KINGSTON CITY COUNCIL

Public Hearing on Ordinance 21-10-12-01
5:45 P.M.
(an ordinance re-zoning Tax Map 058L, Group F, Parcel 003.01, and a portion of the adjacent road rights-of-way of Lawnville Road and Lewis Drive from R-1 residential to R-2)

Regular Meeting

Tuesday, November 9, 2021
6:00 P.M.
(Workshop to be held at 5:00 P.M. to continue discussion of ballfield lighting)

A G E N D A

1. **Call to Order**
2. **Invocation and Pledge**
3. **Roll Call**
4. **Approval of Previous Minutes**

5. **Citizens Comments/Persons to Appear/Proclamations**
   A. A proclamation honoring the Division 1-A State Champion Kingston Boy's Golf Team and proclaiming November 9, 2021 as Kingston Boys Golf Team Day in the City of Kingston

6. **Reports**
   A. Mayor and Council
   B. City Manager's Report

7. **Addition of items to the meeting agenda received after close of agenda deadline (By unanimous consent of all members present)**

8. **Unfinished Business**
   A. Consideration of the second reading of Ordinance 21-10-12-01, an ordinance amending the zoning map of the City of Kingston, Tennessee by rezoning Tax Map 058L, Group F, Parcel 003.01, and a portion of the adjacent road rights-of-way of Lawnville Road and Lewis Drive from R-1 residential to R-2

9. **New Business**
   A. Consideration to authorize the City Manager to solicit Requests for Qualifications from interested firms for the design of gateway signage for the City of Kingston
   B. Consideration to authorize the City Manager to solicit sealed bids for radar traffic light controls
   C. Consideration to authorize the City Manager to purchase a 2013 Dodge Ram 5500 Bucket Truck from Custom Truck One Source in an amount not to exceed $69,900
   D. Consideration to authorize the surplusing of equipment by multiple departments

ALL CITY OF KINGSTON MEETINGS ARE OPEN TO THE PUBLIC. THIS MEETING WILL ALSO BE LIVESTREAMED ON OUR WEBSITE, WWW.KINGSTONTN.GOV AND POSTED TO YOUTUBE AND OUR FACEBOOK PAGE.

REGULAR MEETING KINGSTON CITY COUNCIL
TUESDAY, OCTOBER 12, 2021 – 6:00 P.M.
KINGSTON CITY HALL

The Kingston City Council met in regular session on Tuesday, October 12, 2021 at 6:00 p.m. Mayor Tim Neal called the meeting to order. Council Member Tony Brown gave the Invocation and Vice-Mayor Becky Humphreys led the pledge. Upon roll call the following members were present: Council Member Tony Brown, Council Member Randy Childs, Vice-Mayor Becky Humphreys, Council Member Tara Stockton, Council Member Stephanie Wright and Mayor Neal. Staff present: City Manager David Bolling, City Clerk Kelly Jackson and City Attorney Jack McPherson. Council Member Jeff Griffis was absent.

PREVIOUS MINUTES

A motion was made by Vice-Mayor Humphreys, second by Member Childs to waive the reading and approve as written the minutes of the regular meeting on September 14, 2021 and the Special Called meeting on September 28, 2021

The motion passed with a unanimous roll call vote. 6 Ayes

CITIZENS COMMENTS/PERSONS TO APPEAR/PROCLAMATIONS:

- A Proclamation proclaiming the month of October 2021 as Keep the Tennessee River Watershed Beautiful Month (Accepting representative not able to attend. Signed Proclamation will be sent via mail)
- A Proclamation proclaiming the month of October 2021 as National Chiropractic Health Month.

REPORTS – MAYOR AND COUNCIL –

- Member Brown- advised the 911 Board Packet was included in the City Manager's report; thanked Mayor Neal, City Attorney McPherson and City Manager for securing the donation for the bathrooms
- Member Childs- thanked REU for repairing lights at the Soccer Field; thanked Mayor Neal for getting the donation for the bathrooms.
- Vice Mayor Humphreys- Parks & Recreation reported that flag football begins on Sunday; Planning continues for Fall Street Fest on October 23rd; Outdoor Kingston will host Pup-O-Treat event at Fort Paws on October 28th.
- Member Stockton- Thanked REU for helping install some Veteran Banners since our bucket truck is out of commission.

CITY MANAGER – Mr. Bolling provided updates on the following topics:

- Thanked REU for their help in several ways recently.
- Bond sale is set for October 20th at 10:00 being awarded an AA- bond rating. We should be ready to close in mid-November.
- Recent meeting at Ladd Park with Dept. of Tourism regarding preliminary design work to pursue grant funding.
- TWRA advised that the Ladd Park ramp replacement is still on schedule.
- ARC grant available with pre-application in December (possibly up to $750,000 available)
- Park Facility Restrooms had been locked due to vandalism. Repairs have been made and as of today they are back open but will be locked at night.
- City-wide Brush collection October 25th-November 5th.
- Greenway status update-weather permitting the slope work should be complete within the next two weeks.

ADDITION OF ITEMS TO THE MEETING AGENDA RECEIVED AFTER CLOSE OF AGENDA DEADLINE (BY UNANIMOUS CONSENT OF ALL MEMBERS PRESENT). NONE

UNFINISHED BUSINESS:

A. **Consideration of the second reading of Ordinance 21-09-14-01, an ordinance amending the annual budget for the City of Kingston, Tennessee for fiscal year 2021-2022.**

A motion was made by Member Wright, second by Member Childs to approve second reading of Ordinance 21-09-14-01, an ordinance amending the annual budget for the City of Kingston, Tennessee for fiscal year 2021-2022.

The motion passed with a unanimous roll call vote. 6 Ayes

NEW BUSINESS –

A. **Consideration of Resolution 21-10-12-01, a resolution authorizing the City of Kingston to participate in the Public Entity Partners Property Conservation Matching Grant Program.**

A motion was made by Member Wright, second by Vice-Mayor Humphreys to authorize the City of Kingston to participate in the Public Entity Partners Property Conservation Matching Grant Program

The motion passed with a unanimous roll call vote. 6 Ayes

B. **Consideration of the first reading of Ordinance 21-10-12-01, an ordinance amending the zoning map of the City of Kingston, Tennessee by rezoning Tax Map 058L, Group F, Parcel 003.01, and a portion of the adjacent road rights-of-way of Lawnville Road and Lewis Drive from R-1 residential to R-2.**

A motion was made by Member Wright, second by Member Stockton to approve the first reading of Ordinance 21-10-12-01, an ordinance amending the zoning map of the City of Kingston, Tennessee by rezoning Tax Map 058L, Group F, Parcel 003.01, and a portion of the adjacent road rights-of-way of Lawnville Road and Lewis Drive from R-1 residential to R-2.

The motion passed with a unanimous roll call vote. 6 Ayes

C. **Consideration of approval to surplus items as requested by Public Works**

A motion was made by Member Childs, second by Member Stockton approve the request to surplus items listed by Public Works

The motion passed with a unanimous roll call vote. 6 Ayes

D. Consideration to authorize withdrawing from the TDOT Surface Transportation Program.

City Manager Bolling explained that we received an updated quote from Arcadis ($88,000) and Rogers Group (estimate only-this service will have to be bid) regarding this project and requests that Council give some guidance on proceeding.

A motion was made by Member Brown, second by Member Childs to withdraw from the TDOT Surface Transportation Program.

A motion was made by Member Brown, second by Member Childs to amend the motion to withdraw and to go into contract with Arcadis for $88,136.

Further discussion ensued about the project.

The motion to amend (*A motion was made by Member Brown, second by Member Childs to amend the motion to withdraw and to go into contract with Arcadis for $88,136.*) passed with a unanimous roll call vote. 6 Ayes

The amended motion to go into contract with Arcadis for $88,136 passed with a unanimous roll call vote. 6 Ayes

E. Consideration to authorize the City Manager to solicit bids for the purchase of a bucket truck for Public Works.

A motion was made by Member Stockton, second by Vice-Mayor Humphreys to authorize the City Manager to solicit bids for the purchase of a bucket truck for Public Works.

(Member Brown clarified that this is a request for bids only with no obligation to purchase at this time.)

The motion passed with a unanimous roll call vote. 6 Ayes

Mayor Neal adjourned the meeting at 6:27 p.m.

APPROVED _____

_____
Tim Neal, Mayor

ATTEST:

_____
City Clerk

CITY OF

Kingston

TENNESSEE

PROCLAMATION

WHEREAS, the City of Kingston is the County seat of Roane County, Tennessee; and,

WHEREAS, the City of Kingston wishes to honor the Kingston Boys Golf Team; and,

WHEREAS, the Kingston Boys Golf Team and Mayor Tim Neal representing the City of Kingston hereby set aside November 9, 2021, in honor of this team and in recognition of their accomplishments as follows:

- Finished with a season record of 51-7-2
- Won the District 3 championship
- Won the Region 2 championship
- Colby Johnson and Blake Woody finished top 10 in the state tournament and received all state honors.
- Finished the season as the Tennessee division 1-A state champions.

Members of the team include: Will Bacon, Alex Chandler, Kaiden Gurney, Braeden Hartup, Colby Johnson, Parker Jones, Will Mioduski, Jonas Raymond, Nolan Raymond and Blake Woody. Head Coach Mike Neal and Assistant Landon Hardon.

WHEREAS, the City of Kingston wishes to thank the Kingston Boys Golf Team for their contribution to the city and for setting an example of excellence for the citizens of Kingston; and

THEREFORE, I, Timothy F. Neal, Honorable Mayor of the City of Kingston, Tennessee, do hereby proclaim the 9th day of the month of November 2021, Kingston Boys Golf Team Day; and I urge all citizens to acknowledge their contribution to our city.

IN WITNESS WHEREOF, I have hereunto set my hand and caused this seal to be affixed on November 9, 2021.

_____

Timothy F. Neal, Mayor
City of Kingston, Tennessee

ORDINANCE NO. 21-10-12-01

AN ORDINANCE AMENDING THE ZONING MAP OF THE CITY OF KINGSTON, TENNESSEE BY REZONING PROPERTY FROM R-1, RESIDENTIAL DISTRICT TO R-2, RESIDENTIAL DISTRICT

WHEREAS, the City Council of the City Kingston, in accordance with Sections 13-7-203 and 13-7-204 of the Tennessee Code Annotated, may amend the zoning ordinance and zoning map; and,

WHEREAS, on August 17, 2021, the Kingston Planning Commission recommended that the zoning map be amended by rezoning the property described below from R-1, Residential to R-2, Residential District.

