

## TimeKeeper™ Series Users/Programmers manual

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### Features.

This software supports the following features. Not all models will have all the features. See the list below describing each of the individual models and the features supported. Some of the features are available by custom order only.

- **Time of Day Clock.**

The time of day clock displays hours, minutes and seconds in either military time or 12 hour AM/PM format. Also, minutes and seconds only can be displayed.

- **Up/Count down timer.**

The timer counts from 00.00 to 99.59 minutes, or from 00:00:00 to 99:59:59 hours. On special order, this timer can count seconds and tenths of seconds 000.0 to 999.9. The timer can be changed from time remaining to time elapsed on the fly while the timer is running. The timer has built in Green-Yellow-Red programmable warning times. A beeper may be sounded at each of the warning times, at red only or be turned off.

- **Programmable Presets.**

The timer can have up to 15 programmable presets. The values stored include the timer preset time, green and yellow warning times, beeper mode, count up/down and run/stop status. The presets are stored in non-volatile memory. The settings are remembered even if the power is off and the battery is removed.

- **Remote Display.**

When multiple TimeKeepers™ are connected together, one unit acts as a controller and the other units become remote displays. On the remote display the CLOCK button changes the display to show the time of day clock. The timer RESET button returns to the remote display. All the other buttons are non-functional.

- **Take-A-Turn System.**

This unit may also be used as a take-A-Turn system for NOW SERVING the next customer. The unit has NEXT, PREVIOUS and RESET buttons. The unit also has Remote Ground Closure inputs for external buttons. Range 0 to 999,999.

- **Tallye Counter.**

Wigits, machine operations, game scores or anything you may want to count may be counted. The unit has UP, DOWN and RESET buttons. The unit also has Remote Ground Closure inputs for external buttons or for connecting to a machine for automatic operation. Range 0 to 999,999.

- **Productivity Display Controller.**

In addition to the timer, production goals, running goals and other information may be displayed on a remote display having multiple lines.

- **Scoreboard Controller.**

This unit may be connected to a basketball scoreboard to display home score, visitors score and period of play along with the time of play.

- **Remote Terminal.**

This unit may be operated as a terminal to a PLC or other controller. Button presses from the Timekeeper™ are sent to the PLC. The PLC sends display commands to the Timekeeper™.

- **Serial data port.**

A standard RJ-11 phone jack on the rear of the unit permits the timer to be connected to other timers, to remote displays or to a Crestron, AMX system, PC serial port or any other device having a RS-232C serial port. All data is transmitted at 2400 baud. Some models have user programmable baud rates up to 115K baud.

- **Display Dimming Controls.**

The brightness of Remote displays may be controlled from the Timekeeper™.

- **Dimmable Display.**

The brightness of the digits may be controlled on some models of timers and displays.

- **Alarms.**

Up to 4 alarms may be programmed. Remote devices or the dim/bright status of the dimmer may be controlled at the specified alarm times.

- **RS-485.**

RS-485 Interface.

- **Ethernet.**

Integrated Ethernet time server, web server and data logging system. Custom programming is available for specific applications.

## Timer reference card.

### The TimeKeeper™ Count Up/Down timer with Clock

#### Timer Mode

1. Press Reset to select timer mode.
2. Turn knob to set desired time The Select button selects between setting minutes and seconds.
3. Press the Start/Stop button to start the timer.

The **Mode** button selects between count up and count down modes. You may change between count up and count down modes while the timer is running. In count down mode, the timer stops when it reaches zero. In count up mode, the timer keeps running when the preset time is reached.

Press and hold the **Mode** button to turn the beep on or off.

Press and hold the **Select** button to set the Wrap-It-Up time.

Press the **Select** button again to set the Green warning time.

#### User Programmable Presets

1. Setup the timer preset time to the desired time.
2. Set the green and yellow warning times the way you want them.
3. Also, select the desired count up/down mode and beeper mode.
4. If you want the preset to start the timer automatically, start the timer running.
5. Press and hold the desired **Preset** button to save the timer preset time, green and yellow warning times and timer status. When the display changes, the settings are stored.
6. To activate the **Preset**, a single button press will set the timer to the to the exact conditions that were saved.

#### Clock Mode

1. Press Clock button to select clock mode.
2. The Clock or Select buttons select displaying 12 hour time, military time or seconds. In 12 hour mode, the PM LED will be on for PM and off for AM.

Press and hold the **Clock** button to enter set time mode.

