Installation and Operation Manual

PowerMax™ DA4KSBR-50U

60 dB Gain Dual Band

Wireless Amplifier/Repeater System

Read Instruction before installing!
If you do not understand instructions,
seek professional installation.

DIGITAL ANTENNA

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INSTALLATION AND OPERATION MANUAL Model #DA4KSBR-50U

For answers to *Frequently Asked Questions* visit www.DigitalAntenna.com

IMPORTANT

Read instructions completely before attempting install!

1. Package Contents

Part Number	Description
DA4000SBR	Dual Band Wireless Cellular Amplifier/Repeater
288-PB	Outside omni-directional 9dB gain dual band cell antenna
135-RD	Inside omni-directional dual band cell antenna with stand & 18" cable
DP515	12 VDC to 5 VDC power cable
DP255	110-240 VAC to 5 VDC power supply
DA340-50NM	50' **PowerMax**™ ULTRA low loss cable
DH288	Stainless steel mounting hardware: qty 2 U-bolts, nuts, washers; qty 4 philips head screws

2. Important Safety Information

The DA4000SBR system complies with all FCC, IC, UL rules, regulations and codes. Follow all guidelines in the installation and instruction manual and read completely before beginning the installation procedure. Do not deviate or disregard any of the safety features included in the manual or with the equipment, nor operate the system in an unintended application.

WARNING!
Only Digital Antenna authorized products may be used with the DA4000SBR system. Using unauthorized equipment with the DA4000SBR system will harm the system, voids the warranty and can be detected in the event of a failure.

WARNING!
Do not install antenna near power lines. Contact with any high voltage power lines could result in shock or loss of life.

WARNING!
Handle all electronic parts with care. Dropping or mishandling the DA4000SBR amplifier/repeater, antennas or power supplies can damage sensitive RF and electronic components.

a. LIMITED WARRANTY

Digital Antenna, Inc. warrants marine antennas for five (5) years and cellular antennas and amplifiers for one (1) year that its Products sold hereunder will at the time of shipment be free from defects in material and workmanship and will conform to Digital Antenna's applicable specifications or, if appropriate, to Customer's specifications previously accepted by Digital Antenna in writing.

If products sold hereunder are not as warranted, Digital Antenna shall, at its option either refund the purchase price, or repair or replace the product, provided proof of purchase and written notice of nonconformance are received by Digital Antenna within five (5) or one (1) years of date of purchase and provided said nonconforming Products are, with Digital Antenna's written authorization, returned in protected shipping containers. Digital Antenna will pay for transporting the repaired or exchanged product to Customer.

This warranty shall not apply to any Products Digital Antenna determined to have been, by Customer otherwise, subjected to mishandling, misuse, neglect, improper testing, repair alteration, damage, assembly or processing that alters physical or electrical properties.

b. LIMITATION ON LIABILITY

In no event shall Digital Antenna, Inc. Be liable for any direct, indirect, special, punitive, incidental, exemplary or consequential damages, or any damages whatsoever, even if Digital Antenna, Inc. Has been previously advised of the possibility of such damages, whether in an action under contract, negligence, or any other theory, arising out of or in connection with the use, inability to use, or performance of the information, services, products, and materials available from this manual. These limitations shall apply notwithstanding any failure of essential purpose of any limited remedy. Because some jurisdictions do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of liability for consequential or incidental damages, the above limitations may not apply to you.

c. FCC REGULATIONS

FCC ID: PZODA4000SBR

This equipment has been tested and found to comply with the limits for a class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications, However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or other electronic reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect to isolated power with a ground cable going directly to the battery, DC source or house ground
- Repositioning of the coaxial cable may also eliminate interference
- Consult the dealer or an experienced electronics technician for help.

Warning: Changes or modifications not expressly approved by Digital Antenna, Inc. could void the user's authority to operate the equipment.

