CSM-S-11056

TRIGGER DISTRIBUTION MODULE

USER'S MANUAL

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VXI Technology, Inc.

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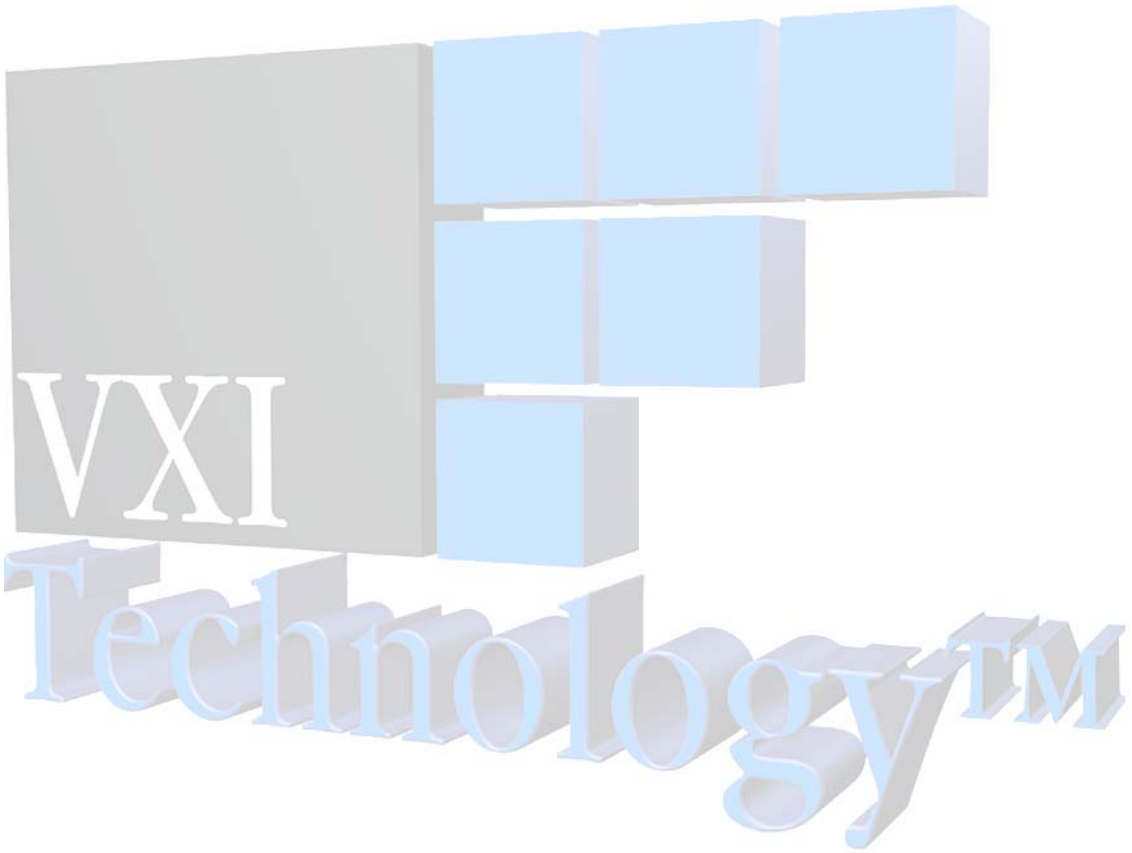
VXI
Technology™

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CERTIFICATION

VXI Technology, Inc. (VTI) certifies that this product met its published specifications at the time of shipment from the factory. VTI further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (formerly National Bureau of Standards), to the extent allowed by that organization's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

The product referred to herein is warranted against defects in material and workmanship for a period of three years from the receipt date of the product at customer's facility. The sole and exclusive remedy for breach of any warranty concerning these goods shall be repair or replacement of defective parts, or a refund of the purchase price, to be determined at the option of VTI.

