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Find the *Measurement Computing / Data Translation DT2919* at our website: *Click HERE*

Reference 1

Troubleshooting

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*Reference 1, "**Troubleshooting**," explains what to do if you encounter difficulty using the DT2919.*

This reference chapter is organized as follows:

- *General Checklist*
- *Specific Problems*
- *Service and Support*

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General Checklist

Go through the following checklist when troubleshooting the DT2919 board to help you isolate your problem.

1. Verify that the factory-settings of the board are adequate for your system.

   Refer to Reference 2, "Configuration," for the factory-configured settings and alternative values for the I/O base address and interrupt priority level.

2. Check the +5V power supply on the board. It must be between +4.75 and +5.25 volts for the board to work properly.

3. Verify that all cables associated with the board are firmly connected.

4. Check that components on the board are not making contact with an adjacent board.

5. Make sure that the DT2919 is firmly seated in its expansion slot.

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Specific Problems

The following details some specific problems that may occur and suggests some possible causes and solutions.

1. No board response.

   - Verify that the board is fully seated in the bus connector.

     Test to see if the board is properly connected by gently pulling the board. If it stays in place, it's connected. If the board exhibits no resistance, it is not seated in its connector. Try pressing more firmly on the board to seat it in its connector.

   - Verify that the board is POS-configured.

     Use the System Configuration Utility to verify that the board is configured and that the I/O base address is what the application software expects.

   - If there is still no response after trying the above, call for assistance.

2. Power supply etch has blown.

   The power supply etch, F1, is located on the component side of the DT2919 beside the J1 connector.

   - Install a fuse (Littlefuse P/N 275003 3 Amp axial lead picofuse, or equivalent) in the holes provided for F1.

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Service and Support

To help you get the best performance from your Data Translation product, the Technical Support staff is available at **(508) 481-3700.** If you are located outside the USA, contact your local distributor for assistance. The name and address of your nearest distributor are listed at the back of the Data Translation catalog.

Please be prepared to answer the following questions when you call for technical support. This information helps us identify specific system and configuration related problems.

- What is the serial number of the product?
- What operating system are you using?
- What other boards, modules, or applications are installed in your system?
- What is your POS-configuration?
- How much RAM do you have?
- What size hard disk are you using?
- How fast is your CPU?
- If you are on a network, what type of network are you using and approximately how many users are on the network?
- If example programs or diagnostics were shipped with your product, have you run them? What were the results?
- Have you verified that all your connections are made properly and are secure?
- Have you isolated the source of your problem: input or output device, board or module, software?

In addition, if it appears your problem is software-related, specify whether or not it has occurred more than once and, if possible, document the sequence of steps that caused the problem. This information helps us to reproduce the problem in-house.

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If Your DT2919 Needs Factory Service

If factory service is necessary:

1. Call the Customer Service Department using the telephone number listed above and obtain a Return Material Authorization (RMA) number.

   All return shipments to Data Translation must be marked with the RMA number in order to ensure proper processing.

2. Package the board as follows:

   - Wrap the board in an electrically conductive plastic material, handling it with ground protection. *A static discharge can destroy board components.*
   - Pack the board in its original shipping container, if available and in good condition; or use any secure shipping container.

3. Return the board to the following address, making sure the RMA number is visible on the outside of the box.

   Customer Service Dept.
   Data Translation, Inc.
   100 Locke Drive
   Marlboro, MA 01752-1192

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Configuration

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*Reference 2, "**Configuration**," describes the POS feature and the POS-configurable parameters on the DT2919 board.*

This reference chapter is organized as follows:

- *Programmable Option Select*
- *The POS Registers*
- *I/O Base Address Selection*
- *Interrupt Priority Level Selection*

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Programmable Option Select

The I/O base address and interrupt priority level for the DT2919 board are software-selectable via the IBM Personal System/2's Programmable Option Select (POS) feature. In most instances you will be able to use the default selections. However, your operating environment may require alternative settings. To change the POS-configurable parameter values, use the System Configuration utility on the Reference diskette supplied with your Personal System/2.

