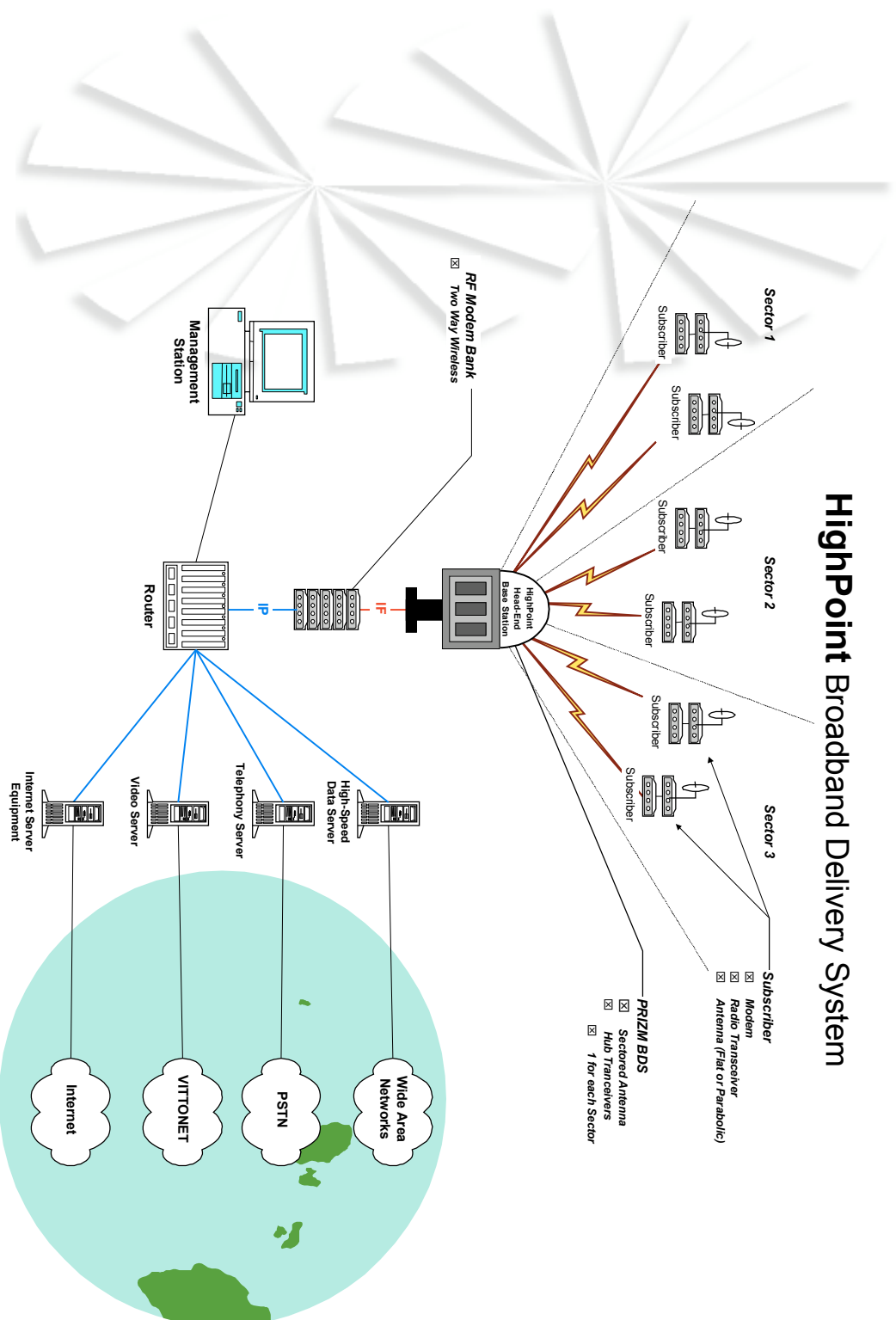


# System Elements

## HighPoint Broadband Delivery System



# System Elements

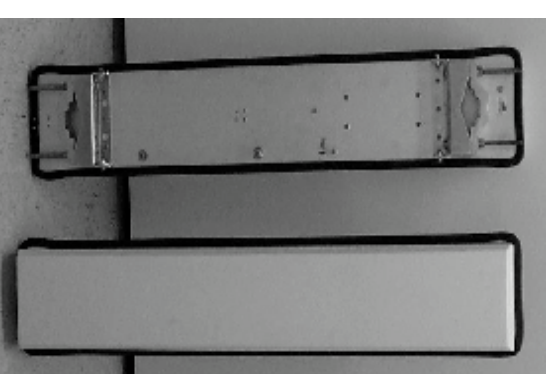
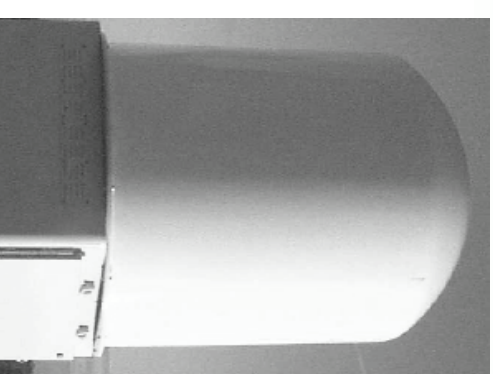
- ▶ Head-end (hub or base-station) Equipment
- ▶ Subscriber Equipment
- ▶ Network Management / Provisioning Server
- ▶ Network Access (router, switch or bridge)

# Base Station Equipment

- Base-station Outdoor Unit (ODU) 24C, 6B
  - Antenna
  - Transceiver(s)
  - Duplexer(s)
- 24C System will support up to 24 sectors in one enclosure, high end system for high subscriber density.
- 6B system has ODU similar to Subscriber but uses 60 or 90 degree antennas.

