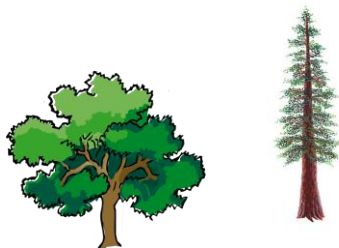


Santa Rosa Swim Meet

## Timing Equipment Documentation

Neptunes, High School North Bay League, Junior College and Masters

Updated 3/5/2023 by Chris Jones et. al (707)799-5502 cell



***North Bay League***



**SANTA ROSA JUNIOR COLLEGE**



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# 1. Quantum

## 1.1. Equipment Setup

8 lanes down the pool:

### 8 Lanes Down the Pool

25 yards shown: same wiring for 50 meters

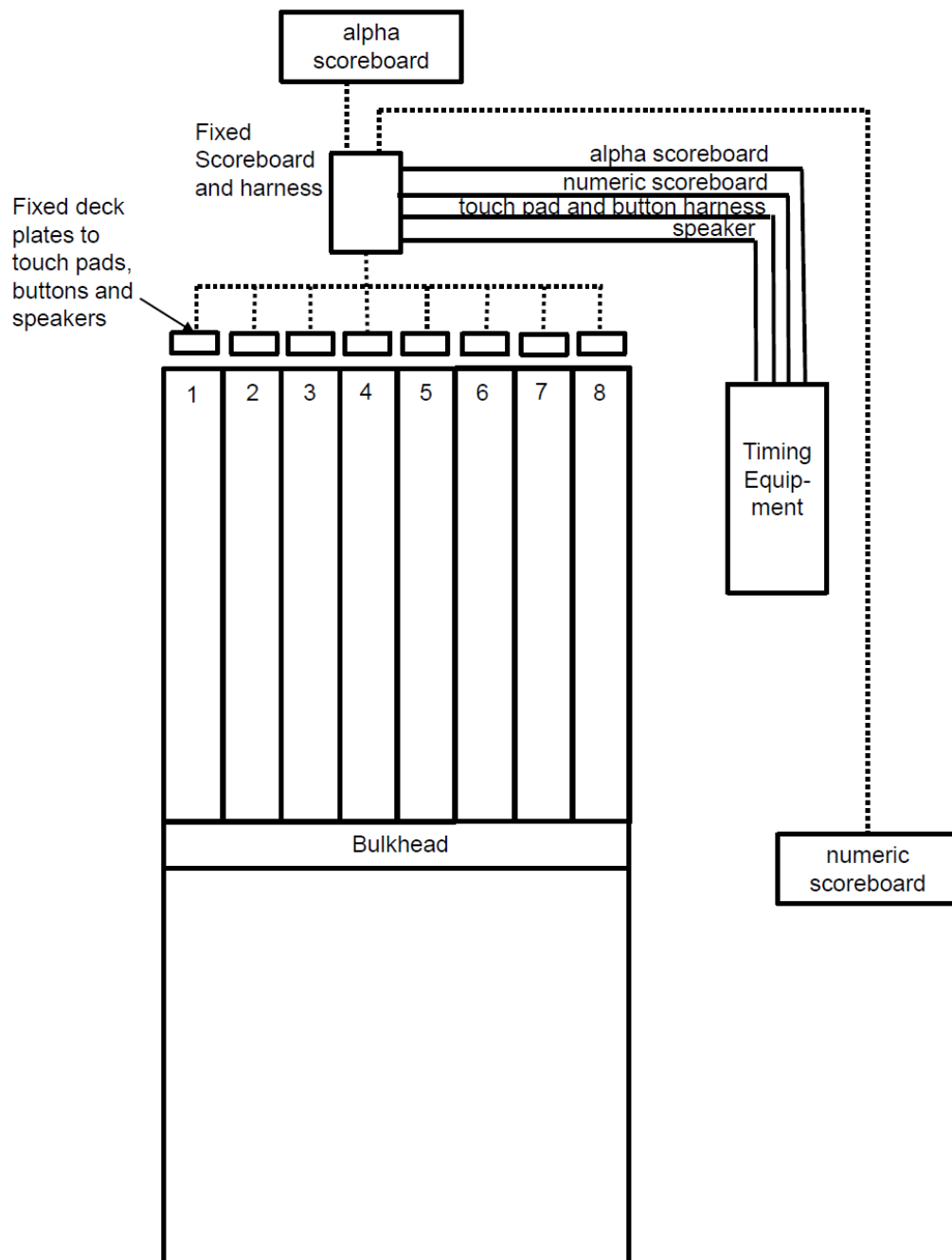


Figure 1: 8 Lanes Down the Pool Configuration.

8 lanes across the pool:

8 Lanes Across the Pool  
25 yards

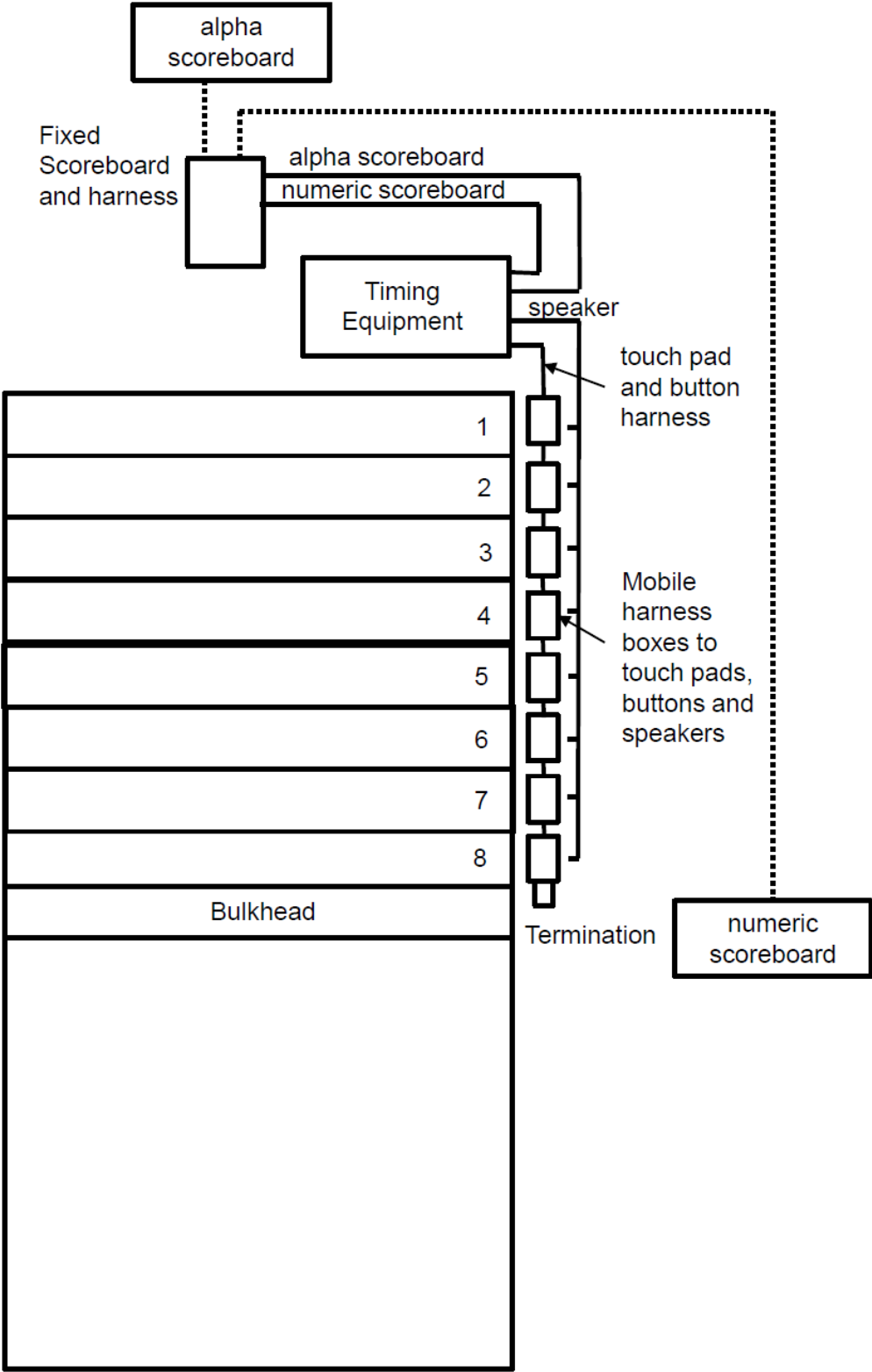


Figure 2: 8 Lanes Across the Pool Configuration.

10 lanes across the pool configuration:

## 10 Lanes Across the Pool

25 yards

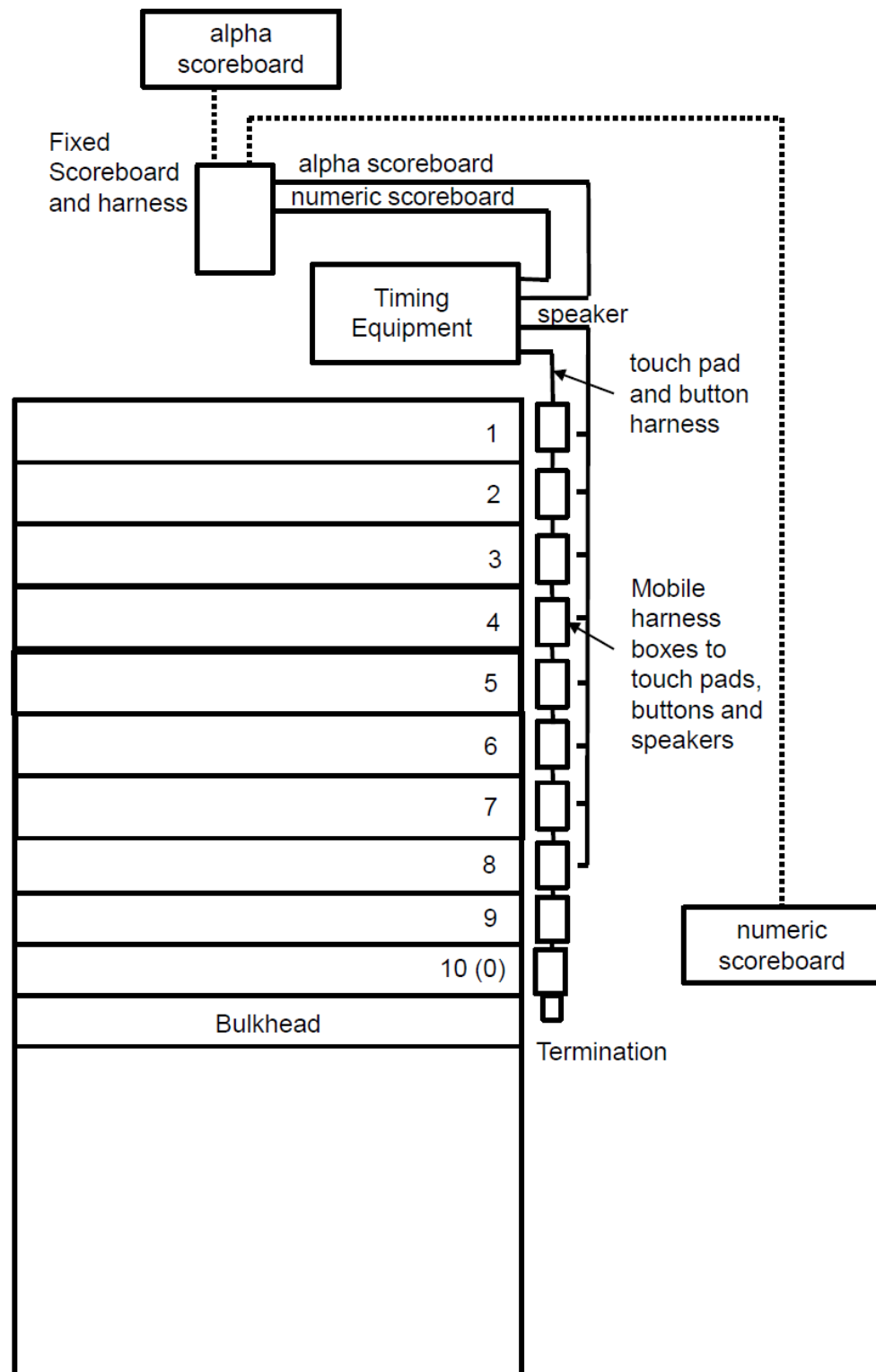


Figure 3: 10 Lanes Across the Pool Configuration.



## Equipment list

Item no.	Item	Note
1	Timing laptop	With 2 USB A ports and ethernet port, with Quantum software installed and configured
2	Timing laptop power supply	
3	Timing laptop USB-C to ethernet and USB-A adapter	Plug in to left side of laptop
4	Timing wireless mouse with USB adapter	
5	Timing mouse pad	
6	Timing printer	USB interface with toner and white printer paper installed
7	Timing printer power cord	
8	Timing printer USB cable	USB-B to USB-A
9	Quantum start system #1	For close end starts. Includes box with light, start in and start out ports mounted on tripod
10	Start system #1 power supply	
11	Start microphone with start switch #1	
12	Start cable #1	
13	Quantum start system #2	For far end starts such as 25 yard races. Includes box with light, loudspeaker, start in and start out ports placed on coaches table
14	Start system #2 power supply	
15	Start microphone with start switch #2	
16	Start cable #2	
17	Quantum timing unit	
18	Quantum timing unit power supply	
19	Quantum timing unit USB cable	USB-B to USB-A
20	Quantum start cable	
21	Quantum harness cable	
22-31	10 Quantum mobile harness boxes	For up to 10 lanes going across the pool
32	Quantum mobile harness terminator	For up to 10 lanes going across the pool
33	Quantum fixed harness	For 8 lanes going down the pool
34-43	10 Quantum loudspeakers	
44	Quantum mobile loudspeaker harness	
45-54	10 touchpads	Hang them on the pool gutter and tighten the clamps snugly so they don't come loose and cause missed touches
55-64	10 button 1s	
65	Fixed 10-Lane video scoreboard	
66	Video scoreboard laptop	
67	Video scoreboard laptop power supply	
68	Video scoreboard controller	
69	Video scoreboard display	
70	Video scoreboard display power supply	
71	Video wireless mouse with USB adapter	
72	Video mouse pad	
73	Video controller HDMI cable	
74	Video display HDMI cable	

75	Video box serial cable	
76	Video scoreboard ethernet cable	
77	Fixed 10-lane numeric scoreboard	
78	Numeric scoreboard cable	
79	Power strip	At least 7 outlets for timing laptop, timing printer, timing unit, start system 1, video scoreboard controller, video laptop and video display
80	Extension cord 1	For power strip
81	Extension cord 2	For second start system
82	Computer room ethernet cable	Long enough to reach from timing laptop to computer room router or switch
83	Reliable power source with circuit breaker location known and accessible	

*Table 1: Quantum timing equipment list.*

## Electrical Connections

Connection No.	Item	From	To
1	Timing laptop power supply	Power strip	Timing laptop
2	Timing laptop USB-C to ethernet and USB-A adapter		Timing laptop USB-C left side
3	Timing wireless mouse USB adapter		Timing laptop
4	Timing printer power cord	Power strip	Timing printer
5	Timing printer USB cable	Timing printer	Timing laptop
6	Timing unit power supply 3 pin 12V	Power strip	Timing unit
6	Start system #1 power supply	Power strip	Starting system #1 External Power jack
7	Start microphone with start switch #1		Starting system #1 e-Gun jack
8	Start cable #1 Amphenol	Start system #1 Start output	Timing unit start 1 input
9	Start system #2 power supply	Extension cord #2	Starting system #2 External Power jack
10	Start microphone with start switch #2		Starting system #2 e-Gun jack
11	Start cable #2 50 meter 4 pin reel black	Start system #2 Start output	Timing unit Start 2 input
12-20	For up to 10 lanes going across only: Mobile harness box 2 Mobile harness box 3 Mobile harness box 4 Mobile harness box 5 Mobile harness box 6 Mobile harness box 7 Mobile harness box 8 Mobile harness box 9 Mobile harness box 10 Mobile harness terminator		Mobile harness box 1 Mobile harness box 2 Mobile harness box 3 Mobile harness box 4 Mobile harness box 5 Mobile harness box 6 Mobile harness box 7 Mobile harness box 8 Mobile harness box 9 Mobile harness box 10
21	Harness 1 cable 7 pin tan: For up to 10 lanes going across only	Mobile harness box 1	Timing unit HA1 jack
	For 8 lanes down the pool only	Fixed harness output box	Timing unit HA1 jack
22-31	For up to 10 lanes going across only: Loudspeakers 1-10 Loudspeaker harness 4 pin black		Loudspeaker harness Start system #1 Speaker out jack
	For 8 lanes down the pool only: Loudspeakers 1-10		Fixed harness starting block plate "S" jacks
32-41	For up to 10 lanes going across only: Touch pads 1-10		Mobile Harness 1-10 "T" jacks
	For 8 lanes down the pool only: Touch pads 1-10		Fixed harness starting block plate "T" jacks
42-51	For up to 10 lanes going across only: Button 1 1-10		Mobile Harness 1-10 "1" jacks

