TRUETIME

Model 560-5197
E1/T1 AMI Output SILIOM Manual

SECTION ONE

1. <u>GENERAL INFORMATION</u>

   1.1. SCOPE OF MANUAL

   This manual contains the information necessary to operate and maintain a TrueTime Model 560-5197 E1 / T1 AMI Output SILIOM. SILIOM stands for **S**ingle **I**n-**L**ine **I**nput / **O**utput **M**odule.

   1.2. PURPOSE OF EQUIPMENT

   The Model 560-5197 card provides a method of adding an E1 or a T1 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:	Seal 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

   Meets G.703 or G.704 as applicable for amplitude, waveshape, and format.

SECTION TWO

2. FUNCTIONAL DESCRIPTION

   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 of the SILIOM is determined by deciding which of the six possible channels in which you want the SILIOM to reside. If you are replacing a SILIOM, simply use the same slot as the old one. 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) if the SILIOM is used as a T1, in the storage position (Pin 1 only) if used as an E1. 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 only be carried out by use of software associated with the Fault Monitor card in a 56000 system. 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. See the following tables for more information.

Length buildout definition (SW2)

P1	P2	P3	P4	Length Build Out	Application	Loopback Status
ON	ON	ON	ON	ILLEGAL STATE	TEST MODE	DISABLED
OFF	ON	ON	ON	LBO = -7.5 dB	T1CSU	DISABLED
ON	OFF	ON	ON	LBO = -15 dB	T1CSU	DISABLED
OFF	OFF	ON	ON	LBO = 0 dB/0-133'	T1CSU/DSX-1 X CONNECT	DISABLED
ON	ON	OFF	ON	LBO = 133'-266'	DSX-1 X CONNECT	DISABLED
OFF	ON	OFF	ON	LBO = 266'-399'	DSX-1 X CONNECT	DISABLED
ON	OFF	OFF	ON	LBO = 399'-533'	DSX-1 X CONNECT	DISABLED
OFF	OFF	OFF	ON	LBO = 533'-655'	DSX-1 X CONNECT	DISABLED
ON	ON	ON	OFF	ILLEGAL STATE	TEST MODE	ENABLED
OFF	ON	ON	OFF	LBO = -7.5 dB	T1CSU	ENABLED
ON	OFF	ON	OFF	LBO = -15 dB	T1CSU	ENABLED
OFF	OFF	ON	OFF	LBO = 0 dB/0-133'	T1CSU/DSX-1 X CONNECT	ENABLED
ON	ON	ON	OFF	LBO = 133'-266'	DSX-1 X CONNECT	ENABLED
OFF	ON	OFF	OFF	LBO = 266'-399'	DSX-1 X CONNECT	ENABLED
ON	OFF	OFF	OFF	LBO = 399'-533'	DSX-1 X CONNECT	ENABLED
OFF	OFF	ON	OFF	LBO = 533'-655'	DSX-1 X CONNECT	ENABLED

NOTES:
1. LOOPBACK **REQUIRES** A 560-5199 CARD TO BE INSTALLED IN ONE SLOT OF THE 560-5153 AND IT IS A CONFIGURATION ERROR TO DO OTHERWISE.
2. P1-3 HAVE NO MEANING WHEN SW1-1 IS OFF.
3. P2-4 MUST NOT BE ALL ZEROS IN ANY EVENT.

SW1 positions 1 and 2

P1	P2	Meaning
ON	X	Output = 1.544 MHz
OFF	X	Output = 2.048 MHz

Position 2 is undefined.

SW1 positions 3 and 4

P3	P4	Meaning
ON	X	faults reporting enabled
OFF	X	reset/fault reporting disabled
X	ON	AIS does not disable output
X	OFF	AIS disables output

The following is a screen dump from the 56000 showing a 560-5153 card installed in Slot 6. (ARROW added for emphasis.) The following screen

dump shows how you can use the "CN?" command, this time as "C6?" to query the 560-5153 card for the contents and status of the I/O channels.

```
TrueTime 56000 Site 01
Automatic Reports Disabled
Periodic Reports Disabled
Secondary Inputs Selected    REFA OK REFB No REFC OK PRI Dis
                             SEC Dis TER Dis

 1. Undefined        OK            Undefined            OK
 2. Undefined        OK            Undefined            OK
 3. Undefined        OK            Undefined            OK
 4. Undefined        OK            Undefined            OK
 5. Undefined        OK            Undefined            OK
 6. 5153    ABC ANA FRQ CUo ←      Undefined            OK
 7. Undefined        OK            Undefined            OK
 8. Undefined        OK            Undefined            OK
 9. Undefined        OK            Undefined            OK
10. Undefined        OK            Undefined            OK
11. Undefined        OK            Undefined            OK
12. Undefined        OK            Undefined            OK
13. Undefined        OK            Undefined            OK
14. 5179-1  Fault Monitor   OK     Undefined            OK
15. Undefined        OK            Undefined            OK
16. Undefined        OK            Undefined            OK
17. Undefined        OK            Undefined            OK
18. Power Supply     OK            Unknown Card         OK
20. Power Supply     OK            Undefined            OK


6, 5153    ABC ANA FRQ Cuo         Undefined
C6 A 560-5197           04 A4 ←
C6 B Empty              FF FF
C6 C Empty              FF FF
C6 D Empty              FF FF
C6 E Empty              FF FF
C6 F Empty              FF FF
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In this case, five of the slots are empty and Slot A contains a 560-5197 SILIOM. The software is reporting the contents of two registers in hexadecimal format. The first register contains the card ID type in bits 0-4, bits 5 and 6 are not used (always zero), and the current SILIOM fault status in bit 7. Bit 7 high indicates the SILIOM has detected a fault. The second register indicates the current on/off status of the eight switches on the card (SW1-1 through SW1-4 and SW2-1 through SW2-4) with SW1 mapped to the upper nibble. Refer to the switch definition tables above for the meaning of each bit. *Keep in mind that the word **"ON"** means that the switch is closed and that that is reported as a **ZERO** in the bit pattern.* The user may thus keep track of his system configuration within his own software or records by remote access via terminal or terminal emulation software. Please refer to the Manual for the 560-5179

card for more details.   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).

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 560-5197 SILIOM contains all the circuitry needed to add an AMI E1 or T1 output to a 560-5153 E1T1 card. A switch controls which standard is supported. Both standards may be output simultaneously by setting multiple (at least two) SILIOMs to different switch settings. Line faults are detected and reported back to the 560-5153.

3.3. DETAILED DESCRIPTION

Reference drawing 560-5197, sheets 2 and 3 of 3. U2 is a CPLD which contains all the logic circuits needed on the SILIOM. U1 is a line driver IC for E1/T1 applications. It can work as either an E1 or T1 line driver. SW2 positions 1, 2, and 3 control the Length buildout of this driver. SW2 position 4 enables the loopback mode of operation to be supported by this SILIOM on a card by card basis. 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 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.

5.   <u>DETAILED DRAWINGS</u>

    5.1.   560-5197   DETAILED DRAWINGS / BILL OF MATERIALS