

TIME MACHINE

USER MANUAL

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TIME MACHINE

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Introduction

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The TIME MACHINE is the latest entry into the printing timer market. It was designed by engineers working at the upper end of technology and incorporates the most current available knowledge. The TIME MACHINE was developed by a runner who has been scoring road races for many years and knows first hand what is needed when timing a race. It was designed to be extremely flexible allowing it to be used for virtually any kind of race or event imaginable. Although very powerful and versatile, it is also extremely easy to use. With its 32-character menu driven LCD display, a new user can quickly master the keystrokes required for his or her timing needs.

The TIME MACHINE utilizes precision timing circuitry and is controlled by a high performance microprocessor unit accessing up to 128,000 bytes of memory. It is compatible with, and will drive other race clocks or scoreboards, and can be synchronized to other TIME MACHINES.

Please take the time to read the DESCRIPTION OF FEATURES section of this manual in order to familiarize yourself with the TIME MACHINE. Also, please read the WARRANTY STATEMENT and send in the product registration form located at the end of this manual.

DESCRIPTION OF FEATURES

FUNCTION KEY LOCKOUT

When the internal time clock is running, the functional keys, such as SET UP, RECALL, MEM, etc., are locked out. This means that an operation normally performed when pressing one of these keys, is inhibited. These keys may be unlocked however, by pressing the CLEAR key just prior to pressing the desired functional key. If a functional key is pressed within two seconds after the CLEAR key is pressed, it will be activated.

The functional keys are locked out when the time clock is running in order to prevent the operator from pressing the wrong key while performing the select-timing operation. If the operator was to accidentally press a function key while inputting a RACE#, then some undesirable consequences may result (such as changing a setup parameter).

The unlock capability is provided so that there are no restrictions on the TIME MACHINE's usage no matter what task it happens to be performing, even during a race. This means that operations such as reprinting results from another race, searching for a specific select-time in memory, retransmitting data, or anything else the TIME MACHINE does, may be performed even while your finish line people are clocking runners across the finish line during a race.

INTERNAL TIME CLOCK

The TIME MACHINE's internal time clock is based on an independent, high precision, quartz crystal controlled, oscillator circuit. The time clock may be preset to any value from 00:00:00 to 31:59:59 in the Cross-Country mode, and up to 7:59:59 in the lap timing mode. The time clock may be set to count up or count down and is controlled directly by the operator from the keyboard or indirectly over the RS232 port by a host computer.

In the lap timing mode there are actually eleven internal timers. One of them is used as the "split-time" timer which may be controlled directly from the keyboard (or RS232 port) using the normal time clock operations. The ten other timers are individual "lap-time" timers. Each of these lap-time timers are dedicated to the ten individual lane inputs and are independent with respect to each other. The lap-time timers run while the main split-time timer is running, and are used to record the individual lap times into memory. When one of the grip switches is pressed during a race, the split-time timer along with the lap-time timer (for that particular lane) are read and their values are stored in memory. The lap-time timer is then reset to zero in order that the timing of a new lap may begin.

Since each lap-time timer is reset whenever its corresponding grip switch is pressed, they could be used in an application that requires multiple independent timers such as staggered starting up to ten competitors. It should be noted however, that the lap-time timers are limited to a maximum time of 31:59.99 and the split-time timer is limited to 7:59:59.99.

OPERATING MODES

The TIME MACHINE has three modes of operation: Cross-Country, Lap-Timing, and Lap-Training. The current mode, that your machine is set to, may be displayed by selecting the "Timing Mode" item from the "Setup Parameters" menu. This is accomplished by repeatedly pressing the SETUP key until the [TIMING MODE] item is displayed and then press ENTER. The mode may be changed by pressing the SETUP key until the desired mode is displayed, and then press ENTER again.

The Cross-Country mode is used for timing races involving a large number of competitors where over 8000 individual finish times from up to 10 chutes may be recorded and processed. Times are entered by pressing either a grip switch button or the ENTER key while the time clock is running. The "grip switch" entries are for clocking competitors across the finish lines. The "ENTER-key" entries may be used for times associated with the "base-unit". The base-unit is actually an 11th timer input. It is normally used for inputting "select times" (refer to the SELECT TIMING feature description). Since the keyboard is used for this "11th timer" input, it is referred to as the "base-unit". The chute number associated with the base-unit is factory set to #11, while the other chute numbers are set to 1 through 10. All of these chute numbers may be programmed to any value between 1 and 99 (refer to the PROGRAMMABLE LANE NUMBERS feature description). Times entered into memory, while in the Cross-Country mode, are separated from times stored while in one of the Lap-Time modes. Therefore all data that is recalled, printed, or transmitted to a host computer, while in the Cross-Country mode, will consist of only Cross-Country data, even if there is lap-mode data with the same event# stored in memory.

The Lap-Timing mode is used for events requiring intermediate split times and lap times to be recorded, such as swimming events. In the Lap-Timing mode the base-unit is considered the same as lane #1, since there is no "select timing" function when in this mode. Therefore pressing the grip switch button for lane #1 or pressing the ENTER key, while the time clock is running, will accomplish the same results. The lane numbers are factory set to 1 through 10 and they may be programmed to any value between 1 and 99 (refer to the PROGRAMMABLE LANE NUMBERS feature description). The print formats and some of the menu items are different when in the Lap-Timing mode as opposed to the Cross-Country mode. For example, lane #'s are referred to as chute #'s in the Cross-Country mode, and in the Lap-Timing mode you have the option of displaying either split-times or lap-times on the LCD.

The Lap-Training mode is identical to the Lap-Timing mode with the exception that the keyboard may be used to "clock-in" competitor times instead of using the grip switches. This allows the trainer to easily record athlete times on any of the 10 lanes without having to use a single grip switch. The trainer can simply press one of the numeric keys corresponding to a lane# in order to "clock-in" an athletes time. This method of timing is particularly useful during athlete training sessions. All of the grip switch inputs are still active when in this mode.

EVENTS

Times stored in memory are organized by event number. The current event# that your machine is set to may be displayed by selecting the "Event Number" item from the "Setup Parameters" menu. This is accomplished by pressing the SETUP key until the [EVENT NUMBER] item is displayed and then press ENTER. The event# may be changed by entering a new event# and then press ENTER again. A complete list of all events stored in memory may be displayed or printed by accessing the Recall menu (refer to the RECALLING DATA feature

description). Each event consists of a set of data (times) that were entered for a particular race. Event numbers allow the user to store data for up to as many as 510 different races in memory (255 in the Cross-Country mode and 255 in the Lap-timing mode). An event# may then be used to specify which race data is to be recalled or retransmitted later on. Whenever a new race is to be started, the event# should be changed so that the data from two separate races will not get merged together. When the TIME MACHINE is initially turned on, a warning will be issued if there is data in memory that contains the same event# that the machine is currently set to.

SELECT TIMING

One of the most powerful features of the TIME MACHINE, when used in the Cross-Country mode, is the Select-timing feature. Select-timing allows the operator to attach a competitors RACE# (or BIB#) to his or her finish time. For a small race, where competitors have enough separation at the finish line, select-timing may be performed on all finishers. For a large race, select-timing is used as a powerful tool to reconcile any discrepancies that may occur due to misalignment of the competitors' times (clocked by the TIME MACHINE) with the competitors' BIB#'s (manually recorded).

Two different methods are available for recording select-times, depending on the user's application. These methods differ in the way in which a select-time is "clocked-in".

The first method uses the ENTER key as a "trigger" input for select-times. This is the most commonly used method of select timing for road running events. When set up for this method, the operator simply enters a competitors RACE# from the keyboard, and then presses the ENTER key when he or she crosses the finish line. The TIME MACHINE automatically stores the RACE#, competitors time, chute#, overall finish place, and place-in-lane in memory. If the printer is on, then these results get printed out immediately. If the printer is not on, the results are available for reprinting (or retransmitting to a computer) at some other time.

The second method uses a grip switch as a "trigger" input for select-times. This method should be used if the operator wants to "arm" the TIME MACHINE with a RACE# using the keyboard, and then "clock" the competitor across the finish line using a grip switch. This allows the select-time to be triggered by a finish line person who may be located far away from the TIME MACHINE. An example of this type of application would be for a downhill ski race. The competitors RACE# could be keyed-in prior to (or after) starting the time clock. The TIME MACHINE may be located in a covered area at the top of the hill and have a grip switch connected to it that is routed all the way to the finish line. When the competitor crosses the finish line, the grip switch is pressed by the finish line person, and the TIME MACHINE records all of the data. The input port used for the select-time grip switch is the "START IN/LANE 1" port. Since this port may be used for starting the time clock, a splitter could be used to connect two grip switches to it. One grip switch would be used for starting, the other would be used for the finish.

The select-timing method is configured by accessing the SET UP menu. This is done by pressing the SET UP key until the "[SLCT TME-TRIGR]" menu item is displayed and then press the ENTER key. The display will then read "Select-Time Trigr Input: [KEYBRD]" (or [GRIP SW] depending on the current configuration). Select the option you want by pressing the SET UP key, then press ENTER (refer to the SELECT TIME TRIGGER setup in the Operating Instructions chapter). The factory setting for select-timing is that of the first method described above, which uses the ENTER key as the select-time trigger input. This setup, as with all of the TIME MACHINE setups, will be permanently stored until changed by the user.

Another option available when performing select-timing, is the use of Place Numbers. In many applications, such as small races, it is desirable to have place numbers associated with the select-times. For large races, where the select-times are used to reconcile problems due to misalignment, place numbers may not be needed. Therefore, the TIME MACHINE allows you to set it up either way. Enabling or disabling place numbers for select-times can be accomplished by accessing the SET UP menu. This is done by pressing the SET UP key until the "[PLACE NUMBER]" menu item is displayed and then press the ENTER key. The display will then read "Allow Base-Unit Place#'s [NO]" (or [YES] depending on the current configuration). Select the option you want by pressing the SET UP key, then press ENTER (refer to the Operating Instructions chapter). The factory setting for this option is **not to allow place numbers for the base-unit**. Therefore, if you want to have place numbers associated with select-times, you will have to change this setup parameter. This setup will be permanently stored until changed by the user.

Note that the select-timing function is performed from the "base-unit". We refer to it as the "base-unit" because the TIME MACHINE's keyboard is used as the input device for entering select-time data. This means that even if a race# (or BIB#) is not entered, but the ENTER key is pressed, a time will be recorded with the base-unit's chute#, and it may or may not have a place number depending how the PLACE NUMBER option was set up.

PROGRAMMABLE LANE NUMBERS

All of the input lane numbers (or chute numbers for Cross-Country mode) of the TIME MACHINE are programmable. This means that any of the lane numbers may be changed to a value between 1 and 99. The TIME MACHINE will store in memory, print, and transmit its data organized by the lane numbers that have been programmed. The lane numbers are set at the factory to be 1 through 11 (1 through 10 for lap-timing mode) and may easily be changed by the user. This capability offers the user a great deal of flexibility in setting up the TIME MACHINE for different applications. For example, each lane could be programmed with a competitor's RACE# allowing each lane input to be dedicated to one competitor. This may be quite useful in timing a stock car race with the TIME MACHINE in the lap-timing mode.

The lane numbers are programmed by using the grip switches to identify the lane that is to be programmed. To program a lane number, simply access the "[MULTILANE]" option from the LANE# menu, input the desired number, and press the ENTER key (refer to the CHUTE NUMBER setup in the Operating Instructions).

