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Barrel 4 Introductory Remarks

Until $\sim$ 7/15/99, we will have to get by with prototype parts. The testing is limited to either a pair of ladders, or a wedge. This is because we will have only 1 CAEN power supply, and 1 prototype CPC. Because there will only be 1 CPC, we think it would be feasible to plug the Old Junction Card (OJC) directly into the prototype CPC. Greg Derylo at SiDet would need to design some support structure to hold the OJC in place. Depending on the readiness of production parts, this configuration may need to be used until even a later date than July 15.

As soon as production parts are ready, we will upgrade the barrel testing system to use these parts.

Once we have upgraded to use production parts, we can manage for a while with 1 production CPC, 1 Test Junction Card, and 1 CAEN. At some point, we will want to test all four electical wedges (2 on each side of the barrel) simultaneously, at which point we will need four CPC's, four junction cards, and four CAEN power supplies. It is possible we could have four of each of these items by September, 99.

For testing ladders in Barrels 1-3, we would like to test 12 full ladders at once. This means that we will need as many as 8 production CPC's, 8 Test Junction Cards, and 8 CAEN PS's for a single barrel. This is because a CAEN PS is designed to power one ladder from each layer (4, 6, 10, 10, and 14 chips for the 5 layers), and therefore, because of current limitations in the CAEN, it can only power up-to three L2, L3, or L4 ladders. If we construct barrels on two CMM's, we will need to double these numbers. Perhaps we can share the CAEN PS's between the 2 CMM's, but swapping in/out the CPC's or Junction Cards would be problematic.

A schematic of the parts needed (apart from the VME modules) for the prototype and production systems is shown in Fig. 1.

The ensuing pages give a list of the parts needed. We need to go through each one and sign off on things as soon as possible and purchase them. A more detailed description of the systems and the needs are presented in the Barrel Testing note. The last page of this brief note gives some open questions/issues which need to be addressed within the next few weeks/months.

