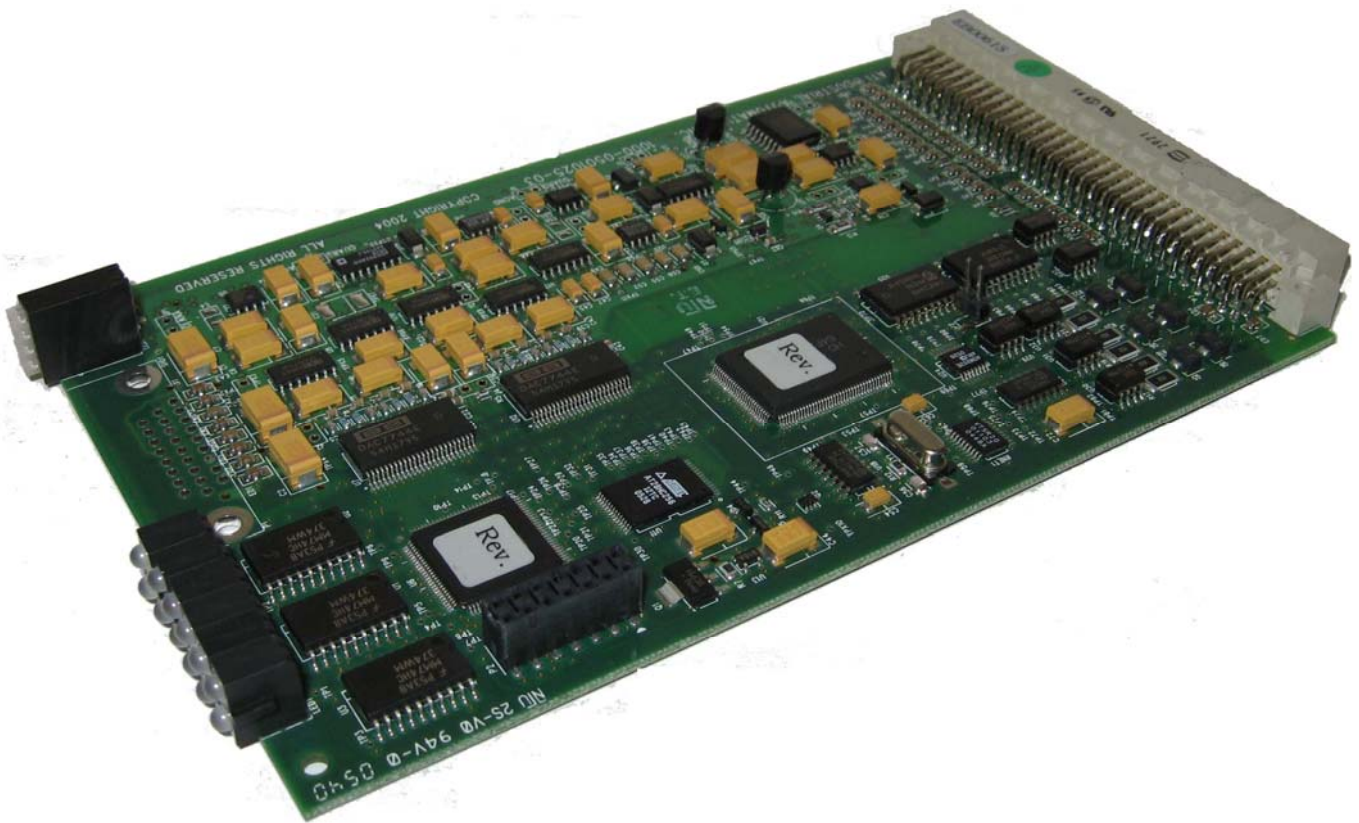




**9610-05-CTL Manual Addendum
for the
Eurocard F/T Controller**



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Engineered Products for Robotic Productivity

Pinnacle Park • 1031 Goodworth Drive • Apex, NC 27539 • Tel: 919.772.0115 • Fax: 919.772.8259 • www.ati-ia.com • Email: info@ati-ia.com

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Forward

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Note:

The Eurocard F/T Controller has not been tested for FCC Compliance and CE conformance outside of the 9105-CTL F/T Controller assembly.

