

# **CRT Reference Summary**

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## **Space Shuttle Orbiter Displays and Controls**

**(Payloads)**

**01-7**

**61-C, 51-L, 61-E**

**DECEMBER 1985**

**STS 85-0260A**

**VOLUME 2**



**Rockwell International**

Space Transportation  
Systems Division

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## **Space Shuttle Orbiter Displays and Controls**

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This CRT Reference Summary is for information only. Payload displays referenced here are documented in the Payload Management Level C Flight Software Requirements documents, JSC-19478-51L, 61C and 61E.

For detail information pertaining to distribution, contact Paul J. Smith, (213) 922-4469.

This Reference Summary is flight oriented; therefore, individual displays are referenced according to flights.

## 61-C

OPS SPEC DISP NO.	DISPLAY	PAGE
201	WESTAR DEPLOY	2A
206	WESTAR PAM MONITOR	2B
211	WESTAR CONTROL	2C
203	SATCOM DEPLOY	2D
208	SATCOM PAM MONITOR	3A
213	SATCOM CONTROL	3B
218	SATCOM STATUS	3C
205	MSL-3/PALLET	3D
210	SYNCOM IV	4A



XXXX/201/ WESTAR DEPLOY XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

ITM	EVENT	SCHD	CPLT	XXXX
1	COUNTDOWN START		X	
2	MECH SEQ START		X	M1 AMPS M2 AMPS
	SUNSHIELD OPEN		XS	X.XX X.XX
	STBD RSTRNT OUT		XS	X.XX X.XX
	PORT RSTRNT OUT		XS	X.XX X.XX
SSP	MECH SEQ DISABLE		XS	
SSP	SPIN ENABLE		XS	
	RSTRNTS INH SYS 1/2		X/X	
	SS-INDX INH SYS 1/2		X/X	M1 AMPS M2 AMPS
3	SPIN XXX.XS XXX.X		X	XX.X XX.X
6/7	S/C ASE X/ENCDR ON		X/X	S/C BATT 1 2
8	CONFIG		X	VOLT XX.X XX.X
9	INT PWR		X	AMPS XX.X XX.X
	TERM SEQ START	3:00	X	S/C BUS
	VEH ORD PREARM	1:30	X	AMPS XX.X XX.X
SSP	PAM S/A		XS	11 S/C SIU ENA X
SSP	S/C S/A		X	12 DECONFIGURE X
10	S/C SIU DISABLE		X	
SSP	DEPLOY PREARM	1:30	X	P/L DEPLOYED X
SSP	DEPLOY ARM	1:05	X	5 RESET
	DEPLOY FIRE	1:00	X	4 DEPLOY INH X

(XX)

### WESTAR DEPLOY

XXXX/XXX/206 WESTAR PAM MONITOR XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

ITM	EVENT	SCHD	CPLT	XXXX
1	AMPS MTR		X	SPIN
2	EN A MTR		X	CANT START XS
1	STAT MTR		X	UNDERSPEED XS
2	DIR MTR		X	OVERSPEED XS
1	2		X	RATE DET NG XS
2	3		X	SCA SEQUENCE
1	2		X	INIT XS
2	3		X	IDLE XS
1	2		X	CLSS XS
2	3		X	OPSS XS
1	2		X	MECH XS
2	3		X	SPIN XS
1	2		X	TERM XS
2	3		X	STOW XS
1	2		X	HALT XS
1	2		X	SAFETY INHIBITS 1 2
2	3		X	MECH SEQ ENA XS XS
1	2		X	INDX EXT CMD XS XS
2	3		X	INDX EXT INH CMD XS XS
1	2		X	SPIN PWR RLY CMD XS XS
2	3		X	SPIN/DPLY ENA XS XS

(XX)

### WESTAR PAM MONITOR

XXXX/211/ WESTAR CONTROL XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

ITM	EVENT	SCHD	CPLT	XXXX
1	DEPLOY ORD		X	SUNSHIELD
2	PREARM		XSXS	CLS S5HLD 5XS
3	ARM CMD		X X	OPN S5HLD 6XS
4	ARM BUS		X X	MTR RLY 1 2
5	FIRE CMD		X X	ENA 7X 8X
6	FIRE RLY		X X	DIS 9X 10X
7	VEH ORD		X	CLS 11X 12X
8	PREARM BUS		XSXS	OPN 13X 14X
9	ARM BUS		XSXS	ON 15X 16X
10	PAM S/A		XXX	OFF 17X 18X
11	SAFE XXXS		X	AMPS X.XX X.XX
12	S/C ORD		1 2	POS 1XXXX XXXX
13	S/C S/A		XSXS	2XXXX XXXX
14	26 SAFE XSXS		X	3XXXX XXXX
15	SEP SW CL		XSXS	HTRS ON 19XS
16	AKM ENA		XSXS	OFF 20XS
17	INH SW		XSXS	RLY BUS ON
18	LVLV OPN 1		XSXS	15 25 35 45
19	2		XSXS	PAM SEP SW CL
20	OMNI ENA 1		XSXS	8V AS BS
21	2		XSXS	16V AS BS

