



# *Radio Frequency (RF) Systems (LLRF and HPRF)*

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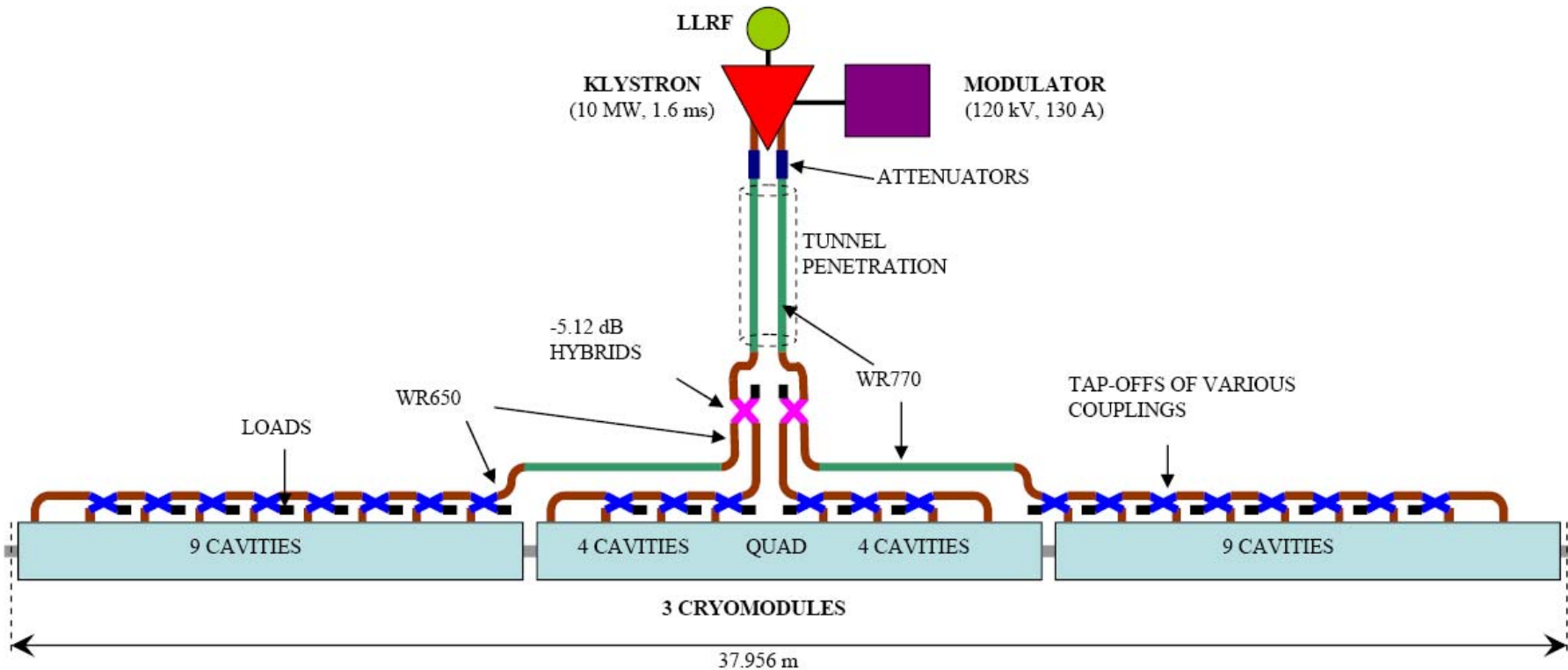


# Outline

- RF system overview
- Low Level RF
  - Requirements
  - Sources of Perturbations
  - Control Concepts
  - RF Control for ILC
- High Power RF
  - Klystrons
  - Modulator
  - RF distribution
- Timing and synchronization



