FDDI Transceiver

Preliminary

FTR-1300-S1N and FTR-1300-S1C FDDI Data-Only Transceivers

Features

- ☐ FDDI Compliant
- ☐ Choice of Isolated Conductive or Non-Conductive Plastic MIC Receptacle
- ☐ Standard +5 Volt Power Supply
- ☐ Serial Differential Pseudo ECL Signal Interconnections
- ☐ Multiple Sourced Package and Pinouts
- ☐ Interfaces Directly with All Available FDDI Chip Sets
- ☐ Signal Detect Status Output
- ☐ Metal Package Provides EMI Shielding for All FDDI Electronic Functions

Description

The PCO FTR-1300-S1 family is a fully compliant Physical Layer Medium Dependent (PMD) fiber optic transceiver for use with Fiber Distributed Data Interface (FDDI) local area networks. Convenient single supply operation, simple direct connection to commercial FDDI chip sets, and secure second sourcing make these transceivers an ideal choice for either single or dual attach station implementation.

Both transmit and receive functions are contained in a single sturdy metal housing which combines EMI protection with excellent heat dissipation capability. A plastic Media Interface Connector (MIC) with selectable keying mates with the FDDI duplex cable plug. The conductive version of the MIC (FTR-1300-S1C) permits a continuous chassis ground (isolated from circuit ground) to be maintained for EMI suppression when the MIC projects through the wall of an enclosure. The non-conductive version (FTR-1300-S1N) permits the MIC to contact an enclosure wall at chassis ground potential while maintaining high dielectric isolation with the metal transceiver housing which is at circuit ground potential.

The FTR-1300-S1 family converts serial differential pseudo emitter coupled logic (PECL) data to and from 1300 nanometer optical energy using PCO's reliable InGaAsP high performance surface emitting LED and InGaAs PIN photodiode. For applications other than FDDI, the FTR-1300-S1 family offers transmission rates over the 1 to 130 Megabaud range for use in a variety of point-to-point data link or local area network configurations.

Preliminary

T-41-91

Transmitter Performance Characteristics (Over Operating Temperature Range)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Data Rate	B	DC	125	130	Mb/s
Optical Output Power	$\overline{P}_O$	-18.5	-16.5	-14.0	dBm
Center Wavelength[1]	λc	1270	-	1380	nm
Rise Time (10% to 90%)[1]	t_r	0.6	-	3.5	ns
Fall Time (90% to 10%)[1]	t_f	0.6	-	3.5	ns
Random Jitter (P-P)	RJ	0.0	-	0.7	ns
Duty Cycle Distortion (P-P)	DCD	0.0	-	0.6	ns
Data Dependent Jitter (P-P)	DDJ	0.0	-	0.6	ns
Extinction Ratio (pl/ph) x 100%	-	-	-	10	%
Transmit Disable Power	P_{off}	-	-	-45.0	dBm
Spectral Width[1]	$\Delta\lambda$	-	140	-	nm
Operating Temperature Range	T	0	-	+70	°C

[1] Center wavelength, spectral width, and rise/fall time are compliant with Figure 5.1 of the FDDI PMD.

Transmitter Electrical Interface (Over Operating Temperature Range)

Parameter	Symbol	Minimum	Maximum	Units
Input HIGH Voltage	V_{IHS}	V_{CC} -1.165	VCC -0.735	V
Input LOW Voltage	V_{ILS}	V_{CC} -1.870	VCC -1.450	V
Differential Input Voltage	V_{DIF}	0.3	1.1	V_{PP}
Input Common Mode Voltage[1]	V_{ICM}	-	1.0	V
Reference Voltage	V_{BB}	V_{CC} -1.39	V_{CC} -1.17	V
Input Signal Rise/Fall Time	t_r, t_f	0.5	5.0	ns (20-80%)

[1] Permissible ± V_{ICM} with respect to V_{BB}

Electrical Power Supply Characteristics

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage		V_{CC}	4.75	5.0	5.25	V
Supply Current	TX	I_{CC}	-	130	140	mA
	RX	I_{CC}	-	105	110	mA
Power Dissipation		P	-	1200	-	mW