(XX)

### WESTAR CONTROL

XXXX/203/ SATCOM DEPLOY XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

ITM	EVENT	SCHD	CPLT	XXXX
1	COUNTDOWN START		X	
2	MECH SEQ START		X	M1 AMPS M2 AMPS
	SUNSHIELD OPEN		XS	X.XX X.XX
	STBD RSTRNT OUT		XS	X.XX X.XX
	PORT RSTRNT OUT		XS	X.XX X.XX
SSP	MECH SEQ DISABLE		XS	
SSP	SPIN ENABLE		XS	
	RSTRNTS INH SYS 1/2		X/X	
	SS-INDX INH SYS 1/2		X/X	M1 AMPS M2 AMPS
3	SPIN XXX.XS XXX.X		X	XX.X XX.X
	S/C BUS VOLTS		X	UNREG XX.XS
SSP	TERM SEQ START	3:00	X	
SSP	S/C ARM	2:00	XS	S/C SAFE XS
	INTERLOCK STATUS		XXX	S/C BUS READY XXXS
	VEH ORD PREARM	1:30	X	S/C RTRN MODE 8X
SSP	PAM S/A		XS	
SSP	DEPLOY PREARM	1:30	X	P/L DEPLOYED X
	DEPLOY ARM	1:05	X	5 RESET
	DEPLOY FIRE	1:00	X	4 DEPLOY INH X

(XX)

### SATCOM DEPLOY

XXXX/XXX/208 SATCOM PAM MONITOR XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

AMPS MTR 1	SPIN	PORT	STBD	SPIN	CANT START	XS
2	XX.X	X.XX	X.XX	X.XX	UNDERSPEED	XS
ENA MTR 1	XXXS	XXXS	XXXS	XXXS	OVERSPEED	XS
2	XXXS	XXXS	XXXS	XXXS	RATE DET NG	XS
STAT MTR 1	XXXS	XXXS	XXXS	XXXS	SCA SEQUENCE	XS
2	XXXS	XXXS	XXXS	XXXS	INIT	XS
DIR MTR 1	XXXS	XXXS	XXXS	XXXS	IDLE	XS
2	XXXS	XXXS	XXXS	XXXS	CLSS	XS
2	XXXS	XXXS	XXXS	XXXS	OPSS	XS
2	XXXS	XXXS	XXXS	XXXS	MECH	XS
2	XXXS	XXXS	XXXS	XXXS	SPIN	XS
2	XXXS	XXXS	XXXS	XXXS	TERM	XS
2	XXXS	XXXS	XXXS	XXXS	STOW	XS
2	XXXS	XXXS	XXXS	XXXS	HALT	XS

INDX/RST	1 2 3 1 2 3	1 2 3 1 2 3
IN	XSXS XSXSXSXSXSXS	XSXSXSXSXSXS
OUT	XSXS XSXSXSXSXSXS	XSXSXSXSXSXS

BUS AMPS	1/A	2/B
1	XX.XS	XX.XS
2	XX.XS	XX.XS
ORD VOLT	XX.XS	XX.XS
TIMER 8V	XX.XS	XX.XS
16V	XS	XS
T/O BAT GO	XS	XS
T/O BAT T	XXXS	XXXS
SOLID T	XXXS	XXXS

SAFETY INHIBITS	1	2
MECH SEQ ENA	XS	XS
INDX EXT CMD	XS	XS
INDX EXT INH CMD	XS	XS
SPIN PWR RLY CMD	XS	XS
SPIN/DPLY ENA	XS	XS

SATCOM PAM MONITOR

XXXX/213/ SATCOM CONTROL XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

1/O INIT 1	DEPLOY ORD	ARM	SUNSHIELD
OUTPUTS XXX	PREARM	XSXS	CLS S5HLD 5XS
SELF TEST XS	ARM CMD	X X	OPN S5HLD 6XS
CLOCK XX.X	ARM BUS	X X	MTR RLY 1 2
SPIN RATE	FIRE CMD	X X	ENA 7X 8X
LIM ORIDE 2X	FIRE RLY	X X	DIS 9X 10X
SLOW 3X	VEH ORD		CLS 11X 12X
NORMAL 4X	PREARM BUS	XSXS	OPN 13X 14X
	ARM BUS	XSXS	ON 15X 16X
	PAM S&A	XXX	OFF 17X 18X
	SAFE XXXS		AMPS X.XX X.XX
S/C			POS 1XXXX XXXX
CMD MSTR 1 ON 21X	36 INLK OVRD ON X		2XXXX XXXX
2 ON 22X	BATTERIES		3XXXX XXXX
PWR MSTR 1 ON 23X	TRKL CHG PRI 38		
2 ON 24X	BU 39		HTRS ON 19XS
MSTR 1/2 OFF 25X	CHGR DISCNT 43		OFF 20XS
DEPLOY MODE 26X	LAND DISCH 44		RLY BUS ON
27 BTX 1/2 ON X	LOAD NORMAL 45		15 25 35 45
29 MWA 1/2 ON X	AMPS CHGR XX.X		PAM SEP SW CL
31 RCS LN HTRS X	UNFUSE XXXS		8V AS BS
33 RTM ON X	FUSE XXX		16V AS BS