Aside:

Please read the manual before calling customer service. Before calling, have the following information available:

1. Transducer serial number (e.g.; FT01234)
2. Transducer model (e.g.; Nano17, Gamma, Theta, etc.)
3. Transducer calibration (e.g.; US-15-50, SI-65-6, etc.)
4. Accurate and complete description of the question or problem
5. Computer and software information. Operating system, PC type, drivers, application software and other relevant information about your configuration.

If possible, be near the F/T system when calling.

How to Reach Us

Sales, Service and Information about ATI products:

ATI Industrial Automation

1031 Goodworth Drive

Apex, NC 27539 USA

www.ati-ia.com

Tel: +1-919.772.0115

Fax: +1-919.772.8259

E-mail: info@ati-ia.com

Technical support and questions:

Application Engineering

Tel: +1-919.772.0115, Option 2, Option 2

Fax: +1-919.772.8259

E-mail: ft_support@ati-ia.com

Table of Contents

1. Getting Started	7
1.1 Introduction.....	7
2. Installation	9
2.1 Power Supply	9
2.2 Connecting to the Eurocard F/T Controller.....	10
2.2.1 Eurocard Connector Pin Assignments.....	10
2.2.2 Suggested Connections to Eurocard Connector	13
2.2.3 Example Wiring Diagram	15
2.2.4 Transducer Cable Wiring.....	17
3. Operation	19
4. Appendix A—General Specifications.....	21
4.1 Environmental	21
4.2 General Specifications	21
4.2.1 Power Supply Requirements	21
4.2.2 Storage and Operating Temperatures.....	21
4.3 Front-Panel Indicators	22
4.4 Eurocard F/T Controller Mechanical Drawing (Sheet 1 of 2).....	23
4.5 Eurocard F/T Controller Mechanical Drawing (Sheet 2 of 2).....	24
5. Terms and Conditions of Sale	25

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1. Getting Started

1.1 Introduction

Note:

Since the Eurocard F/T Controller is the processing component of the F/T Controller most of the information needed to interface and control the Eurocard F/T Controller is contained in the 9620-05-CTL manual. This manual addendum should be consulted when special topics pertaining only to the Eurocard need clarification.

The primary function of the Eurocard F/T Controller is to connector to an ATI mux-based transducer and output Cartesian force/torque components. Communication with the Eurocard F/T Controller can be done through the serial I/O, the discrete I/O, or the analog output ports.

The Eurocard F/T Controller should be mounted in an area so that it is not exposed to temperatures outside of its working range (see *Appendix A—General Specifications*). It is designed to be used indoors in a non-dynamic, non-vibratory environment. It is designed to be used in environments without condensing humidity.

The Eurocard F/T Controller is designed to match standard PCB (printed circuit board) dimensioning for installation in rack and paneling dimensions given in IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992. The PCB meets the dimensions of the standard 3U single-height board and uses the IEC 60603-2 (1995-09) connector for electrical connectivity.

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2. Installation



WARNING: The Eurocard F/T Controller is a static sensitive device, please follow proper ESD grounding protocols when handling and installing.

2.1 Power Supply

A regulated linear power supply that meets electromagnetic compatibility regulations and safety regulations is recommended to ensure accurate data and safe operation from the Eurocard F/T Controller. (See *Appendix A—General Specifications* for more power supply requirements.)



CAUTION: Using a power supply with no or poor output regulation will result in inaccurate or noisy data from the Eurocard F/T Controller and may damage the Eurocard F/T Controller.



CAUTION: The Eurocard F/T Controller does not have any over-voltage protection circuitry, using a power supply without over-voltage protection on the output could damage the Eurocard and transducer system.

2.2 Connecting to the Eurocard F/T Controller

2.2.1 Eurocard Connector Pin Assignments

The ATI F/T Eurocard has a male connector on it. User equipment that mates to it must use a female connector as defined in international standard IEC 60603-2.



CAUTION: Some of the signals being transmitted are sensitive analog measurements, cable and wire lengths should be minimized to ensure signal integrity and output accuracy.



CAUTION: The Eurocard F/T Controller uses a unique pin assignment and can not be used in VMEbus or other systems, doing so will damage the Eurocard and backplane system.

