

# *TrueTime*

## **Model 560-5146-6 -48 VDC Power Supply Manual**

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# SECTION ONE

## 1. FUNCTIONAL DESCRIPTION

### 1.1 PURPOSE OF EQUIPMENT

The TrueTime Model 560-5146-6 Power Supply works in conjunction with the appropriate rear Power Entry Module to provide 48 VDC power to the chassis in a redundant configuration. The Power Entry Module provides the input connector, chassis ground lug and fuse. This Power Supply is for use with POSITIVE-ground 48 VDC input.

The Power Supply provides filtering and transient protection at the input. The 48 VDC input power is delivered to the backplane via an OR-ing diode, connecting it to the power bus in a redundant configuration. If one power supply in the chassis fails, the other takes over. If both supplies are functioning, the highest voltage supply delivers power to the backplane.

#### 1.1.1 PHYSICAL SPECIFICATIONS

Dimensions: 1.6" w X 3.94" h X 8.66" d (4 cm X 10 cm X 22 cm)  
Weight: Approximately ½ pound (¼ kg)

#### 1.1.2 ENVIRONMENTAL SPECIFICATIONS

Operating Temp: 0° to +50°C  
Storage Temp: -17° to +100°C  
Humidity: 95% relative, non-condensing  
Cooling Mode: Convection

#### 1.1.3 POWER SPECIFICATIONS

Input Voltage: -48 VDC ±20% (positive-ground)  
Power Capability: 150 W  
Fuse 5 Amp 3AG SLO-BLO  
CANNOT BE USED WITH NEGATIVE-GROUND INPUT POWER

#### 1.1.4 FUNCTIONAL SPECIFICATIONS

##### 1.1.4.1 INPUT POWER CONNECTOR

See Chassis manual.

#### 1.1.4.2 TEST POINTS

48 VDC+: 48 VDC, Positive Input  
48 VDC-: 48 VDC, Negative Input

#### 1.1.4.3 CARD COMPATIBILITY

Location: Slot 18/19 or 20/21  
Compatibility: -48 VDC Power Entry Module in rear slot

## 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

**CAUTION: Individual components on this card are sensitive to static discharge. Use proper static discharge procedures during removal and installation.**

For proper operation, the Power Supply **MUST** be installed in a slot with a matching rear Power Entry Module.

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

Fault indicator may activate briefly during following hot-insertion or power-up. The following paragraphs describe operation during steady-state conditions.

##### 2.4.1 FAULT INDICATOR

The Fault indicator activates when the input power to the Power Supply is lost. The detection point is approximately 16 Volts lower than the chassis power voltage. This could be caused by a loss of power at the source, a disconnected Power Entry power-input cable or a blown Power Entry fuse.

## 2.4.2 BACKPLANE FAULT OUTPUT

Each slot contains a Fault output, which can be read by the optional Fault Monitor CPU.

## SECTION THREE

### 3. THEORY OF OPERATION

#### 3.1 GENERAL INFORMATION

This section contains a detailed description of the circuits in the Power Supply. These descriptions should be used in conjunction with the drawings in SECTION FOUR.

#### 3.2 HARDWARE DESCRIPTION

The Power Supply incorporates an Input Filter, an OR-ing diode, Fault-detection Indicator.

#### 3.3 DETAILED DESCRIPTION

Reference drawing 560-5146-6.

##### 3.3.1 INPUT FILTER

The input filter consists of a Electro Magnetic Interference (EMI) filter and transorb transient absorbing device. The filter reduces common and differential mode EMI conducted into and/or out of the chassis. The transorb minimizes the effects of any high-voltage transients that enter the chassis. The front panel test points connect directly to the input power.

##### 3.3.2 OR-ING DIODE

Incoming -48 VDC power is delivered to the backplane via a 10 Amp. diode. This connects the two power supplies in a redundant configuration. When the input voltage falls below the backplane voltage the diode ceases to conduct. The Power Supply is designed for use with -48 VDC input power. Therefore, the fuse and OR-ing diodes are located in this 48 VDC NEGATIVE leg.

