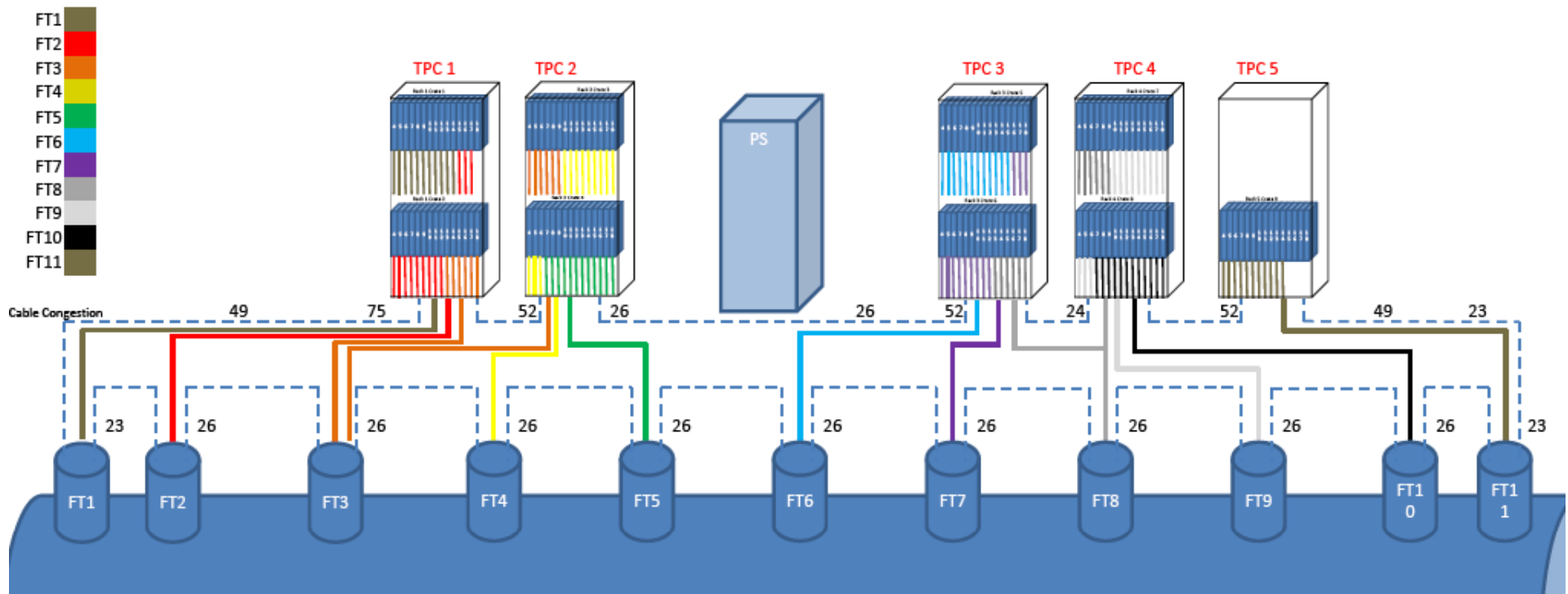


uBooNE

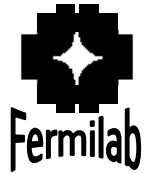
Front-End TPC Cables

- Estimates for Front End Cables given the latest rack layouts and cable mapping.
- In this document the cabling on each FeedThru port is color coded.



