



# Strata Proximity Systems Surface Proximity Module Users Manual v1.0

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# 1 Overview

The Surface Proximity Module is part of a complete HazardAvert proximity warning system from Strata Proximity Systems which provides warnings to both individuals and to machinery to alert them that the individual has entered too close to an operating piece of equipment and is in a dangerous situation or that vehicles or machinery are getting close enough that a collision possibility exists. The Surface Proximity Module is mounted on a vehicle or piece of machinery and is connected to a central control unit. The Surface Proximity Module interfaces to a central control unit, other modules (dual) or as a stand alone (single) unit which interfaces directly to a vehicle or piece of machinery.

## 1.1 Theory of Operation

The functions of the Surface Proximity Module are:

- To transmit a 73kHz field around a vehicle or piece of machinery to act as a protection zone for collision avoidance and for proximity detection for the protection of individuals.
- To receive a 916.48MHz RF signal from other vehicles or Personal Alarm Devices (PAD).
- To receive a 73 kHz field that might be transmitted by other vehicles.
- To generate a 916.48MHz RF signal to alert other vehicles or machinery that a collision possibility exists.

The Surface Proximity Module has an internal 73 kHz generator and wire wrapped ferrite radiator that create a field which creates a protection zone around the vehicle or machine. When certain other devices, either vehicle mounted or worn by individuals, are brought too close to the Surface Proximity Module they will detect this 73 kHz field and will analyze its field strength. If the 73 kHz field strength received by the other devices is above a certain threshold, indicating that the distance between the Surface Proximity Module and the device is close enough to indicate a Warning or Danger condition, then they will reply to the Surface Proximity Module with a 916.48MHz transmission. The Surface Proximity Module has its 916.48MHz receiver on when it is transmitting the 73 kHz field and is "listening" to receive any 916.48MHz transmissions from another vehicle, machine or individual equipped with the HazardAvert system that would indicate the individual or other piece of machinery is too close and warrants a warning or danger condition. During the time that the Surface Proximity Module's 73 kHz generator is not transmitting, the Surface Proximity Module's 73 kHz receiver is on. This 73 kHz receiver is attempting to detect the field that may be emitted by another vehicle or piece of machinery in close proximity. If during this time the Surface Proximity Module receives a 73 kHz transmission, who's field strength is above a level determined to represent a possible collision or individual in too close of proximity, the Surface Proximity Module will turn off its 916.48MHz receiver and will transmit its own 916.48MHz signal to alert other vehicles or machinery of its close proximity to them. If the Surface Proximity Module receives indication that a Warning or Danger condition exists, it will turn on that appropriate LED indicators and will communicate this information to the central controller or other modules (duals) and singles.

Patent #'s 7,420,471  
5,939,986 and 6,810,353  
Patent Pending

## 1.2 Frequency of Operation

The Underground Proximity Generator will transmit on a frequency of 73 kHz and receive on a frequency of 916.48 MHz

## 1.3 Label Information

The Surface Proximity Module label is located on the bottom face of the shunt. A picture of the Strata label is below:



The Strata label defines the model and serial number of the Surface Proximity Module.

### 1.3.1.1 MSHA Blasting Distance

MSHA has published Program Policy Letter P11-V-07 concerning Two Way Communications and Blasting Circuits.

SPS magnetic field generators produce a magnetic field that at 100 kHz or .1000 MHz does not achieve the Critical H Field until 1.42 m with a blasting cap having a pickup area of 10 sq. meters.

SPS magnetic field generators are safe to 1.42 m from the blasting caps. SPS does recommend a minimum distance of 25' as a precaution.

### 1.3.1.2 Pennsylvania Blasting Distance

At this date, Pennsylvania has not made a recommendation or statement concerning surface systems.

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## 1.4 FCC Information

The FCC ID for the Underground Proximity Generator is ZQ3-SPS-SPROX. When configured by Strata for underground use, the device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received including interference that may cause undesired operation.

Any intentional or unintentional changes or modifications to the configuration of the Surface Proximity Module not expressly approved by Strata Proximity Systems LLC could void the user's authority to operate the equipment.

*NOTE: 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.

## 2 Operation

### 2.1 Installation Information

The Surface Proximity Module is mounted on a vehicle or piece of machinery. Metal near the Surface Proximity Module may impact performance. After installing the Surface Proximity Module on the machine, performance of the unit should be verified by calibration and test.

#### 2.1.1 Interoperability Warning

The Surface Proximity Module may experience erratic responses when in *very* close proximity to some electronic devices. Electrical devices may transmit an electrical field and noise from these fields *may* cause interference with the Surface Proximity Module. A safe guideline is to keep the Surface Proximity Generator *at least 75 mm away* from any electrical devices included but not limited to methane monitor, radio, mobile phone, GPS,PDA, battery charger and laptop computers.

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## 2.2 **Charging**

The Surface Proximity Module is directly powered from the controller board or other modules (duals) and requires no internal battery or charging.

## 2.3 **Alerts**

Although the Surface Proximity Module has LED visual indicators, it is not designed to alert the user. The LEDs are used mainly for set up and diagnostics of the system.

## 2.4 **Maintenance**

The Surface Proximity Module should be regularly cleaned to reduce buildup of dust and dirt.

# 3 **Warranty**

Initial system hardware components will be warranted to be free of defects for a period of one (1) year from in service date. Subsequent component purchases will be warranted one (1) year from receipt acknowledgement. Warranted replacement or repair is not applicable in cases of physical damage or abuse as determined at the time of return or inspection.

# 4 **Revision History**

## 4.1 **Version 1.0 – October 11, 2011**

Original release. No revision history