

# *TrueTime*

## **Model 560-5152 NTS Input/Output Module Manual**

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# SECTION ONE

## 1. GENERAL INFORMATION

### 1.1. PURPOSE OF EQUIPMENT

The TrueTime Model 560-5152 NTS Input/Output Module provides an input/output interface, via a Male DB-9 connector (labeled CPU I/O), between the Network Time Server and the user. A female DB15 Attachment Unit Interface (AUI) connector provides the Ethernet interface. A local DC-to-DC converter supplies 12V to the AUI Interface for an external Medium Attachment Unit (MAU).

#### 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% max. relative, non-condensing  
Cooling Mode: Convection

#### 1.1.3. POWER REQUIREMENTS

Voltage: 18-72 Vdc  
Power: 120% of AUI Interface Pin 13 (9 Watts maximum)

#### 1.1.4. USER INPUT/OUTPUT

Connector Type: DB-9M  
Connector Pinout:  
Pin 1: Not Used  
Pin 2: RXD / RS-232 In  
Pin 3: TXD / RS-232 Out  
Pin 4: Not Used  
Pin 5: SIGNAL GND  
Pin 6: RIN- / Differential- In  
Pin 7: RIN+ / Differential+ In  
Pin 8: TOUT- / Differential- Out  
Pin 9: TOUT+ / Differential+ Out

#### 1.1.5. ETHERNET AUI INTERFACE

Connector: DB-15F  
Connector Pinout:  
Pin 1: GND  
Pin 2: CI+  
Pin 3: DO+  
Pin 4: GND  
Pin 5: DI+  
Pin 6: GND  
Pin 7: NC  
Pin 8: NC  
Pin 9: CI-  
Pin 10: DO-  
Pin 11: GND  
Pin 12: DI-  
Pin 13: +12V OUT  
Pin 14: GND  
Pin 15: NC

1.1.6. CARD COMPATIBILITY

Location: Slot 1-17.

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

**CAUTION: Individual components on this card are sensitive to static discharge. Use proper static discharge procedures during 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 NTS I/O Module. These descriptions should be used in conjunction with the drawings in SECTION FOUR.

#### 3.2. HARDWARE DESCRIPTION

The card incorporates a DB-9M male connector and a DB-25F female connector.

The DB-9M connector supports RS-232 and differential communications to/from the NTS User Port. The DB-25F AUI Interface supports Ethernet communications via an external Medium Attachment Unit (MAU).

The DC-to-DC converter converts 48 Vdc backplane power to local +12 Vdc power for external MAU. It is fully isolated from the backplane power and referenced to signal GND on the Analog output card. Backplane power is supplied via a polyswitch fuse device, diode, and Pi-section L-C filter. The poly-fuse protects the backplane power bus from internal DC-to-DC shorts. The diode and L-C filter serve a triple purpose.

During live insertion, the high-current inductor minimizes in-rush current to the DC-to-DC being inserted; and, the diode and capacitor serve to hold up the local voltage at the input to each currently installed DC-to-DC.

During steady-state conditions, the L-C filter minimizes switching noise coupled back into the backplane power bus. During live-extraction, the 0.1 uF capacitor absorbs the inductive kick of the opened circuit, minimizing contact arcing.

## **SECTION FOUR**

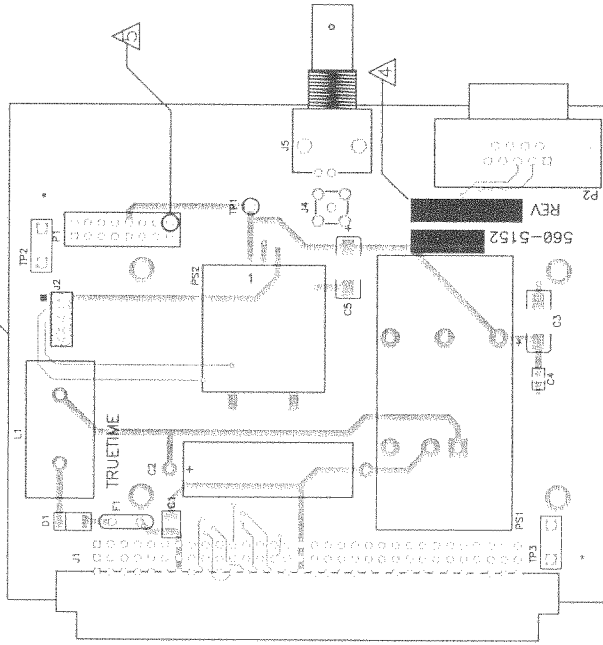
### **4. DETAILED DRAWINGS**

4.1. 560-5152 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 REVISION LEVEL AND ASSEMBLY NUMBER.
-  CLIP PIN 16 OF P1 AFTER INSTALLATION.



