

MODEL M5800SB-SU-EXT

5.8 GHz Digital Spread Spectrum Wireless Internet Subscriber Unit

Installation and Operating Instructions

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- 1•Setup transceiver per instructions herein before installing outdoors.
- 2•Mount the dish antenna to a wall or earth grounded mast 1.5 to 2.5 inches in diameter.
- 3• Install transceiver to dish antenna mounting arm. The pole *must be* securely mounted so that it does not move, and may be from 1.5” to 3” in diameter.



WARNING

USE EXTREME CARE WHEN INSTALLING ANTENNAS NEAR POWER LINES.

- 4• Slide heatshrink over antenna cables. Tighten right angle connectors to transceiver and straight connectors to antenna feed element. Use a 5/16 inch open ended wrench to tighten the connectors until snug. Do not overtighten. Heat the heatshrink until it contracts around the connector junction.
- 5• Construct or purchase a shielded twisted pair (STP) cat 5 straight through 8 conductor Ethernet cable terminated with shielded RJ45 connectors long enough to go along the pole or wall to the building entry point. Use conduit and a drip loop as appropriate per National Electrical Code.
- 6• Connect the cable to the unit and tighten the flange around the cable or conduit.
- 7• Install the junction box indoors near the entry point into the building. Plug the Ethernet cable going to the transceiver into the ODU port (above the power input). Plug the wall mount 20 V adapter into the wall and then into the power input. Verify that both LEDs come on solid after approximately 30 seconds.
- 8• Align the antenna by moving it left to right, then up and down. The blink rate of the yellow LED viewable through the Access Door will increase and ultimately go solid if the signal is strong enough. If the LED is not glowing no signal is being received from the Access Point. Verify that the Green LED blinks occasionally to indicate packets being received from the Access Point.
- 9• Tighten all nuts and bolts down after the alignment is completed.
- 10• To help protect against potential lightning damage, use an ethernet lightning surge arrester in line with the STP cable at the entry point to the building.



CAUTION

DO NOT APPLY POWER TO THE TRANSMITTER UNLESS THE ANTENNA IS CONNECTED. PERMANENT DAMAGE MAY RESULT.

Thank you for choosing Sunstream Wireless to fulfill your wireless internet access needs. Unpack your system carefully. If any items are missing, notify your sales representative. If an item appears to be damaged from shipment, replace it in its packing material and notify the shipper. The subscriber kit contains the following items packaged in three boxes:

- 1 transceiver unit
- 2 mounting brackets
- 4 nuts for mounting brackets
- 1 Junction box
- 1 power adapter
- 1 Dish antenna (24 inch width)
- 2 coaxial cables
- 1 dish antenna feed element
- 1 warranty card

Service:

If the unit ever needs repair service, contact your service provider or Sunstream Wireless distributor as appropriate for return authorization and shipping instructions.

FCC Information:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with these instructions, 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 television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of more of the following measures:

- 1) Reorient the antenna;**
- 2) Increase the separation between the affected equipment and the unit;**
- 3) Connect the affected equipment to an outlet on a different circuit from that which the receiver is connected to;**
- 4) Consult the dealer and/or experienced radio/TV technician for help.**

FCC ID: NCYM5800SBSUEXT
CANADA: Pending

IMPORTANT NOTE:

Intentional or unintentional changes or modifications not expressly approved by the party responsible for compliance must not be made.

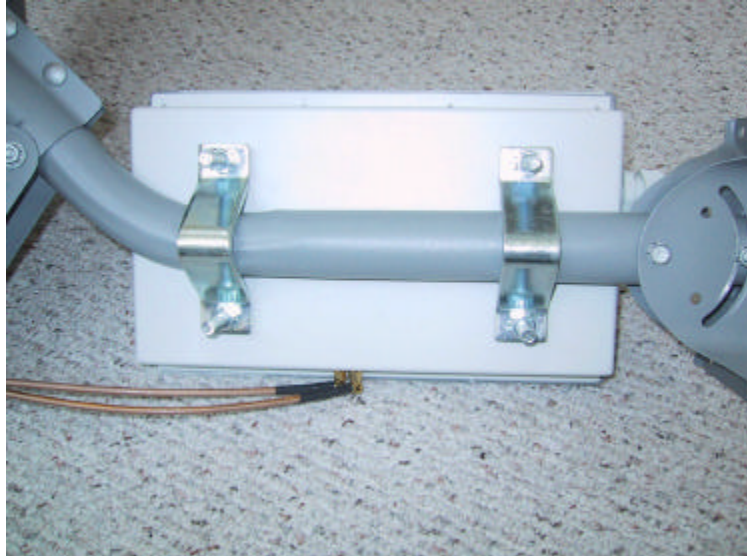
Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

