

American LED-gible®

Reducing Downtime Across the Nation!

The Production Pace Timer Series Six Digit PPTs with Down Time

Owners Manual

PPT System with AB-1194-501 / PP-2110-376D



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Rev D

February 2006

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1.0 Getting Started

Thank you for your confidence in AMERICAN LED-gible®. You have selected one of the best-built, high-quality, precision-engineered products available today. Our products are designed to give you years of trouble-free enjoyment. We appreciate your support, and we will do everything we can to keep you happy with your purchase for many years to come. After all, you are the reason we are in business!

1.1 Product Description

The Production Pace Timer (PPT) is a special purpose numeric marquee system designed to pace the production rate of any manual process. PPT systems are available with GOAL, ACTUAL, DIFFERENCE, EFICIENCY, and DOWN TIME display fields. Display fields are available in 2.3" and 4" digit heights. The PPT processor can be integrated into the display unit or located remotely in a separate control box.

GOAL fields automatically count at a user programmable time interval indicating how many units of production are expected. ACTUAL fields count in response to an input, compatible with most photo-eyes, whisker switches, and palm switches, indicating how many units of production have actually been completed. DIFFERENCE fields display (ACTUAL – GOAL). EFFICIENCY fields display (ACTUAL / GOAL) as a percentage. DOWN TIME fields are minutes and seconds timers that accumulate time while a DOWN condition exists.

The line down condition can be explicitly signaled by activating the DOWN logic input, or the PPT can automatically detect the down condition by measuring the time interval between completed units. If no new units are completed in a user programmable time, the PPT automatically activates the DOWN time timer. The automatic down detection feature was added to the PPT in firmware revision D. Earlier versions of the firmware do not have this feature, but they can be upgraded by simply replacing the firmware PROM chip. Contact American LED-gible tech support for details.

Scaling factors can be independently programmed for the GOAL and ACTUAL counters, allowing GOAL and ACTUAL to increment by any arbitrary amount between 1 and 9999 when any count input is activated. A typical application of this feature is to make the PPT display total units scheduled and actually produced, even though the count inputs are activated by a sensor that detects cases of finished product.

The GOAL and ACTUAL counters may be reset from the operator keypad. Additionally a reset input is provided for connection to a controlling device. The DOWN TIME timer may be reset from the operator keypad. Additionally a reset input is provided for connection to a controlling device.

The GOAL timer may be paused to stop the GOAL counter from automatically incrementing during breaks. A HOLD input is provided for connection to a controlling device, or the operator may hold the GOAL timer via the keypad.

A 1 Farad Super-Cap backs up the PPT processor's memory. The Super-Cap allows the PPT to retain operational values for five days without power. Unlike batteries, Super-Caps do not require special recharge circuitry and have an expected life span in excess of 10 years.

An RS-232 / RS-485 capable serial port allows the PPT to interface with a central computer system. All of the PPT's registers can be read or written via the serial interface. When the PPT is being controlled via the serial interface, the keypad may be disabled to prevent operator modification of PPT registers.

Internal screw terminals are provided to connect 120VAC power; serial communications; AUX communications; HOLD, T-RST, B-RST, CNT1, CNT2, DOWN1, DOWN2, and K-INHIB inputs.

1.2 Unpacking and Installation

Every PPT is carefully tested, both mechanically and electrically, before shipment. Inspect the PPT for damage, which may have occurred in transit. If there is evidence of damage or the PPT fails to operate, file a claim with the shipper and notify American LED-gible.® Save the shipping materials for inspection.

Carefully remove the PPT from the shipping carton. Then mount, hang, or set the PPT in a location where the unit is readily visible.

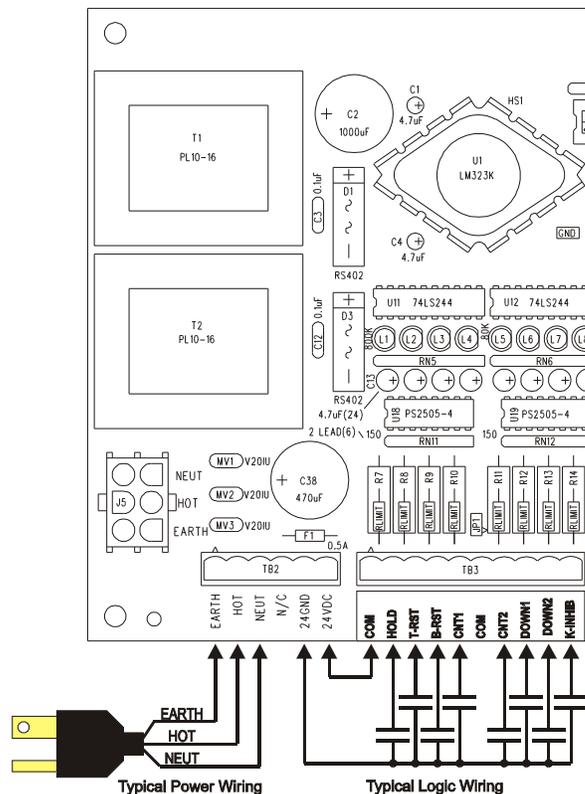
The PPT display unit and optional remote control box are designed to be mounted to a wall by four screws. The display unit enclosure may be rotated to place the conduit holes at the top or the bottom of the enclosure. For systems with a remote control box, mount the control box in a location that the operator can see the display unit from while using the keypad.

Screw terminals are provided inside the display and optional control box units for: 120VAC power; serial communications; HOLD, T-RST, B-RST, CNT1, CNT2, DOWN1, DOWN2, and K-INHIB logic inputs.

1.2.1 Power Installation

Bring the power and logic wiring to the PPT system **separately** through conduit, to avoid noise problems. Connect the power wiring to the screw terminal power connector(s) within each unit. Power wires should be American Wire Gauge #16 with a 600 volt insulation rating.

