



愛高實業(香港)有限公司
HICO INDUSTRIAL (HK) LIMITED

PRODUCT SPECIFICATION

100-Lap Sport Watch

| | |
|---------------|-------------|
| Product Code: | HCS-T021-1 |
| Version: | 1.0 |
| Date: | Aug 4, 2003 |

Hong Kong 香港

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100-Lap Sport Watch (HCS-T021-1)

GENERAL DESCRIPTION

This 100-Lap Sport Watch is a single-chip micro-controller that is preprogrammed for digital watch applications. Its large memory storage allows users to store up to 100 lap records. It is a great device for sport enthusiasts.

FEATURES

- Real Time Clock
 - Hour, Minute, Second, Year, Month, Date, Day of Week
 - 12 or 24 hour display format by user option
 - Hourly chime
- Auto Calendar
 - Auto leap year adjustment from 2000 to 2099
 - Auto setting on Day of Week
- Daily Alarm
 - 3 daily alarms operated independently
- Countdown Timer
 - User adjustable time duration up to 23 hours 59 minutes 59 seconds in 1-second step
 - 3 different modes of operation by user option
 - One-shot, Reload, Continuous
 - Alert signal for designated time intervals
- Chronograph
 - Count up to 23 hours 59 minutes 59.99 seconds with 1/100 second resolution
 - Lap or Split time display by user option
 - 100 lap/split memories
 - Average Lap record and Best Lap Record
- Pacer
 - User adjustable rate from 20 to 180 beats per minute
- Low Battery Reminder
 - Built-in battery level detector display graphical message to remind the replacement of battery
- Operates with 3 volts Lithium battery
- Operates with 3 buttons



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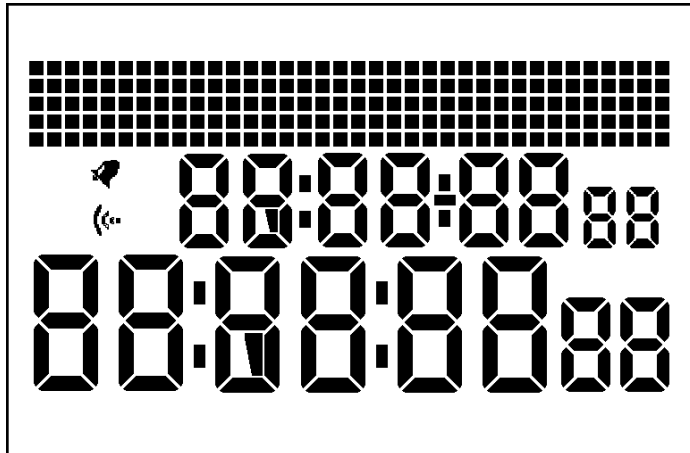
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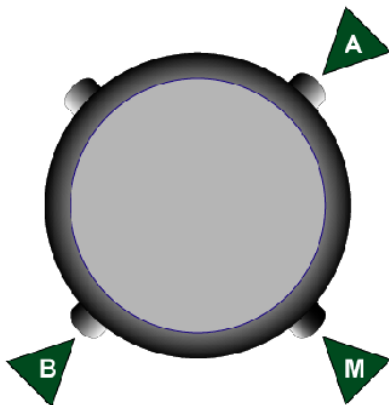
100-Lap Sport Watch (HCS-T021-1)

LCD PATTERN



- Operating voltage: 4.2V
- Duty Cycle: 1/9
- Bias: 1/4
- Viewing Direction: 6 O'clock

BUTTONS



| BUTTON | FUNCTIONS |
|--------|------------|
| A | SET/RESET |
| B | START/STOP |
| M | MODE |

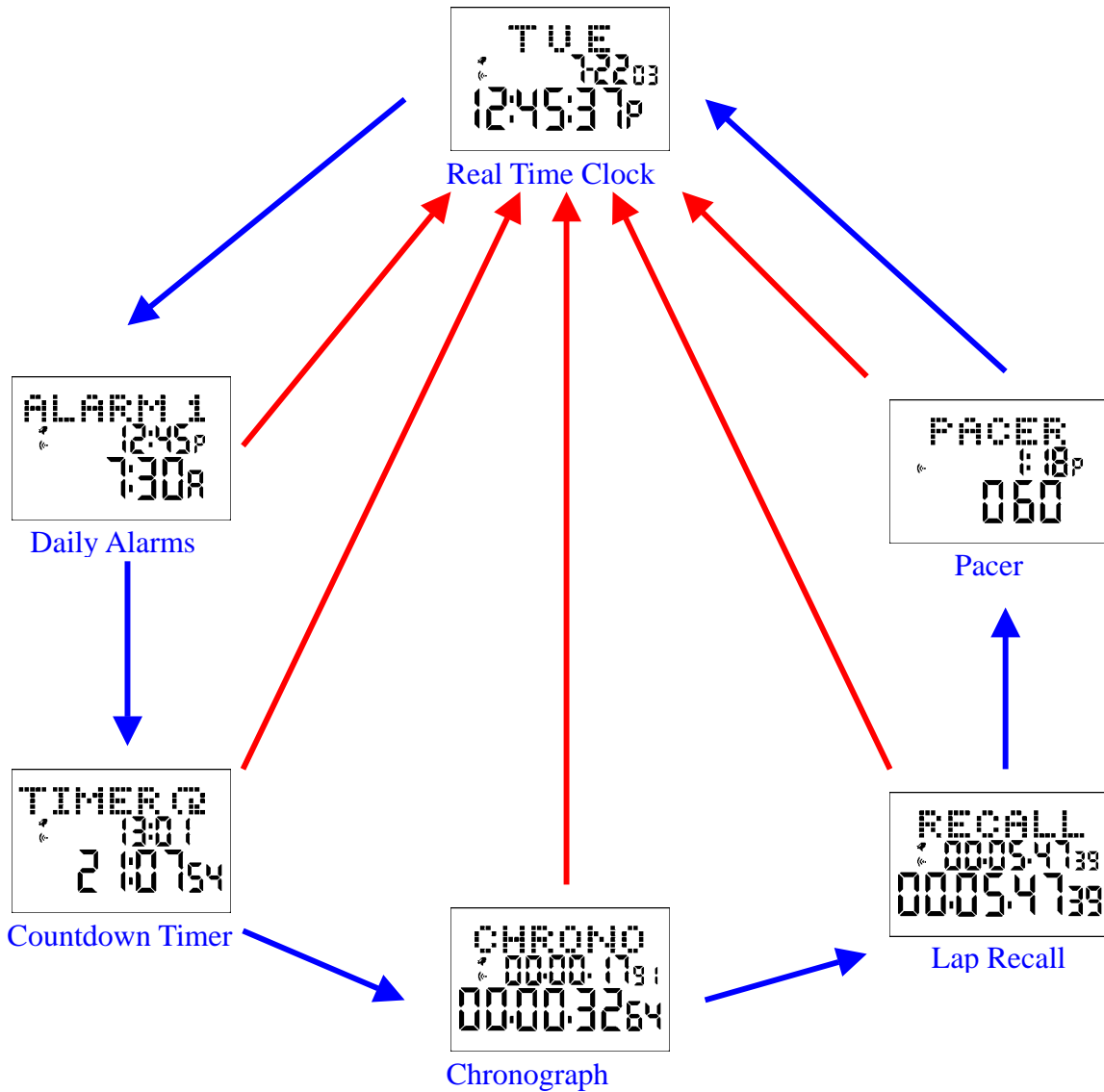


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FUNCTIONAL FLOWCHART



➡ Mode sequence when button [M] is pressed

➡ REAL TIME CLOCK will be resumed if no button pressed for 1 minute



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100-Lap Sport Watch (HCS-T021-1)

