ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Acromag AVME9431-i-L* at our website: ***Click HERE***

Acromag®

Series 9430/9431/9432
VME Isolated 32/64/96 Channel
Digital Output Board

USER'S MANUAL

ACROMAG INCORPORATED
30765 South Wixom Road
P.O. BOX 437
Wixom, MI 48393-7037 U.S.A.
Tel: (248) 624-1541
Fax: (248) 624-9234

8500-326C-05D003

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Manual No. 8500-326

The information in this manual is subject to change without notice. Acromag, Inc., makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Further, Acromag, Inc., assumes no responsibility for any errors that may appear in this manual and makes no commitment to update, nor keep current, the information contained in this manual.

No part of this manual may be copied or reproduced in any form, or by any means, without the prior written consent of Acromag, Inc.

IMPORTANT SAFETY CONSIDERATIONS

It is very important for the user to consider the possible adverse effects of power, wiring, component, sensor or software failures in designing any type of control or monitoring system. This is especially important where economic property loss or human life is involved. It is important that the user employ redundancy and comprehensive failure analysis to insure a safe and satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

Acromag, Inc.
30765 South Wixom Road
P.O. Box 437
Wixom, Michigan 48393-7037, USA

Tel: (248) 624-1541
Fax: (248) 624-9234

Copyright 1992 Acromag, Inc. Printed in USA
Data and specifications subject to change without notice

Artisan Technology Group - Quality Instrumentation Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE OF CONTENTS

CHAPTER

		Page
1.0	**GENERAL INFORMATION**	1.1
1.1	INTRODUCTION	1.1
1.2	DIGITAL SSR OUTPUT FEATURES	1.2
1.3	VMEbus INTERFACE FEATURES	1.3
1.4	FIELD COMPATIBILITY	1.3
2.0	**PREPARATION FOR USE**	2.1
2.1	UNPACKING AND INSPECTION	2.1
2.2	CARD CAGE CONSIDERATIONS	2.1
2.3	BOARD CONFIGURATION	2.1
	2.3.1 Default Jumper Configuration	2.5
2.4	VMEbus CONFIGURATION	2.5
	2.4.1 Address Decode Jumper Configuration	2.5
	2.4.2 Address Modifier Jumper Configuration	2.7
	2.4.3 SYSFAIL* Configuration	2.7
	2.4.4 Over Temperature Automatic Reset Jumper Configuration	2.7
2.5	DIGITAL SSR OUTPUT CONFIGURATION	2.8
	2.5.1 Driving Relay Coils and Other Inductive Loads	2.8
2.6	DIGITAL SSR OUTPUT INTERFACE TO TTL AND CMOS SIGNALS	2.11
2.7	CONNECTORS	2.13
	2.7.1 Digital Output Connector (PORTS A & B)	2.13
	2.7.2 Digital Output Connector (PORTS C & D)	2.14
	2.7.3 Digital Output Connector (PORTS E & F)	2.15
	2.7.4 VMEbus Connections	2.16
2.8	POWER-UP TIMING AND LOADING	2.17
2.9	DATA TRANSFER TIMING	2.17
2.10	FIELD GROUNDING CONSIDERATIONS	2.17
3.0	**PROGRAMMING INFORMATION**	3.1
3.1	MEMORY MAP	3.1
	3.1.1 Board Identification PROM	3.3
	3.1.2 Board Status Register	3.3
	3.1.2.1 Status Bits Usage	3.6
	3.1.3 Port A Digital Output Channel Data Register	3.7
	3.1.4 Port B Digital Output Channel Data Register	3.7
	3.1.5 Port C Digital Output Channel Data Register	3.8
	3.1.6 Port D Digital Output Channel Data Register	3.8
	3.1.7 Port E Digital Output Channel Data Register	3.9
	3.1.8 Port F Digital Output Channel Data Register	3.9
3.2	OVER TEMPERATURE MONITOR	3.10
	3.2.1 Low Limit & High Limit Status Bits	3.10
	3.2.2 Automatic Reset Function	3.10
3.3	GENERAL PROGRAMMING CONSIDERATIONS	3.13
	3.3.1 Board Diagnostics	3.13

Artisan Technology Group - Quality Instrumentation Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER

		Page
4.0	**THEORY OF OPERATION**	4.1
4.1	VMEbus INTERFACE	4.1
	4.1.1 VMEbus Control Logic	4.1
4.2	REGISTER LOCATION SUMMARY	4.3
4.3	ISOLATION BARRIER	4.3
4.4	SSR OUTPUT SECTION	4.3
5.0	**SERVICE AND REPAIR INFORMATION**	5.1
5.1	SERVICE AND REPAIR ASSISTANCE	5.1
5.2	PRELIMINARY SERVICE PROCEDURE	5.1
5.3	PARTS LISTS	5.2
6.0	**SPECIFICATIONS**	6.1
7.0	**SCHEMATIC AND PART LOCATION DRAWINGS**	7.1

APPENDIX:

A.0	**CABLE AND TERMINATION PANELS**	A.1
A.1	CABLE: MODEL 9944-x	A.1
A.2	TERMINATION PANELS: MODELS 6985-16DO	A.3

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLES:

		Page
2.1	P3 CONNECTOR (PORTS A & B)	2.13
2.2	P4 CONNECTOR (PORTS C & D)	2.14
2.3	P2 CONNECTOR (PORTS E & F)	2.15
2.4	P1 BUS CONNECTIONS	2.16
5.1A	PARTS LIST FOR MODEL AVME9430/31/32-I (MAIN BOARD-PARTS COMMON)	5.3
5.1B	PARTS LIST FOR MODEL AVME9431/32-I (64-CH ADD PARTS-PARTS UNIQUE)	5.4
5.1C	PARTS LIST FOR MODEL AVME9430/32-I (32-CH RAFT BOARD-PARTS UNIQUE)	5.4
5.2A	PARTS LIST FOR MODEL AVME943x-I-L (LED EXP. BOARD - PARTS UNIQUE)	5.5

FIGURES:

2.1	AVME9430-I/9431-I/9432-I JUMPER LOCATION DRAWING (4501-270)	2.2
2.2	AVME9431/9432-I-L LED BOARD MECHANICAL ASSEMBLY (4501-275)	2.3
2.3	AVME9430/9432-I 32-CH RAFT BOARD MECHANICAL ASSEMBLY (4501-276)	2.4
2.4	AVME9430/1/2 SIMPLIFIED SSR OUTPUT CHANNEL SCHEMATIC (4501-269)	2.9
2.5	AVME9430/1/2 DIGITAL OUTPUT CHANNEL CONFIGURATIONS (4501-278)	2.10
2.6	AVME9430/1/2 INTERFACE TO TTL AND CMOS SIGNALS (4501-277)	2.12
3.1	BOARD MEMORY MAP	3.2
3.2	AVME9431-I-L BOARD IDENTIFICATION PROM	3.5
3.3	AVME943x OVER-TEMPERATURE AUTOMATIC RESET FUNCTION (4501-279)	3.12
4.1	AVME9430/9431/9432 BLOCK DIAGRAM (4501-268)	4.2
	AVME9430/1/2 SCHEMATIC & PART LOCATION DRAWING (4501-257)	7.2
	AVME9430/2 SCHEMATIC & PART LOCATION DRAWING (Raft Board 4501-258)	7.14
	AVME9431/2 LED EXPANSION BOARD SCH. & PART LOC. DRAWING (4501-256)	7.20
	9944-X FLAT 64 PIN CABLE (4501-135)	A.2
	9948-X FLAT 64 PIN CABLE (4501-291)	A.4
	6985-32DO SCHEMATIC & PART LOCATION DRAWING (4501-272)	A.7
	6985-32DO MOUNTING CLEARANCE & ELECTRICAL CONNECTIONS (4501-273)	A.10

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The AVME9430/9431/9432 Series of VME cards offer a variety of features which make them an ideal choice for many industrial and scientific applications. The AVME9430 contains 32 DC Solid State Relay (SSR) outputs, the AVME9431 contains 64 DC SSR outputs and the AVME9432 contains 96 DC SSR output channels. In addition, channel status indicators are also available on the first 64 channels (P3 and P4) for AVME9431 and AVME9432 models, only.

MODEL	32 Channel Digital DC SSR Outputs P2 Access	64 Channel Digital DC SSR Outputs P3,P4 Access	96 Channel Digital SSR Outputs P2, P3,P4 Access	Channel On LEDs (Red) 64 Channels at P3 & P4
AVME9430-I	XX			
AVME9431-I		XX		
AVME9431-I-L		XX		XX
AVME9432-I			XX	
AVME9432-I-L			XX	XX

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

General Features

- All Digital DC SSR Outputs are isolated from the VMEbus for up to 250 VAC, or 354V DC on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown).

- All Digital DC SSR Channels are isolated from each other for up to 125 VAC, or 125V DC on a continuous basis (will withstand 1250V AC dielectric strength test for one minute without breakdown).

- Field connections accessible through connectors mounted on the Front Panel (AVME9431 and AVME9432).

- Field connections accessible through connectors mounted on the Rear Panel (AVME9430 and AVME9432).

- On board temperature sensor indicates over-temperature conditions with selectable channel reset on over-temperature condition.

- Can be interfaced to TTL & CMOS logic.

- PASS/FAIL status indicator LEDs on the front panel.

- Optional Termination Panels.

1.2 DIGITAL SSR OUTPUT FEATURES

- 32 SSR output channels configured as two (2) 16 bit words (AVME9430).
- 64 SSR output channels configured as four (4) 16 bit words (AVME9431).
- 96 SSR output channels configured as six (6) 16 bit words (AVME9432).

- Ability to read back output states (for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored).

- Outputs sink up to 1 Amp DC, from up to a 55 VDC source (see section 3.2 for additional information).

- DC Solid State Relays (SSRs) operate as Single Pole, Single Throw (SPST), Form A relays.

- Output channel ON (output switch closed) indicating red LEDs (with -L option).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.3 VMEbus INTERFACE FEATURES

- Slave module A24/A16, D16/D08 (EO).
- Short I/O Address Modifiers 29H, 2DH (H = Hex).
- Standard Address Modifiers 39H, 3DH (H = Hex).
- Decode on 1K byte boundaries.

1.4 FIELD COMPATIBILITY

See APPENDIX A for more information on compatible products.

Directly compatible with Acromag output termination panel.

Cables:

Model 9944-X: Flat 64 pin cable (female connectors at both ends) for connecting the AVME9431/2 (P3 or P4 connector) to the 6985-32DO termination panel.

Model 9948-X: Flat 64 pin cable (female connectors at both ends) for connecting the AVME9430/2 (P2 connector) to the 6985-32DO termination panel.

Termination Panel:

Model 6985-32DO: 32 channel output digital termination panel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.0 PREPARATION FOR USE

This chapter provides information about preparing the AVME9430/1/2 Isolated Digital Output Boards for system operation.

2.1 UNPACKING AND INSPECTION

Inspect the shipping carton immediately upon receipt for evidence of mishandling during transit. If the shipping carton is severely damaged or water stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is absent when the carton is opened and the contents of the carton are damaged, keep the carton and packing material for the agent's inspection.

For repairs to a product damaged in shipment, refer to the Acromag Service Policy to obtain return instructions. It is suggested that salvageable shipping cartons and packing material be saved for future use in the event the product must be shipped.



The board is physically protected with foam and electrically protected with an antistatic bag during shipment. It is advisable to visually inspect the board for evidence of mishandling prior to applying power.

The board utilizes static sensitive components and should only be handled at a static safe work station.

2.2 CARD CAGE CONSIDERATIONS

Refer to the specifications for bus loading and power requirements. Be sure that the system power supplies are able to accommodate the additional requirements within the voltage tolerances specified.

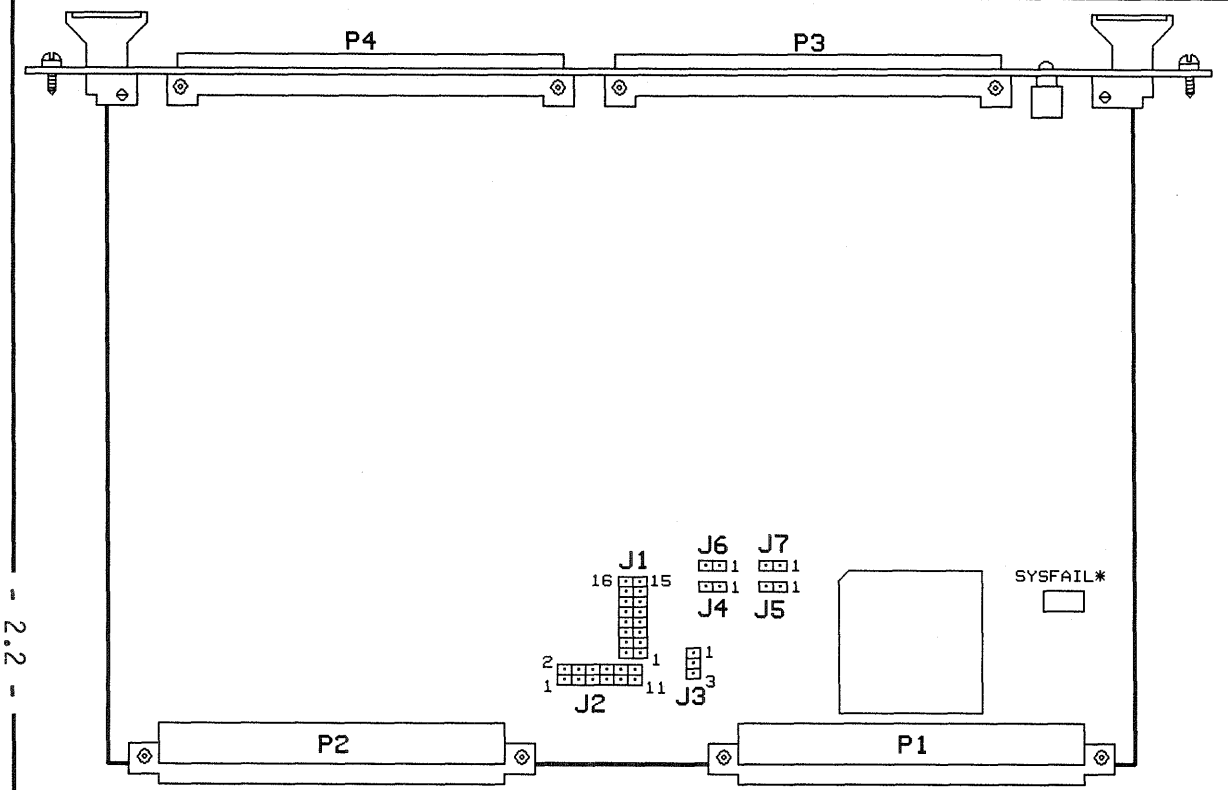
> IMPORTANT
> Adequate air circulation must be provided to prevent a temperature rise above the maximum operating temperature

Due to the large currents associated with these boards, adequate air circulation must be provided. Large and continuing fluctuations in ambient air temperature should be avoided. If the installation is in an industrial environment and the board is exposed to harsh environmental air, careful consideration should be given to air filtering. Refer to section 3.2 for additional information.

2.3 BOARD CONFIGURATION

The board may be configured in a variety of ways for many different applications. Each possible jumper setting will be discussed in the following sections. The jumper locations are shown in Figure 2.1.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



J1: ADDRESS DECODE JUMPER CONFIGURATION

	PINS OF J1							
BASE ADDRESS	A23 15 & 16	A22 13 & 14	A21 11 & 12	A20 9 & 10	A19 7 & 8	A18 5 & 6	A17 3 & 4	A16 1 & 2
00000000H	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
00010000H	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
00020000H	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
00030000H	OUT	OUT	OUT	OUT	OUT	OUT	IN	IN
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
00FC0000H	IN	IN	IN	IN	IN	IN	OUT	OUT
00FD0000H	IN	IN	IN	IN	IN	IN	OUT	IN
00FE0000H	IN	IN	IN	IN	IN	IN	IN	OUT
00FF0000H	IN	IN	IN	IN	IN	IN	IN	IN

J2: ADDRESS DECODE JUMPER CONFIGURATION

	PINS OF J2					
BASE ADDRESS	A15 11 & 12	A14 9 & 10	A13 7 & 8	A12 5 & 6	A11 3 & 4	A10 1 & 2
00000000H	OUT	OUT	OUT	OUT	OUT	OUT
00000400H	OUT	OUT	OUT	OUT	OUT	IN
00000800H	OUT	OUT	OUT	OUT	IN	OUT
00000C00H	OUT	OUT	OUT	OUT	IN	IN
00001000H	OUT	OUT	OUT	IN	OUT	OUT
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
0000EC00H	IN	IN	IN	OUT	IN	IN
0000F000H	IN	IN	IN	IN	OUT	OUT
0000F400H	IN	IN	IN	IN	OUT	IN
0000F800H	IN	IN	IN	IN	IN	OUT
0000FC00H	IN	IN	IN	IN	IN	IN

J6: OVER TEMPERATURE AUTOMATIC RESET JUMPER CONFIGURATION

PINS OF J6	
J6 1 & 2	OVER TEMPERATURE AUTOMATIC RESET
IN	AUTO RESET ENABLED
OUT	AUTO RESET DISABLED

J8: SYSFAIL* JUMPER CONFIGURATION

PINS OF J8	
J8 1 & 2	SYSFAIL* SIGNAL LINE
IN	ENABLED
OUT	DISABLED

NOTE 1: SEE SECTION 3.2 FOR MORE INFORMATION ON THE OVER TEMPERATURE AUTOMATIC RESET FUNCTION.

NOTE 2: SEE SECTION 5.2 FOR MORE INFORMATION ON THE SYSFAIL* SIGNAL LINE.

NOTE 3: J7 IS NOT USED.

J3,J4,J5: ADDRESS MODIFIER JUMPER CONFIGURATION

PINS OF J3,J4,J5				
J3 1 & 2	J3 2 & 3	J4 1 & 2	J5 1 & 2	ADDRESS MODIFIER CODE/FUNCTION
OUT	IN	IN	OUT	2DH ONLY SHORT SUPERVISORY ACCESS
OUT	IN	IN	IN	2DH & 29H SHORT SUPERVISORY ACCESS AND SHORT NON-PRIVILEGED ACCESS
IN	OUT	OUT	OUT	3DH ONLY STANDARD SUPERVISORY DATA ACCESS
IN	OUT	OUT	IN	3DH & 39H STANDARD SUPERVISORY DATA ACCESS AND STANDARD NON-PRIVILEGED DATA ACCESS

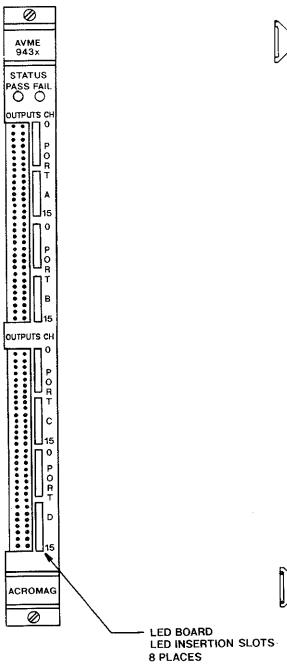
AcroMag® WIXOM, MICH. — 20 NOV 92 | A | TAV | TH

TITLE: JUMPER LOCATION

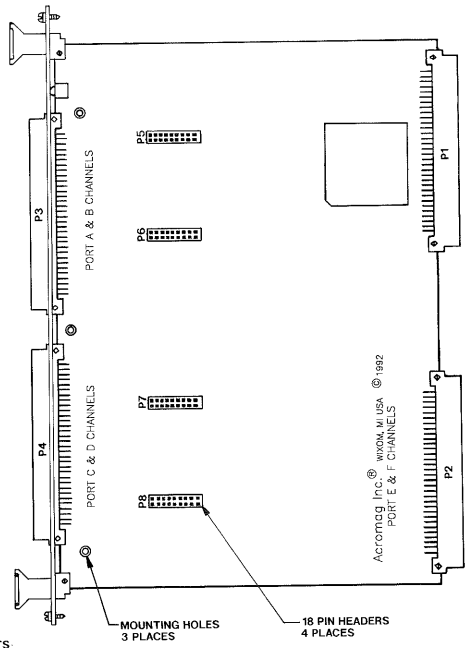
SIZE D DWG | SERIES: AVME9430/1/2 | SHEET: 1 OF 1 | DRAWING: 4501-270 | REV: A

FIGURE 2.1: AVME9430/9431/9432 JUMPER LOCATION

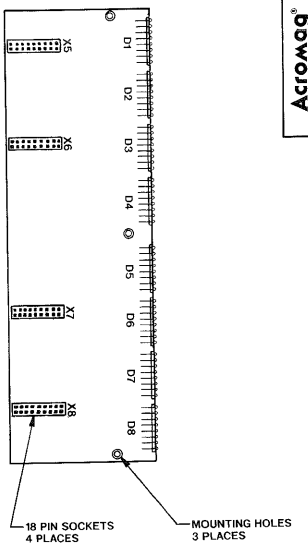
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



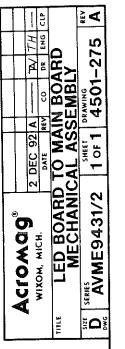
AVME9431/2
FRONT PANEL



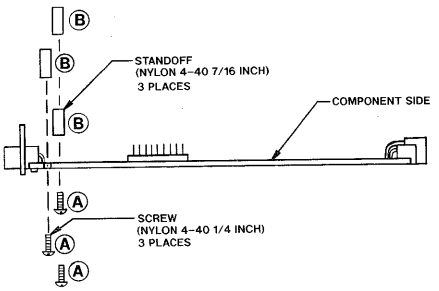
AVME 9431/2
MAIN BOARD



AVME 9431/2
LED BOARD



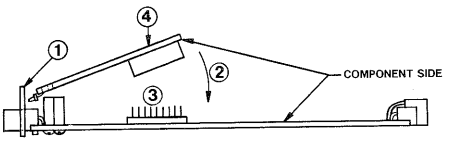
STEP 1.



NOTE:
EJECTOR KNOBS REMOVED FOR CLARITY.

① INSERT NYLON SCREWS, ITEM A, THRU MAIN BOARD INTO SPACERS, ITEM B, (3 PLACES) AND TIGHTEN.

STEP 2.



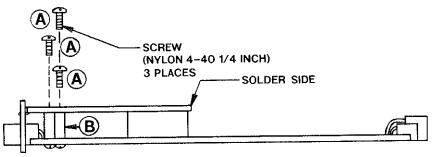
① INSERT LED BOARD'S LED ARRAYS INTO FRONT PANEL LED INSERTION SLOTS.

② ROTATE LED BOARD TOWARDS MAIN BOARD.

③ CAREFULLY ALIGN FOUR (4) 18 PIN SOCKETS TO FOUR (4) 18 PIN HEADERS.

④ GENTLY PRESS LED BOARD ONTO MAIN BOARD UNTIL SOCKETS AND HEADERS ARE SEATED.

STEP 3.



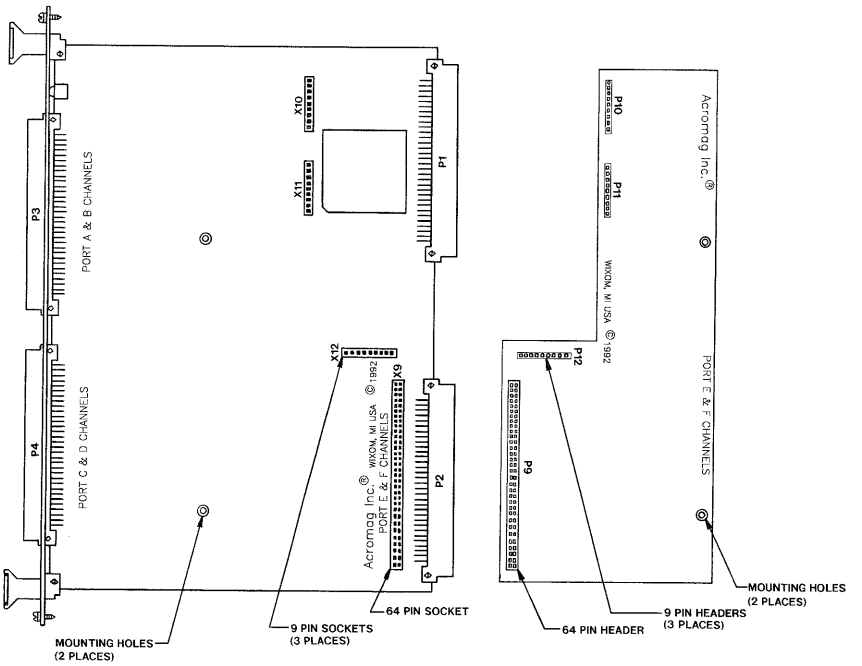
① INSERT NYLON SCREWS, ITEM A, THRU LED BOARD INTO SPACERS, ITEM B, (3 PLACES) AND TIGHTEN.

FIGURE 2.2: AVME 9431/2 LED BOARD TO MAIN BOARD MECHANICAL ASSEMBLY*

NOTE: AVME9431/2 ONLY, -L OPTION.

