

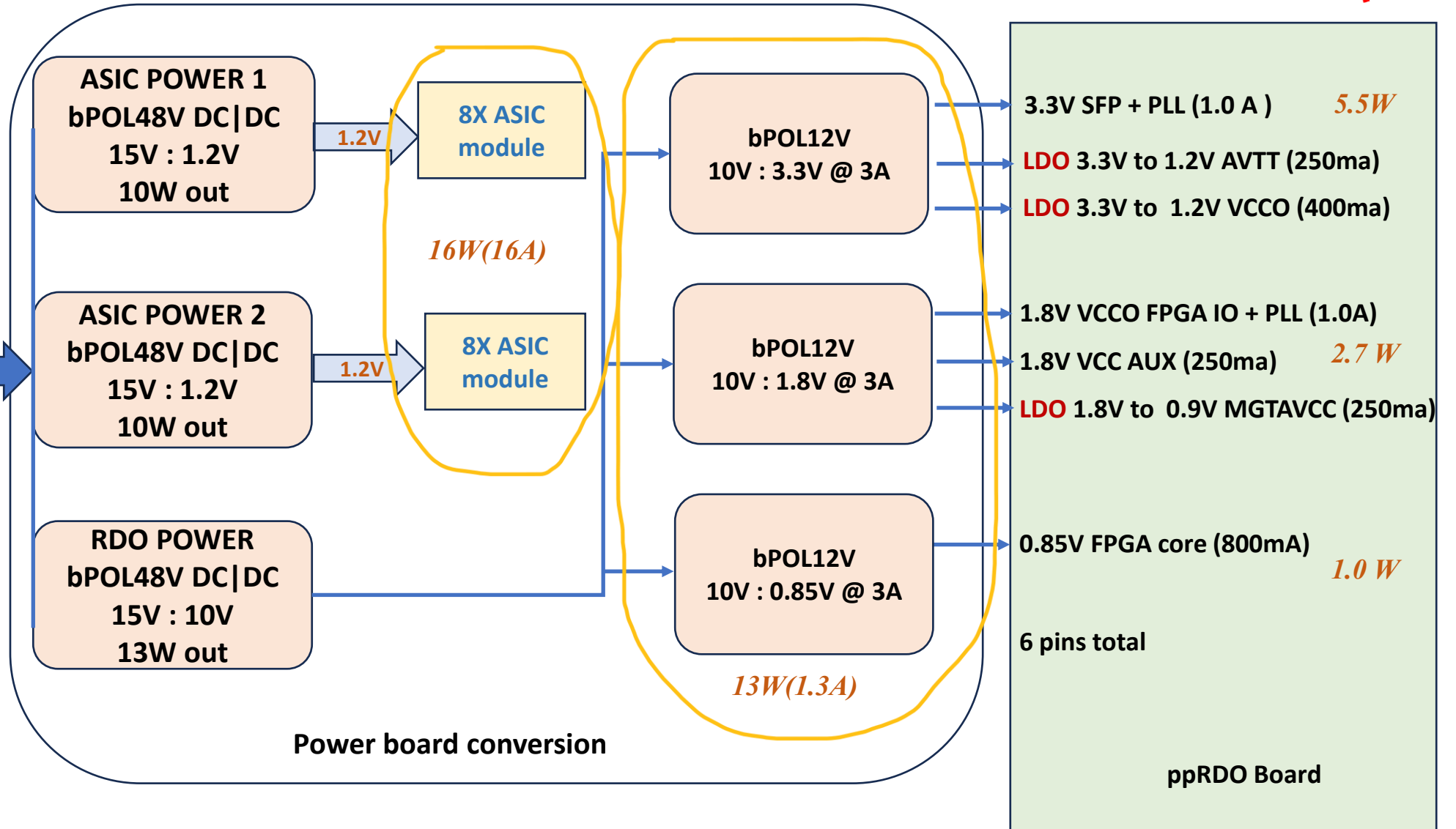
**POWER BOARD POWER DISTRIBUTION BLOCK FTOF
FPGA based RDO service hybrid**



