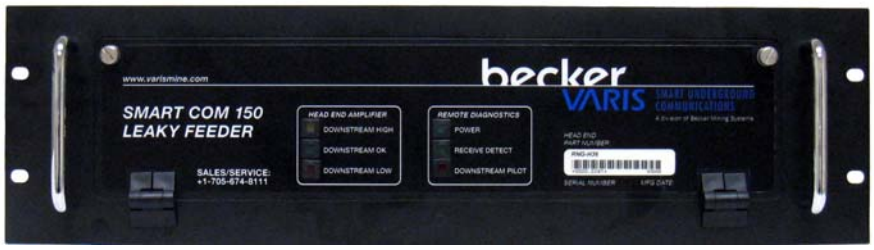
SMART COM 150 HEAD END
RNG-H12, RNG-H36

Varis' Smart Com 150 Head End (HE) is the interface between Base Station equipment such as Repeaters and the Smart Com 150/150IS Leaky Feeder network. Head End units have a pre-amplifier which compensates for the splitting losses in the Head End and performs system Automatic Gain Control (AGC). The Head End unit also injects DC power onto the Leaky Feeder cable to power Smart Com 150 Line amplifiers located near the basestation.



RNG-Hxx Head End

Product Specifications

	12V HEAD END	36V HEAD END
Part Number	RNG-H12	RNG-H36
Physical		
Construction	RNG-Hxx: Rack mount enclosure RNG-RF16: Rack mount panel	
Enclosure	RNG-Hxx: 19" 3U, Steel enclosure RNG-RF16: 19", 3U, Aluminum panel	
Dimensions (W x H x D)	RNG-Hxx: 19 x 5.2 x 14 in (483 x 132 x 356 mm) RNG-RF16: 19 x 5.2 x 1.8 in (483 x 132 x 46 mm)	
Weight (nominal)	RNG-H12: 6.35 kg (14 lbs)	RNG-H36: 7.71 kg (17 lbs) RNG-RF16: 1.35 kg (3 lbs)
Connectors	BR1→ BR4: Three terminal lug connectors RNG-RF16: BNC jack connectors RNG-DRX: BNC jack connectors Head End Amp: BNC jack connector Basestation Power: 16 AWG Bare Lead Wire	
Environmental		
Temperature Range	-20 to +60º C (-4 to +140 ºF)	
Electrical		
Input Voltage	12-14 VDC	
Output Voltage	12-14 VDC	36 VDC
Current Consumption (nominal)	600 mA	1 A
DC Blocking	Jumper select on BR1→BR4	
DC Current Limiting	BR1→BR4 at 2.5 A	
RF Characteristics		
Impedance	BR1→ BR4: 75 ohm Head End Amp: 75 ohm RNG-RF16 Input: 75 ohm RNG-RF16 Outputs (16 Rx/Tx): 50 ohm RNG-DRX Tx, Rx Ports: 50 ohm	
Leaky Cable Types	Varis RNG-500, Varis RNG-501	
Downstream		
Individual Losses/Gains (nominal)	RNG-RF16: 23 dB loss Head End Amp: 10→25 dB gain RF Branch Board: 10 dB loss	
IL Range (nominal)	23 → 8 dB	
Bandwidth (3 dB)	15 MHz	
3 dB Bandpass	145 → 160 MHz	
3rd Order Intermod free Channel Capacity	16 Voice/Data, 8 Video (2 per main branch)	

Ethernet Bandpass	6.0 MHz
Ethernet Center Frequency	153 MHz
DOCSIS 2.0 data rate	54 Mbps
Third Order Intercept (3IP)	+31 dBm
Upstream	
Individual Losses/Gains (nominal)	RNG-RF16: 23 dB loss Head End Amp: 10→19 dB gain RF Branch Board: 10 dB loss
IL Range (nominal)	23 → 14 dB
Bandwidth (3 dB)	15 MHz
3 dB Bandpass	170 → 185 MHz
Ethernet Bandpass	6.4 MHz
DOCSIS 2.0 data rate	41 Mbps
Third Order Intercept (3IP)	+29 dBm
Diagnostics	
Amplifier	
Green LED	Power On, RF Level OK
Red LED	Power On, RF Level Low
Yellow LED	Power On, RF Level High
RF Branch Board	
BR1→BR4, Green LED	DC Power OK
BR1→BR4, Red LED	Branch Shorted
Approvals	
Intrinsic Safety	No
CE Certification	Pending

