List of Implemented Change Requests (482s):

P/TV-00741
P/TV-00742

Incorporate the following:

1. Replace iii thru viii
2. Replace 4-1 and 4-2
3. Replace 5-1 and 5-2
4. Replace 7-1 and 7-2, 7-15 thru 7-18 (4 pages),
   After 7-18, add 7-18a and 7-18b (2 pages)
   Replace 7-23 and 7-24
5. Replace 8-1 and 8-2
6. Replace section 9 (4 pages)
7. Replace 12-15 thru 12-18 (4 pages)
8. Replace 13-3 and 13-4
9. Replace section 16 (16-1 thru 16-6)
10. Replace section 20 (20-1 thru 20-22)
11. Replace section 21 (21-1 and 21-2)

Prepared by: [Signature]
Mission Lead

Approved by: [Signature]
Lead, Shuttle Photo/TV Group

Accepted by: [Signature]
FDF Manager

Encl: 62 pages

*File this PCN immediately behind the front cover as a permanent record*
List of Implemented Change Requests (482s):

P/TV-00740

Incorporate the following:

1. Replace iii thru viii
2. Replace section 4 (4-1 thru 4-32)
3. Delete section 4A
4. Replace section 5 (5-1 thru 5-24)
5. Delete section 5A
6. Replace section 7 (7-1 thru 7-24)
7. Delete section 7A
8. Replace section 9 (9-1 thru 9-6)
9. After 12-12, add 12-12a and 12-12b

NOTE
For STS-127 and subsequent flights

Prepared by: [Signature]
Mission Lead

Approved by: [Signature]
Lead, Shuttle Photo/TV Group

Accepted by: [Signature]
FDF Manager

Encl: 94 pages

File this PCN immediately behind the front cover as a permanent record
List of Implemented Change Requests (482s):

P/TV-0722
P/TV-0723

Incorporate the following:

1. Replace iii thru viii
2. After 5-38, add section 5A (5A-1 thru 5A-24)
3. After 7-16, add section 7A (7A-1 thru 7A-24)

NOTE
For STS-126 and subsequent flights

Prepared by: ____________________________  Approved by: ____________________________
Mission Lead  Lead, Shuttle Photo/TV Group
__________________________  ____________________________
Publication Manager  Manager, Shuttle Procedures Management

Accepted by: ____________________________
FDF Manager

Encl: 54 pages

File this PCN immediately behind the front cover as a permanent record
PCN-4 (Aug 22, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):

P/TV-0718
P/TV-0719

Incorporate the following:

1. Replace iii thru viii
2. After 4-30, add section 4A (4A-1 thru 4A-32)

NOTE
For STS-125 and subsequent flights

Prepared by:  
Mission Lead

Approved by:  
Lead, Shuttle Photo/TV Group

Accepted by:  
FDF Manager

File this PCN immediately behind the front cover as a permanent record
PCN-3 (April 4, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):
P/TV-0717

Incorporate the following:
1. Replace iii thru vi
2. Replace 11-9 and 11-10

NOTE
For STS-124 and subsequent flights
List of Implemented Change Requests (482s):

P/TV-0716

Incorporate the following:
1. Replace iii thru vi
2. Replace 7-9 and 7-10
3. Replace 11-1 and 11-2, 11-5 thru 11-10
4. Replace 20-1 and 20-2, 20-7 and 20-8, 20-15 and 20-16

NOTE
For STS-122 and subsequent flights

Prepared by: [Signature]
Mission Lead

Approved by: [Signature]
Lead, Shuttle Photo/TV Group

Accepted by: [Signature]
FDF Manager

Encl: 20 pages

File this PCN immediately behind the front cover as a permanent record
PCN-1 (Sept 14, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

P/TV-0714
P/TV-0715

Incorporate the following:
1. Replace iii thru vi
2. Replace 4-11 and 4-12, 4-19 thru 4-24
3. Replace Section 5 (38 pages)
   After 5-38, delete 5-39 and 5-40
4. Replace 9-3 thru 9-6
5. Replace 11-9 thru 11-12
6. Replace 12-1 and 12-2, 12-13 thru 12-20
7. Replace 16-3 and 16-4
8. Replace 20-3 thru 20-6, 20-13 and 20-14, 20-17 thru 20-20

NOTE
For STS-120 and subsequent flights

Prepared by: [Signature]  Mission Lead

Approved by: [Signature]  Lead, Shuttle Photo/TV Group

Accepted by: [Signature]  FDF Manager

Encl: 80 pages

File this PCN immediately behind the front cover as a permanent record
MISSION OPERATIONS DIRECTORATE

PHOTO/TV CHECKLIST

GENERIC, REVISION I
June 5, 2007

PREPARED BY:

Carol H. Pierce
C. Pierce
Publication Manager

APPROVED BY:

D. Williams
Technical Lead, Shuttle Photo/TV Group

K. Johnson
Manager, Shuttle Procedures Management

ACCEPTED BY:

Michael T. Hurt
FDF Manager

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.
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† – May be replaced with CD in flight book only
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NOTE
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**NIKON D2Xs**

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D2Xs

SPECIFICATIONS

CAMR BODY

- CMOS SENSOR SIZE: 23.7mm x 15.7mm
- PIXEL COUNT: 4288 x 2848
- DISK/FRAME: 1 GB, ~90 frames; 4 GB, ~360 frames
- RAW FILE SIZE: ~10 MB (compressed)
- EXPOSURE CONTROL: Auto (program, shutter priority, aperture priority), Manual
- METER PATTERN: 3D Color Matrix, Center Weighted, Spot
- EXPOSURE COMP: ±5 in 1, 1/3, 1/2 EV steps
- SHUTTER: Program & Aperture Priority – 1/8000 thru 30 sec (virtually stepless)
  Manual & Shutter Priority – 1/8000 thru 30 sec (1,1/3,1/2) stop increments), 250x, and Bulb (manual only)
- ISO Setting: 100-3200; >800 controlled by menu
- FRAME RATE: Single, CH – 5 fps, CL – 1-4 fps
  Burst Rate: Mode dependent
- CAMR BATT: Li-ION EN-EL4A
- CAMR BATT VOLTAGE: 11.1VDC
- CAMR BATT LIFETIME: ~1000 frames
- CAMR WEIGHT: 2.4 lb (w/Batt & Memory Card)

FLASH

- SB-28 DX
  BATT: 4AA
  BATT LIFETIME: 200+ images
  WEIGHT: w/o Batt – 0.85 lb

- SB-800 DX
  BATT: 4AA
  BATT LIFETIME: 200+ images
  WEIGHT: w/o Batt – .77 lb
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<th>Aperture Range (f/stop)</th>
<th>Approximate Field of View (FOV)</th>
<th>Approx Minimum Focus Distance (ft)</th>
<th>Weight (lb)</th>
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<th>M-A Switch</th>
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D2Xs (Continued)

NOMENCLATURE

CAMR – FRONT

1. Vertical Shooting Sub-command Dial
2. Vertical Shooting Shutter-release Lock pb
3. Vertical Shooting Shutter-release pb
4. Function pb
5. Depth-of-field Preview pb
6. Sub-command Dial
7. Power sw
8. Shutter Release pb
9. Ambient Light Sensor
10. Self-timer LED
11. Flash Sync Terminal
12. 10-pin Remote Terminal
13. Lens Release pb
14. Focus mode Selector
D2Xs (Continued)

NOMENCLATURE (Continued)

CAMR – BACK

1 Speaker
2 ENTER ( )/Playback Zoom ( ) pb
3 Protect ( )/HELP ( ) pb
4 Thumbnail ( ) pb
5 MENU ( ) pb
6 Monitor
7 Playback ( ) pb
8 Delete ( ) pb
9 FORMAT ( ) pb
10 Eyepiece Shutter Lever
11 Viewfinder Eyepiece
12 AE/AF Lock ( ) pb
13 AF-ON ( ) pb
14 Main Command Dial
15 Multi Selector
16 Focus Selector Lock
17 Memory Card Access Lamp
18 AF-area Mode Selector
19 Card-slot Cover Release Button (under Cover)
20 Memory Card Slot Cover
21 Main Command Dial for Vertical Shooting
22 AF-ON ( ) for Vertical Shooting pb
23 Microphone ( ) pb
24 Microphone
25 White Balance (WB) pb
26 Image Quality/Size (QUAL) pb
27 ISO Sensitivity (ISO) pb
28 Rear Control Panel
D2Xs (Continued)

NOMENCLATURE (Continued)

CAMR – TOP

1. Shooting Mode Dial
2. Shooting Mode Dial Lock Release
3. Bracket (pb)
4. Ambient Light Sensor
5. Meter Selector
6. Meter Selector Lock pb
7. Exposure Mode ( )/Format ( ) pb
8. Power sw
9. Shutter-release pb
10. Exposure Compensation ( ) pb
11. Top LCD
12. Diopter Adjustment Knob
13. Accessory Shoe
14. Focal Plane Mark ( )
15. Lock ( ) pb
16. Flash Sync Mode ( ) pb
D2Xs (Continued)

NOMENCLATURE (Continued)

CAMR – LEFT SIDE

Housing Doors Closed

Housing Doors Open

1 Audio/video (A/V) Connector
2 DC-in Connector
3 USB Connector
4 Battery Cover Latch
D2Xs (Continued)

NOMENCLATURE (Continued)

CAMR – TOP CONTROL PANEL

1. High Speed Crop
2. GPS Connection
3. Exposure Compensation
4. Clock Battery
5. Flash Exposure Lock
6. Flash Sync Mode
7. AF Area Mode
8. Memory Card
9. Exposure Mode
10. Flexible Program
11. Shutter Speed Lock Icon
12. Shutter Speed
13. Exposure Compensation Value
14. Aperture Delta
15. Aperture (f/number)
16. Battery
17. Frame Count
18. Number of Remaining Exposures
19. Multiple Exposure
20. Aperture Lock Icon
21. Interval Timer
22. Image Comment
23. Manual Exposure Meter
24. Bracketing Progress Indicator
25. Bracketing Indicator

jsc48037_156.cvx
D2Xs (Continued)

NOMENCLATURE (Continued)

CAMR – REAR CONTROL PANEL

1 ISO Sensitivity Indicator
2 Shooting Menu Settings Bank
3 Remaining Exposure Indicator
4 Custom Settings Bank
5 Image Size
6 White Balance Bracketing Indicator
7 Voice Memo Recording Indicator (Shooting Mode)
8 Voice Memo Status Indicator
9 Voice Memo Recording Mode
10 White Balance Mode
11 Image Quality
12 ISO Sensitivity Length of Voice Memo
D2Xs (Continued)

NOMENCLATURE (Continued)

VIEWFINDER DISPLAY – LOWER BAR

1. Focus Indicator
2. Metering
3. Bracketing Indicator
4. Autoexposure (AE) Lock
5. Shutter Speed Lock Icon
6. Shutter Speed
7. Aperture Lock Icon
8. Aperture (f/number)
9. Exposure Mode
10. Exposure Compensation Indicator
11. Frame Counter
12. Flash Ready Indicator
13. Electronic Analog Exposure Display
14. Aperture Stop Indicator
15. Sync Indicator
16. FV Lock Indicator
17. Battery Indicator
D2Xs (Continued)

NOMENCLATURE (Concluded)

VIEWFINDER DISPLAY – RIGHT SIDE BAR

1. Voice Memo Status Indicator
2. White Balance Bracketing Indicator
3. White Balance Mode
4. Image Size
5. Image Quality
6. ISO Sensitivity Indicator
7. ISO Sensitivity
### CAMR MENU

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**CAMR MENU (Continued)**

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D2Xs (Continued)

CAMR MENU (Continued)

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**D2Xs (Continued)**

### NOMINAL SETUP

**D2Xs PROGRAM w/FLASH**

- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- Batt installed
- Flash Card installed
- Pwr – ON
- Top LCD
- Batt
- Frames remaining sufficient
- Exp Comp (0) – 0.0
- Exp Mode – P
- Meter – Matrix ()
- Diopter – Adjust
- Frame Rate – S
- BKT disabled – 0 F
- Rear LCD
- ISO – 100
- QUAL – RAW
- WB – 0, A
- AF Area Mode – [ ]
- Focus Area – Center
- Focus Selector Lock – L

**SB-800 Flash Settings**

- Diffuser Dome installed
- ON/OFF pb – ON
- MODE – TTL BL
- Exp Comp – 0 EV
- Tilt – 45° (Direct)

---

**D2Xs SHUTTER PRIORITY (EARTH OBS)**

- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- Batt installed
- Flash Card installed
- Pwr – ON
- Top LCD
- Batt
- Frames remaining sufficient
- Exp Comp (0) – 0.0
- Exp Mode – S
- SS – 500
- Meter – Matrix ()
- Diopter – Adjust
- Frame Rate – S
- BKT disabled – 0 F
- Rear LCD
- ISO – 100
- QUAL – RAW
- WB – 0, A
- AF Area Mode – [ ]
- Focus Area – Center
- Focus Selector Lock – L

**SB-800 Flash Settings**

- ON/OFF pb – OFF
D2xs (Continued)

NOMINAL SETUP (Continued)

D2xs APERTURE PRIORITY

- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- √Batt installed
- √Flash Card installed
- Pwr – ON
- Top LCD
- √Batt
- √Frames remaining sufficient
- Exp Comp (تردد) – 0.0
  - Exp Mode – A
    - f/stop – as reqd
- Meter – Matrix (ندارد)
- Diopter – Adjust
- Frame Rate – S
- √BKT disabled – 0 F
- Rear LCD
- √ISO – 100
- √QUAL – RAW
- √WB – 0,A
- AF Area Mode – [ ]
- √Focus Area – Center
- √Focus Selector Lock – L
- SB-800 Flash Settings
  - √Diffuser Dome installed
  - ON/OFF pb – ON
  - √MODE – 
    - # # # # # # #
  - √Exp Comp – 0 EV
  - Tilt – 45° (Direct)

D2xs MANUAL

- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- √Batt installed
- √Flash Card installed
- Pwr – ON
- Top LCD
- √Batt
- √Frames remaining sufficient
- Exp Comp (تردد) – 0.0
  - Exp Mode – M
    - SS – as reqd
    - f/stop – as reqd
- Meter – Matrix (ندارد)
- Diopter – Adjust
- Frame Rate – S
- √BKT disabled – 0 F
- Rear LCD
- √ISO – 100
- √QUAL – RAW
- √WB – 0,A
- AF Area Mode – [ ]
- √Focus Area – Center
- √Focus Selector Lock – L
- SB-800 Flash Settings
  - ON/OFF pb – OFF
D2Xs (Continued)

NOMINAL SETUP (Continued)

D2Xs CREW PHOTO

- Lens – 17-35mm @ 17mm
- Lens Focus Mode – M/A
- Aperture – Min, locked
- Body Focus Mode – S
- Batt installed
- Flash Card installed
- Pwr – ON
- Top LCD
- Batt
- Frames remaining sufficient
- Exp Comp ( ) – 0.0
- Exp Mode – A
  - f/stop – f/8
- Meter – Matrix ( )
- Diopter – Adjust
- Frame Rate – Selftimer
- BKT disabled – 0 F
- Rear LCD
- ISO – 100
- QUAL – RAW
- WB – 0,A
- AF Area Mode – [ ]
- Focus Area – Center
- Focus Selector Lock – L
- SB-800 Flash Settings
  - Diffuser Dome installed
  - ON/OFF pb – ON
  - MODE – TTL
  - Exp Comp – 0 EV
  - Tilt – 45° (Direct)
- Accessory Equipment
  - Shutter Release Cable – Install
  - Multiuse Brkt – Install
  - Multiuse Brkt, Clamp – Install as reqd

Technique
1. Focus on crewmember
2. Body Focus Mode – M
3. Frame, Fire

D2Xs EXPOSURE MATCH

- Lens – 12-24mm @ 18mm
- Lens Focus Mode – M/A
- Aperture – Min, locked
- Body Focus Mode – S
- Batt installed
- Flash Card installed
- Pwr – ON
- Top LCD
- Batt
- Frames remaining sufficient
- Exp Comp ( ) – 0.0
- Exp Mode – P
- Meter – Matrix ( )
- Diopter – Adjust
- Frame Rate – S
- BKT disabled – 0 F
- Rear LCD
- ISO – 100
- QUAL – RAW
- WB – 0,A
- AF Area Mode – [ ]
- Focus Area – Center
- Focus Selector Lock – L
- SB-800 Flash Settings
  - Diffuser Dome installed
  - ON/OFF pb – ON
  - MODE – TTL
  - Exp Comp – 0 EV
  - Tilt – 45° (Direct)

Technique for Single Shots
1. Fill FOV w/sunlit subject
2. Activate D2Xs Camr
3. Auto Exp Lock – Depress, hold
   Expect values such as 250, f/11
4. Focus, Frame, Fire

Technique for Multiple Shots
1. Fill FOV w/sunlit subject
2. Activate D2Xs Camr
3. Note SS, f/stop
4. Expect values such as 250, f/11
5. Exp Mode – M
   SS – as noted
   Aperture – as noted
D2Xs (Continued)

NOMINAL SETUP (Continued)

D2Xs AURORA/AIRGLOW

- **Lens** – 28mm
  - Lens Focus Mode – A
  - Aperture – Min, locked
  - Body Focus Mode – S
  - √Batt installed
  - √Flash Card installed
  - Pwr – ON
  - Top LCD
  - √Batt
  - √Frames remaining sufficient
- Exp Comp (  ) – 0.0
- **Exp Mode** – M
  - SS – 1"
  - f/stop – f/1.4
- Meter – Matrix (  )
- Diopter – Adjust
- √BKT disabled – 0 F
- Rear LCD
  - √ISO – 800
  - √QUAL – RAW
  - √WB – 0,A
  - AF Area Mode – [ ]
  - √Focus Area – Center
  - √Focus Selector Lock – L
- SB-800 Flash Settings
  - ON/OFF pb – OFF
- Technique
  1. Dim cabin lights
  2. Use dark clothing to shield window
  3. Focus, Frame, Fire

D2Xs CITY LIGHTS/STARS

- **Lens** – 28mm
  - Lens Focus Mode – A
  - Aperture – Min, locked
  - Body Focus Mode – S
  - √Batt installed
  - √Flash Card installed
  - Pwr – ON
  - Top LCD
  - √Batt
  - √Frames remaining sufficient
- Exp Comp (  ) – 0.0
- **Exp Mode** – M
  - SS – 4
  - f/stop – f/1.4
- Meter – Matrix (  )
- Diopter – Adjust
- √BKT disabled – 0 F
- Rear LCD
  - √ISO – 800
  - √QUAL – RAW
  - √WB – 0,A
  - AF Area Mode – [ ]
  - √Focus Area – Center
  - √Focus Selector Lock – L
- SB-800 Flash Settings
  - ON/OFF pb – OFF
- Accessory Equipment
  - Shutter Release Cable – Install
  - Multiuse Brkt, Clamp – Install
- Technique
  1. Dim cabin lights
  2. Use dark clothing to shield window
  3. Focus, Frame, Fire
D2Xs (Continued)

NOMINAL SETUP (Continued)

D2Xs LIGHTNING

- **Lens** – 28mm
- **Lens Focus Mode** – A
- **Aperture** – Min, locked
- **Body Focus Mode** – S
- **√Batt installed**
- **√Flash Card installed**
- **Pwr** – ON
- **Top LCD**
  - **√Batt**
  - **√Frames remaining sufficient**
- **Exp Comp (    ) – 0.0**
- **Exp Mode** – M
  - **SS – 2”**
  - **f/stop – f/1.4**
- **Meter** – Matrix (    )
- **Diopter** – Adjust
- **Frame Rate** – S
- **√BKT disabled – 0 F**
- **Rear LCD**
  - **ISO – 400**
  - **√QUAL – RAW**
  - **√WB – 0,A**
  - **AF Area Mode – [ ]**
  - **√Focus Area – Center**
  - **√Focus Selector Lock – L**

SB-800 Flash Settings
- **ON/OFF pb – OFF**

Accessory Equipment
- **Shutter Release Cable** – Install
- **Multiuse Brkt, Clamp** – Install as reqd

**Technique**
1. **Fire Camr repeatedly. Luck reqd**

D2Xs MOON

- **Lens** – as reqd
- **Aperture** – Min, locked
- **Body Focus Mode** – S
- **√Batt installed**
- **√Flash Card installed**
- **Pwr** – ON
- **Top LCD**
  - **√Batt**
  - **√Frames remaining sufficient**
- **Exp Comp (    ) – 0.0**
- **Exp Mode** – M
  - **SS – 500**
  - **f/stop – f/8**
- **Meter** – Matrix (    )
- **Diopter** – Adjust
- **Frame Rate** – S
- **√BKT disabled – 0 F**
- **Rear LCD**
  - **√ISO – 100**
  - **√QUAL – RAW**
  - **√WB – 0,A**
  - **AF Area Mode – [ ]**
  - **√Focus Area – Center**
  - **√Focus Selector Lock – L**

SB-800 Flash Settings
- **ON/OFF pb – OFF**
D2Xs (Continued)

NOMINAL SETUP (Continued)

**D2Xs SILHOUETTE**
- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- √Batt installed
- √Flash Card installed
- Pwr – ON
- Top LCD
- √Batt
- √Frames remaining sufficient
- Exp Comp (署) – 0.0
- Exp Mode – P
- Meter – Matrix ()){
- Diopter – Adjust
- Frame Rate – S
- √BKT disabled – 0 F
- Rear LCD
- √ISO – 100
- √QUAL – RAW
- √WB – 0,A
- AF Area Mode – [ ]
- √Focus Area – Center
- √Focus Selector Lock – L

SB-800 Flash Settings
- ON/OFF pb – OFF

**Technique**
1. Fill FOV w/sunlit subject
2. Activate D2XS Camr
3. **Auto Exp Lock – Depress,hold**
   - Expect values such as 250,f/11
4. Focus, Frame, Fire

**D2Xs SUNRISE/SUNSET**

**WARNING**

**DO NOT LOOK AT SUN**

- Lens – as reqd
- Aperture – Min, locked
- Body Focus Mode – S
- √Batt installed
- √Flash Card installed
- Pwr – ON
- Top LCD
- √Batt
- √Frames remaining sufficient
- Exp Comp (署) – 0.0
- Exp Mode – P
- Meter – Matrix ()){
- Diopter – Adjust
- √BKT disabled – 0 F
- Rear LCD
- √ISO – 400
- √QUAL – RAW
- √WB – 0,A
- AF Area Mode – [ ]
- √Focus Area – Center
- √Focus Selector Lock – L

SB-800 Flash Settings
- ON/OFF pb – OFF

**Technique**
1. Focus, Frame, Fire
D2Xs (Continued)

NOMINAL SETUP (Concluded)

D2Xs SUN STAR EFFECT

- **Lens** – 10.5mm
- **Aperture** – Min, locked
- **Body Focus Mode** – S
- √**Batt installed**
- √**Flash Card installed**
- **Pwr** – ON
- **Top LCD**
  - √**Batt**
  - √**Frames remaining sufficient**
- **Exp Comp** ( ) – 0.0
- **Exp Mode** – A
  - f/stop – f/22
- **Meter** – Matrix ( )
- **Diopter** – Adjust
- **Frame Rate** – S
- √**BKT disabled – 0 F**
- **Rear LCD**
  - √**ISO** – 100
  - √**QUAL** – RAW
  - √**WB** – 0,A
- **AF Area Mode** – [ ]
- √**Focus Area** – Center
- √**Focus Selector Lock** – L

SB-800 Flash Settings
- **ON/OFF pb** – OFF

Technique
1. Place Sun w/Earth, orbiter, crewmember, etc. in FOV

D2Xs TV MONITOR

- **Lens** – as reqd
- **Aperture** – Min, locked
- **Body Focus Mode** – S
- √**Batt installed**
- √**Flash Card installed**
- **Pwr** – ON
- **Top LCD**
  - √**Batt**
  - √**Frames remaining sufficient**
- **Exp Comp** ( ) – 0.0
- **Exp Mode** – S
  - SS – 30
- **Meter** – Matrix ( )
- **Diopter** – Adjust
- **Frame Rate** – S
- √**BKT disabled – 0 F**
- **Rear LCD**
  - √**ISO** – 100
  - √**QUAL** – RAW
  - √**WB** – 0,A
- **AF Area Mode** – [ ]
- √**Focus Area** – Center
- √**Focus Selector Lock** – L

SB-800 Flash Settings
- **ON/OFF pb** – OFF
D2Xs (Continued)

DATE/TIME SET

1. MENU pb – press
2. Navigate pad – sel Menu icon setup menu
   – press (right)
   – sel WORLD TIME (up,down)
   – press (right)
   – sel DATE (up,down)
   – press (right)
3. Set DATE/TIME to GMT
   Navigate pad – sel desired field (left,right)
   – sel desired setting (up,down)
4. ENTER pb – press
5. MENU pb – press twice

DELETING SINGLE IMAGES

1. PLAYBACK pb – press
2. Navigate pad – sel image (up,down)
3. DELETE pb – press twice to delete

ADDING .WAV FILES TO AN IMAGE

1. PLAYBACK pb – press
2. Navigate pad – sel image (up,down)
3. MICROPHONE pb – press, hold (microphone icon appears on rear LCD)
4. Talk to MIC
5. Music Note icon ♪ appears in upper left image

DELETING .WAV FILE FROM AN IMAGE

1. PLAYBACK pb – press
2. Navigate pad – sel image (up,down)
3. DELETE pb – press
4. Sel – Sound only
5. DELETE pb – press
D2Xs (Continued)

.WAV FILE PLAYBACK

1. PLAYBACK button – press
2. Navigate pad – sel image w/music note ♫
3. MICROPHONE button – press

IMAGE FILE TRANSFER

DNLK FROM FLASH CARD

1. Insert Flash Card w/PCMCIA Adapter into KFX PGSC (any networked PGSC), brand name up
2. Inform MCC “files ready”

DCS FILE TO HARD DRIVE

1. Insert Flash Card w/PCMCIA Adapter into any networked PGSC, brand name up
2. Double click:
   “My Computer” icon on desktop
   “Removable Disk D” or appropriate drive
   Folder “DCIM” or appropriate folder
   Folder “100 ND2XS”
3. Select all files
4. Copy all files
5. Double click:
   “Imagery Folder on KFX PGSC” shortcut on desktop
   Appropriate subfolder (e.g., FD1, OMS Pod, etc.)
6. Paste files
7. Close all windows
8. Inform MCC “files ready” on PGSC
9. Stow card
D2Xs (Continued)

RECOVER LOST IMAGES

1. Insert suspect Flash Card into A31p, brand name up
2. Open SHUTTLE APPS | Photo Processing | mediaRECOVER
3. In 'mediaRECOVER' window
   Sel 'Settings' in left-hand column
   Under 'My image file size', move slider until '10.00 MB' displayed
   Sel 'Recovery' in left-hand column
   In 'Drive to recover' column, sel 'Removable Disk' in pulldown menu
   Sel 'Next >'
4. In 'Where do you want to save recovered files?' column
   Sel '…' button
   In 'Choose directory…' window
   Sel 'Local Disk (C)'
   Sel 'OCA-down'
   Sel 'Imagery'
   Sel 'New Folder' option button
   Type 'Recover' as new folder name
   Press Enter
   Click on 'Recover' folder
   Sel 'OK'
   Sel 'Next >'
5. In 'Progress' column
   √ 'Preview' box
   Sel 'Start'
6. In 'Analyze Drive' window

   NOTE
   Scan will take several min (~45 min)

   Sel 'Use folder based recover'
   Verify √ in box next to 'Look for additional lost files'
   Sel 'Continue'
D2Xs (Concluded)

RECOVER LOST IMAGES (Concluded)

7. When 'Preview' window appears, move 'Preview' window below 'mediaRECOVER' window to view progress bar

   **NOTE**
   
   When scan completed, 'Save Images' window will appear

8. In 'Save Images' window

    **NOTE**
    
    May take several minutes to save to 'Recover' folder

    √ All images have '√' in their select box
    
   Sel 'Save Images'

