Equipment 201
Colorado 6
Short Course

June 17, 2025

Contents

- Concepts
- Connections
- How does it work?
- Configuring the Colorado 6
- Configuring a printer for the Colorado 6
- Meet Manager/Colorado 6 communications
- Testing and troubleshooting
- What if …

Concepts

- Understand the equipment. Make it work.
  - Start with a framework: What are the parts? How do they connect?
  - At a conceptual level, how do they work?
  - Build your understanding from that framework
- Meet Manager
  - Windows application with a Microsoft Access (.mdb file) database
  - Access to the database only through Meet Manager
  - Think of a meet as a collection of tables
    - What are the tables?
    - When and how does information enter the tables or change?
- Colorado 6
  - Unix PC with some sort of file structure
  - Custom electronics for cable interfaces
  - All printer drivers are preloaded. The user cannot load additional printer drivers.

Concepts: Meet database – What does Meet Manager hold?

Admin 101 and 201

Before entries

Fees: per swimmer

Overall meet: name, location, meet dates, entry open and close dates, “age up” date, meet type, pool type

Meet is organized into sessions

Sessions: sequence #, name, day, start time, interval, max entries

Events are assigned to sessions.

Events: #, individual vs relay, gender, age, distance, stroke, type, fee, score it?, type seeding

After entries

Teams: name, abbreviation

Teams submit entries for their swimmers.

Swimmers: name, USA Swimming registration ID, birth date

Teams identify the events in which each swimmer will swim and provide a seed time.

Entries: event number, seed time

After seeding

For each entry, a heat and lane in the event per the type seeding for the event and based on the seed time.

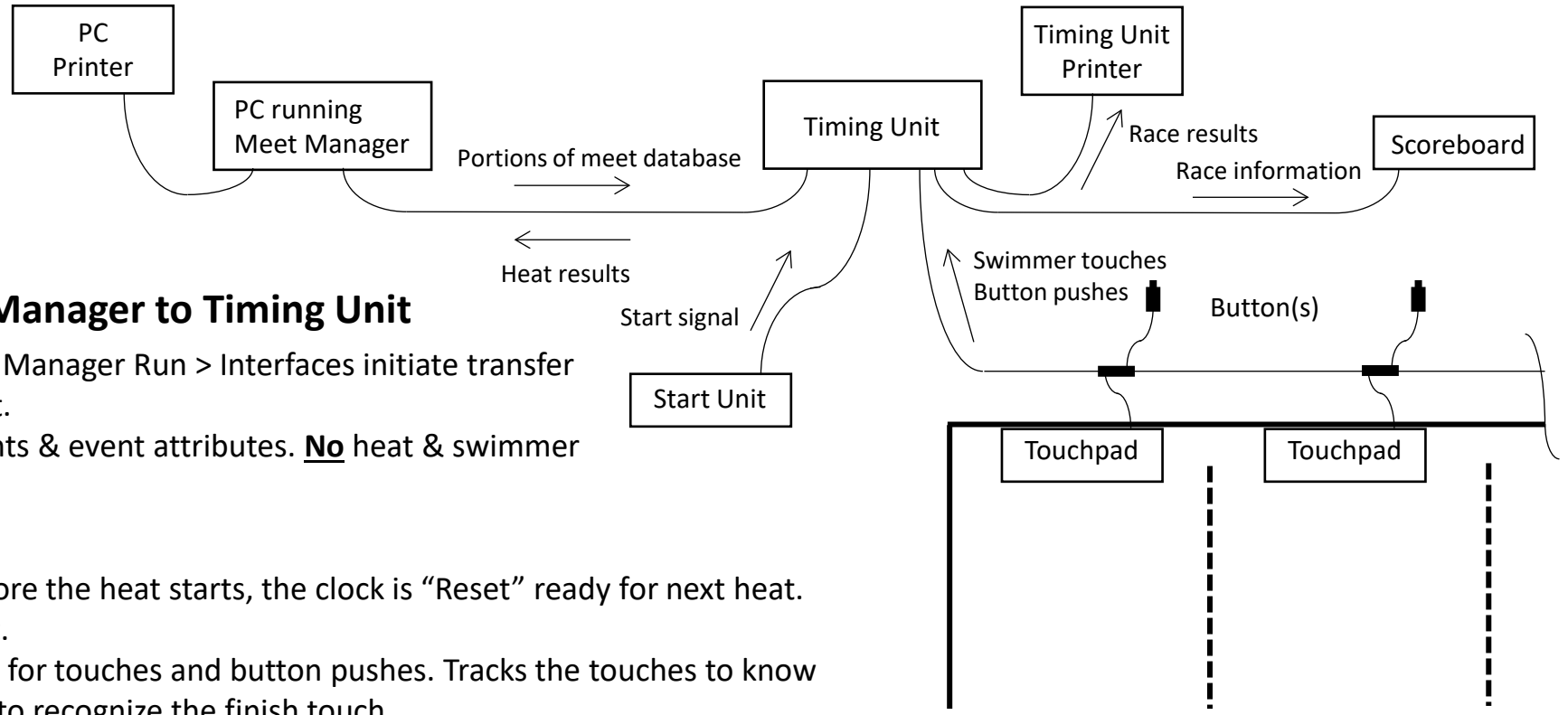
Heats: event #, heat #, for each lane with swimmer: swimmer name

After race

For each heat within an event: event #, heat #, timing unit race # (from timing unit, unique for each race)

For each lane with a seeded swimmer: touchpad split times & button finish times (from timing unit), final time (adjusted as necessary by admin); NS if no pad or button times; DQ where applicable

Concepts: Parts, connections, functions



Meet database from Meet Manager to Timing Unit

Before the session begins, in Meet Manager Run > Interfaces initiate transfer of meet information to Timing Unit.
For Colorado 6: meet identity, events & event attributes. **No** heat & swimmer lane information

Heat

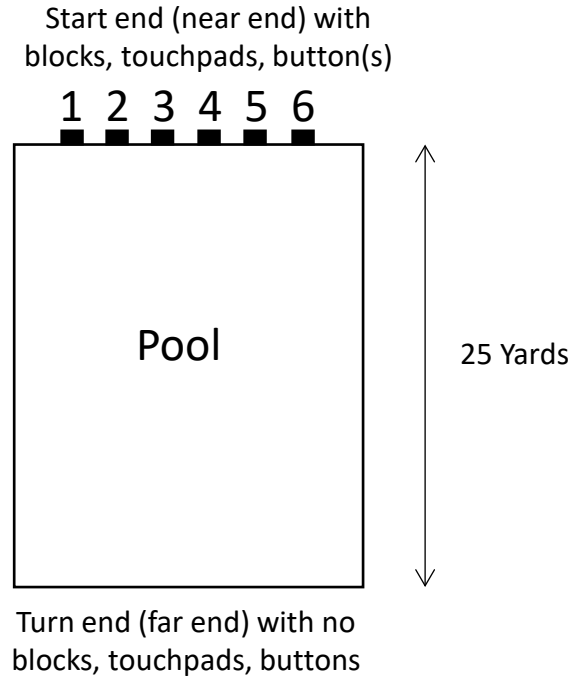
Timing unit contains the clock. Before the heat starts, the clock is "Reset" ready for next heat.
Start unit triggers the clock to start.
Timing unit stores by lane the time for touches and button pushes. Tracks the touches to know number of lengths completed and to recognize the finish touch.