Pin	Signal	Source	Description
A1	-15V	User	-15V DC supply input (see Appendix A for power requirements).
A2	AGnd	User	Analog ground DC supply input ¹
A3	AGnd	User	
A4	AGnd	User	
A5	AGnd	User	
A6	AGnd	User	
A7	+15V	User	+15V DC supply input (see Appendix A for power requirements).
A8	Reserved	Eurocard	Do not connect.
A9	DGnd	User	Digital ground DC supply input ¹
A10	Reserved	Eurocard	Do not connect.
A11	!Reset	User	System reset. System goes into reset when pulled to DGnd.
A12	Reserved	Eurocard	Do not connect.
A13	Reserved	Eurocard	
A14	Reserved	Eurocard	
A15	DGnd	User	Digital ground DC supply input ¹
A16	Reserved	Eurocard	Do not connect.
A17	Reserved	Eurocard	
A18	Reserved	Eurocard	
A19	DGnd	User	Digital ground DC supply input ¹
A20	Health-	Eurocard	Optically isolated output. Conducts when system is healthy. ²
A21	Health+	Eurocard	
A22	Out3-	Eurocard	Optically isolated output. Conducts when discrete bit Out3 is high. ²
A23	Out3+	Eurocard	
A24	Out0-	Eurocard	Optically isolated output. Conducts when discrete bit Out0 is high. ²
A25	Out0+	Eurocard	
A26	In3-	User	Optically isolated input. A high voltage sets discrete bit In3 high. ²
A27	In3+	User	
A28	In0-	User	Optically isolated input. A high voltage sets discrete bit In0 high. ²
A29	In0+	User	
A30	DGnd	User	Digital ground DC supply input ¹
A31	Reserved	User	Do not connect.
A32	Reserved	User	

Table 2.1—Eurocard Connector Pin Out, Row A

Pin	Signal	Source	Description
B1	Reserved	Eurocard	Do not connect.
B2	Reserved	Eurocard	
B3	Fx-	Eurocard	Fx analog output voltage. ³
B4	Fx+	Eurocard	
B5	Fy-	Eurocard	Fy analog output voltage. ³
B6	Fy+	Eurocard	
B7	Fz-	Eurocard	Fz analog output voltage. ³
B8	Fz+	Eurocard	
B9	Tx-	Eurocard	Tx analog output voltage. ³
B10	Tx+	Eurocard	
B11	Ty-	Eurocard	Ty analog output voltage. ³
B12	Ty+	Eurocard	
B13	Tz-	Eurocard	Tz analog output voltage. ³
B14	Tz+	Eurocard	
B15	DGnd	User	Digital ground DC supply input ¹
B16	+5V	User	+5V DC supply input (see Appendix A for power supply requirements).
B17	+5V	User	
B18	DGnd	User	Digital ground DC supply input ¹
B19	Reserved	Eurocard	Do not connect.
B20	Status-	Eurocard	Optically isolated output. Conducts when discrete bit Status is high. ²
B21	Status+	Eurocard	
B22	Out2-	Eurocard	Optically isolated output. Conducts when discrete bit Out2 is high. ²
B23	Out2+	Eurocard	
B24	Monitor-	User	Optically isolated input. A high voltage sets discrete bit Monitor high. ²
B25	Monitor+	User	
B26	In2-	User	Optically isolated input. A high voltage sets discrete bit In2 high. ²
B27	In2+	User	
B28	Reserved	Eurocard	Do not connect.
B29	Reserved	Eurocard	
B30	Reserved	Eurocard	
B31	Reserved	Eurocard	
B32	Reserved	Eurocard	

