T24 Timer and Software User Guide

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Introduction

The T24 timer is a stand-alone multi-channel timer that controls by relays alone, or relays plus T24 0-10V Receiving Modules, four circuits. The timer has a 2-line LCD display and a menu system where the basic functions of the timer can be configured. In addition, you can connect the timer by a USB or network connection and perform that configuration from the T24 software.

In the first section of this User Guide the basic operation of the T24 timer and its menu system is described. In the second section describes the T24 software, its features, and facilities for working with the T24 timer.

For information on installation consult the T24 Timer Wiring Guides.

The T24 Timer Basics

The T24 timer has simple front panel controls. There is a row of four buttons, a row of four LEDs, and a second row of four buttons. There is a USB port for connecting the timer to a computer for setup using the T24 software. If the optional network board is installed, there is a location to plug in a network cable.

The first row of buttons is for the built-in menu system and is used to configure the timer for installations with simple requirements. The second row of buttons is used to control any channel configured as an output. The button action depends upon if the timer is configured for simple ON/OFF actions or by T24 commands which, using a T24 0-10V receiving module, controls fixtures to levels – by default, 100%, 70%, 40%, 70%, and OFF.

If the timer is configured for ON/OFF then the action of the button toggles an output channel on and off. If the timer is configured for level control then each press of the button changes the level to the next step. That is, from OFF to 10%, 10% to 40%, 40% to 70%, 70% to 100%, and 100% to OFF.

If a channel is configured as an output, the LED shows the state of the channel – when the LED is ON the output is ON and when OFF the output is OFF.

If a channel is configured as an input – occupancy sensor, switch, or demand response – the button for that channel has no effect. The LED shows if the input is currently ON or OFF.

There are two ways to configure the timer: Using a Windows software application – available for download from the PCS web site – or by using a menu system built into the timer itself. Before describing both methods, it is first necessary to understand the limits of the timer when using the built-in menus. This may help you choose which method you want to use.

Basic and Advanced mode

The timer can operate in one of two modes: *Basic* or *Advanced*. In basic mode there are a number of limitations on the timer configuration.

The limitations of basic mode are:

- Scheduling is only done in weekly mode. Calendar schedule mode is unavailable.
- Only one schedule in the timer can be accessed.
- Only the first 99 entries of the schedule can be viewed and/or updated.
- All channels of the timer are output only. This means that a channel can't be configured as an occupancy sensor, switch input, or demand response input.
- In basic mode the outputs can support multiple levels if the controlled fixtures have the T24 0-10V receiving module installed. However, in basic mode, access to the table that defines what those levels are is not available. The levels are fixed at their factory default values.

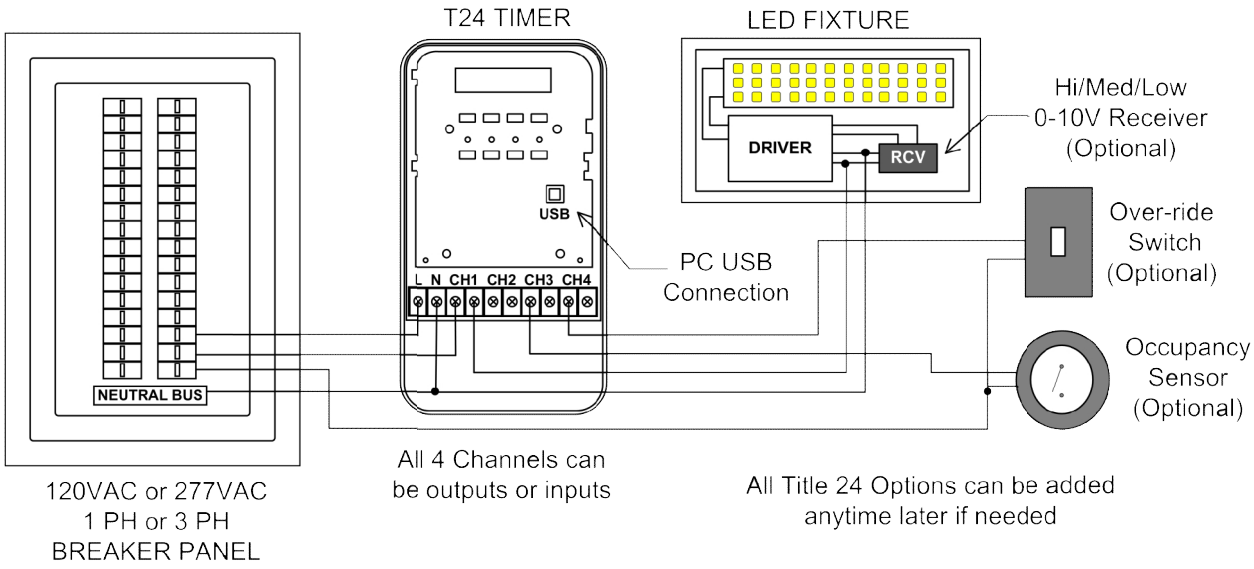
In advanced mode these limitations are not in place.

If you plan on configuring or modifying the timer using both the T24 software and also the menu system on the timer, then you should leave the timer in basic mode. If you don’t do this, then it may become confusing because the timer menu system can’t show all the options that the T24 software can configure.

Wiring Diagram

Additional information can be found on our web site at PCSLighting.com.

FIGURE 1 TYPICAL TIMER WIRING



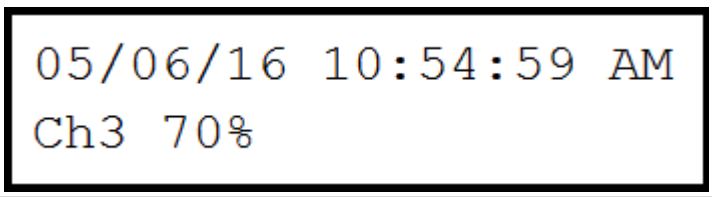
Timer Home Screen

The Home screen shows the date and time, and on the second line the display shows the state of each channel. It shows the state of one channel, and after a few seconds the display changes to show the state of the next channel. To show the state of other channels press the up or down buttons.

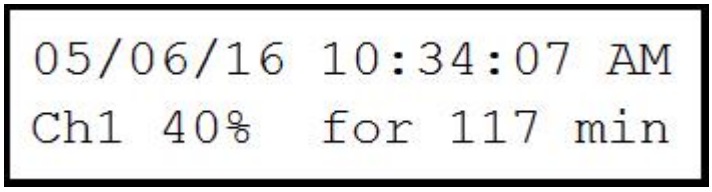
For an output channel, the display shows the level (ON/OFF or percentage) and if suspended or not. If suspended it shows “Suspended!"

For an input channel the display shows the state of the input – ON or OFF, the kind of input attached to the channel (OC = Occupancy sensor, SW = Switch, DR = Demand Response), if the input is enabled or disabled (ENA = Enabled, DIS = Disabled), and if the channel is suspended or not (Suspended = “Susp”).

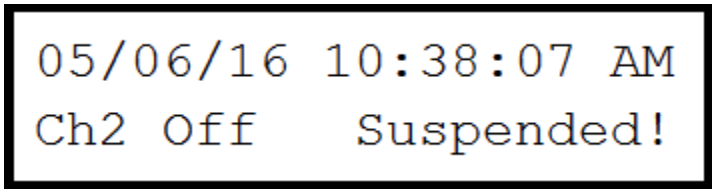
Home screen examples:



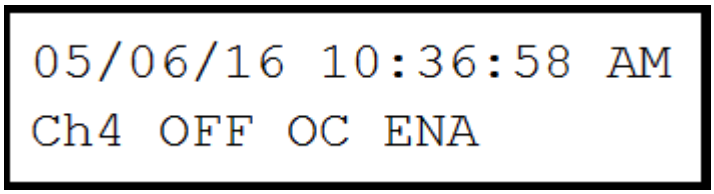
Channel 3 is at 70%.



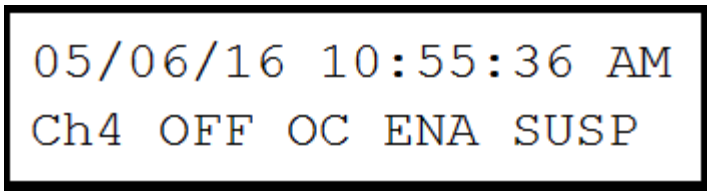
Channel 1 is at 40% and was set to that level by manual action – by pushing the channel button. *For 117 min* tells you that in just under 2 hours it will automatically change to its set point.



Channel 2 is off and suspended from control by the schedule.



Channel 4 is an input configured for an occupancy sensor. The sensor is currently off and it is enabled.



Channel 4 is an input configured for an occupancy sensor. The sensor is currently off and it is enabled but suspended.

If a channel is *suspended* then any event in the schedule that would control that channel has no effect. This gives you a way to disable schedule control of a channel without removing schedule entries. Both output and input channels can be suspended.

Input channels can be enabled or disabled. If an input is *disabled* from its normal action – for example controlling an output to channel to 100% - doesn't happen. This gives you a way to use the schedule to enable inputs only during certain times of the day. This is described in greater detail in a later section of this user guide.

To begin using the timer menu system, press the left most button ("OK") and the menu opens.

Working with the Timer Menus

This section describes the timer menu system and how it can be used to configure timer options, view state, and edit timed events.

General methods when using the timer menus

All actions with the timer menus use the top row of 4 buttons. The actions of these buttons are:

- The up and down buttons – middle two – move from option to option or change from choice to choice.
- The OK button (left button) commits your choice.
- The Exit button (right button) exits the operation.

When the display shows text that is blinking, the option represented by that text is changed by using the up and down buttons – they cycle though your choices. To commit the change, press the OK button.

For example, when setting the clock, the first option - day of the week - will be blinking. Pressing the up button changes *Monday* to *Tuesday* and the down button changes *Monday* to *Sunday*. When you have selected the day of the week you want, commit the change with the OK button.

The next field then begins blinking – in this case the month – and that can be changed in the same manner. When all fields of the clock are set as you want, press the Exit button to leave clock setting.

To quickly move from field to field without making any changes, just press the OK button.

All the operations with the T24 timer menu work the same: The option able to be changed is blinking, up and down buttons move though the option choices, the OK button commits the change and moves to the next field.

Timer Menu

The timer menu contains these options and performs these functions:

1. Set Clock
   Sets the timer clock.

2. Set Location
   Sets the timer location by entering the latitude, longitude, time zone, and if daylight saving time is supported in your location, what the DST start and end dates are (USA or Mexico rules).

3. Edit Events
   The first 99 timed events in schedule 1 can be edited.

4. Channel Mode
   If a channel is suspended or not. When a channel is suspended it is not affected by any timed event that referenced that channel. This is a way to temporarily stop a schedule from acting upon a channel without removing the schedule entries.

5. Timer Options
   There are three options that can be configured from this menu:
   a. Remote Access
      Does the USB port or optional network board allow connections to the timer?
   b. Set Levels in Events
      Do timed events contain only ON or OFF or do they contain percentages that are communicated to the channel using T24 commands?
   c. 2 Hour Override
      If a channel is manually controlled does it stay at that level for 2 hours before automatically being returned to its set point as determined by the schedule?

6. View Sun Times
   Show the sunrise and sunset times as determined by the timer given the date and location.

7. Clear Schedules
   Clears all entries for all schedules. When selected you have to change “No” to “Yes” and press the OK button to cause the schedules to be cleared. The timer beeps to show that this was done.

8. Reset All
   Return all timer settings to the factory defaults. When selected you have to change “No” to “Yes” and press the OK button to cause the reset to occur. The timer beeps to show that this was done.

9. About Timer
   Display the timer firmware version.

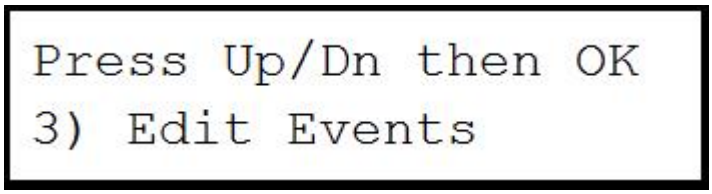
10. Exit Menu
    Exit the menu and return to the timer home screen.

Editing Timed Events

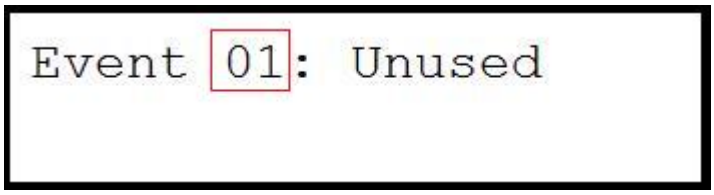
As an example, the following procedure adds an event to the timer schedule. The example event to be created is:

`Channel 1 to 70% at 30 minutes before sunset Monday to Friday.`

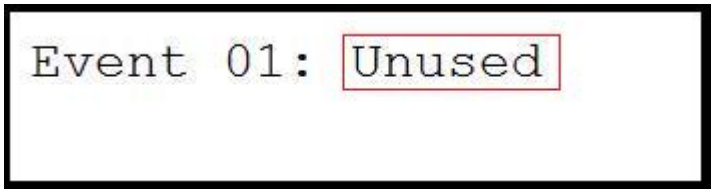
Once the menu system is opened (press OK button), move to “Edit Events”.



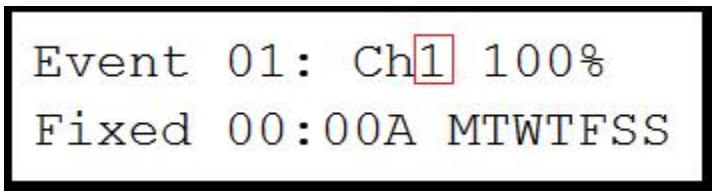
Press OK to begin



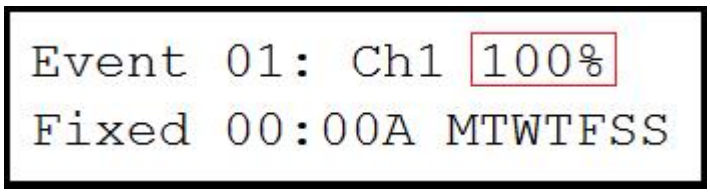
“01” is blinking. Press OK to edit the first event in the schedule.



