Minnesota Swimming
Timing Systems 101

How important is the timing system to you?

- You need quality timing information to succeed

- Intermittent or uncertain timing information
    - Can diminish the quality of your work
    - Make your day long

- Self defense
    - The host team should:
        - Provide a PC with Meet Manager and the PC/timing unit cable drivers
        - Have the timing system configured, tested, working end-to-end
        - Have a person with timing system knowledge
    - But they don't always. Then eyes turn to you, as the most expert person in the moment.

Types of timing systems

- Many pools
  - Colorado 6
  - Daktronics OmniSport 2000
- Small number of pools
  - Colorado Gen7
    - U of M, St. Anthony
  - Superior Swim Timing
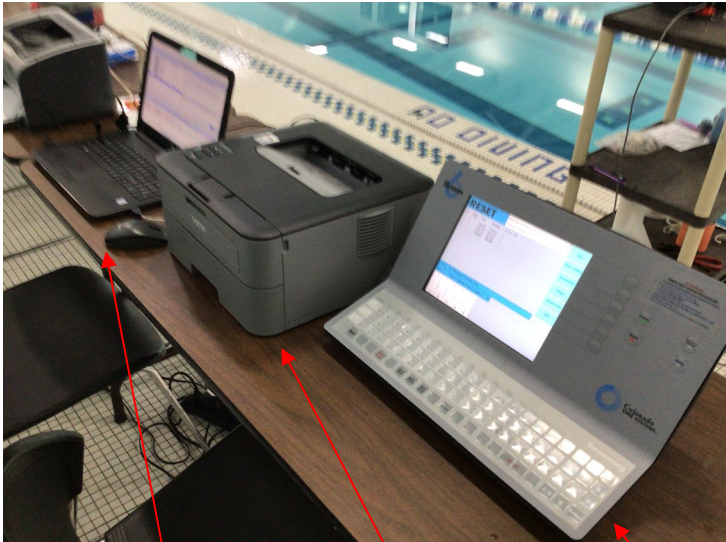   - AQJT, MAKO, ASF
  - Omega
    - STRM

What are the parts?

- PC running Meet Manager and PC printer
  - Meet Manager: Admin 101 and 201
- Timing unit and (in some cases) timing unit printer
- "Lane cable", touchpads, buttons
- Start unit, speaker(s), strobe light(s), start unit cable
- Scoreboard, scoreboard cable

A look at Colorado 6

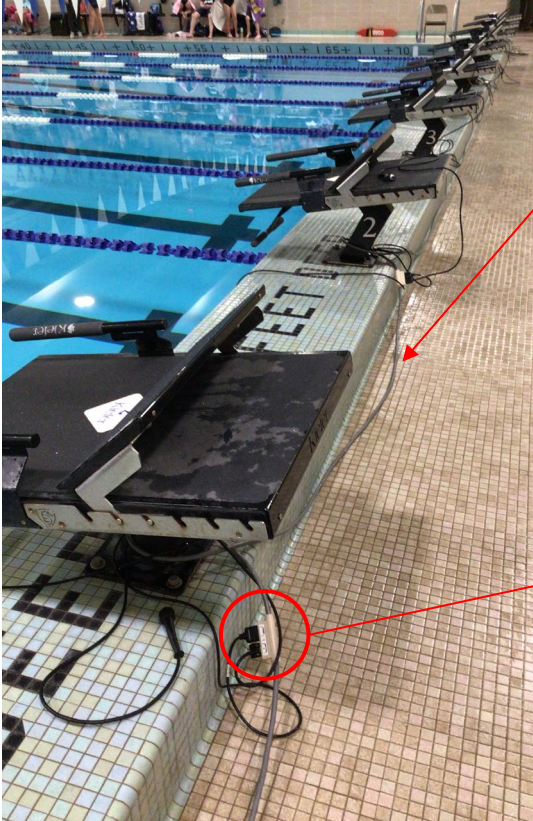Infinity Start Unit

Printer for PC

PC running
Meet Manager

Colorado 6

Printer for Colorado 6

A look at Colorado 6

"Lane cable"
Always a Prime/A cable to connect the touchpad and one button.
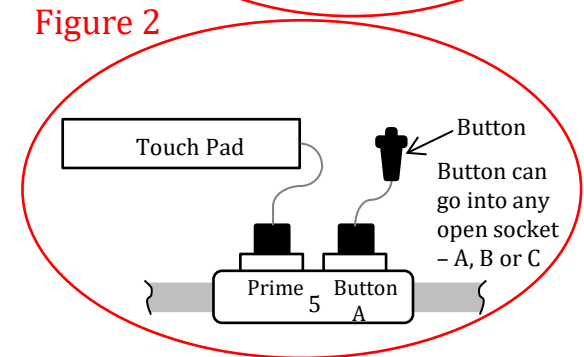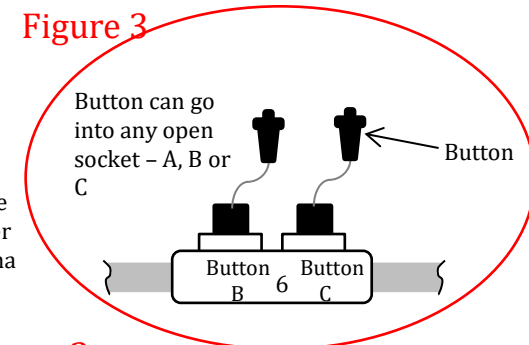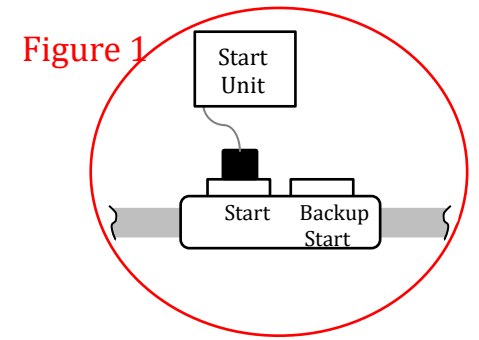Optionally also a B/C cable to connect one or two additional buttons

Championship Start Unit

"Prime" to connect the touchpad

"A" to connect a button

A look at Colorado 6

Figure 1

Start Unit

Start | Backup Start

Scoreboard

Remote speaker cable

Figure 3

B/C cable (optional)   1 2 3 4 5 6 7 8

Prime/A cable   1 2 3 4 5 6 7 8

NEAR END

Colorado

1 2 3 4 5 6 7 8

Start Unit

Figure 1

Colorado Printer

PC

PC Printer

Remote Speaker (optional)

