

PRINTRONIX®

General Purpose Input/Output (GPIO) Module

User's Manual

Product Warranty

Printronix warrants that the Products furnished under this Agreement shall be free from defects in material and workmanship for a period of one year from the date of shipment from the Printronix facility. This warranty is applicable only if the products have had normal utilization within the published specifications as modified from time to time, have been maintained in accordance with recommended procedures with Printronix approved parts, and have not been modified or altered in a manner not approved by Printronix.

For printers sold within the area in which Purchaser normally provides field service:

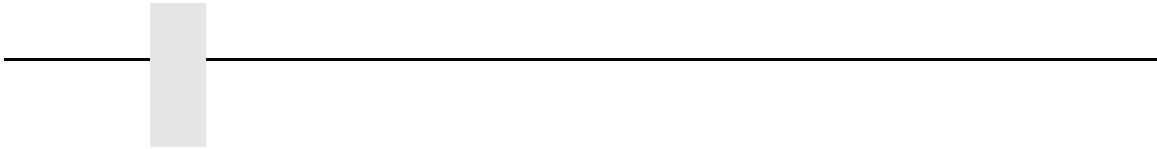
For all printers the Purchaser will provide the end-user with a 90-day on-site warranty. Any printer or part therein found defective within one year of original shipping date from a Printronix facility shall be returned to Printronix and be repaired or replaced at the option and expense of Printronix. Purchaser shall pay shipping cost to the Printronix facility and Printronix will return the item(s) at its expense.

For printers sold outside the area, within the Continental United States, in which Purchaser normally provides field service:

Any printer found defective within 90 days from the date of shipment to the end user will be repaired at the end user's location. If the end user is located within 100 miles of an Authorized Service Provider's location, warranty service will be performed at no charge. If the end user is located more than 100 miles from an Authorized Service Provider's location, travel time and expenses in excess of 100 miles will be billed to the end user at current rates or the printer may be shipped to the nearest Authorized Service Center for repair. If the end user elects to ship the printer for warranty repair, the end user shall pay the shipping cost to the Authorized Service Center and the printer will be returned at Printronix' expense.

The Products may be equipped with a general purpose input/output circuit board and corresponding pin connection (GPIO) which allow the Purchaser's or end user's printer to function as a controller in a computer system. Printronix publishes the specifications associated with GPIO and the pin connection and warrants that the printer's input and output parameters at the pin connection conform to those specifications. Except as expressly warranted, GPIO is sold on an "as is" basis. There are no other warranties whatsoever, express or implied, concerning GPIO.