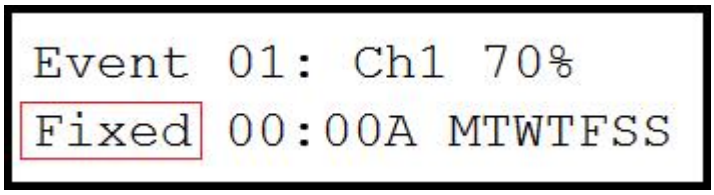
“Unused” is blinking. Press the down arrow to change from "Unused".



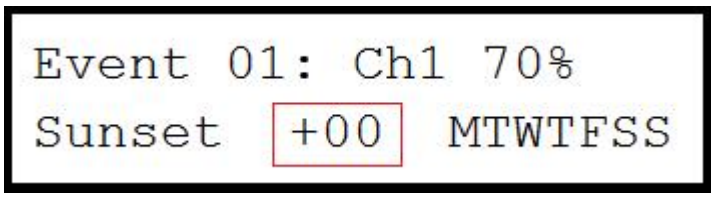
The display changes to show the event. The “1” in CH1 is blinking. Press OK.



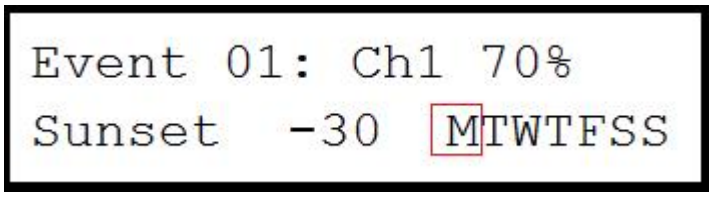
"100%" is blinking. Use down button to change to 70%. Press OK.



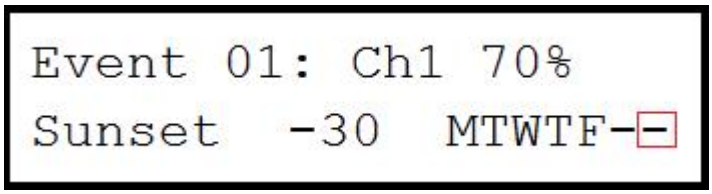
"Fixed” is blinking. Use down button to change to “Sunset”. Press OK.



"+00" is blinking. Use down button twice to change to -30. Press OK.



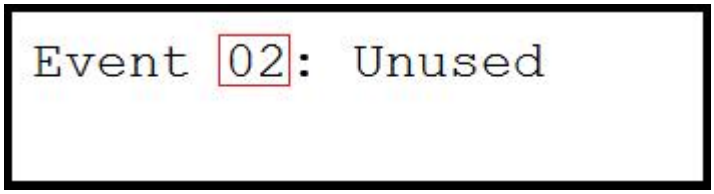
"M"– for Monday – is blinking. The up and down buttons toggle the day as included (shows letter for the day) or excluded (shows "- ").



Use OK button to move to S – Saturday – and exclude then press OK and move to Sunday and exclude.

Finally, use the Exit button to save the timed event into the schedule and exit editing events.

If you wanted to add another event rather than using the exit button, you could use the OK button to move back to the event number and then use the up button to move to event two and edit that event.



Restarting and/or clearing the timer

There are several ways to restart and/or clear the timer to factory defaults.

<u>To restart the timer and clear to factory defaults</u>
Hold down the top right button (labeled *Exit*) while power cycling the timer. When it restarts, release the button and the display shows "Set Factory Defaults / OK to continue. Press the *OK* button to reset the timer. Press the *Exit* button to cancel the reset and clear.

<u>To restart the timer</u>
If the timer has a visible push button or a hole where a "bent paperclip" can be poked though the hole to a pushbutton, press and release that button to reset. The timer restarts and all

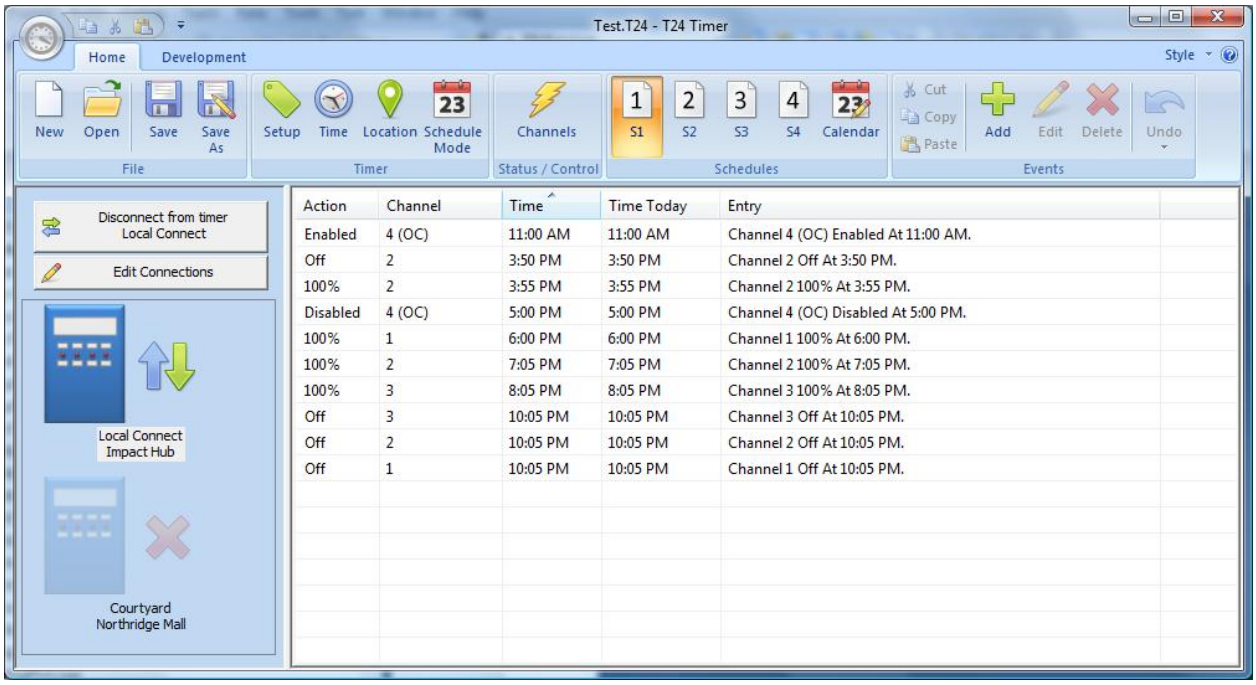
settings are preserved. This can also be accomplished by power cycling the timer without pressing any buttons.

To clear the timer back to factory defaults
The timer menu system has an option (#8) that clears the timer to factory defaults.

T24 Software

The T24 software is a Windows application available for download from the manufacturer web site. It runs on any post-XP version of Windows with minimum processor, disk, and memory resources.

Once started, the T24 software application window displays:



The basic sections of the application are:

- Ribbon containing buttons for the actions you can perform.

- The left pane contains icons for each timer you have defined a connection for. The name and location of the timer is shown below the timer icon. If the T24 software is currently connected to a timer then the connected icon (blue and green arrows) show next to it. If the software isn't connected to that timer a red X displays. At the top of the timer list are two buttons: the top one is to connect to and disconnect from the selected timer. The next button opens the connection editor. Only one timer can be connected at a

time.

- The right pane of the shows the timed events associated with one of the four schedules. In the above image schedule 1 is the displayed schedule and the 10 events in that schedule are shown. To change to one of the other schedules, press one of the schedule buttons in the ribbon. The event list is organized in columns and operated like many other Windows programs you may be familiar with. You can resize the columns by dragging the column header wider or narrower. You can sort on that column by clicking on the column header.

- The application menu is accessed by clicking on the "bubble" at the left end of the ribbon. This dialog contains basic file operations (also available directly from the ribbon), a print option, facilities for working with a network connected timer, and some additional infrequently used operations.

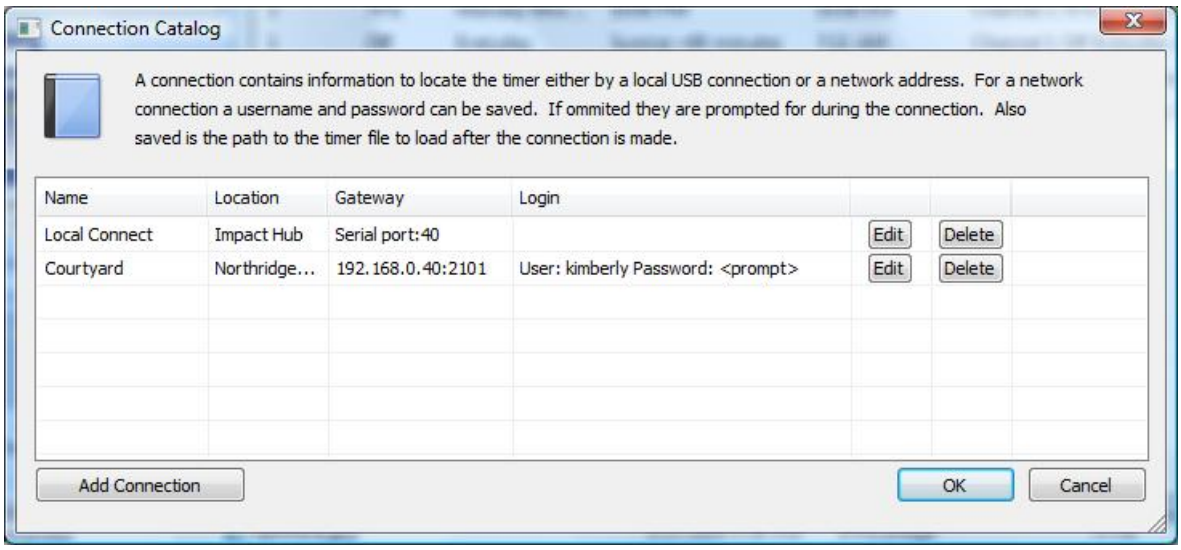
Connections

The T24 software can connect to and program multiple timers installed in multiple locations. This is done by having multiple connections defined. A *connection* contains all the information needed to connect to a timer – its network address or local communication port – and also the file associated with that timer.

NOTE: For the T24 software to connect to a timer the *Remote Access* option must be enabled. This is only changeable from the timer menus.

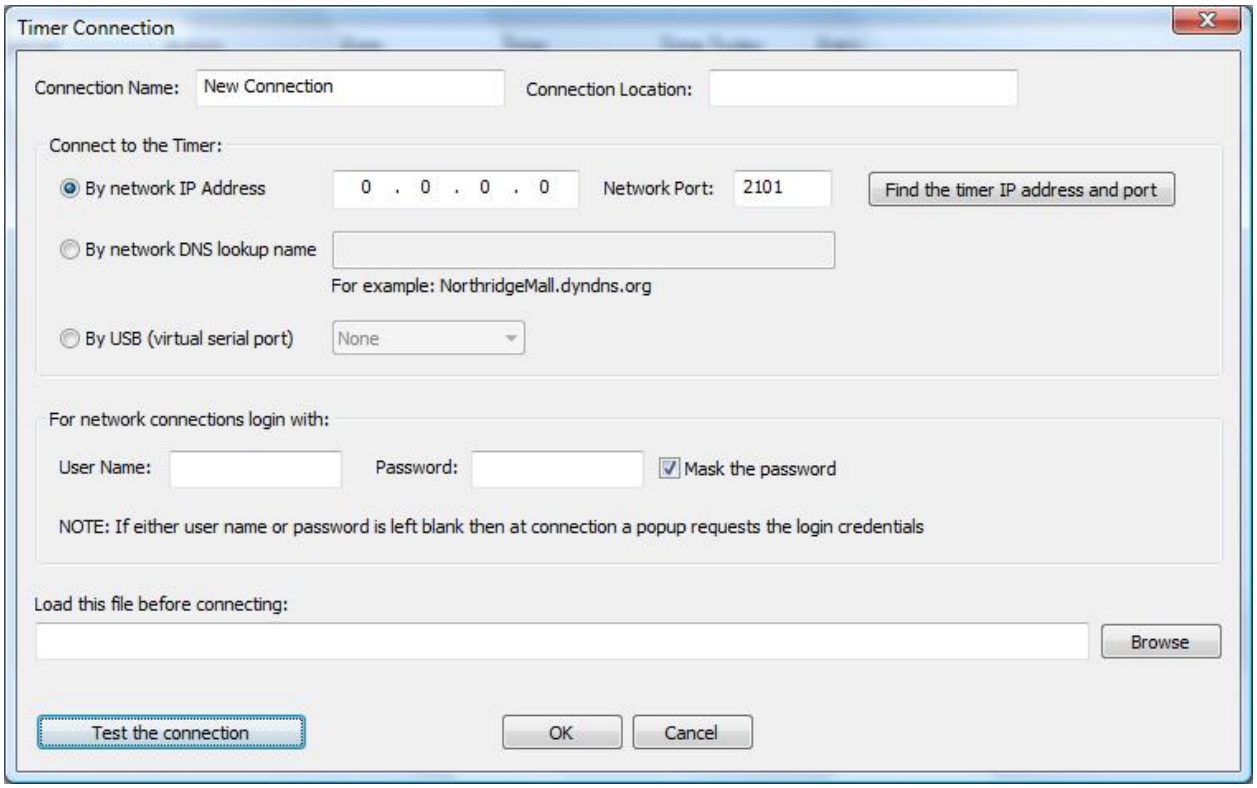
Creating Connections

The first step in using the T24 software is to create a connection to the timer you want to configure. Press the "Edit Connections" button in the left pane. This dialog opens.



This dialog lists all the connections already defined and also gives you the ability to modify and delete them. You can also create a new connection using the *Add Connection* button at the lower left.

Tip: All the connections that you create are saved in a file named TimerConnections.*gcat* stored in the T24 timer folder in your documents area. This file can be backed up and also copied to other computers.



A connection is composed of several parts:

- The connection name and location
  This is displayed in the main window timer list so you can identify which timer is which.

- The connection info
  You can connect to a timer using the computer USB port, or if the timer has the optional network board installed, via a network connection. If a network connection is chosen then you can enter the four part IP address or, if a Dynamic DNS system is used, the name that resolves to the timer current IP address.

