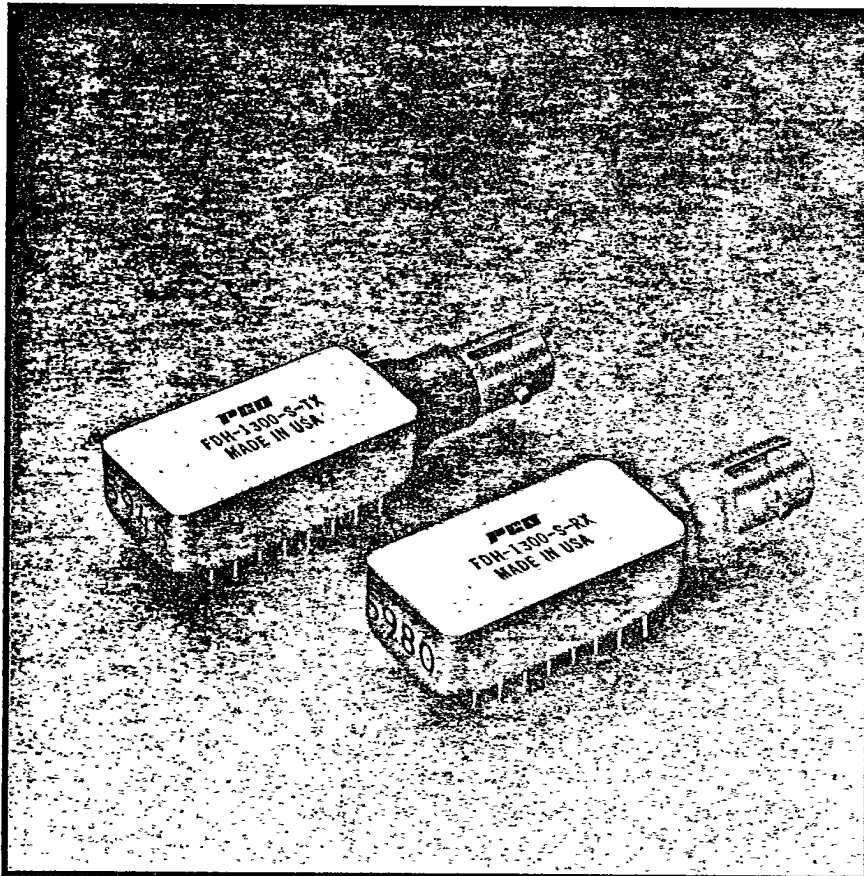




Digital Data Link

Preliminary

FDH-1300-S and FDH-1300-SA**1300 nm Transmitter/Receiver Modules for FDDI***T-41-91***Features**

- ☐ Full FDDI Compliance
- ☐ Single 5 V Power Supply (+5 V or -5.0 V)
- ☐ Standard 16 Pin (0.3" pitch) Footprint
- ☐ Hermetic Metal Package
- ☐ 0°C to +70°C Operating Temperature Range
- ☐ Integral ST™ Connector Coupling
- ☐ Model FDH-1300-SA is Pinout Compatible with AT&T ODL-125

ST is a trademark of AT&T

FDDI Applications

The FDH-1300-S Fiber Optic Transmitter and Receiver Data Link Set is designed to meet or exceed all the requirements of the Physical Layer Medium Dependent (PMD) specification for the Fiber Distributed Data Interface (FDDI). Highly reliable PCO-manufactured 1300 nm surface-emitting LEDs selected for proper rise/fall time, center wavelength and spectral width are utilized in the transmitter. The receiver incorporates a PCO fabricated InGaAs/InP PIN photodiode and high speed transimpedance amplifier to meet the sensitivity and dynamic range requirements of FDDI. The receiver post-amplifier

features the specified Signal Detect function and differential emitter coupled logic (ECL) outputs. The FDH-1300-S transmitter and receiver may be operated on either +5 volt or -5.0 volt power supplies. Both the FDH-1300-S and FDH-1300-SA are housed in all-metal hermetic hybrid packages for EMI and environmental protection.

