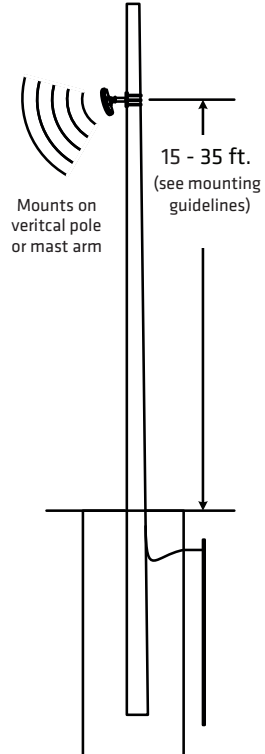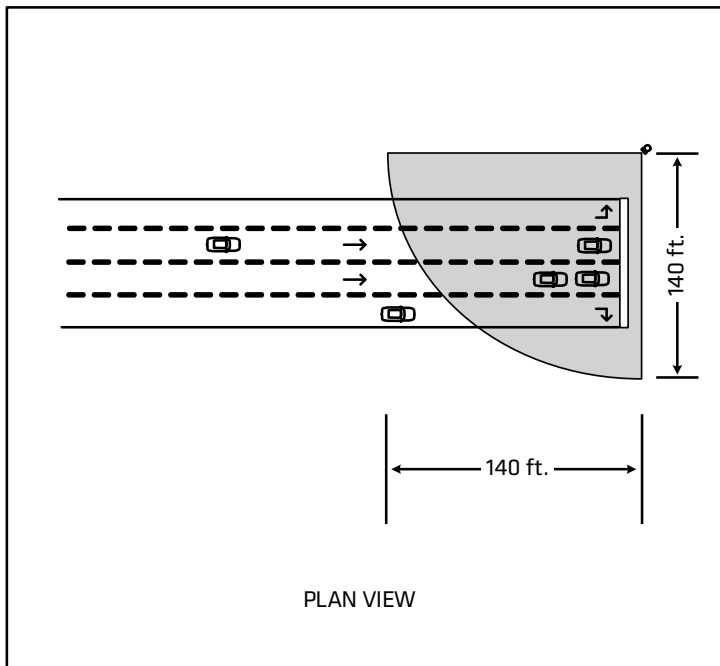# SmartSensor Matrix

The SmartSensor™ Matrix is a first-of-its-kind stop bar presence detector designed for use at signalized intersections to detect vehicles with the reliability of radar and with all the advantages of non-intrusive detection.

Features

- Matrix of 16 radars for two-dimensional coverage
- Tracks vehicles through a 90 degree field of view that extends out 140 ft. (42.7 m)
- Includes Radar Vision™ technology to detect and track in two dimensions
- Reports real-time presence of both moving and stopped vehicles
- Standard detector-rack contact-closure interface
- Easy to install and operate
- Supports curved and angled lanes
- Includes preassembled cabinet backplate, reducing the need to field wire
- Automated manufacturing process
- Patented auto-configuration process
- Patented Digital Wave Radar II™ technology
- Remote accessible for traffic monitoring and sensor management
- Flash upgradable
- Robust to changing temperature, light and weather conditions

PLAN VIEW

140 ft.

140 ft.

15 - 35 ft.
(see mounting guidelines)

Mounts on vertical pole or mast arm

Technical Specifications

Sensor Outputs

- Real-time presence data in 10 lanes
- Maximum number of zones: 16
- Maximum number of channels: 16
- User-selectable zone to channel mapping
- AND logic triggers the channel when all the selected zones are active
- OR logic used to combine multiple zones to a channel output
- Channel output extend and delay functionality
- Algorithms mitigate detections from wrong way or cross traffic
- Fail-safe mode for contact closure outputs if communication is lost

Detectable Area

- Detection range: 6 to 140 ft. (1.8 to 42.7 m)
- Field of view: 90°
- Flexible lane configuration support including:
  - Up to 10 lanes
  - Curved lanes
  - Islands and medians

System Hardware

- A SmartSensor Matrix corner radar for each approach
- A traffic cabinet preassembled backplate with:
  - AC/DC power conversion
  - Surge suppression
  - Terminal blocks for cable landing
  - Communication connection points
  - Cabinet side mount or rack mount
- Contact closure input file cards:
  - 2 or 4 channel
  - Compatible with industry standard detector racks

Maintenance

- No cleaning or adjustment necessary
- No battery replacement necessary
- Recalibration is not necessary
- Mean time between failures: 10 years (estimated based on manufacturing techniques)

Physical Properties

- Weight: 4.2 lbs. (1.9 kg)
- Physical dimensions: 13.2 in. × 10.6 in. × 3.3 in. (33.5 cm x 26.9 cm x 8.4 cm)
- Resistant to corrosion, fungus, moisture deterioration, and ultraviolet rays
- Enclosure: Lexan EXL polycarbonate

Ordering Information

SmartSensor Matrix
SS-225

ACCESSORIES

SS-KIT – Wavetronix install kit

SS-112/114 – Click 112/114 rack cards

SS-704-xxx/705 – SmartSensor 6-conductor cable

SS-611 – SmartSensor mount

SS-B01-0003/0005/0008 – Intersection preassembled backplate – AC

SS-B01-0004/0006 – Intersection preassembled backplate – DC

SS-B02-0002/0003 – Intersection preassembled 19-inch rack

SS-710 – Sensor cable junction box

Wavetronix
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Provo, UT 84606
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www.wavetronix.com

