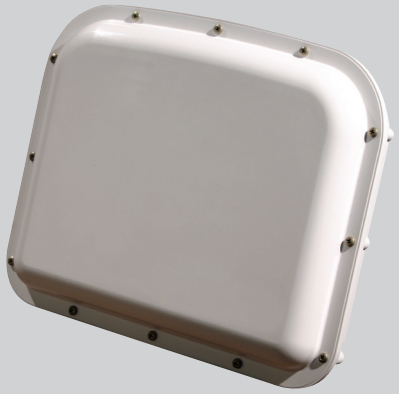
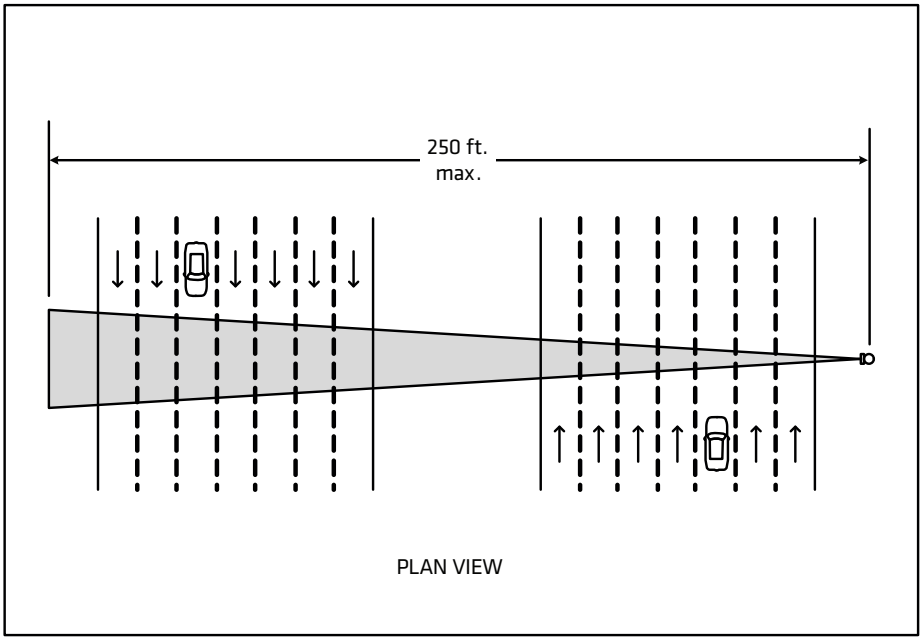
SmartSensor HD

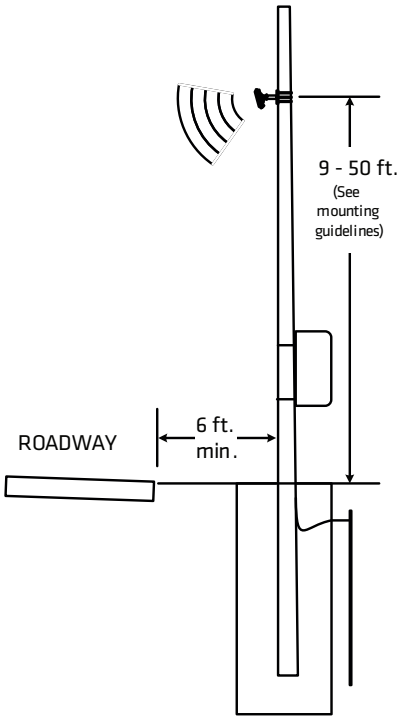
The SmartSensor™ HD delivers consistently accurate data for traffic monitoring systems, even in slow or congested traffic. Operating at five times the bandwidth of the original SmartSensor, the HD also has five times the resolution, a detection range of 250 feet and the ability to simultaneously detect up to 22 lanes of traffic.

Features

- Detects up to 22 lanes of traffic
- Reports the speed, length and classification of individual vehicles
- Works over barriers, guardrails, medians and gores
- Accurately detects lane-changing vehicles
- Patented Digital Wave Radar II™ technology
- Patented auto-configuration process
- Easy to install and operate
- Remote accessible for easy management
- Flash upgradeable
- Integrates with Wavetronix Click products
- Requires no tweaking or tuning
- All-weather, all-condition performance
- No performance variance due to temperature
- Flash memory protects data storage
- Automated manufacturing process







WX-500-0280

Technical Specifications

Measured Quantities

- Per-lane interval data: volume, average speed, occupancy, classification counts, 85th percentile speed, average headway, average gap, speed bin counts, direction counts
- Classification bins: 8
- Interval speed bins: 15
- Per-vehicle data: speed, length, class, lane assignment, range
- Presence data in 22 lanes

