



**Model 560-5187-1F  
CPU I/O / Frequency Reference Input Module Manual**

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# SECTION ONE

## 1. FUNCTIONAL DESCRIPTION

### 1.1. PURPOSE OF EQUIPMENT

The TrueTime Model 560-5187-1F CPU I/O / Frequency Reference Input Module provides an input/output interface, via a Male DB-9 connector (labeled CPU I/O), between the Fault Monitor CPU and the user. Additionally, it provides an input interface to the CPU, via BNC connectors labeled (P and S), for Primary and Secondary Source status. The use of these signals is described in the manual section for the compatible CPU.

In addition to the CPU interface, this card provides inputs, via BNC connectors, that directly drive Reference Signals A through B on the backplane. INPUT A through INPUT B on the Module drive REF A and B, respectively. The two backplane signals are AC-coupled and distributed via controlled-impedance traces, terminated with 50 ohms at Slot 17 on the backplane.

#### 1.1.1. PHYSICAL SPECIFICATIONS

Dimensions: 0.8" w X 4.4" h X 5.0" d (2 cm X 11 cm X 13 cm)  
Weight: Approximately ½ pound (¼ kg)

#### 1.1.2. ENVIRONMENTAL SPECIFICATIONS

Operating Temp: 0° to +50°C  
Storage Temp: -40° to +85°C  
Humidity: Up to 95% relative, non-condensing  
Cooling Mode: Convection

#### 1.1.3. POWER REQUIREMENTS

Power: None

#### 1.1.4. CPU INPUT/OUTPUT

Connector Type: DB-9M

Connector Pinout:

Pin 1:	OUT 1	
Pin 2:	RXD / RS-232 In	Pin 6: RIN- / Differential- In
Pin 3:	TXD / RS-232 Out	Pin 7: RIN+ / Differential+ In
Pin 4:	OUT 2	Pin 8: TOUT- / Differential- Out
Pin 5:	SIGNAL GND	Pin 9: TOUT+ / Differential+ Out

#### 1.1.5. STATUS INPUTS P AND S

Connector Type: BNC  
Signal Type: As specified in manual for compatible CPU.

#### 1.1.6. FREQUENCY REFERENCE INPUTS A AND B

Connector Type: BNC  
Input Impedance: 50 ohms  
Signal Type: 1, 5 or 10 MHz as specified for card(s) using signal.

#### 1.1.7. CARD COMPATIBILITY

Location: The preferred location for this card is slots 1-3, with compatible card in front slot, but slots 4-17 are also acceptable if frequencies are not being used.

Compatibility: See Card Compatibility Matrix.

## SECTION TWO

### 2. INSTALLATION AND OPERATION

#### 2.1. HOT-SWAPPING

All cards, input cables and output cables are hot swappable. It is not necessary to remove chassis power during insertion or removal. The system is designed to protect against permanent effects and minimize any temporary effects of hot swapping.

#### 2.2. REMOVAL AND INSTALLATION

Refer to CARD COMPATIBILITY section prior to installing new card.

To remove card, loosen the captive retaining hardware at the top and bottom of the assembly, then firmly pull on the handle (or on any connector on rear panel adapter cards) at the bottom of the card. Slide the card free of the frame. Refer to the SETUP section for any required switch settings; or, set them identically to the card being replaced. Reinstall the card in the frame by fitting it into the card guides at the top and bottom of the frame and sliding it in slowly, avoiding contact between bottom side of card and adjacent card front panel, until it mates with the connector. Seat card firmly to avoid contact bounce. Secure the retaining screws at the top and bottom of the card assembly.

#### 2.3. SETUP

This card has no setup requirements.

#### 2.4. FAULT INDICATION

This card has no fault indication.

#### 2.5. MAINTENANCE

This card has no maintenance requirements.

## SECTION THREE

### 3. THEORY OF OPERATION

#### 3.1. GENERAL INFORMATION

This section contains a detailed description of the circuits in the CPU I/O Module. These descriptions should be used in conjunction with the drawings in SECTION FOUR.

#### 3.2. HARDWARE DESCRIPTION

The Module incorporates various connectors and comes in various configurations controlled by component installation. Use the Bill of Materials in conjunction with the Schematic to determine the exact configuration of this version.