FUNCTIONAL DESCRIPTIONS

1. Buttons

| MODE | BUTTON | PRESS ONCE | PRESS AND HOLD |
|----------------------------------|--------|---|--|
| Real Time Clock | A | 12 / 24-hours display | ----- |
| | B | Enable / Disable Hourly Chime | ----- |
| | M | Change to Alarm Mode | Enter into Setting Mode |
| Daily Alarms | A | Next Alarm | ----- |
| | B | Enable / Disable Alarm Alert | Test Current Alarm Alert |
| | M | Change to Timer Mode | Enter into Setting Mode |
| Countdown Timer | A | Start / Stop Timer | ----- |
| | B | Select Timer Type (One-shot, Reload & Continuous) | Reload Value (in stop status) |
| | M | Change to Chronograph Mode | Enter into Setting Mode |
| Chronograph | A | Start / Stop Chronograph | ----- |
| | B | Take Lap (in Running status) | Reset Chronograph (in Stop status) |
| | M | Change to Lap Recall Mode | Enter into Chronograph display setting mode (in stop status) |
| Lap Recall | A | Display next lap | Display Best Lap |
| | B | Display last lap | Display Average Lap |
| | M | Change to Pacer Mode | ----- |
| Pacer | A | Start /Stop Pacer | ----- |
| | B | ----- | ----- |
| | M | Change to Real Time Mode | Enter into Pacer Setting Mode |
| Setting Mode | A | Adjust blinking digit | Fast Scrolling |
| | B | Select blinking digits | ----- |
| | M | Exit Setting Mode | ----- |
| Chronograph Display Setting Mode | A | Next Display format | ----- |
| | B | Last Display format | ----- |
| | M | Exit Setting Mode | ----- |
| Pacer Setting Mode | A | Increase Pacer Value | Fast Scrolling |
| | B | Decrease Pacer Value | Fast Scrolling |
| | M | Exit Setting Mode | ----- |



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2. System Defaults

- System will be initialized according to the following tables upon startup

| MODE | ELEMENT | STATUS |
|-----------------|--------------------|--------------------------|
| Real Time Clock | Time | 12:00:00 AM |
| | Date | Wednesday 2003-01-01 |
| | Display format | 12-hour |
| | Hourly chime | Disabled |
| Daily Alarms | Time | 12:00 AM |
| | Alert | Disabled |
| Countdown Timer | Duration | 1 minute |
| | Mode | One shot |
| Chronograph | Status | Stopped |
| | Total time | 0 hr 00 minute 00.00 sec |
| | Lap/Split memories | All cleared |
| | Display option | Lap/Split |
| Pacer | Status | Stopped |
| | Rate | 20 beats per minute |
| | Status | Stopped |

2. Mode Entry Animation

- Each Mode will be assigned a name that will be displayed upon mode entry. Table below illustrated the assigned names:

| MODE | ASSIGNED NAME |
|-----------------|---------------|
| Real Time Clock | TIME |
| Daily Alarm | ALARM |
| Countdown Timer | TIMER |
| Chronograph | CHRONO |
| Lap Recall | RECALL |
| Pacer | PACER |

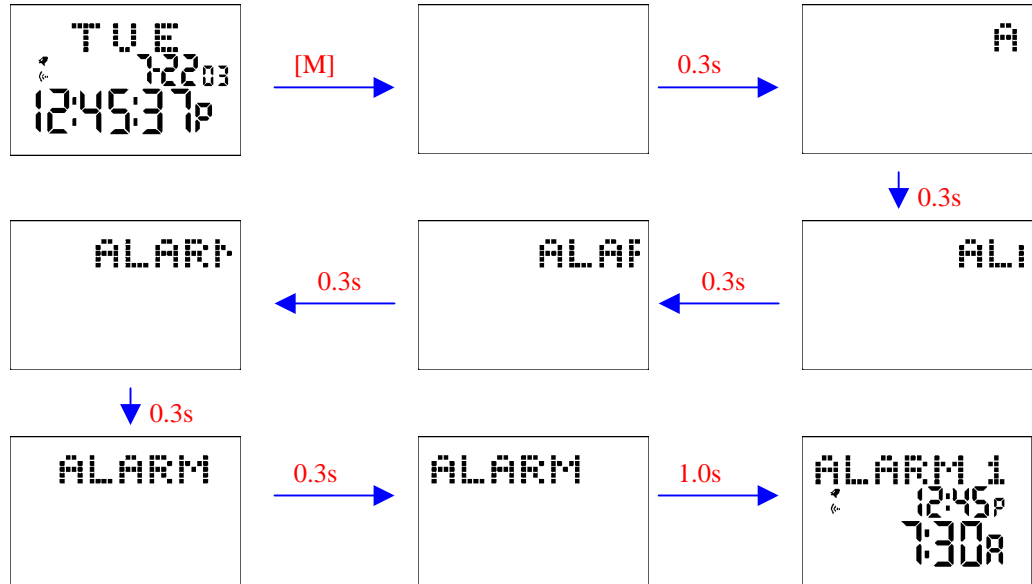


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- Upon mode entry, the assigned name will be displayed according to the following sequences, e.g. Real Time Clock to Daily Alarm:



- All buttons will have NO FUNCTION during the course of the animation.

3. Alert Signals

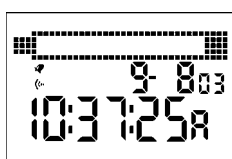
- Sound alerts will be played based on the following priority:

| RANKING | ALERTS | DURATION |
|-----------------------|--------------|------------|
| Highest Lowest | TIMER | 10 seconds |
| | ALARM1 | 20 seconds |
| | ALARM2 | 20 seconds |
| | ALARM3 | 20 seconds |
| | HOURLY CHIME | 1 seconds |
| | PACER | 200 ms |

- If alert in higher rank is being played, subsequent alerts in lower rank will be ignored.

4. Low Battery Reminder

- Battery condition will be detected for every minute updated. If battery level is dropped to 2.4V, Real Time Clock will be resumed automatically with the below graphical reminder being displayed:



Example:

- September 8, 2003
- 10:37:25 AM
- Low Battery Detected

- Under low battery condition, all alerts will be disabled automatically.