IMPORTANT NOTE:

To comply with FCC RF exposure compliance requirements, the following antenna installation and device operating configurations must be satisfied – The antenna for this unit must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

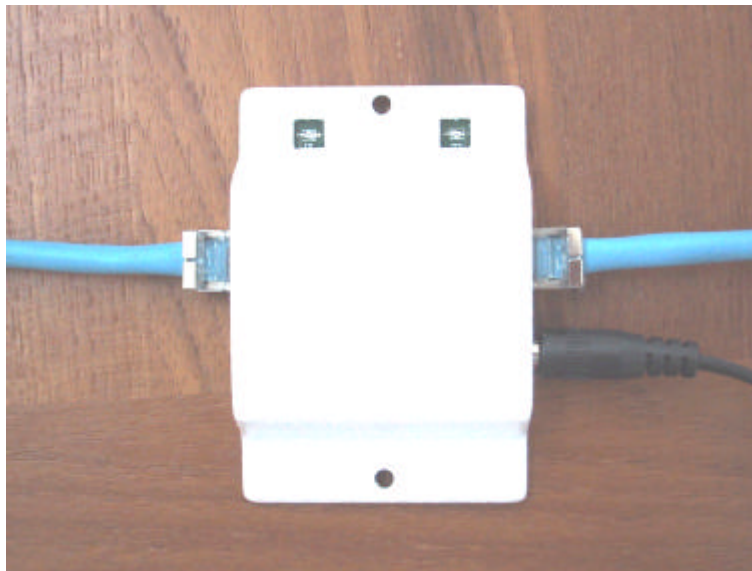
System Description:

The M5800SB-SU-EXT is a broadband wireless internet access system designed for sending and receiving Ethernet based data traffic where conventional wiring is impractical or when higher connection speeds are required. The system utilizes robust spread spectrum technology to reduce susceptibility to interference. The typical subscriber installation consists of an M5800SB-SU-EXT transceiver mounted outdoors with a dish antenna and a junction box mounted indoors. The junction box provides power to the transceiver by injecting the power onto the unused pairs of the Ethernet cable. The transceiver antenna is aligned towards a base station that has a high speed connection to the internet.



• FIGURE 1 •

Figure 1 shows installation of the dish and transceiver.



• FIGURE 2 •

Figure 1 shows installation of the junction box and power adapter.

Installation:

Typically the service provider will program the transceiver and professionally install the entire system. If you are installing the system yourself, below you will find a step by step guide.

TRANSCEIVER SETUP PRIOR TO INSTALLATION

Before installing the hardware you must set up the transceiver to allow communication with the base station. Your service provider should provide a .cfg file to you that contains all the required information.

