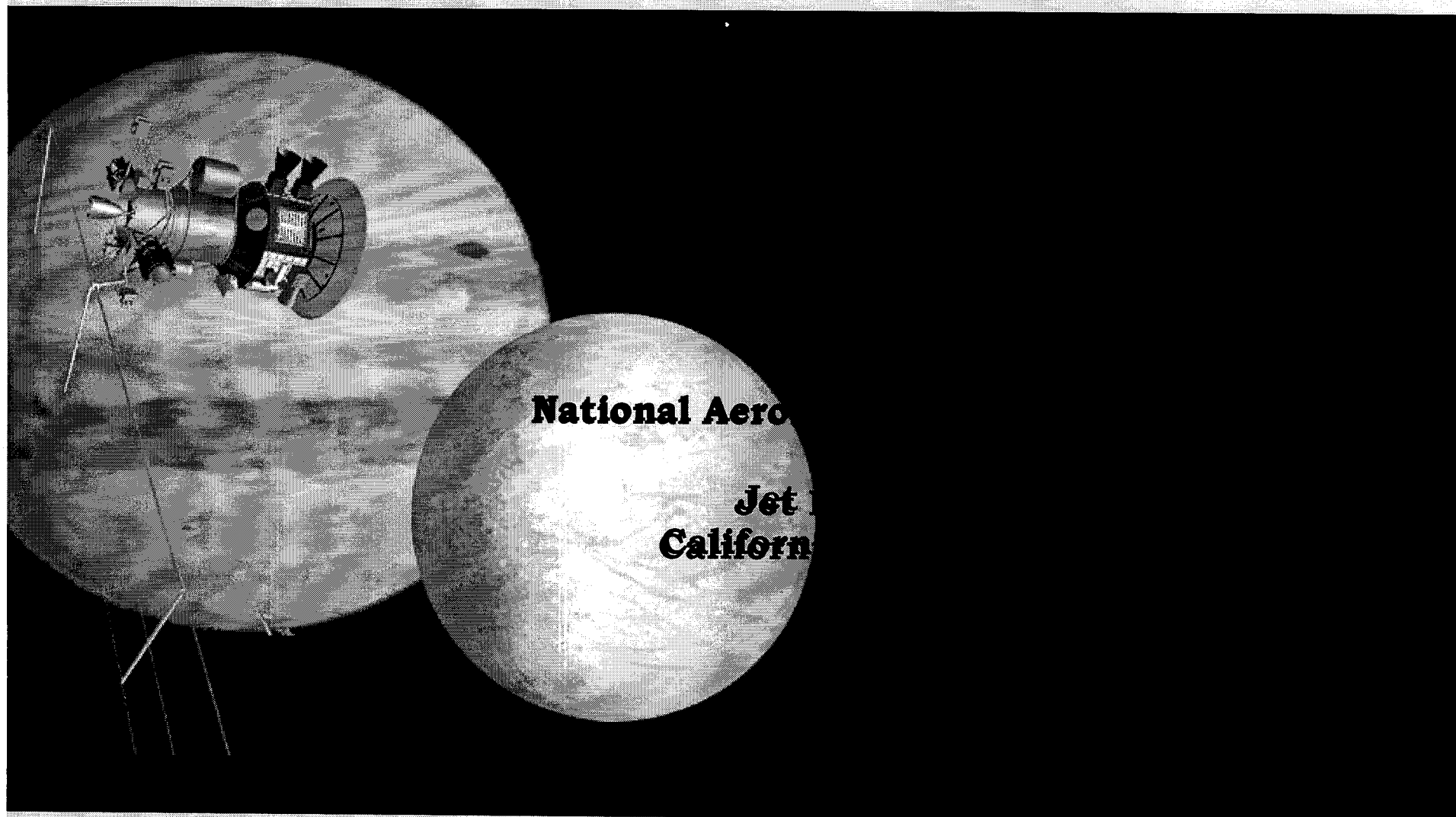
Europa Orbiter/X2000 Avionics Industry Briefing



