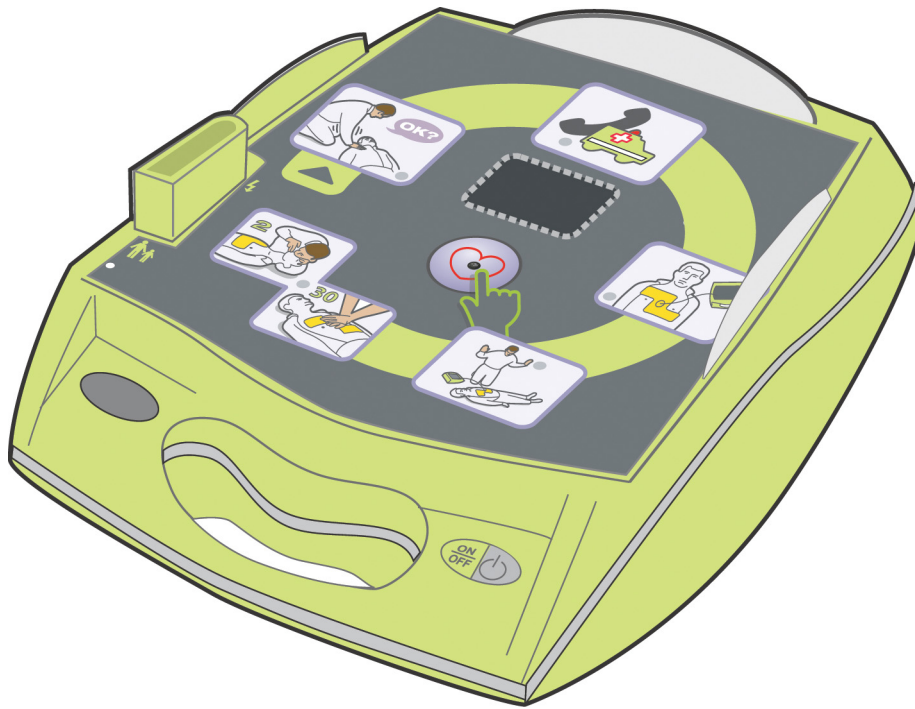




AED brands®

AED Plus®

Administrator's Guide



ZOLL®

9650-0301-01 Rev. X



This issue date for the ZOLL **AED Plus Administrator's Guide**, (REF 9650-0301-01 Rev X) is **March, 2016**.

If more than 3 years have elapsed since the issue date, contact ZOLL Medical Corporation to determine if additional product information updates are available.

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Preface



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The AED Plus® *Administrator's Guide* is to be used by responsible medical authorities in conjunction with the *ZOLL AED Plus Operator's Guide* (REF 9650-0300-01).

The AED Plus is to be used by trained rescuers to provide emergency defibrillation. It incorporates a sequence of visual and voice prompts to help rescuers follow established AHA/ERC Guidelines 2010 protocols for use of AEDs. It also incorporates recording/memory capabilities to allow medical control authorities to review rescuer's use of the device. Recording includes ECG rhythms, event data, device identification, and optionally, voice recording of rescuer and ambient sounds. This information is available via an upload capability to a personal computer for event review and archiving.

Both the American Heart Association (AHA) and the European Resuscitation Council (ERC) publish extensive information regarding the use of automated external defibrillators and their relationship to cardiopulmonary resuscitation. The following publications provide supplemental material to be used in conjunction with the *ZOLL AED Plus Administrator's Guide* and *Operator's Guide*:

1. *2010 American Heart Association Guidelines for CPR and ECC*; Supplement to *Circulation*, Volume 192, Issue 18, November 12, 2010.
2. *European Resuscitation Council Guidelines for Resuscitation 2010*; *Resuscitation* (2010) Volume 81, October 2010.

This guide provides information about the operation and care of the AED Plus unit. The administrator, and user should read each section carefully. Make sure to read the Safety Summary section.

This guide is divided into six sections.

Preface - This page.

Safety Summary - Describes General Warnings and Cautions.

Introduction- Provides a general product overview of the AED Plus.

Section 1 - Operation - Describes the functions of all controls and indicator lights of the AED Plus.

Section 2 - Installation, Self Test, Maintenance and Troubleshooting- Describes configuration of the unit, data communications, troubleshooting, maintenance and how to order accessories and supplies.

Appendices - Provides the specifications of the AED Plus, characteristics of the ZOLL Rectilinear Biphasic™ waveform, and information on the ECG Analysis Algorithm Accuracy.

Safety Summary



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The following section describes general warnings and safety considerations for administrators, rescuers, and patients.

Warnings

- Use the AED Plus unit only as described in this manual. Improper use of the device can cause death or injury.
- DO NOT use or place the AED Plus unit in service until you have read the AED Plus Operator's and Administrator's Guides.
- DO NOT use or place the AED Plus unit in service if the unit's status indicator window (located on the left side of the handle) displays a red "X".
- DO NOT use or place the AED Plus unit in service if the unit emits a beeping tone.
- Connect the electrode cable to the AED Plus unit after installing batteries.
- Keep the electrode cable connected to the AED Plus unit at all times.
- This device should only be used by properly trained individuals.
- Only use electrodes labeled "Infant/Child" on children less than 8 years old or weighing less than 55 lbs (25 kg). Use CPR-D-padz[®] if victim is older than 8 years or weighs more than 55 lbs (25 kg).
- Always stand clear of victim when delivering a shock. Defibrillation energy delivered to the victim may be conducted through the victim's body and cause a lethal shock to those touching the victim.
- DO NOT TOUCH the electrode surfaces, the victim, or any conductive material touching the victim during ECG analysis or defibrillation.
- Move victim away from electrically conductive surfaces prior to use of equipment.
- DO NOT use this unit near or within puddles of water.
- Keep the victim as motionless as possible during ECG analysis.
- DO NOT use this unit near flammable agents, such as gasoline, oxygen-rich atmospheres or flammable anesthetics.
- Avoid radio frequency interference from high-power sources that might cause the defibrillator to interpret cardiac rhythms incorrectly by turning off cell phones and 2 way-radios.
- Disconnect non-defibrillation protected electronic devices or equipment from victim before defibrillation.
- Dry victim's chest, if wet, before attaching electrodes.
- Apply freshly opened and undamaged electrodes, within the electrode expiration date, to clean and dry skin to minimize burning.
- DO NOT place the electrodes directly over the victim's implanted pacemaker. Pacemaker stimuli may degrade the accuracy of ECG rhythm analyses or the pacemaker may be damaged by defibrillator discharges.
- Check labeling inside the AED Plus cover before using the cover as a Passive Airway Support System (PASS) device. Ensure it is intended for this use.
- DO NOT use Passive Airway Support System (PASS) if there is a suspected head or neck injury. Place victim on a firm surface before performing cardiopulmonary resuscitation.
- DO NOT recharge, disassemble, or dispose of batteries in fire. Batteries may explode, if mistreated.
- Do not use or stack the AED Plus unit with other equipment. If the unit is used or stacked with other equipment, verify proper operation prior to use.