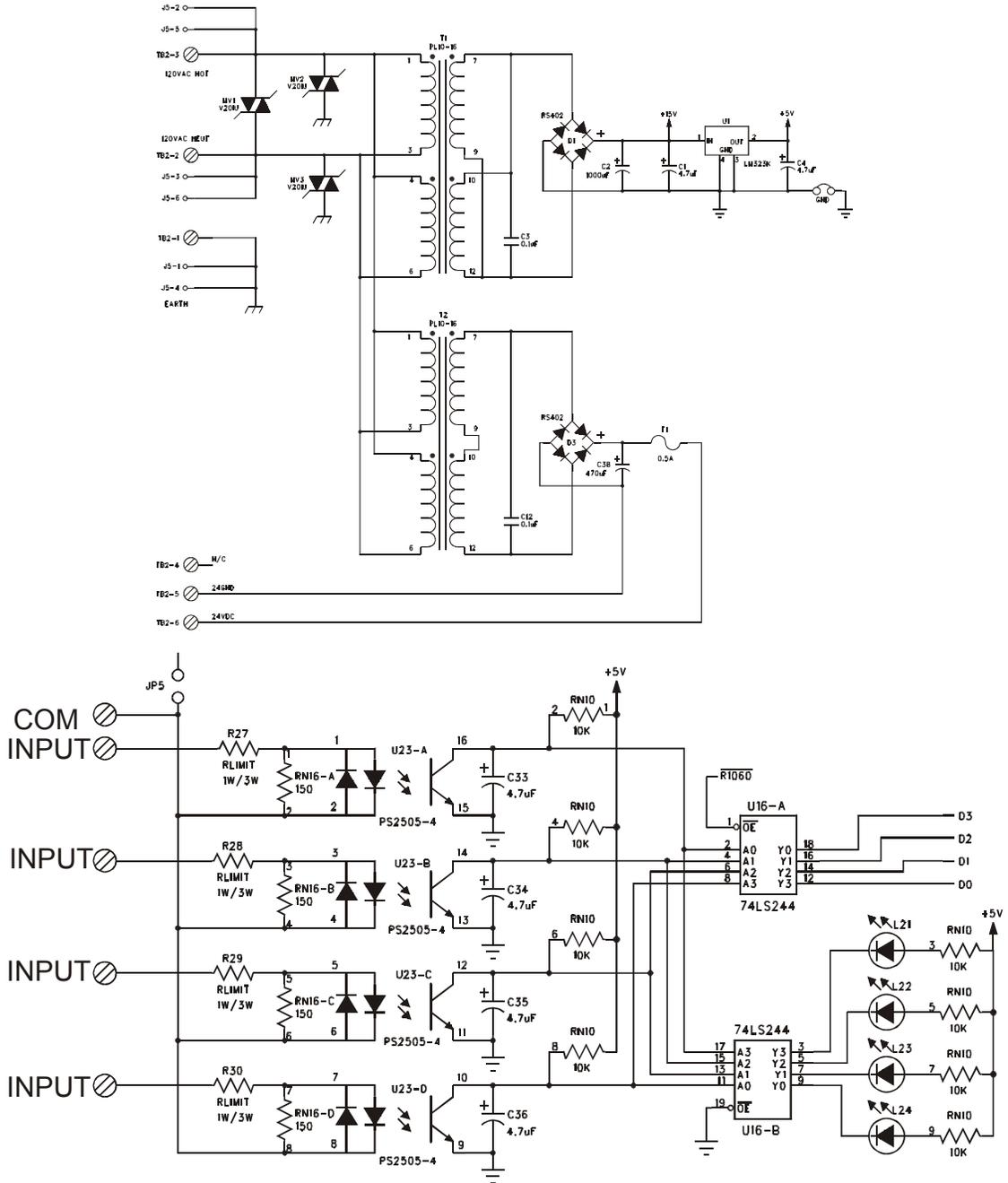
Typical power wiring to the PPT processor board is show below. If the system is integrated, then the PPT processor board is located inside the display unit, and power wiring to the display boards was installed by the factory. If the PPT processor is located in a separate remote control box, then 120VAC power will also have to be connected to the display unit as well



1.2.2 Logic Installation

Bring the power and logic wiring to the PPT system *separately* through conduit, to avoid noise problems. Connect the logic wiring to the screw terminal logic connector on the PPT circuit board. Logic wires should be American Wire Gauge #22 with a 600 volt insulation rating.

The PPT processor board includes a 24VDC unregulated linear power supply to power the optically isolated logic inputs. The PPT logic inputs are designed to be activated by a normally open relay contact that connects the input terminal to 24V_{GND}. The inputs are also compatible with most NPN transistor outputs. (2N3904 Typical)



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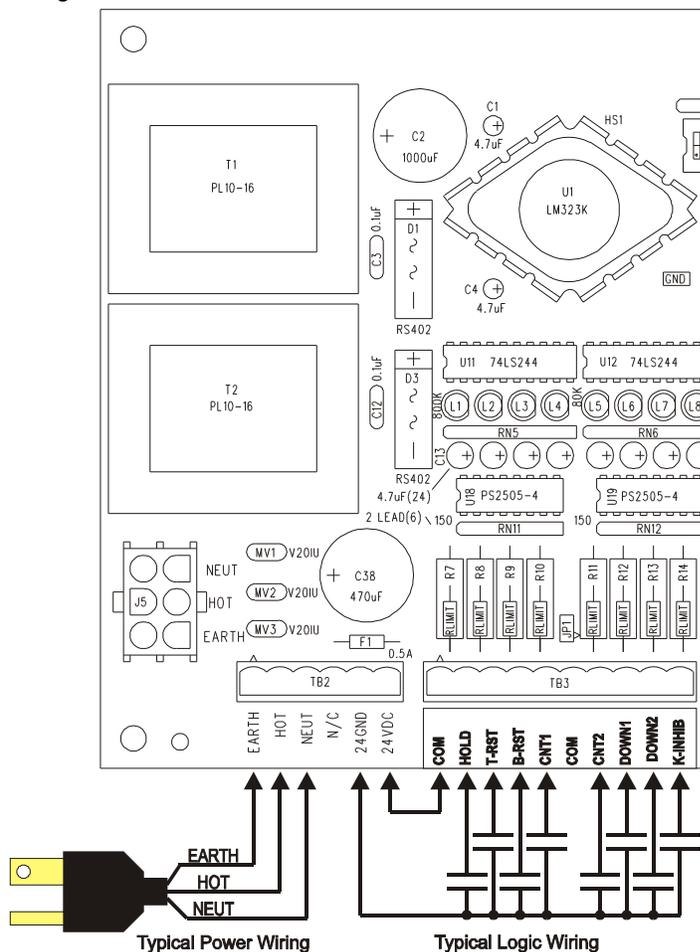
Connecting the HOLD input to 24GND pauses the GOAL timer. Connecting the T-RST input to 24GND resets the GOAL and ACTUAL counters. Connecting the B-RST input to 24GND resets the DOWN TIME timer. Connecting either CNT input to 24GND makes the ACTUAL counter increment. Connecting either DOWN input to 24GND makes the DOWN TIME timer accumulate down time in hours minutes and seconds. Connecting the K-INHIB input to 24GND locks out the operator keypad.

Note: Revision B firmware adds a count down feature to the PPT. If the SW2.7 dip switch is off, then the CNT2 input is a count up input just like CNT1. However if the SW2.7 dip switch is on, then the CNT2 input is changed to count down operation instead of the normal count up operation.

Note: Revision C firmware adds a static goal feature to the PPT. If the SW2.6 dip switch is off, then the goal counter automatically increments throughout the shift as dictated by the PACE / GSCLE register settings. However if the SW2.6 dip switch is on, then the GOAL counter is permanently held, the T-RST input and the TOP reset key only reset the actual counter, and the goal counter is fixed at what ever static number is programmed into it by the user. When the static goal feature is used, the HOLD logic input has no effect on PPT operation.

Note: Revision D firmware adds an automatic down detection feature. When this feature is activated (by programming the Auto Down Scale register, the PPT can infer that a down condition exists by measuring the time interval between count pulses, eliminating the need to use the DOWN logic inputs, but the DOWN logic inputs remain functional. Activating a down input will force the DOWN timer to run, even if automatic down detection is not detecting a down condition.

Typical PPT Logic Wiring is diagrammed below.