Detectable Area

- Number of lanes: up to 22
- Detection range: 6 to 250 ft. (1.8 m to 76.2 m)
- Any lane spacing is supported
- Detection over barriers is supported

Performance

- Per-direction volume accuracy:
  - Typical: 98%–99%
  - Minimum: 95%
- Per-lane volume accuracy:
  - Typical: 98%–99%
  - Minimum: 90%
- Minimum separation between two vehicles: 5.5 ft. (1.67 m)
- Per-direction average speed accuracy: ±3 mph (5 kph)
- Per-lane average speed accuracy: ±3 mph (5 kph)
- Percentage of vehicles generating per-vehicle-speed measurements:
  - Typical: 98%
  - Minimum: 95%
- Per-vehicle speed measurement accuracy: ±3mph (5 kph) for 90% of measurements
- Method of speed measurement: dual radar speed trap
- Per-direction occupancy accuracy: ±10%
- Per-lane occupancy accuracy: ±20%
- Classification accuracy:
  - Typical: 90%
  - Minimum: 80%

Performance Maintenance

- No cleaning or adjustment necessary
- No battery replacement necessary
- No recalibration 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 polycarbonate
- Outdoor weatherable: UL 746C, IP66 rated
- 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-DTL-26482

Ordering Information

SmartSensor HD
101-0415

Retrofitted SmartSensor HD
101-0416

SmartSensor HD with rotating backplate
101-0403

ACCESSORIES

CLK-201/202 – Click 201/202 power supply

CLK-200 – Click 200 surge protector

CLK-112/114 – Click 112/114 rack cards

SS-706-xxx/707 – SmartSensor 8-conductor cable

SS-611 – SmartSensor mount

Wavetronix
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Power

- Power consumption: 7.6 W
- Supply voltage: 10–28 VDC

Communication Ports

- Com ports:
  - Full-duplex RS-232 with RTS/CTS
  - Half-duplex RS-485
- Firmware upgradability over any com port
- User configurable:
  - Baud rate
  - Response delay
  - Data push
  - RS-232 flow control
- Supported baud rates: 9600, 19200, 38400, 57600 and 115200 bps

Data Protocols

- Protocol support for interval, event, presence
- Data protocol document available free of charge
- Interval data for each lane:
  - Sensor ID
  - Timestamp
  - Volume
  - Average speed
  - Occupancy
  - Classification counts
  - Speed bin counts
  - Direction counts
  - Average headway
  - Average gap
  - 85th percentile speed
- Event data for each detection:
  - Sensor ID
  - Timestamp
  - Lane assignment
  - Speed
  - Length
  - Class
  - Range
- Presence data for each lane:
  - Sensor ID
  - Per-lane presence

Data Buffering

- At least 9,000 intervals stored internally
- Intervals timestamped using real-time clock

Radar Design

- Operating frequency: 24.0–24.25 GHz (K-band)
- Dual-radar
- 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°
- Antenna horizontal 6 dB beam width (two-way pattern): 6°
- Antenna two-way sidelobes: -40 dB
- Transmit bandwidth: 245 MHz *
- Un-windowed resolution: 2 ft. (0.6 m)
- RF channels: 4
- EIRP: 18.1 dB
- Antenna gain: 14 dB

Configuration

- Auto-configuration of lanes/detection zones:
  - Internal to the sensor
  - Uses positions of the vehicles
  - Based on probability density function estimation
- Manual configuration supported
- Lane boundary increment: 1 ft. (0.3 m)
- Graphical user interface with traffic pattern display
- Pointing assistant for horizontal alignment
- Windows Mobile–compatible software
- Supported operating systems:
  - Windows Vista
  - Windows 7
  - Windows 8
  - Windows 10
- Software-supported functionality:
  - Auto-find baud rate
  - Auto-find serial port
  - TCP/IP connectivity
  - Sensor configuration back-up and restore
  - Virtual sensor connections

Operating Conditions

- Accurate performance in:
  - Rain up to 2 in. (5.08 cm) per hour
  - Freezing rain
  - Snow
  - Wind
  - Dust

** Limited operating frequency and bandwidth available in some areas.*

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

Documentation

- Comprehensive user guide
- Installer quick-reference guide
- User quick-reference guide
- Documentation available upon request:
  - Volume accuracy
  - Speed accuracy
  - Occupancy accuracy
  - Classification accuracy
  - Auto-configuration performance
  - FCC certification
  - CE certification
  - NEMA TS 2-2003 third-party test data
  - NEMA 250 third-party test data

Warranty

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

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).