

Model V350-EA/B/C11
48-Channel Digital Output
INSTRUCTION MANUAL

March, 1998

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CONTENTS

Features and Applications 1
General Description 1
Specifications 2
Ordering Information 2

UNPACKING AND INSTALLATION 3
 Logical Address Switches 3
 Interrupt Switches 4
 Module Insertion 4
 Front Panel Information 4
 LEDs 4

CONNECTORS 5

PROGRAMMING INFORMATION 5
 VMEbus/VXIbus Addressing 5
 VXIbus Configuration Registers 5
 ID/Logical Address Register 6
 Device Type Register 6
 Status/Control Register 7
 Offset Register 8

INTERRUPT ATTRIBUTE REGISTER 8
 Subclass Register 9
 Operational Registers 9
 Diagnostic Register 10

OUTPUT REGISTER #1 (HIGH) 10
OUTPUT REGISTER #1 (LOW) 10
OUTPUT REGISTER #2 (HIGH) 10
OUTPUT REGISTER #2 (LOW) 10

APPENDIX

V350 REGISTER LAYOUT 13

FIGURES

FIGURE 1 - V350 SWITCH LOCATIONS 3

TABLES

TABLE 1 - V350 Connector Pinout Assignments 5
TABLE 2 - V350 Configuration Registers - Short I/O Address Space 6
TABLE 3 - V350 Operational Registers - Standard Address Space 9

Warranty
NPD:rem(WP)



48-channel Digital Output

V350

GENERAL DESCRIPTION

The V350 is a single-width, C-sized VXIbus module containing a 48 output circuits. These switches are organized as two 24-bit words. Each switch is an open-collector transistor suitable for driving a relay, lamp, solenoid, or similar device.

All of the switches share a common return path. An output switch is closed whenever there is a logical "1" in the corresponding bit of the data register. Each output can sink 250 milliamperes with a maximum open-circuit voltage of 30 volts. Inductive loads should be diode-clamped at the load to remain within the voltage rating. Internal diode suppression clamped to +24 volts is available as an option. The V350 is also available with pull-up resistors for TTL signal levels.

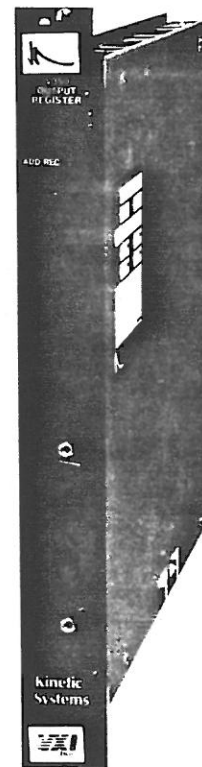
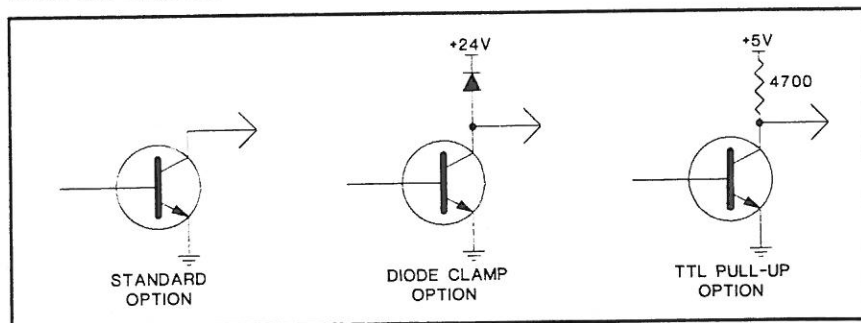
Each output option brings the output switches to a 50-contact "D" type connector on the module front panel.

The V350 supports both static and dynamic configuration capabilities. Access to the data is through memory locations indicated by the Offset Register within the VXIbus Configuration Register set, using A24/16, D16 data transfers.