It should be noted that if the chute numbers are reprogrammed while in the Cross-Country mode, the lane numbers will also reflect the same programmed values when the machine is put in one of the Lap-Timing modes.

MEMORY

The TIME MACHINE contains enough memory to store over 8000 times along with all of the related pertinent information such as race#'s, event#'s, lane#'s, setup parameters, etc. This memory is nonvolatile, which means that the stored information will not be lost when the machine is turned off or even if the battery becomes completely discharged.

The nonvolatile capability is provided by two backup circuits. One circuit uses the 6-volt main battery to supply power to the memory when the power switch is off. If the main battery drops below 3 volts while the power is off, then the second backup circuit takes over. This circuit uses a 3-volt lithium battery to supply the memory. The power drain from the memory is so low that retention of data can be maintained for approximately 10 years with backup supplied by the lithium battery.

The amount of memory used and the amount available can be displayed by pressing the MEM key. This shows how many times have been entered and how many more times may be entered. When the number of available times become 50 or less, a warning message is asserted to inform the operator that the memory is "almost full". If the available times become zero, then another warning is issued to indicate this condition. Even if the memory becomes full, the TIME MACHINE can still print the times and transmit them over the RS232 data link. This is because a small amount of memory is reserved to provide a "memory full buffer". Assuming the printer is "caught up" with the times being input, the buffer will allow about 50 more times to be input ahead of the printer. In other words, as long as the printer doesn't get "behind" by more than 50 times, then all of the times will get printed, even though the memory is full. If the memory isn't full, the printer will be able to print all of the times that have been entered, no matter how far behind the printer becomes. If the memory becomes full and the printer is turned off, the RS232 port will continue to transmit all of the times that are entered.

A special method is used for clearing out the memory. This method is designed to avoid the accidental "clearing" of your stored data. Clearing of the memory is initiated by pressing and holding down the MEM key, and then pressing the CLEAR key. This will cause the TIME MACHINE to assert the message: "Clear All Of The Memory ? [NO]". Pressing the MEM key again will cause the "[YES]" option to be displayed. Finally, pressing ENTER with the "[YES]" option displayed, will cause all of the data in memory to be cleared. Please note that this does not affect any of the stored setups. Only the times that were entered are cleared.

PRINTOUT OPTIONS

The TIME MACHINE provides a hardcopy of the race results on its 28 column, thermal printer and will print approximately 6,400 lines per roll of thermal paper. If the printer is turned on, the results are printed as the competitors are "clocked" at the finish line. If the printer is turned off, the results will be printed when it is turned back on again. As long as the time clock is running, the results will "stack up" in the printer buffer and wait to be printed. The printer buffer is reset when the time clock is stopped, however the race data may be reprinted at any time since it is saved in memory (refer to the RECALLING DATA feature description).

Several different printout formats are available depending on the mode the TIME MACHINE is in as well as what printout option the operator has chosen. In the Cross-Country mode, the operator has three choices of printout when the time clock is running. They are Place-In-Lane, Overall Place, or Single Chute, and are user selectable from the Setup menu. The single chute option allows the operator to specify data to be printed for only one of the chutes during a race, even though other chutes may be active at the same time. The other two printout options cause the printer to print data for all of the active chutes. The difference between them is that one includes the overall place numbers, and the other includes the place-in-lane numbers. Both types of place numbers cannot be printed at the same time because of the printer's width limitation.

The printout option for the Cross-Country mode can be changed by accessing the SET UP menu. This is done by pressing the SET UP key until the "[PRNTOUT OPTION]" menu item is displayed and then pressing the ENTER key. The display will then read "Printout Options [OVERALL PLACE]" (or [PLACE-IN-LANE], or

[SINGLE CHUTE] depending on the current configuration). Select the option you want by pressing the SET UP key, then press ENTER (refer to the Operating Instructions chapter). The factory setting for this option is to print overall place numbers. Therefore, if you want a different printout, you will have to change this setup parameter. This setup will be permanently stored until changed by the user.

Many other printout formats are provided when performing "recall" functions or when operating in the lap-timing mode.

RECALLING DATA

With the TIME MACHINE you have the ability to recall any of your stored race data in several different ways. You can also perform data searches for specific times or specific race#s (BIB#s). If the printer is on, all of the recalled data will be printed. Through the use of the "recall" menus, you can recall data in either time-order, chute#-order, or race#-order. You can also recall events stored to get a summary of all the data that has been entered into memory. The "recall events" operation will provide you with a complete list of event numbers, number of times per event, and mode of event.

Since the data is organized in memory by event# and chute#, the stored data can be recalled selectively. This means that times may be recalled from a particular event, a particular chute (or lane), all chutes in a given event, all events from a given chute, or all times from all events. The user can specify where the data is to be recalled from by setting up the "recall area". The recall area consists of a chute# (or lane#) and event# that the data is to be recalled from. The recall event# can be set to either "all" or to some value between 1 and 255. The recall chute# can also be set to "all" or to some value between 1 and 99. For example, if the recall event# is set to 25 and the recall chute# is set to "all", then when data is recalled it will consist of times from all chute entries in event# 25.

If times are being recalled in time-order or chute#-order, a "Time Search" may be performed. This is done by simply pressing the numeric keys to input the desired search-time, and then press the ENTER key. The TIME MACHINE will scan through the portion of memory specified by the "recall-area", and attempt to find a matching time. If found, the data for that time will be displayed and printed (assuming the printer is on). If not found, the next closest time following the search-time will be displayed and printed. The recalled data following this will consist of times that occurred "after" the search-time. Refer to "RECALL TIMES STARTING AT A GIVEN TIME" in the Operating Instructions chapter.

If times are being recalled in race#-order, a "Race# Search" may be performed. This is done by simply pressing the numeric keys to input the desired search-race#, and then press the ENTER key. The TIME MACHINE will scan through the portion of memory specified by the "recall-area", and attempt to find a matching race# (BIB#). If found, the data for that race# will be displayed and printed (assuming the printer is on). If not found, a message will be asserted stating that the race# couldn't be found in that recall-area. The recalled data following this will consist of times containing the sequential race#'s that occur "after" the search-race#. Refer to "RECALL THE TIMES OF A SPECIFIC BIB#" in the Operating Instructions chapter.

If the printer is on, when the recall operation is being performed, the user may specify that the data be printed continuously without having to repeatedly press the ENTER key. This is accomplished by turning "data-scrolling" on. If data-scrolling is not on, then the ENTER key will have to be pressed each time the data is to be printed. If the printer is off, the ENTER key must be pressed each time the data is to be recalled, regardless of the data-scrolling setting.

Selecting the recall order, setting data-scrolling, and setting the recall area are all accomplished by pressing the RECALL key and choosing the desired "recall" menu items (refer to the Operating Instructions chapter). Once the recall area and data-scrolling options are set, they are permanently stored in memory. There is one exception to this however: if the current event number is changed, the value of the recall event# is automatically changed to reflect the new event number. This is done to simplify the recall operation by not requiring you to change the recall area each time the event number is changed.

Recalling of data may be performed even during a race while the time clock is running (refer to the FUNCTION KEY LOCKOUT feature description). If the printer is on, the normal "real time" printout will simply be suspended during the recall operation. After the recalling of data is finished, the "real time" printout will resume where it left off.

COMPUTER INTERFACE

The TIME MACHINE provides a standard RS232 serial data link for interfacing to your host computer. The data is in standard ASCII coded format making it easy to write software for. When the time clock is running, data is normally transmitted out the RS232 port whenever a time is clocked into memory (provided it is not being suspended by the handshake line or an XOFF command). Data may also be "retransmitted" by manually commanding it from the keyboard or by sending remote commands over the RS232 data link.

The RS232 port operations are very flexible, giving you complete control over the line settings, retransmission of data, and remote control of the TIME MACHINE. A status window is also provided allowing you to monitor the transfer of data, flow control, and handshake line while data is being transmitted to your host computer.

The line settings are completely programmable allowing the user to specify the baud rate, parity, number of data bits, handshake line (data terminal ready), and even set a time-out for the XOFF flow control character. Available baud rates are 1200, 2400, 4800, and 9600 bits/sec. The number of data bits can be 7 or 8. The handshake line can be enabled or disabled, depending on whether it is needed by your race scoring software (required by RUNSCORE). The XOFF time-out may be necessary if the TIME MACHINE "hangs up" waiting for a XON character from your host computer. If this happens a time-out period can be set to force the TIME MACHINE to continue transmitting after the time-out has expired. The TIME MACHINE is shipped from the factory with the XOFF time-out inactive. The user can easily activate it by accessing the RS232 Line Setup menu (refer to the Operating Instructions chapter).

Retransmission of data can be initiated manually from the keyboard or by your host computer over the RS232 line. The event# and chute# (or lane#) from which the data is to be transmitted, as well as an initial starting time, can be specified. The user can specify where the data is to be transmitted from by setting up the "retransmit area". The retransmit area consists of a chute# (or lane#) and event# that the data is to be transmitted from. The retransmit event# can be set to either "all" or to some value between 1 and 255. The retransmit

chute# can also be set to "all" or to some value between 1 and 99. For example, if the retransmit event# is set to 25 and the retransmit chute# is set to "all", then when data is retransmitted it will consist of times from all chute entries in event# 25. If an initial time is specified, then data will be transmitted for only the times that occurred "after" the initial time. When initiated from the keyboard, the user may also specify a beginning place# with which to begin retransmission of data (refer to the Operating Instructions chapter). Once the recall area is set, it is permanently stored in memory. There is one exception to this however: **if the current event number is changed, the value of the retransmit event# is automatically changed to reflect the new event number.** This is done to simplify the retransmit operation by not requiring you to change the retransmit area each time the event number is changed.

Remote control of the TIME MACHINE is a very powerful RS232 port feature. Several commands may be sent over the RS232 port giving you the ability to control many of the TIME MACHINE functions with your host computer. These commands allow you to:

1. Set the time clock to an initial value
2. Start the time clock counting up
3. Start the time clock counting down
4. Stop the time clock
5. Retransmit data
6. Specify retransmit area
7. Specify an initial retransmit time
8. Halt retransmission of data
9. Set current event number
10. Control flow of transmission (XOFF/XON).

Refer to the REMOTE CONTROL OF THE TIME MACHINE section for a detailed description of these commands.

DISPLAY CLOCK INTERFACE

The TIME MACHINE provides an interface which allows it to control an external display clock. The output data is in ASCII code and is formatted to interface directly with a Chronomix CC2000 series time clock. The TIME MACHINE only needs to be connected to the display clock for a few seconds for it to synchronize the clock. After this, it may be disconnected and they will run synchronously to within approximately 1/100th of a second. Refer to the TIME MACHINE Data Formats chapter for a complete description of the data format and refer to Appendix B for a diagram of the TIME MACHINE and the CC2000 signal configurations.

It should be noted that the baud rate needs to be set to 9600 bits/sec in order to control the CC2000 display clock.

