

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

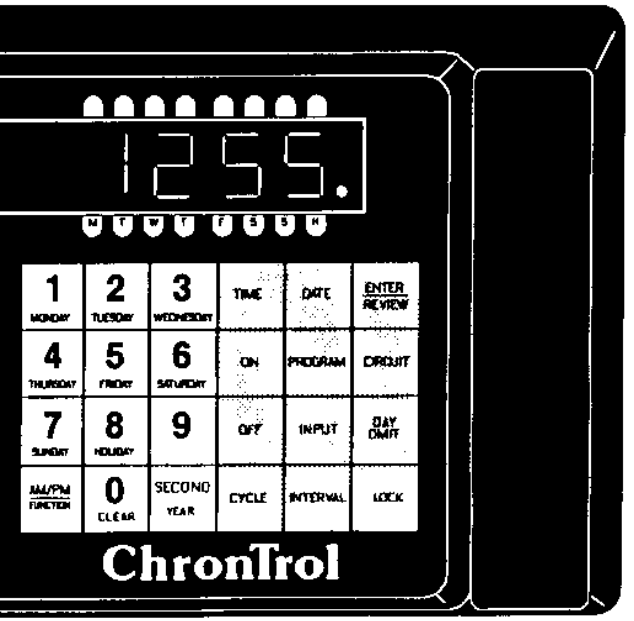
All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

ChronTrol

XT

USER'S GUIDE



IMPORTANT SAFEGUARDS

Always follow basic safety precautions when operating electrical equipment. Please observe the following safeguards:

? Read and save all instructions.
? To avoid electrical shock, do not immerse timer in water or other liquids, and do not operate when wet.
? All equipment controlled by this timer must have wattage ratings within the capacity of this timer, as stated in the *SPECIFICATIONS AND INSTALLATION* instructions. Exceeding the rated capacity may result in overheating and damage.
? Do not use this timer where flammable gas or fumes exist.
? Do not use this timer to control equipment that is damaged or malfunctions.
? Extreme external interference can, in rare situations, cause random behavior of this device. Do not use this timer in applications where random ON or OFF signals are potentially hazardous.

WARNING: If using this timing device in a situation or environment that is critical to the welfare and/or sustenance of laboratory specimens, please test all programs by carefully simulating or staging the critical events.

This document is furnished solely for the convenience of the authorized user without warranty or obligation of any kind whatsoever. ChronTrol Corporation shall not be responsible for any damages, including consequential, caused by reliance on information contained herein including, without limitation, inaccuracies, errors, or omissions of any kind whatsoever.

© Copyright ChronTrol Corporation 2006

ChronTrol Corporation
P.O. Box 19537
San Diego, California 92159
(619) 282-8686

How to Use this Manual

The ***XT User's Guide*** is divided into five sections.

Section 1: Introduction describes the XT's physical characteristics (keyboard, LED's, circuits, and input connector). It also briefly describes the features and capabilities of the XT.

Section 2: Set Up describes step-by-step how to set system parameters (such as the date and time) and how to program the XT to perform simple timing operations (such as turning a circuit ON at a specific time and OFF at a specific time).

Section 3: Programming Procedures provides XT programming strategies and tips, explains how to enter a program into the XT, and how to take advantage of its wide-ranging and powerful capabilities.

Section 4: Sample Programs includes step-by-step instructions for programming the XT. These sample programs illustrate the most common and direct programming techniques.

Appendix A: Special Programming Considerations discusses Interval Timing, the difference between a day and a twenty-four hour period, Day Omission, the Daylight Saving Time standard, and the effect each of these has on programmed operations.

Conventions Used in the Manual:

BOLD CAPS	Represent keyboard keys you should press. **DAY ENTER** means press the DAY key and then the ENTER key.
MMDDYY *HHMMSS*	Expresses how dates and times appear on the display: Month/Day/Year is expressed as MMDDYY. For example, December 3, 1998, displays as 120398. Hours and minutes are expressed as HHMM. For example, 11:45 displays as 1145.
P–*n*	Variables are expressed in italics. For example, an "n" in italics indicates a number to be supplied by the user.
boldface type	Identifies information that appears on the XT's display and, within text, indicates critical information.

Table of Contents

Section 1 - Introduction

Introduction 5
XT Features 6
Physical Description 8
The XT Display 8
The XT LED Indicators 11
Keyboard 12

Section 2 - Setup

Set-up Procedure 13
Setting System Parameters 13
Time 13
Change Between 12- and 24-Hour Format 13
Date 14
Day of Week 14
Lock Code 14
Set the Lock Code 14
Lock the Keyboard 14
Unlock the Keyboard 15
Change the Lock Code 15
Clear the Lock Code 15
Manual Operation 16
Manually Switching a Circuit 16
Manually Activating a Program 16
Two Simple Programs 17

Section 3 - Programming Procedures

Features 18
On/Off and Interval Programs 18
Circuits and Other Control Assignments 19
Day Omission 19
Cycle Length 19
Calendar Feature 19

Entering a Program 20
Program Number 22
Circuit Assignments 22
Program Assignments 22
Input Assignments 22

Interval Specification 23
On Time 24
On Date 24
Off Time 24
Off Date 24
Day Omission 25
Cycle Length 25

Inputs (External Activation) 26
Setting Inputs 26
Manually Enabling and Disabling an Input 27
Functions 27
Function 1: Daylight Saving Time 27
Function 2: Sequence Start 27
Creating and Editing the Holiday List 28

Review 29
System Parameters Review 30
Review Date 30
Review the Day of Week 30
Review the Holiday List 30
Review the Seconds 30
Program Review 32
Begin Program Review 32
Step A: Program Status 32
Step B: Control Assignments 32
Step C: On Time 32
Step D: Off Time 33
Step E: Interval Length 33
Step F: Omitted Days 33
Step G: Cycle Length 33
Step H: Exit Program Review 33
Input Review 34
Cross Review 34
Countdown Timer 35

Changing Program Entries 35
Deleting Program Entries 36
Deleting Input Entries 36
Factory Settings (Defaults) 36

Section 4 - Sample Programs

Sample Program 1: Daylight Saving Time 38
Sample Program 2: Sequence Start 38
Sample Program 3: On/Off Program with Day Omit 38
Sample Program 4: Interval Program with Cycle Length 39
Sample Program 5: On/Off Program with Cycle Length 40
Sample Program 6: On/Off Program with Day-based Cycle 40
Sample Program 7: 24-hour based Program 41
Sample Program 8: Program Controlling Program 42
Sample Program 9: Using Inputs 43
Sample Program 10: Re-trigger and Time Out 44
Sample Program 11: School Bells 45
Sample Program 12: Delay Program 45

Appendix A: Special Programming Considerations

Interval Timing 46
Overlapping Midnight 47
Cycles and Daylight Saving Time 47
How to Set a Day-Based Program 48

Section 1: Introduction

Congratulations on your purchase! Your ChronTrol XT is a programmable, microprocessor-based timer that can control up to 16 devices (outputs) and can receive inputs from up to 8 external devices. The XT can easily be programmed to switch circuits on and off at specific times and dates, for durations, on a cycle, or from external devices attached to its optional input connector. 20 to 40 timing programs can be stored in the XT's memory.

The XT can be programmed down to the second. Its versatile calendar automatically adjusts for leap years, Daylight Saving Time and holidays. Programs are easy to set, review, and change through the 24-pushbutton, audible keyboard.

The XT family includes four basic models: table-top, wall-mount, expandable wall-mount, and rack-mount. Table-top models are available with two or four circuits, AC outlets or dry contacts. All other models are available in two- to sixteen-circuit configurations with dry contact outputs rated up to 20 Amps. The *SPECIFICATIONS AND INSTALLATION* sheet for your particular ChronTrol model is included with your unit. Specification sheets for other types are available upon request. The features and programming techniques described in this manual apply to all models of the XT.

XT Features

The XT supports the following list of functions and programming features. For complete operational descriptions of these functions, see Section 3: *Programming Procedures*.

? **Manual Operation.** ChronTrol's XT series is designed around its advanced programming capabilities; however, you can manually override programmed settings through the keyboard without waiting for or disturbing programmed operations.

? **Advanced Programming.** The XT's advanced programming features open the door to many exciting possibilities. Through the XT keyboard, you can enter up to 40 programs. Each program has a unique number which identifies it when entering, reviewing, or changing its settings. Programs can be set to control circuits, inputs, even other programs. These are referred to as Control Assignments. Control Assignments can switch on and off on a daily or weekly schedule, repeating at rates from two seconds to one year. They can also switch on and off on specific dates, or one time only, responding to either clock time or outside signals.

? **Program Review, Verification, and Change.** The XT allows you to review, verify, and change any and all of its settings. You can review individual programs and input settings. You can also review specific information, such as the activity of a Control Assignment, and the programs or inputs to which it is assigned.

? **Day Omission.** The XT's programming flexibility allows you to enter programs that execute on a regular schedule yet automatically omit specified days of the week, for example Saturday and Sunday.

? **Holidays.** Holidays can occur on any day of the year. The XT allows you to create your own Holiday List. You may then specify, within each program, whether or not that program will execute on the days you've included in your Holiday List.