Heat results from Timing Unit to Meet Manager

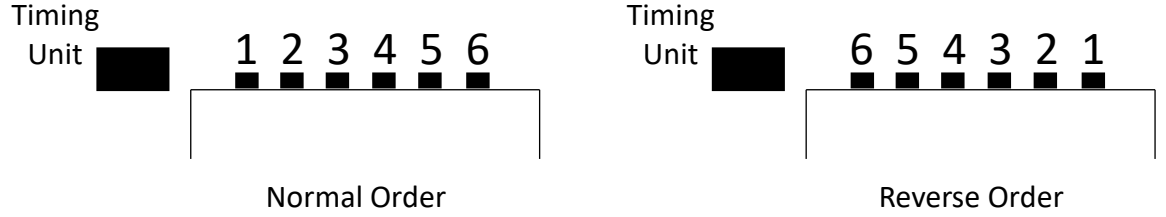
When operator does "Store Print" and "Reset", the Timing Unit sends the race information for the completed heat to the printer.
After the Timing Unit is "Reset" for the next heat, for the heat completed in Meet Manager Run > Get Times button to retrieve race results by event and heat number or Race # to retrieve race results by race number.
Results will only appear for those lanes with swimmers seeded. A given heat can have results from only one race. A race can provide results for one or more heats.

Concepts: The pool – Attributes relevant to timing system configuration

- Short course pool assumptions
  - Pool length: 25
  - Pool length unit of measure: yards
  - First lane number: 1 (as opposed to zero)
  - Lane mapping: See illustration
  - Even length races (50s and up races) start at near end
  - Odd length races (25 yard races) start at far end?
  - Primary finish signal near end: touchpad
  - Primary finish signal far end: No touchpads. Irrelevant.
  - Far end splits not used. No touchpads.
  - No relay takeoff, forward start reaction time or backstroke reaction time electronics



Lane Mapping – Is lane 1 nearest to (Normal) or farthest from (Reverse) the Timing Unit?



Connections

- Connectors
- Equipment connections
- Colorado 6 backplane
- Start units
- Power supplies

