

# Instruction Manual



**PSC1125**

**Digital Television Parallel-to-Serial Converter**

**071-0146-05**

**Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.



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For other information	<p>In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.</p>
To write us	<p>Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000</p>

## Service Assurance

If you have not already purchased Service Assurance for this product, you may do so at any time during the product's warranty period. Service Assurance provides Repair Protection and Calibration Services to meet your needs.

**Repair Protection** extends priority repair services beyond the product's warranty period; you may purchase up to three years of Repair Protection.

**Calibration Services** provide annual calibration of your product, standards compliance and required audit documentation, recall assurance, and reminder notification of scheduled calibration. Coverage begins upon registration; you may purchase up to five years of Calibration Services.

### Service Assurance Advantages

- Priced well below the cost of a single repair or calibration
- Avoid delays for service by eliminating the need for separate purchase authorizations from your company
- Eliminates unexpected service expenses

### For Information and Ordering

For more information or to order Service Assurance, contact your Tektronix representative and provide the information below. Service Assurance may not be available in locations outside the United States of America.

Name	VISA or Master Card number and expiration
Company	date or purchase order number
Address	Repair Protection (1,2, or 3 years)
City, State, Postal code	Calibration Services (1,2,3,4, or 5 years)
Country	Instrument model and serial number
Phone	Instrument purchase date



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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

## To Avoid Fire or Personal Injury

**Use Proper Power Cord.** Use only the power cord specified for this product and certified for the country of use.

**Ground the Product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Provide Proper Ventilation.** Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

**Symbols and Terms**

**Terms in this Manual.** These terms may appear in this manual:



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**WARNING.** Warning statements identify conditions or practices that could result in injury or loss of life.

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**CAUTION.** Caution statements identify conditions or practices that could result in damage to this product or other property.

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**Terms on the Product.** These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

**Symbols on the Product.** The following symbols may appear on the product:



WARNING  
High Voltage



Protective Ground  
(Earth) Terminal



CAUTION  
Refer to Manual



Double  
Insulated

# Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

**Do Not Service Alone.** Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

**Disconnect Power.** To avoid electric shock, disconnect the power cord.

**Do Not Service With Power On.** Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect cables before removing panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.



# Getting Started

This section presents information you need to set up your PSC 1125 Digital Television Parallel-to-Serial Converter. This section contains the following information:

- Product Description
- Options and Accessories
- Installation

## Product Description

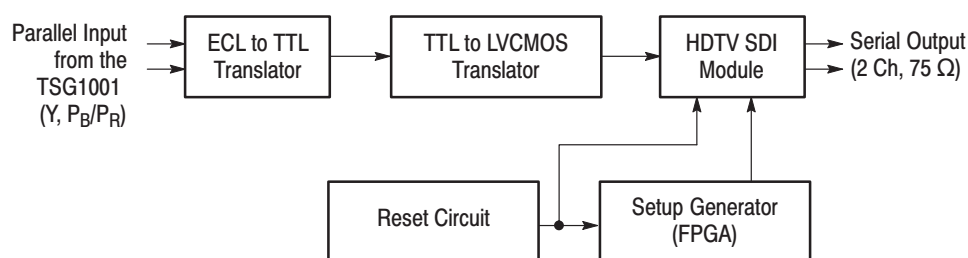
The PSC 1125 Digital Television Parallel-to-Serial Converter converts digital television parallel signals to digital television serial digital signals which comply with BTA S-004A (SMPTE 292M). Because the converter accepts output signals from the Tektronix TSG1001 Multi-format Test Signal Generator, you can generate a digital television signal by using the converter in combination with the generator.

---

**NOTE.** To assure proper operation of your converter, your TSG1001 Multi-format Test Signal Generator must have a serial number of B040000 or above, or it must be upgraded to the B040000 level with the field upgrade kit part number 040-1526-00.

---

See Figure 1-1 for a block diagram of the converter.



**Figure 1-1: Block diagram**

- Features** The converter offers the following features:
- 1125/60, 1125/59.94, 750/60, and 750/59.94 format (auto-selected)
  - TSG1001 parallel digital output signal input, and serial digital signal output
  - Embedded Audio (1125i Format only)

## Options and Accessories

The converter is shipped with the standard accessories listed in Table 1–1.

**Table 1–1: Standard accessories**

<b>Accessory</b>	<b>Part number</b>
Instruction Manual	071-0146-XX
U.S. Power Cord	161-0216-XX
3.5-inch floppy disk, TSG1001 Signal Library for PSC1125	063-2986-XX
2 cables, 25-pin, D-type (for TSG1001 connection) (These cables should be installed as described on page 1–6.)	174-3882-XX
Calibration Certificate	



## Installation

This section provides instructions for installing the converter. Refer to the *Specifications* section for details about the appropriate installation environment.



---

**CAUTION.** Do not install the instrument in a place where ambient temperature may go over 40°C (104°F).

*For proper ventilation, the instrument requires a clearance of 6 inches at the front and rear. The cooling air goes in through the front vent holes and out through the rear panel vent holes. Restricting the air flow can lead to an excessive internal temperature. Before starting operation, make sure that nothing blocks the vent holes.*

---

### Connecting Power

The converter operates from a single-phase power source with the neutral conductor at or near earth ground. The line conductor is fused for over-current protection. A protective ground connection through the grounding conductor in the power cord is essential for safe operation.



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**CAUTION.** The instrument does not have a power-switch. When you connect the power cable to the AC line connector, the instrument powers on.

---

**AC Power Requirements.** The converter operates from an AC line frequency of 50 or 60 Hz, over the range of 100 to 240 V. The typical power draw is 20 VA (approximately 20 Watts). Refer to the *Specifications* section for additional information on power and environmental requirements.

**Connecting Cable.** Connect the power cable to the instrument first, and then connect it to the AC voltage line. Note that connecting the power cable causes the instrument to power on.

After connecting the power, make sure that the fan on the rear panel is working. If the fan is not working, turn off the power by disconnecting the power cable from the AC voltage line and contact Tektronix for servicing.

**Downloading Signal Libraries**

The TSG1001 signal library floppy disk (Tektronix part number 063-2986-XX) is supplied with the converter. This disk contains the following items:

- SMPTE 260M/274M/296M download files which comply with the SDP1000 V2.3 or above
- Special tools to let the TSG1001 generate signals which comply with SMPTE 260M/274M/296M

See Table 1–2 for descriptions of the signals on the disk.

**Table 1–2: Files on the TSG1001 Signal Library floppy disk**

Library DNL file	File description	Field rates
1125_BTA.DNL	HDTV/ BTA S-002A	60 Hz
1125_60.DNL	HDTV/ SMPTE 274M	60 Hz
1125_59.DNL	HDTV/ SMPTE 274M	59.94 Hz
1125.DNL	HDTV/ SMPTE 274M	Both 59.94 Hz and 60 Hz
750_60.DNL	HDTV/ SMPTE 296M	60 Hz
750_59.DNL	HDTV/ SMPTE 296M	59.94 Hz
MULTI.DNL	HDTV/ SMPTE 274M/296M	Both 59.94 Hz and 60 Hz

**NOTE.** *The Zone Plate signal set is available on the TSG1001 and is independent of the DNL signal set that is loaded into the TSG1001 RAM.*

*Press the Signal Set button to select the Zone Plate signal. Select RAM Board to re-select the signal set in the DNL file that was downloaded.*

*The Zone Plate signal is a digital Luminance or Y channel signal for sinusoidal evaluation of multidimensional spectral response and is converted to serial-digital by the converter. However, the Cr/Cb or color-difference signals are not at digital black and this signal does not convert to a proper digital/analog RGB signal.*

*Upon conversion of the Y signal to analog, you can evaluate the picture monitor response by looping the Y signal through all three RGB inputs or by not connecting the Pb/Pr signals to a picture monitor with Y/Pb/Pr inputs.*

*Note also that the Y, Pb, Pr buttons on the TSG1001 front panel selectively blank the digital signal outputs to a value close to, but not equal to, digital black.*

To generate the necessary signal, you must download the signal set data supplied with the floppy disk to the TSG1001. Refer to the SDP1000 user manual for details on how to download to the TSG1001.

An example for downloading the signal libraries follows:

To download the signal libraries from a PC to the TSG1001, you should install the SDP1000 communication utility, COM1000, into the PC. If the necessary communication utility is not already stored in the directory, sdp1000, refer to the TSG1001 and SDP1000 product documentation.

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**NOTE.** For details on installation of the COM1000, the SDP1000 communication utility, and downloading the signal set data to the TSG1001, refer to the manuals supplied with the TSG1001 and SDP1000.

---

1. Connect the TSG1001 and PC using the parallel interface cable that is supplied with the TSG1001. On the PC, type:

```
cd sdp1000 <Return>
com1000 <Return>
<Return>
```

DOWNLOAD screen appears. Press:

```
<Return>
```

2. Insert the signal library floppy disk into the floppy disk drive on the PC. Type:

```
a: <Return>
```

The screen for the libraries appears.

```
<Return>
```

3. Select one of the files. For example, select the 1125\_59 (HDTV/SMPTE 274M 59.94 Hz) signal set file which provides SMPTE 274M data with BT.709 colorimetry and 59.94 Hz field rate. Then press:

```
<Return>
```

Wait until the PC indicates that the download process has completed successfully.

### **Making Connections**

Follow these steps to connect the converter, the TSG1001, and the equipment to which you want to provide the signal.

1. Using one of the cables supplied with the converter, connect the G/Y connector on the TSG1001 to the Y connector on the converter.
2. Using the other cable supplied with the converter, connect one end to the B/Pb connector on the TSG1001. Wrap the cable around the first cable forming a twisted pair with at least 1 full turn per foot of length. Connect the remaining end to the P<sub>B</sub>/P<sub>R</sub> connector on the converter. This twisted-Pair cable arrangement will help assure compliance with EMI radiated emissions.
3. Using a 75  $\Omega$  BNC cable, connect the OUT1 or OUT2 connector on the converter rear panel to a connector on the equipment to which you want to provide the signal.

# Operating Basics

This section provides an overview of the front-panel features and rear-panel connectors. Also included are procedures for cleaning the exterior of the instrument.

## Front Panel Overview

Figure 2–1 shows the front panel of the converter.

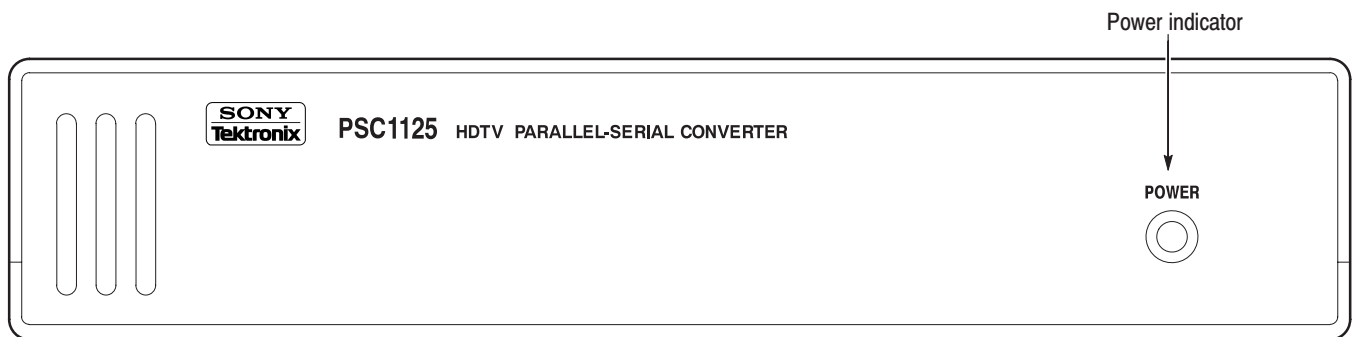


Figure 2–1: PSC 1125 front panel

**Power Indicator** The LED will light in green when the power is turned on.

Note that the instrument does not have a power-switch. When you connect the power cable to the AC voltage line connector, the instrument powers on.

## Rear Panel Overview

Figure 2–2 shows the rear panel of the converter.

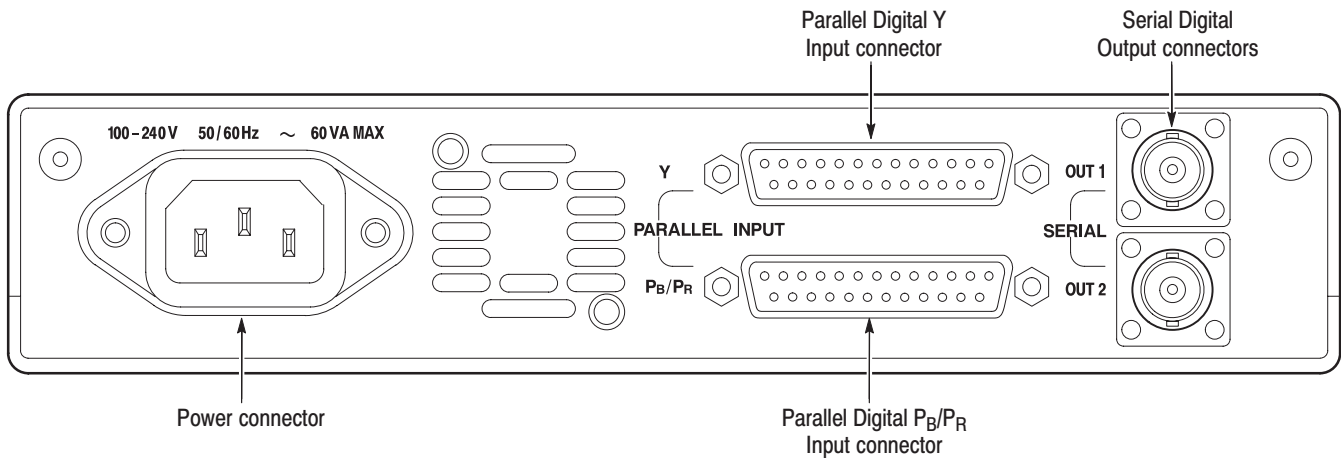


Figure 2–2: PSC 1125 rear panel

### Power Connector

This instrument operates from a single-phase power source with one current-carrying conductor at or near earth-ground (the neutral conductor). Only the line conductor is fused for over-current protection. The mains frequency is 50 or 60 Hz. The operating voltage range is continuous from 100 to 240 VAC.

Note that the instrument does not have a power-switch. When you connect the power cable to the AC voltage line, the instrument powers on.

### Parallel Input Connectors

The two Parallel Input connectors accept signals which comply with the SMPTE 260M/274M/296M standard:

**Y.** Accepts Y parallel signals.

**P<sub>B</sub>/P<sub>R</sub>.** Accepts P<sub>B</sub>/P<sub>R</sub> signals.

### Serial Out 1/2 Connector

The Serial Out 1/2 connector outputs two identical converted serial digital signals which comply with the SMPTE 292M standard.

Inspection and cleaning are preventive maintenance procedures. When done regularly, preventive maintenance may prevent converter malfunction and enhance reliability.

# Customer Maintenance

Preventive maintenance consists of visually inspecting and cleaning the converter, and using general care when operating it. How often to do preventive maintenance depends on the severity of the environment in which the converter operates.

## General Care

The cabinet helps keep dust out of the converter and is a major component of the instrument cooling system.