3. Pre-Installation Guidelines

a. INSTALLATION TOOLS

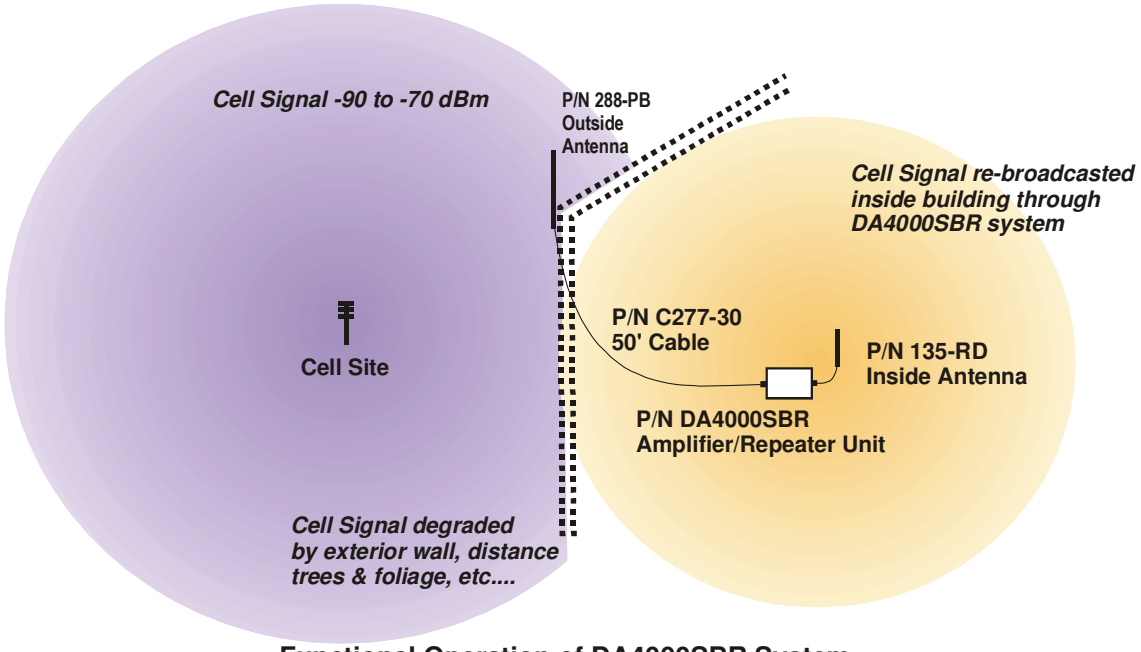
The following tools are required for installation:

- Standard wrench and philips head screwdriver
- Standard drill with ½" bit (optional)
- Cellular phone operating on 800 or 1900 MHz bands (any USA or Canadian cellular phone except Nextel)
- Wire fasteners (optional)
- Multi-meter for testing electrical continuity and AC and DC line voltage (for troubleshooting only)

b. INSTALLATION PROCEDURE

Description of DA4000SBR System

The DA4000SBR Dual Band Wireless Amplifier/Repeater system provides cellular signal coverage to areas that have low signal strength to adequately operate a cellular phone. In these poor coverage areas it becomes difficult to place or receive calls and usually results in a dropped call. The DA4000SBR dual band amplifier/repeater system provides increased reception indoors by filtering, re-directing and amplifying the available signal. This translates into fewer dropped calls, safe, clear connections and stronger signals. The DA4000SBR dual band system operates with all carriers in the USA and Canada except Nextel. A



Functional Operation of DA4000SBR System

Installation requirement: Separation Distance of 40' or more between outside and inside antennas

The DA4000SBR system contains a dual band low power indoor antenna, amplifier/repeater unit and high gain omni-directional outdoor antenna. Both antennas must be installed and operate in a vertical position. The indoor antenna must be used with cable and stand. The outdoor omni-directional antenna, P/N 288-PB, is installed outside

of the building. (see specific section for Home/Office, marine and RV installations) The omni-directional antenna should be installed on the side of the building with the strongest cellular signal as indicated by the bars on the cell phone. The outside antenna must be installed outside of the building, RV or boat. The inside antenna must be mounted in a central location in the building that is 40' or greater from the outside antenna. The inside and outside antenna also must be separated by an exterior wall. Two power supplies are included to maximize installation flexibility.