REVISIONS

REV	DESCRIPTION	DATE	APPROVED
02	CORRECTED BOARD DIMENSIONS & CONNECTOR PATTERN; RELOCATED COMPONENTS	11/13/97	
03	CAR 961	05/14/98	
04	CAR 1005	05/29/98	
05	ECO 1169	05/19/99	SK/RZ



CONTRACT NO.	APPROVALS	DATE
	B.A.S.	11-04-97
DRAWN BY	CHECKED	APPROVED
	SK	SK
		5/99

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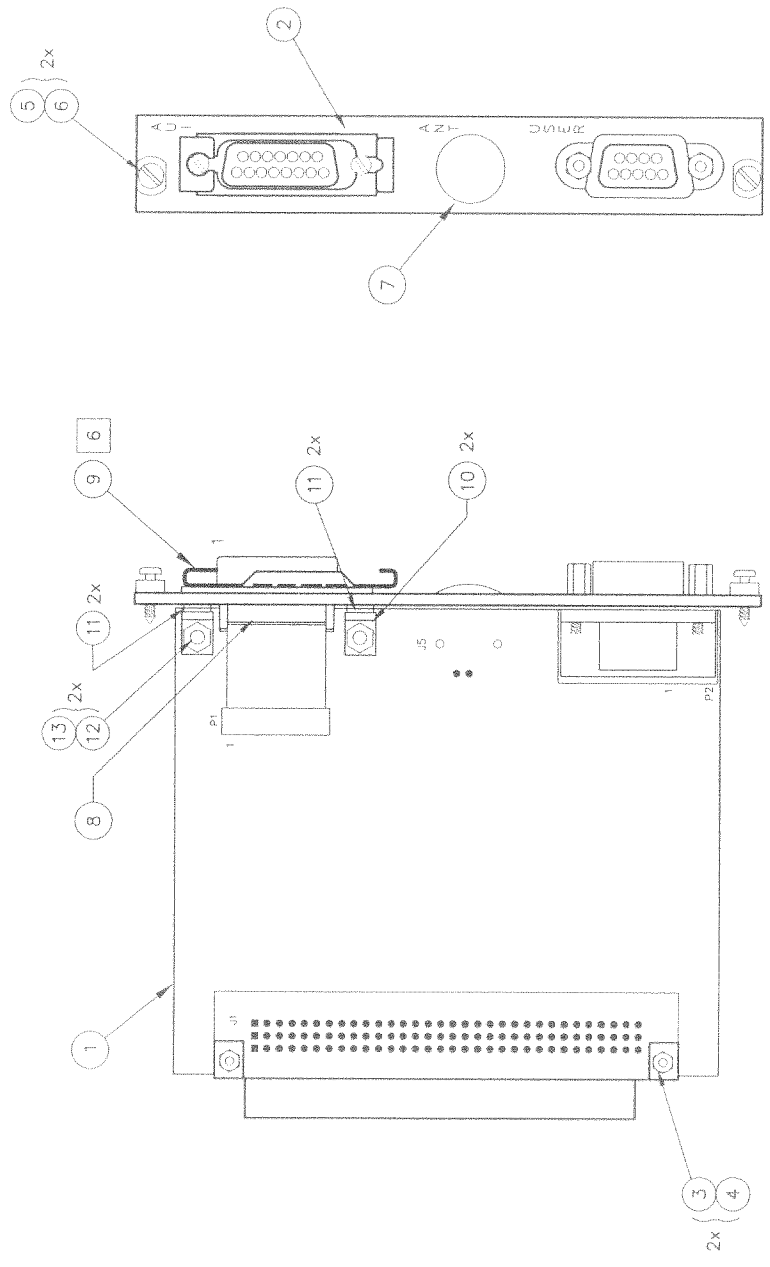
Title	NTS DRC REAR CARD
ASSEMBLY DRAWING, TOP SIDE	
Size	B
Number	560-5152
Rev	05
Date	Wed May 19, 1999 13:19:32
Drawn by	B.A.S.
Filename	2152-02.PCB
Sheet	1 of 3