Inspect and clean the converter as operating conditions require. The collection of dirt on components inside can cause them to overheat and break down. (Dirt acts as an insulating blanket, preventing efficient heat dissipation.) Dirt also provides an electrical conduction path that can cause an instrument failure, especially under high-humidity conditions.

## Inspection

Inspect the outside of the converter for damage, wear, and missing parts. If the converter appears to have been dropped or otherwise abused, seek service.

## Cleaning

Before cleaning, disconnect the converter from the power source.



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**CAUTION.** To prevent damaging the plastics used in the converter, do not use abrasive cleaning agents. Use a 75% isopropyl alcohol solution or a general purpose detergent-and-water solution. Rinse with deionized water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

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**WARNING.** To avoid potential electric shock hazard or damage to the converter circuits, do not allow any moisture inside the converter during external cleaning; use only enough liquid to dampen the cloth or applicator.

---

1. Remove loose dust on the outside of the converter with a lint free cloth.
2. Remove remaining dirt with a lint free cloth dampened in a general purpose detergent-and-water solution. Do not use abrasive cleaners.



# Specifications

Tables \*\*3-1\*\* through \*\*3-4\*\* list the electrical specifications for the PSC 1125 Digital Television Parallel-to-Serial Converter. Performance requirements are generally quantitative and can be tested by qualified service personnel. Reference information describes useful operating parameters and typical characteristics and performance.

The reference information listed in the electrical specification portion of these specifications apply over an ambient temperature range of 0° C to +40° C (32° F to 104° F). The rated accuracies are valid when the instrument is calibrated at an ambient temperature range of +20° C to +30° C (68° F to 86° F), after a warm-up time of 20 minutes.

**Table 3-1: Digital video interface**

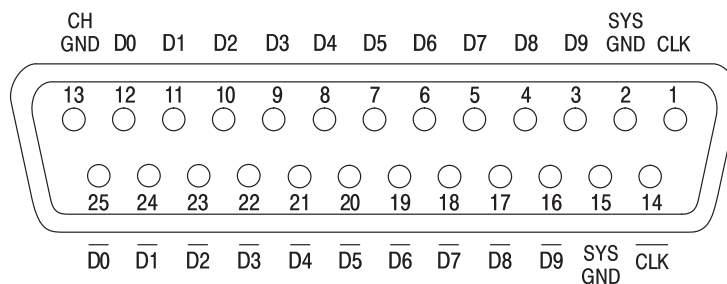
Characteristic	Reference information								
Parallel input									
Format	EAV and SAV must be properly encoded in both the Y and C <sub>B</sub> /C <sub>R</sub> parallel data for each format.  <table border="0"> <tr> <td>1125/60/2:1</td> <td>74.25 MHz</td> </tr> <tr> <td>1125/59.94/2:1</td> <td>74.17582 MHz</td> </tr> <tr> <td>750/60/1:1</td> <td>74.25 MHz</td> </tr> <tr> <td>750/59.94/1:1</td> <td>74.17582 MHz</td> </tr> </table> Format is automatically selected by the EAV-SAV position. CRC and line numbers are automatically embedded for each format.	1125/60/2:1	74.25 MHz	1125/59.94/2:1	74.17582 MHz	750/60/1:1	74.25 MHz	750/59.94/1:1	74.17582 MHz
1125/60/2:1	74.25 MHz								
1125/59.94/2:1	74.17582 MHz								
750/60/1:1	74.25 MHz								
750/59.94/1:1	74.17582 MHz								
Digital input									
Connectors	25 Pin, D-sub, Female × 2								
Y, P <sub>B</sub> /P <sub>R</sub>	10 data pairs, 1 clock pair Balanced ECL (10 KH Series), see Figure **3-1**.								
Timing parameters	See Figure **3-1**.								
Tset	≥ 5 ns (Y signal CLK)								
Thold	≥ 4 ns								
Input impedance	110 Ω ± 10 Ω								
Differential input voltage	150 mV minimum								
Common mode									
Range	-2.85 to -1.3 V								
Voltage	± 1.0 Vdc								
Serial output									
Connectors	BNC × 2								

**Table 3-1: Digital video interface (Cont.)**

Characteristic	Reference information
Number of outputs	2 (same signals, separate drivers)
Bit rate	1.4835 G to 1.485 G bps
Serial amplitude	800 mV ± 10 % (at 75 Ω load)
Rise and fall times	≤ 270 ps (20 to 80 % amplitude points)
Jitter	≤ 135 ps (alignment jitter)
Return loss	≥ 15 dB (5 MHz to 750 MHz) ≥ 10 dB (750 MHz to 1.5 GHz)

**Table 3-2: Embedded Audio**

Characteristic	Reference information
Output	This output is enabled only for 1125I input data.
Format	Based on BTA-S005A, BTA-S006A
Number of channels	8
Sampling frequency	48 kHz only Audio clock is automatically locked to the Parallel Video clock.
Field rate	60 Hz                    48k=(74.25M/9)*8/1375 59.94 Hz                48k=(74.25/(9*1.001))*91/15625
Generated tone	-20 dBFS@1 kHz , - ∞ dBFS, or no data and control packet (by jumper setting)
Data packets	
Data ID	0 X 2E7 and 0X1E6
Control packets	
60 Hz Field rate	Based on BTA S-006A
59.94 Hz Field rate	Based on BTA S-006A; however, AF is set to 0 X 20 and RATE is set to 0 X 21. These values mean the unsynchronized mode. But in fact, audio and video are synchronized.



MSB: D9  
LSB: D0

**Figure 3-1: Parallel input connector (Y, P<sub>B</sub>/P<sub>R</sub>)**

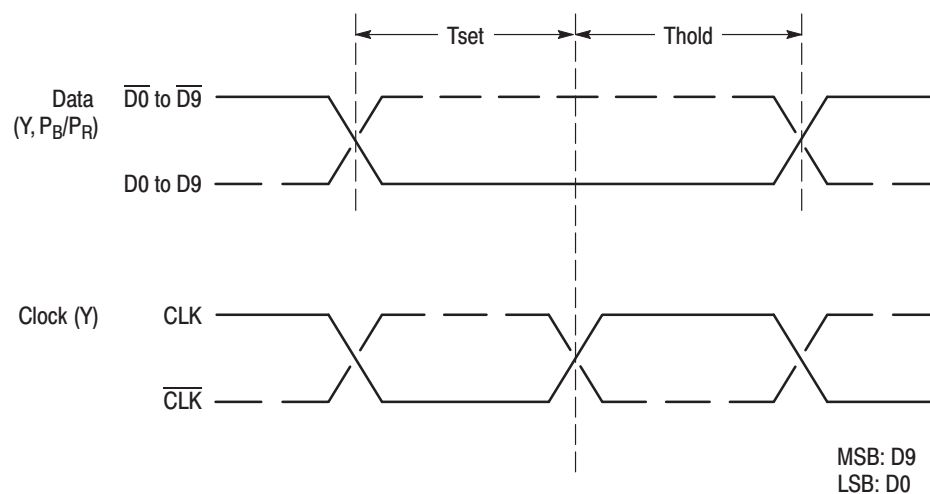


Figure 3-2: Data-to-clock relation (parallel input)

Table 3-3: AC power source

Characteristic	Reference information
Range	100 to 240 VAC, 50 to 60 Hz
Maximum power	30 VA (approximately 30 Watts)
Supply connection	Detachable cord set

Table 3-4: Installation requirements

Characteristic	Reference information
Clearance	
Front	15 cm (6 inches)
Rear	15 cm (6 inches)

Table 3-5: Environmental characteristics

Characteristic	Standard and reference information
Temperature	
Operating	0° to +40° C
Non-operating	-20° to +60° C

**Table 3-5: Environmental characteristics (Cont.)**

Characteristic	Standard and reference information
Altitude	Operating
	4,500 m Maximum operating temperature decreases 1° C each 300 m above 1,500 km.
Non-operating	15,000 m
Relative humidity	Operating
	20 % to 80 % (No condensation)
Non-operating	5 % to 90 % (No condensation)
Vibration	Operating
	15 minutes at 10 to 55 Hz with 0.31 g rms
Mechanical shock	Non-operating
	294 m/s <sup>2</sup> (30 g) 1/2 sine, 11 ms duration, 3 shocks per surface (18 total)

**Table 3-6: Certifications and compliances**

Category	Standards or description
EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EN 55011                                      Class A Radiated and Conducted Emissions EN 50081-1 Emissions: EN 61000-3-2                                  AC Power Line Harmonic Emissions EN 50082-1 Immunity: EN 61000-4-2                                  Electrostatic Discharge Immunity EN 61000-4-3                                  RF Electromagnetic Field Immunity EN 61000-4-4                                  Electrical Fast Transient Immunity EN 61000-4-5                                  Surge Immunity EN 61000-4-6                                  Conducted Disturbances Induced by RF Fields EN 61000-4-8                                  Power Frequency Electromagnetic Field EN 61000-4-11                                Power Line Interruption Immunity
Australia/New Zealand Declaration of Conformity – EMC	Complies with EMC provision of Radiocommunications Act per the following standard(s): AS/NZS 2064.1/2                              Industrial, Scientific, and Medical Equipment: 1992
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits.

**Table 3-6: Certifications and compliances (Cont.)**

Category	Standards or description
EC Declaration of Conformity – Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union: Low Voltage Directive 73/23/EEC, amended by 93/68/EEC EN 61010-1:1993 Safety requirements for electrical equipment for measurement control and laboratory use.
U.S. Nationally Recognized Testing Laboratory Listing	UL3111-1 Standard for electrical measuring and test equipment.
Canadian Certification	CAN/CSA C22.2 No. 1010.1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	IEC61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are: CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location. CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected. CAT I Secondary (signal level) or battery operated circuits of electronic equipment.
Pollution Degree	A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated. Pollution Degree 1 No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms. Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service. Pollution Degree 3 Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind. Pollution Degree 4 Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.
<b>Safety Certification Compliance</b>	
Altitude (maximum operating)	2000 meters
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC 1010-1, Annex H) – grounded product
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010-1, Annex J)
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010-1). Note: Rated for indoor use only.

**Table 3-7: Physical characteristics**

<b>Characteristics</b>	<b>Descriptions</b>
Dimensions	
Height	43.4 mm (1.71 in)
Width	206.2 mm (8.12 in)
Depth	336.0 mm (13.2 in)
Weight	
Net	approximately 2.5 kg (approximately 5.5 lbs)
Shipping	approximately 4.1 kg (approximately 9 lbs)



## ***Warning***

***The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all Safety Summaries before performing any service.***





# Performance Verification

This section describes the operation tests and gives the procedures for those tests.

## Before Running the Tests

Before running the performance tests, perform the following steps:

1. Allow a 20 minute warm-up period for all the instruments.
2. Adjust the internal voltage. Refer to *Adjustment Procedures* on page 6–1.
3. Calibrate external equipment needed for these performance tests.

## Required Equipment

Table 4–1 lists the equipment required for the performance tests. To assure proper operation of your converter, your TSG1001 Multi-format Test Signal Generator must have a serial number of B040000 or above, or it must be upgraded to the B040000 level with the field upgrade kit part number 040-1526-00.

**Table 4–1: Required equipment**

Item	Qty.	Required precision	Recommended equipment	Purpose
Digital TV signal generator	1	Latest modification must be installed.	Tektronix TSG1001 Multi-format Test Signal Generator	Signal source
Digital TV waveform monitor	1		Tektronix WFM1125 Digital TV Waveform Monitor Option 0C	Waveform monitor
Digital audio monitor	1		Tektronix 764 or equivalent	To observe digital audio output
Sampling oscilloscope	1		Tektronix 11801C or equivalent, sampling head (SD-24 or-26)	To observe eye pattern
75-to-50 $\Omega$ minimum-loss pad	2	Minimum loss	Tektronix part no. 011-0057-01	Signal interconnection
50 $\Omega$ BNC to SMA adapter	2		Tektronix part no. 015-1018-00	Signal interconnection
50 $\Omega$ coaxial cable	2	Low loss	Tektronix part no. 012-0432-00	Signal interconnection
75 $\Omega$ coaxial cable	4	Serial digital video cable less than 1 m in length		Signal interconnection
75 $\Omega$ terminator	2		Tektronix part no. 011-0-02-00	Signal interconnection

**Table 4-1: Required equipment (Cont.)**

Item	Qty.	Required precision	Recommended equipment	Purpose
Signal set floppy disk	1	TSG1001 BTA S-002A Signal Library	Tektronix part no. 063-2986-XX, Supplied with the converter	Signal set data to be downloaded to the TSG1001 generator for tests
PC	1	IBM PC compatible		For downloading the signal set data to the TSG1001 generator
Parallel interface cable	1		Tektronix part no. 174-2344-00, Supplied with the TSG1001 generator	Connection between a PC and the TSG1001 generator.
Parallel signal cable	2	D-type, 25 pin	Tektronix part no. 174-3882-00, Supplied with the converter	Connection between the converter and the TSG1001 generator as described on page 1-6 .

## Performance Tests

The performance tests must be performed in the following order:

1. SDI Output Correctness Check
2. Digital Audio Output Check
3. Eye Pattern Check for CH1 and CH2 output
4. Eye Pattern Check for HK-101 unused terminal



**CAUTION.** *The last performance test is only to be performed by trained service technicians.*

### Preparations

Before you perform tests, download to the TSG1001 generator one of the signal sets supplied on the TSG1001 Signal Library floppy disk. See Table 4-2 for descriptions of the signals on the disk.

**Table 4-2: Files on the TSG1001 Signal Library floppy disk**

Library DNL file	File description	Field rates
1125_BTA.DNL	HDTV/ BTA S-002A	60 Hz
1125_60.DNL	HDTV/ SMPTE 274M	60 Hz
1125_59.DNL	HDTV/ SMPTE 274M	59.94 Hz

**Table 4-2: Files on the TSG1001 Signal Library floppy disk (Cont.)**

Library DNL file	File description	Field rates
1125.DNL	HDTV/ SMPTE 274M	Both 59.94 Hz and 60 Hz
750_60.DNL	HDTV/ SMPTE 296M	60 Hz
750_59.DNL	HDTV/ SMPTE 296M	59.94 Hz
MULTI.DNL	HDTV/ SMPTE 274M/296M	Both 59.94 Hz and 60 Hz

**NOTE.** The Zone Plate signal set is available on the TSG1001 and is independent of the DNL signal set that is loaded into the TSG1001 RAM.

Press the Signal Set button to select the Zone Plate signal. Select RAM Board to re-select the signal set in the DNL file that was downloaded.

The Zone Plate signal is a digital Luminance or Y channel signal for sinusoidal evaluation of multidimensional spectral response and is converted to serial-digital by the converter. However, the Cb/Cr or color-difference signals are not at digital black and this signal does not convert to a proper digital/analog RGB signal.

Upon conversion of the Y signal to analog, you can evaluate the picture monitor response by looping the Y signal through all three RGB inputs or by not connecting the Pb/Pr signals to a picture monitor with Y/Pb/Pr inputs.

Note also that the Y, Pb, Pr buttons on the TSG1001 front panel defeat the digital signal outputs but do not set them to digital black.

To load the signal set data into the TSG1001 generator, you should install the SDP1000 communication utility, COM1000, onto a PC. If the necessary communication utility is not already stored in the directory, SDP1000, refer to the TSG1001 and SDP1000 product documentation.

