

# Colorado Timing System Operator Training and Assessment Manual

June 2016

## INTRODUCTION

Most meets in the Bay of Plenty Region use some form of electronic timing. At almost all meets where electronic timing is used, the Colorado Time Systems Sports Timer is used to collect data that is generated by the pushbuttons and pads. The Colorado Time Systems Sports Timer is commonly referred to as the AOD (Automatic Officiating Device).

There are three types of timing systems:

- Automatic — A timing system activated by a starting device and stopped at the finish by the swimmer touching the touchpad.
- Semi-Automatic — With Semi-Automatic Equipment, a timing system activated by a starting device and the finish shall be recorded by buttons pushed by timekeepers at the finish touch of the swimmer.(FR4.5)
- Manual — A timing system consisting of individual lane time keepers, each operating a manual watch that is both started and stopped by the time keeper. There shall be a minimum of three timekeepers per lane.

If automatic timing is used, the number of timer keepers that must be assigned to each lane is reduced to one per lane. Additionally, automatic timing is required for establishing New Zealand Open and Age Group Records, Regional Records and National qualifying times.

All data from automatic and semiautomatic timing systems are collected and recorded by the electronic timing system. This data is then printed and can be imported by meet management software for subsequent processing. The responsibilities of the Timing Equipment Operator are as follows:

The Timing Equipment Operator shall be responsible for the automatic or semi-automatic timing equipment, including the electronic starting system and scoreboard (if used), and shall advise the Referee or Administrative Official of any system problems that might affect the accuracy of times or whenever the touchpad is observed to have failed to record the finish when the swimmer completed the race. The timing equipment should be placed so that the operator is able to observe the finish of each race.

Bay of Plenty Region offers a certification for Timing Equipment Operators. Certification as a Timing Equipment Operator requires working a minimum of five sessions as an apprentice under the supervision of a certified Timing Equipment Operator and successful evaluation by one of the officials who is designated to evaluate Timing Equipment Operators. **An assessment guide is attached in Appendix A.**

The purpose of this guide is to facilitate learning the set-up and operation of the Colorado Time Systems Sports Timer for the purpose of timing swimming (the Colorado Time Systems Sports Timer can be configured for other sports.) Diagrams and illustrations are based on Colorado Time Systems Sports Timer System 6 (AOD); however, almost all of the information in this guide is also applicable to the System 5 (the System 6 uses a colour display, while the System 5 uses a LCD display.)

This guide is divided into three main sections: setup, operation, and troubleshooting. Since the most effective way to learn how to use the AOD is to actually use it at a meet, this guide is intended to be used as a resource as people train (or refresh their training).

## **Swimming New Zealand Regulations**

The following SNZ regulations shall be adhered to for race timing and Timing System operation:

### **SW11 TIMING**

- SW11.1 The operation of Automatic Officiating Equipment shall be under the supervision of appointed officials. Times recorded by Automatic Equipment shall be used to determine the winner, all placing and the time applicable to each lane. The placing and times so determined shall have precedence over the decisions of timekeepers. In the event that a break-down of the Automatic Equipment occurs or that it is clearly indicated that there has been a failure of the Equipment, or that a swimmer has failed to activate the Equipment, the recordings of the timekeepers shall be official (See SW 13.3).
- SW11.2 When Automatic Equipment is used, the results shall be recorded only to 1/100 of a second. When timing to 1/1000 of a second is available, the third digit shall not be recorded or used to determine time or placement. In the event of equal times, all swimmers who have recorded the same time at 1/100 of a second shall be accorded the same placing. Times displayed on the electronic scoreboard should show only to 1/100 of a second.
- SW11.3 Any timing device that is terminated by an official shall be considered a watch. Such manual times must be taken by three timekeepers appointed or approved by the Member in the country concerned. All watches shall be certified as accurate to the satisfaction of the governing body concerned. Manual timing shall be registered to 1/100 of a second. Where no Automatic Equipment is used, official manual times shall be determined as follows:
  - SW11.3.1 If two (2) of the three (3) watches record the same time and the third disagrees, the two identical times shall be the official time.
  - SW11.3.2 If all three (3) watches disagree, the watch recording the intermediate time shall be the official time.
  - SW11.3.3 With only two (2) out of three (3) watches working the average time shall be the official time.
- SW11.4 Should a swimmer be disqualified during or following an event, such disqualification should be recorded in the official results, but no time or place shall be recorded or announced.
- SW11.5 In the case of a relay disqualification, legal splits up to the time of the disqualification shall be recorded in the official results.

- SW11.6 All 50 metre and 100 metre splits shall be recorded for lead-off swimmers during relays and published in the official results.

## **SW12 WORLD RECORDS**

- For rules relating to World Records please refer to the FINA Handbook

## **SW13 AUTOMATIC OFFICIATING PROCEDURE**

- SW13.1 When Automatic Officiating Equipment (See FR 4) is used in any competition, the placing and times so determined and relay take-offs judged by such Equipment shall have precedence over the timekeepers.
- SW13.2 When the Automatic Equipment fails to record the place and/or time of one or more swimmers in a given race:
  - SW13.2.1 Record all available Automatic Equipment times and places,
  - SW13.2.2 Record all human times and places.
  - SW13.2.3 The official place will be determined as follows:
    - SW13.2.3.1 A swimmer with an Automatic Equipment time and place must retain his relative order when compared with the other swimmers having an Automatic Equipment time and place within that race.
    - SW13.2.3.2 A swimmer not having an Automatic Equipment place but having an Automatic Equipment time will establish his relative order by comparing his Automatic Equipment time with the Automatic Equipment times of the other swimmers.
    - SW13.2.3.3 A swimmer having neither an Automatic Equipment place nor an Automatic Equipment time shall establish his relative order by the time recorded by the Semi-Automatic Equipment or by three digital watches.
- SW13.3 The official time will be determined as follows:
  - SW13.3.1 The official time for all swimmers having an Automatic Equipment time will be that time.
  - SW13.3.2 The official time for all swimmers not having an Automatic Equipment time will be the three digital watches or the Semi-Automatic Equipment time.
- SW13.4 To determine the relative order of finish for the combined heats of an event, proceed as follows:

- SW13.4.1 The relative order of all swimmers will be established by comparing their official times.
- SW13.4.2 If a swimmer has an official time which is tied with the official time(s) of one or more swimmers, all swimmers having that time shall be tied in their relative order of finish in that event.

