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

VGO X
VGO Y
VGO Z

TGT

MA

MP

OMMS BOTH 1

L 2
R 3

RCS SEL 4

TV ROLL 5

TRIM LOAD

()	()	()	()
()	()	()	()
()	()	()	()

P 6
LY 7
RY 8

WPT 9

TNG 10

PEG 7 IGTS

()	()	()	()
()	()	()	()
()	()	()	()

AVK 19
AVY 20
AVZ 21



OMMS GAMBL CK:

L PRI					
L SEC					
R PRI					
R SEC					

PRE POST - BURN

RCS TC-LECT:

NOTES

1 OMMS → RCS
2 OMMS → RCS
NONE

DOWN MODE OPTIONS:

2 OMMS → 1 OMMS → RCS
2 OMMS → 1 OMMS
1 OMMS → RCS
FLONE

FOR S TRK PASS:

IMU DES

OMMS HE REG TEST:

GPC OP CL

A			
B			

ORBITAL MANEUVER PAD FOR

OM'S BOTH 1 [] [] [] []
 L 2 [] [] [] []
 R 3 [] [] [] []
 RCS SEL 4 [] [] [] []

TV ROLL 5 [] [] [] []

TRIM LOAD

P 6 () () () ()
 LY 7 () () () ()
 RY 8 () () () ()

WT 9 [] [] [] []

TIG 10 [] [] [] [] [] [] [] [] [] []

PEG 7 TGTS

ΔVX 19 () () () ()
 ΔVY 20 () () () ()
 ΔVZ 21 () () () ()

→ X
 ← X
 MULTI-AXIS

MNVR ATT

R 24 [] [] [] []
 P 25 [] [] [] []
 Y 26 [] [] [] []

ΔVTOT [] [] [] []
 TGO [] [] [] []

VGO X () () () ()
 VGO Y () () () ()
 VGO Z () () () ()

TGT [] [] [] []

HA [] [] [] []

HP () () () ()

OM'S GMBLCK:

PRE [] [] [] []

L PRI [] [] [] []
 L SEC [] [] [] []
 R PRI [] [] [] []
 R SEC [] [] [] []

POST-BURN [] [] [] []

RCS CONNECT:

L OMS → RCS [] [] [] []
 R OMS → RCS [] [] [] []
 NONE [] [] [] []

DOWN MODE OPTIONS:

[] [] [] []
 2 OMS → 1 OMS → RCS
 2 OMS → 1 OMS
 1 OMS → RCS
 NONE

FOR S TRK PASS:

IMU DES

OM'S HE REG TEST:
 L,R OMS HE PVAP ISOL

GPC OP CL [] [] [] []
 A [] [] [] []
 B [] [] [] []

NOTES

RCS

RCS HOT FIRE TEST.....	10-2
GG FREE DRIFT.....	10-6
0.4 DEG/SEC PTC.....	10-8
ON-ORBIT RCS BURN.....	10-9
LOSS OF VERNIERS.....	10-21
RECOVERY OF VERNIERS.....	10-21

RCS

RCS HOT FIRE TEST

1. CONFIGURE FOR JET TEST

DAP: A1/INRTL/VERN

2. PERFORM RCS JET TEST

Wait 3 sec between pulses
Monitor CRT for JET FAIL msgs
Monitor ADI rates to verify jet on
or jet fail

NOTE

If failed RCS JET detected, wait
30 sec before next pulse, deselect
any failed RCS JET not auto
deselected, complete TEST, then go
to MAL, RCS, 10.1a

RCS

014:F
015:f
016:F

PRIMARY RJD DRIVER (eight) - ON

F6
F7

DAP TRANS: PULSE/PULSE/PULSE
DAP: A/FREE/PRI
ADI RATE - LO
FLT CNTLR PWR - ON

GNC 23 RC

CRT

RCS FWD - ITEM 1 EXEC (*)
MANF VLVS STAT OVRD
 ✓1 OP - ITEM 40
 ✓2 OP - ITEM 41
 3 CL - ITEM 42 EXEC
 4 CL - ITEM 43 EXEC
JET DES F2U ITEM 21 EXEC (*)

RCS L - ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
 ✓1 OP - ITEM 40
 2 CL - ITEM 41 EXEC
 3 CL - ITEM 42 EXEC
 4 CL - ITEM 43 EXEC

CRT

RCS R - ITEM 3 EXEC (*)
MANF VLVS STAT OVRD
/1 OP - ITEM 40
2 CL - ITEM 41 EXEC
3 CL - ITEM 42 EXEC
4 CL - ITEM 43 EXEC

F5

Perform the following pulse sequence twice,
THC: +X, 1 PULSE (fires jets R1A,L1A)
-X, 1 PULSE (fires jets F1F,F2F)
+Z, 1 PULSE (fires jets F1U,R1U,L1U)
F6 +Y, 1 PULSE (fires jets F1L,L1L)
-Y, 1 PULSE (fires jets F2R,R1R)

CRT

/RCS R, ITEM 3 - (*)
MANF VLVS STAT OVRD
1 CL - ITEM 40 EXEC
2 OP - ITEM 41 EXEC
/3 CL - ITEM 42
/4 CL - ITEM 43

RCS L - ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
1 CL - ITEM 40 EXEC
2 OP - ITEM 41 EXEC
/3 CL - ITEM 42
/4 CL - ITEM 43

RCS F - ITEM 1 EXEC (*)
JET DES F1U ITEM 17 EXEC (*)
JET DES F2U ITEM 21 EXEC (no *)

Perform the following pulse sequence twice,
THC: +Z, 1 PULSE (fires jets F2U,L2U,R2U)
-Z, 1 PULSE (fires jets F1D,F2D,L2D,R2D)
+Y, 1 PULSE (fires jets F1L,L2L)
-Y, 1 PULSE (fires jets F2R,R2R)

✓RCS F, ITEM 1 - (*)
JET DES FIU ITEM 17 EXEC (no *)
MANF VLVS STAT OVRD
1 CL - ITEM 40 EXEC
2 CL - ITEM 41 EXEC
3 OP - ITEM 42 EXEC
4 OP - ITEM 43 EXEC

CRT

RCS L - ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
✓1 CL - ITEM 40
2 CL - ITEM 41 EXEC
3 OP - ITEM 42 EXEC
✓4 CL - ITEM 43

RCS R - ITEM 3 EXEC (*)
MANF VLVS STAT OVRD
✓1 CL - ITEM 40
2 CL - ITEM 41 EXEC
3 OP - ITEM 42 EXEC
✓4 CL - ITEM 43

Perform the following pulse sequence twice,
THC: +X, 1 PULSE (fires jets L3A,R3A)
-X, 1 PULSE (fires Jet F3F)
-Z, 1 PULSE (fires jets F3D,F4D,L3D,R3D)
+Y, 1 PULSE (fires jets F3L,L3L)
-Y, 1 PULSE (fires jets F4R,R3R)

✓RCS R, ITEM 3 - (*)
MANF VLVS STAT OVRD
✓1 CL - ITEM 40
✓2 CL - ITEM 41
3 CL - ITEM 42 EXEC
4 OP - ITEM 43 EXEC

RCS L - ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
✓1 CL - ITEM 40
✓2 CL - ITEM 41
3 CL - ITEM 42 EXEC
4 OP - ITEM 43 EXEC

Perform the following pulse sequence twice,
THC: +Z, 1 PULSE (fires jets F3U, L4U, R4U)
-Z, 1 PULSE (fires jets F3D, F4D, L4D, R4D)
+Y, 1 PULSE (fires jets F3L, L4L)
-Y, 1 PULSE (fires jets F4R, R4R)