~ 70% power efficiency => 50W
input power (3.5A / hybrid)

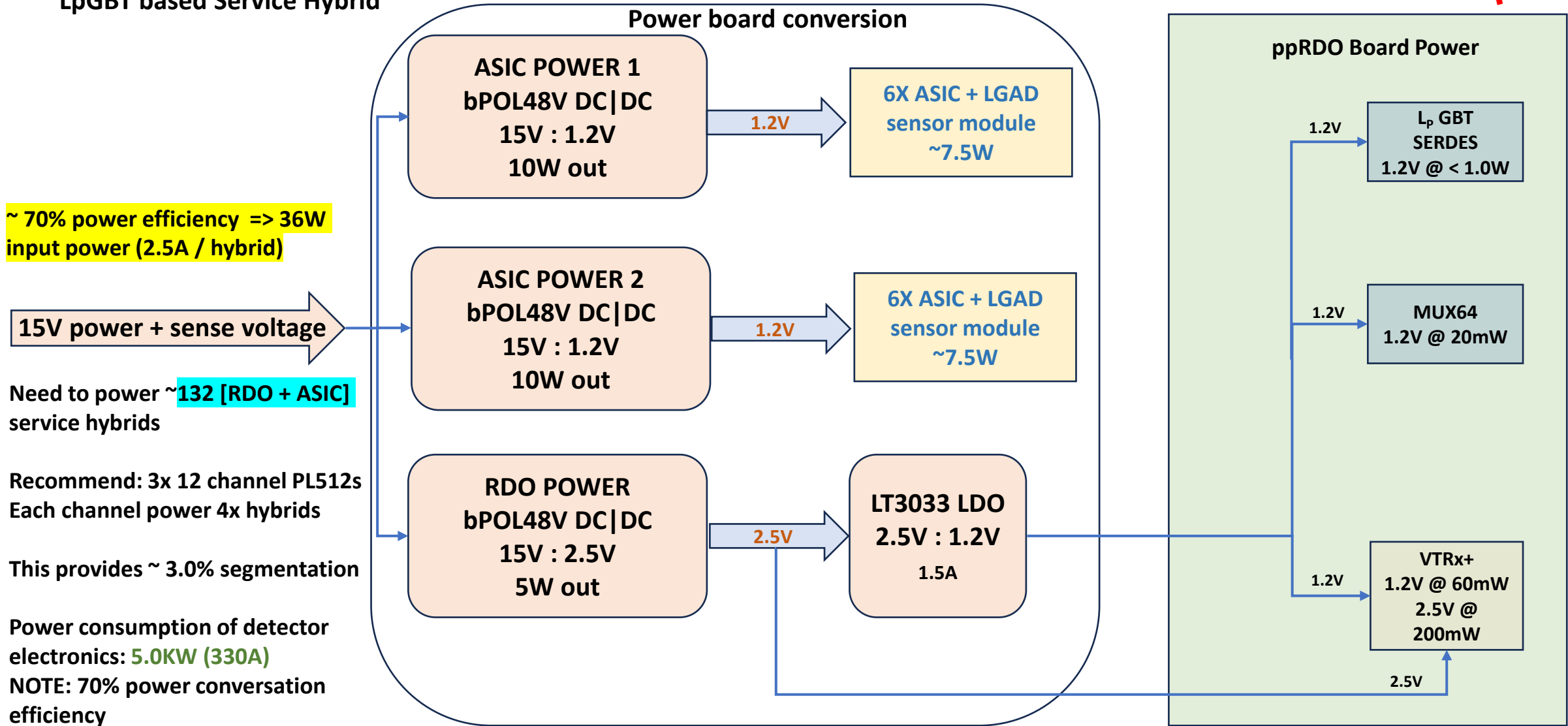
Need to power ~212 [RDO + ASIC]
service hybrids.