For warranty service or repair, this product must be returned to a VXI Technology authorized service center. The product shall be shipped prepaid to VTI and VTI shall prepay all returns of the product to the buyer. However, the buyer shall pay all shipping charges, duties, and taxes for products returned to VTI from another country.

VTI warrants that its software and firmware designated by VTI for use with a product will execute its programming when properly installed on that product. VTI does not however warrant that the operation of the product, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The warranty shall not apply to defects resulting from improper or inadequate maintenance by the buyer, buyer-supplied products or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

VXI Technology, Inc. shall not be liable for injury to property other than the goods themselves. Other than the limited warranty stated above, VXI Technology, Inc. makes no other warranties, express or implied, with respect to the quality of product beyond the description of the goods on the face of the contract. VTI specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subdivision (b)(3)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013.

VXI Technology, Inc.
2031 Main Street
Irvine, CA 92614-6509 U.S.A.

DECLARATION OF CONFORMITY

Declaration of Conformity According to ISO/IEC Guide 22 and EN 45014

MANUFACTURER'S NAME	VXI Technology, Inc.
MANUFACTURER'S ADDRESS	2031 Main Street Irvine, California 92614-6509
PRODUCT NAME	Trigger Distribution Module
MODEL NUMBER(S)	CSM-S-11056
PRODUCT OPTIONS	All
PRODUCT CONFIGURATIONS	All

VXI Technology, Inc. declares that the aforementioned product conforms to the requirements of the Low Voltage Directive 73/23/EEC *and the* EMC Directive 89/366/EEC *(inclusive* 93/68/EEC*) and carries the "CE" mark accordingly. The product has been designed and manufactured according to the following specifications:*

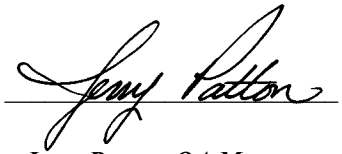
SAFETY	EN61010 (2001)
EMC	EN61326 (1997 w/A1:98) Class A CISPR 22 (1997) Class A VCCI (April 2000) Class A ICES-003 Class A (ANSI C63.4 1992) AS/NZS 3548 (w/A1 & A2:97) Class A FCC Part 15 Subpart B Class A EN 61010-1:2001

The product was installed into a C-size VXI mainframe chassis and tested in a typical configuration.

I hereby declare that the aforementioned product has been designed to be in compliance with the relevant sections of the specifications listed above as well as complying with all essential requirements of the Low Voltage Directive.

April 2003

CE



Jerry Patton, QA Manager

GENERAL SAFETY INSTRUCTIONS

Review the following safety precautions to avoid bodily injury and/or damage to the product. These precautions must be observed during all phases of operation or service of this product. Failure to comply with these precautions, or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture, and intended use of the product.

Service should only be performed by qualified personnel.

TERMS AND SYMBOLS

These terms may appear in this manual:

WARNING Indicates that a procedure or condition may cause bodily injury or death.

CAUTION Indicates that a procedure or condition could possibly cause damage to equipment or loss of data.

These symbols may appear on the product:

ATTENTION - Important safety instructions

Frame or chassis ground

WARNINGS

Follow these precautions to avoid injury or damage to the product:

Use Proper Power Cord To avoid hazard, only use the power cord specified for this product.

Use Proper Power Source To avoid electrical overload, electric shock or fire hazard, do not use a power source that applies other than the specified voltage.

Use Proper Fuse To avoid fire hazard, only use the type and rating fuse specified for this product.

WARNINGS (CONT.)

Avoid Electric Shock

To avoid electric shock or fire hazard, do not operate this product with the covers removed. Do not connect or disconnect any cable, probes, test leads, etc. while they are connected to a voltage source. Remove all power and unplug unit before performing any service. ***Service should only be performed by qualified personnel.***

Ground the Product

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground.