Table 2.2—Eurocard Connector Pin Out, Row B

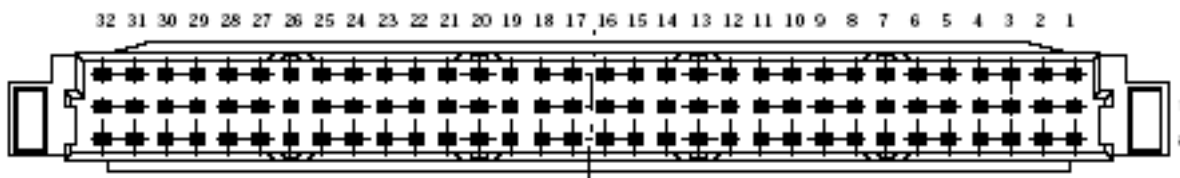


Figure 2.1—Eurocard Connector, IEC 60603-2 (1995-09) Male, Pin-Side View

Pin	Signal	Source	Description
C1	-15V	User	-15V DC supply input (see Appendix A for power requirements).
C2	+15V	User	+15V DC supply input (see Appendix A for power requirements).
C3	+15V	User	
C4	Xdcr2	Transducer	Connect to pin 2 of Transducer cable's DB15 connector
C5	Xdcr9	Transducer	Connect to pin 9 of Transducer cable's DB15 connector
C6	Xdcr3	Transducer	Connect to pin 3 of Transducer cable's DB15 connector
C7	Xdcr10	Transducer	Connect to pin 10 of Transducer cable's DB15 connector
C8	Xdcr4	Transducer	Connect to pin 4 of Transducer cable's DB15 connector
C9	Xdcr5_11_12	Transducer	Connect to pins 5, 11 and 12 of Transducer cable's DB15 connector
C10	AGnd	User	Analog ground DC supply input ¹
C11	Xdcr1	Transducer	Connect to pin 1 of Transducer cable's DB15 connector
C12	AGnd	User	Analog ground DC supply input ¹
C13	Reserved	Eurocard	This pin is reserved for future use by ATI Industrial Automation.
C14	-15V	User	-15V DC supply input (see Appendix A for power requirements).
C15	+5V	User	+5V DC supply input (see Appendix A for power requirements).
C16	Reserved	Eurocard	This pin is reserved for future use by ATI Industrial Automation.
C17	DGnd	User	Digital ground connection from power supply. ¹
C18	Reserved	Eurocard	This pin is reserved for future use by ATI Industrial Automation.
C19	Xdcr7	Transducer	Connect to pin 7 of Transducer cable's DB15 connector
C20	Xdcr15	Transducer	Connect to pin 15 of Transducer cable's DB15 connector
C21	Xdcr8	Transducer	Connect to pin 8 of Transducer cable's DB15 connector
C22	Out1-	Eurocard	Optically isolated output. Conducts when discrete bit Out1 is high. ²
C23	Out1+	Eurocard	
C24	Bias-	User	Optically isolated input. A high voltage sets the Bias input high. ²
C25	Bias+	User	
C26	In1-	User	Optically isolated input. A high voltage sets discrete bit In1 high. ²
C27	In1+	User	
C28	RS232_Gnd	User	RS232 ground.
C29	RS232_Xmit	Eurocard	RS232 transmit signal.
C30	RS232_Rcv	User	RS232 receive signal.
C31	Reserved	Eurocard	Do not connect.
C32	Reserved	Eurocard	

Table 2.3—Eurocard Connector Pin Out, Row C

Notes:

- ¹ AGnd and DGnd are connected on the Eurocard. Performance may be degraded if AGnd and DGnd are connected externally from the Eurocard.
- ² Information on these Discrete I/O signals can be found in ATI manual #9620-05-CTL, section 5.3 *Discrete I/O Description*.
- ³ Information on these Analog Output signals can be found in ATI manual #9620-05-CTL, section 6. *Analog Output*

2.2.2 Suggested Connections to Eurocard Connector

The following tables describe how the connectors on ATI's 9105-CON F/T Controller are connected to the Eurocard connector of the 9105-CTE Eurocard F/T Controller.

Tables 2.4, 2.5 and 2.6 detail these signal connections to the 96-pin connector.

Eurocard Pin	Signal	Discrete I/O	Analog Output	RS232	Transducer
		DB25 Male	HDDDB26 Female	DB9 Male	DB15 Male
A1	-15V				
A2	AGnd		22		
A3	AGnd				
A4	AGnd				
A5	AGnd				
A6	AGnd				
A7	+15V				
A8	Reserved				
A9	DGnd				
A10	Reserved				
A11	!Reset				
A12	Reserved				
A13	Reserved				
A14	Reserved				
A15	DGnd				
A16	Reserved				
A17	Reserved				
A18	Reserved				
A19	DGnd				
A20	Health-	25			
A21	Health+	12			
A22	Out3-	21			
A23	Out3+	8			
A24	Out0-	18			
A25	Out0+	5			
A26	In3-	17			
A27	In3+	4			
A28	In0-	14			
A29	In0+	1			
A39	DGnd				
A31	Reserved				
A32	Reserved				