Typical In-Building Coverage

The DA4000SBR system is designed to provide optimal coverage for a 3,000 ft^2 to 5,000 ft^2 area. Interior coverage varies based upon the outside signal strength and the interior building construction and materials. Typically the DA4000SBR system will penetrate 1-2 interior walls and 1 floor based upon construction material.

Pre-installation Considerations

Establish a site installation plan based upon desired central coverage area

- The inside and outside antenna must have a separation distance of 40 feet or greater, the outside antenna must be outside and separated from the inside antenna by an exterior wall, and both antennas must be in a vertical position.
- Identify the outside antenna location. If the outdoor coverage area is very poor, the outside antenna should be placed on the side of the building where the signal is the strongest. If the signal is equally strong outdoors, the outside antenna should be placed in a secure, unobstructed area. On an RV the antenna can be attached to the back ladder or on the side of the RV. On a boat the outside antenna should be mounted clear of metal objects, 3' from other antennas and as high as possible.
- For maximum coverage the location of the indoor antenna should have a direct line-of-site to as much of the coverage area as possible. The indoor antenna must be used with 18" cable and antenna stand. Never use the inside antenna directly connected to DA4000SBR amplifier/repeater unit.
- Based upon the desired coverage area, choose a central location for the DA4000SBR unit. The location of the DA4000SBR unit must be accessible within reach of the supplied 50' cable (**PowerMax**™ 25' extension cable and 75' replacement cables sold separately) and within 6' of a power receptacle (or an extension cord can be used). The DA4000SBR unit is not waterproof and must be kept in a dry location.

c. ELECTRICAL POWER

To maximize installation flexibility, the DA4000SBR system includes 2 power cord options.

> **WARNING!**
> Only the provided power cables are to be used with the DA4000SBR system. Using any other power cables will harm the DA4000SBR amplifier/repeater unit, can be detected and voids the warranty.

To plug into a standard 110 VAC receptacle use P/N DP255, a 110 VAC to 5VDC Power Supply. For use on a boat or RV, plug P/N DP515, a 12 VDC to 5 VDC Power Cable, into a 12 VDC cigarette style power receptacle.

d. AMPLIFIER/REPEATER STATUS

The DA4000SBR unit is designed with a status/fault indicator to indicate proper unit functionality. The chart below details the different LED color indicators.

	LED	Amplifier/Repeater Status
Picture	Green solid light	Normal Status
Picture	Yellow/orange flickering light	Degree of cellular transmission activity
Picture	Solid Red light	Fault needs immediate corrective action
Picture	No light	No power to the DA4000SBR amplifier/repeater or unit is defective

Green light – shows normal Status and DA4000SBR is operating normally. No corrective action necessary.

Green/yellow/orange flickering light - shows that cellular activity is being transmitted through the DA4000SBR unit. The light will remain green with low levels of cellular transmission and change to flickering yellow/orange as transmission increases. The light may remain green with low levels of transmission.

Solid Red light – indicates a fault. Turn OFF power switch and proceed with the following corrective actions:

- The red light indicates that the inside and outside antennas are located too close to each other and need to be re-located. A typical installation requires that the inside and outside antennas have a minimum separation distance of 40 feet and be separated by an exterior wall. If the inside and outside antennas are not 40 feet apart or more, relocate the antennas.
- If the outside and inside antennas are separated by 40' or more and an exterior wall. The red light also indicates the use of analog phones.

No light – indicates missing power to the DA4000SBR unit. Proceed with the following corrective actions:

- Verify that the power switch on the DA4000SBR unit is in the ON position.
- Test for 5VDC power – verify that 5VDC is available on the output plug of P/N DP255 or DP515. If 5VDC is verified, the DA4000SBR unit may be defective. See below
    - Test for AC line voltage on the input plug of P/N DP255, 100 to 240VAC to 5VDC Power Supply. If AC voltage is available and there is no 5VDC on the output plug. The power supply is defective. See below
    - Test for DC line voltage on the input plug of P/N DP515, 12 VDC to 5 VDC Power Cable. If input voltage is available and there is no 5VDC on the output plug. The power cable is defective. See below
- DA4000SBR unit, DP255 or DP515 may be defective. Contact your dealer. The serial number on the DA4000SBR unit must be available.

e. IN-BUILDING COVERAGE PROBLEMS

If the DA4000SBR unit does not indicate a red light and the coverage area appears to be smaller than anticipated, one or more of the following may limit the signal strength to the area.

