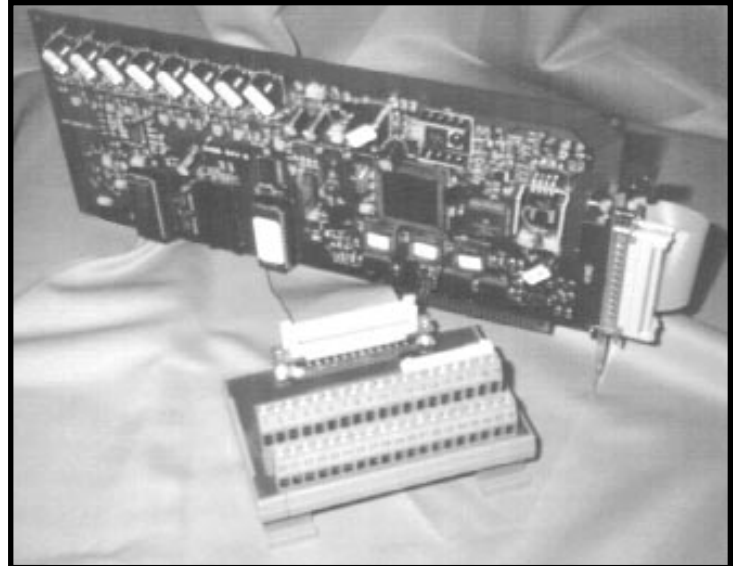


Overview

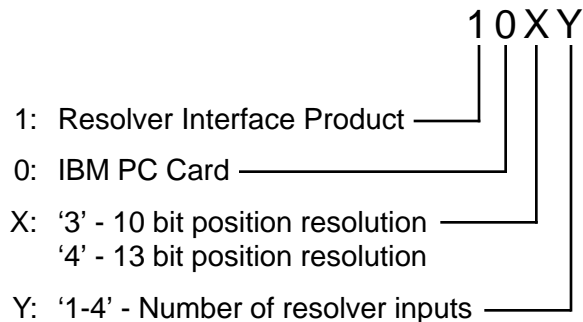
The Series 1000 Resolver Interface Cards is a family of eight cards designed for use with IBM® personal computers and 100% compatibles. Communicating through jumper configurable I/O addresses, these cards supply absolute position and tachometer data from AMCI resolver based transducers.

Using an eight bit data bus, these cards can be plugged into any XT or AT slot of the computers' backplane. The cards use 16 or 32 consecutive bytes of I/O address space and do not use an interrupt.

Resolver connections are made through a 37 pin, D-Sub connector. A DIN rail mountable interface module, (AMCI Part# *IMPC*), is available to simplify field wiring.



Model Part Number



Series 1000 Utility Disk

The 'Series 1000 Utility Disk' is a 1.44M companion diskette for this manual. It contains a compiled 16-bit Windows® .DLL with Visual C++™ source code. The .DLL file contains all of the subprocedures and functions needed to communicate with the Series 1000 card. A Visual Basic® sample application in ASCII format is also on the diskette. See the 'README.WRI' file for complete information.

This manual is also on the diskette in Adobe Acrobat™ format. You must have the Adobe Acrobat Reader before you can view this file.

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SERIES 1000 RESOLVER INTERFACE CARDS