Caution *IBM recommends that programmable options be set only through the System Configuration utility. Direct setting of the POS registers and/or CMOS RAM POS parameters can result in multiple assignment of the same system resource, improper operation of the feature, loss of data, or possible damage to the system or options.*

The System Configuration utility on the Reference diskette uses the adapter description file (ADF) found on the PACER distribution diskette supplied with your board to automatically create configuration data for the system and board. Your system permanently stores this configuration data in battery backed-up memory. Each time the system boots, it reads a unique adapter ID number from the DT2919, matches it with the stored slot ID information, and configures the system accordingly.

Caution *If you remove or install a board, change its configuration, or replace the battery, you must update the configuration data using the System Configuration utility on the Reference diskette, or you may not be able to use your system.*

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The POS Registers

The Programmable Option Select (POS) feature eliminates many jumpers from the DT2919 by replacing their function with programmable registers. The POS consists of eight 8-bit registers. These registers are byte-accessible and are only written to or read from in the system setup mode. Table 12 illustrates the layout of the POS registers on the DT2919.

Table 12: POS Registers

POS Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
100	0	1	1	0	1	1	1	1
101	0	1	0	1	1	1	1	1
102	IOA15	IOA14	IOA13	IOA12	INT02	INT01	INT00	CDEN
103	1/X	1/X	1/X	1/X	1/X	1/X	1/X	1/X
104	1/X	1/X	1/X	1/X	1/X	1/X	1/X	1/X
105	1/X	1/X	1/X	1/X	1/X	1/X	1/X	1/X
106	1/X	1/X	1/X	1/X	1/X	1/X	1/X	1/X
107	1/X	1/X	1/X	1/X	1/X	1/X	1/X	1/X

IOA15 through IOA12 = 4 bits of the DT2919's I/O base address

INT02 through INT01 = interrupt priority level

CDEN = Card Enable

Note *Refer to the IBM Personal System/2 Technical Reference for information on these POS parameters.*

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I/O Base Address Selection

Bits 7 through 4 of POS byte 102 (see Table 12) comprise four bits (bits 15, 14, 13, and 12) of the 16-bit I/O address for the DT2919 board. Bits 11 through 6 and 4 and 3 of this address always match to 1. Bit 5 is always 0. The low three bits of the I/O address are decoded onboard to select one of the eight 8-bit registers in the DT2919 board's control stack. Figure 9 illustrates the I/O base address.

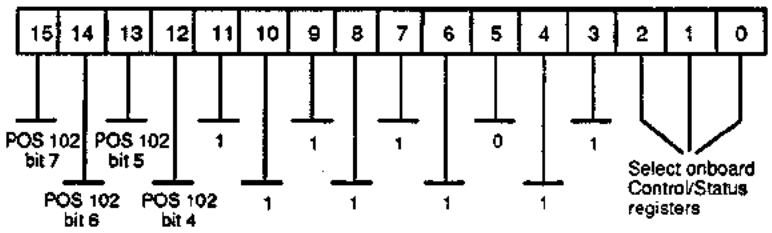


Figure 9: I/O Base Address

You can assign the DT2919 to one of the I/O base addresses in the range 0FD8 (hex) to FFD8 (hex). This parameter selects the I/O base address out of the IBM Personal System/2 I/O space.

The IBM System Configuration Utility allows you to select from a maximum of 16 base address values. If it is necessary to select an alternative value, use the SET CONFIGURATION utility on the Reference diskette supplied with your Personal System/2 to change your I/O base address.

The default selection is system dependent.

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Interrupt Priority Level Selection

The DT2919 can interrupt the host processor on any one of seven different priority levels. The order of priority for these seven levels is 9 (highest), 10, 11, 12, 4, 5, and 7 (lowest).

The default select is interrupt level 5.

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Reference 3

Connectors and Accessories

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*Reference 3, "**Connectors and Accessories**," describes the connectors on the DT2919 board and lists their pinouts, and also discusses the DT758-C Screw Terminal Panel.*

This reference chapter is organized as follows:

- *DT2919 Connectors*
- *DT758-C Screw Terminal Panel*

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DT2919 Connectors

The DT2919 board has two connectors, labeled P1 and J1, as illustrated in Figure 10.