- **Cell Phone Bars** - The bars on the cell phone do not indicate coverage area. One bar may be adequate to successfully place and receive calls. Test coverage area by successfully completing calls while disregarding bar indicator.
- **Physical obstructions degrading the cell signal** – the path of the cell signal is weakened by objects. Large metal objects block or reflect the signal. Inspect the coverage area, rearrange any objects in the path of the cell signal or relocate the indoor antenna.
- **Output Power Control** – The DA4000SBR has an internal output power control circuit that automatically lowers the power when the inside and outside antenna are located too close. Verify that inside and outside antennas are located 30' apart or more and separated by an exterior wall.
- **Cabling** – examine coaxial cable run and verify that the cable is not kinked, coiled or damaged. Re-locate cable to avoid kinks or coils. If supplied 50' cable is damaged contact your dealer. The serial number on the DA4000SBR unit must be available.

f. COAXIAL CABLE RECOMMENDATIONS

The DA4000SBR system includes 50' of Digital Antenna's **PowerMax**^{TM} ULTRA low loss cable and connectors for easy installation. If the installed application requires more than the supplied cable, **PowerMax**^{TM} DA340 ULTRA low loss 25' extension cable and 75' replacement cable are available. Only Digital antenna cable can be used to complete the installation. Unauthorized cable usage can be detected and voids the warranty.

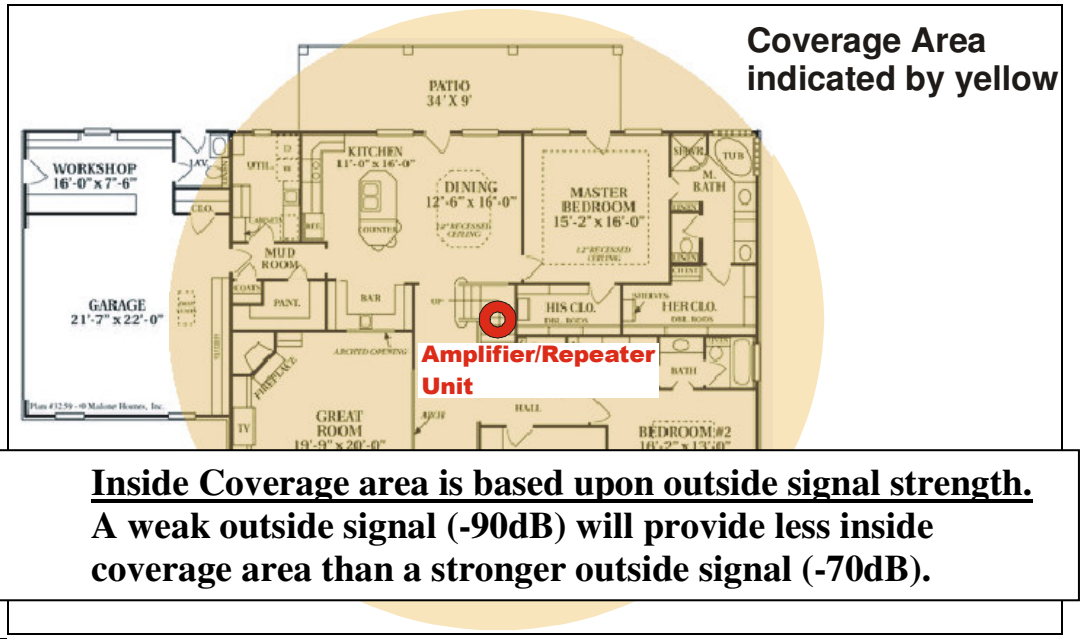
4. Home/Office Installation

Review pre-installation considerations and determine site installation plan.

