Determining the Official Time:
A Guide for the Referee and Administrative Official

Rule 102.14.2C – Administrative Official/Referee – "Shall be responsible to the Referee for: Determination and Recording of Official Time . . ."

Revised: April 2013

Determining the Official Time

One of the most important functions of the Administrative Official/Referee is to determine the official time for every swim. This function used to be called the "Timing Judge". Any references to the "Timing Judge" in this document are to the function, not a particular person.

To accurately perform your duties as the Timing Judge you must become familiar with and follow the rules and procedures in section **102.24 TIMING RULES** of the USA Swimming Rule Book

Standards for Your Meet

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

- Whether Automatic timing system is being used; if so, is it CTS or Daktronics;
- 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;
- Whether the timing system has been reliable in previous sessions of the meet;
- Any special instructions that are peculiar to the conditions of your meet.

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 System		
	Pads, Buttons, Watches	**Buttons, Watches**	**Watches Only**
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 Potomac Valley Swimming will have automatic timing as the primary timing system, this is not always the case.

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. Secondary and tertiary times are recorded. At a minimum, the secondary time should be used to corroborate the primary time. If the primary time cannot be corroborated, the secondary and/or tertiary times should be used to determine the official time for the swim.

The Timing Judge should be aware at all times whether the timing equipment and the timers are functioning properly. If pads, buttons, or watches are repeatedly missing, or if their times widely disagree on a regular basis, this needs to be reported to the Referee and investigated.

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.

Minimum Timing System Standards – The minimum standards for primary and backup timing systems are summarized in the document: Timers at PVS Meets: Minimum Requirements & Guidelines

The official time may be used for all entry and recognition purposes if timed by a timing system that meets the minimum requirements with the following exception: World, American, and U.S. Open Records can be established only when timed by an automatic timing system, a backup camera system, or semi-automatic system if the automatic system fails.

A backup time adjusted for timing system differences (as per procedures described on pages 9-10) may be used as an official time.

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, assuming times are in close agreement. If times are not in close agreement, further investigation is required.
- If only two button or watch times are available, the time is the average of those two times, assuming times are in close agreement. If times are not in close agreement, further investigation is required. After averaging, 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.

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.

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. Pad times for <u>every lane in every heat</u> must be compared with button and/or watch times in order to verify their validity.

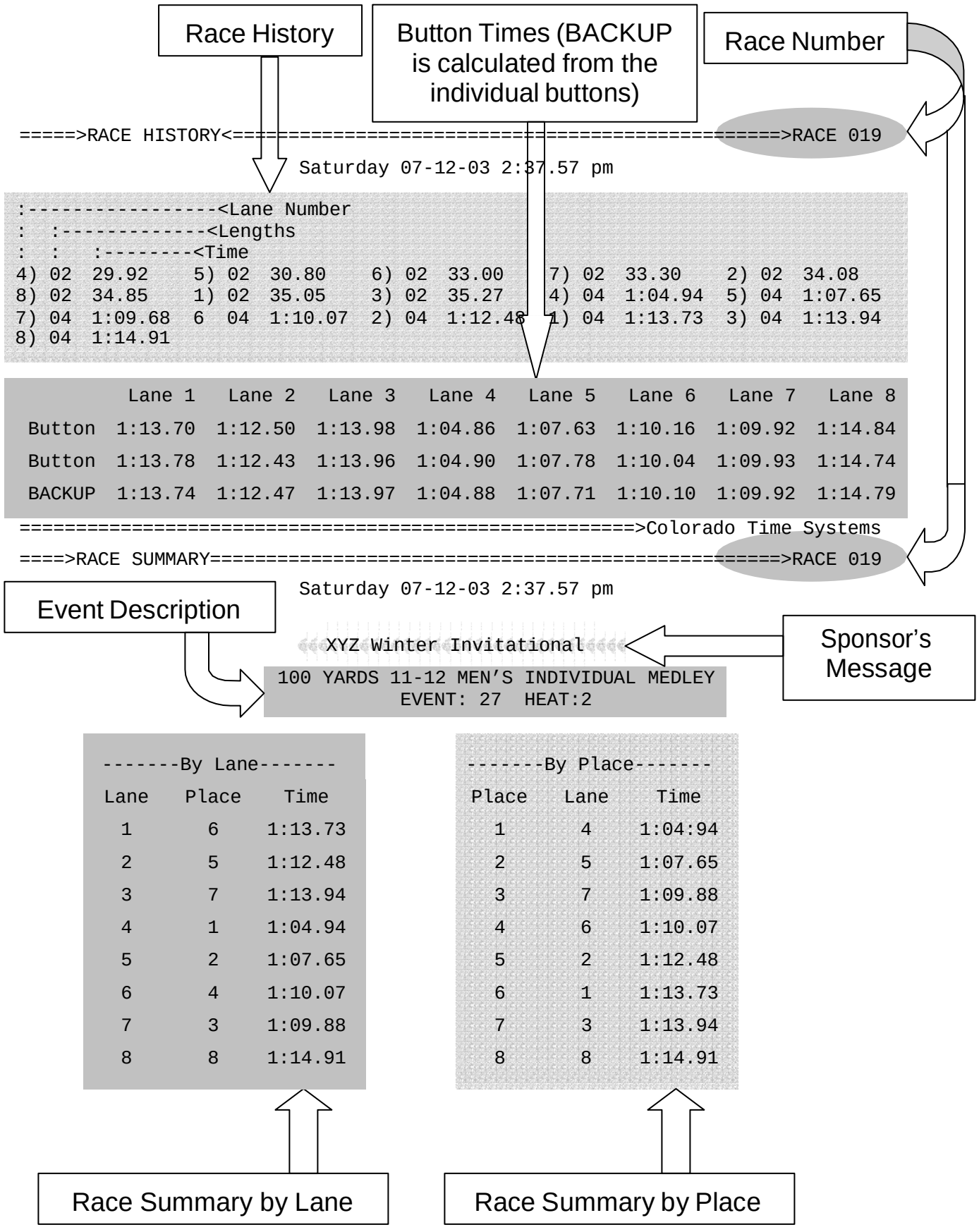
In a given race, the Primary timing system may fail on a single lane (e.g., swimmer misses touchpad) or across all of the lanes (e.g., timing console does not receive automatic start signal, so timing system operator performs a "Manual Start").

