8865

OPERATOR MANUAL

Declaration of conformity
Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Verklaring de overeenstemming
Dichiarazione di conformitá

We/Wir/Nous/WIJ/Noi: **Mettler-Toledo, Inc.**
1150 Dearborn Drive
Worthington, Ohio 43085
USA

declare under our sole responsibility that the product,
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verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Model/Type: 8865 Label Printer

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CE Conformity / CE-Konformität / Conformité CE
90/384/EU Nonautomatic Balances and Scales / Nichteselbsttätige Waagen / Balances à Functionnement non automatique
Article 1.2.a.
EN45501:1992 Adopted European Standard / Norme Européenne Adoptée / Angenommene Europäische Norm
89/336/EU EMC Directive / EMU-Richtlinie / Directive concernant la CEM
EN55022, B 01.04.87/93 Emissions / Funkstörungen
73/23/EU Low Voltage / Niederspannung / basse tension
EN60950, / 06,88 el. Safety / el. Sicherheit / sécurité el.

Other Directives and Standards / Andere Richtlinien und Normen / Autres documents
corresponding to local requirements / entsprechend lokalen Anforderungen / correspondant aux exigences locales

UL1950	el. Safety / el. Sicherheit / sécurité el. (if UL mark is applied)
C22.2 No. 950-M89	el. Safety / el. Sicherheit / sécurité el. (If CUL mark is applied)
FCC, Part 15, class A	Emissions / Funkstörungen (If FCC label is applied)

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
December, 1995

according to EN45014

INTRODUCTION

This publication is provided solely as a guide for individuals who have received METTLER TOLEDO Technical Training in servicing the METTLER TOLEDO product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

FCC NOTE

NOTE: This equipment has been tested and found to comply with the limits of the United States of America FCC rules for a Class A digital device, pursuant to Part 15 of the FCC Rules and the Radio Interference Regulations of the Canadian Department of Communications. 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 case4 the user will be required to correct the interference at his own expense.

IMPORTANT!

It is most important that the correct part number is used when orderinf replacement parts. Parts orders are machine processed, using only the part number and the quantity shown on the order. Orders are not edited to determine if the part number and description agree.

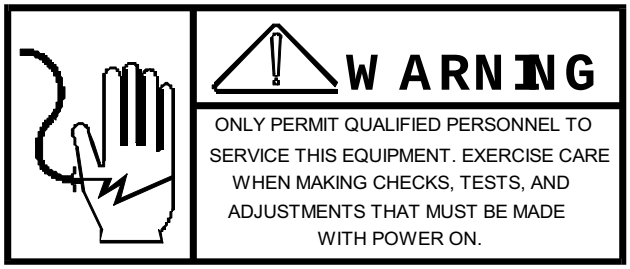
METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

PRECAUTIONS

- **READ** this manual before operating or servicing this equipment.

- **ALWAYS REMOVE POWER** and wait at least 30 seconds **BEFORE** connecting or disconnecting any internal harnesses. Failure to observe these precautions may result in damage to, or destruction of the equipment.

- **ALWAYS** take proper precautions when handling static sensitive devices.



- **DO NOT** connect or disconnect a load cell scale base to the equipment with power connected or damage will result.

- **SAVE** this manual for future reference.

- **DO NOT** allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

- **ALWAYS DISCONNECT** this equipment from the power source before servicing.

- **CALL** METTLER TOLEDO for parts, information, and service.

CONTENTS

1. GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual covers the installation, operation, and normal maintenance of the METTLER TOLEDO Model 8865 Label Printer. The first 5 sections present information needed by a user, or installer of this equipment. Topics covered include environmental and power requirements, unpacking and inspection of the printer, installation of labels and ribbons and testing procedures.

The remaining sections cover formatting of labels by use of ASCII character data, front panel operator controls, in depth descriptions of printable fonts and some sample label formats.

1.2 OPERATION

The Model 8865 is a high-performance, low-cost direct thermal and/or thermal transfer label printer. Powerful capabilities and easy-to-use features set a price/performance standard for industrial direct thermal and thermal transfer label printers.

The 8865 prints at speeds of up to 6" per second (152.4 mm/sec.) with maximum print quality. Print speeds of 8" per second (203.2 mm/sec.) can be attained with only a minor reduction in print quality. All popular bar codes reside in memory and can be printed with adjacent human readable bar code interpretations. Character fonts can be printed in any one of four directions and with any one of nine different font sizes. In addition, a resident smooth font may be selected, called CG Triumvirate, containing 10 different font sizes. By using font multiplication, font sizes from 0.035" (0.9 mm) to 16.0" (406.4 mm) high can be printed.

An innovative dot-history control circuit provides exceptional quality while printing at high speeds. This circuit monitors the printed data and automatically adjusts to provide maximum printhead performance. The 0.0049" print element prints high-density bar codes and attractive and easy to read characters at a 203 dot per inch resolution. In addition, the pixel size can be multiplied by 2 in the horizontal and 3 in the vertical direction producing even larger formats.

1.3 FEATURES

Additional features of the 8865 include:

*Clear side door panel to view stock level
*Thermal transfer and direct thermal printing
*High dot density of 203 dots/inch, 8 dots/mm
*Print speeds up to 8" (202 mm)/second
*Large maximum media width size: 4.65" (118 mm)
*Adjustable label edge sensor: Adjustable 0.25" (6.3 mm) - 2.30" (58 mm) from media edge
*International characters included for most European, Scandinavian, and Spanish speaking countries
*Time and date clock
*Internal label feed counter
*Inch/metric label data input
*User-selectable bar code ratios and heights
*Printing on label, ticket, and tag stock
*Die cut, continuous form, or black stripe sensing media
*Self-peeling demand mode, internal rewind mechanism for backing paper
*Easy to load label stock and transfer ribbon mechanism
*Dot-addressable graphics function compatible with PCX, IMG, and 7/8 bit general modex files
*Built in diagnostics and Self test

1.4 APPLICATIONS

The Model 8865 is designed for use in many different types of applications. The general purpose 8865 should not be used in areas where moisture or conductive or corrosive dusts are present. Acceptable applications of the printer include but are not limited to:

Warehouse ticketing	Parts counting
Inventory control	Pharmaceutical
Product labeling	AIAG (Auto Industry Action Group)
Item tracking	UPC shipping container labels
Asset management	Serial numbering

1.5 HAZARDOUS AREAS

! WARNING !
In locations classified as hazardous by the National Electrical Code (NEC) because of combustible or explosive atmospheres, special precautions are required. DO NOT USE THE 8865 PRINTER IN THESE LOCATIONS.

2. SYSTEM DESCRIPTION

2.1 OPERATING PRINCIPLES

The Model 8865 has two very different modes of operation. The mode of operation may be selected with a switch at the rear of the printer or from software commands sent in the host mode.

2.1.1 The METTLER TOLEDO mode of operation allows direct connection of this printer to a scale or other device that outputs multiple line data. A pre-defined label is stored in a flash memory module (required accessory) in the printer and when data is transmitted from the scale or other device, that data replaces specific fields on the printed label. This enables combination of fixed data fields and graphics that are part of the stored label format with dynamic scale information such as weight and piece count.

2.1.2 In the host mode, the printer can be connected directly to Model 9360 Programmable Keyboard or a computer to print very flexible formats. This mode allows printing of several different formatted labels by downloading the label format with the data to be printed. Although this mode does not require the flash module accessory, it may be used to store formats and graphics.

2.2 SYSTEM COMPONENTS

The printer consists of four major sections of components. Each section has a specific function.

2.2.1 Power Supply - This section consists of a fuse or circuit breaker, transformer and Power Supply PCB. This supplies power to all other parts of the printer.

2.2.2 Control PCB - This PCB contains the electronics for controlling the intelligence in the printer. Data is received, combined with stored formats (in flash modules) or graphics, formatted then transmitted to the printhead for printing of the label or tag.

2.2.3 Sensor PCB - Included in this section are the operator interfaces such as keyboard and LED's. These items allow human interface to help control the printing process. Mounted on this PCB are adjustments for sensitivity of the paper and ribbon sensors.

2.2.4 Mechanical - The fourth section in the printer controls the actual printing as well as the media feeding and control. This consists of the label stock axle, drive rollers, printhead and the associated ribbon feed mechanism.

2.3 FACTORY NUMBER CONFIGURATION

Factory Number	AC Voltage	Market
8865-0001	120 VAC - 50/60 Hz	U.S., Canada
8865-0011	220/240 VAC - 50/60 Hz	Export

Table 2-3

2.4 OPERATOR CONTROLS

The METTLER TOLEDO Model 8865 has three operator accessible switches and three indicator lights on the front panel. Inside the front door, there is an adjustment for print darkness and also a switch for thermal/thermal transfer selection.

POWER SWITCH AND INDICATOR: The POWER ON indicator light is turned on after the POWER switch on the rear of the unit is activated.

PAUSE SWITCH: The PAUSE switch allows the operator to stop the printing of a run of labels and then complete the job by a second depression of the switch. Activation of the switch will: (1) stop the print mechanism when the label being printed is completed, (2) turn on the PAUSE light, (3) stop the label counter, but maintain the count balance, and (4) hold all data in memory.

A second depression of the switch will: (1) restart the printer, (2) print the balance of labels on the counter unless interrupted, and (3) turn off the PAUSE indicator.

PAUSE INDICATOR: This indicator will turn on if any of the following occurs: (1) the PAUSE switch is pressed, (2) a "media out" condition exists (the PAPER/RIBBON indicator will also light), or (3) a print job is canceled with the STOP/CANCEL switch.

STOP/CANCEL SWITCH: The STOP/CANCEL switch allows the operator to stop and cancel a run of labels in the process of being printed, then to continue on to the next run in the printer's buffer.

FEED SWITCH: A manual activation of the FEED switch causes the paper to automatically advance to the first print position of the next label. If the label size is changed, two labels are usually fed before registration occurs.

PAPER/RIBBON INDICATOR: This indicator is activated when no label/ticket/tag edge and/or ribbon is detected by the photoelectric media sensors. The PAUSE light will also turn on in this situation.

THERMAL/TRANSFER SWITCH: This slide switch should be in the OFF (left) position for direct thermal label printing, or in the ON (right) position for thermal transfer printing. When ON, it has two functions: (1) the ribbon sensor is enabled and (2) the head current (temperature) is reduced, since thermal transfer printing does not require as much heat as does direct thermal printing.

DARKNESS CONTROL: The DARKNESS CONTROL potentiometer is used to balance a new printhead so that it prints at the same level of darkness as the previous head.

> IMPORTANT: THIS CONTROL IS NOT INTENDED FOR USE IN ADJUSTING INDIVIDUAL LABEL PRINTING JOBS! Software control using the "H" parameter following the label formatting command <STX>L should be used to vary darkness of printing on a per-label format basis.

2.5 OPTIONS

The Model 8865 has a number of different options that can be added to the printer for additional versatility. The printer makes use of Memory Modules to expand its built-in capabilities. The printer has two module slots located behind the front door and below the operator keypad. The upper slot is referenced as "A" and the lower slot is "B". These slots may contain memory modules and/or font modules.

2.5.1 Memory Modules

RAM modules are the most flexible module option for the 8865 printer. They provide temporary storage of data used in label format printing. Two different size RAM modules are available. A module contains either 256K or 512K of data storage for fonts, graphic images, or label formats. RAM modules can be installed in either the A or B slot on the front of the printer. If a Font ROM module is not in use, the B slot would be the preferred slot to install the RAM module. When the 512K module is in the A slot, the dot memory is double [from 10" to 20" at 203 dots per inch (dpi)].

Fonts can be loaded into the RAM module with most programs that are capable of transmitting fonts in the HP LaserJet (PCL4) format. This is the same format used to load fonts to the HP IIP Laserjet printer. Graphics can be loaded using programs written in basic or using METTLER TOLEDO's label design program with an image download function. The loading of images can also be done with minimal programming on most host computers as the 8865 accepts PCX and IMG file formats. Section 9.6 details the procedure for loading images. Label formats can also be stored and recalled from RAM modules. Commands for this feature are described in section 6.2.

Single font bitmaps, images, or formats cannot be deleted individually. The entire module must be cleared and data reloaded. As mentioned above, RAM modules are for temporary storage of data. When power is lost or if they are removed from the module slot, data stored on them will be erased.

(LaserJet is a trademark of the Hewlett Packard Corporation)

2.5.2 Flash Memory Modules

In addition to the 256K and 512K RAM modules, a 256K byte Flash module is available for applications requiring data to be retained when power is lost. This module is required for operation in the METTLER TOLEDO mode. Typical applications for flash modules include downloadable soft fonts, graphics, and label format storage.

Flash ROM modules provide the same features of the RAM modules and add the benefit of permanent storage. They must be installed in the A slot when being loaded with data. Once they are programmed, they can be installed in either the A or the B slot. There is a copy command available for duplicating flash modules.

2.5.3 Font Modules

Font ROM modules contain additional fonts that extend the capabilities of the internal fonts. Six 512K byte ROM FONT modules are commercially available. They are as follows: CG Triumvirate Bold, CG Triumvirate Italic, CG Times, CG Times Bold, Futura Extra Bold Condensed, and Plantin.

Each Font ROM module comes with documentation detailing the type and point sizes available on the module and the font number of each size used in the label formatting. Font ROM modules are programmed at the factory and cannot be modified for any other purpose. Font modules will operate in either the A or the B slot. They are typically installed in the B slot so that other modules can occupy the A slot.

2.5.4 Label Present Sensor

The 8865 can be configured for "one up" printing mode. With the label present sensor installed and enabled, the next label will not be printed until the last label printed has been removed from the printer. Total quantities of labels printed one-at-a-time can still be selected. Additional label data sent to the printer while a label is still present is buffered up to the limits of the printer (7K).

2.5.5 Label Design Program

METTLER TOLEDO offers a WYSIWYG (What You See Is What You Get) label design program to assist in label formatting. It is a DOS based program designed to operate on IBM or compatible computers. This program is designed specifically for use with the Model 8865 printer and contains all special commands required to create and store a label format in memory. This program is highly recommended as a tool for simple programming and operation of the printer when connected directly to a METTLER TOLEDO weighing product and also when used in the Host mode. Contact your local METTLER TOLEDO representative for information about this label design program.

3. SPECIFICATIONS

3.1 ENVIRONMENT

The 8865 operates from 40 to 100 0F (4 to 38 0C) at 10 to 95 % relative humidity noncondensing.

Storage temperature is from -40 to 158 0F (-40 to 70 0C).

The 8865 must not be used in wet or extremely dusty environments. **Conductive and corrosive dusts must be avoided**.

The printer is ventilated by free air movement and must not be placed in an area where air cannot circulate around it. Allow at least 6" (150 mm) clearance on all sides and the rear of the printer.

The Model 8865 printer must not be used in areas classified as hazardous by the National Electrical Code.

3.2 APPEARANCE AND DIMENSIONS

The 8865 utilizes a tough industrial strength, beige color steel cabinet. A rugged mechanical frame is used to mount the printing mechanism. The front door of the printer is industrial strength molded plastic in a light beige color. The size of the printer is 10" high x 10" wide x 18" deep (25.5 cm x 25.5 cm x 46 cm) and it weighs approximately 36 lb (16.3 kg).

For shipment, the printer is packed in a white box that is 15" high x 15" wide x 21.5" deep (38 cm x 38 cm x 54.5 cm). Shipping weight is approximately 43 lb (19.5 kg).

3.3 ELECTRICAL

3.3.1 Operating Voltage

There are two different versions of the 8865 designed to operate at different nominal input voltage levels. These levels are: 115 VAC +10% -15%, single phase 50/60 Hz and 230 VAC +10% -15%, single phase 50/60 Hz.

The circuit protection for each of the versions is a 1.5 amp Slo Blo fuse at 115 VAC and a 1.2 amp double pole circuit breaker at 230 VAC. The maximum power consumption will not exceed 300 watts.

The 8865 requires clean AC power with a true earth ground for reliable operation. The AC line voltage should not fluctuate more than 10% and the printer should be connected to a properly grounded receptacle. The power line for the 8865 must not be shared with equipment that generates line noise (such as motors, relays, heaters, etc.). If adverse power conditions exist, a power line conditioner may be required.

3.3.2 Power Testing

The Model 8865 has passed METTLER TOLEDO's testing for correct operation during line spikes, power interruptions and voltage variations per the following specifications.

Spike Amplitude	Rise Time	Pulse Width	Repetition
500 Volts	5 ns	100 ns	12 Hz
1000 Volts	25 ns	1 us	1 Hz
1500 Volts	35 ns	3 us	1 Hz

Table 3-3-a Line Spikes

Voltage Reduction	Duration	Repetition
100%	1/2 Cycle	1 Hz
50%	1 Cycle	1 Hz
20%	3 Cycles	1 Hz

Table 3-3-b Power Interruptions

Measured Voltage	Line Frequency
100 VAC - 132 VAC	58.8 Hz - 61.2 Hz
187 VAC - 242 VAC	49.0 Hz - 51.0 Hz
204 VAC - 264 VAC	49.0 Hz - 51.0 Hz

Table 3-3-c Voltage/Frequency Variations

In addition, the line voltage is cycled off for a period of from 2.5 ms to 500 ms (in 2.5 ms steps) then monitored for 5 seconds (after each off time) for functional errors. Each off time is repeated 30 times.

3.4 STANDARDS COMPLIANCE

The Model 8865 has the following compliances and listings.

FCC: The Model 8865 complies with the requirements in Part 15 of FCC rules for Class A computing devices. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception and requires the operator to take whatever steps are necessary to correct the interference.

UL: The Model 8865 is listed under UL 1950 INFORMATION TECHNOLOGY EQUIPMENT, file number E145118.

CSA: METTLER TOLEDO has been authorized by Canadian Standards Association to represent the Model 8865 as CSA Certified under CSA Standard C22.2 No 220-M1986, file number LR88198-2-4.

VDE: METTLER TOLEDO certifies that the Model 8865-0011 label printer complies with the RFI suppression requirement of Vfg 1046/1984 for VDE Class B equipment.

TUV-GS: The Model 8865-0011 printer has been tested and complies with IEC950, EN 60 950/09.87 and bears the TUV-GS mark. License Number: E90711511.1 TUV File Number E9071504.06.

3.5 RADIO FREQUENCY INTERFERENCE (RFI)

The Model 8865 printer has been tested to and found to meet the U.S. and Canadian RFI susceptibility specifications listed below.

Frequencies	Field Strength
27, 169, 464 MHz 27, 464 MHz	3 volts/meter 4 watts at 2 meters

Table 3-5 RFI Test Specifications

3.6 ELECTROSTATIC DISCHARGE (ESD)

The 8865 printer has been tested for ESD susceptibility using up to eight kilovolts at 6.4 millijoules of energy at a repetition rate of one cycle every ten seconds. The 8865 did not sustain any hardware damage, lock-ups or memory loss.

3.7 PRINTING SPECIFICATIONS

Type: Direct thermal or thermal transfer.

Print Speed: 2.0" (50.8 mm) per second to 8" (203.2 mm) per second.

Slew Rate: 2.0" (50.8 mm) per second to 8" (203.2 mm) per second.

Max. Fields/Label: 200 total, 5K bytes of data per label maximum.

Minimum Dot Size: 0.005" (0.127 mm) square.

Optional Dot Sizes: 0.010" (0.254 mm) or 0.015" (0.381 mm) vertical and 0.010" (0.254 mm) horizontal.

Font Styles: Nine alphanumeric fonts from 0.035" (0.9 mm) to 16" (406.4 mm) in height including OCR-A, OCR-B (size and character set III), and a CG TriumvirateÔ smooth font (10 point sizes).

Character Density: 33.83 cpi (FONT 0 at 1X), to 0.70 cpi (FONT 6 at 8X).

Bar Code Fonts: Code 39, Interleaved 2 of 5, CODABAR, UCC Code 128, UPC-A and UPC-E, EAN-13 and EAN-8, MSI Plessey, Code 39 variations to produce all industry standards such as LOGMARS, HIBC, and AIAG.

Bar Code Density: 12.69 cpi using Code 39 at 0.005" narrow bar, 3:1 ratio.
6.34 cpi using Code 39 at 0.010" narrow bar, 3:1 ratio.