The FDH-1300-SA transmitter and receiver are pin and function compatible with the ODL-125 Model Data Link from AT&T, and are for use with a +5 volt power supply only.

Transmitter Operation

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The transmitter behaves logically as a differential input gate which controls a 1300 nm light emitting diode. When the DATA input voltage is greater than the $\overline{\text{DATA}}$ input voltage, the LED is ON. When the

DATA signal is greater than the DATA input voltage, the LED is OFF. When used in a single-ended application, the unused input pin should be biased to V_{BB} ($V_{CC} - 1.32$ volts).

Receiver Operation

The receiver converts optical energy to a photocurrent using a high performance PIN photodiode. The photocurrent is converted to a proportional analog voltage by a transimpedance amplifier. This low level analog signal is amplified by additional gain stages and processed through a shaping filter and a comparator to generate the differential ECL output signals. Both outputs (DATA and $\overline{\text{DATA}}$) are open emitters requiring termination to $V_{CC} - 2$ volts with 50 ohms or to V_{EE} with 510 ohms. For optimum performance both outputs should be terminated identically, even if

only one output is used.

The Signal Detect circuit monitors the level of incoming optical signal and outputs a logic LOW signal when insufficient photocurrent is produced to ensure proper operation. The Signal Detect can be used to control an external squelch circuit to gate off spurious outputs generated by the receiver when no optical input is available. The outputs are open emitter ECL requiring termination (510 ohms to V_{EE} is recommended).

PCB Layout Considerations

The differential inputs to the transmitter and the differential outputs from the receiver are high speed emitter coupled logic signals. Printed circuit board interconnections should be configured in accordance with ECL design rules. The *MECL System Design Handbook* from Motorola, Inc. is an excellent reference. Board layouts created by CAD autorouting techniques should be reviewed

carefully. Special care should be taken with the receiver, since it is a very sensitive analog device. If the receiver outputs drive long traces or multiple loads, the use of an ECL buffer gate to isolate the receiver from transmission line reflections is recommended. A solid ground plane and low impedance power supply traces are highly recommended.

Temperature Range

The FDH-1300-S and FDH-1300-SA transmitter and receiver will function over the -40°C to $+70^{\circ}\text{C}$ temperature range, but compliance with the FDDI

PMD specification is guaranteed only over the 0°C to $+70^{\circ}\text{C}$ range.

Absolute Maximum Ratings

Parameter		Minimum	Maximum	Units
Storage Temperature		-55	+85	$^{\circ}\text{C}$
Operating Temperature		-40	+70	$^{\circ}\text{C}$
Supply Voltage ¹		0	+6.0	V
Input Voltage ²		0	+6.0	V
Lead Soldering	Temperature	-	240	$^{\circ}\text{C}$
	Time	-	10	sec

Notes: 1. Measured from V_{CC} to V_{EE} .

2. Measured with respect to V_{EE} .

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Electrical Performance Characteristics

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Transmitter Electrical Interface

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage	ECL ¹	V _{EE}	-5.25	-5.0	-4.75	V
	Pseudo ECL ^{2,3}	V _{CC}	4.75	5.0	5.25	V
Supply Current		I	-	100	130	mA
Power Dissipation		P	-	520	715	mW
Input HIGH Voltage (Data/Data)		V _{IHS}	V _{CC} -1.15	-	V _{CC} -0.73	V
Input LOW Voltage (Data/Data)		V _{ILS}	V _{CC} -1.90	-	V _{CC} -1.45	V
Differential Input Voltage		V _{DIF}	0.3	-	1.1	V
Input Common Mode Voltage ⁴		V _{ICM}	-	-	1.0	V
Notes: 1. V _{CC} = 0 V 2. V _{EE} = 0 V. 3. The FDH-1300-TX-SA is for Pseudo ECL operation only. 4. Permissible \pm V _{ICM} with respect to V _{BB} .						