# RF Station with Power Distribution

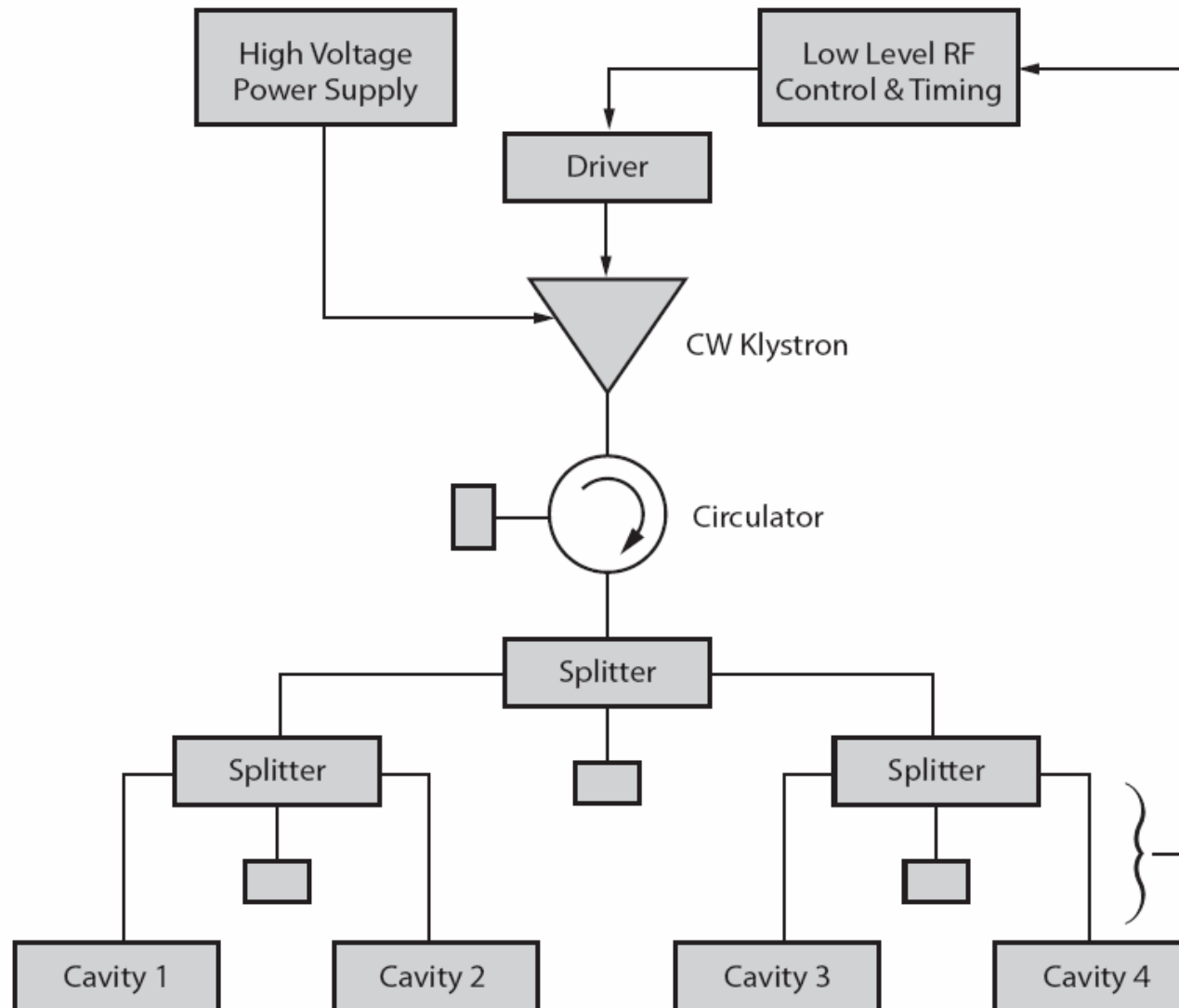


Modulator distribution by type and area.

