TC-18

INSTRUCTION MANUAL

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HOW TO USE THIS MANUAL

This manual is set up by order of commands. For instructions on how to enter a specific command refer to the table of contents for the page number. The command is initiated by pressing the keys in the order they are shown in the "Entry Sequence". The end result of a command is described in each section under "Result". An example is provided for each command. In the example you will find the keypad entries and the expected response from the entry as shown on the display.

If you have problems, call our Technical Support at 903-938-1901 / 800-227-1734. Any questions or comments are welcome.

TC-18

ELTEC's TC-18 is a standalone programmable time-based controller built on a scalable platform which provides a path for upgrading and integration into the System 3000 networkable programmable clock system.

The TC-18 performs local control to operate a relay output and integral DC flasher as programmed through a user-defined schedule. The schedule includes a weekly program of up to 6 ON/OFF operations per day, a holiday/no-school schedule of up to 25 holidays, and an exception schedule for alternate programs such as early dismissal, late starts, and snow delays. The schedule is typically programmed for 1 year at a time, but may be programmed for longer periods provided the user does not exceed 25 holidays or 365 exception periods. Manual control functionality is provided with variable override duration of up to 10 hours.

The TC-18 may be programmed from a host computer using the DLPRO 18 software connected with a USB interface cable. It can also be programmed from the key pad on the front of the clock. Program elements are opened by typing the appropriate access sequence. A key word for each entry is displayed to guide the user through the programming process. Once the required information is entered for each field, the display advances to the next field until all data for that program element is entered. The TC-18 provides 'type-over', 'back up' or 'field skip' features during the entry process to facilitate error correction, simplify navigation, and make programming quick and easy. Program schedules can be reviewed or edited at any time without disturbing the operation of the clock.

The TC-18 maintains time and date during power outages for a minimum of 7 days with its rechargeable capacitive backup system. Program information is stored in non-volatile memory (NVRAM) and will be kept during power off conditions for the life of the clock. Operating in stand-alone mode, a real-time clock maintains time and date information with a quartz crystal accuracy of 2 seconds per month.

QUICK SETUP CHECKLIST

The TC-18 is designed for simplicity of implementation. The following checklist will facilitate easy installation and basic programming.

1. Install clock in cabinet and connect power and control wiring as required.

   A. See provided Wire Reference Chart.

2. Test operational functions using Manual Override [A]31 and [A]32.

3. Set current local time using [A] 11 function.

4. Set current date using [A] 21 function.

5. Program start date, end date and the standard weekly ON/OFF schedule using the [A]87 function.

6. Program Holidays using the [A]67 function.

7. Define Exception days and Program Exception Schedules using the [A]77 and [A]78 functions.

TC-18 PROGRAMMABLE TIME CLOCK FEATURES, SPECIFICATIONS, AND POWER/CONTROL INTERFACE CONNECTIONS

FEATURES

- Upgradable to Network Based Time Clock (TC-3000)
- Operates on either AC or DC (Solar)
- Built-in DC Flasher Circuit
- Isolated Relay Output
- Backlit LCD
- Keypad for Direct Programming
- Display Assisted Program Prompts

- Computer Programmable with DLPRO 18 Software
- Mini USB Port
- Weekly Default Schedule: Up to 6 Daily 'ON/OFF' Intervals
- Holidays/No School Days: Up to 25
- Exception Days: Up to 365
- Programmable Manual Override Duration
- Schedules Stored in Non-Volatile Memory
- Minimum 7-Day Capacitive Battery Backup
- Time Set from Keypad or DLPRO 18 Software
- Extremely accurate temperature compensated Real-Time-Clock Chip
- Automatically Adjust for Daylight Saving Time and Leap Year

Device Display and Keypad

FRI 05-17-13
11:32:02

1	2	3	A
4	5	6	B
7	8	9	C
*	0	#	D

[A] Attention/Back-up
[B] ENTER
[C] CANCEL
[D] Move Forward/Skip Fields

ELTEC

TC-18

A11	Set Time	A77	View/Edit Exceptions
A21	Set Date	A78	New Exception
A31	Manual Flash ON	A85	Clear 7-Day Schedule
A32	Manual Flash OFF	A87	View/Edit 7-Day Schedule
A33	Clear Manual Override	A90	Factory Reset
A36	Set Override Duration	A91	Daylight Saving Time
A65	Clear Holidays	A98	Restart Unit
A67	View/Edit Holiday	A99	Firmware Version
A75	Clear Exceptions	*DD	Display LRC

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SPECIFICATIONS

- Dimensions* .... 8 ¼" H x 4 ¼" W x 1 ¾" D
- Display .... 2 Lines x 16 Characters Alpha-Numeric LCD
- Outputs .... 1 SPDT Rated @ 16A/120 VAC
- Flasher .... Dual-circuit DC, Ground-switching 55FPM
- Back-up Power .... Capacitive: 7 Days Minimum; 60 Days Typical
- Input Voltage.................................. 6-22 VDC/85-264 VAC; 47-440 Hz
- Power Required .... 2.5 Watts
- Temperature Range...-34° C to +74° C
- Electrical Connection .... CPC* with 48 inch Cable

* Add an additional 2 inches of clearance to the bottom of clock for CPC connection.

POWER/CONTROL INTERFACE CONNECTIONS

CPC Pin #1 − **Black** − Line (120/240 VAC)
CPC Pin #2 − **White** − Neutral (120/240 VAC)
CPC Pin #3 − **Green** − Chassis Ground
CPC Pin #4 − **Red** − Relay 1 Common
CPC Pin #5 − **Yellow** − Relay 1 Normally Closed
CPC Pin #6 − **Brown** − Manual Switch (Ground Activation)
CPC Pin #7 − **Violet** − Solar Panel+ (PV+)
CPC Pin #8 − **Orange** − LED 1 Ground
CPC Pin #9 − **Blue** − LED 2 Ground
CPC Pin #10 − **White/Yellow** − Relay 1 Normally Open
CPC Pin #11 − **White/Red** − 12 VDC Positive
CPC Pin #12 − **White/Black** − 12 VDC Negative

NOTE: The Relay is de-energized during power outages.

KEYPAD DESCRIPTION

The TC-18 utilizes a 16-key telephone style keypad. Display-assisted programming guides the process by use of the [A] key along with a set of numbers. The information placard on front of the TC-18 provides a reference of the entry sequence required to initiate a command.

The [A] key is the 'ATTENTION' key. It is used to alert the TC-18 that it is about to "Call" a command. When a command is entered, the TC-18 displays a description and prompts for each required entry. Key in the required data and press the [B] key. The TC-18 display will advance to the next required entry or return to standard TIME, DAY/DATE display if all required information for that command has been entered. Below is a list of the keys and their functions.
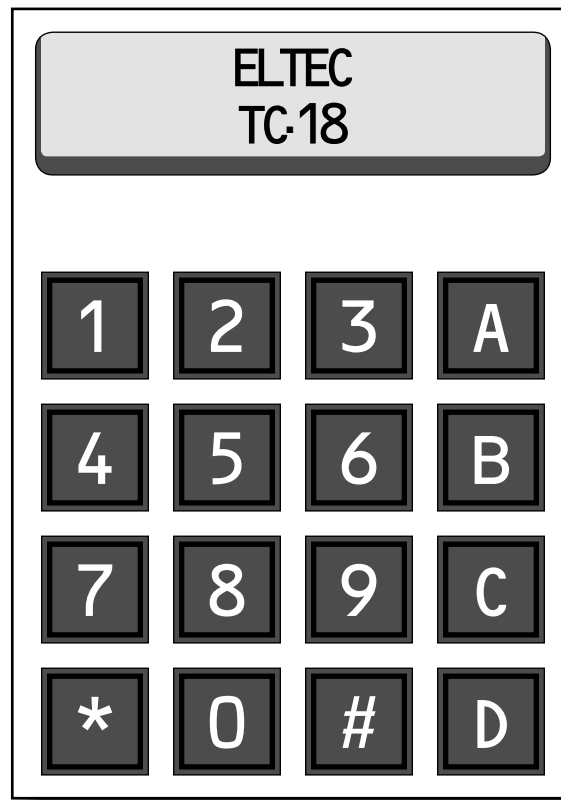
KEY FUNCTIONS

[A] ATTENTION: Used to "Call" commands in conjunction with another key or set of keys. Will "call" the command and cue for specific information to be entered in a certain sequence.

[B] ENTER: Pressing this key will cause the TC-18 to perform the function displayed or accept information displayed.

[C] CANCEL/BACKUP: When a mistake is made, this key will allow user to clear data or escape the function and return to the main display.

[D] SKIP/ERASE KEY/COPY: Allows scrolling on certain command prompts. May function as an erase key. Copies Monday's schedule to Tuesday, Tuesday to Wednesday, etc.

TC-18 PROGRAMMING

Begin operation by manual keypad entry, or via the USB interface, utilizing the optional DLPRO 18 Software available from ELTEC.

FUNCTION	COMMAND		FUNCTION	COMMAND
Set Time	[A] 11		View/Edit Exceptions	[A] 77
Set Date	[A] 21		New Exception	[A] 78
Manual Flash ON	[A] 31		View/Edit 7-Day Schedule	[A] 87
Manual Flash OFF	[A] 32		Factory Reset	[A] 90
Clear Manual Override	[A] 33		Daylight Saving Time	[A] 91
Set Override Duration	[A] 36		12/24 Hour Clock	[A] 94
Clear Holidays	[A] 65		Restart Unit	[A] 98
View/Edit Holidays	[A] 67		Firmware Version	[A] 99
Clear Exceptions	[A] 75			

FUNCTION DESCRIPTIONS

SET TIME [A] 11: Set Time function is provided to facilitate local input of the current time at initial installation or when necessary to establish the current local time for the clock. Time is input and displayed using a 24-hr clock, commonly known as military time, indicated by the hours passed since midnight, from 0 to 23. During normal system operation, the TC-18 keeps time with an internal real-time clock (RTC).

Example: Setting time to 08:00 (8:00 AM)
Entry Sequence: **[A] 1,1**
Display Reads: `Set Time`
                    `00:00`
Entry Sequence: **0,8,0,0 [B]**
Result: Time set to eight AM, Display Time should read: `08:00:00`

Example: Setting time to 15:00 (3:00 PM)
Entry Sequence: **[A] 1,1**
Display Reads: `Set Time`
                    `00:00`
Entry Sequence: **1,5,0,0 [B]**
Result: Time set to three PM, Display Time should read: `15:00:00`

SET DATE [A] 21: Set Date function is provided to facilitate local input of the current date at initial installation or when necessary to establish the current local date for the clock. During normal system operation, date is kept based upon an internal calendar.

Example: Setting date to Tuesday April 24, 2012
Entry Sequence: **[A] 2,1**
Display Reads: `Set Date` (Wait approx. 3 sec.)
The display will read: `Press * to scroll Day of Wk`
After 2-3 sec., display will read: `* scrolls DOWN`
                          `WED 00-00-00` (Where 00-00-00 is MM/DD/YY)
Use the * key to scroll to **TUE**
Enter the current date numerically: **0,4,2,4,1,2**
Press **[B]** to enter the input data
Result: Display Returns to main display and shows date as: `TUE 04-24-12`

MANUAL FLASH ON [A] 31: Manual Flash ON turns on the internal flasher and closes the output relay for a length of time set by the Override Duration Function [A] 36.

    Entry Sequence: **[A] 3,1**
    Display Reads: `OVERRIDE UNTIL:`
                        `00:00` (override time)   `00:00:00` (current time)
                        Current time increment upwards until override time is reached.
  Result: Internal flasher activates. LED indicators on top of clock will wig-wag. Output relay closes activating externally controlled equipment. When override time has elapsed, clock returns to current program state. Use [A] 33 function to clear Manual Flash ON override.

MANUAL FLASH OFF [A] 32: Manual Flash OFF turns off the internal flasher and opens the output relay for the length of time set by the Override Duration Function [A] 36. If the current state of the clock is ON, the Manual OFF will override the state turning the flasher OFF. If the current state of the clock is OFF, the Manual OFF will inhibit the clock from turning ON for the length of time set by the Override Duration. Use [A] 33 function to clear Manual Flash Off override.

    Entry Sequence   **[A] 3,2**
    Display Reads: `OVERRIDE UNTIL:`
                        `00:00` (override time)   `00:00:00` (current time)
                        Current time increment upwards until override time is reached.
  Result: Internal flasher de-activates. Output relay opens, de-activating externally controlled equipment. When override time has elapsed, clock returns to current program state.

CLEAR MANUAL OVERRIDE [A] 33: Clear Manual Override returns the clock to the current programmed state, clearing a manual override condition.

    Entry Sequence: **[A] 3,3**
    Display Reads: `Override Off`
    Result: Internal flasher and relay revert from override state to current program operational state.

SET OVERRIDE DURATION [A] 36: Set Override Duration establishes the length of time that a manual operation overrides the programmed state of the clock. The duration is programmed in hr:mm format (0:01 to 9:59).

    Example: Set override duration to two hours
    Entry Sequence: **[A] 3,6**
    Display Reads: `Set Override in hr:min`
    Entry Sequence: **2,0,0 [B]**
    Result: Display Reads 'Override Saved.' Override duration for manual ON and OFF functions is set to two hours.

CLEAR HOLIDAYS [A] 65: Clear Holidays will delete all currently programmed holiday schedules from the time clock memory.

    Entry Sequence: **[A] 6,5**
    Display Reads: `Erase Holidays? Press B to erase`
    Entry Sequence: **[B]**
    Result: Display Reads: `Holidays erased`

VIEW / EDIT / ENTER HOLIDAYS [A] 67: View / Edit Holidays function allows entry of new holidays and viewing or editing of existing programmed holidays. Holidays, or no flash days, are entered with a start and end date which are inclusive. For a single day holiday, the start and end date are entered as the same date. When entering holidays from the keypad there is no method to enter the holiday name so holidays are 'Unnamed' and identified by the holiday date. When holidays are programmed into the clock using the DLPRO 18 software, holiday names may be entered and will appear on the display when reviewing or editing holidays.

Example: Entering Labor Day holiday on September 3, 2012.

Entry Sequence: **[A] 6,7**
Display Reads:
```
-EDIT HOLIDAYS-
Unnamed holiday
From: 00-00-00
```
Entry Sequence: **0,9,0,3,1,2 [B]**
Display Reads:
```
Date saved
Unnamed holiday
Thru: 00-00-00
```
Entry Sequence: **0,9,0,3,1,2 [B]**
Display Reads:
```
Date saved
Unnamed holiday
From: 00-00-00
```
Entry Sequence: Additional holidays can be entered or press **[C]** to exit
Result: Holiday programmed for September 3, 2012, clock returns to standard date / time display.

CLEAR EXCEPTIONS [A] 75: Clear Exceptions will delete all currently programmed exceptions from time clock memory.

Entry Sequence: **[A] 7,5**
Display Reads: `Erase Excep's? Press B to erase`
Entry Sequence: **[B]**
Result: Display Reads: `Erasing Excep's Please wait...` All programmed exceptions are erased from clock memory. Clock returns to standard date / time display.

VIEW / EDIT EXCEPTIONS [A] 77: View / Edit Exceptions allows viewing, defining or editing the schedule of exception dates or deleting exception dates. If no exceptions have been entered, the screen will display 'No Exceptions...A78 to Create.' New exception dates are defined using the [A]78 function and should be performed prior to this Command.

Example: Defining schedule of exception on August 29, 2012 for early dismissal.

Entry Sequence: **[A] 7,7**
Display Reads:
```
Edit Exceptions
Exc on: 08-29-12 (Note: This exception date was entered using [A]78)
A-Edit Exc Day, B-Skip to next Exc, D-Erase Exc Day,
A78-Create new Exc.
```
Entry Sequence: **[A]**
Display Reads:
```
ON-TIME 1:
00:00
```
Entry Sequence: **0,7,0,0 [B]**
Display Reads:
```
Time saved
OFF-TIME 1:
00:00
```
Entry Sequence: **0,8,3,0 [B]**

Display Reads:	`Time saved`
	`ON-TIME 2:`
	`00:00`
Entry Sequence:	**1,1,1,5 [B]**
Display Reads:	`Time saved`
	`OFF-TIME 2:`
	`00:00`
Entry Sequence:	**1,2,4,5 [B]**
Display Reads:	`Time saved`
	`ON-TIME 3:`
	`00:00`
Entry Sequence:	**[B]**
Display Reads:	`Exc on: 08-29-12`

Result: Exception schedule for August 29, 2012 is programmed to operate from 7:00 AM – 8:30 AM and from 11:15 AM – 12:45 PM

NEW EXCEPTIONS [A] 78: Allows entry of New Exception Date on which an exception/alternate schedule is programmed to run. Exceptions can be used for early dismissal, late start, or other modified schedule days.

Example: Defining exception date on August 29, 2012 for early dismissal.

Entry Sequence:	**[A] 7,8**
Display Reads:	`New Exception on`
	`00-00-00`
Entry Sequence:	**0,8,2,9,1,2 [B]**
Display Reads:	`New Exception on: 08-29-12`
	`Use A77 to edit`
	Clock returns to standard date/time display.

Result: The exception day for early dismissal is defined. [A]77 function can now be employed to define the exception schedule.

VIEW/EDIT 7-DAY SCHEDULE [A] 87: View/Edit 7-Day Schedule allows entering the start and end dates for the school year, entering standard weekly schedule ON/OFF times and viewing or editing of existing programmed schedule times.

No lag now...Each interval is displayed as copied, instead of lag.

Example: Programming 2012-2013 school year from August 29, 2012 to May 30, 2013. Entering morning and afternoon ON/OFF times. (7:30 AM – 8:30 AM and 2:45 PM – 4:00 PM)

Entry Sequence:	**[A] 8,7**
Display Reads:	`CLASSES START:`
	`00-00-00`
Entry Sequence:	**0,8,2,9,1,2 [B]**
Display Reads:	`Date Saved`
	`CLASSES END:`
	`00-00-00`
Entry Sequence:	**0,5,3,0,1,3 [B]**
Display Reads:	`Date saved`
	`Schedule for: MON`
	`A-Edit Day, B-Skip to next day, D-Copy previous day`
Entry Sequence:	**[A]**
Display Reads:	`MON ON-TIME 1:`
	`00:00`

Entry Sequence:	**0,7,3,0 [B]**
Display Reads:	`Time saved`
	`MON OFF-TIME 1:`
	`00:00`
Entry Sequence:	**0,8,3,0 [B]**
Display Reads:	`Time saved`
	`MON ON-TIME 2:`
	`00:00`
Entry Sequence:	**1,4,4,5 [B]**
Display Reads:	`Time saved`
	`MON OFF-TIME 2:`
	`00:00`
Entry Sequence:	**1,6,0,0 [B]**
Display Reads:	`Time saved`
	`MON OFF-TIME 3:`
	`00:00`
Entry Sequence:	**[B]**
Display Reads:	`Schedule for: TUES`
	`A-Edit Day, B-Skip to next day, D-Copy previous day`
Entry Sequence:	**[D]**
Display Reads:	`Copy from MON?`
	`Press B to copy`
Entry Sequence:	**[B]**
Display Reads:	`MON copied:`
	`Schedule for: WED`
	`A-Edit Day, B-Skip to next day, D-Copy previous day`
Entry Sequence:	**[D]**
Display Reads:	`Copy from TUE?`
	`Press B to copy`
Entry Sequence:	**[B]**
Display Reads:	`TUE copied:`
	`Schedule for: THU`
	`A-Edit Day, B-Skip to next day, D-Copy previous day`
Entry Sequence:	**[D]**
Display Reads:	`Copy from WED?`
	`Press B to copy`
Entry Sequence:	**[B]**
Display Reads:	`WED copied:`
	`Schedule for: FRI`
	`A-Edit Day, B-Skip to next day, D-Copy previous day`
Entry Sequence:	**[D]**
Display Reads:	`Copy from THU?`
	`Press B to copy`
Entry Sequence:	**[B]**
Display Reads:	`THU copied:`
	`Schedule for: SAT`
Entry Sequence:	**[C]**

Result: Cancel returns clock to standard date/time display. School year is programmed with standard weekly schedule.

FACTORY RESET [A] 90: Upon execution of this command, all program data is erased and factory defaults are restored.

Entry Sequence:	**[A] 9,0**
Display Reads:	`Factory Reset?`
	`Are you sure?`
Display Reads:	`Factory Reset?`
	`Press B to reset`
Entry Sequence:	**[B]**
Display Reads:	`Erasing Exep's`
	`Please wait...`

Result: 7-day schedule, holidays and exceptions are erased and factory defaults are restored. Clock returns to standard date / time display.

DST ON/OFF [A] 91: Daylight Saving Time observation is selected and DST start and end days are entered for the calendar year.

Example: Selecting DST ON and setting for 2nd Week in March through 1st Week in November

Entry Sequence:	**[A] 9,1**
Display Reads:	`DST: ON (OFF)`
	`A-Change B-Save`
Entry Sequence:	**[A]** (if DST is set to OFF)
Entry Sequence:	**[B]** (to save once DST is set to ON)
Display Reads:	`DST begins on:`
	`2`nd` Sun of Mar`
Entry Sequence:	**[A]** (Use to select 2nd Sun. When pressed sequences 1st, 2nd, 3rd, 4th.)
Entry Sequence:	**[B]** (Saves 2nd Sun and moves cursor to month)
Entry Sequence:	**[A]** (Use to select Mar. When pressed sequences through months of year.)
Entry Sequence:	**[B]** (Saves week and month of DST Start)
Display Reads:	`DST ends on:`
	`1`st` Sun of Nov`
Entry Sequence:	**[A]** (Use to select 1st Sun. When pressed sequences 1st, 2nd, 3rd, 4th.)
Entry Sequence:	**[B]** (Saves 1st Sun and moves cursor to month)
Entry Sequence:	**[A]** (Use to select Nov. When pressed sequences through months of year.)
Entry Sequence:	**[B]** (Saves week and month of DST End)

Result: DST is set to ON, begins the 2nd Sunday in March and ends the 1st Sunday in November.

12/24 HOUR CLOCK [A] 94: Allows the selection for time to be input and displayed as either a 12-hour clock with AM and PM or a 24-hour clock. When command is initiated it prompts the user to change to the alternate of the current setting.

RESET/RESTART UNIT [A] 98: Reset/Restart unit function performs a soft reboot of the clock firmware.

Entry Sequence:	**[A] 9,8**
Display Reads:	`System Reset`

Result: The TC-18 System reboots. Clock returns to standard date / time display and current program state.

FIRMWARE VERSION [A] 99: Displays current version of firmware running on clock.

Entry Sequence**:**	**[A] 9,9**
Display Reads:	`Firmware Version`
	`1.8.4`

Result: Firmware version is displayed. Clock returns to standard date / time display.

GLOSSARY

CMD - Command
CPC - Circular Pin Connector
DLPRO - Data Link Program Software
DST - Daylight Saving Time
LCD - Liquid Crystal Display
MIPS - Millions of Instructions per Second
NVRAM - Non-Volatile Random Access Memory
ROM - Read Only Memory

TC-18 PARTS LIST

Component Item Code	Qty.	Description
860310	1 ea.	CABLE, EXT. 2', 12W, TC18
310819	1 ea.	PLUG, CPC 17-16, AMP 206037-1
761535	1 ea.	ASSY SEC, TC-18
414500	1 ea	TC-18 Case (Color Cardinal y)
450735	1 ea.	Label, TC-18 TIME CLOCK
230235	1 ea.	DISPLAY, LCD-016N002B YYH-ETK
230420	1 ea.	KEYBOARD, LZR AK-1607-N-BBW

TC-18 WEEKLY SCHEDULE RECORD

PROGRAM SCHEDULE for _____

Start Date: _____   **End Date:** _____

SCHEDULE		SUN	MON	TUES	WED	THUR	FRI	SAT
1	**On Time**							
	Off Time							
2	**On Time**							
	Off Time							
3	**On Time**							
	Off Time							
4	**On Time**							
	Off Time							
5	**On Time**							
	Off Time							
6	**On Time**							
	Off Time							

HOLIDAY SCHEDULE

HOLIDAY	START DATE	END DATE

EXCEPTION SCHEDULE

EXCEPTION NUMBER	DATE	TIME	CYCLE 1	CYCLE 2	CYCLE 3	CYCLE 4	CYCLE 5	CYCLE 6
1		On						
		Off						
2		On						
		Off						
3		On						
		Off						
4		On						
		Off						
5		On						
		Off						
6		On						
		Off						
7		On						
		Off						
8		On						
		Off						
9		On						
		Off						
10		On						
		Off						
11		On						
		Off						
12		On						
		Off						
13		On						
		Off						
14		On						
		Off						
15		On						
		Off						
16		On						
		Off						
17		On						
		Off						
18		On						
		Off						
19		On						
		Off						
20		On						
		Off						

FCC NOTICE

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to subpart J of part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which the user will at their expense, be required to correct the interference.

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LIMITED WARRANTY