Power consumption of detector
electronics: 10.6KW (710A)
NOTE: 70% power conversation
efficiency



FTOF POWER BOARD POWER DISTRIBUTION BLOCK

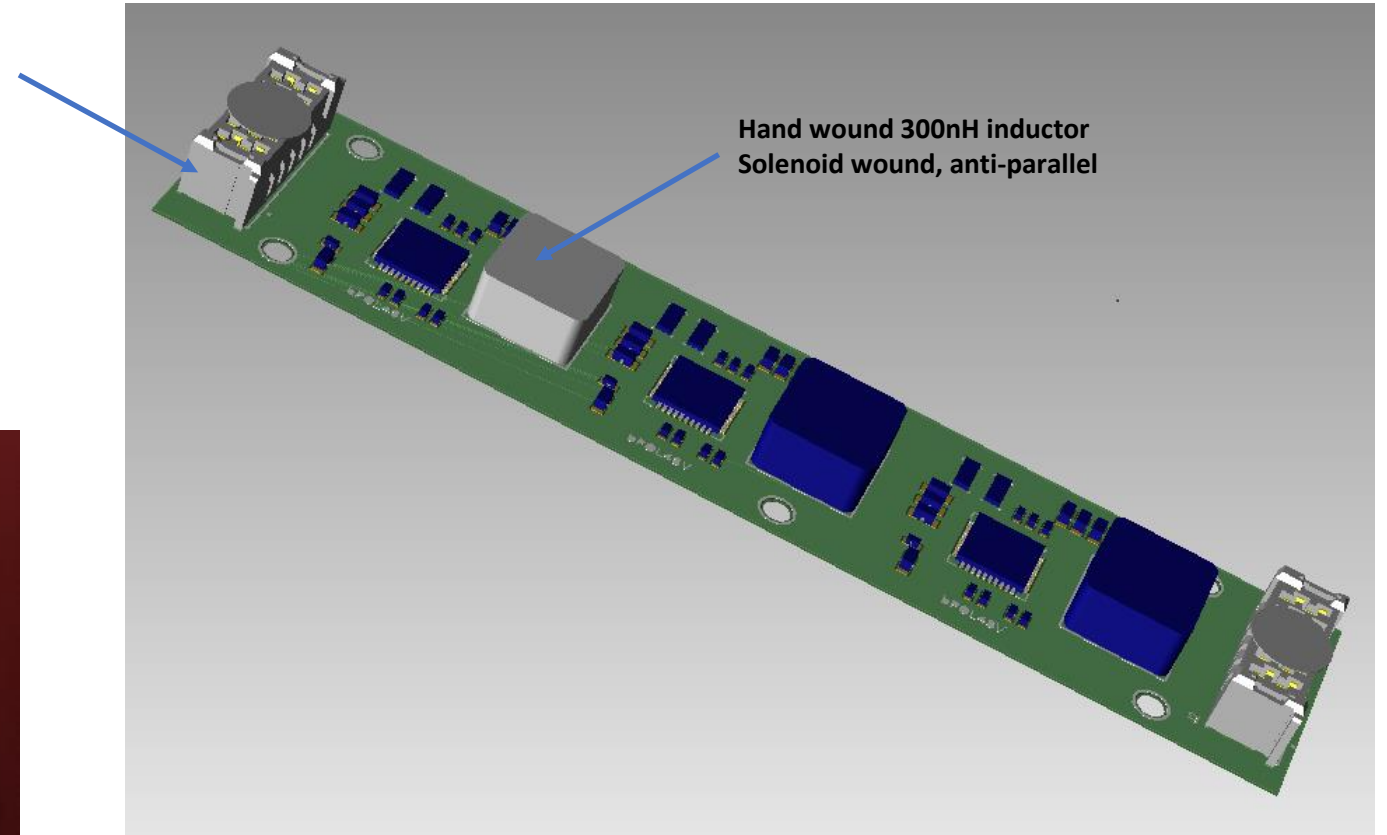
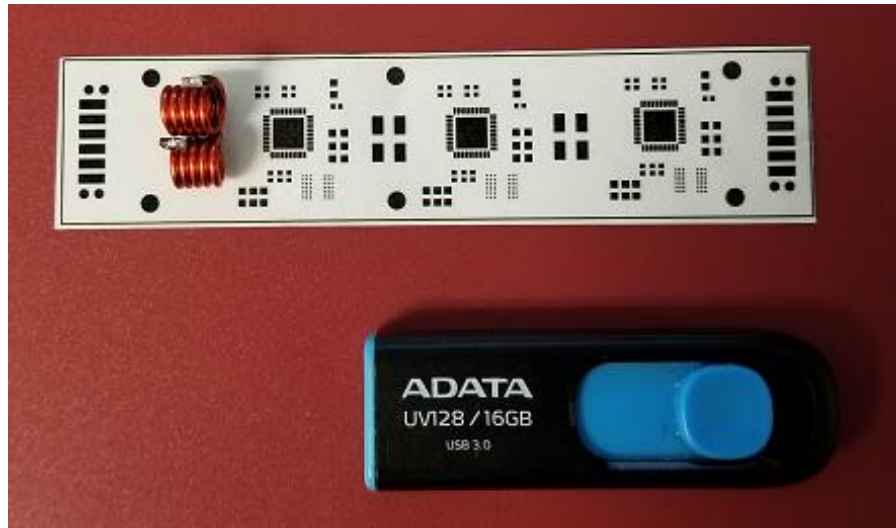
LpGBT based Service Hybrid