Connections: Connectors

- Connectors
  - Dual banana plug
    - No inherent polarity

  - Quarter inch stereo plug
    - Inherent polarity

  - Quarter inch audio plug
    - Inherent polarity

Connections: Connect the equipment

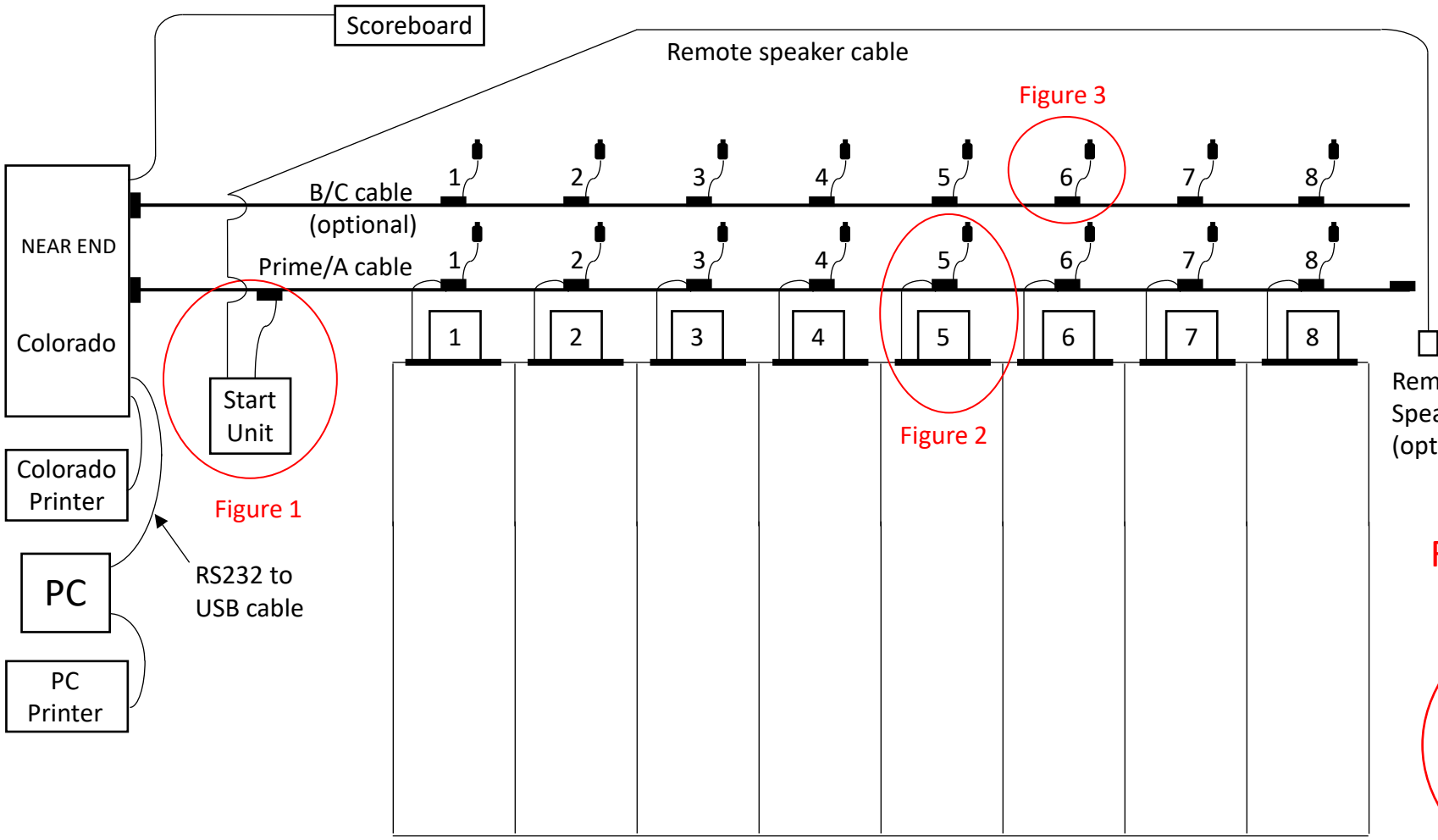


Figure 1

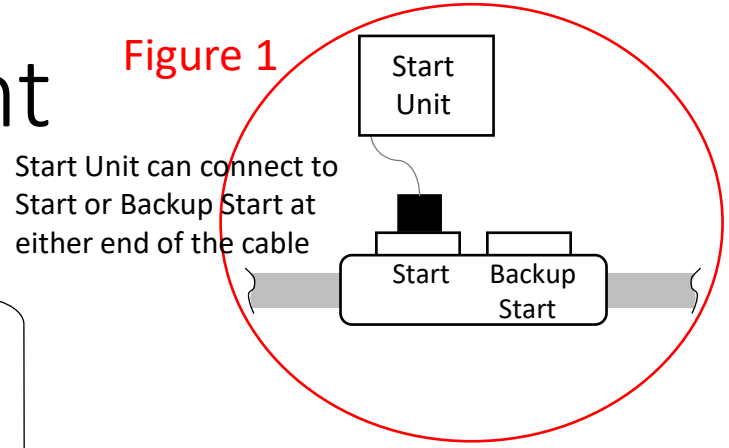


Figure 3

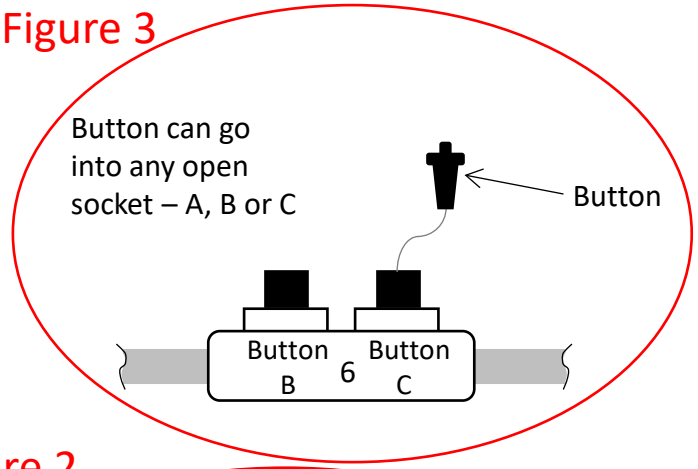
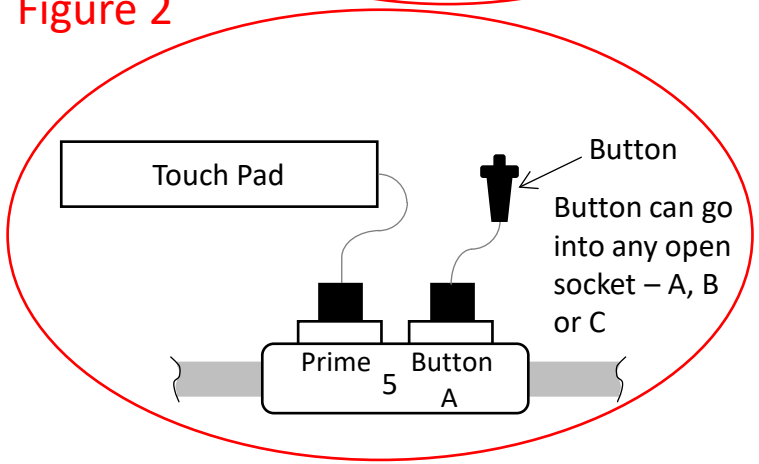
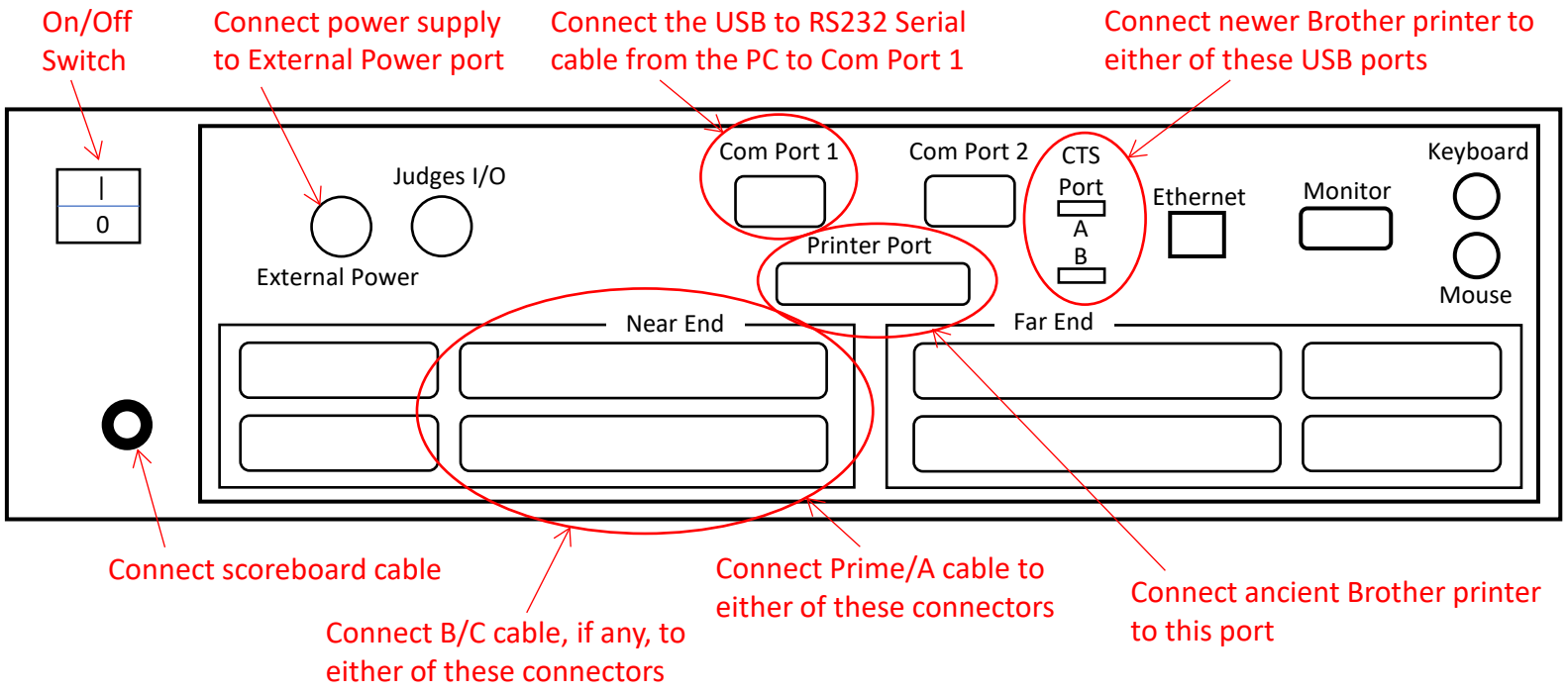


Figure 2



Connections: Connect to the Colorado 6



Connections: Start Units

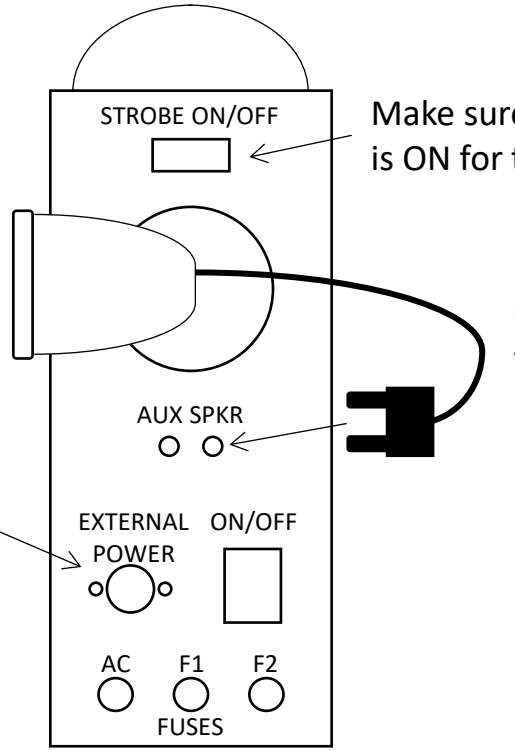
Championship Start Unit

Infinity Start Unit

Connections: Championship Start Unit

The Championship Start Unit is a normally open start unit.