Cautions

- Do not disassemble the unit. A shock hazard exists. Refer all servicing to qualified personnel.
- Use only commercially available type 123A lithium manganese dioxide batteries. Discard batteries properly after removal from unit. Use only batteries from recommended manufacturers.
- If the device is stored outside the recommended environmental conditions, the electrode pads and/or batteries may be damaged or their useful life reduced.
- Safety and effectiveness data submitted by ZOLL Medical Corporation to the Food and Drug Administration (FDA) under section 510(K) of the Medical Device Act to obtain approval to market are based upon the use of ZOLL accessories such as disposable electrodes. The use of electrodes from sources other than ZOLL is not recommended. ZOLL makes no representations or warranties regarding the performance or effectiveness of its products when used in conjunction with electrodes from other sources. If unit failure is attributable to the use of accessories not manufactured by ZOLL, this may void ZOLL's warranty.
- The CPR-D-padz electrode can be connected to other ZOLL Defibrillators with Multifunction Cables. Defibrillation can be administered when connected to other ZOLL Defibrillators. The CPR function does not operate with any device other than the AED Plus and AED Pro[®].

Indications for Use

Use the AED when a suspected cardiac arrest victim has an apparent LACK OF CIRCULATION as indicated by:

- Unconsciousness and
- Absence of normal breathing and
- Absence of a pulse or signs of circulation.

When the victim is less than 8 years of age, or weighs less than 55 lbs (25 kg), the ZOLL AED Plus should be used with the ZOLL AED Plus Pediatric Electrodes. Therapy should not be delayed to determine the victim's exact age or weight.

Contraindications for Use

Do NOT use the AED Plus when the victim:

- Is conscious; or
- Is breathing; or
- Has a detectable pulse or other signs of circulation.

Intended Users of the Device

The AED Plus external defibrillator is intended to be used by personnel who are qualified by training in the use of the AED Plus device, basic life support, advanced life support, or other physician-authorized emergency medical response to defibrillate victims of cardiac arrest. The Real CPR Help[®] function provides a metronome designed to encourage rescuers to perform chest compressions at the AHA/ERC recommended rate of 100 compressions per minute. Voice and visual prompts encourage a minimum compression depth of 2 inches for adult victims. The Real CPR Help function is not intended for use on victims under 8 years of age.



Tracking Requirements

U.S Federal Law (21 CFR 821) requires the tracking of defibrillators. As an owner of this device, you have the responsibility under this law to notify ZOLL Medical Corporation if this product has been received, lost, stolen or destroyed or has been donated, resold or otherwise distributed to a different organization.

If any of the events described above occur, please contact ZOLL Medical Corporation in writing with the following information:

1. Originator's organization - Company Name, Address, Contact Name and Contact Phone Number.
2. Part Number/Model Number and Serial Number.
3. Disposition of Device (e.g. received, lost, stolen destroyed, distributed to another organization).
4. New Location and/or Organization (if different from #1 above) - Company Name, Address, Contact Name and Contact Phone number.
5. Date change took effect.

Notification of Adverse Events

As a health care provider, you may have responsibilities under the Safe Medical Devices Act (SMDA) for reporting to ZOLL and possibly to the FDA, the occurrence of certain events. These events, described in 21 CFR Part 803, include device related death and serious injury or illness. In any event, as part of our Quality Assurance Program, ZOLL should be notified of any device failures or malfunction. This information is required to assure that ZOLL provides only the highest quality products.

Unpacking

- Carefully inspect each packing container for damage.
- Examine the unit for any signs of damage that may have occurred during shipping.
- If the contents are incomplete or damaged or if the unit fails to pass its self test as indicated by a Red "X" in the status indicator window after battery installation, contact ZOLL Medical Corporation's Technical Service Department.
- Review the shipping list to insure that all items ordered were received.

Conventions

Throughout this document, voice prompts are indicated by capital italicized letters, such as *CALL FOR HELP*.

WARNING! Warning statements describe conditions or actions that can result in personal injury or death.

CAUTION! Caution statements describe conditions or actions that can result in damage to the unit.

















NOTE Notes contain additional information on using the defibrillator.

Symbols



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Symbols used in this manual or on the equipment include the following:

	Class II equipment
	Defibrillation protected Type BF patient connection
	ATTENTION: Refer to manual for more information
	DANGEROUS VOLTAGE
	Not new battery cells
	New battery cells
	Do Not push button
	Push button
	Do not use this manufacturer
	Ok to use this manufacturer
	Unit equipped to treat adult and pediatric victims
	Manufacturer
	Authorized representative in the European Community
	Serial Number
	Catalogue number
	Consult instructions for use





Using the ZOLL AED Plus

The AED Plus is an automated external defibrillator (AED) that uses voice prompts and visual indicators to guide the rescuer through a resuscitation sequence that may include defibrillation and/or cardiopulmonary resuscitation (CPR). The unit incorporates the ZOLL Rectilinear Biphasic Defibrillation waveform, and operates in either adult or pediatric mode.