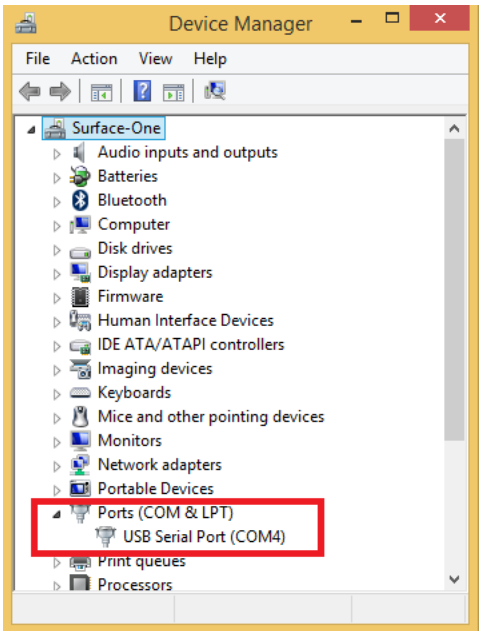
- Security
  If a network connection is in use, then the user name and password can be supplied. If they are not supplied, then upon connection you will be prompted for them.

- File
  The timer software can both read and write to the timer memory but it can also save the schedules and timer options in a file for backup or offline modification. If working with multiple timers, you can have the software automatically load a timer file when the connection is made. This allows you to quickly access the correct timer file if you are managing multiple timers.

The *Test the connection* button at the lower left lets you test the connection to the timer after you enter or modify the connection settings to make sure you have them correct.

Once you close the connection editor, the connection info is saved and the connection list updated.

<u>Local connection considerations</u>
When working with a local connection you must determine the virtual serial port that the USB device driver creates when the timer is plugged in to your USB port. This can best be determined from the Windows Device Manager opened from the Windows Control Panel.



On this computer the timer was plugged into the USB port and COM4 was created. This is the port to use in the connection editor.

Network connection considerations

When working with a network connected timer you need to know its IP address and how the network adapter was assigned an IP address. This can be complex to determine and a later section of this user guide provides information on that. If the timer network adapter is connected to the same local network as the computer running the T24 software, you can use the *Find the timer IP address and port* button to locate it.

Also associated with the timer is a network port. The optional network board for the T24 Timer uses port 2101.

Updating connections

To update an existing connection press the *Edit* button in the connection list or double-click the connection row. When editing a connection all of the parts of the connection can be modified. To save the changes close the edit dialog with OK.

You can delete unneeded connections by pressing the *Delete* button on that connection row in the list. There is no undo operation so delete carefully. If you make a mistake just cancel the connections dialog and all the changes and/or deletions are not saved.

Connecting to a Timer

Once you have created one or more connections you can then connect to a timer. In the main windows select the connection wanted in the left list – the connect button updates to show the name of that connection - and then press the *Connect* button.

These steps are then performed:

1. The USB port or network connection is opened and the connection is verified by reading the timer firmware version.

2. The timer options are read.

3. The schedules – and calendar if in calendar scheduling mode – are read.

4. If you have a timer file loaded before connecting, there may be differences between what is in the file and in the timer memory. If there are, the T24 software contains facilities to report and resolve these differences. This is described in a later section of this user guide.

If a connection can't be made to the timer an error displays and you should check that you have configured the connection properly with the correct IP address or communications port selected.

Main Timer Options

The T24 Timer has a number of options that, when adjusted, let its capabilities match the needs of the installation. This next section describes the main options that effect how schedules are created and how they operate. A later section of this user guide covers another set of options that affect other aspects of the timer operation.

Scheduling mode – weekly and calendar

The Timer supports two types of scheduling. The first is called w*eekly* scheduling. Each timed event happens on one or more weekdays or a weekday range (for example, Monday to Friday) and each week is the same for all 52 weeks of the year.

The T24 timer supports 4 schedules. This makes it possible, for example, to have a schedule for normal use, and another schedule for a vacation period or when the facility is closed. At any given time the timer is working with one schedule – called the "current" or "active" schedule -

which is chosen by you. There are facilities in the Timer remote applications to select the current schedule.

The important point of weekly scheduling is that while there are multiple schedules only one is active at a time and the active schedule is changed only by your action.

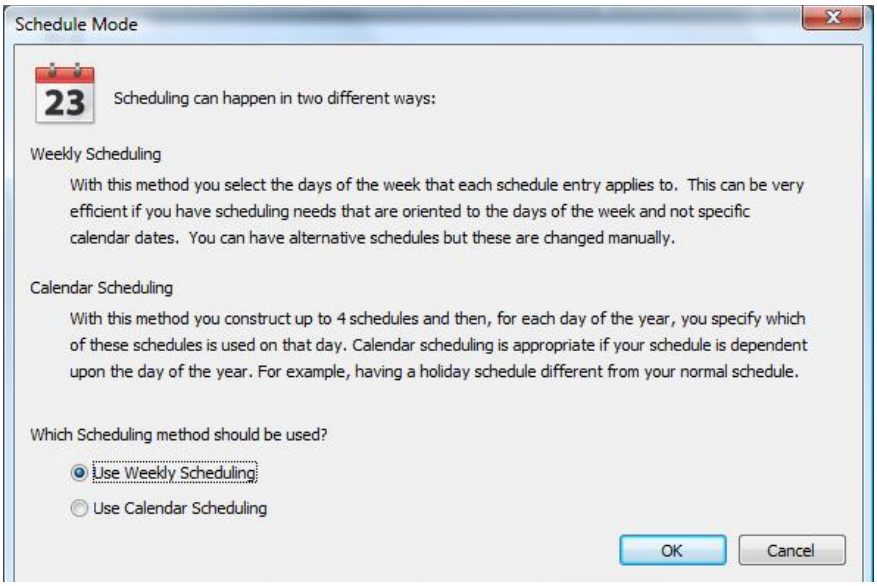
In *calendar* scheduling there are also 4 schedules. But unlike weekly scheduling, in the timed events there are no days of the week specified. Instead each day of the year is associated with one of the four schedules. At midnight the timer looks at the calendar and chooses one of the four schedules to be the active schedule for the next 24 hours.

The advantage of this system is that you can easily create a different schedule for weekdays and weekends – using weekly scheduling this also could have done – but also for periods of the year that are different from the normal week to week schedule. For example, on holidays or times when the facility is closed.

Which mode to use depends upon your application. If the timer is controlling lighting that is the same each week of the year then weekly mode will be fine. If you have days of the year that operate differently than most other days, then calendar scheduling is the correct choice.

Tip: Since calendar schedule can do everything that weekly schedule can do, you might be tempted to use that in all cases. The problem is that the menu system on the T24 timer can't modify any schedules if calendar scheduling is selected. This may or may not be important to you but if weekly scheduling is all that is needed for your installation then you should use that. This way you have the option of updating the schedule from both the software and from the timer menus.

To select which type of scheduling is used, press the “Schedule Mode” button in the ribbon and this dialog opens.



There are two important considerations when choosing the schedule mode. First, changing scheduling mode clears any existing timed events. Second, as described above, calendar scheduling is only supported in the T24 software and not by the timer menu system so it can be selected only when in Advanced mode.

On-Off or Level mode

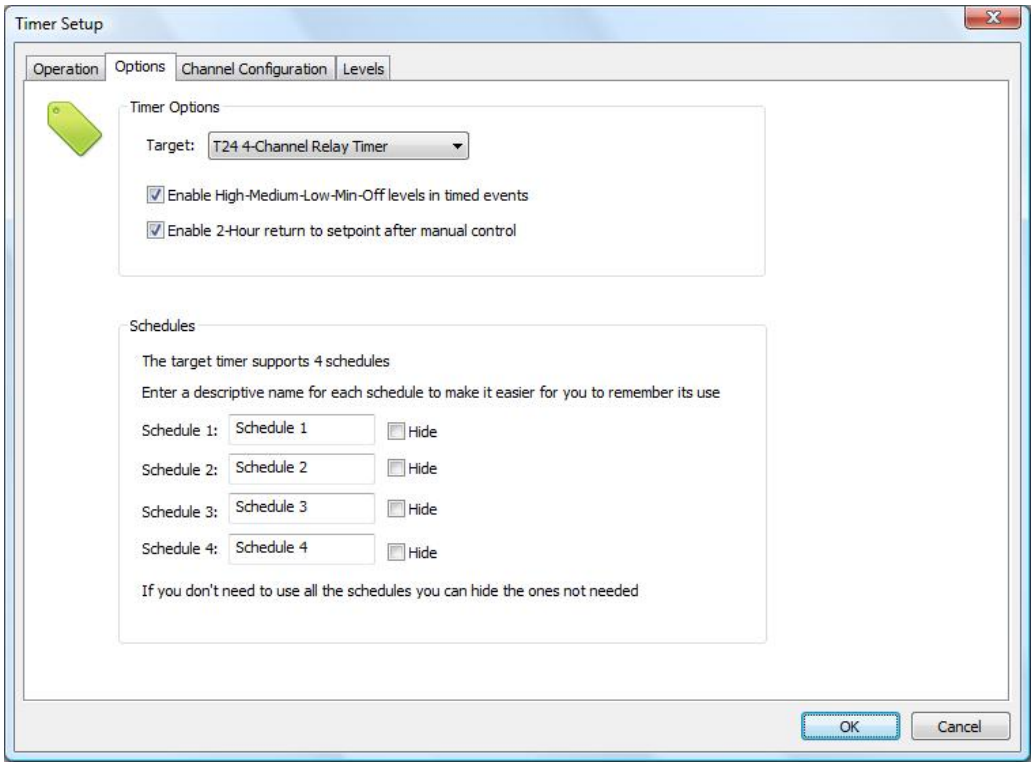
The T24 timer can control loads in one of two ways: By opening and closing a relay or by sending T24 commands. If levels are enabled, then a T24 command is transmitted by the timer, received by the T24 0-10V receiving module, and then acted upon to control the 0-10V driver. Which you need to use depends, of course, on your installation.

In a later section when event editing is discussed you will see that the choice of on-off or levels effects how an event displays and is edited.

Schedules 1, 2, 3, and 4

As described above, the timer contains 4 schedules each containing up to 250 events. The T24 software can edit all of the schedules and all of the events. To select a schedule for viewing or modifying, press the schedule button – labeled S1, S2, S3, S4 – in the ribbon.

To make it easier to remember the usages for each schedule you can assign a name to each schedule. This is done by pressing the *Setup* button in the ribbon and choosing the *Options* tab.



The schedule names are entered in the lower part of the dialog. If you find that in your application you don't need all four schedules you can hide them from the T24 software user interface. Just tick the *Hide* box and that schedule no longer appears in the ribbon.

The other options in this dialog are described in a later section of this user guide.

Timed events

Each action that the timer carries out is represented by a *timed event* – also called a *schedule entry*. Each event has several pieces:

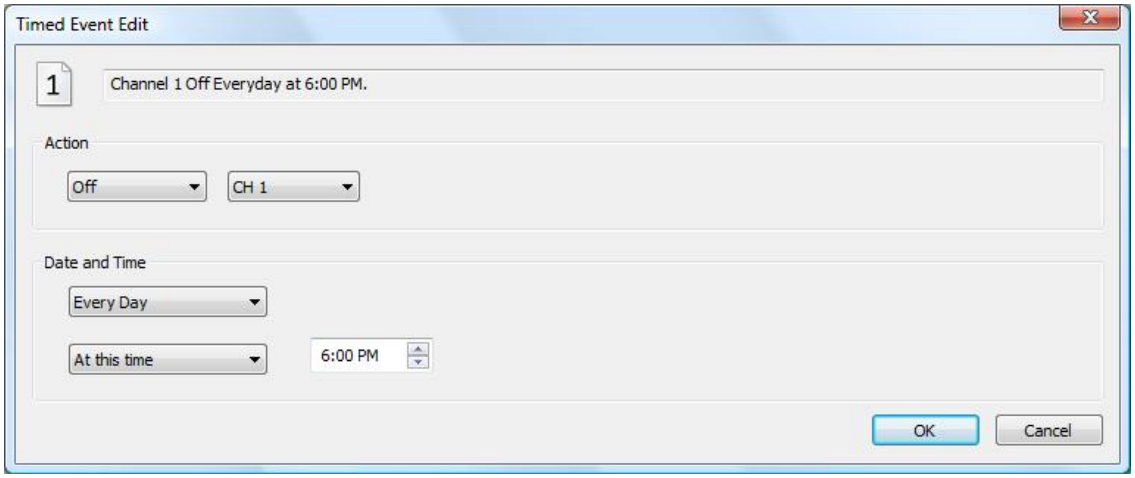
- The day the event happens
  For weekly scheduling this is a selection of one or more weekdays. In calendar scheduling this is not used since the calendar determines the schedule to use for the day.

- The time the event happens
  This can be a clock time – 6:00 PM, 7:17 AM, etc – or a time based upon sunrise or sunset – Sunrise + 30 minutes, Sunset – 45 minutes. Sunrise and Sunset are calculated by the timer based upon the location chosen.

- The action
  This is a channel and what happens to that channel - either On/Off if not in level mode or a percentage (0%, 10%, 40%, 70%, 100%) in level mode.

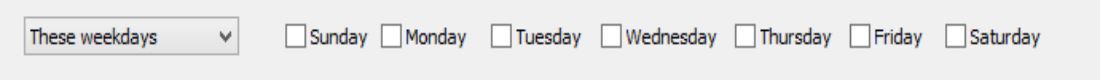
Adding a timed event

To add a new event, press the ribbon *Add* button. The timed event editor opens.



In the image above, the timer is in weekly schedule mode and so has a selection for the date. The choices are:

- Everyday
- Monday-Friday
- Saturday and Sunday
- These weekdays. When chosen, the dialog then shows checkboxes for each weekday and you can tick the ones this event applies to.