Strobe light



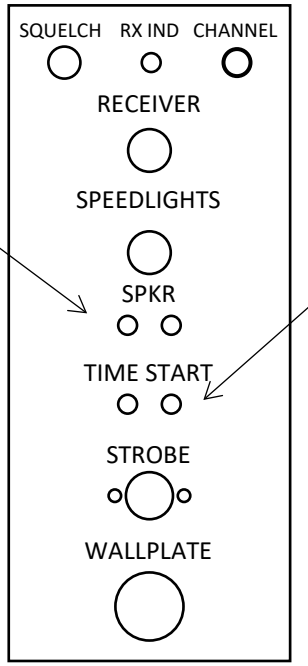
LEFT PANEL

Make sure that strobe light is ON for the heats.

Connect a remote speaker(s) to SPKR connection.
Remote speaker cable is dual banana plug to dual banana plug

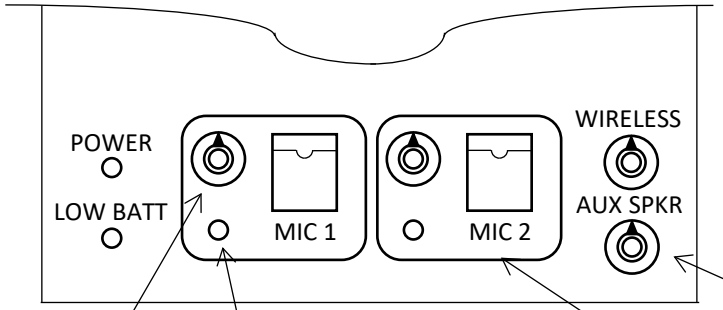
Connect the local speaker to the AUX SPKR connection.

Attach charger Unit. Will work while charging.



RIGHT PANEL

Attach Start cable. Dual banana plug to dual banana plug cable. Connect the one end to this socket and the other to the “Start” or “Backup Start” socket at either end of the Prime/A cable.



FRONT PANEL

Controls the volume for the speaker(s) connected through the AUX SPKR connection.

Controls the volume for speech through the microphone attached to the MIC 1 port for speaker(s) connected through the SPKR connection.

Operators like MIC 1

Attach microphone
Microphone to quarter inch stereo connector cable

Connections: Infinity Start Unit

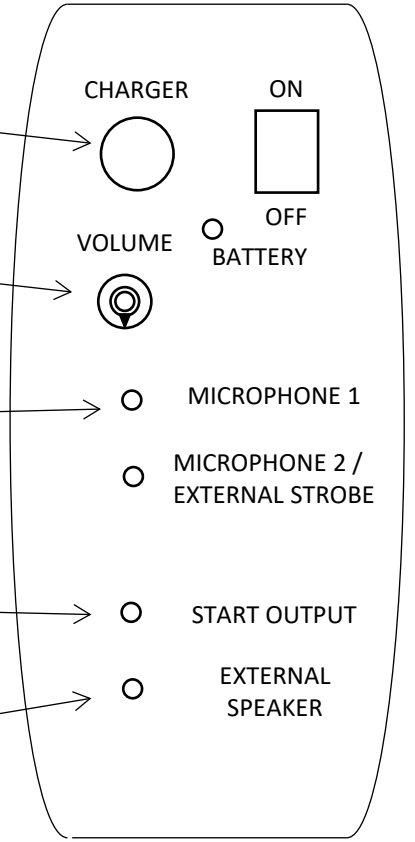
Attach charger
Unit should be OFF while charging.
Unit will not work while charging.

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



The Infinity Start Unit is a normally open start unit.

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

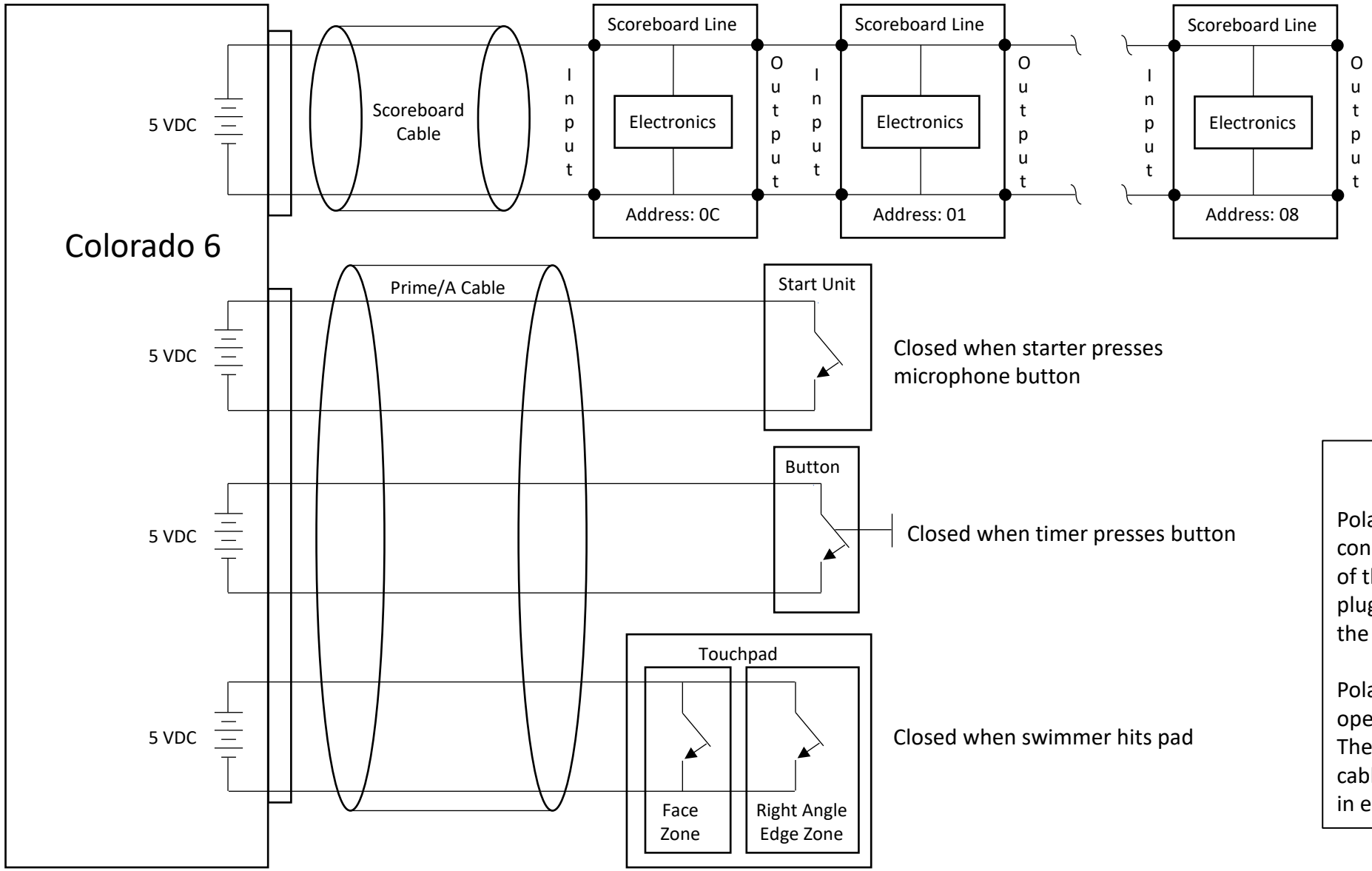
Connections: Power Supplies

- Colorado 5: 12 volt DC
- Colorado 6: 15 volt DC
- Infinity Start Unit: 18 volt DC
- Championship Start Unit : 18 volt DC
  - Infinity and Championship Start Unit power supplies are identical.