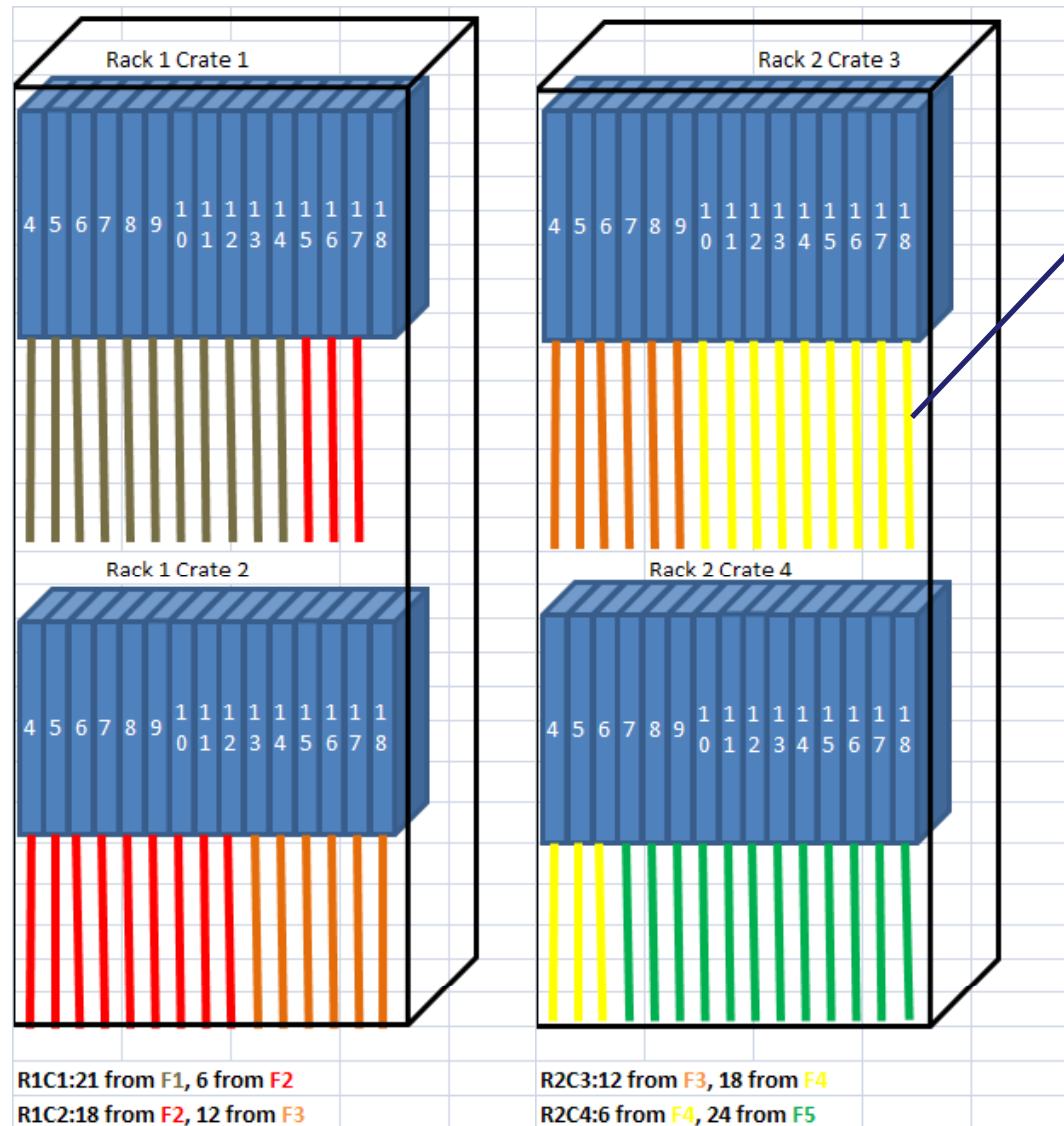


Crate Slot

