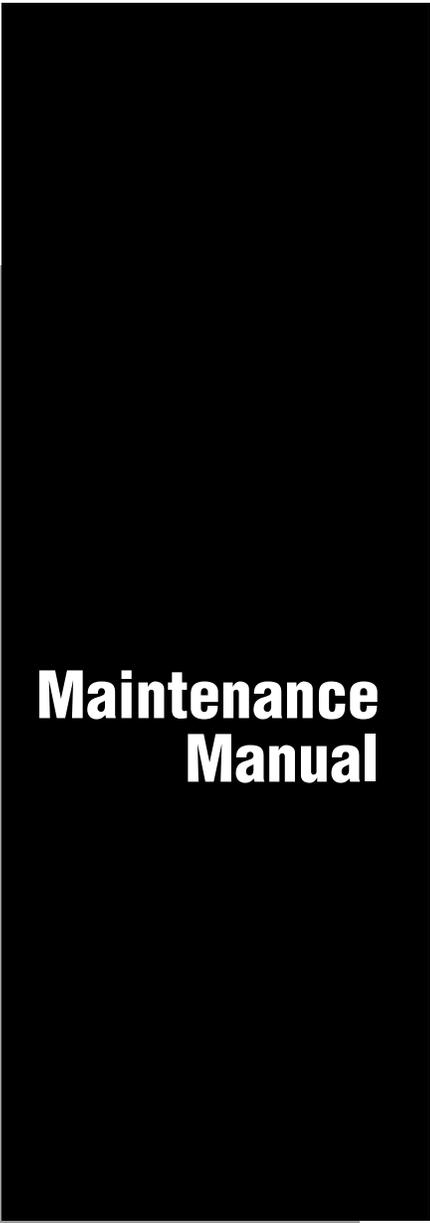




Intermec



**Maintenance
Manual**



3600 Bar Code Label Printer

P/N 062905-001

Intermec® Corporation
6001 36th Avenue West
P.O. Box 4280
Everett, WA 98203-9280

U.S. technical and service support: 1-800-755-5505
U.S. media supplies ordering information: 1-800-227-9947

Canadian technical and service support: 1-800-688-7043
Canadian media supplies ordering information: 1-800-268-6936

Outside U.S. and Canada: Contact your local Intermec service supplier.

The information contained herein is proprietary and is provided solely for the purpose of allowing customers to operate and/or service Intermec manufactured equipment and is not to be released, reproduced, or used for any other purpose without written permission of Intermec.

Information and specifications in this manual are subject to change without notice.

© 1995 by Intermec Corporation
All Rights Reserved

The word Intermec, the Intermec logo, Label Debut, and CrossBar are trademarks of Intermec Corporation.

The name Centronics is wholly owned by GENICOM Corporation.

IBM is a registered trademark of International Business Machines Corporation.

Throughout this manual, trademarked names may be used. Rather than put a trademark (™) symbol in every occurrence of a trademarked name, we state that we are using the names only in an editorial fashion, and to the benefit of the trademark owner, with no intention of infringement.

The software contained in the 3600 printer and the accompanying materials are copyrighted. Unauthorized copying of the software, including software that has been modified, merged, or included with other software, or the written materials is expressly forbidden without the prior written consent of Intermec. All right, title, and interest in all copies of this software are and shall at all time remain the sole and exclusive property of Intermec. Customer may be held legally responsible for any copyright infringement that is caused or encouraged by its failure to abide by these terms.

Contributors

Technical Writer: Robert Shaw

Editor: Craig Thompson

Technical Illustrator: George Wilson

Technical Reviewers: Cathy Aragon
Pixie Austin
Daniel Clark
John Cramer
Allen Crowe
Stephen Eckert
Pat Helton
Laura McCluer
Ed Millet
Art Millican
Matt Roberts
Joe Wade

Contents

Before You Begin xi*Safety Summary xi**Warnings and Cautions xii**Purpose of This Manual xii**Additional Information xv***1**

General Information**Overview of the 3600 Printer 1-3***3600 Features 1-4**3600 Printer Specifications 1-4**Dimensions (no options installed) 1-4**Electrical Requirements 1-4**Printing Methods 1-4**Printing Speed 1-5**Printhead Specifications 1-5**Media Specifications 1-5**Ribbon Specifications 1-5**Environment 1-5**Self-Strip Specifications 1-5**Communications 1-6**Fonts and Graphics 1-6**Character Sets 1-6**Memory 1-6**Factory Default Settings 1-7**3600 Printer Options 1-7**Memory Expansion 1-7**Twinax Interface 1-7**Coax Interface 1-8**Parallel Interface 1-8**Network Connectivity 1-8**Kanji/Katakana Character Support 1-8**Batch Takeup 1-8*

Principal Functional Parts 1-9

Basic Printer Setup and Operation 1-11

- Front Panel Operation 1-11*
 - Over-Temperature 1-11*
 - Media or System Faults 1-12*
 - Feed/Pause Pushbutton 1-12*
- Checking the Printer Configuration 1-12*
 - DIP Switch Settings 1-13*
- Connecting the Printer to a Computer 1-13*
- Printing 1-14*
 - Using Label Debut 1-14*
 - Using Third-Party Software 1-14*
 - Using the Printer Command Set 1-15*

2

Preventive Maintenance

Preventive Maintenance Actions and Intervals 2-3

Inspecting the Printer 2-4

Cleaning the Printer 2-4

- Removing the Media Cover 2-5*
- Cleaning the Printhead 2-6*
- Cleaning the Rollers and Tear Bar 2-8*
- Cleaning the Media Guides and Media Path 2-9*
- Cleaning the Label and Ribbon Sensors 2-11*
- Cleaning the Printer Covers 2-12*

3

Testing and Adjusting

Testing the Printer 3-3

- Running Test and Service Mode at the Printer 3-4*
 - Setting DIP Switches 3-4*
 - Printing Test Labels 3-7*
- Running Test and Service Mode From a Host Computer 3-11*
- Testing Printer and Host Communications 3-12*

Adjusting the Printer 3-13

- Adjusting the Print Bias for Print Quality 3-14*
- Adjusting the Print Intensity 3-15*
- Adjusting the Printhead Adjustment Lever for Print Quality 3-16*
- Adjusting the Label Mark Sensor 3-17*
- Adjusting the Label Gap Sensor 3-19*
- Adjusting the Label Taken Sensor 3-20*

Aligning the Printer 3-21

- Aligning the Rollers 3-22*
- Aligning the Printhead 3-23*
- Aligning the TTR Supply Hub 3-25*

4

Troubleshooting**About Troubleshooting and Repair 4-3**

- Troubleshooting Tips 4-3*
- Where to Start 4-3*
- Repair 4-3*

Troubleshooting Checklist 4-4**Error Handling 4-5**

- Syntax Errors 4-5*
- Parameter Errors 4-5*
- Image Overrun Errors 4-5*
- Invalid Numeric Character Errors 4-6*
- Insufficient Storage RAM Errors 4-6*
- Error Codes 4-6*

Printer Operation Problems 4-9**Print Quality Problems 4-10****Communications Problems 4-12****Environmental Problems 4-13**

- Electrostatic Discharge (ESD) 4-13*
- Electromagnetic and Radio Frequency Interference 4-14*
 - Ground Loops Between Equipment 4-14*
 - Inadequate Earth Ground 4-14*
 - AC Power Problems (Surges, Sags, Spikes, Noise, and Outages) 4-15*

Miscellaneous Problems 4-16

5

Remove and Replace Procedures

- Replacing Printer Components 5-3*
- Replacing the Lithium Battery 5-4*
- Replacing the Printhead 5-5*
- Replacing the Bezel PCB 5-6*
- Replacing the Main PCB 5-8*
- Replacing the Kanji/Katakana Option PCB 5-9*
- Replacing the Label Mark Sensor 5-10*
- Replacing the Label Taken Sensor 5-12*
- Replacing the Label Gap Sensor 5-13*
- Replacing the TTR Drive Roller and Gear/Pulley 5-15*
- Replacing the TTR Takeup Hub, Clutch/Pulley, and Belt 5-18*
- Replacing the TTR Supply Hub and Adjusting Plate 5-20*
- Replacing the Platen Roller and Gear 5-22*
- Replacing the Liner Drive and Takeup Components 5-24*
- Replacing the Stepper Motor 5-30*
- Replacing the AC Plug/Input Filter 5-31*
- Replacing the Power Switch/Circuit Breaker 5-32*
- Replacing the Transformer 5-33*