T-41-91

Preliminary

Receiver Performance Characteristics (Over Operating Temperature Range)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Data Rate		B	1	125	130	Mb/s
Input Power (2.5×10^{-10} BER)[1]	FDDI[2]	$\overline{P}_{in}$	-32.5	-	-14.0	dBm
	2^7 -1 PRBS[3]	$\overline{P}_{in}$	-34.1	-35.5	-14.0	dBm
Signal Detect Thresholds	Assertion	$\overline{P}_{sd}$	-	-	-31.0	dBm
	Deassertion		-45.0	-	-	
Signal Detect Hysteresis		-	1.5	-	-	dB
Signal Detect Timing	Assertion	t_{sd}	-	-	100	μs
	Deassertion		-	-	350	
Operating Temperature Range		T	0	-	+70	°C
Wavelength of Operation		-	1100	1270 to 1380	1600	nm

[1] The receiver sensitivity is optimized for 125 Mb/s operation. Some loss of sensitivity may occur at higher and lower bit rates. Receiver sensitivity is measured at 1300 nm nominal wavelength.

[2] Worst Case FDDI Test Conditions.

[3] When tested with 2^7-1 PRBS with 50% duty cycle, optical rise/fall time of 5.0 nsec, and optimum sampling point at 125 Mbaud.

Receiver Electrical Interface (Over Operating Temperature Range)

Parameter	Symbol	Minimum	Maximum	Units
Output HIGH Voltage	V_{OH}	V_{CC} -1.02	V_{CC} -0.72	V
Output LOW Voltage	V_{OL}	V_{CC} -1.88	V_{CC} -1.56	V
Output Current	I_O	-	25	mA

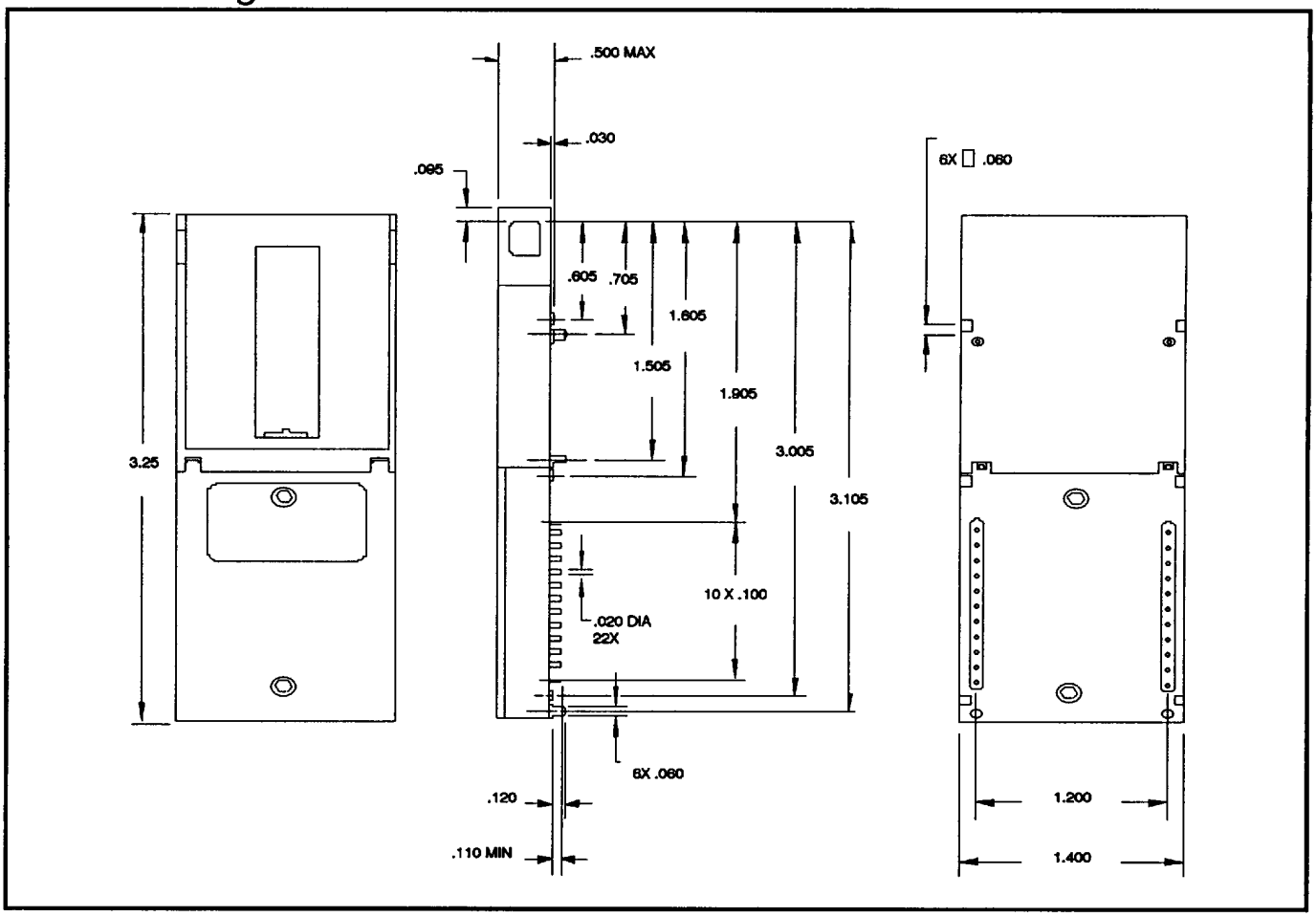
Receiver Optical Interface (Recommended Operating Conditions)