## **OTHER RESOURCES**

CTS Training Videos - <http://www.pvswim.org/official/training/AOD-training.html>

Configuring a Printer for the AOD - [http://www.pvswim.org/official/training/CTS-6\\_Printer.pdf](http://www.pvswim.org/official/training/CTS-6_Printer.pdf)

PVS Setups for AOD - [http://www.pvswim.org/official/training/cts-6\\_setups.pdf](http://www.pvswim.org/official/training/cts-6_setups.pdf)

CTS-6 Users Guide - <http://www.pvswim.org/official/training/System6swim-man.pdf>

## SETUP

Setup of the AOD involves two aspects: hardware installation and configuring the settings. While the Meet Director is ultimately responsible for installing the timing equipment hardware, the timing equipment operator will often do this. Usually it is only necessary to install and connect hardware at the first session of a meet or if there is a problem with the timing equipment and it needs to be replaced. The timing pads will however be removed after each session and reinstalled.

### Hardware

The timing equipment consists of the following components:

- AOD Console
- Cable Harness (connects all the components together)
- Starting System and speakers
- Touchpads (if automatic timing is used, minimum of one touchpad per lane)
- Buttons (generally two or three per lane)
- Printer
- Scoreboard (if used)

Figure 1 shows the rear view of the AOD where the input and output devices connect. To the left (as viewed from behind) of the panel illustrated in Figure 1 is the on/off switch and the 6mm jack connection for the cable to the scoreboard.

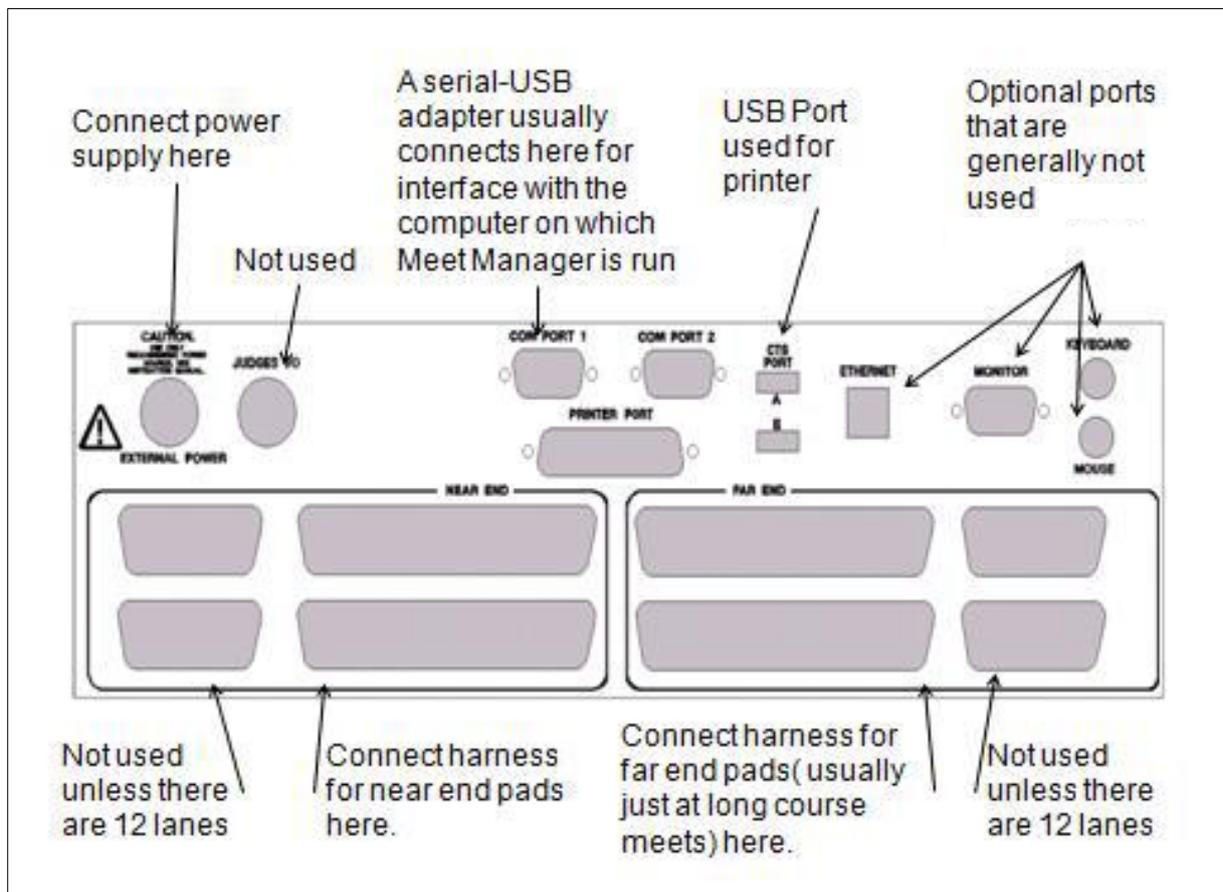
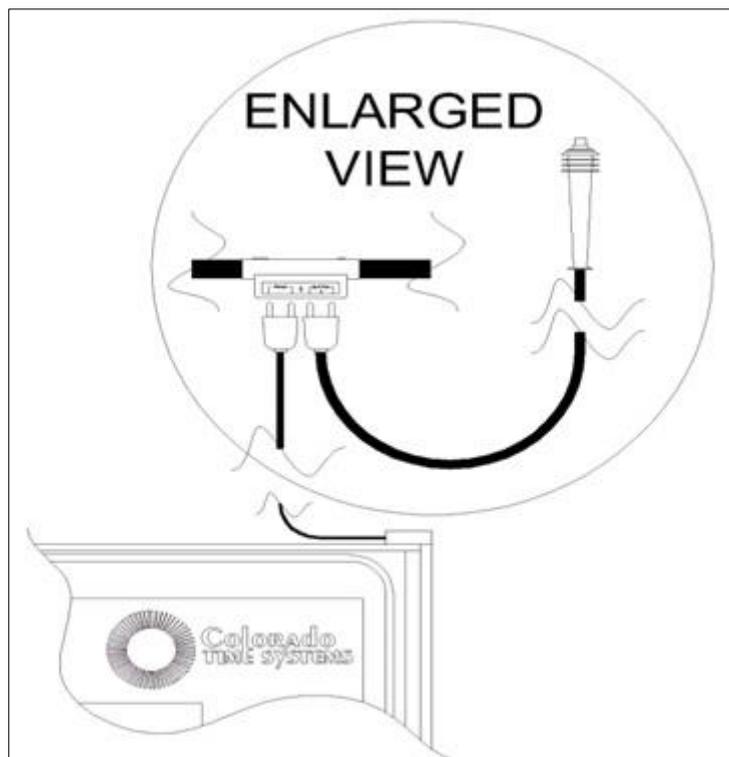