? **Functions.** Two special functions are provided for your convenience: Daylight Saving Time (Function 1), which adjusts the Time of Day clock by one hour; and Sequence Start (Function 2), which controls the

rate at which circuits are restored to the ON position following a power failure.

? **Inputs.** On XT models equipped with the N8 Input Option (see *SPECIFICATIONS AND INSTALLATION* sheet), programs, circuits, and inputs can be switched based on external conditions. Through the input connector, devices such as temperature and light detectors can be connected to the XT. You may then specify that certain programs or circuits be switched by a signal from these external devices. You can program an input to ignore external signals as well.

? **Locking Keyboard.** The XT provides a locking keyboard. With a user-programmable Lock Code, you can prevent unauthorized access to the XT keyboard.

? **Power Fail Protection.** The Time of Day continues to operate, with crystal accuracy, during power failure. A nine-volt battery keeps the clock operating and protects the system memory to prevent the loss of stored programs. When power returns, all ON and OFF times are saved. Outputs are switched to the proper positions for the current time, in sequence or all at once.

? **Countdown Timer.** The XT can count down the hours, minutes, and seconds for any event you specify, such as the execution of a program or the switching of a circuit.

Physical Description

The following sections describe the physical characteristics of the XT controller and define the function of each.

The XT Display

The XT's display serves two functions: ordinarily it displays the current Time of Day in hours, minutes, and seconds, but during programming it confirms entries and reviews previous settings. *Figure 1* illustrates the XT Display and Indicators.

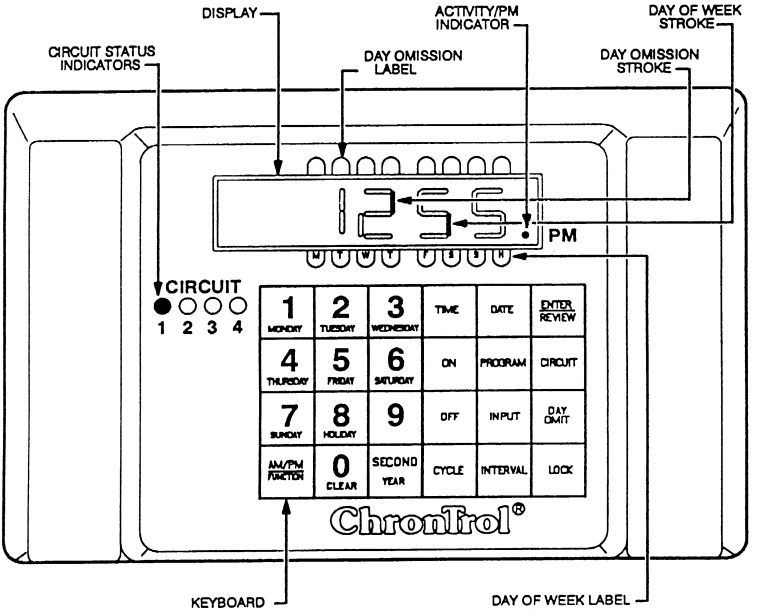


Figure 1: XT Display and Indicators

If you look closely at the numbers comprising the Time of Day displayed in *Figure 1*, each character has two vertical components, with a top segment and a bottom segment. When lit individually, the top segments indicate days omitted from a program; bottom segments indicate the current day of the week and whether that day is a holiday. See *The XT LED Indicators* for further information.

Numbers on the display express time, dates, durations, and control assignment specifications (the number of a circuit, program, or input). Letters and symbols, however, convey specific information to the XT user. See *Table 1* on the following page for definitions of special XT display characters.

P	PROGRAM. This character displays when reviewing the status of an ON/OFF program, when assigning a Program to a list of control assignments, when manually switching a program, or when a program is identified in cross review. It is usually followed by a number identifying the program.
C	CIRCUIT. This character displays when assigning a Circuit to a list of control assignments or when manually switching a circuit. It is usually followed by a number identifying the circuit. It also indicates day-based cycle.
E	ENTER. This character displays after pressing the "Enter" key from the Time display, which is the first step in all programming sequences.
F	FUNCTION. This character displays when setting or reviewing the Sequence Start or Daylight Saving Time functions.
–	This character displays to separate key characters from their identifying number, for example P–04 (Program #4), to indicate you reached the end of a list of control assignments or Holidays, to show that no value was previously assigned to a particular parameter, or to indicate that an interval program under review is currently executing.
– –	INPUT. This character displays when reviewing the status of an input, when assigning an input to a list of control assignments, when manually switching an input, or when an input is identified in cross review. Usually followed by a number identifying the input.
H	Introduces the Holiday List.

Table 1: Special Display Characters

The XT LED Indicators

The following paragraphs define the function of the LED indicators on the face of the XT. Refer to *Figure 1* for an illustration.

Circuit Status Indicators There is a circuit status LED indicator for each circuit on your XT model. When an LED indicator is lit, it indicates that the circuit is ON.

Day of Week Label This label lists the first character of the corresponding day of the week. M=Monday, T= Tuesday, etc. The rightmost character, H represents Holiday.

Day of Week Stroke The bottom segment of a display character (or "stroke"), lit individually above a labeled day of the week, indicates the current day of the week and whether that day is also a Holiday.

Day Omission Label This label shows which Day of the Week is omitted.

Day Omission Stroke The top segment of a display character (or "stroke"), lit individually under the day omission label, indicates which days are omitted from a given program's weekly schedule.

Activity/PM Indicator This indicator lights up under two conditions; when the system clock registers PM hours and when a program or other operation under review is active.

Keyboard

Use the keyboard to set, change, review, or clear parameters on the XT. To enter a keystroke, press each character firmly in the center of the pad. The keyboard responds with an audible "beep" tone. If you attempt to make an invalid entry, the tone changes and the entry is not accepted.

Figure 1 on p. 8 illustrates the XT's keyboard and *Table 2* defines each key's function.

TIME	Sets the Time of Day and changes the clock between 12- and 24-hour format.
ON	Sets and reviews a program's ON time, switches a circuit manually ON, or displays the countdown to an ON time.
OFF	Sets and reviews a program's OFF time, switches a circuit manually OFF, or displays the countdown to an OFF time.
CYCLE	Sets and reviews a program's cycle length.
DATE	Sets and reviews calendar functions.
PROGRAM	Sets and reviews a program's or input's program assignment.
INPUT	Sets and reviews input definitions.
ENTER REVIEW	Reviews and stores program information.
INTERVAL	Sets and reviews a program's interval length.
CIRCUIT	Sets and reviews a program's or input's circuit assignment.
DAY OMIT	Sets and reviews the current day of the week and a program's Day Omission schedule.
LOCK	Locks the keyboard from unauthorized use.
AM/PM FUNCTION	Changes AM settings to PM settings and back. Also selects special functions.
0 / CLEAR	Clears keyboard entries.
SECOND YEAR	Sets and reviews a time setting to the second. Also sets the year for the current date.

Table 2: XT Keyboard Definitions

Section 2: Setup

Follow the separate *SPECIFICATIONS AND INSTALLATION* sheet included with your ChronTrol for installation instructions.

This section includes basic instructions for programming the XT to perform simple operations. Following a demonstration of how to set the System Parameters are procedures for manually turning a circuit ON and OFF and programming a circuit to turn ON and OFF on a schedule.

Setting System Parameters

Before any program can execute accurately, the **System Parameters** must be set. The System Parameters are: Time, Date, Day of Week, and (optionally) the Lock Code.

Time

1. Press **TIME**. The display goes blank.
2. Set the current time in hours and minutes. For example, to set the time to 2:45 p.m., press **2 4 5**.
3. ***Optional*** **-** Press **SECOND**. Set the seconds. Seconds display in the two rightmost digits of the display window.
4. The timer assumes a.m., so use the **AM/PM** key to specify p.m. Skip this step if the time is a.m.
5. Press **ENTER**. The time is set and displayed in hours and minutes.
6. ***Optional*** **-** Press **SECOND** to view hours, minutes, and seconds.

NOTE: The moment you press **ENTER**, the time begins to advance.

Change Between 12- and 24-Hour Format

You can convert between 12-hour (a.m./p.m.) format and 24-hour (Military) format whenever you like. Change between display formats as follows:

1. Press **TIME**. The display goes blank.
2. Press **ENTER**. Time of Day changes to the opposite format.

Date

1. Press **DATE**. **301** displays.
2. Set the current month and day. For example, to enter January 5th, press **1 0 5**.
3. Press **SECOND**/**YEAR**. **00** displays.
4. Type the last two digits of the current year. For example, to enter 1998, press **9 8**. **98** displays in the two rightmost digits.
5. Press **ENTER**. The Date is set and the Time of Day displays.

Day of Week

1. Press **DAY**/**OMIT**. The current setting for the Day of Week is indicated by a lighted stroke along the bottom of the display.
2. Press the number key corresponding to the current Day of Week.
3. Press **ENTER**. The Day of Week is set and the Time of Day is displayed.