Parameter	Symbol	Minimum	Maximum	Units
Optical Input Rise/Fall Time	t_r, t_f	-	5.0	ns
Input Duty Cycle Distortion	t_{DCD}	0	1.0	ns
Input Data Dependent Jitter	t_{DDJ}	0	1.2	ns
Input Random Jitter	t_{RJ}	0	0.76	ns

Preliminary

T-41-91

Outline Drawing



Absolute Maximum Ratings

Parameter		Minimum	Maximum	Units
Storage Temperature		-55	+85	°C
Operating Temperature		0	+70	°C
Supply Voltage [1]		0	+6.0	V
Input Voltage [2]		0	+6.0	V
Output Current		-	50	mA
Lead Soldering	Temperature	-	240	°C
	Time	-	10	sec

[1] Measured from V_{CC} to GND
[2] Measured with respect to GND

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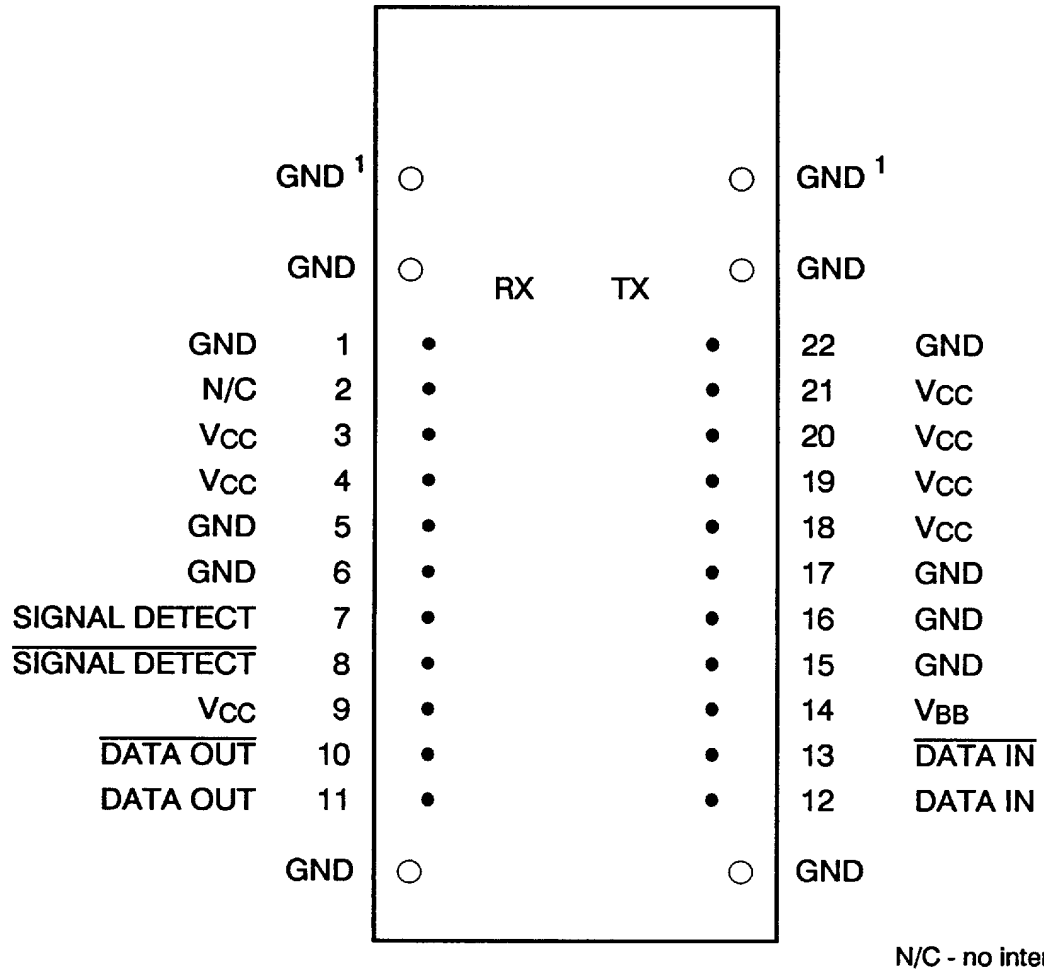
Pin Assignments (Top View)