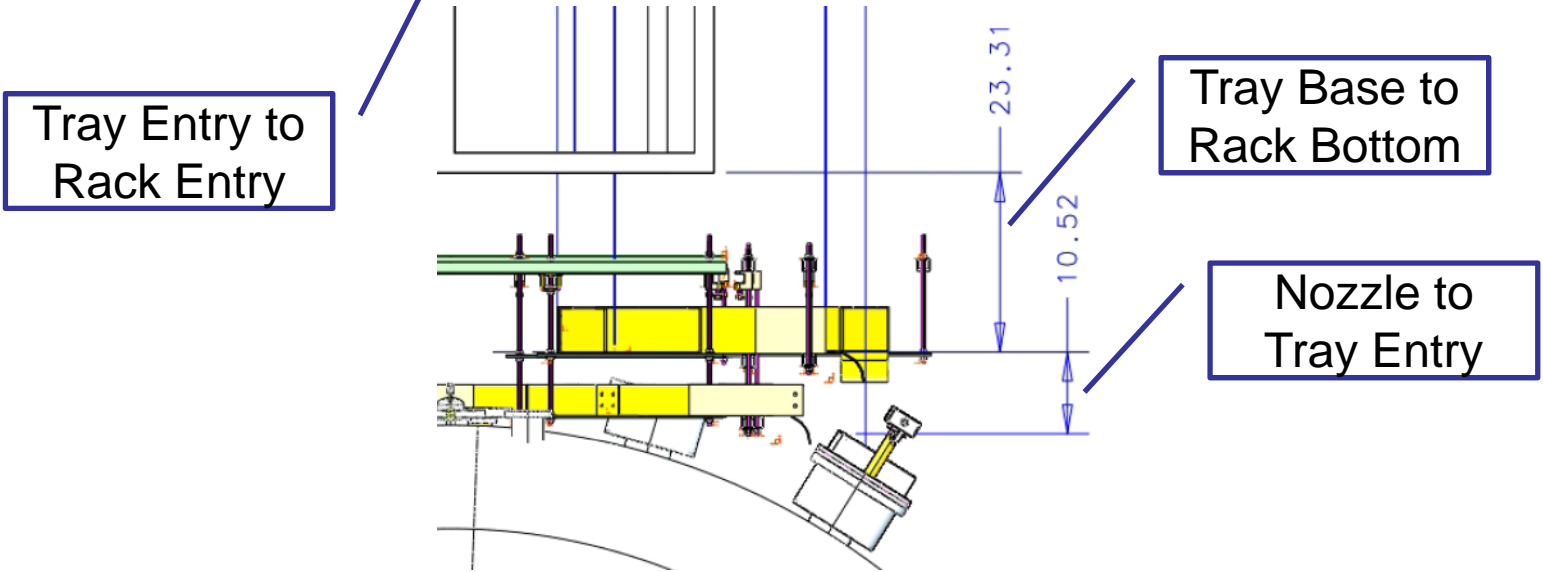
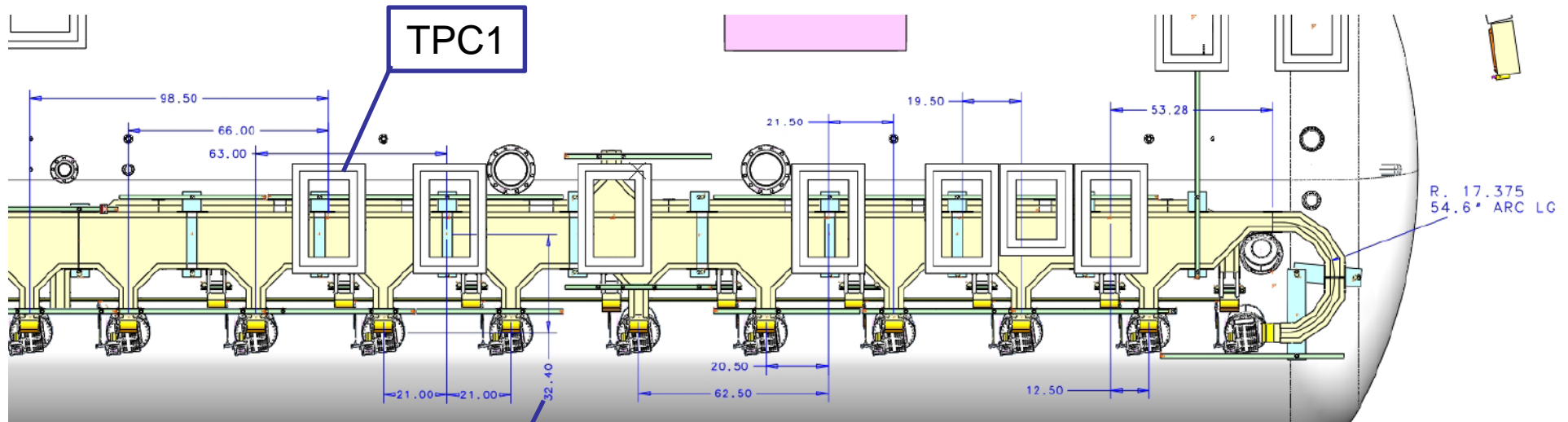