September 2024, T. Camarda BNL

**Connector Samtec:
UMPS-06-05.5-G-V-S-W-TR**

**6 pin blade type connector on each side:
plenty for power + signals**



100mm x 22mm service hybrid power board

REVISION D

10/6/2021 ECN-420354

UMPX MATED VIEWS

DESIGNED & DIMENSIONED
IN MILLIMETERS [INCHES]

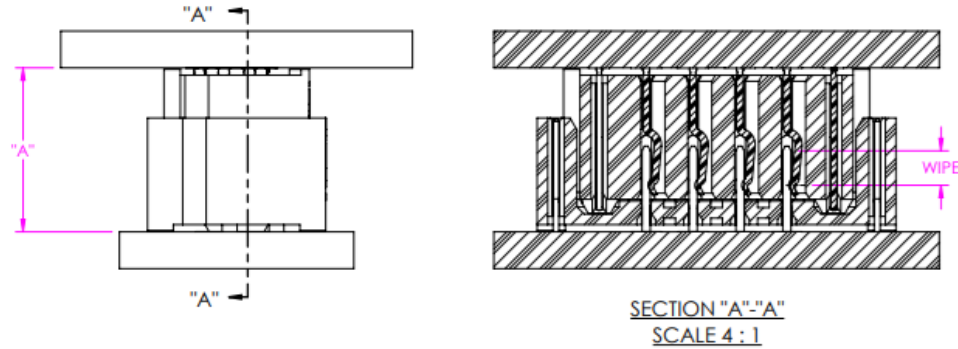


FIG 1
UMPT MATED WITH UMPS

| | | TABLE 1 | | | | | | | |
|-----------------------|---------|-----------------|--------------|-----------------|--------------|--------------|--------------|-------------|---------------|
| | | UMPS LEAD STYLE | | | | | | WIPE | |
| | | -03.5 | | -05.5 | | -07.5 | | FULLY MATED | MIN @ "A" MAX |
| "A" FULLY MATED | "A" MAX | "A" FULLY MATED | "A" MAX | "A" FULLY MATED | "A" MAX | | | | |
| UMPT LEAD STYLE | -01.5 | 5.00 [.197] | 6.09 [.240] | 7.00 [.276] | 8.09 [.319] | 9.00 [.354] | 10.09 [.397] | 1.47 [.058] | 0.38 [.015] |
| | -02.5 | 6.00 [.236] | 7.09 [.279] | 8.00 [.315] | 9.09 [.358] | 10.00 [.394] | 11.09 [.437] | 1.47 [.058] | 0.38 [.015] |
| | -06.5 | 10.00 [.394] | 11.09 [.437] | 12.00 [.472] | 13.09 [.515] | 14.00 [.551] | 15.09 [.594] | 1.47 [.058] | 0.38 [.015] |
| | -07.5 | 11.00 [.433] | 12.09 [.476] | 13.00 [.512] | 14.09 [.555] | 15.00 [.591] | 16.09 [.633] | 1.47 [.058] | 0.38 [.015] |
| | -12.5 | 16.00 [.630] | 17.09 [.673] | 18.00 [.709] | 19.09 [.752] | 20.00 [.787] | 21.09 [.830] | 1.47 [.058] | 0.38 [.015] |

NOTES:

1. ALL DIMENSIONS BASED ON NOMINAL VALUES FOR SAMTEC RECOMMENDED PCB LAYOUTS.
2. ALTHOUGH MAX DIMENSIONS ARE LISTED SAMTEC RECOMMENDS FULLY MATING COMPONENTS.

F:\dwg\sw\exisprod\Mated Docs\UMPX Mated Document.SLDDRW

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Continued....