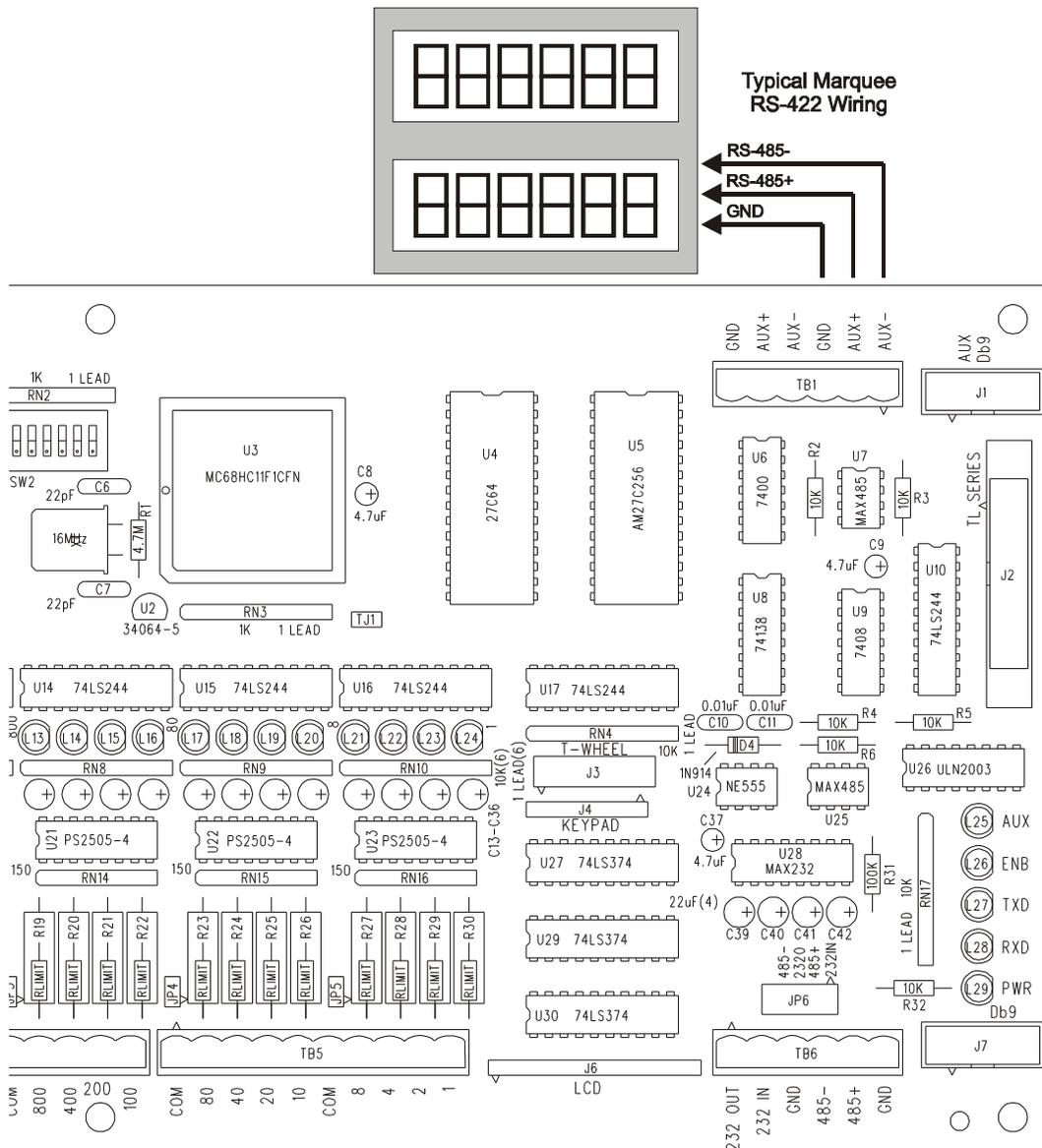


1.2.3 AUX Communications Installation

The PPT processor board uses an AUX RS-422 transmit only port to operate American LED-gible Inc. Trimline Numeric Displays. The AUX RS-422 port is hard coded to operate at 2400 baud, no parity, eight data bits, and one stop bit. GOAL data is transmitted to display address "0" (30H), ACTUAL data is transmitted to display address "1" (31H), DIFFERENCE data is transmitted to display address "2" (32H), and EFFICIENCY data is transmitted to display address "3" (33H). DOWN TIME data is transmitted to display address "4" (34h).

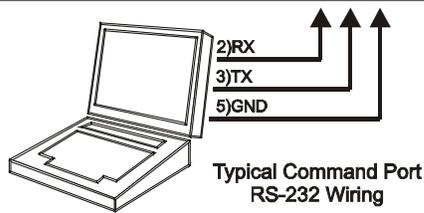
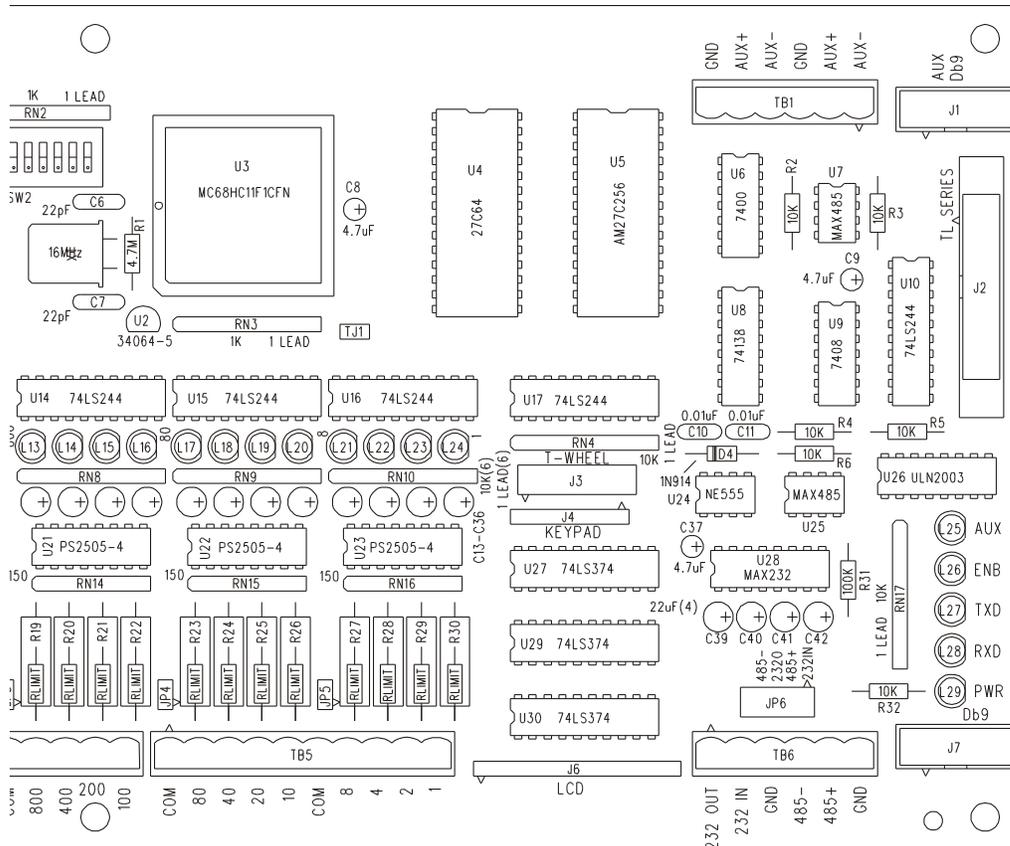
The display units will be factory configured before shipment and will not require configuration. See ALI publication PB-2149-320 for more information on how to configure Trimline display units.

If the PPT processor and Trimline displays are integrated into a single unit, the factory will connect the AUX port to the displays. However if PPT processor is located in a separate remote control box, the AUX port of the PPT processor board will have to be connected to the RS-485 screw terminals in the display unit as show below.