SYNCHRONIZING MULTIPLE TIMERS

Another very powerful and unique feature of the TIME MACHINE is its ability to synchronize multiple timers. This capability allows the user to easily add more timers to a race by synchronizing them up to any timer that is already being used for the race. For example, suppose a large race is being timed and one of the TIME MACHINES being used for the race issues the warning message "Memory Is Almost Full". The race director could simply synchronize another "spare" TIME MACHINE to the one that is almost full, then remove the first one from the race and replace it with the spare. The results from the first machine can be retransmitted or reprinted at some later time. This feature gives any user the ability to build an unlimited expandable timing system.

Several "slave" TIME MACHINES can be synchronized to a single "master" TIME MACHINE at the same time by using a multiple phone cable connector (available at many hardware stores). However, it is much easier to simply synchronize each one separately. This is done by connecting each slave timer up to the master timer just long enough for the slave timer to get synchronized, and then disconnect it. It only takes a few seconds to synchronize and it doesn't matter what the time clock of the slave timer was set to or if it was counting up or down. The only requirement is that the RS232 line settings are the same. The connection for synchronization is a standard phone cable between the CLOCK port of the master timer and the RS232 port of the slave timer (refer to the Operating Instructions chapter). It should be noted that if the timers are connected this way, the slave timer will be controlled by the master timer. This means that if the master's time clock is set to some value, started, or stopped, the slave's time clock will also reflect this.

Another way of synchronizing several TIME MACHINES is to start all of their time clocks simultaneously. This can be done by connecting the START OUT port of one timer to the START IN port of another timer (refer to the Operating Instructions chapter). The second timer could also be connected to a third timer and the third to a fourth and so on. When the first timer is started, all of the other connected timers will be started at the same time. The first timer could be started from the keyboard, by a grip switch (connected to its START IN port), or by an RS232 command from a host computer.

POWER SYSTEM

The TIME MACHINE is powered by a rechargeable 6-volt, 1.2-amp hour sealed lead acid battery. To insure data integrity, it uses a 3-volt lithium battery to support a redundant memory backup circuit (refer to the MEMORY feature description). A regulated battery charging circuit is also built in. This charging circuit automatically protects the battery from overcharge as well as provides a charge indicator light for the user. The charge indicator light tells the user when the battery is fully charged. It can also indicate problems such as a bad battery, a bad charger, or a problem with the internal charging circuit.

The charge indicator light is normally orange in color while the battery is being charged and it turns green when the battery becomes fully charged. If the indicator light stays green and does not turn orange when the charger is plugged in (even though the battery is low), then most likely the 6-volt battery is bad. This is due to the fact that the indicator light will always be orange when electrical current is being drawn from the charger. If the battery is bad, it will not accept a charge and therefore no current will be drawn from the charger, causing the light to be green. It should be noted that this assumes that the TIME MACHINE's power switch is off. If the power switch is on, the TIME MACHINE's circuitry will also draw current from the charger causing the indicator light to glow orange. If the indicator light does not come on at all when the charger is plugged in,

then either the charger is not getting power, the charger is bad or the charging circuit has failed. In this case, you should first make sure that the charger is getting power from the outlet being used. If it is, then Flying Feet Computers should be contacted for advice on repair.

The TIME MACHINE may be charged with either its power switched on or off. It is perfectly OK to operate the TIME MACHINE indefinitely with the charger plugged in. The only drawback to having the timer on when charging, is that it will take longer to obtain a full charge. When fully charged, the TIME MACHINE should run between 7 and 15 hours (depending on the printer usage) before it needs to be charged again.

The TIME MACHINE gives you the ability to check battery level using the LCD display. This is done by selecting the [CHECK BATTERY] option in the Setup menu (refer to the Operating Instructions chapter). A "panel meter" type display shows a "volt scale" on the top line with an arrow pointing to the battery's level on the bottom line. The top line is numbered from 1 to 6 which correspond to an actual voltage range of from 5.0 to 6.0 volts. When a low voltage condition exists, the arrow will blink on and off. Also, a warning signal and message occur about once per minute when the battery level becomes low. If the battery becomes critically low, the printer will automatically be disabled. This is a power saving feature to give the user plenty of time to respond to the low battery situation.

The lifetime of the 6-volt rechargeable battery is typically eight years depending on how many "charge cycles" it receives. It can be charged approximately 2000 times before losing about 30% of its capacity.

A 115 VAC to 9 VDC adapter is provided with the TIME MACHINE for charging its battery, however any 9-volt to 15-volt AC or DC adapter capable of at least 200ma of current will also work. The polarity of the charger connector does not matter. The TIME MACHINE may also be charged from a 12-volt DC automotive battery adapter.

AUTOMATIC SELF TESTS

Each time the power is turned on, the TIME MACHINE executes a series of "self tests". Several of the critical internal circuits are checked along with the memory. If any of the self tests fail, a warning message is asserted to indicate the problem. The TIME MACHINE also automatically performs several other checks continuously during its normal operation. If any problem is detected or if an operator error is detected, a warning message will be asserted. The warning message is usually accompanied by a tone burst, which is designed to get the operator's attention in case he or she did not notice the display.

A complete list of the status and warning messages is provided at the end of this manual (refer to Appendix F, WARNING MESSAGES.) Included in this list is a short description of each message along with a suggested action that may be taken in order to correct the problem.

INCLUDED AS STANDARD EQUIPMENT

- One TIME MACHINE with capacity to store over 8000 times or select times.

- Two waterproof snap action grip switches
- One single lane grip switch adapter for lane #2
- One 25 pin RS232 adapter and cable for connecting The TIME MACHINE to your computer
- One 9 Pin RS232 adapter
- One battery charger
- Two rolls of paper for the printer
- A carrying case
- One plastic bag to use when it rains
- Instruction Manual
- One tree diagram for fast and easy use of The TIME MACHINE

OVERVIEW OF MENU OPERATIONS

Most of the TIME MACHINE functions are accessed through the use of "menu items" which are selected by the operator. When a function key is pressed, the LCD display typically shows a "menu heading" on the top line and a "menu item" on the bottom line. Other menu items under that heading are displayed each time the function key is pressed.

The menu items wrap back around with continued pressing of the function key after all of them have been displayed. If a desired menu item is "passed up" because the function key was pressed too many times, you can "backstep" to it instead of stepping through all of the menu items again.

Backstepping is accomplished by pressing the zero key. It can be used to backstep through any of the menu items, independent of the function key you happen to be using.

Once a desired menu item has been displayed, it is then selected by pressing the ENTER key. Selecting a menu item will cause some function to be performed (such as changing timing mode) or it will present you with another menu level (such as RS232 Operations).

If another menu is presented, then the LCD will show a new menu heading along with a menu item in brackets. Menu item selection is then performed in the same manner as described above. The number of menu levels you must go through to perform a desired operation depends on the type of operation required. The TIME

MACHINE was designed to minimize the number of keystrokes required to do frequently used operations, such as setting the time clock. Other operations, such as enabling the RS232 handshake line, may require going through as many as 4 levels. Fortunately these "menu intensive" operations are stored in nonvolatile memory, so once they have been performed, it is not necessary to repeat the process.

If a menu level was selected by mistake, the operator can easily "escape out" by pressing the CLEAR key. This action will either bring you back to a higher menu level, or bring you back to the normal timeclock display (depending on which menu level you were at). Repeated pressing of the CLEAR key will always bring you back to the normal timeclock display. We encourage you to "step through" all of the various menu items and levels in order to become familiar with the many functions and capabilities of the TIME MACHINE. We have included a "tree diagram" with this manual to help you easily understand and use the TIME MACHINE.

OVERVIEW OF FUNCTION KEYS AND PORTS

POWER SWITCH - The power switch is located on the right side of the TIME MACHINE and is used to turn the power on and off. The memory is nonvolatile and is not affected by switching the power on or off.

PRINTER ON/OFF SWITCH - The Printer switch is used to turn the Printer on and off. The printer can be turned on at any time and will begin printing with the first time entered. If the paper needs to be changed, turn the printer off, change the paper, turn the printer on again, and the printer will resume printing where it left off. When the battery is low the TIME MACHINE slows the printer down and eventually stops printing to allow times to continue to be entered. Times can be printed after the battery is recharged.

PAPER ADV (PAPER ADVANCE KEY) - The Paper Advance key is used to feed paper through the printer. To facilitate paper changing, this key will work with the printer turned off.

PAPER COVER - The paper cover is removed by firmly squeezing the lower back of the cover toward the front and lifting. To insert the printer cover again place the front into the slot, squeeze the back of the cover and push down.

START TIME KEY - The Start Time key is used to start the timeclock at the preset time. The timeclock is stopped by holding the Start Time key down and then pushing the Clear key.

SET TIME KEY - The Set Time key is used to set the timeclock to any preset time. This key is also used to specify whether it is to count up or count down.

CLEAR KEY - The Clear key is used to abort any instruction shown on the display or to return to the normal timeclock display. It is also used in conjunction with the other keys for special functions, as well as "unlock" the function keys when the time clock is running.

LANE # KEY - The Lane # key is used to set the grip switches to a predetermined number. The lanes may be numbered from 1 to 99.

SET UP KEY - The Set Up key is used to set up any desired setting for the various functions. These functions include "Timing Mode", "Event Number", "Place Number", "Printout Options", "SelectTime Trigger", "Check Battery", and "RS232 Port". All set up functions can be accessed while the timeclock is running by first pressing the Clear Key and then the Set Up Key within 2 seconds.

RECALL KEY - The Recall Key is used to recall times, race numbers, times by Chute # and event information that has been stored in memory. The data may be continuously printed and shown on the display (Scrolling on), or it may be printed and shown on the display one item at a time (Scrolling off). The Recall key is also used to select which chute or event is to be displayed or printed. All the recall functions may be used while the timeclock is running, provided the clear key is pressed within 2 seconds prior to the Recall key.

MEM (MEMORY KEY) - The Memory key is used to display the number of data records used, the number of data records available, and to clear the memory. All the memory functions can be used while the timeclock is running, provided the clear key is pressed within 2 seconds prior to memory key.

"0" KEY - In addition to being used for numeric inputs, the 0 (zero) key is used to step backward through any of the menu items. The 0 key is also used to enter the word "ALL" when asked to enter a recall area or a retransmit area.

ENTER KEY - The Enter key is used to enter times and select times into memory. This key is also used to select any of the functions shown on the display.

START IN/LANE 1 PORT - This port is used to start the timeclock using either a grip switch or starting signal from another TIME MACHINE. After the timeclock has been started, this port can be used to time lane #1, using the grip switch.

RS232 PORT - This port is used to connect to a computer. It may also be used to synchronize the timeclock from another TIME MACHINE.

EXT CLOCK PORT (EXTERNAL CLOCK) - This port is used to connect to an external clock or another TIME MACHINE in order to synchronize the times.

MULTILANE CONNECTOR PORT - This port is used to connect up to 10 grip switches using the Multilane Interface Adapter to perform primary timing on 10 lanes plus select timing on one lane. This port is compatible with the Chronomix 737 multilane timing cables.

POWER IN PORT - This port is used to connect the 115VAC to 9VDC power supply to the TIME MACHINE in order to recharge its internal battery. It takes about 5 hours to fully charge the TIME MACHINE. The battery may be charged while operating the TIME MACHINE, however a longer time will be required to reach full charge (approx. 6 to 10 hrs depending on printer usage). No damage will result from "overcharging" the battery. This port may also be used to connect a 12VDC automotive battery adapter to charge or power a TIME MACHINE.

