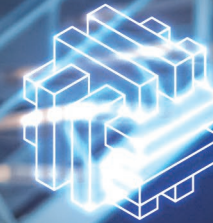


Solving Mission Critical Printing Applications

A Solutions Guide for TSC Printronix Auto ID Enterprise Printers



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Overview

TSC Printronix Auto ID has a rich history of developing thermal printing solutions for enterprise customers. The goal has always been to minimize the effort required for customers to integrate our products, regardless of the physical or IT system environment. It is an ongoing journey – as technology evolves, and our customers’ needs evolve, so do our solutions. This document provides insights into our most compelling solutions.

All TSC Printronix Auto ID Enterprise printers share the same **Printronix System Architecture (PSA)** meaning that nearly all of the feature sets are supported across the entire family. This includes consistent operator panels, printer language support, connectivity options, security, management and integration tools.

The topics discussed in this solution book speak to the TSC Printronix Auto ID application versatility, seamless and rapid deployment, minimal downtime, printer management, and our advanced features.

1

Application Versatility




Printer Language Support


Wide Range of Major Printer Language Emulations: Our vast emulation capabilities, including **major printer languages, PostScript, PDF, IPDS,** and legacy impact printer data streams, ensure seamless plug-and-play integration and future-proof your investment in the event a new ERP or other software deployment is made.


In the thermal printer market, most vendors have developed their own native printer language. These languages are the low-level commands that tell the printer what to print – barcodes, text, lines, and so on. Replacing an incumbent printer with another brand can result in having to re-write the print applications or change the drivers. Whether it's the time investment or related technical challenges, it can become an impediment to placing a better solution in the application.


TSC Printronix Auto ID Enterprise printers avoid that complexity by supporting all major competitor printer languages – see the list below. Some of these brands no longer exist in the market so by supporting all these languages TSC Printronix Auto ID Enterprise printers can replace most legacy printers.


These competitor languages were developed many years ago and have stood the test of time. You can have peace of mind that your application will experience a flexible and seamless integration.


 Printronix Graphics Language is the default emulation provided with the printer


 Monarch (Avery-Dennison) Graphic Language interpreter for Monarch Printer Control Language II (MPLC 11)


 Datamax Graphics Language interpreter for Datamax Printer Language (DPL)

 SATO Graphics Language interpreter for SATO barcode program language (SBPL)

 Eltron Graphics Language interpreter for Eltron Printer Language (EPL)

 Toshiba Graphics Language interpreter for TEC printer control language (TPCL)

 Intermec Graphics Language interpreter for Intermec Printer Language (IPL)

 Zebra Graphics Language interpreter for Zebra ZPL and ZPL II printer languages

 IER Siege Graphics Language interpreter for the IER printer language

PTX-SETUP

PTX-SETUP is a great tool that complements the competitor printer language support. While the individual printer language has to be selected in the control panel, PTX-SETUP is always active. Its commands are pre-parsed before the printer languages.

The function that PTX-SETUP brings is to configure the printer setup dynamically, and independent of the printer language selected. The core print job remains the same, but the PTX-SETUP script is sent first.

What sort of functions can PTX-SETUP support? Here are some examples.

- Sending a command to load a configuration for the print job
- Downloading files such as fonts, logos or templates
- Resetting RFID statistics
- Configuring the ODV-2D barcode inspection operation
- Adding markers to the print job

```
!PTX_SETUP
NIC_SETUP
set sysinfo name warehouse-3
save
reset
END_NIC_SETUP
PTX_END
```

```
!PTX_SETUP
NIC_SETUP
store ifc from default
store ifc 2 wlan ssid vl3_WPA
store ifc 2 wlan passphrase xyz
store ifc 2 wlan cipher tkip+aes
store ifc 2 wlan wpa personal
reset
END_NIC_SETUP
PTX_END
```

PostScript and PDF Printing

TSC Printronix Auto ID was one of the first companies in the thermal printer industry to offer PostScript/PDF support.

A key advantage of having the PostScript language is that most native ERP systems support it due to the prevalence of laser printer support – which use PostScript. Furthermore, you can send PostScript-enabled thermal printer jobs with color embedded in any kind of context and the printer will print greyscale. This means that the PostScript-enabled thermal printer will plug and play perfectly with the ERP system; the user on the ERP side simply selects the right language. TSC Printronix Auto ID Enterprise printers support PostScript Level 1, 2 and 3, although PostScript Level 2 is sufficient to support all of its applications and where color jobs are printed as greyscale.

PostScript and PDF language is supported on 4", 6" and 8" printer models, and both 203 dpi and 300 dpi print resolution, although 300 dpi is recommended. With the ability to print A4 and letter size labels and forms on an 8-inch thermal printer, it provides a more robust and reliable alternative to laser printers that may be deployed in industrial or manufacturing applications for which they are not really suited.

Printer Support T6000e, T8000

XML Printing

Both Oracle and SAP All (Auto-ID Infrastructure) ERP applications define XML schemas and determine which can be used for label printing. TSC Printronix Auto ID Enterprise printers include an XML parser that is able to strip out the critical variable data for printing. This variable data can be linked to the variables within a pre-loaded label template in order to print the desired label format.

Printer Support T800, T4000, T6000e, T8000

Legacy Printing

Following its heritage in-line printers, TSC Printronix Auto ID Enterprise printers also support legacy line printer languages. Although the applications are largely obsolete, this can be a lifesaver for environments where the IT infrastructure is a massive investment.

LP+ Printronix line matrix, Printronix serial matrix, IBM Proprinter III-XL, Epson FX-1050

VGL Code V version II, QMS dot-matrix impact printers

IPDS (Intelligent Printer Data Stream) IBM Advanced Function Presentation printer language

C THI Coax/Twinax TN5250 emulation over Ethernet/Wi-Fi

Printer Support T6000e, T8000

Fonts

TSC Printronix Auto ID Enterprise printers offer **four optional Andale TrueType Font options** each containing **over 49,000 characters** spanning every language in the modern world. The Andale TrueType fonts are provided on a secure SD card.

The Andale fonts are perfect for a multi-national company that ships products worldwide enabling an application or label to be printed without the need to switch between various fonts or character sets to match the regional requirements. There are four different Andale font options, each with a unique style for either **Japanese, Korean, Simplified Chinese, or Traditional Chinese**.

Andale fonts are also a perfect font choice for SAP Smart Forms applications since Andale is one of the fonts selectable from that environment. ■



2

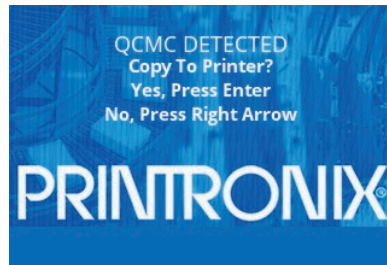
Rapid Deployment and Rapid Recovery

Simplicity starts at setup. Global deployment of our Enterprise printers is quick and easy saving you time, money, and risk. Rapid deployment and quick job changes are facilitated through features such as consistent menu interfaces, stored configurations, and tools built into SOTI Connect or our PrintNet Enterprise (PNE) printer management software. A Configuration Change Module (CCM) can also be used to completely configure or clone machines as they are powered up.

MODEL NO.: ME240
PART NO.: 99-042A053-0001

Quick Change Memory Cartridge (QCMC)

The optional QCMC provides the ability to **duplicate an entire printer's firmware, saved configurations, and custom files** quickly through the printer's control panel with a user-friendly interface. No external host or files are needed to transfer this information to the QCMC. A "snapshot image" is saved of the printer's firmware, configuration settings, and custom files. **The saved image can be copied to any number of printers using the same QCMC so that the printers will be identically configured** (assuming same printer hardware and options are present).



The QCMC has its own resident network **MAC address** that will be used in place of the printer's LAN/WLAN MAC address when the card is left installed in a printer. This allows a mission-critical printer to be exchanged quickly with a spare printer that will be identically configured, including the network MAC address. This is especially convenient if MAC address filtering is used on the network.

For **large deployments**, each printer would have a QCMC installed.

Printer Support T800, T4000, T6000e, T8000

Custom Configuration Module (CCM)

You can make any **standard SD card** or **USB drive** into a Custom Configuration Module (CCM) that can be used **to configure an unlimited number of printers one at a time**. The programmed CCM can contain any combination of printer firmware, printer configuration, network configuration, logo files, font files, and other printer file types.

The CCM master is created using the TSC Printronix Auto ID PSA File Utility (Windows application) to create a set of configuration files that are copied onto an SD card or USB memory stick. Once the CCM Package of files is copied, the SD card or USB drive can be used to identically configure an unlimited number of printers (one by one). Just plug the memory card into the printer, power up the printer, and follow the instructions on the control panel menu.

Printer Support T800, T4000, T6000e, T8000

What are the key differences between the QCMC and CCM?

QCMC	CCM
<ul style="list-style-type: none">Is a printer cloning toolIncludes a dedicated MAC addressUsed for rapid deployment and rapid replacementFor rapid printer replacement, each printer must have a QCMCSD card onlyIs a chargeable option	<ul style="list-style-type: none">CCM master file is created using the PSA File Utility applicationUses any SD card or USB memory stickPrimarily used for rapid deployment

Remote Printer Management Application

Another tool for rapid deployment is TSC Printronix Auto ID's PrintNet Enterprise printer management application. This application includes all the features and capabilities expected of such an application such as printer discovery, printer dashboard, file pushes, alerts, and more.

Once the printer is on the network and discovered, **configurations can be remotely uploaded, edited, and downloaded to one or multiple printers making printer setup a simple exercise**. Multiple different configurations can be created and attached to printer groups to make the configuration management more efficient. This tool is discussed in more detail in the next section. ■

Printer Support T800, T4000, T6000e, T8000

3 Media Handling



Tear-off

Tear-off mode is available on all printers as standard. Once the current label is printed, it will be moved to the tear bar where it is torn off by the operator. The next label will not be printed until the current label has been removed. A sensor in the exit of the printer detects when the label is present or not. Tear-off works best with perforated labels. The perforation is in the gap between the labels and provides a convenient break-away for reliable tearing.

Printer Support

T800, T4000, T6000e, T8000

Tear-off Strip

Tear-off strip is the same concept as tear-off except that multiple labels are printed. After a preset timeout period (default one second), the final label is moved to the tear bar for the operator to take the strip of labels. If another print job is sent, the printer will continue printing even if the operator didn't remove the original strip.

Printer Support T800, T4000, T6000e, T8000

Peel

Peel mode provides a convenient method of automatically peeling the label from the liner backing for the operator to apply to the target item. This eliminates the need for the operator to manually remove the liner.

For T800 the waste liner is dispensed in front of the printer while for the T4000, T6000e, and T8000 the waste liner is rewound onto a spindle within the printer enclosure. The spindles have enough capacity to rewind all the liners from a full 8-inch roll of standard labels.

Printer Support T800, T4000, T6000e, T8000

Batch Rewind

Batch rewind mode allows for rewinding of printed labels onto a spindle. This is helpful when a larger batch of labels will be printed at one time, and then will be used at some other location. For example, the labels will be printed in a print room and taken to the production floor or shipping area for usage.

Rewinding onto the standard spindle allows for maximum rewind of around two-thirds of an 8-inch roll. For the T6000e model, the labels can be wound onto a 3-inch media spindle to make transporting the labels more convenient but the capacity is reduced to approximately one-half an 8-inch roll.

Printer Support T6000e, T8000

Cutter

The cutter provides a way for each print label to be cut into individual labels. The cut mode can be used in an on-demand mode or provide label bundles for later application.

While the T800, T4000, and T6000e offer a guillotine style cutter, the T8000 uses a self-sharpening rotary cutter. While guillotine cutters are a solid solution for most applications, rotary cutters provide a more robust solution and are preferred for higher volume printing or stiffer card stock up to 0.10 – 0.12 inches (0.25 – 0.3mm) thick.

In general, it is not recommended to cut through the adhesive part of the label as this can build up on the cutter blade and require additional cleaning. ■

Printer Support T800, T4000, T6000e, T8000

Enterprise Connectivity and Security

4

All TSC Printronix Auto ID Enterprise printers come standard with Ethernet and are also available with an optional dual-band Wi-Fi 802.11a/b/g/n/ac, the same radio on all models for unified compatibility and consistency. With both IPV4 and IPV6, they also support the latest security protocols, including 802.1X, HTTPS, SNMPv3, and TLS1.3.

The Wi-Fi radio also includes WPA and WPA2 TKIP/AES personal and enterprise security and supports the most popular authentication protocols: EAP-TL, EAP-TTLS, PEAPv0/MS-CHAPv2, PEAPv1, EAP-MDS, and LEAP.

Printer Support

T800, T4000, T6000e, T8000

5

Remote Printer Management



Centralized IT helps maintain worldwide consistency and coordination. Actionable information is critical to operational intelligence, highlighting the importance of collecting device information and managing assets centrally.

PrintNet Enterprise

PrintNet Enterprise (PNE) is a full-featured, printer management application that allows IT administrators to remotely manage their printer fleet. It is downloadable from the [website](#) at no charge. In addition to a dashboard view of all printers, there is a rich suite of advanced tools for managing printer deployment, maintenance, and troubleshooting. Some of the capabilities include printer configuration management,

file management, diagnostics information capture, label sensor profiling, and even a virtual control panel that allows you to maneuver through the control panel as if you were in front of the printer.

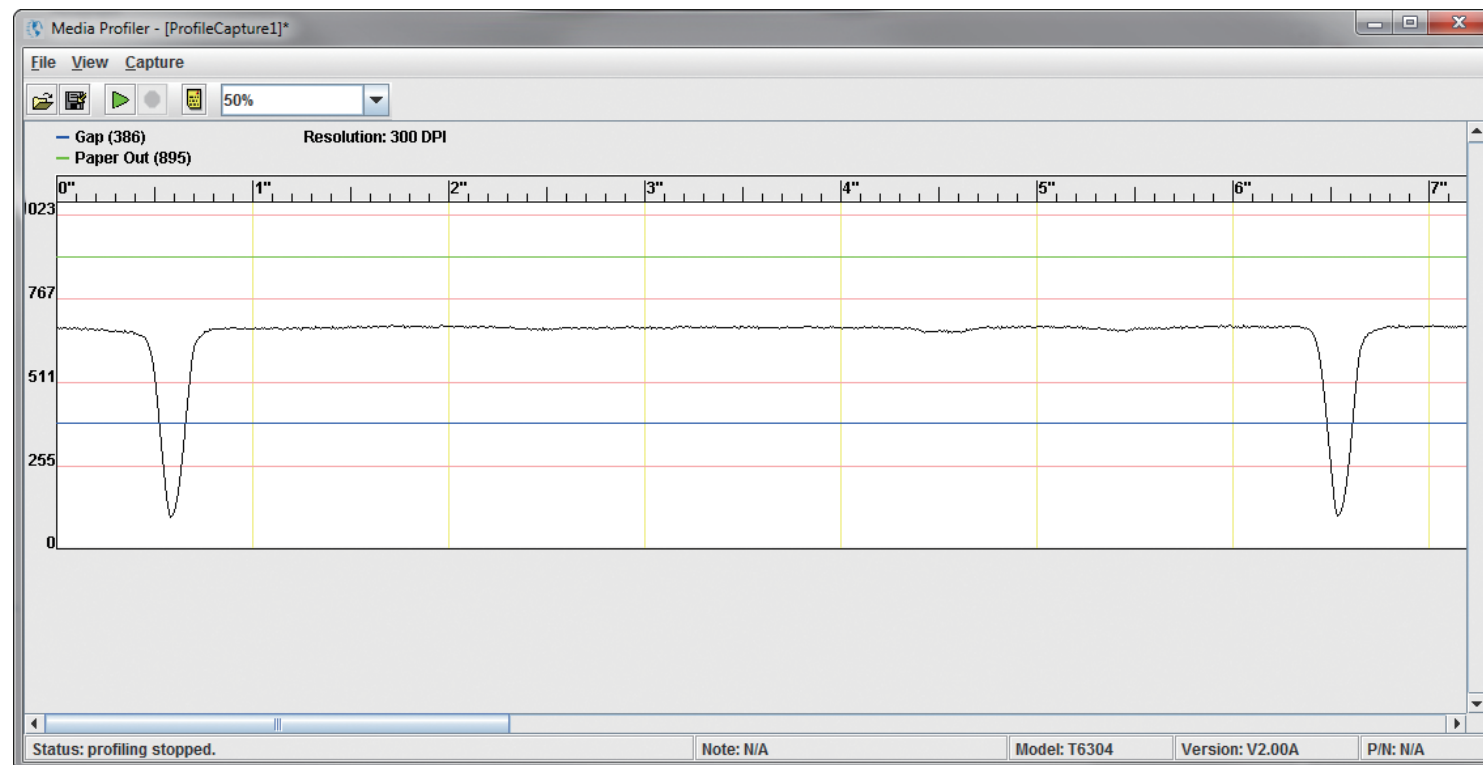
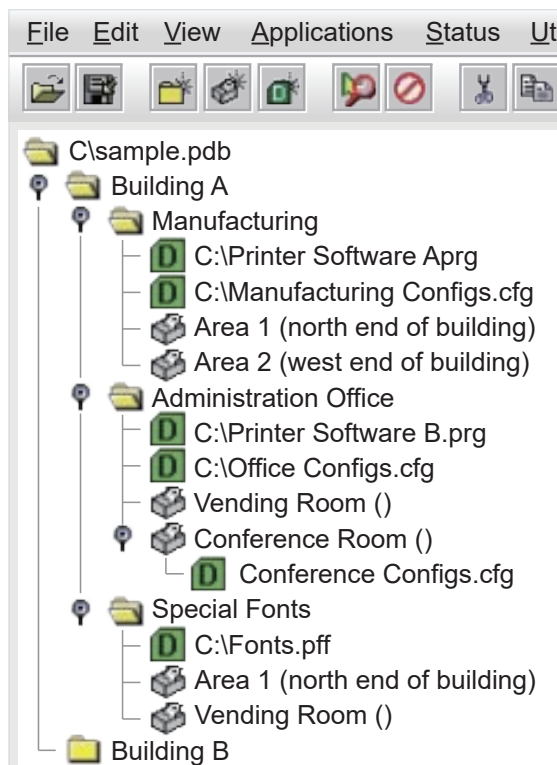
Remote printer fleet maintenance is simplified with the ability to effortlessly push firmware or configuration updates.

The media profiler can help troubleshoot any media-sensing problems remotely. It will provide an online display

of the printer's gap or mark sensor output that can be captured and sent to a service provider for a diagnosis.

Although designed to manage printer fleets on a network, the application can connect peer-to-peer using the printer USB port. ■

Printer Support T800, T4000, T6000e, T8000



PrintNet Enterprise Media Profiler

SOTI Connect

All TSC Printronix Auto ID Enterprise printers are enabled for SOTI Connect IoT Device Management software, available on a subscription basis. Either cloud or on-premise, this application enables remote printer management using any platform with a web browser. SOTI Connect is a full-featured device management application with a dashboard view, groupings, and access to device details and settings. It includes the ability to push files such as firmware and configurations and has a rich rules engine and data collection capabilities for deep usage and performance analysis.



Printer Support T800, T4000, T6000e, T8000

Embedded Webpage

All networked printers serve up an embedded webpage which has all the printer configuration and upgrade capabilities of PrintNet Enterprise, including access to the virtual control panel, but on a peer-to-peer basis. **Simply type in the IP address of the printer from the browser to access the printer home page.**

Printer Support T800, T4000, T6000e, T8000

The screenshot displays the Printronix Auto ID Embedded Webpage interface. At the top, the 'PRINTRONIX AUTO ID' logo is visible, along with navigation tabs for 'Configuration', 'Status', 'Help', and 'About'. The main content area is divided into several sections:

- Configuration:** A section titled 'To configure the Integrated PrintNet Enterprise fill out and submit the forms using the following links.' It includes links for 'Printer: Printer settings' and 'Network: TCP/IP network settings'.
- Status Menu:** A section titled 'Use the following links to view status information about this Intergrated PrintNet Enterprise.' It includes links for 'I/O Port: Printer and job stagus on ther intergrated PrintNet Enterprise I/O port' and 'Network: Network protocols'.
- System:** A section titled 'System: System operation modes (reboot,'.
- Network System Information:** A box containing details such as 'Description: P-400100', 'Location:', 'Contact:', 'Printer Serial Number:', 'Firmware Vision: 2.3.13', 'Compiled: 2019/01/24 12:53:04', and 'Hardware Address: 00:08:96:40:01:00'.
- Integrated PrintNet Enterprise Help:** A section titled 'General Help Information' providing information on how to use the on-line configuration and status reference for the Integrated PrintNet Enterprise network adapter.

On the right side of the page, there are two panels:

- P-400100 ONLINE:** A panel showing the printer's IP address (192.168.086.032), model (T6304), and network type (ETHERNET/PGL/LP+). It also includes a progress bar for 'Print Head'.
- T6304:** A panel showing various status indicators: 'Fault' (checked), 'State' (checked), 'Ribbon' (0%), 'Firmware' (V2.00A), 'Serial Number Name' (P-400100), 'NIC Version' (2.3.13), 'MAC' (00:08:96:40:01:00), and 'Print Queue' (00B HOST).



6

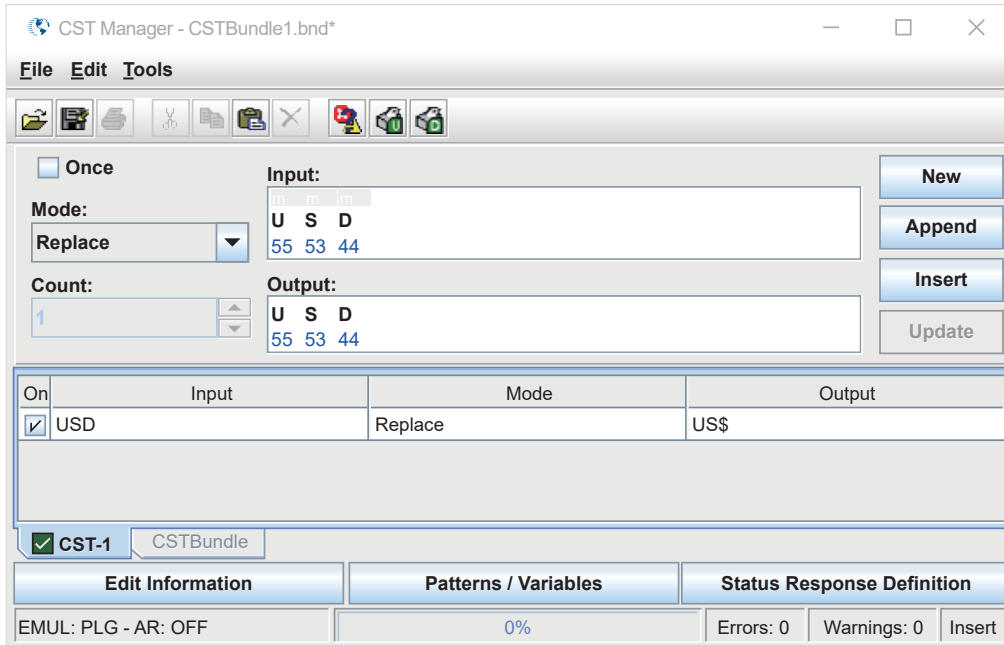
Integration Tools

CST Manager

Character Substitution Tables (CST) are used to modify the data stream before it is processed by the printer. It is a handy integration tool for filtering the incoming data stream – modifying, removing, or appending data automatically.

The typical use is for adapting modern TSC Printronix Auto ID Enterprise printers into legacy systems where the print job was originally created for an older communication interface and may include extraneous characters that are unrelated to the print job. Often, these legacy systems are not easily changed as they may permeate multiple locations, or the existing IT resources are just familiar with the older technology.

As a very simple example, a CST could be created to change the USD sent in the data stream to the US dollar sign (\$). This capability can be extended to more complex conversions as well.



Example CST Table to Convert USD to US\$

The CST file is created using the CST Manager tool, and which is part of the free PrintNet Enterprise printer management tool. Like other printer files, CST files can be added to the PrintNet Enterprise database or directly downloaded to the printer.

Printer Support T800, T4000, T6000e, T8000

PXML

For customers or system integrators that have their own software application and want to integrate with TSC Printronix Auto ID Enterprise printers, they can use the Printronix XML (PXML) device language. This XML based language allows a client application to issue commands to a printer and receive responses from the printer. This communication protocol is dedicated to a separate network port so it does NOT interfere with printing activity. Responses can be either a

response to a command (solicited responses), or responses generated by events that occur during printer operation (unsolicited responses).

Messages to the printer (or command messages) are sent by the client to perform some action or request information. Commands that request information are added to an event queue. A reply to a command may be interspersed with unsolicited messages, although all messages are guaranteed to be well-formed XML.

Messages from the printer or response messages are sent either as a response to a command (solicited) or unsolicited message that is triggered by an RFID report, ODV report, job completion, or an event such as a change of printer state.

Markers can be embedded in the print data stream to indicate the beginning or end of the job. This enables the host application to determine which responses are associated with which job. This is a cornerstone of passing back RFID encoding data or ODV-2D barcode report data.

Printer Support T800, T4000, T6000e, T8000

GPIO

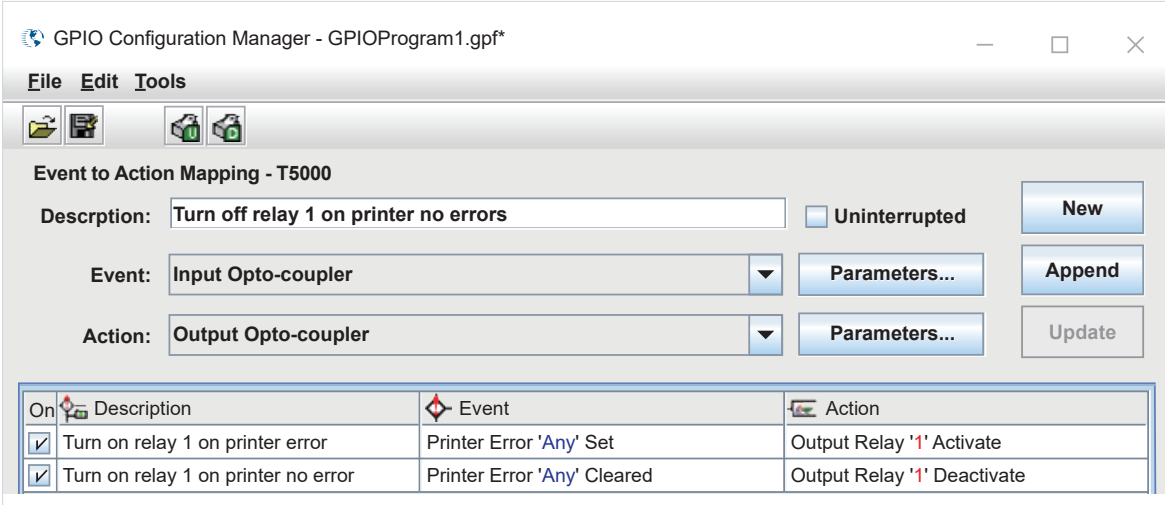
The TSC Printronix Auto ID GPIO (General Purpose Input/Output) option enables the T6000e and T8000 printers to logically interact with external equipment. The GPIO can be used for simple applications such as turning on a remote stack light when the printer has an error or has run out of labels, or more complex applications such as controlling all the functions of a pick and place label applicator without using a separate PLC controller.

There are two parts to the GPIO option: a PCBA option card that mounts inside the printer and the GPIO Configuration Manager software included with the PrintNet Enterprise utility. The GPIO Configuration Manager offers a number of features that work with or without the option card. The option card with eight input, eight output ports, and four relays is available for purchase installed at the factory or as a field installable kit that includes a mating interface connector, installation instructions, and an operator's manual.

Events and Actions: In simplest terms, the GPIO feature is based on using an input or output event to create an action the printer or the attached peripheral equipment should take based on the specific event. An action is the result of (or the reaction to) an event.

The GPIO is programmed by mapping events to actions using the GPIO Configuration Manager. Events can either be printer internal like "paper out" or "print complete", or they can be printer external causing the printer to take an action based on changes in the peripheral equipment. A number of printer events can be acted upon without the GPIO card being installed in the printer, such as sending a notice to the host system, allowing greater customization of the printer's functions.

Applications: By using the GPIO Configuration Manager, the input and output ports can be custom configured and be mapped to predetermined printer actions such as a change in the printer status, ODV analyses, printer control panel key presses or to the printer communications ports, etc. to create powerful applications previously not possible with a single accessory module.



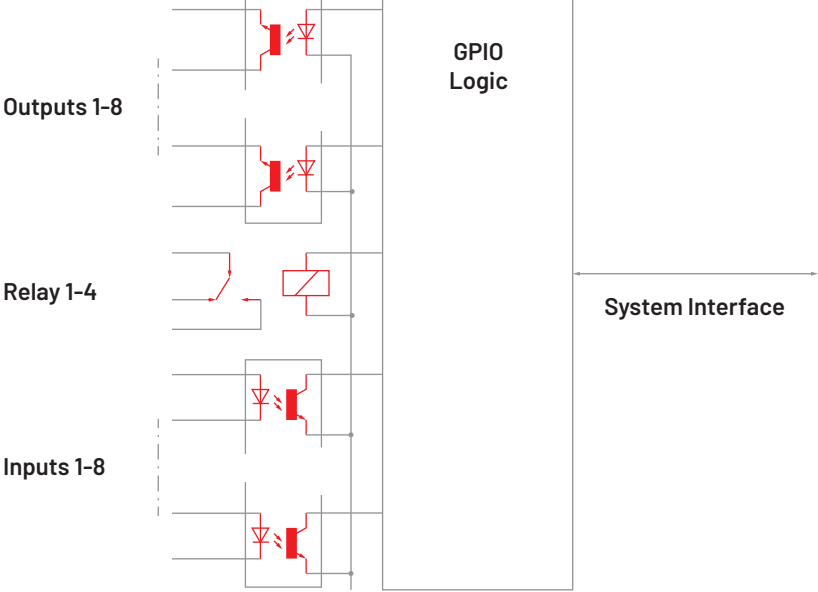
GPIO Configuration Manager

The screenshot on the right shows a simple "program" to turn on one of the GPIO PCBA's four relays when the printer has an error and turn it off when the error is cleared. This program could be used to turn on a remotely mounted stack light to call attention to the printer, by controlling the light tower through the relay. After loading the program in the printer and enabling the program in the GPIO menu, the mappings are activated.

The GPIO hardware (see the block diagram below) consists of 16 opto-couplers, 4 Single Pole Double Throw (SPDT) relays and the logic required to connect this hardware into the printing system. 8 opto-couplers are used as isolated inputs; these are the connections on which the external events will happen. The remaining 8 opto-couplers as well as the 4 relays are used as isolated outputs. Each of these outputs can be activated as an action in response to some event. The board is connected into the printing system through the printer's internal expansion port.

None of the inputs or outputs are connected to a voltage source; it is the responsibility of the integrator to make those connections. A separately fused 5 volts and a separately fused 24 volts are available on the 50-pin connector at which all inputs and outputs are terminated. ■

Printer Support T6000e, T8000



GPIO Configurable Optocoupler Inputs and Output, and SPDT Relays

7 Advanced Solutions



TSC Printronix Auto ID offers other advanced solution offerings including both barcode inspection and RFID encoding.

RAIN / UHF RFID

TSC Printronix Auto ID offers several printers with RFID encoding capability – T800 4", T4000 4", and T6000e 4" and 6". The solution is based on UHF/RAIN/ISO-18000-63 encoding standards. The printers can support RFID label sizes (up to 6.5" wide and as short as 0.625" long), including on-metal tags up to 2.2mm thick.



On each printer, the system can automatically calibrate RFID labels to eliminate any manual setup and to ensure maximum printing/encoding yield.

The TSC Printronix Auto ID RFID Label and Validation Lab is an ongoing program to test and certify the most commonly available RFID chips, inlays, and label constructions to ensure our products are compatible in as many applications as possible.

The T4000 and T6000e non-RFID printers can be upgraded to RFID by a certified field technician, protecting your printer investment.

Printer Support T800, T4000, T6000e

Barcode Inspection

The ODV-2D barcode inspection system is offered on the T6000e 4" and T8000 4" and 6" models. It is a fully integrated barcode verifier that seamlessly checks all 1D and 2D barcodes on all labels as they are printed. The barcode grading is based on ISO standards and any label not meeting the grade criteria is automatically backed-up, overstruck, and re-printed. This system assures barcode quality on all printed labels. There is minimal setup, no change in the way that the print jobs are sent to the printer, and no operator intervention required – it is fully automated.

Furthermore, the printer can create grading reports that can capture using the AutoID Datamanager tool (part of PrintNet Enterprise utility), or send back to the host using the PXML messaging schema described earlier.

```
<?xml version="1.0" encoding="UTF-8"?>
<pxml>
  <status>
    <job type="ODV">
      <odvCodeDetail version="1" failure="false">
        <data type="ascii" size="12">
          <ascii>518001979999</ascii>
        </data>
        <property name="symbology" value="Interleaved 2 of 5"/>
        <property name="gradeOverall" value="A (3.9)"/>
        <property name="aperture" value="10"/>
        <property name="wavelength" value="624"/>
        <property name="dimensionX" value="13.3"/>
        <property name="orientation" value="ladder"/>
        <property name="decodeability" value="70"/>
        <property name="modulation" value="79"/>
        ...
        <property name="ratio" value="2.5"/>
        <property name="scansGood" value="10"/>
        <property name="scansTotal" value="10"/>
      </odvCodeDetail>
    </job>
  </status>
</pxml>
```

Example PXML Barcode Grading Report

Typically, applications are in mitigating vendor chargebacks due to barcode quality issues and also meeting regulatory barcode label requirements.

With the T6000e model, ODV-2D barcode inspection can also be used in conjunction with RFID label encoding. Both the T6000e and T8000 can be upgraded with ODV-2D in the field by a certified technician.

Printer Support T6000e 4", T8000 4", 6"

For more information on any of these items, please check our [website](#) and search for Enterprise printers. ■

Identifier	Failure	Deviation	Operation	Field	Data
R2.1	Pass		Write	EPC	48656C6C6F44565400000000
R2.1	Pass		Read	EPC	48656C6C6F44565400000000
B2.1	Defects	█			[ST]CODE39[ST]
L2.1	Fail (Label)				
R3.1	Pass		Write	EPC	48656C6C6F44565400000000
R3.1	Pass		Read	EPC	48656C6C6F44565400000000
B3.1	Pass	█			[ST]CODE39[ST]
B3.2	Pass	█			[ST]C39[ST]
B3.3	Pass	█			[ST]C39[ST]
B3.4	Pass	█			[ST]CODE39[ST]
L3.4	Pass (Label)				
R4.1	Tag Failure		Write	EPC	48656C6C6F44565400000000
L4.0	Fail (Label)				
R5.1	Pass		Write	EPC	48656C6C6F44565400000000
R5.1	Pass		Read	EPC	48656C6C6F44565400000000
B5.1	Pass	█			[ST]CODE39[ST]
B5.2	Pass	█			[ST]C39[ST]
B5.3	Pass	█			[ST]C39[ST]
B5.4	Pass	█			[ST]CODE39[ST]
L5.4	Pass (Label)				

Example AutoID Datamanager Grading Report

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