SATCOM CONTROL

XXXX/XXX/218 SATCOM STATUS XX X DDD/HH:MM:SS  
 DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS  
 COUNTDOWN XX:XX:XX

XXXX	AKM PYRO BUS 1 DIS	XS
POND 1 ON	2 DIS	XS
2 ON		
SAFETY	SOLAR ARRAY BUS 1 DIS	XS
ORD BUS A DIS	2 DIS	XS
B DIS		
OMNI (LP)	OMNI LP PYRO BUS 1 DIS	XS
PYRO BUS A SAFE	2 DIS	XS
B SAFE		
THRUSTER PWR ODD	OMNI OP PYRO BUS 1 DIS	XS
EVEN	2 DIS	XS
	LATCH VALVE CLSD	1XS 2XS 3XS 4XS

S/C BUS READY	XXXS	HEATERS / THRUSTERS
		5X 9X 15 135
BEACON 1 HI PWR ON X		6X 10X 25 145
2 HI PWR ON X		7X 11X 35 155
MWA SPD 1	XXXXS	8X 12X 45 165
2	XXXXS	
RCS LN HTRS PRI	X	
BU	X	BATTERY VOLTS 1 XX.X
		2 XX.X
		3 XX.X

SATCOM STATUS

XXXX/205/ MSL-3/PALLET XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

I/O INIT 1	ACOUSTIC LEV	PALLET COOLING SYS
ADS FURNACE	HEATER ON 12XS	PUMP 1 ON XS
POWER ON 2XS	OFF 13XS	2 ON XS
OFF 3XS	ROY/PWR XXXS	Δ P XXX.XS
AUTOMATIC 4XS	POWER ON 14XS	IN P XXXS
MANUAL 5XS	OFF 15XS	IN T XXXS
SAMPLE ID XS	AUTOMATIC 16XS	LOOP IN T XXXS
NX SAMPLE XXXS	MANUAL 17XS	OUT T XXXS
	NX SAMPLE XXXS	ACCUM QTY .XXS
	FAIL XXXXS	C PLATE ΔP XXXS
		OUT T XXXS

E/M LEVITATOR	EXP RECORDER	PCB ON XS
POWER ON 6XS	POWER ON 18XS	TEMP XXXS
OFF 7XS	RECORD 19XS	EXP AMPS XXXS
AUTOMATIC 8XS	HALT 20XS	
MANUAL 9XS	TEMP XXXS	
SAMPLE ID XS	TP POS XXXXS	SCU ON XS
NX SAMPLE XXXS	STATUS XXXS	TEST 21
		TEMP XXXS
ACCELEROMETER		STATUS INT XXXS
POWER ON 10XS		EXT XXXS
OFF 11XS		CMD XXXS
		(XX)

MSL-3/PALLET

XXXX/210/

SYNCOM IV

XX X DDD/HHMMSS  
DDD/HHMMSS

MOTOR	A	B	TEMP MONITOR	
ENABLE	1XS	2XS	BATT 2 PACK 3	XXXS
DISABLE	3XS	4XS	RCS LINE	XXXS
DRIVE DIR SEL			FILTER 2	XXXS
INSERT	5XS	6XS	LATCH VLV 1	XXXS
RETRACT	7XS	8XS		

9 AFT PIVOT A/B XXX/XXX X/X  
11 FWD PIVOT A/B XXX/XXX X/X  
13 PUSH-OFF A/B XXX/XXX X/X  
15 KEEL A/B XXX/XXX X/X

A

	POS	A	B
AFT PIVOT	XXX,XS	XXXS	XXXS
FWD PIVOT	XXX,XS	XXXS	XXXS
PUSH-OFF	XXX,XS	XXXS	XXXS
KEEL	XXX,XS	XXXS	XXXS

(XX)

SYNCOM-IV



## 51-L

OPS SPEC DISP NO.	DISPLAY	PAGE
203	AUSSAT DEPLOY	6A
208	AUSSAT PAM MONITOR	6B
213	AUSSAT CONTROL	6C
204	HS-376 DEPLOY	6D
209	HS-376 PAM MONITOR	7A
214	HS-376 CONTROL	7B
200	IUS/TDRS	7C



A

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XXXX/203/ AUSSAT DEPLOY XX X DDD/HHMMSS
DPLY X XXX/XXIXXIXX SCA CLK X XXXX DDD/HHMMSS
ITH EVENT SCHED CPLT COUNTDOWN XXIXXIXX
1 COUNTDOWN START XXXX
2 MECH SEQ START X M1 AMPS M2 AMPS
SUNSHIELD OPEN X,X,X X,X,X
STBD RSTRNT OUT X,X,X X,X,X
PORT RSTRNT OUT X,X,X X,X,X
SSP MECH SEQ DISABLE X,X,X
SSP SPIN ENABLE X,X,X
RSTRNTS INH SYS 1/2 X/X
SS-INDX INH SYS 1/2 X/X
3 SPIN XXX,XS XXX,X X XX,X XX,X
6/7 S/C ASE X/ENCDR ON X/X S/C BATT 1 2
8 CONFIG X VOLT XX,X XX,X
9 INT PWR X AMPS XX,X XX,X
TERM SEQ START 3100 X S/C BUS
VEH ORD PREARM 1130 X AMPS XX,X XX,X
SSP PAM S1A X 11 S/C SIU ENA X
SSP S/C S1A X 12 DECONFIGURE X
10 S/C SIU DISABLE X
SSP DEPLOY PREARM 130 X P/L DEPLOYED X
DEPLOY ARM 105 X 5 RESET
DEPLOY FIRE 100 X 4 DEPLOY INH X
(XXX)

