

Orbit Operations Checklist

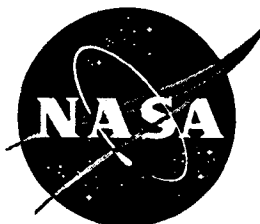
STS-89 Flight Supplement

**Mission Operations Directorate
Operations Division**

**Final
December 1, 1997**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



ORBIT OPS CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
BPSMU CONFIG		
(Front)	FS CC 9-3	ORB OPS-23a/ 89/O/A
(Back)	FS CC 9-3	ORB OPS-23b/ 89/O/A
MD (MO42F/MO39M)		
(Front)	FS CC 9-4	ORB OPS-24a/ 89/O/A
(Back)	FS CC 9-4	ORB OPS-24b/ 89/O/A
SHAB AUDIO (Front)	FS CC 9-5	ORB OPS-25a/ 89/O/A
(Back)	FS CC 9-5	ORB OPS-25b/ 89/O/A
CDR (O5/L5) (Front)	FS CC 9-6	ORB OPS-26a/ 89/O/A
(Back)	FS CC 9-6	ORB OPS-26b/ 89/O/A
PLT (O9/R6) (Front)	FS CC 9-7	ORB OPS-27a/ 89/O/A
(Back)	FS CC 9-7	ORB OPS-27b/ 89/O/A
MS (R10/A11) (Front)	FS CC 9-8	ORB OPS-28a/ 89/O/A
(Back)	FS CC 9-8	ORB OPS-28b/ 89/O/A
FLIGHT DAY 3 DOCKING ORBITER WITH SPACEHAB CO2 ABSORBER REPLACEMENT		
(Front)	FS CC 9-9	ORB OPS-29a/ 89/RCRS/B
LiOH CANISTER STOWAGE LOCATIONS		
(Back)	FS CC 9-10	ORB OPS-29b/ 89/RCRS/C

ORB OPS POC SOFTWARE

TITLE	VERSION	FLOPPY/HARD DRIVE
<u>(DOS ONLY)</u>		
Cshow	Generic	F
FMGR	Generic	F
GAS/BIA	2.1	H
GRiD SpOC	Generic	F
OCA Diagnostics	1.0	F
PCDecom	Generic	H
PKZIP	Generic	F/H
Prowrite	Generic	F
TEHM	3.0	H
TV Controller	Generic	H
<u>(WINDOWS '95 ONLY)</u>		
10.2 Depress	Generic	H
3D Orbiter	Generic	H
Acrobat Reader	Generic	H
BTS	1.0	H
Cabin Leak	Generic	H
Calculator	Generic	H
CG Manager	Generic	H
Character Map	Generic	H
Clipboard Viewer	Generic	H
Control Panel	Generic	H
Deorbit	Generic	H
Earth Kam	3.3	H
EDU-MR	1.0	H
ESC	Generic	H
Excel	Generic	H
Explorer	Generic	H
Floppy Update	Generic	H
Fuel Cell Monitoring System	Generic	H
Hazmat	Generic	H
Hyper Terminal	Generic	H
Locker Stowage	Generic	H
Media Player	Generic	H
MET Clock	Generic	H
MET Server	Generic	H

TITLE	VERSION	FLOPPY/HARD DRIVE
MGM	2.06	F/H
NAV	Generic	H
NMI Detector	Generic	H
Notepad	Generic	H
OCA Audio	Generic	H
OCA KFX	Generic	H
OCA MFX	Generic	H
OCA Stats	Generic	H
Paint	Generic	H
Pan/Tilt	Generic	H
PCAnywhere32	Generic	H
PCMMU Server	Generic	H
PET Clock	Generic	H
PET Timer	Generic	H
Procomm Plus	Generic	H
Proshare	Generic	H
RPOP	Generic	H
Set GMT	Generic	H
Set Launch Time	Generic	H
Set State Vector	Generic	H
SLAMMD	1.0	F/H
Sound Recorder	Generic	H
Spacehab Subsystem	2.88	H
TCS	Generic	H
ThumbsPlus	Generic	H
Time Calculator	Generic	H
Windows	Generic	H
Winzip	Generic	H
Word	Generic	H
Word Pad	Generic	H
WorldMap	Generic	H

(DOS APPLICATIONS AVAILABLE UNDER WINDOWS '95)

GrafEditor	Generic	H
GrafTrak	Generic	H
ORCS	Generic	F/H
Stars	Generic	H

(FDF DOCUMENT FILES)

System Data (Photos)	Gen A,6	H
Malfunction	Gen D,2	H

ORB OPS POC SOFTWARE

TITLE	VERSION	FLOPPY/HARD DRIVE
<u>(DOS ONLY)</u>		
Cshow	Generic	F
FMGR	Generic	F
GAS/BIA	2.1	H
GRiD SpOC	Generic	F
OCA Diagnostics	1.0	F
PCDecom	Generic	H
PKZIP	Generic	F/H
Prowrite	Generic	F
TV Controller	Generic	H
<u>(FDF DOCUMENT FILES)</u>		
System Data (Photos)	Gen A,6	H
Malfunction	Gen D,2	H
<u>(WINDOWS '95 ONLY)</u>		
10.2 Depress	Generic	H
3D Orbiter	Generic	H
Acrobat Reader	Generic	H
Cabin Leak	Generic	H
Calculator	Generic	H
CG Manager	Generic	H
Character Map	Generic	H
Clipboard Viewer	Generic	H
Control Panel	Generic	H
Deorbit	Generic	H
Earth Kam	3.0	H
EDU-MR	1.0	H
ESC	Generic	H
Excel	Generic	H
Explorer	Generic	H
Floppy Update	Generic	H
Fuel Cell Monitoring		
System	Generic	H
Hazmat	Generic	H
Hyper Terminal	Generic	H
KIDSAT	3.0	H
Locker Stowage	Generic	H
Media Player	Generic	H

FS v

ORB OPS/89/FIN

TITLE	VERSION	FLOPPY/HARD DRIVE
MET Clock	Generic	H
MET Server	Generic	H
MGM	2.04	F/H
NAV	Generic	H
NMI Detector	Generic	H
Notepad	Generic	H
OCA Audio	Generic	H
OCA KFX	Generic	H
OCA MFX	Generic	H
OCA Stats	Generic	H
Paint	Generic	H
Pan/Tilt	Generic	H
PCAnywhere32	Generic	H
PCMMU Server	Generic	H
PET Clock	Generic	H
Procomm Plus	Generic	H
Proshare	Generic	H
RPOP	Generic	H
Set GMT	Generic	H
Set Launch Time	Generic	H
Set State Vector	Generic	H
SLAMMD	1.0	F/H
Sound Recorder	Generic	H
Spacehab Subsystem	2.88	H
TCS	Generic	H
ThumbsPlus	Generic	H
Time Calculator	Generic	H
Windows	Generic	H
Winzip	Generic	H
Word	Generic	H
Word Pad	Generic	H
WorldMap	Generic	H
<u>(DOS APPLICATIONS AVAILABLE UNDER WINDOWS '95)</u>		
BSTC-M	1.0	H
GrafEditor	Generic	H
GrafTrak	Generic	H
ORCS	Generic	F/H
Stars	Generic	H
TE-HM	3.0	H

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COMM/INST

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

COMM/
INST

FS 1-1

ORB OPS/89/FIN

COMM/
INST

LOAD PCMMU FORMAT

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 second ID
5. If LOAD - FAIL and ERR MSG - 'I/O ERR
MMU 1(2)':
Go to 5.2a, 'I/O ERR MMU 1(2)
(MAL, DPS) >>
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'
C3 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.
G1,BFS	ASCENT/ENTRY – SPACEHAB/TEHM	102/166	756
G2,G8,S2	ORBIT/ORBIT BURN/FCS C/O	103/161	–
G2,S2	SPACEHAB – FULL RATE/ TEHM/TCS (PRIME)	103/185	761
G2,S2	SPACEHAB – FULL RATE/ TEHM/TCS (B/U)	103/206	768
G2,S2	SPACEHAB – LOW RATE/ TEHM/TCS (PRIME)	103/184	760
G2,S2	SPACEHAB – LOW RATE/ TEHM/TCS (B/U)	103/205	767
G2,S2	SPACEHAB – RECONSTRUCTED (PRIME)	103/192	763
G2,S2	SPACEHAB – RECONSTRUCTED (B/U)	103/211	770
G2,S2,OPS0	OPS 0	–/163	–
G2,S2,P9	MMU C/O	–/163	–
G3,G9,S2	LOSS OF 2 GNC GPCs	–/172	–
GNC,BFS	–	102/FXD	–

NOTE

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

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 and ERR MSG - 'I/O ERR MMU 1(2)':
 - Go to 5.2a, 'I/O ERR MMU 1(2)' (MAL, DPS) >>
4. If LOAD - FAIL and first load attempt:
 - Repeat step 1
5. If LOAD - FAIL and subsequent load attempt:

NOTE

Power cycling PDI will cause PDI to lose DFLs previously loaded

A1L

- ✓MCC
 - PL DATA INTLVR PWR - OFF,ON
 - ✓ERR MSG - 'S62 BCE BYP PL'
 - ✓'S62 BCE BYP PDI'
- PDI:
I/O RESET - ITEM 8 EXEC (*)
Repeat step 1 for all of config (XXX)
6. PCM:
 - I/O RESET PCM - ITEM 5 EXEC (*)

Cont next page

CONFIG	DECOM	FMT	INPUT	USE
756 ASC/ENT	1 2 3 4 5-FPM	06 01 16 - 503	3 4 3 - -	SHAB-DM * TEHM * SHAB-DM * - H-H-H **
TFL 166				
760 SHAB/TEHM/TCS LOW RATE	1 2 3 4 5-FPM	08 01 09 - 502	3 4 2 - -	SHAB-DM * TEHM * TCS2 * - H-H-H ***
(PRIME) TFL 184				
767 SHAB/TEHM/TCS LOW RATE	1 2 3 4 5-FPM	19 - 18 11 505	2 - 3 4 -	TCS2 * - SHAB-DM * TEHM * H-H-H ***
(BACKUP) TFL 205				
761 SHAB/TEHM/TCS FULL RATE	1 2 3 4 5-FPM	04 - 09 11 501	3 - 2 4 -	SHAB-DM * - TCS2 * TEHM * L-H-H ***
(PRIME) TFL 185				
768 SHAB/TEHM/TCS FULL RATE	1 2 3 4 5-FPM	19 01 14 - 504	2 4 3 - -	TCS2 * TEHM * SHAB-DM * - L-H-H ***
(BACKUP) TFL 206				
763 SHAB RECONSTRUCTED	1 2 3 4 5-FPM	- 05 - - 506	- 3 - - -	- SHAB-DM * - - H-H-H ***
(PRIME) TFL 192				
770 SHAB RECONSTRUCTED	1 2 3 4 5-FPM	- - - 15 507	- - - 3 -	- - - SHAB-DM * H-H-H ***
(BACKUP) TFL 211				

* Denotes Downlinked Format

** OI-GNC-BFS, Orbiter Downlist Data Rates (High or Low)

*** OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)

PTG

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

PTG

PTG

STAR PAIRS PAD									
		ATT SET 1				ATT SET 2			
PAIR	ANG SEP	DUAL S TRK		SINGLE S TRK		DUAL S TRK		SINGLE S TRK	
				-Z	-Y			-Z	-Y
A	90.6	-Y:38 R+ 102 -Z:21 P+ 223 Y+ 340	R+ 11 P+ 216 Y+ 326	-Y:21 P+ 208 Y+ 347	R+ 187	-Y:21 R+ 174 -Z:38 P+ 31 Y+ 34	R+ 80 P+ 43 Y+ 24	-Y:38 P+ 20 Y+ 23	
B	87.8	-Y:14 R+ 336 -Z:19 P+ 61 Y+ 316	R+ 243 P+ 52 Y+ 329	-Y:19 P+ 77 Y+ 324	R+ 73	-Y:19 R+ 299 -Z:14 P+ 234 Y+ 27	R+ 212 P+ 236 Y+ 42	R+ 19 P+ 250 Y+ 24	
C	84.9	-Y:54 R+ 85 -Z:34 P+ 294 Y+ 79	R+ 21 P+ 272 Y+ 66	-Y:34 P+ 210 Y+ 79	R+ 253	-Y:34 R+ 155 -Z:54 P+ 82 Y+ 296	R+ 98 P+ 112 Y+ 286	R+ 209 P+ 47 Y+ 293	

PAIR	COAS ALIGN	ANG SEP	COAS ALIGN
	ATTITUDE 1		ATTITUDE 2
C O A S	+X COAS	21 R+ 20 P+ 193 Y+ 65	18 R+ 302 P+ 281 Y+ 43
	-Z COAS	21 R+ 113 P+ 301 Y+ 8	18 R+ 120 P+ 324 Y+ 322

SINGLE S TRK MIN MNVR OPT
TGT ID = 11-110 NAV STAR #
BODY VECTOR = 5

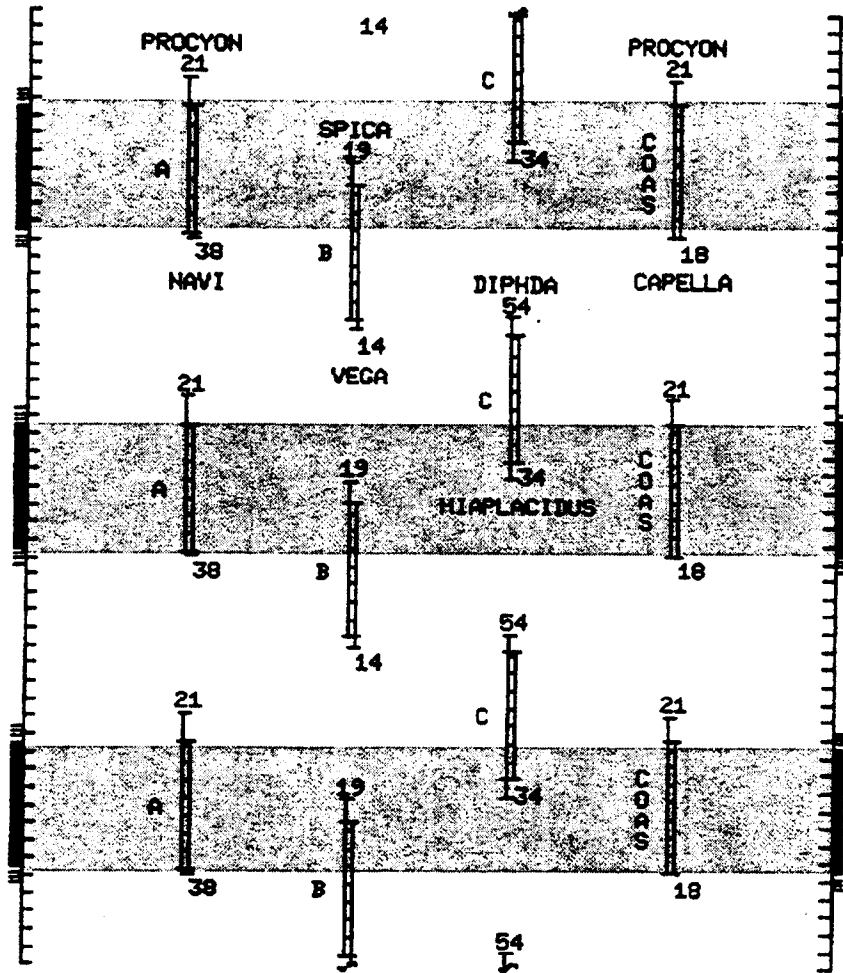
	-Z S TRK	-Y S TRK
P	87.7	0
Y	358	280.6

MET Applicable: 00/00:00 - 09/00:00
Date L/O: 01/15/98
GMT L/O: 015/06:02:50

FS 2-2

ORB OPS/89/FIN

STAR PAIRS



MET Applicable: 00/00:00 - 09/00:00
 Date L/O: 01/15/98
 GMT L/O: 015/06:02:50

DEORBIT IMU STAR PADS

IMU STAR ALIGN PAD

ID -Y: 37, ALPHERATZ
(TIG -03:14 to -02:20)
-Z: 39, ALHENA
(TIG -03:01 to -02:15)
ANG DIFF: 88.3

DUAL S TRKR 2nd ATTITUDE
ALIGNMENT (SINGLE S TRKR)

R	95	-Z: 37	-Y: 39
P	253	5	179
Y	344	244	240
		331	352

IMU VERIFICATION STAR ALIGN PAD

ID -Y: 49, KOCHAB
(TIG -02:49 to -01:59)
-Z: 21, PROCYON
(TIG -03:00 to -02:14)
ANG DIFF: 89.8

DUAL S TRKR 2nd ATTITUDE
ALIGNMENT (SINGLE S TRKR)

R	84	-Z: 49	-Y: 21
P	176	351	168
Y	338	164	164
		327	349

OCA

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OCA

OCA SETUP

OCA

1. Unstow:
 - PGSC/Expansion Tray with OCA card
 - If not pre-routed, OCA cable
 - If not pre-routed, PGSC Modem cable
 - Headset (if reqd)
 - Mini-cam (if reqd)
- PGSC 2. ✓ PGSC Setup complete, PGSC ACT Thinkpad
w/Expansion Chassis, steps 1-6 (PGSC)
- MO52J ✓ DC UTIL PWR - OFF
✓ Expansion Chassis pwr - off
3. Config cables per OCA CABLE DIAGRAM
If VIDEO TELECON, config cables per VIDEO
TELECON CABLE DIAGRAM, FS 3-12
- SSP1 4. Config for KU-Band file xfer
cb PDIP PWR 2/KU BAND RLY - cl
✓ MCC for HDR(LDR)
- PDIP Ku BAND RATE - HI(LO)
- MO52J 5. DC UTIL PWR - ON
PGSC Expansion Chassis pwr - on
PGSC pwr - on
6. At Startup Menu, sel appropriate Expansion
Chassis config

NOTE

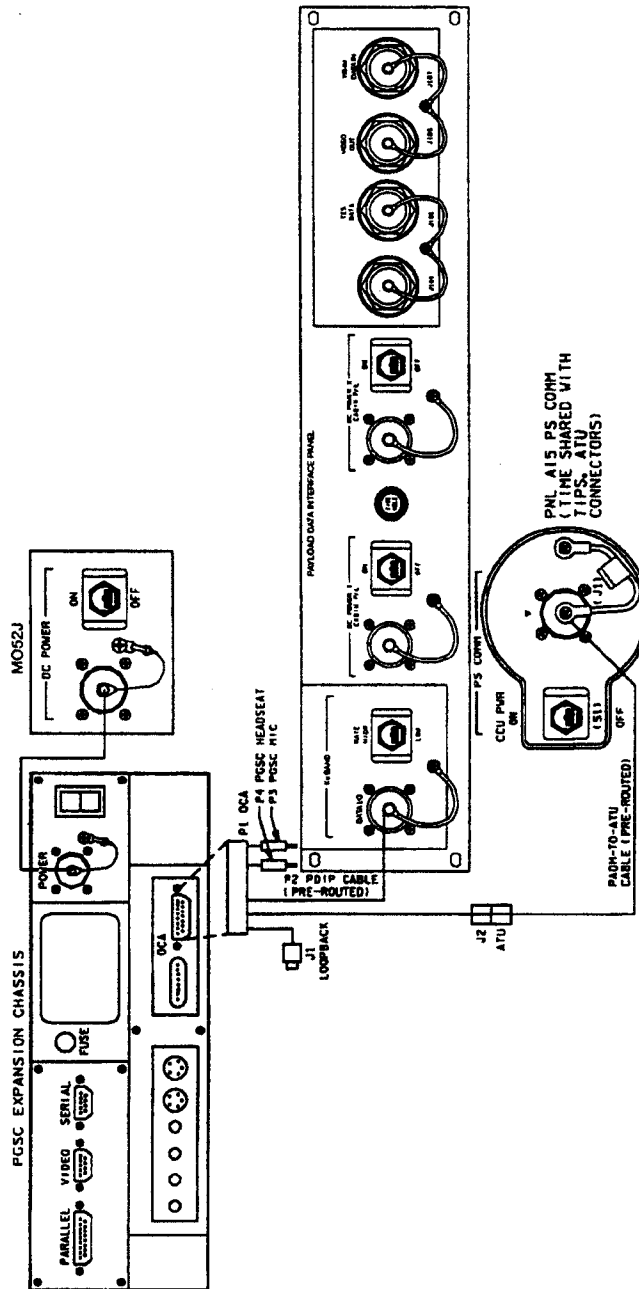
KFX software will be initiated upon
bootup for PGSCs with OCA card
installed

- ✓ 'KFX' icon Mini-Window appears
- ✓ TDRSS LINK STATUS display appears, then:
- ✓ OCA-ORBITER SEND - 4(2) M

- * If SEND rate out of config: *
- * Sel OPTIONS *
- * Sel DOWNLINK RATE 4(2) Mbps, *
- * as reqd *

7. Notify MCC when complete

OCA CABLE DIAGRAM (KU-BAND OR A/G 2)



480368601-PHL.2

OCA DOWNLINK

1. MOVE FILE(S) TO DOWNLINK DIRECTORIES

NOTE

Files will be dnlined via ground cmd,
unless MCC instructs otherwise

See OCA DIRECTORY STRUCTURE, FS 3-5
See OCA FILENAMES for file naming convention
Copy(Move) desired files to
c:\oca-down\mail(payloads)
Notify MCC when complete

2. MONITOR KFX DOWNLINK (if desired)

When link established:

From TDRSS LINK STATUS display:

- ✓UPDATE - flashing
- ✓UPLINK - green dot
- ✓DNLINK - green dot

If minimized, sel 'KFX' icon, then:

Press [ALT]/[M] for KFX Mini-Window

- ✓File Transfer Status

3. MONITOR MFX DOWNLINK (if desired)

If minimized:

- ✓Icon Title displaying File Name, Send/Receive Status

NOTE

For detailed file xfer information,
following steps must be completed
prior to file xfer initiation

Sel 'MFX' icon, then:

Sel File

- ✓Show Status During File Xfers - (✓)
- ✓Z MODEM(1K-X MODEM) display appears,
then:
- ✓Displaying File Name, Send/Receive Status

OCA DIRECTORY STRUCTURE

```
C:\
├── _OCA-DOWN
│   ├── _MAIL
│   └── _PAYLOADS *
├── _OCA-UP
│   ├── _ARCHIVE
│   ├── _MAIL
│   │   ├── _CDR
│   │   ├── _MS1
│   │   ├── _MS2
│   │   ├── _MS3
│   │   ├── _MS4
│   │   ├── _MS5
│   │   ├── _PLT
│   │   ├── _PS1
│   │   └── _PS2
│   ├── _NEWS
│   ├── _OTHER
│   ├── _PAYLOADS
│   └── _SPOC **
└── _OCA—SW (Ground Use Only)
```

