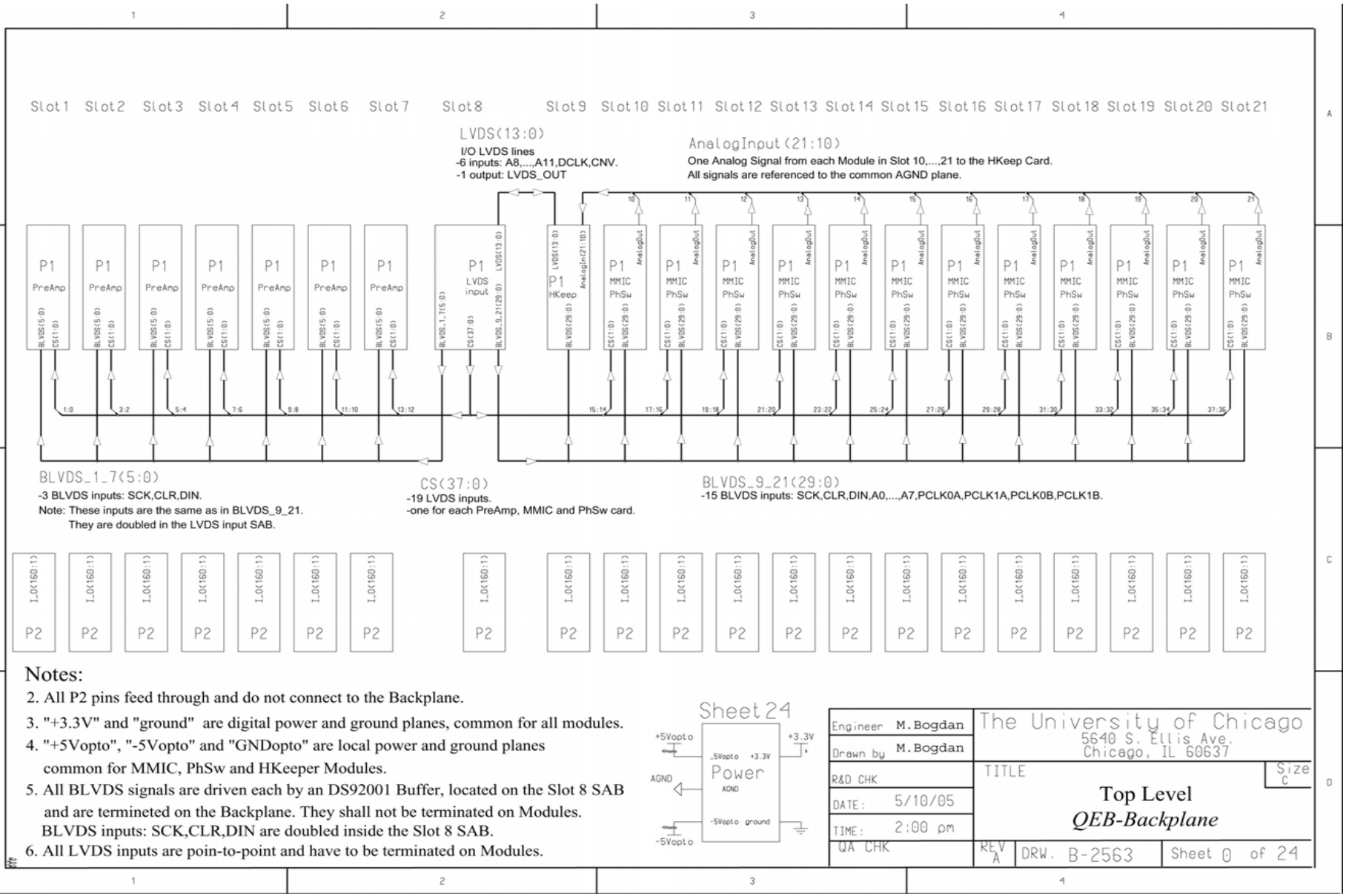
The QUIET Electronics Box Implementation - I



Notes:

2. All P2 pins feed through and do not connect to the Backplane.
3. "+3.3V" and "ground" are digital power and ground planes, common for all modules.
4. "+5Vopto", "-5Vopto" and "GNDopto" are local power and ground planes common for MMIC, PhSw and HKeeper Modules.
5. All BLVDS signals are driven each by an DS92001 Buffer, located on the Slot 8 SAB and are termineted on the Backplane. They shall not be terminated on Modules. BLVDS inputs: SCK,CLR,DIN are doubled inside the Slot 8 SAB.
6. All LVDS inputs are poin-to-point and have to be terminated on Modules.