You receive the Primary and Secondary Times immediately after each race on a printout from the timing console. You **must** get a printout for each race unless the timing console operator informs you that the race was never stored in the console. Review each printout using the procedures described on page 7, and make any necessary notations.

The “clean” CTS printout, shown on the next page, has the following 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 HyTek Operator uses this race number to retrieve the times for the corresponding event/heat from the timing console.
- A “Race History” that records all pad touches in the order that they were made.
- The button time(s) recorded on each lane and the calculated button time (middle button or average button, depending on the number of buttons used).
- A “Sponsor’s Message” – usually blank, but could be the name of the meet or some other message.
- 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 timing console operator.
- A “Race Summary by Lane.” Use this summary area to indicate any changes to the times that the Hy-Tek operator must enter into the meet management software.

A “clean” Colorado Timing System console printout



Reviewing the Timing Console Printout

- Fill in the Event Description/Event Number/Heat Number, if necessary.
- Verify that the occupied/empty lanes match between the timing console printout and the matching lane timer sheets. You may have to consult with the timing console operator and/or the Starter and/or the Referee. Notify the Hy-Tek operator if there are any handwritten entries or name changes on the lane timer sheets.
    - If the touchpad and button times are missing for an occupied lane, confirm with the timing console operator that this was due to a malfunction (e.g. the swimmer missed the pad, or the pad failed).
    - If a touchpad and/or button times appear for an empty lane, confirm with the timing console operator that this was due to a malfunction (for instance, a swimmer or lane timer on deck activates the touchpad or button). Cross out such a time on the timing console printout and mark it as an 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 times: Are all buttons functioning properly? Are the times in close agreement? Was a button pushed early or late?
- 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: Are the pad times within 0.30 second of button times? Is the timing system functioning properly? Has a late or missed touch been reported? Note that the CTS console has automatically compared the touchpad-button difference, and has indicated a discrepancy of more than 0.30 second by printing the backup time to the right of the touchpad time.
- For each occupied lane in the "Race Summary by Lane" section check that exactly one valid time appears. For emphasis, 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 the Referee, verify with the meet program and/or Hy-Tek operator 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. Resolve any issues with the Referee before recording the DQ. Put a line through the Official Time on the timing console printout and mark DQ to the right of the time. Staple the DQ slip to the timing console printout.
- Initial the timing console printout, then pass it along with the lane timer sheets to the Hy-Tek operator.

A typical CTS timing console printout is illustrated on the next page. For an example of a Daktronics printout, see Daktronics training material at the PVS website.