N/C - no internal connection

[1] On the FTR-1300-S1N, this pin is for mechanical support only. May be connected to ground for multiple vendor compatibility. On the FTR-1300-S1C, this pin should be connected to chassis ground if MIC receptacle is to extend through chassis wall. Can be connected to electrical ground if desired.

The differential inputs to the FTR-1300-S1 transmitter section may be driven with either 10 K or 100 K emitter coupled logic (ECL) signals which are referenced to +5 volts (often referred to as pseudo ECL or PECL). A logic HIGH signal (DATAIN > $\overline{\text{DATAIN}}$) turns the LED ON, and a logic LOW signal (DATAIN < $\overline{\text{DATAIN}}$) turns the LED OFF. The transmitter may be driven with a single-ended PECL signal if the unused input is connected to V_{BB} (pin 14).

The differential data outputs of the FTR-1300-S1 follow the optical input signal, i.e., the receiver is non-inverting. The receiver is AC coupled, requiring a balanced optical signal waveform such as that produced by the 4B5B encoding method utilized by FDDI. Sufficient optical input signal for proper operation is indicated by a logic HIGH on the signal detect differential outputs (SIGNAL DETECT > $\overline{\text{SIGNAL DETECT}}$). When the signal detect outputs indicate logic LOW (SIGNAL DETECT < $\overline{\text{SIGNAL DETECT}}$), the differential data outputs could be subject to high bit error rates (>0.01).

The PECL input and output signal lines must be terminated for proper operation. The equivalent of 50 ohms to V_{CC} -2.0 volts is typical.