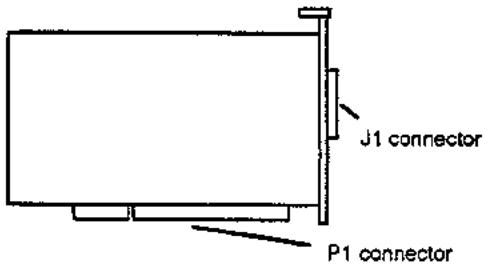


Figure 10: DT2919 Board Connectors

P1, located on the bottom of the board, connects the DT2919 to the IBM Personal System/2 Micro Channel. This connection is made automatically when the board is installed.

J1, located at the rear of the board, is for interfacing external devices with the DT2919.

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P1: IBM Personal System/2 Bus Connector

The DT2919 board interfaces with the IBM Personal System/2 via connector P1. The Personal System/2 Micro Channel connections to the DT2919 board are made automatically when the board is installed.

P1 is a 116-pin Micro Channel connector and has the pin assignment listed in Table 13 on the following pages.

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Table 13: P1 Pin Assignments

IBM PS/2 Pin Label	Mnemonic	Signal Description	
A1	–CD SETUP	Adapter Decode for POS	
A2	MADE24	Enable 24-bit Mem. Addressing	(not used)
A3	DGND	Digital Ground	
A4	A11	Address Bit 11	
A5	A10	Address Bit 10	
A6	A09	Address Bit 09	
A7	+5V	Digital Power	
A8	A08	Address Bit 08	
A9	A07	Address Bit 07	
A10	A06	Address Bit 06	
A11	+5V	Digital Power	
A12	A05	Address Bit 05	
A13	A04	Address Bit 04	
A14	A03	Address Bit 03	
A15	+5V	Digital Power	
A16	A02	Address Bit 02	
A17	A01	Address Bit 01	
A18	A00	Address Bit 00	
A19	+12V	Analog Power	(not used)
A20	–ADL	Address Decode Latch	
A21	–PREEMPT	Bus Master Request	(not used)
A22	–BURST	DMA Burst Request	(not used)
A23	–12V	Analog Power	(not used)
A24	ARB00	Arbitration Bus Bit 0	(not used)
A25	ARB01	Arbitration Bus Bit 1	(not used)
A26	ARB02	Arbitration Bus Bit 2	(not used)
A27	–12V	Analog Power	(not used)
A28	ARB03	Arbitration Bus Bit 3	(not used)
A29	ARB/–GNT	Arbitration Control Line	(not used)

(continued)

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Table 13: P1 Pin Assignments (continued)

IBM PS/2 Pin Label	Mnemonic	Signal Description	
A30	–TC	DMA Terminal Count	(not used)
A31	+5V	Digital Power	
A32	–S0	Read/Write Select Bit 0	
A33	–S1	Read/Write Select Bit 1	
A34	M/–IO	Memory I/O Status	
A35	+12V	Analog Power	(not used)
A36	CD CHRDY	Data Ready	(not used)
A37	D00	Data Bus Bit 0	
A38	D02	Data Bus Bit 2	
A39	+5V	Digital Power	
A40	D05	Data Bus Bit 5	
A41	D06	Data Bus Bit 6	
A42	D07	Data Bus Bit 7	
A43	DGND	Digital Ground	
A44	–DS 16 RTN	OR of all –CD DS 16 Signals	(not used)
A45	–REFRESH	Memory Refresh in Progress	(not used)
A46	KEY	*** End of 8-bit ***	
A47	KEY	*** Section ***	
A48	+5V	Digital Power	(not used)
A49	D10	Data Bus Bit 10	(not used)
A50	D11	Data Bus Bit 11	(not used)
A51	D13	Data Bus Bit 13	(not used)
A52	+12V	Analog Power	(not used)
A53	Reserved	Reserved	(not used)
A54	–SBHE	High Byte Enable	(not used)
A55	–CD DS 16	16-bit Data Available	(not used)
A56	+5V	Digital Power	(not used)
A57	–IRQ 14	Interrupt Request line 14	(not used)
A58	–IRQ 15	Interrupt Request line 15	(not used)

(continued)

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Table 13: P1 Pin Assignments (continued)

IBM PS/2 Pin Label	Mnemonic	Signal Description
B1	Audio GND	Return line from Speaker (not used)
B2	Audio SIG	Output line to Speaker (not used)
B3	DGND	Digital Ground
B4	14.318 MHz	System Oscillator (not used)
B5	DGND	Digital Ground
B6	A23	Address Bit 23 (not used)
B7	A22	Address Bit 22 (not used)
B8	A21	Address Bit 21 (not used)
B9	DGND	Digital Ground
B10	A20	Address Bit 20 (not used)
B11	A19	Address Bit 19 (not used)
B12	A18	Address Bit 18 (not used)
B13	DGND	Digital Ground
B14	A17	Address Bit 17 (not used)
B15	A16	Address Bit 16 (not used)
B16	A15	Address Bit 15
B17	DGND	Digital Ground
B18	A14	Address Bit 14
B19	A13	Address Bit 13
B20	A12	Address Bit 12
B21	DGND	Digital Ground
B22	–IRQ 09	Interrupt Request Line 09 (not used)
B23	–IRQ 03	Interrupt Request Line 03 (not used)
B24	–IRQ 04	Interrupt Request Line 04 (not used)
B25	DGND	Digital Ground
B26	–IRQ 05	Interrupt Request Line 05 (not used)
B27	–IRQ 06	Interrupt Request Line 06 (not used)
B28	–IRQ 07	Interrupt Request Line 07 (not used)
B29	DGND	Digital Ground

(continued)

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Table 13: P1 Pin Assignments (continued)

IBM PS/2 Pin Label	Mnemonic	Signal Description
B30	Reserved	Reserved (not used)
B31	Reserved	Reserved (not used)
B32	–CHCK	Serious System Error (not used)
B33	DGND	Digital Ground
B34	–CMD	Command to Transfer Data
B35	CHRDYRTN	AND of all CD CHRDY Signals (not used)
B36	–CD SFDSK	Adapter Reply except during Setup
B37	DGND	Digital Ground
B38	D01	Data Bus Bit 1
B39	D03	Data Bus Bit 3
B40	D04	Data Bus Bit 4
B41	DGND	Digital Ground
B42	CHRESET	Channel Reset
B43	Reserved	Reserved (not used)
B44	Reserved	Reserved (not used)
B45	DGND	Digital Ground
B46	KEY	*** End of 8-bit ***
B47	KEY	*** Section ***
B48	D08	Data Bus Bit 8
B49	D09	Data Bus Bit 9
B50	DGND	Digital Ground
B51	D12	Data Bus Bit 12
B52	D14	Data Bus Bit 14
B53	D15	Data Bus Bit 15
B54	DGND	Digital Ground
B55	–IRQ 10	Interrupt Request Line 10
B56	–IRQ 11	Interrupt Request Line 11
B57	–IRQ 12	Interrupt Request Line 12
B58	DGND	Digital Ground

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J1: External Device Connector

All user connections to the DT2919 board for the counter/timers and the digital ports interface with the board via connector J1.

J1 is a 50-pin 3M keyed connector and has the pin assignments listed in Table 14 on the following page.

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Table 14: J1 Pin Assignments

Description	Pin		Description
Frequency Out (FOUT)	1	2	Digital Ground
Counter/Timer 1 Output	3	4	Digital Ground
Counter/Timer 2 Output	5	6	Digital Ground
Counter/Timer 3 Output	7	8	Digital Ground
Counter/Timer 4 Output	9	10	Digital Ground
Counter/Timer 5 Output	11	12	Digital Ground
Source 1	13	14	Gate 1
Digital Ground	15	16	Source 2
Gate 2	17	18	Digital Ground
Source 3	19	20	Gate 3
Digital Ground	21	22	Source 4
Gate 4	23	24	Digital Ground
Source 5	25	26	Gate 5
Digital Ground	27	28	Port 0 Latched/
Digital Ground	29	30	Port 0 Strobe/
Port 0 Bit 0	31	32	Port 1 Bit 0
Port 0 Bit 1	33	34	Port 1 Bit 1
Port 0 Bit 2	35	36	Port 1 Bit 2
Port 0 Bit 3	37	38	Port 1 Bit 3
Port 0 Bit 4	39	40	Port 1 Bit 4
Port 0 Bit 5	41	42	Port 1 Bit 5
Port 0 Bit 6	43	44	Port 1 Bit 6
Port 0 Bit 7	45	46	Port 1 Bit 7
Fuse +5V (1A max) [1]	47	48	Interrupt Enable
Fuse +5V (1A max) [1]	49	50	Interrupt/

1 External devices requiring power for operation may use the Fuse +5V power sources. Care should be taken, however, not to draw more than 1A or the power supply etch, F1, will blow.

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DT758-C Screw Terminal Panel

The DT2919 board is compatible with Data Translation's DT758-C general purpose screw terminal panel.

The DT758-C screw terminal panel has 50 screw terminals that provide convenient connection points to the counter/timer signals and digital input/output signals on the DT2919 board. The panel comes equipped with an integral 3.3 foot (1 meter) 50-conductor cable assembly terminating in a 50-pin, 3M-type connector, labeled J1.

Pin Functions

Each screw terminal on the DT758-C connects to a pin on the DT2919's J1 connector. Table 15 on the following page lists the DT758-C screw terminal assignments.

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Table 15: DT758-C Screw Terminal Assignments

Description	Terminal		Description
Frequency Out (FOUT)	1	2	Digital Ground [2]
Counter/Timer 1 Output	3	4	Digital Ground [2]
Counter/Timer 2 Output	5	6	Digital Ground [2]
Counter/Timer 3 Output	7	8	Digital Ground [2]
Counter/Timer 4 Output	9	10	Digital Ground [2]
Counter/Timer 5 Output	11	12	Digital Ground [2]
Source 1	13	14	Gate 1
Digital Ground [2]	15	16	Source 2
Gate 2	17	18	Digital Ground [2]
Source 3	19	20	Gate 3
Digital Ground [2]	21	22	Source 4
Gate 4	23	24	Digital Ground [2]
Source 5	25	26	Gate 5
Digital Ground [2]	27	28	Port 0 Latched/
Digital Ground [2]	29	30	Port 0 Strobe/
Port 0 Bit 0	31	32	Port 1 Bit 0
Port 0 Bit 1	33	34	Port 1 Bit 1
Port 0 Bit 2	35	36	Port 1 Bit 2
Port 0 Bit 3	37	38	Port 1 Bit 3
Port 0 Bit 4	39	40	Port 1 Bit 4
Port 0 Bit 5	41	42	Port 1 Bit 5
Port 0 Bit 6	43	44	Port 1 Bit 6
Port 0 Bit 7	45	46	Port 1 Bit 7
Fuse +5V (1A max) [1]	47	48	Interrupt Enable
Fuse +5V (1A max) [1]	49	50	Interrupt/

1 *External devices requiring power for operation may use the Fuse +5V power sources. Care should be taken, however, not to draw more than 1A or the power supply etch, F1, will blow.*

2 *On the screw terminal panel, all digital grounds should be tied together to reduce crosstalk on the ribbon cable.*

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Specifications

The DT758-C specifications are typical @ +25°C and rated voltage unless otherwise specified.

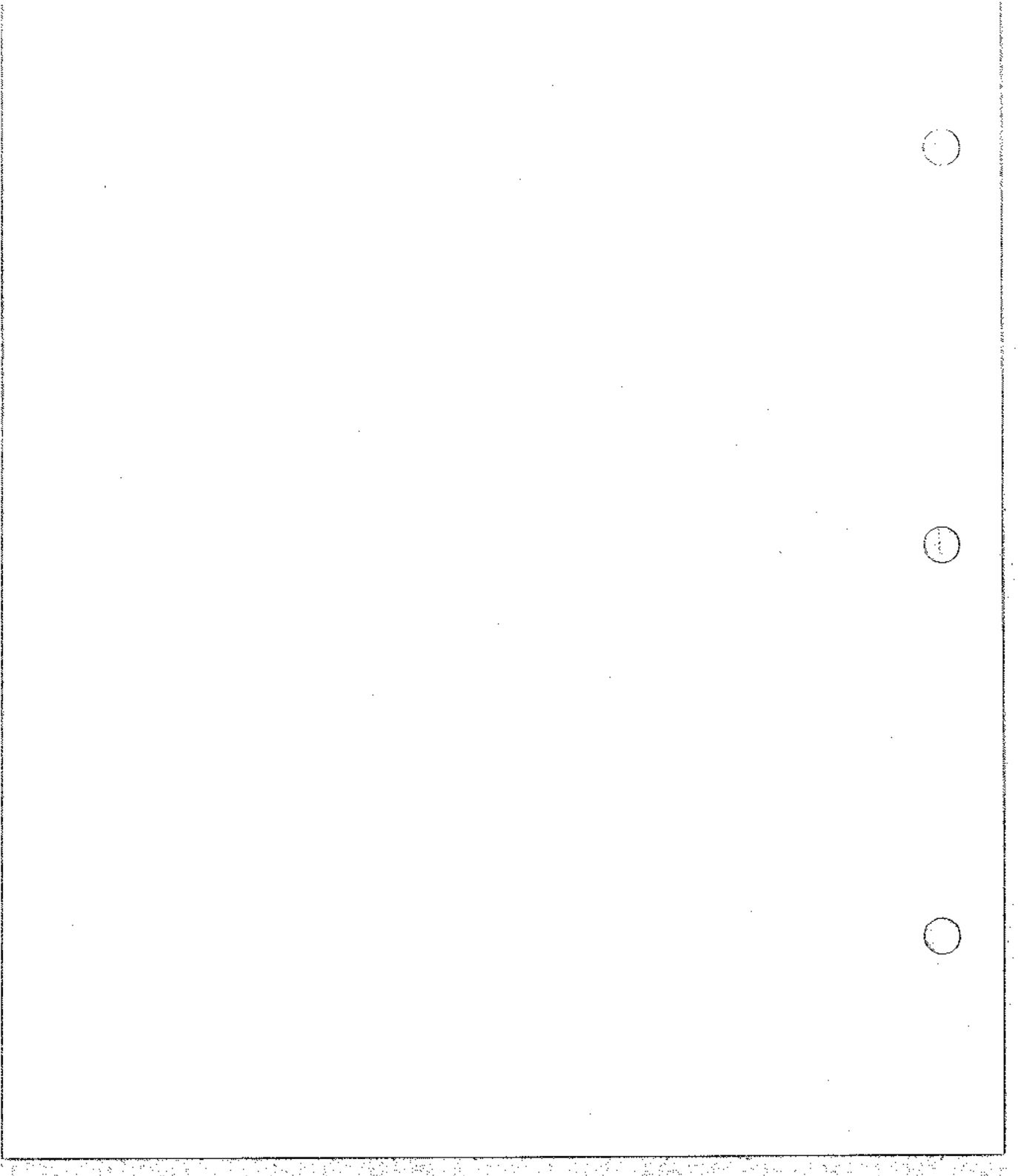
Physical

Board size	3.03" H x 5.31" W x 2.48" D (7.70 x 13.50 x 6.30 cm)
Weight	11 ounces (314 grams)
Screw Terminal	50 screw clamp connections in two tiers of 25 each
Barrier Strip Screw	
Size	6-32 screws
Screw material	High tensile copper alloy
Barrier Strip Material	BASF 6.6 polyamide (Ultramid A3K)
Wire size	up to 12 AWG
Connector	3M #3415 50-pin female edge connector
Cable assembly	3.3 foot (1 meter) 50-conductor flat ribbon cable (included)
Mounting	7.25" (18.42 cm) mounting bracket provided with 2 mounting holes; mounting assembly snaps onto rail

Environmental

Temperature range	–25 to +85°C (–13 to +185°F)
Relative humidity	To 95% non-condensing

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Reference 4

Specifications

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*Reference 4, "**Specifications,**" lists the electrical and mechanical specifications for the DT2919 board. All specifications are typical at +25°C and rated voltage unless otherwise specified.*

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Counter/Timers (Am9513A)

Number	Five 16-bit counter/timers
Maximum Input Frequency	6.8 MHz
Input Source	Software-selectable from the built-in frequency source, the output of the N–1 counter/timer, any of 5 source inputs, or any of 5 gate inputs

Built-In Frequency Source (Am9513A and Onboard Oscillators)

Function	Provides programmable clock frequency source to counter/timers and frequency output circuitry
Usable Range	15Hz to 5 MHz (200ns to 65.5ms)
Base Frequency	Software-selectable for 1 MHz (1 µs interval) or 5 MHz (200ns interval) oscillator
Scaler Values	Base frequency can be divided by 1, 10, 100, 1,000, 10,000 (BCD); or 1, 16, 256, 4,096, or 65,536 (binary)
Oscillator Accuracy	0.01%

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Frequency Output Clock (Am9513A Fout)

Number	1
Usable Output Range	0.95Hz to 5 MHz (200ns to 1.05s)
Frequency Source	Software-selectable as built-in frequency source, the output of any counter/timer, any gate input, or any source input
Programmable Divider	4-bit divider divides frequency source by values from 1 to 16

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Digital I/O

(see Table 16)

Number of DIO lines	16, configurable in groups of 8 for input or output
Logic Family	ALSTTL
Input Logic Load	1 ALSTTL load
Fanout	Drives 14 LSTTL loads
Logic Sense	High true
Input Type	Level sensitive

Table 16: DC Specifications of Digital Lines

Parameter	Digital I/O Lines	DIO Strobe, Int. Req. In	Int Enable Input	Latched/ Status Output
Logic High Input Voltage	2.0V min	2.0V min	2.0V min	—
Logic Low Input Voltage	0.8V max	0.8V max	0.8V max	—
Logic High Input Current	20µA max	20µA max	20µA max	—
Logic Low Input Current	–0.2mA max	–0.4mA max	–0.4mA max	—
Logic High Output Voltage	2.4V max	—	—	2.5V min
Logic Low Output Voltage	0.5V max	—	—	0.5V max
Logic High Output Current	–2.6mA max	—	—	–0.4mA max
Logic Low Output Current	24mA max	—	—	8mA max

Input and output connections to the counter/timer circuits, including gate and source inputs and counter and Fout outputs, pass directly to the Am9513A chip. See the data sheet for this chip for complete electrical and timing information.

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Digital I/O Strobe Input

(see Table 16)

Function	Latches data values into port 0
Input Type	Edge-sensitive; active on high-to-low transition; pullup to +5V
Logic Family	LSTTL
Logic Load	Presents 1 LSTTL load
Minimum Pulse Width	High, 50ns Low, 50ns

Digital I/O Status Output

(see Table 16)

Function	Indicates when unread latched data is present
Logic Sense	Low true
Logic Family	LSTTL
Fanout	Drives 5 LSTTL loads

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Interrupt Enable Input

(see Table 16)

Function	Enables or disables the board's interrupt request circuitry
Logic Sense	High true
Input Type	Level-sensitive; pullup to +5V
Logic Family	LSTTL
Logic Load	Presents 1 LSTTL load
Minimum Pulse Width	High, 50ns Low, 50ns

Interrupt Request Input

(see Table 16)

Function	Initiates an interrupt request to the host bus
Polarity	Active on high-to-low transition
Input Type	Schmitt trigger, edge-sensitive; clocks on falling edge; pullup to +5V
Logic Family	LSTTL
Logic Load	Presents 1 LSTTL load
Minimum Pulse Width	Clock high, 50ns; clock low, 50ns

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Interface Characteristics

Compatible Bus	IBM Micro Channel or compatible
Interface Type	I/O mapped with 10-bit addressing
Bus Loading	Board presents 1 LSTTL load
Number of Locations Occupied	8 bytes reserved
Data path	8 bits
Base Address Range	POS-selectable from 0FD8 hex to FFD8 hex in increments of 8
Interrupts	POS-selectable to level 7, 5, 4, 12, 11, 10, or 9
Interrupt Sources	Any TTL-level signal, including the output of any counter/timer
Mating Connectors	All user connections are made to a single 50-pin connector (J1); mating connector is 50-pin 3M type, user-supplied (Ansley 609-5030 or equivalent)

Physical/Environmental

Dimensions	3.5" H x 6.0" W x 0.75" D (8.9 x 15.2 x 1.9 cm)
Weight	3 ounces (85g)
Operating Temperature Range	0 to +50°C (+32 to +122°F)
Storage Temperature Range	–25 to +85°C (–13 to +185°F)
Relative Humidity	To 95% non-condensing
Power Requirements	+5V ±5% @.5A typical

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