1. Turn the **Knob** to set the hours.
2. Press the **Clock** button again.
3. Turn the **Knob** to set the minutes.
4. Press the **Clock** button again to return to normal display.

The **Clock** or **Select** buttons select displaying 12 hour time, military time or minutes and seconds.

#### Red-Yellow-Green Display

- In the count down mode, the **Green** lamp comes on when the timer is started and begins to blink at the green warning time. In the count up mode, the **Green** lamp comes on at the green warning time..
- When the **Yellow** warning time is reached, the **Green** lamp goes off and the **Yellow** lamp comes on.
- When the timer reaches zero, the **Red** lamp comes on and the **Yellow** lamp goes off. In the count down mode, the timer stops when the **Red** lamp turns on. In the count up mode, the timer keeps running after the lamp turns **Red**.
- Press the reset button on the TimeKeeper™ to turn off the **Red** lamp.

Press the **RESET** and **START** buttons at the same time to turn off the display.

Total time	Green warning	Yellow warning	Red warning
0:00 - 0:29	0:02	0:01	0:00
0:30 - 0:59	0:20	0:10	0:00
1:00 - 1:59	0:30	0:15	0:00
2:00 - 3:59	1:00	0:30	0:00
4:00-99:59	2:00	1:00	0:00

The lamps follow the format of Toastmasters International.

*This reference card describes the most commonly used features only. See the complete manual for a description of all the features.*

## Additional operating instructions

### Standard Controls

- **RESET** – Timer Reset
- **START** – Timer Start/Stop
- **SELECT** – Select between setting hours / minutes / seconds.
- **MODE** - Change to Count Up, Count down.
- **CLOCK** - Change to time of day clock mode.
- **PRESET** - One or more preset buttons.

### Scorekeeper™ mode.

In the Scorekeeper mode, four of the preset buttons have the following functions. You must have a Timekeeper™ with 11 buttons ie: TMR218C-SM11

- **PERIOD** - Set the period / participant.
- **SCORE\_HOME** - Set the home score.
- **SCORE\_VISITORS** - Set the visitors score.
- **HORN** - Beep the Horn

### Clock Mode.

- Press the **clock** button to enter the clock mode.
- The Hours:Minutes:Seconds in 24 hour mode will be selected.
- Press the **clock** button again to display Clock Minutes:Seconds.
- Press the **clock** button again to display Hours:Minutes:Seconds in 12 hour mode.

*NOTE: On a timer with 6 digits, the hours, minutes and seconds will be displayed. On a timer with 4 digits, only the hours and minutes will be displayed.*

### Master Clock Mode.

Press and hold CLOCK button to set the time of day clock.

1. Turn the knob to set the hour.
2. Press the clock button again.
3. Turn the knob to set the minutes.
4. Press one of the following buttons to finish and return to a normal display. Also, the Master clock mode can be changed, if desired.
  - Press the clock button to leave the master clock mode unchanged.
  - Press the reset button to disable the master clock mode. The DSP, RLY and TME commands are sent.
  - Press the start button to enable the master clock mode. Only the TME command is sent.

In the master clock mode, the "TMEhhmmss" is transmitted once per minute. Normal display data

transmission commands "DSP" and "RLY" are disabled. The only other data that is transmitted are the log entries.

The remote displays are updated once per minute with the correct time of day.

### Setting the time of day clock.

When the time of day is being set, the TMEhhmmss command is sent from the controlling clock to the remote displays when the time set mode is exited.

The TMEE and TMEF commands. When a timer is in the remote display mode, and no serial data is being displayed, the display defaults to:

- TMEE command - The display goes blank.
- TMEF command - The display becomes a time of day clock.

The default clock feature is user configurable.

- If the timer was the last function used, the default clock option is disabled in the remote display. (TMEE Command)
- If the clock was the last function used, the default clock option is enabled in the remote display. (TMEF Command)

### Front panel Led definitions

- Lower Left side - ON=Beep on OFF=Beep off.
- Middle Left side - ON=Count up OFF=Count down.
- Upper Left Side - Clock mode. - ON=PM OFF=AM
- Upper Left Side - Timer mode. - ON=Multi-beep mode.
- Lower Right side - ON=RED indicator, Time is up.
- Middle Right Side - ON=YEL indicator, Yellow wrap-it-up.
- Upper Right Side - ON=GRN indicator, Time is running.