Block Diagram and Recommended Decoupling Circuit

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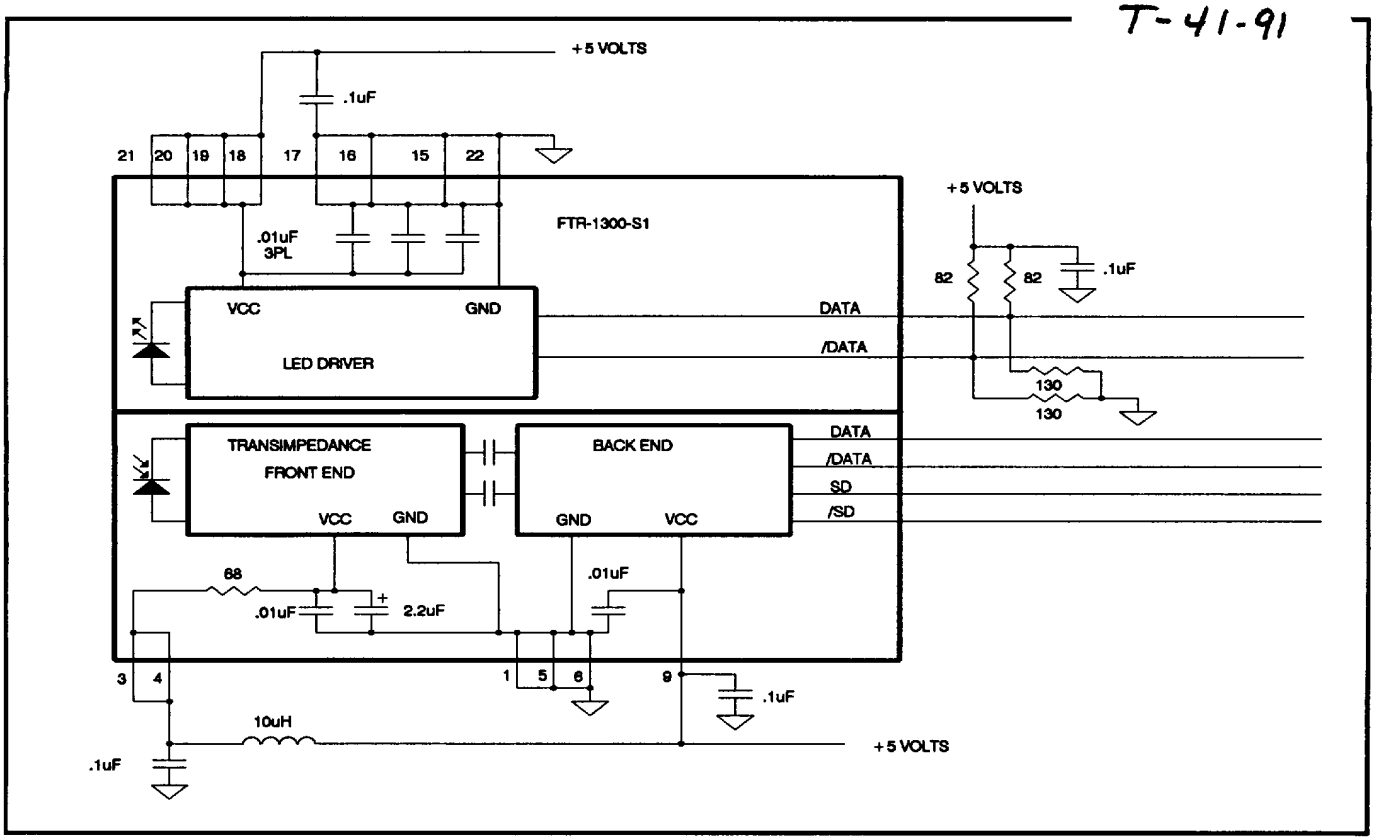

MIC Receptacle Keying Information - Exclusive PCO MICkey™ System

The PCO MICkey™ System offers the flexibility of a keying approach which may be set or changed in the field or at your facility. Each MICkey™ insert fits into PCO's common FDDI transceiver configuration, and may be quickly snapped into place, or extracted, as a final step to configure to any specific application or installation.

The four FDDI required MICkey™ inserts are provided with each PCO FDDI transceiver. They may be installed at the PCO factory according to your specifications, or you may install them yourself. The MICkey™ inserts are also available separately. Call your local PCO technical representative for complete information.

COLOR CODE

Yellow "S" — Single Attachment Station

Green "M" — Single Attachment Concentrator

Blue "B" — Dual Attachment Secondary In Primary Out

Red "A" — Dual Attachment Primary In Secondary Out

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21737-0019 Rev. 1
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Recommended Board Layout of the FTR-1300-S1C