*FOLLOW STEPS IN REVERSE ORDER FOR DISASSEMBLY.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

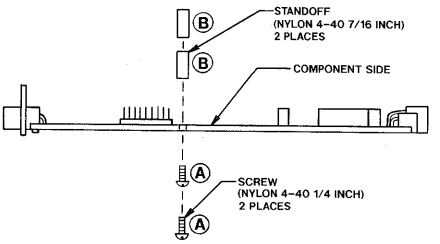


AVME 9430/2 MAIN BOARD

AVME9430/2 RAFT BOARD

Acromag® WIXOM, MICH.	2 DEC 92 A	RAFT BOARD TO MAIN BOARD MECHANICAL ASSEMBLY
	SIZE D	SERIES AVME9430/2
	SHEET 1 OF 1	DRAWING 4501-276
	REV A	

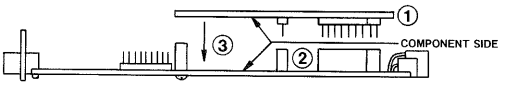
STEP 1.



NOTE:
EJECTOR KNOBS REMOVED FOR CLARITY.

① INSERT NYLON SCREWS, ITEM A, THRU MAIN BOARD INTO SPACERS, ITEM B, (2 PLACES) AND TIGHTEN.

STEP 2.

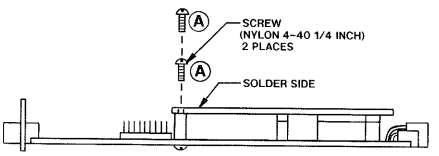


① POSITION RAFT BOARD OVER MAIN BOARD SO THAT COMPONENT SIDES FACE EACH OTHER.

② CAREFULLY ALIGN 9 AND 64 PIN SOCKETS ON MAIN BOARD WITH 9 AND 64 PIN HEADERS ON RAFT BOARD. HOLES SUPPLIED ON RAFT BOARD SHOULD LINE UP WITH SPACERS, ITEM B, (2 PLACES).

③ GENTLY PRESS RAFT BOARD ONTO MAIN BOARD UNTIL SOCKETS AND HEADERS ARE SEATED.

STEP 3.



① INSERT NYLON SCREWS, ITEM A, THRU RAFT BOARD INTO SPACERS, ITEM B, (2 PLACES) AND TIGHTEN.

FIGURE 2.3: AVME 9430/2 RAFT BOARD TO MAIN BOARD MECHANICAL ASSEMBLY*

NOTE: AVME9430/2 ONLY.

*FOLLOW STEPS IN REVERSE ORDER FOR DISASSEMBLY.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3.1 Default Jumper Configuration

VMEbus INTERFACE CONFIGURATION

When a board is shipped from the factory, it is configured as follows:

- VMEbus Short I/O Address of 0000H.

- Set to respond to both Address Modifiers 29H and 2DH.

- AVME9430: 32 dedicated SSR output channels (0 - 15), Ports E and F.
  AVME9431: 64 dedicated SSR output channels (0 - 15), Ports A, B, C, D.
  AVME9432: 96 dedicated SSR output channels (0 - 15), Ports A, B, C, D, E, F.

- SYSFAIL* jumper installed.

- Over temperature automatic reset function enabled.

2.4 VMEbus CONFIGURATION

2.4.1 Address Decode Jumper Configuration

The board interfaces with the VMEbus as a 1K block of address locations in the VMEbus Short I/O Address Space or Standard Address Space. J2 and J1 decode the fourteen most significant address lines A10 through A23 to provide segments of 1K address space. The configuration of the jumpers for different base address locations is shown below. "IN" means that the pins are shorted together with a shorting clip. "OUT" indicates that the clip has been removed. J2 decodes address lines A10 through A15 and J1 decodes Address lines A16 through A23. Therefore, when configured for the Short I/O Address space, only J2 needs to be configured.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Pins of J2						
Base Address	A15 11&12	A14 9&10	A13 7&8	A12 5&6	A11 3&4	A10 1&2
00000000H	OUT	OUT	OUT	OUT	OUT	OUT
00000400H	OUT	OUT	OUT	OUT	OUT	IN
00000800H	OUT	OUT	OUT	OUT	IN	OUT
00000C00H	OUT	OUT	OUT	OUT	IN	IN
00001000H	OUT	OUT	OUT	IN	OUT	OUT
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
0000EC00H	IN	IN	IN	OUT	IN	IN
0000F000H	IN	IN	IN	IN	OUT	OUT
0000F400H	IN	IN	IN	IN	OUT	IN
0000F800H	IN	IN	IN	IN	IN	OUT
0000FC00H	IN	IN	IN	IN	IN	IN

Pins of J1								
Base Address	A23 15&16	A22 13&14	A21 11&12	A20 9&10	A19 7&8	A18 5&6	A17 3&4	A16 1&2
00000000H	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
00010000H	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
00020000H	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
00030000H	OUT	OUT	OUT	OUT	OUT	OUT	IN	IN
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
00FC0000H	IN	IN	IN	IN	IN	IN	OUT	OUT
00FD0000H	IN	IN	IN	IN	IN	IN	OUT	IN
00FE0000H	IN	IN	IN	IN	IN	IN	IN	OUT
00FF0000H	IN	IN	IN	IN	IN	IN	IN	IN

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.4.2 Address Modifier Jumper Configuration

The VMEbus Address Modifier jumpers (J3, J4, and J5) permit the board to respond to the various Address Modifier Codes.

Pins of J3,J4,J5				
J3 1&2	J3 2&3	J4 1&2	J5 1&2	Address Modifier Code/Function
OUT	IN	IN	OUT	2DH Only Short Supervisory Access
OUT	IN	IN	IN	2DH & 29H Short Supervisory Access and Short Non-privileged Access
IN	OUT	OUT	OUT	3DH Only Standard Supervisory Data Access
IN	OUT	OUT	IN	3DH & 39H Standard Supervisory Data Access and Standard Non-privileged Data Access

2.4.3 SYSFAIL* jumper Configuration

The AVME9430/1/2 non-intelligent slave boards assert the SYSFAIL* signal as described in the VMEbus Specification Rev. C.1, when J8 is installed (the pins are shorted together with a shorting clip). Removing jumper J8 will disconnect the SYSFAIL* line from the circuitry on the Acromag board.

2.4.4 Over-Temperature Automatic Reset Jumper Configuration

The AVME9430/1/2 board contains an on-board temperature sensor that monitors the ambient temperature of the board. In the event that inadequate air flow is provided and the board temperature rises above 79^{o}C (high limit exceeded), a software reset will be generated by the over-temperature circuit when J6 is installed (the pins are shorted together with a shorting clip). Removing jumper J6 will disable the automatic reset function. Note that the status of both the high and low limits can be obtained by reading the board status register, independent of automatic reset function (see section 3.2 for additional information).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

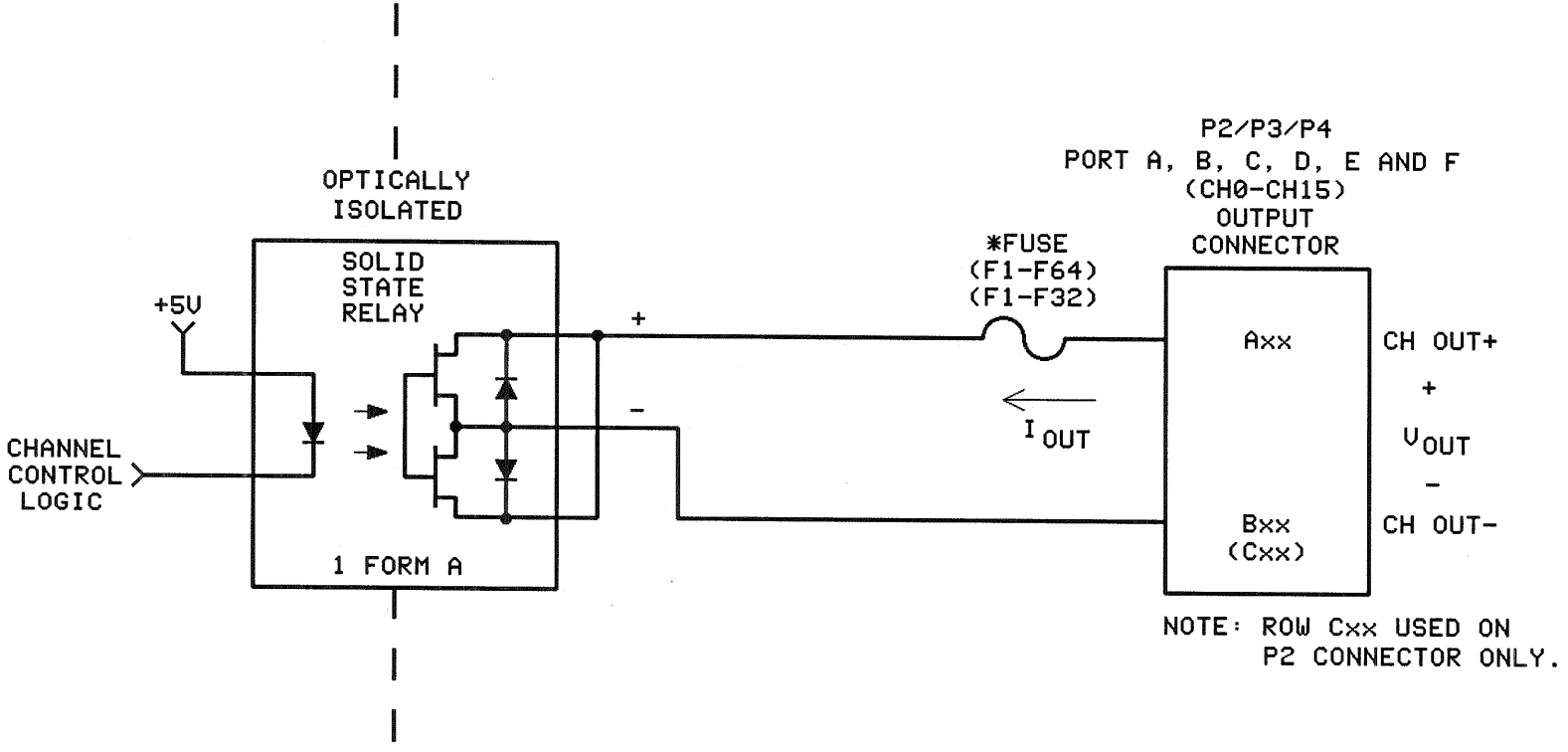
2.5 DIGITAL SSR OUTPUT CONFIGURATION

The DC SSR Outputs are designed to control valves, switch counters, mechanical relays, optical relays, indicator lamps, etc. Each SSR output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input channel and the input channel monitored. See Figure 2.4 for the simplified schematic of a SSR output channel. Outputs include a replaceable fuse (requires soldering). Output loads of up to 1 Amp DC and voltages up to 55V DC are supported.

2.5.1 Driving Relay Coils and Other Inductive Loads

When driving relay coils or other inductive loads, diodes should be placed across each load to limit the voltage spike generated when an inductive load is switched off quickly. See Figure 2.5: SSR Output Channel Configurations, for connections for different output types.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



RANGE:

MAX V_{OUT} = 55VDC (SWITCH OFF)

MAX I_{OUT} = 1A DC (SWITCH ON)

FIGURE 2.4: AVME943x SIMPLIFIED SSR DIGITAL OUTPUT CHANNEL SCHEMATIC

*F1-F64 MAIN BOARD; AVME9431/9432, PORTS A, B, C AND D
F1-F32 RAFT BOARD; AVME 9430/9432, PORTS E AND F

AcroMag® WIXOM, MICH.						
	20 NOV 92	A	——	TAV	TH	—
	DATE	RV	CO	DR	ENG	CLP
TITLE: SIMPLIFIED SSR DIGITAL OUTPUT CHANNEL SCHEMATIC						
SIZE D DWG	SERIES AVME9430/1/2	SHEET 1 OF 1	DRAWING 4501-269	REV A		

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

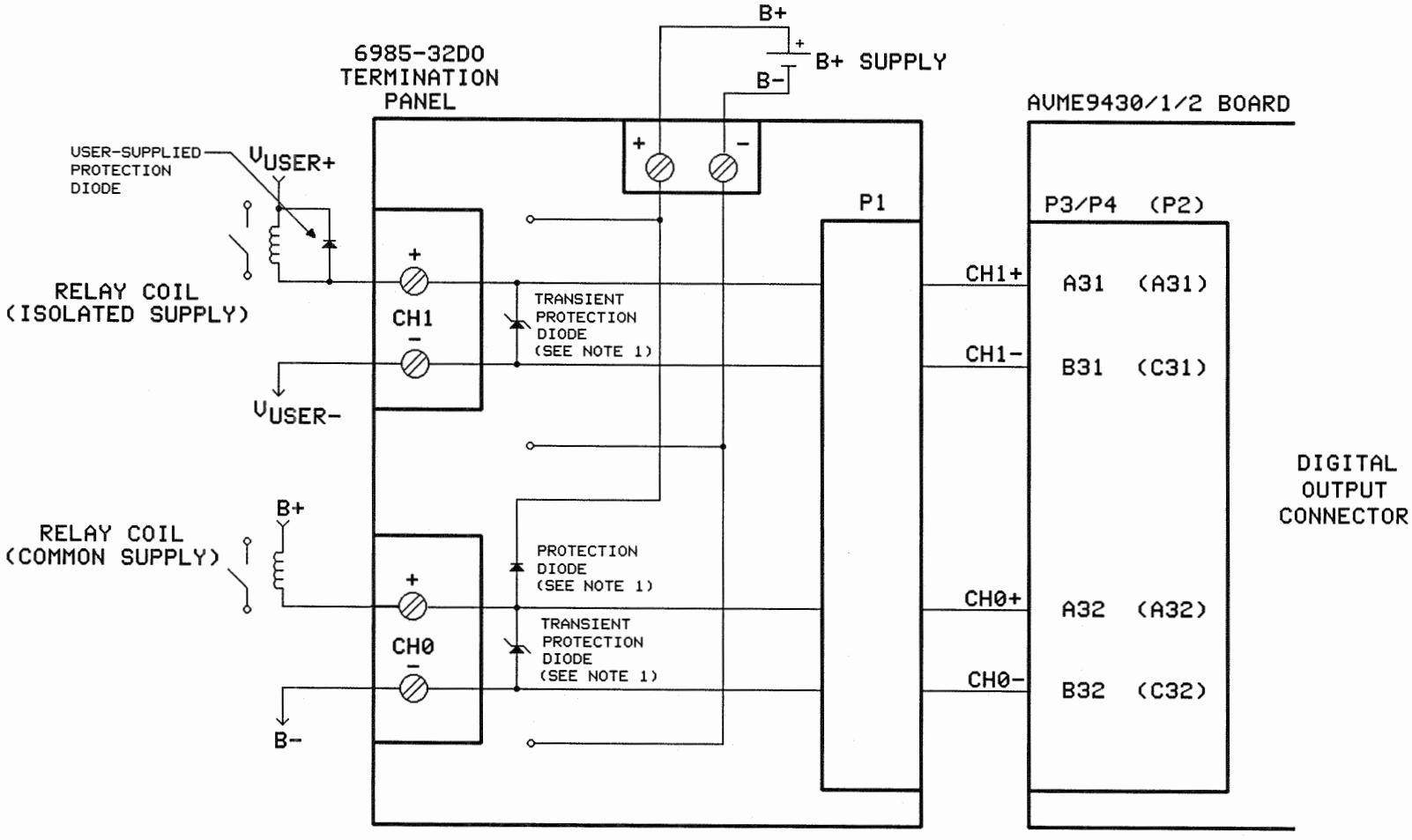


FIGURE 2.5: AVME943x SSR DIGITAL OUTPUT CHANNEL CONFIGURATIONS

NOTE:

1. SLOTS ARE INCLUDED ON THE TERMINATION PANEL TO INSTALL JUMPERS, DIODES, OR RESISTORS FROM B+ TO + (OR B- TO -) AND + TO -.

AcroMag WIXOM, MICH.							
	2 DEC 92	A	——	TAU	TH	—	
	DATE	RV	CO	DR	ENG	CLP	
TITLE: DIGITAL OUTPUT CHANNEL CONFIGURATIONS							
SIZE D DWG	SERIES AVME9430/1/2	SHEET 1 OF 1	DRAWING 4501-278	REV A			

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.6 DIGITAL SSR OUTPUT INTERFACE TO TTL AND CMOS SIGNALS

Logic level outputs are easily interfaced by the use of 74LS04 (or 74HC04) inverter gates. See Figure 2.6: Interface to TTL and CMOS Signals, for connection information. Programming a logic "1" in the corresponding output channel register bit position turns on the output SSR which pulls the input to the inverter gate low. This yields a logic "1" at the output of the inverter gate.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

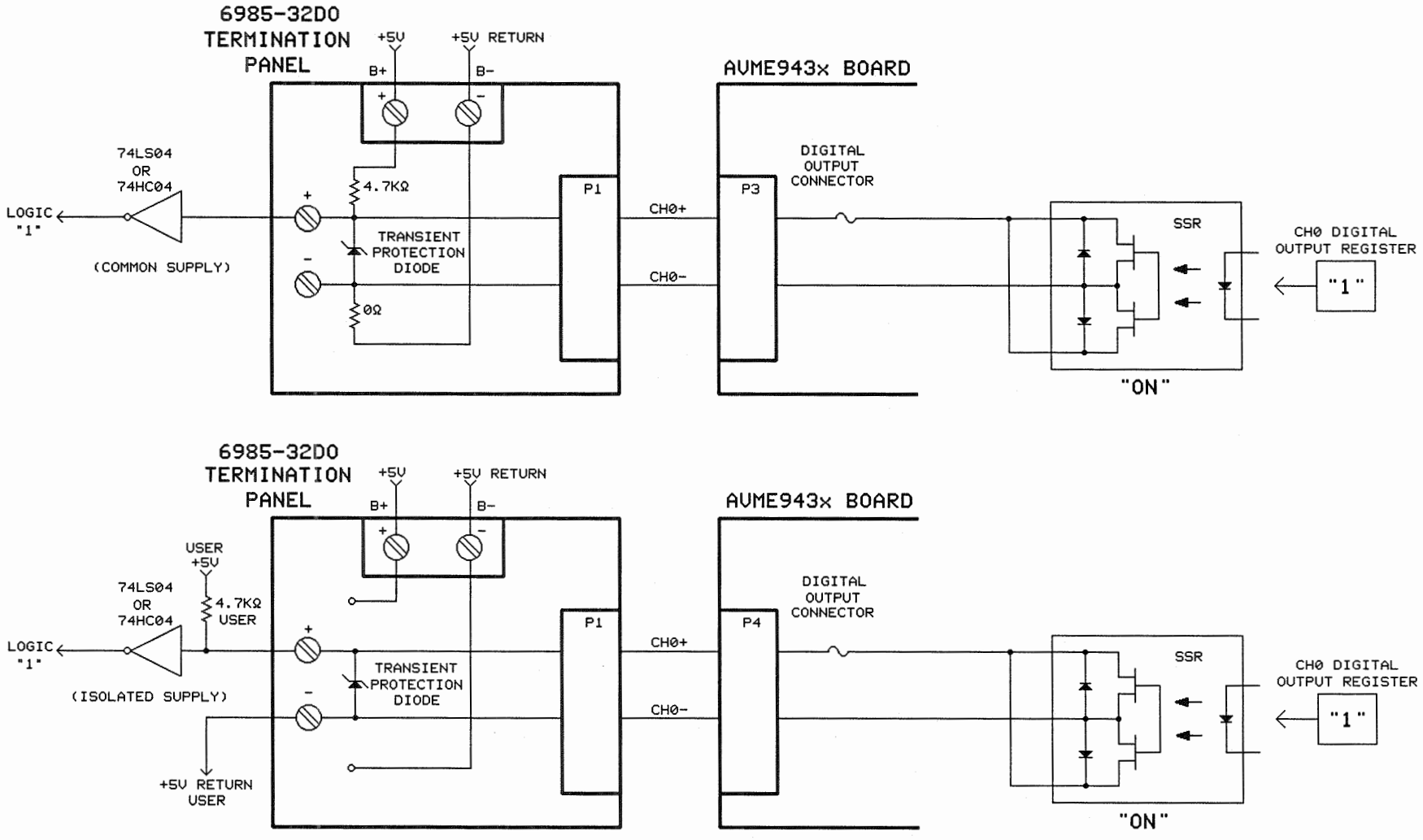


FIGURE 2.6: AVME9430/1/2 INTERFACE TO TTL AND CMOS SIGNALS

AcroMag® WIXOM, MICH.							
	2 DEC 92	A	——	TAV	TH	—	
	DATE	RV	CO	DR	ENG	CLP	
TITLE: INTERFACE TO TTL AND CMOS SIGNALS							
SIZE D DWG	SERIES AVME9430/1/2	SHEET 1 OF 1	DRAWING 4501-277	REV A			

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.7 CONNECTORS

2.7.1 Digital Output Connector (PORTS A & B)

The first group of 32 digital outputs (Port A channels 0 thru 15 and Port B channels 0 thru 15) are connected to the AVME9431/9432 via connector P3 (upper connector as viewed from the front). Table 2.1 defines the assignment. These connections are easily accommodated through the use of Acromag termination panels and flat cable assemblies or through the use of a user defined termination panel.

P3: DIN 41612 64 pin Type B, Level II. Panduit No. 100-064-033B; Series 100, Male Connector. or equivalent.

Table 2.1: P3 CONNECTOR (PORTS A & B)

Pin Number	Mnemonic	Pin Number	Mnemonic
32A	Port A CH0+	32B	Port A CH0-
31A	Port A CH1+	31B	Port A CH1-
30A	Port A CH2+	30B	Port A CH2-
29A	Port A CH3+	29B	Port A CH3-
28A	Port A CH4+	28B	Port A CH4-
27A	Port A CH5+	27B	Port A CH5-
26A	Port A CH6+	26B	Port A CH6-
25A	Port A CH7+	25B	Port A CH7-
24A	Port A CH8+	24B	Port A CH8-
23A	Port A CH9+	23B	Port A CH9-
22A	Port A CH10+	22B	Port A CH10-
21A	Port A CH11+	21B	Port A CH11-
20A	Port A CH12+	20B	Port A CH12-
19A	Port A CH13+	19B	Port A CH13-
18A	Port A CH14+	18B	Port A CH14-
17A	Port A CH15+	17B	Port A CH15-
16A	Port B CH0+	16B	Port B CH0-
15A	Port B CH1+	15B	Port B CH1-
14A	Port B CH2+	14B	Port B CH2-
13A	Port B CH3+	13B	Port B CH3-
12A	Port B CH4+	12B	Port B CH4-
11A	Port B CH5+	11B	Port B CH5-
10A	Port B CH6+	10B	Port B CH6-
09A	Port B CH7+	09B	Port B CH7-
08A	Port B CH8+	08B	Port B CH8-
07A	Port B CH9+	07B	Port B CH9-
06A	Port B CH10+	06B	Port B CH10-
05A	Port B CH11+	05B	Port B CH11-
04A	Port B CH12+	04B	Port B CH12-
03A	Port B CH13+	03B	Port B CH13-
02A	Port B CH14+	02B	Port B CH14-
01A	Port B CH15+	01B	Port B CH15-

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.7.2 Digital Output Connector (PORTS C & D)

The second group of 32 digital outputs (Port C channels 0 thru 15 and Port D channels 0 thru 15) are connected to the AVME9431/9432 via connector P4 (lower connector as viewed from the front). Table 2.2 defines the assignment. These connections are easily accommodated through the use of Acromag termination panels and flat cable assemblies or through the use of a user defined termination panel.

P4: DIN 41612 64 pin Type B, Level II. Panduit No. 100-064-033B; Series 100, Male Connector. or equivalent.

Table 2.2: P4 CONNECTOR (PORTS C & D)

Pin Number	Mnemonic	Pin Number	Mnemonic
32A	Port C CH0+	32B	Port C CH0-
31A	Port C CH1+	31B	Port C CH1-
30A	Port C CH2+	30B	Port C CH2-
29A	Port C CH3+	29B	Port C CH3-
28A	Port C CH4+	28B	Port C CH4-
27A	Port C CH5+	27B	Port C CH5-
26A	Port C CH6+	26B	Port C CH6-
25A	Port C CH7+	25B	Port C CH7-
24A	Port C CH8+	24B	Port C CH8-
23A	Port C CH9+	23B	Port C CH9-
22A	Port C CH10+	22B	Port C CH10-
21A	Port C CH11+	21B	Port C CH11-
20A	Port C CH12+	20B	Port C CH12-
19A	Port C CH13+	19B	Port C CH13-
18A	Port C CH14+	18B	Port C CH14-
17A	Port C CH15+	17B	Port C CH15-
16A	Port D CH0+	16B	Port D CH0-
15A	Port D CH1+	15B	Port D CH1-
14A	Port D CH2+	14B	Port D CH2-
13A	Port D CH3+	13B	Port D CH3-
12A	Port D CH4+	12B	Port D CH4-
11A	Port D CH5+	11B	Port D CH5-
10A	Port D CH6+	10B	Port D CH6-
09A	Port D CH7+	09B	Port D CH7-
08A	Port D CH8+	08B	Port D CH8-
07A	Port D CH9+	07B	Port D CH9-
06A	Port D CH10+	06B	Port D CH10-
05A	Port D CH11+	05B	Port D CH11-
04A	Port D CH12+	04B	Port D CH12-
03A	Port D CH13+	03B	Port D CH13-
02A	Port D CH14+	02B	Port D CH14-
01A	Port D CH15+	01B	Port D CH15-

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.7.3 Digital Output Connector (PORTS E & F)

The third group of 32 digital outputs (Port E channels 0 thru 15 and Port F channels 0 thru 15) are connected to the AVME9430/9432 via connector P2 (lower connector as viewed from the rear). Table 2.3 defines the assignment. These connections are easily accommodated through the use of Acromag termination panels and flat cable assemblies or through the use of a user defined termination panel.