9. When finished saving ('Save Images' window will automatically close), close 'mediaRECOVER' window

10. Close 'Photo Processing' window

11. Notify MCC regarding location of images
# D2Xs EVA CAMR

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</table>
D2Xs EVA CAMR

SPECIFICATIONS

CAMR BODY

- CMOS SENSOR SIZE: 15.7mm x 23.7mm
- PIXEL COUNT: 4288 x 2848
- DISK/FRAME: 1 GB, ~90 frames; 4 GB, ~360 frames
- RAW FILE SIZE: ~10 MB
- EXPOSURE CONTROL: Auto (program, shutter priority, aperture priority), Manual
- METER PATTERN: 3D Color Matrix, Center Weighted, Spot
- EXPOSURE COMP: ±5 in 1, 1/3, 1/2 EV steps
- SHUTTER:
  - Program & Aperture Priority – 1/8000 thru 30 sec (virtually stepless)
  - Manual & Shutter Priority – 1/8000 thru 30 sec (1, 1/3, 1/2) stop increments), 250x, and Bulb (manual only)
- ISO Setting: 100-3200; >800 controlled by menu
- FRAME RATE: Single, C_L – 3 fps, C_H – 5 fps
- Burst Rate: Mode dependent
- CAMR BATT: Li-ION EN-EL4A
- CAMR BATT VOLTAGE: 11.1VDC
- CAMR BATT LIFETIME: ~1000 frames
- CAMR WEIGHT: 2.4 lb (w/Batt & Memory Card)
D2Xs EVA CAMR (Continued)

LENS DATA

**NOTE**
Do not use non-EVA lens w/D2Xs EVA

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<th>Lens</th>
<th>Aperture Range (f/stop)</th>
<th>Approximate Field of View (FOV)</th>
<th>Approx Minimum Focus Distance (ft)</th>
<th>Weight (lb)</th>
<th>Filter Size</th>
<th>M-A Switch</th>
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<td>Horizontal</td>
<td>Vertical</td>
<td>Diagonal</td>
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<td>28mm AF</td>
<td>f/2.8-f/22</td>
<td>46°</td>
<td>31°</td>
<td>54°</td>
<td>1.25</td>
<td>0.46</td>
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<td>35mm AF</td>
<td>f/2.0-f/22</td>
<td>37°</td>
<td>25°</td>
<td>44°</td>
<td>0.9</td>
<td>0.51</td>
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<td>f/1.4-f/16</td>
<td>27°</td>
<td>18°</td>
<td>32°</td>
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<td>70-200mm AF</td>
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<td>13°-4.5°</td>
<td>23°-8°</td>
<td>6.0</td>
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<td>85mm AF</td>
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<td>19°</td>
<td>2.8</td>
<td>1.23</td>
</tr>
<tr>
<td>105mm AF</td>
<td>f/2.8-f/32</td>
<td>13°</td>
<td>9°</td>
<td>15°</td>
<td>1.0</td>
<td>1.22</td>
</tr>
<tr>
<td>180mm AFD</td>
<td>f/2.8-f/22</td>
<td>7°</td>
<td>5°</td>
<td>9°</td>
<td>5.0</td>
<td>1.72</td>
</tr>
</tbody>
</table>
D2Xs EVA CAMR (Continued)

NOMENCLATURE

1. Flash Pwr sw
2. External Camr Batt Low Light/LED
3. Batt Cap
4. Rear Flash Display Window
5. Flash Ready Lt Window
6. Flash Mount Rail
7. Camr Batt Pwr sw
8. Flash Housing
9. Batt Cap Straps
10. Batt Housing
11. External Camr Pwr Port
12. Flash Sync Port
13. Flap F
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR ONLY

NOTE
When Camr not in use during EVA, Thermal Lens Cap must be installed

1. Unstow assemble
   D2Xs Camr
   Lens – as reqd
   If 28(35,50,105)mm EVA Lens:
     √Circular Polar 52mm Filter w/o glass fully installed on lens
   D2Xs Batt – fully charged
   4 GB EVA Flash Card

2. Unstow but do not install
   EVA Camr Blanket
   Camr Mounting Assy w/Thermal Blanket and Tether
   EVA Eyepiece w/Thermal Wrap,Tether

3. Camr Settings
   Lens – as reqd
   Aperture – Min, locked
   Body Focus Mode – S
   √Batt installed
   √Flash Card installed
   Pwr – ON
   Top LCD
     √Batt
     √Frame count = 1
       If >1, perform D2Xs FORMAT, 5-22
   Exp Comp ( ⌘ ) – 0.0
   Exp Mode – P
   Meter – Matrix ( ⦿ )
   Diopter – Adjust
   Frame Rate – S
   √BKT disabled – 0 F
D2xs EVA CAMR (Continued)

D2XS EVA – CAMR ONLY (Continued)

D2xs

3. **Cmr Settings** (Concluded)
   - Rear LCD
     - **ISO** – 100
     - **QUAL** – RAW
     - **WB** – 0,A
     - **AF Area Mode** – [ ]
     - **Focus Area** – Center
     - **Focus Selector Lock** – L
     - **Vertical Shooting Shutter Release Lock** – L (L to white line)
   - **Menu Settings:**
     - **Menu pb** – press
     - **Navigate Pad sel** – Playback Menu ➤ Image Review
       - STOP
       - **Setup Menu ➤ Worldtime**
     - **Date/Time set to GMT**
       - If reqd to set, perform DATE/TIME SET, 5-22

4. Close Eyepiece shutter
5. Remove IVA Eyepiece
6. Open Eyepiece shutter
7. Install EVA Camr Blanket starting at top of Camr
8. **Lens Cap removed from Lens**
9. Activate Shutter Release:
   - No “:EE” in Viewfinder
     - If “:EE” displayed:
       - Remove Lens
       - Aperture – Min, locked
       - Replace Lens
   - **Lens moves freely under EVA Camr Blanket**
10. Install 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
11. Install EVA Eyepiece
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR ONLY (Continued)

12. Thread Eyepiece Tether thru Hot Shoe openings on Camr Thermal Blanket
    Close Hot Shoe Cover

13. Loop Thermal Wrap thru Tether

14. Wrap Thermal Wrap around Eyepiece
D2XS EVA CAMR (Continued)

D2XS EVA – CAMR ONLY (Concluded)

15. Install Camr Mounting Assy w/Thermal Blanket from rear
16. \(\checkmark\) Camr Mounting Assy seated, will not slip off Camr. Release pb – out
17. Connect French Hook to D-Ring on left side of Camr

18. Stow Camr until day of EVA

If Remote Cord Assy used:
19. Connect Remote Cord Assy to Remote Release Port on D2XS Camr (Connector will thread into place)

20. \(\checkmark\) Remote Cord Assy not locked
21. Remove 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
22. Test fire D2XS w/Remote Release (two shots)
23. Install 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
24. Stow until day of EVA
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR ONLY DISASSEMBLY

BETWEEN EVAs

NOTE

Removal of Batt, Card and Camr turnaround main objectives

1. Disconnect Tether from D-Ring
2. Detach Camr Mounting Assy from D2Xs Camr
3. Lift back EVA Camr Blanket to access Batt, Card compartments
4. Remove, replace:
   D2Xs Batt
   4 GB EVA Flash Card
5. Re-install Camr Blanket
6. Install Camr Mounting Assy w/Thermal Blanket from rear
7. √ Camr Mounting Assy seated, will not slip off Camr. Release pb – out
8. Connect French Hook to D-Ring on left side of Camr

FINAL CONFIGURATION

9. Stow Camr until day of EVA
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR ONLY DISASSEMBLY (Concluded)

POST-EVA

NOTE
Removal of Batt, Card and stowing of EVA H/W and IVA use of D2Xs main objectives

1. Disconnect Tether from D-Ring
2. Detach Camr Mounting Assy and Thermal Wrap from D2Xs Camr
3. Disconnect Eyepiece Tether
4. Close Eyepiece shutter
5. Remove:
   - EVA Eyepiece
   - EVA Camr Blanket
   - D2Xs Batt
   - 4 GB EVA Flash Card
6. Replace IVA Eyepiece
7. Open Eyepiece shutter

If reqd:
8. Return Camr to Nominal Ops
   - Replace D2Xs Batt and 4 GB EVA Flash Card
Menu Settings:
   - MENU pb – press
   - Navigate Pad sel – Playback Menu ➤ > Image Review
     - ON
   - ➤ press twice
   - Camr Pwr – OFF
D2XS EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH

NOTE
When Camr not in use during EVA, Thermal Lens Cap must be installed

1. Unstow Install
   D2XS Camr
   Lens – As Reqd
   If 28(35,50,105)mm EVA Lens:
   √Circular Polar 52mm Filter w/o glass fully installed on lens
   D2XS Batt – fully charged
   4 GB EVA Flash Card

2. Unstow but do not install
   EVA Camr Blanket
   Camr Mounting Assy w/Thermal Blanket and Tether
   EVA Eyepiece w/Thermal Wrap and Tether
   Bracket Assy w/Thermal Blanket
   EVA Flash w/Thermal Blanket
   Flash Sync Cable Assy w/Thermal Blanket
   Remote Cord Assy (SED33112525-302)

D2XS

3. Camr Settings
   Lens – as reqd
   Aperture – Min, locked
   Body Focus Mode – S
   √Batt installed
   √Flash Card installed
   Pwr – ON
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH (Continued)

D2Xs

3. **Camm Settings** (Concluded)

   Top LCD
   - √Batt
   - √Frame count = 1
     - If >1, perform D2Xs FORMAT, 5-22
   - Exp Comp ( ) – 0.0
   - Exp Mode – P
   - Meter – Matrix ( )
   - Diopter – Adjust
   - Frame Rate – S
   - √BKT disabled – 0 F

   Rear LCD
   - √ISO – 100
   - √QUAL – RAW
   - √WB – 0.A
   - AF Area Mode – [ ]
   - √Focus Area – Center
   - √Focus Selector Lock – L
   - √Vertical Shooting Release Lock – L (L to white line)

   Menu Settings:
   - Menu pb – press
   - Navigate Pad sel – Playback Menu > Image Review
     - OFF
     - Setup Menu > Worldtime
   - √Date/Time set to GMT
     - If reqd to set, perform DATE/TIME SET, 5-22

4. Close Eyepiece shutter
5. Remove IVA Eyepiece
6. Open Eyepiece shutter
7. Install EVA Camr Blanket starting at top of Camr
8. √Lens Cap removed from Lens
9. Activate Shutter Release:
   - √No “EE” in Viewfinder
     - If “EE” displayed:
       - Remove Lens
       - Aperture – Min, locked
       - Replace Lens
   - √Lens moves freely under EVA Camr Blanket
D2Xs EVA CAMR (Continued)

D2Xs EVA – CAMR w/FLASH (Continued)

10. Install 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
11. Install EVA Eyepiece
12. Thread Eyepiece Tether thru Hot Shoe openings on Camr Thermal Blanket

13. Loop Thermal Wrap thru Tether

14. Wrap Thermal Wrap around Eyepiece
D2Xs EVA CAMR (Continued)

D2Xs EVA – CAMR w/FLASH (Continued)

15. Obtain Bracket Assy w/Thermal Blanket
   If Thermal Blanket not installed, install on Bracket Assy
16. Insert Remote Cord Assy thru hole in Thermal Blanket (verify Remote Cord Assy not locked) and place lip of remote under Thermal Blanket

![Remote Cord Lip](image)

17. Remove Flash Sync Cover from Flash Sync Cable
18. Install Flash Sync Cable to Camr Hot Shoe:
   Lock Flash Sync Cable – turn lever cw
   Secure Camr Hot Shoe Flap to EVA Camr Blanket
19. Reinstall Flash Sync Cover onto Flash Sync Cable Assy
20. Install D2Xs Camr onto Bracket Assy (from front)
21. Install EVA Flash onto Bracket Assy (from rear)

![Mount for EVA Camera](image)

![Mount for Flash](image)

![Mount for Camr Mounting Assy](image)
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH (Continued)

22. Install Camr Mounting Assy w/Thermal Blanket to Bracket Assy (from rear)
23. √D2Xs Camr, EVA Flash, and Camr Mounting Assy seated, will not slip off Bracket Assy. Release pb – out
24. Connect French Hook to D-Ring on left side of Camr

EVA Flash
25. Open Flaps A, B, F
26. Under Flap B, tuck excess Remote Cord Assy (three coils) into pocket on EVA Flash unit
27. Close Flap B using two snaps

28. Connect Remote Cord Assy to Remote Release Port on D2Xs Camr (Connector will thread into place)

**NOTE**
Adjustments to cables may be reqd during installation

D2Xs
29. Connect Flash Sync Cable Assy to Flash Sync Port on EVA Flash

![Remote Cord Coil](image)

![Sync Port](image)

![Ext Camr Pwr Port](image)
D2XS EVA – CAMR W/FLASH (Continued)

30. Close Flap A over Flash Sync Cable Assy, secure w/Velcro

31. Secure Flash Sync Cable and Remote Cord Assy under Flap F on right side of Flash

EVA Flash
32. Access Flash Batt Compartment (remove Flap(s) C as reqd)
33. Remove Batt Cap
34. Install one DCS 760 Batt into FLASH slot (align arrows)
35. Reinstall Batt Cap
36. Flash – ON
37. Activate Camr
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH (Continued)

38. Open Flap D; verify following:
   √ Mode – TTL
   √ Zoom – “M” not displayed
   If “M” displayed, contact MCC

D2Xs 39. Remove 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
40. Test fire Camr w/Flash using Remote Release (two shots)
41. Flash fired

EVA Flash 42. Flash – OFF
43. Close Flap D
44. Remove DCS 760 Batt from FLASH slot

D2Xs 45. Install 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
46. Stow until day of EVA

PRIOR TO ENTERING AIRLOCK:

If Camr only:
1. Remove 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
2. Activate Shutter Release:
   √ No “i:EE” in Viewfinder
   If “i:EE” displayed:
      Remove Lens
      Aperture – Min, locked
      Replace Lens
3. Test fire Camr
4. Install 28mm, 35mm, 50mm Lens Cap
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH (Concluded)

PRIOR TO ENTERING AIRLOCK; (Concluded)

~

If Camr w/Flash:

EVA Flash
5. Remove Batt Cap
6. Install DCS 760 Batt into Flash slot (align arrows)
7. Reinstall Batt Cap
8. Flash – ON
9. Activate Camr
10. Open Flap D; verify following:
   √ Mode –
   √ Zoom – “M” not displayed
   If “M” displayed, contact MCC
11. Remove 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
12. Test fire Camr w/Flash
13. Install 28mm, 35mm, 50mm Lens Cap (Thermal Cap)
14. Flash – OFF
15. Close Flap D
16. Close Flap C
D2xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH DISASSEMBLY

BETWEEN EVAS

NOTE
Removal of Batts,Cards main objective

FLASH

1. Flash – OFF
2. Open Flap C to access Flash Batt compartment
3. Remove Batt Cap
4. Remove DCS 760 Batt
5. Install Batt Cap
6. Close Flap C

CAMR

1. Disconnect Remote Cord Assy from D2xs Camr
2. Disconnect Flash Sync Cable Assy from Camr Hot Shoe:
   Unlock Flash Sync Cable Assy – turn ccw
3. Disconnect French Hook from D-Ring
4. Detach D2xs Camr from Bracket Assy
5. Lift back EVA Camr Blanket to access Batt,cord components
6. Remove,replace:
   D2xs Batt
   4GB EVA Flash Card
7. Re-install Camr Blanket
8. Install D2xs Camr onto Bracket Assy (from front)
9. √ D2xs Camr, EVA Flash, and Camr Mounting Assy seated, will not slip off Bracket Assy. Release pb – out
10. Connect French Hook to D-Ring on left side of Camr
11. Connect Remote Cord Assy to Remote Release Port on D2xs Camr (Connector will thread into place)

NOTE
Adjustments to cables may be reqd during installation

D2xs
12. Connect Flash Sync Cable Assy to Camr Hot Shoe
13. Lock Flash Sync Cable – turn lever cw
14. Re-install Flash Sync Cover onto Flash Sync Cable Assy
15. Stow until day of EVA
D2XS EVA – CAMR W/FLASH DISASSEMBLY (Continued)

POST-EVA

NOTE
Stowing of EVA H/W and IVA use of D2Xs main objective

CAMR W/FLASH

1. Disconnect Remote Cord Assy from D2Xs Camr
2. Disconnect Flash Sync Cable Assy from Camr Hot Shoe:
   Unlock Flash Sync Cable Assy – turn ccw
3. Disconnect French Hook from D-Ring
4. Detach Camr Mount,D2Xs Camr from Bracket Assy

CAMR

NOTE
Eyepiece shutter must be closed in order to remove Eyepiece

1. Disconnect Eyepiece Tether from Camr
2. Close Eyepiece Shutter
3. Remove:
   EVA Eyepiece
   EVA Camr Blanket
   D2Xs Batt
   4 GB EVA Flash Card
4. Replace IVA Eyepiece
5. Open Eyepiece shutter
D2Xs EVA CAMR (Continued)

D2XS EVA – CAMR W/FLASH DISASSEMBLY (Concluded)

POST-EVA (Concluded)

EVA FLASH AND FLASH BRACKET

1. Flash – OFF
2. Open Flap C to access Flash Batt compartment
3. Open Batt Cap and remove DCS 760 Batt
4. Secure Batt Cap
5. Close Flap C
6. Open Flaps A,B,F
7. Disconnect Flash Sync Cable Assy from Flash
8. Remove Remote Cord Assy, Flash Sync Cable from Flap B
9. Close Flaps A,B,F
10. Remove EVA Flash from Bracket Assy
11. Remove Remote Cord Assy from Thermal Blanket
12. Stow all EVA H/W as reqd

RETURN CAMR TO NOM OPS (AS REQD)

1. Replace D2Xs Batt and 4 GB EVA Flash Card
2. Camr Settings:
   Camr Pwr sw – ON
   Menu Settings:
   MENU pb – press
   Navigate Pad sel – Playback Menu > Image Review – ON
   MENU pb – press twice
   Nom Ops settings
3. Camr Pwr – OFF
D2xs EVA CAMR (Continued)

**DATE/TIME SET**

1. MENU pb – press
2. Navigate pad – sel Menu icon □
   – press (right)
   – sel WORLD TIME (up,down)
   – press (right)
   – sel DATE (up,down)
   – press (right)
3. Set TIME/DATE to GMT
   Navigate pad – sel desired field (left,right)
   – sel desired setting (up,down)
4. ENTER pb – press
5. MENU pb – press twice

**D2XS FORMAT**

1. Pwr – ON
2. MENU pb – press
3. Navigate pad – set up MENU □
   – sel ‘Format’
   – sel ‘Yes’
4. ENTER pb – press
5. ‘Formatting’
6. ‘Done’
7. MENU pb – press twice
D2Xs EVA CAMR (Concluded)

STEREO PHOTOGRAMMETRY PROCEDURE

CAMR SETTINGS – ACTIVATION

1. Rcd CAMR and LENS S/Ns
2. Perform EVA – CAMR ONLY(CAMR w/BRACKET ONLY,CAMR w/FLASH)
3. Install Lens – 35mm(28mm) EVA
   Exp Mode – P
   Flash Settings:
   ON/OFF – OFF

TECHNIQUE

1. Distance to subject: 5-7 ft
2. Take mapping images normal to surface, followed by one additional convergent view on each side
3. Shoot photos in pairs. Offset each image laterally 2 in/ft of subject distance, ~10-14 in
4. An additional row of photos may be taken at a 90-60 deg angle to surface to capture critical details not covered in previous images
5. Repeat as time permits
EVA IR CAMR

SPECIFICATIONS

CAMR

- PIXEL COUNT: 320 x 240
- SPECTRAL RANGE: 7.5µm-13µm (Far IR)
- INTERNAL RAM MEMORY: 600 images
- CF CARD/FRAME: 1 GB/6000 images
- FILE SIZE: ~167 KB per image
- TEMPERATURE SENSING RANGE: -40°F to +250°F (-40°C to +120°C)
- LEVEL/SPAN: Auto(Manual)
- EMISSIVITY RANGE: 0.01 to 1.0
- BATT: EHIP
- BATT VOLTAGE: 6V
- LENS FOV: 24°x18°
- POINTING LASER: Wavelength = 635nm
EVA IR CAMR (Continued)

NOMENCLATURE

1. Pointing Laser - Lower side of Baffle (not shown)
2. RCU Cable Strain Relief
3. EHIP Batt
4. EVA Knob (provides handhold for pointing)
5. STD Slide-Lock (holds remote during translation)
6. Lens Baffle
7. Lens
8. Access Cover
9. ENABLE sw
10. MASTER sw
11. Batt Status Indicator LED
12. Compact Flash Memory Card Access (Card secured w/latch (not shown))
EVA IR CAMR (Continued)

NOMENCLATURE (Continued)

1. ENTER/MENU MODE (E/M) pb
2. Focus Preset (-) / Adj Span (-) pb
3. LASER (LSR) pb
4. Sunshades
5. Pb Map/Cheat Sheet
6. LCD Cover
7. LCD
8. START,STOP/TRANSFER (S/T) pb
9. Fine Focus (+) / Adj Level (+) pb
10. Focus Preset (+) / Adj Span (+) pb
11. CANCEL/LEVEL (C/L) pb
12. Fine Focus (-) / Adj Level (-) pb
13. FLAT FIELD/ABORT,ERASE (F/A) pb
14. Cable Attach Point
15. Bayonet
EVA IR CAMR (Continued)

NOMENCLATURE (Continued)

- **LSR pb**
  - Push to turn laser OFF
  - Push, hold ~3 sec to activate laser

- **Up/Down Arrow pbs**
  - Push, hold to fine focus
  - When in “Level/Span:Manual”, push, hold to increase/decrease level
  - When in Menu Mode, use to navigate and change parameters

- **S/T pb**
  - Push to start/stop movie recording
  - Push, hold ~3 sec to transfer images from RAM to compact flash card

- **Left/Right Arrow pbs**
  - Push to select preset focus distances (3, 6, 9, 12 ft, or infinity)
  - When in “Level/Span:Manual”, push, hold to adjust span
  - When in Menu Mode, use to navigate and change parameters

- **F/M pb**
  - Push to enter functions or change parameters
  - Push, hold ~3 sec to enter Menu Mode

- **F/A pb**
  - Push to perform flat field correction
  - When transferring a movie, push, hold ~3 sec to abort transfer
  - When not transferring a movie, push, hold ~3 sec to erase imagery in RAM

- **C/L pb**
  - Push to cancel/exit various menu/Camr options
  - After selecting “Manual Adjust” in menu, push, hold ~3 sec to toggle the functionality of Up/Down/Left/Right arrow pbs between focus and level/span modes

- **F/A and C/L pbs simo**
  - Push, hold simo ~3 sec to reset menu settings back to default parameters
EVA IR CAMR (Continued)

NOMENCLATURE (Concluded)

1. Ball Joint
2. Bracket Screws
3. Camr Interface
4. Tether Loop (two)
5. Dogbone Handrail
6. Cockable Bayonet
EVA IR CAMR (Continued)

CAMR SETUP

1. If Camr Bracket not installed, perform IR CAMR BRACKET ASSEMBLY procedure
2. Install EHIP Batt
3. √CF card installed
4. Lens Cover – Fold to left side
5. MASTER sw – ON (wait 20 sec for initialization)
6. √'Manual'('Level/Span: Manual') not displayed in top left of LCD
7. √Date/Time – GMT
8. E/M pb – push, hold
   Sel: “File – Burst Setup”
   Max # frames – 300
   Save every – 12th frame
   √FPS – 5.0
   √Elapse Time – 60
   E/M pb – push
9. E/M pb – push, hold
   Sel: “File – Images…”
   If images present in directory:
   E/M pb – push, hold
   Sel: “Delete all images”
   Sel: “Delete”
   √NO images present in directory
   C/L pb – push
10. ENABLE sw – OFF (hold for 3 sec, observe shutdown msg on screen)
11. Lens cover – Reinstall
12. If not using within 3 hr:
    MASTER sw – OFF

IR CAMR BRACKET ASSEMBLY

1. Tools Req’d (IFM Tool Locker Tray 3)
   1/4-in Torque Wrench (40-200 in-lb)
   5/32-in Hex Ball
2. Align Camr Body to Camr Bracket
3. Tighten bracket screws to Camr Body, snug (three screws, 5/32-in Hex Ball)
4. Torque bracket screws to 49 in-lb
EVA IR CAMR (Continued)

NOMINAL MENU SETTINGS

**FILE** ('File')
- Images... – N/A
- Save – N/A
- Burst Setup
  - Max # Frames – 300
  - Save every – 12th frame
  - FPS – 5.0
  - Elapse Time – 60
  - Burst recording... – N/A

**ANALYSIS** ('Analysis')
- Object Param...
  - Emissivity – 0.96
  - Distance – 6.6 ft
  - T Reflected – 68°F
  - T Atmosphere – 68°F
  - Rel Humidity – 30%
  - External optics – Off
  - Optics transmission – N/A
  - Optics temperature – N/A

**IMAGE** ('Image')
- Level/Span... – N/A
- Manual Adjust – displayed
- Palette...
  - Palette – Gray
  - Inverted – No

**SETUP** ('Setup')
- Image...
  - Adjust method – Histogram
  - Lock scale – Off
  - Lock value – blank
  - Scale – On
  - Status bar – On
  - Saturation colours – Off
  - Noise reduction – Off
  - Shutter period – Normal
- Other Settings
  - Power...
    - Auto power off – None
    - Display power off – None
    - LCD illumination – Medium
  - Date/Time... – set per GMT
  - Local Settings...
    - Temp unit – °F
    - Distance unit – Feet
    - Date format – MM/DD/YY
  - Camera info...
  - Profile – N/A
  - Factory default – N/A
EVA IR CAMR (Continued)

MOVIE RECORDING

1. √MASTER sw – ON
2. Lens Cover – remove
3. ENABLE sw – ON
4. Wait 5 min before recording images
5. Focus on subject
6. F/A pb – push
7. S/T pb – press (start recording)
8. S/T pb – press (stop recording)
9. S/T pb – press and hold (transfer)
10. √Transfer complete

MOVIE PLAYBACK

1. E/M pb – push,hold
2. Sel: “File – Images…”
3. E/M pb – push
4. Sel desired file
5. E/M pb – push
6. Sel:
7. E/M pb – push
8. When finished: C/L pb – push

DELETING FILES

DELETE SINGLE FILES ON CF CARD

1. E/M pb – push,hold
2. Sel: “File – Images…”
3. E/M pb – push
4. Sel desired file
5. E/M pb – push,hold
6. Sel: “Delete”
7. E/M pb – push
8. Sel: “Delete”
9. E/M pb – push

DELETE ALL FILES ON CF CARD

1. E/M pb – push,hold
2. Sel: “File – Images…”
3. E/M pb – push
4. E/M pb – push,hold
5. Sel: “Delete all images”
6. E/M pb – push
7. Sel: “Delete”
8. E/M pb – push
9. C/L pb – push

DOWNLINKING FILES

IR Camr 1. Remove compact flash (CF) card from Camr
2. Assemble CF Card and PCMCIA Adapter
KFX PGSC 3. Place assembled card,adapter in PGSC
4. Copy files to “C:\Oca-down\dto851”
5. Remove assembled card,adapter from PGSC
6. Disassemble and place CF Card back into Camr
LEVEL/SPAN MODES

MANUAL ADJUST MODE

NOTE
In this mode, user adjusts level, span
1. E/M pb – push, hold
2. Sel: "Image – Manual adjust"
3. E/M pb – push

NOTE
C/L pb will change functionality of arrow pb.

