



Installation Manual

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CPAS TTechnologies SS100

902-928 MHz Spread Spectrum
Data Acquisition System
01/26/04

WARNING In order to comply with Part 15.203 of the FCC regulations, this transmitter system will need to be **installed professionally** in accordance with Part 15.31 of the FCC regulations to ensure that the RF limits are not exceeded. Installation of all antennas must be performed in a manner that will provide at least 2 meters clearance from the front radiating aperture, to any user or member of the public.

Operation of this equipment in a residential area may cause radio interference, in which case the user, at his own expense, will be required to take whatever measures necessary to correct the interference.

FCC Declaration of Conformity

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.

FCC Class B Instructions to users

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 the 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 try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

1.0 Power Level Configuration

Power levels should only be adjusted by a professional installer. While in the Configuration mode of operation, the power level may be set by pressing the '1' key. See the **Operation Manual** for more details on entering the Configuration mode. A selection similar to the following should appear on the screen:

0 – 29	mW	14.6 dBm
1 – 55	mW	17.4 dBm
2 – 78	mW	18.9 dBm
3 – 117	mW	20.7 dBm
4 – 182	mW	22.6 dBm
5 – 309	mW	24.9 dBm
6 – 489	mW	26.9 dBm
7 – 500	mW	27.0 dBm

The power levels are given in milliwatts and dBm (decibels relative to a milliwatt). The FCC allows an ERP (effective radiated power) level of +36 dBi for spread spectrum, frequency hopping 902-928 ISM devices with at least 50 channels. Currently, the antenna choices for use with the SS100 are 2 dBi and 6dBi. With a maximum output power level of 27.0 dBm, the ERP is limited to a maximum of 33 dBm. This is well below the max ERP limit.

RF link range is determined by a variety of factors. Transmitter power is only one of them. Some other important factors are receiver sensitivity, antenna gain, type, orientation, and height above the ground, cable loss, RF obstructions such as trees, vegetation, buildings, etc. Increases in power levels do not result in a linear increase in communication range. One of the best ways to determine if a link is good is by using the RSSI indicators. A received signal strength on the SS100 of -95 dBm or higher will result in an excellent RF link with some margin for environmental changes. Try to set the power levels as low as possible to achieve a good RF link. This helps prevent higher than necessary levels of RF interference with other devices while also reducing current consumption (battery life). With open, line-of-sight communications, a link of 15 or more miles can be achieved. With obstructions such as dense trees, this range is dramatically reduced, possibly to less than 1 mile. Many times experimentation is the only way to verify a communications link in real-world conditions.

1.1 Antenna Selection and Installation

The SS100 is approved for use with two different antennas. We may submit additional antennas for testing at a later date. Antennas should be installed only by **professional installers** in order to comply with FCC regulations for this device.

Manufacturer	Model	Description
Astron Wireless	AXH92RPSMT	6" 2 dBi ½ wave whip
Antenex	FG9026	65" 6 dBi fiberglass omni

Both of these antennas are omni directional. The Antenex antenna is intended to be used as a base station antenna, while the Astron Wireless antennas are intended primarily for remote stations. In many cases, the 2 dBi antenna will be sufficient for the base station as well.

The Antenex antenna has an N-type female connector and will require a cable with an N-type male connector on one end and an SMA male connector on the other. The recommended type of cable is LMR-400. It is a rigid, low-loss type of cable with a mid-range cost. LMR-600 may be used in situations where a longer run is needed. Typical loss per 100 ft of cable is 3.9 dB for the LMR-400 and 2.5 dB for the LMR-600.

The Astron Wireless whip antenna has a reverse polarity SMA connector and is designed to connect directly to the SS100.

Remember, safety is important when installing antennas on towers and rooftops. Never perform these activities in the presence of a lightning storm. Always use approved climbing harnesses and equipment.

Antennas installed on towers should be properly grounded and lightning surge arrestors should also be installed.