Lock Code

You can set a Lock Code to prevent unauthorized or accidental entries. If the keyboard is locked, the timer cannot be programmed without first entering the Lock Code. The timer cannot be locked if a Lock Code has not been set.

Set the Lock Code

1. Press **LOCK**. The display is blank.
2. Set your own Lock Code (up to four digits). The Lock Code displays.
3. Press **ENTER**. The Lock Code is set and the Time of Day displays. The keyboard remains **unlocked** until you press **LOCK** again, or there is a power interruption.

Lock the Keyboard

1. Press **LOCK**. The keyboard is locked and the Time of Day displays. Seconds can be display while the keyboard is locked by pressing **SECOND**.

After a power interruption, the keyboard locks if a Lock Code was set. If no Lock Code was set, the keyboard will be unlocked when power is restored.

Unlocking, Changing, and Removing the Lock Code

The instructions for unlocking, changing, and removing the lock code assume the keyboard is already locked. You have five seconds between each key entry, or the display will return to Time of Day.

Unlock the Keyboard

1. Press **LOCK**. **000** displays.
2. Enter your Lock Code. The Lock Code displays.
3. Press **ENTER**. The keyboard is unlocked and the Time of Day displays.

Change the Lock Code

1. Press **LOCK**. **000** displays.
2. Enter your Lock Code. The Lock Code displays.
3. Press **LOCK**. The display is blank.
4. Set your new Lock Code (up to four digits). The new Lock Code displays.
5. Press **ENTER**. The new Lock Code is set and the Time of Day displays.
6. ***Optional*** **-** Press **LOCK**. The keyboard locks and the Time of Day displays.

Remove the Lock Code

1. Press **LOCK**. **000** displays.
2. Enter your Lock Code. The Lock Code displays.
3. Press **LOCK**. The display is blank.
4. Press **TIME**. The Lock Code is removed and the Time of Day displays. The timer cannot be locked until a new code is set.

NOTE: There is no "back door" to the Lock Code. If a Lock Code is assigned and subsequently forgotten or misplaced, you must electrically shut the timer down and re-program it. All programs are lost.

Manual Operation

This section shows you how to turn circuits ON and OFF and activate programs through the keyboard.

Manually Switching a Circuit

You can turn any Circuit ON or OFF immediately, without waiting for or disturbing program settings. When you manually switch circuits ON or OFF, they remain in the switched position until a program automatically switches them, or until you manually switch them back again.

Manually Switch a Circuit ON or OFF as follows:

1. ***Optional -*** Press **CIRCUIT**.
2. Type the circuit number to be switched. **C–***n* displays, where *n* is the number (1-16) of the circuit specified.
3. Press **ON** or **OFF**. The Circuit switches and the Time of Day displays.

Manually Activating a Program

You can activate or deactivate any program using the keyboard at any time. At initial start-up, all of ChronTrol's 20 or 40 available programs are active. However, they can be turned off and left inactive but kept in memory.

While inactive, **On/Off Programs** will continue to cycle at the rate you specified, but they will have no effect. **Interval Programs** with Cycle Length stop cycling when de-activated.

Manually Switch a Program ON or OFF as follows:

1. Press **PROGRAM**.
2. Type the program number to be switched. **P–***n* displays, where *n* is the number of the program specified.
3. Press **ON** or **OFF**. The Program switches, and the Time of Day displays. All control assignments for that program remain in their current position until switched manually through the keyboard, or automatically by another program.

Two Simple Programs

The following instructions demonstrate how to program the XT to perform simple timing operations.

First, set an **On/Off Program** to turn Circuit #1 ON at 1:00 p.m. and OFF at 1:02 p.m. each day as follows:

1. Press **ENTER**. **E–** displays in the window.
2. You could type in your own program number (1-40), OR you could press **ENTER** again to display the **next available** program number. For this demonstration, choose program #2 by pressing **2**. **E–02** displays.
3. Press **CIRCUIT**. **C–** displays.
4. Type **1**. **C–01** displays.
5. Press **ON**. A dash (–) displays.
6. Set the ON time. Press **1 0 0 AM/PM**. **100.** displays.
7. Press **OFF**. A dash (–) displays.
8. Set the OFF time. Press **1 0 2 AM/PM**. **102.** displays.
9. Press **ENTER** to store the last entry. **P–02.** displays.
10. Press **TIME** to exit the program and return to the Time of Day display.

Now, you could sit and wait for 1:00 p.m. to arrive. OR you could set an **Interval Program** to turn Circuit #1 ON for 2 minutes RIGHT NOW:

Set an **Interval Program** to turn Circuit #1 ON for 2 minutes as follows:

1. Press **ENTER**. **E–** displays in the window.
2. Press **ENTER** again to display the next available program, or type in you own program number. In this example, type **3**. **E–03** displays.
3. Press **CIRCUIT**. **C–** displays.
4. Press **1**. **C–01** displays.
5. Press **INTERVAL**. A dash (–) displays.
6. Set the duration. Press **2**. **0002** displays.
7. Press **ENTER** to store the last entry. **0 03** displays.
8. Press **TIME** to exit the program and return to the Time of Day display.

Now activate the program as follows:

9. Press **PROGRAM 3 ON**. The Time of Day displays and Circuit #1 immediately turns ON for 2 minutes.

Section 3: Programming Procedures

This section discusses how to enter a program into the timer, and how to review and verify entered information.

Features

This discussion will provide you with a general working knowledge of the XT's features. The XT's programming capabilities are very flexible. Plan your programs carefully to maximize their usefulness.

On/Off Programs vs. Interval Programs

There are two types of programs: **On/Off** and **Interval.**

An **On/Off Program** uses ChronTrol's accurate internal clock as a reference for *real time* settings. Specific On/Off program settings are made in hours and minutes, a.m. or p.m., and seconds if desired. An On/Off Program repeats at the same time every day unless the Day Omission or Cycle Length features are used. Time settings can also be set to occur on a specific date in the upcoming year, or to begin on one date and end on another. If your application requires any of these settings, familiarize yourself with the Day Omission, Cycle Length, and Calendar features.

An **Interval Program** does not use real time settings, but is activated only on demand by an input, another program or a keyboard command. An interval program is entered as a duration of time, like one hour, or two hours, etc. An interval program occurs one time only, when activated, or it can repeat by using the Cycle Length feature. For information on the four types of intervals that can be set, see Appendix A*: Special Programming Considerations.*

Any On/Off Program or Interval Program can control circuits, inputs, or other programs, which are called Control Assignments.

Circuits and other Control Assignments

A **circuit** is an output that supplies switched 120V AC (Table Top AC Outlet models) or a dry contact switch closure (all other models). Circuits are numbered from 1 to 16 depending on your ChronTrol model.

Any circuit or circuits that are controlled by a given program are kept in a list of Control Assignments with the program. Assignments can be made or deleted in any order. They are stored in numerical order.

Programs and **inputs** can also be controlled by programs. They are assigned and deleted in the same way as circuits.

Day Omission

The **Day Omission** feature is used to omit (skip) the execution of a program on any days of the week, and on the holidays specified in the **Holiday List**.

The **Holiday List** is a list of dates. You decide which programs, if any, should be omitted from the days in the Holiday List. Programs can also be set to run *only* on holidays (by omitting Days 1 through 7).

Cycle Length

By using the **Cycle Length** feature, programs can be set to repeat at a rate as short as every two seconds (one second ON and one second OFF) or as long as every 365 days.

The Cycle Length feature is used to set an **On/Off Program** to repeat at a rate other than every day, or to set an **Interval Program** to occur more than one time. Cycle Length settings are made in hours, minutes, seconds, and days, to a maximum of 365 days, if necessary. For example, a program with a 15 hour and 40 minute cycle repeats its operation every 15 hours and 40 minutes.