Receiver Electrical Interface

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage	ECL ¹	V _{EE}	-5.25	-5.0	-4.75	V
	Pseudo ECL ^{2,3}	V _{CC}	4.75	5.0	5.25	V
Supply Current		I	-	100	130	mA
Power Dissipation		P	-	520	715	mW
Output HIGH Voltage		V _{OH}	V _{CC} -1.06	-	V _{CC} -0.72	V
Output LOW Voltage		V _{OL}	V _{CC} -1.90	-	V _{CC} -1.56	V
Notes: 1. V _{CC} = 0 V 2. V _{EE} = 0 V. 3. The FDH-1300-RX-SA is for Pseudo ECL operation only.						

EMI Susceptibility

The cases of both the transmitter and receiver should be grounded to shield the internal circuitry. The transmitter power supply leads should be bypassed with RF quality capacitors (0.1microfarad) close to the package. Recommended power supply filtering circuits for the receiver are shown elsewhere in this document.

Optical Performance Characteristics

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Transmitter Performance (Over Operating Temperature Range 0°C to +70°C)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Data Rate	B	DC	125	130	Mb/s
Optical Output Power	\bar{P}_o	-19.0	-16.0	-14.0	dBm
Center Wavelength ¹	λ_c	1270	1320	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	-	0.70	ns
Duty Cycle Distortion (p-p)	DCD	0	-	0.6	ns
Data Dependent Jitter (p-p)	DDJ	0	-	0.6	ns
Extinction Ratio (pI/ph) x 100%	-	-	-	10	%
Transmit Disable Power	P_{off}	-	-	-45.0	dBm
Spectral Width ¹	$\Delta\lambda$	-	150	-	nm
Note: 1. Center wavelength, spectral width, and rise/fall time are compliant with Figure 5.1 of the FDDI PMD.					

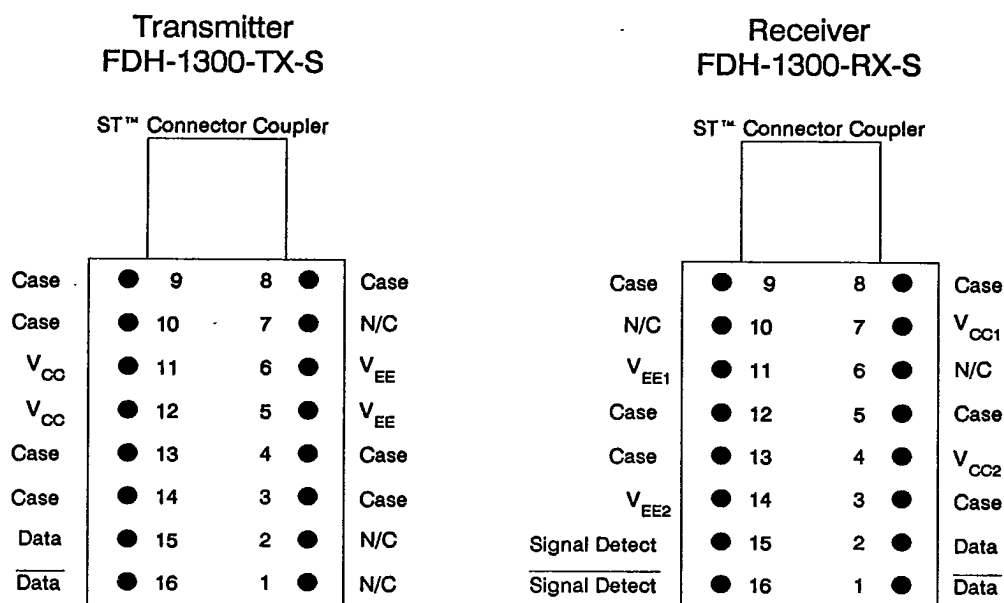
Receiver Performance (Over Operating Temperature Range 0°C to +70°C)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Data Rate	B	1	125	130	Mb/s
Optical Input Power (BER = 2.5×10^{-10})	\bar{P}_{in}	-31.5	-	-14.0	dBm
Signal Detect Thresholds	Assertion	P_{sd}	-	-31.0	dBm
	Deassertion		-		
Signal Detect Hysteresis		1.5	-		dB
Signal Detect Timing	Assertion	T_{sd}	-	100	μS
	Deassertion		-	350	
Wavelength of Operation	-	1100	1320	1600	nm