F7/F8

DAP: A/INRTL/VERN
FLT CNTLR PWR - OFF

3. RECONFIGURE JET SELECT

CRT

✓RCS L, ITEM 2 - (*)
MANF VLVS STAT OVRD
1 OP - ITEM 40 EXEC
2 OP - ITEM 41 EXEC
3 OP - ITEM 42 EXEC
✓4 OP - ITEM 43

RCS R - ITEM 3 EXEC (*)
MANF VLVS STAT OVRD
1 OP - ITEM 40 EXEC
2 OP - ITEM 41 EXEC
3 OP - ITEM 42 EXEC
✓4 OP - ITEM 43

RCS F - ITEM 1 EXEC (*)
MANF VLVS STAT OVRD
1 OP - ITEM 40 EXEC
2 OP - ITEM 41 EXEC
✓3 OP - ITEM 42
✓4 OP - ITEM 43

4. CONFIGURE FOR VERNIER MANIFOLD VALVE TEST

R15

cb MANF ISOL L5, R5, F5 (three) - op

5. PERFORM TEST

NOTE

If any vernier manifold closes, ignore
DAP RECONFIG message, re-open affected
manifold, complete TEST and notify MCC

07,08

L, R, F RCS MANF ISOL 5 (three) - CL (tb-OP)

6. CLEANUP

R15

cb MANF ISOL L5, R5, F5 (three) - c1

Reconfigure to FLT PLN DAP

10-5

ORB OPS/ALL/GEN B,1

GG FREE DRIFT

1. AUTO MNVR TO ATTITUDE

Change DAP A,B to A3,B3

GNC UNIV PTG

CRT

✓TGT ID, ITEM 8 - 2
BODY VECT - ITEM 14 +5 EXEC
Load Body Vector P,Y,OM (table, 10-7)
✓START TIME, ITEM 1 - In the past

If VERN jets avail:
DAP: B3/AUTO/VERN

If VERN jets not avail:
DAP TRANS: NORM/NORM/NORM,LOW Z
DAP: B3/AUTO/PRI

GNC UNIV PTG

CRT

TRK - ITEM 19 EXEC (CUR-*)
✓ERR TOT - ITEM 23 (+)

2. ESTABLISH FREE DRIFT

F6,F8

✓Att mnvr complete
ADI ATT - LVLH
FLASH EVAP CNTLR PRI A,B (two) - OFF
✓SEC - OFF

L1

✓HI LOAD DUCT HTR - OFF

If VERN jets avail:
DAP: A3/AUTO/VERN
Wait 3 min
DAP: FREE

If VERN jets not avail:
DAP: A3/AUTO/PRI
Wait 30 sec
Wait until $-0.01 < \text{Roll Rate} < 0.01$,
then:

DAP: FREE

Rcd MET ___/___:___:___

NOTE
 If FREON EVAP OUT TEMP > 60, execute
 PRIORITY PWRDN GROUP A and subsequent
 (ORB PKT, PRIOR PWRDN) to maintain
 FREON EVAP OUT TEMP ≤ 55

3. VEHICLE RECOVERY AND FES RESTART

If VERN jets avail:
 ✓RJD DRIVER (nine) - ON
 ✓DAP: A3/FREE/VERN
 If VERN jets not avail:
 ✓DAP: A3/FREE/PRI
 ✓Primary RJD DRIVER (eight) - ON

014:F,
 015:F,
 016:F

014:F,
 015:F,
 016:F
 F6,F8

ADI ATT - as reqd
 Reconfig to FLT PLN DAP

DAP: INRTL

SM 88 APU/ENVIRON THERM

CRT(01) If EVAP OUT TEMP > 41 and ≤ 47 degF:
 L1 RAD CNTLR OUT TEMP - HI
 CRT(01) When EVAP OUT TEMP = 50° ± 2 degF
 L1 RAD CNTLR OUT TEMP - NORM,
 then immediately:
 FLASH EVAP CNTLR PRI A(B) - ON
 CRT(01) If EVAP OUT TEMP ≤ 41 or > 47 degF:
 L1 FLASH EVAP CNTLR PRI A(B) - ON

GRAVITY GRADIENT BODY VECTORS

	ATT ID	EXEC DATA			BODY RATES (±0.002)		
		P	Y	OM	R	P	Y
+ PLBD							
X NORTH	A	357.51	0.97	249.18	0.002	0.024	-0.062
L SOUTH	B	357.51	359.23	110.91	-0.002	0.024	0.062
V IN-PLANE	C	359.06	0.11	4.44	0.000	-0.066	0.005
- PLBD							
X NORTH	D	177.51	0.77	89.09	0.002	-0.024	-0.062
L SOUTH	E	177.51	359.03	290.82	-0.002	-0.024	0.062
V IN-PLANE	F	179.06	359.89	175.56	0.000	0.066	-0.005

0.4 DEG/SEC PTC

1. MNVR TO PTC ATTITUDE

DAP: A1/AUTO/VERN

GNC UNIV PTG

CRT

TGT ID - ITEM 8 +4 EXEC
BODY VECT - ITEM 14 +5 EXEC
P - ITEM 15 +2 7 0 EXEC
Y - ITEM 16 +0 EXEC
OM - ITEM 17 +2 7 0 EXEC
TRK - ITEM 19 EXEC (CUR-*)

2. INITIATE PTC ROTATION

DAP: A2/AUTO/PRI

GNC UNIV PTG

CRT

BODY VECT - ITEM 14 +1 EXEC
ROT - ITEM 20 EXEC (CUR-*)
When ROT RATE $-0.4^{\circ}/\text{sec}$,
DAP: A2/AUTO/VERN

3. TERMINATE PTC ROTATION

014:F, ✓Primary RJD DRIVER (eight) - ON
015:F,
016:F

DAP: A2/AUTO/PRI

GNC UNIV PTG

CRT

CNCL - ITEM 21 EXEC
When RATES DAMPED,
DAP: A2/AUTO/VERN
Reconfig to FLT PLN DAP

ON-ORBIT RCS BURN, MM 202

NOTE

PRESS & VLV checks reqd only on RCS pods to be used during burn (steps 1 & 2)

1. AFT RCS/OMS SYSTEM CHECK

F7
03
07
08

- If I'CNCT: L(R) OMS to RCS;
- ✓OMS PRESS He TK P L,R > 1500 psia
- ✓L,R OMS OX,FU PRESS > 234 psia
- DAP: FREE
- AFT L,R RCS TK ISOL (six) - CL (tb-CL)
- XFEED (four) - OP (tb-OP)
- ✓L,R OMS He PRESS VAP/ISOL (four) - CL
- ✓TK ISOL A,B (four) - OP (tb-OP)
- ✓XFEED A (two) - CL (tb-CL)
- L(R) OMS XFEED B - OP (tb-OP)
- DAP: as reqd

GNC 23 RCS

OMS PRESS ENA, L(R) OMS - ITEM 5(6) EXEC

CRT

If No I'CNCT:

03
07

- ✓L,R RCS OX,FU PRESS > 190 psia
- ✓He PRESS > 456 psia
- ✓AFT L,R RCS He PRESS A(B) (two) - GPC (tb-OP)
- B(A) (two) - CL (tb-CL)
- ✓TK ISOL (six) - OP (tb-OP)
- ✓XFEED (four) - CL (tb-CL)

2. FWD RCS SYSTEM CHECK

03
08

- ✓FWD RCS OX,FU PRESS > 190 psia
- ✓He PRESS > 456 psia
- ✓A(B) - GPC (tb-OP)
- ✓B(A) - CL (tb-CL)

3. LOAD TGT DATA AND MNVR

014:F, ✓Primary RJD DRIVER (eight) - ON
015:F,
016:F

✓DAP B set to B1

GNC UNIV PTG

DAP: B/AUTO/VERN(PRI)

.....IF -X BURN.....
· Perform Auto Mvnr to Burn Att ·
·
· Load MNVR OPTION:
· R ITEM 5 + _ _ _ ·
· P ITEM 6 + _ _ _ ·
· Y ITEM 7 + _ _ _ EXEC ·
· START MNVR - ITEM 18 EXEC ·
· When in Att, proceed ·
.....

CNCL - ITEM 21 EXEC
GNC, OPS 202 PRO

1: GNC ORBIT MNVR EXEC

2: GNC SYS SUMM

Load TGT DATA per Burn Pad
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓BURN DATA per Burn Pad

If -X or Multi-Axis Burn:
Perform Burn in current Att,
ignore computed Att
If +X Burn:
MNVR - ITEM 27 EXEC (*)

4. PERFORM RCS BURN

F7/F8 FLT CNTLR PWR (two) - ON
014:E, ✓cb DDU (six) - c1
015:E,
016:E

TIG-3:00 ADI ERROR/RATE - MED
ATT - INRTL
DAP: B1/INRTL/PRI
TRANS: NORM/NORM/NORM

.....IF I'CONNECT.....
.TIG-2:00 L(R) OMS He PRESS/VAP ISOL A - OP.
.....