FEATURES

- 48 output switches
- 30 volt open-circuit rating
- 250 milliampere current drive per switch
- Diode clamping option available
- TTL output option available

OUTPUT CIRCUIT



900 N. State Street, Lockport, Illinois 60441 • (815) 838-0005 • FAX (815) 838-4424

SPECIFICATIONS

Item	Specification
Outputs Number of outputs Output signal options	48 Open-collector switch, Diode clamp option, TTL pull-up option
Output Ratings Maximum open circuit voltage Maximum current	30 volts 250 milliamperes
Output Connector Type	50-pin "D" connector
Mating Connector	KineticSystems Model 5934-Z1A
Power Requirements: +5 volts	2150 mA, typical
Environmental and Mechanical Temperature Range Operational Storage Relative Humidity Cooling requirements Dimensions Front Panel Potential	0°C to +50°C -25°C to +75°C 0 to 85%, non-condensing to +40°C 10 cubic feet per minute 340mm X 233.35mm X 30.48mm (C-sized VXIbus) Chassis Ground

ORDERING INFORMATION

- Model V350-EA11 48-channel Digital Output; open-collector output
- Model V350-EB11 48-channel Digital Output; diode clamped output
- Model V350-EC11 48-channel Digital Output; TTL pull-up output

UNPACKING AND INSTALLATION

The Model V350 is shipped in a anti-static bag within a styrofoam packing container. Carefully remove the module from its static-proof bag and prepare to set the various options to conform to the operating environment.

Logical Address Switches

The V350 represents one of the 255 devices permitted in a VXIbus system. (Logical Address 0 is reserved for the Slot 0 device). The module is shipped from the factory with its address set for Logical Address 255. This address can be shared by multiple devices in a system that supports dynamic configuration. If the V350 is to be used in a system that does not support dynamic configuration, or in a system where static configuration of the module is desired, the Logical Address must be manually established. This is accomplished by manipulating eight rocker switches located under the access hole in the module's right-side ground shield. (Refer to Figure 1.)

