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Z1800-Series

OPERATOR'S GUIDE

Teradyne, Inc.
Assembly Test/Walnut Creek
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Z1800-Series Operator's Guide

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PREFACE

The **Z1800-Series Operator's Guide** provides the information you need to operate Z1800-series testers. The procedures outlined here are meant to be performed by persons designated as operators.

This manual provides operator safety information, a description of tester hardware, and instructions for operating the tester and interpreting test results.

Procedures requiring the expertise of technicians, programmers, or supervisors are documented in your tester-specific system reference, the **Z1800-Series Maintenance Reference, Z1800-Series Programmer's Guidebook**, and the Z1800-Series options documentation pertinent to your system.

For detailed information about the documentation set, refer to the **Getting Started Quick Reference.**

How to Use the Manual

To find information efficiently, refer to the table of contents and the index. The table of contents lists first- and second-level headings and also lists the titles of illustrations and tables. The index will help you find specific information in greater detail, often under different terms reflecting varying ways of thinking about a topic.

To help you accomplish tasks, procedures are broken into numbered steps. Illustrations accompanying procedures facilitate the performance of complex tasks.

CHAPTER 1 SAFETY

The Z1800-Series test systems have been carefully designed for long-term safe and reliable operation in a manufacturing environment. However, in-circuit testing requires that these testers use and distribute high power and high voltage, both AC and DC. As a consequence, if you do not follow proper tester operation procedures, the testers can cause serious personal injury and equipment damage.

This chapter identifies tester hazards that operators may encounter. Read this chapter before performing any operations on the tester.

Follow the precautions in this chapter during all stages of tester operation. Teradyne does not assume liability for a customer's failure to comply with established procedures.

Teradyne's Product Safety Policy

- Teradyne equipment is designed and manufactured to be functionally safe for persons who operate or service it. Potential hazards are addressed through a combination of careful system design, appropriate warning labels, and documentation.
- Teradyne equipment design reflects the Teradyne Product Safety Standards. These standards incorporate applicable electrical codes and safety regulations. When codes and regulations do not directly apply to automatic test equipment, the Teradyne Product Safety Standards adhere to the spirit and purpose of these publications.
- If specific questions arise about product safety or local requirements, Teradyne is prepared to address these issues with any customer.

General Safety Information

The tester is a "Safety Class 1" apparatus using a protective grounding scheme provided from the protective ground wire of the "AC Mains" power cable.

WARNING! **Any interruption of the protective conductor inside or outside the apparatus or disconnection of the protective earth terminal could possibly make the apparatus dangerous. Intentional interruption is prohibited.**

This apparatus has been designed and tested in accordance with **IEC Publication 348, Safety Requirements for Electronic Measuring Apparatus**, and has been supplied in a safe condition. The present instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the apparatus in safe condition.

The apparatus has been designed for indoor use. It may occasionally be subjected to temperatures between -5°C and -10°C without degradation of its safety.

When the apparatus is connected to its power supply, terminals may be live, and the opening of covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts. The apparatus shall be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance, or repair.

Capacitors inside the apparatus may still be charged even if the apparatus has been disconnected from all voltage sources.

Safety Practices

Safety features incorporated in the Z1800-Series testers are:

- Safety warnings and information labels placed on testers close to hazards to warn a knowledgeable service person of a potential hazard.
- Detailed installation, verification, and service documentation.
- Door locks to prevent unauthorized access to the interior of the testers.

Teradyne recommends that persons using the tester observe the safety practices described below while the tester is operating.

WARNING! **The tester is capable of producing lethal voltages. Extreme care must be taken to ensure the safety of persons operating the tester. Please read all safety information before attempting operation.**

Operation

Operators should read this manual and understand the procedures and precautions. Teradyne does not assume liability for the customer's failure to comply with established procedures.

- Consult your supervisor about the proper steps to take if the tester should experience an operational problem.
- Do not operate the tester in the vicinity of flammable gases or fumes.
- Do not substitute parts or perform any unauthorized modifications to the tester, in order to avoid introducing additional hazards.
- Do not place tools, food, liquids, or any other items on the top surfaces of the tester.
- Wear protective eyewear and nonflammable clothing.
- Remove or cover conductive items such as rings and watches before using or servicing the tester.
- Exercise electrostatic discharge (ESD) control measures when handling components or circuit assemblies. Refer to the section titled "Electrostatic Discharge."
- Do not replace components on a board-under-test when it is installed on the tester.
- Be aware of and exercise caution against all electrical hazards which include:
  - DC voltages equal to or greater than 60 V
  - AC voltages equal to or greater than 30 Vrms (42 V peak)
  - 24 V pulses
  - 240 V-A power combination
  - 10 joules reactive energy
- Keep tester doors locked.
- Use caution near the device-under-test when power is applied.Capacitors mounted in reverse (reverse polarity) can explode.
- Do not use water or any other unauthorized cleaning agent either externally or internally.
- Use caution when lifting large fixtures.
- Do not work on the fixture while it is connected to the tester.
- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver and consequently place the operator at risk.
- If you have a vacuum tester, do not use the tester vacuum hose to clean any part of the tester. Doing so clogs the vacuum and shortens the vacuum pump life.
- Z1805, Z1808, Z1880 and Z1890 testers can be tilted up to 15 degrees or be raised up to eight inches. Only qualified maintenance technicians should perform tilt adjustments.

- Z1884 can be tilted up to 30 degrees with the powered tilt mechanism. Only qualified maintenance technicians should perform tilt adjustments. The tester is intended to operate in the tilted mode.

Electrostatic Discharge

Manufacturers and users of electronic systems are becoming increasingly aware of the impact which electrostatic discharge (ESD) can have on the operation and long term reliability of complex equipment. This tester contains semiconductors which, by the nature of their material or design, are susceptible to damage from ESD. The nature of ESD damage may be either:

- Hard failures, such as open or fused semiconductors, or
- Partial failure caused by stressing device lands and junctions which degrades electrical performance and increases failure susceptibility.

Teradyne offers the following recommendations to help prevent ESD damage.

Static Prevention

While operating the tester, use the operator's wrist strap or another approved method of preventing ESD. Connect the wrist strap to the wrist strap receptacle. Wrist strap receptacles are located on the test jack panel of all testers and the rear (I/O) panels.

To minimize electronic charge generation:

- Use ground straps whenever you are operating the tester.
- Inform yourself about electrostatic charge phenomena, discharge damage, and methods to prevent problems.
- Eliminate offending insulating materials, such as the following, from work areas:
  - Plastic and styrofoam coffee cups
  - Food containers and wrappers
  - Clothing and shoes made from synthetic materials as well as rubber-soled shoes
  - Cellophane and paper tapes
- Create a static conductive work area including static conducting floors and tables.
- Properly ground both operators and boards to prevent ESD damage during unpacking, installation, or removal of boards from the tester.

Static Control

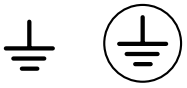
To control electronic charge generation:

- Drain static charges from persons and tools in the work area by using static conductive floor mats and grounded antistatic service mats and using grounded wrist straps with 1 Megohm resistors.
- When handing electronic devices or assemblies to another person, touch each other before the exchange to neutralize static charges.
- Minimize ESD damage by:
  - Moving and handling electronic parts and assemblies in antistatic containers.
  - Not touching printed circuit board lands or component leads of electronic assemblies.
  - Servicing electronic assemblies in a static-controlled area.
  - Discharging static from tools before servicing electronic assemblies.
  - Not using photocopies around the tester. Photocopies may carry electrostatic charges.

Safety Symbols and Markings

The following symbols appear in various places on the tester to call your attention to hazards or to indicate that you should consult the manuals for further information.

Safety Symbols



The protective ground symbol is used to define any connection point where a safety ground wire is added to the hardware. This would normally be any conductive point referenced to the safety ground wire of the main AC input.



The frame or chassis terminal symbol indicates a connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



The remote instrumentation ground symbol indicates grounding for instruments attached to the tester.



The black high voltage flash symbol indicates any connection where a high voltage, either AC or DC, from 60 V to 999 V may be present.



The information symbol on hardware indicates that there is important servicing or operating information in the manual. It appears close to the documented area.



Alternating current (power line).



The red and black danger label calls attention to a high energy electrical connection or a concealed hazard. Qualified technicians should consult appropriate manuals before servicing the instrument.

Safety Labels

WARNING
Hazardous voltages may be present on receiver/fixture

The warning label above appears near the fixture receiver interface.

- Do not remove fixture receiver covers while a test program is running. Power may be applied to the fixture receiver, which places you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any other conductive material you are wearing.

Caution
Do not remove or install printed circuit boards or other subassemblies without first removing power from that subassembly. Failure to remove power may result in component damage.

Proper electrostatic discharge precautions must be observed.

The Caution label appears on the test head cage. Turn off tester power before removing any printed circuit boards or electrical subassembly, and observe ESD practices.

Warning Terminology

The following terms are used in respect to Teradyne products.

Term	Definition
Danger	HAZARD PRESENT. Before proceeding, refer to the operator or maintenance documentation to avoid personal injury and damage to equipment, or HAZARD NOT IMMEDIATE, but potentially lethal if a barrier is removed.
Caution	POTENTIAL HAZARD. Before proceeding, refer to operator or maintenance manual to avoid personal injury and damage to equipment.
Warning	WARNING. Calls attention to a hazard. If the procedure, practice, or condition is not adhered to or is performed incorrectly, injury or death could result.

Power On/Off Sequence

The steps below describe how to turn the power on and off under normal operating conditions.

Important: For emergency situations, see the “Emergency Off Procedures” section.

The Power Control switch is on:

- Operator control panel for the following testers:

  Z1890
  Z1888
  Z1884
  Z1880
  Z1860
  Z1860-NB
  Z1850
  Z1840
  Z1808
  Z1805

- Dual operator control panel for the Z1866
- Test jack panel for the following testers:

  Z1820
  Z1800

- Operator control pod for the following testers:

  Z1860M
  Z1850M
  Z1840M

Power On

Follow the steps below to turn the power on to the tester and other accessories. See Chapter 3 of your tester-specific system reference for information about powering up the tester after installation or maintenance.

1. Turn on the Power Control switch.

   Turn on the switch at least 30 minutes prior to production use to ensure that the analog components of the stimulus and measurement instrumentation have reached temperature equalization.

2. Turn on the computer.

   Z1866: Turn on the computers for systems A and B. Refer to your computer manual for more information.

3. Turn on the printer.

Z1866: Turn on the printers for systems A and B. Refer to your printer manual for more information.

On Z1890, Z1888, Z1884, Z1880, Z1866, Z1860-NB, Z1860, Z1850, Z1840, Z1808, Z1805, and Z1803 Plus testers Power Control, Interface Vacuum, Start, and Cancel switches are illuminated when they are on.

On Z1820 and Z1800 testers Power Control switch on the test jack panel and Start, Cancel, Manual, Fix 1 and Fix 2 switches on the operator control panel are illuminated when they are on.

On Z1860M, Z1850M, and Z1840M testers Power Control, Start, and Cancel switches are illuminated when they are on.

Normal Power Off

Under normal operation, the tester, computer, and printer are left on. Generally they are turned off only for certain maintenance procedures. Follow the procedures below to turn off the tester, computer, and printer.

Important: Under extreme conditions, turn off the Power Control switch first to remove power from the tester. See the "Emergency Off Procedures" section below.

Power Off Procedure for Vacuum Testers Z1890, Z1888, Z1884, Z1880, Z1860-NB, Z1860, Z1850, Z1840, Z1820, Z1808, Z1805, Z1803 Plus, and Z1800

To prevent damage to the tester and loss of data, follow the steps below to power down the tester from a production situation.

1. Quit the test program.
   - Continue pressing Q or ESC to return to the Main menu.
   - Select Files from the Main menu.
   - Select Exit to return to the DOS prompt.
2. Release the vacuum under the board.

   Turn off the Fixture Vacuum 1 and Fixture Vacuum 2 switches if quitting from the program has not already released the vacuum.
3. Remove the board from the fixture.
4. Release the fixture.

   Turn off the Interface Vacuum switch on the following testers:

   Z1890
   Z1888
   Z1884
   Z1880
   Z1860-NB
   Z1860
   Z1850
   Z1840
   Z1808
   Z1805 Plus

   Turn off the Receiver Vacuum Valve switch on the Z1820 and Z1800 testers.
5. Remove the vacuum hoses from the fixture.
6. Take the fixture off the fixture receiver.

You may choose to leave the fixture mounted on the tester. In that case, place the clear plate over the probes on the fixture top. The clear plate protects the fixture from contamination and damage.

7 Turn off the computer power.

8 Turn off the Power Control switch.

9 Turn off the vacuum pump.

10 Turn off the printer.

Power Off Procedure for the Z1866

- **To power off both systems:**

1 Quit the test program on each of the computers.
   - Continue pressing Q or ESC to return to the Main menu.
   - Select Files from the Main menu.
   - Select Exit to return to the DOS prompt.

2 Release the vacuum under the board or boards.

   Turn off the fixture vacuum switches if quitting from the program has not already released the vacuum.

3 Remove the board or boards from the fixture.

4 Release the fixture by turning off the Interface Vacuum switch on the operator control panel.

5 Remove the vacuum hoses from the fixture.

6 Take the fixture off the fixture receiver.

   You may choose to leave the fixture mounted on the tester. In that case, place the clear plate over the probes on the fixture top. The clear plate protects the fixture from contamination and damage.

7 Turn off the computer power for both systems.

8 Turn off the printers.

9 Turn off the Power Control switch.

10 Turn off the vacuum pump.

- **To power off one system only:**

1 Check that the tester is in individual mode.

2 Quit the test program.
   - Continue pressing Q or ESC to return to the Main menu.
   - Select Files from the Main menu.
   - Select Exit to return to the DOS prompt.

3 Release the vacuum under the board.

   Turn off the appropriate fixture switch if quitting the program has not released the vacuum.

4 Remove the appropriate board from the fixture.

5 Turn off the computer power.

6 Turn off the printer.

7 Turn off DUT and Test Head circuit breakers at the DUT and Test Head Power Supply.

Power Off Procedure for the Z1860M, Z1850M, and Z1840M Testers

To prevent damage to the tester and loss of data, follow the steps below to power down the tester from a production situation.

1 Quit the test program.
- Continue pressing Q or ESC to return to the Main menu.
- Select Files from the Main menu.
- Select Exit to return to the DOS prompt.

2 Remove the board from the fixture.

3 Turn off the printer.

4 Turn off the computer power.

5 Turn off the Power Control switch.

Other Power Off Procedures

You can turn off power to the tester in several ways. Depending on the situation, you may need to turn off all power to the tester, including the computer, or it may be enough just to cancel the test you are executing.

Important: For emergency situations, see the “Emergency Off Procedures” section.

Power Control Switch To turn off power to all test head electronics, use the Power Control switch.

Turn off the power if the program is producing dangerous voltages or other hazardous test situations due to a problem with the board-under-test.

Be aware that power remains on the line conditioner, AC power control, and unswitched user outlets after you have turned the Power Control switch off.

Stop the Program To stop the program immediately and return to the test menu, press the ESC key.

Z1866: To stop the program for both systems, you must press the ESC key on both keyboards.

If an error message is displayed, press the ESC key multiple times to cycle through the error messages until you return to the currently displayed menu.

Cancel the Test You may cancel the test you are running by:

- Pressing the Cancel key (F4) on the computer keyboard,
- Clicking the Cancel button in the lower right portion of the screen
- Pressing the Cancel switch on the operator control panel or pod

  Z1866: Press the appropriate system Cancel switch on the operator control panel if you are in Independent mode. To cancel the tests for both systems you must cancel the test for one system, then the other. If you are running the systems in tandem, pressing either Cancel switch cancels the test for both systems.

Cancelling returns you to the start of the test program.

Emergency Power Off

To turn off power to everything connected to the tester, turn off the AC breaker. The AC breaker is on the AC power distribution assembly for all Z1800-series testers except for the Z1820/00 breaker. The Z1820/00 AC breaker is on the rear panel.

Note: Because turning off power to everything connected with the tester may result in loss of data if the computer is powered off at the same time, you should do it only in emergencies.

Emergency Manual Off Switch

Z1890, Z1888, Z1884, Z1880, Z1808, and Z1805 The Emergency Manual Off (EMO) switch is a large red button set in a black panel at the left front corner of the tester tabletop.

Push the switch to activate it. Turn the switch to reset it.

Activating the EMO has the same effect as pressing the Power Control switch on the operator control panel. Power remains on the line conditioner, AC power control, and unswitched user outlets.

For the Z1890, 1888, and Z1880, the EMO may be flush with the tabletop, or you can tilt it 15 degrees up from the tabletop. A screw at the back of the switch secures it in the desired position.

External Hazards

Be aware of the hazards described below which are on the outside of the tester. Hazards may be electrical or mechanical.

Electrical

Electrical hazards include test points, fixture receiver, and AC connections at the rear of the tester.

Test Points The E, F, and G test points on the test jack panel can have high voltages when the analog debug light is on.

Fixture Receiver Hazardous voltage may be present on the fixture receiver.

AC Power Distribution Assembly or Rear Panel(s) Hazardous voltage and current may be present at the AC power input and the user outlets.

Mechanical

Mechanical hazards include fixture receiver pins, test area probes, fixtures, and printers.

Fixture Receiver Pins Use caution to avoid puncture wounds.

Test Area Probes Use caution with probes to avoid puncture wounds.

Fixtures Tools left inside the fixture will damage the pins or cause shorts.

Use care when lifting heavy fixtures.

If your fixture is hinged, be sure it is locked together before picking it up. The hinged bottom of the fixture must be mated to the fixture, and the spring-loaded release on the left side of the fixture must be retracted into the sleeve.

Printer(s) After extended use, the print head is hot.

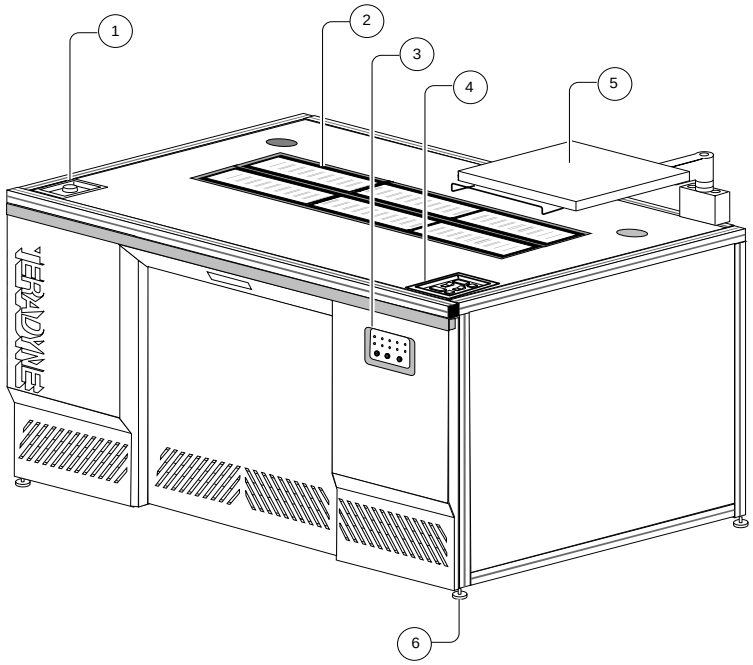
Safety Notes

The following illustrations show numbers indicating areas where hazards, safety labels, and symbols are located. Except where otherwise indicated, the notes assume that power is applied to the tester.

Note: For safety information on options, refer to the appropriate option manuals.

Z1890, Z1880

Z1890 and Z1880—Front, Top, and Right Side



1. **Emergency Manual Off (EMO) switch**
   Push to activate. Turn to deactivate. Activating this switch has the same effect as pressing the Power Control switch on the operator control panel. Power is still present on the line conditioner, AC power control, and unswitched user outlets.

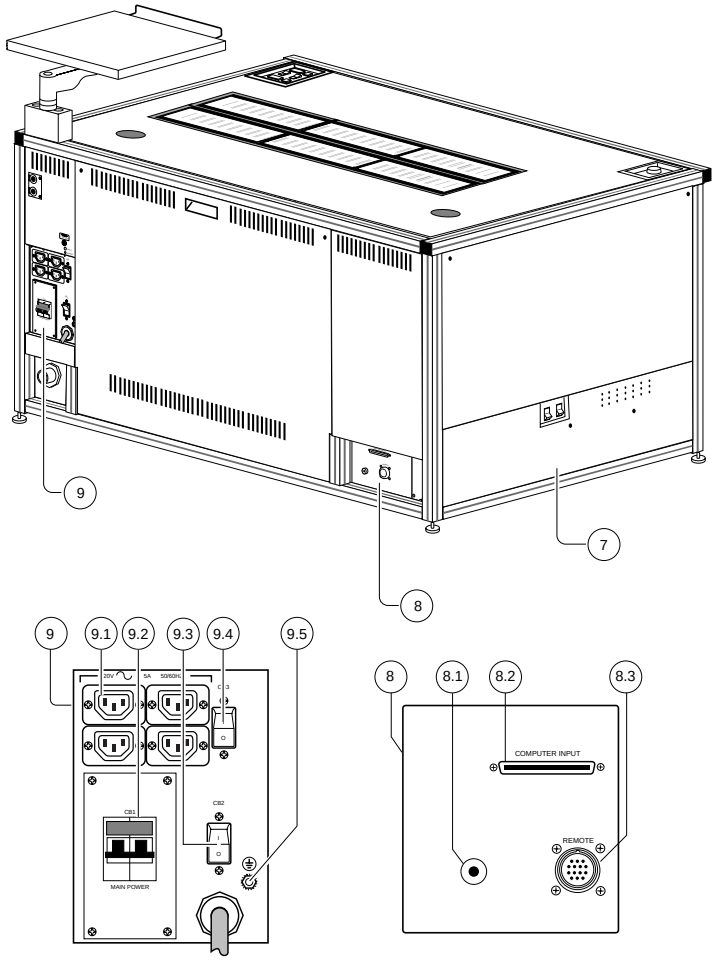
2. **Fixture receiver**
   Warning. Hazardous voltages may be present on fixture receiver during test.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, consequently placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel.
- Observe proper ESD precautions.

3. **Test jack panel**
   Warning. When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

Z1890 and Z1880—Rear and Left Side



4. **Operator control panel**
   The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures" section for detailed information.

   Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.

5. **CRT arm**
   Used to hold the computer monitor. Do not put items weighing more than 70 pounds on the CRT arm.

6. **Extendable legs**
   Used to level the tester and may be used to raise or tilt the entire tester. Do not extend legs beyond the red mark or the leg may fall off. Only qualified maintenance technicians should perform tilt adjustments.

7. **Test head and DUT power supplies**

   Danger. Electrical hazard present whenever system power is applied.

   Caution. Hazardous voltages may be present.

8. **Rear panel**

   8.1. Wrist strap receptacle This receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all

times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

8.2. Computer input The computer input connects the computer I/O cable to tester.

8.3. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

9. AC power distribution assembly

9.1. Outlets 120 VAC outlets.

Electrical hazard present whenever Circuit Breaker 3 and the main AC breaker is on, and AC power is connected to the power inlet.

9.2. Main AC circuit breaker Do not connect or disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage present whenever AC power cord is attached.

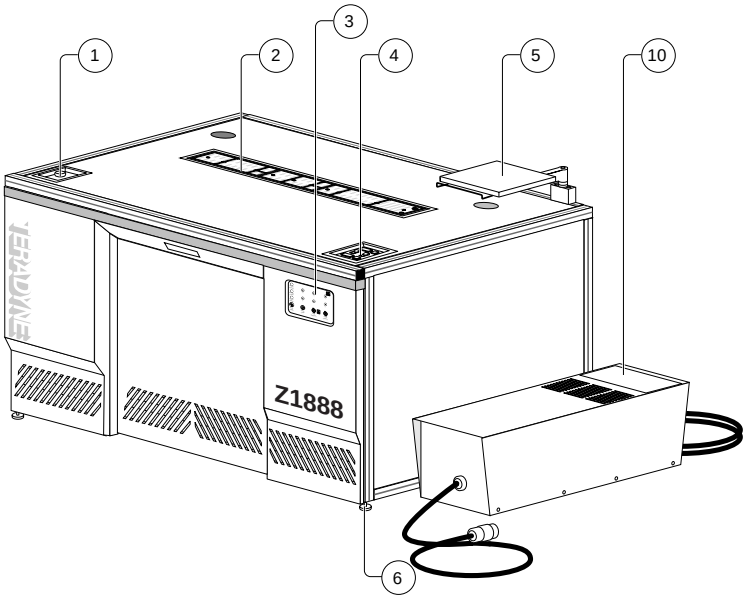
9.3. CB2 Circuit breaker for user outlets, 5 A.

9.4. CB3 Circuit breaker for switched system outlets.

9.5. Ground Used to connect your facility ground to the tester ground system.

Z1888—Z1888-1, Z1888-2

Z1888—Front, Top, and Right Side



1. Emergency Manual Off (EMO) switch
Push to activate. Turn to deactivate. Activating this switch has the same effect as pressing the Power Control switch on the operator control panel. Power is still present on the line conditioner, AC power control, and unswitched user outlets.

2. Fixture receiver
Warning. Hazardous voltages may be present on fixture receiver during test.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, consequently placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel.

- Observe proper ESD precautions.

3. **Test jack panel**
   Warning. When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

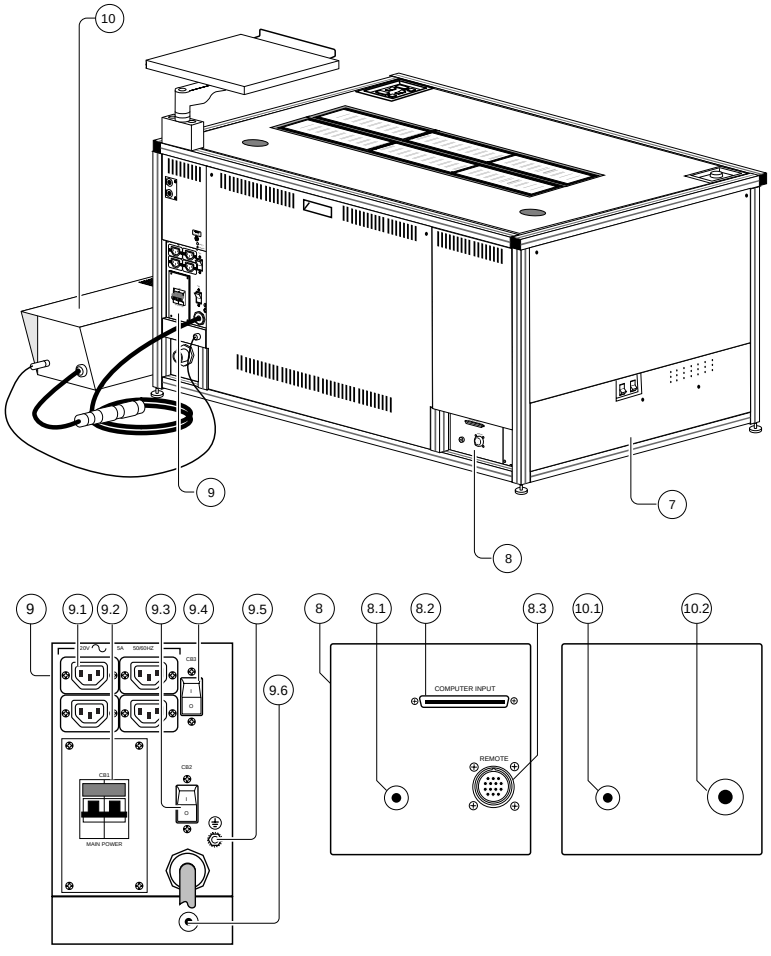
   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

4. **Operator control panel**
   The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures" section for detailed information.

   Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.

5. **CRT arm**
   Used to hold the computer monitor. Do not put items weighing more than 70 pounds on the CRT arm.

Z1888—Rear and Left Side



6. **Extendable legs**

Used to level the tester and may be used to raise or tilt the entire tester. Do not extend legs beyond the red mark or the leg may fall off. Only qualified maintenance technicians should perform tilt adjustments.

7. **Test head and DUT power supplies**

   Danger. Electrical hazard present whenever system power is applied.

   Caution. Hazardous voltages may be present.

8. **Rear panel**

   8.1. Wrist strap receptacle This receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

   8.2. Computer input The computer input connects the computer I/O cable to tester.

   8.3. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

9. **AC power distribution assembly**

   9.1. Outlets 120 VAC outlets.

   Electrical hazard present whenever Circuit Breaker 3 and the main AC breaker is on, and AC power is connected to the power inlet.

   9.2. Main AC circuit breaker Do not connect or disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage present whenever AC power cord is attached.