DATE/TIME SET

1. E/M pb – push, hold
2. Sel: “Setup – Other settings”
3. E/M pb – push
4. Sel: “Date/time”
5. E/M pb – push
6. Sel desired field (up/down arrow pb)
7. Sel desired setting (left/right arrow pb)
8. E/M pb – push

SELECTING DIFFERENT PALETTES

1. E/M pb – push, hold
2. Sel: “Image – Palette…”
3. E/M pb – push
4. Sel desired palette (left/right arrow pb)
5. E/M pb – push

RESET TO NASA PROFILE

1. √ All images transferred to CF card
2. F/A pb, C/L pb – push and hold simo for 3 sec

DEACTIVATION

1. √ All images transferred to CF card
2. ENABLE sw – OFF (hold for 3 sec)
3. MASTER sw – OFF
4. Lens Cover – cl
IR CAMR 6.1 NO LCD PWR/DISPLAY

Nominal Config:
(Camr)
EHIP – install
CF Card – install
Lens Cover – fold to left
MASTER sw – ON
✓“Level/Span: Manual” or “Manual” not displayed on LCD
(Camr)
EHIP – install
CF Card – install
Lens Cover – fold to left
MASTER sw – ON
✓“Level/Span: Manual” or “Manual” not displayed on LCD
(RCU Menu – Burst Setup)
✓Max # frames: 300
✓Save every: 12 frames

1. Batt status LED green or flashing red & green?
   Yes
   "Manual" or "Manual" text displayed on LCD?
   Yes
   Press, hold F/A and C/L pbs simo (3 sec)
   LCD displays image or data?
   Yes
   ✓ Set up procedure or contact MCC for Burst Setup Settings
   No

2. ENABLE sw is a momentary sw
   Yes

3. Batt status LED green or flashing red & green?
   Yes
   LCD displays image or data?
   Yes
   ✓ Set up procedure or contact MCC for Burst Setup Settings
   No

4. ENABLE sw – up (wait 10 sec)
   Batt status LED green or flashing red & green?
   Yes
   LCD displays image or data?
   Yes
   ✓ Set up procedure or contact MCC for Burst Setup Settings
   No

5. Batt status LED green or flashing red & green?
   Yes
   LCD has data on display?
   Yes
   ✓ Continue nominal ops
   No

6. MASTER sw – OFF
   Reseat EHIP Batt
   MASTER sw – ON (wait 20 sec)
   Batt status LED green or flashing red & green?
   Yes
   LCD has data on display?
   Yes
   ✓ Continue nominal ops
   No

7. Camr Location
   EVA
   ✓ MCC
   IVA
   ✓ MCC

8. Batt status LED green or flashing red & green?
   Yes
   LCD has data on display?
   Yes
   ✓ Continue nominal ops
   No

9. Batt status LED green or flashing red & green?
   Yes
   LCD has data on display?
   Yes
   ✓ Continue nominal ops
   No

10. MASTER sw – OFF
    Replace EHIP Batt
    MASTER sw – ON (wait 20 sec)
    Batt status LED green or flashing red & green?
    Yes
    LCD has data on display?
    Yes
    ✓ Continue nominal ops
    No

11. Batt status LED green or flashing red & green?
    Yes
    LCD has data on display?
    Yes
    ✓ Continue nominal ops
    No

12. Batt status LED green or flashing red & green?
    Yes
    LCD has data on display?
    Yes
    ✓ Continue nominal ops
    No

13. Batt status LED green or flashing red & green?
    Yes
    LCD has data on display?
    Yes
    ✓ Continue nominal ops
    No
IR CAMR

6.2 RCU pbs NOT RESPONDING

RCU pbs Not Responding

Nominal Config:
(Camr)
EHIP – install
CF Card – install
Lens Cover – fold to left
MASTER sw – ON
√"Level/Span:
Manual" or
"Manual" not display on LCD
(RCU Menu – Burst Setup)
√Max # frames: 300
√Save every: 12 frame

1
- ENABLE sw – up (hold for 3 sec)
- ENABLE sw – up (wait 10 sec)

Does Camr focus via RCU?

Yes
No

CAUTION
Removing master pwr will erase RAM data and remove heater pwr to RCU, Camr

2
- MASTER sw – OFF, then ON (wait 20 sec)

Does Camr focus via RCU?

Yes
No

3
- Continue nominal ops

4
√MCC

1 ENABLE sw is a momentary sw
6.3 BATT LED NOT SOLID GREEN

1. Batt status LED flashing red & green?
   - Yes
   - No

2. ENABLE sw – up (wait 10 sec)
   - Batt status LED solid green?
     - Yes
     - No

3. Batt status LED flashing red & green?
   - Yes
   - No

4. If movies in RAM, transfer movies to CF Card

5. POSSIBLE BAD EHIP BATT

6. Camr Location
   - EVA
   - IVA

7. ENABLE sw – up (hold 3 sec)
   - MASTER sw – OFF
   - Replace EHIP Batt
   - MASTER sw – ON (wait 20 sec)

8. Batt LED solid green?
   - Yes
   - No

9. Continue nominal ops

Nominal Config:
(Camr)
EHIP – install
CF Card – install
Lens Cover – fold to left
MASTER sw – ON
√“Level/Span:
Manual” or
“Manual” not display on LCD

(RCU Menu – Burst Setup)
√Max # frames: 300
√Save every: 12 frame

1. Flashing red & green LED indicates that 75% of Batt has been used
2. ENABLE sw is a momentary sw
IR CAMR Will Not Record

Nominal Config:
(Camr) 
EHIP – install 
CF Card – install 
Lens Cover – fold to left 
MASTER sw – ON 
√"Level/Span: Manual" or "Manual" not display on LCD 
(RCU Menu – Burst Setup) 
√Max # frames: 300 
√Save every: 12 frame

1
- Press and release S/T pb

Does Camr record?

Yes

No

2
- Is RAM full? 

('0' displayed on left-hand side of focus distance)

Yes

No

3
- Transfer movies to CF Card

Can a movie be recorded?

Yes

No

4
- ENABLE sw – up (hold 3 sec)
- ENABLE sw – up (wait 10 sec)

Can a movie be recorded?

Yes

No

CAUTION

Removing master pwr will erase RAM data and remove heater pwr to RCU, Camr

5
- MASTER sw – OFF, then ON (wait 20 sec)

Can a movie be recorded and transferred?

Yes

No

6
- Press, hold F/A and C/L pbs simo (3 sec)
- Set up procedure or contact MCC for Burst setup settings

Can a movie be recorded and transferred?

Yes

No

7
- Continue nominal ops

8
- √MCC
**Nominal Config:**
(Camr)
- EHIP – install
- CF Card – install
- Lens Cover – fold to left
- MASTER sw – ON
- “Level/Span: Manual” or “Manual” not display on LCD
- (RCU Menu – Burst Setup)
- √ Max # frames: 300
- √ Save every: 12 frame

**6.5 WHITE LCD WITH “HOT” TEXT**

1. Point RCU toward dark space (wait 30 sec)
   - Is “HOT” msg still displayed?
     - Yes
       - MCC
     - No
     - 3. Continue nominal ops
IR CAMR

Movie Transfer Error

Nominal Config:
(Camr)
EHIP – install
CF Card – install
Lens Cover – fold to left
MASTER sw – ON
√“Level/Span:
Manual” or
“Manual” not display on LCD
(RCU Menu – Burst Setup)
√Max # frames: 300
√Save every: 12 frame

1. Is there a movie in RAM? (Number between 0-599 displayed on left-hand side of focus distance)
   Yes
   No

2. Can a movie be recorded?
   Yes
   No
   • Press and hold S/T pb 3 sec

3. Is “Disk Full” displayed?
   Yes
   No

4. Can a movie be recorded?
   Yes
   No

5. Determine camr location
   EVA
   IVA

6. Can movie be transferred?
   Yes
   No
   • ENABLE sw – up (hold for 3 sec)
   • ENABLE sw – up (wait 10 sec)

7. Take CF Card out of Camr
   • Transfer files to PGSC
   • Once complete, delete files on CF Card
   • Install CF Card in Camr

8. Is CF Card installed properly?
   Yes
   No

9. Can movie be transferred?
   Yes
   No

10. Re-install CF Card

11. Can movie be transferred?
    Yes
    No
    • Continue nominal ops

12. If CF Card not properly installed, Burst record settings are not configurable via menu
13 Has step 9 been previously performed?
   Yes
   CAUTION
   Removing master pwr will erase RAM data and remove heater pwr to RCU, Camr
   No

14 Can a movie be recorded and transferred?
   Yes
   15 Continue nominal ops
   No

16 • √MCC
CANON G1

SPECIFICATIONS

- **IMAGE SENSOR:** 1/3-in CCD x 3 (1,670,000 pixels)
- **ZOOM:** 20X Optical Zoom, 4.5-90mm (32.5-650mm, 35mm in Photo Equivalent)
- **VIDEO RECORDING SYSTEM:**
  - HDV – High Definition Video 1080i
  - DV – Standard Definition Video 480i
- **AUDIO RECORDING SYSTEM:**
  - HDV – MPEG-1, 16 bit (48kHz)
  - DV – PCM Digital Sound, 16 bit (48kHz) or 12 bit (32kHz)
- **TAPE FORMAT:** Mini DV Cassette (Mini DVCAM acceptable)
- **MAXIMUM RECORDING TIME:**
  - HDV – 60 min
  - DV: SP – 60 min; LP – 90 min
- **VIEWFINDER:** 0.57-in wide, 16:9 aspect ratio TFT Color; ~269,000 pixels
- **LCD SCREEN:** 2.8-in wide, 16:9 aspect ratio TFT Color; ~207,000 pixels
- **MICROPHONE:** Stereo Electret, Cross-layout
- **FOCUS SYSTEM:** Autofocus, Manual Focusing w/Focus Ring
- **WHITE BALANCE:** Auto White Balance, Preset, Custom, Manual
- **MINIMUM ILLUMINATION:** 0.4 lx (1/3 Shutter, F1.6, Gain 18 dB)
- **IMAGE STABILIZATION:** Optical Shift Image Stabilizer
- **POWER:** 7.2V Li-ION Batt Pack, 8.4V DC In
- **BODY WEIGHT:** 4.6 lb
- **BATT LIFETIME:** ~90 min
- **BATT WEIGHT:** 0.41 lb
- **WIDE ANGLE CONVERTER:**
  - **CONVERSION – 0.8X**
  - **CONVERTED FOCAL LENGTH – 3.6-72mm**
  - **WEIGHT – 1.60 lb**

### LENS DATA

<table>
<thead>
<tr>
<th>Lens</th>
<th>Zoom Ratio</th>
<th>Approximate Field of View</th>
<th>Filter Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Horizontal</td>
<td>Vertical</td>
</tr>
<tr>
<td>4.5-90mm</td>
<td>20:1</td>
<td>58°-3.2°</td>
<td>40.5°-2.1°</td>
</tr>
<tr>
<td>w/Wide Conversion Lens 3.6-72mm</td>
<td>20:1</td>
<td>69.4°-4.0°</td>
<td>49.5°-2.6°</td>
</tr>
</tbody>
</table>
CANON G1 (Continued)

NOMENCLATURE

CAMCORDER – TOP VIEW

1. LOCK sw
2. Start/Stop pb
3. Grip Zoom
4. OPEN/EJECT sw
5. PHOTO pb
6. Zoom Speed Adjustment Dial
7. RESET pb
8. MIC ATT sw
9. WHITE BAL PRESET sw
10. END SEARCH pb
11. Strap Mount
12. REC pb
13. FAST FWD pb
14. PLAY pb
15. REW pb
16. STOP pb
17. PAUSE pb
18. PHOTO pb
19. Handle Zoom
20. Strap Mount
21. Hot Shoe
22. Microphone

End Search pb
Strap Mount
Start/Stop pb
Grip Zoom
OPEN/EJECT sw
PHOTO pb
Zoom Speed Adjustment Dial
RESET pb
MIC ATT sw
WHITE BAL PRESET sw
END SEARCH pb
Strap Mount
REC pb
FAST FWD pb
PLAY pb
REW pb
STOP pb
PAUSE pb
PHOTO pb
Handle Zoom
Strap Mount
Hot Shoe
Microphone
CANON G1 (Continued)

NOMENCLATURE (Continued)

CAMCORDER – LEFT SIDE FRONT SECTION

1. ND FILTER sw
2. POSITION PRESET sw
3. POSITION PRESET ON/SET sw
4. DISP. (Display) pb
5. PEAKING pb
6. MAGN. (Magnification) pb
7. (Record Review) pb
8. Focus Mode sw
9. EXP. LOCK pb
10. SHUTTER/K tw
11. PUSH AF pb
12. Aperture Ring
13. Zoom Ring
14. Focus Ring
CANON G1 (Continued)

NOMENCLATURE (Continued)

CAMCORDER – LEFT SIDE REAR SECTION

1. AGC sw (Automatic Gain Control)
2. AWB sw (Automatic White Balance)
3. Side Panel Display
4. POWER Indicator
5. POWER Dial
6. OPEN sw (open the LCD display)
7. AUDIO CH1/CH2 Dials
8. SELECT/SET Dial
9. AUDIO LEVEL sw
10. MENU pb
11. CUSTOM PRESET SELECT pb
12. CUSTOM PRESENT ON/OFF pb
13. CUSTOM KEY pb
14. WHITE 3AL pb (White Balance)
15. WHITE 3AL sw
16. OUTPUT sw
17. GAIN sw
CANON G1 (Continued)

NOMENCLATURE (Continued)

CAMCORDER – PWR DIAL

EXT. CONT.
VCR/PLAY
OFF
A
Tv
Av
M

External Control Mode
VCR/PLAY Mode
Power Off
Auto
Shutter Priority
Aperture Priority
Manual
Spotlight
Night
Easy Recording

CAMERA
Recording Programs

jsc4037_164.png
CANON G1 (Continued)

NOMENCLATURE (Continued)

CAMCORDER – RIGHT SIDE

1. V2 Terminal
2. ZOOM SPEED sw
3. Card/Tape sw [ ] [ ]
4. Zoom Speed Adjustment Dia
5. PHOTO pb
6. Grip Zoom
7. LOCK sw
8. MIC (External Microphone) Terminal
9. XLR MIC ATT. sw
10. LINE/MIC sw
11. Input Channel Selection sw
12. 48V sw
13. CH1 Input Terminal
14. CH2 Input Terminal
15. Cassette Compartment
16. TIME CODE sw
CANON G1 (Continued)

NOMENCLATURE (Continued)

CAMCORDER – BACK VIEW

1. Battery/Memory Card Compartment
2. BATT. RELEASE Latch
3. Battery Attachment Unit
4. Memory Card Slot
5. OPEN sw (Battery Compartment)
6. CARD Access Indicator
7. Dioptic Adjustment Lever
8. Viewfinder
9. Terminal
10. HDV/DV Terminal
11. HDV Indicator
12. Start/Stop pb
13. Standby/Lock Lever
14. HD/SD SDI Terminal
15. GENLOCK Terminal
16. TIME CODE Terminal
17. A/V1/V2 sw
18. A/V1 Terminal
19. COMPONENT OUT Terminal
20. Headphones Terminal
CANON G1 (Continued)

NOMENCLATURE (Concluded)

CAMCORDER – FRONT VIEW

1. Grip Belt
2. Instant AF External Sensor
3. Tally Lamp
4. Remote Sensor
CANON G1 (Continued)

NOMINAL MENU SETTINGS

CAMR MENU (* – non-default)

**SIGNAL SETUP**
- **TIME CODE**
  - **FRAME SETTING – DROP**
  - **COUNT-UP – REC-RUN**
  - **GENLOCK ADJUST – 0000**

**SIGNAL STD – HD**
- **FRAME RATE – 60i**
- **COMP. OUT – 1080i/480i**
- **SDI OUTPUT – OFF**
- **SPEC. – AUTO**

**CAMERA SETUP**
- **AE SHIFT – ±0**
- **GAIN SETTING**
  - **GAIN L – ±0dB**
  - **M – 6dB**
  - **H – 12dB**
- **AF MODE – NORMAL AF**
- **IMG STAB – ON ((     ))**
- **SKIN DETAIL**
  - **EFFECT LEVEL – OFF**
- **SKY DETAIL – OFF**
- **COLOR CORR.**
  - **CORRECT – OFF**
- **F SPEED PSET – HIGH**

**RECORDING SETUP**
- **DV REC MODE – SP** (Standard Definition Mode Only)
- **UB REC – INT. USR-BIT**
  - **SELECT – 00 00 00 00**
- **IMG QUALITY – FINE**
- **IMAGE SIZE – LW1920x1080**
- **FILE NOS. – CONTINUOUS**

**AUDIO SETUP**
- **DV AUDIO – 16 bit** (Standard Definition Mode Only)
- **AUD. M. SET – NORMAL**
- **MIC MODE – NORMAL**
  - **SENS. – NORMAL**
- **XLR INPUT – OFF**
  - **GAIN UP – OFF**

**DISPLAY SETUP**
- **CVF SETUP**
  - **BRIGHTNESS – mid**
  - **CONTRAST – mid**
  - **COLOR – mid**
  - **SHARPNESS – mid**
  - **BACKLIGHT – NORMAL**

**LCD SETUP**
- **CVF+LCD BW – OFF**
  - **ON – OFF**
- **LANGUAGE – ENGLISH**
- **MARKERS – OFF**
- **ASPECT GUIDE – 4:3**
- **SAFETY ZONE – OFF**
- **ZEBRA – OFF**
  - **LEVEL – 85**
- **TV SCREEN – OFF**
- **AUDIO LEVEL – OFF**
- **GUIDE INFO – CUSTOM KEYS**
- **UB DISPLAY – OFF**
CANON G1 (Continued)

NOMINAL MENU SETTINGS (Continued)

CAMR MENU (* – non-default) (Continued)

SYSTEM SETUP
CUSTOM KEY 1 – SHTR D.LOCK*
  2 – (NONE)*
D/TIME SET
  T.ZONE/DST – LONDON*
  DATE/TIME – 'GMT'*
  DATE FORMAT – 'M.D.Y.TIME'
DV CONTROL – OFF
MAGN. B. LOCK – ACTIVE*
SHTR D. LOCK – DISABLED
RESET ALL – NO

CUSTOMIZE
CUSTOM PRESET (Concluded)
  RG MATRIX – 2*
  RB MATRIX – 0
  GR MATRIX – 0
  GB MATRIX – 1*
  BR MATRIX – 0
  BG MATRIX – -4*

FUNCTION – C.Fn1 Active*

SETTING ITEMS
  00 SHCKLSS WB/GN – 00
  01 AE RESPONSE – 00
  02 HIGH-SPEED ZOOM – 00
  03 FOCUS RING CTRL – 01*
  04 BUTTONS OPER. – 00
  05 RINGS DIRECTION – 00
  06 DIALS DIRECTION – 00
  07 FOCUS PRIORITY – 00
  08 SIMULT.IMG.REC – 00
  09 MARKER LEVEL – 00
  10 F. AST BW-MOD – 00
  11 OBJ DST UNIT – 00
  12 ZOOM INDICATOR – 00
  13 COLOR BARS – 00
  14 1kHz TONE – 00
  15 WIRELESS REMOTE – 00
  16 POWER SAVE – 01*
  17 TALLY LAMP – 02*
  18 LED – 00
  19 BEEP – 00
  20 CHARACTER REC – 00
CANON G1 (Continued)

NOMINAL MENU SETTINGS (Continued)

CAMR MENU (Concluded)

CUSTOMIZE (Concluded)

CUSTOM DISPLAY

SETTING ITEMS (*non-default)

00 REC PROGRAMS – 01
01 CAMERA DATA1 – 03
02 CAMERA DATA2 – 07
03 ZOOM – 01
04 FOCUS – 02*
05 ND – 01
06 IMAGE EFFECTS – 07
07 F. ASSIST FUNC. – 03
08 CUSTOMIZE – 03
09 RECORDING STD – 01
10 DV REC MODE – 00
11 FRAME RATE – 01
12 TAPE – 03
13 TAPE REMAINDER – 01*
14 TAPE/CARD – 02*
15 LIGHT METERING – 03
16 CARD – 03
17 CARD REMAINDER – 02
18 AUDIO – 00
19 CONDENSATION – 01
20 BATTERY – 01*
21 WIRELESS REMOTE – 02

VCR MENU (* non-default)

SIGNAL SETUP

TIME CODE

FRAME SETTING – DROP
COUNT-UP – REC RUN
HDV/DV IN – REGEN.
PLAYBACK STD – AUTO
COMP. OUT – 1080i/480i
SDI OUTPUT – OFF
SPEC. – AUTO
AV->DV – OFF
HD DOWN-CONV – ON
LETTERBOX – OFF

RECORDING SETUP

DV REC MODE – SP
UB SELECT — 00 00 00 00
IMG QUALITY – FINE
HD IMG SIZE — LW1920x1080
FILE NOS. – CONTINUOUS

AUDIO SETUP

SEL AUDIO CH – CH1/3 / CH2/4
AUD. M. SET – CH1/2
DV AUDIO – 16 bit
CANON G1 (Continued)

NOMINAL MENU SETTINGS (Concluded)

VCR MENU (* – non-default) (Concluded)

DISPLAY SETUP
CVF SETUP
  BRIGHTNESS – mid
  CONTRAST – mid
  COLOR – mid
  SHARPNESS – mid
  BACKLIGHT – NORMAL

LCD SETUP
  BRIGHTNESS – mid
  CONTRAST – mid
  COLOR – mid
  SHARPNESS – mid
  BACKLIGHT – NORMAL

CVF+LCD BW – OFF
  ON- OFF

TV SCREEN – OFF
AUDIO LEVEL – ON

LANGUAGE – ENGLISH

CUSTOM KEY – OFF

DATA CODE – DATE & TIME

6SEC. DATE – OFF

UB DISPLAY – OFF

SYSTEM SETUP

CUSTOM KEY 1 – TV SCREEN
  2 – DATA CODE

D/TIME SET
  T.ZONE/DST – LONDON
  DATE/TIME – ‘GMT’
  DATE FORMAT – ‘M.D.Y.TIME’

RESET ALL – NO

CUSTOM FUNCTION – C.FN1

SETTING ITEMS (*NON-DEFAULT)

00 SHCKLSS WB/GN – 00
01 AE RESPONSE – 00
02 HIGH-SPEED ZOOM – 00
03 FOCUS RING CTRL – 01*
04 BUTTONS OPER. – 00
05 RINGS DIRECTION – 00
06 DIALS DIRECTION – 00
07 FOCUS PRIORITY – 00
08 SIMULT.IMG.REC – 00
09 MARKER LEVEL – 00
10 F. AST BW-MOD – 00
11 OBJ DST UNIT – 00
12 ZOOM INDICATOR – 00
13 COLOR BARS – 00
14 1kHz TONE – 00
15 WIRELESS REMOTE – 00
16 POWER SAVE – 01*
17 TALLY LAMP – 02*
18 LED – 00
19 BEEP – 00
20 CHARACTER REC – 00
CANON G1 (Continued)

MANUAL SETTINGS

FOCUS

MANUAL FOCUS
PWR dial – [A] (Tv,Av,M, [A], [J])
AF/M sw – MANUAL (MF display in viewfinder (LCD))
Zoom – IN to subject
Focus manually
Zoom to desired setting
Begin recording as reqd

TEMP AUTO FOCUS
PUSH AF pb – press,hold for temp Auto Focus

SHUTTER SPEED
PWR dial – [A] (Tv,M)
If [A], EXP.LOCK pb – push
SHUTTER/K tw – rotate to select SS from 1/4 to 1/15,000 sec, CS
If [A], to exit Shutter Speed:
EXP.LOCK pb – push
√No SS displayed

WHITE BALANCE
PWR dial – [A] (Tv,Av,M, [A], [J])
AWB – OFF
WHITE BAL – A(B,PRE)
For A(B):
To set WHT BAL, place white sheet of paper in CC FOV
(under same lighting conditions)
[A] tw – push
White Balance icon [A] A(B) will blink for 2 sec and
become steady

WHITE BALANCE (Concluded)

For PRE:
WHITE BAL PRESET – [K]
For [K]:
[A] pb – push (flashing #K)
SHUTTER/K tw – rotate to desired color temperature
[A] pb – push (solid #K)

APERTURE
PWR dial – [A] (Av,M)
If [A], EXP.LOCK pb – push
Aperture Ring – rotate to select AP from F1.6 to F9.5
PROGRAM AE pb – press
If [A], to exit Aperture:
EXP.LOCK pb – push
√No F# displayed

GAIN
PWR dial – [A] (Tv,Av,M)
AGC – OFF
GAIN – L(M,H) as reqd
√+/- #dB displayed on LCD(Viewfinder)
CANON G1 (Continued)

**ANALOG (SD DTV) CC REC, DNLK**

- Config H/W per dwg at right

**AVIU**
- SYNC/VIDEO – VIDEO
- HI-Z/75 – 75
- PWR SELECT – LO

**O19(MO58F)**
- √ TV PWR – ON

**CC**
- √ Wide Conversion lens installed
- √ ND FILTER – OFF
- Install Audio Muting Plug (optional)
- OUTPUT – CAM
- √ A/V1/V2 – V2
- √ STANDBY/LOCK – STANDBY

**PWR dial**
- “green”
- If rec to tape:
  - Tape – Install
  - Viewfinder (LCD) displays “green” •||

Mount w/Multiuse Brkt, Clamp

---

**CAUTION**
Due to temp constraints, worklights at full pwr for 60 min; 90% pwr for unlimited time

**Worklights**
- Install fresh BATTS
- Mount light(s) w/Brackets (Velcro/tape)
- Pwr – as reqd

**Cabin Lts**
- Flt Deck – ON
- Lts in FOV – OFF as reqd
- Lt Shades – install as reqd
- Window Shades – install as reqd
CANON G1 (Continued)

ANALOG (SD DTV) CC REC,DNLK (Concluded)

CC
√Scene composition

Adjust Camr angle for best framing

CCU
CCU PWR – ON

ATU
PWR – AUD
A/G 1(2) – T/R
All Other Loops – OFF
XMIT/ICOM MODE SEL – PTT/PTT
MSTR SPKR VOL SEL – as reqd

When ready for dnlk:

A7
√TV DNLK – ENA
PWR CNTL – PNL
CONTR UNIT – MNA(B)
CNTL – CMD (wait 10 sec for system initialization)

If ANALOG, On MCC GO:
| VID OUT DNLK pb – push
| IN FLT DECK(MIDDECK) pb – push

If SD DTV, On MCC GO:

L10 (MUX)
√CABLES CONNETED
MUX/VTR/CC PWR – on (LED on)
√MUX BYPASS – ACT
(VIP) PWR – on (LED on, DATA FLOW LED flashes twice)
(VTR) √ON/STANDBY LED – green
√INPUT SELECT – VIDEO

A7
VID OUT DTV pb – push
IN FLT DECK(MIDDECK) pb – push

L10 (MUX)
√CHANNEL 3 DATA LED – on

When dnlk complete:

CC
PWR dial – OFF
Worklights
PWR – OFF
O19
TV PWR – OFF
L10 (MUX) MUX/VTR/CC PWR – off(LED off)

Go to DEACTIVATION (Cue Card, TV) as reqd
CANON G1 (Continued)

**HD DIGITAL CC DNLK**

Notify MCC, configuring for HD TV dnlk

Config H/W per dwg at right

**CC**
For cable strain relief attach MPC-to-G1 Cable
Velcro strap to CC strap

**AVIU**
SYNC/VIDEO – VIDEO
HI-Z/75 – 75
PWR SELECT – LO

**O19**
√ TV PWR – ON

**CC**
√ Wide Conversion Lens installed
Install LAV MIC
√ ND FILTER – OFF
√ OUTPUT – CAM
√ [ ] [ ] – [ ]
√ STANDBY/LOCK – STANDBY

PWR dial – "green" [ ]
If rec to tape
Tape – Install
√ Viewfinder (LCD) display “green” •]
Mount w/Multisuse Bracket, Clamp as reqd

**L10 (MUX)**
√ MUX/VTR/CC PWR – on (LED on)
√ MUX BYPASS – ACT
√ CHANNEL 0,1 RATE SEL – 1
√2 RATE SEL – 8

(VTR) ON/STANDBY pb – push (LED red)
(VIP) PWR – off (LED off)

**O19**
DC UTIL PWR MNA – ON
MPC PWR
SPLY
MPC

PWR-ON (HDV, TAXI, 5V, 3V green LEDs on)
CANON G1 (Continued)

HD DIGITAL CC DNLK (Continued)

L10 (MUX)  √CHANNEL 2 F/O OK, DATA LEDS on

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to temp constraints, worklights at full pwr for 60 min; 90% pwr for unlimited time</td>
</tr>
</tbody>
</table>

Worklights
Install fresh BATTS
Mount light(s) w/Brackets (Velcro/tape)
PWR – as reqd

Cabin Lts
Flt Deck – ON
Lts in FOV – OFF as reqd
Lt Shades – install as reqd
Window Shades – install as reqd

CC
√Scene composition
Adjust Camr angle for best framing

LAV MIC
PWR – ON (talk), OFF (listen)
√MCC if BLACK VIDEO and COLOR BARS reqd

If reqd:
CC
PWR dial – AV
APERTURE – CLOSE (AFT RING)
√Av CLOSE displayed on top left of LCD
AGC – OFF
√GAIN sw – L
√+ Odb displayed on LCD
OUTPUT – BARS

When MCC says done w/bars:
OUTPUT – CAM

When MCC says done w/black screen test:
PWR dial – “green”  ☑️
When dnlk complete:

**CC**
PWR dial – OFF

**Worklights**
PWR – OFF

**O19**
TV PWR – OFF as reqd

**MPC**
PWR – OFF
PWR DC PWR SPLY PWR SW1 – OFF

**O19**
DC UTIL PWR MNA – OFF

**L10 (MUX)**
MUX/VTR/CC PWR – off (LED off)
(VIP) PWR – on (LED on, DATA FLOW LED flashes, twice)
(VTR) ON/STANDBY pb – push (LED green)

Notify MCC, returned to SD DTV dnlk

Go to DEACTIVATION (Cue Card, TV) as reqd
CANON G1 (Continued)

CC BATT CHARGING

1. Config H/W per dwg below

AVIU

2. SYNC/VIDEO – VIDEO
HI-Z/75 – 75
PWR SELECT – HI

NOTE
When batt charger not in use, remove pwr

O19
(MO58F)

3. TV PWR – ON

4. Insert Batt in charger. Check charger LED for charge status (~2 hr)
CANON G1 (Continued)

G1 TO G1 VIA FIREWIRE

Config H/W per dwg at right

AVIU (two)  SYNC/VIDEO – VIDEO
HI-Z/75 – 75
PWR SELECT – LO

PLBK CC  PWR dial – VTR/PLAY
Install source tape. Protect Tab – slide (red visible)
Cue tape to desired take via FF(REW) pb
PLAY pb – push
|| pb – push

RCD CC  PWR dial – VTR/PLAY
Install new tape
REC pb – push
|| pb – push

Perform following for each video segment:

PLBK CC  || pb – push (To PLAY)
RCD CC  || pb – push (To REC)

When EDIT segment complete:

PLBK CC  || pb – push (PAUSE)
RCD CC  || pb – push (PAUSE)

When complete:
STOP pb – push simo
Cue to next starting point and repeat as reqd
CANON G1 (Continued)

G1 TO V10 VIA FIREWIRE

Configure H/W per diagram at right

AVIU (two)  
SYNC/VIDEO – VIDEO  
HI-Z/75 – 75  
PWR SELECT – LO

CC  
PWR dial – VTR/PLAY  
Disconnect DTV IEEE 4-4 Pin Cable  
MENU pb – push  
SELECT/SET:  
   Sel ‘SIGNAL SETUP’  
   HD DOWN-CONV – ON  
MENU pb – push  
Reconnect DTV IEEE 4-4 Pin Cable  
Install source tape. Protect Tab – slide (red visible)  
Cue tape to desired take via FF(REW) pb  
PLAY pb – push  
|| pb – push

V10  
PWR – ON  
DISPLAY pb – push  
Install new tape  
REC (two) pb – push simo  
PAUSE pb – push

Perform following for each video segment:

CC  
|| pb – push (To PLAY)  
V10  
PAUSE pb – push (To REC)  
When EDIT segment complete:

CC  
|| pb – push (PAUSE)  
V10  
PAUSE pb – push (PAUSE)  

When complete:

STOP pb – push simo  
Cue to next starting point and repeat as reqd

**Diagram Description**

- ORBITERO19 (MO58F)
- TV Pwr Cable (10 ft or 20 ft)  
  (2293284–504/528–20650–1(3))
- AVIU  
  J2  
  J4  
  J6
- VIDEO  
  J3  
  J5
- PLBK CC  
  J1  
  J7
- TV Pwr Cable (10 ft or 20 ft)  
  (2293284–504(503)/528–20650–1(3))
- Digital CC Vid/Pwr Cable (15 ft)  
  (SEZ16103275-503)
- DTV IEEE 4-4 Pin Cable  
  (SDZ16103652-801)
- HDV/DV  
  (N/A)
- PLBK CC  
  V10

**Notes**

- TV Pwr Cable (10 ft or 20 ft)  
  (2293284–504/528–20650–1(3))
- Digital CC Vid/Pwr Cable (15 ft)  
  (SEZ16103275-503)
- DTV IEEE 4-4 Pin Cable  
  (SDZ16103652-801)
CANON G1 (Continued)

G1 TO V10 VIA ORBITER TV SYSTEM

Config H/W per dwg at right
√Orbiter in async mode
Perform ACTIVATION (Cue Card, TV)

AVIU
SYNC/VIDEO – VIDEO
HI-Z/75 – 75
PWR SELECT – LO

O19(MO58F)
√TV PWR – ON

CC
PWR dial – VTR/PLAY
√AV1/V2 – V2
Install source tape, Protect Tab – slide (red visible)
Cue tape to desired take via FF(REW) pb
PLAY pb – push
|| pb – push

V10
PWR – ON
DISPLAY pb – push
Install new tape
REC pb – push
PAUSE pb – push

A7
VID OUT MON 1(2) pb – push
IN FLT DECK(MIDDECK) pb – push

Perform following for each video segment:

CC
|| pb – push (To PLAY)
V10
PAUSE pb – push (To REC)
When EDIT segment complete:

CC
|| pb – push (PAUSE)
V10
PAUSE pb – push (PAUSE)
CANON G1 (Continued)

G1 TO DSR-25 VTR

Config H/W per dwg at right

L10 (MUX)
- VTR/CC PWR – on (LED on)
- ON/STANDBY LED – green
- INPUT SELECT – DV

Install new tape
- REC pb – push, hold
- PLAY pb – push, simo (red dot displayed on LCD)
- PAUSE pb – push

CC
- PWR dial – VTR/PLAY
- Disconnect DTV IEEE 1394 Cable
- MENU pb – push
- SELECT/SET:
  - Sel ‘SIGNAL SETUP’
  - HD DOWN-CONV – ON
- MENU pb – push
- Reconnect DTV IEEE 1394 Cable
- Install source tap, Protect Tab – slide (red visible)
- Cue tape to desired take via FF(REW) pb
- PLAY pb – push
  || pb – push

Perform following for each video segment:

CC
  || pb – push (To PLAY)
L10 (VTR)
  PAUSE pb – push (To REC)

When EDIT segment complete:

CC
  || pb – push (PAUSE)
L10 (VTR)
  PAUSE pb – push (PAUSE)

When complete:

- INPUT SELECT – VIDEO
- Remove, mark tape
- ON/STANDBY pb – push (red LED on)
- Remove, stow IEEE 1394 female cable

(MUX)
- VTR/CC PWR – off (LED off) as reqd
- Reconnect IEEE 1394 male cable to IEEE 1394 connector
CANON G1 (Concluded)

SINGLE CAMCORDER W/CAMCORDER MICROPHONE

Config H/W per dwg at right

AVIU
- SYNC/VIDEO – VIDEO
- HI-Z/75 – 75
- PWR SELECT – LO

O19(MO58F)
- √TV PWR – ON

CC
- √Wide Conversion Lens installed
- √ND FILTER – OFF
- √AF/M – AF
- √AGC – OFF
- √GAIN – L(M)
- √OUTPUT – CAM
- √AWB – ON
- √A/V1/V2 – V2
- √STANDBY/LOCK – STANDBY
- PWR dial – A
- √CP1(2-9) displayed on LCD (VIEWFINDER)
  Tape – Install
- √Viewfinder (LCD) displays “green” •||
  Multiuse Brkt, Clamp

Lav Mic
- ON/OFF – ON

CAUTION
Due to temp constraints, worklights at full pwr for 60 min; 90% pwr for unlimited time

Worklights
- Install fresh BATTs
- Mount light(s) w/Brackets (Velcro/tape)
  PWR – as reqd

Cabin Lts
- Flt Deck(Middeck) – ON
- Lts in FOV – Off as reqd
  Lt Shades – install as reqd

CC
- √Scene Composition
  Adjust Camr for best framing
- √Audio Quality
## SONY V10

| SPECIFICATIONS | 8-2 |
| NOMENCLATURE    | 8-3 |
| NOMINAL MENU SETTINGS | 8-5 |
| V10 TO V10 VIA FIREWIRE | 8-6 |
SONY V10

SONY V10

SPECIFICATIONS

- TAPE: Mini DVCAM Cassette
- TAPE LENGTH: 40 min
- CD: Color, 5.5 in
- AUDIO: 16 bit at 48 KHz
- PWR: 7.2V Li-ION Batt Pack, 8.4V DC IN
- BATT LIFETIME: ~60 min w/LCD closed
  ~30 min w/LCD open
- BODY WEIGHT: 2.00 lb
- BATT WEIGHT: 0.41 lb
SONY V10 (Continued)

NOMENCLATURE

1. REC ORG TC Lamp
2. REC ORG TC pb
3. TC Reset pb
4. DISPLAY pb
5. AUDIO DUB pb
6. REC (recording) pb and Lamp
7. SLOW pb
8. PAUSE pb
9. PLAY (playback) pb
10. FF (fast Forward) pb
11. STOP pb
12. REW (rewind) pb
13. LCD Screen
14. POWER sw
15. MENU pb, Control dial
16. AUDIO Input/Output Jacks (R,L)
17. RFU DC OUT Jack
18. VIDEO Input/Output Jack
19. S VIDEO Input/Output Jack
20. LCD BRIGHT pb
21. Speaker
22. Volume pb
23. Headphone Jack
24. EJECT sw
25. Remote Sensor
26. Power Lamp
SONY V10 (Continued)

NOMENCLATURE (Concluded)

1. PUSH OPEN pb
2. EDITOR COVER RELEASE
3. DV IN/OUT Jack
4. BATT Release
5. Batt Adapter
SONY V10 (Continued)

NOMINAL MENU SETTINGS

CMD – VTR4
HiFi SOUND – STEREO
AUDIO MODE – FS48K (non-default)
TIME CODE – DF
BEEP – ON
AUDIO MIX – “left” (ST1)
CM SEARCH – ON
DATA CODE – DATE/CAM
LCD COLOR – “center”
LCD HUE – “center”
DISPLAY – LCD
JOG AUDIO – OFF
CLOCK SET – set to GMT
SONY V10 (Concluded)

V10 TO V10 VIA FIREWIRE

Config H/W per dwg at right

AVIU
SYNC/VIDEO – VIDEO
HI-Z/75 – 75
PWR SELECT – LO

PLBK V10
PWR – ON
DISPLAY pb – push
Install source tape. Protect Tab – Slide (red visible)
PLAY pb – push
Cue tape to desired take
PAUSE pb – push

RCD V10
PWR – ON
DISPLAY pb – push
Install new tape
REC pb – push
PAUSE pb – push

Perform following for each video segment:

PLBK V10
PAUSE pb – push (To PLAY)

RCD V10
PAUSE pb – push (To REC)

When EDIT segment complete:

PLBK V10
PAUSE pb – push (PAUSE)

RCD V10
PAUSE pb – push (PAUSE)
PORTABLE MONITORS

A31p VIDEO CONVERTER ............................................................................................................................................................................  9-2
VPU REPEATER ............................................................................................................................................................................................  9-4
**PORTABLE MONITORS**

**A31p VIDEO CONVERTER**

A31p

1. √A31p Pwr – ON

2. Connect A31p Video Adapter to A31p VID IN “√”

3. Connect appropriate hardware from video source to A31p Video Adapter Cable depending on desired video source per table below

<table>
<thead>
<tr>
<th>Video Source</th>
<th>Hardware (part #)</th>
<th>From</th>
<th>To</th>
<th>Cable Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAYLOAD/DTV</td>
<td>• AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• L10A1 VTR OUT</td>
<td>• A31p Video Adapter</td>
<td>• BNC – RCA</td>
</tr>
<tr>
<td>Monitor 1/2 (option 1)</td>
<td>• Monitor to AVIU/CM Cable (20 ft) (SED39122074-303) • AVIU (SED33111493-302/303) • AVIU Video Cable Assy (SEZ33114239-301)</td>
<td>• Mon/J3</td>
<td>• AVIU/J4</td>
<td>• Circ – Twinax</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Monitor to AVIU/CM Cable (20 ft) (SED39122074-303) • AVIU (SED33111493-302/303) • Balanced Video Cable (SED33105778-301) • Bal/Unbal Xfmr (SED39124190-301) • AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• Mon/J3</td>
<td>• AVIU/J4</td>
<td>• Circ – Twinax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>• Mon/J3</td>
<td>• AVIU/J4</td>
<td>• Circ – Twinax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Monitor to AVIU/CM Cable (20 ft) (SED39122074-303) • AVIU (SED33111493-302/303) • AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• Mon/J3</td>
<td>• AVIU/J4</td>
<td>• Circ – Twinax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Monitor to AVIU/CM Cable (20 ft) (SED39122074-303) • AVIU (SED33111493-302/303) • AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• Mon/J3</td>
<td>• AVIU/J4</td>
<td>• Circ – Twinax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### A31p VIDEO CONVERTER (Concluded)

<table>
<thead>
<tr>
<th>Video Source</th>
<th>Hardware (part #)</th>
<th>From</th>
<th>To</th>
<th>Cable Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS</td>
<td>• VPU Patch Cable (SED39136025-301) • Balanced Video Cable (SED33105778-301) • Bal/Unbal Xfmr (SED39124190-301) • AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• VPU FROM ISS • VPU Patch Cable • Bal/Unbal Xfmr</td>
<td>• Balanced Video Cable • Bal/Unbal Xfmr</td>
<td>• Plug – Twinax • Twinax – Twinax • BNC – RCA</td>
</tr>
<tr>
<td>Spare 1 (SSV)</td>
<td>• SSV to PDIP/CIP Cable (SED16103246-301) • Bal/Unbal Xfmr (SED39124190-301) • AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• L11A2 PDIP/J107 • Bal/Unbal Xfmr</td>
<td>• A31p Video Adapter</td>
<td>• Circ – Twinax • BNC – RCA</td>
</tr>
<tr>
<td>WVS</td>
<td>• AVIU-CC Video Cable (15 ft) (SED39122269-301)</td>
<td>• R12A2 WIB XCVR1(2) UNBAL</td>
<td>• A31p Video Adapter</td>
<td>• BNC – RCA</td>
</tr>
<tr>
<td>PD100 Camc (option 1)</td>
<td>• PD100 A/V Adapter Cable (SEZ16103275-301) • RCA - RCA Cable (SED39122260-314)</td>
<td>• PD100 A/V Port • A/V Adapter</td>
<td>• RCA-RCA Cable (via female adapter) • A31p Video Adapter</td>
<td>• Stereo – RCA • RCA – RCA</td>
</tr>
<tr>
<td>PD100 Camc (option 2)</td>
<td>• Y-C Cable (SED33104816-301)</td>
<td>• PD100 S-Video Port</td>
<td>• A31p Video In Port (No A31p Video Adapter)</td>
<td>• S-Video – S-Video</td>
</tr>
</tbody>
</table>

4. Config H/W per dwg at right
5. Double-click Shuttle Apps > ‘NASA Video Overlay’
6. √’NASA Video Overlay’ window displayed
7. Sel ‘Local Full Screen’
   Press ‘ESC’ or ‘W’ key to minimize display as reqd
PORTABLE MONITORS (Concluded)

VPU REPEATER
CCTV

SPECIFICATIONS

CTVC (SOLID STATE)
- EFFECTIVE IMAGE SIZE: 6.54mm X 8.62mm
- PWR: 43.3W at 32V (all motors on)
- ZOOM SPEED: End-to-End 8 sec
- FOCUS SPEED: End-to-End 22 sec
- IRIS: Auto(Manual) Close ~7 sec
- WEIGHT: 18.9 lb
- DIMENSION: 17" (L) x 6.4" (W) x 6.3" (H)

ITVC
- EFFECTIVE IMAGE SIZE: 6.54mm X 8.62mm
- PWR: 33.6W at 32V
- ZOOM SPEED: End-to-End 8 sec
- FOCUS SPEED: End-to-End 22 sec
- IRIS: Auto Close ~6 sec
- WEIGHT: 17 lb
- DIMENSION: 19.6" (L) (Includes 3.2" Lens) x 6.4" (W) x 6.3" (H)
### CCTV (Continued)

#### LENS DATA

<table>
<thead>
<tr>
<th>Lens/Focal Length</th>
<th>Aperture Range</th>
<th>Zoom Ratio</th>
<th>Minimum Focus Distance (ft)</th>
<th>Approximate Field of View (FOV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Horizontal</td>
</tr>
<tr>
<td><strong>CTVC (COLOR)</strong>*</td>
<td>5.5mm-47mm</td>
<td>f/1.7 to f/16 (T2-T360)</td>
<td>8:1</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>ITVC (B/W)</strong>*</td>
<td>8.5mm-127mm</td>
<td>f/1.7 to f/16 (T2-T360)</td>
<td>15:1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

#### ILLUMINATOR DATA

<table>
<thead>
<tr>
<th>Color</th>
<th>LEDs</th>
<th>LED Deg Angles</th>
<th>Camr Type</th>
<th>Locations</th>
<th>Modes</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>120</td>
<td>8°/22°/8° *</td>
<td>ITVC</td>
<td>Bulkhead, Elbow, Keel</td>
<td>ON/OFF</td>
<td>cb CAMR HTR</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>22°</td>
<td>ITVC</td>
<td>Bulkhead, Elbow, Keel</td>
<td>ON/OFF</td>
<td>cb CAMR HTR</td>
</tr>
<tr>
<td>White</td>
<td>40</td>
<td>44°</td>
<td>CTVC</td>
<td>Wrist</td>
<td>ON/OFF</td>
<td>cb CAMR HTR</td>
</tr>
<tr>
<td></td>
<td>180</td>
<td>20°</td>
<td>CTVC/ITVC</td>
<td>Bulkhead, Elbow, Keel</td>
<td>ON/OFF</td>
<td>cb PAN/TILT HTR</td>
</tr>
<tr>
<td></td>
<td>156</td>
<td>29°</td>
<td>Videospection</td>
<td>Keel</td>
<td>156 LED/84 LED/30 LED/OFF</td>
<td>SSP/CAMR HTR sw</td>
</tr>
</tbody>
</table>

*Three rings of LEDs:
  Inner, outer rings – 8° LEDs
  Middle ring – 22° LEDs*
CCTV SYSTEM OVERVIEW

CCTV Types
CTVC, ITVC

PLB Camrs
• A – Fwd Bay
• B – Keel/EVA
• C – Aft Bay
• D – Stbd RMS

Port RMS Camrs
• Elbow
• Wrist

Keel/Aux Camrs
• w/Pan/Tilt Unitsd

Camr Types
CCTV, ITVC

Remote Control Unit (RCU)

SYNC
GEN/OSC
Test Pattern

PLB Camrs
• A – Fwd Bay
• B – Keel/EVA
• C – Aft Bay
• D – Stbd RMS

Port RMS Camrs
• Elbow
• Wrist

Keel/Aux Camrs
• w/Pan/Tilt Unitsd
CCTV (Continued)

AVIU OVERVIEW

- **J1**
  - Unbalanced Video Input/Output

- **J2**
  - 28V Input
  - Sync Input
  - Balanced Video Output

- **J3**
  - 8.4V Power Output if HI/LO sw – LO
  - Unbalanced Video Input/Output

- **J4**
  - Balanced Video Input

- **J5**
  - 12V Power Output if HI/LO sw – HI
  - Unbalanced Video Input/Output
  - Unbalanced Video Output (of J4 Balanced Input) if SYNC/VIDEO sw – VIDEO
  - Sync Output if SYNC/VIDEO sw – SYNC

- **J6**
  - Balanced Video Signal Output (turnaround from J4)

- **J7**
  - Unbalanced Video Output (of J4 Balanced Input) if SYNC/VIDEO sw – VIDEO
  - Sync Output if SYNC/VIDEO sw – SYNC

**SYNC/VIDEO sw**
- VIDEO – Unbalanced Video Output to J5,J7 from J4 Input
- SYNC – Sync Output to J5(J7) from J2 input

**HI-Z/75 sw**
- 75 – For nominal video output at J1
- HI-Z – For video output at J1 to a terminal source (i.e., PGSC, PD100, or V10)

**HI/LO sw**
- HI – 12V output at J5
- LO – 8.4V output at J3
PHOTO FLOODLIGHT

1. Accessory Foot (Photoflood)
2. AC Connector
3. 2A Fuse
4. ON/OFF sw
5. HI/LO sw
10.1 NO MONITOR PICTURE/MENU

No Picture on Monitor 1(2)

Nominal Config:
(R14:D)
- cb MNA TV C AFT BAY CAMR/PAN-TILT – cl
- CAMR HTR – cl
- PAN-TILT HTR – cl
- cb MNA TV CONTR UNIT – cl
- cb MNA TV MON 1 – cl
- cb MNB TV A FWD BAY CAMR/PAN-TILT – cl
- CAMR HTR – cl
- PAN-TILT HTR – cl
- cb MNB TV CONTR UNIT – cl
- cb MNB TV MON 2 – cl
- cb MNC TV B KEEL/EVA CAMR/PAN-TILT – cl
- CAMR HTR – cl
- PAN-TILT HTR – cl
- cb MNC TV CAB – cl
(R14:E)
- cb MNA D STBD RMS TV CAMR/PAN-TILT – cl
- CAMR HTR – cl
- PAN-TILT HTR – cl
- cb MNB RMS PORT RMS TV CAMR/PAN-TILT – cl
- CAMR HTR – cl
- PAN-TILT HTR – cl
(A7U)
- TV PWR CNTL – CMD
- TV PWR CONTR UNIT – MNA(MNB)
- TV SYNC – NORM TV DNLK – ENA
(A3)
- MON 1(2) SOURCE – as reqd
- SYNC – INT
- PWR – ON
- MODE – AUTO
- GUNS – R,G,B – ON

1. • MON 1(2) LVPS STATUS
   (A3) MON 1(2)
   Green LED lit?
   Yes
   No

2. Record current MON 1(2) Source and Video Input
   Device if possible
   (A3)
   MON 1(2) menu
   • Record SOURCE:
   (A7U)
   • VID OUT MON 1(2) (DNLK) pb – push
   • Record VID INPUT:
   Menu visible?
   Yes
   No

3. Try to bring up Menu
   (A3)
   MON 1(2)
   • FUNCTION – →
   • FUNCTION – ←
   Menu visible?
   Yes
   No

4. Does cursor move?
   Yes
   No

5. Send test pattern to MON 2(1)
   (A3)
   MON 2(1) menu
   • SOURCE – PNL
   (A7U)
   • VID OUT MON 2(1) pb – push
   • VID IN TEST pb – push
   Test pattern on MON 2(1)?
   Yes
   No

6. Which menu SOURCE is currently in use:
   C(D,SPLIT,RGB)
   PNL
   DNLK
   (A3)
   MON 2(1) menu
   • SOURCE – DNLK
   Picture on MON 2(1)?
   Yes
   No

7. Try MON 2(1) DNLK SOURCE
   (A3)
   MON 2(1) menu
   • SOURCE – DNLK
   Picture on MON 2(1)?
   Yes
   No

8. VCU OK
   22

9. Which menu SOURCE is currently in use:
   C(D,SPLIT,RGB)
   PNL
   DNLK
   (A3)
   MON 2(1) menu
   • SOURCE – DNLK
   Picture on MON 2(1)?
   Yes
   No

10. LVPS = low voltage pwr supply
11. Current SOURCE and INPUT recorded here will be used in subsequent mal blocks
INPUT used here was recorded in block 2.

Video Input Device is the device connected to INPUT which was recorded in block 2.

All TV config in VCU will be lost. All camrs must be pwrd up and reselected.

Standalone MON 1(2) ops may be possible on inputs C,D, or RGB if connected and also if input SOURCE generates its own sync.

Try MON 2(1)

MON 1(2) menu
• \SOURCE – PNL

VID OUT MON 2(1) pb – push
VID IN INPUT pb – push

Selected picture on MON 2(1)?

Send test pattern to MON 1(2)

MON 1(2) menu
• \SOURCE – PNL

VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Test pattern on MON 1(2)?

Switch SYNC generators

TV SYNC – REVERSE
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Test pattern on MON 1(2)?

VIDEO INPUT DEVICE OR VSU INPUT FAILURE

Which Video device used for input:

STANDARD ORBITER CCTV CAMR (NOT CAMCORDER)
CAMCORDER
ORBITER VTR

Try other VCU pwr source

TV PWR CNTL – PNL
TV PWR CONTR UNIT – MNB(MNA)
Wait 10 sec
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Test pattern on MON 1(2)?

FAILED PWR RELAY OR RELAY DRIVER IN RCU

Continue nominal ops on MNB(MNA)

Which Video device used for input:

STANDARD ORBITER CCTV CAMR (NOT CAMCORDER)
CAMCORDER
ORBITER VTR

Continue on SYNC REVERSE

10.3 1
10.2 1
10.4 1
10.1 1
18 1
19 1
17 1
16 1
15 1
14 1
13 1
12 1
11 1
10 1
9 1
8 1
7 1
6 1
5 1
4 1
3 1
2 1
1 1
Brightness and contrast controls may need to be adjusted to see menu.

SOURCE is the source recorded in block 2.

Try to bring up menu on MON 1(2).

SOURCE is the source recorded in block 2.
SOURCE is the source recorded in block 2.

Picture will be B&W with possible flicker.
If DNLK in progress, selecting test pattern to DNLK not reqd.
MCC will advise on DNLK status

If DNLK in progress, selecting test pattern to DNLK not reqd.
MCC will advise on DNLK status
Recovery of video source device may be possible

Inputs C.D may be useable without SPLIT
10.2 NO CAMR VIDEO

No Camr Video

Nominal Config:
(R14:D)
cb MNA TV C AFT
BAY CAMR/PAN-TILT – cl
CAMR HTR – cl
PAN-TILT HTR – cl
cb MNA TV CONTR
UNIT – cl
cb MNA TV MON 1 – cl
cb MNB TV A FWD
BAY CAMR/PAN-TILT – cl
CAMR HTR – cl
PAN-TILT HTR – cl
cb MNB TV CONTR
UNIT – cl
cb MNB TV MON 2 – cl
cb MNC TV B KEEL/EVA CAMR/PAN-TILT – cl
CAMR HTR – cl
PAN-TILT HTR – cl
cb MNC TV CAB – cl
(R14:E)
cb MNA D STBD
RMS TV CAMR/PAN-TILT – cl
CAMR HTR – cl
PAN-TILT HTR – cl
cb MNB RMS PORT
RMS TV CAMR/PAN-TILT – cl
CAMR HTR – cl
PAN-TILT HTR – cl
(A7U)
TV PWR CNTRL – CMD
TV PWR CONTR
UNIT – MNA(MNB)
TV SYNC – NORM
TV DNLK – ENA
(A3)
MON 1(2)
SOURCE – as reqd
SYNC – INT
MODE – AUTO
GUNS – R,G,B – ON

1 Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
• VID OUT MON 1(2) pb – push
• VID IN TEST pb – push
Test pattern on MON 1(2)?

Yes

2 Location of affected Camr:

CABIN – Camcorder
CABIN – Standard orbiter CCTV Camr (not Camcorder)

CAMR A-D or KEEL

RMS

3 Cycle MIDDECK(FLT DECK) Camr pwr
(M058F(O19))
• TV PWR – OFF
• Wait 10 sec
• TV PWR – ON

(A7U)
• VID OUT MON 1(2) pb – push
• VID IN MIDDECK (FLT DECK) pb – push
• CAMR CMD ALC pb – push
• CAMR CMD AVG pb – push
Picture on MON 1(2)?

Yes

No

4 Cycle Camr pwr

(A7U)
• (Aff Camr) TV CAMR PWR – OFF
• Wait 10 sec
• (Aff Camr) TV CAMR PWR – ON
• VID OUT MON 1(2) pb – push
• VID IN (Aff Camr) pb – push
• CAMR CMD ALC pb – push
• CAMR CMD AVG pb – push
Picture on MON 1(2)?

Yes

No

5 Cycle RMS Camr pwr

(A7U)
• TV CAMR PWR RMS – OFF
• Wait 10 sec
• TV CAMR PWR RMS – ON
• VID OUT MON 1(2) pb – push
• VID IN (PORT) RMS pb – push
• CAMR CMD ALC pb – push
• CAMR CMD AVG pb – push
Picture on MON 1(2)?

Yes

No

6 CAMR LOST

7 ALC LOGIC LOCKUP IN AFFECTED CAMR

8 Continue nominal ops

9

10
If currently selected to WRIST(ELBOW) then select ELBOW (WRIST)

9 Try alternate TV cable
   (A7U)
   • VID OUT MON 1(2) pb – push
   • VID IN MIDDECK (FLT DECK) pb – push
   (MO58F(O19))
   • TV PWR – OFF
   • Replace Camr cable
   • TV PWR – ON
   (On Camr)
   • ALC - AVG

   Picture on MON 1(2)?