* PAYLOADS Directory: Directory may contain flight specific subdirectory

** SpOC Directory: Directory will contain latest SpOC updates. To create SpOC update disk, copy all files in c:\oca-up\spoc to a:\uplink directory

OCA FILENAMES

UPLINKED FILES

LOCATION

SpOC updates:	a:\uplink\c:\oca-up\spoc\
World News:	c:\oca-up\news\
Ops notes:	c:\oca-up\other\
Graphics files:	c:\oca-up\other\
Uplinked personal mail:	c:\oca-up\mail\
Uplinked Payload files:	c:\oca-up\payloads\

DOWNLINKED FILES

LOCATION

Personal mail, other:	c:\oca-down\mail\
P/L files:	c:\oca-down\payloads\

STD FILENAMES

filename.doc	WORD documents only
filename.txt	ASCII text file (NOTEPAD or WORD)
filename.bmp	Graphics file (Paint)
filename.pcx	Graphics file (Paint)
famcdr01.doc	family mail: CDR -> family on FD01
cdrfam02.doc	family mail: family -> CDR on FD02
fltcd02.doc	message: CDR -> FLT Director on FD02
plx_06.doc	message: to Payload X on FD06

NOTE

Do not downlink medical data. Downlink directories will be cleared of all files at end of each OCA session. To retain archive copy of downlink msgs, save in personal directory

OCA DEACT

- PGSC 1. Exit OCA applications
- 2. Shut down Windows
- 3. PGSC pwr – off
Expansion Chassis pwr – off
- MO52J 4. DC UTIL PWR – OFF
- PGSC 5. Disconnect data cables
If reqd, disconnect pwr cables
- 6. Stow:
 - OCA cable
 - PGSC Modem cable
 - PGSC/Expansion Chassis as reqd
 - PGSC pwr cables as reqd
 - Headset (as reqd)
 - Mini-cam (as reqd)

OCA KU-BAND (KFX) MANUAL ACTIVATION

- PGSC 1. ESTABLISH LINK
PDIP ✓OCA cable connected to DIGI CAM DATA outlet
 ✓MCC for HDR(LDR)
 Ku BAND RATE – HI(LO)
- PGSC 2. SET S/W TRANSMIT RATE
 Sel 'Shuttle Apps' icon
 Sel OCA program group
 Sel 'OCA Stats' icon
 ✓TDRSS LINK STATUS display appears, then:
 ✓UPDATE – flashing
- From TDRSS LINK STATUS display:
 Sel OPTIONS
 Sel DOWNLINK RATE 4(2) Mbps (HDR(LDR))
 ✓SEND – 4(2) M
3. ACTIVATE FILE XFER S/W

NOTE

KFX takes ~5 to 10 sec to initiate

From OCA program group, sel 'KFX'

Arrange KFX window as reqd:

If KFX Mini-Window, press [ALT]/[M]

If KFX window always on top, press [ALT]/[T]

OCA KU-BAND (KFX) MANUAL DOWNLINK

1. CONFIGURE S/W FOR FILE DOWNLINK

NOTE

This status will match TDRSS
LINK STATUS display

✓KFX maximized to OCA KU-BAND FILE XFER
(KFX) display, then:

- * If KFX Mini-Window present, *
- * press [ALT]/[M] to maximize *

✓REMOTE KFX – green

✓UPLINK – flashing green dot

✓DNLINK – flashing green dot

✓DOWNLINK FILE(S) button – enabled (bold text)

- * If DOWNLINK FILE(S) button *
- * disabled (text grayed out): *
- * Sel OPTIONS, then: *
- * Sel SETUP, then: *
- * Sel USER TRANSMIT – *
- * enabled (IX) *
- * Sel SAVE *
- * ✓DOWNLINK FILE(S) button – *
- * enabled (bold text) *

2. SELECT FILE(S) TO DOWNLINK

Use EXPLORER to sel files/directories to transfer

Drag files over KFX window

Rel mouse button

✓KFX FILE TRANSFER PREVIEW display appears,
then:

✓Files located in FROM THE FLIGHT PGSC listbox

Cont next page

3. ADD ADDITIONAL FILE FOR DOWNLINK
 - ✓KFX FILE TRANSFER PREVIEW display active, then:
 - Sel SEL SEL EC T FILE(S)
 - ✓LOCAL VOLUME display appears, then:
 - Sel desired file from file listbox
 - Sel ADD
 - Repeat for each additional file as reqd
 - Sel DONE
4. REMOVE FILE FROM DOWNLINK
 - ✓KFX FILE TRANSFER PREVIEW display active, then:
 - Sel desired file(s) in FROM THE FLIGHT PGSC listbox
 - Sel DESELECT FILE(S)
5. START FILE DOWNLINK

NOTE

User may halt transfer while in progress
by sel ABORT

- ✓KFX FILE TRANSFER PREVIEW display active, then:
 - Sel START DOWNLINK
- ✓FILE TRANSFER STATUS display appears, then:
- ✓Displaying xfer status

OCA S-BAND MODEM (MFX) MANUAL ACTIVATION

1. ESTABLISH LINK

On MCC GO:

A15 PS COMM CCU PWR - OFF

L9 PS AUD PWR - 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

CAUTION

Loss of A/A (UHF) will occur if OCA cable connected to COMM OUTLET and A/A in T/R on ATU

O9 R AUD A/G 2 - OFF
O5 L AUD A/G 2 - OFF
R10 MS AUD A/G 2 - OFF
A13(OV102) OS AUD A/G 2 - OFF
MO42F MIDDECK SPKR AUD A/G 2 - OFF

If spacelab:

A1 AUD CTR SL A/G 2 - OFF

A15 ✓PGSC Modem cable conn to PS COMM outlet

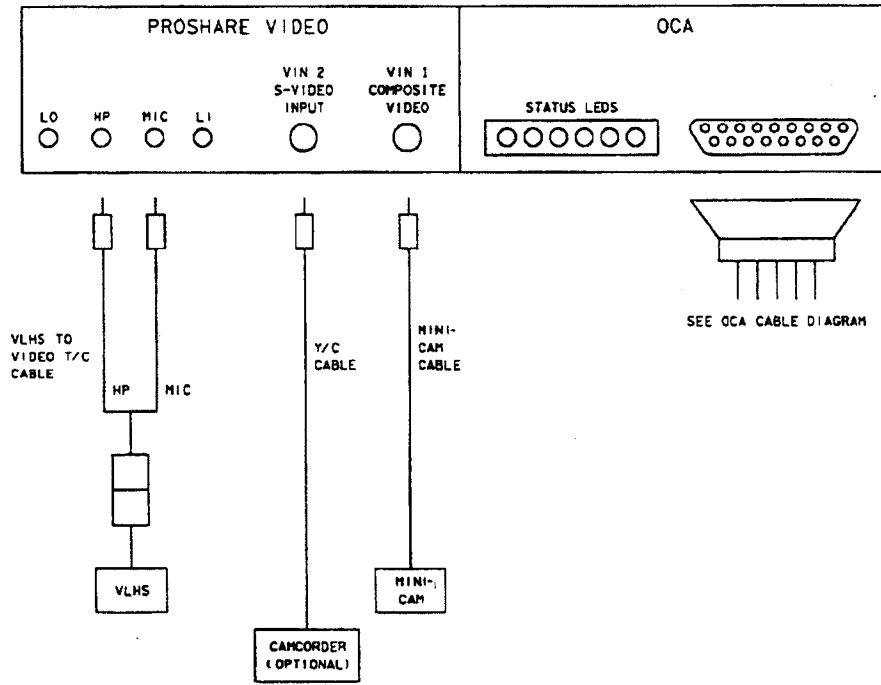
2. ACTIVATE FILE XFER S/W

NOTE

MFX takes ~5 to 10 sec to initiate

PGSC From OCA program group, sel 'MFX'
✓MFX display appears, then:
✓WINDOW - OFFLINE
Arrange MFX window as reqd

VIDEO TELECON CABLE DIAGRAM



480368106.P01

VIDEO TELECONFERENCING

1. Perform steps 1 thru 4 of OCA SETUP (w/Video T/C equip), FS 3-2
- PGSC 2. Sel 'Shuttle Apps' icon, then:
Sel 'OCA' icon
Sel 'OCA Proshare Video' icon

NOTE

Video T/C takes ~30 sec to start

3. ✓Video active in 'LOCAL' window
4. Adjust Thinkpad display tilt-angle, camera position, iris, focus so oper's face centered in 'LOCAL' video window
5. ✓Picture quality and position
 - * If picture quality poor: *
 - * From 'LOCAL' video window: *
 - * Sel 'Adjust Video' (slide bar icon) *
 - * Adjust picture quality as reqd *
 - * Sel 'Close' *
 - * If 'Save camera control settings?' *
 - * appears, sel 'Yes' button *
 - * *
 - * ✓'Zooms in' button (mag glass) in out *
 - * position *
6. TO RECEIVE CALL
Notify MCC ready to receive video teleconference call, wait for MCC to initiate
7. TO INITIATE CALL
Notify MCC ready to place video teleconference call, wait for MCC confirmation
Sel 'Dial List'
Sel 'MCC, PC'
Sel 'Dial'

Cont next page

NOTE

Title of remote video window changes to designate caller when video teleconference established

8. **CONDUCT VIDEO TELECONFERENCE**

NOTE

Video teleconference performance may be affected if other applications are active

- ✓ Remote video window active, audio active
- Move remote video window directly beneath camera. To move window separately from the handset, choose 'Split' button on handset
- Adjust audio volume using slide bar under remote video window

9. **TERMINATE VIDEO TELECONFERENCE**

NOTE

When video teleconference completed, either side can terminate call. If MCC has disconnect, 'Hang Up' button will change to 'Dial'

From Proshare Video handset:

- Sel 'Hang Up'
- Sel system menu (upper-left corner)
- Sel 'Exit' (Alt-Shift-F4)

OCA CHALKBOARD

1. Perform VIDEO TELECONFERENCING, steps 1 thru 6(7), then continue with step 2, below
2. TO RECEIVE CHALKBOARD SESSION
Notify MCC ready to receive chalkboard session, wait for MCC to initiate

PGSC

From Proshare Video handset, sel 'Split'
If 'LOCAL' video remains on screen, minimize 'LOCAL' video window

3. TO INITIATE CHALKBOARD SESSION
Notify MCC ready to initiate chalkboard session, wait for MCC confirmation

From Proshare Video handset:
Sel 'OCA CHALKBOARD'

'Do You Want to Share Notebook?' – left-click 'Yes'

Minimize all unused windows

4. TERMINATING CHALKBOARD SESSION

NOTE

When chalkboard session completed, either side can terminate session

From Proshare Personal Conferencing menu bar:
Sel 'Conference'
Sel 'UnShare Notebook' menu

If MCC has terminated session, sel 'OK' in 'The other participant closed the notebook'

From Proshare Personal Conferencing menu bar:
Sel 'File'
Sel 'Exit'

NOTE

Operator will be prompted to save chalkboard session in 'xxxx.mtg' file

APPLICATION SHARING

- PGSC
1. Launch desired application
 2. Perform OCA CHALKBOARD, steps 1 thru 3, then continue with step 3, below
 3. From Proshare Personal Conferencing menu bar:
Sel 'Application'
Sel 'Share Application View..'
 4. From 'Share Application View' dialog box:
Sel desired application
Sel 'OK'
 5. Perform application edits with MCC when application is shared

NOTE

Mouse operation, shared between MCC and flight operator, must be coordinated using teleconference audio

6. **TERMINATING APPLICATION SHARING**
Either side can terminate application sharing by exiting application

REMOTE PAN/TILT/ZOOM CONTROL OF GROUND CAMERA (KCA CAMERA CNTL)

NOTE

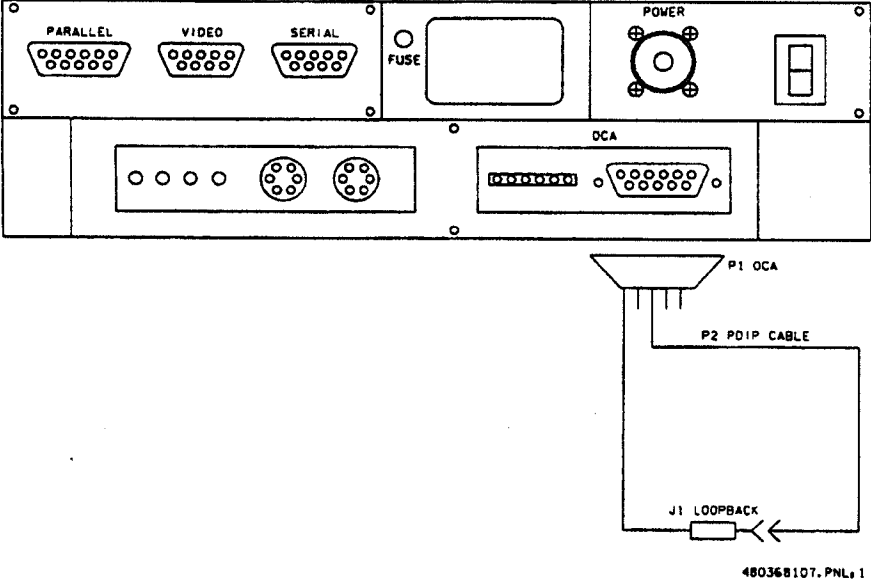
PAN/TILT control is only available if ground workstation involved in telecon has PAN/TILT, and ground PAN/TILT camera is running

1. Perform VIDEO TELECONFERENCING, steps 1 thru 6(7), then continue with step 2, below
- PGSC 2. Sel 'Shuttle Apps' icon, then:
Sel 'OCA' icon
Sel 'OCA Proshare Pan-Tilt' icon
3. Sel 'Help' in KCA Camera Control menu bar for instructions
4. When camera control ops complete, close KCA camera control application

OCA/PROSHARE CONFIG FOR CAMCORDER OPS

- PGSC 1. Sel 'Explorer' icon
2. Sel 'Psvideo' directory
3. Sel 'Pssystem.ini' file
4. In '[PSVideo/Capture]' section,
Change: 'Video Source = 0'
To: 'Video Source = 1'
5. Sel 'File'
Sel 'Save'
Sel 'File'
Sel 'Exit'
Exit 'Explorer' (if desired)

OCA CABLE DIAGRAM – LOOPBACK



OCA LOOPBACK TEST

- PGSC 1. INITIATE INTERNAL LOOPBACK TEST
Sel OCA program group
Sel 'OCA Stats' icon

From TDRSS LINK STATUS display:
Sel Options
Sel Internal Loopback

After 10 sec, ✓Status display:
Successful Test – Animated Signal moving
inside PC icon
Unsuccessful Test – 'Frowny Face' displayed
inside PC icon
Inform MCC of results

2. TERMINATE INTERNAL LOOPBACK TEST
From TDRSS LINK STATUS display:
Sel Options
Sel Internal Loopback

3. INITIATE EXTERNAL LOOPBACK TEST
Disconnect OCA cable from PDIP panel
Conn PDIP end of OCA cable to loopback port on
PGSC end of cable
See OCA CABLE DIAGRAM – LOOPBACK,
FS 3-18, for cable config

From TDRSS LINK STATUS display:
Sel Options
Sel External Loopback

After 10 sec, ✓Status display:
Successful Test – Animated Signal moving
outside PC icon
Unsuccessful Test – 'Frowny Face' displayed
inside PC icon
Inform MCC of results

4. TERMINATE EXTERNAL LOOPBACK TEST
From TDRSS LINK STATUS display:
Sel Options
Sel External Loopback

POST INSERTION PGSC SETUP

- L10 1. Unstow STS2 PCDecom PGSC
- 2. Unstow STS3 WorldMap PGSC
 Demate Thinkpad from chassis and place
 Thinkpad on Panel F1
 Stow chassis in locker
- PGSC 3. Connect PGSC DC power cables to STS2, STS3:
 From STS3 to pnl F1 port J3
 From STS2 to PDIP pnl port J2
- 4. Unstow RS232 cable from locker
 Connect RS232 to Com1 on STS2, STS3
- 5. Connect PCMMU cable to STS2
- 6. STS3 PGSC pwr – on
 At Startup Menu, select Configuration 2
 (RS422/PCMMU)
- 7. On STS3, activate WorldMap application
 Wait until screen displays Worldmap, then
 continue
- 8. STS2 PGSC pwr – on
 At Startup Menu, select Configuration 1
 (Undocked)
- 9. On STS2, activate PCDecom application
 Select 'RS422.pcd' configuration
- 10. Check for hex characters in display on STS2
- 11. On STS3, click on 'Update' in toolbar
 Select 'State Vector'
 Click 'PCMMU Feed on' to activate

RECUMBENT SEAT KIT (RSK) ATTACHMENT

RECUMBENT SEAT KIT (RSK) ATTACHMENT FS 4-2

RSK

FS 4-1

ORB OPS/89/FIN

RECUMBENT SEAT KIT (RSK) ATTACHMENT

NOTE

This procedure is used to install RSK-6.
Refer to figure 4-1 for assembly config

- | | | | |
|------------|-------------------------------|--|--|
| RSK | Middeck
Starboard
Floor | 1. Unstow:
Bushing (spare in IFM locker)
Headrest Cushion
Double-sided Hook Velcro | |
| | | 2. Reconfig light-weight seat(s):
✓Bushing on port-side seat back installed
Position seat pan to entry config
Replace headrest cushion with RSS cushion
and flap | |
| | | 3. Attach seat to seat rail, align slots, install pip pins
(four) | |
| | MF57K | 4. ✓Locker doors open, secure with Velcro, Trays
removed | |
| | | 5. Align seat rail with deck studs located on LiOH
door (S6) | |
| | | 6. Lock spherical deck stud latches (four) | |
| | | 7. ✓Seat rail secure | |
| | MO32M,
MO39M,
MHA | 8. Connect DC pwr cable, O2, comm cables | |
| | MO32M, | 9. Install lower back support cushion (orange
cushion), parachute, Lumbar Pad | |

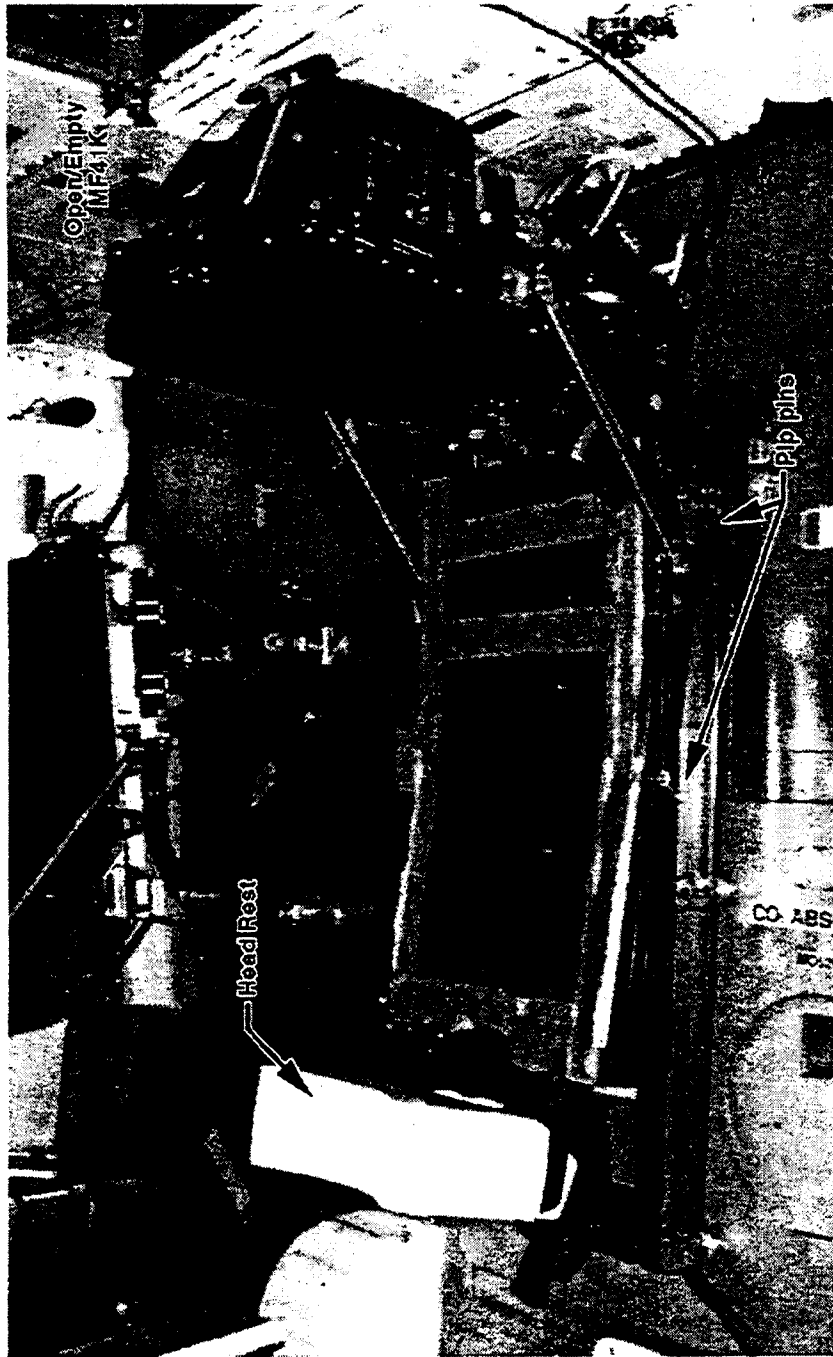


Figure 4-1-1.- RSK-6 fully assembled and installed with seat pan in entry position.

