



**Model 560-5193
Relay Output SILIOM
Operation and Maintenance Manual**

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SECTION ONE

1. GENERAL INFORMATION

1.1. SCOPE OF MANUAL

This manual contains the information necessary to operate and maintain a TrueTime Model 560-5193 Relay Output SILIOM. SILIOM stands for **S**ingle **I**n-**L**ine **I**nput / **O**utput **M**odule.

1.2. PURPOSE OF EQUIPMENT

The Model 560-5193 SILIOM provides a method of adding an alarm relay output to a 560-5153 E1T1 motherboard.

1.2.1. PHYSICAL SPECIFICATIONS

Dimensions: 4.25" long x .687" wide
Weight: Approximately 2 ounces

1.2.2. ENVIRONMENTAL SPECIFICATIONS

Operating Temp: 0° to +50°C
Storage Temp: -40° to +85°C
Humidity: Up to 95% relative, non-condensing
Cooling Mode: Convection
Altitude: Sea level to 10,000 ft.

1.2.3. POWER REQUIREMENTS

Voltage: +5 VDC ±10%
Current: +50 mA with relay energized
Power: 250 mW

1.2.4. OUTPUT RATING

Voltage: +40 VDC ±10%
Current: +500 mA resistive
Power: 2 Watts

SECTION TWO

2. INSTALLATION AND OPERATION

2.1. INTRODUCTION

This section contains installation instructions and operating instructions.

2.2. REMOVAL AND INSTALLATION

CAUTION: All SILIOMS contain static sensitive semiconductor devices. Use a personal grounding strap and a static safe workstation while performing any handling of the SILIOM and/or the Motherboard.

This SILIOM is a customer installed option. To install the SILIOM in the motherboard, grasp it gently by the ends and insert it into the SIMM style connector on the motherboard while orienting it perpendicularly to the face of the motherboard. Then press the top of the SILIOM down and toward the bottom edge of the motherboard until the retainer clips snap down over the SILIOM. Removal is accomplished by spreading the retainer clips apart with your fingers while pushing the SILIOM top up with your thumbs. The SILIOM is keyed to prevent improper insertion, and only gentle pressure is required.

If replacing the SILIOM, check the switch setting on the old SILIOM and set the switches on the new SILIOM the same. The proper location for the SILIOM is determined by deciding which of the six possible channels you want the SILIOM to reside in. If you are replacing a SILIOM simply use the same slot it came out of. If this is a new addition then you must wire the appropriate connector on the rear panel adapter associated with the Channel you decide to use. Any SILIOM can be used in any slot without restriction.

Each SILIOM edge connector is associated with an "Output Jumper" located on the 560-5153 Card, which must be set according to the type of SILIOM installed. JP1 is associated with Channel A (at the top of the 560-5153), JP2 is associated with Channel B, and so on through JP6 and Channel F. The card JP(X) must have a shunt installed across pins 1 and 2 (out of 4). Pin 1 is near the top of the card when viewed from an "as installed" perspective. The JP blocks are located near the end of the SILIOM edge connectors that are farthest from the Front Panel of the 560-5153 Card. Revision 2 and later cards have additional jumper blocks (JP7-12) that are used for special JTAG operations on the card. If shunts are installed on these jumper blocks they should be "stored" on only one pin of the jumper block.

2.3.

OPERATION

There are no operator actions required by this SILIOM other than setting the configuration switches. Any possible operator action can only be carried out by use of software associated with the Alarm Monitor card in a 56000 system. SW1-1 sets whether the SILIOM's relay de-energizes on receipt of a Major (SW1-1 in the **OFF** position) or Minor (SW1-1 in the **ON** position) alarm. The alarms are defined and actuated by software on the Alarm Monitor card. SW1-2 and 4 have no function and SW1-3 is used to clear faults on the SILIOM in factory test procedures. It should always be left in the **ON** position *unless* you wish to disable fault detection on this module. You must also set or verify the Output Configuration Jumper (JP1-JP6) associated with the channel (A-F, J2-J7) that the card is installed in on the 560-5153 card. Set the shunt on this card to cover pins 1 and 2 of JP(X).

SW 1-1	Meaning
OFF	Relay de-energizes after a Major alarm is received
ON	Relay de-energizes after a Minor alarm is received
SW 1-2	Non Functional
SW 1-3	
ON	Enables Fault Detection
OFF	Disables Fault Detection
SW 1-4	Non Functional

SECTION THREE

3. THEORY OF OPERATION

3.1. GENERAL INFORMATION

This section contains a detailed description of the circuits on this SILIOM. These descriptions should be used in conjunction with the drawings in SECTION FIVE.

3.2. SILIOM DESCRIPTION

The 560-5193 SILIOM contains all the circuitry needed to add an alarm relay to a 560-5153 E1T1 card. The Relay is normally energized in the non-alarmed state (contacts open). Any one of three states can de-energize the relay into the alarming state (contacts closed) and they are Loss of Power, Major Alarm, or Minor Alarm. A dip switch chooses between Major and Minor and power loss will always cause an alarm.

