

### **10-3. FIBER OPTIC TRANSMITTERS AND RECEIVERS**

#### **GENERAL**

When fiber optic transmitters (FOTS) are connected to fiber optic receivers (FORS) via a fiber optic link, they shall support a minimum optical loss budget of 14 dB including system margin over a single mode fiber. The data channels shall be multiplexed and transmitted digitally with the video channel. The data channels shall support EIA-232 full duplex with data rate capability up to 9.6 kbps. The units shall use PFM, FM, FDM, FSK and digital techniques. The result shall be high quality, crosstalk free, adjustment free operation over a wide dynamic range. There shall be no variations in the video output level due to fiber attenuation, variation because of LED aging, optical "slip rings", dynamic cable layout, or environmental factors. The units shall be optimized for single-mode 8.3/125 μm fiber operating in the 1300 nm optical window. The optical connectors shall be of the ST-compatible type.

Each transmitter and receiver shall have sync and loop back indicators in its front face panel for visual verification of bi-directional operation.

#### **PERFORMANCE REQUIREMENTS**

The baseband video signal output from the video/data receivers when it is receiving an optical signal from the video/data transmitters at an average power level equal to the video/data receiver sensitivity shall meet the following performance specifications defined and measured in accordance with EIA-250 for Short Haul Transmission System for End-to-End modified performance.

Output Signal Level	as per EIA- 250
Amplitude Vs Frequency Characteristics	as per EIA- 250
Chrominance to Luminance Gain Inequality	as per EIA- 250
Chrominance to Luminance Delay Inequality	as per EIA- 250
Field Time Waveform Distortion	as per EIA- 250
Line Time Waveform Distortion	as per EIA- 250
Insertion Gain Variation	as per EIA- 250
Differential Gain	as per EIA- 250
Differential Phase	±2 degrees
Signal-to-noise ratio	50 dB weighted
Signal-to-low frequency noise ratio	as per EIA- 250

#### **PHYSICAL AND MECHANICAL REQUIREMENTS**

Each FOTS shall have the capability of transmitting one simplex composite NTSC baseband video channel, three full duplex data channels and one bi-directional audio channel over a single-mode optical fiber. Each FOTS shall accept a composite NTSC video input as well as provide input/output for full duplex data and audio. The FOTS shall utilize cooled 1300 nm laser diodes with at least -14 dBm and the spectral line width of less than or equal to 5 nm.

Each FOTS shall have the following interfaces:

1. The video interface shall be via a BNC connector.
2. Each data channel interface shall be via an 8-position, 8-conductor modular jack (RJ45).

3. Each FOTS shall provide an audio interface port compatible with unbalanced and balanced 0 dBm, 600  $\Omega$ , 4 wire line. The audio interface shall be via an 8-position , 8-connection modular jack (RJ45).
4. Each FOTS shall provide a handset port compatible with standard telephone set equipped with carbon microphone. The handset port shall consist of a 4-position, 4-connection modular jack.

Each FORS shall have the capability of receiving one simplex composite NTSC baseband video channel, three full duplex data channels and one bi-directional audio channel from a single-mode optical fiber. Each FORS shall provide a composite NTSC video output as well as provide input/output for full duplex data and audio.

Each FORS shall have the following interfaces:

1. The video interface shall be via a BNC connector.
2. Each data interface shall be shall be via an 8-position, 8-connector modular jack (RJ45). A harness with the modular jacks and screw terminal connectors for the audio and data signals shall be provided for each FORS unit. The harness shall be fully compatible with the FDU and FORS as specified in these special provisions.

The I/O for each FORS shall correspond to the following configuration on the RJ45 jack of the harness. Single ended or differential transmission shall be selected by DIP-switches on the FORS.

RJ45 CONTACTS	EIA-232	EIA-422
1	NC	NC
2	CTRL OUT	NC
3	TxD	TxD-
4	RxD	RxD-
5	GND	RxD+
6	GND	TxD+
7	CTRL IN	NC
8	NC	NC

3. Each FORS shall provide an audio interface port compatible with unbalanced and balanced 0 dBm, 600  $\Omega$ , 4 wire line. The audio interface shall be via an 8-position , 8-connection modular jack (RJ45).
4. Each FORS shall provide a handset port compatible with standard telephone set equipped with carbon microphone. The handset port shall consist of a 4-position, 4-connection modular jack and shall be located on the front panel of each FORS.

Each FOTS and FORS shall be housed in a compact stand-alone enclosure with side flanges and shall be shelf mountable.

Each FOTS and FORS shall be powered by unregulated +12 V(dc) at 370 to 480 mA. An AC to DC wall mount adapter may be used for powering from 120 V(ac), 60 Hz.

## **ENVIRONMENTAL REQUIREMENTS**

Each FOTS and FORS shall be fully operational over a temperature range of -30°C. to +70°C. and shall withstand a humidity range from 0 to 95 percent without condensation.