3.8 MEDIA SPECIFICATIONS

Label Type: Roll-fed, die-cut labels, tags, tickets, continuous forms with black stripe sensing.

Label Material: Plain coated thermal transfer paper, vinyl, Mylar, metalized paper, nonwoven fabric, fine woven fabric, visible light scannable thermal paper, infrared scannable paper, thermal ticket/tag stock, thermally sensitive plastic stock.

Supply Capacity: 8" (203 mm) maximum outside roll diameter on standard 3" (76 mm) core. Total of 6250 linear inches of stock (158.8 linear meters), 0.0065" (0.159 mm) thick.

Transfer Ribbon: Black or colored inks, 1180 feet (360 m) long, 4.6 microns thick, backcoated width within +/- 10% of label width.

Rewind Capacity: 5" (127 mm) maximum outside diameter on internal rewind spindle using a 1.5" (38 mm) core. 2100 linear inches of stock (53.3 linear meters), 0.0065 (0.159 mm) thick.

MEDIA SPECIFICATION CHART

Item	Minimum	Maximum
Width, label:	0.75" (19 mm)	4.65" (118 mm)
Length, label:	0.50" (13 mm)	10.0" (254 mm)
Thickness, label:	0.0023" (0.06 mm)	0.010" (0.254 mm)
Width, backing:	0.75" (19 mm)	4.65" (118 mm)
Thickness, backing:	0.0023" (0.06 mm)	0.010" (0.254 mm)
Gap between labels:	0.1" (2.54 mm)	60" (1.52 m)
Width (sensor opening):	0.035" (0.89 mm)	0.065" (1.6 mm)
Distance - edge of media to sensor opening	0.200" (5.1 mm)	2.250" (57 mm)
Reflective sensor mark: Must be carbon base ink.	0.125" (3.2 mm)	1.00" (25.4 mm)

3.9 LABEL SENSING

Label edge sensing is accomplished by an adjustable photo sensor. This sensor locates the leading edge of a label, tag or form by measuring the level of opaqueness. This sensor can be moved left and right to accommodate different sensing locations, i.e., holes, notches, label edge, slots, or backprinted, black stripe. The black stripe sensor locates the leading edge of a label, tag or form by measuring the level of reflectivity instead of a change in opaqueness.

4. SUPPLIES

4.1 PRINT MEDIA

The Model 8865 is capable of both direct thermal and thermal transfer printing. Since the printer allows for software and direct setting of many printing parameters, such as the head temperature, print speed, and slew rates, many direct thermal or thermal transfer stocks can be used.

Media sizes can range from 0.75" (19 mm) wide by 0.50" (13 mm) long to 4.65" (118 mm) wide to 10.00" (254 mm) long. The printable area is 4.1" (104 mm) left justified. Media thickness can range from 0.0023" (0.06 mm) to 0.01" (0.25 mm).

Supply rolls are wound on cores with a minimum inside diameter of 1.5" (38 mm) and a maximum inside diameter of 3" (76 mm). The maximum roll diameter should not exceed 8" (203 mm).

The list of common direct thermal stocks includes visible-light scannable paper, infrared scannable paper, thermal ticket, tag, and thermal sensitive plastic stocks. A similar list of thermal transfer stocks includes plain coated vinyl, Mylar, metalized paper, and non-woven and fine woven fabrics.

METTLER TOLEDO offers five standard label sizes in both direct thermal and thermal transfer. Almost any custom label size is available. Our thermal transfer label stock also includes thermal transfer ribbons. The ribbons have been matched with the label stock to provide the best possible printability while maintaining excellent smudge and scratch resistance.

Use of other types of label stock and/or ribbons may invalidate the printhead warranty.

4.2 MEDIA SELECTION - DIRECT THERMAL

Consider three important factors when selecting direct thermal stock:

4.2.1 The abrasive qualities of the material that covers the thermal reactive layer of the paper.

If the coating layer is too abrasive, the printhead will be "sanded off" at a faster rate than would normally occur. The abrasive qualities of the stock are not as critical in thermal transfer applications since the thermal transfer ribbon is between the printhead and the stock.

4.2.2 The ability of the paper layer to control the chemical reaction that occurs when the image is "burned."

If the layer cannot contain the reaction, the printhead will become "pitted," and the dots across the web of the printhead will fail.

4.2.3 The amount of heat required to image the paper.

The reaction temperature, or the temperature at which the chemical process causes an image to print is important because the greater the degree of heat required to image the paper, the greater the amount of time needed for the printhead and paper to cool. This process reduces the maximum print speed that can be obtained with the stock without printhead damage.

4.3 MEDIA SELECTION - THERMAL TRANSFER

Consider two important factors when selecting thermal transfer media combinations.

4.3.1 Image quality is affected by the label top coating and ribbon combinations. The top coating provides a layer to contain the substrate fibers and provides a base for the ribbon to adhere to. Ribbons are formulated to provide various levels of smudge resistance and print quality. The correct choice will provide you with cost-effective clear printing. Usually, the more expensive media combinations perform better.

4.3.2 Ribbon backcoating is highly recommended. It provides protection for the printhead and many also provide an antistatic coating which is desirable.

4.4 TRANSFER RIBBON SELECTION

METTLER TOLEDO thermal transfer ribbons are selected specifically for use with our thermal transfer label stock. Use of ribbons other than those supplied by METTLER TOLEDO may result in a poor quality printing of bar codes and their ability to be scanned. This may also invalidate the printhead warranty. METTLER TOLEDO ribbons are:

*Black ink, scratch, and smudge resistant.
*1082 feet (330 meters) long, 4.6 microns thick.
*Have a 1 inch core with no notch required.
*Wound ink side in.
*Have a 1' (300 mm) opaque leader.
*Have a 1' (300 mm) clear trailer.
*Contains a backcoating.

One ribbon has the capacity to image two full 8" (200 mm) diameter rolls wound on 3" ID cores.

It is recommended that the width of the thermal transfer ribbon be within +/- 10% of the label width. METTLER TOLEDO offers 3" (76 mm) wide and 4" (102 mm) wide ribbons standard. Additional sizes are available on a custom order basis.

5. INSTALLATION INSTRUCTIONS

After unpacking and physical inspection of the printer to ensure no damaged occurred during shipping, the 8865 has a unique setup and self-test routine that should be run. This self-test will save you time later and will remind you of the print functions that can be set, such as temperature, print speed, and slew rate.

In the setup and self-test procedure, you will first test the printer with direct thermal labels. If you will use the printer in the thermal transfer mode, load plain coated paper stock and a thermal transfer ribbon and repeat the tests.

The standard 8865 is shipped in a configuration that allows it to be connected to a properly grounded 120 VAC single-phase 50/60 Hz outlet. The printer has a small sticker next to CJ1 (the power cord connection) that states the power requirements.

The 8865 is also available in a 230 VAC operation version. Most of these printers are shipped to international markets. If you are at all uncertain about the configuration of the printer, or the outlet you are connecting to, check with a qualified METTLER TOLEDO service technician to verify the installation before connecting power.

5.1 UNPACKING AND INSPECTION

Inspect shipping container(s) for evidence of in-transit damage, such as being dropped, crushed, or punctured. If damage is evident, contact the carrier directly to specify the nature and extent of damage.

The Model 8865 is packed in custom styrofoam packaging. The printer itself is enclosed in a plastic bag to reduce the chance of moisture damage during shipping. After removing the printer from this plastic bag, remove any additional packing material from the printer mechanism. (This material is placed in the printer mechanism to prevent vibration during shipping.)

The front door panel of the printer is shipped in a separate bag and needs to be installed on the front of the printer. To install the front panel, locate the two hinge pins inside the left edge of the front of the printer. Hold the panel vertically and perpendicular to the front of the printer, align the two hinge pins with the panel, and lower the panel into place.

In addition to this manual, the shipping container(s) should include the following standard items:

Model 8865 Printer
Front door panel (packaged inside 8865 box)
One sample roll of 4.5" x 2.5" direct thermal paper stock
Thermal transfer ribbon rewind clamp
Back rewind/label rewind clamp
Power cord (supplied for 120 VAC units only)

Additionally, items purchased separately may be included. These include:

Additional labels
Additional ribbons
Interconnecting cable
Memory module cartridges *
METTLER TOLEDO label design software

* A flash memory module (0901-0326) is required for operation in the METTLER TOLEDO mode.

5.2 PARTS IDENTIFICATION

The following diagrams show the location of certain parts discussed in this manual. Figure 5-1-a is a top front view of the printer, Figure 5-1-b is a view of the front panel with the front cover open, 5-1-c is a detail view of the print mechanism from the side, and 5-1-d is a back view of the printer.

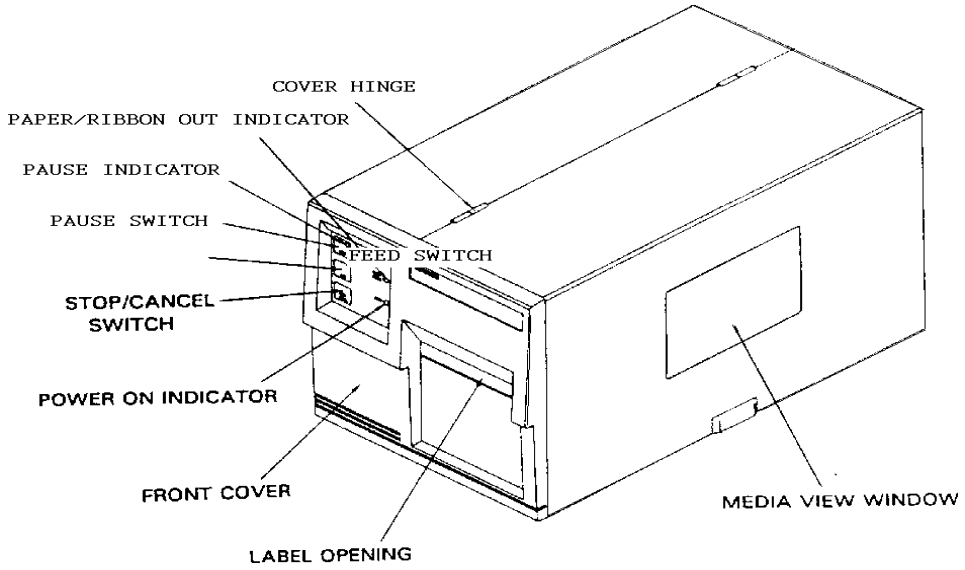


Figure 5-2-a Top Front View

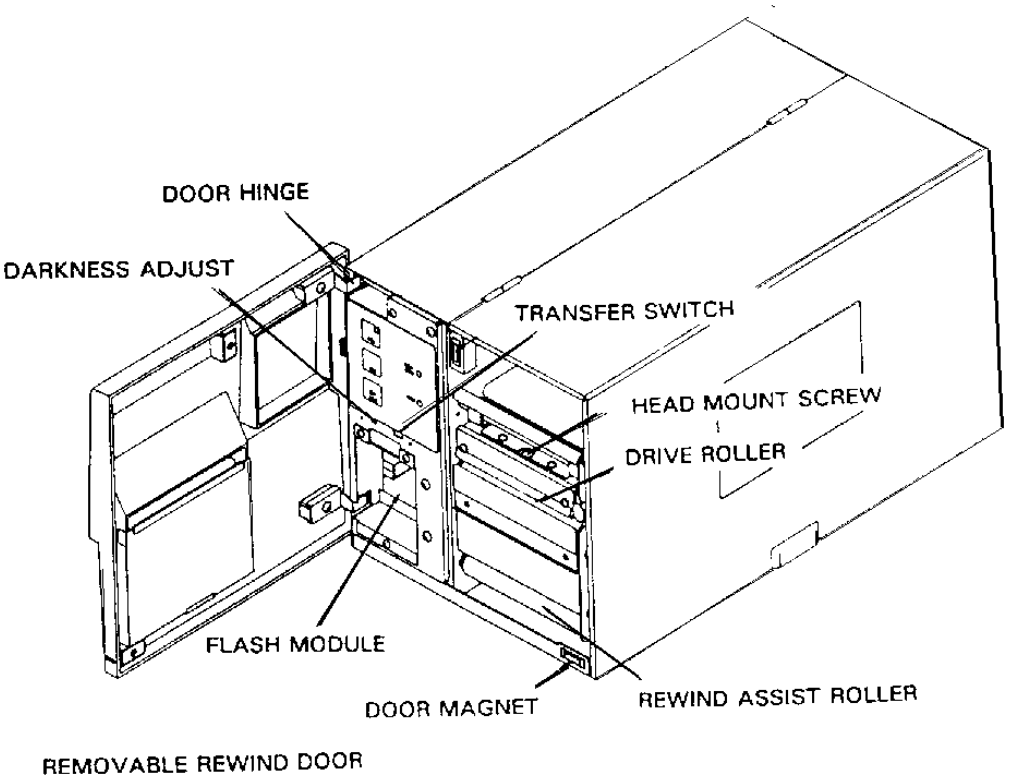


Figure 5-2-b

Front Panel (Front Cover Open)

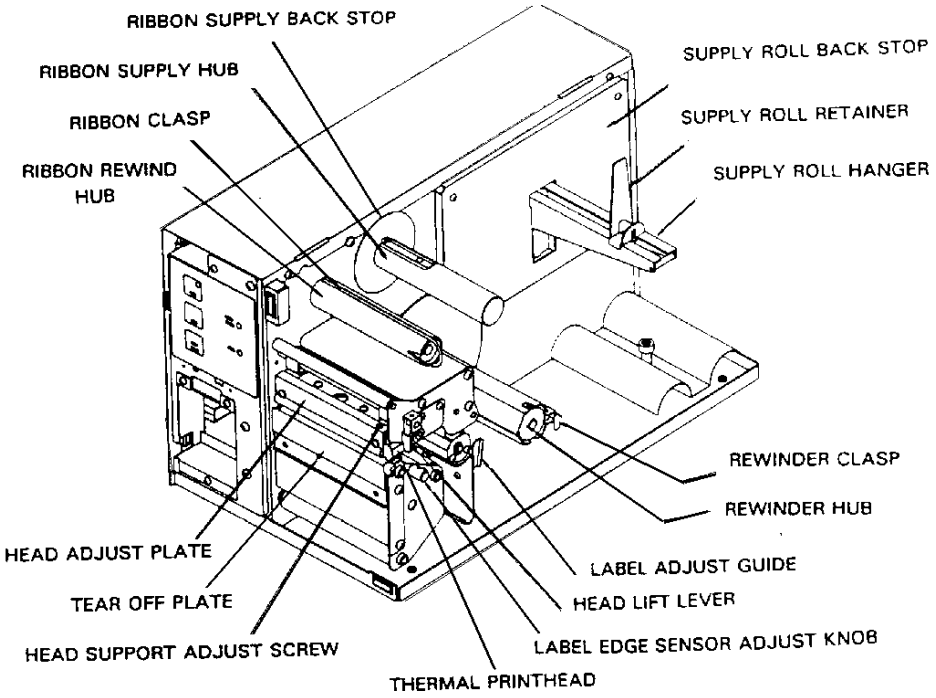


Figure 5-2-c Mechanism Detail

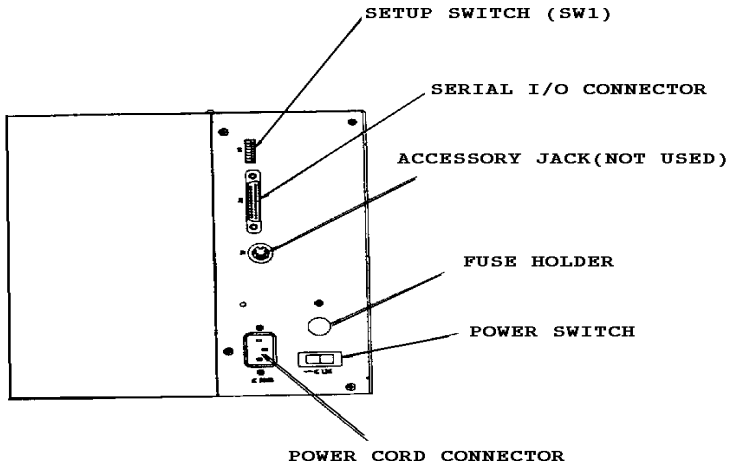
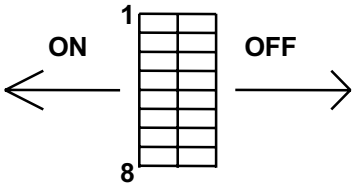


Figure 5-2-d Back View

5.3 PROGRAMMING SWITCHES

On the back of the printer, you will find an eight-position dip switch (SW1). This section describes the function of these switches. The shaded selections indicate the factory default settings.

When viewing the switch from the rear of the printer, the ON condition is obtained by flipping the switch handle to the left while the OFF condition is obtained by flipping the switch handle to the right.



SW1-1, SW1-2, SW1-3 BAUD RATE

These switches control the speed at which data is received (baud rate). The following table lists the baud rate selections possible. Match this selection to the source device.

BAUD RATE	SW1-1	SW1-2	SW1-3
300	ON	OFF	ON
600	ON	OFF	OFF
1200	OFF	ON	ON
2400	OFF	ON	OFF
4800	OFF	OFF	ON
9600	OFF	OFF	OFF
19200	ON	ON	OFF
TEST/9600	ON	ON	ON

SW1-4 ASCII WORD LENGTH

The Model 8865 will accept either 7 bit or 8 bit data depending upon the position of this switch. Parity will be ignored regardless of this selection. Select 7 bit for compatibility with METTLER TOLEDO products.

SW1-4	ASCII Character Length
ON	7 bit
OFF	8 bit

NOTE: You must select 8 bit format mode if you wish to access the foreign language characters from Appendix B. These characters are available in fonts 1, 6 and 9.

SW1-5 OPERATING MODE

This switch selects the mode of operation for the printer. In the METTLER TOLEDO mode, multiple line data strings will replace predetermined lines of the label format stored in the flash module. In the host mode, the 8865 will operate in a mode utilizing all the standard control and formatting commands.

SW1-5	OPERATING MODE
ON	METTLER TOLEDO Mode
OFF	Host Mode

SW1-6 LABEL PRESENT SENSOR

With the addition of the Label Present Sensor option, the printer can be configured for "on demand" printing mode. With the sensor installed and enabled, the 8865 will not print a second label (keeps it in internal buffer) until the previously printed label has been removed from the front of the printer. The quantity of labels printed (printed one at a time) is still selectable in the label format.

SW1-6	Label Present Sensor
ON	Enabled
OFF	Disabled

SW1-7 RIBBON SENSOR POLARITY

Some special purpose ribbons, such as colored ribbons are sometimes translucent and may not be detected by the ribbon sensor. To run these ribbons in the 8865 printer, the polarity of the sensor can be reversed by this switch. Keep in mind that no end-of-ribbon sensing takes place under this condition unless the ribbon has an opaque trailer.

SW1-7	Ribbon Sensor Polarity
ON	Inverted
OFF	Normal

SW1-8 CUTTER ENABLE

The cutter is an option that attaches to the front of the printer to cut continuous label stock. Only enable this output if the option is present.

SW1-8	Cutter Option
ON	Enabled
OFF	Disabled

5.4 LOADING MEDIA

The Model 8865 is designed for easy installation of label stock and ribbon. A diagram located under the cover of the printer shows the feed path for print media(s). Lift the cover of the printer from the right-hand side and open the front cover for installation instructions.

5.4.1 Disengage printhead by rotating "head lift lever" (1) clockwise to the "UP" position.

5.4.2 Slide "retainer" (4) to outer end of "supply mount" (5) and flip down.

5.4.3 Place label roll on "supply mount" (5), flip the "retainer" up and slide it firmly back against the roll.

5.4.4 Rotate "media guide" (7) down by pulling top toward you.

5.4.5 Insert label stock as shown.

5.4.6 If peel off mode is desired, route the media backing down past the "assist roller" (8) to the "rewinder" (6) as shown and reverse the serrated tear off plate (refer to Figure 5-2-c).

5.4.7 If label rewinding is desired, fasten "rewind adaptor" (9) to front of mechanism as shown so that the media slides over the adaptor. Also remove the "window cover" (10) from "faceplate molding" (11).