**NOTE.** For the details on installing the COM1000, installing the SDP1000 communication utility, and downloading the signal set data to the TSG1001 generator, refer to the manuals supplied with the TSG1001 generator and the SDP1000 package.

1. Connect the TSG1001 generator and PC with a parallel interface cable. On the PC, type:

```
cd sdp1000 <Return>
com1000 <Return>
<Return>
```

DOWNLOAD screen appears. Press:

<Return>

2. Insert the signal set floppy disk into the floppy disk drive on the PC. Type:

a: <Return>

The screen for the download files appears.

3. Select the MULTI (HDTV/SMPTE 274M/296M 59.94 Hz and 60 Hz) signal set file which provides SMPTE 274M/296M data with 59.94 Hz and 60 Hz field rate. Then press:

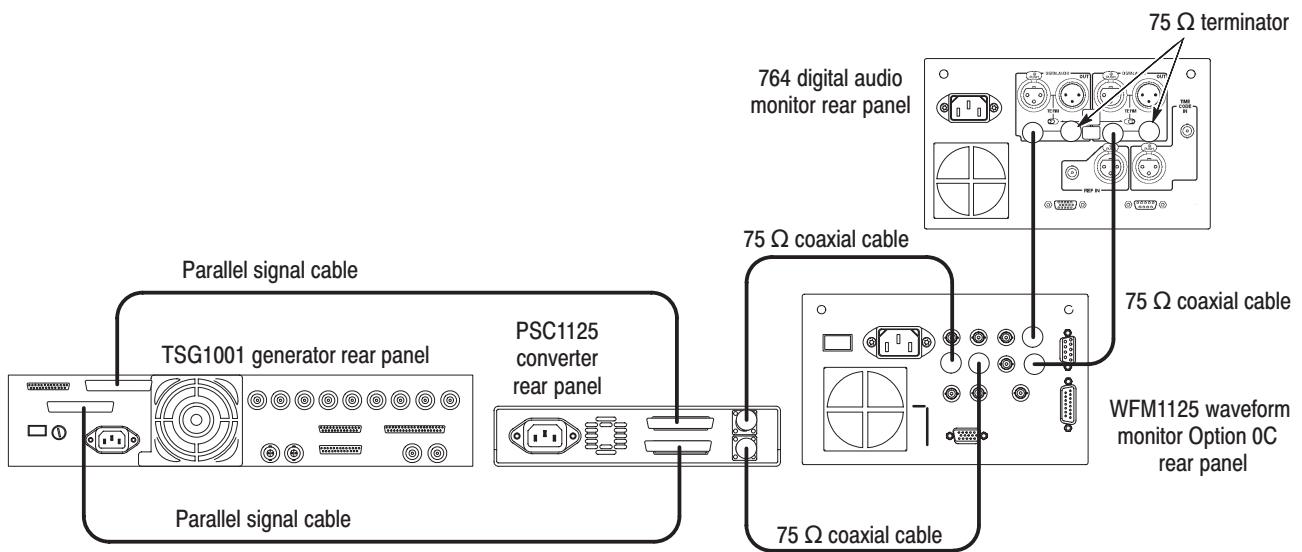
<Return>

Wait until the PC indicates that the download process has completed successfully.

**SDI Output Correctness Check**

<b>Equipment required</b>	Four 75 Ω coaxial cables Two parallel signal cables Two 75 Ω terminators WFM1125 Digital TV Waveform Monitor Option 0C TSG1001 Programmable TV Generator 764 Digital Audio Monitor
---------------------------	---

1. Refer to Figure 4–1 to install the test hookup:
  - a. Using one of the parallel signal cables (174-3882-XX) supplied with the converter, connect the G/Y connector on the TSG1001 generator to the Y connector on the converter.
  - b. Using the other parallel signal cable (174-3882-XX), connect the B/Pb connector on the TSG1001 generator to the P<sub>B</sub>P<sub>R</sub> connector on the converter.
  - c. Using two of the 75 Ω coaxial cables, connect the OUT1 and OUT2 connectors on the converter rear panel to the CH A and CH B connectors, respectively, on the digital TV waveform monitor rear panel.
  - d. Using the other two 75 Ω coaxial cables, connect the AUDIO CHA and AUDIO CHB connectors on the digital TV waveform monitor rear panel to the CH1–2 and CH3–4 BNC connectors, respectively, on the digital audio monitor rear panel.
  - e. Terminate the other side of loop-through to the CH1-2 and CH3–4 BNC connector with the 75 Ω terminators.



**Figure 4-1: Performance check initial hookup**

2. Set the TSG1001 generator signal output to ZONE PLATE and format to SMPTE 274M.
3. Set the digital TV waveform monitor interface format to SMPTE 274M.
4. Check the displayed waveform and CRC error:
  - a. Confirm that the waveform is correctly displayed on the digital TV waveform monitor.
  - b. Check that the CRC ERROR LED on the digital TV waveform monitor does not light.
5. Check the OUT2 output:
  - a. Select CH B input channel in the digital TV waveform monitor.
  - b. Perform step 4 to check the OUT2 output.
6. Change the TSG1001 generator signal output format to SMPTE 296M.
7. Set the digital waveform monitor interface format to SMPTE 296M.
8. Repeat steps 4 and 5 for SMPTE 296M.

## Embedded Audio Check

Only trained service technicians should perform the following procedure.

Use the test hookup and equipment controls from the previous test.



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**CAUTION.** *In the following procedures, you remove the converter top cover and access an internal module. Be sure to disconnect the power cable from the AC power line connector when you remove or install the cover or when you access the internal module.*

---



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**WARNING.** *To avoid serious injury, do not touch the exposed connections or components when operating the instrument with the protective cover removed. Dangerous potentials exist at several points within the converter.*

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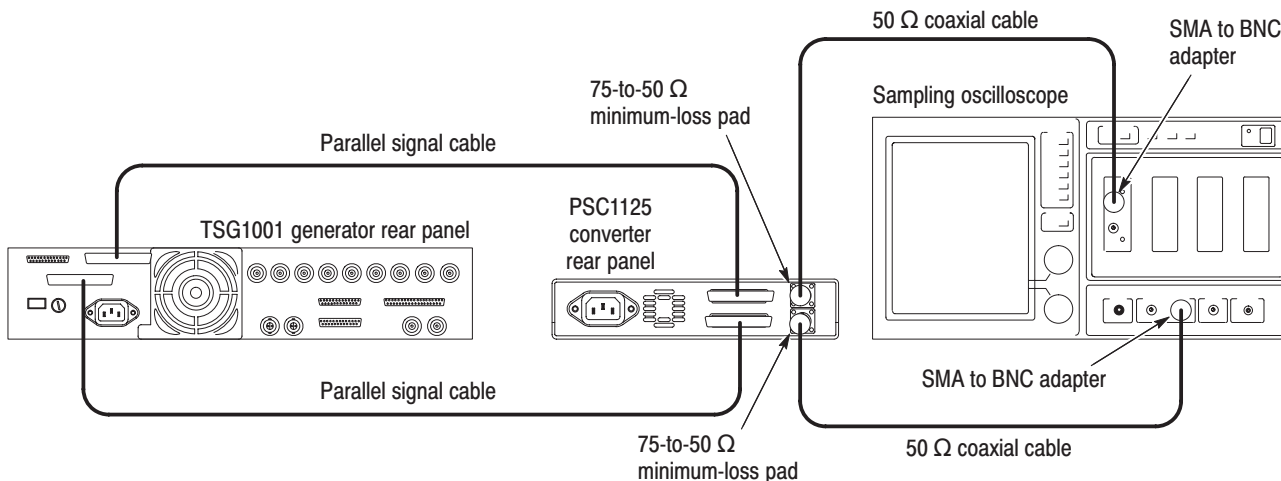
1. Change the internal jumper setting in the converter:
  - a. Disconnect the AC power cable from the AC Power line connector.
  - b. Remove the top cover and shield cover. Refer to *Top Cover and Shield Cover in Removal and Installation Procedures* on page 7–9.
  - c. Locate J400 on the A10 board and confirm that no jumpers put onto the jumper pin pairs 3–4 and 5–6. Refer to *Setting Sound Packet* section for more information about the jumper configuration.
  - d. Reconnect the AC power cable to the AC Power line connector.
2. Press the FORMATS button on the TSG1001 generator front panel to set the FORMATS to SMPTE 274M/59.94Hz.
3. Set the digital TV waveform monitor format setting to SMPTE 240M/274M.
4. On the digital audio monitor front panel, press the MENU button to display the menu.
5. Select input items from the menu, and select “CH1–2 input: BNC-unbalanced” and “CH3–4 input: BNC-unbalanced” items from the submenu.
6. On the digital audio monitor front panel, press the CLEAR MENU button to clear the menu.
7. On the digital audio monitor front panel, press the CH STATUS button to display CHANNEL STATUS view.
8. In the view, check CRC errors are not displayed.
9. On the digital audio monitor front panel, press the VIEW AUDIO button and SESSION button to display AUDIO/SESSION view.

10. In the view, check Highest true pks are  $-20$  dBFS.
11. Press the FORMATS button on the TSG1001 generator front panel to set the FORMAT to SMPTE 274M/60Hz.
12. Repeat steps from 7 to 10 for SMPTE 274M/60Hz.
13. Change the internal jumper setting in the converter:
  - a. Disconnect the AC power cable from the AC Power line connector.
  - b. Insert either jumper into the pin 3–4 on J400.
  - c. Reconnect the AC power cable to the AC Power line connector.
14. On the digital audio monitor front panel, press the CH STATUS button to display CHANNEL STATUS view.
15. In the view, check CRC errors are not displayed.
16. On the digital audio monitor front panel, press the VIEW AUDIO button and SESSION button to display AUDIO/SESSION view.
17. In the view, check Highest true pks are  $-90$  dBFS and below or null.
18. Press the FORMATS button on the TSG1001 generator front panel to set the FORMAT to SMPTE 274M/59.94Hz.
19. Repeat steps from 14 to 17 for SMPTE 274M/59.94Hz.
20. Change the internal jumper setting in the converter:
  - a. Disconnect the AC power cable from the AC Power line connector.
  - b. Move the jumper from pin 3–4 to pin 5–6.
  - c. Reconnect the AC power cable to the AC Power line connector.
21. On the digital audio monitor front panel, press the CH STATUS button to display CHANNEL STATUS view.
22. In the view, check that 0 is displayed for all items.
23. Disconnect the AC power cable from the AC Power line connector on the converter rear panel.
24. Return the jumper to the previous position.
25. Install the top cover and shield cover, and then connect the AC power cable to the AC power line connector on the converter rear panel.
26. Disconnect the digital TV waveform monitor and the digital audio monitor. Retain the connections between the TSG1001 generator and the converter.

**Check Eye Pattern for CH1 and CH2 output**

<b>Equipment required</b>	Two low-loss 50 Ω coaxial cables Two 75-to-50 Ω minimum-loss pads Two SMA-to-BNC adapters Two parallel signal cables Sampling oscilloscope with sampling head TSG1001 Programmable TV Generator
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1. Refer to Figure 4–2 to install the test hookup:
  - a. On the converter, attach a 75-to-50 Ω minimum-loss pad to each of the two serial digital output connectors, OUT1 and OUT2.
  - b. On the oscilloscope sampling head, attach an SMA-to-BNC adapter to the CH1 connector.
  - c. On the oscilloscope, attach an SMA-to-BNC adapter to the TRIGGER DIRECT INPUT connector.
  - d. Using one of the 50 Ω coaxial cables, connect the OUT1 attenuator on the converter to the CH1 adapter on the oscilloscope sampling head.
  - e. Using the other 50 Ω coaxial cables, connect the OUT2 attenuator on the converter to the TRIGGER DIRECT INPUT adapter on the oscilloscope.



**Figure 4–2: Eye pattern test initial hookup**

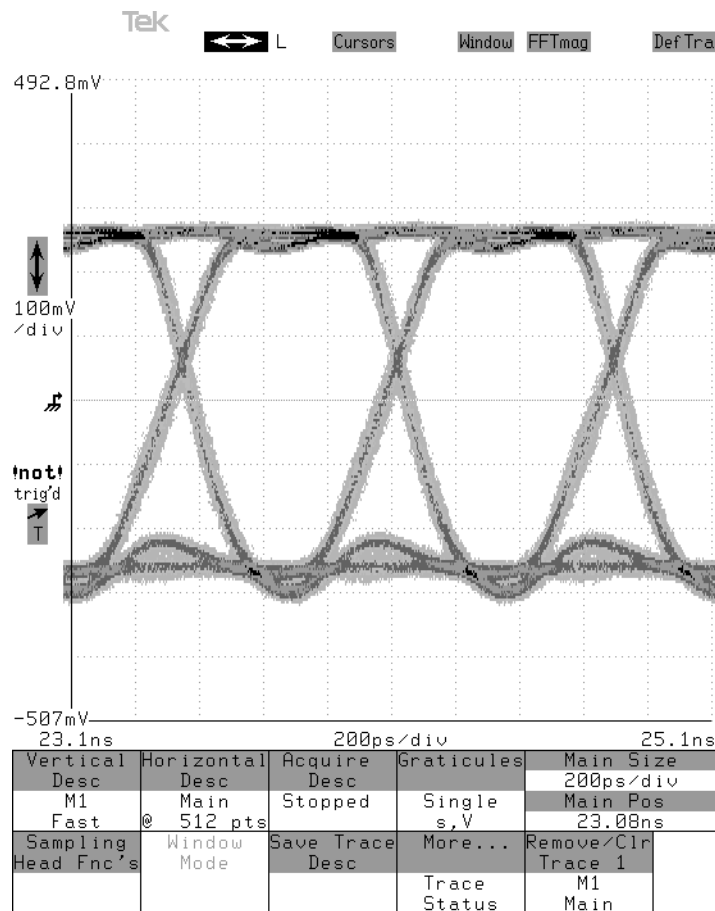


2. Set the equipment controls:
  - a. Set the TSG1001 generator signal output to ZONE PLATE.
  - b. Set the oscilloscope controls:

Vertical .....	CH1
Coupling .....	AC
Scale .....	100 mV/div
Horizontal	
Sweep .....	200 ps/div
Trigger	
Coupling .....	AC
Slope .....	Positive
Level .....	0 V
Mode .....	Auto
Display mode .....	Color Grading or Infinite

3. Check that the OUT1 eye pattern displayed on the oscilloscope is fully open.

Figure 4–3 shows an example of the eye pattern for an acceptable output signal.



**Figure 4-3: Example of eye pattern for an acceptable output signal**

4. Exchange the cable connection on the oscilloscope:
  - a. Disconnect the coaxial cable from the OUT1 connector on the sampling head of the oscilloscope.
  - b. Disconnect the coaxial cable from the TRIGGER DIRECT INPUT connector on the oscilloscope, and then connect it to the CH1 connector on the sampling head of the oscilloscope, through the 75-to-50  $\Omega$  attenuator.
  - c. Connect the coaxial cable disconnected in step 4.a. to the TRIGGER DIRECT INPUT connector on the oscilloscope, through the 75-to-50  $\Omega$  attenuator.

5. Check that the OUT2 eye pattern displayed on the oscilloscope is fully open (see Figure 4–3).
6. Retain the connections and controls when you go on to the next performance test procedures.