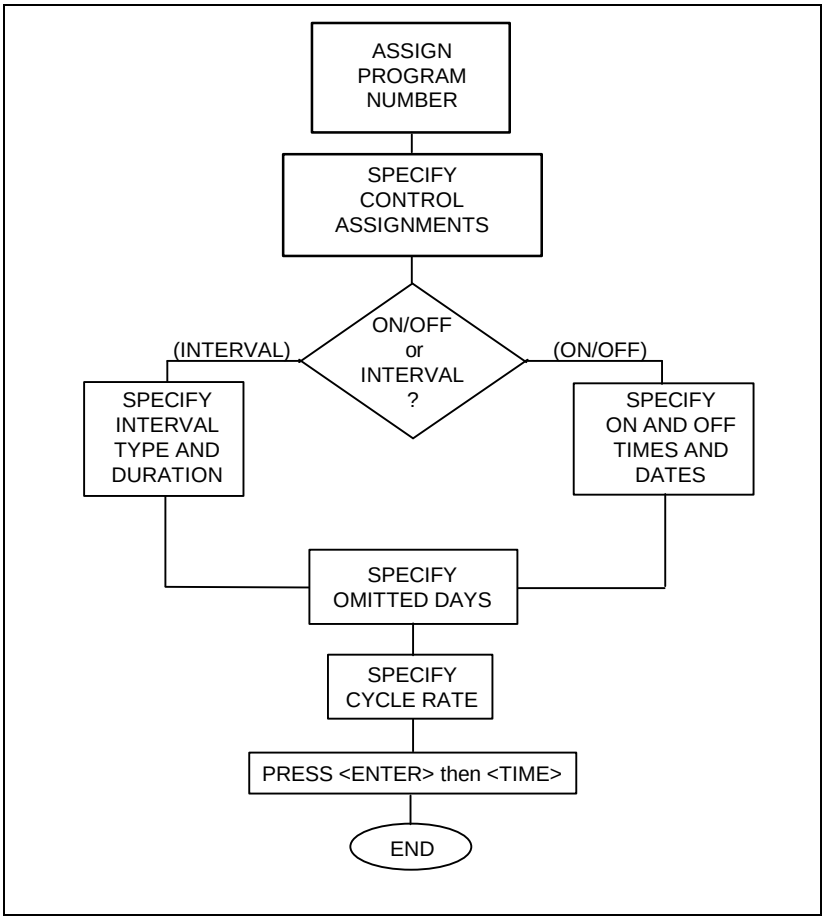
Calendar Feature

The Turn-On time and Turn-Off time in any of ChronTrol's 20 or 40 programs can be set to occur on specific dates within the next 12 months. In this case, the program repeats at the same time every year, unless the Day Omission or Cycle Length features are used. You could use this feature to set a window of operation around a daily schedule that changes every month or every season, for example.

Entering a Program

This section provides step-by-step instructions for programming the XT. At first, you should follow this procedure from beginning to end. You may soon discover that after **Step 1**, the sequence you follow is arbitrary, until you perform **Step 6**, which exits the programming procedure. Between the first and last steps, it isn't necessary to follow the sequence.

Figure 6 illustrates programming logic. It is a flowchart for program entry.



Figue 6: Programming Logic

REMEMBER Begin all programming with the display showing Time of Day (with or without Seconds displayed). If you become lost or confused during any step, press **TIME** and start over. Be aware that pressing **TIME** does not clear settings you've already made in an aborted programming attempt. Settings remain in memory until corrected.

REMEMBER The Time of Day can be displayed in either a 12- or 24-hour format, and all program settings display in the same format.

REMEMBER The timer will not accept an entry that's out of range.

Set a program as follows:

Step 1 - Assign Program Number

Select the number for a new program as follows:

1. Press **ENTER**. **E–** displays.
2. Type the number of the program you want to set. **E–***n* displays, where *n* is the number you put in. **NOTE**: If you skip this step, ChronTrol will automatically assign the next available program number.
3. Press **ENTER**. **P–***n* displays, where *n* is the number of the program, along with its status. A dash (**–**) displays if no program is available.

Step 2 - Specify Control Assignments

Decide if you want to switch circuits ON or OFF, enable or disable inputs, or activate or deactivate other programs.

Circuits - If you want this program to switch any of the AC outlets or dry-contact outputs ON or OFF, assign them to the program as follows:

1. Press **CIRCUIT**. **C–** displays.
2. Type the number of the circuit. **C–***n* displays, where *n* is the number of the circuit specified.

Repeat this procedure until all the circuits are assigned.

Program Assignment - If you want this program to activate or de-activate other programs, assign them as follows:

1. Press **PROGRAM**. **P–** displays in the window.
2. Type the program number. **P–***n* displays, where *n* is the number of the program specified.

Repeat the above procedure until all the programs to be activated or de-activated by this program are assigned.

Input Assignment - If you want this program to enable or disable any of the inputs, assign them as follows:

1. Press **INPUT**. **– –** displays.
2. Type the number of the input. **– –***n* displays, where *n* is the number of the input specified.

Repeat this procedure until all the inputs to be enabled or disabled by this program are assigned.

Step 3 - On/Off or Interval Program

If this program is an **On/Off Program**, skip to the On/Off procedure on page 24. If this program is an **Interval Program**, use the following steps to specify the type of interval you wish to set. If the Interval is 24 hours or more, specify the Interval in days, hours, minutes, and seconds.

Interval Program

See Appendix A: *Special Programming Considerations* for a discussion of Interval types.

NOTE: Interval Programs will not switch until activated by an input, by another program, or through the keyboard.

1. Decide which type of **Interval Program** (0-3) you want.

> For **Type 0** Interval (ON, then OFF after Interval), press **ON OFF INTERVAL**, or **INTERVAL** only.
>
> For **Type 1** Interval (OFF after Interval), press **OFF INTERVAL**.
>
> For **Type 2** Interval (OFF, then ON after Interval), press **OFF ON INTERVAL**.
>
> For **Type 3** Interval (ON after Interval), press **ON INTERVAL**.

2. Set the duration or interval length in hours and minutes (*HHMM*). The interval length displays. Press **0** if Interval is less than one minute.
3. ***Optional*** - Press **SECOND**. **00** displays in the two rightmost digits.
4. ***Optional*** - Set the desired seconds. The seconds display in the two rightmost digits.
5. ***Optional*** - Press **DATE**. A dash (**–**) displays if no previous setting was made.
6. ***Optional*** - Enter the number of whole days within the interval length (1 to 365). The number of days displays.
7. Skip to Step 4 - *Specify Omitted Days*.

On/Off Program

ON Time

Specify the time at which you want this program to turn on as follows:

1. Press **ON**. A dash (**–**) displays if no previous Turn On time has been set for this program.
2. Set the desired Turn On time in hours and minutes (*HHMM*). The Turn On time displays.
3. ***Optional -*** Press **SECOND**. 00 displays in the two rightmost digits.
4. ***Optional -*** Set the desired seconds. The seconds display in the two rightmost digits.
5. ***Optional -*** The XT default time is a.m. To make the time setting p.m., press **AM**/**PM**. The PM indicator light turns on.

Specify the particular *date*, if any, on which you want this program to turn on as follows:

6. ***Optional -*** Press **DATE**. A dash (**–**) displays if no previous setting has been made.
7. ***Optional -*** Set the date by month and day (*MMDD*). (The year does not need to be entered since the next occurrence of the date is assumed.) The date displays.

OFF Time

Specify the time at which you want this program to turn off as follows:

1. Press **OFF**. A dash (**–**) displays if no previous Turn Off time has been set for this program.
2. Set the desired Turn Off time in hours and minutes (*HHMM*). The Turn Off time displays.
3. ***Optional -*** Press **SECOND**. **00** displays in the two rightmost digits.
4. ***Optional -*** Set the desired seconds. The seconds display in the two rightmost digits.
5. ***Optional -*** The XT default time is a.m. To make the time setting p.m., press **AM**/**PM**. The PM indicator light turns on.

Specify the particular *date*, if any, on which you want this program to turn off as follows:

6. ***Optional -*** Press **DATE**. A dash (**–**) displays if no previous setting has been made.
7. ***Optional -*** Set the date by month and day (*MMDD*). (The year does not need to be entered since the next occurrence of the date is assumed.) The date displays.

NOTE: If you set an ON date, make sure you set an OFF date or the OFF date will be **today's date**.

Step 4 - Specify Omitted Days

A day begins at midnight (12:00 a.m.) and ends one second prior to midnight (11:59:59 p.m.). Omitting days from a program that includes On or Off times that overlap midnight requires special consideration. See Appendix A: *Special Programming Considerations* for further information.

1. Press **DAY/OMIT**. The stroke for the current day of the week lights along the bottom row of the display.
2. To omit execution of this program on specific days, type the number key corresponding to each omitted day. The stroke for each day you enter appears in the top row. See *Figure 1*.

> **NOTE**: Pressing the number key again for a day which is already omitted removes it from the Day Omission list, re-enabling the program on those days. Pressing **0/CLEAR** removes all days.

Step 5 - Specify Cycle Rate

Specify the rate, if any, at which you want this program to repeat. See Appendix A: *Special Programming Considerations* for a discussion of cycle lengths of 24 hours or more.

1. Press **CYCLE**. A dash (**–**) displays if no previous setting has been made.
   If Cycle contains only a whole number of days (Day-based), skip to 5.
2. Set the desired cycle length in hours and minutes (*HHMM*). The cycle length displays. Press **0** if Cycle is less than one minute.
3. ***Optional*** - Press **SECOND**. **00** displays in the two rightmost digits.
4. ***Optional*** - Set the desired seconds. The seconds display in the two rightmost digits.
5. ***Optional*** - Press **DATE**. A dash (**–**) displays if no previous setting has been made. **000** displays if On or Off date settings have been made.
6. ***Optional*** - Enter the number of whole days between 1 and 365.

Step 6 - Exit

When finished entering a program, always press **ENTER** to store the last entry followed by **TIME** to exit the program and return to the Time of Day display.

Inputs (External Activation)

An input is a signal sent to the ChronTrol by an external device or detector. If your timer is equipped with the N8 Input Option, programs, circuits, or other inputs can be switched On or Off by the input. When an input is enabled, it does whatever it's been programmed to do. When an input is disabled, it ignores what it has been programmed to do. Inputs can be enabled or disabled by programs, by inputs, or through the keyboard. An input can even disable itself.