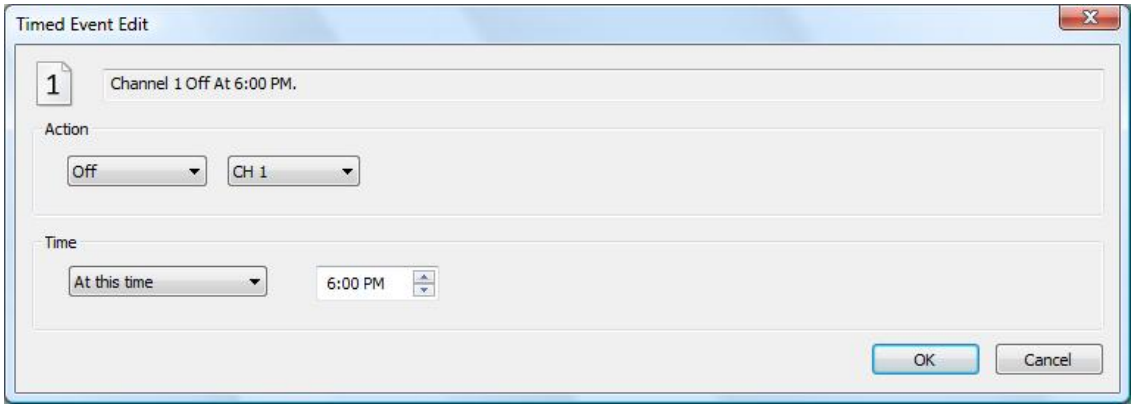


The time choices are:

- At this time
- Sunset
- Sunrise

When sunrise or sunset is selected, additional dialog controls become available for choosing the time difference – before or after – sunrise or sunset. These are in 15 minute increments from 90 minutes before to 90 minutes after.

Creating an event when the timer is in calendar mode is very similar. The only difference is that the date is omitted from the editor.



Editing timed events

To edit a timed event, select it in the event list and press the *Edit* ribbon button or double-click the event in the list. The same dialog as used for event creation displays and all settings of the event can be modified.

Deleting timed events

To delete one or more timed events select them in the event list and press the *Delete* ribbon button. The events are removed from the list.

Modifying schedule tools – clipboard and undo

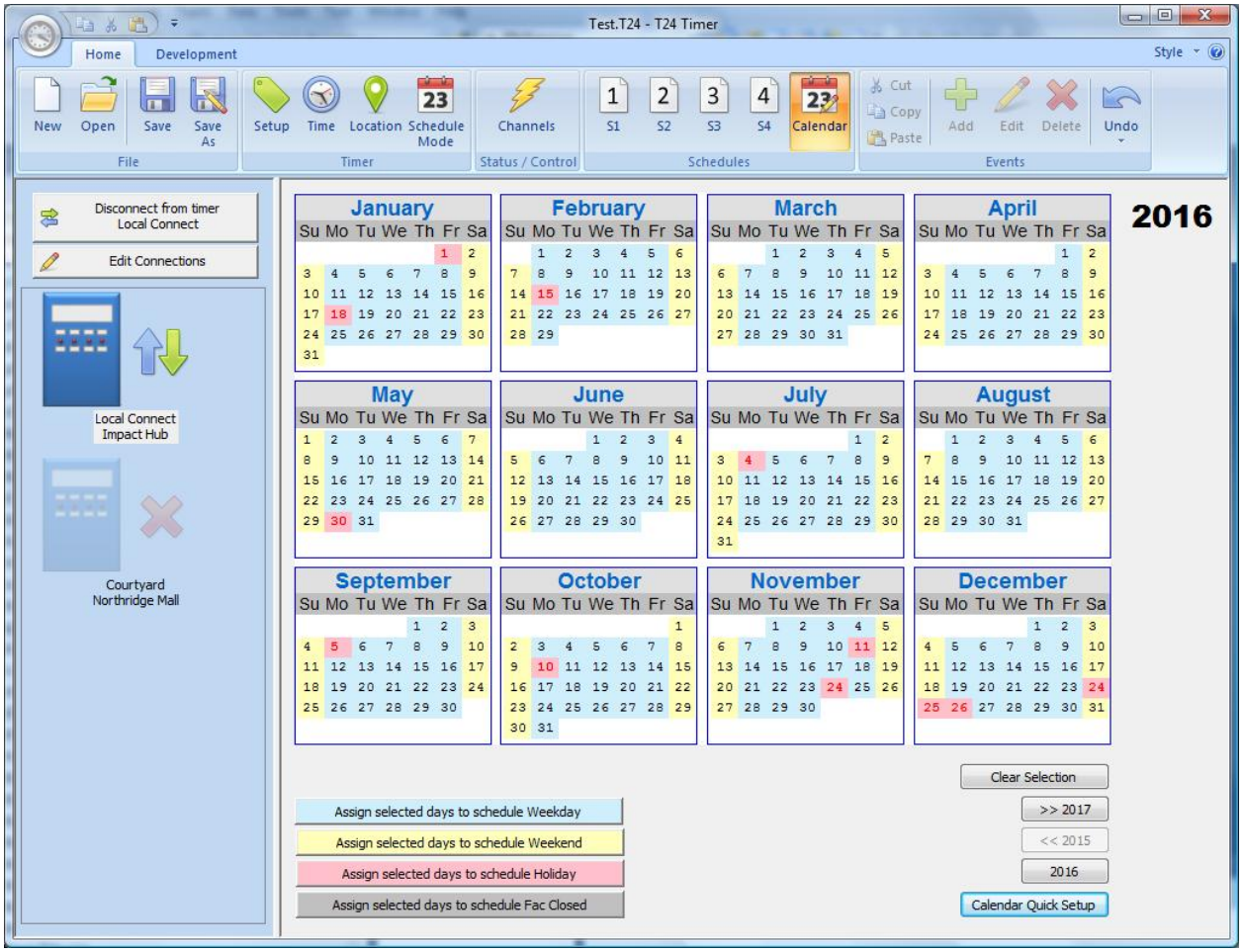
You can also use the clipboard to cut, copy, and paste events in a similar manner as you can do in Word and Excel. Select one or more events and press the copy or cut ribbon buttons and the events are copied to the clipboard in a format where they can be pasted into a timer schedule. If you selected *cut* then they are also removed from the schedule.

Using the clipboard is an easy way to create a different schedule when you want to start with approximately the same events as another schedule. Simply copy the contents of the one schedule to the clipboard and then choose a different schedule – use the ribbon *schedule* buttons – and paste into that schedule and then make any necessary changes.

The T24 software has an undo operation that reverses the last change or changes made. This is very useful if you make a change or delete schedule entries and then realize it was a mistake.

Scheduling using the calendar

If you have selected Calendar mode scheduling, the procedures outlined above all apply but additionally, as part of the scheduling process, you need to associate each day of the year with a schedule. To perform that, press the *Calendar* ribbon button. The main window changes to show a calendar instead of a schedule.



The Timer stores a 20 year calendar so you can configure the scheduler for days that “move around” like holidays in the various years. To show the calendar for another year, use the year buttons at the lower right to change years.

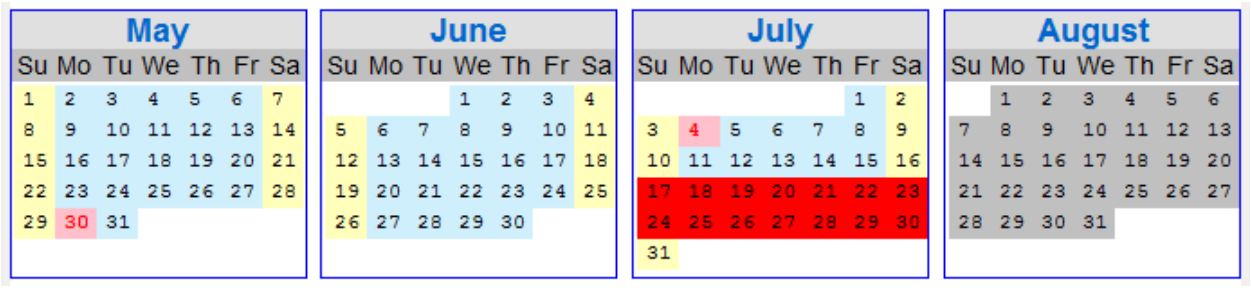
As you can see in the above image, each day of the year is associated with a schedule and those associations are shown by a color. In this example, the *Weekday* schedule is colored a light blue, the *Weekend* schedule is colored yellow, etc. In the calendar months those days that are holidays show in red text. For example, in January the 1st and 18th are holidays and in this example they are associated with the *Holiday* schedule. Other days are associated with other schedules. In the calendar, every day must be associated with one of the 4 schedules.

Every day at midnight the timer determines which schedule is the active schedule by checking the calendar. Using the example calendar above, on January 17 the *Weekend* schedule is the active schedule. Then at midnight on the 17, the active schedule becomes the *Holiday* schedule. At midnight on the 18th the active schedule then becomes the *Weekday* schedule.

Note about holidays: *The T24 software installs a holiday definition file that contains the observed dates for the US Federal holidays for the next several years. This file, called holidays.csv is in the Timer software installation in the "Program" sub-folder. Its format is simple and can be edited if you want to add or change the shown holidays.*

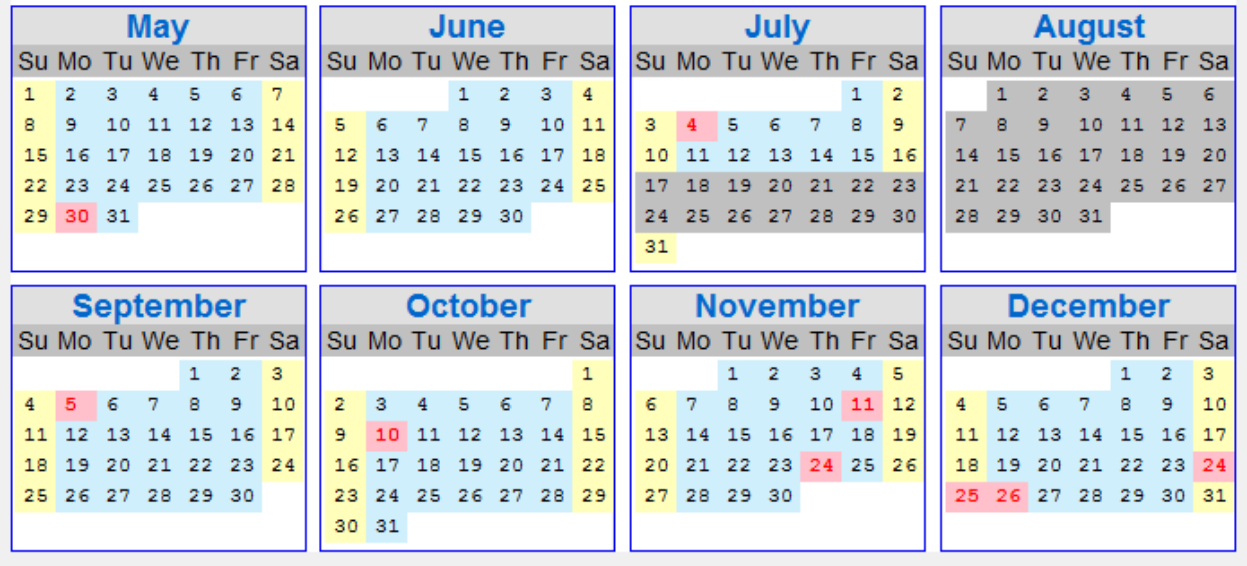
Associating one or more days with a schedule

To associate one or more days with a given schedule, click on the days in the calendar and those days are marked temporarily with a red background. In this example the last two weeks of July are selected.



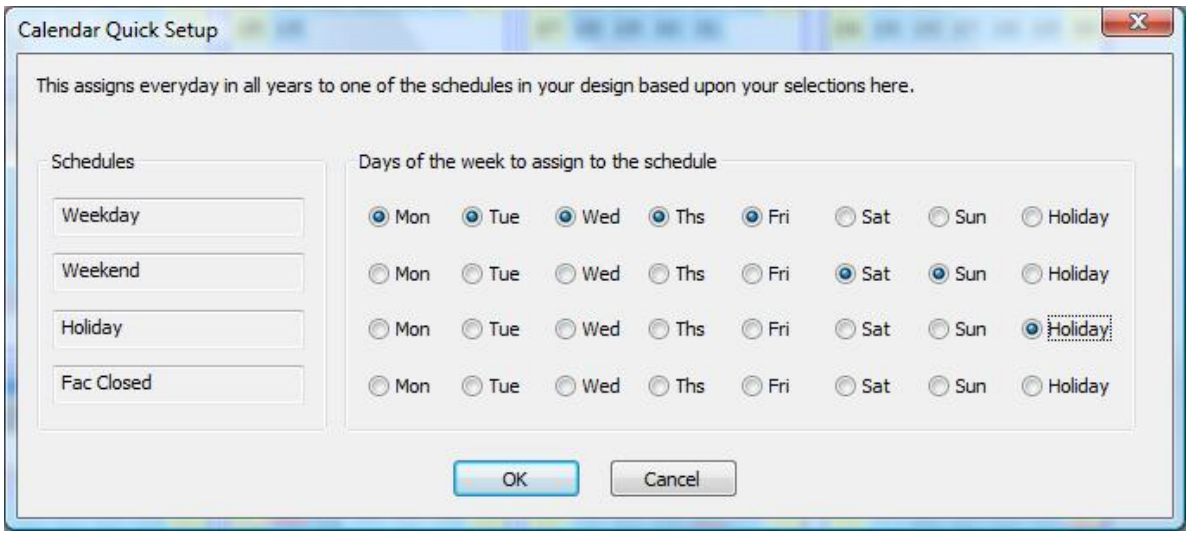
Next, press one of the "Assign schedule" buttons in the dialog lower left and the selected days are associated with that schedule. You can see that this has happened as the selected days are then displayed with the selected schedule background color.

In this example, those two weeks that were selected were assigned to the *Fac Closed* schedule. As you can see in the picture below they now show in the *Fac Close* schedule color – which is gray.



Calendar quick configuration

To quickly configure the calendar by associating each weekday to a given schedule, use the *Calendar Quick Setup* tool opened from the last button on the lower right of the calendar tab.



For each weekday choose the schedule it is to be associated with and then close the dialog with OK. The calendar updates to make these weekday-schedule associations. Using the quick setup can make it easier to work with the calendar by performing the majority of assignments for you and then you can use the selection method to change the assignments for specific days as needed.

Timer memory and timer files

Before showing how to program the timer with all the options, schedules, and calendar, it is best to discuss how the timer memory and the timer file interact.

The timer file contains all the settings for the timer options, schedule, and calendar. Those same things are also stored in the timer. Here are several scenarios that show how this works and any potential issues that can occur.

Scenario one
You start the T24 software, don't load a file, and then connect to the timer. All the settings are read from the timer and displayed in the software. You make changes and press the save button. The T24 software asks for a filename to save the configuration in and also programs the timer. At this time, what's in the file and what is in the timer are exactly the same.

