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The attached documents are being provided to Switching Power Magazine for information purposes. This magazine is writing a feature article on the International Space Station Electrical Power System, focusing on the switching power processors. These units include the DC-DC Converter Unit (DDCU), the Bi-directional Charge/Discharge Unit (BCDU) and the Sequential Shunt Unit (SSU).

These diagrams are high-level schematics/block diagrams depicting the overall functionality of each unit.

6920/Gregory V. Schmitz, Acting EPS SSM Team Lead

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Figure 1 - BCDU Simplified Block Diagram

Remote Bus Isolator (RBI)

Fault Isolator (FI)

Battery Power I/O

0.15 Ohms

750.0 uFd

Remote Bus Isolator (RBI)

300.0 uFd

(S - A)

(S - B)

(S - C)

(S - E)

(V - A)

(V - B)

(V - D)

Command Bus Out

(2)

Control Bus Out

Address Data

All Signals Shown for
Battery 'A'
are Replicated for 'B'

Dual 1553 Bus

Power Supply 'A'

Power Supply 'B'

Bias to Battery 'A'

Bias to Battery 'B'

RT Address Data

(5 Bits, Parity & Rtns)

Battery Monitor Input A & Rtn

Heater On - Battery A-1

Heater On - Battery A-2

Drain Off A

Local Data Interface (LDI)

Commands:

A = RBI Close
B = RBI Open
C = Pulse Enable
D = RBI Open/Close
E = Heater
F = Heater
G = BSCCM
H = BSCCM
I = DC Current
J = BSCCM P5: A On/Off
K = BSCCM P5: B On/Off
How Error Signal Relates to Power Flow

BCDU Power Stage

130V - 180V Source Voltage

Voltage Setpoint from Host Computer

-1/8x

Outer Voltage Control Loop

Duty Cycle

Inner Current Control Loop

Error +2.5 Duty Cycle .75

-2.5 .

0

6.5 mV/Amp

6.5 mV/Amp

Charge Setpoint from Host Computer

8x

-1x

To Other BCDUs

Closed When -Charging or -Slave or -Off

.95A 2.5V

.95A .

1A .

-15V

19 JAN 01
FILE ERROR-SIG VSD
WJD6/AM