

Dorado Bioacoustics Concept

901807 NEXT GEN BIOACOUSTICS ON DORADO MBARI 2018



Monterey Bay Aquarium
Research Institute

Derived Requirements

Mechanical

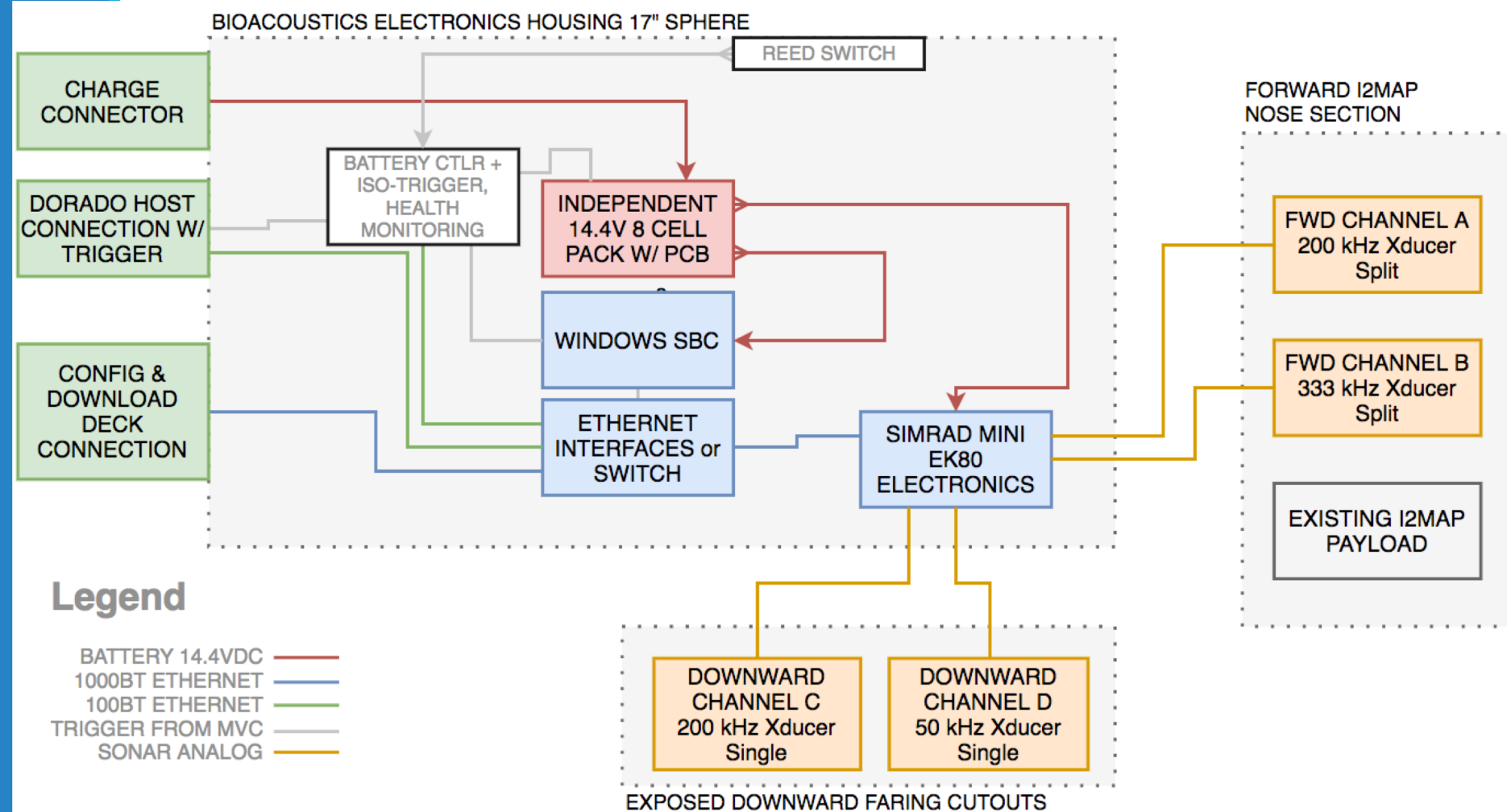
- The following are mechanical requirements:
- Depth rated to 1500-m
- No obstruction for transducers to xx degrees (TBD)
- No video obstruction
- Transducers mounted permanently or easily installed/removed.
- Neutrally buoyant
- Vehicle shall remain in stable flight at existing I2MAP normal through-water speed.

Electrical / Software

- The electrical and software requirements are:
- Self-powered (12-17VDC) and auv-host connection (18-36VDC), existing electronics require a clean 12-17VDC input.
- Power required (TBD) *Currently 10W with computer*
- Isolated Trigger Input, ability to interleave w/ other sources.
- GPS/Depth/MRU serial data to sonar software
- Configuration interface (ethernet/remote desktop)
- CPU must accommodate simrad and echoview software
- Unit must store minimum 1 dive's data (confirm LFM worst case).
- Disciplined time input (ntp or 1-PPS)
- Download interface must facilitate a maximum 5-hour download time.
- Isolate all communication.
- Data Workflow
- Minimum 4 hour run time.
- Must respect normal AUV health monitoring standards.