Table 2.4—Suggested Connections to Eurocard Connector Row A

Eurocard Pin	Signal	Discrete I/O DB25 Male	Analog Output HDDDB26 Female	RS232 DB9 Male	Transducer DB15 Male
B1	Reserved				
B2	Reserved				
B3	Fx-		18		
B4	Fx+		9		
B5	Fy-		17		
B6	Fy+		8		
B7	Fz-		16		
B8	Fz+		7		
B9	Tx-		15		
B10	Tx+		6		
B11	Ty-		14		
B12	Ty+		5		
B13	Tz-		13		
B14	Tz+		4		
B15	DGnd		11		
B16	+5V		2		
B17	+5V				
B18	DGnd				
B19	Reserved				
B20	Status-	23			
B21	Status+	10			
B22	Out2-	20			
B23	Out2+	7			
B24	Monitor-	22			
B25	Monitor+	9			
B26	In2-	16			
B27	In2+	3			
B28	Reserved				
B29	Reserved				
B30	Reserved				
B31	Reserved				
B32	Reserved				

Table 2.5— Suggested Connections to Eurocard Connector Row B

Eurocard Pin	Signal	Discrete I/O DB25 Male	Analog Output HDDDB26 Female	RS232 DB9 Male	Transducer DB15 Male
C1	-15V				
C2	+15V				
C3	+15V				
C4	Xdcr2				2
C5	Xdcr9				9
C6	Xdcr3				3
C7	Xdcr10				10
C8	Xdcr4				4
C9	Xdcr5_11_12				5, 11, 12
C10	AGnd				
C11	Xdcr1				1
C12	AGnd				
C13	Reserved				
C14	-15V				
C15	+5V				
C16	Reserved				
C17	DGnd				
C18	Reserved				
C19	Xdcr7				7
C20	Xdcr15				15
C21	Xdcr8				8
C22	Out1-	19			
C23	Out1+	6			
C24	Bias-	24			
C25	Bias+	11			
C26	In1-	15			
C27	In1+	2			
C28	RS232_Gnd			5	
C29	RS232_Xmit			2*	
C30	RS232_Rec			3*	
C31	Reserved				
C32	Reserved				

Note:

* RS232 transmit and receive lines are shown in the straight configuration; they may have to be swapped depending on computer interface and cabling.

Table 2.6— Suggested Connections to Eurocard Connector Row C

2.2.3 Example Wiring Diagram

Figure 2.2 shows how the suggested connectors would be connected to the Eurocard.

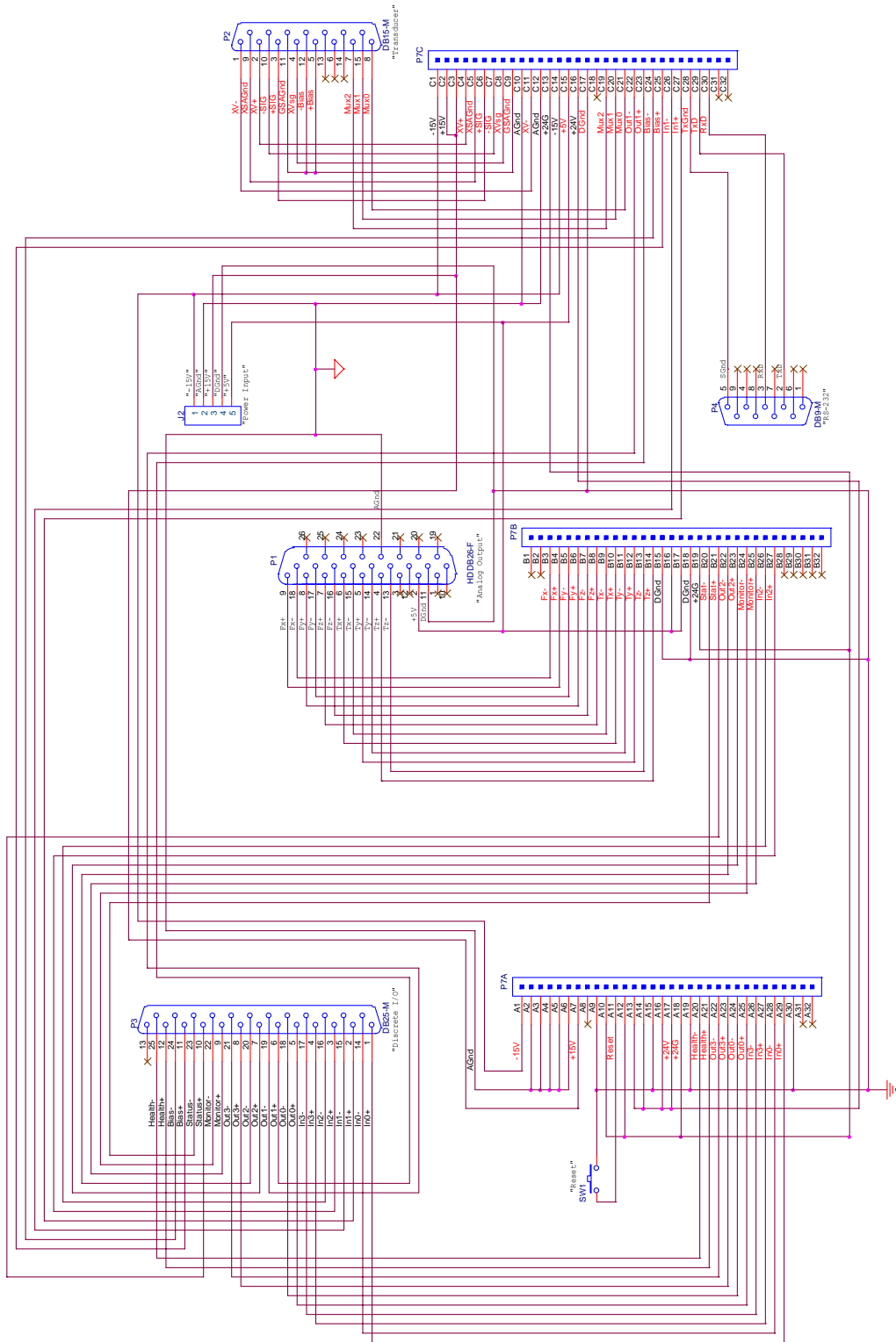


Figure 2.2—Example Wiring Diagram

2.2.4 Transducer Cable Wiring

Note:

Providing a chassis ground path for the transducer cable shielding may help reduce the amount of noise in the analog signals.

The following information is provided for users who choose not to connect the Eurocard's *Xdcr* signals to the ATI standard DB15 transducer connector.

The wire in ATI's 9105-C3 cable assemblies contains twelve conductors configured as five individual wires, two twisted pairs (Green/White and Green/Red), and one twisted triad (Red/Black/Yellow).

The column labeled *Eurocard* contains the standard connections to the 9105-C3 cable's DB15 connector. The column labeled *Transducer* contains connections to the various transducer connector options, each listed by ATI Industrial Automation transducer cable type.

Signal Name	Wire Color (ATI cable*)	Eurocard	Transducer		
		DB15	9105-C3-□-□	9105-C3-L-□-□	9105-C3-□-M*
Xdcr1	Yellow (Red/Blk/Yel)	1	10	1	1
Xdcr2	Red (Red/Blk/Yel)	2	2	2	2
Xdcr3	White (Grn/Wht)	3	5	3	3
Xdcr4	Red (Grn/Red)	4	4	4	4
Xdcr5_11_12	Black	5	11	5	5
-	-	6	-	-	-
Xdcr7	Yellow	7	1	6	7
Xdcr8	White	8	8	7	8
Xdcr9	Black (Red/Blk/Yel)	9	9	8	9
Xdcr10	Green (Grn/Wht)	10	6	9	10
Xdcr5_11_12	Green (Grn/Red)	11	3	10	11
Xdcr5_11_12	Red	12	12	11	12
-	-	13	-	-	-
-	-	14	-	-	-
Xdcr15	Green	15	7	12	15
(grounded chassis)	Shield	Shield	Shield	Shield	Shield

*Note: The conductors in ATI cabling used for 9105-C3-□-M may have different colors than shown here.