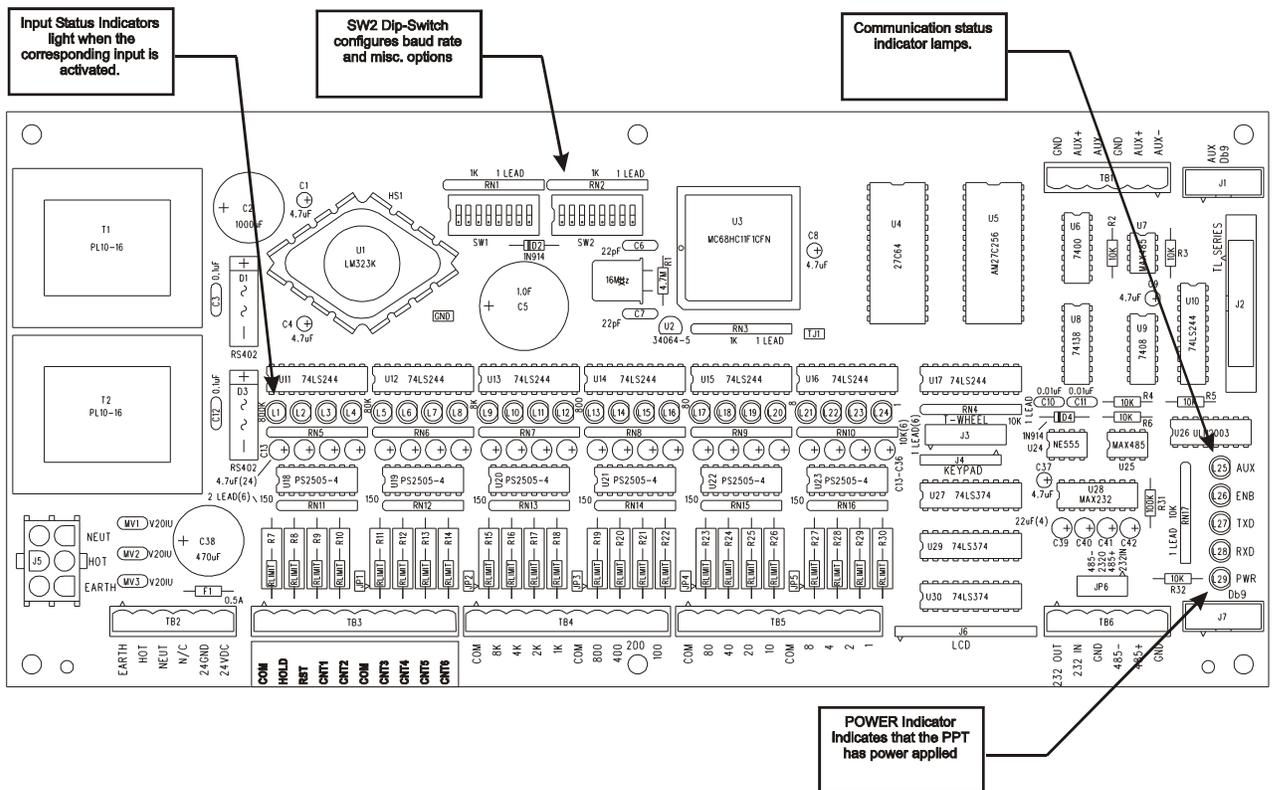
1.2.4 Serial Communications Installation

Use of the PPT processors main RS-232 / RS-485 serial port is an optional advanced feature. Most installations will not use the serial port, rendering serial port wiring and configuration unnecessary. However, if use of the serial port is desired, it is still advisable to first complete and test a basic installation, and then add use of the serial port later. For this reason, wiring and configuration of the serial port is covered in the manual sections that discuss operation of the PPT serial port instead of the installation sections.



1.3 Basic Configuration

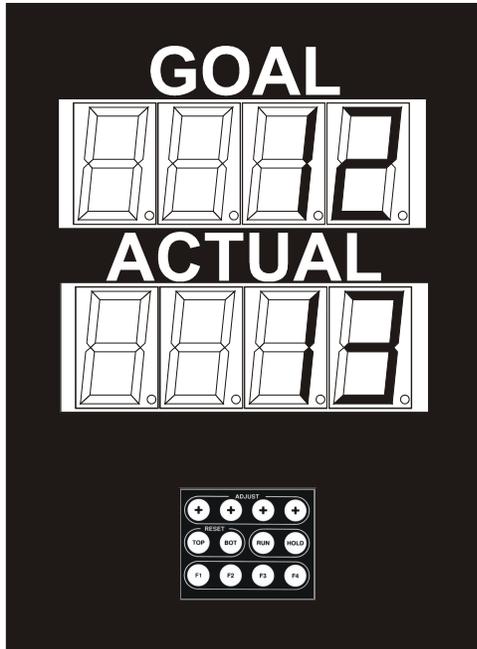
For a basic PPT installation, only the miscellaneous options selected on switches SW2.4, SW2.5, SW2.6 and SW2.7 have any effect. SW2.4 enables leading zero blanking, SW2.5 selects the PPT time base, SW2.6 enables static goal operation, and SW2.7 makes CNT2 a count down input. All of the other dip-switch settings can be ignored until the PPT serial port is used.



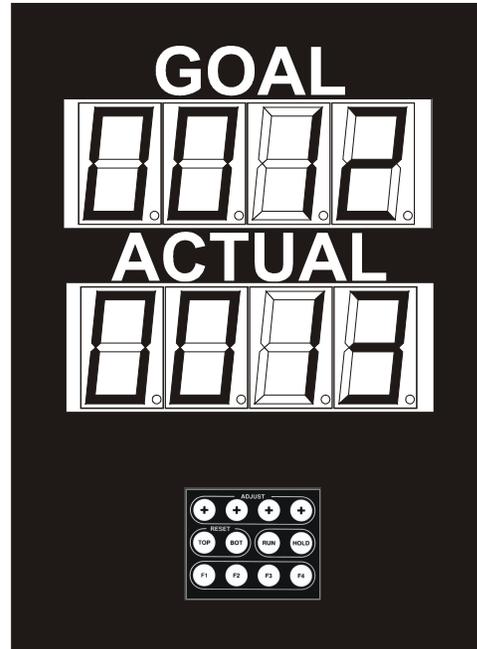
1.3.1 Leading Zero Blanking

The PPT can be configured to display data with leading zeros blanked, or non-blanked. To enable leading zero blanking, turn SW2.4 ON. To disable leading zero blanking, turn SW2.4 OFF.

LZB Enabled (SW2.4 ON)



LZB Disabled (SW2.4 OFF)



1.3.2 Time Base Selection

The GOAL counter of the PPT automatically increments at a user configurable time interval known as PACE time. This time interval can be specified in whole seconds, or in 1/10th of seconds. The unit of time the PPT uses for the PACE setting is known as the time base. To configure the PPT for a 1 second time base, turn SW2.5 ON. To configure the PPT for a 1/10th second time base, turn SW2.5 OFF.

LZB Setting	Minimum PACE Time	Maximum PACE Time
SW2.5 ON	0001 Seconds per Count	9999 Seconds per Count
SW2.5 OFF	000.1 Seconds per Count	999.9 Seconds Per Count

1.3.3 Running or Static Goal Selection

In most PPT installations, a running goal is used. When the PPT is used in this way, the operator presses the [TOP] reset key on the keypad, or activates the T-RST logic input at the start of the shift to zero the goal and actual counters. Then the goal counter automatically increments at the operator programmed pace throughout the shift.

In some PPT installations, a static goal is used. When the PPT is used in this way, the operator presses the [TOP] reset key on the keypad, or activates the T-RST logic input at the start of the shift to zero the actual counter. The goal counter does not reset to zero. The static non-changing goal is set by pressing the [F1] key several times to recall the goal register, and then the operator directly dials in the desired number. When the PPT is configured for static goal operation, the goal counter is held. Pressing the [RUN] / [HOLD] key on the keypad will have no effect. The HOLD logic input also has no effect.

To configure the PPT for running goal operation, turn SW2 switch 6 OFF (OPEN).

To configure the PPT for static goal operation, turn SW2 switch 6 ON.

1.3.4 Selecting CNT2 Direction

In most PPT installations, both the CNT1 and the CNT2 count inputs are configured to increment the actual counter.. However the CNT2 input can be reconfigured to decrement the actual counter by turning SW2 switch 7 ON.

Count down inputs are usually only used in installations where the count sensor is located such that all completed units are counted, but then the units are tested, and bad units need to be “backed out” of the actual count.

To configure the CNT2 logic input for count up operation, turn SW2 switch 7 OFF (OPEN).

To configure the CNT2 logic input for count down operation, turn SW2 switch 7 ON.