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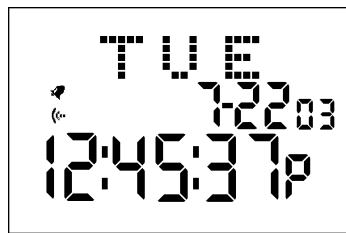
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OPERATION INSTRUCTIONS

1. Real Time Clock

1.1 Normal Display

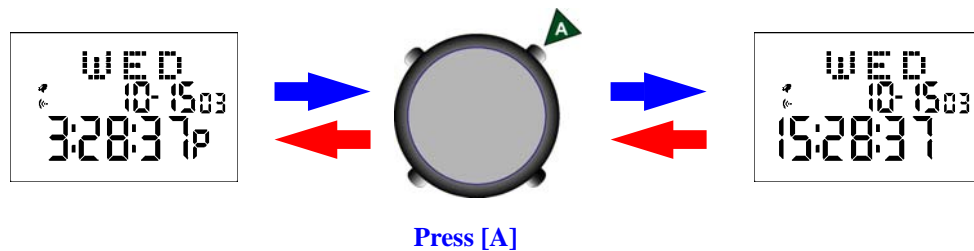


Example:

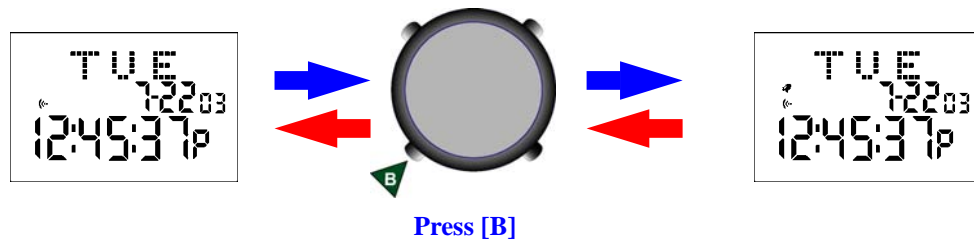
- July 22, 2003
- 12:45:37 PM
- Tuesday

1.2 Buttons

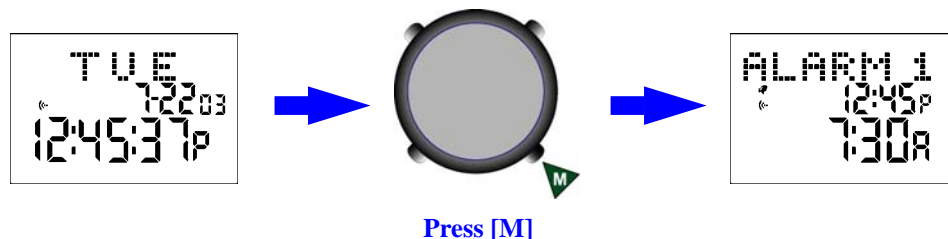
a) Toggle 12 / 24 hour format display



b) Enable / Disable Hourly Chime



c) Press [M] key to change to Alarm Mode



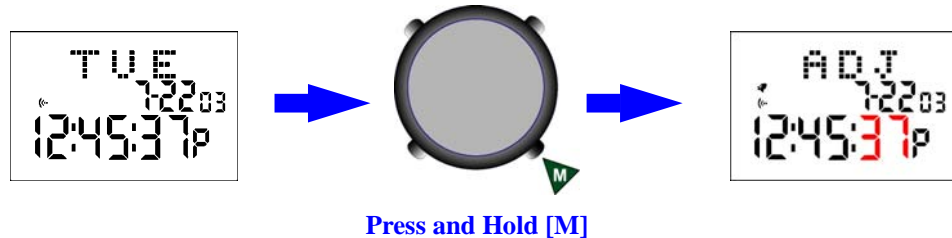


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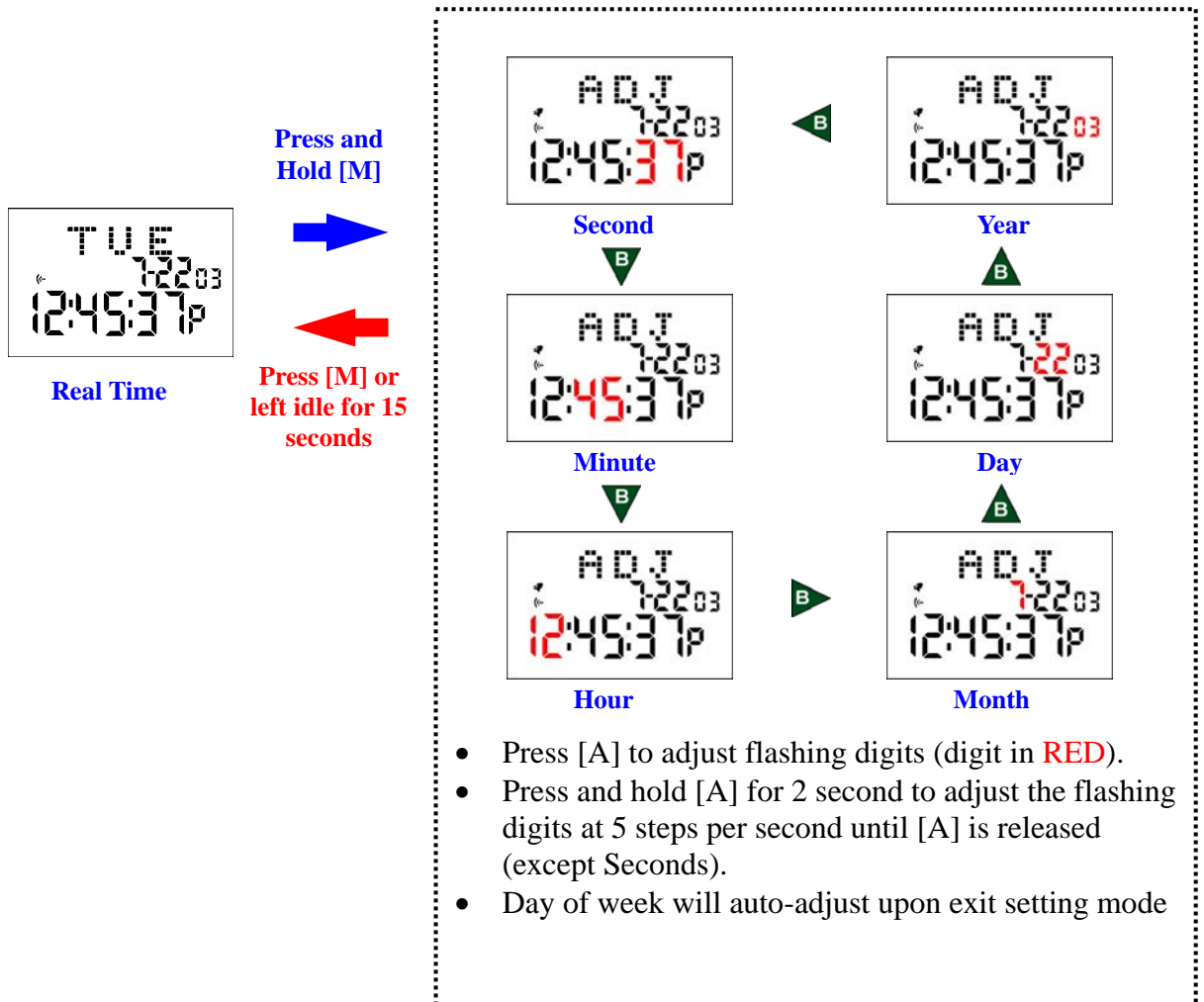
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d) Press and Hold [M] key 2 seconds to enter Real Time Setting Mode



1.3 Adjust the Real Time Clock





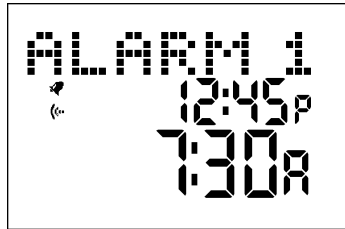
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2. Daily Alarm