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FDH-1300-S Pin Assignments (Top View)

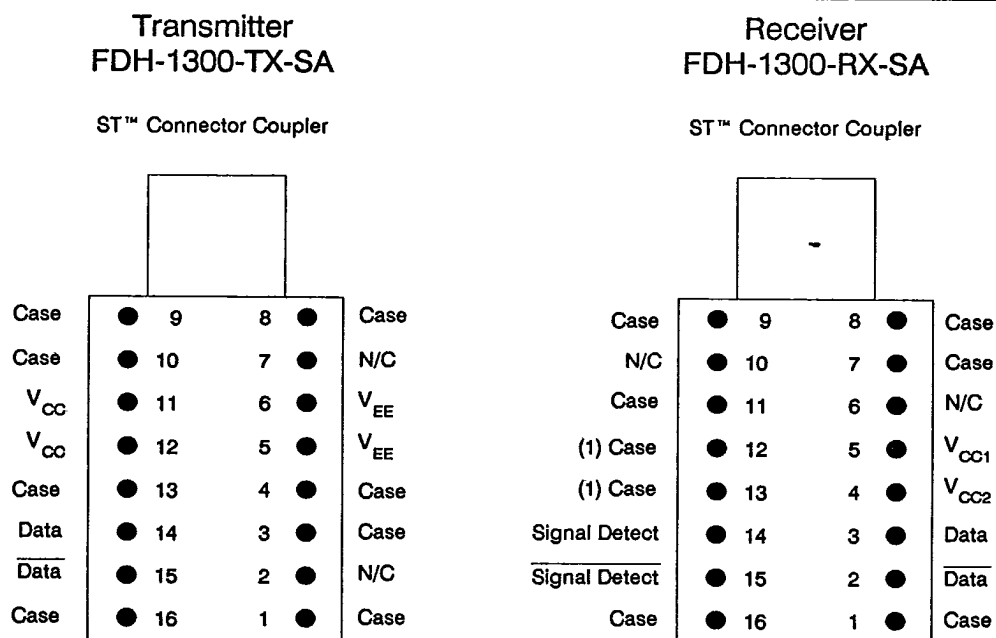
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N/C—No internal connection

FDH-1300-SA Pin Assignments (Top View)



ST is a trademark of AT&T

(1) Internal case connection

N/C—No internal connection

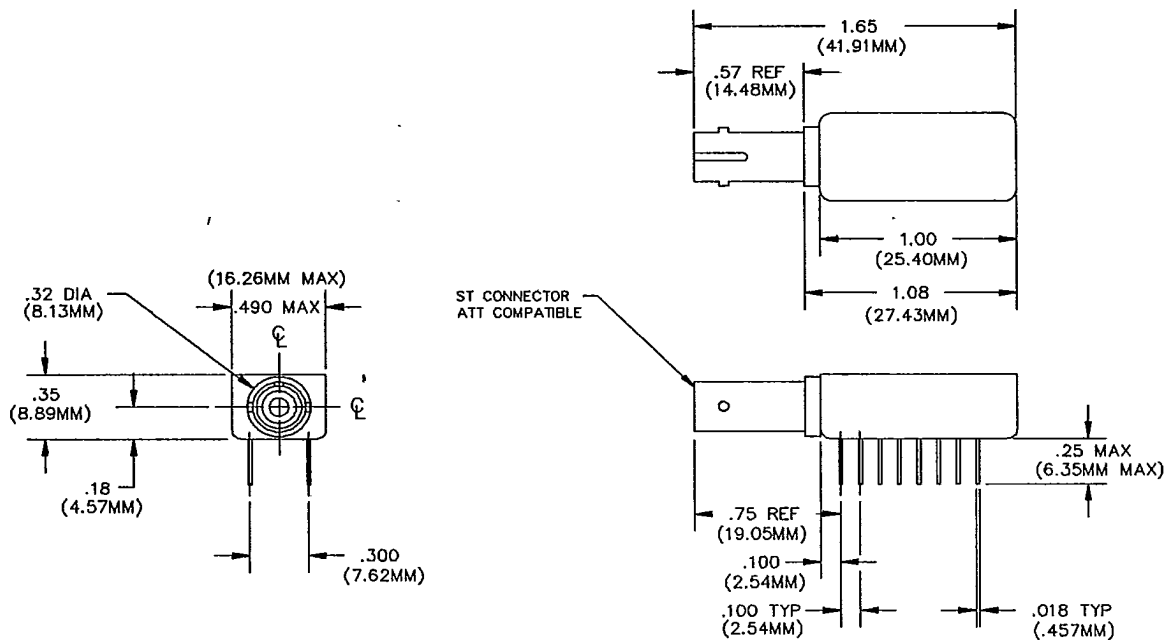
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FDH-1300-S and FDH-1300-SA Outline Drawing