NOTE

For Multi-Axis burns, if VGO Z is neg,
use Z,X,Y sequence otherwise use X,Y,Z

F8 ✓BURN ATT, then:
ADI - REF
ATT REF pb - push

At TIG, deflect THC, null VGOs
✓ATT ERR \pm 3°
Cutoff release THC
C3 DAP TRANS: PULSE/PULSE/PULSE

CRT GNC, OPS 201 PRO
F7/F8 FLT CNTLR PWR (two) - OFF
014:E, cb DDU (six) - as reqd
015:E,
016:E

DAP: as reqd

.....IF I'NECT RETURN.....
• DAP: FREE
• GNC 23 RCS
• OMS PRESS ENA, OFF - ITEM 7 EXEC
• L,R OMS XFEED (four) - CL (tb-CL)
• He PRESS/VAP ISOL A - CL
• AFT L,R RCS
• ✓He PRESS A(B) (two) - GPC (tb-OP)
• ✓B(A) (two) - CL (tb-CL)
• XFEED (four) - CL (tb-CL)
• TK ISOL (six) - OP (tb-OP)
• DAP: as reqd
.....

CRT
08

07

CRITICAL MANEUVER PAD FOR

MINVR ATT

R	24				
P	25				
Y	26				

AVTOT

TGO

:	:	:	:	:	:
---	---	---	---	---	---

VGO X () () () () () ()

VGO Y () () () () () ()

VGO Z () () () () () ()

MA

MP

TGT

OMIS BOTH 1

L 2

R 3

RCS SEL 4

TV ROLL 5

TRIM LOAD

P 6 () () () () () ()

LY 7 () () () () () ()

RY 8 () () () () () ()

WT 9

TKG 10

PEG 7 TGTS

AVX 19 () () () () () ()

AVY 20 () () () () () ()

AVZ 21 () () () () () ()



NOTES

RCS DIRECT:

L OMS → RCS

R OMS → RCS

NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS

2 OMS → 1 OMS

1 OMS → RCS

NONE

FOR S TRK PASS:

IMU DES

OMIS HE REG TEST:

L/R OMS HE P/V/AP ISOL

GPC OP CL

A					
B					

ORBITAL MANEUVER PAD FOR _____

OMBS BOTH 1 [] [] [] [] []
 L 2 [] [] [] [] []
 R 3 [] [] [] [] []
 RCS SEL 4 [] [] [] [] []

TV ROLL 5 [] [] [] [] []

TRIM LOAD
 P 6 [] [] [] [] []
 LY 7 [] [] [] [] []
 RY 8 [] [] [] [] []
 WT 9 [] [] [] [] []
 TIG 10 [] [] [] [] []

PEG 7 TGTS
 ΔVX 19 [] [] [] [] []
 ΔVY 20 [] [] [] [] []
 ΔVZ 21 [] [] [] [] []

[] [] [] [] []
 MULTI-AXIS
 + X
 - X

MINVR ATT [] [] [] [] []
 R 24 [] [] [] [] []
 P 25 [] [] [] [] []
 Y 26 [] [] [] [] []

AVTOT [] [] [] [] []
 TGO [] [] [] [] []

VGO X () [] [] [] [] []
 VGO Y () [] [] [] [] []
 VGO Z () [] [] [] [] []

HA [] [] [] [] []
 TGT [] [] [] [] []

OMBS GMBL CK: [] [] [] [] []

PRE POST-BURN [] [] [] [] []
 L PRI [] [] [] [] []
 L SEC [] [] [] [] []
 R PRI [] [] [] [] []
 R SEC [] [] [] [] []

RCS YCNECT: [] [] [] [] []
 L OMS → RCS
 R OMS → RCS
 NONE

DOWN MODE OPTIONS:
 2 OMS → 1 OMS → RCS
 2 OMS → 1 OMS
 1 OMS → RCS
 NONE

NOTES

FOR S TRK PASS: IMU DES

OMBS HE REG TEST:
 L R OMS HE PWAP ISOL
 GPC OP CL [] [] [] [] []
 A [] [] [] [] []
 B [] [] [] [] []

ORBITAL MANEUVER PAD FOR

2-NVR ATT

R	Z4		
P	Z5		
Y	Z6		

AVTOT

TGO

VGO X ()

VGO Y ()

VGO Z ()

MA

HP

TGT

OMS BOTH 1

--	--	--	--

L 2

--	--	--	--

R 3

--	--	--	--

RCS SEL 4

--	--	--	--

TV ROLL 5

--	--	--	--

TRIM LOAD

P 6

LY 7

RY 8

WT 9

TGT 10

PEG 7 TGT

AVX 19

AVY 20

AVZ 21



NOTES

RCS F'CNCT:

L OMS → RCS
R OMS → RCS
NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS
2 OMS → 1 OMS
1 OMS → RCS
NONE

OMS GMBL CK:

PRE POST-BURN

L PRI
L SEC
R PRI
R SEC

FOR S TRK PASS: IMU DES

OMS HE REG TEST:
L/R OMS HE PVAP ISOL

GPC OP CL

A B

ORBITAL MANEUVER PAD FOR

MNVRATT

R	24
P	25
Y	26

ΔVTOT

TGO

:					

VGO X

()					
()					
()					

VGO Y

()					
()					
()					

VGO Z

()					
()					
()					

MA

--	--	--	--	--	--

MP

()					
-----	--	--	--	--	--

TGT

--	--	--	--	--	--

OMS BOTH 1

--	--	--	--	--

L 2

--	--	--	--	--

R 3

--	--	--	--	--

RCSSEL 4

--	--	--	--	--



TV ROLL 5

--	--	--	--

TRIM LOAD

P 6

()				
()				
()				

LY 7

()				
()				
()				

RY 8

()				
()				
()				

WT 9

--	--	--	--	--

TIG 10

/									
---	--	--	--	--	--	--	--	--	--

PEG 7 TGT5

ΔVX 19

()					
()					
()					

ΔVY 20

()					
()					
()					

ΔVZ 21

()					
()					
()					

NOTES

OMS GMBL CK:

L PRI

--	--	--	--	--	--

L SEC

--	--	--	--	--	--

R PRI

--	--	--	--	--	--

R SEC

--	--	--	--	--	--

PRE POST-BURN

--	--	--	--	--	--

RCS FORECT:

L OMS → RCS

--	--	--	--	--	--

R OMS → RCS

--	--	--	--	--	--

NONE

--	--	--	--	--	--

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS

--	--	--	--	--	--

2 OMS → 1 OMS

--	--	--	--	--	--

1 OMS → RCS

--	--	--	--	--	--

NONE

--	--	--	--	--	--

OMS HE REG TEST:
L/R OMS HE PVAP ISOL

GPC OP CL

--	--	--	--	--	--

A

--	--	--	--	--	--

B

--	--	--	--	--	--

FOR S TRK PASS:

BMU DES

--	--	--	--	--	--

ORBITAL MANEUVER PAD FOR

MMVR ATT

R	24		
P	25		
Y	26		

ΔVTOT

TGO

VGO X

()			
()			
()			

VGO Y

()			
()			
()			

VGO Z

()			
()			
()			

TGT

MA

HP

()			
()			
()			

OMS BOTH 1

L	2		
R	3		
RCS SEL	4		

MULTI-AXIS

+ X

- X

TV/ROLL 5

TRIM LOAD

P 6

()			
LY	7		
RY	8		

WT 9

TIG 10

PEG 7TGTS

ΔVX 19

()			
ΔVY	20		
ΔVZ	21		

NOTES

OMS GMBL CK:

L PRI

L SEC

R PRI

R SEC

POST-BURN

RCS TONECT:

L OMS → RCS

R OMS → RCS

NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS

2 OMS → 1 OMS

1 OMS → RCS

NONE

FOR S TRK PASS:

MMU DES

OMS HE REG TEST:
L/R OMS HE PVAP ISOL

GPC OP CL

A B

ORBITAL MANEUVER PAD FOR _____

MMVRATT

R	24
P	25
Y	26

ΔVTOT

TGO

VGO X ()

VGO Y ()

VGO Z ()

TGT

--	--	--	--	--	--

HA

--	--	--	--	--	--

HP

--	--	--	--	--	--

OMS BOTH 1

--	--	--	--	--	--

L 2

--	--	--	--	--	--

R 3

--	--	--	--	--	--

RCS SEL 4

--	--	--	--	--	--

+ X

--	--	--	--	--	--

- X

--	--	--	--	--	--

MULTI-AXIS

TV ROLL 5

--	--	--	--	--	--

TRIM LOAD

P 6

--	--	--	--	--	--

LY 7

--	--	--	--	--	--

RY 8

--	--	--	--	--	--

WT 9

--	--	--	--	--	--

TGT 10

--	--	--	--	--	--

PEG 7 TGT

ΔVX 19

--	--	--	--	--	--

ΔVY 20

--	--	--	--	--	--

ΔVZ 21

--	--	--	--	--	--

NOTES

OMS GMBLCK:

L PRI

--	--	--	--	--	--

L SEC

--	--	--	--	--	--

R PRI

--	--	--	--	--	--

R SEC

--	--	--	--	--	--

PRE POST-BURN

--	--	--	--	--	--

RCS CORRECT:

L OMS → RCS

--	--	--	--	--	--

R OMS → RCS

--	--	--	--	--	--

NONE

--	--	--	--	--	--

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS

--	--	--	--	--	--

2 OMS → 1 OMS

--	--	--	--	--	--

1 OMS → RCS

--	--	--	--	--	--

NONE

--	--	--	--	--	--

OMS HE REG TEST:
L R OMS HE PVAP ISOL

GPC OP CL

--	--	--	--	--	--

A B

--	--	--	--	--	--

FOR S TRK PASS:

IMU DES

--	--	--	--	--	--

ORBITAL MANEUVER PAD FOR

MANVR ATT

R	24		
P	25		
Y	26		

ΔVTOT

TGO

VGO	X	()									
VGO	Y	()									
VGO	Z	()									

MA

TGT

MP

MULTI-AXIS

OMIS BOTH 1

RCS SEL

TV ROLL 5

TRIM LOAD

P	6	()							
LY	7	()							
RY	8	()							

WT 9

TIG 10

PEG 7 TGT

ΔVX	19	()							
ΔVY	20	()							
ΔVZ	21	()							

OMIS GMPL CK:

PRE POST-BURN

L PRI L SEC R PRI R SEC

NOTES

RCS TCHCT:

L OMS → RCS
R OMS → RCS
NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS
2 OMS → 1 OMS
1 OMS → RCS
NONE

FOR S TRK PASS:

MMU DES

OMIS HE REG TEST:
L/R OMS HE PVAP ISOL

GPC OP CL

A					
B					

ORBITAL MANEUVER PAD FOR

MMV/ATT

R 24			
P 25			
Y 26			

ΔVTOT

TGO

VGO X

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

VGO Y

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

VGO Z

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

MA

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

MP

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

TGT

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

OMS BOTH 1

L 2

R 3

RCS SEL 4

TV/ROLL 5

TRIM LOAD

P 6

LY 7

RY 8

WT 9

TIG 10

PG 7TGTS

ΔVK 19

ΔVY 20

ΔVZ 21



PG 7TGTS

()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

NOTES

OMS GMBL CK:

PRE

POST-BURN

L PRI

L SEC

R PRI

R SEC

GPC

OP

CL

A

B

MMU DES

FOR S TRK PASS:

MMU DES

FOR 5 TRK PASS:

MMU DES

OMS HE REG TEST:
L,R OMS HE PVAP ISOL

OMS HE REG TEST:
L,R OMS HE PVAP ISOL

OMS HE REG TEST:
L,R OMS HE PVAP ISOL

OMS HE REG TEST:
L,R OMS HE PVAP ISOL

OMS HE REG TEST:
L,R OMS HE PVAP ISOL

RCS TO NEXT:

L OMS → RCS

R OMS → RCS

NONE

DOWN MODE OPTIONS:

2 OMS → 1 OMS → RCS

2 OMS → 1 OMS

1 OMS → RCS

NONE

LOSS OF VERNIERS

NOTE

Unless otherwise specified in Deploy, RNOZ, PDRS, or EVA FS C/Ls (to satisfy payload requirements), use TAIL ONLY CNTL for nominal and sleep configurations or NOSE & TAIL CNTL when reqd to minimize state vector perturbations

DAP: FREE

1. CONFIG DAP FOR TAIL ONLY (NOSE & TAIL) CNTL

Change DAP A,B to A6,B2(A1,B3)

2. ESTABLISH PRIMARY CONTROL

014:F, ✓Primary RJD DRIVER (eight) - ON
015:F,

016:F,
016:F ✓RJD L5/F5/R5 DRIVER - OFF

DAP: A6(A1)/FREE/PRI
A6(A1)/AUTO/PRI

RECOVERY OF VERNIERS

DAP: FREE

1. CONFIG DAP

Reconfig to FLT PLN DAP

2. CONFIG FOR VERNIER (PRIMARY) CONTROL

016:F RJD L5/F5/R5 DRIVER - ON, wait 5 sec

DAP: A/AUTO/VERM(PRI)

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SEP MANEUVER

SEP MANEUVER..... 11-2

SEP
MANVR

11-1

ORB OPS/ALL/GEN B

SEP MANEUVER

1. SET UP AFT STATION

AGU

✓SENSE - as reqd
DAP: A1/INRTL/PRI
DAP TRANS: as reqd
FLT CNTLR PWR - ON

2. OBTAIN VISUAL CONTACT THROUGH OVHD WINDOW

DAP ROT: as reqd
RHC: as reqd

When adequate visual contact obtained,
DAP ROT: DISC/DISC/DISC

3. NULL CLOSING RATE

THC: +Z (dn: -X SENSE)
(out: -Z SENSE)
as reqd to null closing rate

4. PERFORM RR ACQ (if desired)

AIU

KU MODE - RDR PASSIVE
RADAR OUTPUT - HI
KU - AUTO TRACK
KU CNTL - PNL

Slew antenna to target
✓KU TRACK tb - gray

If no TRK,
KU SEARCH - SEARCH (tb-gray)

If no lock-on within 1 min,
repeat SEARCH as convenient

5. OBTAIN -1 FPS OPENING RATE

A6U

DAP TRANS: NORM/NORM/NORM
THC: +Z for 3 sec (DN: -X SENSE)
(OUT: -Z SENSE)
* If Low Z (MCC call), *
* THC: +Z for 12 sec *

6. PERFORM OUT-OF-PLANE MANEUVER

CRT

GNC UNIV PTG
CNCL - ITEM 21 EXEC
GNC, OPS 202 PRO

GNC ORBIT MNVR EXEC
RCS SEL - ITEM 4 EXEC (*)

Set TIG to current time +2:00
TGT PEG 7 ΔV_x - ITEM 19 +0 EXEC
 ΔV_y - ITEM 20 +2 EXEC
 ΔV_z - ITEM 21 +0 EXEC

LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

$\sqrt{VGO Z} \geq 0$; if $VGO Z < 0$, then:

* TGT PEG 7 ΔV_y - ITEM 20 -2 EXEC *
* LOAD - ITEM 22 EXEC *
* TIMER - ITEM 23 EXEC *
* $\sqrt{VGO Z} \geq 0$ *

DO NOT MNVR to BURN ATT

A6U

At TIG deflect THC to null VGOs

7. PERFORM FINAL SEP

CRT

GNC ORBIT MNVR EXEC
 $\sqrt{RCS SEL}$ - ITEM 4 (*)

If ΔVY (Block 6) is +2:
| TV ROLL - ITEM 5 +2 Z 0 EXEC
If ΔVY (Block 6) is -2:
TV ROLL - ITEM 5 +0 Z 0 EXEC

Set TIG to TIG from step 6 +15:00
TGT PEG 7 ΔV_x - ITEM 19 +3 EXEC
 ΔV_y - ITEM 20 +0 EXEC
 ΔV_z - ITEM 21 +0 EXEC

LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
DAP: A/AUTO/PRI

At TIG-8:00, MNVR - ITEM 27 EXEC (*)

A6U At TIG, deflect THC to null VG0s
FLT CNTRLR PWR - OFF

8. MNVR TO MINIMUM DRAG NTT JUDE (-ZLV)

A6U DAP: A/AUTO/VERN

CRT GNC, OPS 201 PRO

GNC UNIV PTG

TGT ID: 2

BODY VECT: 3

OM: 180

START TRK - ITEM 19 EXEC (CUR-*)

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FS v1

ORB OPS/43/FIN

COMM/INST

LOAD PCMMU FORMAT..... FS 1-2
PDI DECOM FORMAT..... FS 1-4

COMM/
INST

LOAD PCMMU FORMAT

- C3
1. OI PCMMU FORMAT - GPC
SM 62 PCMMU/PL COMM
 2. FORMAT:
FXD - ITEM 1 EXEC (+)
SEL ID - ITEM 3 +X X X EXEC
 3. ✓SM COMM BUF - RDY
LOAD - ITEM 4 EXEC
✓LOAD, ITEM 4 - RUN, CPLT
 4. If LOAD - CPLT
Repeat steps 2 and 3 for 2nd ID
 5. If LOAD - FAIL & ERR MSG - 'I/O ERR MMU 1(2)'
Go to MAL, DPS, 5.2a >>
 6. If LOAD - FAIL and first load attempt
Repeat steps 2 and 3 for FAIL ID
 7. If LOAD - FAIL and subsequent load attempt
C3 OI PCMMU PWR - 2(1)
✓ERR MSG - 'I/O ERR PCM'
- 'I/O ERR DL'
I/O RESET PCM - ITEM 5 EXEC (+)
Repeat steps 2 and 3
 8. When final LOAD - CPLT
PGM - ITEM 2 EXEC (+)

DNLIST COMPATIBILITY	PHASE	FORMAT ID 64 / 128	CONFIG NO
G2,GB,S2,S4	ORB/ORB BURN/FCS C/O	103 / 161	775
G2,S2,GB,S4	IUS-16K (PRIME)	103 / 192	763
G2,S2,GB,S4	IUS-16K (B/U)	103 / 211	770
G2,S2,S4	IUS-64K (PRIME)	103 / 183	759
G2,S2,S4	IUS-64K (B/U)	103 / 204	766
G3,BFS	ENTRY	102 / 164	777
G2,S2,S4,OPS 0	OPS 0	/ 163	776
G2,S2,S4,P9	MMU C/O	/ 163	776
G3,S2,S4	LOSS OF 2 GNC GPCs	/ 172	779
GNC,BFS	-	- / FXD	-

NOTE

LDR TFL may affect PCMMU BITE. If PCMMU or SM 2 GPC has been switched since last TFL, ID 64 and 128 will not reflect current state

GPC DUMP/TFL COMPATIBILITY				
	DUMP TYPE	PCMMU FORMAT IDs		
		(NSP DATA XMIT = HI)	(XMIT = LO)	
P A S S	H/W (HISAM)**	FXD,160,161,163,164,166,192,201, 211		
	S/W HDR	GNC	FXD,160,161,163,164,166,192,201,211	
		SM	161,163,192,211	
		OPS/PL9*	160,163	
	S/W LDR	GNC	183***,204***	102,103
		SM	183***,204***	103
OPS/PL9*				
B F S	H/W (HISAM)**	FXD,164,166,201		
	S/W HDR	FXD,164,166,201		
	S/W LDR	102		

*Requires downlist GPC change on SPEC 0

**if NSP DATA XMIT - LO, dump will not be in the downlist but will be recorded on the OPS recorders

***For IUS TFL's 183 and 204 in DPS SSR-2, use 'DUMP LDR' values in all tables and steps even if NSP DATA XMIT - HI

LOAD PDI DECOM FORMAT

SM 62 PCMMU/PL COMM

1. PDI:
 - /I/O RESET - ITEM 8 (*)
 - SEL DECOM - ITEM 9 +X EXEC
 - SEL FMT - ITEM 10 +X X X EXEC
 - LOAD - ITEM 11 EXEC
2. If LOAD - CPLT
 - SEL INPUT - ITEM 12 +X EXEC
 - LOAD - ITEM 13 EXEC
 - Continue steps 1 and 2 for additional DECOMS/FPM
3. If LOAD - FAIL & ERR MSG - 'I/O ERR MMU 1(2)'
Go to MAL, DPS, 5.2a >>
4. If LOAD - FAIL and first load attempt
Repeat step 1
5. If LOAD - FAIL and subsequent load attempt
/MCC for possible power cycle attempt

6. PCM:
I/O RESET PCM - ITEM 5 EXEC (*)

CONFIG	DECOM	FMT	INPUT	USE
763 ORB, IUS-16K PRIME TFL 192	1 2 3 4 5-FPM	18 7 16 15 506	2 3 5 5	TDRS SHARE IUS-64K IUS-16K
770 ORB, IUS-16K B/U TFL 211	1 2 3 4 5-FPM	17 8 5 6 504	3 2 5 5	SHARE TDRS IUS-16K IUS-64K
759 ORB, IUS-64K PRIME TFL 183	1 2 3 4 5-FPM	18 7 16 15 503	2 3 5 5	TDRS SHARE IUS-64K IUS-16K
766 ORB, IUS-64K B/U TFL 204	1 2 3 4 5-FPM	17 8 5 6 505	3 2 5 5	SHARE TDRS IUS-16K IUS-64K

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GNC

STAR PAIRS PAD..... FS 2-2
STAR PAIRS..... FS 2-3
DEORBIT IMU STAR PADS..... FS 2-4

GNC

CMC

		STAR PAIRS PAD			
		ATT SET 1		ATT SET 2	
PAIR	ANS SEP	DUAL S TRK	SINGLE S TRK	DUAL S TRK	SINGLE S TRK
		-Z	-Y	-Z	-Y
A	01.1	-T: 20 P+ 202 -Z: 14 P+ 119 Y+ 320	P+ 197 -T: 14 P+ 138 Y+ 315	-T: 14 P+ 344 -Z: 26 P+ 310 Y+ 285	P+ 201 -Z: 14 P+ 298 Y+ 285
B	00.2	-T: 57 P+ 342 -Z: 40 P+ 3 Y+ 325	P+ 200 -T: 40 P+ 348 Y+ 323	-T: 40 P+ 187 -Z: 57 P+ 185 Y+ 52	P+ 200 -Z: 40 P+ 187 Y+ 285
C	03.1	-T: 48 P+ 06 -Z: 24 P+ 182 Y+ 11	P+ 178 -T: 24 P+ 180 Y+ 20	-T: 24 P+ 284 -Z: 48 P+ 288 Y+ 1	P+ 307 -Z: 24 P+ 11 Y+ 304
D	04.5	-T: 50 P+ 180 -Z: 41 P+ 282 Y+ 76	P+ 06 -Z: 50 P+ 318 Y+ 06	-T: 41 P+ 115 -Z: 50 P+ 133 Y+ 259	P+ 24 -Z: 41 P+ 127 Y+ 285