Table 2.7—Transducer Cable Wiring Table

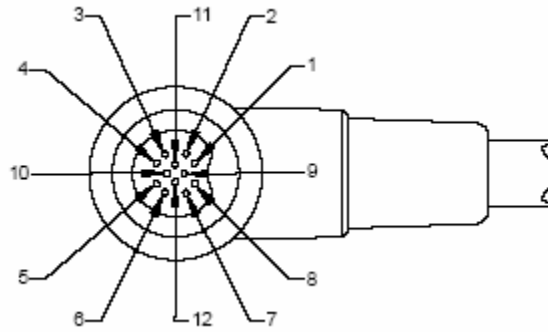


Figure 2.3—9105-C3-□-□ Transducer Cable’s 12-pin Female Connector

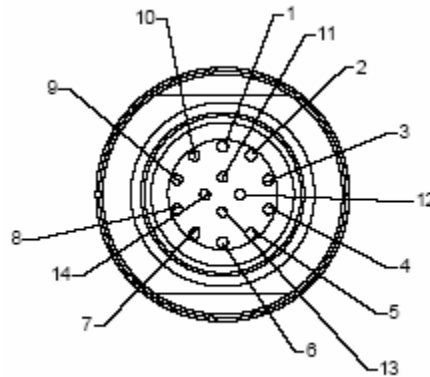


Figure 2.4—9105-C3-L-□-□ Transducer Cable’s 14-Pin Female Lemo Connector

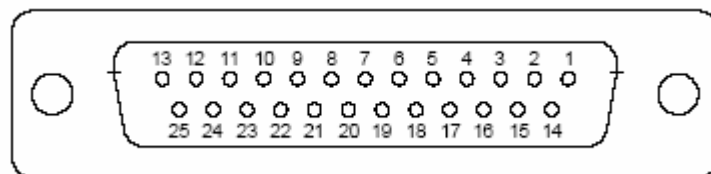


Figure 2.5—9105-C3-□-M Transducer Cable’s 25-Pin Female DB25 Connector

3. Operation

Information on operating the Eurocard F/T Controller can be found in ATI manual #9620-05-CTL, section 4 - *Commands*, section 5 - *Serial and Discrete I/O*, section 6 - *Analog Output*, section 7 - *Troubleshooting Guide* and section 8 - *Advanced Topics*.

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4. Appendix A—General Specifications

4.1 Environmental

The standard Eurocard F/T controller is not designed with any environmental protection. The user is responsible for protecting the Eurocard.

4.2 General Specifications

4.2.1 Power Supply Requirements

The Eurocard requires three voltages to operate. The 5V supply is used to power mostly digital circuitry while the +15V and -15V supplies power the analog circuitry. The digital and analog supplies should have separate ground return lines. The ground return lines are referred to as *DGnd* and *AGnd* in this document. The ground return lines are connected on the Eurocard. For best performance it is recommended that these lines are not connected externally to the Eurocard as a noise generating ground loop could be created.

A linear power supply is highly recommended. This helps insure low-noise operation. (Switching power supplies typically have much higher voltage ripple, which can cause noise.)

DC Supply	+5 Volts	+15 Volts	-15 Volts
VDC	+5V \pm 0.1V	+15V \pm 0.1V	-15V \pm 0.1V
Current Maximum (A)	300mA	150mA	100mA
Ripple Maximum	3mV p-p	3mV p-p	3mV p-p
Stability Maximum (%)	0.5	0.5	0.5

Table 4.1—Electrical Requirements

4.2.2 Storage and Operating Temperatures

The Eurocard's storage and operating temperatures are different.

	Storage Temperature	Operating Temperature
Eurocard F/T Controller	-40°C to +100°C	0°C to +55°C

Table 4.2—Storage and Operating Temperatures

4.3 Front-Panel Indicators

Refer to ATI manual #9620-05-CTL section 5 - *Serial and Discrete I/O* and section 7 - *Trouble Shooting Guide* for details about using the front-panel indicators and error-code definitions.