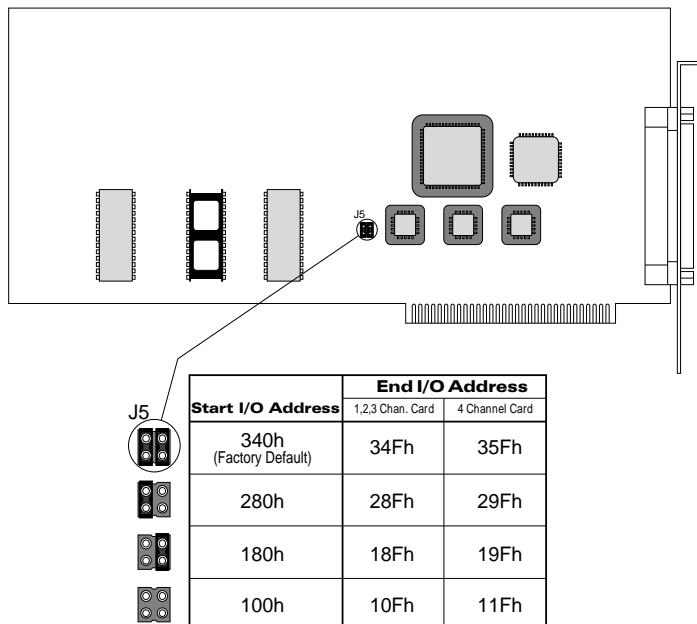
Installation

Setting the I/O Address

The starting I/O address used by the card is jumper configurable. Use the figure on the right to locate the four pin header used to set this address. The factory default starting address is 340h. (Both jumpers installed.) The starting address can be set to 340h, 280h, 180h or 100h.

The 1034 and 1044 four channel Resolver Input Cards require 32 bytes of I/O memory space. All other cards require 16 bytes. The figure on the right lists the starting and ending I/O addresses used by the cards.

These are the only I/O addresses a Series 1000 card can be configured for. If other devices in your system are using these resources you must reconfigure one of them to free the resources for the card.



Backplane Installation

- 1) With the power off, remove the system cover. Remove the bracket and screw from an available XT or AT slot.
- 2) Install the Series 1000 card in the designated slot. Care should be taken to press it evenly and snugly into the slot. Once firmly installed, secure the card with the bracket screw.
- 3) Install the system cover. Attach any cabling to the computer that was disconnected before removing the system cover.
- 4) Power the system. The computer should boot normally. If you experience problems, remove the Series 1000 card to make sure the system operates correctly without it. Check the I/O Address settings to confirm that the card is not conflicting with another device.

The Series 1000 cards draw a maximum of 660 mA @ 5Vdc. Add this to system current requirements when sizing the system power supply.

Transducer Installation

The Series 1000 cards are compatible with the following AMCI Transducers:

- ◆ HT-20
- ◆ HT-20S
- ◆ HT-20K
- ◆ HT-20L
- ◆ HT-20-(x)
- ◆ HTT-20-1
- ◆ H25SE
- ◆ H25FE
- ◆ H25SS
- ◆ H25FS
- ◆ HTCR Cable Reel Assemblies