	For 8 lanes down the pool only: Button 1 1-10		Fixed harness starting block plate "1" jacks
52	Quantum timing unit USB cable	Quantum timing unit	Timing laptop USB-A right side
53	Video scoreboard laptop power supply	Power strip	Video laptop
54	Video scoreboard controller power cord		Power strip
55	Video scoreboard display power supply	Power strip	Video display
56	Video wireless mouse adapter		Video laptop
57	Video controller HDMI cable	Video laptop	Video controller
58	Video display HDMI cable	Video controller	Video display
59	Video controller DB9 serial cable	Timing unit Serial 1 DB9 output	Video controller Timer 1 input
60	Video scoreboard ethernet cable	Video controller Out 1	Fixed Swiss Timing box LAN Port #1
61	Numeric scoreboard serial cable	Timing unit Serial 2 DB9 numeric scoreboard output	Fixed Swiss Timing box Numeric scoreboard input jack Amphenol
62	Extension cord 1	AC outlet #1	Power strip
63	Extension cord 2	AC outlet #2	Start system #2 power supply
64	Computer room ethernet cable	Timing laptop USB-C to ethernet adapter ethernet port	Computer room router or switch

*Table 2: Quantum electrical connection list.*

#### Fixed Deck Connector Locations

- Fixed deck plate lane connections to touch pad, button and speaker for 8 lanes down the pool only: #1 below (lane 8 shown)
- Fixed harness and scoreboard connections: #2 below

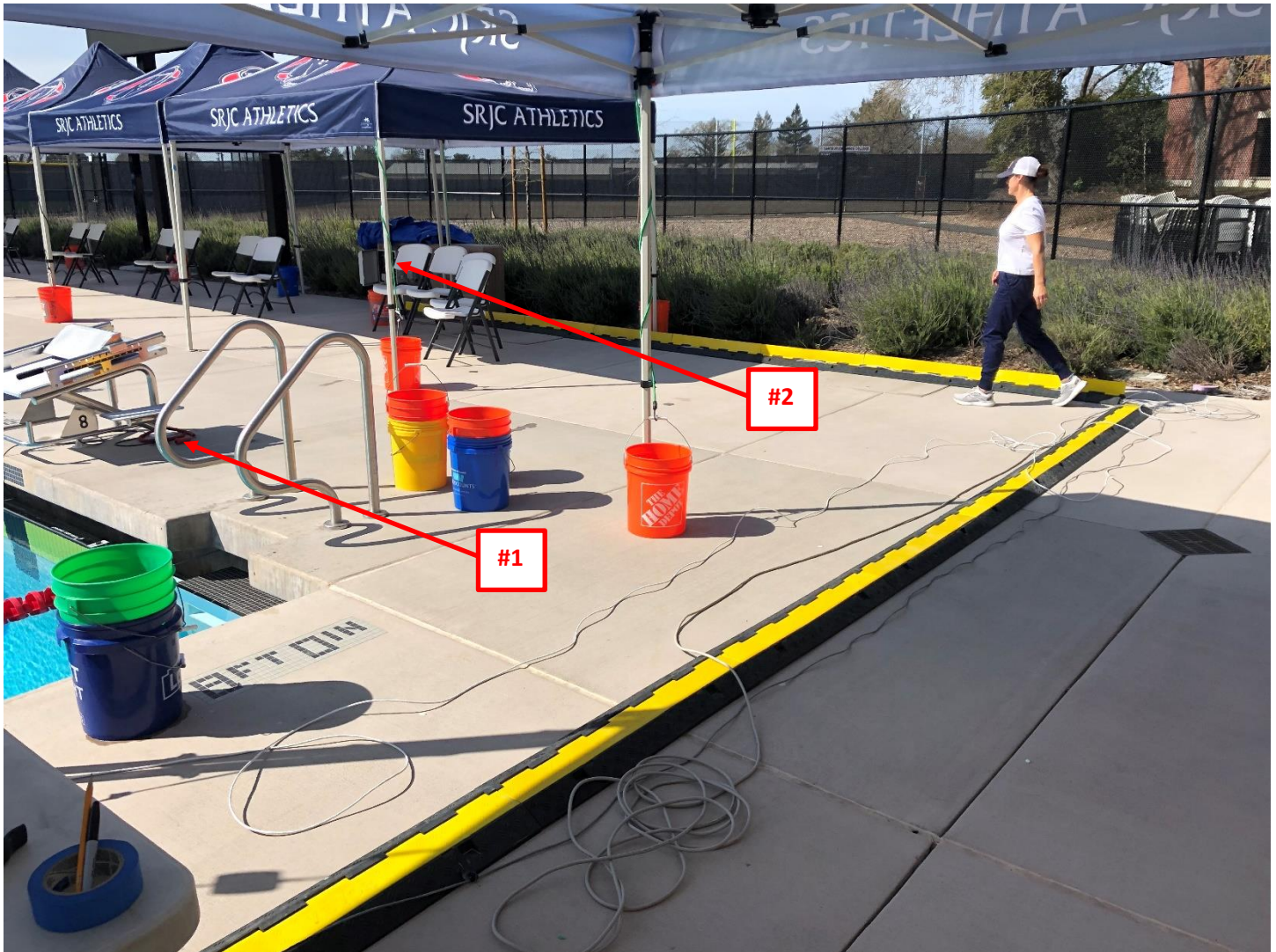


Figure 4: Buried Deck Connector Locations.

## Fixed Deck Plate Lane Connections

For 8 lanes down the pool only

- Speaker “S”, #1 below
- Button “1”, #2 below
- Touch pad “T”, #3 below

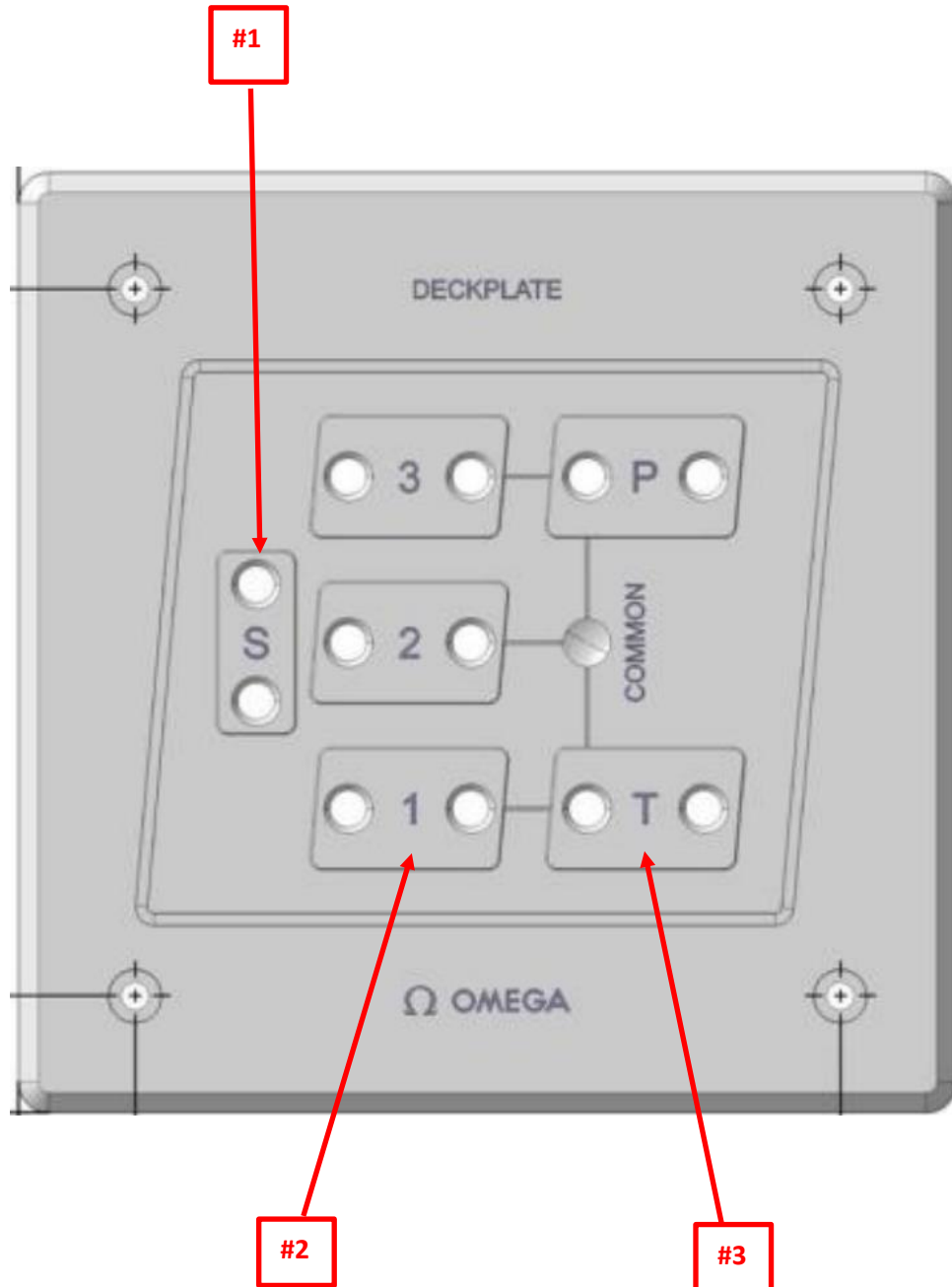


Figure 5: Quantum Fixed Deck Plate Connections.



### Fixed Harness and Scoreboard Connections

- Harness “HA”, #1 below
- “Numeric” Scoreboard, #2 below
- “Speaker”, #3 below
- LAN port “1”, #4 below

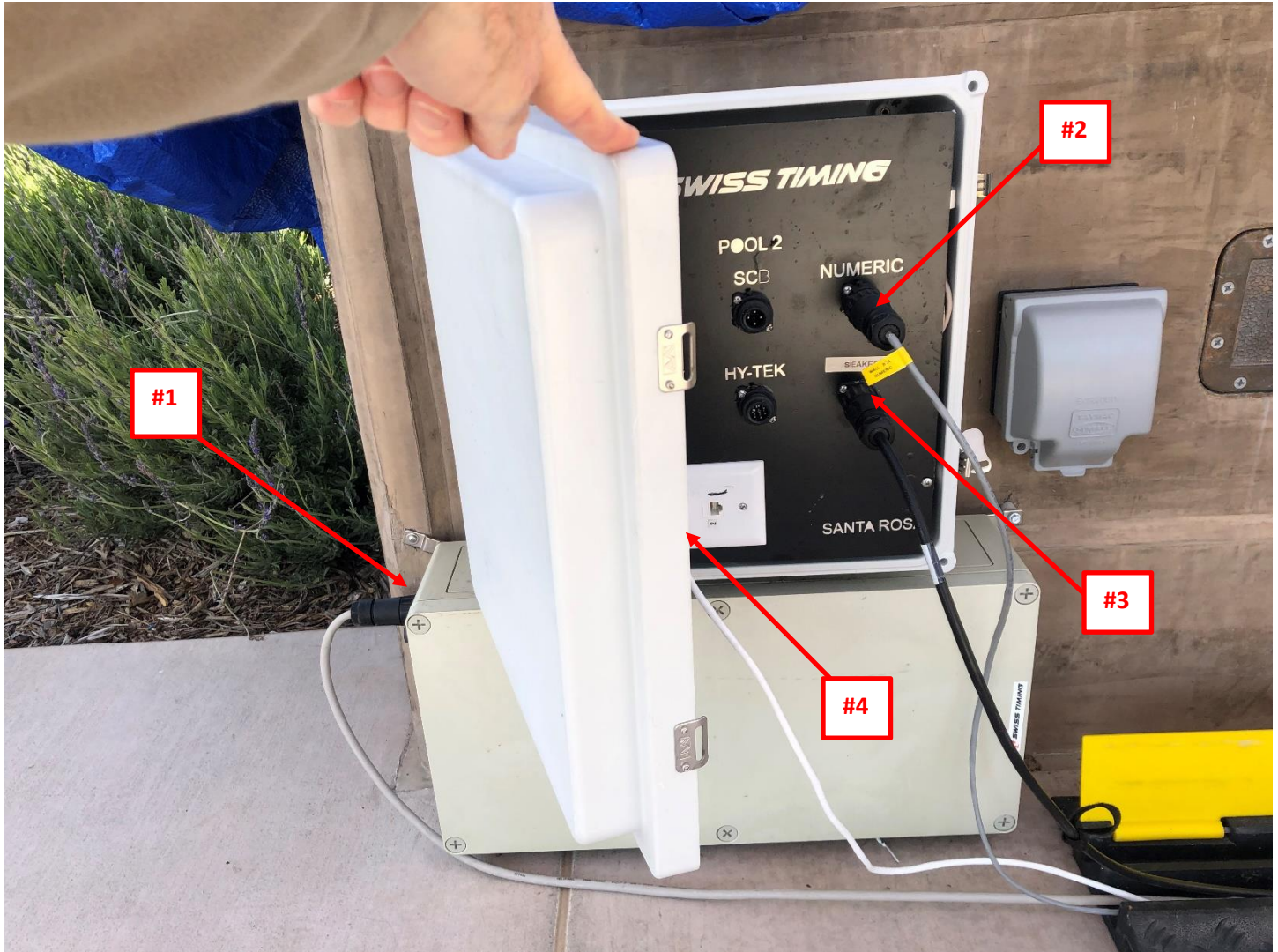


Figure 6: Fixed Harness and Scoreboard Connections.

#### Turn on equipment

- Timing laptop
- Wireless mouse
- Timing printer
- Timing unit
- Start system #1
- Start system #2
- Video scoreboard
- Numeric scoreboard
- Video scoreboard laptop
- Video scoreboard controller
- Video scoreboard display

#### Prepare for an outdoor environment if necessary

- Clean timing laptop and video scoreboard displays with glass cleaner if dirty.
- Bring a sun shade to see the timing laptop display if the sun is at the wrong angle.
- Use paperweights to contain papers if windy.
- Bring flashlight if meet goes in to the night without adequate lighting.



#### Prepare printer if needed

On timing laptop, launch Printers and Scanners. Make sure connected printer is listed as default. If not:

- Select connected printer
- Click Manage
- Click Set as Default
- Click X to close window

#### Adjust volume of both starters

- Press speaker button
- Select Internal or External speakers
- Adjust volume to avoid feedback

#### Configure video scoreboard

Project pictures or movies when races are not in progress:

Sports Control

Double-click media player to play movie

Doubleclick Start to project event, heat, names and times

Embellish with Jill's notes here

#### Configure Quantum computer

- If necessary, plug in USB dongle protection key that holds the Quantum license, if not hard coded on the laptop.
- Create session folder. Example "c:\Hy-Tek Meet Files\20230304 High School Invite"
- Launch Quantum AQ Swimming program. This brings you to the Home page.
- Verify box in upper right is green, indicating that the Quantum-Aq Timer is connected to the PC via USB cable.  
Be patient: this may take up to 10 seconds normally, and up to 1 minute the first time it makes the connection.

- Configure Timing
  - Click Configuration button. This brings up the Timer tab.
  - Click Timing tab.
  - Verify Arming at start is set to 10 seconds not the 8 second default, to allow swimmers more time to get out of the pool.

Quantum-AQ

Configuration PrimaryOn Air 02:44:30

Timer Timing Printer Language Version Backup DB & Logs

**Timing**

Times (sec)

15	Arming	10	Arming at start
1	Reaction window +/-	1	Relay window +/-
10	Net time hold	10	No touch warning

Miscellaneous

<input checked="" type="checkbox"/> Sound for touch	<input checked="" type="checkbox"/> Sound for start
<input checked="" type="checkbox"/> Warn for unofficial races	<input checked="" type="checkbox"/> Auto unused lanes
<input type="checkbox"/> Auto update records table on official	<input checked="" type="checkbox"/> Skip split times when no touchpads

Arming indicators aspect

Waiting to arm	Armed	Waiting touch	Selected side	Radius	4

☐ Advanced view

Figure 7: Quantum Configuration Timing screen.

- Create a new session

Called a meet in Quantum but one “meet” is required per session within a meet.

- Click red Home button in upper right corner of screen.
- Click Race button.
- Press green “+” button to create a new meet.

The screenshot shows the Quantum-AQ Race interface. At the top, there's a 'Race' header and a 'Meet' tab. A red arrow points to a green '+' button in the 'Meets' section, labeled 'Open'. Below this is a table of meets. The sidebar on the right contains various controls like 'Side', 'Lane', 'Lap', 'Armed', 'Contact', and 'Prop', along with 'Reset' and 'Refresh' buttons.

Name	Nb of races	Nb of competitors	Creation date
02_03_2023_Hancock Dual	26	70	03 February 2023
02_04_2023_Norcal Relays	24	206	03 February 2023
02_17_2023_Neptune Invitational	28	282	17 February 2023
02_18_2023_Neptune Invitational	20	278	18 February 2023
02_18_2023SwimOff	22	277	18 February 2023
02_25_2023_Alumni Meet	28	192	25 February 2023
02_26_2023_Zone All Stars	64	356	26 February 2023
09_2022_CBA_SSN1	80	474	30 September 2022
10_22_2022_Super League	28	170	21 October 2022
1_14_2023_SR_Masters	12	492	13 January 2023
2022 Training SSN1	79	881	28 September 2022
220929 Test Meet	6	20	29 September 2022
221021 Test	80	480	21 October 2022
221021_Trimet_SRIC1	26	100	21 October 2022
230219SRNInvitational	23	266	19 February 2023
230219_SRN_Invite_FINALS	22	192	19 February 2023
2_18_2023NeptunelInvitationalFinal	20	190	18 February 2023
Dickens2022	84	82	09 December 2022
Dickens2022_session2	84	100	10 December 2022
Dickens2022_Session2a	84	294	10 December 2022
Dickens2022_Session2b	0	0	10 December 2022
Dickens2022_Session2c	84	283	11 December 2022
Event110	1	2	18 February 2023
neptunetest	0	0	04 November 2022
test	21	393	09 June 2022
test10	70	278	16 February 2023
testy	28	170	01 December 2022
testy2	28	170	01 December 2022
testy3	7	105	01 December 2022
testy4	84	479	06 December 2022
testy5	2	2	06 December 2022

Figure 8: Quantum Add New Meet Screen.