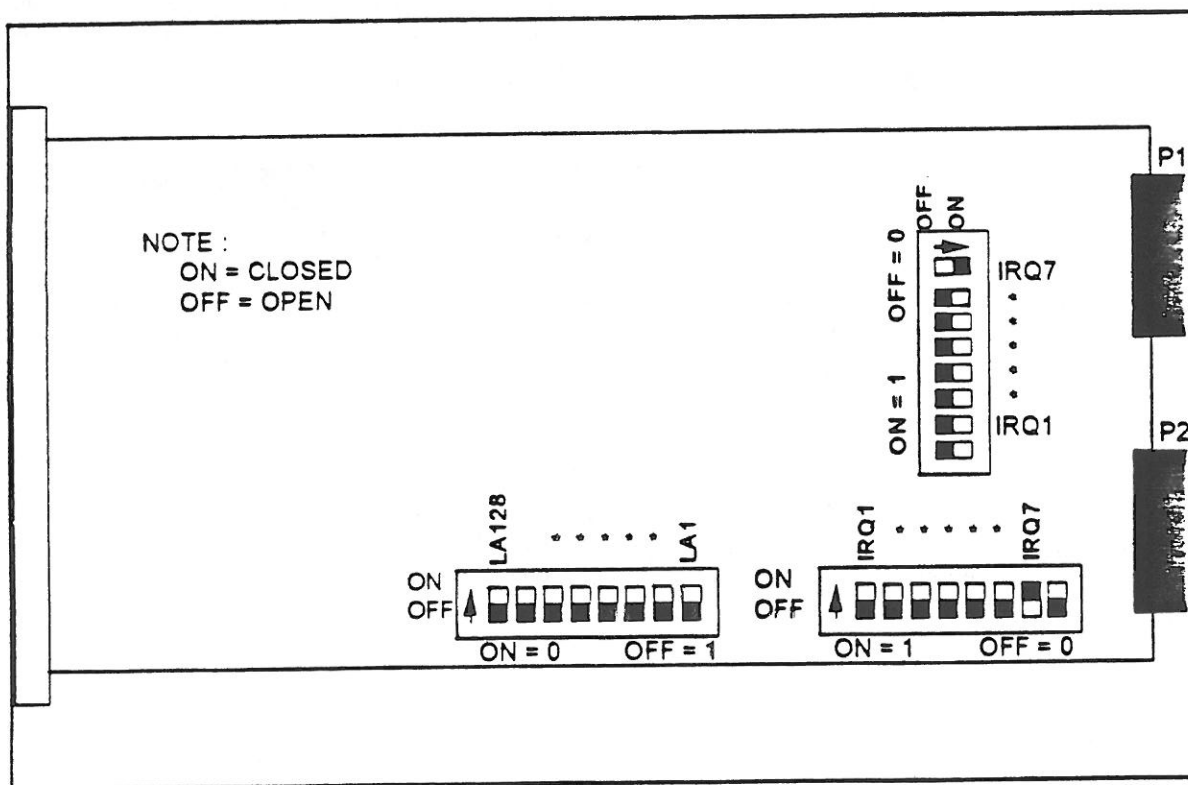


FIGURE 1 - V350 SWITCH LOCATIONS

Model V350-EA/B/C11

The bit pattern for the base address is shown below:

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	R
1	1	LA128	LA64	LA32	LA16	LA8	LA4	LA2	LA1	0	0	0	0	0	0	

Bits 15 and 14 are set to one (VXI defined).

Bits 13 through 6 are user selectable via the address switches LA128-LA1.

Bits 5 through 0 are set to "0" to indicate a block of 64 bytes.

Interrupt Switches

The V350 does not generate interrupts. No switches are provide for the setting the Interrupt Request level.

Module Insertion

The V350 is a C-sized, single width VXIbus module. It requires 2150 milliamperes of +5 volt power, and 10 cubic feet per minute of air flow to maintain stability. Except for Slot 0, it can be mounted in any unoccupied slot in a C-size VXIbus main frame.

CAUTION: TURN MAINFRAME POWER OFF WHEN INSERTING OR REMOVING MODULE

WARNING: REMEMBER TO REMOVE INTERRUPT ACKNOWLEDGE DAISY-CHAIN JUMPERS PRIOR TO INSERTING MODULE IN BACKPLANE
--

To insure proper interrupt acknowledge cycles from the V350 module, the daisy-chain Interrupt Acknowledge jumper must be removed before the module is installed in a slot. Conversely, daisy-chain jumpers must be installed in any empty slot between the V350 and the Slot 0 Controller.

Front Panel Information

LEDs

ADD_REC This LED turns on when the V350's operational registers are being accessed.

CONNECTORS

Table 1. Connector Pinout Assignments

17 Channel 17 Out	33 Channel 33 Out	50 Module Ground
16 Channel 16 Out	32 Channel 32 Out	49 Module Ground
15 Channel 15 Out	31 Channel 31 Out	48 Channel 48 Out
14 Channel 14 Out	30 Channel 30 Out	47 Channel 47 Out
13 Channel 13 Out	29 Channel 29 Out	46 Channel 46 Out
12 Channel 12 Out	28 Channel 28 Out	45 Channel 45 Out
11 Channel 11 Out	27 Channel 27 Out	44 Channel 44 Out
10 Channel 10 Out	26 Channel 26 Out	43 Channel 43 Out
9 Channel 9 Out	25 Channel 25 Out	42 Channel 42 Out
8 Channel 8 Out	24 Channel 24 Out	41 Channel 41 Out
7 Channel 7 Out	23 Channel 23 Out	40 Channel 40 Out
6 Channel 6 Out	22 Channel 22 Out	39 Channel 39 Out
5 Channel 5 Out	21 Channel 21 Out	38 Channel 38 Out
4 Channel 4 Out	20 Channel 20 Out	37 Channel 37 Out
3 Channel 3 Out	19 Channel 19 Out	36 Channel 36 Out
2 Channel 2 Out	18 Channel 18 Out	35 Channel 35 Out
1 Channel 1 Out		34 Channel 34 Out

PROGRAMMING INFORMATION

VMEbus/VXibus Addressing

Of the defined VXibus Configuration Registers, the V350 implements those required for register-based devices. The V350 also contains a set of Operational Registers to monitor and control the functional aspects of the device. Both register sets are described in this section.

Access to the Configuration Registers for all VXibus modules is available through the VMEbus short address space. The register addresses are located in the upper 16 kilobytes of the A16 address range (C000₁₆ to FFFF₁₆). The setting of the Logical Address switch, or the contents of the Logical Address Register (see below) are mapped into Address lines A6 through A13, thereby establishing a base address for the module somewhere in the range of C000₁₆ to FFC0₁₆.