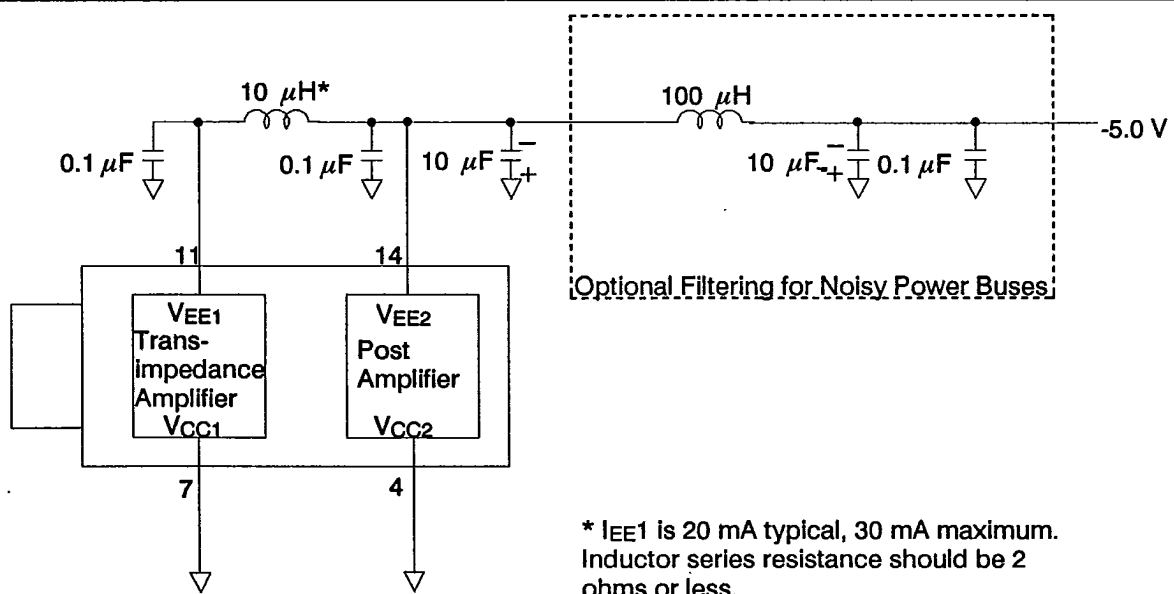
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The metal housings of these modules are conductive and should be prevented from contacting circuit board traces or the sleeves of

low profile screw machine sockets. A thin plastic DIP insulator (such as BIVAR, Inc. Part Number 816-030 or equivalent) is recommended.