CHARGE INDICATOR LIGHT - This light is used to indicate when the battery is receiving a charge and when the battery has become fully charged. The charge indicator light is illuminated when the charger is plugged in. The light glows orange while the battery is being charged and turns green when the battery is completely charged.

TIME MACHINE

Operating Instructions

SET TIME CLOCK AT 0:00:00

1. Press SET TIME key. The display will show "Set Time Clock."
2. Press ENTER key. The display will show "Select Count Direction [UP]."
3. Press ENTER key if you want to count up.
4. Press SET TIME key if you want to count down. The display will show "Select Count Direction [DOWN]."
5. Press ENTER key if you want to count down.
6. Press START TIME key to start the clock.

SET TIME CLOCK AT A TIME OTHER THAN 0:00:00

1. Press SET TIME key. The display will show "Set Time Clock."
2. Enter the desired time. If an error is made, press the CLEAR key.
3. Press ENTER key. The display will show "Select Count Direction [UP]."
4. Press ENTER key if you want to count up.
5. Press SET TIME key if you want to count down. The display will show "Select Count Direction [DOWN]."
6. Press ENTER key if you want to count down.
7. Press START TIME key to start the clock.

STOP THE TIME CLOCK

Press the START TIME key and while holding it down, press the CLEAR key.

ENTER TIMES IN THE CROSS COUNTRY MODE

1. Start the time clock.
2. Press the ENTER key. Each time the ENTER key is pressed, a time is recorded.
3. If a push button is connected to the TIME MACHINE, then times can be entered by pushing the button.

4. If the printer is turned on, the times will be printed.

ENTER SELECT TIMES USING KEYBOARD (CROSS COUNTRY MODE ONLY)

(Note: Be sure the Select-Time Trigger input is set to "KEYBRD". See "TO CHANGE THE SELECT TIME TRIGGER".)

1. Start the time clock.
2. Enter the bib #. (If you have the alphanumeric version, you may enter a letter before the bib #.)
3. Press the ENTER key to enter the time.
4. If the printer is turned on, the chute #, bib # and times will be printed.]

ENTER SELECT TIMES USING A GRIP SWITCH (CROSS COUNTRY MODE ONLY)

(Note: Be sure the Select-Time Trigger input is set to "GRIPSW". See "TO CHANGE THE SELECT TIME TRIGGER".)

1. Start the time clock
2. Enter the bib #.
3. Press the ENTER key to enter the bib # and arm the TIME MACHINE.
4. Press the grip switch to enter the time into the memory. (Grip switch must be plugged into the Lane #1 port.)
5. If the printer is turned on, the chute #, bib #, and times will be printed.

ENTER TIMES IN LAP TIMING MODE

1. Start the time clock.
2. Connect the lane #1 grip switch, Lane #2 adapter grip switch, or the multilane adapter.
3. When a grip switch is pressed, a time is recorded for the Lane # corresponding to the grip switch that was pressed.
4. If the printer is turned on, the times will be printed.

ENTER LAP TRAINING TIMES (LAP TRAINING MODE ONLY)

1. Start the time clock.
2. Press any numeric key. (0 to 9, with 0 representing 10.) Each time a numeric key is pressed, a time is recorded for the Lane # corresponding to the number of that key.

ENTER NUMBERS WHEN TIME CLOCK IS STOPPED

Enter the number desired and press the ENTER key. Note: This may be desired for inputting bib #'s off a spindle to print out later or to transmit to a computer.

USE FUNCTION KEYS WHEN TIME CLOCK IS RUNNING

1. Press CLEAR key.
2. Within 2 seconds, press the key desired.
3. Press CLEAR key to resume normal entry of times and/or bib #'s.

ADJUST THE BRIGHTNESS OF THE LCD DISPLAY

Take the printer cover off and remove the paper. Using your thumb, rotate the small thumb wheel knob (located at the top left under the case lip) to the desired level.

RECALL TIMES IN TIME ORDER

1. Press the RECALL key until the display shows "Recall Times in [TIME ORDER]."
2. Press the ENTER key. The first time in the designated recall area will be displayed.
3. Press the ENTER key each time you want to display or print a time.
4. To print the times, turn the printer on.
5. To print all the times continuously, the scrolling of data must be set to "ON." (See "Scrolling of Data.")
6. If there are times entered but they cannot be recalled, check the recall area. (See "Change Recall Area.")

RECALL TIMES STARTING AT A GIVEN TIME

1. To recall times starting at a given time, follow the instructions as given above, and once you have begun to recall times, you may enter the time you want to start with. Times may be entered using hours, minutes, or seconds, but not hundredths of a second. After entering the time, press the ENTER key to display times beginning with the selected time.
2. If the exact time is not found, the TIME MACHINE will beep and display "TIME Not Found In Recall Area." The Next Closest Time Was: ". The next closest time will then be displayed.
3. If the printer is turned on, the data displayed will be printed.

RECALL TIMES IN BIB # ORDER

1. Press the RECALL key until the display shows "Recall Times in [RACE # ORDER]."
2. Press the ENTER key. The first time in the designated recall area will be displayed.
3. Press the ENTER key each time you want to display or print a time.
4. To print the times, turn the printer on.
5. To print all the times continuously, the scrolling of data must be set to "ON." (See "Scrolling of Data.")
6. If there are times entered but they cannot be recalled, check the recall area. (See "Change Recall Area.")

RECALL THE TIMES OF A SPECIFIC BIB

1. Follow directions #1 and #2 in "Recall Times in Bib # Order."
2. Enter the bib # you want, and press the ENTER key.
3. To print the time, turn the printer on.
4. Set the scrolling of data to "OFF" if you want to just print individual times.
5. Set the scrolling of data to "ON" if you want to print a continuous list of times starting at the designated bib #.

RECALL TIMES IN CHUTE # ORDER

1. Press the RECALL key until the display shows "Recall Times in [CHUTE # ORDER]."
2. Press the ENTER key. The first time of the first chute in the designated recall area will be displayed.
3. Press the ENTER key each time you want to display or print a time.
4. To print the times, turn the printer on.
5. To print all the times continuously, the scrolling of data must be set to "ON." (See "Scrolling of Data.")
6. If there are times entered but they cannot be recalled, check the recall area. (See "Change Recall Area.")

RECALL LAP ENTRIES

Follow instructions as given for other recall functions, but when in the lap mode, only lap entries will be recalled. On the first display of times, the display will show LANE #, EVENT #, LAP #, and the SPLIT TIME (which is also the lap time). On all the times thereafter, the display will show the LANE #, LAP #, LAP TIME and SPLIT TIME.

TO CHANGE SCROLLING OF DATA

This feature allows you to have the printer print continuously, or to print one item at a time.

1. Press the **RECALL** key until the display shows "Turn Scrolling of Data [ON] or [OFF]."
2. Press the **ENTER** key to activate.

TO DISPLAY THE RECALL AREA

1. Press the **RECALL** key until the display shows "DISPLAY THE RECALL AREA."
2. Press the **ENTER** key.
3. Press the **RECALL** key again if you want to change the recall area.

TO CHANGE THE RECALL AREA

1. Press the **RECALL** key until the display shows "Change Recall Area: [CHUTE #] or [EVENT #]."
2. Press the **ENTER** key. The display will show "Recall Data From Event #" or "Recall Data From Chute #."
3. Enter the number (0=all), and press the **ENTER** key.

TO CLEAR MEMORY

This will erase all numbers and times in memory.

1. While holding the **MEMORY** key down, press the **CLEAR** key. The display will show "Clear All Of The Memory? [NO]."
2. If you **DO NOT** want to clear the memory, press the **ENTER** key.
3. If you **WANT** to clear the memory, press the **MEMORY** key again. The display will show "Clear All Of The Memory? [YES]." Now press the **ENTER** key and the memory will be cleared.
4. To abort, press the **CLEAR** key.

TO LOOK AT AVAILABLE MEMORY

1. Press the **MEMORY** key. The display will show "# Entered = " and "Available = ."
2. Press the **CLEAR** or the **ENTER** key to continue.

TO LOOK AT NUMBER OF TIMES YOU HAVE ENTERED

1. Press the MEMORY key. The display will show "# Entered = " and "Available = ".
2. Press the CLEAR or the ENTER key to continue.

PRINTER

To start the printer, turn the PRINTER ON/OFF switch to PRINTER ON. Printer can be turned on or off at any time. It will always begin where it left off and it will print a new heading if you have not turned off the timeclock.

TO TAKE THE PRINTER PAPER COVER OFF

The paper cover is removed by firmly squeezing the lower back of the cover toward the front and lifting. To insert the printer cover again, place the front into the slot and push down.

CHUTE NUMBER

The LANE # key is used to recall chute numbers or to re-program the chute numbers. The Base Unit (used for select times) is factory set for chute #11. The other chute buttons are factory numbered 1 through 10. All chutes may be set to any number you choose between 1 and 99. If the Chute #'s are NOT set to factory default, the "Nd" indicator symbol is shown in the upper left corner when you press the Lane # key.

TO PROGRAM CHUTE #'S ON THE BASE UNIT

1. Press the LANE # key. The display will show "Program Chutes: [BASE UNIT]."
2. Press the ENTER key. The display will show "Base Unit = #11." Change it to → _____. To change the chute # for the base unit, enter the chute # and press the ENTER key. You may use any number for the chutes between 1 and 99.

TO PROGRAM CHUTE #'S ON THE OTHER 10 CHUTES

1. Press the LANE # key until it shows "Program Chutes: [MULTILANES]"
2. Press the ENTER key. The display will show "Switch [1] = #1. Change it to → _____. To change the chute # of any of the chute buttons, enter the new chute number and press the ENTER key. The display will show the new number entered while the ENTER key is held down. When the ENTER key is released, the next chute # is displayed.
3. To display any desired chute # setting, continue pressing the LANE # key until it is displayed. Use the "0" key to back step through these settings.

3. To see the number setting of a given chute button, press the selected chute button when the display shows "Push a Button or Enter Chute #." The number of that chute button will be displayed. To change it press the CLEAR key, enter the new chute # and press the selected chute button. If you do not want to change the chute number, press the selected chute button and the number will remain unchanged. You may use any chute number between 1 and 99.

TO RETURN TO DEFAULT CHUTE #

(DEFAULT IS THE FACTORY SET CHUTE #)

1. Press the LANE # key until the display shows "Program Chutes: [SET TO DEFAULT]."
2. Press the ENTER key to set to default. If you do not want to set to default, press either the CLEAR key or the LANE # key.
3. If any lane # is not at its default value, the indicator symbol "Nd" will be present in the upper left corner of the display when the Lane Key is initially pressed.

TO CHANGE TIMING MODES (CROSS COUNTRY & LAP TIME)

1. Press the SET UP key until the display shows "SET UP Parameter: [TIMING MODE]."
2. Press the ENTER key. The display will show what mode the TIME MACHINE is set to. If you do not want to change the mode, press either the CLEAR key or the ENTER key.
3. To change the mode, press the SET UP key until the display shows the mode you want. Press the ENTER key to enter that mode.

TO CHANGE THE DISPLAY WHEN IN THE LAP TIMING MODE

1. Press the SET UP key until the display shows "SET UP Parameter: [DISPLAY: ST/LT]." "ST" stands for Split Times and "LT" stands for Lap Times.
2. Press the ENTER key. The display will show "Type of Display: [LAP TIMES]" or "[SPLIT TIMES]" with the current setting being shown first. If you do not want to change the setting, press the ENTER key.
3. To change the display, press the SET UP key until the display shows the desired setting, then press the ENTER key.