P2: DIN 41612 64 pin Type C, Level II Rows A & C equipped. Panduit No. 100-964-033B; Series 100, Male Connector or equivalent.

Table 2.3: P2 CONNECTOR (PORTS E & F)

Pin Number	Mnemonic	Pin Number	Mnemonic
32A	Port E CH0+	32C	Port E CH0-
31A	Port E CH1+	31C	Port E CH1-
30A	Port E CH2+	30C	Port E CH2-
29A	Port E CH3+	29C	Port E CH3-
28A	Port E CH4+	28C	Port E CH4-
27A	Port E CH5+	27C	Port E CH5-
26A	Port E CH6+	26C	Port E CH6-
25A	Port E CH7+	25C	Port E CH7-
24A	Port E CH8+	24C	Port E CH8-
23A	Port E CH9+	23C	Port E CH9-
22A	Port E CH10+	22C	Port E CH10-
21A	Port E CH11+	21C	Port E CH11-
20A	Port E CH12+	20C	Port E CH12-
19A	Port E CH13+	19C	Port E CH13-
18A	Port E CH14+	18C	Port E CH14-
17A	Port E CH15+	17C	Port E CH15-
16A	Port F CH0+	16C	Port F CH0-
15A	Port F CH1+	15C	Port F CH1-
14A	Port F CH2+	14C	Port F CH2-
13A	Port F CH3+	13C	Port F CH3-
12A	Port F CH4+	12C	Port F CH4-
11A	Port F CH5+	11C	Port F CH5-
10A	Port F CH6+	10C	Port F CH6-
09A	Port F CH7+	09C	Port F CH7-
08A	Port F CH8+	08C	Port F CH8-
07A	Port F CH9+	07C	Port F CH9-
06A	Port F CH10+	06C	Port F CH10-
05A	Port F CH11+	05C	Port F CH11-
04A	Port F CH12+	04C	Port F CH12-
03A	Port F CH13+	03C	Port F CH13-
02A	Port F CH14+	02C	Port F CH14-
01A	Port F CH15+	01C	Port F CH15-

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.7.4 VMEbus Connections

Table 2.4 indicates pin assignments for the VMEbus signals at the P1 connector. The P1 connector is the upper connector on the 9430/9431/9432 board as viewed from the rear. The connector consists of 32 rows of three pins labeled A, B, and C. Pin A1 is located at the upper left hand corner of the connector. Refer to the VMEbus specification for additional information on the VMEbus signals.

TABLE 2.4: P1 BUS CONNECTIONS

PIN NUMBER	MNEMONIC	PIN NUMBER	MNEMONIC	PIN NUMBER	MNEMONIC
1A	D00	1B	BBSY*	1C	D08
2A	D01	2B	BCLR *	2C	D09
3A	D02	3B	ACFAIL*	3C	D10
4A	D03	4B	BGOIN*	4C	D11
5A	D04	5B	BGOOUT*	5C	D12
6A	D05	6B	BG1IN*	6C	D13
7A	D06	7B	BG1OUT*	7C	D14
8A	D07	8B	BG2IN*	8C	D15
9A	GND	9B	BG2OUT*	9C	GND
10A	SYSCLK	10B	BG3IN*	10C	SYSFAIL*
11A	GND	11B	BG3OUT*	11C	BERR*
12A	DS1*	12B	BRO*	12C	SYSRESET*
13A	DSO*	13B	BR1*	13C	LWORD*
14A	WRITE*	14B	BR2*	14C	AM5
15A	GND	15B	BR3*	15C	A23
16A	DTACK*	16B	AMO	16C	A22
17A	GND	17B	AM1	17C	A21
18A	AS*	18B	AM2	18C	A20
19A	GND	19B	AM3	19C	A19
20A	IACK*	20B	GND	20C	A18
21A	IACKIN*	21B	SERCLK	21C	A17
22A	IACKOUT*	22B	SERDAT*	22C	A16
23A	AM4	23B	GND	23C	A15
24A	A07	24B	IRQ7*	24C	A14
25A	A06	25B	IRQ6*	25C	A13
26A	A05	26B	IRQ5*	26C	A12
27A	A04	27B	IRQ4*	27C	A11
28A	A03	28B	IRQ3*	28C	A10
29A	A02	29B	IRQ2*	29C	A09
30A	A01	30B	IRQ1*	30C	A08
31A	-12V	31B	+5V STDBY	31C	+12V
32A	+5V	32B	+5V	32C	+5V

* Indicates that the signal is active low.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.8 POWER-UP TIMING AND LOADING

The 9430/9431/9432 board uses a Logic Cell Array to handle the bus interface and control logic timing. Upon power-up, the Logic Cell Array automatically clocks in configuration vectors from a local PROM to initialize the logic circuitry for normal operation. This time is measured as the first 145 mS (typical) after the +5 Volt supply raises to +2.5 Volts at power-up. If a data transfer is attempted during this time, it will simply be ignored and the board will not respond. This should not be a problem because the VME specification requires that the bus master drive the system reset for the first 200 mS after power-up, thus inhibiting any data transfers from taking place.

Digital output channels are reset to the OFF state following a power-up sequence. Writing to the digital output registers can program outputs ON.

2.9 DATA TRANSFER TIMING

Data transfer time is measured from the falling edge of DSx* to the falling edge of DTACK* during a normal data transfer cycle.

REGISTER	DATA TRANSFER TIME
All Registers	590nS, typical

2.10 FIELD GROUNDING CONSIDERATIONS

The board is designed to isolate every output channel from each other as well as from the VMEbus. This is intended to protect each channel and the VMEbus from voltage spikes and transients such as those caused by ground currents and "pick-up". The isolation provides the ability to earth ground the field wiring without the concern of ground currents damaging the card cage electronics.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.0 PROGRAMMING INFORMATION

This chapter provides the specific information necessary to operate the Isolated Digital Output Board.

3.1 MEMORY MAP

The board is addressable on 1K byte boundaries in the Short I/O Address Space or Standard Address Space. All Acromag VMEbus non-intelligent slaves have a standard interface configuration which consists of a 32 byte board ID PROM and a Board Status register. The rest of the 1K byte address space contains registers or memory specific to the function of the board. The memory map is shown in Figure 3.1 (Addresses in Hex).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Figure 3.1: Board Memory Map

Address Base +	D15 Even D8	D7 Odd D0	Address Base +
00	Undefined	R - Board ID PROM	01
3E			3F
40	Undefined		41
7E			7F
80	Undefined	R/W - Board Status	81
82	Undefined		83
C8			C9
CA	R/W - Port A Digital Output Channel Data Register CH15 ... CH0		CB
CC	R/W - Port B Digital Output Channel Data Register CH15 ... CH0		CD
CE	R/W - Port C Digital Output Channel Data Register CH15 ... CH0		CF
D0	R/W - Port D Digital Output Channel Data Register CH15 ... CH0		D1
D2	R/W - Port E Digital Output Channel Data Register CH15 ... CH0		D3
D4	R/W - Port F Digital Output Channel Data Register CH15 ... CH0		D5
D6	Undefined		D7
3EF			3FF

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.1 Board Identification PROM - (read only) - 01H through 3FH (odd)

The board contains an identification section. This section of data describes the board model number, the manufacturer, and the product revision level. The identification section starts at the board's base address plus 1 and is 32 bytes in length. Bytes are addressed using only the odd addresses between 1 and 63. The PROM contents are shown in Figure 3.2 for an AVME9431-I-L (each model has a unique PROM).

3.1.2 Board Status Register - (read/write) - 81H

The Board Status Register reflects and controls functions globally on the board.

MSB 7	6	5	4	3	2	1	LSB 0
High Temp Limit	Low Temp Limit	AutoReset Function	Software Reset	<--Reserved-->		Green LED	Red LED

Where: (R) = Read Only (W) = Write Only (R/W) = Read/Write

Bit 7: High Temperature Limit (R) - when read, this bit will return a "1" if the ambient temperature of the board is greater than or equal to 79°C (typical), and "0" when the temperature is below 79°C.

Bit 6: Low Temperature Limit (R) - when read, this bit will return a "1" if the ambient temperature of the board is greater than or equal to 69°C (typical), and "0" when the temperature is below 69°C.

Bit 5: AutoReset Function (R) - when read, this bit will return a "1" if the Over-Temperature Automatic Reset function is enabled (jumper J6 installed), and "0" when the function is disabled (J6 removed).

Bit 4: Software Reset (R/W) - writing a "1" to this bit causes a software reset. Writing "0" or reading the bit has no effect, however, this bit will return a "1" if an Over-Temperature Automatic Reset has occurred. The effect of a software reset on the various registers is described in the description of each register.

Reset Condition (except Over-Temperature): Set to "0".
Over-Temperature Automatic Reset Condition: Set to "1".

Note: An Over-Temperature Automatic Reset (function must be enabled) is the only condition that will set bit 4 to a "1". In order to clear this bit, a "1" must be written to bit 1 (Green LED on) or the board must be powered down.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Bit 3: Reserved for future use - equal "0" if read.

Bit 2: Reserved for future use - equal "0" if read.

Bit 1: Green LED (R/W) - when written, this bit will control the state of the green LED on the front panel. A "1" will turn it on and clear the Over-Temperature Automatic Reset Condition flag, if set (see description for bit 4). Writing a "0" will turn the green LED off. Reading it will reflect its current state.

Reset Condition: Set to "0", green LED off.

Bit 0: Red LED (R/W) - when written, this bit will control the state of the red LED on the front panel, the state of the VMEbus SYSFAIL* signal and the state of the Over-Temperature Automatic Reset function. Writing a "1" will turn the LED off, set SYSFAIL* high and enable the Over-Temperature Automatic Reset function if J6 has been installed. Writing a "0" will turn the LED on, set SYSFAIL* low and disable the Over-Temperature Automatic Reset function. Reading it will reflect its current state. (See Sections 2.4.3 and 5.2 for additional information on SYSFAIL*, section 3.2 for additional information on the Over-Temperature Automatic Reset function.)

Reset Condition: Set to "0", red LED lit, SYSFAIL* is set low and the Over-Temperature Automatic Reset function is disabled.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Figure 3.2: AVME9431-I-L Board Identification PROM

Offset From Board Base Address	Value		Descriptions
	ASCII Character	Numeric	
01H	V	56H	All boards have "VMEID"
03H	M	4DH	
05H	E	45H	
07H	I	49H	
09H	D	44H	
0BH	A	41H	Manufacturer's I.D., "ACR" for Acromag
0DH	C	43H	
0FH	R	52H	
11H	9	39H	Board Model Number (6 characters and 1 trailing "blank")
13H	4	34H	
15H	3	33H	
17H	1	31H	(Each model has a unique number)
19H	I	49H	
1BH	L	4CH	
1DH		20H	
1FH	1	31H	Number of KILOBYTES of address space used.
21H		20H	
23H	A	41H	Product revision level (letter)
25H		20H	
27H		20H	
29H	Undefined		Reserved
2BH	Undefined		
2DH	Undefined		
2FH	Undefined		
31H	Undefined		
33H	Undefined		
35H	Undefined		
37H	Undefined		
39H	Undefined		
3BH	Undefined		
3DH	Undefined		
3FH	Undefined		

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.2.1 Status Bits Usage

The status register bits 1 and 0 along with the green and red LEDs provide the user with a means of keeping track of a board's functionality in the system. Since there is no intelligence on the board (see note below), the host computer controls these bits. The following paragraphs and summary table describe possible uses of the bits in the status register and the LEDs on the front panel.

On power-up the bits in the status register read low, with the green LED off, the red LED lit, and SYSFAIL* low. This indicates that the board has failed or that it has not been tested yet.

If the status register bit 1 reads low and Bit 0 reads high, the LEDs will both be off and SYSFAIL* high. This indicates an inactive board.

If the status register bit 1 reads high and Bit 0 reads low, the LEDs will both be lit and SYSFAIL* low. This indicates the board is undergoing a diagnostic checkout.

If the status register bits 1 and 0 read high, the green LED will be lit with the red LED off and SYSFAIL* high. This indicates the board is fully functional.

Status Bits - Possible Usage

Bit 1 (Green LED)	Bit 0 (Red LED)	SYSFAIL*	Description
0, (off)	0, (on)	Low	Failed or reset condition
0, (off)	1, (off)	High	Inactive board
1, (on)	0, (on)	Low	Diagnostics are running
1, (on)	1, (off)	High	Normal operation

NOTE: Although there is no intelligence on the board and the host computer controls these bits, both LED's provide additional information in conjunction with the Over-Temperature Automatic Reset function (when enabled) as follows:

1. The green LED will blink at a 2Hz rate during the 30 second delay period between High limit exceeded and the automatic reset occurring. Note: blinking occurs independent of the state of Bit 1.

2. The red LED will blink at a 4Hz rate when the High Limit is exceeded and at a 2Hz rate when only the Low Limit is exceeded. Note that blinking will only occur when Bit 0 is set to "0". This provides a visual indication that an Over-Temperature Automatic Reset has occurred.

   (See Sections 3.2 for additional information on the Over-Temperature Automatic Reset function.)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.3 Port A Digital Output Channel Data Register (R/W) - CAH & CBH

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

3.1.4 Port B Digital Output Channel Data Register (R/W) - CCH & CDH

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.5 Port C Digital Output Channel Data Register (R/W) - CEH & CFH

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

3.1.6 Port D Digital Output Channel Data Register (R/W) - D0H & D1H

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.7 Port E Digital Output Channel Data Register (R/W) - D2H & D3H

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

3.1.8 Port F Digital Output Channel Data Register (R/W) - D4H & D5H

When the digital output channel data register is written to, the value written is represented on the output channels. A "0" means that the corresponding output channel's Solid State Relay (SSR) is open (off). Writing a "1" means that the SSR is closed (on).

Each digital output can be written to and then read back immediately for verification purposes, but for complete confidence in the output setting, the output should be fed back to an input point and the input point monitored.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0

All bits are set to "0" following a reset which means that the output SSR is OFF.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.2 OVER-TEMPERATURE MONITOR

3.2.1 Low Limit & High Limit Status Bits

Due to the large currents associated with these boards, adequate forced air circulation must be provided, especially at elevated ambient temperatures. Typically, at room temperature (+25^{o}C) with 96 channels passing 1 Amp at 100% duty cycle, the local ambient temperature of a AVME9432-I-L board will rise above 70^{o}C without forced air cooling in an open card cage.

Since it is difficult to characterize the thermal behavior of a dynamic system in an industrial environment, a temperature monitor was provided so that actual conditions can be monitored and compensated for in real time.

The temperature monitor incorporates two setpoints. A Low Limit which is set at 69^{o}C (typical) and a High Limit which is set at 79^{o}C (typical). When the ambient temperature of the board exceeds either of the two limits, a corresponding bit in the Board Status Register is set (see section 3.1.2 and figure 3.3). Exceeding the Low Limit is considered a warning and immediate action should be taken to lower the board's ambient temperature or reduce power dissipation by turning some channels off. Exceeding the High Limit is considered a fault condition and all channels should be turned off until the board is within its specified operating temperature range. Note that when the High Limit is exceeded, the Low Limit must also be exceeded.

3.2.2 Automatic Reset function

The Over-Temperature Automatic Reset Function works in conjunction with the Over-Temperature Monitor described above (see figure 3.3). When enabled by installing jumper J6 and writing a "1" to bit 0 of the board status register (Red LED off), the board will automatically generate a software reset 30 seconds after the High Limit is exceeded. A software reset, described in section 3.1.2, will return all channels to the OFF condition and clear bits 1 and 0 of the board status register (Green LED off and Red LED on with SYSFAIL* asserted). NOTE that in addition to installing J6, the Red LED must be turned OFF (writing a "1" to bit 0 of the board status register) in order for the Automatic Reset function to work. This allows the user to disable the Automatic Reset function in software and also prevents repeated resets from occurring.

During the 30 second delay period between exceeding the High Limit and the Automatic Software Reset occurring, the green LED will blink at a 2Hz rate to visually indicate that an Over-Temperature Software Reset is imminent. Note that this advance warning is also available in software by polling bit 7 of the board status register.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

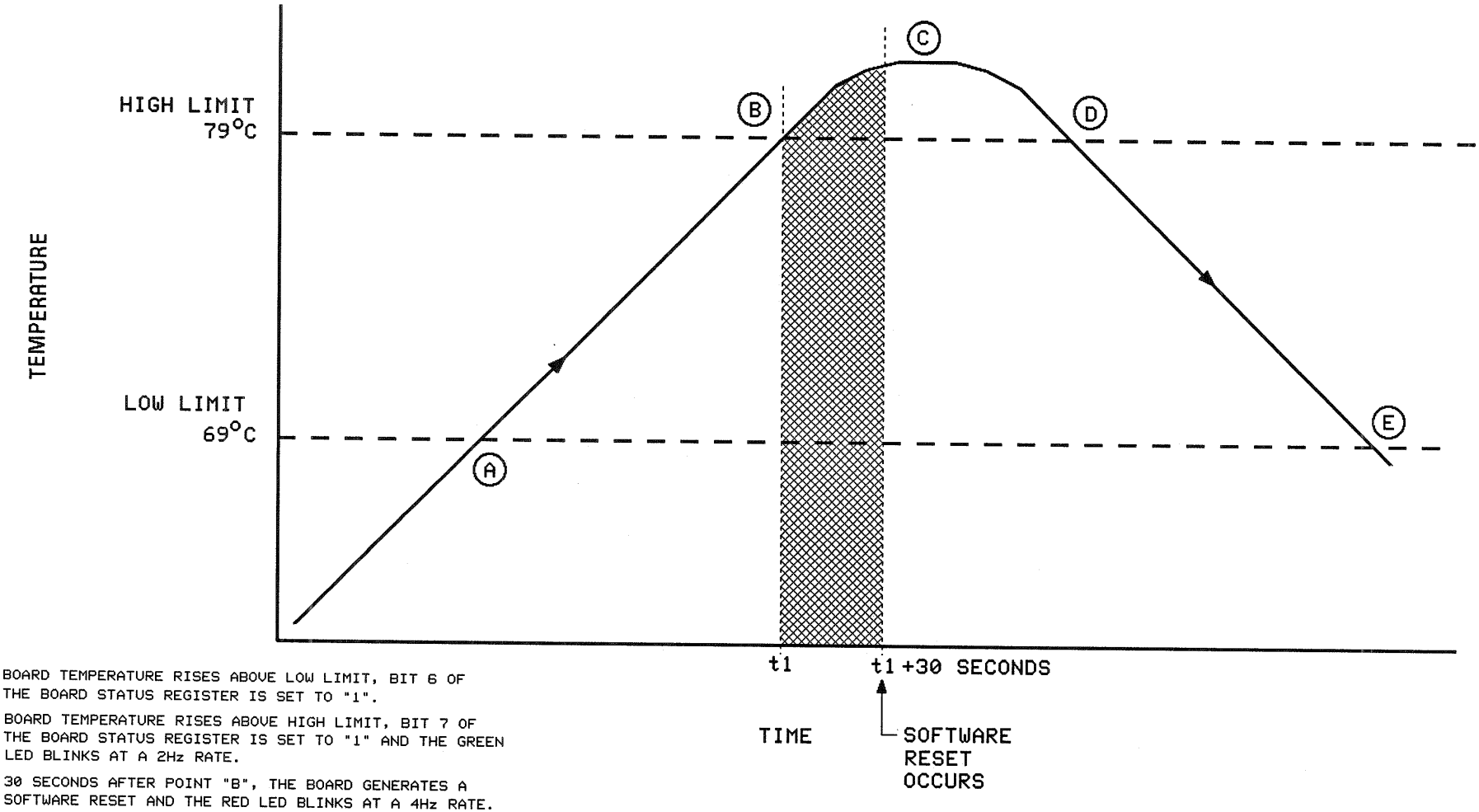
Whenever a Reset occurs, bit 0 of the board status register is cleared (set to "0" and the Red LED is on). To visually differentiate between a normal reset and an Over-Temperature Software Reset, the Red LED will blink at a 4Hz rate while the High Limit is exceeded and at a 2Hz rate when only the Low Limit is exceeded, whenever bit 0 of the board status register is cleared (set to "0"). Since the Red LED will stop blinking when the board cools down below the Low Limit, a more permanent record indicating an Over-Temperature Software Reset has occurred is kept in bit 4 of the board status register (see section 3.1.2 for additional information).

If the Red LED is turned OFF (writing a "1" to bit 0 of the board status register) while the High Limit is still exceeded, the board will again reset in 30 seconds as described above. Note that the High Limit must remain exceeded for 30 seconds without interruption for the reset to occur.

The status of jumper J6, installed (Automatic Reset function enabled) or removed (Automatic Reset function disabled), can be determined by reading bit 5 of the board status register. This allows users to determine the status of the Automatic Reset function through software.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTE: THE AUTOMATIC RESET FUNCTION MUST BE ENABLED
(J6 INSTALLED AND RED LED TURNED OFF.)



A: BOARD TEMPERATURE RISES ABOVE LOW LIMIT, BIT 6 OF THE BOARD STATUS REGISTER IS SET TO "1".

B: BOARD TEMPERATURE RISES ABOVE HIGH LIMIT, BIT 7 OF THE BOARD STATUS REGISTER IS SET TO "1" AND THE GREEN LED BLINKS AT A 2Hz RATE.

C: 30 SECONDS AFTER POINT "B", THE BOARD GENERATES A SOFTWARE RESET AND THE RED LED BLINKS AT A 4Hz RATE. BIT 4 OF THE BOARD STATUS REGISTER IS ALSO SET TO "1".

D: BOARD TEMPERATURE FALLS BELOW HIGH LIMIT, BIT 7 OF THE BOARD STATUS REGISTER IS CLEARED TO "0" AND THE RED LED BLINKS AT A 2Hz RATE.

E: BOARD TEMPERATURE FALLS BELOW LOW LIMIT, BIT 6 OF THE BOARD STATUS REGISTER IS CLEARED TO "0" AND THE RED LED STOPS BLINKING.

FIGURE 3.3: AVME943x OVER-TEMPERATURE AUTOMATIC RESET FUNCTION

AcroMag® WIXOM, MICH.							
	28 DEC 92	A	——	TAV	TH	——	
	DATE	RV	CO	DR	ENG	ELP	
TITLE: OVER-TEMPERATURE AUTOMATIC RESET FUNCTION							
SIZE D DWG	SERIES: AVME9430/1/2	SHEET: 1 OF 1	DRAWING: 4501-279	REV: A			

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.3 GENERAL PROGRAMMING CONSIDERATIONS

3.3.1 Board Diagnostics

The board is a non-intelligent slave and does not perform self diagnostics. It does, however, provide a standard interface architecture which includes a Board Status Register useful in system diagnostics.

Status bits, control of front panel LED's, and control of the SYSFAIL* signal are provided through the Board Status Register. Bits 0 and 1 may be used as follows:

Board Status Register bit 1	bit 0	LEDs Green	Red	SYSFAIL* Signal	Condition
0	0	Off	On	On	Board failed test or has not been tested.
1	0	On	On	On	Board is being tested.
1	1	On	Off	Off	Board has passed test.
0	1	Off	Off	Off	Board is inactive.

At power up, the system diagnostic software can test each non-intelligent Slave, sequencing the status bits to indicate "undergoing test" and then to "passed" or "failed".

After testing each board, the system software records which boards have failed and sets their status to indicate "inactive". By setting the board's status to inactive, the SYSFAIL* signal is released and may then be useful for an on-line indication of failure by other boards.

Alternatively, the system software could simply set the bits and therefore front panel LEDs, to "passed test" as a visual indication that the presence of the board is recognized.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.0 THEORY OF OPERATION

This chapter describes the circuitry that is used on the board. A block diagram is shown in Figure 4.1. Parts lists are in chapter 5, and the schematic & part location drawings are in Chapter 7.

4.1 VMEbus INTERFACE

The VMEbus interface is composed of two functional circuit areas.