Scenario Two
You start the T24 software and load a file. You then connect to the timer. What is in the file and what is in the timer may or may not agree – maybe you loaded the wrong file. If there are differences then the T24 software reports them and you get to decide which you want: The options from the timer or the file, the schedule from the timer or the file, the calendar from the timer or the file.

Scenario three
You start the T24 software and load a file but don't connect. You make changes - possibility changing timer options, the schedules, or the calendar. You connect to the timer. What is in the file and what is in the timer will not match since your changes have yet to be programmed into the timer. The T24 software reports those changes and you should select the configuration stored in the file and continue. Then you can save the new configuration to the timer.

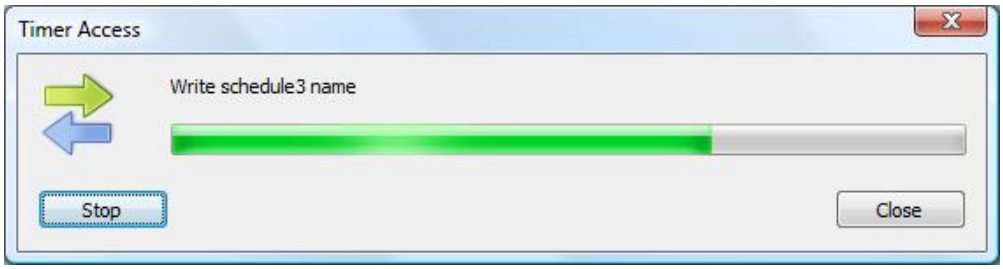
Scenario Four
You have previously programmed the timer and saved those settings in a file. At some time since then someone made a change to a schedule using the timer menu system. You start the T24 software, load the file, and connect to the timer. The T24 software reports the differences and you need to decide if that change to the schedule is still wanted. If it is then you would choose the schedule from the timer rather than the schedule from the file.

The bottom line here is that the configuration of the timer is stored in two places: the timer memory and in a file. This has the advantage of having a backup. You can always reprogram the timer using the file and all the options, schedules, and calendar are restored. It has the disadvantage that the two – the timer and the file – can disagree and then you may be called upon to resolve those differences.

Saving to the timer

Up until now all the changes made to one or more schedules are only represented in the T24 software. To program the timer with the updated settings press the ribbon *Save* button. What happens next depends upon if you have an open connection to a timer. If you don't, then the save operation only saves the timer settings and schedules to a timer file (timer files have file type *T24*).

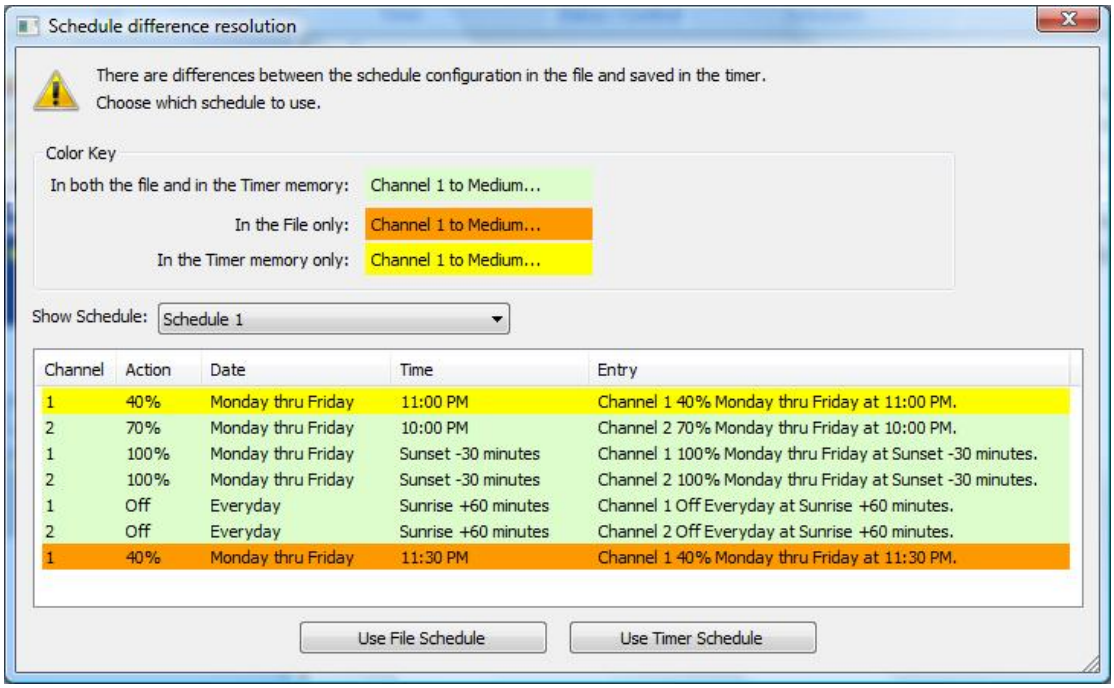
If you have an open connection to a timer, then in addition to saving to the timer file, the timer is programmed with the selected options, schedules, and if in calendar scheduling mode, the calendar. While this happens a progress dialog shows. For example:



Loading from the timer

When connecting to the timer, the reverse of what is described above happens: the timer options, schedule, and calendar are read from the timer and displayed. When connecting to a timer when a file is already loaded – and the connection doesn't specify a different timer file to load – then the loaded file may have a configuration different than what is read from the timer, and that has to be resolved.

If the schedule read from the timer matches what is in the file, then all is well. If they don't match this could be due to several possible reasons as described in the scenarios given above. Regardless of the reason, if what is in the loaded file and the timer memory don't match then one or more resolution dialogs display.



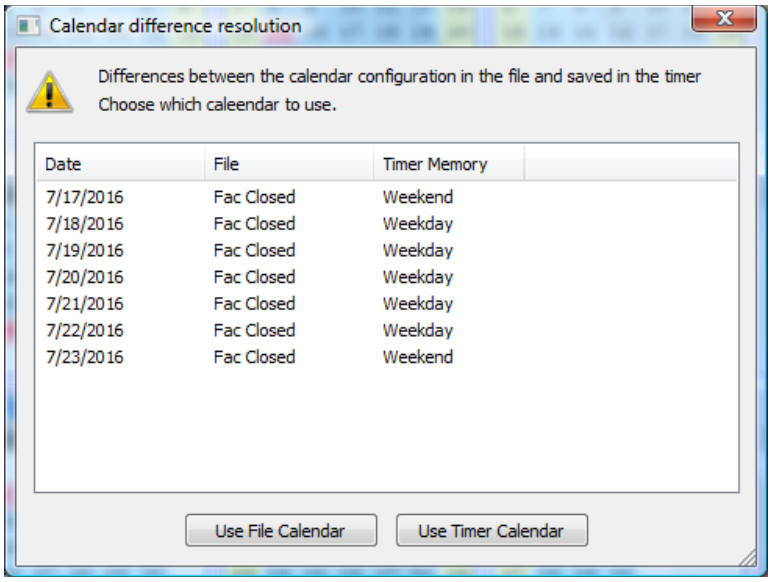
As it shows in the above image, the dialog shows a mixture of the events read from the timer and those in the loaded file. If the same event is found in both, then the event is colored green. If it is in the timer only, the event is colored yellow. If it is in the file only, then it is colored orange.

Tip: Don't forget that the timer holds 4 schedules and there may be differences in more than one schedule. To see differences – if any - in other schedules, use the schedule dropdown to change the displayed schedule.

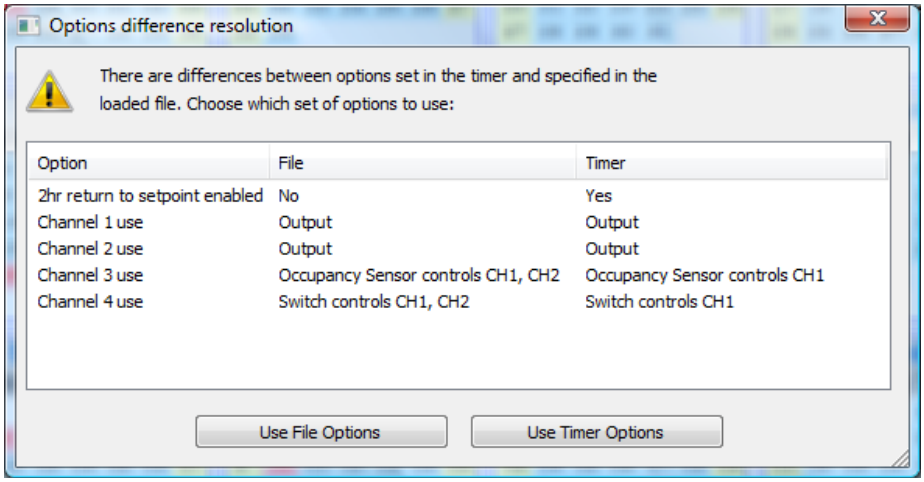
In the above image it appears that the event that controls channel 1 to 40% was changed in the file to happen at 11:30 but the timer shows it to happen at 11:00.

There are two ways to resolve this difference: You can use the schedule as it came from the file or the schedule as it came from the timer. You don't get to pick and choose from the schedule entries – it is either all from the timer or all from the file.

When in calendar scheduling mode the calendar, like the schedules, is read from the timer and compared to the calendar in the loaded file. If there are differences they are displayed as well.



Finally, if the options read from the timer differ from those stored in the file then a resolution dialog appears for that as well.



Tip: If there are lots of differences between the file and the timer and you don't want to lose what was read from the timer nor do you want to modify the file, do this: Accept the schedule, calendar, and options from the timer and then immediately do a File-Save-As to save the configuration to a new file. You then have two files – one with what was read from the timer and the other the original timer file. You can open each, examine, and sort out the differences between them.

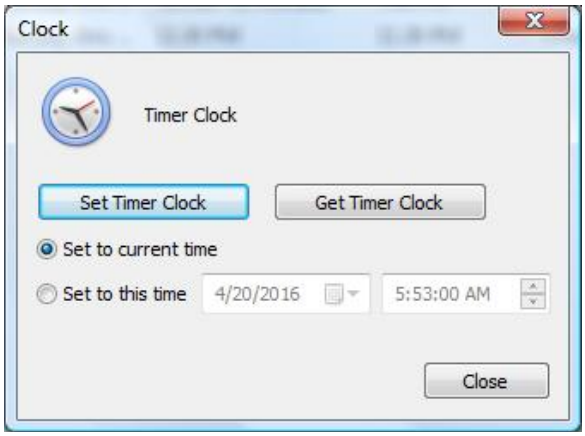
Working offline

If the above description of possible problems didn't dissuade you from working with a file when not connected to a timer, you can take advantage of offline editing.

After you start the T24 software and before you connect to a timer, open an existing timer file or create a new one and then modify it as needed. This lets you completely configure the timer with all the options, schedules, and calendar and then connect to the timer and program it all. And if you are using the optional network interface you can do it all from the comfort of your office rather than a dark, cold, wiring room!

Setting the timer clock

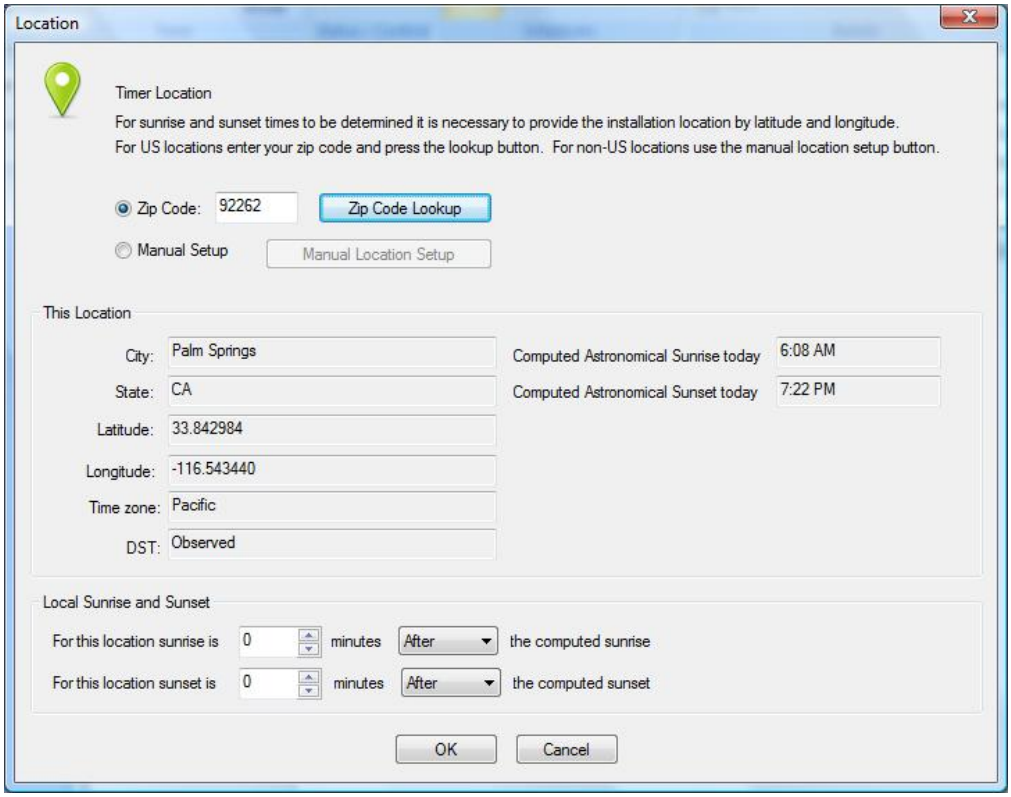
To set the clock in the timer press the *Time* button in the ribbon. The Clock dialog opens.



