

Toshiba Global Commerce Solutions
SureMark 4610 Printers

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Programming Guide for Models 1xR and 2xR

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Note

Before using this information and the product it supports, be sure to read Safety Information- Read This First, Warranty Information, Uninterruptible Power Supply Information, and the information under "Notices" on page 133.

September 2013

This edition applies to SureMark Printer Models 1xR and 2xR and replaces GA27-5005-01.

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Safety

Before installing this product, read the Safety Information- Read This First.

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Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

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Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

About this book

This guide provides programming commands and other technical information for the Toshiba® SureMark™ Models 1xR and 2xR printers.

Who should read this guide

This guide is intended for use by programming personnel who are installing, setting up, or modifying the SureMark printer Models 1xR and 2xR.

How this guide is organized

This publication is organized as follows:

- Chapter 1, “Introducing the 4610 Models 1xR and 2xR,” on page 1 describes the hardware features of the 4610 Models 1xR and 2xR.
- Chapter 2, “Communication parameters,” on page 5 provides the communication variables and commands required to customize your printer.
- Chapter 4, “Page mode printing commands,” on page 101 describes the communication parameters for page mode printing.
- Chapter 5, “Document handling,” on page 107 describes the communication parameters for document handling.
- Chapter 6, “Status information,” on page 111 describes the communication parameters for the byte status information.
- Chapter 7, “Character fonts,” on page 119 describes the communication parameters for the character fonts
- Chapter 8, “Tests and diagnostics,” on page 123 is an overview of the MICR and flipper tests, and the offline diagnostic tests available on the Models 1xR and 2xR

Related publications

The following publications are available from the Toshiba Global Commerce Solutions support website at www.toshibagcs.com/support.

- *SureMark Printers: User's Guide for Models 1NR, 1NA, and 1ND*, G362-0564
- *SureMark Printers: User's Guide for Models 2CR and 2NR*, GA27-5003
- *SureMark Printers: Hardware Service Guide for Models 1NR, 1NA, and 1ND*, G362-0565
- *SureMark Printers: Hardware Service Guide for Models 2CR and 2NR*, GA27-5004
- *SurePOS 700 Series: System Reference*, SA27-4224
- *SurePOS 500 Series: System Reference*, SA27-4255.
- *POSS Programming Reference and User's Guide*, SC30-3560.

Publications accessibility

The softcopy version of this guide and other related publications are accessibility enabled.

Notice statements

Notices in this guide are defined as follows:

Notes	These notices provide important tips, guidance, or advice.
Important	These notices provide information or advice that might help you avoid inconvenient or problem situations.
Attention	These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
CAUTION	These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
DANGER	These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Summary of changes

September 2013

This update includes the transition to Toshiba branding changes. Additional updates throughout the entire book include information regarding Ethernet support and other related updates.

November 2012

This update provides additional changes throughout the entire book from the new product specifications.

October 2011

This update provides additional changes throughout the entire book from the new product specifications.

Changes or additions to the text are indicated by a change bar to the left of the text.

June 2009

This update provides additional changes throughout the entire book from the new product specifications.

April 2009

This update provides changes throughout the book from the new product specifications.

Chapter 1. Introducing the 4610 Models 1xR and 2xR

The SureMark printer Models 1xR and 2xR consist of a high-speed thermal station and an impact station for printing inserted documents. For further information about the physical specifications of Models 1xR and 2xR, refer to the *User's Guide for Models 1NR, 1NA, and 1ND* (G362-0564) or the *User's Guide for 2CR and 2NR* (GA27-5003).

Operating system requirements

Drivers can be downloaded from the Toshiba Global Commerce Solutions support website at www.toshibagcs.com/support.

RS-232 Printer

The RS-232 interface supports systems with the following operating systems:

Table 1. RS-232 operating systems supported

Operating System	JavaPOS Drivers 1.9.6 or later	OPOS Drivers 1.9.6 or later	POS Subsystem 1.9.6 or later	Windows Native Drivers (NWD)	Direct IO	Comments
4690					Yes	V5R2 and V6R2*
Microsoft® Windows® XP	Yes	Yes		Yes	Yes	
Microsoft Windows Embedded for Point of Service (WEPOS) 1.11	Yes	Yes		Yes	Yes	
Microsoft Windows Embedded POSReady 2009	Yes	Yes		Yes	Yes	
Microsoft Windows Embedded POSReady 7	Yes	Yes		Yes	Yes	
Microsoft Windows 7 (Professional/ Ultimate)	Yes	Yes		Yes	Yes	
SUSE Linux® Enterprise Desktop (SLED) 11	Yes				Yes	
SUSE Linux Enterprise Server (SLES) 11	Yes				Yes	
SUSE Linux Enterprise Point of Service (SLEPOS) 11	Yes				Yes	

Table 1. RS-232 operating systems supported (continued)

Operating System	JavaPOS Drivers 1.9.6 or later	OPOS Drivers 1.9.6 or later	POS Subsystem 1.9.6 or later	Windows Native Drivers (NWD)	Direct IO	Comments
PC DOS 2000					Yes	

*The 2NR/2CR printers are supported in compatibility mode in V5R2, but 4690 OS can only update the firmware starting with the 0820 maintenance package. The 1NR is supported in compatibility mode in V5R2, but requires package 0900 for firmware update. All of these models are supported in compatibility or native mode in V6R2.7.

RS-485 Printer

Table 2 includes a description of native mode support for the RS-485 Printer.

Table 2. Native Mode Support - RS-485 Printer

Operating System	JavaPOS Drivers 1.9.6 or later	OPOS Drivers 1.9.6 or later	POS Subsystem 1.9.6 or later	Windows Native Drivers (NWD)	Direct IO	Comments
4690						V5R2 and V6R2*
Microsoft Windows XP	Yes	Yes				
Microsoft Windows Embedded for Point of Service (WEPOS) 1.11	Yes	Yes				
Microsoft Windows Embedded POSReady 2009	Yes	Yes				
Microsoft Windows Embedded POSReady 7	Yes	Yes				
Microsoft Windows 7 (Professional/Ultimate)	Yes	Yes				
SUSE Linux Enterprise Desktop (SLED) 11	Yes		Yes			
SUSE Linux Enterprise Server (SLES) 11	Yes		Yes			
SUSE Linux Enterprise Point of Service (SLEPOS) 11	Yes		Yes			
PC DOS 2000						Not supported

Note: *The 2NR/2CR printers are supported in compatibility mode in V5R2 but 4690 OS can only update the firmware starting with the 0820 maintenance package. The 1NR is supported in compatibility mode in V5R2 but requires package 0900 for firmware update. All of these models are supported in compatibility or native mode in V6R2.

USB Printer

Table 3 includes a description of native mode support for the USB Printer.

Table 3. Native Mode Support - USB Printer

Operating System	JavaPOS Drivers 1.9.6 or later	OPOS Drivers 1.9.6 or later	POS Subsystem 1.9.6 or later	Windows Native Drivers (NWD)	Direct IO	Comments
4690						V5R2 and V6R2*
Microsoft Windows XP	Yes	Yes		Yes		
Microsoft Windows Embedded for Point of Service (WEPOS) 1.11	Yes	Yes		Yes		
Microsoft Windows Embedded POSReady 2009	Yes	Yes		Yes		
Microsoft Windows Embedded POSReady 7	Yes	Yes		Yes		
Microsoft Windows 7 (Professional/Ultimate)	Yes	Yes		Yes		
SUSE Linux Enterprise Desktop (SLED) 11	Yes		Yes			
SUSE Linux Enterprise Server (SLES) 11	Yes		Yes			
SUSE Linux Enterprise Point of Service (SLEPOS) 11	Yes		Yes			
PC DOS 2000						Not supported

Ethernet Printer

Table 4. Native Mode Support - Ethernet Interface

Operating System	JavaPOS Drivers 1.13.5 or later	OPOS Drivers 1.13.5 or later	Windows Native Drivers (NWD) 3.1.0 or later	Comments
4690				Not supported
Microsoft Windows XP	Yes	Yes		
Microsoft Windows Embedded for Point of Service (WEPOS) 1.11	Yes	Yes	Yes	
Microsoft Windows Embedded POSReady 2009	Yes	Yes	Yes	
Microsoft Windows Embedded POSReady 7	Yes	Yes	Yes	
Microsoft Windows 7 (Professional/Ultimate)	Yes	Yes	Yes	
SUSE Linux Enterprise Desktop (SLED) 11, Service Pack 3	Yes			

Table 4. Native Mode Support - Ethernet Interface (continued)

Operating System	JavaPOS Drivers 1.13.5 or later	OPOS Drivers 1.13.5 or later	Windows Native Drivers (NWD) 3.1.0 or later	Comments
SUSE Linux Enterprise Server (SLES) 11, Service Pack 3	Yes			
SUSE Linux Enterprise Point of Service (SLEPOS) 11, Service Pack 3	Yes			
PC DOS 2000				Not supported

4690 OS

Customers must be at these application levels (or higher) when running the 4690 OS:

Application Name	Product Number	Maintenance Level
Note: Some of these applications will only support the printers if they are set in TI3/4 compatibility mode.		
Toshiba SurePOS Application Client/Server Environment for 4690 OS	5745-C44	N/A
Toshiba Chain Drug Sales Application	5669-212	9701 with PRPQ 5799-QYP
Toshiba 4680/4690 General Sales Application	5696-546	9701 with APAR IR33229 and PRPQ 5799-QYN
Toshiba 4680/4690 Supermarket Application	5696-536	9701 with APAR IR33228 plus PRPQ 5799-QYL
Linux	See note	Release 1.4
Note: 4690 Terminal Services for Windows NT is required when you use Windows NT 4.0 or Windows 2000 as the primary operating system with this 4690 application.		

Hardware requirements

SureMark printers operate with the following systems:

- Toshiba 4694
- Toshiba 4695 (RS-232 connection only and with power supply)
- PC or other store controller with an RS-232, USB, or Ethernet port
- SurePOS™ 100 Series
- SurePOS 300 Series
- SurePOS 500 Series
- SurePOS 700 Series
- Toshiba Self Checkout
- Toshiba AnyPlace™ Kiosk
- TCx™ Wave

Updating the firmware

A SureMark printer has the capability to receive SureMark firmware updates from its attached host system unit. To update the firmware, use the latest drivers from the Toshiba Global Commerce Solutions support website: www.toshibagcs.com/support.

Chapter 2. Communication parameters

Communication to SureMark 4610 printers is supported via RS-232, RS485, USB, and Ethernet interfaces. Ethernet is supported on printers manufactured after June 10, 2013, with firmware EC level 14.00 and above.

RS-232 serial parameter

Protocol DTR/DSR mode or XON/XOFF mode

Baud Rate 9600, 19200, 115200

Start 1 bit Data 8 bits Parity None Stop 1 bit

Ethernet Configuration

Ethernet communications are supported on printers manufactured after June 10, 2013, with firmware EC level 14.00 and above. The date can be found on the bottom of the printer.

Older levels of the main logic cards (MLC) for these printers will not support Ethernet. MLCs that have the circuitry to support Ethernet will be identified internal to the card.

If an Ethernet Interface adapter is installed and the MLC indicates that Ethernet is not supported, an error message is printed. On the 2xR printers, the ready light will blink amber and the internal LED#2 will be lit indicating interface card error. On the 1xR printers, the ready light will blink amber.

A media access control (MAC) address is necessary for Ethernet function and will be stored in the Ethernet interface adapter at the factory. The printer will print out an error message if the MAC address is invalid or is not stored in the Interface card. There is no capability of changing or cloning a MAC address in the field. Every interface card (IFC) has a unique MAC address.

If an Ethernet adapter is detected, the firmware will not back-level to a pre-Ethernet supported level.

Ethernet addressing options can be changed via:

1. Offline menus: See “Firmware offline tests (Models 2xR)” on page 124 for more information. Reset Network Configuration will reset the user-modifiable network configuration items to factory default. MAC is not affected.
2. Web interface.
3. Configuration utility.
4. Web API configuration download.

When these options are changed, they are stored in the MLC (main logic card) and backed up in the IFC (interface card). If the printer's IFC is replaced, the values will be updated with the following logic:

- When an IFC does not have a valid serial number (a card from FRU stock), all Ethernet options will be copied automatically from the MLC to the IFC.
- If an IFC has a valid serial number, but it is different from the printer's serial number, a menu will print with the options of updating MLC or updating IFC.

Remarks:

- The MAC address in the IFC will never change.
- On the 1NR printer, the serial number of the printer will not be overwritten by the serial number in the IFC.
- On the 2xR printer, the menu will ask which serial number is correct. The Ethernet options will be updated along with the serial number and other stored data.

Note: The exception to the logic above occurs when the IFC is setup as a slave card. When the IFC is a slave card, the Ethernet options used will be those pulled from the IFC.

Slave cards may be used by a depot or integrators to setup configurations or flash the printer's firmware without changing any settings on the MLC before it is shipped.

To make an IFC slave card:

- Store a serial number of **55-55555**.

Addressing

The printer supports standard Internet Protocol version 4 (IPv4) addressing. The IP address and other IP network parameters are assigned using the following list of priorities:

1. Fixed, if enabled and defined for the fixed IP selected.
2. Dynamic Host Configuration Protocol (DHCP), if the previous assignment method does not apply and a DHCP server is available.
3. Auto IP, if neither of the previous assignment methods apply and Auto IP is enabled.

When Fixed IP and Auto IP are disabled, the printer will wait for a valid DHCP server.

Table 5. Provided ports

Port	Protocol	Service	Comments
80	TCP	HTTP	
161	UDP	SNMP	Version 1 and 2 are supported.
162	TCP/UDP	SNMP Trap	
9100	UDP	Printer Control	Used for reservation and other control function.
	TCP	PDL Data Stream	Used to send RAW printer data to a printer.

DHCP

Dynamic Host Configuration Protocol (DHCP) is the default IP configuration method (see "Addressing" on page 6 for more information). DHCP will be implemented according to Request for Comments (RFC) 2131, Dynamic Host Configuration Protocol, RFC 2132, DHCP Options and BOOTP Vendor Extensions, and applicable updates. These specifications and applicable updates may be found at <http://datatracker.ietf.org/>.

Table 6. Supported DHCP options

Tag	Name
1	Subnet Mask
3	Router
6	Domain Name Server
12	Hostname

Auto IP

Auto IP is a method for a host to assign itself a Local Link IP address, described in RFC 3927. The printer will randomly select an address from the range 169.254.1.0 to 169.254.254.255 and verify that it is not in use.

Auto IP can be disabled when the user determines that the printer should always have a valid server. This will keep the printer from setting up an auto IP when the server is temporarily unavailable.

Note: A printer may take two minutes or more to obtain an IP address via Auto IP due to the DHCP server time-out and other required delays. Auto IP is intended for initial printer setup when a DHCP server is not available.

Systems management support with Ethernet - SNMP

Ethernet printers support Read Only Simple Network Management Protocol (SNMP) for systems management. The printers support management information base II (MIB II) for management of the Ethernet configuration (RFC 1213) and a private, enterprise MIB for the 4610 printers. Any client can retrieve the MIB data from the printer. The printer will also support up to two SNMP managers to receive SNMP Traps on state changes in the printer and attached cash drawers.

SNMP is used to manage the printer, not the printing process. SNMP gathers information about the state of the printer:

- Status: Information regarding the current operating state of the printer (offline / on line / error conditions).
- Alert: The representation of a reportable event in the printer. An event is a change in the state of the printer; sent as an SNMP trap.

SNMP contains support for retrieving data (Get and GetNext requests) and receiving notification of change of state and error conditions via Alerts (or Traps) as unsolicited messages to listening managers. Setting or changing a condition in the printer (Set requests) is not supported via SNMP.

Alerts

Clients can register to receive Traps on the following state changes in the printer:

Table 7. Printer state changes

Function	Name	Object Identifier (OID)
Cash Draw Open / Closed	DrawerOpened	1.3.6.1.4.1.1129.2.500.1.1.3.1
Magnetic Interference MICR	MICR_CurrentMICRNoiseValue	1.3.6.1.4.1.1129.2.500.1.1.3.6

Table 7. Printer state changes (continued)

Function	Name	Object Identifier (OID)
CR cover Open / Closed	receiptCoverOpen	1.3.6.1.4.1.1129.2.500.1.1.2.1
DI Cover Open / Closed	NA	1.3.6.1.4.1.1129.2.500.1.3.2.4
Paper Out	receiptEmpty	1.3.6.1.4.1.1129.2.500.1.1.2.2
Paper Low	NA	1.3.6.1.4.1.1129.2.500.1.3.2.2
Home Error	NA	1.3.6.1.4.1.1129.2.500.1.3.2.3
Offline / Online	NA	1.3.6.1.4.1.1129.2.500.1.3.2.6
Paper Jam	NA	1.3.6.1.4.1.1129.2.500.1.3.2.5
Cutter Jam	NA	1.3.6.1.4.1.1129.2.500.1.3.2.1

Up to two SNMP managers can be enabled to receive these alerts. See Statistics table entries for details on enabling these traps.

4610 Private Enterprise MIB

The 4610 Private Enterprise management information base II (MIB II) is shown in Table 8 on page 8. Get request to the printer will retrieve this data.

Note: The access type for all entries is Read Only.

Table 8. 4610 Private Enterprise MIB

Name	Object Identifier (OID)	Type
receiptStationPresent	1.3.6.1.4.1.1129.2.500.1.1.1.1	Integer
paperCutter	1.3.6.1.4.1.1129.2.500.1.1.1.2	Integer
coverSensor	1.3.6.1.4.1.1129.2.500.1.1.1.3	Integer
receiptEmptySensor	1.3.6.1.4.1.1129.2.500.1.1.1.4	Integer
nearEndSensor	1.3.6.1.4.1.1129.2.500.1.1.1.5	Integer
receiptPageMode	1.3.6.1.4.1.1129.2.500.1.1.1.6	Integer
receiptCoverOpen	1.3.6.1.4.1.1129.2.500.1.1.2.1	Integer
receiptEmpty	1.3.6.1.4.1.1129.2.500.1.1.2.2	Integer
ThermalPrintHeadElementFailure	1.3.6.1.4.1.1129.2.500.1.1.2.3	Integer
receiptNearEnd	1.3.6.1.4.1.1129.2.500.1.1.2.4	Integer
receiptPaperRemaining	1.3.6.1.4.1.1129.2.500.1.1.2.5	Integer
receiptPaperJamCount	1.3.6.1.4.1.1129.2.500.1.1.2.6	Integer
receiptUnexpectedCoverOpenCount	1.3.6.1.4.1.1129.2.500.1.1.2.7	Integer
receiptPaperCutCount	1.3.6.1.4.1.1129.2.500.1.1.2.8	Integer
receiptCharactersPrintedCount	1.3.6.1.4.1.1129.2.500.1.1.2.9	Integer
receiptCoverOpenCount	1.3.6.1.4.1.1129.2.500.1.1.2.10	Integer
receiptLineFeedCount	1.3.6.1.4.1.1129.2.500.1.1.2.11	Integer
receiptFailedPaperCutCount	1.3.6.1.4.1.1129.2.500.1.1.2.12	Integer
writeCountNVRAM	1.3.6.1.4.1.1129.2.500.1.1.2.13	Integer
maximumTemperatureReachedCount	1.3.6.1.4.1.1129.2.500.1.1.2.14	Integer

Table 8. 4610 Private Enterprise MIB (continued)

Name	Object Identifier (OID)	Type
receiptPrintHeadFailureCount	1.3.6.1.4.1.1129.2.500.1.1.2.15	Integer
flashWriteFailedCount	1.3.6.1.4.1.1129.2.500.1.1.2.16	Integer
barcodePrintedCount	1.3.6.1.4.1.1129.2.500.1.1.2.17	Integer
DrawerOpened	1.3.6.1.4.1.1129.2.500.1.1.3.1	Integer
DrawerGoodOpenCount	1.3.6.1.4.1.1129.2.500.1.1.3.2	Integer
DrawerFailedOpenCount	1.3.6.1.4.1.1129.2.500.1.1.3.3	Integer
MICR_GoodReadCount	1.3.6.1.4.1.1129.2.500.1.1.3.4	Integer
MICR_FailedReadCount	1.3.6.1.4.1.1129.2.500.1.1.3.5	Integer
MICR_CurrentMICRNoiseValue	1.3.6.1.4.1.1129.2.500.1.1.3.6	Integer
slipStationPresent	1.3.6.1.4.1.1129.2.500.1.2.1.1	Integer
fullSlip	1.3.6.1.4.1.1129.2.500.1.2.1.2	Integer
bothSidesPrint	1.3.6.1.4.1.1129.2.500.1.2.1.3	Integer
ImpactHeadFailedCount	1.3.6.1.4.1.1129.2.500.1.2.2.1	Integer
PrintSideChangeCount	1.3.6.1.4.1.1129.2.500.1.2.2.2	Integer
FailedPrintSideChangeCount	1.3.6.1.4.1.1129.2.500.1.2.2.3	Integer
slipCharactersPrintedCount	1.3.6.1.4.1.1129.2.500.1.2.2.4	Integer
slipCoverOpenCount	1.3.6.1.4.1.1129.2.500.1.2.2.5	Integer
slipLineFeedCount	1.3.6.1.4.1.1129.2.500.1.2.2.6	Integer
slipUnexpectedCoverOpenCount	1.3.6.1.4.1.1129.2.500.1.2.2.7	Integer
slipFeedErrorCount	1.3.6.1.4.1.1129.2.500.1.2.2.8	Integer
HomeErrorCount	1.3.6.1.4.1.1129.2.500.1.2.2.9	Integer
FormInsertionCount	1.3.6.1.4.1.1129.2.500.1.2.2.10	Integer
DeviceID	1.3.6.1.4.1.1129.2.500.1.3.1.1	String
PhysicalDeviceDescription	1.3.6.1.4.1.1129.2.500.1.3.1.2	String
PhysicalDeviceName	1.3.6.1.4.1.1129.2.500.1.3.1.3	String
Bus	1.3.6.1.4.1.1129.2.500.1.3.1.4	String
DeviceCategory	1.3.6.1.4.1.1129.2.500.1.3.1.5	String
FirmwareRevision	1.3.6.1.4.1.1129.2.500.1.3.1.6	String
ManufactureDate	1.3.6.1.4.1.1129.2.500.1.3.1.7	String
ManufacturerName	1.3.6.1.4.1.1129.2.500.1.3.1.8	String
ModelName	1.3.6.1.4.1.1129.2.500.1.3.1.9	String
SerialNumber	1.3.6.1.4.1.1129.2.500.1.3.1.10	String

MIB II

Management information base II (MIB II) is used to convey information about the TCP/IP configuration. The majority of the data that is recorded as part of MIB II will not be useful in supporting the printer. For details, see the following information on RFC 1213:

- Tree view of the RFC: <http://www.snmpink.org/OnLineMIB/Standards/>
- Full text: <http://tools.ietf.org/html/rfc1213>

The objects in MIB II are arranged in the following groups:

- System
- Interfaces
- Address Translation (deprecated)
- IP
- ICMP
- TCP
- UDP
- EGP
- Transmission
- SNMP

HTTP Server

The printer provides an HTTP server for configuration, management, and diagnostic functions.

Login and Overview

When a new HTTP connection is made, the printer prompts for a User Name and Password. Completion of login establishes an active session which enables the functionality as defined in the following sections. The logon screen varies depending on the browser.

The default Username and Password are “Admin” and “Admin” respectively. These may be redefined with the Web Interface in the HTTP Server, the Configuration Utility, or the Web API configuration (see “Web API for printer configuration management” on page 11).

The User Name and Password are limited to eight alphanumeric characters and are case sensitive.

Data Display/Entry Fields

User Name:

Admin

- If an alternate login name is defined, the data entry field is blank; otherwise, the default login name is displayed.

Password:

Admin

- The password is not displayed. A dummy character “*” is displayed for each character entered.

The HTTP session remains active until the user logs off.

Web Pages

Once logged on, there are several pages in the printer that can be used for printer management.

Overview:

Reports the printer's serial number, model, firmware level, and the current Ethernet setting.

Diagnostic:

Supports printing of an offline receipt, reports the user statistics of the printer, and shows the current status of the printer.

Network:

Allows the user to change the current Network configuration.

SNMP:

Allows the user to set up the SNMP managers.

Admin Access:

Allows the user to change the Login and Password used for the HTTP server.

System Update:

Allows the user to configure the printer and to download firmware, font, and configuration files.

Reset:

Allows the user to reset the printer.

Logout:

Allows the user to log out of the printer.

Web API for printer configuration management

The Managing Client can retrieve the printer's configuration via an HTTP "Get". The printer will respond with a configuration file (see "Retrieving Printer's configuration using HTTP Server Get" on page 12). This file will include all necessary information to determine the current printer configuration or setup:

- Firmware version
- Checksums of the various flash memory sectors:
 - Fonts
 - Character sets
 - Messages
- Network settings

Knowledge of the printer specification and the locations of the given parameters are required to interpret the output.

Once the manager determines that a printer requires updating, there are three file types the printer will accept. These will come to the printer via HTTP POST:

1. **Firmware file:** The same firmware file that is supported by the drivers. *.hex file.

The printer will verify the file format, validity (correct CRC), and version before beginning the update process. Once verification is complete, it will program the new firmware and reset. Following the reset, the printer will run at the new firmware level.

2. **Configuration file:** Contains all the data the printer would need for configuration in a given environment. This includes the network configuration.
3. **Font file:** The *.fon file that is supported by the UPOS drivers. See the UPOS font support for creating this file with a configuration tool 4610cvnt.exe.

This file contains all the required data for setting up the font file in the printer. If necessary, the printer will erase and then store all the font files and MCT values associated with the font file. Example: If one of the DBCS font files is downloaded, the printer will store the DBCS Impact, DBCS Thermal, SBCS Impact User defined set 1, and SBCS Thermal User defined set 1, as well as the MCTs needed to use these files by the printer and the UPOS drivers. If required when downloading DBCS character sets, the printer will reset when the font is done storing.

Upon completion of setup, the printer will respond by sending a response to the HTTP file.

Retrieving Printer's configuration using HTTP Server Get

The HTTP server Get is used for retrieving the configuration of the printer.

The HTTP header starts with get_Config:

```
GET /get_Config HTTP
```

```

6c ae 8b 46 00 5e f0 de f1 84 a5 e8 08 00 45 00 1..F.^.. .....E.
00 c9 78 90 40 00 80 06 00 00 09 2a e7 a2 09 2a ..x.@... ..*...*
e7 90 df 2c 00 50 f8 fc 5a 3f 3e de 5d 32 50 18 ...,P.. z?>.]2P.
fa f0 e2 42 00 00 47 45 54 20 2f 67 65 74 5f 43 ...B..GE T /get_C
6f 6e 66 69 67 20 48 54 54 50 2f 31 2e 31 0d 0a onfig HT TP/1.1..
55 73 65 72 2d 41 67 65 6e 74 3a 20 4a 61 76 61 User-Age nt: Java
2f 31 2e 37 2e 30 5f 30 36 0d 0a 48 6f 73 74 3a /1.7.0_0 6..Host:
20 39 2e 34 32 2e 32 33 31 2e 31 34 34 0d 0a 41 9.42.23 1.144..A
63 63 65 70 74 3a 20 74 65 78 74 2f 68 74 6d 6c ccept: t ext/html
2c 20 69 6d 61 67 65 2f 67 69 66 2c 20 69 6d 61 , image/ gif, ima
67 65 2f 6a 70 65 67 2c 20 2a 3b 20 71 3d 2e 32 ge/jpeg, *; q=.2
2c 20 2a 2f 2a 3b 20 71 3d 2e 32 0d 0a 43 6f 6e , */*; q =.2..Con
6e 65 63 74 69 6f 6e 3a 20 6b 65 65 70 2d 61 6c nection: keep-al
69 76 65 0d 0a 0d 0a ive....

```

Figure 1. Get Configuration header example

The format of the file sent back is the following:

```

<Configuration>
  <serial_number>SSSSSSSS</serial_number>
  <mac_address>MMMMMMMMMM</mac_address>
  <ip4>xx.xx.xx.xx</ip4>
  <firmware>xx.xx</firmware>
  <devinfo>Printer ID</devinfo>
  <mct><length><512></length><data>data</data></mct>
  <stat><length><512></length><data>data</data></stat>

```



```
<snmptrap1>databytes</snmptrap1>
<snmptrap2>databytes</snmptrap2>
<snmpmanager1>xx.xx.xx</snmpmanager1>
<snmpmanager2>xx.xx.xx</snmpmanager2>
<hostname>name</snmpmanager2>
<autoipenable>xxx</autoipenable>
<fixedipenable>xxx</fixedipenable>
<fixedipselected>fixedipselected</fixedipselected>
<ipv4fixedip>xx.xx.xx</ipv4fixedip>
<subnet>xx.xx.xx</subnet>
<gateway>xx.xx.xx</gateway>
```

</Configuration>

Where:

SSSSSSSS

Printer Serial Number; ASCII alphanumeric string.

MMMMMMMMMMMM

Printer's MAC address; ASCII encoded HEX.

name ASCII String; max 12 characters.

xx.xx.xx Valid IP address

- snmpmanager1: IP address of the 1st client receiving SNMP alerts
- snmpmanager2: IP address of the 2nd client receiving SNMP alerts
- ipv4fixedip: User Defined Fixed IP

xx.xx ASCII encoded Hex number representing the EC level of the firmware.

xxx YES or NO.

n Hex number for the slot number, MCT number or statistic number being changed.

data Hex bytes.

- MCT: Two bytes for each location in the MCT table. The table is 256 locations of two bytes each. MCTs that are not defined are set as 0xffff.
- Stat: Two bytes for each location in the statistics table. The table is 256 locations of two bytes each. Statistics that are not defined are set as 0xffff.

databytes

Two hex bytes associated with the traps being set:

Bit 15 Cash Drawer Open / Closed

Bit 14 Magnetic Noise present (MICR read)

Bit 13 Paper Out

Bit 12 Paper Low

Bit 11 Home Error

Bit 10 Paper Jam

Bit 9 Cutter Jam

Bit 8 CR Cover Open / Closed

Bit 7 DI Cover Open / Closed

Bit 6 Hard Error at the printer (printer offline). MLC error / IFC error / Firmware can not initialized motion sensor and/or thermal print head.

Bits 2 - 5
Reserved - should remain high

Bit 0, 1
Version option for returning Trap messages – SNMP manager 1:

11 Version 1

10 Version 2

01 Version 3 (Currently not supported)

Details:

snmptrap1:

Bit 15 Cash Drawer Open / Closed

Bit 14 Magnetic Noise present (MICR read)

Bit 13 Paper Out

Bit 12 Paper Low

Bit 11 Home Error

Bit 10 Paper Jam

Bit 9 Cutter Jam

Bit 8 CR Cover Open / Closed

Bit 7 DI Cover Open / Closed

Bit 6 Hard Error at the printer (printer offline). MLC error / IFC error / Firmware can not initialized motion sensor and/or thermal print head.

Bits 2 - 5
Reserved - should remain high

Bit 0, 1
Version option for returning Trap messages – SNMP manager 1:

11 Version 1

10 Version 2

Default: 0xFF

snmptrap2:

Bits 2 - 15
Reserved - should remain high

Bit 0, 1
Version option for returning Trap messages – SNMP manager 2:

11 Version 1

10 Version 2

Default:
0xFF

| **fixedipselected:**

| fip: Hex byte

| 0x03 = User Configured Fixed IP Enabled (default) when there is a
| fixed IP defined.

| 0x02 = Fixed IP Config 1 Enabled

| 0x01 = Fixed IP Config 2 Enabled

| 0x00 = Fixed IP Config 3 Enabled

| **Default:**

| 0xFF

| **ipv4fixedip**

| Valid IP address encoded as ASCII encoded Decimal that will return only
| when User Configured Fixed IP is enabled and defined.

| HTTP Server POST

| The HTTP server power-on self-test (POST) is used for updating firmware, sending
| the font file, and sending the configuration file.

| **Firmware Upload:**

- | • The HTTP header starts with upload after POST: **POST /upload HTTP/**.
- | • Content type is "multipart/form-data".
- | • Content-type: String needs to be at the end of header, beginning of data section.
- | • Response:
 - | – On successful storing: Firmware file download complete.
 - | – On any error with receiving or storing file: Invalid Firmware File.

| **Configuration Upload:**

- | • The HTTP header starts /upload_Config after POST: **POST /upload_Config
| HTTP/**.
- | • Content type is "multipart/form-data".
- | • Response:
 - | – On successful storing: Configuration Update completed.
 - | – On any error with receiving or storing file: Invalid Configuration File.

| **Font Upload:**

- | • The HTTP header starts /upload_Font after POST: **POST /upload_Font HTTP/**.
- | • Content type is "multipart/form-data".
- | • Response:
 - | – On successful storing: Fonts download completed.
 - | – On any error with receiving or storing file: Invalid Font File.

| **Example of Java Program for posting a file:**

```

| public static void main(String[] args) throws IOException {
|     // takes file path from first program's argument
|     String filePath = "C:\\ec12_0a.hex";
|     File uploadFile = new File(filePath);
|
|     System.out.println("File to upload: " + filePath);
|
|     // creates a HTTP connection
|     URL url = new URL(UPLOAD_URL);
|     HttpURLConnection httpConn = (HttpURLConnection) url.openConnection();
|     httpConn.setUseCaches(false);
|     httpConn.setDoOutput(true);
|     httpConn.setRequestMethod("POST");
|     httpConn.setRequestProperty("Content-type","multipart/form-data; boundary=" + boundary);
|
|     // sets file name as a HTTP header
|     httpConn.setRequestProperty("fileName", uploadFile.getName());
|     httpConn.connect(); // new.
|     // opens output stream of the HTTP connection for writing data
|     OutputStream outputStream = httpConn.getOutputStream();
|
|     // Opens input stream of the file for reading data
|     FileInputStream inputStream = new FileInputStream(uploadFile);
|
|     byte[] buffer = new byte[BUFFER_SIZE];
|     int bytesRead = -1;
|
|     System.out.println("Start writing data...");
|
|     outputStream.write((twoHyphens + boundary + crlf).getBytes("UTF8"));
|     outputStream.write(new String("Content-Disposition: form-data; name=\"" +
| uploadFile.getName() + "\";filename=\"" + "textField" + "\"" + crlf).getBytes("UTF8"));
|     outputStream.write(new String("Content-Type: application/octet-stream\r\n\r\n").
| getBytes("UTF8"));
|
|     while ((bytesRead = inputStream.read(buffer)) != -1) {
|         outputStream.write(buffer, 0, bytesRead);
|     }
|     outputStream.write(crlf.getBytes());
|     outputStream.write((twoHyphens + boundary + twoHyphens).getBytes());
|
|     System.out.println("Data was written.");
|     outputStream.close();
|     inputStream.close();
|
| }
|

```

Configuration file format

```

|         <configuration>
|             <logo>
|                 <erase>xxx</erase>
|                 <slot><number>n</number><width>WW</width><height>HH</height><data>

```

```

|         databytes</data></slot>
|         <slot><number>n</number><width>WW</width><height>HH</height><data>
|         databytes</data></slot>
|         .....
|     </logo>
|     <message>
|         <erase>xxx</erase>
|         <slot><number>n</number><length>LLLL</length><data>databytes</data></slot>
|         <slot><number>n</number><length>LLLL</length><data>databytes</data></slot>
|         .....
|     </message>
|     <mct>
|         <slot><number>n</number><data>databytes</data></slot>
|         <slot><number>n</number><data>databytes</data></slot>
|         .....
|     </mct>
|     <statistics>
|         <slot><number>n</number><data>databytes</data></slot>
|         <slot><number>n</number><data>databytes</data></slot>
|         .....
|     </statistics>
|     <network>
|         <snmptrap1>databytes</snmptrap1>
|         <snmptrap2>databytes</snmptrap2>
|         <snmpmanager1>xx.xx.xx</snmpmanager1>
|         <snmpmanager2>xx.xx.xx</snmpmanager2>
|         <httpuserid>name</httpuserid>
|         <httppw>password</httppw>
|         <hostname>name</hostname>
|         <autoipenable>xxx</autoipenable>
|         <fixedipenable>xxx</fixedipenable>
|         <fixedipselected>fip</fixedipselected>
|         <ipv4fixedip>xx.xx.xx</ipv4fixedip>
|         <subnet>xx.xx.xx</subnet>
|         <gateway>xx.xx.xx</gateway>
|     </network>
| </configuration>

```

Where:

xxx YES or NO

n Hex number for the slot number, MCT number, or Statistic number being changed.

LLLL Length of the message data (ASCII representation of hex value).

WW Width of the logo (ASCII representation of hex value).

HH Height of the logo (ASCII representation of hex value).

xx.xx.xx

Valid IP address encoded as ASCII encoded Decimal.

name ASCII String, Max 12 characters.

databytes

Hex number for data associated with this change.

|
|
| **Details:**

| **MCTs and Statistics:**

| 2 bytes for each MCT number or Statistics number. There are 256 values
| for each: MCT and Statistic. Values not defined are set as 0xffff.

| **Logo:** Logo data in hex, of length WW x HH x 8. See “Download graphics (logo)
| commands” on page 34 for format.

| **Message:**

| Hex data of message length is defined by LLLL. See “Predefined
| messages” on page 36 for allowed data.

| **snmptrap1:**

| **Bit 15** Cash Drawer Open / Closed

| **Bit 14** Magnetic Noise present (MICR read)

| **Bit 13** Paper Out

| **Bit 12** Paper Low

| **Bit 11** Home Error

| **Bit 10** Paper Jam

| **Bit 9** Cutter Jam

| **Bit 8** CR Cover Open / Closed

| **Bit 7** DI Cover Open / Closed

| **Bit 6** Hard Error at the printer (printer offline). MLC error / IFC error /
| Firmware can not initialized motion sensor and/or thermal print
| head.

| **Bits 2 - 5**

| Reserved - should remain high

| **Bit 0, 1**

| Version option for returning Trap messages – SNMP manager 1:

| 11 Version 1

| 10 Version 2

| **Default: 0xFF**

| **snmptrap2:**

| **Bits 2 - 15**

| Reserved - should remain high

| **Bit 0, 1**

| Version option for returning Trap messages – SNMP manager 2:

| 11 Version 1

| 10 Version 2

| **Default:**

| 0xFF

| **fip:** fip: Hex byte

| 0x03 = User Configured Fixed IP Enabled (default) when there is a
| fixed IP defined. See on page 19.

0x02 = Fixed IP Config 1 Enabled
 0x01 = Fixed IP Config 2 Enabled
 0x00 = Fixed IP Config 3 Enabled

Default:

0xFF

ipv4fixedip

Valid IP address encoded as ASCII encoded Decimal that will return only when User Configured Fixed IP is enabled and defined.

fip: Hex byte

0x03 = User Configured Fixed IP Enabled (default) when there is a fixed IP defined.

0x02 = Fixed IP Config 1 Enabled

0x01 = Fixed IP Config 2 Enabled

0x00 = Fixed IP Config 3 Enabled

Configuration file examples

Example 1:

To download these Predefined Messages:

- To Slot 16: abcdefghijklmnopqrstuvwxyz<linefeed>
- To Slot 02: <X'1B;2D;01'>
 abcdefghijklmnopqrstuvwxyz<linefeed><X'1B;2d;00'>

```

Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 3C 63 6F 6E 66 69 67 75 72 61 74 69 6F 6E 3E 0D <configuration>.
00000010 0A 09 0D 0A 09 3C 6D 65 73 73 61 67 65 3E 0D 0A .....<message>..
00000020 20 20 20 20 20 20 20 09 09 3C 65 72 61 73 65 3E ..<erase>
00000030 4E 4F 3C 2F 65 72 61 73 65 3E 0D 0A 09 09 3C 73 NO</erase>...<s
00000040 6C 6F 74 3E 3C 6E 75 6D 62 65 72 3E 31 30 3C 2F lot><number>10</
00000050 6E 75 6D 62 65 72 3E 3C 6C 65 6E 67 74 68 3E 30 number><length>0
00000060 30 31 42 3C 2F 6C 65 6E 67 74 68 3E 3C 64 61 74 01B</length><dat
00000070 61 3E 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E a>abcdefghijklmnop
00000080 6F 70 71 72 73 74 75 76 77 78 79 7A 0A 3C 2F 64 opqrstuvwxyz.</d
00000090 61 74 61 3E 3C 2F 73 6C 6F 74 3E 3C 73 6C 6F 74 ata></slot><slot
000000A0 3E 3C 6E 75 6D 62 65 72 3E 32 3C 2F 6E 75 6D 62 ><number>2</numb
000000B0 65 72 3E 3C 6C 65 6E 67 74 68 3E 30 30 32 31 3C er><length>0021<
000000C0 2F 6C 65 6E 67 74 68 3E 3C 64 61 74 61 3E 1B 2D /length><data>.-
000000D0 01 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E 6F .abcdefghijklmnop
000000E0 70 71 72 73 74 75 76 77 78 79 7A 0A 1B 2D 00 3C pqrstuvwxyz.-.<
000000F0 2F 64 61 74 61 3E 3C 2F 73 6C 6F 74 3E 0D 0A 09 /data></slot>...
00000100 09 0D 3C 2F 6D 65 73 73 61 67 65 3E 0A 09 0D 0A ..</message>....
00000110 3C 2F 63 6F 6E 66 69 67 75 72 61 74 69 6F 6E 3E </configuration>
  
```

Download to slot 16 (or 0x10) --
 Hex number represented in ASCII format

Linefeed sequence (x'0A') embedded
 in the Predefined Message

Message length = 33 (or 0x21) bytes --
 Hex number represented in ASCII format

Command embedded in the Predefined
 Message (x'1B;2D;00)

Figure 2. The configuration file open in a hex editor

Example 2:

To download a 2 x 4 logo to Slot 1:

```

Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 3C 63 6F 6E 66 69 67 75 72 61 74 69 6F 6E 3E 0D <configuration>.
00000010 0A 09 3C 6C 6F 67 6F 3E 0D 09 09 3C 65 72 61 73 ..<logo>...<eras
00000020 65 3E 59 45 53 3C 2F 65 72 61 73 65 3E 0A 09 09 e>YES</erase>...
00000030 3C 73 6C 6F 74 3E 3C 6E 75 6D 62 65 72 3E 31 3C <slot><number>1<
00000040 2F 6E 75 6D 62 65 72 3E 0A 20 20 20 20 20 3C 77 /number>. <w
00000050 69 64 74 68 3E 32 3C 2F 77 69 64 74 68 3E 3C 68 idth>2</width><h
00000060 65 69 67 68 74 3E 34 3C 2F 68 65 69 67 68 74 3E eight>4</height>
00000070 3C 64 61 74 61 3E FF F0 FF FF FF FF 00 FF FF BF BF <data>y@yyy.yyy?
00000080 BF FF FF FF FF FF FF FF FF 00 FF FF FF FF FF FF ?YYYYYYYY.YYYYYY
00000090 FF FF FF FF FF FF FF FF F0 F0 F0 F0 FF FF FF FF YYYYYYYY8888YYYYY
000000A0 FF FB BB FF FF FF FF FF FF FF FF FF 00 00 00 FF y0»YYYYYYYYYY...y
000000B0 FF FF FF FF FF FF 3C 2F 64 61 74 61 3E 0A 09 09 YYYYYY</data>...
000000C0 3C 2F 73 6C 6F 74 3E 3C 2F 6C 6F 67 6F 3E 0D 0A </slot></logo>..
000000D0 3C 2F 63 6F 6E 66 69 67 75 72 61 74 69 6F 6E 3E </configuration>

```

Width and height -- Hex numbers in ASCII representation

Logo data in hex

Figure 3. The configuration file open in a hex editor

Printer sharing

The printer sharing protocol provides a means for multiple clients to share a printer, with each being granted exclusive access during the time of usage. The protocol is established with Toshiba supported drivers, which can be found on the Toshiba Global Commerce Solutions support website: www.toshibagcs.com/support.

Chapter 3. System Commands

Unless noted otherwise, the commands in this section apply to SureMark printers that attach to a POS system with an RS-232 (EIA232) cable connection.

If you use the RS-485, USB, or Ethernet communications interface, refer to either the SureMark driver documentation in the appropriate Toshiba book for your operating system or to the *OLE for Retail POS Application Programming Guide* when using OPOS drivers.

The 4690 OS publication is available on the current maintenance diskette for the Toshiba 4690 operating system. Current versions of all publications are available on the Toshiba Global Commerce Solutions support website: www.toshibagcs.com/support.

Command summary by function

The commands listed in Table 9 are described in detail in the following sections.

Table 9. RS-232 command summary by function

Description	Command	Page
System Commands		
EC/Request/Real-time status request	DLE ENQ 4 or X'100534' Immediate or X'1B008000' Buffered	28
Enable/disable the feed buttons	ESC c 5 n X'1B6335;n'	68
Extended address command (request printer ID)	GS | SOH or X'1D4901' This is an IMMEDIATE command.	29
Re-initialize the printer	ESC @ or X'1B40'.	67
Reset printer	DLE ENQ @ or X'100540'	28
Status request	ESC v or X'1B76'	28
Verify previous commands completed	X'1B00;80;00'	27
Preset or Onetime-Set Commands		
Download graphics (logo) commands	GS * logo# n1 n2 data or X'1D2A';logo#;n1;n2;data	34
Download user-defined characters	ESC & s n m data or X'1B26;s;n;m;data'	38
Erase flash EPROM sector	ESC # n or X'1B23;n'	44
Flash storage write	ESC ' n1 n2 data or X'1B27;n1;n2;data'	44
Microcode tolerance (MCT) information - loading	ESC M n h l or X'1B4D;n;h;l'.	45
Microcode tolerance (MCT) information - request	ESC S n or X'1B53;n'	45
Predefine messages	GS : message# data GS : or X'1D3A; message#;data;'X'1D3A'	36
Send checksum of flash EPROM sector	ESC " n or X'1B22;n'	43
Setup Commands		
Align positions	ESC a n or X'1B61;n'.	64
Define document wait time	ESC f x y or X'1B66;x;y'	65

Table 9. RS-232 command summary by function (continued)

Description	Command	Page
System Commands		
Enable/disable upside-down printing	ESC { <i>n</i> or X'1B7B; <i>n</i> '	68
Fix font matrix	ESC : <i>n</i> or X'1B3A <i>n</i> '	70
Print logo inline	GS J <i>d n1 n2 data</i> or X'1D4A; <i>d;n1;n2;data</i> '	70
Request document length for landscape print	GS N X'02' Null or X'1D4E0200'	56
Request document length for landscape print	GS c 1 <i>n</i> where <i>n</i> = 2 bytes indicating the length of the document in print motor steps.	56
Select 1/8-inch line spacing	ESC 1 or X'1B31'.	59
Select 1/6-inch line spacing	ESC 2 or X'1B32'	60
Select color printing	ESC r <i>n</i> or X'1B72; <i>n</i> '	60
Select character for reprinted lines	ESC + <i>n</i> or X'1B2B; <i>n</i> '	66
Select character size for scalable fonts	GS ! <i>n</i> or X'1D21; <i>n</i> '	69
Select maximum print speed	ESC / <i>n</i> or X'1B2F; <i>n</i> '	55
Select thermal paper	GS; <i>n</i> or X'1D 3B <i>n</i> '	71
Select user-defined or resident character sets	ESC % <i>n</i> or X'1B25; <i>n</i> '	57
Set code page	ESC t <i>n</i> or X'1B74; <i>n</i> '	57
Set document length for landscape print	GS c 1 <i>n</i> where <i>n</i> = 2 bytes indicating the length of the document in print motor steps.	55
Set error recovery function	ESC c 4 <i>n</i> or X'1B63;34; <i>n</i> '	65
Set horizontal tab positions	ESC D [<i>n1 n2</i>] NUL NUL or X'1B44[<i>n1 n2</i>]0000'	62
Set intercharacter spacing	ESC SP <i>n</i> or X'1B20; <i>n</i> '	58
Set left margin position	ESC \$ <i>n1 n2</i> or X'1B24; <i>n1;n2</i> '	62
Set line spacing using minimum units	ESC 3 <i>n</i> or X'1B33; <i>n</i> '	61
Set or cancel double-wide mode	ESC W <i>n</i> or X'1B57; <i>n</i> '	53
Set or cancel double-high mode	ESC h <i>n</i> or X'1B68; <i>n</i> '	53
Set or cancel emphasized printing	ESC G <i>n</i> or X'1B47; <i>n</i> '	54
Set or cancel invert mode	ESC H <i>n</i> or X'1B48; <i>n</i> '	54
Set or cancel overline mode	ESC x'5F' <i>n</i> or X'1B5F; <i>n</i> '	54
Set or cancel rotated character	ESC V <i>n</i> or X'1B56; <i>n</i> '	59
Set or cancel underline mode	ESC - <i>n</i> or X'1B2D; <i>n</i> '	54
Set or cancel unidirectional printing	ESC U <i>n</i> or X'1B55; <i>n</i> '	55
Set print mode	ESC ! <i>n</i> or X'1B21; <i>n</i> '	51
Set print station	ESC c 0 <i>n</i> or X'1B6330; <i>n</i> '	56
Set print station parameters	ESC c 1 <i>n</i> or X'1B6331; <i>n</i> '	59.
Set relative position	ESC \ <i>n1 n2</i> or X'1B5C; <i>n1;n2</i> '	63
Set right margin position	ESC] <i>n1 n2</i> or X'1B 5D; <i>n1;n2</i> "	63

Table 9. RS-232 command summary by function (continued)

Description	Command	Page
System Commands		
Set sheet eject length	ESC C <i>n</i> or X'1B43;n'	61
Status sent to system	ESC) <i>n</i> or X'1B29;n'	66
Bar Code Commands		
Enable PDF417 truncation	GS T <i>n</i> or X'1D54;n'	82
Select Aspect Ratio PDF417 bar code	GS S <i>r;c</i> or X'1D53;r;c'	81
Print bar code	GS k <i>n</i> NUL or X'1D6B;n;data;00'	72
Print PDF417 bar code	GS P <i>data</i> NUL or X'1D50;data;00'	80
Select bar code height	GS h <i>n</i> or X'1D68;n'	79
Select font for HRI	GS f <i>n</i> or X'1D66;n'	80
Select horizontal size of bar code	GS w <i>n</i> or X'1D77;n'	79
Select printing position of human-readable information (HRI)	GS H <i>n</i> or X'1D48;n'	79
Select PDF417 ECC Level	GS R <i>n</i> or X'1D52;n1;n2'	81
Print Character Commands		
Print and line feed	LF or X'0A' or CR or X'0D'	85
Print, form feed, and cut the paper (FF)	FF or X'0C'	85
Print and feed paper <i>n</i> lines	ESC d <i>n</i> or X'1B64;n'	86
Print and feed paper using minimum units	ESC J <i>n</i> X'1B4A;n'	86
Print Graphic Messages		
Select and print a graphics (logo) command	ESC * <i>d w h data</i> or X'1B2A;d;w;h;data'	86
Print predefined graphics (logo) command	GS / <i>m logo#</i> or X'1D2F;m;logo#'	88
Print predefined messages	GS ^ <i>message#</i> or X'1D5E;message#'	89.
Miscellaneous Commands		
Retrieve checksum of each downloaded logo or each stored message	ESC | <i>n1 n2</i> or X'1B7C <i>n1 n2</i> '	43
Tab to next tab stop	HT or X'09'	92
Return home (select print head location)	ESC < <i>n</i> or 1B3C; <i>n</i>	93
Paper cut/DI eject	ESC i or ESC m -- X'1B69' or X'1B6D'	94
Generate drive pulse for cash drawer	ESC p <i>m n1 n2</i> or X'1B70;m;n1;n2'	94.
Retrieve the flash storage	ESC 4 <i>n1 n2</i> X'1B34;n1;n2'	94
Retrieve size of user flash storage	ESC 4 x '03 FF FF FF' or X'1B3403FFFFFF'	95
Retrieve Native Mode Status	GS N ENG NULL or X'1D4E0500'	28
Retrieve Native Mode Device ID	GS N ENG 01 or X'1D4E0501'	29
Check Processing Commands		

Table 9. RS-232 command summary by function (continued)

Description	Command	Page
System Commands		
Flip check	ESC 5 or X'1B35'	92
MICR read	ESC I or X'1B49'	90
Asynchronous (Real-Time) Commands		
Real-time requests	DLE ENQ <i>n</i> or X'1005n'	95
Data Buffer Management and Batch Printing		
Reset line count	ESC 6 or X'1B36'	98
Disable line count	ESC 8 <i>n</i> or X'1B38'n	98
Hold printing until buffer is released	ESC 7 or X'1B37'	98
Release print buffer	DLE ENQ 1 X'10;05;31''	99
Page Mode Printing Commands		
Select page mode	ESC L or X'1B4C'	101
Select standard mode	ESC S or X'1B4f'	101
Select printable area	ESC X or X'1B58;x;y;dx;dy'	101
Select printing direction/position	ESC T <i>n</i> or X'1B54;n'	102
Set vertical position	GS \$ <i>y</i> or X'1D24;y'	102
Set relative vertical position	GS \ <i>y</i> or X'1D5C;y'	102
Set right margin position	ESC] <i>n1 n2</i> or X'1B5D;n1;n2''	63
Set left margin position (standard mode), Set absolute print position (page mode)	ESC \$ <i>n1 n2</i> or X'1B24;n1;n2'	103
Set relative horizontal position	ESC <5C>h <i>n1 n2</i> or X'1B5C;n1;n2'	103
Set printing position	GS] <i>x y</i> or X'1D5D;x;y'	104
Print and form feed and cut the paper	FF or X'0C'	104
Print page in page mode	ESC FF or X'1B0C'	104
Clear print data in page mode	CAN or X'18'	105

Alphabetized command summary

Table 10. Commands in alphabetical order

Description	Command	Page
Align positions	ESC a <i>n</i> or X'1B61;n'	64
Clear print data in page mode	CAN or X'18'	105
Disable line count	ESC 8 <i>n</i> or X'1B38'n	98
Define document wait time	ESC f <i>x y</i> or X'1B66;x;y'	65
Download double-byte characters	485/USB Syntax: X'1B28;s;n;data' RS232 Syntax: ESC s (<i>n data</i> or X'1B;28;s;n;data''	34
Download graphics (logo) commands	GS * <i>logo# n1 n2 data</i> or X'1D2A;logo#;n1;n2;data'	34
Download user-defined characters	ESC & <i>s n m data</i> or X'1B26;s;n;m;data'	38

Table 10. Commands in alphabetical order (continued)

Description	Command	Page
Enable PDF417 truncation	GS T <i>n</i> or X'1D54;n'	82
Enable/disable the feed buttons	ESC c 5 <i>n</i> X'1B6335;n'	68.
Enable/disable two-color printing	GS; <i>n</i> or X'1D3B <i>n</i> '	71
Enable/disable upside-down printing	ESC { <i>n</i> or X'1B7B <i>n</i> '	68
Erase flash EPROM sector	ESC # <i>n</i> or X'1B23;n'	44
Extended address command-request printer ID	GS l or X'1D4901'	29
Fix font matrix	ESC : <i>n</i> or X'1B3A;n'	70
Flash storage write	ESC ' <i>n1 n2 data</i> or X'1B27;n1;n2;data'	44
Flip check	ESC 5 or X'1B35'	92
Generate drive pulse for cash drawer	ESC p <i>m n1 n2</i> or X'1B70;m;n1;n2'	94
Hold printing until buffer is released	ESC 7 or X'1B37'	98
Impact code page	MCT commands.	41
MICR read	ESC l or X'1B49'	90
Microcode tolerance (MCT) information - loading	ESC M <i>n h l</i> or X'1B4D;n;h;l'	45
Microcode tolerance (MCT) information - request	ESC S <i>n</i> or X'1B53;n'	45
Paper cut/DI eject	ESC i or ESC m or X'1B69' or X'1B6D'	94
Predefine messages	GS : <i>message# data</i> GS : or X'1D3A;message#;data;1D3A'	36
Print and feed paper <i>n</i> lines	ESC d <i>n</i> or X'1B64;n'	86
Print and feed paper using minimum units	ESC J <i>n</i> or X'1B4A;n'	86
Print and line feed	LF or X'0A'	85
Print and line feed	CR or X'0D'	85
Print bar code	GS k <i>n</i> NUL or X'1D6B;n;data;00'	72
Print logo inline	GS J <i>d n1 n2 data</i> or X'1D4A;d;n1;n2;data'	70
Print page in page mode	ESC FF or X'1B0C'	104
Print PDF417 bar code	GS P <i>data</i> NUL or X'1D;50;data;00'	80
Print predefined graphics (logo) command	GS / <i>m logo#</i> or X'1D2F;m;logo#'	88
Print predefined messages	GS ^ <i>message#</i> or X'1D5E;message#'	89
Proportional font	ESC & <i>s n m data</i> or X'1B26;s;n;m;data'	39
Real-time requests	DLE ENQ <i>m</i> or X'1005n'	95
Re-initialize the printer	ESC @ or X'1B40'	67
Request document length for landscape print	GS N X'02' Null or X'1D4E;02;00'	56
Reset line count	ESC 6 or X'1B36'	98
Retrieve size of user flash storage	ESC 4 x '03 FF FF FF' or X'1B34;03;FF;FF;FF'	95
Retrieve the flash storage	ESC 4 <i>n1 n2</i> X'1B34;n1;n2'	94

Table 10. Commands in alphabetical order (continued)

Description	Command	Page
Retrieve checksum of each downloaded logo or each stored message	ESC | n1 n2 or X'1B7C;n1;n2'	43
Retrieve Native Mode Status	GS N ENG NULL or X'1D4E0500'	28
Retrieve Native Mode Device ID	GS N ENG 01 or X'1D4E0501'	29
Return home (select print head location)	ESC < n or X'1B3C;n'	93
Select and print a graphics (logo) command	ESC * d w h data or X'1B2A;d;w;h;data'	86
Select aspect ratio PDF417 bar code	GS S r;c or X'1D53;r;c'	81
Select bar code height	GS h n or X'1D68;n'	79
Select character for reprinted lines	ESC + n or X'1B2B;n'	66
Select character size for scalable fonts	GS ! n or X'1D21;n'	69
Select color printing	ESC r n or X'1B72;n'	60
Select font for HRI	GS f n or X'1D66;n'	80
Select horizontal size of bar code	GS w n or X'1D77;n'	79
Select page mode	ESC L or X'1B;4C'	101
Select PDF417 ECC level	GS R n or X'1D52;n1;n2'	81
Select printable area	ESC X or X'1B58;x;y;dx;dy'	101
Select printing direction/position	ESC T n or X'1B54;n'	102
Select printing position of human-readable information (HRI)	GS H n or X'1D48;n'	79
Select standard mode	ESC S or X'1B4f'	101
Select user-defined or resident character sets	ESC % n or X'1B25;n'	57
Select 1/6-inch line spacing	ESC 2 or X'1B32'	60
Select 1/8-inch line spacing	ESC 1 or X'1B31'	59
Send checksum of flash EPROM sector	ESC " n or X'1B22;n'	43
Select maximum print speed	ESC / n or X'1B2F;n'	55
Set code page	ESC t n or X'1B74;n'	57
Set document length for landscape print	GS c 1 n	55
Set error recovery function	ESC c 4 n or X'1B63;34;n'	65
Set horizontal tab positions	ESC D [n1 n2] NUL NUL or X'1B44[n1n2]0000'	62
Set intercharacter spacing	ESC SP n or X'1B20;n'	58
Set left margin position	ESC \$ n1 n2 or X'1B24;n1;n2'	62
Set left margin position (standard mode), Set absolute print position (page mode)	ESC \$ n1 n2 or X'1B24;n1;n2'	103
Set line spacing using minimum units	ESC 3 n or X'1B33;n'	61

Table 10. Commands in alphabetical order (continued)

Description	Command	Page
Set or cancel double-high mode	ESC h <i>n</i> or X'1B68;n'	53
Set or cancel double-wide mode	ESC W <i>n</i> or X'1B57;n'	53
Set or cancel emphasized printing	ESC G <i>n</i> or X'1B47;n'	54
Set or cancel invert mode	ESC H <i>n</i> or X'1B48;n'	54
Set or cancel overline mode	ESC x'5F' <i>n</i> or X'1B5F;n'	54
Set or cancel rotated character	ESC V <i>n</i> or X'1B56;n'	59
Set or cancel underline mode	ESC – <i>n</i> or X'1B2D;n'	54
Set or cancel unidirectional printing	ESC U <i>n</i> or X'1B55;n'	55
Set print mode	ESC ! <i>n</i> or X'1B21;n'	51
Set print station parameters	ESC c 1 <i>n</i> or X'1B63;31;n'	59
Set print station	ESC c 0 <i>n</i> or X'1B63;30;n'	56
Set printing position	GS] <i>x y</i> or X'1D5D;x;y'	104
Set relative horizontal position	ESC <5C>h <i>n1 n2</i> or X'1B5C;n1;n2'	103
Set relative position	ESC \ <i>n1 n2</i> or X'1B5C;n1;n2'	63
Set right margin position	ESC] <i>n1 n2</i> or X'1B5D;n1;n2''	63
Set low paper calibration	GS c 2 or X'1D63;32'	64
Set relative vertical position	GS \ <i>y</i> or X'1D5C;y'	102
Set sheet eject length	ESC C <i>n</i> or X'1B43;n'	61
Set vertical position	GS \$ <i>y</i> or X'1D24;y'	102
Status request	ESC v or X'1B76'	28
Status sent to system	ESC) <i>n</i> or X'1B29;n'	66
Tab to next tab stop	HT or X'09'	92
Thermal code page	MCT commands; see Table 14 on page 46.	38
Verify previous commands completed	X'1B00;80;00'	27

System commands

This section describes the system commands.

Verify previous commands completed

Syntax:

X'1B00;80;00'

Purpose:

This command is used to ensure that all commands preceding it have been completed. The application waits for the status return with status byte 5, bit 1 set.

Remarks:

The printer status is returned in status bytes 1–16. Status byte 5, bit 1 is set after this request has been executed. See Chapter 6, “Status information,” on page 111 for more information.

Error Conditions:

None

Status request

Syntax:

ESC v or X'1B76'

Purpose:

The printer status is sent to the system. This command will be processed in the order it was received.

Remarks:

The printer status is returned in status bytes 1–16. See Chapter 6, “Status information,” on page 111 for more information. For RS-232 printers, this command is always buffered and processed in the order it is received.

Error Conditions:

None

Reset printer

Syntax:

DLE ENQ @ or X'100540'

Purpose:

The printer stops if processing a command and begins its reset routine. The print buffer is canceled. All commands are erased. All printer settings go back to default values.

Remarks:

None

Error Conditions:

None

EC/Request/Real-time status request

Syntax:

DLE ENQ 4 or X'100534' Immediate or X'1B008000' Buffered

Purpose:

To send the printer status to the system.

Remarks:

The printer status is returned in status bytes 1–16. Status byte 5 bit is set after the EC request is executed. When used as a buffered command, this command can be used to insure that all commands preceding it have been completed. The application waits for the status to return with Status Bytes 5, bit 1 set. (See Chapter 6, “Status information,” on page 111.)

Error conditions:

None

Retrieve Native Mode Status (when printer is in compatibility mode)

Syntax:

GS N ENG NULL or X'1D;4E;05;00'

Purpose:

To read the native mode status when in compatibility mode.

Remarks:

16 status bytes of data will be sent over the serial following the status bytes. Status byte 5 is set, indicating that there is extra data attached.

Note: Supported on 2xR/1NR printers.

Error conditions:

None

Retrieve Native Mode Device ID (when printer is in compatibility mode)

Syntax:

GS N ENG NULL or X'1D;4E;05;01'

Purpose:

To read out the native mode device ID when in compatibility mode.

Remarks:

Following the 8 compatibility mode status bytes is the native mode device ID status bytes.

Note: Supported on 2xR/1NR printers.

Error conditions:

None

Extended address command-request printer ID

Syntax:

GS I SOH or X'1D4901'

Purpose:

This command returns 15 bytes of printer-specific information following the printer status.

Printer ID format

Table 11. Device Type = 30

Byte 1:	Device type = 30	Reserved
Byte 2:	Device ID	08
Byte 3:	EC – HW version level	Reserved
Byte 4:	EC – Software release level	This level increments after a formal test cycle on the code. (This is the same as Status byte #4)
Byte 5:	EC – Software interim version Level	The level that would increment as fixes were released for test. If a customer had a “pre-released” level, this would be used to track their level.
Byte 6:	CR station width	<ul style="list-style-type: none"> 72 (0x48): 72 mm print width for 80 mm paper width 50 (0x32): 50 mm print width for 58 mm paper width

Table 11. Device Type = 30 (continued)

Byte 7:	DI station width 2CR/2NR = 0x50 1NR = 0x00	Portrait station width 80 or 0x50 for 80 mm print width Note: The 4610 is 80.33 mm print width; 474 dots at 150 dpi, and 374 at 120 dpi
Byte 8:	Feature byte detection 2CR / 2NR / 1NR = 0xFF	<p>Bit 0 Two-color printing</p> <p>Bit 1 Two-color enabled</p> <p>Bit 2 CR Cutter</p> <p>Bit 3 Out of Paper detection</p> <p>Bit 4 Low Paper Detection</p> <p>Bit 5 Cover Open Detection</p> <p>Bit 6 Paper jam detection</p> <p>Bit 7 Cutter failure</p>
Byte 9:	Feature byte 2CR = 0x9E 2NR = 0x86 1NR = 0x80	<p>Bit 0 Reserved</p> <p>Bit 1 DI Landscape Station; N/A for Model 1xR</p> <p>Bit 2 DI Station support multipart forms; N/A for Model 1xR</p> <p>Bit 3 MICR reader present; N/A for Models 2NR and 1xR</p> <p>Bit 4 Flipper present; N/A for Models 2NR and 1xR</p> <p>Bit 5 Scanner present; N/A for Models 1xR and 2xR</p> <p>Bit 6 Journal print station – N/A for Models 1xR and 2xR</p> <p>Bit 7 Cash drawer capable. Cannot detect when cash drawer is attached.</p>
Byte 10:	Feature byte	<p>Bit 0 DBCS capable</p> <p>Bit 1 DBCS enabled (character sets downloaded and DBCS mode selected)</p> <p>Bit 2 EJ capable</p> <p>Bit 3 EJ enabled (memory allocated for EJ)</p> <p>Bit 4 Beeper present - N/A for 2CR and 2NR</p> <p>Bit 5 Reserved</p> <p>Bit 6 Reserved</p> <p>Bit 7 Reserved</p>
Byte 11:	Feature byte	Command set version. This is incremented when major printer functions change.

Table 11. Device Type = 30 (continued)

Byte 12:	Communication settings	Bit 3 Bit set to 1 when printer is in RS232, XON/XOFF mode.
Byte 13:	Hardware options	<p>Bit 0, 1 Motion sensor card level 00 Sensor at 1NR, 2xR GA 01 Sensor card released 2Q 2010 10 Reserved 11 Reserved</p> <p>Bit 2, 3 Card Level Support 00 Initial release, first revisions 01 Card will support Ethernet 10 Reserved 11 Reserved</p> <p>Bit 4015 Reserved</p>
Byte 14:	Feature byte	Reserved
Byte 15:	Feature byte	Reserved

Emulation mode for Model 1xR / 2xR

The emulation mode for Model 1xR/2xR is intended for customers with applications that are hard-coded for their existing SureMark printers.

When the interface is Ethernet, compatibility mode is disabled. When in emulation mode, the printer will:

- Respond to the Device ID command and match one of the existing printers.
- Return a status that:
 - Matches the existing printers of 8 status bytes.
 - Fixes the “Status Byte 4” (for RS-232) EC level at 0x61
 - Fixes the EC level in the DEVICE ID at 0x61.
 - Sets status byte 1 bit 6 (CR cover open) if any of the following errors are detected:
 - CR feed error (status byte 11 bit 0)
 - CR paper out (status byte 8, bit 5)
 - Cutter jam (status byte 11 bit 5)
- Firmware download and erase commands: The firmware will look at the code that is downloaded to verify that the code is 1xR/2xR code before it erases the current code in the printer. If the code is not 1xR/2xR code, the old firmware will not be erased. No error bit will be set.

All DBCS characters must be downloaded at the same time.

Usage variables for system management cannot be read with the same commands as legacy printers. Use the Toshiba drivers for access to system management.

Physical differences between Models 1xR and 2xR and previous printers:

- The position of the cutter is different.
- Not as much paper needs to be fed to advance the paper above the print head.
- The default for the “0C” command will be less.

The diagnostic package recognizes the printer as being in emulation mode and sends the correct firmware file to the printer for updating.

The printer will be setup in Emulation mode when sent from the factory. Any driver and application that support Models 1xR and 2xR should put the printer into native mode when it is installed. This can also be done using an offline setup procedure.

Emulation of Non-Toshiba printers

A 1xR printer can be put into EPSON Emulation mode via an Offline setup or via a Software command, MCT #1E, bit 0. See Microcode Tolerance Information -Loading. If the printer is in Epson Emulation mode and you want to run the Toshiba Diagnostics for POS Systems and Peripherals package against the printer, then you must put the printer into native mode or legacy mode using the printer offline test mode before the diagnostics package is started. Once you have finished running Diagnostics against the printer, you can set the printer back into Epson Emulation mode using the utilities in the diagnostics package or the same function in the printer offline test mode.

- Emulation mode is only supported in the RS-232.
- Emulation is only supported in single-byte character set (SBCS) mode; can emulate an Epson single-station SBCS printer.
- Emulation mode provides full support for most Epson commands. However, some commands are supported partially and a few commands are not supported at all.
- There will be some differences in the printed output, because of different dot pitches in the print heads and the minimum distance that the paper feed motors can move the paper. These differences will appear when there are a number of printed lines, and the method of aligning the data is different.
- Logos and downloadable characters are supported in emulation mode. However, because the Epson printer prints at 180 dpi and the SureMark prints at 200 dpi, the emulated printout will be smaller.
- In order to implement fixes, new functionality, and other improvements, new releases of printer microcode are routinely published. It is advisable that you run the most recent version firmware on the printer.
- If one line is aligned using spaces and another line is aligned using the relative position commands, the data might appear misaligned. The commands, such as the relative position and margin commands that use the minimum unit of motion values are based on a fraction of an inch, which eliminates the differences in the dot pitch. Tabs and spaces are subject to pitch differences.
- To use one of the 1NR code pages while in EPSON Emulation Mode, store the code page number to MCT #0x81. See “Set code page” on page 57 for additional information.

Preset or onetime-set commands

The SureMark printer has commands to specialize and tune each printer to improve its usability, performance, and uniqueness. This flexibility is provided through the use of flash erasable programmable read-only memory (flash EPROM). Data in this memory device remains valid until it is redefined. This information only needs to be defined once because it remains for the life of the printer or until it is redefined.

To verify that data was previously stored in the printer, the system can request a checksum on data stored in each sector.

The Flash EPROM can be allocated up to 10 sectors. To rewrite information in a sector, you must first erase the sector.

- For logo commands and predefined messages, erasing the sector is necessary only to replace a logo or predefined message number, or when the length of the logo or message exceeds space available in that sector.
- For user flash memory, erasing the sector is necessary only when writing to an address that has already been written to.
- For user-defined thermal and impact characters, new characters can be added if they have the same matrix as characters already in the character set. If new character sets are added, the flash memory does not have to be erased. To replace characters, you must first erase the sector.

Sector Function:

- | | |
|----|---|
| 1 | Download graphics (logo) commands |
| 2 | Predefined messages |
| 3 | Two user-defined impact character sets |
| 4 | User-defined thermal character set: four fixed matrix or 2 proportional |
| 5 | User flash memory |
| 7 | Thermal DBCS character storage |
| 8 | Impact DBCS character storage |
| 9 | Electronic journal storage |
| 10 | User-defined code page mapping |

Memory allocation

The amount of memory allocated to each function is specified by the value stored to its respective MCT location. (See Microcode Tolerance Information - Loading and Microcode Tolerance Information - Request commands regarding information for adjusting these values.) The MCT value represents the number of 64KB sectors assigned to the respective function.

In Model 2xR/1xR reallocation: To change the memory allocation of any of the character sets (user-defined impact characters, user-defined thermal characters, thermal DBCS character storage, Impact DBCS character storage), ALL memory partitions must be emptied or erased. To change the memory allocation of any of the remaining functions, ALL remaining memory partitions must be emptied/erased. If the memory is not erased, an MCT write error status will be returned.

After the MCT values are written, the new values will not take effect until after a reset. The new memory allocations will start with the user defined character sets (sectors 3 and 4), and then the DBCS (sectors 7 and 8), and then increment upward starting with sector 1. Memory will be allocated until all requests are satisfied, or until all available memory is used.

There is a total of forty-eight 64 KB sectors, for a total of 3.0 MB of FLASH memory to allocate.

Note: The flash EPROM is guaranteed for a minimum life of 100,000 write/erase commands by the flash manufacturer.

Table 12 on page 34 lists the printer defaults.

Table 12. Printer memory allocation defaults

Function	Default memory allocation	MCT location
User-defined impact characters**	64 KB (0x0001) - 2xR 0 KB - 1xR	0xa0
User-defined thermal characters	64 KB (0x0001)	0xa1
Logos	64 KB (0x0001)	0xa2
Predefined messages	64 KB (0x000a)	0xa3
User memory	128 KB (0x0002)	0xa4
Scan image storage	0 KB (0x0000) for Model 2xR and 1xR	0xa5
Thermal DBCS character storage	1152K (0x0012)	0xa6
Impact DBCS character storage**	567 KB (0x0009)	0xa7
Electronic journal storage Note: For electronic journal storage in the printer, use the drivers provided by Toshiba. See www.toshibagcs.com/support .	0KB (0x0000)	0xa8
User defined code page mapping	64 KB	0xa9
**For single station printers, the impact DBCS character storage and the user-defined impact characters storage cannot be addressed: they remain at 0 KB.		
DBCS Code page Note: As double-byte code pages are modified, these allocations could change. See the double-byte information available at www.toshibagcs.com/support .	Memory allocation required for thermal DBCS (0xa6)	Memory allocation required for impact DBCS (0xa7)**
		N/A for 1xR In the 1xR this value is fix to 0KB.
Japan - 932	0x0007 (448 KB)	0x00004 (256 KB)
Traditional Chinese - 950	0x000E (960 KB)	0x0007 (448 KB)
Simplified Chinese - 1381	0x0007 (448 KB)	0x0004 (256 KB)
Korean - 949	0x0007 (448 KB)	0x0003 (192 KB)

Double-byte characters

Important

Use the Toshiba-provided drivers, diagnostics, and utilities to download the DBCS characters to the printer.

Download graphics (logo) commands

Syntax:

GS * logo# n1 n2 data or X'1D2A;logo#;n1;n2;data'

Where:

logo# The logo number being stored

1 \leq logo# \leq 255

n1 One-eighth the number of dots in the horizontal direction (width = 8 × n1).

range = 1 to 72 for a thermal logo

range = 1 to 59 for an impact logo

n2 One-eighth the number of dots in the vertical direction (height = 8 × n2).

range = 1 to 255 for a thermal logo

range = 1 to 5 for an impact logo

data The data to form the graphics image. The number of data bytes for the image is $n1 \times n2 \times 8$

Purpose:

To store all-points-addressable print messages

Remarks:

A checksum is stored in the printer for each logo downloaded to the printer. See “Retrieve checksum of each downloaded logo or each stored message” on page 43. The checksum can be read by the application to determine the logos that have been stored in the printer. These messages can be positioned on the page using the commands for setting positions.

Decimal values are shown, but all parameter values (logo number, n1, n2) must be hex values when sent to the printer.

The dot density of these messages is specified when the message is printed. See “Print predefined graphics (logo) command” on page 88.

The total number of data bytes defined for all defined graphics messages depends upon the amount of memory the user has allocated. See “Memory allocation” on page 33.

If the parameters logo#, n1, or n2 are out of range, the command is discarded and its remaining data is processed as print data.

This command should be sent only when the data buffer is empty. See the description of bit 6 in “Erase flash sector” on page 44.

Images for the thermal logo commands will be defined by one-dot-high rows (horizontal slices), and the impact will be defined by eight-dot-high rows (vertical slices).

Note: For a thermal graphic message that is 24 dots high, across the page (n1 = 72, n2 = 3) takes over 2000 bytes of data.

Example: n1 = 2 & n2 = 2

slice #	row #	Bit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Data	bytes
0 (MSB)	7	7	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	1	2
1	6	6	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	3	4
2	5	5	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	5	6
3	4	4	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	7	8
4	3	3	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	9	10
5	2	2	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	11	12
6	1	1	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	13	14
7 (MSB)	0	0	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	15	16
8 (MSB)	7	7	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	17	18
9	6	6	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	19	20
10	5	5	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	21	22
11	4	4	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	23	24
12	3	3	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	25	26
13	2	2	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	27	28
14	1	1	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	29	30
15 (LSB)	0	0	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	31	32

Bit # → (MSB) 7 6 5 4 3 2 1 0 7 6 5 4 3 2 1 0 (LSB)

Data Byte → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Data Byte → 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

For Thermal Graphics - Defined as:

X'1D2A010202AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
55555555555555555555555555555555'

For Impact Graphics - Defined as:

X'1D2A020202FF00FF00FF00FF00FF00FF00FF00FF00
00FF00FF00FF00FF00FF00FF00FF00FF'

Error Conditions:

The error is status byte 3, bit 3: Flash EPROM load error. The following conditions caused this error to occur:

- The command is trying to redefine a logo that was already defined, or
- The allocated memory is full.

Verify the sector was erased before downloading images.

Predefined messages

Syntax:

GS : *message# data* GS : or X'1D3A;*message#;data;1D3A'*

Where:

message# The message number being stored

1 to 255

data All data and commands to be included in this message. No immediate commands can be included in the data.

Purpose:

To store predefined messages. This cuts transmission time. This is where you can store the header and the trailer of receipts, for example.

Remarks:

- After a "GS ::" occurs, all incoming commands are stored in the message until another "GS ::" occurs.

- “Print predefined graphics (logo) command” on page 88 can be included in this command.
- A Checksum for each downloaded message is stored along with the message. This can be used to verify the correct messages are stored in the printer at printer initialization. See “Retrieve checksum of each downloaded logo or each stored message” on page 43.

Example:

Store a trailer message:

```
X'1D3A01'
'Thank You For Shopping' X'0D'
' At RSD STORE' X'0D'
'Store #1234567' X'0D'
X'1D3A'
```

This would store this message as predefined message 1. See “Print predefined messages” on page 89 for printing this trailer message. Commands for selecting the print station and print characteristics must be included with the stored message.

Limitations:

- “Print predefined graphics (logo) command” on page 88 can be included in this command. Select and print a graphics command cannot be used. See “Print graphic messages” on page 86.
- “Print predefined messages” on page 89 can be included in this command, but can only be nested one message deep.

Example: Store a predefined message ('Jane Doe') at location 3, then issue the following commands:

1. X'1D3A06'
2. 'Welcome to Our Store' X'0D'
3. X'1D5E03' (This prints the message that has been stored at location 3. The message cannot have a X'1D5Exx' in it, because that would be more than one level of nesting.)
4. 'Is Your Cashier Today' X'0D'
5. X'1D3A'

Using the stored message and the above commands, the resulting text will be:

```
Welcome to Our Store
Jane Doe Is Your Cashier Today
```

- These commands **cannot** be included in the predefined message:
 - “Define document wait time” on page 65.
 - “Select character for reprinted lines” on page 66.
 - “Set sheet eject length” on page 61.
 - “Select and print a graphics (logo) command” on page 86.
- This command should be sent only when the data buffer is empty. See the description of bit 6 in “Erase flash sector” on page 44.

Error Conditions:

The error is Status byte 3, bit 3: Flash EPROM load error. The following conditions caused this error to occur:

- The command is trying to redefine a logo that was already defined, or
- The allocated memory is full.

Verify that the sector was erased before downloading images.

Download user-defined characters

Syntax:

ESC & *s n m data* or X'1B26;s;n;m;data'

Where:

- s** The character set being defined
- 1** User-defined thermal code page 1
 - 2** User-defined thermal code page 2
 - 3** User-defined thermal code page 3
 - 4** User-defined thermal code page 4
 - 5** User-defined impact code page 1
 - 6** User-defined impact code page 2
- n** The beginning ASCII address of the characters being defined.
- m** The ending ASCII address of the characters being defined.
- data** The slice data for the defined characters. Note the number of bytes is determined by which code page is being defined and the character matrix of that code page.

Purpose:

To define a matrix pattern for user-definable code pages stored in flash EPROM.

Remarks:

- After characters are downloaded to the printer, they remain valid until you redefine them. This is true even if power to the printer is removed.
- Before the characters are defined, the sector of the flash EPROM which stores this data must be erased. (See “Erase flash sector” on page 44.) Also, the character matrix for the code page must have already been defined. (See Table 14 on page 46, MCT# 3, 4, and 5.)
- Flash EPROM sector 4 contains all user-defined code pages for the thermal printhead. To redefine a code page, you must erase and reprogram all of them.
- Flash EPROM sector 3 contains both user-defined code pages for the impact print head. To redefine a code page, you must erase and reprogram both of them.
- You cannot redefine one character only. You must redefine a whole code page.
- This command should be sent only when the data buffer is empty. See the description of bit 6 in “Erase flash sector” on page 44.
- ASCII characters 0-31 are reserved for commands.

Thermal code page

You define the character matrix (width/height) for each code page. The values are stored as Microcode Tolerance values in the EEPROM. See Table 14 on page 46.

Note: The height must be an even number. If an odd number is downloaded, the command will be rejected.

The number of data bytes per character loaded is $2 \times \text{the character height}$. The total number of data bytes for this command is $2 \times \text{the character height} \times (1+m-n)$.

Example: 10 wide x 20 high

slice # row #	1	2	3	4	5	6	7	8	9	10	Data	bytes
1	X	X	.	.	.	.	.	.	X	X	1	2
2	X	X	.	.	.	.	.	.	X	X	3	4
3	X	X	.	.	.	.	.	.	X	X	5	6
4	X	X	.	.	.	.	.	.	X	X	7	8
5	X	X	.	.	.	.	.	.	X	X	9	10
6	X	X	.	.	.	.	.	.	X	X	11	12
7	X	X	.	.	.	.	.	.	X	X	13	14
8	X	X	.	.	.	.	.	.	X	X	15	16
9	X	X	X	X	X	X	X	X	X	X	17	18
10	X	X	X	X	X	X	X	X	X	X	19	20
11	X	X	X	X	X	X	X	X	X	X	21	22
12	X	X	.	.	.	.	.	.	X	X	23	24
13	X	X	.	.	.	.	.	.	X	X	25	26
14	X	X	.	.	.	.	.	.	X	X	27	28
15	X	X	.	.	.	.	.	.	X	X	29	30
16	X	X	.	.	.	.	.	.	X	X	31	32
17	X	X	.	.	.	.	.	.	X	X	33	34
18	X	X	.	.	.	.	.	.	X	X	35	36
19	X	X	.	.	.	.	.	.	X	X	37	38
20	X	X	.	.	.	.	.	.	X	X	39	40

Bit # → (MSB) 7 6 5 4 3 2 1 0 7 6 (LSB)

Defined as:

```
X'C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0FFC0FFC0
IC0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0'
```

The above statement defines character X'48' as an 'H'.

Note: The number of data bytes = $2 \times \text{dot height} (20) = 40$ bytes.

Proportional font

Note: The syntax for the proportional font command is the same command as the “Download user-defined characters” on page 38 with limitations.

EIA-232 Syntax:

```
ESC & s n m data or X'1B26;s;n;m;data'
```

Where:

- s** The character set being defined
 - 1** User-defined thermal code page 1
 - 3** User-defined thermal code page 3
- n** The beginning ASCII address of the characters being defined
- m** The ending ASCII address of the characters being defined
- data** The height and width of the character, and the matrix pattern for the data. The number of data bytes is $(m-n+1) \times (2+wb \times 32)$. *wb* is defined in the MCT command.

Purpose:

To download and print proportional fonts (True Type fonts) in the thermal

station. Each character in the code page has its own unique width and height. The matrix must be within the following ranges:

Width $8 \leq \text{width} \leq 32$

Height
 $8 \leq \text{width} \leq 32$

Remarks:

- Proportional and standard fonts may be used on the same line. If both types of fonts are used on a line, you would probably use proportional fonts for the description and resident fonts for the amounts.
- For alignment, a command that will allow right and left alignment on the same line may be used. This will allow the user to align a column (decimal point) on the right, and still be left-aligned. (See “Align positions” on page 64).
- Once characters are downloaded to the printer, they remain valid until you redefine them. This is true even if power to the printer is removed.
- Before the characters are defined, the sector of the flash EPROM which stores this data must be erased. (See “Erase flash sector” on page 44).
- You cannot redefine one character only. You must redefine a whole code page.
- If the parameter **s**, **n**, or **m** is out of range, the command is discarded and the remaining data is processed as print data.
- This command should be sent only when the data buffer is empty. See the description of bit 6 in “Erase flash sector” on page 44.
- ASCII characters 0 through 31 are reserved for EIA-232 functions and cannot be defined.
- See “Proportional fonts” on page 119 for suggestions about how to implement proportional fonts.

Limitations:

The memory required for proportional fonts is much greater than the memory that was required for user-defined fonts. Therefore, when code page 1 (or 3) is set up as proportional, code page 2 (or 4) is not valid.

You cannot set up code page 2 or code page 4 as a proportional font.

A conversion program for TrueType (TT) fonts is available on the 4610 Web site. This program converts the TT fonts to the required download format for the 4610 printers.

To download the font:

1. Store the code page matrix as an MCT value. Use the command X'1B 4D x 55 wb' where:
x X'02' for thermal code page 1, X'17' for thermal code page 3
wb The number of bytes, which is also 1/8 the number of dots, in the width of the widest character. The valid range is $2 \leq wb \leq 4$.
2. Erase the existing character set using the command X'1B 23 04'.
3. Use the proportional font command to download the font.

Example:

To define an A to code page 1 when *wb* is set to 02, enter the following:

Landscape printing is limited to characters with a height of 9 dots or less. If user-defined characters are to be used in landscape print mode, they must be less than 10 dots high.

The number of data bytes per character loaded is $2 \times \text{character width}$. The total number of data bytes for this command is $2 \times \text{character width} \times (1+m-n)$. Each slice is defined with two bytes; the most significant bit (MSB) of each slice is the bottom of the character.

When defining wire patterns, the same wire does *not* fire in consecutive, primary (P) and secondary (S) positions. (The printer does not check for errors in defining the character.) If the character is defined with dots in consecutive positions only one of the dots is fired.)

Example: 11 half-dots wide (or 5.5 full dots) × 9 high

slice # →	1		2		3		4		5		6
Bit #	P	S	P	S	P	S	P	S	P	S	P
7 (MSB)	.	.	.	.	.	X	.	.	.	.	.
0 (LSB)	.	.	.	.	X	.	X	.	.	.	.
1	.	.	.	X	.	.	.	X	.	.	.
2	.	.	X	.	.	.	.	.	X	.	.
3	.	X	.	.	.	.	.	.	.	X	.
4	X	.	X	.	X	.	X	.	X	.	X
5	X	.	.	.	.	.	.	.	.	.	X
6	X	.	.	.	.	.	.	.	.	.	X
7 (MSB)	X	.	.	.	.	.	.	.	.	.	X
Data Byte	2		4		6		8		10		12
Data Byte	1		3		5		7		9		11
	13		15		17		19		21		22

Defined as:

X'1B26034141F000080014000200110000081100020014000800F000'

The above statement defines character X'41' as an 'A'.

Note: The number of data bytes = $2 \times \text{dot width (11)} = 22$ bytes.

Error Conditions:

Flash EPROM load error - Verify the sector was erased before downloading images.

User-defined code page mapping

485/USB Syntax:

X'1B;6a;data'

RS232 Syntax:

ESC j data or X'1B;6a;data'

Where:

data 256 bytes of data to fill code page.

Remarks:

Each character is referenced by its Unicode number. If the Unicode for a character downloaded is NOT part of the resident characters stored in the printer, a space character will be inserted.

Note: The table below only shows a portion of code page 858. If the entire code page 858 were shown, the table would have 128 rows instead of the 9 rows shown below.

Table 13. Unicode positions for code page 858 - 2 bytes for each mapping location

U00000C7	Ç	80h
U00000FC	ü	81h
U00000E9	é	82h
U00000E2	â	83h
.....
U00000B9	1	FBh
U00000B3	3	FCh
U00000B2	2	FDh
U00025A0	■	FEh

For the Unicode characters supported in the printers please see separate Spread Sheet.

Characters 0x20 through 0x7F are the same as other codepages. Therefore, the amount of Unicode values will be from 0x80 through 0xFF (128 Unicode values, 256 bytes).

Selection of the User Defined code page is ignored if the code page has not been defined. The previous codepage will still be selected.

Error conditions:

- Flash EPROM Load Error: Verify that this sector was erased before downloading the images.
- Command Reject: When there is no memory allocated for this function.

Request checksum of flash memory sector

Syntax:

ESC " n or X'1B22;n'

Where:

- n
- 01 Sector 1 - downloaded graphics
- 02 Sector 2 - predefined messages
- 03 Sector 3 - user-defined impact character set
- 04 Sector 4 - user-defined thermal character sets
- 05 Sector 5 - user flash storage
- 06 Thermal double byte character sets
- 07 Impact double byte character sets
- 08 User defined code page mapping

Purpose:

To verify data integrity of the data loaded in the Flash EPROM in the printer.

Retrieve checksum of each downloaded logo or each stored message

ESC | n1 n2 or X'1B7C;n1;n2'

where

- n1** = 0x01 for downloaded logos
= 0x02 for stored messages
- n2** The number of the downloaded logo or message that is being queried.

1 <n2<255 or 0x1 < n2 <= 0xFF

Purpose

To verify data integrity of the logos or messages stored in the printer. The printer responds with a 2 byte checksum following the status bytes. If the logo or message is not defined, the checksum will respond as 0x0000.

Status byte 10 bit 2 will be set when this status is returned.

Flash storage write

Syntax:

ESC ' n1 n2 data or X'1B27;n1;n2;data'

Where:

n1 = number of data bytes to store

n2 = 3-byte address where data bytes are to be stored

Error Conditions:

Flash EPROM load error: Verify the sector was erased before downloading data.

Remarks:

The valid address range depends on the memory allocated to this function. Use "Retrieve size of user flash storage" on page 95 to determine the valid range.

The command is rejected when the address is out of range.

Erase flash sector

Syntax:

ESC # n or X'1B23;n'

Where:

n

01 downloaded graphics

02 predefined messages

03 user-defined impact character set

04 user-defined thermal character sets

05 flash storage

06 double byte characters

07 reserved

08 Scanned image storage area; n/a for Models 2xR and 1xR

09 Electronic journal storage area

0A User-defined code page mapping

0B - FF

Reserved

Purpose:

To erase the flash EPROM before downloading the data into the printer.

Remarks:

The command should only be sent to the printer when the buffer is empty (status byte 2, bit 6). No other commands should be sent until this command is complete.

Status byte 3, bit 7 (command complete bit) is set to show erasing is finished and the command is complete.

The flash EPROM is guaranteed for a minimum life of 100,000 write/erase commands by the Flash manufacturer.

Microcode tolerance (MCT) information - loading

Syntax:

ESC M *n h l* or X'1B4D;n;h;l'

Where:

n Microcode tolerance (MCT) that is being adjusted

h The high-order byte of MCT data

l The low-order byte of MCT data

Purpose:

The microcode tolerance (MCT) information is used to make adjustments to the printer's microcode. MCT data is nonvolatile data stored in the printer EPROM that is specific to a printer. For example, an MCT parameter can be defined to adjust for mechanical tolerances which cause a print line to not be centered on a document. Another would be for adjusting for the number of motor steps to the first print position on a document. This data remains intact until changed by the user.

Remarks:

Table 14 on page 46 lists the MCT values by the parameter (*n*). The table includes the default, the minimum, and the maximum values of each MCT.

If you try to set an MCT value out of its defined range, it is set to the closest limit (the minimum or maximum value) or rejected.

Error Conditions:

EPROM load error

Microcode tolerance (MCT) information - request

Syntax:

ESC S *n* or X'1B53;n'

Where:

n Microcode tolerance (MCT) information that is being requested

Purpose:

To enable reading MCT information from EEPROM.

Remarks:

- MCT data is sent over the serial line after status bytes. See Table 14 on page 46 for the values of parameter *n*.
- MCT write command values that are out of range will cause the command to be rejected. (See bit 7 of "Status byte 1" on page 112.)

Table 14. MCT command definitions

DEC	HEX	MCT	Default	Min	Max
1	1	DBCS code page Byte 1: Code page selected Byte 2: Matrix for the impact code page. 0 = 16 x 16 matrix 1 = 9 x 16 matrix	X'FF00'	X'0000'	X'FFFFH'
2	2	Matrix of user-defined thermal code page 1 Byte 1: Dot row width Byte 2: Dot row height	X'0A14' (10x20)	X'0810'	X'1020' (16x32)
3	3	Matrix of user-defined thermal code page 2 Byte 1: Dot row width Byte 2: Dot row height	X'0A14' (10x20)	X'0810'	X'1020' (16x32)
4	4	Matrix of user-defined impact code page 1 Byte 1: Half-dot row width Byte 2: Dot row height	X'0707' (07x07)	X'0404'	X'1010' (16x16)
5	5	Matrix of user-defined impact code page 2 Byte 1: Half-dot row width Byte 2: Dot row height	X'0707' (07x07)	X'0404'	X'1010' (16x16)
23	17	Matrix of user-defined thermal code page 3 Byte 1: Dot row width Byte 2: Dot row height	X'0A14' (10x20)	X'0810'	X'1020' (16x32)
24	18	Matrix of user-defined thermal code page 4 Byte 1: Dot row width Byte 2: Dot row height	X'0A14' (10x20)	X'0810'	X'1020' (16x32)

Table 14. MCT command definitions (continued)

DEC	HEX	MCT	Default	Min	Max
30	1E	<p>Mode options</p> <p>Bit 0: (Valid in the 1xR printers)</p> <ul style="list-style-type: none"> • 1 = Toshiba native mode. • 0 = Set to non-Toshiba emulation mode. <p>Bits 1–12 Reserved for future use, should be left at 1</p> <p>Bit 13: (DI portrait mode only)</p> <ul style="list-style-type: none"> • 1 = Line feeds not executed until DI ready (non-Toshiba mode). • 0 = Line feeds are executed without regard for the state of DI ready (Toshiba mode). <p>Bit 14:</p> <ul style="list-style-type: none"> • 1 = Normal operations (Toshiba mode). • 0 = Switch order of font A and font B (non-Toshiba mode). <p>Bit 15:</p> <ul style="list-style-type: none"> • 0 = Disable CR (X'0D') in CR station. No line feeds in DI (non-Toshiba mode). • 1 = Normal operations. Treat CR (X'0D') the same as line feeds (X'0A'). (Toshiba mode). 	X'FFFF'	N/A	N/A
33	21	<p>RS232 - Communication. Baud/DataFlow</p> <p>Bit 15</p> <p>1 = DTR/DSR Dataflow 0 = XON/XOFF</p> <p>Bit 14</p> <p>1 = System Unit Flow Control (DTR) Disabled 0 = System Unit Flow Control (DTR) Enabled</p> <p>Bit 13-8 Reserved</p> <p>Bit 7 -0 BAUD Rate: 9600 Baud == xx08h 19200 Baud == xx10h 115200 Baud == xx60h</p>	FF60h on Models 1xR and 2xR		FFFFH

Table 14. MCT command definitions (continued)

DEC	HEX	MCT	Default	Min	Max
51	33	DBCS Address Vector 1	80FFh	0000H	FFFFH
52	34	DBCS Address Vector 2	0000h	0000H	FFFFH
53	35	DBCS Address Vector 3	0000h	0000H	FFFFH
68	44	Power supply capabilities - peak current - mAmps			
96-104	60-68	Reserve for manufacturing / native windows driver			FFFH
105 - 108	69 – 6E	Printer usage statistics	N/A	N/A	FFFFH
111	6F	Status request options:	N/A	0	FFFFH
		<p>Bit 15: See “Microcode tolerance (MCT) information - request ” on page 45. The status returned when the bit is set to 1, the MCT number is not sent with the MCT data; when the bit is set to 0, the MCT number is sent in byte after MCT data.</p> <p>Bit 14: 1 = compatibility mode with older printers. 0 = Models 1xR and 2xR native mode. The number of Status bytes increases and the format of the Device ID response has changed. See “Extended address command-request printer ID” on page 29.</p> <p>Bit 13: 1 = MICR will be read into the flipper. 0 = MICR reading setup for back-to-back MICR reads. First read into the throat of printer, then read into the flipper.</p> <p>Bit 12: Magnetic noise level: 1 = compatibility mode with older printers. 0 = The data sent from the printer as a result of a MICR read command (1B;49) will include a byte with the amplitude of a noise level. Data would be structured as {Signal Strength; magnetic noise level; MICR read data}</p> <p>Bit 11: MICR Raw data format; 1 = compatibility mode with older printers. 0 = Change the MICR data response to TOAD Format. Symbol Definition “T” TRANSIT “O” ON-US “A” AMOUNT “D” DASH</p> <p>Bits 10: Electronic Journal Options: When all electronic journal sectors are full. 0 = Printer automatically erases the ‘earliest’ session to store the latest data. If there is only one session, the automatic erasing will not work and printer will report an error that all sectors are full. 1 = Printer will report back an error message that all sectors are full. A session must be erased before more EJ data can be stored. Note: For electronic journal storage in the printer, use the drivers provided by Toshiba. See www.toshibagcs.com/support.</p> <p>Bits 9- 0: Reserved for future use – should remain at 1.</p>			
129	81	Default Code Page. Upper nibble reserved. Lower nibble default code page. See “Set code page” on page 57 for options.	FF01h	FF00h	FF18h
160	A0	User Defined Impact Character Memory Allocation	0001h - 2xR 0000h - 1xR	0000h	0001h
161	A1	User Defined Thermal Character Memory Allocation	0001h	0000h	0001h
162	A2	User Defined Logos Memory Allocation	0001h	0000h	0030h
163	A3	Predefined messages Memory Allocation	0001h	0000h	0030h
164	A4	User FLASH Storage Memory Allocation	0002h	0000h	0030h
165	A5	Scan Image Storage Memory Allocation	0000h	0000h	0000h
166	A6	Thermal DBCS Character Storage Memory Allocation	000Eh	0000h	002Fh

Table 14. MCT command definitions (continued)

DEC	HEX	MCT	Default	Min	Max
167	A7	Impact DBCS Character Storage Memory Allocation	0000h - 1xR 0007h - 2xR	0000h	002Fh
168	A8	Electronic Journal Storage Memory Allocation	0000h	0000h	0030h
169	A9	User-defined Code Page Mapping	0001h	0000h	0001h
214	DB	White Space Reduction With the following bit low, the reduction will be as follows: Bit 0: 2 dots between print line Bit 1: 4 dots between print line Bit 2, 3: Reserved Bit 4: 75% reduction of blank space Bit 5: 50% reduction of blank space Bit 6, 7: Reserved Bit 8: 75% Barcode height reduction Bit 9: 50% Barcode height reduction Bit 10: 25% Barcode height reduction Bit 11: Reserved Bit 12: Font A override Bit 13, 14, 15: Reserved	0xFFFF		

White Space Reduction

This function overrides the application settings for line spacing, height of barcodes, and font. This is intended for customers that would like to reduce the paper printed without changing their existing applications. This can be setup either via the offline test or setting MCT # 0xDB.

Supported on:

- 1xR / 2xR printers
- Thermal Print Station only
- At EC level 0F.xx and above

Syntax:

X'1B;4D;DB;n1;n2'

Where:

n1; n2 With the following bit low, the reduction will be as follows:

Bit 0: 2 dots between print line

Bit 1: 4 dots between print line

Bit 2, 3:
Reserved

- Bit 4:** 75% reduction of blank space
- Bit 5:** 50% reduction of blank space
- Bit 6, 7:**
Reserved
- Bit 8:** 75% Barcode height reduction
- Bit 9:** 50% Barcode height reduction
- Bit 10:**
25% Barcode height reduction
- Bit 11:**
Reserved
- Bit 12:**
Font A override
- Bit 13, 14, 15:**
Reserved

For reference:

The printer feeds at 200 steps per inch.
 6 LPI ==> 34 steps/line
 8 LPI ==> 26 steps/line
 Font A = 20 dots tall (18 + 2 rows for descenders)
 Font B = 24 dots tall (22 + 2 rows for descenders)

When the applications set the printer to:

Font B / 6LPI == 10 dots white space between line
 Font A / 6LPI == 14 dots white space between line
 Font A / 8LPI == 6 dots white space between line
 Font B / 8LPI == 2 dots white space between line

The height of the barcode is set by the application with the command Select Vertical Size of Bar Code. The default is 162 dots high.

Example:

A receipt with setting: Font B, 6 LPI, and barcode height of 0.8 inches

Choose to reduce the following:

2 dots between print lines and Font A override → changes 34 dots per line to 22
 75% reduction of blank space → changes 34 dots per line to 8.5

75% Barcode height reduction → depends on height of barcode

Table 15. n1; n2 → 0xEEEE

	Calculation of dots	Size as printer on application (inches)	Dots	Reduce size (inches)
½ inch Logo	100	0.5	100	0.5
25 text print lines	25*34 = 816	4.0	25*22 = 550	2.8
9 blank lines	9*34 = 306	1.5	9*8.5 = 77	0.4
Barcode	162	0.8	(162/4) + 2 = 42	0.4
Total		6.8		4.1

Setup commands

Setup commands change character font, intercharacter spacing, and the target print station.

Set print mode

Syntax:

ESC ! *n* or X'1B;21;*n*'

Where:

n Specifies print characteristics, as shown in Table 16.

Table 16. Print characteristics

Bit Number	Function	Bit=0	Bit=1	Thermal	Impact
(LSB) 0	CPI/font	Char/page	See below	yes	yes
1	Font	Char/page	See below	yes	yes
2	Overline	Cancel	Set	yes	no
3	Emphasized	Cancel	Set	yes	yes
4	Double-high	Cancel	Set	yes	yes
5	Double-wide	Cancel	Set	yes	yes
6	Inverted/DBCS compressed	Cancel	Set	yes	DBCS only
(MSB) 7	Underlined	Cancel	Set	yes	no

Default:

n = 00

Example

To set the print mode to Font B, Emphasized, and Underlined, use the X'1B;21;89' command.

Remarks:

Single byte character sets:

- Table 17 lists the characters to select fonts A, B, or C.

Table 17. Characters that select font A, B, and C

Bit	User defined Thermal	User defined Impact	Resident Thermal	Resident Impact
1 0	Code page 1	Page 1 @ 150 dpi	Font A	Font A
0 0	Code page 2	Page 1 @ 120 dpi	Font B	Font B
1 0	Code page 3	Page 2 @ 150 dpi	Font C	Font A
1 1	Code page 4	Page 2 @ 120 dpi	Reserved	Font B

- For thermal printing:
 - Font A = 10 dots (wide) × 20 dots (high) or 1.25 mm × 2.5 mm.
 - Font B = 12 dots (wide) × 24 dots (high) or 1.5 mm × 3.0 mm.
 - Font C = 8 dots (wide) × 20 dots (high) or 1.0 mm × 2.0 mm.Invert cannot be used with over-line and underline.

- For impact printing:
 - Font A = dot density of 75 half-dots per inch (resident characters = 1.2 mm × 2.0 mm).
 - Font B = dot density of 60 half-dots per inch (resident characters = 1.5 mm × 2.0 mm).

Emphasized printing enable and disable, and font A or font B selection must be at the beginning of a print line to be recognized.

User-defined characters greater than 9 dots high cannot be printed double high in T11/2 printers.

Double-high and emphasized characters are not valid in landscape mode.
- See Chapter 7, “Character fonts,” on page 119, “Download user-defined characters” on page 38, “Set print station” on page 56, and “Select user-defined or resident character sets” on page 57 for related information.

Double byte character sets:

- For thermal printing:

Font size supported = 24 dots (w) x 24 dots (H) or 3.0 mm x 3.0 mm

The number of characters per line is dependent on the intercharacter spacing. For example, if intercharacter spacing is six:

 - There are 19 characters/line with 80 mm paper
 - There are 13 characters/line with 50 mm paper
- For impact printing:

There are two different font matrixes supported by the printer firmware; however, only one font matrix can be downloaded into the printer at a time:

 - 16 dots x 16 full-dots
 - 9 dots x 16 half-dots
- Matrix 16x16

Characters can be printed in the following sizes:

Normal

 - 75 DPI - 5.4 mm (weight) x 4.0 mm (height)
 - 60 DPI - 6.8 mm (weight) x 4.0 mm (height)
 - Printed in 2 passes or the print head
 - Top half of character
 - Bottom half of character
 - Print speed ~2 lines per second

Compressed

 - 150 DPI - 2.7 mm (weight) x 4.0 mm (height)
 - 120 DPI - 3.4 mm (weight) x 4.0 mm (height)
 - Printed in 4 passes or the print head
 - 1st pass: Top half of character, primary dots
 - 2nd pass: Top half, secondary dots
 - 3rd pass: Bottom half, primary dots

- 4th pass: Bottom half, secondary dots
- Print speed reduces to ~1 line per second

The size printed is controlled by bit 0 and bit 6:

- Bit 0 can only be changed at the beginning of a print line.
- Bit 6 can change at any time.

Characters that are 150 DPI and 75 DPI can be mixed on a line. However, characters that are 150 DPI and 120 DPI cannot be mixed on a line. For example, if you have an intercharacter spacing of 3:

- 75 DPI - 13 characters per line (237 dots per line); n=0x00
- 60 DPI - 10 characters per line (190 dots per line) n=0x01
- 150 DPI - 24 characters per line (474 dots per line) n=0x40
- 120 DPI - 19 characters per line (379 dots per line) n=0x41

- Matrix 9x16

Bit 6 has no effect on this font.

Characters are printed in the following sizes:

- 150 DPI - 2.7 mm (weight) x 2.2 (height)
- 120 DPI - 3.4 mm (weight) x 2.2 mm (height)

For example, if the intercharacter spacing is three:

- 150 DPI - 24 characters per line (474 dots per line)
- 120 DPI - 19 characters per line (379 dots per line)

Set or cancel double-wide mode

Syntax:

ESC W *n* or X'1B57;n'

Where:

n=00 Cancel double-wide mode

n=01 Set double-wide mode

Default:

n = 00

Set or cancel double-high mode

Syntax:

ESC h *n* or X'1B68;n'

Where:

n=00 Cancel double-high mode

n=01 Set double-high mode

Default:

n = 00

Purpose:

For better print quality with double-high characters in the document station.

Remarks:

See "Set or cancel unidirectional printing" on page 55.

Set or cancel underline mode

Syntax:

ESC – *n* or X'1B2D;*n*'

Where:

n=00 Cancel underline mode

n=01 Set underline mode

Default:

n = 00

Remarks:

This is valid in the Cash Receipt station.

Set or cancel overline mode

Syntax:

ESC x'5F' *n* or X'1B5F;*n*'

Where:

n=00 Cancel overline mode

n=01 Set overline mode

Default:

n = 00

Remarks:

This is valid in the customer receipt station only.

Set or cancel invert mode

Syntax:

ESC H *n* or X'1B48;*n*'

Where:

n=00 Cancel Invert Mode

n=01 Set Invert Mode

Default:

n = 00

Remarks:

This is valid in the customer receipt station only.

Set or cancel emphasized printing

Syntax:

ESC G *n* or X'1B47;*n*'

Where:

n=00 Cancel Emphasized Mode

n=01 Set Emphasized Mode

Default:

n = 00

Remarks:

This must be at the beginning of a print-line in the document portrait station. It is enabled for the entire line.

Select maximum print speed

Syntax:

ESC ? *n* or X'1B2F;*n*'

Where:

n=00 80 lines per second

n=01 52 lines per second

n=02 35 lines per second

Default:

n = 00

Remarks:

- In the cash receipt station, the printing will slow down to the maximum selected speed. This will increase the quality of the printing and lower the current draw from the power supply when printing high-density images, such as dark logos.
- This is the maximum speed being selected, so the dot utilization algorithms can still slow the speed further when necessary.

Set or cancel unidirectional printing

Syntax:

ESC U *n* or X'1B55;*n*'

Where:

n=00 Cancels unidirectional printing

n=01 Sets unidirectional printing

Default:

n = 00

Remarks:

This is valid in the document station in portrait mode only, when there must be two passes of the print head to print one print line.

Example: double-high or emphasized print.

When unidirectional mode is set to double-high characters, it takes three passes of the print head.

In bidirectional mode, printing double-high characters takes only two passes of the print head.

Unidirectional printing takes longer but increases the quality of the print.

Set document length for landscape print

Syntax:

GS c 1 *n*

Where:

n 2 bytes indicating the length of the document in print motor steps.

Remarks

- Document length data is sent in the status after the status bytes.
- Status byte 5, bit 3, is sent to indicate that extra data is attached.

Note: There are 50 motor steps per inch. A 6-inch document = 300 steps. (Use 295 to allow a margin for error; $n=0 \times 127$.) To calculate the number of dots per printed line:

- Under normal operation, the printer measures the length of the document. This command can be used to save transaction time if the document length is known by the application.
- **for 150 DPI** (dots per inch)
 $[(\text{motor_steps} - 75 * 3.12) - 10 = \text{dots per line}]$
- or for a 6-inch document
 $(676 \text{ dots}) / (10 = \text{dots per character}) = 67 \text{ characters per line}$
- **for 120 DPI**
 $[(\text{motor steps} - 75) * 2.5] - 10 = \text{dots per line}$
- or for a 6-inch document
 $(540 \text{ dots}) / (10 = \text{dots per character}) = 54 \text{ characters per line}$

or

Attention: Set the document length a few steps shorter than the actual document. If you set the document length too long the printer will feed the document out of the printer roller and an error will be generated.

Request document length for landscape print

Syntax:

GS N X'02' *NULL* or X'1D4E;02;00'

Purpose

To determine the length of the document in the Landscape Print station

Remarks

- Document length data is sent in after the status bytes.
- Status byte 5, bit 3, is sent to indicate that extra data (beyond status byte 8) is attached.

Set print station

Syntax:

ESC c 0 *n* or X'1B63;30;*n*'

Where:

n Specifies the print station.

Bit # ↓	Station
LSB 0	Reserved
1	Cash Receipt Station
2	Document Station - Portrait Mode
3	Document Station - Landscape Mode
4	Reserved
5	Reserved
6	Reserved
7	Reserved

Default:

n = 02

Remarks:

See Chapter 5, "Document handling," on page 107.

The EJ station can be selected along with one of the other stations; however, you cannot select both CR and DI.

Select user-defined or resident character sets

Syntax:

ESC % n or X'1B25;n'

Where:

n=00 Select resident character sets

n=01 Select user-defined character sets

Default:

n = 00 when printer is in Single Byte Mode

n = 01 when printer is in Double Byte Mode. MCT #0x10 Bit 7

Remarks:

See "Download user-defined characters" on page 38.

Set code page

Syntax:

ESC t n or X'1B74;n'

Where:

n=00 Code Page 437 - United States

n=01 Code Page 858 - Multilingual

n=02 Code Page 863 - Canadian-French

n=03 Code Page 860 - Portugal

n=04 Code Page 865 - Norway

n=05 Printer's Generic Code Page 1

n=06 Printer's User Defined Code Page Mapping

n=07 Code Page 869 – Greek

n=08 Code Page 857 – Turkish

n=09 Code Page 864 – Arabic

n=0a Code Page 867 – Hebrew (Israel)

n=0b Code Page 852 – Hungarian, Polish, Czech, Romanian, Slovak, Slovenian, Croatian

n=0c Code Page 848 – Ukrainian

n=0d Code Page 866 – Russian (cyrillic)

n=0e Code Page 872 – Bulgarian, Serbian

n=0f Code Page 775 – Lithuanian, Latvian, Estonia

- n=10** Code Page 861 – Icelandic
- n=11** Code Page 1250 – Windows Latin 2
- n=12** Code Page 1251 – Windows Cyrillic
- n=13** Code Page 1252 – Windows Latin 1
- n=14** Code Page 1253 – Windows Greek
- n=15** Code Page 1254 – Windows Turkish
- n=16** Code Page 1255 – Windows Hebrew
- n=17** Code Page 1256 – Windows Arabic
- n=18** Code Page 1257 – Windows Baltic Rim

Default:

n = 01

Remarks:

Changing code pages is valid for resident character sets only. If user-defined character sets are enabled, this command will not do anything. In the DBCS printer, the characters used from each of these code pages will be determined by the DBCS Vector Ranges that are selected. Selection of the User Defined Code Page Mapping (0x06), is ignored if the code page has not been defined. The previous codepage will still be selected

Set intercharacter spacing for single byte character sets

Syntax:

ESC SP *n* or X'1B20;*n*'

Where:

n The number of dot-spaces in the thermal print station or half-dot spaces in the impact print station.

Default:

n = 03

Maximum:

n = 08

Remarks:

If you select double-width printing, the space to the right of each character is doubled.

Set intercharacter spacing for double byte character sets

Syntax:

ESC T *n* or X'1B52;*n*'

Where:

n The number of dot-spaces in the thermal print station or half-dot spaces in the impact print station.

Default:

n = 06

Maximum:

n = 20 hex (32 decimal)

Remarks:

If you select double-width printing, the space to the right of each character is doubled.

Set or cancel rotated characters

Syntax:

ESC V *n* or X'1B56;*n*'

Where:

n=00 Cancel Rotated Characters

n=01 Set Rotated Character

Default:

n = 00

Remarks:

Rotation is 90 degrees clockwise. This command is supported only in the thermal print station.

Set print station parameters

Syntax:

ESC c 1 *n* or X'1B63;31;*n*'

Where:

n Specifies the print station.

Bit # ↓ Station

LSB 0 Reserved

1 Customer Receipt Station

2 Document Station - Portrait Mode

3 Document Station - Landscape Mode

4 Reserved

5 Reserved

6 Reserved

7 Reserved

Purpose:

This command is used for setting the line spacing, margins, and tabs.

Remarks:

More than one station can be selected at the same time if the settings are common to all of the selected stations.

Default:

n = 02 (customer receipt station)

Select 1/8-inch line spacing

Syntax:

ESC 1 or X'1B31'

Remarks:

In the thermal (receipt) station this would set line feeding to 26 steps/line.

In the impact (document - portrait) station this would be set to 6 steps/line.

Note: Spacing in the document - portrait is actually 8.5 lines per inch. Line spacing dimension is approximate. For the impact printer in portrait mode, the actual line spacing must be calculated using 51 steps per inch.

Note: For DI Portrait Printing: Characters greater than 9 dots high (DBCS 16x16 character) takes 2 passes of the print head - with paper fed in-between the lines (4 steps). The actual lines-per-inch will be adjusted. Example if printer is set to 1/8 inch line spacing. The printer will line feed 6 steps in-between each line, and the 4 steps inside of the line. The result is 10 steps/line or 4.8 lines per inch.

In the impact (document - landscape) station this would be set to 16 steps/line.

This command should be sent after "Set print station parameters" on page 59.

Select 1/6-inch line spacing

Syntax:

ESC 2 or X'1B32'

Remarks:

In the thermal (receipt) station this would set line feeding to 34 steps/line.

In the impact (document - portrait) station this would be set to 8 steps/line.

Note: Spacing in the document - portrait is actually 6.375 lines per inch. Line spacing dimension is approximate. For the impact printer in portrait mode, the actual line spacing must be calculated using 51 steps per inch.

In the impact (document - landscape) station this would be set to 21 steps/line.

This command should be sent after "Set print station parameters" on page 59.

Note: For DI Portrait Printing: Characters greater than 9 dots high (DBCS 16x16 character) takes 2 passes of the print head - with paper fed in-between the lines (4 steps). The actual lines-per-inch will be adjusted. Example if printer is set to 1/6 inch line spacing. The printer will line feed 8 steps in-between each line, and the 4 steps inside of the line. The result is 12 steps/line or 4 lines per inch.

Select color printing

Syntax:

ESC r n or X'1B72;n;'

Where:

n =

- 00 Cancel color printing
- 01 Enable full-character color printing
- 02 Enable half-character color printing

Default:

n = 00

Purpose:

To enable half-character or full-character color printing, or to disable color printing.

Remarks:

- You can enable and disable full-character color printing within a print line. This enables you to print one word in a different color.
- This command can be used up to 8 times in a line when full-character color printing is used.
- Half-character color printing is only supported at the beginning of a print line.
- If both bit 1 and bit 0 of *n* are set (*n*=03), only half-character color printing will be enabled.
- This command is only valid if the Enable Color Printing command is sent first. When color paper is enabled, the printer is limited to printing at 15 LPS when printing 8 LPI.

Limitations:

- This command is only valid if Color Printing is enabled (see “Select thermal paper” on page 71).
- When color paper is enabled, depending on the paper, the printer might be limited to printing at 15 lps when printing 8 lpi.

Set line spacing using minimum units

Syntax:

ESC 3 *n* or X'1B33;*n*'

Where:

n Specifies line-feed steps.

In the customer receipt station, 1 inch = 204 steps and 1 mm = 8 steps. Thermal must be an even number.

In the document portrait station, 1 inch = 51 steps and 1 mm = 2 steps.

In the document landscape station, 1 inch = 127 steps and 1 mm = 5 steps.

This command should be sent after “Set print station parameters” on page 59.

Set sheet eject length

Syntax:

ESC C *n* or X'1B43;*n*'

Where:

n Specifies the number of line feed steps using minimum units moved when a *FF* is sent in the receipt station.

In the document station, an eject will feed until the document has exited the lower document sensors - this length is not used.

Default:

n = 0x68 (104 decimal)

Maximum:

255 steps (FF hex)

This value is stored in the printer memory so that it is not lost when the printer is reset.

Set horizontal tab positions

Syntax:

ESC D [*n1 n2*] NUL NUL or X'1B44[*n1n2*]0000'

Where:

n1 The high-order-byte dot offset for the horizontal tab.

n2 The low-order-byte dot offset for the horizontal tab.

Default:

There is a tab every 100 dots.

Remarks:

This command should be sent after "Set print station parameters" on page 59.

Up to 5 tab positions can be stored. All 5 *n1 n2* value pairs can be included in one command. Values must be entered in hex.

A tab is calculated from the left margin position.

Tab values must be in ascending order.

Example: To set 3 tab positions - at the 100, 150 and 300 dot positions:

- X'1B4400640096012C0000'

See "Horizontal tab" on page 92.

Set left margin position

Syntax:

ESC \$ *n1 n2* or X'1B24;*n1;n2*'

Where:

n1 The high-order byte of the dot offset from the beginning of the print line.

n2 The low-order byte of the dot offset from the beginning of the print line.

Default:

n1 = 0, n2 = 0

Remarks:

In the customer receipt station, 1 mm = 8 dots.

In the document station, 1 inch = 150 half-dots (75 dots).

n1 and *n2* are hex values. Convert each to decimal. Then, use this formula to get the decimal equivalent: $(n1 \times 256) + n2$.

If the number exceeds the printable area, it is ignored.

The maximum value for the customer receipt station is 576. The maximum value for the document insert station is 474.

In the customer receipt station, this number is rounded back to a factor of 8.

This command should be sent after "Set print station parameters" on page 59.

Set right margin position

Syntax:

ESC] *n1 n2* or X'1B5D;*n1;n2*"

Where

n1 Is the high order byte of the dot offset from the beginning of the print line.

n2 Is the low order byte of the dot offset from the beginning of the print line.

Default:

n1 = 0, *n2* = 0

Remarks

In the thermal station, 1 mm = 8 dots.

In the impact station, 1 inch = 150 half-dots (75 dots)

n1, and *n2* are hex values - to get the decimal equivalent = (*n1* × 256) + *n2*

If the number exceeds the printable, it is ignored. If the number + the number set for the left margin does not leave enough room to print a character, these margins are ignored. Maximum value in thermal CR station is 576. Maximum value in Impact DI station is 474. In the CR station, this number is rounded back to a factor of 8.

This command should be sent after "Set print station parameters" on page 59.

Set relative position

Syntax:

ESC <5C>h *n1 n2* or X'1B5C;*n1;n2*'

Where:

n1 The high-order byte of the dot offset from the left margin.

n2 The low-order byte of the dot offset from the left margin.

Default:

n1 = 0, *n2* = 0

Remarks:

In the thermal station, 1 mm = 8 dots.

In the impact station, 1 in. = 75-dots (150 half-dots).

n1 and *n2* are hex values. Convert each to decimal, then use this formula to get the decimal equivalent: (*n2* × 256) + *n1*

To move the position to the left, use a negative number.

Example: *To move N dots to the left* ⇒ 65536 – *N*.

If this number plus the left margin exceeds the printable area it is ignored.
See “Set left margin position” on page 62.
In the customer receipt station, this number is rounded back to a factor of 8.

Set low paper calibration

Syntax:

GS c 2 or X'1D63;32'

Purpose:

You must calibrate the printer to accurately recognize the thickness of the paper supply. Calibration can be done using an offline test (see “Summary of the offline test menus (Models 1xR)” on page 130) or using the above command.

Default:

11meter = 0x2AF8.

Note: See “Low paper sensing and calibration” on page 123

Align positions

Syntax:

ESC a *n* or X'1B61;*n*'

Where:

- n = 00** Align Left
- n = 01** Align Center
- n = 02** Align Right
- n = 04** Align Column Right

Default:

n = 00

Remarks:

- Values 00, 01, and 02 are only valid at the beginning of a line.
- Tabs are only valid when printing is aligned to the left. If tabs are used when left alignment is not used, results can be unpredictable. (See “Horizontal tab” on page 92.)
- Alignment is relative to the left margin.
- To use the Align Column Right command:
 1. Send the characters that you want to be left aligned.
 2. Send the Align Column Right command.
 3. Send the characters that you want to be right aligned.
 4. Send an end of line command, for example X'0A' or X'0D'.

The printer will return to left aligned after the line is printed.

Limitations for n=04:

- The command is only valid in the cash receipt station.
- The command is ignored if the printer is not left aligned when the command is received.

- If the Align Column Right command is received but the line is filled before an EOL is received, the filled line is treated as an EOL. There are usually a few dot positions available, but not enough for a full character. The column alignment will occur on the few dot positions available.

Set error recovery function

Syntax:

ESC c 4 n or X'1B63;34;n'

Where:

n Selects the function.

Bit # ↓	Function	Bit=0	Bit=1
LSB 0	Reserved	N/A	N/A
1	Reserved	N/A	N/A
2	Release Print Buffer after Error Correction	Release	Hold
32	Automatic retry on a Home Error	Enabled	Not Enabled
4	Hold buffer when waiting for a document	Release	Hold
5	Hold buffer after a flip error	Release	Hold

Default:

n = 00

Remarks:

When set to **not** automatically release the print buffer after error correction (bit #2), the printer does not execute commands until it receives a "Real-time requests" on page 95 command to cancel or release the print buffer.

When automatic retry on a home error is selected, the printer will try to reset the print head to a known location, then reprint the line on which the error occurred. If the printer is unable to reset the print head, operator intervention is needed.

An error will be sent back to the system and the LED will blink.

Define document wait time

Syntax:

ESC f x y or X'1B66;x;y'

Where:

x Time the printer should wait, from receiving a print line for the document station until the document is inserted.

If the document has not been detected by the time the wait time ends, a document error is sent to the system. The system continues to wait for a document to be inserted.

Wait Time = x * 0.5 seconds

y Delay from the time the document is detected until it is *grabbed* by the printer (start of document printing):

- Side insertion - closes the document throat.
- Front insertion - pulls the document into the printer and feeds it to its top of form.

Delay = y × 0.1 seconds

Defaults:

x = 02 y = 03

Remarks:

If y = 0, the printer does not grab the document. The operator must use the document feed button to pull the document into the printer.

If x = 0, the printer *never* sends error status if no print data is sent to the document station.

Select character for reprinted lines.

Status sent to system

Syntax:

ESC) n or X'1B29;n'

Where:

n Selects the function.

Bit # ↓	Function	Bit=0	Bit=1
LSB 0	Print Buffer Empty/Full	Yes	No
1	Reserved	Yes	No
2	Front Document Sensor Change	Yes	No
3	Top Document Sensor Change	Yes	No
4	After status byte 6 is incremented or status byte 3, bit 7, is set	Yes	No
5	Cash Draw Sensor Change	Yes	No
6	Key In Use	Yes	No
7	Cover Open	Yes	No

Default:

0x00

Remarks:

Bit 4 can be used in place of the command complete. When the buffer is empty, the system can assume that everything stored in the printer has been completed. To enable these status messages, unsolicited status must be enabled. See “Asynchronous (real-time) commands” on page 95.

Select character for reprinted lines

Syntax:

ESC + n or X'1B2B;n'

Where:

n The ASCII representation of the character printed in the first character position on the print line when recovering from a home error. This occurs in impact print stations only.

Default:

n = 2A hex (This is an asterisk (*) in most code pages.)

Remarks:

The value is stored to printer memory to prevent loss when the printer is reset. The default value after the reset is the value last sent.

Re-initialize the printer

Syntax:

ESC @ or X'1B40'

Purpose:

Re-initialize all printer setting to their default values and reset the impact print head.

Remarks:

Commands in the print buffer are *not* lost when this command is issued. The settings that are re-initialized follow (all numbers are in hex):

Setting	Default Value
Print Mode	00
Print Station Selected	02
User-Defined/Resident Character Sets	00
Code Page	01
Intercharacter Spacing (Single Byte)	03
Intercharacter Spacing (Double Byte)	06
Rotated Characters	00
Station for line spacing	02
Line Spacing (all stations)	Six LPI
Tab Positions	every 100 dots
Left Margin (all stations)	00
Relative Position	00
Align Positions	00
Unidirectional printing	00
Horizontal Size of Bar Code	03
Vertical Size of Bar Code	A2
Position of HR	00
Font for HRI	00
Right Margin (all stations)	00
Error Recovery Color	00

Error Conditions:

None

Enable or disable the beeper

Syntax:

ESC BEL *n1 n2* or X'1B 07 *n1 n2*'

where:

n1 Enables or disables beeper.

X'00' Disable beeper.

X'01'–X'FE'

Timed enable beeper.

X'FF' Enable beeper.

n2 Sets the beeper volume and tone.

Bits 0–3

The note. Bit 0 is the LSB.

Bits 4–5

The octave.

Bit 6 Reserved.

Bit 7 Volume. 0 = loud, 1 = soft.

Value (Bits 0–3)	Note	Value (Bits 0–3)	Note	Value (Bits 4–5)	Octave
0000–0	C	1000–8	G#	00–0	1
0001–1	C#	1001–9	A	01–1	2
0010–2	D	1010–A	A#	10–2	3
0011–3	D#	1011–B	B	11–3	4
0100–4	E	1100–C	Rest / Silence		
0101–5	F	1101–D	Reserved		
0110–6	F#	1110–E	Reserved		
0111–7	G	1111–F	1 KHz (normal beep)		

Default:

n = X'00'

Purpose:

To enable or disable the beeper.

Remarks:

- Any value other than X'00' or X'FF' is treated as an amount of time that the beeper is to be enabled. The time is calculated as $n1 \times 0.1$ seconds.
- To stop a beep command early, send the Disable Beeper command.
- Timed beeps can be chained together. They can also be downloaded as canned messages.
- Use a value of $n2 = X'2F'$ for the most audible tone.
- Set bits 0–3 to 1100 to put a timed silence in a beep sequence.

Enable or disable the feed buttons

Syntax:

ESC c 5 n or X'1B63;35;n'

Where:

n=0 Enables feed buttons

n=1 Disables feed buttons

Default:

n = 0

Purpose:

To disable the feed buttons while in the middle of a transaction.

Remarks:

If the printer is set to have the buttons disabled, the offline tests will also be disabled.

Enable or disable upside-down printing

This command is only supported in the thermal station.

Syntax:

ESC { n or X'1B 7B n'

Where:

n enables or disables upside-down printing.

X'00' Disable upside-down printing.

X'01' Enable upside-down printing.

Default:

n = X'00'

Purpose:

The print data appears upside down when data is printed normally. This command allows the data to be right-side up as it comes out of the printer.

Remarks:

- When upside-down printing is enabled, the last line of data must be sent to the print first.
- This command is valid only at the beginning of a printer line.

Select character size for scalable fonts

This command is only supported in the thermal station.

Syntax:

GS ! n or X'1D21;n'

Where:

n Defines the height and width of a character. The four least significant bits (LSBs) specify the height and the four most significant bits (MSBs) specify the width of the character. See Table 18.

For example, if n=X'14' the scaled character will be twice the defined width and five times the defined height.

Table 18. Width and height for scalable fonts

Four MSBs (in hex)	Character Width	Four LSBs (in hex)	Character Height
0	As defined	0	As defined
1	2 × defined width	1	2 × defined height
2	3 × defined width	2	3 × defined height
3	4 × defined width	3	4 × defined height
4	5 × defined width	4	5 × defined height
5	6 × defined width	5	6 × defined height
6	7 × defined width	6	7 × defined height
7	8 × defined width	7	8 × defined height

Default:

n = 00

Purpose:

To select the size of a character.

Remarks:

- This command is valid only in the thermal print station.

- Bits 3 and 8 of *n* are ignored.
- The *Set Print Mode* command (see “Set print mode” on page 51) can also select the character height (double high and double wide). The last command that is received is the effective command.
- Underline and overline is not supported when the height is scaled 8x.
- The bar for overline and underline is not magnified in thickness

Fix font matrix

Syntax:

ESC : *n* or X'1B3A;*n*'

Where:

n The character width to which all proportional characters will be adjusted. The range of valid values is $8 \leq n \leq 32$. Use X'00' to disable this command and print proportional characters normally.

Default:

n = 00

Purpose:

To fix the matrix of proportional fonts. This command will be used mostly to align numbers and decimal points.

Remarks:

- This command is valid only on proportional user-defined fonts.
- If the character is larger than the width defined by this command, then the right side of the character will be truncated.
- If the character is smaller than the width defined by this command, then the character will be centered in the space.

Print logo inline

Syntax:

GS J *d n1 n2 data* or X'1D4A;*d;n1;n2;data*'

Where:

d Relative height of the character.

0 Single high

1 Double high

n1 MSB of the logo width.

n2 LSB of the logo width.

data The data to form the graphics image.

Purpose:

To print a small logo inline with characters.

Remarks:

- Thermal station only
- Rotate characters must be disabled
- *n1* and *n2* indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated as $n1 \times 256 + n2$ (after first converting *n1* and *n2* to decimal).

- The logo is 24 dot rows high. If printed in double-high mode, the logo will be 48 rows high.
- The number of data bytes to form the image is figured by $\{((n1 \times 256 + n2) - 1) / 8 + 1\} \times 24$.
- Like user-defined characters, if the image is only 14 dots wide, the last two dots should be zero to complete the byte. When printed, the image will be only 14 dots wide.

Set or cancel strike-through

Syntax:

ESC; *sn* or X'1B73;n'

Where:

n = 00 Cancel strike-through mode.

n = 01 Set strike-through mode.

Default:

n = 00

Remarks:

This is only valid in the Cash Receipt Station.

Select thermal paper

Syntax:

GS; *n* or X'1D3B;n'

Where:

n = X'00'
Disable two-color printing.

n = X'01'
Enable color printing using print parameter set 1.

n = X'02'
Enable color printing using print parameter set 2.

n = X'03'
Enable color printing using print parameter set 3.

X'n = 04'–X'FF'
Select the print parameters to be defined.

Purpose:

To enable two-color printing and select the print parameters that are best suited for the paper selected.

Remarks:

- New parameters will be defined as new color papers become available.
- The speed of printing will change depending on the print parameters. When print parameter set 1 is used, the print speed will be 15 lines per second.
- This command setting is saved in nonvolatile memory.

Bar code commands

Bar code commands are valid in the thermal print station only.

Note: For the Models 1xR and 2xR, barcodes print at a maximum rate of 52 LPS.

Print bar code

Syntax:

GS k n NUL or X'1D6B;n;data;00'

Where: n =

Bar Code

X'0A' GS1

DataBar Omni-Directional

X'0B' GS1

DataBar Omni-Directional Stacked

X'0C' GS1

DataBar Expanded

X'0D' GS1

DataBar Expanded Stacked

X'00' UPC-A

X'01' UPC-E

X'02' JAN13 (EAN-13)

X'03' JAN8 (EAN-8)

X'04' CODE 39

X'05' ITF

X'06' CODABAR

X'07' CODE 128C

X'08' CODE 93

X'09' CODE 128A, 128B, and 128C

data For $n=0A$ through $n=0D$, supported on the Thermal Print station only.

For $n=0A$ and $n=0B$, Omni-Directional and Omni-Directional Stacked.

The Application Identifier is always 01 for these barcodes.

- Begins with an Application Identifier (01).
- Numeric Numbers (0-9).
 - Sent as hex string: 0x30 to 0x39
- Data is 13 or 14 digits. If 13 digits are sent, check digit is calculated by the firmware and embedded into the barcode. If 14 digits are sent, firmware will ignore the check digit.
- When human-readable characters (HRI) are printed, 01 will be appended to show the Application Identifier.

Invalid Data:

- Does not have "(01)" in front of data.
- Alphanumeric.
- Less than 13 digits or more than 14 digits.

- If an image cannot be printed because it is too wide or there is invalid data: Status byte 7, bit 2 will be set.

For n=0C and n=0D: Databar Expanded and Databar Expanded Stacked

For these barcodes, Application Identifier must be specified in the data. DataBar Expanded and Databar Expanded Stacked are variable length linear symbologies.

Data Options:

- Numeric: (0-9)
 - Sent as hex string: 0x30 to 0x39
 - Max number of digits is 74
- Alphanumeric: (0-9) (A-Z) * , - . /
 - Sent as hex string:
 - 0-9: 0x30 to 0x39\
 - A-Z: 0x41 to 0x5A
 - , - . /: 0x2A, 0x2C, 0x2D, 0x2E
 - Max number of digits is 41
- ISO/IEC 646: (0-9) (A-Za-z) ! " % & ' () * + , - . / : ; < = > ? _ (SPACE)
 - Sent as hex string:
 - 0-9: 0x30 to 0x39
 - A-Z: 0x41 to 0x5A
 - a-z: 0x61 to 0x7A
 - ! " % & ' () * + , - . / : ; < = > ? _ (SPACE): 0x20 to 0x2F, 0x3A to 0x3F, 0x5F
 - Max number of digits depends on the AI and the order of the AI. See ISO/IEC specification.

The data needs to be formatted following these rules:

- Begin with an Application Identifier.
- All Identifiers need to be enclosed in (AI).
- With fixed length Application Identifiers, the data length needs to be corrected.
- There are different encode modes. Mode 1, 2, 3, 4, and 5 need a indicator digit of 9 after (01) and a check digit at the end of GTIN. If the data is formatted correctly, the firmware will encode accordingly with its highest compression.
- Mode 6 does not need an indicator, after (01). It does need a check digit.
- Firmware will append a group separator after the variable length AIs. Depending on the scanner, the group separator will most likely be transmitted as 0x1D in the scanner's output data.
- The following list is ordered from the most compressed to the least compressed size:
 - Mode 1: (01) and (3103)
 - Mode 2: (01) and (3202) / (3203)
 - Mode 3: (01), (310x) or (320x), and (11) or (13) or (15)
 - Mode 4: (01) and (392x)
 - Mode 5: (01) and (393x)
 - Mode 6: (01) and other AIs

- Mode 7: any AIs
- Mode 1, 2, and 3 have fixed length.
- Mode 4, 5, 6, and 7 have variable length.

Invalid input:

- Not beginning with a "("
- AI is not enclosed in "(" and ")"
- AI is not in AI list
- Data's length is not correct
- If an image cannot be printed because it is too wide or there is invalid data: Status byte 7, bit 2 will be set.

For $n=00$ through $n=08$, this is the ASCII representation of the characters to be printed.

For $n=09$, this is the hexadecimal representation of the characters to be printed. The first byte of data must be the byte-count of the remaining data. The trailing X'00' should not be included for this command.

Remarks:

- The maximum number of data allowed differs between symbologies, and varies depending on what AIs are used.
- The group separator may display differently depending on the scanner that the customer is using. It is possible that the scanner manufacturer allows its customers to customize the group separator. The group separator is inserted only after a variable length AI and before the next one. In firmware, the group separator is encoded as 5 bits, 11111. The firmware team used a Symbol scanner for testing with the group separator displayed as 0x1D. The group separator in the data will be inserted by the printer firmware. Since the group separator is encoded as 5 bits, it will be counted into the data length.
- Valid at the beginning of a line only.
- This command will increment status byte 6.
- Printing will not start until X'00' is received, or the end of a data packet in RS-485.
- Data after any invalid character for a particular bar code will be discarded. The printer will continue to wait for X'00'.
- If X'00' or an invalid character is received before the required number of data bytes, zeros will be inserted following the data until the required number is reached (for UPC-A, UPC-E, JAN13, and JAN8).
- Excess characters will be discarded.
- A check digit will be generated if one is not supplied for UPC-A, JAN13, and JAN8.
- Check digits will be figured and added for Code 128C and Code 93.
- For UPC-E, the printer will expand the data, generate a check digit and parse the data before generating the bar code (6 or 7 digits are executed). If 7 digits are received and digit 1 is 0, the last 6 digits are used.
If digit 1 is not 0, digit 1 is used and the digit 7 is ignored.
- For CODABAR, a stop and start character is required.
- A leading zero will be added to the data for ITF bar codes if the data received has an odd number of bytes.

- If a bar code width is greater than the paper width, the right of the bar code is truncated, making the bar code unreadable.
- Bar codes will always be printed in black, regardless of color printing settings.

Examples:

- Data Mode 1: (01)90012345678908(3103)001750
- Data Mode 2: (01)90012345678908(3202)000156
- Data Mode 3: (01)90012345678908(3103)012233(15)991231
- Data Mode 4: (01)90012345678908(3922)795
- Data Mode 5: (01)90012345678908(3932)0401234
- Data Mode 6: (01)00012345678905(10)ABC123
- Data Mode 7: (21)12345678910

Table 19. Check digit calculation

ID Key Format	Digit Positions																	
					N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉	N ₁₀	N ₁₁	N ₁₂	N ₁₃	N ₁₄
GTIN-14																		
Step 1: Multiply value of each position by																		
	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	
Step 2: Add results together to create sum																		
Step 3: Subtract the sum from nearest equal or higher multiple of ten = Check Digit																		

More info about Application Identifiers: <http://en.wikipedia.org/wiki/GS1-128>

References

- GS1 databar technical presentation: http://www.gs1.org/sites/default/files/docs/barcodes/databar/GS1_DataBar_Technical.pdf
- GS1 General Specifications Version 10
- Databar AIs definition:
 - <http://www.gs1-128.info/ai-values/>
 - <http://www.databar-barcode.info/application-identifiers/>

Table 20. Code 128 character set

Value		Code		
Decimal	Hex	Set A	Set B	Set C
0	0	SP	SP	00
1	1	!	!	01
2	2	"	"	02
3	3	#	#	03
4	4	\$	\$	04
5	5	%	%	05
6	6	&	&	06
7	7	'	'	07
8	8	(	(	08
9	9	)	)	09
10	A	*	*	10
11	B	+	+	11
12	C	'	'	12
13	D	-	-	13
14	E	.	.	14
15	F	/	/	15
16	10	0	0	16
17	11	1	1	17
18	12	2	2	18
19	13	3	3	19
20	14	4	4	20
21	15	5	5	21
22	16	6	6	22
23	17	7	7	23
24	18	8	8	24
25	19	9	9	25
26	1A	:	:	26
27	1B	;	;	27
28	1C	<	<	28
29	1D	=	=	29
30	1E	>	>	30
31	1F	?	?	31
32	20	@	@	32
33	21	A	A	33
34	22	B	B	34
35	23	C	C	35
36	24	D	D	36
37	25	E	E	37
38	26	F	F	38

Table 20. Code 128 character set (continued)

Value		Code		
Decimal	Hex	Set A	Set B	Set C
39	27	G	G	39
40	28	H	H	40
41	29	I	I	41
42	2A	J	J	42
43	2B	K	K	43
44	2C	L	L	44
45	2D	M	M	45
46	2E	N	N	46
47	2F	O	O	47
48	30	P	P	48
49	31	Q	Q	49
50	32	R	R	50
51	33	S	S	51
52	34	T	T	52
53	35	U	U	53
54	36	V	V	54
55	37	W	W	55
56	38	X	X	56
57	39	Y	Y	57
58	3A	Z	Z	58
59	3B	[	[	59
60	3C	\	\	60
61	3D	]	]	61
62	3E	^	^	62
63	3F	_	_	63
64	40	MUL	'	64
65	41	SOH	a	65
66	42	STX	b	66
67	43	ETX	c	67
68	44	EOT	d	68
69	45	ENO	e	69
70	46	ACK	f	70
71	47	BEL	g	71
72	48	BS	h	72
73	49	HT	i	73
74	4A	LF	j	74
75	4B	VT	k	75
76	4C	FF	l	76
77	4D	CR	m	77

Table 20. Code 128 character set (continued)

Value		Code		
Decimal	Hex	Set A	Set B	Set C
78	4E	SO	n	78
79	4F	SI	o	79
80	50	DLE	p	80
81	51	DC1	q	81
82	52	DC2	r	82
83	53	DC3	s	83
84	54	DC4	t	84
85	55	NAK	u	85
86	56	SYN	v	86
87	57	ETB	w	87
88	58	CAN	x	88
89	59	EM	y	89
90	5A	SUB	z	90
91	5B	ESC	{	91
92	5C	FS	|	92
93	5D	GS	}	93
94	5E	RS	~	94
95	5F	US	DEL	95
96	60	FNC3	FNC3	96
97	61	FNC2	FNC2	97
98	62	SHIFT	SHIFT	98
99	63	CODE C	CODE C	99
100	64	CODE B	FNC4	CODE B
101	65	FNC4	CODE A	CODE A
102	66	FNC1	FNC1	FNC1
103	67	START CODE A		
104	68	START CODE B		
105	69	START CODE C		

Print bar code examples

Table 21. Print bar code examples

	Command	n =	Data
UPC-A	X'1D6B'	X'00'	X'30 33 31 33 32 33 31 32 30 37 38 00'
UPC-E	X'1D6B'	X'01'	X'34 39 30 36 39 30 00'
JAN 13 (EAN-13)	X'1D6B'	X'02'	X'34 39 31 32 33 34 35 36 37 38 39 30 00'
JAN8 (EAN-8)	X'1D6B'	X'03'	34 39 31 32 33 34 35 36 00
CODE 39	X'1D6B'	X'04'	30 31 32 33 34 35 36 37 00
ITF	X'1D6B'	X'05'	31 32 33 34 35 36 37 38 39 30 31 32 00
CODABAR	X'1D6B'	X'06'	42 39 30 2E 2B 3A 2F 24 2D 43 00
CODE 128C	X'1D6B'	X'07'	35 34 35 35 35 36 35 37 35 38 35 39 00
CODE 93	X'1D6B'	X'08'	31 32 33 34 35 36 00
Reserved	X'1D6B'	X'0A - FF'	

Select horizontal size of bar code

Syntax:

GS w *n* or X'1D77;n'

Where:

n The horizontal magnification of the line width in the bar code, ($2 \leq n \leq 4$).

Default:

n = 03

Note: The last valid value is kept when an invalid value is sent.

Select bar code height

Syntax:

GS h *n* or X'1D68;n'

Where:

n The dot height of the bar code, ($1 \leq n \leq 255$).

Default:

n = X'A2' (162 decimal)

Select printing position of human readable information (HRI)

Syntax:

GS H *n* or X'1D48;n'

Where:

n = the print position

n = X'00'
Not Printed

n = X'01'
Above the bar code

n = X'02'
Below the bar code

n = X'03'
Both above and below the bar code.

Default:

n = X'00'

Remarks:

Human readable information is normal text associated with the bar code.

Note: The last valid value is kept when an invalid value is sent.

Select font for HRI

Syntax:

GS f *n* or X'1D66;*n*'

Where: n = the font for the HRI

n = X'00'
Font A

n = X'01'
Font B

Default:

n = X'00'

Remarks:

Only resident character sets are used:

- Font A = 10 dots (W) × 20 dots (H) or 1.25 mm × 2.5 mm
- Font B = 12 dots (W) × 24 dots (H) or 1.5 mm × 3.0 mm

Note: The last valid value is kept when an invalid value is sent.

Print PDF417 bar code

Syntax:

GS P *data* NUL or X'1D;50;*data*;00'

Where:

data The ASCII representation of the characters to be printed.

Remarks:

Valid only at the beginning of a line. Printing will not start until a X'00' is received.

This command will increment status byte 6.

The maximum number of characters to be encoded is 1000.

Error Conditions:

If an image cannot be printed, status byte 7, bit 2 will be set. This may happen when the image is too big to print. Try decreasing the ECC level.

Select PDF417 ECC (error correction codewords) level**Syntax:**

GS R *n* or X'1D;52;n1;n2'

Where:

n1 The high-order byte of the ECC level.

n2 The low-order byte of the ECC level.

Default:

n1 = 00

n2 = 15

Range:

$0 \leq n1n2 \leq 400$ decimal (170 hex)

Remarks:

For $0 \leq n1n2 \leq 8$, the ECC level is assumed as that particular security level. The security level determines the number of error correction code words added to the symbol.

Error Correction

Security Level	Codewords
0	0
1	2
2	6
3	14
4	30
5	62
6	126
7	254
8	510

For $9 \leq n1n2 \leq 400$, the ECC level is assumed as a percentage of the codewords in the bar code.

Select aspect ratio PDF417 bar code**Syntax:**

GS S *r;c* or X'1D;53;r;c'

Where:

r The height dimension for the ratio; $1 \leq r \leq 9$.

c The width dimension for the ratio; $1 \leq c \leq 9$.

Default:

r = 1, c = 2

Remarks:

This is not an exact ratio. The image will get as close as possible to the ratio. However, the maximum width of an image is 12 columns and the maximum height is 90 rows.

Enable PDF417 truncation

Syntax:

GS T *n* or X'1D;54;*n*'

Where:

n Whether to enable truncation
0 Disable truncation.
1 Enable truncation.

Default:

n = 0

Remarks:

Truncated PDF generates a symbol with the right row indicator and stop pattern replaced by a single width bar. There is a slight degradation in decode performance if truncation is enabled, which allows more data to fit in the image width.

Print QR Code

Syntax:

GS O *n1*, *n2*, *n3* *data* NUL or X'1D;4f;*n1*;*n2*;*n3*;*data*;00'

Where:

n1 Encoding Mode Parameter

00 Byte

Encodes lower case letters, text double-byte characters, binary data, and 8 bit values.

01 Alphanumeric Mode

Alphanumeric mode encodes data from a set of 45 characters. They are:

- 10 numeric digits (0 - 9) (byte values 30 HEX to 39 HEX)
- 26 alphabetic characters (A - Z) (byte values 41 HEX to 5A HEX)
- 9 symbols SP, \$, %, *, +, -, ., /, : (byte values 20 HEX, 24 HEX, 25 HEX, 2A HEX, 2B HEX, 2D HEX, 2E HEX, 2F HEX, 3A HEX respectively)

The command will be rejected if data is outside the supported range for this mode.

02 Numeric Mode

This mode encodes data from the decimal digit set (0 - 9) (byte values 30 HEX to 39 HEX). The command will be rejected if data is outside the supported range for this mode.

03 Kanji Mode

This mode encodes Kanji characters.

Note: The amount of data needs to be an even number. The supported range of Kanji characters are from 8140 HEX to 9FFC HEX and from E040 HEX to EBBF HEX. Characters outside these ranges will be rejected.

04 Extended Channel Interpretation (ECI) Mode

This mode allow the encoding of character sets different than the default.

05 Mixing Mode

This mode allows the printer to encode data using different modes; currently works with numeric, alphanumeric, byte, and Kanji characters. In this mode, printer will decide which type of characters and encode them accordingly.

n2 Error Correction Level

- 00 L - 7% recovery
- 01 M - 15% recovery
- 02 Q - 25% recovery
- 03 H - 30% recovery

If a parameter is outside of the range, it is assumed the setting is 0. The higher the error correction levels, the more redundancy there is in the symbol. Therefore:

- The symbol will be larger for the same amount of data.
- The symbol may still be readable even when damaged.

n3 ECI value – valid only if the application chooses the ECI mode

Note: To reserve the encoded characters, the firmware will check for the data in Numeric and Alphanumeric mode. If the data has just one character that belongs to byte mode, the whole data will be encoded in the byte mode.

Table 22. ECI Values and Character Sets

ECI Value	Character Set
0	Cp437
1	ISO8859_1
2	Cp437
3	ISO8859_1
4	ISO8859_2
5	ISO8859_3
6	ISO8859_4
7	ISO8859_5
8	ISO8859_6
9	ISO8859_7
10	ISO8859_8
11	ISO8859_9
12	ISO8859_10

Table 22. ECI Values and Character Sets (continued)

ECI Value	Character Set
13	ISO8859_11
15	ISO8859_13
16	ISO8859_14
17	ISO8859_15
18	ISO8859_16
20	SJIS
26	UTF-8

Data: The byte representation of the characters to be encoded. This field has a maximum of 1000 bytes. Sending more than 1000 bytes will cause a command reject. Note that there is also a maximum number of bytes that can be encoded per mode. See below.

Remarks:

Only supported on the 1NR/2xR printers with firmware level 0E.00 or above. For RS485 or USB, if this command is longer than one I-Frame it may be divided into several I-Frames using a continuation command.

- Valid only at the beginning of a line.
- Printing will not start until a X'00' is received.
- This command will increment status byte 6.
- The maximum number of characters to be encoded is:

Table 23. Characters to be encoded

Error Correction	Numeric	Alphanumeric	Byte	Kanji
L (7%)	1000	1000	919	500
M (15%)	1000	1000	701	432
Q (25%)	1000	721	499	308
H (30%)	945	566	393	242

Example: With level H error correction, the printer can encode 945 numeric characters or 566 alphanumeric characters; 393 bytes, or 242 Kanji characters.

Notes:

- This function is only supported in the customer receipt station.
- The data length is capped at 1000 bytes. Sending more will result in a command reject. This becomes the maximum for characters to be encoded for error correction levels that support more than 1000 characters. Kanji Mode uses 2 bytes per character.
- The scanning accuracy depends on the scanner and decoding software. Scanning becomes more difficult as the amount of data increases. It is recommended to keep the amount of data lower than 75% of the maximum number of characters allowed for each mode.

Error Conditions:

Status byte 7, bit 2 will be set on error:

- This may happen when the image is too big to print. Try decreasing the Error Correction level.

- If the data format is not correct for the selected encoding mode.
- If the maximum number of characters that can be encoded for the selected mode is exceeded.

Scale QR

RS485 Syntax:
X'1D;5f;s'

RS232 Syntax:
GS _ s or X'1D;5f;s'

Where:

s Is the scale; $0 \leq s \leq 5$

Default:

s = 5

Remarks:

s = 0, sets the scale at a minimum size of 3 dots per pixel. Only supported on the 1NR/2xR printers with firmware level 0F.xx or above.

Print character commands

These commands should be sent after ASCII data is sent to the printer and is being held in the print buffer. Any of these commands will increment the line count by 1. (See “Status byte 6” on page 113 and “Reset line count” on page 98.)

Print and line feed

Syntax:
LF or X'0A'

Purpose:

Prints data in the print buffer and feeds the paper by a preset amount.

Print and line feed

Syntax:
CR or X'0D'

Purpose:

Prints data in the print buffer and feeds the paper by a preset amount.

Remarks:

For applications that send both this command and LF (print and line feed command), and when only one line feed is required, the printer can be set to ignore this command. See MCT #30 (0x1e) in Table 14 on page 46. The default is a line feed.

Print, form feed, and cut the paper (FF)

Syntax:
FF or X'0C'

Purpose:

Prints data in the print buffer and feeds the paper in the customer receipt

station or document insert station by a preset amount, until the document exits the feed rollers. If a cutter is available at the station (CR station only), it cuts the paper.

Print and feed paper *n* lines

Syntax:

ESC d *n* or X'1B64;*n*'

Where:

n Specifies the number of line-feeds.

Purpose:

Prints data in the print buffer and feeds the paper by the amount specified in this command.

Print and feed paper using minimum units

Syntax:

ESC J *n* or X'1B4A;*n*'

Where:

n Specifies the line feed steps.

In the receipt station: 1 in. = 204 steps (1 mm = 8 steps).

In the document portrait station: 1 in. = 51 steps (1 mm = 2 steps).

In the document landscape station: 1 in. = 127 steps (1 mm = 5 steps).

Note: Line spacing dimension is approximate. For the impact printer in portrait mode, the actual line spacing must be calculated using 51 steps per inch.

Purpose:

Prints data in the print buffer and feeds the paper by the amount specified in this command.

Print graphic messages

Select and print a graphics (logo) command

This command can be used to print signature captures at the printer.

1. Capture the signature as a bitmap.
2. Convert the bitmap to a series of graphics (logo) messages.
3. Hold the buffer.
4. Send the graphics messages to the printer.
5. Release the buffer.

Syntax:

ESC * *d w h data* or X'1B2A;*d;w;h;data*'

Where:

d Dot density.

00 Normal Print - 200 dpi in the receipt station, 150 dpi in the document station.

Note: In the document station, this takes three passes of the print head for a logo that is 8 dots high.

01 Double wide - 100 dpi in the receipt station, 75 dpi in the document station.

Note: In the document station, this takes one pass of the print head for a logo that is 8 dots high.

02 Double wide and high - 100 dpi in the receipt station, 75 dpi in the document station. Every dot row in the vertical direction will be printed twice.

w One-eighth the number of dots in the horizontal direction, (width = $8 \times w$)

range = 1 to 72 for a thermal logo.

range = 1 to 59 for an impact logo.

In the receipt station, 1 = 8 dots = 1 mm.

In the document station, 6 = 48 dots = 1 inch.

h One-eighth the number of dots in the vertical direction, (height = $8 \times h$).

range = 1 to 255 for a thermal logo.

range = 1 to 5 for an impact logo.

data The data to form the graphics image.

The number of data bytes must be less than *64K* or $(h \times w) \times 8 < 64K$. To print graphics greater than 64K, see "Download graphics (logo) commands" on page 34 for an example of the data.

Purpose:

To print all-points-addressable print messages.

Remarks:

The margin will be ignored if this causes the logo to overrun the line length.

These messages can be positioned on the page using the commands for setting positions.

Not supported in document landscape mode.

To print graphics on the printer when the data is greater:

1. Hold the buffer.
2. Send all the data.
3. Release the buffer.

Note: When the buffer is held, care must be taken to avoid exceeding the capacity of the printer memory.

The left margin will be rounded down to a factor of 8. For example, if the margin = 74, the logo starts at 72.

Retries are not attempted on print errors.

Valid at the beginning of the line only.

When printing in the document station, a line feed command must be sent to advance the paper past the last line of the logo.

If the parameter *d*, *w*, or *h* is out of the defined range for this command, the command is discarded and the remaining data is processed as print data.

This command will increment status byte 6.

If this message is printed on a regular basis, consider downloading it to save communication time. (See "Download graphics (logo) commands" on page 34.)

The data buffer can be used for signature capture.

Print predefined graphics (logo) command

Syntax:

GS / *m logo#* or X'1D2F;*m;logo#*'

Where:

m The dot density:

00 Normal Print - 200 dpi in the receipt station, 150 dpi in the document station.

Note: In the document station, this takes three passes of the print head for a logo that is 8 dots high.

01 Double wide - 100 dpi in the receipt station, 75 dpi in the document station.

Note: In the document station, this takes one pass of the print head for a logo that is 8 dots high.

02 Double wide and high - 100 dpi in the receipt station, 75 dpi in the document station. Every dot row in the vertical direction will be printed twice.

logo # The number associated with the logo that is stored.

- range = 1 to 40 for all models
- range = 1 to 255 for Models 2CR

Purpose:

To print predefined all-points-addressable print messages.

Remarks:

The margin is ignored if it causes the logo to overrun the line length. Printing this message in the document station at 150 dpi will take three passes of the print head.

These messages can be positioned on the page using the commands for setting positions.

Valid at the beginning of the line only.

This command is not valid in landscape mode.

This command will increment status byte 6.

Retries will not be attempted on print errors.

In the document portrait station, a line-feed command must be sent to advance the paper past the last line of the logo.

See "Download graphics (logo) commands" on page 34.

Enable watermark printing

Syntax:

GS 2B *logo dot offset alignment* or X'1D2B;'logo;dot offset;alignment

Where:

logo Is the number of the stored logo that will be used as the WaterMark
(0x01 <= 0xFF)

dot offset

Is the number of millimeters (8 dot rows = 1 mm) offset between each WaterMark (0x00 <= 0xFF)

alignment/density

Is the alignment and density of the mark

x0 Align Left

x1 Align Center

x2 Align Right

x3 Roll Right (Left -> Center -> Right -> Left -> ...)

x4 Roll Left (Right -> Center -> Left -> Right -> ...)

x5 Zig-Zag (Left -> Center -> Right -> Center -> Left -> ...)

0x Normal Print - 200 DPI in the thermal (receipt) station

1x Double Wide - 100 DPI in the thermal (receipt) station

2x Double High - 100 DPI in the thermal (receipt) station

3x Double Wide and High - 100 DPI in the thermal (receipt) station

Remarks:

Valid only in the Thermal Station. 1 cm = 80 dots.

Limitations:

You cannot use both page mode printing and watermark printing at the same time. The speed of printing depends on the dot density of the watermark. The logo downloaded should be made with a low dot density. This command is support with firmware version 08.00 and greater. When printing line by line the printer will buffer the line that overlaps with the watermark region. Watermark is temporarily disabled when printing barcodes or logos.

Print predefined messages

Syntax:

GS ^ *message#* or X'1D5E;message#'

Where:

message#

The number associated with the stored predefined message.

- range = 1 to 25 for all models

Purpose:

To print predefined print messages.

Remarks:

Valid at the beginning of the line only.

Retries will not be attempted on print errors.

Attention: Stored commands can increment status byte 6. See "Predefined messages" on page 36.

Check processing commands - 2CR only

This printer can process the check entirely without taking it from the printer. It can read the magnetic ink character (MICR) line, frank the back of the check, and flip the check to print the face of the check.

Note: To print the face of the check, select the document station in landscape mode as the print station.

MICR read

Syntax:

ESC I or X'1B;49'

Purpose:

To read account information from the magnetic ink character line on customers' checks.






Remarks:

- Checks should be inserted upside-down from the front and against the right wall of the printer. The check can be, but does not have to be, registered in the printer before this command is given. The check will be fed forward, until the bottom sensor is uncovered, then fed back for the MICR reader reading. After the reading is complete, the check is fed to the first print position.
- If the printer is unable to read any character on the first try, the check will be fed forward and back for a second try. Complete status will then be sent to the terminal - if the character was still not read it will be identified by a Hex 3F (ASCII "?").

Note: Checks with magnetic ink printing within 1.2 inches of the right edge of the check will not be read correctly. This occurs when the amount field is printed on the check.

- The MICR read command increments the line count (status byte 6).
- At the completion of this command, the MICR information will be sent over the serial I/O following the normal status bytes.

Character	Description	ASCII representation	Hex value	TOAD representation
			Bit 13 = 1	Bit 13 = 0
MICR data representation - default				
0-9	Numerical data	0-39	X'30-9'	Same as ASCII representation and Hex value.
	Blank	3F	X'20'	
	Unreadable Character	?	X'3F'	
E13-B - Special characters				
|:	Transit	T	X'54'	T X'54'
||	On Us	A	X'4F'	O X'4F'
|'	Amount	\$	X'41'	A X'41'

Character	Description	ASCII representation	Hex value	TOAD representation
|||	Dash	-	Bit 13 = 1 X'44'	Bit 13 = 0 D X'44'
CMC7 - Special characters				
	Special character 1	a	X'61'	
	Special character 2	b	X'62'	
	Special character 3	c	X'63'	Same as ASCII representation and Hex value.
	Special character 4	d	X'64'	
	Special character 5	e	X'65'	

- For E13B checks, the 1st byte of additional data is the signal level of the check. This level represents a percentage of difference that this check is from a nominal check. Nominal checks will have a signal level of 100 (64 hex).
- For CMC7 checks, the additional byte of data will always read 100 (64 hex). In this case, the signal level has no meaning.

Response options

- Dependant upon your options, data is presented as {signal strength; magnetic noise level; MICR read data}.
- Depending upon the setting of MCT 0x6f, bit 10, the second byte of additional data will either be the characters read off the check (up to a maximum of 67 characters) *or* the magnetic noise level (on a scale of 0-100).
 - The default setting is the characters read off the check. If the user enables reading the magnetic noise level, this level will be in the 2nd byte of additional data and the characters read off the check will follow.
 - The characters are read from left to right. The MICR information will be represented as ASCII characters.
- Bit 11: MICR raw data format
 - 1 = Compatibility mode with older printers
 - 0 = Change the MICR data response to TOAD (Transit, On-US, Amount, Dash)
- Bit 12: Magnetic noise level
 - 1 = Compatibility mode with older printers {Signal strength; MICR read data}
 - 0 = The data sent from the printer as a result of a MICR read command (1B;49) will include a byte with the amplitude of a noise level. Data would be structured as {signal strength; magnetic noise level; MICR read data}
- Bit 13:
 - 1 = MICR will be read into the flipper.
 - 0 = MICR reading setup for back-to-back MICR reads. First read into the throat of the printer, then read into the flipper.

Error Conditions:

Document feed error (status byte 7). This bit is set if the inserted check is too long. The maximum check length is 10 inches. The error is also set if the check does not clear the document sensor when expected.

Magnetic noise present (status byte 8, bit 6). Set when MICR read shows random noise count ≥ 100 decimal or periodic noise > 0 . If set to a "1", this value will be in the status message when status byte 5, bit 2 = "1" otherwise it will be a "0" in other status messages. Magnetic noise might be due to a fan or CRT and will affect the accuracy of the MICR reading.

This command is ignored on 2NR printers (without the MICR capability).

Flip check

Syntax:

ESC 5 or X'1B35'

Purpose:

To flip the check after a MICR read. This will allow the face of the check to be printed.

Remarks:

- For faster check processing, set the print station to the document landscape before sending the flip command. Then, the check can print as it leaves the flip mechanism.
- This command increments the line count (status byte 6).

Error Conditions:

Document feed error (status byte 7). This bit is set if the inserted check is too long. The maximum check length is 10 inches. The error is also set if the check does not clear the document sensor when expected.

Miscellaneous commands

Horizontal tab

Syntax:

HT or X'09'

Purpose:

Moves the print position to the next tab stop.

Remarks:

See "Set horizontal tab positions" on page 62.

Tabs are valid when printing is aligned to the left only. If the tabs are used when alignment is not left, results can be unpredictable. (See "Align positions" on page 64.)

Backspace for composite characters

Syntax:

X'08"

Purpose:

To move the print position to the beginning of the last character.

Remarks:

This is only supported on 2xR/1xR printers. It is intended for use with languages that require “composite characters”.

Example. Send x`61; 08; 87; 08; 98' to get the composite character below.

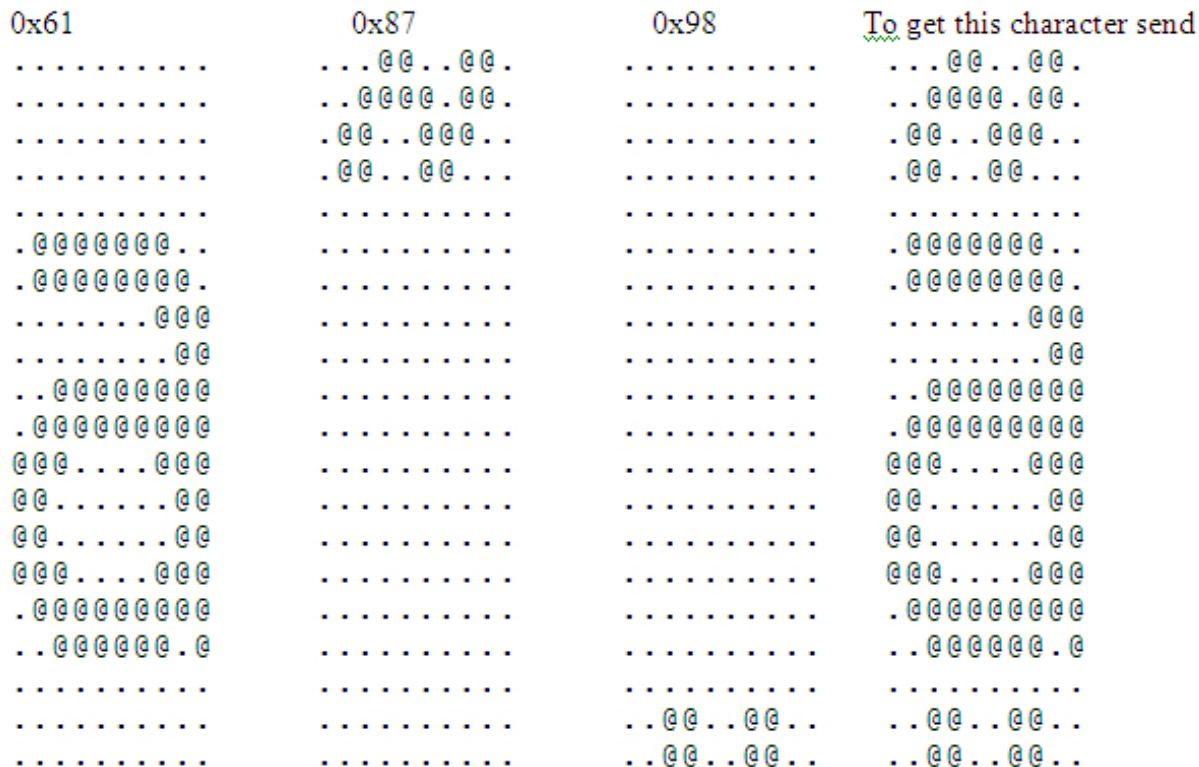


Figure 5. Composite Characters

Return home (select print head location)

Syntax:

ESC < n or X'1B;3C;n'

Where:

- n** The print-head position:
 - 00** Document Home Position
 - 01** Open Document Throat Position
 - 02** Reserved
 - 03** Left Home Position
 - 04** Re-find Document Home position. This can be used to recover from a home error.
 - 05** Register Document
 - Close throat if open and document present
 - Advance paper forward to first position if not open
 - 06** Re-register the document if a document is in the printer; brings it back to the first print position on the document.

Remarks:

Only valid at the beginning of the line. Only valid for impact print stations.

Purpose:

To move the print head to the desired location.

Remarks:

Valid at the beginning of the line only. Valid in impact print stations only.

Paper cut/DI eject

Syntax:

ESC i or ESC m or X'1B;69 or 1B;6D'

Purpose:

To cut the paper in the customer receipt station, or eject the document in the document insert station.

Remarks:

- This command is the equivalent of a form feed (*OC*) in the document insert station but does not feed the customer receipt in the CR station.
- ESC i or X'1B69' *does not* increment status byte 6.
- ESC m or X'1B6D' *does* increment status byte 6.

Generate drive pulse for cash drawer

Syntax:

ESC p *m n1 n2* or X'1B;70;m;n1;n2'

Where:

- m** The cash drawer number - 0 or 1.
- n1** Pulse width on time = (n1 × 2) milliseconds.
- n2** Pulse width off time = (n2 × 2) milliseconds.

Purpose:

To open one of the cash drawers attached to the printer.

Remarks:

Printing will be suspended while a cash drawer is being opened.

Retrieve the flash storage

Syntax:

ESC 4 *n1 n2* or X'1B;34;n1;n2'

Where:

- n1** One-byte count of the bytes to be returned
- n2** Three-byte address of the first byte to be returned

Purpose:

Retrieve data from user flash storage.

Remarks:

One byte will be returned if a byte count of X'00' is specified.

In many RS-485 printers, the number of bytes retrieved should be kept under 200 to ensure that the system's receive buffer is not overrun.

The valid address range for each SureMark depends on the model number and which memory option, if any, is installed. Use “Retrieve size of user flash storage” to determine the valid address range for your printer.

Retrieve size of user flash storage

Syntax:

ESC 4 x '08 FF FF FF' or X'1B;34;08;FF;FF;FF'

Purpose:

Retrieve the size of the user flash storage in the printer.

Remarks:

The size of the user flash storage will be returned in 8 bytes after the printer status bytes. The data will be in the form of ASCII decimal data.

Prepare printer for shut down (S3)

Syntax:

ESC g or X'1B;67'

Purpose:

Prepares the printer to shut down.

Remarks:

The printer firmware tracks many things in internal memory, including when to trigger low paper parameters and user statistics. These variables must be stored in nonvolatile memory before the printer loses power to keep accurate count of these statistics. When either the ESC g or a reset command is sent to the printer, the printer will store all internal variables into the flash memory. This should be sent to the printer by the system unit before it enters S3 mode, where power is removed for I/O. When the printer powers on (IPLs), a small amount of paper is fed (1/3 of an inch). If ESC g is sent before the printer powers off, the paper will not feed when the printer powers on.

Note: The ESC g command is only supported on the 2xR/1NR printers after the 0C.xx release of the code. It is not supported on legacy printers.

Asynchronous (real-time) commands

These commands are processed as soon as they are received. They do not go into the printer buffer.

Note: These commands are not recognized when they occur in the middle of another command. For example, sending this command after the second byte of a 3-byte command, as in ESC J n.

Real-time requests

Syntax:

DLE ENQ *m* or X'1005:n'

Where:

m Specifies the ASCII command character

n - Specifies the hexadecimal command character

n	Description
31	Release print buffer
32	Cancel print buffer
33	Undefined
34	EC request; send status
35	Undefined
36	Undefined
37	Undefined
38	Undefined
40	Reset printer
41	Enable unsolicited status
42	Disable unsolicited status
43	Disable transparent XON/XOFF

m	n	Description
1	31	Release the print buffer for printing. This should be sent after an error has occurred and the print buffer is held. If an error occurred during the transaction that was being held, the printer sends back the line number with the error and the error status. The system can then decide to cancel or continue printing after the error is corrected. The system uses this command to continue printing after the error is corrected.
2	32	Cancel print buffer. This clears the print buffer of all data. In RS-232 (EIA-232) mode, the user must wait for buffer empty status (status byte 2, bit 6) before sending any more commands. Note: A status message is returned immediately after execution of this command.
3	33	Undefined.
4	34	EC request - transmit printer status. Sends the printer's status to the system. This command does not go into the printer's data buffer but is processed immediately. The printer status is returned in status bytes 1–16. See Chapter 6, "Status information," on page 111 for more information. Status byte 5, bit 1, will be set after the EC request has been executed.
5-8	35-38	Undefined
@	40	Reset the printer. The printer stops what it is doing and goes through its reset routine. The print buffer is canceled and all commands erased. All printer settings go back to default values.

m	n	Description
A	41	Enable unsolicited status. Note: A status message is returned immediately after execution of this command. To enable these status messages, the Status Sent to System setup command must be enabled. See "Status sent to system" on page 66.
B	42	Disable unsolicited status
C	43	Disable transparent XON/XOFF

Purpose:

To process a command immediately.

Remarks:

Either the *Release print buffer* or the *Cancel print buffer* command must be used when the print buffer is held. If the printer is set to hold on error then one of these commands must be used when the error condition is cleared.

After the printer resets, it defaults to **not** sending status unless requested. If an error occurs, the printer appears hung, unless a status is requested. If unsolicited status is enabled, the printer sends the error to the system as soon as it occurs.

Note: If transparent XON/OFF is disabled, X'10', X'11', and X'13' can be imbedded in returned status and data. To re-enable the printer, the printer must be reset.

Data buffer management and batch printing

Marker command

Syntax

ESC = marker or X'1B 3D' marker'

Where:

marker = 1 byte marker: 0x00 and 0x01 markers are reserved.

Purpose

To allow the driver to monitor how much of the data in the printer's buffer has executed. The EC Level command returns status with the EC bit set. If you want to know when a specific command has finished execution, a buffered EC level request could be sent following the command. When status is returned with the EC level bit set, then the previous command has been completed.

Remarks:

The marker will be sent as status byte #4 in place of the EC level of the code, and Status Byte 9, bit #1 will be set to indicate that the EC level has been replaced by the marker for this status. The status with the marker will be sent when all commands received before it has been processed. If only a partial line is sent to the printer (characters without a line feed command), the marker will be sent before the line gets printed.

Example:

```
LINE 1 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 2 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 3 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
0x'1B3D04'
```

LINE 4 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 5 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 6 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 7 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
LINE 8 FGHIJKLMNOPQRSTUVWXYZ1234567890x'0a'
0x'1B3D05'

- After the first three lines, the printer will transmit back status with the normal printer status: Status Byte 4 = x'04'.
- After the 8th line, the printer will send back status with Status Byte 4 = 0x05.

Reset line count

Syntax:

ESC 6 or X'1B36'

Purpose:

Resetting the line count lets the system track the print line where an error occurs.

Remarks:

The line count is incremented at every print command. The count is sent in every status message to the system. The count can go to 256 (X'FF'), when it rolls back to 0. (See "Print character commands" on page 85.)

Disable line count

Syntax:

ESC 8 *n* or X'1B;38'*n*

Where

- *n* = 1, disable line count
- *n* = 0, enable line count

Purpose:

To temporarily not increment the line count. This can be used when printing predefined messages, if the number of lines embedded in the message is unknown.

Hold printing until buffer is released

Syntax:

ESC 7 or X'1B37'

Purpose:

If the system cannot send data to the printer at a speed needed to keep the printer in constant motion, it can hold the printer queue until it sends all data lines for a transaction.

Remarks:

The printer must be printing one line while processing the next line. If the printer is unable to completely process a line, the print speed reduces to half.

The line count is reset when the buffer is held.

Release print buffer

Syntax:

DLE ENQ 1 X'10;05;31"

Purpose:

To release the print buffer for printing

Remarks:

If an error occurs during the transaction that was being held, the printer will send back the line number it occurred on with the error status. The system can then decide to cancel or continue the printing when the error is corrected. The command will continue the printing after the error is fixed.

Chapter 4. Page mode printing commands

This section describes the page mode commands.

Select page mode

Syntax:

ESC L or X'1B;4C'

Remarks:

- Enables page mode printing.
 - Supported on thermal station only.
 - Starting position is set by *Set printable area X'1B;57.'* and *Set print direction X'1B;54.'* commands.
 - Intercharacter spacing X'1B;20;n' and line spacing X'1B;31', X'1B;32', X'1B;33' commands are set independently for page mode and standard mode.
 - The following commands are allowed:
 - Rotate characters
 - Set alignment
 - Set/Clear upside-down
 - Set margins
-

Select standard mode

Syntax:

ESC O or X'1B;4f'

Remarks:

- This command is effective in page mode only.
 - Data buffered in page mode is cleared.
 - This command sets the print position to the beginning of the line.
-

Select printable area

Syntax:

ESC X or X'1B;58;x;y;dx;dy'

Where:

- *x, y*
 - Two-byte horizontal and vertical starting position (in dots)
- *dx, dy*
 - Two-byte horizontal and vertical printing area (in dots)

Remarks:

- When sent in standard mode, this command sets the printable area for page mode, but has no effect on standard mode printing.
- If the starting position (*x, y*) is outside the maximum range, the entire command is ignored.
- If the printing area is defined outside the maximum page size, the printing area is limited to the page size.

- Maximum page size is 576 dots in the horizontal direction, and 800 dots in the vertical direction (except Models Tx8 and Tx9, which is 1250 dots in the vertical direction).

Select printing direction/position

Syntax:

ESC T *n* or X'1B;54;*n*'

Where:

n

Table 24. Print direction

<i>n</i> =	Direction / position
X'00'	Left to right / top left
X'01'	Bottom to top / bottom left
X'02'	Right to left / bottom right
X'03'	Top to bottom / top right

Remarks:

When sent in standard mode, this command sets the print direction for page mode, but has no effect on standard mode printing.

Starting position is within the printable area defined by the *Select printable area* command (X'1B;58...').

Set vertical position

Syntax:

GS \$ *y* or X'1D;24;*y*'

Where:

y is a two-byte vertical printing position (in dots)

Remarks:

- Applies to page mode only.
- Moves the printing position to the specified dot position perpendicular to the printing direction specified by the *Select printing direction* command. If printing direction is bottom-to-top, or top-to-bottom, this command adjusts the printing position in the horizontal direction.
- If the value of *y* is outside the specified printable area, this command is ignored.

Set relative vertical position

Syntax:

GS \ *y* or X'1D;5C;*y*'

Where:

y is the two-byte vertical printing position (in dots).

Remarks:

- Applies to page mode only.
- Moves the printing position the specified number of dots from the current print position, in the direction perpendicular to the printing direction specified by the *Select printing direction/position* command (X'1B;54...'). If

the print direction is bottom-to-top, or top-to-bottom, this command adjusts the printing position in the horizontal direction.

- If the value of *y* is outside the specified printable area defined by the *Select printable area* command, this command is ignored.
- If *y* is a negative value, the current print position will move in the opposite direction.

Set left margin position (standard mode), set absolute print position (page mode)

Syntax:

ESC \$ *n1 n2* or X'1B;24;*n1;n2*'

Where:

- *n1* is the high-order byte of the dot offset from the beginning of the print line.
- *n2* is the low-order byte of the dot offset from the beginning of the print line.

Default:

n1 = 0, *n2* = 0

Remarks:

- In the thermal station, 1 mm = 8 dots.
- In the impact station, 1 inch = 150 half-dots (75 dots).
- *n1* and *n2* are hex values. Convert each to decimal, and use this formula to get the decimal equivalent: (*n1* x 256) + *n2*.
- The maximum value in the thermal CR station is 576. The maximum value in the impact DI station is 474.
- In the CR station, this number is rounded back to a factor of 8.
- If the *n1,n2* value exceeds the maximum, it is ignored.
- This command should be sent only after the command that selects the station, *Set print station* (ESC *c1 n*).
- In Page mode, the printing position is moved the specified number of dots from the beginning of the print line, in the same direction as printing, specified by the *Select printing direction/position* command (X'1B;54...'). If the print position is bottom-to-top, or top-to-bottom, this command adjusts the print position in the vertical direction.
- This is a one-time adjustment on the current line. If this command moves the print position outside the printable area specified by the *Select printable area* command, it is ignored.

Set relative horizontal position

Syntax:

ESC <5C>h *n1 n2* or X'1B;5C;*n1;n2*'

Where:

- *n1* is the high-order byte of the dot offset, relative to the left margin in standard mode or the current print position in page mode.
- *n2* is the low-order byte of the dot offset, relative to the left margin in standard mode or the current print position in page mode.

default:

$n1 = 0, n2 = 0$

Remarks:

- In the thermal station, 1 mm = 8 dots.
- In the impact station, 1 inch = 150 half-dots (75 dots).
- $n1$ and $n2$ are hex values. To get the decimal equivalent, convert each to decimal, and then use this formula: $(n1 \times 256) + n2$.
- To move the position to the left, use a negative number.
- If this number plus the left margin exceeds the printable area, the command is ignored.
- In the CR station, this number is rounded back to factor of 8. See the *Set left margin position* command for more information.
- When printing in page mode, this is a one-time adjustment on the current line. If this command moves the current print position outside the printable area defined by the *Select printable area* command, the command is ignored.

Set printing position

Syntax:

GS] x y or X'1D;5D;x;y'

Where:

- x is the two-byte horizontal position, with respect to the paper, regardless of printing direction.
- y is the two-byte vertical position, with respect to the paper, regardless of printing direction.

Remarks:

- This command allows complete control of the printing position with a single command.
- If either parameter is outside the printable area defined by the *Select printable area* command, the command is ignored.

Print, form feed and cut the paper

Syntax:

FF or X'0C'

Remarks:

- In standard mode, the data in the print buffer feeds the paper in the CR station or DI station by a preset amount, until the document exits the feed rollers. If a cutter is available (CR station only), it cuts the paper.
- In page mode, the printer prints the page, then returns to standard mode. The page loaded in the printer's buffer is cleared. The paper is not cut.

Print page in page mode

Syntax:

ESC FF or X'1B 0C'

Remarks:

- In standard mode, this command is ignored.

- In page mode, this command prints the page that is loaded in the printer. The page remains loaded in the printer's buffer and the printer remains in page mode. This should be used for repeatedly printing the same page, or if there is a template that is filled in with each printout.

Clear print data in page mode

Syntax:

CAN or X'18'

Remarks:

This command deletes all print data in the current printable area of the page stored in the print buffer.

Chapter 5. Document handling

To read checks, insert them from the front of the printer. Use the side load capability only for documents that must be positioned to begin printing at a particular location on the document. (There is an arrow on the side of the cover to indicate where printing begins.) Use front load for all other cases.

Portrait mode

This is a suggested method of document handling:

1. ESC f (x) (y): Set up document wait time

x Time the printer should wait from receiving a print line for the document station until the document is inserted.

If the document has not been detected by the time the wait time ends, a document error is sent to the system but the system continues to wait for a document to be inserted.

y Delay from the time the document is detected until it is *grabbed* by the printer (the start of document printing):

- Side insertion - closes the document throat.
- Front insertion - pulls the document into the printer and feeds it to the Top of Form.

2. ESC c 0 X'04': Select document station - normal print mode:

The document present indicator blinks until a document is detected, then it stays on continuously.

- If the document is inserted from the front, it is fed to the first print position after the document wait time. Then, commands in the printer buffer begin executing.
- If the document is inserted from the side, printing starts at the location where it was inserted.

(The document throat must be open to insert the document from the side.) Manually, open the throat by pressing and then releasing both buttons. You can also open it with these commands - ESC q or ESC < X'01'.

If a document is not detected within the wait time (specified in the ESC f command), the printer sends error status to the system, and continues to wait.

Note: The system can either cancel the print buffer, thereby deleting all data in the print buffer, or wait for a document to be inserted.

The printer appears to be hung until an action is taken.

3. Send print lines to be printed in this station.

4. Final handling.

You have an option on final handling, finish printing and either eject the document or open the document throat to allow manual removal of the document:

FF: Print and Eject Document.

Finish printing and eject the document.

Landscape mode

Landscape mode printing is primarily for printing the face of a check.

Notes on landscape printing:

- Lines you send to print start at the bottom of the form, against the right stop, and continue to the top of the form, to a maximum of 80 mm from the bottom of the form. This is because the bottom of the form is known (against the right stop) and the top of the form is unknown to the printer.
- Different lengths of paper allow different print-line lengths. Therefore, the application must know the size of the print line.
- The printer calculates the length of a document it is to print. To do that, it must feed the document up past the bottom sensor and back to the top sensor. (On a 5-inch document this takes 2 seconds.) If a MICR read was done previously, the length was calculated at that time.
- When landscape mode is used without the check flipper, the document should be inserted so that the right edge is at the top of the printer, and the bottom edge is against the printer's right wall.
- To position the printing in landscape mode to the correct position, the system must send line feeds. The printer assumes that the top of form for a document in landscape mode is the far left edge of the document (to a maximum of 80 mm from the bottom of the form).
- Line feeding is 5 steps per mm or 21 steps per line, at 6 LPI.
- All landscape printing must be done with one printing pass. Therefore:
 - Double-high printing is not allowed.
 - User-defined characters greater than 9 dots high are not allowed.
- There is no error recovery for landscape printing.
- Set print station to document landscape mode to print the face of the check as it comes out of the flipper mechanism.

Landscape printing commands

1. ESC f (x) (y): Set up document wait time

Same as for portrait mode.

2. ESC c 0 X'08': Select document station - landscape print mode:

- A** If the document was not previously loaded:
- The document present indicator blinks until a document is detected.
 - Once detected, the document will be *grabbed* by the printer and fed to the right margin on the document. Because the document is inserted on its side, this is at the top of the printer.
 - If a document is not detected within the wait time (specified in the ESC f command), the printer sends error status to the system, and continues to wait.
The system can either cancel the print buffer, deleting all data in the print buffer, or wait for a document to be inserted.
The printer appears to be hung until an action is taken.
- B** If the document was previously loaded, the printer feeds the paper to the right margin on the document.

3. Send print lines to be printed in this station.

The number of characters that can be printed on a line depends on the width of the document. The print area is:

- 63 mm high, starting 17 mm from the bottom of the document
- The entire width of the document less 34 mm from the right edge and 10 mm from the left edge

4. Final handling.

You have an option on final handling: finish printing and either eject the document or open the document throat to allow manual removal of the document:

4a. FF: Print and Eject Document.

Finish printing and eject the document.

4b. ESC q or ESC < X'01': Open Document Throat

Finish printing and release the document from the printer's rollers.

Note: The document station stays selected. The printer will wait for another document until the station is changed.

Chapter 6. Status information

Models 2CR and 2NR have 16 status bytes. When Models 2CR and 2NR is in emulation mode the status bytes will reflect the status of the older 4610 models. Status is sent to the system for the following conditions:

Table 25. Summary of status conditions

- Cash receipt print error. The cover is open or out of paper.
- Printer buffer empty. If enabled, see “Status sent to system” on page 66.
- Document sensor state changed. If enabled, see “Status sent to system” on page 66.
- Cash drawer sensor change. If enabled, see “Status sent to system” on page 66.
- Nonrecoverable home error.
- Document not inserted after document station was selected.
- Document sensor is covered or cleared.
- Flash EPROM load error.
- Memory sector is full.
- User flash storage is full.
- Printer ID request (extended address command).
- MICR read command.
- MCT read command.
- User flash read command.
- Print buffer being held.
- Ribbon cover sensor change.
- Document feed error.
- Low Paper Detected
- Out of paper
- Thermal Paper Jam
- Cutter failure
- DI feed slip

Message from the printer

A message from the printer has this format:

Bytes	Contents
1 - 2	Data count (X'000A' to X'00FF'). The data count includes the two data-count bytes.
3 - 19	Status bytes 1-16. See the descriptions of each byte in the sections that follow.
20 - <i>n</i>	Either 5 bytes of additional status from the “Extended address command-request printer ID” on page 14 command, or up to 246 bytes of user data that can include: <ul style="list-style-type: none">• MICR data• User flash data• MCT data

Status byte 1

Table 26. Status byte 1

Bit	Description
0 (LSB)	Command complete (immediate command and flash storage commands). Set to 1 when the command is complete.
1	Reserved
2	Document left home position. Set to 1 when the print head is in the left home position.
3	Document right home position. Set to 1 when the print head is in the right home position.
4	Reserved. Always 0.
5	Ribbon cover open. Set to 1 when the ribbon cover is open.
6	Compatibility mode will set this bit on cover open/out of paper/paper jam or cutter jam. Native mode will only set this bit for cover open.
7 (MSB)	Command reject.

Status byte 2

Table 27. Status byte 2

Bit	Description
0 (LSB)	Document ready. Set to 0 when the document insert station is ready for printing. This occurs when both document sensors detect the document and the document has been fed to the first print position.
1	Document present under the front sensor. Set to 0 when a document is under to top document sensor.
2	Document present under the top sensor. Set to 0 when a document is under the top document sensor.
3	Reserved. Always equals 1.
4	Print buffer held. Set to 1 when the print buffer is being held. Cleared when buffer released. The printer can be held due to a Hold buffer Command or one of the following printer errors: Ribbon cover open, with commands to be printed on the document station. Cash receipt print error with commands to the cash receipt station.
5	Open throat position. Set to 1 when the print head is in the open throat position.
6	Buffer empty. Set to 1 when no print data and no commands are in the buffer.
7 (MSB)	Buffer full. Set when the message pipe is 80% full. Cleared when the message pipe is 60% full. Commands will be rejected when pipe is 100% full.

Status byte 3

Table 28. Status byte 3

Bit	Description
0 (LSB)	Memory sector is full.
1	Home error.

Table 28. Status byte 3 (continued)

Bit	Description
2	Document error. the document was not inserted after the document station was selected, and the wait subsequently timed out.
3	Flash EPROM load error or MCT load error.
4	Reserved. Always equals 0.
5	User flash storage sector is full.
6	Firmware error. CRC on the firmware failed. The printer is running out of the boot sector. Only system commands and firmware commands are accepted. The firmware must be reloaded into the printer.
7 (MSB)	Fiscal bit. Set to show a line completed printed. Set to 1 when Flash erase is complete.

Status byte 4

Contains the printer engineering code (EC) level with all status messages.

Status byte 5

Table 29. Status byte 5

Bit	Description
0 (LSB)	Printer ID Request/Extended Address command. Set to 1 when responding to a Printer ID request.
1	EC Level. Set to 1 when responding to an EC level request.
2	MICR Read. Set to 1 when responding to a MICR read command.
3	MCT Read. Set to 1 when responding to an MCT read command.
4	User flash read. Set to 1 when responding to a flash read command.
5	Reserved. Defaults to 1.
6	Reserved
7 (MSB)	Reserved

Status byte 6

Contains the current line count.

Status byte 7

Table 30. Status byte 7

Bytes	Description
0 (LSB)	Reserved
1	Lost +24V. Set when +24V drops below +20V. Note: If the printer is powered off with the power switch, this status will go out as the printer shuts down.
2	Bar code generation problem. Set to one when there is a problem creating a bar code image.
3	Cash drawer status.
4	Print key pressed. Set to one when a printer key operation is in progress.
5	Reserved. Defaults to 1.

Table 30. Status byte 7 (continued)

Bytes	Description
6	Station selected. Set to 1 when document insert station is selected. Clear when the cash receipt station is selected.
7 (MSB)	Feed error. This is a document feed error: Set when there is an error after a Flip Check or a MICR command is executed.

Status byte 8

Table 31. Status byte 8

Bit	Description
0 (LSB)	Reserved
1	Reserved
2	Reserved
3	Reserved
4	Reserved (always 0)
5	Set to 1 when CR paper is out.
6	Magnetic noise present - only for MICR read command - "1" when MICR read shows random noise count ≥ 100 decimal or periodic noise > 0 , otherwise "0". If set to a "1", this value will be in the status message when status byte 5, bit 2 = "1" otherwise it will be a "0" in other status messages. When magnetic noise present bit is set there is excessive magnetic noise which might be due to a fan or CRT and it will affect the accuracy of the MICR reading.
7 (MSB)	Thermal Print Algorithm Engaged: The thermal algorithm pauses printing to safeguard the parts in the printer when either the print head or the paper feed motor is considered too hot to continue printing. The bit clears when the printer has cooled down. Prior to 2xR/1xR level 09.xx, this bit was set when the printer was almost too hot to continue printing. Pass these levels, the bit is set only when the algorithm is actually engaged. Note: The printer stops printing when the temperature exceeds 65° C, and will restart printing when the temp is below 60° C.

Status byte 9

Table 32. Status byte 9

Bit	Description
0 (LSB)	Reserved
1	Marker attached
2	Reserved
3	Reserved
4	Reserved (always 0)
5	Reserved
6	Printer is in offline mode, or has an unrecoverable error.
7 (MSB)	Reserved

Status byte 10

Table 33. Status byte 10

Bit	Description
0 (LSB)	Reserved
1	Reserved
2	Set when responding to checksum request for download graphics logos or stored messages.
3	Reserved
4	Reserved (Always = 0)
5	Reserved
6	Reserved
7 (MSB)	Reserved

Status byte 11

Table 34. Status byte 11

Bit	Description
0 (LSB)	CR feed error - no motion detected when line feeding.
1	Reserved
2	Detected partial paper cut. Cutter may be failing.
3	Unexpected cover open. This bit will be set when the cover is open, where there isn't an error condition.
4	Reserved (always = 0)
5	Cutter jam. CANNOT print in the CR station when this bit is set.
6	Set to 1 when CR paper is low.
7 (MSB)	Set to 1 when CR paper is critically low.

Status byte 12

This will contain information RMA should monitor.

Table 35. Status byte 12

Bit	Description
0 (LSB)	Reserved
1	Document feed slip detected. Document does not appear to move as far as it should when feeding. Tested during MICR read and landscape print.
2	Reserved
3	Unexpected DI cover open. This bit will be set when the cover is open and there has not been an error.
4	Reserved (Default = 0)
5	High voltage detection. The printer will be offline if this bit is set.
6	Reserved
7 (MSB)	Reserved

Status byte 13

The printer can detect problems with the cards and might be able to communicate. If it can communicate, these are the statuses that are sent. If the failure is such that the printer cannot print, offline status will be set, and the CR LED will blip.

Table 36. Status byte 13

Bit	Description
0	(LSB) Main logic card - CRU failure
1	Interface logic card - CRU failure
2	Thermal printhead - CRU failure
3	Impact print head failure (not a CRU)
4	Reserved (Always = '0')
5	Motion sensor failure (not a CRU)
6	Reserved
7 (MSB)	Reserved

Status byte 14

Table 37. Status byte 14

Bit	Description
0	(LSB)
1	
2	
3	
4	Reserved (Always = '0')
5	Problem communicating with the thermal printhead
6	Executing offline test via command or keys
7 (MSB)	

Status byte 15

Table 38. Status byte 15

Bit	Description
0	(LSB)
1	
2	
3	
4	
5	
6	
7 (MSB)	Reserved (Always = '1')

Status byte 16

Table 39. Status byte 16

Bit	Description
0 (LSB)	IPL count: The lower bits of the number stored at the IPL count statistic
1	IPL count: The lower bits of the number stored at the IPL count statistic
2	IPL count: The lower bits of the number stored at the IPL count statistic
3	
4	
5	
6	
7 (MSB)	Reserved (Always = '1')

Chapter 7. Character fonts

This section describes font capabilities. For more information about font-related commands, see:

- “Download user-defined characters” on page 38
- “Set print station” on page 56
- “Set print mode” on page 51
- “Set code page” on page 57
- “Set intercharacter spacing for single byte character sets” on page 58
- “Select user-defined or resident character sets” on page 57

Thermal printing font

The number of characters printed per inch depends on the character size, the intercharacter spacing, and the chosen font. For example:

- 17 cpi = 10-dot wide character + 2-dot space (font A) = 48 characters per line
- 15 cpi = 10-dot wide character + 3-dot space (font A) = 44 characters per line
- 12 cpi = 12-dot wide character + 5-dot space (font B) = 34 characters per line
- 20 cpi = 8-dot wide character + 2-dot space (font C) = 57 characters per line

You can choose the character size of four user-defined character sets (code pages) or two proportional fonts. The parameter ranges for user-defined character sets are:

- $8 \leq \text{dot width} \leq 32$
- $16 \leq \text{dot width} \leq 32$
- Height must be a multiple of 2, such as 20, 22, 24, 26 and so forth.

Notes:

1. Any of the thermal printing fonts can be scaled up to eight times the defined width and eight times the defined height. The scaling factor for the width does not have to equal the scaling factor for the height. For example, you could specify twice the width and five times the height.
2. For paper that has a width of 80 mm, the cash receipt print line is 72 mm (2.83 in.) long. There are 576 dots per line and 203 dots per inch.

Proportional fonts

This section describes the procedure for converting and downloading proportional fonts. It also gives recommendations that will simplify implementing proportional fonts on a receipt.

Preparing the fonts

Download proportional fonts to the SureMark as follows:

1. Convert a TrueType font to the SureMark proportional font format. Use the Toshiba Proportional font conversion utility, fontconvert.exe, to convert the fonts. See “Proportional fonts.”
2. Download the converted font file to the printer.

Implementing proportional fonts

The variable width of proportional fonts can make it difficult to layout a receipt using traditional methods. you can simplify the process of laying out the format of a receipt by using the alignment and tab features of the SureMark printer.

The following topics show how to use the alignment and tab features with proportional fonts. Command descriptions are given in RS-232 (EIA-232) command format. For the command syntax when you use a printer driver, consult the driver documentation.

A single proportional character set requires two user-defined code pages. Therefore, the printer allows the following combination of user-defined and proportional character sets to be stored in the printer.

Number of Proportional Character Sets	Number of User-Defined Character Sets
0	4
1	2
2	0

Selecting code page 2 when a proportional character set is defined for code page 1 (or selecting code page 4 when proportional characters are defined in code page 3) will result in unreadable characters being printed.

A proportional character set is enabled using the select User-Defined Characters command.

Layout using align commands

A common requirement for receipt layout includes aligning item prices. This is commonly accomplished using fixed field lengths for item descriptions or counting characters. Using proportional fonts makes this method of alignment practically impossible.

The simplest method to align prices is to use the Align Column Right command with the Fix Font Matrix command.

- Unlike other Align Position commands, the Align Positions-Align Column Right command can be sent in the middle of a print line. Print characters sent before the alignment command will be left aligned, while characters sent after the alignment command will be right aligned.
- The Fix Font Matrix command forces proportional characters to print using a single width defined by the command. This essentially negates the proportional characteristic of the font, while still allowing the user to utilize the custom font. The following sequence assumes proportional characters have been downloaded and selected for printing. The following sequence should be used for each item line. The printer output would resemble the following:

```
Candy Bar          $ .45
Fountain Soda     $ 1.11
```

1. Print the item description. For the first item, this is the ASCII data Candy Bar.
2. Issue the Set Alignment command with n=4 (Right Align Column). The command syntax is X'1B 61 04'.
3. Issue the Fix Font Matrix command with n=dot width of the widest number used. The command syntax is X'1B 3A xx'.

Note: Finding the optimum value of xx for this command will vary depending on the proportional character set being used, and may require some experimentation.

4. Print the item price. For the first item, this is the ASCII data \$.45.
5. Issue the Fix Font Matrix command with n=0, which disables the fixed font matrix. The command syntax is X'1B 3A 00'.
6. Issue the Print and Line Feed command. Use the command syntax X'0A' or X'0D'.

Layout using set tab position

In situations where you do not need the price right aligned, or where you require an additional column (for example, a column for quantity), using tabs is the best method to guarantee alignment. Tab positions that you define during the setup operation will remain intact until the printer is reset or re-initialized. Once tabs are setup, all that is required is to send a tab character X'09' to move to the next tab position. Use the Fix Font Matrix if alignment of the individual characters in a field is important (for example, to align the decimal points of prices).

The following Set Tab Positions command will define tab positions for 3 columns: item description, quantity and price. The command assumes that the font width is approximately 10 dots. This procedure assumes that proportional characters have been downloaded and selected for printing, and that the item description will be left aligned.

```
X'1B 44 01 90 01 D6 00 00'
```

The following sequence should be used for each item line. The printer output would resemble the following:

```
Candy Bar    03 $ 1.00  
Fountain Soda 10 $11.10
```

1. Print the item description. For the first item, this is the ASCII data Candy Bar.
2. Issue the Tab command. The command syntax is X'09'.
3. Issue the Fix Font Matrix command with n=dot width of the widest number used. The command syntax is X'1B 3A xx'.

Note: Finding the optimum value of xx for this command will vary depending on the proportional character set being used, and may require some experimentation.

4. Print the quantity. For the first item, this is the ASCII data 03.
5. Issue the Tab command. The command syntax is X'09'.
6. Print the price. For the first item, this is the ASCII data \$1.00.
7. Issue the Fix Font Matrix command with n=0, which disables the fixed font matrix. The command syntax is X'1B 3A 00'.
8. Issue the Print and Line Feed command. Use the command syntax X'0A' or X'0D'.

Proportional font conversion utility

Toshiba provides three True Type fonts and a utility that you can use to convert the fonts to files that the SureMark printer can use. The application and instructions for downloading the converted fonts are available from the Retail Store Solutions Web site.

Note: You might have True Type fonts other than those supplied by Toshiba on your system. Before using the conversion utility to convert and download any non-Toshiba fonts for use by the SureMark printer, you must confirm that you have received authorization from the owner of the fonts to convert and download the fonts.

Chapter 8. Tests and diagnostics

This section describes the tests available for the 4610 Models 2xR and 1xR printers.

Low paper sensing and calibration

Low paper sensing is based upon the paper thickness and the core size. You can modify the low paper and critically low sensing settings. These settings determine the amount of paper that remains on the roll and at which time the low paper and the critically low paper status is sent. The default setting for low paper status is when 5 meters (or 5000 mm) remains on the roll, and 1 meter (or 1000 mm) for critically low.

Note: With Firmware level 0F.xx and above, the paper remaining will be stored in non-volatile memory with every paper cut. Prior to this level, turning off the printer, without sending either a reset command or a “Prepare printer for shut down” command would affect the printer’s accuracy when determining the low paper status.

For Models 1xR, the low-paper sensor is customer-selectable for table or wall mount, depending on application. The printer comes from the factory already in table mount mode. For wall mount applications, you must move the low-paper selector switch on the bottom of the printer to the WALL position.

You must calibrate the printer to accurately recognize the thickness of the paper supply. Calibration can be done using an offline test or by a command. See ““Set low paper calibration” on page 64”, ““Summary of the offline test menus (Models 2xR)” on page 125, or “Summary of the offline test menus (Models 1xR)” on page 130”.

One printer can be calibrated for the paper supply. The calibration constant can then be broadcast to all printers that will use the same paper.

To set the low paper supply sensors of all printers within your system:

1. Run the calibration on one printer. See Table 40.
2. Read out MCT#0x28 from the calibrated printer.

- Note:** The calibration constant is stored in MCT 0x28. System management can interrogate all printers to see if one has been recently calibrated.
3. Clear the high-order bit and send the value to all printers in the enterprise.

Table 40. MCT load command settings for low paper and critically low paper

Dec	Hex	
38	26	Low paper amount. This is the amount of paper left in the printer when the low paper status is sent. Default is 5 meters (5000 or 0x1388 number stored as mm).
39	27	Critically low paper amount. This is the amount of paper remaining in the printer when the low paper status is sent. Default is 1 meter (1000 or 0x03E8 number stored as mm).

Table 40. MCT load command settings for low paper and critically low paper (continued)

Dec	Hex	
40	28	LowPaperCalibrationConstant; The high order bit to this variable is set after this printer has calibrated the Low Paper. The lower order bits are the number of mm the printer will feed after detecting the sensor change until the paper is out.

Firmware offline tests (Models 2xR)

To enter the firmware offline test and setup procedures for 4610 Models 2xR, complete the following steps:

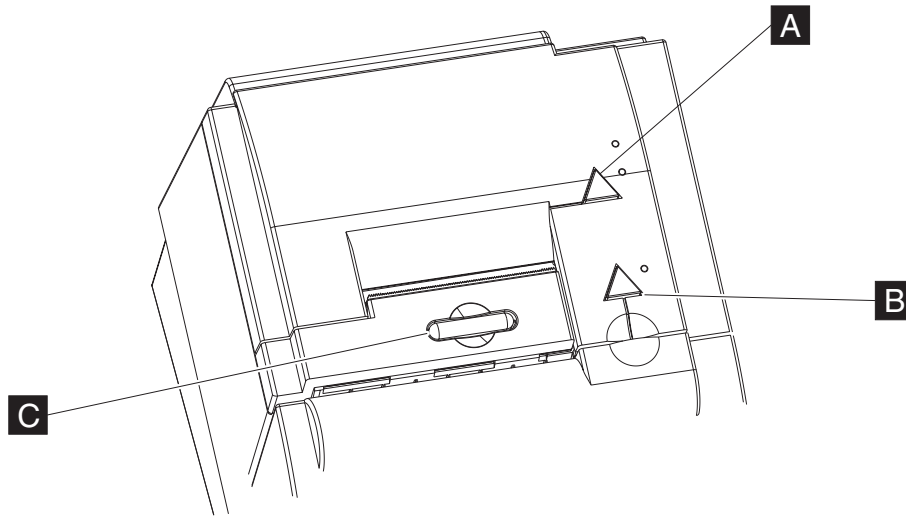


Figure 6. Paper feed and document feed buttons

1. Open the paper cover (**C**) and press the power button to power on the printer. The power button comes with a cover over it, so it may be necessary to use a paper clip or similar item to push the button through the cover. See Figure 7 on page 125 for the location of the power button.

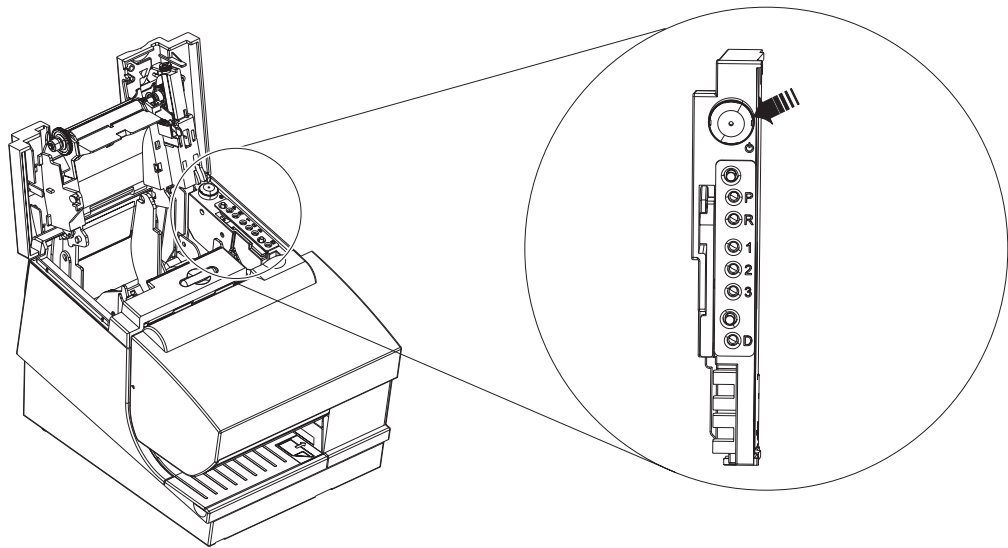


Figure 7. Pressing the power button

2. Close the paper cover and press the paper feed button (**A**) while the printer is powering up.
3. The following offline selection menu is printed. See Figure 8.

Off-line Selection started

To select a sub-menu or test:

FIRST, press the paper feed button the indicated number of times.

THEN, press again and hold button down at least 1 second to confirm selection.

Sub-menus and tests	Press
Thermal Receipt test	1
Choose Emulation Mode	2
Model Selection	3
EIA-232/RS-232 Flow Control	4
More Selections	5

To exit Off-line setup, open printer cover.

Figure 8. Example of the offline selection main menu. See Table 41 for an explanation of these menu items.

4. Follow the instructions that are printed for each required test.

Summary of the offline test menus (Models 2xR)

Use the firmware offline test menus to perform the offline tests. However, note that some existing offline test methods still apply (see “Earlier methods for offline tests” on page 128). Table 41 describes the available firmware offline test menus:

Table 41. Summary of the offline test menu items for Models 2xR

Menu item	Definition	Sub-menu (if applicable)	Definition
Thermal receipt test	Prints a receipt		

Table 41. Summary of the offline test menu items for Models 2xR (continued)

Menu item	Definition	Sub-menu (if applicable)	Definition
Choose emulation mode	Displays the submenus (see next column)	Compatibility with Legacy 4610	Changes the command set and statuses to support the previous drivers and applications (such as plug and play for existing 4610 printers). Note: Not applicable to Ethernet interface printers.
		Native mode	Changes the command set and statuses to support the low-paper detection, paper jam detection, and other 4610 Model 2xR sensors.
		Diagnostics mode	Gives printer Fixed IP address required by Toshiba Diagnostics for POS Systems and Peripherals. Note: Applicable to printers with Ethernet interface only.
Model selection	You specify the printer type: MICR reading or non-MICR reading model.		
EIS-232/RS-232 flow control	Provides a list of available baud rates and flow controls.		
Ethernet Configuration	Provides a list of Ethernet configuration options.		
More selections	Provides additional menus.		
MCT listing	Information for service personnel.		
Low-paper calibration	You are instructed to insert a <i>small</i> roll of paper in the printer. During the test the printer ejects all of the paper from this roll to calibrate the low-paper sensor.		
MICR read test (Model 2CR only)			
Document print test	Starts print test.		
Hex dump mode	A debug mode that is used when attached via an RS-232 that prints the commands and data that the printer receives. This allows the application writer to see what data is actually being received at the printer.		
Execute printhead test	Starts printhead test.		
Reset TPH user data Execute after thermal Printhead is replaced	Select after you install a new thermal printhead.		
Paper out sensor test	Checks the operation of the paper-out sensor.		
Code Page Menu	Prints out all Code Pages resident in the printer.		
Paper reduction	Displays submenus to Enable Paper reduction options.		
Main menu	Return to main menu.		

Changing the interface card or logic card

During the servicing process, you often will change an interface card or logic card in the printer. If one of the cards is a new FRU, then the printer firmware automatically updates the new card with the printer settings and other information. (These settings include the serial number, baud rate, and model number.) The first time you power on the printer with a FRU card in it, the update will occur and the printer will reset.

For proper operation, the information on the interface and logic cards must match. If you install either card (interface or logic) with previously written firmware information, you must direct the firmware to overwrite the correct card.

The following message is printed when an information mismatch occurs:

A card in the printer has been replaced
Main Logic's S/N is 41-MVT02
Interface Card's S/N is 41AAVT50
Check the serial number (S/N) of the
printer. The S/N is located next to the
document insert station and on the
bottom of the printer.

If S/N matches one of the above, please
update the card with the incorrect S/N.

If S/N does not match one of the above,
Refer to the Hardware Service Manual.

To select a sub-menu or test:
FIRST, Press the paper feed button
the indicated number of
times.
THEN, press again and hold
button down at least 1 second
to confirm selection.

OPTIONS. Press
1. Main Logic Update Menu . . . 1
2. Interface Card Update Menu . . 2
3. Continue without updating . . 3

To exit Off-line setup, open printer cover.

If you select option 1, the following message prints:

Main Logic Card Update Menu
Data will be copied from the
interface card to the main logic
Printer will reset when update is done.
To update the Main Logic Card,
Press the paper feed button

To Exit without updating, Open Printer Cover.

If you select option 2, the following message will print:

Interface Card Update Menu
To update the Interface Card,
Press the paper feed button
Data will be copied from the
main logic to the Interface Card.

To Exit without updating,
open printer cover

Selecting Option 3. Continuing without updating could produce unexpected
results.

Storing a new serial number in the firmware

For proper printer operation, the firmware must correlate the serial number of the printer with the serial number of the logic card. When you replace either the logic card or the interface card, the serial number is restored into the new card. However, if both cards are replaced, you must store the correct serial number in the firmware.

For more information, see the Toshiba Global Commerce Solutions support website at www.toshibagcs.com/support.

Earlier methods for offline tests

The section provides the previous methods for initiating offline tests. Although these methods are supported, you should use the firmware menu and sub-menus to initiate all offline tests.

Resetting the printer and the document sensor threshold

To reset the printer:

1. Press and hold the paper feed and document feed buttons (**A** and **B** in Figure 6 on page 124) to enter offline mode.
2. When the printer-ready indicator begins blinking, release both buttons.
3. Open and close the paper door by pressing the paper release button **C** in Figure 6 on page 124.

Customer receipt test

Note: You should use the offline menus to initiate this test.

To initiate the customer receipt test, follow these steps:

1. Press and hold both the paper feed and document feed buttons (**A** and **B** in Figure 6 on page 124) to enter offline mode
2. When the printer-ready indicator begins blinking, release both buttons.
3. Press and release the paper feed button to start the test

Document insert station test

Note: You should use the offline menus to initiate this test.

To initiate the document insert station test, follow these steps:

1. Press and hold both the paper feed and document feed buttons (**A** and **B** in Figure 6 on page 124) buttons to enter offline mode.
2. When the printer-ready indicator begins blinking, release both buttons.
3. Press and release the document feed button to start the test.

MICR read, flipper test (Model 2CR only)

Note: You should use the offline menus to initiate this test.

The MICR read test is accessed through the sub-menus in offline mode.

Follow these steps to start the MICR read and flipper test:

1. Insert the check face down with the magnetic ink characters to the right.
2. To enter offline mode, press and hold both buttons until the printer-ready indicator begins blinking.
3. Then release both buttons.
4. Press and release both buttons again. The printer reads the check.
5. Characters that match the magnetic ink characters are printed on the customer receipt. The check is then flipped over, and ejected.

Understanding MICR test results: If the characters printed do not match the magnetic ink characters, check the MICR read head. The printer will insert question marks if the MICR read engine cannot decode a number. If the printer detects noise, it will print out the amplitude and frequency of the noise, if possible.

Firmware offline tests (Models 1xR)

To enter the firmware offline test and setup procedures for Models 1xR, complete the following steps:

The following sections describe the steps to enter the firmware offline test and setup procedures for Model 1xR.

1. Open the top cover.
2. Press the white power reset switch (**A** in Figure 9) to turn the printer off and then on again.

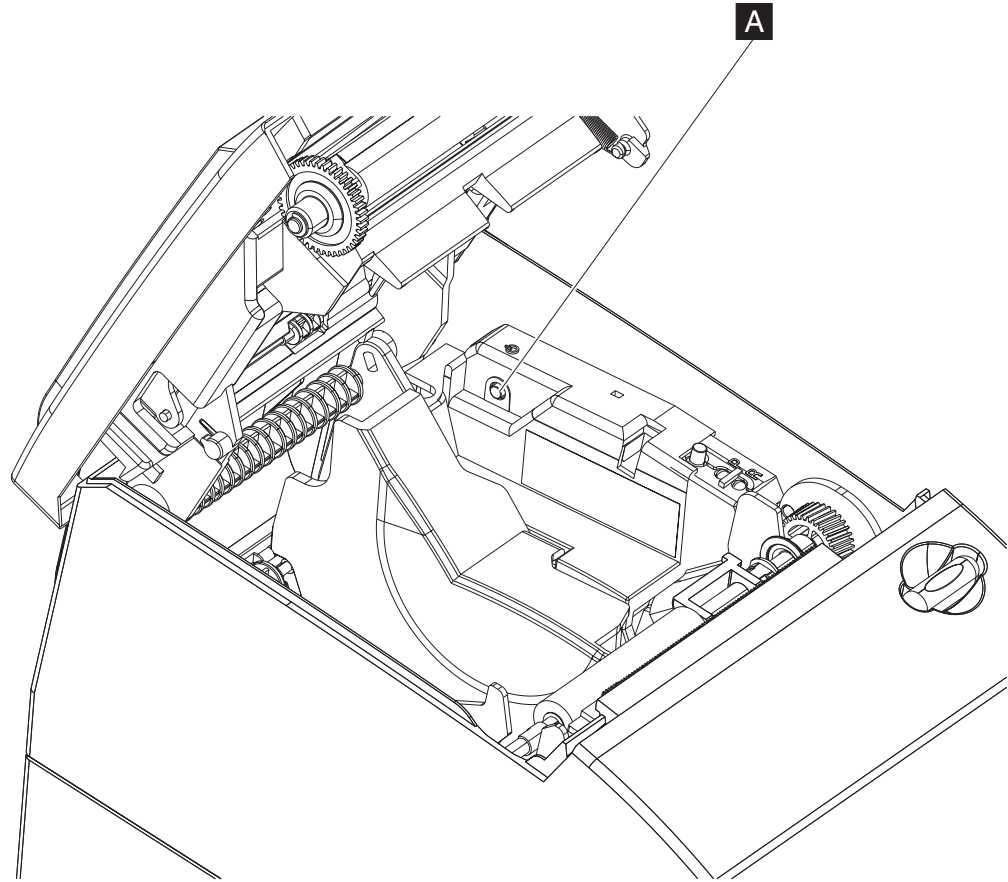


Figure 9. Offline tests activation

3. Close the top cover
4. While the printer is powering up, press and hold the paper feed button until the front LED indicator blinks. The offline test is printed (see Figure 10 on page 130).

Off-line Selection started
 To select a sub-menu or test:
 FIRST, press the paper feed button the indicated number of times.
 THEN, press again and hold button down at least 1
 second to confirm selection.

Sub-menus and tests	Press
Thermal Receipt test	1
Choose Emulation Mode	2
Select receipt width	3
EIA-232/RS-232 Flow Control	4
More Selections	5

To exit Off-line setup, open printer cover.

Figure 10. Example of the offline selection main menu. See 130 for an explanation of these menu items.

5. Follow the instructions that are printed for each required test.

Summary of the offline test menus (Models 1xR)

Use the firmware offline test menus to perform the offline tests. Table 42 describes the available firmware offline test menus for Models 1xR:

Table 42. Summary of the offline test menu items for models 1xR

Menu Item	Definition	Sub-menu (if applicable)	Definition
Thermal receipt	Prints a receipt		

Table 42. Summary of the offline test menu items for models 1xR (continued)

Menu Item	Definition	Sub-menu (if applicable)	Definition
Choose emulation mode	Displays the submenus (see next column)	Compatibility with Legacy 4610	Changes the command set and statuses to support the previous drivers and applications (such as plug and play for existing 4610 printers). Note: Not applicable to Ethernet interface printers.
		Native mode	Changes the command set and statuses to support the low-paper detection, paper jam detection, and other 4610 Model 1NR, 1NA, and 1ND sensors.
		EPSON Emulation	Emulates an EPSON printer.
		Diagnostics mode	Gives printer Fixed IP address required by Toshiba Diagnostics for POS Systems and Peripherals. Note: Applicable to printers with Ethernet interface only.
EIS-232/RS-232 flow control	Provides a list of available baud rates and flow controls.		
Ethernet Configuration	Provides a list of Ethernet configuration options.		
MCT listing	Provides information for service personnel.		
Low-paper calibration	You are instructed to insert a small roll of paper in the printer. During the test, the printer ejects all of the paper from this roll to calibrate the low-paper sensor.		
Hex dump mode	A debug mode that is used when attached via an RS-232 that prints the commands and data that the printer receives. This allows the application writer to see what data is actually being received at the printer.		
Execute printhead test	Starts printhead tests.		
Reset TPH user data	Select after you install a new thermal printhead.		
Paper Out Sensor Test	Starts the test up.		
Code Page Menu	Prints out all Code Pages resident in the printer.		
Paper Reduction	Provides Line Spacing, Blank Space, Barcode Height, and Font Size options.		

Table 42. Summary of the offline test menu items for models 1xR (continued)

Menu Item	Definition	Sub-menu (if applicable)	Definition
Main menu	Returns to main menu.		

Storing a new serial number in the firmware after a logic or interface card change

During the servicing process, you might have to change an interface card or logic card in the printer.

For proper printer operation, the firmware must correlate the serial number of the printer with the serial number of the logic card. When you replace either the logic card, you must store the correct serial number in the firmware.

For more information, see the Toshiba Global Commerce Solutions support website: www.toshibagcs.com/support.

Customer receipt test

Use the offline menu to initiate the customer receipt test.

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Toshiba Global Commerce Solutions is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A Emission Compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A Statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

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This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Toshiba Global Commerce Solutions

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Germany Class A Statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

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Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan Voluntary Control Council for Interference Class A statement

Attention: This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase)

Korean communications statement

Please note that this device has been approved for business purposes with regard to electromagnetic interference (Type A). If you find this is not suitable for your use, you may exchange it for a non-business purpose one.

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Russian Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А. В жилых помещениях оно может создавать радиопомехи, снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission Statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

中华人民共和国“A类”警告声明

声 明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

European Community (EC) Mark of Conformity Statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Toshiba Global Commerce Solutions cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-Toshiba Global Commerce Solutions option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Electrostatic Discharge (ESD)

Attention: Electrostatic discharge (ESD) damage can occur when there is a difference in charge between the part, the product, and the service person. No damage will occur if the service person and the part being installed are at the same charge level.

ESD damage prevention

Anytime a service action involves physical contact with logic cards, modules, back-panel pins, or other ESD sensitive (ESDS) parts, the service person must be connected to an ESD common ground point on the product through the ESD wrist strap and cord.

The ESD ground clip can be attached to any frame ground, ground braid, green wire ground, or the round ground prong on the AC power plug. Coax or connector outside shells can also be used.

Handling removed cards

Logic cards removed from a product should be placed in ESD protective containers. No other object should be allowed inside the ESD container with the logic card. Attach tags or reports that must accompany the card to the outside of the container.

Japanese Electrical Appliance and Material Safety Law statement

本製品およびオプションに電源コードセットが付属する場合は、それぞれその装置専用のものでありますので他の機器には使用しないで下さい。

Japanese power line harmonics compliance statement

高調波ガイドライン適合品

高調波ガイドライン適合品

Cable ferrite requirement

All cable ferrites are required to suppress radiated EMI emissions and must not be removed.

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. Toshiba Global Commerce Solutions encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Toshiba Global Commerce Solutions offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on Toshiba Global Commerce Solutions product recycling offerings can be found on the Toshiba Global Commerce Solutions product recycling web site.

Español:

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. Toshiba Global Commerce Solutions recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. Toshiba Global Commerce Solutions dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de Toshiba Global Commerce Solutions en el sitio web Toshiba Global Commerce Solutions product recycling.



Notice: This mark applies only to countries within the European Union (EU) and Norway.

Appliances are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège. L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

注意：このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local Toshiba Global Commerce Solutions representative.

Disposal of IT products should be in accordance with local ordinances and regulations.

Battery return program

This product may contain sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries go to the Battery disposal web site or contact your local waste disposal facility.

For Taiwan:



Please recycle batteries.

For the European Union:



Notice: This mark applies only to countries within the European Union (EU)

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries

and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local Toshiba Global Commerce Solutions representative.

This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators and power cells includes the cost of the environmental management of their waste.

For California:

Perchlorate material – special handling may apply

Refer to www.dtsc.ca.gov/hazardouswaste/perchlorate.

The foregoing notice is provided in accordance with *California Code of Regulations Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials*. This product/part includes a lithium manganese dioxide battery which contains a perchlorate substance.

Flat panel displays

The fluorescent lamp in the liquid crystal display contains mercury. Dispose of it as required by local ordinances and regulations.

Monitors and workstations

Connecticut: Visit the website of the Department of Energy & Environmental Protection for information about recycling covered electronic devices in the State of Connecticut, or telephone the Connecticut Department of Environmental Protection at 1-860-424-3000.

Oregon: For information regarding recycling covered electronic devices in the state of Oregon, go to the Oregon Department of Environmental Quality site.

Washington: For information about recycling covered electronic devices in the State of Washington, go to the Department of Ecology Web site or telephone the Washington Department of Ecology at 1-800-Recycle.

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