## Connecting multiple Timekeepers™ together.

### Remote Display

- The Timekeeper™ defaults to remote display mode at power up.
- If any buttons are pressed, the remote display mode is disabled and the timer/clock mode is selected.
- If the first command received is from the serial port, then the remote display mode is locked and remains selected until the power is removed.

Lock the unit function. When multiple units are connected together, only one unit may become the controlling unit. The rest of the units become remote displays.

The purpose of the lock unit function is to determine which unit will be the controlling timer. The remaining units that are connected together become remote displays.

The first unit to press a button becomes the controlling unit.

- When a timer is first powered up, it is in the Remote Display mode.
- The unit remains in remote display mode until a button is pressed on the front panel.
- Once a button is pressed, the unit changes to timer mode.
- The lock mode option is set.
- The unit remains in timer mode until the power is turned off.
- The unit transmits commands to other units.
- When a unit receives a command from another unit, the Lock mode option bit is set.
- This locks the unit into the remote display mode until the power is turned off.

### Display Dimming

The dimmer value in the range 0 to 99 provides 25 distinct levels of brightness. Where 0-3 is the lowest brightness, and 96-99 is the highest brightness. See the RLY command for programming details.

### Remote Ground Closure Inputs

The timer can be started, stopped or reset by remote control. Grounding the respective signal activates the function.

Notice that inputs IN2 and IN3 are dual function. They operate differently depending on whether the display is in timer mode or Tallye mode.

### Timer Mode

- IN1 – Changes the display to timer mode. Starts the timer.
- IN2 – In timer mode, stops the timer.
- IN3 – In timer mode, Resets the timer values to the initial preset values.

### Tallye Mode

- IN2 – In Tallye mode, decrements the Tally Count by one.
- IN3 – In Tallye mode, Sets the tally count to zero. Reset does not stop the timer.
- IN4 – Changes the display to Tallye mode. Increment the Tally Count by one.

### Device control Outputs

- Optional Relay Control signal (RC3) Activated whenever the timer is running.
- Optional Relay Control signal (RC4) Activated whenever the timer reaches time zero.
- Both outputs are cleared when the timer is reset.

### Manual Shutoff

Pressing the RESET button and the START button at the same time turns off the display on both the local timer and the remote displays.

### Beeper modes

The Timekeeper™ has three beeper modes: Single beep; Beep at each of the warning times; and beeper disabled.

- Press and hold the MODE button to enable the beeper. The timer will generate a beep when the preset time is reached.
- Press and hold the MODE button a second time to enable the 3 beep feature. . The timer will generate a beep at the green warning time, yellow warning time and when the preset time is reached.
- Press and hold the MODE button a third time to disable the beeper. No beeps are generated.

## Timer Models

This manual supports the following Timekeeper(tm) models.

DSP221D-SM0 - Four digit remote display (surface mount)

DSP221D-FM0 - Four digit remote display (flush mount)

- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Enclosure: Black painted metal.
- Dimensions: Surface mount W=4.375", L=4.5", D=1.375" (TMR221D-SM0)
- Dimensions: Flush mount W=5.125", L=5.125", D=1.5" (TMR221D-FM0)

DSP221D-SM3 - Count Down timer with time of day clock (surface mount)

DSP221D-FM3 - Count Down timer with time of day clock (flush mount)

DSP175B-SM3 - Count Down timer with time of day clock (surface mount)

DSP175B-FM3 - Count Down timer with time of day clock (flush mount)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Auto shutoff while operating from batteries.
- Enclosure: Black painted metal.
- Dimensions: Surface mount W=4.375", L=4.5", D=1.375" (TMR221D-SM0)
- Dimensions: Flush mount W=5.125", L=5.125", D=1.5" (TMR221D-FM0)

DSP221D-SM5 - Count Up/Down timer with time of day clock (surface mount)

DSP221D-FM5 - Count Up/Down timer with time of day clock (flush mount)

DSP175B-SM5 - Count Up/Down timer with time of day clock (surface mount)

DSP175B-FM5 - Count Up/Down timer with time of day clock (flush mount)

- Knob for setting times and other values.

- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Auto shutoff while operating from batteries.
- Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Enclosure: Black painted metal.
- Dimensions: Surface mount W=4.375", L=4.5", D=1.375" (TMR221D-SM5)
- Dimensions: Flush mount W=5.125", L=5.125", D=1.5" (TMR221D-FM5)

DSP221D-SM8 - Count Up/Down timer with time of day clock and presets (surface mount)

DSP221D-FM8 - Count Up/Down timer with time of day clock and presets (flush mount)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Buttons for Three Timer Presets.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Auto shutoff while operating from batteries.
- Four Remote Ground Closure inputs. Timer start, Timer Stop/Tallye Count down, Reset and Tallye Count up.
- Dimmer control for dimming displays 00 to 99.
- Four programmable Alarms.
- Scoreboard/Production Goal control/
- Enclosure: Black painted metal.