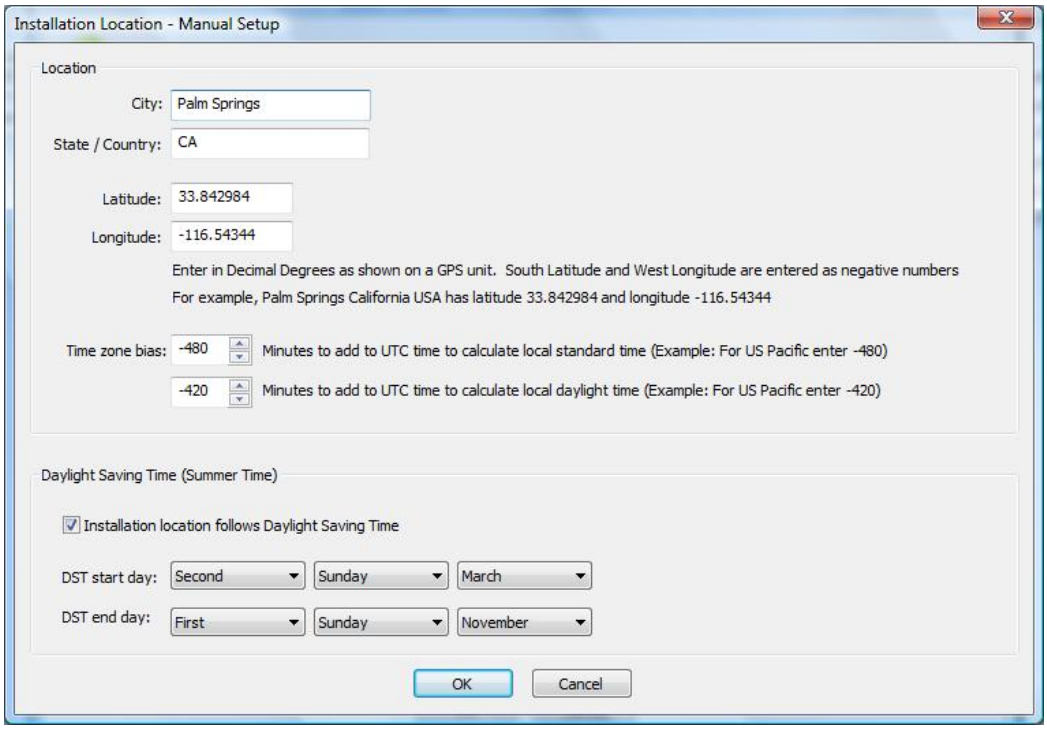
From this dialog you can read or set the timer clock. When setting the clock you can set it to the computer clock or to a date/time you select.

Setting the timer location

Having the timer location set correctly is important so that it correctly determines sunrise and sunset times. To set the timer location, press the ribbon *Location* button. The location dialog opens.



If the location has been previously set then the location read from the timer is shown. If no location has been set then a default location is used. In the United States the location can be set by entering in a zip code. If the zip code isn't found or for non-US locations, choose *Manual Setup* and press the *Manual Location Setup* button.



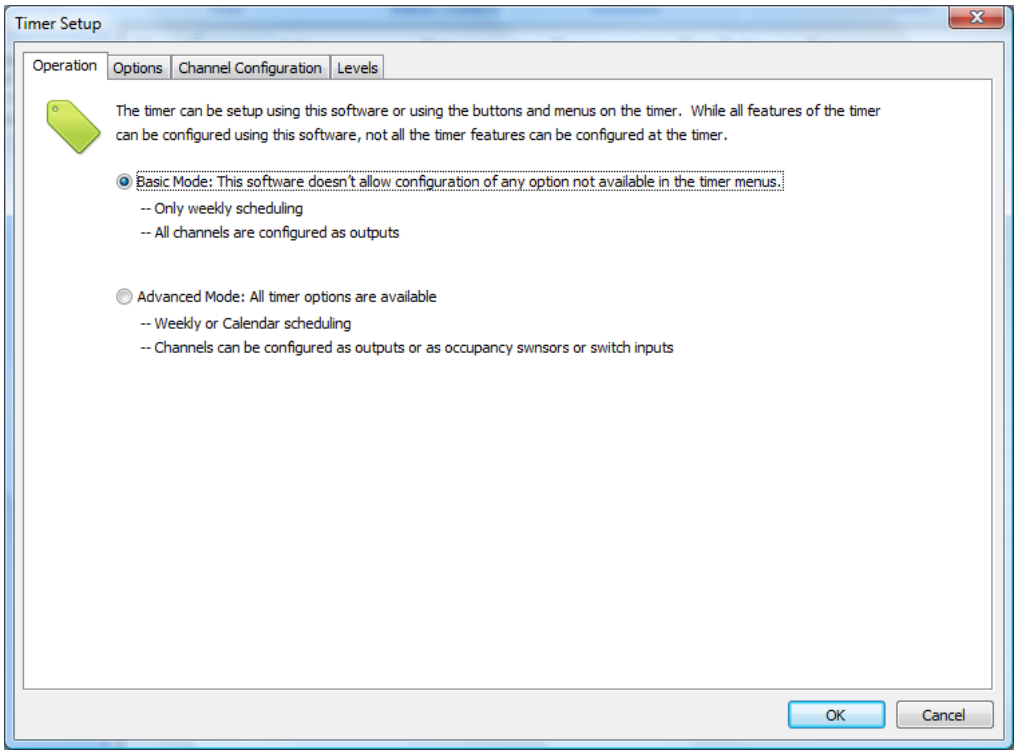
Enter in this dialog the location information. The latitude and longitude, entered in decimal degrees, can be found from many online mapping programs. Also in this dialog are the rules for Daylight Saving Time if the location changes to DST during the year.

Timer Setup

There are a number of options that you can configure and they are in multiple tabs of a dialog opened from the ribbon *Setup* button.

Choosing Advanced or Basic mode

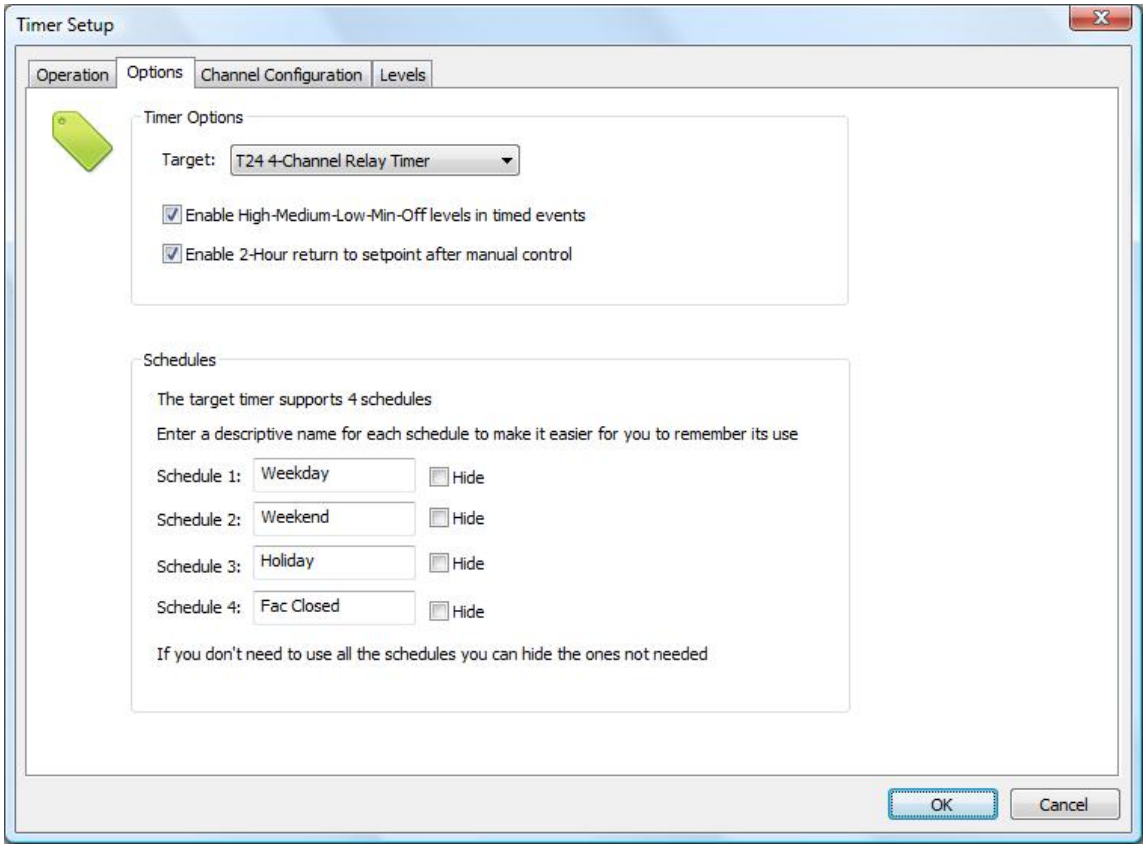
As described in a section above there are several timer features that can only be configured when in Advanced mode. To switch the timer mode press the *Setup* button in the ribbon.



Switching from Advanced back to Basic mode clears all schedules if you are in calendar scheduling mode since in basic mode only weekly scheduling is available.

General timer options

There are several options that control the action of the timer. These are in the Setup dialog on the *Options* tab.



The first option- Target – marks the intended destination of the timer file. This gives you a way to make sure that the facilities used in the file are present in the timer that you are programming.

The other options are:

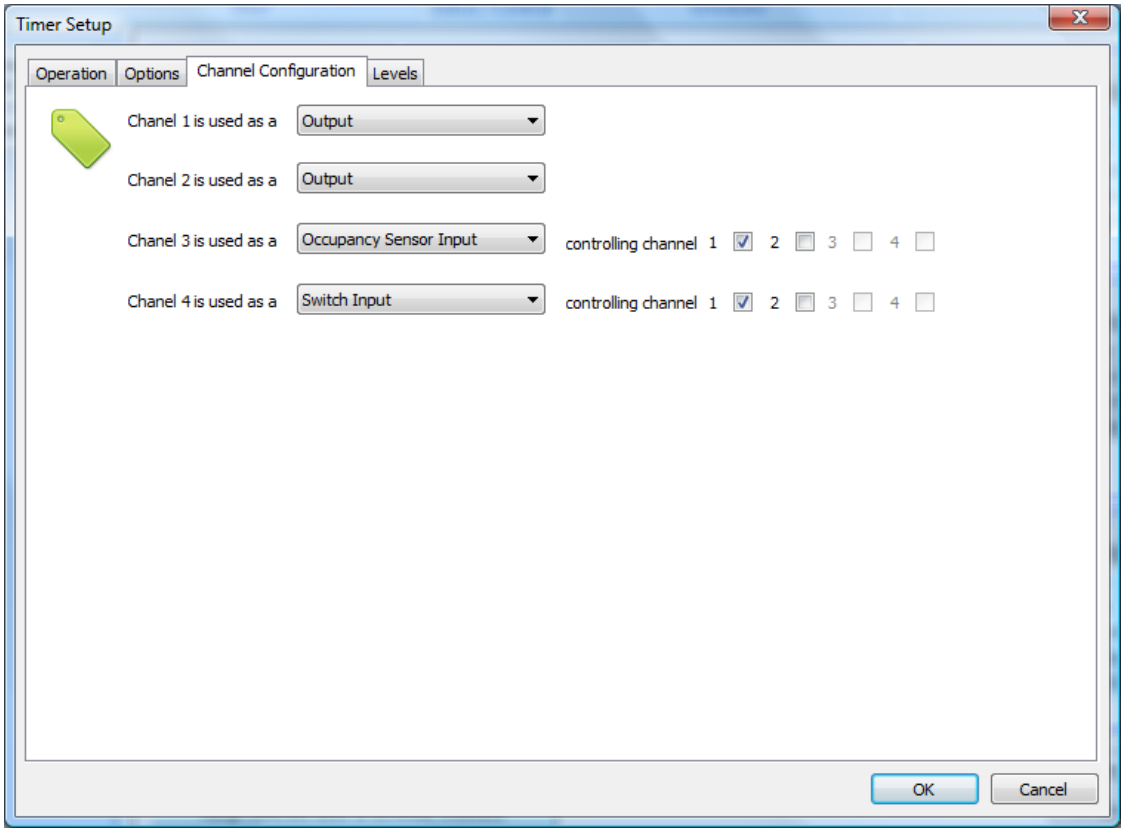
- Enable levels
  As described above, the timer can either control output channels with a simple on/off of the relay or it can transmit T24 commands. This option chooses which method is used.
- Enable 2-hour override
  When a channel is manually controlled by pressing the channel control button on the timer itself, if this option is enabled then in 2 hours the channel reverts to its set point as determined by the schedule.

Channels Configuration

When in Advanced mode one or more of the channels in the timer can be designated as inputs rather than as outputs. Three input types can be configured:

- Occupancy Sensor
- Switch
- Demand Response

To configure channels as inputs, press the ribbon *Setup* button and choose the *Channel Configuration* tab.



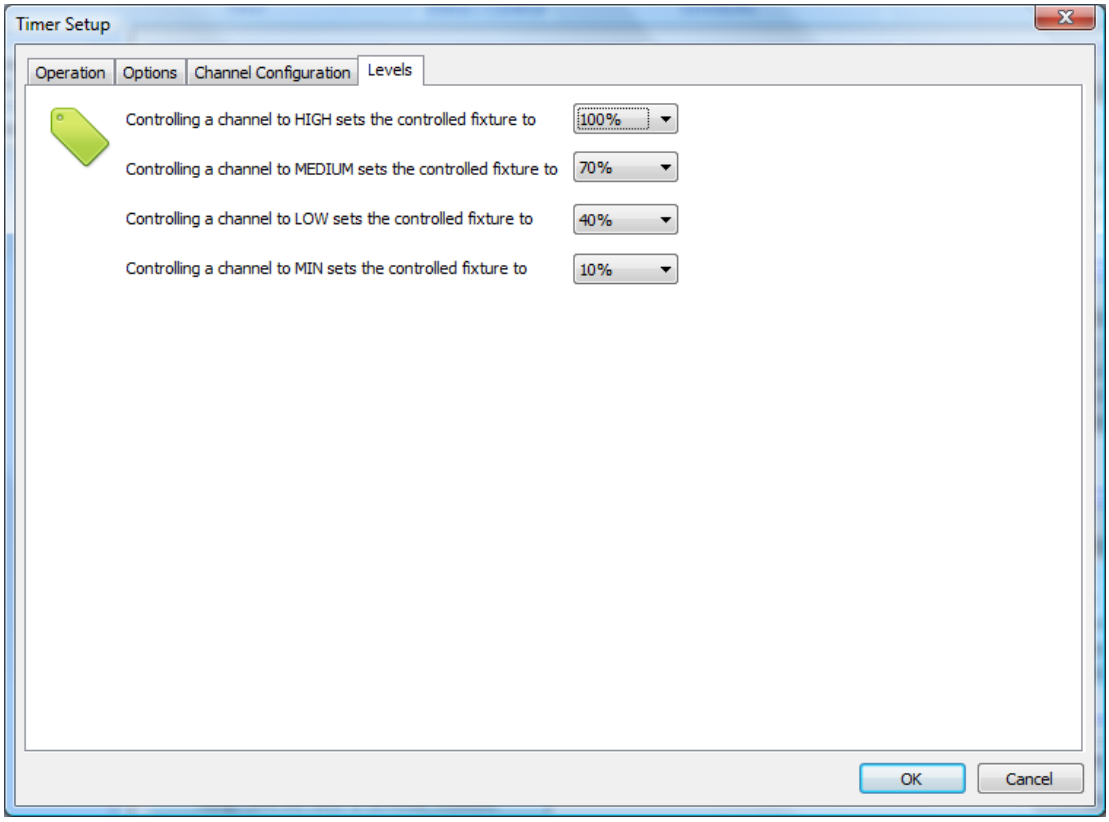
The actions of this dialog are simple: For each channel choose if it is an input or output. For the input choose what the input type is and what channel(s) it controls.