5.4.8 Rotate "media guide" (7) back up and slide to edge of media.

5.4.9 Engage printhead by rotating "head lift lever" (1) counterclockwise to the "DOWN" position.

If the media is not sensing, try adjusting the sensor position by turning the adjusting knob (refer to Figure 5-2-c) for the movable sensor. The gauge behind and below the printhead can be viewed for making this adjustment. If a label edge is not detected within 12" of feeding, the printer will stop and the PAPER OUT indicator will remain lit. In this case, check the threading of the media around the bottom of the upper and lower media guides.

If the paper feeds forward only about 2.5" each time you press the FEED button, and does not seem to be stopping on a label edge, the THERMAL/THERMAL TRANSFER switch shown in Figure 5-2-b has probably been turned on without a thermal transfer ribbon installed. Slide this switch back to the left side for direct thermal printing.

If the media used is less than 4" (100 mm) wide, printhead pressure will need to be adjusted. Refer to section 11.2 for this adjustment. Failure to do this will result in poor print quality and possibly premature failure of the printhead and drive roller.

5.5 LOADING RIBBONS

Refer to the same diagram inside the shown in Figure 5-4-a.

5.5.1 Disengage printhead by rotating "head lift lever" (1) clockwise to the "UP" position.

5.5.2 Slide ribbon supply onto "supply hub" (3). Route ribbon as shown and attach to ribbon "rewinder" (2) using supplied clasp. If an empty ribbon supply spool is available, it is recommended that it be used as a hub for the take up. Also refer to the alternate loading paragraph following the next step.

5.5.3 Engage printhead by rotating "head lift lever" (1) counterclockwise to the "DOWN" position.

Alternate Ribbon Loading Instructions:

When loading partial ribbons, or ribbons with leaders that have a high elasticity, you may have some difficulty removing the clasp after the ribbon has been consumed. As an alternate method of loading the ribbon, you can neatly wrap the ribbon over the clasp, turning the take up spindle until the ribbon appears to track smoothly through the printer. When the ribbon has been consumed, the clasp will be under the ribbon and can easily be removed from the spindle.

5.6 POWERUP SELF-TEST

Once labels are installed in the printer, a self-test should be performed. The printer will power up in the self- test mode when the FEED button is held depressed as the printer is being powered up. The printer should be loaded with 4.5" wide stock whenever this test is conducted. The self test prints across the entire width of the printhead.

If you want to perform the TXD/RXD and CTS/RTS loop back checks, you will need to fabricate a test plug as illustrated in Figure 5-6-a. Connect the plug to the RS-232 connector on the back of the printer before the self test is run. A complete sample self-test label is shown in Figure 5-6-b.

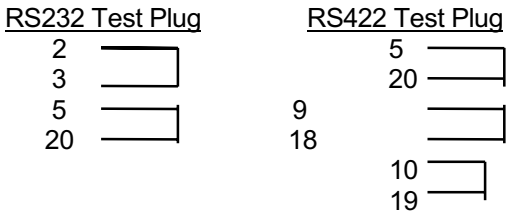


Figure 5-6-a Test Plug Configurations

Figure 5-6-b Sample Self Test Printout

5.6.1 The test begins with the feeding of a blank label. If a label edge is detected, the printer will begin to print the configuration and then the self-test pattern. If a label edge is not detected within 12" of stock, the printer will stop feeding labels. If this occurs, refer back to section 5.4 and refeed the media (see Figure 5-2-c to help find the location of the sensor).

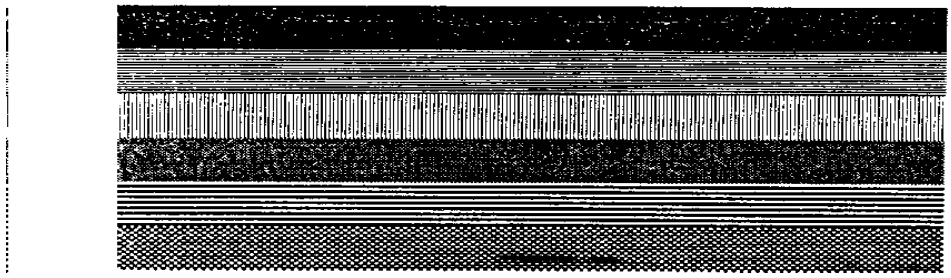
```
SUN  FEBRUARY  01, 1993  10:45   290
VER: B - 02.02T   01/11/93

SYSTEM ROM CHECKSUM: 7B53   IS GOOD
FONT   ROM CHECKSUM: 2E7A   IS GOOD
TOTAL  ROM CHECKSUM: A9CD   IS GOOD
SYSTEM RAM CHECKS GOOD
SERIAL PORT BAUD RATE IS 9600

TRANSFER SWITCH IS OFF
SETUP SWITCH  1   2   3   4   5   6   7   8
              OFF OFF OFF ON  OFF OFF OFF OFF

ANALOG INPUT VALUES:
 PAPER: 238   EDGE: 149   TEMP: 062
 POT ADJ: 000   BAT VOL: 197

INCH COUNTER    DATE SET:      03/25/92
TOTAL LABEL LENGTH IN INCHES: 00012821Ø
```



5.6.2 The self-test print provides information about the printer configuration. The self-test label contains the date and the time on the first line. The second line contains the program version number. This number is helpful if assistance is requested from your METTLER TOLEDO representative.

5.6.3 After one blank line, four lines of diagnostic information are printed. The first three diagnostic messages indicate whether the ROM's which stores the program and the resident fonts are GOOD or BAD. This is checked using a signature called a ROM checksum. The fourth line in this group indicates whether the RAM at location U5 and U6 passed a RAM self-test. If either ROM or RAM indicate BAD, service is required.

5.6.4 The last diagnostic line indicates the current serial interface baud rate. If one of the loop back connectors (shown in Figure 5.6-a) is connected, the serial port message will also indicate whether transmit/receive and CTS/DTR connections have tested successfully. If you use the test plug but the serial test and handshake test are not printed, service may be required.

5.6.5 The next line shows the status of the direct thermal or thermal transfer switch inside the front cover of the printer. If the test printout does not match a visual inspection of the switch, try flipping the switch once or twice and retesting.

5.6.6 The programming switch positions are shown next. These two lines indicate the position of each switch in SW1. If they do not agree with visual inspection of the switches, try turning the switches off and on several times and retesting.

5.6.7 Next, all of the sensor values are reported as ANALOG INPUT VALUES on the next two lines. If the printer is set up properly, the following parameters will be identified on the self-test: PAPER and EDGE where the value shown for PAPER should always be greater than the EDGE reading, TEMP which will normally fall between 55 - 80, the POT ADJ which indicates the position of the darkness control at the front of the printer should be 128 +/- 10 when the potentiometer is adjusted to the 12:00 position. The BATTERY VOLTAGE ranges from 150 - 194. If the battery value is lower than 150, the battery is low. If values of these readings don't fall within these ranges it does not necessarily indicate that a problem exists. The performance of the printer is the final factor in determining whether or not a problem exists.

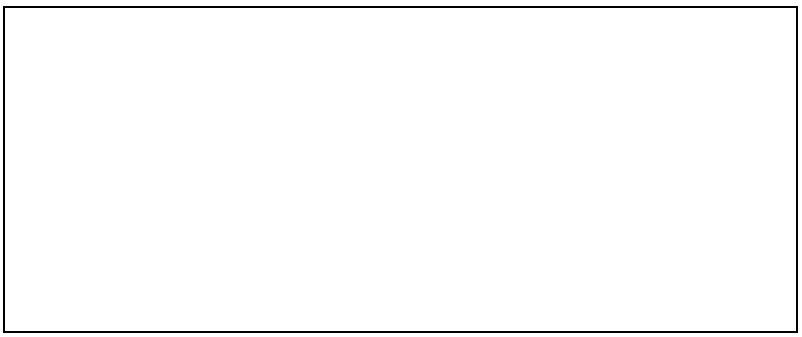
5.6.8 A third label printed shows an area of alternating patterns of lines and dots. This demonstrates uniformity of print across the web and to verify that all of the dots on the printhead are imaging on the paper. You will notice some lighter and darker regions in the pattern printed on the label. This variance is normal in the first area.

Note: After the self-test, power down the printer, then reapply power. This removes the 8865 from the input monitor mode which is used in diagnostics. This feature is described in section 8.5 of this manual.

5.7 TESTING OPERATION IN METTLER TOLEDO MODE

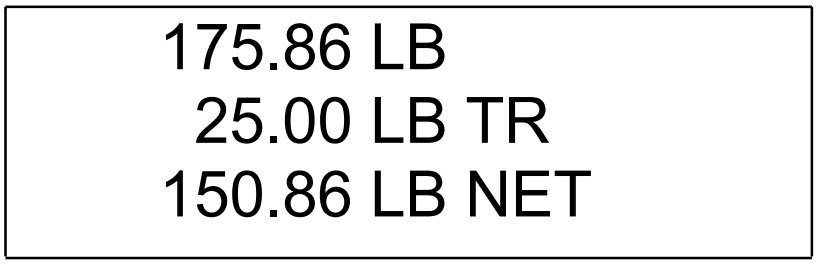
Each flash module from METTLER TOLEDO has been preprogrammed at the factory with a stored label format. This format (shown in Figure 5-7-a) allows printing of three lines of data with up to 16 characters per line. If fewer lines are sent, the printer will print after a 400 ms timeout. If more than 3 lines of data are sent, multiple labels will print.

To test the printer, first make sure the flash module is installed in the top slot of the printer (located behind the front door). Connect a standard scale (or other ASCII device capable of multiple line output) to the back of the printer. Program the transmitting device for 9600 baud and 7 data bits. When the device sends data, the data will be printed in the available space on a label using the default label format. Refer to Figure 5-7-b.



Printer by a METTLER TOLDEO Model 8865 Programmable Printer

Figure 5-7-a Default Stored Label Format



Printer by a METTLER TOLDEO Model 8865 Programmable Printer

Figure 5-7-b Data Printed on Default Label

6. PROGRAMMING COMMANDS

The 8865 printer uses a combination of system commands and label format commands to print a label. The system commands communicate such things as memory module status, label offset values and to initiate various test routines. The label formatting commands actually setup the label format and control items associated with a single format. Sample labels in section 10 show how these commands are used.

6.1 SYSTEM COMMANDS USING <STX>

Each of these commands is invoked after the control character <STX> (02 hex). Each of these commands must have the <STX> character transmitted before it. All commands are terminated by an ASCII <CR> (0D hex) unless otherwise noted. All system commands in this section are functional only in the Host mode.

COMMAND **DESCRIPTION**

A **Set Time and Date**

Use the format AwmmddyyyyhhMMjjj (16 digits total) where;

w is 1 digit for day of the week (1 is Monday)
mm are 2 digits for the month
dd are 2 digits for the day
yyyy are 4 digits for the year
hh are 2 digits for the hour in 24 hour format
MM are 2 digits for minutes

jjj are 3 digits for julian date [numeric value for day (out of 365)]

FORMAT: <STX>A5070419931200000<CR> sets the day as Friday, July 4th, 1993 and the time at 12:00 noon.

a **Enable Feedback Characters**

If this command is sent, after printing a label, a 0 (30 hex) is transmitted back to the source device. After printing a complete batch of labels, a 1 (31 hex) is returned.

B **Transmit Time and Date**

This command requests that the time and date be transmitted out the serial port. The format will be the same as described for the <STX>A command.

bHnnnn **Cutter Signal Time Command**

Switches the cutter signal to the 50% low then 50% high mode before the printer continues printing. This signal is available at J4 on the printer. This changes the default settings of 5us low pulse and 75ms delay time to a low pulse equal to the delay time. Each digit entered as the "nnnn" value equals 24us. For a low signal of 60ms then a delay of 60ms, the format would be:

FORMAT: <STX>bH2500<CR> The value 2500 represents 2500 units of 24us which equals 60ms. (50ms / 0.024ms = 2500)

C **Copy Module**

Copies all data from module B to module A. Module A is the top slot. Both modules must be flash modules. This command is used to make multiple copies of stored label formats.

When using this command, the source module should be installed in the B slot, and the blank module in the upper A slot. A WRITE PROTECT switch on the flash module can protect data stored in the module from being accidently overwritten or erased.

cnnnn Set Continuous Paper Length

Used for continuous forms applications. In this command, "nnnn" is the length of paper to feed (in 0.01" units) per label format. This should be set to zero for normal operation.

d **Set Buffer for 2 Dots**

This command sets the printer up for 2 dot buffer processing. Normally, the 8865 prints a 10" long (black space) 203 dpi label. This command allows the printer to print a 5" long label while a second label is formatting in memory. These maximum label lengths double when using 512K RAM cartridge.

Ennnn Set Print Quantity for Stored Label

Set the quantity of labels to print for the stored label to "nnnn". The "nnnn" must always be 4 digits. This command is used only when recalling and printing a label format from memory in the host mode using the <STX>G command. This does not function in the M-T Mode.

e **Select Edge Sensing**

This programs the printer for "see-through" media sensing; e.g., die cut labels, tags with sensor holes. This is the default for media sensing. The <STX>r command can be used to select reflective sensing instead of edge sensing.

F **Form Feed**

This commands tells the printer to feed one label.

fnnn **Label Feed-Out Distance**

This command causes the media to feed out an additional distance past the form offset value before stopping. When the next label starts to print, the media will back feed this added distance before printing. The value "nnn" is 3 digits of distance from sensor given in 0.01" increments. A value of approximately 130 will place the spacing between labels over the tear-off plate so the label can be torn off easily. The value for the cab cutter is about 235. Values less than the form edge offset value (<STX>Onnnn) will be ignored.

Note: This distance is independent of Form Edge Offset.

G **Print Stored Label**

Prints the previously stored or printed label commands. May also be used to restart a canceled batch if it was the last processed label. This command is used when there is a label format in the buffer and the printer is in the Host mode.

Hnnnn **Set Cutter Signal Delay Time**

This sets the cutter signal "on" delay time. This is an external signal at port J4. The "nnnn" is 4 digits of time, each count equal to 24 Ts. The default value is 3125 which represents a delay of 75 ms before the printer will continue to print.

FORMAT: <STX>H2500<CR> The value 2500 represents 2500 units of 24 Ts which equals 60 ms. (50 ms / 0.024 ms = 2500)

labfnnn... **Input Graphics Data Block**

a = Memory module bank A (Slot A), B (Slot B)
b = (optional) A for 7 bit data, 8 bit if left out of command
f = F for 7 bit .IMG load file
I for reversed .IMG 8-bit format (image will be flipped)
i for .IMG 8-bit format (save image as received)
P for reversed .PCX 8-bit format (image will be flipped)
p for .PCX 8-bit format (save image as received)
n = Name up to 8 characters for image. Terminated by a <CR>.

Graphics are described in greater detail in section 9.6.

FORMAT: <STX>IApARROW<CR> - Stores the PCX data that follows this command in the memory module that is in slot A by the name ARROW.

i **Enter the MT Mode**

This command tells the printer to enter the METTLER TOLEDO mode from the Host mode. It is used when manually downloading new formats to the flash module or any time you wish to change modes. In order to switch to the MT mode, there must be a flash module installed.

k **Transmit Letter "Y"**

This command sends the character "Y" out the RS-232 port. This can be used as a test to make sure the printer command system is in sync with your system.

L **Enter Label Formatting Mode**

After receiving this command, the printer expects Label Formatting commands and field record definitions until an "E" or "X" command is received. Section 6.3 describes what commands are functional in the label formatting mode.

Mnnnn **Maximum Label Length**

This is used for paper out sensing. The "nnnn" is four digits in 0.01" steps. The default setting is 1200 indicating 12.00". The maximum setting is 9999. The printer will feed out up to this length of media without sensing the next label before giving an out of stock error.

This command is a nice feature while designing labels. It prevents the printer from feeding out tremendously long strips of media if an error is made by the host device.

It is recommended that the label-out value be set to 2.5 times the actual label length that is being used. This will allow for a label to be missing on a roll without stopping the printing.

m **Enter Metric Mode**

After receiving this command, all parameters passed to the printer that make reference in this manual to be by 0.01" will reference 1 mm steps instead. All reference to measurement will be metric values until the printer is reset. There is no conversion done on existing numbers, the same values are used.

Onnnn **Set Form Edge Offset**

This controls the amount of empty space at the bottom of the label. The variable "nnnn" is 4 digits for this offset. The value 0110 is the typical "zero" setting and is also the default. Settings below 0050 are adjusted back to 0110.

The printer normally stops the label media at 0.20" past the printhead. This means that the last label printed is still attached to the label backing and can be removed by an operator.

If you are printing in batch mode and rewinding the labels, you may want to have the label offset changed so that printing can begin on the very bottom of a label.

This command is different from the <STX>C command, which changes the location of the print on the label. This command actually changes the zero reference point of the label.

P **Enter Self Test Mode**

When this command is received, the printer enters the input character monitor mode (self test mode). Any characters sent to the printer will be printed. The printer must be reset to return to normal operation. This feature is described in detail in section 8.5.

q(A/B) Clear Module (A or B)

This command clears the selected memory module. The letter A is the upper slot, B is the lower slot. This will clear a stored label format in the flash. It is not possible to erase just one stored format or graphic. Everything is erased from the module. Use caution when sending this command.

FORMAT: <STX>qA<CR> - Clears all data from module A.

R(Y/N) Ribbon Saver Option

The ribbon saver is an option not currently available for the 8865. To enable the ribbon saver, send the letter Y. To disable this option, send the letter N. The default at power up is Y.

FORMAT: <STX>RY<CR> - Enables the ribbon saver.

r **Select Reflective Sensor**

This selects reflective sensor mode for label detection. This is used for black stripe media sensing; e.g., continuous tags, butt-cut labels. The black stripe must be printed on the back side of the media and must be carbon based ink. The <STX>e command can be used to switch to edge sensing.

Sn **Set Feed Rate**

This command is separate from the P and S commands found in the label formatting commands (section 6.3) for print speed and slew rate. The "n" will be a letter (C-O) corresponding to feed rates from 2" to 8" per second in 0.5" increments. This programs the default value used when the feed button is pressed. Only the feed rate is changed, not the print and slew rates.

n	Speed	n	Speed
A	2.0" per second	I	5.0" per second
B	2.0" per second	J	5.5" per second
C	2.0" per second	K	6.0" per second (Default)
D	2.5" per second	L	6.5" per second
E	3.0" per second	M	7.0" per second
F	3.5" per second	N	7.5" per second
G	4.0" per second	O	8.0" per second
H	4.5" per second		

FORMAT: <STX>SG<CR> - sets the feed rate at 4" per second.

s **Set 1 Dot Buffer**

This command sets the printer up for 1 dot buffer processing. This is the default which allows the 8865 to print a 10" long (black space) 203 dpi label. This maximum label length doubles when using 512K RAM cartridge.

T **Print Test Label**

Initiates printing of the printhead dot pattern test label. To see the full test pattern, a label 2.5" high by 4.5" wide must be used. The input character monitor mode will not be accessed.

t **Run RAM Module Test**

This runs a memory test for RAM modules. This test will return the following sequence if the memory module is good. If there are two RAM modules, one in each slot, then two lines will be returned, one for each module.

a bbbK MODULE GOOD
"a" will be a 1 or 2 to specify the slot, 1 = Slot A, 2 = Slot B.
"bbb" will be 256 or 512 for the size of the module tested.

Unnss.. **Fill Replaceable Field**

This command fills the "nn" format line (must be 2 digits) of a stored label format with the new data "ss..". The new data must equal the original string length.

FORMAT: <STX>U02TOLEOD<CR> - Replaces the data in the 2nd line of a buffered format with the data "TOLEDO". The original data also had 6 characters.

u **Upload Stored Label Format from RAM**

This command asks the printer to upload the format data that is currently stored in RAM. This is intended to work with the METTLER TOLEDO label design package for recalling formats.

Vn **Set Pseudo Switch Settings**

This command allows temporary replacement of the power-up status of switches SW1-6, SW1-7, and SW1-8. A number from 0 to 7 is used to represent the combined status of these switches. A power on reset will cause the 8865 to read the actual switches again.

n =	SW1-6	SW1-7	SW1-8
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

FORMAT: <STX>V4<CR> - turns SW1-6 On and SW1-7 and SW1-8 both OFF.

v **Send Firmware Version**

This command initiates a transmission of the firmware version to the serial port. This output will be transmitted just as it appears on the test label in Figure 5-6-a.