Rack	Cra.	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
R1	TPC 1	F1	F1	F1	F1	F1	F1	F1	F1	F1	F1	F1	F2	F2	F2	XMIT		
		M1C1	M1C3	M2C2	M3C1	M3C3	M4C2	M5C1	M5C3	M6C2	M7C1	M7C3	M1	M1	M1			
		M1C2	M2C1	M2C3	M3C2	M4C1	M4C3	M5C2	M6C1	M6C3	M7C2		C1,2	C3,4	C5,6			
R1	TPC 2	F2	F2	F2	F2	F2	F2	F2	F2	F2	F3	F3	F3	F3	F3	F3	XMIT	
		M2	M2	M2	M3	M3	M3	M4	M4	M4	M1	M1 C3,4	M1	M2	M2 C3,4	M2		
		C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6		
R2	TPC 3	F3	F3	F3	F3	F3	F3	F4	F4	F4	F4	F4	F4	F4	F4	F4	XMIT	
		M3	M3	M3	M4	M4	M4	M1	M1	M1	M2	M2 C3,4	M2	M3	M3 C3,4	M3		
		C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6		
R2	TPC 4	F4	F4	F4	F5	F5	F5	F5	F5	F5	F5	F5	F5	F5	F5	F5	XMIT	
		M4	M4 C3,4	M4	M1	M1	M1	M2	M2 C3,4	M2	M3	M3 C3,4	M3	M4	M4 C3,4	M4		
		C1,2		C5,6	C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6	C1,2		C5,6		
R3	TPC 5	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F6	F7	F7	F7	XMIT	
		M1	M1	M1	M2	M2 C3,4	M2	M3	M3 C3,4	M3	M4	M4 C3,4	M4	M1	M1	M1		
		C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6	C1,2		C5,6	C1,2	C3,4	C5,6		
R3	TPC 6	F7	F7	F7	F7	F7	F7	F7	F7	F7	F8	F8	F8	F8	F8	F8	XMIT	
		M2	M2 C3,4	M2	M3	M3 C3,4	M3	M4	M4 C3,4	M4	M1	M1	M1	M2	M2 C3,4	M2		
		C1,2		C5,6	C1,2		C5,6	C1,2		C5,6	C1,2	C3,4	C5,6	C1,2		5,6		
R4	TPC 7	F8	F8	F8	F8	F8	F8	F9	F9	F9	F9	F9	F9	F9	F9	F9	XMIT	
		M3	M3	M3	M4	M4	M4	M1	M1	M1	M2	M2 C3,4	M2	M3	M3 C3,4	M3		
		C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6		
R4	TPC 8	F9	F9	F9	F10	F10	F10	F10	F10	F10	F10	F10	F10	F10	F10	F10	XMIT	
		M4	M4 C3,4	M4	M1	M1	M1	M2	M2 C3,4	M2	M3	M3 C3,4	M3	M4	M4 C3,4	M4		
		C1,2		C5,6	C1,2	C3,4	C5,6	C1,2		C5,6	C1,2		C5,6	C1,2		C5,6		
R5	TPC 9	F11	F11	F11	F11	F11	F11	F11	F11	F11	F11	F11	XMIT					
		M1C1	M1C3	M2C2	M3C1	M3C3	M4C2	M5C1	M5C3	M6C2	M7C1	M7C3						
		M1C2	M2C1	M2C3	M3C2	M4C1	M4C3	M5C2	M6C1	M6C3	M7C2							

Rack-Crate Layout



Each Line Represents 2 cables





Cable Path Length in Inches



Distances in Inches		Rack 1	Rack 2	Rack 3	Rack 4	Rack 5
Nozzle to Tray Entry	11"					
Tray Entry to Rack Entry	33"					
FT Nozzle 1		99"				
FT Nozzle 2		66"				
FT Nozzle 3		24"	63"			
FT Nozzle 4			21"			
FT Nozzle 5			21"			
FT Nozzle 6				63"		
FT Nozzle 7				21"		
FT Nozzle 8				22"	23"	
FT Nozzle 9					20"	
FT Nozzle 10					62"	
FT Nozzle 11						108"
Tray Base to Rack Bottom	23"					
Rack Bottom to Cards	120"					

* This is an estimate since there are two lengths for the Rack bottom entry to electronics cards depending on the Crate position.



