TOP FEE

ground / shield plan & EMC issues

2014-06-20

GND session @ B2GM18

M. Andrew
TOP location in ehut(F2) and in barrel

bPID/TOP grounding scheme

E-hut F2

Belle 2

each TOP module contains 4 boardstacks

2014-06-19

GND session @ B2GM18
LV supply feed

bPID/TOP grounding scheme

E-hut F2

Belle 2

Each TOP module contains 4 boardstacks

Shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)*64
HV supply feed

bPID/TOP grounding scheme

E-hut F2

Belle 2

each TOP module contains 4 boardstacks

coax for each HV: (RG-316)*512

shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)*64

on-detector rack/crates

2014-06-19
ground & shield

bPID/TOP grounding scheme

E-hut F2

all shields tied to local ehut ground

coax for each HV: (RG-316)'512

shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)'64

each TOP module contains 4 boardstacks

copper cooling tubes (not shown) are tied to local ground

note: "local ground" = QBB housing, which is electrically tied to the ECL flange of the Belle II structure

Belle 2

2014-06-19

2014-06-20 GND session @ B2GM18 M. Andrew
LV ground & shield & return

bPID/TOP grounding scheme

E-hut F2

all shields tied to local e hut ground

coax for each HV: (RG-316)*512

shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)*64

Belle 2

each TOP module contains 4 boardstacks

copper cooling tubes (not shown) are tied to local ground

LV DC shields tied to local ground and supply returns at front-end electronics power entry

note: "local ground" = QBB housing, which is electrically tied to the ECL flange of the Belle II structure

2014-06-19
HV ground & shield/return

bPID/TOP grounding scheme

E-hut F2

all shields tied to local e-hut ground

coax for each HV: (RG-316)*512

CAEN HV DC: return/shield for groups of 24 channels tied together inside supply

LV/LV/LV/LV (isolated returns)

shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)*64

HV returns/shields isolated from local ground through independent 220 Ohm resistors

copper cooling tubes (not shown) are tied to local ground

LV DC shields tied to local ground and supply returns at front-end electronics power entry

note: "local ground" = QBB housing, which is electrically tied to the ECL flange of the Belle II structure

each TOP module contains 4 boardstacks

Belle 2

2014-06-19
FTSW connections

bPID/TOP grounding scheme

E-hut F2

Belle 2

each TOP module contains 4 boardstacks

FTSW/TTD: (cat7*2)*64

trigger/timing link = AC-coupled
JTAG link = DC-coupled

CAEN HV DC: return/shield for groups of 24 channels tied together inside supply

HV returns/shields isolated from local ground through independent 220 Ohm resistors

coax for each HV: (RG-316)*512

shielded twisted pair for each LV: (1.87V, 3.15V, 4.33V)*64

copper cooling tubes (not shown) are tied to local ground

LV DC shields tied to local ground and supply returns at front-end electronics power entry

note: "local ground" = QBB housing, which is electrically tied to the ECL flange of the Belle II structure

2014-06-19
cal / bpm

bPID/TOP grounding scheme

each TOP module contains 4 boardstacks

2014-06-19
EMC

• we have not seen significant degradation of performance from EM susceptibility with existing electronics
• have not tested our EM emission (yet)
• new PCBs use LVDS preferentially over single-ended signals, so we don't expect any problems
• still working on final PCB designs
• planning to test EMC issues afterwards