Figure 2

Figure 3

Button can go into any open socket – A, B or C

Button

Button B   6   Button C

Figure 2

Button

Touch Pad

Button can go into any open socket – A, B or C

Prime 5   Button A

A look at Daktronics

Printer for PC

PC running
Meet Manager

HS-200 Start Unit

OMNISport 2000
Daktronics Timing Unit
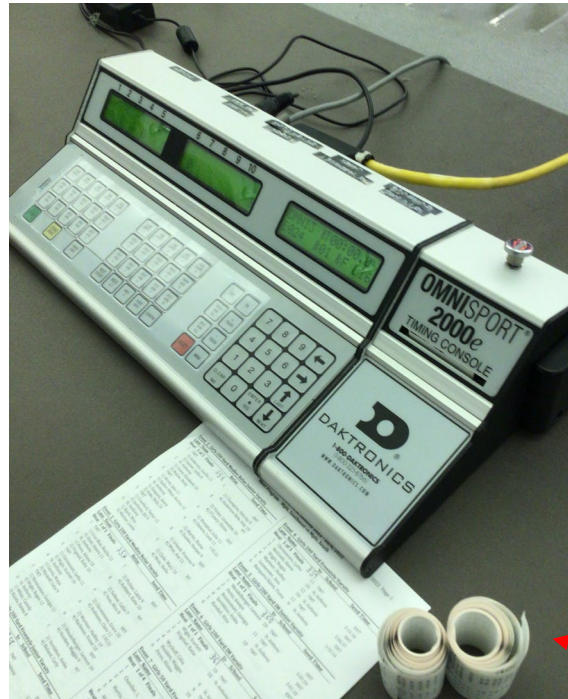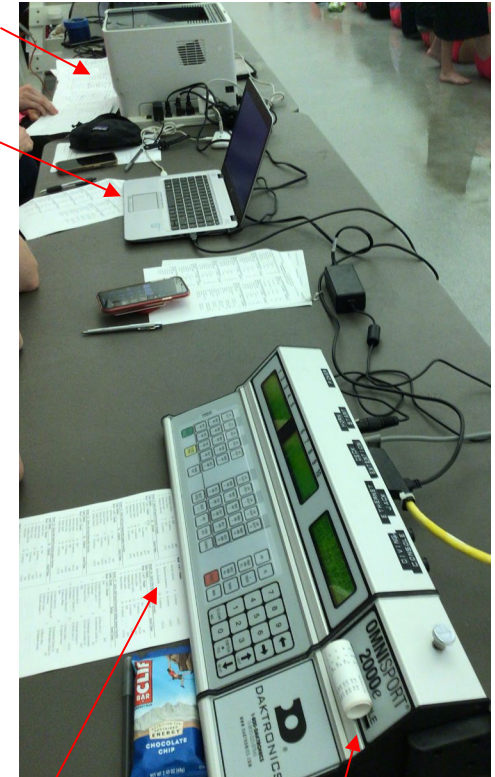
Daktronics Timing Unit

Note: No printer. Prints on
"cash register" rolls of paper

A look at Daktronics

Timing unit

From last
Lane Module
to timing unit
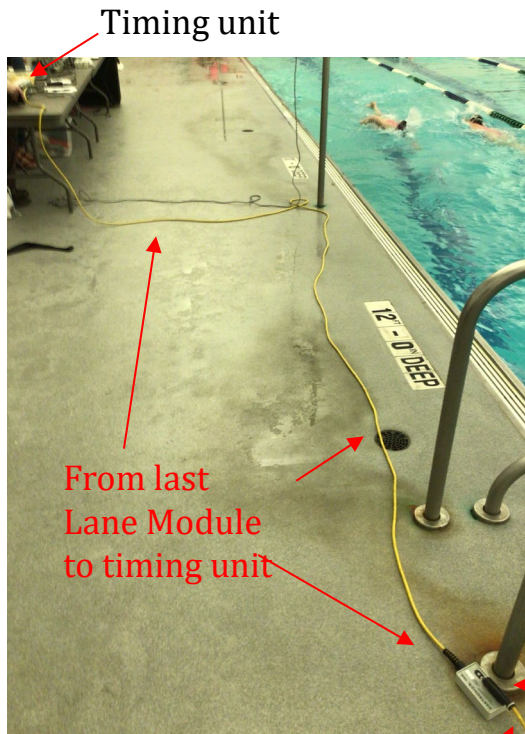
Cable from last Lane Module
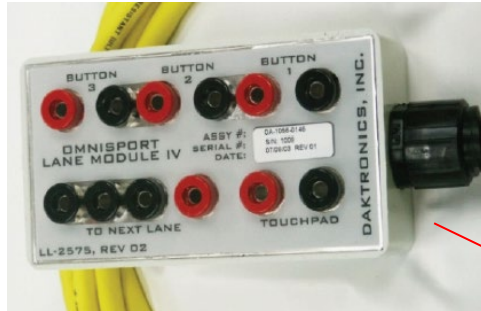
Lane Module – one for each lane to connect touchpads and button(s)

Lane Extension Module runs from Lane Module nearest the timing unit to the timing unit

From one lane to the next
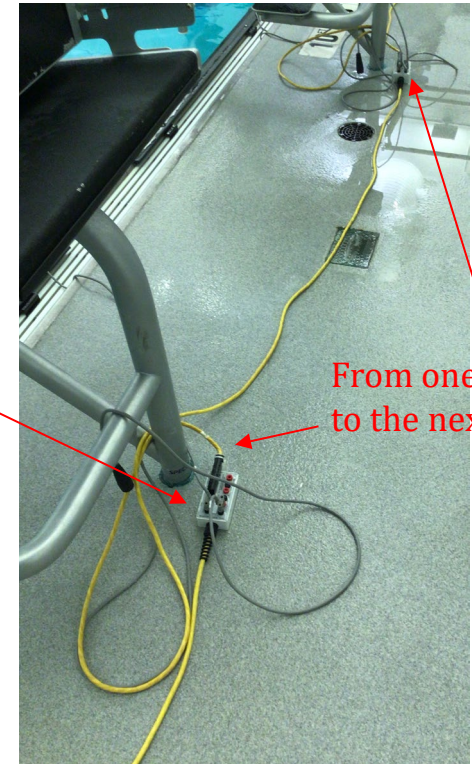
Lane Module – one for each lane daisy chain connected

A look at Daktronics

Scoreboard

Remote speaker cable

OmniSport 2000

Lane Extension Module

1 2 3 4 5 6 7 8

Remote Speaker (optional)

Figure 1

Start Unit

PC

PC Printer

Figure 1

Touch Pad

Lane Module for Lane 5

To Lane 4

From Lane 6
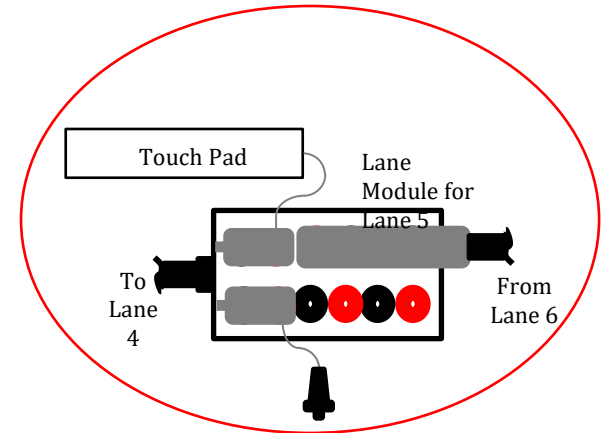
How does it work?