6

PCB Drawings and Schematics

7

Replacement Parts

A**Appendix****Functional Description of the 3600 Mechanics A-3****Functional Description of the 3600 Electronics A-4***Power Supply A-4**+5V A-4**+40V A-4**+24V A-4**Power Fail Detection A-5**Battery A-5**Battery Life Calculations A-5**Reset A-5**Motor Driver A-6**Processor A-7**Chip Selects A-7**TPU A-7**QSM A-8**Interrupt Priority Levels A-8**Crystal A-8**Memory A-9**Static RAM A-9**EPROM A-9**DRAM A-9**Communications Interface A-10**A/D Converter A-10**DIP Switches A-10**ASIC and I/O Option Interface A-10**Address/Data Multiplexor A-10**Chip Select Generation A-11**I/O Option Connector A-11**FIFO A-11**Front Panel Interface A-11**Debug Interface A-11***Functional Description of the 3600 Software A-14***Band Buffering and Font Caching A-14**Image Band Buffering A-14**Image Band Example A-15**Font Caching A-18**Print Energy Compensation A-18**Digital Thermal Compensation A-18**Global Compensation A-18*

Before You Begin

This section describes the purpose and arrangement of this manual to you. It is intended to bring to your attention, important general safety concerns, specific warnings and cautions, and sources of additional information.

Safety Summary

Your safety is extremely important. Read and follow all of warnings and cautions in this book before handling and operating Intermec equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the safety warnings and cautions.

Do Not Repair or Adjust Alone Do not repair or adjust energized equipment alone under any circumstances. Someone capable of providing first aid must always be present for your safety.

First Aid Always obtain first aid or medical attention immediately after an injury. Never neglect an injury, no matter how slight it seems.

Resuscitation Begin resuscitation immediately if someone is injured and stops breathing. Any delay could result in death or permanent injury. To work on or near high voltage, you should be familiar with approved industrial first aid methods.

Energized Equipment Never work on energized equipment unless you are authorized by a responsible authority. Energized electrical equipment is dangerous. Electrical shock from energized equipment can cause death. If you must perform authorized emergency work on energized equipment, be sure that you comply strictly with approved safety regulations.

Warnings and Cautions

The warnings and cautions in this manual use the following format and address the issues described:



Warning

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons working on the equipment.



Caution

A caution alerts you to an operating procedure, practice, condition, or statement that must be strictly observed to prevent equipment damage or destruction, or corruption or loss of data.

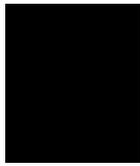
Purpose of This Manual

The purpose of this maintenance manual is to provide the information you need to clean, adjust, and repair the Intermec 3600 Bar Code Label Printer.

Who Should Read This Manual?

This manual is written for experienced electronic technicians trained by Intermec, who will service and, if necessary, repair the 3600 printer. Detailed operating instructions and specific related information is provided in the *3600 Bar Code Label Printer User's Manual*.

This document is not intended to support user operations or persons untrained in troubleshooting and repair. You should have a working knowledge of electronics with an advanced understanding of PCs, DOS, data communications, and bar code applications. It is assumed that you are familiar with the installation, programming, and operation of the Intermec 3600 Bar Code Label Printer and all of its options, including a working knowledge of the Label Debut (or Label) software tool.



How This Manual Is Organized

You will find the following information in the referenced section:

For information about:

A basic description of the 3600

Scheduled cleanings and checks

Making sure the printer is operating correctly and providing quality results

Problem solving

Removing and replacing components

Main PCB drawings and diagrams

Spare parts

Theory of operation

Refer to:

Chapter 1 - An illustrated overview of the 3600 printer; listing printer features, specifications, and options, identifying primary parts, and summarizing some setup and operating information.

Chapter 2 - Actions, intervals, and illustrated preventive maintenance procedures.

Chapter 3 - Procedures for running printer tests printing test labels, printing out the configuration settings, and for making printer adjustments and alignments.

Chapter 4 - Information for identifying, duplicating, isolating, and eliminating conditions or failures in the printer environment or the printer components.

Chapter 5 - Instructions for the removal and replacement of key components.

Chapter 6 - Engineering drawing and schematic diagram of the main PCB.

Chapter 7 - Two lists of the spare parts: one in ascending part number sequence and one alphabetically by description, keyed to exploded illustrations of the printer. Part numbers for tools and documentation are also provided.

Appendix - functional descriptions of the 3600 mechanics, electronics, and firmware.

Terms and Conventions

The following terms and conventions occur throughout this manual. A complete glossary of terms is provided in the *3600 Bar Code Label Printer User's Manual*.

Terms

- “Backing” (or liner) refers to the silicon release portion of the media that carries the label.
- “Host” refers to any computer that the printer is connected to.
- “TTR” refers to the thermal transfer ribbon used when the printer is in thermal transfer rather than direct transfer mode.
- “Media” is the stock on which the printer prints labels. Media can be made of plain paper, polyester, thermally reactive paper, or other materials with adhesive backing.

Conventions

The following conventions are used throughout this manual for operating procedures and descriptions of the printer.

- Downloaded commands appear in the order that you enter them into the printer with the following conventions:

Convention	Description
< >	Angle brackets < > enclose mnemonic representations of ASCII control characters. For example, <ETX> represents the ASCII “End of Text” control character.
{ }	Braces {} enclose variable data. For example, {n} signifies a variable for which you can designate a constant value.
[]	Brackets around a word or letter represent a key on your keypad. For example, [Tab] represents the Tab key and [M] represents the letter M key.
[]-[]	When two keys are joined with a dash, press them simultaneously. For example, if you see the command [Ctrl]-[C], press the two keys at the same time.
E3;F3	Enter all characters not enclosed in brackets by pressing an individual keypad key. For example, E3;F3; is entered as [E][3][;][F][3][.] with the E and the F in uppercase.

Additional Information

The following documents may be of interest or help to you in servicing the 3600 printer.

3600 Bar Code Label Printer User's Manual (P/N 062732)

Label Debut User's Manual (P/N 062982)

Data Communications Reference Manual (P/N 044737)

The Bar Code Book by Roger C. Palmer

1

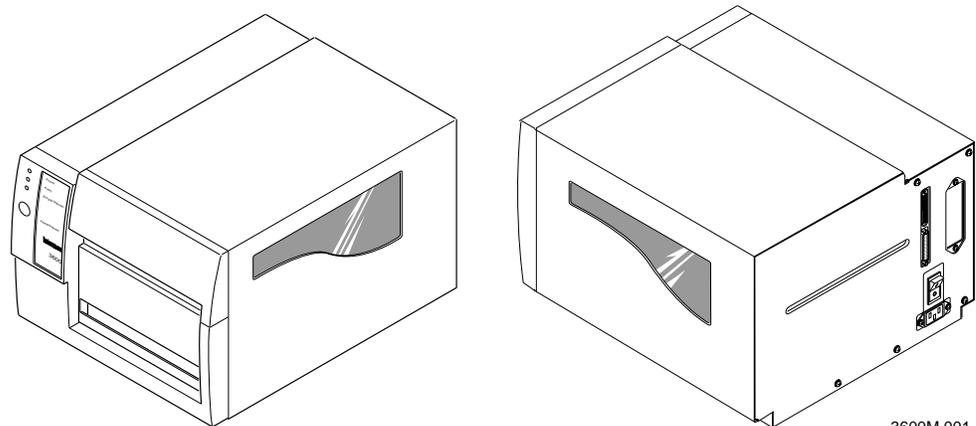
General Information

This chapter identifies basic features, options, and technical specifications of the 3600 printer. It names principal functional parts and reviews basic printer setup and operation.

Overview of the 3600 Printer

The Intermec 3600 is a microprocessor-based thermal printer that prints standard bar code or 2D symbology, human-readable characters, graphics, lines, and borders on 3-inch (7.62 cm) to 6.6-inch (16.8 cm) wide continuous feed label stock.

The 3600 prints directly to thermal label media or can print on regular label media with the use of a thermal transfer ribbon (TTR).



3600M.001

The 3600 supports applications that need a wider print capability than the Intermec 3400 Bar Code Label Printer can provide.