The front panel test points connect directly to the input power, indicating the state of the external power supply rather than backplane power.

##### 3.3.3 FAULT DETECTION / INDICATOR

The indicator is powered by the backplane 48 VDC. It receives power via current limiting resistors, a 15 V zener diode and the input to an opto-isolator. An additional diode is connected from the high side of the zener to the -48 VDC input. While the input and backplane voltages are equal, the diode pulls current away from the indicator and opto-isolator, keeping them inactive. When the input power drops to approximately 16 volts lower than the backplane power, the diode can no longer pull current

away, activating the indicator. The opto-isolator drives the backplane fault line, which is read by the optional Fault Monitor CPU.

## SECTION FOUR

### 4. DETAILED DRAWINGS

4.1 560-5146-6 DETAILED DRAWINGS / BILL OF MATERIALS



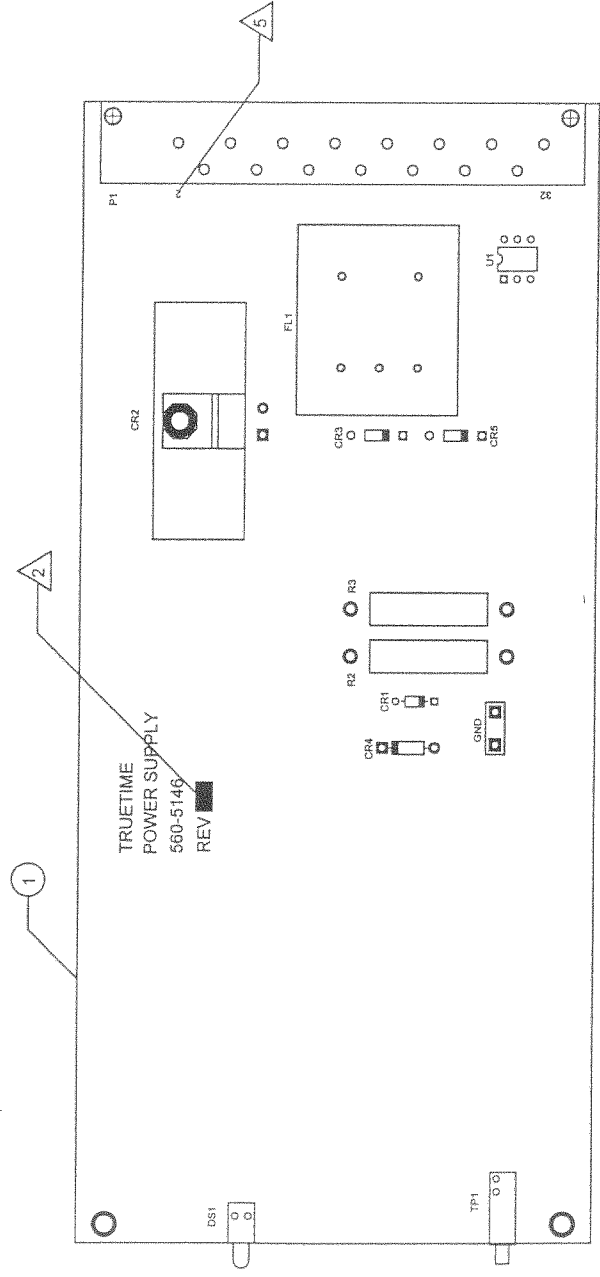
A B C D

NOTES: UNLESS OTHERWISE SPECIFIED

- 1. VALUES OF RESISTORS ARE IN OHMS AND CAPACITORS ARE IN uf
- 2. STAMP ASSEMBLY AND REV LEVEL.
- 3. BEFORE SOLDERING FRONT PANEL COMPONENTS  
INSTALL FRONT PANEL, THEN SOLDER.
- 4. ASSEMBLE PER ASSEMBLY REQUIREMENTS  
DOCUMENT 421-11.
- 5. DISREGARD PC BOARD'S SILK SCREEN,  
IT SHOULD BE "4".