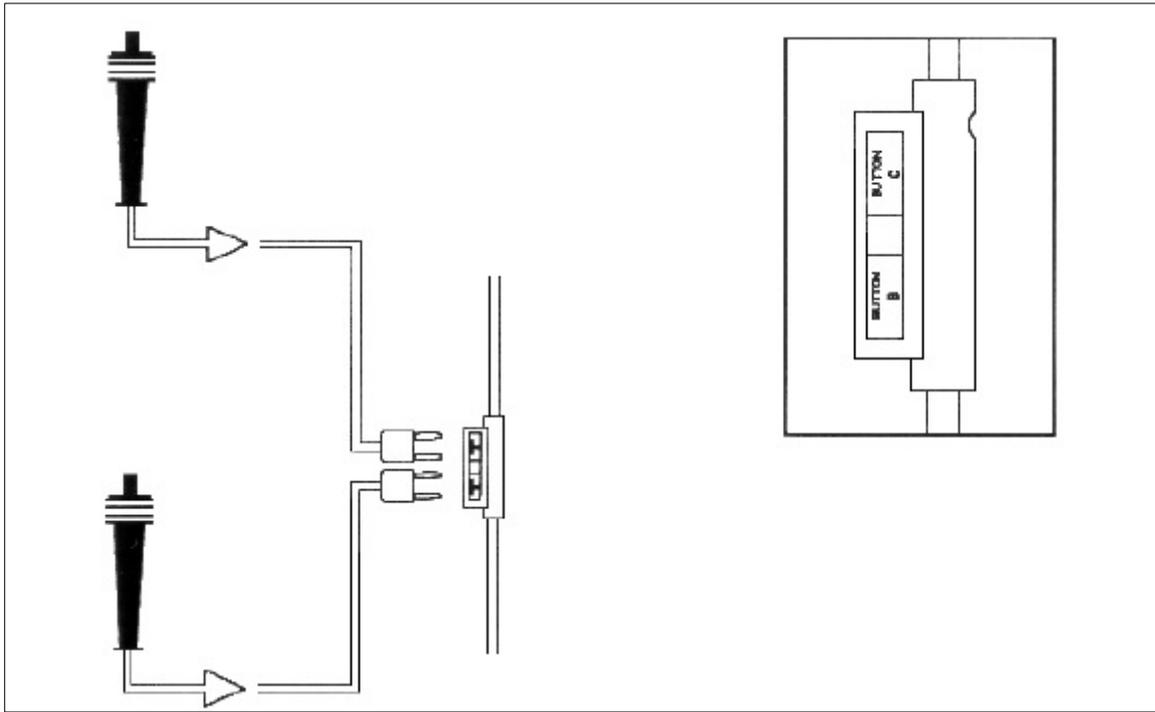
Figure 1 Rear View of AOD

Some pools have hard-wired connections into which the pads and buttons and the output from the starting system connect. Buttons and pads connect to plates that are located below each lane. The plates have two-prong receptacles labelled "prime" (for the pads) and "A", "B" and "C" (for the buttons.) At these pools, a short harness will connect the in-ground wiring to the AOD.

At pools that don't have in-deck wiring, for most meets at short course (25m) pools, there will be a set of two harness cables at the starting end of the pool. Each harness has twelve sets of two connections each. Ten sets of the connections are labelled 1-10, and two sets are labelled "start" and "start backup," one set at each end. On one of the harnesses, the connections for the lanes are labelled "prime" and "Button A" (see Figure 2). On the other harness, the connections for the lanes are labelled "B" and "C" for buttons (See Figure 3.)



