TESSONICS

RSWA Original

Resistance Spot Weld Analyzer

Hardware Manual

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Chapter 1

Getting Started

The Tessonics Resistance Spot Weld Analyzer (RSWA) has been designed and manufactured as a high quality instrument. Under normal working conditions the RSWA will provide long, trouble-free service.

1.1 Damage in Transit

Inspect the unit thoroughly and immediately upon receipt, for evidence of external or internal damage that may have occurred during shipment. Immediately notify the carrier making the delivery of any damage, since the carrier is usually liable for damage in shipment. Preserve packing materials, waybills, and other shipping documentation in order to claim any damages. After notifying the carrier, contact Tessonics to receive assistance in the damage claims, and provide replacement equipment, if necessary. Please note that your shipping container is re-usable and may be used in the future when returning the unit for recalibration or repair.

1.2 Setting Up

Check the list of supplied items. Verify that you have received all items listed on the RSWA Packing List. If anything is missing, please contact Tessonics Sales and Service office.

Please check the battery charge gage after receiving it. Refer to Chapter **6**, External Battery on how to interpret the batteries fuel gage indicator.

Note: The external battery is shipped **disconnected**

Open the battery pocket cover of the soft case and connect the battery connector to the internal wiring cord connector. Connect the A/C adapter to the external battery and charge the battery for at least 4 hours before using it for the first time.

Chapter 2

Overview

The Resistance Spot Weld Analyzer consists of several parts (Figure **2.1**). The base unit consists of a Windows-based tablet PC with an attached DSP board and installed software. The probe has a 52-element matrix transducer which connects to the DSP board. An external battery provides up to 6 hours of run time when disconnected from a power source. A charger/AC adapter provides power for simultaneous device operation and battery charging. A soft case holds all these components together and provides protection against shock and mechanical damage.

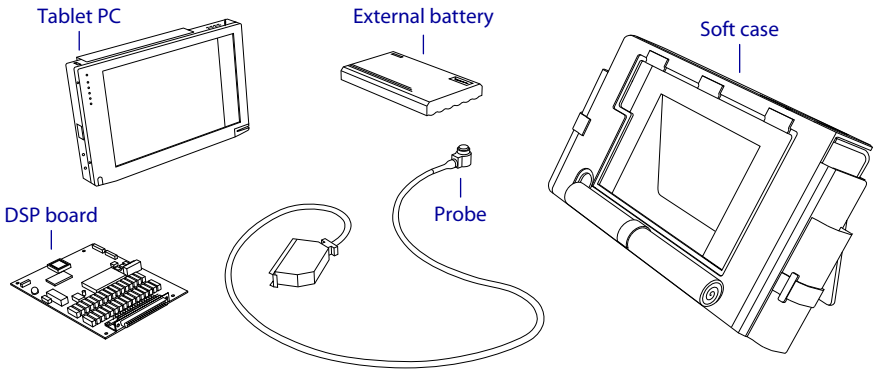


Figure 2.1 RSWA Components

Chapter 3

Ultrasonic Probe

The probe consists of a multiple coax cable and an ultrasonic transducer. This is the most critical part of an RSWA. A malfunctioning or damaged probe may not provide accurate measurements. Figure **3.1** shows the major parts of the probe.