VXibus Configuration Registers

Configuration Registers are required by the VXibus specification so that the appropriate levels of system configuration can be accomplished. The Configuration Registers in the V350 are offset from the base address. **Note: the V350 only responds to these addresses if the Short Nonprivileged Access (29₁₆) or Short Supervisory Access (2D₁₆) Address Modifier Codes are set for the backplane bus cycle.** Table 2 shows the applicable Configuration Registers present in the V350, their offset from the base (Logical) address, and their Read/Write capabilities.

Table 2. Configuration Registers - Short I/O Address Space

OFFSET	READ/WRITE CAPABILITY	REGISTER NAME
00 ₁₆	Read/Write	ID/Logical Address Register
02 ₁₆	Read Only	Device Type Register
04 ₁₆	Read/Write	Status/Control Register
06 ₁₆	Read/Write	Offset Register
08 ₁₆	Read Only	Attribute Register
1E ₁₆	Read Only	Subclass Register

ID/Logical Address Register

The format and bit assignments for the ID/Logical Address Register are as follows:

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
00 ₁₆	1	1	0	0	1	1	1	1	0	0	1	0	1	0	0	1	Read Write
	Not Used								Logical Address Register								

On READ transactions:

<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15, 14	Device Class	This is a Register-Based device.
13, 12	Address Space Needs	This module requires the use of A16/A24 address space.
11 - 00	Manufacturer's ID	3881 (F29 ₁₆) for KineticSystems.

For WRITE transactions, bits 15 through eight are not used, and setting them has no effect on the V350. In Dynamically configured systems (i.e., the Logical Address switches were set to a value of 255), bits seven through zero are written with the new Logical Address value.

Device Type Register

The format and bit assignments for the Device Type Register are as follows:

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
02 ₁₆	1	1	1	1	0	0	1	1	0	1	0	1	0	0	0	0	Read

Model V350-EA/B/C11

On READ transactions:

<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15 - 12	Required Memory	The V350 requires 256 bytes of additional memory space.
11 - 00	Model Code	Identifies this device as Model V350 (350 ₁₆).

Status/Control Register

The format and bit assignments for the Status/Control Register are as follows:

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
04 ₁₆	A24 ACT	MODID	S	1	0	0	0	0	0	0	0	0	RDY	PASS	0	RST	Read
	A24 ENA	Not Used		1	Not Used										RST	Write	

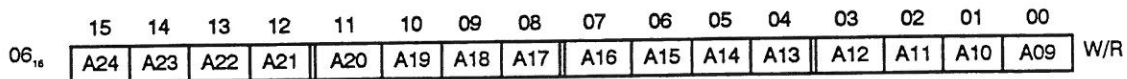
<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15	A24 Enable	This bit is written with a "1" to enable A24 addressing and reset (to "0") to disable A24 addressing. This bit <u>must</u> be set to "1" to allow access to the module's Operational Registers. Reads of this bit indicate its current state. This bit is reset to "0" on power-up or the assertion of SYSRESET*.
14	MODID	This Read-Only bit is set to a "1" if the module is <u>not</u> selected with the MODID line on P2. A "0" indicates that the device is selected by a high state on the P2 MODID line.
13	Status	This Read-Only bit indicates the status of the last operational transaction to the V350. A "1" indicates the transaction completed successfully.
12		This Read/Write bit is included for compatibility with other KineticSystems VXibus modules. It should always be written with a "1."
11 - 04	Not Used	When read, will return all "0s". These bits are ignored when written.
03	Ready	Along with Bit 02 (Passed), this Read-Only bit will appear as a "1" to indicate its readiness to accept operational commands.
02	Passed	See the Ready bit description.

Model V350-EA/B/C11

01	Not Used	Read as "0" and ignored on write transactions.
00	Reset	This Read/Write bit controls the Soft Reset condition within the V350. While the Soft Reset condition is enabled (by writing a "1" to this bit position), any further access to the Operational Registers (see below) is inhibited. The output bit patterns from the module are maintained in the state they were in just prior to the Soft Reset being enabled. This bit can be reset by writing a "0", on power-up or the assertion of SYSRESET*.