NOW, THEREFORE, BE IT ORDAINED by the Mayor and City Council of the City of Kingston, Tennessee that:

Section 1. The Zoning Map of the City of Kingston is hereby amended by rezoning Tax Map 058L, Group F, Parcel 003.01, and a portion of the adjacent road rights-of-way of Lawnville Road and Lewis Drive, as shown on the attached map, from R-1 Residential to R-2, Residential District.

Section 2. This ordinance shall take effect upon final passage, the public welfare requiring it.

Passed on first reading: 10-12, 2021.

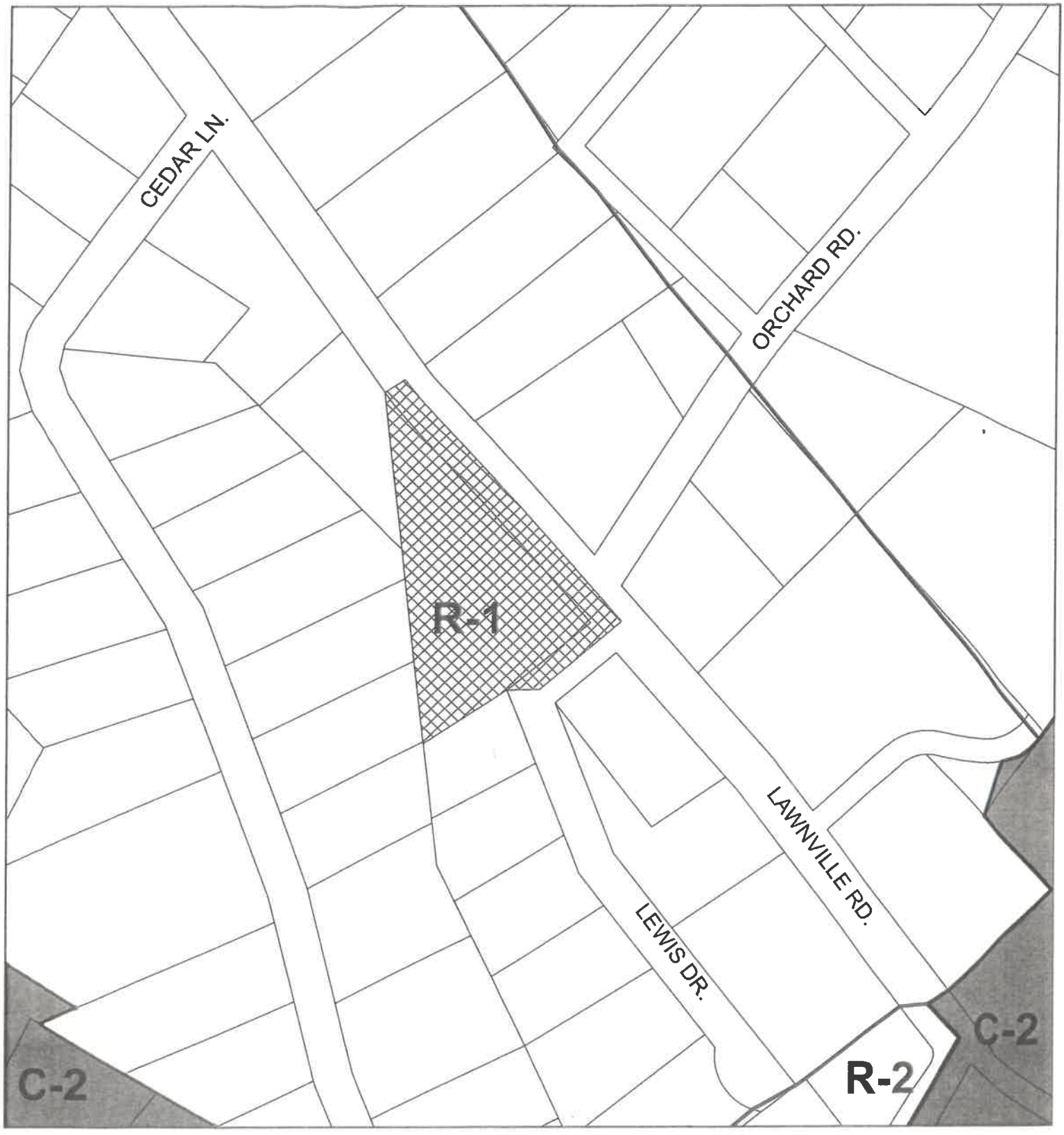
Passed on second reading: _____, 2021.

Public hearing held: _____, 2021.

_____
Mayor

ATTEST:

_____
City Clerk



200 100 0 200 Feet

PROPOSED REZONING

PROPOSED REZONING: R1 TO R2

Kingston, Tennessee

Map Prepared by:
East Tennessee Development District
Planning Advisory Service
Alcoa, TN
Geographic Information Systems
Map Printed: September 20, 2021
This is not an engineering map.

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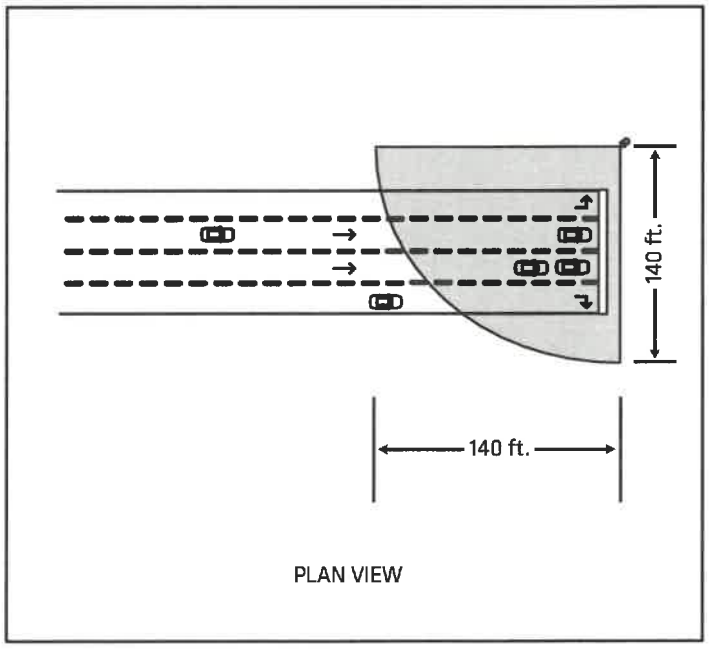
Map Attachment For Ordinance # 21-10-12-01

SmartSensor Matrix

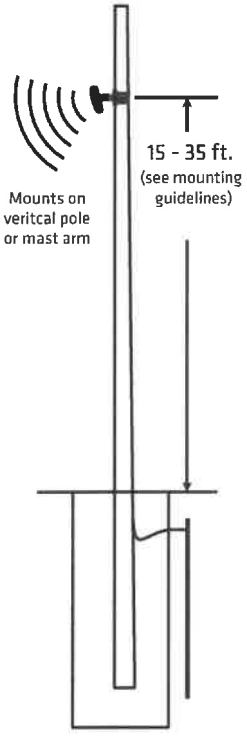
The SmartSensor™ Matrix is a first-of-its-kind stop bar presence detector designed for use at signalized intersections to detect vehicles with the reliability of radar and with all the advantages of non-intrusive detection.

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 back-plate, 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



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
- Either one of the following:
  - A traffic cabinet preassembled backplate with AC/DC power conversion, surge suppression, terminal blocks for cable landing, communication connection points; can be cabinet side mount or rack mount
  - A cabinet interface device (the Click 600 or 650) that performs the following functions: power conversion, surge protection, communication with a connected computer, communication with contact closure devices/traffic controller
- Contact closure input file cards (if necessary):
  - 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)

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
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

- Resistant to corrosion, fungus, moisture deterioration, and ultraviolet rays
- Enclosure: Lexan EXL polycarbonate
- 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: 10–28 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 Vista
  - Windows 7
  - Windows 8
- 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 accurate 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
  - CE certification
  - IEC 61000-4-5 class 4 test report

Warranty

- Two-year warranty against material and workmanship defect Warranty (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).

SmartSensor Matrix Bid Specification

1.0 General. This item shall govern the purchase of aboveground radar presence detector (RPD) equivalent to the Wavetronix SmartSensor™ Matrix.

An RPD detects vehicles by transmitting electromagnetic radar signals through the air. The signals bounce off vehicles in their paths and part of the signal is returned to the RPD. The returned signals are then processed to determine traffic parameters.

RPDs are not affected by normal weather and environmental conditions such as rain, wind, snow, dust, etc. They also do not require cleaning and can maintain performance over a wide range of ambient temperatures.

RPDs provide a non-intrusive means of detecting traffic. This property not only makes them safer to install but also more cost effective than sensors that require roadway modifications or placement.

2.0 Sensor Outputs. The RPD shall present real-time presence data in 10 lanes.

The RPD shall support a minimum of 16 zones.

The RPD shall support a minimum of 16 channels.

The RPD shall support user-selectable zone to channel mapping.

The RPD shall use AND logic to trigger channels when all selected zones are active.

The RPD shall use OR logic to combine multiple zones to a channel output, and shall have channel output extend and delay functionality.

The RPD algorithms shall mitigate detections from wrong way or cross traffic.

The RPD system shall have fail-safe mode capabilities for contact closure outputs if communication is lost.

3.0 Detectable Area.

3.1 Detection Range. The RPD shall be able to detect and report presence in lanes with boundaries as close as 6 ft. (1.8 m) from the base of the pole on which the RPD is mounted.

The RPD shall be able to detect and report presence in lanes located within the 140 ft. (42.7 m) arc from the base of the pole on which the RPD is mounted.

3.2 Field of View. The RPD shall be able to detect and report presence for vehicles within a 90 degree field of view.

3.3 Lane Configuration. The RPD shall be able to detect and report presence in up to 10 lanes.

The RPD shall be able to detect and report presence in curved lanes and areas with islands and medians.

4.0 System Hardware. For each approach to be detected, one RPD corner radar shall be used.

4.1 Connectivity and Surge. Each RPD shall be used with a preassembled backplate or a cabinet interface device.

If a traffic cabinet preassembled backplate, it shall have the following:

- AC/DC power conversion
- Surge protection
- Terminal blocks for cable landing
- Communication connection points
- The preassembled backplate for the RPD shall be a cabinet side mount or rack mount

If a cabinet interface device, it shall be a single device that performs the following functions:

- Provide DC power to up to four connected sensors
- Provide surge protection for those sensors
- Communicate between the device and a connected computer
- Communicate with contact closure devices and/or a traffic controller

4.2 Contact Closure Input File Cards. The RPD may use contact closure input file cards with 2 or 4 channel capabilities.

The contact closure input file cards for the RPD shall be compatible with industry standard detector racks.