   9.3. CB2 Circuit breaker for user outlets, 5 A.

   9.4. CB3 Circuit breaker for switched system outlets.

   9.5. Ground Used to connect your facility ground to the tester ground system.

   9.6. Power detector line Used to signal the AC line conditioner that it is okay to sample incoming AC power.

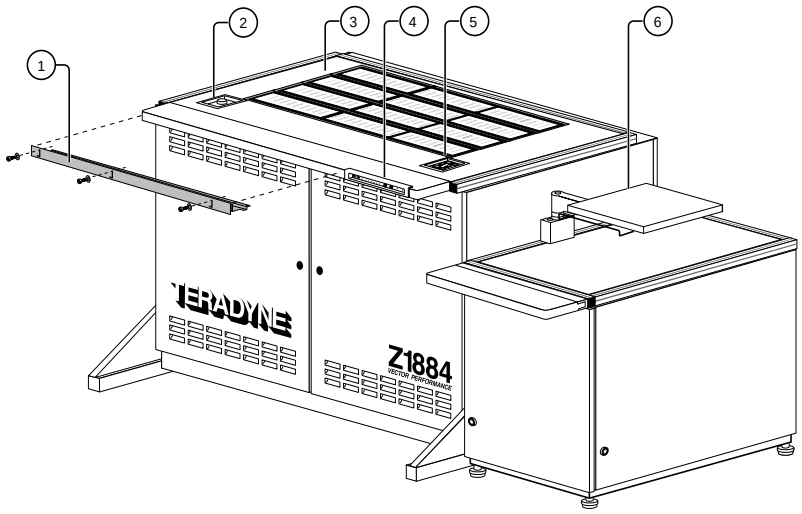
10. **AC power distribution assembly**

    10.1. AC power cable Carries power from AC Mains through the line conditioner to the tester.

    10.2. Power detector line

Z1884

Z1884 Safety Notes—Front, Top, and Right Side



1. **Safety ledge**
   Prevents objects from sliding off when the tester is tilted.
2. **Emergency Manual Off (EMO) switch**
   Push to activate. Turn to deactivate. Activating this switch has the same effect as pressing the Power Control switch on the operator control panel. Power is still present on the line conditioner, AC power control, and unswitched user outlets.
3. **Fixture receiver**
   Warning. Hazardous voltages may be present on fixture receiver during test.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, consequently placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel.
- Observe proper ESD precautions.

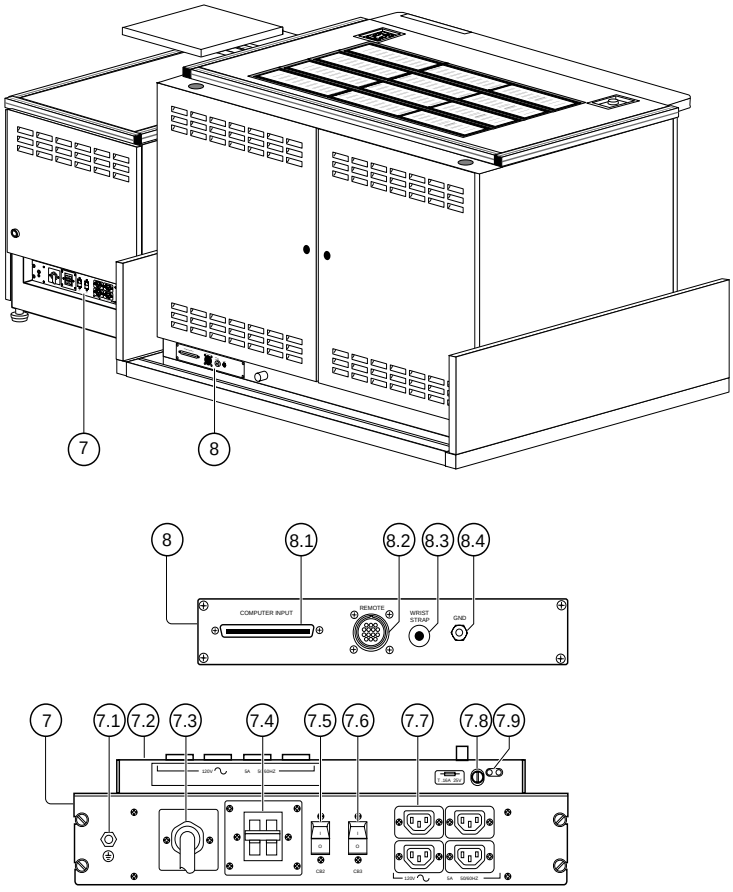
4. **Test jack panel**
   When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.
5. **Operator control panel**

- The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section for more detailed information.
- Pressing the Cancel switch stops test execution and returns to the start of the program. See the “Emergency Off Procedures” section for further details.

6. **CRT arm**
   Used to hold the computer monitor. Do not put items weighing more than 70 pounds on the CRT arm.

Z1884 Safety Notes—Rear and Left Side



7. AC power distribution assembly

7.1. Ground

7.2 Switched System Outlets Eight 120 VAC outlets provide AC distribution to tester. When line monitor detects faults, it cuts power to these outlets.

7.3. AC power input Makes protective ground connection.

Hazardous voltage and current. When you are connecting or disconnecting AC power, the main circuit breaker must be in the Off position or the AC control fuse within the controller may blow.

7.4. CB1 Mains circuit breaker, 25 A.

7.5. CB2 Circuit breaker for user outlets, 5 A.

7.6 CB3 Circuit breaker for switched system outlets.

7.7. User outlets Four 120 VAC outlets.

Electrical hazard is present whenever the main AC breaker is on and AC power is connected to the power inlet.

7.8. Fuse Line monitor board protection.

7.9. LEDs The green LED indicates AC power is on. The red LED indicates a fault.

8. Test head bay rear panel

8.1. Computer input The computer input connects the computer I/O cable to tester.

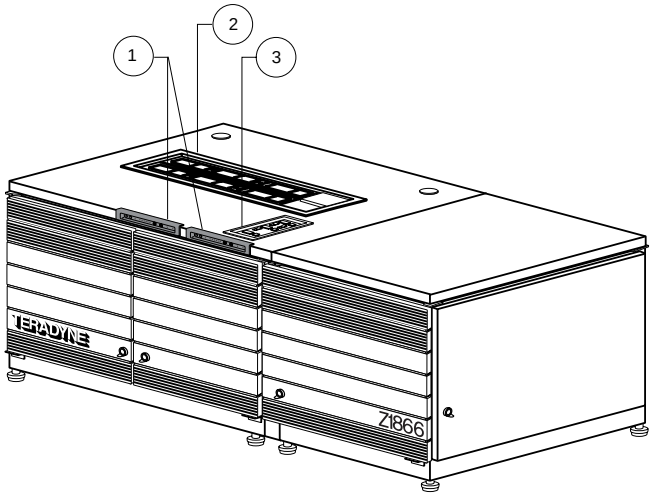
8.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

8.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

8.4. Ground

Z1866

Z1866 Safety Notes—Front, Top and Right Side View



1. Test jack panels

- When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
- The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.

2. Fixture receiver

Hazardous voltages may be present on fixture receiver.

Danger. High voltages may be present on input/output pins during test if the High Voltage Option is available.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel you are wearing.
- Use proper ESD procedures.

3. Operator control panel

- The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
- Pressing the Cancel switch stops test execution and returns you to the start of the test program. See the “Emergency Off Procedures” section for further details.

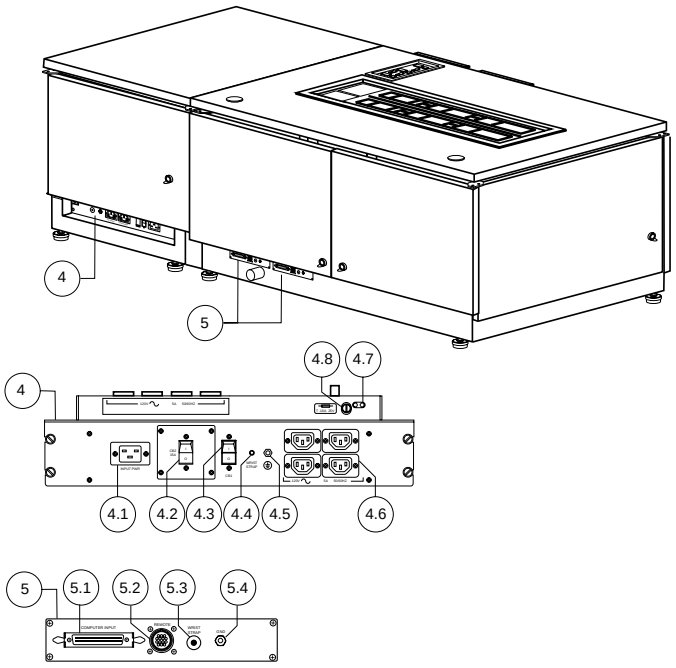
4. AC power distribution assembly

4.1. AC power input

- Makes protective ground connection.
  Hazardous voltage and current. When you are connecting or disconnecting AC power, the main circuit breaker must be in the Off position or the AC control fuse within the controller may blow.

4.2. CB2 Mains circuit breaker, 15 A.

Z1866 Safety Notes—Rear



4.3. CB1 Circuit breaker for user outlets, 5 A.

4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Ground

4.6. User outlets Four 120 VAC outlets.

Electrical hazard is present whenever the main AC breaker is on and AC power is connected to the power inlet.

4.7. LEDs The green LED indicates AC power is on; red indicates a fault.

4.8. Fuse Line monitor board protection.

5. Test head bay rear panels

5.1. Computer input The computer input connects the computer I/O cable to tester.

5.2. Remote On left test head bay rear panel only.

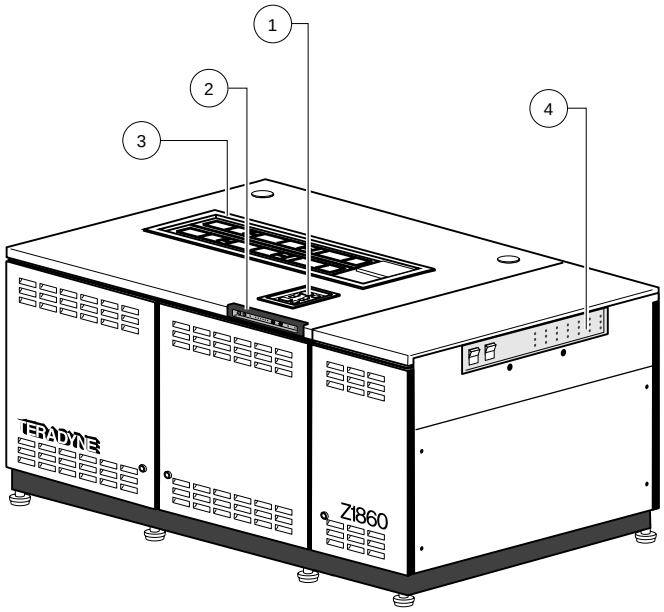
The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

5.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

5.4. Ground

Z1860-NB

Z1860-NB Safety Notes—Front, Top and Right Side View



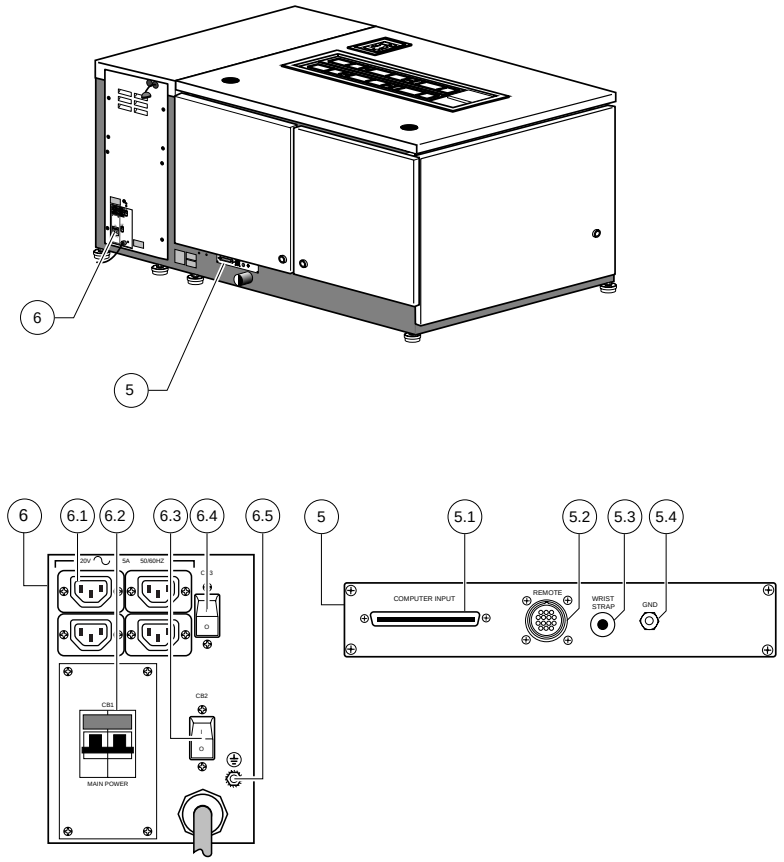
1. **Operator control panel**
   - The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
   - Pressing the Cancel switch stops test execution and returns you to the start of the test program. See the “Emergency Off Procedures” section for further details.
2. **Test jack panel**
   - When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
   - The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.
3. **Fixture receiver**

   Hazardous voltages may be present on fixture receiver.
   Danger. High voltages may be present on input/output pins during test if the High Voltage Option is available.
   - Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, placing you at risk.
   - Keep fingers away from fixture receiver pins.
   - Remove rings, watches, bracelets, or any loose or conductive apparel you are wearing.
   - Use proper ESD procedures.
4. **Test head and DUT power supply**
   Danger. Electrical hazard present whenever system power is applied.
   Caution. Hazardous voltages may be present.
5. **Test head bay rear panel**

   5.1. Computer input The computer input connects the computer I/O cable to tester.

Z1860-NB Safety Notes—Rear and Left Side View



5.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

5.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

5.4. Ground

6. AC power distribution assembly

6.1. Outlets 120 VAC outlets.

Electrical hazard present whenever Circuit Breaker 3 and the main AC breaker is on, and AC power is connected to the power inlet.

6.2. Main AC circuit breaker Do not connect or disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage present whenever AC power cord is attached.

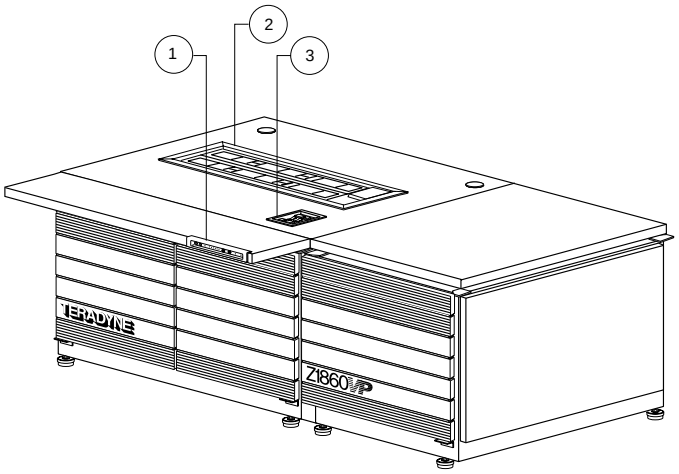
6.3. CB2 Circuit breaker for user outlets, 5 A.

6.4. CB3 Circuit breaker for switched system outlets.

6.5. Ground Used to connect your facility ground to the tester ground system.

Z1860

Z1860 Safety Notes—Front, Top and Right Side View



1. **Test jack panel**
   When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.

2. **Fixture receiver**
   Hazardous voltages may be present on fixture receiver.

   Danger. High voltages may be present on input/output pins during test if the High Voltage Option is available.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel you are wearing.
- Use proper ESD procedures.

3. **Operator control panel**

- The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
- Pressing the Cancel switch stops test execution and returns you to the start of the test program. See the “Emergency Off Procedures” section for further details.

4. **AC power distribution assembly**

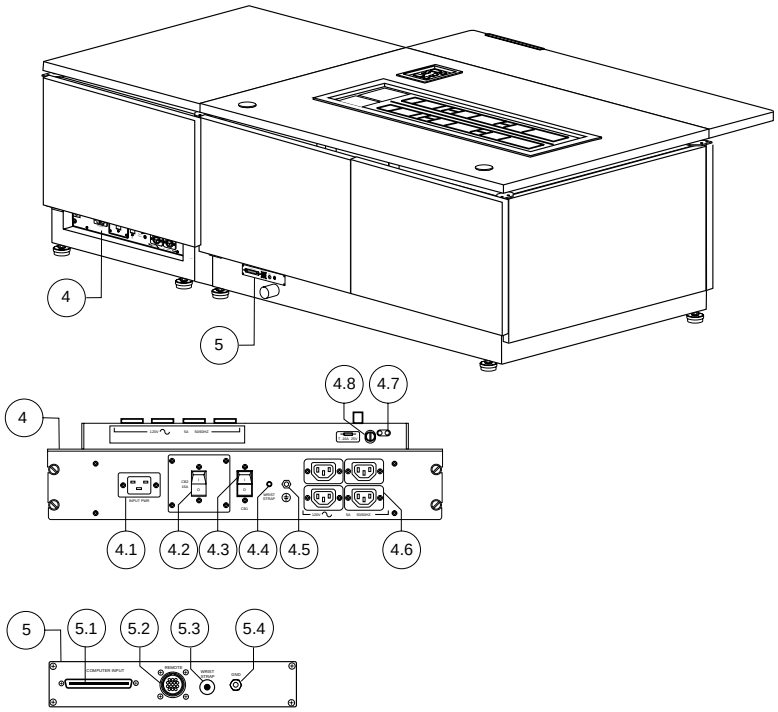
   4.1. AC power input Makes protective ground connection.

   Hazardous voltage and current. When you are connecting or disconnecting AC power, the main circuit breaker must be in the Off position or the AC control fuse within the controller may blow.

   4.2. CB2 Mains circuit breaker, 15 A.

   4.3. CB1 Circuit breaker for user outlets, 5 A.

Z1860 Safety Notes—Rear and Left Side View



4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Ground

4.6. User outlets Four 120 VAC outlets.

Electrical hazard is present whenever the main AC breaker is on and AC power is connected to the power inlet.

4.7. LEDs The green LED indicates AC power is on. The red LED indicates a fault.

4.8. Fuse Line monitor board protection.

5. Test head bay rear panel

5.1. Computer input The computer input connects the computer I/O cable to tester.

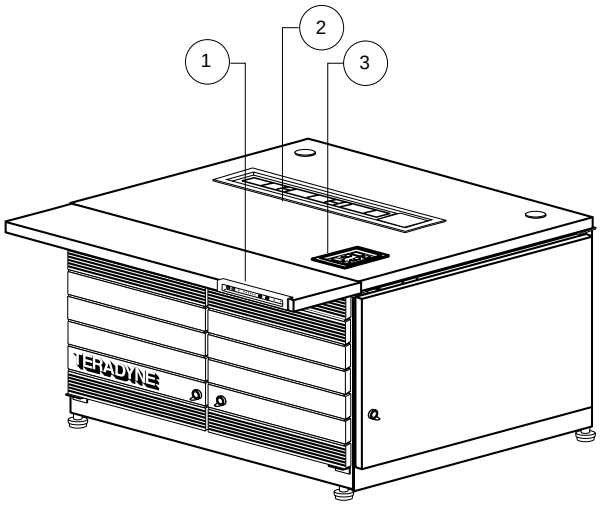
5.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

5.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

5.4. Ground

Z1850

Z1850 Safety Notes—Front, Top and Right Side View



1. Test jack panel

- When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
- The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.

2. Fixture receiver

Hazardous voltages may be present on fixture receiver.
Danger. High voltages may be present on input/output pins during test if the High Voltage Option is available.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel you are wearing.
- Use proper ESD procedures.

3. Operator control panel

- The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
- Pressing the Cancel switch stops test execution and returns you to the start of the test program. See the “Emergency Off Procedures” section for further details.

4. AC power distribution assembly

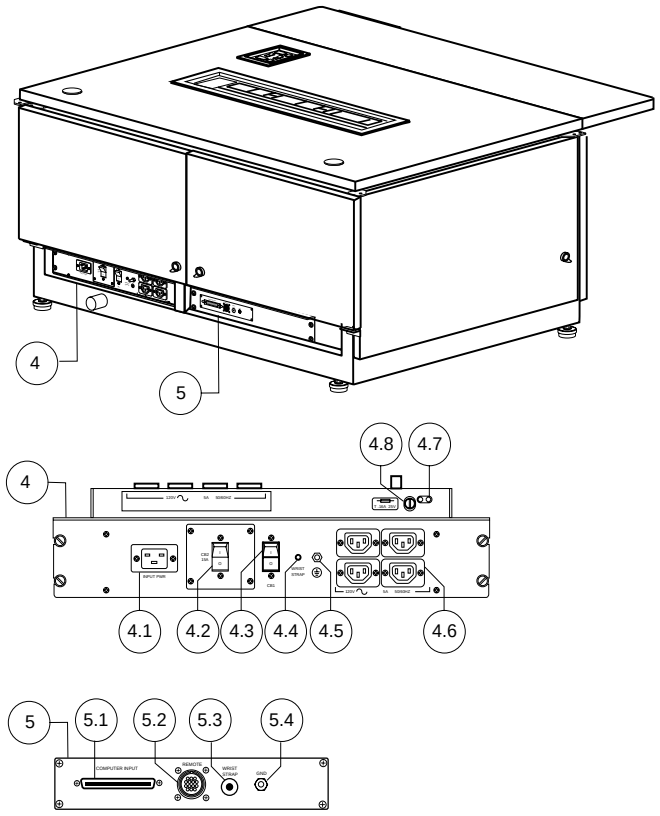
4.1. AC power input Makes protective ground connection.

Hazardous voltage and current. When you are connecting or disconnecting AC power, the main circuit breaker must be in the Off position or the AC control fuse within the controller may blow.

4.2. CB2 Mains circuit breaker, 15 A.

4.3. CB1 Circuit breaker for user outlets, 5 A

Z1850 Safety Notes—Rear and Left Side View



4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Ground

4.6. User outlets Four 120 VAC outlets. Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.

4.7. LEDs The green LED indicates AC power is on. The red LED indicates a fault.

4.8. Fuse Line monitor board protection.

5. Rear panel

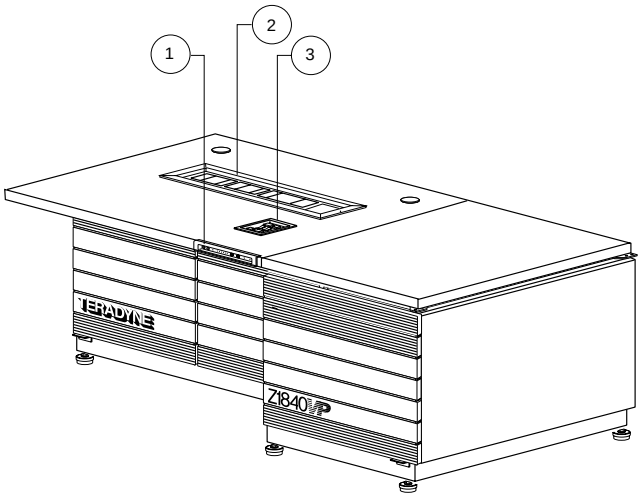
5.1. Computer input The computer input connects the computer I/O cable to tester.

5.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

5.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

5.4. Ground

Z1840 **Z1840 Safety Notes—Front, Top and Right Side View**



1. **Test jack panel**
   - When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
   - The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.

2. **Fixture receiver**

   Hazardous voltages may be present on fixture receiver.

   Danger. High voltages may be present on input/output pins during test if the High Voltage Option is available.

   - Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, placing you at risk.
   - Keep fingers away from fixture receiver pins.
   - Remove rings, watches, bracelets, or any loose or conductive apparel you are wearing.
   - Use proper ESD procedures.

3. **Operator control panel**
   - The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
   - Pressing the Cancel switch stops test execution and returns you to the start of the test program. See the “Emergency Off Procedures” section for further details.

4. **AC power distribution assembly**

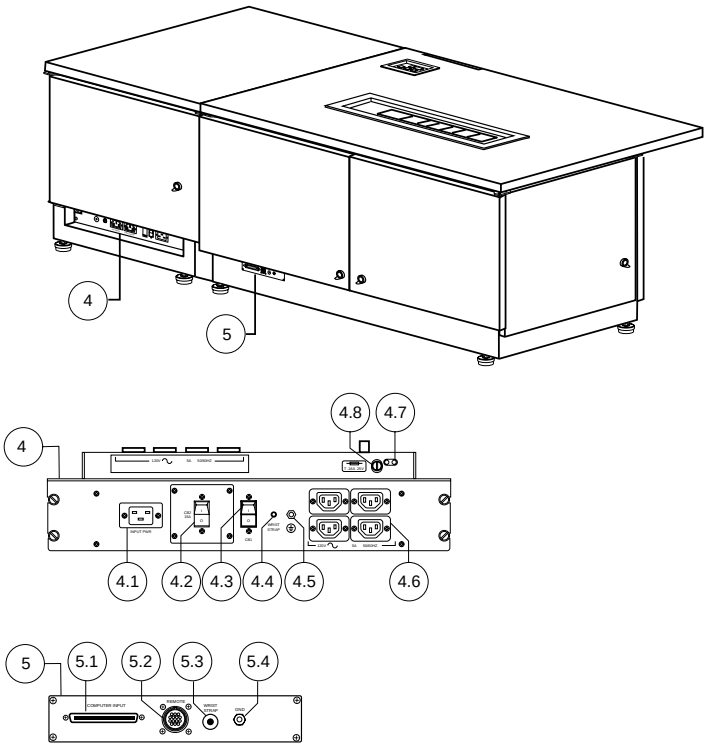
   4.1. AC power input Makes protective ground connection.

   Hazardous voltage and current. When you are connecting or disconnecting AC power, the main circuit breaker must be in the Off position or the AC control fuse within the controller may blow.

   4.2. CB2 Mains circuit breaker, 15 A.

   4.3. CB1 Circuit breaker for user outlets, 5 A.

Z1840 Safety Notes—Rear and Left Side View



4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Ground

4.6. User outlets Four 120 VAC outlets.

Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.

4.7. LEDs The green LED indicates AC power is on. The red LED indicates a fault.

4.8. Fuse Line monitor board protection.

5. Test head bay rear panel

5.1. Computer input The computer input connects the computer I/O cable to tester.

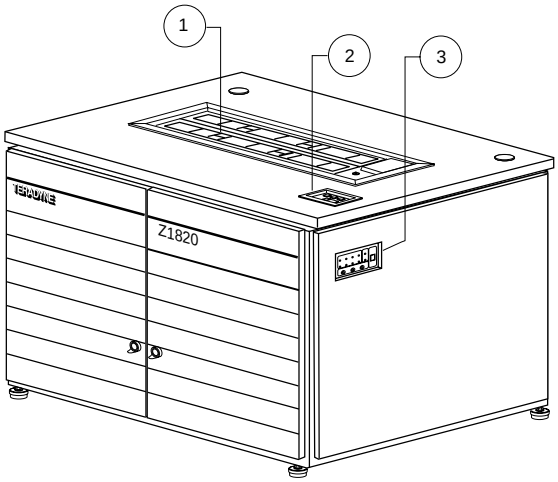
5.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

5.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

5.4. Ground

Z1820

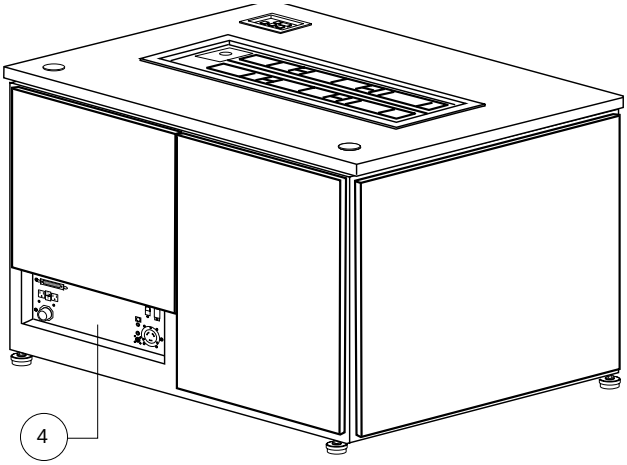
Z1820 Safety Notes—Front, Top and Right Side View

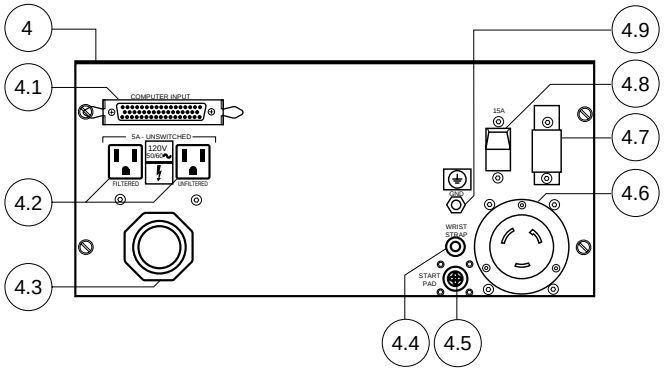


1. **Fixture receiver**
   Hazardous voltages may be present on the fixture receiver.
   - Do not remove fixture top covers while a program is running. Power may be applied to the board-under-test consequently placing you at risk.
   - Keep fingers away from fixture receiver pins.
   - Remove rings, watches, and bracelets.
2. **Operator control panel**
   Pressing the Cancel switch stops test execution and returns to the start of the program. See the “Emergency Off Procedures” section for further details.
3. **Test jack panel**
   - The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section earlier in this chapter.
   - When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
   - The wrist strap receptacle is provided for grounding the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.
4. **Rear panel**
   - **4.1. Computer input** The computer input connects the computer I/O cable to tester.
   - **4.2. Outlets** 120 VAC outlets

     Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.