Offset Register

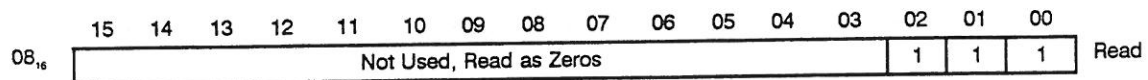
The format and bit assignments for the Offset Register are as follows:



This Read/Write register defines the base address of the V350's Operational Registers. These 16 bits contain the 16 most significant bits of the module's A24 space register addresses. The register is reset to an all "0" condition on power-up or the assertion of SYSRESET*, and is written with the appropriate value under program control.

INTERRUPT ATTRIBUTE REGISTER

The format and bit assignments for the Interrupt Attribute Register are as follows:

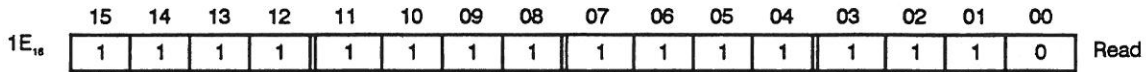


<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15 - 03	Not Used	These bits are not used by the V350, and are read as zeros.
02	Intr Control	The V350 does not have any Interrupt Control capabilities.
01	Intr Handler	The V350 does not have Interrupt Handler capabilities.
00	Intr Status	The V350 does not have an Interrupt Status register.

Model V350-EA/B/C11

Subclass Register

The format and bit assignments for the Subclass Register are as follows:



<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15	Extended Device	"1" indicates this to be a VXIbus defined Extended Device.
14-00	Register-Based	$7FFE_{16}$ indicates this to be an Extended register-based Device.

Operational Registers

The Operational Registers are the channels through which the output data patterns of the V350 are controlled. For compatibility with other KineticSystems VXIbus modules in this series, these registers are positioned in VMEbus Standard Address (A24) space. The base address for these registers is defined by the contents of the Offset Register within the Configuration Register set (see page 8).

Prior to gaining access to the Operational Registers, the A24 Enable bit (bit 15) must be set in the Status/Control Register (see page 7). **Note: The V350 will only respond to these addresses if the Standard Nonprivileged Data Access (39_{16}), Standard Nonprivileged Program Access ($3A_{16}$), Standard Supervisory Data Access ($3D_{16}$), or Standard Supervisory Program Access ($3E_{16}$) Address Modifier Codes are set for the bus cycle(s).**

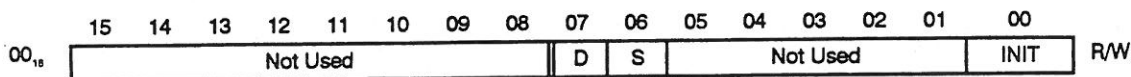
Of the 256 bytes requested by the setting of the Device Type register in the Configuration Register set, only ten bytes are used. (256 is the minimum number of bytes that can be requested through the Device Type register.) Table 3 shows the applicable Operational Registers present in the V350, their offset from the base A24 address, and their Read/Write capabilities.

Table 3. Operational Registers - Standard Address Space

A24 OFFSET	READ/WRITE CAPABILITY	REGISTER NAME
00_{16}	Read/Write	Diagnostic Register
10_{16}	Write Only	Output Register 1 (High)
12_{16}	Write Only	Output Register 1 (Low)
14_{16}	Write Only	Output Register 2 (High)
16_{16}	Write Only	Output Register 2 (Low)