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## AUSSAT DEPLOY

B

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XXXX/XXX/208 AUSSAT PAM MONITOR XX X DDD/HHMMSS
DPLY X XXX/XXIXXIXX SCA CLK X XXXX DDD/HHMMSS
COUNTDOWN XXIXXIXX
SPIN PORT STBD SPIN
AMPS MTR 1 XX,X X,XX X,XX SPIN
2 XX,X X,XX X,XX CANT START XS
ENA MTR 1 XXXS XXXS XXXS UNDERSPEED XS
2 XXXS XXXS XXXS OVERSPEED XS
STAT MTR 1 XXXS XXS XXS RATE DET NG XS
2 XXXS XXS XXXS SCA SEQUENCE
DIR MTR 1 XXXS XXXS INIT XS
2 XXXS XXXS IDLE XS
BRAKE PWR XXXS CLSS XS
XXXS OPSS XS
INDX/RST 1 2 1 2 3 1 2 3 MECH XS
IN XSXS XSXSXSXSXSXS SPIN XS
OUT XSXS XSXSXSXSXSXS TERM XS
1/A 2/B STOW XS
BUS AMPS XX,XS XX,XS HALT XS
ORD VOLT XX,XS XX,XS SAFETY INH/BITS 1 2
TIMER 8V XX,XS XX,XS MECH SEQ ENA XS XS
16V XX,XS XX,XS INDX EXT CMD XS XS
T/O BAT GO XS XS INDX EXT INH CMD XS XS
T/O BAT T XXXS XXXS SPIN PWR RLY CMD XS XS
SOLID T XXXS SPIN/DPLY ENA XS XS
(XXX)

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## AUSSAT PAM MONITOR

C

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XXXX/213/ AUSSAT CONTROL XX X DDD/HHMMSS
DPLY X XXX/XXIXXIXX XXXX DDD/HHMMSS
PRI SCA X XXXX COUNTDOWN XXIXXIXX
1/6 INIT 1 DEPLOY ORD ARM SUNSHIELD
OUTPUTS XXX PREARM XSXS CL5 SSHLD 5XS
SELF TEST XS ARM CMD X X OPN SSHLD 6XS
CLOCK XX,X ARM BUS X X MTR RLY 1 2
SPIN RATE FIRE CMD X X ENA 7X 8X
LIM ORIDE 2X FIRE RLY X X DIS 9X 10X
SLOW 3X VEH ORD CLS 11X 12X
NORMAL 4X PREARM BUS XSXS OPN 13X 14X
ARM BUS XSXS ON 15X 16X
S/C SYSTEMS 1 2 PAM S1A XXX OFF 17X 18X
21 ASE OFF XSXS SAFE XXXS AMPS X,XX X,XX
22/23 TCHG ON S/C ORD 1 2 POS 1XXXX XXXX
24/25 OFF S/C S1A XSXS 2XXXX XXXX
PCM CLOCK ON XSXS 26 SAFE XSXS 3XXXX XXXX
ODD STAT GO XSXS SEP SW CL XSXS HTRS ON 19XS
EVEN STAT GO XSXS ARM ENA XSXS OFF 20XS
BATT T GO XSXS INH SW XSXS RLY BUS ON
LVLV OPN 1 XSXS 15 25 35 45
2 XSXS PAM SEP SW CL
OMN] ENA 1 XSXS 8V AS BS
2 XSXS 16V AS BS
(XXX)

