Status of MTA RF Controls and Instrumentation

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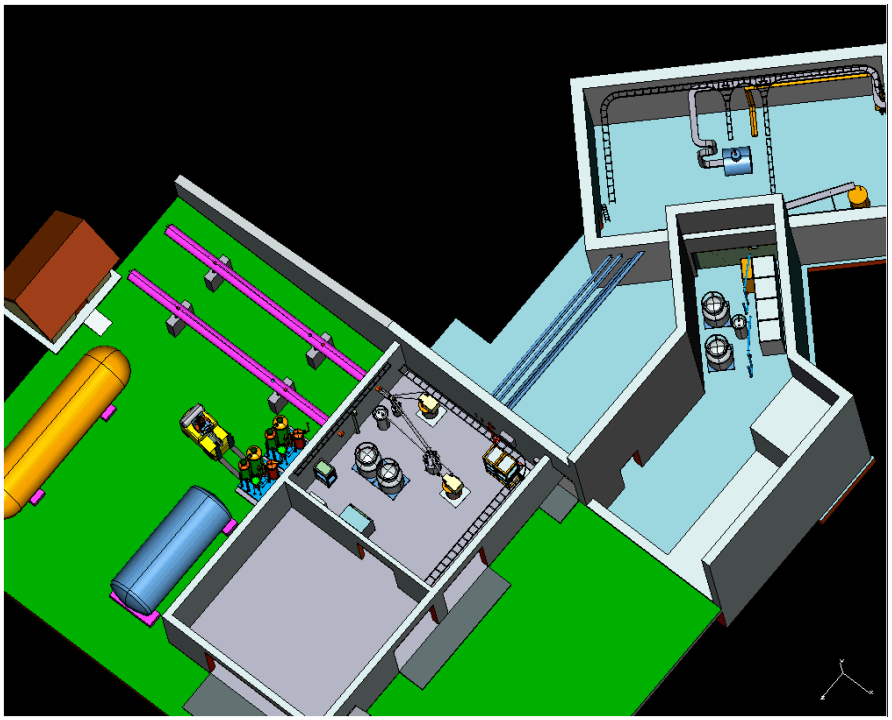
Goals



- Control readout of detectors in MTA Experimental Hall
  - Radiation, microphonics, temperature, …
- Save enough rf-cavity information on a pulse-by-pulse basis to allow meaningful analysis
- Automate cavity conditioning?

Constraints

- Controlled access (2-person) to Experimental Hall
- No room in/access to Refrigerator and Compressor rooms
- Rf controls in Linac gallery, no "control room"

Lots of Cable!

COUNT	CABLE TYPE	FROM	TO	LENGTH	CONN	DESCRIPTION	RATINGS	NOTE
1. CABLES FROM MTA EXPERIMENTAL HALL TO LINAC GALLERY VIA BERM TROUGH (along west wall across center)								
8	Belden 9332	Linac LK8-6	MTA ExpHall east	360		9-pair multiconductor cable absorber diagnostics	PLTC/ITC/CMG	1, 2
4	Optical fiber	Linac LK8-6	MTA ExpHall east	360		50/125u breakout cable L-Com FOB500B2-M absorber diagnostics	OFNP	1, 2
4	1/2 inch heliax	Linac LK8-6	MTA ExpHall center	360	N	rf diagnostics	CATVR	
4	1/2 inch heliax	Linac RF7	MTA ExpHall center	410	N	rf diagnostics	CATVR	
16	1/4 inch heliax	Linac LK8-6	MTA ExpHall center	360	N	rf diagnostics	CATVR	
4	1/4 inch heliax	Linac RF7	MTA ExpHall center	410	N	rf diagnostics	CATVR	
12	RG 58/U green	Linac LK8-6	MTA ExpHall center	360	BNC	rf diagnostics	fire rated	
12	RG 58/U red	Linac LK8-6	MTA ExpHall center	360	SHV	high voltage for rf diagnostics	fire rated	
2	Okonite 261-10-2208	Linac LK8-6	MTA ExpHall	360		8 twisted pair, shielded	ITC/PLTC Class I-Division 2	1
3. CABLES FROM REFRIG. ROOM THROUGH THE MTA EXP. HALL (along south and west walls) AND BERM TROUGH, TO 805MHZ STATION								
1	Optical fiber	Linac LK8-6 through ExpHall 7	MTA RefRm through 7	525	ST	62.5/125 breakout cable GPIB link	OFNP	1
4	RG 59/U	Linac LK8-6 through ExpHall 7	MTA RefRm through 7	525	BNC	Belden 1506A, video	plenum, NFPA262	3
4. CABLES FROM MTA EXPERIMENTAL HALL TO LINAC GALLERY LOWER LEVEL VIA BERM TROUGH								
7	RG 58/U green	Rad Safety MUX Box	MTA ExpHall, ?	300		Radiation safety cables to Linac lower level near blue stairs		4
5. CABLES WITHIN MTA EXPERIMENTAL HALL								
4	500 MCM Cable	MTA ExpHall southwest corner	MTA ExpHall center to magnet	?		braided Cu cable for solenoid power		5