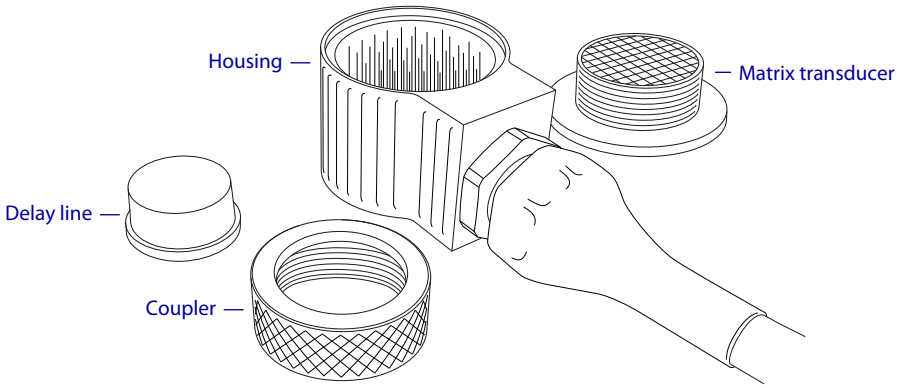


Figure 3.1 Parts of RSWA transducer

3.1 Usage

The front face of the transducer is very fragile. Check that there is no dust, grease, or any other foreign particles between the front face of the probe and the delay line before mounting the delay. The delay and the coupler are the only replaceable parts on the probe. Please do not try to disassemble the protective case, take out the matrix transducer, or detach the cable from the protective case as this will damage the probe beyond repair.

3.2 Cleaning and Maintenance

- Clean the front face and the thread of the transducer. If possible, use isopropyl alcohol, dry using an air jet
- Clean the face of the delay which will be in contact with the front face of the transducer and the collar using the same technique, dry with an air jet
- For operation, a very thin layer of a standard ultrasonic gel should be applied between the transducer front face and the delay to provide sufficient acoustical contact
- Make sure the gel is clean and there are no air bubbles in it
- During storage or transportation, the front face of the transducer must be protected with the delay or with a protection cap

- When storing the transducer for long periods of time (longer than a month), make sure there is no gel left on the surface of the transducer
- Under normal operating conditions, the gel layer should be replaced each month; In a warm and dry environment the gel should be replaced more often

Warning: Ensure the delay line is face up before attaching the coupler

Chapter 4

CPU Unit

The CPU unit is a fully functional computer (a Tablet PC) which runs the RSWA software.

4.1 Features

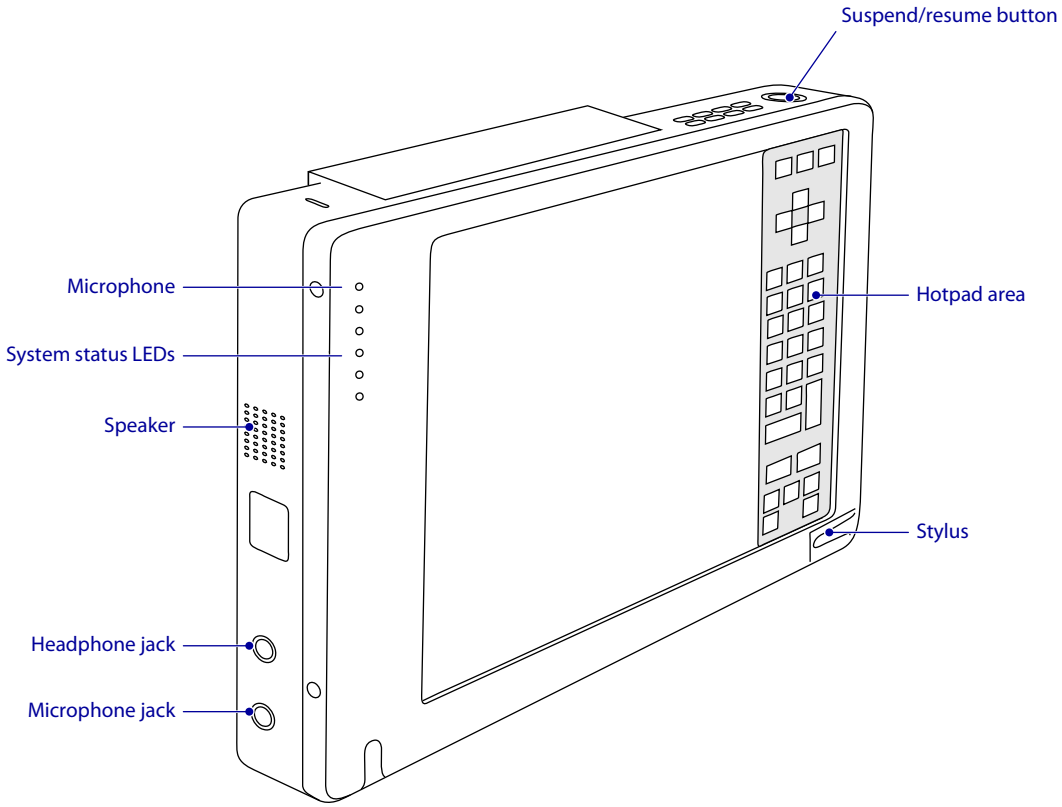


Figure 4.1 Tablet PC parts (front view)