FDH-1300-S Recommended De-Coupling Circuit for -5.0 V Operation

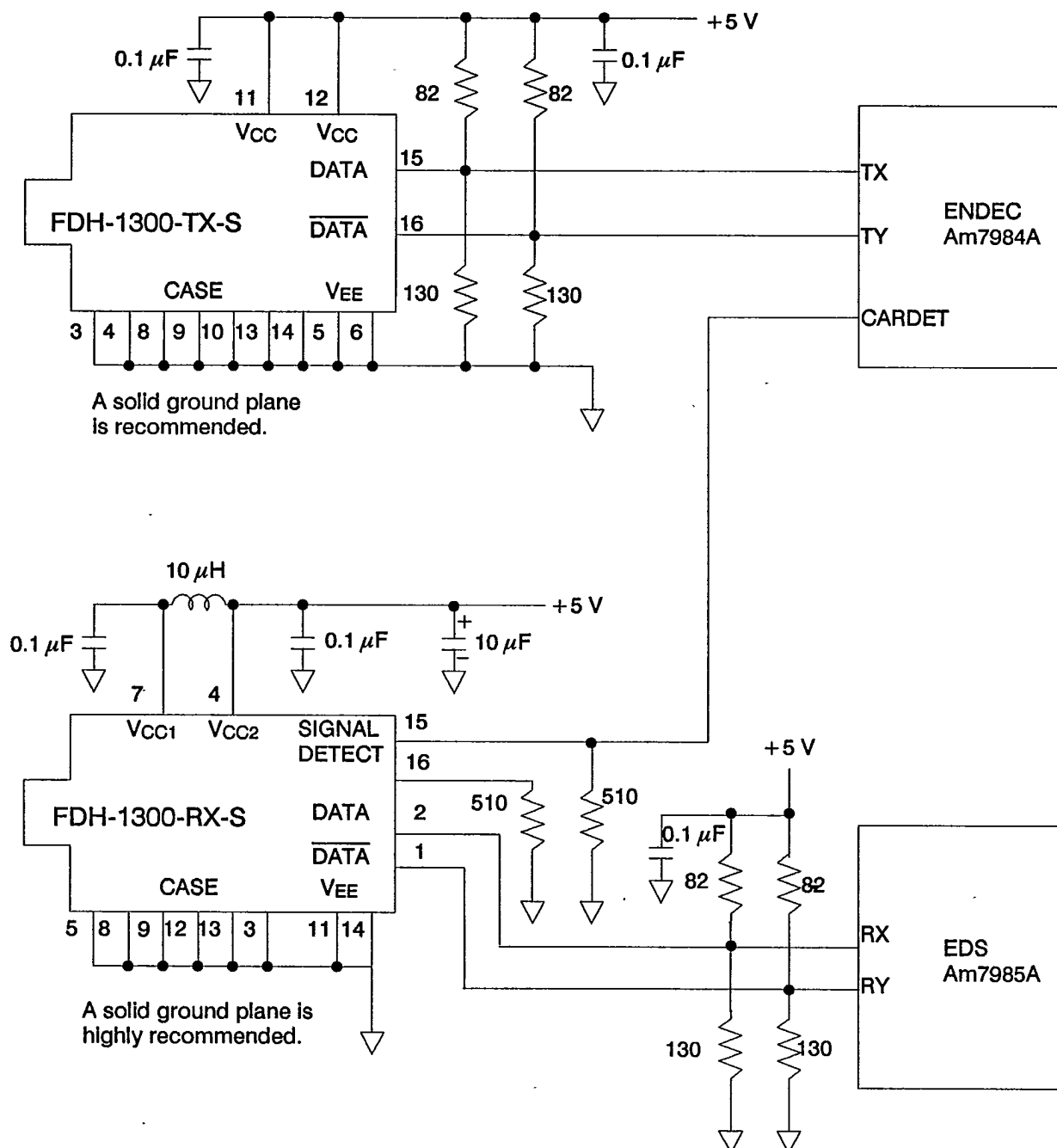


* I_{EE1} is 20 mA typical, 30 mA maximum. Inductor series resistance should be 2 ohms or less.

Preliminary

Connections with AMD Supernet™ Chip Set

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Transmitter and Receiver printed circuit board traces for DATA/ $\overline{\text{DATA}}$ should conform to ECL design rules.

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Ordering Information

T-41-91

FDH - 1300 -XX - XX	
PRODUCT CODE	PACKAGE TYPE S: PCO Pinouts SA: AT&T Pinouts
WAVELENGTH	FUNCTION TX: Transmitter RX: Receiver

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.



A Subsidiary of Corning Incorporated

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