

Determining the Official Time with Automatic, Semi-Automatic, & Manual Timing Systems: A Guide for the Referee and Timing Judge

Virginia Swimming, Inc.
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Rule 102.16.3.E Timing Judge—Under the direction of the Referee, the Timing Judge shall determine the official time for each swimmer...

The information in this manual is meant to expand upon, but not replace, the USA Swimming Rules and Regulations. If there are any points of confusion or conflict between the two, the USA Swimming Rules and Regulations supersede this manual.

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1. Standards for Your Meet

For you to perform your Timing Judge duties fairly and consistently, you should obtain the following information from the Meet Referee before the beginning of your session:

- Method by which timing adjustments are to be made, when necessary
- Range of timing adjustments that you can make without consulting the Referee
- Number of buttons and stopwatches per lane for semi-automatic and manual times
- Any special instructions that are peculiar to the conditions of your meet

It is the **responsibility of the Referee** to provide you with this information; if you do not get it, then seek out the Referee prior to the start of your session.

2. Types of Timing Systems

There are three types of timing systems that can be used at a meet:

- **Automatic:** Begins automatically with an electronic signal from the starting unit and ends automatically with an electronic signal from the finish pad
- **Semi-Automatic:** Begins automatically with an electronic signal from the starting unit and ends manually when the timer pushes his/her button at the finish of the race
- **Manual:** Begins manually and ends manually, as with stop watches

Timing systems are also designated in the order in which their results are used as shown in the following table:

| Timing System Designation | Type of Timing Systems in Use | | |
|---------------------------|-------------------------------|-------------------------------|----------------------|
| | Pads, Buttons, Watches | Buttons, Watches | Watches |
| Primary: | Automatic = pad times | Semi-automatic = button times | Manual = watch times |
| Secondary: | Semi-automatic = button times | Manual = watch times | None |
| Tertiary: | Manual = watch times | None | None |

Although most meets sanctioned by VSI will have automatic timing as the primary timing system, this is not always the case. For example, in some meets with 10&U (or 8&U) swimmers, the Referee may decide that the failure rate of pad times is so high for events involving those swimmers, that he/she will have the pads turned off for those events and use the button times as the primary time. Another common practice is to start the 25s from the blocks which means that the finish is at the “turn” end of the pool which lacks pads. In this case, watch times are used as the primary timing system.

As detailed below, the primary timing system is always used to determine the official time for a swimmer, unless you have judged that there was a failure of the primary timing system. If you cannot use the primary system to determine the official time, then use the secondary system. Likewise, only use the tertiary system when you have judged that both the primary and secondary systems have failed.

3. Timing System Math

Timing System Resolution—All timing systems should have a resolution of one one-hundredth (0.01) of a second. If the timing system records to thousandths (0.001) seconds, the digit representing thousandths is dropped with no rounding. For example, 30.499 becomes 30.49, not 30.50.

Semi-automatic and Manual Timing—Whenever semi-automatic or manual timing is used, the times shall be determined as follows:

- If **two** of the three button or watch times agree, that is the time for that timing system.
- If all three buttons or watches disagree, the time of the **intermediate** button or watch is the time for that timing system.
- If only two button or watch times are available, the time is the **average** of those two times. The digits representing thousands of a second are dropped with no rounding.
- If only one button or watch time is available, the time of that button or watch is the time for that timing system.

Do **not** mix and match times

- The button time is only derived from button times
- The watch time is only derived from watch times
- Watch times may be used to help decide between disparate button times
- Button and watch times should never be averaged or pooled together to get an intermediate time

4. Automatic Timing System

Automatic timing systems such as the Colorado Timing System (CTS) or Daktronics Timing System receive an automatic start signal from the starting unit on the pool deck and stop signals for each lane from the touchpad in the pool and from the buttons held by the lane timers.

Priority of Timing Systems for Determining the Official Time

- The Primary Time comes from the touchpad via the timing console.
 - Use the Primary Time as the Official Time unless you have reason to believe that the Primary time for a specific lane and race is invalid.
- The Secondary Time comes from the button(s) via the timing console.
 - Use the Secondary Time as the Official Time when you have determined that the Primary time is invalid, unless you have reason to believe that the Secondary time for a specific lane and race is also invalid.
- The Tertiary Time comes from the stopwatch(es) via a lane timer card or lane timer sheet.
 - Use the Tertiary Time for the Official Time when you have determined that the Primary and Secondary times for a specific lane and race are invalid.

- **Never** use a hybrid time (e.g., average of touchpad and button times, or average of button and watch times) for the Official Time.

In a given race, the Primary timing system may fail on a single lane (e.g., swimmer misses touchpad) or across all of the lanes (e.g., timing console does not receive automatic start signal, so timing system operator performs a “Manual Start”). The Secondary timing system may fail on a single lane (e.g., lane timer doesn’t push button at finish) or across all lanes (e.g., timing console does not receive automatic start signal).

Primary, Secondary and Tertiary Times

The following is a description of the printout obtained from the Colorado Timing System following the finish of each race. The Daktronics Timing System provides a different style of printout, a description of which may appear in a future edition of this manual.

You receive the Primary and Secondary Times immediately after each race on a printout from the CTS console. You must get a printout for each race unless the CTS operator informs you that the race was never stored in the CTS console. The CTS operator may inform you orally or by a note on the CTS printout of a malfunction that he/she observed in a particular lane. This would be considered evidence of an invalid Primary or Secondary Time. You receive the Tertiary Times from the Runner soon after the race has ended (if lane timer cards are used) or the conclusion of all heats of an event (if lane timer sheets are used).

A “clean” CTS printout is shown on page 4, with the following highlighted elements:

- A unique race number that is automatically assigned to each race. If you are missing a printout for a particular race, ask the CTS operator for a fresh printout of “Race #____” at his/her earliest convenience. The Recorder’s Meet Manager software uses this race number to retrieve the times for the corresponding event/heat from the CTS console.
- A “Race History” that records every pad touch in the order that they are received. **[NOTE: You may be able to recover the Primary Time for an apparent malfunction by examining the sequence of times for a given lane in this Race History, otherwise, you will generally ignore this section.]**
- The button time(s) recorded on each lane and the calculated button time (middle button, average button, etc., as described in section 3). At the start of your session, you should verify that the calculated times appear and are being calculated using the number of buttons designated by the Meet Referee.
- A “Sponsor’s Message” – usually the name of your meet.
- The event description, event number, and heat number. Occasionally, the CTS operator will write these in by hand (e.g., if he/she did not advance the CTS console to the next heat or event). If this information is missing, you should write them in yourself, after confirming the proper event/heat number with the CTS operator.
- A “Race Summary by Lane.” Use this summary area to indicate any changes to the times that the Recorder must enter into the meet management software.
- (Optional) A “Race Summary by Place.” This summary can be ignored and you can ask the CTS operator to turn it off so that you have more room to write in Official Times.

A problematic CTS printout with common anomalies highlighted is shown on page 8, and discussed on page 9.