### Check Eye Pattern for HK-101 unused terminal



Only trained service technicians should perform the following procedure:

---

**CAUTION.** *In the following procedures, you remove the converter top cover and access an internal module. Be sure to disconnect the power cable from the AC power line connector when you remove or install the cover or when you access the internal module.*

---




---

**WARNING.** *To avoid serious injury, do not touch the exposed connections or components when operating the instrument with the protective cover removed. Dangerous potentials exist at several points within the converter.*

---

Use the test hookup and equipment controls from the previous test.

1. Change the internal cable connection in the converter:
  - a. Disconnect the AC power cable from the AC power line connector.
  - b. Remove the top cover and shield cover. Refer to *Top Cover and shield cover* in *Removal and Installation Procedures* on page 7–9.
  - c. Disconnect the cable connected to the HK-101 OUT 3 terminal and then connect it to the HK-101 OUT 1 terminal (unused in normal operation).

For disconnecting and connecting the cable attached to the HK-101 module, refer to *A10 Board and Connectors* beginning on page 7–15.

- d. Connect the AC power cable to the AC power line connector to turn on the converter.
2. Check that the HK-101 OUT 1 output signal eye pattern displayed on the oscilloscope is fully open (see Figure 4–3).

- 3.** Restore the internal cable connection:
  - a.** Disconnect the AC power cable from the AC power line connector.
  - b.** Disconnect the cable connected to the HK-101 OUT1 terminal and then connect it to the HK-101 OUT 3 terminal.
  - c.** Install the top cover.
  - d.** Connect the AC power cable to the AC power line to turn on the converter.
- 4.** Disconnect the oscilloscope.

# Setting Sound Packets

The converter provides the feature to embed sound packets in the output serial digital data. This feature is available through the jumpers of J400 connector pin on the A10 board. This section describes how to configure the jumpers for setting sound packets.

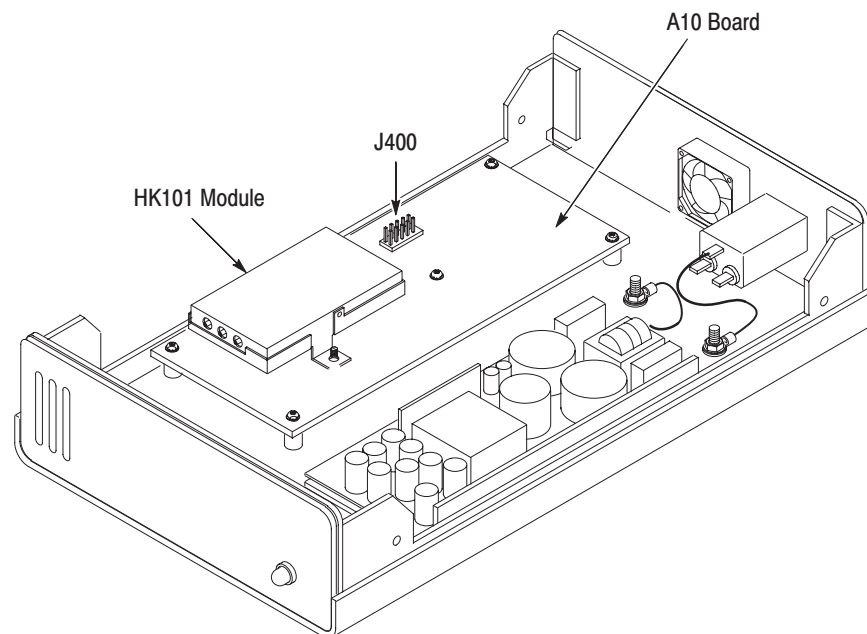
This feature is available for any instrument with serial number J300149 and above.



**WARNING.** To avoid possible personal injury or death, disconnect the power cord from the line voltage source before doing any procedures in this section.

## Removing the Top Cover and Shield Cover

1. Remove top cover and shield cover. For removal and installation procedures for the top cover and shield cover, refer to *Top Cover and Shield Cover* on page 7–9.
2. Find J400 on the A10 board. See Figure 5–1.



**Figure 5–1: Location of J400**

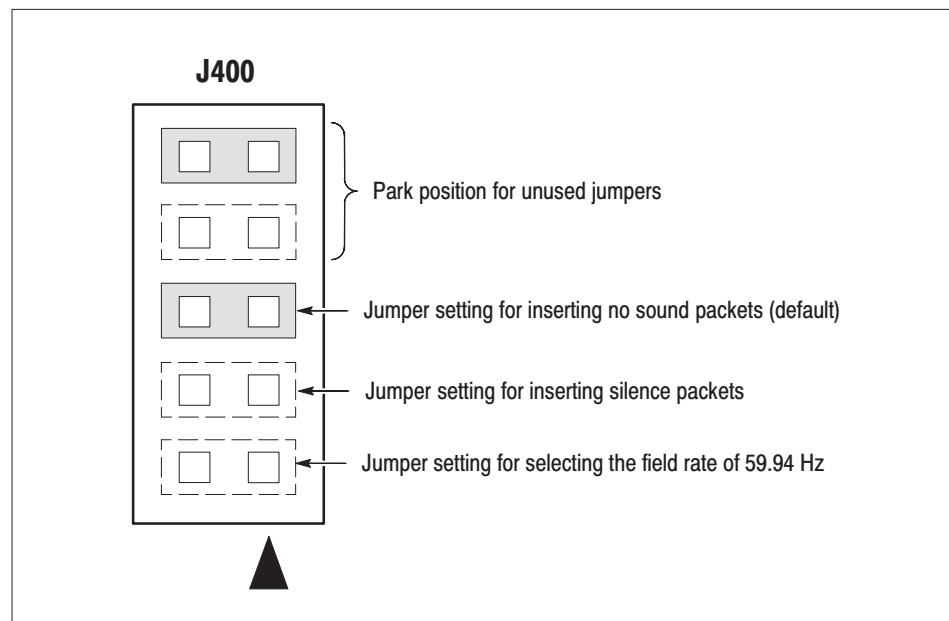
## Jumper Configuration

### For J300149 – J310100

You can select silence, 1 kHz tone, or no sound packets (default) that is embedded in the output serial data and the field rate to 59.94 MHz by changing the jumper setting. Figure 5–2 shows J400 connector pin and the functions set by the jumpers. Insert and remove the jumpers in /from the jumper pin pairs to achieve that function. Note the triangular symbol below the connector pin (This mark indicates pin one).

If two jumpers are placed in the park position, the field rate of the instrument is set to 60 Hz and 1 kHz tone signal is embedded in the output serial data.

The top and second pin pairs of J400 are provided as a convenient place to park unused jumpers.



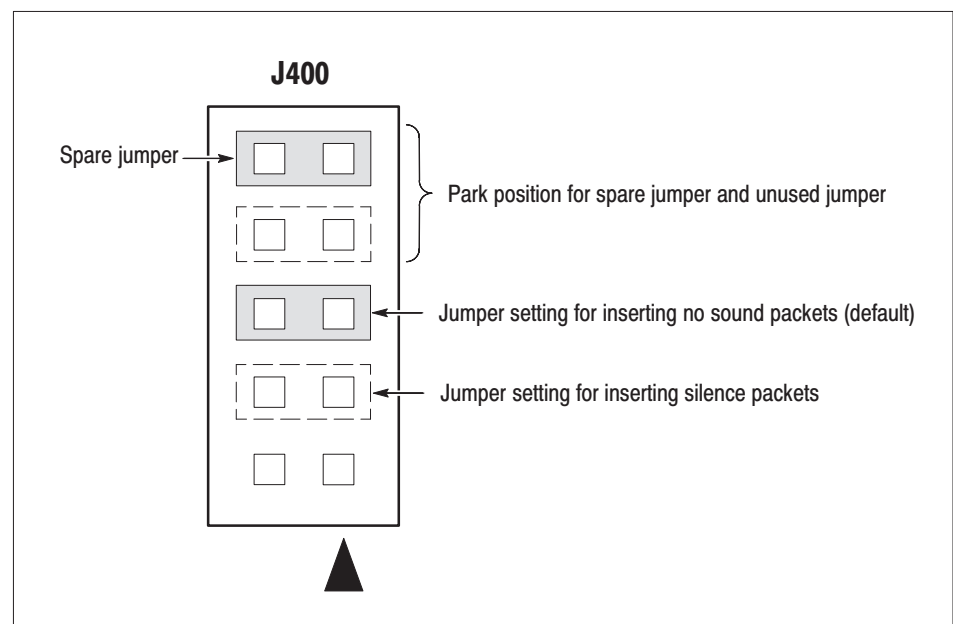
**Figure 5-2: Jumper configuration for selecting sound packets (J300149 – J310100)**

**For J310101 and Above**

You can select silence, 1 kHz tone, or no sound packets (default) that is embedded in the output serial data by changing the jumper setting. Figure 5–3 shows J400 connector pin and the functions set by the jumper. Insert and remove the jumper in /from the jumper pin pairs to achieve that function. Note the triangular symbol below the connector pin (This mark indicates pin one).

If the jumper is placed at the park position, 1 kHz tone signal is embedded in the output serial data.

The top and second pin pairs of J400 are provided as a convenient place to park spare jumpers and unused jumpers. The jumper placed at pin 9–10 is a spare one.



**Figure 5–3: Jumper configuration for selecting sound packets (J310101 and above)**





# Adjustment Procedures

The *Adjustment Procedures* are described only for manually adjusting the power supply voltage.

---

**NOTE.** After the removal and replacement of an A10 module or power supply module due to electrical failure, you must perform the adjustment.

---

## Requirements for Performance

Before you perform this procedure, you need to address the following requirements:

**Personnel** This procedure is only to be performed by trained service technicians.

**Warm-Up Period** The converter requires a 20 minute warm-up time in a +20° C to +30° C (68° F to 86° F) environment before it is adjusted.

**Access** When adjusting the supply voltage, you need to remove the cabinet.

## Equipment Required

Table 6–1 lists the test equipment required to adjust the power supply module.

**Table 6–1: Test equipment**

Item description	Minimum requirements	Example
Digital multimeter (DMM)	DC volt range: 0.1 to 20 V, Accuracy: $\pm 0.5\%$	Tektronix DMM252
A set of test leads		Supplied with the DMM

## Voltage Adjustment

### Preparation

To perform the display adjustments, you must first remove the top cover and shield cover. For removal and installation procedures, refer to *Top Cover and Shield Cover* on page 7–9.

After you have removed the top cover and shield cover, find the test points on the A10 board and the variable resistor on the Power Supply board. See Figures 6–1 and 6–2.

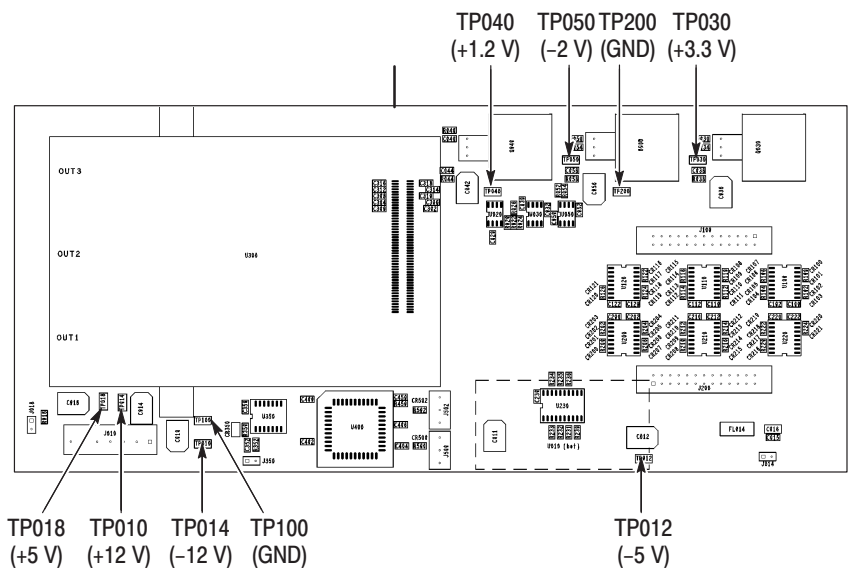


Figure 6-1: A10 board view and test points

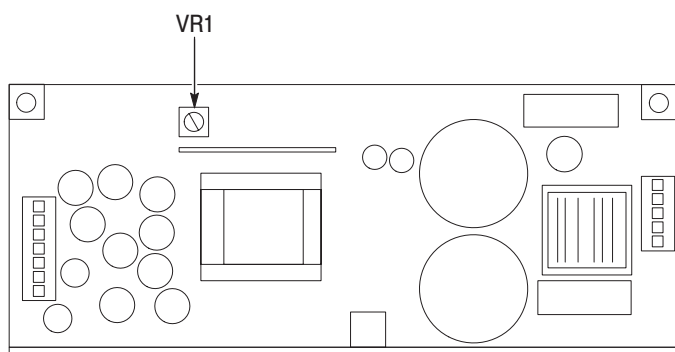


Figure 6-2: Power supply board view and VR1

## Adjustment



**WARNING.** To avoid serious injury, do not touch exposed connections or components when operating the instrument with the protective enclosure removed. Dangerous potentials exist at several points within the converter.

1. Connect the power cord to turn on the power.
2. Locate the test points: TP010, TP012, TP014, TP018, TP030, TP040, and TP050 located on the A10 board. See Figure 6–1.
3. Locate the variable resistor VR1 on the Power Supply board. See Figure 6–2.
4. Adjust the voltages:
  - a. Connect the DMM test leads to the TP018 and the chassis ground.
  - b. Turn the VR1 clockwise or counterclockwise so that the voltage at the TP018 is in the range between +4.9 V and +5.1 V.
  - c. Verify and adjust the VR1 so that the voltages at all the other test points fall within the ranges between the lower and upper limits listed in Table 6–2.

**Table 6–2: Test points and voltage ranges**

Test points	Typical voltage	Lower limit	Upper limit
TP010	+12 V	+11.4 V	+12.6 V
TP012	-5 V	-5.25 V	-4.75 V
TP014	-12 V	-12.6 V	-11.4 V
TP018	+5 V	+4.9 V	+5.1 V
TP030	+3.3 V	+3.2 V	+3.4 V
TP040	+1.2 V	+1.16 V	+1.24 V
TP050	-2 V	-1.94 V	-2.06 V



# Maintenance

This section contains the information needed to do periodic and corrective maintenance on the PSC 1125 Digital Television Parallel-to-Serial Converter. Specifically, the following subsections are included:

- *Tektronix Service Offerings.* Describes the type of service that Tektronix offers.
- *Preparation.* Covers general information on preventing damage to internal modules when doing maintenance. Refer to page 7–2.
- *Inspection and cleaning.* Covers information and procedures for inspecting the converter and cleaning its external and internal modules. Refer to page 7–4.
- *Removal and Initiation Procedures.* Provides procedures for removing defective modules and replacing new or repaired modules. Refer to page 7–8.
- *Repackaging.* Covers information on packaging the converter properly for shipment. Refer to page 7–19.
- *Troubleshooting.* Covers information for isolating failed modules in a troubleshooting flowchart. Refer to page 7–20.

## Tektronix Service Offerings

Tektronix provides service to cover repair under warranty as well as other services that may provide a cost-effective answer to your service needs.