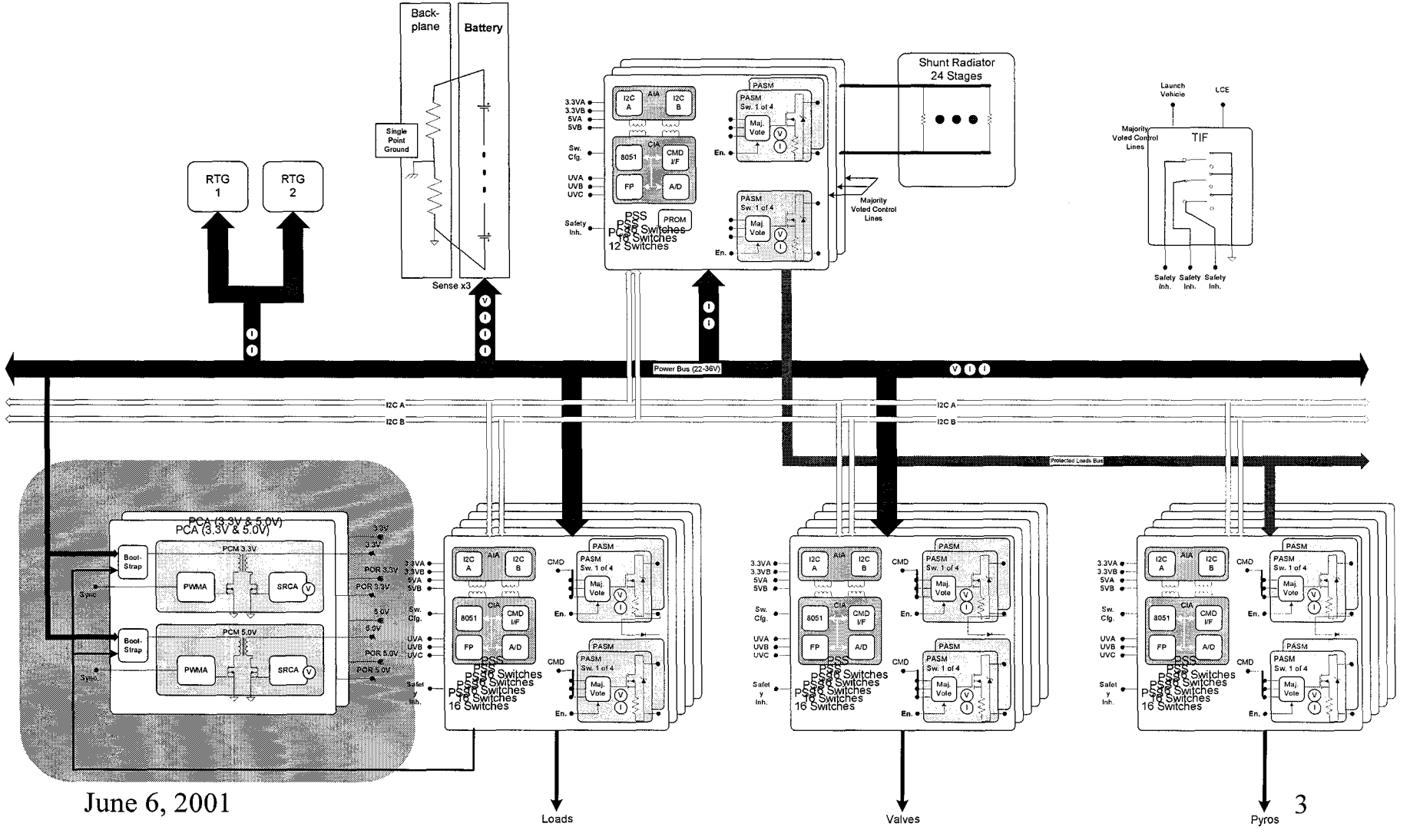
June 6, 2001

Power Converter Module and Assembly

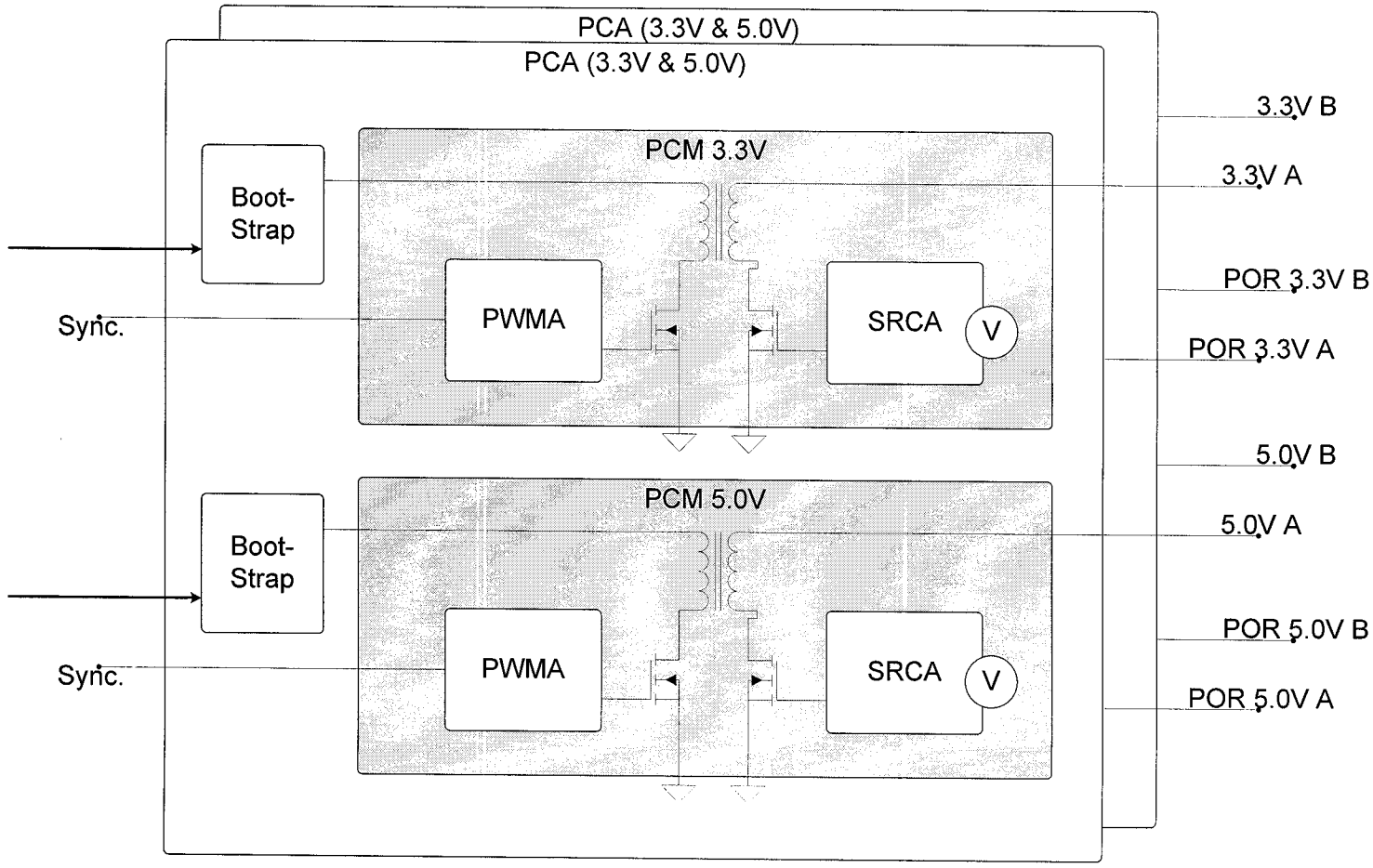
Loren Jones
loren.jones@jpl.nasa.gov

June 6, 2001

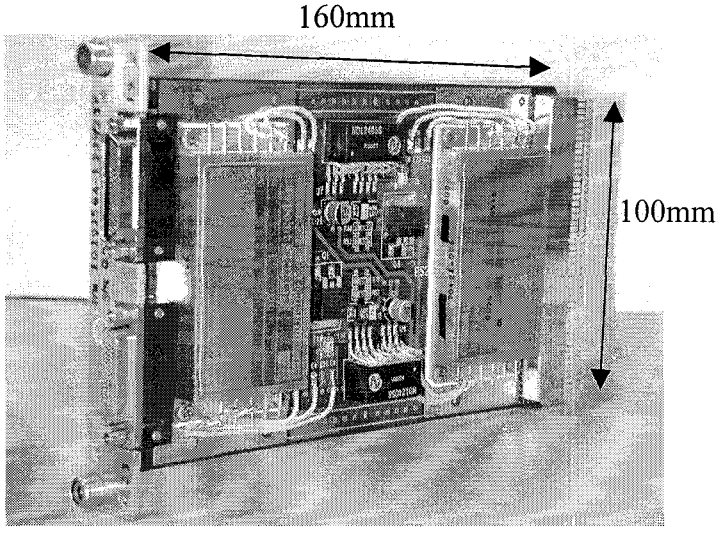
PSE Block Diagram



PCA Slices

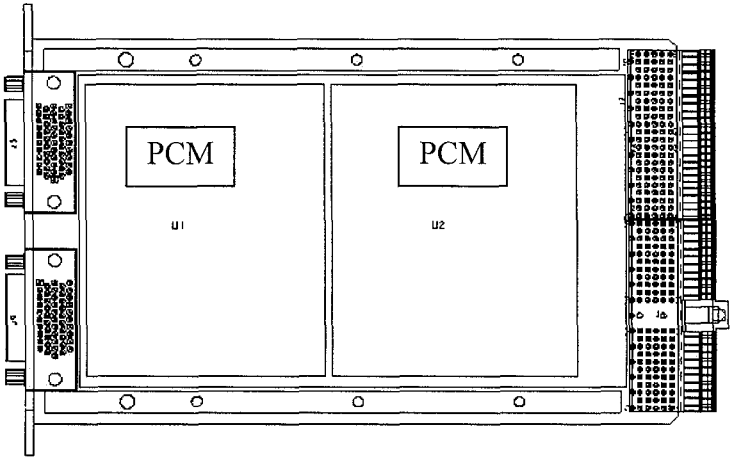

PCA (3.3V & 5.0V)
PCA (3.3V & 5.0V)
PCM 3.3V
Boot-Strap
PWMA
SRCA
V
Sync.
PCM 5.0V
Boot-Strap
PWMA
SRCA
V
Sync.
3.3V B
3.3V A
POR 3.3V B
POR 3.3V A
5.0V B
5.0V A
POR 5.0V B
POR 5.0V A

PCA Description



Breadboard Power Converter Assembly (PCA) using COTS DC/DC on CompactPCI 3U card

- No Input or Output Filter
- Fuses for Output Current Limit



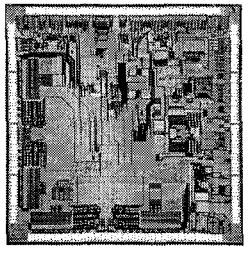
Power Converter Assembly (PCA) on CompactPCI 3U card

- All Features included

PCA Features

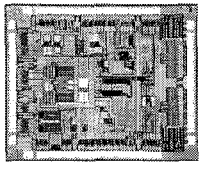
- Mass: 570 grams
- 3U CompactPCI (160mm x 100mm x 19.9mm)
- Two PCMs mount on one PCA
- 60W power output (30W max per PCM)
- PCMs can operate independently or share one load
- PCA provides mechanical/electrical interface
  - Output diode ORing
  - Thermal path
  - Electrical connection to backplane and front panel connectors