Timing Console Printout with Timing Judge's Notations:

====> RACE HISTORY <==========> Race 0021
Saturday 02-15-08 2:36.57 pm

:----------< 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	1)	EARLY	.51	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									

	Lane 1	Lane 2	Lane 3	Lane 4	Lane 5	Lane 6	Lane 7	Lane 8
Button	~~34.54~~	1:12.50	1:13.29	1:04.86	1:07.73	1:10.16	1:09.92	1:14.84
Button	1:13.78	1:12.43	1:13.25	1:04.90	1:07.78	1:10.04	1:09.93	
BACKUP	~~.54.16~~	1:12.47	1:13.27	1:04.88	1:07.75	1:10.10	1:09.92	

==========> Colorado Time Systems

====> RACE SUMMARY <==========> Race 0021
Saturday 02-15-08 2:36.57

Colorado Time Systems
100 YARDS
EVENT: 27 HEAT: 2

By Lane				By Place			
Lane	Place	Time ok		Place	Lane	Time	
1	6	1:13.73	<~~54.16~~>	1	4	1:04.94	
2	5	1:12.48		2	5	1:07.65	
3	7	~~1:13.94~~	~~1:13.27~~ 1:13.25	3	7	1:09.88	
4	1	1:04.94		4	6	1:10.07	
5	2	1:07.65		5	2	1:12.48	
6	4	1:10.07		6	1	1:13.73	<54.16>
7	3	1:09.88		7	3	1:13.94	
8	8	1:14.91		8	8	1:14.91	

In Lane 1, the timing console reports a backup time where the timer pushed the button too early. After reviewing the watch times, the Timing Judge concludes that the pad time is correct. The incorrect button time is crossed out in "Race History."

In Lane 3, there is more than 0.30 seconds difference between the pad time and the button times. The timers indicate that the swimmer touched the pad late. Using the procedure described in Rule 102.24.4E, the Timing Judge calculates the adjusted official time as 1:13.25 (pad and backup differential for the seven "good" lanes = -0.17; the average difference between valid pad and backup times for those seven lanes is -0.02; subtract 0.02 from the valid backup time for lane 3 = 1:13.25).

Only one button time was recorded in Lane 8 – in this case it supports the pad time. If the button time had not confirmed the pad time, the Timing Judge should determine if the watch time(s) confirm the pad time. If not, further investigation is required.

Timing Adjustments

When Automatic (pad) Timing is the primary timing system, the pad times must be compared with the button or watch times to verify that the pad times are valid. If the automatic timing system is functioning properly and the backup times vary from the pad time by less than .30 seconds, the pad time is generally used as the Official Time. When such a verification cannot be obtained (i.e., there is a difference of **0.30 seconds or more**), the Timing Judge should review other available information in order to make an informed recommendation to the Referee. This information can include consistent backup times supporting a different time, reports that the swimmer missed the pad or touched the pad too lightly, the reliability of the pad in other heats, and/or a recorded order of finish. USA Swimming Rule 102.24.4D 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 making the best estimate possible of what the pad time would have been if the pad had operated properly. The Timing Judge and Referee must strive to make the most accurate estimate that is practical under the circumstances of the particular meet.

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 the Timing Judge, within certain parameters. If the Timing Judge is unsure of what to do, he/she should gather all the relevant information and let the Referee make the decision.

Automatic Correction Made by the CTS

Most PVS-sanctioned meets are run using the Colorado Time Systems (CTS) System 5 or System 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. Colorado Timing Systems incorporated this correction into its consoles based on research that timers push their buttons an average of 0.15 seconds after the touchpad is activated. **Please note that the Daktronics Timing System records the button times without this adjustment. It is critical that proper adjustments be made to secondary timing systems when using Daktronics.**

Making Adjustments

By rule, when recorded by properly operating automatic timing equipment, the touchpad time shall be the official time. As per USA Swimming Rule 102.24.4C, a malfunction of the primary timing system **may** have occurred if:

- The difference between the time obtained by the primary system and the back-up system is approximately 0.30 seconds or greater, or
- The place judge(s) record a different order of finish, or
- It is reported that the swimmer missed the touchpad or had a soft touch.