2.1 Normal Display

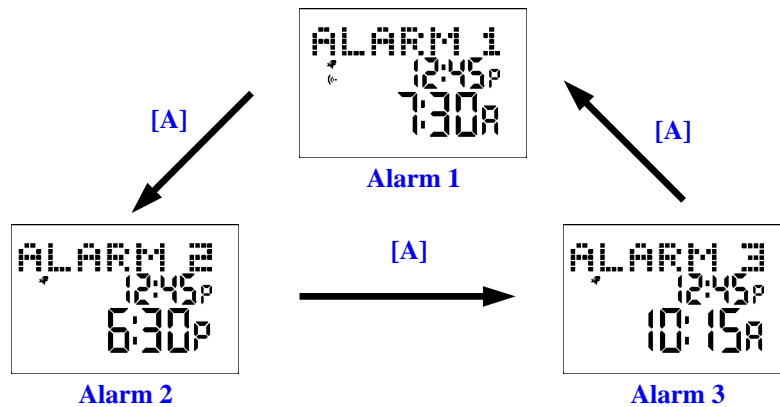


Example:

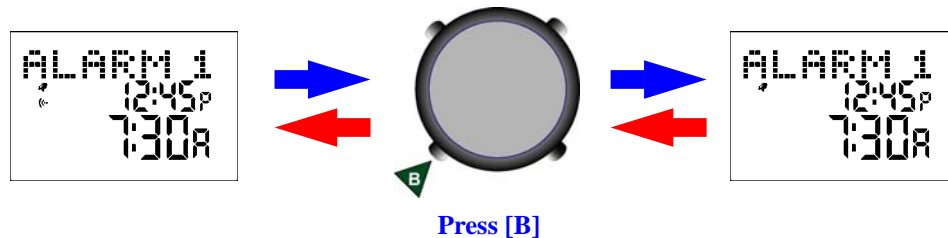
- Alarm 1 set 7:30AM
- Real Time 12:45PM
- Alarm Enabled

2.2 Buttons

a) Press [A] to change Next Alarm



b) Press [B] key to Enable / Disable Alarm Alert



c) Press and Hold [B] key 2 seconds to test the current Alarm Alert Tone



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d) Press [M] Key to change to Timer Mode



e) Press and Hold [M] key 2 seconds to enter setting mode



2.3 Adjust the Alarm Time

- Press [A] to adjust flashing digits (digit in RED).
- Press and hold [A] for 2 second to adjust the flashing digits at 5 steps per second until [A] is released.

2.4 Operating the Alarm

- All Alarms are operated identically with only different in the alert tone.
- Alert tone goes off for 20 seconds when the real time reach the alarm time.



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3. Countdown Timer

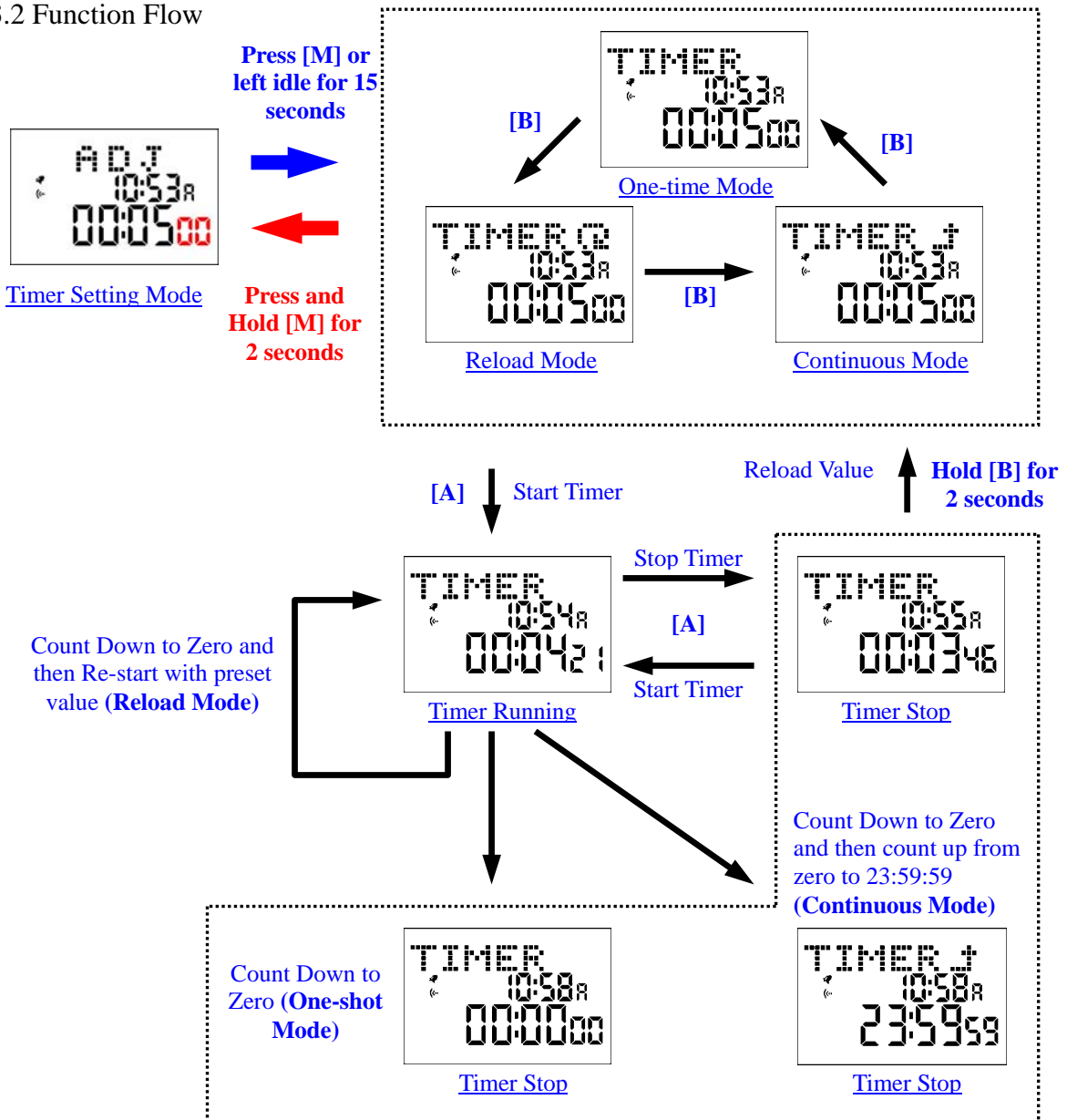
3.1 Normal Display



Example:

- Timer value 21 Hours 7 Minutes 54 seconds
- Real Time 13:01
- Timer Mode: Reload

3.2 Function Flow





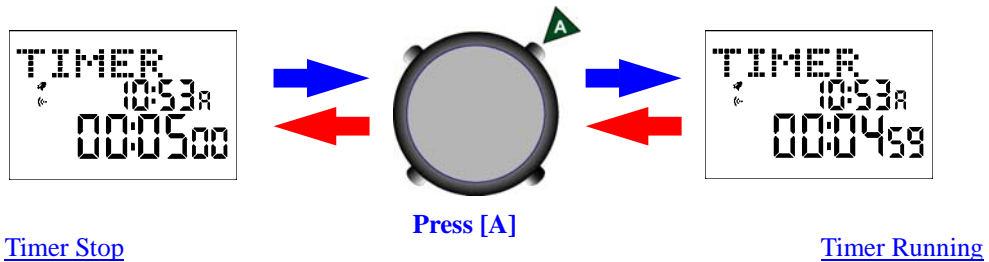
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3.3 Buttons

a) Press [A] to Start / Stop the Timer



b) Press [B] to change the Timer Mode

1) One-Time Mode

Timer will be stop when countdown to zero.