SINGLE S TRK MIN MINV OPT
TOT ID = 11-110 MCW STAR 0
BODY VECTOR = 8

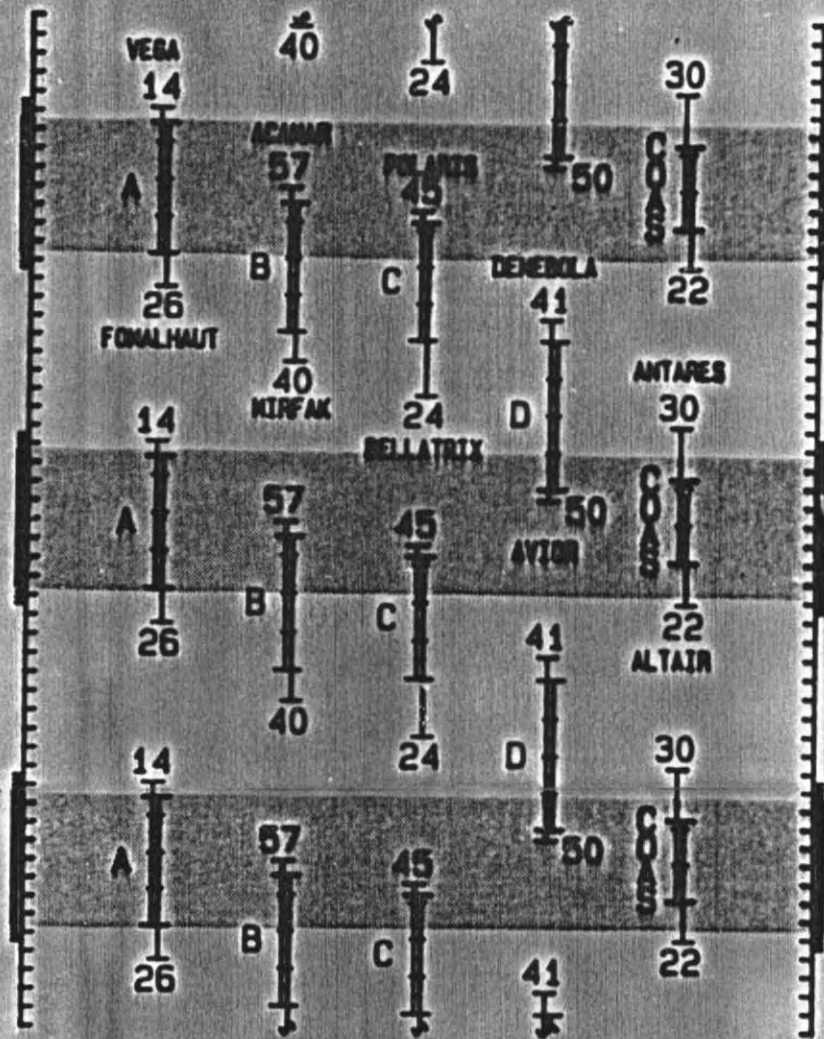
	-Z S TRK	-Y S TRK
P	67.7	0
Y	308	280.8

COAS ALIGN ANS COAS ALIGN
ATTITUDE 1 SEP ATTITUDE 2

C	4X COAS	30 P+ 253 P+ 128 Y+ 305	22 P+ 111 P+ 341 Y+ 288
D			
A	-Z COAS	30 P+ 282 P+ 328 Y+ 327	22 P+ 281 P+ 318 Y+ 28
B			

Data Applicable 7/25/91 - 8/03/91

STAR PAIRS



Data Applicable 7/25/91 - 8/03/91

DEORBIT IMU STAR PADS

IMU STAR ALIGN PAD

ID -Y: 26, FOMALHAUT
(TIG -02:53 to -02:09)
-Z: 14, VEGA
(TIG -02:57 to -02:14)
ANG DIF: 91.4

DUAL S TRKR		2nd ATTITUDE	
<u>ALIGNMENT</u>		<u>(SINGLE S TRKR)</u>	
R	282	-Z: 26	-Y: 14
P	119	197	23
Y	320	125	138
		334	315

IMU VERIFICATION STAR ALIGN PAD

ID -Y: 57, ACAMAR
(TIG -02:37 to -01:44)
-Z: 40, MIRFAK
(TIG -02:37 to -01:49)
ANG DIF: 90.3

DUAL S TRKR		2nd ATTITUDE	
<u>ALIGNMENT</u>		<u>(SINGLE S TRKR)</u>	
R	142	-Z: 57	-Y: 40
P	3	59	220
Y	326	10	345
		312	323

Launch - 07/25/91
TIG - 08/21:45:06 MET

MODEM DTO

PADM SETUP..... FS 3-3 |
POWERDOWN..... FS 3-4 |

MODEM
DTO

FS 3-1

ORB OPS/43/FIN 1

MODER
OTO

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FS 3-2

ORB OPS/43/FIN

PADM SETUP

Unstow:
PGSC/PADM
DC pwr cable
PADM DATA diskette

PGSC PWR - OFF

✓DC UTIL PWR - OFF
Connect DC pwr cable from PGSC port 7
to DC UTIL PWR outlet

R6 R COMM PWR - OFF

Connect PADM audio cable from PADM to
R COMM OUTLET

09 R AUD A/G 1 - OFF
A/G 2 - T/R
A/A - OFF
ICOM (two) - OFF
VOL A/G 2 tw - 0
XMIT/ICOM MODE - PTT/PTT

L9 PS AUD A/G 2 - OFF
05 L AUD A/G 2 - OFF

R10 MS AUD A/G 2 - OFF

MO42F MIDDECK SPKR AUD A/G 2 - OFF

R6 R COMM PWR - ON

DC UTIL PWR - ON
PGSC PWR - ON

Notify MCC ready for modem ops

On MCC GO,
Select 'MODEM' from PGSC main menu
Insert PADM data diskette into PGSC
floppy drive

✓PGSC in host mode

PADM POWERDOWN

If PGSC main menu not present (still in host mode)
Press <ESC> to quit host mode
Press <ALT-X> then <Y> to confirm exit of modern software

R6 R COMM PWR - OFF
Unplug PADM audio cable
Reconfigure Audio System

09 R AUD A/G 1 - T/R
A/G 2 - RCV
A/A - T/R
ICOM (two) - T/R
VOL A/G 2 tw - as reqd
XMIT/ICOM MODE - PTT/VOX

L9 PS AUD A/G 2 - RCV
05 L AUD A/G 2 - RCV
R10 MS AUD A/G 2 - RCV
MO42F MIDDECK SPKR AUD A/G 2 - RCV

NOTE

If PADM is to be removed, power off PGSC prior to removal

AMOS

AMOS RCS TEST..... FS 4-3

AMOS /

FS 4-1

ORB OPS/43/FIN

AMDS

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FS 4-2

ORB OPS/43/FIN

AMOS RCS TEST

TCA	TEST 1	TEST 2	TEST 3
ACTUAL NET	_/_:_:	_/_:_:	_/_:_:

A7U ✓PL BAY FLOOD (eight) - OFF

CRT SM 2 TIME

Set CRT timer counting down to TCA

F7 Set event timer counting down to TCA

UNIV PTG

✓TGT ID: 2

✓BODY VECT: 3

✓OM: 180

Change DAP B to B2

DAP TRANS: NORM/NORM/NORM

TCA-00:24 DAP: B/FREE/PRI

F7/F8 FLT CNTLR PWR (two) - ON

TCA-00:14 THC -X (out), hold 3 sec (0.9 ft/sec)
(fires F1F, F2F)

TCA-00:06 THC +X (in), hold 3 sec (0.8 ft/sec)
(fires R3A, L3A)

TCA+00:02 RHC +PITCH (up, past soft stop), hold 3 sec
(1.5 deg/sec) (fires L1U, R1U)

TCA+00:10 RHC -PITCH (down, past soft stop), hold 3 sec
(1.0 deg/sec) (fires L3D, R3D)

F7/F8 FLT CNTLR PWR (two) - OFF

DAP: A/AUTO/VERM

Reconfig to FLT PLN DAP

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FS 4-4

ORB OPS/43/FIN

ALT MODE DAP

ALT MODE DAP (DTO 798)..... FS 5-2
ATTITUDE HOLD TEST..... FS 5-2
MMVR PERFORMANCE TEST..... FS 5-4
ROTATION PERFORMANCE TEST..... FS 5-6
UARS SIMULATION TEST..... FS 5-8 |

ALT
MODE/
DAP

ALT MODE DAP (DTO 798)

1. ATTITUDE HOLD TEST

a.