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
C	ECC: 1048	8-5-96	DJL
D	CAR 1436, CAR 1437	4-1-99	SBK
E	PR 3367, PR 3451	9-24-99	SBK
F	PR 3947	102-10-00	O-K



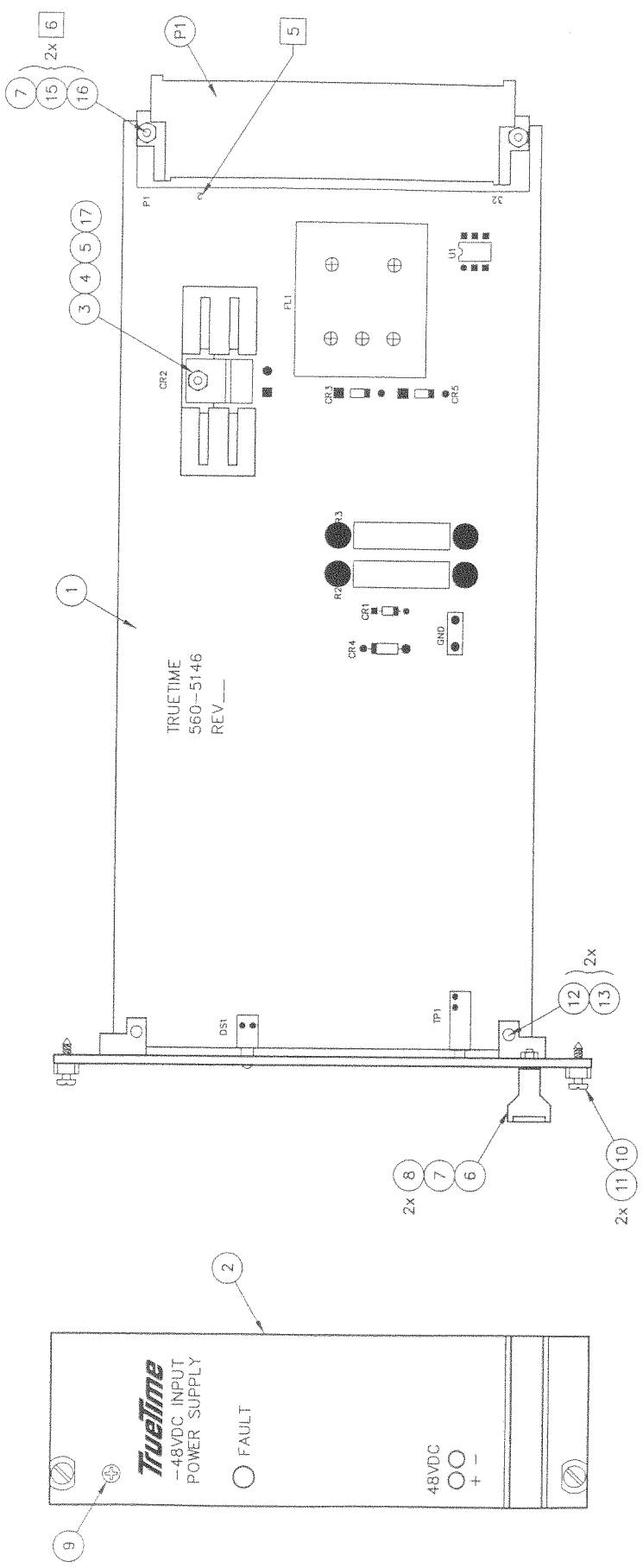
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CONTRACT NO.	APPROVALS	DATE
	R.E.C.	5-20-98
	R.E.C.	06-98
	DJL	06-98

DRAWN BY: R.E.C.  
 CHECKED: R.E.C.  
 APPROVED: DJL  
 NEXT ASSY

TrueTime, Inc. Santa Rosa, California	
Title	ASSY DRAWING
Size	POWER SUPPLY -48VDC
Number	B
Rev	F
Date	02-10-00
Filename	21468.PCB
r.e.c.	Sheet 1 of 3

1 2 3 4



**TrueTime®**  
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 2855 Duane Ct. Santa Rosa, CA 95407

SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		560-5146-6	F
SCALE: NONE			SHEET 2 OF 3

FILENAME: \560\5146-6B  
 DATE: 02-10-00

[6] APPLY LOCTITE (ITEM 16) WHERE SHOWN.