How does Colorado 6 work?

- Colorado 6 gets the event information from Meet Manager, but gets no information on the number of heats or the seeded lanes for a heat.
  - Operator sets the event and heat numbers and turns lanes without a swimmer “Off”.
  - For a given race the operator might in error use the same event and heat number as a previous race.
  - Colorado 6 assigns every race a unique race number.
- Contains a clock
- Reacts to closed circuit events on the start unit, touchpads and buttons
- For each race
  - Begins in “Reset” mode. Clock is at zero.
  - Reacts to the start unit closed circuit. Starts the clock. Assigns to the race a race number.
  - Recognizes the touchpad and button closed circuit events. Records the touch time for each touch for each lane and the button close time at the finish.
  - Based on touchpad touches counts the number of lengths the swimmer has completed.
  - When the Colorado 6 recognizes the touchpad touch for the final length, the Colorado 6 records the time as the finish time.
  - When the operator selects “Store/Print”. Colorado 6 stores the race information with the event and heat numbers set for the race at that time and sends the race information to the Colorado printer.
  - When the operator then selects “Reset” the Colorado 6 resets its clock to zero and is ready for the next race.

How does Colorado 6 work?



The Colorado 6 sends the scoreboard information on a serial connection. The serial connection propagate a signal with a series of 0s and 1s through the scoreboard line units.

The Colorado 6 sends packets of information encoded in the 0s and 1s with a start sequence, address and payload. Each scoreboard line identifies the packets with its address and displays information according to the payload.

Polarity

Polarity is critical for the scoreboard connections to maintain the integrity of the 0s and 1s. The tip-sleeve audio plug connectors enforce polarity in the connections.

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.

Configure the Colorado 6

- Download Colorado 6 User Manual. Manual provides helpful information.

- In the Sports Loader menu select Swimming. In Swimming select Setups.
- When done with configuration, Save your setup. Otherwise, the Colorado 6 will revert to the previous setup on shutdown.

- Configuration menu
  - Start/Finish
  - Hardware
  - Timing
  - Pool
  - Scoreboard
  - Printer
    - Not relevant if using USB connection for printer and install per instructions in slides below
  - Event Sequence

Start/Finish

#	Setting	Value
1	Start Even-Length Races at [Near End/Far End]	Where will the swimmers start? Short Course: Near End Long Course: Near End
2	Start Odd-Length Races at [Near End/Far End]	Short Course: only 25s may start at the turn end, use Near End unless 25s start at far end Long Course: Far End, unless at U of M
3	[Do NOT] Clear Lanes Automatically	Do NOT: want the start of the next race to clear lanes
4	[Do NOT} Show Start Reaction Times on Scoreboard	Do Not: most pools do not have electronics for start reaction times
5	Near End Primary Finish = [Pad/Buttons]	Pad: Pad is always primary. Button is backup
6	Far End Primary Finish = [Pad/Buttons]	Pad: Pad is always primary. Button is backup
7	[Do NOT] Blink Time for Record Breaker	Do NOT
8	[Do NOT] Post Intermediate Place on Scoreboard	Do NOT

Hardware

#	Setting	Value
1	Speaker Volume (0 to 3)=2	2
2	Backlight Intensity (1 to 9)=5	5
3	Remote setup [NOT allowed/allowed]	Allowed: to be able to download events from Meet Manager to Colorado
4	Relay Judging using [Platforms/Buttons] (Near End)	Platforms, even though there is no judging electronics
5	Relay Judging using [Platforms/Buttons] (Far End)	Platforms
6	Relay Judging Interval=0.75 sec	0.75
7	Far end splits [NOT used/used]	Short course: NOT used Long course: used
8	[Do/Do NOT] use start reaction times	Do NOT
9	[Do/Do NOT] use backstroke start reaction times	Do NOT
0	Scoreboard Intensity (1 to 8)=8	8

Timing

#	Setting	Value
1	Timing Precision=.01 sec	.01 sec by USA Swimming rule
2	[Do/Do NOT Use Automatic Backup Adjustment	Do NOT. The Admin makes the backup adjustments in Meet Manager
3	Near-End Pad Split Delay=??	18 to 20 sec. Give as much time as possible for a relay swimmer to climb out, but less time than the fastest swimmer can complete a lap.
4	Nar-End Pad Split Delay=??	18 to 20 sec. Same considerations as above.
5	[Do Not] Display Time Warning Message	Display. Want the Colorado to display when the pad and button time differ by greater than or equal to the Pad to Backup Comparison Amount.
6	Pad Delay At Start=??	18 to 20 sec. Give as much time as possible for a swimmer to climb out on a flyover start, but less time than the fastest swimmer can complete a lap.
7	Scoreboard Lengths Count [Up/Down]	Up
8	Screen Lengths Count [Up/Down]	Up
9	[Do NOT] Show ------ on DQ	Do NOT: DQs are entered in Meet Manger, not the Colorado
0	Pad to Backup Comparison Interval=.031 sec	.31 sec by USA Swimming standards

Pool

#	Setting	Value
1	Lane Mapping	1 Normal: Colorado is nearest lane 1 in the pool 2 Reverse: Colorado is nearest the highest numbered lane in the pool 3 Shift Lanes Up: Lane 1 for the meet is not at some higher lane number on the cable 4 Shift Lanes Down: Opposite of 3 above
2	Lanes in Pool=?	Number of lanes in the pool
3	Lanes Used=?	Number of lanes being used for the meet. Smaller meet might not use all lanes in the pool.
4	Pool Length=?	25 for short course 50 for long course
5	Race Distance Units=?	Yards for short course Meters for long course
6	First Lane Number	1 as opposed to 0

Scoreboard

#	Setting	Value
1	Self Test	Do not use
2	Define Module(s)	Should already be done
3	Blank Module(s)	Should already be done
4	?-Lane Scoreboard	Number of lanes that the scoreboard displays
5	Time To Step One-Line Scoreboard=1	Applies only to single line scoreboard. Number of times that the scoreboard displays the results for each lane in a heat.
6	One-Line Scoreboard Sequence Time=3	Applies only to single line scoreboard. Number of seconds the scoreboard pauses to display the results for a lane.
7	One-Line Scoreboard Sequence List	Place Order: to display finish times on a single line scoreboard with dipswitch setting 0F
8	Results in [LANE/PLACE] Order	LANE
9	Scoreboard Splits: [SUBTRACTIVE/CUMULATIVE]	Experiment to determine which provides the best information on the scoreboard
0	Do NOT emulate 10 Lane Scoreboard	