Installation

- In Intrinsically Safe (IS) systems, the base station must be installed on surface in the Safe Area.
- Non-IS systems can benefit from the Base Station being installed underground as all four Head End branches may be used. This also reduces the requirement for underground power supplies and also provides a form of redundancy. Another benefit of U/G Base Stations is that it reduces the number of amplifiers in cascade and thus the noise floor.
- The Base Station location should be dry, heated and have reliable, clean AC power.
- If the Base Station must be located outdoors, a climate controlled NEMA 4/4X enclosure is required. Cable glands are required to maintain the NEMA rating of the cabinet.
- The Base Station should be placed to provide access to both front and rear doors.
- LF cables can enter the Base Station cabinet through the top of the cabinet or through the access panel on the bottom of the cabinet.
- Run RF coaxial cables and DC power cables on opposite sides of the cabinet.
- Label all cables at both ends.
- Connect all Repeater transmitters to the Tx ports on the RNG-RF16 and all Repeater receiver radios to the Rx ports on the RNG-RF16.
- The transmit power into each Tx port on the RNG-RF16 is limited to +0 dBm max.
- Connect the diagnostic receiver (DRX) using supplied 50 ohm coaxial cables:
  - Connect the Tx port to RNG-RF16 Tx0-16 port.
  - Connect the Rx port to RNG-RF16 Rx0-16 port.
  - Connect Power Leads to +12 VDC supply. Green “Power” LED and Red “Pilot” LED should light.
  - Calibrate downstream pilot level. Refer to Remote Diagnostics Installation Manual for calibration procedure.

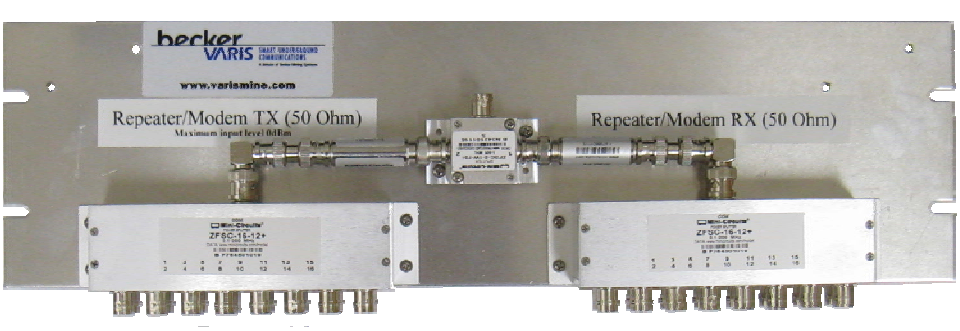
- The head end amplifier AGC works to keep the total Downstream RF power at +9 dBm as the number of active repeaters changes. The Upstream gain is controlled using the manual attenuation switch (IC14) – leave gain control jumper at “AUTO”. The upstream gain can be varied between 10 and 19 dB.

- The first line amplifier must be installed no more than 350 m (1150 ft) away from the head end.

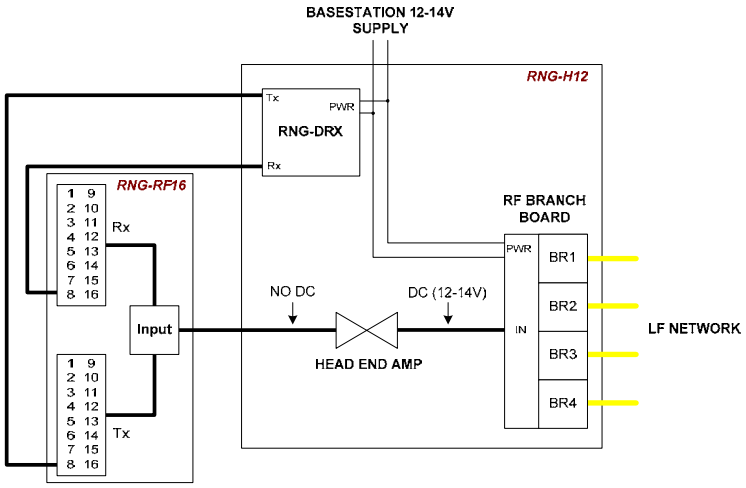
Hardware Overview

- Each head end is shipped with 16-port RF distribution (RNG-RF16), a rack mount server and server mounting hardware.