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GPIO

Overview

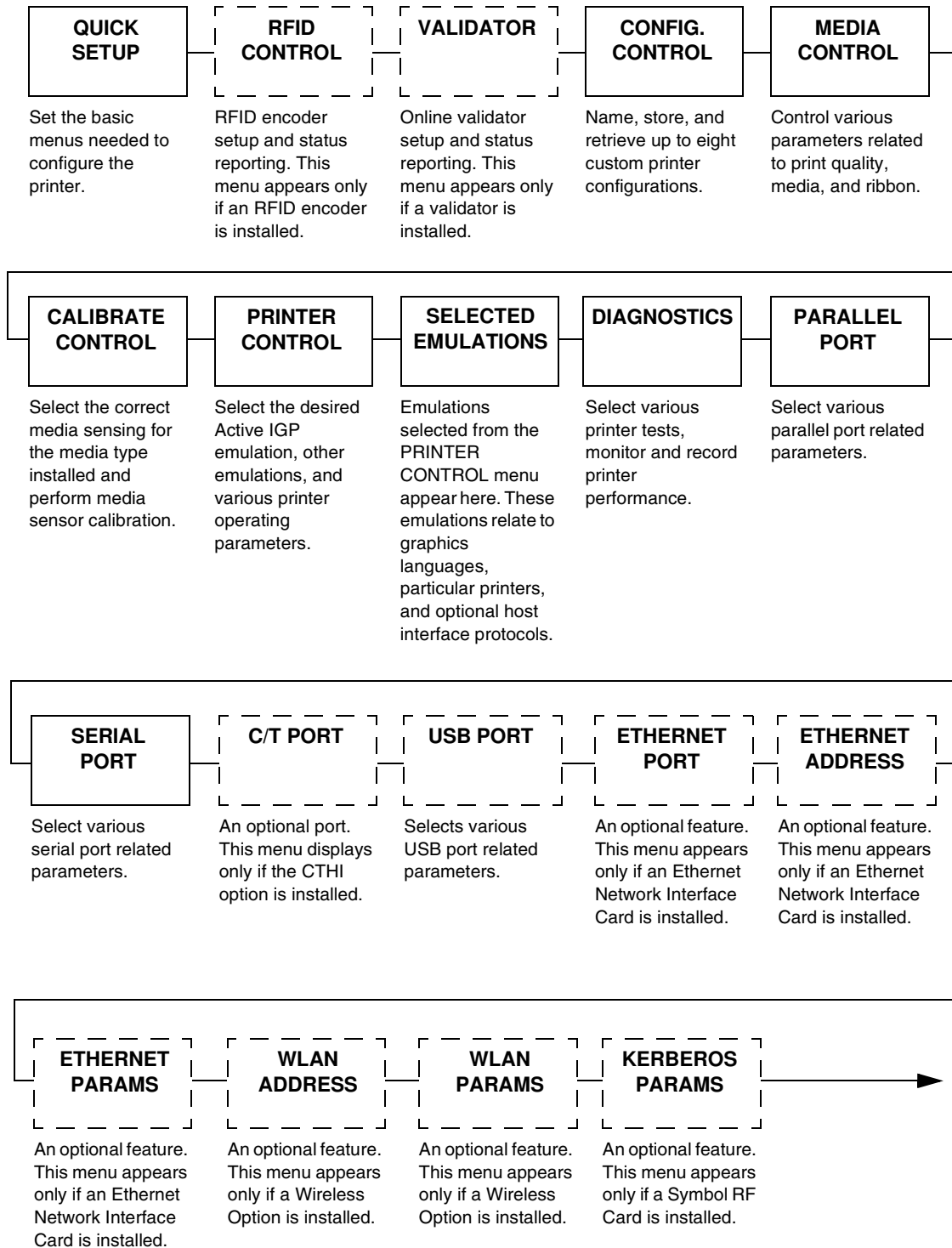
The Printronix General Purpose Input/Output (GPIO) module is an optional accessory for SL5000r/T5000r thermal and P7000 line matrix printers. It enables the printers to interface with an external device such as a label applicator system.


Simple printer menus allow for programming three of the eleven pre-defined interface signals (seven outputs, four inputs) to select particular polarity or logic functions that can meet practically all typical print/apply requirements or be compatible with practically all the features available on other manufacturers' external I/O interfaces. This allows easy migration of Printronix thermal and line matrix printers to new or existing systems. Field interface is accomplished through an industry standard 50-pin D-type connector.

GPIO is available as a factory option or field installable kit that also includes a mating connector for field interface, installation instructions, and operation manual.

Although there are seven pre-defined outputs and four pre-defined inputs, the GPIO module actually contains a total of eight inputs, eight outputs (all inputs and outputs are optically-isolated), and four relays. By using Printronix GPIO Manager software, these can all be custom configured and be mapped in conjunction with Printronix proprietary functions such as ODV analyses, printer front panel keys, and communications ports to provide powerful functions, including multiple interfaces, previously not attainable with a single accessory module.