WC VENTING

WC VENTING FS 5-2

WC
VENTING

FS 5-1

ORB OPS/89/FIN

WC VENTING

OBJECTIVE: Provides method for venting of Contingency Water Containers (CWCs) to vacuum for removal of residual air

NOTE

MCC will TMBU SUPPLY H2O NOZ T A,B (two) LL to 100. Current SUPPLY H2O NOZ T A,B (two) UL is 250

INITIAL DUMPLINE PURGE

WCS Outboard Wall 1. Install SPLY H2O Dumpline Purge Device (ML60E) into CONT X-TIE POT QD

R11L 2. ✓ SPLY H2O DUMP ISOL VLV - CL (tb-CL)
SM 66 ENVIRONMENT

ML86B:A * If DMP LN T < 65, enable 2nd htr: *
* cb MNB(MNA) H2O LINE HTR *
* B(A) - cl *

R11L SPLY H2O DUMP VLV ENA/NOZ HTR - ON

CRT When SUPPLY H2O NOZ T A,B (two) exceed 100, continue

NOTE

Supply H2O Nozzle temps should not exceed 350 degF at any time, to avoid potential damage to TPS tiles

R11L SPLY H2O DUMP VLV - OP (tb-OP), wait 4 min
- CL (tb-CL), wait 60 sec
- OP (tb-OP), wait 60 sec
- CL (tb-CL)

SPLY H2O DUMP VLV ENA/NOZ HTR - OFF
(✓tb-bp)

WC
VENTING

- WCS 3. Remove SPLY H2O Dumpline Purge Device from
Outboard CONT X-TIE POT QD
Wall Stow in ML60E

CWC VENTING

NOTE

For stowage locations of CWCs, related hardware reqd in procedure below, see SHUTTLE/MIR H2O CONTAINER FILL (MIR/SHUTTLE JOINT OPS, GEN NON-JOINT) unless otherwise specified

- WCS 4. Connect Y/R QD Adapter (retrieve from MA12B
Outboard Window Shade Bag) to CONT X-TIE POT QD
Wall
5. Connect Galley Tee Adapter with R/Y hose and EDV QD Adapter attached (SPACEHAB AC08) to free-end of Y/R QD Adapter, using ¼-in male connector on run of galley tee
Disconnect EDV QD Adapter from free-end of R/Y hose, temp stow (will be needed for water transfer procedure)
6. Attach CWC to free-end of R/Y hose

NOTE

Have one crewmember hold CWC flat on flat surface, while another crewmember works air pockets toward CWC outlet

- R11L 7. SPLY H2O DUMP VLV ENA/NOZ HTR - ON
- OP (tb-OP)

This step initiates venting of CWC
Perform for 1/2 to 2 min for each CWC

NOTE

Supply H2O Nozzle temps should not exceed 350 degF at any time, to avoid potential damage to TPS tiles

- CRT
R11L 8. If SUPPLY H2O NOZ T A,B (two) exceed 250,
 SPLY H2O DUMP VLV ENA/NOZ HTR – OFF
- CRT
R11L If SUPPLY H2O NOZ T A,B (two) then fall
 below 100:
 SPLY H2O DUMP VLV ENA/NOZ HTR – ON
- WCS
Outboard
Wall 9. When venting is complete, or if CWC begins to
 crumple, disconnect QD at CWC from R/Y hose
10. Remove CWC, temp stow until ready for water fill
 procedure
11. Repeat steps 6,8,9,10 for all desired CWCs
 When ALL CWCs have been evacuated,
 disconnect all hardware from CONT X-TIE
 POT QD and return all hoses and related
 equipment to original as-stowed config
 Temp stow until needed for water fill procedure
- R11L 12. SPLY H2O DUMP VLV ENA/NOZ HTR – ON
 (if still OFF from step 8 above)
 SPLY H2O DUMP VLV – CL (tb-CL)
 – ENA/NOZ HTR – OFF
 ✓tb – bp

NOTE

SPLY H2O Dump Isol vlv will be reopened on MCC call

GPS DEVELOPMENT FLIGHT TEST (DTO 700-14)

GPS CONFIG	FS 6-2
ACTIVATION	FS 6-3
HARD DISK SWAP	FS 6-5
DOWNLINK	FS 6-6
DEACTIVATION	FS 6-7
PARTIAL INITIALIZATION	FS 6-8
TOTAL INITIALIZATION	FS 6-9
INITIALIZATION ERROR MSG TABLE	FS 6-10
PGSC SCHEMATIC	FS 6-11

DTO
700-14

GPS CONFIG

1. ACTIVATION

A13 ✓GPS PWR - ON
 ✓PRE AMPL LC - MNA
 ✓UC - MNC

O14:D ✓cb MNA GPS PRE AMPL UC - op
 ✓LC - cl

O16:D ✓MNC GPS PRE AMPL UC - cl
 ✓LC - op

DTO
700-14

GPS ACTIVATION

SETUP

- MA75J 1. Connect GPS PL1 PGSC RS-422 cable (prerouted to MA16D) to LapTop MAGR port (old TAGS Volume - AV BAY 3B)
- PGSC 2. Connect GPS RS-422 cable to PL1 PGSC (J1) (GPS PGSC SCHEMATIC, FS 6-11)
- PGSC 3. ✓Expansion Chassis pwr - off
4. ✓PGSC Expansion Chassis airflow ports not obstructed
- PGSC 5. Expansion Chassis pwr - on
PGSC pwr - on

DATA COLLECTION

6. At DOS prompt, enter 'GPS', then:
At Intro display, sel 'CONTINUE'
- L10A1 7. First unstow RS-422 Y cable
8. Connect Rx Only leg of RS-422 Y cable to GPS PL1 PGSC COM3/RS-422 port and Source leg to PCDECOM PGSC COM2 port (see GPS PGSC SCHEMATIC, FS 6-11). Connect other end of Y cable (RX/TX) to DTO 700-15
9. ✓Screen for msgs
If msg, notify MCC
10. At Main Menu, press [F1]
11. ✓DATA DISPLAY (Data should be updating)
After at least one SV in State 5, press <CTRL R>
<ESC> <F1> (sets clock in PGSC)
12. ✓For data file recording
If recording, FLAGS block should contain:
a. 'Recording' - (✓)
b. ✓Filename below 'Recording'
c. ✓'ON' below filename
If not recording, press [F8] to toggle recording

Cont next page

13. Record approx MET ____:____:____
14. Call MCC (Report step 12, MET)

NOTE

Velocity RSS, FOM, time since 4 SV NAV, '4 at STATE 5' flags are located in DATA DISPLAY (F1). FOM and time since 4 SV NAV are located in WorldMap Display (F2)

15. Select Display F1 or F2
If FOM = 9, and Time since 4 SV NAV > 1 hr, or
if Velocity RSS > 8000 m/s, report to MCC

GPS HARD DISK SWAP

1. Go to DTO 700-15, HARD DRIVE SWAP

GPS DOWNLINK

NOTE

GPS Filenames are: GPSXXX.001 –
GPSXXX.999 where XXX is GMT day.

Files are located in C:\GPS subdirectory.

✓MCC for files to be downlinked.

When Recording Bit toggled OFF/ON, new
file is created

- PGSC
1. Exit GPS program:
Press [ESC]
Highlight EXIT using arrow keys,
press [ENTER]
 2. Insert OCA data disk into floppy drive
 3. From 'C:\GPS>' subdirectory, enter
"copy GPSXXX.XXX a:" to copy GPS data file to
floppy drive where GPS "XXX.XXX" is GPS data
file to be downlinked per MCC direction
 4. Remove disk from floppy drive
 5. Enter 'GPS' and press [F1] to resume data
collection
- OCA
PGSC
6. Insert OCA data disk into OCA PGSC floppy drive
Perform OCA DOWNLINK (OCA) to downlink
desired file(s)

GPS DEACTIVATION

1. Exit GPS program (press [ESC] twice)
- PGSC 2. Thinkpad pwr – off
Expansion Chassis pwr – off
- MO13Q 3. If DTO 700–15 PGSC PWR – OFF, then
DC UTIL PWR – OFF
If DTO 700–15 still powered, perform steps 5–7
4. Disconnect pwr cable to Expansion Chassis
5. Disconnect GPS RS–422 Y cable from GPS
Thinkpad
- PGSC 6. Disconnect GPS RS–422 cable from GPS
Expansion Chassis
- AV Bay 7. Disconnect GPS RS–422 cable from J64 Laptop
3B Computer I/F
8. Stow GPS equipment (Thinkpad with Expansion
Chassis, RS–422 cable)

GPS PARTIAL INITIALIZATION

- PGSC
1. At DATA DISPLAY(WorldMap), press [CTRL]/[R]
(Enters SELECT INITIALIZATION MODE display)
 2. Press [p] or [P] (Enters Partial RECEIVER INIT STATE VECTOR display)
 3. If status displays 'Unable to Refresh via PCDECOM' and if default STATE VECTOR > 2 hr old, update STATE VECTOR manually using SPEC 34

NOTE

Use arrow keys to mnvr between fields

4. Press [F10] (Initialize receiver)
5. Press [y] or [Y] (Performs partial initialization)
✓DATA DISPLAY returns after approx 20 sec
SATELLITES block status (SV, Stat, C/No)
should all momentarily = 0

NOTE

Satellite Acquisition may take up to 15 min

6. ✓Velocity RSS between 7000 and 8000 m/s
7. ✓SATELLITES block channels 1-4 Stat: 5
✓FLAGS block "4 at STATE 5": ✓
(Verifies successful satellite acquisition and navigation)
Report satellite acquisition and navigation status to MCC

GPS TOTAL INITIALIZATION

- GPSC
1. At DATA DISPLAY(WorldMap), press [CTRL]/[R]
(Enters SELECT INITIALIZATION MODE display)
 2. Press [t] or [T] (Enters SET PC TIME display)
 3. Enter current GMT time plus several sec
Arrow down to last line
Press [ENTER] on last line at exact time
specified in data entry screen (Enters
TOTAL RECEIVER INIT display)
 4. If status displays 'Unable to Refresh via
PCDECOM' and if default PVT > 2 hr old,
update PVT manually using SPEC 34

NOTE

Use arrow keys to mnvr between fields

5. Press [F10] (Initialize receiver)
6. Press [y] or [Y] (Performs total initialization)
✓DATA DISPLAY returns after approx 20 sec
✓ SATELLITES block statuses (SV, Stat, C/No)
should all momentarily = 0

NOTE

Satellite Acquisition may take up to 15 min

7. ✓Velocity RSS between 7000 and 8000 m/s
8. ✓GMT DATE/TIME updated
✓SATELLITES block channels 1-4 Stat: 5
✓FLAGS block '4 at STATE 5': ✓
(Verifies successful satellite acquisition and
navigation)
Report satellite acquisition and navigation status
to MCC

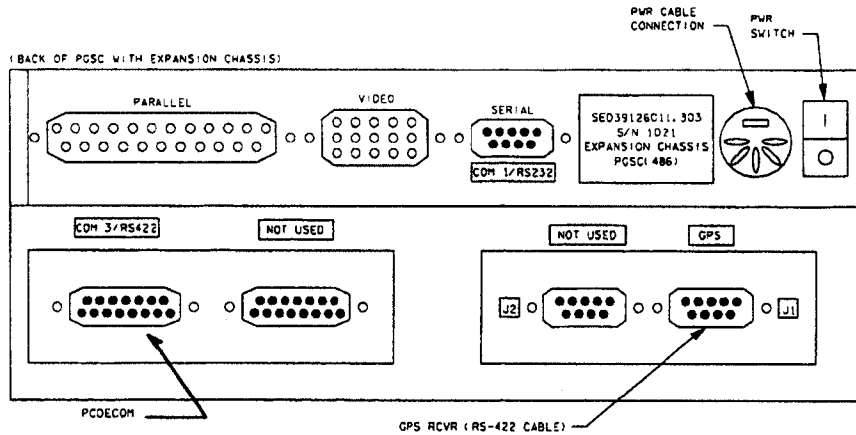
GPS INITIALIZATION ERROR MSG TABLE

MESSAGE	POSSIBLE CAUSE	ACTION
Response to block 10 command not received	RS-422 data line noise	Wait for system to recover automatically. If recovery does not occur within 3 min, reboot Thinkpad, restart GPS software, and perform initialization again
Error with GMT input	Time entered was zero	Perform initialization again with a non-zero GMT time input
Error in Px Py Pz input	All three position values entered were zero	Perform initialization again with non-zero position input in at least one axis

FS 6-10

ORB OPS/89/FIN

GPS PGSC SCHEMATIC



1. Connect GPS RS-422 cable to GPS Expansion Chassis
2. Connect Rx Only leg of RS-422 Y cable to GPS Thinkpad COM3/RS-422 port and Source leg to PCDECOM PGSC COM2 port

UNSTOW SIGI

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 5

- MA16D 1. Open locker door
2. ✓Temp strip rightmost three blocks black
- * If Temp strip, rightmost three blocks not *
 - * black: *
 - * ✓MCC *
- MO13Q * DC UTIL PWR – OFF *
- MA16D * Wait 10 min *
- MA16D * PGSC pwr – off * |
- * Expansion Chassis pwr – off *
- * ✓Temp strip rightmost three blocks black *
- MO13Q * DC UTIL PWR – ON *
- MA16D * Expansion Chassis pwr – on * |
- * PGSC pwr – on *
3. Remove PGSC foam assy
- SIGI 4. Open PGSC monitor
- PGSC ✓1553 Msgs successful counter incrementing
- * If 1553 Msgs unsuccessful *
 - * counter incrementing, ✓MCC *
5. Press [ALT]/[ESC]
- ✓‘C:\>’ appears on display
6. Enter ‘cflash’
- ✓15–20 total files copied from PCMCIA flash cards to drive C (internal hard drive)
7. PGSC pwr – off
- Expansion Chassis pwr – off
- MO13Q 8. DC UTIL PWR – OFF

DTO
700-15

- MA16D 9. Remove PGSC from bottom foam assy
- 10. Demate pwr and 1553 A&B connections
- 11. Remove cables from locker door openings

NOTE

The following steps require transitioning from single pwr cable to a prerouted Y-pwr cable. Connect Y-pwr cable to both DTO 700-14 and DTO 700-15 simultaneously

- MF28O 12. Unstow DTO 700-14 PGSC
- SIGI 13. Reconnect pwr and 1553 A&B connections
PGSC 1553 cable:
P1/A to 1553A
P2/B to 1553B
- 14. Connect Y-pwr cable to both DTO 700-14 and DTO 700-15:
Connect PL1 PGSC pwr to DTO 700-14 (PL1)
Connect PL2 PGSC pwr to DTO 700-15 (PL2) at MO13Q
Disconnect PGSC DC pwr cable
Connect PGSC DC pwr to Y-cable
- Foam 15. Unstow PCMCIA OCA/Entry Flash Cards (two)
Assy
- SIGI 16. Remove PCMCIA Ascent Flash Cards (two)
PGSC Stow PCMCIA Ascent Flash Cards (two) in foam assy
- 17. Insert PCMCIA OCA/Entry Flash 1 Card - drive D (top slot)
Insert PCMCIA OCA/Entry Flash 2 Card - drive E (bottom slot)
- MA16D 18. Stow foam assy in locker and close locker door
- MO13Q 19. DC UTIL PWR - ON

ON-ORBIT DATA COLLECTION INIT

- SIGI
PGSC
1. ✓ Expansion Chassis pwr – on
PGSC pwr – on
 2. ✓ 'C:\' appears on display
 - * If not, perform ON-ORBIT DATA *
 - * COLLECTION TERM *
 3. Enter 'orbit'
 - ✓ 1553 Msgs successful counter incrementing
 - * If 1553 Msgs unsuccessful counter *
 - * incrementing, ✓MCC *
 4. Toggle to Status Page by pressing [ALT]/[U]
 5. Begin data recording by pressing [ALT]/[R]
 - ✓ Record flag blinking
 - * If not blinking, repeat step 5 *
 6. At Status Page:
 - ✓ Parameter Values against WorldMap PGSC:
 - Time UTC/GMT within 5 sec
 - Latitude within 2°
 - Longitude within 2°
 - Altitude within 2 nm
 - GPS Status 4 satellites tracked
 - * If any parameter out of limits, *
 - * ✓MCC with value *
 7. Close PGSC monitor if desired

ON-ORBIT DATA COLLECTION TERM

- SIGI
PGSC
1. Terminate data recording by pressing [ALT]/[R]
 2. Exit data collection software by pressing [ALT]/[ESC]
 - ✓ 'C:\' appears on display

SIGI DATA DOWNLINK

- SIGI
PGSC
1. ✓ Expansion Chassis pwr – on
PGSC pwr – on
 2. ✓ PCMCIA OCA/Entry Flash Cards in PCMCIA slots
 3. ✓ 'C:\' appear on display
Enter 'dataxfer'

NOTE

Dataxfer copies up to 37 MB of data from the internal hard drive to each Flash Card and archives all data on PGSC hard drive

4. When 'C:\' appears on display (dataxfer complete), remove OCA/Entry Flash Cards (two) from PCMCIA slots
- OCA
PGSC
5. Insert OCA/Entry Flash 1 Card in top slot (drive D)
 6. Perform OCA DOWNLINK, step 1 (OCA)
 7. Remove OCA/Entry Flash 1 Card
Insert Flash 2 Card in top slot (drive D)
 8. Perform OCA DOWNLINK, step 1 (OCA)
 9. Remove OCA/Entry Flash 2 Card
 10. ✓ MCC Total number of files copied
- SIGI
PGSC
11. Insert PCMCIA OCA/Entry Flash 1 Card – drive D (top slot)
Insert PCMCIA OCA/Entry Flash 2 Card – drive E (bottom slot)

HARD DRIVE SWAP

- MF28O 1. Acquire spare DTO 700–14 540 MB hard drive
2. Temp stow
- SIGI PL2 3. Exit Orbit program ([ALT]/[ESC]) if running
PGSC
4. ✓PGSC pwr – off
✓Expansion Chassis pwr – off
- GPS PL1 5. Exit GPS program (press [ESC] twice) if running
PGSC
6. ✓PGSC pwr – off
✓Expansion Chassis pwr – off
- MO13Q 7. DC UTIL PWR – OFF
- GPS PL1 8. Demate Expansion Chassis pwr cable
PGSC
9. Open monitor
10. Pull keyboard release latches (same latches used to open monitor) forward until 'snap,' then lift keyboard up
11. Using blue tab, pull up handle on hard drive (hard drive is located in front, right-hand side)
12. Pull up and back on handle to remove hard drive
13. Stow hard drive removed in step 12
14. Place spare hard drive (from step 1) in PGSC, snap handle into place to secure
15. Pull keyboard release latches forward, close keyboard
16. Remate Expansion Chassis pwr cable
- MA16D 17. Acquire spare DTO 700–15 540 MB hard drive from foam assy, remove any packaging

18. Temp stow
- SIGI PL2 19. Demate Expansion Chassis pwr cable
PGSC
20. Open monitor
21. Pull keyboard release latches (same latches used to open monitor) forward until 'snap,' lift keyboard up
22. Using blue tabs, pull up handle on hard drive (hard drive is located in front, right-hand side)
23. Pull up and back on handle to remove hard drive
- MA16D 24. Stow hard drive removed in step 23 in foam assy and stow foam assy in locker
- SIGI PL2 25. Place spare hard drive (from step 17) in PGSC, PGSC snap handle into place to secure
26. Pull keyboard release latches forward, close keyboard
27. Remate Expansion Chassis pwr cable
- MO13Q 28. DC UTIL PWR – ON
- SIGI PL2 29. PGSC pwr – on
PGSC Expansion Chassis pwr – on
- GPS PL1 30. PGSC pwr – on
PGSC Expansion Chassis pwr – on

ATTITUDE RE-INIT

NOTE

If ATTITUDE RE-INIT performed within
30 min of ON-ORBIT DATA COLLECTION
TERM, steps 1-3 may be omitted

- SIGI
PGSC
1. Perform ON-ORBIT DATA COLLECTION INIT |
 2. Wait 5 min
 3. Perform ON-ORBIT DATA COLLECTION TERM
 4. PGSC pwr – off
Expansion Chassis pwr – off
 5. Expansion Chassis pwr – on
PGSC pwr – on
 6. ✓PCDECOM CONNECT completed
 7. ✓PCDecom program running
 - * If not running, perform PCDECOM OPS, *
 - * ACT (PGSC) *
 8. At 'c:\' prompt, enter "align" |
 - ✓Following appear on screen:
 - PCDecom Port Status – 'ENABLED' (green)
 - PCDecom Receive Status – 'SUCCESS'
(green)
 - * If PCDecom Receive Status – 'WAITING' *
 - * counter larger than 20, repeat step 6 *
 9. ✓'Attitude initialization successfully completed' or
'Attitude Initialization Not Necessary (< 1.0 deg
error)' appears on bottom of screen, followed by
'C:\' prompt |
Read down any other msgs to MCC |

* If not, wait 60 sec *
* Press [Q] *
* ✓MCC *

10. PGSC pwr – off
Expansion Chassis pwr – off

ENTRY-DATA COLLECTION

SIGI 1. ✓PGSC pwr – off
PGSC Expansion Chassis pwr – off

MO13Q 2. DC UTIL PWR – OFF

NOTE

Due to Y-pwr cable, DTO 700-14 pwr connection should be disconnected at this point

SIGI 3. Demate pwr, RS-422, and 1553 A&B
PGSC connectors

MA16F 4. Replace Y-pwr cable with single pwr cable |
Reroute pwr and 1553 cables through locker door

SIGI 5. Reconnect single pwr cable and 1553 A&B |
connections
PGSC 1553 cable: P1/A to 1553A
P2/B to 1553B

MO13Q 6. DC UTIL PWR – ON

SIGI 7. Expansion Chassis pwr – on
PGSC PGSC pwr – on

8. ✓'C:\' appears on display
✓Expansion Chassis fan running

9. ✓OCA/Entry Flash Cards (two) installed in
PCMCIA slots

MA16F 10. Unstow foam assy and carefully place PGSC in
foam
✓Cables routed through foam
✓PGSC connections secure

11. ✓'C:\' appears on display

12. Enter 'dflash' to erase data on PCMCIA Cards

13. Enter 'entry' to begin data acquisition
✓1553 Msgs successful counter incrementing

- * If 1553 Msgs unsuccessful counter *
- * incrementing, ✓MCC *

14. Toggle to Status Page by pressing [ALT]/[U]
✓Parameter Values against WorldMap PGSC:
Time UTC/GMT within 5 sec
Latitude within 2°
Longitude within 2°
Altitude within 2 nm
GPS status 4 satellites tracked

- * If any parameter out of limits, ✓MCC with *
- * value *

15. Close monitor

- MA16F 16. Stow foam assy (with PGSC inside) in locker
Close locker door
✓PGSC pwr, 1553 connections secure

COLDSTART (CONTINGENCY ONLY)

- A13 1. ✓INS PWR sw – off
2. Wait 30 sec
 ✓INS PWR sw – on
- SIGI 3. ✓'C:\' appears on display
- PGSC * If not, press [ALT]/[ESC] to exit program *
- MA16F 4. Enter 'orbit' to test 1553 communication
 ✓1553 Msgs successful counter incrementing
- * If 1553 Msgs unsuccessful counter *
 * incrementing, ✓MCC *
5. Press [ALT]/[EXC] to exit program
- SIGI 6. PGSC pwr – off
PGSC Expansion Chassis pwr – off
7. ✓'PCDECOM CONNECT' complete
8. ✓PCDECOM program running
- PGSC * If not running, perform PCDECOM OPS, *
 * ACT (PGSC) *
- SIGI 9. Expansion Chassis pwr – on
PGSC PGSC pwr – on
 ✓'C:\' appears on display
10. Enter 'cldstart'
 ✓Following appear on screen:
 PCDecom Port Status – 'ENABLED' (green)
 PCDecom Receive Status – 'SUCCESS'
 (green)
- * If PCDecom Receive Status – WAITING *
 * counter larger than 20, repeat step 7 *

