

## HL996 SMARTDISPLAY CLOCK MODE OPERATION MANUAL

### 1.0 GENERAL

The SMARTDISPLAY will operate as an independent clock with full split, lap, and time-out functions during count-up and count-down.

The display derives its power from the factory-supplied adapter/charger, or from an internal 12-volt battery (optional). An external 12-volt battery may be used. Contact your sales agent for the proper connection.

IF USING THE OPTIONAL INTERNAL BATTERY, the adapter/charger will gradually charge the internal battery while the unit is in operation. If relying solely on the internal batteries, and the digits appear to move sluggishly, or the correct numbers are not forming, it is time to recharge the battery. You can plug in the charger unit and continue operation. Or for quicker charging, turn the display off. The charger can be left on indefinitely without causing damage to the internal batteries.

### 2.0 EXPLANATION OF CONTROLS

#### 2.1 CONNECTOR PLATE FEATURES

2.1.2 DC CONNECTOR. Accepts 12 volts DC from the factory-supplied charger unit or external 12-volt battery. Use only the charger supplied with the Smartdisplay.

TIP = +12 - +16 VDC                      RING = GND -

2.1.3 FUSE HOLDER. The fuse holder contains a 3 amp, 250 volt, slo-blow fuse. To replace: push and turn counterclockwise to release. Push and turn clockwise to set.

2.1.4 DATA-IN CONNECTOR. Accepts a standard 1/4" mono plug to connect to the timing device. TIP = signal, RING = gnd.

PLUGGING IN THE SERIAL DATA CONNECTOR AUTOMATICALLY PUTS THE UNIT INTO SLAVE MODE. STAND-ALONE FUNCTIONS BECOME DISABLED.

2.1.5 REMOTE CONTROL CONNECTOR. Accepts the 9-pin mating plug from the Remote Control Pad or Junction Box.

2.1.6 ON/OFF SWITCH. Push UP for ON, and DOWN for OFF.

2.1.7 BAUD RATE SWITCH. Select the baud rate to match your timing device.

2.2 REMOTE CONTROL PAD. The remote control pad allows you to control all timing functions in CLOCK MODE. Switches include:

2.2.1 TIME SET BUTTONS. These three push buttons are used to set time-of-day/race in CLOCK MODE.

2.2.2 LAP BUTTON. This button is used to obtain lap times. Pressing this button will give you the current lap time, while starting a new internal clock from zero.

2.2.3 COUNT-UP/SPLIT BUTTON. This button causes the display to count up from zero or any pre-set time. Press it again to obtain a split time (with internal clock still running).

2.2.4 COUNT-DOWN/STOP/RESUME SWITCH. This button will cause the display to count down (from a pre-set time). Press it again and the display will stop (along with the internal clock). Press again to resume counting. The STOP/RESUME function also works while counting up.

TO RESET DISPLAY: PRESS BOTH COUNT-UP AND COUNT-DOWN BUTTONS SIMULTANEOUSLY.

2.2.6 TIME ACCURACY SWITCH. This three position toggle switch is used to select accuracy of times to be displayed, per the following chart. This switch should always be set before power-up.

SWITCH	CLOCK
POSITION	MODE:
UP.....	1 SECOND
MIDDLE....	AUTO SHIFT *
DOWN.....	DIGIT TEST ON INITIAL POWER UP

\* shows minutes and seconds (until 59:59.99), then automatically shifts to hours, minutes, seconds (01:00:00).

### 2.3 CLOCK MODE OPERATION

- 1) Make sure the DATA-IN connector is unplugged.
- 2) Select RESOLUTION as per switch settings listed above.
- 3) Turn power switch ON.

### 2.3.1 TO SET TIME-OF-DAY/RACE

After following the procedure above, you may set hours, minutes, and seconds by pressing the SET BUTTONS. If you make an error, simply press both COUNT UP and COUNT DOWN buttons simultaneously. This will reset the clock to zero. If you do not wish to set a time-of-day/race, simply leave the set buttons alone, and go to the next step.

2.3.2 TO GIVE COUNT-UP COMMAND. Simply press the COUNT UP button to commence from zero or any pre-set time.

### 2.3.3 TO GIVE COUNT-DOWN COMMAND

You must pre-set a time other than zero for the countdown to commence. Once you have done so, simply press the COUNT DOWN button.

Once the display has reached zero, it will automatically return to the pre-set value. Press COUNT DOWN TO resume another session from the pre-set time.

### 2.3.4 SPLIT FUNCTION

During both count-up and count-down, you may have the display show a split time with the internal clock continuing to run. To do this, simply push the COUNT-UP/SPLIT BUTTON momentarily. The split time will show for 5 seconds, then resume running time.

### 2.3.5 STOP/RESUME FUNCTION

Follow the same procedure as in 2.4.4, only using the COUNTDOWN/STOP button. The display and internal clock will stop indefinitely. To resume counting, press again.

To review: Push COUNTDOWN to stop, and again to resume.

### 2.3.6 LAP FUNCTION

Push the LAP button to commence the race. With each lap completion of a single competitor, simply push the LAP button. The lap time will show for 5 seconds, then resume counting the NEW lap running time.

### 2.3.7 RESET FUNCTION

To reset both the display and internal clock, push both COUNT UP and COUNT DOWN buttons simultaneously.

### 3.0 CARE OF DISPLAY

Although the display is designed for outdoor use in harsh environments, we recommend you take the following precautions:

\* If the display has been exposed to water, wipe down immediately after use, and store in a dry place.

\* If possible, avoid facing display directly into the sun. Take steps to shade it on very hot days. Generally, cold weather will not effect operation, but any steps to guard the display from the elements is advised.

### 3.1 TECHNICAL

CPU: CMOS Z80            MEMORY: 64K EPROM, 16K RAM

DATA BUFFERING: opto-isolator 4N25

SERIAL FORMAT: 1200 or 2400 baud, no parity, 8 bits, 1 stop.

DISPLAY METHOD: Seven-segment electromechanical digits.

CONTROL FUNCTIONS: Working contact, +5vdc -> ground. Opto-isolated.

POWER CONSUMPTION: 150ma resting, 1 amp peak (300 ms)

VOLTAGE REQUIREMENT: no less than 12VDC, no greater than 16VDC.

OPERATING TEMPERATURE RANGE: 0F to +100 F., 95% RH.

DIMENSIONS: L x W x H: 44" x 6" x 8"

WEIGHT: 22 lb.

### 3.2 CONNECTORS

POWER-IN: TIP = +12, RING = GROUND

DATA-IN: TIP = SIGNAL, RING = GROUND

REMOTE CONTROL PAD:

PIN	FUNCTION	DIP SWITCH
1	LAP FUNCTION	2
2	SET HOURS	7
3	COUNT UP / SPLIT / RESUME	3
4	COUNT DOWN / STOP / RESUME	6
5	GROUND (COMMON)	-
6	1-SECOND ACCURACY	4
7	.01-SECOND ACCURACY	5
8	SET SECONDS	1
9	NO CONNECTION	

SEE DIP-SWITCH FUNCTION MAP AND ADDITIONAL MANUALS FOR DUAL ET, DUAL DIFF, AND SLAVE FUNCTIONS

### 3.3 LIMITED WARRANTY

The display is warranted for one year for parts and workmanship.

Defective product is determined solely through inspection by the manufacturer. Product failure resulting from neglect, customer modification or alteration, and transport are not covered.

## 2.3 OPERATION IN SLAVE MODE

### 2.3.1 CONNECTION TO TIMING DEVICE

On the interface cable which is provided, the smaller 1/8" plug is intended for the CP502, CP505 or SM510. On the back panel of either device, locate the connector labeled "COMPUTER" and make the connection. Plug the larger 1/4" phone plug into the appropriate jack on the side of the display.

Turn on the timing device, and go through the initialization procedure. You are now ready to send data to the display. But before turning on the display, follow the procedures as described below.

2.3.2 START-UP PROCEDURES. Select the DIP SWITCH parameters as listed on the DIP SWITCH FUNCTION MAP for section UNIVERSAL CHRONOPRINTER SLAVE.

4) POWER-UP DISPLAY. NOTE: During its initializing, the right most digit will show certain combinations of vanes (depending on which DIP switches are active at the time) for a period of about 1 second, and then disappear. Once it disappears, the display will say "HEUEr", and is fully initialized and ready.

The SMARTDISPLAY will sit idle until it reads the correct data from the timing device. When the data is read, it will display the information just as it appears on the devices' LCD or PRINTER. The display will respect the accuracy levels you have selected (e.g.: 1, .1, .01, or .001) for net times in MANUAL MODE on the Chronoprinter or Speedmeter.

The information will be shown for the display duration you've selected, after which the display will blank. Regardless of the length of the display duration, new information will be saved in memory and eventually shown.

5) To change the parameters of display duration, or to select a different form of data to be displayed, or to change accuracy levels, turn the power off and start over.