W(F/G/L) **Request Directory of Memory Module**

The printer will respond to this command by transmitting the name of any font, graphic or label information stored in its memory modules. The letter transmitted determines which data is returned. Also included is a number indicating the space still available in the module.

F returns stored Font information.
G returns stored Graphic information.
L returns stored Label Format information.

FORMAT: <STX>WL<CR> - returns a list of all stored label formats and in which slot the module is located.

If the printer does not respond, one of three things may be assumed.

1. There are no modules installed.

2. A module has corrupted memory. In this case, you should power down the printer then turn it back on. The corrupted module should reformat.

3. There is a hardware problem. Service may be required.

w **Test Flash Memory Module**

Runs a memory test on the flash module. This process takes about 20 seconds. The flash module must have the write protect switch off. The printer will return a string of 16 p's and 16 v's if the flash module is okay. Any question marks (? - 3F hex) returned in the string indicates a hardware problem. This may be either the module or the interfacing to the module. All information in the flash module will be erased during this sequence.

X(A/B) Set Default Module

Selection of the default module is used when downloading information to RAM modules. If both slots contain modules, slot A is used as the default for loading. This command is used to switch the loading to go to slot B. Use "A" to select slot A (Top) and "B" to select slot B (Bottom).

FORMAT: <STX>XB<CR> - selects slot B as target module.

Z **Initiate Print of Self Test Data**

This initiates printing of a complete self test as shown in Figure 5.6-b. To see the full test pattern, a label 2.5" high by 4.5" wide must be used. The input character monitor mode will not be accessed.

z **Get Printer Status**

The printer will respond with a string of 8 bytes describing its current status followed by a <CR> (0D hex). Each of these bytes will be either a Y (59 hex) for yes or a N (4E hex) for no. The bytes represent:

Character No.	Description
1	Command interpreter busy?
2	Paper out?
3	Ribbon out? (only when enabled)
4	Printing batch?
5	Busy Printing?
6	Printer paused?
7	Label presented? (only when enabled)
8	Always a N

6.2 SYSTEM COMMANDS USING <ESC>

Each of these commands is invoked after the control character <ESC> (1B hex). Each of these commands must have the <ESC> character transmitted before it. All commands are terminated by an ASCII <CR> (0D hex) unless otherwise noted. These system commands are used when in the METTLER TOLEDO mode only.

COMMAND **DESCRIPTION**

E **Exit MT Mode and Enter Host Mode**

This command tells the printer to exit the METTLER TOLEDO mode and enter the Host mode. It is used when manually downloading new formats to the flash module or any time you wish to change modes.

z **Get Printer Status**

The printer will respond with a string of 8 bytes describing its current status followed by a <CR> (0D hex). Each of these bytes will be either a Y (59 hex) for yes or a N (4E hex) for no. The bytes represent:

Character No.	Description
1	Command interpreter busy?
2	Paper out?
3	Ribbon out? (only when enabled)
4	Printing batch?
5	Busy Printing?
6	Printer paused?
7	Label presented? (only when enabled)
8	Always a N

6.3 LABEL FORMATTING COMMANDS

Unlike a line printer whose only option is to print data received on the next line or to a line further down in a document, the 8865 allows the source device to select where and how data is to appear on a label. The rotation of the data, the selection and magnification of the font style, and the data for each field can be controlled by the source device through simple commands. The 8865 has a 5000 character area that stores data to be printed on a label in up to 200 different fields. Each field description may contain up to 255 characters.

In addition to the control on "what" and "where" data is to be printed, the printer also allows you to control the "how." This includes commands that control the printhead temperature, the print speed, the slew rate during white space, and the amount of precalculation before images are printed on the stock. All of these commands follow the <STX>L<CR> Enter Label Formatting command.

Any commands received while in the Label Formatting command mode not starting with a 1, 2, 3, or 4 (specifying a field rotation) are interpreted as printing process commands. The label formatting mode is exited by an "E" or "X" or "sAnn.." label formatting command line.

COMMAND **DESCRIPTION**

Cnnnn **Set Column Offset**

This command function is used to adjust the printing of data on a label horizontally. This feature is useful when you need to print a single format on several different types of labels that have preprinted information. If the preprinted data does not show up in the same place every time, the data you image on the label may overlap the preprinted data. The <STX>Cnnnn command instructs the printer to print the following label formats over "nnnn" increments to the right of where the format actually specifies. The "nnnn" are 4 digits 0 to 9 which can specify a number from 0000 to 4000.

cnn **Quantity of Labels for Cutter Command**

The optional cutter will perform a cutting action after the number of labels specified in this command. The "nn" is 2 digits of labels printed before cut. Default setting is 01.

Dhv **Set Horizontal and Vertical Dot Size**

The "h" is one digit that sets the horizontal dot size which can be a 1 or 2. The "v" is one digit that sets the vertical dot size which can be a 1, 2, or 3. Each count is 0.005" steps. The default is D22. The D22 command will double the size of printed fields.

E **Terminate Field Generation and Print**

This should be the last character in the label format. When the printer reads this character, the label format mode is exited and the printer prints the label.

G **Enter Previous Data Line into Global Register**

The Model 8865 contains a utility for printing duplicate data fields in multiple places on a label. After a field has been created, the "G" command must be sent as the next line. The data in the previous data field is placed into a global register. Global registers are named in the order created, starting with A and assigned consecutively through register P.

Once data has been entered into a global register, it can be used as the data for other fields. To print the global register data in other locations, place the command <STX>Sn (where "n" is the register designator A to P) in the data field of another location. The printer will use the data from the global register defined into that data field.

EXAMPLE: <STX>L<CR>
121100001000100MODEL8865<CR>

G<CR>
1A2210502000100<STX>SA<CR>
E<CR>

The G<CR> command after the first field will place the string "MODEL 8865" into the next available global register, which in this case would be A since no other global registers have been used. The <STX>SA in the data location of the following field will take the data out of global register A and place it in that data field.

Hnn **Label Heat Setting**

This formatting command changes the "on time" for the individual dot rows on the printhead. The printer powers up with a default value of 10. Varying this number changes the amount of time the dots are "turned on." This changes the amount of heat that is transferred from the head to the media, causing lighter and darker images to be burned. The range of valid settings for "nn" are from 01 to 20. Each step increases or reduces the burn time by 100us.

The control on the front of the printer labeled "DARKER" is for matching a replacement printhead to the printer during the head replacement procedure. It has very little control over the actual burn temperature used for imaging.

This command is beneficial when the printer is used with several different media types. When a label format is sent to the printer and the media requires more or less heat than the amount set by the default temperature, the host device may send a command before or after the format to correct for the media.

m **Set Metric Mode**

This command functions the same as the <STX>B system level command that switches the interpretation of all command values stored from 0.01" to 1mm. The printer must be reset in order to return to standard inch measure.

Pn **Enter Print Speed**

The print speed of the 8865 printer can be adjusted by the host device to meet specific requirements of particular applications. This command will set the print speed according to the single digit represented by the "n" in the command. The print speeds are listed below.

n	Speed	n	Speed
A	2.0" per second	I	5.0" per second
B	2.0" per second	J	5.5" per second
C	2.0" per second	K	6.0" per second (Default)
D	2.5" per second	L	6.5" per second
E	3.0" per second	M	7.0" per second
F	3.5" per second	N	7.5" per second
G	4.0" per second	O	8.0" per second
H	4.5" per second		

Qnnnn **Print Label Quantity**

This command indicates to the printer how many labels to print with the label format and data being sent to it. The "nnnn" is 4 digits of quantity from 0001 up to 9999. This command is functional only in the Host mode when downloading the complete label format and printing a batch of labels.

Rnnnn **Row Offset Value**

This is a label formatting command that is used to adjust the print position of data on a label. This feature is useful when you need to print a single format on several different types of preprinted labels. If the preprinted data does not appear in the same place every time, the data you image onto

the label may overlap the preprinted data. This instructs the printer to print the following label formats "nnnn" further up on the label than the format actually specifies. The "nnnn" numbers in the command are digits 0 to 9 indicating 0.01". This allows you to move the format up a distance from 00.00" to 99.99" before printing of the label format.

rnn... **Recall Stored Label Format**

To retrieve a stored format from a memory module, use this command. Although this command will work with RAM modules, it is impractical since formats will be lost at power down. Therefore, the flash module should be used with this command. The "nn...n" is the name of the format and can be up to 16 characters long terminated by <CR>.

EXAMPLE: <STX>L<CR>
rLABEL1<CR>
Q0004<CR>
E<CR>

This string of commands retrieves a label format named LABEL1 from flash memory and prints four labels.

Sn **Enter Slew Speed**

The slew speed, which is the rate at which white space is advanced when no printing is taking place on a label, can be set by the "Sn" command where the "n" is replaced by an alpha character A through L to get slew rates of:

n	Speed	n	Speed
A	2.0" per second	I	5.0" per second
B	2.0" per second	J	5.5" per second
C	2.0" per second	K	6.0" per second (Default)
D	2.5" per second	L	6.5" per second
E	3.0" per second	M	7.0" per second
F	3.5" per second	N	7.5" per second
G	4.0" per second	O	8.0" per second
H	4.5" per second		

s(A/B/C)nn.. **Save Label Format to Module**

This command will store a label format into a module designated by the slot letter A, B or C. This label formatting command terminates the label formatting mode.

A is the top module
B is the bottom module
C is the default RAM module
nn...n is the label format name of up to 16 characters

EXAMPLE: <STX>L<CR>
292200302000100MODEL<CR>
2922003010001008865<CR>
sAFORMAT2<CR>

The sample shown will store the format names FORMAT2 into the flash module in slot A. This allows recall of the format with the rnn... label format command.

W **Select Formatting Mode**

The native formatting mode of the Model 8865 is to begin printing immediately once the command to generate is executed. Some printers create an entire video image of the label in memory before printing begins. Sending the "W" command will enable this type of formatting.

X **Exit Label Format Mode**

This command is used when the <STX>E, <STX>G, and/or <STX>U commands will be used to modify a fixed format before printing. This will remove the printer from the label formatting mode but not print a label.

+pii.. **Make Previous Field Incrementing**

The 8865 is capable of incrementing data fields between each print when used in the Host mode printing batches of labels. To cause a field to increment, send the field in the normal manner to the printer. After the ASCII <CR> that terminates the field, send the string "+pii..." where the "p" is a fill character for the far left-hand characters of the field and the "ii" is the 1 or 2 digit value to increment by. The data in the field will increment by this value each time a label is printed.

EXAMPLE: <STX>L<CR>
1322000010001000001<CR>
+01<CR>
Q0003<CR>
E<CR>

This example will generate a single field label that prints the first label with a value of 0001 and increments by a value of 1 for three labels.

-pii.. **Make Previous Field Decrementing**

The 8865 is also capable of decrementing data fields between each print from the Host mode when printing batches of labels. To cause a field to decrement, send the field in the normal manner to the printer. After the ASCII <CR> that terminates the field, send the string "-pii..." where the "p" is a fill character for the far left-hand characters of the field and the "ii" is a 1 or 2 digit value to decrement by. The data in the field will decrement by this value each time a label is printed.

EXAMPLE: <STX>L<CR>
1322000010001001000<CR>
-02<CR>
Q0005<CR>
E<CR>

This example will generate a single field label that prints the first label with a value of 1000 and decrements by a value of 2 for five labels.

>pii.. **Make Previous Field Alphanumeric Incrementing**

The 8865 is capable of incrementing data fields between each print in the Host mode when printing batches of labels. To cause a field to increment, send the field in the normal manner to the printer. After the ASCII <CR> that terminates the field, send the string ">pii..." where the "p" is a fill character for the far left-hand characters of the field and the "ii" is the value to increment by. The data in the field will increment by this value each time a label is printed.

EXAMPLE: <STX>L<CR>
132200001000100000A<CR>
>01<CR>
Q0003<CR>
E<CR>

This example will generate a single field label that prints the first label with a value of 000A and increments alphanumerically by a value of 1 for three labels.

<pii.. **Make Previous Field Alphanumeric Decrementing**

The 8865 is also capable of decrementing data fields between each print in the Host mode when printing batches of labels. To cause a field to decrement, send the field in the normal manner to the

printer. After the ASCII <CR> that terminates the field, send the string "<pii..." where the "p" is a fill character for the far left-hand characters of the field and the "ii" is the value to decrement by. The data in the field will decrement by this value each time a label is printed.

EXAMPLE: <STX>L<CR>
1322000010001000000Z<CR>
<02<CR>
Q0005<CR>
E<CR>

This example will generate a single field label that prints the first label with a value of 000Z and decrements alphanumerically by a value of 2 for five labels.

^nn **Set Label Count For Incrementing/Decrementing**

An application that requires incrementing or decrementing fields will occasionally require that a duplicate label be printed with the same values before the update of field data occurs. The Model 8865 handles this feature with the "^nn" command. The "nn" is a two digit value. It specifies how many labels are to be generated before the incrementing or decrementing of the data field is to occur. This command can only be sent once per label format.

EXAMPLE: <STX>L<CR>
1322000000000000001<CR>
+01<CR>
^02<CR>
Q0006<CR>
E<CR>

This example prints the single printed field of 0001 and increments it by 1 every 2 labels for a total printing of 6 labels.

z **Zero Character Printing**

This command will convert the printing of the number zero (0) to the letter O. This eliminates the slash when the zero character is printed.

6.4 PRINT FIELD FORMAT COMMANDS

The Model 8865 printer requires a certain sequence of commands in order to print a label correctly. The previous section lists the "label format commands" used but there is also a requirement for commands for each line of data to be printed called "field formatting commands". All label format commands must be grouped together after the "begin label format" command <STX>L. This sets the printer up to accept the label formatting and field formatting commands. When entering the label formatting mode, the printer does several things. It clears the field register area and loads the FIELD GENERATION interpreter. The interpreter will scan the data as it is received, placing completed fields into registers. It also verifies the media is in the "home position" at the time the <STX>L command is received. References made by the label format commands that follow will consider the current paper position as 0,0.

The printer begins to look for strings terminated by an ASCII <CR> (0D hex). The interpreter takes the data in the string and places the appropriate pieces into the appropriate registers. Whenever the 8865 encounters an incorrect label format command, the data is not accepted. If any received data does not meet the requirements for a label formatting command, the 8865 checks to see if the string is a field formatting command. If the command still does not match, the field is discarded.

The Model 8865 can accept up to 5000 characters of field data per label, in up to 200 fields. Each field follows the same format. Fields and label formatting commands are sent to the printer until the desired label format has been achieved.

After the last field is sent, the host device terminates the formatting session by sending an ASCII E (45 hex) as a single character string terminated by a <CR>. The printer will then print the label from the field registers created and return to the system command processor.

A field format command line always has the same format. The first 15 characters define the rotation, font, size and position for the printed data. The actual data begins with the 16th character. A sample format would be:

FORMAT: 1 2 1 2 000 0100 0100 METTLER TOLEDO

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

6.5 PRINTING TEXT

We will use the following format example to represent a typical field format command string to print a line of text.

FORMAT: 1 2 1 2 000 0100 0100 METTLER TOLEDO

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

The following paragraphs describe what each of the characters in the above format example instruct the printer to do.

CHAR # DESCRIPTION

1 Field Rotation

The first character that is received in a field format command is a character that selects the rotation. The only possible choices for rotation are 1, 2, 3, and 4. If the printer receives any other character as the first character in a command string, it will not consider this data to specify a field. It will check the string as a possible command for other action. If the string cannot be matched to a command, it will be discarded by the printer. The following diagram details the direction of data that each rotation will give with respect to the label feed direction and the label opening in the front of the printer.

1 = 0 degrees
2 = 90 degrees
3 = 180 degrees
4 = 270 degrees

In our formatting example the first character is a "1" which indicates 0 degrees or no rotation. The print will be normal as viewed from the front of the printer. A selection of 2 would indicate a 90 degree rotation which would print the field vertically and readable from the left side of the label (top to bottom). Each rotation continues in this clockwise sequence.

2 Font Selection

After the rotation field, the next character received is the font type. Characters 0-9 select human readable fonts. Characters 0-8 select 9 different font sizes of the standard printer fonts. Character 9 selects the internal CG Triumvirate™ smooth font and any optional font cartridges. When the number 9 is used, there are 10 internal smooth font sizes that are selected using characters 5, 6, and 7 in the field format command. They will be described later. The character 9 is also used to select downloadable fonts by putting a different font size number in characters 5, 6, and 7.

In our example, a human readable font number "2" has been selected.

3 Horizontal Multiplier

The following digit, character number 3, is the horizontal multiplier. Digits 1-9 and A-O represent multiplication factors of 1-9 and 10-24, respectively.

For human readable fonts, the multiplication factor represents the number of times the dot tables for the font selected are multiplied in the horizontal direction.

The horizontal multiplier for our sample field format command is a "1".

4 Vertical Multiplier

The next character is the vertical multiplier. Digits 1-9 and A-K represent multiplication factors of 1-9 and 10-24, respectively.

For human readable fonts, the multiplication factor represents the number of times the dot tables for the font selected are multiplied in the vertical direction.

In our example, the vertical multiplier is a "2" so the height will be doubled.

5, 6, 7 Select Font Number

Characters 5, 6, and 7 in the string depend on the font selected in the second character. For human readable fonts 0-8 these three characters are ignored but should be sent as 000.

For human readable font 9 these three characters must be a number 001-010 to select a font size for the CG Triumvirate™ smooth font. Numbers 100-999 are available for selecting downloaded fonts stored on RAM or flash memory modules and ROM FONT memory modules. Refer to section 9.3 for available point sizes of the internal font.

We selected font 2 in our example so these characters are "000".

8 - 11 Vertical Position

The next four digits, characters 8 through 11, provide the vertical position. This offset determines the placement, from the home position, of the data that is specified at the end of the string received. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch on graphic interfaces unless the toggle to metric measure has been made. This value can be thought of as "how far up" from the bottom of the label the data is to be printed.

Our example indicates the printer should begin printing "1.0" inches from the bottom of the label.

12 - 15 Horizontal Position

Characters 12 through 15 are used as the horizontal offset from the home position. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far over" from the left edge of the label the data is to be printed.

A selection of "0350" in our format tells the printer to begin printing 1.0" from the left edge.

16 - ... Printed Data

The remaining data in the string up to the <CR> or <LF> characters is the data to be printed. This data can be from 1 to 255 characters. Characters that are placed in this field may or may not actually be able to print on the label. The printer will print all of the characters that fall within the possible range of the printhead. For example: you direct the printer to print "HELLO WORLD" in rotation 1, font 6, and to magnify 2X in the horizontal and the vertical direction. The characters "HELLO W" and part of the "O" will appear at the very bottom of the label. The "RLD" will not show up on the label since it is outside the physical limits of the printer.

6.6 PRINTING BAR CODES

We will use the following format example to represent a typical field format command string to print a line of bar code with human readable text beneath.

FORMAT: 3 A 6 2 050 0100 0350 METTLER TOLEDO

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

The following paragraphs describe what each of the characters in the above format example instruct the printer to do.

CHAR # DESCRIPTION

1 Field Rotation

The first character that is received in a field format command is a character that selects the rotation. The only possible choices for rotation are 1, 2, 3, and 4. If the printer receives any other character as the first character in a command string, it will not consider this data to specify a field. It will check the string as a possible command for other action. If the string cannot be matched to a command, it will be discarded by the printer. The following diagram details the direction of data that each rotation will give with respect to the label feed direction and the label opening in the front of the printer.

1 = 0 degrees
2 = 90 degrees
3 = 180 degrees
4 = 270 degrees

In our formatting example the first character is a "3" which indicates 180 degrees of rotation. The print will appear upside down as viewed from the front of the printer. A selection of 2 would indicate a 90 degree rotation which would print the field vertically and readable from the left side of the label (top to bottom). Each rotation continues in this clockwise sequence.

2 Bar Code Selection

After the rotation field, the next character received is the font type. Characters A-L or a-l select bar code fonts. Characters A-L (uppercase) will print bar code fonts with human readable interpretation beneath the bar code and characters a-l (lowercase) will print bar code fonts without human readable interpretation.

A full description of the available bar codes are provided in section 9.4 of this manual.

In our example, code 39 bar code with human readable beneath it has been selected by using "A".

3 Wide Bar Width

The following digit, character number 3, specifies the wide bar width. Characters 1-9 and A-K will give a wide bar width of 0.005" to 0.120" when using a 0.005" dot size on the 8865 printer. A maximum wide bar width of 0.240" can be printed horizontally by selecting a 0.010" dot size. A maximum wide bar width of 0.360" can be printed vertically by selecting a 0.015" dot size and rotating the bar code to print vertically.

For UPC, EAN and code 128 fonts, only 1,2,3,4,6, & 8 are valid when human readable data is printed.

The wide bar width multiplier for our sample field format command is a "6".

4 Narrow Bar Width

The next character is the narrow bar width. Characters 1-9 and A-K will give a narrow bar width of 0.005" to 0.120" when using a 0.005" dot size. A maximum narrow bar width of 0.240" can be printed horizontally by

selecting a 0.010" dot size and a multiplier of 24. A maximum narrow bar width of 0.360" can be printed vertically by selecting a 0.015" dot size and rotating the bar code to print vertically.

For UPC, EAN and code 128 fonts, the narrow bar should be set equal to the wide bar setting.

In our example, the narrow bar width multiplier is a "2". This 3:1 ration between wide and narrow bar widths is common for code 39.

5, 6, 7 Bar Code Height

Characters 5, 6, and 7 in the string are a bar code height number. Numbers ranging from 001 to 999 can be used to represent bar heights of 0.01" to 9.99", respectively.

In our example, the numbers "050" select a height of 0.5".

8 - 11 Vertical Position

The next four digits, characters 8 through 11, provide the vertical position from the home position, of the data to be printed. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far up" from the bottom of the label the data is to be printed.

The value of "0100" in our example will tell the printer to begin to print the bar code 1" from the bottom of the label.

12 - 15 Horizontal Position

Characters 12 through 15 are used as the horizontal offset from the home position. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far over" from the left edge of the label the data is to be printed.

A selection of "0350" in our format tells the printer to begin printing 3.5" from the left edge.

16 - ... Printed Data

The remaining data in the string up to the <CR> or <LF> characters is the data to be printed. This data can be from 1 to 255 characters. Characters that are placed in this field may or may not actually be able to print on the label. The printer will print all of the characters that fall within the possible range of the printhead. For example: you direct the printer to print "HELLO WORLD" in rotation 1, font A, and to magnify 2X in the horizontal and the vertical direction. The bar coded characters "HELLO W" and part of the "O" will appear on the label. The "RLD" will not show up on the label since it is outside the physical limits of the printer.

The data to be printed in our sample is "METTLER TOLEDO".

6.7 PRINTING LINES AND SOLID BOXES

The field format command string for lines is similar to the one for text with the exception that there is no printed data beginning with character 16. The data field becomes the letter "L" followed by the width and height of the line. The field format command for a line will always be 22 characters long.

You can print data "reversed" by selecting a solid box to print at the same location where text is to print. When the printer finds two fields at the same location, it only prints where one of the fields has data and leaves the common space white.

We will use the following format example to represent a typical field format command string to print a line.

FORMAT: 1 X 1 1 000 0250 0050 L 300 025

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

The following paragraphs describe what each of the characters in the above format example instruct the printer to do.

CHAR # DESCRIPTION

1 Must always be a "1"

2 Line Selection

To select lines, this character must be an uppercase "X".

3 Horizontal Multiplier

Any value entered will be the multiplier to the width of the line. This will typically be "1" and actual measurements will be used to specify the line in characters 17, 18, and 19.

Our example uses a multiplier of "1".

4 Vertical Multiplier

Any value entered will be the multiplier to the height of the line. This will typically be "1" and actual measurements will be used to specify the line in characters 20, 21, and 22.

Our example uses a multiplier of "1".

5, 6, 7 Must always be "000"

8 - 11 Vertical Position

The next four digits, characters 8 through 11, provide the vertical position from the home position, of the line to be printed. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far up" from the bottom of the label the line is to be printed.

The value of "0250" in our example will tell the printer to begin to print the line 2.5" from the bottom of the label.

12 - 15 Horizontal Position

Characters 12 through 15 are used as the horizontal offset from the home position. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far over" from the left edge of the label the line is to be printed.

A selection of "0050" in our format tells the printer to begin printing 0.5" from the left edge.

16 Line Definition

This character must always be the letter "L" to indicate a line field.

17, 18, 19 Line Width

These three digits will indicate the width of the line from the horizontal position. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the width of the line is "3.0" inches.

20, 21, 22 Line Height

These three digits will indicate the height of the line from the vertical position. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the height of the line is "0.25" inches.

6.8 PRINTING BOXES

The field format command string for boxes is similar to the one for lines with the exception that there is a selection for the thickness of all sides of the box. The data field becomes the letter "B" followed by the width and height of the box then the thickness of the sides. The field format command for a box will always be 28 characters long.

We will use the following format example to represent a typical field format command string to print a box.

FORMAT: 1 X 1 1 000 0050 0050 B 300 400 004 002

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

The following paragraphs describe what each of the characters in the above format example instruct the printer to do.

CHAR # DESCRIPTION

1 Must always be a "1"

2 Box Selection

To select boxes, this character must be an uppercase "X".

3 Horizontal Multiplier

Any value entered will be the multiplier to the width of the box. This will typically be "1" and actual measurements will be used to specify the box in characters 17, 18, and 19.

Our example uses a multiplier of "1".

4 Vertical Multiplier

Any value entered will be the multiplier to the height of the box. This will typically be "1" and actual measurements will be used to specify the line in characters 20, 21, and 22.

Our example uses a multiplier of "1".

5, 6, 7 Must always be "000"

8 - 11 Vertical Position

The next four digits, characters 8 through 11, provide the vertical position from the home position, of the box to be printed. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far up" from the bottom of the label the box is to be printed.

The value of "0050" in our example will tell the printer to begin to print the box 0.5" from the bottom of the label.

12 - 15 Horizontal Position

Characters 12 through 15 are used as the horizontal offset from the home position. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far over" from the left edge of the label the box is to be printed.

A selection of "0050" in our format tells the printer to begin printing 0.5" from the left edge.

16 Box Definition

This character must always be the letter "B" to indicate a box field.

17, 18, 19 Box Width

These three digits will indicate the width of the box from the horizontal position. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the width of the box is "3.0" inches.

20, 21, 22 Box Height

These three digits will indicate the height of the box from the vertical position. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the height of the box is "4.0" inches.

23, 24, 25 Top and Bottom Thickness

These three digits will indicate the thickness of the edges that make up the top and bottom of the box. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the top and bottom edges are "0.04" inches thick.

26, 27, 28 Side Thickness

These three digits will indicate the thickness of the sides of the box. Three digits must always be used. The value is expressed in 0.01" increments.

In our sample, the sides of the box are "0.02" inches thick.

6.9 PRINTING GRAPHIC IMAGES

The field format command string for printing graphic images is similar to the one for text with the exception that there is no printed data beginning with character 16. The data field becomes the letter name of the stored graphic image. This name can be up to 8 characters long. The image must already exist in either a RAM module or a flash module.

Use the following format example to represent a typical field format command string to print a stored graphic image named ARROW. Also, refer to section 9.6 of this manual.

FORMAT: 1 Y 1 1 000 0075 0050 ARROW

Note: The spaces shown in the above format are not sent to the printer. They are used in this example to separate the different field format commands for clarity.

The following paragraphs describe what each of the characters in the above format example instruct the printer to do.

CHAR # DESCRIPTION

1 Must always be a "1"

2 Graphic Selection

To select lines, this character must be an uppercase "Y".

3 Horizontal Multiplier

Any value entered will be the multiplier to the width of the graphic. This will typically be "1" when the graphic image is sized properly for the label before storing it.

Our example uses a multiplier of "1".

4 Vertical Multiplier

Any value entered will be the multiplier to the height of the graphic. This will typically be "1" when the graphic image is sized properly for the label before storing it.

Our example uses a multiplier of "1".

5, 6, 7 Must always be "000"

8 - 11 Vertical Position

The next four digits, characters 8 through 11, provide the vertical position from the home position, of the graphic to be printed. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far up" from the bottom of the label the line is to be printed.

The value of "0075" in our example will tell the printer to begin to print the image 0.75" from the bottom of the label.

12 - 15 Horizontal Position

Characters 12 through 15 are used as the horizontal offset from the home position. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch unless the toggle to metric measure has been made. This value can be thought of as "how far over" from the left edge of the label the image is to be printed.

A selection of "0050" in our format tells the printer to begin printing 0.5" from the left edge.

16 Graphic Name

The data field portion of the graphic field command is the name of the graphic as stored in RAM or flash. This can be up to 8 characters in length.

In our example, the name of the graphic image to be printed is "ARROW" so that information is included beginning with the 16 byte.

6.10 PRINTING TIME AND DATE

A time and date field may be printed anywhere on a label just like a standard text line. Only one time and date field can be printer per label. The format for the field format command is the same as a text field with the exception of the actual data. When selecting time and date to print, the data field format is <STX>Tnnn...n where "nnn..." is the desired time and date format from the following table including any spaces or punctuation marks desired terminated with <CR>.

While this feature is functional in the METTLER TOLEDO mode, it is not possible to reset the time or date without connecting a computer to the port and sending the correct commands. For this reason, it should only be used when printing in the Host mode from a computer or other programmable device.

The following chart shows the letter to select in the bottom row to obtain the format described in the top row. The letters for the format in the top row are defined below the chart.

w	W	W	W	m	m	M	M	M	M	M	M	M	M	M	d	d	y	y	y	y	h	h	H	H	n	n	a	a	j	j j
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d	e f

Character	Function	Data Printed
w	Day of Week, 1 = Monday	(1 digit)
WWW	Day Name	(3 letters)
mm	Month	(2 digits)
MMM	Month Name	(9 letters)
dd	Day of Month	(2 digits)
yyyy	Year	(4 digits)
hh	Hour in 24 hour format	(2 digits)
HH	Hour in 12 hour format	(2 digits)
nn	Minutes	(2 digits)
aa	AM or PM for 12 hour format	(2 letters)
jjj	Julian date	(3 digits)

Time and date is printed by selecting characters A-Z and a-f from the above chart to retrieve data from the printer's internal clock. In the example below, we will print time first then the date on the same line.

```
FORMAT:    1 3 1 1 000 0050 0050 <STX>TBCD GHI PQ, RSTU
```

This sample field format command would print: MON FEB 08, 1993 Note that spaces and punctuation are printed as is.

6.11 PRINTING GLOBAL REGISTERS

In section 6.3 the G<CR> label format command was discussed as a method of identifying a data field for repeat printing in additional places on the label. In order to retrieve this data and print it again, the string <STX>Sn is placed in the data location of that field. The "n" will be the letter A, B, C, etc. depending upon which global register you want to pull data from. This data may be recalled as many times as required.

EXAMPLE:
```
<STX>L<CR>
121100001000100MODEL 8865<CR>
G<CR>
1A2210502000100<STX>SA<CR>
E<CR>
```

The G<CR> command after the first field will place the string "MODEL 8865" into the next available global register, which in this case would be A since no other global registers have been used. The <STX>SA in the data location of the following field will take the data out of global register A and place it in that data field.

7. OPERATING INSTRUCTIONS

7.1 OPERATOR FRONT PANEL

The METTLER TOLEDO Model 8865 has three operator accessible keys and three indicator lights on the front panel. Inside the front door, there is an adjustment for print darkness and also a switch for thermal/thermal transfer selection.

PAUSE KEY: The PAUSE key allows the operator to stop the printing of a run of labels and then complete the job by a second depression. Activation of this key will: (1) stop the print mechanism when the label being

printed is completed, (2) turn on the PAUSE light, (3) stop the label counter, but maintain the count balance, and (4) hold all data in memory.

A second depression of the key will: (1) restart the printer, (2) print the balance of labels on the counter unless interrupted, and (3) turn off the PAUSE indicator.

PAUSE LIGHT: This indicator will turn on if any of the following occurs: (1) the PAUSE key is pressed, (2) a "media out" condition exists (the PAPER/RIBBON indicator will also light), or (3) a print job is canceled with the STOP/CANCEL key.

FEED KEY: A manual activation of the FEED key causes the paper to automatically advance to the first print position of the next label. On a new size label, two labels are usually fed before registration occurs.

STOP/CANCEL KEY: The STOP/CANCEL key allows the operator to stop and cancel a run of labels in the process of being produced, and then to continue on to the next run in the printer's buffer (if any).

PAPER/RIBBON INDICATOR: This indicator is activated when no label/ticket/tag edge and/or ribbon is detected by the photoelectric media sensors. The pause light will also turn on in this situation.

POWER SWITCH AND INDICATOR: The "power on" indicator light is turned on after the power switch on the rear of the unit is activated.

THERMAL/TRANSFER SWITCH: Located behind the front door, this slide switch should be in the OFF (left) position for direct thermal label printing, or in the ON (right) position for thermal transfer printing. When ON, it has two functions: (1) the ribbon sensor is enabled and (2) the head current (temperature) is reduced, since thermal transfer printing does not require as much heat as does direct thermal printing.

DARKNESS CONTROL: Also located behind the front door, the darkness control potentiometer is used to balance a new printhead so that it prints at the same level of darkness as the previous head.

> IMPORTANT: THIS CONTROL IS NOT INTENDED FOR USE IN ADJUSTING INDIVIDUAL LABEL PRINTING JOBS! Software control using the "H" parameter following the label formatting command <STX>L should be used to vary darkness of printing on a per-label format basis.

7.2 POWERUP SEQUENCE

When power is applied to the Model 8865 printer, several actions take place.
The switches are read and the serial port and other options described by the switches are setup as programmed.

The power indicator on the front of the printer is turned on.

An ASCII "R" (52 hex) is transmitted from the serial port to indicate the printer has been powered up. This is followed by an ASCII <DC1> (11 hex) when the printer has completed its power up sequence and is ready for data.

The printer determines if it is programmed for the Host mode or the METTLER TOLEDO mode and precedes accordingly. If in the METTLER TOLEDO mode, the letter "t" (74 hex) is transmitted out the serial port following the "R<DC1>".

7.2.1 METTLER TOLEDO Mode

If SW1-5 is in the ON position when power is applied, the printer will attempt to enter the METTLER TOLEDO mode. This requires a format with the name TOLEDO be stored in the flash module. If a flash module is not detected or a format with the name TOLEDO is not found, the printer will revert to the Host mode.

If the format TOLEDO is found, the printer loads defaults stored in the flash and enters the METTLER TOLEDO mode. The printer will then wait for data sent from a scale or other ASCII device.

7.2.2 Host Mode

If SW1-5 is OFF when power is applied, the printer will enter the Host mode and wait for commands from a computer or similar device.

7.3 CLEANING

7.3.1 Covers and Keyboard

Clean the covers and keyboard with a soft cloth that has been dampened with a mild window type cleaner. **DO NOT USE ANY TYPE OF INDUSTRIAL SOLVENT. DO NOT SPRAY CLEANER DIRECTLY ONTO THE UNIT.**

7.3.2 Printhead

It is necessary to occasionally remove contamination from the thermal printhead. The life of the 8865 printhead is directly related to how clean the printhead is kept. If the head becomes dirty from ribbon and label debris, it will decrease print quality and possibly overheat and fail.

At least every two rolls of labels, open the side door of the printer, loosen the printhead, remove the media and briskly wipe the print area with a lint-free cloth dampened with isopropyl alcohol to remove any debris. After cleaning, lower the printhead and continue normal operation.

If you are using a commercially available cleaning pen or pad, follow the directions included with the cleaning item.

7.3.3 Internal Label Area

Approximately once a month, open the side cover of the printer and clean any label dust and particles that may be lying on the base of the printer under the media supply roll. This will help keep dust and other contaminates from being transported to the print area and possibly damaging the printhead.

8.0 INTERFACING

8.1 SERIAL PORT CONFIGURATION

For both modes of operation, you must set the baud rate and ASCII character length of the interface. Make sure that the selections in the printer match the scale or host device. Refer to section 5.3 for switch descriptions.

The Model 8865 will accept either 7 bit or 8 bit data, while ignoring parity. At least one stop bit is also required. This configuration assures the greatest compatibility with most serial devices, even if the data format arrangement of the host cannot be modified. Programming switch SW1-4, located on the back panel, selects the ASCII word length.

NOTE: You must select 8 bit format mode if you wish to access the foreign language characters from the ASCII chart in section 9.1. These characters are available in fonts 1, 6 and 9.

8.2 HANDSHAKING

The 8865 supports both XON/XOFF and CTS/DTR handshaking. Whenever the printer is interfaced in a mode that will not be using the CTS/DTR pins, a jumper should be placed between pins 4 and 5 (CTS/RTS) to bypass the operation of these control lines.

For connection to most host systems, the XON/XOFF handshaking works to reduce the number of wires needed in the interface cable. For interfacing RS-422 devices, the XON/XOFF handshake is the only appropriate method.

8.3 CONNECTOR LOCATION

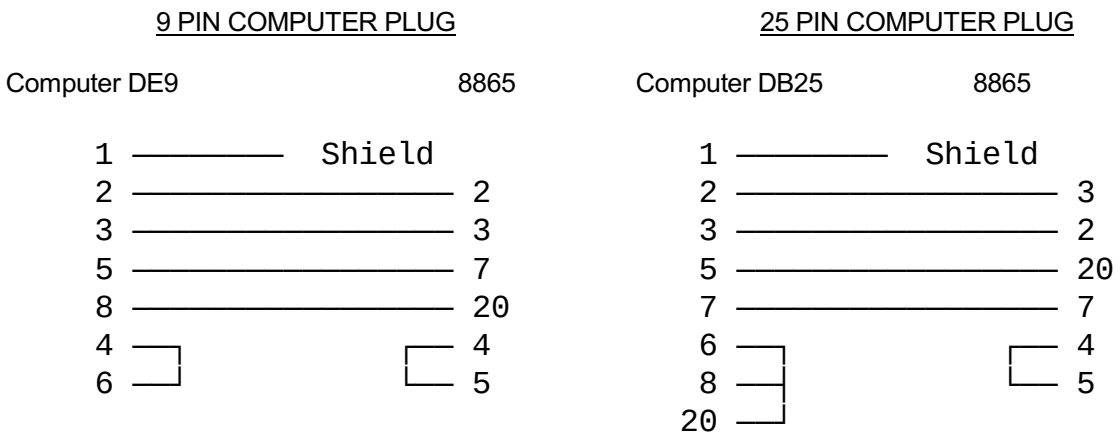
For most applications, the interface between the 8865 and the host device will be RS-232C. An interconnecting cable connects the DB-25 connector labeled J2 on the back of the printer to the serial data connector on the scale or host device. Refer to Figure 5-2-d for location of the J2 connector.

8.4 INTERCONNECTING CABLES

When using the 8865 printer in the METTLER TOLEDO mode, two cables will be utilized. The first cable will be used to connect the printer to the computer from which you are downloading the label format. After the format is stored, this cable is disconnected and the cable to the scale that will be used is connected. Both these types of cables are listed next.

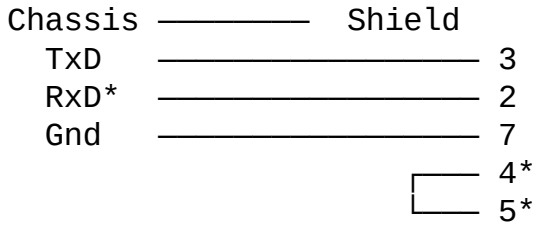
A complete listing of part numbers for interconnecting cables can be found at the end of this section.

8.4.1 Interconnect cable to computer.



8.4.2 Interconnect cable to scale.

Scale 8865



* The receive line to the scale and the handshaking lines are optional.

8.4.3 METTLER TOLEDO interconnect cable part numbers.

Use	Cable Length	Part Number	Factory Number
AT type computer (9 pin female)	6'	13604800A	0900-0277
XT type computer (25 pin female)	6'	13604700A	0900-0276
3026, 8510SS	20'	13769600A	0900-0237
XX38, 8510PM	6'	13191100A	0900-0255
8140D*, 8142D&R, 8146D, 8525*, 8530D&R, 8581*, 8582	6'	B12822000A	0900-0214
8140W*, 8142W, 8146W, 8530W	20'	12822100A	0900-0215
8520, 8522	15'	13371700A	0900-0258
8505	15'	13488900A	0900-0264
8571**, 8572	6'	13230500A	0900-0243
SM Scales	5'	33640	33640
ID1s, ID2sx, ID5***	10'	503755	503755

* - Optional RS-232 output required.
** - Cable 0900-0214 may be substituted with 8571.
*** - Option 089 required. Pin 2 must be removed from printer end of cable and shorted to pin 7.

Table 8-4 Cable Part Numbers

8.5 INPUT CHARACTER MONITOR MODE

The Model 8865 printer has a special input character monitor mode that may be useful in two different situations.

The first situation involves checking serial transmissions from the sending device to the printer.

The second situation involves monitoring data that is to be interpreted as graphic control statements.

To access this mode, perform the self-test as described in section 5.6 of this manual by holding the FEED key depressed while applying AC power. Note that 4" wide media is required for the self-test print. Do not remove power after the test is complete. The test plug shown in Figure 5-6-b must be used for the input character monitor mode to function.

After the self-test is complete, the printer automatically goes into the monitor mode. Any character received will be printed. The printer will print the data in its buffer as soon as a full line of information has been received, or after a pause of 250 ms is detected in the received data string.

The complete set of ASCII characters can be printed by the 8865 including control characters which have values ranging from 0 to 31 hex. These characters will be represented by their control codes. An ASCII <NUL> character (00 hex) has a value of 0 and is represented by a control"@" or "^@". The ASCII <SOH> character (01 hex) has a value of 1 and is represented by a "^A". The <STX> and <ETX> characters are "^B" and "^C" respectively. This pattern continues through ASCII value 31, the <US> character. Character values greater than 31 will print as the actual ASCII character. See section 9.1 for a table of ASCII character values.

When monitoring is complete, the Input Monitor mode is exited by resetting the printer (by turning the main power switch off and then back on).

8.6 TRANSMITTED PRINTER OUTPUT CODES

Several characters may be transmitted by the 8865 printer when certain conditions exist. All of these do not necessarily indicate a problem. Handshaking lines or a jumper between pins 4 and 5 at the printer end of the interconnecting cable must be used in order to allow the printer to send these characters. The list below indicates these codes and their probable cause.

<DC1> Typically follows the "R" code to indicate the printer is ready for data.

<RS> Feedback character that can be sent after each label has printed. The system command <STX>a enables this feature.

<US> Feedback character that can be sent after each batch of labels has printed. The system command <STX>a enables this feature.

c Printer received a data byte from the host that contains a framing error (corrupted) usually due to noise.

R The printer has been powered up.

t The METTLER TOLEDO mode has been entered either at powerup or with the <STX>i command.

v The input buffer has overflown. Try utilizing handshaking or XON/XOFF protocol.

Y This letter will be transmitted in response to the <STX>k system command. It is used as a test for verifying operation of the serial port.

9. CHARACTER, FONT AND BAR CODE DESCRIPTIONS

9.1 ASCII CONTROL AND CHARACTER CHART

The following charts give the decimal (Dec.) and hexidecimal (Hex.) value for each printable character and control characters from 00 to 15F hex. This includes all the international characters.

Char.	Dec.	Hex.
NUL	0	00
SOH	1	01
STX	2	02
ETX	3	03
EOT	4	04
ENQ	5	05
ACK	6	06
BEL	7	07
BS	8	08
HT	9	09
LF	10	0A
VT	11	0B
FF	12	0C
CR	13	0D
SO	14	0E
SI	15	0F
DLE	16	10
DC1	17	11
DC2	18	12
DC3	19	13
DC4	20	14
NAK	21	15
SYN	22	16
ETB	23	17
CAN	24	18
EM	25	19
SUB	26	1A
ESC	27	1B
FS	28	1C
GS	29	1D
RS	30	1E
US	31	1F

Char.	Dec.	Hex
SP	32	20
!	33	21
"	34	22
#	35	23
$	36	24
%	37	25
&	38	26
'	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
,	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D
>	62	3E
?	63	3F

Char.	Dec.	Hex.
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D
^	94	5E
_	95	5F

Char.	Dec.	Hex.
`	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F
p	112	70
q	113	71
r	114	72
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
|	124	7C
}	125	7D
~	126	7E
	127	7F

ASCII CONTROL AND CHARACTER CHART (continued)

Char.	Dec.	Hex.
Ç	128	80
ü	129	81
é	130	82
â	131	83
ä	132	84
à	133	85
å	134	86
ç	135	87
ê	136	88
ë	137	89
è	138	8A
ï	139	8B
î	140	8C
ì	141	8D
Ä	142	8E
Å	143	8F
É	144	90
æ	145	91
Æ	146	92
ô	147	93
ö	148	94
ò	149	95
û	150	96
ù	151	97
ÿ	152	98
Ö	153	99
Ü	154	9A
ø	155	9B
£	156	9C
Ø	157	9D
×	158	9E
ƒ	159	9F

Char.	Dec.	Hex
á	160	100
í	161	101
ó	162	102
ú	163	103
ñ	164	104
Ñ	165	105
ª	166	106
º	167	107
¿	168	108
®	169	109
	170	10A
½	171	10B
¼	172	10C
¡	173	10D
	174	10E
	175	10F
	176	110
	177	111
	178	112
	179	113
	180	114
Á	181	115
Â	182	116
À	183	117
©	184	118
	185	119
	186	11A
	187	11B
	188	11C
¢	189	11D
¥	190	11E
	191	11F

Char.	Dec.	Hex.
	192	120
	193	121
	194	122
	195	123
	196	124
	197	125
ã	198	126
Ã	199	127
	200	128
	201	129
	202	12A
	203	12B
	204	12C
	205	12D
	206	12E
	207	12F
ð	208	130
Ð	209	131
Ê	210	132
Ë	211	133
È	212	134
8	213	135
Í	214	136
Î	215	137
Ï	216	138
	217	139
	218	13A
	219	13B
	220	13C
	221	13D
Ì	222	13E
	223	13F

Char.	Dec.	Hex.
Ó	224	140
ß	225	141
Ô	226	142
Ò	227	143
õ	228	144
Õ	229	145
l	230	146
þ	231	147
Þ	232	148
Ú	233	149
Û	234	14A
Ù	235	14B
ý	236	14C
Ý	237	14D
	238	14E
	239	14F
	240	150
±	241	151
	242	152
¾	243	153
	244	154
	245	155
÷	246	156
2	247	157
/	248	158
(	249	159
0	250	15A
	251	15B
	252	15C
	253	15D
	254	15E
	255	15F

9.2 HUMAN READABLE FONTS

The second character sent in the print field format commands selects the desired font to print. Nine internal fonts (0 - 8) are shown next with examples of different vertical and horizontal multipliers. These examples show the same value used for both vertical and horizontal multipliers (shown in parenthesis). You may select different numbers for the horizonal multiplier than was selected for the vertical multiplier. The CG Truimvirate™ font is described in the following section 9.3.

All examples are printed with a 5 x 5 mil pixel size. This is accomplished using the D11 label formatting command after the <STX>L (Enter Label Formatting Mode) command. Sample prints with values from 1 to 9 are shown for both vertical and horizontal multipliers for font 0 through font 8. All these sizes may be doubled by selecting the D22 label format command instead of the D11.

Font **Explanation**

0 Identifies a 96-character alphanumeric font. All characters are 7 dots high, 5 dots wide, with 1 dot spacing which equates to 33.84 cpi at a height of 0.035".

Characters: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | } ~ 0123456789
abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ

(1 x 1) ABC123

(2 x 2) ABC123

(3 x 3) ABC123

(4 x 4) ABC123

(5 x 5) ABC123

(6 x 6) ABC123

(7 x 7) ABC123

(8 x 8) ABC123

(9 x 9) ABC123

1 Identifies a 145-character alphanumeric font that includes several special and international characters. All characters are 13 dots high, 7 dots wide, with 2 dots spacing. This provides 22.56 cpi at a 0.065" height.

Characters: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | } ~ 0123456789
abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ
â ä à á å ÅÄ ê ë è é É ï ì í î f ô ö ò ó ø ØÖ û ü ù ú Ü ÿ æ Æ ª º çÇñÑß£ƒ×½¼¿®«»

(1 x 1)ABC123

(2 x 2)ABC123

(3 x 3)ABC123

(4 x 4)ABC123

(5 x 5)ABC123

(6 x 6)ABC123

(7 x 7)ABC123

(8 x 8)ABC123

(9X9)ABC123

2: Identifies a 138-character alphanumeric font. Characters are 18 dots high, 10 dots wide, with 2 dots spacing which provides 16.92 cpi at a height of 0.09".

Characters: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ` { | } ~ 0123456789
abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ
â ä à á å ÅÄ ê ë è é É ï ì í î ô ö ò ó ø ÖØ û ü ù ú Ü ÿ æ Æ ª º çÇñÑß£ƒ×½¼¿

(1 x 1)ABC123

(2 x 2)ABC123

(3 x 3)ABC123

(4 x 4) ABC123

(5 x 5)ABC123

(6 x 6)ABC123

(7 x 7)ABC123

(8 x 8)ABC123

(9 x 9)ABC123

3: Identifies a 62-character alphanumeric font with uppercase letters only. Characters are 27 dots high, 14 dots wide, with 2 dots spacing which equates to 12.69 cpi at 0.135" height.

Characters: # $ % & ( ) * + , - . / : 0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ Å Ä É Ö Ø Ü Æ Ç Ñ ß £ ¿

(1 x 1ABC123

(2 x 2)ABC123

(3 x 3)ABC123

(4 x 4) ABC123

(5 x 5)ABC123

(6 x 6) ABC12

(7 x7)ABC123

(8 x 8)ABC123

(9 x 9)ABC123

4: Identifies a 62-character alphanumeric font with uppercase letters only. Characters are 36 dots high, 18 dots wide, with 3 dots spacing. This provides 9.67 cpi at a height of 0.18".

Characters: # $ % & ( ) * + , - . / : 0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ Å Ä É Ö Ø Ü Æ Ç Ñ ß £ ¿

(1 x 1)ABC123

(2 x 2) ABC123 (7 x 7) ABC1

(3 x 3)ABC123

(4 x 4)ABC123 (8 x 8)ABC1

(5 x 5)ABC1

(6 x 6)ABC1 (9 x 9)ABC

5: Identifies a 62-character alphanumeric font, uppercase only. The characters are 52 dots high, 18 dots wide, with 3 dots spacing giving 9.67 cpi with a height of 0.26".

Characters: # $ % & ( ) * + , - . / : 0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ Å Ä É Ö Ø Ü Æ Ç Ñ ß £ ¿

(1 x 1)ABC123

(2 x 2)ABC123

(7 x 7)ABC1

(3 x 3)ABC123

(4 x 4) ABC12

(8 x 8)ABC1

(5 x 5)ABC1

(6 x 6) ABC1

(9 x 9)ABC

6: Identifies a 62-character alphanumeric font, uppercase only. All characters are 64 dots high, 32 dots wide, with 4 dots spacing. This gives 5.64 cpi with a height of 0.32".

Characters: # $ % & ( ) * + , - . / : 0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ Å Ä É Ö Ø Ü Æ Ç Ñ ß £ ¿

(1 x 1)ABC123

(2 x 2) ABC123

(3 x 3)ABC1

(4X4)ABC

(5 x 5)AB

(6 x 6)AB

(7 x7) AB

(8 x 8)AB

(9 x 9)AB

7: Identifies a font that prints OCR-A, size I. Characters are 32 dots high, 15 dots wide, with 5 dots spacing providing 10.15 cpi at a 0.16" height.

Characters: # $ % & ( ) * + , - . / : ; = " { } ? ' ^ [ ] < > ! @ \ 0123456789
abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ

(1 x 1)

(2 x 2)

(7 x 7)

(3 x 3)

(4 x 4)

(8 x 8)

(5 x 5)

(6 x 6) (9 x 9)

8: Identifies a font that prints OCR-B, size III. Characters are 28 dots high, 15 dots wide, with 5 dots spacing. This equates to 10.15 cpi at a height of 0.14"

Characters: + < > | 0 1 2 3 4 5 6 7 8 9 C E N S T X Z

(1 x 1)

(2 x 2)

(7 x7)

(3 x 3)

(4 x 4)

(8 x 8)

(5 x 5)

(6 x 6) (9 x 9)

9.3 CG TRIUMVIRATE™ FONT

The second character sent in the print field format commands selects the desired font for printing. A value of 9 in this position selects the internal CG Triumvirate™ font. There are 10 different point sizes selectable each with vertical and horizontal multipliers. The examples shown use a multiplier of 1. The same value must be used for both vertical and horizontal multipliers.

All examples are printed with a 5 x 5 mil pixel size. This is accomplished using the D11 label formatting command after the <STX>L (Enter Label Formatting Mode) command. All these sizes may be doubled by selecting the D22 label format command instead of the D11. Sample prints with values from 1 to 10 (for characters 5, 6 and 7 in the field format commands) are shown for the various point size selections. Each of these examples may be enlarged if a value other than 1 is entered for the vertical and horizontal multipliers.

Font — Explanation

9: This code identifies the internal Triumvirate font. The point sizes are selected by the number entered in characters 5, 6,and 7 of the print field format command line. Point sizes vary from 6 pt to 48 pt.

Characters: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | } ~ ± ÷ 0 ¢
0123456789abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ
â ä à á å ã Å Ä À Â Á Ã è é É Ê Ë È ï ì í î f Í Î Ï Ì ô ö ò ó ø õ Ö Ø Ô Ò Õ
û ü ù ú Ü Û Ù Ú ÿ ý Ý æ Æ Ç ñ ß £ ƒ × ¥ Ð ð 1 Þ þ (0 2 ¡ ½ ¼ ¾ ® ©

(001 - 6 pt.) ABC123

(002 - 8 pt.) ABC123

(003 - 10 pt.) ABC123

(004 - 12 pt.) ABC123

(005 - 14 pt.) ABC123

(006 - 18 pt.) ABC123

(007 - 24 pt.) ABC123

(008 - 30 pt.) ABC123

(009 - 36 pt.) ABC123

(010 - 48 pt.) ABC123

9.4 BAR CODES

The second character sent in the print field format commands can select different bar codes to print. There are 15 types of bar codes to select from either with or without printed human readable interpretation. Uppercase letters select the printing of human readable data while lowercase letters inhibit the print of the human readable data. The height of the bar code is adjustable using characters 5, 6, and 7 of the field formatting command line.

Most examples are printed with a 5 x 5 mil pixel size. This is accomplished using the D11 label formatting command after the <STX>L (Enter Label Formatting Mode) command. Some examples use a 10 mil x 10 mil pixel size by selecting the D22 label format command instead of D11.

The dot size (D11 or D22) and the bar code ratio required for each bar code is determined by the limitations of the print media and also the scanning device that will scan the bar code. Typically, the width of the narrow element is specified with the ratio of wide to narrow elements. To calculate the actual element width of ratio based bar codes, multiply the dot size selected (1 for D11 or 2 for D22) by the ratio number (1 for narrow and 3 for wide on a 3:1 ratio) by the print head dot width of 0.005" (0.125 mm).

Typical medium density bar code scanners can scan a narrow element of either 0.01" (0.25 mm) or 0.015" (0.375 mm) without difficulty. There are high density scanners available that can scan elements down to 0.005" (0.125 mm).

Barcode **Explanation**

A: This selects Code 39 bar code which is ratio based. Ratio based means that the wide elements are a ratio in width of the narrow elements. This ratio is selected using the 2nd and 3rd characters in the print field format command. Code 39's normal wide to narrow bar ratio is 3:1. Code 39 is an uppercase, alphanumeric bar code that is variable in length. Start and stop characters are automatically added by the printer before printing.

Characters: <sp> $ % * + - / 0123456789 ABCDEFGHIJKLMNOPQRSTUVWXYZ

D11, 9:3 Ratio
Narrow - 0.015" Wide - 0.045"

D22, 3:1 Ratio
Narrow - 0.01" Wide - 0.03"

D22, 6:2 Ratio
Narrow - 0.02" Wide - 0.06"

D22, 5:2 Ratio
Narrow - 0.02" Wide - 0.05"

B: This selects the UPC-A bar code, a numeric-only bar code with a fixed length of 12 characters. Eleven digits are supplied by the scale or host, the 12th digit (check digit) is supplied by the printer. If the 12th digit is sent by the host, the printer will check that character against the calculated checksum and will print the bar code as all zeros if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. A maximum of 10 bar codes per label can be printed.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

Option V: This selects Random Weight UPC bar code. The seventh digit supplied by the host or application software must be an uppercase "V" followed by 4 digits of weight information. The eleventh digit (checksum) is supplied by the printer.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

C: The code C selects the truncated UPC-E bar code. This is a numeric-only bar code with a fixed length of 7 characters. Six digits are supplied by the scale or host and the 7th digit (checksum) is supplied by the printer. If the 7th digit is sent by the host, the printer will check that character against its calculated checksum and will print the bar code as all zeroes if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

D: This selects the Interleaved 2 of 5 bar code. Interleaved 2 of 5 is a numeric-only code that is ratio based. Code 2 of 5i's normal wide to narrow bar ratio is 5:2. A maximum of 8 bar codes per label can be printed. Codes J and L also select variations of the Interleaved 2 of 5 bar code.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 9:3 Ratio
Narrow - 0.015" Wide 0.045"

D22, 5:2 Ratio
Narrow - 0.02" Wide - 0.05"

E: This selects Code 128 variable length bar code with modulo 103 checksum calculation. Code 128 can encode the entire 128 ASCII character set, including both uppercase and lowercase alpha characters. Code 128 is an element based bar code similar to UPC fonts, therefore ratios must be equal to one. The valid ratios are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8.

The 8865 supports Code 128 Code Subset A, B, and C. You can select the printer to start on any code subset and switch to another within the data area (default is subset B).

Subset A includes all of the standard upper case alphanumeric keyboard characters plus the control and special characters. To select Subset A, preceed the data to be encoded with an ASCII A (41 hex).

Subset B includes all of the standard upper case alphanumeric keyboard characters plus lower case alphabetic and special characters. To select Subset B, preceed the data to be encoded with an ASCII B (42 hex). If no start character is sent for Code 128, Subset B will be selected by default.

Subset C includes the set of 100 digit pairs from 00 through 99 inclusive, as well as special characters. This subset is used for double density encoding of numeric data. To select Subset C, preceed the data to be encoded with an ASCII C (43 hex). You must not try to encode alpha data if you select Subset C.

Special Character Handling

Characters above ASCII value 95 are considered special characters. To access these values, a two character reference table has been built into the printer. The following table describes this reference.

ASCII	2 CHARACTERS	SUBSET A	SUBSET B	SUBSET C

96	&A	FNC3	FNC3	N/A
97	&B	FNC2	FNC2	N/A
98	&C	SHIFT	SHIFT	N/A
99	&D	SUBSET C	SUBSET C	N/A
100	&E	SUBSET B	FNC4	SUBSET B
101	&F	FNC4	SUBSET A	SUBSET A
102	&G	FNC1	FNC1	FNC1

As an example, to get FNC2 to be encoded into a Subset A bar code, send an ASCII & (26 hex) followed by an ASCII B (41 hex).

Example: ATEST&B123
Data Encoded: TEST<FNC2>123

Control Codes

Control characters can be encoded into Subset A by sending the lowercase ASCII characters "a" through "z" where "a" = SOH (01 hex), "b" = STX (02 hex), "c" = ETX (03 hex) and so on.

Font Sizing

Font sizing for Code 128 on rotation #2 is not consistent because of the variable character code to character correlation. This means the row address may have to be adjusted to place the field properly.

D11, 2:2 Ratio
Narrow - 0.01"

D11, 3:3 Ratio
Narrow - 0.015"

F: This font selects the standard EAN-13 bar code. This is a numeric-only bar code, fixed in length. Twelve digits are supplied by the scale or host and the 13th digit (checksum) is supplied by the printer. If the 13th digit is sent by the host, the printer will check that character against its calculated checksum and will print the bar code as all zero if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify the size of the elements since EAN type bar codes are element based and not ratio based. A maximum of 12 bar codes can be printed per label.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

G: This selects the truncated EAN-8 bar code. This is a numeric-only bar code, fixed in length. Seven digits are supplied by the scale or host and the 8th digit (checksum) is supplied by the printer. If the 8th digit is sent by the host, the printer will check that character against its calculated checksum and will print the bar code as all zero if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since EAN type bar codes are element based and not ratio based.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

H: This font selects the HIBC (modulo 43 checksum) version of code 39 bar code. The checksum will be placed at the end of the data string that is received from the host. The host device must supply the leading "+"s to identify the data format type. This code is an uppercase, alphanumeric bar code that is variable in length. Code 39's normal wide to narrow bar ratio is 3:1.

Characters: <sp> $ % & ' * + - / 0123456789 ABCDEFGHIJKLMNOPQRSTUVWXYZ

D22, 3:1 Ratio
Narrow - 0.01" Wide - 0.03"

D11, 9:3 Ratio
Narrow - 0.015" Wide - 0.045"

I: This selects the 20-character CODABAR bar code. CODABAR is ratio based numeric bar code plus some special start and stop characters. The length of the code is variable and is normally printed with a 3:1 ratio. CODABAR needs both start and stop characters.

Characters: $ + - . / : 0123456789 ABCD

D22, 3:1 Ratio
Narrow - 0.01" Wide - 0.03"

D11, 9:3 Ratio
Narrow - 0.015 Wide - 0.045"

J: This selects the ratio based Interleaved 2 of 5 bar code with modulo 10 checksum calculation. Code 2 of 5i's normal wide to narrow bar ratio is 5:2. Fonts D and L also print different forms of the 2 of 5i bar code. A maximum of 8 bar codes can be printed per label.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 9:3 Ratio
Narrow - 0.015" Wide - 0.045"

D22, 5:2 Ratio
Narrow - 0.02" Wide - 0.05"

K: This selects the ratio based MSI Plessey bar code which contains a modulus 10 checksum digit.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 9:3 Ratio
Narrow - 0.015" Wide - 0.045"

D22, 6:2 Ratio
Narrow - 0.02" Wide - 0.06"

L: This code selects an Interleaved 2 of 5 bar code with modulo 10 checksum (UPC shipping container symbology). This ratio based code does the special human readable formatting under the bar code and adds bearer bars to the top and bottom of bars when encoding 13 digits. Interleaved 2 of 5's normal wide to narrow bar ratio is 5:2. Fonts D and L also print different forms of the 2 of 5i bar code. A maximum of 8 bar codes per label can be printed.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 9:3 Ratio
Narrow - 0.015" Wide - 0.045"

D22, 5:2 Ratio
Narrow - 0.02" Wide - 0.05"

M: This selects the 2 digit addendum code for UPC fonts. It is a numeric-only bar code with a fixed length of 3 characters. Two characters supplied by the host or application software, the third digit (checksum) is supplied by the printer. If the third digit is sent by the host, the printer will check that character against its calculated checksum and will print the bar code as all zeroes if they do not match. This is an addendum code for fonts B, C, F, and G. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. This bar code must be placed after the UPC/EAN code manually. This code should be placed 9 modulus away from the end of preceding bar code.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

N: This code selects the 5 digit addendum code for UPC fonts. It is a numeric-only bar code with a fixed length of 6 characters. Four characters are supplied by the scale or host and the sixth digit (checksum) is supplied by the printer. If the sixth digit is sent by the host, the printer will check that character against its calculated checksum and will print the bar code as all zero if they do not match. This is an addendum code for fonts B, C, F, and G. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. This code must be placed after the UPC/EAN code manually. It should be placed 9 modulus away from the end of preceding bar code.

In order to print 100% UPC bar code sizes, a lower density printhead is required (6 dots/mm). The 8865 can print either 113% bar code widths or 76% bar code widths. The actual bar coded characters are the same - only the widths of the elements vary slightly.

Characters: 0 1 2 3 4 5 6 7 8 9

D11, 3:3 Ratio (113% UPC)

D11, 2:2 Ratio (76% UPC)

O: This selects Code 93 bar code. Code 93 is an upper and lower case alphanumeric bar code. The normal ratios that the printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These numbers actually specify size of magnification and are element based; not ratio based.

Characters: : , & # 0 $ % * + - . / 0123456789
abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ

D11, 3:3 Ratio

D22, 2:2 Ratio

9.5 DOWNLOADING FONTS

The purpose of these commands is to download user selected fonts to a RAM or flash module. Each of these commands are preceeded by the ASCII character <ESC> (1B hex) which represents the control character "escape". Downloading soft fonts requires use of HP LaserJet[1] II (PCL-4) language. For additional information on font description and bitmap format, please contact your local authorized METTLER TOLEDO representative.

COMMAND	DESCRIPTION
*c###D Assign Font ID	Where ### is the font ID. The numbers 000 through 099 are reserved for resident fonts of the CG Triumvirate font. Numbers 100 through 999 are available for fonts stored in memory modules.
)s#Wnn...n	Font Descriptor Where # is the number of bytes for the font descriptor data and nn...n is the actual font descriptor data.
*c#E	Character Code Where # is the ASCII value for next character to be downloaded.
(s#Wnn...n	Download Character Where # is the number of bytes of bitmap data and nn...n is the actual bitmap data.

10. SAMPLE LABEL FORMATS

The 8865 Label printer is capable of printing an unlimited number of label formats. Labels can be printed in the METTLER TOLEDO mode or the Host mode. The formatting commands are similar; however, they are used differently in the two modes.

10.1 EXAMPLES OF METTLER TOLEDO MODE

The METTLER TOLEDO mode is for use with METTLER TOLEDO products or any other device that transmits serial ASCII data with each line terminated by <CR><LF>. In order to use this mode, a format must be stored in the flash memory module with the name "TOLEDO". This format may be the factory default or a custom format downloaded in the host mode or from the MT label design package.

The printer is connected to a PC in order to design a label for the customer. METTLER TOLEDO offers its own WYSIWYG program that makes this a very simple procedure. Other commercially available programs can be used if allow modification of the format string before sending the data to the printer.

All limitations that apply to a label format used in the Host mode apply to the MT mode. This includes up to 200 format lines per label and one type of bar code can be used only 8 times per label.

When producing the label format, any data field to be replaced with a field of data from a scale should be filled with the number "9" up to the maximum number of characters that will be sent from the scale. Any data field that is not filled with 9's will print normally as a constant field. All characters for the data field in the label format must be 9's if you want it to be a replaceable field. If there are any other character included in the data field with the 9's, those exact characters will be printed and it will not be treated as a replaceable field. These fields are filled with scale data in the order they appear in the actual label format - not necessarily where they appear on the label. Lines and boxes may be added as desired. Duplication of a field is possible using the global register fill command "G".

When designing the label, keep in mind that the number of characters allowed for replaceable data (the number of 9's) is the maximum number of characters that can print for that field. Shortening the number of 9's to a number fewer than the characters to be received allows stripping off trailing characters. There is no way to strip leading characters.

The final step of the label design process is to store the label format in the flash module with the name "TOLEDO". No other format name will work when the printer is in the MT mode.

With the desired format stored, the computer is disconnected from the printer and the printer is then connected to the scale. The scale must be set up for multiple line output. Each line of data output from the scale fills a data field on the label format that had all 9's in it. Other lines from the format are printed normally.

The lines of data from the scale are inserted in the label format in the order that they appear in the label format. If you are going to send gross, tare and net weights, your label design must have definition of the gross weight field first then the tare then the net. If this isn't done, the fields will not appear in the desired location when printed.

In order to store data to the flash module, the printer must be in the Host mode. This can be accomplished by either changing programming switch SW1-5 or with ASCII commands. System commands have been added to the software to allow switching between Host mode and MT mode and also for communication purposes. These commands are:

<STX>i - Go into MT mode from Host mode
<ESC>E - Exit the MT mode and go into the Host mode
<ESC>z - Ask printer for its status while in MT mode
<STX>z - Ask printer for its status while in Host mode

If a label format is designed for four lines of data, and only three are sent from the scale, the printer will print after a timeout. The 8865 will wait approximately 400 ms after receiving the last characters before automatically initiating a print. Only three lines will be printed and they will print in the first three replaceable fields in the label format.

Most system and label format commands are stored with the label format in the flash. This includes continuous paper length (<STX>cnnnn), label sensor type (<STX>e or <STX>r), cutter timing (<STX>Hnnn), maximum label length (<STX>Mnnnn), label feed out distance (<STX>fnnn), form edge offset (<STX>Onnnn), dot buffer size (<STX>d or <STX>s), print speed (<STX>P), heat adjustment (after <STX>L - Hnn), and vertical dot size (after <STX>L - Dnn).

The quantity command (after <STX>L - Qnnnn) only works properly in the Host mode when the complete format is downloaded to the printer. In order to print two labels in the MT mode, it is necessary to format two labels as one and use global registers to repeat the data.

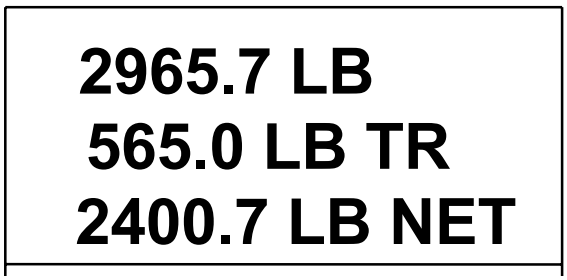
In the examples below, all lines are terminated by a <CR>, although not shown. Spaces have been added for clarity.

10.1.1 Default Label

The factory default label format shown below will print three, sixteen character fields sent from any serial ASCII device. A description of each formatting command line is given following it. A sample data transmission that would be appropriate for the format is also shown.

<STX> e
<STX> M1000
<STX> s
<STX> O0110

<STX> f136
<STX> L
D11
H10
PD
SO
1244000016900229999999999999999
1244000010400229999999999999999
1244000003900229999999999999999
1X1100000290017B392190001001
191100100100084Printed by a METTLER TOLEDO Model 8865 Programmable Printer
sATOLEDO



Printed by a METTLER TOLEDO Model 8865 Programmable Printer

System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set label feed out distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

1 2 4 4 000 0169 0022 9999999999999999
1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0169: Row address of 1.69" up from bottom of label
0022: Column address of 0.22" from left edge of label
9..9: Replaceable field length of 16 characters

1 2 4 4 000 0104 0022 9999999999999999
1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0104: Row address of 1.04" up from bottom of label
0022: Column address of 0.22" from left edge of label
9..9: Replaceable field length of 16 characters

1 2 4 4 000 0039 0022 9999999999999999

1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0039: Row address of 0.39" up from bottom of label
0022: Column address of 0.22" from left edge of label
9..9: Replaceable field length of 16 characters

Print Field Format Commands (continued)

1 X 1 1 000 0029 0017 B 392 190 001 001

1: Rotation of 00
X: Must be X when defining box
1: Must be 1 when defining box
1: Must be 1 when defining box
000: Must be 000 when defining box
0029: Row address of 0.29" up from bottom of label
0017: Column address of 0.17" from left edge of label
B: 'Box' designation
392: Horizontal width of box
190: Vertical height of box
001: Thickness of bottom and top edges
001: Thickness of sides of box

1 9 1 1 001 0010 0084 Printed by a METTLER TOLEDO ...

1: Rotation of 00
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
001: Point size of 8 selected
0010: Row address of 0.10" up from bottom of label
0084: Column address of 0.84" from left edge of label
P...: Constant Data field to be printed

sATOLEDO Save format called 'TOLEDO' to slot 'A'(flash)

Typical Data Transmission
(from METTLER TOLEDO 8142)

<STX><SP>2965.7<SP>LB<CR><LF>
<SP><SP>565.0<SP>LB<SP>TR<CR><LF>
<SP><SP>2400.7<SP>LB<SP>NET<CR><LF>

10.1.2 Fields Printed Multiple Times

The label format shown below will print three fields as text, then repeat each field printed in bar code format. A description of each formatting command line is given in the following pages. A sample data transmission that would be appropriate for the format is also shown.

<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
D11
H10
PD

SO
391100700420340999999999999999
G
39110070082034099999999999999
G
391100701220340999999999
G
3A6305002120360<STX>SA
3A6305002920360<STX>SB
3A6305003720360<STX>SC
sATOLEDO

1234567890123456
35.62 LB NET
2478 PCS

System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set Label Feed Out Distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

3 9 1 1 007 0042 0340 9999999999999999
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0042: Row address of 0.42" up from bottom of label
0340: Column address of 3.40" from left edge of label
9..9: Replaceable field length of 16 characters

G
G: Place data from preceding line in global register A(first register)

3 9 1 1 007 0082 0340 999999999999999
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0082: Row address of 0.82" up from bottom of label
0340: Column address of 3.40" from left edge of label
9..9: Replaceable field length of 15 characters

G
G: Place data from preceding line in global register B (second register)

3 9 1 1 007 0122 0340 9999999999
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0122: Row address of 1.22" up from bottom of label
0340: Column address of 3.40" from left edge of label
9..9: Replaceable field length of 10 characters

G
G: Place data from preceding line in global register C(third register)

Print Field Format Commands (continued)

3 A 6 3 050 0212 0360 <STX>SA

3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0212: Row address of 2.12" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SA: Data from Global register A

3 A 6 3 050 0292 0360 <STX>SB
3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0292: Row address of 2.92" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SB: Data from Global register B

3 A 6 3 050 0372 0360 <STX>SC
3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0372: Row address of 3.72" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SC: Data from Global register C

sATOLEDO Save format called 'TOLEDO' to slot 'A'(flash)

Typical Data Transmission
(from METTLER TOLEDO 8572)

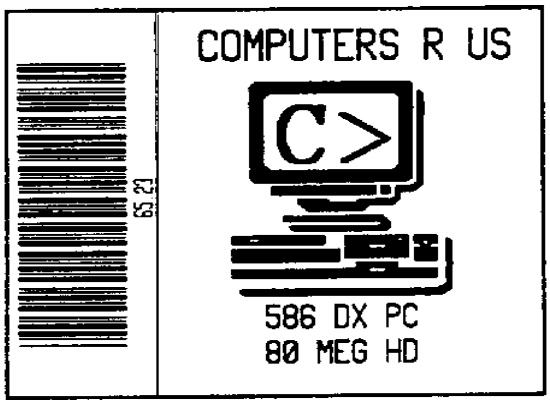
<STX>1234567890123456<CR><LF>
<SP><SP><SP>35.62<SP>LB<SP>NET<CR><LF>
<SP><SP>2478<SP>PCS<CR><LF>

10.1.3 Graphic Field Printing

The command string shown below store a label format with a graphic image, a bar code field, and other various fields. A description of each formatting command line is given following. In this example, the graphics image is recalled from the flash memory. Following the description is an example a data transmission that would be appropriate for the format.

<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
D11
H10
PD
SO
341100000400030COMPUTERS R US
1Y1100000500180COMP
331100001900270586 DX PC
33110000210027080 MEG HD
2A620500200032099999999
1X1100000100140B250220002002

1X1100000120320L001216
sATOLEDO



System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set Label Feed Out Distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

3 4 1 1 000 0040 0030 COMPUTERS R US
- 3: Rotation of 270
- 4: Font 4 selected
- 1: Horizontal multiplier of 1
- 1: Vertical multiplier of 1
- 000: Must be 000 when using font 4
- 0040: Row address of 0.40" up from bottom of label
- 0030: Column address of 0.30" from left edge of label
- C...: Constant text field

1 Y 1 1 000 0050 0180 COMP
- 1: Rotation of 0
- Y: Must be Y when specifying graphic image
- 1: Horizontal multiplier of 1
- 1: Vertical multiplier of 1
- 000: Must be 000 when specifying graphic image
- 0050: Row address of 0.50" up from bottom of label
- 0180: Column address of 1.80" from left edge of label
- COMP: Graphic image title

3 3 1 1 000 0190 0270 586 DX PC
- 3: Rotation of 270
- 3: Font 3 selected
- 1: Horizontal multiplier of 1
- 1: Vertical multiplier of 1

000: Must be 000 when using font 3
0050: Row address of 0.50" up from bottom of label
0180: Column address of 1.80" from left edge of label
58..: Constant text field

3 3 1 1 000 0210 0270 80 MEG HD
3: Rotation of 270
3: Font 3 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
000: Must be 000 when using font 3
0210: Row address of 0.50" up from bottom of label
0270: Column address of 1.80" from left edge of label
80..: Constant text field

Print Field Format Commands (continued)

2 A 6 2 050 0200 0320 99999999
2: Rotation of 180
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
2: Bar Code Narrow Bar Width set to 0.010"
050: Bar Code Height set to 0.50"
0200: Row address of 2.00" up from bottom of label
0320: Column address of 3.20" from left edge of label
9..9: Replaceable field length of 8 characters
Actual field length sent is 11 - last 3 characters are stripped off.

1 X 1 1 000 0010 0140 B 250 220 002 002
1: Rotation of 0
X: Must be X when defining box
1: Must be 1 when defining box
1: Must be 1 when defining box
000: Must be 000 when defining box
0010: Row address of 0.10" up from bottom of label
0140: Column address of 1.40" from left edge of label
B: 'Box' designation
250: Horizontal width of box
220: Vertical height of box
002: Thickness of bottom and top edges
002: Thickness of sides of box

1 X 1 1 000 0012 0320 L 001 216
1: Rotation of 0
X: Must be X when defining line
1: Must be 1 when defining line
1: Must be 1 when defining line
000: Must be 000 when defining line
0012: Row address of 0.12" up from bottom of label
0320: Column address of 3.20" from left edge of label
L: 'Line' designation
001: Horizontal width of line
216: Vertical height of line

sATOLEDO Save format called 'TOLEDO' to slot 'A'(flash)

Typical Data Transmission
(from METTLER TOLEDO 8142)

<STX><SP><SP><SP>65.23 LB<CR><LF>

10.2 HOST MODE

The host mode is for use with devices that are dedicated controllers. These devices need to be programmable in order to send the appropriate control characters for a particular label. When this mode is used, the flash memory module (0901-0326) is not necessarily required.

10.2.1 Sample Label

The following command string is an example of a format sent from a host device. In this case the entire label format is sent from the host device, therefore no flash memory module is needed. The label format shown below will print three lines of text. A description of each formatting command line is given in the following pages.

```
<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
      D11
      H10
      PD
      SO
      124400001690022THIS IS A TEST
      124400001040022OF THE 8865
      124400000390022IN THE HOST MODE
      E
```

THIS IS A TEST
OF THE 8865
IN THE HOST MODE

System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set label feed out distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

1 2 4 4 000 0169 0022 THIS A TEST
1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0169: Row address of 1.69" up from bottom of label
0022: Column address of 0.22" from left edge of label
TH..: Text field

1 2 4 4 000 0104 0022 OF THE 8865
1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0104: Row address of 1.04" up from bottom of label
0022: Column address of 0.22" from left edge of label
OF..:Text Field

1 2 4 4 000 0039 0022 IN THE HOST MODE
1: Rotation of 00
2: Font 2 selected
4: Horizontal multiplier of 4
4: Vertical multiplier of 4
000: Must be 000 when using font 2
0039: Row address of 0.39" up from bottom of label
0022: Column address of 0.22" from left edge of label
IN..: Text Field

E Exit formatting commands and print label

10.2.2 Fields Printed Multiple Times

The command string shown below will print a label with three text fields, then repeat each field printed in bar code format. A description of each formatting command line is given in the following pages.

```
<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
        D11
        H10
        PD
        SO
        391100700420340GLOBAL
        G
        391100700820340REGISTER
        G
        391100701220340EXAMPLE
        G
        3A6305002120360<STX>SA
        3A6305002920360<STX>SB
        3A6305003720360<STX>SC
        E
```

System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set Label Feed Out Distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

3 9 1 1 007 0042 0340 GLOBAL
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0042: Row address of 0.42" up from bottom of label
0340: Column address of 3.40" from left edge of label
GL..:Text field

G
G: Place data from preceding line in global register A(first register)

3 9 1 1 007 0082 0340 REGISTER
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0082: Row address of 0.82" up from bottom of label
0340: Column address of 3.40" from left edge of label
RE..:Text field

G
G: Place data from preceding line in global register B (second register)

3 9 1 1 007 0122 0340 EXAMPLE
3: Rotation of 2700
9: Font 9 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
007: 7th point size selected
0122: Row address of 1.22" up from bottom of label
0340: Column address of 3.40" from left edge of label
EX..:Text field

G
G: Place data from preceding line in global register C(third register)

Print Field Format Commands (continued)

3 A 6 3 050 0212 0360 <STX>SA

3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0212: Row address of 2.12" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SA: Data from Global register A

3 A 6 3 050 0292 0360 <STX>SB
3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0292: Row address of 2.92" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SB: Data from Global register B

3 A 6 3 050 0372 0360 <STX>SC
3: Rotation of 2700
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
3: Bar Code Narrow Bar Width set to 0.015"
050: Bar Code Height set to 0.50"
0372: Row address of 3.72" up from bottom of label
0360: Column address of 3.60" from left edge of label
<STX>SC: Data from Global register C

E Exit formatting commands and print label

10.2.3 Storing a Label Format in Memory

The following command string will store a label format in the flash module (or other module) in slot A but will not print a label. In order to print a label, the label will have to be retreived and printed. This is described in the next section 10.2.4. Also, fields may be replaced when the format is retreived. This is described in section 10.2.5.

```
<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
      D11
      H10
      PD
      SO
      124400001690022THIS IS A TEST
      124400001040022OF THE 8865
      124400000390022IN THE HOST MODE
      sATEST
```

THIS IS A TEST
OF THE 8865
IN THE HOST MODE

System Commands

<STX> e	Select edge sensor - for die cut labels
<STX> M1000	Set maximum label length for stock low indication to 10.00"
<STX> s	Set up for 1 dot buffer
<STX> O0110	Set form edge offset to 1.10"
<STX> f136	Set label feed out distance to 1.36"
<STX> L	Enter label formatting command mode

Label Formatting Commands

D11	Set horizontal and vertical dot size to 1
H10	Set heat setting to 10
PD	Set print speed to 2.5"/sec.
SO	Set slew rate to 8"/sec.

Print Field Format Commands

1 2 4 4 000 0169 0022 THIS A TEST

1:	Rotation of 00
2:	Font 2 selected
4:	Horizontal multiplier of 4
4:	Vertical multiplier of 4
000:	Must be 000 when using font 2
0169:	Row address of 1.69" up from bottom of label
0022:	Column address of 0.22" from left edge of label
TH..:	Text field

1 2 4 4 000 0104 0022 OF THE 8865

1:	Rotation of 00
2:	Font 2 selected
4:	Horizontal multiplier of 4
4:	Vertical multiplier of 4
000:	Must be 000 when using font 2
0104:	Row address of 1.04" up from bottom of label
0022:	Column address of 0.22" from left edge of label
OF..:	Text Field

1 2 4 4 000 0039 0022 IN THE HOST MODE

1:	Rotation of 00
2:	Font 2 selected
4:	Horizontal multiplier of 4
4:	Vertical multiplier of 4
000:	Must be 000 when using font 2
0039:	Row address of 0.39" up from bottom of label
0022:	Column address of 0.22" from left edge of label
IN..:	Text Field

sATEST Save format called 'TEST' to slot 'A'(flash)

10.2.4 Retreiving a Label Format from Memory

The following commands will retreive the label format stored as "TEST". The final command line "E" could be changed to retreive the label from memory but not print it by using an "X" in place of the E. This would be used with replaceable fields in Host mode. A description of each formatting command line is given following the example.

<STX>	L	Enter label formatting command mode
	rTEST	Recall the label format called 'TEST'
	E	Exit formatting commands and print label

Label Printed

THIS IS A TEST
OF THE 8865
IN THE HOST MODE

10.2.5 Replaceable Fields

This system level command modifies the data of a stored label format. It is used in conjunction with the retreive command shown in the previous example. In this example, we assume the label format named "TEST" has been stored. The following command string will recall the format, replace field 3 as shown, then print the label.

Command String

<STX> L

```
        rTEST
        X
<STX>U03REPLACING FIELDS
<STX>G
```

System Command Description

<STX> L	Enter label formatting mode

Label Formatting Commands

rTEST	Recall the label format called "TEST"
X	Exit the label formatting commands but don't print

System Command Description

<STX> U 03 REPLACING FIELDS

<STX> U:	Replaceable field command
03:	Indicates change to print field line 03
R..:	Replace data with "REPLACING FIELDS".

<STX> G	Exit system commands and print label

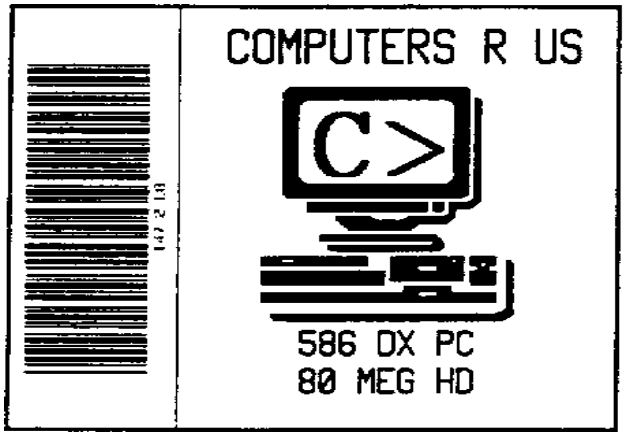
THIS IS A TEST
OF THE 8865
REPLACING FIELDS

10.2.6 Graphic Field Printing

The label format shown below will print a graphic image, a bar code field, and other various fields. A description of each formatting command line is given in the following pages. In this example, the graphics image is recalled from the flash memory.

```
<STX> e
<STX> M1000
<STX> s
<STX> O0110
<STX> f136
<STX> L
        D11
        H10
        PD
        SO
        341100000400030COMPUTERS R US
        1Y1100000500180COMP
        331100001900270586 DX PC
        33110000210027080 MEG HD
        2A6205002000320147.2 LB
        1X1100000100140B250220002002
        1X1100000120320L001216
        E
```

]



System Commands

<STX> e Select edge sensor - for die cut labels
<STX> M1000 Set maximum label length for stock low indication to 10.00"
<STX> s Set up for 1 dot buffer
<STX> O0110 Set form edge offset to 1.10"
<STX> f136 Set Label Feed Out Distance to 1.36"
<STX> L Enter label formatting command mode

Label Formatting Commands

D11 Set horizontal and vertical dot size to 1
H10 Set heat setting to 10
PD Set print speed to 2.5"/sec.
SO Set slew rate to 8"/sec.

Print Field Format Commands

3 4 1 1 000 0040 0030 COMPUTERS R US
3: Rotation of 2700
4: Font 4 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
000: Must be 000 when using font 4
0040: Row address of 0.40" up from bottom of label
0030: Column address of 0.30" from left edge of label
C...:Constant text field

1 Y 1 1 000 0050 0180 COMP
1: Rotation of 00
Y: Must be Y when specifying graphic image
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
000: Must be 000 when specifying graphic image
0050: Row address of 0.50" up from bottom of label
0180: Column address of 1.80" from left edge of label
COMP:Graphic image title

3 3 1 1 000 0190 0270 586 DX PC
3: Rotation of 2700
3: Font 3 selected

1: Horizontal multiplier of 1
1: Vertical multiplier of 1
000: Must be 000 when using font 3
0050: Row address of 0.50" up from bottom of label
0180: Column address of 1.80" from left edge of label
58..:Constant text field

3 3 1 1 000 0210 0270 80 MEG HD
3: Rotation of 2700
3: Font 3 selected
1: Horizontal multiplier of 1
1: Vertical multiplier of 1
000: Must be 000 when using font 3
0210: Row address of 0.50" up from bottom of label
0270: Column address of 1.80" from left edge of label
80..:Constant text field

Print Field Format Commands (continued)

2 A 6 2 050 0200 0320 147.2 LB
2: Rotation of 1800
A: Bar Code Font A selected
6: Bar Code Wide Bar Width set to 0.03"
2: Bar Code Narrow Bar Width set to 0.010"
050: Bar Code Height set to 0.50"
0200: Row address of 2.00" up from bottom of label
0320: Column address of 3.20" from left edge of label
14..B: Replaceable field length of 8 characters

1 X 1 1 000 0010 0140 B 250 220 002 002
1: Rotation of 00
X: Must be X when defining box
1: Must be 1 when defining box
1: Must be 1 when defining box
000: Must be 000 when defining box
0010: Row address of 0.10" up from bottom of label
0140: Column address of 1.40" from left edge of label
B: 'Box' designation
250: Horizontal width of box
220: Vertical height of box
002: Thickness of bottom and top edges
002: Thickness of sides of box

1 X 1 1 000 0012 0320 L 001 216
1: Rotation of 00
X: Must be X when defining line
1: Must be 1 when defining line
1: Must be 1 when defining line
000: Must be 000 when defining line
0012: Row address of 0.12" up from bottom of label
0320: Column address of 3.20" from left edge of label
L: 'Line' designation
001: Horizontal width of line
216: Vertical height of line

E Exit label formatting commands and print label

11. TECHNICAL / ADJUSTMENTS

This section contains suggestions and procedures for adjustments of the 8865 printer. If a particular subject or adjustment is not discussed here, please contact your local authorized METTLER TOLEDO service location for assistance.

11.1 PRINT QUALITY

The 8865 printer provides maximum flexibility by offering both thermal and thermal transfer printer capability. To provide this diverse printing option, the printer has a flexible set of printing controls.

The amount of heat applied per dot row and the rate at which the paper moves under the head have the most effect on the images that are printed. The printer allows you to control these factors but also limits them so you cannot ask the printer to print an image that could be damaging. For example, low cost direct thermal stocks have very high reaction temperatures. It takes a lot of heat to make clear images on this type of paper. The Model 8865 allows two methods of compensation. The burn time can be set to a greater value by using the "H" label formatting command. This would cause more heat to be transferred into the media, which would generate a darker image. The second method would be to reduce the print speed with the "P" label formatting command. This would allow the paper to remain under the head for a longer amount of time. This would also allow more heat to transfer into the media.

You will find that printing fine images on inexpensive thermal and thermal transfer media at the higher speeds is difficult. At one heat setting the image will fade and at the next higher heat setting the image can bleed. This is because the reaction temperature of the media is so high that at higher rates of speed, it cannot react quick enough.

To print fine images at higher speed, medias with lower reaction or release temperatures are required. On the slower end of the print rate settings, crisper images are possible because the media is not being stretched beyond its limits.

11.2 PRINTHEAD PRESSURE AND SUPPORT

The Model 8865's printhead pressure is provided by two springs in the head mount assembly which apply a fixed 9.5 pounds of force upon the printhead. If you believe greater or lesser head pressure is desired, contact your authorized METTLER TOLEDO representative for advice.

Adjustment of the printhead support is required if you are using media widths of 3.5 inches or less. Figure 11-2-a shows the printhead mount, ribbon shield, head support plate, and adjustment screw in an exploded view.

The head support plate exists for the purpose of supporting the outer end of the printhead when narrow media is used. Without this support, the printhead would bear down on the drive roller, causing diminished print quality and premature wear. Again, the head support plate needs to be engaged only when the media width is less than 4 inches.

To make an adjustment, loosen the two mounting screws that fasten the head support plate, leaving the screw on the left slightly snug. Load the print media then engage the printhead by rotating the head lift lever to the down position. Turn the adjustment screw clockwise until the support plate moves down and contacts the bearing plate underneath. Finally, tighten the two mounting screws to secure the support plate.

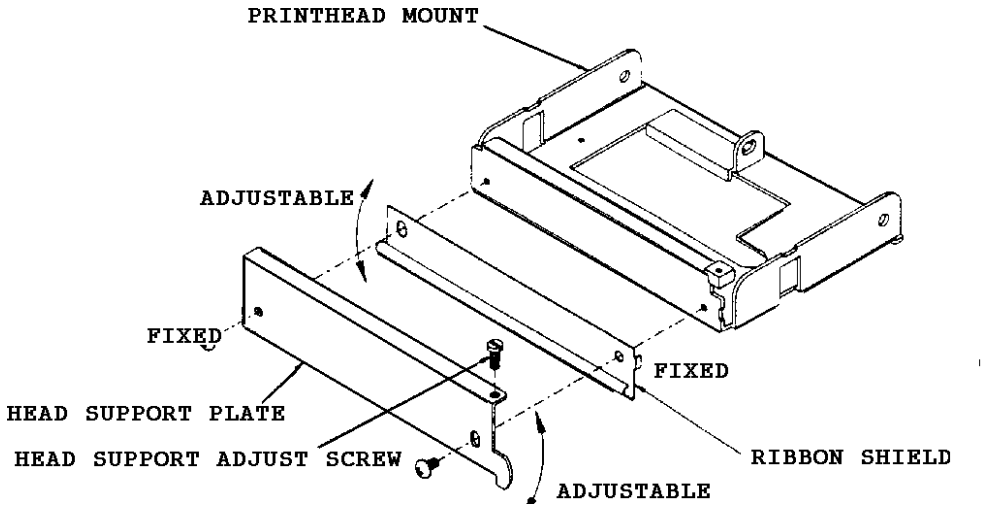


Figure 11-2-a Printhead Mount, Ribbon Shield, and Head Support Plate

For narrow stock, the head support plate should be adjusted so that the print image on the outside edge of the label begins to lighten. Gradually lower the head support plate until the print quality becomes acceptable. Make certain that the printhead does not contact the roller. It would be advisable for the print quality on the outer edge to be lighter if possible. This will ensure that the printhead does not come in contact with the roller. After this procedure is done, you will have to realign the ribbon shield to compensate for ribbon tracking.

NOTE: The mounting screws which secure the head support plate also secure the ribbon shield. When loosening these screws, be aware that both the plate and the shield are adjustable. If you move one, the other may move also.

11.3 PRINTHEAD ALIGNMENT

The Model 8865 is adjusted at the factory using 4 mil label stock. When using heavier labels or tag stock, the printhead may need to be adjusted forward. The components involved in printhead alignment are illustrated in Figure 11-3-a.

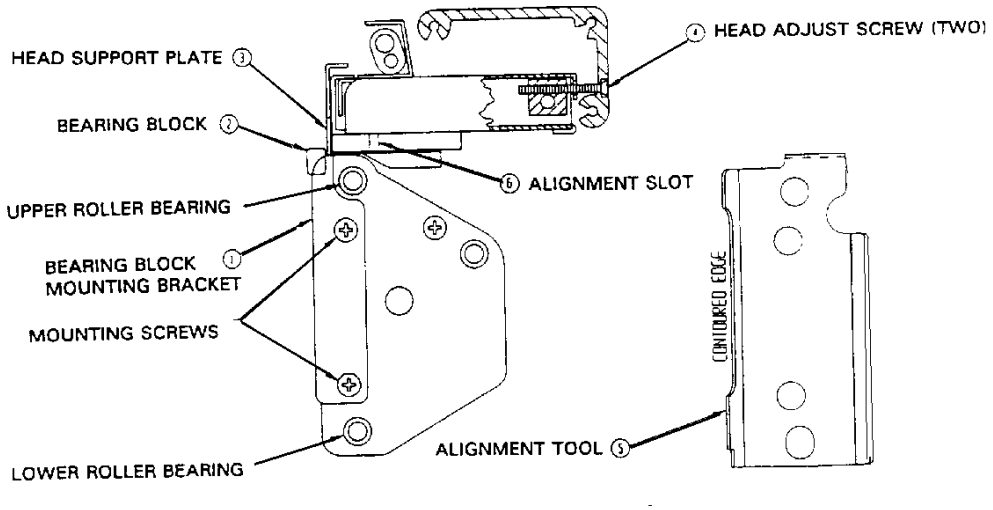


Figure 11-3-a Printhead Alignment Adjustment

The horizontal placement of the printhead is adjusted by turning the right and left head adjust screws (item 4) which correspond to the right and left side of the printhead. Turning the screws 1/2 turn counterclockwise will move the printhead 0.012" (0.3 mm) forward. Conversely, 1/2 turn clockwise will move the printhead back 0.012" (0.3 mm).

CAUTION
Do not turn the head adjust screws more than 2 turns in either direction. Damage to the head mount assembly could result if the adjustment screws are turned too far.

11.3.1 Coarse Adjustment

Loosen the mounting screws which secure the bearing block mounting bracket (1). Place the special alignment tool (5), over the bearing block mounting bracket (1) inserting the upper and lower "drive roller" bearings into the corresponding holes in the alignment tool. The narrow tab on the top of the alignment tool should center into the printhead alignment slot (6). If the tab does not center, then turn the left head adjust screw until it centers.

To align the opposite end of the printhead, turn the alignment tool upside down and insert the contoured edge into the space along the left end of the printhead. When the alignment plate is seated against the metal shoulders of the upper and lower drive roller, the printhead should be adjusted forward until it just touches the edge of the alignment plate using the right side head adjust screw.

The printhead should now be aligned roughly so that the print line is centered on the drive roller. Print quality at this point should look fairly good. To finalize the adjustment, move on to step 11.3.2.

11.3.2 Fine Adjustment

Print a 90/ rotated bar code and inspect the printing quality. With a 1/16" hex key, turn the left and/or right head adjust screws counter clockwise 1/4 to 1/2 turn until the desired print quality is achieved. Now push the bearing block (2) back into contact with the head support plate (3) and tighten the mounting screws to secure the bearing block mounting bracket (1). Finally, turn the left head adjust screw 1/4 turn counter clockwise.

11.4 PRINT DARKNESS

The darkness of the printed media is the result of several items. One of the most important items that can affect this is the quality of the media. Also, if the ribbon and media are not properly matched when printing in thermal transfer mode, a very light print may result. There are no adjustments for mismatched media supplies. METTLER TOLEDO highly recommends that all media be sourced through METTLER TOLEDO Aftermarket parts in order to obtain consistently high quality media.

There is a darkness control behind the front door of the 8865. This is used to adjust the printhead temperature so the quality of print from a new printhead can be matched to the previous printhead. Do not use this adjustment to adjust the darkness of individual labels.

The recommended method of controlling darkness on verified high quality media is to adjust the heat setting of a label format by changing the "Hnn" value in the Label Formatting commands. This allows full adjustment of the printhead and also allows the flexibility of adjusting the darkness for a particular format. This setting combined with the correct print speed will provide the best quality dark label possible.

11.5 LABEL PRESENT SENSOR

The label present sensor is an option that can be attached to the front of the printer chassis to prevent printing of a second label before the first label is removed from the front of the printer. The sensor consists of a light source and a light sensor which detects light reflected off the media.

If the sensor stops operating, it may need label dust removed from its aperture. Clean the tip of the sensor with a moist lint free cloth. Another possibility is that the sensor is no longer oriented properly to sense the reflected light. Make sure that the sensor tip is perpendicular to the media as it exits the printer.

11.6 SPARE PARTS / ACCESSORY LISTING

The following chart lists parts that may be required over a period of time in order to keep the 8865 printer operating at 100% efficiency. The part numbers noted with asterisks (*) should be kept on hand to reduce the possibility of a long down time in case of failure.

PART DESCRIPTION	PART NUMBER	QTY
Thermal Printhead	14154600A	1
Label Drive Roller	14155100A	1
Control PCB	14154500A	1
Keyboard	14154700A	1
Stepper Motor	14154800A	1
Timing Belt 200 GR MXL (Short)	14154900A	1
Timing Belt 270 GR MXL (Long)	14155000A	1
1.5A Slo-Blo Fuse	12465400A	1

Sensor/Keyboard PCB	14155200A	1
Ribbon Sensor Assembly	14155400A	1
Label Sensor Assembly	14155300A	1
Module Connection PCB	14155500A	1
Ribbon Clasp	14155600A	1
Liner Take-up Clasp	14155700A	1

ACCESSORY	FACTORY NUMBER	PART NUMBER
Flash Memory Module	0901-0326	14105400A
MT Label Design Program	0901-0331	14165800A
Label Present Sensor Kit	0901-0330	14165700A
Cable - PC (XT) to 8865	0900-0276	13604700A
Cable - PC (AT) to 8865	0900-0277	13604800A

11.7 INTERCONNECTING DIAGRAM (120 VAC)