The AED Plus supports both adult and pediatric defibrillation electrode pads, and automatically adjusts the defibrillation energy based on the type of electrode pads connected to it. Following attachment of electrodes to a victim's chest, the defibrillator monitors the electrocardiographic (ECG) rhythm of the victim's heart, analyzes that rhythm, and determines whether the rhythm is shockable or non-shockable. When needed, defibrillation energy is delivered through these same electrodes. When the unit detects a shockable rhythm, it charges and issues the warning *PRESS FLASHING SHOCK BUTTON*. The rescuer presses the Shock Button to deliver the shock. The rescuer will then be prompted to perform CPR for a period of 2 minutes, after which the unit automatically initiates a new ECG analysis.

Some versions of the AED Plus include a cover that can also be used as a PASS (Passive Airway Support System) to support the victim's neck and shoulders in a position that assists in maintaining an open airway. Some versions also contain disposable accessories (razor, barrier mask, scissors, and a towel). The AED Plus is powered by ten commercially available consumer brand lithium-manganese dioxide batteries.

The AED Plus can:

- Perform periodic self tests to ensure its continual readiness.
- Use a one-piece electrode assembly (*CPR-D-padz*) that facilitates proper electrode placement and that is easy to apply to the victim.
- Analyze heart rhythm and inform the rescuer if the rhythm is shockable or non-shockable.
- Deliver defibrillation treatment to victims of cardiac arrest who exhibit shockable ECG rhythms.
- Provide voice prompts and graphics to guide the rescuer regarding what to do and when to do it during a cardiac emergency, such as calling for help or giving CPR to the victim.
- Provide audible beeps to encourage rescuers to provide CPR compressions at 100 CPM (requires *CPR-D-padz*).
- Monitor the depth of chest compressions during CPR and provide voice prompts, if compression depth is inadequate (requires *CPR-D-padz*).
- Provide a unit cover that functions as a Passive Airway Support System (PASS). (Note the PASS feature is standard with some versions of the product and optional with others.)
- Upload data from the defibrillator to a computer to store events or print event reports.
- Use commercially available batteries.



Using Real CPR Help[®]

The *CPR-D•padz* include a sensor that detects the rate and depth of CPR chest compressions. This sensor is placed (as part of the electrodes application) on the victim's chest so that it is located between the rescuer's hands and the victim's lower sternum during chest compressions. When the rescuer performs CPR compressions, the sensor detects their rate and depth and sends the information to the AED Plus unit. When used with *CPR-D•padz*, the AED Plus monitors the depth and rate of CPR chest compressions. It provides a CPR metronome function designed to encourage rescuers to perform chest compressions at the AHA/ERC recommended rate of 100 compressions per minute (CPM) as well as voice and visual prompts to encourage a minimum compression depth of 2 inches for adult victims.

WARNING! Real CPR Help is intended for use on adult victims only; do not use on victims under 8 years of age.

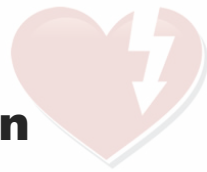
The adaptive metronome function is disabled during periods when CPR should not be performed (for example, during ECG analyses and defibrillation shock sequences). During periods when CPR may be indicated, the metronome begins issuing audible beeps following detection of the rescuer's first few compressions. The beeps continue automatically (at rates described below) until a few seconds after chest compressions are halted by the rescuer or until the recommended "CPR period" ends (2 minutes for AHA and ERC protocols). If the rescuer ceases chest compressions during the CPR period, metronome beeps stop within a few seconds after compressions are halted. Audible beeps resume during the CPR period following any re-initiation of CPR compressions. If no CPR compressions are detected during "CPR periods", the AED Plus periodically re-issues the *CONTINUE CPR* prompt.

The rate of beeps issued by the AED Plus adaptive metronome function adapts to the rescuer's actual chest compression rate. The metronome will beep at 100 CPM when chest compressions are delivered at greater than 80 compressions per minute (CPM). Should the rescuer fail to deliver compressions at 80 CPM or greater, the metronome will beep at a rate that is approximately 15 CPM higher than the rescuer's actual rate. This increased metronome rate is intended to encourage the rescuer to increase his/her chest compression rate until the recommended 100 CPM rate is achieved. The metronome beeps at a minimum rate of 60 CPM in cases where the rescuer's compression rate is substantially below 60 CPM.

During CPR, the AED Plus may issue one or more audible prompts based on the depth of chest compressions detected. When Real CPR Help determines that compression depth is consistently less than 2 inches, a *PUSH HARDER* prompt will be issued. A *GOOD COMPRESSION* prompt will be issued if the rescuer responds by increasing compression depth to 2 inches or more.

The AED Plus unit can be configured to display the *FULLY RELEASE* text prompt to remind the user to lift the hands off the chest during CPR. By default, this text prompt is not enabled.

Operation



This section describes the following functions:

- Operating Controls and Indicators
- Using the AED Plus Graphical User Interface
- Voice Prompts
- Using the LCD Display
- Using the Passive Airway Support System (PASS)
- Using Electrodes
- Applying CPR-D-padz
- Applying pedi-padz II® (Infant/Child Electrodes)
- Using the CPR Monitoring Function — Real CPR Help
- Using the Audio Recording Option

Operating Controls and Indicators

See *Table 1: Control Functions* for an explanation of each of these controls.