For example, an independent temperature detector can signal a ChronTrol input (to which it is connected) every time the room temperature exceeds 76°. This input could then activate an **Interval Program** which would turn an air conditioner on for twenty minutes. Additionally, an **On/Off Program** could disable the input to prevent wasting energy outside business hours.

Wiring instructions for the input connector are contained in the *SPECIFICATIONS AND INSTALLATION* sheet included with units equipped with this option.

Setting Inputs

If your ChronTrol is equipped with the N8 option, you have eight inputs to use to trigger switching events. The following procedure describes how to set Inputs.

NOTE: Input settings do not reduce the number of available programs.

1. Press **ENTER**. **E–** displays.
2. Press **INPUT**. **– –** displays.
3. Type the number (1-8) of the Input you want to set. **– –***n* displays.
4. Press **CIRCUIT** and a number (1-16). **C–***n* displays. Or press **PROGRAM** and a number (1-40). **P–***n* displays. Or press **INPUT** and a number (1-8). **– –***n* displays.
5. Press **ON** or **OFF**. If you press **ON**, the activity indicator (decimal point) lights on the display. If you press **OFF**, the activity indicator does not light.

Repeat Steps 4 and 5 for each item to be controlled. When finished, press **ENTER** followed by **TIME** to return to the Time of Day display.

Each item will switch as specified when a signal is received by the input while the input is enabled.

Manually Enabling or Disabling an Input

You can enable or disable any input using the keyboard at any time. At initial start-up, all of ChronTrol's eight inputs are enabled. However, they can be disabled. While disabled, signals received by inputs will have no effect.

Manually enable or disable an Input as follows:

1. Press **INPUT**.
2. Type the input number (1-8) to be switched. **– –***n* displays, where *n* is the number of the input specified.
3. Press **ON** or **OFF**. The Input switches, and the Time of Day displays.

Functions

Functions are factory-programmed routines that are used by your ChronTrol timer. Functions cannot be switched manually.

Currently there are two functions available:

? **Function 1**. Daylight Saving Time

? **Function 2**. Sequence Start

Function 1: Daylight Saving Time

Function 1 moves the Time of Day clock forward by one hour at 2 a.m. on the second Sunday in March, and moves it back one hour at 2 a.m. on the first Sunday in November. Function 1 is automatically enabled when you set the date during the setup procedure. If you need to disable Daylight Saving Time, see *Sample Program 1* in Section 4.

Function 2: Sequence Start

After a power failure, Function 2 restores circuits to the ON position, in order, at the rate you specify, until all circuits scheduled to be ON have been restored. If Function 2 is not used, all circuits scheduled to be ON will simultaneously switch ON when power is restored. See *Sample Program 2* in Section 4 for the factory-recommended Function 2 Program.

Creating and Editing the Holiday List

The Holiday List is the point of reference for all programs which omit holidays (Day 8), or for programs which are set to execute *only* on holidays (by omitting Days 1 through 7).

Dates can be entered in any order. The maximum number of holidays which can be assigned is 366. Holidays are displayed with three or four digits, depending on the month, and can be entered in any order, and removed or inserted individually.

To create or edit the Holiday List, follow this procedure:

1. Press **DAY/OMIT** then **DATE**. **H–** appears on the display.
2. If creating a new list, type the month and day (*MMDD*) of each holiday. Press **ENTER** after each date.
3. To delete a date from the Holiday List, press **ENTER** repeatedly to scroll through the list until the date to be deleted is displayed. Then press **CLEAR** followed by **ENTER**. The display now shows the next date in the list, if any. Press **TIME** to return to the Time of Day display when you are finished.

NOTE: If you pressed **CLEAR** for a date you wish to keep, and you have not yet pressed **ENTER**, you may re-enter the list by pressing **DATE**. The date will NOT be deleted and you will be returned to the beginning of the list.

Reviewing, Changing, and Deleting Entries

Review

ChronTrol's XT model has powerful and flexible review capabilities. The review section of this manual presents information that allows you to review or verify programming information. The following categories of review are available:

System Parameters Review – You can review the current date, day of the week, the list of holidays, and display the seconds ticking on the clock in the two rightmost digits of display.

Program Review – Any program can be reviewed by pressing the specific keys which were used when first entering the program. As long as no new values are entered, no changes are made to the program. You can review the status of a program, what it controls, its On time, Off time, interval length, list of omitted days, and cycle length.

Input Review – If your XT is equipped with inputs, you can review the status of an input (enabled or disabled), and what it controls.

Cross Reference Review – This is a quick way to find out who controls what. That is, for any given circuit, program, or input, you can identify which programs and inputs control it.

Countdown Timer – You can review the time remaining until a programmed event occurs. By leaving the XT in this mode, you can effectively use it as countdown timer.

Reviewing System Parameters

The following section explains how to review system parameters:

Review the Date

1. Press **DATE**. The current date setting appears in the display.
2. ***Optional -*** Press **SECOND/YEAR** to display the current year in the two rightmost digits of display.
3. Press **TIME** to return to the Time of Day display.

Review the Day of the Week

1. Press **DAY/OMIT**. The stroke for the current Day of Week lights up.
2. Press **TIME** to return to the Time of Day display.

Review the Holiday List

1. Press **DAY/OMIT**, **DATE**, then **REVIEW**. The first date in the Holiday List displays (month and day). If no holidays are set or you reach the end of the list, a dash (**–**) appears on the display.
2. Press **REVIEW** repeatedly to move through the list one date at a time. Holidays appear in numerical order beginning with March 1. Pressing **DATE** followed by **REVIEW** at any time returns you to the first date in the list.
3. Press **TIME** to return to the Time of Day display.

Review Seconds

1. Press **SECOND**. The seconds display in the two rightmost digits.
2. Press **TIME**. The display returns to hours and minutes.

Status Display for Program Review and Input Review

Figure 7 on the next page illustates the organization of Program Status and Input Status information, which is described in the sections on Program Review (Step A: *Program Status* on p. 32) and Input Review (p. 34). The "Status Blocks" shown here are locations on the display where status information appears. In particular, Blocks 1 and 2 consist of the two middle digits of the display, Block 3 is the two rightmost digits, and Block 4 is simply the decimal point. When these blocks contain the characters described in the adjoining chart, they can tell you much about the program or input you are reviewing.

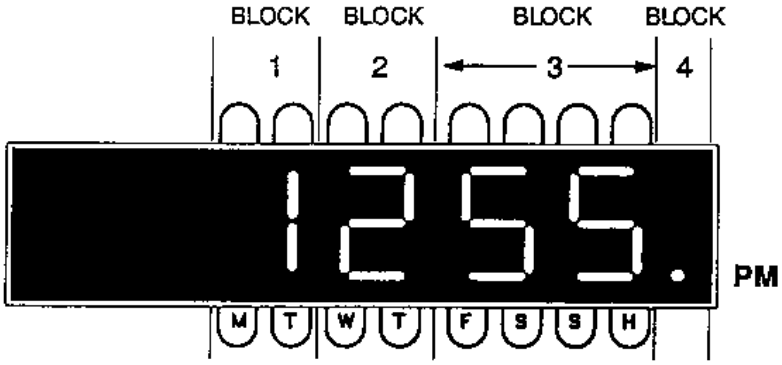


Figure 7: Status Blocks

BLOCK #	DESCRIPTION
1	Type – – Indicates Input P – Indicates On/Off Program 0 – Indicates ON - then - OFF Interval Program 1 – Indicates OFF only Interval Program 2 – Indicates OFF - then - ON Interval Program 3 – Indicates ON only Interval Program
2	Interval Program Activity Indicator. – (dash) Indicates Interval Program is executing. However, a dash after a dash or P is only a separator. () (blank) Indicates Interval Program is not executing.
3	Program or Input Number.
4	Activity Indicator. Lights when program under review is active or when input under review is enabled.

For example, **P – 04.** indicates that the program under review is an ON/OFF program; its program number is 4; and it is active.

Program Review

You can review seven different types of program information. As with the procedure for Setting a Program, you do not have to review in any particular sequence.

Begin Program Review

1. Press **REVIEW**. **E–** displays.
2. Type the program number (1-40) you wish to review.
3. Proceed to any of Steps A - H.

Step A: Program Status

You can review the status of a program (active or inactive) and whether it is an **On/Off Program** or **Interval Program**. If it is an Interval Program, you can determine which of four **types** it is: ON - then - OFF, OFF - then - ON, ON only, or OFF only.

1. Press **REVIEW**. Program status displays. See Figure 7 for status information.
2. Proceed to any of Steps B - H.

Step B: Control Assignments

You can review the list of circuits, programs, and inputs controlled by this program.

1. Press **CIRCUIT**, then **REVIEW**. The first assignment displays. If no assignments are set or you reach the end of the list, a dash (**–**) appears on the display.
2. Press **REVIEW** repeatedly to move through the list one entry at a time. Assignments display in numerical order. Pressing **CIRCUIT** followed by **REVIEW** at any time returns you to the beginning of the list.
3. Proceed to any of Steps B - H.