- Dimensions: Surface mount W=4.375", L=4.5", D=1.375" (TMR221D-SM8)
- Dimensions: Flush mount W=5.125", L=5.125", D=1.5" (TMR221D-FM8)

TMR218C4-AL - Count Up/Down timer. (almond)

TMR218C4-BK - Count Up/Down timer. (black)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Optional Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Enclosure: ABS Plastic black or almond.
- Dimensions: Table Top W=6.75", L=4.75", H=2.5" (TMR218C4)

TMR218C5-AL - Count Up/Down timer with time of day clock. (almond)

TMR218C5-BK - Count Up/Down timer with time of day clock. (black)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Optional Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Enclosure: ABS Plastic black or almond table top
- Dimensions: Table Top W=6.75", L=4.75", H=2.5" (TMR218C5)

TMR218C8-AL - Count Up/Down timer with time of day clock and presets. (almond)

TMR218C8-BK - Count Up/Down timer with time of day clock and presets. (black)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Buttons for Three Timer Presets.
- Display: Red LED, 4 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Optional Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Enclosure: ABS Plastic black or almond.
- Dimensions: Table Top W=6.75", L=4.75", H=2.5" (TMR218C8)

TMR218C-SM11 - Count Up/Down timer with time of day clock and presets (Surface Mount)

TMR218C-SM19 - Count Up/Down timer with time of day clock and presets (Surface Mount)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Buttons for Six Timer Presets. TMR219C-SM11
- Buttons for Fourteen Timer Presets. TMR219C-SM19
- Display: Red LED, 6 digits, 0.56" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Optional Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Optional RS-232 Serial port.

- Optional RS-485 Serial port.
- Optional Ethernet port with integrated time server and web server
- Enclosure: Black painted metal.
- Dimensions: Surface mount W=6.25", L=5", H=2"

TMR219C-SM11 - Count Up/Down timer with time of day clock and presets (Surface Mount)

TMR219C-SM19 - Count Up/Down timer with time of day clock and presets (Surface Mount)

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Buttons for Six Timer Presets. TMR219C-SM11
- Buttons for Fourteen Timer Presets. TMR219C-SM19
- Display: 8 digit alphanumeric, 0.45" high.
- LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Optional Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Optional RS-232 Serial port.
- Optional RS-485 Serial port.
- Optional Ethernet port with integrated time server and web server
- Enclosure: Black painted metal.
- Dimensions: Surface mount W=6.25", L=5", H=2"

DSP204C0 - Large display with 2-1/5 inch high digits.

- - Display: Red LED, 4 digits, 2.6" high.
- - Optional LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- - Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- - Enclosure: Black painted metal. Optional OAK Ends may be added.
- - Alternative enclosure: Full oak surround.
- - Dimensions: Table Top W=10.5", L=5", H=1.5" (metal)
- - Dimensions: Table Top W=12", L=6.25", H=2" (full oak surround)

DSP204C5 - Large display with 2-1/5 inch high digits with integrated clock/timer.

DSP204C6 - Large display with 2-1/5 inch high digits with integrated clock/timer.

- Knob for setting times and other values.
- Button for Timer Start/Stop.
- Button for Timer Reset.
- Button for Time of day Clock.
- Button for Timer Mode selects count up/down and enables beeper.
- Button for Timer Select selects setting hours/minutes/seconds and warning times.
- Optional Button for One Timer Preset.
- Display: Red LED, 4 digits, 2.6" high.
- Optional LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- LEDs to display timer mode: Beeper status, Count Up/Down.
- LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- Enclosure: Black painted metal. Optional OAK Ends may be added.
- Dimensions: Table Top W=10.5", L=5", H=1.5" (metal)
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DSP254C0 - Large 4 digit display with 2-1/5 inch high digits.

DSP256C0 - Large 6 digit display with 2-1/5 inch high digits.

- - Display: Red LED, 4 digits, 2.6" high.
- - Optional LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- - LEDs to display timer mode: Beeper status, Count Up/Down.
- - LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- - Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- - Optional RS-232 Serial port.
- - Enclosure: Black painted metal. Optional OAK Ends may be added.
- - Dimensions: Table Top W=10.5", L=5", H=1.5" (metal)

DSP254C6 - Large 4 digit display with 2-1/5 inch high digits with integrated clock/timer.