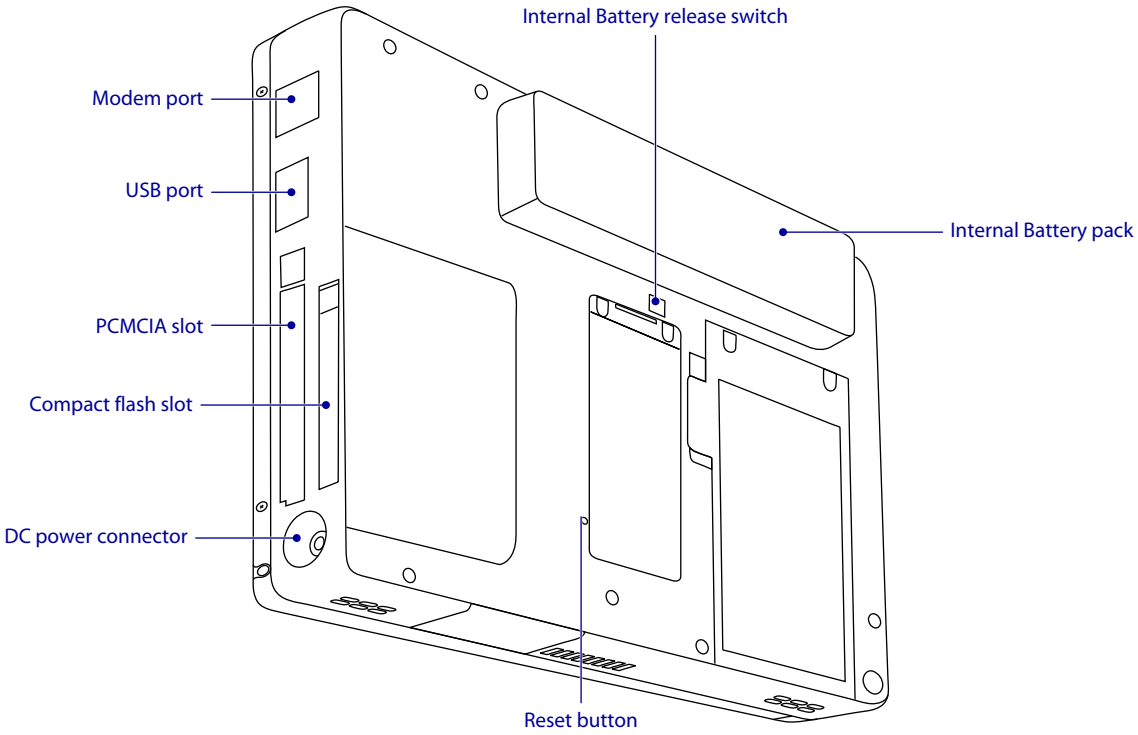


Figure 4.2 Tablet PC parts (back view)

4.2 Status Indicators

Status indicators show the status of system functions such as system power and internal battery charge level. The location of these indicators is shown in Figure **4.3**.