In brief, the action of a switch or occupancy sensor going ON is to set the controlled channel to 100% and then when the input goes OFF then the channel is restored to its normal set point as determined by the schedule.

Tip: Refer to the electrical connection diagram for how the inputs should be connected to the timer.

Timer level table

The timer level table is the location where the four adjustable levels are selected - 0% or off is always available and so it is not configurable. In the Setup dialog choose the Levels tab.



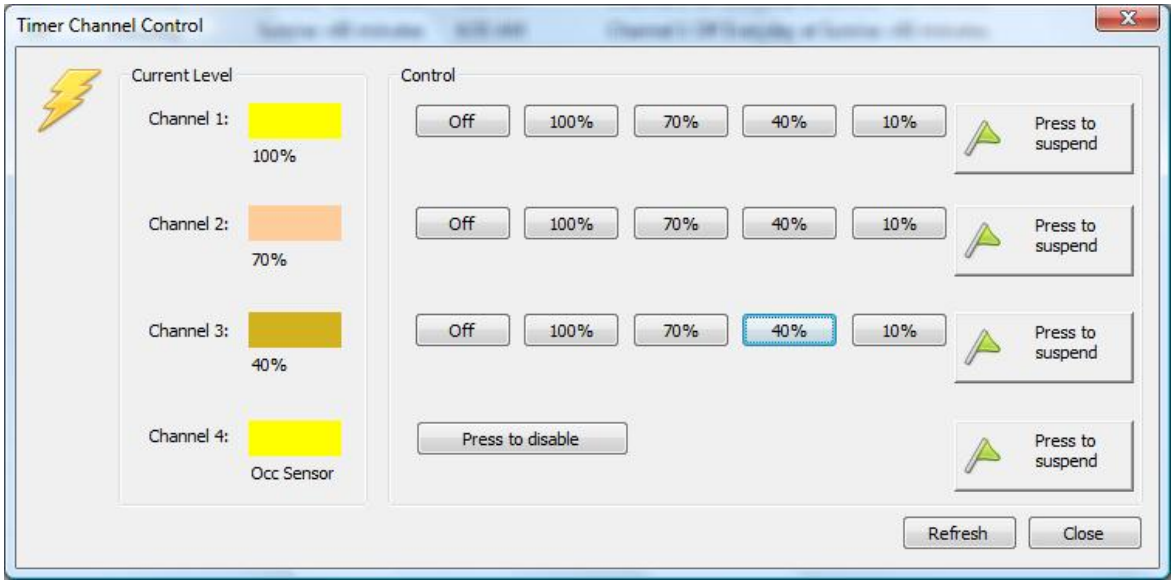
These are the levels that the T24 0-10V receiving module can set the LED driver to. When editing schedule entries the percentages chosen here are the choices for the event action.

A timed event can't set a channel to an arbitrary level. It can only set the level to one of the four percentages – plus OFF - selected here.

If you make a change to the level table, it may have an effect on existing timed events. Suppose you have an event that shows as “Channel 1 40% at 6pm”. Now you open the timer setup dialog and on the Levels tab change 40% to 50%. When you next go back to the schedule you will see that the schedule entry now shows “Channel 1 50% at 6pm”. Think of each event choosing not a percentage but rather an index into the level table. The level table defines the percentage not the event itself.

Viewing and controlling timer channels

When connected to the timer you can view the state of the timer channels, and for output channels, change their state. Press the *Channels* ribbon button to open the control dialog.



The state of all four channels is shown in the left side of the dialog by the color and for output channels by the text below the box. As long as this dialog is open any changes to the state of the channels are automatically reflected in the channel color and text. Anytime you want to query the timer to update the state shown, press the *Refresh* button.

An output channel can be suspended and when so suspended it no longer is controlled by the current schedule. The schedule is still in place but it has no effect on the channel. You may want to do this in exceptional circumstances but you have to remember to "un-suspend" it. The *Press to suspend* button becomes *Press to resume* when a channel is already suspended.

Like an output channel, an input channel can be suspended but additionally it also can be enabled or disabled. When an input is disabled then any change to it has no effect. The input device may change the voltage on the timer input but it has no effect. For example, if the input was an occupancy sensor and if the input was disabled then the occupancy sensor "seeing" motion or not "seeing" motion would have no effect on the output channels the occupancy sensor is controlling.

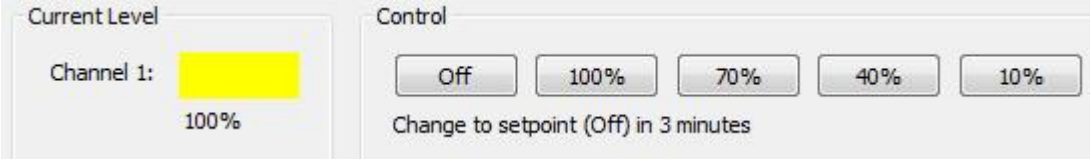
There are two ways to enable and disable input channels. You can manually enable or disable using the *press to disable* button in the dialog as shown above. You can also schedule the input channel to be enabled or disabled at a specified time.

Note: When using the timer menu to edit an event for an input channel you choose rather than *enable* and *disable*, ON or OFF. When that timed event happens, if the event controls an input

channel to ON then the input is enabled. If it controls the channel to OFF then the input is disabled.

Timed events for inputs like occupancy sensors can be very useful. You can schedule the output channel controlled by the occupancy sensor to be ON during "normal" hours and the occupancy sensor channel disabled. Then after hours, schedule the output channel to be OFF and the occupancy channel to be enabled. In this way the occupancy sensor can take over and control the lights on an as-needed basis.

Also shown in the channel control dialog is the override time for any channel that has been manually controlled if the "2 hour return to set point" option is enabled. For example:



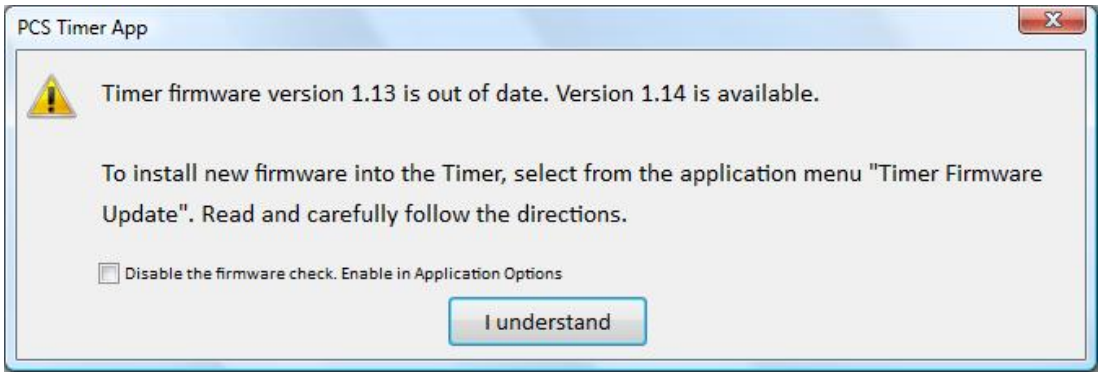
This shows that channel 1 will return to its set point – Off – after 3 minutes. The set point shown is the current set point which may not be what it is at the end of the override timer. If during the next 3 minutes a schedule changes the state of the channel its set point will change and when the override timer expires then the channel is controlled to that set point.

Timer firmware update

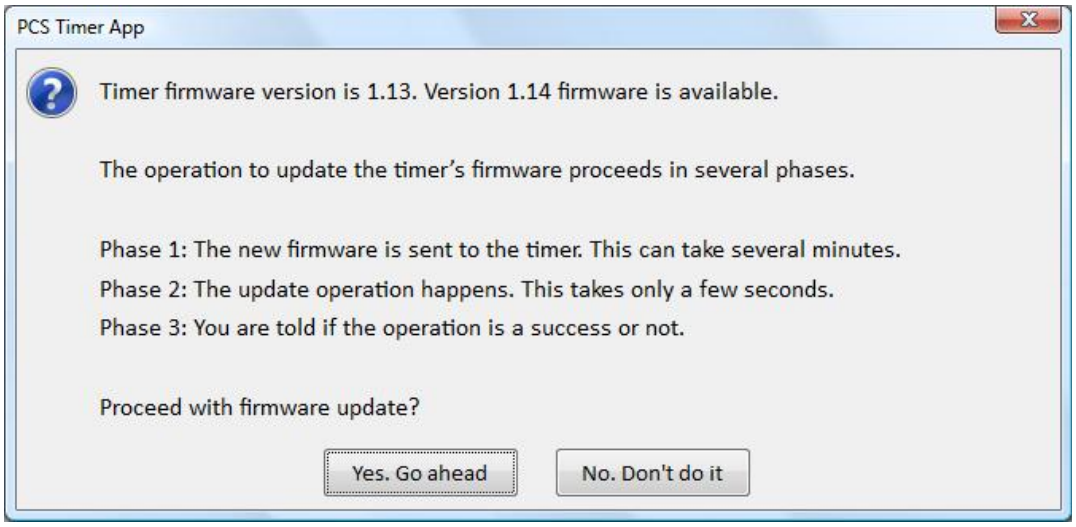
Timer firmware update is a rarely used operation but as new features are made available from the manufacturer, the timer firmware can be easily updated.

The T24 timer software ships with the latest firmware and if a new firmware version is released it will be included in a new version of the T24 software.

When connecting to the timer if a new version of firmware is available this dialog appears:



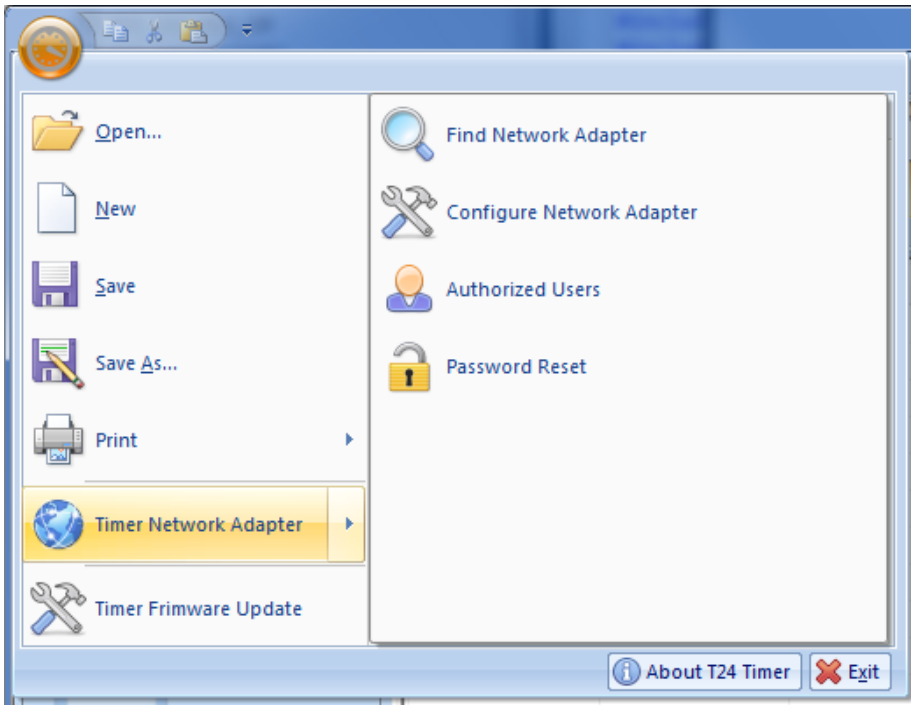
As the dialog says, select *Timer Firmware Update* from the application menu. The process is nearly hands-free except for starting it.



Once complete you should disconnect and reconnect to the timer to verify correct operation. Refer to any release notes on the new features.

Network connection

Using the optional T24 network interface – called the T24-NA or *Network* Adapter - to access the timer remotely can be a major help if you are managing multiple timers. The T24 software has a number of facilities for managing network connections. These are found on the application menu.

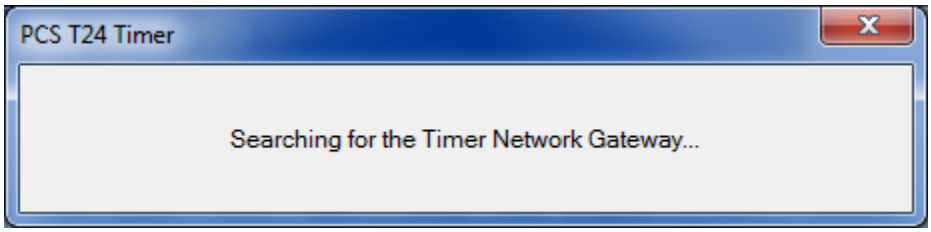


The operations are:

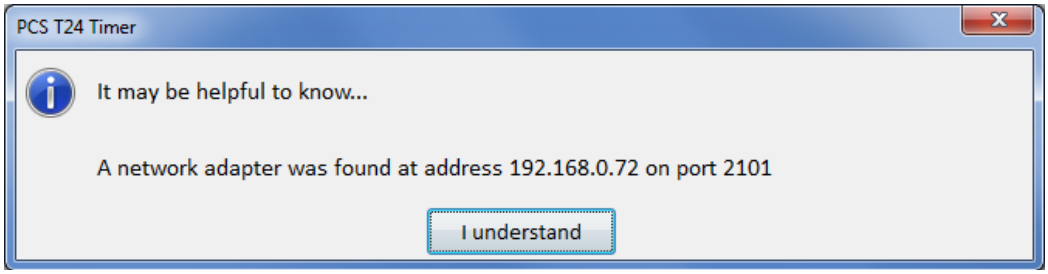
- Find the network adapter
  This operation attempts to locate the network adapter and will find it if it is on the same local network as the computer running the T24 software. It also determines what network port is being used.
- Configure Network Adapter
  Every device attached to a network – computers too – has an IP address. The configure dialog determines how the IP address for the timer network adapter is assigned.
- Authorized Users
  When allowing network access to a timer you must consider security since you don't want unauthorized access to your installation. To prevent this, the network adapter implements a user and password system for connection and assigns to valid users what level of access they have.
- Password Reset
  In case you can no longer access the timer using the network adapter because you have lost your username or password there is a method to erase all users and password from the network adapter.