Model V350-EA/B/C11

Diagnostic Register

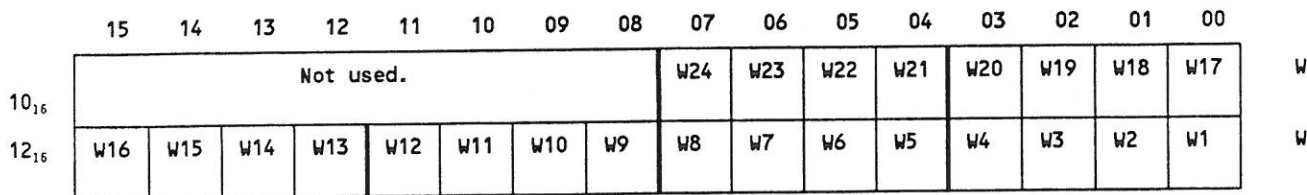


<u>Bit(s)</u>	<u>Mnemonic</u>	<u>Meaning</u>
15 - 08	Not Used	On Read transactions, these bits return an all "0" pattern. On Write transactions, these bits are ignored by the module.
07	Diagnostic	When this bit is set to a one, the last register access to the Operational Register (10 ₁₆) through 16 ₁₆) was valid.
06	Status	When this bit is set to a one, the last register access to the Operational Register (10 ₁₆ through 16 ₁₆) was accepted.
05 - 01	Not Used	Read as "0".
00	Initialize	Setting this bit to a one will only reset the Operational Register (10 ₁₆ through 16 ₁₆). The configuration and diagnostic registers are unaffected.

**OUTPUT REGISTER #1 (HIGH)
OUTPUT REGISTER #1 (LOW)**

**OUTPUT REGISTER #2 (HIGH)
OUTPUT REGISTER #2 (LOW)**

To write all 24-bits of the Output Register, a write to the HIGH register must be executed before a write to the LOW register is written. A write to the LOW register will set the output state for bits 1-16, while the HIGH register will set the state for bits 17-24. Writing a "1" will turn on the corresponding bit while writing a "0" will reset the corresponding bit.



D16

Model V350-EA/B/C11

15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00

14 ₁₆	Not used.								W32	W31	W30	W29	W28	W27	W26	W25	W
16 ₁₆	W48	W47	W46	W45	W44	W43	W42	W41	W40	W39	W38	W37	W36	W35	W34	W33	W

D16

Model V350-EA/B/C11

APPENDIX

V350 REGISTER LAYOUT

Configuration Registers - Short I/O Address Space

OFFSET	WRITE/READ CAPABILITY	REGISTER NAME
00 ₁₆	Write/Read	ID/Logical Address Register
02 ₁₆	Read Only	Device Type Register
04 ₁₆	Write/Read	Status/Control Register
06 ₁₆	Write/Read	Offset Register
08 ₁₆	Read Only	Attribute Register
1E ₁₆	Read Only	Subclass Register

Configuration Register Formats

ID/LOGICAL ADDRESS REGISTER

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
00 ₁₆	1	1	0	0	1	1	1	1	0	0	1	0	1	0	0	1	Read
	Not Used								Logical Address								Write

DEVICE TYPE REGISTER

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
02 ₁₆	1	1	1	1	0	0	1	1	0	1	0	1	0	0	0	0	Read

STATUS/CONTROL REGISTER

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
04 ₁₆	A24 ACT	MODID	S	1	0	0	0	0	0	0	0	0	RDY	PASS	0	RST	Read
	A24 ENA	Not Used		1	Not Used										RST	Write	

OFFSET REGISTER

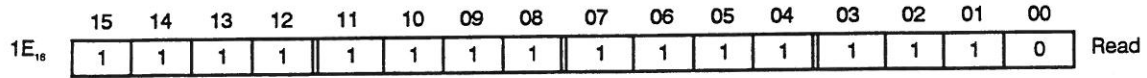
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
06 ₁₆	A24	A23	A22	A21	A20	A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A09	W/R

INTERRUPT ATTRIBUTE REGISTER

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
08 ₁₆	Not Used, Read as Zeros														1	1	1	Read

Model V350-EA/B/C11

SUBCLASS REGISTER

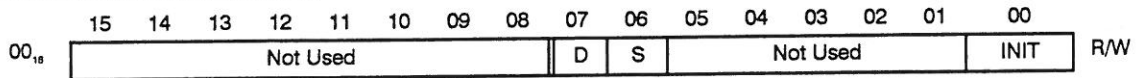


Operational Registers - Standard Address Space

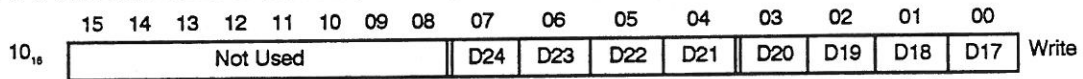
A24 OFFSET	READ/WRITE CAPABILITY	REGISTER NAME
00 ₁₆	Read/Write	Diagnostic Register
10 ₁₆	Write Only	Output Register 1 (High)
12 ₁₆	Write Only	Output Register 1 (Low)
14 ₁₆	Write Only	Output Register 2 (High)
16 ₁₆	Write Only	Output Register 2 (Low)