3600 Features

The 3600 printer's features are summarized in the following list:

- Print speed from 2 to 5 ips
- Programmable, nonvolatile printer configuration
- Bitmap font capabilities
- Outline/vector font support
- User selectable gap feature for fonts
- 2D symbology support (Code One, PDF 417, and Maxicode)
- 128k (standard), 512k (optional) storage memory
- Autoselection of Intermec protocols
- Printable control characters
- Image banding and memory management
- Dot-by-dot digital thermal compensation
- Self-strip or continuous print (with internal rewind)
- Media sensitivity numbering system
- Wide range of label media
- Label Debut™ label design software

3600 Printer Specifications

The specifications and performance parameters for the 3600 printer are itemized in this section.

Dimensions (no options installed)

Height	11 inches (27.9 cm)
Width	12 inches (30.5 cm)
Length	17 inches (43.2 cm)
Weight	45 pounds (20.3 kg)

Electrical Requirements

Input Voltage	100, 115, or 230 VAC \pm 10%
Frequency	47 to 63 Hz

Printing Methods

Direct Thermal
Thermal Transfer (thermal transfer ribbon (TTR) required)

Printing Speed

Maximum	5 ips (50.8 mm per second)
Minimum	2 ips (127 mm per second)

The print speed can be changed in 1 ips increments only: 2, 3, 4, or 5.

Printhead Specifications

Element size	0.00492 inch square (0.13 mm)
Width	6.6 inches maximum print (168 mm)
Resolution	203 dots per inch (8 dots per mm)
# of Elements	1344 per printhead
X dimensions	10 mil to 50 mil or 0.25 mm to 1.27 mm, 5 mil (0.13 mm) in drag mode with specified media

Media Specifications

Roll	6,000 linear inches (152 m)
Length	0.5 inch (13 mm) to 17 inches (432 mm) (stripped media)
Width	3.0 inch (76 mm) to 6.7 inches (170 mm)
Thickness	0.012 inches (0.3 mm) maximum
Diameter	8.38 inch maximum diameter (213 mm)

Ribbon Specifications

Roll	6,000 linear inches (152 m)
Widths	3.0 inches (76 mm) 4.1 inches (104 mm) 5.4 inches (137 mm) 6.7 inches (170 mm)
Diameter	2.25 inches maximum (57 mm)

Environment

Operating	50°F to 104°F (10°C to 40°C)
Humidity	10% to 90% noncondensing

Self-Strip Specifications

The liner takeup hub can spool the backing of an entire 6,000-inch roll of media.

Peel Release	10 to 50 grams
--------------	----------------

Communications

Asynchronous RS-232C, RS-422, RS-485 interfaces

Serial ASCII code

Hardware (Ready/Busy) flow control

XON/XOFF protocol

Intermec Standard Block protocol

Polling Mode D protocol

Multi-Drop protocol

Baud Rates: 1200, 2400, 4800, 9600, 19200

Fonts and Graphics

5x7, 7x9, 7x11, and 10x14 86XX compatible fonts

2 bitmap OCR fonts

3 bitmap fonts measured in point sizes 8, 12, and 20

1 outline font

12 monospaced bitmap fonts

Kanji/Katakana bitmap font card (option)

Kanji/Katakana bitmap and outline font card (option)

UDF size of 4 inches (101.6 mm) maximum

UDC size of 4 inches (101.6 mm) maximum

Character Sets

US ASCII Norwegian/Danish

UK ASCII Swedish/Finnish

German Italian

French Spanish

Swiss

Memory

Base 512K of DRAM for imaging
 128K of SRAM for storage

Optional 512K of SRAM for storage

Factory Default Settings

The following is a list of the factory default settings for the 3600 printer:

Configuration	Default Setting
Preamble Character	Disabled
Postamble Character	Disabled
Auto-Transmit 1	Disabled
Auto-Transmit 2	Disabled
Auto-Transmit 3	Disabled
Message Delay	0 ms
Power-Up Mode	Advanced mode
End-of-Print Skip Distance	100 dots
Top of Form	20 dots
Media Sensitivity	420
Number of Image Bands	3
Maximum Label Length	1000 dots
Printer Character Set	US ASCII
Label Retract	Enabled
Print Speed	3 ips
Label Stock Type	Die-cut
Intercharacter Delay	0 ms

3600 Printer Options

The 3600 you are servicing can be equipped with one or more of the following options:

Memory Expansion

Storage memory for formats, pages, graphics, and fonts can be increased to 512K of battery backed static RAM. This option provides an additional 512K of nonvolatile bulk storage to hold more formats, fonts, or bitmap graphics. It also increases the printer's image buffering capabilities.

Twinax Interface

Allows connection of the 3600 printer to IBM Twinax systems. The printer emulates an IBM 5256 Model 1 printer and can operate with an IBM System 34/36/38 or AS/400 host computer.

Coax Interface

Allows connection of the 3600 printer to IBM coax systems. The 3600 emulates an IBM 3287 printer by connecting the printer to IBM 3270 Type A coax cable computer systems operating in the VTAM (CICS/IMS/TSO) or 8100 (DPPX) environments. Connection can be made to an IBM 3174/76/99 system controller/multiplexer.

Parallel Interface

This option lets the user connect the 3600 to a PC through any Centronics™ parallel interface in addition to the standard serial interface.

Network Connectivity

Using the Parallel Interface option and an Ethernet or other network adapter, the 3600 can be connected to a network.

Kanji/Katakana Character Support

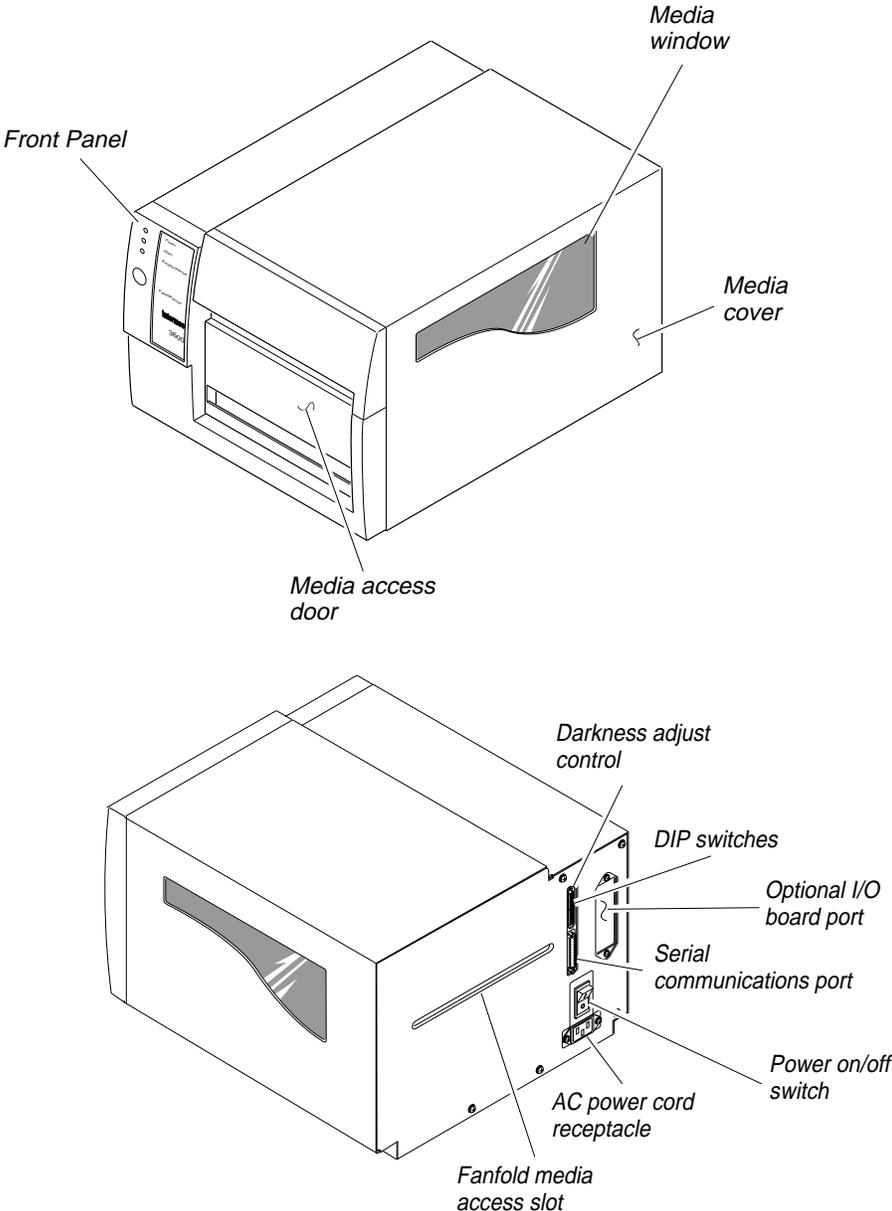
The 3600 has two Kanji/Katakana options: bitmap fonts only, or outline and bitmap fonts. Users shipping finished materials or work in process materials to Japan can meet Japanese label requirements for Kanji/Katakana (JIS Interleaved 2 of 5).