Notional Wiring Concept

- SBCs exist that can offer the 4 connections as drawn through mini PCIe connections



Battery Controller

Current Battery: PH2054HD34

PART NUMBERS:	PH2054HD31 = 6.2Ah / PH2054HD34 = 6.8Ah Hi capacity
CHEMISTRY / CELL ARRAY:	8 Li-Ion 18650 cells / 4S2P array
CAPACITY / ENERGY:	6.2Ah / 89Wh 6.8Ah, / 98Wh
VOLTAGE:	Vmax=16.8V Vnom=14.4 V Vcutoff=10.0V
EQ. LI CONTENT:	6.9g
MAX CONTINUOUS DISCHARGE	8A
MAX CONT DISCHARGE TO CUTOFF VOLTAGE	80W

Features:

- Incorporate the LPC1769 using micromint SOM and firmware from dorado
- Controls battery charge/discharge
- Provides a place for trigger signal isolation
- Load fusing
- Health Monitoring (humidity, pressure, leak)



Alternatively

- We could skip some of this board, and since the charge will last for currently estimated 33 hours on 8 cells, you could avoid smart charging.
- Thoughts?



SBC Requirements

- Celeron or better x86/x64
- 10-16.8V Input range desired
- 1x Gig-Ethernet & 1 100BT-Ethernet
- Serial port or dig IO for trigger
- Runs windows 7 or better
- SATA 3 or mSATA storage interfaces

Preliminary Power Budget

Batteries

Hotel Battery Energy	4.6 kWhr	Single Sphere 8x PH2054HD34
Sonar Battery Energy	0.744 kWhr	

Payload

i2MAP Payload Hotel	97.6 watts	Instruments, Micro, Fan, Switch, Camera LSL-2050 Sealite
i2MAP Payload Lamps	364 watts	
AUV Hotel Payload	157 watts	Based on propulsion budget from M. Chaffey
Propulsion Speed	0.5 knots	
Propulsion Power	0.66 watts	
Total AUV Battery Load	619.26 watts	

Duration

Duration All Items On	7.43 hours
Recording On Percentage	30 %
Duration On Percentage	12.62 hours

BioAcoustics Payload

Transceiver Hotel	10 watts	Minimum Required Well exceeds an estimate for opportunistic lamp usage.
SBC	12 watts	
Duration Two Cells	8.45 hours	
Duration 8 Cells	33.82 hours	

Preliminary Cost Estimates

- Padding in budget from likely unnecessary foam and fairing line items.

Subsea Housing

Item	Quantity	Unit	Extended
17" Nautilus Sphere	1	\$ 1,300.00	\$ 1,300.00
Lincoln60e	1	\$ 100.00	\$ 100.00
Housing Manager Board	1	\$ 2,000.00	\$ 2,000.00
8 Cell Plastic Sphere Adaptor	1		\$ -
8 Cell Bent Aluminum Chassis	1		\$ -
Sphere Exterior Mounting Fixture	1		\$ -
SBC	2	\$ 2,700.00	\$ 5,400.00
SBC Accessories	2	\$ 151.20	\$ 302.40
SBC Heat Pipe Plate	1	\$ 58.00	\$ 58.00
8 Cell Battery PCB	1	\$ -	\$ -
Batteries PH2054HD34 14.4V	8	\$ 168.04	\$ 1,344.32

Category Total:	\$	10,504.72
Budgeted Amount:		\$11,968.00
Shortfall/Surplus:	\$	1,463.28

Wet Connectors

Item	Quantity	Unit	Extended
Download GigE Bulkhead (NETG)	1	\$ 265.00	\$ 265.00
Download GigE Cable	1	\$ 600.00	\$ 600.00
Download Bench Cable	1	\$ 900.00	\$ 900.00
Download GigE Dummy	2	\$ 200.00	\$ 400.00
AUV Host Bulkhead ()	1	\$ 1,100.00	\$ 1,100.00
AUV Host Cable	1	\$ 2,200.00	\$ 2,200.00
AUV Host Bench Cable	1	\$ 1,100.00	\$ 1,100.00
AUV Host Dummy	2	\$ 400.00	\$ 800.00
Transducer {A:D} Bulkhead	4	\$ 330.44	\$ 1,321.76
Transducer {A:D} Cable	4	\$ 445.50	\$ 1,782.00
Transducer {A:D} Dummy	8	\$ 44.00	\$ 352.00

Category Total:	\$	10,820.76
Budgeted Amount:		\$10,820.76
Shortfall/Surplus:	\$	-

Note: Need to get quotes for many of these.

Dorado Mechanical

Item	Quantity	Unit	Extended
Transducer Forward Mounts	1	\$ -	\$ -
Transducer Downward Mounts	1	\$ -	\$ -
Foam Modifications	1	\$ -	\$ -
Weight	1	\$ -	\$ -
Floatation	1	\$ -	\$ -

Category Total:	\$	-
Budgeted Amount:		\$8,690.00
Shortfall/Surplus:	\$	8,690.00

Schedule

- Transducers arriving April
- PDR 4/5
- Purchase SBCs and test against the hardware in May
- CDR for PCBs May.
- Longest lead times potentially 12 weeks, orders placed by early April for July/August Build
- At Sea: 10/26, 10/29, 12/6

Immediate Tasks

- Select Mounting Scheme
- Finalize Wiring concept
- Draw initial wiring docs / spec connectors
- Select COTS hardware (batteries, SBC, SOMs)