Whether providing warranty repair service or any of the other services listed below, Tektronix service technicians are well equipped to service the converter. Tektronix technicians train on Tektronix products; they have access to the latest information on improvements to the converter.

### Warranty Repair Service

Tektronix technicians provide warranty service at most Tektronix service locations worldwide. The Tektronix product catalog lists all service locations worldwide.

### Self Service

Tektronix supports repair to the module level by providing a module exchange program.

This service reduces down-time for repair by allowing you to exchange most modules for new or remanufactured ones. Tektronix ships an updated and tested

exchange module from the Beaverton, Oregon service center, typically within 24 hours.

For more information, contact your local Tektronix service center or sales engineer for more information on any of the repair or adjustment services just described.

## Preparation

Before doing any of the procedures in the *Maintenance* section, note the following:

- Only trained service technicians should perform these procedures.
- Read the *General Safety Summary* and the *Service Safety Summary*, beginning on page v near the beginning of this manual.
- Read section 2, *Getting Started*, and section 3, *Operating Basics*, before servicing the converter.
- Read the following section, *Preventing ESD*.

## Preventing ESD



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**CAUTION.** *Static discharge can damage any semiconductor component in the converter.*

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When performing service which requires internal access to the converter, follow these precautions to avoid damaging internal modules and their components due to electrostatic discharge (ESD).

1. Minimize handling of static-sensitive modules.
2. Transport and store static-sensitive modules in their static-protected containers or on a metal rail. Label any package that contains static-sensitive modules.
3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these modules. Do service of static-sensitive modules only at a static-free work station.
4. Consider all internal modules static-sensitive.
5. Do not allow anything capable of generating or holding a static charge on the work station surface.
6. Handle circuit boards by the edges when possible.

7. Do not slide the modules over any surface.
8. Avoid handling modules in areas that have a floor or work-surface covering capable of generating a static charge.
9. Do not use high-velocity compressed air when cleaning dust from modules.

Table 7–1 lists the relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

**Table 7–1: Relative susceptibility to static-discharge damage**

<b>Semiconductor classes</b>	<b>Relative susceptibility levels<sup>1</sup></b>
MOS or CMOS microcircuits or discrete circuits, or linear microcircuits with MOS inputs (most sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFET	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (least sensitive)	9

<sup>1</sup> **Voltage equivalent for levels (voltage discharged from a 100 pF capacitor through resistance of 100 ohms):**

1 = 100 V to 500 V

2 = 200 V to 500 V

3 = 250 V

4 = 500 V

5 = 400 V to 600 V

6 = 600 V to 800 V

7 = 400 V to 1000 V (est.)

8 = 900 V

9 = 1200 V

## Inspection and Cleaning

This subsection describes how to determine whether the converter needs cleaning and how to do the cleaning. Inspection and cleaning are preventive maintenance procedures. When done regularly, preventive maintenance may prevent converter malfunction and enhance reliability.

Preventive maintenance consists of visually inspecting and cleaning the converter, and using general care when operating it. How often to do maintenance depends on the severity of the environment in which the converter operates.

### General Care

The cabinet helps keep dust out of the converter and is a major component of the instrument cooling system. The cabinet should normally be in place when operating the converter.

### Inspection and Cleaning Procedures

Inspect and clean the converter as operating conditions require. The collection of dirt on components inside can cause them to overheat and break down. (Dirt acts as an insulating blanket, preventing efficient heat dissipation.) Dirt also provides an electrical conduction path that can cause an instrument failure, especially under high-humidity conditions.



**WARNING.** *To avoid personal injury or death due to electric shock, unplug the power cord from the line voltage source before cleaning the converter.*

---



**CAUTION.** *To prevent damaging the plastics used in the converter, do not use chemical cleaning agents. Use a 75% isopropyl alcohol solution as a cleaner, and rinse with deionized water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.*

*To prevent damaging converter components, do not use high-pressure compressed air when cleaning dust from the interior of the converter. (High pressure air can cause electrostatic discharge.) Instead, use low pressure compressed air (about 9 psi).*

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**Exterior Inspection.** Inspect the outside of the converter for damage, wear, and missing parts, using Table 7-2 as a guide. If the converter appears to have been dropped or otherwise abused, check it thoroughly to verify correct operation and performance. Repair any defects that may cause personal injury or lead to further damage.



**Table 7-2: External inspection check list**

Item	Inspect for	Repair action
Cabinet, front panel, and cover	Cracks, scratches, deformations, damaged hardware or gaskets	Replace defective module.
Connectors	Broken shells, cracked insulation, and deformed contacts; dirt in connectors	Replace defective modules. Clear or wash out dirt.
Cabinet, feet	Correct operation	Replace defective module.
Accessories	Missing items or parts of items, bent pins, broken or frayed cables, and damaged connectors	Replace damaged or missing items, frayed cables, and defective modules.

**Exterior Cleaning.** Before cleaning, disconnect the converter from the power source.



**WARNING.** To avoid potential electric shock hazard or damage to the converter circuits, do not allow any moisture inside the converter during external cleaning; use only enough liquid to dampen the cloth or applicator.

1. Remove loose dust on the outside of the converter with a lint free cloth.
2. Remove remaining dirt with a lint free cloth dampened in a general purpose detergent-and-water solution. Do not use abrasive cleaners.

**Interior Inspection.** To access the inside of the converter for inspection and cleaning, refer to the *Removal and Installation Procedures* in this section.

Inspect the interior of the converter for damage and wear using Table 7-3 as a guide. Repair any defects immediately.



**CAUTION.** To prevent damage from electrical arcing, ensure that circuit boards and components are dry before applying power to the converter.

**Table 7-3: Internal inspection check list**

Item	Inspect for	Repair action
Circuit boards	Loose, broken, or corroded solder connections; burned circuit boards; burned, broken, or cracked circuit-run plating	Remove failed modules and replace with a new module.
Resistors	Burned, cracked, broken, blistered condition	Replace failed module and replace with a new module.

**Table 7-3: Internal inspection check list (Cont.)**

Item	Inspect for	Repair action
Solder connections	Cold solder or rosin joints	Resolder joint and clean with isopropyl alcohol.
Capacitors	Damaged or leaking cases; corroded solder on leads or terminals	Remove damaged module and replace with a new module from the factory.
Semiconductors	Loosely inserted in sockets; distorted pins.	Firmly seat loose semiconductors. Remove devices that have distorted pins. Carefully straighten pins (as required to fit the socket), using long-nose pliers, and reinsert firmly. Ensure that straightening action does not crack pins, causing them to break off.
Wiring and cables	Loose plugs or connectors; burned, broken, or frayed wiring.	Firmly seat connectors. Repair or replace modules with defective wires or cables.
Chassis	Dents, deformations, and damaged hardware	Straighten, repair, or replace defective hardware.

**Interior Cleaning Procedure.** If, after doing steps 1 and 2 below, a module is clean upon inspection, skip the remaining steps.

1. Blow off dust with dry, low-pressure, deionized air (approximately 9 psi).
2. Remove any remaining dust with a lint-free cloth dampened in isopropyl alcohol (75% solution), and rinse with warm deionized water. (A cotton-tipped applicator is useful for cleaning in narrow spaces and on circuit boards.)
3. If steps 1 and 2 do not remove all the dust or dirt, spray wash the converter using a solution of 75% isopropyl alcohol and perform steps 4 through 8.
4. Gain access to the parts to be cleaned by removing easily accessible shields and panels (see *Removal and Installation Procedures* on page 7-8).
5. Spray wash dirty parts with the isopropyl alcohol, and wait 60 seconds for the majority of the alcohol to evaporate.
6. Use hot (48.9° C to 60° C, 120° F to 140° F) deionized water to thoroughly rinse the parts.

7. Dry all parts with low-pressure, deionized air.
8. Dry all components and assemblies in an oven or drying compartment using low-temperature (51.7° C to 65.6° C, 125° F to 150° F) circulating air.

## Removal and Installation Procedures

This subsection describes removing and installing mechanical and electrical modules.

### Preparation

This subsection contains the following information:

- Safety and ESD information needed to properly do the procedures that follow
- A list of equipment required when removing modules
- Procedures for removing and installing electrical and mechanical modules




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**WARNING.** *To avoid possible personal injury or damage to converter components, read the Installation subsection on page 1–3 and Preventing ESD on page 7–2. Before doing this or any other procedure in this manual, read the General Safety Summary and the Service Safety Summary, beginning on page v near the beginning of this manual.*

*To avoid possible personal injury or death, disconnect the power cord from the line voltage source before doing any procedures in this section.*

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**List of Mechanical Parts.** Refer to the *Replaceable Parts List* beginning on page 8–1 for all mechanical parts in the converter.

**Equipment Required.** Table 7–4 lists the tools required to remove and reinstall the modules of the converter.

**Table 7–4: Equipment required**

Name	Description
Phillips screwdriver, #1	Standard tool
Nut driver, 5 mm	Standard tool
Nut driver, 5.5 mm	Standard tool
Nut driver, 7 mm	Standard tool
Needle-nose pliers	Standard tool
Soldering iron	Standard tool

## Removal and Installation Procedure Groups

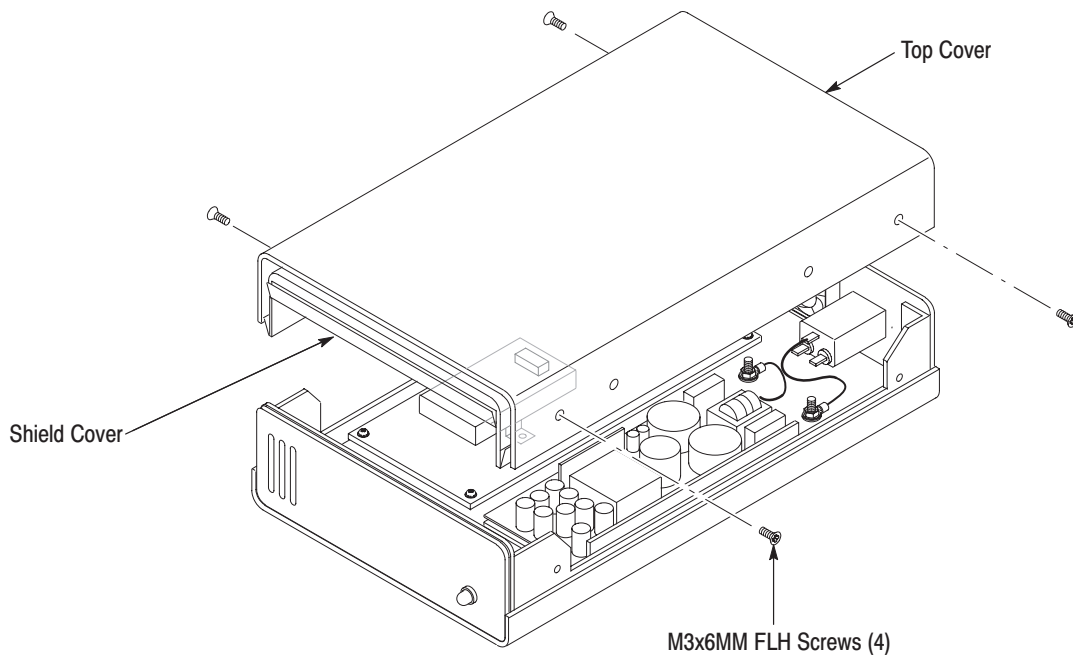
This group contains the following procedures:

- Top Cover and Shield Cover
- Power Indicator Module
- Noise Filter and Power Supply
- Fan Module
- A10 board and Connectors
- Bottom Cover and Front Panel

### Top Cover and Shield Cover

<b>Equipment required</b>	#1 Phillips screwdriver
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1. Remove top cover and shield cover: (See Figure 7–1)
  - a. Using a #1 Phillips screwdriver, remove the four screws securing the top cover and shield cover to the instrument chassis.
  - b. Lift the covers off to complete the removal.
2. Reinstall top cover and shield cover by reversing step 1.



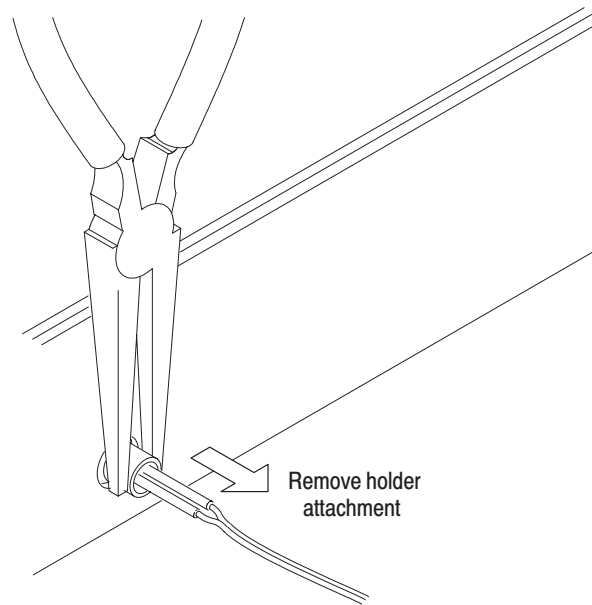
**Figure 7-1: Top cover and shield cover removal**

**Power Indicator**

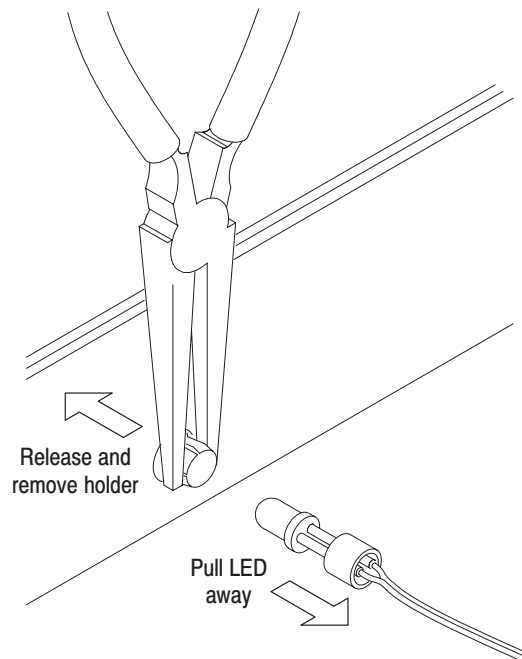
When you replace the LED or interconnect cable, you will need a soldering iron to disassemble the power indicator module.

<b>Equipment required</b>	Needle-nose pliers Soldering iron
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1. Orient instrument: Set the converter with the bottom down on the work surface and the rear panel facing you.
2. Remove power indicator module:
  - a. Disconnect the ribbon interconnect cable from J018 on the A10 circuit board.
  - b. See Figure 7-2. Using needle-nose pliers, slide the holder attachment in the direction indicated by the arrow in the figure.
  - c. See Figure 7-3. Pull the LED away in the direction indicated by the arrow in the figure.
  - d. See Figure 7-3. Using needle-nose pliers, release the holder while pushing it in the direction indicated by the arrow.



**Figure 7-2: Removal of power indicator module holder attachment**

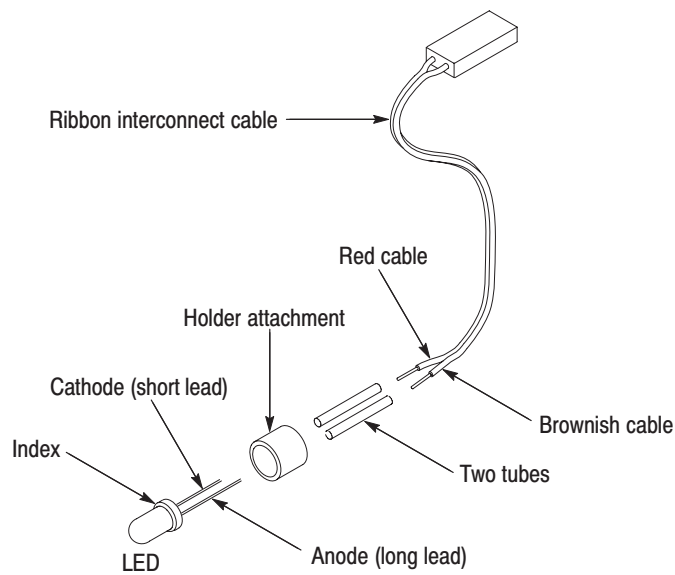


**Figure 7-3: Removal of power indicator module LED and holder**

3. Disassemble the power indicator module:
  - a. Slide the two tubes along the ribbon interconnect cable until the connection between the LED lead and cable is exposed.
  - b. Unsolder the two interconnect cables attached to the LED leads. See Figure 7-4.
4. Reinstall:
  - a. Assemble power indicator module by reversing step 3.
  - b. Install the power indicator module by reversing step 2.



**CAUTION.** When you connect the ribbon cable to the connector on the circuit board, make sure that the index on the ribbon cable connector is aligned to the index marked near the connector pin on the circuit board.



**Figure 7-4: Power indicator assembly interconnect cable removal**

**Noise Filter and Power Supply**

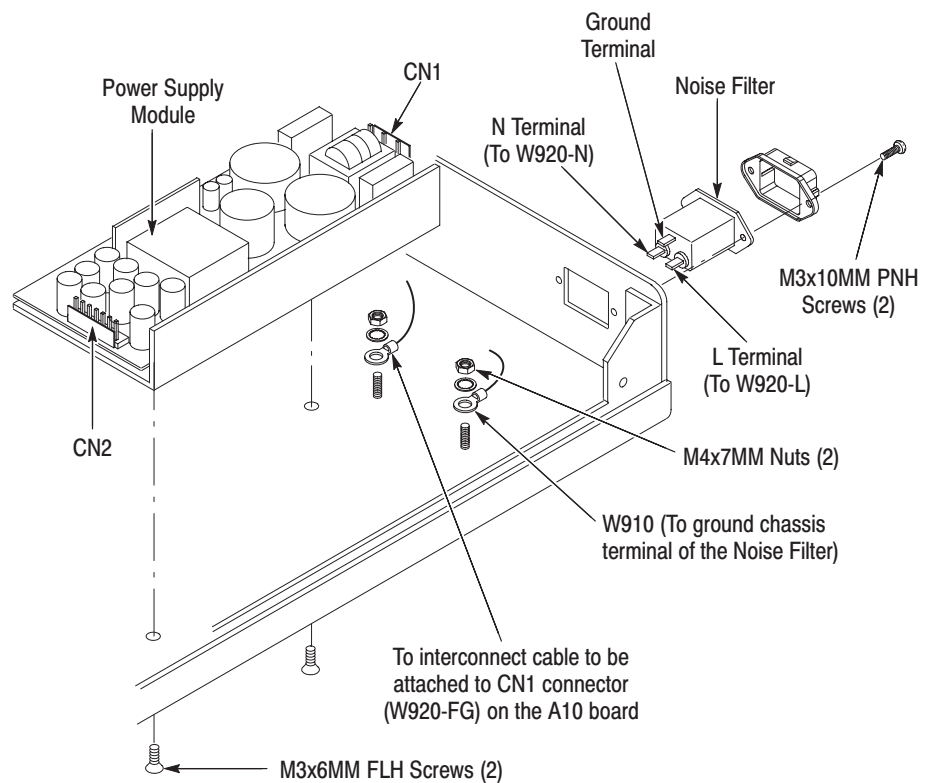
You will need a soldering iron to disassemble the power indicator assembly.

<b>Equipment required</b>	#1 Phillips screwdriver 7 mm size nut drive Soldering iron
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### Noise Filter Module Removal.

1. Remove noise filter module: (See Figure 7-5)
  - a. Remove the two interconnect cables attached to the L and N terminals of the noise filter module.
  - b. Using a 7 mm size nut driver, remove the nut attaching the ground wire to the chassis.
  - c. Unsolder the interconnect cable attached to the ground terminal of the noise filter.
  - d. Using a #1 Phillips screwdriver, remove the two screws securing the noise filter to the rear panel, and pull it out of the chassis to complete the removal.



**Figure 7-5: Noise filter and power supply module removal**

2. Reinstallation: Install the noise filter module by reversing step 1.

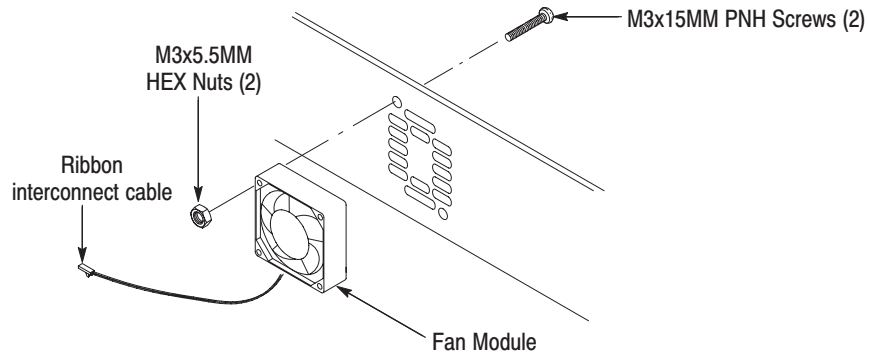
**Power Supply Module Removal.**

3. Remove power supply module: (See Figure 7-5)
  - a. Disconnect the interconnect cable at CN2 on the Power Supply board.
  - b. Disconnect the interconnect cable at CN1 on the Power Supply board.
  - c. Using a 7 mm size nut driver, remove the nut attaching the ground wire to the chassis.
  - d. Using a #1 Phillips screwdriver, remove the two screws securing the power supply module to the chassis and lift it off.
4. Reinstallation: Install the power supply module by reversing step 3.

**Fan Module**

<b>Equipment required</b>	#1 Phillips screwdriver
	Needle-nose pliers

1. Remove fan module: (See Figure 7-6)
  - a. Disconnect the ribbon interconnect cable from J014 on the A10 circuit board.
  - b. Using a #1 Phillips screwdriver, remove the two screws securing the fan to the rear panel while holding the nuts with the needle-nose pliers, and pull it out of the chassis to complete the removal.



**Figure 7-6: Fan module removal**

2. Reinstallation: Install the fan module by reversing step 1.



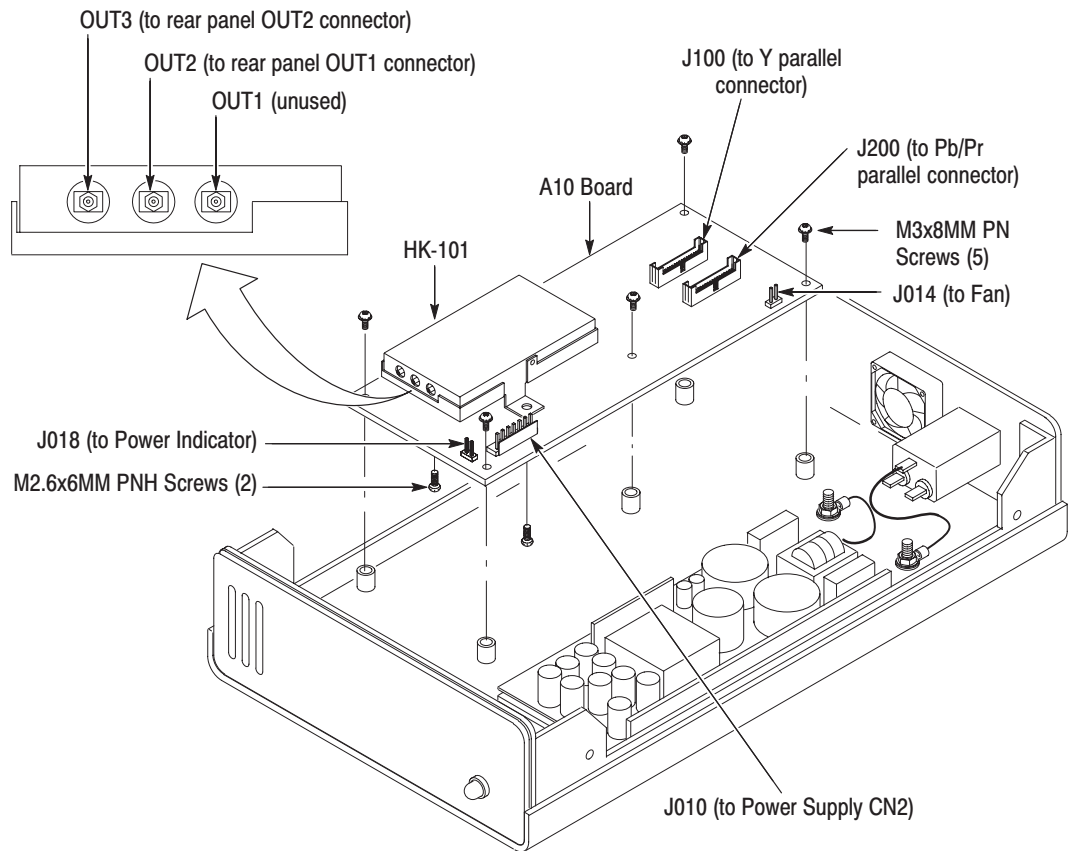
**CAUTION.** When you connect the ribbon cable to the connector on the circuit board, make sure that the index on the ribbon cable connector is aligned to the index marked near the connector pin on the circuit board.

## A10 Board and Connectors

<b>Equipment required</b>	#1 Phillips screwdriver 5 mm nut driver Needle-nose pliers
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### A10 Module Removal.

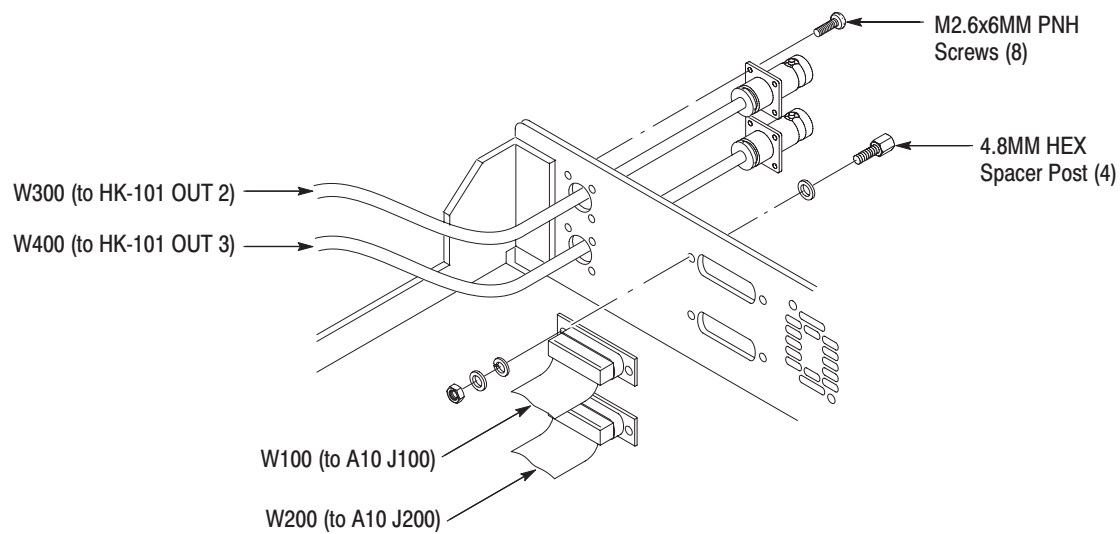
1. Remove all cables on the A10 board: (See Figure 7-7)
  - a. Using the needle-nose pliers, disconnect the connector cables from OUT2 and OUT3 terminals on the HK-101 module.
  - b. Disconnect the connector cables from J100 and J200 connectors on the A10 modules.
  - c. Disconnect the power indicator and fan cables from J018 and J014 connectors on the A10 board.
  - d. Disconnect the inter module cable from the J010 connector on the A10 board.
2. Remove the A10 board: Using a #1 Phillips screwdriver, remove the five screws securing the A10 board to the chassis, and lift the A10 board out of the chassis to complete the removal.
3. Reinstallation: Install the A10 board by doing step 1 and step 2 in reverse order.



**Figure 7-7: A10 module removal**

**Connector Removals.**

1. Remove two serial output connectors: (See Figure 7-8)
  - a. Using a #1 Phillips screwdriver, remove the eight screws securing the connectors to the rear panel.
  - b. Pull the cables completely out of the rear panel.
2. Remove two parallel input connectors: Using a 5 mm size nut driver, remove the four screws securing the parallel input connectors to the rear panel to complete the removal. (See Figure 7-8)
3. Reinstallation: Install the connector by doing step 1 and step 2 in reverse order.

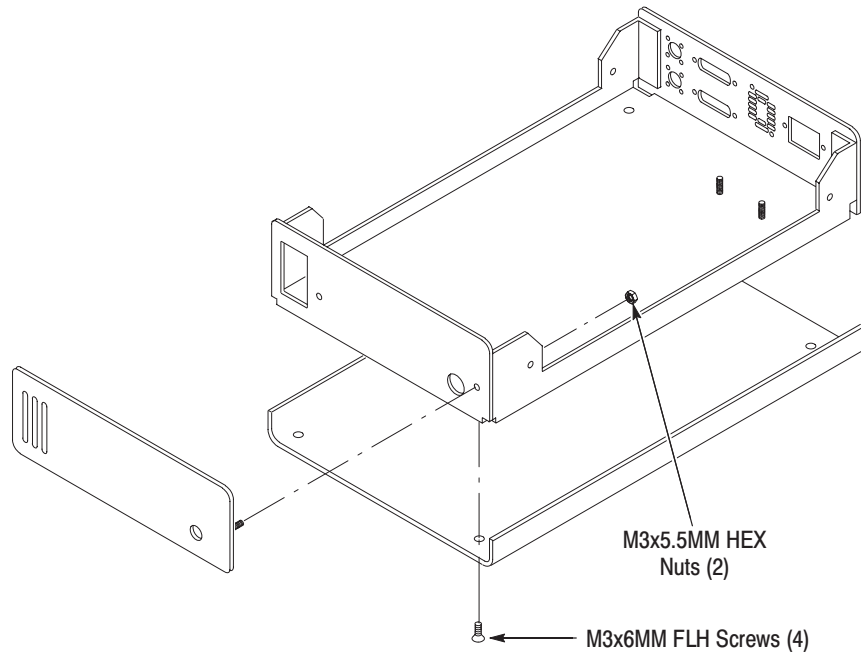


**Figure 7-8: Input and output connector removal**

**Bottom Cover and Front Panel**

<b>Equipment required</b>	#1 Phillips screwdriver 5.5 mm size nut drive
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1. Remove the front panel: (See Figure 7-9)
  - a. Using a 5 mm size nut driver, remove the two nuts.
  - b. Separate the front panel from the chassis.
2. Remove the bottom cover: (See Figure 7-9)
  - a. Using a 5.5 mm nut driver, remove the four nuts securing the bottom cover to the chassis.
  - b. Separate the cover from the chassis.
3. Reinstallation: Install the bottom cover and front panel by doing step 1 and step 2 in reverse order.



**Figure 7-9: Front panel and bottom cover removal**

## Repackaging

This subsection contains information about repackaging the converter for shipment.

Use a corrugated cardboard shipping carton having a test strength of at least 275 pounds and with an inside dimension at least six inches greater than the converter dimensions. (If available, use the original shipping carton, which meets these requirements.)

If the converter is shipped to a Tektronix Service Center, enclose the following information:

- The owner's address
- Name and phone number of a contact person
- Type and serial number of the converter
- Reason for returning
- A complete description of the service required

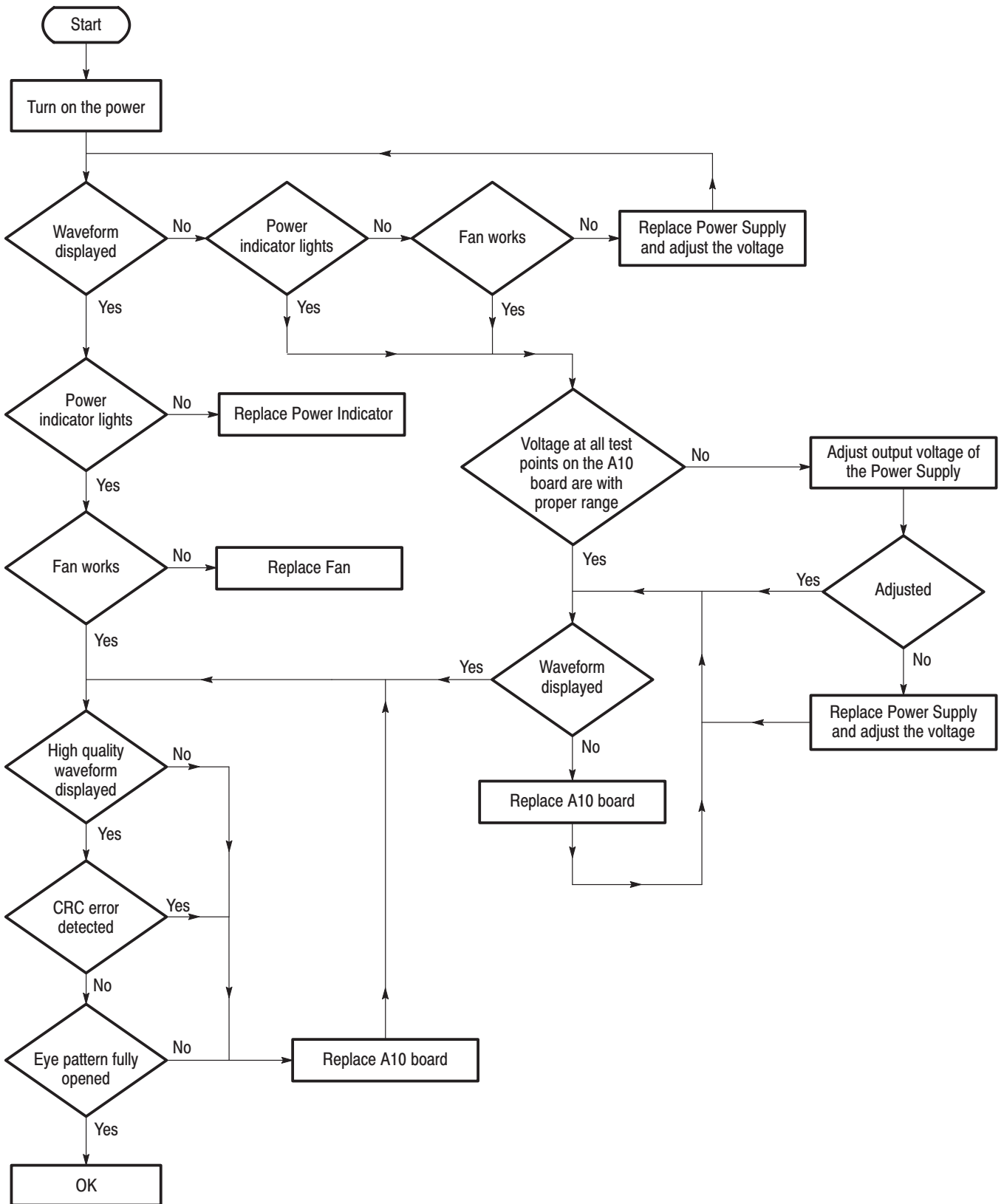
Seal the shipping carton with an industrial stapler or strapping tape.

Mark the address of the Tektronix Service Center and your own return address on the shipping carton in two prominent locations.

## **Troubleshooting**

This subsection contains a troubleshooting tree designed to help you isolate faulty modules in the converter.







# Replaceable Parts List

This section contains a list of the replaceable modules for the converter. Use this list to identify and order replacement parts.

## Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

### Module Servicing

Modules can be serviced by selecting one of the following three options. Contact your local Tektronix service center or representative for repair assistance.

**Module Exchange.** In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-TEK-WIDE, extension 6630.

**Module Repair and Return.** You may ship your module to us for repair, after which we will return it to you.

**New Modules.** You may purchase replacement modules in the same way as other replacement parts.

## Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the converter. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

### Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. code	This indicates the code of the actual manufacturer of the part.
8	Mfr. part number	This indicates the actual manufacturer's or vendor's part number.

**Abbreviations**      Abbreviations conform to American National Standard ANSI Y1.1–1972.

**Mfr. Code to Manufacturer Cross Index**      The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

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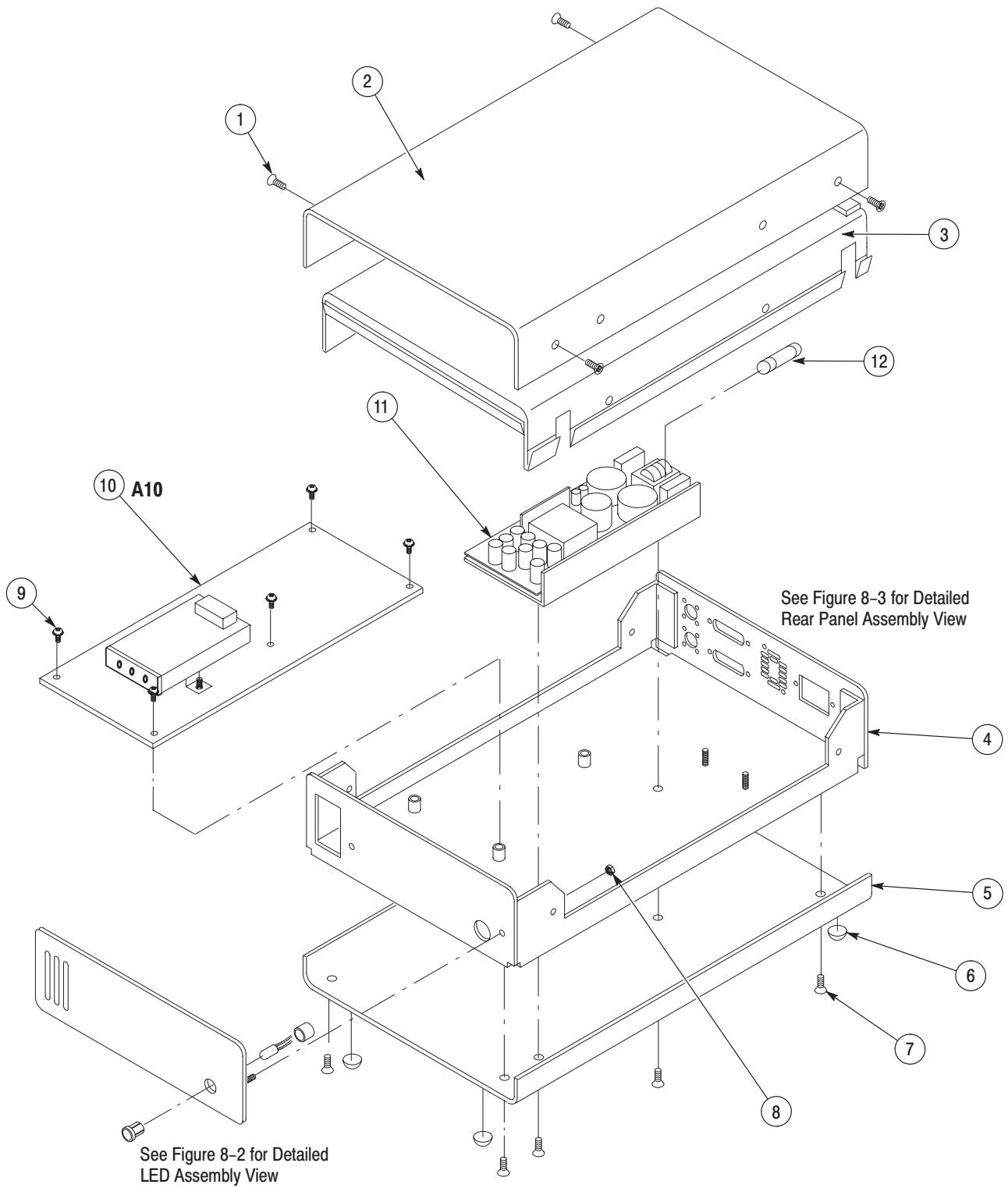
**Manufacturers cross index**

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<b>Mfr. code</b>	<b>Manufacturer</b>	<b>Address</b>	<b>City, state, zip code</b>
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
80126	PACIFIC ELECTRICORD CO	747 W REDONDO BEACH PO BOX 10	GARDENA CA 90247-4203

**Replaceable parts list**

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
8-1					Main chassis and circuit boards		
-1	211-0785-XX			4	SCREW,MACHINE:M3X6MM L,FLH,STL,BLK ZN PL,CROSS REC	80009	2110785XX
-2	390-1185-XX			1	CABINET, TOP	80009	3901185XX
-3	337-4170-XX			1	SHIELD,ELEC:TOP,AL	80009	3374170XX
-4	441-2152-XX			1	CHASSIS,MAIN	80009	4412152XX
-5	390-1184-XX			1	CABINET,BOTTOM	80009	3901184XX
-6	348-1330-XX			4	PAD,CUSHIONING:16MM DIA X 7.9MM H,POLYURETHANE W/ADHESIVE	80009	3481330XX
-7	211-0785-XX			6	SCREW,MACHINE:M3X6MM L,FLH,STL,BLK ZN PL,CROSS REC	80009	2110785XX
-8	220-0212-XX			2	NUT,PLAIN,HEX:M3X5.5MM HEX,STL,ZN-C,1-SHU	80009	2200212XX
-9	211-0751-XX			5	SCREW,ASSEM WSHR:M3 X 8MM,PNH,STL ZN PL,W/FLAT & LOCK WSHR	80009	2110751XX
-10	671-4383-XX			1	CIRCUIT BOARD:A10 MAIN	80009	6714383XX
-11	119-5808-XX			1	POWER SUPPLY:IN 85-264VAC,47-63HZ, OUT +5VDC/3A,+12VDC/1A,-12VDC/0.33A	80009	1195808XX
-12	159-0415-XX			1	FUSE,CARTRIDG:250V,3A	80009	1590415XX

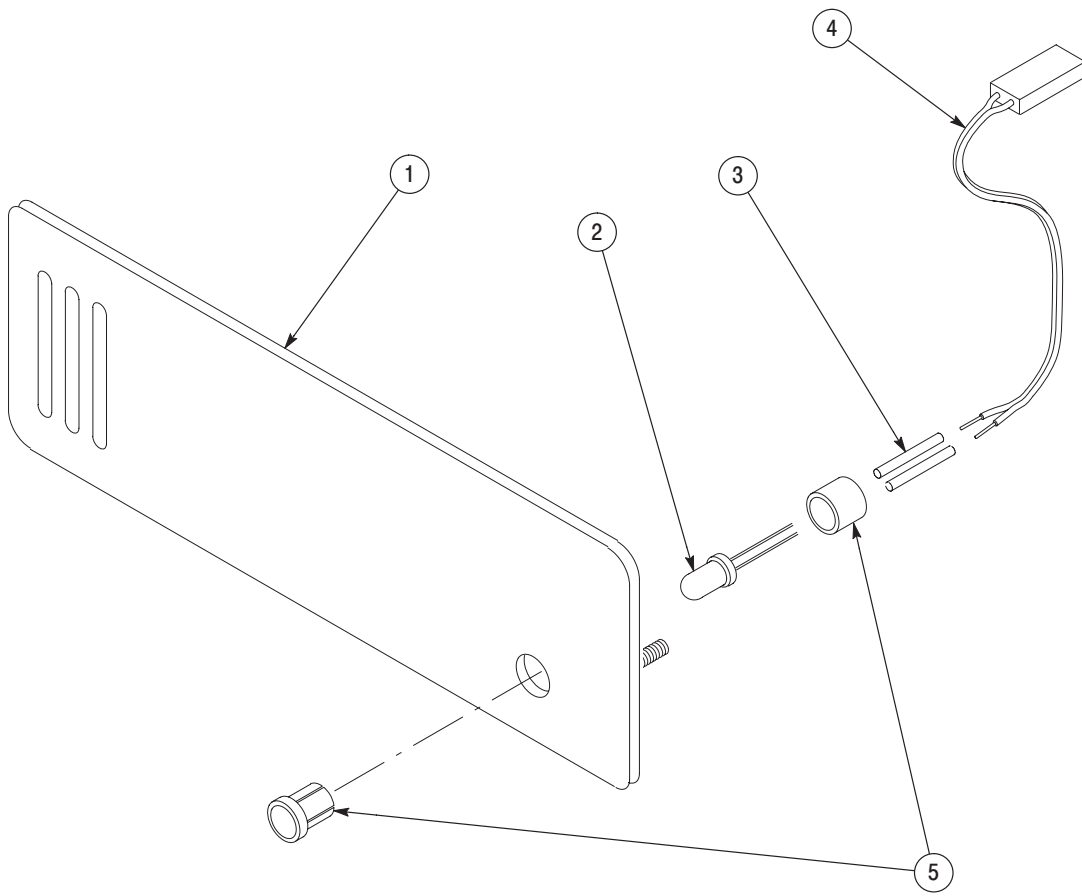


**Figure 8-1: Main chassis and circuit boards**

**Replaceable parts list**

<b>Fig. &amp; index number</b>	<b>Tektronix part number</b>	<b>Serial no. effective</b>	<b>Serial no. discont'd</b>	<b>Qty</b>	<b>Name &amp; description</b>	<b>Mfr. code</b>	<b>Mfr. part number</b>
8-2					Front panel and power indicator		
-1	333-4271-XX			1	PANEL,FRONT	80009	3334271XX
-2	150-0248-XX			1	LT EMITTING DIO:GREEN,4V,555NM,20MA	80009	1500248XX
-3	162-0561-XX			2	INSUL SLVG,ELEC:HT SHRNK,2.7MM ID,POLYOLEFIN,BLK,600V,125DEG. C	80009	1620561XX
-4	-----			1	CA ASSY (FOR FRONT PANEL GREEN LED) (SEE W018)		
-5	352-0858-XX			1	HOLDER,LED:PLASTIC	80009	3520858XX

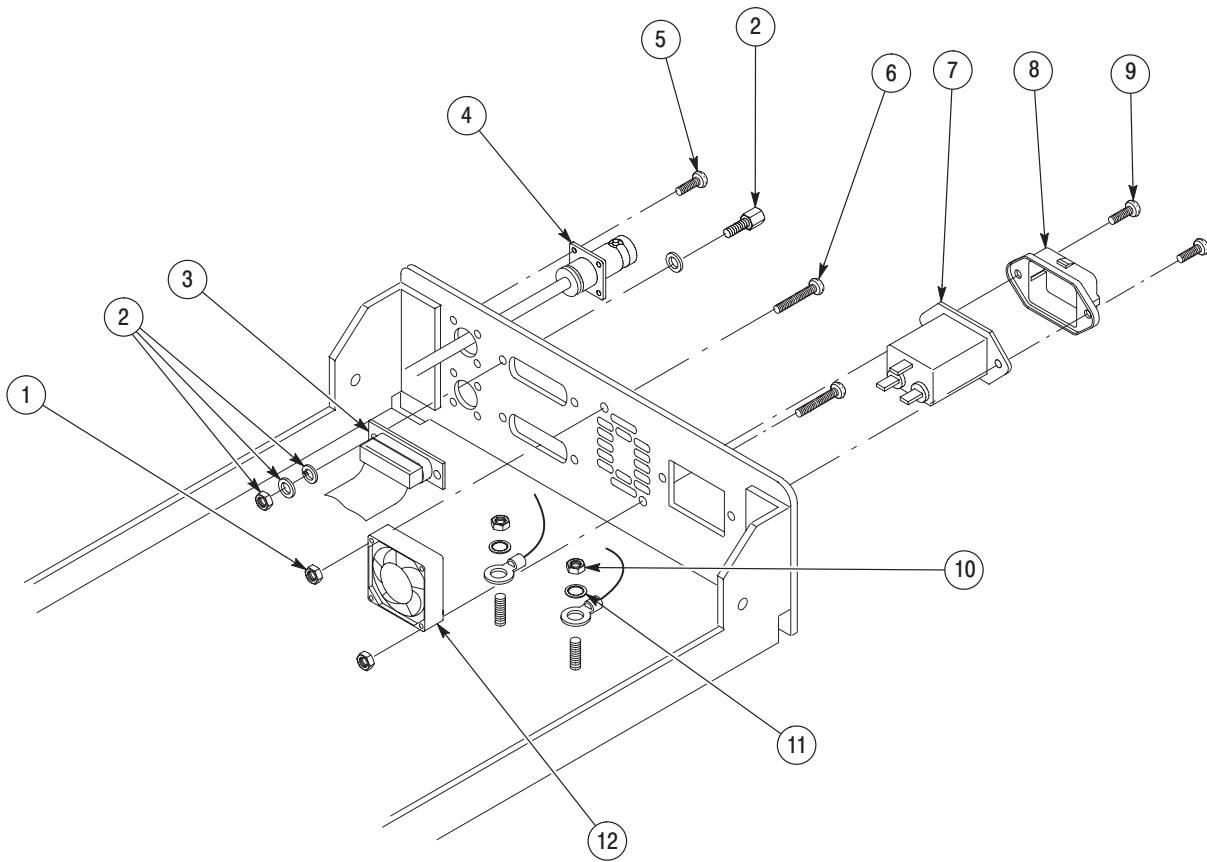




**Figure 8-2: Front panel and power indicator**

**Replaceable parts list**

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
8-3					Rear panel and grounding		
-1	220-0212-XX			2	NUT,PLAIN,HEX:M3X5.5MM HEX,STL,ZN-C,1-SHU	80009	2200212XX
-2	129-1051-XX			4	SPACER,POST:4.8MM L,4-40INT/4-40EXT,STL 4.8MM HEX W/WASHER	80009	1291051XX
-3	-----			2	CA ASSY,SP,ELEC:28AWG,10CM L,FLAT (SEE W100 & W200)		
-4	-----			2	CABLE ASSY,RF:75OHM COAX,36CM L, BNC TO PL71LP 174-B099-XX (SEE W300 & W400)		
-5	211-0953-XX			8	SCREW,MACHINE:M2.6X6MM L,PNH,SST,CROSS REC	80009	2110953XX
-6	211-0389-XX			2	SCREW,MACHINE:M3 X 15MM L,PNH,STL,MFZN-C,CROSS REC	80009	2110389XX
-7	119-1536-XX			1	FILTER,RFI:3A,250VAC,0.5MA,0.15OHM,50/60HZ	80009	1191536XX
-8	131-4131-XX			1	CONN,PLUG,ELEC:MALE W/LOCKING ADPTR,EXT MTG	80009	1314131XX
-9	211-0829-XX			2	SCREW,MACHINE:M3 X 10MM L,PNH,STL,MFZN-C,CROSS REC	80009	2110829XX
-10	220-0193-XX			2	NUT,PLAIN,HEX:M4X7MM HEX,STL,ZN-C	80009	2200193XX
-11	210-0008-XX			3	WASHER,LOCK:#8 INTL,0.02 THK,STL CD PL	80009	2100008XX
-12	119-5809-XX			1	FAN,TUBEAXIAL:12VDC,0.095A,1.14W, 30MM X 30MM,W/CONN	80009	1195809XX



**Figure 8-3: Rear panel and grounding**

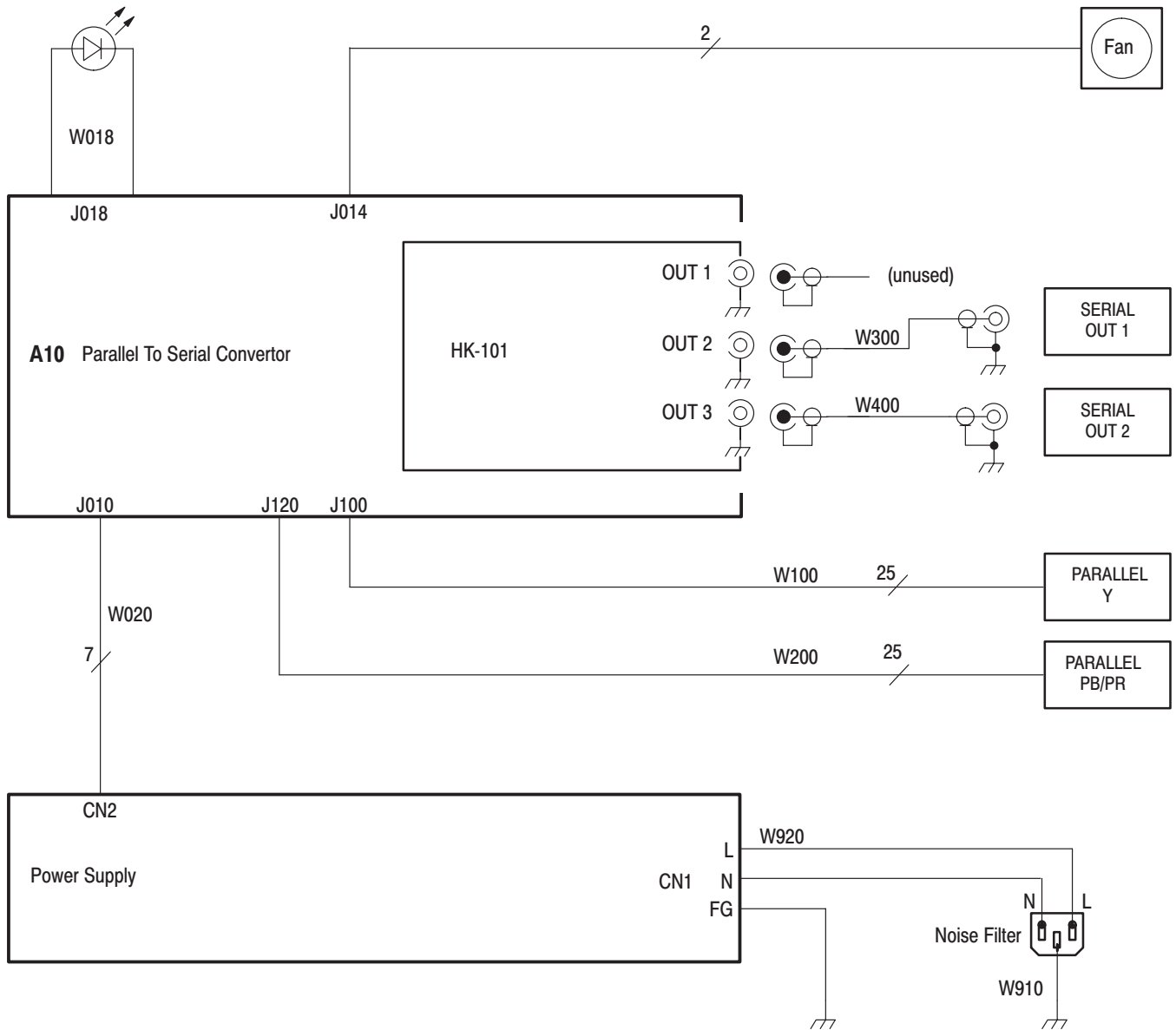
**Replaceable parts list**

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
<b>CABLE ASSEMBLIES **</b>							
W018	-----				CA ASSY (FOR FRONT PANEL GREEN LED) (NON-REPLACEABLE)		
W020	174-3904-XX				CA ASSY,SP,ELEC:7,22AWG,15CM L,W/CONN	80009	1743904XX
W100	174-3906-XX				CA ASSY,SP,ELEC:28AWG,10CM L,FLAT	80009	1743906XX
W200	174-3906-XX				CA ASSY,SP,ELEC:28AWG,10CM L,FLAT	80009	1743906XX
W300	174-3903-XX				CABLE ASSY,RF:75OHM COAX,36CM L, BNC TO PL71LP 174-B099-XX	80009	1743903XX
W400	174-3903-XX				CABLE ASSY,RF:75OHM COAX,36CM L, BNC TO PL71LP 174-B099-XX	80009	1743903XX
W910	195-3990-XX				LEAD,ELECTRICAL:AWG18,100MM L,5-4,W/LUG	80009	1953990XX
W920	174-3905-XX				CA ASSY,SP,ELEC:3,18AWG,10CM L,W/CONN	80009	1743905XX
<b>STANDARD ACCESSORIES</b>							
	071-0146-XX			1	MANUAL,TECH:INSTRUCTION	80009	0710146XX
	103-0013-XX			1	ADAPTER CONN:2 TO 3,125V,15A,41-13213	80009	1030013XX
	161-0216-XX			1	CABLE ASSY,PWR,;3,18 AWG,2.5M L,BLACK (STANDARD ONLY)	80126	C7120-25M-BL
	063-2986-XX			1	3.5",DISK,TSG1001 SIGNAL LIBRARY FOR PSC1125	80009	0632986XX
	174-3882-XX			2	CA ASSY,SP,ELEC:12PAIR TWIST,W/SHILD,100CM L	80009	1743882XX

\*\* For cable interconnections, see Figure 9-1.

# Diagrams

This contains the block diagram and the interconnection diagram for the PSC 1125 Digital Television Parallel-to-Serial Converter.



**Figure 9-1: Interconnections**

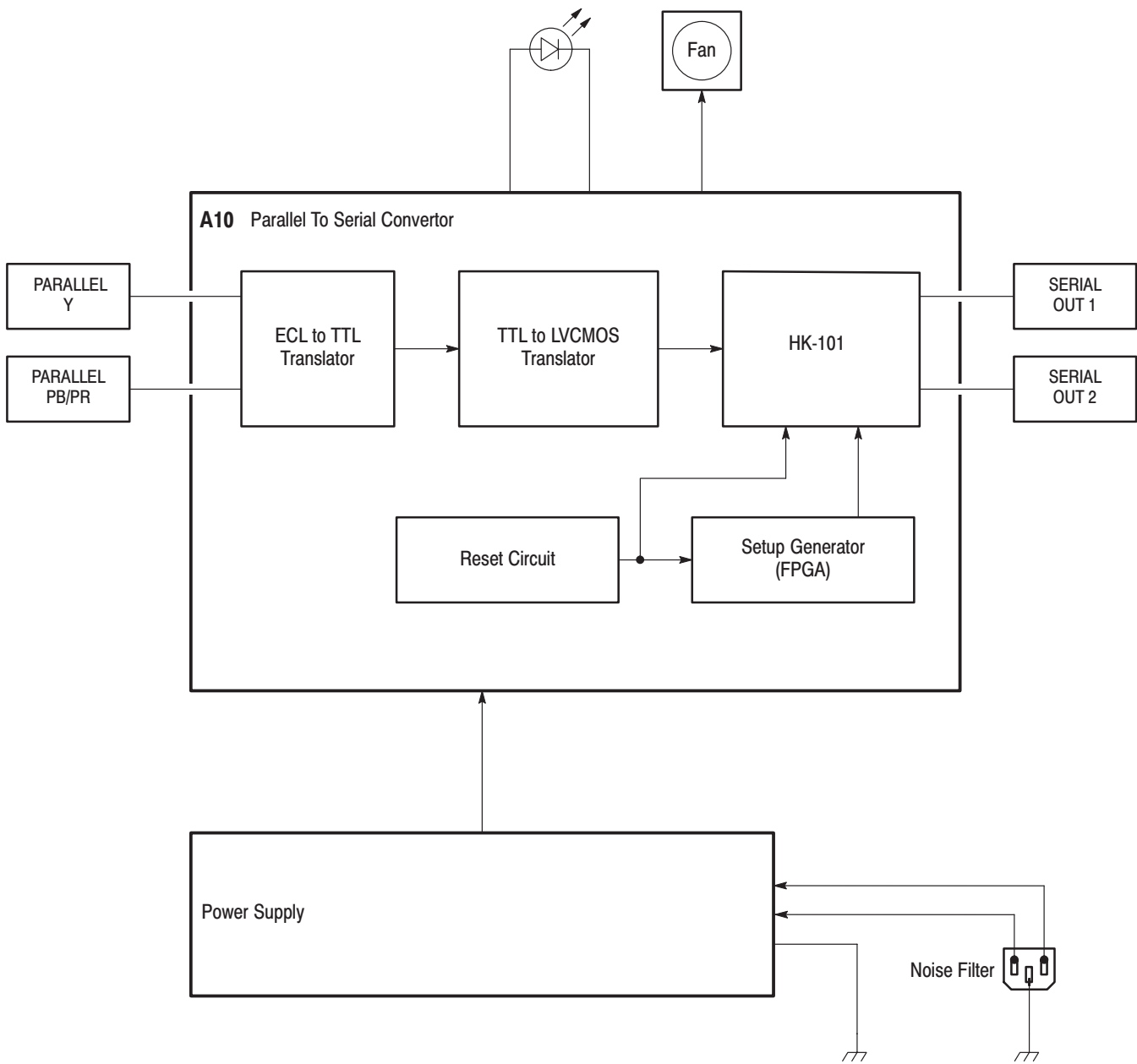


Figure 9-2: Block diagram

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