Batch Takeup

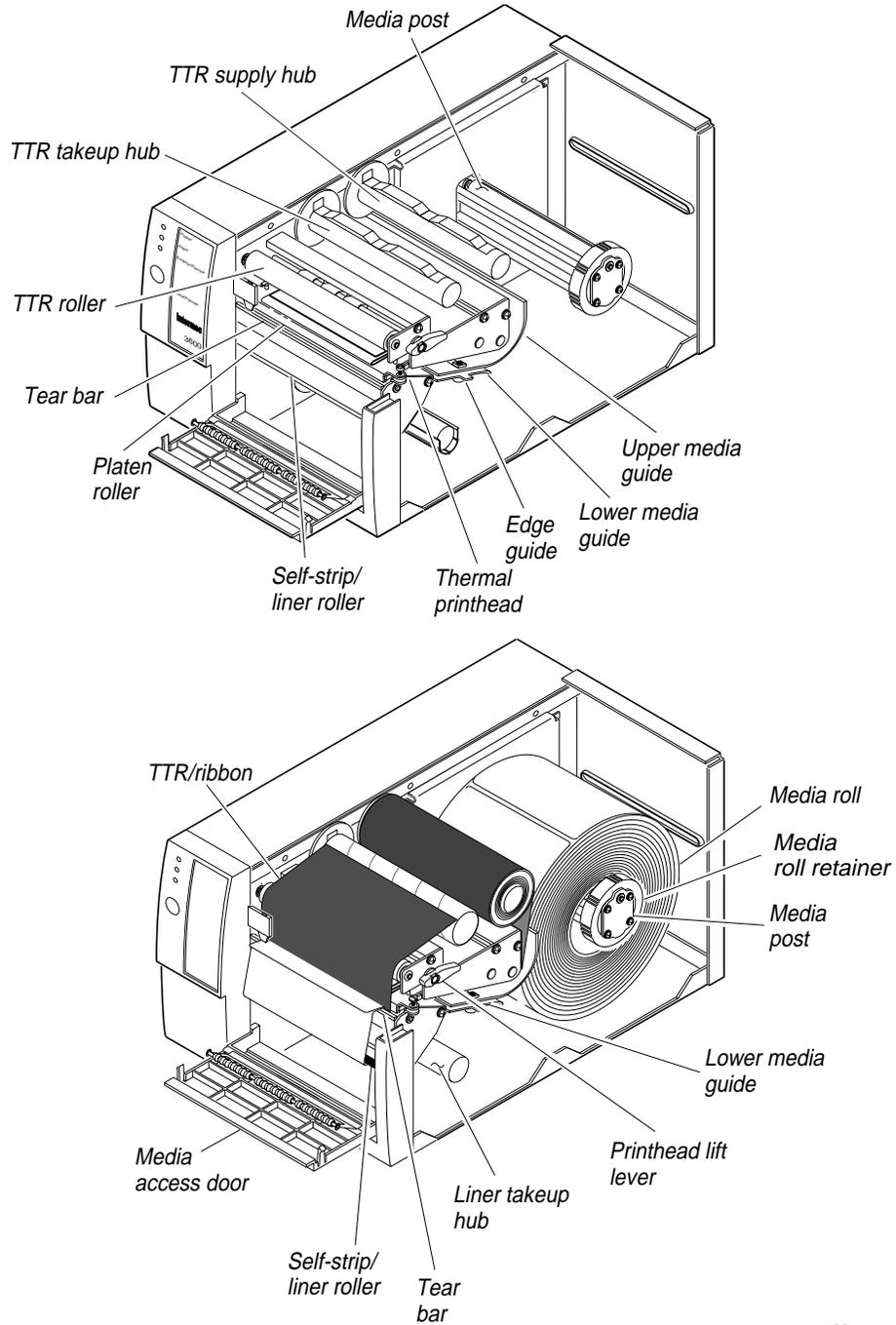
A larger diameter liner takeup hub permits printed labels to be spooled for later use without causing as much label curl as the smaller diameter hub. The maximum takeup outside diameter is 5 inches.

Principal Functional Parts

The following illustrations identify the common name and location of the major functional elements of the 3600 printer.



3600M.002



3600M.003

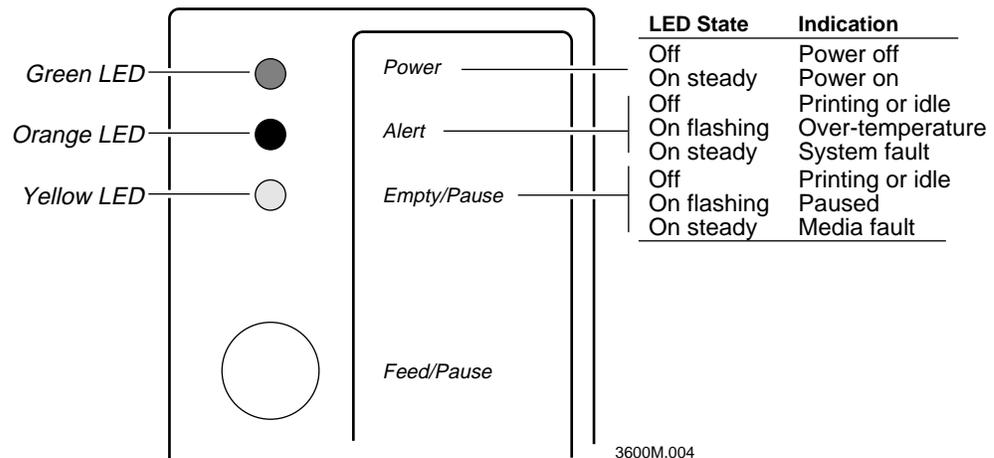
Basic Printer Setup and Operation

Detailed operating instructions for the 3600 printer are contained in the user's manual. This section summarizes the following basic setup and operating information for you as a quick reference:

- Front panel operations
- Checking printer configuration
- Connecting the printer to a computer
- Printing

Front Panel Operation

The three light emitting diodes (LEDs) on the printer's front panel (Power, Alert, and Empty/Pause) indicate the conditions identified in the following illustration:



Over-Temperature

If the printhead reaches an over-temperature condition, the Alert LED on the printer flashes and the printer halts printing. Usually, you will not need to intervene. If you allow the printer enough time to cool down, it normally resumes operation on its own.

Media or System Faults

If you are servicing a printer indicating a media or system fault, refer to Chapter 4, "Troubleshooting," for information about the problem.

Feed/Pause Pushbutton

Operating the Feed/Pause button produces the following actions, depending on what condition the printer is in:

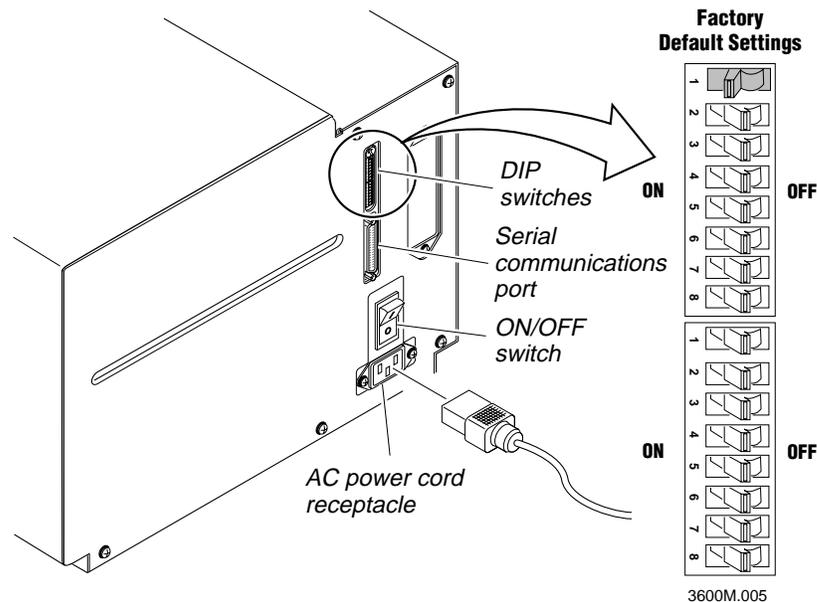
Printer Condition	Operation/Function
If the printer is idle:	Pressing and releasing the Feed/Pause button causes the printer to feed out one label or a minimum specified amount of media.
	Pressing and holding the button down causes media to feed continuously until the button is released.
	Pressing the Feed/Pause button twice takes the printer offline. Press the button once more to bring the printer online.
If the printer is printing:	Pressing and releasing the Feed/Pause button causes the printer to pause.
	Subsequent pressing and releasing of the button allows the printer to resume printing.
	Pressing and holding the Feed/Pause button down until the printer stops printing cancels the current print job.
When the printer is first powered on:	Pressing and holding the Feed/Pause button down when turning printer power on places the printer in the Test and Service mode and causes the hardware configuration label to print.