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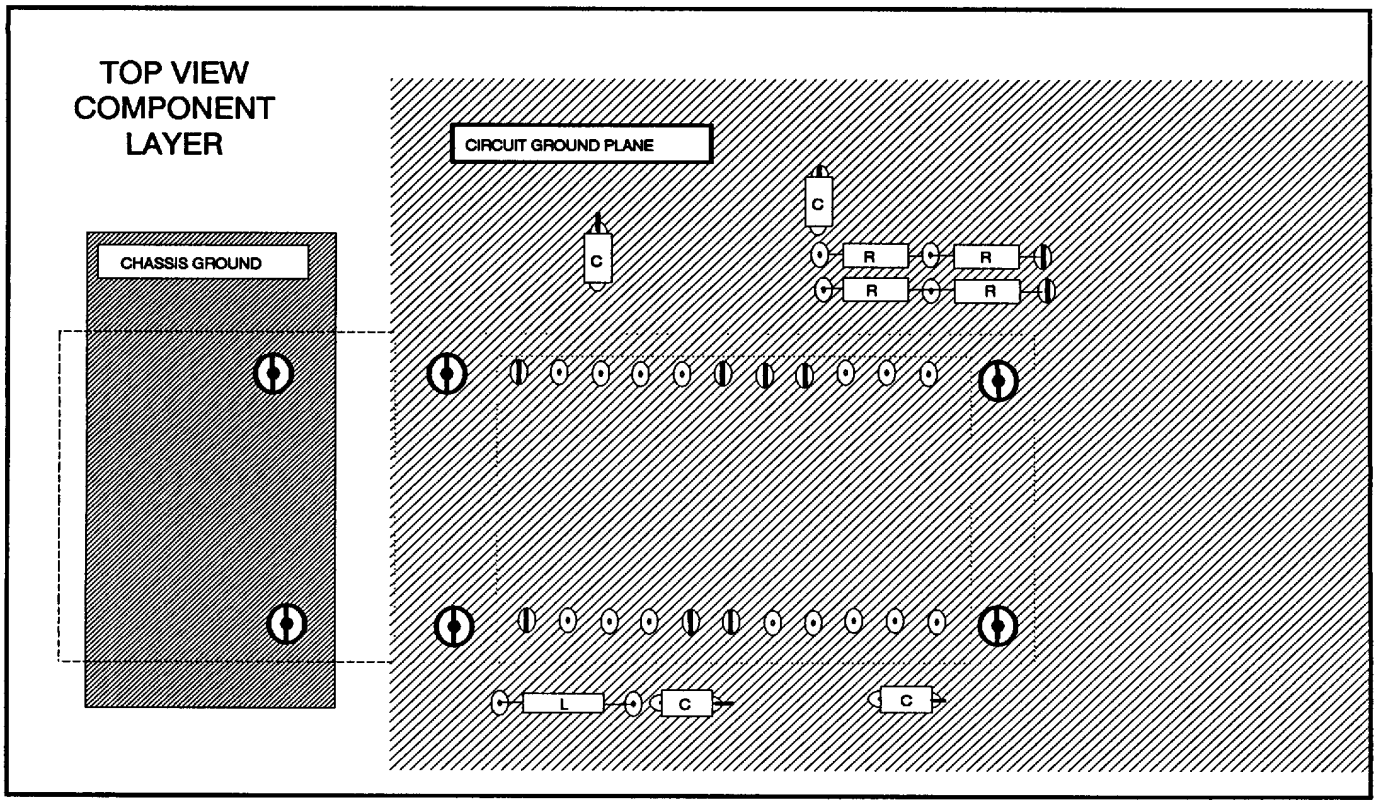