- At the start of a race, the timing unit is in "Reset" mode. The timing unit clock is at zero.
  - The starter presses the start unit button to start the race.
  - The horn sounds, and strobe light flashes.
  - The start unit signals the timing unit. The timing unit starts its clock.
- The swimmers hit the touchpad for the intermediate turns of the race
  - Timing unit recognizes the touch event through the Lane Cable and records the time of the touch
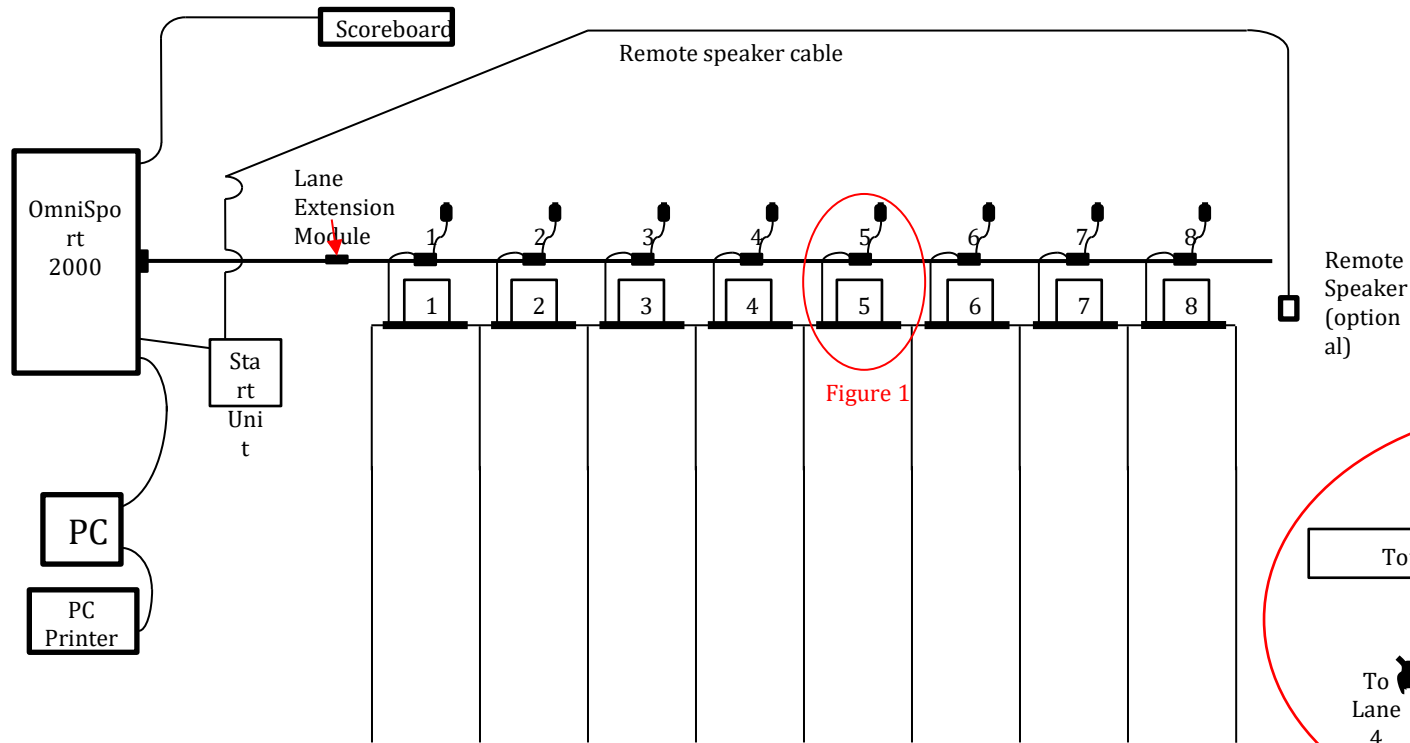- The swimmer hits the touchpad at the end of the race. The lane timer(s) press the button(s).
  - Timing unit recognizes the pad and button events through the Lane cable and records a time for each event as finish information.
- The timing unit operator "Resets" the timing unit for the next event.
- The PC operator, in the Meet Manager > Run, uploads the race results.

How does it work? – Colorado 6

- Works like a switch turning on a light. Instead of a light there is a Colorado 6 timing unit. The Colorado 6 sees the switch close. Normally open.
- Polarity is not important for an open/close type circuit connection. The dual banana plugs for the start cable, buttons and touchpads can go in either orientation.

Colorado 6

5 VDC

Prime/A Cable

Start Unit

Closes when starter presses microphone button

5 VDC

Button

Closes when timer presses button

5 VDC

Touchpad

Face Zone

Right Angle Edge Zone

Closes when swimmer hits pad
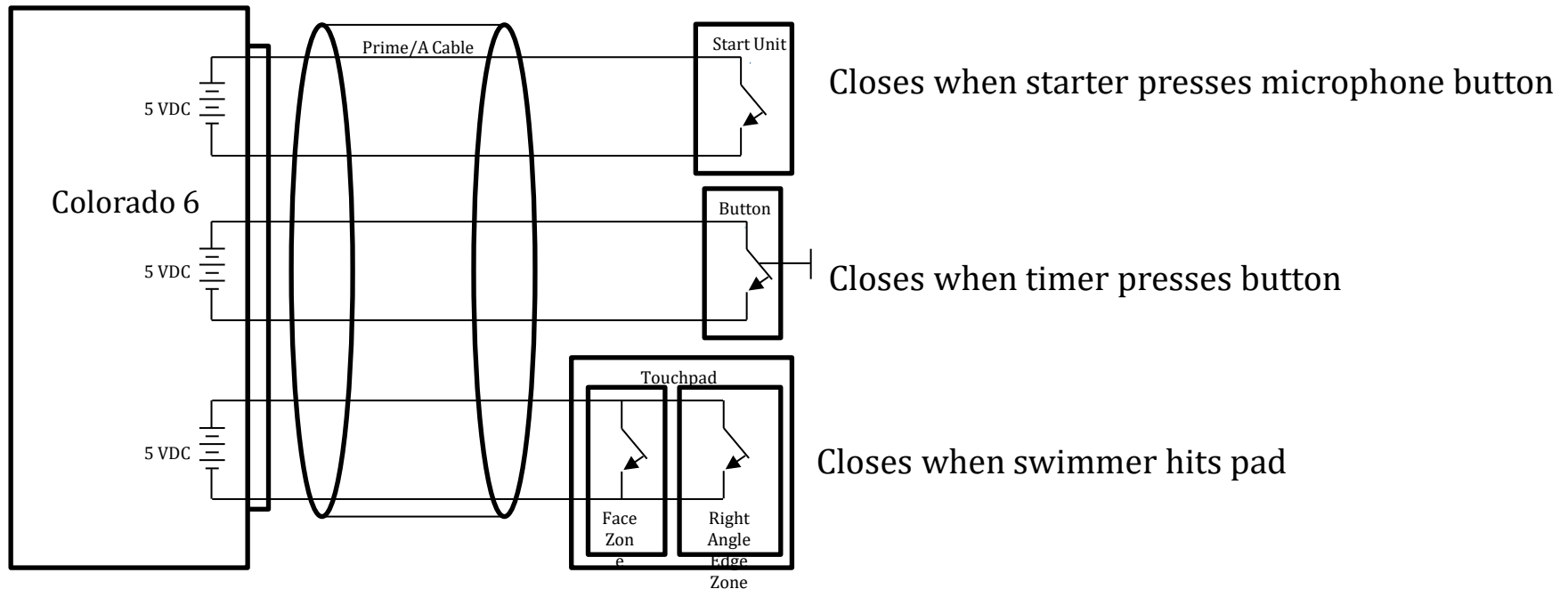
How does it work? - Daktronics