Checking the Printer Configuration

The factory default settings for the 3600 printer are listed with the 3600 specifications in this chapter. These parameters are set using a combination of DIP switch settings and downloadable printer commands, which are described in the user's manual. Remember, you can print out hardware and software configuration labels for statistics of the printer you are servicing.

DIP Switch Settings

The DIP switches on the rear panel of the printer control communications parameters, media type configuration, and test and service functions. To change settings, carefully position the plastic (breakable) switches to ON or OFF with a small straight-slot screwdriver. The printer is shipped from the factory in the standard configuration, with the 16 DIP switches set as shown in the following illustration. When changing switch settings, you must cycle the printer power from off to on for the changes to take affect.



Connecting the Printer to a Computer

To operate as intended, the 3600 must be interfaced with a computer (desktop or laptop PC, local area network, AS400 or similar mainframe) with its serial port configured for the communications protocol appropriate to the computer interface. It is assumed that the correct interface (point-to-point, non-switched modem, network, etc.) was achieved originally at installation and should have a history of correct operation.

Refer to the *3600 User's Manual* or contact an applications analyst for detailed information about the type of installation you are servicing.

Serial Port Settings

Parameter	Settings	Description
Baud Rate	1200, 2400, 4800, 9600, 19,200	The rate, in bits per second (bps) at which the host exchanges data with the printer.
Parity	Even, Odd, None	Checks each transmitted character for errors.
Protocol	Intermec, XON/XOFF, XON/XOFF with status	The type of network used to connect the printer, the host, and the rest of the data collection system. Intermec protocol includes Standard, Polling Mode D, and Multi-Drop protocols.
Device Address	A to Z, 0 to 5	Unique address for each device connected using Multi-Drop protocol.
Test and Service	Test Prints, Data Line Print, Cloning, Selective Transfer, Memory Reset	Provides printer diagnostics to the host and prints test labels.

Printing

Regardless of your computer setup, you can use several methods to download information to print labels. This section describes different ways you can communicate with the printer. Refer to the *3600 User's Manual* for detailed information.

Note: Remember that these factors affect print quality: correct media, media sensitivity setting, print speed, and correct bar code orientation.

Using Label Debut

If you are using a point-to-point (printer-to-PC) connection to communicate with the printer, the printer parameters can be easily set using the DOS-based software package Label Debut. The Label Debut prompting screens assist you in designing, printing, and editing labels. Refer to the *Label Debut User's Manual* for more detailed information.

Using Third-Party Software

Your customer may be using third-party software to create label formats and convert graphics into a UDC format that the 3600 printer can interpret. You can use the same software to set the printer parameters.

Using the Printer Command Set

You can also create labels by downloading formats (designs) and data created with the printer command set. The commands in the printer command set can perform any function or activate any feature of the 3600 printer. You can use the following methods to download commands:

- Downloading printer commands using DOS
- Using ASCII control characters or hexadecimal equivalents
- Using readable protocol/command characters
- Downloading printer commands with a PC communications program or host terminal
- Using a Novell network

2

Preventive Maintenance

This chapter identifies scheduled maintenance actions and provides illustrated procedures for cleaning the 3600 printer.

Preventive Maintenance Actions and Intervals

Preventive maintenance consists primarily of scheduled cleanings, but also occasional performance checks and, possibly, adjustments based on those checks. When you perform preventive maintenance, you should also conduct the tests and adjustments described in Chapter 3, “Testing and Adjusting,” that will ensure the printer continues to deliver the highest quality output. You need to perform preventive maintenance procedures at the intervals identified to ensure a printer remains in proper working condition.

The following table is a schedule of recommended printer cleaning and checking. Detailed cleaning procedures follow. Chapter 4, “Troubleshooting,” contains instructions for performing various tests and adjustments.

Printer Component	Maintenance Action and Interval
Printer	Inspect the printer (and the rest of the data collection system) at every service visit. Your inspection should include the types of items listed in the following section.
Printhead	Inspect after every roll of media. Clean after every roll (or 6,000 inches) of media or more often if necessary. Inspect or test print quality every service visit. Make any necessary adjustments.
Drive roller and tear bar	Clean after every five rolls of media. Using hi-tack adhesive requires cleaning after every roll of media. If the customer uses tag stock or continuous media, you may want to clean after every five rolls of media, or more often if necessary. Harsh or dusty environments dictate the need to clean more frequently. Inspect or test the operation of these printer elements at every service visit. Make any necessary adjustments.
Media path, edge, and guides	
TTR drive roller	
Liner drive roller	
Media supply post	
Label and ribbon sensors	
Pinch roller	

Inspecting the Printer

You should routinely inspect the printer and the rest of the data collection system. Your inspection needs to address the following and similar concerns:

- Make sure the printer is properly grounded.
- Make sure the printer's AC power source is within tolerance.
- Make sure the printer is clean.
- Make sure the printer is away from liquids.
- Inspect the work environment for cleanliness and arrangement. Large electric motors, welders, and switching equipment can negatively affect printer performance.
- Check the data collection network regularly for loose wires or poorly installed connections. Be sure to replace corroded wires.

Cleaning the Printer

Use these procedures to access the printer parts and clean them. Heed the warnings and cautions to prevent harm to yourself or damage to the printer. You will need the following items to clean the printer correctly:

- Isopropyl alcohol
- Cotton swabs
- Clean lint-free cloth
- Soft bristle brush
- Vacuum cleaner
- Soapy water/mild detergent



Warning

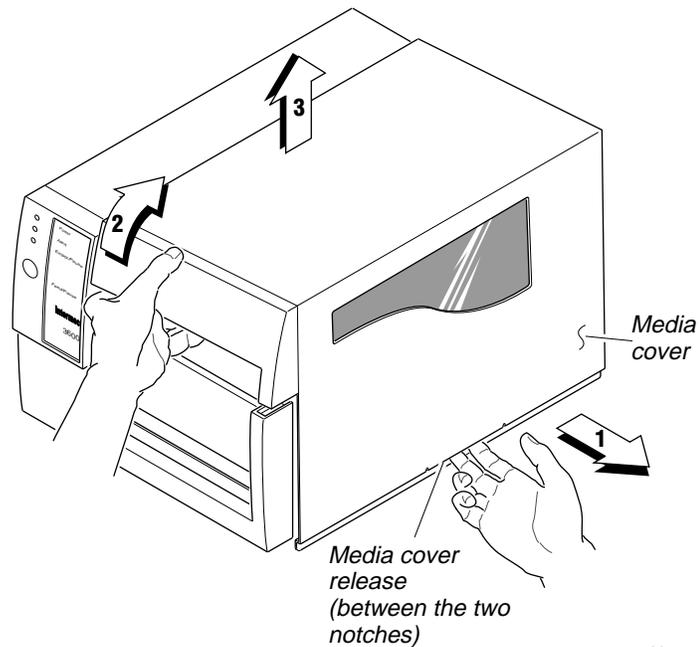
Energized electrical equipment is dangerous. Switch off the printer power and remove the power cord before cleaning any part of the printer. Failure to comply can result in injury or death.

Removing the Media Cover

Most of the cleaning procedures require that you remove the media cover.

To remove the media cover

1. Place your fingers in the space at the lower center edge of the media cover and pull the bottom of the cover away from the base of the printer.
2. Grasp the front of the media cover and lift the front of the cover upward.



3600M.010

3. Lift the media cover away from the printer.

Cleaning the Printhead

Since the printhead must maintain close contact with the media to provide good print quality, cleaning media debris from the printhead is very important. Clean the printhead after every roll (or 6,000 inches) of media or whenever necessary.