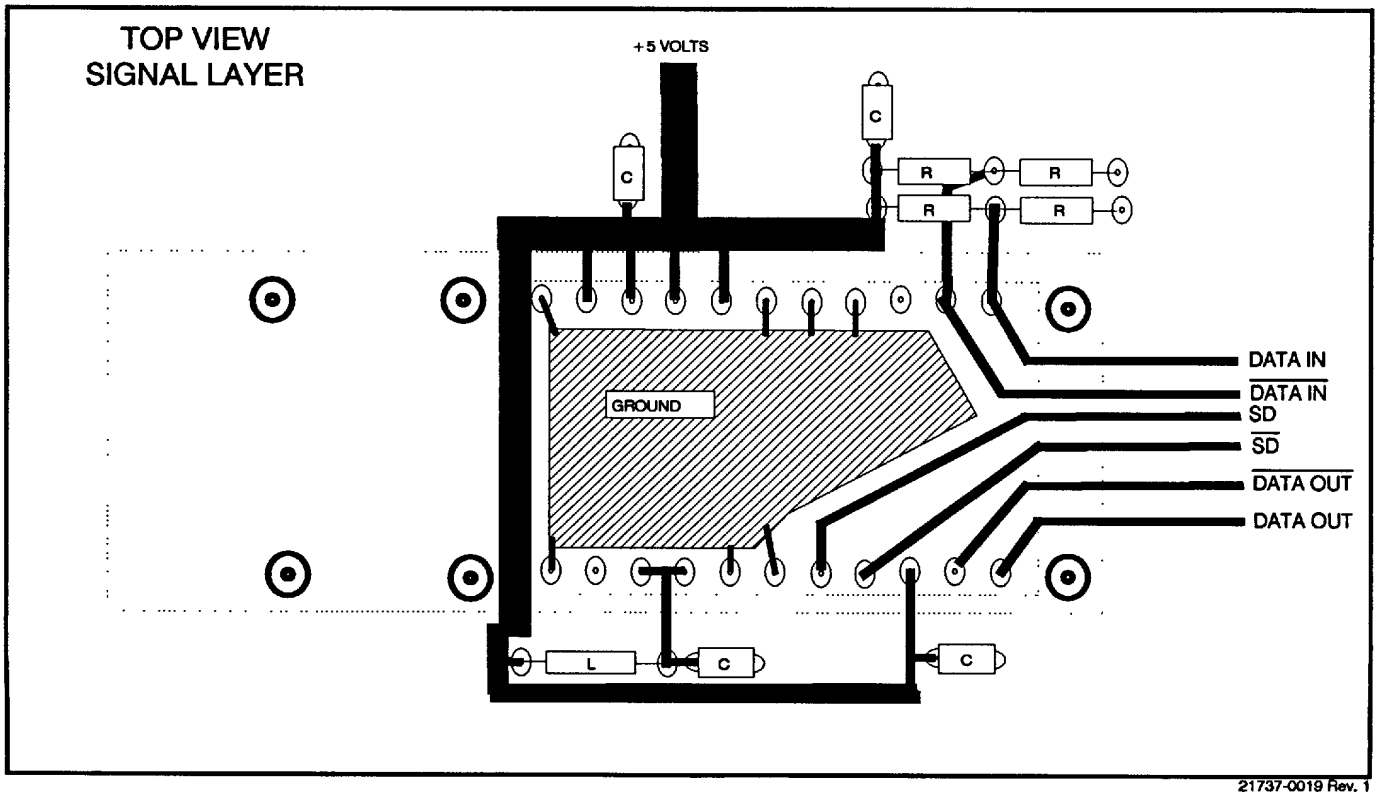

21737-0019 Rev. 1
01/31/91

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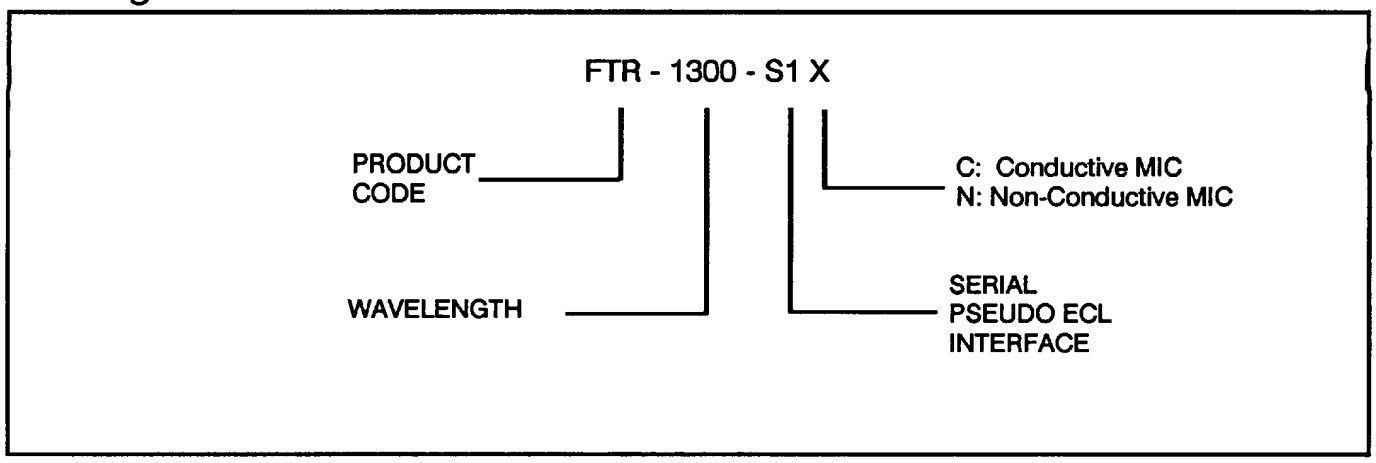
Preliminary

T-41-91

Ordering Information



HANDLING PRECAUTIONS

Normal handling precautions for electrostatic-sensitive devices should be taken.

PRELIMINARY DATA

This data sheet contains preliminary data. Supplementary data will be published at a later date. PCO, Incorporated reserves the right to make changes at any time without notice.

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21737-0019 Rev. 1
01/31/91