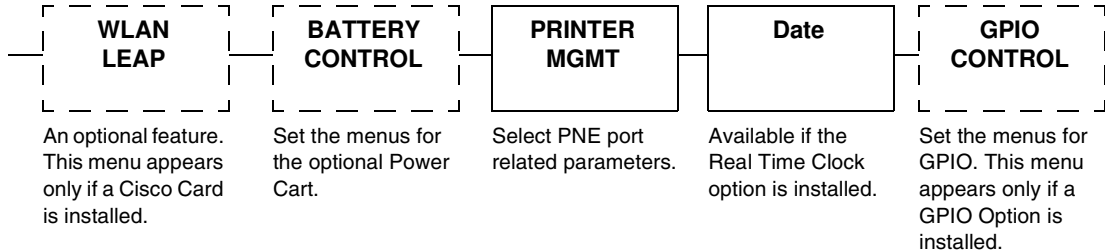
SL5000r/T5000r Menu Overview



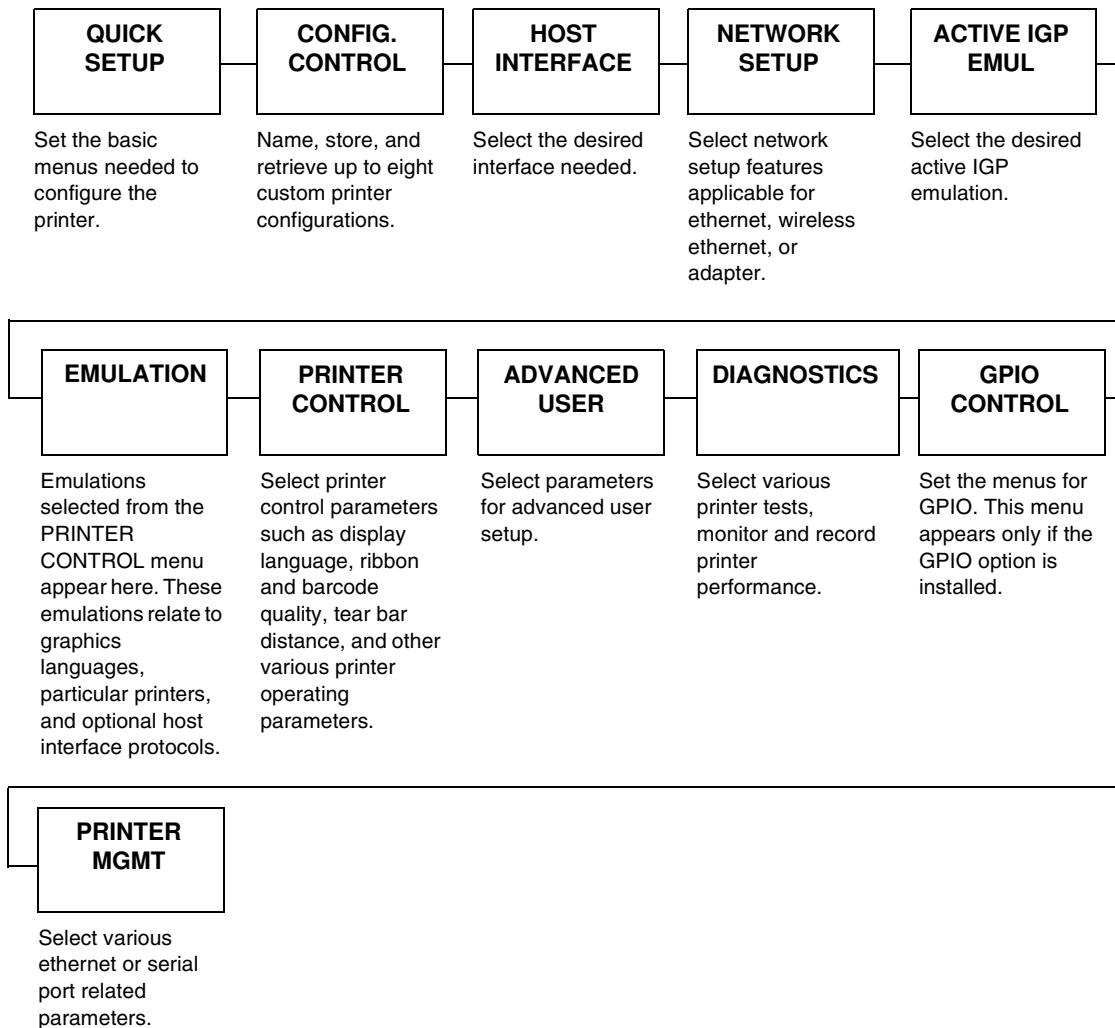
Press  to select the next main menu.