2.0 Basic Operation

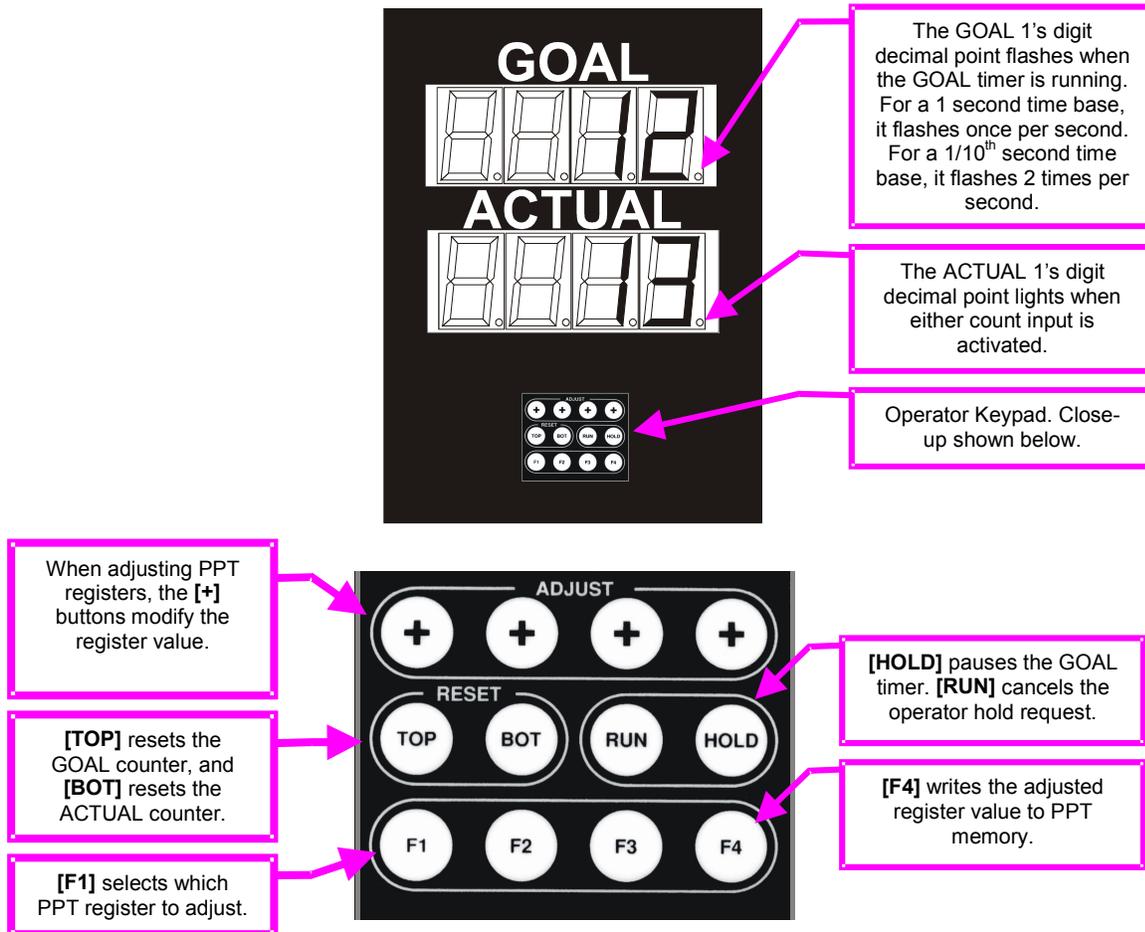
When the PPT processor powers up, it first restores GOAL, ACTUAL, and other register values from backed up memory. If the PPT processors backed up memory has expired then all PPT registers are reset to default values.

Every PPT is operated at the factory for 24 hours before shipping the unit to the customer. Therefore it is very likely that when the PPT starts up, the GOAL and ACTUAL values that were on the PPT when it was packed at the factory will be restored.

The rightmost decimal point of the GOAL counter flashes when the GOAL timer is running. The rightmost decimal point of the ACTUAL counter lights when any CNT input is asserted.

The **[TOP]** button on the keypad resets the GOAL and ACTUAL counters. The **[BOT]** button resets the DOWN TIME timer. The **[HOLD]** button pauses the GOAL timer. The **[RUN]** button cancels the operator request to pause the GOAL timer.

The **[F1]**, **[+]**, and **[F4]** buttons are used to adjust PPT registers, which is covered in the next section.

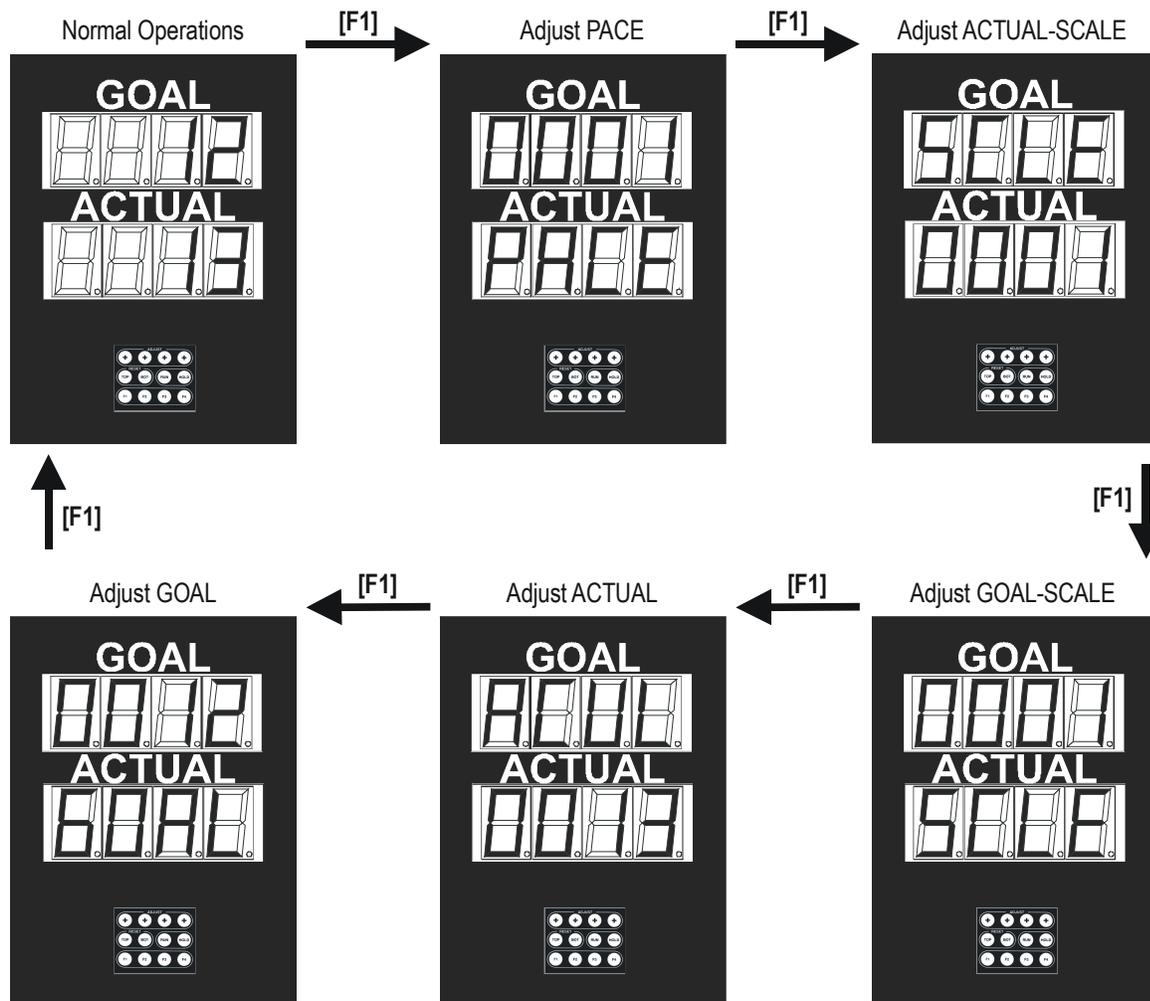


2.1 Adjusting PPT Registers

The PPT has several registers that can be modified from the operator keypad. The following registers can be accessed and adjusted from the PPT operator keypad.