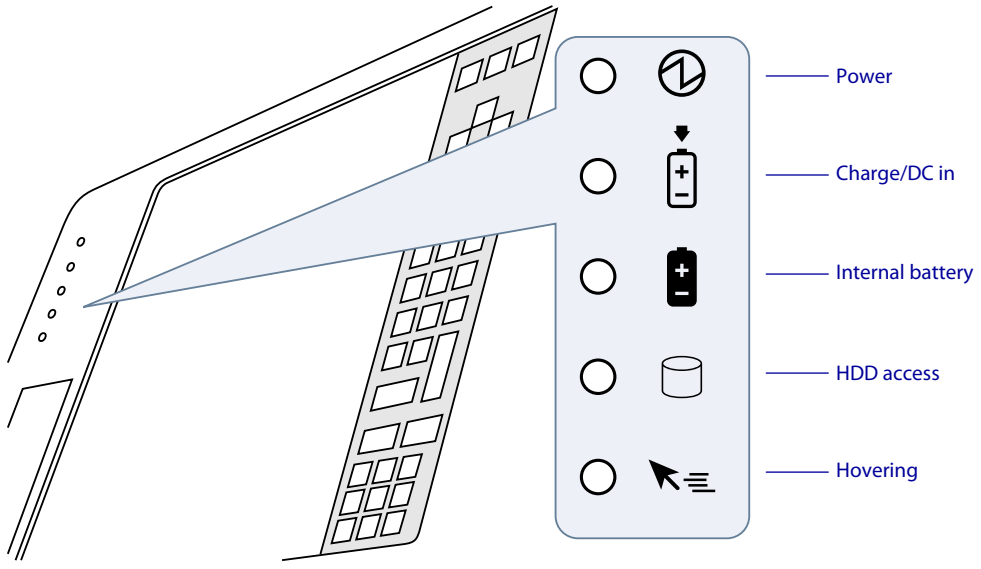


Figure 4.3 Status indicators

Icon	LED State	Remarks
Power	Green (continuous)	On State or Idle Mode
	Green (blinking)	Suspend-to-RAM State
	Off	Off State or Save-to-Disk State

Icon	LED State	Remarks
Charge	Green	• AC adapter and internal battery are available and system is not charging (internal battery fully charged) • AC adapter is available but internal battery is not present
	Amber (continuous)	AC adapter and internal battery are available and system is charging
	Amber (blinking)	AC adapter and internal battery are available and waiting to charge (internal battery is out of thermal range)
	Off	AC adapter is not available
Internal Battery	Green	Internal battery charge is 100% – 50%
	Amber	Internal battery charge is 49% – 13%
	Red	Internal battery charge is 12% – 0%
	Red (blinking fast)	There is an internal battery error
	Off	Internal battery is not installed
HDD Access	Green	Displayed when hard disk drive is accessed
	Off	Hard disk drive is not being accessed
Hovering	Green	Hovering mode is enabled
	Off	Hovering mode is disabled

4.3 System States

On Mode

The system is running and the display screen is on.

Idle Mode

Some system functions are regulated or turned off to conserve power. The display screen may be turned off. The system returns to the On state when pen activity or other input is detected.

Suspend-to-RAM Mode

System operation is suspended. Most system functions are turned off to conserve power. Power to memory is on, maintaining data in programs that were running before system operation was suspended. The system does not respond to the pen or other input when in Suspend-to-RAM mode. Push the power button return back to On state.

Save-to-Disk Mode

System operation is suspended. All system functions are turned off to conserve power. Active data in programs that were running before suspending system

operation is stored on the hard disk drive. The system does not respond to the pen or other input. Push the power button return back to On state.

Off Mode

All system functions are turned off to conserve power. The system does not respond to the pen or other input. The system boots at the next system power-on.

Note: The system consumes the same amount of power whether it is in Save-to-Disk mode or Off mode.

Your system can be configured to enter some of these states automatically after a period of inactivity to conserve battery power.

4.4 Screen Protector

Using a screen protector will help insure that the screen remains as clear as possible. When installed, the screen protector becomes a durable, replaceable surface that protects the display from abrasion.

Note: The tablet PC is not waterproof. Do not pour liquids on the system or wash it with a wet cloth.