TO CHANGE THE SELECT TIME TRIGGER

To allow Select Times to be entered from either the keyboard or a grip switch.

1. Press the SET UP key until the display shows "SET UP Parameter: [SLCT-TME TRIGR]."
2. Press the ENTER key. The display will show "Select-Time Trigr Input: [KEYBRD] or [GRIP SW]."

3. Press the SET UP key until the display shows the choice you want.
4. Press the ENTER key to enter your choice.

TO CHANGE AN EVENT NUMBER

(CAN STORE UP TO 255 SEPARATE EVENTS PER TIMING MODE)

1. Press the SET UP key until the display shows "SET UP Parameter: [EVENT NUMBER]."
2. Press the ENTER key. The display will show "EVENT # = 1 ENTER NEW #." The 1 is the event number currently entered.
3. To change the event #, enter the number desired and press the ENTER key. Note: The place number will be reset for the new event selected.
4. If you do not want to change the event #, press the CLEAR key or the ENTER key.
5. The current event # will be stored in memory until it is changed. The new Event # selected is automatically changed in both the recall area and the RS232 retransmit area.

TO LIST THE EVENTS STORED IN MEMORY

1. Press the Recall key until the display shows "RECALL EVENTS STORED IN MEMORY."
2. Press the ENTER key. The first event will be displayed showing the event number, the number of entries, and the mode.
3. Press the ENTER key each time for the additional events listed. If the printer is turned on a complete list will be printed.

TO ALLOW BASE UNIT PLACE #'S TO BE PRINTED OR TRANSMITTED OUT THE RS232 PORT

(CROSS COUNTRY MODE ONLY)

1. Press the SET UP key until the display shows "SET UP Parameter: [PLACE NUMBER]."
2. Press the ENTER key. The display will show "Allow Base-Unit Place #'s? [NO]." If you do not want the Base Unit place numbers to be printed or transmitted, press the Enter key.
3. To print or transmit Base Unit place numbers, press the SET UP key and the display will show "Allow Base-Unit Place #'s [YES]." Press the ENTER key.

PRINT PLACE-IN-LANE ON PRINTOUTS

1. Press the SET UP key until the display shows "SET UP Parameter: [PRINTOUT OPTIONS]."

2. Press the ENTER key.
3. Press the SET UP key until the display shows "Printout Option: [PLACE-IN-LANE]."
4. Press the ENTER key.

PRINT OVERALL PLACE ON PRINTOUTS

1. Press the SET UP key until the display shows "SET UP Parameter: [PRINTOUT OPTIONS]."
2. Press the ENTER key.
3. Press the SET UP key until the display shows "Printout Options: [OVERALL PLACE]."
4. Press the ENTER key.

PRINT SINGLE CHUTE ON PRINTOUTS

1. Press the SET UP key until the display shows "SET UP Parameter: [PRINTOUT OPTIONS]."
2. Press the ENTER key.
3. Press the SET UP key until the display shows "Printout Option: [SINGLE CHUTE]."
4. Press the ENTER key.

TO CHANGE THE RS232 LINE SET UP

1. Press the SET UP key until the display shows "SET UP Parameter: [RS232 PORT]." Press the ENTER key.
2. Press the SET UP key until the display shows "RS232 Operations [CHG LINE SET UP]." Press the ENTER key.
3. Press the SET UP key until the display shows the parameter to be changed. Press the ENTER key.
4. Press the SET UP key until the display shows the item or value you want. Press the ENTER key. Press the CLEAR key to continue.

TO ENABLE THE RS232 HANDSHAKE LINE

(REQUIRED BY SOME TIME SCORING PROGRAMS)

1. Press the set up key until the display shows "SET UP Parameter: [RS232 PORT]." Press the ENTER key.
2. Press the SET UP key until the display shows "RS232 Operations [CHG LINE SET UP]." Press the ENTER key.

3. Press the SET UP key until the display shows "RS232 Line SET UP [HANDSHAKE LINE]." Press the ENTER key.
4. Press the SET UP key until the display shows "[ENABLE] The Handshake Line." Press the ENTER key

TO RE-TRANSMIT DATA THROUGH RS232 PORT

1. Press the SET UP key until the display shows "SET UP Parameter: [RS232 PORT]." Press the ENTER key.
2. Press the SET UP key until the display shows "RS232 Operation [RE-XMIT DATA]."
3. Press the ENTER key. The display will show "Specify [TIME] to begin Re-xmit."
4. Press the ENTER key if you want to enter a time, or you want to start at the beginning. The display will show "Begin Re-xmit At Time → 0." Enter a starting time and press the ENTER key, or just press the ENTER key and it will begin retransmitting at the beginning (first time in retransmit area).
5. Press the SET UP key if you want to begin the retransmission at a given place. The display will show "Specify [PLACE #] to begin Re-xmit." Press the ENTER key. The display will show "Begin Re-xmit at Ovrll Plc# →." Enter the Place # you want and press the ENTER key, or just press the ENTER key and the retransmission will start at the beginning.

TO CHANGE THE RE-TRANSMIT AREA THROUGH THE RS232 PORT

1. Press the SET UP key until the display shows "SET UP Parameter: [RS232 PORT]." Press the ENTER key.
2. Press the SET UP key until the display shows "RS232 Operations [CHANGE XMT AREA]." Press the ENTER key.
3. Press the SET UP key until the display shows the item to be changed. Press the ENTER key.
4. Enter the number you want, or enter a "0" for "All." Press the ENTER key. Press the CLEAR key to continue.

TO CHECK ON THE TRANSMISSION STATUS THROUGH RS232 PORT

1. Press the SET UP key until the display shows "SET UP Parameter: [RS232 PORT]." Press the ENTER key.
2. Press the SET UP key until the displays shows "RS232 Operations [TRANSMIT STATUS]." Press the ENTER key.
3. The display will then show the records being transmitted, the XON/XOFF status, and the handshake line status. Press CLEAR key to continue.

TO HALT RE-TRANSMIT OF DATA THROUGH THE RS232 PORT

1. Press the SET UP key until the display shows "Setup Parameter: [RS232 Port]."

2. Press the ENTER key
3. Press the SET UP key until the display shows "RS232 Operations [HALT RE-XMIT]."
4. Press the ENTER key to halt the retransmission.

TO CHANGE THE RS232 XOFF TIMEOUT

1. Press the SET UP key until the display shows "SET UP Parameter: [RS232 PORT]". Press the ENTER key.
2. Press the SET UP key until the display shows "RS232 Operations [CHG LINE SETUP]". Press the ENTER key.
3. Press the SET UP key until the display shows "RS232 Line Setup [SET XOFF TIMEOUT]". Press the ENTER key.
4. The display will read: "Set A Time Limit For XOFF? [YES]", if it's currently set up to have a time limit. If no timeout period is currently selected for XOFF, then the "[NO]" option will be displayed.
5. If you do not want a timeout for XOFF, press the SET UP key until "[NO]" appears, then press the ENTER key.
6. If you do want a timeout for XOFF, press the ENTER key with the "[YES]" option displayed.
7. Enter the desired XOFF timeout period and press ENTER. The timeout can range from 1 to 99 seconds.

TO START THE TIMECLOCKS OF OTHER TIME MACHINES

1. Connect a standard telephone cord to START OUT port on TIME MACHINE "A" and to the START IN port on TIME MACHINE "B."
2. Connect a standard telephone cord to START OUT port on TIME MACHINE "B" and to the START IN port on TIME MACHINE "C."
3. Add as many TIME MACHINE's as you like as stated in #2 above.
4. Make sure the display on each TIME MACHINE shows the time you at which you want the TIME MACHINE to start.
5. Connect a grip switch to the START IN port on TIME MACHINE "A", if desired.
6. Press the grip switch or the START TIME key on TIME MACHINE "A" and all TIME MACHINES will start at the same time.

TO SYNCHRONIZE THE TIME TO A TIME MACHINE

1. Connect a standard telephone cord from the EXT CLOCK port of TIME MACHINE "A" to the RS232 port of TIME MACHINE "B" (or to the time input port of a compatible external clock).

2. The time clock of TIME MACHINE "B" will then be synchronized to the time clock of TIME MACHINE "A."
3. The cord may then be disconnected, leaving TIME MACHINE "B" or the external clock running synchronously. Note, the time clock of the TIME MACHINE "A" may be counting either up or down.
4. While connected, TIME MACHINE "A" may be set to any time and started or stopped. The time clock of TIME MACHINE "B" (or external clock) will be automatically controlled by TIME MACHINE "A."

TO CHECK THE BATTERY LEVEL

1. Press the SET UP key until the display shows "SET UP Parameter: [CHECK BATTERY]."
2. Press the ENTER key. The display will indicate the battery charge. If the arrow is pointing to the right the battery is at a high charge. The arrow will move to the left as the battery discharges. The display range of 1 to 6 corresponds to a voltage range of 5 to 6 volts.

TO CHARGE THE BATTERY

1. Plug the charger into the charge port found on the end of the TIME MACHINE.
2. The TIME MACHINE can be either on or off, but we recommend that you normally turn the machine off during charging. (The battery will charge faster when the TIME MACHINE is turned off.)
3. The charge light will glow orange during charging. When the battery is fully charged, the charge light turns green.

TIME MACHINE

TIME MACHINE Data Formats

RS232 DATA FORMATS

The TIME MACHINE transmits data in ASCII format. Each word transmitted consists of a start bit, a parity bit (if selected) and two stop bits. The baud rate, word size, parity, handshake line and XOFF timeout are user programmable. Their ranges are as follows:

Baud Rate - 1200, 2400, 4800, or 9600
Word Size - 7 bits or 8 bits
Parity - odd, even, or none
Handshake line - enabled or disabled
XOFF Timeout - 1 to 99 seconds when enabled

The data is transmitted as a line. Each line begins with a code byte and is terminated with a carriage return (CR) and a line feed (LF). The code byte identifies the type of data line being transmitted. There are six (6) different types of data lines. Four are used in the Cross-Country mode and three are used in the Lap Timing mode.

CROSS-COUNTRY MODE DATA LINES

The following data lines are transmitted in the Cross-Country mode: The code bytes are shown in hexadecimal code. The ASCII (hex Codes) of the characters are also shown for your convenience.