- The daisy chain of lane modules form a "serial bus" – a data connection transmitting 0's and 1's encoded to pass the touch and button information to the timing unit.
- Polarity matters. Wrong polity cause the recognition of 0's and 1's to fail. The banana club pin with the ground tab goes into the black socket hole.
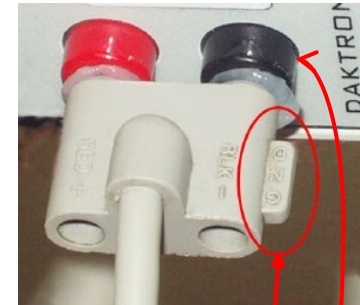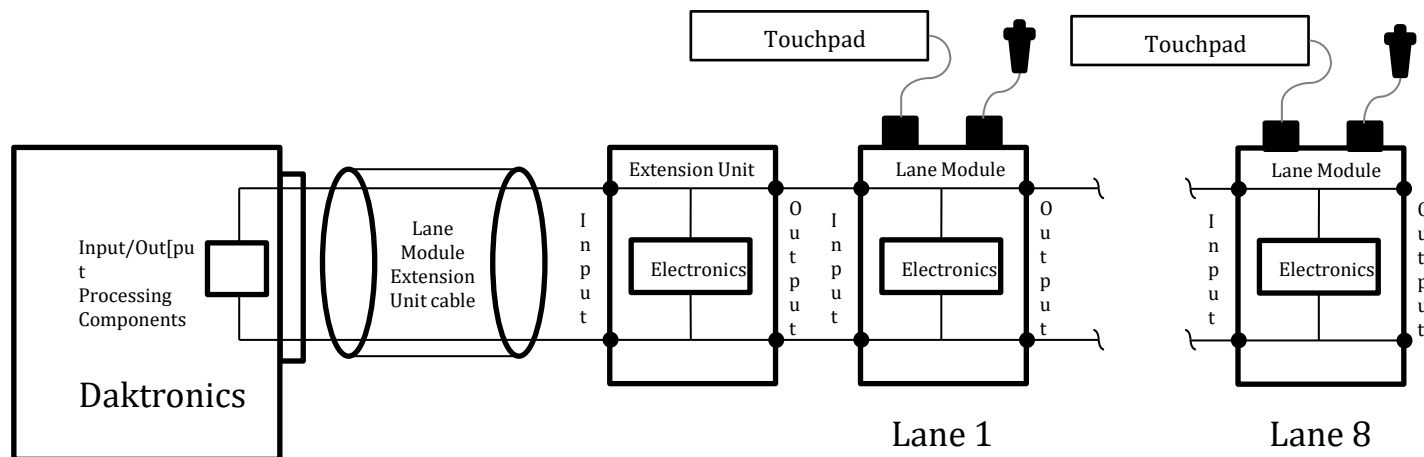
Pin with GND tab goes into black socket

Lane Modules recognize the touchpad and button triggers and encode the event in zeros and ones to pass back the event information to the timing unit

Succeeding – your timing unit operator

- Provide a "2 page" instruction of the common actions
- Provide a meet program for the operator. Instruct the operator to write on the program the race number for each heat
- Get to know your timing unit operator. Observe and work with the timing unit operator the first few heats. How much skill and experience does your timing unit operator have?
- If the timing unit operator is new or is struggling, train, work with the operator through multiple heats.
  - Other tasks may seem more urgent, but bringing your operator up to speed saves time as the session progresses.
- Check your operator as the session progresses. Is the operator attentive?
- Ask the operator to bring undesirable timing system performance to your attention as soon as he or she detects it.
  - You do not want to discover that you have lost a lane's button information 15 heats after the button has failed.

Succeeding - Test

- Overall system test
  - In Reset mode with a 50-yard race
  - Talk into the start unit. Start the race from the start unit. The timing unit should start timing the race.
  - After at least 15 seconds and no more than 20 seconds, each lane should be in a "Finished Armed" condition ready to accept finish touches and buttons.
  - For each lane, hit the touchpad and press the button or buttons
  - The lane information on the timing unit should show a finish time and a for each button an indication that the timer pressed the button.

Succeeding – Troubleshoot

- Get help from the knowledgeable host person
- First: diagnose. Second: fix. Calm and methodical. Go slowly to go fast.
- Always check that the connections to the timing unit backplane are firmly in position
  - Concurrent multiple failures of buttons or pads almost never happen. In such situations, more often the connections at the backplane are not firm.
- For an individual pad or button with intermittent behavior, do not always immediately replace the pad or button
  - Is the plug in good condition? Is the socket or plug corroded or otherwise not clean? Cleaning may be a better solution than replacing.

Succeeding – Clean, Clean, Clean

- Pool is a harsh environment. Corrosion and contaminants are often a source of intermittent behavior.
- Preventive maintenance is a wonderful thing.
- Cleaning fluids and tools
    - Isopropyl alcohol
    - CLR (Calcium Lime Rust Remover) or Lime-A-Way
    - Cleaning duster (pressured air through small tube; Best Buy)
    - Soft bristled toothbrush. **Never steel wool or stiff bristled brush**
    - Dielectric grease (Menards, Home Depot, auto parts store)
    - Pipe cleaners (smoke shop, craft shop, Target craft department)
    - Paper towel
- Cleaning the cable terminating connections
    - Protect the thin plating on connector contacts. No abrasives. No CLR. No dialect grease.
    - Blow clean with cleaning duster.
    - Gently wipe clean with soft toothbrush and alcohol
- Cleaning the dual banana plugs and sockets
    - Alcohol and paper towel for plugs. Alcohol and pipe cleaner for sockets.
    - If seriously corroded, use CLR. Do not use CLR frequently. It removes both plating and corrosion.
    - After cleaning apply dielectric grease. Small amount goes a long way. Can be a mess.

Succeeding – Build your knowledge

- Be curious. Observe how the equipment is connected. Review the timing system configuration. Take the time to learn.

- Never be afraid to ask.

- Download the timing system user guides.

- Timing system 201 coming soon.

QUESTIONS?