Operating Conditions

To avoid injury, electric shock or fire hazard:

- Do not operate in wet or damp conditions.
- Do not operate in an explosive atmosphere.
- Operate or store only in specified temperature range.
- Provide proper clearance for product ventilation to prevent overheating.
- DO NOT operate if any damage to this product is suspected. ***Product should be inspected or serviced only by qualified personnel.***

Improper Use

The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired. Conformity is checked by inspection.

SUPPORT RESOURCES

Support resources for this product are available on the Internet and at VXI Technology customer support centers.

Internet Support

E-mail: support@vxitech.com
Web Address: http://www.vxitech.com

Telephone Support (U.S.)

Tel: (949) 955-1894 **West Coast**
(216) 447-8950 **East Coast**

Fax: (949) 955-3041 **West Coast**
(216) 447-8951 **East Coast**

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SECTION 1

INTRODUCTION

CSM-S-11056 TRIGGER DISTRIBUTION MODULE

The CSM-S-11056 Trigger Distribution Module is designed to capture an input signal on each of two channels and distribute the signals to other devices. Each channel has eight TTL compatible outputs and one differential ECL output. Each input signal is passed through a high-speed comparator to convert analog type signals into logic level signals with a minimum propagation delay. Each output is individually buffered to prevent signal interactions.

The module is housed in a C size VXIbus enclosure and derives all necessary power from the VXIbus. The module is not programmable via the VXIbus and a VXI slot-zero controller would not be aware of the module's presence in the chassis. The module does pass through the VXIbus Interrupt and Bus Grant daisy chains to simplify system integration.

CMS-S-11056 SPECIFICATIONS

GENERAL SPECIFICATIONS	
INPUT CONNECTOR	
	SMB Jack
INPUT VOLTAGE RANGE	
	+5 V to -5 V
INPUT IMPEDANCE	
	50 Ω
INPUT THRESHOLD	
	+2.5 V to -2.5 V (requires removing covers to adjust), Factory set to +2.0 V
ECL OUTPUT CONNECTOR	
	15 pin DSUB, female
ECL OUTPUT CHARACTERISTICS	
	10k series ECL, differential signal pulled down to -5.2 V with 499 Ω
TTL OUTPUT CONNECTOR	
	SMB Jack
TTLT OUTPUT IMPEDANCE	
	12.5 Ω
TTL OUTPUT TERMINATION	
	TTL signals should be forward terminated into 50 Ω to ground
TTL OUTPUT LEVELS	
Open Circuit	
Low	< +0.4 V
High	> +4.6 V
50 Ω Termination	
Low	< +0.4 V
High	> +3.6 V

TABLE 1-2 CONNECTOR PIN ASSIGNMENTS

Connector	Signal
J108	Input Channel 1
J208	Input Channel 2
J109-1	ECL Channel 1, Output +
J109-2	ECL Channel 1, Output -
J109-3	ECL Ground Reference
J109-4	ECL Channel 2, Output +
J109-5	ECL Channel 2, Output -
J100	TTL Channel 1, Output 1
J101	TTL Channel 1, Output 2
J102	TTL Channel 1, Output 3
J103	TTL Channel 1, Output 4
J104	TTL Channel 1, Output 5
J105	TTL Channel 1, Output 6
J106	TTL Channel 1, Output 7
J107	TTL Channel 1, Output 8
J200	TTL Channel 2, Output 1
J201	TTL Channel 2, Output 2
J202	TTL Channel 2, Output 3
J203	TTL Channel 2, Output 4
J204	TTL Channel 2, Output 5
J205	TTL Channel 2, Output 6
J206	TTL Channel 2, Output 7
J207	TTL Channel 2, Output 8

SECTION 2

THEORY OF OPERATION

INTRODUCTION

The Trigger Distribution module consists of two independent channels of a comparator driving an ECL line driver and eight TTL line drivers. Each comparator has both a threshold level adjustment and a hysteresis adjustment. Because each channel is identical, all references will be made to Channel 1, but apply equally to Channel 2.