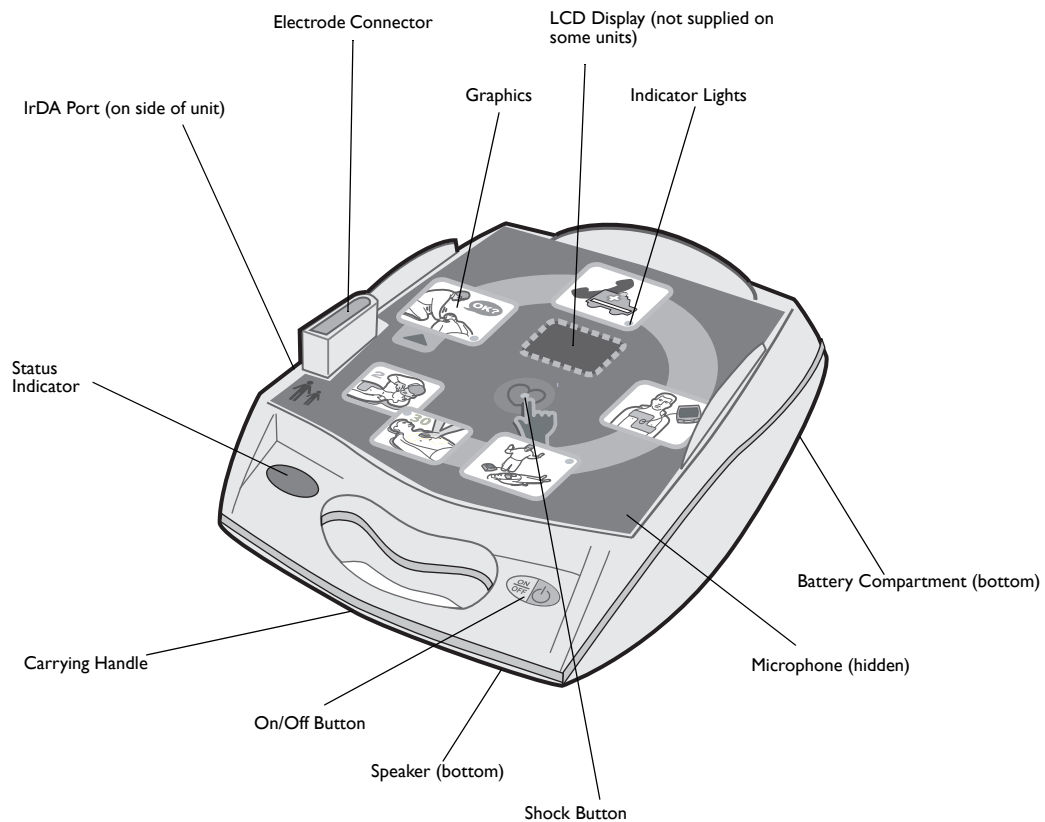


Figure 1: Identifying Operating Controls and Indicators

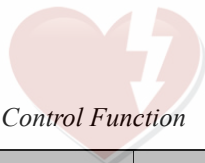



Table 1: Control Function

Control/Indicator	Description
ON/OFF Button	Turns power ON or OFF. When held depressed for > 5 seconds initiates self test or data communications.
Indicator lights	Illuminates to indicate which step rescuer must take to treat a victim.
Shock Button	Illuminates when the AED Plus is charged and ready to deliver a shock to the victim. When pressed, causes the charged and ready AED Plus to discharge its energy into the victim. When the AED Plus is not charged the lighted button is extinguished. Pressing this button initiates a voice prompt that indicates the number of defibrillator shocks delivered since the unit was powered on.
Pictograms	Icons that explain the series of steps needed for resuscitation and defibrillation.
Status Indicator	 <p>Illuminated check mark indicates the unit passed its last self test and is ready for use.</p> <p>Illuminated “X” indicates unit has failed its self test and is not ready for use</p>
LCD Display	Displays elapsed time, shock count, user prompts, CPR compression depths and ECG waveforms.
IrDA Port	Provides a communications link between the defibrillator and a personal computer or another IrDA™ equipped device.
PASS Cover (optional)	Some AED Plus models include a cover that may be used as a shoulder support to aid victim airway management. The PASS can be ordered separately for other AED Plus models (see “Ordering Accessories” on page 27).
Battery Compartment	Holds 10 123A lithium manganese dioxide batteries used to power the unit.
Electrode Connector	Connector for attaching electrodes to the AED Plus.
Speaker	Provides audio prompts and metronome beeps that direct rescuers on what to do during a rescue; also provides voice prompts to indicate if service is required.
Microphone (optional)	When voice recording option is installed, this microphone picks up and records ambient sounds, including rescuer’s voice.

Using the AED Plus Graphical User Interface

The AED Plus graphical user interface (see Figure 2) is visible on the top of the unit when the cover is removed. The pictograms are reminders of the steps to follow when performing a rescue and reinforce instructions provided through voice prompts and optional display messages.

Each pictogram on the device is associated with an indicator light (LED) and voice prompts. This combination draws attention to the graphics in a sequence defined by current protocols for use of an Automated External Defibrillator (AED) by the AHA and ERC.

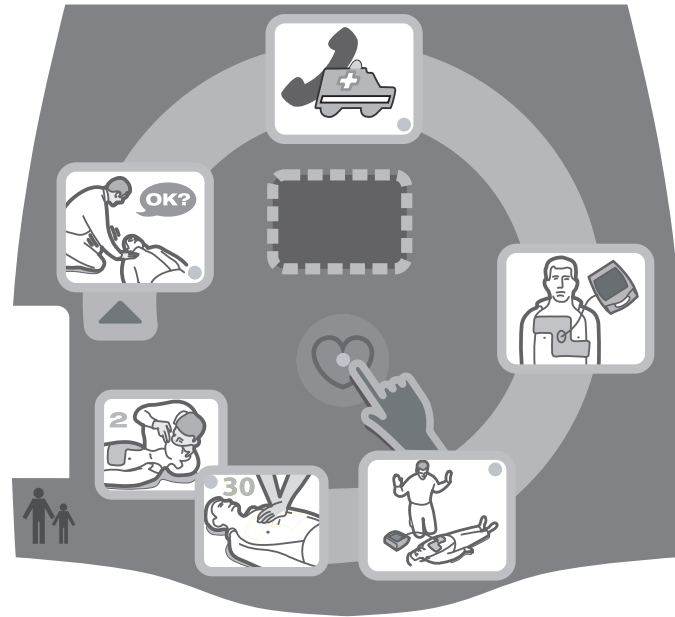


Figure 2: Graphical User Interface

The AED Plus unit contains an LCD display (some special models do not have an LCD) that displays elapsed time, number of shocks delivered, text messages corresponding to the voice prompts, and depth of CPR compressions. The LCD can also be configured to display the acquired ECG signals.