# Base-station Antenna

- 24C system has a 15 degree coverage antenna and can be provisioned for up to 24 sectors to provide a full 360 degrees of coverage. The antenna is integral to the Base-station cabinet. One antenna feed per transceiver (duplexer required).
- The 6B system uses a 60 or 90 degree panel antenna. Typically separate TX and RX antennas are used with each transceiver. The antennas are mast mounted, small and light weight.



# 24C Outdoor Unit

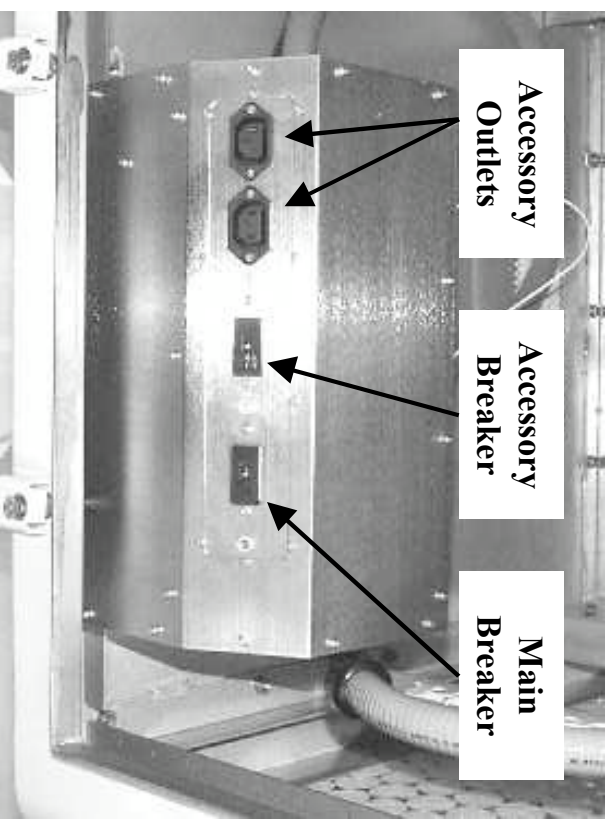
- Major Components of 24C ODU
  - Power Distribution Box
  - Power Supply(s)
  - Card Cage(s)
  - Fan Tray
  - Transceivers
  - Duplexers
  - Hub Antenna
  - Pedestal (optional)