- Outdoor weatherable: UL 746C
- Watertight by NEMA 250 standard
- NEMA 250 compliant for:
  - External icing (clause 5.6)
  - Hose down (clause 5.7)
  - 4X corrosion protection (clause 5.10)
  - Gasket (clause 5.14)
- Withstands 5-ft. (1.5-m) drop
- Connector: MIL-C-26482
- Rotational backplate for 360° of roll

Electrical

- Power consumption: 9 W
- Supply voltage: 9–28 VDC

- Onboard surge protection

Communication Ports

- Two half-duplex RS-485 com ports support:
  - Dedicated detection comms
  - Configuration, verification or traffic display without disrupting detection comms
- Firmware upgradability over any com port
- User configurable:
  - Response delay
  - Push port

Radar Design

- Operating frequency: 24.0–24.25 GHz (K-band)
- Matrix of 16 radars
- No manual tuning to circuitry
- Transmits modulated signals generated digitally
- No temperature-based compensation necessary
- Bandwidth stable within 1%
- Printed circuit board antennas
- Antenna vertical 6 dB beam width (two-way pattern): 65°
- Horizontal field of view: 90°
- Antenna two-way sidelobes: -40 dB
- Transmit bandwidth: 245 MHz
- Un-windowed resolution: 2 ft. (0.6 m)
- RF channels: 8
- Self-test for verifying hardware functionality
- Diagnostics mode for verifying system functionality

Configuration

- Automatic and manual configuration of lanes, stop bars and zones
- Lane positioning increment: 1 ft. (0.3 m)
- Four-sided zones of any shape and size
- Overlapping zones supported
- Sensor reconfiguration without detection disruption supported
- Graphical user interface with traffic pattern display
- Counting and Pulsed channels supported
- Windows Mobile®–compatible software
- Supported operating systems:
  - Windows Mobile v5.0 or greater (Socket Mobile 650-M)
  - Windows XP
  - Windows Vista
  - Windows 7
- Software-supported functionality:
  - TCP/IP connectivity
  - Sensor configuration back-up and restore
  - Backed-up sensor configurations can be viewed and edited
  - Real-time traffic visualization for performance verification

and traffic display
  - Zone and channel actuation display
  - Virtual sensor connections for demonstration and training
  - Local or remote sensor firmware upgradability

Operating Conditions

- Accurate performance in:
  - Rain up to 1 in. (2.5 cm) per hour
  - Freezing rain
  - Snow
  - Wind
  - Dust
  - Fog
  - Changing temperature
  - Changing lighting (even direct light on sensor at dawn and dusk)
- Ambient operating temperature: -40°F to 165°F (-40°C to 74°C)
- Humidity: Up to 95% RH (non-condensing)

Testing

- Tested under FCC CFR 47, part 15, section 15.249
- FCC certification on product label
- FCC regulation-compliant for life of the sensor
- Tested under IEC 61000-4-5 class 4
- Tested under NEMA TS 2-2003
  - Shock pulses of 10 g, 11 ms half sine wave
  - Vibration of 0.5 g up to 30 Hz
  - 300 V positive/negative pulses
  - Stored at -49°F (-45°C) for 24 hours
  - Stored at 185°F (85°C) for 24 hours
  - Operation at -29.2°F (-34°C) and 10.8 VDC
  - Operation at -29.2°F (-34°C) and 26.5 VDC
  - Operation at 165.2°F (74°C) and 26.5 VDC
  - Operation at 165.2°F (74°C) and 10.8 VDC

Manufacturing

- Manufactured in the USA
- Surface mount assembly
- IPC-A-610C Class 2–compliant
- Operational testing:
  - Sub-assembly test
  - 48-hour unit level burn-in
  - Final unit test
- Unit test results available

Support

- Training and tech support available from Wavetronix
- Wavetronix training includes:
  - Installation and configuration instruction to ensure accu-

       rate performance
- □ Classroom and in-field instruction
- □ Knowledgeable trainers
- □ Use of presentation materials
- □ Virtual configuration using computer playback
- □ Instruction in use of computer and handheld devices and other necessary equipment
- ■ Wavetronix tech support includes:
  - □ Technical representatives available for installation and configuration
  - □ Ongoing troubleshooting and maintenance support

Documentation

- ■ Instructional training guide
- ■ Comprehensive user guide
- ■ Installer quick-reference guide
- ■ User quick-reference guide
- ■ Documentation available upon request:
  - □ FCC certification
  - □ IEC 61000-4-5 class 4 test report

Warranty

- ■ Two-year warranty against material and workmanship defect Warranty (see SmartSensor Extended Warranty datasheet for complete details)

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The advertised detection accuracy of the company's sensors is based on both external and internal testing, as outlined in each product's specification document. Although our sensors are very accurate by industry standards, like all other sensor manufacturers we cannot guarantee perfection or assure that no errors will ever occur in any particular applications of our technology. Therefore, beyond the express Limited Warranty that accompanies each sensor sold by the company, we offer no additional representations, warranties, guarantees or remedies to our customers. It is recommended that purchasers and integrators evaluate the accuracy of each sensor to determine the acceptable margin of error for each application within their particular system(s).