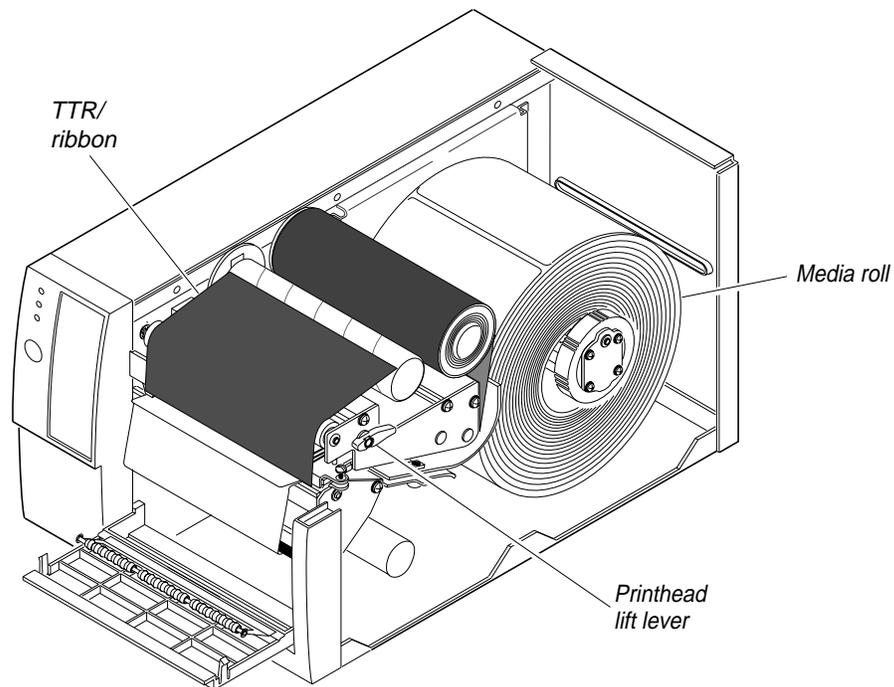


Caution

Do not use sharp objects such as knives or screwdrivers to scrape the printhead clean. Cleaning with sharp objects will damage the printhead. Clean with only a cotton swab, or a clean, lint-free cloth or tissue moistened with isopropyl alcohol.

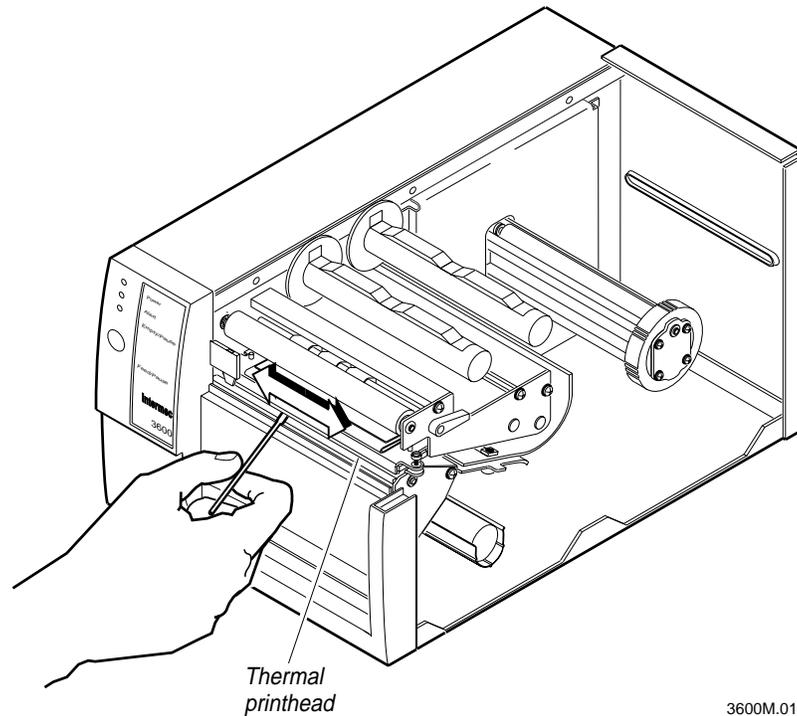
To clean the printhead

1. Remove the media cover.
2. Raise the printhead by rotating the head lift lever clockwise until the printhead releases.



3600M.011

3. Remove the media from the paper path and the ribbon (if installed) from the TTR supply and takeup hubs.
4. Use a cotton swab moistened with alcohol to remove any dirt, adhesive, or debris from the print surface on the bottom of the printhead.



3600M.012

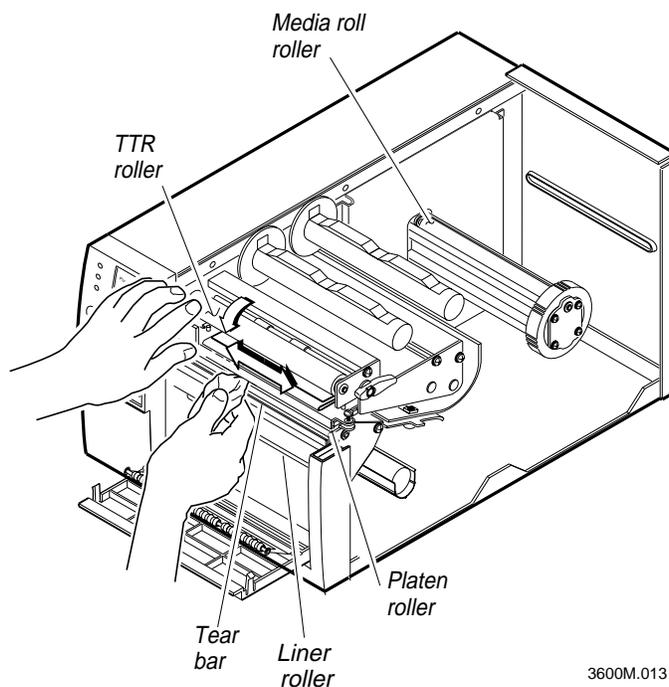
5. Wait 5 to 10 seconds for the print surface to dry. Reload the media (and ribbon if used).
6. Engage the printhead by rotating the head lift lever counterclockwise until it locks in place.
7. If you are finished cleaning, install the media cover.

Cleaning the Rollers and Tear Bar

Cleaning the platen roller and the tear bar preserves print quality by ensuring close contact between the media and the printhead. The TTR roller, liner roller, and media roller are cleaned in the same fashion to minimize general debris and to maximize their efficiency.

To clean the rollers and tear bar

1. Remove the media cover.
2. Raise the printhead by rotating the head lift lever clockwise until the printhead releases.
3. Remove the media from the paper path and the ribbon (if installed) from the TTR hubs.
4. Clean the rollers with a lint-free cloth moistened in isopropyl alcohol. Wipe the cloth over the rollers, rotating each roller so that you clean all of it.



3600M.013

5. Clean both sides of the tear bar with a lint-free cloth moistened in isopropyl alcohol. Remove all traces of dust, paper, and adhesive.
6. Reload the media (and ribbon if used) and then engage the printhead by turning the head lift lever counterclockwise until the printhead locks.
7. If you are finished cleaning, install the media cover.

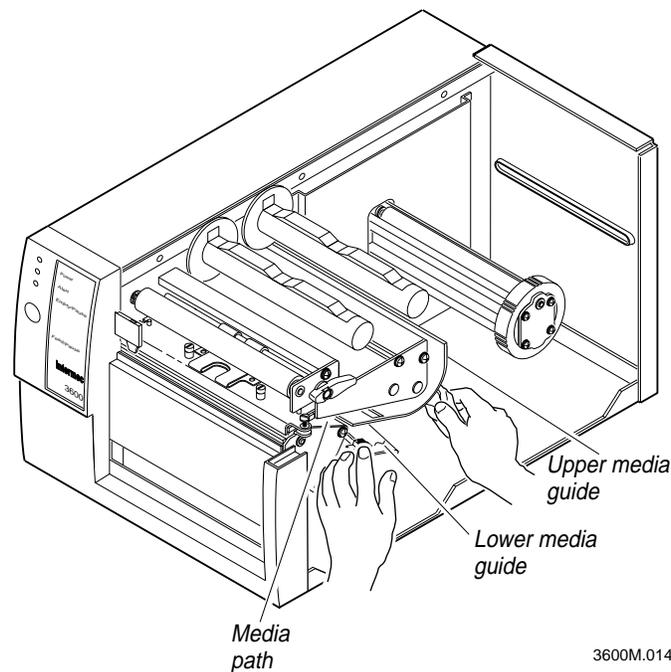
Cleaning the Media Guides and Media Path

Clean the media guides and media path regularly to keep debris off the media surface and printhead where irregularities can spoil print quality or damage the printhead. Cleaning the guides also helps prevent media skewing or improper tracking as it travels through the paper path, which can result in print problems. Always clean the media guides immediately after any label jam in the printer.