Register Name	Register Function
PACE	<p>This register holds the number of seconds to wait between GOAL counter increments. Set this register to 5 seconds, and the GOAL counter will automatically increment once every five seconds.</p> <p>If the PPT time base is set to 1 second, PACE may be set to any value ranging from "0001" to "9999". "5 seconds" is entered as "0005". If the PPT time base is set to 1/10th second, PACE may be set to any value ranging from "000.1" to "999.9". "5 seconds" is entered as "005.0".</p>
ACTUAL-SCALE	<p>This register holds the scaling factor for the ACTUAL counter. Each time either count input is activated, the ACTUAL counter is incremented by ACTUAL-SCALE.</p> <p>ACTUAL-SCALE can be any value ranging from "0001" to "9999".</p> <p>To make the ACTUAL counter increment by "7" each time the either count input is activated, set ACTUAL-SCALE to "0007".</p>
GOAL-SCALE	<p>This register holds the scaling factor for the GOAL counter. Each time the GOAL timer runs out (see PACE) the GOAL counter is incremented by GOAL-SCALE.</p> <p>GOAL-SCALE can be any value ranging from "0001" to "9999".</p> <p>To make the GOAL counter increment by "12" each time the GOAL timer runs out, set GOAL-SCALE to "0012".</p>
ACTUAL	<p>This register holds the ACTUAL counter value. The only reason to modify this register is to manually correct an error in the ACTUAL counter value.</p> <p>ACTUAL can be any value ranging from "0000" to "9999".</p>
GOAL	<p>This register holds the GOAL counter value. The only reason to modify this register is to manually correct an error in the GOAL counter value.</p> <p>GOAL can be any value ranging from "0000" to "9999".</p>
ADS (Automatic Down Scale)	<p>This register hold the Automatic Down Scale Value. ADS is .typically set to somewhere between "0002" and "0005".</p> <p>To make the DOWN timer automatically activate when production fails to produce product for three PACE times, set ADS to "0003".</p> <p>ADP can be set to any value ranging from "0000" to "9999"</p> <p>To disable the automatic down detection feature of the PPT, set this register to "0000"</p>

To adjust any PPT register, first use the **[F1]** key to select the register. Each press of the **[F1]** key selects the next register for adjustment until finally rotating back to normal operating mode as illustrated below.



After selecting a PPT register, use the **[+]** keys to rotate the digits. The rightmost **[+]** key rotates the rightmost digit. The leftmost **[+]** key rotates the leftmost digit.

Once the new register value is displayed on the PPT, press the **[F4]** key to enter the adjustment and return the PPT to normal operating mode. If the **[F4]** key is not pressed, the adjustment will not take effect.

There is a timeout on adjusting PPT registers, if no **[+]** keys are pressed for 10 seconds, the PPT will automatically cancel the adjustment and return to normal operating mode. The register will remain unchanged.

2.2 Basic Operation Example

Widget Co. the worlds leading manufacturer of widgets wishes to pace the widget production process. It takes four seconds to produce each widget, and widgets are packaged into cases of six. The CNT1 input of the PPT is connected to a whisker switch that detects cases of six widgets each. The other logic inputs will not be used.

It is decided that the GOAL counter should increment by one every four seconds, and that the ACTUAL counter increment by six for each case of completed widgets. A time base of 1/10th second is selected because of the extra accuracy it affords to scheduling production. (Set SW2.5 OFF to select a 1/10th second time base.) For this configuration, the PPT registers need to be set as follows:

PACE	=	"004.0"
ACTUAL-SCALE	=	"0006"
GOAL-SCALE	=	"0001"

To set the PACE register, press the **[F1]** key once to select the PACE register. Use the **[+]** keys to select a PACE of "004.0" seconds. Then press the **[F4]** key to apply the new PACE settings.

To set the ACTUAL-SCALE register, press the **[F1]** key twice to select the ACTUAL-SCALE register. Use the **[+]** keys to select a scale factor of "0006" units. Then press the **[F4]** key to apply the new ACTUAL-SCALE setting.

To set the GOAL-SCALE register, press the **[F1]** key three times to select the GOAL-SCALE register. Use the **[+]** keys to select a scale factor of "0001" units. Then press the **[F4]** key to apply the new GOAL-SCALE setting.

Press **[TOP]** to reset the GOAL counter, **[BOT]** to reset the ACTUAL counter, and then **[RUN]** to start the GOAL timer. Start the widget production process.

After running this PPT configuration for a few days, production complains that it is not fair that the GOAL counter increments by one unit every four seconds. Production requests that the PPT be reconfigured to increment the GOAL counter by six units (a full case of widgets) every twenty four seconds. For this configuration, the following registers need to be adjusted:

PACE	=	"024.0"
GOAL-SCALE	=	"0006"

To set the PACE register, press the **[F1]** key once to select the PACE register. Use the **[+]** keys to select a PACE of "024.0" seconds. Then press the **[F4]** key to apply the new PACE settings.

To set the GOAL-SCALE register, press the **[F1]** key three times to select the GOAL-SCALE register. Use the **[+]** keys to select a scale factor of "0006" units. Then press the **[F4]** key to apply the new GOAL-SCALE setting.

After running this PPT configuration for a few days, management decides to enable the PPT automatic down detection feature. Management decides that is no widgets are produced for five times the expected cycle time of the line, then the production line is down. For this configuration, the following registers need to be adjusted:

ADP	=	"0005"
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To set the ADS (Automatic Down Scale) register, press the **[F1]** key six times. Use the **[+]** keys to select a ADP of "0005". The press the **[F4]** key to apply the new ADS setting.

Notes on ADP: The PPT computes an automatic down interval by multiplying the PACE setting by the ADS setting. For the above example, PACE=24, and ADS=5, resulting in an automatic down trip time of $24 * 5 = 120$ seconds. So in in the above example if a case of widgets is not completed in 120 seconds, the PPT detects a down condition and activates the DOWN time timer.

3.0 Using PPT Command Mode

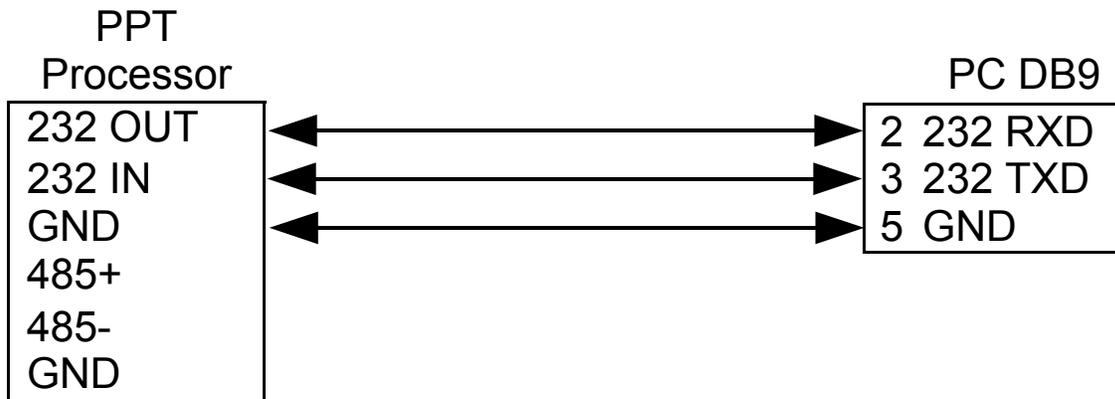
The PPT serial port can accept commands from a central computer system. This is the "COMMAND" mode of operation. In this mode, the central computer system can issue commands to the PPT to read and write registers. PPT's are addressable allowing up to 96 PPTs to be managed from a single computer system.