The DB-9M connector, J5, supports RS-232 and differential communications to/from the CPU and a status output from the CPU. The signaling protocol is dependent on the card installed in the front slot.

The Module also has two BNC connectors, J3 and J4, which are used as status inputs as defined in the compatible CPU manual.

The two Frequency Reference Signal inputs are supported via BNC connectors J1 and J2, which drive REF A and B, respectively. These signals are distributed via 50 Ohm traces. On the backplane, they are terminated at Slot 17 with 50 Ohm termination resistors. As a result of this architecture, this card must be located at or near Slot 1 with all REF signal users located in higher slots.

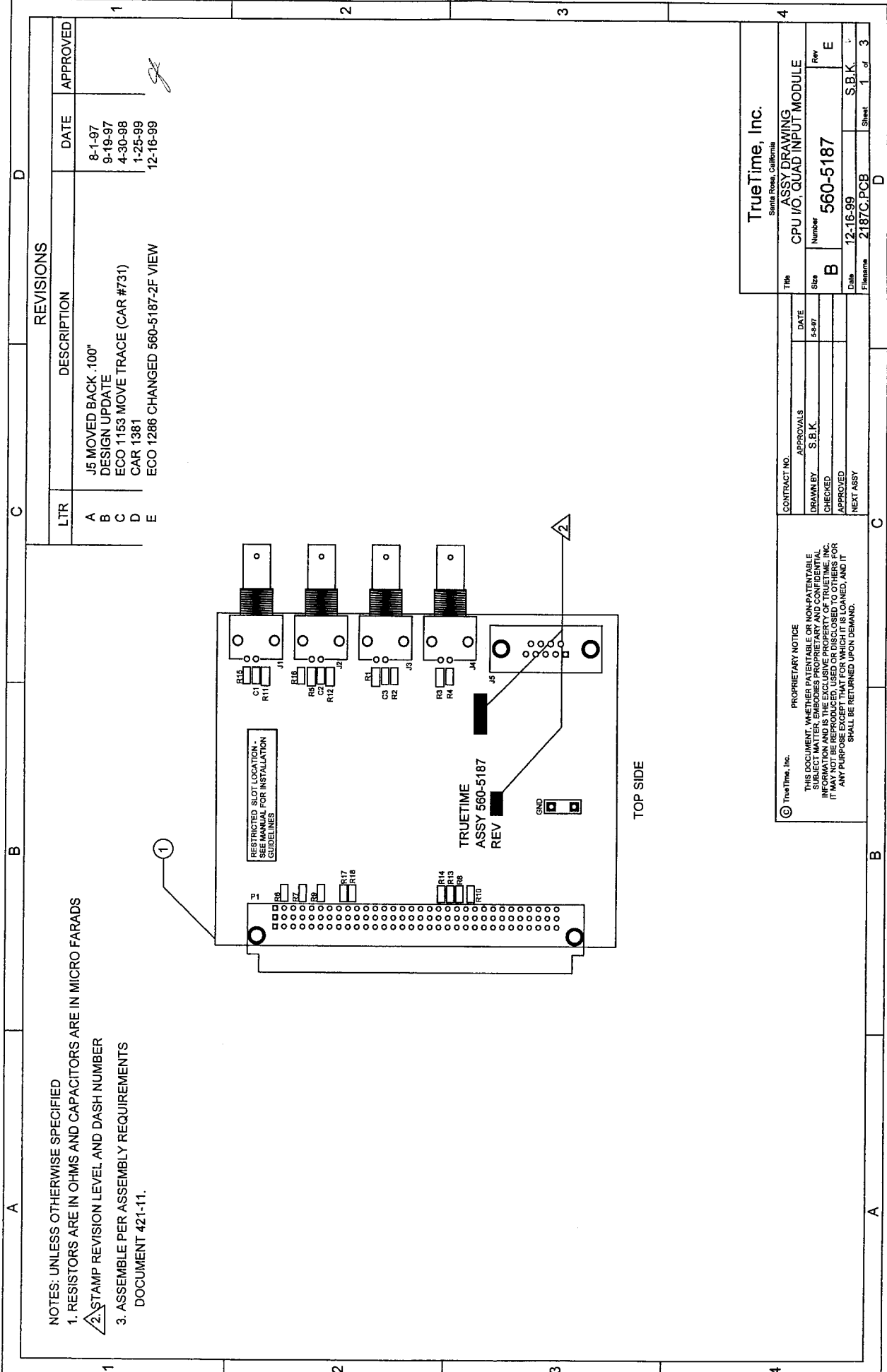
## **SECTION FOUR**

### **4. DETAILED DRAWINGS**

#### **4.1. 560-5187-1F DETAILED DRAWINGS / BILL OF MATERIALS**

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

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	UOM	REV LVL	REFERENCE DESCRIPTION
560-5187-1F	CPU I/O MODULE, QUAD INPUT MADE FROM 560-2187						EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000		EA	<i>See 1/99</i>
0000-PL	PARTS LIST REV LEVEL		000000		1.0000		EA	REV E (01-29-99)
0000-PRINT	REFERENCE PRINT		000000		1.0000		EA	SEE 560-5187
0000-REV	PCB REV LEVEL HERE >>>>		000000		1.0000		EA	560-2187 REV C
002S-000	RES 0 OHM 1/4W 0805	NIC NRC10Z0TR	000000		4.0000		EA	R6,7,17,18
002S-787R	RES 78.7 OHM 1/4W 1206 1%	NIC NRC12F78R7TR	000000		2.0000		EA	R1,3