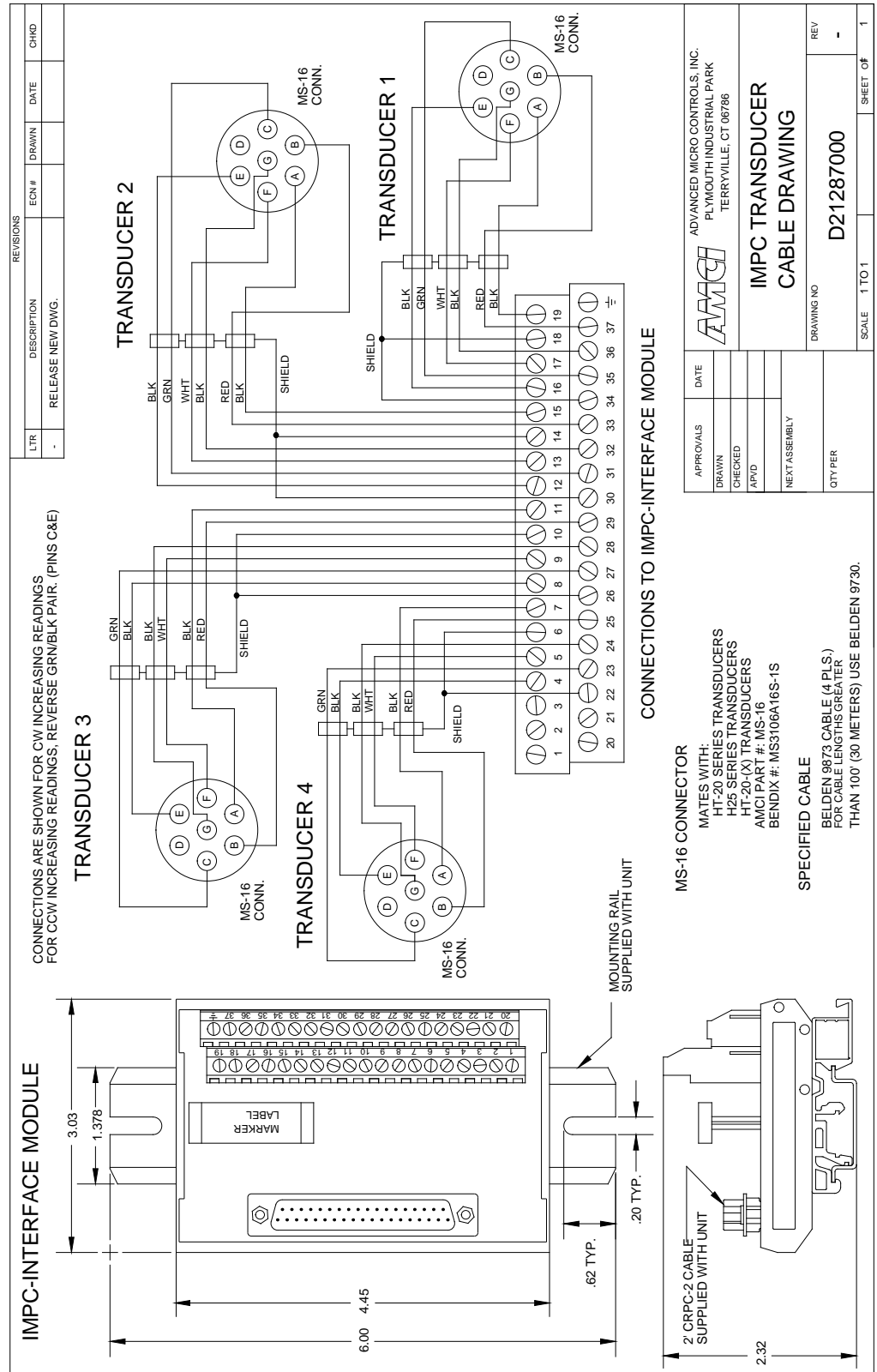
The *Brushless Resolver Transducer* companion guide give specifications, outline drawings and cabling diagrams for all compatible AMCI transducers except the HTT-20-1 and the HTCR transducers. Information on these transducers is included with the transducer itself.

The IMPC Interface Module simplifies field wiring by connecting the cards' D-Sub connector to screw terminals through a two foot ribbon cable. The print on the following page gives mounting dimensions and shows how to connect C1T-(x) transducer cables to the IMPC module.

IMPC Installation

The IMPC Interface Module simplifies field wiring of the transducer cables. The IMPC mounts on a standard DIN rail. A DIN rail is supplied as shown in the drawing.

This print shows the wiring for all of the compatible AMCI transducers except for the HTT-20-1. AMCI print D21223000 shows connections to the HTT-20-1 connector. You can then use this print to determine connections to the Series 1000 card.



SERIES 1000 RESOLVER INTERFACE CARDS

Data Format

The format of the data that you can read from the card is shown below. The first two bytes of data are the status bits. They show all programming and card faults and are set to '1' when indicating an error. Position and tachometer data is placed in the remaining bytes in binary format.

Note that the position and tachometer data are 16 bit (word) values. When reading data from a Series 1000 card, consider converting the byte data to word data before using it.

The data format for a four resolver input card is shown below. The data formats of the other cards can be considered a subset of this format.

	ODD BYTE								EVEN BYTE							
	07	06	05	04	03	02	01	00	07	06	05	04	03	02	01	00
BYTES 1/0	ACK	CARD ERR	T4 ERR	T3 ERR	T2 ERR	T1 ERR	CMD ERR	MES IGN	SF4 ERR	PS4 ERR	SF3 ERR	PS3 ERR	SF2 ERR	PS2 ERR	SF1 ERR	PS1 ERR
BYTES 3/2	TRANSDUCER 1 POSITION, BINARY FORMAT															
BYTES 5/4	TRANSDUCER 1 TACHOMETER, BINARY FORMAT															
BYTES 7/6	TRANSDUCER 2 POSITION, BINARY FORMAT															
BYTES 9/8	TRANSDUCER 2 TACHOMETER, BINARY FORMAT															
BYTES 11/10	TRANSDUCER 3 POSITION, BINARY FORMAT															
BYTES 13/12	TRANSDUCER 3 TACHOMETER, BINARY FORMAT															
BYTES 14/15	TRANSDUCER 4 POSITION, BINARY FORMAT															
BYTES 17/16	TRANSDUCER 4 TACHOMETER, BINARY FORMAT															