Z1820 Safety Notes—Rear and Left Side View





4.3. Vacuum inlet The vacuum inlet connects the vacuum hose to the vacuum source.

4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Start pad foot control connection Connects start pad to tester.

4.6. AC power input Makes protective ground connection.

Hazardous voltage and current.

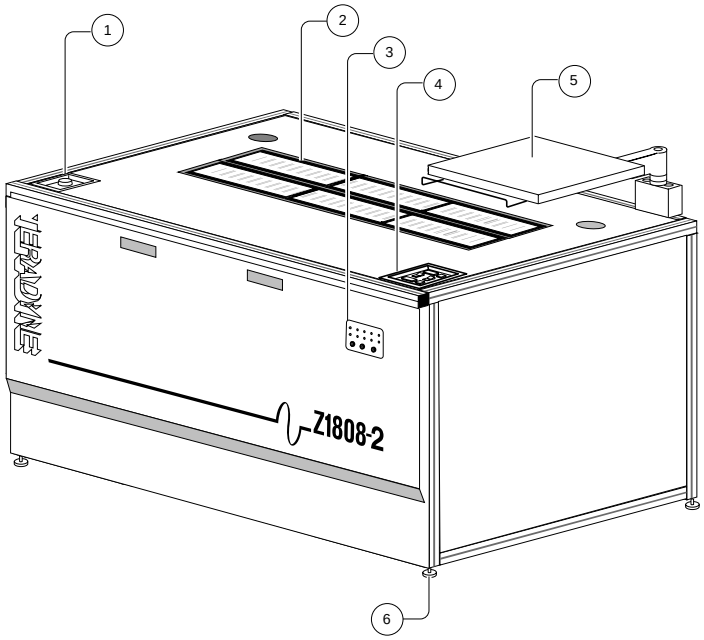
4.7. Main AC circuit breaker Only one of the main AC circuit breakers is used. The unused circuit breaker is covered.

4.8. Main AC circuit breaker Do not disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage is present whenever AC power cord is attached.

4.9. Ground

Z1808, Z1805

Z1808 and Z1805 Safety Notes—Front, Top, and Right Side



1. **Emergency Manual Off (EMO) switch**
   Push to activate. Turn to deactivate. Activating this switch has the same effect as pressing the Power Control switch on the operator control panel. Power is still present on the line conditioner, AC power control, and unswitched user outlets.

2. **Fixture receiver**
   Warning. Hazardous voltages may be present on fixture receiver during test.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, consequently placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel.
- Observe proper ESD precautions.

3. **Test jack panel**
   Warning. When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

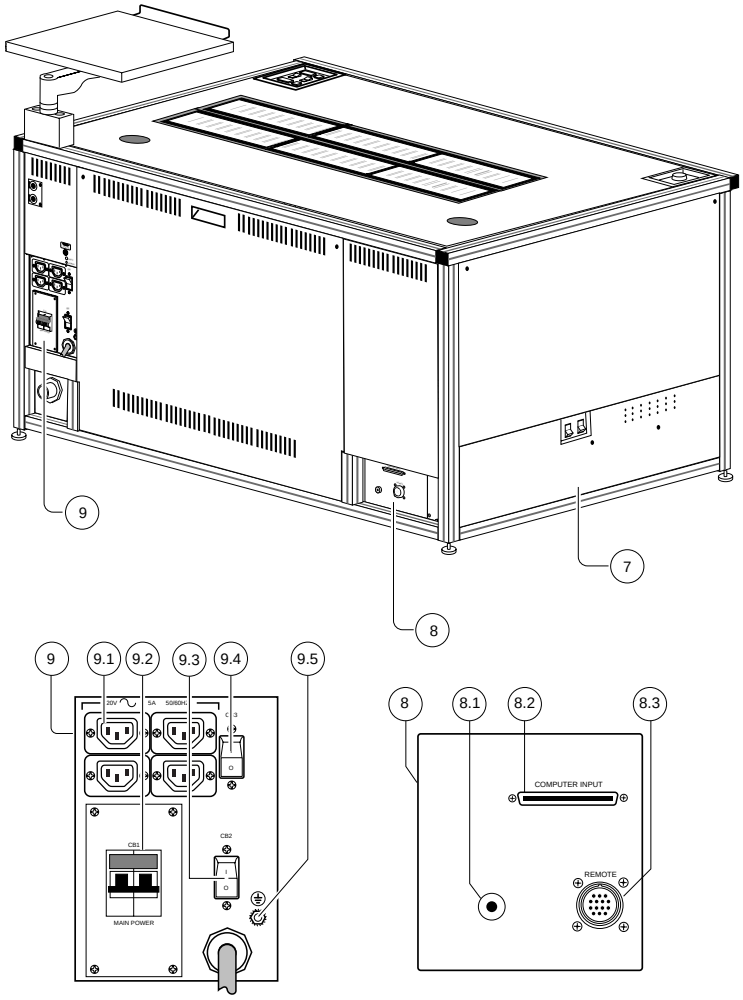
   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

4. **Operator control panel**

- The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section for detailed information.
- Pressing the Cancel switch stops test execution and returns to the start of the program. See the “Emergency Off Procedures” section for further details.
- Vacuum control

5. **CRT arm**
   Used to hold the computer monitor. Do not put items weighing more than 70 pounds on the CRT arm.

Z1808 and Z1805 Safety Notes—Rear and Left Side



6. **Extendable legs**
   Used to level the tester and may be used to raise or tilt the entire tester. Do not extend legs beyond the red mark or the tester may fall over. Only qualified maintenance technicians should perform tilt adjustments.

7. **Test head and DUT power supplies**
   Danger. Electrical hazard present whenever system power is applied.

   Caution. Hazardous voltages may be present.

8. **Rear panel**

   8.1. Wrist strap receptacle This receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

   8.2. Computer input The computer input connects the computer I/O cable to tester.

   8.3. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

9. AC power distribution assembly

9.1. Outlets 120 VAC outlets.

Electrical hazard present whenever Circuit Breaker 3 and the main AC breaker is on, and AC power is connected to the power inlet.

9.2. Main AC circuit breaker Do not connect or disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage present whenever AC power cord is attached.

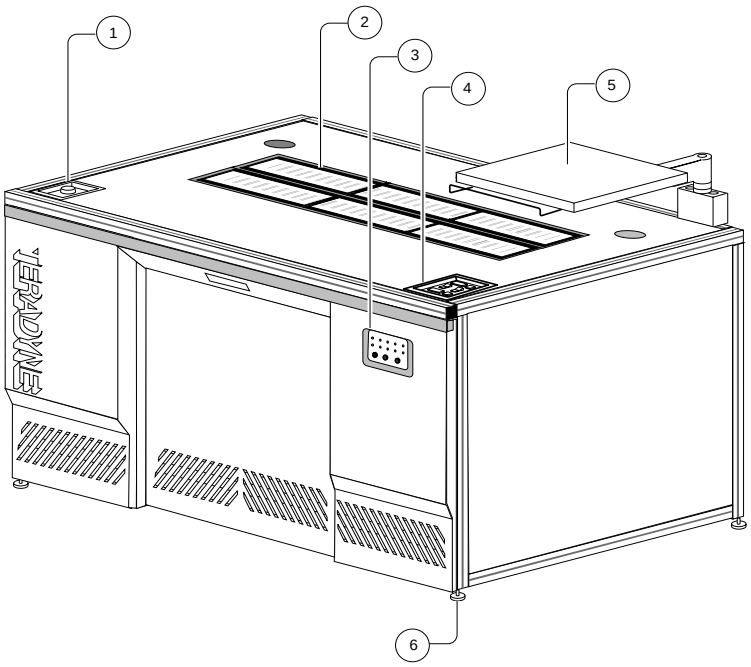
9.3. CB2 Circuit breaker for user outlets, 5 A.

9.4. CB3 Circuit breaker for switched system outlets.

9.5. Ground Used to connect your facility ground to the tester ground system.

Z1803 Plus—Z1803-1, Z1803-2

Z1803 Plus—Front, Top, and Right Side



1. Emergency Manual Off (EMO) switch, optional
Push to activate. Turn to deactivate. Activating this switch has the same effect as pressing the Power Control switch on the operator control panel. Power is still present on the line conditioner, AC power control, and unswitched user outlets.

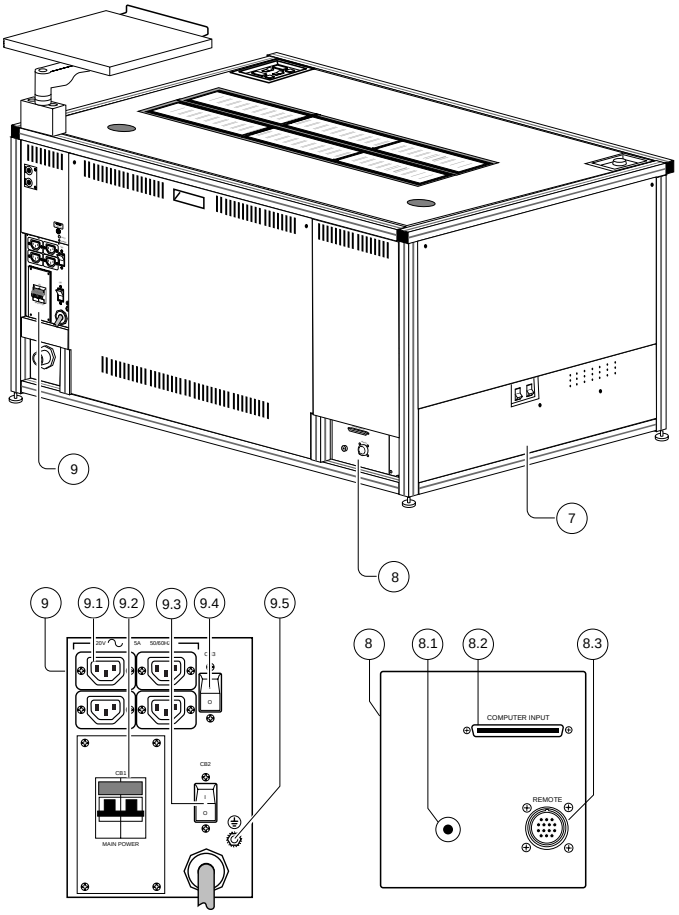
2. Fixture receiver
Warning. Hazardous voltages may be present on fixture receiver during test.

- Do not remove fixture receiver covers while a program is running. Power may be applied to the fixture receiver, consequently placing you at risk.
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, bracelets, or any loose or conductive apparel.
- Observe proper ESD precautions.

3. **Test jack panel**
   Warning. When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.

   The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

Z1803 Plus—Rear and Left Side



4. **Operator control panel**
   The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures" section for detailed information.

   Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.

   Vacuum control

5. **CRT arm**
   Used to hold the computer monitor. Do not put items weighing more than 70 pounds on the CRT arm.

6. **Extendable legs**
   Used to level the tester and may be used to raise or tilt the entire tester. Do not extend legs beyond the red mark or the leg may fall off. Only qualified maintenance technicians should perform tilt adjustments.

7. **Test head and DUT power supplies**

   Danger. Electrical hazard present whenever system power is applied.

   Caution. Hazardous voltages may be present.

8. **Rear panel**

   8.1. Wrist strap receptacle This receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.

   8.2. Computer input The computer input connects the computer I/O cable to tester.

   8.3. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

9. **AC power distribution assembly**

   9.1. Outlets 120 VAC outlets.

   Electrical hazard present whenever Circuit Breaker 3 and the main AC breaker is on, and AC power is connected to the power inlet.

   9.2. Main AC circuit breaker Do not connect or disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage present whenever AC power cord is attached.

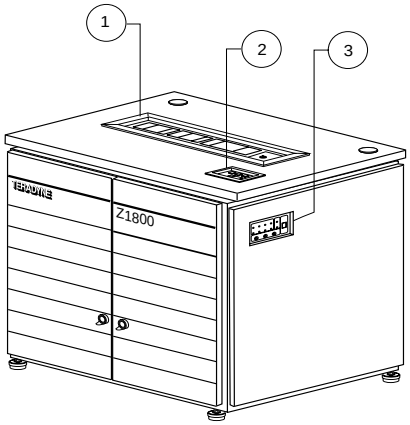
   9.3. CB2 Circuit breaker for user outlets, 5 A.

   9.4. CB3 Circuit breaker for switched system outlets.

   9.5. Ground Used to connect your facility ground to the tester ground system.

Z1800

Z1800 Safety Notes—Front, Top and Right Side View



1. **Fixture receiver**
   Hazardous voltages may be present on the fixture receiver.

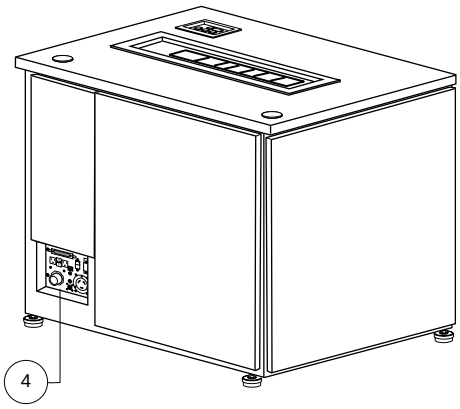
- Do not remove fixture top covers while a program is running. Power may be applied to the board-under-test consequently placing you at risk.

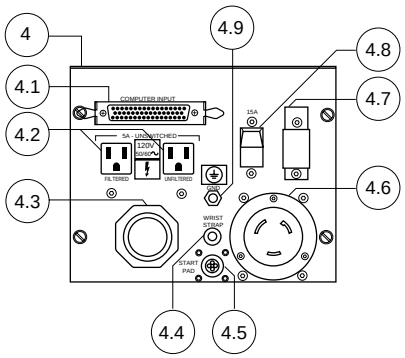
- Keep fingers away from fixture receiver pins.
- Remove rings, watches, and bracelets.

2. **Operator control panel**
   Pressing the Cancel switch stops test execution and returns to the start of the program. See the “Emergency Off Procedures” section for further details.

3. **Test jack panel**
   - The Power Control switch turns power to the tester on and off. When the Power Control switch is off, the unswitched outlets are still powered. See the “Emergency Off Procedures” section for more detailed information.
   - When the analog debug LED is on, and the High Voltage option is installed, high voltage may be present on the E, F, and G test points.
   - The wrist strap receptacle is provided for grounding the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system, except when you are working on the AC power control or when you are otherwise instructed.

Z1800 Safety Notes—Rear and Left Side View





4. Rear panel

4.1. Computer input The computer input connects the computer I/O cable to tester.

4.2. Outlets 120 VAC outlets.

Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.

4.3. Vacuum inlet The vacuum inlet connects the vacuum hose to the vacuum source.

4.4. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.5. Start pad foot control connection

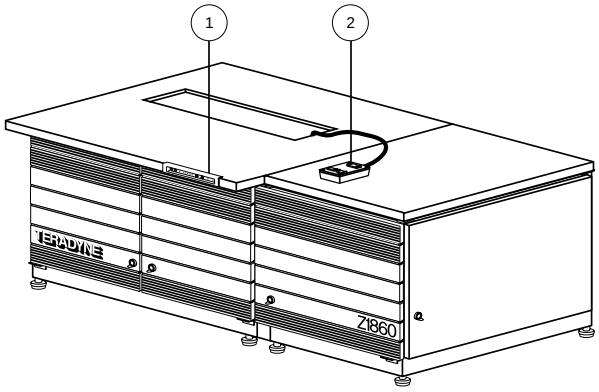
4.6. AC power input Makes protective ground connection. Hazardous voltage and current.

4.7. Main AC circuit breaker Only one of the main AC circuit breakers is used. The unused circuit breaker is covered.

4.8. Main AC circuit breaker Do not disconnect the AC power cord while the main AC breaker is on; damage to the tester can result. Hazardous voltage is present whenever AC power cord is attached.

4.9. Ground

Z1860M **Z1860M Safety Notes—Front, Top and Right Side View**

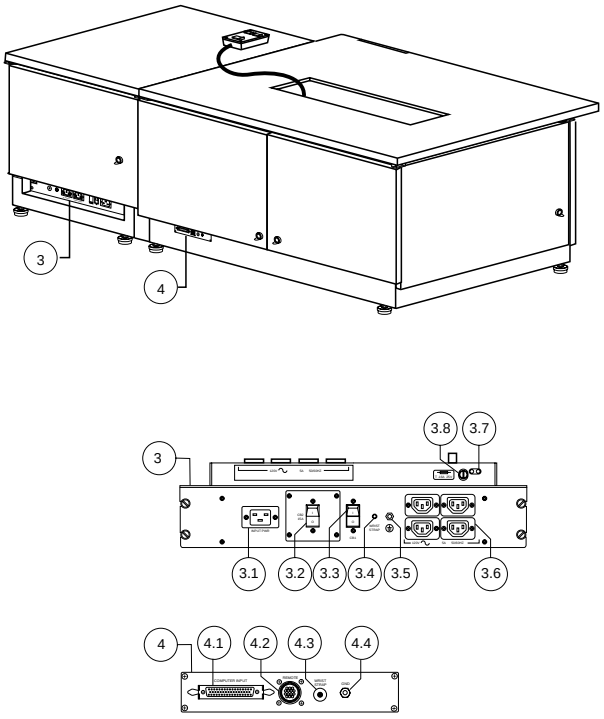


1. **Test jack panel**
   - When the analog debug LED is on, and the High Voltage Option is installed, high voltage may be present on the E, F, and G test points.
   - The wrist strap receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.
2. **Operator control pod**
   - The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures" section for more detailed information.
   - Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.
3. **AC power distribution assembly**
   - **3.1. AC power input** Makes protective ground connection.

     Hazardous voltage and current.
   - **3.2. CB2** Mains circuit breaker, 15 A.
   - **3.3. CB1** Circuit breaker for user outlets, 5 A.
   - **3.4. Wrist strap receptacle** The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.
   - **3.5. Ground**
   - **3.6. User outlets** Four 120 VAC outlets.

     Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.
   - **3.7. LEDs** The green LED indicates AC power is on. The red LED indicates a fault.
   - **3.8. Fuse** Line monitor board protection.

Z1860M Safety Notes—Rear and Left Side View



4. Test head bay rear panel

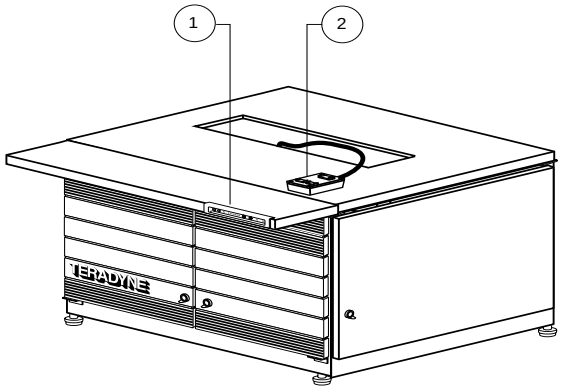
4.1. Computer input The computer input connects the computer I/O cable to tester.

4.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

4.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.4. Ground

Z1850M **Z1850M Safety Notes—Front, Top and Right Side View**



1. **Test jack panel**
   - When the analog debug LED is on, and the High Voltage Option is installed, high voltage may be present on the E, F, and G test points.
   - The receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.
2. **Operator control pod**
   - The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures" section for more detailed information.
   - Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.
3. **AC power distribution assembly**

   3.1. **AC power input** Makes protective ground connection.

   Hazardous voltage and current.

   3.2. **CB2** Mains circuit breaker, 15 A.

   3.3. **CB1** Circuit breaker for user outlets, 5 A.

   3.4. **Wrist strap receptacle** The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

   3.5. **Ground**

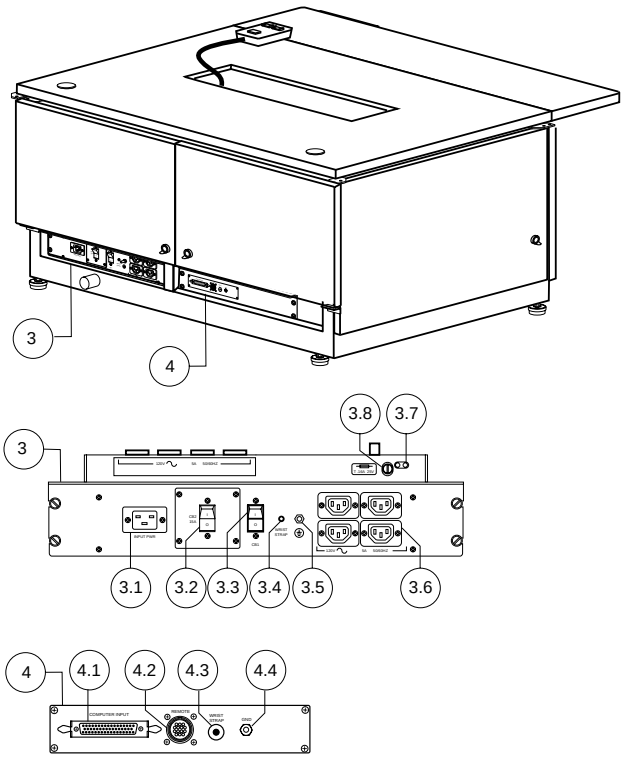
   3.6. **User outlets** Four 120 VAC outlets.

   Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.

   3.7. **LEDs** The green LED indicates AC power is on. The red LED indicates a fault.

   3.8. **Fuse** Line monitor board protection.

Z1850M Safety Notes—Rear and Left Side View



4. Rear panel

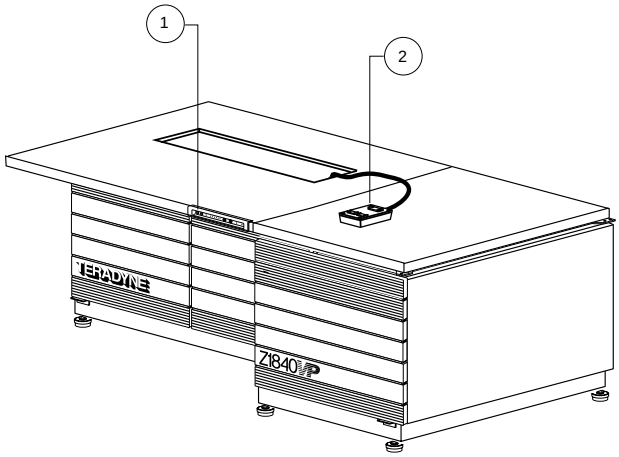
4.1. Computer input The computer input connects the computer I/O cable to tester.

4.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

4.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.4. Ground

Z1840M **Z1840M Safety Notes—Front, Top, and Right Side View**

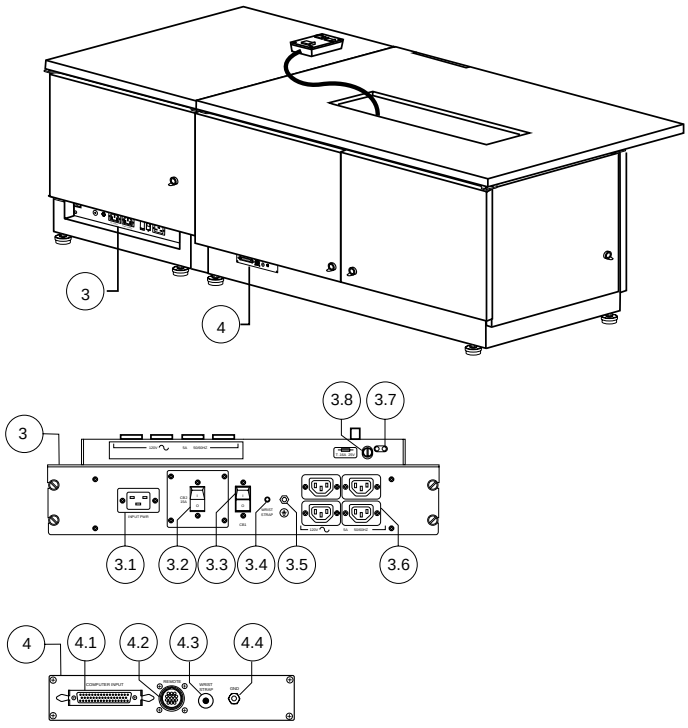


1. **Test jack panel**
   - When the analog debug LED is on, and the High Voltage Option is installed, high voltage may be present on the E, F, and G test points.
   - The receptacle grounds the antistatic wrist strap. Connect the wrist strap to one of the receptacles on the tester and wear it at all times when you are working on the system except when you are working on the AC power control or when you are otherwise instructed.
2. **Operator control pod**
   - The Power Control switch turns power to the tester on and off. However, when the Power Control switch is off, the unswitched outlets are still powered. See the "Emergency Off Procedures section" for more detailed information.
   - Pressing the Cancel switch stops test execution and returns to the start of the program. See the "Emergency Off Procedures" section for further details.
3. **AC power distribution assembly**
   - **3.1. AC power input** Makes protective ground connection.

     Hazardous voltage and current.
   - **3.2. CB2** Mains circuit breaker, 15 A.
   - **3.3. CB1** Circuit breaker for user outlets, 5 A.
   - **3.4. Wrist strap receptacle** The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.
   - **3.5. Ground**
   - **3.6. User outlets** Four 120 VAC outlets.

     Electrical hazard is present whenever the main AC breaker is on, and AC power is connected to the power inlet.
   - **3.7. LEDs** The green LED indicates AC power is on. The red LED indicates a fault.
   - **3.8. Fuse** Line monitor board protection.

Z1840M Safety Notes—Rear and Left Side View



4. Test head bay rear panel

4.1. Computer input The computer input connects the computer I/O cable to tester.

4.2. Remote The remote port connects remote control devices such as start pad and contains duplicate of control panel signals.

4.3. Wrist strap receptacle The receptacle is provided primarily for grounding the antistatic floor mats. You can also connect the antistatic wrist strap to this receptacle.

4.4. Ground

❖❖

CHAPTER 2 TESTER DESCRIPTION

Systems and assemblies accessible to the operators are:

- Console controls
- Rear panels
- AC power system
- Fixture receiver interface
- Vacuum system
- Fixture
- Computer

This chapter describes the Z1800-Series testers and acquaints you with the controls and features you will use in the production environment.

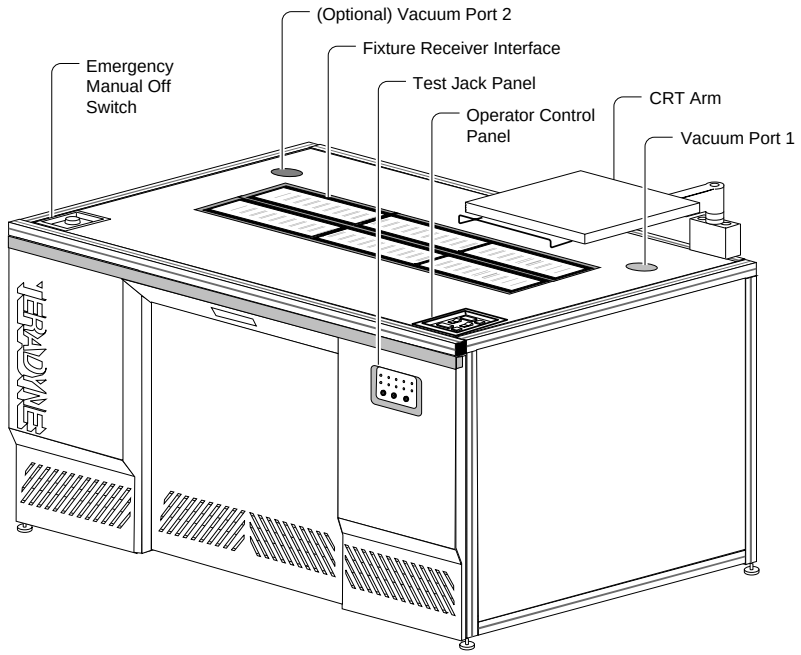
Illustrations of the Testers

The following pages provide front, side, and rear views of the Z1800-Series testers.