Step C: ON Time

1. Press **ON** to review the On time in hours and minutes.
2. ***Optional -*** Press **SECOND** to review hours, minutes, and seconds.
3. ***Optional -*** Press **DATE** to review the On date, if any.
4. Proceed to any of Steps A - H.

Step D: OFF Time

1. Press **OFF** to review the Off time in hours and minutes.
2. ***Optional*** - Press **SECOND** to review hours, minutes, and seconds.
3. ***Optional*** - Press **DATE** to review the Off date, if any.
4. Proceed to any of Steps A - H.

Step E: Interval Length

1. Press **INTERVAL** to review the interval length in hours and minutes. If the program is an **On/Off Program**, the display shows Program Status (**P–***n*) instead of interval length (see Step A: *Program Status* above).
2. ***Optional*** - Press **SECOND** to review hours, minutes, seconds.
3. ***Optional*** - Press **DATE** to review the interval length in days, if any.
4. Proceed to any of Steps A - H.

Step F: Omitted Days

1. Press **DAY/OMIT** to review skipped days. See *LED Indicators* in Section 1 for display information.
2. Proceed to any of Steps A - H.

Step G: Cycle Length

If no cycle length is set, an **On/Off Program** turns ON and OFF at the same time each day (except skipped days). To review a cycle length, follow this procedure:

1. Press **CYCLE** to review the cycle length in hours and minutes.
2. ***Optional*** - Press **SECOND** to review hours, minutes, and seconds.
3. ***Optional*** - Press **DATE** to review the cycle length in days, if any.
4. Proceed to any of Steps A - H.

Step H: Exit Program Review

To exit the review at any time, press **TIME**.

Input Review

If your XT is equipped with inputs, you can review the status of an input (enabled or disabled) and what circuits, programs, or other inputs it controls.

1. Press **ENTER**, then **INPUT**. **– –** displays.
2. Type the number (1-8) of the input you want to review.
3. Press **ENTER**. Status displays. See *Figure 7* for status information.

You can review the list of circuits and other assignments controlled by this input by stepping through each assignment in sequence.

4. Press **REVIEW**. The first assignment displays. If no assignments are set or you reach the end of the list, a dash (**–**) displays.

> **NOTE**: If the decimal point on the display is lit, the control assignment is turned ON by this input. If the decimal point on the display is unlit, the control assignment is turned OFF by this input.

5. Press **REVIEW** repeatedly to move through the list one entry at a time. Assignments display in numerical order. Pressing **CIRCUIT** followed by **REVIEW** at any time returns you to the beginning of the list.
6. To exit the review at any time, press **TIME**.

Cross Reference Review

Cross Reference review is a quick way to identify which programs and inputs control a given Control Assignment (circuit, program, or input).

1. Press **CIRCUIT**. **C–** displays, OR press
   PROGRAM. **P–** displays, OR press
   INPUT. **– –** displays.
2. Type the number of the Control Assignment you wish to find.
3. Press **REVIEW**. ChronTrol begins scanning all programs and inputs, and displays the number of the first program or input that controls this Control Assignment.
4. Press **REVIEW** repeatedly to search for more. A dash (**–**) indicates there are no more.
5. Press **TIME** to return to the Time of Day display when you are finished.

> **NOTE**: If you skip step 2, ChronTrol stops at all programs and inputs that control *anything*.

Countdown Timer

To view the time remaining until a program switches any given circuit, program, or input, follow this procedure:

1. Press **CIRCUIT**. **C–** displays.
   PROGRAM. **P–** displays.
   INPUT. **– –** displays.
2. Type the number of the circuit, program, or input you wish to review.

   If the control assignment is included in more than one program, press **ENTER** repeatedly until the specific program you wish to view in Countdown Mode displays.
3. Press **TIME**. The Time of Day displays.
4. Press **ON** to review the time remaining until the control assignment is turned ON or press **OFF** to review time remaining until control assignment is turned OFF

   NOTE: For Interval Programs Type 2 and Type 3, press **ON** to review the time remaining until the control assignment is turned OFF, and **OFF** to review the time remaining until the control is turned ON.

5. Press **TIME** to return to the Time of Day display when you are finished.

Changing Program Entries

To change a program, use the setting procedure outlined in the section *Program Review* above. As the value for each parameter displays (control assignments, on and off times and dates, cycle length, day omission), type in the new value followed by **ENTER** or followed by the key corresponding to the next parameter to be changed (if more than one parameter is to be changed). Press **ENTER** followed by **TIME** to return to the Time of Day display when you are finished.

NOTE: If you begin to change the value of a parameter by mistake, press the parameter key again to restore the original value.

Deleting Program Entries

Follow the procedure outlined in the section *Program Review.* As the value for each parameter you want to delete is displayed (control assignments, on and off times and dates, interval length, cycle length, day omission), press **CLEAR** followed by **ENTER**.

To remove a program from memory entirely:

1. Press **CLEAR**. **CL** displays.
2. Press **PROGRAM**. **CL P–** displays.
3. Type the number of the program. **CL P–***n* displays, where *n* is the number of the program specified.
4. Press **ENTER**. The program is deleted and the Time of Day displays.

Repeat this procedure until all desired programs are deleted.

Deleting Input Entries

Follow the procedure outlined in the section *Input Review.* As the value for each control assignment you want to delete is displayed, press **CLEAR** followed by **ENTER**.

To remove an input from memory entirely:

5. Press **CLEAR**. **CL** displays.
6. Press **INPUT**. **CL – –** displays.
7. Type the number of the input. **CL – –** *n* displays, where *n* is the number of the input specified.
8. Press **ENTER**. The input is deleted and the Time of Day displays.

Repeat this procedure until all desired inputs are deleted.

Factory Settings (Defaults)

When you first install ChronTrol's XT timer, the following parameters are in effect:

? All programs are active
? All inputs are enabled (on models equipped with N8 Input Option)
? Date is set to 30199 (March 1, 1999)
? Time is set at 12:00:00 a.m. and counting
? No Lock Code is set or active

Section 4: Sample Programs

Program 1: Daylight Saving Time 38
Program 2: Sequence Start 38
Program 3: On/Off Program with Day Omit 38
Program 4: Interval Program with Cycle Length 39
Program 5: On/Off Program with Cycle Length 40
Program 6: On/Off Program with Day-based Cycle 40
Program 7: 24-hour based Program 41
Program 8: Program Controlling Program 42
Program 9: Using Inputs 43
Program 10: Re-trigger and Time Out 44
Program 11: School Bells 45
Program 12: Delay Program 45

Sample Program 1: Function 1 - Daylight Saving Time

In most cases it is advisable to let ChronTrol handle the change at Daylight Saving Time automatically every year. However, it may be necessary or desirable to disable it. Turn Automatic DST on and off as follows:

1. Press **ENTER**, **FUNCTION**, then **1**. **F–01** displays.
2. Press **ENTER**. The decimal point lights up if DST is enabled.
3. Press **ON** or **OFF** to enable or disable the function. The decimal point lights accordingly.
4. Press **ENTER**. The function is set and the display shows Time of Day.

You may hit **TIME** to exit from this procedure at any point.

Sample Program 2: Function 2 - Sequence Start

You can specify the rate at which circuits restore to the ON position following a power failure by setting the value of Function 2 in seconds (up to 99 seconds). The default value is 0 seconds, so all circuits turn back on at once following a power failure. Adjust the Sequence Start rate as follows:

1. Press **ENTER**, **FUNCTION**, then **2**. **F–02** displays.
2. Press **ENTER**. The Sequence Start rate in seconds displays.
3. Type in the value you want for Sequence Start in seconds, up to 99.
4. Press **ENTER**. The function is set and the display shows Time of Day.

You may hit **TIME** to exit from this procedure at any point.

Sample Program 3: On/Off Program with Day Omit

Desired effect: Turn on the heat in building zones 1 and 2 between 6 a.m. and 6 p.m., Monday through Friday, but zone 2 only on Saturday and Sunday between 6 a.m. and 4 p.m.

Plan: Zone 1 is controlled by Circuit #1. Zone 2 is controlled by Circuit #2.

Set Program #1

1. Press **ENTER**, then **1**. **E–01** displays.
2. Press **CIRCUIT**, then **1**. **C–01** displays.
3. Press **CIRCUIT**, then **2**. **C–02** displays.
4. Press **ON**, then **6 0 0**. **600** displays.
5. Press **OFF**, then **6 0 0 AM/PM**. **600.** displays.
6. Press **DAY/OMIT**, then **6 7**. Strokes for Saturday and Sunday display.
7. Press **ENTER** to store the last entry followed by **TIME** to return to the Time of Day display.

Set Program #2

1. Press **ENTER**, then **2**. **E–02** displays.
2. Press **CIRCUIT**, then **2**. **C–02** displays.
3. Press **ON**, then **6 0 0**. **600** displays.
4. Press **OFF**, then **4 0 0 AM/PM**. **400.** displays.
5. Press **DAY/OMIT**, then **1 2 3 4 5**. Strokes for Monday through Friday display.
6. Press **ENTER** to store the last entry followed by **TIME** to return to the Time of Day display.