Data Format (continued)

Status Bits

- PS(n) ERR:** {n = 1..4} Set when programming an invalid Preset Value for transducer (n).
- SF(n) ERR:** {n = 1..4} Set when programming an invalid Scale Factor for transducer (n).
- MES IGN:** Message Ignored. If an error bit is set, the error must be cleared by programming the affected parameter or using the **CLR ERR** programming bit. This bit is set if you attempt to program a different parameter before clearing the error.
- CMD ERR:** Command Error. Set under three conditions. 1) Attempt to program the card while there is an E²PROM error. 2) No command bits are set when a program transfer is initiated. 3) Programming bits that must be zero are set to 1. Reset when valid instructions are sent to the card.
- T(n) ERR:** {n = 1..4} Set when there is a transducer fault on channel (n).
- CARD ERR:** Set when there is an E²PROM error or hardware error on the Series 1000 card. Use the **CLR ERR** programming to clear the faults. If the card does not respond, cycle power to the card. If the error still exists, call AMCI Technical Support for assistance. (See back cover.)
- ACK:** Acknowledge Bit. Used to acknowledge a program transfer.



All Series 1000 cards use a device called a Dual Port RAM as their interface to the backplane. This device has two banks of RAM. When the card is writing new values into one bank, the PC has access to the other bank so it can read the latest, complete set of data. Once the PC accesses a bank, the Series 1000 card will not switch the banks until the PC has read the LAST word of Data in the bank. (Always the odd byte of the last available tachometer value.) CONSEQUENTLY, If you read the data only as you need it instead of as a block, you run the risk that the PC will NOT have access to new data from the Series 1000 card. **You should consider reading all of the data from the Series 1000 card into a buffer, even if you will use only some of the data in your program.**

SERIES 1000 RESOLVER INTERFACE CARDS

Programmable Parameters

The Series 1000 cards give you tremendous flexibility when applying them to your application. With these cards you can scale the position data, preset the position data, and set the tachometer update time. The cards also supply transducer and module fault diagnostics data to the PC.

The Series 1000 cards use programmable *Parameters* to achieve this flexibility. These parameters are listed below with brief explanations and default values.

Scale Factor - Specifies the number of counts per turn. Minimum value of 2, maximum of 1024 when using 103X card, or maximum of 8192 when using a 104X card. Default value of 360, one count per degree of rotation.

Preset Value - Specifies the count the position changes to when the **Preset Transducer** bit is active. Range of values is zero to (Programmed Scale Factor - 1). Default value of zero.

Tachometer Response - Specifies the time between tachometer updates. The tachometer has a 1 RPM resolution. Set the tach response to 32 mSec for high speed response to a change in machine speed, 120 mSec for better speed averaging. Default of 120 mSec.

Programming from the Processor

Use the output bytes assigned to the card to program its parameters. The first two bytes are programming bits. The remaining bytes hold the parameter data to be written to the card. The data format of a four resolver input card is shown below. The data formats of the remaining cards can be considered subsets of this format. All unused programming bits must be set to zero. (For example, the programming bits of channels three and four if you are using a two channel card.) Unused data words need not be written to the card.

The Series 1000 cards consider the data written them to be words, not bytes. When programming, consider manipulating the data as words and converting it to bytes before writing it to the card.

	ODD BYTE								EVEN BYTE																						
	07	06	05	04	03	02	01	00	07	06	05	04	03	02	01	00															
BYTES 1/0	TRMT	CLR	ERR	PRG	TR	TACH	RESP	PSET	POS4	PSET	POS3	PSET	POS2	PSET	POS1	PRG	SF4	PRG	PS4	PRG	SF3	PRG	PS3	PRG	SF2	PRG	PS2	PRG	SF1	PRG	PS1
BYTES 3/2	TRANSDUCER 1 SCALE FACTOR, BINARY FORMAT																														
BYTES 5/4	TRANSDUCER 1 PRESET VALUE, BINARY FORMAT																														
BYTES 7/6	TRANSDUCER 2 SCALE FACTOR, BINARY FORMAT																														
BYTES 9/8	TRANSDUCER 2 PRESET VALUE, BINARY FORMAT																														
BYTES 11/10	TRANSDUCER 3 SCALE FACTOR, BINARY FORMAT																														
BYTES 13/12	TRANSDUCER 3 PRESET VALUE, BINARY FORMAT																														
BYTES 14/15	TRANSDUCER 4 SCALE FACTOR, BINARY FORMAT																														
BYTES 17/16	TRANSDUCER 4 PRESET VALUE, BINARY FORMAT																														