- Type Meet name. Do not use special characters. Create one meet per session. Example “20230304 High School Invite”. For multi-session meets indicate which session it is in the title.
- Click OK. This brings up the Race Settings Tab and Timing subtab.

- Configure Printing
  - Click Printer subtab.
  - Select Autoprint on official only if you are printing the results for each heat, such as for club, high school and Masters swimming. Not needed for JC

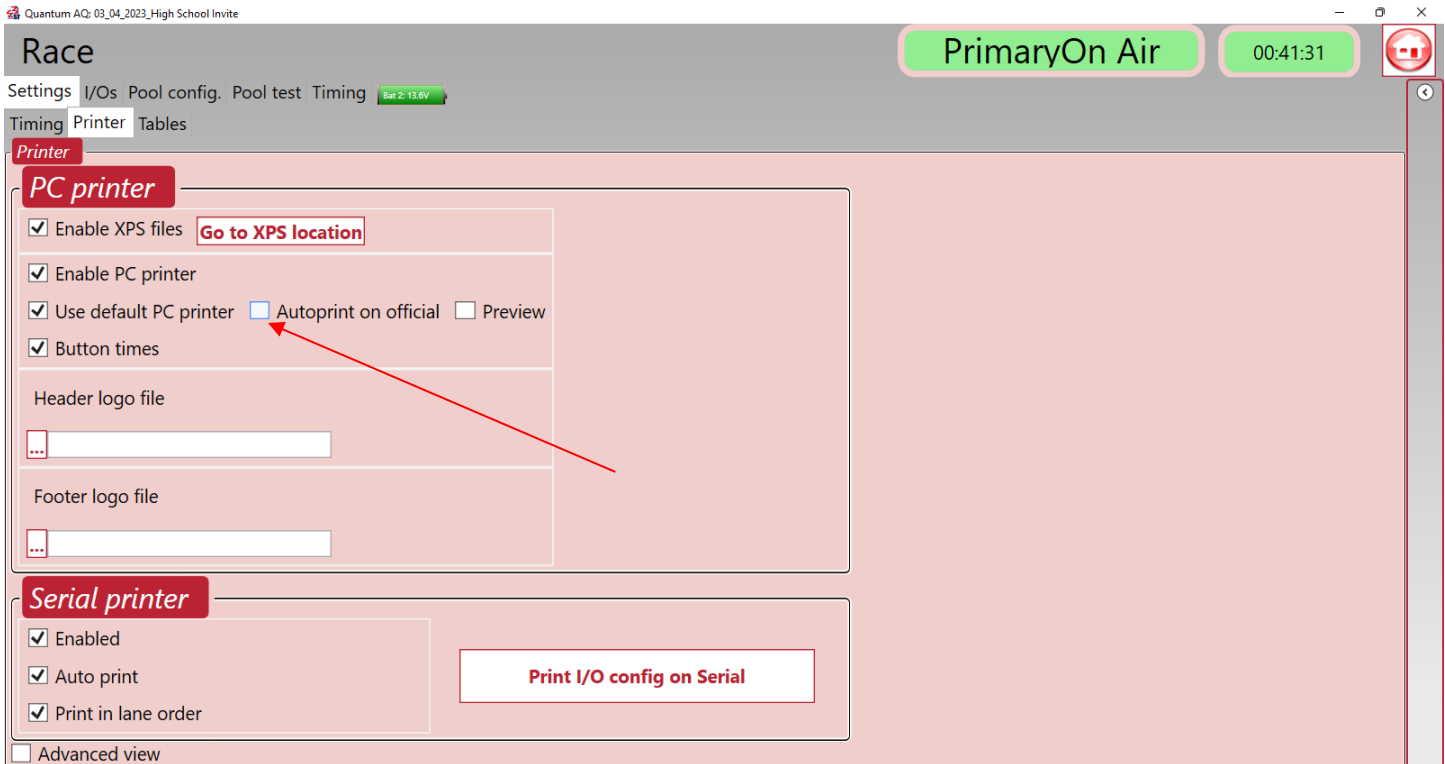


Figure 9: Quantum Autoprint Screen.

- Set Up Race Distances
  - Click Tables subtab.
  - Click Distances sub-subtab.
  - Add any distances in the meet that are not listed in the table by clicking the green add arrow and filling the distance. Notice uncommon Norcal Relay meet distances added below – 150, 250 and 300 yards.

Quantum AQ: 03\_04\_2023\_High School Invite

Race

PrimaryOn Air 02:50:56

Settings I/Os Pool config. Pool test Timing **Bar 2: 13.5V**

Timing Printer Tables

**Tables**

Distances Styles Categories Rounds Status Records

✕ + ↺

Distance	Text	Nb. of Relays	Unit
50	50 Y	1	
100	100 Y	1	
200	200 Y	1	
400	400 Y	1	
800	800 Y	1	
1500	1500 Y	1	
400	4x100Y	4	
800	4x200Y	4	
200	4x50 Y	4	
25	25 Y	1	
300	3x100Y	3	
150	3x50Y	3	
500	3x500Y	3	
250	250 Y	1	

Figure 10: Quantum Race Distance Table.

Figure out how to switch from yards to meters and add document here. Switching from default meters to yards as well as adding the uncommon race lengths included Omega setup both on-site and then subsequently remotely with a comment that they would have to do it again in the future, but I suggest they teach us how to fish instead.

- Configure I/Os
  - Click I/Os tab.
  - Verify on the top row that SCB1 is set to Serial 1, SCB Swiss Timing Alpha alphanumeric jumbotron scoreboard and is selected.
  - Verify in the second row that SCB2 is set to Serial 2, SCB Calypso numeric scoreboard and is selected.
  - Verify in the 4<sup>th</sup> row that the left column is Hy-Tek, 3<sup>rd</sup> column says DH Hytek and is selected.
  - Verify the third row SCB3, 5<sup>th</sup> row DH2 and 6<sup>th</sup> row DH3 are all blank.
  - Click 4<sup>th</sup> row second column to select Hytek file sharing folder. This brings up a new window below.
  - Click on “..” at right side of ePath for the files row. A new folder navigation window pops up below.
  - Navigate to folder specified by computer operator, such “c:\Hy=Tek Meet Files\20230304 High School Invite\” then click OK.

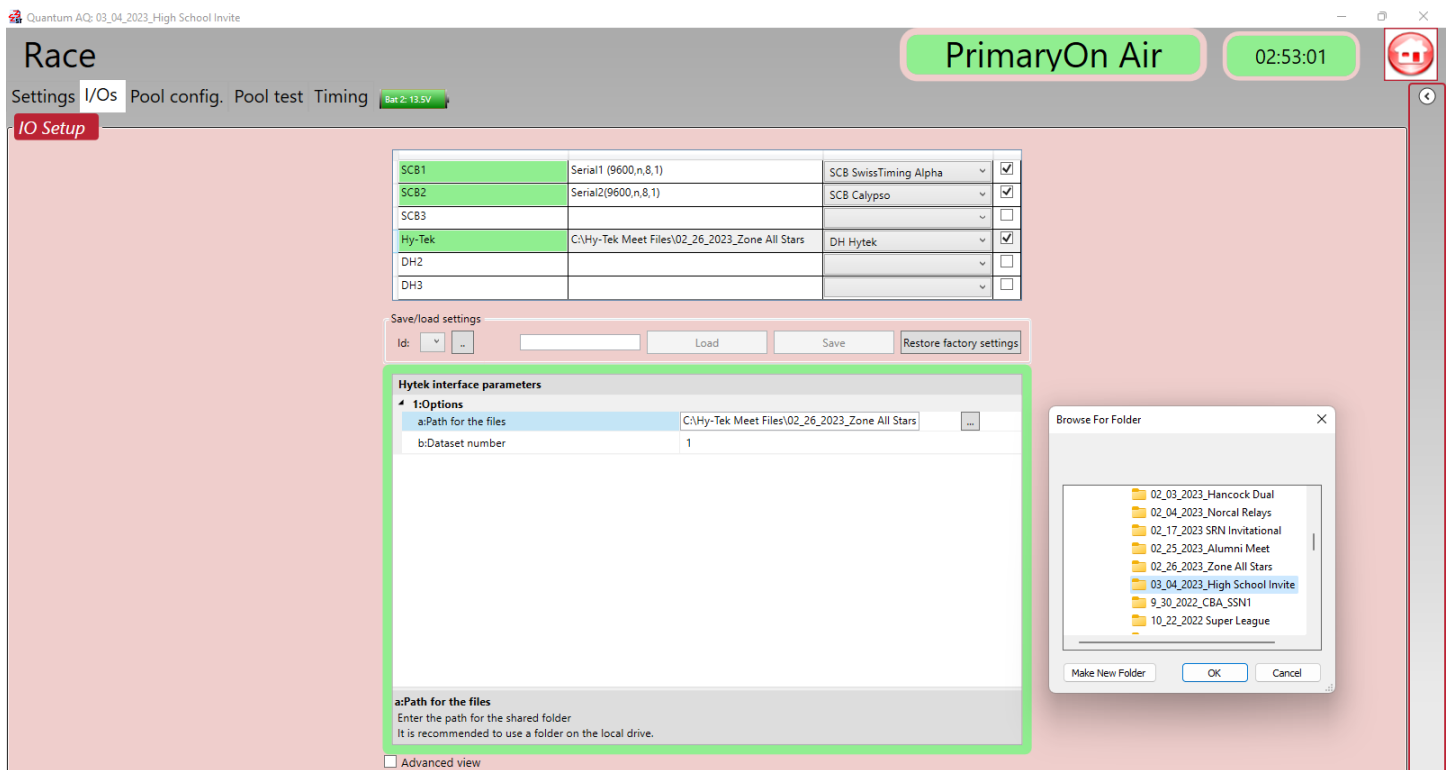


Figure 11: Quantum Race I/O Setup Screen.

- Verify ePath was updated to target file share folder.

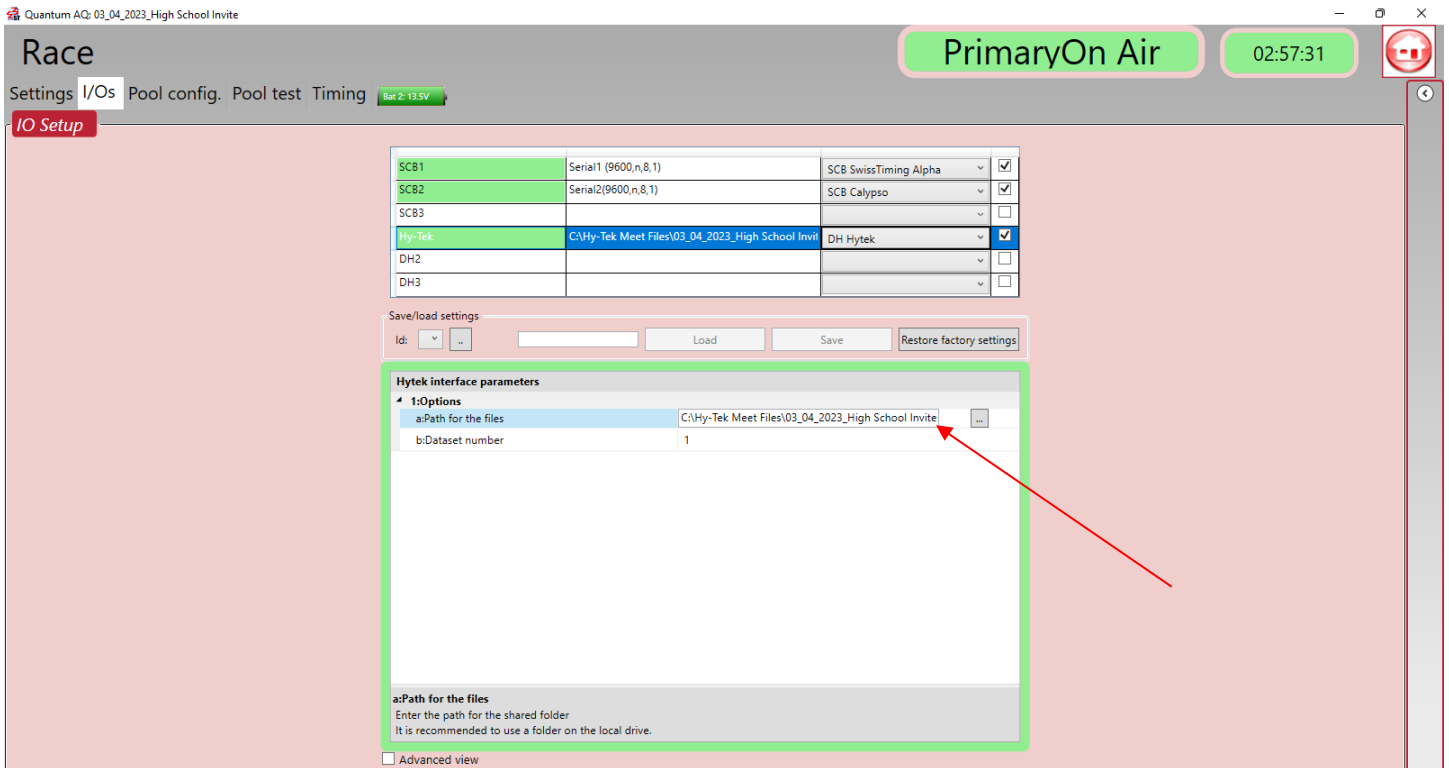


Figure 12: Updated Quantum Race I/O Screen.

- Configure pool
  - Click Pool config tab

8 lanes down the pool:



*Figure 13: 8 Lanes Down the Pool Lane Picture.*





*Figure 14: 8 Lanes Down the Pool Equipment Picture.*

- Toggle on Enable Changes button to be selected.
- Under Harnesses, select HA1 on right, and deselect 3 other options.
- Under Contacts, select touch pad and button 1 on right, and deselect other 8 options.
- Under Number of Lanes select 1-8.
- Under Lanes use recycle buttons and arrow keys as needed to get lane 1 on the top (far side of pool) and lane 8 on the bottom (close side of pool) in the right green column. Ignore middle white and red left columns.
- Under General configuration, select Pool Length = 25 and Start/Finish Place Finish at Right.
- Click Save as Default.
- Toggle Enable Changes button to be deselected.

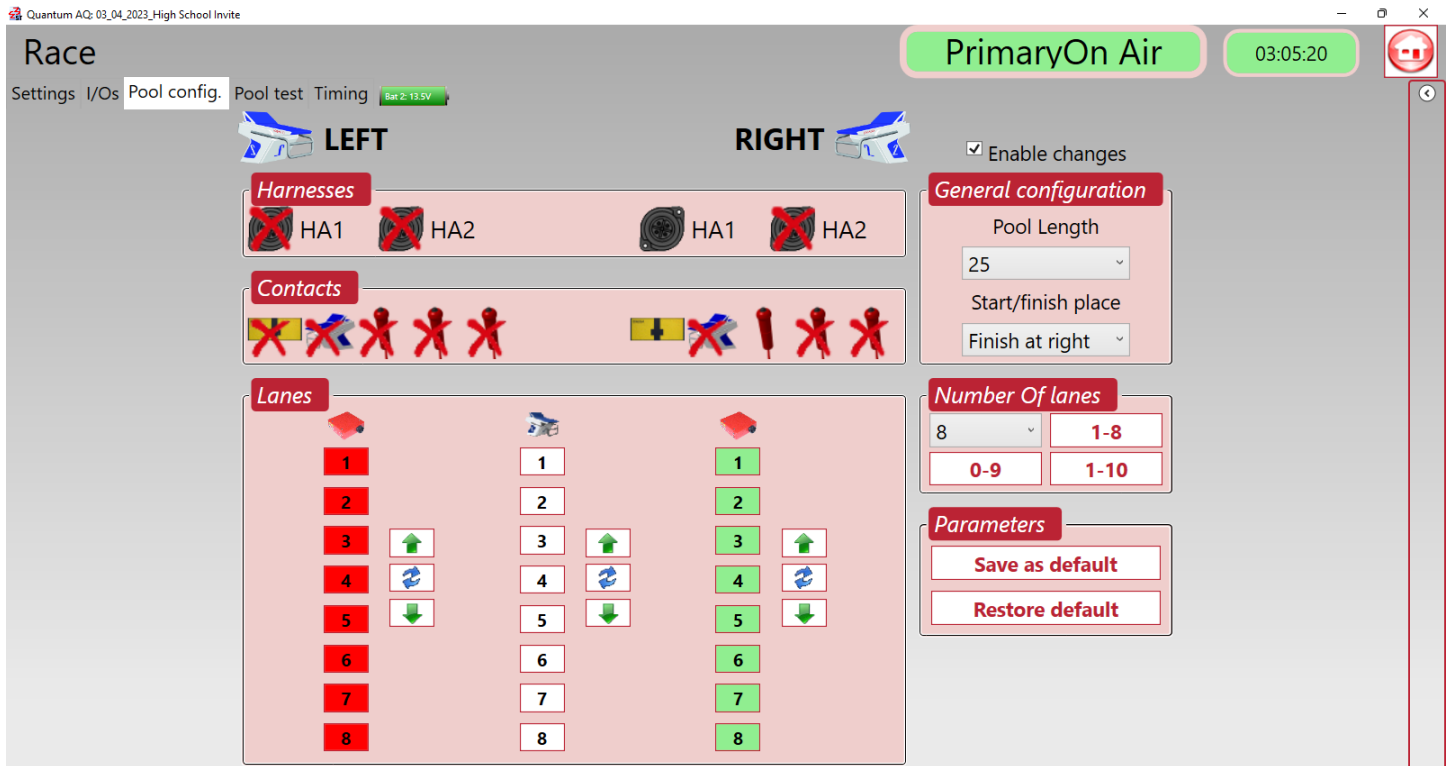


Figure 15: Quantum 8 Lanes to Bulkhead Configuration Screen.



8 lanes across the pool:

### Add photos of pool and equipment

- Toggle on Enable Changes button to be selected.
- Under Harnesses, select HA1 on left, and deselect 3 other options.
- Under Contacts, select touch pad and button 1 on left, and deselect other 8 options.
- Under Number of Lanes select 1-8.
- Under Lanes use recycle buttons and arrow keys as needed to get lane 1 on the bottom (close side of pool) and lane 8 on the top (far side of pool) in the left green column. Ignore middle white and red right columns.
- Under General configuration, select Pool Length = 25 and Start/Finish Place Finish at Right.
- Click Save as Default.
- Toggle Enable Changes button to be deselected.

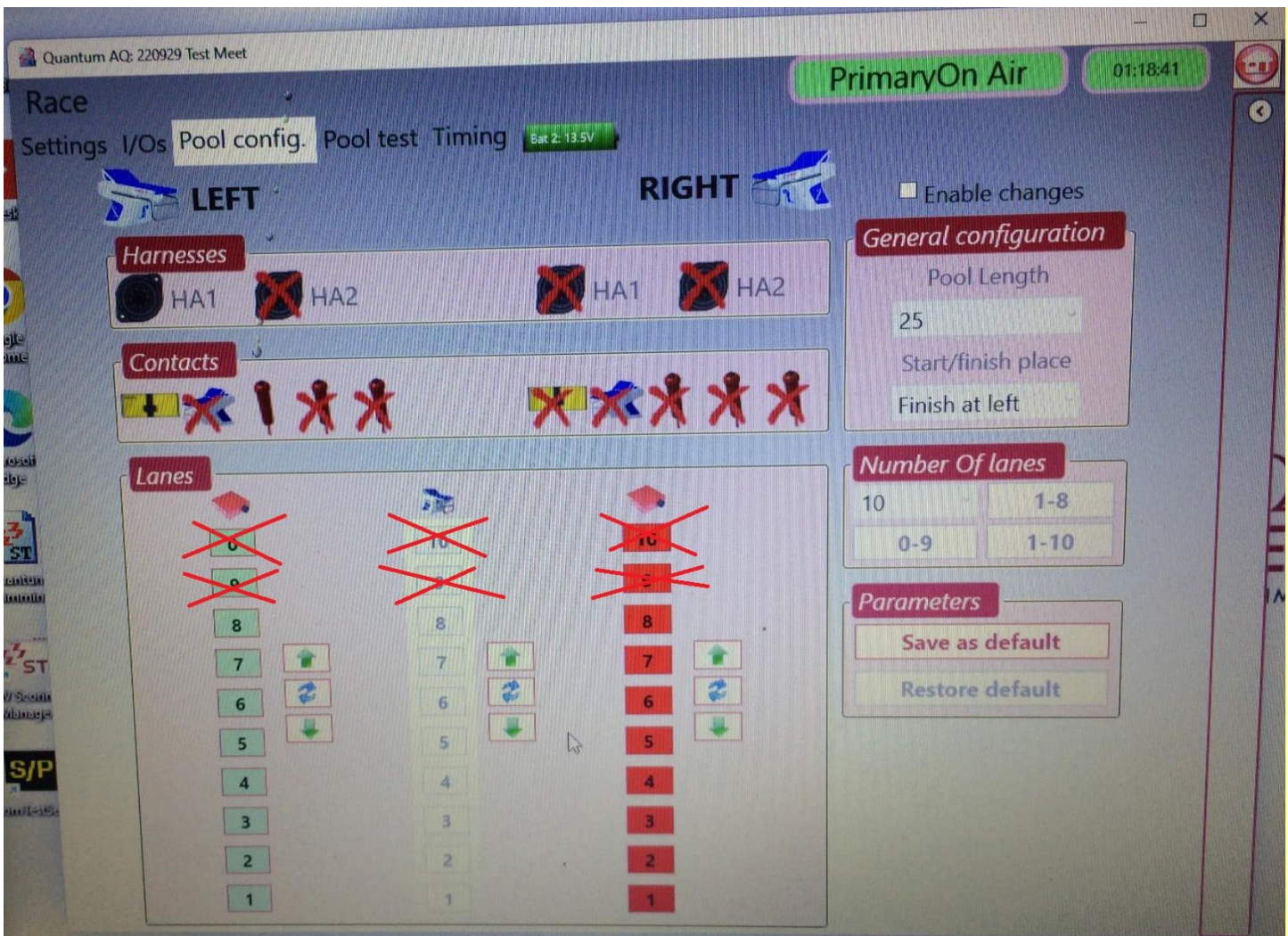


Figure 16: Quantum 8 Lanes Across Configuration Screen.

### Replace with proper screen shot



10 lanes across the pool:

### Add photos of pool and equipment

- Toggle on Enable Changes button to be selected.
- Under Harnesses, select HA1 on left, and deselect 3 other options.
- Under Contacts, select touch pad and button 1 on left, and deselect other 8 options.
- Under Number of Lanes select 1-10.
- Under Lanes use recycle buttons and arrow keys as needed to get lane 1 on the bottom (close side of pool) and lane 0 on the top (far side of pool) in the left green column; box 0 = lane 10. Ignore middle white and red right columns.
- Under General configuration, select Pool Length = 25 and Start/Finish Place Finish at Right.
- Click Save as Default.
- Toggle Enable Changes button to be deselected.

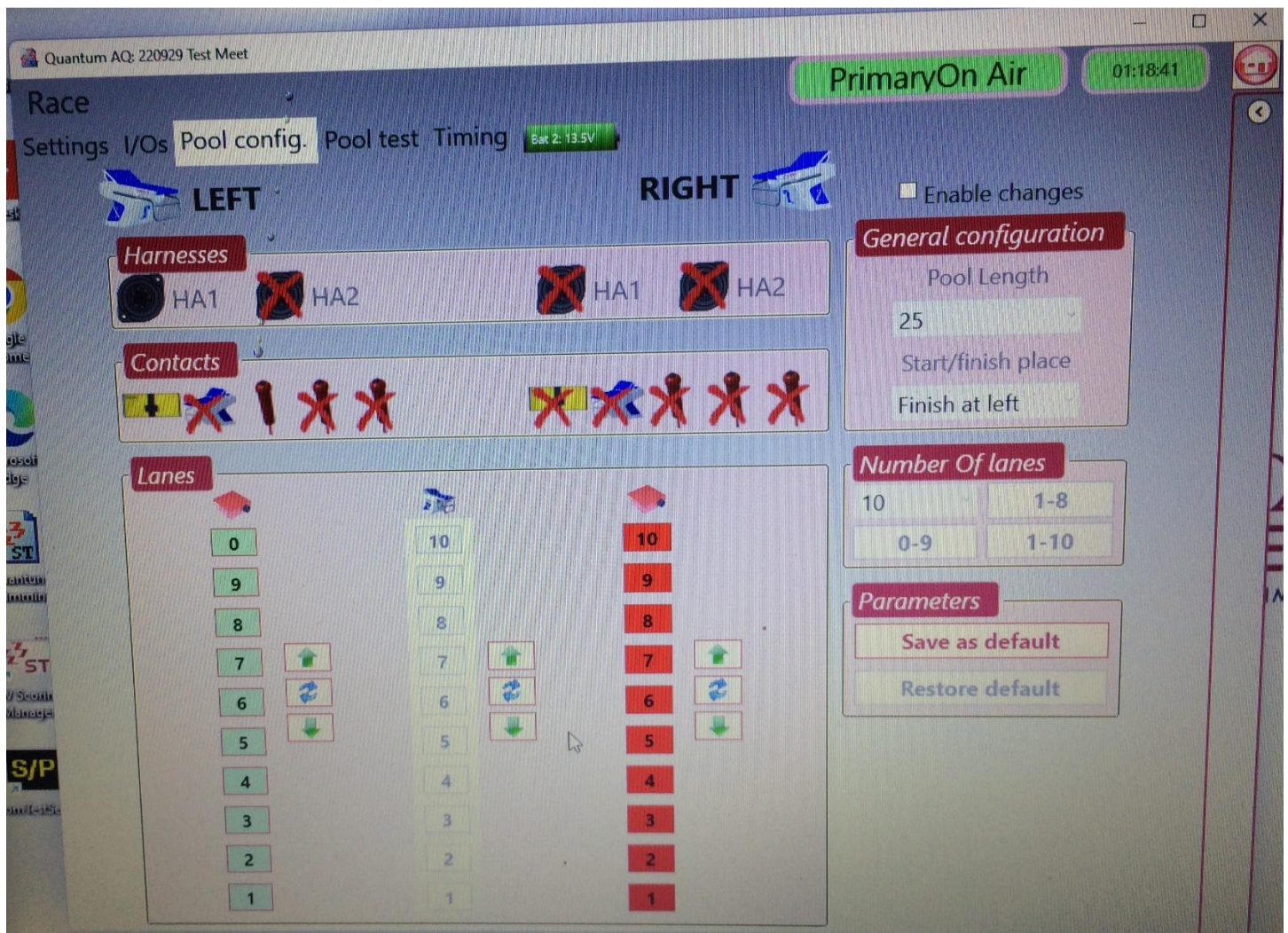


Figure 17: Quantum 10 Lanes Across Configuration Screen.

Replace with proper screen shot

Test start system:

- Click Pool test tab.
- Press starter e-Gun start button. Make sure it goes beep and the clock starts going on the Quantum laptop, video scoreboard and numeric scoreboard, and that the laptop looks like this:



Figure 18: Quantum Test Start Screen.

- Make sure each lane's pad touch looks like this:



Figure 19: Quantum Touch Pad Test Screen.

Make sure each button press looks like this:

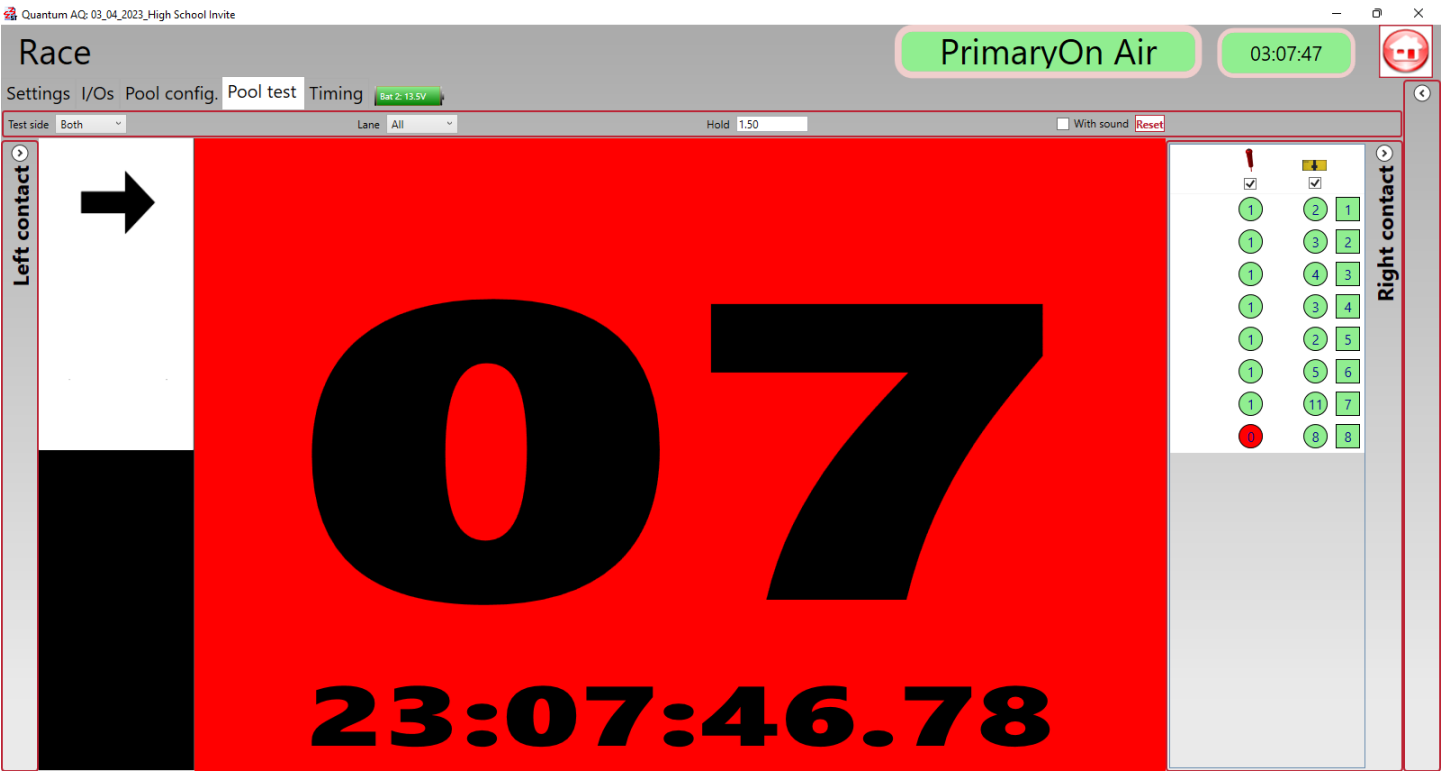


Figure 20: Quantum Button Press Test Screen.

Test timing printer:

Figure out how to do this

## Configure Printing

- Click Timing tab. This brings up main run window with Timing tab open.
  - Click Printer tab in lower right

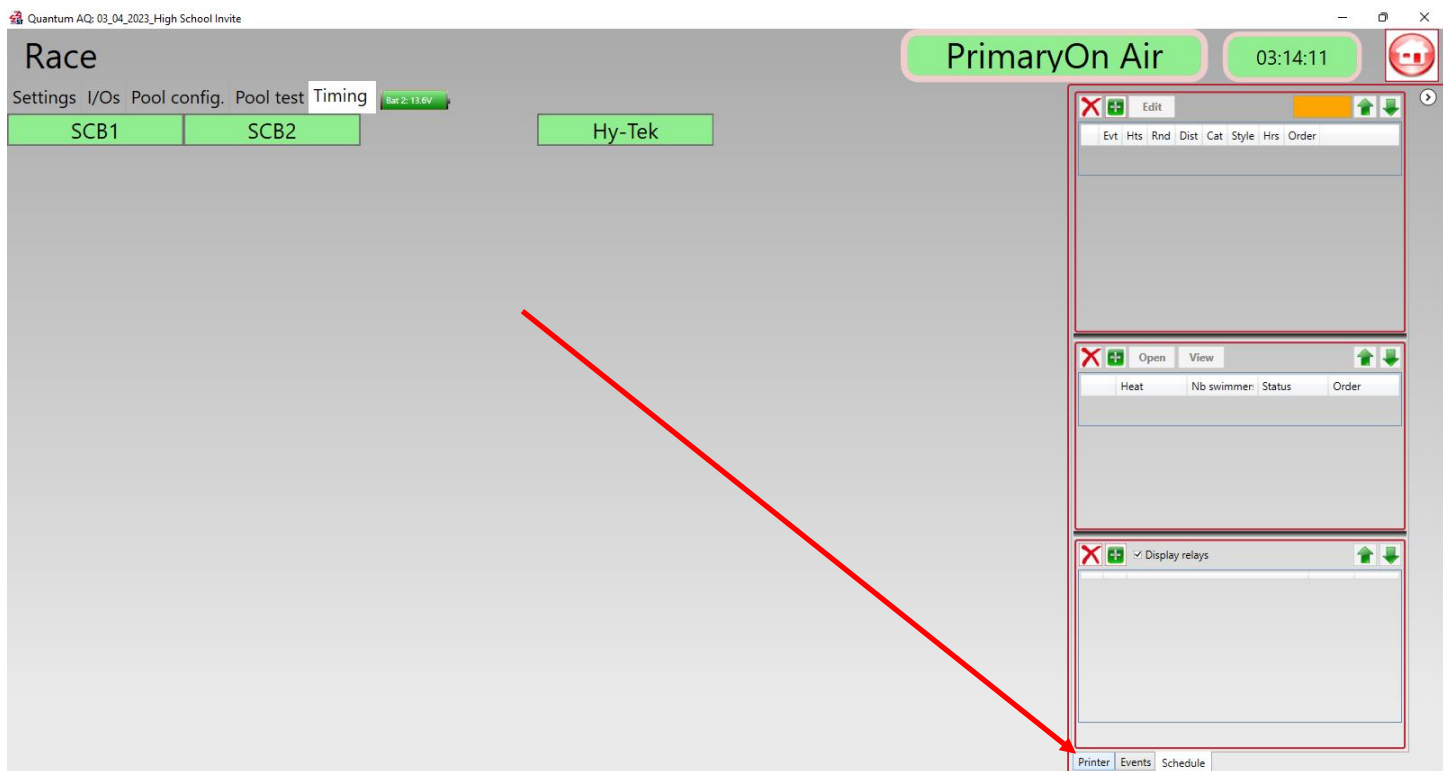


Figure 21: Quantum Initial Race Timing Screen.



- Select Print On Paper if desired.

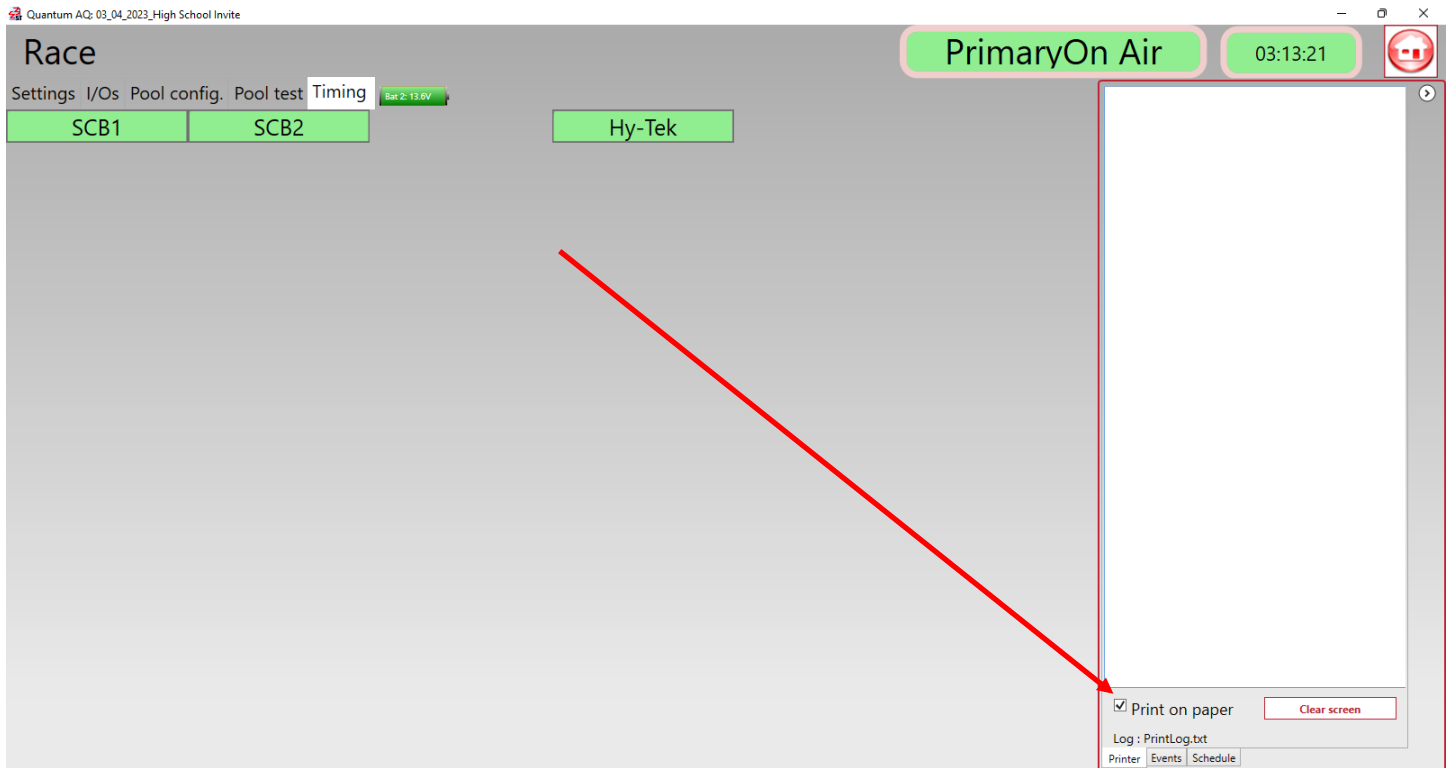


Figure 22: Quantum Print On Paper Screen.

- Update the Meet Schedule
  - Click on Schedule subtab, #1 below.
  - Once the computer operator has downloaded the meet schedule to the Quantum computer, click on Hy-Tek, #2 below and select Import Meet Schedule. This reads the quantum.sch file created by the Hy-Tek computer operator and populates the upper right table with events. Verify that these events agree with the meet sheet. Completion of this step confirms proper connection between the Quantum and Hy-Tek computers.

Figure out how to test getting times back to HyTek without making a practice meet, which defeats the purpose because changing meets can change the configuration and stop working.

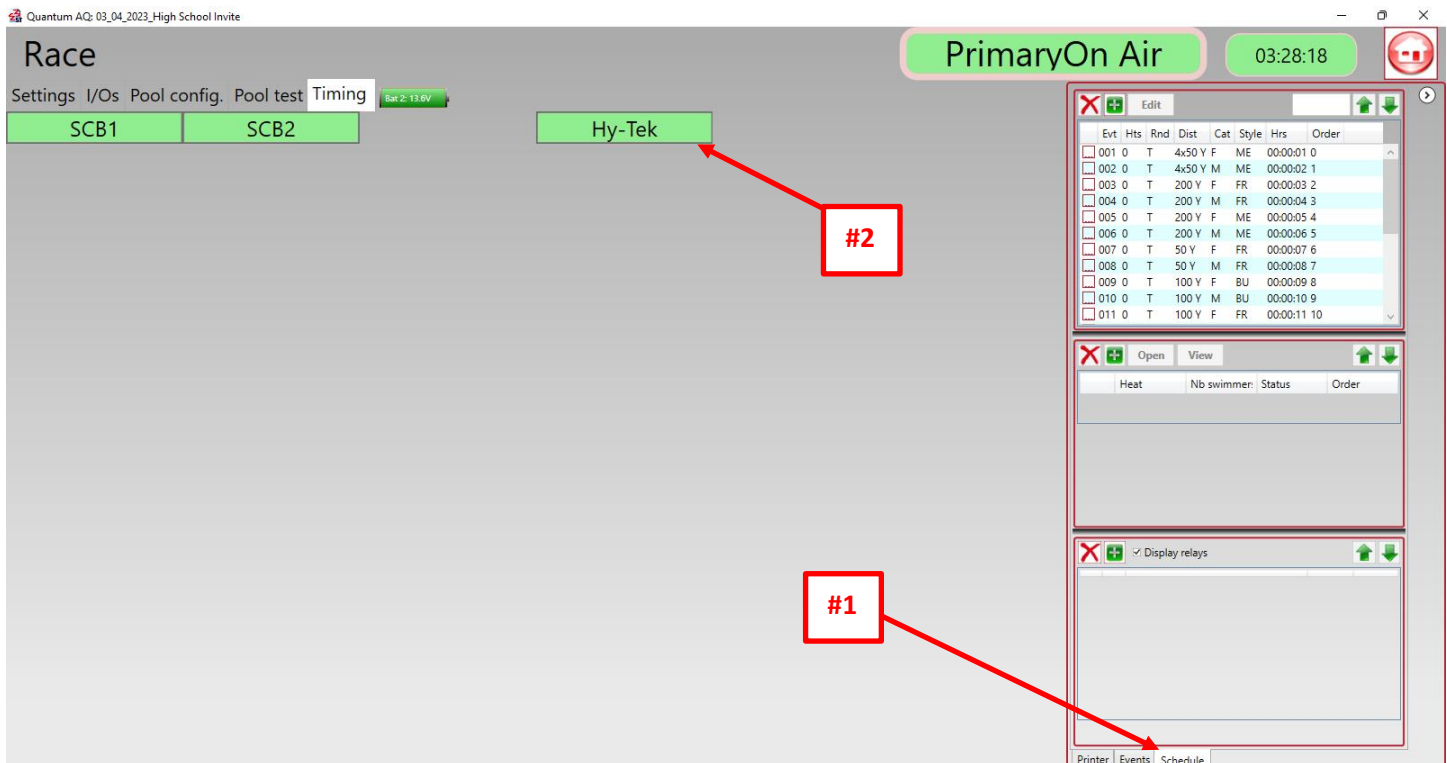


Figure 23: Quantum Import Schedule Screen.

Update screen shot with the Hy-Tek menu dropped down showing Import schedule.

In the event of a problem connecting to the Hy-Tek computer, you can create a schedule manually, but no names will be displayed on the scoreboard. See page 21 in Quantum user manual for instructions.

## 1.2. Timing Equipment Operator Duties

- Navigate to Run Screen

You will be running the equipment in the Timing Tab in Race Mode. To navigate there:

- In Quantum-AQ Swimming program, go to the Home screen by clicking the red house icon in the upper right corner. The session should already be set up per the previous section.
- Click Timing tab.

- Update Start List

Do this once before the session for preseeded meets, and before each event for deck seeded meets.

- Click green HyTek button, #1 below.
- Click Refresh Start List Whole Meet, #2 below. This reads the quantum.rec and quantum.slx file in the session folder populated by the computer seeding operator.
- Click on green heat button. That populates the heat window.
- Click on heat row in center right window. That populates the lower right swimmer window.

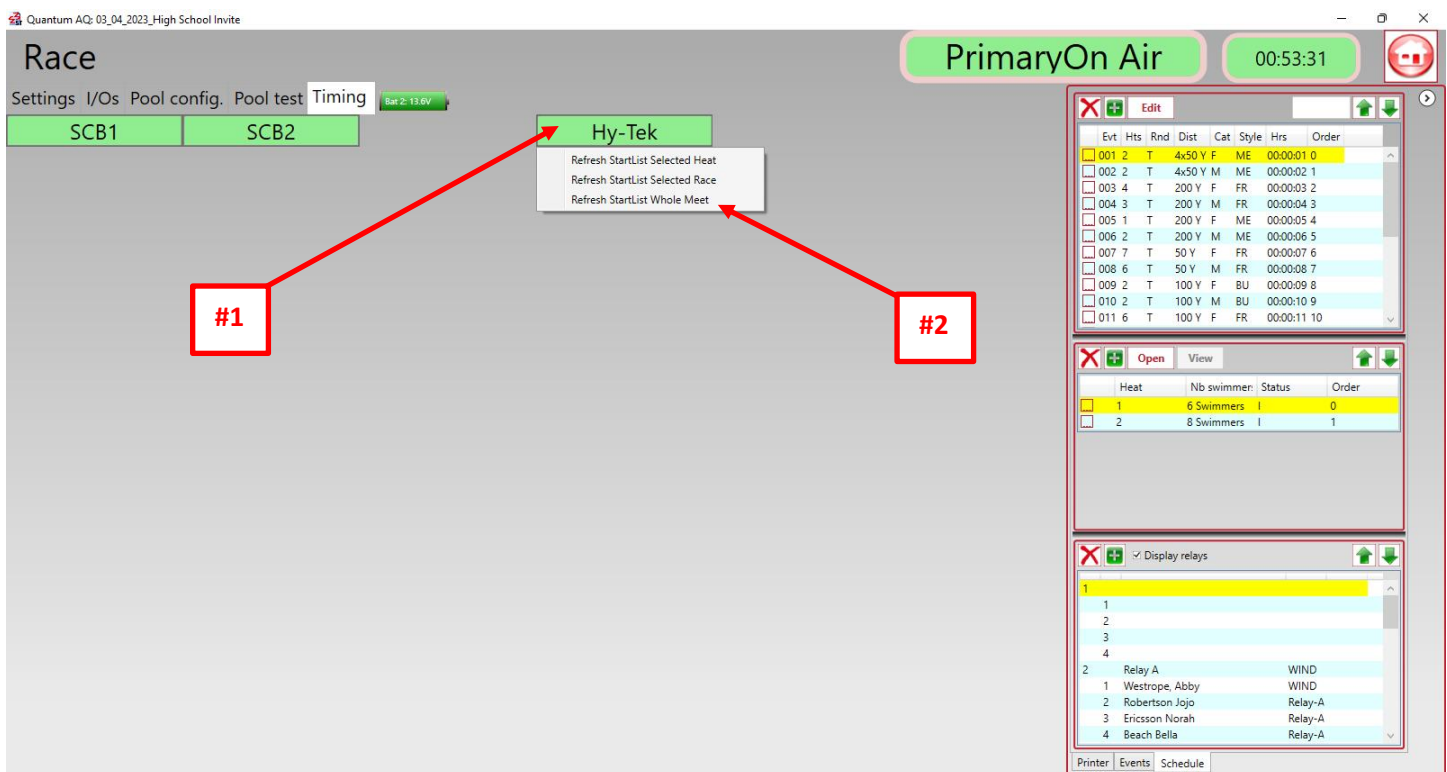


Figure 24: Quantum Refresh Start List Screen for Preseeded Meet.

Quantum AQ: 03\_04\_2023\_High School Invite

# 017-3/4: F - 100 Y BA - T

Settings I/Os Pool config. Pool test Timing Bar 2:13.5V

**PrimaryOn Air** 04:28:55

SCB1 SCB2 Hy-Tek

21.4

HA OFF

15s(10s) 2 0/100

Refresh StartList Selected Heat  
Refresh StartList Selected Race  
Refresh StartList Whole Meet

4:28:34.0060

#1

#2

Evt	Hrs	Rnd	Dist	Cat	Style	Hrs	Order
007	7	T	50 Y	F	FR	00:00:07	6
008	6	T	50 Y	M	FR	00:00:08	7
009	2	T	100 Y	F	BU	00:00:09	8
010	2	T	100 Y	M	BU	00:00:10	9
011	6	T	100 Y	F	FR	00:00:11	10
012	6	T	100 Y	M	FR	00:00:12	11
013	2	T	500	F	FR	00:00:13	12
014	2	T	500	M	FR	00:00:14	13
015	2	T	4x50 Y	F	FR	00:00:15	14
016	2	T	4x50 Y	M	FR	00:00:16	15
017	4	T	100 Y	F	BA	00:00:17	16

Heat	Nb swimmers	Status	Order
1	3 Swimmers	O	0
2	6 Swimmers	O	1
3	8 Swimmers	S	2
4	8 Swimmers	I	3

	Name	Nat
1	Hernandez Olivia	Relay-A
4	Octavio, Layney	TAMA
5	Lawson, Claire	TAMA
6	Sarganis, Aris	MACA
7	Bernard, Julia	HEAL
8	Hecker, Victoria	MONG

Figure 25: Quantum Refresh Start List Screen for Deck Seeded Meet.

During each heat:

- Prepare for Start
  - Make sure all data has been stored from previous heat; see Store results below.
  - Make sure Start Armed is checked. If you are having trouble and need to hold the start, contact the starting referee or toggle the Start Armed button to disable their ability to start a race.
  - Make sure all lanes selected are green, meaning the lane touch pads and buttons are detected.

Quantum AQ: 03\_04\_2023\_High School Invite

# 014-1/2: M - 500 FR - T

Settings I/Os Pool config. Pool test Timing Bat 2: 13.5V

SCB1 SCB2 Hy-Tek

0.0

Start armed

Attrib last start

HA OFF

15s(10s) 10 0/500

1	
2	
3	• X 0
4	• X 0
5	• X 0
6	
7	
8	

I	Lane	Name	Nat
	3	LeFebvre Forrest	Relay-A
	4	Lemus Yeshua	Relay-B
	5	Loughmiller Wyatt	Relay-B

PrimaryOn Air 03:48:48

Evt	Hts	Rnd	Dist	Cat	Style	Hrs	Order
004	3	T	200 Y	M	FR	00:00:04	3
005	1	T	200 Y	F	ME	00:00:05	4
006	2	T	200 Y	M	ME	00:00:06	5
007	7	T	50 Y	F	FR	00:00:07	6
008	6	T	50 Y	M	FR	00:00:08	7
009	2	T	100 Y	F	BU	00:00:09	8
010	2	T	100 Y	M	BU	00:00:10	9
011	6	T	100 Y	F	FR	00:00:11	10
012	6	T	100 Y	M	FR	00:00:12	11
013	2	T	500	F	FR	00:00:13	12
014	2	T	500	M	FR	00:00:14	13

Heat	Nb swimmer	Status	Order
1	3 Swimmers	W	0
2	7 Swimmers	I	1

1		
2		
3	LeFebvre Forrest	Relay-A
4	Lemus Yeshua	Relay-B
5	Loughmiller Wyatt	Relay-B
6		
7		
8		

Figure 26: Quantum Prepared for Start screen.

- Run The Race

Once race is started:

- Verify clock is running.
- Watch the wall and listen for click sounds on the computer speaker when a touch is recorded.
- Watch the race window. The yellow and red bars going across shows estimated progress of the swimmer. If it goes all the way across, check to see if that swimmer missed a touch.

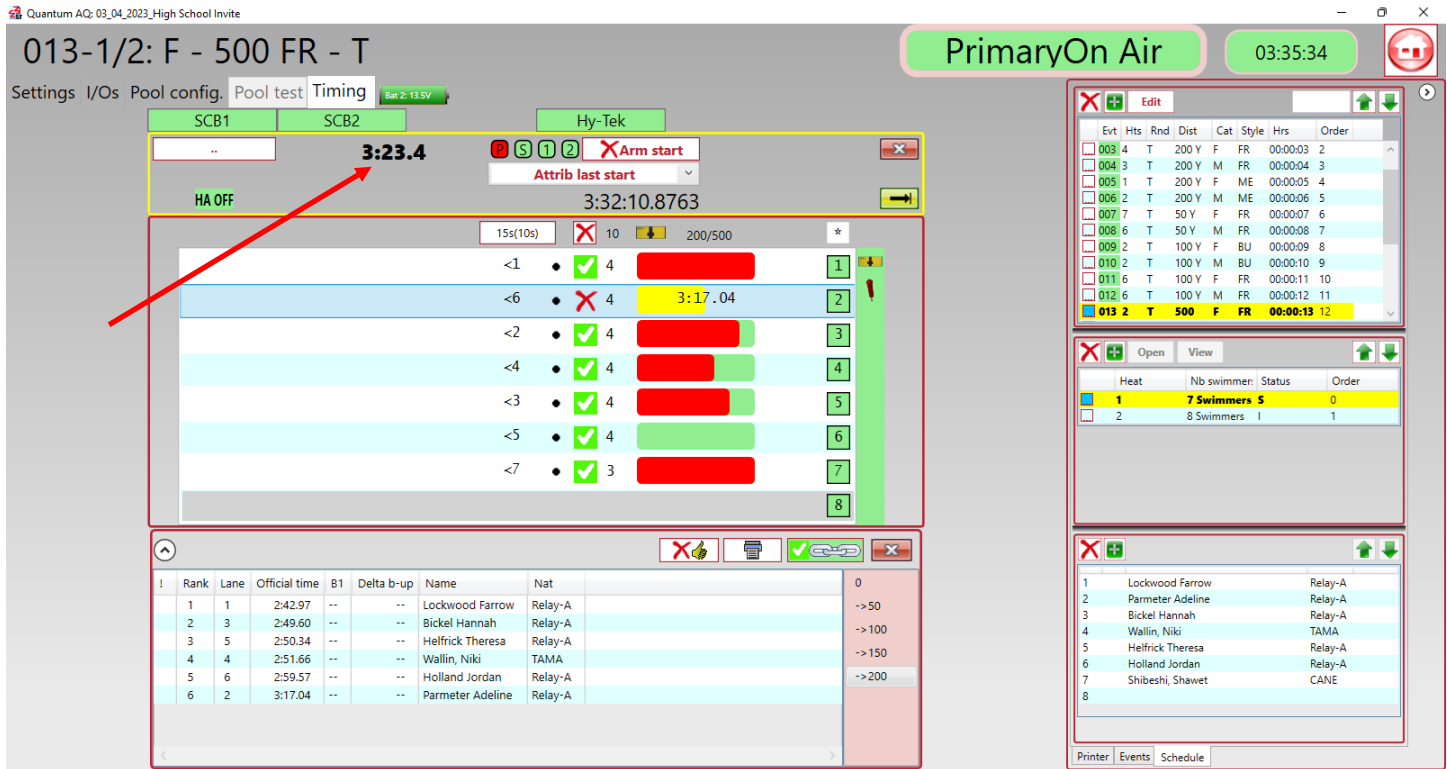


Figure 27: Quantum Started Race Screen.

Edit lanes during the race as needed:

- Right-click on green boxed lane number requiring editing, example lane 2 #1 below. This brings up a pop-up window with some options, #2 below.
- If an exiting swimmer in a relay exits after 10 seconds and touches the pad and adds an extra touch, select Lap -1.
- If the swimmer missed a touch, select Lap +1. Note if there is a pattern on a lane and if so dispatch someone to troubleshoot. Common causes of extra missed touches include pad clamps that come loose and the pad floats away from the edge, and not having clean and properly electrically greased touch pad banana plug connectors.
- If there was one or more extra touches that erroneously is reporting that the swimmer is finished and the swimmer is imminently going to finish, select Arm touchpad.
- Select DNS for no-shows.
- If swimmer does not finish the race, select DNF.
- If the swimmer has a soft touch at the end, or if you missed adding or subtracting a touch during the race, but a button was pushed, select Take Backup time.
- Toggle Used/Unused to disable lanes for any athletes that scratched at the block.

Quantum AQ: 03\_04\_2023\_High School Invite

013-1/2: F - 500 FR - T

Settings I/Os Pool config. Pool test Timing Bat 2:13.6V

SCB1 SCB2 Hy-Tek

4:09.10

HA OFF

3:32:10.8763

15s(10s) 10 300/500

#1

<1 • X 6 4:09.10

<6 • X 5 4:08.82

<3 • ✓ 5

<4 • ✓ 5

<2 • ✓ 5

<5 • ✓ 5

<7 • ✓ 4

Lap -1

Lap +1

Q: Arm touchpad

Y: DisArm touchpad

Edit Finish Time

DSQ

DNS

DNF

Take Backup time

Used / Unused

#2

1 Rank Lane Official time B1 Delta b-up Name Nat

1 1 4:09.10 -- -- Lockwood Farrow Relay-A

0

-> 50

-> 100

-> 150

-> 200

-> 250

-> 300

PrimaryOn Air 03:36:25

Evt	Hts	Rnd	Dist	Cat	Style	Hrs	Order
003	4	T	200 Y	F	FR	00:00:03	2
004	3	T	200 Y	M	FR	00:00:04	3
005	1	T	200 Y	F	ME	00:00:05	4
006	2	T	200 Y	M	ME	00:00:06	5
007	7	T	50 Y	F	FR	00:00:07	6
008	6	T	50 Y	M	FR	00:00:08	7
009	2	T	100 Y	F	BU	00:00:09	8
010	2	T	100 Y	M	BU	00:00:10	9
011	6	T	100 Y	F	FR	00:00:11	10
012	6	T	100 Y	M	FR	00:00:12	11
013	2	T	500	F	FR	00:00:13	12

Heat	Nb swimmer	Status	Order
1	7 Swimmers	5	0
2	8 Swimmers	1	1

1	Lockwood Farrow	Relay-A
2	Parmeter Adeline	Relay-A
3	Bickel Hannah	Relay-A
4	Wallin, Nikki	TAMA
5	Hefrick Theresa	Relay-A
6	Holland Jordan	Relay-A
7	Shibeshi, Shawet	CANE
8		

Printer Events Schedule

Figure 28: Quantum Lane Edit Menu.

Once Race has ended:

- Verify no one is left swimming in the pool; failure to do so could lead to losing their results!
- When race is done, click Officialize thumbs up button, #1 below. This automatically saves the results to the shared folder for Hy-Tek, and prints the results of the heat to the printer if selected.
- Click yellow right arrow icon to proceed to next heat or event in the schedule, #2 below.

Quantum AQ: 03\_04\_2023\_High School Invite

# 013-1/2: F - 500 FR - T

Settings I/Os Pool config. Pool test Timing **Bar 2: 13.5V**

SCB1 SCB2 Hy-Tek

**6:57.74** **3:32:10.8763** **HA OFF** **15s(10s)** **10** **500/500** **\***

**#1** (points to thumbs up icon)

**#2** (points to yellow right arrow icon)

**PrimaryOn Air** **03:41:17**

Rank	Lane	Official time	B1	Delta b-up	Name	Nat
1	1	6:57.74	6:57.77	0.03	Lockwood Farrow	Relay-A
2	5	7:08.35	7:08.52	0.17	Helfrick Theresa	Relay-A
3	3	7:19.72	7:19.83	0.11	Bickel Hannah	Relay-A
4	4	7:32.57	7:32.67	0.10	Wallin, Niki	TAMA
5	6	7:53.02	7:53.10	0.08	Holland Jordan	Relay-A
6	2	8:21.15	8:21.35	0.20	Parmeter Adeline	Relay-A
7	7	9:04.18	9:04.35	0.17	Shibeshi, Shawet	CANE

**013 2 T 500 F FR 00:00:13 12**

**Heat** **Nb swimmer** **Status** **Order**

Heat	Nb swimmer	Status	Order
1	7 Swimmers	F	0
2	8 Swimmers	I	1

**1** Lockwood Farrow Relay-A

**2** Parmeter Adeline Relay-A

**3** Bickel Hannah Relay-A

**4** Wallin, Niki TAMA

**5** Helfrick Theresa Relay-A

**6** Holland Jordan Relay-A

**7** Shibeshi, Shawet CANE

**8**

Printer Events Schedule



### 1.3. Intermediary Duties

This person sits between the Timing Equipment Operator and the Admin or head Referee. This person's job is to verify printer is working properly; troubleshoot and fix any printing problems that may occur while the timing equipment operator concentrates on capturing times, and collect all results paperwork and give it to the Admin for review.

After each race:

- Collect Race Summary Sheet from the printer.
- Circle the event number and heat number with a pencil.
- Verify button(s) or pad were pressed and the times did not span more than 0.3 seconds for each lane, and that the timing equipment selected the middle time as the Finish Time.
  - If so, draw a line next to the lane time column with a pencil indicating you have checked it and it is good.
  - If not, circle a single time if it is a single outlier or is missing, or circle the whole column if all the numbers are far from each other or all missing, to flag admin or head referee that there is a problem.
- If more than one button or pad was pushed and the span as greater than 0.3 seconds, verify that the timing equipment threw out the outlying data points.
- If one time was an outlier, make sure timing equipment picked the time of the two other times that was closest to the outlier for the Finish Time.
- If all three data points were spread far apart, make sure the timing equipment picked the middle time for the final time.
- If only one button was pushed, make sure the timing equipment selected it for the Finish Time.
- If there were no buttons pushed, or there was a problem with the timing system, notify the head Referee so they can look at the Lane Time Sheet or Coach's Timer to determine the Finish Time.
- If a button or pad is regularly not being pressed but it appears like someone is trying to press it, check the finish cable harness seating and switch connection seating, or send someone over to talk to the timer and possibly swap out their button or a pad. Note that this could cause a delay in the meet.
- If anyone was DQd after the event was over, write DQ in pencil on the Timing event program, tear off the carbon copy of the DQ form, and hand it to the Admin or Chief Stroke and Turn Judge.
- Compare order of finish on timing system printout to referee sheet as applicable.

Replace following picture with Quantum printout (CTS System 6 shown)

====> RACE HISTORY <=====> Race 0041 <=====  
 Saturday 04-27-19 :54.59 am

Lane Number		Lengths		Time	
3)	02 37.07	6)	02 38.37	5)	02 39.08
1)	02 45.22	4)	02	4)	04 1:12.34
6)	04 1:20.95	2)	04 1:23.40	1)	04 1:30.93

	Lane 1	Lane 2	Lane 3	Lane 4	Lane 5	Lane 6	Lane 7
Button	1:31.08	1:23.44	1:19.65	1:12.29	1:19.02	1:20.18	1:21.69
Button	1:30.94	1:23.39	1:19.74	1:12.25	1:19.04	1:20.64	1:21.63
Button	1:30.95	1:23.35	1:19.72	1:12.27	1:19.08	1:20.40	1:21.34
BACKUP	1:30.95	1:23.39	1:19.72	1:12.27	1:19.04	1:20.40	1:21.63

=====> Colorado Time Systems -- Version 3.29.3

====> RACE SUMMARY <=====> Race 0041 <=====  
 Saturday 04-27-19 :54.59 am

Colorado Time Systems

100 YARDS Boys Backstroke Final  
 EVENT: 20 HEAT: 2

By Lane			By Place		
Lane	Place	Time	Place	Lane	Time
1	6	1:30.93	1	4	1:12.34
2	5	1:23.40	2	5	1:19.17
3	3	1:19.84	3	3	1:19.84
4	1	1:12.34	4	6	1:20.95 <1:20.40>
5	2	1:19.17	5	2	1:23.40
6	4	1:20.95 <1:20.40>	6	1	1:30.93
7		<1:21.63>	7		<1:21.63>

*late back use buttons* (pointing to Lane 4, Place 1)

*with* (pointing to Lane 6, Place 1)

*missed back use buttons* (pointing to Lane 6, Place 1)

=====> Colorado Time Systems -- Version 3.29.3

Figure 29: Example Quantum marked up heat results printout.

After each event:

Clip the paperwork together in the following order:

- DQ slips
- Colorado meet sheets
- Referee meet sheets
- Lane timer sheets

Give the stack of paperwork to the Runner who will bring it to the Computer Room.

## 2. Dolphin

### 2.1. Equipment Setup

Equipment list:

Item no.	Item	Note
1	Timing laptop	With 3 USB A ports and ethernet port, with Dolphin and Gadwin Printscreen software installed and configured
2	Timing laptop power supply	
3	Wireless mouse with USB adapter	
4	Mouse pad	
5	Timing printer	USB interface with toner and white printer paper installed
6	Timing printer power cord	
7	Timing printer USB cable	USB-B to USB-A
8	Start system	Includes box with speaker, light, start in and dual BNC start out ports mounted on tripod
9	Start system power supply	
10	Start microphone with start switch	
11	1 Lane scoreboard	
12	Scoreboard power cord	
13	Dolphin base unit	Colorado Time Systems
14	Dolphin base unit USB cable	USB-B to USB-A
15	Dolphin starter unit	Mini-BNC output, make sure 9V battery is not low
16	Mini-BNC to BNC cable	
17	BNC to dual banana adapter	
18	Dolphin wireless scoreboard adapter	
19-42	24 Dolphin Wireless Stopwatches	Make sure batteries are not low
43	25 spare fresh 9V batteries	
44	Small flat blade screwdriver	To replace batteries
45	Power strip	At least 3 outlets for timing laptop, timing printer and starting system
46	Extension cord 1	For power strip
47	Extension cord 2	For scoreboard
48	Ethernet cable	Long enough to reach from timing laptop to computer room router or switch
49	Reliable power source with circuit breaker location known and accessible	

*Table 3: Dolphin timing equipment list.*

Make electrical connections:

Insert wiring diagram here

Connection No.	Item	From	To
1	Timing laptop power supply	Power strip	Timing laptop
2	Wireless mouse USB adapter		Timing laptop
3	Timing printer power cord	Power strip	Timing printer
4	Timing printer USB cable	Timing printer	Timing laptop
5	Start system power supply	Power strip	Starting system External Power jack
6	Start microphone with start switch		Starting system Starter jack
7	Scoreboard power cord		Scoreboard
8	Dolphin base unit USB cable	Dolphin base unit	Timing laptop
9	Mini-BNC to BNC cable and BNC to dual banana adapter	Start system Start jack	Dolphin starter unit
10	Dolphin Scoreboard adapter		Scoreboard
11	Extension cord 1	AC outlet #1	Power strip
12	Extension cord 2	AC outlet #2	Scoreboard power cord
13	Ethernet cable	Timing laptop	Computer room router or switch

*Table 4: Dolphin electrical connection list.*

Turn on equipment:

- Timing laptop
- Wireless mouse
- Timing printer
- Start system
- Scoreboard
- 24 Dolphin wireless stopwatches, by pressing the reset button for 5 seconds

Prepare for an outdoor environment if necessary:

- Clean timing laptop display with glass cleaner if dirty.
- Bring a sun shade to see the timing laptop display if the sun is at the wrong angle.
- Use paperweights to contain papers if windy.
- Bring flashlight if meet goes in to the night without adequate lighting.

Configure printer:

- On timing laptop, launch Printers and Scanners. Make sure connected printer is listed as default. If not:
- Select connected printer
- Click Manage
- Click Set as Default
- Click X to close window

#### Configure Dolphin:

- On timing laptop, launch Dolphin
- Verify all 24 watches and starter unit all have good reception and enough battery charge. Swap out batteries and watches and reconfigure watches as needed. To reassign a lane and position to a watch:
  - Turn the watch on by pressing and holding the Reset button.
  - Enter the menu by pressing and holding the Reset button at the same time as either of the side buttons.
  - Once in the menu, the first setting is LANE. Press a side button to change the lane assignment for this watch.
  - Press Reset quickly to advance to the TIMER setting.
  - Press a side button to change the TIMER setting for this watch - A, B or C. Must be uniquely set.
  - Press Reset quickly to advance to the MAN setting.
  - Press a side button to toggle to “off”, depending on a starting system to start the race.
  - Press a side button to select the channel number. This must match the channel on the starter and the base.
  - Press Reset quickly to exit the menu.
- Click Logging Enabled. This will write the results to file and automatically advance the heat.
- Click Enable Scoreboard
- Set scoreboard lines = 1
- Set number of lanes to match pool configuration, i.e. 6, 7 or 8
- Set scroll time per referee preference, typically 2 seconds
- List by place then lane
- Click OK
- Make sure scoreboard is on.

#### Test start system:

- Ask the referee to announce and perform a test start.
- Verify loudspeakers are working for both voice and beep.
- Verify clock starts running.

Test wireless stopwatches:

- Press a black button on each stopwatch once.
- Verify all stopwatch times were recorded, like this:



Figure 30: Example Dolphin wireless stopwatch test results.

Test timing printer:

- Press Ctrl and PrnSc. This should bring up Gadwin Printscreen capture box.
- If the box is not aligned with the Dolphin window, drag and drop the box edges to match.
- Press Enter to save box alignment changes.
- Press Enter to print. Verify screen capture of window only is printed portrait to the timing printer.



## 2.2. Timing Equipment Operator Duties

This person operates the laptop. Their primary tasks are to capture times, save them both electronically and on paper, and record the file number associated with each heat and any changes in lane assignments. Since it is easy to lose time data and the outcome can be undesirable, this person needs to do the following:

Either be already trained, or be trained on the job by an experienced operator.

Focus on collecting and recording data, not partaking in distracting activities such as having deep conversations with other people, or using a cell phone.

Keep track of which event and heat is in the water, and keep the Dolphin software heat and lane configuration updated accordingly.

Keep track of the last athlete swimming in a race, not saving the data before that last swimmer is in.

Print the screen and save the data quickly after a race to prepare for the next race to keep the meet on schedule, but...

Communicate clearly to the starting referee if there are problems, telling them firmly that they need to wait.

At the beginning of each event:

Write down the event start time on the timeline for referee reference.

Write down the event start time in the upper right corner of the Colorado page.

During each heat:

Write the file number in the left margin of the event program sheet stamped "Colorado". *This is so the computer operators know which file to import results from.*

Set the heat and lane information in the Dolphin software, making sure it matches what the Colorado sheet says. The heat automatically advances in the software since data file logging is enabled, but if it's a new event, or if the boys and girls heats are being run alternated across two events, you will need to edit both event and heat.

Cross out no-shows on the event program sheet with a pencil, and write DNS on the side.

Edit lane assignments as instructed by the referee with a pencil.

If a swimmer does not finish the race, write DNF next to their name with a pencil.

Add picture(s) of marked up Dolphin sheet – DNS, move swimmer, DNF, file names, event start time

After each heat:

Make sure all swimmers have completed the race. *Note: failure to do so can result in losing the time for that swimmer.*

Click on Dolphin window to select it, if it is not already selected.

Press Left Ctrl-PrintScr. This launches Gadwin Printscreen and shows a box where the capture window is.

If the capture window box does not line up with the Dolphin window, drag and drop the handles along the edges of the box until they do. *This should only have to be done once, unless someone moves the Dolphin window.*

Press Enter. Verify the printer prints the capture box.

Click "Reset Timers".

Click "Yes" to confirm. *This saves the data to the file that the computer operators will import.*

After each event:

Give the meet program stamped "Colorado" to the Chief Timing Officer.

Edit event in the Dolphin software to increment to next event.

After each session:

Wait until the results files are uploaded to the computer room.

Turn off computer, even if there is a session the next day. *This is done to make sure software doesn't get in a stale state due to a memory leak.*

## 2.3. Intermediary Duties

After each heat:

Remove heat screen shot printout from the printer and verify the event and heat are correct. If they are not, write the correct heat and event information in pencil on the printout.

Check each lane for 3 watch times. If there is a missing time, circle the blank time in pencil to flag this discrepancy to the admin per the example below.

CTS Dolphin

Race Time: 02:32

Starter

Reset Timers (r)

Lane	Timer A	Timer B	Timer C	Final Time	Place
1	02:22.66	02:22.68	02:22.60	02:22.66	5
2	02:21.44	02:21.40	02:21.38	02:21.40	3
3	02:23.26	02:23.39	02:23.30	02:23.30	6
4	02:09.69	02:09.60	02:09.65	02:09.65	1
5	02:19.95	02:20.30	02:20.32	02:20.30	2
6	02:18.64		02:18.48		
7	02:25.74	02:25.76	02:25.75	02:25.75	7
8	02:21.47	02:21.44	02:21.47	02:21.47	4
9					
10					

Current File: C:\CTSDolphin\007-005-001A-0020.do4

Channel: 7

Splits: 1

Scoreboard settings

☒ Logging Enabled

CTS Dolphin Version 4.3

Prev Event Next #5

Prev Heat Next #1

Figure 31: Example Dolphin results printout with missing time.

Check each lane for a span of times of less than 0.3 seconds. If there is more than 0.3 second span, circle the 3 numbers in pencil to flag this discrepancy to the admin.

CTS Dolphin

Race Time: 00:39

Starter

Reset Timers (r)

Lane	Timer A	Timer B	Timer C	Final Time	Place
1	00:31.72	00:31.59	00:31.77	00:31.72	6
2	00:24.45	00:24.32	00:24.24	00:24.32	5
3	00:23.33	00:23.30	00:23.27	00:23.30	3
4	00:21.28	00:21.24	00:21.31	00:21.28	2
5	00:23.51	00:23.47	00:23.31	00:23.47	4
6	00:20.79	00:20.51	00:20.55	00:20.55	1
7	00:38.24	00:38.14	00:38.23	00:38.23	8
8	00:33.62	00:37.27	00:33.67	00:33.67	7
9					
10					

Current File: C:\CTSDolphin\008-016-002A-0051.do4

Channel: 7

Splits: 1

Scoreboard settings

☒ Logging Enabled

CTS Dolphin Version 4.3

Prev Event #16 Next

Prev Heat #2 Next

Figure 32: Example Dolphin results printout with more than .3 second span.

Compare order of finish on timing system printout to referee sheet.

If no lanes have a discrepancy, put a check mark in the right margin to indicate that you have looked at it.

Circle event and heat so it is easy to find.

After each event:

Collect the meet program stamped "Colorado" from the Timing Equipment Operator.

Collect the 2 to 3 meet programs stamped "Referee" and any DQ slips from the referees.

Staple DQ slips to respective green DQ cards.

Collect the 8 lane timer sheets from the lane timers via the Runner. Make sure the event is correct and put them in numerical order.

Create an event packet with the paperwork clothes-pinned together in the following order:

DQ slips

“Colorado” meet program

“Referee” meet programs

Heat screen shots from Dolphin system, in heat order

Lane timer sheets, in lane order

Give event packet to Admin.

Reconfigure a spare timer for lane and seat

If a watch stops working, configure spare watch to match the correct lane and seat:

Press Reset and Stop buttons simultaneously for a few seconds

Press Reset to advance to next screen

Press Stop button to change displayed information

Verify channel is correct, matching other working watches i.e. “7”

Set lane to desired lane, i.e. “4”

Set seat to desired seat i.e. “C”

## 2.4. Troubleshooting

If the Dolphin isn't saving result files, short term use the screen shot printouts or files in a folder on the desktop; mid term switch it out with seeding or results computer but make sure and move the database file; long term may need reinstallation of the Dolphin software to fix it, TBD. This may have been caused by a Windows Update but we are not sure.

If you can't find the last Dolphin results file of the session, go press reset on the Dolphin computer to save it. If they already shut down the app or the computer, you will have to manually enter the results from the printout.

If the scoreboard stops updating, power cycle the wireless scoreboard receiver.

If the printer stops printing, power cycle it. If it still doesn't print, try a different USB port.

If the scoreboard gets started before the referee starts it, don't worry, one of the lane timers accidentally hit their button which started it, but the referee starter signal will re-start it. *The author sees this as a shortcoming of the system to not be able to disable starting from the lane timers.*

If the Dolphin software stops writing files, power cycle and try again. If it persists, swap computers and use one of the computer room computers for the Dolphin and vice versa – they are configured to be interchangeable. Then after the meet take the Dolphin computer and uninstall the software, make a backup of the data files in C:\CTSDolphin, then delete the C:\CTSDolphin folder, then reinstall the software. *Something in the software seemed to get corrupted when this happened.*

If you need to reprint a screen shot, you can find the screen shots saved in the My Computer \Pictures\My Screen Shots\ folder. You can browse them until you find the file based on date and time and checking for the correct event and heat in the screen capture.

If the Dolphin program starts acting erratically -- such as resetting without the timing equipment operator initiating a reset, or not responding to the starter -- reboot the computer and relaunch Dolphin and set up logging and the scoreboard. *This could be caused by not turning off the Dolphin software or computer overnight and the software could have a memory leak that causes problems after several hours, resulting in unexpected behavior.*

Raise base up high to get better reception from watches further away.

Type on keyboard slowly to not outrun the software lag.

Check battery levels at first boot of watches for best accuracy. Replace if half full.

### 3. System 6

Also applies to System 5.

#### 3.1. Equipment Setup

Equipment list:

<u>Item no.</u>	<u>Item</u>	<u>Note</u>
1	System 6	Colorado Time Systems With timing harness, start, serial communications and parallel printer ports
2	System 6 power supply	
3	Timing printer	Parallel interface with toner and white printer paper installed
4	Timing printer power cord	
5	Timing printer parallel cable	
6	Start system	Includes box with speaker, light, start in and dual BNC start out ports mounted on tripod
7	Start system power supply	
8	Start microphone with start switch	
9	8 lane scoreboard	No names
10	Scoreboard power cord	
11	Primary harness	For start, touch pads and 1 button
12	Backup harness	For buttons 2 and 3, if used
13	Starter cable	
14	Scoreboard cable	
15-22	8 touch pads	
23-46	24 buttons	
47	Power strip	At least 3 outlets for System 6, timing printer and starting system
48	Extension cord #1	For power strip
49	Extension cord #2	For scoreboard
50	Serial cable	Long enough to reach from System 6 to computer room computer USB to serial adapter
51, 52	External speakers	
53	Reliable power source with circuit breaker location known and accessible	

*Table 5: System 6 timing equipment list.*



Make electrical connections:

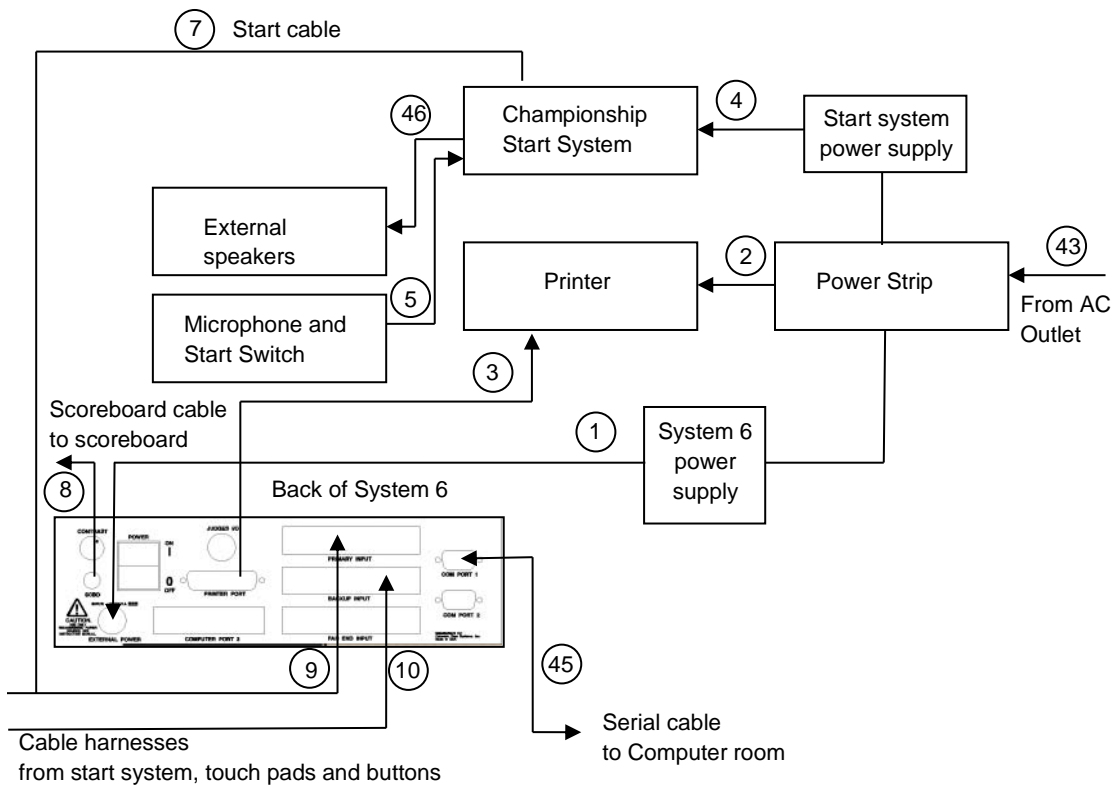


Figure 33: System 6 electrical connection diagram.

Connection No.	Item	From	To
1	System 6 power supply	Power strip	System 6 External Power jack
2	Timing printer power cord	Power strip	Timing printer
3	Timing printer parallel cable	Timing printer	System 6 Printer Port
4	Start system power supply	Power strip	Starting system External Power jack
5	Start microphone with start switch		Starting system Starter Jack
6	Scoreboard power cord (not shown)		Scoreboard
7	Start cable	Start system Start jack	Primary harness Start input
8	Scoreboard cable	System 6 SCBD jack	Scoreboard
9	Primary Harness		System 6 Primary Input
10	Backup Harness		System 6 Backup Input
11-18	Touch pads (not shown)		Primary Harness Prime inputs
19-26	A stop buttons (not shown)		Primary Harness A inputs
27-42	B and C stop buttons (not shown)		Backup Harness B and C inputs
43	Extension cord 1	AC outlet #1	Power strip
44	Extension cord 2 (not shown)	AC outlet #2	Scoreboard power cord
45	Serial cable	System 6	Computer room router or switch
46	External speaker cable	Start system Speaker Cable jack	External speakers

Table 6: System 6 electrical connection list.

Turn on equipment:

- System 6
- Timing printer
- Start System

Prepare for an outdoor environment if necessary:

- Adjust contrast knob on back of System 6 for maximum brightness.
- Clean System 6 display with glass cleaner if dirty.
- Bring a sun shade to see the System 6 display if the sun is at the wrong angle.
- Use paperweights to contain papers if windy.
- Bring flashlight if meet goes in to the night without adequate lighting.

Configure System 6:

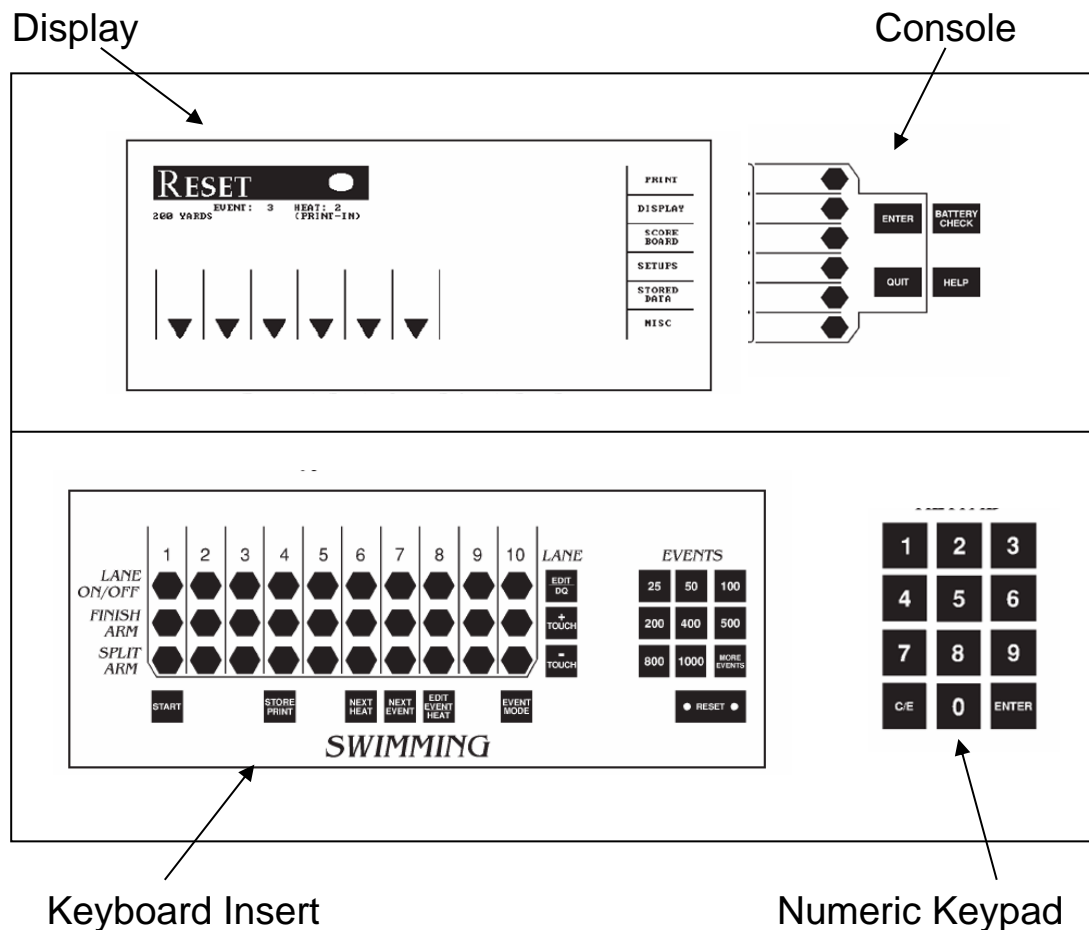


Figure 34: System 6 operator interface.

- Press “Sports Menu” then “Swimming” to get to the main menu.
- Press “Battery Check” on Console and make sure greater than two hours of running time are left on the battery, and that AC mode is on.
- Press “Setups” Soft Key on the Console. Navigate within setup menu with up and down soft keys to select the group on the left, then with the numeric keypad to toggle or select a field for further configuration.
- Select “Start”.
  - Press “1” for “Automatic”.
- Select “Finish/Buttons”.
  - For Zone championship meets, the touch pads will be primary and there will be 3 backup buttons. For these meets press “1” for “Pad (Prime Finish)” and press “7” for “Three Buttons (backup finish)”.
  - For SRJC meets, the touch pads will be primary and there will be 1 backup button. For these meets press “1” for “Pad (Prime Finish)” and press “5” for “One Button (backup finish)”.
  - For meets where the touch pads are malfunctioning, 3 buttons may be used. For these meets press “4” for “Three Buttons (Primary Finish).”
  - Press “8” for “Compare button early to pad” so soft touches are highlighted in the results for admin review.
- Select “Hardware Setup”:
  - Press “1” to select “Speaker Volume” then type “1”, “2” or “3” and then “Enter” to set level. Usually 3 is best to hear the touch pad register beeps in a noisy indoor pool.
  - Press “3” to “Allow Remote Setup” from computer via serial port.
- Select “Splits”:
  - Press “1” to select “Cumulative” splits to be printed.
  - Press “2” to select “By Lap” splits to be printed.
- Select “Timing”:
  - Select “1” for .01 second accuracy or “2” for .001 second accuracy, depending on what the head referee wants, typically .01 seconds.
  - Press “3” and “15” then “Enter” to set near end pad split delay to 15 seconds.
  - We don’t use far end pads, so no need to set them up.
  - Press “6” and “15” then “Enter” to set pad delay after start to 15 seconds. Note: default is 3 seconds; if you don’t change this, swimmers exiting the pool after non-relay flyover starts can trigger a false touch.
  - Do not press 5, 7 or 8 to warn about predicted times or count down laps, just pay attention instead.
- Select “Pool”:
  - Select “1” if the nearest lane to the Colorado is lane 1, or “2” if lane 1 is farthest from the Colorado.
  - Press “3” and enter 6, 8 or 10 lanes. If running an odd number, select the next highest even number and then turn off the highest lane as described later.
  - Do not select “Far End Splits” since we never use them.
  - Press “5” for short course pool or “6” for long course pool.
  - Press “7” if yards or “8” if meters.
- Select “Scoreboard”:
  - Press “1” to select “high speed” data transmission.
- Select “Printer”:
  - Press “1” and select “IBM” as printer type.
  - Press 3 for “Store/Print Format”. Here is where the navigation gets complicated. Select “Race Summary” to print both by lane and by place, and then scroll down and select “Line Feed”. Use soft

keys to navigate and remove or add elements. Use upper Enter key in Console to enter changes, not lower Enter in numeric keypad.

- Select “Event Sequence”:
  - No need to do anything here, since this will be set once the session is downloaded from the computer in to the System 6.
- Select “Time/Date”:
  - Set the “Time”, “Day” and “Date” if necessary.
  - Select 12/24 hour clock format as desired by Meet Referee – typically 12 hour.
- Press “Record Setups” Soft Key to write preferences to non-volatile memory that will persist across power cycles.
- Press “yes” when it asks you again.
- Press “Quit” to exit setup menu.
- Press “Scoreboard” Soft Key.
  - Press “Scoreboard On” Soft Key.
  - Press “Scoreboard Blank” and verify time of day is displayed on the Scoreboard.
  - Press “Scoreboard Blank” again to blank the scoreboard.
  - Press “Quit”.
- Press “Display” Soft Key. Verify window on display comes up with lane vs. pad and button pressed table.
- **Insert reset display screen shot here**

Test start system:

- Press “Edit Event/Heat” button on Keyboard Insert.
- For testing purposes only, change Event Number to 99, Heat Number to 1, and Events length to 50 and press Enter.
- Ask the referee to announce and perform a test start.
- Verify loudspeakers are working for both voice and beep.
- Verify clock starts running.

Test touch pads and buttons:

- Press all touch pads and backup buttons.
- Verify all touches and buttons were recorded, like this:  
**Insert completed display screen shot here**
  - If touch pads are shorting out and falsely indicating touches, remove pad from water and use touch pad pump needle to let air in.
  - If touch pads are not recording presses, remove pad from water and use touch pad pump to pull air out of the pad.

Test timing printer:

- Press Store/Print and verify printer prints properly. Output should look like this:

Replace picture with non-marked up System 6 results printout

```

===== Race 0041 <=====
Saturday 04-27-19 :54.59 am

-----< Lane Number
|-----< Lengths
|-----< Time
3) 02 37.07      6) 02 38.37      5) 02 39.08      2) 02 39.69      7) 02 40.65
1) 02 45.22      4) 02 1:12.34      5) 04 1:19.17      3) 04 1:19.84
6) 04 1:20.95      2) 04 1:23.40      1) 04 1:30.93

Button   Lane 1   Lane 2   Lane 3   Lane 4   Lane 5   Lane 6   Lane 7
Button   1:31.08  1:23.44  1:19.65  1:12.29  1:19.02  1:20.18  1:21.69
Button   1:30.94  1:23.39  1:19.74  1:12.25  1:19.04  1:20.64  1:21.63
Button   1:30.95  1:23.35  1:19.72  1:12.27  1:19.08  1:20.40  1:21.34
BACKUP   1:30.95  1:23.39  1:19.72  1:12.27  1:19.04  1:20.40  1:21.63

===== Colorado Time Systems -- Version 3.29.3

===== Race 0041 <=====
Saturday 04-27-19 :54.59 am

Colorado Time Systems

100 YARDS Boys Backstroke Final
EVENT: 20 HEAT: 2

----- By Lane -----
Lane Place Time
1 6 1:30.93
2 5 1:23.40
3 3 1:19.84
4 1 1:12.34
5 2 1:19.17
6 4 1:20.95 <1:20.40>
7 1:21.63 <1:21.63>
(<backup time>)

----- By Place -----
Place Lane Time
1 4 1:12.34
2 5 1:19.17
3 3 1:19.84
4 6 1:20.95 <1:20.40>
5 2 1:23.40
6 1 1:30.93
7 1:21.63 <1:21.63>

===== Colorado Time Systems -- Version 3.29.3

```

*late touch use buttons*

*with*

*missed touch use buttons*

Figure 35: Example System 6 race results printout.

## 3.2. Timing Equipment Operator Duties

This person sits in front of the Colorado which is situated behind the starting Referees. This person's job is to:

- Manually synchronize the Colorado with the race event and heat numbers as decided by the Starter Referee and then arm the Start process
- Visually verify timer is started, and split and finish data is being collected by the machine; troubleshoot the system if it is not working properly
- Manually invoke the saving of data for a valid race and race summary printout process
- Collect Colorado Meet Sheets from the Runner, and annotate them with race number, no shows and DQs submitted during an event
- Collect DQ slips and Referee Meet Sheets from Referees
- Give Colorado and Referee Meet Sheets and DQ slips to Chief Timing Officer

Perform the following sequence for each heat:

After data has been stored and printed from a previous heat, press both "Reset" buttons simultaneously. Verify display then shows "Reset".

NOTE 1: YOU WILL LOSE DATA IF YOU DO NOT STORE/PRINT BEFORE RESET!

Note 2: if there is a start after Store/Print but before Reset, the Colorado will ask "Start detected, valid start?" and if it is, press yes. DO NOT PRESS RESET!

If the next race is the first heat of a new event, press "Next Event" on the Keyboard Insert. If an event number is being skipped because boys or girls are not doing the corresponding race, press "Next Event" again. Otherwise press "Next Heat". Verify Event and Heat on Display are correct, compared to meet sheet and what the starter is announcing.

Note: if you forget to update the heat and event before the start of the race, you can do it before the end of the race, but you can't do it after Store/Print.

If any lanes are not occupied, either per the meet sheet or due to a no show, deselect them by pressing the corresponding "Lane On/Off" button on the Keyboard Insert. Make sure every lane that is not vacant is turned on and was not left off from a previous heat lane vacancy. If the vacancy is due to a no show, cross out the swimmer on the Colorado Meet Sheet and write "No Show".

You may want to indicate to the Starter when you are ready. Then be quiet while they start the race. Verify that the clock on the display starts to advance and the printer prints a few lines once the starter beep and strobe goes off.

Record the last three digits of the race number on the Display on the left hand margin of the Colorado Meet Sheet with a red pen.

Assuming touch pads are being used and hence splits are being taken:

- Verify "S Armed" comes up after 15 seconds for each lane for longer races with 1

or more splits, or “F Armed” comes up for shorter races with no splits. Note that there is a delay so a swimmer from the previous race could get out of the pool and press the touch pad without accidentally counting a split.

- If a split pad touch does not get pressed on a lane, which is common, press “+ Touch” on Keyboard Insert and enter lane number on the Numeric Keypad.
- If you lose track of missed touches and you know the swimmer is coming in to the finish, which is easy to do, press “Finish Arm” on their corresponding lane.
- If you mistakenly press “+ Touch”, which is less common, press “- Touch” on Keyboard Insert and enter lane number on the Numeric Keypad.

I don’t know why one would ever press “Split Arm” on a given lane.

Watch the swimmers come in, listening for one beep per button or pad touch. As soon as all the swimmers complete, verify all pads and buttons have been pushed on the Display. If no presses occur, notify the Admin, so the lane timer stop watch time or a coach’s timer time can be used instead. Determine why no buttons were pushed and rectify the situation.

Once all swimmers are in, press “Store/Print” button on Keyboard Insert. Verify “Stored” message comes up with in a few seconds, then the printer starts printing and advancing the paper immediately. Also reverify the race number is what you wrote on the meet program margin.

**NOTE 1: RACE DATA WILL BE LOST IF “STORE/PRINT” IS NOT PRESSED BEFORE “RESET”!**

**NOTE 2: DO NOT TURN OFF COLORADO AT END OF MEET UNTIL COMPUTER OPERATOR HAS TOLD YOU THAT ALL RESULTS DATA HAVE BEEN RETRIEVED.**

At the end of each event:

4.9 Pass Colorado program sheet to the Intermediary.



After the session ends:

If trials, power cycle Colorado and have computer operator load finals session in to Colorado.

After the Meet Ends:

## 6. Shut Down

Press "Quit"

Press "Scoreboard"

Press "Scoreboard Blank" Twice. Verify the Scoreboard goes off.

Press "Quit".

At the end of the day, check with the Meet Manager Computer Controller to make sure they have remotely stored all data inside the Colorado to the Computer before powering down the primary Colorado or disconnecting the DB9 cable from its COM1 port.

**NOTE: TURNING OFF THE COLORADO BEFORE THE COMPUTER ROOM DOWNLOADS THE DATA COULD RESULT IN LOSS OF DATA!**

Turn off all equipment.

If the meet is over or equipment is not secure or is exposed to weather, disconnect all equipment and put it inside.

## 7. Troubleshooting

If buttons or pads seem to be intermittent, reseal connectors at lanes and in to the back of the Colorado.

If pads are too hard to press, evacuate air from bladder with pump and needle.

If pads are shorting, inject air in to bladder with pump and needle.

If comm test passes but meet does not download over a long serial cable, bring computer next to Colorado and connect them with a short serial cable and retry.

### 3.3. Intermediary Duties

This person sits between the Timing Equipment Operator and the Admin or head Referee.

This person's job is to:

- Verify printer is working properly; troubleshoot and fix any printing problems that may occur while the timing equipment operator concentrates on capturing times
- Collect the Race Summary Sheets from the printer
- Verify buttons worked and were pressed in a timely fashion, annotate the race summary sheet accordingly, and work with the admin or head referee when there is a problem
- Collect Colorado and Referee Meet Sheets and DQ slips from the Automatic Equipment Operator
- Collect DQ slips from Referees after the event and annotate the Colorado Meet Sheet
- Collect Lane Timing Sheets from the Runner
- Clip together the DQ slips, Colorado and Referee Meet Sheets, Race Summary Sheets and Lane Timing Sheets for an event and give to Runner

The following sequence will be performed for each race:

Collect Race Summary Sheet from the printer.

Circle the event number and heat number with a pencil.

Verify at least one button or pad was pressed and the times did not span more than 0.3 seconds for each lane, and that it selected the middle time as the Finish Time. If so, draw a line next to the lane time column with a pencil indicating you have checked it and it is good. If not, circle a single time if it is a single outlier or is missing, or circle the whole column if all the numbers are far from each other or all missing, to flag admin or head referee that there is a problem.

If more than one button or pad was pushed and the span was greater than 0.3 seconds, verify that the Colorado threw out the outlying data points.

- If one time was an outlier, make sure Colorado picked the time of the two other times that was closest to the outlier for the Finish Time.
- If all three data points were spread far apart, make sure the Colorado picked the middle time for the final time.

If only one button was pushed, make sure the Colorado selected it for the Finish Time.

If there were no buttons pushed, or there was a problem with the timing system, notify the head Referee so they can look at the Lane Time Sheet or Coach's Timer to determine the Finish Time.

If a button or pad is regularly not being pressed but it appears like someone is trying to press it, check the finish cable harness seating and switch connection seating, or send someone over to talk to the timer and possibly swap out their button or a pad. Note that this could cause a delay in the meet.

If anyone was DQ'd after the event was over, cross them out on the Colorado Meet Sheet and write DQ with a red pen, tear off the carbon copy of the DQ form, and hand it to the Admin or Chief Stroke and Turn Judge.

Compare order of finish on timing system printout to referee sheet.

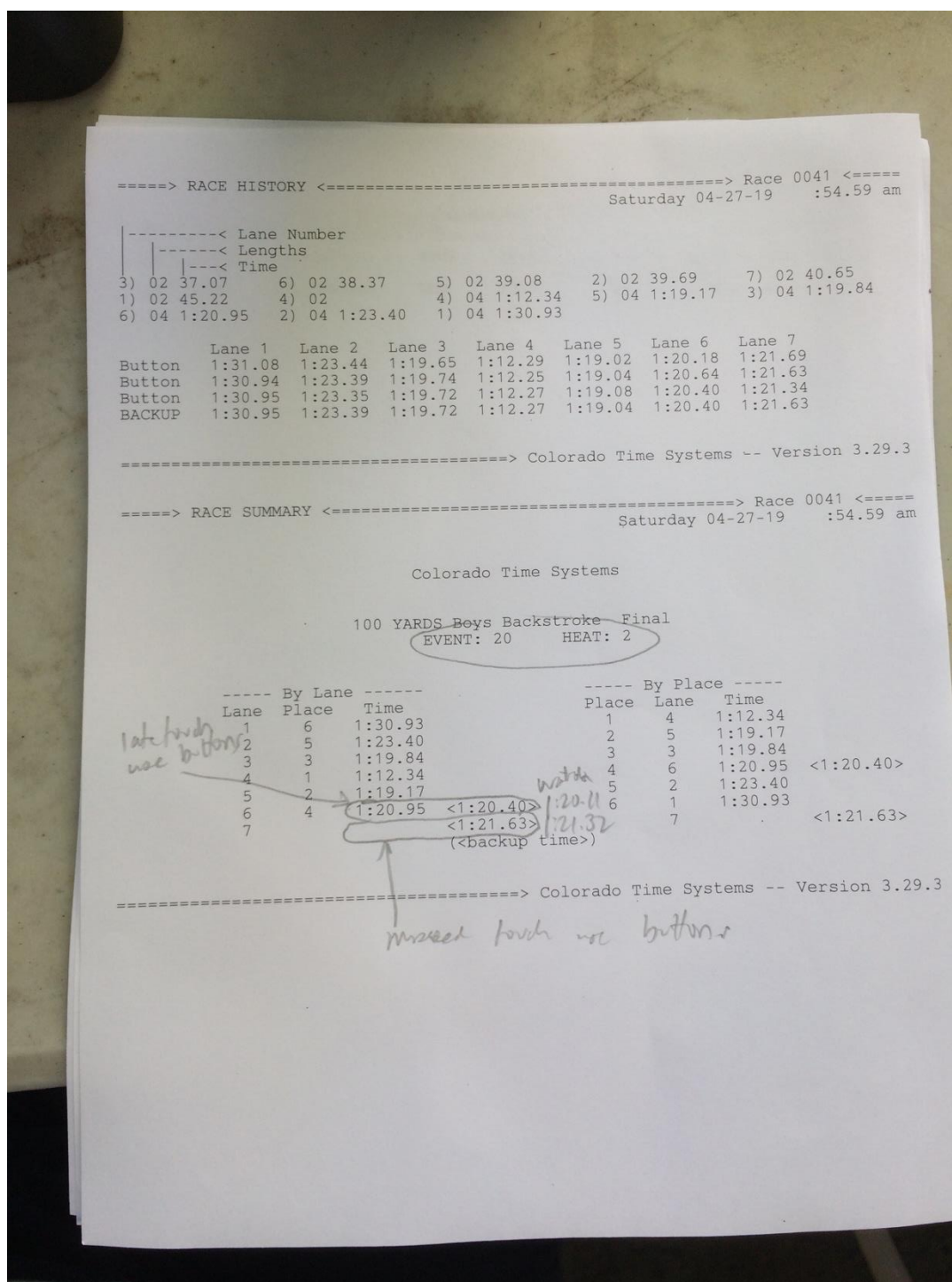


Figure 36: Example System 6 marked up heat results printout.

The following sequence will be followed at the end of each event.

When event is over, clip the paperwork together in the following order:

- DQ slips
- Colorado meet sheets
- Referee meet sheets
- Lane timer sheets

Give the stack of paperwork to the Runner who will bring it to the Computer Room.

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## 4. Appendix

### 4.1. Quantum Timing Equipment Operator Checklist

Before Each heat:

- Update start list for deck seeded meets only.

During each heat:

- Select + if there is a soft touch.
- Select – if there is an extra touch.
- Select Arm touchpad if you missed one or more soft touches and are certain the swimmer is coming in for the finish.
- Select DNS if a swimmer does not show.
- Select DNF if swimmer does not finish.
- Select Take backup time if there were too many or too few touches and corrections.
- Toggle Used/Unused for swimmers that scratch before the heat.

After each heat:

- When all swimmers are finished, press Officialize thumbs up button.
- Select next heat/event.

After each event:

- Give timing equipment operator program sheet to intermediary.

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## 4.2. Dolphin Timing Equipment Operator Checklist

During each heat:

- Verify event number and heat number are correct.
- Write file number on left margin of Colorado meet program sheet.

After each heat:

- When all swimmers are finished, press Left Ctrl-PrntScrn. Verify Gadwin Printscreen box is around Dolphin window.
- Press Enter to print screen and save to file.
- Type “r” for Reset.
- Type “y” to confirm.

After each event:

- Give timing equipment operator program sheet to intermediary.

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### 4.3. Colorado Timing Equipment Operator Checklist

During each heat:

- Turn off unused lanes.
- Verify event number and heat number are correct.
- Write file number on left margin of Colorado meet program sheet.
- Press + if there is a soft touch.
- Press – if there is an extra touch.
- Press Finish Arm if you missed one or more soft touches and are certain the swimmer is coming in for the finish.

After each heat:

- When all swimmers are finished, press Store/Print.
- Press Reset with two fingers.

After each event:

- Give timing equipment operator program sheet to intermediary.

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#### 4.4. Intermediary Checklist

After each heat, if results being printed:

- Collect timing equipment heat result printouts from printer.
- Circle heat and event.
- Circle any missing watch times.
- Check all button and pad times across a lane to make sure they do not vary more than 0.3 seconds. If they do, or if there is a late touch flagged, circle the lane row.

After each event:

- Create a packet of event papers held by a clothespin with the papers in the following order:
  - DQ slips from Chief Stroke and Turn Judge.
  - Meet program from timing equipment operator.
  - Referee meet program(s).
  - Timing system heat result printouts, if being printed.
  - Lane timer sheets delivered by runner.
- Give event packet to admin or meet referee for review before sending it to the computer room.