1. Install supplied outside antenna (P/N 288-PB) to vertical surface or pole with supplied hardware. Mount the outside antenna clear of metal objects and obstructions. Outside antenna must be mounted in a vertical position.

   WARNING!
   Only Digital Antenna authorized products may be used with the DA4000SBR system. Using unauthorized equipment will harm the DA4000SBR system, can be detected and voids the warranty.

2. On supplied 50' cable (P/N DA340-50NM) (or optional 25' extension cable or 75' replacement **PowerMax**™ cable) attach N male connector to N female connector on outside antenna. Secure cable to the side of the building with appropriate fasteners (not supplied). Route cable according to site installation plan to the DA4000SBR unit.
3. Attach mini-UHF male connector at the end of the supplied 50' cable to DA4000SBR unit on the port labeled outside antenna. Attach the 18" cable attached to the inside antenna and stand to the port labeled inside antenna. The inside antenna must be operated in a vertical position.
4. The DA4000SBR unit has four mounting holes that can be fastened to a secure surface. (fastening hardware not included) When mounting the DA4000SBR unit the inside antenna must be in a vertical position.
5. Plug 100-240VAC power supply to the DA4000SBR unit. Plug the other end into standard household 110VAC receptacle.
6. Turn the power switch to ON. If the light on the DA4000SBR unit is green then the DA4000SBR system is operating. Test the amplifier/repeater system by making a cell call and verifying that the indicator light does not turn red. If the light on the DA4000SBR unit turns red immediately turn OFF the DA4000SBR unit and refer to the Amplifier/Repeater status section.



Inside Coverage area is based upon outside signal strength. A weak outside signal (-90dB) will provide less inside coverage area than a stronger outside signal (-70dB).

5. Marine Installation

Review pre-installation considerations and determine site installation plan.

1. Install supplied outside antenna (P/N 288-PB) to vertical surface or pole with supplied hardware. Mount the outside antenna clear of metal objects and obstructions and as high as possible. Outside antenna must be mounted in a vertical position. The DA4000SBR system may also be used with one of Digital Antenna's marine 9dB gain dual band cellular antennas. (Follow minimum 40' Inside and Outside antenna separation guideline)

> **WARNING!**
> Only Digital Antenna authorized products may be used with the DA4000SBR system. Using unauthorized equipment will harm the DA4000SBR system, can be detected and voids the warranty.

2. On supplied 50' cable (P/N DA340-50NM) (or optional 25' extension cable or 75' replacement **PowerMax**™ cable) attach N male connector to N female connector on outside antenna. Secure cable to the side of the building with appropriate fasteners (not supplied). Route cable according to site installation plan to the DA4000SBR unit.
3. Attach mini-UHF male connector at the end of the supplied 50' cable to DA4000SBR unit on the port labeled outside antenna. Attach the 18" cable attached to the inside antenna and stand to the port labeled inside antenna. The inside antenna must be operated in a vertical position.
4. The DA4000SBR unit has four mounting holes that can be fastened to a secure surface. (fastening hardware not included) When mounting the DA4000SBR unit the inside antenna must be in a vertical position.
5. When using 110VAC - Plug 100-240VAC power supply to the DA4000SBR unit. Plug the other end into standard 110VAC receptacle.
   When using 12VDC – Plug the 12 VDC to 5 VDC power cable (P/N DP515) into the DA4000SBR unit. Plug the other end into a 12VDC cigarette style power source.

> **WARNING!**
> To have DC power hardwired consult a professional electronic technician.

6. Turn the power switch to ON. If the light on the DA4000SBR unit is green then the DA4000SBR system is operating. Test the amplifier/repeater system by making a cell call and verifying that the indicator light does not turn red. If the light on the DA4000SBR unit is red immediately turn OFF the DA4000SBR unit and refer to the Amplifier/Repeater status section.

6. RV Installation

Review pre-installation considerations and determine site installation plan.