Press ↓ or ↑ to move within each main menu.

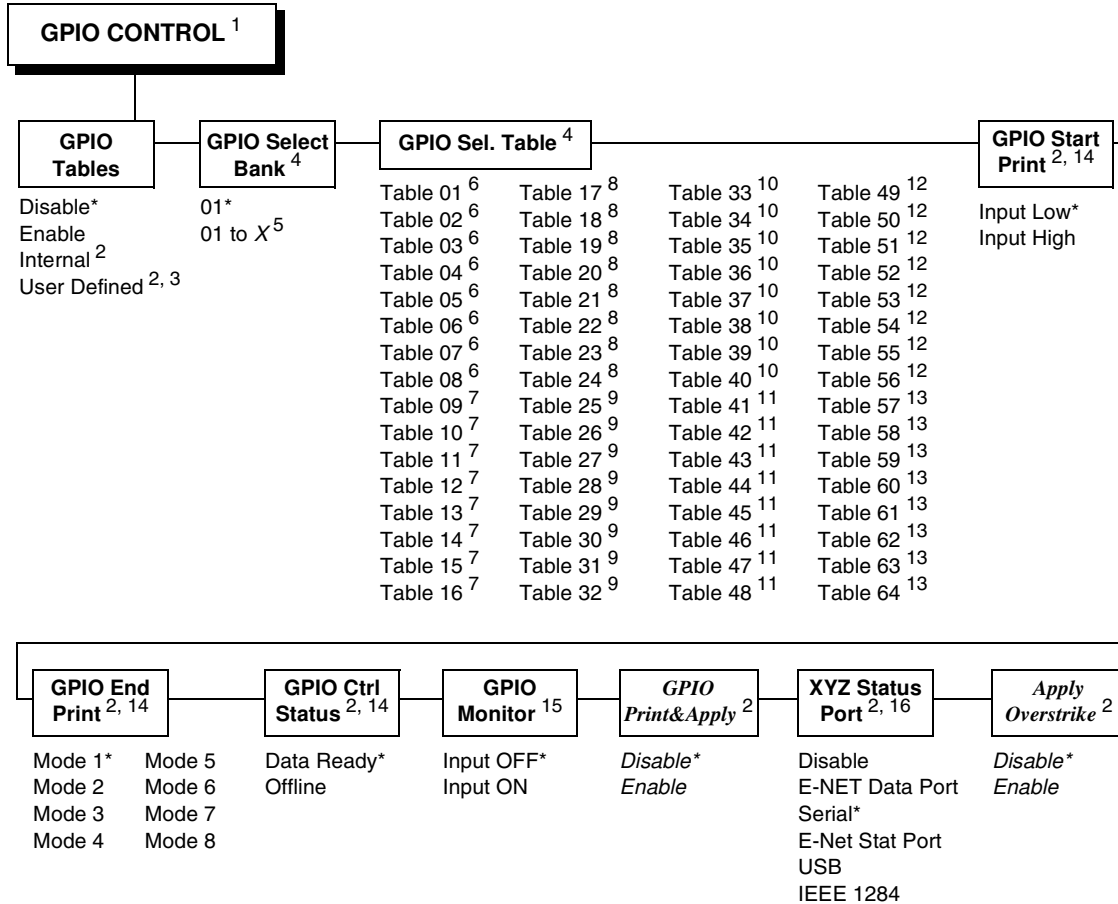
SL5000r/T5000r Menu Overview (continued)



P7000 Menu Overview



GPIO CONTROL Menu



NOTES:

* = Default

Italicized items appear only when Admin User is set to Enable (in the PRINTER CONTROL menu).

¹ This menu appears only if a GPIO option is installed.

² This menu item appears only for thermal printers.

³ This menu item appears only if a user-defined table is downloaded to the printer.

⁴ This menu appears only if GPIO Tables is set to Enable or User Defined.