   Yes
   No

10 Switch to alternate RMS Camr
   (A7U)
   • RMS CAMR PORT – ELBOW(WRIST)
   • Wait 10 sec
   • CAMR CMD ALC pb – push
   • CAMR CMD AVG pb – push

   Picture on MON 1(2)?

   Yes
   No

11 RMS WRIST(ELBOW)
   Camr FAILURE

12 CAMR CABLE FAILURE

13 RMS REMOTE VIDEO SWITCHER FAILURE OR VSU
   RMS INPUT FAILURE

14 RMS ELBOW(WRIST) Camr functional

15 Try alternate TV pnl
   (MO58F(O19))
   (original pnl)
   • TV PWR – OFF
   • Disconnect TV Cable at pnl
   (O19(MO58F))
   (new pnl)
   • TV PWR – OFF
   • Connect cable
   • TV PWR – ON
   (On Camr)
   • ALC - AVG

   Picture on MON 1(2)?

   Yes
   No

16 Both RMS Camrs unusable

17 Try alternate Camr
   (O19(MO58F))
   • TV PWR – OFF
   • Connect alternate Camr
   • TV PWR – ON
   (On Camr)
   • ALC - AVG

   Picture on MON 1(2)?

   Yes
   No

18 ORIGINAL TV PANEL FAILURE

19 TV CAMR FAILURE

20 INDEPENDENT DOUBLE FAILURE
1 Replacement tape should have good video recorded on it

2 V10 requires dump thru pnl O19(MO58F)

3 √ MCC if alternate equip avail

4 IFM for AVIU(cables) may be possible

No VTR Playback Video

Nominal Config:
(R14:D)
cb MNA TV
CONTR UNIT – cl
cb MNA TV
MON 1 – cl
cb MNB TV
CONTR UNIT – cl
cb MNB TV
MON 2 – cl
cb MNC TV CAB – cl

(A7U)
TV PWR CNTL – CMD
TV PWR CONTR
UNIT – MNA(MNB)
TV SYNC – NORM
TV DNLK – ENA

(A3)
MON 1(2)
SOURCE – as reqd
SYNC – INT
MODE – AUTO
GUNS – R,G,B – ON

(V10)
PWR – ON

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Test pattern on MON 1(2)?

No

Yes

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No

Send test pattern to MON 1(2)

(A3)
MON 1(2) menu
SOURCE – PNL

(A7U)
VID OUT MON 1(2) pb – push
VID IN TEST pb – push

Picture on MON 1(2)?

Yes

No
CCTV 10.3 (Cont)

9. Try alternate PIGMY Cable
   (V10)
   • STOP pb – push
   (O19(MO58F))
   • TV PWR – OFF
   • Replace PIGMY Cable
   • TV PWR – ON
   (V10)
   • PLAY pb – push

Picture on MON 1(2)?

10. ORIGINAL PIGMY CABLE VID/SYNC/PWR LEG FAILURE

11. 
   • Continue ops on alternate PIGMY Cable

12. Try alternate TV pnl
   (O19(MO58F))
   (original pnl)
   • TV PWR – OFF
   • Disconnect TV Cable (PIGMY Cable) at pnl
   (MO58F(O19))
   (new pnl)
   • TV PWR – OFF
   • Connect cable
   • TV PWR – ON
   (A7U)
   • VID OUT MON 1(2) pb – push
   • VID IN MIDDECK (FLT DECK) pb – push

Picture on MON 1(2)?

13. 
   • MCC

14. V10 FAILURE

15. ORIGINAL TV PNL FAILURE

16. 
   • Continue ops using alternate TV pnl

3. 

4. IFM for AVIU(cables) may be possible
10.4 NO CAMCORDER VIDEO ON COLOR TV MONITOR

1. Send test pattern to MON 1(2)
   (A3)
   MON 1(2) menu
   • SOURCE – PNL
   (A7U)
   • VID OUT MON 1(2) pb – push
   • VID IN TEST pb – push

   Test pattern on MON 1(2)
   Yes
   No

2. Cycle Camcorder pwr
   • MODE – OFF
   • Wait 10 sec
   • MODE – CAMERA
   • Config as reqd

3. Send Camcorder video to MON 1(2)
   (A7U)
   • VID OUT MON 1(2) pb – push
   • VID IN FLT DECK (MIDDECK) pb – push

   Picture on MON 1(2)?
   Yes
   No

4. TRANSIENT CAMCORDER FAILURE
   Yes
   No

5. AVIU OR CABLE FAILURE
   Yes
   No

Nominal Config:
(R14:D)
cb MNA TV
CONTR UNIT – cl
cb MNA TV MON 1 – cl
cb MNB TV
CONTR UNIT – cl
cb MNB TV MON 2 – cl
cb MNC TV CAB – cl
(A7U)
TV PWR CNTL – CMD
TV PWR CONTR UNIT – MNA(MNB)
TV SYNC – NORM
TV DNLK – ENA
(A3)
MON 1(2) menu
• SOURCE – PNL
(MOD100)
MODE – CAMER
Video link from Camcorder to orbiter TV pnl should already be connected via Digital CC Vid/Pwr cable, AVVIU, and TV Pwr cable when viewing Camcorder video on orbiter color TV monitor.

1. Camcorder on batteries?
   - Yes: Change out Camcorder Battery Pack
     - (A7U)
       - VID OUT MON 1(2) pb – push
       - VID IN MIDDECK (FLT DECK) pb – push
     - (PD100)
       - MODE – OFF
       - Replace Battery Pack
       - MODE – CAMERA
     - Picture on MON 1(2)?
       - Yes: Try powering Camcorder w/orbiter pwr
         - (A7U)
           - VID OUT MON 1(2) pb – push
           - VID IN MIDDECK (FLT DECK) pb – push
         - (PD100)
           - MODE – OFF
           - Remove Battery Pack
           - Install Digital CC Vid/Pwr Cable
         - (MO58F(O19))
           - TV PWR – OFF
         - (MO58F(O19))
           - TV PWR – ON
       - No: ORIGINAL BATTERY PACK DEAD
         - (PD100)
           - MODE – OFF
           - Remove Battery Pack
           - Install Digital CC Vid/Pwr Cable
         - (MO58F(O19))
           - TV PWR – OFF
         - (MO58F(O19))
           - TV PWR – ON
         - (PD100)
           - MODE – CAMERA
         - Picture on MON 1(2)?
           - Yes: CAMCORDER FAILURE. CAMCORDER NOT USEABLE
           - No: Other devices receiving pwr?
             - Yes: BATTERY PACK DEAD
               - (MO58F(O19))
                 - TV PWR – ON
             - No: Continue ops on orbiter pwr or try remaining Batteries
               - (MO58F(O19))
                 - TV PWR – ON
18 AVIU OR CABLE FAILURE
20 Continue troubleshooting w/orbiter TV pwr
(C)
• PWR – OFF
• Remove Battery pack
• Install CC VID/PWR Cable Battery Pack

22 Try alternate TV Pwr Cable
(A7U)
• VID OUT MON 1(2) pb – push
• VID IN MIDDECK (FLT DECK) pb – push
(PD100)
• MODE – OFF
(MO58F(O19))
• TV PWR – OFF
• Replace TV Pwr Cable
• TV PWR – ON
(PD100)
• MODE – CAMERA
Picture on MON 1(2)?

23 Try alternate TV pnl
(PD100)
• MODE – OFF
• Remove Battery Pack
• Install Digital CC Vid/Pwr Cable
(MO58F(O19))
• TV PWR – OFF
• Disconnect TV Pwr Cable (PIGMY Cable) at pnl
(O19(MO58F))
• TV PWR – OFF
• Connect TV Pwr Cable (PIGMY Cable) to pnl
• TV PWR – ON
(C)
• MODE – CAMERA
(A7U)
• VID OUT MON 1(2) pb – push
• VID IN MIDDECK (FLT DECK) pb – push
(PD100)
• MODE – OFF
(MO58F(O19))
• TV PWR – OFF
• Replace PIGMY Cable
• TV PWR – ON
(PD100)
• MODE – CAMERA
Picture on MON 1(2)?

24 ORIGINAL TV PWR CABLE FAILURE
Yes

25 Try alternate PIGMY Cable
(A7U)
• VID OUT MON 1(2) pb – push
• VID IN MIDDECK (FLT DECK) pb – push
(PD100)
• MODE – OFF
(MO58F(O19))
• TV PWR – OFF
• Replace PIGMY Cable
• TV PWR – ON
(PD100)
• MODE – CAMERA
Picture on MON 1(2)?

26 Continue ops on alternate TV Pwr Cable

27 • MCC

28 ORIGINAL PIGMY CABLE VID/SYNC/PWR LEG FAILURE
Yes

31 • MCC

35 • MCC

32 Continue ops on alternate PIGMY Cable

34 • MCC

29 TV CABIN PWR FAILURE

30 ORIGINAL TV PNL FAILURE

33 • MCC

35 • MCC

Yes

Yes

Yes

No

No

No
Pwr routed to both Camrs at all times and switched inside Camrs. Short occurring in one Camr may cause loss of pwr to both Camrs on RMS. Decision to proceed based on current spikes, if any, and importance of RMS Camrs to remainder of mission.
CCTV 10.5 (Cont)

9
(A7U)
- TV CAMR PWR RMS – ON
- CAMR CMD ALC pb – PEAK

Video on Monitor and cb closed?

Yes → 10 Elbow Camr operational

No → 8

11 Wrist Camr work in block 3?

Yes → 12 Select Wrist Camr

(A7U)
- PORT RMS CAMR – WRIST

(R14:E)
On MCC GO:
- cb MNB RMS PORT RMS
- TV CAMR/PAN-TILT – cl

(A7U)
- CAMR CMD ALC pb – push
- CAMR CMD PEAK pb – push

Video on Monitor and cb closed?

Yes → 13 WRIST CAMR OPERATIONAL. ELBOW CAMR FAILED

No → 14 WIRING FAILURE OR CAMR PWR RELAY FROZEN. BOTH RMS CAMRS LOST

15
- Do not use Elbow Camr
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CENTERLINE (C/L) CAMR

C/L CAMR INSTALL

1. ODS C/L Camr Config
   L12 (SSP 2)  √ C/L CAM PWR – OFF

   R12 (VPU)  √ SEC C/L Cap installed
   √ Green Jumper – SEC C/L
   √ VPU PWR – ON (LED on)

   Unstow PRI C/L Camr, PRI C/L TV Camr Harness Assy
   per stowage plan

   NOTE
   When connecting ODS C/L TV Camr Harness Assy, √ pins to
   socket connection

   ODS  √ ODS C/L Camr Brkt mounted securely
   Mount PRI C/L Camr to ODS C/L Camr Brkt
   √ Flex Duct attached to Camr brkt
   Config cable per dwg at right

   C/L Camr  √ SSF/STS sw – STS

   L12 (SSP 1)  √ cb SW PWR 1 (CB2) – cl
   (SSP 2)  C/L CAM PWR – SEC ON
C/L CAMR INSTALL (Continued)

2. Camr Position Verification

NOTE
This view in ODS looking up from Camr bottom

PRI C/L TV Camr Harness Assy (8.5 ft)
V828–774057–004
C/L CAMR INSTALL (Concluded)

3. ODS C/L Camr Alignment Check
   Perform ACTIVATION (Cue Card, TV) as reqd

   A7
   VID OUT MON 1(2) pb – push
   IN PL2(VPU) pb – push
   ALC pb – push
   AVG pb – push

   MON 1(2)
   LDATA – ON
   CDATA – GRN
   XHAIR – GRN

   A7
   Zoom to 10° ± 0.5°
   Focus to see Xhair target

   NOTE
   Green xhairs on monitor may move off center in calibration target when zooming in,out. Xhair will be closest to center at full zoom in position

   MON 1(2)
   √ Vertical xhairs coincide w/vertical alignment wire and are parallel. If xhair marks overlay each other, no yaw(axial) alignment needed (see dwg above)

   √ Intersection of monitor vertical,horizontal xhair falls within target circular opening from ~10-40° zoom range of Camr

   Report results of both alignment verifications (at 10° and 40°) to MCC

4. Deactivation
   A7
   CAMR CMD IRIS – CL
   L12 (SSP 2)
   C/L CAM PWR – OFF
   Go to DEACTIVATION (Cue Card, TV) as reqd
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR VIDEO TROUBLESHOOT

1. √C/L Camr nominal config:
   - **ODS**: Camr SSF/STS sw – STS
   - PRI C/L Camr connected via PRI C/L TV Camr Harness Assy to TV2 port
   - **R12 (VPU)**: √VPU SEC C/L Cap installed on SEC C/L
     - √Green Jumper – SEC C/L
     - √VPU PWR – ON (lt ON)
   - **L12 (SSP 1)**: √cb SW PWR 1 (CB2) – cl
   - **L12 (SSP 2)**: C/L CAM PWR – SEC ON
   - **A7**: VID OUT MON 1(2) pb – push
     - IN PL2(VPU) pb – push
   - **A3 (MON)**: √C/L Camr Video

   If no C/L Camr video on monitor:

2. Pwr-Cycle C/L Camr:
   - **A7**: CAMR CMD IRIS – CL (hold 8 sec)
   - **L12 (SSP 2)**: C/L CAM PWR – OFF, wait 10 sec, SEC ON
   - **A7**: ALC pb – push
     - AVG pb – push
   - **A3 (MON)**: √C/L Camr Video
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR VIDEO TROUBLESHOOT (Continued)

If still no C/L Camr video on monitor:

3. Change ODS TV port:
   A7   CAMR CMD IRIS – CL (hold 8 sec)
   L12 (SSP 2)   C/L CAM PWR – OFF

   ODS   Disconnect PRI C/L TV Camr Harness Assy from TV2 port
         Connect PRI C/L TV Camr Harness Assy to TV1 port

   R12 (VPU)   \VPU PRI C/L Cap installed on PRI C/L
               Green Jumper – PRI C/L
   L12 (SSP 2)   C/L CAM PWR – PRI ON

   A7   ALC pb – push
        AVG pb – push
   A3 (MON)   \C/L Camr Video

If still no C/L Camr video on monitor:

4. Change C/L TV Camr Harness Assy:
   A7   CAMR CMD IRIS – CL (hold 8 sec)
   L12 (SSP 2)   C/L CAM PWR – OFF

   Unstow SEC C/L TV Camr Harness Assy per stowage plan
   Disconnect PRI C/L TV Camr Harness Assy from ODS TV1 port and PRI C/L Camr
   Connect SEC C/L TV Camr Harness Assy to ODS TV1 and PRI C/L Camr

   L12 (SSP 2)   C/L CAM PWR – PRI ON

   A7   ALC pb – push
        AVG pb – push
   A3 (MON)   \C/L Camr Video
If still no C/L Camr video on monitor:

5. Install SEC C/L Camr:
   A7 CAMR CMD IRIS – CL (hold 8 sec)
   L12 (SSP 2) C/L CAM PWR – OFF

   Unstow SEC C/L TV Camr per stowage plan
   Disconnect SEC C/L TV Camr Harness Assy from PRI C/L Camr
   Remove PRI C/L Camr from ODS C/L Camr Brkt
   Mount SEC C/L Camr to ODS C/L Camr Brkt
   Connect SEC C/L TV Camr Harness Assy to SEC C/L Camr
   L12 (SSP 2) C/L CAM PWR – PRI ON
   A7 ALC pb – push
   AVG pb – push
   A3 (MON) C/L Camr Video

   If video, perform C/L CAMR INSTALL, step 3

If still no C/L Camr video on monitor:

6. √MCC
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR MISALIGNMENT

If green xhair outside inner diameter of circular portion of calibration target during PRI C/L Camr alignment, perform following:

1. Describe to MCC location of xhair in relation to target circle. Reference dwgs, 11-9
2. Remove, re-install Camr to bridge. Recheck alignment per C/L CAMR INSTALL, step 3

Perform each of the remaining steps if misalignment persists:

3. Remove, re-install mounting bridge to ODS. Recheck alignment per C/L CAMR INSTALL, step 3
4. Shim Camr/bridge interface:
   a. Obtain feeler gauges from ML60B Primary C/L Foam
   b. Loosen fasteners on Camr/bridge interface
   c. Insert feeler gauge between Camr brkt and bridge as appropriate to center xhair and tighten fasteners
   d. Recheck alignment per C/L CAMR INSTALL, step 3
   e. Repeat as reqd w/different sized feeler gauges or shim locations until xhair within target circle

5. Install SEC C/L Camr using PRI C/L Camr Harness Assy and ODS TV Port 2 (no change to VPU selections) per stowage plan:
   
   A7                  CAMR CMD IRIS – CL (hold 8 sec)
   L12 (SSP 2)        C/L CAM PWR – OFF
   ODS
   Disconnect Camr Harness Assy from PRI C/L Camr
   Replace PRI C/L Camr w/SEC C/L Camr
   Connect Camr Harness Assy to SEC C/L Camr

   L12 (SSP 2)        C/L CAMR PWR – SEC ON
   A7                  ALC pb – push
                        AVG pb – push
   Check alignment per C/L CAMR INSTALL, step 3. Describe misalignment to MCC per step 1

6. Repeat step 4 for SEC C/L Camr

7. If shimming both PRI and SEC C/L Camrs fails to bring xhair within target circle, re-install Camr w/best alignment. Report which Camr installed

8. √MCC to determine if ODS CENTERLINE CAMR ANGULAR ALIGNMENT (IFM, PROCEDURES M THRU R) reqd
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR MISALIGNMENT (Concluded)

PRI C/L CAMR

SEC C/L CAMR
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR OPS FOR VSU FAIL

1. **Setup**

   Obtain:
   - TVCU/CIP I/F Cable
   - TVCU
   - Camr Cont/CTVM Cable
   - TV Pwr Cable (20 ft) (2)
   - AVIU LCD Cable
   - LCD
   - RS-232 Cable
   - PGSC
   - PGSC Pwr Cable(s)
   - PIGMY
   - AVIU
   - V10
   - MON to VIU/CM Cable
   - Digital CC VID/PWR Cable
   - AVIU-CC VID Cable

   A3  \(\sqrt{\text{MON 2 PWR – OFF}}\)
   R14:D  cb MNB TV MON 2 – op
   A3  Disconnect Pwr MNB from MON 2 J1

   Config per dwg, 11-11

2. **Activation**

   TVCU
   - CENTERLINE/CAMCORDER sw – CENTERLINE
   - TV Pwr – ON
   - L12  C/L CAM PWR – SEC ON
   (SSP 2)

   PGSC
   - PGSC PWR SOURCE – ON
   - A31p  PGSC – ON
   - R14:D  cb MNB TV MON 2 – cl
   - A3  MON 2 PWR – ON
   - V10  PWR – ON (LED on)
   - Tape – Installed
   - LCD  PWR – ON
   - A31p  Insert TVCU Boot CD
   - Shutdown Windows
   - Pwr on A31p while holding down F12 key until ‘Boot Menu’ appears
   - Sel ‘3. CD-ROM Drive’ using down arrow
   (selected when text white)
   - <Enter>
   - CTVC CONTROLLER menu
     - CAMERA (click)
     - P2 (click)
     - ALC – AVG (click)
   - Return to P/TV scene as reqd
   - CTVC CONTROLLER menu
     - \(\sqrt{\text{Zoom,Iris,Focus as reqd}}\)
CENTERLINE (C/L) CAMR (Continued)

C/L CAMR OPS FOR VSU FAIL (Continued)

[Diagram of video system connections and components, including PGSC power source, TVCU, Centerline Camcorder, VID/SYNC Centerline, LCD Output CC VID IN, ODS TV, and various cables and connectors such as RS232 Conn, BNC Conn, Tri X Conn, TV Conn, and Video connections.]
CENTERLINE (C/L) CAMR (Concluded)

C/L CAMR OPS FOR VSU FAIL (Concluded)

3. **Deactivation**

A31p
- CTVC CONTROLLER menu
  - IRIS – CLOSE
  - QUIT
- PGSC – OFF
- PGSC Pwr Source – OFF

L12 (SSP 2)
- C/L CAM PWR – OFF

O19
- TV PWR – OFF

LCD
- PWR – OFF

MON 2
- Pwr – OFF
- Stow hardware as reqd
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<td>VTR CLOCK SET</td>
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<tr>
<td>12.1 NO VIDEO AT VTR OUT</td>
<td>12-16</td>
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<td>12.2 NO DIGITAL DNLK VIDEO AT MCC</td>
<td>12-16</td>
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<tr>
<td>12.3 MUX PWR LED(s) OFF</td>
<td>12-17</td>
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<td>12.4 MUX CHANNEL 3 DATA LED OFF</td>
<td>12-17</td>
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<tr>
<td>12.5 VIP PWR LED OFF</td>
<td>12-18</td>
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<td>12.6 VIP DATA FLOW LED OFF</td>
<td>12-18</td>
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<td>12.7 VTR ON/STANDBY RED LED OFF</td>
<td>12-19</td>
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<tr>
<td>12.8 VTR STARTS RECORDING OR REWINDS AND STARTS PLAYING AFTER MUX PWR APPLIED</td>
<td>12-19</td>
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<tr>
<td>12.9 VTR TAPE CONTROLS NOT FUNCTIONING (VTR DISPLAY INDICATES “ERR”)</td>
<td>12-19</td>
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<td>12.10 VTR DISPLAYS ERROR MSG 32</td>
<td>12-19</td>
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<td>12.11 VTR DISPLAYS ERROR MSG 21</td>
<td>12-20</td>
</tr>
<tr>
<td>12.12 VTR AUTOMATICALLY PWRS OFF</td>
<td>12-20</td>
</tr>
</tbody>
</table>
DTV

SPECIFICATIONS

VIP
PWR SOURCE: 400 Hz A/C via AC2 PAYLOAD 3φ (MA73C:E)
PWR DRAW: 6.84 Watts
FUSES: F1 = 5 amp
F2 = 2 amp
WEIGHT: 4.19 lb
DIMENSION: 10.5” (L) X 5.25” (W) X 2.69” (H)

VTR (SONY DSR-25)
PWR SOURCE: 13.2 VDC via MUX
PWR DRAW: 12.88 to 33.6 Watts (depending on mode)
TAPE: Standard DVCAM or Mini DVCAM
TAPE LENGTH: 3 hr or 40 min
AUDIO: 2 Channel, 16 bit at 48 KHz
CLOCK PWR: 300 hr internal rechargeable capacitor (after 8 hr charge)
OPERATING TEMP: 41 degF to 104 degF
WEIGHT: 9 lb
DIMENSION: 15.5” (L) X 8.37” (W) X 3.87” (H)

MUX
PWR: 28 VDC via PAYLOAD AUX bus (R1)
PWR DRAW: 39.76 to 72.8 Watts (depending on VTR,CC config)
FUSE: 5 amp
WEIGHT: 15.2 lb
DIMENSION: 19” (L) X 17.88” (W) X 3.45” (H)
DTV (Continued)

NOMENCLATURE

VIP

BACK
1. Video Loop Thru Connector (J5)
2. ATU Audio Connector (J2)
3. F2: 2–Amp Fuse
4. F1: 5–Amp Fuse
5. AC Pwr Connector (J1)
6. Playback Audio Connector (J8)
7. Record Audio Connector (J7)
8. Interval DATA OUT Connector (J6)

FRONT
9. Data Flow LED (green)
10. PWR LED (green)
11. PWR sw
12. Balanced Video Connector (J3)
13. ATU sw
14. PLAYBACK/KEY MIC LED
15. Unbalanced Video Connector (J4)
16. CCTV VIDEO IN sw
DTV (Continued)

NOMENCLATURE (Continued)

VTR (SONY DSR-25) – FRONT PANEL

1. Phone Jacks
2. PHONE LEVEL Control kb
3. AUDIO OUTPUT SELECT sw (CH 1/2)
4. TIMER sw (OFF)
5. ON/STANDBY pb, LED (red/green)
6. KEY INH sw (OFF)
7. Cassette Compartment
8. Display Window and Controls
9. EJECT pb
10. AUDIO INPUT sw (FIX)
11. CH-1 AUDIO REC LEVEL Control kb (N/A)
12. CH-2 AUDIO REC LEVEL Control kb (N/A)
13. DUP pb (not used)
14. AUDIO DUB pb (N/A)
15. Tape Transport Controls
16. INPUT SELECT sw (VIDEO)
17. CHARACTER DISPLAY sw (OFF)
18. Monitor Display and Controls
### NOMENCLATURE (Continued)

#### VTR (SONY DSR-25) – FRONT PANEL (Concluded)

<table>
<thead>
<tr>
<th>No.</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PHONES jack</td>
<td>Stereo headphone connection point to monitor live(playback) audio</td>
</tr>
<tr>
<td>2</td>
<td>PHONE LEVEL kb</td>
<td>Controls headphone jack volume level</td>
</tr>
<tr>
<td>3</td>
<td>AUDIO OUTPUT SELECT sw (Default = CH 1/2)</td>
<td>Determines which audio channels are output in 32 kHz mode only</td>
</tr>
<tr>
<td>4</td>
<td>TIMER sw (Default = OFF)</td>
<td>Used to auto repeat a tape or automatically start recording once pwr is applied to VTR</td>
</tr>
<tr>
<td>5</td>
<td>ON/STANDBY pb, LED (red/green)</td>
<td>Changes pwr mode of VTR between STANDBY (red LED) and ON (green LED). Will automatically go to ON when MUX pwr applied</td>
</tr>
<tr>
<td>6</td>
<td>KEY INH sw (Default = OFF)</td>
<td>Disables all pbS when ON</td>
</tr>
<tr>
<td>7</td>
<td>Cassette Compartment</td>
<td>Tape insertion location, door opened/closed via EJECT pb</td>
</tr>
<tr>
<td>8</td>
<td>Display windows and controls</td>
<td>See 12-6 for details</td>
</tr>
<tr>
<td>9</td>
<td>EJECT pb</td>
<td>Opens/closes cassette compartment door and ejects tape, if installed</td>
</tr>
<tr>
<td>10</td>
<td>AUDIO INPUT sw (Default = FIX)</td>
<td>Enables/disables AUDIO REC LEVEL control knobs. FIX sets fixed gain based on AUDIO INPUT LEVEL sw on rear of VTR</td>
</tr>
<tr>
<td>11</td>
<td>CH-1 AUDIO REC LEVEL kb (N/A)</td>
<td>Controls audio level of orbiter audio</td>
</tr>
<tr>
<td>12</td>
<td>CH-2 AUDIO REC LEVEL kb (N/A)</td>
<td>Controls audio level for VI data</td>
</tr>
<tr>
<td>13</td>
<td>DUP pb (not used)</td>
<td>Used for tape-to-tape recording to duplicate the time code</td>
</tr>
<tr>
<td>14</td>
<td>AUDIO DUB pb (N/A)</td>
<td>Used for tape-to-tape recording to duplicate the 32 kHz mode audio channels</td>
</tr>
<tr>
<td>15</td>
<td>Tape Transport Controls</td>
<td>See 12-7 for details</td>
</tr>
<tr>
<td>16</td>
<td>INPUT SELECT sw (Default = VIDEO)</td>
<td>Determines which video input jack the VTR will process</td>
</tr>
<tr>
<td>17</td>
<td>CHARACTER DISPLAY sw (Default = OFF)</td>
<td>Determines if VTR monitor text is displayed in VTR OUT video</td>
</tr>
<tr>
<td>18</td>
<td>Monitor Display and Controls</td>
<td>See 12-8 for details</td>
</tr>
</tbody>
</table>
### NOMENCLATURE (Continued)

**VTR (SONY DSR-25) – DISPLAY WINDOW AND CONTROLS**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>PAL Indicator/Amber (not used)</td>
<td>Lit when NTSC/PAL sw is in PAL posn or PAL formatted video being processed by the VTR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>NTSC Indicator/Amber (on)</td>
<td>Lit when NTSC/PAL sw is in NTSC posn or NTSC formatted video being processed by the VTR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>DVCAM Indicator/Amber (on)</td>
<td>Lit when the VTR is playing a DVCAM-formatted tape or when the VTR is set to DVCAM</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>4</strong></td>
<td>Cassette Indicator/Amber</td>
<td>Lit solid when a tape is loaded into the VTR. Flashes during tape ejection</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>5</strong></td>
<td>INDEX pb</td>
<td>Initiates index mark on the tape that can be used to cue the tape to that posn on the tape via INDEX SEARCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>END SEARCH pb</td>
<td>VTR will search for the last 5 sec of recorded video, play it, and return to stop mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>RESET pb</td>
<td>Resets COUNTER displayed numbers to all zeroes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>COUNTER SELECT sw</td>
<td>Determines which time data will be displayed in the counter display</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Time Counter Display</td>
<td>Displays time data (counter/time code/user bits). Self-diagnosis code numbers or error msgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>Remote Control Detector</td>
<td>Self explanatory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### VTR (SONY DSR-25) – TAPE TRANSPORT CONTROLS