Operational Register Formats

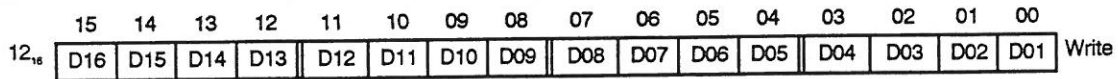
DIAGNOSTIC REGISTER



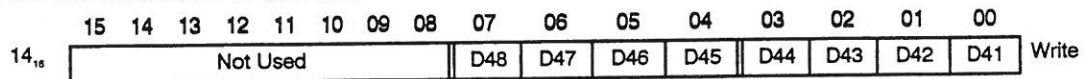
OUTPUT REGISTER 1 (HIGH)



OUTPUT REGISTER 1 (LOW)



OUTPUT REGISTER 2 (HIGH)



Model V350-EA/B/C11

OUTPUT REGISTER 2 (LOW)

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
¹⁶ _{is}	D40	D39	D38	D37	D36	D35	D34	D33	D32	D31	D30	D29	D28	D27	D26	D25	Write

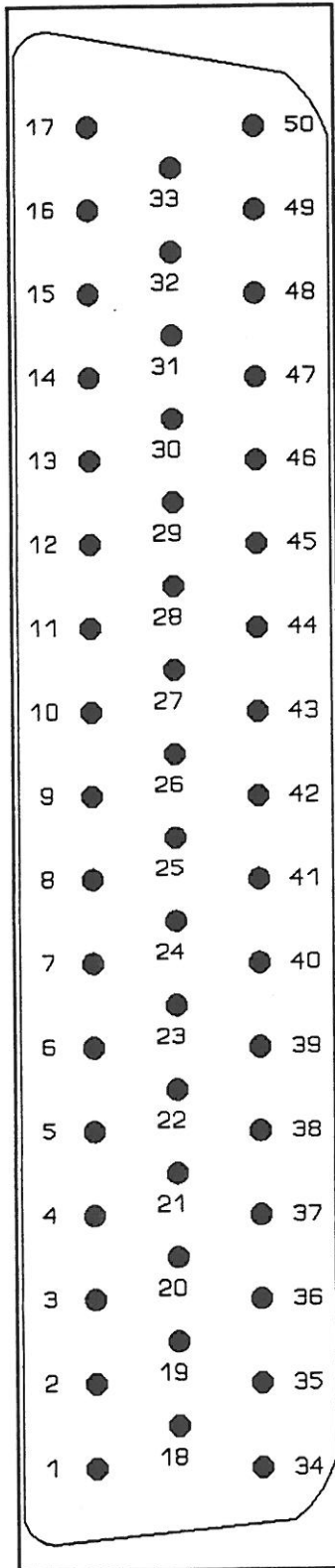


Figure 1 Connector Pinout

Connector Pinout Assignments

17 Channel 17 Out	33 Channel 32 Out	50 Module Ground
16 Channel 16 Out	32 Channel 32 Out	49 Module Ground
15 Channel 15 Out	31 Channel 31 Out	48 Channel 48 Out
14 Channel 14 Out	30 Channel 30 Out	47 Channel 47 Out
13 Channel 13 Out	29 Channel 29 Out	46 Channel 46 Out
12 Channel 12 Out	28 Channel 28 Out	45 Channel 45 Out
11 Channel 11 Out	27 Channel 27 Out	44 Channel 44 Out
10 Channel 10 Out	26 Channel 26 Out	43 Channel 43 Out
9 Channel 9 Out	25 Channel 25 Out	42 Channel 42 Out
8 Channel 8 Out	24 Channel 24 Out	41 Channel 41 Out
7 Channel 7 Out	23 Channel 23 Out	40 Channel 40 Out
6 Channel 6 Out	22 Channel 22 Out	39 Channel 39 Out
5 Channel 5 Out	21 Channel 21 Out	38 Channel 38 Out
4 Channel 4 Out	20 Channel 20 Out	37 Channel 37 Out
3 Channel 3 Out	19 Channel 19 Out	36 Channel 36 Out
2 Channel 2 Out	18 Channel 18 Out	35 Channel 35 Out
1 Channel 1 Out		34 Channel 34 Out