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## AUSSAT CONTROL

D

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XXXX/204/ HS-376 DEPLOY XX X DDD/HHMMSS
DPLY X XXX/XXIXXIXX SCA CLK X XXXX DDD/HHMMSS
COUNTDOWN XXIXXIXX
1 COUNTDOWN START XXXX
2 MECH SEQ START X M1 AMPS M2 AMPS
SUNSHIELD OPEN X,X,X X,X,X
STBD RSTRNT OUT X,X,X X,X,X
PORT RSTRNT OUT X,X,X X,X,X
SSP MECH SEQ DISABLE X,X,X
SSP SPIN ENABLE X,X,X
RSTRNTS INH SYS 1/2 X/X
SS-INDX INH SYS 1/2 X/X
3 SPIN XXX,XS XXX,X X XX,X XX,X
6/7 S/C ASE X/ENCDR ON X/X S/C BATT 1 2
8 CONFIG X VOLT XX,X XX,X
9 INT PWR X AMPS XX,X XX,X
TERM SEQ START 3100 X S/C BUS
VEH ORD PREARM 1130 X AMPS XX,X XX,X
SSP PAM S1A X 11 S/C SIU ENA X
SSP S/C S1A X 12 DECONFIGURE X
10 S/C SIU DISABLE X
SSP DEPLOY PREARM 130 X P/L DEPLOYED X
DEPLOY ARM 105 X 5 RESET
DEPLOY FIRE 100 X 4 DEPLOY INH X
(XXX)

```

## HS-376 DEPLOY

A

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XXXX/XXX/209 HS-376 PAM MONITOR XX X DDD/HH:MM:SS
DPLY X XXX/XX:XX:XX SCA CLK X XXXX DDD/HH:MM:SS
SPIN PORT STBD COUNTDOWN XX:XX:XX
AMPS MTR 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
XX.X X.XX X.XX X.XX SPIN CANT START XS
XX.X X.XX X.XX X.XX UNDERSPEED XS
ENA MTR XXXS XXXS XXXS XXXS OVERSPEED XS
XXXS XXXS XXXS RATE DET NG XS
STAT MTR XXXS XXXS XXXS SCA SEQUENCE
XXXS XXXS XXXS
DIR MTR XXXS XXXS INIT XS
XXXS XXXS IDLE XS
XXXS XXXS CLSS XS
BRAKE PWR XXXS OPSS XS
XXXS
INDX/RST 1 2 1 2 3 1 2 3 MECH XS
IN XSXS XSXSXS XSXSXS SPIN XS
OUT XSXS XSXSXS XSXSXS TERM XS
1/A 2/B STOW XS
BUS AMPS XX.XS XX.XS HALT XS
ORD VOLT XX.XS XX.XS SAFETY INHIBITS 1 2
TIMER 8V XX.XS XX.XS MECH SEQ ENA XS XS
16V XX.XS XX.XS INDX EXT CMD XS XS
T/O BAT GO XS XS INDX EXT INH CMD XS XS
T/O BAT T XXXS XXXS SPIN PWR RLY CMD XS XS
SOLID T XXXS SPIN/DPLY ENA XS XS
(X)

```

HS-376 PAM MONITOR

B

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XXXX/214/ HS-376 CONTROL XX X DDD/HH:MM:SS
DPLY X XXX/XX:XX:XX XXXX DDD/HH:MM:SS
PRI SCA X XXXX COUNTDOWN XX:XX:XX
I/O INIT 1 DEPLOY ORD ARM SUNSHIELD
OUTPUTS XXX PREARM XSXS CLS S5HLD 5XS
SELF TEST XS ARM CMD X X OPN S5HLD 6XS
CLOCK XX.X ARM BUS X X MTR RLY 1 2
SPIN RATE FIRE CMD X X ENA 7X 8X
LIM ORIDE 2X FIRE RLY X X DIS 9X 10X
SLOW 3X VEH ORD PREARM BUS XSXS CLS 11X 12X
NORMAL 4X ARM BUS XSXS ON 13X 14X
S/C SYSTEMS 1 2 ARM SIA XXX OFF 17X 18X
21 ASE OFF XSXS SAFE XXXS AMPS X.XX X.XX
22/23 TCHG ON S/C ORD 1 2 POS 1XXXX XXXX
24/25 OFF S/C SIA XSXS 2XXXX XXXX
PCM CLOCK ON XSXS 26 SAFE XSXS 3XXXX XXXX
ODD STAT GO XSXS SEP SW CL XSXS HTRS ON 19XS
EVEN STAT GO XSXS AKM ENA XSXS OFF 20XS
BATT T GO XSXS INH SW XSXS RLY BUS ON
XSXS 15 25 35 45
XSXS 2 PAM SEP SW CL
OMN ENA 1 XSXS 8V AS BS
2 XSXS 16V AS BS
(X)