Programming from the Processor (continued)

Programming Bits

PRG PS(n): {n = 1..4} Set to program the Preset Value of transducer (n) to the value specified in the appropriate data word.

PRG SF(n): {n = 1..4} Set to program the Scale Factor of transducer (n) to the value specified in the appropriate data word.

TACH RESP: Specifies the Tachometer Response time when the **PRG TR** bit is set. Set to '0' for a 120 mSec response time, '1' for a 32 mSec response. All of the transducers are programmed to the same Tachometer Response time.

PRG TR: Set to program the Tachometer Response time. When this bit is set, the card programs the Tachometer Response to the time specified by the **TACH RESP** bit.

CLR ERR: Set to clear programming errors or hardware faults. Transducer faults cannot be cleared with this programming bit. Transducer faults are cleared when a working transducer is properly attached to the card.

TRMT: Transmit Bit - A program cycle is initiated when this bit makes a 0 → 1 transition.

To program the card, simply write the data into the correct data bytes, set the proper programming bits and then set the TRMT Bit to 1. The Series 1000 card accepts new commands only on a 0 → 1 transition of the TRMT bit. You can program the parameters while the card is in transducer fault. However, you cannot preset the position of the faulted transducer.

Once the Series 1000 card has accepted and processed the commands, it will set/reset the appropriate status bits and then set the ACKnowledge Bit. Once the ACK bit is set, check the status bits for errors and reset the TRMT bit. The module will respond by resetting the ACK bit. The programming cycle is now complete and a new cycle can begin.

NOTE: If the card encounters an error while storing data, it will stop processing commands and set the appropriate status bit. None of the parameters will be stored in the E²PROM. You can clear the error by either setting the **CLR ERR** bit, or correcting the wrong data, and starting a new programming cycle.



The EEPROM used to store the parameters is guaranteed for approximately 100,000 write cycles before writing to it will cause it to fail. Therefore continuously presetting the position or writing new parameters should be avoided. If your application requires you to continuously preset the position, consider calculating and applying the required position offset in your program.

SERIES 1000 RESOLVER INTERFACE CARDS

Important User Information

The products and application data described in this manual are useful in a wide variety of different applications. Therefore, the user and others responsible for applying these products described herein are responsible for determining the acceptability for each application. While efforts have been made to provide accurate information within this manual, AMCI assumes no responsibility for the application or the completeness of the information contained herein.

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The provisions of the "STANDARD WARRANTY" are the sole obligations of AMCI and excludes all other warranties expressed or implied. In no event shall AMCI be liable for incidental or consequential damages or for delay in performance of this warranty.

Returns Policy

All equipment being returned to AMCI for repair or replacement, regardless of warranty status, must have a Return Merchandise Authorization number issued by AMCI. Call (860) 585-1254 with the model number and serial number (if applicable) along with a description of the problem. A "RMA" number will be issued. Equipment must be shipped to AMCI with transportation charges prepaid. Title and risk of loss or damage remains with the customer until shipment is received by AMCI.

24 Hour Technical Support Number

24 Hour technical support is available on this product.

For technical support, call (860) 583-7271. Your call will be answered by the factory during regular business hours, 8AM - 5PM, Monday through Friday. During non-business hours an automated system will ask you to enter the telephone number you can be reached at. Please remember to include your area code. The system will page one of two engineers on call. Please have your product model number and a description of the problem ready before you call.

Revision History

This manual, LM1000086, replaces LM1000076. It fixes several typographical errors in the first revision. It was first released 8/1/96.

AMCI manuals are constantly evolving entities. If you notice any errors or would like to comment on the contents of this manual please call or fax AMCI Technical Documentation. Tel. (860) 585-1254 Fax. (860) 584-1973