| Detector | Type | Front End LV Power | HV Bias | LV Power Supply Type | HV Power Supply Type | Power Supply Location | LV Power Feed | LV Feed Cables (Tray Rated) | Cooling (Board Electronics) |
|---|-----------------|--------------------|-----------------------|----------------------|-----------------------|----------------------------|---------------|-----------------------------|---------------------------------|
| Barrel HCAL | SiPM | 220W | 1.6W @50V | MPV 8016I | MPV 8120I | S. Platform, 19" rackmount | 10V @ 30A | 8x 16AWG | Liquid |
| Barrel ECAL | SiPM + AstroPix | 1.6kW | 1W @50V & 100W @ 400V | MDH-07/16 | MPV 8120I & EHS F005p | S. Platform, 19" rackmount | 10V @ 200A | 16x 12AWG | Liquid |
| DIRC | HRPPD | 330W | 70W@3kV | MPV 4018I | CAEN A1515BV | S. Platform, 19" rackmount | 1.2V@ 350A | 16x 12AWG | Forced-Air convection or Liquid |
| Barrel fTOF 212 service hybrids | AG-LGAD | 10.6kW | 4W@400V | PL512 | CAEN A1625 | S. Platform, 19" rackmount | 10V @ 900A | 30x 10AWG | Liquid |
| HE TOF | AG-LGAD | 16.0kW | 4W@400V | PL506 | CAEN A1625 | S. Platform, 19" rackmount | 10V @ 2,000A | 60x 8AWG | Liquid |
| dRICH | SiPM | 300W | 23W@70V | MPV 4016I | MPV 8120I | S. Platform, 19" rackmount | 10V @ 40A | 4x14AWG | Liquid |
| FWD ECAL | SiPM | 2.8kW | 750W@ 50V | PL506 | MPV 8120I | E. Platform, 19" rackmount | 10V @ 350A | 20x 12AWG | Liquid |
| HE HCAL (LFHCAL) | SiPM | 1.7kW | 3kW@ 50V | PL506 | MPV 8120I | E. Platform, 19" rackmount | 10V @ 200A | 12x 12 AWG | Heatsink Convection |
| | | | | | | | | | |
| | | | | | | | | | |

Note: Refer to [ePIC Services on-line Spreadsheet](#) for details of power distribution
 August 2023, T.Camarda for BNL EE Group
 REV-02