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HS-376 CONTROL

C

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XXXX/200/ IUS/TDRS XX X DDD/HH:MM:SS
DDD/HH:MM:SS
IUS TDRS
SV/ATT XFER 1X SAFETY S/C BUS
ATT ACCEPT XS ANTENNA STAT VOLTS XX.XS
SV ACCEPT XS MG SEL S AMPS XX.XS
LOWER SEL S
UPPER SEL XS BATT ON 15 25 35
STAR SCAN RF PWR XX.XS
RDY TO BEGIN XS CMD RCVR A B
UP/DT STAR 1 XS SIG PRES XS XS
2 XS MSN PHASE CMD LOCK XS XS
SCAN CPLT XS XMIT ON XS XS
F-ALIGN OK XS SRM 1 UNSAFE AB
2 UNSAFE S5 RCS ISOL VLV OPEN
COMP STAT A B BAS ABS AAS BBS
IN CNTL XS XS ORD BUS ON S5 RCS VDE ON AS BS
A FAILED XS XS ISOL VLV ENA S5 ARRAY ORD ENA S
B FAILED XS XS
RCVR CMD LOCK XS
(X)

```

IUS/TDRS



## 61-E

OPS SPEC DISP NO.	DISPLAY	PAGE
201	WESTAR DEPLOY	10A
206	WESTAR PAM MONITOR	10B
215	WESTAR CONTROL	10C
210	S/L DPADEPLOY	10D
211	S/L DPA PERIPHERAL	11A
212	S/L LINK MANAGEMENT	11B
213	S/L EXPERIMENT RAUS	11C
214	S/L COMMUNICATIONS	11D
220	S/L EXPERIMENT POWER	12A
208	S/L SS DC POWER	12B
222	S/L AC POWER	12C
224	S/L COOLING LOOPS	12D



A

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XXXX/201/ WESTAR DEPLOY XX X DDD/HHMMISS
DPLY X XXX/XXIXXIXX SCA CLK X XXXX DDD/HHMMISS
JTM EVENT SCHED CPLT COUNTDOWN XXIXXIXX
1 COUNTDOWN START XXXX
2 MECH SEQ START X M1 AMPS M2 AMPS
SUNSHIELD OPEN XS X,XX X,XX
STBD RSTRNT OUT XS X,XX X,XX
PORT RSTRNT OUT XS X,XX X,XX
SSP MECH SEQ DISABLE XS
SSP SPIN ENABLE XS
RSTRNTS INH SYS 1/2 X/X
SS-INDX INH SYS 1/2 X/X M1 AMPS M2 AMPS
3 SPIN XXX,XS XXX,X X XX,X XX,X
6/7 S/C ASE X/ENCDR ON X/X S/C BATT 1 2
8 CONF IG X VOLT XX,X XX,X
9 INT PWR X AMPS XX,X XX,X
TERM SEQ START 3100 X S/C BUS
VEH ORD PREARM 1130 X AMPS XX,X XX,X
SSP PAM SIA XS 11 S/C SIU ENA X
SSP S/C SIA X 12 DECONFIGURE X
10 S/C SIU DISABLE X
SSP DEPLOY PREARM 130 X P/L DEPLOYED X
DEPLOY ARM 105 X 5 RESET
DEPLOY FIRE 100 X 4 DEPLOY INH X
(XX)

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WESTAR DEPLOY

B

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XXXX/XXX/206 WESTAR PAM MONITOR XX X DDD/HHMMISS
DPLY X XXX/XXIXXIXX SCA CLK X XXXX DDD/HHMMISS
SPIN PORT STBD COUNTDOWN XXIXXIXX
AMPS MTR 1 XX,X X,XX X,XX SPIN
2 XX,X X,XX X,XX CANT START XS
ENA MTR 1 XXXS XXXS XXXS UNDERSPEED XS
2 XXXS XXXS XXXS OVERSPEED XS
STAT MTR 1 XXXS XXS XXS RATE DET NG XS
2 XXXS XXS XXS SCA SEQUENCE
DIR MTR 1 XXXS XXXS INIT XS
2 XXXS XXXS IDLE XS
BRAKE PWR XXXS CLSS XS
XXXS OPSS XS
INDX/RST 1 2 1 2 3 1 2 3 MECH XS
IN XSXS XSXSXSXSXSXS SPIN XS
OUT XSXS XSXSXSXSXSXS TERM XS
1/A 2/B STOW XS
BUS AMPS XX,XS XX,XS HALT XS
ORD VOLT XX,XS XX,XS SAFETY INHIBITS 1 2
TIMER 8V XX,XS XX,XS MECH SEQ ENA XS XS
16V XX,XS XX,XS INDX EXT CMD XS XS
T/O BAT GO XS XS INDX EXT INH CMD XS XS
T/O BAT T XXXS XXXS SPIN PWR RLY CMD XS XS
SOLID T XXXS SPIN/DPLY ENA XS XS
(XX)

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WESTAR PAM MONITOR

C

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XXXX/215/ WESTAR CONTROL XX X DDD/HHMMISS
DPLY X XXX/XXIXXIXX XXXX DDD/HHMMISS