DSP256C6 - Large 6 digit display with 2-1/5 inch high digits with integrated clock/timer.

- - Knob for setting times and other values.

- - Button for Timer Start/Stop.
- - Button for Timer Reset.
- - Button for Time of day Clock.
- - Button for Timer Mode selects count up/down and enables beeper.
- - Button for Timer Select selects setting hours/minutes/seconds and warning times.
- - Button for One Timer Preset.
- - Display: Red LED, 4 digits, 2.6" high.
- - Optional LEDs to display warning times: Green-Running; Yellow-Warning; Red-Done.
- - LEDs to display timer mode: Beeper status, Count Up/Down.
- - LEDs to display time of day clock status: AM/PM, Clock SYNC status.
- - Four Remote Ground Closure inputs. Timer start, Stop and reset, Tallye Count.
- - Optional RS-232 Serial port.
- - Enclosure: Black painted metal. Optional OAK Ends may be added.
- - Dimensions: Table Top W=10.5", L=5", H=1.5" (metal)

## Technical Description.

This section contains information that might be useful for system designers, system integrators and installers.

### Power up

When the unit is first powered up all the LEDs come on and the message "Hello" is displayed in the display.

### Firmware Version Control

After the unit is first powered up, and before the knob is turned, the version number can be displayed.

- Press the Reset button.
- Press and hold the Select button until the display changes. The first half of the version number is displayed.
- Press the Select button again. The second half of the version number is displayed.

A typical version number is 29-51. The first half is 51 and the second half is 29.

## Jumper strap configurations.

### Standard configuration

In the standard configuration, the transmit data and receive data signals are connected together. Both RJ-11 serial data connectors are identical and default as inputs.

When the first command is received after turning on the unit, the operational mode of the unit is determined.

- If the first command received is from the serial port, the unit is locked into remote display mode. The unit will accept "DSP", "TME" and "RLY" commands on the serial port.
- If the first command received is from a front panel button press, the unit is locked into controller mode. The serial data transmit port is enabled. The transmit data signal is changed into an output. The unit will transmit "DSP", "TME" and "RLY" commands on the serial port.

### Optional configuration one

In the optional configuration one, the transmit data and receive data signals are not connected to each other. Master clock systems will typically use this configuration.

- The RJ11-J2 connector transmits data out to other units on DATA 1 and receives data on DATA 3.
- The RJ11-J3 connector transmits data out to other units on DATA 3 and receives data on DATA 1.

- The DATA 2 pin on both RJ11-J2 and RJ11-J3 carry the 50/60Hz sync signal.
- Use 4-conductor modular cord when single directional communications is required. RJ11-J2 is typically used for transmit data. RJ11-J3 is typically used for receive data.
- Use 6-conductor modular cord when bi-directional communications is required.. RJ11-J2 is typically used for transmit data on DATA 1 and receive data on DATA 3. RJ11-J3 is typically used for receive data on DATA 1 and transmit data on DATA 3. RJ11-J3 is typically used for transmit and receive data to and from a PLC or other controller. The RS232 or RS485 interface option is required.

### Optional configuration two

In the optional configuration two, the transmit data and receive data signals are not connected to each other. Remote terminal operation will typically use this configuration.

- The RJ11-J2 connector transmits data out to other units on DATA 1.
- The RJ11-J3 connector transmits data out to other units on DATA 2 and receives data on DATA 1.
- The 50/60Hz sync signal is not connected to either of the RJ11 connectors.
- Using 4-conductor modular cord. RJ11-J2 is typically used for transmit data. RJ11-J3 is typically used for transmit and receive data to and from a PLC or other controller. The RS232 or RS485 interface option is required.

See the specific applications on how these optional configurations are used.

### Battery Operation.

The unit goes into a shutdown mode if left idle for fifteen minutes or more while operating from batteries. Shutdown mode simply turns off the display. The time of day clock continues to run. Pressing any button or applying 60Hz sync restores the unit to normal mode. In remote display mode, when serial data is received, normal mode is restored.

Keep the timer awake if any of the following are true.

- DC power is applied.
- 50/60 Hertz signal being received.
- The timer is running.
- Buttons are being pressed.
- Data is being received on the serial port.