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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STOP pb</td>
<td>Stops current tape transport operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>REW pb/Indicator/Amber</td>
<td>Rewinds tape and illuminates the REW indicator. Video not visible unless held during play or play/pause mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PLAY pb/Indicator/Green</td>
<td>Starts playback ops and illuminates the PLAY indicator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FF pb/Indicator/Amber</td>
<td>Fast forwards tape and illuminates the FF indicator. Video not visible unless held during play or play/pause mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PAUSE pb/Indicator/Amber</td>
<td>Pauses playback or recording ops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>REC pb/Indicator/Red</td>
<td>Pressing PLAY pb while holding in REC pb will start recording and both PLAY and REC indicators will illuminate. Just pressing REC pb will illuminate the REC indicator and allow for audio/video monitoring</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**NOMENCLATURE (Continued)**

**VTR (SONY DSR-25) – MONITOR DISPLAY AND CONTROLS**

<table>
<thead>
<tr>
<th>Number</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD Monitor</td>
<td>Displays playback(live) video and superimposed text, audio levels, and menu data</td>
</tr>
<tr>
<td>2</td>
<td>CHARACTER DISPLAY (LCD) sw (Default = ON)</td>
<td>Controls the display of superimposed text on the monitor. BLACK BACK will block video flow to the monitor to provide a black background to improve superimposed data viewing</td>
</tr>
<tr>
<td>3</td>
<td>DISPLAY SELECT sw</td>
<td>Determine what superimposed data is displayed on the monitor</td>
</tr>
<tr>
<td>4</td>
<td>EXEC pb</td>
<td>Executes and selects menu items</td>
</tr>
<tr>
<td>5</td>
<td>↑↓ pbs</td>
<td>Allows navigation through and setting of menu items when in MENU mode, and adjusts monitor brightness when in DATA mode</td>
</tr>
</tbody>
</table>
DTV (Continued)

NOMENCLATURE (Continued)

VTR (SONY DSR-25) – REAR PANEL

1. INPUT Jacks
2. OUTPUT Jacks
3. MONITOR Jack
4. DV Jack
5. Cooling Fan (two)
6. DC IN Connector
7. AUDIO INPUT LEVEL sw (-10)
### NOMENCLATURE (Continued)

**VTR (SONY DSR-25) – REAR PANEL (Concluded)**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>INPUT Jacks</td>
<td>Video and audio inputs</td>
</tr>
<tr>
<td></td>
<td>S_VIDEO</td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td>VIDEO</td>
<td>Video input of DTV signal from orbiter VSU</td>
</tr>
<tr>
<td></td>
<td>AUDIO CH-1/3</td>
<td>Orbiter audio input</td>
</tr>
<tr>
<td></td>
<td>AUDIO CH-2/4</td>
<td>Orbiter &quot;VI&quot; input</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>OUTPUT Jacks</td>
<td>Video and audio outputs</td>
</tr>
<tr>
<td></td>
<td>S_VIDEO</td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td>VIDEO</td>
<td>VTR OUT video (No VI data)</td>
</tr>
<tr>
<td></td>
<td>AUDIO CH-1/3</td>
<td>Orbiter audio playback output</td>
</tr>
<tr>
<td></td>
<td>AUDIO CH-2/4</td>
<td>Not used</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>MONITOR Jack</td>
<td>VTR MON Video  (Note: Will not display VTR Playback Video)</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>DV Jack</td>
<td>IEEE 1394 4-pin video/audio connection</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Cooling Fans</td>
<td>Reversed to bring air into unit</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>DC IN Connector</td>
<td>DC pwr source connection</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>AUDIO INPUT LEVEL sw</td>
<td>Sets the audio fixed gain level when the AUDIO INPUT is set to FIX. Default is -10. Is ignored in the VAR setting</td>
</tr>
</tbody>
</table>
DTV (Continued)

NOMENCLATURE (Continued)

MUX – FRONT

1. VTR/CC PWR LED (green)
2. VTR/CC PWR sw
3. +12 VDC Connector (N/A)
4. MUX BYPASS sw
5. MUX 5–Amp Fuse
6. MUX/VTR/CC sw
7. MUX PWR LED (green)
8. BYPFR DATA Connector
9. BYPFR CLOCK Connector
10. IEEE 1394 Connector
11. CHANNEL 3 BUFFER ERROR LED (yellow)
12. CHANNEL 3 1394 ERROR LED (yellow)
13. CHANNEL 3 DATA LED (green)
14. CHANNEL 2 DATA Ports, LEDs (N/A)
15. CHANNEL 1 DATA Ports, LEDs (N/A)
16. CHANNEL 0 DATA Ports, LEDs (N/A)
NOMENCLATURE (Concluded)

MUX – BACK

1. DATA Port (N/A)
2. CLOCK IN Connector (J1)
3. DATA IN Connector (J2)
4. CLOCK OUT Connector (J3)
5. DATA OUT Connector (J4)
6. +12 VDC OUTPUT Connector (J6)
7. +28 VDC INPUT Connector (J5)
MULTI-PROTOCOl CONVERTER (MPC)

SPECIFICATIONS

DOWNLINK: HDV signal via ISS High Rate Data Link (HRDL)
INTERFACES: IEEE1394 (Firewire) for HDV
          RJ-45 for Ethernet to an SSC (not used)
          ST for TAXI link to ISS via HRFM
POWER: 16VDC
TAXI OUTPUT: 68Mbps (maximum) bitstream only (HDV rate ~30Mbps)
HDV INPUT: 27Mbps (Average)
ETHERNET INPUT: 50Mbps maximum by UDP/IP (not used)
ETHERNET PROTOCOL: FTP, TFTP, UDP
DIMENSIONS: 203mm x 187mm x 41mm
            (8" x 7.4" x 1.6")
MASS: 1.0kg (2.2 lb)
### VTR (SONY DSR-25) NOMINAL MENU SETTINGS

<table>
<thead>
<tr>
<th>MENU</th>
<th>SUB MENU</th>
<th>MENU</th>
<th>SUB MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC (TC/UB SET)</td>
<td>TC PRESET – N/A</td>
<td>AUDIO MODE – FS48k (non-default)</td>
<td>JOG AUDIO – OFF</td>
</tr>
<tr>
<td></td>
<td>UB PRESET – N/A</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>DV IN TC – INTERNAL</td>
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<tr>
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<td>TC MAKE – REGEN</td>
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<td></td>
<td>TC RUN – REC RUN</td>
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<td>TC FORMAT – AUTO</td>
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<tr>
<td>CM (CM SET)</td>
<td>CM SEARCH – ON</td>
<td>REC MODE – DVCAM</td>
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</tr>
<tr>
<td></td>
<td>TITLE DISP – ON</td>
<td>AUTO INDEX – ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LABEL DISP – ON</td>
<td>STILL PICT – AUTO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TAPE LABEL – N/A</td>
<td>FF/REW SPD – FF/REW</td>
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<tr>
<td></td>
<td>ITEM ERASE – N/A</td>
<td>DUPLICATE – N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ERASE ALL – N/A</td>
<td>DV EE OUT – ON (non-default)</td>
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<td></td>
<td></td>
<td>STILL TIME – 1 MIN (non-default)</td>
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<tr>
<td>DISP (DISPLAY SET)</td>
<td>DATA CODE – DATE (non-default)</td>
<td>COMMANDER – WIRELESS</td>
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<td>EE/PB SEL – EE</td>
<td>AC ON MODE – POWER ON (non-default)</td>
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<td>LTR SIZE – NORMAL</td>
<td>AUTO STBY – DISABLE</td>
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<td>COLOR BAR – OFF</td>
<td>BEEP – ON</td>
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<tr>
<td></td>
<td>DATE DISP – M/D/Y</td>
<td>LCD BRIGHT – mid</td>
<td></td>
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<tr>
<td></td>
<td>TIME DISP – 24H</td>
<td>LCD COLOR – mid</td>
<td></td>
</tr>
<tr>
<td>V (VIDEO SET)</td>
<td>PB YNR – OFF</td>
<td>CLOCK SET – GMT</td>
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<tr>
<td></td>
<td>PB CNR – OFF</td>
<td>HRS METER – N/A</td>
<td></td>
</tr>
</tbody>
</table>

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12-13

P/TV/ALL/GEN I,1
DTV (Continued)

DTV FUNCTIONAL SCHEMATIC

[Diagram of DTV functional schematic with various components and connections, including VSU, MA73C, KU-Band Signal Processor, MCC, MUX, PSDP, VTR, VIP, PNL L10A2, and other related components and signals.]
VTR CLOCK SET

1. Activate VTR

   R1 √ PL AUX – ON

   L10 (MUX) VTR/CC PWR – on (LED on)
   (VTR) √ ON/STANDBY LED – green

2. Set VTR clock to GMT

   DISPLAY SELECT – MENU
   ↓ pb – ETC, EXEC pb – push
   ↓ pb – CLOCK SET, EXEC pb – push
   Use ↑,↓,EXEC to set Y,M,D,hr,min to GMT

   DISPLAY SELECT – DATA

3. Deactivate VTR as reqd

   ON/STANDBY pb – push (red LED on)

   MUX VTR/CC PWR – off (LED off)
DTV (Continued)

MALS

12.1 NO VIDEO AT VTR OUT

A7  Video Signal routed to VID OUT DTV pb

If using CTVM:

MON 2  SOURCE – C

R1  PL AUX – ON

MA73C  cb AC2 PL 3Φ – cl

L10 (MUX)  VTR/CC(MUX/VTR/CC) PWR – on (LEDs on); if not, go to MAL 12.3

(VIP)  CCTV VIDEO IN – J3

(PWR – on (LED on); if not, go to MAL 12.5

(VTR)  DATA FLOW LED – on; if not, go to MAL 12.6

(INOP SELECT LED – green

If no joy, MCC

12.2 NO DIGITAL DNLK VIDEO AT MCC

Video from VTR MONITOR, if none, perform MAL 12.1

MCC has configured Ku Signal Band Processor CH3 for PL MAX

L10 (MUX)  MUX BYPASS – ACT

L10 (MUX)  IEEE 1394 male cable connected to IEEE 1394 port

(VTR)  DISPLAY SELECT – MENU

pb – VTR, EXEC pb – push

pb – DVEE OUT, ON

(DISPLAY SELECT – DATA

(MUX)  CHANNEL 3 DATA LED – on; if not, go to MAL 12.4

If no joy, MCC for possible IEEE 1394 male cable replacement
DTV (Continued)

MALs (Continued)

12.3 MUX PWR LED(s) OFF

R1

√ PL AUX – ON

L10 (MUX)

√ VTR/CC (MUX/VTR/CC) PWR – on (LEDs on)

Notify MCC before proceeding

√ 5 Amp Fuse (spare in DTV Fuse Kit)

If no joy, √ MCC

12.4 MUX CHANNEL 3 DATA LED OFF

√ DTV MAL 12.2 complete

L10 (MUX)

If CHANNEL 3 1394, BUFF LEDs – on, signal not reaching MUX for processing

( VTR )

ON/STANDBY pb – push (red LED on)

L10 (MUX)

MUX/VTR/CC PWR – off, wait 5 sec, on

( VTR )

√ ON/STANDBY LED – green

If no joy:

Repeat pwrdn per previous steps

Disconnect, reconnect IEEE 1394 cable

Repeat pwrup per previous steps

If no joy, √ MCC

( VTR )

If only CHANNEL 3 1394 LED – on, MUX 1394 format error

√ MCC

If only CHANNEL 3 BUFF LED – on, MUX FIFO memory buffer error

√ MCC
MALS (Continued)

12.5 VIP PWR LED OFF

MA73C \( \frac{\sqrt{\text{cb AC2 PL 3\text{\(\Phi\)}}}}{\text{cl}} \)

L10 (VIP) \( \frac{\sqrt{\text{PWR – on}}}{\text{cl}} \)

 Notify MCC before proceeding
 Pull VIP from container to check fuses
 \( \sqrt{\text{F1 5 Amp Fuse (spare in DTV Fuse Kit)}} \)
 \( \sqrt{\text{F2 2 Amp Fuse (spare in DTV Fuse Kit)}} \)

 If no joy, \( \sqrt{\text{MCC}} \)

12.6 VIP DATA FLOW LED OFF

MA73C \( \frac{\sqrt{\text{cb AC2 PL 3\text{\(\Phi\)}}}}{\text{cl}} \)

L10 (VIP) \( \frac{\sqrt{\text{PWR – on}}}{\text{cl}} \)

 A7 \( \frac{\sqrt{\text{Video signal routed to VID OUT DTV pb}}}{\text{cl}} \)
 \( \frac{\sqrt{\text{Video signal has Vertical Interval data (PLB Camrs)}}}{\text{cl}} \)

L10 (VTR) \( \frac{\text{DISPLAY SELECT – AUDIO}}{\text{cl}} \)

 CHANNEL 2 AUDIO LEVEL METER indicates signal
 If signal indicated, LED failed
 Notify MCC, continue Nom Ops

DISPLAY SELECT – DATA

(VIP) PWR – off, then on \( \frac{\sqrt{\text{DATA FLOW LED flashes twice}}}{\text{cl}} \)
 If LED does not flash twice, \( \sqrt{\text{MCC}} \)
DTV (Continued)

MALS (Continued)

12.7  VTR ON/STANDBY RED LED OFF

R1  √PL AUX – ON

L10 (MUX)  √VTR/CC(MUX/VTR/CC) PWR – on (LEDs on)
Reset internal fuse by:
   VTR/CC(MUX/VTR/CC) PWR – off, wait 30 sec, on

If no joy, √MCC

12.8  VTR STARTS RECORDING OR REWINDS AND STARTS PLAYING AFTER MUX PWR APPLIED

   Timer sw out of config

L10 (VTR)  √TIMER – OFF

If no joy, √MCC

12.9  VTR TAPE CONTROLS NOT FUNCTIONING (VTR DISPLAY INDICATES “ERR”)

   Key Inhibit sw appears to be on

L10 (VTR)  √KEY INH – OFF

If no joy, √MCC

12.10 VTR DISPLAYS ERROR MSG 32

   VTR has entered SAFE MODE

L10 (VTR)  ON/STANDBY pb – push (red LED on)
(MUX)  VTR/CC,MUX/VTR/CC PWR – off (LEDs off), wait 10 sec, on (LED on)
(VTR)  √ON/STANDBY LED – green
   √Error msg no longer displayed

If no joy, √MCC
DTV (Concluded)

MALS (Concluded)

12.11 VTR DISPLAYS ERROR MSG 21

VTR has detected moisture inside

L10 (VTR) Remove tape
ON/STANDBY pb – push (red LED on)
Leave for 1 hr before re-attempting pwr on
Notify MCC

12.12 VTR AUTOMATICALLY PWRS OFF

VTR Auto Off feature on

L10 (VTR) DISPLAY SELECT – MENU
↓ pb – ETC, EXEC pb – push
↓ pb – AUTO STBY, √Disable
DISPLAY SELECT – DATA

If no joy, √MCC
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</tr>
</tbody>
</table>
BPSMU

BPSMU SPECIFICATIONS

BPSMU
- INTEGRAL CABLE LENGTH: 8 ft
- RECOMMENDED MIC POSITION: Directly in front of mouth; 6 in. from mouth
- BATT: Two 9V (pwr mic, not speaker; launched disconnected)
- BATT: 18V
- BATT LIFETIME: ~7-10 days
- BPSMU WEIGHT: 1.12 lb (w/batt)

BPSMU CABLES – DIRECT CCU CONNECTIONS
- BPSMU TO CCU ADAPTER (1 ft): Adapts BPSMU integral cable to CCU
- BPSMU/ODS ADAPTER (4 in): Adapts 4 ft A/V Cable to CCU
- A/V CABLES (4 ft, 42 ft): Minimum A/V Cable config for audio ops

BPSMU CABLES – TV CONNECTIONS
- A/V CABLES (4 ft, 22 ft, 44 ft, 35 ft, 42 ft) w/TVCU: Config for Camcorder thru ODS TV 1(2) port (TVCU assumes 125 ft of cable)
- BPSMU A/V PATCH CABLE (10 ft): Patches ODS TV Port audio into CCU using PRI(SEC) C/L port on VPU
Integral Cable
1

Speaker
2

ICOM pb
3

XMIT pb
4

Speaker Volume Control kb
5

Microphone (detachable)
6

Batt Compartment
7

1 Integral Cable
2 Speaker
3 ICOM pb
4 XMIT pb
5 Speaker Volume Control kb
6 Microphone (detachable)
7 Batt Compartment
1. **Set up BPSMU, Safe ODS TV Port**
   - Connect Batt
   - L12 (SSP 2) C/L CAM PWR – OFF
   - Config H/W per dwg at right

2. **Set up G1**
   - CC Install Headset
   - Install Batt
   - Wide Conversion Lens installed
   - ND FILTER – OFF
   - OUTPUT – CAM
   - A/V1/V2 – V2
   - STANDBY/LOCK – STANDBY
   - PWR dial – “green”
   - OPEN LCD
   - Tape installed as req'd

3. **Config TVCU**
   - CENTERLINE/CAMCORDER sw – CAMCORDER

---

**BPSMU AUDIO/VIDEO**

- BPSMU 44 ft Audio Cable
  - (SED16102418-325)
- BPSMU 35 ft Audio Cable
  - (SED16102418-323)
- BPSMU 22 ft Audio Cable
  - (SED16102418-321)
- RCA-BNC Adapter
- Wide Conversion Lens
- Multiuse Arm
- V2
- TVCU CENTERLINE/CAMCORDER sw – CAMCORDER
- RCA-BNC Adapter
- BPSMU 42 ft Audio Cable
  - (SED16102418-317)
- BPSMU 44 ft Audio Cable
  - (SED16102418-325)
- BPSMU 4 ft Audio Cable
  - (SED16102418-315)

---

**List of Materials**

- 8 ft RCA A/C Adapter
- BPSMU 4 ft Audio Cable
- BPSMU 35 ft Audio Cable
- BPSMU 22 ft Audio Cable
- Wide Conversion Lens
BPSMU (Continued)

**BPSMU AUDIO/VIDEO (Concluded)**

4. **Config TV System**  
   Config H/W per dwg at right

   - **R12 (VPU)**  
     Green Jumper – SEC C/L
     ✔ VPU PWR – ON (LED on)

   - **L12 (SSP2)**  
     C/L CAM PWR – SEC ON

   - **MON 1**  
     PWR – ON (LED on)
     MON 1 PWR – ON (LED on)

   - **A7**  
     TV PWR CNTL – PNL
     CONTR UNIT – MNA(B)
     CNTL – CMD (wait 10 sec for system initialization)
     VID OUT MON 1 pb – push
     IN PL2(VPU) pb – push

   - **MON 1**  
     ✔ CC video

5. **Config Comm System**

   - **O9**  
     R AUD PWR – AUD/TONE
     ✔ MSTR VOL 1(2) – MAX
     A/G 2, ICOM B – T/R (or loop as desired)
     XMIT/ICOM MODE sel – PTT/PTT
     VOL A/G 2, ICOM B tw – 8

   - **Other Loops** – OFF

   Perform audio check w/BPSMU
BPSMU (Continued)

DRAG THROUGH QD MATING

NOTE
If activation of quick disconnect feature of the Drag Through QD reqd, both halves (station and orbiter) are to be mated using Alignment Tool

1. Disconnect cables from orbiter half of Drag Through QD. Disconnect cables from Station half as reqd
2. Inspect connectors, mating surfaces for debris or bent pins
3. Open access hole (rotate cw)
4. Remove Alignment Tool from Drag Through QD Handle Stowage (unthread ccw)
5. Place two Drag Through QD halves together, but not mated, and insert Alignment Tool into access hole
BPSMU (Continued)

DRAG THROUGH QD MATING (Continued)

6. Squeeze quick release levers together, rotate Alignment Tool cw (pressure may be needed to engage Alignment Tool threads on station half) until Alignment Tool reaches a soft stop

7. Release quick release levers, verify quick release levers in normal spread posn

8. Remove Alignment Tool (turn ccw)
9. Stow Alignment Tool in Drag Through QD Handle Stowage (turn cw)
BPSMU (Continued)

DRAG THROUGH QD MATING (Concluded)

10. Replace Alignment Tool on station half of Drag Through QD.

DRAG THROUGH QD DEACTIVATION

1. Disconnect RWS cables (two) from orbiter side Video 1,2 ports. Stow on orbiter stbd ditch wall
2. Disconnect BPSMU cable from ODS CCU port 1 (coil as reqd)
3. Transfer Drag Through QD and remaining attached cables to ISS
BPSMU (Continued)

DRAG THROUGH QD NOMENCLATURE

1. BPSMU #1 (J5), BPSMU #2 (J7) directly below
2. Video #2 (J3)
3. Ethernet (J9)
4. Video #1 (J1)
5. Video #1 (J2)
6. Ethernet (J10)

7. Video #2 (J4)
8. Quick Release Lever
9. BPSMU #1 (J6), BPSMU #2 (J8) directly below
10. Alignment Tool
11. Alignment Tool Holder
BPSMU (Continued)

DRAG THROUGH QD NOMENCLATURE (Continued)

STATION HALF

1. Quick Release Lever
2. Alignment Tool Holder
3. Alignment Pin Receptacle
4. Center Locking Pin Receptacle
5. DB25 Male Connector

ORBITER HALF

6. Alignment Pin
7. DB25 Female Connector
8. Ball Plunger
9. Center Locking Pin
BPSMU (Concluded)

DRAG THROUGH QD NOMENCLATURE (Concluded)

1. BPSMU #2 (J8)
2. Alignment Tool
3. BPSMU #1 (J6)
4. Video #2 (J4)
5. Quick Release Lever
6. Video #1 (J2)
7. Ethernet (J10)
8. Video #1 (J1)
9. Video #2 (J3)
10. BPSMU #1 (J5)
11. Alignment Tool
12. BPSMU #2 (J7)
13. Alignment Tool Access Hole Cover
14. Ethernet (J9)
MINI-CAM

SPECIFICATIONS

CAMR DIMENSIONS: 5 1/4 in (L) X 1 in (W) X 1 3/16in (D)
WEIGHT: 0.40 lb
IMAGER MODEL: XC-999
HORIZONTAL RESOLUTION: 470 lines
PIXEL COUNT: 768 Horizontal, 494 Vertical
SENSING AREA: 6.4mm Horizontal, 4.8mm Vertical, 8.0mm Diagonal
AVIU VOLTAGE: 12V
WEIGHT: 1.6 lb

LENS DATA

<table>
<thead>
<tr>
<th>Lens</th>
<th>Aperture Range (f/stop)</th>
<th>Approximate Horizontal Field of View (FOV)</th>
<th>Minimum Focus Distance</th>
<th>Weight (lb)</th>
<th>Configuration Used</th>
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</thead>
<tbody>
<tr>
<td>3.5mm</td>
<td>f/1.8-f/16</td>
<td>84.87°</td>
<td>Fixed</td>
<td>0.10</td>
<td>Glareshield, Aft Window</td>
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<tr>
<td>6.0mm</td>
<td>f/1.4-f/16</td>
<td>56.15°</td>
<td>0.3m</td>
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<td>Aft Window</td>
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<tr>
<td>12.0mm</td>
<td>f/1.4-f/16</td>
<td>29.86°</td>
<td>0.5m</td>
<td>0.10</td>
<td>HUD</td>
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<tr>
<td>23.0mm</td>
<td>f/1.4-f/22</td>
<td>15.8°</td>
<td>0.2m</td>
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BRACKET DATA

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<th>Mount Type</th>
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<td>Width</td>
</tr>
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<td>Glareshield</td>
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<td>2 in</td>
</tr>
<tr>
<td>Rear Window</td>
<td>12 in - 20 in</td>
<td>2 in</td>
</tr>
<tr>
<td>HUD</td>
<td>4.5-in base</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1.5-in extension</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-in rise</td>
<td></td>
</tr>
</tbody>
</table>
MINI-CAM (Concluded)

NOMENCLATURE

1. Pwr/Video Connector
2. Body (covered in Black Velcro hook)
3. Yellow Velcro (HUD Brkt)
4. Lens
5. CCD
6. Lens Mount
7. Threaded Mount
8. Aperture Ring
9. Focus Ring
10. Aperture Lock Nut

3.5 mm Lens
6 mm Lens
12 mm Lens
23 mm Lens
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<td>WVS PLB MOUNTED H/W</td>
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</table>
WIRELESS VIDEO SYSTEM (WVS)

SPECIFICATIONS

RF CAMR (aka EVA mobility unit Radio frequency Camr Assembly (ERCA))
MOUNTING INTERFACE: EVA helmet light structure
CAMRS: 3 per helmet
LENSES:
- LEFT: 6mm (56° HFOV) (mounted on left helmet light)
- CENTER: 3.5mm (85° HFOV)
- RIGHT: 12mm (30° HFOV) (mounted on right helmet light)
FOCUS CONTROL: FIXED at HYPERFOCAL
IRIS: MANUAL via PGSC
SHUTTER SPEED: AUTO(MANUAL)
GAIN CONTROL: AUTO(MANUAL) (0 to +6 dB)
WHITE BALANCE: AUTO(PRESET)
IMAGER:
- MODEL: Sony XC-999
- HORIZONTAL RESOLUTION: 470 lines
- PIXEL COUNT: 768 Horizontal, 494 Vertical
- SENSING AREA: 6.4mm Horizontal, 4.8mm Vertical, 8.0mm Diagonal
UHF RCVR ANTENNA: 1 (on top of helmet)
S-BAND XMTR ANTENNAS: 2 (on side of helmet light batts)
POWER: 12V from REBA batt enabled by pwr pb on right side of ERCA
OPERATING TEMP: -31 degC to +185 degC

PAYLOAD BAY TRANSCEIVERS (XCVR): 2 units
LOCATION: BAY 5 (under PLB liner)
OPS POWER: 28 VDC from A7/WIRELESS VIDEO POWER sw, Control Bus BC1
HTR POWER: 28 VDC from A7/WIRELESS VIDEO HEATER sw, Control Bus BC1
OPERATING TEMP: -190 degC to +210 degC

UHF PLB COMMAND ANTENNA: 1 unit
LOCATION: ODS TRUSS – AFT
WIRELESS VIDEO SYSTEM (WVS) (Continued)

SPECIFICATIONS (Concluded)

S-BAND RECEIVE ANTENNAS: Up to 7
LOCATIONS: 2 at BAY 1 PORT, STBD SILL
2 at BAY 4 PORT, STBD SILL
2 at BAY 11 PORT, STBD SILL
1 at AFT BULKHEAD
POWER: 28 VDC from A7/WIRELESS VIDEO HEATER sw, Control Bus BC1

COMMAND LINK: UHF
FREQUENCY: 400 MHz
EFFECTIVE BANDWIDTH: 12kHz
BIT RATE: 9600 bps

TELEMETRY/VIDEO LINK: S-BAND
FREQUENCY: 2410 & 2470 MHz
VIDEO BANDWIDTH: 16 MHz
TELEMETRY BANDWIDTH: 5.8 & 6.8 MHz
TELEMETRY BIT RATE: 9600 bps per channel
RANGE: 300 ft reqd, 1100 ft expected (direct line-of-sight)
WIRELESS VIDEO SYSTEM (WVS) (Continued)

NOMENCLATURE

RF CAMR MOUNTED TO EMU HELMET

1 EMU Helmet
2 Pwr Indicator
3 Pwr sw
4 12mm Lens
5 UHF Antenna
6 3.5mm Lens
7 6mm Lens
8 Latch (2X)
9 Pwr Receptacle
10 S–Band Antenna (2X)
11 PLSS
12 Helmet Light Module (2X)

NOTE
Thermal Cover not shown for clarity
WIRELESS VIDEO SYSTEM (WVS) (Continued)

NOMENCLATURE (Continued)

RF CAMR MOUNTED TO EMU HELMET LIGHT

1. 12mm Lens
2. Pwr sw
3. Pwr Indicator
4. UHF Antenna
5. 3.5mm Lens
6. 6mm Lens
7. S–Band Antenna
WIRELESS VIDEO SYSTEM (WVS) (Continued)