1: GNC 20 DAP CONFIG	2: GNC UNIV PTG
----------------------	-----------------

CRT1 ITEM 23 +0.5 EXEC
/ITEM 35: 0.08

CRT1,2 b. Set event timer to test duration
Set DAP B/LOW Z/UNIV PTG option per
TEST CONFIG TABLE - desired test #

CRT2 If MNVR:
MNVR - ITEM 18 EXEC (*)
If TRK:
TRK - ITEM 19 EXEC (*)

When in att and within deadband,
DAP: B/AUTO/ALT
Start timer

- * If during tests, *
- * continuous jet firings *
- * DAP: B/FREE/PRI *
- * A/INRTL/PRI *
- * /MCC *

1620 12+1
13+1

At end of test duration,
If next test 1-9:
DAP: B/AUTO/PRI
Repeat part b for next att hold
test
If next test 10-21:
DAP: B/AUTO/VERM

ALT MODE
DAP

TEST CONFIG TABLE - ATTITUDE HOLD

		Relaxed Deadband Tests				Flight Deadband Tests				
TEST # ->		1	2	3	4	5	6	7	8	9
G N C 2 0 D A P C O N F I G	ATT HOLD DURATION (MIN)	20	20	20	20	10	10	10	10	2
	DISC RATE (ITEM 18)	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2
	DEADBAND ATT (ITEM 22)	5.0	3.0	5.0	5.0	0.5	0.5	0.5	3.0	0.3
	CNTL ACCEL (ITEM 28)	0	0	0	1	0	0	0	1	0
	RATE DB (ITEM 32)	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1
	JET OPT (ITEM 33)	1	3	1	1	1	3	1	1	1
	# JETS (ITEM 34)	2	1	3	2	2	2	1	2	2
	DELAY TIME (ITEM 36)	0	0	0	15	0	0	0	15	0
	LOW Z?	YES	NO	NO	YES	YES	NO	NO	YES	YES
	U N I V	R P Y			027 074 011	027 074 011				
P T I C G	TGT ID BODY VECT PITCH, YAW OM	2 3 90.0 280	2 3 90.0 280			2 3 90.0 280	2 3 90.0 280	2 3 90.0 280	2 3 90.0 280	

2. MNVR PERFORMANCE TEST

a. ✓DAP: B/AUTO/VERM

1: GNC 20 DAP CONFIG	2: GNC UNIV PTG
----------------------	-----------------

CRT1 ✓ITEM 23: 0.5
 ✓ITEM 35: 0.08

CRT1,2 b. Set event timer to test duration

Set DAP B/LOW Z/UNIV PTG option per
TEST CONFIG TABLE - desired test #

CRT2 When within deadband,
 DAP: B/AUTO/ALT
 If MNVR:
 | MNVR - ITEM 18 EXEC (*)
 If TRK:
 TRK - ITEM 19 EXEC (*)
 Start timer

- * If during tests, *
- * continuous jet firings *
- * DAP: B/FREE/PRI *
- * DAP: A/INRTL/PRI *
- * ✓MCC *

At end of test duration,
DAP: B/AUTO/VERM
Repeat part b for next mnvr test

TEST CONFIG TABLE - MNVR PERFORMANCE

MNVRs - Relaxed Deadbands					MNVRs - Light Deadbands				
TEST # ->	10	11	12	13	14	15	16	17	
TEST DURATION (MIN)	7:30	3:00	16:00	7:30	7:30	7:30	11:15	7:30	
DISC RATE (ITEM 16)	0.2	0.5	0.1	0.2	0.2	0.2	0.2	0.2	
DEADBAND ATT (ITEM 22)	3.0	3.0	3.0	3.0	1.0	0.5	3.0	1.0	
CNTL ACCEL (ITEM 28)	0	0	1	0	0	0	1	0	
RATE DB (ITEM 32)	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	
JET OPT (ITEM 33)	1	1	1	1	3	1	1	1	
# JETS (ITEM 34)	3	3	3	1	2	2	2	2	
DELAY TIME (ITEM 36)	0	0	15	0	0	0	15	0	
LOW Z7	NO	NO	YES	YES	NO	NO	NO	YES	
UNIV	R P Y	048 111 006	027 074 011	054 071 335	027 074 011				
PITG	TGT ID BODY VECT PITCH, YAW OM					2 5 69.30 301	2 3 90.0 280	2 5 122.18 312	2 3 90.0 280

3. ROTATION PERFORMANCE TEST

a. ✓DAP: B/AUTO/VERM
DAP: NO LOW Z

1: GMC 20 DAP CONFIG	2: GMC UNIV PTG
----------------------	-----------------

CRT1 ✓ITEM 35: 0.08

CRT1,2 b. Set event timer to test duration

Set DAP B/UNIV PTG per TEST CONFIG
TABLE - desired test #

CRT2 When within deadband,
DAP: B/AUTO/ALT
ROT - ITEM 20 EXEC (*)
Start timer

- * If during tests, *
- * continuous jet firings *
- * DAP: B/FREE/PRI *
- * A/INRTL/PRI *
- * /MCC *

At end of test duration,
CNCL - ITEM 21 EXEC
Wait 30 sec
DAP: B/AUTO/PRI
Repeat part b for next rot test

TEST CONFIG TABLE - ROTATION PERFORMANCE

TEST # ->	18 ✓	19 ✓	20 ✓	21
TEST DURATION (MIN)	1:30	7:30	3:00	2:08
DISC RATE (ITEM 18)	1.0	0.2	0.5	0.7
DEADBAND ATT (ITEM 22)	3.0	3.0	3.0	1.0
CNTL ACCEL (ITEM 28)	0	1	0	0
RATE DB (ITEM 32)	0.2	0.2	0.2	0.2
JET OPT (ITEM 33)	1	1	1	3
# JETS (ITEM 34)	3	3	3	2
DELAY TIME (ITEM 36)	0	15	0	0
BODY VECT	4	1	5	5
P Y	N/A N/A	N/A N/A	45 45	0 90

90°

4. UARS SIMULATION TEST

Set DAP B/UNIV PTG per test #22

DAP: B/AUTO/ALT
INIT TRK - ITEM 19 EXEC (*)

Return to FLT PLN

TEST CONFIG TABLE - UARS SIMULATION

		TEST # ->	22
G N C	DISC RATE (ITEM 18)		0.1
	DEADBAND ATT (ITEM 22)		3.0
	CNTL ACCEL (ITEM 28)		1
	RATE DB (ITEM 32)		0.1
	JET OPT (ITEM 33)		3
	# JETS (ITEM 34)		2
	DELAY TIME (ITEM 38)		3.75
U N I V	TGT ID		2
	BODY VECT		3
P T G	P Y OM		90 0 270

290

CURSOR CNTL DTO

CURSOR CNTL DEVICE (DFO 120A)..... FS 6-3

CURSOR
CNTL DTO

FS 6-1

ORB OPS/43/FIN



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JURSOR
CNTL DTD

FS 6-2

ORB OPS/43/FIN

CURSOR CNTL DEVICE (DTO 1208)

1. INITIAL POWERUP (Perform only if first use of Mac)
 - a. ✓ Display lid closed and locked
 - b. Install fuse
 - c. ✓ Locking sw (left side of computer) - pulled forward
 - d. Plug computer power cord in AC3-J3 on power panel A15
 - e. Open display lid
 - f. Depress any key for > 0.5 sec, wait for boot sequence completion
 - g. Pull down <APPLE> menu and select <CONTROL PANEL>
 - h. Set <SPEAKER VOLUME> TO <7> by dragging indicator up
 - i. Set <TIME> and <DATE> fields to SPEC 2 GMT values by clicking on hour, minute or second and click on arrows to adjust
 - j. ✓ <RAM CACHE> - OFF
 - k. Select <PORTABLE> from <CONTROL PANEL> icon list on left side of window using arrows
 - l. Set <HARD DISK> automatic sleep to 30 min by dragging indicator
 - m. Adjust <SCREEN BRIGHTNESS> as needed by dragging indicator up or down
 - n. Hold down <OPTION> key and click on text <MINUTES UNTIL AUTOMATIC SLEEP>
 - o. Select the <DON'T REST> radio button and click <OK>
 - p. If <STAY AWAKE WHEN PLUGGED IN> is not marked, click box to mark it. Click <OK> or press <RETURN>
 - q. Close <CONTROL PANEL> window by clicking small box in upper left-hand corner
 - r. Insert DTO 1208, spare disk into MAC Double-click diskette icon Double-click <DTO 1208 INSTALL> icon Click <INSTALL> Click <QUIT> Close <DTO 1208 INSTALL> window Eject diskette
 - s. Open (double-click) <MacSPOC> folder

Rename Spare Diskette
Click once on diskette icon
Press <delete> key
Type "DTO 1208 Update"

- t. Open (double-click) <MacSPOC+> application
- u. Update fields for <EDIT LIFTOFF GMT> and <EDIT M50 STATE VECTOR>
- v. Click <CHECK SV...>
Click <SAVE>
Click <GO>
- w. Pull down <FILE> menu and select <QUIT>
- x. ✓<MacSPOC.cp> document in <MacSPOC> folder
If file not there, go to step t

2. SOFTWARE STARTUP

NOTE

All key sequences should be entered in sequence by pressing and holding each key down.