To install a new screen protector:

1. If a screen protector is already installed on the display screen, remove it before installing the new screen protector. The screen protector is held onto the display screen surface by a thin strip of adhesive around the edges. A notch in one corner of the screen protector allows you to slide your fingernail under the screen protector for easy removal.
2. Clean the display by wiping the screen surface gently using a soft cotton cloth dampened with denatured alcohol. Ensure that all residues have been removed from the screen before applying a new screen protector.
3. Remove the protective coating from the adhesive side of the screen protector first. Apply the screen protector to the display screen surface. When doing so, orient the screen protector with the adhesive side of the screen protector facing the display screen and the notched corner of the screen protector toward the lower left corner of the display screen.
4. Apply pressure to the screen protector with your finger using a continuous wiping motion along the edges. The adhesive sets completely within 48 hours. To ensure a good seal between the screen protector and the display, do not lift the screen protector from the display once it has been applied.
5. Remove the protective plastic cover from the face of the screen protector.
6. Clean any residue remaining on the screen protector by wiping gently with a soft cotton cloth dampened with denatured alcohol. Wipe the screen protector with a soft dry cloth to remove any low-tack adhesive.

4.5 Storing

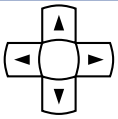
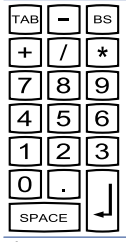
Store the equipment in the Off state with a fully charged external battery installed. The external battery always provides power to some system components even when the system is in the Off state. If the system is stored with the external battery removed, these components are powered by the system's internal battery. The internal battery is not designed for extended use and will discharge in a short period of time; this could result in damage to the internal battery. You can store the equipment in the Off state for about 30 days with a fully charged external battery installed. After this period, the external battery pack should be recharged or replaced with a charged external battery.

4.6 Using the Hotpad

The hotpad area consists of several touch screen "keys" on the right side of the system display that you can use to change several settings. The hotpad allows you to:

- Adjust the display and speaker settings
- Invoke right mouse button
- Invoke hovering capability
- Use as a numeric pad
- Use as a NumLock key

To use a hotpad key, tap directly on it with the pen. You can also press and hold the pen tip against the Volume and Brightness hotpad keys to automatically repeat the previous hotpad function. The location of each hotpad key is shown in the table below.

Icon	Name	Description
	Escape	Functions the same as the Esc key on a typical keyboard
	Display	Each time the Display Device hotpad key is tapped, the display unit is switched (in the following order): LCD → CRT → both LCD and CRT → back to LCD
	NumLock	Acts in the same way as the NumLock on the keyboard (default is Off)
	Cursor Control	Acts in the same way as the cursor keys on a keyboard
	Numeric Keypad	Acts in the same way as the numeric keypad on a keyboard (note: "BS" signifies "Backspace")
	Right Mouse Button	Switches the pen function from left mouse button to right mouse button emulation for a single mouse event after tapping the hotpad
	Pen Hovering	Switches the hovering mode on or off; throughout the hovering mode, the hovering status indicator is lit green

Icon	Name	Description
	Speaker Volume	Decrease/Mute/Increase the speaker volume
	Brightness Control	Changes the luminance of the display backlight; changes in brightness level can be monitored with the on-screen indicator

4.7 Using Hovering Mode

Selecting the pen hovering icon on the keypad provides the user with better cursor control. When the hovering option is enabled, the cursor can be positioned over an icon without activating it. This is useful when you are performing procedures that require accurate cursor positioning, such as when simulating a mouse rollover, selecting a small icon, or beginning a paint session.

- To enable hovering, tap the Pen Hovering icon on the keypad. The Hovering system status indicator light illuminates green when hovering is selected.
- To disable hovering, tap the Pen Hovering icon again. The Hovering system indicator light is off when hovering is not selected.

Chapter 5

DSP Board

The DSP (Digital Signal Processing) Board connects the transducer with the computer. The major parts of the board are:

DSP

Handles communications with the computer, controls all the activity of various components on the board, provides certain stages in signal processing

Pulser

Sends a short electrical pulse to the transducer.

Receiver

Receives electrical signals coming back from the transducer.

Multiplexer

Redirects signals from pulser to a particular element in the transducer.

ADC (Analog-to-digital converter)

Converts electrical signals into a digital form.