Media debris may accumulate around the printer mechanism and along the media path during normal operation of the printer. Clean debris away using a soft bristle brush or vacuum cleaner. Remove all traces of dust, paper, and adhesive. Clean the flat surfaces of the media path (including the edge guide) with a lint-free cloth and isopropyl alcohol. Also remove all traces of dust, paper, and adhesive from the pinch rollers on the media access door.

To clean the media guides and media path

1. Remove the media cover.
2. Remove the media from the paper path and the ribbon (if installed) from the TTR hubs.
3. Pull down and hold the spring-loaded lower media guide to open up the media path.
4. Clean the lower media guide with a lint-free cloth moistened in isopropyl alcohol.

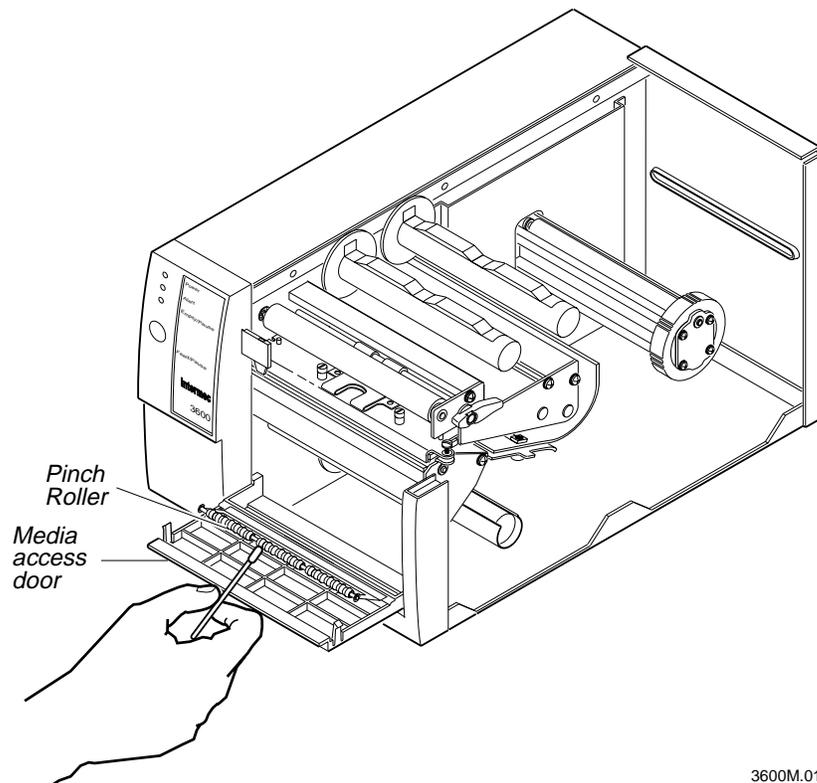


3600M.014

5. Use a lint-free cloth moistened with isopropyl alcohol to clean the upper media guide. Be sure to remove all traces of debris.
6. Reload the media (and ribbon if used).
7. If you are finished cleaning, install the media cover.

To clean the pinch rollers

1. Open the media access door.
2. Use a cotton swab moistened with isopropyl alcohol to clean the pinch rollers. Rotate the rollers to get any debris out of all of the grooves.



3600M.015

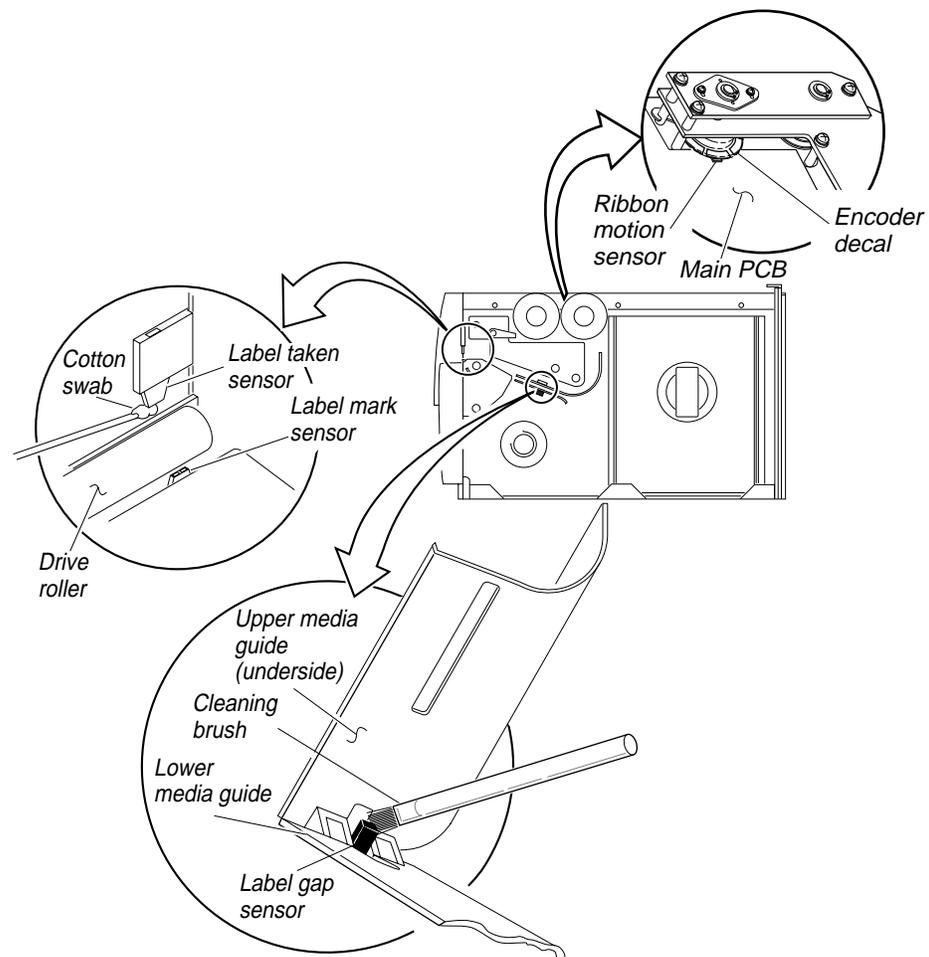
3. If you are finished cleaning, install the media cover.

Cleaning the Label and Ribbon Sensors

There are three label sensors and a ribbon sensor on the 3600 printer that require cleaning: the label taken sensor, the label mark sensor, the label gap sensor, and the ribbon motion sensor.

To clean the sensors

1. Remove the media cover.
2. Raise the printhead by rotating the head lift lever clockwise until the printhead releases.
3. Remove the media from the paper path and the ribbon (if installed) from the TTR hubs.
4. Clean the label taken sensor and the label mark sensor with a cotton swab moistened with isopropyl alcohol.



3600M.016

5. Pull down on the lower media guide to expose the label gap sensor. Using a soft bristle brush, remove all debris and dust from the label gap sensor.
6. Clean the label gap sensor with a cotton swab and alcohol.
7. Remove the electronics cover.
8. Very carefully clean the small ribbon motion optical sensor on the main PCB and the black and white encoder decal on the TTR supply clutch/encoder assembly with a cotton swab moistened with alcohol.
9. Install the electronics cover.
10. Reload the media (and ribbon if used).
11. Engage the printhead by rotating the head lift lever counterclockwise until it locks in place.
12. If you are finished cleaning, install the media cover.

Cleaning the Printer Covers

Clean the 3600 printer covers with a general purpose cleaner (soapy water/mild detergent). Do not use abrasive cleansers or solvents. Be sure to clean the transparent panel on the media cover so that you can see the media supply inside the printer when the cover is closed.

3

Testing and Adjusting

This chapter contains procedures for testing the printer's performance as a quality check during preventive maintenance, as a functional check when troubleshooting, and as part of the repair process after replacing a printer component. This chapter also contains procedures for making adjustments and alignments that ensure the printer is operating normally.

Testing the Printer

If you are on site for preventive maintenance or are following up a corrective action and the printer is working, start conducting quality checks from the Test and Service mode. If you are on site for corrective maintenance, determine if the problem lies with setup and process or the printer itself. Use the Test and Service mode to determine if the printer can print. If it can, perform the communications test.