Engineer M.Bogdan	The University of Chicago 5640 S. Ellis Ave. Chicago, IL 60637	
Drawn by M.Bogdan		
R&D CHK	TITLE	Size C
DATE: 5/10/05	Top Level *QEB-Backplane*	
TIME: 2:00 pm		
QA CHK	REV A / DRW. B-2563	Sheet 0 of 24

QEB – Power/pins requirements

MMIC Bias Interface Boards(7 boards):
-total power power: 350mW x 14 modules x 7 PCBs = 34.3W
-current from isolated power supplies:
  14 floating power supplies @ 3.5V/600mA - 28 pins/600mA each;
  14 floating power supplies @ 5V/25mA - 28 pins/25mA each.

PhSw Interface Boards(5 boards):
-total power: ~2.5W/PCB x 5 PCBs = 12.5W
-current from isolated power supplies:
  30 floating power supplies @ 5V/50mA - 60 pins/50mA each

PreAmp Boards (7 boards each):
- total power: 7W/PCB x 7PCBs = 50W
-current from isolated power supplies:
  28 floating power supplies @ 5V/0.5A - 56 pins/1A each

HouseKeeping board:
- total power not specified; guess: 5W – no extra pins

Shared digital: 3.3V/3A: 10W - 8 pins/1A each

Shared analog: ±5V/1A: 10W - 8 pins/1A each.

~120W

Total Pins

- 72 pins – 1A
- 28 pins – 600mA
- 28 pins – 25mA
- 60 pins – 50 mA
- 90 pins LVDS data

---

278 pins total

Cables & Connectors

- Analog data: 12 pc. Pave Tech. Micro D 100 pins

  - quote for hermetic connector and wires inside dewar
    (twisted pairs, individually shielded, shield goes to pin)

  - no quote for the exterior cables yet (100 pin Micro D to 78 pin)

- Power: 3 pc. Glenair Bulkhead Feed-Thru Hermetic 947-115 series, 79 pins

  - quote for hermetic connectors with cables to inside/outside, no end of cables
    (cryostat design change required!)

- LVDS: 1 pc. Pave Tech Micro D, twin-connector 2x51 pins

  - quote in progress for twisted pairs

Yet to be defined:

- shielding of power cables (Twisted pairs with shields? Faraday-cage? Braid?)

- cables for power and LVDS outside dewar ('hydra-cables' required going
  e. g. from 2 to 3 connectors or some kind of 'breakout box')