Cable Path Length in Inches



QUOTIENT		=RackBottom2Cards+NozTrayEntry+TrayEntryRackEntry+TrayBase2RackBottom+Noz2Rack1																					
	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
FT1	23	23											FT1	285"									
FT2	26	7	19										FT2	252"	Rack1								
FT3	26		13	13									FT3		210"	249"							
FT4	26			19	7								FT4			207"	207"						
FT5	26				26								FT5				207"						
FT6	26						26						FT6					249"					
FT7	26						7	19					FT7						207"				
FT8	26							13	13				FT8						208"		209"		
FT9	26								19	7			FT9								206"	206"	
FT10	26									26			FT10										248"
FT11	23										23		FT11										
Total Cables		30	32	32	33	33	32	32	33	23													

Distances in Inches	Rack 1	Rack 2	Rack 3	Rack 4	Rack 5
Nozzle to Tray Entry	11"				
Tray Entry to Rack Entry	33"				
FT Nozzle 1	99"				
FT Nozzle 2	66"				
FT Nozzle 3	24"	63"			
FT Nozzle 4		21"			
FT Nozzle 5		21"			
FT Nozzle 6			63"		
FT Nozzle 7			21"		
FT Nozzle 8			22"	23"	
FT Nozzle 9				20"	
FT Nozzle 10				62"	
FT Nozzle 11					108"

Cable Lengths in feet	Rack 1	Rack 2	Rack 3	Rack 4	Rack 5
FT1	24'				
FT2	21'	21'			
FT3		18'	21'		
FT4			17'	17'	
FT5				17'	
FT6					21'
FT7					17'
FT8					17'
FT9					
FT10					17'
FT11					21'

Tray Base to Rack Bottom	23"
Rack Bottom to Cards	120"

Total Cables	30	32	32	33	33	32	32	33
--------------	----	----	----	----	----	----	----	----