3.3. DETAILED DESCRIPTION

Reference drawing 560-5193, sheets 2 and 3 of 3. U2 is a CPLD which contains all the logic circuits needed on the SILIOM. Q1 buffers the CPLD output and drives the solenoid of K1. The upper set of contacts are routed off the SILIOM to the rear panel where they may be used to operate an external alarm device. Although these contacts are rated higher than we rate them, no attempt should be made to use them at voltages or currents which would cause more than 40 Watts of power to be handled by the SILIOM. To do so invites catastrophic failure. The lower set of contacts is used by U2 to determine if the relay is in the state commanded by the Major or Minor inputs as selected by S1-1. A delay circuit in U2 allows time for contact bounce to settle out before sampling the LINEFAULT input. If a failure is detected, that information is latched and reported to the 560-5153 card and thence to the Alarm Monitor card if one is installed in the system. There are two ways to clear the fault, the preferred one is to use the Alarm Monitor cards software and the other is to power down the system, necessary if there is no Alarm Monitor card. U2 is programmed in system using a JTAG port and a dedicated fixture or the JTAG port on the 560-5153, and a special cable and software running on a PC.

SECTION FOUR

4. MAINTENANCE AND REPAIR

4.1. MAINTENANCE

This module requires no maintenance. Schematics are provided in SECTION 5 for those who desire to troubleshoot a problem down to the component level. All parts are standard commercially-available parts except for the printed circuit board itself.

4.2. REPAIR

This module is constructed mostly of surface mount components. These components are extremely difficult to replace successfully without a great deal of specialized SMT rework equipment and specialized training. Additionally, the majority of the circuitry on this board resides in a programmable part which requires special equipment, software, and data files to program. For these reasons it is strongly recommended that you return any malfunctioning module to the factory where it can be repaired.

SECTION FIVE

5. DETAILED DRAWINGS

5.1. 560-5193 DETAILED DRAWINGS / BILL OF MATERIALS

NOTES: UNLESS OTHERWISE SPECIFIED

1. ASSEMBLE PER ASSEMBLY REQUIREMENTS DOCUMENT 421-11.
2. RESISTOR VALUES IN OHMS. CAPACITORS IN MICRO FARADS.
3. POLARIZED CAPACITORS ARE SHOWN WITH A ROUNDED EDGE INDICATING THE POSITIVE SIDE.



STAMP DASH NUMBER & REVISION LEVEL.

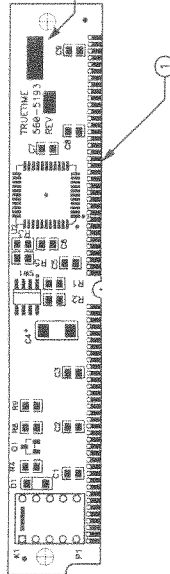
REVISIONS

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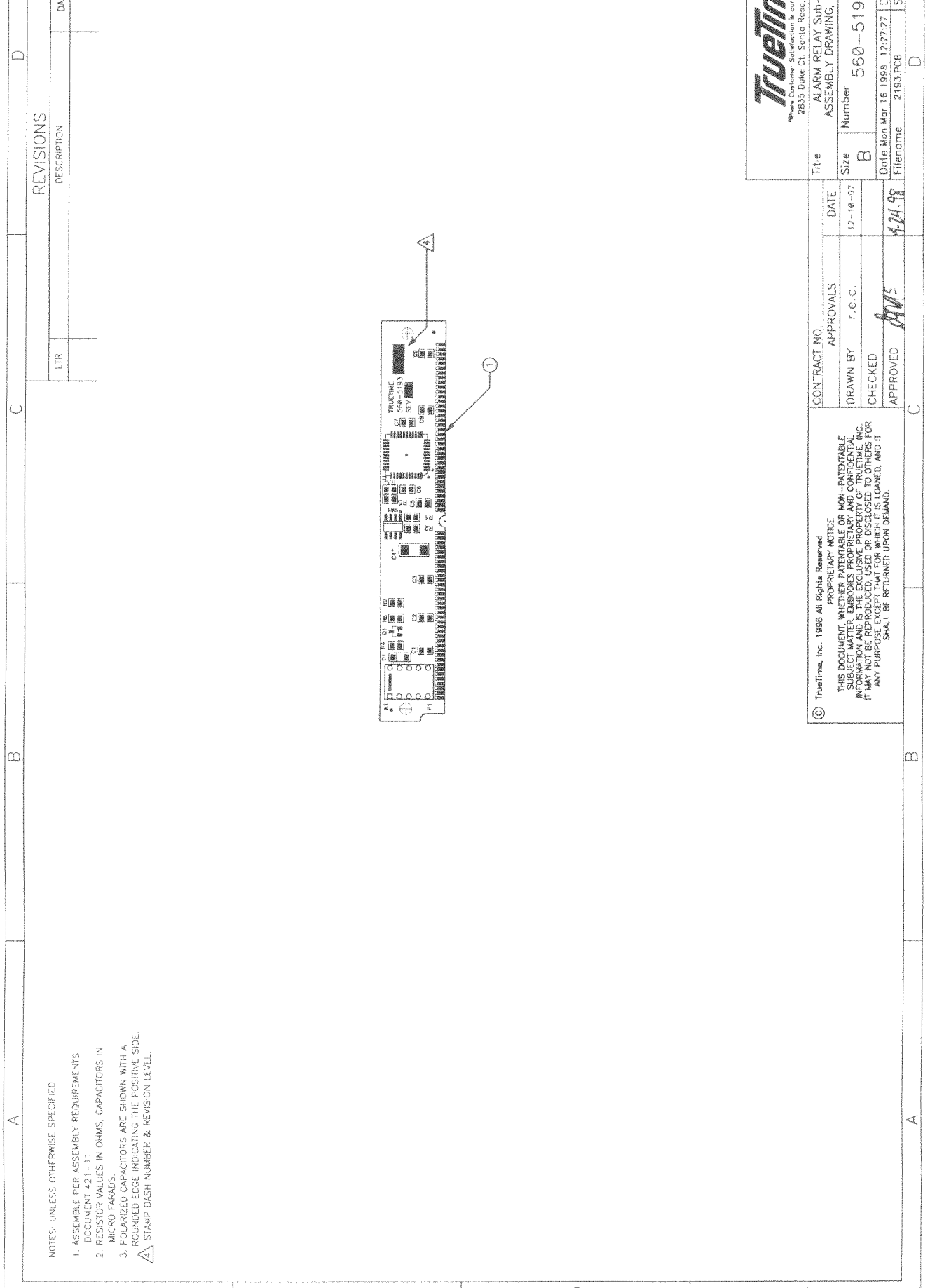
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CONTRACT NO.	APPROVALS	DATE
	r.e.c.	12-18-97
DRAWN BY	CHECKED	APPROVED
	<i>[Signature]</i>	<i>[Signature]</i>
		4-21-98

Title		ALARM RELAY Sub-Module	
Size	Number	Rev	
B	560-5193	01	
Date	Mon Mar 16 1998 12:27:27	Drawn by	r.e.c.
Filename	2193.PCB	Sheet	1 of 3



MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	REV UOM LVL	REFERENCE DESCRIPTION
560-5193	ASSY RELAY OUTPUT (T1E1)	MADE FROM 560-2193				EA	
0000-APPROVAL	PARTS LIST APPROVAL		0000		1.0000	EA	<i>DTM for 5/95</i>
0000-PL	PARTS LIST REV LEVEL		0000		1.0000	EA	REV 01 (05-07-98)
0000-PRINT	REFERENCE PRINT		0000		1.0000	EA	560-5193 REV 01
0000-REV	PCB REV LEVEL HERE >>>>		0000		1.0000	EA	560-2193 REV 01
008S-1002	RES 10K OHM 1/8W 1% 0805	NIC NRC12R1002FTR	0000		1.0000	EA	R8
008S-101	RES 100 OHM 1/8W 0805 5%	NIC NRC12R101TR	0000		2.0000	EA	R4,9
008S-472	RES 4.7K OHM 1/8W 0805 5%	NIC NRC12R472TR	0000		4.0000	EA	R1-3,5
036S-Y5V104	CAP CER .1UF Y5V 50V 0805	NIC NMC0805Y5V104Z50TR	0000		8.0000	EA	C1-3,5-9
037S-106-TL	CAP TANT 10UF 16V SIZE C	PANASONIC ECS-H10C106R	0000		1.0000	EA	C4
057S-4148	DIODE 1N4148	ROHM RLS4148TR	0000		1.0000	EA	D1
065S-002	SWITCH DIP HALF PITCH	MEPCDPAL CHS-04A	0000		1.0000	EA	SW1
069-015	RELAY, 2 FORM C, 5V	COMMUNICATION INSTR MQP5	0000		1.0000	EA	K1
175S-3904	XSISTOR, SMALL SIG SOT23	MOTOROLA MMBT3904-LT1	0000		1.0000	EA	Q1
178S-MACH211SP	IC, PROGRAMMABLE, CPLD	VANTIS MACH211 SP-15 VC	0000		1.0000	EA	
	INSTALL U2 (NOT PROGRAMMED/NOT SOCKETED) AT ASSEMBLY.						
	PART WILL BE PROGRAMMED AT TRUETIME DURING TEST FUNCTION. PROGRAM USING 185-006.WCH AND 185-006.J1 AND TEST FIXTURE 441-T1E1.						
185-006	PROGRAM (MACH)	FOR 560-5193	0000		1.0000	EA	FOR U2
560-2193	PCB RELAY OUTPUT (T1E1)	FAB	0000		1.0000	EA	01
LA	LABOR ASSEMBLY COST HRS		0000		0	EA	
LT	LABOR TEST COST HOURS		0000		0	EA	
NOTE 1			0000		1.0000	EA	
	DISREGARD THIS ENTRY. PURPOSE IS TO OFFSET AN ERROR IN MRP SOFTWARE.						
OSV560-5193	OUTSIDE LABOR 560-5193	PCA	0000		1.0000	EA	