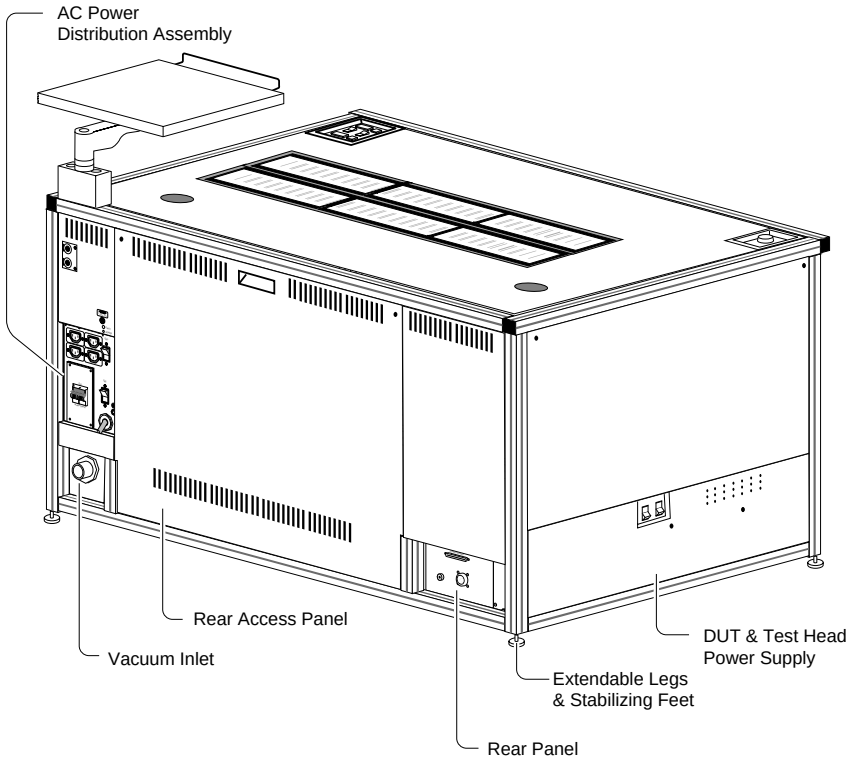
Z1890, Z1880

The Z1890 and Z1880 electronics are housed in one console.

Z1890 and Z1880—Front, Top, Right Side



Z1890 and Z1880—Rear and Left Side View

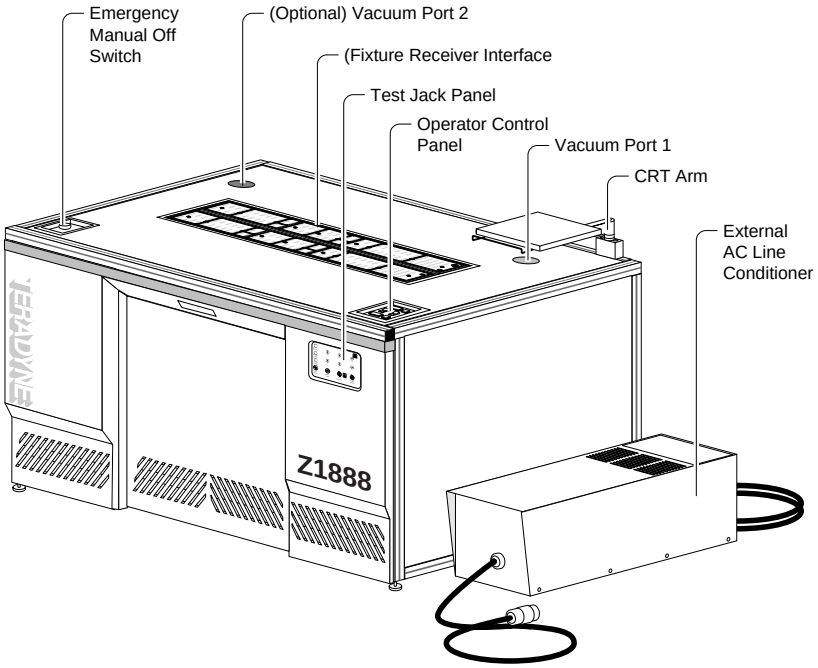


Z1888—Z1888-1, Z1888-2

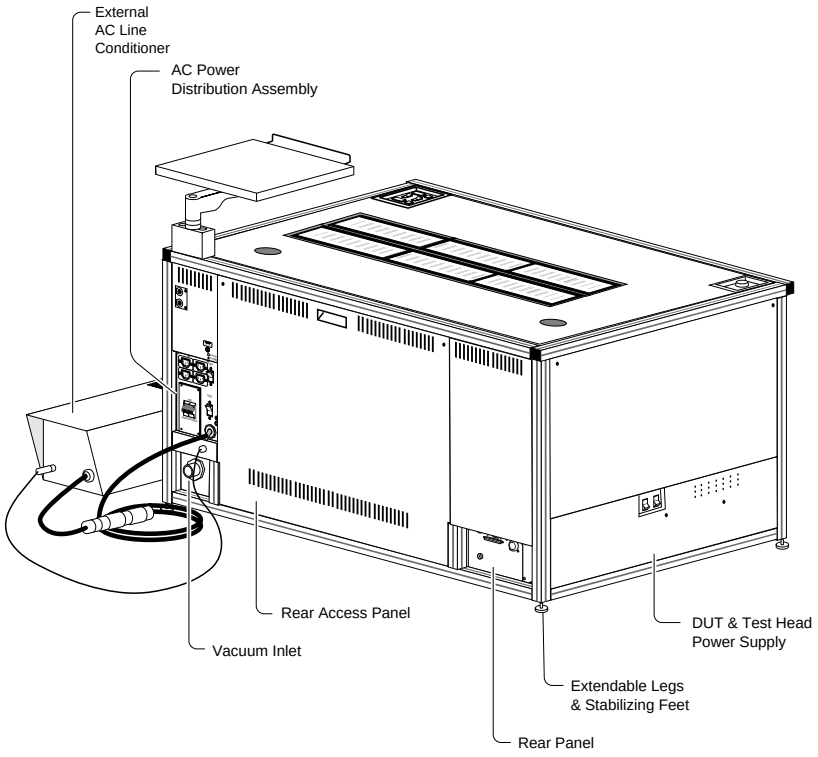
The Z1888 electronics are housed in one console and one external line conditioner. The system is configured as either:

- Z1888-1, one test head cage, 1024 pin capacity in a 1-well fixture receiver interface
- Z1888-2, two test head cages, 2048 pin capacity in a 2-well fixture receiver interface

Z1888—Front, Top, Right Side



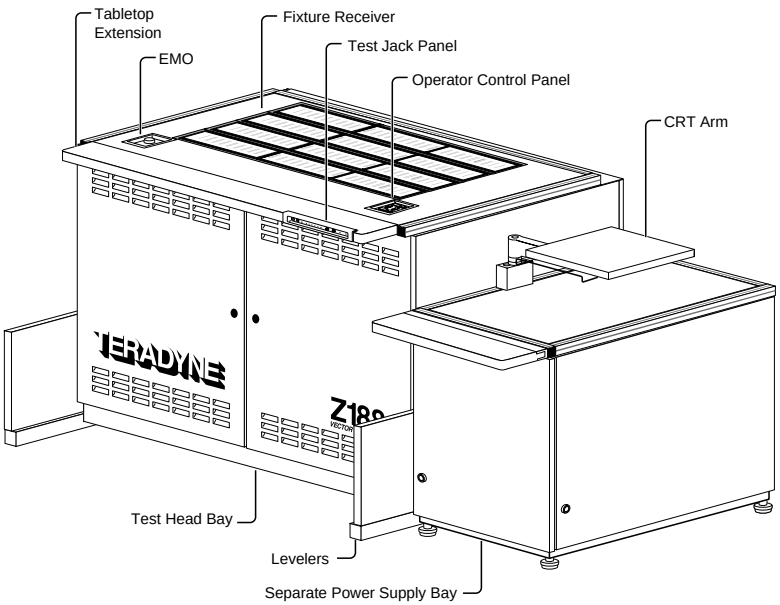
Z1888—Rear and Left Side View



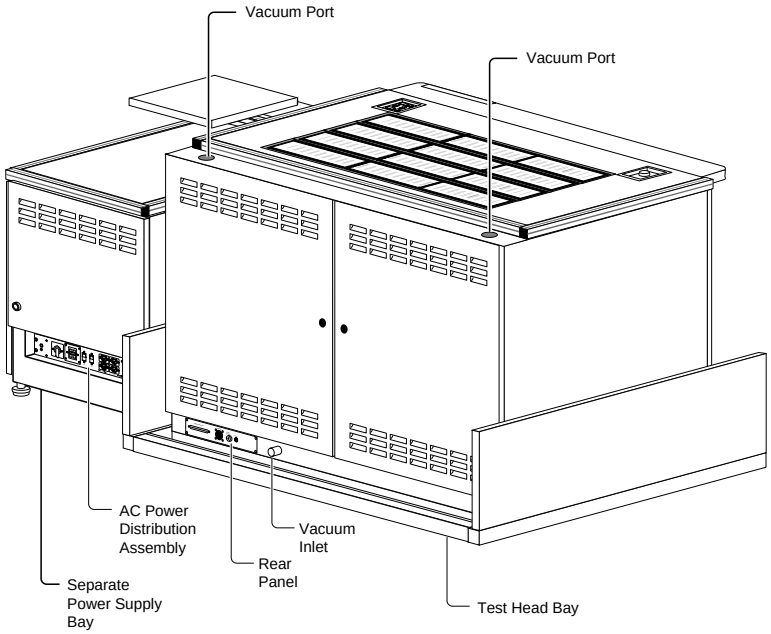
Z1884

The Z1884 is divided into a test head bay and a separate power supply bay to accommodate special production line configuration needs. The tabletop extension is standard.

Z1884—Front, Top, and Right Side View



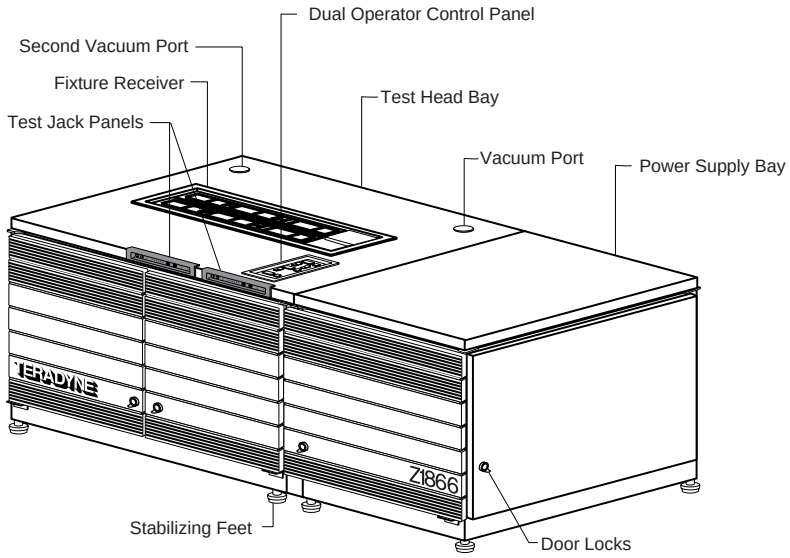
Z1884—Rear and Left Side View



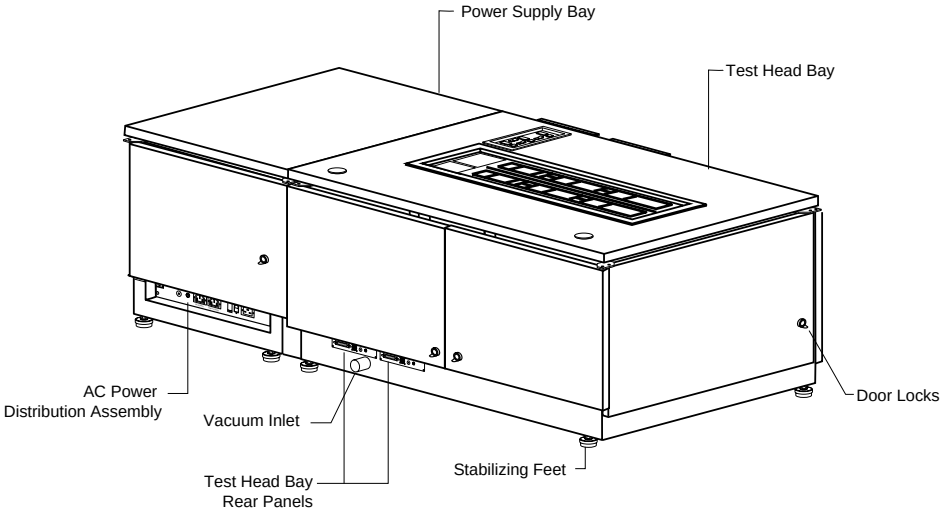
Z1866

The Z1866 tester is divided into a test head bay and a power supply bay.

Z1866—Front, Top, and Right Side View



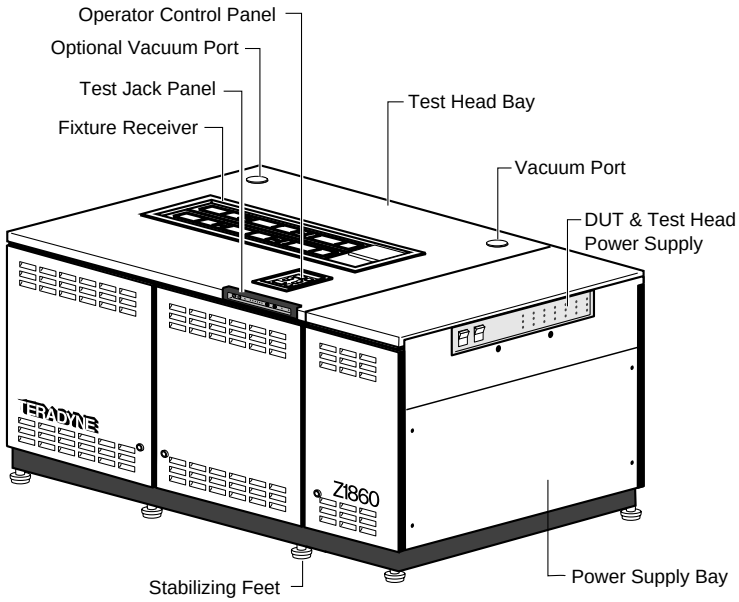
Z1866—Rear and Left Side View



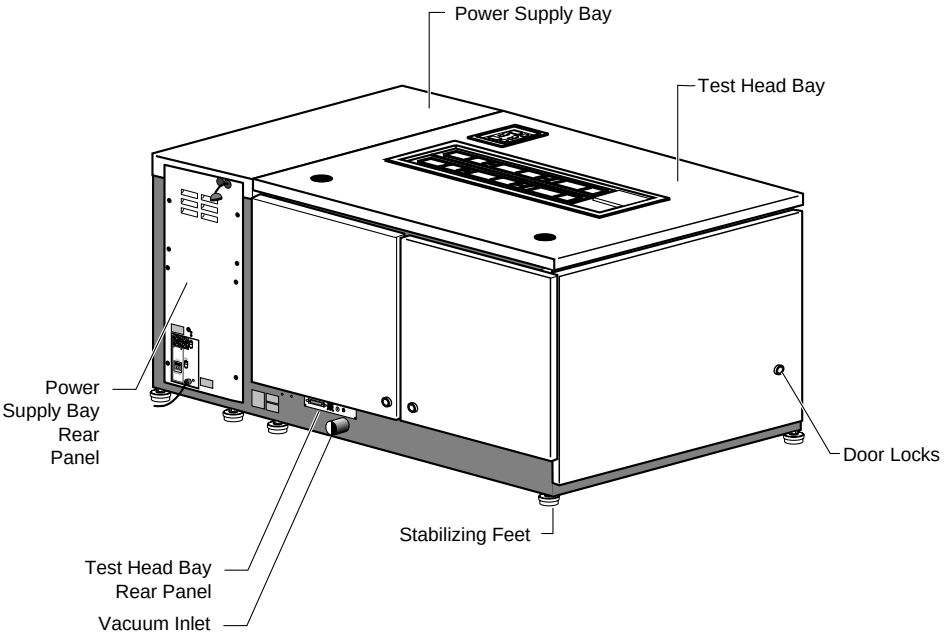
Z1860-NB

The Z1860-NB tester is divided into a test head bay and a power supply bay.

Z1860-NB—Front, Top, and Right Side View



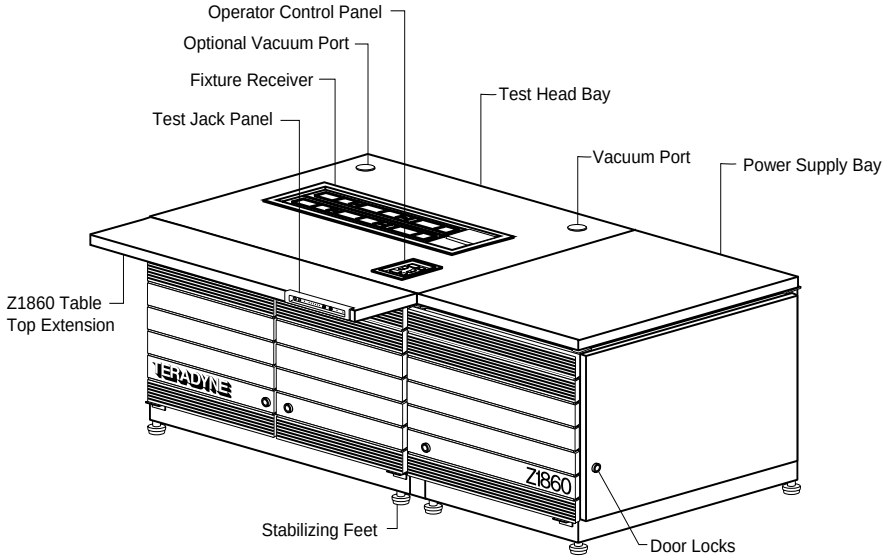
Z1860-NB—Rear and Left Side View



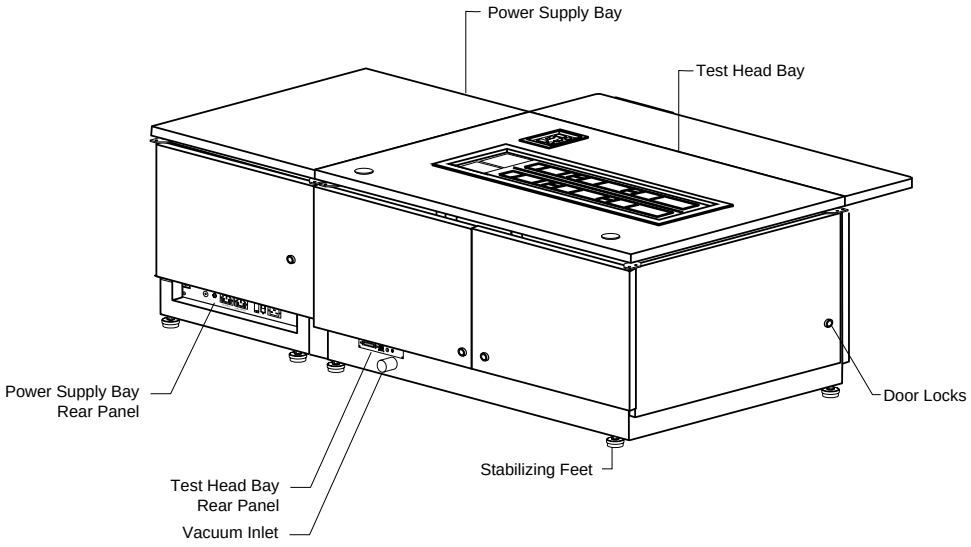
Z1860

The Z1860 tester is divided into a test head bay and a power supply bay. The power supply bay may be moved from the right end to the left end of the test head bay to accommodate production line requirements. The tabletop extension is an option.

Z1860—Front, Top, and Right Side View



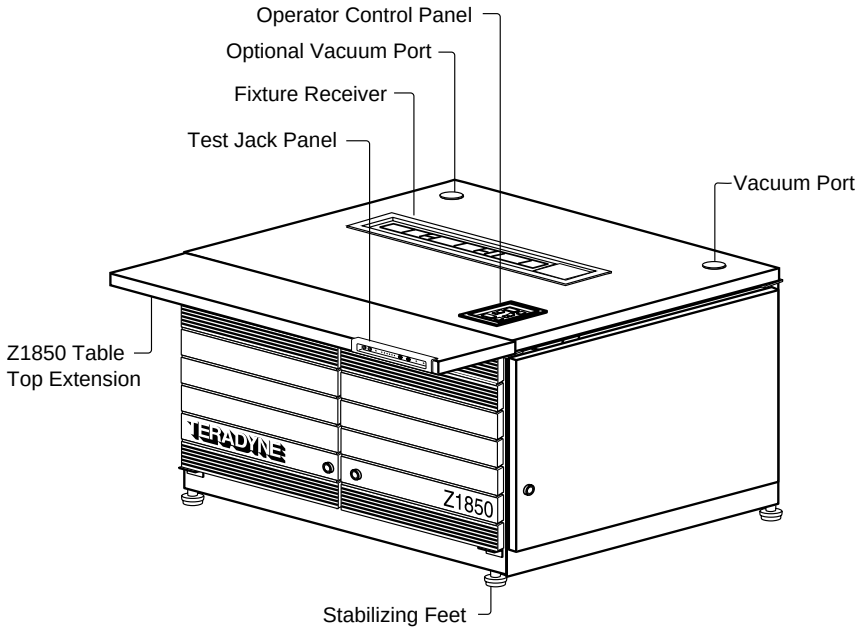
Z1860—Rear and Left Side View



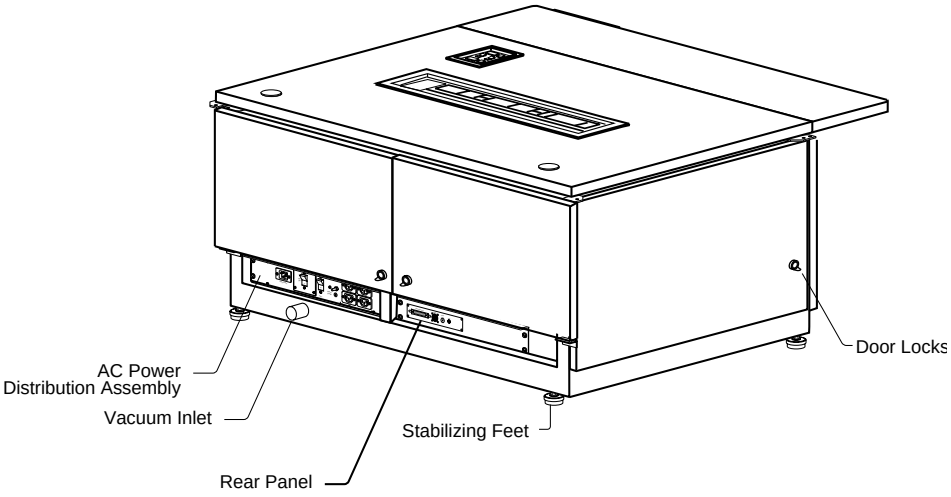
Z1850

The Z1850 electronics are housed in one console. The tabletop extension is an option.

Z1850—Front, Top, and Right Side View



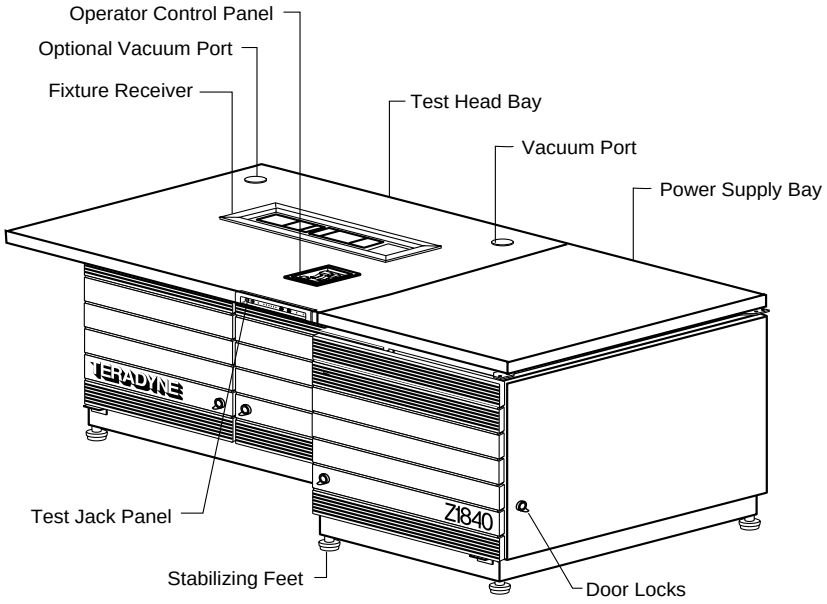
Z1850—Rear and Left Side View



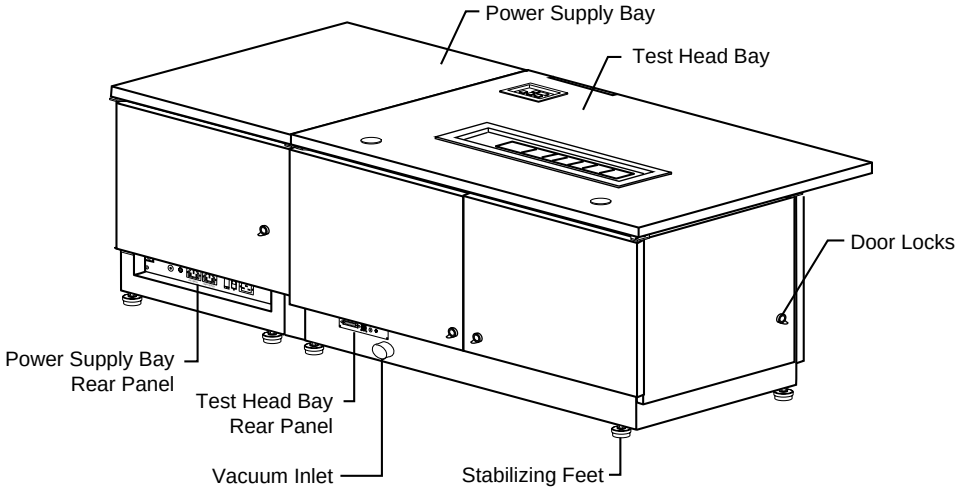
Z1840

The Z1840 tester is divided into a test head bay and a power supply bay. The power supply bay may be moved from the right end to the left end of the test head bay to accommodate production line requirements.

Z1840—Front, Top, and Right Side View



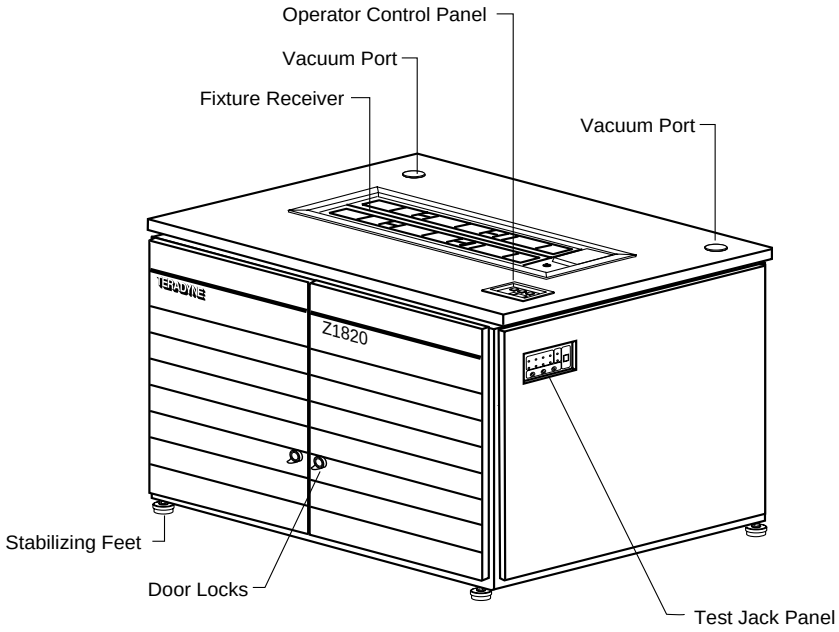
Z1840—Rear and Left Side View



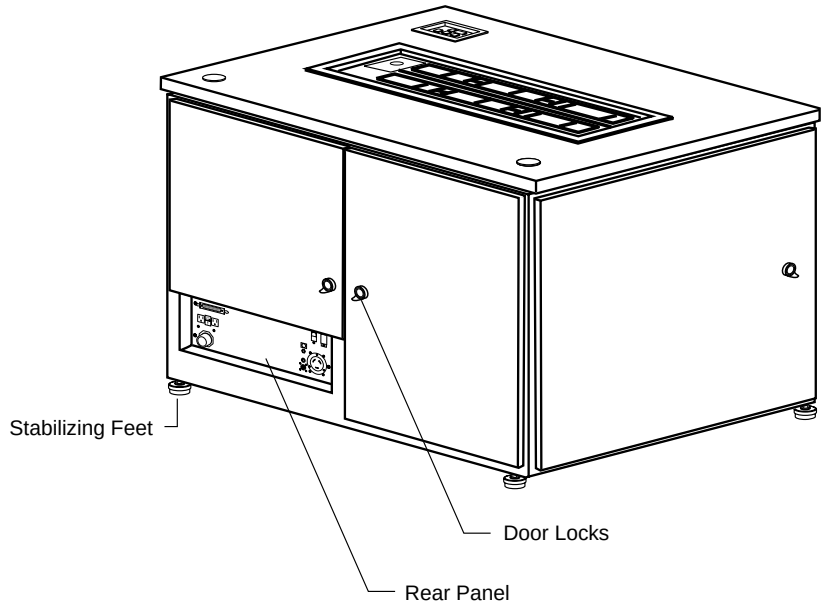
Z1820

Z1820 electronics are housed in one console.