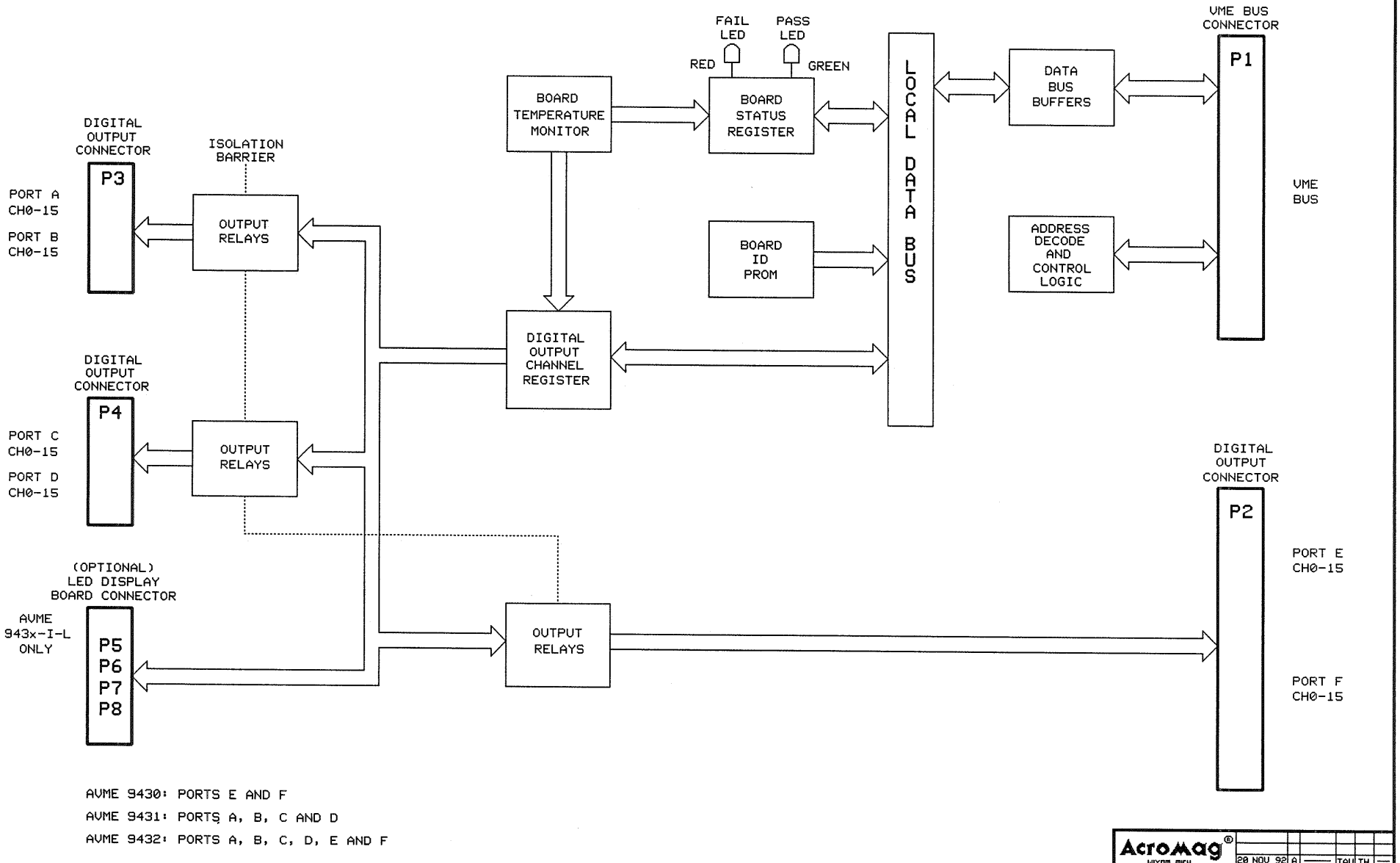
- Data buffers (U80, U81)
- Address decode and bus control logic (U74, U75, U77, U79)

4.1.1 VMEbus Control Logic

The Data Transfer Acknowledge (DTACK*) signal is generated by the logic/timing circuitry (U77, U79) on the board for handshaking with the bus master during data transfer cycles. The DTACK* signal will be asserted after the card address has been properly decoded and either of the data strobes (DS1*, DS0*) is asserted. The amount of delay before DTACK* is asserted is controlled by circuitry within U77 which uses the SYSCLK (16MHz.) provided on the VMEbus to derive a fixed time delay.

The AVME9430/9431/9432 boards do not use (assert) the VME BERR* signal (as permitted in the VMEbus specification). If the bus master improperly addresses the board, it will not get a response, however the VMEbus Bus Timer located in the System Controller will time-out and cause an end to the cycle.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



AVME 9430: PORTS E AND F

AVME 9431: PORTS A, B, C AND D

AVME 9432: PORTS A, B, C, D, E AND F

FIGURE 4.1: BLOCK DIAGRAM

AcroMag® WIXOM, MICH.							
20 NOV 92	A	——	TAV	TH	—		
DATE	RV	CO	DR	ENG	CLP		
TITLE: BLOCK DIAGRAM							
SIZE D DWG	SERIES AVME9430/1/2	SHEET 1 OF 1	DRAWING 4501-268	REV A			

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.2 REGISTER LOCATION SUMMARY

Local memory locations are implemented in various data registers on board. The registers are located in the following devices:

- Board Identification PROM (U73)
- Board Status Register (U77)
- Port A Digital Output Channel Data Register (U65, U66 on main board)
- Port B Digital Output Channel Data Register (U67, U68 on main board)
- Port C Digital Output Channel Data Register (U69, U70 on main board)
- Port D Digital Output Channel Data Register (U71, U72 on main board)
- Port E Digital Output Channel Data Register (U33, U34 on raft board)
- Port F Digital Output Channel Data Register (U35, U36 on raft board)

4.3 ISOLATION BARRIER

Optical isolation is used to isolate all digital output channels from the logic and VMEbus circuits.

4.4 DC SSR OUTPUT SECTION (9430-I)

There are 64 digital output channels available on the main board (U1-U64) and 32 digital output channels available on the raft board (U1-U32). Optically coupled, Solid State Relays (SSRs) provide the single pole, single throw normally open (SPST-NO), relay function. The SSRs cover the wide DC output voltage range without requiring range jumpers. Digital outputs may be read back (prior to the optical isolation) for verification purposes. A replaceable fuse (soldering required) is also provided for each channel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.0 SERVICE AND REPAIR INFORMATION

This chapter provides instructions on how to obtain service and repair assistance, service procedures, and component parts lists.

5.1 SERVICE AND REPAIR ASSISTANCE

It is highly recommended that a non-functioning board be returned to Acromag for repair. Acromag uses tested and burned-in parts, and in some cases, parts that have been selected for characteristics beyond that specified by the manufacturer. Acromag has automated test equipment that thoroughly checks the performance of each board. When a board is first produced and when any repair is made, it is tested, placed in a burn-in room at elevated temperature, and retested before shipment.

Please refer to Acromag's Service Policy Bulletin or contact Acromag for complete details on how to obtain parts and repair.

5.2 PRELIMINARY SERVICE PROCEDURE

Before beginning repair, be sure that all of the procedures in Chapter 2, Preparation For Use, have been followed. The procedures are necessary since the board has jumpers that must be properly configured.

CAUTION
POWER MUST BE OFF BEFORE REMOVING OR INSERTING BOARDS

Note: It has been observed that on occasion, a "boot" program for a disk operating system will "hang" waiting for the VMEbus SYSFAIL* signal to be released by an intelligent disk controller board. Acromag's non-intelligent slave boards assert the SYSFAIL* signal as described in the VMEbus Specification Rev. C.1 and therefore, the disk operating system will remain "hung". The best solution to this problem is to correct the boot program so that it is no longer dependent upon the SYSFAIL* signal. When this solution is not practical, the SYSFAIL* signal can be removed from the circuitry on the Acromag board (disabled) by removing jumper J8. Additional information for configuring J8 can be found in section 2.4.3.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.3 PARTS LISTS

Parts Lists are provided as an aid to the user in troubleshooting the Board (also reference the schematic and part location drawings of chapter 7). Tables 5.1A to 5.1C list the parts installed on the main and raft boards for the various models; similarly Table 5.2A lists parts for the LED expansion board. Replacement parts and repair services are available from Acromag.

Changes are sometimes made to improve the product, to facilitate delivery, or to control cost. It is therefore important to include the Component Reference Number, the Acromag Part Number, the Board Model Number, and the Board Serial Number when providing information to order parts.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE 5.1A: PARTS LIST FOR MODEL AVME9430/31/32-I)
(MAIN BOARD - PARTS COMMON TO ALL MODELS)

COMPONENT REFERENCE NUMBER	ACROMAG PART NUMBER	DESCRIPTION
U73	5025-02x	Programmed part
U77	1033-578	IC XC3030-70PC84C
U78	5025-025	Programmed part
U76	1033-670	IC 74LS174N
U80,81	1033-627	IC 74LS645-1ND
U79	1033-623	IC 74F38N
U74,75	1033-626	IC AM25LS2521PCB
U82	1033-804	IC TMP-01EP
R20	1000-825	RES FILM 5% .25W 330 OHM
R17,18	1100-494	RES NETWORK 7 1K
R19	1100-268	RES NETWORK 9 4.7K
R21,22	1100-627	RES NETWORK 9 22K
R23	1000-843	RES FILM 1% .125W 36.5K
R24	1000-731	RES FILM 1% .125W 2.49K
R25	1000-878	RES FILM 1% .125W 84.5K
C9-17,C19	1002-530	CAP MONO 0.1UF 100V Z5U
C18	1002-314	CAP TAN 150UF 15V
C20	1002-442	CAP MONO 0.01UF 100V
D1	1001-197	LED BILEVEL RED/GRN
D2	1001-113	DIODE IN914B
X1	1004-606	CHIP CARRIER, 84 PIN
P1	1004-733	CONN. EDGE 96 PIN MALE RT
J1	1004-379	HEADER 16 POST 2 ROW
J2	1004-383	POST 2 ROW 12 POSITION
J3	1004-333	HEADER 3 PIN POST
J4-8	1004-410	POSTS 1 ROW 2 POS
ITEM	1004-332	CLIP BUCK SHORTING

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE 5.1B: PARTS LIST FOR MODEL AVME9431/32-I)
(64-CH ADD PARTS - PARTS UNIQUE TO THESE MODELS)

COMPONENT REFERENCE NUMBER	ACROMAG PART NUMBER	DESCRIPTION
U65-72	1033-777	IC SN74ALS996NT-3
U1-64	1033-614	IC HSSR-8060 OPTOCOUPLER
R9-16	1100-490	RES NET 9 1K
R1-8	1100-635	RES NET 2% 9-COM 270 OHM
C1-8	1002-530	CAP MONO 0.1UF 100V Z5U
F1-64	1030-496	FUSE PICO 2 AMP
P3,4	1004-734	CONN. 64 POS RA PC MOUNT
P5,6,7,8	1004-738	TERM. STRIP 9 POS 2 ROW

TABLE 5.1C: PARTS LIST FOR MODEL AVME9430/32-I)
(32-CH RAFT BOARD - PARTS UNIQUE TO THESE MODELS)

COMPONENT REFERENCE NUMBER	ACROMAG PART NUMBER	DESCRIPTION
U33-36	1033-777	IC SN74ALS996NT-3
U1-32	1033-614	IC HSSR-8060 OPTOCOUPLER
R5,6,7,8	1100-490	RES NET 9 1K
R1,2,3,4	1100-635	RES NET 2% 9-COM 270 OHM
C1,2,3,4	1002-530	CAP MONO 0.1UF 100V Z5U
F1-32	1030-496	FUSE PICO 2 AMP
X9	1004-739	SOCKET STRIP 32 POS 2 ROW
X10,11,12	1004-645	SOCKET 9 PIN SINGLE ROW
P2	1004-732	CONN. EDGE 64 MALE RT.
P9	1004-740	TERM. STRIP 32 POS 2 ROW
P10,11,12	1004-626	HEADER 9 POST SHORT

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE 5.2A: PARTS LIST FOR MODEL AVME9430/31/32-I-L (LED EXPANSION BOARD – PARTS UNIQUE TO THESE MODELS)		
COMPONENT REFERENCE NUMBER	ACROMAG PART NUMBER	DESCRIPTION
R1-64	1400-405	RES 0603 680 OHM SMT
D1-64	1401-055	LED RED RIGHT ANGLE SMT
X5, 6, 7, 8	1004-737	SOCKET STRIP 9-POS 2 ROW

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6.0 SPECIFICATIONS

Operating Temperature	0 to +70 deg. C (see note 1)
Relative Humidity	5-95% non-condensing.
Storage Temperature	-25 to +85 deg. C
Physical Characteristics:	(Double Eurocard)
Length	9.187 in. (233.3 mm)
Width	6.299 in. (160.0 mm)
Board Thickness	0.062 in. (1.59 mm)
Component Height	0.550 in. (13.97 mm)
Recommended Card Spacing	0.800 in. (20.32 mm)
Connectors:	
P1	DIN 41612 96 pin Type C, Level II
P2	DIN 41612 64 pin Type C, Level II Rows A+C
P3,P4	DIN 41612 64 pin Type B, Level II
Power Requirements:	
+ 5 Volts (+/-5%)	700mA typical (All channels off) 2.5A maximum (AVME9432-I-L All channels on)
+ 12 Volts	0.0mA (no load)

ISOLATION VOLTAGE

Between all digital channels and the VMEbus: 250VAC or 354V DC on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown). Complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.

Between all digital channels: 125VAC or 125V DC on a continuous basis (will withstand 1250V AC dielectric strength test for one minute without breakdown). Complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.

NOTE 1: Forced air cooling may be required for operation over the full temperature range. Refer to section 3.2 for additional information concerning board cooling requirements.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VME COMPLIANCE

Meets or exceeds all written VME specifications per revision C.1 dated October, 1985 and IEC 821-1987.

Data Transfer Bus	A24/A16:D16/D08 (EO) DTB slave
VMEbus Access Time	590 nS typical (all registers) (Measured from the falling edge of DSx* to the falling edge of DTACK*.)
Address Modifier Codes	29H, 2DH, 39H, 3DH
Memory Map	Standard or short address space; Supervisory or non-privileged access; Occupies 1K byte; Base address jumper-selectable

DIGITAL SSR OUTPUTS

Output Channels per Card	32, P2 only (AVME9430) 64, P3 and P4 (AVME9431) 96, P2, P3 and P4 (AVME9432)
Output Type (DC)	Solid State Relay (SSR) Form A (SPST - NO) (Single Pole Single Throw - Normally Open)
Output "OFF" Voltage Range	0 to +55V DC (in a single range)
Output "OFF" Leakage Current	5uA. DC maximum @ 55V DC
Output "ON" Current Range	0 to +1 Amp DC (0 to 40 deg. C) (observe proper polarity)
Derate "ON" Current Above 40 C	10mA. per deg. C
Output "ON" Voltage @ 1 Amp DC	0.5V DC maximum
Output Response Time @ 1 Amp DC	2.0mS. maximum
Logic Compatibility	Can be interfaced to TTL and CMOS (See Section 2.6)
Output Fuse	F1-32(64) 2 AMP (Little Fuse No. 255002)
Output "ON" Indicating LEDs	64 red LEDs (front panel AVME9431/2 only) (driven by the input signal to the SSR) (with -L option only)

OVER TEMPERATURE MONITOR

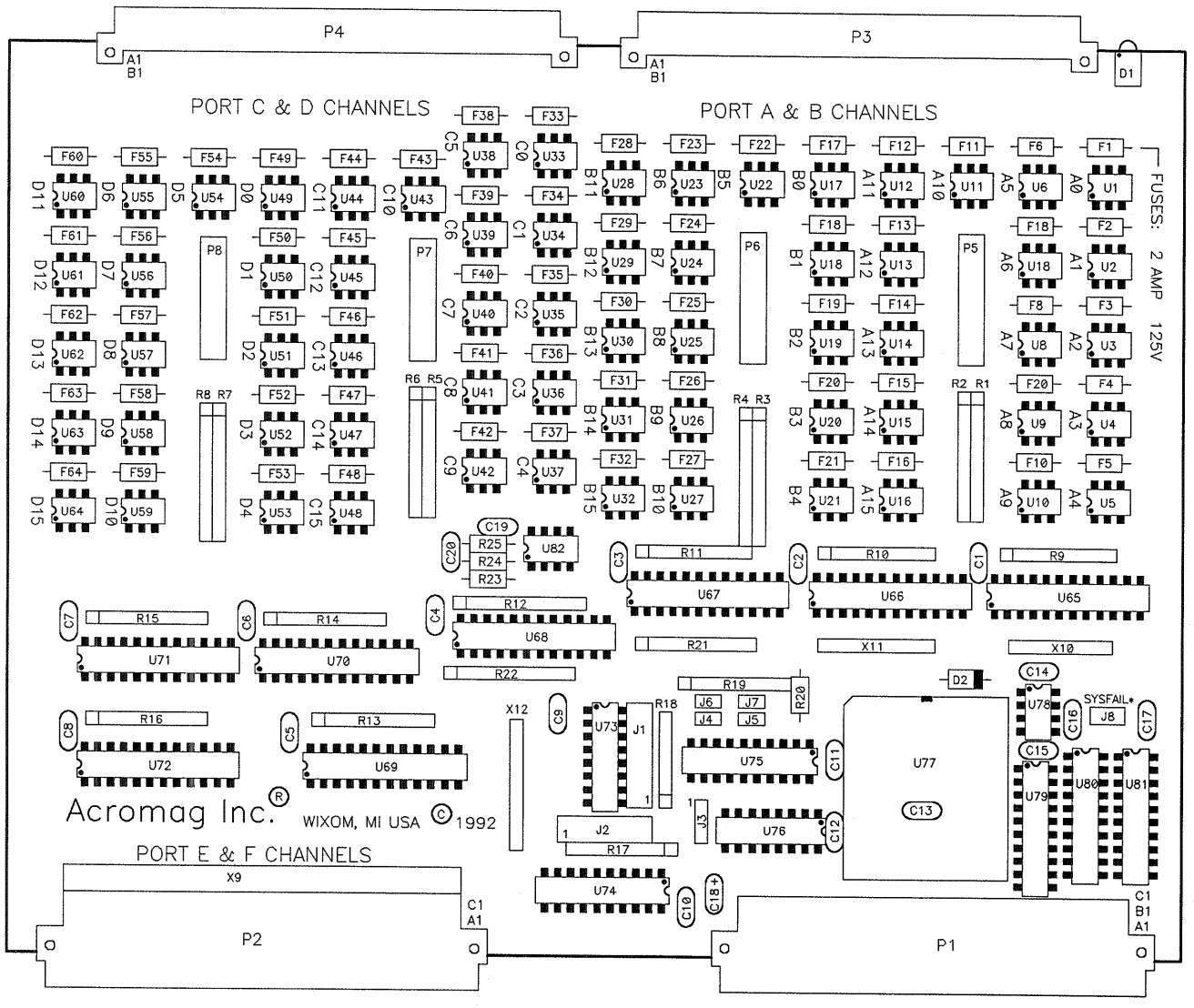
Low Limit Setpoint	69 deg. C (typical)
High Limit Setpoint	79 deg. C (typical)
Hysteresis	2 deg. C (typical)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7.0 SCHEMATIC AND PART LOCATION DRAWINGS

The following sheets contain the schematic and part location drawings for the AVME9430/9431/9432 main board, raft board and the optional LED expansion board.

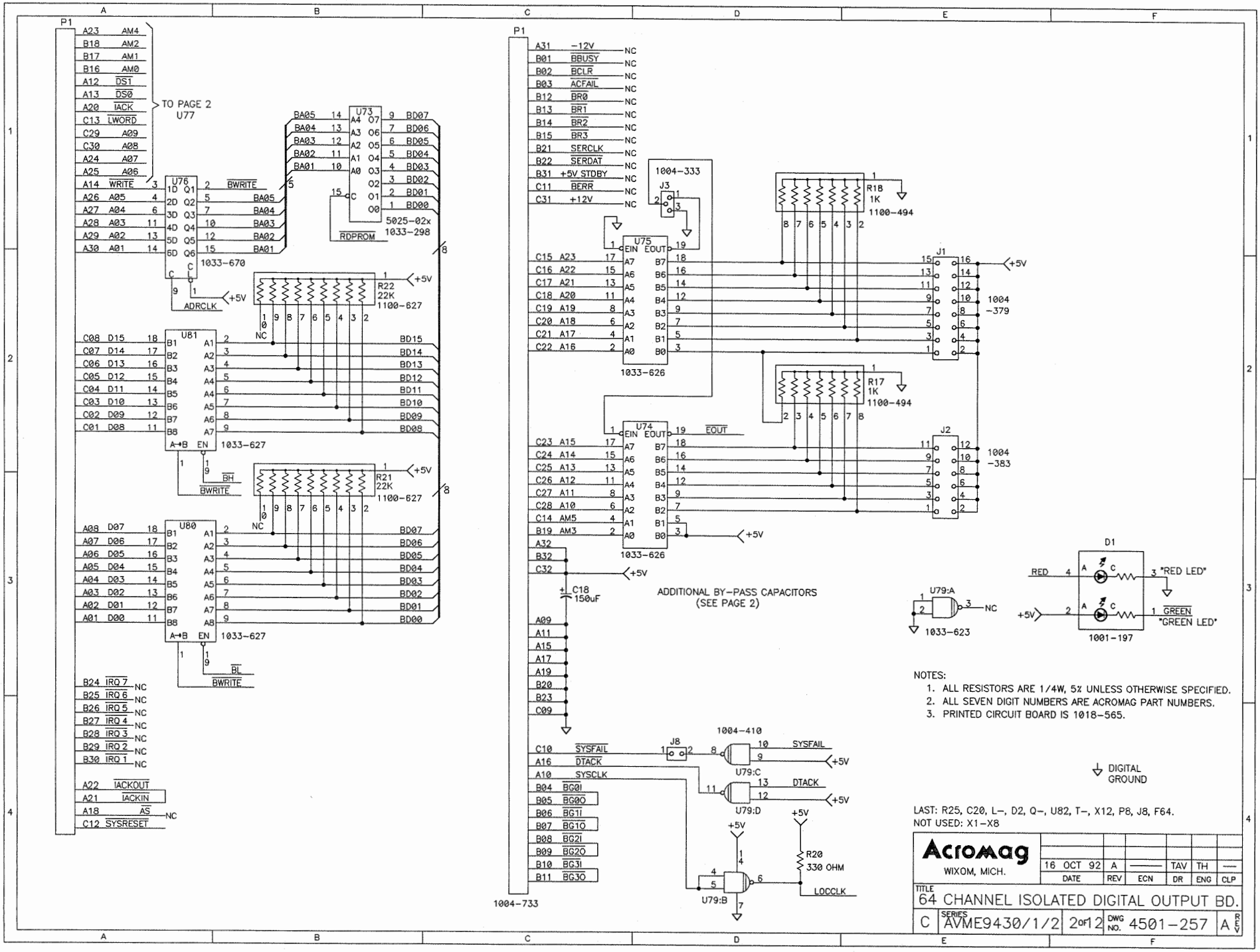
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



P.C. BOARD 1018-565

Acromag WIXOM, MICH.							
	16 OCT 92	A	———	TAV	TH	—	
	DATE	REV	ECN	DR	ENG	CLP	
TITLE 64 CHANNEL ISOLATED DIGITAL OUTPUT BD.							
C	SERIES AVME9430/1/2	1 of 12	DWG NO. 4501-257			A	REV

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



NOTES:

1. ALL RESISTORS ARE 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL SEVEN DIGIT NUMBERS ARE ACROMAG PART NUMBERS.
3. PRINTED CIRCUIT BOARD IS 1018-565.