11. Allow up to 90 sec for coldstart program to run

✓'Cold Start Trajectory Initialization Completed'
appears on bottom of screen, followed by 'C:\'
prompt

* If 'C:\' prompt does not appear after several *
* min, press [Q] *
* ✓MCC *

12. PGSC pwr – off
Expansion Chassis pwr – off

13. Go to ON-ORBIT DATA COLLECTION UNIT

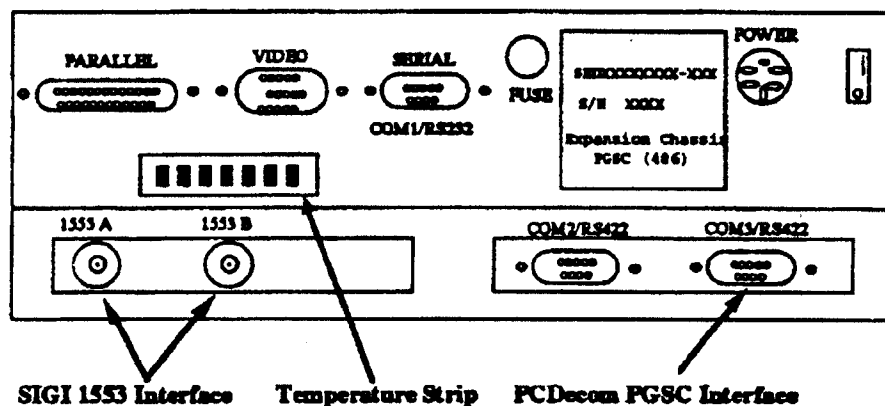
SOFTWARE UPDATE (CONTINGENCY ONLY)

- OCA
PGSC
1. Insert floppy disk in drive A
 2. Use Windows Explorer to copy all files from 'C:\payloads\gps-ins' folder to 'A:\'
 3. Remove floppy disk
- SIGI
PGSC
4. ✓ PGSC pwr – on
Expansion Chassis pwr – on
 5. ✓ 'C:\' appears on display

* If not, press [ALT][Esc] to exit program *
 6. Insert floppy disk in drive A
 7. Enter 'a:\update' to load new software
 8. When batch program is finished, remove floppy disk

SIGI SCHEMATIC

Back of SIGI PGSC Expansion Chassis



STAR LINE MANEUVER (SLM)

1. CONFIG

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

DAP: B

Change DAP A,B to A14,B2

GNC UNIV PTG

Load first attitude per table

DAP: B2/AUTO/ALT

Init MNVR ITEM 18 EXEC

When in attitude:

DAP: A/AUTO/VERN(ALT)

2. SLM DATA TAKES

Wait 1 min

C3

DAP: FREE

GNC 22 S TRKR/COAS CNTL

Clear Star Table - ITEM 20 EXEC

Acquire Star

SLM #1,2 STAR ID: 26

SLM #3,4 STAR ID: 13

Verify Star in table

Clear Star Table - ITEM 20 EXEC

Verify Star in table

If SLM #4 complete, go to step 3

Cont next page

Load next attitude:

GNC UNIV PTG

SLM #1	SLM #2	SLM #3	SLM #4
R = 196.6	R = 301.6	R = 91.7	R = 87.8
P = 116.4	P = 0.4	P = 223.9	P = 224.0
Y = 8.6	Y = 71.1	Y = 17.0	Y = 16.1

Init MNVR ITEM 18 EXEC
DAP: B/FREE/ALT
DAP: AUTO
When in attitude:
DAP: A/AUTO/VERN(ALT)
Repeat step 2

3. RECONFIG

Change DAP A,B to A6,B1

DAP: A/AUTO/ALT

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

GALLEY IODINE REMOVAL

GALLEY IODINE REMOVAL ASSEMBLY (GIRA)	
INSTALLATION	FS 8-2
GALLEY OVERNIGHT CONFIG	FS 8-5
MORNING CONFIG	FS 8-5
WATER SAMPLE.	FS 8-5
GIRA STOWAGE	FS 8-6

GIRA

GIRA

GALLEY IODINE REMOVAL ASSEMBLY (GIRA) INSTALLATION (Time: 1 hr)

EQUIPMENT PREPARATION

NOTE

IRC is Iodine Removal Cartridge (large cartridge).
IRA is Iodide Removal Assembly (small cartridge
with sampling tee)

Unstow the following from Middeck Port (Floor)
Bag Contingency Hose and Cable Kit (CHCK):

Loose MCV (microbial check valve)
Tee/R-Y hose assembly
IRC (large silver cartridge)
IRA (small silver cartridge)
"-2" hose adapter/Y-R QD/B-Y hose with two
Tees/microbe filter (silver taped cartridge)
assembly

NOTE

Have towel ready for possible release of water
when mating/demating any connections

INSTALLATION

- ML90N
1. Remove tie-wrap (if present) connecting Galley Ambient (uninsulated) and Chilled (insulated) hoses to structure
Detach Galley Ambient hose from Ambient QD at QD bracket
 2. Connect outlet end of MCV (refer to flow direction arrow) to Ambient QD at QD bracket
 3. Connect Galley Ambient hose to inlet end of MCV
 4. Connect female Tee-end of Tee/R-Y hose assembly to Chilled QD at QD bracket
Temporarily secure hose coil

Cont next page

FS 8-2

ORB OPS/89/FIN 1

5. Connect microbe filter end of B-Y hose/microbe filter assembly to Galley Chilled hose
6. Attach IRA (small cartridge) to “-2” hose adapter
7. Attach IRC (large cartridge) to IRA
(Do not connect R-Y hose to IRC yet)
8. Wrap and black Velcro/Gray Tape towel(s) as reqd around IRC, IRA, and microbe filter (helps prevent condensation)
9. Secure IRC/IRA assembly between MAR and galley, with IRC toward ceiling and B-Y hose connection toward floor
Secure microbe filter below galley, with B-Y hose connection forward (Reference figure 1)
Ensure access to locker MF140
10. Attach free end of R-Y hose (end opposite of tee) to IRC (upper end of IRC/IRA assembly)
Secure R-Y hose over top and forward of galley
(Reference figure 1)
11. Circulate water through galley:
Galley OVEN/RHS – OFF,ON

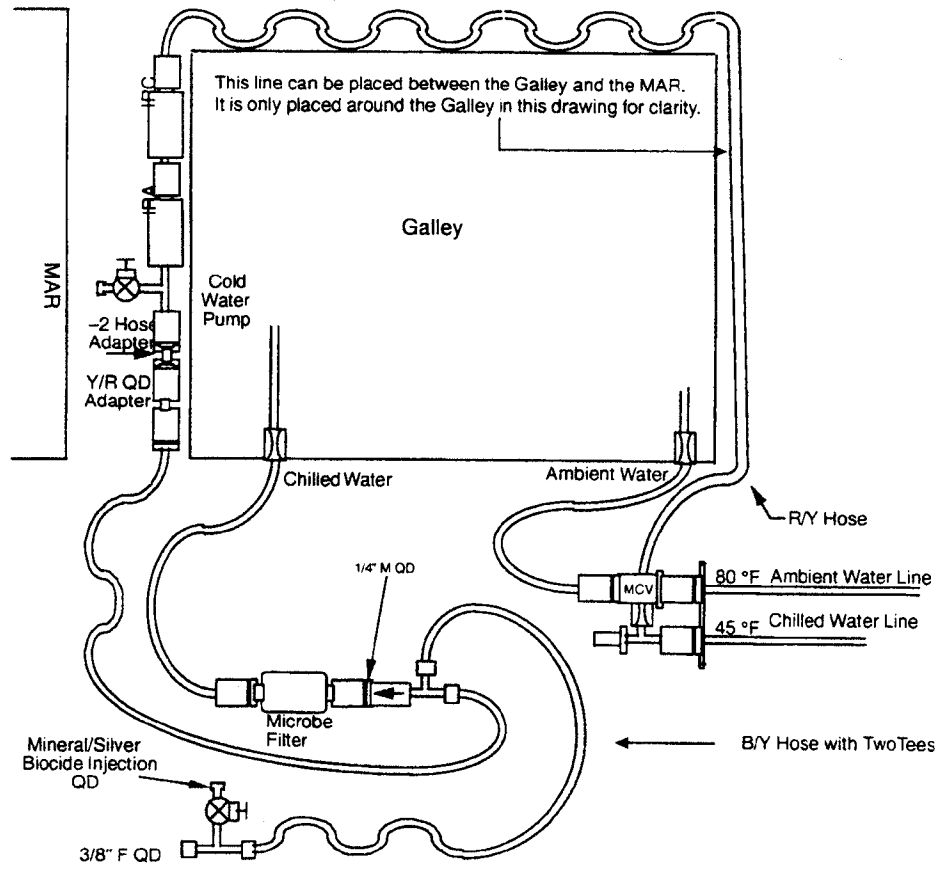


Figure 1.- GIRA configuration (connections and routing).

GALLEY OVERNIGHT CONFIG (Time: 5 min)

NOTE

Have towel ready for possible release of water when mating/demating any connections

- ML90N
1. Disconnect Galley Chilled line from microbe filter
 2. Connect Galley Chilled hose to free-end of Tee attached to Chilled QD at QD bracket
- Galley
3. Circulate water through galley:
OVEN/RHS – OFF,ON

GALLEY MORNING CONFIG (Time: 5 min)

NOTE

Have towel ready for possible release of water when mating/demating any connections

- ML90N
1. Disconnect Galley Chilled line from Tee attached to Chilled QD at QD bracket
 2. Connect Galley Chilled hose to microbe filter
- Galley
3. Circulate water through galley
OVEN/RHS – OFF,ON

GALLEY WATER SAMPLE (Time: 5 min)

- Middeck
Port
(Floor)
Bag
- Retrieve Galley sample bags
1. Fill one with 8 oz hot water
 2. Fill out label (circle hot, record MET)
 3. Fill one with 8 oz chilled water
 4. Fill out label (circle cold, record MET)
 5. Stow Sample Bags in empty fresh food locker

GIRA STOWAGE (Time: 15 min)

NOTE

Have towel ready for possible release of water when mating/demating any connections

- | | |
|-----------------------------------|---|
| MAR/
Galley | 1. Remove all black Velcro/Gray Tape from Chilled line assembly and hoses
Remove insulating towel(s) from Chilled line assembly |
| ML90N | 2. Detach Galley Chilled hose (insulated) from microbe filter
Disconnect Tee from QD bracket
Reconnect Galley Chilled hose to chilled QD at QD bracket |
| | 3. Breakdown Chilled line assembly into sub-assemblies as follows:
Between R-Y hose and IRC (large cartridge)
Between IRC and IRA (small cartridge)
Between IRA and "-2" adapter |
| | 4. Detach Galley Ambient hose (uninsulated) from MCV
Remove MCV from Ambient QD Reconnect Galley Ambient hose to Ambient QD at QD bracket |
| | 5. Resecure Galley Ambient and Chilled hoses with tie wrap (if present) |
| Middeck
Port
(Floor)
Bag | 6. Stow loose MCV and all sub-assemblies |

CUE CARD
CONFIG

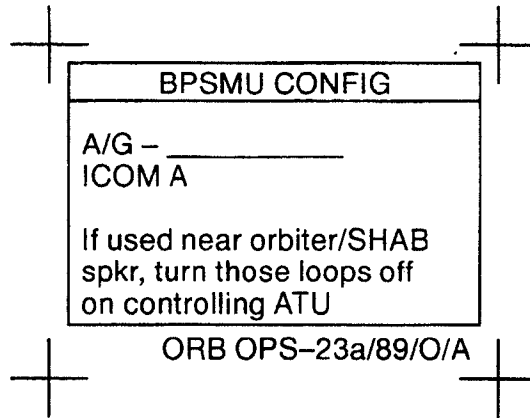
CUE CARD CONFIGURATION

FAB USE ONLY

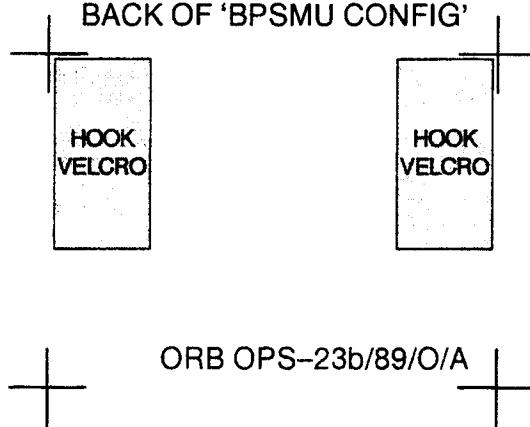
FS 9-1

ORB OPS/89/FIN 1

TOP



TOP
BACK OF 'BPSMU CONFIG'



FAB USE ONLY

(reduced copy)

FS CC 9-3

ORB OPS/89/FIN 1

FAB USE ONLY

TOP

HOOK
VELCRO

MD (MO42F/MO39M) CONFIG	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
NOM ORB OPS	A/T	T/R	R	R	T/R	R	P/P	HHM	ON
SHAB B/U MODE	A/T	T/R	R	OFF	T/R	T/R	P/P	AIU+	ON
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	MHA+	ON
SLEEP CONFIG	A/T	T/R	T/R	OFF	R	R	P/P	HHM	ON

HOOK
VELCRO

ORB OPS-24a/89/O/A

FS CC 9-4

(reduced copy)

TOP

BACK OF 'MD (MO42F/MO39M)'

HOOK
VELCRO

NON-STANDARD AUDIO CONFIG

HOOK
VELCRO

ORB OPS-24b/89/O/A

ORB OPS/89/FIN 1

FAB USE ONLY

TOP

HOOK
VELCRO

SHAB AUDIO	A/G 1	A/G 2	ICOM A	ICOM B	MODE
NOM ORB OPS	As Req'd	T/R	T/R	R	P/P
DEDICATED A/G X	Other ATUs: A/G X - OFF When complete: Other ATUs: A/G X - As req'd				

HOOK
VELCRO

ORB OPS-25a/89/O/A

FS CC 9-5
(reduced copy)

TOP
BACK OF 'SHAB AUDIO'

HOOK
VELCRO

HOOK
VELCRO

NON-STANDARD AUDIO CONFIG

ORB OPS/89/FIN 1

ORB OPS-25b/89/O/A

FAB USE ONLY

FS CC 9-6

ORB OPS/89/FIN 1

(reduced copy)

TOP

HOOK
VELCRO

CDR (O5/L5) CONFIG	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	VLHS	OFF
PMC	A/T	As Req'd	As Req'd	OFF	OFF	OFF	P/P	VLHS	ON
VHF OPS	AUD	OFF	R	OFF	OFF	OFF	P/P	VHF	ON
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	VLHS	ON

HOOK
VELCRO

ORB OPS-26a/89/O/A

TOP
BACK OF 'CDR (O5/L5)'

HOOK
VELCRO

NON-STANDARD AUDIOCONFIG

HOOK
VELCRO

ORB OPS-26b/89/O/A

FAB USE ONLY

TOP

HOOK
VELCRO

PLT (O9/R6) CONFIG	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	VLHS	OFF
BPSMU OPS	AUD	T/R	OFF	OFF	T/R	As Reqd	P/P	CIP	ON
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	HIU	ON

HOOK
VELCRO

ORB OPS-27a/89/O/A

(reduced copy)

FS CC 9-7

TOP
BACK OF OF 'PLT (O9/R6)'

HOOK
VELCRO

NON-STANDARD AUDIO CONFIG

HOOK
VELCRO

ORB OPS-27b/89/O/A

ORB OPS/89/FIN 1

FAB USE ONLY

FS CC 9-8

ORB OPS/89/FIN 1

(reduced copy)

TOP

HOOK
VELCRO

MS (R10/A11) CONFIG	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	MHA+	ON
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	HHM	ON
EVA	A/T	T/R	R	OFF/R	T/R	T/R	P/P	HHM	ON
SLEEP CONFIG	A/T	T/R	T/R	OFF	R	R	P/P	HHM	ON
PAO	AUD	OFF	T/R	OFF	OFF	OFF	P/P	HHM	ON

HOOK
VELCRO

ORB OPS-28a/89/O/A

TOP
BACK OF 'MS (R10/A11)'

HOOK
VELCRO

NON-STANDARD AUDIO CONFIG

HOOK
VELCRO

ORB OPS-28b/89/O/A

TOP

HOOK
VELCRO

**FLIGHT DAY 3 DOCKING
ORBITER WITH SPACEHAB
CO2 ABSORBER REPLACEMENT**

(MIR CO2 ON/
7 Crewmembers/1 Shift/FD 1-13)

FLIGHT DAY	POS A	POS B	CK CMLPT
LAUNCH	1*	2	
PRE FD1	"	"	
POST FD2	3	4	
PRE FD2	5	"	
POST FD3	"	6*	
MID FD3	7	8	
PRE FD3	9	"	
POST FD4	10	11	
MID FD4	"	12	
PRE FD4	13	"	
POST FD5	14	15	
MID FD5	"	"	
PRE FD5	"	16	
POST FD6	17	18	
MID FD6	"	19	
PRE FD6	20	"	
POST FD7	21	22*	
MID FD7	"	23	
PRE FD7	24	"	
POST FD8	25	26	
PRE FD8	"	27	
POST FD9	28	29	
PRE FD9	30	"	
POST FD10	31	32	EOM
PRE FD10	"	33	
POST FD11	34	35	EOM+1
PRE FD11	36	"	
POST FD12	37	38	EOM+2
PRE FD12	"	39	
POST FD13	40	41	EOM+3

* Reseal LiOH cans w/Gray Tape and stow
(Location of canisters on back)

ORB OPS-29a/89/RCRS/B

(reduced copy)

FAB USE ONLY

FS CC 9-9

ORB OPS/89/FIN 1

TOP
BACK OF 'FLIGHT DAY 3 DOCKING
ORBITER WITH SPACEHAB CO2
ABSORBER REPLACEMENT'



HOOK
VELCRO

**LiOH CANISTER STOWAGE
LOCATIONS**

LiOH Stowage Locations

Orbiter:

MD52M (LiOH): Cans 3-31

Middeck Port Ceiling Bag:

Cans 32-41



FAB USE ONLY

ORB OPS-29b/89/RCRS/C

(reduced copy)

FS CC 9-10



ORB OPS/89/FIN 1

Orbit Operations Checklist

STS-86 Flight Supplement

Mission Operations Directorate
Operations Division

Final
July 30, 1997

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




JSC-48036-86

MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST
STS-86 FLIGHT SUPPLEMENT**


FINAL
July 30, 1997

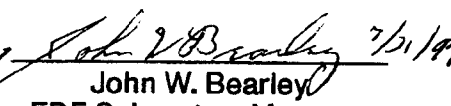
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	ORB OPS-1294	ORB OPS-1303
	ORB OPS-1295	ORB OPS-1308
	ORB OPS-1297	

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DO3/H. Scott	483-0670
Alt Book Manager	DO3/P. Hancock	244-1188

ORBIT OPERATIONS CHECKLIST
STS-86 FLIGHT SUPPLEMENT

LIST OF EFFECTIVE PAGES

FINAL 07/30/97

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FS iv	* 86/FIN	FS 4-7	86/FIN
FS v	* 86/FIN	FS 4-8	86/FIN
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FS 1-3	86/FIN	FS 4-16	86/FIN
FS 1-4	86/FIN	FS 4-17	86/FIN
FS 1-5	86/FIN	FS 4-18	86/FIN
FS 1-6	86/FIN	FS 4-19	86/FIN
FS 2-1	86/FIN	FS 4-20	86/FIN
FS 2-2	86/FIN	FS 5-1	86/FIN
FS 2-3	86/FIN	FS 5-2	86/FIN
FS 2-4	86/FIN	FS 5-3	86/FIN
FS 3-1	86/FIN	FS 5-4	86/FIN
FS 3-2	86/FIN	FS 6-1	86/FIN
FS 3-3	86/FIN	FS 6-2	86/FIN
FS 3-4	86/FIN	FS 6-3	86/FIN
FS 3-5	86/FIN	FS 6-4	86/FIN
FS 3-6	86/FIN	FS 7-1	86/FIN
FS 3-7	86/FIN	FS 7-2	86/FIN
FS 3-8	86/FIN	FS 7-3	86/FIN
FS 4-1	86/FIN	FS 7-4	86/FIN
FS 4-2	86/FIN	FS 7-5	86/FIN
FS 4-3	86/FIN	FS 7-6	86/FIN

* - Omit from flight book

FS iii

ORB OPS/86/FIN

FS 7-7	86/FIN
FS 7-8	86/FIN
FS 7-9	86/FIN
FS 7-10	86/FIN
FS 7-11	86/FIN
FS 7-12	86/FIN
FS 7-13	86/FIN
FS 7-14	86/FIN
FS 7-15	86/FIN
FS 7-16	86/FIN
FS 7-17	86/FIN
FS 7-18	86/FIN
FS 8-1	86/FIN
FS 8-2	86/FIN
FS 8-3	86/FIN
FS 8-4	86/FIN
FS 8-5	86/FIN
FS 8-6	86/FIN
FS 8-7	86/FIN
FS 8-8	86/FIN
FS 8-9	86/FIN
FS 8-10	86/FIN
FS 8-11	86/FIN
FS 8-12	86/FIN
FS 8-13	86/FIN
FS 8-14	86/FIN
FS 8-15	86/FIN
FS 8-16	86/FIN
FS 8-17	86/FIN
FS 8-18	86/FIN
FS 9-1	* 86/FIN
FS 9-2	* 86/FIN
FS CC 9-3	* 86/FIN
FS CC 9-4	* 86/FIN
FS CC 9-5	* 86/FIN
FS CC 9-6	* 86/FIN
FS CC 9-7	* 86/FIN
FS CC 9-8	* 86/FIN