PRI SCA X XXXX COUNTDOWN XXIXXIXX
1/0 INIT 1 DEPLOY ORD ARM SUNSHIELD
OUTPUTS XXX PREARM XSXS CLS S5HLD 5XS
SELF TEST XS ARM CMD X X OPN S5HLD 6XS
CLOCK XX,X ARM BUS X X MTR RLY 1 2
SPIN RATE FIRE CMD X X ENA 7X 8X
LIM ORIDE 2X FIRE RLY X X DIS 9X 10X
SLOW 3X VEH ORD CLS 11X 12X
NORMAL 4X PREARM BUS XSXS OPN 13X 14X
ARM BUS XSXS ON 15X 16X
PAM SIA XXX OFF 17X 18X
S/C SYSTEMS 1 2 SAFE XXXS AMPS X,XX X,XX
21 ASE OFF XSXS S/C ORD 1 2 POS 1XXXX XXXX
22/23 TCHG ON S/C SIA XSXS 2XXXX XXXX
24/25 OFF 26 SAFE XSXS 3XXXX XXXX
PCM CLOCK ON XSXS SEP SW CL XSXS HTRS ON 19XS
ODD STAT GO XSXS AKM ENA XSXS OFF 20XS
EVEN STAT GO XSXS INH SW XSXS RLY BUS ON
BATT T GO XSXS LVLV OPN 1 XSXS 15 25 35 45
2 XSXS PAM SEP SW CL
OMNI ENA 1 XSXS 8V AS B5
2 XSXS 16V AS B5
(XX)

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WESTAR CONTROL

D

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XXXX/210/ S/L DPA XX X DDD/HHMMISS
1/0 UNIT SS EXP DDD/HHMMISS
PWR ON A 1XS 11XS 33 CDMS MSTR OFF ✓
B 2XS 12XS
OFF 3XS 13XS COMPUTER SSC BUC EXC
AMPS XX,XS XX,XS 21XS 25XS SS EXP
TEMP XXXS XXXS RESTART ENA 21XS 25XS
+5V X,XS X,XS PWR ON-DMA A 22XS 30XS
0/A S OFF 23XS 26XS 28XS
U/V S S 24XS 27XS 31XS
COUPLER +5V X,XS X,XS X,XS
ALL A ON 4 14 AMPS XX,XS XX,XS XX,XS
PMU B ON 5XS 15XS TEMP XXXS XXXS XXXS
RAU B ON 6XS 16XS TEST FAIL S S S
MDM B ON 7XS 17XS MMU LOAD 24 29 32
MMU B ON 8XS 18XS LOAD EXEC XS XS XS
DDU B ON 9XS 19XS
TIME OFF 10XS 20XS PROGRAM LOAD SS EXP
FAIL DMA S S MMU BITE XS XS
RAU S S LOAD COUNTER XXXS XXXS
MDM S S PIDL COUNTER XXXS XXXS
MMU S S TIME SOURCE XXXS XXXS
DDU S S SYS STOP ERR XXXXS XXXXS
TIME S S IT LEVEL XXS XXS
(XX)

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XXXX/211/ S/L DPA PERIPHERAL XX X DDD/HH:MM:SS  
 SS RAU ALL ON 1 OFF 2 DDD/HH:MM:SS

	ON	OP	NOP	P/S	SEQ	STATUS	MMU	STATUS
				OK	FAIL		PWR	ON 42XS OFF 43XS
A	3XS	12XS	21XS	XS	S	XXS	+5V	X.XS
B	4XS	13XS	22XS	XS	S	XXS	TEMP	XXXS
C	5XS	14XS	23XS	XS	S	XXS		
D	6XS	15XS	24XS	XS	S	XXS		
E	7XS	16XS	25XS	XS	S	XXS		

OP 55C EXC  
 NOP 44XS 46XS  
 45XS 47XS  
 ERRORS  
 REGA XXXXS XXXXS  
 REGB XXXXS XXXXS

A

DDS	1	2	IPS	RAU	Z	ON	OFF
DDU A	X.XS	X.XS	POWER			48XS	49XS
KB A	X.XS	X.XS	SIO MOD			50	51
TEMP	XXXS	XXXS	OP		52XS		
SSC	OP 30XS	34XS	NOP		53XS		
	NOP 31XS	35XS	P/S OK		XS		
EXC	OP 32XS	36XS	SEQ FAIL		S		
	NOP 33XS	37XS	STATUS		XXS		

(XX)

S/L DPA PERIPHERAL

XXXX/212/ S/L LINK MGMT XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

MDM SEL	SSC	EXC	GPC/SL	LINK	ERROR	SSC	EXC
CHANNEL	A B	A B					
ENA	1X 2X	4X 5X	NOP	IND		X	X
DSBL	3X	6X	COMM			X	X
MDM TEST	SSC	EXC	LINK	INTRPT		X	X
RTRN CHW	7XXXX	8XXXX	NO SL	RESP		X	X
MSG	9XXXX	10XXXX	GPC	NO MATCH		X	X
			SL	LENGTH		X	X
SV SEL	SSC	EXC	AR	NO MATCH		X	X
ENA GTOD	11X	12X	SR	NO MATCH		X	X
M50	13X	14X	RIW	ERROR STATUS			
			XMIT	RI		XXX	XXX
			GPC	RCVD RI		XXX	XXX
			SL	RCVD RI		XXX	XXX
MSG REJECT	SSC	EXC	LENGTH			XXX	XXX
ITEM	X	X	LINK	BUSY		X	X
GNC	X	X	DSBL			X	X
U/L	X	X					
PCS	X	X	ERROR	RESET		15	
TEC	X	X					

(XX)