Z1820—Front, Top, and Right Side View



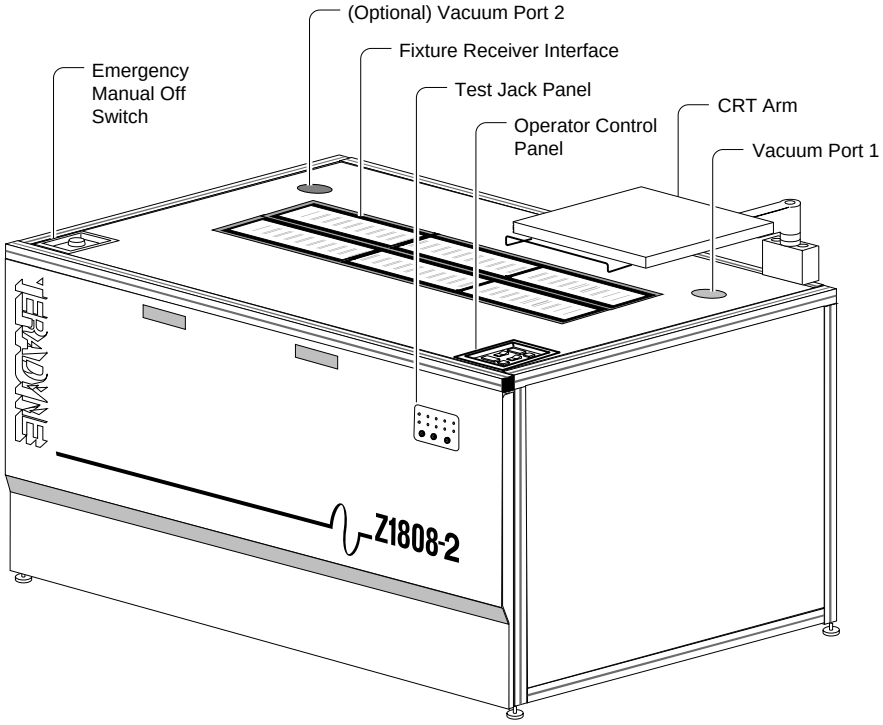
Z1820—Rear and Left Side View



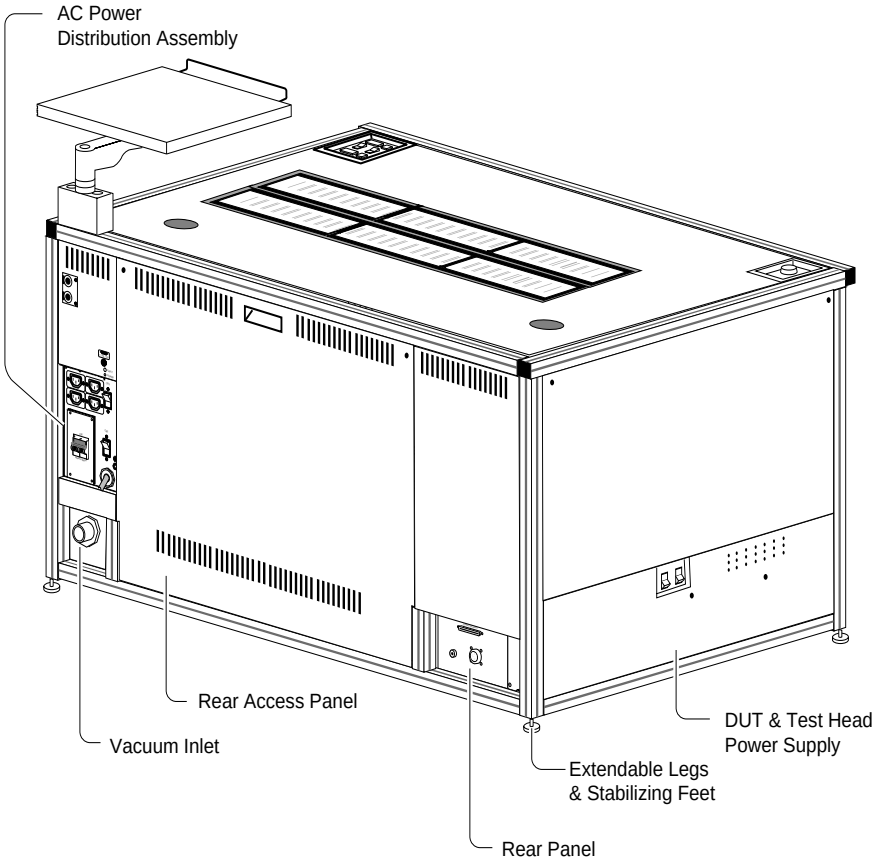
Z1808, Z1805

The Z1808 and Z1805 electronics are housed in one cabinet.

Z1808 and Z1805—Front, Top, and Right Side View



Z1808 and Z1805—Rear and Left Side View

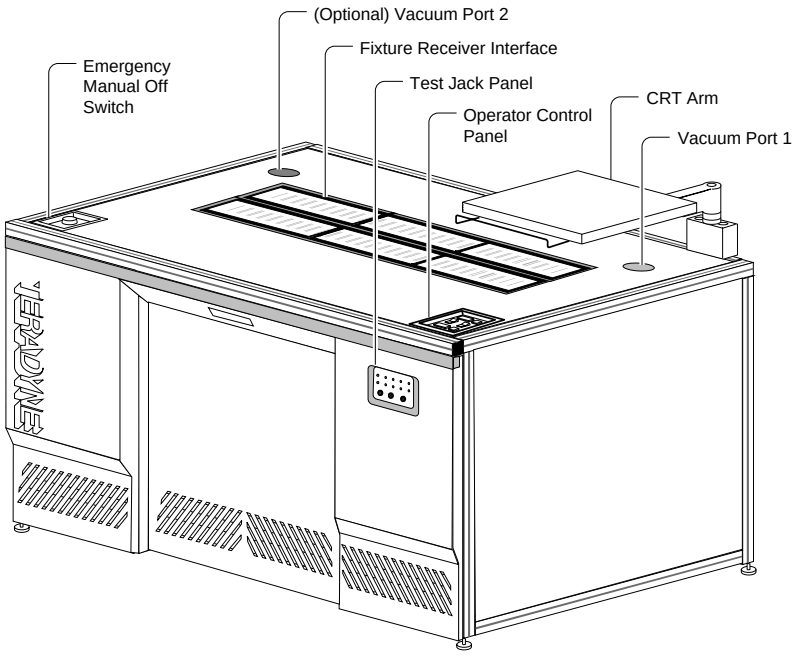


Z1803 Plus—Z1803-1, Z1803-2

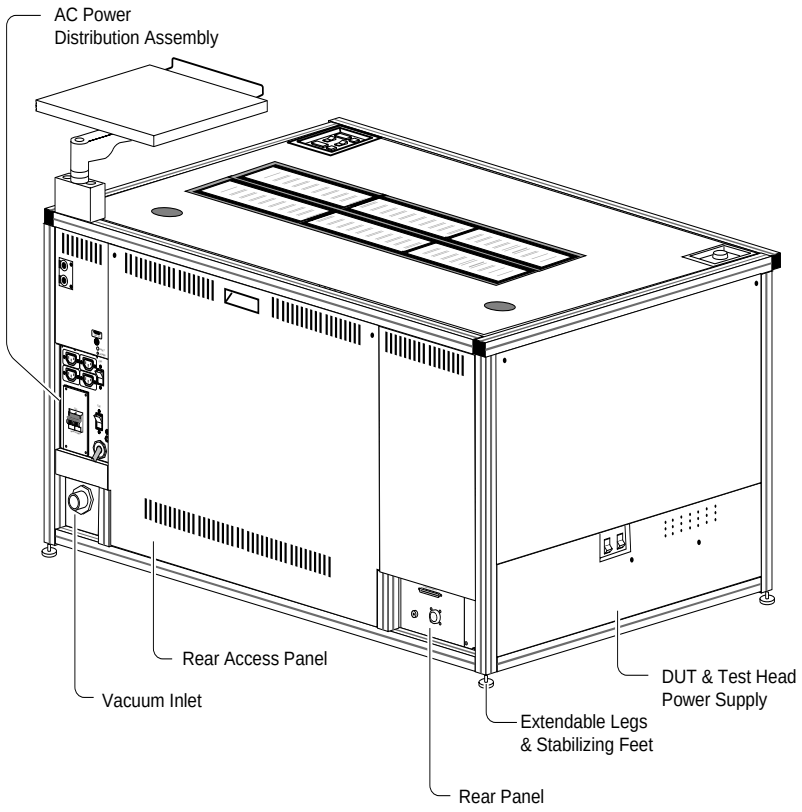
The Z1803 Plus system is configured as either:

- Z1803-1, one test head cage, 1024 pin capacity in a 1-well fixture receiver interface
- Z1803-2, two test head cages, 2048 pin capacity in a 2-well fixture receiver interface

Z1803 Plus—Front, Top, Right Side



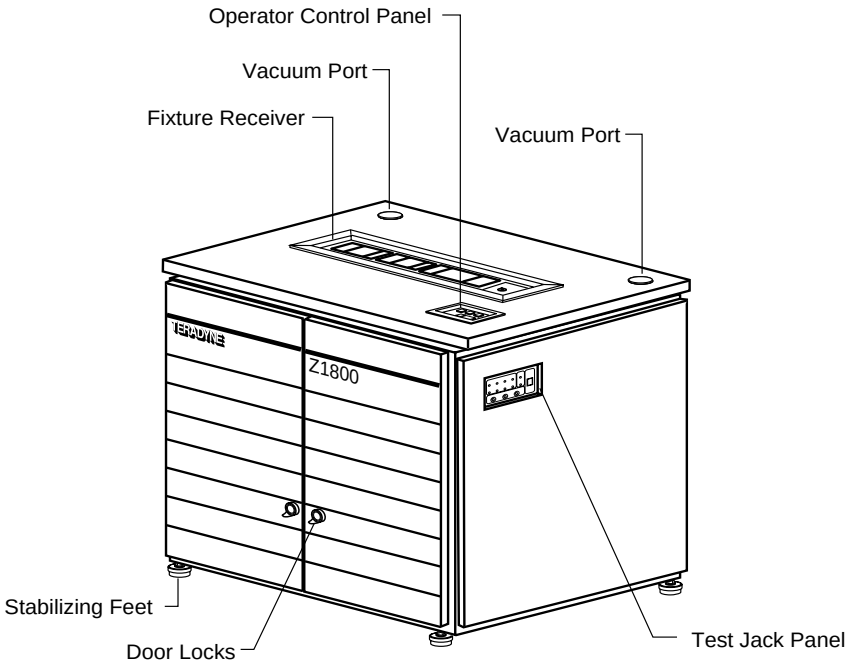
Z1803 Plus—Rear and Left Side View



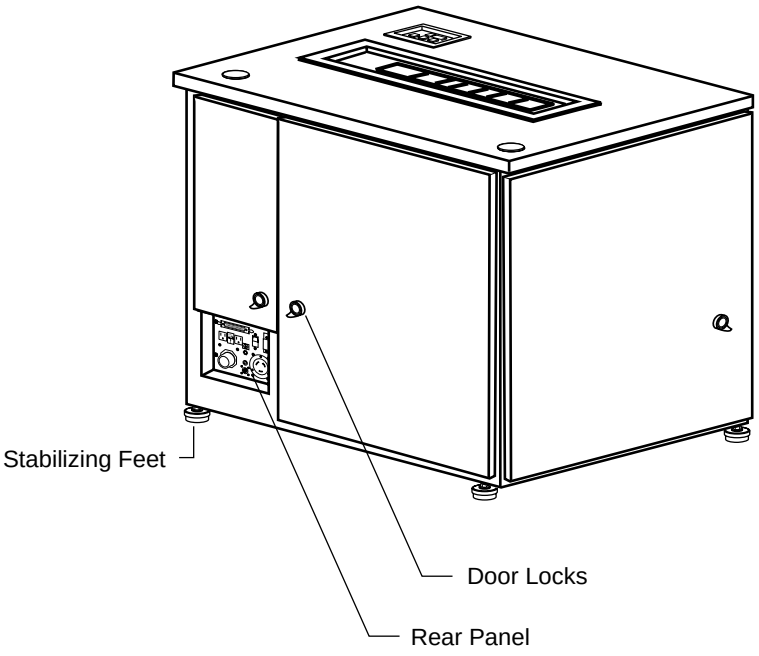
Z1800

Z1800 electronics are housed in one console.

Z1800—Front, Top, and Right Side View



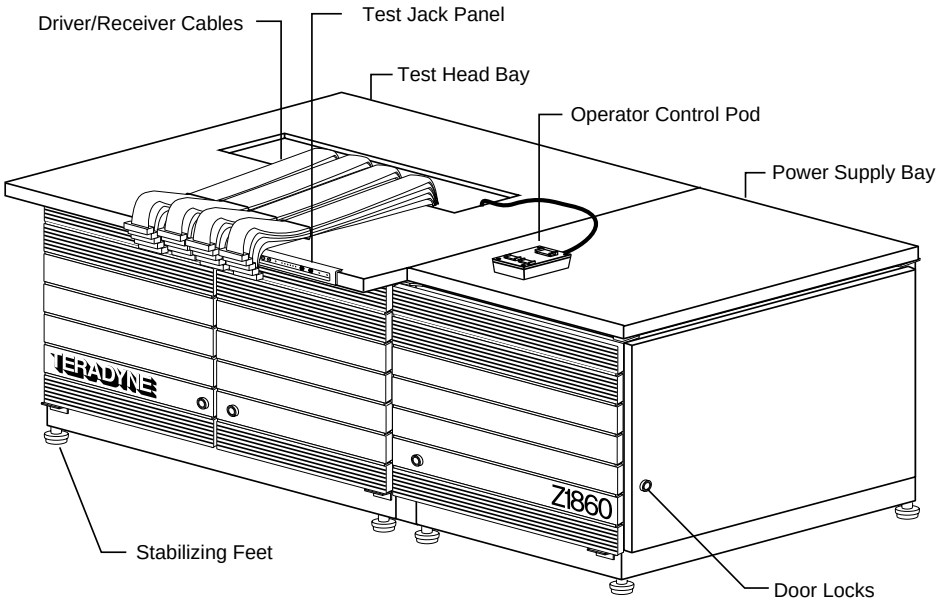
Z1800—Rear and Left Side View



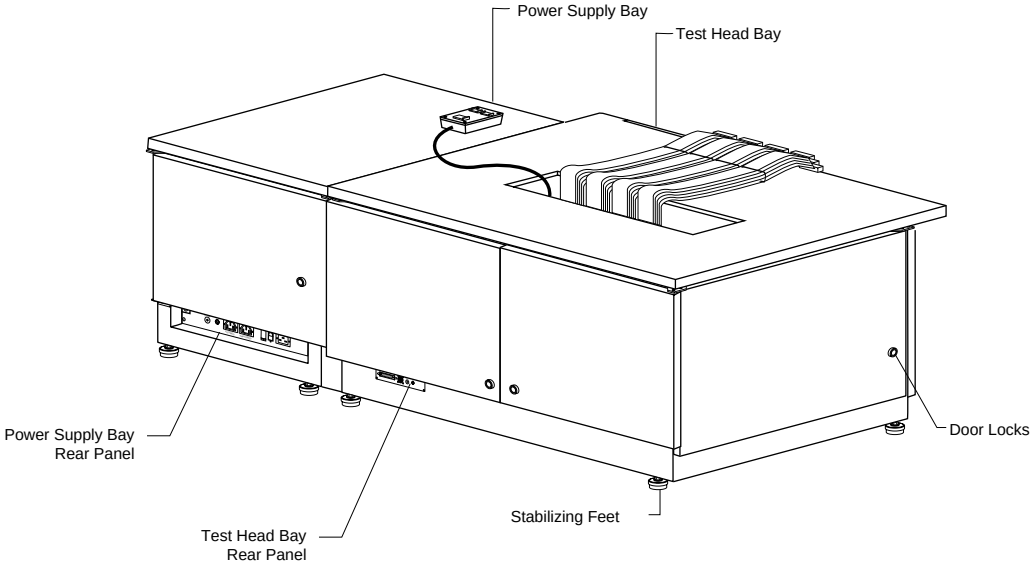
Z1860M

The Z1860M tester is divided into a test head bay and a power supply bay. The power supply bay may be moved from the right end to the left end of the test head bay to accommodate production line requirements.

Z1860M—Front, Top, and Right Side View



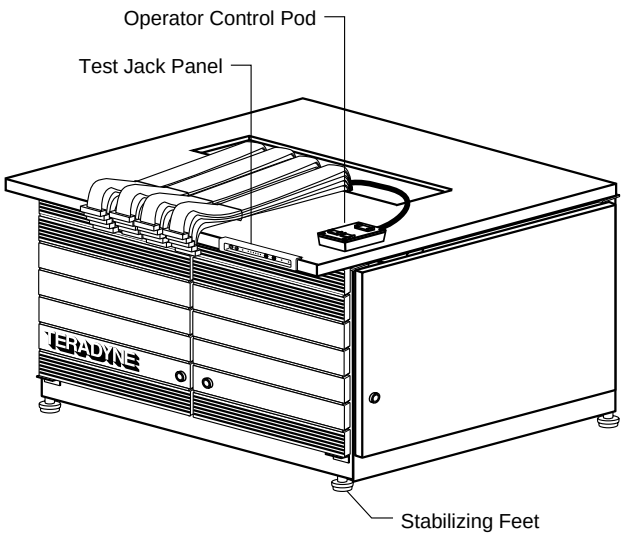
Z1860M—Rear and Left Side View



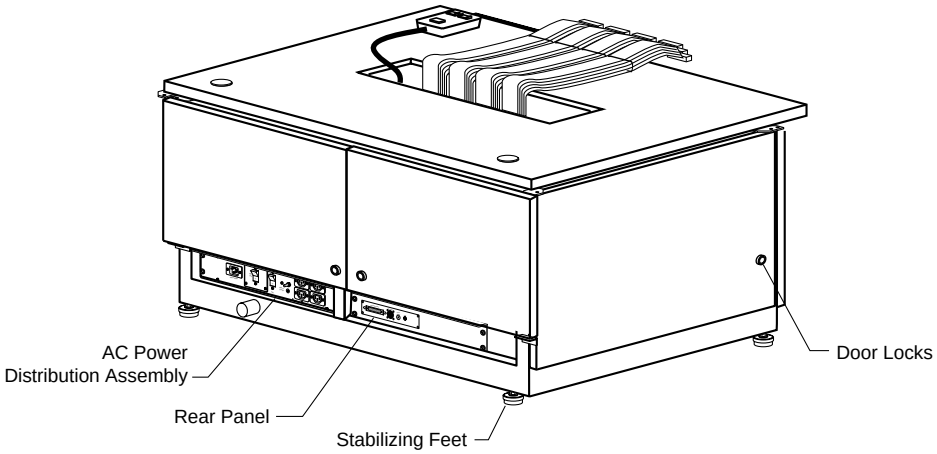
Z1850M

The Z1850M electronics are housed in one console.

Z1850M—Front, Top, and Right Side View



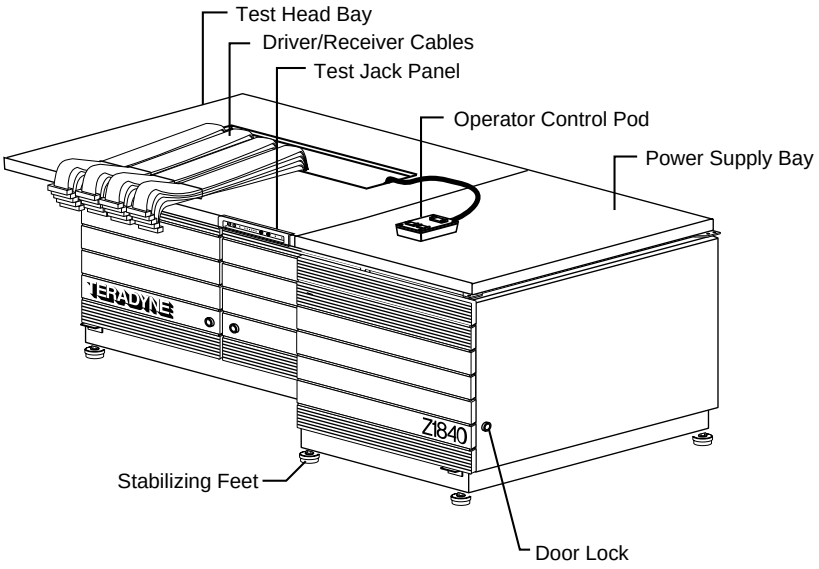
Z1850M—Rear and Left Side View



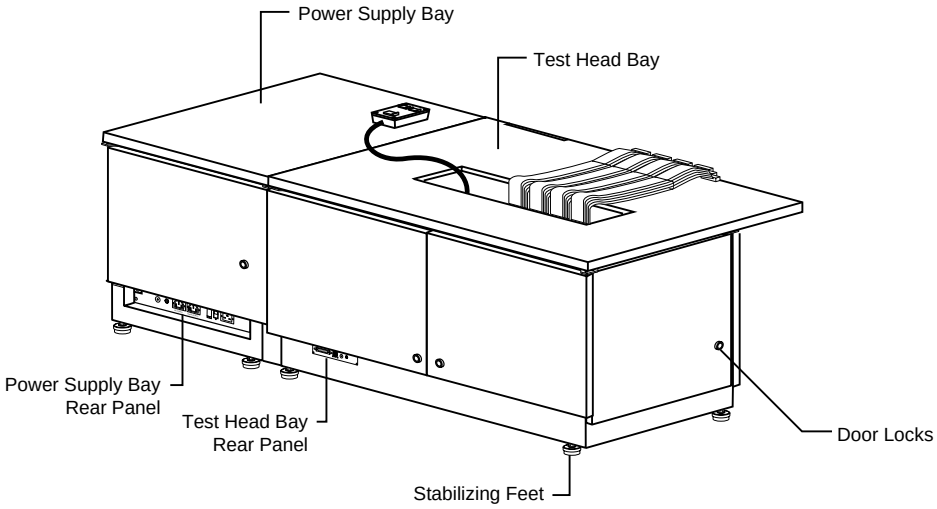
Z1840M

The Z1840M tester is divided into a test head bay and a power supply bay. The power supply bay may be moved from the right end to the left end of the test head bay to accommodate production line requirements.

Z1840M—Front, Top, and Right Side View



Z1840M—Rear and Left Side View



Console Controls

Z1800-Series tester console controls consist of the operator control panel, the dual operator control panel, or the operator control pod, and the test jack panel.

Some tester models have an Emergency Manual Off (EMO) switch on the top of the console.

The Z1820 and Z1800 also have Interface Vacuum switches.

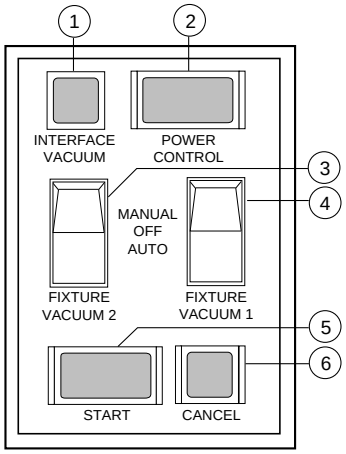
The Z1866 has a dual operator control panel and two test jack panels.

Operator Control Panels

Operator Control Panel—Z1890, Z1888, Z1884, Z1880, Z1860-NB, Z1860, Z1850, Z1840, Z1808, Z1805, Z1803 Plus

The operator control panel is mounted on the front right of the test head bay tabletop. The Power Control, Interface Vacuum, Start, and Cancel switches are illuminated when test head power is on.

Operator Control Panel—Z1890, Z1888, Z1884, Z1880, Z1860-NB, Z1860, Z1850, Z1840, Z1808, Z1805, Z1803 Plus



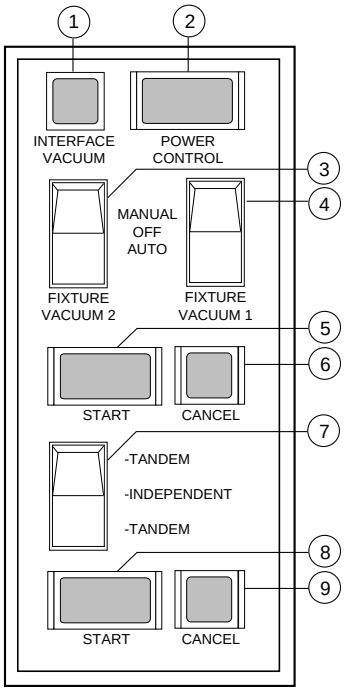
Operator Control Panel Switches—Z1890, Z1888, Z1884, Z1880, Z1860-NB, Z1860, Z1850, Z1840, Z1808, Z1805, Z1803 Plus

Item #	Switches	Function
1	Interface Vacuum	Pulls fixture onto the fixture receiver.
2	Power Control	Turns on power to tester.
3	Fixture Vacuum 2	Enables optional left-hand vacuum; settings are Manual (vacuum always on), Off (vacuum never on), and Auto (vacuum controlled by test program).
4	Fixture Vacuum 1	Enables right-hand vacuum; settings are Manual, Off, and Auto, as above.
5	Start	Initiates or continues test functions.
6	Cancel	Terminates a board test.

Dual Operator Control Panel—Z1866

The dual operator control panel is mounted on the front right of the test head bay tabletop.

The Power Control, Interface Vacuum, Start, and Cancel switches are illuminated when test head power is on.

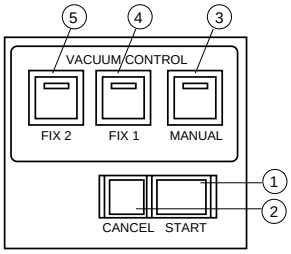


Item #	Switches	Function
1	Interface Vacuum	Pulls fixture onto the fixture receiver.
2	Power Control	Turns on power to tester.
3	Fixture Vacuum 2	Enables optional left-hand vacuum; settings are Manual (vacuum always on), Off (vacuum never on), and Auto (vacuum controlled by test program).
4	Fixture Vacuum 1	Enables right-hand vacuum; settings are manual, Off, and Auto, as above.
5	Start	Initiates or continues test functions for System B.
6	Cancel	Terminates a board test for System B.
7	System Mode	Choose Tandem so that the Start and Cancel switches activate both systems. Choose Independent so that the Start and Cancel switches function only for their own specific system.
8	Start	Initiates or continues test functions for System A.
9	Cancel	Terminates a board test for System A.

Operator Control Panel—Z1820, Z1800

The operator control panel is mounted on the console tabletop. The five push button switches are Start and Cancel and the three vacuum control switches, Manual, Fix 1 (fixture 1) and Fix 2 (fixture 2).

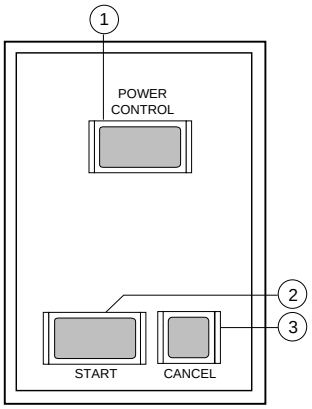
The Start and Cancel switches are always illuminated when test head power is on. The fixture switches are also illuminated when on.



Item #	Switches	Function
1	Start	Initiates or continues test functions.
2	Cancel	Terminates a board test.
3	Manual	Allows direct vacuum valve control. Use with Fix 1 and Fix 2.
4	Fix 1	Enables right-hand vacuum.
5	Fix 2	Enables left-hand vacuum.

Operator Control Pod

Z1860M, Z1850M, Z1840M The operator control pod connects to the tester through the Remote port on the test head bay rear panel.



Item #	Switches	Function
1	Power Control	Turns on power to tester.
2	Start	Initiates or continues test functions.
3	Cancel	Terminates a board test.

Emergency Manual Off Switch

Z1890, Z1888, Z1884, Z1880, Z1808, Z1805 The Emergency Manual Off (EMO) switch is a large red button set in a black panel at the left front corner of the tester's tabletop.

Push the switch to activate it. Activating the EMO has the same effect as pressing the Power Control switch on the operator control panel with one exception: once activated, the tester cannot power up again until it is deactivated by releasing the EMO switch. Turn the EMO switch counterclockwise 60 degrees until it releases.