5.0 Maintenance. The RPD shall not require cleaning or adjustment to maintain performance.

The RPD shall not rely on battery backup to store configuration information, thus eliminating any need for battery replacement.

Once the RPD is calibrated, it shall not require recalibration to maintain performance unless the roadway configuration changes.

The mean time between failures shall be 10 years, which is estimated based on manufacturing techniques.

6.0 Physical Properties. The RPD shall not exceed 4.2 lbs. (1.9 kg) in weight. .

The RPD shall not exceed 13.2 in. by 10.6 in. by 3.3 in. (33.5 cm x 26.9 cm x 8.4 cm) in its physical dimensions.

All external parts of the RPD shall be ultraviolet-resistant, corrosion-resistant, and protected from fungus growth and moisture deterioration.

6.1 Enclosure. The RPD shall be enclosed in a Lexan EXL polycarbonate.

The enclosure shall be classified "f1" outdoor weatherability in accordance with UL 746C.

The RPD shall be classified as watertight according to the NEMA 250 standard.

The RPD enclosure shall conform to test criteria set forth in the NEMA 250 standard for type 4X enclosures. Test results shall be provided for each of the following type 4X criteria:

- External icing (NEMA 250 clause 5.6)
- Hose-down (NEMA 250 clause 5.7)
- 4X corrosion protection (NEMA 250 clause 5.10)
- Gasket (NEMA 250 clause 5.14)

The RPD shall be able to withstand a drop of up to 5 ft. (1.5 m) without compromising its functional and structural integrity.

The RPD enclosure shall include a connector that meets the MIL-C-26482 specification. The MIL-C-26482 connector shall provide contacts for all data and power connections.

7.0 Electrical. The RPD shall consume less than 10 W.

The RPD shall operate with a DC input between 10 VDC and 28 VDC.

The RPD shall have onboard surge protection.

8.0 Communication Ports. The RPD shall have two communication ports, and both ports shall communicate independently and simultaneously.

Two independent communication ports allow one port to be used for configuration, verification and traffic monitoring without interrupting communications on the dedicated data port.

The RPD shall support the upload of new firmware into the RPD's non-volatile memory over either communication port.

The RPD shall support the user configuration of the following:

- Response delay
- Push port

The communication ports shall support a 9600 bps baud rate.

9.0 Radar Design. The RPD shall be designed with a matrix of 16 radars.

The matrix of 16 radars enables the sensor to provide detection over a large area and to discriminate lanes.

9.1 Frequency Stability. The circuitry shall be void of any manual tuning elements that could lead to human error and degraded performance over time.

All transmit modulated signals shall be generated by means of digital circuitry, such as a direct digital synthesizer, that is referenced to a frequency source that is at least 50 parts per million (ppm) stable over the specified temperature range, and ages less than 6 ppm per year. Any upconversion of a digitally generated modulated signal shall preserve the phase stability and frequency stability inherent in the digitally generated signal.

This specification ensures that, during operation, the RPD strictly conforms to FCC requirements and that the radar signal quality is maintained for precise algorithmic quality. Analog and microwave components within an RPD have characteristics that change with temperature variations and age. If the output transmit signal is not referenced to a stable frequency source, then the RPD is likely to experience unacceptable frequency variations which may cause it to transmit out of its FCC allocated band and thus will be non-compliant with FCC regulations.

The RPD shall not rely on temperature compensation circuitry to maintain transmit frequency stability.

Temperature-based compensation techniques have been shown to be insufficient to ensure transmit frequency stability. One reason this type of technique is not sufficient is that it does not compensate for frequency variations due to component aging.

The bandwidth of the transmit signal of the RPD shall not vary by more than 1% under all specified operating conditions and over the expected life of the RPD.

The bandwidth of an RPD directly affects the measured range of a vehicle. A change in bandwidth causes a direct error in the measured range, i.e., a 5% change in bandwidth would cause a range error of 10 ft. (3 m) for a vehicle at 200 ft. (61 m). If the bandwidth changes by more than 1% due to seasonal temperature variations and component aging, then the RPD will need to be frequently reconfigured to maintain the specified accuracy.

9.2 Antenna Design. The RPD antennas shall be designed on printed circuit boards.

Printed circuit board antennas eliminate the need for RF connectors and cabling that result in decreased reliability. Printed circuit antennas are less prone to physical damage due to their extremely low mass.

The vertical beam width of the RPD at the 6 dB points of the two-way pattern shall be 65 degrees or greater.

The antennas shall cover a 90 degree horizontal field of view.

The sidelobes in the RPD two-way antenna pattern shall be -40 dB or less.

Low sidelobes ensure that the performance from the antenna beam widths is fully achieved.

9.3 Resolution. The RPD shall transmit a signal with a bandwidth of at least 245 MHz.

The bandwidth of the transmit signal translates directly into radar resolution, which contributes directly to detection performance. For example, an RPD that transmits at a low bandwidth will have low radar resolution, which could cause it to count a single

vehicle as two vehicles in adjacent lanes. As another example of the adverse effects of low radar resolution, the response from a sign or other radar target in the roadway may spill over into the lanes of travel and desensitize the radar. In order to achieve the specified detection accuracy in a variety of conditions, the unwindowed radar resolution cannot be larger than 2 ft. (0.6 m) at the half-power level, which requires a bandwidth of 240 MHz. The high radar resolution reduces the problem of vehicle responses getting drowned out by brighter vehicles in adjacent lanes and improves performance for moving and stopped vehicles near roadway targets.

9.4 RF Channels. The RPD shall provide at least 8 RF channels so that multiple units can be mounted in the same vicinity without causing interference between them.

9.5 Verification. The RPD shall have a self-test that is used to verify correct hardware functionality.

The RPD shall have a diagnostics mode to verify correct system functionality.

10.0 Configuration.

10.1 Auto-configuration. The RPD shall have a method for automatically defining traffic lanes, stop bars and zones without requiring user intervention. This auto-configuration process shall execute on a processor internal to the RPD and shall not require an external PC or other processor.

The auto-configuration process shall work under normal intersection operation and may require several cycles to complete.

10.2 Manual Configuration. The auto-configuration method shall not prohibit the ability of the user to manually adjust the RPD configuration.

The RPD shall support the configuring of lanes, stop bars and detection zones in 1-ft. (0.3-m) increments.

When lanes have variable widths or have variable spacing (e.g. gore between lanes), precise resolution is necessary.

10.3 Windows® Mobile-based Software. The RPD shall include graphical user interface software that displays all configured lanes and the current traffic pattern using a graphical traffic representation.

A visual representation of traffic patterns allows an installer to quickly associate specific detections with corresponding vehicles, and it facilitates verification of RPD performance.

The RPD shall include the ability to do counting and pulsed channels.

The graphical interface shall operate on Windows Mobile, Windows XP, Windows Vista and Windows 7 in the .NET framework.

The software shall support the following functionality:

- Operate over a TCP/IP connection
- Give the operator the ability to save/back up the RPD configuration to a file or load/restore the RPD configuration from a file
- Allow the backed-up sensor configurations to be viewed and edited
- Provide zone and channel actuation display
- Provide a virtual connection option so that the software can be used without connecting to an actual sensor
- Local or remote sensor firmware upgradability

11.0 Operating Conditions. The RPD shall maintain accurate performance in all weather conditions, including rain, freezing rain, snow, wind, dust, fog and changes in temperature and light, including direct light on sensor at dawn and dusk.

RPD operation shall continue in rain up to 1 in. (2.5 cm) per hour.

The RPD shall be capable of continuous operation over an ambient temperature range of -40°F to 165.2°F (-40°C to 74°C).

The RPD shall be capable of continuous operation over a relative humidity range of 5% to 95% (non-condensing).

12.0 Testing.

12.1 FCC. Each RPD shall be certified by the Federal Communications Commission (FCC) under CFR 47, part 15, section 15.249 as an intentional radiator.

The FCC certification shall be displayed on an external label on each RPD according to the rules set forth by the FCC.

The RPD shall comply with FCC regulations under all specified operating conditions and over the expected life of the RPD.

12.2 NEMA TS 2-2003 Testing. The RPD shall comply with the applicable standards stated in the NEMA TS 2-2003 standard. Third party test results shall be made available for each of the following tests:

- Shock pulses of 10 g, 11 ms half sine wave
- Vibration of 0.5 g up to 30 Hz
- 300 V positive/negative pulses applied at one pulse per second at minimum and maximum DC supply voltage
- Cold temperature storage at -49°F (-45°C) for 24 hours
- High temperature storage at 185°F (85°C) for 24 hours
- Low temp, low DC supply voltage at -29.2°F (-34°C) and 10.8 VDC
- Low temp, high DC supply voltage at -29.2°F (-34°C) and 26.5 VDC
- High temp, high DC supply voltage at 165.2°F (74°C) and 26.5 VDC
- High temp, low DC supply voltage at 165.2°F (74°C) and 10.8 VDC

13.0 Manufacturing. The RPD shall be manufactured and assembled in the USA.

The internal electronics of the RPD shall utilize automation for surface mount assembly, and shall comply with the requirements set forth in IPC-A-610C Class 2, Acceptability of Electronic Assemblies.

The RPD shall undergo a rigorous sequence of operational testing to ensure product functionality and reliability. Testing shall include the following:

- Functionality testing of all internal sub-assemblies
- Unit level burn-in testing of 48 hours' duration or greater
- Final unit functionality testing prior to shipment

Test results and all associated data for the above testing shall be provided for each purchased RPD by serial number, upon request.

14.0 Support. The RPD manufacturer shall provide both training and technical support services.

14.1 Training. The manufacturer-provided training shall be sufficient to fully train installers and operators in the installation, configuration, and use of the RPD to ensure accurate RPD performance.

The manufacturer-provided training shall consist of comprehensive classroom labs and hands-on, in-the-field, installation and configuration training.

Classroom lab training shall involve presentations outlining and defining the RPD, its functions, and the procedures for proper operation. These presentations shall be followed by hands-on labs in which trainees shall practice using the equipment to calibrate and configure a virtual RPD. To facilitate the classroom presentation and handson labs, the manufacturer-provided training shall include the following items:

- Knowledgeable trainer or trainers thoroughly familiar with the RPD and its processes
- Presentation materials, including visual aids, printed manuals and other handout materials for each student
- Computer files, including video and raw data, to facilitate the virtual configuration of the RPD
- Laptop computers or Windows CE handheld devices with the necessary software, and all necessary cables, connectors, etc.