*To manually force the unit into shutdown mode, press the START and RESET buttons simultaneously.*

## DC power status checking and the 50/60Hz SYNC signal.

The unit will accept either 50Hz or 60Hz line frequencies. It will auto detect which line frequency is being received.

The DC power status can be checked by observing the 60Hz SYNC signal.

- Steady logic low indicates battery operation.
- Steady logic high indicates DC power applied.
- Pulsing at the 60 Hz rate indicates 60 Hz AC power applied.
- Pulsing at the 50 Hz rate indicates 50 Hz AC power applied.

## Clock SYNC signal status monitoring system.

An indicator that visibly indicates whether the 50/60Hz sync is being received. In the timer mode, the PM LED is held on permanently if no 50/60Hz sync is detected.

While in clock mode, the center colon reflects same info as the yellow Clock LED. The clock LED will be used to indicate the status of the clock SYNC signal. When the clock LED is off, the unit is in the timer or tally mode.

### No sync signal is being received.

- The clock LED is on steady.
- When the clock LED is on steady, no sync signal is being received.
- In this mode the clock is the least accurate. In this mode, the clock has an accuracy of 0.01 percent.

### The 32KHz is generating the sync signal.

- The clock LED flashes once every 2 seconds.
- When the clock LED is making very short flashes one per second, the internal 32KHz crystal is generating the SYNC signal.
- In this mode the clock is the much more accurate. In this mode, the clock has an accuracy of 20 parts per million.

### External 50hz sync has been detected.

- The clock LED blinks on/off every 2 seconds.
- When the clock LED is on for two seconds, then off for two seconds, etcetra, the timer is receiving a SYNC signal from a 50Hz AC line.
- In this mode the clock is the most accurate. The clock is as accurate as the AC line frequency. In most countries the accuracy is within one second per year.

### External 60hz sync has been detected.

- The clock LED blinks on/off once per second.
- When the clock LED is on for one second, then off for one second, etcetra, the timer is receiving a SYNC signal from a 60Hz AC line.
- In this mode the clock is the most accurate. The clock is as accurate as the AC line frequency. In most countries the accuracy is within one second per year.

## Timer Mode.

- The TMRhhmm remotely sets the count down timer initial value.

## Clock Mode.

### Receiving

- The TME command accepts hours, minutes and seconds. TMEhhmmss
- When the unit is in the timer mode and the jumper straps are set to the standard configuration, the TME command is ignored.
- When the unit is in the remote display mode, the TME command updates the internal time of day clock.

### Transmitting

- When the unit is in the timer mode and the jumper straps are set to one of the alternate configurations where the transmit data and receive data are not connected together, the TME command updates the internal time of day clock.
- The "TMEhhmm" is transmitted once per minute to keep the remote displays updated with the correct time of day.

## Default Clock Mode.

### Receiving

- The TMEE command disables the default clock mode.
- The TMEF command enables the default clock mode.

## Programming

Not all features are supported on every model. When ordering, be sure to specify the features that are required for your application.

### **DSP Display command (in or out)**

Send or receive a serial data stream DSPxyxx<CR>

- xx = Digits to be displayed on the seven segment display.
- y = Colon or period between digits.

On seven segment displays, only certain characters can be displayed. Non-displayable characters will appear as a minus(-). The letter Z will appear as two "L"s.

This command supports all the special characters of alphanumeric displays except the character codes 0AH and 0DH. These are terminator characters <CR> and <LF>.

NOTE: The only buttons will be active are the clock button and the Timer Reset button, all other buttons are ignored.

- The CLOCK button displays the time of day.
- The TIMER RESET button displays the remote display value.

### **RLY Status command (in or out)**

Send out a serial data stream RLY@nsldd<space> once per second.

The bit pattern for "nsl" is: "01xxxxxx". All bit combinations will generate legal ASCII characters. If all bits "x" are zero, the equivalent ASCII character is "@". Example: If the red indicator is on, the bit code will be "01000001". The equivalent ASCII character is "A".

where: n = Red-yellow-green status.

- Bit 7 = 0
- Bit 6 = 1
- Bit 5 = Remote Display: 1=Right Justify, 0=Left Justify
- Bit 4 = Beep the speaker.
- Bit 3 = Timer Running.
- Bit 2 = Green Indicator.
- Bit 1 = Yellow Indicator.
- Bit 0 = Red Indicator.

When the DSP command is received by a remote display and the number of characters in the command is greater than the number of digits in the display not all the digits can be displayed.

Left Justify - The first digits received are displayed.