- 1) Obtain the M5800S-SU Series Wizard program, .cfg file diskette, and Setup cable (CBLDAT-1) from your service provider.
- 2) Load the wizard program onto a PC or Laptop
- 3) Connect the junction box ODU port to the transceiver with a short section of 8 conductor UTP cat 5 network cable.
- 4) Connect the CBLDAT-1 to the PC or laptop serial port.
- 5) Use a Philips head screwdriver to remove the access door temporarily. Inside is an RJ11 jack
- 6) Connect the phone connector end into the RJ11 jack.
- 7) Plug the power adapter into the junction box and then into a 120 VAC wall outlet.
- 8) Wait 30 seconds for the unit to power up. The LEDs on the junction box should both be glowing solid.
- 9) Click on the wizard program icon.
- 10) Click on the "Serial Port" button, choose the appropriate COM port, and enter the password (obtained from your service provider). If none was provided, the default is "sunstream".
- 11) Click the "Connect" button.
- 12) The screen should change to a display with the notation "PG-SYSINFO" at bottom right.
- 13) Click the "Load Configuration" button.
- 14) A dialog box pops up prompting for the .cfg file. Locate this file on the diskette provided by the service provider. Highlight it and click "open"
- 15) The program should return to the PG-SYSINFO page and show the new values just loaded from the .cfg file.
- 16) Click "Reboot Unit" and wait 1 minute.
- 17) Click "Quit"
- 18) The unit is now ready for service and may be powered down . All settings loaded will be retained in the non-volatile memory.

HARDWARE INSTALLATION

Mount the transceiver antennas above human and mechanical traffic, aiming it in the general direction of the base station. In general, the higher above the ground the antenna is, the better. A 10 foot 2 3/8" diameter steel mast on top of a building is typical. Make sure that the mast is well grounded to earth ground with an 8 AWG or larger wire. For best performance, the antenna must be 15 to 20 feet above all obstacles in the line of sight to the base station. Mount the feed to the end of the antenna.

- 1) Keep the transmission path as open as possible. Objects such as walls and metallic objects near the transmission path reflect signals and may reduce the transmission distance.
- 2) Do not add additional lengths of cable to connect the to the antenna as significant losses in signal and reduced transmission range will occur.
- 3) Mount the transceiver on the dish mounting pole as shown in Figure 1.
- 4) Connect the antenna cables, paying attention to the polarization shown on the feed.

IMPORTANT NOTE: The transmitter uses a non-standard jack to connect to the transmitter antenna. Any modification to this jack may void the user's authority to operate the equipment and will void the manufacturer's warranty.

- 5) Connect the STP run no longer than 150 feet – Use straight through 8 conductor cat 5 cable, making sure that the RJ45 terminations are shielded.
- 6) Use standard outdoor to indoor drip loop and grounding per National Electrical Code and electrical conduit if appropriate.
- 7) Connect the Junction Box to an interior wall near the entry point of the cable.
- 8) Plug the STP cable into the ODU port of the Junction Box.
- 9) Plug the wall mount power adapter into the Junction box.
- 10) Plug the wall mount adapter into the wall outlet.
- 11) The LEDs on the Junction box should both be on, indicating that the power is coming into the junction box properly and that the outdoor transceiver is powered up properly. Check the wiring if this is not the case.

ANTENNA ALIGNMENT

Once the power to the transceiver is verified, align the antenna by aiming it towards the base station until the yellow LED blinks as fast as possible or turns completely solid. This indicates a very strong signal from the base station. If the Yellow LED is lit up at all, the signal is not being received or the antenna is aimed far away from the base station. The beamwidth of the antenna is about 7 degrees, so small movements of the antenna can create large changes in signal strength.

CONNECTION VERIFICATION

After the alignment is completed, an Ethernet cable can be connected to the "NET" port of the Junction Box and then to a switched hub or PC network card. A crossover cable will be required if connecting to a PC NIC.



CAUTION DO NOT APPLY POWER TO THE TRANSCEIVER WITHOUT THE ANTENNA SECURELY ATTACHED.

M5800SB-SU-EXT Inputs and Outputs

1. POWER INPUT

Accepts a 10.5-24 Vdc power source such as the standard 20 Vdc adapter (supplied with Sunstream part number ODU-PKIT-1).

2. ETHERNET DATA INTERFACE

Use a shielded cat 5 cable to connect the junction box to the transceiver unit. It is ok to us UTP for the indoor connection to the switch or PC.

4. LED INDICATORS

These LEDs indicate when a data packet is transmitted(red) or received (green). The yellow LED indicates the strength of the signal received from the base station.



CAUTION

WHEN THE UNIT IS IN OPERATION AVOID STANDING DIRECTLY IN FRONT OF THE ANTENNA. STRONG RF FIELDS ARE PRESENT WHEN THE TRANSMITTER IS ON.