- All other equipment necessary to facilitate the virtual configuration of the RPD

Field training shall provide each trainee with the hands-on opportunity to install and configure the RPD at roadside. Training shall be such that each trainee will mount and align the RPD correctly.

14.2 Technical Assistance. Manufacturer-provided technical support shall be available according to contractual agreements, and a technical representative shall be available to assist with the physical installation, alignment, and auto-configuration of each supplied RPD. Technical support shall be provided thereafter to assist with troubleshooting, maintenance, or replacement of RPDs should such services be required.

15.0 Documentation. RPD documentation shall include an instructional training guide and a comprehensive user guide as well as an installer quick-reference guide and a user quick-reference guide.

The RPD manufacturer shall supply the following documentation and test results at the time of the bid submittal:

- FCC CFR 47 certification (frequency compliance)
- CE certification
- IED 6100-4-5 class 4 test report (surge)

16.0 Warranty. The RPD shall be warranted free from material and workmanship defects for a period of two years from date of shipment.

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).

SmartSensor Matrix Installation Specification

1.0 General. This item shall govern the installation of an aboveground radar presence detector (RPD) equivalent to the Wavetronix SmartSensor Matrix.

RPDs can provide accurate, consistent, and reliable presence detections provided they are installed properly. The requirements in this specification are intended to ensure proper RPD installation.

2.0 Mounting and Installation.

2.1 Mounting Assembly. The RPD shall be mounted directly onto a mounting assembly fastened to a mast arm, pole or other solid structure.

The RPD mounting assembly shall provide the necessary degrees of rotation to ensure proper installation.

The RPD mounting assembly shall be constructed of weather-resistant materials and shall be able to support a 20-lb. (9.1-kg) load.

2.2 Mounting Location. The RPD shall be mounted at a height that is within the manufacturer's recommended mounting heights.

The RPD shall be mounted at an offset from the first lane that is consistent with the RPD's minimum offset.

The RPD shall be mounted so that at least 20 feet along the farthest lane to be monitored is within the field view of the RPD.

The RPD shall be mounted with its cable connector down and shall be tilted so that the RPD is aimed at the center of the lanes to be monitored. Typically, the RPD is tilted off of vertical by 20–30 degrees.

The RPD shall be mounted on a vertical signal pole or on the horizontal mast arm.

The RPD shall be mounted so that its field of view is not occluded by poles, signs or other structures.

RPDs that are mounted within 20 ft. (6.1 m) of each other or that are monitoring the same intersection shall be configured to operate on different RF channels regardless of the pointing direction of the RPDs.

It is recommended that the manufacturer be consulted to verify final RPD placement if the RPD is to be mounted near large planar surfaces (sound barrier, building, parked vehicles, etc.) that run parallel to the monitored roadway.

2.3 Cabling. The cable end connector shall meet the MILC- 26482 specification and shall be designed to interface with the appropriate MIL-C-26482 connector. The connector backshell shall be an environmentally sealed shell that offers excellent immersion capability. All conductors that interface with the connector shall be encased in a single jacket, and the outer diameter of this jacket shall be within the backshell's cable O.D. range to ensure proper sealing. The backshell shall have a strain relief with enough strength to support the cable slack under extreme weather conditions. Recommended connectors are Cannon's KPT series, and recommended backshells are Glenair Series 37 cable sealing backshells.

The cable shall be the Orion Wire Combo-2204-2002-PVCGY or an equivalent cable that conforms to the following specifications:

- The RS-485 conductors shall be a twisted pair.
- The RS-485 conductors shall have nominal capacitance conductor to conductor of less than 40 pF/ft at 1 kHz.
- The RS-485 conductors shall have nominal conductor DC resistance of less than 16.7 ohms/1000 ft. (304.8 m) at 68°F (20°C).
- The power conductors shall be one twisted pair with nominal conductor DC resistance of less than 11.5 ohms/1000 ft.

(304.8 m) at 68°F (20°C).

- Each wire bundle or the entire cable shall be shielded with an aluminum/mylar shield with a drain wire.

The cable shall be terminated only on the two farthest ends of the cable.

The cable length shall not exceed 2000 ft (609.6 m) for the operational baud rate of RS-485 communications (9.6 Kbps).

If 12 VDC is being supplied for the RPD then the cable length shall not exceed 110 ft. (33.5 m).

If 24 VDC is being supplied for the RPD then the cable length shall not exceed 600 ft. (182.9 m).

Both communication and power conductors can be bundled together in the same cable as long as the abovementioned conditions are met.

2.4 In Cabinet Interface Equipment. The RPD shall be installed using the SmartSensor Matrix Preassembled Traffic Cabinet Backplate or an equivalent that provides input power surge suppression, sensor cable surge suppression, AC to DC power conversion (if necessary), and terminal blocks. The surge protection devices shall meet or exceed the EN 61000-4-5 Class 4 specifications.

2.5 Power Supply. If needed, the RPD shall be installed using the Click™ 202, Click 204 or an equivalent AC to DC power converter that meets the following specifications:

The power converter shall be power rated at 48 W for temperatures less than 140°F (60°C) with a 5% power decrease for each degree increase up to 158°F (70°C).

The power converter shall operate in the temperature range of to -29.2°F to 165.2°F (–34°C to 74°C).

The power converter shall operate in the humidity range of 5% to 95% at 77°F (25°C) non-condensing.

The power converter shall accept an input voltage of 85 to 264 VAC or 120 to 370 VDC.

The power converter shall operate at an input frequency of 47 Hz to 63 Hz.

The power converter shall produce an output voltage of 24 VDC ±4%.

The power converter shall withstand a voltage across its input and output of 3 kV. The power converter shall withstand a voltage across its input and ground of 1.5 kV.

The power converter shall conform to safety standards UL 60950-1 and EN 60950-1 and be certified and tested to meet the limited power source requirement according to clause 2.5. Its output current shall be limited to a maximum current of 4A both under normal and single fault condition; with double/reinforced insulation between its input and output circuits.

The power converter shall conform to EMC standards EN 55022 Class B and EN 61000-3-2, 3.

In brown-out conditions (i.e. < 85 VAC input), the output voltage of the power converter shall be less than 1 VDC.

The terminal blocks shall be color-coded insulation displacement terminal blocks.

The terminal blocks shall be prewired to the other in-cabinet equipment so that no wiring other than cable terminations, connecting input power and connecting input file cards shall be required during installation.

2.6 Input File Cards. The Click 114, Click 112 or an equivalent that meets the following specifications shall be used.

The input file cards shall be compatible with 170, 2070, NEMA TS 1, and NEMA TS 2 style input racks.

The input file card shall translate data packets from the RPD into contact closure outputs.

The input file card shall support presence detection.

The input file card shall receive data packets over an RS-485 bus at a baud rate of 9600 bps.

The input file card shall autobaud and auto-detect an RPD over wired and wireless communication channels that have a maximum latency of 500 ms.

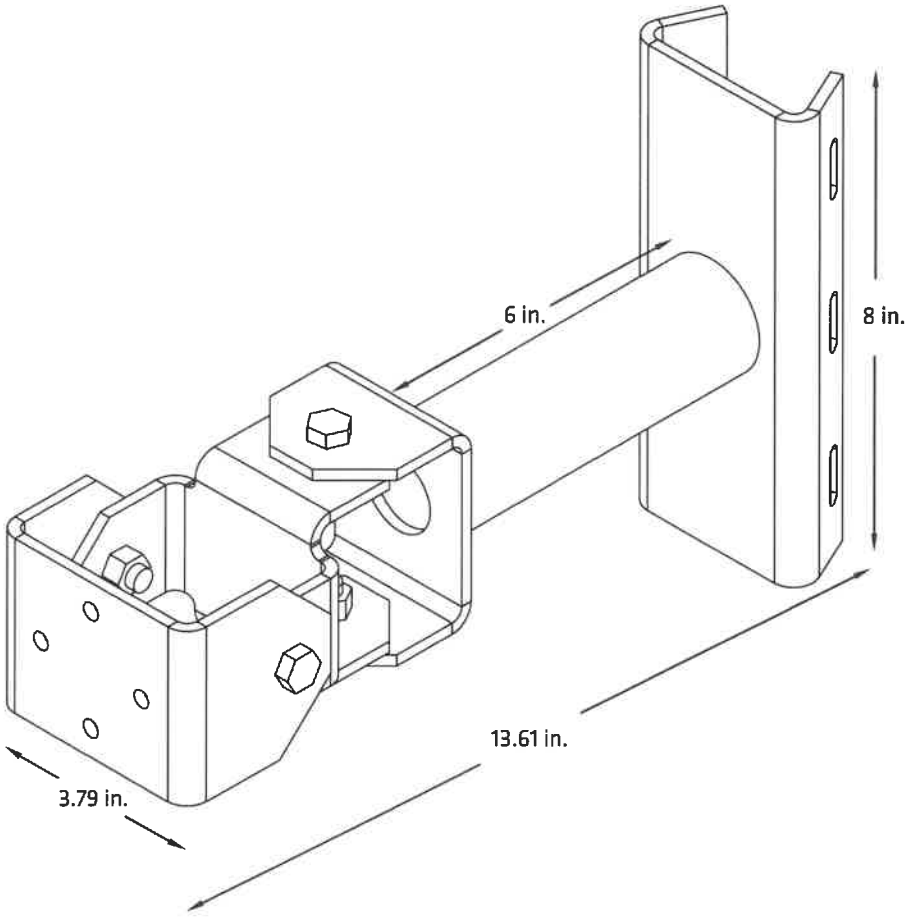
The input file card shall comply with the NEMA TS 2-1998 or newer Traffic Controller Assemblies with NTCIP Requirements (Section 2.8 specification).

SmartSensor Mount

The SmartSensor™ mount makes installation quick and easy by helping you securely mount any of the Wavetronix SmartSensors. Sturdily built of powder-coated aluminum for durability and weather-resistance, this mount can withstand whatever the elements throw at it.