2) Reload Mode

When countdown to zero, preset value will be loaded and start to countdown.

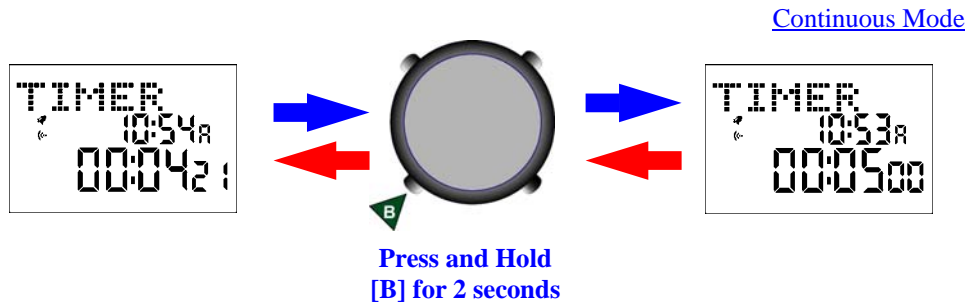


3) Continuous Mode

When Timer countdown to zero, Timer will start to count from 00:00:00 to 23:59:59 (23 Hours 59 Minutes, 59 Seconds)



c) Press and Hold [B] to reload Timer value



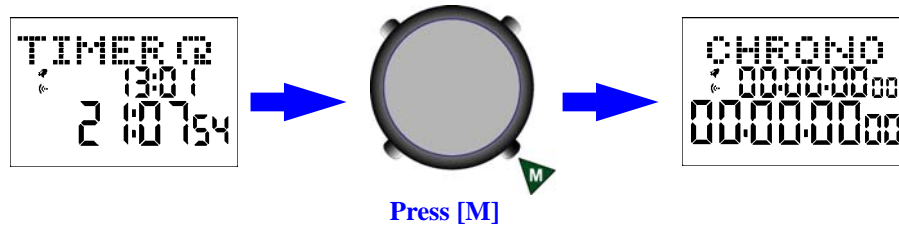


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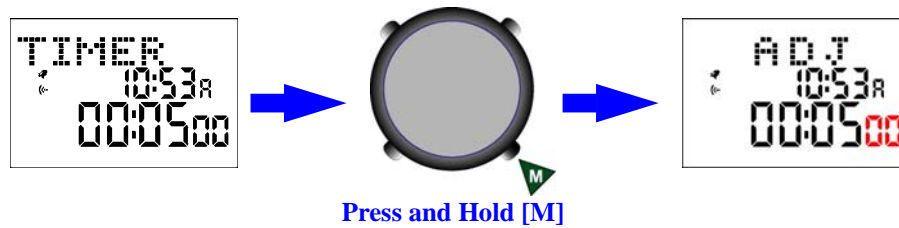
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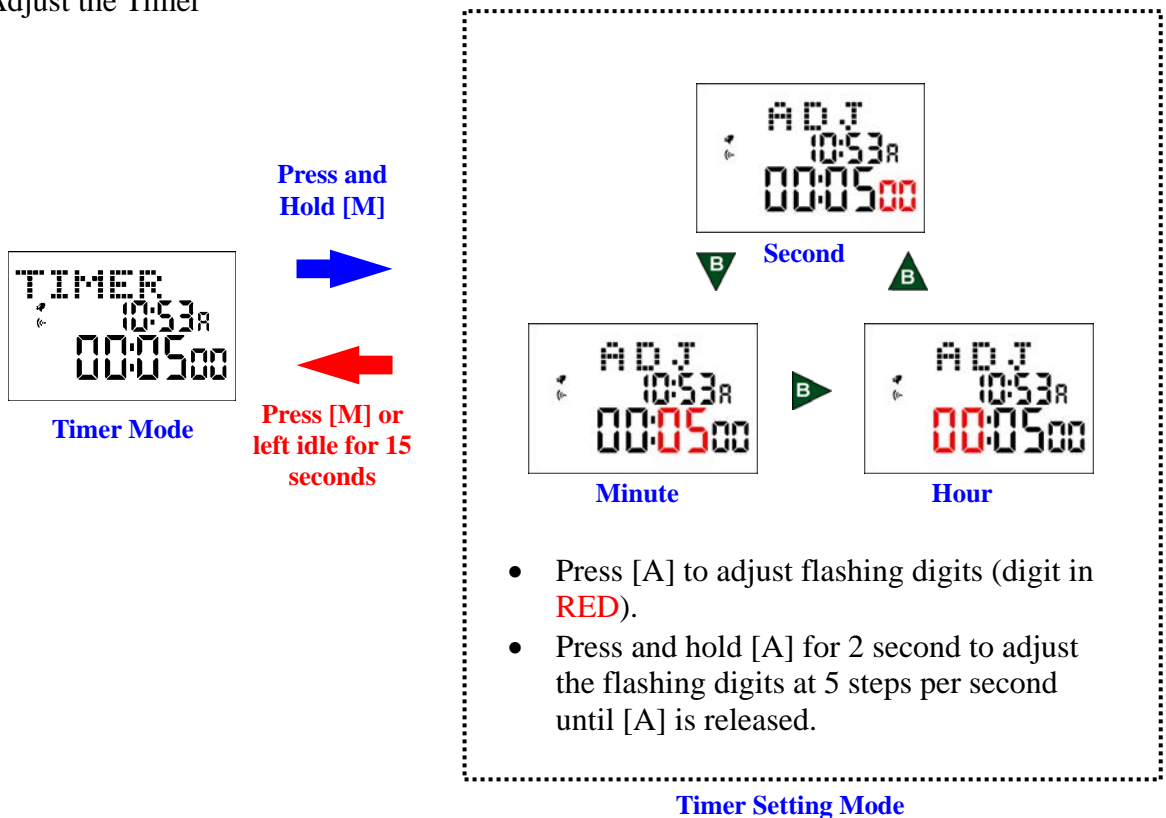
d) Press [M] to change to Chrono Mode



e) Press and Hold [M] for 2 seconds to enter Timer Setting Mode.