# 24C ODU Power Distribution Box

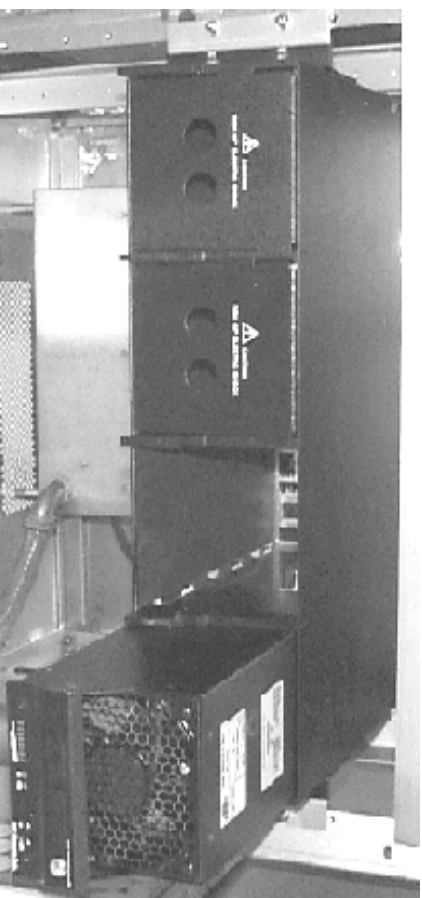
## ➤ AC Distribution Box

- Provides a connection point for the AC service.
- Filters out noise on the AC service.
- Provides a convenient accessory power outlet.
- Contains circuit breakers for main power and the accessory receptacle.



# 24C ODU DC Power Supply

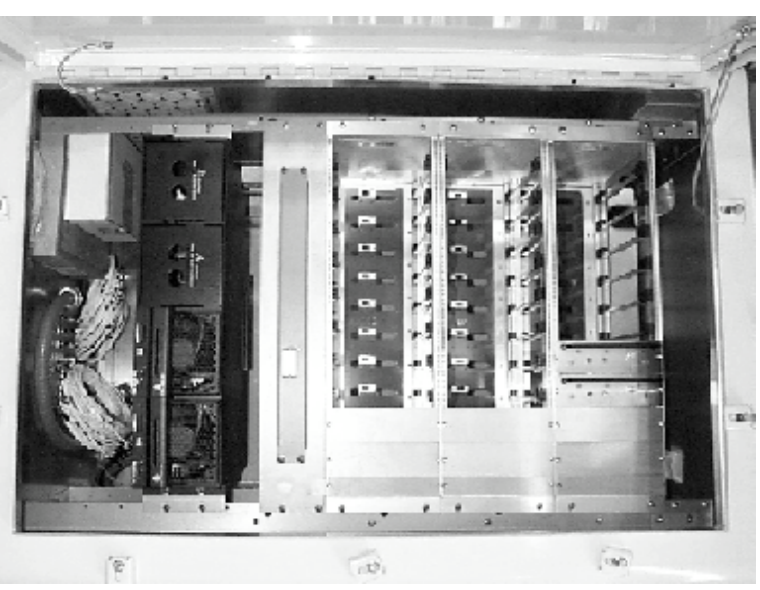
- Consists of a mainframe that will hold up to 4 power supply modules.
- Broad input voltage range 90-264 VAC, 47 to 63 Hz.
- Output is 13.6 VDC @ 100Amps.
- 2 power supplies used for redundancy.





# 24C ODU Equipment Enclosure

- **Mechanical Components of Cabinet**
- The **pedestal** which supports the cabinet and antenna provides a 4 hole flange for securing the base station to its mounting surface. It also provides a convenient cable entry way.
- The **cabinet** contains an **integral rack** which provides a mounting surface for the card cages, power supply and fan tray. The antenna assembly is mounted to the top of the cabinet.
- A **card cage** will hold up to 12 transceivers or duplexers and one controller card. Multiple card cages can be mounted in a cabinet
- The **fan tray** provides air circulation to cool the electronics.



