

HCAL Front End Electronics List

Table 1. HCAL Front End Modules List.

Module Type	Description	Inputs Channels (Outputs)	Number (Test Lab +CMU)	Comments, Power consumption (per module)
PS776	Amplifier 10x, 16ch, NIM	16 (2)	18 (17+1)	6V – 3.9W 12V – 3.6W Total: 7.5W
PS706	Discriminator, 16ch, NIM	16 (2)	19 (18)	6V – 5.1W 12V – 5.4W 115V AC – 9.2W Total: 10.5W+9.2W(AC)
Summing Uva-120	Summing module, 36 inputs, NIM	36 (1)	18 (4+16)	6V – 4W 12V – 4W Total: 8W
PS740	Fan In/Out 4x4ch, NIM	16 (4)	5 (2)	6V – 5.1W 12V – 2.7W Total: 7.8W
Summing UVa-133 (135)	Summing module 4 inputs, NIM	4x4 (1x4)	3 (1+1)	6V – 4W 12V – 4W Total: 8W
Total			63	7 NIM crates (9 modules per crate)

Table 2. HCAL Front End Patch Panels (PP).

Patch Panel ID	Description	Inputs Channels (Outputs)	Number	Comments
PP1-PP5	64x BNC-BNC, Patch Panel, size 2U	64 (64)	5	Individual Amplitudes to DAQ FADC
PP6-PP10	64x BNC-BNC, Patch Panel, size 2U	64 (64)	5	Individual Times to DAQ TDC
SP	16x BNC-BNC Splitter 0.1/0.9, size 2U	16 (16)	18	Splitter 0.1/0.9

Table 3. HCAL Front End Signal Cables List. (PP- patch panel)

N/n	Signal Path	Cable Type	Connectors	Number	Minimum Length, m
1	PMT → PS776 (Ampl)	RG58	BNC-LEMO	288	6
2	PS776 → PP1-PP5	RG58	LEMO-BNC	288	2
3	PS776 → Splitter	RG58	LEMO-LEMO	288	2
4	Splitter → PS706 (Discr)	RG58	LEMO-LEMO	288	2
5	PS706 → PP6-PP10	RG58	LEMO-BNC	288	1
6	Splitter → Summing UVA-120	RG58	LEMO-LEMO	288	2
7	Summing UVA-120 → PS740 (Fan)	RG58	LEMO-LEMO	18	2
8	PS740 → Summing UVA-133	RG58	LEMO-LEMO	40	1
9	Summing UVA-133 → PS706 (Discr)	RG58	LEMO-LEMO	10	1
10	PS706 → PP10	RG58	LEMO-BNC	10	1

Table 4. Total HCAL Front End Signal Cables by Types

N/n	Connectors	Length, m (Delay)	Total
1	BNC-LEMO	6 (30ns)	288
2	BNC-LEMO	2 (10ns)	576
3	BNC-LEMO	1 (5ns)	298
4	LEMO-LEMO	2 (10ns)	576+306=882
5	LEMO-LEMO	1 (5ns)	50

Table 5. HCAL HV Modules List.

Module Type	Description	Channels	Number (in Test Lab)	Comments, Power consumption (per module)
1461N	HV module 3kV, 12ch, size 6U	12	24 (24)	24V - 22W Total: 22W
Total			24 +2 spare	2 HV crates (13 modules per crate)

Table 6. HCAL HV Cables. (PP - patch panel, HCAL-D, HV-D – distribution box)

Signal Path	Cable Type	Connectors	Number	Length (m)
PMT → HCAL-D1-24	SHV	SHV-??	288	6
HCAL-D1-24 → HV-D1-24	24 ch SHV	??-??	12 +1 spare	75
HV-D1-24 → HV Module	SHV	SHV-SHV	288	1