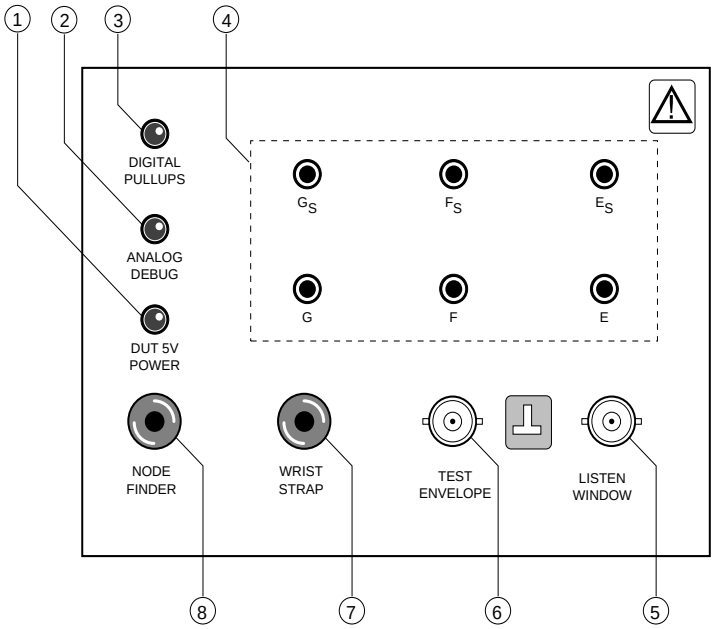
Important: Power remains on the line conditioner, AC power control, and unswitched user outlets.

Test Jack Panels

Test Jack Panel—Z1890, Z1888, Z1880, Z1808, Z1805, Z1803 Plus

The test jack panel, located on the front panel, contains 10 jacks and 3 LED indicators. The jacks connect operating and grounding cables and debugging probes to the tester. The LEDs indicate that certain functions are in use.

WARNING! **When the analog debug light is on, lethal voltages may be present on the test jack panel.**



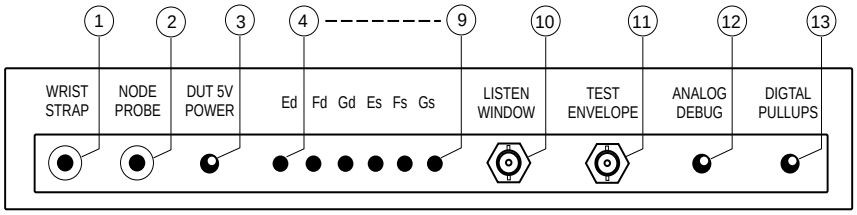
Item #	Name	Function
1	DUT 5 V Power LED	Green LED lights up when DUT 5 V Power is in use.
2	Analog debug	Green LED lights up during analog debugging, indicating possible high voltage on E, F, and G test jacks.
3	Digital pullups	Red LED lights up when built-in termination resistors are in use.
4	E, F, G Poles (Tip jacks)	E, E_S (E_{sense}), F, F_S (F_{sense}), G, and G_S (G_{sense}) monitor signals during program development. The E, F, and G analog drive and sense buses are routed to these six jacks during analog debugging. The same six jacks are connected to the six digital response buses during digital debugging.
5	Listen window	Identifies the measurement interval.
6	Test envelope	Identifies time interval when stimuli are applied and measurements occur during in-circuit test.
7	Wrist strap (Yellow banana jack)	Provides protection against electrostatic discharge. Connects ESD wrist strap to the ground via a 10 MΩ resistor.
8	Node Finder (Black banana jack)	Connects Node Probe to tester ground.

Test Jack Panel—Z1884, Z1866, Z1860-NB, Z1860, Z1850, Z1840, Z1860M, Z1850M, and Z1840M

The test jack panel, located on the front edge of the tabletop or tabletop extension, contains 10 jacks and 3 LED indicators. The jacks connect operating and grounding cables and debugging probes to the tester. The LEDs indicate when certain functions are in use. You can use the Node Probe or the outside of the BNCs for ground reference.

The Z1866 has two test jack panels on the front edge of the tabletop labelled System A and System B.

WARNING! When the analog debug light is on, lethal voltages may be present on the test jack panel.

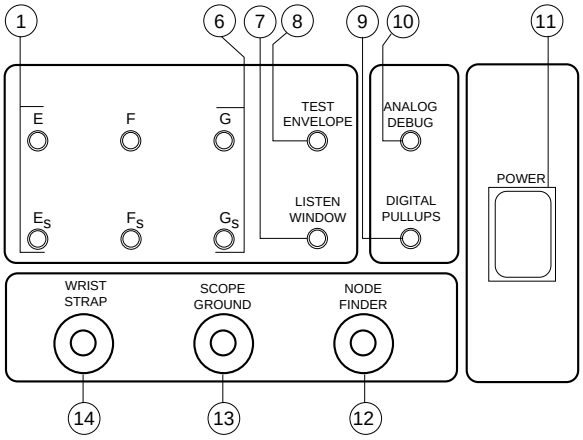


Item #	Name	Function
1	Wrist strap (Yellow banana jack)	Provides protection against electrostatic discharge. Connects to 10 MΩ internal resistor.
2	Node Probe (Black banana jack)	Connects Node Probe to tester ground.
3	DUT 5V Power	Green LED indicates when DUT 5V power supply is on.
4–9	E, F, G Poles (Tip jacks)	E, Es (E sense), F, Fs (F sense), G, and Gs (G sense) monitor signals during program development. The E, F, and G analog drive and sense buses are routed to these six jacks during analog debugging. The same six jacks are connected to the six digital response buses during digital debugging.
10	Listen window (BNC)	Identifies the measurement interval.
11	Test envelope (BNC)	Identifies time interval when stimuli are applied and measurements are made during in-circuit test.
12	Analog debug	Green LED lights up during analog debugging, indicating possible high voltage on E, F, and G test jacks.
13	Digital pullups	Red LED lights up when built-in termination resistors are in use.

Test Jack Panel—Z1820, Z1800

The test jack panel, located on the upper right side of the tester console, contains the Power Control switch, 11 jacks, and two LED indicators. The Power Control switch turns on power to the tester and is always illuminated when power is on. The jacks provide connections for operating and grounding cables and debugging probes. The LEDs indicate when analog debug and pull-up resistors are in use.

WARNING! When the analog debug light is on, lethal voltages may be present on the test jack panel.

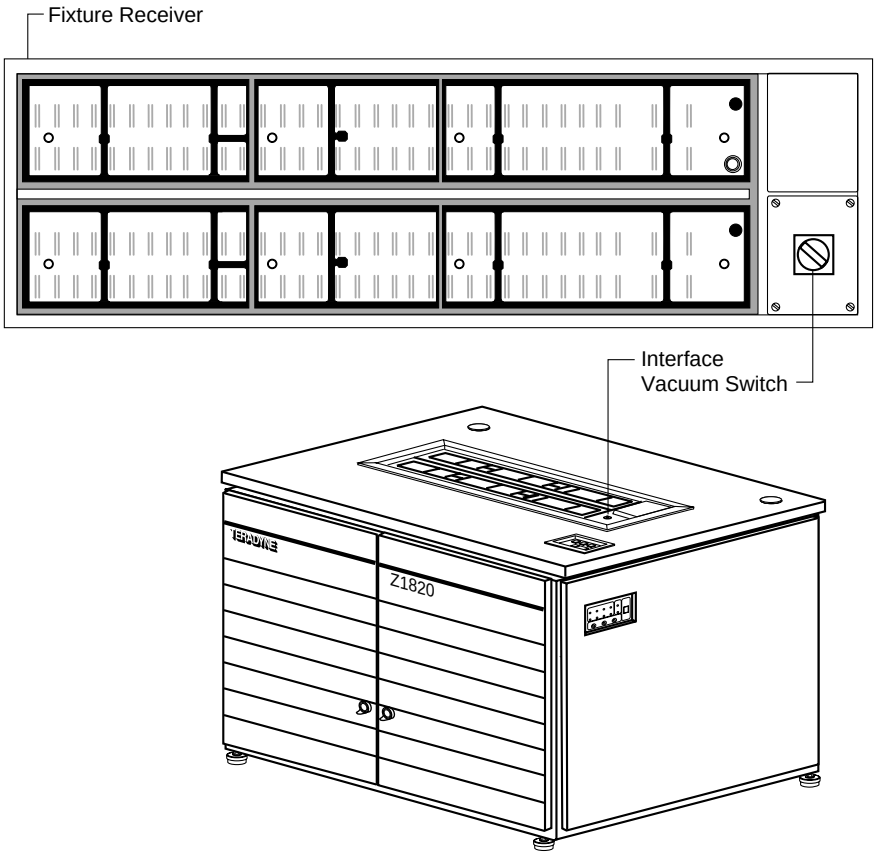


Item #	Name	Function
1–6	E, F, G Poles (Tip jacks)	E, E_S (E_{sense}), F, F_S (F_{sense}), G, and G_S (G_{sense}) monitor signals during program development. The E, F, and G analog drive and sense buses are routed to these six jacks during analog debugging. The same six jacks are connected to the six digital response buses during digital debugging.
7	Listen window (Tip jack)	Identifies the measurement interval.
8	Test envelope (Tip jack)	Identifies time interval when stimuli are applied and measurements are made during in-circuit test.
9	Digital pullups	Red LED lights up when built-in termination resistors are in use.
10	Analog debug	Green LED lights up during analog debugging, indicating possible high voltage on E, F, and G test jacks.
11	Power	Power Control switch turns power on and off to tester.
12	Node Finder (Black banana jack)	Connects Node Finder probe to tester ground.
13	Scope Ground (Black banana jack)	Oscilloscope ground.
14	Wrist strap (Yellow banana jack)	Provides protection against electrostatic discharge. Connects to ground via 10 MΩ internal resistor.

Interface Vacuum Switches

Interface Vacuum Switch—Z1820

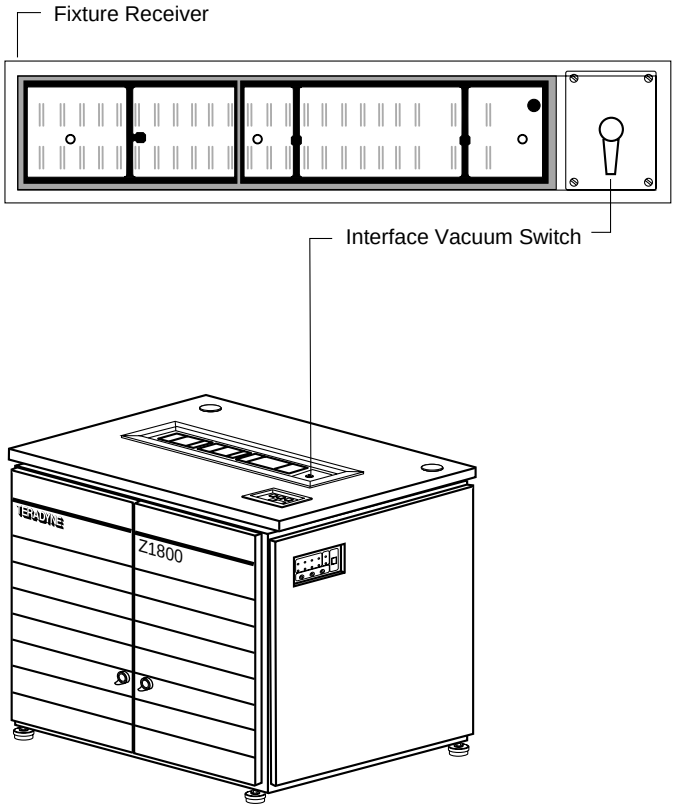
The Interface Vacuum switch, located in a well adjacent to the fixture receiver interface, controls the application of vacuum to the fixture. In the On position, it pulls the fixture onto the tester's fixture interface.



Interface Vacuum Switch—Z1800

The Interface Vacuum switch, located in a well adjacent to the fixture receiver interface, controls the application of vacuum to the fixture. In the On position, it pulls the fixture onto the tester's fixture interface.

The Interface Vacuum switch for the Z1800 is mechanical.



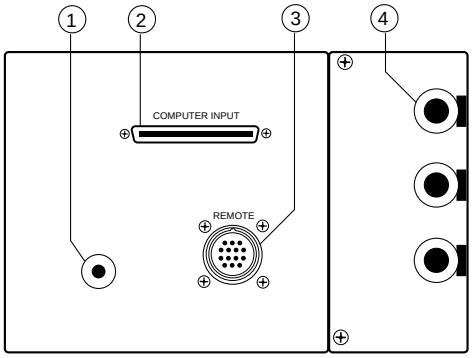
Rear Panels

Rear Panels—Z1890, Z1888, Z1880, Z1808, Z1805, Z1803 Plus

The rear of Z1890, Z1888, Z1880, Z1808, Z1805, and Z1805 Plus testers have an AC power distribution assembly, a rear access panel, and a rear (I/O) panel. The AC power distribution assembly is discussed in the next section of this chapter.

The rear access panel is between the rear panel and the AC power distribution assembly. It has vents at the top and bottom to assist in cooling the tester's interior. It has either quarter-turn screws or three-turn screws to lock it in place.

The rear panel is recessed. It can be removed for maintenance. The rear panel has a computer input connection, a remote connection for the start pad assembly, and a yellow banana jack for the wrist strap.



Item #	Name	Function
1	Wrist Strap	Connects wrist strap or antistatic mats.
2	Computer Input	Connects computer I/O cable to tester.
3	Remote	Connects remote control devices such as start pad, and contains duplicate of control panel signals.
4	Cable Access Slots	Use for IEEE instruments, Digital Function Processor, etc.

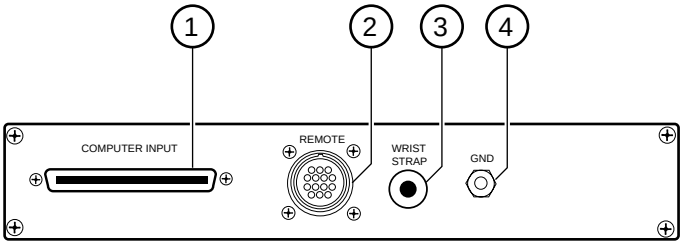
Rear Panel—Z1884, Z1860-NB, Z1860, Z1840, Z1866, Z1850

The Z1884, Z1860-NB, Z1860, and Z1840 testers have a panel on the lower left rear of the test head bay. The test head bay rear panel contains the computer input, the remote port, the wrist strap receptacle, and ground.

The Z1866 has two panels on the lower left rear of the test head bay. The panel for System A has a computer input, a remote port, a wrist strap receptacle, and ground. The panel for System B has a computer input, a wrist strap receptacle, and ground.

The rear panel of the Z1850 tester contains the computer input, the remote port, the wrist strap receptacle, and ground.

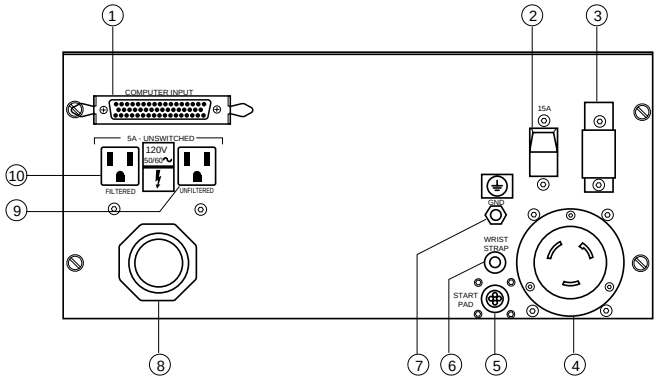
Rear Panel—Z1884, Z1860-NB, Z1866, Z1860, Z1850, Z1840



Item #	Name	Function
1	Computer Input	Connects computer I/O cable to tester.
2	Remote	Connects remote control devices such as start pad and contains duplicate of control panel signals. Z1866: The remote port is on the panel for System A only
3	Wrist Strap	Connects wrist strap or antistatic mats.
4	Gnd	Connects to ground.

Rear Panels—Z1820, Z1800

Z1820 and Z1800 testers have a rear panel on the lower left rear of the tester which contains the computer input, two circuit breakers, the main AC power input, the start pad connector, a wrist strap connector, ground stud, the vacuum inlet, and two 120 VAC outlets which can provide up to 5A. The Z1820 is shown below.

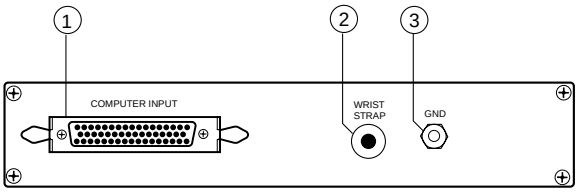


Item #	Name	Function
1	Computer Input	Connects computer cable to tester.
2	15A Circuit Breaker	15A circuit breaker.
3	Circuit Breaker Cover	Circuit breaker cover prevents access to the circuit breaker not in use.
4	Main AC input	Input for AC power cord.
5	Start Pad	Connects start pad to tester.
6	Wrist Strap	Connects wrist strap or antistatic mats.
7	Gnd	Connects to ground.
8	Vacuum Inlet	Connects to hose from vacuum source.
9	Unswitched (Unfiltered)	Connects peripherals such as the computer or monitor.
10	Unswitched (Filtered)	Connects “noisy” peripherals such as the list printer.

Rear Panel—Z1860M, Z1840M, Z1850M

The rear panel for the Z1860M and the Z1840M, which is located on the lower left rear of the test head bay, contains the computer input, the wrist strap receptacle, and ground.

The rear panel of the Z1850M tester contains the computer input, the remote port, the wrist strap receptacle, and ground.



Item #	Name	Function
1	Computer Input	Connects computer cable to tester.
2	Wrist Strap	Connects wrist strap or antistatic mats.
3	Gnd	Connects to ground.

AC Power System

The AC power system consists of the main power cable, the line conditioner, and the AC power distribution assembly or the AC power control.

The AC mains power cord connects to the AC power control. The AC mains breaker protects against excessive current draw by the tester. LEDs indicate when power is applied to the tester and are illuminated when out-of-range power is present. The green power LED lights when power is applied to the AC mains inlet and the AC main circuit is on. The red Fault LED lights when an out-of-range voltage or an emergency off signal is detected. Either an Emergency Off or a fault will open the AC power contactor, cutting off power within the tester.

The Z1820 and Z1800 AC power control assembly is behind locked doors and is not accessible to operators.

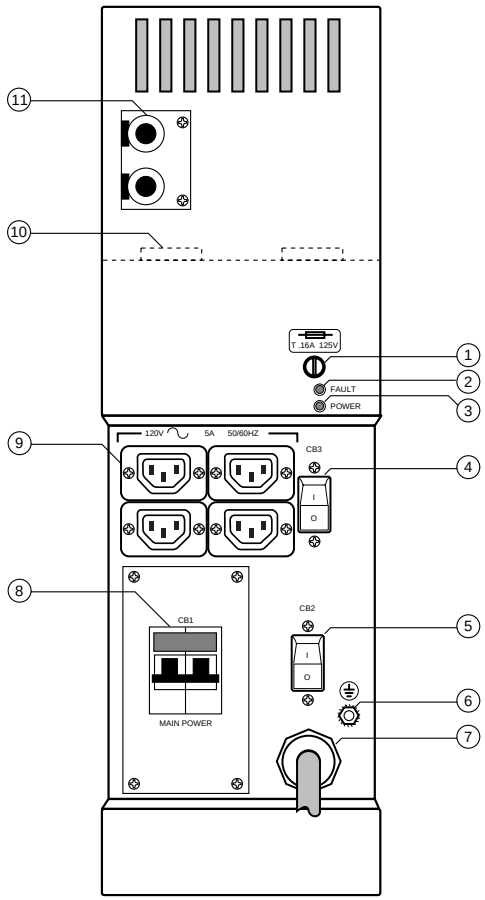
The AC power cord for all testers is 15 feet long. In the case of the Z1888 with the external line conditioner, the AC power cord from the tester to the line conditioner is 15 feet long. The AC power cord coming out of the line conditioner to AC Mains is another 15 feet.

The AC power cords for the Z1890, Z1888, Z1880, Z1860-NB, Z1808, Z1805, and Z1803 Plus are not detachable.

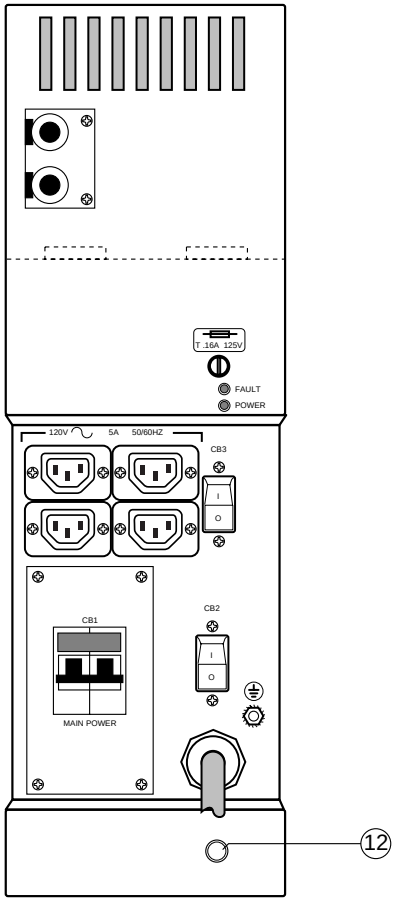
AC Power Distribution Assembly—Z1890, Z1888, Z1880, Z1860-NB, Z1808, Z1805, Z1803

The AC power distribution assembly for the Z1890, Z1888, Z1880, Z1808, Z1805, and Z1803 Plus testers contains power line monitoring circuitry which ensures that acceptable electrical voltages are maintained within the system.

Z1890, Z1880, Z1808, Z1805, and Z1803 Plus



Z1888 (Addition of #12)



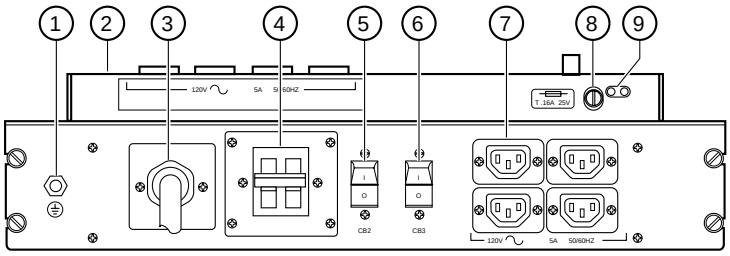
Important: The LEDs are not safety indicators.

Item #	Name	Function
1	Fuse T.16A 125V	Line monitor board protection.
2	Fault light	Red LED indicates detection of out-of-range voltage or an emergency OFF signal.
3	Power	Green LED indicates AC power is ON.
4, 5	Circuit Breakers	4: CB3 is the breaker for four unswitched user outlets. 5: CB2 turns off switched outlets inside the tester.
6	Ground	Connects to ground.
7	AC power cable	AC power cable hardwired to the tester.
8	25A main circuit breaker	Controls main power to the tester.
9, 10	User Outlets	9: Four 120 VAC outlets provide unswitched power. 10: Twelve switched outlets inside the tester.
11	Cable access cover	Removable cover attached by two screws and a gasket.
12 (Z1888)	Power detector cable	Signals AC line conditioner to test incoming AC power.

AC Power Distribution Assembly—Z1884

The AC power distribution assembly for Z1884 contains power line monitoring circuitry which ensures that acceptable electrical voltages are maintained within the system.

Important: The LEDs are not safety indicators.

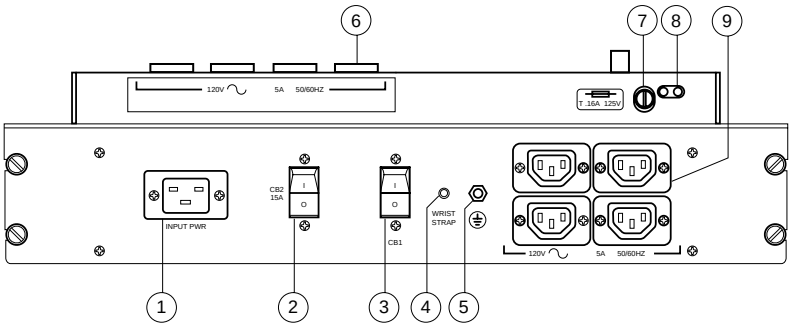


Item #	Name	Function
1	Ground	Connects to ground.
2	Switched System Outlets	Eight 120 VAC outlets provide AC distribution to tester. When line monitor detects faults, it cuts power to these outlets.
3	Power Input	Connects AC power.
4	CB1	25 A AC Mains circuit breaker to switch AC power on/off.
5	CB2	5 A user outlets circuit breaker for four user unswitched outlets.
6	CB3	15 A circuit breaker to turns off switched outlets inside the tester.
7	Unswitched User Outlets	Four 120 VAC outlets to provide unswitched power.
8	Fuse	Line monitor board protection.
9	LEDs	Green LED indicates AC power is on. It remains on as long as AC is on. Red LED indicates detection of out-of-range voltage or an emergency off signal.

AC Power Distribution Assembly—Z1866, Z1860, Z1850, Z1840, Z1860M, Z1850M, Z1840M

The AC power distribution assembly for the Z1866, Z1860, Z1850, Z1840, Z1860M, Z1850M, and Z1840M testers contains power line monitoring circuitry which ensures that acceptable electrical voltages are maintained within the system.

Important: The LEDs are not safety indicators.



Item #	Name	Function
1	Power Input	Connects AC power.
2	AC Mains Breaker	15 A circuit breaker to switch AC power on/off.
3	User Outlets Breaker	5 A circuit breaker for user unswitched outlets.
4	Wrist Strap	Connects wrist strap or antistatic mats.
5	Ground	Connects to ground.
6	Switched System Outlets	Eight 120 VAC outlets provide AC distribution to tester. When line monitor detects faults, it cuts power to these outlets.
7	Fuse	Line monitor board protection.
8	LEDs	Green LED indicates AC power is on. It remains on as long as AC is on. Red LED indicates detection of out-of-range voltage or an emergency off signal.
9	Unswitched User Outlets	Four 120 VAC outlets to provide unswitched power.

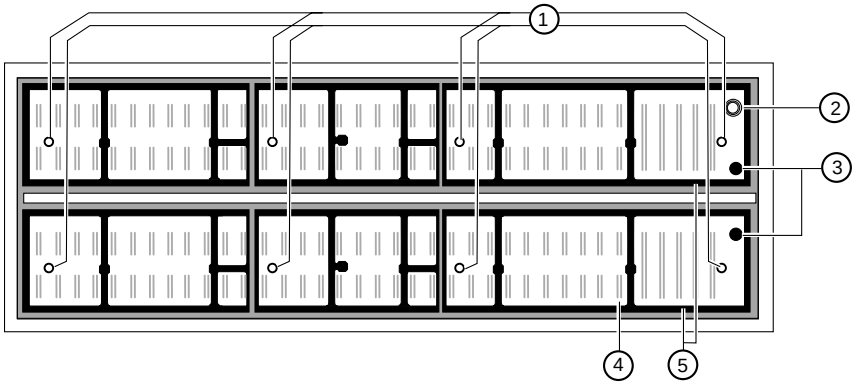
Fixture Receiver Interface

The vacuum-actuated fixture receiver assembly is recessed into the console tabletop. It provides the interface between the tester and the board test fixture.

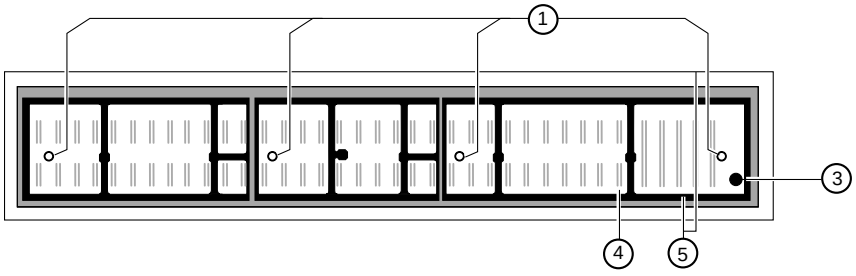
Fixture Receiver Interface—Z1890, Z1888, Z1880, Z1808, Z1805, Z1803 Plus

Z1890, Z1888, Z1880-2, Z1808-2, Z1805-2, and Z1803-2 testers have 2048 prewired pins that connect to the driver/receiver boards through the receiver interface. The Z1880-1, Z1808-1, Z1805-1, and Z1803-1 testers have 1024 prewired pins. Additional interface pins are provided for DUT power supplies, user relay array connections, grounds, and other auxiliary features.