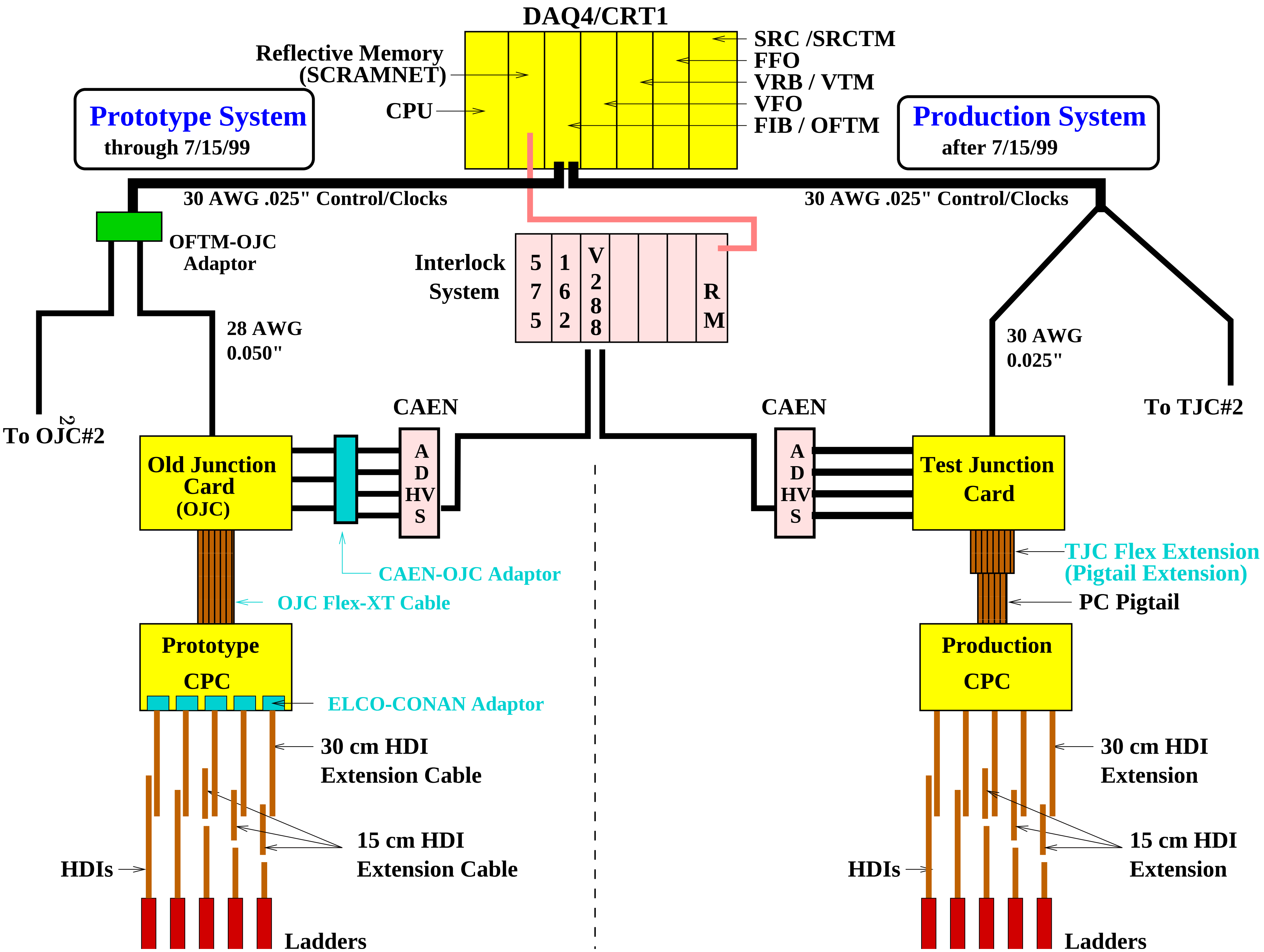

Figure 1: Schematic of the prototype and production systems needed to read out a ladder on Barrel 4.

Barrel 4 Needs (Prototype or Production System)

Item #	Item	Who	Avail.	Comments
1	SRC	ESE, S. Nahn	7/1/99	
2	SRCTM	ESE, S. Nahn	7/1/99	
3	FFO	ESE, S. Nahn	7/1/99	
4	OFTM	ESE, S. Nahn	7/1/99	10 by 6/21
5	FIB	ESE, S. Nahn	7/5/99	
6	VRB	ESE, S. Nahn	7/1/99	
7	VTM	ESE, S. Nahn	7/1/99	
8	VFO	ESE, S. Nahn	7/1/99	
9	SRC to VFO Cu cable	ESE	7/1/99	
10	SRCTM to FFO G-LINK	ESE	7/1/99	
11	SRC to FFO Cu cable	ESE	7/1/99	
12	FIB to VTM G-LINK	ESE	7/1/99	

Table 1: DAQ VME modules which are needed for testing ladders in Barrel 4.

Item #	Item	Who	Avail.	Comments
1	TI-575 crate	M. Kruse	Now	
2	575 CPU	M. Kruse	Now	
3	VME 162	M. Kruse	Now	
4	CAEN V-288 controller	M. Kruse	Now	
5	SCRAMNET module (RM)	M. Kruse	Now	
6	TI-505 crate	M. Kruse	Now	
7	Network Interface module	M. Kruse	Now	
8	Remote Base Controller	M. Kruse	Now	
9	RTD module	S. Blusk	7/1/99	#505-2557
10	Analog Input module	S. Blusk	7/1/99	#505-2555
11	Analog Output module	S. Blusk	7/1/99	#505-6208
12	Digital Output module	S. Blusk	7/1/99	#505-4516

Table 2: Interlock system modules needed to test ladders in Barrel 4.

Barrel 4 Needs (Prototype System)

Item #	Item	Who	Avail.	Details
1	Old Junction Card	Sergio	Done	
2	Prototype CPC	Yuri	7/1/99	CPC#5,#6 for us
3	CAEN Power Supply	C. Rivetta	7/1/99	Works well
4	OFTM-OJC Adaptor	M. Bishai, Charis	6/15/99	1 made, need 1 more
5	CAEN-OJC Adaptor	C. Rivetta, S. Blusk	Student?	Need to be made
6	ELCO-to-CONAN Adaptor	LBL, Yuri	???	20 prs. subm. 6/9/99

Table 3: We need the following components to test ladders in Barrel 4 using the prototype system.

Item #	Item	Who	Avail.	Comments
1	OFTM to OFTM-OJC cable	S. Blusk/ESE	7/1/99	Have 60 ft.
2	OFTM-OJC to OJC cable	S. Blusk/ESE	7/1/99	Some cables at FCC
3	CAEN Power/Sense Cables	S. Blusk/M. Gold/C. Rivetta	7/1/99	Have for 1 PS
4	CAEN-OJC to OJC cables	S. Blusk/M. Gold	7/1/99	Stockroom?
5	15 & 30 cm HDI extension	Glasgow	7/1/99	Review by 6/18

Table 4: Cables needed for testing ladders in Barrel 4 using the prototype system.

