ITEM 11680.960571 M - FIBER OPTIC DATA TRANSCEIVER- MULTIDROP, STANDALONE
ITEM 11680.960572 M - FIBER OPTIC DATA TRANSCEIVER- MULTIDROP, RACK MOUNTED

DESCRIPTION:
This work shall consist of furnishing and installing into field cabinets and Variable Message Signs Fiber Optic Data Transceivers of the type designated in the Contract Documents and as ordered by the Engineer. Data transceivers are used to transmit data over fiber between the hubs and the field equipment. Standalone data transceivers are installed in equipment cabinets, and rack mounted transceivers installed in equipment racks in hub cabinets.

MATERIALS:
All material furnished, assembled, fabricated or installed shall be new, corrosion resistant and in strict accordance with all the details shown in the Contract Documents and in these Special Specifications.

Functional Requirements
To insure compatibility and interchangeability with equipment furnished under previous projects, the Fiber Optic Data Transceiver-Multidrop shall be the following:

D19130SHR Self-Healing Ring/Full Duplex Data Transceiver and an R-3 rack manufactured by International Fiber Systems, Inc.
16 Commerce Road
Newtown CT 06470

or equal as approved by the Engineer.

The equipment furnished as part of these items shall meet the following requirements:

a. All equipment furnished under these items shall be from the same manufacturer.
b. Equipment shall operate over the fiber furnished as part of this contract.
c. Transmitter and receiver be fully compatible with each other.
e. Operate in a two-fiber pair self healing drop-insert architecture configuration. Data shall be transmitted over both pairs of fibers with automatic selection of the first arriving pulse.

Specific Requirements
The data transceivers shall meet the following requirements:

Operational

a. Anti-streaming timeout with the timeout adjustable between 4 and 60 seconds and disabled.
b. Adjustment free.
c. Regeneration of the optical signal at each data transceiver.
d. Self healing such that a break in the fiber or the failure of one or more transceivers will not interrupt communications between the data transceiver at the hub and the other remote field units.
e. Switch over to the alternate path within a maximum of 30 ms after detection of a failure.
f. User selection of the transceiver for either master or slave operation.

Optical:

a. Fiber type: Single mode.
b. Optical transmitter: laser.
c. Link loss budget range: minimum 0 to 13 dB.
d. Dynamic range: 0 to 13 dB without external attenuators.
e. Connector: ST.

Data:

a. Data rate: 0 to 19.2 kbps.
b. BER (for any link loss between 0 and 13 dB): < 10^-9
c. Data Interface: Serial RS-232C

Indicators:

Led indicators shall be provided to indicate the following:

- Data transmit (both channels).
- Data received (both channels).
- Power-on

Environmental

Temperature - operating: -40°C to +70°C.
Humidity: 0 to 95% non-condensing.

Electrical Requirements

a. Voltage: 115±20 VAC. An adapter may be used to provide the required power to the stand-alone data transceivers. For rack mounted data transceivers a power supply shall be contained in the rack.
b. Current: 150 mA max.
c. Resettable circuit breakers or fuses shall be provided to protect the equipment. The protection may be provided either as part of the cabinet wiring or as part of the equipment.
d. All equipment shall be hot swappable.
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Mechanical

Stand-Alone
The stand-alone data transceivers shall be suitable for mounting on a shelf or attached to a wall of the cabinet. The maximum size of the transmitter shall be as follows: 180 mm x 150 mm x 25 mm.

Rack Mounted
The rack mounted transceivers shall fit into the rack as described below and shall occupy one rack slot. The slots shall be assigned in accordance with the plans or as directed by the Engineer. The rack shall be furnished as part of the item for rack mounted transceivers.

a. The rack shall contain fourteen (14) fully wired rack slots for data transceivers either point to point, multi-drop or a combination. All power to the rack mounted data transceivers shall be distributed through the rack. The rack shall not be used to house other types of equipment.
b. The rack shall contain an internal power supply with automatic resettable solid state current limiters.
c. Cover plates shall be furnished and installed over each unassigned slot.
d. The maximum dimensions of the rack shall be as follows: 483 mm by 178 mm high by 330 mm deep and shall comply with EIA-19 mounting spacing.

CONSTRUCTION DETAILS:

The Contractor shall install the fiber data transceivers in the equipment cabinets designated on the plans. The data transceivers shall be connected to the fiber optic cable through the fiber optic patch panel and patch cables furnished as part of the cabinet.

The Contractor shall connect the data terminals of the fiber optic data transceivers to the device designated in these contract documents.

Warranties and Guarantees

The Contractor shall provide warranties and guarantees to the State of New York Department of Transportation in accordance with Article 104-08 of the Standard Specifications.

Documentation

Manuals

Six (6) advance copies of equipment manuals furnished by the manufacturer shall be submitted to the Engineer for review at least ten-days prior to the scheduled start of the first Operational Stand-Alone Test. The Engineer will verify the manufacturer’s equipment manual as part of the test and integration process. The equipment manual incorporating the Engineer’s corrections and comments shall be integrated by the Contractor into the operations and maintenance manual as described in the General Requirements. The manuals shall, as a minimum, include the following:

a. Complete and accurate schematic diagrams.
b. Complete installation and operation procedures.
c. Complete performance specs (functional, electrical, mechanical and environmental) of the unit.

d. Complete list of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/ RETMA or EIA.

e. Complete maintenance and troubleshooting procedures.

Testing

Operational Test

After installation of the equipment in the field and completion of the Fiber Optic Cable Post Installation test for the cables containing the fibers to which the Fiber Optic Data Transceivers under test are connected and prior to integration of the equipment into the system, the Contractor shall perform an operational test in the field for each of the Fiber Optic Data Transceivers installed. The test shall demonstrate as a minimum the ability of the Transceiver to transmit and receive data between the hub and each of the field sites. This test shall be performed with all of the transmitters on the ring installed and operating. Each of the transceivers in the field cabinets shall be turned off in sequence to demonstrate operation of the self-healing feature. As part of the operational test the optical transmit and receive signal level of each of the transceivers shall be measured and recorded.

If the Operational Test fails, the equipment shall be repaired and the test shall be rerun for that site. If a component has been modified as a result of a failure, that component shall be replaced in all like units and the test shall be rerun for each unit.

METHOD OF MEASUREMENT:

The Fiber Optic Data Transceiver, Multidrop will be measured for payment as each unit of the type specified in the plans furnished, installed, made fully operational and tested.

BASIS OF PAYMENT:

The unit price bid for each Fiber Optic Data Transceiver- Multidrop, Standalone and Fiber Optic Data Transceiver- Multidrop, Rack Mounted shall include the cost of furnishing all labor, materials and equipment necessary to complete the work and to make the Fiber Optic Data Transceiver fully operational.

Progress payment will be made as follows:

Forty percent of the bid price for each item will be paid upon satisfactory completion of the Operational Test. Twenty-five percent of the bid price for each item will be paid upon successful completion of the Communications Network Performance Verification Test described in the Special Notes. Twenty-five percent of the bid price for each Fiber Optic Data Transceiver-Multidrop, Standalone will be paid upon successful completion of the Remote Equipment Group Site Verification Test for the cabinet housing the transceiver. Twenty-five percent of the bid price for each Fiber Optic Data Transceiver - Multidrop, Rack Mounted will be paid when all of the transceivers on its circuit have completed the Remote Equipment Group Verification Test. Ten percent of the bid price will be paid upon system acceptance.