A "clean" Colorado Timing System console printout

Race History

Button Times (BACKUP is calculated from the individual buttons)

Race Number

```

=====>RACE HISTORY<=====
Saturday 07-12-03 2:37.57 pm
----->RACE 019
:-----<Lane Number
: :-----<Lengths
: : :-----<Time
4) 02 29.92  5) 02 30.80  6) 02 33.00  7) 02 33.30  2) 02 34.08
8) 02 34.85  1) 02 35.05  3) 02 35.27  4) 04 1:04.94  5) 04 1:07.65
7) 04 1:09.68  6) 04 1:10.07  2) 04 1:12.48  1) 04 1:13.73  3) 04 1:13.94
8) 04 1:14.91
----->Colorado Time Systems
=====>RACE SUMMARY=====

```

| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 | Lane 7 | Lane 8 |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| Button | 1:13.70 | 1:12.50 | 1:13.98 | 1:04.86 | 1:07.63 | 1:10.16 | 1:09.92 | 1:14.84 |
| Button | 1:13.78 | 1:12.43 | 1:13.96 | 1:04.90 | 1:07.78 | 1:10.04 | 1:09.93 | 1:14.74 |
| BACKUP | 1:13.74 | 1:12.47 | 1:13.97 | 1:04.88 | 1:07.71 | 1:10.10 | 1:09.92 | 1:14.79 |

Event Description

Saturday 07-12-03 2:37.57 pm

Sponsor's Message

```

-----XYZ Winter Invitational
100 YARDS 11-12 MEN'S INDIVIDUAL MEDLEY
EVENT: 27 HEAT:2

```

-----By Lane-----

| Lane | Place | Time |
|------|-------|---------|
| 1 | 6 | 1:13.73 |
| 2 | 5 | 1:12.48 |
| 3 | 7 | 1:13.94 |
| 4 | 1 | 1:04.94 |
| 5 | 2 | 1:07.65 |
| 6 | 4 | 1:10.07 |
| 7 | 3 | 1:09.88 |
| 8 | 8 | 1:14.91 |

-----By Place-----

| Place | Lane | Time |
|-------|------|---------|
| 1 | 4 | 1:04.94 |
| 2 | 5 | 1:07.65 |
| 3 | 7 | 1:09.88 |
| 4 | 6 | 1:10.07 |
| 5 | 2 | 1:12.48 |
| 6 | 1 | 1:13.73 |
| 7 | 3 | 1:13.94 |
| 8 | 8 | 1:14.91 |

Race Summary by Lane

Race Summary by Place

The lane timer cards (or the lane timer sheets) for the matching heat will have the swimmer's name, event description, event number, heat number, lane number, and one or more watch times written by the lane timer(s). If lane timer cards are in use, you can cross-check the CTS printout with the lane timer cards soon after each heat has ended. Otherwise, you perform this cross-check for multiple heats when the lane timer sheets are delivered to you by the Runner—typically, at the end of each event.

Go through each CTS printout with a red pen to make any necessary notations. While different Timing Judges may have slightly different approaches to determining the official time of each swimmer, the following generic instructions (here through pages 7) are a good starting point and will make the most sense by referring to the CTS printout on page 8. Specific comments about the printout follow on page 9.

- Fill in the Event Description/Event Number/Heat Number, if necessary.
- Verify that the occupied/empty lanes match between the CTS printout and the matching heat's index cards or lane timer sheets. Resolve each discrepancy by determining conclusively whether the lane was occupied or empty. You may have to consult with the CTS operator and/or the Starter and/or the Referee. Notify the Recorder if there are any handwritten entries or name changes on the cards or lane timer sheets. (If you are using lane timer sheets, you may choose to do this step last, not first.)
 - If an index card is missing for an occupied lane, ask the Runner to deliver it at his/her earliest convenience.
 - If the touchpad and button times are missing for an occupied lane, confirm with the CTS operator that this was due to a malfunction (e.g., the lane was turned off inadvertently).
 - If a touchpad and/or button times appear for an empty lane, confirm with the CTS operator that this was due to a malfunction (e.g., swimmer or lane timer on deck activates the touchpad or button). Cross out such a time on the CTS printout and mark it as EL ("Empty Lane").
- In the "Button Times" section, verify that the required number of button times appear for each occupied lane, and determine the validity of the Secondary Times (the BACKUP row).
 - If an expected button time is missing, draw a line through the blank space to affirm that you noticed this and mark the BACKUP time (with an asterisk, say) to indicate that you will have to make a manual touchpad-BACKUP comparison for this lane. (With older versions of the CTS software, the console does not perform the automatic touchpad-BACKUP comparison if not all required buttons were pressed. With the newest version of the CTS software, which has been loaded on some, but possibly not all of the CTS units, the comparison will be made if two buttons are obtained in a three button set-up.) [**Note:** *Some but not all timing judges will make the notations indicated in this paragraph. Whether or not you make the notations, it is important to know the circumstances under which the CTS does not automatically make the Pad-Button comparison.*]
 - If you determine that an individual button time, generally more than about 0.30 second apart from the other button time(s), is invalid (e.g., by comparing with the touchpad or watch times and/or by consulting with the CTS operator), draw a line through that time and through the lane's invalid BACKUP time and mark the invalid

button time as EB (“Early Button”) or LB (“Late Button”). The newly determined BACKUP time should then be indicated as follows:

- *Using one button per lane:* If the one button time is invalid, write the watch time (or watch time average) under the invalid BACKUP time and mark it as WT (“Watch Time”).
 - *Using two buttons per lane:* If one button time is invalid, copy the other button time under the invalid BACKUP time. If both button times are invalid, write the watch time under the invalid BACKUP time and mark it as WT (“Watch Time”).
 - *Using three buttons per lane:* If one button time is invalid, copy the average of other two button times under the invalid BACKUP time. If two button times are invalid/missing, copy the other button time under the invalid BACKUP time. If all three button times are invalid, write the watch time (or watch time average) in the BACKUP space for that lane, and mark it as WT (“Watch Time”).
- In the “Race Summary by Lane” section verify that a touchpad time appears for each occupied lane, and determine the validity of these Primary Times. Note that the CTS console has automatically compared the touchpad-BACKUP difference – but only for lanes in which all required buttons were pressed (or two buttons in a three button setup with the newest software) – and has indicated a discrepancy of 0.3 second or more by printing the BACKUP time to the right of the touchpad time. (See Page 8.) **[NOTE: You may be able to recover a good touchpad time for a lane with a missing or very late touchpad time by examining the touch times for that lane in the “Race History” section.]**
 - If the touchpad time is present and you accepted the CTS-calculated BACKUP time (i.e., you didn’t mark it with an asterisk nor replace it with another number in the “Button Times” section) and this BACKUP time is not printed next to the touchpad time here, then the touchpad time is valid – write nothing.
 - If the touchpad time is missing, draw a line through the blank space to affirm that you noticed this failure of the Primary Timing System and write NP (“No Pad”).
 - If you determined earlier that the CTS-calculated BACKUP time was invalid, draw a line through the invalid BACKUP time that appears to the right of the missing touchpad time and write your new BACKUP time to the right.
 - Compare the BACKUP time with the watch time (middle, average, or single depending upon meet setup). If they disagree by more than 0.3 second, try to obtain a coach time to resolve which of the BACKUP or watch time to use as the Official Time. If you use the Watch time, write it in and mark it as WT (“Watch Time”).
 - If the touchpad time is present and you wrote in a BACKUP time or marked a BACKUP time with an asterisk in the “Button Times” section, draw a line through the invalid BACKUP time here (if present) then compare the touchpad time to your new BACKUP time. If the touchpad time is present and the valid CTS-calculated BACKUP time is printed to the right of the touchpad time here, then the CTS has alerted you to a suspect touchpad and/or BACKUP time.
 - A touchpad time that is 0.3 seconds or more later than the BACKUP time is most likely invalid: draw a line through it and mark it as LP (“Late Pad”) then

apply the rules from the previous step to determine whether to use the BACKUP or watch time here. The late touch may be corroborated by a deck official and/or the CTS operator and/or the lane timer(s).

- A touchpad time that is 0.3 seconds or more earlier than the validated BACKUP time may be valid – but is, on occasion, early because of an activation of the touchpad by someone on deck or by a misfiring (intermittent electrical short). If you can rule out such anomalies by examining the watch time(s) and/or consulting with other officials, draw a line through the invalid BACKUP time here (if present). Otherwise, draw a line through the invalid touchpad time and mark it as EP (“Early Pad”) then apply the rules from the previous step to determine whether to use the BACKUP or watch time here.
- If a button time is used for the Official Time, apply the timing adjustment method previously agreed upon by you and the Referee (see Section 7). For example, if you are using the “Session Adjustment Time” method, write this time next to the button time.
- If a watch time is used for the Official Time, it should be corrected for the average pad-watch time difference (determined in the same manner as pad-button differences as illustrated in Section 7). With all but Championship level meets, the Referee may determine that the amount calculations involved and the staffing level of the meet are not conducive to performing this calculation.
- For each occupied lane in the “Race Summary by Lane” section check that exactly one valid time appears; all other times should have a line drawn through them. For emphasis, some Timing Judges like to circle the valid time if anything other than the touchpad time is to be used as the Official Time.
- If you have received a DQ slip from one of the Referees, verify with the Meet Program and Recorder (if necessary) that the swimmer’s name, team, event, heat, and lane are accurate, and check that at least one infraction has been marked and that the slip has the signatures of the deck official and the Referee. (For False Start or Early Relay Start, you may see only the Referee’s signature.) Resolve any issues with the Referee before recording the DQ. Put a line through the Official Time on the CTS printout and mark DQ (“Disqualification”) to the right of the time. (It’s preferable to put a light line through the Official Time so that it is still visible to the Recorder who can then enter it in the results along with the checked “DQ” box, in case the disqualification is overturned at some later time.) Transcribe the information from the DQ slip to the DQ log sheet, then staple the DQ slip to the CTS printout. [**Note:** *The reviewing and logging of DQ slips is handled differently throughout the state and may or may not involve the Timing Judge. Regardless of whose responsibility it is to review and log the DQ slips, it is the responsibility of the Timing Judge to make sure that the DQ is indicated on the CTS printout and to file the DQ slip with the heat information.*]
- Initial the CTS printout, then pass it along with the lane timer index cards or lane timer sheets to the Recorder. Remember to alert the Recorder to any write-in names that you spotted on the index cards or lane timer sheets. (You might do this by writing this additional information in a blank area of the CTS printout.)

A marked-up Colorado Timing System console printout

(The timing adjustment method shown is the addition of a calculated session average)

=====>RACE HISTORY<=====>RACE 019

Saturday 07-12-03 2:37.57 pm

```

:-----<Lane Number
: :-----<Lengths
: : :-----<Time
4) 02 29.92    6) 02 33.00    7) 02 33.30    2) 02 34.08    8) 02 34.85
1) 02 35.05    3) 02 35.27    4) 04 1:04.94  5) 02 1:07.65  7) 04 1:09.68
6) 04 1:10.07  2) 04 1:12.48  1) 04 1:13.73  3) 04 1:13.94  8) 04 1:14.91
5) 04 1:22.65
  
```

| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 | Lane 7 | Lane 8 | |
|--------|--------------------|--------------------|---------|--------------------|---------|--------------------|---------|--------------------|-----------|
| Button | 1:13.70 | 1:13.70 | 1:13.58 | 1:04.86 | 1:07.63 | 1:08.16 | 1:09.92 | 34.88 | EB |
| Button | 1:13.70 | 1:11.43 | 1:13.56 | 1:05.40 | 1:07.78 | 1:10.04 | 1:09.93 | 1:17.74 | LB |
| BACKUP | 1:13.70* | 1:11.43* | 1:13.57 | 1:05.13 | 1:07.71 | 1:09.10 | 1:09.92 | 56.31 | |

=====>Colorado Time Systems
 1:04.86 **LB** 1:10.04 **EB** 1:14.70 **WT**
 =====>RACE SUMMARY<=====

Saturday 07-12-03 2:37.57 pm

XYZ Winter Invitational
 100 YARDS 11-12 MEN'S INDIVIDUAL MEDLEY
 EVENT: 27 HEAT:2

| -----By Lane----- | | | -----By Place----- | | |
|-------------------|-------|---|--------------------|------|-------------------|
| Lane | Place | Time | Place | Lane | Time |
| | 1 | 5 1:13.73 | 1 | 4 | 1:04:94 |
| LP | 2 | 4 1:12.48 1:11.43 +0.01 | 2 | 7 | 1:07.88 <1:09.92> |
| LP | 3 | 6 1:13.94 <1:13.57> +0.01 | 3 | 6 | 1:10.07 <1:09.10> |
| | 4 | 1 1:04.94 DQ | 4 | 2 | 1:12.48 |
| PAD | 5 | 7 1:22.65 <1:07.71> 1:07.65 | 5 | 1 | 1:13.73 |
| | 6 | 3 1:10.07 <1:09.10> | 6 | 3 | 1:13.94 <1:13.57> |
| EP | 7 | 2 1:07.88 <1:09.92> +0.01 | 7 | 5 | 1:22.65 <1:07.71> |
| WT | 8 | 8 1:24.91 <56.31> 1:14.70 | 8 | 8 | 1:24.91 <56.31> |

Comments on CTS Printouts

Examine the clean CTS printout on page 5.

- All buttons were pressed, so the CTS console automatically performed the touchpad-BACKUP comparison for each occupied lane.
- Both buttons in each lane agreed with each other, so each BACKUP time was valid.
- The CTS comparison of these BACKUP times with the touchpad times did not flag any suspicious lanes. (That is, no BACKUP times appeared in “Race Summary by Lane.”)
- The Timing Judge accepted all touchpad times as the Official Times.

Examine the marked-up CTS printout on page 8.

“Button Time Section” Comments:

- The missing lane 1A and 2B button times were noted, and the BACKUP time for these lanes were deemed valid after comparison with the touchpad and watch times, then were marked with “*” to emphasize the need for manual comparison with the touchpad times.
- The lane 4B button was deemed late, so the BACKUP was replaced with the valid 4A button time.
- The lane 6A button was deemed early (as confirmed by the CTS operator), so the lane 6 BACKUP was replaced with the valid 6B button time.
- The lane 8A button was early (lane timer pressed it at 50-yard turn, by mistake, and then neglected to press it again at the finish – but did get another watch from the Head Timer and stopped it properly at the finish), while the 8B button was deemed late after comparison with the watch time, which matched the coach’s watch time. The lane 8 BACKUP was replaced with the valid lane timer’s watch time.

“Race Summary by Lane” Comments

- Lane 1: The Pad time is valid.
- Lane 2: The Pad time was determined to be late. The “corrected” button time was indicated and a “+0.01” Session Adjustment Time was also indicated which is to be added to the button time before recording.
- Lane 3: The touchpad time was deemed late (as confirmed by the CTS operator), so the printed valid lane 3 BACKUP time was used. Again, a “+0.01” Session Adjustment Time was marked next to this for the Recorder so that he would adjust this valid button time.
- Lane 4: Although the PAD time is valid for this lane, a DQ was recorded for the swimmer.
- Lane 5: The touchpad time was deemed very late. The BACKUP time might have been used, but the astute Timing Judge noticed in the “Race History” section that the 50 yard touch had not been recorded and the 100 yard touch (circled in red) had been recorded as if it were a 50 yard touch, while the final (invalid) touchpad time was recorded when the swimmer exited the pool. The circled time was deemed the valid touchpad time; it was transcribed to lane 5 of the “Race Summary by Lane” section and marked “PAD.”
- Lane 6: The PAD time was deemed valid after discarding one BUTTON time.
- Lane 7: The touchpad time was deemed early as: the CTS operator reported a misfiring.
- Lane 8: The touchpad time was deemed very late and after review of all available information including the coaches time, the watch time was used as the official time.

5. Semi-Automatic Timing System

In this configuration, a Colorado Timing System or equivalent console, receives an automatic start signal from the Starter's unit on the pool deck, and stop signals for each lane from the button(s) held by the on-deck lane timer(s).

This configuration is sometimes used with young swimmers (generally 10 & unders) who frequently fail to trigger the pad at the conclusion of their race. Rather than having to use backup times for many or most of the lanes, the Referee might opt to forgo automatic timing in favor of semi-automatic timing. This configuration is also used at pools where the deck-pool interface is such that pads can not readily be installed.

The approach to semi-automatic timing is similar to that used for automatic timing systems. Individual buttons need to be checked for outliers (generally greater than about 0.3 seconds than the companion buttons) and obvious early or late buttons should be eliminated and the button time recalculated. This can be relatively easy to do when three buttons are available, but with two buttons, generally the best one can do is to take the average. Comparison with the watch times will sometimes resolve a discrepancy, but as often as not, the timer has stopped their watch and pushed their button simultaneously, thus the watch and button time from a given timer will generally be similar. A coaches time can sometimes be helpful, but care must be exercised when doing so for the reasons already mentioned in Section 4.

A sample CTS printout for a race timed with a semi-automatic timing system is shown on Page 11. Note that only the finish times are recorded; there are no intermediate times recorded in multiple lap events because there are no Pads to pickup the intermediate touches. Particularly astute Timing Judges might notice that the times recorded in the RACE HISTORY section will sometimes differ from those recorded in the RACE SUMMARY section when a three button setup is being used. This is because the times recorded in the RACE HISTORY section are an average of the first two buttons pushed (and rounded up), and they are recorded in the order of finish as determined by the middle of three buttons (don't try to understand it, just accept it!). In contrast, the results in the RACE SUMMARY section are determined according to the standard rules as described in Section 3 and are the valid times for the race.

6. Manual Timing System

Manual times are obtained from watch times only. Manual timing is frequently used to time 25 Yard/Meter events when the swimmers are started from the blocks. Manual timing is also sometimes used for dual meets in which an automatic or semi-automatic timing system is not available. Also, keep in mind that if the automatic or semi-automatic timing fails, a meet can continue to run with manual only timing.

The official time is determined as indicated in Section 3, and the caveats raised in Sections 4 & 5 about potential outliers apply here as well.

EXAMPLE #6 (Buttons as Prime)

=====>RACE HISTORY<=====
 Saturday 07-12-03 2:37.57 pm

```

:-----<Lane Number
: :-----<Lengths
: : :-----<Time
3) 02 23.08    8) 02 23.55    1) 02 24.17    5) 02 24.33    2) 02 24.32
6) 02 25.83    4) 02 27.82
    
```

| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 | Lane 7 | Lane 8 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Button | 24.23 | 24.27 | 23.05 | | 24.33 | 25.81 | | 23.51 |
| Button | 24.15 | 24.37 | 23.22 | 27.79 | 24.39 | 25.85 | | 23.59 |
| Button | 24.18 | 24.50 | 23.10 | 27.84 | 24.33 | 25.85 | | 23.76 |
| FINISH | 24.18 | 24.37 | 23.10 | 27.82 | 24.33 | 25.85 | | 23.59 |

=====>Colorado Time Systems
 =====>RACE SUMMARY=====

Saturday 07-12-03 2:39.57 pm

Gator Summer Invitational
 25 YARDS Boys Freestyle 8 & Under Final
 EVENT: 29 HEAT:2

| -----By Lane----- | | | -----By Place----- | | |
|-------------------|-------|-------|--------------------|------|-------|
| Lane | Place | Time | Place | Lane | Time |
| 1 | 3 | 24.18 | 1 | 3 | 23.10 |
| 2 | 5 | 24.37 | 2 | 8 | 23.59 |
| 3 | 1 | 23.10 | 3 | 1 | 24.18 |
| 4 | 7 | 27.82 | 4 | 5 | 24.33 |
| 5 | 4 | 24.33 | 5 | 2 | 24.37 |
| 6 | 6 | 25.85 | 6 | 6 | 25.85 |
| 8 | 2 | 23.59 | 7 | 4 | 27.82 |

7. Timing Adjustments

Why Do Timing Adjustments?

In the typical setup for a VSI swim meet, touchpads are used for the primary time, buttons for the secondary time, and watches as the tertiary time. When the touchpad provides a valid time, that time is used for the official time. When the touchpad does not provide a valid time, the button or watch time is used to determine the official time, and an adjustment must be performed to account for bias. For a touchpad time, the clock starts electronically by a signal from the starter system and finishes electronically by the swimmer's touch; it is therefore considered free of bias. For a button time, the clock is started electronically as for the touchpad, but is stopped when the lane timer depresses the button; this introduces human reaction time on the finish. (Repeated determinations show that button times are on average about 0.13 second slower than the corresponding pad time.) Stopwatches are started manually and finished manually, which introduces human reaction time twice. (One might argue that these errors cancel, on average, since both entail the same reaction delay; others argue that they don't cancel because a timer is able to anticipate the finish as the swimmer approaches the wall—we haven't measured the difference so we can't tell you here).

The purpose of timing adjustments is to account for known bias in timing systems and, in some cases, for unusual circumstances affecting a particular heat. USA Swimming Rule 102.16.5D requires that timing adjustments be made to button or watch times before they are integrated with pad times to determine official times and final results. Officials should keep in mind that, when a pad malfunctions, the backup systems and the timing adjustment merely provide a method for **estimating** what the pad time would have been if the pad had operated properly. The Timing Judge and Referee should strive to make the most accurate estimate that is practical under the circumstances of the particular meet.

Automatic Correction made by the CTS

Most VSI-sanctioned meets are run using the Colorado Time Systems (CTS) System 5 or 6 timing consoles. These consoles adjust all button times internally by subtracting 0.15 seconds from the button time before it is printed on the CTS printout sheet or transmitted to the Recorder's computer. [**Note:** *This 0.15 second correction can not be defeated nor changed in the CTS-5, although it apparently can be changed in the CTS-6. Until we've had time to evaluate the CTS-6, this setting should not be changed even if you find that it can be done.*] Colorado Timing Systems incorporated this correction into its console based on their measurements that timers push their buttons an average of 0.15 seconds after the touchpad is activated. Some Referees argue that this correction is sufficient to meet the requirements of rule 102.16.5.D, which says that an "adjustment for timing system difference may be incorporated into the automatic or semi-automatic system by design..." while others argue that because we have some evidence that this is a slight overcorrection (a VSI study determined the average pad-button difference to be 0.13 second rather than 0.15 second, i.e., the console overcorrects by 0.02 second), an additional adjustment should be done. The bottom line is that it is the Referee's call. [**Daktronics Note:** *Because the Daktronics Timing System records the button times without adjustment, it is imperative that one of the adjustment methods described below be used when the primary pad time cannot be used as the official time.*]

What Types of Timing Adjustments Are Available and How To Choose Among Them?

In addition to the internal CTS correction, other adjustments to the button or watch times can be made by you, in consultation with the Referee, to make a more accurate *estimation* of the

swimmer's true time. Several different types of timing adjustments are available that vary not only in their accuracy, but also in their complexity and the length of time it takes to perform the calculations. With several methods available to make timing adjustments, let's first consider how to choose among them. **First and foremost, the Referee has the responsibility for determining which method of timing adjustments will be used at a meet.** For all practical purposes, most meets will be run with either the horizontal adjustment method or the session average adjustment method. A vertical adjustment, while probably the most accurate method of estimating backup times, is calculation intensive and impractical to use except at championship level meets where sufficient staffing is available to perform the needed calculations. There are instances, however, where more than a single method would be used in a meet. For example, you may have a heat with two swimmers, one of which receives a pad time with two "bad" buttons, and the second of which receives two button times but no pad time. If the horizontal adjustment method is being used there is no valid data from which to calculate the adjustment factor for the second swimmer's button time. In this case, a vertical adjustment factor or a session adjustment would need to be calculated. In fact, it is an excellent idea to calculate a session adjustment factor early in the session even when horizontal adjustments are being done so that the information is readily available if needed.

Horizontal Touchpad-Button Adjustment: This adjustment, described in Rule 102.16.5E and its accompanying Table 1, is used when a touchpad malfunction occurs on a particular lane. The adjustment is calculated for that lane using the average difference between pad and backup times from the other lanes *in the same heat* in which the touchpad malfunction occurred. This adjustment is often referred to as a "horizontal adjustment" because it is based on differences *across* the lanes in the same heat.

The Recorder's Adjustment Screen (see Appendix, pp 17-20) permits automated calculation of this horizontal adjustment of button times. To prevent a single, errant button time from skewing the heat's Average Differential time, ask the Recorder to eliminate from the calculation any lane in which you deemed a button time invalid or with a touchpad-button difference generally exceeding 0.20 second. Then, if the heat's average differential looks reasonable (generally between -0.02 and 0.06 second), ask the Recorder to accept the adjusted times; otherwise, have the Recorder check with you for further instructions. Depending upon the average differentials that are observed in other heats it may be reasonable to accept a differential exceeding this range, it may be reasonable to eliminate additional outliers from the calculation, or it may be necessary to calculate a session average differential as described below, or a vertical adjustment as described below. When in doubt, consult the Referee on this decision.

| Horizontal Adjustment for one Heat | | | | | | | |
|------------------------------------|--------|------------|--------|--------|--------|--------|-----------|
| Pad – Button Differentials | | | | | | | |
| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 | Heat Avg. |
| Heat 1 | .05 | .04 | .04 | .04 | .10 | -.02 | .04 |
| Heat 2 | .03 | .04 | .03 | .03 | --- | .03 | .03 |
| Heat 3 | .03 | .37 | .01 | .07 | .04 | .08 | .04 |
| Heat 4 | --- | .08 | .06 | .08 | -.04 | .07 | .05 |
| Heat 5 | -.02 | -.10 | -.02 | .10 | -.06 | -.06 | -.02 |
| Heat 6 | .00 | -.01 | -.01 | .03 | -.06 | --- | -.01 |
| Heat 7 | .07 | .00 | .10 | --- | .01 | -.04 | .02 |
| Heat 8 | .07 | .02 | .02 | .12 | .02 | .08 | .05 |

In the above example, Lane 2 of Heat 3 had an invalid touchpad time. The Recorder's Adjustment Screen for Heat 3 showed an average touchpad-button differential of 0.04 second for the other lanes, and it proposed adding +0.04 second to Lane 2's (valid) button time in order to obtain the Official Time. (It did not propose any adjustments to the other lanes, whose touchpad times were valid.) The Recorder should be directed to accept the adjusted time.

Session Adjustment Time: Rule 102.16.5D allows for the calculation of a “consistent average difference between the primary and back-up systems used at that meet.” If this technique is used, it is suggested that the Pad-Button differentials from at least six to eight heats near the start of each session be used to calculate the average Pad-Button differential. To provide the most accurate session average it is also suggested that the Pad-Button differentials only be obtained when there are 4 or more valid Pad-Button differentials in a 6 lane pool, or 5 or more valid Pad-Button differentials in an 8 lane pool. Note that with this method of determining the adjustment time, the Recorder cannot finalize any heats at the start of the session that require timing adjustments until you have (1) determined this Adjustment Time from the aforementioned heats and (2) obtained the Referee's concurrence on your determined value of the Adjustment Time.

The average differential from each of the reference heats is obtained by going to the same adjustment screen used in the calculation of the horizontal adjustment factor. The guidance given above for excluding outliers applies here as well. *Once recording the adjustment factor from an individual heat,, it is important that the Recorder exit the adjustment screen by rejecting the adjusted times.* Once you have obtained the differential for each reference heat, average all these differentials to obtain the session-specific Adjustment Time Factor. This Time Adjustment Factor will generally fall between -0.02 and +0.06 seconds. Values outside this range should be viewed with skepticism and warrants the review of the individual heat values or the use of additional sample heats, as directed by the Referee. It is possible, however, that a value outside this range is valid for the particular times and equipment at a meet.

| Calculation of Session Adjustment Time | | | | | | | |
|--|--------|--------|--------|------------|--------|-------------|-----------|
| Pad – Button Differentials | | | | | | | |
| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 | Heat Avg. |
| Race 1 | --- | .02 | .03 | .45 | --- | --- | --- |
| Race 2 | .05 | .04 | .04 | .04 | .10 | -.02 | .04 |
| Race 3 | .03 | .04 | .03 | .03 | --- | .03 | .03 |
| Race 4 | .03 | -.07 | .01 | .07 | .04 | .08 | .02 |
| Race 5 | --- | .08 | .06 | .08 | -.04 | .07 | .05 |
| Race 6 | -.02 | -.10 | -.02 | .10 | -.06 | -.06 | -.02 |
| Race 7 | .00 | -.01 | -.01 | .03 | -.06 | --- | -.01 |
| Race 8 | 0.01 | --- | .00 | 0.03 | --- | 0.39 | --- |
| Race 9 | .07 | .00 | .10 | --- | .01 | -.04 | .02 |
| Race 10 | .07 | .02 | .02 | .12 | .02 | .08 | .05 |
| Session Adjustment Time $0.18 \div 8 = 0.0225$ (use 0.02) | | | | | | | .02 |

In the above example, eight sample races were used to calculate an Adjustment Time of 0.02 second (truncated to hundredths of a second as per USA Swimming rules. The differential from Race 1 was not used because there were only valid differentials from two swimmers (three lanes were empty and Lane 4 requires a timing adjustment). The differential from Race 8 was not used for similar reasons. The Adjustment Time of 0.02 seconds would then be added to the

backup button time of the swimmers in Race 1/Lane 4, Race 8/Lane6, and any subsequent button times being used in place of the pad time.

Time permitting, you can recalculate this Adjustment Time several times during a session. Some advocate that you should do this by stroke, but this is generally impractical at most meets with the level of staffing available.

Vertical Touchpad-Button Adjustment: An alternative timing adjustment method involves looking at the differences between touchpad and button times *in the same lane* in nearby heats. This adjustment is permitted under Rule 102.16.5E, which allows adjustments, where necessary, based on times in immediately preceding or following heats. Because this adjustment looks up and down at previous and subsequent heats, it is often referred to as a “vertical adjustment.” Sometimes significant discrepancies can appear between the touchpad-button differences for the timers on one lane and those on other lanes due to variations in reaction time, for example. If you suspect such an effect, you may get the most accurate timing adjustment by examining the performance of that lane’s timer(s) in nearby heats. It is advisable to look at 6-8 heats in calculating a vertical adjustment for a lane.

In the following example, Lane 4 of Heat 7 had an invalid touchpad time. By manual calculation, you would observe that Lane 4’s average pad-button differential in the surrounding heats was +0.09 second (excluding Heat 7), quite different from the average differential in the other lanes. You would use the button time plus 0.09 second as the Official Time for Lane 4 of Heat 7.

| Vertical Adjustment for one Lane | | | | | | |
|----------------------------------|--------|--------|--------|--------|--------|--------|
| Pad – Button Differentials | | | | | | |
| | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Lane 5 | Lane 6 |
| Heat 1 | .05 | .04 | .04 | .06 | .10 | -.02 |
| Heat 2 | .03 | .04 | .03 | .09 | --- | .03 |
| Heat 3 | .03 | -.07 | .01 | .07 | .04 | .08 |
| Heat 4 | --- | .08 | .06 | .08 | -.04 | .07 |
| Heat 5 | -.02 | -.10 | -.02 | .10 | -.06 | -.06 |
| Heat 6 | .00 | -.01 | -.01 | .13 | -.06 | --- |
| Heat 7 | .07 | .00 | .10 | .37 | .01 | -.04 |
| Heat 8 | .07 | .02 | .02 | .12 | .02 | .08 |
| Lane Avg. | .03 | .00 | .02 | .09 | .00 | .01 |

Touchpad-Watch Adjustment: This adjustment factor is applied whenever a watch time is used as the Official Time due to a failure of both the Primary and Secondary timing systems in a particular lane, or to all times in a heat that suffered a delayed CTS start (see next section). This is a time-consuming calculation and generally used only at championship level meets where sufficient help is available to assist with the calculations. Like the Pad-Button adjustment factor, the Pad-Watch adjustment factor can be determined by one of several methods including: (1) a vertical calculation in which the Pad-Watch differences from multiple heats are averaged for a given lane; (2) a horizontal calculation in which the Pad-Watch differences from all but one or two lanes in a given heat are averaged to calculate a heat differential which is then applied to the lane or lanes in the heat in which the watch time is being used; and (3) a session average calculation in which the horizontally calculated Pad-Watch differences from multiple heats are averaged together.

Malfunction Affecting Entire Heat (Late Start of CTS): In this situation, the late start of the CTS makes the pad times inaccurate, but all pad times should be off by the same amount (the period between the actual start of the race and when the CTS began). Watch times are used to adjust the pad times as shown in the following table. Rule 102.16.5F specifies that a horizontal adjustment must be made using the pad-watch differential on all the lanes in the heat. This horizontal adjustment generally corrects for the late start of the CTS on the heat, however, this adjustment alone fails to account for the typical difference between pad and watch times that occurs in all heats due to the manual start and stop of the watches. In order to adjust the pad times most accurately, it is therefore preferable to make a second adjustment for the session-specific consistent average pad-watch differential or a vertical pad-watch adjustment for each lane. This second adjustment may require significant calculation and therefore may only be practical at certain high level meets with ample timing personnel.

| Lane | Primary Pad Time | Watch Time | Watch Time Less Pad Time | Heat Adjustment | Official Time |
|------|------------------|------------|---|-----------------|---------------|
| 1 | 52.12 | 55.14 | 3.02 | +3.06 | 55.18 |
| 2 | 51.56 | 54.61 | 3.05 | +3.06 | 54.62 |
| 3 | 51.09 | 54.18 | 3.09 | +3.06 | 54.15 |
| 4 | 50.12 | 53.18 | 3.06 | +3.06 | 53.18 |
| 5 | 49.78 | 52.90 | 3.12 | +3.06 | 52.84 |
| 6 | 49.06 | 52.06 | 3.00 | +3.06 | 52.12 |
| 7 | 52.21 | 55.30 | 3.09 | +3.06 | 55.27 |
| 8 | 52.92 | 55.99 | 3.07 | +3.06 | 55.98 |
| | | | Sum=24.50 (24.50 ÷ 8 = 3.0625) Truncate to 3.06 | | |

Complete Failure of Electronic Timing System: In this situation, watch times must be used to calculate the official time. Before integrating them with pad times from other heats, however, they should be adjusted using either a session-specific average pad-watch differential or vertical pad-watch adjustment for each lane. These adjustments are complex and may only be practical at certain high level meets.

Fixed CTS Pad-Button Difference: VSI was granted a one year trial period in which a standard adjustment factor of 0.02 second could be added to the CTS-reported button time. This trial period has expired without renewal, and thus this procedure can **no longer** be used.

When in Doubt...

Under USA Swimming rules, it is the responsibility of the Referee to decide when a timing system malfunction has occurred and to determine the official time for the swimmer. In most cases, the Referee delegates these responsibilities to you, the Timing Judge, frequently within certain parameters (See Section 1) If you are unsure of what to do, gather all the relevant information and let the Referee make the decision.

8. Use of Hy-Tek's Meet Manager Heat Adjustment Capability

In this default version of the Run screen from Meet Manager, backup times are not displayed. The touchpad time – shown here as “Finals Time” – is highlighted in yellow [blue] if it is more than 0.30 second later [earlier] than the hidden backup time calculated by the CTS console (the average of two or the middle of three button times).

| EVENTS - All Events - SCY - [Session not selected] | | | | | | Records | | | |
|--|-----|--------|----------------------------|-----|--|---------|------|------|----------------|
| Evt # | Rnd | Status | Event Name | HTs | | Record | Time | Date | Record Holder |
| 1 | F | Done | Girls 10&U 500 Yard Free | 1 | | | | | None Available |
| 2 | F | Done | Boys 10&U 500 Yard Free | 2 | | | | | |
| 3 | F | Done | Girls 11-14 1000 Yard Free | 6 | | | | | |
| 4 | F | Done | Boys 11-14 1000 Yard Free | 3 | | | | | |
| 5 | F | Done | Girls 14&U 200 Yard IM | 18 | | | | | |
| 6 | F | Done | Boys 14&U 200 Yard IM | 9 | | | | | |
| 7 | F | Done | Girls 12&U 50 Yard Fly | 8 | | | | | |
| 8 | F | Done | Boys 12&U 50 Yard Fly | 6 | | | | | |
| 9 | F | Done | Girls 11-14 200 Yard Fly | 3 | | | | | |
| 10 | F | Done | Boys 11-14 200 Yard Fly | 1 | | | | | |

| Heat 10 of 18 == Finals == Event 5 Girls 14andU 200 Yard IM | | | | | | | | | | |
|---|----------------------|-----|---------------------------|-----------|-------------|--------------------------|--------------------------|-----|----|-----|
| Lane | Athlete Name | Age | Team | Seed Time | Finals Time | DQ | Exh | HPL | PL | Pts |
| 1 | Reynolds, Lauren | 13 | Coast Guard Blue Dolphins | 2:32.36 | 2:31.50 | <input type="checkbox"/> | <input type="checkbox"/> | 7 | 51 | |
| 2 | Lee, Jessica | 13 | Nova of VA Aquatics | 2:32.04 | 2:29.62 | <input type="checkbox"/> | <input type="checkbox"/> | 2 | 39 | |
| 3 | Goss, Lauren | 12 | Old Dominion Aquatic Club | 2:31.92 | 2:29.64 | <input type="checkbox"/> | <input type="checkbox"/> | 3 | 9 | |
| 4 | Wilcox, Sarah | 12 | Coast Guard Blue Dolphins | 2:31.38 | 2:30.67 | <input type="checkbox"/> | <input type="checkbox"/> | 4 | 11 | |
| 5 | Grimes, Stephanie | 13 | Coast Guard Blue Dolphins | 2:31.82 | 2:41.32 | <input type="checkbox"/> | <input type="checkbox"/> | 8 | 75 | |
| 6 | Trevillian, Kimberly | 13 | Va Assoc. for Comp. Swim | 2:31.93 | 2:30.80 | <input type="checkbox"/> | <input type="checkbox"/> | 5 | 43 | |
| 7 | Powell, Aimee | 14 | Burkwood Aquatic Club | 2:32.34 | 2:24.89 | <input type="checkbox"/> | <input type="checkbox"/> | 1 | 24 | |
| 8 | Locher, Erica | 13 | Unattached Tac | 2:32.59 | 2:31.17 | <input type="checkbox"/> | <input type="checkbox"/> | 6 | 47 | |

To see the backup and individual button times, the Recorder clicks the “ShowBkup” button, leading to the alternate version of the Run screen shown on the next page.

In this alternate version of the Run screen, the touchpad time (“Finals Time”) and the individual button times (“Backup 1”, “Backup 2”, “Backup 3”) are visible for each lane. Some Recorders prefer to use this version of the Run screen at all times, since it helps them alert the Timing Judge to the source of a possible timing system failure that is highlighted in yellow [blue] if the touchpad time is very late [early] compared to the backup time. VSI strongly recommends that the Recorder use this alternate Run screen at all times.

If the Recorder clicks on any of the calculator icons to the right of the backup times, the Time Adjustment screen appears (see right), floating over the Run screen, showing the primary-secondary Difference in addition to the Primary and button times for each lane. (The secondary time is the average of two or the middle of three button times.) The Average Differential is at the bottom of this screen. Invalid lanes (with difference greater than +0.30 or less than -0.30 second) are not included in the Average Differential; neither are lanes that the Recorder has unchecked in the “Use” column. The “Adjusted” time in the last column is either the touchpad time or the Average-Differential-shifted secondary time (for a yellow-highlighted lane).

Case 1 – Late pad in Lane 3

| Time Adjustment - Girls 14&U 200 Yard IM - Heat 10 | | | | | | | |
|--|------|---------|----------|----------|----------|------------|----------|
| Lane Adjustment Using Backup Times | | | | | | | |
| Use | Lane | Primary | Button 1 | Button 2 | Button 3 | Difference | Adjusted |
| <input checked="" type="checkbox"/> | 1 | 2:31.50 | 2:31.46 | 2:31.40 | | 0.07 | 2:31.50 |
| <input checked="" type="checkbox"/> | 2 | 2:29.62 | 2:29.49 | 2:29.57 | | 0.09 | 2:29.62 |
| <input checked="" type="checkbox"/> | 3 | 2:31.64 | 2:29.75 | 2:29.72 | | 1.91 | 2:29.75 |
| <input checked="" type="checkbox"/> | 4 | 2:30.67 | 2:30.78 | 2:30.58 | | -0.01 | 2:30.67 |
| <input checked="" type="checkbox"/> | 5 | 2:41.32 | 2:41.29 | 2:41.34 | | 0.01 | 2:41.32 |
| <input checked="" type="checkbox"/> | 6 | 2:30.80 | 2:30.83 | 2:30.82 | | -0.02 | 2:30.80 |
| <input checked="" type="checkbox"/> | 7 | 2:24.89 | 2:24.82 | 2:24.74 | | 0.11 | 2:24.89 |
| <input checked="" type="checkbox"/> | 8 | 2:31.17 | 2:31.19 | 2:31.27 | | -0.06 | 2:31.17 |

If there is more than .30 second difference between the middle backup time and the primary time, calculate the average difference between the pad and intermediate times of the other lanes. Add this difference to the valid backup time of the problem lane.

Total Differential = 0.19 and Average Differential = 0.02

1. Lane 3 is highlighted in yellow since its Difference exceeds 0.3 second. Its Difference is NOT included in the Total Differential. The Average Differential, $0.19 / 7 = 0.02$ second [truncated to the hundredths of a second] is calculated from the Differences in the seven valid lanes, and is applied to Lane 3's average button time to give an Adjusted time of 2:29.75.

2. "Accept Adjusted" replaces Lane 3's primary time with the Adjusted time. Other lane times are unchanged.

Case 2 – Late Button #1 in Lane 2

| Time Adjustment - Girls 14&U 200 Yard IM - Heat 10 | | | | | | | |
|--|------|---------|----------|----------|----------|------------|----------|
| Lane Adjustment Using Backup Times | | | | | | | |
| Use | Lane | Primary | Button 1 | Button 2 | Button 3 | Difference | Adjusted |
| <input checked="" type="checkbox"/> | 1 | 2:31.50 | 2:31.46 | 2:31.40 | | 0.07 | 2:31.50 |
| <input checked="" type="checkbox"/> | 2 | 2:29.62 | 2:30.49 | 2:29.57 | | -0.41 | 2:30.03 |
| <input checked="" type="checkbox"/> | 3 | 2:29.64 | 2:29.75 | 2:29.72 | | -0.09 | 2:29.64 |
| <input checked="" type="checkbox"/> | 4 | 2:30.67 | 2:30.78 | 2:30.58 | | -0.01 | 2:30.67 |
| <input checked="" type="checkbox"/> | 5 | 2:41.32 | 2:41.29 | 2:41.34 | | 0.01 | 2:41.32 |
| <input checked="" type="checkbox"/> | 6 | 2:30.80 | 2:30.83 | 2:30.82 | | -0.02 | 2:30.80 |
| <input checked="" type="checkbox"/> | 7 | 2:24.89 | 2:24.82 | 2:24.74 | | 0.11 | 2:24.89 |
| <input checked="" type="checkbox"/> | 8 | 2:31.17 | 2:31.19 | 2:31.27 | | -0.06 | 2:31.17 |

If there is more than .30 second difference between the middle backup time and the primary time, calculate the average difference between the pad and intermediate times of the other lanes. Add this difference to the valid backup time of the problem lane.

Total Differential = 0.01 and Average Differential = 0

1. Lane 2 is highlighted because its Difference is below -0.30 second. The Recorder and Timing Judge note that Button #1 is late, while Button #2's time matches the Primary time.

2. "Reject Adjusted" discards the proposed Adjusted time for Lane 2 and leaves the Primary time intact. (The Timing Judge will arrive at the same conclusion in examining the times on the CTS printout.)

Case 3 – Late Button #1 in Lane 5 and late pad in Lane 6

| Time Adjustment - Girls 14&U 200 Yard IM - Heat 10 | | | | | | | |
|--|------|---------|----------|----------|----------|------------|----------|
| Lane Adjustment Using Backup Times | | | | | | | |
| Use | Lane | Primary | Button 1 | Button 2 | Button 3 | Difference | Adjusted |
| <input checked="" type="checkbox"/> | 1 | 2:31.50 | 2:31.46 | 2:31.40 | | 0.07 | 2:31.50 |
| <input checked="" type="checkbox"/> | 2 | 2:29.62 | 2:29.49 | 2:29.57 | | 0.09 | 2:29.62 |
| <input checked="" type="checkbox"/> | 3 | 2:29.64 | 2:29.75 | 2:29.72 | | -0.09 | 2:29.64 |
| <input checked="" type="checkbox"/> | 4 | 2:30.67 | 2:30.78 | 2:30.58 | | -0.01 | 2:30.67 |
| <input checked="" type="checkbox"/> | 5 | 2:41.32 | 2:41.86 | 2:41.34 | | -0.28 | 2:41.32 |
| <input checked="" type="checkbox"/> | 6 | 2:31.76 | 2:30.83 | 2:30.82 | | 0.94 | 2:30.80 |
| <input checked="" type="checkbox"/> | 7 | 2:24.89 | 2:24.82 | 2:24.74 | | 0.11 | 2:24.89 |
| <input checked="" type="checkbox"/> | 8 | 2:31.17 | 2:31.19 | 2:31.27 | | -0.06 | 2:31.17 |

If there is more than .30 second difference between the middle backup time and the primary time, calculate the average difference between the pad and intermediate times of the other lanes. Add this difference to the valid backup time of the problem lane.

Total Differential = -0.17 and Average Differential = -0.02

Accept Adjusted Reject Adjusted

1. The Timing Judge alerts the Recorder to the large difference between the button times in Lane 5. Late Button #1 is deemed invalid. The Primary time is valid since it agrees with the Button #2 time.

2. The Recorder unchecks Lane 5's "Use" box to discard the invalid Difference of -0.28 when calculating the Average Differential.

3. Lane 6 is highlighted as in Case 1; its time is not used in calculating the Average Differential.

| Time Adjustment - Girls 14&U 200 Yard IM - Heat 10 | | | | | | | |
|--|------|---------|----------|----------|----------|------------|----------|
| Lane Adjustment Using Backup Times | | | | | | | |
| Use | Lane | Primary | Button 1 | Button 2 | Button 3 | Difference | Adjusted |
| <input checked="" type="checkbox"/> | 1 | 2:31.50 | 2:31.46 | 2:31.40 | | 0.07 | 2:31.50 |
| <input checked="" type="checkbox"/> | 2 | 2:29.62 | 2:29.49 | 2:29.57 | | 0.09 | 2:29.62 |
| <input checked="" type="checkbox"/> | 3 | 2:29.64 | 2:29.75 | 2:29.72 | | -0.09 | 2:29.64 |
| <input checked="" type="checkbox"/> | 4 | 2:30.67 | 2:30.78 | 2:30.58 | | -0.01 | 2:30.67 |
| <input type="checkbox"/> | 5 | 2:41.32 | 2:41.86 | 2:41.34 | | 0 | 2:41.32 |
| <input checked="" type="checkbox"/> | 6 | 2:31.76 | 2:30.83 | 2:30.82 | | 0.94 | 2:30.83 |
| <input checked="" type="checkbox"/> | 7 | 2:24.89 | 2:24.82 | 2:24.74 | | 0.11 | 2:24.89 |
| <input checked="" type="checkbox"/> | 8 | 2:31.17 | 2:31.19 | 2:31.27 | | -0.06 | 2:31.17 |

If there is more than .30 second difference between the middle backup time and the primary time, calculate the average difference between the pad and intermediate times of the other lanes. Add this difference to the valid backup time of the problem lane.

Total Differential = 0.11 and Average Differential = 0.01

Accept Adjusted Reject Adjusted

4. The Average Differential of 0.01 is calculated from the Differences in lanes 1-4 and 7-8, excluding lanes 5 and 6, and is applied to Lane 6's average button time to obtain an Adjusted time of 2:30.83.

5. "Accept Adjusted" uses Lane 6's Adjusted time of 2:30.83 in place of the late pad time. Other lane times are unchanged.

The Recorder should always "Reject Adjusted" when using this screen to report the Average Differential time for each race that is used in the determination of the Session Adjustment Time at the beginning of a session. (See page 14.)