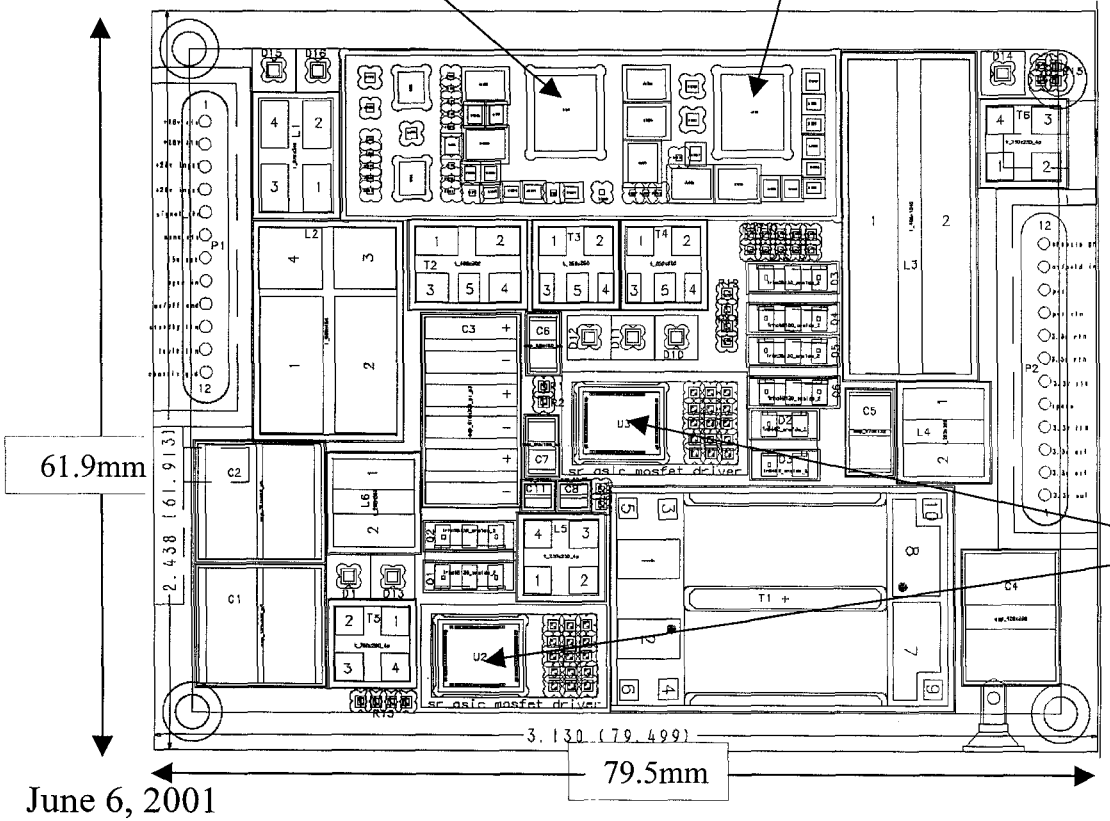
Power Converter Module (PCM) w/MOSFETs



Pulse Width Modulator ASIC (PWMA), HX2080

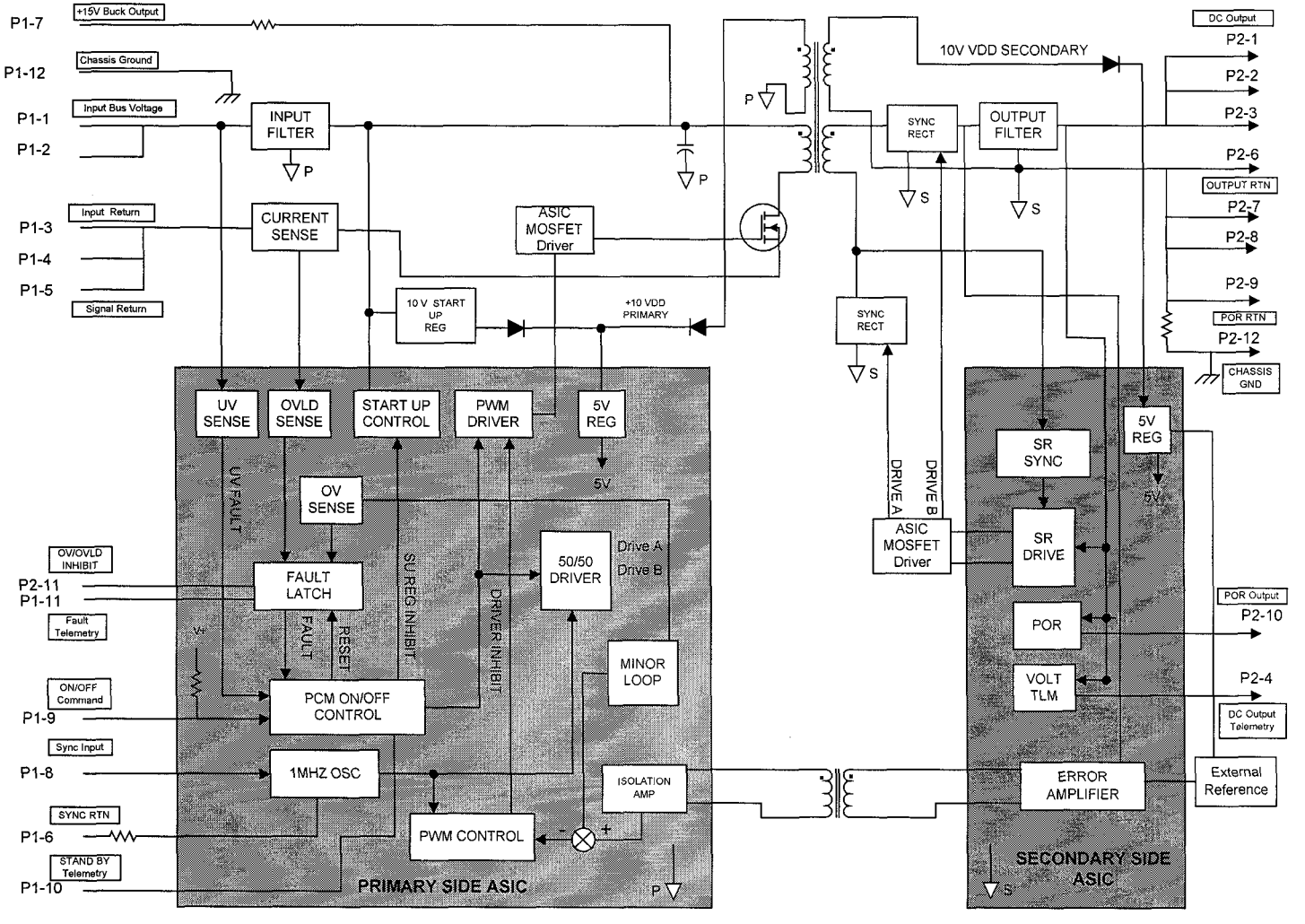
Synchronous Rectifier Controller ASIC (SRCA), HX2040





MOSFET Driver ASICs, HX2040

PCM Block Diagram



PCM Features

• Input Voltage	22V to 36Vdc
• Output Voltage (single only)	+3.3V or +5.0V
• Efficiency	82% at 30W output

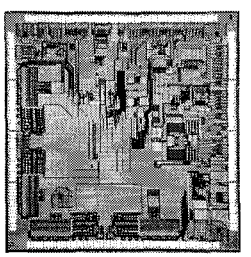
- Over Voltage Protection
- Output Short Circuit Protection
- Load Sharing
- Input Undervoltage Protection
- Input Reverse Voltage Protection
- Inhibit Signal
- External Synchronization Capability
- Power On Reset (POR) Signal

PCM Features

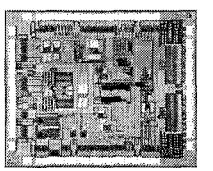
• Temperature	-55°C to +90°C
• Radiation	>1000kRads(Si)
• LET	>80 MeV-cm^2/mg
• Lifetime	10 years
• Mass (module only)	140 grams

PWM and SRC ASIC Features

- Input Voltage +8V to +15Vdc
- Max Switching Frequency 1.0MHz
- Temperature -55°C to +125°C
- Radiation >1000kRads(Si)
- Designed by Boeing/LM-CSS/JPL
- Manufactured at Honeywell