Z1890, Z1888-2, Z1880-2, Z1808-2, Z1805-2, and Z1803-2



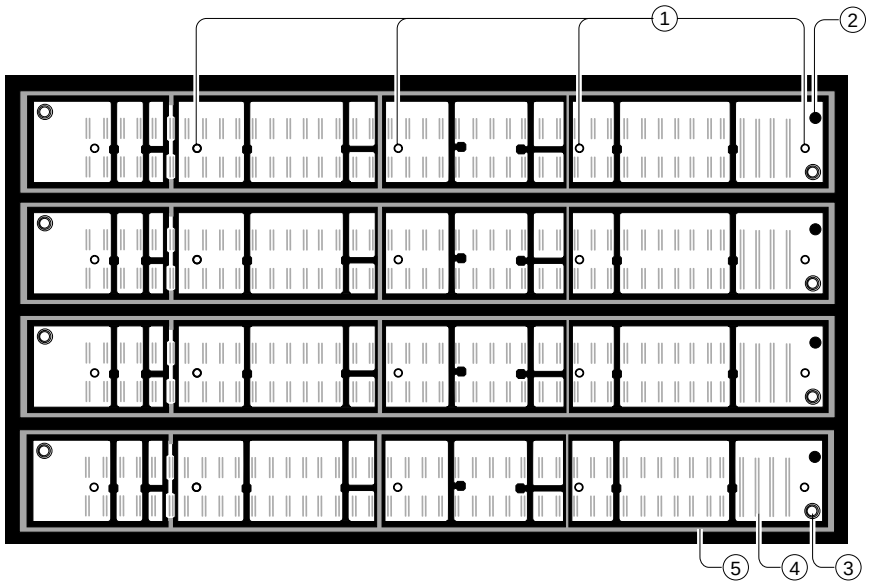
Z1888-1, Z1880-1, Z1808-1, Z1805-1, and Z1803-1



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Rear Well Switch (Not present in single well systems.)	Senses when a double well fixture is used and turns on rear well vacuum.
3	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
4	Probes	Provide electrical connection between test fixture and tester.
5	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1884

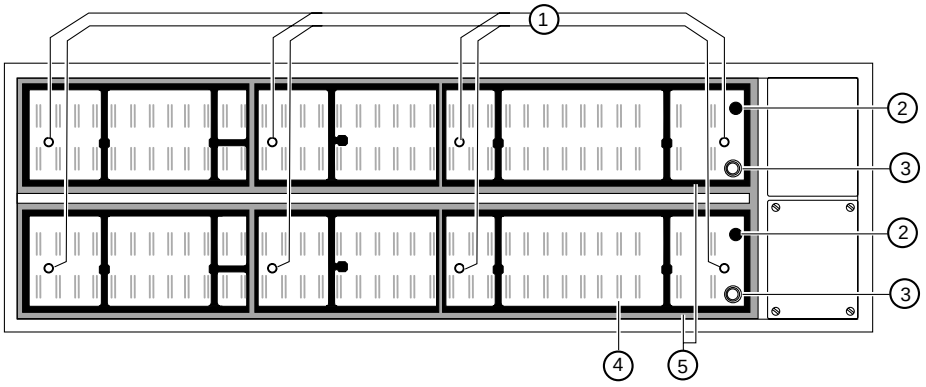
The Z1884 has 5120 prewired pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Rear Well Switch	Senses when a double well fixture is used and turns on rear well vacuum.
4	Probes	Provide electrical connection between test fixture and tester.
5	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1866

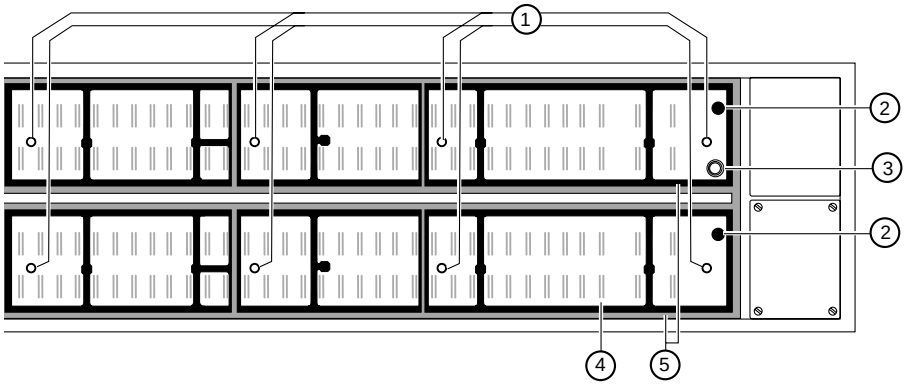
The Z1866 has two sets of 1024 prewired pins for a total of 2048 pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Rear Well Switch	Senses when a double well fixture is used and turns on rear well vacuum.
3	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
4	Probes	Provide electrical connection between test fixture and tester.
5	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1860-NB, Z1860

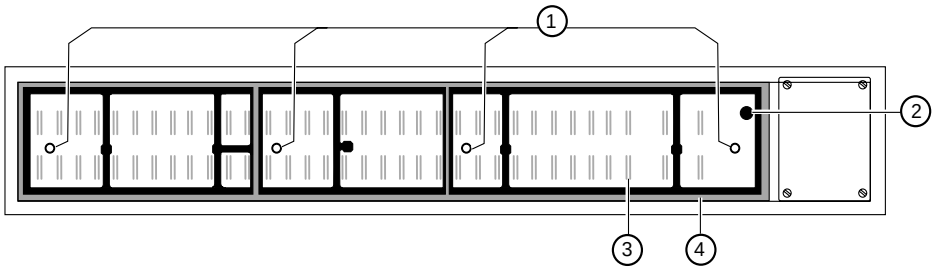
The Z1860-NB and Z1860 have 2048 prewired pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Rear Well Switch	Senses when a double well fixture is used and turns on rear well vacuum.
4	Probes	Provide electrical connection between test fixture and tester.
5	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1850

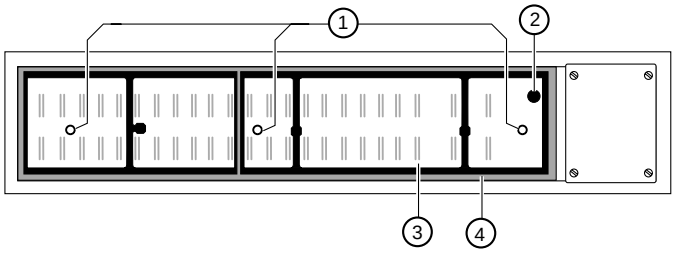
The Z1850 has 1024 prewired pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Probes	Provide electrical connection between test fixture and tester.
4	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1840

The Z1840 has 640 prewired pins. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



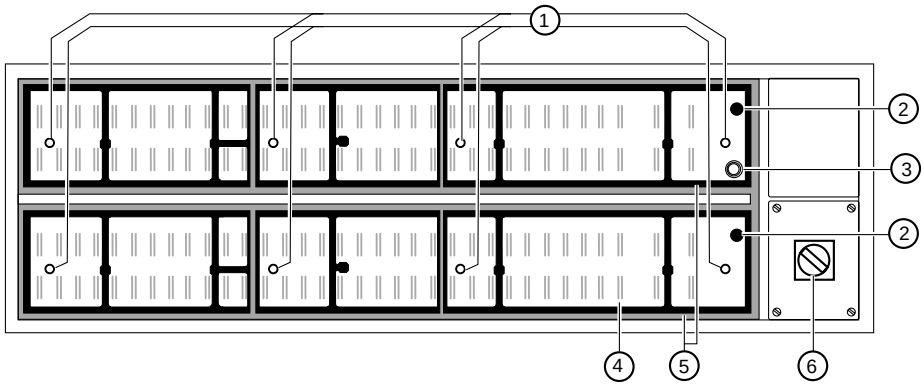
Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Probes	Provide electrical connection between test fixture and tester.
4	Interface Seal	Provides a vacuum seal between the fixture and tester.

Fixture Receiver Interface—Z1860M, Z1850M, Z1840M

Z1860M, Z1850M, and Z1840M tester interface to the driver/receiver boards is via ground plane ribbon cables, permitting flexible connections to a variety of test hardware.

Fixture Receiver Interface—Z1820

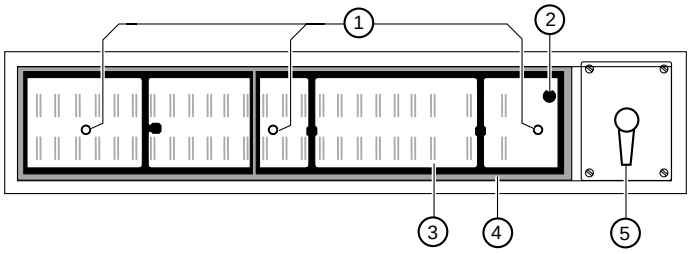
The Z1820 has 2048 prewired pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Rear Well Switch	Senses when a double well fixture is used and turns on rear well vacuum.
4	Probes	Provide electrical connection between test fixture and tester.
5	Interface Seal	Provides a vacuum seal between the fixture and tester.
6	Vacuum Switch	Applies vacuum to receiver vacuum ports which pulls fixture onto fixture receiver interface.

Fixture Receiver Interface—Z1800

The Z1800 has 640 prewired pins that connect to the driver/receiver boards through the receiver interface. Each point has stimulus, measurement, and guarding capabilities for analog and digital testing. Additional interface pins are provided for DUT power supplies, relay array connections, grounds, and other auxiliary features.



Item #	Name	Function
1	Guide Pins	Align fixture on fixture receiver interface.
2	Receiver Vacuum Port	Enables fixture to be pulled down on interface.
3	Probes	Provide electrical connection between test fixture and tester.
4	Interface Seal	Provides a vacuum seal between the fixture and tester.
5	Vacuum Switch	Applies vacuum to receiver vacuum ports which pulls fixture onto fixture receiver interface.

Vacuum System—Vacuum Testers

The vacuum system consists of the hoses, plumbing and pipes, vacuum valve assemblies, and vacuum control switches.

The application of vacuum in board test is a two-step process. First, turning on the Vacuum Interface switch pulls the fixture onto the fixture receiver interface. Second, actuating the fixture vacuum switches allows the board to be pulled down onto the fixture manually or under program control.

For information about the vacuum controls, refer to the “Console Controls” section earlier in this chapter.

Fixture—Vacuum Testers

The fixture is the interface between the board-under-test and the tester. Z1800-Series testers accommodate fixtures of varying sizes and also enable you to test boards in tandem.

The fixture receiver interface and vacuum assembly accommodates three types of fixtures:

- Single-well fixture for testing one board at a time or, with the Multipanel functionality, several boards at a time.
- Tandem fixture with two separately actuated vacuum chambers which enable the operator to change a board on one chamber while the board on the second chamber is being tested.
- WaveScan fixture, which allows you to use a radio frequency stimulus technique to deliver high fault coverage over a range of device types and fault classes.

Important: The second vacuum valve is standard for the Z1890, Z1884, and Z1866, but it is an option for the other Z1800-Series testers, and must be installed to use the tandem fixture.

Computer

For computer specifications for the standard tester configuration, please refer to the **Z1800-Series Site Preparation Guide** and the **Z1800-Series Computer Configuration Guide**.

Keyboard

Use the keyboard to perform both standard operations and specific testing operations through dedicated function keys. The keyboard template included with the tester indicates the functions invoked by the keys. Pressing the Shift-F1 key combination displays a keyboard template at the bottom of the screen.

Mouse

Use the mouse to perform simple point and click selections to perform operations.

Screen Color

Screen display colors correspond with the type of information they show. They alert you to current operating situations.

Printer

The printer prints board test results. What you do with the printed test results depends on your production environment requirements. For example, in some production environments, printouts of test results, especially failures, are attached to the board itself, to inform repair personnel of the nature of the failure. In other environments, printouts of all tests are kept together.

❖❖

CHAPTER 3 OPERATING THE TESTER

Default permissions for operators are limited to logging in, selecting a test, and running a test. The procedures in this chapter are based upon these defaults.

For detailed explanations of the Z1800-Series software, see the **Z1800-Series Programmer's Guidebook**.

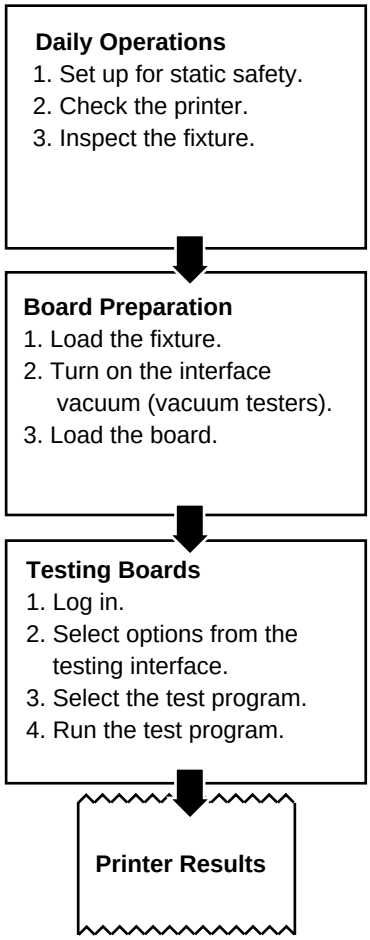
You must prepare yourself and your test system properly before you can perform consistently successful board tests. The figure below shows the preparation and test process.

These procedures are covered in detail in the two sections, “Daily Operations” and “Board Testing.”

The section titled “Testing Digital Connectivity” describes a tool used for testing the connectivity of digital components.

The section titled “Analyzing Printout of Test Results” describes test failure messages.

The “Troubleshooting for Operators” section covers occasionally occurring problems which operators can easily remedy.



Daily Operations

Because Teradyne recommends that you keep the tester power on except for maintenance and emergencies, daily operations do not include powering the tester on and off. For information about those procedures see the “Power On/Off Sequence” section in Chapter 1 of this manual.

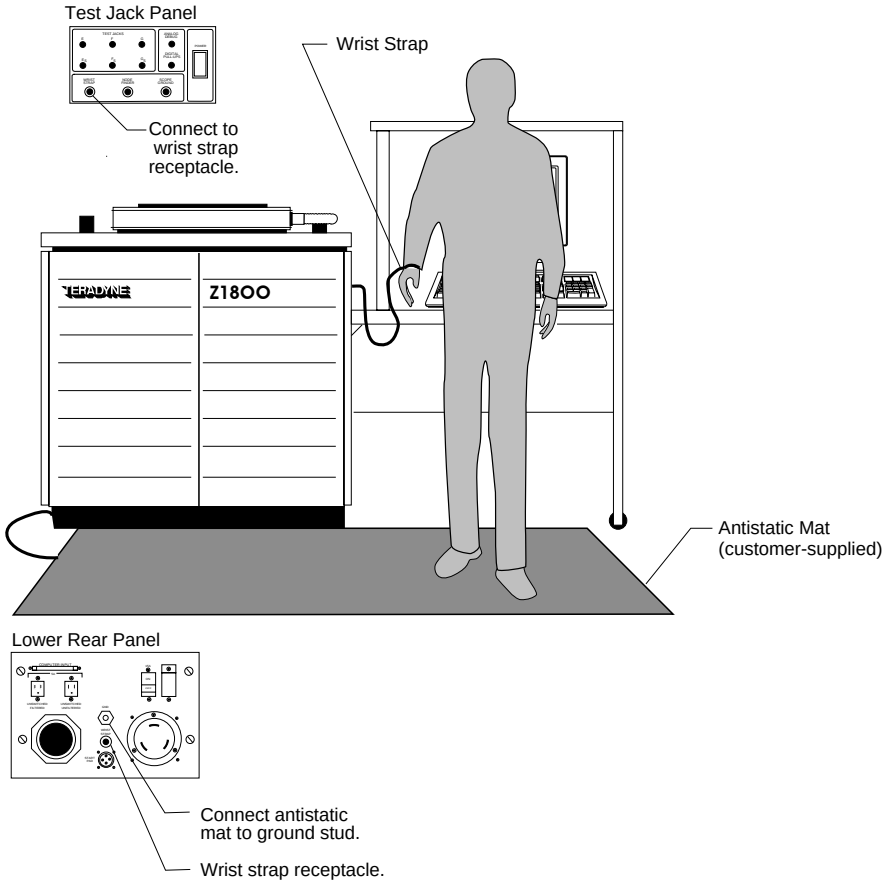
Verify that diagnostics have been run before you begin board testing. To ensure optimal test results:

- Set up for static safety.
- Check the printer.
- Inspect the fixture.

Set Up for Static Safety

Antistatic safeguards which protect electronic components on the board-under-test include:

- Static-dissipative work surfaces and grounding devices.
- Conductive floor mats which plug into the wrist strap connection on the rear panel(s).
- Operator’s wrist strap which plugs into the test jack panel.



To set up for static safety:

- Connect the antistatic floor mat to the tester.
- Use the operator's wrist strap.
- Wear proper clothing.
- Eliminate static producing materials from the work area.

See "Using the Tester Safely" in Chapter 1 for more information on static prevention and control.

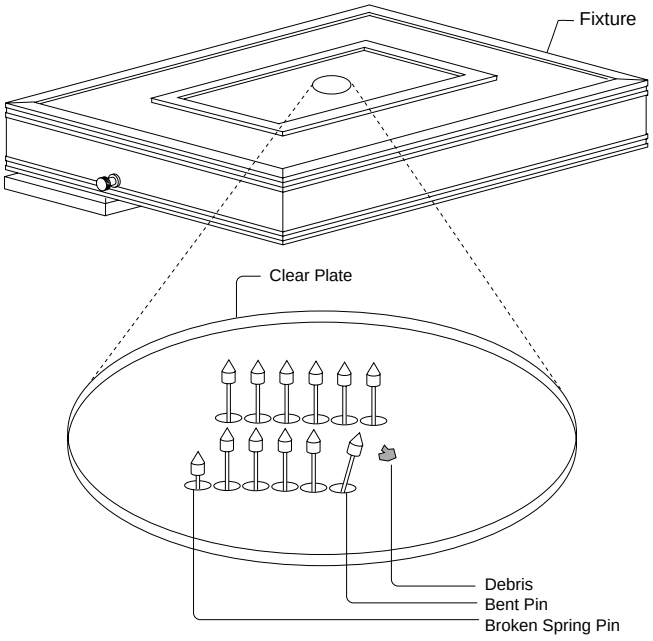
Note: Z1800-Series manuals are bound in static-dissipative binders. They will not store an electrostatic charge and are safe to use near sensitive electronic components. Teradyne recommends against making copies of pages for use around testers—photocopies may carry electrostatic charges.

Check the Printer

Check that the diagnostic printer is working properly, and that it has enough paper. Inspect the paper-feed mechanism for paper-feed jams. See the printer manual for further information.

Inspect the Fixture

Fixtures require regular inspection. Inspect the fixture at least once a day. Inspect it more often when the production environment dictates. Use a soft brush and compressed air to keep the fixture's surface clean and free of dust and contaminants. A clean surface ensures that the fixture accurately contacts the board-under-test.



Board Testing

Testing boards requires operator interaction with both the computer and the tester. The general steps involved in testing boards are:

- Loading the fixture and board
- Logging in as operator
- Testing boards
- Analyzing test printout results

Load the Fixture and Board

Load the Board and Fixture for the Z1890, Z1888, Z1884, Z1880, Z1860-NB MS, Z1860, Z1850, Z1840, Z1820, Z1808, Z1805, Z1803 Plus, Z1800

Refer to the illustration below as you read this procedure.

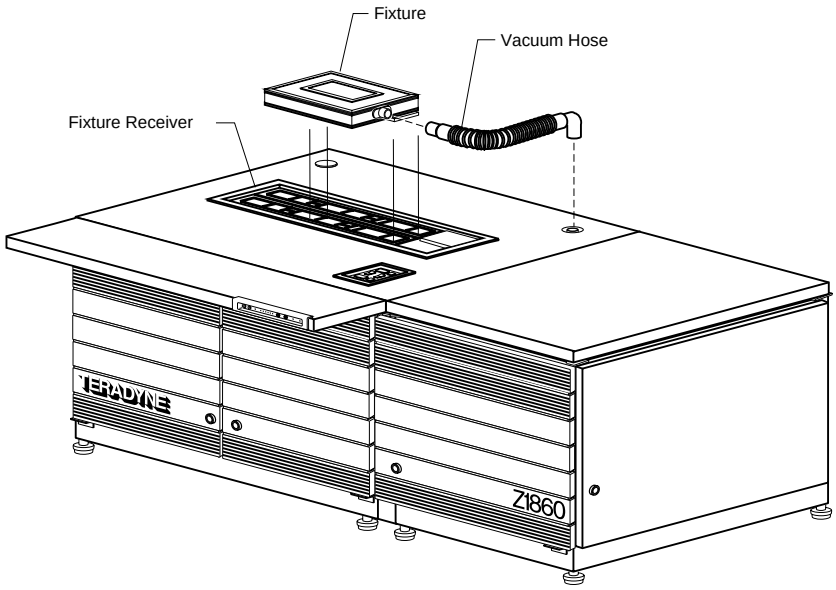
1. Place the fixture on the fixture receiver.

   Make sure the fixture lines up with the tester guide pins, which in turn align the fixture to the fixture receiver pins and the vacuum seal.

2. Turn on the Vacuum Interface switch to pull the fixture on to the fixture receiver interface.

   For the Z1890, Z1884, Z1880, Z1860-NB MS, Z1860, Z1850, Z1840, Z1808, and Z1805: press the Vacuum Interface switch.

   For the Z1820 and Z1800: turn the vacuum control knob.



3. Connect the vacuum hose(s) to the fixture hose fitting(s).
4. Set the fixture vacuum switches on as required.
5. Carefully load the board, aligning the tooling holes on the board with the tooling pins on the fixture.

Load the Fixture and Board for the Z1866

1. Place the fixture on the fixture receiver.

   Make sure the fixture lines up with the tester guide pins, which in turn align the fixture to the fixture receiver pins and the vacuum seal.

2. Press the Vacuum Interface switch to pull the fixture on to the fixture receiver interface.
3. Connect the vacuum hose(s) to the fixture hose fitting(s).
4. Set the fixture vacuum switches on as required.
5. Set the operator control panel for Tandem or Independent.

   In Tandem mode, the Start and Cancel of either system affect both systems. In Independent mode, the testers are completely independent except for the common Power Control switch and a single Interface Vacuum switch which activates whichever interface has a fixture installed.
6. Carefully load the board for system A, aligning the tooling holes on the board with the tooling pins on the fixture. Then load the board for system B.

Load the Fixture and Board for the Z1860M, Z1850M, Z1840M

For instructions about loading the fixture, refer to the user manual for the unit you are using.

Log In

After you have loaded the fixture and board, make sure you follow all safety precautions regarding power and setup before you apply power to the board. Safety precautions are discussed in Chapter 1.

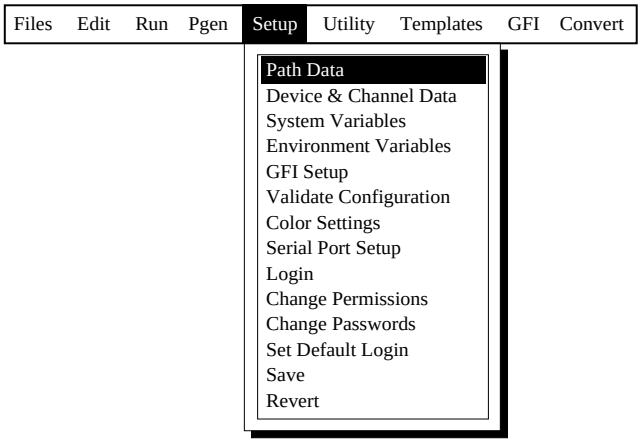
Important: You must log in to both systems A and B for the Z1866.

The login procedure described below is the default procedure. Consult with your supervisor to determine how your system is set up.

1. Go to the test program's Main menu by typing `18xx` after the DOS prompt and pressing Enter.

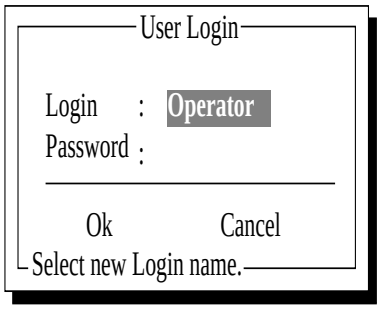
   The Main menu appears on your screen with Files and Setup highlighted on the menu bar, indicating that only those menus are available at this point.
2. Select Setup from the Main menu.

   The Setup pull-down menu appears.



3. Select Login.

The User Login window appears. Operator will be preselected in the User Login window.



4. Select the Password field and type your password.
5. Move the cursor to the OK field using the mouse or arrow keys.
6. Select OK.

   When you have successfully logged in, the menus available to you will be highlighted. The default menu selections are Files, Edit, Run, Utility, and GFI. Not all the functions within those menus are available to operators in the default mode.

   Default operator permissions are Program Select, File Manipulation, Program Execute, Node Probe Tools, and GFI Execute.

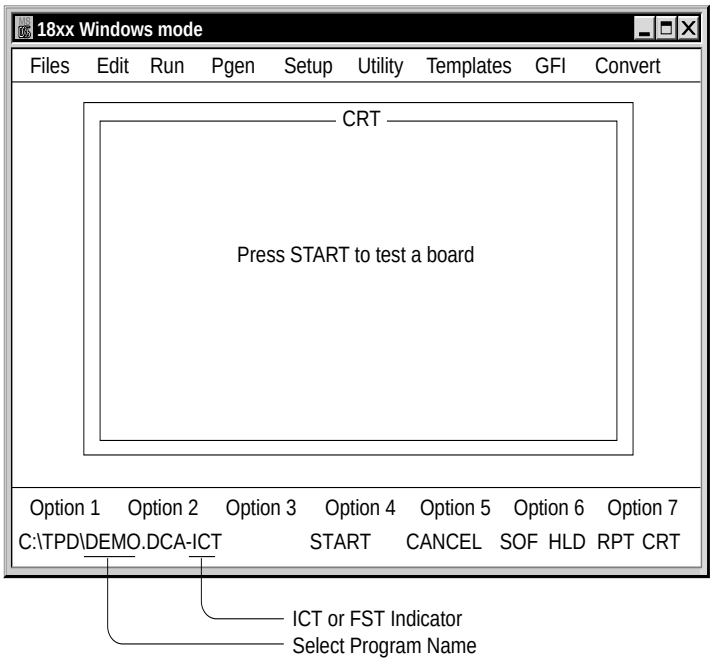
Test Boards

Testing Interface

The testing interface consists of:

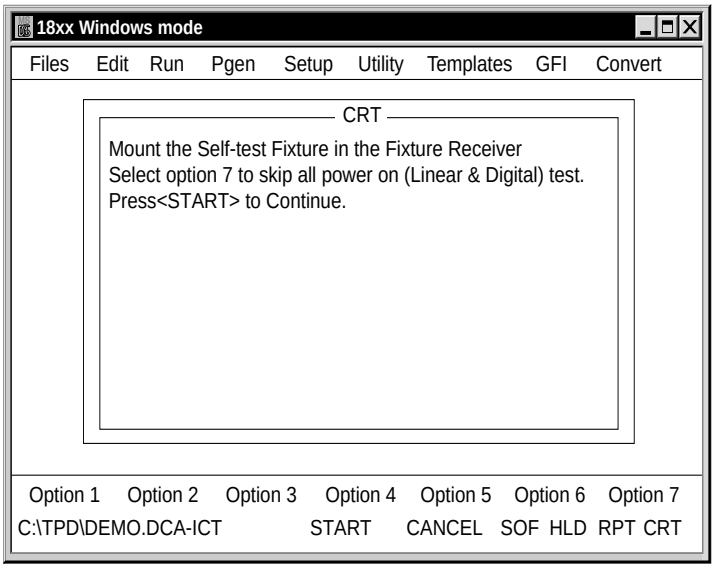
- Menu bar at the top of the testing interface screen
- CRT Output window in the center of the screen
- Options buttons/Status Display on the upper of the two lines at the bottom of the screen
- Board Name field and Test Control buttons on the lowest line of the screen

The Board Name field remains constant throughout the testing process. It displays the name of the board and the type of test being run, either ICT (in-circuit test) or FST (fixture self-test).



Selecting Option Buttons By displaying messages in the CRT Output window, the test program may direct you to select one or more options from the option buttons line at the bottom of the screen.

To select an option, either point the mouse cursor at the desired option and click the mouse button, or press the number key that is located above the alphabetic keys on the keyboard. The option you select will be highlighted. Once you start the test, the Status Line replaces the Option Buttons line.



Selecting Test Control Buttons The Test Control buttons are Stop on Fail (SOF), Hold (HLD), Repeat (RPT), and CRT (which displays test step messages on the screen as the program runs). These Test Control buttons give you control over test execution.

Toggle the Test Control buttons to select or deselect a function. You can toggle these buttons before the test starts or during test execution. To toggle the buttons, either point the mouse cursor at the button on the screen and click, or press the appropriate function key as described by the keyboard template.

- Start and Cancel

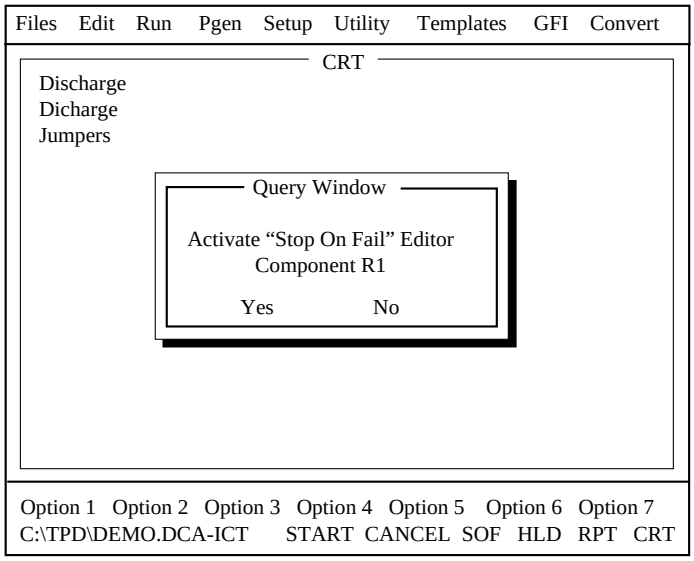
  The Start and Cancel buttons in the lower right corner of the screen duplicate the functions of the Start and Cancel switches on the operator control panel and F3 and F4 function keys.