When the AED Plus is turned on, the unit automatically initiates the sequence of voice prompts and graphic illuminations for a rescue event. The sequence continues until the AED Plus is turned off or the electrodes are disconnected from the victim for an extended period of time. As soon as electrodes are attached to the victim and impedance of the connection is verified, the unit stops cycling through the above-mentioned voice and graphic illumination sequence and automatically begins analysis of the ECG rhythm.

Following the results of this ECG analysis, voice prompts tell the rescuer whether a shockable or non-shockable rhythm has been detected. If a shockable ECG rhythm is present, the graphics illuminate and voice prompts guide the rescuer through the defibrillation sequence. When no shock is advised, the AED Plus issues the audio prompts, *NO SHOCK ADVISED* and *START CPR*, and illuminates the CPR-related graphics. A period of 2 minutes (depending upon device configuration) is then allowed for rescuer CPR. Following this “CPR period”, the AED Plus automatically re-initiates a new ECG rhythm analysis.



The AED Plus automatically adjusts defibrillation energy to adult or pediatric levels based on the type of electrodes attached to the unit. In its factory default configuration, the unit delivers the first three shocks at 120J, 150J, and 200J respectively in adult mode, and at 50J, 70J, and 85J in pediatric mode. However, the device can be configured to deliver shocks at other energy levels, as long as the setting for each successive shock is the same or greater than the setting for the preceding shock. Shocks are delivered by depressing the Shock Button (indicated by the heart icon and associated LED) located in the center of the graphical user interface.

Consult the AED Plus *Operator's Guide* for more details on the graphics included in the unit's graphic interface, the audio prompts issued at each step in the treatment protocol and the rescuer action associated with these audio and visual prompts.

Loss of contact between the electrodes and the victim interrupts ECG analysis and/or shock delivery until the electrodes are re-attached and results in a *CHECK ELECTRODE PADS* prompt to the operator.

Voice Prompts

During clinical use of the AED Plus, you may hear the following voice prompts.

Table 2: Clinical Voice Prompts

Voice Prompt	Definition
<i>UNIT OK.</i>	AED Plus has successfully passed its power up self tests.
<i>UNIT FAILED.</i>	AED Plus has failed its power up self tests and is not usable for victim care.
<i>CHANGE BATTERIES.</i>	AED Plus self test has detected a low battery condition that is insufficient for the device's use for victim care. Replace batteries immediately.
<i>STAY CALM.</i>	Relax as much as possible and focus on the rescue effort.
<i>CHECK RESPONSIVENESS.</i>	Check victim for responsiveness/consciousness by gently shaking the victim and shouting "Are you all right?"
<i>CALL FOR HELP.</i>	Activate the EMS system or ask a bystander to do it for you.
<i>OPEN AIRWAY.</i>	Place victim in the supine position and perform Head Tilt – Chin Lift or Jaw – Thrust maneuver to open victim's airway. (This prompt is off by default.)
<i>CHECK BREATHING.</i>	Look, listen or feel for the presence of breathing and/or airflow from the victim's lungs. (This prompt is off by default.)
<i>GIVE TWO BREATHS.</i>	If victim is not breathing, give two rescue breaths. (This prompt is off by default.)
<i>PLUG IN CABLE.</i>	Ensure that the electrode cable is properly connected to the AED Plus electrode connector.
<i>ATTACH DEFIB PADS TO PATIENT'S BARE CHEST.</i>	Attach defibrillation pads to the victim's bare chest.
<i>CHECK ELECTRODE PADS.</i>	Previously attached electrodes are not making good contact with the victim's skin or the electrodes are defective.



Voice Prompt	Definition
<i>ADULT PADS.</i>	AED Plus has detected adult electrode pads connected to it and adjusted defibrillation energy settings to adult levels.
<i>PEDIATRIC PADS.</i>	AED Plus has detected pediatric electrode pads connected to it and adjusted defibrillation energy settings to pediatric levels.
<i>DON'T TOUCH PATIENT, ANALYZING.</i>	Do not touch victim, an ECG rhythm analysis is in progress or about to begin.
<i>SHOCK ADVISED.</i>	ECG rhythm analysis has detected the presence of ventricular fibrillation or shockable ventricular tachycardia.
<i>NO SHOCK ADVISED.</i>	ECG rhythm analysis has detected a rhythm that is not treatable by defibrillation.
<i>ANALYSIS HALTED. KEEP PATIENT STILL.</i>	ECG rhythm analysis has been halted due to excessive ECG signal artifact. Stop any ongoing CPR and keep the victim as motionless as possible.
<i>DON'T TOUCH PATIENT. PRESS FLASHING SHOCK BUTTON.</i>	Warn all persons in attendance of the victim to stand clear and stop touching the victim. Press the Shock Button to deliver defibrillation therapy.
<i>RELEASE SHOCK BUTTON.</i>	Shock Button was depressed before the defibrillator was ready to defibrillate. Release the Shock Button and press again after the ready tone sounds.
<i>SHOCK DELIVERED.</i>	A defibrillation shock has just been delivered to the victim.
<i>NO SHOCK DELIVERED.</i>	No shock was delivered to the victim because rescuer failed to press Shock Button or an error condition was detected.
<i>n SHOCKS DELIVERED.</i>	A total of <i>n</i> shocks have been delivered since the AED Plus was turned on.
<i>START CPR.</i>	Begin CPR.
<i>CONTINUE CPR.</i>	Continue providing CPR. This prompt may also be issued if Real CPR Help fails to detect chest compressions at least $\frac{3}{4}$ of an inch deep.
<i>PUSH HARDER.</i>	CPR compressions are consistently less than 2 inches deep.
<i>GOOD COMPRESSIONS.</i>	After prompting to Push Harder, rescuer has succeeded in delivering chest compressions at least 2 inches deep.
<i>STOP CPR.</i>	Stop CPR, the AED Plus is about to begin an ECG rhythm analysis.



Prompts that may be heard during non-clinical use of the AED Plus unit include:

Table 2b Non-Clinical Voice Prompts

Voice Prompt	Definition
<i>IF NEW BATTERIES, PRESS BUTTON.</i>	Press the Battery Reset Button located in the battery compartment after replacing <u>ALL</u> batteries in the device with new batteries.
<i>NON-RESCUE MODE.</i>	AED Plus device has entered the diagnostics/data communications mode.
<i>COMMUNICATIONS ESTABLISHED.</i>	IrDA Communications between the AED Plus and a personal computer or modem have been established.