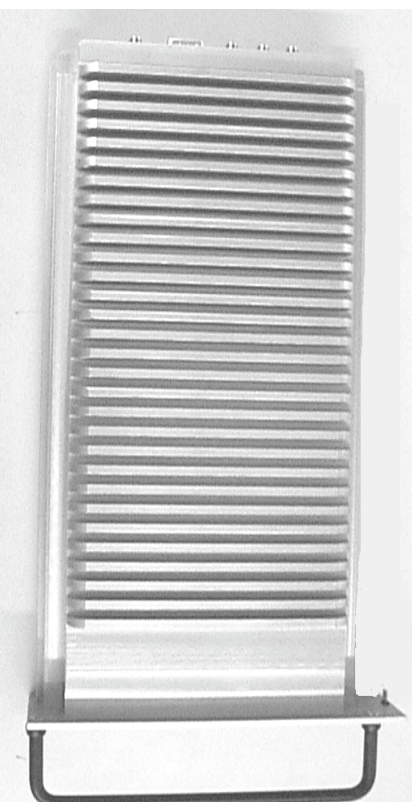


# 6B Hub Transceiver

- ▶ Outdoor, weather proof, mast mounted enclosure
- ▶ DC Power and remote communications are diplexed on to the IF cable, single cable between ODU and IDU.
- ▶ Requires a Bias “T” with indoor transceiver power supply.
- ▶ 2 frequency bands, 2.5 and 3.5 GHz
- ▶ Can use 2 antennas which improves system gain and tuning range, no duplexer limitations.
- ▶ Single antenna option available at 2.5 GHz

# 24C Hub Transceiver

- Designed to mount in 24C Card Cage.
- Rear panel power, IF and RF connections.
- Front panel diagnostic LED and com port.
- Two Frequency Bands- 2.5 GHz, 3.5 GHz.
- 2.5 GHz – option of internal or external duplexer.
- Transceiver tuning range is duplexer dependent.



# Transceiver Features

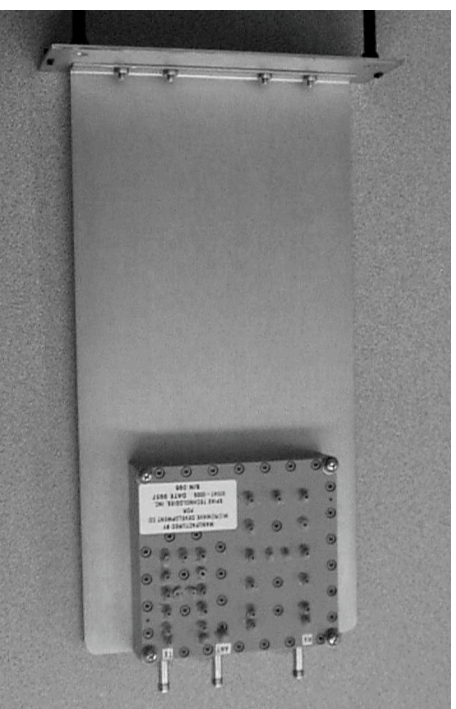
- ▶ Frequency Agile
- ▶ Adjustable TX and RX gain
- ▶ Local & remote diagnostics & configuration
- ▶ Single cable modem connection
- ▶ Diagnostic LED

# Hub Transceiver Connectors

- ▶ TX Output
- ▶ RX Input
- ▶ Antenna (optional internal duplexer)
- ▶ IF
- ▶ Test, serial interface (1/8 stereo phone jack)
- ▶ DC Power (24C only)

# External Duplexer

- Used in the Hub base station
- Purpose is to allow simultaneous transmission and reception on the same antenna.
- Consists of a TX and RX band-pass filter. 3 port device, TX, RX and Antenna.
- Pass-band depends on TX to RX separation
- One duplexer per transceiver