**Figure 2 Pad and Button "A" Harness Connections**



**Figure 3 Buttons “B” and “C” Harness Connections**

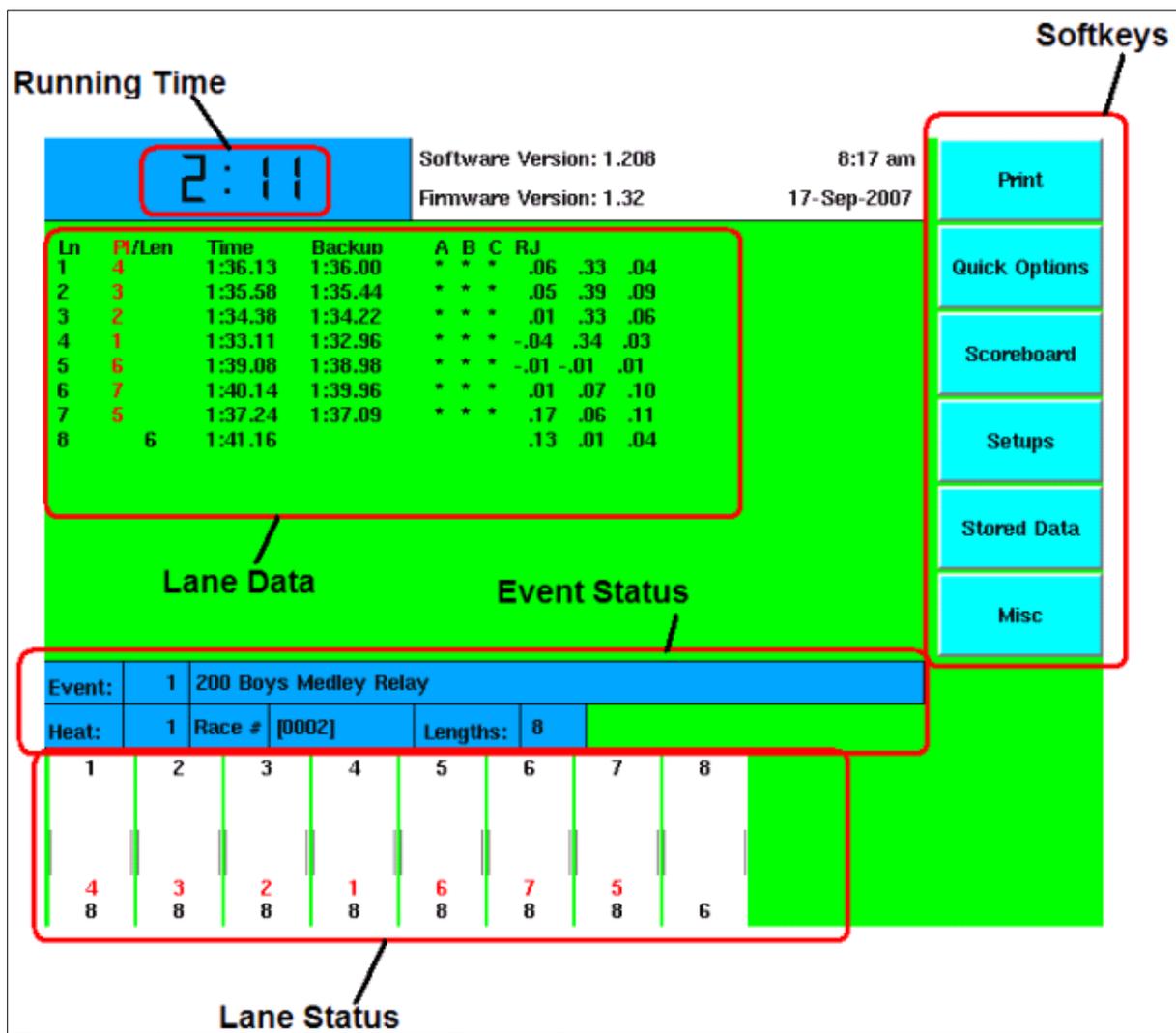
If only buttons are used then one button should be attached to the harness or deck plate connection labelled "prime" and the second button should be attached to the connection labelled "Button A." etc

The start-end harnesses plug into the back of the AOD as shown in Figure 1. There is one connection for each harness cable and this is plugged into the ‘Near End’ connector. The complete setup is shown in Figure 5.

At long course meets, there will likely be another harness or set of harnesses at the turn end of the pool. Pads for intermediate splits would connect to the far end harness. Depending on the pool configuration, buttons or a starting unit can also be connected to the far end harness. Connections are made in the same manner as the near end harness, although there may be a 50 meter harness extension used to connect the far end harness to the AOD.

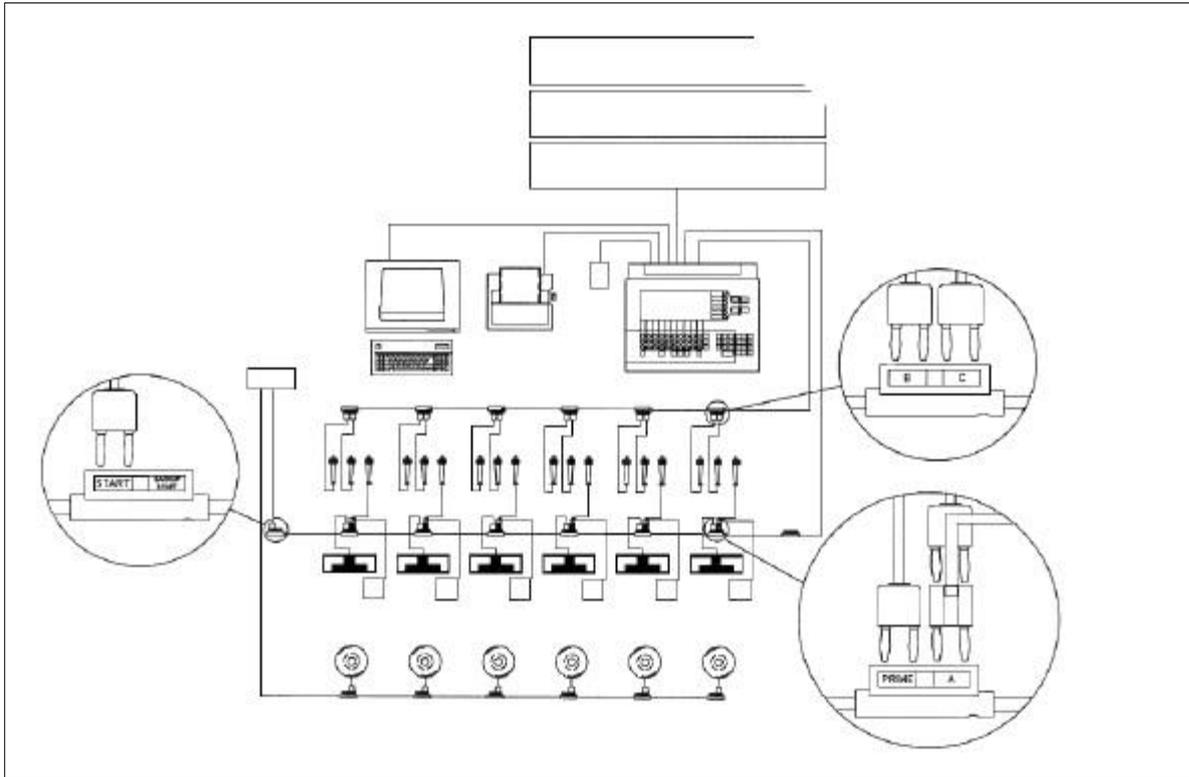
The AOD is powered up via a switch that is located on the back of the console. Upon being turned on, the AOD goes through a bootup process. After this is complete you are presented with a menu of options. The purpose of this menu is to start up a SPORTS PROGRAM, SHUT DOWN the timer, automatically INSTALL new software or firmware and do some DIAGNOSTICS on the timer.

After the AOD is powered-on, press the soft key next to "Swimming." Once the startup is complete, a display similar to Figure 4 will appear.



**Figure 4 AOD Main Screen**

After all the connections have been made, the timing system should be tested. To conduct a test, press the two buttons labelled "Reset" and then set the AOD to an event number that will not be used at the meet (like 100 or 200) by pressing "Edit Event/Heat". Then enter the event number using the numeric keypad followed by "ENTER", and then the heat number using the numeric keypad followed by "ENTER" After entering the event and heat numbers, set the distance to 50 (short course) or 100 (long course.) Use the microphone on the starting unit to test the speakers and then start the race. Confirm that the AOD received the starting signal by looking to see if the time runs on the AOD display and on the scoreboard. Then, check the pads by pressing the face of the pad (or, if warm-ups are in process, the swimmers will contact the pads.) Also, test all buttons by pressing them.



**Figure 5 Complete Setup**

Then, check the AOD display. Ideally, each lane should show a place number (instead of "Finish Arm") and have two or three asterisks (number of back up buttons) next to the time. If one or more lanes still flash "Finish Armed," then you will need to investigate if the pad connection to the harness is secure or if the pad is malfunctioning. Similarly, if there are less asterisks than the number of backup buttons used in any lane, then you will need to investigate if the button connections are not secure or if the button is malfunctioning. Note that the AOD display aligns the asterisks in three columns labelled "A", "B" and "C"; these columns correspond to the positions into which the buttons are connected in the harness or deck plate.

If there are buttons or pads that were not recorded by the AOD, then you should first verify that the pad or button was properly plugged into the harness. After checking the harness connection, test the button or pad again to see if it was recorded by the AOD. A common error is pads or buttons plugged into the speaker cable by people helping to set up.

If the button or pad still was not recorded by the AOD, then you can check the button or pad by plugging it into the Pad Tester (see Figure 6 – usually there is one available in the AOD equipment box.) The pad or button can be tested by unplugging it from the harness and then plugging it into the pad Tester. Test operation of the pad/button and see whether the pad Tester registers operation of the pad or button. If it does not, then the pad/button will need to be replaced.

If the Pad Tester did record operation of the pad/button, then the harness/deck plate can be tested by plugging the tester into the harness/deck plate and pressing the button on the tester. Then, check to see whether the AOD recorded operation of the pad/button. If not, then the connections may need to be cleaned.

If a pad tester is not available, then simply find a replacement pad or button and see if that solves the problem.



**Figure 6 pad Tester**

After the test is complete, press "Store/Print" and the two "Reset" buttons. The results for the test should print from the printer. If the results of the test did not print, check to see if the printer was configured or set up properly.

### **Configuration Settings**

The AOD software configurations should also be checked prior to each session. At a minimum, the setups will change when the AOD is used at a different pool configuration than the last time it was used (e.g., 25m or 50m pool), but the settings may require changes even if the pool type is the same as the last time the AOD was used.

The setup menu is accessed from the home screen (see Figure 4.) The setups are separated into 10 categories, which can be navigated using the "UP" or "DOWN" softkeys to move the arrow pointer to the desired setup option. After the arrow points to the desired section, the options can be changed by pressing the number button on the keypad that corresponds to the option of interest. Repeatedly pressing the numeric button will toggle between different options. Press the soft key "SAVE SETUPS" to save the setting changes. Pressing the "QUIT" button returns to the main screen.

Some setup information is also accessed via the "QUICK OPTIONS" and "MISC" softkeys. Under "QUICK OPTIONS", "FAR END" should be "ON" if there are pads at the tuning end of the pool (usually only at 50m pools). "DISPLAY LANES" should be "ON" so that current race information is displayed on-screen. Press the appropriate softkey to toggle between the settings.

The "MISC" softkey can be used to turn off the power to the pads until the next start is received. This can be done (but it is not required) during warmups. The AOD is powered-off via the "MISC" softkey at the end of the day.

Setup changes are made permanent only if you press the "SAVE SETUPS" softkey. Otherwise, setup changes apply to the current session only and are lost when you turn the AOD off. Press "QUIT" to exit the setups menu.

After the hardware is installed and the setups are verified, it's a good idea to set the scoreboard to "BLANK" (assuming one is in use.) This will display the current time or a welcome message on the scoreboard instead of data from the last race (or test of the AOD.) This is done by pressing the "SCOREBOARD" softkey. If the incorrect time is displayed, the time can be set via the "SETUPS" softkey.

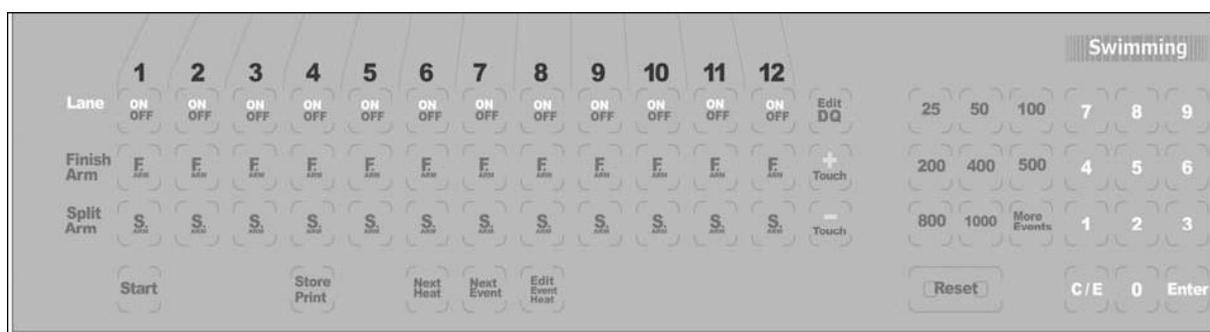
### Setup Checklist

All Buttons and pads connected to harness or deck plate	
Starter connected to "start" connection in harness or deck plate	
Harnesses connected to AOD	
Printer connected to AOD and powered on	
AOD connected to the computer running Meet Manager	
Scoreboard connected to AOD if applicable	
AOD powered-on and "Swimming" selected	
All components tested	
Verify correct settings	

## RUNNING A MEET

Ideally, running a meet only involves pressing a few keys: "STORE/PRINT", "RESET", and "NEXT HEAT" or "NEXT EVENT", and occasionally tuning lanes off when they are empty (and back on again if the CTS5 is in use.). However, such an ideal meet is highly unlikely to occur. When problems occur, there is frequently time pressure (a heat is in the water or the next heat is about to start.) The number one rule of running the AOD is **DON'T PANIC**. Most problems can be solved if they are addressed before the next heat begins. If you need more time to solve a problem, let the referee know to wait before starting the next heat.

This section first reviews normal operation of the AOD, then reviews some common problems and their solutions. A detailed list of common problems and solutions is presented in the next section. Figure 7 shows the keyboard from the AOD.



**Figure 7 AOD Keyboard**

Before a session begins, you will need a printed copy of the meet program. Make sure that the AOD is reset and confirm with the Meet Recorder that they have downloaded the events to the AOD. Communication issues sometime arise between the Meet Manager computer and the AOD console. When this occurs check Meet Manager is configured to the correct Port. This can be checked on the Meet Manager computer under device manager, look for the Ports menu item and expand to view the serial port number. This serial port number needs to be entered into Meet Manger – Configure ports. Sometimes a reboot of the Meet Manager computer and/or the AOD is required to establish communications.

The first step in running a meet is to select the correct event and heat. This is done by pressing "EDIT EVENT/HEAT" on the keyboard (bottom row below the lane 8 buttons.) Then enter the event number from the meet program using the numeric keypad followed by "ENTER", and then the heat number using the numeric keypad followed by "ENTER".

After setting the correct event and heat, a description of the event (distance, possibly age, gender and stroke) will appear in the portion of the screen where the event status is displayed (see Figure 4.) If the correct event is displayed, but the description is not shown, confirm with the Meet Recorder that they have downloaded the events. The referee should check to see if you are ready before starting the first race. Double-check that the AOD is reset (top left of screen) and that the correct event, heat, distance and description of the event is displayed before stating that you are ready.

After the race is started, "RESET" should be replaced with a running clock. If "RESET" is still displayed, let the referee know. The referee should not start the next race until the reason for the missed start is identified and corrected (e.g., loose start cable.)

The top row of buttons (in the row labelled "LANE") is used to turn off the lanes when they are empty. After a heat starts, the referee or starter should inform you of the empty lanes or you might be able to see them directly. Turn off the empty lanes and cross through them on your meet program. Whether or not there are empty lanes, record the race number (shown in the event status part of the display - see Figure 4) on the meet program so that it is clear which race numbers are associated with which heats.

After all of the athletes have finished, press "STORE/PRINT" and "RESET" (both reset buttons.) You should see "RESET" displayed in the upper left corner. If you hear the referee's long whistle, and "RESET" is not displayed, ask the referee to pause while you make sure the AOD is ready for the next heat.

If a pad time is not recorded or the backup buttons are activated outside of a defined time tolerance when compared to the pad time. A backup time acceptance screen will come up on the AOD screen after the "STORE/PRINT" button is pressed. The AOD operator should press "ACCEPT ALL BACKUPS" soft key and then the "OK TO PRINT" soft key. **This needs to be done before the two reset buttons are pressed.** Accepting the backup times will print out a second page which should be attached on top of the first page printed for the race. The referee will decide which times will be used (backup or pad time).

If the AOD believes that one or more athletes may not have finished the race (e.g., when a lane was not turned off), then a warning notice is displayed asking whether or not to accept the reset. Confirm that the race has finished, and accept the reset using the appropriate softkey.

After reset is displayed, change the event and/or heat as appropriate using either "NEXT HEAT" or "NEXT EVENT". Note that for some events (e.g., distance events), the event and heat numbers will not be consecutive; in such cases you will need to change the event and heat numbers using "EDIT EVENT/HEAT" and entering the correct event and heat numbers using the numeric keypad followed by "ENTER".

If you do not change the event or heat number, or change them to an event and heat that has been used before, a warning message will be shown in the lower right corner of the display. When this happens, confirm that the correct heat and event number shows in the event status portion of the display (see Figure 4.)

If "RESET" is not displayed, and the AOD receives another start signal, a warning message will be displayed asking whether or not to accept the reset. Enter the correct response using the softkey.

When buttons are pressed, an asterisk appears in the lane data portion of the screen next to the lane number. Note that the AOD display aligns the asterisks in three columns labelled "A", "B" and "C"; these columns correspond to the positions into which the buttons are connected in the harness or plate. If one or more buttons are often not being pressed at the finish, notify the Chief Timekeeper or the referee which lane and button was missed (i.e., "A", "B" or "C".) The button may have come loose, may need to be replaced, or the timekeeper may simply need to be reminded to press the button at the finish of the race.

For all races that are longer than 50 meters, observe all lanes for touches when there are turns. When an athlete turns, the lane status should change from "ARMED" to blank or "FINISH LAP" (depending on how many laps remain) and the number of lengths displayed should increment by one for touches at long course meets (pads installed at both ends) or by two for touches at short course meets. See Figure 8.

Event:	3	100 Meters					
Heat:	2	Race #	[0002]	Lengths:	4		
		3	4	5	6	7	8
			Armed				
		1	0	1	1	1	1

**Figure 8 - Lane Status for Touch**

If the athlete turned, but the "ARMED" indicator did not change to blank or "FINISH LAP" and the number of lengths did not increment, then press "+ TOUCH" on the keypad, enter the lane number using the numeric pad, and then press "ENTER." After doing this, check that the correct number of completed lengths is displayed.

Note that there is a delay from the time that the athlete touches a pad to when the pad arms again; this delay is user-adjustable from the "SETUPS" menu (from the "operations" submenu.)

When the athlete approaches the finish of the race, "FINISH ARMED" should flash (see Figure 9.) If "FINISH ARMED" does not flash, then you can press "FINISH ARM" in the second row of the keypad (see Figure 7) below the correct lane number. "FINISH ARM" can save you, as you can always take away a touch, which will undo the finishing the race, or press "FINISH ARM" again the re-enable "FINISH ARMED". So, if unsure if a swimmer is finishing or not, press "FINISH ARM", then if you are wrong press the "FINISH ARM" again.

Event:	3	200 Meters					
Heat:	2	Race #	[0003]	Lengths:	8		
		3	4	5	6	7	8
		Finish Armed	Finish Armed	Finish Armed	Finish Armed	Finish Armed	Finish Armed
		6	6	6	6	4	6

**Figure 9 - Finish Armed**

Occasionally, an extra touch is registered (for example, during a relay if one of the relay swimmers is slow to leave the pool after they finish.) In such a case, you can subtract the extra touch by pressing "— TOUCH" on the keypad, entering the lane number using the numeric

keypad and pressing "ENTER." After doing this, check that the correct number of completed lengths is displayed.

The third row of buttons on the keypad (see Figure 7) is labelled "SPLIT ARM." Pressing "SPLIT ARM" for a lane arms the lane and subtracts a touch.

After all of the athletes have finished, press "STORE/PRINT" and "RESET" (both buttons.) You should see "RESET" displayed in the upper left corner. If you hear the referee's long whistle, and "RESET" is not displayed, ask the referee to pause.

Check to see whether pad finishes were registered (if pads are in use) and all buttons that are in use in each lane were pressed. If a pad finish was not registered, then "FINISH ARMED" will still be displayed in the lane. When a touch is registered at the finish, "FINISH ARMED" disappears and the finish place is shown in the lane in red. See Figure 4.

The reason that a pad finish was not recorded may simply be that the athlete missed the pad. However, if you observe that pad touches were not recorded in the same lane for multiple sequential heats, notify the Referee. The pad connection with the harness may have come loose, or the pad may need to be replaced.

### **Meets That Only Use Semiautomatic Timing**

Semiautomatic timing would generally only be used in pools that can't have pads installed due to narrow lanes or inability to mount the pad at the pool end. A back up button is installed in the PRIME connection on the AOD harness to replace the pad. All other AOD operations are the same for fully automatic timing.

### **Printing Stored Data**

Occasionally, you will be asked to print stored data. An example of when this might occur is when heats of different events are combined. In such a case, the administrative official would want copies of the printout to include with the records from each event.

To print stored data, press the "STORED DATA" softkey. See Figure 4. This displays the results of the last race saved. You can navigate to the race that you need to print using the "NEXT RACE", "PREVIOUS RACE", "NEXT EVENT" and "PREVIOUS EVENT" softkeys. Once the correct race is displayed, press "PRINT RACE" and then the "RACE SUMMARY", "SPLITS SUMMARY" and then "FORM FEED". See Figure 10.



Figure 10 - Stored Data Print Options

PRINTOUT DATA

Annotated printouts are shown in Figure 11 and Figure 12.

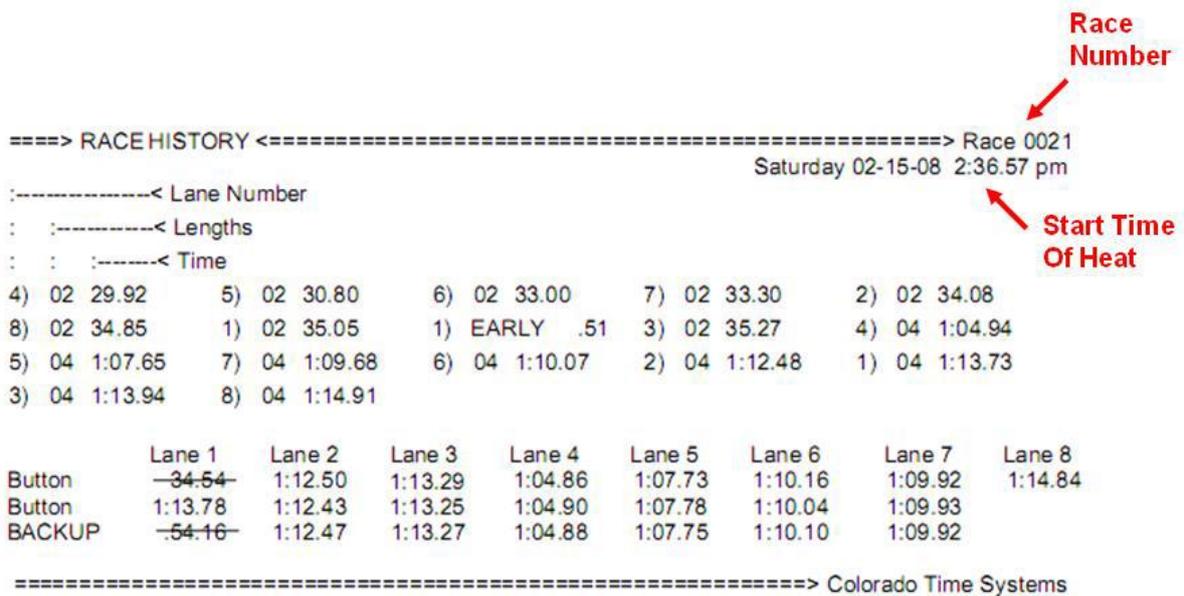


Figure 11 - Splits Summary

Event/Heat  
Description

-----> RACE SUMMARY <----- Race [0003] <-----  
Monday 17-Sep-07 10:23:52 am

200 Boys Medley Relay  
 Event: 1 Heat: 3

----- BY LANE -----				----- BY PLACE -----			
Lane	Place	Time	Backup	Place	Lane	Time	Backup
1	1	1:35.94		1	1	1:35.94	
2	2	1:36.68		2	2	1:36.68	
3	4	1:38.14		3	4	1:37.63	
4	3	1:37.63		4	3	1:38.14	
5	5	1:38.62		5	5	1:38.62	
6	6	1:39.10		6	6	1:39.10	
7	7	1:39.53		7	7	1:39.53	
8	8	1:39.95		8	8	1:39.95	

Pad Times in Lane Order
Pad Times in Place Order

Figure 12 - Race Summary

### COMMON PROBLEMS AND SOLUTIONS

These problems are presented in a table format so that the table can be detached from this guide and kept handy during training sessions. Always remember that the number one rule of running the AOD is **DON'T PANIC**. Most problems can be solved if they are addressed before the next heat begins. If you need more time to solve a problem, let the deck referee know to wait before starting the next heat.

Problem	Solution
No display at all when power is turned on.	Check power adapter cable and wall outlet
Start signal not received by AOD ("RESET" still displayed.)	Immediately press "START." For a short race (e.g., 50 free) you may need to press "FINISH ARM" in all lanes. Notify the administrative official of the manual start. Check connection from starter to harness and clean connectors if necessary.
AOD does not register pad or finish button/backup button.	<ol style="list-style-type: none"> <li>1) The timer must be ready for a pad touch. Ensure that the pad armed indicator is displayed in the appropriate lane(s).</li> <li>2) Confirm that lane mapping is set properly for the lane(s).</li> <li>3) Make sure touchpad and button cables are properly and securely connected.</li> <li>4) Clean connectors</li> <li>5) Check cabling.</li> <li>6) Check touchpad(s) or button(s); see Figure 6.</li> </ol>

Multiple inputs (e.g., pads, buttons, etc.) don't work.	Check harness connections. Clean if necessary.
Did not turn off an empty lane	The AOD will expect a finish in that lane. Acknowledge via softkey that you wish to reset when you press the "RESET" buttons.
AOD not reset when next event starts	The AOD will warn that an unexpected start was received. Accept the start via softkey.
Printer does not print.	<ol style="list-style-type: none"> <li>1) Make sure printer is On-Line and is loaded with paper.</li> <li>2) Make sure printer is configured properly (see appendix B).</li> <li>3) Make sure cable connections are secure.</li> <li>4) Clean printer cable connectors.</li> <li>5) Try pressing the Form Feed key</li> </ol>
Scoreboard not working	<ol style="list-style-type: none"> <li>1) Make sure scoreboard has power and is turned on.</li> <li>2) Make sure scoreboard is not blanked.</li> <li>3) Make sure scoreboard cable is properly connected.</li> <li>4) Check scoreboard cable connectors for corrosion and clean or replace as necessary.</li> </ol>
Forgot to "STORE/PRINT" before starting another race.	Proceed with current race.
Did not advance to next heat or event	1) If race was not "STORE/PRINT" then advance to next heat or event.

	<p>2) Otherwise write correct event and heat on AOD printout</p>
The event is a different distance	<p>1) Advance to correct event or edit event/heat to get to the proper event or</p> <p>2) Press correct distance on console keypad (during or after the race finishes but before "STORE/PRINT" is pressed</p>
Lane turned off, but someone was in that lane	AOD will still record their times, if lane is turned back on again before "STORE/PRINT" is pressed
Swimmer missed, or lightly touched pad during turn	<p>1) Press "+ TOUCH" and then enter the lane number</p> <p>2) If it was the last touch before finishing, press "FINISH ARM" in the appropriate lane</p>
Extra touch recorded in lane	<p>1) Press "- TOUCH" and then enter the lane number.</p> <p>2) Press "SPLIT ARM" in the appropriate lane.</p>

# Appendix A

## Colorado Timing System (AOD) Operator Assessment

Name \_\_\_\_\_

Certification as an AOD Timing Equipment Operator requires working a minimum of Three meets under the supervision of a certified AOD Operator and successful evaluation by one of the officials who is designated to evaluate AOD Operators.

The following assessment tool should be used as guidance for the AOD Operator evaluation.

---

### Elements and performance criteria

#### Element 1 - Timing System operator to demonstrate assembly of the AOD and Starter equipment without assistance.

##### Performance criteria

##### **1.1 Operator able to unpack and assemble AOD console and connect accessories:**

<i>Assessment Criteria</i>	Lay out of AOD harness correct and aligned to swim lanes	Y / N
	Pads and Back up buttons installed correctly	Y / N
	Harness connected to AOD console correctly	Y / N
	AOD printer set up and connected correctly	Y / N
	Meet Manager Computer connected correctly	Y / N

##### **1.2 Operator correctly unpack and assemble starter and connect accessories:**

<i>Assessment Criteria</i>	Starter and stand assembled correctly	Y / N
	Lane speakers and speaker cable connected correctly	Y / N
	Start cable connected to AOD harness and starter correctly	Y / N

---

#### Element 2 - AOD operator to carry out pre-meet function tests correctly to ensure AOD is ready for service.

##### Performance criteria

##### **2.1 AOD console correctly started and console settings checked**

<i>Assessment Criteria</i>	Correct start up sequence with swimming selected	Y / N
	Console settings checked and adjusted to suit pool	Y / N
	Comms with Meet manager computer checked	Y / N

## **2.2 AOD and Starter function tests completed correctly**

<i>Assessment Criteria</i>	Console selected to a test event number 100 or 200	Y / N
	Starter turned on and speakers function tested	Y / N
	Start initiated from starter and confirm console timer start	Y / N
	Console finish armed, pad and backup buttons tested	Y / N
	Console reset and printer function checked	Y / N
	Meet downloaded to console from meet manager computer	Y / N

---

## **Element 3 - Operate AOD equipment to time the swim meet without assistance.**

### Performance criteria

#### **3.1 Operate AOD console correctly**

<i>Assessment Criteria</i>	Correct Event and heat are selected	Y / N
	Lanes are switched off for empty swim lanes	Y / N
	After race has concluded correct key sequence is used	Y / N
	Correct backup soft key sequence is used when required	Y / N
	Race missed touch is identified and corrected	Y / N
	Extra touches are identified and corrected	Y / N
	Identify and rectify equipment defects Eg faulty pad	Y / N
	Reprint results from a previous race	Y / N
	Console left on an unused event/heat at end of session	Y / N
	Demonstrate understanding of printed results	Y / N
	Discuss circumstances where a manual start may be required	Y / N

---

## **Element 4 - Timing System operator can dismantle and correctly stow the AOD equipment to ensure it is not damaged during transport.**

### Performance criteria

#### **4.1 Shut down AOD console correctly and stow equipment**

<i>Assessment Criteria</i>	Meet manager times exported before console is shut down	Y / N
	Correct console shutdown procedure conducted	Y / N
	Starter switched off and stowed correctly	Y / N
	Timing pads are removed and stowed in trolley correctly	Y / N

AOD cables and harness are stowed correctly	Y / N
AOD printer and cables are stowed correctly	Y / N
AOD console and cables are stowed correctly	Y / N

Assessor name \_\_\_\_\_

Date \_\_\_\_\_

Assessor Sign \_\_\_\_\_

Pass / Not Achieved