  Clicking Start advances test execution. Clicking Cancel aborts test execution, turns off all power supplies, and returns you to the top of the test program.

Important: For the Z1866, the Start and Cancel buttons work in parallel in the Tandem mode. The buttons work separately in the Independent mode.

- Stop on Fail (SOF)

  Selecting SOF stops the program running as soon as a test step fails. A Query Window appears.



  To activate the SOF editor, select Yes with the mouse or press the Enter key. To continue program execution, select No. When you activate the SOF editor, the worksheet for the failed component will appear on the screen, enabling you to make necessary changes.

  The default operator settings do not allow you to save any changes that have been made to the test step.

- Hold (HLD)

  Selecting HLD, stops the program at each measurement in sequence, so you can execute the program measurement by measurement.

- Repeat (RPT)

  Selecting RPT repeats a test step. When RPT is toggled on, the test program repeats one measurement until you press the Start key or toggle off RPT. Pressing the Start key forwards the program to the next measurement. This next measurement repeats until you either toggle Repeat off or press Start again.

  If the test step has a single measurement, pressing the Start key with Repeat on moves the program forward to the next step. In Debug mode on the worksheet, where there is

no next step, pressing the Start key when repeating the last measurement of a component turns Repeat off.

The Repeat button does not function with shorts or ignores.

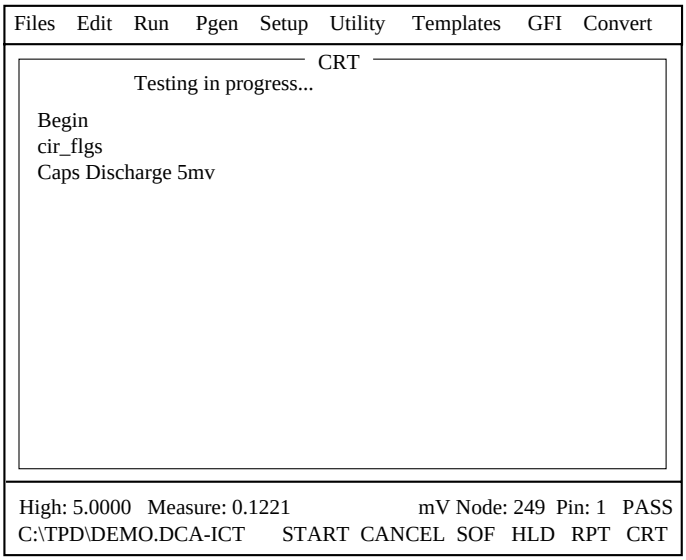
- Cathode Ray Tube (CRT)

  When CRT is on, program progress information is displayed on the CRT. One line of information is displayed per test step. The information shows the test ID, test name, and description.

  The test ID describes the component, for example, R14. The test name is the component type, for example, 10K resistor, 7404. The description includes any other pertinent information.

- Status Display

  When Status Display is on, the Status Line at the bottom of the screen shows the measured values, node, pin, and whether that test step passed or failed.



Running the Test Program

Running the test program requires you to select the test program and execute it. You can select any permitted command from within a menu by

- Clicking the menu name with the mouse
- Typing the highlighted or key letter
- Using the arrow keys to navigate through the menu then pressing the Enter key to invoke the function

Important: For the Z1866, you must choose whether the two systems are to work independently or in parallel. Choose Independent or Tandem on the operator control panel.

Select the Test Program Follow the steps below to select the program.

1. Choose Select from the Files menu.

   A list of available programs appears in the Select window.

2. Select the program to execute.

   The selected program name appears at the bottom of the screen, followed by either ICT to indicate in-circuit test or FST to indicate fixture-self test.

   After you select the test program, the program returns you to the Main menu.

Run the Test Program Follow the steps below to run the program.

1. Select Run from the Main menu.

   The testing interface appears on the screen.

2. Select the options and tester controls

3. Start the test.

   Press the Start key (F3), or click Start at the lower right corner of the screen, or use the table top Start button on the operator control panel.

   The Main menu remains on the screen while the program is running. The program runs until you:

   - Press the Escape key
   - Press the tabletop Cancel button on the operator control panel
   - Press the F4 (Cancel) key on the keyboard
   - Use the mouse to click Cancel in the lower right corner of the screen
   - Point the mouse cursor anywhere on the main menu bar and click

Screen Messages The following are examples of messages which may be displayed on the screen during test execution.

```
Press S T A R T to test a board.
Testing in progress
Testing Continuities
Testing Shorts
Testing Capacitors
Testing Resistors
Power on
Testing digital devices
Testing COMPLETED—PASSED
```

The test program automatically releases the board when the test is complete. Tag the board if it needs repair. Place the next board on the fixture and repeat the test process.

Exit the Main Menu To exit from the Main menu, select Exit from the Files menu. The program returns you to the DOS prompt.

Testing Digital Connectivity

Digital Tracer is a digital testing tool which allows you to test the connectivity of digital component leads to the board-under-test via a hand held probe. Once Digital Tracer has been enabled in the software, it stops a test when it locates a failing device and shows a representation of the device on the screen.

During the tracer process, you orient the device if it is not oriented properly, probe the component pins of the device (Initial Pass), and probe each tied pin individually (Second Pass—optional).

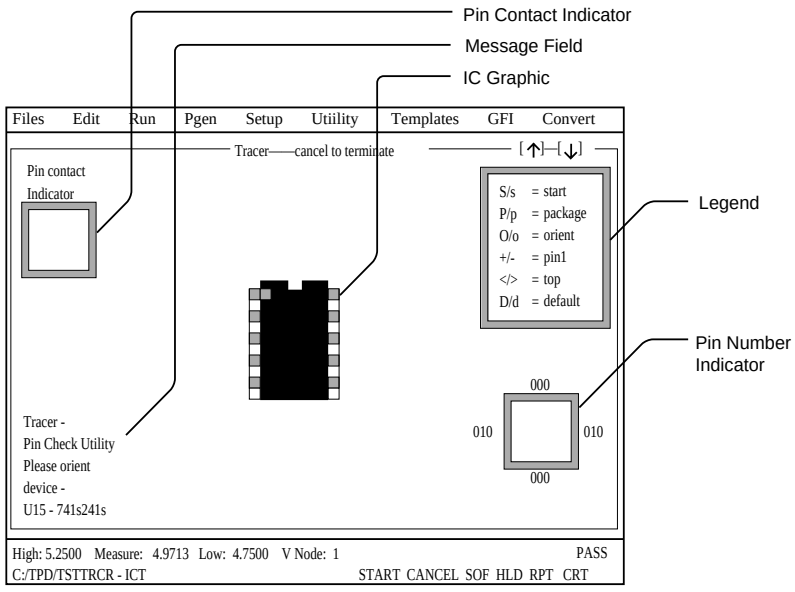
At the end of the probing, pin graphics which remain the same color in the monitor'sgraphic display show the location of opens. That information is sent to output devices specified in the program.

For information on enabling Digital Tracer in the software, see the "Digital Tracer" section in Chapter 9 "Test and Debug Tools" in the **Z1800-Series Programmer's Guidebook**.

Important: Digital Tracer is not available for the Z1805.

Digital Tracer Graphic Display

If the test detects a failure when Digital Tracer is enabled, a graphic display similar to the following appears.

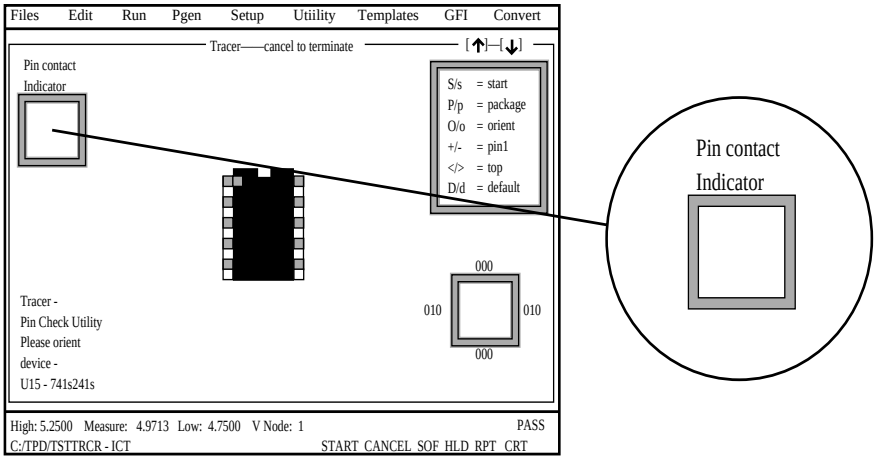


The Digital Tracer graphic display consists of the following elements.

- Pin contact indicator
- IC graphic
- Message field
- Legend
- Pin number indicator

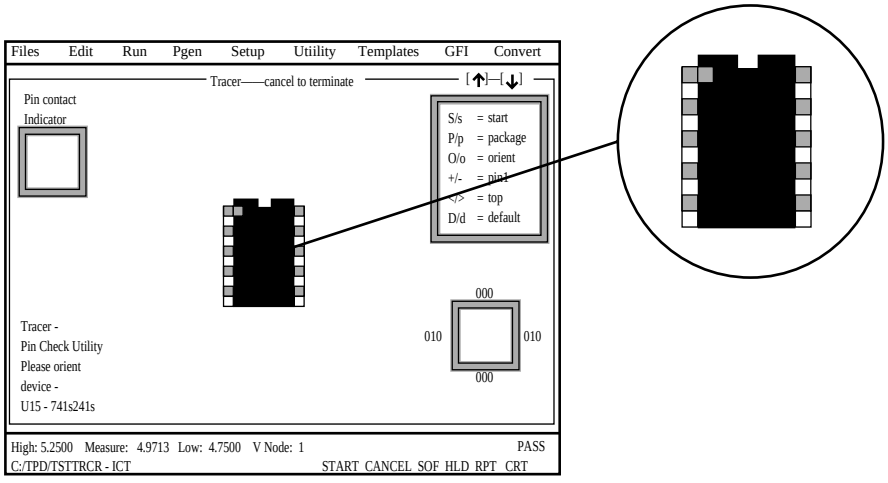
Pin Contact Indicator The pin contact indicator shows when the probe has made contact with a target pin. Target pins are pins that the operator has not yet probed. When the probe contacts the pin, the pin contact indicator changes color and Digital Tracer makes a beep.

Digital Tracer cannot individually display all the pins for high density devices; therefore, the pins for such devices are grouped with a single pin graphic. You may have to contact two or more pins before the pin graphic changes. However, the pin contact indicator changes state each time you contact a target pin.

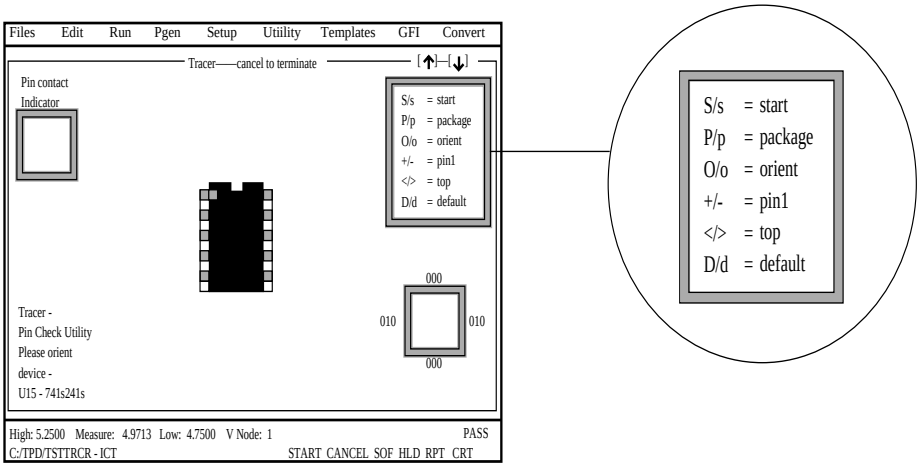


Integrated Circuit (IC) Graphic Devices are represented by a simplified line drawing. Since every discreet pin of a large digital device may not be represented on a single video image, rows of pins are represented as line segments which change color as you probe the pins. Multiple pins can be
represented by a single pin graphic for large digital devices.

The example shows one pin per pin graphic.



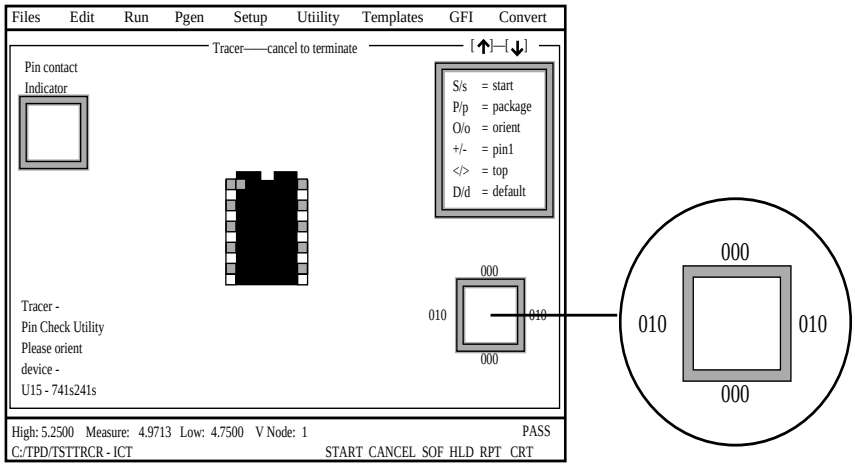
Legend A legend on the upper right hand corner of the screen describes keyboard usage and is valid only during orient mode. During orient mode, you can manually override the device orientation and type from the keyboard if the programmer has not correctly oriented the device in the setup.



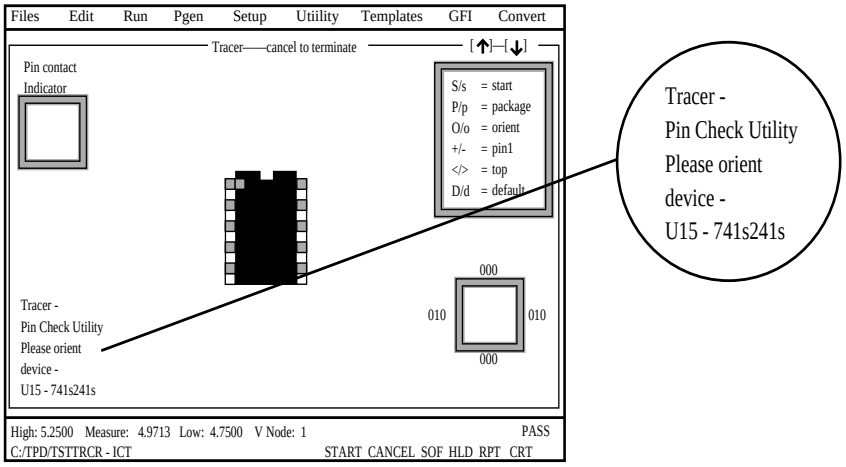
Keyboard options are described below.

Keys	Functions
S/s = start	Starts probing mode.
P/p = package	Toggles between QUAD and DIP packages. Choose DIP if you have pins on 2 sides. Choose Quad if you have pins on 4 sides.
O/o = orient	Rotates the current IC graphic one quarter turn counterclockwise each time you press the key. Device orientation corresponds to its physical placement on the board when mounted on the tester, as you face the front of the tester.
+/- = pin1	+ moves the pin graphic indicating pin #1 counterclockwise around the device. - moves the pin graphic indicating pin #1 clockwise around the device.
</> = top	< and > affects only QUAD devices. < decreases the number of pins on the top and the bottom of the device and redistributes the pins to the sides. > increases the number of pins on the top and bottom of the device, taking the pins from the sides.
D/d = default	Reverts the graphics to the package and orientation specified by the global setup or worksheet description entry.

Pin Number Indicator The pin number indicator at the lower right hand corner of the screen specifies the actual number of pins represented on each side of the device.



Message Field The message field prompts you with directions for the next step in the process.



Using Digital Tracer

When Digital Tracer locates a failing device, a graphic representation of the device appears on the screen.

Orienting the Device When you invoke the Digital Tracer graphic display, a message, shown below, appears at the bottom of the screen, prompting you to orient the device if it has not been properly oriented in the program. Device orientation corresponds to the device's physical placement on the board when the board is mounted on the tester, from your perspective as you face the front of the tester.

```
"Tracer -
Pin Check Utility
Please orient
device
<ID> - <NAME>"
```

Important: <ID> and <NAME> are replaced with component data.

If the programmer has not correctly oriented the device in the setup, you can manually override the orientation and device type. Use the keyboard to change the package and orientation.

Important: Once you start probing, you cannot change the display. Any key press is considered a Start.

If you do not need to reorient the device, either press the Start button to continue with the initial pass, or press the Cancel button to stop Digital Tracer and report an operator cancellation.

To orient the device, choose from the options listed on the legend in the upper right corner of the screen. The options are described below.

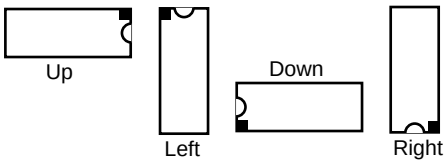
- Package

  Press P to toggle between Dip or Quad. Choose DIP if you have pins on two sides. Choose Quad if you have pins on four sides.

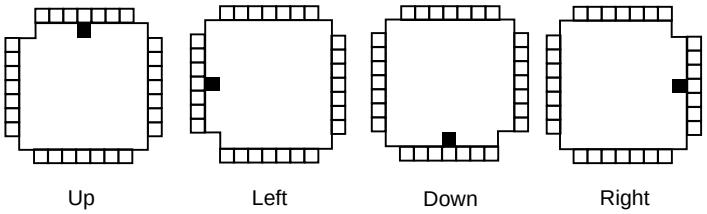
- Orient

  Press O to specify the direction that pin 1 faces. The in-circuit (IC) graphic rotates one quarter turn counterclockwise each time you press the key.

  The illustration below shows the orientation of a DIP device and the location of pin 1, which is indicated by the square (pin graphic) in the corner.

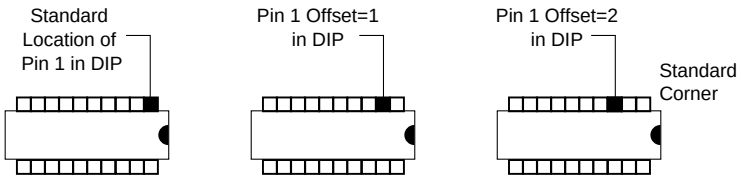


The following shows the orientation of a QUAD device and the location of pin 1.



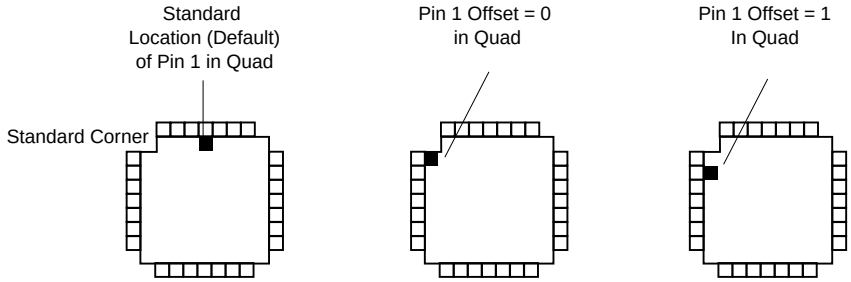
- Pin 1

  If pin 1 is not in the correct location, press the + key to move pin 1 counterclockwise around the IC graphic, or press the - key to move pin 1 clockwise around the IC graphic.



- Top—Increase or Decrease Pins

  To decrease the number of pins on the top and bottom of a Quad device and redistribute the pins to the sides, press the < key. To increase the number of pins on the top and bottom of a Quad device and redistribute the pins to the sides, press the > key.



- Default

  Press the D key to cause the graphics to revert to the default, that is, to the package and orientation specified by the global setting or worksheet description entry.

  If you are using a valid C.1 compatible tracer.def file, the default key steps you through each tracer.def entry with the same number of pins as the current device. However, the worksheet description field entries override the C.1 tracer.def entries.

  For more information about tracer.def, see the “Digital Tracer” section in Chapter 11 “Test and Debug Tools” in the **Z1800-Series Programmer’s Guidebook**.

Probing the Component Pins After you have oriented the component device or pressed the Start button, a message like the one below appears at the bottom of the screen, prompting you to probe the component pins.

```
"Tracer -
Pin Check Utility
Please probe all
device leads on
<ID> - <NAME>"
```

Brush the probe across the pins.

Important: During the initial pass, contact is accepted when the Nodefinder probe touches a pin.

Digital Tracer displays the probing progress graphically on the computer monitor. As each pin passes the test, the pin graphic changes color on a color monitor. If a graphic element represents multiple pins, the graphic won't change until you contact all the pins represented.

You can press Cancel to stop Digital Tracer.

After probing the component pins, press Start to continue to the Second Pass if the Second Pass option is enabled, or press Cancel to stop Digital Tracer.

Important: You must press Cancel twice to exit the program: once to cancel Digital Tracer, and a second time to cancel the program.

When Tracer has finished, due to you pressing either Start or Cancel, press Start to continue testing or press Cancel to abort the program.

Probing Tied Pins Individually After the initial pass, if Tracer Second-Pass is enabled in the header, Digital Tracer prompts you to probe the tied pins a second time, separately, to determine if the trace between them is broken.

A message window appears, instructing you which pins to probe.

```
"Tracer -
Pin Check Utility
Please probe pin <n>
<ID> - <NAME>"
```

Important: <n>is replaced with component data.

Select Start to continue to the next pin. Select Cancel to report leads that were not contacted on the initial pass and pins not contacted in the second pass.

Important: During the second pass, contact is accepted when you lift the Nodefinder probe from the pin.

Analyzing Printer Messages If the printer is enabled in the Setup/Data menu, Digital Tracer prints a message similar to the following, when it detects an open.

```
Tracer scan open on pins <number> <number> node <number>
Test COMPLETED – FAILED!
```

Analyzing Printout of Test Results

The test program can be set up to send test results to the printer. Typically, the printout states the date and test time. The printout can list the node numbers of open connections, shorts, and component failures, as well as tester-related problems, such as faulty voltage on the device under test (DUT) and poor node contact. The printout may also indicate boards which have passed the test, or tests which have been terminated by pressing Cancel. The printout becomes the DUT failure tag.

Important: The Z1866 requires two printers: one for System A's results, the other for System B's results.

Below are examples of component, APC, Section Abort, and Shorts Locator messages.

Component Failure Message

The following are examples of component failure messages.

Note: Digital capability is not available on the Z1805.

Continuity failures

```
Cont. Cont. Cont.
15 to 31 Failed
32 to 40 Failed
54 to 62 Failed
```

Inductor failure

```
L1 1.mH 1 millihenry
2.0 mH
NODE  33,  53 PIN:  1
```

Capacitor failure

```
C4 100nF 100 nanofarad
50 nF
NODE  90 PIN:  2
```

Resistor failure

```
R28 10kΩ 10 kilohms
8 KO
NODE  67 PIN:  1
```

Resistor Pack failure

```
RP1 22.00K0 22.00 kilohms
20.8 KO
NODE  66 PIN:  2
18.6 KO
NODE  35 PIN:  3
24.3 KO
NODE  34 PIN:  4
25.7 KO
NODE  67 PIN:  5
```

Gray Code failure

```
U2 74HCT1191 74HCT1191
CRC 7EC4 NODE: 328 PIN:  2
CRC 7EC4 NODE: 333 PIN:  3
CRC 7EC4 NODE: 349 PIN:  6
```

Vector failure

```
U2 (Vec)  74240 vector
NODE:  210   PIN:    3   STATES: 2,5,7
NODE:  212   PIN:    5   STATES: 2,6,8
NODE:  214   PIN:    7   STATES: 2,11,13
NODE:  217   PIN:    9   STATES: 2,22
NODE:  220   PIN:   12   STATES: 2,5,7
NODE:  222   PIN:   14   STATES: 2,3
NODE:   227   PIN:    18   STATES:  2,27
```

AutoProbeCheck Failure Messages

The AutoProbeCheck (APC) test checks for probe contact. If it finds an open, the test aborts, and a failure message, such as the one below, is displayed on the CRT and on the printout. If a failure tag indicates APC failures, you may have a fixture contact problem. Check the fixture, and retest the board.

```
R 28 10 K
Node 67

Possible contact problem on node 65
Possible contact problem on node 84
```

Section Abort Messages

Section Abort is a function enabled in the program Header. When it is on, Section Abort stops the program execution if failures are encountered early in the test. Failures in early sections can produce false readings in subsequent sections, or, in the case of a short, could result in damage to the board if DUT power is turned on. When Section Abort is off, the test will continue running to the end despite failures during execution.

Below is an example of a screen message which may be displayed when Section Abort is enabled:

```
Conts
367 to 383 Failed

Ignores
Shorts
Test terminated, Interconnect problem!

Test COMPLETED - FAILED!
```

When Section Abort is off, the following type of message is output to the screen:

```
Conts
Open 327 to 343

C 17 47 pF
Node 45

+12 Volt Power
Node 18

Digital

Bus 23 Stuck LOW
CRC 0000 NODE 200 PIN 1
CRC 0000 NODE 201 PIN 2
CRC 0000 NODE 202 PIN 3
Mixed mode test for DAC0802
Test terminated, Interconnect problem!
Test terminated, Analog problem
Test terminated, Power problem!

Test COMPLETED - FAILED!
```

The three test termination messages indicate that test execution continued to the end of the program despite several failures in process.

Shorts Locator Messages

Shorts Locator provides more information about shorts than the standard shorts message, which lists only the shorted nodes.

Shorts Locator provides a correlation between the physical parts of the board and the tester node numbers. It helps you identify where to look for the short when you are repairing the board.

Shorts Locator lists the devices connected to the shorted node, to the depth specified in the Shorts ID Depth field under the Program Header Edit menu. The range of the field is 0–31. The depth indicates how many device pins will appear. The maximum number of device pins is 31.

The following examples show the difference between information provided when Shorts Locator is on and when it is off.

Shorts Locator On

```
SC
(3-19)
Shorted to: 7,23,26,33

NODE 3      CONT
              C114-.1U (e)
              C115-.01 (e)
              C118-.01 (e)
              C122-5U (e)

NODE 19    CONT

NODE 7      CONT
              SC
              L1-8.2UH (e)
              C122-5U (f)
              CR66-1N4 (Anode)

NODE 23   CONT
              SC
NODE 26   CONT
              SC
              L1-8.2UH (f)

NODE 33   CONT
```

Shorts Locator Off

```
SC
(3-19)
Shorted to: 7,23,26,33

Test Terminated, Interconnect problem

Test COMPLETED - FAILED!
```

Troubleshooting for Operators

The most common tester problems and their solutions are listed below. Contact your supervisor when a new or persistent problem occurs.

Tester Power

Problem: The tester has no power.

Solution:

- Turn the Power Control switch off and on.

  For the Z1890, Z1884, Z1880, Z1866, Z1860-NB MS, Z1860, Z1850, Z1840, Z1808, and Z1805: the Power Control switch is on the operator control panel.

  For the Z1820 and Z1800: the Power Control switch is on the test jack panel.

  For the Z1860, Z1850, and Z1840M: the Power Control switch is on the operator control pod.
- If the AC power cord is not connected to the tester, turn off the main breaker located on the rear panel, then connect the power cord to the tester.
- Check that the main AC breaker is on after the tester is connected to the AC power source.

Inconsistent Board Failures

Problem: Inconsistent board failures occur after running the test on the same board three times. Test failures are different on consecutive tests.

Solution: The fixture probes are sticking, contaminated, or broken. Use the fixture clear plate to examine them. Clean the probes with compressed air or remove the fixture for repair. See the **Z1800-Series Fixturing Guidebook** for fixture maintenance information.

Failing Batches of Boards

Problem: An entire batch of boards fails the test.

Solution: Look for the obvious, such as damaged or missing components on the boards; then, tag the boards for rework.

Run Command

Problem: The Run command does not work. The error message “Hardware not available” may appear.

Solution:

- Check that your computer/tester cable is connected correctly and that tester power is on.
- Return to the Main menu to reselect Program Test Run.

Vacuum Tester Problems

The problems described below may occur when you are using Z1890, Z1884, Z1880, Z1866, Z1860-NB MS, Z1860, Z1850, Z1840, Z1820, Z1808, Z1805, and Z1800 testers.

No Vacuum

Problem: No vacuum is present.

Solution:

- Plug in and turn on the vacuum. Press the Pump Start switch if you use a local pump.
- Check that the vacuum control switches are on.

Insufficient Vacuum

Problem: There is less than 20 inches of mercury on the vacuum pump gauge, resulting in loss of vacuum.

Solution:

- The fixture or board-under-test is leaking. Remove the fixture or board and have a qualified technician repair the defect.
- There is a leak in the vacuum hose between the tester and the vacuum pump. Replace the hose.

Hissing Noise

Problem: While running the tester, you hear a hissing noise.

Solution: The fixture or board-under-test is leaking. Remove the fixture or board and have a qualified technician repair the defect.

❖❖

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