CHAR #	START LINE	EVENT LINE	PRIMARY TIME LINE	SELECT TIME LINE
1	19H	00H	17H	14H
2	"X" (58H)	"E" (45H)	10's CHUTE	10's CHUTE
3	"C" (43H)	"V" (56H)	1's CHUTE	1's CHUTE
4	Space (20H)	"E" (45H)	Space	Space
5	10's HOURS	"N" (4EH)	100's PL in Lane	100's PL in Lane
6	1's HOURS	"T" (54H)	10's PL in Lane	10's PL in Lane
7	":" (3AH)	Space	1's PL in Lane	1's PL in Lane
8	10's MINS	100's EVENT	Space	Space
9	1's MINS	10's EVENT	1000's Overall PL	1000's Overall PL
10	":" (3AH)	1's EVENT	100's Overall PL	100's Overall PL
11	10's SECS	CR	10's Overall PL	10's Overall PL
12	1's SECS	LF	1's Overall PL	1's Overall PL
13	":" (2EH)		Space	Space
14	10ths SECS		10's HOURS	10's HOURS
15	100ths SECS		1's HOURS	1's HOURS
16	Space (20H)		":"	":"
17	CR (0DH)		10's MINS	10's MINS

Continues on next page

CHAR #	START LINE	EVENT LINE	PRIMARY TIME LINE	SELECT TIME LINE
18	LF (0AH)		1's MINS	1's MINS
19			":"	":"
20			10's SECS	10's SECS
21			1's SECS	1's SECS
22			":"	":"
23			10ths SECS	10ths SECS
24			100ths SECS	100ths SECS
25			Space	Space
26			CR	Space
27			LF	Space
28				10000's RACE #
29				1000's RACE #
30				100's RACE #
31				10's RACE #
32				1's RACE #
33				CR
34				LF

A typical transmission would begin with a START LINE when the TIME MACHINE is started. Next would be an Event line indicating the event number of the data which is to follow. After this, PRIMARY TIME and SELECT TIME lines would be transmitted. If the event number was changed during the race, then another EVENT LINE would be transmitted to indicate the new event #. If the data is re-transmitted (either during or after the race), an event line would initially be transmitted and followed by the PRIMARY and SELECT TIME lines.

If the event number changed during the retransmit, then another EVENT line would be transmitted to indicate it. A retransmit can be easily detected during a race because a "START OF RETRANSMIT" line is transmitted prior to the sending of "retransmit" data. After the retransmit data is finished being sent, a "END OF RETRANSMIT" line is sent. The data from the race will then continue where it left off prior to the retransmission.

LAP TIMING MODE DATA LINES

The following data lines are transmitted in the Lap Timing Mode:

CHAR #	START LINE	EVENT LINE	LAP TIME LINE
1	18H	00H	16H
2	"L" (4CH)	"E"	10's LANE
3	"T" (54H)	"V"	1's LANE
4	Space	"E"	Space
5	10's HOURS	"N"	Space
6	1's HOURS	"T"	Space
7	":"	Space	10's LAP #

Continues on next page

CHAR #	START LINE	EVENT LINE	LAP TIME LINE
8	10's MINS	100's EVENT	1's LAP #
9	1's MINS	10's EVENT	Space
10	":	1's EVENT	10's HOURS
11	10's SECS	CR	1's HOURS
12	1's SECS	LF	":
13	":		10's MINS
14	10ths SECS		1's MINS
15	100ths SECS		":
16	Space		10's SECS
17	CR		1's SECS
18	LF		":
19			10ths SECS
20			100ths SECS
21			Space
22			Space
23			10's MINS
24			1's MINS
25			":
26			10's SECS
27			1's SECS
28			":
29			10ths SECS
30			100ths SECS
31			CR
32			LF

Transmissions in the Lap Timing Mode are identical in nature to those of the Cross-Country mode with the exception that LAP TIME lines are transmitted instead of PRIMARY TIME and SELECT TIME lines.

EXTERNAL TIME CLOCK DATA LINE

The following data line is transmitted out of the External Clock port:

CHAR #	EXTERNAL CLOCK LINE
1	80H, 82H, OR 84H
2	1's SECS
3	10's SECS
4	1's MINS
5	10's MINS
6	1's HOURS
7	10's HOURS
8	CR (ODH)
9	LF (OAH)

The first character transmitted is an ID code whose value depends on the status of the TIME MACHINE's internal "Time Clock". When the Time Clock is "set" to some value, a data line is transmitted with an ID code of 80H. If the Time Clock is counting up, then a data line with an ID code of 82H is transmitted once each second. The timing is aligned such that the last character (linefeed) is sent when the Time Clock's "seconds digit" changes. Its accuracy is within 1/100th of a second and this is independent of the baud rate. If the Time Clock is counting down, then a data line with an ID code of 84H is transmitted once each second.

START/END OF RETRANSMIT DATA LINE

When a "retransmit" operation occurs (or is commanded over an RS232 link), a "START OF RETRANSMIT" line is initially transmitted. This is followed by an "EVENT LINE", and then the data consisting of "TIME LINES". After all of the Time Lines have been sent, an "END OF RETRANSMIT" line is transmitted. The "START OF RETRANSMIT" and "END OF RETRANSMIT" lines are sent regardless if any data is available in the specified "retransmit area". The format for the data line is as follows:

CHAR #	START OF RETRANSMIT LINE	END OF RETRANSMIT LINE
1	01H	04H
2	"S"	"E"
3	"T"	"N"
4	"A"	"D"
5	"R"	Space
6	"T"	"O"
7	Space	"T"
8	"O"	Space
9	"F"	"R"
10	Space	"E"
11	"R"	"T"
12	"E"	"R"
13	"T"	"A"
14	"R"	"N"
15	"A"	"S"
16	"N"	"M"
17	"S"	"T"
18	"M"	"T"
19	"I"	CR
20	"T"	LF
21	CR	
22	LF	

CONTROL OF THE TRANSMITTED DATA

The host computer may control the transmission of data by pausing and continuing the data flow at any desired time. This can be accomplished by either a software command (XON/XOFF) or by a hardware handshake line. When the TIME MACHINE receives a "transmit off" command (XOFF = 13H or CTRL-S), it will suspend the data transmission until it receives a "transmit on" command (XON = 11H or CTRL-Q). The hardware handshake line may also be used to accomplish this. When it is held high (2.4v to 25v), the data transmission will continue. If it is pulled low (0.8v to -25v), the transmission will be paused. The handshake line may also be used to detect a disconnected

RS232 cable by halting the transmission if a "break" occurs in the link, since the handshake line is pulled low when not connected. This feature may be bypassed, if the host is not capable of holding it high. The handshake line can be disabled via the RS232 menu in the TIME MACHINE. The XOFF command may be time limited if the "XOFF Timeout" is enabled. In this case, if an XON doesn't occur, then data will only be suspended until the XOFF Timeout period has expired. This capability is provided for situations where the transmission "hangs up" because the Time Machine is not "seeing" an XON command.

A "Transmit Status" window can be displayed on the TIME MACHINE's LCD display. It shows the data records being transmitted, the XON/XOFF commands being received and the state of the hardware handshake line. This is particularly useful when trouble shooting transmission problems.

NOTE - Both the Primary Time line and Select Time data lines are identical to the Chronomix 737 timer.

TIME MACHINE

Remote Control of The TIME MACHINE

The Time Machine may be controlled remotely from a host computer by sending commands over its RS232 data link. Five different functions can be controlled depending on the command sent. The Commands are:

1. TIMECLOCK - Control of the Time Clock
2. RETRANSMIT - Retransmission of data
3. HALT RETRANSMIT - Stop the retransmission
4. SET EVENT HEAT - Set the Event # (and Heat # for TM model 2)
5. XON & XOFF - Flow control of the RS232 transmitted data

The command formats are given below:

CHAR#	TIMECLOCK	RETRANSMIT	HALT RETRANSMIT	SET EVENT HEAT	XON/XOFF
1	80H, 82H, or 84H	05H	17H	06H	11H/13H
2	1's SECS	100's EVENT#		100's EVENT#	
3	10's SECS	10's EVENT#		10's EVENT#	
4	1's MINS	1's EVENT#		1's EVENT#	
5	10's MINS	10's CHUTE/HEAT#		10's HEAT#	
6	1's HOURS	1's CHUTE/HEAT#		1's HEAT#	
7	10's HOURS	CR or 15H		CR	
8	CR (ODH)	LF or 10's HOURS		LF	
9	LF (OAH)	1'S HOURS			
10		10'S MINS			
11		1'S MINS			
12		10'S SECS			
13		1'S SECS			
14		CR			
15		LF			

NOTE: Due to the high speed RS232 interfaces available on many of the newer computers that the Time Machine is used with, it will probably be necessary to provide delays between the characters that are sent. This is due to the fact that the Time Machine's internal microprocessor is interrupt driven by several sources, with the RS232 port being a low priority source. The microprocessor may be busy servicing a high priority interrupt (such as the timer), and miss the RS232 interrupt when a

character is received. This situation is easily avoided by adding a delay between the command characters being sent or by reducing the baud rate. We suggest adding the delays in order to obtain the maximum data rate possible.

The following is a detailed description of each command and how the parameters of each function may be controlled.

THE TIMECLOCK COMMAND

The Time Clock may be set to any value, within the proper limits. It may be started or stopped, and the direction (up or down count) may be specified. This is accomplished by sending a TIMECLOCK command. The format of this command is shown above. The first character sent is an ID code. The value of the ID code determines the count direction and whether the Time Clock is to be started or stopped. The characters following this are used to "set" the Time Clock. They are sent in standard ASCII format (i.e. an ASCII "5" character = 35 hex) and are ordered from the least significant "Seconds" digit to the most significant "Hours" digit. The last two characters to be sent are ASCII "carriage return" and "line feed" characters, which are hexadecimal "0D" and "0A" respectively. The ID code is given in hexadecimal format and is interpreted as follows:

80H = Stop the Time Clock (if Time Clock is running)

80H = Set the Time Clock (if Time Clock is already stopped)

82H = Set the Time Clock and start it counting up

84H = Set the Time Clock and start it counting down

If the Time Clock is running and an "80H" ID code is received, the Time Clock will be stopped and its current time value will remain unchanged regardless of the HRS, MIN, & SECS characters that were sent.

If the Time Clock is already stopped and an "80H" ID code is received, the Time Clock will be loaded with the HRS, MIN, & SECS characters that were received.

Also, if an external display clock is connected to the Time Machine, it will reflect the changes made to the Time Clock. However, when attempting to set the external display clock to a desired value, and the Time Clock is stopped, it is necessary to send the "set TIMECLOCK" command twice in a row. This is not necessary when sending a "countup" or "countdown" command. The following example sets the Time Clock to 00:10:25, starts a countdown, stops the Time Clock, and then sets it to 02:45:18.

1. send 84H,"5","2","0","1","0","0",0DH,0AH - Load 00:10:25 and start the countdown
2. send 80H,"0","0","0","0","0","0",0DH,0AH - Stop the Time Clock
3. send 80H,"8","1","5","4","2","0",0DH,0AH - Set Time Clock to 02:45:18
4. send 80H,"8","1","5","4","2","0",0DH,0AH - To set external display clock if one is connected.

All nine characters must be sent in order for this command to be executed properly.

THE RETRANSMIT COMMAND

The Retransmit command tells the TIME MACHINE to retransmit data back to the host computer. Like the TIMECLOCK command, it consists of an ID code followed by ASCII characters. Its ID code is 05 hex which happens to be an ASCII "Ctrl-E" character.

The data following the ID code specifies the "Retransmit Area" from which the transmitted data is to be selected. The first three characters specify the Event# of the retransmit data and the next two characters specify the Chute#, if in the Cross-Country Mode, or the Heat#, if in the Lap-Timing Mode (Model 2 only) of the retransmit data. If a "000" is sent for the Event#, then this is interpreted to mean "send data from ALL events".

If a "00" is sent for the Chute# or Heat#, then this means "send data from ALL chutes or heats". The effect of commanding a RETRANSMIT is the same as manually setting the Retransmit Area in the TIME MACHINE followed by manually retransmitting the data starting from a user specified "initial time". Therefore this command will change the Retransmit Area, which is saved in non volatile memory.