- DSP123456 Only 1234 are displayed on a 4 digit display.

Right Justify - The last digits received are displayed.

- DSP123456 Only 3456 are displayed on a 4 digit display.

LEDs on either side of seven segment display.

where: s = Status of digit\_leds.0 to 5

- Bit 7 = 0
- Bit 6 = 1
- Bit 5 = D1 Lower Left side
- Bit 4 = D2 Lower Right side
- Bit 3 = D3 Middle Left side
- Bit 2 = D6 Middle Right Side
- Bit 1 = D5 Upper Left Side
- Bit 0 = D4 Upper Right Side

where: 1 = Status of digit\_leds.6,7 and other LEDs

- Bit 7 = 0
- Bit 6 = 1
- Bit 5 = 0
- Bit 4 = 0
- Bit 3 = 0
- Bit 2 = 0
- Bit 1 = LED above clock button. (bi-color LED)
- Bit 0 = LED above clock button.

where: dd = Dimmer value in the range 00 to 99

### **TME Command (in or out)**

send out a serial data stream TMEhhmmssMMdd<CR>  
Abbreviated version "TMEhhmmss"

where:

- TME = Header.
- hh = hour. (00 to 23)
- mm = Minutes. (00 to 99) or (00 to 59)
- ss = Seconds. (00 to 59)
- MM = Month. (01=Jan to 12=Dec)
- dd = Day of month. (00 to 31)
- <CR> = Carriage return, Linefeed.

*NOTE: The month and day feature is not installed unless specifically ordered.*

When the unit is in controller mode, one of the following commands is sent.

- TMEE = Send TMEE when the RESET button is pressed.
- TMEF = Send TMEF when the CLOCK button is pressed.

### **TME Command (in only)**

The TMEc command was received.

where "c" is a single character command.

TME@ = Ignore the command.

TMEA = Start the timer.

TMEB = Stop the timer.

TMEC = Stop and Reset the timer.

TMED = Reset the timer Leave timer running if it was already running.

TMEE = Clear the default clock mode.

TMEF = Set the default clock mode.

TMEG = Set the count up mode.

TMEH = Set the count down mode.

TMEI = Beep the beeper.

TMEJ = Set the beeper mode to off.

TMEK = Set the beeper mode to on, beep at red warning time.

TMEL = Set the beeper mode to on, beep at green, yellow, red warning times.

TMEM = Change the display to clock mode.

TMEN = Tally Mode. Count up by one.

TMEO = Tally Mode. Count down by one.

TMEP = Tally Mode. Reset.

*Note: the tally commands are not implemented unless specifically ordered.*

TMRmms = Set the count down initial timer preset value 00:00 to 99:59 minutes and seconds. The TMRC (timer reset) command must be sent after sending the TMRhmm command for the new initial timer preset value to take effect.

### **"K Key and knob commands (out only).**

This unit can send and receive commands from a controller or computer via a bi-directional serial port. A button press on the timer generates a command that is sent to the host.

*NOTE: The "L command initiates the remote display mode. Button presses and knob turns on a timer that is in the remote display mode will generate "K commands rather than activate the normal functions.*

"K+n<CR><LF> Knob turned forward (timer to host). where "n" is an integer value 1 to 7 indicating the number of knob ticks turned since the last "K+n command.

"K+2 Knob turned forward 2 ticks.

"K-n<CR><LF> Knob turned reverse (timer to host). where "n" is an integer value 1 to 8 indicating the number of knob ticks turned since the last "K+n command.

"K-3 Knob turned reverse 3 ticks.

"KPx<CR><LF> Key press (timer to host).

where "x" is the key value in the range @=no button pressed, A=Button 1 to Z=Button 26

*Note: Typically, you should ignore the numeric value associated with the "K commands.*

"KPA-KPD B1 --> B4, B5, B6, B7 (DSP-221C)

"KPE-KPH B2 --> B4, B5, B6, B7 (DSP-221C)

"KPI-KPL B3 --> B4, B5, B6, B7

"KPM-KPP C5 --> B4, B5, B6, B7

"KPQ-KPT E0 --> B4, B5, B6, B7

"KPU-KPX Remote ground closure inputs A0, A4, A5, E1

"KPA - Mode (count up/down)

"KPB - Select (min/sec)

"KPE - Aux 3

"KPF - Aux 2

"KPG - Aux 1

"KPH - Clock mode

"KPR - Reset timer

"KPS - Start/Stop timer

"KPT - Config mode.