Chapter 6

External Battery

In addition to the battery that comes together with the tablet PC, an RSWA is equipped with the second external battery. This additional battery pack provides power for the DSP board and simultaneously charges and powers the tablet PC.

RSWA can be equipped with one of the following battery types (see Figure **6.1**):

- PowerPad 80 (shipped with older units)
- Universal battery (shipped with newer units)

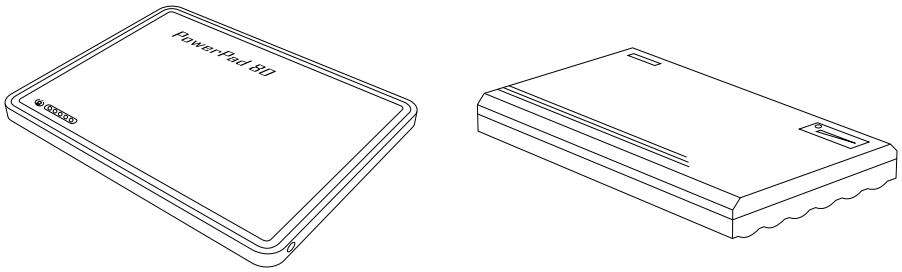


Figure 6.1 External batteries

6.1 PowerPad 80

This external battery uses a comprehensive fuel gauge system to indicate its state of charge. The fuel gauge, which consists of 3 green lights, 1 yellow light and 1 red light, will normally be lit and will turn off automatically when the battery is not in use.

Under abnormal operating conditions, such as extreme temperatures, the battery will not charge or discharge. Under these conditions the light panel will indicate 1 red light and 1 green light.

While the battery is charging, the fuel gauge lights will blink every 7 seconds until the battery is fully charged, at which time the fuel gauge lights will remain lit. The lights that are “ON” will indicate the state of charge at that time.

While the fuel gauge provides a relatively accurate state of charge during discharge, it more accurately shows the true state of charge when idle. It is therefore normal for the battery to alter its state of charge after it has been idle for more than an hour.

Note: When not in use for a month or more, fully charge the battery prior to storing.

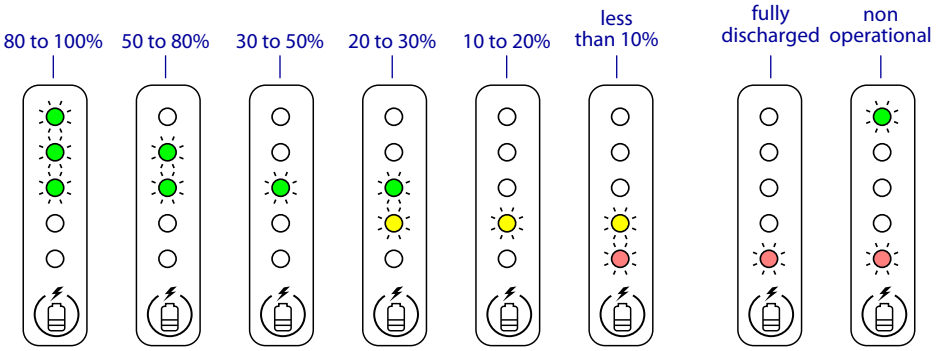


Figure 6.2 PowerPad 80 fuel gage

6.2 Universal Battery

The universal battery has a DC out voltage switch at the back (Figure **6.3**).

Note: This switch must be set to the 16V position (knob toward the center of the battery).

The power meter is activated by pressing the Test button. The number of LED lights indicates the power level of the battery pack.

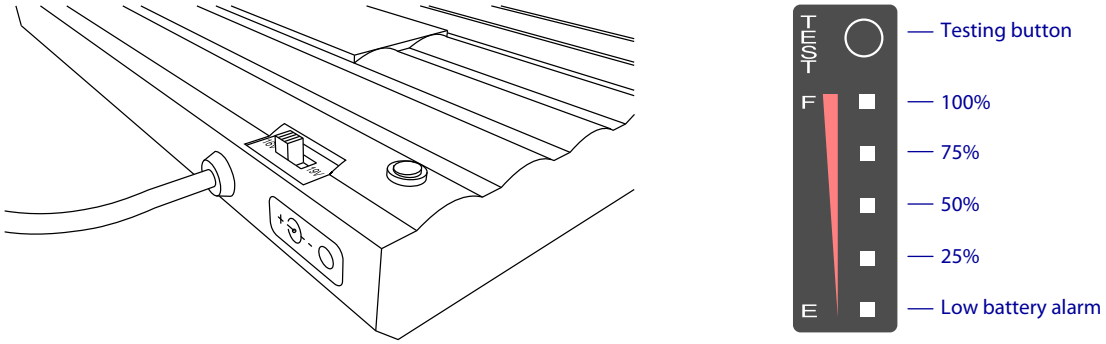


Figure 6.3 Universal battery DC out voltage switch (left) and power meter (right).

Chapter 7

Charger/AC Adapter

The universal AC adapter transforms power line voltage into DC voltage which is used for charging the external battery and/or simultaneous operation of the RSWA.

An input range 100–240 V at frequencies 50–60 Hz makes it possible to use the adapter in most countries around the world. It is strongly recommended to use the supplied power cord, as its plug determines the type of suitable power line.

The output cord connects to the charging input of the external battery. If you have a newer Universal Battery, you can also bypass the external battery and plug the adapter directly into the RSWA unit. (Useful if the external battery ever becomes faulty and you want to continue running the RSWA).

Note: Keep AC adapter clean and away from spilled liquids and shocks. If there is any type of visible damage to the adapter case or power cord, the item should be replaced.

Warning: Tessonics has no responsibility for damage caused by use of unauthorized power adapters or by connecting the power adapter to improper power lines.

Any battery has a limited number of charge/discharge cycles. With this in mind, using the RSWA with the AC adapter plugged in helps to prolong the life of the battery. This method works best when the RSWA is being used in a table-top manner to inspect welds on a smaller part. It also ensures the battery is fully charged and ready for the next inspector.

Chapter 8

Soft Case

A soft case holds the whole device together and protects it from shock and mechanical damage. On the top of the case is a clip-on handle for easy lifting and transporting of the RSWA unit. The rear part of the case flips out and can be used as a rest for convenient positioning of the unit. Additional features are pockets for gel bottles and accessories.

Warning: Do not lift or carry the RSWA by pinching the back of the case and the screen. Use the supplied case handle.

Appendix A

Specifications

Probe

- Frequency (-6 dB): 20 MHz
- Bandwidth (-6 dB): 60%
- Number of channels: 52
- Elementary pitch: 1.25 mm
- Stainless steel housing
- Cable length: 2 m

CPU Unit

- Processor: Pentium III with Intel Speed Step technology 600/300 MHz
- Main RAM: 256 MB
- Hard disk drive: 2.5"
- Digitizer: Resistive
- Display: 8.4" TFT/VE-TFT Color SVGA 800 × 600 pixels, 8 levels of brightness
- PC Card Slot: One Type-I or Type-II, PCMCIA CardBus version 3.0
- Compact Flash Card slot
- Integrated interfaces: RJ-11 (modem), USB 1.0, DC-In, Expansion connector, Microphone In, Stereo Out, IrDA 1.1
- Internal battery: 6-cell warm-swappable lithium ion pack; 10.8 V @ 3400 mAh
- Operating temperature: 0° – 40° C (32° – 104° F)
- Storage temperature: -20° – 60° C (-4° – 140° F)
- Operating and storage humidity: 20 – 80% non-condensing

PowerPad 80 Battery

- Maximum Capacity: 80 Wh
- Charge time: 4 hours to 80%
- Weight: 1.5 lbs or 0.65 kg
- Operating Temperature: 0° – 60° C (32° – 140° F)

Universal Battery

- Maximum capacity: 130 Wh
- Maximum current: 4.5 A @ 16 V
- Charge time: 3.5 hours (4 hours for maximum charge)
- Weight: 1.5 lbs or 0.65 kg
- Operating temperature: 0° – 60° C (32° – 140° F)

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