Using the LCD Display

The AED Plus is equipped with a 1.3 x 2.6 inch LCD screen (see Figure 3) that displays the following information:

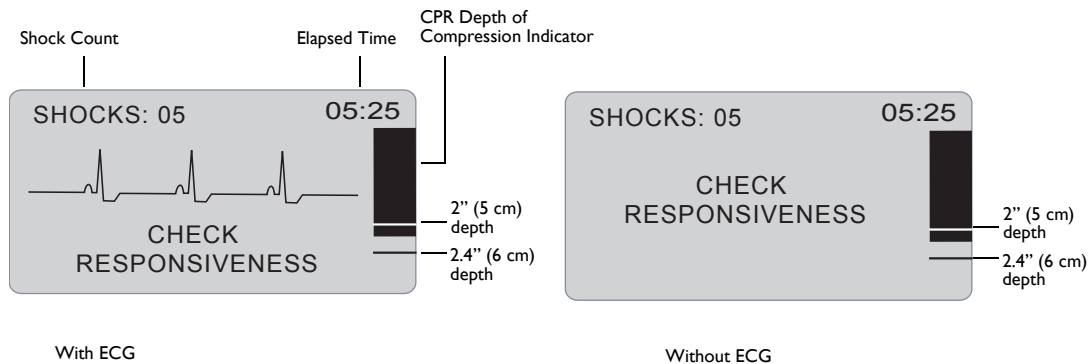


Figure 3: LCD Displays

NOTE Some special AED Plus models do not have an LCD.

Shock Count (Upper left corner of screen): Indicates the total number of defibrillation shocks delivered by the AED Plus since it was last powered on. Shock count is saved through brief power off periods (< 5 seconds). When the AED Plus is turned off for more than 5 seconds, the shock count is reset to 0.

Elapsed Time (Upper right corner of screen): Indicates the total time in minutes and seconds that has elapsed since the AED Plus was last powered on. Elapsed time continues to be counted through brief power off periods (< 5 seconds). When the AED Plus is turned off for more than 5 seconds, elapsed time is reset to 00:00. When elapsed time exceeds 99 minutes and 59 seconds, the timer wraps around to 00:00 and continues counting.

CPR Depth of Compression Indicator (Right side of screen): A bar graph is displayed that shows the depth of chest compressions measured during the delivery of CPR. Indicator lines are displayed in the bar graph area at 2 and 2.4 inches of compression depth to provide reference points for rescuers performing CPR.

Visual User Prompts (Lower 1/3 of screen): Whenever the AED Plus issues a voice prompt, the text of the voice prompt is simultaneously displayed on the LCD display.

ECG Waveform (Center portion of screen): Although AED Plus units do not display ECG waveforms in their factory default configuration, the device can be specifically set up to continuously display ECG signals as they are acquired.

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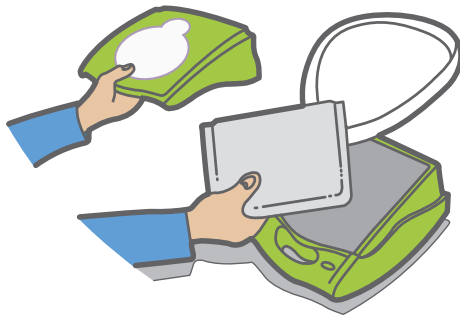
Using the Passive Airway Support System (PASS)

If there is no evidence of head or neck trauma, the head tilt chin lift method is the recommended maneuver for opening the airway. The PASS may be placed under the victim's shoulders to help maintain head tilt.

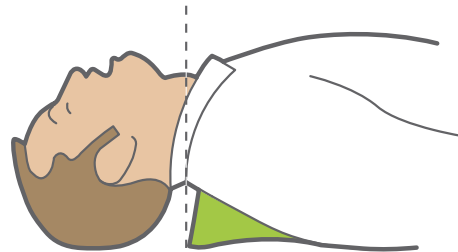
WARNING! DO NOT use PASS if suspected head or neck injury. Place victim on a firm surface before performing CPR.

If the victim requires airway support and there is no evidence of head or neck trauma, roll the victim on his/her side and then roll him/her back over so that the PASS is under the victim's shoulders causing the head to tilt backwards.

For PASS COVERS only: The shape of the PASS, when placed under the shoulders of the victim, can be used to help maintain an open airway (see Figure 4).



The unit cover also functions as the Passive Airway Support System (PASS).



Place the PASS under the victim to lift his/her shoulders. Do not use the PASS if there is a suspected head or neck injury.

Figure 4: Using the PASS Cover

WARNING! DO NOT reuse electrodes.

The AED Plus supports both adult and pediatric electrode pads. The device automatically adjusts defibrillation energy to adult or pediatric levels depending on the type of electrodes connected to it. Make sure that the electrode pads used are appropriate for the victim.

WARNING! DO NOT use adult electrode pads or CPR-D•pads on victims under 8 years of age.

The AED Plus uses electrode packs that are connected to the unit by a cable. The package contains electrodes that you attach to the victim.

- Make sure to install a new package of electrodes and connect the electrode cable to the unit after each use, to prepare for future emergencies.
- Check the electrode expiration date regularly to ensure that electrodes are fresh and ready to use in an emergency situation.
- Replace electrodes, if expired
- After the AED Plus is powered on and completes its self-test, the unit will issue an “Adult Pads” voice prompt or a “Pediatric Pads” voice prompt to indicate the type of electrodes connected to the unit. Verify that the connected electrode pads are appropriate for the victim being treated. Connect alternate electrode pads if necessary.

If the electrodes are not attached properly, the unit issues the *CHECK ELECTRODE PADS* or the *ATTACH ELECTRODE PADS* voice prompt during operation. If the electrode cable is not properly attached to the unit, the unit issues the *PLUG IN CABLE* prompt. Make certain to connect the electrode cable to the AED Plus unit and attach the electrodes to the victim properly.