Modulator type	Total	e <sup>-</sup> Inj	e <sup>+</sup> Inj	e <sup>-</sup> RTML	e <sup>+</sup> RTML	e <sup>-</sup> Linac	e <sup>+</sup> Linac	e <sup>-</sup> DR	e <sup>+</sup> 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

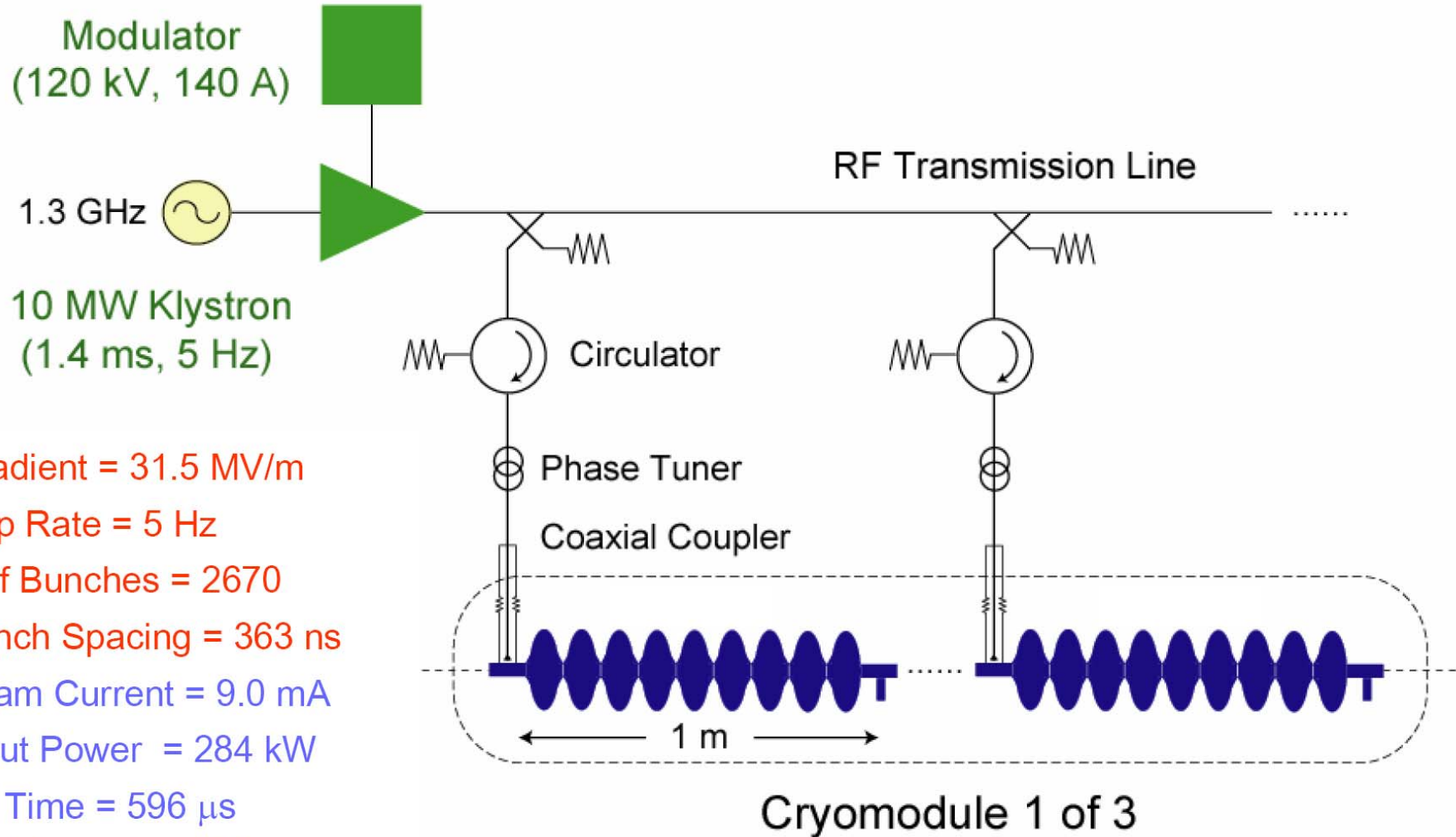


# Schematic for Damping Ring RF Station





# 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  $\mu$ s  
Train Length = 969  $\mu$ s

**(9-8-9 Cavities per Cryomodule)**



# Integration LLRF, HPRF, Timing/Synchronization