Pressing and holding any button generates the lower case of the respective button. If the Mode button is pressed and held for 2 seconds or more, the "Kpa command is generated instead of "KPA.

### **"L Display command (in only)**

"Lnxxx...xxx<CR><LF> Send ASCII text string (host to timer) where "xxx...xxx" is an ASCII test string of one or more characters.

where "n" is the line number where the test is to be placed. In our case the display is only one line long. The line number must always be "0".

On seven segment displays, only certain characters can be displayed. Non-displayable characters will appear as a minus(-). The letter Z will appear as two "L"s.

This command supports all the special characters of alphanumeric displays except the character codes 0AH and 0DH. These are terminator characters <CR> and <LF>.

*NOTE: The "L command initiates the remote display mode. Button presses and knob turns on a timer that is in the remote display mode will generate "K commands rather than activate the normal functions.*

### **"S LED Status command (in only)**

"Ss<CR><LF> Send the status of the LEDs (host to timer).

LEDs on either side of seven segment display.  
where: s = Status of the LEDs 0 to 5

- Bit 7 = 0
- Bit 6 = 1
- Bit 5 = D1 Lower Left side
- Bit 4 = D2 Lower Right side
- Bit 3 = D3 Middle Left side
- Bit 2 = D6 Middle Right Side
- Bit 1 = D5 Upper Left Side
- Bit 0 = D4 Upper Right Side

where: l = Status of digit\_leds.6,7 and other LEDs

- Bit 7 = 0
- Bit 6 = 1
- Bit 5 = 0
- Bit 4 = 0
- Bit 3 = 0
- Bit 2 = 0
- Bit 1 = LED above clock button. (bi-color LED)
- Bit 0 = LED above clock button.

### **Tally function, alarm function and display dimmer function.**

Hold reset depressed while pressing SELECT button to enable QLITES function Pressing the AUX1, AUX2 and AUX3 buttons sends out the "RLY02", "RLY03" and "RLY03" commands respectively on the serial port. (special order)

Hold reset depressed while pressing AUX 2 button to enable the TALLY function.

Pressing the AUX 1 button toggles between the high and low dimmer values. Turn the knob to change the selected dimmer value (00 to 99). 00 = OFF, 99 = Maximum brightness.

Pressing the AUX 2 button displays the TALLY value and transmits the six digit TALLY value on the serial port "DSPxxxxxx". Pressing the SELECT button toggles

between setting the lower middle or upper digit pair of the TALLY value.

- Press SELECT. Turn the knob to change the lower 2 digits.
- Press SELECT. Turn the knob to change the middle 2 digits.
- Press SELECT. Turn the knob to change the upper 2 digits.
- Press SELECT. Returns to displaying the lower 4 digits. Knob disabled.

Pressing the AUX 3 button displays the month and day. The month and day will be displayed on the remote display. Pressing the SELECT button toggles between displaying the Month and Day and setting the month of the year and setting the day of the month.

### **Scoreboard Mode**

- Hold reset depressed while pressing AUX 3 button to enable SCORE function. The current timer value and the three score values are displayed on the remote display.

- Press the AUX 1 button to display score 1 (PERIOD).
- Turn the knob to change the score.
- Press the AUX 2 button to display score 2 (VISITORS).
- Turn the knob to change the score.
- Press the AUX 3 button to display score 3 (HOME).
- Turn the knob to change the score.
- The MODE button changes function. When the MODE button is pressed, the horn (or beeper) is sounded.

### **Alarm mode.**

Press the AUX2 button to change the alarm mode. Press the AUX2 button to select alarms 1 through 4. Turn the knob to change the alarm function.

- Hold reset depressed while pressing CLOCK button to enable ALARM function.
- Press the AUX 1 button to select which alarm (1 to 4) to display.
- Set the mode to "00" to disable the selected alarm  
Mode 00 = Alarm disabled.  
Mode 01 = Select the high dimmer value.  
Mode 02 = Select the low dimmer value.  
Mode 05 = Turn relay 1 on.  
Mode 06 = Turn relay 1 off.

Mode 09 = Turn relay 2 on.  
Mode 10 = Turn relay 2 off.  
Mode 13 = Turn relay 3 on.  
Mode 14 = Turn relay 3 off.  
Mode 17 = Turn relay 4 on momentarily.  
Mode 18 = Turn relay 4 off.

Press the AUX 3 button to change the time of the selected alarm.

Pressing the SELECT button toggles between setting hours and minutes.