036S-X7R104-50	CAP .1UF X7R 50V 0805 10%	NIC NMC0805X7R104K50TR	000000		2.0000		EA	C1,2
223-138	SCREW SH CH ZN M2.5X10	SCHROFF #21100-138	000000		2.0000		EA	03
223-144	NUT M2.5	SCHROFF #21100-144	000000		2.0000		EA	04
223-379	SCREW CAP NP M2.5 X 11	SCHROFF #21100-379	000000		2.0000		EA	07
223-464	SLEEVE, STAINLESS	SCHROFF 21100-660	000000		2.0000		EA	08
273-009	TERMINAL TEST POINT	COMP CORP PJ-201-25	000000		1.0000		EA	GND
372-09P	CONN 9-P D-SUB RT ANG ML	AMP 748879-1 (BOM NAV)	000000		1.0000		EA	J5
372-609-003	JACK SOCKET SET OF 2	THOMAS & BETTS 609-003	000000		1.0000		EA	FOR J5
372-96RA	CONN, 96-P FM DIN RT ANGLE	BERG 68353-296	000000		1.0000		EA	P1
375-022	LOCKWASHER, BNC PC MT	AMP 1-329632-2	000000		4.0000		EA	10
375-023	NUT BNC PC MT	AMP 1-329631-2	000000		4.0000		EA	
	05 (J1-J4) DO NOT USE THE NUT THAT COMES WITH THE CONNECTOR.							
375-227677-1	CONN BNC PC MT	AMP 227677-1	000000		4.0000		EA	06 (J1-J4)
391-004	ADAPTER FOR RS PORT	FAITECH MCM70029	000000		1.0000		EA	SHIPPING KIT
560-1231-1	REAR PNL, CPU I/O QUAD	SCREEN	000000		1.0000		EA	02
560-2187	CPU I/O MODULE, QUAD INPUT FAB		000000		1.0000		EA	01
LA	LABOR ASSEMBLY COST HRS		000000		0		EA	
LT	LABOR TEST COST HOURS		000000		0		EA	
NOTE 1			000000		1.0000		EA	
	DO NOT INSTALL: R2,R4,R5,R8-16 C3							
OSV560-5187-1F	OUTSIDE LABOR 560-5187-1F PCA		000000		1.0000		EA	



NOTES: UNLESS OTHERWISE SPECIFIED  
 1. RESISTORS ARE IN OHMS AND CAPACITORS ARE IN MICRO FARADS  
 2. STAMP REVISION LEVEL AND DASH NUMBER  
 3. ASSEMBLE PER ASSEMBLY REQUIREMENTS DOCUMENT 421-11.