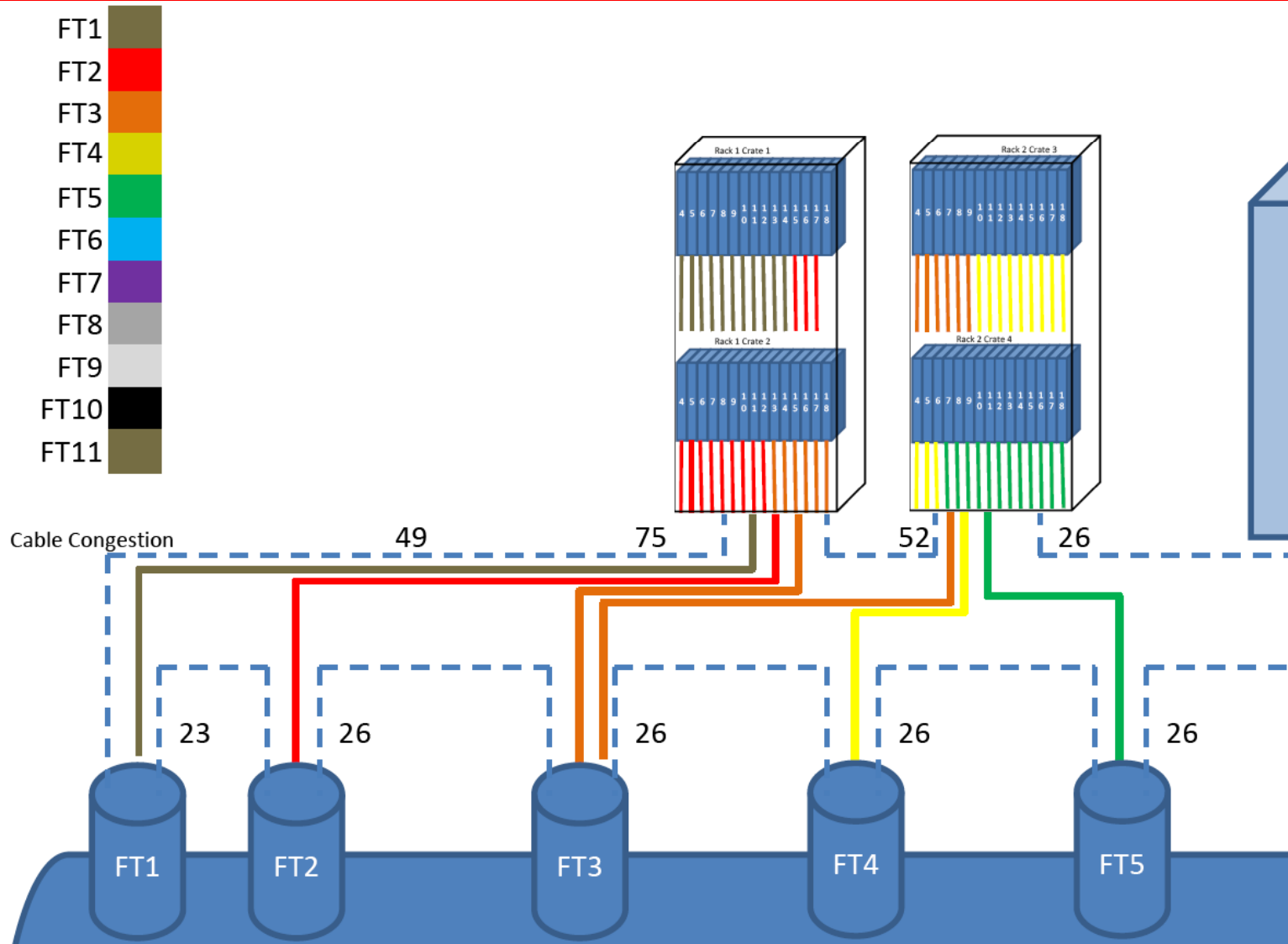
Signal Map Cable Count



		TPC Rack 1		TPC Rack 2		TPC Rack3		TPC Rack4		TPC Rack5
	#Cables	Crate 1	Crate 2	Crate 3	Crate 4	Crate 5	Crate 6	Crate 7	Crate 8	Crate 9
FT1	23	23								
FT2	26	7	19							
FT3	26		13	13						
FT4	26			19	7					
FT5	26				26					
FT6	26					26				
FT7	26					7	19			
FT8	26						13	13		
FT9	26							19	7	
FT10	26								26	
FT11	23									23
Total Cables		30	32	32	33	33	32	32	33	23