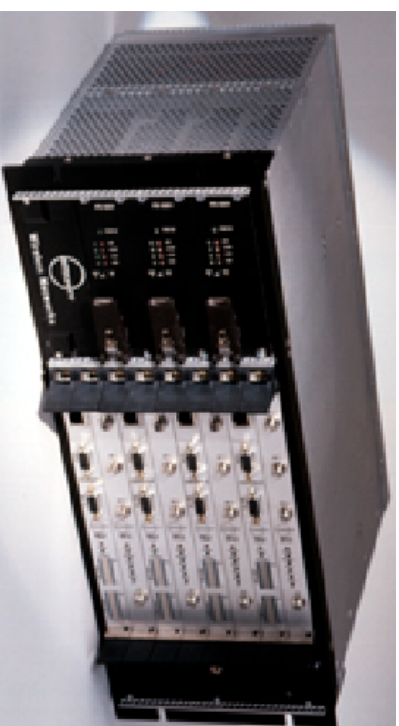


# Head-end Modem

- Consists of a cabinet that can support up to 4 modems.
- A modem is made up of 3 cards.
  - Power Supply Card
  - CPU Card
  - RF Card
- Additionally the head-end modem requires a forward path frequency translator and a diplexer.

# Head-end Modem

- The modem has the following connectors.
  - 100BT Ethernet (RJ45)
  - Console Port, Serial (DB9)
  - Power Input, 90-250 VAC, 47-63 Hz, (IEC-320)
  - Forward Path TX IF, 44 MHz (Type F female)
  - Reverse Path 0-2, (Type F female)





# Head-end Modem

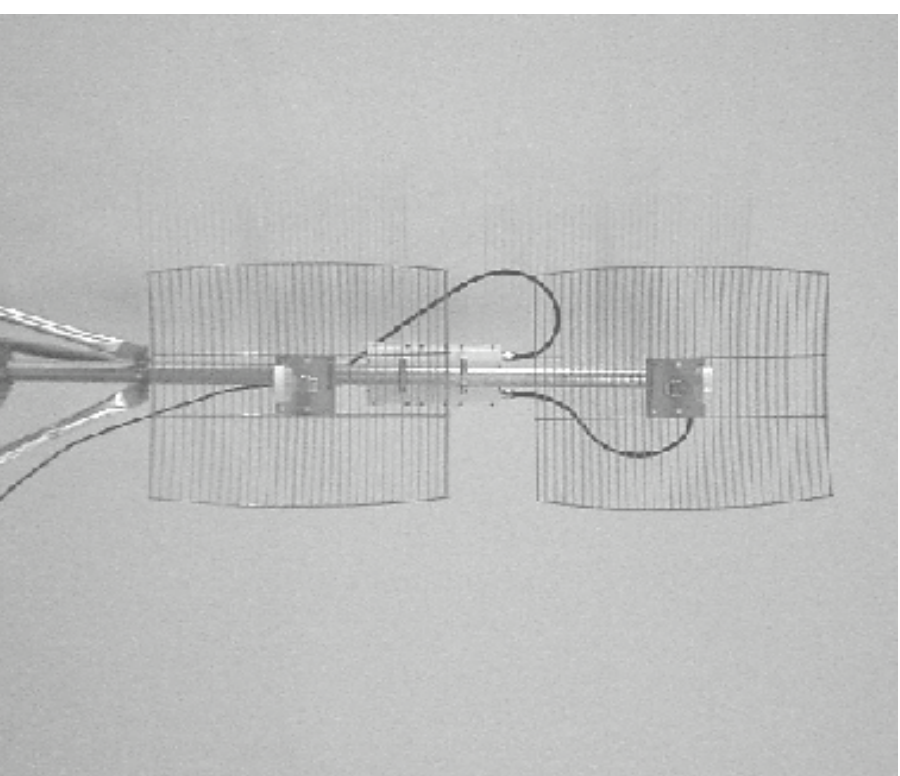
- Visual Indicators are as follows.
  - Forward Path Traffic (10 segment LED)
  - Reverse Path Traffic (10 segment LED)
  - Summary Fault (Red)
  - Forward Path Active (Green)
  - Reverse Path 0-2 Active (Green)



# Head-end Modem Features

- Up to 22 Mbit/s downstream throughput
- Up to 4.9 Mbit/s upstream throughput per channel
- Bridging for up to 4096 work stations
- Support up to 100 subscribers per carrier
- SNMP management
- Over the air firmware upgrades
- User controllable parameters
- Forward error correction

# Subscriber Equipment

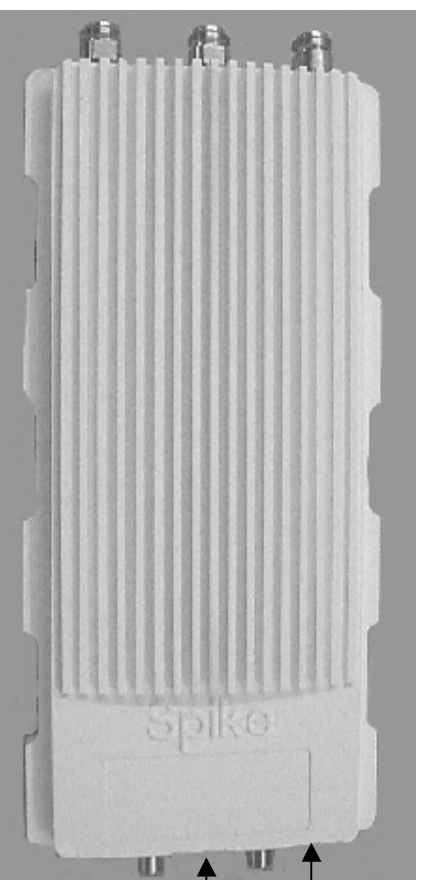


# Sub Transceiver

- ▶ Outdoor, weather proof, mast mounted enclosure.
- ▶ DC Power and remote communications are diplexed on to the IF cable, single cable between ODU and IDU.
- ▶ 2 frequency bands, 2.5 and 3.5 GHz.
- ▶ Can use 2 antennas which improves system gain and tuning range, no duplexer limitations.
- ▶ Single antenna option available at 2.5 GHz.

# Sub Transceiver Connectors

- TX Output (N female)
- RX Input (N female)
- Antenna (N female) optional int. duplexer
- IF/DC Power (F female)
- Test, serial interface (1/8 stereo phone jack)



Status Indicator

IF Port

Ext. Ref. Not used

Craft Interface Port

Arrows point from the labels to the corresponding ports on the right side of the transceiver.

# Sub Modem Features

- Built in bridging for up to 15 work stations
- SNMP management
- Over the air software upgrades
- Data rate up to 9.6 Mbit/s DS, 4.6 Mbit/s US
- User controllable parameters
- Forward error correction
- Compact, low cost



# Sub Modem Connectors

- Console Port (DB-9)
- IF Port (F female)
- 10BT Ethernet (RJ45)
- Power Input, 90-250 VAC, 47-63 Hz (IEC)





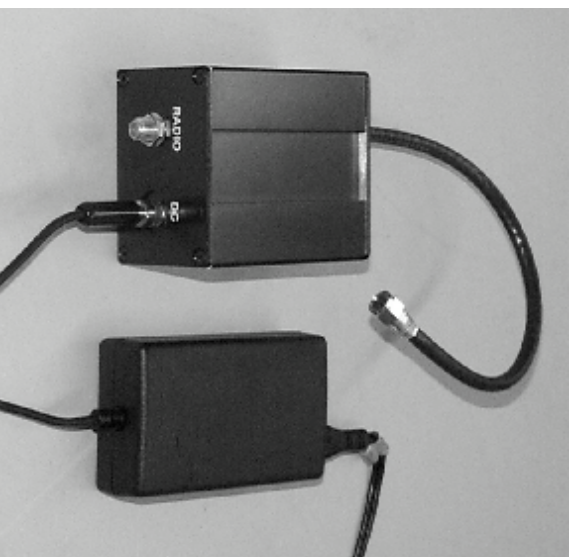
# Sub Modern Visual Indicators

- Power (Green)
- Ethernet Activity (Green)
- TX (Yellow)
- RX (Yellow)
- Fault (Red)
- Ready (Green)
- Sync (Green)



# Bias “T”

- Combines the TX/RX IF with DC power and the communications channel (used for remote configuration and diagnostics on the transceiver).
- Contains circuitry for communications with the transceiver.



# Bias “T” Ports

- ▶ “Modem” modem connects to this port (F female) flexible cable attached.
- ▶ “Radio” transceiver connects to this port (F female) DC power on this connector be careful when connecting test equipment.
- ▶ “DC” transceiver power supply connection (3.5 MM).
- ▶ “Comm” serial interface (1/8 inch stereo female).