Power Supplies

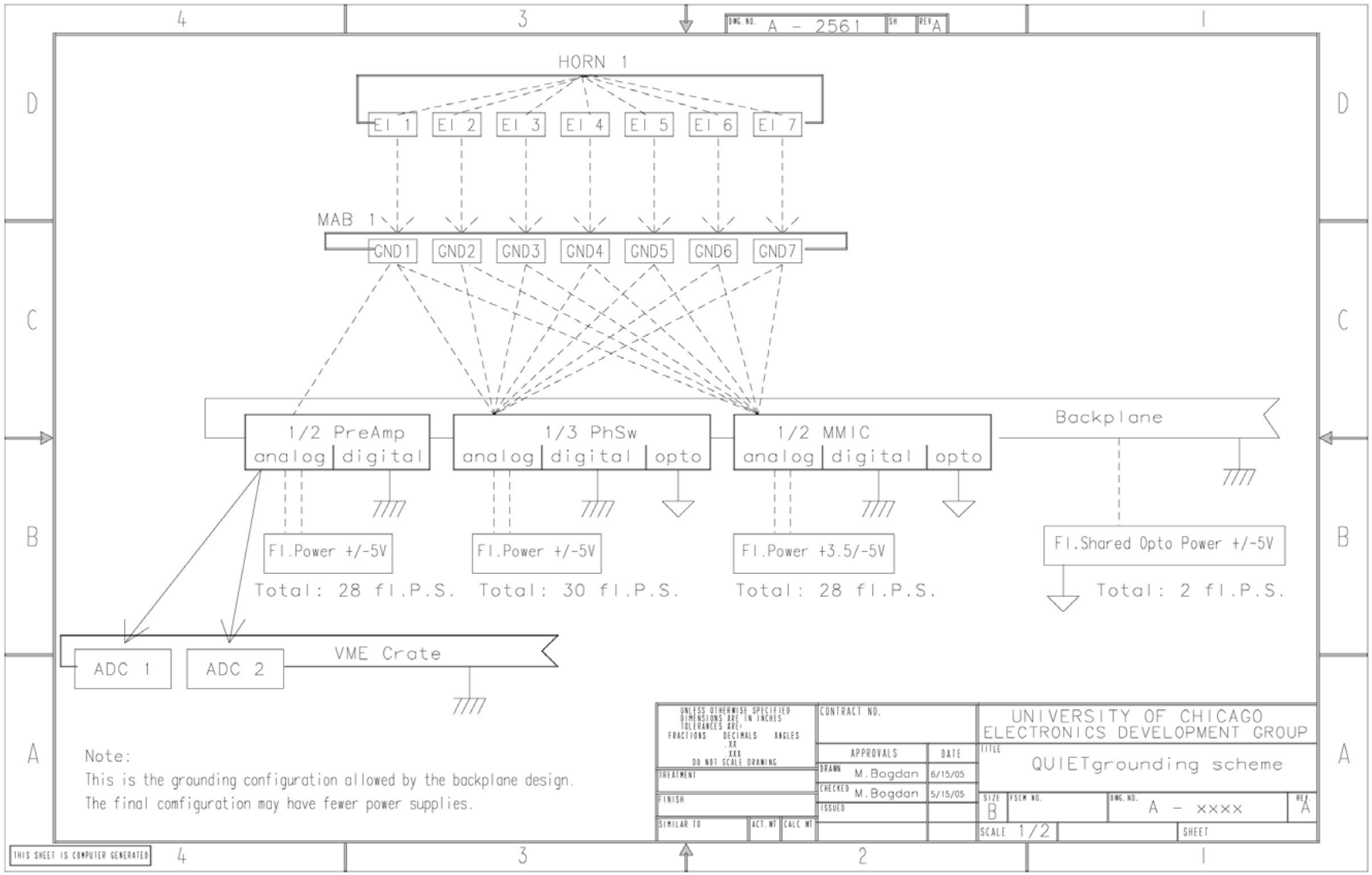
Outside power supplies needed:

- 14 floating power supplies: 3.5V/1A each (for MMIC);
- 28 floating power supplies: 5V/1A each (for PreAmps);
- 44 floating power supplies: 5V/50mA each (for MMIC and PhSw);
- 2 floating power supplies: 5V/3A each (for shared analog);
- one regular power supply: +3.3V/3A (for shared logic).

Ex.: Acopian 5EB100: 5V/1A, Linear Regulated, ripple: 1mV RMS, temp coefficient: 0.03%/degC.

size: 1.6” x 2.5” x 3.5” => 24 pieces on a 16” by 15” plate, can stack up the plates.

Worst case scenario: All power supplies occupy a volume the size of a 6U VME Crate.


DWG. NO. A - 2561
REV A
HORN 1
EI 1
EI 2
EI 3
EI 4
EI 5
EI 6
EI 7
MAB 1
GND1
GND2
GND3
GND4
GND5
GND6
GND7
1/2 PreAmp
analog
digital
1/3 PhSw
analog
digital
opto
1/2 MMIC
analog
digital
opto
Backplane
FI.Power +/-5V
FI.Power +/-5V
FI.Power +3.5/-5V
FI.Shared Opto Power +/-5V
Total: 28 fI.P.S.
Total: 30 fI.P.S.
Total: 28 fI.P.S.
Total: 2 fI.P.S.
ADC 1
ADC 2
VME Crate
Note:
This is the grounding configuration allowed by the backplane design.
The final comfiguration may have fewer power supplies.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX .XXX DO NOT SCALE DRAWING
CONTRACT NO.
APPROVALS DATE
DRAWN M.Bogdan 6/15/05
CHECKED M.Bogdan 5/15/05
ISSUED
TREATMENT
FINISH
SIMILAR TO
ACT. WT
CALC WT
UNIVERSITY OF CHICAGO
ELECTRONICS DEVELOPMENT GROUP
TITLE
QUIETgrounding scheme
SIZE B
FSCM NO.
DWG. NO. A - xxxx
REV A
SCALE 1/2
SHEET
THIS SHEET IS COMPUTER GENERATED