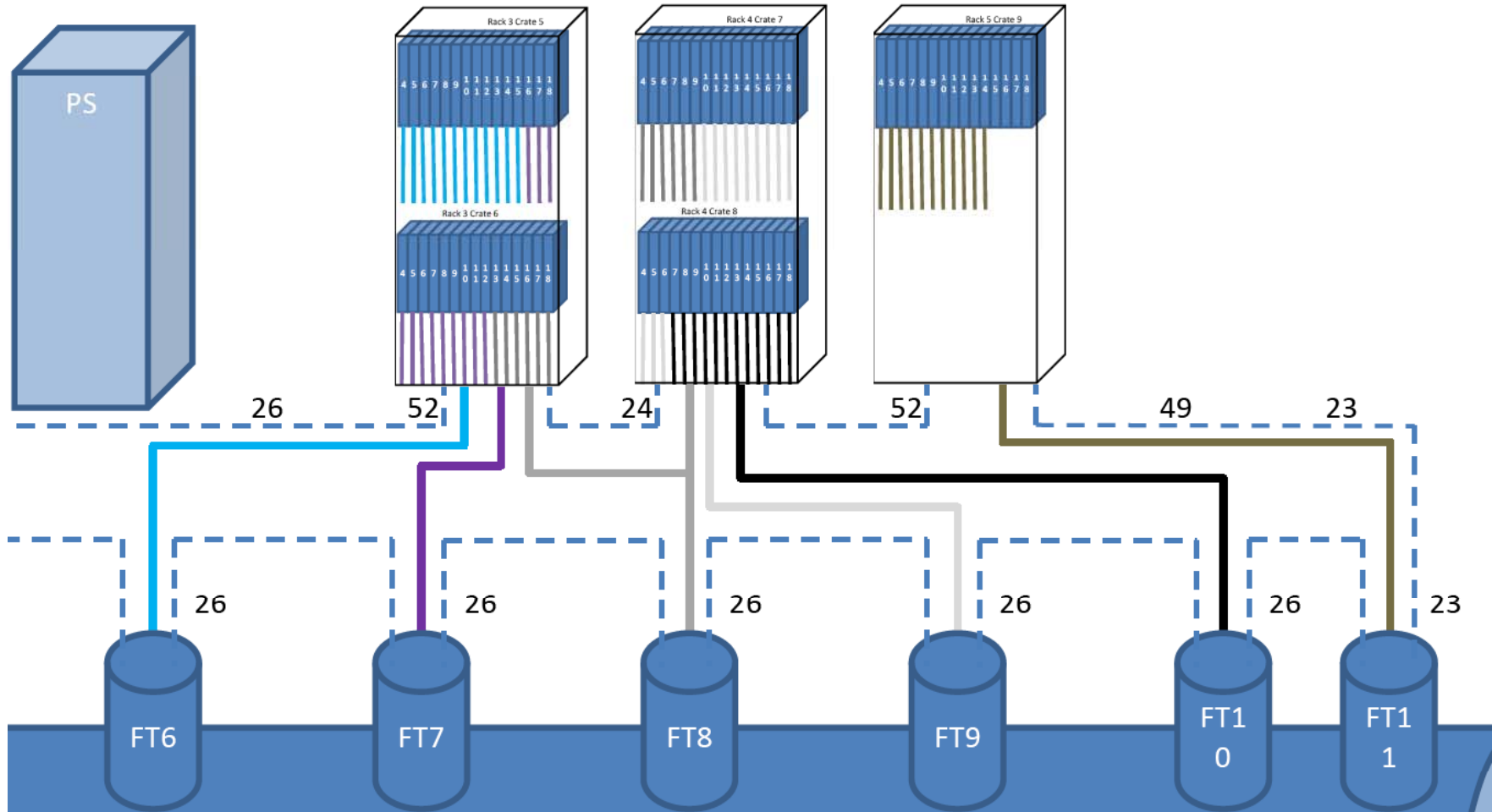
Nozzle FE Cable Map

Detail 1



Nozzle FE Cable Map

Detail 2





Length Distribution



	TPC Rack 1		TPC Rack 2		TPC Rack3		TPC Rack4		TPC Rack5	
FT1	285"									
FT2	252"	252"								
FT3		210"	249"							
FT4			207"	207"						
FT5				207"						
FT6					249"					
FT7					207"	207"				
FT8						208"	209"			
FT9							206"	206"		
FT10								248"		
FT11									294"	

# of Cables	Feet	Meters
52	17.2'	5.24
65	17.3'	5.27
13	17.4'	5.30
13	17.5'	5.34
52	20.7'	6.31
13	20.8'	6.34
26	21.0'	6.40
23	23.7'	7.23
23	24.5'	7.47
280		

	Cable Lengths in feet									
FT1	23.7'									
FT2	21.0'	21.0'								
FT3		17.5'	20.8'							
FT4			17.3'	17.3'						
FT5				17.3'						
FT6					20.7'					
FT7					17.2'	17.2'				
FT8						17.3'	17.4'			
FT9							17.2'	17.2'		
FT10								20.7'		
FT11									24.5'	
Total Cables	30	32	32	33	33	32	32	33	23	



Conclusions



-
-
- All the cables are between 17' (5.2m) and 25' (7.6m)
 - Cables 10m long will work for all locations.