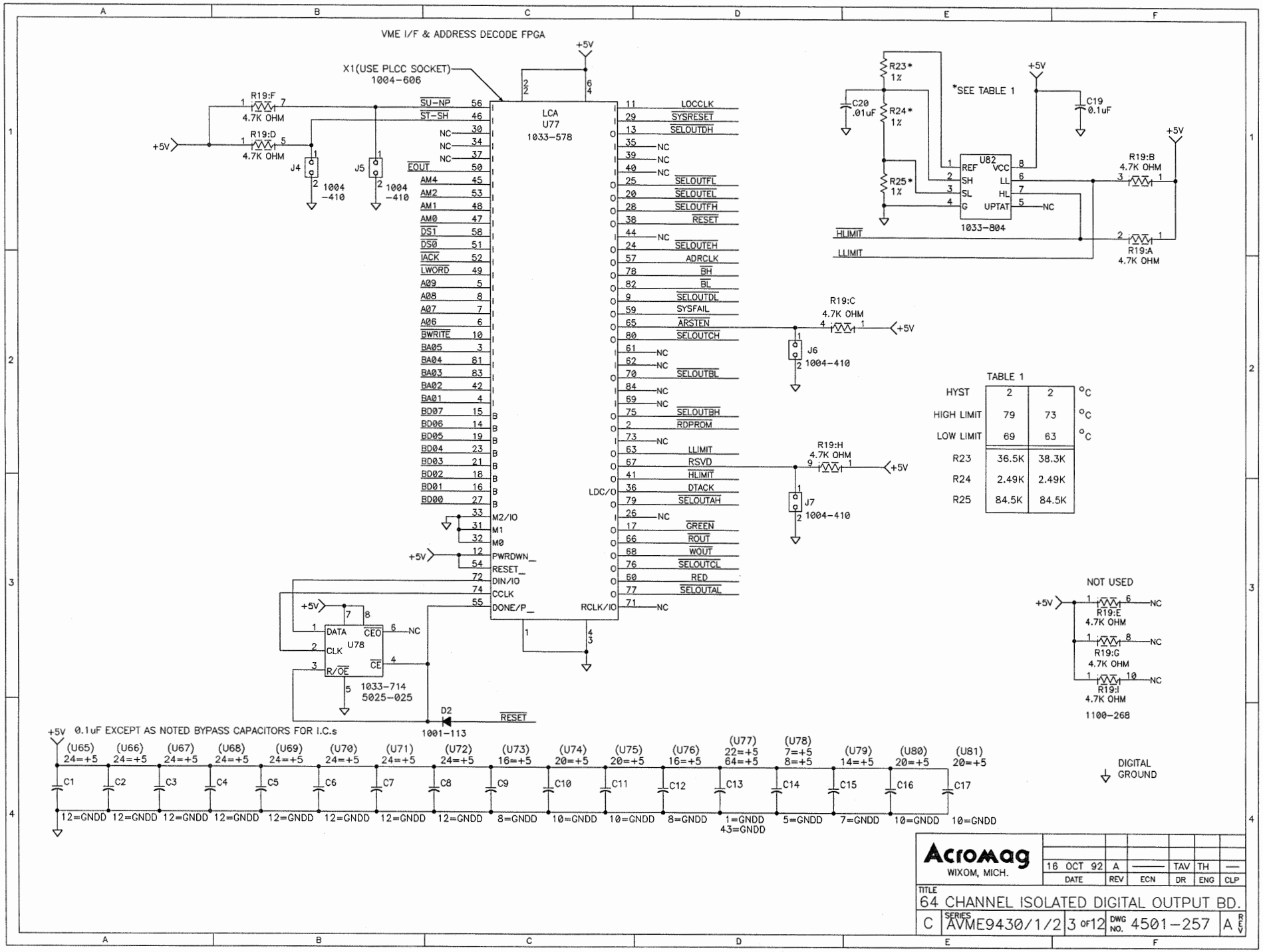
LAST: R25, C20, L-, D2, Q-, U82, T-, X12, P8, J8, F64.
NOT USED: X1-X8

Acromag WIXOM, MICH.							
	16 OCT 92	A	———	TAV	TH	———	
	DATE	REV	ECN	DR	ENG	CLP	

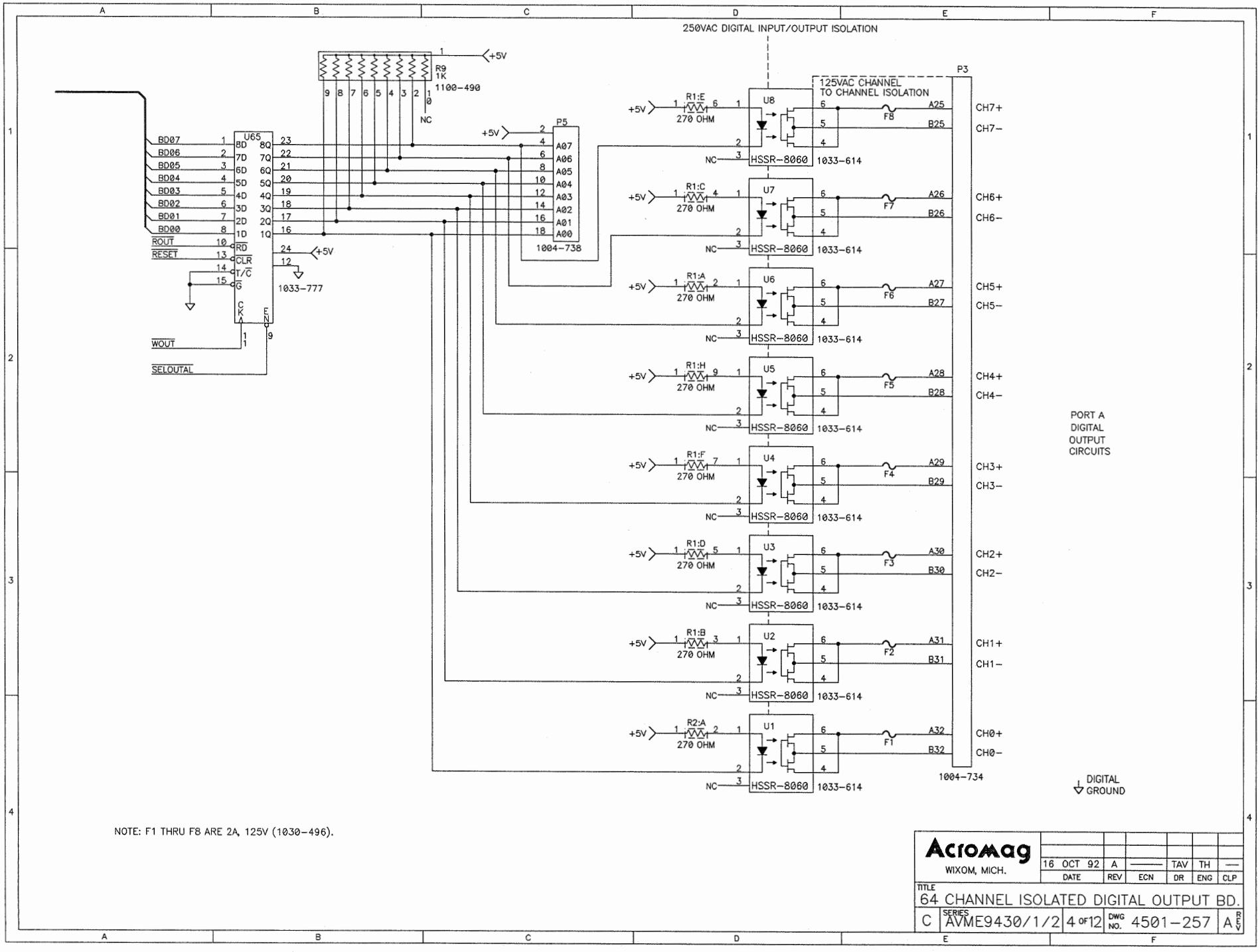
TITLE: 64 CHANNEL ISOLATED DIGITAL OUTPUT BD.

C	SERIES AVME9430/1/2	2 OF 12	DWG NO. 4501-257	A REV

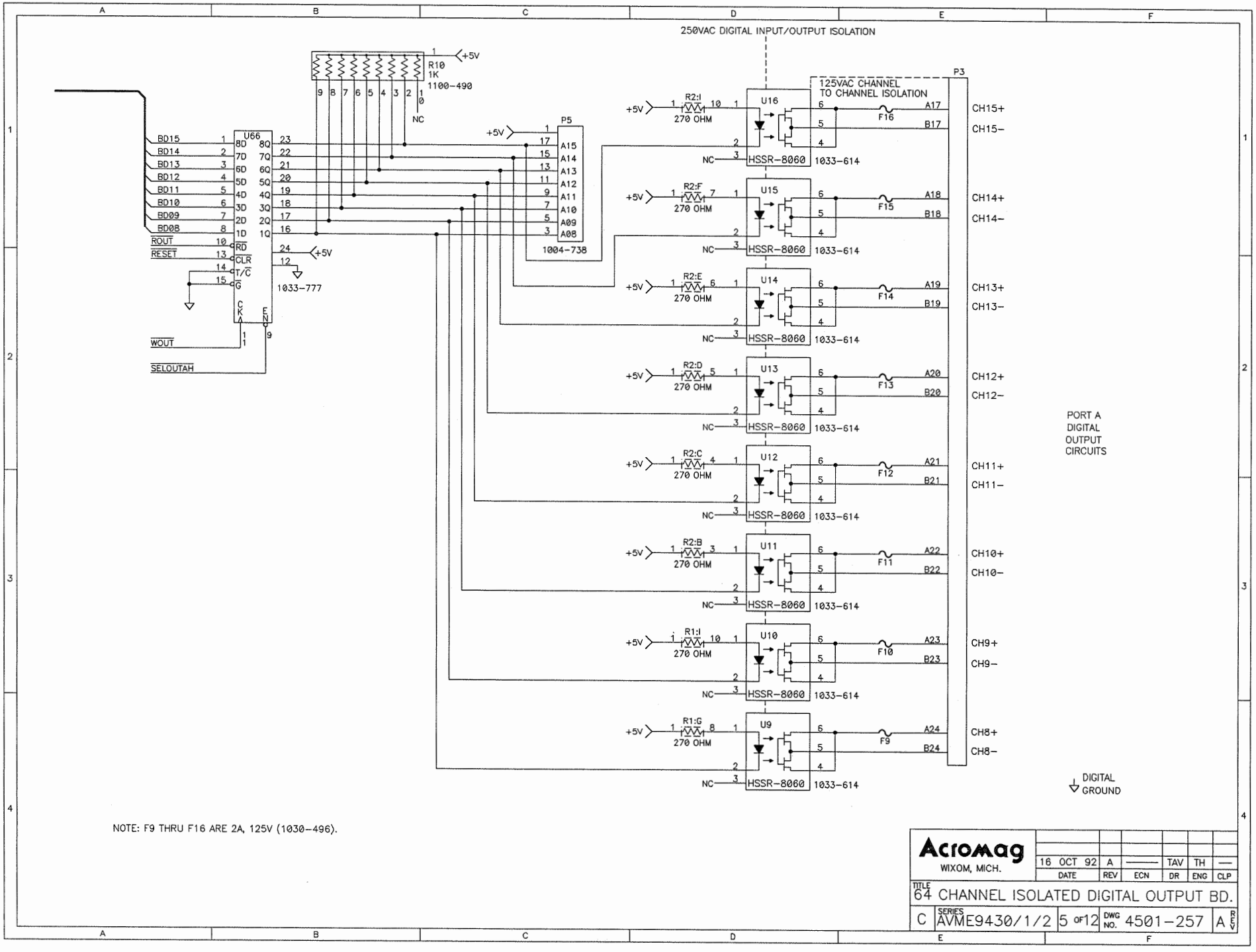
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



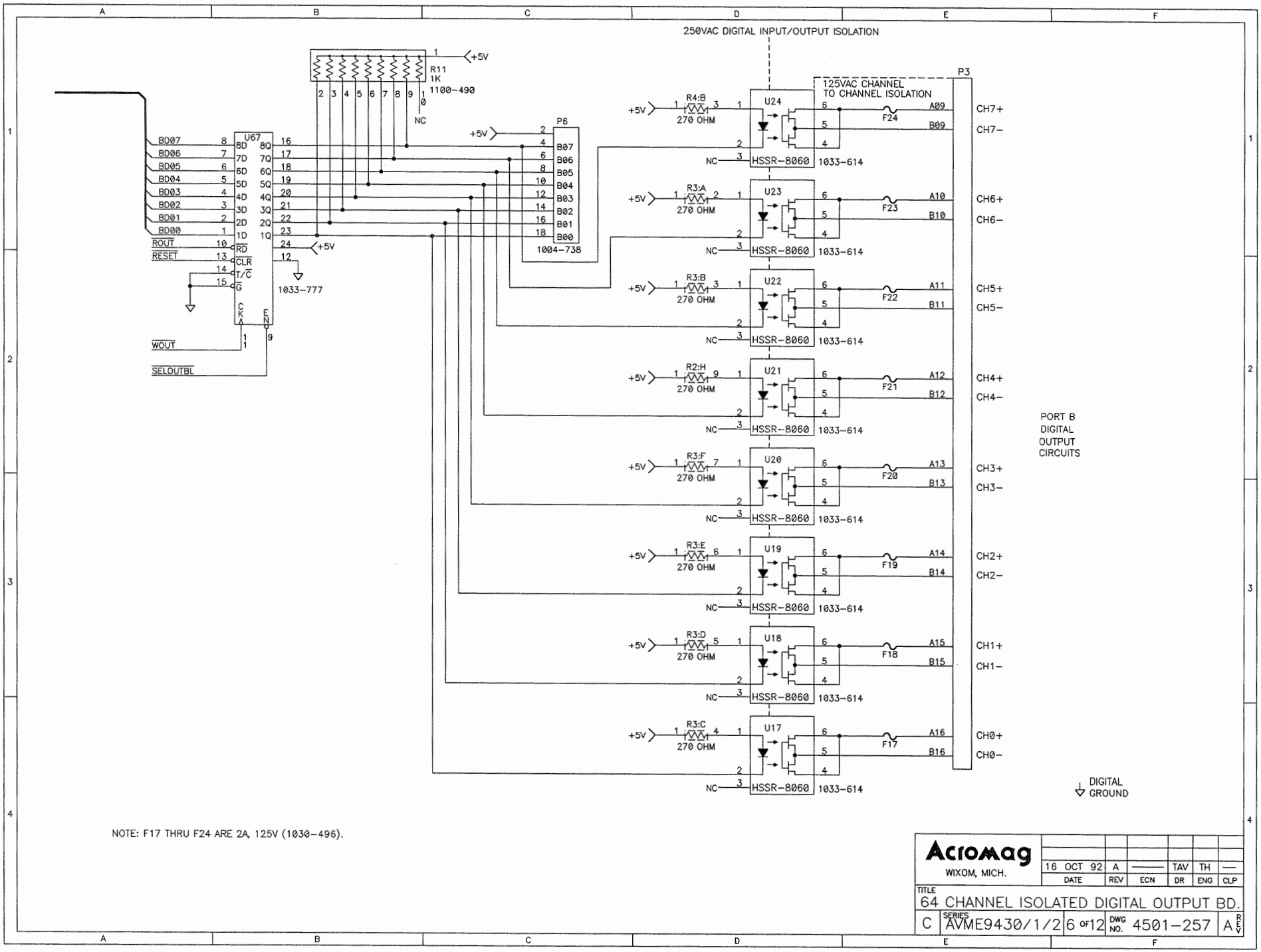
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



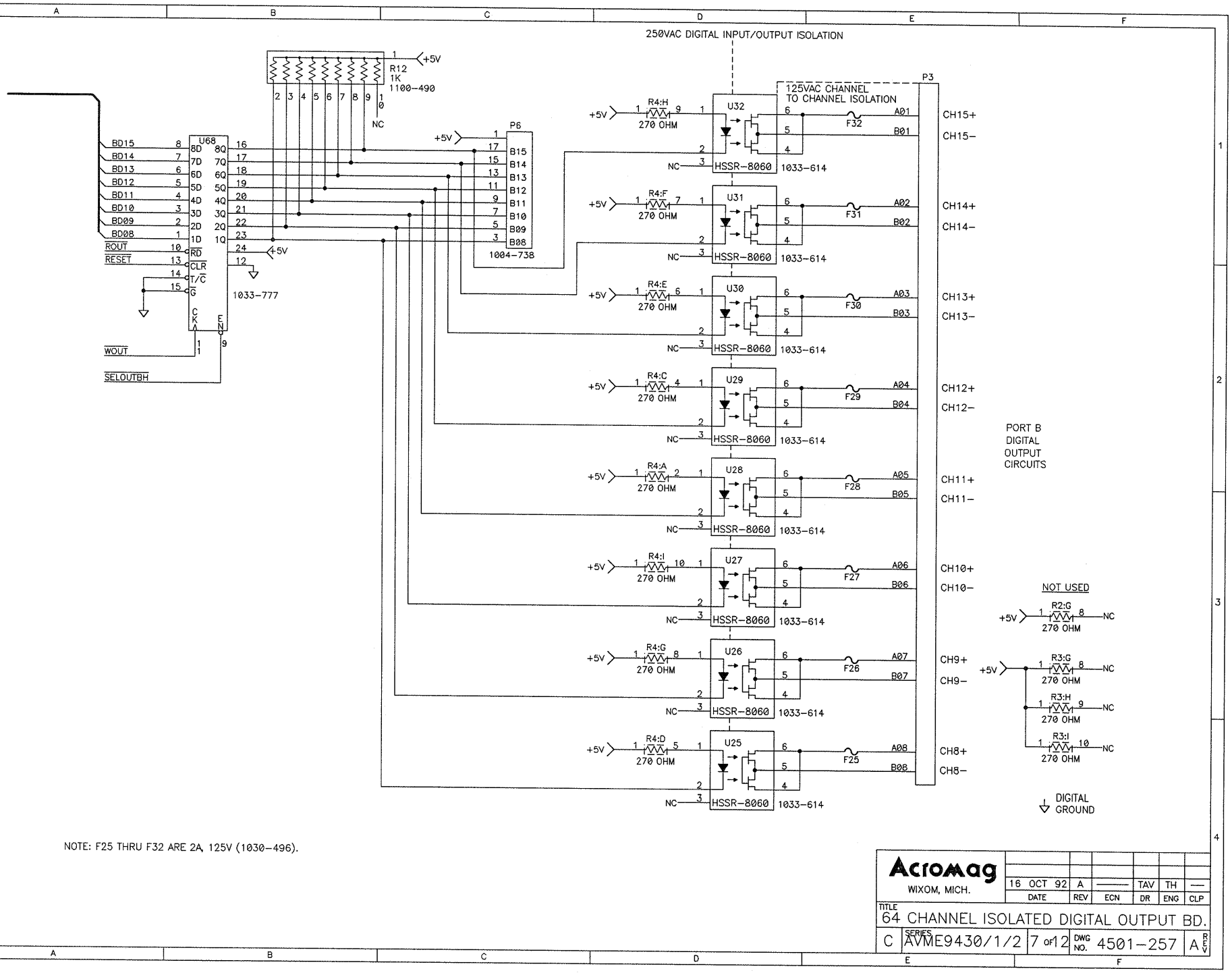
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



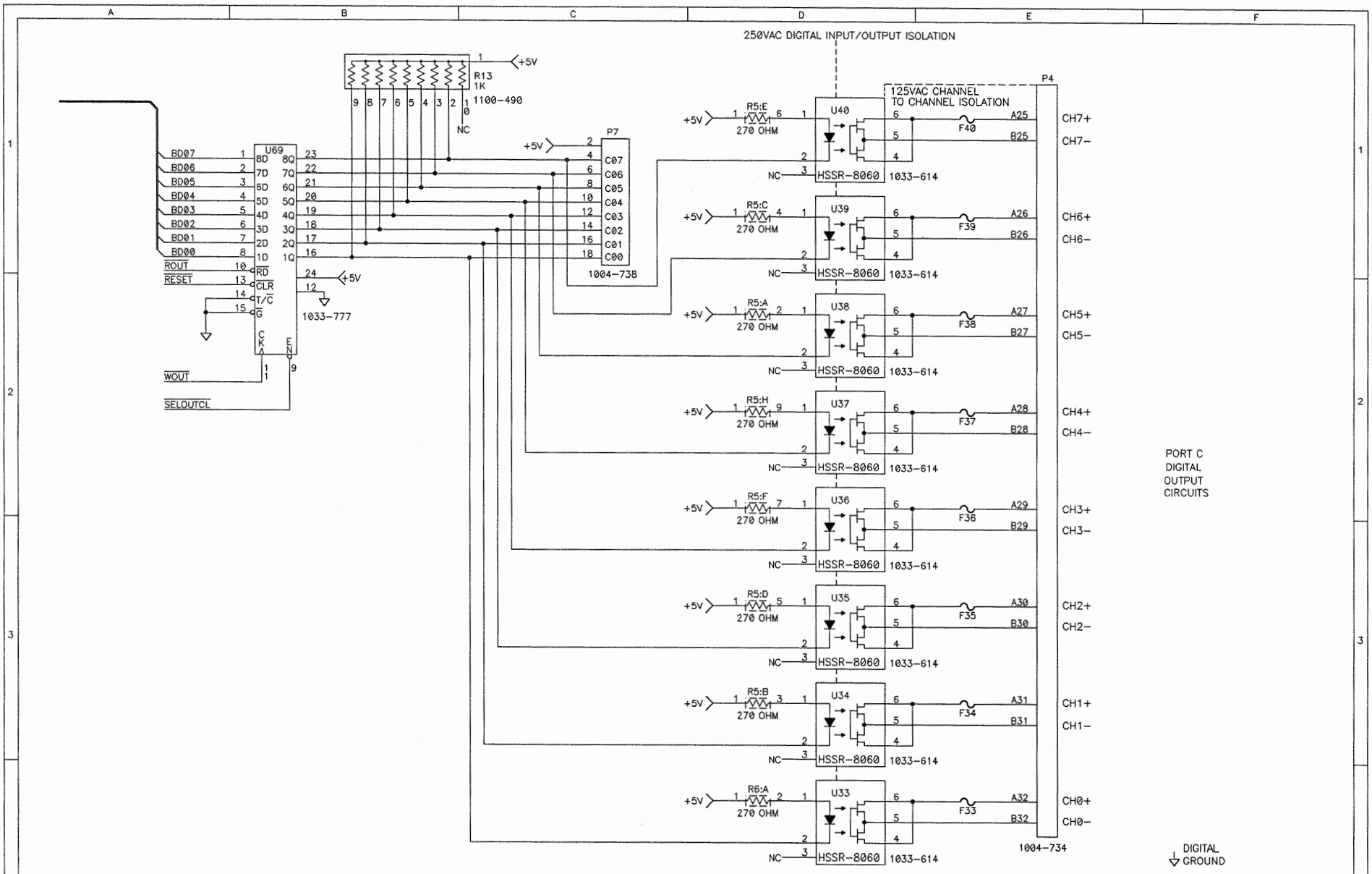
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



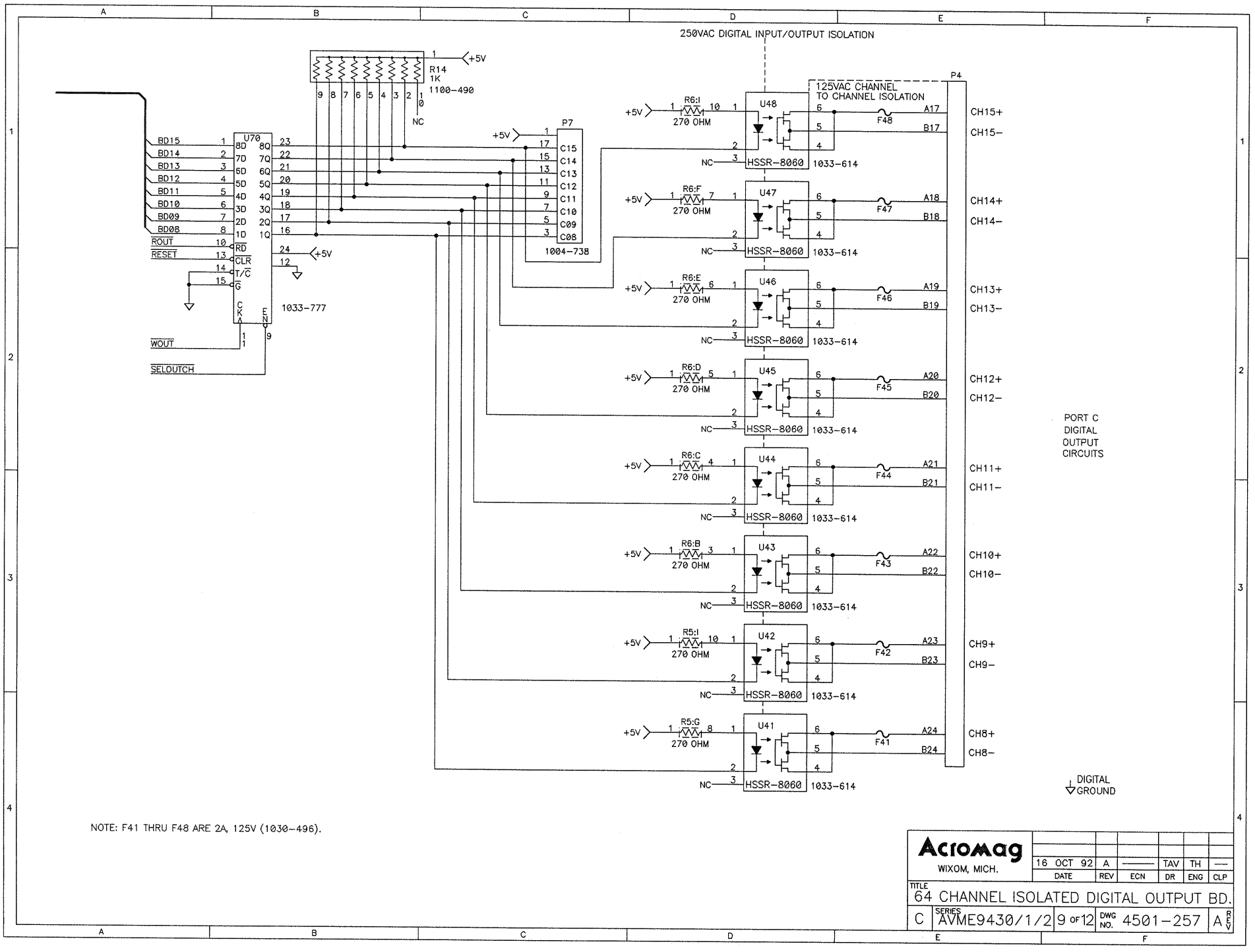
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