If necessary to abort task at any time, press <OPTION> - <APPLE> - <5> at the same time.

If necessary to suspend task at any time, press <CONTROL> - <ESCAPE>.
To resume, press <OPTION> - <ESCAPE>

- a. Notify ground that session is beginning
- b. Depress any key for > 0.5 sec; wait for boot sequence completion
- c. ✓<TIME> and <DATE> fields for SPEC 2 GMT values
If incorrect, go to INITIAL POWERUP and perform procedures (e-q)
- d. Reboot portable by pressing <APPLE>-<F>
- e. Open (double click) <DT0-1208, CURSOR EVAL> folder
- f. Open (double click) <CURSOR EVAL> icon
- g. Pause until screen setup complete (do not touch cursor control device)
- h. If prompted, press <OPTION>-<9> when ready to begin
If prompted, reboot portable by pressing <APPLE>-<F>

3. SETUP SOFTWARE

a. Plug in appropriate device

Session	ADAMSON		LOW		LUCID*	
	1st Dev	2nd Dev	1st Dev	2nd Dev	1st Dev	2nd Dev
1	B	D	C	A	A	D
2	A	C	D	B	B	C
3	D	A	B	C	D	B
4	C	B	A	D	C	A

A - Built-in trackball
C - Thumbball

B - Optical mouse
D - Trackball (w/restraint)
* - only if time permits
Note: Dev stands for device

- b. Enter last name and hit <OK> or hit <RETURN>
- c. Enter device label as specified in onscreen control device assignment matrix (A,B,C,D) and hit <OK> or hit <RETURN>
- d. Device plugged in
- e. Enter <Y> for 'yes' or <N> for 'no' and hit <OK> or hit <RETURN>
- f. If using A (Built-in Trackball),
<SHIFT>-<OPTION>-<6>
If using B (Optical mouse),
<SHIFT>-<OPTION>-<9>
If using C (Thumbball),
<SHIFT>-<OPTION>-<6>
If using D (External Trackball),
<SHIFT>-<OPTION>-<6>
Pause for computer to set speed
- g. Click <NEXT> to start

4. TEXT SELECT TASK

NOTE

If error made during test,
click <SELECT> to repeat trial.

If inadvertent keystrokes corrupt
underlined field, click <SELECT>
and reselect underlined text

- a. Click <SELECT> and immediately highlight (Drag Select) underlined text, then click <NEXT>. Repeat until first 18 trials complete
- b. Press <CONTROL> - <5> to continue when prompted
- c. Click <NEXT> to continue
- d. Click <SELECT> and immediately highlight (Drag Select) underlined text, then click <NEXT>. Repeat until second 18 trials complete
- e. If first device then:
Press <APPLE>-<CONTROL>-<5> to continue when prompted
If desired, add notes by using <MOCKWRITE>
Press <APPLE>-<CONTROL>-<9>
Go back to step 3 (SETUP SOFTWARE)

If second device and if last session then:
Press <CONTROL>-<5>
Answer electronic questionnaire
Press <SHIFT>-<OPTION>-<1> to end task when prompted

If second device and if session 1 thru 3 then:
If desired, add notes by using <MOCKWRITE>
Press <SHIFT>-<OPTION>-<1> to end task when prompted

5. SAVE DATA

- a. Insert appropriately numbered session diskette (label side up)
- b. Double click floppy diskette icon
- c. Copy (Drag) <HYPERCARD (KEYS)> icon into your folder on floppy diskette
- d. Copy (Drag) named files (2) icons into your folder on floppy diskette
- e. Eject diskette by dragging floppy diskette icon to trash can icon
- f. Move (Drag) named icons (2) into folder named <DATA>
- g. Notify ground that session has been completed
- h. If not desired to PWRDN laptop, press <APPLE>-<L>
- i. If desired to PWRDN laptop - <SHUT DOWN> in <SPECIAL> icon on menu bar

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|

MAC MODEM

MAC MODEM..... FS 7-3 |
MODEM HALF..... FS 7-6 |

**MAC
MODEM**

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**MAC
MODEM**

FS 7-2

ORB OPS/43/FIN

MAC MODEM

1. MAC DATA XFR SETUP

Unstow:

Macintosh

Mac pwr cable assy

Mac modem cable

R6 R COMM PWR - OFF
✓Macintosh PWR - OFF
✓AC UTIL PWR - OFF

A15 Connect Mac pwr cable assy from Macintosh
to AC UTIL PWR outlet

Connect Mac modem cable to Macintosh

Connect PADM audio cable from Mac modem
cable to R COMM outlet

09 R AUD A/G 1 - OFF
A/G 2 - T/R
A/A - OFF
ICOM (two) - OFF
VOL A/G 2 tw - 0
XMIT/ICOM MODE - PTT/PTT

L9 PS AUD A/G 2 - OFF
05 L AUD A/G 2 - OFF

R10 MS AUD A/G 2 - OFF

MO42F MIDDECK SPKR AUD A/G 2 - OFF

R6 R COMM PWR - ON
AC UTIL PWR - ON
Macintosh PWR - ON

Open (double click) <APPLELINK> icon
On MCC GO, continue

Note system clock time on <CONTROL PANEL>
____:____:____

Enter password: ANYSEES
(Do not press return)

Click <CONNECT LATER>
Select <GET UNREAD ITEMS AND SAVE THEM>
Click <SELECT FOLDER>

✓<NEW MAIL> folder open (in box below
<SELECT THE FOLDER TO HOLD THE
RECEIVED ITEMS>)

If <NEW MAIL> folder not open:
Position cursor arrow on folder
identifier box
Hold down trackball bar
Select <Macintosh HD> from list
Double-click <NEW MAIL>

Click <OK>

Set <CONNECT TO THE NETWORK AT> time to
approx 1 or 2 min past estimated current
system clock time

Click <BEGIN CONNECTION>

NOTE

File transfers are complete when
"Disconnecting from the Applelink
Network" momentarily appears and
Applelink services window disappears

When file transfers complete, continue

*OK - will copy data to 1
NASA/SIS
2010
2010
FS 7-4*

FS 7-4

ORB OPS/43/FIN 1

2. MAC DATA XFR POWERDOWN

If desired (at any time):

Uplinked files may be opened using
Applelink

WristMac files moved to <WristMac>
folder

MacSPOC files moved to <MacSPOC> folder

Enter <COMMAND-Q> to quit Applelink

If required, shut down Mac,
pull down <SPECIAL> menu, select
<SHUTDOWN>

R6

R COMM PWR - OFF

Unplug and recap PADM audio cable

Reconfigure Audio System

09

R AUD A/G 1 - T/R
A/G 2 - RCV
A/A - T/R
ICOM (two) - T/R
VOL A/G 2 tw - as reqd
XMIT/ICOM MODE - PTT/VOX

L9

PS AUD A/G 2 - RCV

05

L AUD A/G 2 - RCV

R10

MS AUD A/G 2 - RCV

MO42F

MIDDECK SPKR AUD A/G 2 - RCV

MAC MODEM MALF

If Mac does not start up:

✓Mac power cable connected securely to
AC UTIL PWR outlet

✓AC UTIL PWR - ON

Depress tabs on rear of Mac and remove
cover

✓Internal battery and fuse properly
installed

Replace cover

If operating normally:

Reset clock to "SPEC 2 GMT"

Return to normal operations

If still does not start, ✓MCC

If no response to keystrokes or clicks:

Push back locking sw (left side of
computer)

Press button of left side of computer
nearest locking sw (the Mac will
restart)

If operating normally, return to normal
operations. If not: ✓MCC