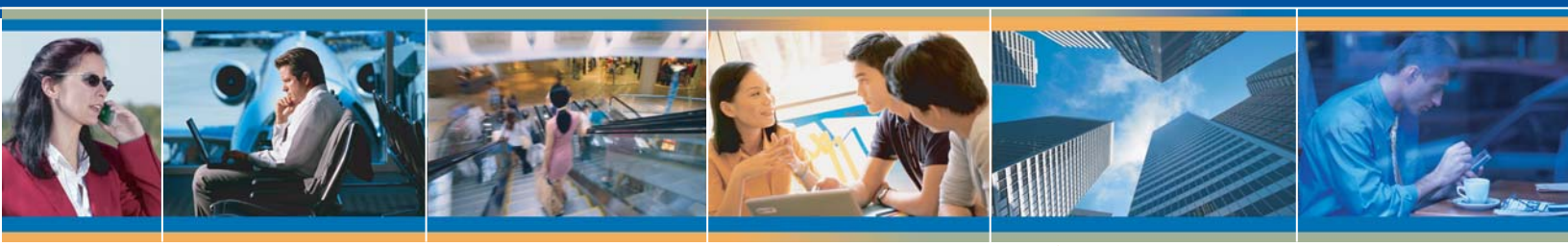
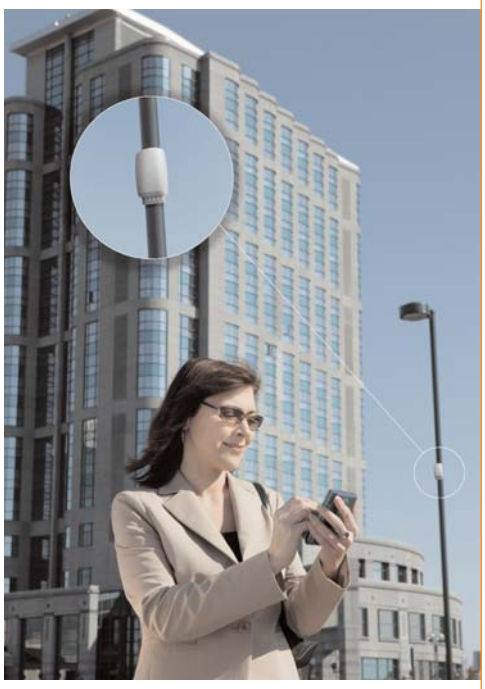
BelAir NETWORKS

BelAir100



Wireless Internetworking Node For Mesh Edge and Mesh Termination Applications



The BelAir100 is a two-radio, wireless internetworking node that can be deployed outdoors to provide Wi-Fi coverage in nearby buildings or over large outdoor areas. The BelAir100 can operate as a standalone device, or participate in a BelAir Networks multiple point-to-point mesh as an edge node or to terminate the mesh where the full functionality of the four-radio BelAir200 is not required.

More compact, simpler and lower cost than the BelAir200, the BelAir100 uses the same radio modules and management framework as the larger platform. It also delivers the same wide-area Wi-Fi access coverage for standalone private buildings. The typical configuration for the BelAir100 includes one Access Radio Module (ARM) in the 2.4 GHz band and one Backhaul Radio Module (BRM) in the 5 GHz band. Antennas for these radio modules are integrated into the enclosure.

Public and Private Network Applications

As part of the complete BelAir Networks wireless networking solution, the BelAir100 allows network operators to quickly and easily build networks for public Internet access applications such as:

- E-mail
- Web surfing
- Instant messaging
- Corporate VPN access

FEATURES AND BENEFITS

- **Two radio, modular platform for wireless networking.**
- **Integrates Wi-Fi access and wireless backhaul.**
- **Implements patented multiple point-to-point cellular LAN architecture.**
- **Ideal for covering isolated buildings or as an edge node in BelAir Networks wireless mesh.**
- **Compact, environmentally hardened, outdoor enclosure.**
- **Easily mounted on light poles, buildings or indoors.**
- **Uses same radio modules and management framework as BelAir200.**
- **Eliminates disruptive, in-building network deployment.**
- **Reduces T1, DSL and other backhaul costs.**

It can also be used for closed and private wireless applications such as:

- Corporate VPNs
- Security and surveillance
- Operations and maintenance messaging and tracking
- Essential service messaging, tracking and file sharing for police, health, fire, and other emergency response units

These applications can be provided for:

- **Hot Zones**
  - Hotels, conference and convention centers, and resorts
  - Office buildings and corporate campuses
  - Manufacturing centers and research parks
  - University and college campuses
  - Airports, train stations and bus terminals
  - Large warehouses and shipping yards
  - Construction sites
  - Apartment buildings
  - Shopping malls
  - Complex shaped buildings
  - Heritage buildings
- **Metro Zones**
  - Urban centers
  - Municipal offices
  - Recreation areas
  - Business districts and office parks
  - Transportation corridors
- **Hot Spots**
  - Coffee shops
  - Book stores
  - Restaurants

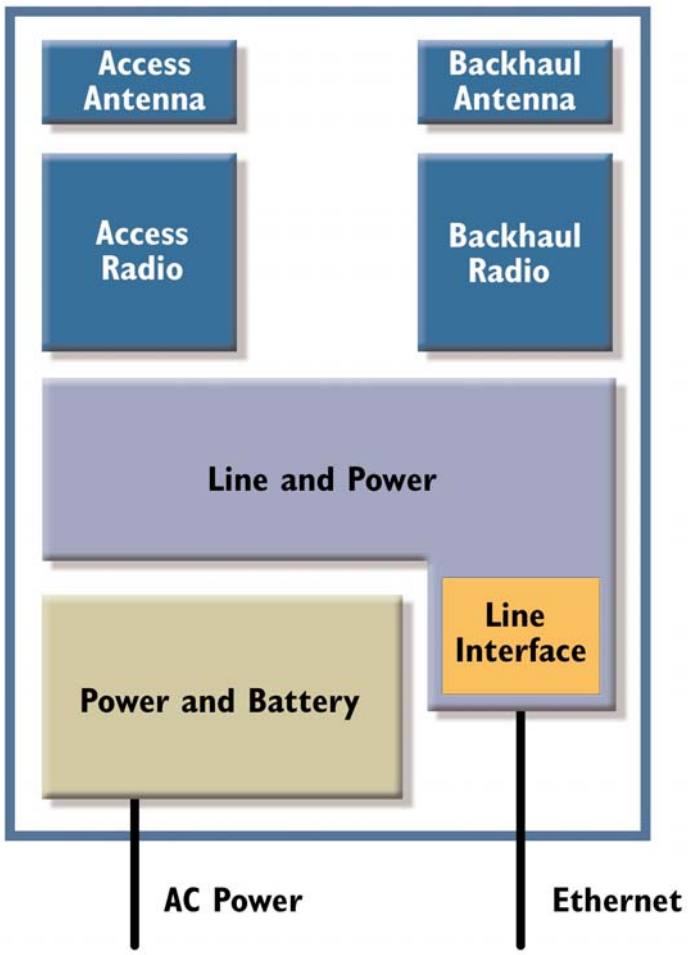
Compact, Integrated, Modular Platform

The modular BelAir100 features a rugged outdoor enclosure, brackets for pole mounting or wall mounting, a 10/100 Mbps Ethernet port, one 2.4 GHz access antenna and one 5 GHz backhaul antenna. Each unit can be ordered with up to two radio modules and is available in multiple configurations. Standard on all BelAir100s are a backup power supply and a high-performance network processing core complete with an open embedded software environment.

The software provides operator-class, network level operation, administration and maintenance (OAM) capabilities and a wealth of security, mobility, and management services.

A typical BelAir100 configuration will include one Access Radio Module and one Backhaul Radio Module using the integral antennas.

The Access Radio Module includes a high power, enhanced 2.4 GHz radio and custom antenna. These are optimized to beam Wi-Fi signals into a building from outside to provide coverage to multiple floors at once.



Typical BelAir100 Configuration

The Backhaul Radio Module operates in the 5 GHz band and is used to form a secure point-to-point wireless link in the patented BelAir Networks mesh architecture. Each BelAir100 can connect to other BelAir100s or multiple BelAir200s, with the combined connections forming a wireless mesh.

For outdoor deployments, the BelAir100 can be mounted directly on light poles in parking lots or on city streets, or readily attached to the side or roof of a building. For indoor applications, it can be mounted directly on a wall and project a 5 GHz backhaul link to other BelAir units outside the building or provide Wi-Fi access to clients indoors. Installation can be completed by one person, in one trip.

Carrier Grade Wireless Mesh Networking

The BelAir100 is designed for quick deployment as part of the patented BelAir Networks multiple point-to-point mesh architecture. This carrier grade mesh is the first to integrate wireless access and backhaul. It is designed to simplify WLAN infrastructures and eliminate the crippling T1 and DSL backhaul costs that have so far stifled the deployment of economical large-scale WLAN networks. It also substantially reduces installation costs and eliminates disruptive in-building deployments for single building applications.

There are no extra switches, routers or cables required to connect multiple BelAir Networks platforms in a BelAir Networks mesh. The fully meshed backbone provides carrier-class network level redundancy to ensure service availability without operator intervention. It also makes interconnecting BelAir Networks platforms much simpler and more cost-effective than conventional point-to-point mesh architectures.

Simple, Effective, Carrier Grade Wireless Networks

As part of the complete BelAir Networks wireless internetworking solution, the BelAir100 enables the creation of large carrier grade WLANs. It simplifies network deployment, gives service providers more flexibility in the design of their networks and extends the functionality of the BelAir Networks multiple point-to-point wireless mesh.

The BelAir100's modular two-radio design allows for multiple configurations for public Internet access and private wireless network applications. This design allows the BelAir100 to go beyond providing basic Wi-Fi access to deliver low-cost, wireless networking without limits for service providers, enterprises, and users.

Specifications

Access Radio

Performance Enhanced 802.11b

Frequency Band (Rx/Tx)	2.4 to 2.4835 GHz	ISM Band
Supported Data Rates	1, 2, 5.5, 11 Mbps	Radios automatically select best data rate
Average Transmit Power	27 dBm	
Transmit Power Control	8 steps over 20dB range	
Receive Sensitivity	-83dBm @ 11 Mbps -94dBm @ 1 Mbps	
Antenna	Internal	
Antenna Panel Azimuth Coverage (3 dB point)	65°	Dual slant linear polarized diversity antenna
Antenna Panel Elevation Coverage (3 dB point)	65°	
Elevation Tilt	9°	Up tilt Optional mounting bracket available to change tilt.
Antenna Panel Gain	8 dBi	Along bore-sight
External Antenna	Optional	2 N-type connectors for diversity

Future upgrade to 802.11g

Backhaul Radio

Optimized for mesh Point-to-Point operation

Frequency Band (Rx/Tx)	5.25 to 5.35 GHz, 5.725 to 5.825GHz	U-NII2 and U-NII3 bands. Radios also support frequencies in between for future expansion
Supported Data Rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps	Radios automatically select best data rate
Average Transmit Power	12 dBm at 54 Mbps 17 dBm at 6 Mbps	
Transmit Power Control	8 steps over 15 dB	
Receive Sensitivity	-69 dBm @ 54 Mbps -90 dBm @ 6 Mbps	
Antenna	Internal	
Antenna Azimuth Coverage	60°	±30° 3 dB point from bore-sight
Antenna Azimuth Positions	-45°, 0°, +45°	3 antenna positions provide total of 150° azimuth coverage
Antenna Elevation Coverage	45°	±22.5° 3 dB point from bore-sight
Elevation Tilt	0°	
Antenna Panel Gain	10.5 dBi	Along bore-sight
External Antenna	Optional	N-type connector

Line Interfaces

Electrical Interface	10/100 Base-TX Compliant to IEEE 802.3 CSMA/CD 10/100 autosense	Fast Ethernet with lightning protection IEC 60000-4-5 level 4 surge
Optical Interface (Option replaces Electrical interface)	100 Base-FX, 1310nm Tx/Rx, 15 km Intermediate reach, Class 1	Dual LC fiber interface with environmental NEMA4 sealing gland and optional 50 or 100m optical pigtail

Layer 2 Support

802.1Q VLAN Support	Transparent VLAN pass-through
Class of Service	4 priority classes
Packet Filtering	Upstream and downstream Configurable MAC address filtering
Authentication Based VLANs	VLAN allocation based on 802.1x (port, MAC address) Multiple VLANS supported

Security (Fully WPA compliant)

Authentication	802.1x EAP – TLS (RFC 2716) EAP – MD5 PEAP
Encryption	WEP 64 and 128 bit RC4 (24 bit IV) TKIP / MIC per 802.1x

Accounting

RADIUS Accounting	RFC 2866

Mobility

Layer 2	802.11f IAPP including authentication security context transfer

Device Management and Other Protocols

Monitoring and MIBs	
MIB-II	RFC 1213
SNMPv2 MIB	RFC 3418
802.11 MIB	IEEE 802.11 - 1999
802.1x MIB	IEEE 802.1x - 2001
Ethernet-like MIB	RFC 2665
Interface Group MIB	RFC 2863
Interfaces	
Command Line	Familiar Command Line Interface
Web GUI	HTTP and HTTPS
SNMP	v1 / v2 RFC 3416, 3417
SSHv2	IETF Draft
Access	
	Locally via RJ45 connection or optional 100 BASE FX optical interface Locally via access radio Remotely via backhaul interface to NOC
Firmware Upgrade	TFTP over access or backhaul links Support for automatic rollback on download failure
Other Protocols	
SNTP	RFC 2030
ICMP	RFC 792
HTTP	RFC 2616
ARP	RFC 826
TCP	RFC 793
UDP	RFC 768
Telnet	RFC 854
TFTP	RFC 1350
IP	RFC 791

Environmental, Physical and Regulatory

Operating Temperature Range	-40°C to +50°C	
Storage Temperature Range	-40°C to +60°C	
Operating Humidity	5 to 95%	Non-condensing at 40°C
Typical Power Consumption	30 Watts	All radios active and transmitting at 50% duty cycle, Ambient Temp > 5°C, Battery charging
Power Supply	95 to 264 V ac 47-63 Hz	110/220V nominal, 60/50Hz
Battery Voltage	8V	Nominal voltage, Sealed Lead Acid
Battery Backup time	15 minutes	At 25°C
Outdoor Plant	UL50 (C22.2 No 94-M91) NEMA IP56 Rating	Unit operates under wet and dusty conditions
Size	12" height, 6" depth	
Weight	10 lbs	Including battery
Mounting	Wall or pole mounting kits	
Safety	CAN/CSA-C22.2 No 60950-1, ANSI/UL Std No. 60950-1	
Laser Safety	Class 1 Laser Product Complies with 21CFR 1040 and IEC60825	
RF Safety	FCC OET Bulletin 65 Health Canada Safety Code 6	Compliant with FCC Guidelines
EMI	FCC 47 CFR Part 15, Subpart B	Meets Class B
Radio	FCC Part 15 Industry Canada RSS210, Issue 5	

BelAir NETWORKS

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