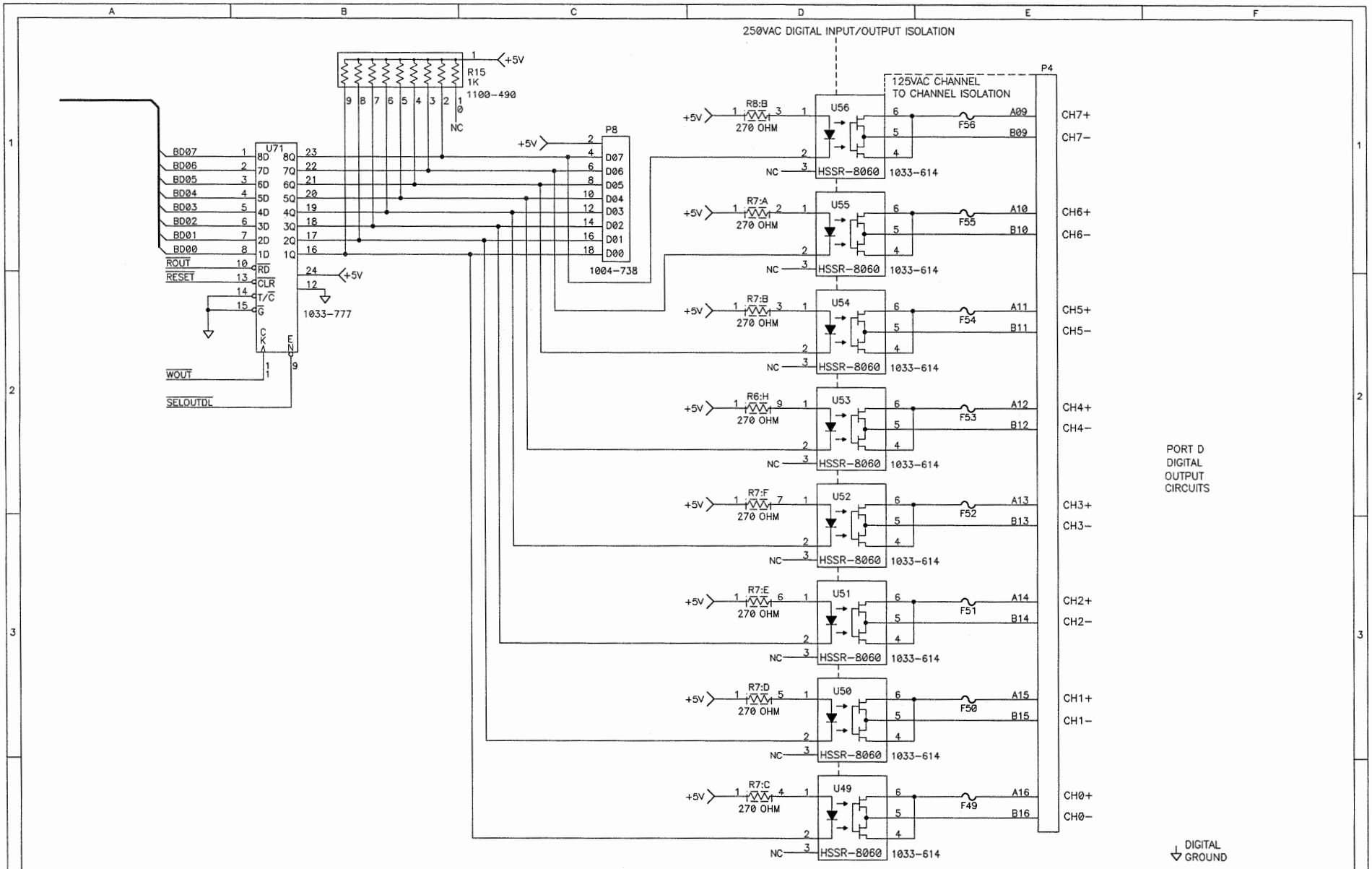
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



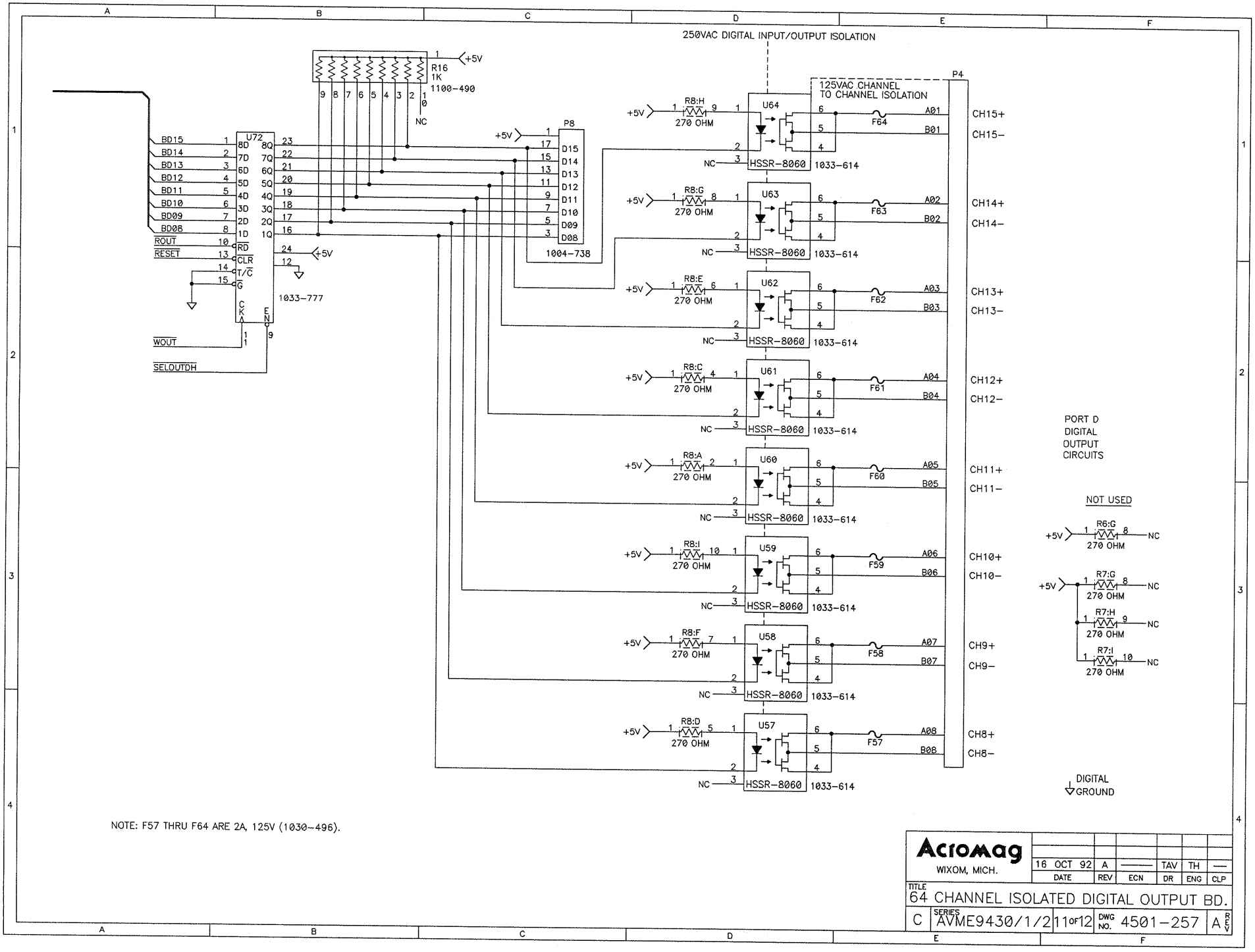
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



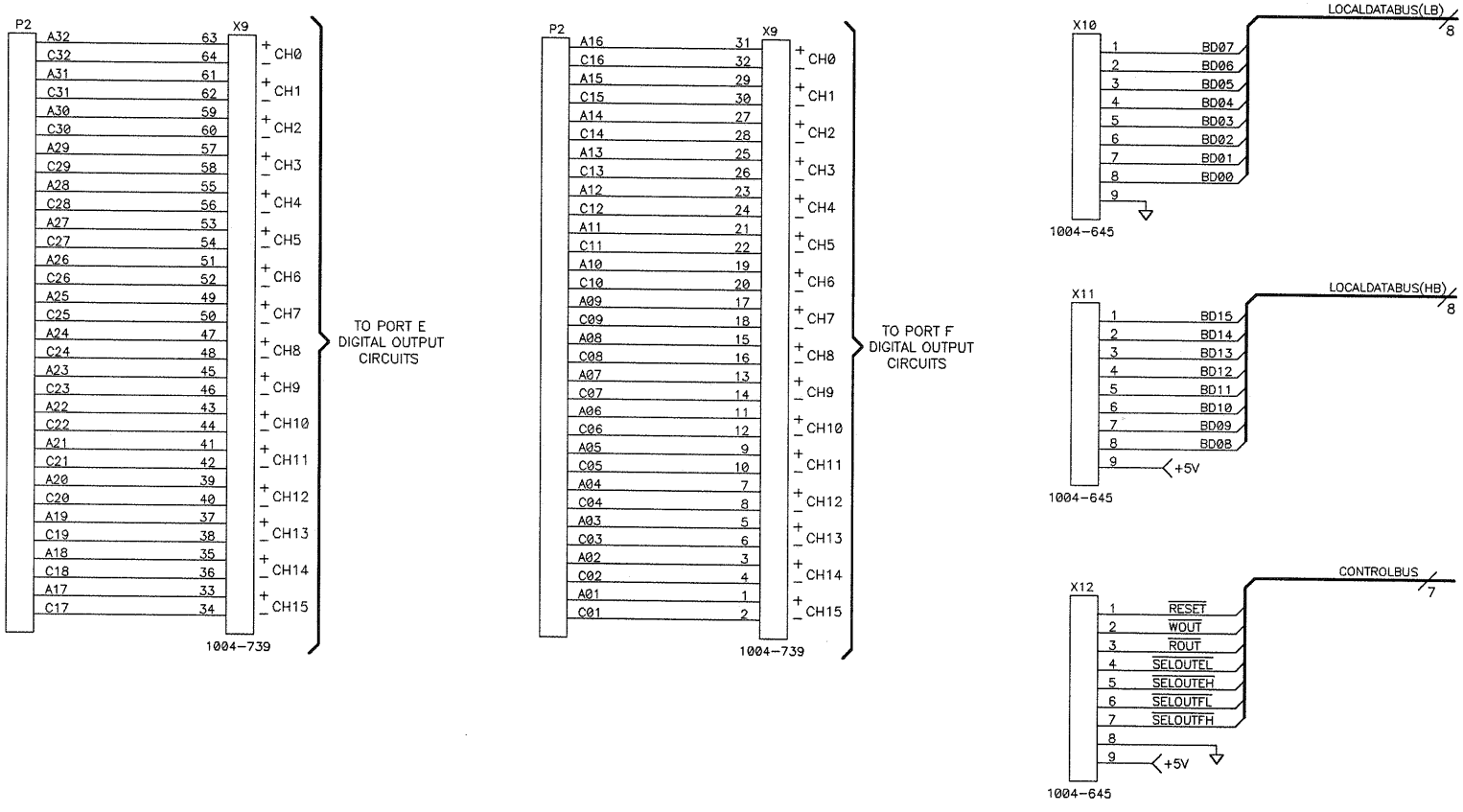
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

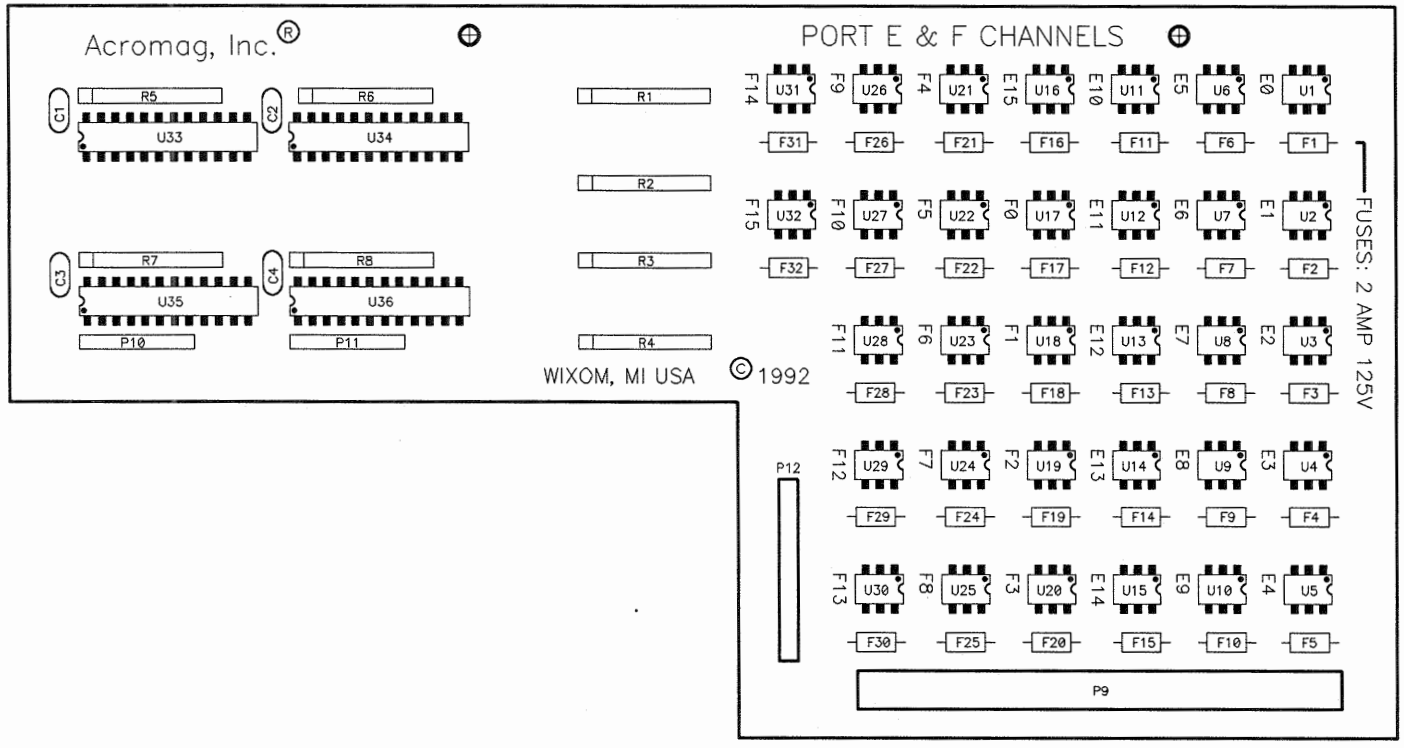


Acromag WIXOM, MICH.						
	16 OCT 92	A	——	TAV		—
	DATE	REV	ECN	DR	ENG	CLP

TITLE: 64 CHANNEL ISOLATED DIGITAL OUTPUT BD.

C	SERIES AVME9430/1/2	12 OF 12	DWG NO. 4501-257	REV A

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



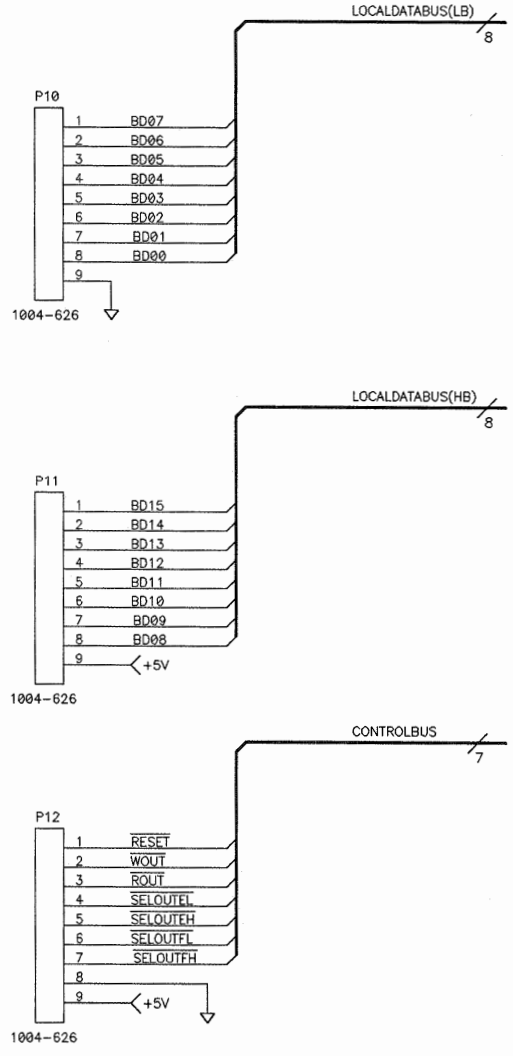
P.C. BOARD 1018-566

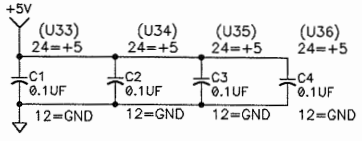
Acromag WIXOM, MICH.						
	16 OCT 92	A	———	TAV	TH	—
	DATE	REV	ECN	DR	ENG	CLP

TITLE: 32 CHANNEL ISOLATED DIGITAL OUTPUT BD.

C	SERIES AVME9430/2	1 OF 6	DWG NO. 4501-258	A REV

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com





NOTES:

1. ALL SEVEN DIGIT PART NUMBERS ARE ACROMAG PART NUMBERS.
2. PRINTED CIRCUIT BOARD IS 1018-566.

DIGITAL GROUND

LAST: R8, C4, U36, P12, F32

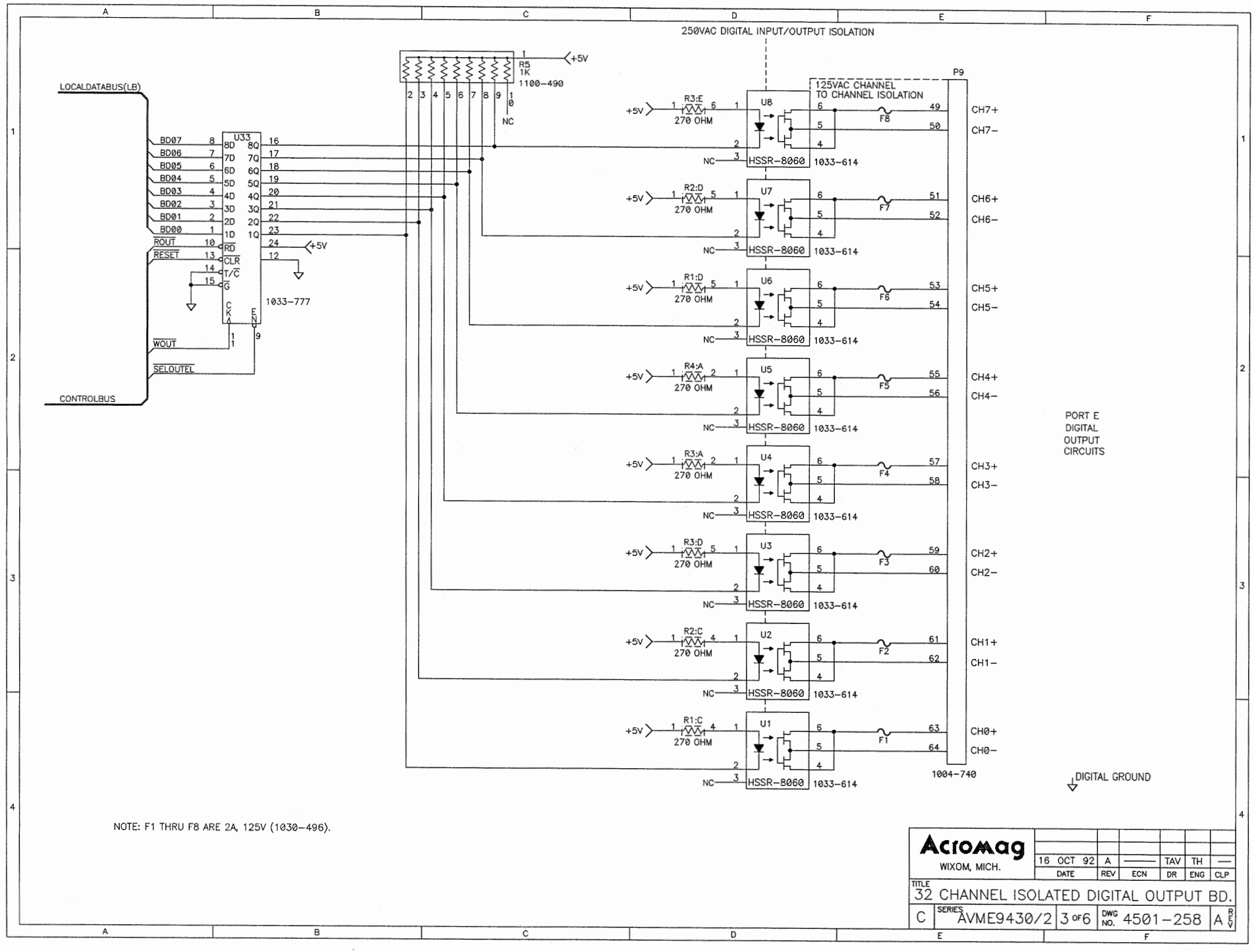
NOT USED: P1 THRU P8

Acromag WIXOM, MICH.						
	16 OCT 92	A	———	TAV	TH	—
	DATE	REV	ECN	DR	ENG	CLP

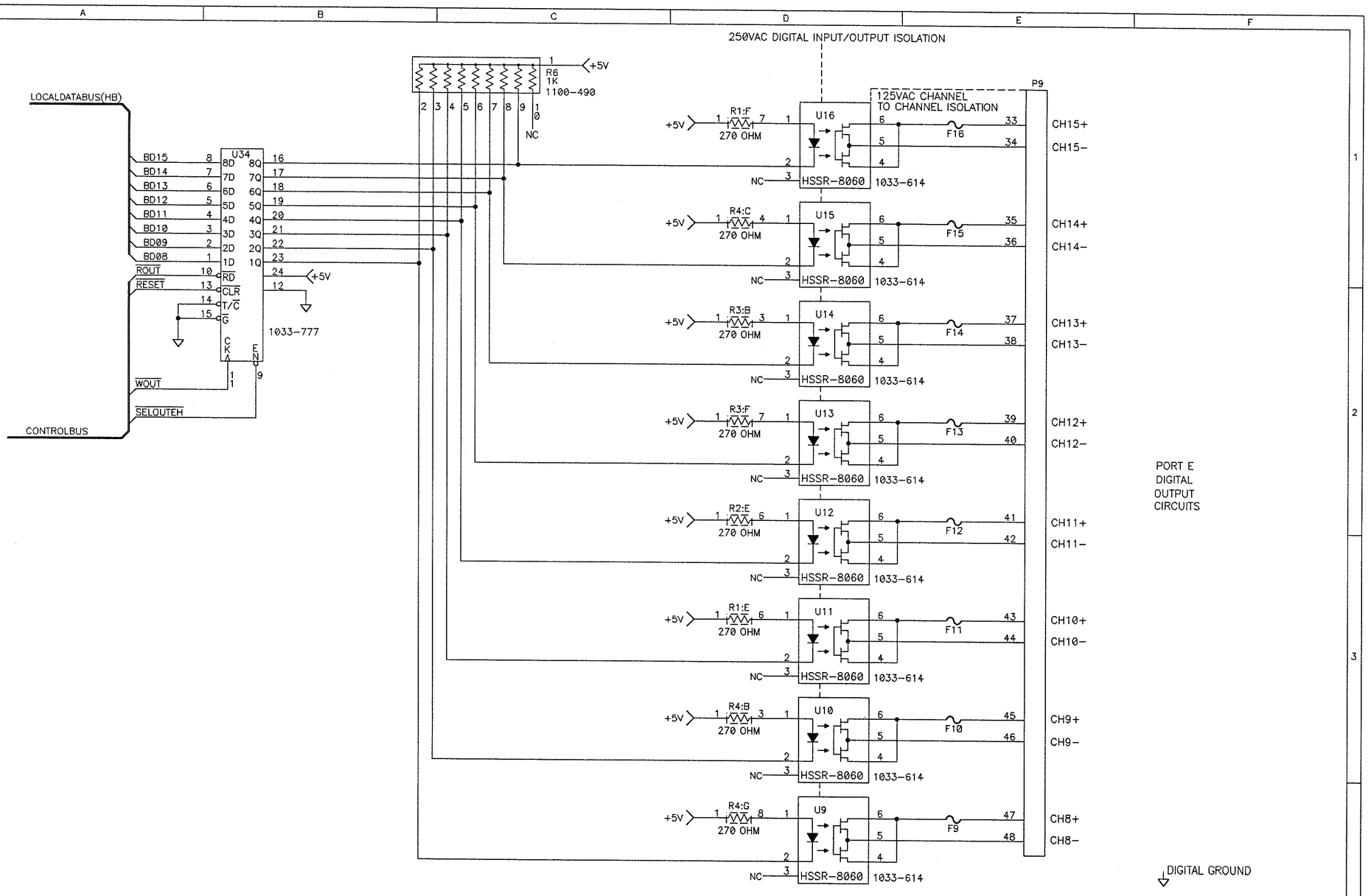
TITLE: 32 CHANNEL ISOLATED DIGITAL OUTPUT BD.