⁵ X = total number of defined tables divided by eight, rounded up to the next whole number (e.g., 15 tables = 2 banks). The maximum value for X is 08, since the maximum number of tables is 64.

⁶ These menu items appear only if GPIO Select Bank is set to 01.

⁷ These menu items appear only if GPIO Select Bank is set to 02.

⁸ These menu items appear only if GPIO Select Bank is set to 03.

⁹ These menu items appear only if GPIO Select Bank is set to 04.

¹⁰ These menu items appear only if GPIO Select Bank is set to 05.

¹¹ These menu items appear only if GPIO Select Bank is set to 06.

¹² These menu items appear only if GPIO Select Bank is set to 07.

¹³ These menu items appear only if GPIO Select Bank is set to 08.

¹⁴ This menu appears only if GPIO Tables is set to Internal.

¹⁵ This menu appears only if GPIO Tables is set to Enable, Internal, or User Defined.

¹⁶ This menu for reference only. This is a proprietary feature not available with the standard GPIO product.

GPIO CONTROL Menu Items

GPIO Tables

Allows you to select a mapping table.

- **Disable.** The default.
- **Enable.** The user-defined mapping table.
- **Internal.** The standard internal mapping table.

NOTE: Internal is available only for thermal printers.

- **User Defined.** The user-defined mapping table.

NOTE: User Defined is available only for thermal printers.

IMPORTANT

On SLPA printers, set GPIO Tables to Disable to avoid unexpected tamp motion during printer configuration. After all configurations are complete, set GPIO Tables to Enable.

GPIO Select Bank

NOTE: This menu appears only if GPIO Tables is set to Enable or User Defined.

Allows you to select a bank of tables.

The range is from 01 to X , where X is the total number of defined tables (see GPIO Sel. Table below) divided by eight, rounded up to the next whole number (e.g., 15 tables = 2 banks).

The maximum for X is 08, since the maximum number of tables is 64.

GPIO Sel. Table

NOTE: This menu appears only if GPIO Tables is set to Enable or User Defined.

Allows you to select a table.

The range depends on the number of defined tables (maximum 64) and the GPIO Select Bank setting. See Table 1.

Table 1. GPIO Sel. Table Range

GPIO Select Bank Setting	GPIO Sel. Table Range
01	01 to 08
02	09 to 16
03	17 to 24
04	25 to 32
05	33 to 40
06	41 to 48

Table 1. GPIO Sel. Table Range

GPIO Select Bank Setting	GPIO Sel. Table Range
07	49 to 56
08	57 to 64

GPIO Start Print

NOTE: This menu appears only for thermal printers, and only if GPIO Tables is set to Internal.

Start print logic.

- **Input Low.** The default. Start print when input asserts low.
- **Input High.** Start print when input asserts high.

GPIO End Print

NOTE: This menu appears only for thermal printers, and only if GPIO Tables is set to Internal.

Mode selectable via the printer menu.

NOTE: End print applies only to printed labels. Output remains in normal state for blank labels.

- **Mode 1.** The default. Normally high. Low only when a label is being moved forward.
- **Mode 2.** Normally low; high only when a label is being moved forward.
- **Mode 3.** Normally high; low for 50 milliseconds when a label has been printed and positioned. Always high during continuous printing modes.
- **Mode 4.** Normally low; high for 50 milliseconds when a label has been printed and positioned. Always low during continuous printing modes.
- **Mode 5.** Normally high. When the label has been printed completely, a low going, 50 millisecond pulse is sent. (This mode shows the end of a label print cycle, even in batch mode where labels are continuously being printed.)
- **Mode 6.** Identical to Mode 5, except normally low with a high going 50 millisecond pulse.
- **Mode 7.** Normally high. At the beginning of a label being printed, the output is set low. When the label is completed, the signal goes high. If another label has started printing, the signal stays high for 50 milliseconds. (This mode shows start and end of a label print cycle, even in batch mode where labels are continuously printed.)
- **Mode 8.** Identical to Mode 7, except normally low with high going signal.

GPIO Ctrl Status

NOTE: This menu appears only for thermal printers, and only if GPIO Tables is set to Internal.

Programmable via printer menu.

- **Data Ready.** The default. Low when sufficient data has been received to begin printing the next label. High whenever printing is stopped after the current label due to any condition causing the printer to pause or in the absence of a label format.
- **Offline.** Low whenever the printer is offline. High whenever the printer is able to receive command streams and print labels.

GPIO Monitor

NOTE: This menu appears only if GPIO Tables is set to Enable, Internal, or User Defined.

Shows the status of the GPIO input opto-couplers on the control panel LCD. A '.' (dot) indicates that the corresponding opto-coupler is inactive. A '|' (bar) indicates the opto-coupler is active.

- **Input OFF.** The default. Disable.
- **Input ON.** Enable.

GPIO Print&Apply

NOTE: This menu appears only for thermal printers, and only if Admin User is set to Enable (in the PRINTER CONTROL menu).

Enables the use of print and apply hardware.

- **Disable.** The default.
- **Enable.**

Apply Overstrike

NOTE: This menu appears only for thermal printers, and only if Admin User is set to Enable (in the PRINTER CONTROL menu).

This menu is used when GPIO Print&Apply is set to Enable. If the Apply Overstrike is set to Enable, RFID or verifier overstrike labels are applied to boxes like passing labels. If Apply Overstrike is set to Disable, RFID or verifier overstrike labels are not applied to boxes.

- **Disable.** The default.
- **Enable.**

Connector Pinout

The Printronix GPIO feature uses a 50-pin DIN connector to interface to Label Applicators, Programmable Logic Controllers, and the like.

Using the printer resident pre-programmed I/O mapping tables, a number of connector pins are each assigned a specific function as listed in the table below. See “Signal Descriptions” on page 14 for a complete description these functions.

INPUT OPTO-COUPLER		CONNECTOR PINS	
1	Reprint Last Label	1 (anode)	9 (cathode)
2	Start Print	2 (anode)	10 (cathode)
3	Feed	3 (anode)	11 (cathode)
4	Pause	4 (anode)	12 (cathode)
5 to 8	Not Used	5 to 8 (anode)	13 to 16 (cathode)

OUTPUT OPTO-COUPLER		CONNECTOR PINS	
1	Ribbon Low	18 (collector)	26 (emitter)
2	Ribbon Out	19 (collector)	27 (emitter)
3	Media Out	20 (collector)	28 (emitter)
4	Service Required	21 (collector)	29 (emitter)
5	End Print	22 (collector)	30 (emitter)
6	Control Status	23 (collector)	31 (emitter)
7	Not Used	24 (collector)	32 (emitter)
8	Power On	25 (collector)	33 (emitter)

Signal Descriptions

Outputs

Ribbon Low

NOTE: This applies to thermal printers only.

- Normally high, goes low when ribbon remaining is about 50 meters.
In the printer configuration menu, Ribbon Low can be set to “Disable” or “Enable.” If “Disable” is selected, the GPIO signal is disabled.
- Stays low when ribbon is out.

Ribbon Out

NOTE: This applies to thermal printers only.

Normally high. Low during a Ribbon Out condition.

Media Out (Label Out)

Normally high. Low during a Label Out condition.

Error (Service Required)

Normally high. Goes low whenever the printer is stopped for a fault condition that requires the user to perform an action to start again. This can be head open, or any operation fault condition, etc.

End Print

Logic programmable via printer menu.

- **Mode 1.** The default. Normally high. Low only when a label is being moved forward.
- **Mode 2.** Normally low; high only when a label is being moved forward.
- **Mode 3.** Normally high; low for 50 milliseconds when a label has been printed and positioned. Always high during continuous printing modes.
- **Mode 4.** Normally low; high for 50 milliseconds when a label has been printed and positioned. Always low during continuous printing modes.
- **Mode 5.** Normally high. When the label has been printed completely, a low going, 50 millisecond pulse is sent. (This mode shows the end of a label print cycle, even in batch mode where labels are continuously being printed.)
- **Mode 6.** Identical to Mode 5, except normally low with a high going 50 millisecond pulse.
- **Mode 7.** Normally high. At the beginning of a label being printed, the output is set low. When the label is completed, the signal goes high. If another label has started printing, the high signal stays high for 50 milliseconds. (This mode shows start and end of a label print cycle, even in batch mode where labels are continuously printed.)
- **Mode 8.** Identical to Mode 7, except normally low with high going signal.

NOTE: End Print applies only to printed labels. Output remains in normal state for blank labels.

Data Ready/Off Line

Programmable via printer menu.

- **Ready Mode.** The default. Low when sufficient data has been received to begin printing the next label. High whenever printing is stopped after the current label due to any condition causing the printer to pause or in the absence of a label format.
- **Off Line Mode.** Low whenever the printer is offline. High whenever the printer is able to receive command streams and print labels.

Power On

Low when valid power is applied to printer, i.e., the main CPU is operating. During power off, this should be in a high impedance state so an external device can pull up to a voltage.

Inputs

Reprint

When low going edge is detected, the printer reprints the last label printed prior to receiving the signal. Only one label is reprinted. The signal must toggle high then low again to reprint another label.

Start Print

Signal polarity selectable via printer menu.

- **Active Low.** The default. When low, the printer will print one label. If still low at the end of the label, another label will be printed without delay. If high, the printer will not print. If the signal goes high while the printer is printing a label, printing will continue until the label has completed. The printer will then stop and obey any other settings for end of label control such as eject, feed a particular distance, etc.
- **Active High.** Identical to Mode 1 except opposite polarity. A high input will print one label, etc.

Feed

- If low, will feed a blank label (or labels) until a high input is detected. A high input stops the feeding of blank labels, and last blank label fed will stop at top-of-form.
- This signal has the lowest priority over other functions. If the printer is printing, ODV is voiding, or there are any error conditions, the signal is ignored.

NOTE: This signal also has lower priority than Start Print.

Pause

- When a signal toggles from high to low, it causes the printer to go into pause as if the PAUSE key were pressed.
- If a signal goes low during an operation, it will be treated the same way as if the PAUSE key were pressed, i.e., the label will finish if one was being printed, etc.
- This condition can only be reset by pressing the PAUSE key or by a similar command from a host if you have created one.
- The signal must toggle high then low again to achieve another valid pause input.

Power and Grounds

- +24 VDC
- 24 VDC Return (Ground)
- + 5 VDC
- 5 VDC Return (Ground)
- Frame Ground

Hardware Specifications

This section is a quick reference to the GPIO connections available when using the printer resident pre-programmed I/O mapping tables as well as the electrical specifications of the components used and the voltages available. See page 19 for a schematic diagram.

Pre-Programmed Inputs for Use with Printer Menus

Start Print (Polarity programmable via printer menu); input 2

Pause; input 4

Feed; input 3

Reprint (requires 16MB DRAM printer memory to function); input 1

Not used; inputs 5, 6, 7, 8

Pre-Programmed Outputs for Use with Printer Menus

End Print (8 modes via printer menu); output 5
Data Ready/Online (programmable via printer menu); output 6
Ribbon Low; output 1
Ribbon Out; output 2
Error - Service Required; output 4
Media Out; output 3
Power On; output 8
Not used; output 7

External Power Outputs

+5VDC (.5 A fused)
+24VDC (.25 A fused) – not available if cutter installed
Two DC ground pins

Compatibility

GPIO is compatible with all T5000r accessories except Coax/Twinax and wireless communication options.

Electrical

Inputs (eight total)

- Opto-isolated, separate anode and cathode pins per input
- Input voltage range (steady state); 5-10 VDC
- Series resistor; 4700 ohm, .25W
- Resistor through hole mounted; changeable with common techniques

Outputs (eight total)

- Opto-isolated, NPN transistor, separate collector and emitter pins per output
- Open collector output, NPN transistor
- Current – 300 ma maximum
- 70 VDC collector to emitter voltage maximum.

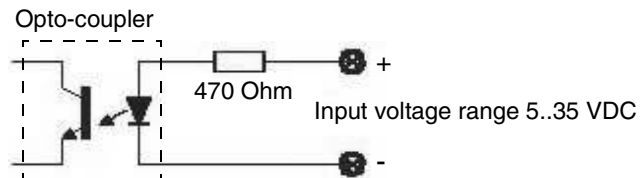
WARNING For safety reasons voltage should be limited to 42 volts DC max.

- Through hole options for pull-up and series resistors; installable with common techniques

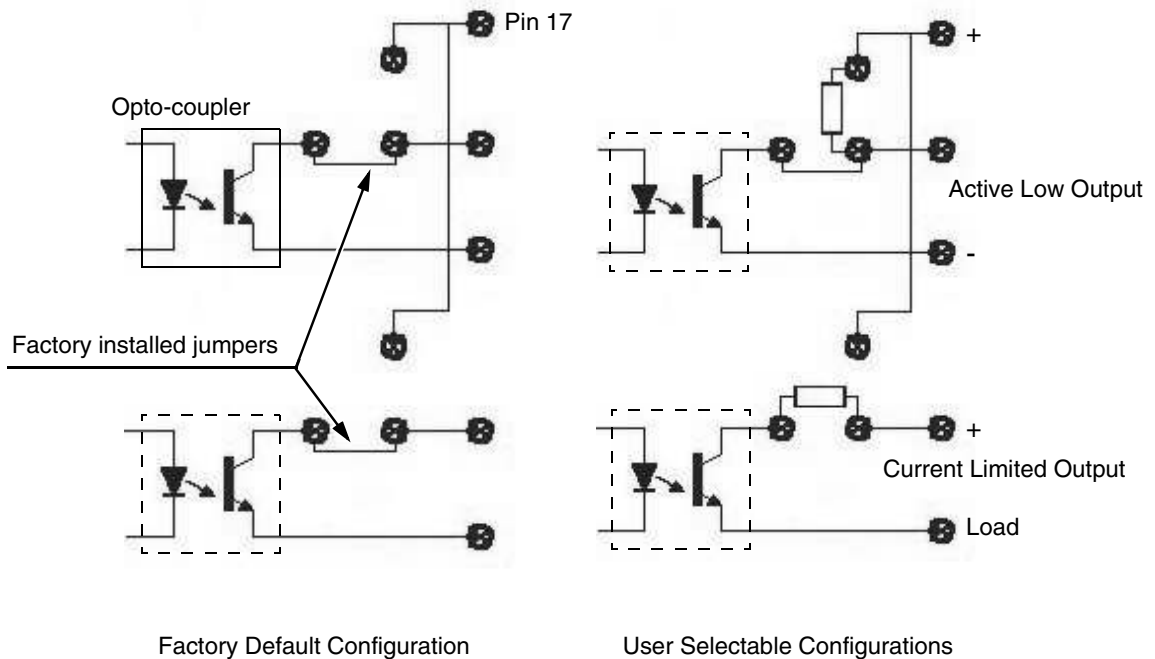
A

Inputs And Outputs - Electrical

GPIO Opto-coupled Input Circuit



GPIO Opto-coupled Output Circuit



B

Contact Information

Printronix Customer Support Center

IMPORTANT

Please have the following information available prior to calling the Printronix Customer Support Center:

- Model number
- Serial number (located on the back of the printer)
- Installed options (i.e., interface and host type if applicable to the problem)
- Configuration printout:

Thermal Printer

See "Printing A Configuration" in the *Quick Setup Guide*

Line Matrix Printer

Press **PRT CONFIG** on the control panel, then press **Enter**

- Is the problem with a new install or an existing printer?
- Description of the problem (be specific)
- Good and bad samples that clearly show the problem (faxing or emailing of these samples may be required)

Americas (714) 368-2686

Europe, Middle East, and Africa (31) 24 6489 311

Asia Pacific (65) 6548 4114

China (86) 800-999-6836

<http://www.primtronix.com/support.aspx>

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