NOMENCLATURE (Concluded)

RF CAMR SHELL
WIRELESS VIDEO SYSTEM (WVS) (Continued)

RF CAMR ELECTRONICS

Remote Head #2
Gimbal mounted
w/Helmet light

Remote Head #3
Fixed at center
of Helmet

Remote Head #1
Gimbal mounted
w/Helmet light

S–Band
Transmit Antennas

UHF
Receive Antenna

S–Band Transmitter

UHF Receiver

Head Select Switch

Iris Motor

CCD Lens

Iris Motor

CCD Lens

3.5mm, 85° H FOV

6mm, 56° H FOV

12mm, 30° H FOV
WIRELESS VIDEO SYSTEM (WVS) (Continued)

WVS PLB MOUNTED H/W

1. Aft Bulkhead Antenna
2. Mid–Body S–Band Antennas
3. Transceivers
4. Mid–Body S–Band Antennas
5. Fwd S–Band Antennas
6. UHF Cmd Antenna
WIRELESS VIDEO SYSTEM (WVS) (Continued)

SOFTWARE – TOP STATUS AREA

RF CAMERA Status
[ON/green / OFF/black]

RF CAMERA Pulldown
Selects/deselects Camr assignments to each PLB XCVR. RF Camrs will swap assignments if alternate assigned Camr selected

CMD PWR:LVL Status
[OFF:Min(Max) / ON:Min(Max)]
Denotes which PLB XCVR is processing/sending cmds (ON/OFF). Displays cmd level (Min/Max)

Frequency Status/Cmd
[High / Low]
Frequency that PLB XCVR is receiving S-Band signal from RF Camr. Will swap Camr assignments.
Easiest way to swap Camr video coming from WIB connectors, recorders

Lens Select Cmd
[L,C,R]
Selects operational lens. Default is Center

ALERT Msg Display
Displays error msgs generated by system. Msgs start off flashing/blue and change to static/black when acknowledged (clicked). "Temp Caution" msg will start off flashing/yellow until acknowledged. Msgs disappear when problem fixed. Highest priority error displayed first. Five available msgs:

Static XCVR Loss of comm between PGSC, PLB XCVR
Static RF Camera Loss of comm between XCVR, RF Camr
Bad Camera ID Mismatch between RF Camr selected and RF Camr transmitting ID
Temp Alert Displays when RF Camr(PLB XCVR) temp is 5° from going into caution range (ERCA = -35° to -30° C or +80° to +85° C, XCVR = -40° to -35° C or +80° to +85° C)
Temp Caution Displays RF Camr(PLB XCVR) temp has gone out of limits (ERCA < -35° C or >+85° C, XCVR < -40° C or >+85° C)

Select Page Icons
[RF Camera, XCVR, Telemetry]
Provides selection between the three displays
SOFTWARE – RF CAMR PAGE

XCVR | RF Camera | CMD PWR:LVL | Frequency | Lens Select | ALERT |
-----|-----------|-------------|-----------|-------------|-------|
1    | OFF       | OFF:Min     | High      | L C R       |       |
2    | OFF       | OFF:Min     | Low       | L C R       |       |

None | C

Lens Iris Control: Close   | Open
Electronic Shutter: Auto

White Balance Control: Auto

Advanced Control

Automatic Gain Control: Disabled
Power: ON   | OFF   | MUTE
S-Band Level: Dynamic

Automatic Gain Control: Disabled
Power: ON   | OFF   | MUTE
S-Band Level: Dynamic
### SOFTWARE – RF CAMR PAGE (Concluded)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lens Iris Control</strong></td>
<td>Opens(closes) Iris for selected lens. No telemetry other than video. Number displayed shows motor speed. Can click, hold</td>
</tr>
<tr>
<td>[Close, Open]</td>
<td></td>
</tr>
<tr>
<td><strong>Electronic Shutter Control</strong></td>
<td>Brightens(darkens) image scene by controlling electronic shutter. Manual status runs from dark (0 = tbd sec) to bright (100 = 1/60 sec). Initial value = 50. Afterwards, setting stays where it was left</td>
</tr>
<tr>
<td>[Auto, Manual]</td>
<td></td>
</tr>
<tr>
<td><strong>White Balance Control</strong></td>
<td>Determines how white balance set for Camr</td>
</tr>
<tr>
<td><strong>Automatic Gain Control</strong></td>
<td>Controls status of AGC. Enabled needed for dark subjects; otherwise, it is disabled to reduce noise on video</td>
</tr>
<tr>
<td>[Disabled, Enabled]</td>
<td></td>
</tr>
<tr>
<td><strong>Power Status</strong></td>
<td>Status of RF Camr transmitter. Related to top status or RF Camr (black off, green on). Mute stops video signal from being sent to antenna</td>
</tr>
<tr>
<td>[On, Off, Mute]</td>
<td></td>
</tr>
<tr>
<td><strong>S-Band Level</strong></td>
<td>Dynamic (default) – Pwr adjusted per signal strength seen at receiver (adjusted to be received at -40dB)</td>
</tr>
<tr>
<td>[Dynamic, Maximum]</td>
<td>Maximum – Sends signal at full pwr for signal strength problems</td>
</tr>
<tr>
<td><strong>Black Pedestal</strong></td>
<td>NOT USED. Brightness control varies from 0 to 100</td>
</tr>
<tr>
<td>[Increase, Decrease]</td>
<td></td>
</tr>
<tr>
<td><strong>Zoom, Focus, LED Control</strong></td>
<td>NOT AVAILABLE. Future capabilities</td>
</tr>
</tbody>
</table>
## Wireless Video System (WVS) (Continued)

**Software - XCVR Page**

<table>
<thead>
<tr>
<th>XCVR</th>
<th>RF Camera</th>
<th>CMD PWR LVL</th>
<th>Frequency</th>
<th>Lens Select</th>
<th>ALERT</th>
<th>Select Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF:Min</td>
<td>High</td>
<td>L</td>
<td>C</td>
<td>R</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>OFF:Min</td>
<td>Low</td>
<td>L</td>
<td>C</td>
<td>R</td>
</tr>
</tbody>
</table>

**Transceiver 1**
- CMD Power: Off
- Antenna: Auto

**Transceiver 2**
- CMD Power: Off
- Antenna: Auto

**Advance Controls**
- Chroma Stablizer: On
- IF: Wide
- CMD Level: Min

![Image](jc48037_082.cnv)
### SOFTWARE – XCVR PAGE (Concluded)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Function Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CMD Power</strong></td>
<td>Activates XCVR cmd processor. Only one XCVR can perform this duty. XCVR 1,2 selections are mutually exclusive and an ON cmd will automatically turn the other OFF. Status also shown under CMD PWR:LVL in top status area</td>
</tr>
<tr>
<td><strong>Antenna</strong></td>
<td>Controls antenna selection method. Auto (default) picks antenna based on strongest signal strength. Manual provides antenna number selection. Antenna numbering sequence shown on WVS cue card NOT USED</td>
</tr>
<tr>
<td><strong>Chroma Stabilizer</strong></td>
<td>NOT USED</td>
</tr>
<tr>
<td><strong>Intermediate Frequency (IF)</strong></td>
<td>Controls bandwidth sampled for RF Camr return signal. Changed to Narrow during signal strength troubleshooting</td>
</tr>
<tr>
<td><strong>CMD Level</strong></td>
<td>NOT USED w/new spread spectrum XCVRs. Status shown under CMD PWR:LVL in top status area</td>
</tr>
</tbody>
</table>
## WIRELESS VIDEO SYSTEM (WVS) (Continued)

### SOFTWARE – TELEMETRY PAGE

#### RF Camera System Telemetry

<table>
<thead>
<tr>
<th>RX Camera Lens</th>
<th>Signal Strength</th>
<th>RX Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>??? - 1 M RM</td>
<td>-1.00 M</td>
<td>-1 M</td>
</tr>
<tr>
<td>??? - 1 M RM</td>
<td>-1.00 M</td>
<td>-1 M</td>
</tr>
</tbody>
</table>

#### Power

<table>
<thead>
<tr>
<th>Electronics</th>
<th>Voltage</th>
<th>Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 M</td>
<td>0.00 M</td>
<td>0.00 M</td>
</tr>
<tr>
<td>32 M</td>
<td>0.00 M</td>
<td>0.00 M</td>
</tr>
</tbody>
</table>

#### Temperature (C)

<table>
<thead>
<tr>
<th>XCVR 1</th>
<th>32 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCVR 2</td>
<td>32 M</td>
</tr>
</tbody>
</table>

#### Transceiver Telemetry

<table>
<thead>
<tr>
<th>S Band</th>
<th>Signal Strength</th>
<th>Antenna Select</th>
<th>Antenna Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00 M</td>
<td>1 M</td>
<td>Manual M</td>
</tr>
<tr>
<td></td>
<td>0.00 M</td>
<td>1 M</td>
<td>Manual M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00 M</td>
<td>10.00 M</td>
</tr>
<tr>
<td>10.00 M</td>
<td>10.00 M</td>
</tr>
</tbody>
</table>
### WIRELESS VIDEO SYSTEM (WVS) (Concluded)

#### SOFTWARE – TELEMETRY PAGE (Concluded)

**RF Camr System Telemetry**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RF CAMERA</strong></td>
<td>Displays RF Camr title</td>
</tr>
<tr>
<td><strong>Lens</strong></td>
<td>Displays currently selected lens</td>
</tr>
<tr>
<td><strong>UHF Signal Strength</strong></td>
<td>Displays cmd link signal strength in dB seen at RF Camr</td>
</tr>
<tr>
<td><strong>UHF RX Good</strong></td>
<td>NOT USED</td>
</tr>
<tr>
<td><strong>Pwr Voltage</strong></td>
<td>Displays RF Camr system voltage</td>
</tr>
<tr>
<td><strong>Pwr Amperes</strong></td>
<td>Displays RF Camr system current</td>
</tr>
<tr>
<td><strong>Temperature Electronics</strong></td>
<td>Displays RF Camr electronics temp in degC. Alert range = -30° to -35° C and +80° to +85° C. Caution range = &lt;-35° C and &gt;+85° C.</td>
</tr>
<tr>
<td><strong>Temperature L,C,R</strong></td>
<td>Displays RF Camr left Camr temp in degC. Alert range = -30° to -35° C and +80° to +85° C. Caution range = &lt;-35° C and &gt;+85° C.</td>
</tr>
</tbody>
</table>

**Transceiver Telemetry**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>XCVR 1,2 Temperature</strong></td>
<td>Displays XCVR temp in degC. Alert range = -40° to -35° C and +80° to +85° C. Caution range = &lt;-40° and &gt;+85° C.</td>
</tr>
<tr>
<td><strong>S-Band Signal Strength</strong></td>
<td>Displays return signal strength seen at XVCR in dB</td>
</tr>
<tr>
<td><strong>S-Band Antenna Select</strong></td>
<td>Displays which S-Band antenna the XCVR is using to get video signal</td>
</tr>
<tr>
<td><strong>S-Band Antenna Mode</strong></td>
<td>Displays XCVR antenna selection mode</td>
</tr>
<tr>
<td><strong>Power Voltage</strong></td>
<td>Displays XCVR system voltage</td>
</tr>
<tr>
<td><strong>Power Amperes</strong></td>
<td>Displays XCVR system current</td>
</tr>
<tr>
<td><strong>Quads 1,2</strong></td>
<td>Displays current signal strength for each XCVR’s selected S-Band antenna in dB showing strongest of antenna quads</td>
</tr>
</tbody>
</table>
# SEQUENTIAL STILL VIDEO (SSV)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Page</th>
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<td>NOMENCLATURE</td>
<td>16-2</td>
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<td>TEST PATTERN VIA SSV</td>
<td>16-3</td>
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<tr>
<td>SSV TLM DNLK</td>
<td>16-3</td>
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<tr>
<td>SSV DEACTIVATION</td>
<td>16-4</td>
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<td>MALS</td>
<td>16-5</td>
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<tr>
<td>16.1 PWR LED NOT LIT</td>
<td>16-5</td>
</tr>
<tr>
<td>16.2 FRONT PANEL LEDS NOT INDICATING CORRECTLY</td>
<td>16-5</td>
</tr>
</tbody>
</table>
SEQUENTIAL STILL VIDEO (SSV)

SPECIFICATIONS

DIMENSIONS: 8.5 in (L) x 4.245 in (W) x 2.72 in (H)
PWR: 28V
FUSE: 2A
WEIGHT: 3.02 lb

NOMENCLATURE

1. Encoder Data LED
2. 28 VDC Port
3. BNC Composite Video Port
4. IN SEL sw
5. Y/C Component Video Port
6. Pwr LED
7. MODE sw
8. OUT RATE sw
9. DOWNLINK OUT Port
10. Fill Frame Data LED
11. Framer Data LED
12. FUSE

DIMENSIONS: 8.5 in (L) x 4.245 in (W) x 2.72 in (H)
PWR: 28V
FUSE: 2A
WEIGHT: 3.02 lb

NTSC – BNC CONN
Y/C – 4 PIN DIN CONN
TST_PAT – COLOR BAR TEST PATTERN

MODE
1 – Q = 10
2 – Q = 30
3 – Q = 50
4 – Q = 70
5 – Q = 85
6 – TELEMETRY TEST PATTERN

OUT RATE
1 – 4KBPS
2 – 8KBPS
3 – 16KBPS
4 – 25KBPS
5 – 32KBPS
6 – 64KBPS
7 – 2MBPS
8 – 4MBPS

TAILOR DECAL

IN_SEL
NTSC – BNC CONN
Y/C – 4_PIN_DIN CONN
TST_PAT – COLOR BAR TEST PATTERN

MODE
1 – Q = 10
2 – Q = 30
3 – Q = 50
4 – Q = 70
5 – Q = 85
6 – TELEMETRY TEST PATTERN

OUT RATE
1 – 4KBPS
2 – 8KBPS
3 – 16KBPS
4 – 25KBPS
5 – 32KBPS
6 – 64KBPS
7 – 2MBPS
8 – 4MBPS

SEQUENTIAL STILL VIDEO COMPRESSION ENCODER
P/N SED 16103222–301
S/N [ ]
SEQUENTIAL STILL VIDEO (SSV) (Continued)

TEST PATTERN VIA SSV

1. Perform SSV NOMINAL SETUP, step 1 (PHOTO/TV FS, SCENES)

2. SSV Settings
   - IN SEL – TEST PAT
   - Mode – 3 (may change if desired)
   - SSV Pwr – ON
   - Pwr LED illum
   - ENC DATA LED flickering
   - FRM DATA LED flickering
   - FILL FRM pulsing

SSV TLM DNLK

1. Perform SSV NOMINAL SETUP, step 1 (PHOTO/TV FS, SCENES)

2. SSV Settings
   - IN SEL – NTSC
   - Mode – 6
   - SSV Pwr – ON
   - Pwr LED illum
   - ENC DATA LED flickering
   - FRM DATA LED flickering
   - FILL FRM pulsing
SEQUENTIAL STILL VIDEO (SSV) (Continued)

SSV DEACTIVATION

1. **SSV**
   - SSV Pwr – off
   - √ Pwr LED not illuminated
   - √ ENC DATA LED not illuminated
   - √ FRM DATA LED not illuminated
   - √ FILL FRM LED not illuminated

L11
(PDIP 2)

   - DC PWR 1 CAB PL – OFF

2. **TV System**
   - Go to DEACTIVATION (Cue Card, TV) as reqd
SEQUENTIAL STILL VIDEO (SSV) (Concluded)

MALS

16.1 PWR LED NOT LIT

√Fuse
Replace fuse if blown w/fuse from SSV Fuse Kit
(SED 15500338-301)

√DC Pwr from orbiter util

16.2 FRONT PANEL LEDs NOT INDICATING CORRECTLY

Cycle pwr on SSV Compression Encoder
SSV Pwr – 0 (off)
Wait 5 sec
SSV Pwr – 1 (on)

√Cables
√Video source
## BINOCULARS

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Stabilization</th>
<th>Pwr</th>
<th>Magnification</th>
<th>Objective Lens (mm)</th>
<th>Exit Pupil</th>
<th>Approx FOV</th>
<th>Approx Linear FOV @ 1000 yd</th>
<th>Approx Minimum Focus (ft)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zeiss 8 X 20</td>
<td>No</td>
<td>N/A</td>
<td>8X</td>
<td>20</td>
<td>2.5mm</td>
<td>6.6°</td>
<td>346.5 ft</td>
<td>9.0</td>
<td>0.39</td>
</tr>
<tr>
<td>Fuji 10 X 40 Day/Night</td>
<td>Yes (Gyro)</td>
<td>6AA</td>
<td>10X</td>
<td>40</td>
<td>4.5mm</td>
<td>5.0°</td>
<td>210.0 ft</td>
<td>65.0</td>
<td>5.5</td>
</tr>
<tr>
<td>Fuji 14 X 40</td>
<td>Yes (Gyro)</td>
<td>6AA</td>
<td>14X</td>
<td>40</td>
<td>2.8mm</td>
<td>4.0°</td>
<td>210.0 ft</td>
<td>75.0</td>
<td>4.6</td>
</tr>
<tr>
<td>Fuji 16 X 70</td>
<td>No</td>
<td>N/A</td>
<td>16X</td>
<td>70</td>
<td>4.4mm</td>
<td>4.0°</td>
<td>210.0 ft</td>
<td>100.0</td>
<td>4.76</td>
</tr>
<tr>
<td>Zeiss 20 X 60</td>
<td>Yes (Mechanical)</td>
<td>N/A</td>
<td>20X</td>
<td>60</td>
<td>3.0mm</td>
<td>2.9°</td>
<td>150.0 ft</td>
<td>50.0</td>
<td>3.66</td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
<td></td>
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<tr>
<td>SPECIFICATIONS</td>
<td>18-2</td>
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<tr>
<td>NOMENCLATURE</td>
<td>18-2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTIVATION/OPERATION</td>
<td>18-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>DEACTIVATION</td>
<td>18-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIBERSCOPE LIGHT PWRUP (30 min)</td>
<td>18-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIBERSCOPE LENS REPLACEMENT</td>
<td>18-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FIBERSCOPE

SPECIFICATIONS

LIGHT PWR: Orbiter – 6V via IFM Breakout Box

NOMENCLATURE

<table>
<thead>
<tr>
<th>Lens Tip Adapter (FOV in deg)</th>
<th>10D</th>
<th>20D</th>
<th>40D</th>
<th>40S (Rt angle Lens)</th>
<th>80D</th>
</tr>
</thead>
</table>

- Fiberscope Light
- Light Plug
- Fiberscope (SED 33103861–303)
- Bending Section
- Objective Lens
- Screw Thread
- Locking Ring
- Positioning Dot (red)
- Objective Lens Tip Adapter
- (Forward-viewing Adapter)
- Light Guide Windows
- Focusing Ring
- Angle Free Knob (for RIGHT and LEFT)
- Angle Free Knob (for UP and DOWN)
- Angle Knob (for UP and DOWN)
- Angle Knob (for RIGHT and LEFT)
- Dioptr Adjustment Ring
- Ocular
- Fiberscope to Mini-Cam Adapter

Mini-Cam
FIBERSCOPE (Continued)

ACTIVATION/OPERATION

MA9N
1. Unstow Fiberscope Kit, Fiberscope Light, if reqd
2. If Fiberscope Light reqd:
   - Install Fiberscope Light Plug into Fiberscope Light
   - Perform FIBERSCOPE LIGHT PWRUP, 18-4, steps 1 thru 12
3. If installed lens not desired:
   - Unstow spare lens
   - Perform FIBERSCOPE LENS REPLACEMENT, 18-6
4. If video dnlk(viewing) reqd:
   - Unstow Fiberscope-to-Mini-Cam Adapter
   - Screw Adapter into Mini-Cam body lens mount
   - Mount Adapter to Fiberscope by aligning setter pin w/orange dot, rotate Adapter cw to lock
   - Perform IN-CABIN MINI-CAM (MINI-CAM)
   - Route Mini-Cam video to monitor or dnlk:
     A7
     - VID OUT MON 1(2) (DNLK) pb – push
     - IN FLT DECK(MIDDECK) pb – push
     - Push button on Adapter and rotate Fiberscope until slit mark on image edge at top of image
     OR
     - Unstow,install Fiberscope Eyepiece
5. Adjust diopter until slit mark clearly visible
   - Adjust Camr viewing by rotating up/down,left/right angle knobs while free knobs are in F posn
   - Adjust focus by rotating focus ring

DEACTIVATION

1. If Fiberscope Light used:
   - Perform FIBERSCOPE LIGHT PWRUP, 18-4, steps 13 thru 15
   - Remove Fiberscope Light from Fiberscope Light Plug
   - Stow Fiberscope Light
2. If Mini-Cam used:
   O19(MO58F)
   - TV PWR – OFF
   - Remove Mini-Cam Adapter from Fiberscope
   - Remove, stow Mini-Cam Adapter from Mini-Cam body
3. Remove, stow Fiberscope Eyepiece
4. Stow Fiberscope, Fiberscope Kit
FIBERSCOPE (Continued)

FIBERSCOPE LIGHT PWRUP (30 min)

1. Unstow:
   Multimeter
   Pin Kit (two 5-in 20 ga Pin/Pin Test Jumper Leads, two 24-in Minigrabbers, 5-Amp Fuse)
   Gray Tape
   IFM Breakout Box
   DC Pwr Cable

2. Remove Battery Holder Assembly from Fiberscope Light

3. √DC UTIL PWR MNA – OFF

4. a. Config Breakout Box:
   AUX – OFF
   28V/VAR VOLT – VAR VOLTS
   PWR A,B – OFF
   b. Remove fuse cap from side A
   c. Rotate GA SEL A – 20
   d. Install 5-Amp Fuse, replace cap

5. Assemble Breakout Box and Multimeter as shown below

   ![Diagram of Breakout Box and Multimeter setup]

   Multimeter
   Leads to Side A Volt Test; Red to + Black to –
   To DC Util Outlet MO52J
   IFM DC Pwr Cable
   Insert 5-Amp Fuse
   IFM Breakout Box
FIBERSCOPE (Continued)

FIBERSCOPE LIGHT PWRUP (30 min) (Continued)

6. Configure Multimeter for DC V (auto range)

7. DC UTIL PWR MNA – ON

8. Breakout Box:
   √ VAR VOLTS – ON (lt on)

9. Set VAR VOLTS output by rotating VAR rotary sw until Multimeter reads 6 VDC

NOTE
Positive, negative leads from Breakout Box can be attached to either terminal on Fiberscope Light

10. Install Breakout Box and cables to Fiberscope Light as shown below
FIBERSCOPE (Concluded)

FIBERSCOPE LIGHT PWRUP (30 min) (Concluded)

11. Secure IFM Breakout Box, Multimeter, and PWR Cable in convenient location

12. When ready to operate Fiberscope:
   Breakout Box:  PWR A – ON (lt on)

13. When finished operating Fiberscope:
   Breakout Box:  PWR A – OFF

14. DC UTIL PWR MNA – OFF

15. Disconnect Minigrabbers, Test Jumper Leads, Multimeter, and IFM DC Pwr Cable

FIBERSCOPE LENS REPLACEMENT

1. Unscrew lock ring from lens until second threads disengage

2. Rotate lens to align green dots

3. Pull lens to engage first threads, unscrew lock ring until lens free

4. Select desired lens and stow removed lens in foam

5. Align green dots on lens and Fiberscope; slowly push lens on until lens stops against first threads; screw on lens until first threads disengage

6. Rotate lens until green dot aligns w/Fiberscope red dot

7. Push lens into Fiberscope until it stops against second threads, screw on lens until second threads fully engaged
LASER DYNAMIC RANGE IMAGER (LDRI)

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MONITOR INDICATIONS FOR LDRI VIDEO ................................................................................................................................................. 19-11
LASER DYNAMIC RANGE IMAGER (LDRI)

SPECIFICATIONS

CAMERA MODEL: Sony XC-ST70
PIXEL COUNT: 720 x 480
CAMERA SENSOR FOV: 15 x 19.7 deg
FOCAL LENGTH: 50.6mm
IRIS: Fixed at F11
FOCUS: Fixed at 6 ft

LASER MODEL & TYPE: LaserTelLT-1110-20W-CS, Class IV rated @ 20W and limited to 11W
LASER WAVELENGTH: 805 nm +/- TBD based upon laser temperature
LASER COVERAGE: 23.7 (vertical) x 19.9 deg (horizontal)
CAMERA/LASER PARALLAX: Approx 1.5 in horizontal
HAZARD ZONE: 9 ft

MOUNTING INTERFACE: Bottom of ITVC (ITVC specifications in CCTV section)
POINTING CAPABILITY: Standard Pan Tilt Unit (PTU)
PAN RANGE: 179.8 deg
TILT RANGE: 300 deg
ITVC ILLUMINATOR: LDRI

WEIGHT: 6.5 lb + 3 lb counter-weight
DIMENSION: 11 in (L) x 5.88 in (W) x 4.0 in (H)
PWR: 28V +/- 4V
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

NOMENCLATURE

NOTE
Thermal covers are not depicted

1 W601 Interface Cable Assembly (EVA releasable at boom I/F)
2 Isolator Plate
3 Isolator (x4)
4 PTU External Thermistor Interface Cable*
5 Counterweight Support
6 Counterweight
7 ITVC
8 ITCV External Thermistor Interface Cable*
9 LDRI Laser Diffuser
10 LDRI Camera Orifice
11 LDRI Power/Sync Input and Video Output
12 LDRI
13 ITVC Power/Sync Input and Video Output
14 Boom Interface Bracket (EVA Releasable)

* Items 4 and 8 are subsets of item 1, the W601 Interface Cable Assembly
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

NOMENCLATURE (Concluded)

1. LDRI Front Face
2. Power/Sync Input and Video Output
3. Camera Orifice
4. Laser Orifice (covered by diffuser)
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

OBSS PTU PAN AND TILT RANGES

Pan
In this depiction, pan = -90 deg relative to the origin.

+9.8 deg
-170.0 deg

Tilt

+175 deg

-125 deg
(negative tilt range is limited by cable routed to LDRI)
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

ITVC, LDRI, AND PTU INTERACTIONS

Camera/PTU Power → ITVC → PTU Commands → Video → LDRI

Sync/Cmds → Camera Heater Power → LTVC

Camera Heater Power → LDRI → Video → PTU

PTU Heater Power → PTU

Heaters control sys video sys → Video → Switching → Illuminator intensifier modulator

* Pan and tilt values for display on MON

VPU

MISS CAM

PL2

VSU

jsc48037_12.tr2.cvx
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

OPP PANEL

R12

OBSS SW PWR (CB1 AND S1)
- Closure of 3-amp OBSS SW PWR cb followed by sw will provide CAB PL3 POWER to R12 OBSS panel

RSC VIDEO (J105)
- Provides balanced, asynchronous video from RMS Sideview Camr (RSC)
- Video will be routed to VSU PL3 input on R12/VPU/WIB using PDIP Video Cable to support viewing/recording/dlnk ops

LCS CMD/TLM (J107)
- Provides PGSC interface for crew control, data, and telemetry for Laser Camr System (LCS) and ISIS Digital Camr (IDC)
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

OBSS PANEL

R12

RSC PWR (S2)
- Provides CABIN PL3 POWER to RMS Sideview Camr (RSC) and its heater
- Heater must remain active for duration of mission

ITVC ENA (S3)
- ON sends an enable command to the OBSS ITVC
- SPEE PWR must be ON prior to ITVC enable
- OFF disables Camr. A 10-sec wait reqd before re-enabling

SPEE PWR (S4)
- ON closes K1 pwr relay in RMS End Effector. Pwr flows to OBSS ITVC/LDRI/PTU and to RSC illuminator. Upon initial relay closure, illuminator has pwr but not active
- After initial closure of K1 relay, cycling SPEE PWR sw to OFF, then ON will command RSC illuminator to full pwr (156 LEDs). Subsequent K1 relay cycling will take illuminator to med pwr (84 LEDs), then low pwr (30 LEDs), then OFF, and then back to full pwr
- Cycling K1 relay OFF, then ON will rest OBSS PTU pan and tilt values to zero; take LDRI to stby (Mode 1) and ITVC to manual state
LASER DYNAMIC RANGE IMAGER (LDRI) (Continued)

A7 PANEL

Command interfaces listed below pertain only to OBSS LDRI and not to OBSS ITVC/PTU. Commands to ITVC/PTU handled by selecting PL2 as video input and treating that address in the same manner as PLB ITVC.