Part numbers for cables/connectors from Table 4

1. Cable: 3M # 90101/50 (104 Ω). Connectors: AMP # 786090-5 (1 per end)
2. Cable: 3M # 3517/26 (119 Ω). Connectors: AMP # 746288-6
3. PS Cables
   - Analog
     (a) Cable: Amphenol #843-11-2214-024 22 AWG Flat cable (24 or 26 cond?)
     (b) Connector 1 (CAEN Side): Positronic Industries #ODD-26 (26-pin high density plug) ;
     (c) Connector 2 (OJC Side): Positronic Industries #ODD-26 (26-pin high density plug) .
   - Digital

(a) Cable: Amphenol #843-11-2214-038 22 AWG Flat cable (38 cond.)
(b) Connector 1 (CAEN Side): Positronic Industries #ODD-44 (44-pin high density plug);
(c) Connector 2 (OJC Side): Positronic Industries #ODD-44 (44-pin high density plug).

- Bias Voltage
  (a) Cable: 3M #3517/20 28 AWG shielded jacketed flat (20 cond)
  (b) Connector 1 (CAEN Side): 3M #8225-6000 D-sub mass termination connector (25-pin plug)
  (c) Connector 2 (OJC Side): 3M #8225-6000 D-sub mass termination connector (25-pin plug)
- Sense Lines
  (a) Cable: 3M #1785-20 28 AWG shielded jacketed twisted-pair (20 cond)
  (b) Connector 1 (CAEN Side): 3M #8225-6000 D-sub mass termination connector (25-pin plug)
  (c) Connector 2 (OJC Side): 3M #8225-6000 D-sub mass termination connector (25-pin plug)

4. 22 AWG twisted pairs

Barrel 4 Needs (Production System)

Item #	Item	Who	Avail.	Details
1	Test Junction Card	M. Gold, Sergio	8/1/99	Review ~6/9/99
2	CAEN Power Supply	C. Rivetta	7/1/99	
3	Production CPC	LBL, Yuri	8/1/99	Test stand needs?

Table 5: We need at least 1 of each of the following to test ladders in Barrel 4. Eventually, to test 4 electrical wedges, we will need 4 of each.

Part numbers for connectors from Table 5

1. Test junction card (TJC) input connectors
   - Analog: Positronic Industries #DFDD-26 (26-pin high density receptacle)
   - Digital: Positronic Industries #DFDD-44 (44-pin high density receptacle)
   - Bias: Amp#1-745967-4 (25-pin vertical PCB mount receptacle)
   - Sense: Amp#1-745967-4 (25-pin vertical PCB mount receptacle)
   - OFTM signals: 3M #10226-6212vc
2. CAEN power supply - same power connectors as TJC

Item #	Item	Who	Avail.	Comments
1	OFTM to TJC cable	S. Blusk/M. Gold	7/1/99	
2	CAEN Power/Sense Cables	S. Blusk/M. Gold	7/1/99	60 feet?
3	15 & 30 cm HDI extension	Glasgow	7/1/99	Review on ~6/16/99
4	PC Pigtail	ESE	6/10/99	designed & submitted
5	PC Pigtail Extension	ESE	8/15/99	who?

Table 6: Cabling needs for testing Barrel 4 using production parts.

Part numbers for cables/connectors from Table 6

1. Cable: 3M # 90101/50 (104 Ω). OFTM-side connector: AMP # 786090-5; TJC-side connector: 3M # 10126-6000ec, 10326-1230-00. Tooling ???
2. PS Cables - same as in Table 4

Open Questions

- Are we signed off on the OFTM output connector which goes to the junction card? It currently is a single connector with 50 pins. The flat cable which is connected to this connector must split into two 25-conductor sections and be routed to two junction cards. How do we maintain the continuity of the shielding?
- Long term reliability and fragility of prototype CPC's (wire bonds)?
- Will power supplies be turned on using Fix Dynamics (DMACS) or through a GUI from the DAQ system? In the former case, do we need any communication between the DAQ and the Interlock system? In the latter case, we need someone to write the GUI (S. Nahn?)
- Heat generation in PC pigtail cable is ~2-3 Watts. Being redesigned with wider traces.
- Will a 2.5 mm wide, 70 mm long ground strap work for all layers? This is our current design.
- Do we need the reccommended tooling for the Test Juction Card connector? It costs ~ $2K!
- Do we want to have temp. probes (RTDs) on the silicon? If so, which detectors?
- Ladders
  - Sensitivity to AVDD & DVDD setpoints
  - Cell-ID mismatch
  - Increased leakage currents near scratches
  - what else?