M5800SB-SU-EXT Specifications

Transmitter Section

Radio Section:

Frequencies:

Storable Channels:	32 memory locations
Channel spacing:	5.736 to 5.836 GHz in 2 MHz increments
Default channel plan-	Channel 1: 5.736 GHz
	Channel 2: 5.756 GHz
	Channel 3: 5.776 GHz
	Channel 4: 5.796 GHz
	Channel 5: 5.816 GHz
	Channel 6: 5.836 GHz

RF Output Power:	Max: +18 dBm +/- 1 dB
	Min: -8 dBm +/- 1 dB

EIRP:	+45 dBm (4 Watts) with 27 dBi dish (standard) antenna
Freq. Stability:	.000435 % PLL Stabilized (4.35 ppm) over temp range
Freq. Plan:	Single upconversion, 480 MHz IF
Modulated Bandwidth:	22 MHz (null to null, 20 dB)
2 nd Harmonic atten:	Per CFR47 part 15.247 (-58 dBc min)
LO Supression:	Per CFR47 part 15.247 (-70 dBc min)
Symbol Rate:	1.375 MSPS
Error Correction:	None

Modulation: 1 MBPS DBPSK for header, 11 MBPS CCK spread spectrum for payload

Data Input Section

Buffer size: 128K Bytes
Data Rate (User): Up to 9.5 MBPS Sustained throughput
Format: 10/100 BaseT IEEE 802.3 Ethernet compliant
Ethernet packet size: Up to 1760 byte long packets

Power

Input Voltage: Input voltage range at unit is 10.5 VDC to 24 VDC max
Power is supplied on Ethernet cable using junction box provided with up to 150 foot STP cable.

Current Cons.: 740 mA in transmit mode at max power using 20 V standard adapter (14.8W)
580 mA in receive mode using 20 V standard adapter (11.6 W)

Receiver Section

Radio Section

LO Frequencies:

Default channel plan- Channel 1: 5.256 GHz
Channel 2: 5.276 GHz
Channel 3: 5.396 GHz
Channel 4: 5.316 GHz
Channel 5: 5.336 GHz
Channel 6: 5.356 GHz
Channels 7-32: not programmed

Cascade Noise Figure: < 6 dB
Sensitivity for 1E10-6 BER: - 80 dBm max 1000 byte packets
Adj. Channel Rejection: > 20 dB
Image Rejection: > 60 dB
Frequency Plan: Single conversion, IF at 480 MHz
LO stability: .00025% PLL stabilized (+/-2.5ppm) over temperature range
Input compression point: > -10 dBm

Data Output Section

Buffer size: 128K Bytes
Data Rate (User): 9.5 MBPS Maximum sustained throughput
Format: 10/100 BaseT IEEE 802.3 Ethernet compliant
Supported Protocols: TCP/IP, Telnet, TFTP, UDP

Mechanical and Environmental

General

Material: Powdercoated Aluminum base with polycarbonate radome
Size: 12.5"x5"x8" including mounting studs
Weight: 4 lb
Mounting: Grey steel pole mount provided

Connectors/Indicators

RF Output: Direct connect to antenna per Part 15C, 15.203.

FCC Compliance: The transceiver shall comply with the following:
FCC Part 15.247
FCC Part 15.207(a)

Serial Interface: RJ11 connector
LAN Interface: Shielded RJ45 connector
Power: Carried on 4 unused pins of Ethernet cable

Environmental

Operating Temp: -40 to 60 deg C
Storage: -40 to 85 deg C
Humidity: 100 % When sealed properly
NEMA Rating: NEMA 4X
Shock: Sustain 3 axis drop from 5 feet

STANDARD EXTERNAL POWER SUPPLY

24 Volt DC Power adapter and J-Box supplied in ODU-PKIT-1 accessory package.

Type: Linear wallmount transformer
Input: 120 VAC
Output: 20 VDC +/- 1 V
Max current: 1200 mA

STANDARD ANTENNA

The unit is designed to operate with the AD5800-27-D dual linear polarized dish antenna.
See the product specification for more information.