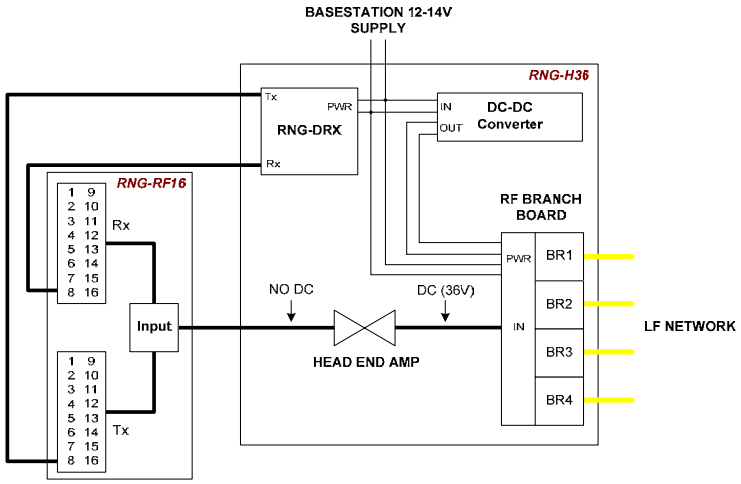
Rack Mount Server



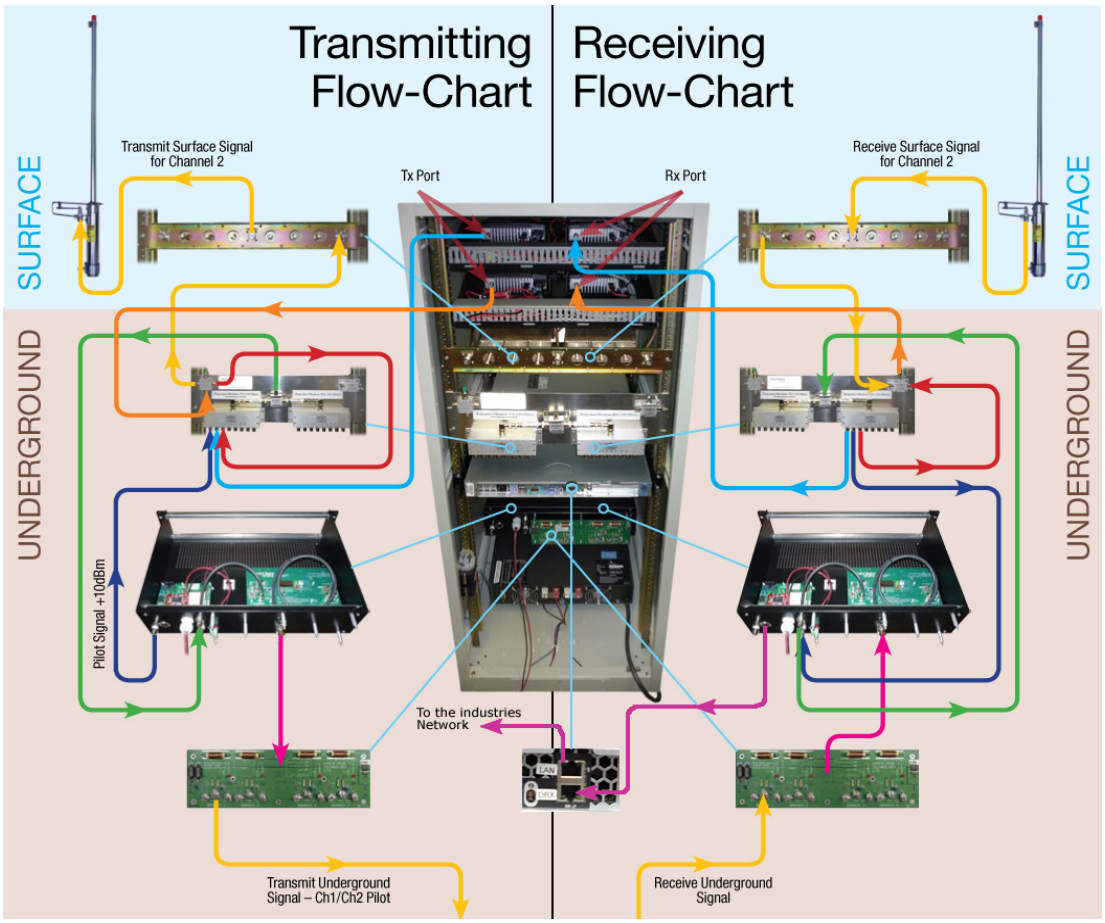
RNG-RF16