WARNING! Electrodes must be pre-attached to the device. Keep the electrode cable connected to the AED Plus unit at all times.

The electrode package may include:

- Scissors to cut clothing or chest hair.
- Razor to remove excessive hair at the electrode application site, if necessary.
- Small towel to make sure that the victim’s skin is dry.
- Gloves.
- Barrier Mask.

NOTE Electrodes contain no hazardous materials and may be disposed of in general trash unless contaminated with pathogens. If contaminated, appropriate precautions should be used in their disposal.

Applying **CPR-D-padz** | A E D brands®

Prepare the victim before attaching the electrodes.

WARNING! CPR-D-padz are intended for use on adult victims only; do not use on victims under 8 years of age.

To prepare the victim:

1. Remove all clothing covering the victim's chest.
2. Ensure the victim's chest is dry.
3. If the victim has excessive chest hair, clip or shave the hair to help ensure proper adhesion of the electrodes.

To apply the electrodes:

1. Tear open the electrode package and unfold the electrodes. Place the electrodes on the victim according to the graphics on the package (see Figure 5).
2. Hold the CPR sensor and place the sensor between the nipples and on the middle of the victim's breastbone, using the sensor's cross hairs to guide you.
3. Press the CPR sensor with your right hand and pull the number 2 tab to peel the protective backing from the electrode. Press the electrode from the center out to make sure it adheres properly to the victim's skin.
4. Press the CPR sensor with your left hand and pull the number 3 tab to peel the protective backing from the electrode. Press the electrode from the center out to make sure it adheres properly to the victim's skin.

NOTE If the victim is large or there is a need to place the electrode under a breast, you may need to tear away the lower pad at the perforated line (see Figure 5) and extend the pad. Place the pad slightly to the victim's left and below the victim's left breast.

NOTE If the victim has an implanted pacemaker or defibrillator in the upper right chest, angle the electrodes slightly to avoid placing the electrodes over either device. Make certain that the CPR sensor maintains a position over the lower half of the breastbone.

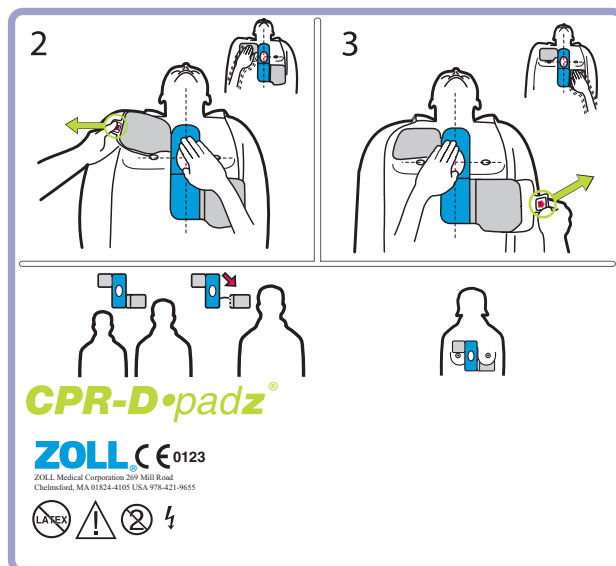


Figure 5: Placement of CPR-D-padz

Applying *pedi-padz II* (Infant/Child Electrodes)

Prepare the victim before attaching the electrodes.

Important! This symbol indicates that an AED Plus unit is equipped for treating adult and pediatric victims. An AED Plus unit without this symbol is not equipped to treat pediatric victims and will NOT work with the *pedi-padz II* pediatric electrodes. To upgrade an AED Plus unit for use with ZOLL *pedi-padz II* pediatric electrodes, contact ZOLL Medical Corporation or an authorized ZOLL distributor for information on the ZOLL AED Plus Pediatric Upgrade Kit.



To prepare the victim:

1. Remove all clothing covering the victim's chest.
2. Ensure the victim's chest is dry.

To apply the electrodes:

1. Tear open the electrode package and unfold the inner package to expose the electrodes. Place the electrodes on the victim according to the graphics on the package (see Figure 6).
2. Remove the round electrode from its backing material and place it on the victim's chest (as shown in Figure 6).
3. Place your hand on the electrode edge and, using the other hand, gently roll the electrode onto the victim's chest, pushing any air out from beneath the electrode as you go.
4. Roll the victim onto his/her chest, remove the square electrode from its backing and place it on the victim's back (as shown in Figure 6).
5. Place your hand on the electrode's edge and, using your other hand, roll the electrode onto the victim's skin, pushing any air out from beneath the electrode as you go.
6. Roll the victim onto his/her back and follow the AED Plus prompts.

NOTE The *pedi-padz II* (infant/child electrodes) can also be used with ZOLL pacemaker products for up to one hour of pacing (see the *M Series Operator's Guide* for information about pacing).

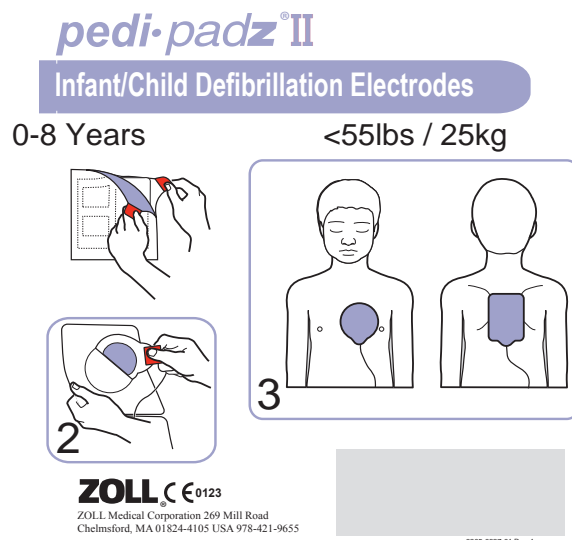


Figure 6: Placement of *pedi-padz II*



Using the CPR Monitoring Function — Real CPR Help

When used with ZOLL CPR-D-padz, the AED Plus monitors the rate and depth of CPR chest compressions. The AED Plus provides a CPR adaptive metronome function designed to encourage rescuers to perform chest compressions at the AHA/ERC recommended rate of 100 compressions per minute. Voice and visual prompts encourage a minimum compression depth of 2 inches for adult victims. Real CPR Help operates only when CPR-D-padz are used, and is intended for use on adult victims only.

To use Real CPR Help you must do the following:

1. Connect CPR-D-padz to the AED Plus unit.
2. Apply the CPR-D-padz to the victim as described in the previous section
Ensure that the CPR sensor is centered on the lower half of the victim's sternum.
3. If no signs of circulation are present when the AED Plus issues the *START CPR* prompt, place your hands on top of the CPR sensor and push on the sensor to deliver chest compressions to the victim. After your first few compressions, the AED Plus adaptive metronome will begin issuing timing beeps. Try to maintain synchronization between these beeps and your chest compressions. Shortly after you stop chest compressions to deliver rescue breaths the metronome will stop beeping.

NOTE If the AED Plus prompts you to *PUSH HARDER*, your compressions are less than 2 inches deep. Increase your compression depth to improve CPR performance.

4. Deliver the appropriate number of rescue breaths then resume chest compressions. The metronome will begin to beep again after your first few compressions have been delivered.

Using the Audio Recording Option

If installed and configured, the AED Plus contains an audio recording option that records and stores 20 minutes of continuous audio and clinical event data during a rescue. (The unit records and stores at least 7 hours of clinical event data if the audio recording option is disabled.) The recorded audio data is synchronized to the clinical event data. The audio recording starts when the AED Plus issues the *STAY CALM* prompt.

NOTE The AED Plus allows for up to 3 minutes of audio recording prior to electrode attachment. When you turn the unit off, the first indicator light (LED) on the graphical user interface illuminates and the second indicator light (LED) flashes intermittently while the unit stores the data in memory.

Whenever the device detects a clinical event in rescue mode, the AED Plus deletes previously stored data (ECG, Audio and Event) from memory before data for the current rescue is recorded. Overwriting of old ECG, audio and event data begins 10 seconds after the electrodes are properly connected to the victim. However, if the AED Plus is started in Non-rescue Mode, the recorded data of the last rescue is retained and may be uploaded to a data storage or archiving system.

Installation and Self Test



This section describes the following functions to prepare the AED Plus for use:

- Inspecting the Unit
- Preparing the AED Plus for Use
- Using the Self Test Feature
- Installing or Replacing Batteries
- Identifying Battery Condition

Inspecting the Unit

Once unpacked, inspect the device for any signs of damage due to shipping. Check for accessories and any other parts ordered.

Preparing the AED Plus for Use

To ensure that the AED Plus is functioning properly and is ready for use in an emergency situation, the following set-up and checkout procedures should be performed before placing the device into service and after each clinical use.

1. Inspect all external surfaces of the unit to ensure that they are clean and free of structural damage such as cracks, broken or missing parts.
2. Inspect the electrode connector to ensure that there are no broken or missing connector pins.
3. Verify that new CPR-D-padz, stat-padz® II or pedi-padz II to be used with the AED Plus are well within their expiration date.
4. Follow instructions provided with the new electrodes to pre-connect them to the electrode connector on the device and pack them within the AED Plus cover.

NOTE If the electrodes are not connected to the AED Plus unit, the device will fail the self test and display a red “X” in the status indicator window.

5. If the status indicator displays a red X, install new batteries. (See “Installing or Replacing Batteries” on page 18.)
6. Close the top cover of the AED Plus unit and initiate a self test by pressing the Power Button. Verify that the unit issues the *UNIT OK* voice prompt. This prompt indicates that the new batteries and electrodes are properly installed and that the unit is ready for service.
7. Verify that the AED Plus unit issues the appropriate “Adult Pads” or “Pediatric Pads” voice prompt.
8. Turn the AED Plus unit off.
9. Wait 2 minutes. Verify that the green check symbol (✓) appears in the status indicator window and that the unit does not emit a beeping tone.
10. Place the AED Plus unit in service.
11. Check the AED Plus unit periodically to ensure that the green check symbol (✓) appears in the status indicator window.

NOTE If the status indicator displays a red X following completion of the above test, the AED Plus is not ready for use and may be defective. Remove the AED Plus from service and consult the Troubleshooting section on page 23 of this guide to help determine the problem.

Using the Self Test Feature

The AED Plus performs the following self tests to verify unit integrity and its readiness for emergency use:

- Battery Installation Self Test
- Power On Self Test
- Manual Self Test
- Automatic Self Test
- Automatic Monthly Test (software version 5.32 or higher only)

Following successful completion of all self tests, the AED Plus's status indicator displays a green check (✓) to show that all tests passed and that the unit is ready to use.

If the status indicator displays a red X following completion of any self test, the AED Plus is not ready for use and may be defective. Remove the AED Plus from service and consult the Troubleshooting section of this guide to help determine the problem.

Battery Installation Self Test

The AED Plus performs a self test whenever batteries are installed and verifies the following functions:

1. Defibrillation Electrodes Connection: Verifies that the defibrillation electrodes are properly pre-connected to the device.
2. ECG Circuitry: Verifies that the ECG signal acquisition and processing electronics are functional.
3. Defibrillator Charge and Discharge Circuitry: Verifies that the device's defibrillator electronics are functional and can charge and discharge at 200 joules.
4. Microprocessor Hardware/Software: Verifies proper function of the AED Plus microprocessor electronics and the integrity of its software.
5. CPR Circuitry and Sensor: Verifies that CPR monitoring and compression depth detection are functional.
6. Audio Circuitry: Verifies that voice prompts are functional.

At the end of this self test, the AED Plus prompts the user to press the Battery Reset Button, located inside the battery compartment. Pressing this button resets the unit's battery usage indicator to full charge.

CAUTION! DO NOT press the Battery Reset Button unless all batteries are new. Pressing the Battery Reset Button when used batteries are installed may result in a false high reading of battery capacity. See the "Installing or Replacing Batteries" on page 18 for more information.