If a single PPT is being managed by a central computer, and the cable between the PPT and the computer will be no longer than fifty feet, RS-232 communication is preferable, otherwise RS-485 communications should be used.

3.1 Command Mode RS-232 Wiring

When using RS-232, a three-conductor cable designed for serial communications will be needed. American LED-gible suggests using Belden 9463 "Blue Hose" cable.

Typical wiring between an IBM PC compatible DB9 serial port and the PPT is illustrated below.



3.2 Command Mode RS-232 Configuration

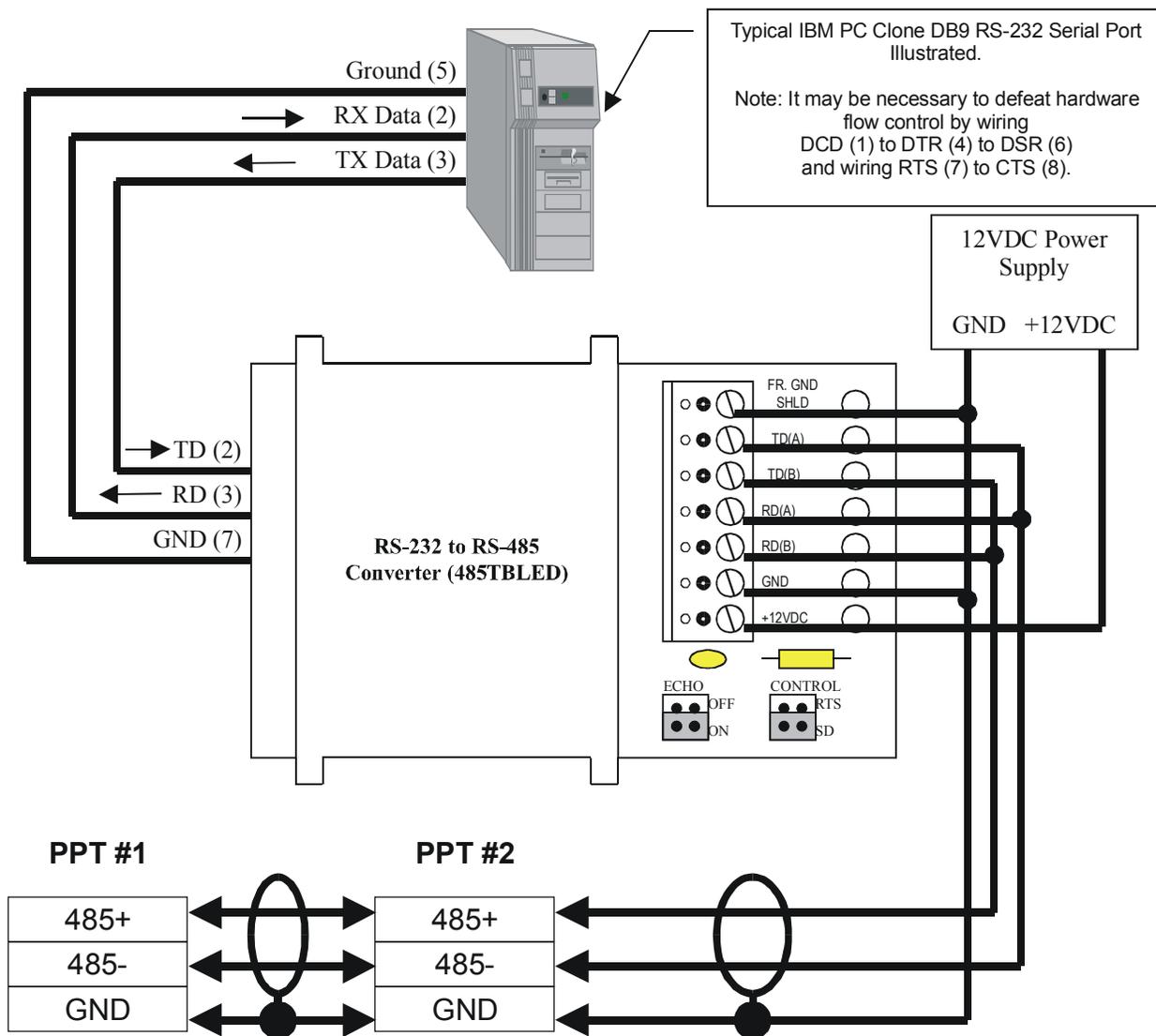
Several switch settings need to be completed to operate the PPT in COMMAND mode with RS-232 wiring. Set the following switches as directed:

Switch Setting	Reason
SW1.1 through SW1.7 ASCII Address SW1.1 is the LSB SW1.7 is the MSB ON = Logic 1 OFF = Logic 0	These switches set the PPT's address. The PPT's address can be any printable character between space (20h) and "~" (7Eh). The address is selected by entering the binary number representing the ASCII character. Selecting an invalid address results in the PPT address being set to "A" (41h).
SW1.8 ON	For RS-232 communications, the RS-232 echo must be enabled.
SW2.1 through SW2.3 All three switches OFF selects 19200 baud. SW2.1 ON, SW2.2 and SW2.3 OFF selects 9600 baud	SW2.1 through SW2.3 set the PPT's baud rate. Setting all three switches to the OFF position selects 19200 baud operation.
SW2.4 for LZB Enabled: ON for LZB Disabled: OFF	This switch enables / disables leading zero blanking as described in section on Leading Zero Blanking.
SW2.5 for 1.0 second: ON for 0.1 second: OFF	This switch selects the PPT time base as described in section Time Base Selection.
SW2.6 through SW2.8 Don't Care	These switches are reserved for future expansion of the PPT feature set.

3.3 Command Mode RS-485 Wiring

When using RS-485, a three-conductor cable designed for serial communications will be needed. American LED-gible suggests using Belden 9463 "Blue Hose" cable.

Typically an RS-485 communications converter will be required to adapt the RS-232 port on the central computer to RS-485 communications. American LED-gible suggests using a model 485TBLED converter manufactured by B&B Electronics. This converter can be ordered by calling B&B at (815) 434-0846.



3.4 Command Mode RS-485 Configuration

Several switch settings need to be completed to operate the PPT in COMMAND mode with RS-485 wiring. Set the following switches as directed:

Switch Setting	Reason
SW1.1 through SW1.7 ASCII Address SW1.1 is the LSB SW1.7 is the MSB ON = Logic 1 OFF = Logic 0	These switches set the PPT's address. The PPT's address can be any printable character between space (20h) and "~" (7Eh). The address is selected by entering the binary number representing the ASCII character. Selecting an invalid address results in the PPT address being set to "A" (41h).
SW1.8 OFF	For RS-485 communications, the RS-232 echo must be disabled.
SW2.1 through SW2.3 All three switches OFF selects 19200 baud. SW2.1 ON, SW2.2 and SW2.3 OFF selects 9600 baud	SW2.1 through SW2.3 set the PPT's baud rate. Setting all three switches to the OFF position selects 19200 baud operation.
SW2.4 for LZB Enabled: ON for LZB Disabled: OFF	This switch enables / disables leading zero blanking as described in section on Leading Zero Blanking.
SW2.5 for 1.0 second: ON for 0.1 second: OFF	This switch selects the PPT time base as described in section on Time Base Selection.
SW2.6 through SW2.8 Don't Care	These switches are reserved for future expansion of the PPT feature set.