C	SERIES AVME9430/2	2 OF 6	DWG NO. 4501-258	REV A

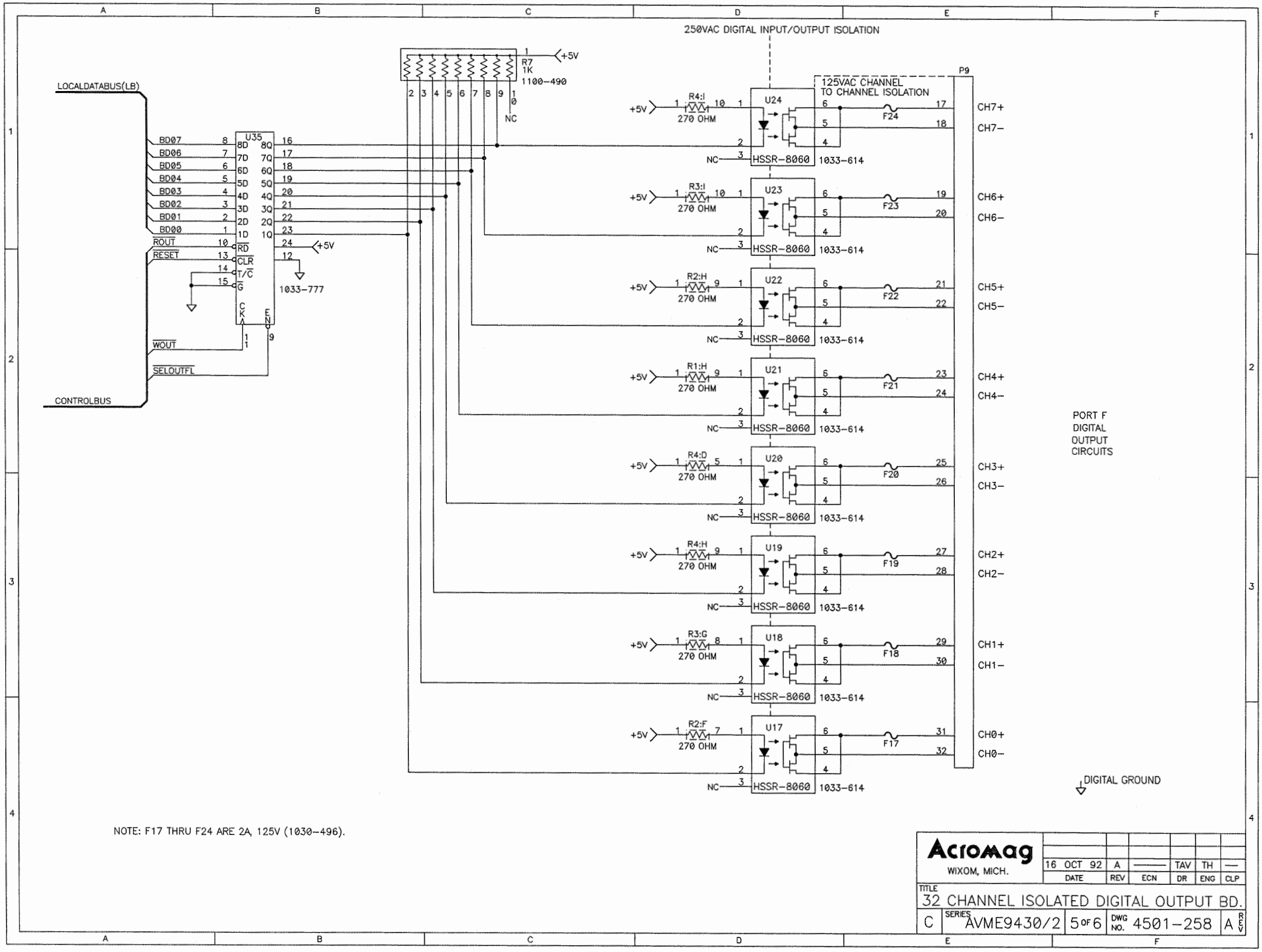
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



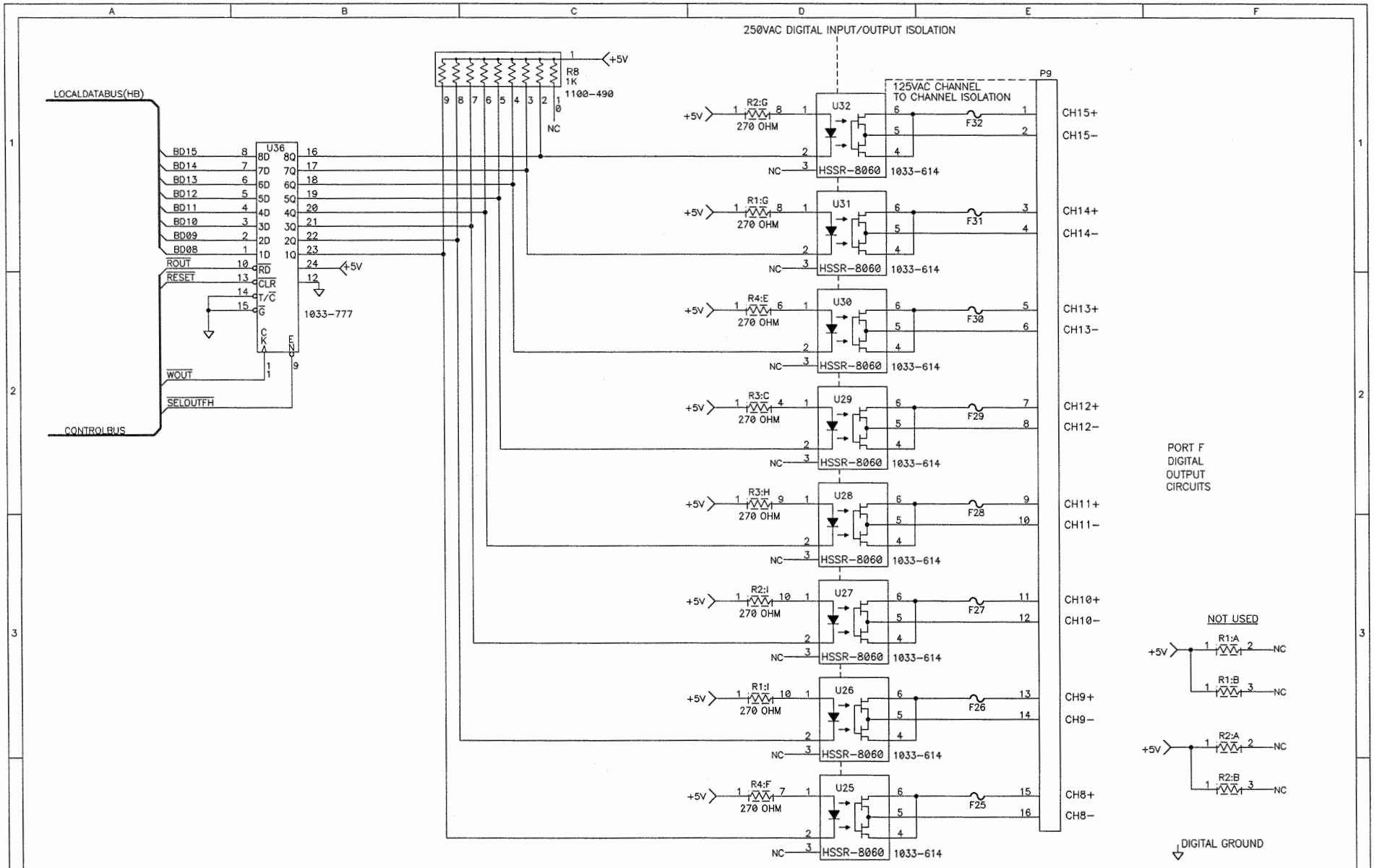
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



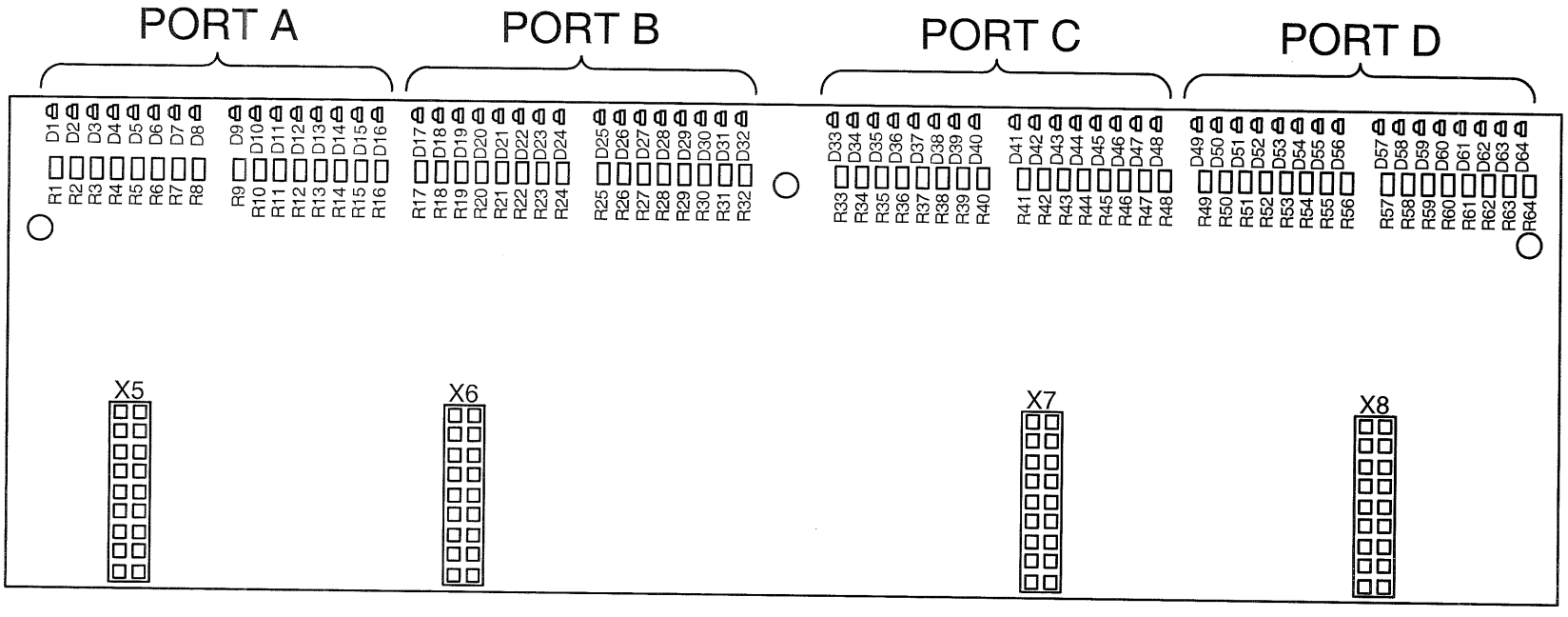
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



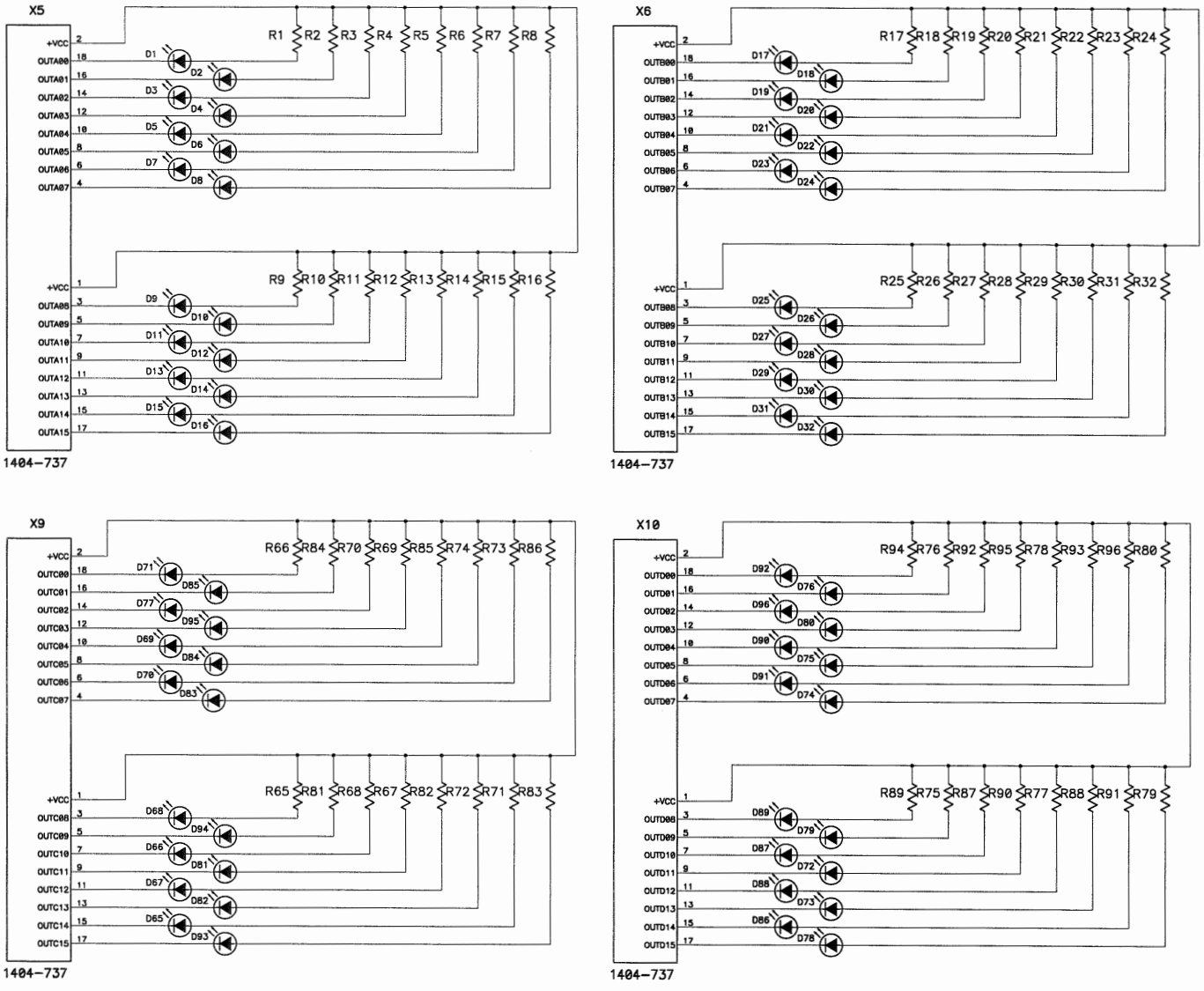
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



P.C. BOARD 1018-564C

Acromag® WIXOM, MICH.	13 APR 05	B	05D003	TAV	CAP	CAP
	16 OCT 92	A	———	CAP	TH	TH
	DATE	REV	CO	DR	ENG	CLP
TITLE: 64 CHANNEL LED OPTION BOARD PART LOCATION AND SCHEMATIC						
SIZE: A	SERIES: AVME943X-I	PAGE: 1 OF 2	4501-256			REV: B

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



NOTES:

1. P.C. BOARD IS 1018-564.
2. ALL SEVEN DIGIT NUMBERS ARE ACROMAG PART NUMBERS.

Acromag® WIXOM, MICH.						
13 APR 05	B	05D003	CAP	CAP	CAP	
23 SEP 92	A	———	TH	TH	—	
DATE	REV	ECN	DR	ENG	CLP	
TITLE: AVME943X-I LED OPTION BOARD PART LOCATION AND SCHEMATIC						
C	SERIES: AVME934X	2 OF 2	DWG NO. 4501-256	REV B		

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A.0 CABLE AND TERMINATION PANELS

A.1 CABLE: MODEL 9944-x

Type: Ribbon Cable, 64 wire (Header - Header)

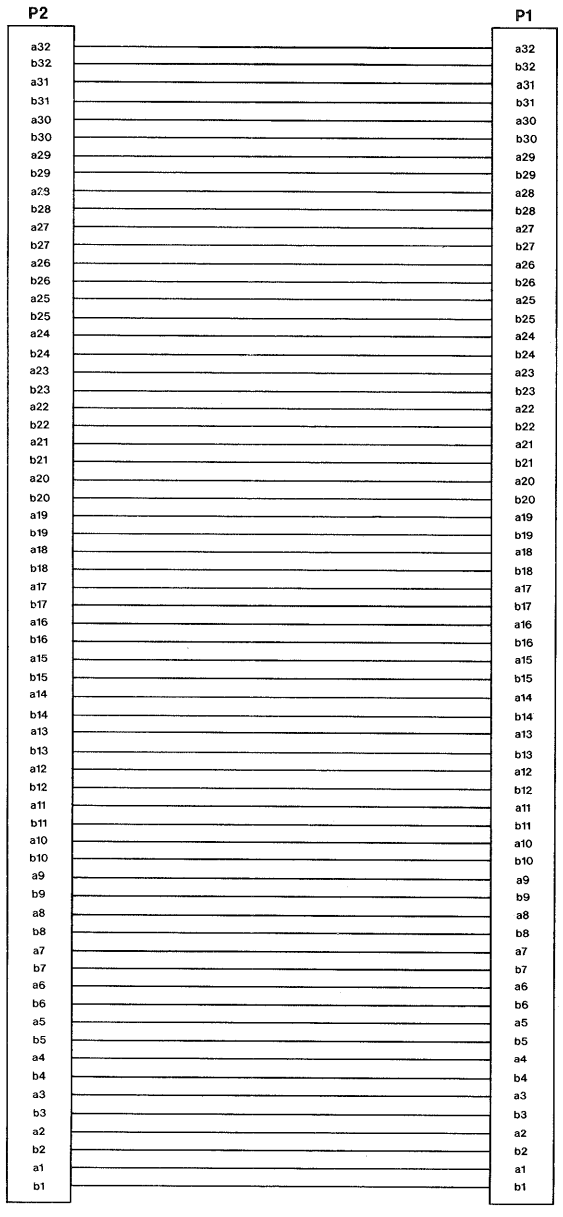
This cable connects the 6985-32DO termination panel to the AVME9431/9432 boards (P3 and/or P4 connectors only). The length of the cable in feet is indicated by the "x" in the model number (9944-x), 12 feet maximum. It is recommended that this length be kept to a minimum to reduce noise pickup and power loss (especially important since output currents can reach 1.0 Amp DC).

Part numbers are given below for the various cable components. Use these references if you wish to assemble your own cables.

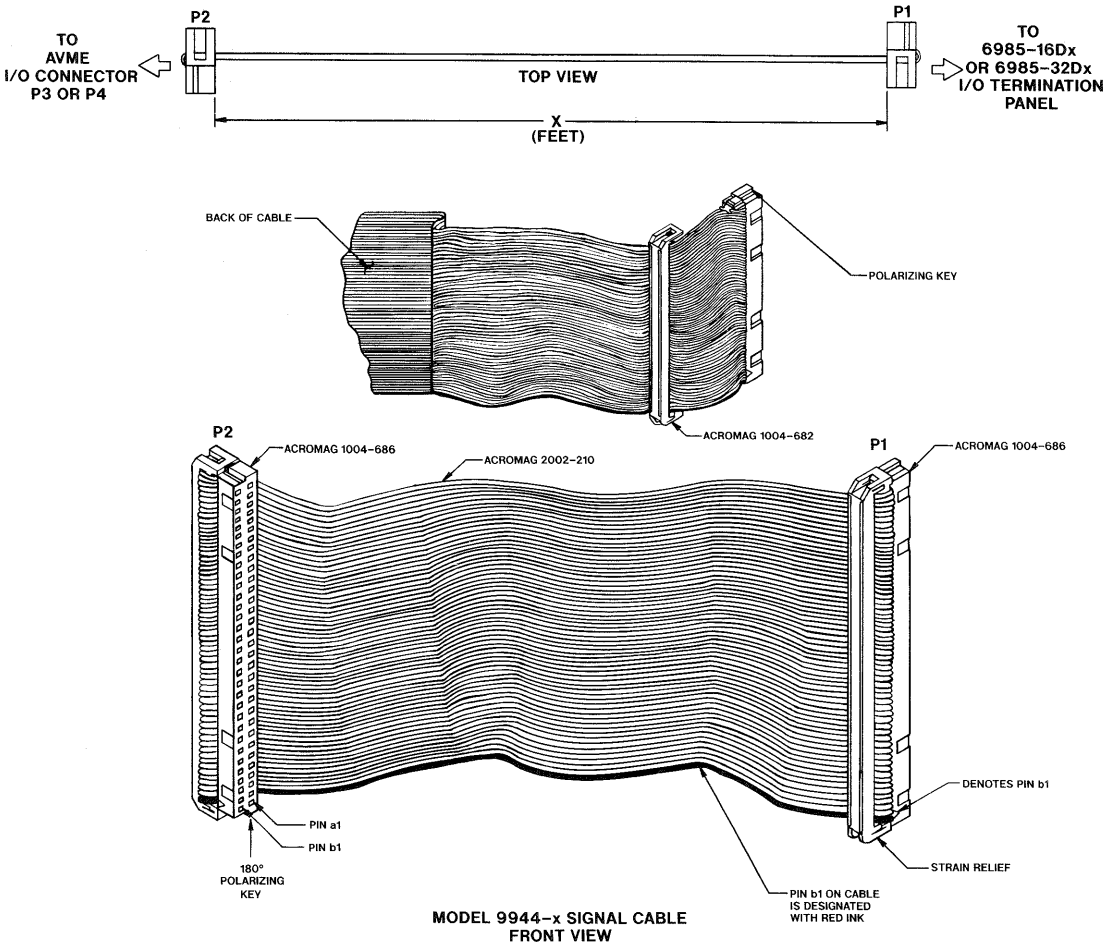
MODEL: 9944-x

Application	Use to connect 6985-32DO termination panel to the AVME9431/9432 boards P3 and/or P4 connectors. (both have 64 pin connectors).
Cable	64 wire flat ribbon cable, 28 gauge. Acromag Part 2002-210 (3M Type C3365/64 or equivalent).
Length	Last field in part number designates length in feet, specified by user (12 feet maximum).
Headers (Both Ends)	64-pin header, female, includes strain relief. *Header:* Acromag Part 1004-686 (Panduit Type 120-064-435 or equiv.). *Strain Relief:* Acromag Part 1004-682 (Panduit Type 120-000-032 or equiv.).
Keying	Headers, both ends, have polarizing key to prevent improper installation.
Schematic and Mech. Dimensions	See Drawing 4501-135.
Shipping Weight	1.0 pounds (0.5Kg) packed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



MODEL 9944-x SCHEMATIC



MODEL 9944-x SIGNAL CABLE
FRONT VIEW

Acromag® WIXOM, MICH.	18 DEC 92	A	10362	TAV	ATS	TH
	8 NOV 91	—	———	TAV	ATS	—
	DATE	REV	CO	DR	ENG	CLP
TITLE: CABLE: MODEL 9944-x						
SIZE D DWG	SERIES AVME	SHEET 1 OF 1	DRAWING 4501-135	REV A		

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A.2 CABLE: MODEL 9948-x

Type: Ribbon Cable, 64 wire (Header - Header)

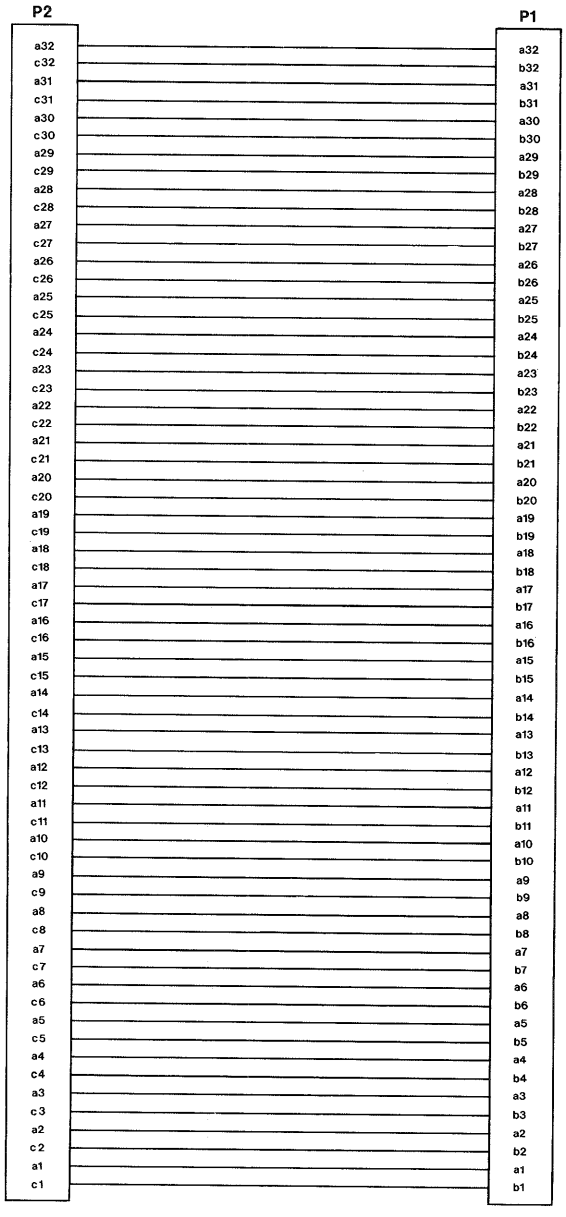
This cable connects the 6985-32DO termination panel to the AVME9430/9432 boards (P2 connector only). The length of the cable in feet is indicated by the "x" in the model number (9948-x), 12 feet maximum. It is recommended that this length be kept to a minimum to reduce noise pickup and power loss (especially important since output currents can reach 1.0 Amp DC).