Find Network Adapter

To locate a network adapter use the *Find* operation from the application menu. A popup displays:



If the network adapter is located then the IP address and port are shown:



Note: In the connection editor there is a *Find* button that does the same operation and captures the located network adapter IP address and port into the connection.

Configure Network Adapter

As a network device, the network adapter must have what is known as an IP address. IP addresses are usually listed as 4 numbers separated by dots. For example, 192.168.1.120. The network adapter acquires its address in one of two ways. It can be assigned a fixed address – called a "static IP address" - or it can be assigned an address by a DHCP server. Most routers, DSL, and cable modems act as DHCP servers.

Depending upon your network configuration you may need to configure the network adapter to use either a static IP address or to accept an address from a DHCP server. In the vast majority of cases you will be using an address assigned by a DHCP server. Use of a DHCP server is the default assigned to the network adapter at the factory.

You probably want the network adapter to have a known IP address that doesn't change over time. Older routers often assigned a new IP address each time a device was powered on. Most new routers don't do that as they implement something called "IP Reservations". If you have an older router you may want to assign the network adapter an IP address outside of the router DHCP pool so that it is fixed and doesn't conflict with any IP address the router may assign to a device.

In order to configure the network adapter for the first time you must connect it to a network that has a DHCP server, as it comes from the factory configured for getting its address from a DHCP server.

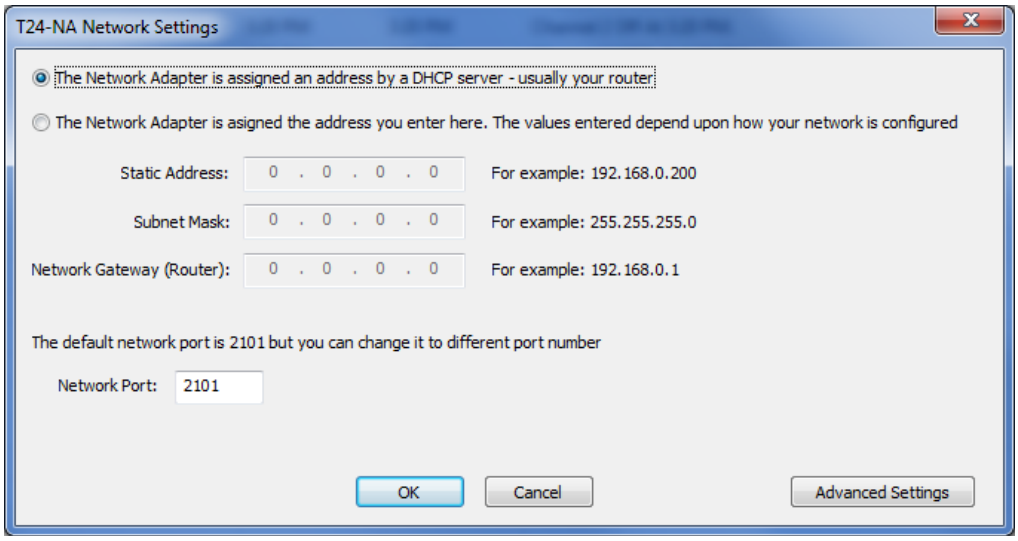
Note: If in the very unusual case where the timer is being installed in a location that doesn't have a DHCP server you have a few options.

- You can first install it elsewhere where a DHCP server is available, configure the IP address, and then move it to the other network.

- If the timer network adapter doesn't find a DHCP server it assigns the IP address 192.168.1.120 and you can try connecting to that if the computer is on that same 192.168.1.x subnet.

- If all else fails, you can get a crossover network cable and connect the computer directly to the network adapter and create a temporary network using 192.168.1.x

Once you have connected to the network adapter, open the network configuration dialog from the application menu.



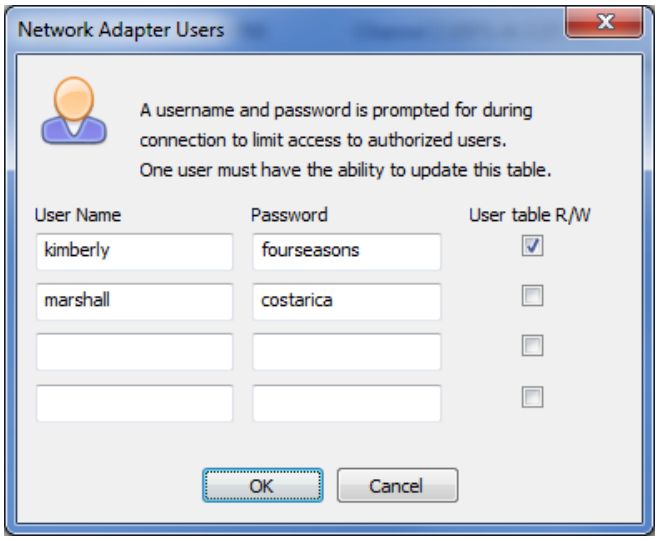
In this dialog you can choose how the network adapter is assigned an IP address. If you choose a static address, that address is entered here. Regardless of how the IP address is assigned, you can also use this dialog to choose the network port.

Until the network adapter is power cycled – power cycle the whole timer to do that – any changes here are not put into effect.

Authorized Users

Accessing the timer though the network adapter can greatly simplify making changes to the timer schedule but it also opens up the timer to the larger world. To prevent unauthorized

users from getting access, the network adapter contains a table of authorized users. Select from the application menu *Authorized Users* and this dialog opens.



Enter in the table the user name and password of each user. One of the users must have the ability to add and update the user list. That user must have the *User table R/W* box ticked. This user is also authorized to update the network settings.

As you can see the network adapter can store information for up to four users. User names and passwords can be up to 16 characters in length. While there are few limitations on the characters used in the usernames or password – commas are not allowed - it would be a very good idea to stick to the usual characters easily entered from your keyboard. Usernames and password are case sensitive.

In the connection editor when you specify the network connection parameters, in addition to the IP address you can also enter the user name or the user name and password. If you don't provide them in the connection then the T24 software prompts for them upon connection.

Tip: If you don't want to store the user name and password in the connection, it is best to at least put the user name in the connection setup and omit the password. In this way the T24 software prompts for the password before starting to make the connection.

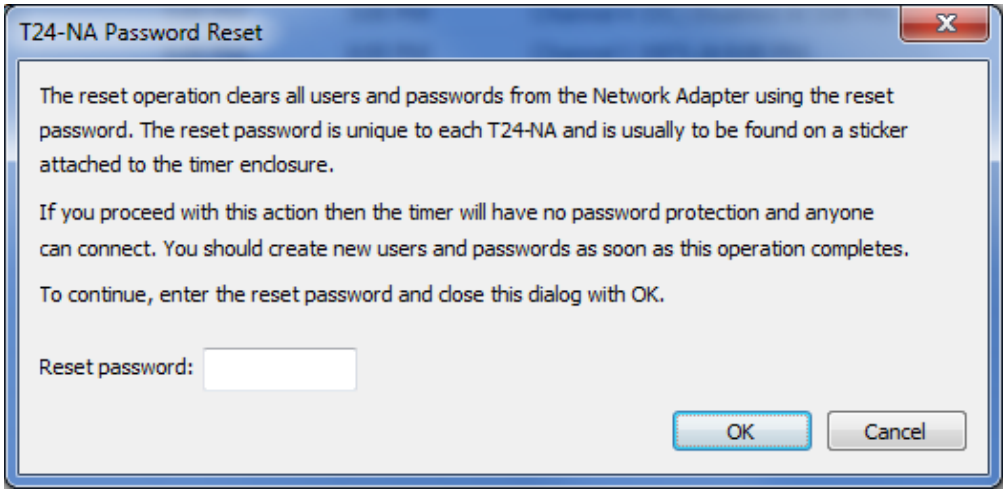
Tip: If your router supports it and you are very concerned about security, you may want to investigate using a Virtual Private Network (VPN). Establishing one and configuring for it is beyond the scope of this User Guide or PCS Technical support. Contact people who specialize in networks.

NOTE: All this about authorized users is only when using the network connection. When connected to the timer using the USB port there is no user and password requested nor needed.

Reset from lost user name or password

If you have lost your user name and/or password there is a method to regain access to the timer though the network adapter and it can be done remotely. To perform this you need the reset password that was assigned at the factory. The reset password should be found on a sticker on the timer. Each reset password is unique so you do not need to be concerned that every T24 timer network adapter can be reset using the same password.

If you find you must reset the network adapter password table, select from the application menu *Password reset*.



As described in the dialog, this operation removes all users and password so that anyone can connect. It is important after you complete this operation that you connect and enter new users and passwords. And perhaps write down and save them where they will not be lost again.

Accessing the Timer from outside the firewall

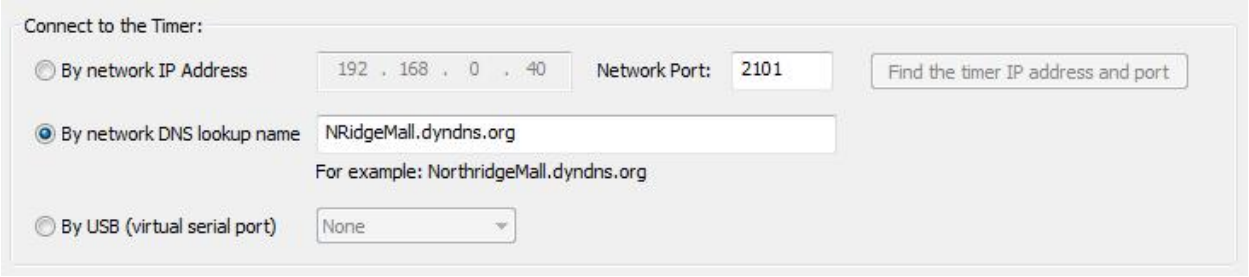
In order to access the timer using the network adapter from outside the network firewall there are two issues: the IP address will be different than on the local network and the router must be configured to forward port requests to the network adapter – this is called *Port Forwarding*.

When accessing the network adapter on the internal network it is usually assigned an IP address something like 192.168.x.y. Where x is usually 0 or 1 and y is a number from 2 to 250. These are the usual numbers but what is used on your network depends upon how the network was configured.

Outside the firewall instead of that IP address the connection is made to the IP address of the DSL or cable modem. That IP address is assigned by whatever ISP is used and often can change from day to day. Because of that a good idea is to use a dynamic IP service like dyndns.org. These services give you a name – like ngatemall.dyndns.org that is translated to the IP address of your DSL or cable modem.

Tip: Try www.DynDNS.org

Configuring DynDNS is beyond the scope of this user guide. There are excellent references on the internet for this. In a T24 software network connection you enter in either an IP address (a.b.c.d) or the name you selected from the DynDNS facility. For example:



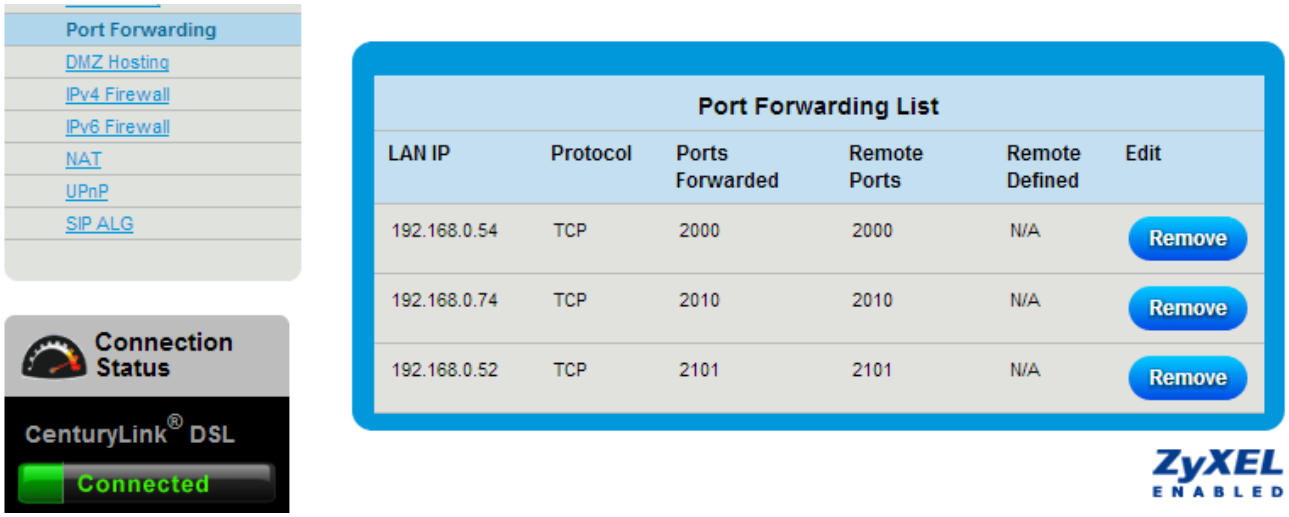
Port Forwarding

In addition to this IP address you must also configure your DSL or cable modem to understand that a connection to it from a specific port number should have those requests sent to the adapter. This is called “port forwarding”. Configuring this is different for each network and is beyond the scope of this user guide. There are excellent references on the internet that may help you configure your specific hardware.

Tip: Try www.portforward.com

As an example, this is a screen image from a CenturyLink DSL modem. The network adapter is

on port 2101 and its internal IP address is 192.168.0.52.



Port Forwarding makes it possible for a remote application to connect to this network using a name (by way of the DynDNS service) and then directs any traffic to/from port 2101 to the Timer Network Adapter.

User Guide Ends