Adjustment for Malfunction on a Lane

An adjustment, described in Rule 102.24.4E and its accompanying Appendix 1-A, is necessary when a touchpad malfunction occurs on a particular lane. The adjustment is calculated for that lane using the average difference between valid pad and backup times of the other lanes in that heat, or if necessary, using times from heats immediately preceding and/or following the heat. This is done by adding, or subtracting when appropriate, that average difference to the valid back-up time of the lane where the 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. **It is recommended that this adjustment be calculated within the Hy-Tek program, using the procedure described on page 12.**

Lane	Primary Pad Time	Button A	Button B	Average of Two Buttons	Pad Minus Backup Time	Official Time
1	52.21	52.07	52.17	52.12	.09	52.21
2	52.18	52.11	51.91	52.01	.17	52.18
3	51.05	51.01	50.99	51.00	.05	51.05
4	51.04	50.79	50.97	50.88	.16	51.04
5	51.96	51.22	51.30	51.26	.70	51.37
6	51.65	51.60	51.54	51.57	.08	51.65
7	52.27	52.19	52.07	52.13	.14	52.27
8	51.87	51.68	51.82	51.75	.12	51.87
					.81 total	

A late touch (and 0.30 seconds or more difference) is confirmed on lane 5. Since there are two buttons being used as the Secondary timing system, the backup time is the average of the two buttons. Subtracting the difference between the pad time and the backup time (excluding lane 5, the malfunctioning lane) gives a result of .81. Dividing this number by 7 (the number of functioning lanes) gives a result of .11571; the digits after hundreds are dropped, leaving a timing system difference of .11 seconds. This is added to the valid backup time for lane 5, making the official time 51.37 for that lane. The Timing Judge should mark this adjusted time on the timing system printout, and the Hy-Tek operator should record this as the official time for lane 5.

An alternative timing adjustment method involves looking at the differences between touchpad and button times in the same lane 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." If significant discrepancies appear between the touchpad-button differences for the timers on one lane and those on other lanes, you may get the most accurate timing adjustment by examining the performance of that lane's timers in previous and subsequent heats.

Horizontal Adjustment

Heat 6	Lane 1	Lane 2	Lane 3	Lane 4	Lane 5	Lane 6
Pad	27.44	27.52	?	27.12	27.42	27.48
Backup	27.30	27.39	27.05	27.06	27.24	27.38

.14 +.13 +.06 +.18 +.10 =.61 $\frac{.61}{5}$ = .12 27.05 + .12 = 27.17 **Official Time = 27.17**

Vertical Adjustment

Lane 3	Heat 3	Heat 4	Heat 5	Heat 7	Heat 8	Heat 9
Pad	28.23	28.01	27.60	27.20	27.68	27.11
Backup	28.13	27.86	27.49	27.04	27.59	26.98

.10 +.15 +.11 +.16 +.09 +.13 =.74 $\frac{.74}{6}$ = .12 **Official Time = 27.17**

Malfunction Affecting Entire Heat (i.e., late manual 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 102.24.4F specifies that an 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. This additional adjustment may require significant calculation and therefore may only be practical at certain high level meets with ample timing personnel.

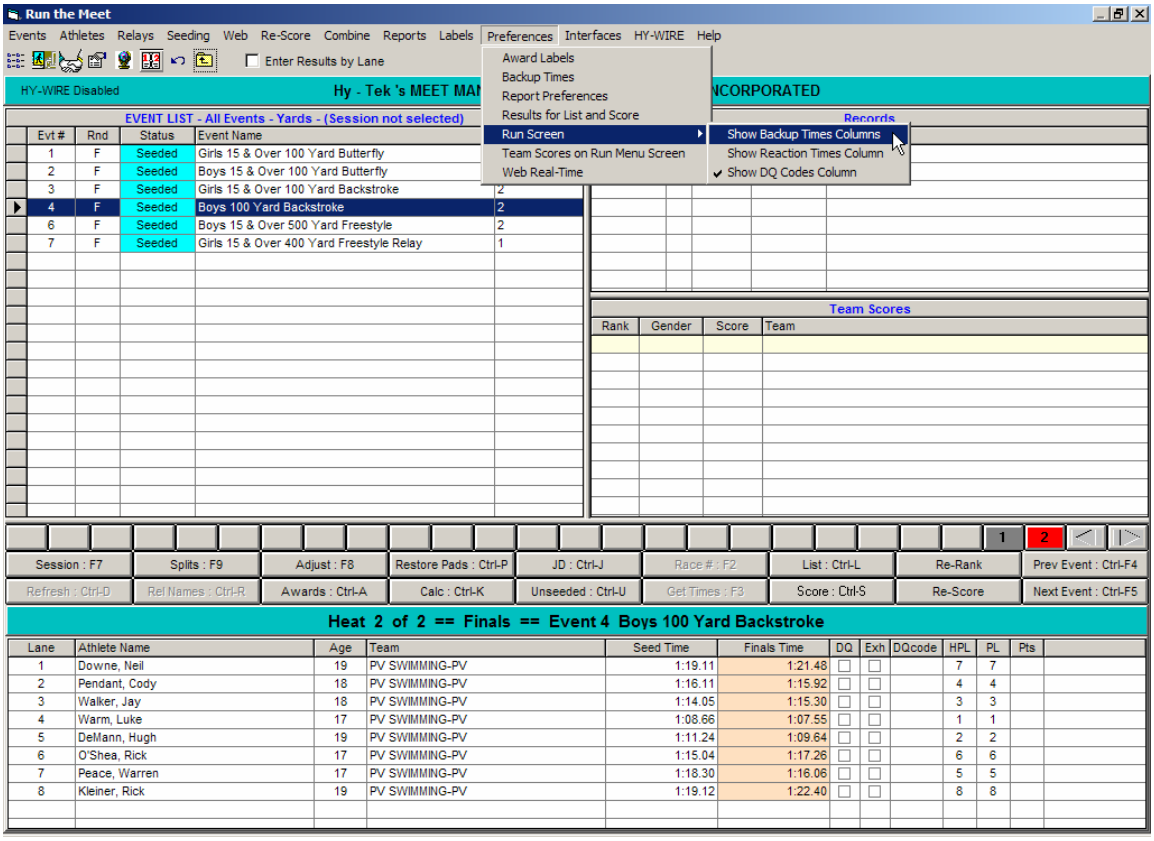
Lane	Pad Time	Watch Time	Pad Time Minus Watch Time	Heat Adjustment	Official Time
1	52.12	55.14	3.02	+3.06	55.18
2	51.56	54.61	3.05	+3.06	54.62
3	51.09	54.18	3.09	+3.06	54.15
4	50.12	53.18	3.06	+3.06	53.18
5	49.78	52.90	3.12	+3.06	52.84
6	49.06	52.06	3.00	+3.06	52.12
7	52.21	55.30	3.09	+3.06	55.27
8	52.92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

Hy-Tek Meet Manager provides an automated method to enter watch times in this scenario and then calculate the adjusted times – see page 15, example 4.

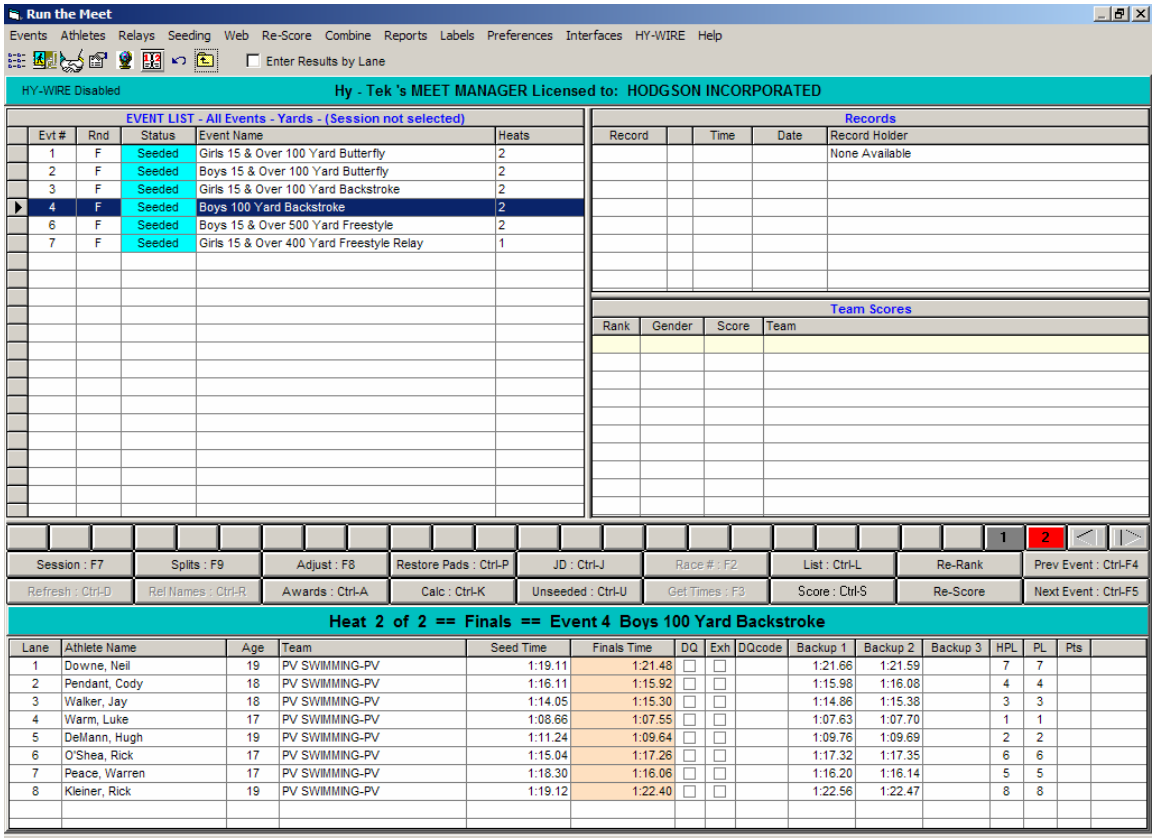
Complete Failure of Electronic Timing System
In this situation, watch times must be used to calculate the official time. Before integrating them with pad times from other heats, however, they should be adjusted using a session-specific average pad-watch differential.

Hy-Tek's Heat Adjustment Capability

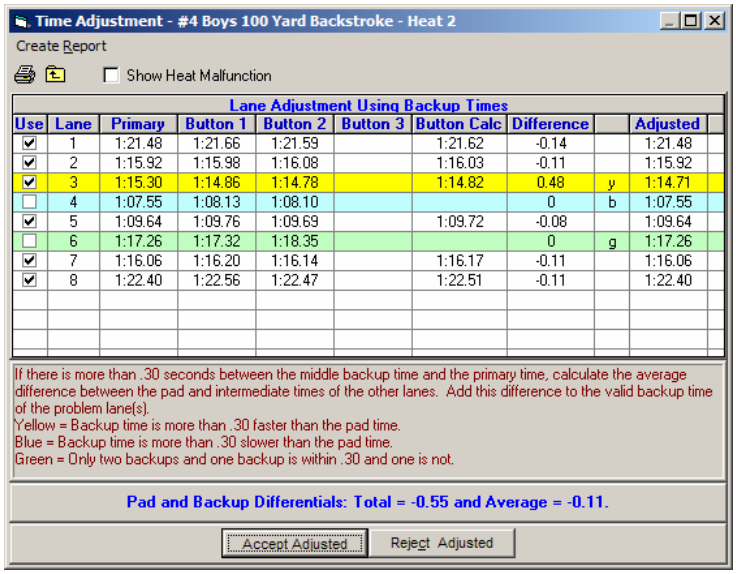
In the default Run screen from HyTek Meet Manager, backup times are not displayed. The touchpad time – shown here as "Finals Time" – is highlighted in yellow or blue if it is more than a 0.30 second difference from the hidden backup time calculated by HyTek (the average of two or the middle of three button times).



To see the backup and individual button times, the HyTek operator goes to **Preferences > Run Screen > Show Backup Times Columns**, 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. **It is recommended that the Hy-Tek operator use this alternate version of the Run screen <u>at all times</u>.**



If the Hy-Tek operator clicks anywhere in the blank column to the right of **Pts**, or clicks the **Calc** button, or hits **Ctrl+K** on the keyboard, the Time Adjustment screen appears (see below), floating over the Run screen, showing the primary-secondary difference in addition to the pad and button times for each lane. The Average Differential is at the bottom of this screen. Invalid lanes (with difference greater than 0.30 second) are not included in the Average Differential; neither are lanes that the Hy-Tek operator 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 or blue highlighted lane).

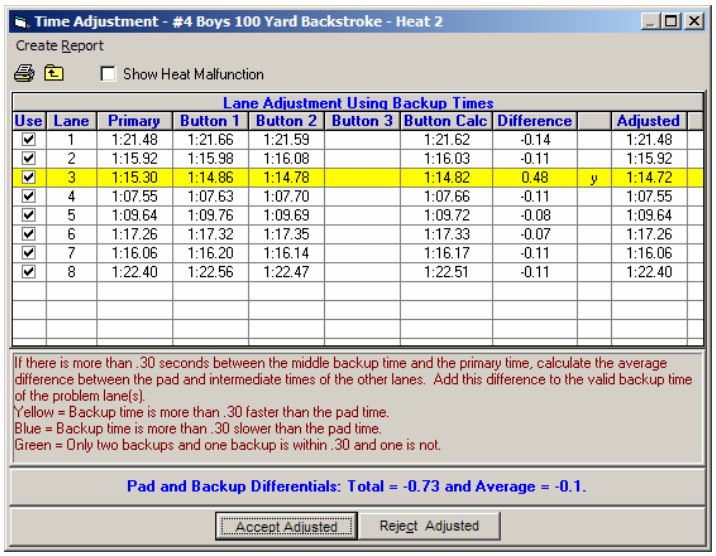


Backup times that are more than 0.30 slower than a pad time are highlighted in blue and the letter **b** is displayed.

Backup times that are more than 0.30 faster than a pad time are highlighted in yellow and the letter **y** is displayed.

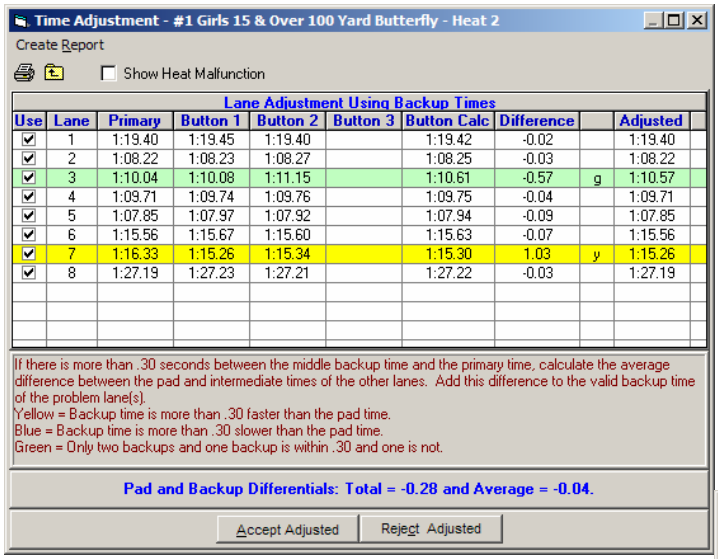
If there are two backup times and one is within 0.30 second of the pad time and one is more than 0.30 seconds from the pad time, then the lane is highlighted in green and the letter **g** is displayed. These lanes default to being unchecked for use since these times usually will not be adjusted due to the inaccuracy of the button time.

Example 1:



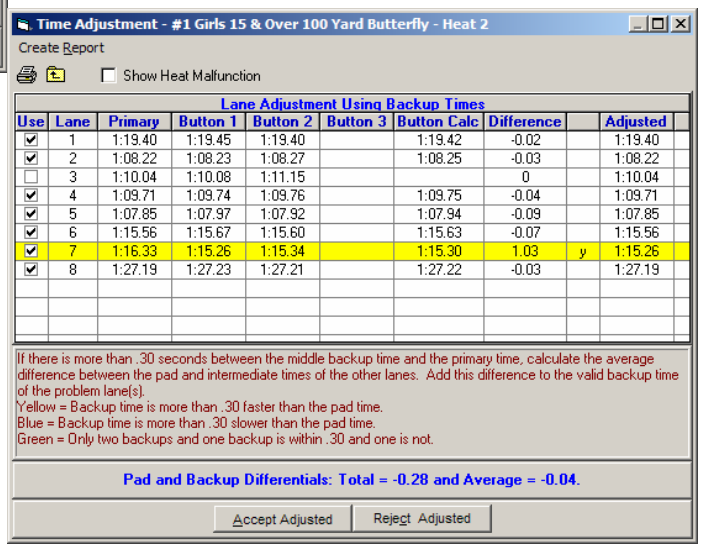
In this example, lane 3's difference exceeds .30 second. A late touch was reported and both buttons and watches are in relative agreement. The Hy-Tek operator should click "Accept Adjusted" to replace lane 3's Primary time with the adjusted time. Other lane times are unchanged.

Example 2:

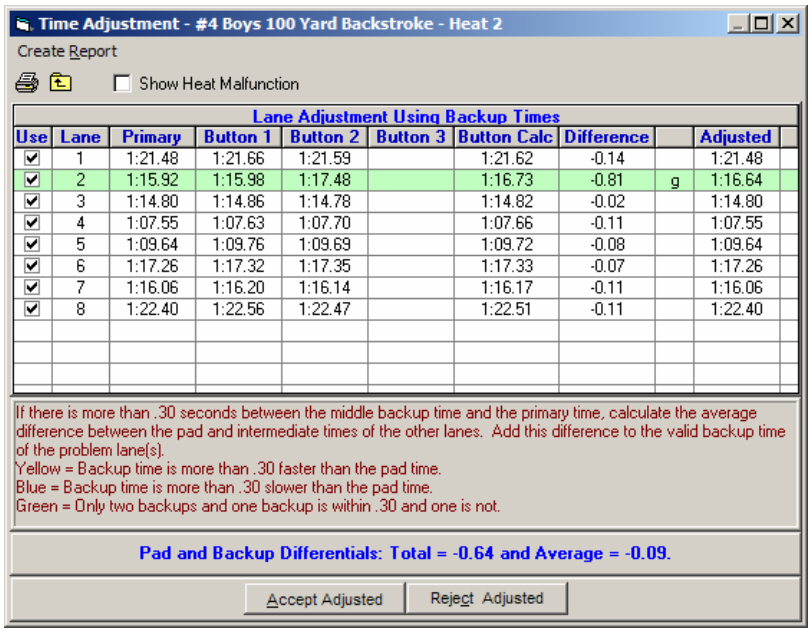


In this example, lanes 3 and 7 both exceed a .30 second difference.
A late touch is reported in lane 7.
After reviewing watch times, button 2 in lane 3 is clearly out of line with all the other times; a late button is suspected.

The Hy-Tek operator has removed the check mark from the "Use" column of lane 3, since its calculation time is judged invalid. Lane 3's invalid backup time will not be used to calculate the adjusted time. The Hy-Tek operator should click "Accept Adjusted" to replace lane 7's primary time with the adjusted time. The primary (pad) time is valid for lane 3.

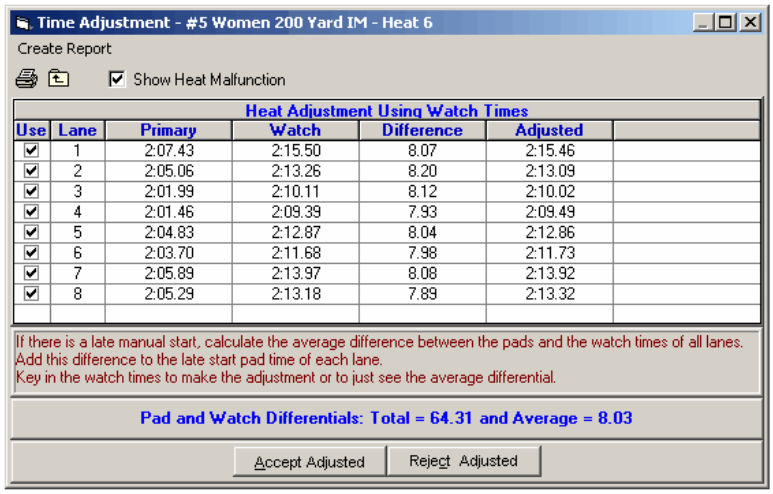


Example 3:



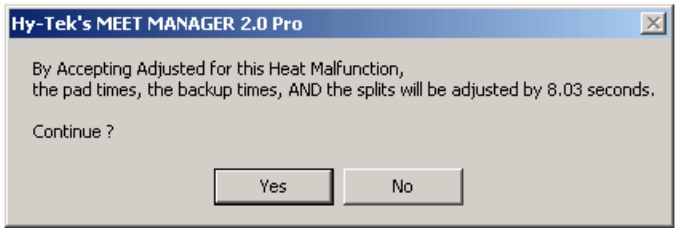
In this example, lane 2 has one button that varies greatly from the pad time as well as the other button. It is determined that the timer pushed the button late. The Hy-Tek operator should click "Reject Adjusted," since the pad time should not be altered by an invalid button.

Example 4:



In this example, there was a late manual start of the electronic timing system and the times from the pads are equally incorrect for all the lanes in the heat. The order of finish and the absolute difference of the times between the swimmers are believed to be accurate.

The Hy-Tek operator displays the Time Adjustment window and then clicks "Show Heat Malfunction." He/she enters the watch times; average difference from pad times in this case is 8.03 seconds. Timing system operator agrees that the manual start occurred approximately 8 seconds after the start. HyTek operator clicks "Accept Adjusted." The following dialog box appears:



The Hy-Tek operator clicks **Yes**, and all times are adjusted by 8.03 seconds.