NOTES: CONT'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
560-5146-6	ASSY PWR SUPPLY -48VDC	MADE FROM 560-2146				EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000	EA	<u>DOK 2-18-00</u>
0000-PL	PARTS LIST REV LEVEL		000000		1.0000	EA	REV F (02-11-00)
0000-PRINT	REFERENCE PRINT		000000		1.0000	EA	560-5146-6 REV F
0000-REV	PCB REV LEVEL HERE >>>>		000000	ECO 1170	1.0000	EA	560-2146 REV B
003-2701-2	RES 2.7K OHM 2W 5%		000000		2.0000	EA	R2,3
055-SA60	TRANSORB 60V	GSI SA60 (BOM NAV)	000000		2.0000	EA	CR3,CR5
057-1N5245	DIODE,ZENER 15V 0.5W	MOTOROLA 1N5245A (NAV)	000000		1.0000	EA	CR1
057-4002	DIODE 100V 3A RECTIFIER	1N4002	000000		1.0000	EA	CR4
057-MBR10100	RECTIFIER	MOTOROLA MBR10100	000000		1.0000	EA	CR2
058-020	LED	DIALIGHT 550-3007	000000		1.0000	EA	DS1
176-4N37	4N37 OPTICAL COUPLER	TI 4N37 (SEE BOM NAV)	000000		1.0000	EA	U1
223-008	HANDLE FOR 3U X 8HP	SCHROFF 20808-062	000000		1.0000	EA	06
223-131	SCHROFF TP DUAL	SCHROFF 69004-131	000000		1.0000	EA	TP1
223-138	SCREW SH CH ZN M2.5X10	SCHROFF #21100-138	000000		2.0000	EA	15
223-144	NUT M2.5	SCHROFF 21100-144	000000		3.0000	EA	07
223-181	HOLDER (PB) DIE CAST	SCHROFF 20827-072	000000		2.0000	EA	12
223-379	SCREW CAP NP M2.5 X 11	SCHROFF #21100-379	000000		2.0000	EA	11
223-464	SLEEVE, STAINLESS	SCHROFF 21100-660	000000		2.0000	EA	10
223-500	SCREW PH FH NP M2.5X10	SCHROFF #21100-500	000000		1.0000	EA	09
240-004-003	SCREW PH PN SS 4-40X3/8	SCREW PAN	000000		1.0000	EA	17
249-005	SCREW M2.5 X 8	SCHROFF #21100-140	000000		2.0000	EA	13
249-007	SCREW SH CH ZN M2.5X12	SCHROFF 21100-148	000000		2.0000	EA	08
251-004	NUT KEP SS 4-40	AROW KN-04C-S-0-M	000000		1.0000	EA	03
272-009	INSULATOR TO-220 SIL PAD	BERGQUIST 3223-07AC-55	000000		1.0000	EA	04
273-009	TERMINAL TEST POINT	COMP CORP PJ-201-25	000000		1.0000	EA	GND
280-009	HEATSINK FOR TO-220	THERMALLOY 6071B	000000		1.0000	EA	05
282-290	SEALANT LOCTITE 290	10 ML BOTTLE	000000		0.1020	EA	16
342-013	FILTER,LINE 6A 250V PC MT	CORCOM 6EDP	000000		1.0000	EA	FL1
372-15RA	CONN 15-P DIN PWR RT ANG	HARTING 09-06-115-2921	000000		1.0000	EA	P1
560-1209	PANEL, FRT PWR SUPPLY	FAB/SCREEN	000000		1.0000	EA	02
560-2146	PCB POWER SUPPLY	FAB	000000		1.0000	EA	01
LA	LABOR ASSEMBLY COST HRS		000000		0	EA	
LT	LABOR TEST COST HOURS		000000		0	EA	
OSY560-5146-6	OUTSIDE LABOR 560-5146-6	PCA	000000		1.0000	EA	