Following the specified "Retransmit Area" characters are either a carriage return and line feed (CRLF), or another ID code. If CRLF is sent, then data will be retransmitted beginning at time zero (the 1st time in the Recall Area). If the ID code "15" hex (which happens to be an ASCII Ctrl-U character) is sent, then the data following this specifies the initial time that the retransmitted data is to begin with. The initial time consists of hours, minutes, and seconds. This data is then followed by a carriage return and line feed.

All eight characters must be sent (or fifteen when specifying an initial time) in order for this command to be executed properly. If your machine does not support "heats" and you wish to send this command in the Lap-Timing mode, then use "00" for the Retransmit Heat#.

Sending a non-numeric ASCII character or not sending the correct number of characters will cause the Command Receiver in the TIME MACHINE to ignore that command.

THE HALT RETRANSMIT COMMAND

This command is used to stop the retransmission of data. It may be used to stop the transmission of data after the times you are interested in have already been received. For example, suppose you have data stored that ranges in time from 01:30:00 to 3:00:00 and you only want to retransmit the data between the times of 02:20:00 and 02:40:00. To do this you could issue a RETRANSMIT command with an initial starting time of 02:20:00. Your software could then wait until it received the data for time 02:40:00 or later and then issue a HALT RETRANSMIT command.

The HALT RETRANSMIT command consists of a single character whose value is 17 hex, which happens to be an ASCII "Ctrl-W" (the "end of transmission block" character).

THE SET EVENT HEAT COMMAND

This command is used to change the Event and Heat (model 2 only) numbers in the TIME MACHINE. Like the other commands, it consists of a ID code followed by ASCII characters. Its ID code is 06 hex which happens to be an ASCII "Ctrl-F" character.

The data following the ID code specifies the new Event# and Heat# which are to be set. Valid characters for the Event# are "001" through "255", anything else will be ignored. Valid characters for the Heat# are "01" through "99", anything else will be ignored.

The effect of commanding a SET EVENT HEAT is the same as manually setting the Event and Heat (model 2 only) numbers in the TIME MACHINE. Therefore this command will actively change these parameters and save them in nonvolatile memory. Following the Event and Heat characters are a carriage return and a line feed. All eight characters must be sent in order for this command to be executed properly. If your machine does not support "heats", then use "00" for the "Heat#". Sending a non-numeric ASCII character or less than eight characters will cause the Command receiver in the TIME MACHINE to ignore that command.

Note: sending a "000" for Event# and a "03" for Heat# is legal. This would set the new Heat# to "3" and leave the current Event# unchanged.

THE XON COMMAND

This command simply turns the TIME MACHINE's RS232 transmitter on, allowing serial data to be output. It is used in conjunction with the XOFF command to control RS232 data flow to the host computer. It consists of a single character whose value is 11 hex, which happens to be an ASCII "Ctrl-Q".

THE XOFF COMMAND

This command simply turns the TIME MACHINE's RS232 transmitter off, pausing the serial output data. It is used in conjunction with the XON command to control RS232 data flow to the host computer. It consists of a single character whose value is 13 hex, which happens to be an ASCII "Ctrl-S".

THE XOFF TIMEOUT FEATURE

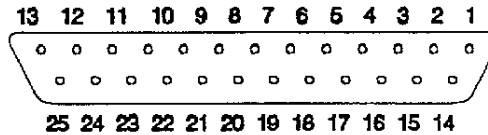
The XOff Timeout feature allows you to set a specified time (1-99 sec.) in which the TIME MACHINE will wait until it turns the transmitter back on. The number of seconds can be changed in the RS232 set up. (See Chapter 2)

TIME MACHINE

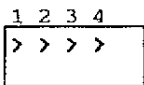
Appendices

A: CONNECTOR SPECIFICATIONS

MULTILANE CONNECTOR:



PIN	SIGNAL	PIN	SIGNAL
1	MULTILANE 1	14	START IN
2	MULTILANE 2	15	START OUT
3	MULTILANE 3	16	START COMMON
4	MULTILANE 4	17	HANDSHAKE
5	MULTILANE 5	18	N/C
6	MULTILANE 6	19	N/C
7	MULTILANE 7	20	N/C
8	MULTILANE 8	21	N/C
9	MULTILANE 9	22	+5 VDC Regulated Voltage
10	MULTILANE 10	23	RS232 - RECEIVE
11	GROUND	24	GROUND
12	EXTERNAL CLOCK - TRANSMIT	25	GROUND
13	RS232 - TRANSMIT		



LOOKING IN VIEW - MODULAR PHONE CONNECTOR

RS232 CONNECTOR

PIN	SIGNAL
1	TRANSMIT
2	RECEIVE
3	HANDSHAKE
4	GROUND

EXTERNAL CLOCK CONNECTOR

PIN	SIGNAL
1	GROUND
2	N/C
3	TRANSMIT
4	N/C

START OUT CONNECTOR

PIN	SIGNAL
1	GROUND
2	SYNC START
3	N/C
4	N/C

START IN CONNECTOR

PIN	SIGNAL
1	N/C
2	N/C
3	SYNC START
4	GROUND

B: TO SYNCHRONIZE A CHRONOMIX CC2000 SERIES TIMECLOCK TO A TIME MACHINE

TIME MACHINE EXTERNAL
CLOCK PORT

N/C	-	4
TXD	-	3
N/C	-	2
GND	-	1

CHRONOMIX CC2000 SERIES
DISPLAY CLOCK

4	-	TXD
1	-	RXD
2	-	N/C
3	-	GND

LOOKING IN VIEW - TIME MACHINE
MODULAR PHONE CONNECTOR

1	2	3	4
>	>	>	>

LOOKING IN VIEW - CHRONOMIX
AMP. CONNECTOR

0	
1	
0	0
2	3
0	
4	

P/N: A1300
PIN P/N: A1340

C: TO CONNECT A HOST COMPUTER TO A TIME MACHINE

TIME MACHINE
RS232 PORT

GROUND	4
HANDSHAKE	3
RECEIVE	2
TRANSMIT	1

HOST COMPUTER
25 PIN RS232 CONNECTOR

7	GROUND
4	RTS
2	TRANSMIT
3	RECEIVE

OR

TIME MACHINE
RS232 PORT

GROUND	4
HANDSHAKE	3
RECEIVE	2
TRANSMIT	1

HOST COMPUTER
9 PIN RS232 CONNECTOR

5	GROUND
7	RTS
3	TRANSMIT
2	RECEIVE

D: SPECIFICATIONS

TIME BASE AND ACCURACY: Accuracy: +/- 0.0002% (+/- 0.17 sec/24hr) at 70 degrees F, Stability: +/- 0.003% (+/- 2.6 sec/24hr) from -4 degrees to 158 degrees F

DIMENSIONS AND WEIGHT: 9.5" long X 6.25" wide X 2" deep; 2.5 lbs

CONSTRUCTION: Enclosed in high impact ABS molded plastic.

PRINTER: 28 column thermal printer, 1 line/sec; thermal paper required

TIME RESOLUTION: 1/100 of a second.

PARAMETER RANGES:

Finish Times: 31 hours, 59 minutes, 59.99 seconds - Cross-Country Mode

Split Times: 7 hours, 59 minutes, 59.99 seconds - Lap Timing Modes

Lap Times: 31 minutes, 59.99 seconds

Event #'s: 1 to 255

Chutes (or Lane) #'s: 1 to 99

Race #'s: 0 to 99,999

Lap #'s: 1 to 30 (rolls over upon overflowing)

MEMORY: Nonvolatile buffer memory for over 8000 times. Memory Status can be displayed showing entries made and the number of entries available. Foolproof "Memory Clear" capability.

TIME PRESET: Allows any preset time to 31 hours, 59 minutes, 59 seconds in Cross-Country Mode, and 7 hours, 59 minutes, 59 seconds in Lap Timing Mode. Selectable up-count or down-count.

KEYBOARD: 18 button full size keyboard. Full travel "computer style" keys with tactile feedback.

LCD DISPLAY: 32 character, 2 line alphanumeric Liquid Crystal Display shows elapsed running time, Chute #, finish #, and finish time (split time) of the most recent entry for the Cross-Country Mode. Shows elapsed running time, Lane # and Split time or Lap time (selectable) for the Lap-Timing Mode. Shows all information entered through the keyboard, status information, recalled information, warning messages, and operator interface messages.

TONE GENERATOR - Tones are sounded for warning messages and operator errors.

DATA OUTPUT - RS232 compatible serial interface. Baud rate is selectable from 1200 to 9600, parity for odd, even, or none, and word size of 7 or 8 bits. RS232 set up is saved in nonvolatile memory. RS232 connector mates with standard "telephone handset" type modular cord.

GRIPSWITCH TIMING CORDS: Rugged waterproof grip switches with snap action push button on 7' cords. Standard "telephone" modular extension cords may be used to extend the length.

DEVICE SYNC CABLES: Standard "telephone handset" type modular cord.

MAIN BATTERY: Rechargeable 6-volt sealed lead acid battery. Discharge rate depends on printer usage with at least 20 hours while printer is off.

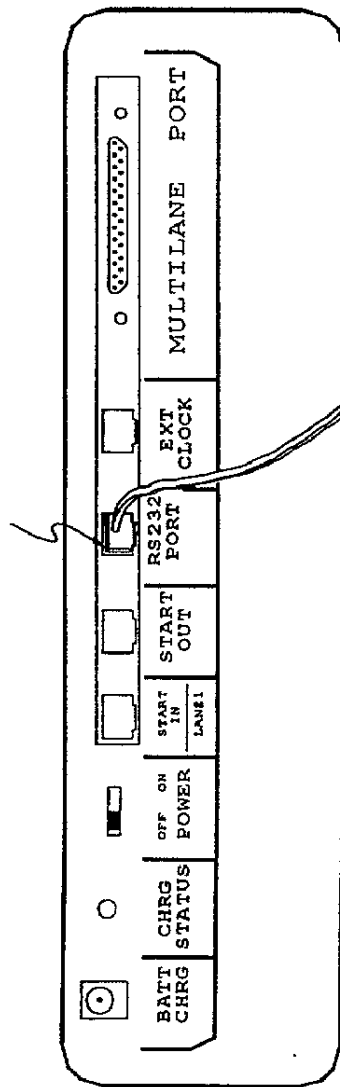
BACKUP BATTERY: A 3 volt Lithium battery is used to back up the nonvolatile memory. Lifetime is typically 10 years.

BATTERY LEVEL INDICATOR: Battery level can be displayed on the LCD. A "Panel Meter" type display shows voltage levels on the top line, with arrow pointing to the current level on the bottom line. Also, a warning signal and message appears about once a minute when battery level becomes low. After battery reaches a "low voltage" condition, it will last approximately 90 minutes with printer off. Backup batteries are automatically checked each time the TIME MACHINE is turned on. A warning message will tell you if they need replacement or if they have failed. Also, as the battery becomes low with the printer on, the TIME MACHINE automatically slows down and eventually shuts off the printer, to allow you to continue timing the race. After the batteries are recharged, the remaining times can be reprinted.