NOTE

MUX1(2)R(L), MIDDECK pb
- Selection of any of four VIDEO OUTPUT MUX pb followed by VID IN MIDDECK pb enables commanding of OBSS LDRI.

IRIS sw
- IRIS sw provides gain cntl for LDRI Modes 3,4,5,6. Feedback is available in MON Lens Data in place of T-stop.
- Gain range – 10 (brightest) to 280 (darkest). Default value – 280.
- Gain applied on one of Modes 3(4,5,6) will apply to other three. Gain returns to default value by selecting Mode 1.

MODE, MENU pb
- Six MODE/MENU pb, left to right, allow selection of LDRI modes 1 thru 6:
  - MODE 1 – STANDBY
  - MODE 2 – ILLUMINATOR
  - MODE 3 – 2D
  - MODE 4 – 2D GAMMA
  - MODE 5 – 3D
  - MODE 6 – 3D GAMMA
- If OBSS/ITVC cntl selected (by depressing VID OUT pb selected for PL2) while in LDRI modes 3(4,5,6), LDRI video will continue to flow to VID OUT. For this scenario, all ITVC cmds active in blind.
- Mode fdbk for Modes 3,4,5,6 avail when PL2 illuminated. In Modes 1 and 2, MODE/MENU pb indicate ITVC exposure setting, not mode.
LASER DYNAMIC RANGE IMAGER (LDRI) (Concluded)

MONITOR INDICATIONS FOR LDRI VIDEO

NOTE
LDRI video assigned to PL2 using R12/VPU MISS CAM jumper posn. LDRI video (Modes 3-6) will have black rounded corners. Lens data and green Camr data ON for this illustration.

Gain value as set by IRIS sw on A7 (70=brightest and 280=darkest)
Default = 280

-112.5P +22.5T +28C CAMB
Pan, tilt for OBSS PTU
Temp from LDRI Laser
This Page Intentionally Blank
# Laser Camr System (LCS)/Integrated Sensor Inspection System Digital Camr (IDC)

- **LCS Specifications** ................................................................. 20-2
- **LCS Nomenclature** ................................................................. 20-3
- **LCC Software GUI** ................................................................. 20-4
- **IDC Specifications** ................................................................. 20-8
- **IDC Nomenclature** ................................................................. 20-9
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- **LCS/IDC Combined Nomenclature** ....................................... 20-14
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- **LCC Software Exit Dialogue Boxes** ....................................... 20-16
- **Manual A31p Desktop Dnlk Setup** .......................................... 20-17
- **Reconfiguration of A31p Screen Resolution** .......................... 20-20
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC)

LCS SPECIFICATIONS

LASER WAVELENGTH: ≈1500 nm, near-IR
LASER CLASSIFICATION: Class 3b
OPERATIONAL RANGE: 4-10 ft
LASER SPOT SIZE: 0.04 in @ 4.5 ft
HAZARD ZONE:
  Nominal Hazard Keep Out Zone (KOZ) – 5 ft
  Worst Case Hazard KOZ – 64 ft
LASER COVERAGE:
  Detailed Area and Quick View Scan Modes – 30 x 30 deg
  Continuous Line Scan Mode – Variable 2 to 42 deg
LINEAR DETECTION ARRAY (LDA): 256-pixel linear array CCD w/13-bit intensity dynamic range
LCH WEIGHT: 24.5 lb
LCH DIMENSIONS: 11 in (L), 10 in (W), 5.6 in (H)

LCH PWR MODES/SOURCES: Refer to LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (PHOTO/TV FS, REF PROC)
HEATER PWR MODES/SOURCES: Refer to LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (PHOTO/TV FS, REF PROC)

LASER SCAN MODES:
  Detailed Area – Two-directional scanning in rectangular pattern (used for "stop and stare" ops). Both X,Y mirrors used
  Quick View – Low-resolution detailed area-scan mode
  Continuous Line – One-directional scanning passes thru optical center of FOV (used for scanning ops). RMS provides scanning motion

CREW CONTROL:
  Hardware – LCC (Laser Camr Controller – A31p)
  Software – LCC software shortcut (Shuttle Apps\IDC)
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

LCS NOMENCLATURE

1. Laser Orifice
2. RS422 Connector (J4)
3. Test Connector (J3)
4. COMMS/DATA Connector (J2)
5. POWER Connector (J1)
6. Ethernet Peripheral Device Connector (J5)
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

LCC SOFTWARE GUI

1. File
2. Tools
3. Window
4. Help

Database

C:\ics\Config\ics.dsc

Stop Scan

Detailed Area Scan

Start Area Scan

Quick View Scan

Start Quick View

Auto-Exposure:

- Use Auto-Exposure:
- Custom Area

Continuous Line Scan

Start Line Scan

Scan Status:

Laser  Comm  Temp  Elec

GMT  Message  MSG ID

GMT:
**LCC SOFTWARE GUI (Continued)**

<table>
<thead>
<tr>
<th>Menu Bar [File, Tools, Help]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[File]</strong></td>
<td></td>
</tr>
<tr>
<td>Open</td>
<td>Allows user to open and view previous scan bin files. If several open, they are shown in order under File menu</td>
</tr>
<tr>
<td>Close</td>
<td>Closes displayed scan bin file. Appears only when viewing previous scans. If several open, only currently selected file will be closed with this function</td>
</tr>
<tr>
<td>Close All</td>
<td>Closes all scan bin files. Appears only when viewing previous scans. If several open, all files will be closed. Multiple scans collected in series will reside in RAM until cleared with this feature. Good housekeeping feature to use between scan AOIs</td>
</tr>
<tr>
<td>Load Database</td>
<td>Allows user to change current database. When load database option selected, a window will appear and allow user to select another database. Only files with .dsc extension selectable</td>
</tr>
<tr>
<td>Exit</td>
<td>See LCC SOFTWARE EXIT DIALOGUE BOXES, 21-16</td>
</tr>
<tr>
<td><strong>[Tools]</strong></td>
<td></td>
</tr>
<tr>
<td>Set GMT</td>
<td>Sets GMT clock on both LCC, LCH. When selected, window will appear allowing A31p time to be set. LCC time must be within 3 sec of onboard SM GPC. Once clock set, LCC A31p will update its system clock every 5 min using LCH system clock if LCC GUI running</td>
</tr>
<tr>
<td>IDC Control</td>
<td>Not used. Allows user to power on/off IDC. This task preferably done via IDC software</td>
</tr>
<tr>
<td>Zoom Toolbar</td>
<td>Allows Zoom Toolbar to be displayed under Menu Bar</td>
</tr>
<tr>
<td>Intensity Adjustments</td>
<td>Not currently selected (used). Invokes Intensity Adjustment window on GUI so user can adjust Gamma, Brightness, and Contrast of displayed scan image</td>
</tr>
<tr>
<td>Peak Status Highlight</td>
<td>Not currently selected (used). Invokes Peak Status window so user can select voxel status: Below Min Intensity, Above Max Intensity, Overflow, Underflow, Invalid Peak, No Peak, and Multiple Highlights</td>
</tr>
<tr>
<td>Status Toolbar</td>
<td>Allows Status Toolbar to be displayed below GUI. Contains only GMT</td>
</tr>
<tr>
<td><strong>[Window]</strong></td>
<td></td>
</tr>
<tr>
<td>(Menu appears only when scan bin files being viewed)</td>
<td></td>
</tr>
<tr>
<td>Cascade</td>
<td>Cascades all currently opened scan bin files</td>
</tr>
<tr>
<td>Tile Vertically</td>
<td>Will ‘vertically tile’ all opened scan bin files. User can scroll up, down with vertical, horizontal slide bars</td>
</tr>
<tr>
<td>Tile Horizontally</td>
<td>Will ‘horizontally tile’ all opened scan bin files. User can scroll up with vertical slide bar</td>
</tr>
<tr>
<td>Arrange Icons</td>
<td>If multiple windows open and minimized in display area, will align minimized files</td>
</tr>
<tr>
<td><strong>[Help]</strong></td>
<td></td>
</tr>
<tr>
<td>About</td>
<td>Displays window w/software-specific information; i.e., version of release</td>
</tr>
</tbody>
</table>

**Zoom Toolbar**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit 1:1</td>
<td>If displayed scan bin file has been zoomed in/out, button allows user to fit image to display area</td>
</tr>
<tr>
<td>Magnifier w/+ Sign</td>
<td>Zoom in button</td>
</tr>
<tr>
<td>Magnifier w/- Sign</td>
<td>Zoom out button</td>
</tr>
<tr>
<td>Magnifier in box</td>
<td>Allows user to select a box on display to zoom in on. Mouse arrow will change to magnifier. User will outline area with two mouse clicks and view is fitted in display area</td>
</tr>
</tbody>
</table>

**Zoom Percentage Menu**

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Allows user to zoom in/out according percentage displayed. Selectable percentages: 25%, 50%, 75%, 100%, 150%, 200%, 300%, 400%, Fit to Window</td>
<td></td>
</tr>
</tbody>
</table>

**Database**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays current database and its path. Default is “c:/lcs/config/lcs.doc”</td>
<td></td>
</tr>
</tbody>
</table>

**File**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays name of current file being saved on LCC hard drive during scan. Will display last scan file name when no scan in progress</td>
<td></td>
</tr>
</tbody>
</table>

**Scanning Page [Detailed Area Scan, Continuous Line Scan, Quick View Scan]**

(One of two pages which allows user to select scan from one of three drop-down menus and execute type of scan)

**[Detailed Area Scan]**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Area Scan</td>
<td>Drop-down menu allows user to select one out of a possible 30 detailed area scans</td>
</tr>
<tr>
<td>Start Area Scan</td>
<td>Executes detailed area scan selected from drop-down menu</td>
</tr>
</tbody>
</table>

**[Quick View Scan]**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Area Scan</td>
<td>Drop-down menu allows user to select one out of a possible 10 quick-view scans</td>
</tr>
<tr>
<td>Start Quick View</td>
<td>Executes quick-view scan selected from drop-down menu</td>
</tr>
</tbody>
</table>

**[Auto-Exposure]**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Auto-Exposure</td>
<td>Enables Auto-Exposure. AE feature adds ~10 sec. Three initial scans taken and exposure calculated based on those scans</td>
</tr>
<tr>
<td>Custom Area</td>
<td>Enables Custom Area Box in image as req'd. Auto-exposure calculated from Custom Area Box</td>
</tr>
</tbody>
</table>

**[Continuous Line Scan]**

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Area Scan</td>
<td>Drop-down menu allows user to select one out of a possible 30 continuous line scans</td>
</tr>
<tr>
<td>Start Line Scan</td>
<td>Executes continuous line scan selected from drop-down menu</td>
</tr>
</tbody>
</table>
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

LCC SOFTWARE GUI (Continued)
### LCC SOFTWARE GUI (Concluded)

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Data Page</strong></td>
<td>Displays LCH component temp values in deg Celsius. Values are FDA’d according to limits set in current database. An out of allowable limit value is backlit in yellow and causes a msg to be displayed.</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td>Displays LCH component elec values. Values are milliWatts, milliamps, and Volts.</td>
</tr>
<tr>
<td>Laser On (Green)</td>
<td>Scan in progress. Backlit in green while laser diode is on.</td>
</tr>
<tr>
<td>Laser Off (Blue)</td>
<td>Scan not in progress. Backlit in blue while laser diode is off.</td>
</tr>
<tr>
<td>Laser ? (Gray)</td>
<td>No insight into LCH. Backlit in gray when no LCH to LCC Ethernet connectivity.</td>
</tr>
<tr>
<td><strong>Comm Light</strong></td>
<td>Displays Ethernet communication state between LCC, LCH.</td>
</tr>
<tr>
<td>Green Light</td>
<td>Indicates good Ethernet connection.</td>
</tr>
<tr>
<td>Yellow Light</td>
<td>Indicates bad Ethernet connection.</td>
</tr>
<tr>
<td><strong>Temp</strong></td>
<td>Light displays temp status of LCH components.</td>
</tr>
<tr>
<td>Temp (Green/Yellow)</td>
<td>Green Light – Backlit in green when all LCH component temp values within ranges specified by current database. Yellow Light – Backlit in yellow when one or more values out of limits.</td>
</tr>
<tr>
<td><strong>Elec</strong></td>
<td>Light displays elec status of LCH components.</td>
</tr>
<tr>
<td>Elec (Green/Yellow)</td>
<td>Green Light – Backlit in green when all elec values within ranges specified by current database. Yellow Light – Backlit in yellow when one or more values out of limits.</td>
</tr>
<tr>
<td><strong>Scan Status</strong></td>
<td>Displays last scan line collected or Stop Scan button selected.</td>
</tr>
<tr>
<td>Blank</td>
<td>When LCS software launched and no scans have been executed.</td>
</tr>
<tr>
<td>Complete</td>
<td>Displays last scan line collected or Stop Scan button selected.</td>
</tr>
<tr>
<td>Vertical Resolution</td>
<td>While scan in progress, field displays vertical resolution of scan and current line being scanned; i.e., 211/512 means current line being scanned and recorded on LCC is 211 and vertical resolution is 512.</td>
</tr>
<tr>
<td><strong>Message Area</strong></td>
<td>Displays GMT of time tagged off-nominal message.</td>
</tr>
<tr>
<td>GMT</td>
<td>Displays text description of error messages. Any messages displayed here are logged into system log.</td>
</tr>
<tr>
<td>Message</td>
<td>Displays text description of error messages. Any messages displayed here are logged into system log.</td>
</tr>
<tr>
<td>MSG ID</td>
<td>Display unique six-digit number that corresponds to error message that appears in message area.</td>
</tr>
<tr>
<td>CLR</td>
<td>Clears current error messages displayed in message area. Button will invoke a dialogue box asking user if he wants to clear message area.</td>
</tr>
<tr>
<td>GMT DDD/HH:MM:SS</td>
<td>Displays GMT based on A31p system clock. Once GMT set via Tools menu, LCC will sync up to time kept on LCH, which is accurate.</td>
</tr>
</tbody>
</table>
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

IDC SPECIFICATIONS

IDC DIMENSIONS: 6 in (L), 5 in (W), 2 in (D)
IDC ELECTRONIC COMPONENTS: Adimec-2000m/S and Pleora i-port PT1000-CL
IDC ELECTRONIC PWR: 12V conditioned pwr from LCH

HEATER PWR MODES/SOURCES: Refer to LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (PHOTO/TV FS, REF PROC)

IMAGER MODEL: Adimec-2000m/S gray-scale imager
CCD: 1920 x 1080
CCD PIXEL SIZE: 7.4 microns (square pixels)
SPECTRAL RESPONSE:
    350 nanometers (25%)
    500 nanometers (42% Peak)
    700 nanometers (20%)
FOCAL LENGTH: 50mm
DYNAMIC RANGE: 60dB
GAIN: 1X-8X
APERTURE: f/8
FOCUS DISTANCE: 6 ft 3 in
WORKING DISTANCE: 5 ft
    Target Resolution at 5 ft: 113 pixels/in
    Horizontal Coverage at 5 ft: 17 in
    Vertical Coverage at 5 ft: 10 in
INTERFACE: 10Base2 half duplex
CREW CONTROL:
    Hardware – LCC (Laser Camr Controller – A31p)
    Software – LCC software shortcut (Shuttle Apps\IDC)
IMAGE FORMAT: 16-bit tif
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

IDC NOMENCLATURE

1. DCA to LCH Cable Connector
2. Digital Camr Assy (DCA)
3. Lens Attachment
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

IDC SOFTWARE GUI

1. Other Commands...

2. 


4. Power ON  Power OFF  CC  AE  SP  Default Scenario

5. Scan Lo-Res  Scan Hi-Res  ○ Avg  ○ Sub  ○ Peak

6. Acquire Set  Acquire One  View File...

Gain: #X  Exp: ####### usec
<table>
<thead>
<tr>
<th><strong>LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IDC SOFTWARE GUI (Continued)</strong></td>
</tr>
</tbody>
</table>

1. **Other Commands** (Pulldown menu provides other commands with/without keys)

   - **Advanced Command**
     - Brings up an Advanced Settings dialog box in which user may apply or see specific setting for individual image acquisition options. See pg 21-12
   - **[F2]**
     - Brings up “Add Notation” box for adding text to tiff. This text will be added to all tiffs; so, clear it if added to text box
   - **[F5]**
     - Toggle Summary View
   - **[F6]**
     - Toggle Image Mode
   - **[F7]**
     - Zoom In
   - **[F8]**
     - Zoom Out
   - **[F9]**
     - Reset Brightness and Contrast
   - **[F10]**
     - Reset Auto Exposure Aperture to Default
   - **[F11]**
     - Toggle Auto Exposure Aperture Visibility
   - **[F12]**
     - Find Auto Exposure Aperture

2. **Display Area**
   - Shows the tiff or last image collected

3. **Status Bar 1**
   - GMT: Displays current time
   - Zoom Level:
     - Fit, 1X, 2X, 4X, 8X
   - Mouse Position:
     - Shows “X, Y” positions of mouse
   - Camr Temperature:
     - Temperature of Camr in Celsius
   - Comm Status Light:
     - Blinking green light when in nominal case; static while imaging

4. **Power On/Off, Auto Exposure (AE); Color Coded (CC); Scenario File Drop List/Brightness and Contrast Controls**
   - **[Power On]/[Power Off]**
     - Buttons control the power to the IDC
   - **[CC]**
     - Allows user to color code the over and under exposed areas of image
   - **[AE]**
     - Allows selection of auto-exposure capability
   - **AE Setpoint Slide Bar**
     - Allows user to set starting exposure for AE algorithm. Bar can be used when Avg, Sub, and Peak algorithms selected
   - **Scenario File Drop List**
     - Drop down list allows user to select Gain and Exposure settings for all image acquisition buttons that depend upon light scenario
   - **Brightness and Contrast**
     - When user switches into "Image Mode", scenario drop down list turns into "Brightness and Contrast" controls, allowing user to manipulate viewable image
     - **Note:** Brightness and Contrast has no control over Camr brightness or contrast

5. **Image Command Area**
   - Image Acquisition Buttons: (Each button may be accessed during another operation to switch acquisition types quickly. Allows user to set scene with “Scan Lo-Res” and then Hi-Res”, “Acquire Set” or “Acquire One” as needed without extra action
   - **Scan Lo-Res**
     - Image(s) not saved to disk. Displays decimated Camr view. Used to set software exposure and situational awareness
   - **Scan Hi-Res**
     - Continuously saves full images to disk
   - **Acquire Set**
     - Image(s) saved to disk. Acquires bracket set of images
   - **Acquire One**
     - Image saved to disk. Acquires one image with no exposure control from AE
   - **Avg**
     - Selects averaging AE algorithm. Exposes based on pixels inside box
   - **Sub**
     - Selects sub image AE algorithm. Takes two images
   - **Peak**
     - Selects peak AE algorithm. Exposes based on brightest pixels in box
   - **View and Save Files**
     - Allows user to select a file from a directory to view or (when holding "CTRL" key while clicking on "Save File To...") button) select a directory indicating where subsequent images will be saved. Green arrows allow user to quickly browse thru images alphabetically

6. **Status Bar 2**
   - Contains status of current operation, gain and exposure settings for image being displayed, Status Bar Error Advisory, Status Error Strings, and Normal Operation Strings
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

IDC SOFTWARE GUI (Continued)

Advanced Settings

Acquire One

- Exposure: ###### usec
- Gain: #X ▼

Acquire Set

- Select Image: # ▲ ▼
- Exposure: ###### usec
- Gain: #X ▼
- or Fraction: X

Scan

- Select Type:
  - Lo-Res
  - Hi-Res
- Exposure: ###### usec
- Gain: #X ▼
  - Decimation: ## ▲ ▼
- Period: X msec

Do Self Test

Black Level: ##

Cancel  Reset to Defaults  Accept
## IDC SOFTWARE GUI (Concluded)

| **8** | **Acquire One** Settings  
(Allows user to set exposure and gain settings for "Acquire One" cmd which acquires a single image from Camr)  
| [Exposure] User may set exposure from 25 usec to 80025 usec  
| [Gain] User may set Gain from 1X to 8X  
| **9** | **Acquire Set** Settings  
(user to set exposure and gain settings for "Acquire Set" cmd. Each image acquired in set can have a different setting for exposure and gain. [Display] checkbox will determine if image is to be displayed when acquired)  
| [Select Image] As a default, user may select up to 7 images  
| [Exposure] User may set exposure from 25 usec to 80025 usec  
| [Gain] User may set Gain from 1X to 8X  
| [or Fraction] Shows denominator value for exposure value. A "1" is assumed for the numerator  
| **10** | **Scan** Settings  
(Allows user to exposure, gain, and decimation settings for low/high resolution continuous scans)  
| [Lo-Res]/[Hi-Res] Buttons User selects which scan to set attributes to:  
Lo-Res – Scans are displayed only and not saved to disk  
Hi-Res – Scans are displayed and saved to disk  
| [Exposure] User may set exposure from 25 usec to 80025 usec  
| [Gain] User may set Gain from 1X to 8X  
| [Decimation] User may select a decimation level between 1-16. When decimation is a high number, time for image to be displayed on screen is faster due to smaller size and lower quality of image  
| [Period] Sets scan period. Allows user to throttle rate of image/file creation for some scan scenarios  
| **11** | **Do Self Test** Command  
Queries IDC for an image test pattern which is then displayed on main display window. Test image is also stored to disk  
| **Black Level** Input Box Sets Camr's "Black Level" threshold for all acquired images. Can be set from 0 to 4095  
| **Reset to Defaults** Command Restores application defaults applied at startup to all settings. Holding CTRL and pressing "Reset to Defaults" will restore project defaults established in DCCS.ini file |
LCS/IDC COMBINED NOMENCLATURE

1. ISIS Digital Camr (IDC)
2. 50mm Lens
3. Top View (from IDC perspective)
4. LC-1 Radiator
5. Top View (from LCH scan perspective)
6. Towards OBSS Grapple Fixtures
7. Laser Camr Head (LCH)
8. Laser Camr Head (LCH) to Digital Camr Assy (ECA) Cable
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

LCS/IDC KEEP ALIVE PWR AND DATA INTERFACES (Berthed on MPMs)
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

LCC SOFTWARE EXIT DIALOGUE BOXES

Case 1: Selecting “File” and choosing “Exit” w/green Comm light.

When either “Shutdown LCH and exit LCC software” or “Shutdown LCH” are selected from “Shutdown” dialogue box, following “Shutdown?” dialogue box displayed:

ShUTDOWN?

This will shut down LCH and IDC.

Note: An LCH pwr cycle will be reqd to resume sensor ops.

OK Cancel

When “Exit LCC software” is selected from “Shutdown” dialogue box, following “Shutdown?” dialogue box displayed:

ShUTDOWN?

This will only exit LCC software.

Note: LCH health and status monitoring is not possible in this state. LCC software will need to be restarted to shutdown LCH.

OK Cancel

Case 2: Selecting “File” and choosing “Exit” w/yellow Comm light.
NOTE
For desktop dnlk config to work correctly, ensure there is a load on A31p Video Out port (video coming out of laptop into pwr input, such as AVIU(V10))

1. √ Video destination properly configured per LCC ACTIVATION, step 1 (Cue Card, LCS) and pwrnd
   MO58F
   √ TV PWR – ON
   AVIU
   √ HI-Z/75 – 75
   √ PWR SELECT – LO
   CC
   PWR – OFF

A31p 2. Desktop
   Right click
   Sel 'Properties'

3. 'Display Properties' Dialog Box
   Sel 'Settings'
   √ Screen Area – 1024 x 768
   If not 1024 x 768:
   Move Screen Area slidebar to 1024 x 768
   Sel 'Apply'
   When second 'Display Properties' dialog box opens:
   Sel 'OK'
   When 'Monitor Settings' dialog box opens:
   Sel 'Yes'

4. 'Display Properties' Dialog Box
   Sel 'Advanced'

5. '(Multiple Monitors) and ATI MOBILITY FIRE GL 7800 Properties' Dialog Box
   Sel 'Displays' tab
6. Displays' tab against fig 20-1 cases' circled areas and perform matching case steps below:

**Case 1**
- TV PWR – ON
- LCS Video Cable connected to J1
- LCS Video Adapter connected to A31p Video Out port
- Repeat steps 4-6

**Case 2**
- TV PWR – ON
- LCS Video Cable connected to J1
- LCS Video Adapter connected to A31p Video Out port
- Sel ‘OK’

**Case 3**
- TV PWR – ON
- LCS Video Cable connected to J1
- LCS Video Adapter connected to A31p Video Out port
- Click on red button in Case 3 circle
- Display looks like Case 1
- Sel ‘OK’
- When ATI Property Page appears:
  - Sel ‘Yes’

**Case 4**
- Sel ‘OK’
66. (Concluded)

If Case 4 (Bad LCS video cable, adapter, or connection, AVIU not powered or configured or A31p port problem):
- Sel 'OK'
- AVIU
  \ LCS Video Cable connected to J1
- A31p
  \ LCS Video Adapter connected to A31p Video Out port
Repeat steps 4-6
If no longer Case 4:
- Repeat step 6
If still Case 4:
  - Sel 'OK'
  - Replace entire LCS Video Cable (including A31p Video Adapter)
  - Repeat steps 4-6
If no longer Case 4:
  - Repeat step 6
If still Case 4:
  - Sel 'OK'
  - Replace AVIU
  - Repeat steps 4-6
If no longer Case 4:
  - Repeat step 6
If still Case 4:
  - Sel 'OK'
  - Replace A31p
  - Repeat steps 1-6
If no longer Case 4:
  - Repeat step 6
If still Case 4:
  - MCC

7. 'Display Properties' Dialog Box
- Sel 'OK'
LASER CAMR SYSTEM (LCS)/INTEGRATED SENSOR INSPECTION SYSTEM DIGITAL CAMR (IDC) (Continued)

RECONFIGURATION OF A31p SCREEN RESOLUTION

NOTE
Following steps will disable auto reconfiguration that automatically ships video. Capture Card will need to be manually configured using MANUAL A31p USING DESKTOP DNLK SETUP procedure, 20-17 for desktop dnlk ops.

A31p

1. Desktop
   Right click
   Sel 'Properties'

2. 'Display Properties' Dialog Box
   Sel 'Settings'
   Sel 'Advanced'

3. '(Multiple Monitors) and ATI MOBILITY FIRE GL 7800 Properties' Dialog Box
   Sel 'Displays'

4. TV display tab
   If Red(Gray) tab:
   | Go to step 5
   If Green tab:
   Click Green tab. Tab automatically turns red after selection (see fig 20-1)
   Sel 'Apply'

5. 'ATI Property Page' Dialog Box
   Sel 'Yes'

6. (Multiple Monitors) and ATI MOBILITY FIRE GL 7800 Properties' Dialog Box
   Sel 'OK'

7. 'Display Properties' Dialog Box
   Sel 'OK'

8. Desktop
   Right Click
   Sel 'Properties'
9. **'Display Properties' Dialog Box**
   Sel 'Settings'  
   Move Screen Area slidebar to 1600 x 1200  
   \(\sqrt{\text{Colors – True Color (32 bit)}}\)  
   If not, sel True Color (32 bit) from drop down menu  
   Sel 'Apply'  
   When 'Display Properties' dialog box opens:  
   Sel 'OK'  
   When 'Monitor Settings' dialog box opens:  
   Sel 'Yes' (within 15 sec)  
   If 15 sec window missed:  
   Repeat step 9  
   When 'Display Properties' dialog box opens:  
   Sel 'OK'
## BATTS & FUSES
### BATTS & FUSES REFERENCE

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<th>ITEM</th>
<th>BATTERY</th>
<th>SAME AS:</th>
<th>FUSE</th>
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<td>ET A-B Converter</td>
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### INSTRUMENT FUSES
- 1/2 A(2) 5A (5)
- 1A (5) 7.5A (2)
- 2A (2) 10A (2)
- 3A (5) 2A (5)

### IFM FUSE KITS
- DTV FUSES
  - 1/2A (2)
  - 1A (2) 7.5A (2)
  - 2A (2) 10A (2)

### BUS FUSES (1/4 X 1-1/4)
- 1/4A (2) 3A (2)
- 1/2A (2) 5A (5)
- 1A (2) 7.5A (2)
- 2A (2) 10A (2)
PHOTO/TV CHECKLIST

STS ALL