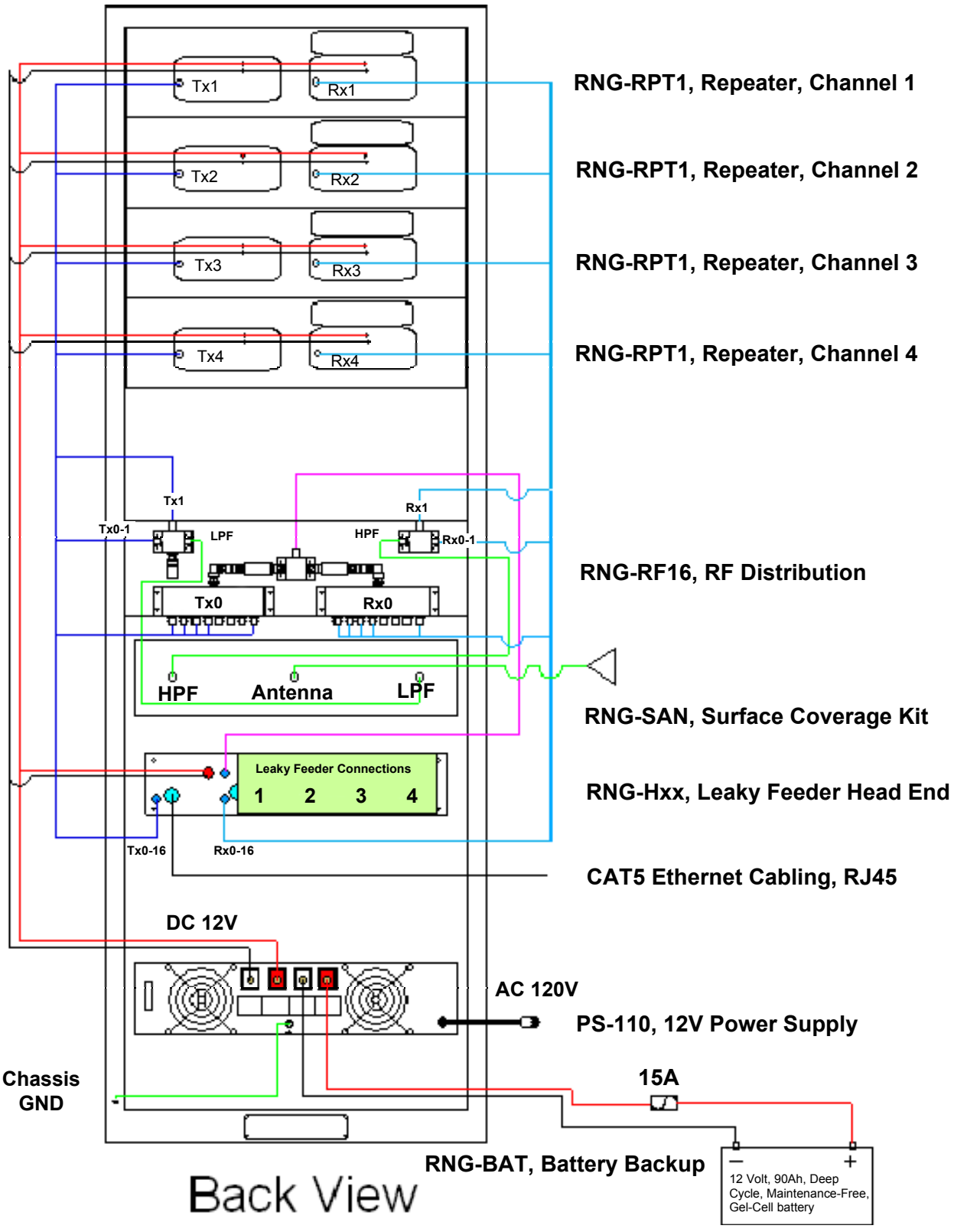
RNG-H12 Head End Wiring



RNG-H36 Head End Wiring



Head End RF Flow



Base Station Wiring Diagram