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Two questions for the end of the training session

- What would make this Equipment 101 training better?
- What would you want and expect in Equipment 202 training?

Appendix

- Timing Unit Backplanes
- Start Unit connection and volume control panels
- "2 page" instructions for timing unit operator

Timing Unit Backplanes

- Colorado 6

- Daktronics OmniSport2000

Backplane: Colorado 6
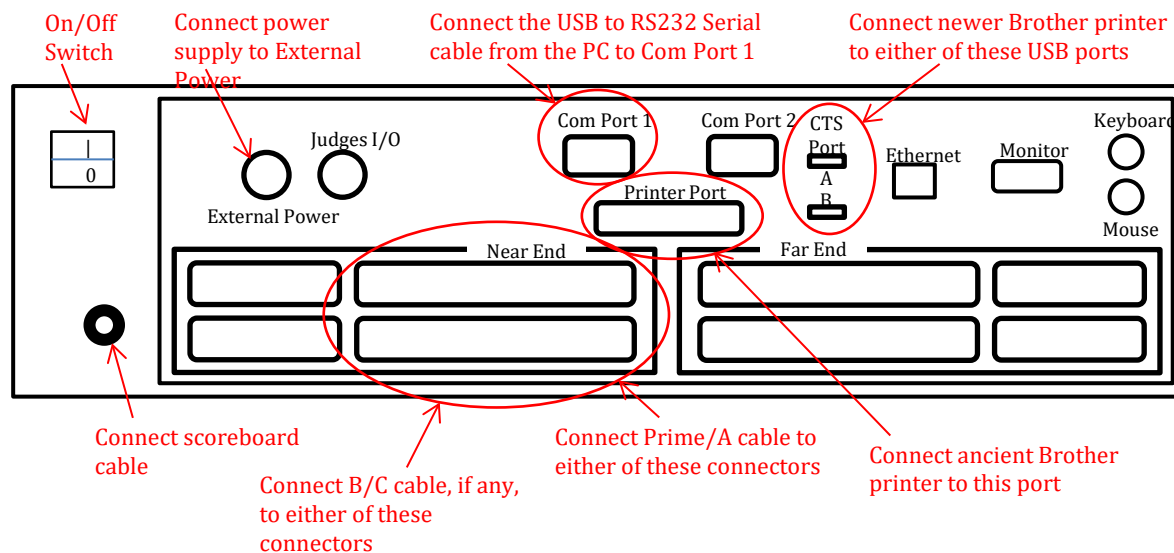
Backplane: Daktronics OmniSport2000

Connect Lane Modules via Lane Extension Module

Connect power supply to External Power

On/Off Switch

Connect scoreboard cable

Connect the USB to RS232 Serial cable from the PC to RESULTS PORT

Connect cable from Start Unit
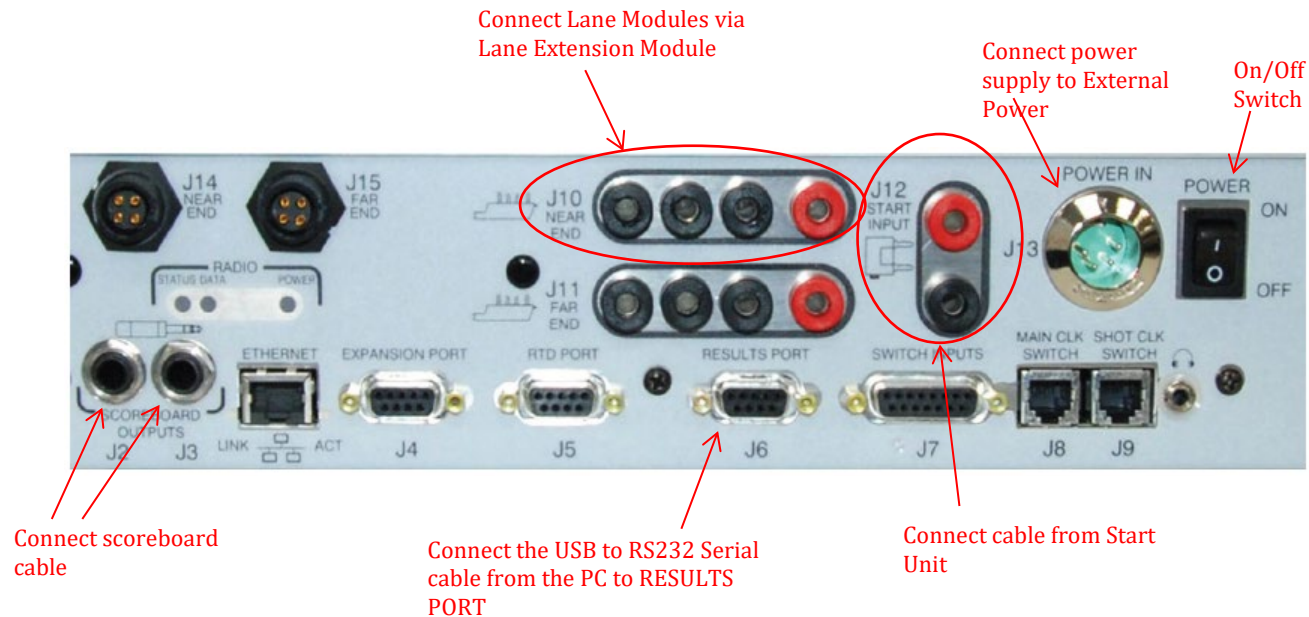
Start Unit connection volume control panels

- Colorado Infinity Start Unit

- Colorado Championship Start Unit

- Daktronics HS-200 Start Unit

Colorado Infinity Start Unit

Attach charger
Unit should be OFF while charging.
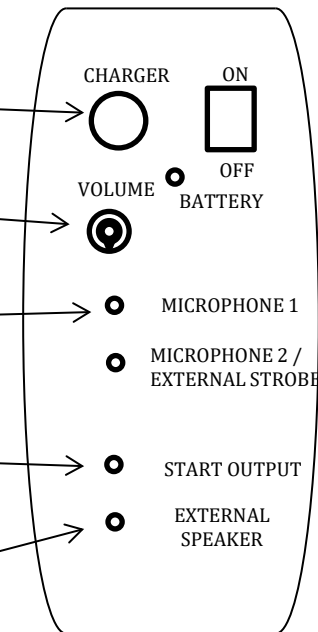Unit will not work while charging.

Controls the volume of the starter speech at the integrated speaker and, if any, remote speaker. Note: The horn sound is always at maximum amplification.

Attach microphone
Microphone to quarter inch stereo connector cable

Attach Start cable
Quarter inch audio connector cable to dual banana plug cable. Connect the dual banana plug into the "Start" or "Backup Start" sockets at either end of the Prime/A cable.

Attach remote speaker, if any
Speaker to quarter inch stereo connector cable

CHARGER   ON

VOLUME   OFF
        BATTERY

MICROPHONE 1

MICROPHONE 2 /
EXTERNAL STROBE

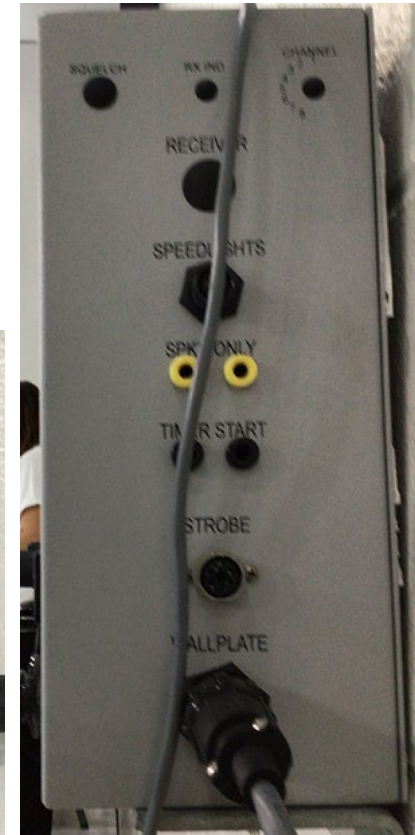START OUTPUT

EXTERNAL
SPEAKER

The Infinity Start Unit is a normally open start unit.

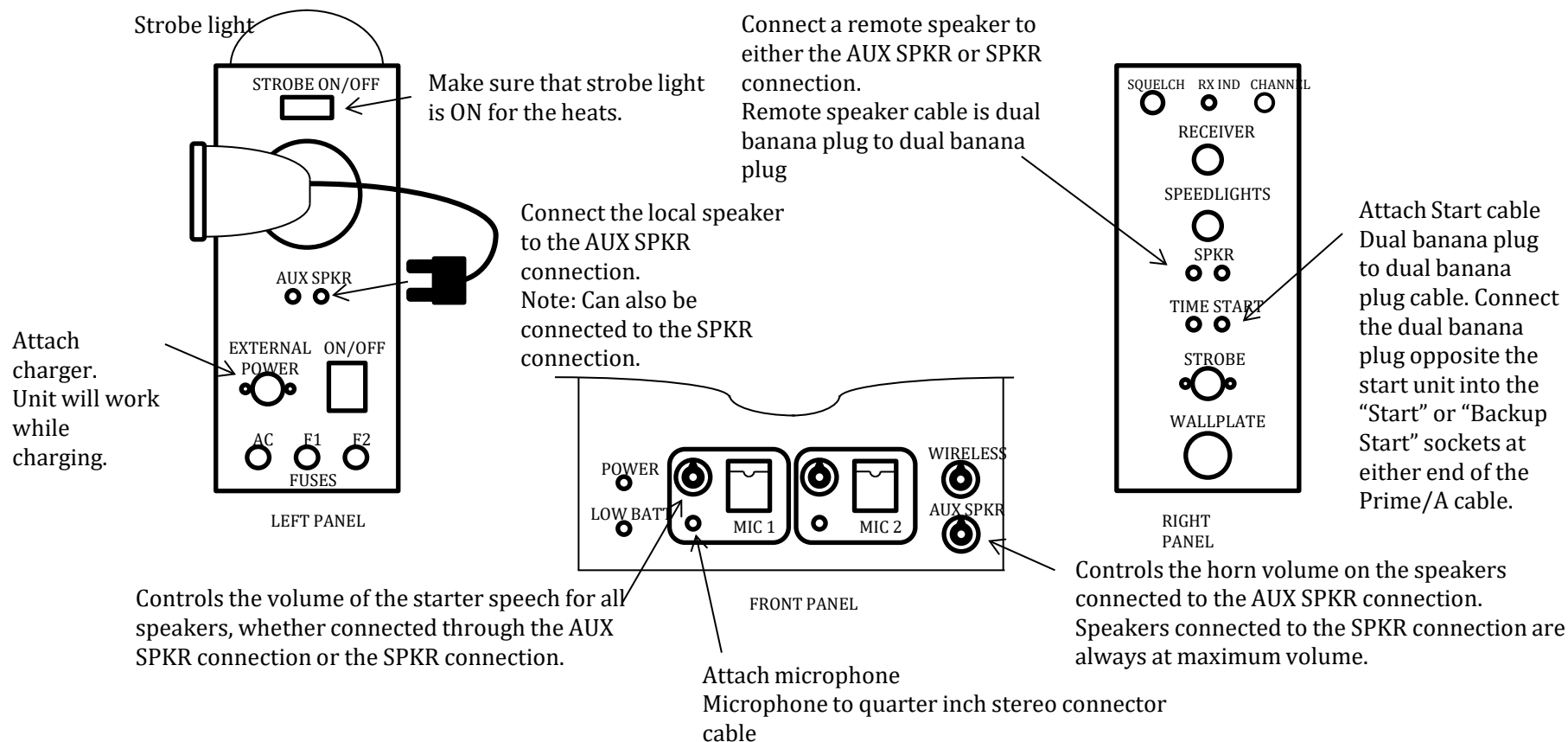The Infinity Start Unit has a speaker integrated into the unit.
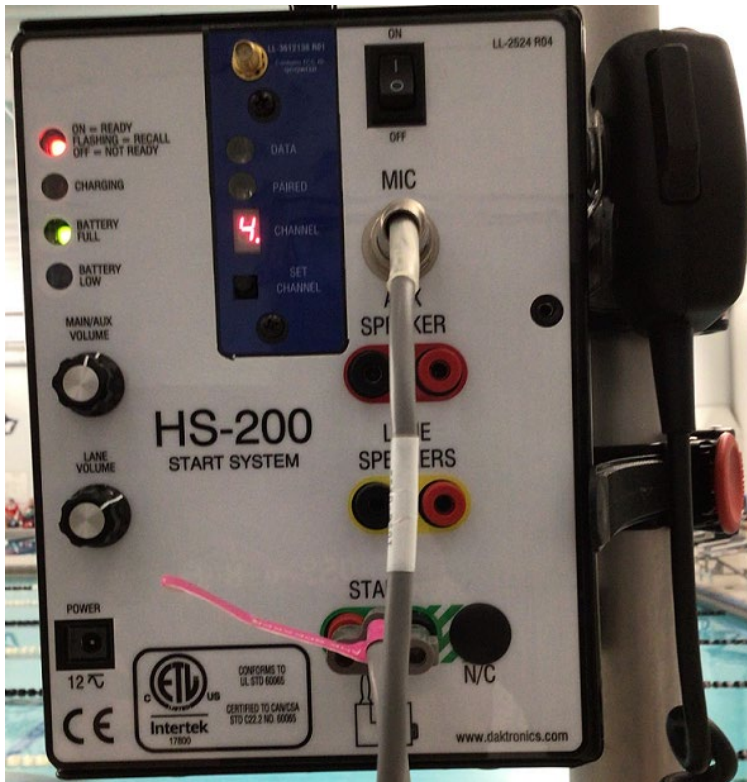
Colorado Championship Start Unit

Colorado Championship Start Unit

Strobe light

STROBE ON/OFF

Make sure that strobe light is ON for the heats.

Connect a remote speaker to either the AUX SPKR or SPKR connection.
Remote speaker cable is dual banana plug to dual banana plug

SQUELCH   RX IND   CHANNEL

RECEIVER

SPEEDLIGHTS

Connect the local speaker to the AUX SPKR connection.
Note: Can also be connected to the SPKR connection.

SPKR

TIME START

AUX SPKR

Attach Start cable Dual banana plug to dual banana plug cable. Connect the dual banana plug opposite the start unit into the "Start" or "Backup Start" sockets at either end of the Prime/A cable.

Attach charger. Unit will work while charging.

EXTERNAL POWER   ON/OFF

STROBE

WALLPLATE

AC   F1   F2

FUSES

LEFT PANEL

POWER

LOW BATT

MIC 1

WIRELESS

AUX SPKR

MIC 2

RIGHT PANEL

FRONT PANEL

Controls the volume of the starter speech for all speakers, whether connected through the AUX SPKR connection or the SPKR connection.

Attach microphone
Microphone to quarter inch stereo connector cable

Controls the horn volume on the speakers connected to the AUX SPKR connection.
Speakers connected to the SPKR connection are always at maximum volume.
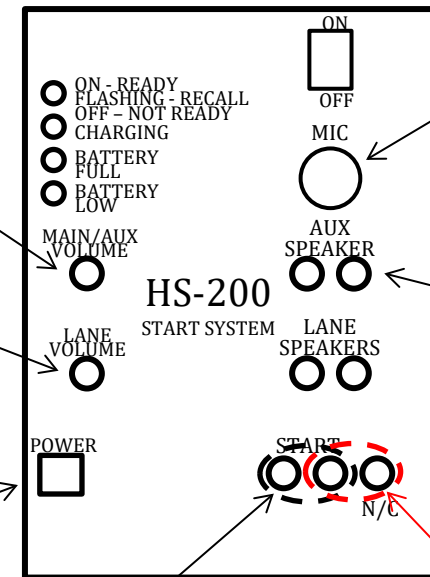
Daktronic HS-200 Start Unit

HS-200 Start Unit is normally open start unit.

Controls the volume of the internal speaker and, if any, remote speaker connected through AUX SPEAKER socket.

Controls the volume of any speakers connected through LANE SPEAKER socket.

Attach charger. Unit will work while charging.

Attach microphone cable

Attach remote speaker, if any.

Attach dual banana plug start unit to timing unit cable. Must use this socket. It is for a normally open start unit like the HS-200.
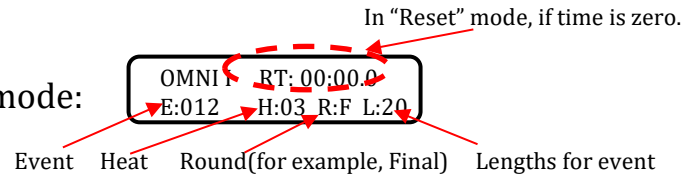
Do **not** use this socket. It is used only for a start unit that operates on a normally closed basis.

Daktronics OmniSport 2000 timing unit
Quick tips for Operator

In "Reset" mode, if time is zero.

At the start timing unit should be in "Reset" mode:

OMNI   RT: 00:00.0
E:012   H:03 R:F L:20

Event   Heat   Round(for example, Final)   Lengths for event
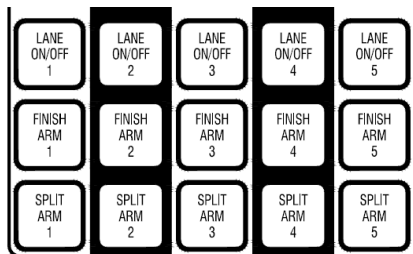
Before the start (or as soon after as possible): Set the Event and Heat numbers.

To increment the Heat: [HEAT +1]   Heat increases by one.

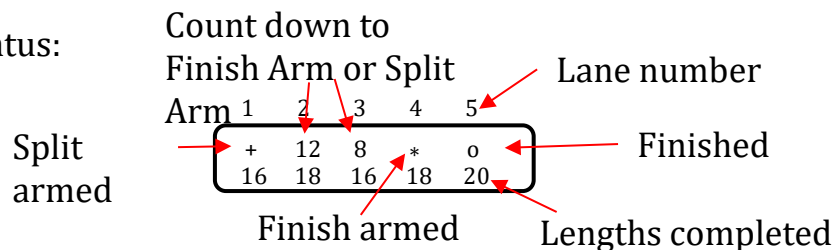To increment the Event: [NEXT EVENT]   Event increases by one. Heat goes to 1.

To change the Event and Heat: [EVENT HEAT]   then keypad [Event #] [Enter] and then keypad [Heat #] [Enter]

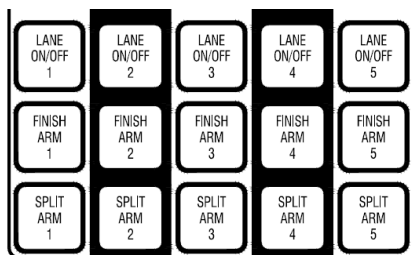When the race starts, turn off the lanes without a swimmer: Toggles lane off and on.

LANE ON/OFF 1	LANE ON/OFF 2	LANE ON/OFF 3	LANE ON/OFF 4	LANE ON/OFF 5
FINISH ARM 1	FINISH ARM 2	FINISH ARM 3	FINISH ARM 4	FINISH ARM 5
SPLIT ARM 1	SPLIT ARM 2	SPLIT ARM 3	SPLIT ARM 4	SPLIT ARM 5

During the race, watch the lane status:

Count down to
Finish Arm or Split
Arm

Lane number

Split armed

Finished

Finish armed

Lengths completed

1	2	3	4	5
+	12	8	*	0
16	18	16	18	20

If the touchpad did not record a touch, add a touch: [+ TOUCH] and the keypad [lane #] [Enter]

If the touchpad recorded an extra touch, subtract a touch: [- TOUCH] and the keypad [lane #] [Enter]

If the swimmer is approaching the touchpad for a split, but the lane is not "split armed", split arm the lane:

LANE ON/OFF 1	LANE ON/OFF 2	LANE ON/OFF 3	LANE ON/OFF 4	LANE ON/OFF 5
FINISH ARM 1	FINISH ARM 2	FINISH ARM 3	FINISH ARM 4	FINISH ARM 5
SPLIT ARM 1	SPLIT ARM 2	SPLIT ARM 3	SPLIT ARM 4	SPLIT ARM 5

If the swimmer is approaching the touchpad to finish, but the lane is not "finish armed", split arm the lane:

As soon as all swimmers have finished: [STORE PRINT] and then: [RESET]

What if all swimmers have finished, but the clock for a lane is still running?

Select: [RESET] ⟶ Timing Unit displays:

| RUNNING TIME |
| RESET NOW?   Y/N |

⟶ Select: "Yes"

What if the starter starts the race before the timing unit is "Reset"?

Select: [RESET] ⟶ Timing Unit displays:

| WAS THIS RACE A |
| FALSE START?   Y/N |

⟶ Select: "No"

Colorado 6 timing unit
Quick tips for Operator

At the start timing unit should be in "Reset" mode: **RESET** in Colorado 6 screen, upper left

Before the start (or as soon after as possible): Set the Event and Heat numbers.

To increment the Heat: [Next Heat]   Heat increases by one.

To increment the Event: [Next Event]   Event increases by one. Heat goes to 1.

To change the Event and Heat: [Edit Event Heat]   then keypad [Event #] [Enter] and then keypad [Heat #] [Enter]

When the race starts, turn off the lanes without a swimmer: Toggles lane off and on.

Keypad

Enter
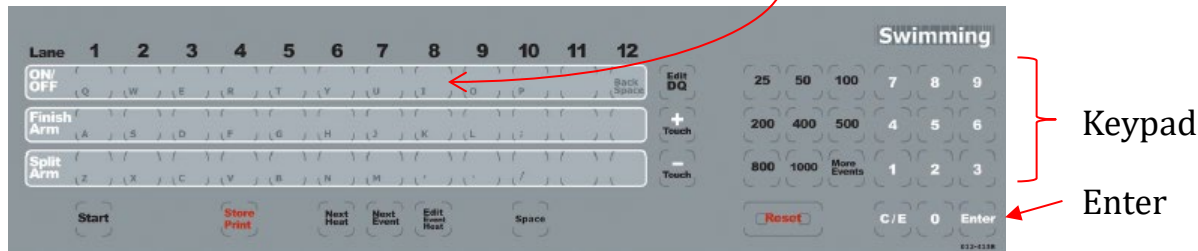
During the race, watch the lane status:

Race number. Increments by one at start of race.
Write the race number in the program.

Event: 3 500 Boys Freestyle Final
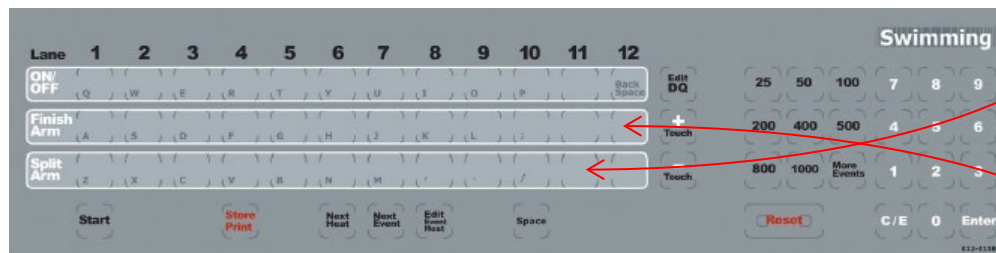Heat: 2 Race # [00002] Lengths 20

- Lane number
- Touchpad status
- Number of lanes completed

If the touchpad did not record a touch, add a touch: [+ Touch] and the keypad [lane #] [Enter]

If the touchpad recorded an extra touch, subtract a touch: [- Touch] and the keypad [lane #] [Enter]

If the swimmer is approaching the touchpad for a split, but the lane is not "split armed", split arm the lane.
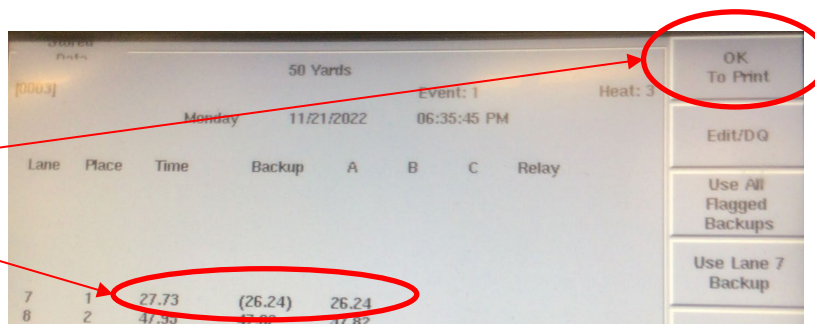

If the swimmer is approaching the touchpad to finish, but the lane is not "finish armed", finish arm the lane.

As soon as all swimmers have finished: [Store Print] and then: [Reset] (two fingers)

You press: [Store Print] and then: [Reset]

and the "OK to print" screen appears. It happens when the pad and button times for a lane differ by more than .30 seconds.

			50 Yards					
			Monday 11/21/2022 06:35:45 PM					Event: 1 Heat: 3
Lane	Place	Time	Backup	A	B	C	Relay	
7	1	27.73	(26.24)	26.24				
8	2	47.33	47.82	47.82				

OK To Print

Edit/DQ

Use All Flagged Backups
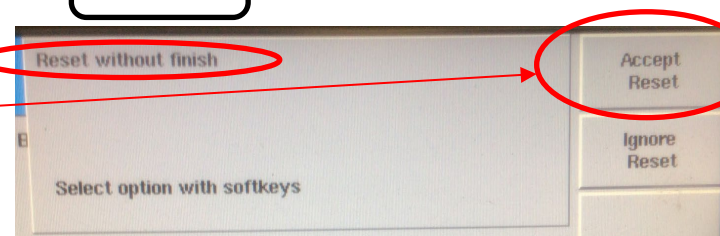
Use Lane 7 Backup

Press: [Quit]

and then:

[Reset]

What if all swimmers have finished, but the clock for a lane is still running?

As soon as all swimmers have finished: [Store Print] and then: [Reset] (two fingers)

"Reset without Finish" dialog box appears.

Select: "Accept Reset"

Reset without finish

Accept Reset

Ignore Reset

Select option with softkeys

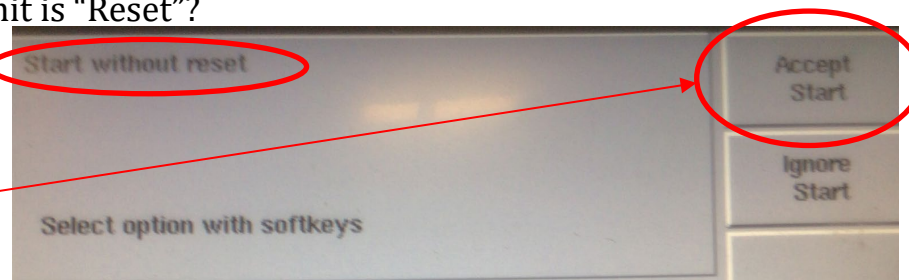What if the starter starts the race before the timing unit is "Reset"?

Immediately press [Start]

"Start without Reset" dialog box appears.
Select: "Accept Start"

Start without reset

Accept Start

Ignore Start

Select option with softkeys

Record Your Attendance

Please visit the following link to record your attendance at this clinic:

https://forms.gle/iJKF2rMsHSnXbsJN9

(This link is in the PDF posted on the MNSI website.)

-or-

Email: mnsitraining@gmail.com