1. Install supplied outside antenna (P/N 288-PB) to vertical surface or pole with supplied hardware. Outside antenna must be mounted in a vertical position. Mount the outside antenna clear of metal objects and obstructions and as high as possible but take care not to exceed height of other roof mounted items such as A/C.

> **WARNING!**
> Only Digital Antenna authorized products may be used with the DA4000SBR system. Using unauthorized equipment with the DA4000SBR system will harm the system, can be detected and voids the warranty.

2. On supplied 50' cable (P/N C277-30) (or optional 25' extension cable or 75' replacement **PowerMax**™ cable) attach N male connector to N female connector on outside antenna. Secure cable to the side of the building with appropriate fasteners (not supplied). Route cable according to site installation plan to the DA4000SBR unit.
3. Attach mini-UHF male connector at the end of the supplied 50' cable to DA4000SBR unit on the port labeled outside antenna. Attach the 18" cable attached to the inside antenna and stand to the port labeled inside antenna. The inside antenna must be operated in a vertical position.
4. The DA4000SBR unit has four mounting holes that can be fastened to a secure surface. (fastening hardware not included) When mounting the DA4000SBR unit the inside antenna must be in a vertical position.
5. When using 110VAC - Plug 100-240VAC power supply to the DA4000SBR unit. Plug the other end into standard 110VAC receptacle.
   When using 12VDC – Plug the 12 VDC to 5 VDC power cable (P/N DP515) into the DA4000SBR unit. Plug the other end into a 12VDC cigarette style power source.

> WARNING!
> To have DC power hardwired consult a professional electronic technician.

6. Turn the power switch to ON. If the light on the DA4000SBR unit is green then the DA4000SBR system is operating. Test the amplifier/repeater system by making a cell call and verifying that the indicator light does not turn red. If the light on the DA4000SBR unit is red immediately turn OFF the DA4000SBR unit and refer to the Amplifier/Repeater status section.

7. Specifications

Amplifier/Repeater Unit P/N DA4000SBR

- Frequency:
  Uplink: 824-849 MHz and 1850-1910 MHz
  Downlink: 869-895 MHz and 1930-1990 MHz
- Modulations: AMPS/GPRS/TDMA/PCS/CDMA/GSM850/GSM1900
- Max Output Power: 3W (824-849 MHz), 2W (1850-1910 MHz)
- Dynamic Variable Gain: 60dB Max
- Impedance: 50 ohms
- Noise Figure: < 10dB
- Power Consumption: Standby 5 vdc/0.5A, Uplink 5 vdc/1.5A
- Internal Fuse: 3A
- FCC approved, FCC ID: PZODA4000SBR
- Industry Canada approved, IC ID: 4260A-DA4000SBR
- Dimensions: 4.5" l x 4.0" w x 1.25" h (114mm x 102mm x 32mm)
- Weight: 12 oz (.345 kg)
- RF Connections:
  Outside Antenna Port: Mini-UHF Female
  Inside Antenna Port: Mini-UHF Female
  DC Power: Coaxial ID = 2.5mm, OD = 5.5mm (center positive)
- Indicator: Multi color status indicator
- Power Switch: Slide switch toward LED = ON

Outside Antenna P/N 288-PB

- Radiation pattern: Omni-directional
- Gain: 9 dBi
- VSWR: < 1.5:1 @ 850 MHz; < 1.5:1 @ 1900 MHz
- Bandwidth VSWR: < 1.5:1 = 810-950 and 1800-1980 MHz
- Max input power: 250 watts
- Dimensions: 18" l x .75” OD (45.7 cm x .2 cm)
- Weight:
- RF connector: N female
- Wind rating: 121.8 mph
- Installation: supplied L-bracket and hardware wall or pole

Inside Antenna P/N 135-RD

- Radiation pattern: Omni-directional
- Gain: Unity
- VSWR: < 1.5:1 @ 850 MHz; < 1.5:1 @ 1900 MHz
- Bandwidth VSWR: < 1.5:1 = 810-950 and 1800-1980 MHz
- Max input power: 50 watts
- Dimensions: 3.5" l x .25” OD (45.7 cm x .2 cm)
- Weight:
- RF connector: mini-UHF male
- Installation: Freestanding mount with 18” cable