Configuring a printer for the Colorado 6

- Type printer
  - Laserjet, not inkjet. Laserjet works much better in moist environment
  - Low capacity, black-and-white sufficient. 2-sided is nice, but not essential.
  - Must support Printer Command Language (PCL). Most inexpensive printers for use with Windows PCs do not support PCL.
- Print drivers on Colorado 6
  - Colorado Time Systems preloads print drivers and does not allow users to load additional print drivers.
  - Printer manufacturers release new printers faster than Colorado Time Systems adds print drivers to the Colorado 6. Most of the printers for which Colorado Time Systems has preloaded drivers are no longer commercially available.
  - Good news: Many printer models have the same print driver as earlier models. Even if a newer model is not in the Colorado Time Systems list, there may be a suitable print driver.
- Finding a printer for the Colorado 6
  - Ask other teams what they have used successfully.
  - Optionally buy a used printer in the Colorado Time System list.
  - Most success with Brother printers
    - On Brother website select the printer. In the printer information go to SPECIFICATIONS > Print > Emulation(s). The emulations must include PCL 6 (PCL XL Class 3.0). A printer only supporting GDI will not work.
    - Two Brother printers currently available (Jan, 2023) that work for Colorado 6
      - HL-L5100DN (Driver from Colorado 6 list: HL-5140 foomatic/hl 1250 (recommended))
      - HL-L2370DW (Driver from Colorado 6 list: HL-2060 foomatic/hl 1250 (recommended))

Configuring a printer for the Colorado 6

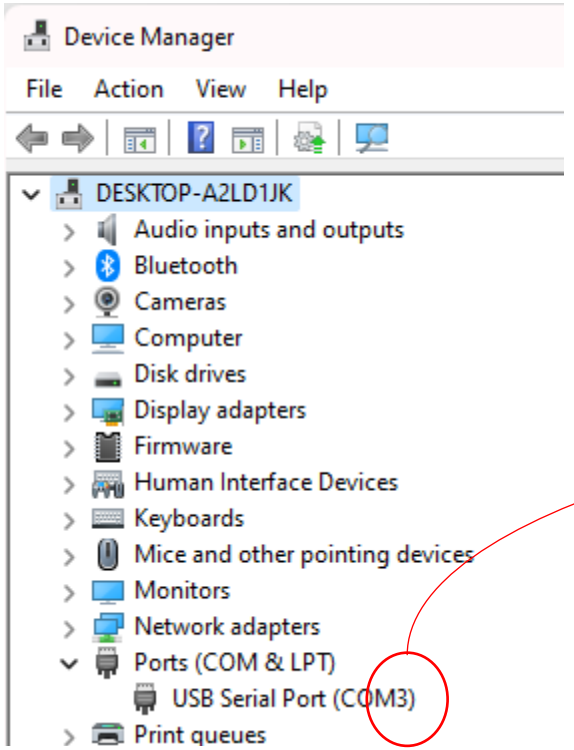
- Turn on the Colorado 6 at the Sports Loader level (not the Swimming level)
- Turn on the printer and connect it to the Colorado 6 (either USB port)
- Select Configure Printers > Add Printer
  - Detecting Attached Printer. Please Wait … appears. Eventually the Colorado 6 highlights a printer manufacturer. If not correct navigate with the Up and Down to the correct manufacturer.
- Once the correct manufacturer is highlighted, Select the manufacturer
  - Detecting Available Printer Drivers. Please Wait … appears.
  - Sometimes with a new printer, this step fails. Then identifying a suitable driver becomes a trial and error process.
  - Select a driver for a printer, usually the one that the Colorado 6 highlights as recommended works.
    - For Brother printers, most success with drivers with names in the pattern: [model number] foomatic/hl 1250 (recommended)
- Once a driver is highlighted, press Select
- Select Test Selected. Give the Colorado 6 time to pass data to the printer and the printer to generate the test pattern printout
  - If the test pattern prints successfully
    - Select the printer
    - Set the printer as the default
    - Delete the other printers
  - If the test pattern does not print, try a different driver.

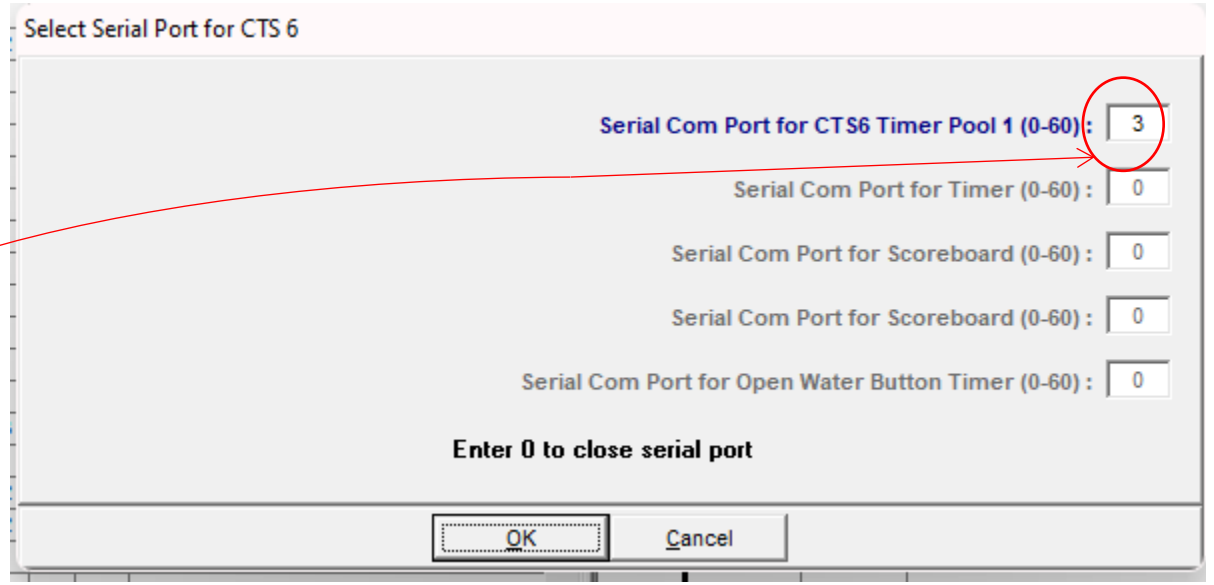
Meet Manager/Colorado 6 communications

- Connection: USB 2.0 Type A Male connector (PC end) to RS232 DB9 Male (Colorado 6 end in Comm Port 1) serial cable
  - Cable requires driver not normally installed on Windows PC.
  - To install driver:
    - With Windows 10 or 11, attach cable to PC when PC is connected to internet. Windows may go to the internet and download and install a driver.
    - If Windows does not automatically install driver
      - Prolific and FTDI make most of the USB to serial chips.
      - Google: download Prolific|FTDI USB to serial cable driver Windows
      - Go to links, download the driver install application and install the driver.
- In Colorado 6 configuration in Hardware > Remote Setup must be Allowed
- In Meet Manager in Set-up > Timing Console Interface or Run > Interfaces > Timing Console Interface must select: Colorado Time Systems 6 and Gen 7

Meet Manager/Colorado 6 communications

- Open the connection between Meet Manager and Colorado 6
  - Attach the cable to Comm Port 1 on Colorado 6 and USB port on PC
  - On Colorado 6 go into Swimming and place the Colorado 6 in “Reset”
  - On PC
    - Open Device Manager application (find with Search in Settings)
    - Expand the Ports to find the COMM port number for cable
  - In Meet Manager
    - In Meet Manager select Run > Interfaces > Timer CTS6 > Open/Close Serial Port for CTS6
    - In dialog box that appears enter the COMM port number discovered in Device Manager in the field Serial Comm Port for CTS6 Timer and the OK.