Warranty

KineticSystems Corporation warrants its standard hardware products to be free of defects in workmanship and materials for a period of one year from the date of shipment to the original end user. Software products manufactured by KineticSystems are warranted to conform to the Software Product Description (SPD) applicable at the time of purchase for a period of ninety days from the date of shipment to the original end user. Products purchased for resale by KineticSystems carry the original equipment manufacturer's warranty.

KineticSystems will, at its option, either repair or replace products that prove to be defective in materials or workmanship during the warranty period.

Transportation charges for shipping products to KineticSystems shall be prepaid by the purchaser, while charges for returning the repaired product to the purchaser, if located in the United States and Switzerland, shall be paid by KineticSystems. Return shipment will be made by UPS, where available, unless the purchaser requests a premium method of shipment at their expense. The selected carrier shall not be construed to be the agent of KineticSystems, nor will KineticSystems assume any liability in connection with the services provided by the carrier.

The product warranty may vary outside the United States or Switzerland and does not include shipping, customs clearance, or any other charges. Consult your local authorized representative for more information regarding specific warranty coverage and shipping details.

KINETICSYSTEMS SPECIFICALLY MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY EITHER EXPRESSED OR IMPLIED, EXCEPT AS IS EXPRESSLY SET FORTH HEREIN. PRODUCT FAILURES CREATED BY UNAUTHORIZED MODIFICATIONS, PRODUCT MISUSE, OR IMPROPER INSTALLATION ARE NOT COVERED BY THIS WARRANTY.

THE WARRANTIES PROVIDED HEREIN ARE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDIES ON ANY CLAIM OF ANY KIND FOR ANY LOSS OR DAMAGE ARISING OUT OF, CONNECTED WITH, OR RESULTING FROM THE USE, PERFORMANCE OR BREACH THEREOF, OR FROM THE DESIGN, MANUFACTURE, SALE, DELIVERY, RESALE, OR REPAIR OR USE OF ANY PRODUCTS COVERED OR FURNISHED BY KINETICSYSTEMS INCLUDING BUT NOT LIMITED TO ANY CLAIM OF NEGLIGENCE OR OTHER TORTIOUS BREACH, SHALL BE THE REPAIR OR REPLACEMENT, FOB FACTORY, AS KINETICSYSTEMS MAY ELECT, OF THE PRODUCT OR PART THEREOF GIVING RISE TO SUCH CLAIM, EXCEPT THAT KINETICSYSTEMS' LIABILITY FOR SUCH REPAIR OR REPLACEMENT SHALL IN NO EVENT EXCEED THE CONTRACT PRICE ALLOCABLE TO THE PRODUCTS OR PART THEREOF WHICH GIVES RISE TO THE CLAIM. IN NO EVENT SHALL KINETICSYSTEMS BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFITS.

Products will not be accepted for credit or exchange without the prior written approval of KineticSystems. If it is necessary to return a product for repair replacement or exchange, a Return Authorization (RA) Number must first be obtained from the Repair Service Center prior to shipping the product to KineticSystems. The following steps should be taken before returning any product:

1. Contact KineticSystems and discuss the problem with a Technical Service Engineer.
2. Obtain a Return Authorization (RA) Number.
3. Initiate a purchase order for the estimated repair charge if the product is out of warranty.
4. Include a description of the problem and your technical contact person with the product.
5. Ship the product prepaid with the RA Number marked on the outside of the package to:

USA, Canada, and Mexico
KineticSystems Corporation
Repair Service Center
900 North State Street
Lockport, IL 60441

Telephone: (815) 838-0005
Facsimile: (815) 838-4424