LTR	DESCRIPTION	DATE	APPROVED
A	J5 MOVED BACK .100"	8-1-97	
B	DESIGN UPDATE	9-19-97	
C	ECO 1153 MOVE TRACE (CAR #731)	4-30-98	
D	CAR 1381	1-25-99	
E	ECO 1286 CHANGED 560-5187-2F VIEW	12-16-99	

TrueTime, Inc. Santa Rosa, California	
Title	ASSY DRAWING
Size	CPU I/O QUAD INPUT MODULE
Number	560-5187
Rev	E
Date	12-16-99
Filename	2187C.PCB
Sheet	1 of 3

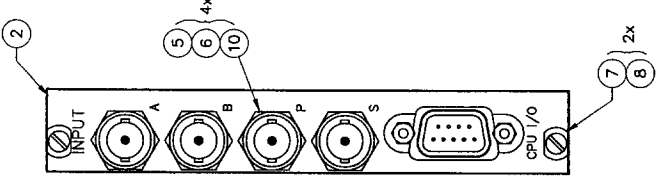
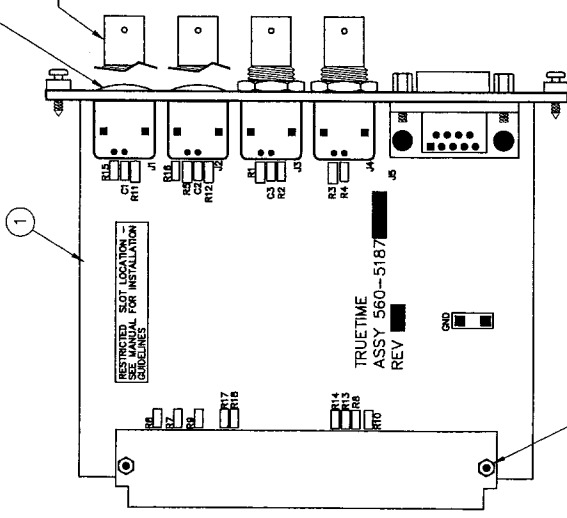
CONTRACT NO.	APPROVALS	DATE
	S.B.K.	5-8-97
DRAWN BY	CHECKED	
APPROVED		
NEXT ASSY		

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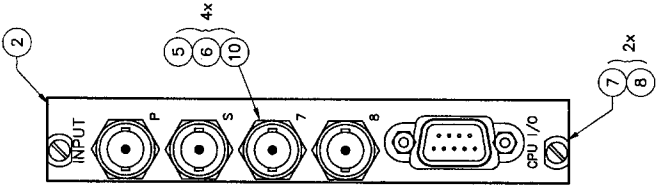


FOR -1S & -2F  
ASSEMBLIES ONLY

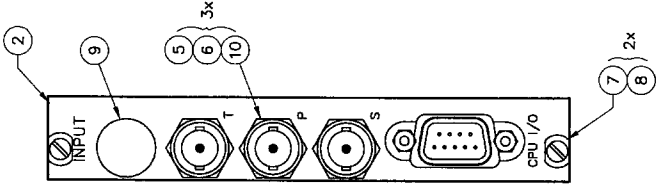
FOR -1F & -1T  
ASSEMBLIES ONLY



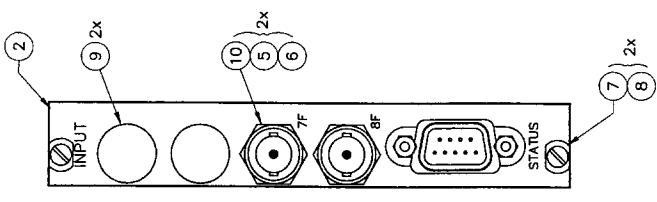
-1F  
REFERENCE MODE  
VERSION



-1T  
STATUS & TIMING  
VERSION



-1S  
STATUS  
VERSION



-2F  
INPUT MODE  
VERSION

<p>Where Customer Satisfaction is our Highest Priority 2835 Dulite Ct. Santa Rosa, CA 95407</p>					
SIZE	B	CODE IDENT NO.	560-5187	REV	E
SCALE	NONE	DRAWING NO.	560-5187	SHEET 2 OF 3	

FILENAME: \560\5187  
DATE: 12-14-99