Sample Program 4: Interval Program with Cycle

Desired effect: To turn Circuit #3 ON for one second, then OFF for four seconds, over and over again.

Plan: Make the next available program a 1-second On-Off Interval with a 5-second Cycle Length. Start and stop the program through the keyboard.

Set Program #1.

1. Press **ENTER ENTER**. **P–*n*.** displays, where *n* is the number of the next available program.
2. Press **CIRCUIT**, then **3**. **C–03** displays.
3. Press **INTERVAL**, then **0**. **0000** displays.
4. Press **SECOND**, then **1**. **000001** displays.
5. Press **CYCLE 0 SECOND 5**. **000005** displays.
6. Press **ENTER** to store the last entry, then press **TIME** to return to the Time of Day display.

Start the Program.

1. Press **PROGRAM** *n* **ON**, where *n* is the same program number given above. Time of Day displays and Circuit #3 starts clicking ON and OFF.

Stop the Program.

1. Press **PROGRAM** *n* **OFF**. Time of Day displays and Circuit #3 stops clicking. **NOTE**: Circuit #3 will remain ON if you turned the program OFF before it turned the circuit OFF.

Sample Program 5: On/Off Program with Cycle Length

Desired Effect: To turn Circuit #4 On for 10 seconds every minute starting at 2 p.m.
Plan: Set Program #4 to turn Circuit #4 ON at 2:00 p.m. and OFF at 2:00:10, on a 1 minute cycle.

Set Program #4

1. Press **ENTER**, then **4**. **E–04** displays.
2. Press **CIRCUIT**, then **4**. **C–04** displays.
3. Press **ON**, then **200 AM/PM**. **200.** displays.
4. Press **OFF 200 SECOND 10 AM/PM**. **20010.** displays.
5. Press **CYCLE**, then **1**. **0001** displays.
6. Press **ENTER** to store the last entry followed by **TIME** to return to the Time of Day display.

When the clock reaches 2 p.m., Circuit #4 will begin turning ON for 10 seconds and OFF for 50 seconds, over and over. If you disable Program #4 (**PROGRAM 4 OFF**) you will observe that the switching stops. When you enable the program once again (**PROGRAM 4 ON**), you will see the switching resume, but not until the next whole minute is reached. In other words, the program has remained *in step* with the clock while it was disabled.

Sample Program 6: Program with a Day-based Cycle

Desired Effect: To sample carbon monoxide emissions at the same time during rush hour on Monday the first week, on Tuesday the second week, etc., that is, every eighth day.
Plan: Set Program #12 to switch Circuit #2 on for 1 minute at 7:30 a.m. on an 8-day cycle.

1. Press **ENTER**, then **1 2**. **E–12** displays.
2. Press **CIRCUIT**, then **2**. **C–02** displays.
3. Press **ON**, then **7 3 0**. **730** displays.
4. Press **OFF**, then **7 3 1** **731** displays.
5. Press **CYCLE**, then **DATE**, then **8**. **008** displays.
6. Press **ENTER** to store the last entry followed by **TIME** to return to the Time of Day display.

To review the cycle length:

1. Press **ENTER**, then **1 2**. **E–12** displays.
2. Press **CYCLE**. **C** displays.
3. Press **DATE**. **008** displays.
4. Press **TIME** to return to the Time of Day display.

NOTE: These times will not occur 192 hours apart during the weeks that Daylight Saving Time starts and ends.

Sample Program 7: 24-hour based Program

Desired Effect: Have a circuit turn ON every day and not be affected by Daylight Saving Time. A 24-hour-based program is used so that the time between events is always 24 hours, regardless of DST.

Plan: Set Program #8 to turn on Circuit #1 every 24 hours beginning at 4:00 p.m. Depending on what day of the year the program is set, its setting will shift to 3:00 p.m. or 5:00 p.m. at some point.

1. Press **ENTER**, then **8**. **E–08** displays.
2. Press **CIRCUIT**, then **1**. **C–01** displays.
3. Press **ON**, then **4 0 0 AM/PM**. **400.** displays.
4. Press **OFF**, then **4 0 0**. **400** displays.
5. Press **SECOND**, then **3**, then **AM/PM**. **40003.** displays.
6. Press **CYCLE**, **0**, **DATE**, then **1**. **001** displays.
7. Press **ENTER** to store the last entry followed by **TIME** to return to the Time of Day display.

Sample Program 8: One Program Controlling Another

Desired Effect: To turn a circuit on for one second, at the same time every day, for one month every year. Subsequently, another program may control it for a different time.

Plan: Program #20 is an Interval program that turns on Circuit #1 for 1 second whenever the program is activated, and then repeats the operation every 24 hours until it is stopped. Program #1 starts Program #20 at 6:15 a.m. on March 1 and stops it on April 1 at midnight.

Set Program #1.

1. Press **ENTER**, then **1**. **E–01** displays.
2. Press **PROGRAM**, then **2 0**. **P–20** displays.
3. Press **ON**. A dash (–) displays if no previous On time has been set for this program.
4. Press **6 1 5**. **615** displays.
5. Press **DATE**, then **3 0 1**. **301** displays.
6. Press **OFF**. A dash (–) displays if no previous OFF time has been set for this program.
7. Press **1 2 0 0**. **1200** displays.
8. Press **DATE**, then **4 0 1**. **401** displays.
9. Press **ENTER** to store the last entry, then press **TIME** to return to the Time of Day display.

Set Program #20.

1. Press **ENTER**, then **20**. **E–20** displays.
2. Press **CIRCUIT**, then **1**. **C–01** displays.
3. Press **INTERVAL 0 SECOND 1**. **000001** displays.
4. Press **CYCLE**, then **0**. **0000** displays.
5. Press **ENTER** to store the last entry, then press **TIME** to return to the Time of Day display.

Sample Program 9: Using Inputs

Desired Effect: When a Start signal is received, turn On Circuit #1 for 5 seconds and OFF for 5 seconds until a Stop signal is received. At the same time, turn Circuit #2 ON for 10 seconds and OFF for 10 seconds until the Stop signal is received.

Plan: The Start and Stop signals are presented to the ChronTrol through Inputs #1 and #2 respectively. Circuits #1 and #2 are controlled by Programs #1 and #2 respectively.

Set Input #1.

1. Press **ENTER INPUT**, then **1**. **– –01** displays.
2. Press **PROGRAM**, then **1**. **P–01** displays.
3. Press **ON**. **P–01.** displays.
4. Press **PROGRAM 2 ON**. **P–02.** displays.
5. Press **ENTER** to store the last entry, then press **TIME** to return to the Time of Day display.

Set Input #2.

1. Press **ENTER INPUT 2**. **– –02** displays.
2. Press **PROGRAM 1 OFF**. **P–01** displays.
3. Press **PROGRAM 2 OFF**. **P–02** displays.
4. Press **CIRCUIT 1 OFF**. **C-01** displays.
5. Press **CIRCUIT 2 OFF**. **C-02** displays.
6. Press **ENTER**, then press **TIME**.

Set Program #1.

1. Press **ENTER**, then **1**. **E–01** displays.
2. Press **CIRCUIT**, then **1**. **C–01** displays.
3. Press **INTERVAL**, then **0**. **0000** displays.
4. Press **SECOND**, then **5**. **000005** displays.
5. Press **CYCLE 0 SECOND 1 0**. **000010** displays.
6. Press **ENTER**, then press **TIME**.

Set Program #2.

1. Press **ENTER**, then **2**. **E–02** displays.
2. Press **CIRCUIT**, then **2**. **C–02** displays.
3. Press **INTERVAL 0 SECOND 1 0**. **000010** displays.
4. Press **CYCLE 0 SECOND 2 0**. **000020** displays.
5. Press **ENTER**, then press **TIME**.

Sample Program 10: Re-trigger and Time Out

Desired Effect: To stop a motor when 10 seconds have elapsed without a signal from a detector.

Plan: The detector provides a switch closure to Input #3 whenever an object passes on a conveyer. The signal re-starts Program #7, a 10-second Off Interval Program, so the conveyer motor on Circuit #2 won't turn off until 10 seconds have passed since the last signal.

Set Input #3

1. Press **ENTER INPUT 3**. **– –03** displays.
2. Press **CIRCUIT 2 ON**. **C–02.** displays.
3. Press **PROGRAM 7 ON**. **P–07.** displays.
4. Press **ENTER**, then **TIME** to return to the Time of Day display.

Set program controlling Circuit #2.

1. Press **ENTER**, then **7**. **E–07** displays.
2. Press **CIRCUIT**, then **2**. **C–02** displays.
3. Press **OFF INTERVAL**, then **0**. **0000** displays.
4. Press **SECOND**, then **1 0**. **000010** displays.
5. Press **ENTER**. The display shows **1 07**, indicating that Program #7 is a Type 1 (Off only) Interval Program.
6. Press **TIME** to return to the Time of Day display.

Sample Program 11: School Bells

Desired Effect: To ring a bell at 7 a.m., 7:05 a.m., and various other times throughout the day.

Plan: Program #15 is a 3-second interval that rings the bell on Circuit #1, and skips Saturday, Sunday, and holidays. Programs #1-12 call upon Program #15 at various times throughout the day.