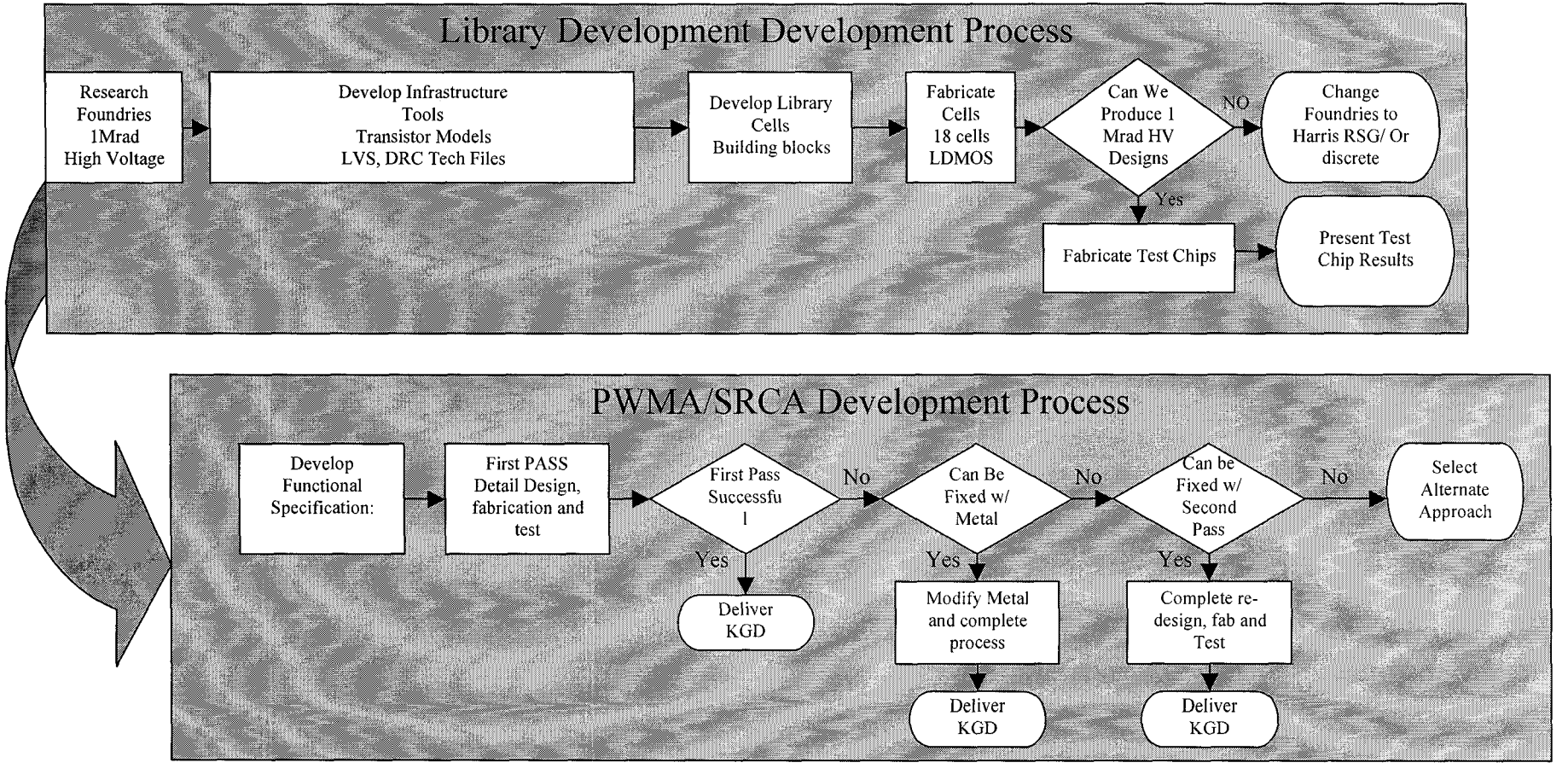


PWMA
HX2080



SRCA
HX2040

Power Mixed Signal ASIC Development Plan



Schedule

• PCM Peer Review	Sept. 2001
• PWMA & SRCA Re-design CDR	Nov. 2001
• PCM CDR	Feb. 2002
• PWMA & SRCA POD Delivery	June 2002
• Prototype PCM Evaluation	Feb. 2003
• Prototype PCA Build and Test	April 2003
• PCM/PCA Qualification	Aug. 2004
• Flight PCA Delivery	Aug. 2005