Radio Frequency (RF) Systems (LLRF and HPRF)

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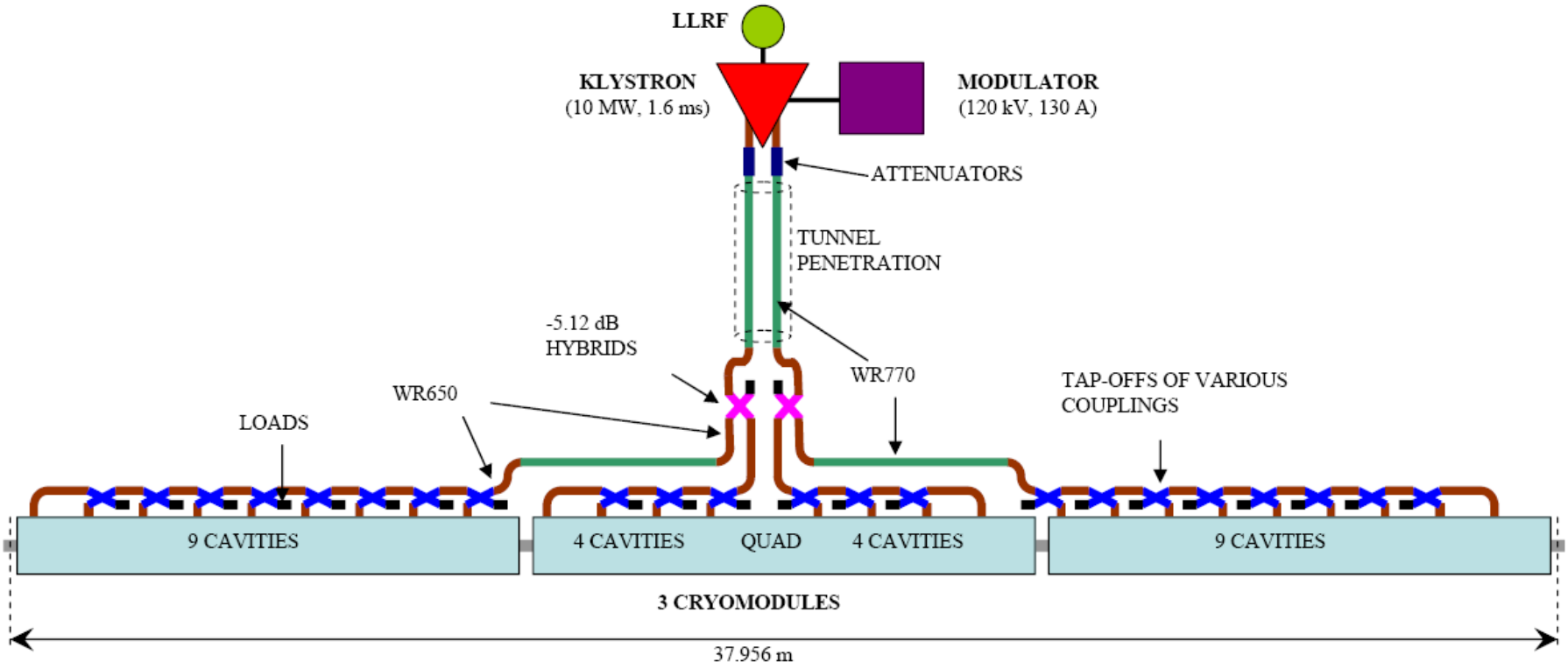
Outline

- RF system overview
- Control Theory
- Low Level RF
  - Requirements
  - Sources of Perturbations
  - Control Concepts
  - RF Control
- High Power RF
  - Klystrons
  - Modulator
  - RF distribution

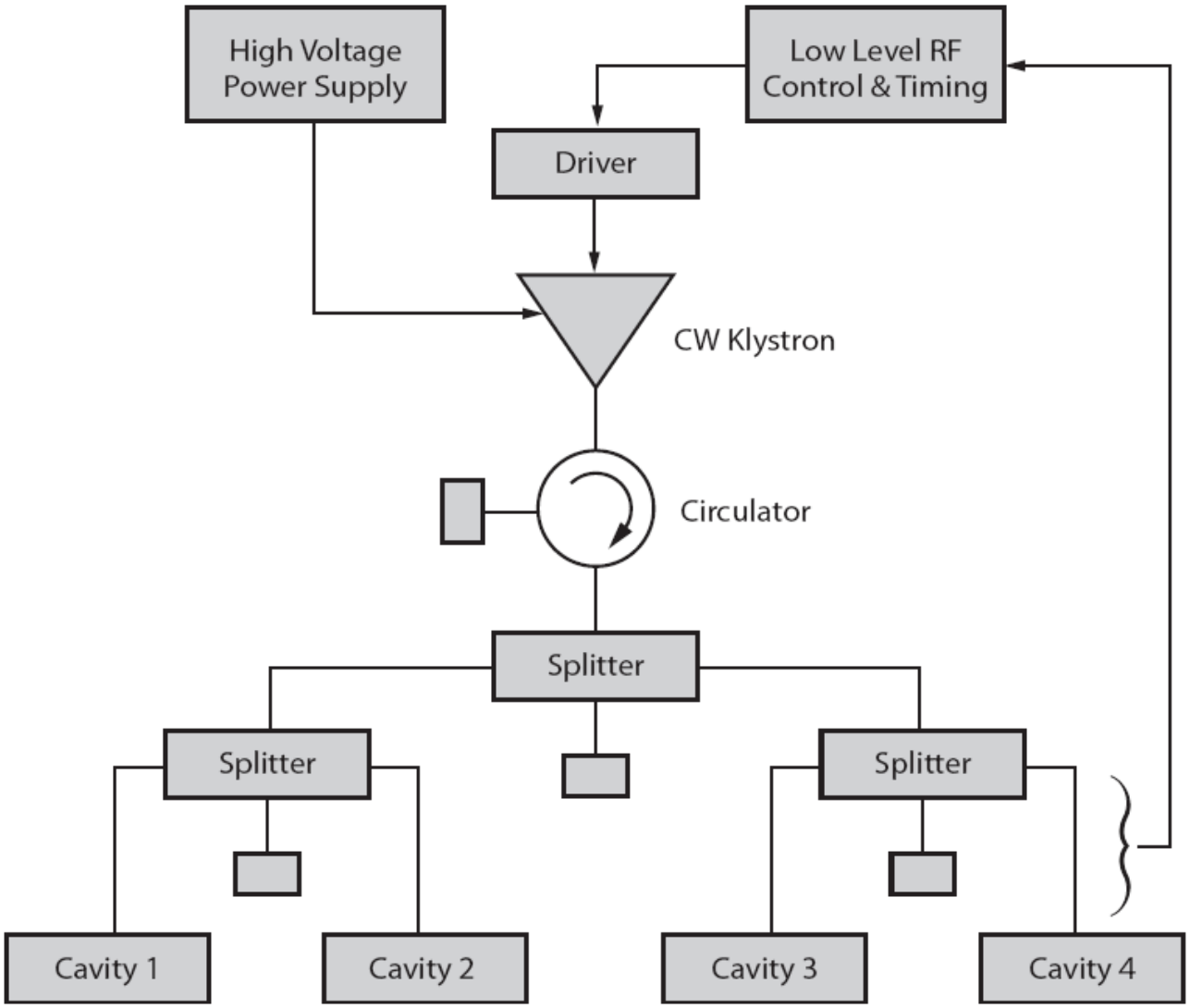
RF Station with Power Distribution



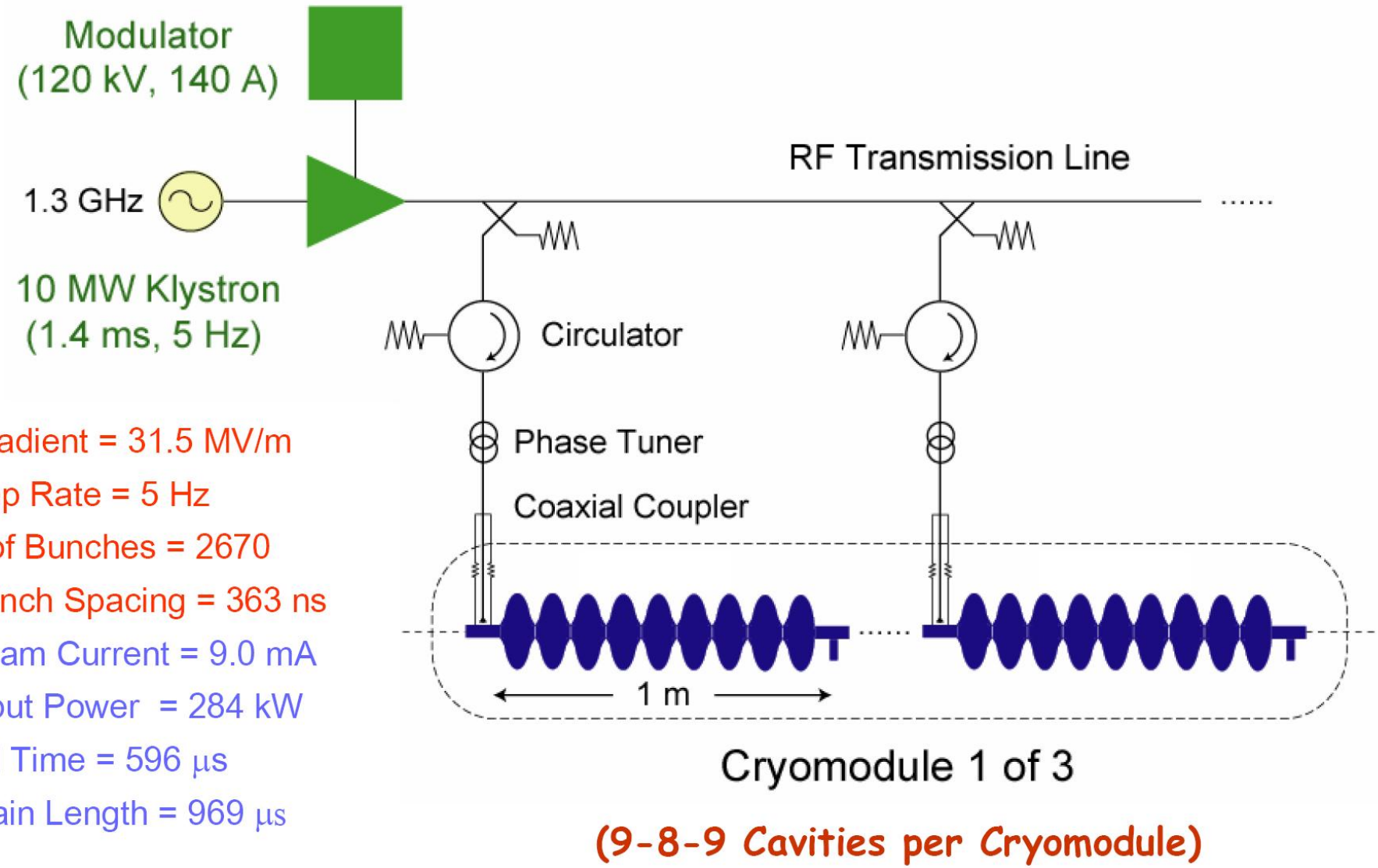
Modulator distribution by type and area.

Modulator type	Total	e^- Inj	e^+ Inj	e^- RTML	e^+ RTML	e^- Linac	e^+ Linac	e^- DR	e^+ DR
10 MW–1.3 GHz–5 Hz	646	13	39	17	17	282	278	0	0
1.2 MW–650 MHz–CW	20	0	0	0	0	0	0	10	10

Schematic for Damping Ring RF Station



ILC RF Unit for Main Linacs (x560)



Gradient = 31.5 MV/m

Rep Rate = 5 Hz

# of Bunches = 2670

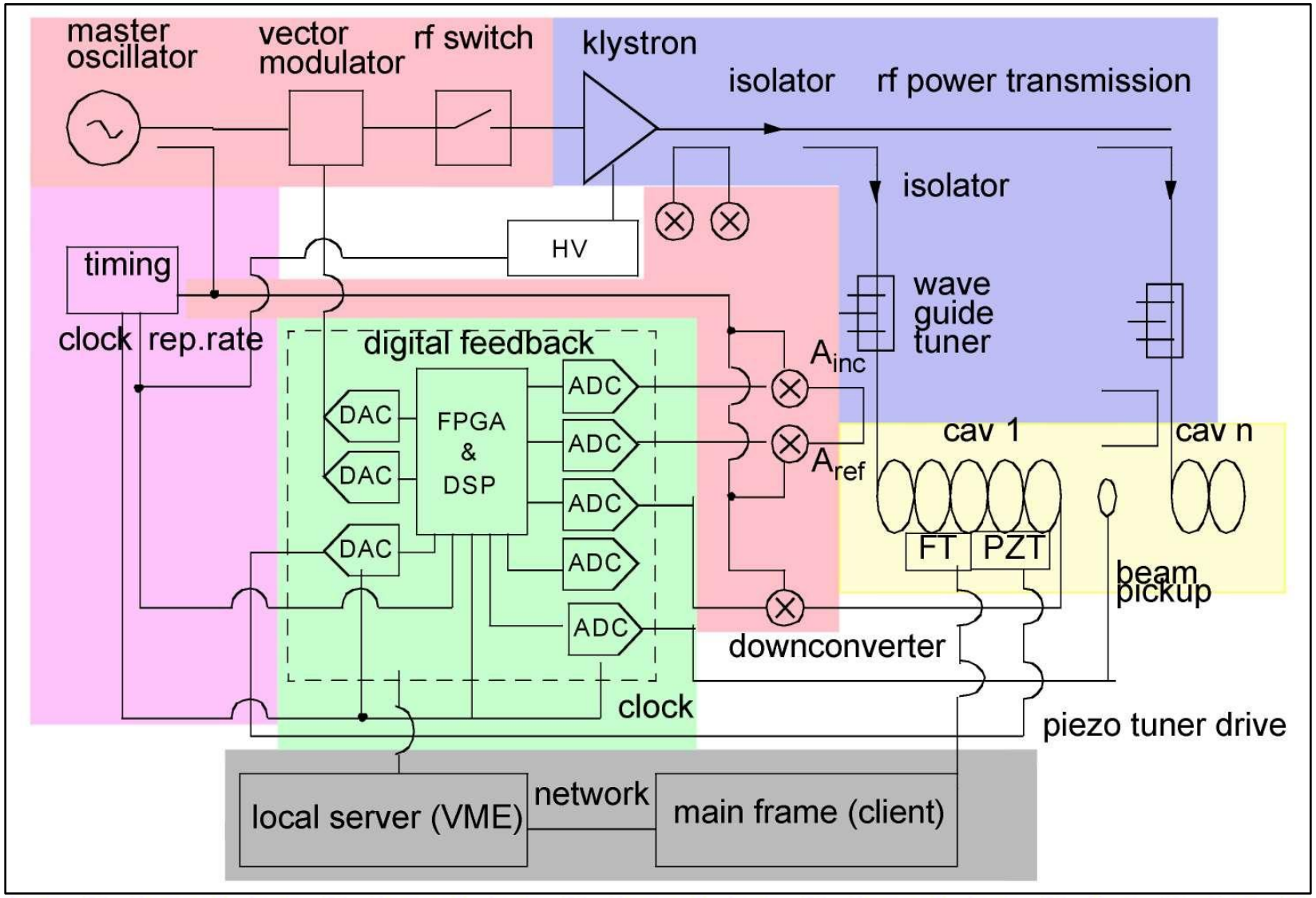
Bunch Spacing = 363 ns

Beam Current = 9.0 mA

Input Power = 284 kW

Fill Time = 596 μs

Train Length = 969 μs

(9-8-9 Cavities per Cryomodule)

Integration LLRF, HPRF, Timing/Synchronization