Features

- Two axes of rotation for horizontal and vertical positioning
- Mates with fixed and rotational back-plates on the SmartSensor V, SmartSensor HD, SmartSensor Advance, and SmartSensor Matrix
- Symmetric hole pattern for flexibility in sensor attachment
- Two contact points for attachment to circular or non-circular poles
- On circular poles, another axis of rotation around the pole is available
- Accepts ¾" banding
- Supports a 15-lb. (6.8-kg) load
- Heavy duty aluminum construction makes mount sturdy and long-lasting
- Powder coated for oxidization resistance, allowing mount to withstand the harshest weather conditions



Technical Specifications

Mounting

- Rotational axes: 2
  - NOTE: SmartSensor Advance and SmartSensor Matrix are shipped with rotational backplate for third axis of rotation. SmartSensor V and SmartSensor HD can be ordered with rotational backplate if third axis is required.
- Maximum load: 15 lbs. (6.8 kg)
- Symmetric hole pattern that mates with fixed and rotational SmartSensor backplates
- Contact points with pole: 2
- Slotted for ¾-in. (1.9-cm) banding

Construction

- Constructed of aluminum 0.1875 in. (0.48 cm) thick
- 316 stainless steel hardware
- Powder coated
- Weight: 3 lbs. (1.36 kg)

Ordering Information

SmartSensor mount
SS-611

ACCESSORIES

360-0129 – Extra mount knuckle

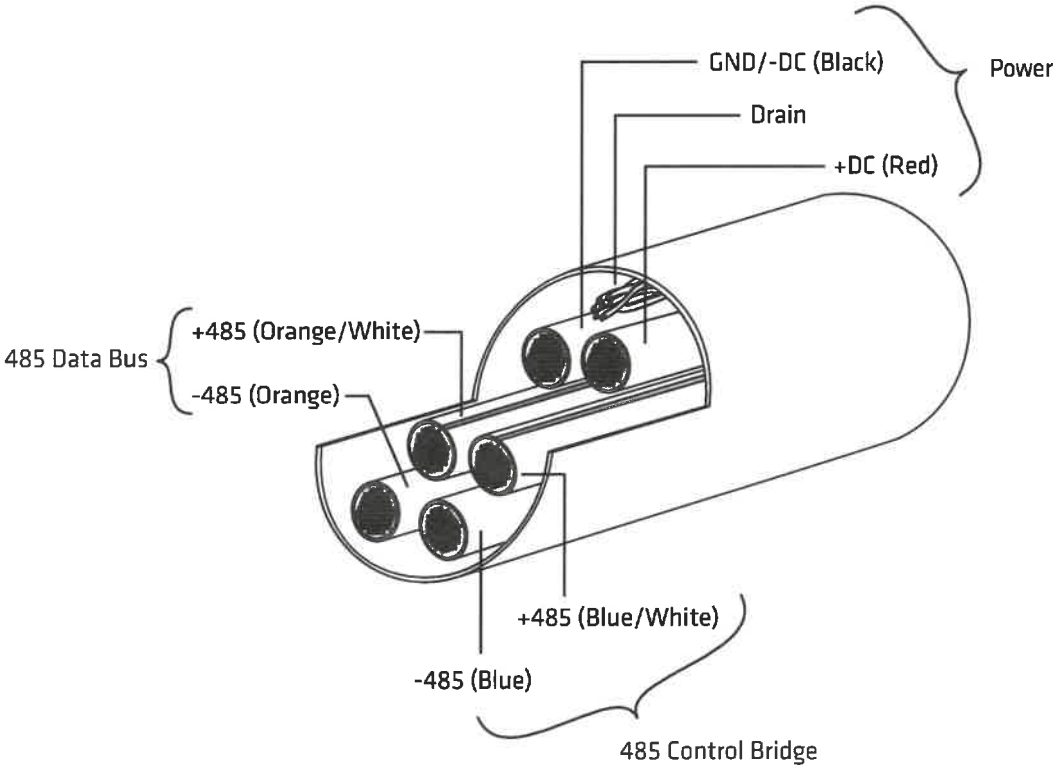
Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

SmartSensor 6-conductor Cable

The SmartSensor™ 6-conductor cable is used with the SmartSensor Matrix and SmartSensor Advance to provide power and communication connectivity to the sensors. Heavy-duty and weather-resistant, this custom cable is ideal for cable runs from the sensor to the cabinet.

Features

- 6-conductor cable that attaches to an 8-pin connector
- Provides power and RS-485 communications between sensor and cabinet
- Connector is keyed to ensure proper connection
- Color-coded for quick and easy wiring to terminal blocks, Click modules
- RS-485 and power conductors are twisted pairs
- Cable assembly is shielded with aluminum/mylar shield and a tinned copper drain wire
- RoHS compliant
- Cable end connector backshell is environmentally sealed, offering excellent immersion capability
- Connector backshell supports cable slack under extreme weather conditions



Technical Specifications

Cable

- RS-485 conductors: 2 twisted pairs
- RS-485 conductor nominal capacitance, conductor to conductor: less than 40 pF/ft at 1 kHz
- RS-485 conductor nominal conductor DC resistance: less than 16.7 ohms/1000 ft. (304.8 m) at 20°C
- Power conductors: twisted pair with nominal conductor DC resistance of less than 11 ohms/1000 ft. (304.8 m) at 20°C
- Cable assembly shielded with aluminum/polyester shield and tinned copper drain wire
- Jacket: 0.053-in. (1.3-mm) gray PVC
- Cable diameter: 0.41 in. (1.04 cm)
- Wire gauges:
  - Power wires: 20 AWG
  - Comms wires: 22 AWG
- RoHS compliant
- Approvals: UL/cUL Type CMG
- Ambient operating temperature: up to 221°F (105°C) dry / 167°F (75°C) wet
- Flammability rating: FT4
- UV resistant: Yes (per UL 720 Hour Sunlight Resistance Test)
- 600 Volt AWM style 2587

Connector

- Meets MIL-C-26482 specification
- Backshell is environmentally sealed
- Backshell offers excellent immersion capability
- All conductors that interface with the connector are encased in a single jacket
- Backshell has a strain relief with enough strength to support the cable slack under extreme weather conditions

Ordering Information

SmartSensor 6-conductor cable
SS-704-006 – 6-ft. cable
SS-704-020 – 20-ft. cable
SS-704-040 – 40-ft. cable
SS-704-060 – 60-ft. cable
SS-704-080 – 80-ft. cable
SS-704-100 – 100-ft. cable

SmartSensor 6-conductor cable (bulk spool)
SS-705 – minimum 1000 ft. (304.8 m)

8-pin Female Connector
SS-709

Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

SmartSensor 6-conductor Cable Bid Specification

1.0 General. This item shall govern the purchase of a traffic sensor–to–traffic cabinet cable equivalent to the Wavetronix Smart-Sensor™ 6-conductor cable.

2.0 Cable. The cable shall be the Orion Wire Combo-2204-2002-PVCGY or an equivalent cable that conforms to the following specifications:

- The RS-485 conductors shall be 2 twisted pairs.
- The RS-485 conductors shall have nominal capacitance conductor to conductor of less than 40 pF/ft at 1 kHz.
- The RS-485 conductors shall have nominal conductor DC resistance of less than 16.7 ohms/1000 ft. at 20°C.
- The power conductors shall be a twisted pair.
- The power conductors shall have nominal conductor DC resistance of less than 11 ohms/1000 ft. at 20°C.
- The entire cable shall be shielded with an aluminum/polyester shield with a drain wire.
- The cable jacket shall be made of gray PVC that is 0.053 in. (1.3 mm) thick.
- The cable shall have a diameter of 0.41 in. (1.04 cm).
- The power wires in the cable shall be 20 AWG; the communications wires shall be 22 AWG.
- The cable shall be RoHS compliant.
- The cable shall have a UL/cUL type CMG safety approval.
- The cable shall be cable of operating at temperatures up to 221°F (105°C) while dry and 167°F (75°C) while wet.
- The cable shall have an FT4 flammability rating.
- The cable shall be UV resistant, as per the UL 720 Hour Sunlight Resistance Test.
- The cable shall support 600 Volts per AWM style 2587.

3.0 Connector. The cable end connector shall meet the MIL-C-26482 specification and shall be designed to interface with the appropriate MIL-C-26482 connector. The connector backshell shall be an environmentally sealed shell that offers excellent immersion capability. All conductors that interface with the connector shall be encased in a single jacket, and the outer diameter of this jacket shall be within the backshell's cable O.D. range to ensure proper sealing. The backshell shall have a strain relief with enough strength to support the cable slack under extreme weather conditions. Recommended connectors are Cannon's KPT series, and recommended backshells are Glenair Series 37 cable sealing backshells.

SmartSensor Mount Bid Specification

1.0 General. This item shall govern the purchase of a traffic sensor mounting assembly equivalent to the Wavetronix SmartSensor™ mount.

2.0 Mounting. The mounting assembly shall provide at least two axes of rotation to ensure proper installation.

The mounting assembly shall be able to support at least a 15-lb. (6.8-kg) load.

The mounting assembly shall feature a symmetric hole pattern that mates with fixed and rotational SmartSensor backplates.

The mounting assembly shall have two contact points with the pole.

The mounting assembly shall be slotted for 3/4-in. (1.9-cm) banding.

3.0 Construction. The mounting assembly be constructed of 0.1875 in. (0.48 cm) thick or thicker aluminum with 316 stainless steel hardware.

The mounting assembly shall be powder coated for oxidation resistance.

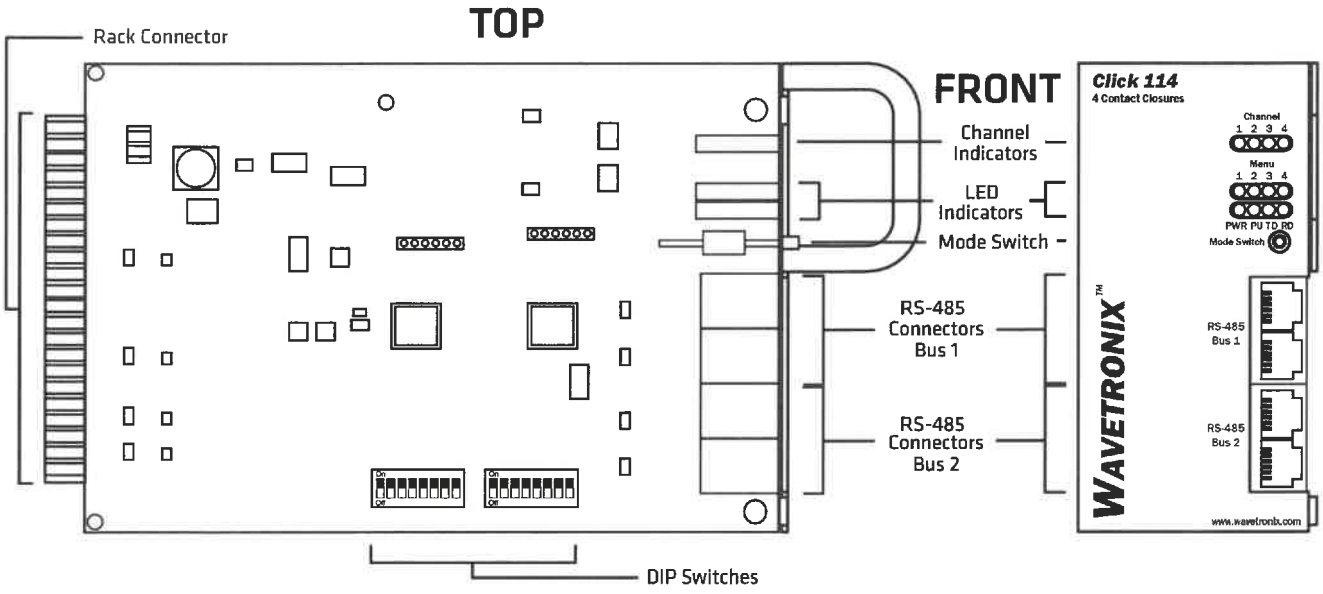
The mounting assembly shall weigh 3 lbs. (1.36 kg)

Detector Rack Cards

The Click 112/114 are 2-/4-channel contact output rack cards that plug into any standard detector rack card slot in any cabinet type. Each output is electrically isolated and is normally open. When the cards receive the appropriate serial message from SmartSensor™ sensors, they will close the contact outputs.

Features

- Compatible with NEMA TS1 and TS2, 170, and 2070 traffic controllers
- Plugs into any standard input file rack card slot
- Fail-safe mode in case of interruption of data flow
- Dual communications ports for separate data and configuration communication
- Uses industry-standard RS-485 communications
- Displays detection via LEDs on faceplate
- Automatically sets baud rate
- Solid state outputs
- Configurable via hardware (DIP switches) or software (front panel interface or Click Supervisor)
- Software configuration is read-only when in Hardware Configuration mode
- Conformal coated



Technical Specifications

Physical

- Weight: 0.25 lbs. (0.11 kg) / 0.29 lbs. (0.13 kg)
- Physical dimensions: 8.3 in. x 4.5 in. x 1.2 in. (21.1 cm x 11.4 cm x 3 cm) / 8.3 in. x 4.5 in. x 2.4 in. (21.1 cm x 11.4 cm x 6.1 cm)
- Ambient operating temp: -29°F to 165°F (-34°C to 74°C)
- Humidity: up to 95% RH

Mounting

- Inserts into an input file rack

Power

- Power supply voltage: 9–30 VDC
- Power consumption: 1 W

Connections

- Detection and power: 44 terminal card edge connector
- Four RJ-11 jacks: two for RS-485 bus 1 and two for RS-485 bus 2

Communication

- Has two independent RS-485 buses, so that the device can be configured without interrupting data flow
- Vehicle information to traffic controller via contact closures

Baud Rates

- Supports the following baud rates:
  - 9600 bps
  - 19200 bps
  - 38400 bps
  - 57600 bps

DIP Switch Configuration Features

- Separate DIP switches for baud rate and channel mapping selection
- DIP switch settings disable faceplate or software configurability

Faceplate Configuration Features

- Mode Switch controls menu operation
- Detection LEDs (red) display the current detection state
- Menu LEDs (Level 2) (red) lets you view and set menu options
- Menu LEDs (Level 1) displays menu item selected, as well as the following status indications:
  - Red LED (PWR) indicates the device has power
  - Blue LED (PU) is reserved for future use
  - Green LED (TD) indicates device is transmitting data
  - Yellow LED (RD) indicates device is receiving data
- Supports configuration of baud rate and channel mapping settings

Ordering Information

Click 112 2-channel detector rack card
CLK-112

Click 114 4-channel detector rack card
CLK-114

Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

Software Configuration Features

- Comes with Click Supervisor, configuration software with the following features:
  - Runs on Pocket PC or Windows desktop or laptop PC (Windows XP and newer)
  - Configures serial communication settings including serial baud rates
  - Configures channel mapping settings
  - Can remotely and directly upgrade the device firmware to add new features to the device
  - Can save/open a configuration to/from a file, allowing a common configuration to be easily programmed into many devices
  - Has customizable drivers that are stored in an XML file that describes the settings for a device as well the graphical user interface for that driver in the configuration software

Data Conversion

- Outputs traffic data as contact closures specified by a Wavetronix SmartSensor

Fail-safe Mode

- Enters a fail-safe mode if it has lost communications with a sensor for more than 10 seconds
- In fail-safe mode, all channel outputs are asserted
- Fail-safe mode will be exited when communication with sensor is restored

Class 4 Compliance

- Complies with the EN 61000-4-5 Class 4 lightning surge protection on the DC input

Contact Closure Outputs

- Dissipates up to a 600 W power surge received on any contact closure output terminal
- Contact closure output terminals can withstand 50 V continuously
- Contact closure outputs are less than 8 ohms in conduction state
- Contact closure outputs in non-conducting state leak less than 1uA
- Contact closure outputs can switch up to 150 mA

Pocket PC & PC Configuration Software

- Comes with Click Supervisor, configuration software with the following features:
  - Runs on Pocket PC or Windows desktop or laptop PC (Windows 2000 and newer)
  - Configures serial communication settings including serial baud rates
  - Can remotely and directly upgrade the device firmware to add new features to the device
  - Can save/open a configuration to/from a file, allowing a common configuration to be easily programmed into many devices
  - Has customizable drivers that are stored in an XML file that describes the settings for a device as well the graphical user interface for that driver in the configuration software

Remote Upgradeability

- Flash memory can be remotely upgraded to add functionality to the firmware when new features have been developed to improve the performance of the installation

Testing

- Passes manufacturer's test before shipping
- Tested under NEMA TS2-2003

Extended Support

- Extended support options are available from Wavetronix; contact a Wavetronix representative for more information

Warranty

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

Click 112/114 Bid Specification

1.0 General. This item shall govern the purchase and installation of a detector rack card (DRC) equivalent to the Wavetronix Click 112/114. The DRC shall be used to output contact closure data from a radar vehicle sensing device (RVSD) equivalent to the Wavetronix SmartSensor™. Test results and other documentation demonstrating performance and capabilities shall be provided.

2.0 Product Description. The DRC shall convert real-time serial data from the RVSD to contact closure data, providing 2- or 4-channel contact closure outputs, depending on the model. The device shall plug into a detection card slot and have two independent RS-485 buses.

3.0 Physical. The two-channel DRC shall not exceed 0.25 lbs. (0.11 kg) in weight. The four-channel DRC shall not exceed 0.29 lbs. (0.13 kg) in weight.

The two-channel DRC shall not exceed 8.3 in. x 4.5 in. x 1.2 in. (21.1 cm x 11.4 cm x 3 cm) in its physical dimensions. The four-channel DRC shall not exceed 8.3 in. x 4.5 in. x 2.4 in. (21.1 cm x 11.4 cm x 6.1 cm) in its physical dimensions.

The DRC shall operate over a temperature range of -29°F to 165°F (-34°C to 74°C).

The DRC shall operate in up to 95% humidity.

4.0 Mounting. The DRC shall mount in an input file rack slot.

5.0 Power. The DRC shall accept 9–30 VDC and shall operate using 1 W of average power.

6.0 Connections. The DRC shall have a 44 way edge connector for detection and power.

The DRC shall also have four RJ-11 jacks, two each for its two RS-485 buses.

7.0 Communication. The DRC shall have two independent RS-485 buses, allowing it to be configured without interfering with data communication.

The DRC's connection to the detector rack shall allow it to pass vehicle information to a traffic controller via contact closures.

8.0 Baud Rates. The DRC shall support baud rates of 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps and 57600 bps.

9.0 DIP Switch Configuration Features. The DRC shall feature separate DIP switches for baud rate and channel mapping selection. When these switches are on, faceplate and software configuration options shall be disabled.

10.0 Faceplate Configuration Features. The DRC shall have a mode switch for controlling menu operation.

The DRC shall have three banks of LEDs. The first bank shall have red LEDs used for detection; these shall indicate the current detection state.

The second bank of LEDs shall aid in viewing and setting menu options and shall consist of red LEDs. The third bank shall display menu items for selecting; they shall also have the following status-indicating functions:

- One LED shall illuminate to indicate the DRC has power
- One LED shall illuminate to indicate when the device is transmitting data
- One LED shall illuminate to indicate when the device is receiving data

The DRC faceplate configuration features shall support the configuration of baud rate and channel mapping settings.

11.0 Software Configuration Features. The DRC shall be provided with configuration software that:

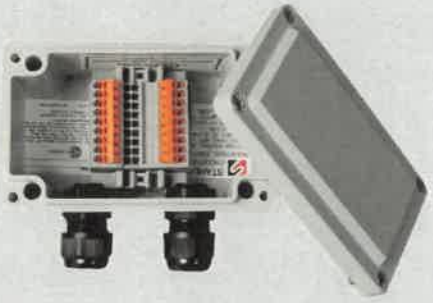
- Runs on both a Pocket PC and a Windows desktop or laptop PC (Windows XP and newer)
- Configures serial communication settings including serial baud rates

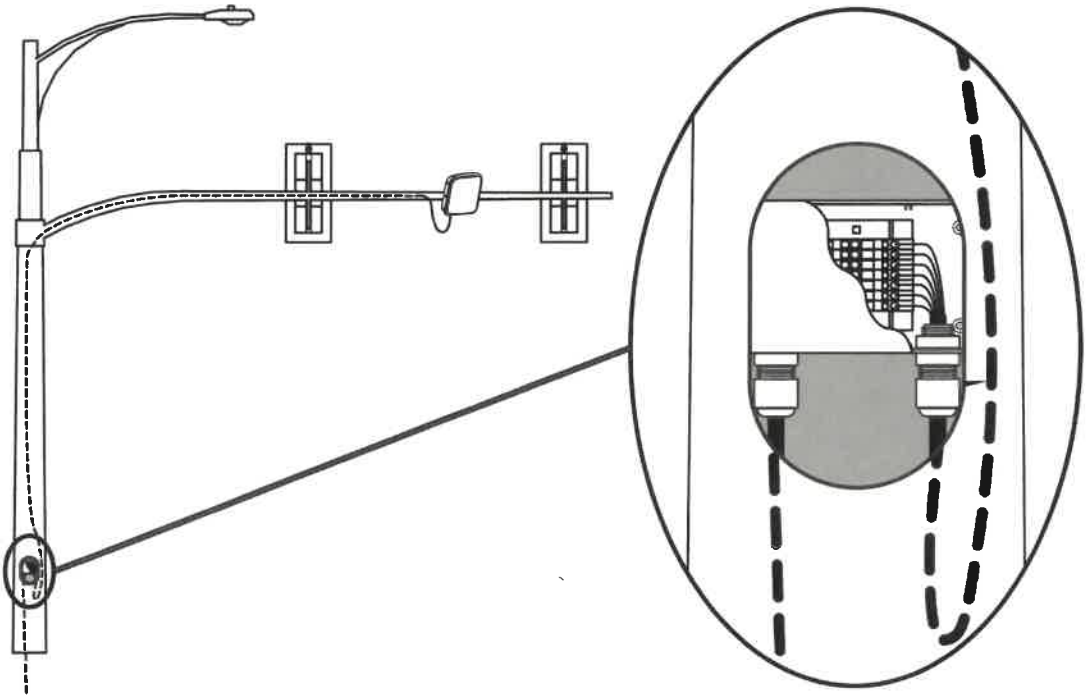
Sensor Cable Junction Box

The sensor cable junction box provides connection between the sensor's pigtail cable and the homerun cable to the cabinet. This box's nine terminal blocks eliminate the need to pull a connectorized cable from the sensor to the cabinet. Its small size allows for an in-line connection that will fit in a hand hole.

Features

- Type 4, 4x enclosure
- Insulation displacement terminal blocks for quick wiring
- Small form factor for placement in traffic pole hand hole
- Cable grips for water resistance
- Same-side cable entry prevents cable path water trails from pooling on cable grip
- Nine terminal blocks means that the box can be used with cables with nine or fewer conductors and drains. namely the Wavetronix SmartSensor™ 6-conductor cable and the 8-conductor cable





Technical Specifications

Physical

- Dimensions: 6 in. x 3.6 in. x 3.1 in. (15 cm x 9 cm 8 cm)
- Cable grip cable diameter: 0.2 in.–0.5 in. (5 mm–12.7 mm)
- Designed to meet IP 66 & NEMA 250 type 1, 3R, 4X, 6P and 12 ratings
- Material: fiberglass
- 316 stainless steel backplate

Connector Block

- 9 terminal blocks
- Connections: insulation displacement
- Nominal current IN: 17.5 A
- Nominal voltage UN: 500 V
- Maximum load current: 17.5 A
- Wire: 24–16 AWG

Ordering Information

Sensor cable junction box
SS-710

ACCESSORIES

SS-704 – SmartSensor 6-conductor cable

SS-706 – SmartSensor 8-conductor cable

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

Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

Sensor Cable Junction Box Bid Specification

1.0 General. This item shall govern the purchase of a junction box (JB) equivalent to the Wavetronix SmartSensor™ cable junction box.

2.0 Physical. The JB shall not exceed 6.3 in. x 3.6 in. x 2.4 in. (16 cm x 9 cm x 6 cm) in its dimensions.

The JB's cable grip shall allow for a cable with a diameter of 0.2 in.–0.5 in. (5 mm–12.7 mm).

The JB shall be designed to meet IP 66 & NEMA 250 type 1, 3R, 4X, 6P and 12 ratings.

The JB shall be made of fiberglass and include a 316 stainless steel backplate.

3.0 Connector Block. The JB shall have nine terminal blocks; these blocks' connections shall employ insulation displacement technology. The JB shall have a nominal current of 17.5 A and a nominal voltage of 500 V. Its maximum load current shall be 17.5 A. The JB shall accept wire ranging in size from 24–16 AWG.

- Configures channel mapping settings
- Can remotely and directly upgrade the DRC firmware to add new features to the DRC
- Can save/open a configuration to/from a file. This allows a common configuration to be easily programmed into many devices.
- Has a customizable driver that is stored in an XML file that describes the settings for a device as well the graphical user interface for that driver in the configuration software.

12.0 Data Conversion. The DRC shall output traffic data as contact closures specified by the RVSD.

13.0 Fail-safe Mode. The DRC shall enter a fail-safe mode if it loses communications with the RVSD for more than ten seconds. In fail-safe mode, all channel outputs shall be asserted.

The DRC shall exit fail-safe mode when communication with the RVSD is restored.

14.0 Class 4 Compliance. The DRC shall comply with the EN 61000-4-5 Class 4 lightning surge protection on the DC input.

15.0 Contact Closure Outputs. The DRC shall dissipate up to a 600 W power surge received on any contact closure output terminal.

The contact closure output terminals on the DRC shall be able to withstand 50 V continuously. The DRC's contact closure outputs shall be less than 8 ohms in conduction state. Outputs in a non-conducting state shall leak less than 1uA. They shall also be able to switch up to 150 mA.

16.0 Remote Upgradeability. The DRC shall have flash memory that can be remotely upgraded to add functionality to the firmware when new features have been developed to improve the performance of the installation.

17.0 Testing. Before shipping, each DRC shall have passed a manufacturer's test.

The DRC shall comply with the applicable standards stated in the NEMA TS2-2003 Standard.

18.0 Extended Support. Extended support options shall be available.

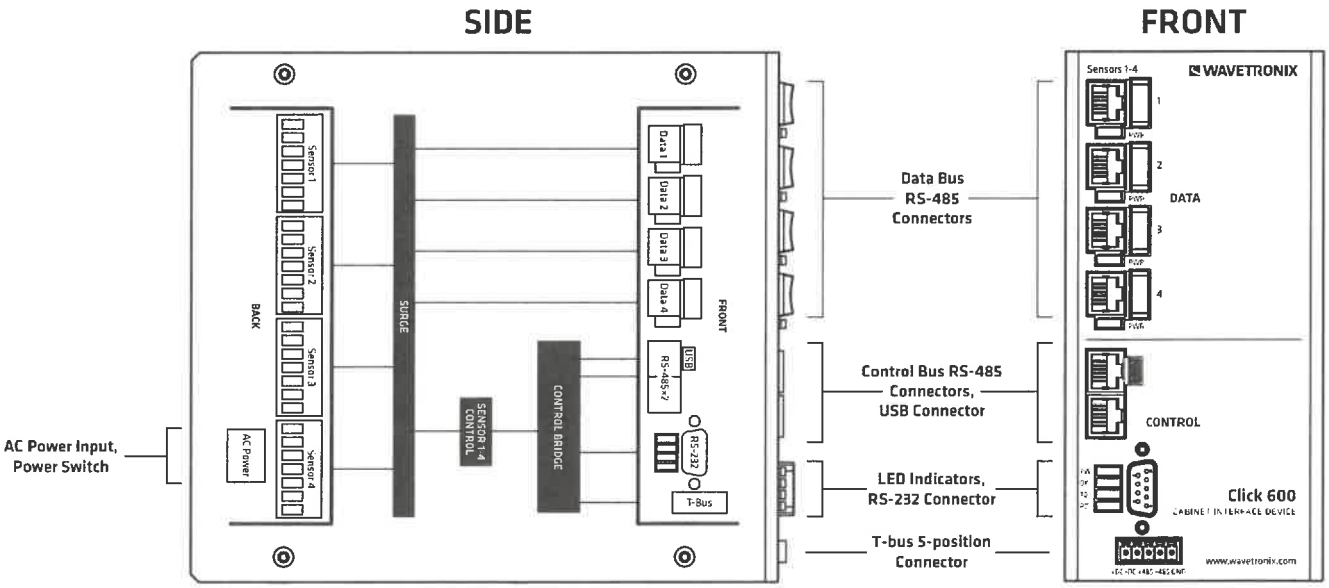
19.0 Warranty. The DRC shall be warranted to be free from material and workmanship defects for a period of one year from date of shipment.

Cabinet Interface Device

The Click 600 cabinet interface device provides all the basic functionality you need for your SmartSensor Matrix or Advance installation in one compact case. This module provides power to your sensors, protects your cabinet from surges, and communicates with contact closure devices.

Features

- Can be used in place of Intersection Preassembled Backplates
- Provides DC power for up to 4 sensors
- Protects the sensor from surges
- Forwards detection data collected from the sensors to contact closure devices (not included)
- Has a power switch for each sensor, allowing you to turn sensors on and off individually
- Has multiple configuration connections for communicating from your computer to the connected sensors:
  - USB
  - RJ-11 jacks for RS-485
  - DB-9 connector for RS-232
  - T-bus port
- Can be used on a shelf or affixed to the cabinet wall



Technical Specifications

Included Components

- Click 600
- AC power cord
- Extra fuse
- Terminal blocks for attaching to cable
- 4 jumper cables

Physical

- Weight: 3.4 lbs. (1.5 kg)
- Physical dimensions: 7.5 in. × 6.7 in. × 3.3 in. (19 cm x 17 cm x 8.4 cm)
- Ambient operating temp: -29°F to 165°F (-34°C to 74°C)
- Humidity: up to 95% RH

Mounting

- Shelf-mount
- Optional U-channel mounting bracket accessory package allows mounting on the side of the traffic cabinet

Power

- Power supply voltage: 90 to 260 VAC
- AC frequency: 50–60 Hz
- Max power: 75 W @ 80°C
- 24 VDC output on sensor connectors

Connections and Communication

- Power
  - AC input: IEC AC input
- Four terminal block connectors on back of device for connecting to sensors
  - Cable terminal points for sensor power and RS-485 communications
  - Matching terminal blocks are included with Click 600
  - Matches terminal blocks used for cable termination with Wavetronix intersection preassembled backplates
- Four RJ-11 jacks on faceplate of device for connecting to contact closure devices
  - Communicate via RS-485
  - Jacks make up physical interface of data bus on device and are for sending detection data from sensors on to contact closure devices such as rack cards (which are not included)
  - Communicate with rack cards via jumper cables (included)
- Four communication ports on faceplate make up physical interface of control bus and are for connecting to the sensors to configure them
  - DB-9 port for communicating via RS-232
  - Two RJ-11 jacks for communicating via RS-485
  - USB mini-B connector
  - T-bus port for connecting to a T-bus; allows Click 600 to send DC power and RS-485 communications to other devices connected to a T-bus

Other Features

- Four multicolored LEDs with activity indicating functions:
  - Red LED (PW) illuminates when device has power
  - Blue LED (OK) extinguishes if device has been disabled by surges
  - Green LED (TD) illuminates when data is transmitted on the control bus
  - Yellow LED (RD) illuminates when data is received on the control bus
- Each data bus RJ-11 jack on the faceplate corresponds to one sensor and has the following features:
  - Switch for turning the power to that sensor on and off
  - LED for indicating when that sensor has power
- Switch for turning power on and off to entire device

NEMA TS2-2003 Testing

- Complies with the applicable standards stated in the NEMA TS2-2003 Standard
- Test results available for each of the following tests:
  - Shock pulses of 10 g, 11 ms half sine wave
  - Vibration of 0.5 Grms up to 30 Hz
  - 300 V positive/negative pulses applied at one pulse per second at minimum and maximum DC supply voltage

Ordering Information

Click 600
102-0402

ACCESSORIES

102-0423 – U-Channel Mounting Bracket Accessory Pack

Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

- 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

FCC Testing

- FCC-compliant

Testing

- Passes manufacturer's test before shipping

Extended Support

- Extended support options are available from Wavetronix; contact a Wavetronix representative for more information

Warranty

- Two-year warranty against material and workmanship defect

Click 600 Bid Specification

1.0 General. This item shall govern the purchase and installation of a cabinet interface device (CID) equivalent to the Wavetronix Click 600. Test results and other documentation demonstrating performance and capabilities shall be provided.

2.0 Product Description. The CID shall be a module that provides power and surge protection and that communicates with contact closure devices. The CID shall be shipped with the AC power cord, jumper cables and terminal blocks necessary for wiring it, as well as with an extra fuse.

3.0 Physical. The CID shall not exceed 3.4 lbs. (1.5 kg) in weight.

The CID shall not exceed 7.5 in. × 6.7 in. × 3.3 in. (19 cm x 17 cm x 8.4 cm) in its physical dimensions.

The CID shall operate in the temperature range of -29°F to 165°F (-34°C to 74°C) and in humidity up to 95% RH.

4.0 Mounting. The CID shall be shelf-mounted. It shall be capable of being mounted on the side of the traffic cabinet with the aid of U-channel mounting brackets.

5.0 Power. The power supply voltage of the CID shall be 90 to 260 VAC. Its AC frequency shall be 50–60 Hz and the maximum power shall be 75 W at 80°C.

The CID's sensor connectors shall output 24 VDC.

6.0 Connections and Communication. The CID shall include the following connections for power and communication:

6.1 Power. The CID shall have an IEC AC input.

6.2 Terminal Block Connectors. The CID shall have four terminal block connectors for connecting to sensors. These connectors shall be for terminating cables that carry power and RS-485 communications to and from the sensors.

6.3 Data RJ-11 Connectors. The CID shall have four RJ-11 jacks for sending detection data from sensors to contact closure devices such as rack cards via jumper cables. This data shall be sent via RS-485. These jacks shall make up the physical interface of a dedicated data bus.

6.4 Control Connectors. The CID shall have four other communication ports. These ports shall make up the physical interface of a dedicated control bus and shall allow users to connect to the sensors and configure them.

- DB-9 port for communicating via RS-232
- Two RJ-11 jacks for communicating via RS-485
- USB mini-B connector
- T-bus port for connecting to a T-bus

7.0 Other features. The CID shall have the following other features:

7.1 LEDs. The CID shall have four multicolored LEDs with activity-indicating functions:

- An LED that indicates when the device has power
- An LED that indicates if the device has been disabled by surges
- An LED that indicates when data is being transmitted on the control bus
- An LED that indicates when data is being received on the control bus.

7.2 Data RJ-11 Jack Features. The four jacks that make up the physical interface of the data bus (and that each correspond to one sensor) shall have a switch for turning their corresponding sensor off and an LED that indicates when that sensor has power.

7.3 Power Switch. The CID shall have a switch for turning power off for the entire device.

8.0 NEMA TS2-2003 Testing. The CID shall comply with the applicable standards stated in the NEMA TS2-2003 Standard. Test results shall be made available for each of the following tests:

- Shock pulses of 10g, 11 ms half sine wave
- Vibration of 0.5 Grms up to 30 Hz
- 300 V positive/negative pulses applied at one pulse per second at minimum and maximum DC supply voltage
- Cold temperature storage at -49°F (-45°C) for 24 hours
- High temperature storage at 185°F (85°C) for 24 hours
- Low temp, low DC supply voltage at -29.2°F (-34°C) and 10.8 VDC
- Low temp, high DC supply voltage at -29.2°F (-34°C) and 26.5 VDC
- High temp, high DC supply voltage at 165.2°F (74°C) and 26.5 VDC
- High temp, low DC supply voltage at 165.2°F (74°C) and 10.8 VDC

9.0 FCC Testing. The CID shall be FCC-compliant.

10.0 Testing. Before shipping, each CID shall have passed a manufacturer's test.

11.0 Extended Support. Extended support options shall be available. Contact the manufacturer's representative for more information.

12.0 Warranty. The CID shall be warranted to be free from material and workmanship defects for a period of two years from date of shipment.

CUSTOM TRUCK ONE SOURCE™

2013 Dodge Ram 5500

ETI ETC37IH Bucket Truck

CHASSIS SPECS

UNIT INFORMATION
VIN: 3C7WRMAL3DG595933
Dash: 37,374 Miles
4x2 Single Axle
Hydraulic Brakes
Pintle/Ball Hitch
-Electric Connection
Single Frame

CAB FEATURES
Standard Daycab
Aerodynamic Mirrors
City Horn

INTERIOR FEATURES
Mid Level Interior
A/C Equipped
Manual Windows
Manual Door Locks
High Back Driver Seat
High Back Passenger Seat
Cruise Control
Tilt Steering Column
AM/FM

GVWR
18,750 LBS.

FRONT AXLE
6000 LB. FAWR

REAR AXLES
13,500 LB. RAWR

REAR SUSPENSION
Leaf Spring

ENGINE
Cummins 6.7L HP
Horizontal Exhaust

TRANSMISSION
Automatic

TIRES/WHEELS
Front Tire: 225/70R19.5
Front Wheel: Steel
Rear Tire: 225/70R19.5
Rear Wheel: Steel

EQUIPMENT SPECS

2013 ETI ETC37IH
S/N: 1113C710551
37 Ft. Platform Height
350 LB. Platform Capacity
Insulated
28 Ft. Side Reach
Continuous Rotation
Upper & Lower Controls



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This Unit Qualifies For Extended Warranty
Call For Details!

PRICE: $69,900
STOCK#: 13478R
EX WORKS: Houston, TX

QUOTE NUMBER: JD1.02-K_21

EXPIRATION DATE: 11/18/2021

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CITY OF
Kingston
TENNESSEE

November 2021 Surplus Items

Finance Dept:

- 12-foot Christmas tree w/ decorations
- Brother typewriter w/ accessories
- 3-Bookcases
- Metal Cabinet w/ doors
- Wood printer stand
- 2-drawer file cabinet
- 2 brochure holders
- Magnetic time keeping board
- Multitude of old 3-ring binders

Parks & Recreation

- 2000 Ford Ranger/ Vin: 1FTYR10C6YPB86056
- 2000 Ford Ranger/ Vin: 1FTYR10C4YPB34344
- 1999 Toro Reelmaster 5200d S/N 03540-90584
- Five Bay Lights

Water Distribution/Collection

- Aries Sewer camera reel & tractor -Serial number: 00011001 (parts only)
- Aries Sewer camera monitor -Serial number: 99011101 (parts only)
- Demac Electric Hoist -Serial number: 089816 (working at time of removal)

KINGSTON BEER BOARD
REGULAR MEETING
Tuesday, November 9, 2021

A G E N D A

A. Call to Order

B. Roll Call

C. Previous Minutes

D. New Business

1. None

ALL CITY OF KINGSTON MEETINGS ARE OPEN TO THE PUBLIC. THIS MEETING WILL ALSO BE LIVESTREAMED ON OUR WEBSITE, WWW.KINGSTONTN.GOV AND POSTED TO YOUTUBE AND OUR FACEBOOK PAGE.

REGULAR MEETING – KINGSTON BEER BOARD
TUESDAY, OCTOBER 12, 2021
KINGSTON CITY HALL

The Regular Meeting of the Kingston Beer Board was held on Tuesday October 12, 2021. Chairman Tim Neal called the meeting to order with the following members present upon roll call: Member Tony Brown, Member Randy Childs, Vice-Chair Becky Humphreys, Member Tara Stockton, Member Stephanie Wright and Chairman Tim Neal. Member Jeff Griffis was absent.

PREVIOUS MINUTES

A motion made by Member Childs, second by Vice-Chair Humphreys to waive the reading and approve as written the minutes of the regular meeting on September 14, 2021.

The motion passed with a unanimous roll call vote. 6 Ayes

Citizens Comments: None

New Business: None

Chairman Neal adjourned the meeting. 6:28 pm

APPROVED _____

_____
Timothy Neal, Chairman

ATTEST:

_____
City Clerk

KINGSTON WATER BOARD
REGULAR MEETING
Tuesday, November 9, 2021

A G E N D A

A. Call to Order

B. Roll Call

C. Previous Minutes

D. Citizens' Comments

E. Utility Director's Report

F. New Business

1. None

ALL CITY OF KINGSTON MEETINGS ARE OPEN TO THE PUBLIC. THIS MEETING WILL ALSO BE LIVESTREAMED ON OUR WEBSITE, WWW.KINGSTONTN.GOV AND POSTED TO YOUTUBE AND OUR FACEBOOK PAGE.

REGULAR MEETING – KINGSTON WATER BOARD
TUESDAY OCTOBER 12, 2021
KINGSTON CITY HALL

The Regular Meeting of the Kingston Water Board was held on Tuesday, October 12, 2021. Chairman Tim Neal called the meeting to order with the following members present upon roll call: Member Tony Brown, Member Randy Childs, Vice-Chair Becky Humphreys, Member Tara Stockton, Member Stephanie Wright and Chairman Tim Neal. Member Jeff Griffis was absent.

PREVIOUS MINUTES

A motion made by Member Wright, second by Member Stockton to waive the reading and approve the minutes as written the minutes of the regular meeting on September 14, 2021

The motion passed with a unanimous roll call vote. 6 Ayes

Citizen Comments – None
Board Comments –

- Member Brown mentioned the water/sewer infrastructure maps from Vaughn & Melton (older maps and some infrastructure has been updated since). Mr. Bolling explained we are attempting to get updated maps from a grant.
- Member Brown suggested that Council instruct the Utility Director to write a letter to the County Mayor and request funds from the county for various water/sewer needs so they are aware that we are interested in receiving funds.
- Member Wright suggested that the letter to the County Mayor also include a request of funds for Tourism as well as water/sewer needs.

UTILITY DIRECTOR'S REPORT – Mr. Bolling gave updates on the following:

- Admin/Staff working to identify potential projects regarding water/sewer infrastructure.
- ARPA funds scorecard for needs assessment. TDEC will begin training in November tentatively.
- State ARPA funds will go to the county which then can be allocated to utilities through an unknown process.
- Roane County Commission formed a committee for ARPA funds and are soliciting projects for partnerships regarding their money. Deadline to submit to this committee is October 30th.
- He will send a letter to the County Mayor as instructed above.

New Business: None

Chairman Neal adjourned the meeting. 6:38 pm

APPROVED _____

_____
Timothy Neal, Chairman

ATTEST:

_____
City Clerk