B

S/L LINK MANAGEMENT

XXXX/213/ S/L EXP RAUS XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

ALL EXP RAUS ( IPS RAU Z ON )

RAU	ON	OFF	P/S	OP	NOP	SEQ	STATUS
			OK	FAIL			
5	2	3	XS	4XS	5XS	S	XXS
6	6	7	XS	8XS	9XS	S	XXS

C

(XX)

S/L EXPERIMENT RAUS

XXXX/214/ S/L COMM XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

VOICE DIGIT	ENA	INH	HDRR	PRIM
CHAN	1	1XS 4XS	PWR	ON 19XS OFF 20XS
	2	2XS 5XS	STAT	EU XS TU XS
	3	3XS 6XS	MTR	A X.XS TEMP ±XXXS
HRH			RATE	MHZ 2 21XS 4 22XS 8 23XS 16 24XS 32 25XS
PWR	ON 7XS	INP 12XS	MODE	STOP 26XS RCD 27XS PB 28XS FFWD 29XS RWD 30XS MOTION XXXXS TAPE XXX.XS
OFF	8XS	1XS 12XS		EOT XS
STAT	XS	2XS 13XS		SELF TEST 31XS STATUS XXXS
TEMP	±XXXS	3XS 14XS		
PS0	9XS	4XS 15XS		
PS1	10XS	5XS 16XS		
PS2	11XS	6XS 17XS		
OP	SSC 12XS	7XS 18XS		
NOP	SSC 13XS	8XS 19XS		
OP	EXC 14XS	9XS 20XS		
NOP	EXC 15XS	10XS 21XS		
SLF TEST	16XS	11XS		
STATUS	XXXXS			
CUR FMT	XXS			
17 LOAD FMT	XXS			
EXEC	18			

(XX)

D

S/L COMMUNICATIONS

XXXX/220/ S/L EXP POWER XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

EPDB	DC		AC		MN VDC XX.XS KW XX.XS EXP BUS VOLTS #AB #BC #CA XXXX XXXS XXXS
	ON	OFF	ON	OFF	
11	1XS	2XS	3XS	4XS	
12	5XS	6XS	7XS	8XS	
13/4	9XS	10XS	11XS	12XS	
21	13XS	14XS	15XS	16XS	
22	17XS	18XS	19XS	20XS	
23/4	21XS	22XS	23XS	24XS	

EPDB DC AMPS  
 1 XXXS  
 2 XXXS

EPDB AC AMPS  
 #A #B #C  
 1 XX.XS XX.XS XX.XS  
 2 XX.XS XX.XS XX.XS

EPDB 1 2  
 ON 61XS 63XS  
 OFF 62XS 64XS

(XX)

S/L EXPERIMENT POWER

XXXX/XXX/208 S/L SS DC POWER XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

BUS	VOLTS	MAIN	AMPS	XXXX
MAIN	XX.XS	AMPS	XXXX	
ESS	SS XX.XS	KW	XX.XS	
	EXP XX.XS	ESS+EM A	XX.XS	
	RAAB XX.XS			
AUX	A XX.XS			
	B XX.XS			
	A/B UV S			
EM	IPS XX.XS			
	SS C XX.XS			

RAAB	P/S	AS	BS	SPDB DC	VOLTS	AMPS
BUS	VOLTS			CDMS1	XX.XS	XX.XS
28-1	XX.XS			RAU 3	XX.XS	
28-2	XX.XS			4	XX.XS	
6-1	X.XS			CDMS2	XX.XS	XX.XS
6-2	X.XS			RAU 1	XX.XS	
6-3	X.XS			2	XX.XS	
6-4	X.XS			CDMS3	XX.XS	XX.XS
+10	XX.XS			4-1	XX.XS	XX.XS
-10	XX.XS			4-2	XX.XS	

(XX)

S/L SS DC POWER

XXXX/222/ S/L AC POWER XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

INVERTERS

SS	EXP	SS POWER ON	1XS
ON 2XS	4XS	SPDB SW PWR	XXXXS
OFF 3XS	5XS		

BUS	SS	EXP	SPDB AC BUS
V IN	XX.XS	XX.XS	0/U V ECS 2 S
A IN	XXXXS	XXXXS	3 S
V #A	XXX.XS	XXX.XS	
#B	XXX.XS	XXX.XS	
#C	XXX.XS	XXX.XS	
A #A	XX.XS	XX.XS	
#B	XX.XS	XX.XS	
#C	XX.XS	XX.XS	
TEMP	XXXXS	XXXXS	
0/V SHDN	S	S	

SS BUS VOLTS  
 #A XXXS  
 #B XXXS  
 #C XXXS  
 #AB XXXS  
 #BC XXXS  
 #CA XXXS

EXP BUS VOLTS  
 #AB XXXS  
 #BC XXXS  
 #CA XXXS

AMPS  
 ECS2 #A X.XS  
 #B X.XS  
 #C X.XS  
 ECS3 #A X.XS  
 #B X.XS  
 #C X.XS

(XX)

S/L AC POWER

XXXX/224/ S/L COOLING LOOPS XX X DDD/HH:MM:SS  
 DDD/HH:MM:SS

IGLOO PRESSURE XX.XS

FREON LOOP

PUMP	1 ON	4XS
1#2 OFF		5X
2 ON		6XS

FLOW XXXXS  
 ACCUM QTY XXXS  
 PUMP IN P XXXS  
 OUT P XXXS  
 #P STAT S  
 IN T XXXS  
 INTL HX OUT T XXXS

7 ECS MASTER OFF X

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S/L COOLING LOOPS



## NOTES





## NOTES