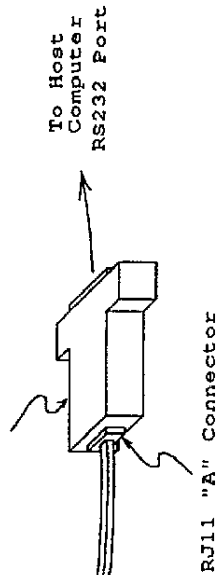
EXTERNAL POWER: 9 to 15 volts AC or DC at 0.5 amp maximum. Either the 115 VAC to 9 VDC power pack (included) or an optional 9 to 12 VDC automotive battery adapter may be used to recharge the battery or run the TIME MACHINE if the internal battery is too low.

TIME MACHINE TO HOST COMPUTER CONNECTION

RJ11 "B" Connector



9-pin Or 25-pin To RJ11 Adapter



To Connect the TIME MACHINE To Your Computer:

1. Check the serial (RS232) port on your computer to determine if it is a 25-pin or a 9-pin connector.
2. Check the connector on the RS232 cable provided with your TIME MACHINE, to see if it matches the connector required by your computer. If it doesn't match, remove the adapter from the RJ11 connector (RJ11 "A" connector in the diagram) and attach the other adapter that was provided.
3. Connect the adapter end of the RS232 cable to your computer and the other end (RJ11 "B" connector in the diagram) to the RS232 PORT of the TIME MACHINE.

NOTE: The RJ11 connector mates with standard telephone cable accessories. Therefore, telephone extension cables may be used to lengthen the RS232 cables or the Grip Switch cables. The length of the RS232 cable however, should be limited to about 50 feet depending on the baud rate being used. The lower the baud rate, the longer the cable can be.

E: ACCESSORIES AND PARTS AVAILABLE

- GRIPSWITCHES
- MULTILANE INTERFACE ADAPTER
- ADDITIONAL PAPER FOR PRINTER ALSO AVAILABLE FROM SEIKO. CALL FOR LOCAL SEIKO OUTLET AT (213) 517-7788 (IF YOU ARE ON THE WEST COAST) OR (213) 517-7787 (IF YOU ARE ON THE EAST COAST). ASK FOR SEIKO THERMAL PAPER P/N TP201-211-25C.
- PROGRAM TO DOWNLOAD TO DOS DATA BASE
- ALPHANUMERIC VERSION (YOU CAN USE THREE LETTERS IN FRONT OF THE BIB NUMBER WHEN ENTERING SELECT TIMES.)
- UPGRADES AS THEY BECOME AVAILABLE (Note: Your current model and version number can be seen by holding the CLEAR key down and turning on the power.)
- NEW MULTI-PURPOSE (CROSS COUNTRY, TRACK, AND SWIMMING) TIMER

We are working on a new model of the TIME MACHINE which will better support the requirements of swimming and track events. This new model will be compatible with electronic starting horns, touch pads, multiple grip switches for each lane, and scoreboards. It will allow up to 99 "heats" per event and provide final heat results as well as overall finish results based on up to three "clocked" times per finish lane. Call us if you have any questions about this new model.

F: WARNING MESSAGES

The following is a list of warning messages that may appear during the operation of your TIME MACHINE. These warnings are classified into four categories: status, noncritical, critical and fatal. The following is a brief description of each warning message, and a suggestion for a corrective action which may help solve the problem.

Status Messages

The following status messages include both informational messages, and those which may require operator action in order to avoid a problem.

Status Message	Description	Corrective Action
WARNING: Battery Voltage is Low!	The battery voltage has dropped below approximately 5.6 volts.	The battery will last another 15 minutes with the printer on, and up to 2 more hours with it off. The battery may need to be recharged depending on the circumstances.
BATTERY MUST BE RECHARGED!	The battery voltage has dropped below 5.1 volts.	Recharge the battery.
Battery Too Low to Operate TM	The battery voltage has dropped below 5.0 volts.	Recharge the battery.
TMDISABLED DUE TO LOW BATTERY!	The main battery needs to be recharged before the TIME MACHINE can be used again.	Recharge the battery.
WARNING: Memory Is Almost Full!	The memory has the capacity to store only 50 more times.	Synchronize a "fresh" backup timer to the one low on memory and then swap them.
WARNING!! MEMORY IS FULL!	The memory capacity has been exceeded.	Synchronize a "fresh" backup timer to the one that is out of memory and then swap them.
WARNING: PRINTER JAMMED!	The CPU cannot drive the printer motor.	Turn the printer switch off. Check for foreign material in the printer's gears or for jammed paper in the paper feed mechanism. Turn switch back on after "freeing" printer.
Print Buffer FullPlease wait!	The "recall data" printer buffer is full. The printer is "behind" the display by more than 20 times during "recall" of data.	Wait for the printer to print a few lines before pressing the ENTER key. This will help empty the "recall data" buffer.
WARNING: Event # Must Be Changed Because Data In Memory Uses This #.	There are times stored in memory that have the same event # that is currently set for the next race's data.	Change the event number.
No Times Have Been Entered!	A recall of data was attempted when no times had been entered for the current timing mode that the TIME MACHINE is in.	Check memory status (press MEM key) to see if any times were entered. If so, then recall "event" data to see what data may be stored in memory.
No Times Found In Recall Area	There are no times at all in the recall area that is currently set up.	Check the recall area to see if it is set up the way you want it to be.

Status Message	Description	Corrective Action
TIME Not Found In Recall Area The Next Closest TIME Found Was:	The "searched" time does not exist in the recall area that is currently set up.	This may be desirable. If not, check the recall area to see if it is set up the way you want it to be.
No Race#'s Found In Search Area!	The "searched" area does not exist in the recall area that is currently set up.	Check to see if the race# was entered correctly or check the recall area to see if it is set up the way you want it to be.
RACE# Not Found In Recall Area	There are no select times with race# in the recall area that is currently set up.	Check the recall area to see if it is set up the way you want it to be.
No Race#'s Found In Recall Area!	There are no select times with race# in the recall area that is currently set up.	Check the recall area to see if it is set up the way you want it to be.
No More Data In Recall Area	All of the data in the recall area has been recalled.	No corrective action required.
No More Events Stored In Memory	All of the event information has been recalled from memory.	No corrective action required.
No Times Found In Re-transmit Area!	No times were found when a retransmit was attempted.	Double check the retransmit area to see if it is set to the desired chute# (or lane#) and event#.
RETRANSMIT OF DATA TERMINATED	Retransmission of data has been terminated by the operator.	No corrective action required.
RETRANSMIT OF DATA IS COMPLETE	All of the data in the retransmit area has been retransmitted.	No corrective action required.

Noncritical Warnings

The noncritical warning messages are generally caused by operator errors.

Warning Message	Description	Corrective Action
Time Clock Is Not Running!	A "baseunit" type time entry was attempted without the time clock running.	Start the time clock if you want to input data.
Timer Is Running Can't Set Deflts	An attempt was made to set the lane#'s to their default values while the time clock was running.	Stop the time clock before programming any of the multilane lane numbers.
Timer Is Running Can't Set Mltlne	An attempt was made to program one of the lane#'s while the time clock was running.	Stop the time clock before programming any of the multilane lane numbers.
Data Is Not Retransmitting	The TIME MACHINE was not retransmitting when a "halt retransmission" was commanded.	No corrective action required.
Event# Must Be Between 1 & 255	Improper event number was entered.	Input a numeric value between 1 and 255.

Critical Warnings

Critical warning messages may be caused by temporary problems that can be solved by the user, or more permanent problems that will have to be solved in the repair shop.

Warning Message	Description	Corrective Action
MEMORY BACKUP HAS FAILED!	Critical data in the memory has become corrupted and recovery is not possible. The memory backup circuits may have failed.	Wait for warning to end. The factory default parameters will automatically be set and the data memory will be reset. If this warning occurs each time the machine is turned on, then it must be sent in for repair.
MEMORY HAS BEEN CORRUPTED! Reset All Of The Memory? [NO]	Some of the data stored in memory has been inadvertently altered.	This may be due to static discharge or possibly by excessive moisture. If the data is important, do not reset the memory. First save the data by retransmitting or reprinting it, then you can reset the memory.
WARNING: Printer Failure!	The CPU cannot control the printer.	The printer may be jammed at its "home" position. Check for foreign material in the printer's gears or in the print head drive shaft grooves. If the problem persists, then send the machine in for repair.

Fatal Warnings

Most conditions that cause fatal warning messages are electronic circuit failures, requiring that the TIME MACHINE be sent in for repair. However, some of these warnings may be due to harsh environmental conditions such as static electricity discharge or powerful electromagnetic interference.

Warning Message	Description	Corrective Action
The "nn" Key Is Stuck	CPU is continually receiving input from the keyboard.	Check to see if a key is actually stuck and fix it if you can. Otherwise, send the machine in for repair.
Keyboard Decoder Failure Detected	CPU is receiving improper data from the keyboard decoder.	Send machine in for repair.
MEMORY ERROR! Data Not Stored	CPU cannot read back what was written into memory.	Send machine in for repair.
FAILURE: Unable To Access Memory	Critical sections of the memory cannot be accessed.	Send machine in for repair.
TIMEBASE Circuit Has Failed CLK200HZ Signal Out Of Tolerance	The timebase oscillator is too far out of tolerance for the time clock to use.	Send machine in for repair.
CIRCUIT FAILURE: NO VTCOMP SIGNAL	The voltage/temperature compensation circuit has failed.	Send machine in for repair.

Warning Message	Description	Corrective Action
STACK OVERFLOWED AT ADDRESS: mmm	CPU probably skipped an instruction causing its internal stack to overflow.	This can occur if the machine is shocked by static electricity. If this message persists, send the machine in for repair.

PROBLEM SOLVING

The information given above is intended to help you trouble-shoot problems you may encounter with the TIME MACHINE. If you have any additional problems with the operation, or if you have any questions concerning your TIME MACHINE, please call 1-800-328-4070. Our fax number is 206-863-1689.

When sending your TIME MACHINE back for either upgrades or repairs, send it to our production facility. Please be sure to include a note telling us what the problem is you are having with the machine, including the wording of any error message(s) you received.

The address is:

Flying Feet Computers
11112 204th Ave Ct E
Bonney Lake, WA 98390
(800) 328-4070
(206) 863-1689 fax

WARRANTY STATEMENT

The manufacturer warrants to the original purchaser of the TIME MACHINE that it shall be free of defects resulting from faulty manufacture of the product or its components for a period of two years from the date of sale. Defects covered by this warranty shall, at the option of the manufacturer, be corrected either by repair or by replacement. The replacement unit will be warranted for the remainder of the original two year period.

The sole obligation of the manufacturer under this warranty is limited to repair or replacement of products which prove defective within two years of purchase. The manufacturer shall not, in any event, be liable for any consequential damages or loss of profits of any kind resulting from the use of this product or the technical information enclosed in this manual.

Some states do not allow limitation of the duration of implied warranties, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Please fill out and return the Product Registration Form at the end of this manual. This product must be registered within thirty (30) days from the date of purchase in order to activate your warranty coverage.

TIME MACHINE

Product Registration Form

Please fill out the following information and send it to:

Flying Feet Computers, Inc.

11112 204th Ave Ct E

Bonney Lake, WA 98390

800-328-4070

800-328-4070 fax

By sending this form back to us, we can let you know of any upgrades to your TIME MACHINE as well as our new products as they become available. This form is also used to activate your warranty coverage.

Name		
Company Name		
Address		
City	State	ZIP
Home Phone	Work Phone	
Purchased From	Date Purchased	Serial Number