3.5 Command Mode Commands

The PPT has many registers that can be written and read in real time via the serial port. Accesses to the PPT registers are provided via the COMMAND mode protocol.

Each PPT has a single character (byte) address ranging from space (20h) to “~” (7Eh) which is set on dip-switch SW1. Each unit’s address in a communications network must be unique or collisions will occur on the network.

All PPT commands begin with a CTRL-B character followed by the address of the PPT the command is directed too. All commands end with a CTRL-C character. The PPT uses the CTRL-B and CTRL-C characters to find the beginning and the end of command packets within the serial data stream.

Each PPT has the following internal registers:

Register Name	Register Code	Register Description
GOAL	GO	6 Digit ACTUAL Value 000000 to 999999
ACTUAL	AC	6 Digit ACTUAL Value 000000 to 999999
PACE	PA	4 Digit PACE Value 0001 to 9999
GSCALE	GS	4 Digit GOAL Scale Value 0001 to 9999
ASCALE	AS	4 Digit ACTUAL Scale Value 0001 to 9999
DTIME	DT	6 Digit DOWN TIME Value 000000 to 995959 (HHMMSS)
KHOLD	KH	1 Digit Keyboard Hold Flag, 0 to 1 (1 = HOLD)
KDISABLE	KD	1 Digit Keyboard Disable Flag, 0 to 1 (1 = Disabled)

Any of the above registers can be read or written, in real time. The operation (Read or Write) and the register selected is specified by a 3-character opcode.

The first character in an opcode is an “R” character for a READ operation or a “W” character for a WRITE operation. The second and third characters of the opcode specify a PPT register. See the “Register Code” column in the table above for the two character codes that specify PPT registers.

Write opcodes are followed by numeric data as appropriate for the command. The numeric data must be fixed width, and cannot contain spaces or decimal points. For example, to write “1” to the PACE register, the data section of the command must be “0001”. If the PPT time base is set to 1/10th second, “0001” is interpreted as 0.1 seconds. If the PPT time base is set to 1 second, “0001” is interpreted as 1 second.

To write “1234” to the ASCALE register of PPT “A”, use the opcode “WAS” (WRITE ASCALE) with data “1234” as shown below.

STX	ADDR	OPCODE			DATA				ETX
CTRL B	A	W	A	S	1	2	3	4	CTRL C
02h	41h	57h	41h	53h	31h	32h	33h	34h	03h

If the command is accepted, the PPT will respond with a single ACK character (CTRL-F, 06h).

To read the GOAL register of PPT “B” use the opcode “RGO” (READ GOAL) as shown below:

STX	ADDR	OPCODE			ETX
CTRL B	B	R	G	O	CTRL C
02h	42h	52h	47h	4Fh	03h

If the command is accepted, the PPT will respond with the requested data followed by an ACK character.

DATA						ACK
1	2	3	4	5	6	CTRL F
31h	32h	33h	34h	35	36	06h

If the PPT cannot interpret the command, it will respond with a NAK character (CTRL-U, 15h).

Note: To help our customers develop custom command and control solutions for the PPT, ALI has prepared a simple but explanatory Visual Basic 5.0 PPT command program. The example retrieves and displays all of the PPT registers in real time from a single PPT. The PC user can also manually issue writes to any of the PPT registers.

The source code for the example is free to ALI customers, and may be used as the starting point for the customers application without limitation, however ALI does not warrant the example in any way.

To get a copy of the example command program, contact ALI and request applications note **PB-2150-139**.

4.0 Product Specifications

GENERAL:

Line Voltage	120VAC 60Hz
Power Consumption	Less than 120 Watts
Operating Temperature	0° F to 135° F (-17° C to +50° C)
Operating Humidity	35% to 80%
Dimensions	18" Wide, 36" High, 4" Deep (Basic four line display unit)
Weight	50 Pounds
Enclosure	NEMA 1 painted black steel
Mounting	Wall mount tabs

L.E.D. DISPLAY:

Digit Type	2.3" tall 7-segment L.E.D. module
Digit Brightness	36mcd typical
Lamp Life	100,000 Hours (11.4Years)
Viewing Distance	125 Feet

Operation:

Minimum / Maximum Pace	0.1 seconds per increment / 9999 seconds per increment
Maximum / Maximum Scale	1 unit per increment / 9999 units per increment
Minimum / Maximum Goal	0 units / 999999 units
Minimum / Maximum Actual	0 units / 999999 units

Logic Inputs:

Functions	T-Reset, B-Reset, Hold, Count-1, Count-2, Down1, Down2, K-Inhib
Logic Level	24VDC
Maximum Count Rate	10Hz @ 50% duty cycle

Communications:

Signaling	Full Duplex RS-232, Half Duplex RS-485, Simplex RS-422
Baud Rate	19200bps, 9600bps switch selectable
Character Format	Eight Data Bits, No Parity, One Stop Bit

5.0 In Case of Difficulties

If you need technical assistance, contact us by phone or fax and please have the following information available:

- 1) Model number.
- 2) Serial number.
- 3) Description of the problem.

The serial number and model number of the marquee can be located on the backside of the meeting timer imprinted on a SILVER ID TAG.

American LED-gible Inc. (614) 851-1100 August 2003 Model # SO-6346-001 Serial # SO-6346-001

American LED-gible technical support may be reached at:

Phone: (614) 851-1100

Fax: (614) 851-1121

E-mail: ledgible@ledgible.com

WWW: www.ledgible.com

6.0 Limited Warranty

We warrant to you that your AMERICAN LED-gible BRAND MARQUEE, when purchased by you, will be free from defects in material and workmanship, under normal use, for one year from date of delivery. If your LED-GIBLE BRAND MARQUEE should prove to be defective within the warranty period, we will repair it (or, if we think necessary, replace it) without charge to you.

To obtain service, please call our Customer Service Department at 1-614-851-1100 or write to:

AMERICAN LED-gible Inc.
1776 LONE EAGLE STREET
COLUMBUS, OHIO 43228

We will furnish you with shipping instructions. This warranty covers merchandise returned to American LED-gible (shipped prepaid) for repair, not in plant repairs. Should you need an in plant repair at your facility, American LED-gible will schedule a trip. Rates are per diem, plus travel expenses.

ALI shall have the right of final determination as to the existence and cause of the defect. This warranty expressly excludes any defects or damages caused by accessories, replacement parts, or repair service, other than those which have been authorized by ALI. This warranty does not cover any damage caused by accident, misuse, shipment, or other than ordinary use.

This warranty excludes all incidental or consequential damages. Some states do not allow the exclusion of, or limitation of, incidental or consequential damages, so the foregoing exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty is in lieu of any other warranty, express, written, implied, or statutory, and no agreement extending or modifying it will be binding upon ALI, unless in writing and signed by duly authorized officer.

If your AMERICAN LED-gible MARQUEE is outside the warranty period, please call our Customer Service Department as above. After you return the unit to American LED-gible, we will estimate the repair charges, and contact you so a purchase order can be issued. Again, should you require in-house repair of your marquees, ALI rates are per diem, plus travel expenses. Please make sure to call, so a trip can be scheduled if this option is preferred.

LIMITATION OF LIABILITY:

If this product is not in good working order as warranted above, your sole remedy shall be repair or replacement as provided above. In no event will ALI be liable for special, indirect, or consequential damages, or any damages whatsoever resulting from loss of use, data, or profits arising out of, or in connection with this contract or the use or performance of ALI products, whether in an action of contract or tort, including negligence. ALI's liability for damage to property shall be limited to the cost of the product sold to the buyer.

7.0 Connection Labels

