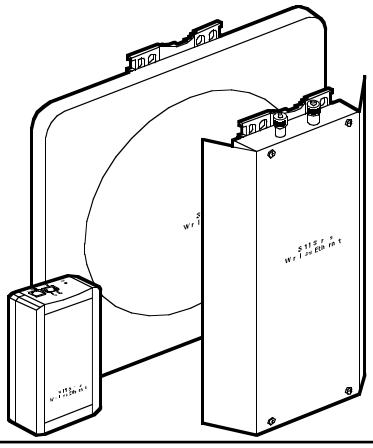
BLACK BOX®
NETWORK SERVICES

DS 11 SERIES WIRELESS ETHERNET



Link multiple remote sites to a central server in wireless point-to-point or point-to-multipoint applications.

Key Features

- ***Supports up to 24 kilometers (U.S. and Canada) at 11 Mbps.***
- ***Ideal for bridging segments within campuses or any remote sites.***
- ***Uses Direct Sequence Spread Spectrum radio.***
- ***IEEE 802.11b and 802.3 compatible.***
- ***Transparent to 802.1q VLANs.***
- ***Management GUI included. Supports SNMP.***
- ***Integrated and external antenna options.***
- ***Align antennas with 10-LED bar.***

The BLACK BOX® DS 11 Series Wireless Ethernet Base Units and Remote Bridges offer you an easy way to connect LANs in distant buildings at speeds nearly as fast as what you'd expect with wired Ethernet.

Ideal for applications where it's either impractical or impossible to run cabling, the DS 11 Series units have features designed specially for outdoor applications.

The DS 11 units comply with both FCC and ETSI regulations for wireless point-to-point and point-to-multipoint communications in the unlicensed 2.4-GHz ISM band. The base units and bridges comply with IEEE 802.11b HR standards, are completely interoperable with other 802.11b-compliant products, and operate at air interface speeds of 11 Mbps.

What's more, the DS 11 units use RC4 40-bit key Wired Equivalent Privacy (WEP) encryption and are Wi-Fi compliant and IEEE 802.3 compatible.

The DS 11 products feature an indoor/outdoor architecture with a baseband interface. The system's indoor LAN interface/power supply unit supplies power and data connectivity to an outdoor unit, which contains the baseband interface and the front-end radio. This way, you don't need to use expensive, high-loss RF cables and the units can transmit up to 25 kilometers (15.5 mi.) in U.S. and Canadian applications and up to 10 kilometers (6.2 mi.) in U.K. and ETSI applications. These wireless distances are made possible by the DS 11's dynamic output power range for transmitting in all regulatory domains.

Choosing your wireless solution depends on where you plan to use it (in the U.S., Canada, the U.K., or Europe) and the number of points in your LAN application. We suggest you speak with one of our Tech Support experts before ordering. Black Box offers on-site professional installation services for these and other components.

All DS 11 configurations, at the very least, are comprised of a DS 11 Series Base Unit and a Remote Bridge. The base unit connects directly to a 10BASE-T network and acts as the central site in a point-to-multipoint network or is situated at one end of a link in a point-to-point application. The remote bridge connects an individual remote LAN to a central server site and can handle a network with up to 1024 stations. Up to 128 remote bridges can be connected to a single base unit at the same time to form a single wireless LAN.

Base units and remote bridges each come with an indoor LAN interface/power supply unit and an outdoor unit, which is available with an integrated antenna or with an RF connection that's used to link to an optional external antenna. No matter which antenna you choose (integrated or detachable external), you can count on high-quality reception.

The maximum cable length between the outdoor and the LAN interface unit is 280 feet (85.3 m). Because these units connect at baseband frequencies, you can use low-cost UTP cable.

DS 11 Series units also come with a user-friendly configuration and management utility. The base unit has a 10-LED Radio Signal Strength Indicator (RSSI) bar display that you use for easy antenna alignment.

Technically Speaking

The DS 11 Series products can be used in point-to-point or point-to-multipoint configurations. By default, the units automatically select the highest possible rate for transmission—11 Mbps. But, if you want range instead of speed, you can also manually adjust the units to operate at 2 or 5.5 Mbps. The default operative range is set at 5 kilometers, which can be changed by adjusting the acknowledge delay time.

Up to three base units and remote bridges can be co-located on the same building top or tower (the exact number depends on the regulatory domain). Each unit is assigned to one of the non-overlapping channels: 1, 6, or 11 for U.S. and Canadian models; or 1, 7, or 13 for U.K. and ETSI models.

The DS 11 Series Wireless Ethernet Base Unit is an IEEE 802.11b-compliant base station bridge that's used to connect either a single remote site or multiple remote sites to a central server or Internet connection. In a multipoint configuration, it serves as the central unit; in a point-to-point configuration, it must be installed at one end of the link.

Up to 1024 network MAC addresses can be learned by the base unit from the LAN side. You can order the base unit with an antenna integrated on the front cover of its outdoor unit (with the front cover also serving as a protective sun cover) or with no integral antenna.

If you choose the latter, its outdoor unit comes with two antenna connectors, which enable you to connect one or two external antennas (ordered separately).

In one possible installation scheme, the outdoor unit (with or without an external antenna) can be mounted on a pole using the supplied brackets, with the unit's ground cable properly strung to the building's grounding point.

The indoor unit can be wall-mounted, and you would use a straight Ethernet 10BASE-T cable to connect it to a hub. Or you can use a crossed cable to connect it directly to a PC's network interface card (NIC).

The outdoor unit connects to the indoor LAN interface/power supply unit via the baseband cable that's shipped with the package. This cable, which provides a pin-to-pin connection on both ends, is supplied open-ended so you can conveniently route it into the waterproof seal of the outdoor unit and through holes in walls. If you require a longer length, order the DS 11 Series Indoor/Outdoor CAT5 Cable (LW2050A/LW2090A).

The DS 11 Series Wireless Ethernet Remote Bridge connects a remote Ethernet network to a base unit located at a central server or Internet site. It, too, can handle up to 1024 MAC addresses from the LAN side.

When a station on the Ethernet LAN sends a message that's not destined for a local station, the remote bridge wirelessly forwards the message to the base unit. Conversely, when the base unit receives a message destined for a station on the remote bridge's LAN, the base unit wireless forwards it to to the remote bridge.

As with the base unit, the remote bridge can be ordered with or without an integral antenna and can be mounted the same way. The model without an integral antenna has antenna connectors on its outdoor unit for connecting an external antenna.

Antenna options

You may want to use external antennas instead of units with integrated flat-panel antennas. But we ask that you call Tech Support first to discuss which antennas best fit your application requirements and the antennas currently available.

For instance, in applications where you might not expect multipath propagation, a single antenna may be enough to do the job. However, in situations where multipath propagation exists, we recommend using two antennas to take advantage of the DS 11 Series space diversity feature. By using two antennas per unit, your system can select the best antenna on a per-packet basis (every several milliseconds).

Antennas also have varying levels of gain. If you order high-gain antennas, which have a narrow beamwidth, you'll have to go through an alignment procedure to optimize the connected link. But you can easily do this using the RSSI bar on the remote bridge's bottom panel.

Configuration utility

To ease setting up base units and remote bridges, the units come with a graphical configuration utility that operates on any Windows® based, network-ready PC.

With this utility, you can configure, control, and monitor every DS 11 device on your network from a single location.

In addition to verifying the status of all wireless network units, you can use the utility to:

- Assign radio channels for optimal cell operation
- Configure units with a specified IP address
- Set the SNMP read/write community strings
- Select antennas
- Configure a wide range of operational parameters, including wireless LAN, IP, and security parameters
- View transmit (Tx) and receive (Rx) counters
- Obtain general information, such as the firmware version and system name.

Because the configuration utility is SNMP based, you can use the DS 11 SNMP MIB on standard management platforms (like SNMPc and HP® OpenView®) so you have a consistent view of your wireless network.

The DSL 11 products are interoperable with other IEEE 802.11b-compatible, 2.4-GHz direct-sequence products and are compatible with the following standards:

- IEEE 802.11b Wireless LAN
- IEEE 802.3 10BASE-T Ethernet
- IEEE 802.1Q and 802.1P virtual LAN transparent
- DHCP for automatic IP address assignment
- SNMP for system management.

Precautions

- DS 11 Series products cannot be used with the BLACK BOX® Pro 11 Series Wireless Ethernet line or its accessories because the voltage isn't the same between families.
- Detached antennas, whether installed indoors or out, should be installed ONLY by experienced antenna-installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities.

Packages Include

Base units and remote bridges:

- LAN interface/power supply unit
- Outdoor unit with or without integrated antenna
- Pole mounting kit for outdoor unit, including (2) brackets and (4) sets of screws, nuts, and washers
- Power cord
- (1) 20-m (65.6-ft.) baseband cable for connecting LAN interface unit and outdoor unit
- (3) shielded RJ-45 connectors*
- Sun cover with screws (LW2007A and LW2003A models only)
- Configuration software utility

*NOTE: Crimp tool and die sets are required.

Specifications

Compliance: EMC: FCC Part 15 for 2.4-GHz wireless products, EN 300-385;
Safety: UL® 1950, EN 60950;
Environmental: ETS 300 019, Bellcore GR-63-CORE;
Wireless LAN: IEEE 802.11b HR, ETSI ETS 300 328; Wi-Fi compliant

Distance (Maximum):
U.S., Canada models: 25 km (15.5 mi.);
U.K., ETSI models: 10 km (6.2 mi.)

Humidity Tolerance: 5% to 95%

Integrated Antenna Type:
LW2001A, LW2005A: Flat panel 16 dBi, 20° vertical/horizontal

Management: SNMP-based enhanced (Windows® 95/98, Windows NT®, Windows 2000) configuration utility with integrated site-survey tool; SNMP agents (MIB II, bridge MIB, DS 11 private MIBs); software agents for simultaneous multi-unit software upgrade using configuration utility and TFTP download

Processing Gain: 10.4 dB nominal

Radio Channels:
U.S., Canada models: 11;
U.K., ETSI models: 13

Radio Frequency Range:
2.4–2.4835-GHz ISM band

Radio Output Power (Maximum):
U.S., Canada models: 24 dBm;
U.K., ETSI models: 14 dBm

Radio Type: Direct Sequence Spread Spectrum (DSSS)

Security: 40-bit WEP authentication, data encryption

Sensitivity: (BER IE10-6)
11 Mbps: -85 dBm, 256 CCK modulation; 5.5 Mbps: -88 dBm, 16 CCK modulation; 2 Mbps: -90 dBm; DQPSK modulation; 1 Mbps: -93 dBm, DBPSK modulation

Temperature Tolerance:
Outdoor units: -40 to +131°F (-40 to +55°C);
LAN interface/power supply units: 32 to 104°F (0 to 40°C)

Connectors: RF (antenna) connector on outdoor units: N-type jack (lightning protected);
Baseband: Outdoor units: Shielded RJ-45 with special waterproof sealed cap; Indoor units: Shielded RJ-45;
Ethernet: 10BASE-T (RJ-45)

Indicators: Outdoor unit: RSSI bar; (3) LEDs: WLAN (wireless link indicator), DC Power (self-test and power indicator); ETH (Ethernet activity/connectivity indicator);
Indoor units: (2) LEDs: Power (power indicator); LINK (self-test and remote link indication)

Power: U.S., Canada models: 110 VAC
U.K., ETSI models: 220 VAC (power cords adapted to country requirements)

Size: LAN interface/power supply units: 6.1"H x 3.3"W x 2.2"D (15.5 x 8.4 x 5.6 cm);
LW2001A, LW2005A outdoor units: 11.8"H x 11.8"W x 2.8"D (30 x 30 x 7.1 cm);
LW2003A, LW2007A outdoor units: 12"H x 4.7"W x 2"D (30.5 x 11.9 x 5.1 cm)

Black Box offers the best warranty program in the industry—Fido Protection®. For more information, request **FaxBack 22512**.

Ordering Information

ITEM	CODE
First, order your base unit and remote bridge(s)…	
For U.S. (FCC) applications:	
DS 11 Series Base Unit with Integrated 16-dBi Antenna	LW2005A-US
DS 11 Series Base Unit for Use with Detached Antenna	LW2007A-US
DS 11 Series Remote Bridge with Integrated 16-dBi Antenna	LW2001A-US
DS 11 Series Remote Bridge for Use with Detached Antenna	LW2003A-US
For Canadian applications:	
DS 11 Series Base Unit with Integrated 16-dBi Antenna	LW2005A-CA
DS 11 Series Base Unit for Use with Detached Antenna	LW2007A-CA
DS 11 Series Remote Bridge with Integrated 16-dBi Antenna	LW2001A-CA
DS 11 Series Remote Bridge for Use with Detached Antenna	LW2003A-CA
For U.K. applications:	
DS 11 Series Base Unit with Integrated 16-dBi Antenna	LW2005A-UK
DS 11 Series Base Unit for Use with Detached Antenna	LW2007A-UK
DS 11 Series Remote Bridge with Integrated 16-dBi Antenna	LW2001A-UK
DS 11 Series Remote Bridge for Use with Detached Antenna	LW2003A-UK
For European (ETSI) applications:	
DS 11 Series Base Unit with Integrated 16-dBi Antenna	LW2005A-EU
DS 11 Series Base Unit for Use with Detached Antenna	LW2007A-EU
DS 11 Series Remote Bridge with Integrated 16-dBi Antenna	LW2001A-EU
DS 11 Series Remote Bridge for Use with Detached Antenna	LW2003A-EU
You may also need:	
8-dBi Omnidirectional Antenna	LW0029-R3
24-dBi Directional Antenna	LW013-R2
For links between the LAN interface/power supply units and the outdoor units, order:	
DS 11 Series Indoor/Outdoor CAT5 Cable, 50-m (164-ft.)	LW2050A
Shielded Ethernet Connectors, 10-Pack	LW2022A
Modular Crimp Tool (Frame Only)	FTM40
Die Sets (for RJ-45 Connectors)	FTM50

If you want to use external antenna(s) with your base units and remote bridges, call Tech Support.