

# *TrueTime*

## Model 560-5196 CMOS Square Wave Output SILIOM 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 560-5196 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 560-5196 card provides a method of adding CMOS square wave 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
Power:	250 mW

#### 1.2.4. OUTPUT RATING

Voltage:	+4 VDC ±5%
Load:	50Ω

## 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 in which of the six possible channels you want the SILIOM to reside. If you are replacing a SILIOM simply use the same slot. 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 in the "storage" position (Pin 1 only). 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. Other possible operator actions can be carried out by use of software associated with the Fault Monitor card in a 56000 system. See the following charts for switch function definition. SW1-3 is used to clear faults on the card in factory test procedures. It should always be left in the **ON** position *unless* you wish to disable fault detection on this module.

### SW1 bit definition

SW1-1	SW1-2	Meaning
0	0	Output = 64 kHz
1	0	Output = 8 kHz
0	1	Output = 1.544 MHz
1	1	Output = 2.048 MHz

### SW1 bit definition, continued.

SW1-3	SW1-4	Meaning
0	x	Fault reporting enabled
1	x	Fault reporting disabled/clear faults
x	0	AIS does not disable output
x	1	AIS disables output

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. Store the shunt for this card on pin 1 of JP(X).

## 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 560-5196 SILIOM contains all the circuitry needed to add a CMOS square wave output to a 560-5153 E1T1 card. It can drive a  $50\Omega$  load to a minimum of 4 Vpk at frequencies exceeding 10 MHz. It also monitors its own output and can detect a shorted output as well as stuck high or stuck low faults. These it reports back to the 560-5153 card.

#### 3.3. DETAILED DESCRIPTION

Reference drawing 560-5196, sheets 2 and 3 of 3. U2 is a CPLD which contains all the logic circuits needed on the SILIOM. U1 buffers the CPLD output. The output is coupled to the fault detector by C13. D1 rectifies the signal and C12 filters it to produce a DC value proportional to the SILIOM output. R8 and R9 form a voltage ref for the comparator U3. When the voltage across C12 falls below  $\cong 1.020$  VDC its pin 7 output will go high to indicate the fault condition. When a failure is detected, that information is latched and reported to the 560-5153 card and thence to the Fault Monitor card if one is installed in the system. There are three ways to clear the fault, the preferred one is to use the Fault Monitor cards software, another is to momentarily move SW1-3 to the OFF position and then back to the ON position (possible only if the 560-5153 card is on an extender card), and the third is to power down the system (necessary if there is no Fault 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 FIVE 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

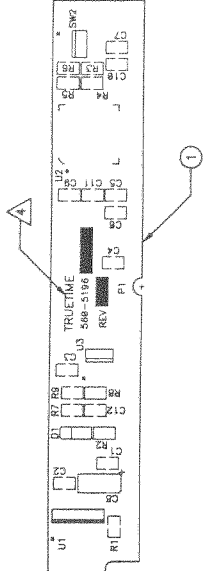
### 5. DETAILED DRAWINGS

560-5196 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**

LTR	DESCRIPTION	DATE	APPROVED
02	ADDED C13,D1,F7-R9,U3; CHANGED C12,R1,R2,U1; CHANGED SIGNAL NAMES	03/04/98	<i>[Signature]</i>



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CONTRACT NO.	DATE
APPROVALS	01-05-98
DRAWN BY	S.RAMEK
CHECKED	
APPROVED	<i>[Signature]</i>

Title		SQUARE WAVE OUT	
ASSEMBLY DRAWING, TOP SIDE	Number	560-5196	Rev
Size	B	02	02
Date	Tue May 12 1998 09:15:30	Drawn by	B.A.S.
Filename	2196-02.PCB	Sheet	1 of 3



A B C D

1

2

3

4

A

B

C

D



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
560-5196	ASSY SQUARE OUTPUT (T1E1) MADE FROM 560-2196					EA	
0000-APPROVAL	PARTS LIST APPROVAL		0000		1.0000	EA	
0000-PL	PARTS LIST REV LEVEL		0000		1.0000	EA	
0000-PRINT	REFERENCE PRINT		0000		1.0000	EA	
0000-REV	PCB REV LEVEL HERE >>>>		0000		1.0000	EA	
008S-100	RES 10 OHM 5% 0805	NIC NRC12R100TR	0000		1.0000	EA	R1
008S-102	RES 1K OHM 1/8W 1% 0805	NIC NRC12R102FTR	0000		1.0000	EA	R2
008S-104	RES 100K OHM 1/8W 1% 0805	NIC NRC12R104FTR	0000		1.0000	EA	R7
008S-392	RES 3.9K OHM 1/8W 0805	NIC NRC12R392TR	0000		2.0000	EA	R8,9
008S-472	RES 4.7K OHM 1/8W 0805 5%	NIC NRC12R472TR	0000		4.0000	EA	R3-6
036S-Y5V104	CAP CER .1UF Y5V 50V 0805	NIC NMC0805Y5V104Z50TR	0000		11.0000	EA	C1-7,9-12
037S-106-TL	CAP TANT 10UF 16V SIZE C	PANASONIC ECS-H1CC106R	0000		1.0000	EA	C8
057S-4148	DIODE 1N4148	ROHM RLS4148TR	0000		1.0000	EA	D1
065S-002	SWITCH DIP HALF PITCH	MEPCOPAL CHS-04A	0000		1.0000	EA	SW2
176S-LT1016	LT1016 (8SO)	LINEAR TECH LT1016CS8	0000		1.0000	EA	U3
178S-74AC14	74AC14 (14SO)	RCA CD74AC14M	0000		1.0000	EA	U1
178S-MACH211SP	IC, PROGRAMMABLE, CPLD	VANTIS MACH211 SP-15 VC	0000		1.0000	EA	

*DAMS* 5-12-98

PART WILL BE PROGRAMMED AT TRUETIME DURING THE TEST FUNCTION. PROGRAM USING 185-009.WCH AND 185-009.J1 AND TEST FIXTURE 441-T1E1.

185-009	PROGRAM (MACH)	FOR 560-5196	0000		1.0000	EA	FOR U2
560-2196	PCB SQUARE 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.						
OSV560-5196	OUTSIDE LABOR 560-5196	PCA	0000		1.0000	EA	