Cable P/N DA340-50NM

- Length: 50’
- Impedance: 50 Ohm
- RF connectors: N male and mini-UHF male factory attached
- Attenuation at 800 MHz: 2.5 dB per 30’
- Attenuation at 1900 MHz: 5.5 dB per 30’

Power Supply P/N DP255

- Input: 100-240VAC 50/60 Hz
- Output: 5VDC 1.5A
- Mounting: Wall type
- Cord Length: 10’ (3m)
- Output plug: 5.5 x 2.5 x 11mm

Power Cable P/N DP515

- Input: +/- 9VDC to +/- 24 VDC
- Output: 5VDC 1.5A
- Center Positive, smooth cable positive
- Connector: Cigarette lighter style
- Internal fuse: 3A
- Cord Length: 76” (1.93m)
- Output plug: 5.5 x 2.5 x 11mm

8. Antenna & Accessory Options

Outside Dual Band Cellular Antennas

For complete antenna specs Visit www.DigitalAntenna.com	White P/N	Black P/N
Digital Antenna’s 500 series antennas include: 20’ cable, mount 1”-14 threads, high-gloss finish		
2.5' Dual Band 9dB Gain Cellular Antenna	**561-CW**	**561-CB**
4' Dual Band 9dB Gain Cellular Antenna	**563-CW**	**563-CB**
8' Dual Band 9dB Gain Cellular Antenna	**567-CW**	**567-CB**
Digital Antenna’s 800 series antennas include: female N connector, mount 1”-14 threads, high-gloss finish		
2.5' Dual Band 9dB Gain Cellular Antenna w/ male 1"-14	**854-CW**	**854-CB**
4' Dual Band 9dB Gain Cellular Antenna w/ male 1"-14	**883-CW**	**883-CB**
8' Dual Band 9dB Gain Cellular Antenna w/ male 1"-14	**897-CW**	**897-CB**
Digital Antenna’s 800 series antennas include: female N connector, mount wall/pole, high-gloss finish		
2.5' Dual Band 9dB Gain Cellular Antenna w/ wall-pole base	**996-CW**	**996-CB**
4' Dual Band 9dB Gain Cellular Antenna w/ wall-pole base	**962-CW**	**962-CB**
8' Dual Band 9dB Gain Cellular Antenna w/ wall-pole base	**967-CW**	**967-CB**

Description	P/N
25’ **PowerMax**™ ULTRA low loss extension cable w/ connectors (attaches to included 50’ cable)	**CA340-25NM**
75’ **PowerMax**™ ULTRA low loss cable w/ connectors	**DA340-75NM**

Ferrule for mounting P/N 288-PB on 1"x14 male threads	**F114 (available 7/01/04)**
2-way Cellular Combiner w/ mini-UHF female connectors	**DA-2100**
Dash/wall mount adapter cable 5' length	**C428-05**

Digital Antenna manufacturers cellular amplifiers, repeaters and antennas for the best communication on land or sea. All products are designed, engineered and manufactured by Digital Antenna in the USA. Visit www.DigitalAntenna.com to view our complete product line.

9. Technical Support

Read Product FAQs on Digital Antenna's website prior to calling Tech Support. www.DigitalAntenna.com. Locate the Digital Antenna Inc. serial number on the DA4000SBR unit before calling. The serial number is located on the bottom of the DA4000SBR unit. The DA4000SBR serial number must be available to authorize technical support and/or establish a return authorization. For installation technical support contact your dealer. For system warranty issues contact Digital Antenna Technical Support between the hours of 9:00 AM and 5:00 PM EST, at 954-747-7022 or e-mail support@DigitalAntenna.com. The DA4000SBR system must be used with Digital Antenna authorized equipment. The technical support team will only support Digital Antenna authorized equipment. Contact your dealer for installation questions.

For answers to ***Frequently Asked Questions*** visit www.DigitalAntenna.com