* - Omit from flight book

ORBIT OPS CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
BPSMU CONFIG		
(Front)	FS CC 9-3	ORB OPS-23a/ 86/O/A
(Back)	FS CC 9-3	ORB OPS-23b/ 86/O/A
MD (MO42F/MO39M)		
(Front)	FS CC 9-4	ORB OPS-24a/ 86/O/A
(Back)	FS CC 9-4	ORB OPS-24b/ 86/O/A
SHAB AUDIO (Front)	FS CC 9-5	ORB OPS-25a/ 86/O/A
(Back)	FS CC 9-5	ORB OPS-25b/ 86/O/A
CDR (O5/L5) (Front)	FS CC 9-6	ORB OPS-26a/ 86/O/A
(Back)	FS CC 9-6	ORB OPS-26b/ 86/O/A
PLT (O9/R6) (Front)	FS CC 9-7	ORB OPS-27a/ 86/O/A
(Back)	FS CC 9-7	ORB OPS-27b/ 86/O/A
MS (R10/A11) (Front)	FS CC 9-8	ORB OPS-28a/ 86/O/A
(Back)	FS CC 9-8	ORB OPS-28b/ 86/O/A

ORB OPS POC SOFTWARE

TITLE	VERSION	FLOPPY/HARD DRIVE
<u>(DOS ONLY)</u>		
Cshow	Generic	F
FMGR	Generic	F
GAS G-036/BIA	2.1	H
GRiD SPoC	Generic	F
OCA Diagnostics	1.0	F
PCDecom	Generic	H
PKZIP	Generic	F/H
Prowrite	Generic	F
TV Controller	Generic	H
<u>(WINDOWS '95 ONLY)</u>		
10.2 Depress	Generic	H
3D Orbiter	1.01	H
Cabin Leak	Generic	H
Calculator	Generic	H
CCM-A	1.2.r	F/H
CG Manager	Generic	H
Character Map	Generic	H
Clipboard Viewer	Generic	H
Control Panel	Generic	H
Deorbit	Generic	H
ESC	Generic	H
Excel	Generic	H
Explorer	Generic	H
Floppy Update	Generic	H
Hazmat	Generic	H
Hyper Terminal	Generic	H
Locker Stowage	Generic	H
Media Player	Generic	H
MET Clock	Generic	H
MET Server	Generic	H
NAV	Generic	H
NMI Detector	Generic	H
Notepad	Generic	H
OCA Audio	Generic	H
OCA KFX	Generic	H

TITLE	VERSION	FLOPPY/HARD DRIVE
OCA MFX	Generic	H
OCA Stats	Generic	H
Paint	Generic	H
Pan/Tilt	Generic	H
PCAnywhere32	Generic	H
PCMMU Server	Generic	H
PET Clock	Generic	H
Procomm Plus	Generic	H
Proshare	Generic	H
RPOP	Generic	H
Set GMT	Generic	H
Set Launch Time	Generic	H
Set State Vector	Generic	H
Sound Recorder	Generic	H
Spacehab Subsystem	2.87	H
TCS	Generic	H
ThumbsPlus	Generic	H
Time Calculator	Generic	H
Windows	Generic	H
Winzip	Generic	H
Word	Generic	H
Word Pad	Generic	H
WorldMap	Generic	H

(DOS APPLICATIONS AVAILABLE UNDER WINDOWS '95)

BSTC-M	1.0	H
GrafEditor	Generic	H
GrafTrak	Generic	H
ORCS	Generic	F/H
Stars	Generic	H

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COMM/INST

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

COMM/
INST

FS 1-1

ORB OPS/86/FIN

COMM/
INST

LOAD PCMMU FORMAT

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 second ID
5. If LOAD - FAIL and ERR MSG - 'I/O ERR MMU 1(2)':
Go to 5.2a, 'I/O ERR MMU 1(2)'
(MAL, DPS) >>
6. If LOAD - FAIL and first load attempt:
Repeat steps 2 and 3 for FAIL ID
7. If LOAD - FAIL and subsequent load attempt:
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.
G1,BFS	ASCENT - SPACEHAB INSIGHT (PRIME)	102/166	756
G1,BFS	ASCENT - SPACEHAB INSIGHT (B/U)	102/201	764
G2,G8,S2	ORBIT/ORBIT BURN/FCS C/O	103/161	-
G2,S2	SPACEHAB/SSV/TCS (PRIME)	103/179	757
G2,S2	SPACEHAB/SSV/TCS (B/U)	103/203	765
G2,S2	SPACEHAB/TCS/TEHM (PRIME)	103/184	760
G2,S2	SPACEHAB/TCS/TEHM (B/U)	103/205	767
G2,S2	SPACEHAB/TCS/TEHM/EPS (PRIME)	103/185	761
G2,S2	SPACEHAB/TCS/TEHM/EPS (B/U)	103/206	768
G2,S2	SPACEHAB(HDR)/TCS/TEHM/ EPS (PRIME)	103/188	762
G2,S2	SPACEHAB(HDR)/TCS/TEHM/ EPS (B/U)	103/208	769
G2,S2,OPS0	OPS 0	-/163	-
G2,S2,P9	MMU C/O	-/163	-
G3,G9,S2	LOSS OF 2 GNC GPCs	-/172	-
GNC,BFS	-	102/FXD	-

NOTE

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

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 and ERR MSG - 'I/O ERR MMU 1(2)':
 - Go to 5.2a, 'I/O ERR MMU 1(2)' (MAL, DPS) >>

4. If LOAD - FAIL and first load attempt:
 - Repeat step 1

5. If LOAD - FAIL and subsequent load attempt:

NOTE

Power cycling PDI will cause PDI to lose DFLs previously loaded

- A1L
- ✓ MCC
 - PL DATA INTLVR PWR - OFF, ON
 - ✓ ERR MSG - 'S62 BCE BYP PL'
 - ✓ 'S62 BCE BYP PDI'
- PDI:
- I/O RESET - ITEM 8 EXEC (*)
 - Repeat step 1 for all of config (XXX)
6. PCM:
 - I/O RESET PCM - ITEM 5 EXEC (*)

Cont next page

CONFIG	DECOM	FMT	INPUT	USE
756 ASC/ENT (PRIME) TFL 166	1 2 3 4 5-FPM	6 1 16 - 504	3 5 3 - -	SHAB-DM * TEHM * SHAB-DM * H-H-H **
764 ASC/ENT (BACKUP) TFL 201	1 2 3 4 5-FPM	- 27 - 11 508	- 3 - 5 -	- SHAB-DM * - TEHM * H-H-H **
757 SHAB-DM/SSV (PRIME) TFL 179	1 2 3 4 5-FPM	8 5 7 11 502	3 5(4) 1(2) 0(5) -	SHAB-DM * SSV/(EPS) * TCS1(2) * -(TEHM) * L-H-H ***
765 SHAB-DM/SSV (BACKUP) TFL 203	1 2 3 4 5-FPM	17 1 18 15 506	1(2) 0(5) 3 5(4) -	TCS1(2) * -(TEHM) * SHAB-DM * SSV/(EPS) * L-H-H ***
760 SHAB-DM/TCS (PRIME) TFL 184	1 2 3 4 5-FPM	8 1 7 9 503	3 5 1 2 -	SHAB-DM * TEHM * TCS1 * TCS2 * H-H-H ***
767 SHAB-DM/TCS (BACKUP) TFL 205	1 2 3 4 5-FPM	17 19 18 11 507	1 2 3 5 -	TCS1 * TCS2 * SHAB-DM * TEHM * H-H-H ***
761 SHAB-DM LDR (PRIME) TFL 185	1 2 3 4 5-FPM	8 5 7 11 502	3 4(5) 1(2) 5(0) -	SHAB-DM * EPS/(SSV) * TCS1(2) * TEHM/(-) * L-H-H ***

* Denotes Downlinked Format

** OI-GNC-BFS, Orbiter Downlist Data Rates (High or Low)

*** OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)

CONFIG	DECOM	FMT	INPUT	USE
768	1	17	1(2)	TCS1(2) *
SHAB-DM	2	1	5(0)	TEHM(-) *
LDR	3	18	3	SHAB-DM *
	4	15	4(5)	EPS/(SSV) *
(BACKUP)	5-FPM	506		
TFL 206				L-H-H **
762	1	4	3	SHAB-DM *
SHAB-DM	2	5	4(5)	EPS/(SSV) *
HDR	3	7	1(2)	TCS1(2) *
	4	11	5(0)	TEHM(-) *
(PRIME)	5-FPM	501		
TFL 188				H-L-H **
769	1	17	1(2)	TCS1(2) *
SHAB-DM	2	1	5(0)	TEHM(-) *
HDR	3	14	3	SHAB-DM *
	4	15	4(5)	EPS/(SSV) *
(BACKUP)	5-FPM	505		
TFL 208				H-L-H **

* Denotes Downlinked Format

** OI-GNC-BFS, Orbiter Downlist Data Rates (High or Low)

PTG

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

PTG

PTG

STAR PAIRS PAD

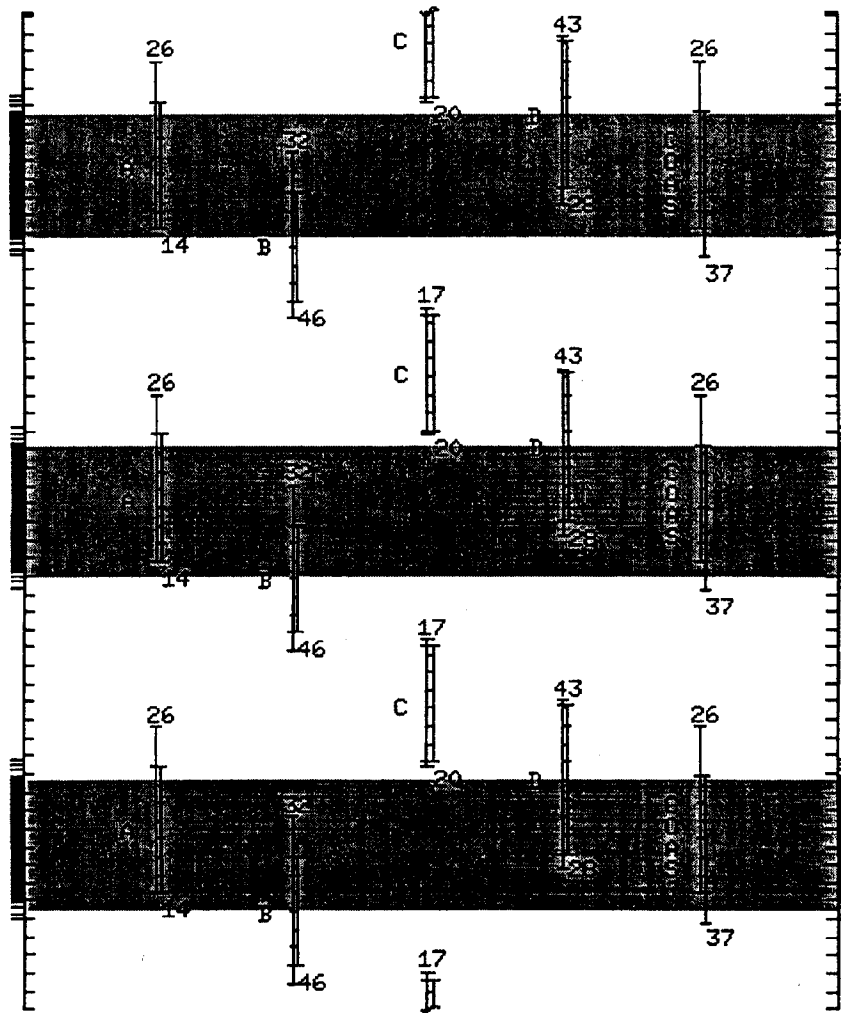
STAR PAIRS PAD									
PAIR	ANG SEP	ATT SET 1				ATT SET 2			
		DUAL S TRK		SINGLE S TRK		DUAL S TRK		SINGLE S TRK	
		-Y	-Z	-Y	-Z	-Y	-Z	-Y	-Z
A	91.4	-Y:26 R+ 282 -Z:14 P+ 119 Y+ 320	R+ 187 P+ 125 Y+ 334	-Y:14 P+ 138 Y+ 315	R+ 23 P+ 310 Y+ 25	-Y:14 R+ 344 -Z:26 P+ 310 Y+ 25	R+ 261 P+ 298 Y+ 36	-Y:26 R+ 65 P+ 324 Y+ 33	
B	87.7	-Y:46 R+ 86 -Z:32 P+ 155 Y+ 29	R+ 3 P+ 146 Y+ 17	-Y:32 P+ 141 Y+ 38	R+ 180 P+ 321 Y+ 344	-Y:32 R+ 180 -Z:46 P+ 321 Y+ 344	R+ 98 P+ 335 Y+ 336	R+ 263 P+ 311 Y+ 332	
C	85.0	-Y:20 R+ 2 -Z:17 P+ 27 Y+ 291	R+ 254 P+ 2 Y+ 301	-Y:17 P+ 42 Y+ 304	R+ 101 P+ 42 Y+ 55	-Y:17 R+ 289 -Z:20 P+ 184 Y+ 55	R+ 195 P+ 194 Y+ 89	R+ 358 P+ 205 Y+ 48	
D	85.0	-Y:43 R+ 344 -Z:28 P+ 321 Y+ 352	R+ 259 P+ 311 Y+ 3	-Y:28 P+ 332 Y+ 1	R+ 70 P+ 332 Y+ 1	-Y:28 R+ 287 -Z:43 P+ 192 Y+ 353	R+ 201 P+ 136 Y+ 7	R+ 14 P+ 146 Y+ 348	

PAIR	COARS ALIGN ATTITUDE 1		ANG SEP		COARS ALIGN ATTITUDE 2	
	R+	P+	NOSE UP	TRAIL UP	R+	P+
C	26	171	31	61	37	163
D		31				331
A		346				1
S	26	346			37	1
		303				241
		9				17

SINGLE S TRK MIN MNR OPT TGT ID = 11-110 NAV STAR # BODY VECTOR = 5			
	-Z S TRK	-Y S TRK	-Y S TRK
P	87.7	0	0
Y	358	280.6	280.6

MET Applicable: -
Date L/O: 09/18/97
GMT L/O: 261/05:39:33

STAR PAIRS



MET Applicable: -
Date L/O: 09/18/97
GMT L/O: 261/05:39:33

DEORBIT IMU STAR PADS

IMU STAR ALIGN PAD

ID -Y: 27, DENE
(TIG -03:00 to -02:16)
-Z: 54, DIPHDA
(TIG -02:56 to -02:13)
ANG DIFF: 83.7

DUAL S TRKR ALIGNMENT	2nd ATTITUDE (SINGLE S TRKR)		
R 15	-Z: 27	-Y: 54	
P 283	305	92	
Y 44	262	293	
	47	58	

IMU VERIFICATION STAR ALIGN PAD

ID -Y: 32, ALDERBARAN
(TIG -02:41 to -01:52)
-Z: 46, PHECDA
(TIG -02:49 to -01:55)
ANG DIFF: 87.7

DUAL S TRKR ALIGNMENT	2nd ATTITUDE (SINGLE S TRKR)		
R 180	-Z: 32	-Y: 46	
P 321	98	263	
Y 344	335	311	
	336	332	

SPLY/WST DUMP

SUPPLY/WASTE WATER DUMP FS 3-2

SPLY/WST
DUMP

FS 3-1

ORB OPS/86/FIN

SUPPLY/WASTE WATER DUMP

For SPLY H2O Dump, perform steps 1,2,4,6,8
For WST H2O Dump, perform steps 1,3,5,7,8
For Simo SPLY/WST H2O Dump, perform steps 1-8

NOTE

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

If no comm: Dump H2O tanks to provide
100% total ullage in any single or
combination of TKs A,B,C,D. 100% ullage
is reqd for FC produced water for 12 hr.

QTY of approx 200% among TKs A,B,C,D is
reqd for deorbit/entry FES usage.

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

INITIATE DUMP

1. Dump Prep
- WCS If performing SPLY H2O Dump, unstow and
install SPLY H2O Dumpline Purge Device
into CONT H2O X-TIE POT QD
- MO10W If performing Simo SPLY/WST H2O Dump:
H2O TK N2 REG INLET SYS 1, SYS 2 vlv
(two) - OP
- Notify MCC, "Ready to begin"

Cont next page

When 'S66 SPLY H2O TEMP' and/or 'S66 WASTE H2O TEMP' annunciated (limits TMBU'd) or on MCC GO, proceed to step 2 for SPLY H2O Dump or Simo SPLY/WST H2O Dump, or step 3 for WST H2O Dump

If no comm, change limits via Table A for SPLY H2O Dump, Table B for WST H2O Dump, or both for Simo SPLY/WST H2O Dump

TABLE A

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
SUPPLY H2O QTY A	0620410	*	
B	0620420	*	
C	0620548	*	*
D	0620544		
NOZ T A	0620440	90	250
B	0620439	90	250

* Limits TMBU'd on-orbit to provide leak and overflow detection

TABLE B

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O QTY 1	0620540	*	99
NOZ T A	0620520	50	250
B	0620519	50	250

* Limits TMBU'd on-orbit to provide leak and overflow detection

CAUTION
Dumping WASTE H2O TK1 QTY below 5% can cause bellows damage

Cont next page

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, configuration is set up to empty
TKB and then start dumping TKA
through TKB

R11L

- ✓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,
configuration will isolate TKC to allow
more efficient water management

ML31C
R11L

- 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. Supply H2O Dump Nozzle Htr Activation

SM 66 ENVIRONMENT

- ML86B:A * If DMP LN T < 65, enable 2nd htr: *
- * cb MNB(MNA) H2O LINE HTR B(A) - cl *
- R11L ✓SPLY H2O DUMP ISOL VLV - OP (tb-OP)
- VLV ENA/NOZ HTR - ON
- CL (tb-CL)

Cont next page

5. Waste H2O Dump Initiation

SM 66 ENVIRONMENT

- CRT When WASTE H2O NOZ T A,B (two) exceed 250 (~10 min), continue
- ML31C ✓WASTE H2O TK1 VLV – OP (tb–OP)
DUMP VLV – OP (tb–OP)
- CRT ✓WASTE H2O QTY 1 – decr (~1 to 2% per min)
✓NOZ T A,B (two) – not incr
- If 'S66 WASTE H2O TEMP', H2O WASTE NOZ T A(B) ↓, then:
- ML31C WASTE H2O DUMP VLV – CL (tb–CL)
When WASTE H2O NOZ T A,B (two) exceeds 250 (~8 min), continue
WASTE H2O DUMP VLV – OP (tb–OP)

TERMINATE DUMP

NOTE

Note distinction between DUMP VLV and DUMP ISOL VLV in following steps

6. Supply H2O Dump Termination

- R11L SPLY H2O DUMP ISOL VLV – CL (tb–CL)
CRT ✓SUPPLY H2O QTY A(B,C,D) – not decr
- * If SUPPLY H2O QTY A(B,C,D) decr, *
 - * cycle SPLY H2O DUMP ISOL VLV *
 - * If not successful, *
 - * SPLY H2O DUMP VLV – CL (tb–CL) *
- CRT When SUPPLY H2O NOZ T A,B (two) exceed 250, continue
- R11L SPLY H2O DUMP VLV – CL (tb–CL) wait 60 sec
– OP (tb–OP) wait 60 sec
– CL (tb–CL)
ISOL VLV – OP (tb–OP)

Cont next page

R11L SPLY H2O DUMP VLV ENA/NOZ HTR - OFF
√tb - bp

CRT √SUPPLY H2O NOZ T A,B (two) - not incr

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

WCS Remove and stow SPLY H2O Dumpline Purge
Device from CONT H2O X-TIE POT QD

7. Waste H2O Dump Termination

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

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

CRT When H2O NOZ T A,B (two) exceeds 250
(~8 min), continue

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

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

MO10W If Simo SPLY/WASTE H2O DUMP performed,
execute following after both dumps complete:
H2O TK N2 REG INLET SYS 1(SYS 2)
vlv - CL

Cont next page

8. Post Dump FDA Cleanup

NOTE

MCC will reset SM limits via TMBU post-dump. If no comm, change limits via Table A for SPLY H2O Dump, Table B for WST H2O Dump, or both for Simo SPLY/WST H2O Dump

TABLE A

SM 60 TABLE MAINT

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

TABLE B

SM 60 TABLE MAINT

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

NOTE

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

OCA

OCA SETUP	FS 4-2
CABLE DIAGRAM	FS 4-3
DOWNLINK	FS 4-4
DIRECTORY STRUCTURE	FS 4-5
FILENAMES	FS 4-6
DEACT	FS 4-7
KU-BAND (KFX) MANUAL ACTIVATION	FS 4-8
DOWNLINK	FS 4-9
OCA S-BAND MODEM (MFX) MANUAL ACTIVATION	FS 4-11
VIDEO TELECON CABLE DIAGRAM	FS 4-12
TELECONFERENCING	FS 4-13
OCA CHALKBOARD	FS 4-15
APPLICATION SHARING	FS 4-16
REMOTE PAN/TILT/ZOOM CONTROL OF GROUND CAMERA (KCA CAMERA CNTL)	FS 4-17
OCA/PROSHARE CONFIG FOR CAMCORDER OPS	FS 4-17
OCA CABLE DIAGRAM - LOOPBACK	FS 4-18
LOOPBACK TEST	FS 4-19

OCA

OCA SETUP

OCA

1. Unstow:
 - PGSC/Expansion Tray with OCA card
 - If not pre-routed, OCA cable
 - If not pre-routed, PGSC Modem cable
 - Headset (if reqd)
 - Mini-cam (if reqd)
- PGSC 2. ✓ PGSC Setup complete, PGSC ACT Thinkpad
w/Expansion Chassis, steps 1-6 (PGSC)
- MO52J ✓ DC UTIL PWR - OFF
✓ Expansion Chassis pwr - off
3. Config cables per OCA CABLE DIAGRAM
If VIDEO TELECON, config cables per VIDEO
TELECON CABLE DIAGRAM, FS 4-12
- SSP1 4. Config for KU-Band file xfer
cb PDIP PWR 2/KU BAND RLY - cl
✓ MCC for HDR(LDR)
PDIP Ku BAND RATE - HI(LO)
- MO52J 5. DC UTIL PWR - ON
- PGSC Expansion Chassis pwr - on
PGSC pwr - on
6. At Startup Menu, sel appropriate Expansion
Chassis config