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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		560-5152	05
SCALE: NONE			SHEET 2 OF 3

FILENAME: \560\5152  
 DATE: 05-19-99

6 DISCARD NUTS AND LOCK WASHERS.  
 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	UOM	REV LVL	REFERENCE DESCRIPTION
560-5152	ASSY NTS REAR CONN	(DRC56000)					EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000	EA		<i>SLR/DR 5/99</i>
0000-PL	PARTS LIST REV LEVEL		000000		1.0000	EA		REV 05 (05-20-99)
0000-PRINT	REFERENCE PRINT		000000		1.0000	EA		560-5152 REV 05
0000-REV	PCB REV LEVEL HERE >>>>		000000		1.0000	EA		560-2152 REV 02
023-010-250	CAP AE 10UF 250V A	SPRAGUE TVA-1504	000000		1.0000	EA		C2
036S-X7R104	CAP .1UF X7R 100V 1210	NIC NMC1210X7R104K100TR	000000		1.0000	EA		C1
045-33	INDUCTOR 33UH 5.5A	DALE IHM-2 33UH +/-10%	000000		1.0000	EA		L1
057S-4002	DIODE 4002	ROHM RLR4002	000000		1.0000	EA		D1
208-001	BRACKET UNIV L SHAPE	KEYSTONE 612	000000		2.0000	EA		10
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		05
223-464	SLEEVE, STAINLESS	SCHROFF 21100-660	000000		2.0000	EA		06
241-004-003	SCREW PH FH SS 4-40X3/8	BUY/USE 100 DEGREE ONLY	000000		2.0000	EA		12
251-004	NUT KEP SS 4-40	AROW KN-04C-S-0-M	000000		2.0000	EA		13
253-004S	WSHR, FLAT #4 SS .209 OD	SMALL PATTERN	000000		4.0000	EA		11
273-009	TERMINAL TEST POINT	COMP CORP PJ-201-25	000000		1.0000	EA		TP3
274-009	PLUG HOLE NYL BLK 1/2 IN.	HEYCO 2643	000000		1.0000	EA		07
355-UWR-12	DC-DC 18-72VIN +12V OUT	DATEL UWR-12/750-D48	000000		1.0000	EA		PS1
363-0.9LV	POLYSWITCH 0.9A (60 VOLT)	RAYCHEM RXE090	000000		1.0000	EA		F1
372-09P	CONN 9-P D-SUB RT ANG ML	AMP 748879-1 (BOM NAV)	000000		1.0000	EA		P2
372-15D	KIT, SLIDE LATCH 15D CONN	ITT CANNON DA51220-1	000000		1.0000	EA		09
372-609-003	JACK SOCKET SET OF 2	THOMAS & BETTS 609-003	000000		1.0000	EA		FOR P2
372-96RA	CONN,96-P FM DIN RT ANGLE	BERG 68353-296 (BOM NAV)	000000		1.0000	EA		J1
391-004	ADAPTER FOR RS PORT	FAITECH MCM70029	000000		1.0000	EA		SHIPPING KIT
392-692	CABLE ASSY NTS-100		000000		1.0000	EA		08
392-694	CABLE ASSY NTS-100	AUI EXTENSION	000000		1.0000	EA		SHIPPING KIT
401-01-02-34	CONN 64-P DBL ROW HDR	BERG 67998-464	000000		1.0000	EA		P1 (CUT TO FIT)
560-1244	PANEL,REAR DRC NTS	FAB/SCREEN	000000		1.0000	EA		02
560-2152	PCB NTS REAR CONN	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: C3,4,5							
	PS2							
	J2,4,5							
	TP1,2							
OSV560-5152	OUTSIDE LABOR 560-5152	PCA	000000		1.0000	EA		