2. CABLES FROM MTA EXPERIMENTAL HALL (southeast corner) TO REFRIGERATION ROOM (northwest corner and north wall)								
4	1/2 inch heliax	RefRm rack through 12	MTA ExpHall center through 12	150	N	rf diagnostics	CATVR	
8	1/4 inch heliax	RefRm rack through 12	MTA ExpHall center through 12	150	N	rf diagnostics	CATVR	
8	RG 58/U green	RefRm rack through 6	MTA ExpHall center through 6	150	BNC	rf diagnostics	fire rated	
8	RG 58/U red	RefRm rack through 7	MTA ExpHall center through 7	150	SHV	high voltage for rf diagnostics	fire rated	
1	Optical fiber	RefRm rack through 7	MTA ExpHall center through 7	150	ST	62.5/125u breakout cable GPIB link	OFNP	1
6	RG 59/U	RefRm rack through 7	MTA ExpHall through 7	150	BNC	Belden 1506A, video	plenum, NFPA262	3
2	Belden 9332	RefRm rack through 7	MTA ExpHall east through 7			9-pair multiconductor cable absorber diagnostics	PLTC/ITC/CMG	1, 2
2	Okonite 261-10-2208	RefRm southeast through 7	MTA ExpHall through 7	180		radiation interlocks 8 pair, shielded	ITC/PLTC Class I-Division 2	1
8	Okonite 284-20-1401	RefRm near Neslab through 6	MTA ExpHall center through 6	150		thermocouple wire single twisted pair	ITC/PLTC Class I-Division 2	1
4	500 MCM Cable	RefRm near Neslab through 5	MTA ExpHall center to magnet through 5	160		braided Cu cable for solenoid power		
8	Okonite 264-10-3301	RefRm near Neslab through 6	MTA ExpHall through 6	150		1 twisted pair, shielded	ITC/PLTC Class I-Division 2	1

Auxiliary DAQ

- Had to be cheap and flexible
- Generic PC
  - Configurable D/A card (for slow signals)
    - 16SE/8Diff channels, 12bit, 50mV-10V full-scale, 8k sample buffer
  - PCI-GPIB controller
    - for instrument control and storage-scope output
    - with GPIB-over-fiber extension
      - 100-150m away from exp. Hall
  - SCSI adapter (for 8mm tape and CAMAC control)
  - Dual-boot (Windows for board calibration, configuration, Linux for everything else)
  - Will add PCI video capture card
- CAMAC crate with
  - SCSI crate controller
  - Interface electronics (Input/output registers, gate/delay generator, discriminator/coincidence register)
  - ADC modules (charge and peak sensing)
  - TDC module
  - 40MHz digitizer (for rf power envelope)

Current Status

- Cabling is mostly complete (not all terminated)
- MTA signals available on ACNET
- Video cameras installed
- Auxiliary DAQ being tested
- Linac crew looking at automated control of cavity voltage for 805 and 201MHz
  - Just ordered GPIB signal generator for modulator voltage control
- Setup ongoing in Linac gallery