Set Program #1.

1. Press **ENTER ENTER**. **P–01.** displays.
2. Press **PROGRAM**, then **15**. **P–15** displays.
3. Press **ON**, then **7 0 0**. **700** displays.
4. Press **ENTER**, then **TIME**.

Set Program #2.

1. Press **ENTER ENTER**. **P–02.** displays.
2. Press **PROGRAM**, then **15**. **P–15** displays.
3. Press **ON**, then **7 0 5**. **705** displays.

4. Press **ENTER**, then **TIME**.

Repeat the above steps, substituting the time for each bell in step 3, until all times have been entered.

Set Program #15.
1. Press **ENTER 1 5**. **E–15** displays.
2. Press **CIRCUIT 1**. **C–01** displays
3. Press **INTERVAL 0 SECOND 3**. **000003** displays.
4. Press **DAY OMIT**, then **6 7 8** to skip Saturday, Sunday, and holidays.
5. Press **ENTER**, then **TIME** to return to the Time of Day display.

Sample Program 12: Delay Program

Desired Effect: After a Start command, delay 45 seconds before turning Circuit #2 ON for 15 seconds

Plan: Program #1 is an On-only Interval Program that turns on Program #2 after an interval of 45 seconds. Program #2 turns ON Circuit #1 for 15 seconds.

Set Program #1.
1. Press **ENTER**, then **1**. **E–01** displays.
2. Press **PROGRAM**, then **2**. **P–02** displays.
3. Press **ON INTERVAL 0 SECOND 4 5**. **000045** displays.
4. Press **ENTER**. The display shows **3 01**, indicating that Program #1 is a Type 3 (On only) Interval Program.
5. Press **TIME**.

Set Program #2.
1. Press **ENTER**, then **2**. **E–02** displays.
2. Press **CIRCUIT**, then **1**. **C–01** displays.
3. Press **INTERVAL 0 SECOND 1 5**. **000015** displays.
4. Press **ENTER** to store the last entry, then press **TIME** to return to the Time of Day display.
5. When you're ready, press **PROGRAM 1 ON** to give the Start command.

Appendix A: Special Programming Considerations

The following subsections discuss special programming considerations and programming techniques for the XT.

Interval Timing

If your application requires an **Interval Program**, it is important to identify how you want the program to affect its control assignments. Review the corresponding **type** of Interval (0-3) from the list below before setting an Interval Program. The key sequence is different for each type.

There are four ways an Interval Program can be used to switch its control assignments:

Type 0 ON for a length of time, then OFF. Key sequence: **ON OFF INTERVAL** (or **INTERVAL** alone; Type 0 Interval is assumed), then the duration. Duration is the length of time ON before switching OFF. Think of it as "ON, then OFF after an INTERVAL of *n*".

Type 1 OFF after a length of time, regardless of current condition. Key sequence: **OFF INTERVAL**, then the duration. Duration is the length of time before switching OFF. Think of it as "OFF after an INTERVAL of *n*".

Type 2 OFF for a length of time, then ON. Key sequence: **OFF ON INTERVAL** and duration. Duration is the length of time OFF before switching ON. Think of it as "OFF, then ON after an INTERVAL of *n*".

Type 3 ON after a length of time, regardless of current condition. Key sequence: **ON INTERVAL** and duration. Duration is the length of time before switching ON. Think of it as "ON after an INTERVAL of *n*".

Overlapping Midnight

You may need to consider how the **Day Omission** feature affects a program with ON and OFF times that overlap midnight.

For instance, suppose you enter a program schedule which begins at 9:30 p.m. and ends at 12:30 a.m. Monday through Friday (omitting Saturday and Sunday). The event which begins on Friday at 9:30 p.m. will not end at 12:30 a.m. the next day because the next day is Saturday, and Saturday has been omitted. Since Sunday is also omitted, the next time the program will turn OFF is 12:30 a.m. Monday morning.

If the program must finish its execution on the omitted day (Saturday), and not turn ON that day, a second program must be entered. This program would need to turn OFF at 12:30 a.m. and omit all days of the week but Saturday.

Cycles and Daylight Saving Time

This section discusses the difference between a **day** and a **24-hour** period and how **Daylight Saving Time** affects programmed events occurring during the "changeover" hour.

A "day" begins at midnight (12:00:00 a.m.) and ends just before midnight (11:59:59 p.m.) Ordinarily this is 24 hours, except when Daylight Saving Time begins and ends. A "24-hour" period, on the other hand, is exactly that: 24 hours between occurrences of an event.

You may need to consider how Daylight Saving Time will influence both day-based programs and 24-hour-based programs whenever an event occurs during the changeover hour.

Day-Based Programs at the Start of DST

On the first day of Daylight Saving Time (2 a.m. on the second Sunday in March), a day-based program that occurs each day at 2:30 a.m. will occur at 3:30 a.m. because the clock advanced 1 hour at 2 a.m. On the second day of Daylight Saving Time the event will occur when the clock reads 2:30 a.m., but only 23 actual hours will have elapsed since its last occurrence.

Any event scheduled to occur later in the hour between 2 and 3 a.m. than an event occurring between 3 and 4 a.m. will occur "out of order" in the changeover hour. For instance, an event scheduled for 3:15 a.m. will occur

half an hour BEFORE an event occurring at 2:45 a.m. This happens because ChronTrol runs these two hours at the same time.

Day-Based Programs at the End of DST

When Daylight Saving Time ends at 2 a.m. on the first Sunday in November, the event mentioned earlier will occur when the clock reads 2:30 a.m., even though 25 actual hours will have elapsed since its last occurrence, because the clock fell back one hour at 2 a.m.

Also, day-based programs scheduled to occur in the hour between 1:00 a.m. and 2:00 a.m., the "repeated hour," will occur only once, during the first running of that hour.

24-Hour Based Programs at the Start of DST

A program set to occur every 24 hours starting at 2:30 a.m. will continue the 24-hour cycle regardless of the clock time. On the first day of Daylight Saving Time, the event will occur 24 hours after the last occurrence, but the clock will read 3:30 a.m. because it advanced 1 hour at 2 a.m. The next day the event will also occur at 3:30 a.m. and each day thereafter.

24-Hour Based Programs at the End of DST

When Daylight Saving Time ends, the event will go back to occurring when the clock reads 2:30 a.m. because the clock fell back one hour at 2 a.m., but there will always be 24 hours between occurrences.

How to set a Day-Based Program

A day-based program is set by leaving out the hours and minutes in the **Cycle Length**, and using only days.

By definition, a program with *no* cycle length is a day-based program; that is, it will repeat at the same time every day, regardless of whether the day is 23, 24, or 25 hours long.
(Remember that a program with an On Date or Off Date will repeat once every calendar year if no cycle length is set, regardless of whether the year is 365 or 366 days long).

Sample Programs 4 through 7 illustrate applications in which events repeat at rates other than every day. When you review the cycle length of a day-based program, a "C" displays. This is an indication to you that, even though no hours and minutes of the cycle have been set, cycle days *are* set.

ChronTrol Service

ChronTrol Service, during or after the warranty period, is available from ChronTrol Corporation, San Diego, CA, USA.

Should you have difficulty with ChronTrol, call the ChronTrol Service Hotline at (800) 854-1990. Be prepared to follow the Service Technician's instructions. This may require having the ChronTrol within reach, if possible, or having pencil and paper ready to take notes or instructions. If the Technician issues a Returned Material Authorization (RMA), return the ChronTrol, postpaid, to the address given by the Technician, WITH A DESCRIPTION of the problem.

Enclose $10.00 to cover shipping and handling charges on all returns. If under warranty, no additional charges will be made. Non-warranty repair costs will be advised for approval prior to correction and return.

CAUTION: There are no user-serviceable parts inside a ChronTrol Timer. Servicing must be performed by a ChronTrol Corporation Authorized Service Technician.

Warranty

ChronTrol Timers are warranted to be free from defects in workmanship or material under normal use and service for a period of one (1) year from the date of purchase by the user.

ChronTrol Corporation’s obligation under this Warranty is limited to repairing or replacing at its Factory Service Center any product which shall, within the time limit set forth above, be received at its Factory Service Center with transportation charges prepaid provided that ChronTrol Corporation’s examination discloses to its satisfaction that such product is defective.

Any adjustment or replacement of defective parts made under this Warranty does not void the Warranty; nor does it extend the original Warranty period.

This Warranty shall not extend to any ChronTrol product which has been tampered with or repaired by someone other than ChronTrol Corporation’s Authorized Service Technician, nor to any product which has been subject to misuse, neglect, accident or damage, or which has not been properly installed and tested in operation.

Under no circumstances shall ChronTrol Corporation be liable to any purchaser or third party for any loss of profits or other direct or indirect costs, expenses, losses or consequential damages arising out of, or as a result of, any defects in, or failure of, its products, or any part or parts thereof.

This Warranty is in lieu of any other warranty, either expressed or implied, as to description, quality, merchantability, fitness for any particular purpose or use, or any other matter.

Copyright 2006 ChronTrol Corporation

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP