

Keltron TLC Series Compact Thermal Printer User's Manual



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Manual Objective

This user's manual supplies the necessary information for installing and operating the Keltron TLC series compact printers.

- Visual overview of the printer
- Power, data and panel mount installation procedures
- Initial power up and printer self-test
- Operation overview – graphics, built-in clock/calendar, line counter and interval timer outputs.
- Manual programming and programming via PC covered

Description

The Keltron TLC series is a rugged printer packaged in a metal enclosure ready to panel mount or use on the desktop. This model features compact reliable, thermal printers capable of printing from 24 through 64 columns per line.

The Keltron TLC series printer supports the RS232C serial communication handshake. The Keltron TLC series also features user selectable print features and a 2000 character print buffer to free the host computer during the printing process.

The basic Keltron TLC series printer is comprised of a microcomputer-based printer controller card, a printer mechanism module, a power supply with an interface card and a metal enclosure. The printer controller and the printer mechanism are located behind the front panel. The rear panel holds the interface connectors and the power supply module.

The Keltron printer controller and interface cards manage all the features supported by the printer. The boards hold the printer drivers, communication interfaces, real time clock, line counter, interval timer output, 2K print buffer and the front panel switch inputs. These enhanced features ease the operation and integration of the printers with data acquisition applications.

Upon initial power-up, the printer controller goes through extensive self-test procedures. It verifies the amount of print buffer installed and restores the default printer settings.

In the idle mode, the printer continuously checks the front panel controls and the paper out detector. It also services the time clock, interval timer, print buffer, internal processor and the power supply watchdog monitor.

Unpacking the Keltron TLC Series Compact Printer

Remove the Keltron TLC series printer from the shipping container and make sure it is undamaged. The package also includes an AC/DC power adapter or a power input plug as well as a roll of paper. If any of the components are missing, contact Keltron for assistance.

Keep the packing material so you can repack the printer for storage or shipment. If there is any visible damage to the printer, record it on the freight bill, have the freight carrier acknowledge it and submit your claim to the carrier.

Caution: Do not install or operate damaged equipment as safety and performance may be affected.

Specifications

Power:

110VAC $\pm 10\%$	(2.0A @ 9VDC)
220VAC $\pm 10\%$	(2.0A @ 9VDC)
+5VDC $\pm 3\%$	(2.0A)
+7.5 to 13.6VDC	(2.0A)
+9 to 35VDC	(10 Watts)

The AC models have a wall mount transformer with 5 ½ 'cord. The DC models come with a power harness 18" long, ready to wire to a power source (RED is +DC and BLACK is COMMON). With all DC models it is strongly recommended that 2.0A SLB fuses be installed externally.

Paper:

2.25" wide x 2.00" diameter (approx. 80' length), 15 pounds, thermal paper roll
One roll supplied with printer, replacement paper is readily available at most office supplies stores.

Print:

Thermal
24 to 64 column width (2.2 lines/second printing)
Full 256 ASCII character set
Print head life is 100,000 meters
Dots-per-line is 384

Operating Temperature & Relative Humidity (RH):

0 to 50°C (ambient)
RH 20% to 85% (non-condensing)

Weight:

2 lbs (0.907 kg) – boxed ready to ship
1.4 lbs (actual printer weight)

RS232C Serial Communications

Serial Protocol (see Table 1): In this mode, pins 4 (RTS) and 5 (CTS) are used to control data flow to and from the printer.

Pin 4 (RTS) is used to control the data flow to the printer, which raises RTS when it is ready to accept data and lowers RTS under any of the following conditions:

- Print buffer has less than 256 unused locations
- Printer is out of paper
- Printer is off-line (the select button <SLCT> on the front panel has been pressed)

Input to pin 5 (CTS) is monitored during data transmission from the printer. The unit transmits only if CTS is high under **Serial Busy Protocol**.

XON/XOFF Protocol: The unit transmits XON when it is ready to accept data and XOFF for conditions listed above in the Serial Busy Protocol section.

Under XON/XOFF protocol the data flow out from the printers serial port is halted on receipt of XOFF and resumed on receipt of XON.

RS232C Specifications (see Table 2):

Baud rate DIP switch selectable for 150 through 9600 baud
 Parity DIP switch selectable for ODD/EVEN/NO parity
 Word length 1 start, 7 or 8 data bits (DIP switch selectable) and 1 or 2 stop bits (DIP switch selectable)
 Signal levels Mark or Logical 1 = -3 to -14VDC
 Space or Logical 0 = +3 to +15VDC
 Handshaking RTS/CTS or XON/XOFF
 Connection DB25S receptacle type (see Table 1 for pinouts)

The printer communications protocol can be modified from the front panel or by DIP switches located inside the printer. When power is cycled to the printer the printer will always revert to the DIP switch settings. It is recommended that the printer communication protocol be set by the DIP switches.

Note: When DIP switch settings have been modified cycle power to the Keltron TLC series printer to enable the new settings.

DB25S Connector Pin#	Description	Signal Name
1	Earth Ground	GND
2	RS232 output	TXD
3	RS232 input	RXD
4	Request to send – output	RTX
5	Clear to send – input	CTS
7	Logic common	COM

Table 1 Pinout for Keltron TLC series rear panel connector

Switch#	150 Baud	300 Baud	600 Baud	1200 Baud	1800 Baud	2400 Baud	4800 Baud	9600 Baud
1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
3	ON	ON	ON	ON	OFF	OFF	OFF	OFF
Switch#	7 Data Bits	8 Data Bits	No parity	Parity enabled	Even parity	Odd parity		
4	ON	OFF	-	-	-	-		
5	-	-	ON	OFF	OFF	OFF		
6	-	-	-	-	ON	OFF		

Table 2 DIP switch setting for the Keltron TLC series printer

NOTE: All the switches are in the OFF position from the factory.

Front Panel Description

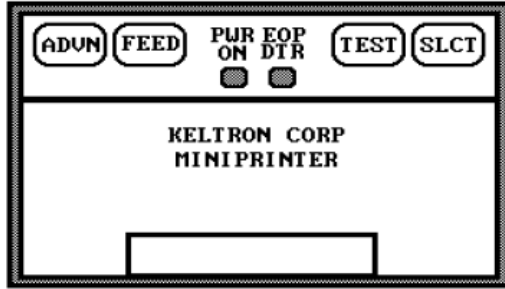


Figure 1 Keltron TLC series front panel

LEDS:

PWR (Green) When lit when power is ON

DTR/EOP (Yellow) When lit printer is ON-LINE
When flashing printer is OUT OF PAPER

Function Keys:

ON-LINE:

- <SLCT>** Press to change printer from ON-LINE to OFF-LINE mode.
ON-LINE the DTR/EOP LED is ON
- <ADV>** Press when printer is ON-LINE to advance paper five lines.
- <TEST>** Press to print program version, time, date and count value of printer.
- <FEED>** Press to advance paper one line.

OFF-LINE:

- <SLCT>** Press to change printer from ON-LINE to OFF-LINE mode.
OFF-LINE the DTR/EOP LED is OFF
- <ADV>** Press when printer is OFF-LINE to enter printer set mode menus.
See the 'Front Panel Programming' section
- <TEST>** Press to print program version, time, date and count value of printer.
- <FEED>** Press to advance paper one line.

Installing Paper

Note: Printer power must be on to install paper.

When the printer is out of paper, the yellow DTR/EOP LED will blink.

To replace the paper supply, pull the front bezel forward, insert a new roll of paper and thread as show in Figure 2. The mechanism has an "auto feed" feature and once it senses the paper starting it will advance the paper through the front panel.

The Keltron TLC series printer is placed OFF-LINE automatically when out-of-paper is sensed. When the paper is replaced press the <SLCT> button to place the printer back ON-LINE and the printer will resume printing.

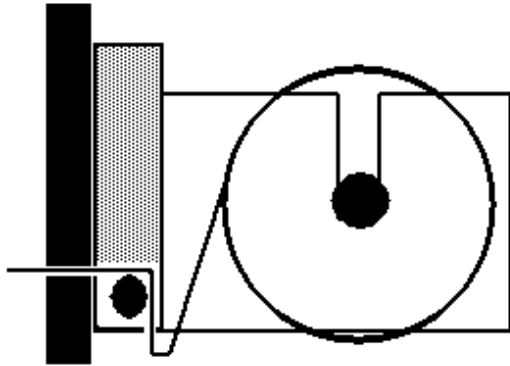


Figure 2 Paper path

Installation

The Keltron TLC series printer should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the printer near devices that generate excessive heat should be avoided.

When cleaning the front bezel use only a soft cloth and neutral soap products. DO NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel. DO NOT use tools of any kind (screwdrivers, pens, pencils, etc...) to operate the push buttons on the unit.

Desk Top Mounting:

If mounting the Keltron TLC series printer on a desk top it is suggested you install rubber feet (available with a peel off backing). This will prevent the unit from drifting on the surface during print mode.

Panel Mounting:

The following procedure assures proper installation:

1. Cut panel opening and drill mounting holes to specified dimensions (refer to Figure 3). Remove burrs and clean around panel opening.
2. Pull unit from case until stops reached.
3. Slide printer case into the panel.
4. Install 4 mounting screws through the brackets on the printer case all the way through the panel. Screws may be secured with lock washers.
5. Push the bezel of the printer toward the panel until it latches in the case.

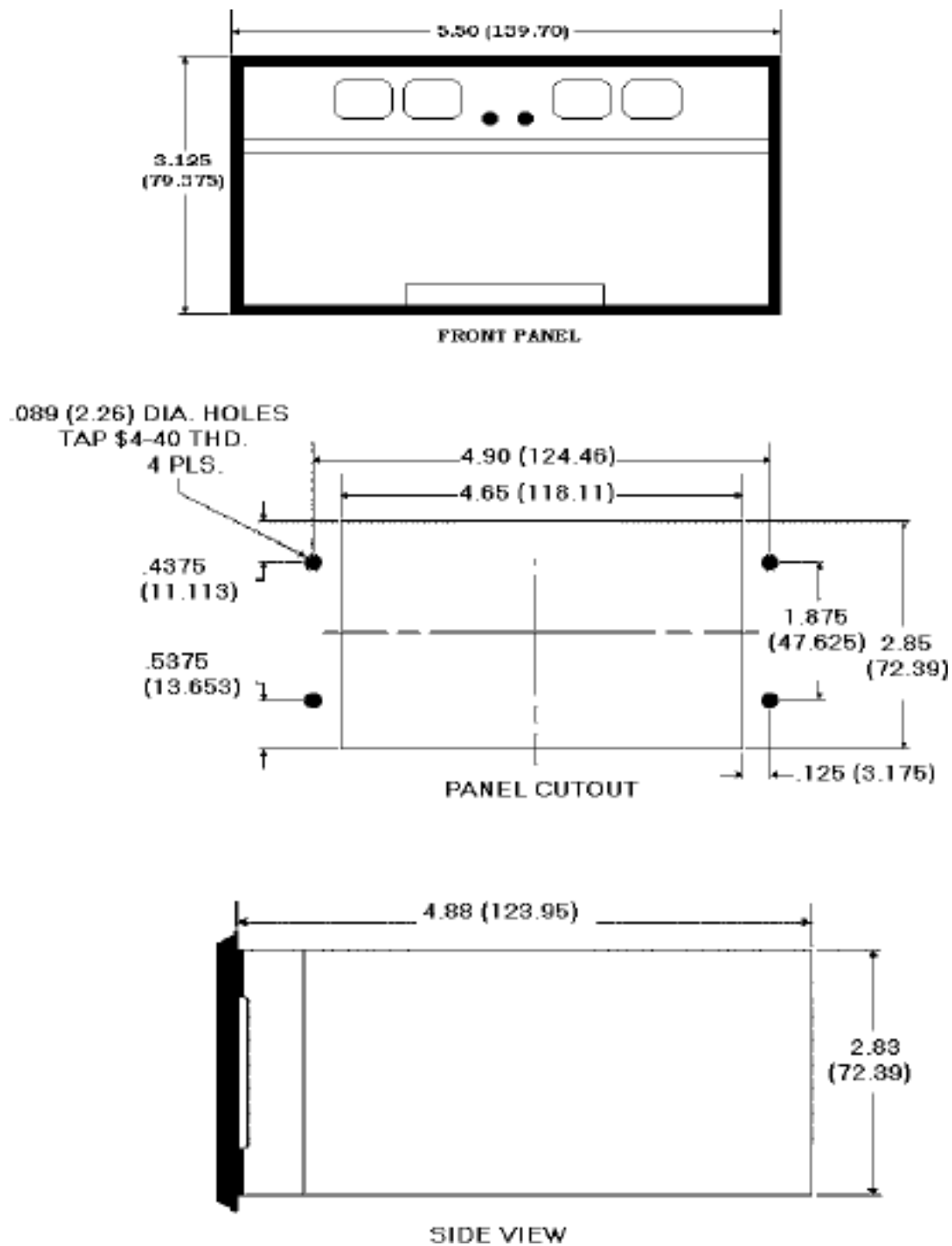


Figure 3 Keltron TLC series printer mounting dimensions

Initial Power-Up and Self-Test

A self-test feature is built into the Keltron TLC series printer. To start this press and hold the <TEST> switch and power up the printer. Continue holding the <TEST> switch until the printer has started printing.

The self-test program checks the integrity of the operating program installed, the 2048 character buffer, the processor watchdog and the power supervision circuits. If no problems are found, the following messages are printed:

Sample Test Print:

```
BAUD 9600, DATA 8, PARITY NONE  
INTERFACE: SERIAL  
BATT. CLOCK INSTALLED  
2K BUFFER INSTALLED  
V1.6 - TLC
```

Description:

the current protocol settings (this line may overflow)
type of interface being used
verifies the battery is installed (standard on all TLCs)
indicates buffer size installed
indicates version of firmware installed and series type

Interval Timer

- Range: 5 seconds to 24 hours (can be selected manually or programmed by sending as ASCII data string.
- Action: Once an interval is selected, the Keltron TLC series printer will execute the following actions on time-out:
1. Transmits control character ENQ (^E, 05H, 5)
 2. Restarts timer

Keltron TLC Series ASCII Character Set

The ASCII character set includes 255 characters. The first 32 characters (decimal 0 through 31) are reserved control characters. The remaining 224 characters (decimal 32 through 255) are printable characters.

Figure 4 lists the printable character set. The first 96 entries in this table are the 96 ASCII upper and lower case characters (like what can be found on a standard QWERTY keyboard). The remaining 128 characters are international, scientific and IBM PC extended characters.

032 033 034 035 036 037 038 039 040 041 042 043 044 045 046 047	080 081 082 083 084 085 086 087 088 089 090 091 092 093 094 095	128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143	160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175	208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223
048 049 050 051 052 053 054 055 056 057 058 059 060 061 062 063	096 097 098 099 100 101 102 103 104 105 106 107 108 109 110 111	144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159	176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191	224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239
064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079	112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127	160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175	192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207	240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255

Figure 4 ASCII Character Set

Front Panel Programming

Main Set Menu:

With DTR/EOP LED ON, press <SLCT> then <ADVN> to access the menu below:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BAUD RATE AND PARITY	See <i>Baud Rate & Parity</i> Section
<TEST>	CLOCK/CALENDAR/INTERVAL	See <i>Clock/Calendar/Counter/Interval timer</i> Section
<FEED>	PRINT FEATURES	See <i>Print & Character Features</i> Section

Baud Rate and Parity:

From the Main Set Menu press <ADVN> to access the menu below:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BACKUP TO PREVIOUS MENU	Exits to Main Set Menu
<TEST>	ADVANCE FIELD SELECTED	Advances selections in the field marked with →
<FEED>	GO TO NEXT FIELD	Moves → to the next field

Example:

→	BAUD 2400	DATA7	PARITY NONE
Field	A	B	C

Field	Selections for Baud Rate and Parity Fields
A	150, 300, 600, 1200, 2400, 4800, 9600: Baud Rate
B	7, 8: Data
C	Even, Odd, None: Parity

Note: See DIP switches for default settings, the Keltron TLC Series printer will revert to the DIP switch settings should the printer lose power.

Clock/Calendar/Interval Timer:

From the Main Set Menu press <TEST> to access the menu below:

Printer Clock/Calendar/Interval Timer Selection Mode Menu:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BACKUP TO PREVIOUS MENU	Exits to Main Set Menu
<TEST>	CLOCK/CALENDAR FORMAT	Formats printout of clock/calendar/counter/interval timer
<FEED>	CLOCK/CALENDAR SET	Sets clock/calendar/counter/interval timer

Fields for Clock/Calendar/Line Counter Format:

From the Selection Model Menu, press <TEST> to access the menu below:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BACKUP TO PREVIOUS MENU	Exits to Main Set Menu
<TEST>	ADVANCE FIELD SELECTED	Advances selections in the field marked with →
<FEED>	GO TO NEXT FIELD	Moves → to the next field

Example:

→	ON	HH:MM	:SS	MM/DD	/YY	COUNT ON
Field	A	B	C	D	E	F

Field	Selections for Clock/Calendar/Counter/Interval Timer Formats		
	Enabled	Disabled	
A	On	OFF	Clock Printout
B	HH:MM	:	Hours & Minutes Printout
C	:SS	:	Seconds Printout
D	MM/DD	/	Month & Date Printout
E	/YY	/	Year Printout
F	COUNT ON	COUNT OFF	Line Counter Printout

Note: The Keltron TLC series printer has battery backup capability to maintain these settings on power down.

Note: The time date stamp will not occur until one second after the final carriage return of a transmission. The line counter will continue to count carriage returns even if the line counter printout is off.

Fields for Clock/Calendar/Counter/Interval Timer Set:

From the Selection Model Menu, press **<FEED>** to access the menu below:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BACKUP TO PREVIOUS MENU	Exits to Main Set Menu
<TEST>	ADVANCE FIELD SELECTED	Advances selections in the field marked with →
<FEED>	GO TO NEXT FIELD	Shows the value entered and moves → to the next field Pressing the <FEED> from field G loops back to field A.

Example:

→	21	:30	04	/24	/10	0000	OFF
Field	A	B	C	D	E	F	G

Field	Selections for Clock/Calendar/Counter/Interval Timer Set Fields	
A	00-24: Set hours in 24 hour format. Press <TEST> once for each hour advanced*	
B	00-59: Set minutes. Press <TEST> once for each minute advanced*	
C	00-12: Set month. Press <TEST> once for each month advanced*	
D	00-31: Set date. Press <TEST> once for each date advanced*	
E	00-30, 96-00: Set year. Press <TEST> once for each year advanced*	
F	0000-9999: Reset line counter (counts number of carriage returns). Press <TEST> to reset to 0000	
G	OFF 05S 15S 30S 01M 02M 05M 15M 30M 01H 02H 04H 06H 08H 12H 24H Sets the interval time. Press <TEST> for each timer period advanced and displayed.	

Note: Value will advance without display indication. Press <FEED> to review settings.

Print and Character Features:

From the Main Set Menu press <FEED> to access the menu below:

<SLCT>	EXIT SET MODE	Exits the Set Mode and places the printer ON-LINE
<ADVN>	BACKUP TO PREVIOUS MENU	Exits to Main Set Menu
<TEST>	ADVANCE FIELD SELECTED	Advances selections in the field marked with →
<FEED>	GO TO NEXT FIELD	Moves → to the next field

Example:

→	LINE	NORMAL	H07	W05	CRLF	F40
Field	A	B	C	D	E	F

Field	Selections for Print and Character Features Fields
A	LINE: Prints as soon as a complete line of characters is stored or when a carriage return, form feed, vertical tab or line feed is received (default) BUFFER: Only prints when 2K buffer is full or with CTRL D
B	NORMAL: The bottom of the characters come out of the printer first (default) INVERTED: The top of the characters come out of the printer first. First line transmitted is printed last.
C	H07: Character normal height 7 dots (default) H14: Character expanded height 14 dots
D	W05: Character width 5 dots (default) W10: Character width 10 dots
E	CRLF: If carriage return and line feed is received it is converted to line feed or after a full line both carriage return and line feed is ignored (default) ALL: All carriage returns and line feeds are processed
F	F24: 24 characters per line (default) F32: 32 characters per line F30: 30 characters per line F40: 40 characters per line F42: 42 characters per line F48: 48 characters per line F64: 64 characters per line

***Note: The Keltron TLC Series printer cannot function with expanded width enabled, when programming the printer – skip over this field.**

Printer returns to default settings with a serial CTRL X command. The Clock/Calendar/Counter stamp and program menus will always print in normal height and width. Also the Print and Character Features settings will be maintained on power down.

Using a Terminal Emulator Program to Program the TLC Series Printer

The following ASCII commands and ESCAPE functions can be used on a PC using a terminal emulator program (such as PROCOMM or TELIX).

ASCII Printer Commands:

Character	CTRL Keys (use all CAPS)	Hexidecimal/ Decimal	Control Action
FNT-24	^B	02/02	Select 24 characters per line font
FNT-32	^C	03/03	Select 32 characters per line font
EOT	^D	04/04	End of Text or Print Buffer
BS	^H	08/08	Back Space: remove previous character
HT	^I	09/09	Horizontal Tab: advances four spaces from current position on line
LF	^J	0A/10	Line Feed: advance to beginning of next line
VT	^K	0B/11	Vertical Tab: advance 5 lines
FF	^L	0C/12	Form Feed: advance 10 lines
CR	^M	0D/13	Carriage Return: advance to beginning of next line
SO	^N	0E/14	All characters extended height (14 dots)
SI	^O	0F/15	All characters normal height (7 dots)
XON	^Q	11/17	Transmitted if printer is ON-LINE to receive data. If received, the host is ready to accept data.
AUX ON	^R	12/18	Print head on: Transmitted after loading paper in the printer.
XOFF	^S	13/19	Transmitted if printer is taken OFF-LINE (via <SLCT>), if print buffer is full or printer out of paper. If received, host's transmitter is off
AUX OFF	^T	14/20	Print head off: transmitted if out of paper
CANCEL	^X	18/24	Resets printer to defaults
ESC	^[	1B/27	Escape: Precedes various functions

Note: The Clock/Calendar/Counter Stamp and programming menu will always print in normal height even if the data is expanded.

Escape Key [ESC] Printer Functions:

Command (CAPS)	Function
[ESC]E	Auto print clock/calendar/counter. Enter once to Auto print after each carriage return per [ESC]F format.
[ESC]F{Format Character*}	Format print clock/calendar/line counter for Auto print [ESC]E
[ESC]D	Disable print clock/calendar/line counter. Enter once to stop Auto print [ESC]E
[ESC]T{Format Character*}	Single serial transmit clock/calendar/line counter per this format.
[ESC]P{Format Character*}[CTRL M]	Single print clock/calendar/line counter per this format.
[ESC]S{time date}[CTRL M] Note: Can only be performed in normal width mode.	Set {time and date} 24 hour format: HH:MM:SS MM/DD/YR
[ESC]C	Reset the line counter to 0000
[ESC]I@	Disable interval timer
[ESC]I?	Prints current interval timer setting
[ESC]I{Interval Character}	Set interval timer {see Interval Timer Chart for Interval Character}
[ESC]MN	Normal mode: Bottom of the character prints first (default)
[ESC]MI	Inverted mode: top of the character prints first, first line transmitted is the last line printed
[ESC]ML{CTRL D}	Line mode: Prints as soon as a complete line of characters is stored or when carriage return, form feed, vertical tab or line feed is received (default)
[ESC]MB	Buffer mode: only prints when 2K buffer is full or with CTRL D print buffer command
[ESC]MC	CR-LF mode: If carriage return and line fee is received it is converted to LF or after a full line both carriage return and line feed is ignored (default)
[ESC]MA	Print All mode: all carriage returns and line feed are processed

**See the Clock/Calendar/Line Counter Format Chart for format character*

Note: CTRL X: Resets printer to default

More Escape Key [ESC] for the extra FONTS available:

Command (CAPS)	Font selected
[ESC]F0	24 column
[ESC]F1	32 column
[ESC]F2	40 column
[ESC]F3	42 column
[ESC]F4	48 column
[ESC]F5	64 column

Clock/Calendar/Line Counter Format Chart: This chart is only used for escape functions F, T and P.

Format character	Hours/Minutes	Seconds	Month/Day	Years	Line
@ (40 HEX)	=	=	=	=	=
A (41 HEX) or I (49 HEX)			=	=	=
B (42 HEX) or R (52 HEX)	=	=			=
C (43 HEX) or K (4B HEX) or S (53 HEX) or [(5B HEX)					=
D (44 HEX)	=	=	=	=	
E (45 HEX) or M (4D HEX)			=	=	
F (46 HEX) or V (56 HEX)	=	=			
G (47 HEX) or O (4F HEX) or W (57 HEX)					
H (48 HEX)	=		=	=	=
J (4A HEX) or Z (5A HEX)	=				=
L (4C HEX)	=		=	=	
N (4E HEX) or ^ (5E HEX)	=				
P (50 HEX)	=	=	=		=
Q (51 HEX) or Y (59 HEX)			=		=
T (54 HEX)	=	=	=		
U (55 HEX)			=		
X (58 HEX)	=		=		=
\ (5C HEX)	=		=		
] (5D HEX)		=			

Interval Timer Chart: This chart is only used for escape function I.

ASCII character	(HEX Value)	Interval selected
?	(3F)	Prints current setting
@	(40)	OFF
A	(41)	5 seconds
B	(42)	15 seconds
C	(43)	30 seconds
D	(44)	1 minute
E	(45)	2 minutes
F	(46)	5 minutes
G	(47)	15 minutes
H	(48)	30 minutes
I	(49)	1 hour
J	(4A)	2 hours
K	(4B)	4 hours
L	(4C)	6 hours
M	(4D)	8 hours
N	(4E)	12 hours
O	(4F)	24 hours

For additional explanations on these settings see Interval Timer Section.

Warranty

The Keltron Corporation warrants all products against defects in workmanship, materials, and construction under normal use and service for a period of ONE YEAR, except radio transceivers which carry a 36-month warranty, from the date of shipment. Keltron Corporation's responsibility under this warranty is limited to the repair or replacement of defective parts that are returned to the factory, freight prepaid. Repaired parts are returned to the customer from the factory, freight prepaid.

This warranty does not extend to any of our products that in our opinion have been subjected to misuse, neglect, accident, improper installation, or misapplication. The warranty does not extend to products that have been repaired or altered outside our factory without our written approval.

Except as provided above, Keltron Corporation makes no warranty of any kind, express or implied, except that the goods sold under this agreement shall be of the standard quality of Keltron Corporation, and the buyer assumes all risk and liability resulting from the use of the goods. Keltron Corporation neither assumes nor authorizes any person to assume for Keltron Corporation any other liability in connection with the sale or use of the goods sold, and there are no oral or written agreements or warranties collateral to or affecting this agreement. Further, Keltron Corporation shall not be liable for consequential damages resulting from any breach of warranty.