3.4 Adjust the Timer





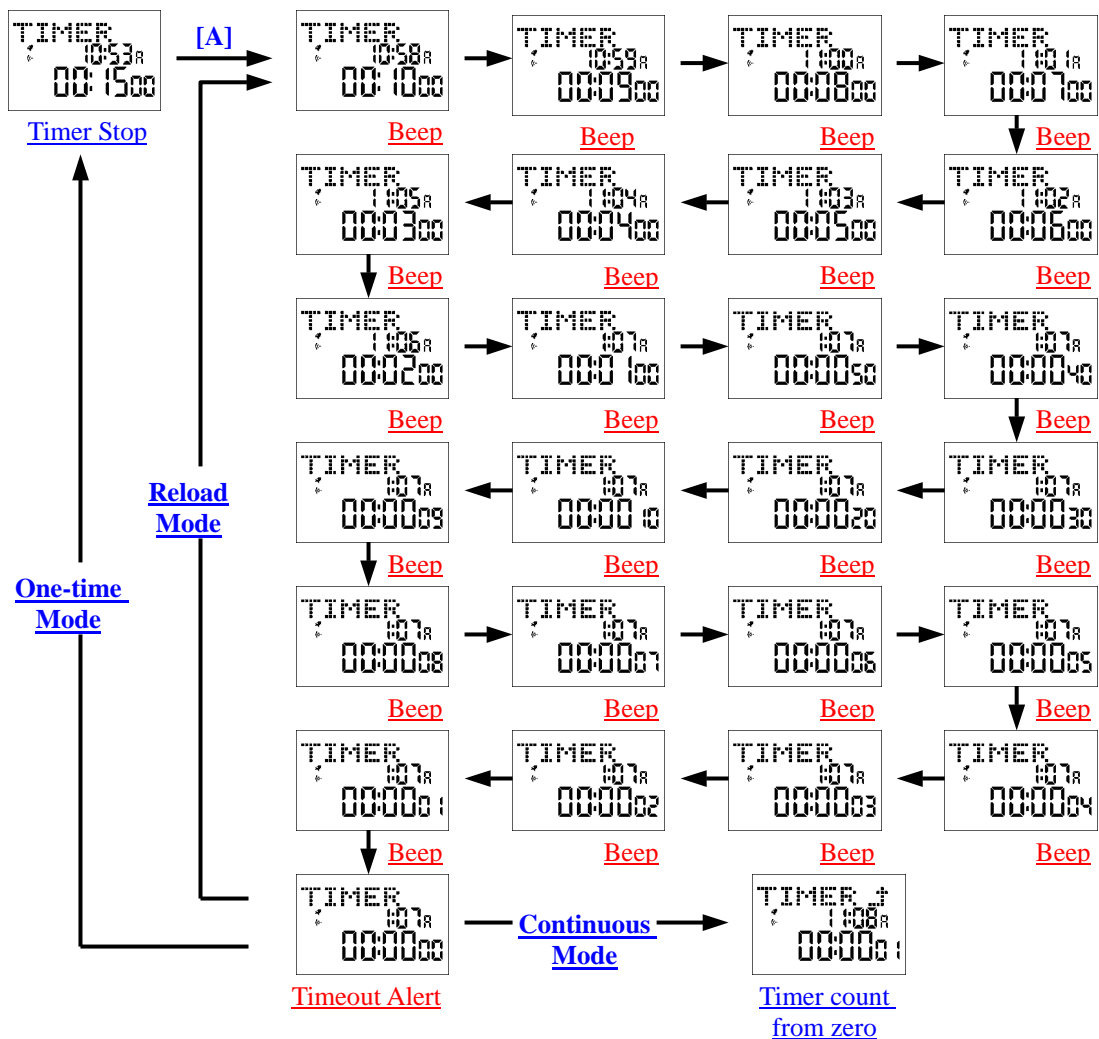
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3.5 Operating the Timer

- Press [A] to start the timer.
- Sound 'Beep' when the time at 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1 minute(s); 50, 40, 30, 20, 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1 second(s).
- When the counting time reach 0 seconds, the watch sounds Timer Timeout Alert for 20 seconds
- For One-time Mode, Timer will be stop when reach 0 seconds and reload value after the timer alert
- For Reload Mode, timer value will be reloaded when reach 0 seconds and start the timer to countdown.
- For Continuous Mode, when the time reach 0 seconds, timer will start to count-up from 0 seconds.





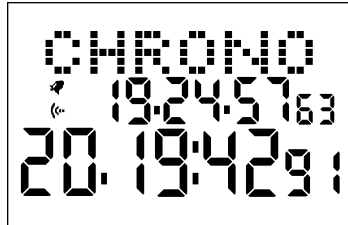
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4. Chronograph

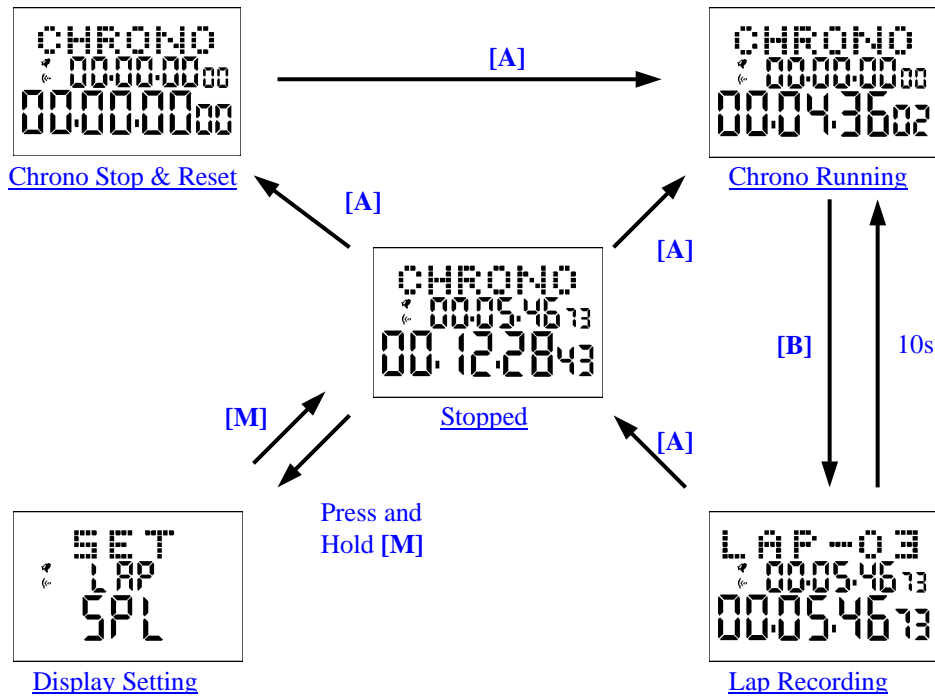
4.1 Normal Display



Example:

- Lap time: 19 hours 24 minutes 57.63 seconds
- Chrono time: 20 hours 19 minutes 42.91 seconds

4.2 Function Flow



4.3 Button

- a) Press [A] key to start / stop the chronograph



The Maximum value of chrono is 23 Hours 59 Minutes 59.99 Seconds.
Chrono will be stopped when reach the maximum value.



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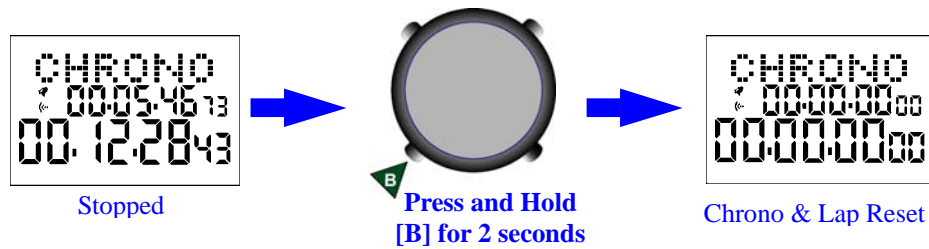
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- b) Press [B] to take Lap Record when Chrono is running.

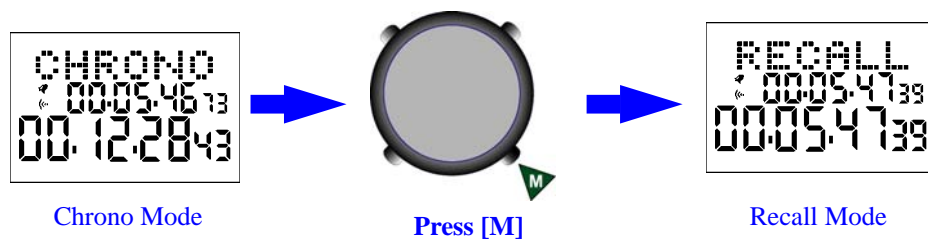


Maximum number of Lap Record is 100, from Lap-00 to Lap-99. Maximum value of Lap is 23 Hours 59 Minutes 59.99 Seconds.

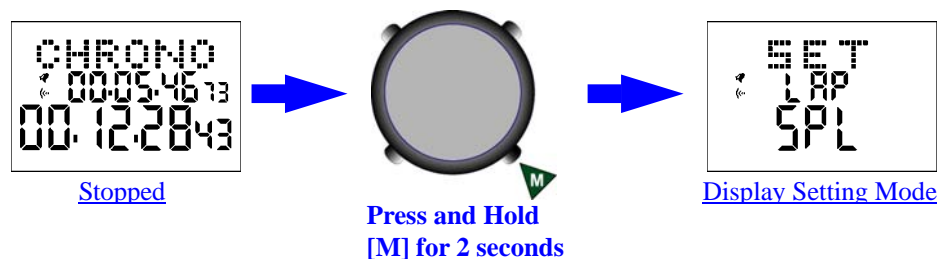
- c) Press and Hold [B] for 2 seconds to reset chrono and Lap value when chrono is stopped.



- d) Press [M] to change to Lap Recall Mode



- e) Press and Hold [M] for 2 seconds to enter Chrono Display Setting Mode.





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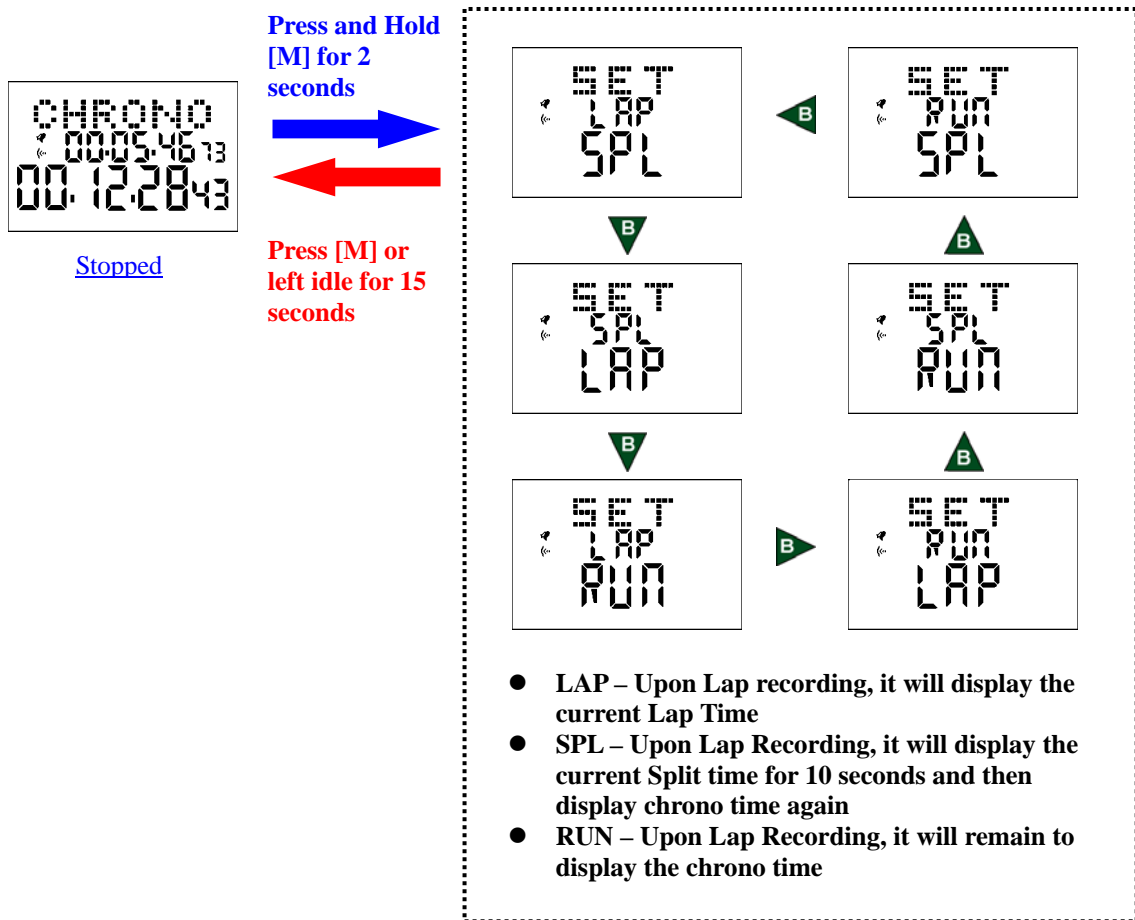
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TEL: (852) 2648 6862 FAX: (852) 2637 3691 URL: <http://www.hico.com.hk> EMAIL: enquiry@hico.com.hk
香港新界沙田小瀝源安耀街三號匯達大廈二十二樓

100-Lap Sport Watch (HCS-T021-1)

4.4 Chronograph Display Setting Mode

Press and Hold [M] key for 2 seconds to enter setting mode. Press [A] to select the display format.

Enter into display setting mode, press [B] to select the display format for lap recording.



Chronograph Display Setting Mode



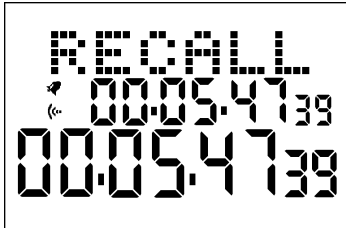
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100-Lap Sport Watch (HCS-T021-1)

5. Recall Mode

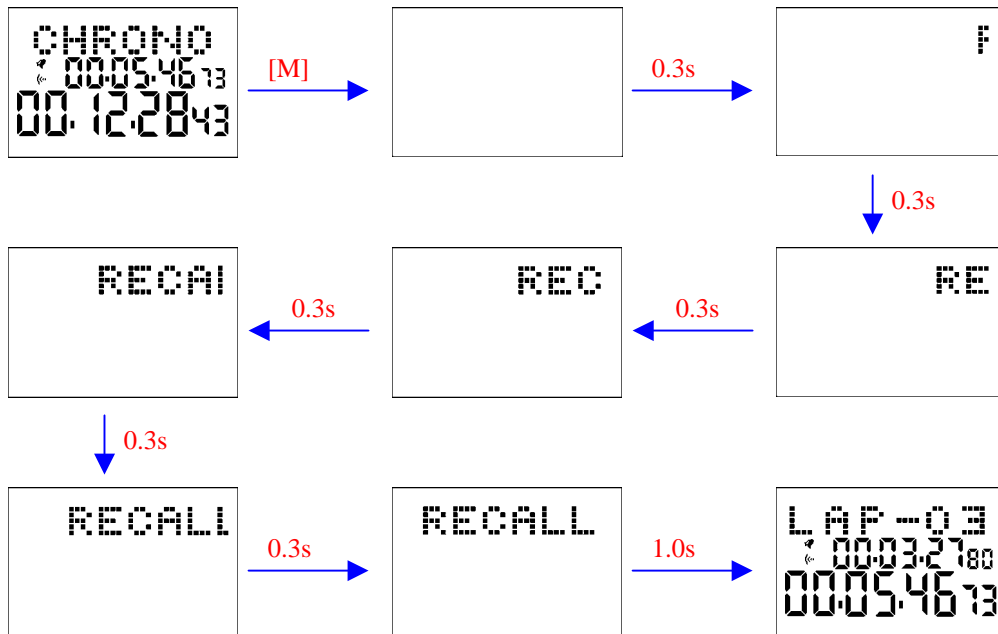
5.1 Normal Display



Example:

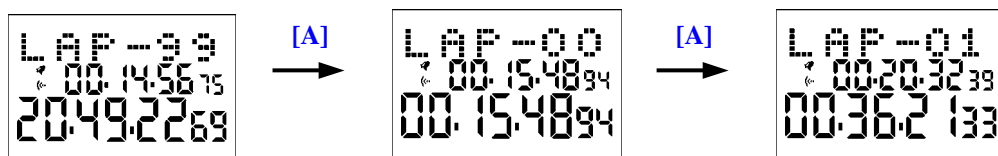
- Lap time : 5 minutes 47.39 seconds
- Split time : 5 minutes 47.39 seconds

- Upon entry Recall Mode, the assigned name will be displayed according to the following sequences.



5.2 Button

- a) Press [A] for next lap record





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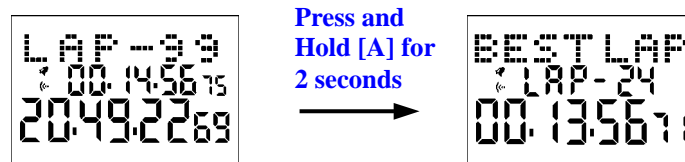
22/F., DELTA HOUSE, 3 ON YIU STREET, SIU LEK YUEN, SHATIN, N.T., HONG KONG.
TEL: (852) 2648 6862 FAX: (852) 2637 3691 URL: <http://www.hico.com.hk> EMAIL: enquiry@hico.com.hk
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100-Lap Sport Watch (HCS-T021-1)

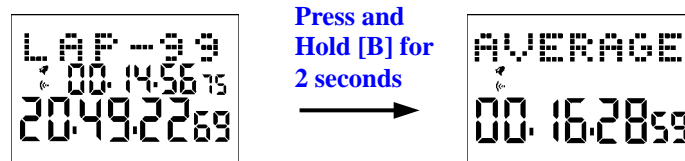
b) Press [B] key for last lap record



c) Press and Hold [A] for 2 seconds to display Best Lap time and Lap number.

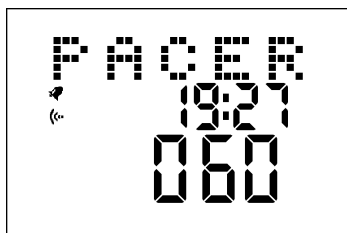


d) Press and Hold [B] key for 2 seconds to display Average Lap time.



6. Pacer Mode

6.1 Normal Display

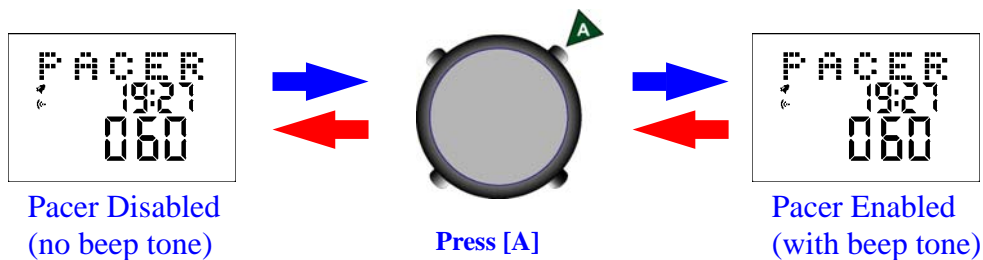


Example:

- Real Time : 19:27
- Pacer value : 060

6.2 Button

a) Press [A] key to Enable / Disable pacer



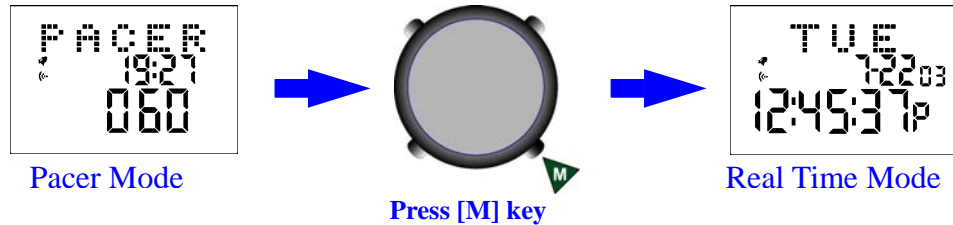


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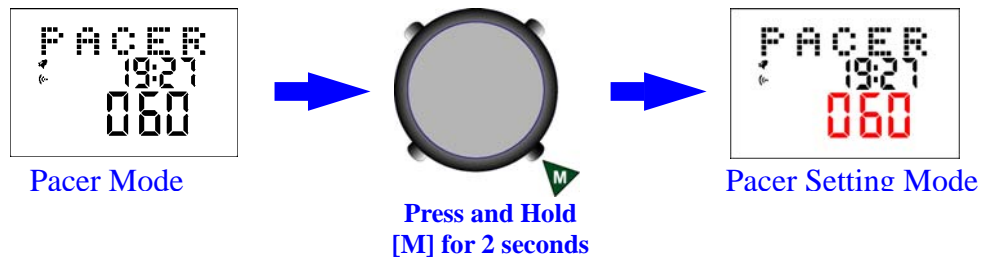
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100-Lap Sport Watch (HCS-T021-1)

b) Press [M] key to change to Real Time Mode



c) Press and hold [M] key to enter Pacer Setting Mode.



6.3 Adjust the Pacer

Pacer Mode

Press [M] or left idle for 15 seconds → Press and Hold [M] for 2 seconds → Pacer Setting Mode

Pacer value = 180 Pacer value = 60 Pacer value = 61

- Press [A] to increase the pacer value (digit in RED) in single step.
- Press [B] to decrease the pacer value in single step.
- Press and hold [A] for 2 second to increase the value at 5 steps per second until [A] is released.
- Press and hold [B] for 2 second to decrease the value at 5 steps per second until [A] is released.
- Maximum value of pacer is 180

Pacer Setting Mode