NOTE

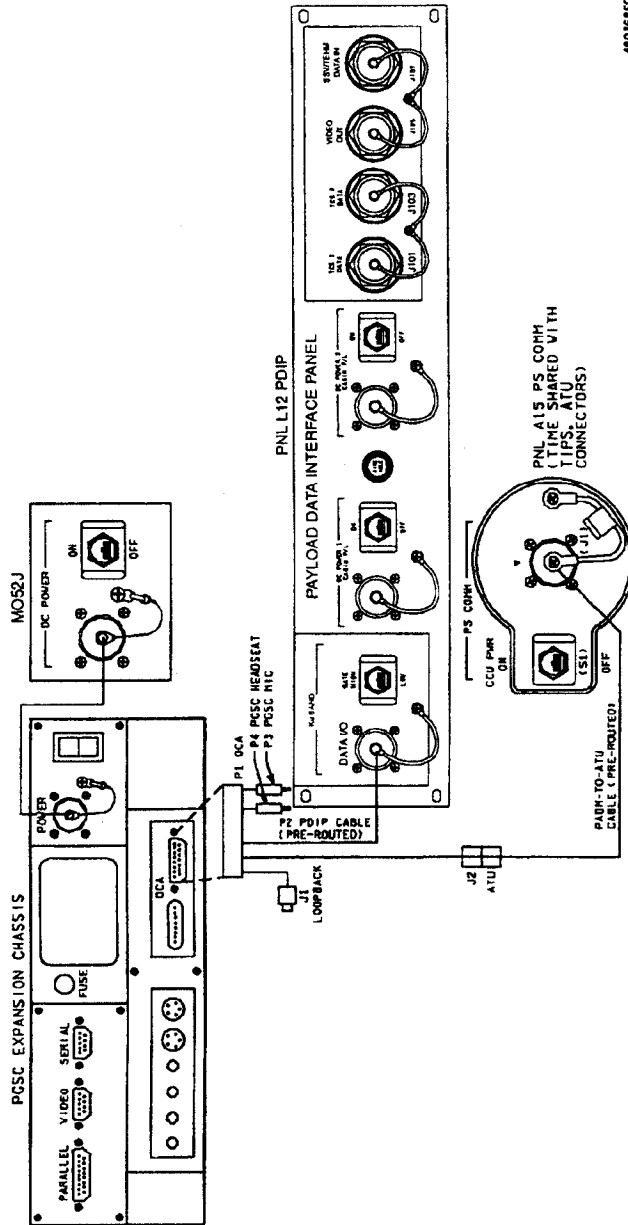
KFX software will be initiated upon
bootup for PGSCs with OCA card
installed

- ✓ 'KFX' icon Mini-Window appears
- ✓ TDRSS LINK STATUS display appears, then:
- ✓ OCA-ORBITER SEND - 4(2) M

- * If SEND rate out of config, then: *
- * Sel OPTIONS *
- * Sel DOWNLINK RATE 4(2) Mbps, *
- * as reqd *

7. Notify MCC when complete

OCA CABLE DIAGRAM (KU-BAND OR A/G 2)



480368601, PNL 2

OCA DOWNLINK

1. MOVE FILE(S) TO DOWNLINK DIRECTORIES

NOTE

Files will be dnlined via ground cmd,
unless MCC instructs otherwise

See OCA DIRECTORY STRUCTURE, FS 4-5
See OCA FILENAMES for file naming convention
Copy(Move) desired files to
c:\oca-down\mail(payloads)
Notify MCC when complete

2. MONITOR KFX DOWNLINK (if desired)

When link established:

From TDRSS LINK STATUS display:

- ✓UPDATE - flashing
- ✓UPLINK - green dot
- ✓DNLINK - green dot

If minimized, sel 'KFX' icon, then:

Press [ALT]/[M] for KFX Mini-Window

✓File Transfer Status

3. MONITOR MFX DOWNLINK (if desired)

If minimized:

✓Icon Title displaying File Name, Send/Receive
Status

NOTE

For detailed file xfer information,
following steps must be completed
prior to file xfer initiation

Sel 'MFX' icon, then:

Sel File

- ✓Show Status During File Xfers - (✓)
- ✓Z MODEM(1K-X MODEM) display appears,
then:
- ✓Displaying File Name, Send/Receive Status

OCA DIRECTORY STRUCTURE

```
C:\
|__OCA-DOWN
|   |__MAIL
|   |__PAYLOADS *
|
|__OCA-UP
|   |__ARCHIVE
|   |__MAIL
|       |__CDR
|       |__MS1
|       |__MS2
|       |__MS3
|       |__MS4
|       |__MS5
|       |__PLT
|       |__PS1
|       |__PS2
|   |__NEWS
|   |__OTHER
|   |__PAYLOADS
|   |__SPOC **
|
|__OCA—SW (Ground Use Only)
```

* PAYLOADS Directory: Directory may contain flight specific subdirectory

** SPoC Directory: Directory will contain latest SPoC updates. To create SPoC update disk, copy all files in c:\oca-up\spoc to a:\uplink directory

OCA FILENAMES

UPLINKED FILES

LOCATION

SPoC updates:	a:\uplink\c:\oca-up\spoc\
World News:	c:\oca-up\news\
Ops notes:	c:\oca-up\other\
Graphics files:	c:\oca-up\other\
Uplinked personal mail:	c:\oca-up\mail\
Uplinked Payload files:	c:\oca-up\payloads\

DOWNLINKED FILES

LOCATION

Personal mail, other:	c:\oca-down\mail\
P/L files:	c:\oca-down\payloads\

STD FILENAMES

filename.doc	WORD documents only
filename.txt	ASCII text file (NOTEPAD or WORD)
filename.bmp	Graphics file (Paint)
filename.pcx	Graphics file (Paint)
famcdr01.doc	family mail: CDR -> family on FD01
cdrfam02.doc	family mail: family -> CDR on FD02
fltcd02.doc	message: CDR -> FLT Director on FD02
plx_06.doc	message: to Payload X on FD06

NOTE

Do not downlink medical data. Downlink directories will be cleared of all files at end of each OCA session. To retain archive copy of downlink msgs, save in personal directory

OCA DEACT

- PGSC 1. Exit OCA applications
2. Shut down Windows
3. PGSC pwr – off
Expansion Chassis pwr – off
- MO52J 4. DC UTIL PWR – OFF
- PGSC 5. Disconnect data cables
If reqd, disconnect pwr cables
6. Stow:
OCA cable
PGSC Modem cable
PGSC/Expansion Chassis as reqd
PGSC pwr cables as reqd
Headset (as reqd)
Mini-cam (as reqd)

OCA KU-BAND (KFX) MANUAL ACTIVATION

PGSC 1. ESTABLISH LINK
PDIP ✓OCA cable connected to DIGI CAM DATA outlet
 ✓MCC for HDR(LDR)
 Ku BAND RATE – HI(LO)

PGSC 2. SET S/W TRANSMIT RATE
 Sel 'Shuttle Apps' icon
 Sel OCA program group
 Sel 'OCA Stats' icon
 ✓TDRSS LINK STATUS display appears, then:
 ✓UPDATE – flashing

From TDRSS LINK STATUS display:

 Sel OPTIONS
 Sel DOWNLINK RATE 4(2) Mbps (HDR(LDR))
 ✓SEND – 4(2) M

3. ACTIVATE FILE XFER S/W

NOTE

KFX takes ~5 to 10 sec to initiate

From OCA program group, sel 'KFX'

Arrange KFX window as reqd:

 If KFX Mini-Window, press [ALT]/[M]

 If KFX window always on top, press [ALT]/[T]

OCA KU-BAND (KFX) MANUAL DOWNLINK

1. CONFIGURE SW FOR FILE DOWNLINK

NOTE

This status will match TDRSS
LINK STATUS display

✓KFX maximized to OCA KU-BAND FILE XFER
(KFX) display, then:

- * If KFX Mini-Window present, *
- * press [ALT]/[M] to maximize *

✓REMOTE KFX – green
✓UPLINK – flashing green dot
✓DNLINK – flashing green dot

✓DOWNLINK FILE(S) button – enabled (bold text)

- * If DOWNLINK FILE(S) button *
- * disabled (text grayed out): *
- * Sel OPTIONS, then: *
- * Sel SETUP, then: *
- * Sel USER TRANSMIT – *
- * enabled () *
- * Sel SAVE *
- * ✓DOWNLINK FILE(S) button – *
- * enabled (bold text) *

2. SELECT FILE(S) TO DOWNLINK

Use EXPLORER to sel files/directories to transfer
Drag files over KFX window
Rel mouse button

✓KFX FILE TRANSFER PREVIEW display appears,
then:
✓Files located in FROM THE FLIGHT PGSC listbox

Cont next page

3. ADD ADDITIONAL FILE FOR DOWNLINK

- ✓ KFX FILE TRANSFER PREVIEW display active,
then:
Sel SELECT FILE(S)
- ✓ LOCAL VOLUME display appears, then:
Sel desired file from file listbox
Sel ADD
Repeat for each additional file as reqd
Sel DONE

4. REMOVE FILE FROM DOWNLINK

- ✓ KFX FILE TRANSFER PREVIEW display active,
then:
Sel desired file(s) in FROM THE FLIGHT PGSC
listbox
Sel DESELECT FILE(S)

5. START FILE DOWNLINK

NOTE

User may halt transfer while in progress
by sel ABORT

- ✓ KFX FILE TRANSFER PREVIEW display active,
then:
Sel START DOWNLINK
- ✓ FILE TRANSFER STATUS display appears, then:
- ✓ Displaying xfer status

OCA S-BAND MODEM (MFX) MANUAL ACTIVATION

1. ESTABLISH LINK

On MCC GO:

A15 PS COMM CCU PWR - OFF

L9 PS AUD PWR - 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

CAUTION

Loss of A/A (UHF) will occur if OCA cable connected to COMM OUTLET and A/A in T/R on ATU

O9 R AUD A/G 2 - OFF
O5 L AUD A/G 2 - OFF
R10 MS AUD A/G 2 - OFF
A13(OV102) OS AUD A/G 2 - OFF
MO42F MIDDECK SPKR AUD A/G 2 - OFF

If spacelab:

A1 AUD CTR SL A/G 2 - OFF

A15 ✓ PGSC Modem cable conn to PS COMM outlet

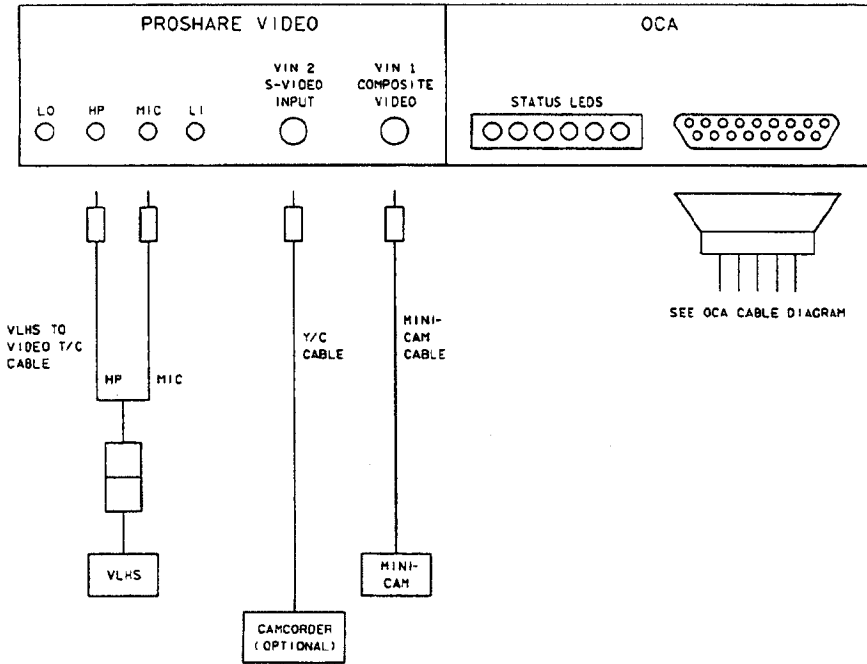
2. ACTIVATE FILE XFER S/W

NOTE

MFX takes ~5 to 10 sec to initiate

PGSC From OCA program group, sel 'MFX'
✓ MFX display appears, then:
✓ WINDOW - OFFLINE
Arrange MFX window as reqd

VIDEO TELECON CABLE DIAGRAM



480368106. P01

VIDEO TELECONFERENCING

1. Perform steps 1 thru 4 of OCA SETUP (w/Video T/C equip), FS 4-2
- PGSC 2. Sel 'Shuttle Apps' icon, then:
Sel 'OCA' icon
Sel 'OCA Proshare Video' icon

NOTE

Video T/C takes ~30 sec to start

3. ✓Video active in 'LOCAL' window
4. Adjust Thinkpad display tilt-angle, camera position, iris, focus so oper's face centered in 'LOCAL' video window
5. ✓Picture quality and position
 - * If picture quality poor: *
 - * From 'LOCAL' video window: *
 - * Sel 'Adjust Video' (slide bar icon) *
 - * Adjust picture quality as reqd *
 - * Sel 'Close' *
 - * If 'Save camera control settings?' *
 - * appears, sel 'Yes' button *
 - * *
 - * ✓'Zooms in' button (mag glass) in out *
 - * position *
6. TO RECEIVE CALL
Notify MCC ready to receive video teleconference call, wait for MCC to initiate
7. TO INITIATE CALL
Notify MCC ready to place video teleconference call, wait for MCC confirmation
Sel 'Dial List'
Sel 'MCC, PC'
Sel 'Dial'

Cont next page

NOTE

Title of remote video window changes to designate caller when video teleconference established

8. **CONDUCT VIDEO TELECONFERENCE**

NOTE

Video teleconference performance may be affected if other applications are active

- ✓ Remote video window active, audio active
- Move remote video window directly beneath camera. To move window separately from the handset, choose 'Split' button on handset
- Adjust audio volume using slide bar under remote video window

9. **TERMINATE VIDEO TELECONFERENCE**

NOTE

When video teleconference completed, either side can terminate call. If MCC has disconnect, 'Hang Up' button will change to 'Dial'

From Proshare Video handset:

Sel 'Hang Up'

Sel system menu (upper-left corner)

Sel 'Exit' (Alt-Shift-F4)

OCA CHALKBOARD

1. Perform VIDEO TELECONFERENCING, steps 1 thru 6(7), then continue with step 2, below
2. TO RECEIVE CHALKBOARD SESSION
Notify MCC ready to receive chalkboard session, wait for MCC to initiate

PGSC

From Proshare Video handset, sel 'Split'
If 'LOCAL' video remains on screen, minimize
'LOCAL' video window

3. TO INITIATE CHALKBOARD SESSION
Notify MCC ready to initiate chalkboard session, wait for MCC confirmation

From Proshare Video handset:
Sel 'OCA CHALKBOARD'

'Do You Want to Share Notebook?' – left-click 'Yes'

Minimize all unused windows

4. TERMINATING CHALKBOARD SESSION

NOTE

When chalkboard session completed, either side can terminate session

From Proshare Personal Conferencing menu bar:
Sel 'Conference'
Sel 'UnShare Notebook' menu

If MCC has terminated session, sel 'OK' in 'The other participant closed the notebook'

From Proshare Personal Conferencing menu bar:
Sel 'File'
Sel 'Exit'

NOTE

Operator will be prompted to save chalkboard session in 'xxxx.mtg' file

APPLICATION SHARING

- PGSC
1. Launch desired application
 2. Perform OCA CHALKBOARD, steps 1 thru 3, then continue with step 3, below
 3. From Proshare Personal Conferencing menu bar:
Sel 'Application'
Sel 'Share Application View..'
 4. From 'Share Application View' dialog box:
Sel desired application
Sel 'OK'
 5. Perform application edits with MCC when application is shared

NOTE

Mouse operation, shared between MCC and flight operator, must be coordinated using teleconference audio

6. TERMINATING APPLICATION SHARING
Either side can terminate application sharing by exiting application

REMOTE PAN/TILT/ZOOM CONTROL OF GROUND CAMERA (KCA CAMERA CNTL)

NOTE

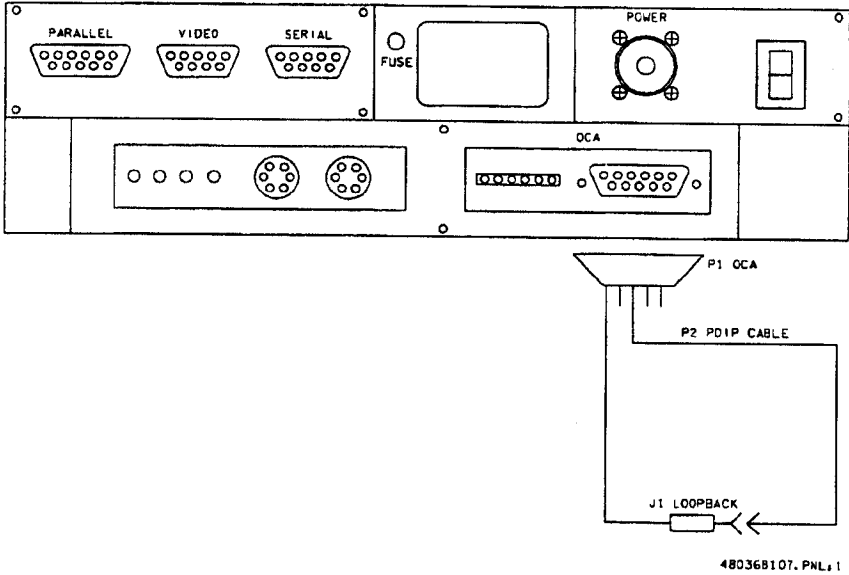
PAN/TILT control is only available if ground workstation involved in telecon has PAN/TILT, and ground PAN/TILT camera is running

1. Perform VIDEO TELECONFERENCING, steps 1 thru 6(7), then continue with step 2, below
- PGSC 2. Sel 'Shuttle Apps' icon, then:
Sel 'OCA' icon
Sel 'OCA Proshare Pan-Tilt' icon
3. Sel 'Help' in KCA Camera Control menu bar for instructions
4. When camera control ops complete, close KCA camera control application

OCA/PROSHARE CONFIG FOR CAMCORDER OPS

- PGSC 1. Sel 'Explorer' icon
2. Sel 'Psvideo' directory
3. Sel 'Pssystem.ini' file
4. In '[PSVideo/Capture]' section,
Change: 'Video Source = 0'
To: 'Video Source = 1'
5. Sel 'File'
Sel 'Save'
Sel 'File'
Sel 'Exit'
Exit 'Explorer' (if desired)

OCA CABLE DIAGRAM - LOOPBACK



OCA LOOPBACK TEST

- PGSC
1. INITIATE INTERNAL LOOPBACK TEST
Sel OCA program group
Sel 'OCA Stats' icon

From TDRSS LINK STATUS display:
Sel Options
Sel Internal Loopback

After 10 sec, ✓Status display:
Successful Test – Animated Signal moving
inside PC icon
Unsuccessful Test – 'Frowny Face' displayed
inside PC icon
Inform MCC of results
 2. TERMINATE INTERNAL LOOPBACK TEST
From TDRSS LINK STATUS display:
Sel Options
Sel Internal Loopback
 3. INITIATE EXTERNAL LOOPBACK TEST
Disconnect OCA cable from PDIP panel
Conn PDIP end of OCA cable to loopback port on
PGSC end of cable
See OCA CABLE DIAGRAM – LOOPBACK,
FS 4–18, for cable config

From TDRSS LINK STATUS display:
Sel Options
Sel External Loopback

After 10 sec, ✓Status display:
Successful Test – Animated Signal moving
outside PC icon
Unsuccessful Test – 'Frowny Face' displayed
inside PC icon
Inform MCC of results
 4. TERMINATE EXTERNAL LOOPBACK TEST
From TDRSS LINK STATUS display:
Sel Options
Sel External Loopback

RECUMBENT SEAT KIT (RSK) ATTACHMENT

RECUMBENT SEAT KIT (RSK) ATTACHMENT FS 5-2

RSK

FS 5-1

ORB OPS/86/FIN

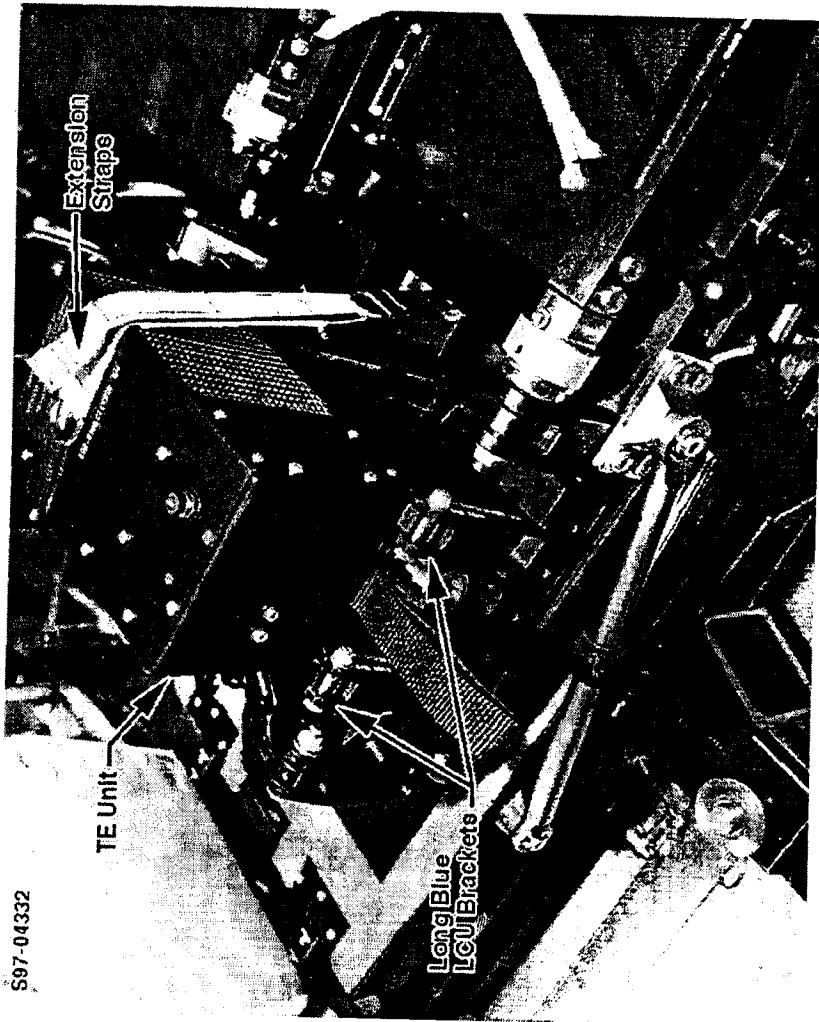
RECUMBENT SEAT KIT (RSK) ATTACHMENT

NOTE

This procedure is used to install RSK-6.
Refer to figures 5-1, 5-2 for assembly
config

- | | |
|---------------------------|---|
| Airlock
Ceiling
Bag | 1. Unstow:
Bushing (spare in IFM locker)
LCU Brackets
Extension Straps
Headrest Cushion
Double-sided Hook Velcro |
| | 2. Reconfig light-weight seat(s):
✓Bushing on port-side seat back installed
✓Long blue LCU brackets installed
Install extension strap, TE unit, restrain unit,
and legs
Position seat pan to entry config
Replace headrest cushion with RSS cushion
and flap |
| | 3. Attach seat to seat rail, align slots, install pip pins
(four) |
| MF41K | 4. ✓Locker removed |
| | 5. Align seat rail with deck studs located on LiOH
door (S6) |
| | 6. Lock spherical deck stud latches (four) |
| | 7. ✓Seat rail secure |
| MO32M,
MO39M,
MHA | 8. Connect DC pwr cable, O2, comm cables |

RSK



S97-04332

Figure 5-1.- Seat pan in folded position with TE unit installed.

FS 5-4

ORB OPS/86/FIN

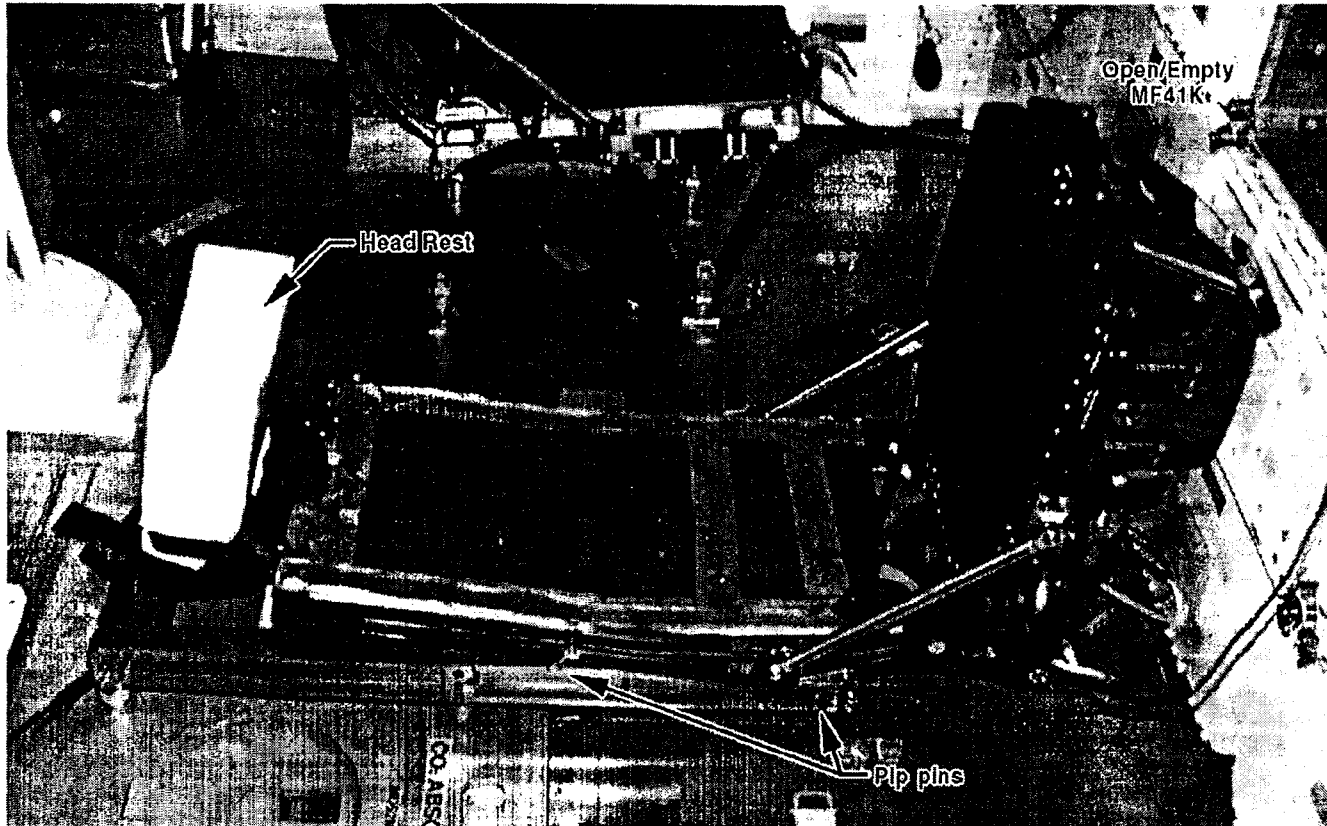


Figure 5-2.- RSK-6 fully assembled and installed with seat pan in entry position.

WC VENTING

WC VENTING FS 6-2

**WC
VENTING**

FS 6-1

ORB OPS/86/FIN

WC VENTING

OBJECTIVE: Provides method for venting of Contingency Water Containers (CWC) to vacuum in order to remove residual air

NOTE

MCC will TMBU SUPPLY H2O NOZ T A,B (two) LL to 100. Current SUPPLY H2O NOZ T A,B (two) UL is 250

INITIAL DUMPLINE PURGE

- WCS
Outboard
Wall
1. Install SPLY H2O Dumpline Purge Device (ML60E) into CONT X-TIE POT QD
- R11L 2. ✓ SPLY H2O DUMP ISOL VLV - CL (tb-CL)
- SM 66 ENVIRONMENT
- ML86B:A
- * If DMP LN T < 65, enable 2nd htr: *
 - * cb MNB(MNA) H2O LINE HTR *
 - * B(A) - cl *
- R11L SPLY H2O DUMP VLV ENA/NOZ HTR - ON
- CRT When SUPPLY H2O NOZ T A,B (two) exceed 100, continue

NOTE

Supply H2O Nozzle temps should not exceed 350 degF at any time, to avoid potential damage to TPS tiles

- R11L SPLY H2O DUMP VLV - OP (tb-OP), wait 4 min
- CL (tb-CL), wait 60 sec
- OP (tb-OP), wait 60 sec
- CL (tb-CL)
- SPLY H2O DUMP VLV ENA/NOZ HTR - OFF (✓tb-bp)

WC
VENTING

- WCS 3. Remove SPLY H2O Dumpline Purge Device from
Outboard CONT X-TIE POT QD
Wall Stow in ML60E

CWC VENTING

NOTE

For stowage locations of CWCs, related hardware reqd in procedure below, see SHUTTLE/MIR H2O CONTAINER FILL (MIR/SHUTTLE JOINT OPS, GEN NON-JOINT) unless otherwise specified

- WCS 4. Connect Y/R QD Adapter (retrieve from MA12B
Outboard Window Shade Bag) to CONT X-TIE POT QD
Wall
5. Connect Galley Tee Adapter with R/Y hose and EDV QD Adapter attached (SPACEHAB AC08) to free-end of Y/R QD Adapter, using ½-in male connector on run of galley tee
Disconnect EDV QD Adapter from free-end of R/Y hose, temp stow (will be needed for water transfer procedure)
6. Attach CWC to free-end of R/Y hose

NOTE

Have one crewmember hold CWC flat on flat surface, while another crewmember works air pockets toward CWC outlet

- R11L 7. SPLY H2O DUMP VLV ENA/NOZ HTR - ON
- OP (tb-OP)

This step initiates venting of CWC
Perform for 1/2 to 2 min for each CWC

NOTE

Supply H2O Nozzle temps should not exceed 350 degF at any time, to avoid potential damage to TPS tiles

- CRT
R11L 8. If SUPPLY H2O NOZ T A,B (two) exceed 250,
SPLY H2O DUMP VLV ENA/NOZ HTR - OFF
- CRT
R11L If SUPPLY H2O NOZ T A,B (two) then fall
below 100:
SPLY H2O DUMP VLV ENA/NOZ HTR - ON
- WCS
Outboard
Wall 9. When venting is complete, or if CWC begins to
crumple, disconnect QD at CWC from R/Y hose
10. Remove CWC, temp stow until ready for water fill
procedure
11. Repeat steps 6,8,9,10 for all desired CWCs
When ALL CWCs have been evacuated,
disconnect all hardware from CONT X-TIE
POT QD and return all hoses and related
equipment to original as-stowed config
Temp stow until needed for water fill procedure
- R11L 12. SPLY H2O DUMP VLV ENA/NOZ HTR - ON
(if still OFF from step 8 above)
SPLY H2O DUMP VLV - CL (tb-CL)
- ENA/NOZ HTR - OFF
✓tb-bp

NOTE

SPLY H2O Dump Isol vlv will
be reopened on MCC call

GLOBAL POSITIONING SYSTEM/INERTIAL NAVIGATION
SYSTEM (DTO 700-12)

UNSTOW	FS 7-2
ON-ORBIT DATA COLLECTION INIT	FS 7-4
TERM	FS 7-5
DATA DOWNLINK	FS 7-5
PCDECOM CONNECT	FS 7-6
ATTITUDE RE-INIT	FS 7-7
ASCENT DATA DOWNLINK	FS 7-8
SETUP	FS 7-10
ENTRY-DATA COLLECTION	FS 7-11
GPS/INS SCHEMATIC	FS 7-12
STAR LINE MANEUVER (SLM)	FS 7-13
GPS/INS - PGSC 1553 COMMUNICATION LOSS ..	FS 7-15
COLDSTART	FS 7-16
GPS/INS SOFTWARE UPDATE	FS 7-18

DTO
700-12

FS 7-1

ORB OPS/86/FIN

UNSTOW

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 5

- MA16D 1. Open locker door
- 2. ✓Temp strip - rightmost three blocks black
 - * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr - off *
 - * Expansion Chassis pwr - off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
 - * DC UTIL PWR - ON *
 - * Expansion Chassis pwr - on *
 - * PGSC pwr - on *
 - * ✓MCC *
- 3. Remove PGSC foam assy
- GPS/INS 4. Open PGSC monitor
PGSC
- 5. Press [ALT]/[ESC]
✓'C:\>' appears on display
- 6. Enter 'cflash'
✓15-20 total files copied from drive D
- 7. PGSC pwr - off
Expansion Chassis pwr - off

Cont next page

DTO
700-12

WARNING
Pwr cable remains active; use
caution when handling

- 8. Disconnect data cables, pwr cables
- MA16D 9. Remove cables from locker door openings
- 10. Remove foam bottom assy from PGSC
- GPS/INS11. Reconnect data cables, pwr cables
PGSC
- MA16D 12. Unstow PCMCIA OCA/Entry Flash Cards (two)
- PCMCIA 13. Remove PCMCIA Ascent Flash Cards (two)
Slots
- MA16D Stow PCMCIA Ascent Flash Cards (two)
- PCMCIA 14. Insert PCMCIA OCA/Entry Flash 1 Card -
Slots Drive D (Top Slot)
Insert PCMCIA OCA/Entry Flash 2 Card -
Drive E (Bottom Slot)
- MA16D 15. Stow foam assy in locker

ON-ORBIT DATA COLLECTION INIT

If GPS/INS software running, go to step 4

- GPS/INS 1. Expansion Chassis pwr - on
PGSC PGSC pwr - on
2. ✓ 'C:\>' appears on display
 3. Enter 'ORBIT'
✓ 1553 msgs successful counter incrementing
 4. Toggle to Summary display:
Press [ALT]/[U]
 5. Begin Data Recording:
Press [Alt]/[R]
✓ Record flag blinking
 6. At Summary display:
✓ Parameter Values against WorldMap PGSC:
Time GMT within 5 sec
Latitude within 2°
Longitude within 2°
Altitude within 2nm
of SVs Valid 4 satellites tracked
If any parameter out of limits, ✓MCC
 7. If desired, close monitor

ON-ORBIT DATA COLLECTION TERM

- GPS/INS 1. At end of data recording, terminate data
PGSC acquisition:
Press [ALT]/[R]
✓ Record flag not blinking
Close monitor
2. If pwrnd desired:
Press [ALT]/[ESC]
✓ 'C:\>' appears on display
PGSC pwr - off
Expansion Chassis pwr - off >>

DATA DOWNLINK

- GPS/INS 1. If GPS/INS software running:
PGSC ✓ Record flag not blinking
Press [ALT]/[ESC]
✓ 'C:\>' appears on display
Go to step 3
2. Expansion Chassis pwr - on
PGSC pwr - on
✓ 'C:\>' appears on display
- PCMCIA 3. ✓ PCMCIA OCA/Entry Flash 1 Card - Drive D
Slots (Top Slot)
PCMCIA OCA/Entry Flash 2 Card - Drive E
(Bottom Slot)
4. Copy current data files to PCMCIA OCA/Entry
Flash 1 Card:
Enter 'dataxfer'

Cont next page

NOTE

Data xfer copies up to 40 Mb of data to top slot flash card and then archives same data onto hard drive

5. When data transfer complete:
Remove PCMCIA OCA/Entry Flash 1 Card - Drive D (Top Slot)
- OCA
PGSC 6. Insert PCMCIA OCA/Entry Flash 1 Card - Drive D
7. Perform OCA DOWNLINK (OCA), step 1
8. Remove PCMCIA OCA/Entry Flash 1 Card from OCA PGSC
- GPS/INS
PGSC 9. Insert PCMCIA OCA/Entry Flash 1 Card - Drive D (Top Slot)
10. ✓ 'C:\>' appears on display
PGSC pwr - off
Expansion Chassis pwr - off >>

PCDECOM CONNECT

1. Locate pre-routed, spare RS-422 data cable
- PCDecom
PGSC 2. If not completed, perform PCDECOM OPS, ACT (PGSC)
3. Connect spare TRAD RS-422 cable (command PGSC 486 (source) connector) to serial port (COM 2)
- GPS/INS
PGSC 4. Connect spare TRAD RS-422 cable (PGSC 486 receive only connector) to serial port (COM 3) (Reference GPS/INS SCHEMATIC)

ATTITUDE RE-INIT

- GPS/INS
PGSC
1. Perform ON-ORBIT DATA COLLECTION INIT
 2. Wait 5 min
 3. Perform ON-ORBIT DATA COLLECTION TERM
 4. PGSC pwr - off
Expansion Chassis pwr - off
 5. Expansion Chassis pwr - on
PGSC pwr - on
 6. ✓PCDECOM CONNECT completed
 7. ✓'C:\>' appears on display
 - * If 'C:\>' does not appear, *
 - * press [ALT]/[ESC] *
 8. Enter 'ALIGN'
 - ✓PCDecom Port Status - ENABLED
 - PCDecom Receive Status:
'Success' appears on display

NOTE

Attitude init may take up to 1 min

- ✓'Attitude Initialization successfully completed' or
'Attitude Reinitialization Not Necessary
(< 1.0 Deg Error)'
- If GPS/INS attitude init not complete after 1 min:
Record current attitude difference per axis
from display
Press 'Q'
Contact MCC
9. ✓'C:\>' appears on display
PGSC pwr - off
Expansion Chassis pwr - off >>

ASCENT DATA DOWNLINK

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 5

- MA16D 1. Open locker door
2. ✓Temp strip – rightmost three blocks black
- * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr – off *
 - * Expansion Chassis pwr – off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
- * DC UTIL PWR – ON *
 - * Expansion Chassis pwr – on *
 - * PGSC pwr – on *
 - * ✓MCC *
3. Remove PGSC foam assy
- GPS/INS 4. Open PGSC monitor
PGSC
5. Press [ALT]/[ESC]
✓‘C:\>’ appears on display
6. Enter ‘cflash’
✓15–20 total files copied from drive D
7. PGSC pwr – off
Expansion Chassis pwr – off
- MA16D 8. Unstow PCMCIA OCA/Entry Flash Cards (two)
- PCMCIA 9. Remove PCMCIA Ascent Flash Cards (two)
Slots
- MA16D Stow PCMCIA Ascent Flash Cards (two)

Cont next page

FS 7-8

ORB OPS/86/FIN

PCMCIA 10. Insert PCMCIA OCA/Entry Flash 1 Card -
Slots Drive D (Top Slot)
Insert PCMCIA OCA/Entry Flash 2 Card -
Drive E (Bottom Slot)

GPS/INS11. Perform DATA DOWNLINK
PGSC

12. Perform ON-ORBIT DATA COLLECTION INIT

13. Close monitor

MA16D 14. Return hardware to locker and close locker door
✓Data and pwr cable connections secure

SETUP

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 4

- MA16D 1. Open locker door
2. ✓Temp strip – rightmost three blocks black
- * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr – off *
 - * Expansion Chassis pwr – off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
- * DC UTIL PWR – ON *
 - * Expansion Chassis pwr – on *
 - * PGSC pwr – on *
 - * ✓MCC *
- GPS/INS 3. Open PGSC monitor
PGSC
4. Press [ALT]/[ESC]
✓'C:\>' appears on display
5. PGSC pwr – off
Expansion Chassis pwr – off
6. Perform DATA DOWNLINK
- WARNING**
Pwr cable remains active; use
caution when handling
7. Disconnect data cables, pwr cables
- MA16D 8. Remove cables from locker door openings

Cont next page

GPS/INS 9. Reconnect data cables, pwr cables
PGSC

MA16D 10. Stow foam assy in locker

ENTRY-DATA COLLECTION

1. If GPS/INS software running:
 - ✓ Record flag not blinking
 - Press [ALT]/[ESC]
 - ✓ 'C:\>' appears on display

GPS/INS 2. PGSC pwr - off
PGSC Expansion Chassis pwr - off

WARNING
Pwr cable remains active; use
caution when handling

3. Disconnect data cable, pwr cable, PCDECOM cable

MA16D 4. Reroute cables through locker door opening

5. Remove foam assy

GPS/INS 6. Stow PGSC in bottom foam assy
PGSC

7. Reconnect data, pwr cables through foam assy

8. Expansion Chassis pwr - on
PGSC pwr - on

9. ✓ 'C:\>' appears on display
✓ Expansion Chassis fan running

PCMCIA 10. ✓ PCMCIA OCA/Entry Flash Cards (two) installed
Slots

Cont next page

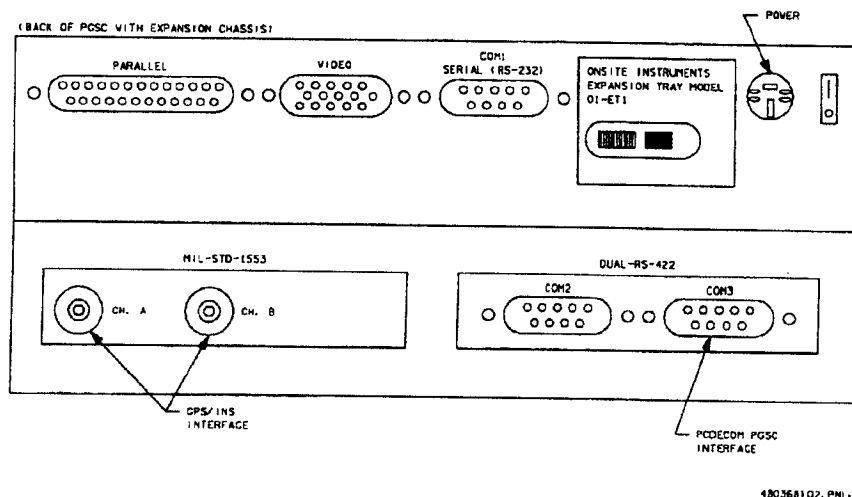
11. Clear PCMCIA data:
Enter 'dflash'
✓'File(s) not found' appears for Drive D,E
12. Enter 'ENTRY'
✓1553 msgs successful counter incrementing
13. Toggle to Summary display:
Press [ALT]/[U]
14. ✓Parameter Values against WorldMap PGSC:

Time	GMT within 5 sec
Latitude	within 2°
Longitude	within 2°
Altitude	within 2nm
# of SVs Valid	4 satellites tracked

 If any parameter out of limits, ✓MCC
15. Close monitor
16. Stow foam assy in locker
✓Data, pwr cable connections secure

MA16D 17. Close locker door

GPS/INS SCHEMATIC



STAR LINE MANEUVER (SLM)

1. CONFIG

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

DAP: B

Change DAP A,B to A14,B2

GNC UNIV PTG

Load first attitude per table

DAP: B2/AUTO/ALT

Init MNVR ITEM 18 EXEC

When in attitude:

DAP: A/AUTO/VERN(ALT)

2. SLM DATA TAKES

Wait 1 min

DAP: FREE

GNC 22 S TRKR/COAS CNTL

Clear Star Table - ITEM 20 EXEC

Acquire Star

SLM #1,2 STAR ID: 27

SLM #3,4 STAR ID: 83

Verify Star in table

Clear Star Table - ITEM 20 EXEC

Verify Star in table

If SLM #4 complete, go to step 3

C3

Cont next page

Load next attitude:

GNC UNIV PTG

SLM #1	SLM #2	SLM #3	SLM #4
R = 219.1	R = 307.5	R = 66.2	R = 70.1
P = 14.0	P = 259.0	P = 133.1	P = 133.2
Y = 22.6	Y = 45.6	Y = 31.7	Y = 32.3

Init MNVR ITEM 18 EXEC
DAP: B/FREE/ALT
DAP: AUTO
When in attitude:
DAP: A/AUTO/VERN(ALT)
Repeat step 2

3. RECONFIG

Change DAP A,B to A6,B1

DAP: A/AUTO/ALT

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

GPS/INS - PGSC 1553 COMMUNICATION LOSS

- GPS/INS PGSC
1. Attempt to restore 1553 communication by cycling pwr on the PGSC:
PGSC pwr - off
Expansion Chassis pwr - off,on
PGSC pwr - on
 2. Enter 'ORBIT' at the 'C:\>' prompt to test communication
 3. If unsuccessful 1553 msgs counter incrementing:
Report status of successful/unsuccessful counters
✓1553 data cable connections A and B firmly mated to PGSC
 4. If still unsuccessful 1553 msgs counter incrementing:
Report status of successful/unsuccessful counters
Perform DTO 700-12 COLDSTART

COLDSTART

- GPS/INS 1. PGSC pwr - off
PGSC Expansion Chassis pwr - off
- A13 2. ✓INS PWR sw - OFF
Wait 30 sec
✓INS PWR sw - ON
- GPS/INS 3. Expansion Chassis pwr - on
PGSC PGSC pwr - on
4. ✓1553 A and 1553 B connectors securely mated
✓PCDecom RS-422 cable mated to COM3 port
5. Enter 'ORBIT' to test 1553 bus communication
Report status of successful/unsuccessful
counters
If successful = 0 (not incrementing):
Press [ALT]/[ESC] to exit software
PGSC pwr - off
Expansion Chassis pwr - off
- A13 6. ✓INS PWR sw - OFF
Wait 30 sec
✓INS PWR sw - ON
- GPS/INS 7. [ALT]/R, wait 1 min, then [ALT]/R
PGSC Press [ALT]/[ESC] to exit software
PGSC pwr - off
Expansion Chassis pwr - off,on
PGSC pwr - on
8. Enter 'cldstart' to initialize GPS/INS
Wait 60 sec
✓'Cold Start Trajectory Initialization Completed'
appears on display
If program execution not completed in 60 sec,
Press 'q' - exits program
Report status

Cont next page

9. PGSC pwr - off
Expansion Chassis pwr - off
10. Perform ON-ORBIT DATA COLLECTION INIT

GPS/INS SOFTWARE UPDATE

GPS/INS 1. ✓ 'C:\>' prompt appears on screen
PGSC

* If not, press [ALT]/[ESC] to end program *

2. Enter 'mkdir archive' to create subdirectory
3. Enter 'move *.dat archive' to archive latest data files

OCA
PGSC

4. Enter 'cd c:\OCA-up\other'
5. Insert floppy disk in drive A:
6. Enter 'copy update.bat a:' to copy files to floppy
7. Enter 'copy *.exe a:' to copy files to floppy

GPS/INS
PGSC

8. Place floppy disk in drive
9. Enter 'a:' to switch to floppy drive
10. Enter 'update' to load new executable
11. Enter 'c:' to switch back to hard drive

SPACE INTEGRATED GLOBAL POSITIONING
SYSTEM/INERTIAL NAVIGATION SYSTEM (DTO 700-15)

UNSTOW	FS 8-2
ON-ORBIT DATA COLLECTION INIT	FS 8-4
TERM	FS 8-5
DATA DOWNLINK	FS 8-5
PCDECOM CONNECT	FS 8-6
ATTITUDE RE-INIT	FS 8-7
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ENTRY-DATA COLLECTION	FS 8-11
SIGI SCHEMATIC	FS 8-12
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SIGI - PGSC 1553 COMMUNICATION LOSS	FS 8-15
COLDSTART	FS 8-16
SIGI SOFTWARE UPDATE	FS 8-18

DTO
700-15

DTO
700-15

UNSTOW

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 5

- MA16F 1. Open locker door
2. ✓Temp strip – rightmost three blocks black
- * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr – off *
 - * Expansion Chassis pwr – off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
- * DC UTIL PWR – ON *
 - * Expansion Chassis pwr – on *
 - * PGSC pwr – on *
 - * ✓MCC *
3. Remove PGSC foam assy
- SIGI 4. Open PGSC monitor
PGSC
5. Press [ALT]/[ESC]
✓'C:\>' appears on display
6. Enter 'cflash'
✓15-20 total files copied from drive D
7. PGSC pwr – off
Expansion Chassis pwr – off

Cont next page

WARNING
Pwr cable remains active; use
caution when handling

8. Disconnect data cables, pwr cables
- MA16F 9. Remove cables from locker door openings
10. Remove foam bottom assy from PGSC
- SIGI 11. Reconnect data cables, pwr cables
PGSC
- MA16F 12. Unstow PCMCIA OCA/Entry Flash Cards (two)
- PCMCIA 13. Remove PCMCIA Ascent Flash Cards (two)
Slots
- MA16F Stow PCMCIA Ascent Flash Cards (two)
- PCMCIA 14. Insert PCMCIA OCA/Entry Flash 1 Card -
Slots Drive D (Top Slot)
Insert PCMCIA OCA/Entry Flash 2 Card -
Drive E (Bottom Slot)
- MA16F 15. Stow foam assy in locker

ON-ORBIT DATA COLLECTION INIT

If data acquisition software running, go to step 4

- SIGI
PGSC
1. Expansion Chassis pwr - on
PGSC pwr - on
 2. ✓ 'C:\>' appears on display
 3. Enter 'ORBIT'
✓ 1553 msgs successful counter incrementing
 4. Toggle to Summary display:
Press [ALT]/[U]
 5. Begin Data Recording:
Press [Alt]/[R]
✓ Record flag blinking
 6. At Summary display:
✓ Parameter Values against WorldMap PGSC:
Time GMT within 5 sec
Latitude within 2°
Longitude within 2°
Altitude within 2nm
GPS Status 4 satellites tracked
If any parameter out of limits, ✓MCC
 7. If desired, close monitor

ON-ORBIT DATA COLLECTION TERM

- SIGI
PGSC
1. At end of data recording, terminate data acquisition:
Press [ALT]/[R]
✓ Record flag not blinking
Close monitor
 2. If pwrnd desired:
Press [ALT]/[ESC]
✓ 'C:\>' appears on display
PGSC pwr - off
Expansion Chassis pwr - off >>

DATA DOWNLINK

- SIGI
PGSC
1. If data acquisition software running:
✓ Record flag not blinking
Press [ALT]/[ESC]
✓ 'C:\>' appears on display
Go to step 3
 2. Expansion Chassis pwr - on
PGSC pwr - on
✓ 'C:\>' appears on display
- PCMCIA
Slots
3. ✓ PCMCIA OCA/Entry Flash 1 Card - Drive D (Top Slot)
PCMCIA OCA/Entry Flash 2 Card - Drive E (Bottom Slot)
 4. Copy current data files to PCMCIA OCA/Entry Flash 1 Card:
Enter 'dataxfer'

NOTE

Data xfer copies up to 40 Mb of data to top slot flash card and then archives same data onto hard drive

5. When data transfer complete:
Remove PCMCIA OCA/Entry Flash 1 Card - Drive D (Top Slot)

Cont next page

- | | |
|--------------|---|
| OCA
PGSC | 6. Insert PCMCIA OCA/Entry Flash 1 Card - Drive D |
| | 7. Perform OCA DOWNLINK (<u>OCA</u>), step 1 |
| | 8. Remove PCMCIA OCA/Entry Flash 1 Card from
OCA PGSC |
| SIGI
PGSC | 9. Insert PCMCIA OCA/Entry Flash 1 Card -
Drive D (Top Slot) |
| | 10. ✓ 'C:\>' appears on display
PGSC pwr - off
Expansion Chassis pwr - off >> |

PCDECOM CONNECT

- | | |
|-----------------|--|
| | 1. Locate pre-routed, spare RS-422 data cable |
| PCDecom
PGSC | 2. If not completed, perform PCDECOM OPS, ACT
(<u>PGSC</u>) |
| | 3. Connect spare TRAD RS-422 cable (command
PGSC 486 (source) connector) to serial port
(COM 2) |
| SIGI
PGSC | 4. Connect spare TRAD RS-422 cable (PGSC 486
receive only connector) to serial port (COM 3)
(Reference SIGI SCHEMATIC) |

ATTITUDE RE-INIT

- SIGI
PGSC
1. Perform ON-ORBIT DATA COLLECTION INIT
 2. Wait 5 min
 3. Perform ON-ORBIT DATA COLLECTION TERM
 4. PGSC pwr - off
Expansion Chassis pwr - off
 5. Expansion Chassis pwr - on
PGSC pwr - on
 6. ✓ PCDECOM CONNECT completed
 7. ✓ 'C:\>' appears on display
 - * If 'C:\>' does not appear, *
 - * press [ALT]/[ESC] *
 8. Enter 'ALIGN'
 - ✓ PCDecom Port Status - ENABLED
 - PCDecom Receive Status:
'Success' appears on display
- NOTE**
Attitude init may take up to 1 min
- ✓ 'Attitude Initialization successfully completed' or
'Attitude Reinitialization Not Necessary
(< 1.0 Deg Error)'
 - If attitude init not complete after 1 min:
 - Record current attitude difference per axis
from display
 - Press 'Q'
 - Contact MCC
9. ✓ 'C:\>' appears on display
 - PGSC pwr - off
 - Expansion Chassis pwr - off >>

ASCENT DATA DOWNLINK

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 5

- MA16F 1. Open locker door
2. ✓Temp strip – rightmost three blocks black
- * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr – off *
 - * Expansion Chassis pwr – off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
- * DC UTIL PWR – ON *
 - * Expansion Chassis pwr – on *
 - * PGSC pwr – on *
 - * ✓MCC *
3. Remove PGSC foam assy
- SIGI 4. Open PGSC monitor
PGSC
5. Press [ALT]/[ESC]
✓'C:\>' appears on display
6. Enter 'cflash'
✓15–20 total files copied from drive D
7. PGSC pwr – off
Expansion Chassis pwr – off
- MA16F 8. Unstow PCMCIA OCA/Entry Flash Cards (two)
- PCMCIA 9. Remove PCMCIA Ascent Flash Cards (two)
Slots
- MA16F Stow PCMCIA Ascent Flash Cards (two)

Cont next page

FS 8–8

ORB OPS/86/FIN

PCMCIA 10. Insert PCMCIA OCA/Entry Flash 1 Card -
Slots Drive D (Top Slot)
Insert PCMCIA OCA/Entry Flash 2 Card -
Drive E (Bottom Slot)

SIGI 11. Perform DATA DOWNLINK
PGSC

12. Perform ON-ORBIT DATA COLLECTION INIT

13. Close monitor

MA16F 14. Return hardware to locker and close locker door
✓Data and pwr cable connections secure

SETUP

NOTE

Interrupting PGSC pwr when removing from locker will cause loss of data. Be careful to ensure all cable connections remain secure through step 4

- MA16F 1. Open locker door
2. ✓Temp strip - rightmost three blocks black
- * If Temp strip rightmost three blocks not *
 - * black, turn pwr off at ML85E, then: *
 - * Wait 10 min *
 - * PGSC pwr - off *
 - * Expansion Chassis pwr - off *
 - * ✓Temp strip rightmost three blocks black *
- ML85E
- * DC UTIL PWR - ON *
 - * Expansion Chassis pwr - on *
 - * PGSC pwr - on *
 - * ✓MCC *
- SIGI 3. Open PGSC monitor
- PGSC
4. Press [ALT]/[ESC]
✓'C:\>' appears on display
5. PGSC pwr - off
Expansion Chassis pwr - off
6. Perform DATA DOWNLINK
- WARNING**
Pwr cable remains active; use
caution when handling
7. Disconnect data cables, pwr cables
- MA16F 8. Remove cables from locker door openings

Cont next page

SIGI 9. Reconnect data cables, pwr cables
PGSC

MA16F 10. Stow foam assy in locker

ENTRY-DATA COLLECTION

1. If data acquisition software running:
 - ✓ Record flag not blinking
 - Press [ALT]/[ESC]
 - ✓ 'C:\>' appears on display

SIGI 2. PGSC pwr - off
PGSC Expansion Chassis pwr - off

WARNING
Pwr cable remains active; use
caution when handling

3. Disconnect data cable, pwr cable, PCDECOM cable

MA16F 4. Reroute cables through locker door opening

5. Remove foam assy

SIGI 6. Stow PGSC in bottom foam assy
PGSC

7. Reconnect data, pwr cables through foam assy

8. Expansion Chassis pwr - on
PGSC pwr - on

9. ✓ 'C:\>' appears on display
✓ Expansion Chassis fan running

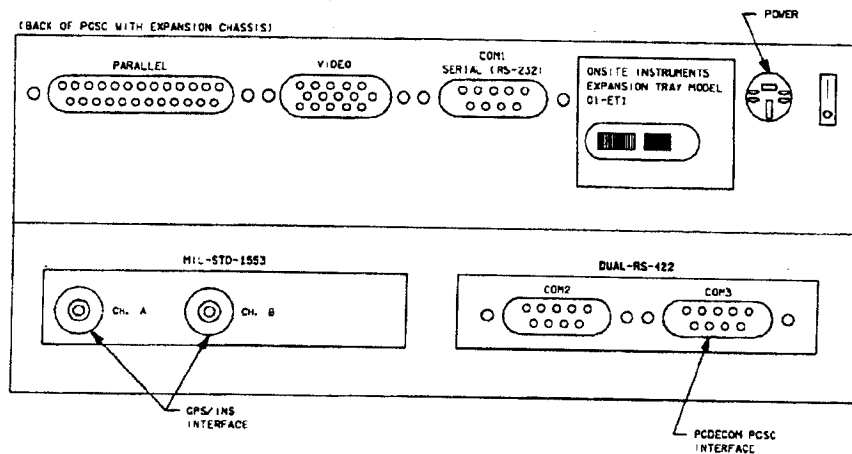
PCMCIA 10. ✓ PCMCIA OCA/Entry Flash Cards (two) installed
Slots

Cont next page

11. Clear PCMCIA data:
Enter 'dflash'
✓'File(s) not found' appears for Drive D,E
12. Enter 'ENTRY'
✓1553 msgs successful counter incrementing
13. Toggle to Summary display:
Press [ALT]/[U]
14. ✓Parameter Values against WorldMap PGSC:
Time GMT within 5 sec
Latitude within 2°
Longitude within 2°
Altitude within 2nm
GPS Status 4 satellites tracked
If any parameter out of limits, ✓MCC
15. Close monitor
16. Stow foam assy in locker
✓Data, pwr cable connections secure

MA16F 17. Close locker door

SIGI SCHEMATIC



480368102, PNL 1 2

FS 8-12

ORB OPS/86/FIN

STAR LINE MANEUVER (SLM)

1. CONFIG

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

DAP: B

Change DAP A,B to A14,B2

GNC UNIV PTG

Load first attitude per table

DAP: B2/AUTO/ALT

Init MNVR ITEM 18 EXEC

When in attitude:

DAP: A/AUTO/VERN(ALT)

2. SLM DATA TAKES

Wait 1 min

C3

DAP: FREE

GNC 22 S TRKR/COAS CNTL

Clear Star Table - ITEM 20 EXEC

Acquire Star

SLM #1,2 STAR ID: 27

SLM #3,4 STAR ID: 83

Verify Star in table

Clear Star Table - ITEM 20 EXEC

Verify Star in table

If SLM #4 complete, go to step 3

Cont next page

Load next attitude:

GNC UNIV PTG

SLM #1	SLM #2	SLM #3	SLM #4
R = 219.1	R = 307.5	R = 66.2	R = 70.1
P = 14.0	P = 259.0	P = 133.1	P = 133.2
Y = 22.6	Y = 45.6	Y = 31.7	Y = 32.3

Init MNVR ITEM 18 EXEC
DAP: B/FREE/ALT
DAP: AUTO
When in attitude:
DAP: A/AUTO/VERN(ALT)
Repeat step 2

3. RECONFIG

Change DAP A,B to A6,B1

DAP: A/AUTO/ALT

GNC 22 S TRKR/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

SIGI - PGSC 1553 COMMUNICATION LOSS

- SIGI
PGSC
1. Attempt to restore 1553 communication by cycling pwr on the PGSC:
PGSC pwr - off
Expansion Chassis pwr - off,on
PGSC pwr - on
 2. Enter 'ORBIT' at the 'C:\>' prompt to test communication
 3. If unsuccessful 1553 msgs counter incrementing:
Report status of successful/unsuccessful counters
✓1553 data cable connections A and B firmly mated to PGSC
 4. If still unsuccessful 1553 msgs counter incrementing:
Report status of successful/unsuccessful counters
Perform DTO 700-15 COLDSTART

COLDSTART

- SIGI
PGSC
1. PGSC pwr - off
Expansion Chassis pwr - off
- A13
2. ✓GPS PWR sw - OFF
Wait 30 sec
✓GPS PWR sw - ON
- SIGI
PGSC
3. Expansion Chassis pwr - on
PGSC pwr - on
4. ✓1553 A and 1553 B connectors securely mated
✓PCDecom RS-422 cable mated to COM3 port
5. Enter 'ORBIT' to test 1553 bus communication
Report status of successful/unsuccessful
counters
If successful = 0 (not incrementing):
Press [ALT]/[ESC] to exit software
PGSC pwr - off
Expansion Chassis pwr - off
- A13
6. ✓GPS PWR sw - OFF
Wait 30 sec
✓GPS PWR sw - ON
- SIGI
PGSC
7. [ALT]/R, wait 1 min, then [ALT]/R
Press [ALT]/[ESC] to exit software
PGSC pwr - off
Expansion Chassis pwr - off,on
PGSC pwr - on
8. Enter 'cldstart' to initialize SIGI
Allow at least 90 sec for program execution
✓'Cold Start Trajectory Initialization Completed'
appears on display
If program execution not completed in 2 min,
Press 'q' - exits program
Report status

Cont next page

9. PGSC pwr - off
Expansion Chassis pwr - off
10. Perform ON-ORBIT DATA COLLECTION INIT
11. On msg T-1 (first msg), check word 3 to
✓receiver is working properly
Report value of word 3, NAV'MODE'W2

GPS/INS SOFTWARE UPDATE

SIGI
PGSC

1. ✓ 'C:\>' prompt appears on screen

* If not, press [ALT]/[ESC] to end program *

2. Enter 'mkdir archive' to create subdirectory
3. Enter 'move *.dat archive' to archive latest data files

OCA
PGSC

4. Enter 'cd c:\OCA-up\other'

5. Insert floppy disk in drive A:
6. Enter 'copy update.bat a:' to copy files to floppy
7. Enter 'copy *.exe a:' to copy files to floppy

SIGI
PGSC

8. Place floppy disk in drive
9. Enter 'a:' to switch to floppy drive
10. Enter 'update' to load new executable
11. Enter 'c:' to switch back to hard drive

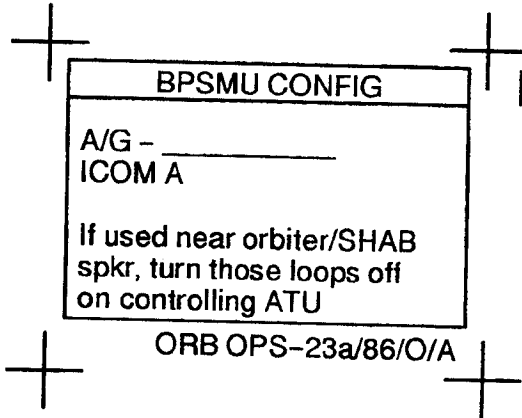
CUE CARD
CONFIG

CUE CARD CONFIGURATION

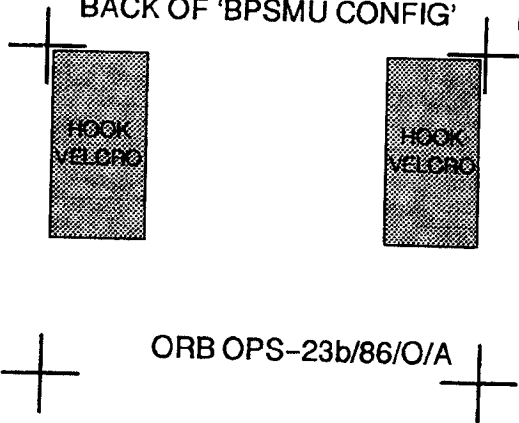
FS 9-1

ORB OPS/86/FIN

TOP



TOP
BACK OF 'BPSMU CONFIG'



FAB USE ONLY

FS CC 9-3

ORB OPS/86/FIN

FAB USE ONLY

FS CC 9-4

ORB OPS/86/FIN

(reduced copy)

TOP

MD (MO42F/MO39M)	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	MHA+	ON
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	HHM	ON
VHS OPS	A/T	T/R	OFF	OFF	T/R	T/R	P/P	HHM	ON
SHAB B/U MODE	A/T	T/R	R	OFF	T/R	T/R	P/P	AIU+	ON
SLEEP CONFIG	A/T	OFF	OFF	OFF	T/R	T/R	P/P	HHM	ON

ORB OPS-24a/86/O/A

TOP
BACK OF 'MD (MO42F/MO39M)'

NON-STANDARD AUDIO CONFIG

ORB OPS-24b/86/O/A

FAB USE ONLY

TOP

HOOK
VELCRG

SHAB AUDIO	PWR	A/G 1	A/G 2	ICOM A	ICOM B	MODE
NOM ORB OPS AUD/T	ON	T/R	R	T/R	T/R	P/P
PAO (SHAB) AUD	ON	R	T/R	R	R	P/P
SLEEP CONFIG	ON	OFF	OFF	T/R	T/R	P/P
DEDICATED A/G X	Other ATUs: A/G X - OFF When complete: Other ATUs: A/G X - As reqd					

HOOK
VELCRG

ORB OPS-25a/86/O/A

(reduced copy)
FS CC 9-5

TOP
BACK OF 'SHAB AUDIO'

HOOK
VELCRG

NON-STANDARD AUDIO CONFIG

HOOK
VELCRG

ORB OPS/86/FIN

ORB OPS-25b/86/O/A

FAB USE ONLY

TOP

CDR (O5/L5)	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	Helmet	ON
NOM ORB OPS/SLEEP	A/T	T/R	R	OFF	T/R	T/R	P/P	VLHS	OFF
PMC	A/T	As Reqd	As Reqd	OFF	OFF	OFF	P/P	VLHS	ON
VHF OPS	AUD	OFF	T/R	OFF	OFF	OFF	P/P	VHF	ON
PAO (FLT DECK-MS)	AUD	T/R	OFF	OFF	T/R	T/R	P/P	VLHS	ON

ORB OPS-26a/86/O/A

TOP
BACK OF 'CDR (O5/L5)'

NON-STANDARD AUDIO CONFIG

ORB OPS-26b/86/O/A

(reduced copy)
FS CC 9-6

ORB OPS/86/FIN



FAB USE ONLY

TOP

PLT (09/R6)	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	Helmet	ON
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	VLHS	OFF
BPSMU OPS	AUD	As Reqd	As Reqd	OFF	T/R	OFF	P/P	CIP	ON
PAO (FLT DECK-MS)	AUD	T/R	OFF	OFF	T/R	T/R	P/P	VLHS	ON

ORB OPS-27a/86/O/A

TOP
BACK OF 'PLT (09/R6)'

NON-STANDARD AUDIO CONFIG

ORB OPS-27b/86/O/A

(reduced copy)

FS CC 9-7

ORB OPS/86/FIN

FAB USE ONLY

TOP

MS (R10/A11)	PWR	A/G 1	A/G 2	A/A	ICOM A	ICOM B	MODE	CCU PLUG	CCU PWR
ASC/ENT	A/T	T/R	T/R	T/R	T/R	T/R	P/V	MHA+	ON
NOM ORB OPS	A/T	T/R	R	OFF	T/R	T/R	P/P	HHM	ON
EVA	A/T	T/R	R	T/R	T/R	T/R	P/P	HHM	ON
SLEEP CONFIG	A/T	T/R	T/R	OFF	R	R	P/P	HHM	ON
PAO (FLT DECK-MS)	AUD	OFF	T/R	OFF	OFF	OFF	P/P	HHM	ON

ORB OPS-28a/86/O/A

TOP
BACK OF 'MS (R10/A11)'

NON-STANDARD AUDIO CONFIG

ORB OPS-28b/86/O/A

FS CC 9-8

(reduced copy)

ORB OPS/86/FIN