POWER INPUT

Power is derived from the VXI back plane via connectors P1 and P2. The supply voltages are filtered with a ferrite bead L1, and L3 and with chokes L2, and L4. Tantalum capacitors C7 and C14 provide low frequency bypass capacitance while the 0.01 μF monolithic ceramic capacitors provide high frequency decoupling. Both supply voltages are fuse-protected by F1 and F2. A front panel mounted LED is connected to J2 and is powered from both +5 V and -5.2 V. The zener diode, D7, drops approximately 5.6 volts in the LED circuit. This will cause the LED to extinguish should either power supply fail.

INPUT COMPARATOR

The front panel input signal is routed to E1. Resistors R9, R11, R12 and R13 are configured to provide input impedance of 50 Ω and to divide the signal level by two. The resulting signal is routed through R10 to the comparator inputs of U4. The two comparators in U4 along with two gates in U3 are configured as a window comparator. The two gates in U3 form a cross-coupled latch. When the input at U4-10 goes positive relative to U4-9, U4-15 will go to logic 1, which in turn causes the output on U3-3 to go to logic low. This low level will cause the output on U3-4 to go to logic high. When the input at U4-8 goes negative relative to U4-7, U4-2 will go to logic 1, which in turn causes U3-4 to go to logic low.

The threshold voltages that the two comparators see is set by the output of U1. Voltage reference diodes D2 and D3 provide accurate +1.2 volt and -1.2 volt potentials and potentiometer R27 provides an adjustment range between these to voltages. Operational amplifier U1:A is configured as a unity gain buffer and provides a low impedance threshold voltage at the junction of R14 and R8. Resistors R24 and R25, and capacitor C21 are configured to allow U1:A to drive the capacitance of C18 without oscillation. Resistors R7, R10 and R14, which are connected directly to the comparator inputs, are damping resistors, to prevent the comparator input transistors from oscillating.

In order to set a hysteresis band in the window comparator, R8 will drop an adjustable amount of voltage above the level at the junction of R8 and R14. The amount of voltage is determined by the amount of current flow through R8 as set by the precision current source developed by U1:B and Q1. Reference diode D1 provides a precision potential at VCC -1.2 V. Potentiometer R2's wiper can therefore be adjusted between VCC and VCC -1.2 V. This voltage is filtered by R4 and C15 and superimposed onto R1 by U1:B and Q1. The operational amplifier forces the emitter of Q1 to the same potential as the wiper of R2. This forces a current through R1 which, except for a small percentage of current passing through the base of Q1, passes through Q1's collector. This current (0 to 2.4 mA) imposes a voltage across R8 (0 to 0.6 V) which establishes the window voltage. Resistor R6 is provided as a damping resistor to prevent oscillations in Q1.

OUTPUT BUFFERS

The output of the cross-coupled gate latch implemented in U3 drives the ECL output buffer implemented by U3 gate D. The buffer's output is pulled down to VEE with 499 Ω resistors (R21 and R22). These outputs can drive a 50 Ω line terminated to an external -2.0 V level. The latch output also drives the ECL to TTL translator U2. U2 in turn drives the TTL buffers implemented by U10 and U12. Each output channel is formed by paralleling four buffers with individual 50 Ω output spreading resistors. This configuration presents a 12.5 Ω source impedance and allows the buffer to drive a 50 Ω transmission line terminated into 50 Ω and achieve TTL compatible logic levels at the load.

CALIBRATION

The Trigger Distribution Module is factory calibrated with a nominal input threshold of +2.0 V and with 300 mV of hysteresis. The following calibration procedure will calibrate the unit to these levels; however the unit may be calibrated for any values within the stated specifications by modifying the input signals and adjustments as required.

REQUIRED EQUIPMENT

Qty	Description
1	VXI chassis, VXI Technology CT-100B or equivalent
1	Oscilloscope, Tek 2465A or equivalent with 10x probe
1	Function Generator, HP 33120A or equivalent
2	Coaxial Cable, 50 ΩSMB plug to BNC plug
1	Coaxial Cable, 50 Ω BNC plug to BNC plug
1	BNC tee connector, 1 plug, and 2 jacks
1	Small flat blade screw driver
1	#1 Phillips screw driver

SET UP

1. Remove the top cover of the trigger distribution module.
2. Install the module into the VXI chassis. Make sure the chassis power is off before installing.
3. Connect the BNC tee connector to the function generator output.
4. Connect a coaxial cable from the tee connector to J108 of the trigger distribution module.
5. Connect a coaxial cable from the tee connector to the Channel 1 input of the oscilloscope.
6. Connect a coaxial cable from J100 of the trigger distribution module to the Channel 2 input of the oscilloscope.

CALIBRATION PROCEDURE

Set the oscilloscope for 1.0 V per division on both channels. Set Channel 1 for DC coupled and 1 MΩ input impedance. Set Channel 2 for DC coupled and 50 Ω input impedance. Set the function generator for 1 kHz triangle wave output with 4.0 V_{P-P} and +2.0 V offset (the waveform will display on the oscilloscope with a swing of 0 to +4.0 V). Select automatic triggering on Channel 1 using DC coupling. Note that the procedure calibrates Channel 1 of the trigger distribution module first. The procedure is identical for Channel 2 but uses the connectors and adjustment points in parenthesis.

The output signal from J100 (J200) should produce a rectangular waveform, which is seen on Channel 2 of the oscilloscope. Adjust the oscilloscope's horizontal sweep and triggering to display one cycle of the triangle waveform, and adjust Channel 1's vertical position to center the waveform vertically. Channel 2's vertical position should also be adjusted to center the rectangular output vertically. The waveforms should now be superimposed and where they cross each other represents the positive and negative thresholds of the comparator.

R27 (R55) will adjust the threshold of the comparator and R2 (R30) will adjust the hysteresis. In order to calibrate to the factor settings, adjust R27 (R55) for a falling edge cross over at -0.15 V below the centerline of the oscilloscope screen. Then adjust R2 (R30) to give a rising edge cross over of +0.15 V above the centerline of the oscilloscope screen. Notice that adjusting R27 (R55) will move both cross over points, while R2 (R30) will only effect the rising edge cross over point.

To calibrate Channel 2, move the connection from the function generator to J208 and repeat the adjustments made in the previous two paragraphs using the connections and adjustment points in parenthesis.

VERIFICATION

To verify all outputs for Channel 1, using the same setup as the calibration setup, apply the function generator output to J108 and confirm a rectangular wave output on J100 through J107. Verify the ECL output by connecting the oscilloscope probe to the oscilloscope Channel 2 and setting Channel 2 in the DC coupled 1 MΩ input mode. Connect the probe ground to J109 pin 3 and probe J109 pin 1 and pin 2. Note that pin 1 is in phase with the input and pin 2 is 180° out of phase.

To verify the outputs of Channel 2, return the oscilloscope to the calibration setup and apply the function generator output to J208. Confirm a rectangular wave output on J200 through J207. Verify the ECL output by repeating the oscilloscope probe configuration of the previous paragraph. Connect the probe ground to J109 pin 3 and probe J109 pin 4 and pin 5. Note that pin 4 is in phase with the input and pin 5 is 180°out of phase.

Calibration is now complete.

SECTION 3

DOCUMENTATION

DOCUMENT LIST

VTI Document No.	Description
50-0113-000	SCHEMATIC, CSM-S-11056 TRIGGER DISTRIBUTION MODULE
52-0170-000	ASSY, PCB, CSM-S-11056 TRIGGER DISTRIBUTION MODULE
70-0123-000	FINAL ASSY, CSM-S-11056, TRIGGER DISTRIBUTION MODULE

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