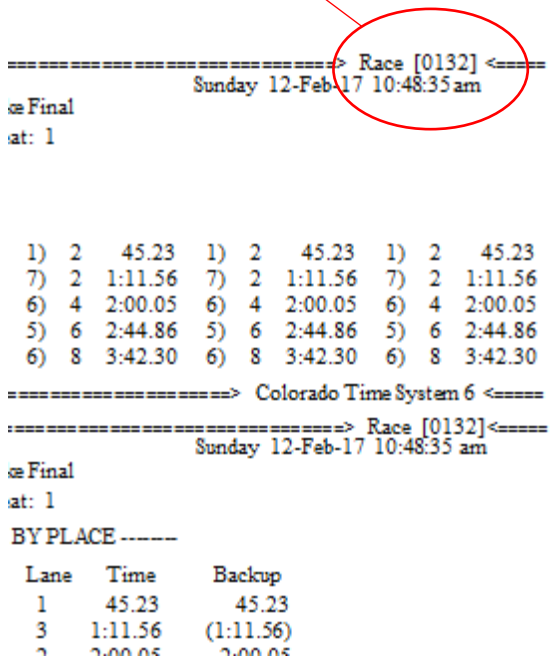
Meet Manager/Colorado 6 communications

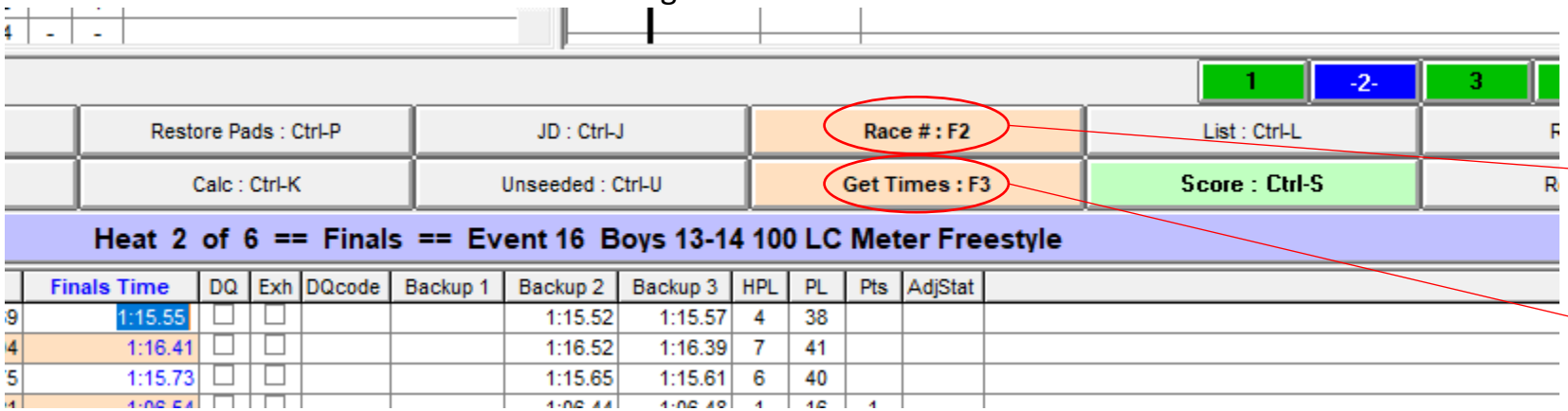
- Download events from Meet Manager to Colorado 6
  - Colorado 6 must be in Swimming “Reset” mode
  - In Meet Manager select Run. In Run:
    - Click Session button and select a specific session or “All” for events to download
    - Select Interfaces > Timer > Download Events to CTS6
    - In Slot dialog block that appears, select a slot
      - Some slots may be used for preconfigured meets, for example, high school dual meets
      - Slots 2-7 hold 100 events maximum. Slots 8 & 9 hold 240 events. Select slot 8 or 9.
      - Events should download
  - In Colorado 6 after download is complete
    - Use Edit Heat/Event key to initialize the event and heat to the first heat of the session.
    - Do this step even if the first heat already appears to assure proper initialization

Meet Manager/Colorado 6 communications

- Download race results from Colorado 6 into Meet Manager
  - Provide the Colorado operator with a program. Have the operator write the race number for each race on the program
    - Colorado 6 creates a unique race number for each race. Increments race numbers sequentially. Race number increments when race starts.
  - In Run select the event and heat
    - Heat must be complete and the Colorado 6 must have been Reset for the next heat, before the heat information can be downloaded to Meet Manager
    - If the event and heat number in the Colorado 6 is correct for the race, select the Get Times button
    - If the race has a different event and heat number for the results for a given heat, select the Race # button and then enter the race number for the race that has the correct information
      - Situations: Colorado operator set wrong event or heat. Initial splits. Combined heats. Swimmer swam in the wrong event or heat.

Race number in Colorado 6 printout in upper right





Race #, if the race for the event and heat has a different event or heat number in the Colorado 6

Get Times, if the race has the correct event and heat numbers

Testing and troubleshooting: test instruments

Dual banana plug that
can be hand tightened
$6 on Amazon

Multimeter with dual banana
jack and plug sockets

7 function digital
multimeter
$7 at Harbor Freight

Colorado Time System test meter
$250

Testing and troubleshooting: Test the timing system

- Test the touchpads and buttons individually
  - Use the Colorado test unit or the multimeter with the dual banana plug. Set the multimeter to 2000 ohms
  - For button insert the dual banana plug in the socket and press the button. The Colorado test unit responds quickly. With the multimeter hold the button for a couple of seconds. Reading should go from a “1” on the left to a single digit number on the right.
  - For pads insert the dual banana plug in the socket. Press the pad left, right and center on the right angle edge and the flat. For the multimeter apply sustained pressure for a couple seconds. Reading changes as described above.
- Test the voltage out at the Prime/A and B/C cable sockets
  - Make sure the pad voltage is “ON”.
    - Run a race or on the keyboard use Misc > Pad Power > On
  - Set the multimeter to 20 volts DC
  - Insert the multimeter plug into the sockets along the cable. In general the voltage should be above 4.65 volts. Colorado specifications allow lower readings, but issues start to appear as readings go lower.

Testing and troubleshooting: Test the timing system

- Test the start, touchpads and buttons with a test race
  - In Reset mode with a 100 yard race
  - Talk into the start unit. Start the race from the start unit.
  - Wait until all lanes show “Split Armed”
  - For each lane, hit the touchpad
  - (If you start with a 50 yard race, then complete only the steps below.)
  - Wait until each lane shows 2 laps completed and “Finish Armed”
  - For each lane, hit the touchpad and press the button or buttons
  - The lane information of the Colorado 6 screen should show a finish time and an asterisk under the button for each button pressed.

Testing and troubleshooting: Clean, Clean, Clean

- Pool is a harsh environment. Corrosion and contaminants 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.
- Cleaning keyboard inserts
  - Mild detergent and water. Rinse and dry.
- Cleaning Colorado 6 LCD screen
  - Use cleaner such as Windex, safe for clear plastic. Never use a dry cloth. Never use any product with ammonia.

Testing and troubleshooting: Troubleshooting

- First: diagnose. Second: fix. Calm and methodical. Go slowly to go fast.
- PC/Colorado 6 communications
  - PC does not recognize PC to Colorado 6 cable
    - Make sure the cable works with the PC before going to the pool.
    - Attach the cable to the PC. Open Device Manager and expand Ports
    - If Device Manager does not show a COMM port for the cable, download and install the most recent Prolific and FTDI drivers.
  - Once PC to Colorado 6 cable is connected on both ends, Run > Interfaces > Timer > Open/Close Serial Port fails
    - Make sure the cable is securely attached at both end and in the COMM PORT 1 (not 2) on the Colorado 6
    - Make sure that Colorado 6 has Swimming loaded and status Reset. In the setup configuration Hardware > Remote Setup must be Allowed
    - In Meet Manager go into Run, Interface > Set-up-Timing Console interface, check that the configuration is set to Colorado 6.
    - In Meet Manager go into Run > Interfaces > Timer > Open/Close Serial Port, make sure that the Serial Com Port entry matches the COMM port number for the cable in Device Manager > Ports.
  - Run > Interfaces > Timer > Open/Close Serial Port passes, but Run > Interfaces > Timer > Download Events fails
    - In Colorado 6 configuration make sure Hardware > Remote Setup is Allow
    - Make sure that Colorado 6 has Swimming loaded and status Reset.
  - Attempt to get results with Get Times fails: no results for event and heat number
    - Race must be completed and the Colorado 6 Reset after the race, before race results can be downloaded.
    - Attempt to get the results with Race # using race number on Colorado print out or race number that Colorado operator writes on program

Testing and troubleshooting: Troubleshooting

- Starting
  - No or low horn sound from start unit
    - Does the Start Unit battery need charging? Observe battery LED.
    - Try a different microphone. Try microphone in both Microphone 1 and Microphone 2 positions.
    - Championship: Adjust AUX SPKR dial. Try connecting speaker in the AUX SPKR socket and in the SPKR socket
    - Infinity: No adjustment for horn volume.
  - No or low speaker voice from start unit
    - Does the Start Unit battery need charging? Observe battery LED.
    - Try a different microphone. Try microphone in both Microphone 1 and Microphone 2 positions.
    - Championship: Try connecting speaker in in the AUX SPKR socket and in the SPKR socket. Use the dial for which the microphone is attached to adjust the volume.
    - Infinity: Adjust volume dial.
  - No strobe light from start unit
    - Championship: Turn strobe light on.
    - Infinity: Strobe light is always on.
  - Start unit does not trigger start
    - Is the Prime/A cable plug seated level and tight on the Colorado 6 connector?
    - Are the start cable plugs and sockets for the start cable clean and in reasonable condition?
    - With the Colorado 6 in Reset status, place a good button into the Start socket and press button to generate a start. If it generated a start, then the issue is with the Start Unit. If it failed, try the other start sockets on the cable.

Testing and troubleshooting: Troubleshooting

- Touches and button pushes
  - Instruct your Colorado operator to alert you to any curious behavior
  - No pad touches
    - In Colorado 6 configuration is Hardware > Start Even Length Races set to “Near End”? Is Hardware > Near End Primary Finish set to “Pad”
    - Is the Prime/A cable connected to a Near End (not Far End) connection on the Colorado 6? Is the Prime/A cable plug seated level and tight on the Colorado 6 connector?
  - Multiple pads and buttons work intermittently or not at all
    - Concurrent failure of multiple individual pads or buttons is very rare.
    - Is the Prime/A cable plug seated level and tight on the Colorado 6 connector?
  - Swimmers climbing out of the pool after flyover start triggering pad
    - In Colorado 6 configuration is Hardware > Pad Delay at Start too low? Should be in range 15 to 20 seconds, as much time as possible, but less than the time in which the fastest swimmer could complete a lap.
  - 1st, 2nd or 3rd swimmers on relay triggering pad both when finishing and when climbing out
    - In Colorado 6 configuration is Hardware > Pad Split Delay Near End too low? Should be in range 15 to 20 seconds. Similar to Pad Delay at Start.

Testing and troubleshooting: Troubleshooting

- Touches and button pushes
  - Clean, clean, clean before assuming pads or buttons are bad.
  - A single pad works intermittently or not at all
    - Check to make sure that the cable is firmly attached on the Colorado 6 backplane.
    - Insert a known working button in the socket and test whether the Colorado sees the button push. If the button registers a touch, replace the pad.
    - If the problem is in the socket and a backup Prime/A cable exists, attach the second Prime/A cable to the other Near End connection on the backplane. Use the Prime socket in the backup cable.
    - If cannot establish a working pad, use 3 watches on the lane.
  - A single button works intermittently or not at all
    - Check to make sure that the cable is firmly attached on the Colorado 6 backplane.
    - Test the button in a known working socket. If it fails, replace the button.
    - If the problem is in the socket
      - If a B/C cable is installed, use a different button socket.
      - If no B/C cable exists, but a backup Prime/A cable exists, attach the second Prime/A cable to the other Near End connection on the backplane. Use the A socket in the backup cable.
    - If cannot establish a working button, put at least two watches on the lane.

What if ……..

- Prime/A cable Start socket does not provide start connection
  - Try the Backup Start by the Start or the Start or Backup Start on the far end
- No Prime/A Start or Backup Start provides start connection
  - If a backup Prime/A cable is available, attach it to the other Near End connection on the backplane. Connect the start unit through this cable.
  - Otherwise:
    - Starter announces, “Take your mark” and then sounds start
    - Upon start sound, Colorado operator presses Colorado 6 Start button
    - Admin (not happy) performs heat malfunction adjustment for each heat
- A Prime/A Start or Backup Start provides start connection, but Start Unit will not generate start trigger
  - Attach a known working button in Start socket
  - Starter announces, “Take your mark” and then sounds start and simultaneously presses button
- Prime/A cable has failed Prime connection for a lane
  - If a backup Prime/A cable is available, attach it to the other Near End connection on the Colorado 6. Use this backup Prime/A cable for the lane with the failure.
  - If no backup Prime/A cable is available, then put 3 timers, each with a watch, on the lane. For each race, the middle watch time of the 3 watch times is the final time for the lane.