

# Time Synchronization Of All Code Events

For hospital resuscitation events, recording accurate event times is difficult because multiple time sources are used<sup>1</sup>. Consider the following: What is the master clock? Is it the clock on the wall? The recorder's watch? Or maybe the time printed on the ECG strip? And how do these times reconcile with the paging system clock that marks the time the code was called?

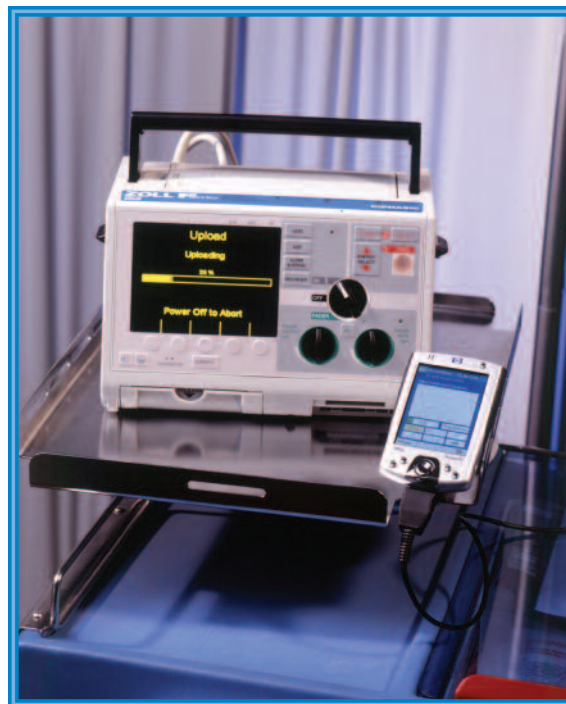
Accurate intervention times and intervals (i.e. Time to First Shock, Time to First Intubation, etc.) are key measurements of a code team's performance. The ZOLL CodeNet<sup>®</sup> system is designed to bring all interventions on to a single timeline. It synchronizes defibrillator recorded events with those charted by the caregiver and ultimately the hospital's master clock, providing hospital management with a unique ability to measure code response performance.

## How does the CodeNet system get everything on a single timeline?

During a code, two separate time-keeping activities occur in parallel: ZOLL defibrillators log defibrillator-related events with a time-stamp based upon the time that has elapsed from the time the defibrillator is turned on. All other interventions are documented with CodeNet Writer and are time-stamped based on the PDA clock.

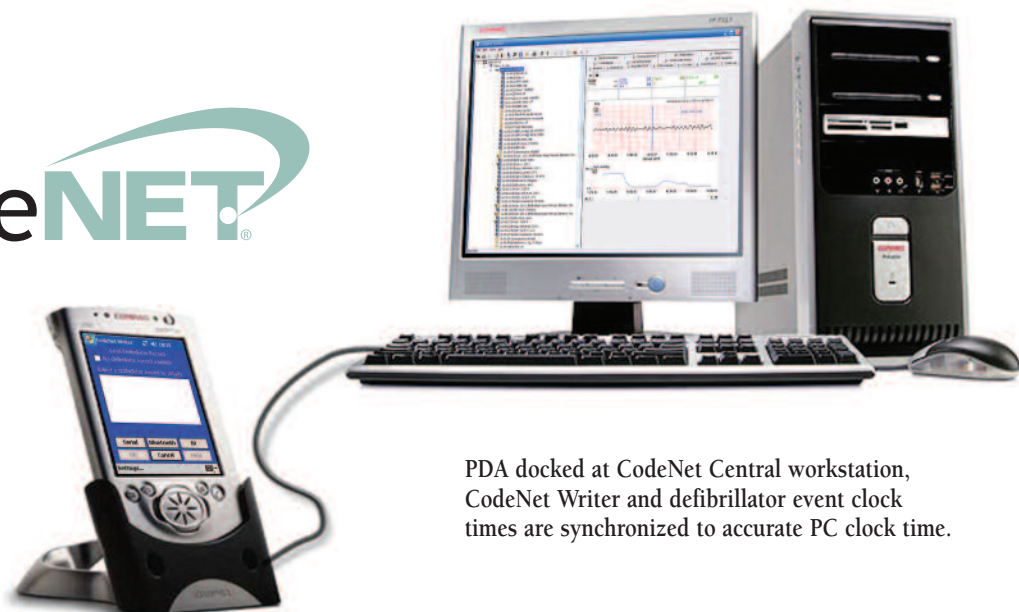
At the end of the code, time synchronization occurs in two steps:

- 1 When the defibrillator log is downloaded to CodeNet Writer, the PDA clock serves as the reference to which the elapsed defibrillator time values are synchronized. Then,
- 2 When the PDA clock is docked to a PC running CodeNet Central software, a second time adjustment takes place. During this download the CodeNet Writer and defibrillator times are synchronized to the PC clock. If the PC clock is driven from the same network as the hospital's paging system, the single timeline can extend back to the time the code was called, resulting in true time synchronization of code events.



M Series<sup>®</sup> data is downloaded to CodeNet Writer post code. M Series clock times are synchronized to CodeNet Writer clock times.

CodeNET<sup>®</sup>



PDA docked at CodeNet Central workstation, CodeNet Writer and defibrillator event clock times are synchronized to accurate PC clock time.

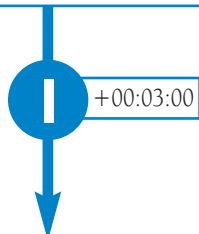
<sup>1</sup> Kaye W, Mancini ME and Truitt TL. When minutes count – the fallacy of accurate time documentation during in-hospital resuscitation. *Resuscitation* 2005; 65: 285-290

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# APPLICATION NOTE

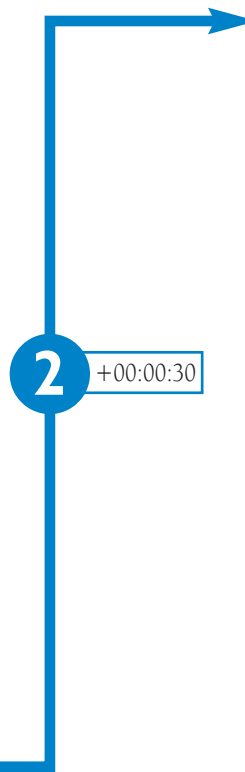
## Defibrillator Time Stamped Events

- 16:50:52 Power On
- 16:51:37 NIBP (mmHg) 69/40/50(M)
- 16:52:05 NIBP (mmHg) 69/41/50(M)
- 16:52:16 Defib state: charging
- 16:52:24 Shock: 1 120 J
- 16:52:24 Energy delivered 121 J
- 16:52:24 Patient current: 15 A
- 16:52:24 Patient impedance: 55 ohms
- 16:52:33 Defib state: charging
- 16:52:40 Shock: 2 150 J
- 16:52:40 Energy delivered 149 J
- 16:52:40 Patient current 17 A
- 16:52:40 Patient impedance: 55 ohms
- 16:52:46 Defib state: charging
- 16:52:53 Shock: 3 200 J
- 16:52:53 Energy delivered 214 J
- 16:52:53 Patient current 22 A
- 16:52:53 Patient impedance: 55 ohms
- 16:54:09 Defib state: charging
- 16:54:17 Shock: 4 200 J
- 16:54:17 Energy delivered 216 J
- 16:54:17 Patient current 22 A
- 16:54:17 Patient impedance: 56 ohms
- 16:55:18 Defib state: off
- 16:55:20 Case end



## CodeNet Writer Time Stamped Events

- 16:54:06 Code log start
- 16:54:23 Compressions in progress
- 16:54:25 Rhythm: VF
- 16:55:17 Compressions stopped
- 16:55:58 Compressions started
- 16:56:04 Epinephrine: 1 mg, IV bolus
- 16:56:09 Rhythm: VF
- 16:56:21 Atropine: 1 mg, IV bolus
- 16:56:33 ET tube
- 16:57:08 Compressions stopped
- 16:57:34 Rhythm: Sinus (incl. sinus tach)
- 16:57:34 Pulse: Present, adequate



## Time Synchronized Events in CodeNet Central (Master Clock)

- 16:54:22 Power On
- 16:54:36 Code log start
- 16:54:53 Compressions in progress
- 16:54:55 Rhythm: VF
- 16:55:07 NIBP (mmHg) 69/40/50(M)
- 16:55:35 NIBP (mmHg) 69/41/50(M)
- 16:55:46 Defib state: charging
- 16:55:47 Compressions stopped
- 16:55:54 Shock: 1 120 J
- 16:55:54 Energy delivered 121 J
- 16:55:54 Patient current: 15 A
- 16:55:54 Patient impedance: 55 ohms
- 16:56:03 Defib state: charging
- 16:56:10 Shock: 2 150 J
- 16:56:10 Energy delivered 149 J
- 16:56:10 Patient current 17 A
- 16:56:10 Patient impedance: 55 ohms
- 16:56:16 Defib state: charging
- 16:56:23 Shock: 3 200 J
- 16:56:23 Energy delivered 214 J
- 16:56:23 Patient current 22 A
- 16:56:23 Patient impedance: 55 ohms
- 16:56:28 Compressions started
- 16:56:34 Epinephrine: 1 mg, IV bolus
- 16:56:39 Rhythm: VF
- 16:56:51 Atropine: 1 mg, IV bolus
- 16:57:03 ET tube
- 16:57:38 Compressions stopped
- 16:57:39 Defib state: charging
- 16:57:47 Shock: 4 200 J
- 16:57:47 Energy delivered 216 J
- 16:57:47 Patient current 22 A
- 16:57:47 Patient impedance: 56 ohms
- 16:58:04 Rhythm: Sinus (incl. sinus tach)
- 16:58:04 Pulse: Present, adequate
- 16:58:48 Defib state: off
- 16:58:50 Case end



ZOLL Medical Corporation  
 269 Mill Road  
 Chelmsford, MA 01824-4105 USA  
 Toll Free: 800 348-9011  
 Telephone: +1 978 421-9655  
 Fax: +1 978 421-0025  
 www.zoll.com