Part numbers are given below for the various cable components. Use these references if you wish to assemble your own cables.

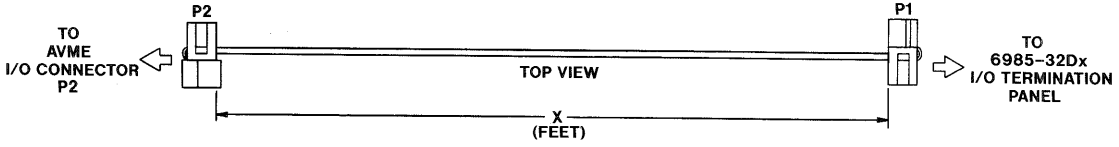
MODEL: 9948-x

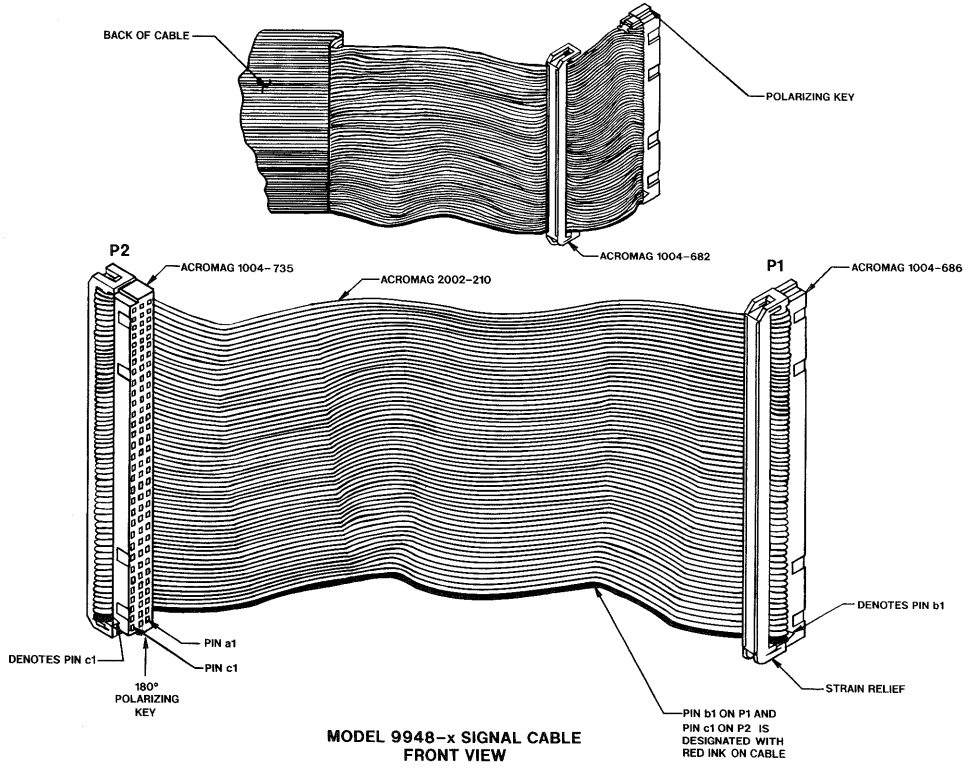
Application	Use to connect 6985-32DO termination panel to the AVME9430/9432 boards P2 connector. (both have 64 pin connectors).
Cable	64 wire flat ribbon cable, 28 gauge. Acromag Part 2002-210 (3M Type C3365/64 or equivalent).
Length	Last field in part number designates length in feet, specified by user (12 feet maximum).
Socket (AVME 9430/9432 End)	64-pin socket, female, includes strain relief. *Socket:* Acromag Part 1004-735 (Panduit Type 120-964-435 or equiv.). *Strain Relief:* Acromag Part 1004-682 (Panduit Type 120-000-032 or equiv.).
Header (6985-32DO End)	64-pin header, female, includes strain relief. *Header:* Acromag Part 1004-686 (Panduit Type 120-064-435 or equiv.). *Strain Relief:* Acromag Part 1004-682 (Panduit Type 120-000-032 or equiv.).
Keying	Headers, both ends, have polarizing key to prevent improper installation.
Schematic and Mech. Dimensions	See Drawing 4501-291.
Shipping Weight	1.0 pounds (0.5Kg) packed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



MODEL 9948-x SCHEMATIC





MODEL 9948-x SIGNAL CABLE
FRONT VIEW

Acromag WIXOM, MICH.							
	2 DEC 92	A		TA	AT5		
	DATE	REV	CO	DR	ENG	CLP	
TITLE: CABLE: MODEL 9948-x							
SIZE D DWG	SERIES: AVME	SHEET 1 OF 1	DRAWING 4501-291	REV A			

3A00-026

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A.3 TERMINATION PANELS: MODELS 6985-32DO

Type: Termination Panels For AVME9430/9431/9432 Boards

The 6985-32DO panel facilitates the connection of up to 32 field output signals and connects to the AVME9430/9431/9432 boards via a flat ribbon cable (Model 9944-x or Model 9948-x). Field signals are accessed via screw terminal strips.

Optionally, the user may connect a +5 to +55V DC supply to the B+ and B- power (screw) terminals to provide a common supply reference for output channels (e.g. a +5V DC supply would be useful for interfacing to TTL signals as shown in Figure 2.6). The panels have slots to add pull-up/down resistors (or jumpers) or protection diodes from each channel to the B+ and B- terminals. See Drawing 4501-272: 6985-32Dx Schematic and Part Location Drawing for specifics. Typical output channel configurations are shown in Figure 2.5. If the application requires that channel to channel isolation be maintained, then do not compromise this by making connections to a common supply (i.e. the B+ and B- terminals).

Before connecting the 6985-32DO termination panel to the AVME9430/9431/9432 boards, connect a wire from chassis ground to the ground (GND) screw terminal on the panel (see Drawing 4501-273: 6985-32DO Mounting, Clearance & Electrical Connections). This wire ties the output transient protection circuitry to ground.

MODELS: 6985-32DO

FEATURES:

Digital Output Channels	Up to 32 channels with 6985-32DO.
Wiring Connections	See Drawing 4501-273.
Power	Optional user supply terminals (B+ and B-); do not use if channel to channel isolation is required. Supply Range: +5 to +55V DC. (3 Amps maximum for pc board foil traces)
Power On LED	Illuminates if a +5 to +55V DC supply is connected to the B+ and B- power (screw) terminals.
User Configurable Panel Circuits	See Drawing 4501-272. Slots to add pull-up/down resistors (or jumpers) or protection diodes from each channel to the B+ and B- terminals.
Isolation	Between individual digital channels and the ground terminal: 250VAC or 354V DC on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown). Complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

	Between all digital channels: 125VAC or 125V DC on a continuous basis (will withstand 1250V AC dielectric strength test for one minute without breakdown). Complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.
Output Transient Protection.....	See Drawing 4501-273. Connect a wire from chassis ground to the ground (GND) screw terminal on the panel.

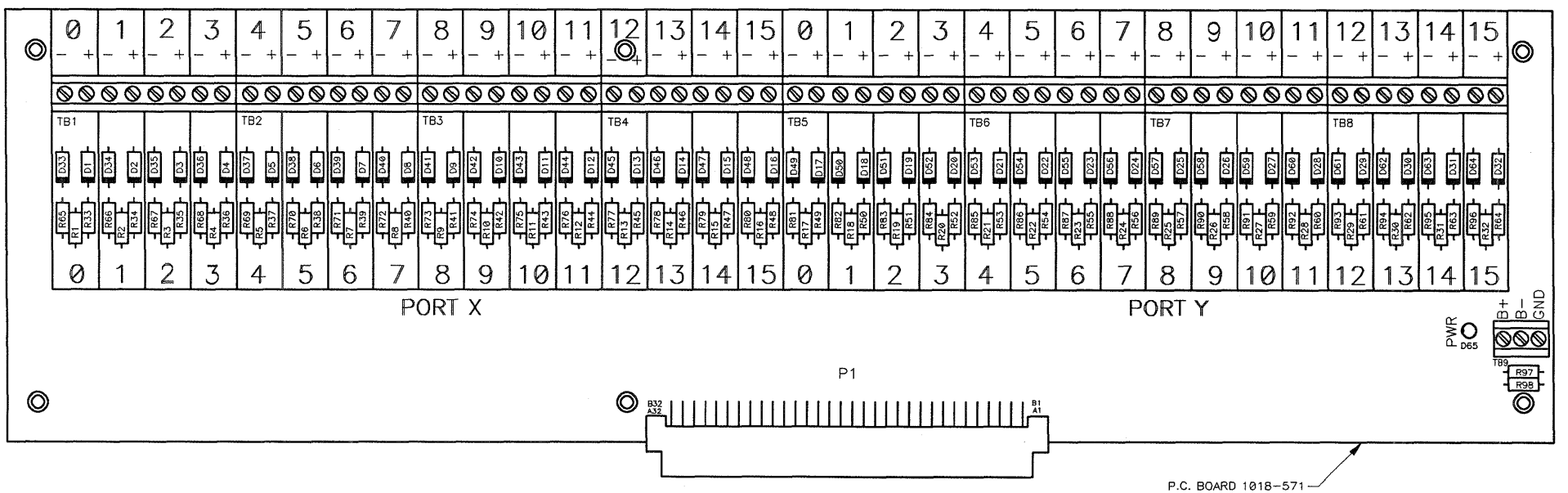
PHYSICAL CHARACTERISTICS:

Shipping Weight.....	1.25 pounds (0.6Kg) packed.
Mounting.....	Surface mounting. Leave sufficient space around the termination panel for wiring.
Mounting Hardware.....	The termination panel is supplied with 0.375 inch standoffs. All standoffs should be secured using No. 6 hardware to provide maximum physical strength.
Field/Power Wiring.....	Terminal blocks with screw clamps. Wire range 14 to 26 AWG.
Connections to AVME9430/9431/9432...	P1; Panduit No. 100-064-033B; Type B Male Connector, rows A & B equipped, (64 pins total). Use Acromag 9944-x or 9948-x cable (keyed) to connect panel to VME board. Keep cable short to reduce power loss and noise.
Mechanical Dimensions.....	See Drawing 4501-273.
Printed Circuit Board.....	Military grade FR-4 epoxy glass circuit board. Thickness: 0.063 inches.

OPERATING CONDITIONS:

Operating Temperature.....	0 to 70 deg. C.
Storage Temperature.....	-25 to +85 deg. C.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



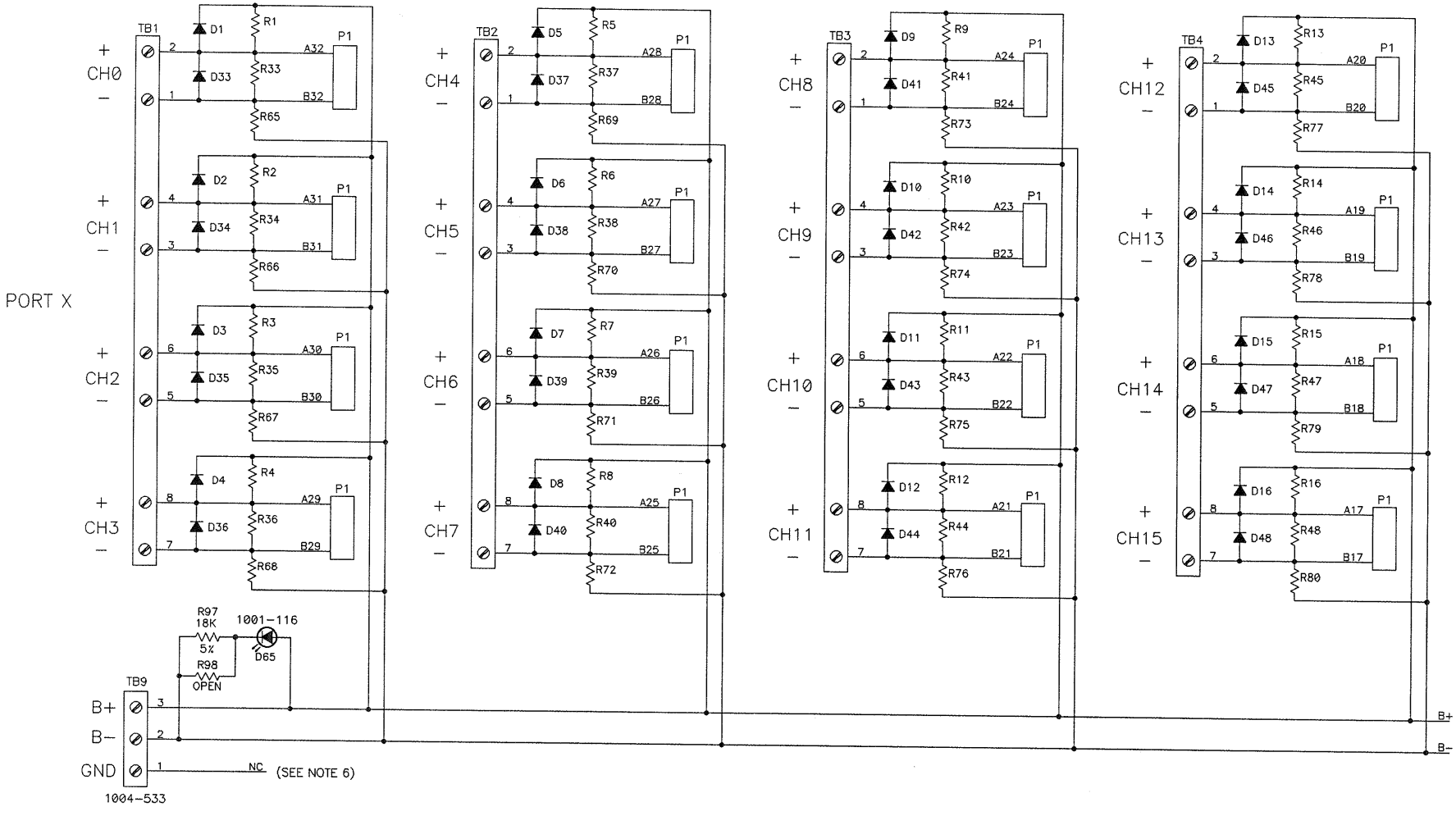
Acromag WIXOM, MICH.

DATE	REV	ECN	DR	ENG	CLP
23 NOV 92	A	——	TAV	JGV	——

TITLE: 6985-32Dx TERMINATION PANEL SCHEMATIC & PART LOCATION

SIZE	SERIES		DWG NO.	REV
D	AVME	1 OF 3	4501-272	A

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



NOTES:

1. ALL SEVEN DIGIT NUMBERS ARE ACROMAG PART NUMBERS.
2. TB1 THROUGH TB8 ARE ACROMAG 1004-531.
3. R1 THROUGH R96 ARE 1/4W.
4. R98 IS OPTIONAL.
5. D1 THROUGH D64 ACCEPT TS2 LEADS.
6. EACH CHANNELS' (+) AND (-) INPUT CONTAINS A 0.064" SPARK GAP TO GND OF TB9.
7. P.C. BOARD IS 1018-571.

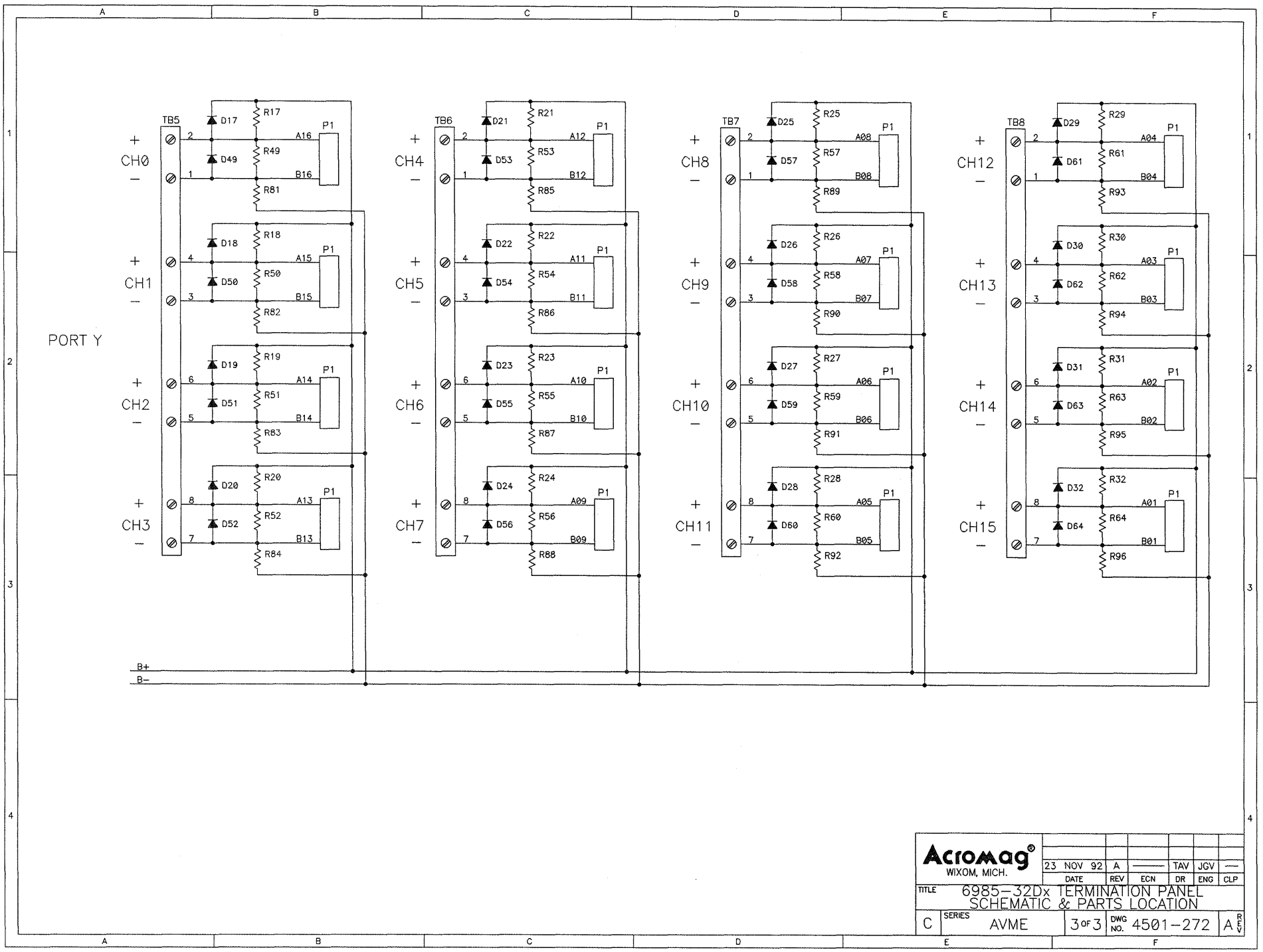
Acromag® WIXOM, MICH.

DATE	REV	ECN	DR	ENG	CLP
23 NOV 92	A	———	TAV	JGV	—

TITLE: 6985-32Dx TERMINATION PANEL SCHEMATIC & PART LOCATION

SIZE	SERIES		DWG NO.	REV
C	AVME	2 OF 3	4501-272	A

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



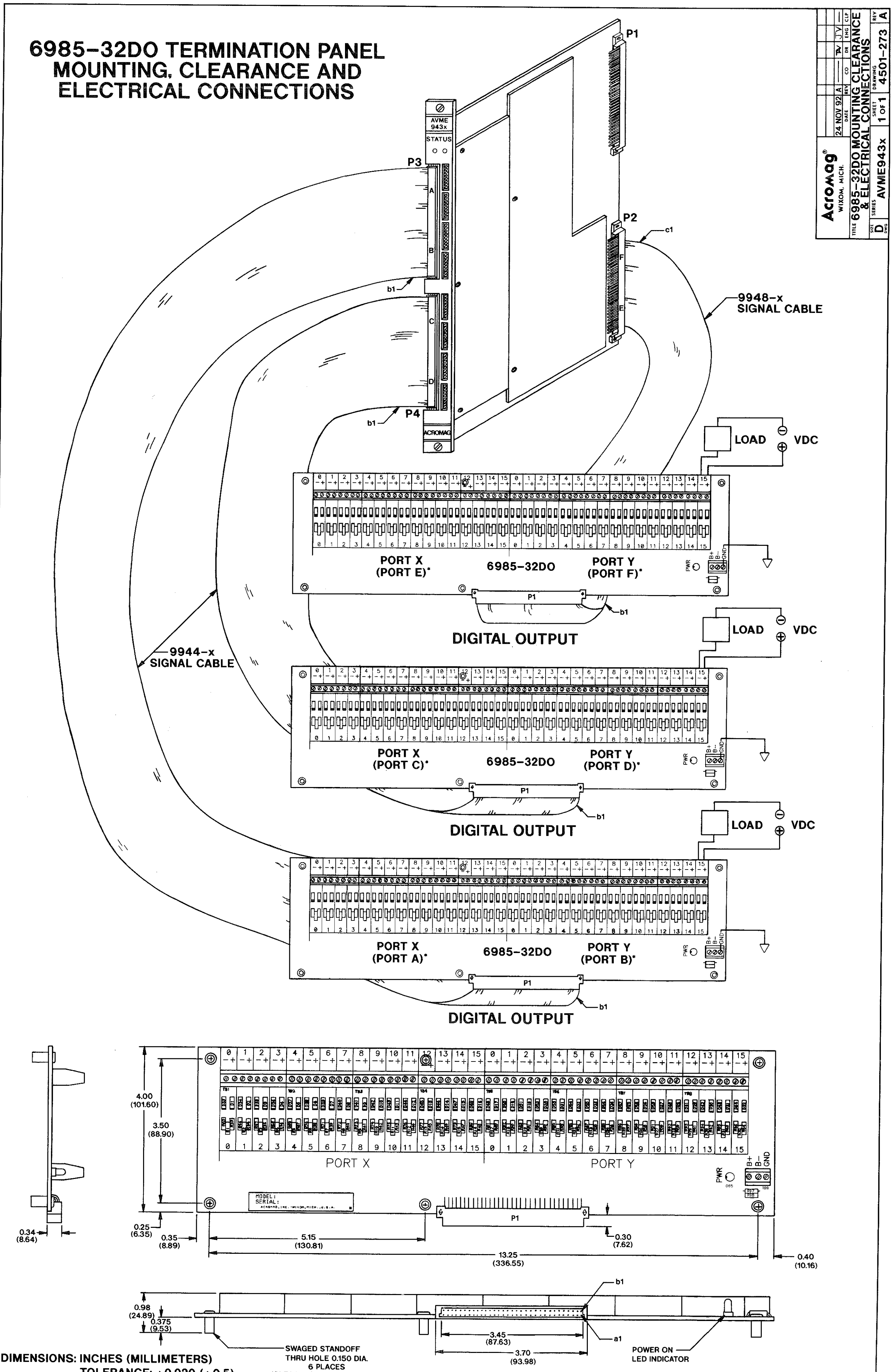
Acromag WIXOM, MICH.							
	23 NOV 92	A	——	TAV	JGV	—	
	DATE	REV	ECN	DR	ENG	CLP	

TITLE: 6985-32Dx TERMINATION PANEL SCHEMATIC & PARTS LOCATION

C	SERIES AVME	3 OF 3	DWG NO. 4501-272 A REV

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6985-32DO TERMINATION PANEL MOUNTING, CLEARANCE AND ELECTRICAL CONNECTIONS



DIMENSIONS: INCHES (MILLIMETERS)
TOLERANCE: ±0.020 (±0.5)

* PORT ASSIGNMENT PER THIS INSTALLATION

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP