ZOLL®

X Series® In-service Script

Introductions and Expectations

At less than ½ the size and weight of typical defibrillators, the X Series® is the most advanced defibrillator on the market today!

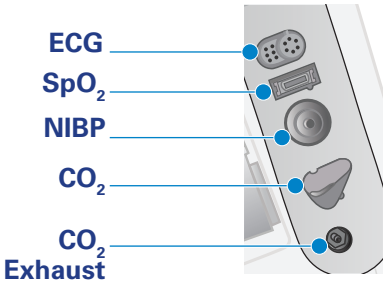
Key points to note:

- All-in-one critical care monitor and defibrillator, including pacing, cardioversion, and CPR feedback capabilities
- It is the lightest and most durable defibrillator on the market
- For the most efficient in-service, and so no one gets ahead or lost, please follow along and please don't push any buttons unless instructed
- Please remove battery now

Landscape of Device: Left and Right

Left Side Saddle Bag (Monitoring Bag)

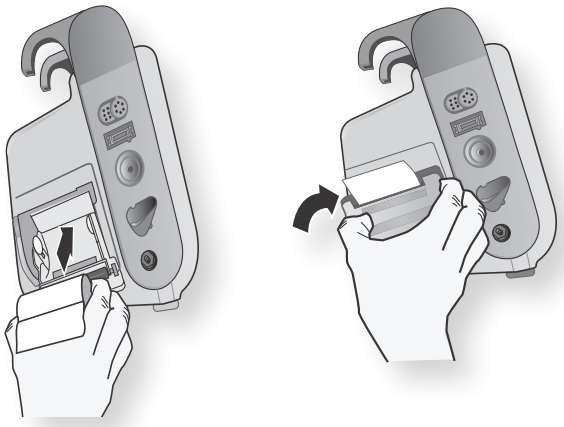
- ECG Leads
- SPO_2
- NIBP
- $ETCO_2$ Connection
- CO_2 Exhaust Port
- Paper Roll/Compartment



Changing Printer Paper

- Open paper door on left side of device
- Prepare roll, end of strip facing up and away from device
- Carefully push the roll in evenly so roll is flush with "prongs"
- Close door firmly and ensure it is fully closed
- Tear excess paper away

If changing paper with X Series Carry Case, follow above mentioned process. **To access paper door, lift "black hinge", continue to hold** while changing paper, and release hinge when finished. Tear or feed paper up behind black hinge and out of X Series carry case.



Landscape of Device: Left and Right (cont.)

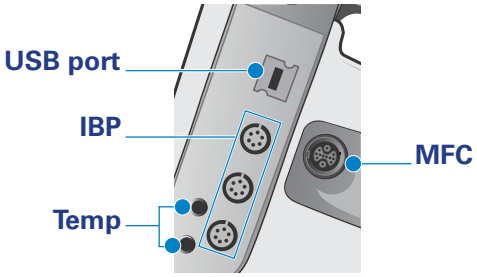
Battery

On top/back of the defib. - Lift up latch and pull out.

- **Indicator lights** shows 30 min. incriminates of time for total of **6 hours of runtime**
- If **AMBER** light appears on "?" section of battery for > 5 seconds or a **RED** light appears on the "X" section of the battery for > 5 seconds = CALL Biomed

Right Side Saddle Bag
("Invasive Bag")

- Contains multi-function electrotherapy cable
- USB port for transferring data
- 3 invasive pressure line connections (if applicable)
- 2 temperature probe connections (if applicable)



Overview of Front of the X-Series:

Hard keys/fixed function buttons "FLIP Phone" Right side (arrows)

- On-screen navigation
- Pt modes
- Screen views
- Snapshot
- NIBP

Electrical Therapy Keys (Bottom)
Quick Access Buttons "**Smartphone**" (Left side)

- General Monitoring
- 12-lead ECG
- $EtCO_2$
- Treat Markers
- SYNC
- Printer Features
- IBP
- Alarms/Case Push/Set-up Menu

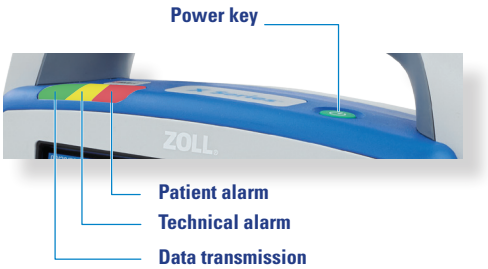
Landscape of Device: Left and Right (cont.)

Power Lights
located bottom left on the device

- Illuminated power lights= device is plugged in;
  NO LIGHTS = device NOT plugged in
  - Plugging in your device will operate it and simultaneously charge its battery
  - Steady **Green** battery light = battery is charged
  - Steady **Amber** battery light = battery is charging
  - NO BATTERY light = check battery (battery may not be inserted

Power Button
(Have class hold off turning on their defibs)

- **Green Power key located on top**. Press, and the device will power on
- While the device is powering up, it will do a "system check" to verify the device is in working condition, and all 3 Alarm Indicators will flash **Green**, **Yellow** and **Red**
- Will display "**Test Passed** or "**Test Failed**" in the middle of the screen



First demo only instructor defib by turning it ON
Note: Self-Test Passed and then discuss below

- Verify Ready for Use (RFU) indicator (Top right corner of device) before use
  - "**Black Octagon**" means device passed self-test and is RFU
  - If device fails test, it will display the following **DO NOT USE symbol** ⃠
    - Call Biomed to troubleshoot device and DO NOT USE
- Press and HOLD the power button to turn the device off

NOW have class turn defibs on and look for Self-Test results and RFU indicator (but remind them not to touch any other buttons until instructed to do so)

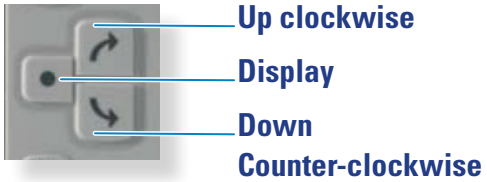
- Discuss the 3 Alarm Indicator lights on top left of defib:
  - **Yellow** Indicator light = technical alarm (e.g. check recorder paper)
  - **Red** Indicator light = patient alarm (check patient)
  - **Green** Indicator light = lights up when transmitting data via Wi-Fi or to USB

Main Navigation Buttons

Basic Navigation

Hard Keys

- Audio Off/Reset
  - Used to acknowledge current alarm
  - Pauses current **patient** alarm audio for 90 sec's
  - Pauses current **technical** alarm permanently
- Home/Trend Display Button
  - Cycles through 3 display modes
    - Home Screen display (default screen)
    - Trends Screen display
    - Large numerical display (no ECG trace)
      - Press Home key to bring you back to the Home Screen no matter what sub-menu you are in
- Navigation Keys
  - Up and Down arrows navigate you around the display (blue indicator)
    - Up (clockwise) arrow, Down (counter-clockwise) arrow
  - "Select Key" is the "Black Dot. Press to enter desired function
    - "If it's Blue, there's something you can do
  - Use Nav keys to highlight NIBP; push black dot to select and open menu
    - Navigate as necessary, explain manual vs auto; explain Turbo Cuff (which "repeatedly takes as many BP's as it can in 5 minutes)



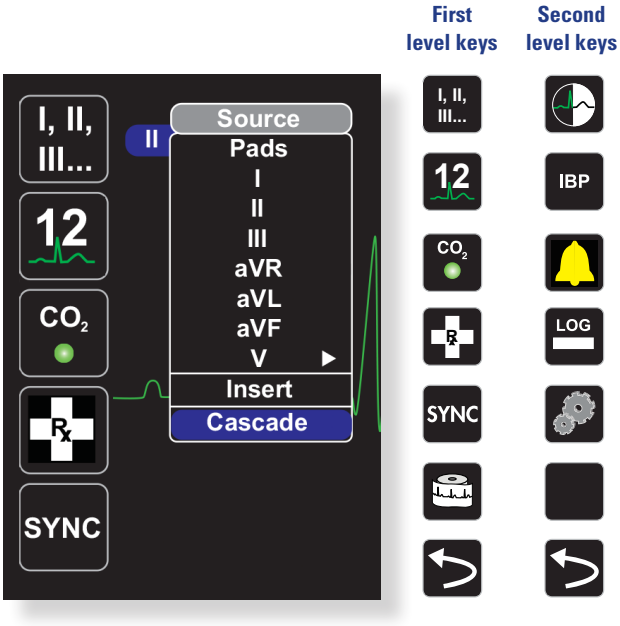
- Snapshot Key – this is 1 of 2 ways to print a strip
  - Prints a 24 second strip
    - 12 seconds before you pushed it, and 12 seconds after you pushed it
- NIBP Key
  - Push to start and stop a NIBP cycle
  - Talk about Welch Allyn dual lumen hose
    - Sure BP Technology, listens to systolic pulse while going up, but if it misses it going up, it will take it while it's going
    - Smartcuff Technology, adapts to motion artifact of the patient and coincides with the QRS to give a more accurate BP
    - Make sure proper size cuff is selected, artery marker is lined up within range, get it as close to the skin as possible

Quick Access Menu / Soft Keys

SOFT KEYS
(Think of these like apps on a smartphone; most keys have sub-menuss)

First Level Soft Keys: (explained as above…)

- I, II, III… Lead Select:
  - Able to select Pads, I, II, III, aVR, aVL, aVF, V, more…
- 12-LEAD ECG: (if applicable)
  You need a 12-Lead X Series simulator box and the 12 lead adaptor connection
  - Camera 12-lead = will acquire and print 12 lead
    - Stop Acquisition
  - Patient Information must be entered:
    - Male or Female, & age minimum
    - Use Navigation keys to enter
    - Can also use Up/Down Row Keys
  - Menu options for 12-lead:
    - 12-Lead Review
      - 12-Lead Review Next
    - Transmit (via WiFi if enabled)
    - Exit 12-lead sub-menu



	AcquireCollects 10 seconds of 12-lead data for print.
STOP	**Stop Acquisition** Stops acquisition of 12-lead data.
	Patient Information Allows you to enter information to accompany 12-lead data: patient name, age, gender, and ID
Row ↑	**Row Up** Allows you to move to the previous row when entering patient information
Row ↓	**Row Down** Allows you to move to the next row when entering patient information.
	12-Lead Review Reviews all your 12-lead captured data.
	12-Lead Review Next Goes to the next page
	Transmit Transmits 12-lead data.
Exit 12	**Exit 12-Lead** Exits the 12-lead monitoring screen.

Quick Access Menu / Soft Keys (cont.)

First Level Soft Keys (cont.)

- Capnography
  - Connect ETCO2 (do not overtighten when connecting) **Fig. 1**
  - Push CO2 button, initializes and zeros itself in under 15 seconds **Fig. 2**
  - Capnograph tracing self-populates on the display
    - You can highlight the CO2 scale to reduce or enlarge the capnography trace
    - AUTO-PURGE feature – allows for auto-purging of a clogged line
      - If applicable: There is an optional high humidity sidestream line (has a yellow connector, used on patients that may have high humidity, like pneumonia)
- Treatment Key (Code Markers) **Fig. 3**
  - time stamp clinical actions and retrieve them later on
- SYNC button (talk about later during therapies) **Fig. 4**
- Paper Print button - starts and stops continuous chart print **Fig. 5**
- More Arrow - brings up Secondary Menu of soft keys **Fig .6**


Fig 1

Fig 2

Fig 3

Fig 4


Fig 5


Fig 6

Second Level Soft Keys Menu

- Contrast Button **Fig. 7**
  - Alternates between Normal Color Display **Fig. 8**
  - And High Contrast Display – good in direct sunlight **Fig. 9**
- IBP – hospital to prep and zero their own line per their own protocol **Fig. 10**
  - (e.g. Closed to pt, Open to air, Press ZERO, Closed to air, Open to pt)
  - Must use X Series Sim Box with IBP probe to Demo:
    - Put Sim Box into Asystole to ZERO probe
    - bring up P1 menu, push ZERO, **Fig. 11**
    - then put simulator into NSR after it is done zeroing.
    - Demo how to use Navigation Keys to select P1, re-label P1 as either "ART or "CVP
- Alarms Button - brings up Alarm options **Fig. 12**
  - Stat Set – if alarms are on… **Fig. 13**
  - it will set Alarm Limits +/- 20% of whatever vitals have ever been taken on the screen
    - Limits – manually set alarm limits **Fig. 14**
    - Bell with X – temp suspend alarms for 4 minutes **Fig. 15**,
      - Can also turn them off, or turn them back on
- Log Button (records cases, and overwrites oldest case when full) **Fig. 16**
  - Treatment Summary Button – all the Code Summary cases That have ever been recorded (can be up to 150 cases) **Fig. 17**
    - Select Case you want to print, highlight
    - and navigate to Print Treatment Summary to print
  - Trends - Patient Trends Summary **Fig. 18**
    - Used to print the current case trends
  - Trends Settings **Fig. 19**
    - display settings for trend format, interval, and alarms
  - USB Button – transfer data via USB **Fig. 20**
    - device can store and transfer 10 gigs of data


Fig 7


Fig 8

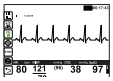


Fig 9

IBP Setup

IBP Zero

Fig 10

Fig 11

Fig 12


Fig 13

Fig 14

Fig 15


Fig 16

Fig 17

Fig 18

Fig 91


Fig 20

Quick Access Menu / Soft Keys (cont.)

Second Level Soft Keys menu (cont.)

- Envelope Button – transfer data via WiFi **Fig. 1**
  - Sub Menu (blue highlights are STRONG SUGGESTIONS; e.g. Close Case)
    - Navigate and select Case Menu
      - Highlight the case
      - PUSH THE HOME KEY (**Fig. 2**)TO SAVE and
      - it will highlight the Transfer Button
      - push Transfer Button
      - and it will send WiFi to the Hospital's CASE REVIEW server
        - (that's if WiFi and Case Review has been set up)
  - Clear the Log button (Trash Can) – to delete cases **Fig. 3**
- Gears Button - Configuration Menu – whatever is changed here will stay changed! **Fig. 4**
  - Configurations should only be changed by unit directors or Biomed

Fig 1


Fig 2


Fig 3


Fig 4

Connecting and Disconnecting Pads (Latch to lighting)

- The LATCH locking lever holds pads and cable into place
- Press on the far ridged end of the latch, pull apart to release

Have class connect therapy cable to the maniken training connector

Pads

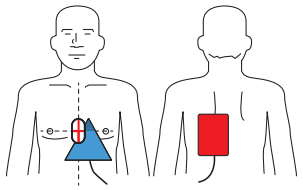
Using the Onestep CPR Pads

- It is important to prep the skin as best as you possibly can
- Wipe the patient down, remove as much hair as possible
  - Always PRESS AND ROLL each pad firmly into place

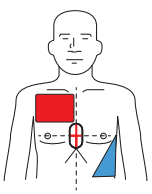
Recommended Placement

- **Posterior** Pad **RED** Place 1st
- **Anterior** Pad **BLUE** Place 2nd
  - Posterior Pad is placed posterior sub-scapular, to the left of the spine
  - Anterior Pad is placed anterior with the CPR sensor Mid Sternum
    - Mid-sternum where you will perform chest compressions
- Placing- Take the pad from packaging, lift up on red tab to peel the pad off of the plastic backing
  - Press and Roll the pad firmly in to place

Recommended Placement



Alternate Placement



Alternate Placement: A/A Positioning (If A/P is not applicable)

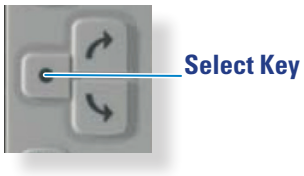
- Posterior Pad- Put Posterior Pad in the Anterior/Sternal positon
- Anterior Pad- Position in the Lateral/Apex position
  - Tear the CPR sensor from pad and place in center of chest

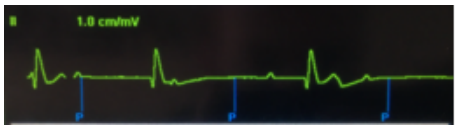
Therapies

Pacing

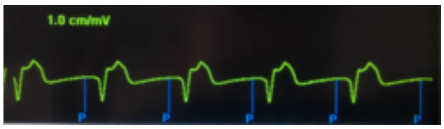
Pacing Simulator box set to 3rd and connect ECG Leads to sim box. To ensure best pacing results, follow the steps below: (MUST have pads & ECG Leads on pt)

1. Press Green Pacer Key
2. Use the navigation keys, to select Rate, nav and select desired rate
3. Navigate to Start Pacer and press the SELECT Key
   - Verify blue pacer spikes marked **P** You can then arrow UP or DOWN to select Output
4. Use the UP arrow navigation key to increase mA Output to Electrical Capture
5. Not Captured vs. Electrical Capture (see pictures below)
   - Once Electrical Capture is achieved, increase output 10%



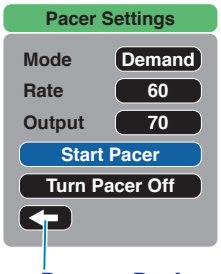


Not Captured



Electrical Capture

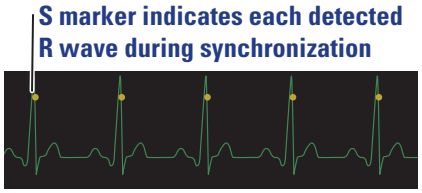
6. Confirm Mechanical Capture by feeling femoral or brachial pulse
   - Should feel pulse every time you see a QRS
   - If no pulse, check BP; if BP low, increase Rate which may give better BP=better central pulses
7. Checking the Underlying Rhythm
   - Press the Green Pacer Key
   - Navigate to Pause Pacer and select
   - Check underlying rhythm
   - To continue pacing, select and press Resume Pacing
8. Turn Pacer Off
   - When finished pacing patient, select Turn Pacer Off



Resume Pacing

Synchronized Cardioversion Simulator box set to AFIB

- To synchronize, press the SYNC Soft Key on the left side soft key area
- Observe sync indicators (Yellow S on top of R Wave)
- Energy Select, Charge, press and hold Shock Key until therapy is delivered
- To perform a second shock, re-sync, and repeat process (depending on configuration)



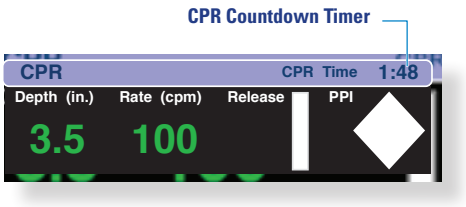
Defibrillation Simulator box set to VT-HI

- **ANALYZE** can be pressed to run unit as an AED
- To **manually defibrillate**, follow the **1-2-3** sequence
- Energy Select, Charge, Shock
- Energy levels 120J, 150J, 200J (1J-200J range)
   - Peds energy levels 50J, 70J, 85J (1J-200J range)

CPR Technology

CPR DASHBOARD/CPR FEEDBACK
Sim Box should be set to VT HI

- Begin by pressing on the CPR Sensor
- Dashboard will populate automatically
- Ensure proper Depth (2.0-2.4), Rate (100-120 cpm), and Full Release (you want to see a Full Release/recoil bar)



Corrective Prompts

- Insufficient Depth: <2 will prompt Push Harder and Yellow numerical color change
- Insufficient Rate: <100 cpm or >120 cpm will prompt metronome and Yellow numerical color change; follow metronome to get back within proper range
- Insufficient Release: Release Bar will not reach top of indicator graph
- Insufficient PPI (Perfusion Performance Indicator): If one or more of metrics is out of range, the Perfusion Diamond will not completely fill

Pediatric Pads:
0-8 Years of Age, and up to 25kg (< 55lbs)

- ONLY A/P positioning recommended
- Defib recognizes Pediatric Pads and uses a Pediatric Algorithm
- CPR Sensor placed mid-sternum
- **Pediatric CPR Dashboard will only show Depth and Rate**
  - Pediatric pads are recommended for Ages 0-8; Rate=100-120 CPM
    - Metronome activates if too slow or too fast to get you back to proper CPM
  - An Infant's Depth should be 1.5 or 1/3 their AP diameter of their chest
  - A Pediatric Depth should be about 2 or 1/3 their AP diameter of their chest
  - Rational: A 6 month's old 1/3 AP depth is completely different than a 7 year old's 1/3 AP depth
    - You will have to use your clinical judgement on your patient's 1/3 AP diameter;
    - **Defib will NOT correct you for depth ranges**

Filtered ECG:
SIM BOX changed 3 times during this demonstration:

1. Set sim box to VF CPR Filtered to start,
2. Then VF CPR Artifact when performing chest compressions,
   - Must compress at approx. 130 cpm to demonstrate properly. Explain that CPR has to be faster ONLY to demo See-Thru CPR on the X Series sim box
   - Will function normally with a real patient
   - Can charge defib while still on the chest (defib will hold charge for 60 seconds)
3. And then change sim box to VF CPR Filtered when coming off the chest to analyze rhythm.
   - Press SHOCK if a shockable rhythm is noted, or DISARM if rhythm is non-shockable

CPR Technology (cont.)

Filtered ECG (cont.)**:**
SIM BOX changed 3 times during this demonstration:

- **If using OneStep Electrodes, FILTERED ECG will display See-Thru CPR technology when performing manual compressions on the CPR Sensor**

Testing

DAILY TEST

To ensure X Series is in operational condition, perform the following daily test:

1. Ensure therapy cable is connected to OneStep Electrodes or Black Testing Block
2. Insert newly charged battery (if applicable)
3. Unplug unit from A/C Power
4. Turn unit on and ensure Test Passed on display
5. Ensure Short Detected in center of display
6. Press ENERGY SELECT key down to 30J
7. Press the CHARGE Key
8. Once fully charged, press the SHOCK Key
9. Ensure Defib Short Test Passed in bottom left of display
10. Turn device Off
11. Re-connect to A/C Power
12. IF TEST FAILS – CALL BIOMED

***PUSH AND HOLD the power button to turn X Series defibrillator off.**

***Clean per hospital approved protocols/clean to wipes.**

Testing (cont.)

X Series Daily Manual Testing Procedure
09.2019 (pg. 24-4)

To ensure the readiness and optimum working condition of the X Series unit, perform the following inspections and tests once every 24 hours. or per policy.

1. Ensure the X Series is plugged into A/C Power and connected to black test block on the Therapy Cable.
2. Insert newly charged Battery into the X Series (if applicable).
3. Press the green Power button on top of the unit; verify the green SELF TEST PASSED icon on the screen.
   - If the unit displays SELF TEST FAILED, do not use the device. Check your battery and cable connections, and retest. If the issue is not resolved, call BioMed.
   - You will also see a Red Slashed Circle in the Ready For Use indicator in the top right corner of the device if it has failed
4. Disconnect the X Series from A/C power.
5. Press the Lead Key in the top left corner and verify LEAD FAULT is displayed when Lead I, II, or III are selected.
6. Press the Lead Key again until Pads is selected. Verify SHORT DETECTED is displayed on the monitor.

Defibrillator Check

7. Press the Energy Select down until 30J is displayed.
8. Press the Charge key > then press the Shock key when ready.
9. Verify DEFIB SHORT TEST PASSED in the bottom left corner. If it reads FAILED, call BioMed.

Pacer Check

10. Press the green Pacer key. Set the values to the following: Mode- Fixed, Rate- 60ppm, Output 100 mA.
11. Press the Start Pacer then press the green Pacer key again. A strip will begin to print. Verify the following on the screen: Green indicator blinks each second, PACING: SHORT DETECTED displays on monitor. Refer to printed strip and verify pacer markers are 25mm apart on strip (5 Boxes).
12. Disconnect therapy cable from the Black Testing Block.
13. Verify PACING: CHECK PADS on the screen and the audible alarm is active.
14. Reconnect the therapy cable to the Black Testing Block.
15. Press the green Pacer Button and select Turn Pacer Off.
16. Turn the X Series Off. Reconnect the X Series to A/C Power. Disconnect the Black Testing Block and connect to a closed set of patients pads for code readiness (if consistent with hospital policy)

For BLS Users Only, Demo The Following:

- Quick Overview of Defib.
  - Left Side Bag parameters and paper change
  - Battery – 6-hour battery life
  - Right Side Bag Therapy Cable
- Front face buttons
  - Hard Keys on the Right side
  - Quick overview of Soft Keys – only use if applicable to BLS users at the facility
  - Therapy Keys – focus on ANALYZE button
  - Lights - if plugged in
  - Power Button on Top

Testing (cont.)

- Pads and Pad Placement
- ANALYZE Button - to determine if rhythm is shockable or not (sim box set to VT HI)
- CPR Feedback/CPR Dashboard if using OneStep Complete Electrodes esting Block and connect to a closed set of patients pads for code readiness (if consistent with hospital policy)

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NOTES