

# Special Specification 6060

## City Global Positioning System (GPS) Communications Serial Module



### 1. DESCRIPTION

Furnish, install, and make fully operational a City of Houston (City) GPS Serial Communications Module at designated locations as shown on the plans and as detailed in accordance with these specifications. Use the same manufacturer and model for each City GPS Serial Communications Module. The City GPS Serial Communications Module provides a reliable and independent GPS time reference for 2070 controller applications.

### 2. MATERIALS

Provide only equipment that is new, corrosion resistant, and in strict accordance with the details shown on the plans and in the specification. Provide a City GPS Serial Communications Module that is fully compatible with the 2070 controller.

2.1. **GPS Serial Communications Module.** Provide a City GPS Serial Communications Module unit that has the following 2070 controller interface features:

- A GPS receiver that operates in SP3 or SP1 slots in the back of the 2070 controller
- Microwave OS-9 clock update application included (operates with any 2070 -1A or -1B CPU Module)
- Communicates to the 2070 controller via Din 95P connector
- Tracking LED that indicates GPS satellite acquisition status

2.2. **GPS Antenna.** Provide a GPS Antenna that has the following features:

- 28dB gain
- 3m cable
- SMA Male
- Complies with Part 15 of FCC
- Mounted externally on the traffic signal cabinet
- Water and dust resistant

2.3. **C22S Serial Port.** Provide a C22S Serial Port that has the following features:

- DB9 Female connector
- Up to 38,400 bps
- Electrically-isolated
- 2070 SP2/SP4
- Full modem control when used as SP2 (RTS/CTS/DCD)

2.4. **Ethernet Media Converter.** Provide an Ethernet Media Converter unit that has the following additional features:

- Visual Indicators to display status of the following:
  - GPS satellite acquisition
  - Transmitting (TX)/Receiving (RX) for GPS connections
  - Transmitting (TX)/Receiving (RX) for C22S serial connections

- 2.5. **Dimensions.** Maximum allowable dimensions of the Ethernet Media Converter follow:

Height	Width	Depth	Weight
5 in.	1 6/8 in.	8 3/4 in.	2 lb.

- 2.6. **Power.** Provide a City GPS Serial Communications Module that meets the following power specifications:
- 125mA @ 12V
  - LED power status indicator
- 2.7. **Environmental.** Provide a City GPS Serial Communications Module that is designed to operate in the following environmental conditions:
- -40 °C to 85 °C operating temperature range
- 2.8. **Operation.** Once the City GPS Communication Serial Module acquires satellite communication (as shown by LED indicator), ensure the GPS unit then operates as follows:
- It shall have the operating software of the 2070 controller interface with the GPS Communication Module to sync the date and time of the 2070 controller once per minute.

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### 3. CONSTRUCTION

Provide equipment that utilizes the latest available techniques for design and construction with a minimum number of parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality.

Design the equipment for ease of maintenance. Provide component parts that are readily accessible for inspection and maintenance. Provide test points that are for checking essential voltages and waveforms.

- 3.1. **Electronic Components.** Provide this item in accordance with Special Specification "Electronic Components."
- 3.2. **Mechanical Components.** Provide external screws, nuts, and locking washers that are stainless steel; no self-tapping screws will be allowed. Provide parts made of corrosion resistant material, such as plastic, stainless steel, anodized aluminum, or brass. Protect materials from fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.
- 3.3. **Documentation Requirements.** Provide one copy of the manufacturer's operation manual at each installation location. Deliver 1 paper copy of the manufacturer's operation manual per GPS antenna supplied, plus an electronic copy (in either .doc or .pdf format) to the Engineer before the first City GPS Serial Communications Module installation.
- 3.4. **Testing.** City of Houston, hereinafter called the "City," reserves the right to test GPS Serial Communications Modules to ensure quality assurance before installations and random sampling of units being provided to the City. City GPS Communication Modules that show a failure rate above 5% will be removed from the Prequalified Products List (QPL). The City's QPL testing procedures will include the following:
- The City GPS Serial Communication Module will meet the criteria of the specification.
  - The GPS unit demonstrates the operations described in Section 2H of this specification.
  - The City GPS Communication Serial Module and its components will be tested in an environmental chamber (temperature ranges from -40 °C to 85 °C).

- 3.5. **Experience Requirements.** Meet the following requirements, as a minimum, for the Contractor or designated subcontractors involved in the installation and testing of the GPS Serial Communication equipment:
- Have 3 years' experience in the installation of GPS equipment.
  - Have 2 systems where City GPS Communications Modules are installed and the systems have been in continuous satisfactory operation for at least 2 years.
  - Submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the system.
  - Provide necessary documentation of subcontractor qualifications.
- 3.6. **Technical Assistance.** Ensure that a manufacturer's technical representative is available on site to assist the technical personnel at each installation site and with GPS equipment installation and communication system configuration.
- Do not execute the initial powering up of the City GPS equipment without the permission of the manufacturer's representative.
- 3.7. **Warranty.** Ensure equipment, materials, and other appurtenances are warranted by the manufacturer for 5 years following the approval of the system by the Engineer. The warranty will include the specific installation characteristics for the geographic region and project limits.

#### 4. SUBMITTALS

Submit manufacturers' cut sheets / specifications and software for the equipment proposed under these specifications to the City's Traffic Signal and Operations branch at Houston TranStar (713-881-3172) before construction.

#### 5. MEASUREMENT

This item will be measured as each unit furnished, installed, made fully functional, and tested in accordance with these special specifications or as directed. A unit will include one City GPS Serial Communications Module meeting the specifications, standards, and requirements contained herein, antenna, and antenna cabling back to the module, mounting hardware, manufacturer's operation manual, required testing results, manufacturer's technical specification, and the cost of the materials, training, warranty, equipment, and accessories necessary to the complete installation of the unit.

#### 6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "City GPS Communications Module." This price is full compensation for the equipment described under this Item with antenna, cables, and connectors; for documentation and testing, and for the cost of furnishing labor, materials, software, warranty, training, equipment, and incidentals.