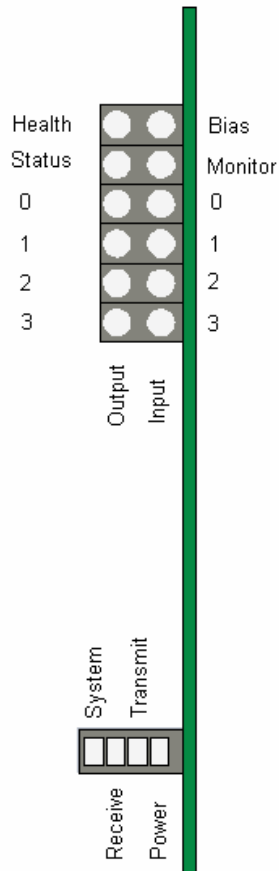
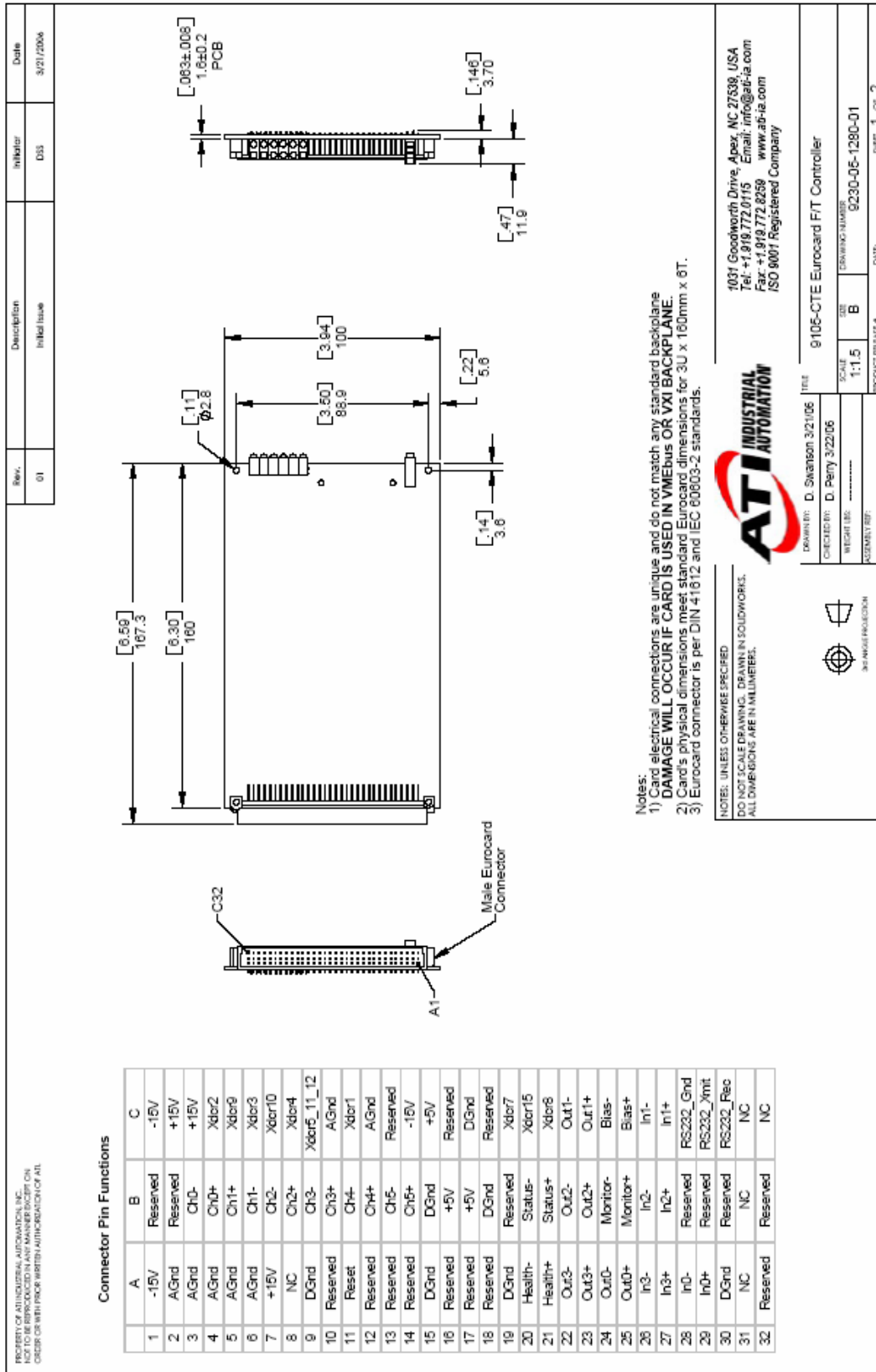


Figure 4.1—Front-Panel Indicators

4.4 Eurocard F/T Controller Mechanical Drawing (Sheet 1 of 2)



5. Terms and Conditions of Sale

The following Terms and Conditions are a supplement to and include a portion of ATI's Standard Terms and Conditions, which are on file at ATI and available upon request.

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No action against ATI, regardless of form, arising out of or in any way connected with products or services supplied hereunder may be brought more than one year after the cause of action accrued.

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