The quality and efficiency of producing labels reveals if a printer is operating correctly. In addition to analyzing labels to evaluate printer performance, the 3600 printer Test and Service mode allows you to conduct printer tests that include printing test labels (illustrated in this section) with a fixed look so you can compare them to an expected standard. The test labels can be used for checking printhead alignment, printhead bias, dots out of specification, label tracking, and ribbon wrinkling. Test and Service mode functions can be run at the printer or from a host terminal through the use of commands.

If you find a printer lacking in performance after running your tests, check and make the adjustments and alignments necessary to return the printer to normal service. If you cannot get a printer working properly with an adjustment or alignment, troubleshoot for a component failure.

Note: Making the alignments out of order can introduce, not solve printing problems. Review the section about printer alignments before making any changes.

Running Test and Service Mode at the Printer

Note: When the printer is placed in Test and Service mode, it prints out a hardware configuration label, regardless of its initial DIP switch settings, and remains in Test and Service mode until the power is switched off and the DIP switches are reset. Momentarily pressing the Feed/Pause button during a test will cause the test to halt. Holding the Feed/Pause button down will start a new run of whichever test you select.

To enter Test and Service mode and select test functions at the printer

1. Switch off the printer power.
2. Set the DIP switches to select the function that you want to run.
3. Press down and hold the Feed/Pause button while powering on the printer. The printer prints out a hardware configuration label.
4. Hold the Feed/Pause button down for 1 second. The test begins immediately.
5. If you wish to perform another function, repeat Steps 1 through 4. The function currently being executed is terminated and the new function begins.

To exit Test and Service mode

1. Switch off the printer power.
2. Return all DIP switches to their original settings.
3. Switch on the printer power.

Setting DIP Switches

Use the information provided in the following tables and examples to set the DIP switches for the Test and Service mode function that you wish to perform. The "0"s indicate that the switch is in the OFF position and the "1"s indicate that the switch is in the ON position.

Test and Service Switch Settings

	Top Bank								Bottom Bank								
	OFF								ON								
TESTS	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
Test Prints																	
Configurations																	
Hardware	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	A
Software	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	A
Test Labels																	
Print Quality	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	A
Pitch	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	A
Page																	
Single Page	0	0	0	0	1	0	0	0	B	B	B	B	B	0	0	A	
All Pages	0	0	0	1	0	1	1	0	1	1	1	1	1	0	0	A	
Format																	
Single Format	0	0	0	1	1	0	0	0	B	B	B	B	B	0	0	A	
All Formats	0	0	0	1	1	0	1	0	1	1	1	1	1	0	0	A	
UDC																	
Single UDC	0	0	0	0	0	1	0	0	B	B	B	B	B	B	B	A	
All UDCs	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	A	
Font																	
Single Font	0	0	0	1	0	1	0	0	B	B	B	B	B	B	0	0	
All Fonts	0	0	0	1	0	1	1	0	1	1	1	1	1	1	0	0	
Data Line Print	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cloning																	
Receiver	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sender	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Selective Transfer																	
Receiver	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Send Pages																	
Single Page	1	1	0	1	0	0	C	C	C	C	C	D	D	D	D	D	
All Pages	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	
Send Format																	
Single Format	1	1	0	0	1	0	0	0	0	0	0	D	D	D	D	D	
All Formats	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	
Send UDC																	
Single UDC	1	1	0	1	1	0	C	C	C	C	C	C	C	C	0	0	
All UDCs	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0	
Send Font																	
Single Font	1	1	0	0	0	1	C	C	C	C	C	D	D	D	D	0	
All Fonts	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	
Send Configuration	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	
Send Tables	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	
Send All	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	
Memory Reset																	
Page/Format	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
UDC/Font	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Configuration	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
Tables	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
All	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	

A: OFF = Batch of 1. ON = Batch of 100.
 B: Page/Format/UDC/Font number. Least significant bit first.
 C: Source Page/Format/UDC/Font number. Least significant bit first.
 D: Destination Page/Format/UDC/Font number. Least significant bit first.

3600M.020

Test and Service Configuration Settings

O = OFF
1 = ON

	Top Bank								Bottom Bank							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Label Rest Point	O	1	1						N	N	N	N	N			
Adjust Forward				O					N	N	N	N	N			
Adjust Backward				1					N	N	N	N	N			
86XX Emulation	1	O	1													
Advanced Mode					O	O										
10 Mil					1	O										
15 Mil					1	1										
X Forms Adjust	1	1	1	1					N	N	N	N	N			
Adjust Forward							O		N	N	N	N	N			
Adjust Backward							1		N	N	N	N	N			
Y Forms Adjust	1	1	1	O					N	N	N	N	N			

N: Number. Least significant bit first.

3600M.021

Dot Increment Switch Settings

0 = OFF
1 = ON

	Bottom Bank				
	1	2	3	4	5
# of dot increments					
1	1	O	O	O	O
2	O	1	O	O	O
3	1	1	O	O	O
4	O	O	1	O	O
5	1	O	1	O	O
6	O	1	1	O	O
7	1	1	1	O	O
8	O	O	O	1	O
9	1	O	O	1	O
10	O	1	O	1	O
11	1	1	O	1	O
12	O	O	1	1	O
13	1	O	1	1	O
14	O	1	1	1	O
15	1	1	1	1	O
16	O	O	O	O	1
17	1	O	O	O	1
18	O	1	O	O	1
19	1	1	O	O	1
20	O	O	1	O	1
21	1	O	1	O	1
22	O	1	1	O	1
23	1	1	1	O	1
24	O	O	O	1	1
25	1	O	O	1	1
26	O	1	O	1	1
27	1	1	O	1	1
28	O	O	1	1	1
29	1	O	1	1	1
30	O	1	1	1	1

3600M.022

Printing Test Labels

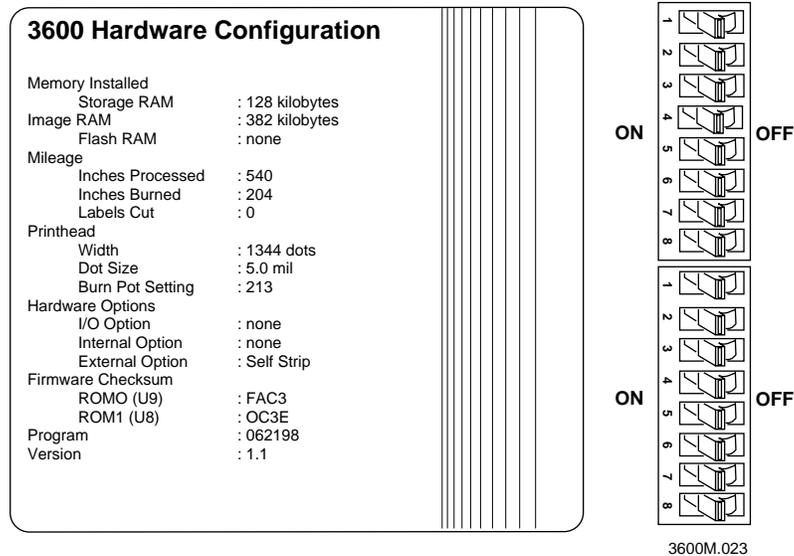
The test labels can be used for checking printhead alignment, printhead bias, dots out of specification, label tracking, and ribbon wrinkling. The examples show the DIP switch settings that select the illustrated label.

Hardware Configuration

The hardware configuration label is the first label printed when you enter Test and Service mode. This label serves as a configuration reference as well as an alphanumeric and alignment print test. This label contains the following information and uses:

- Printer memory including both storage and image RAM.
- Printer mileage including inches processed and inches burned.
- Printhead settings including width, dot size, and burn pot setting.
- Firmware checksum, program, and version number.
- Vertical lines for evaluating printhead alignment.

To achieve the highest quality label, print the hardware configuration label at a speed of 3 ips (inches per second).



Software Configuration

This three-label set lists current configuration parameters that are set from the host computer. It also lists defined pages, formats, graphics, fonts, and installed options. This label serves as a configuration reference as well as an alphanumeric and multiple label alignment and print test.

<p>Program Version : 1.1</p> <p>Pages Defined : 0</p> <p>Formats Defined : 0, 19</p> <p>Fonts Defined : 0, 1, 2, 7, 20 21, 22, 23, 24, 25, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41</p> <p>Graphics Defined : none</p>	<p>PRINT SPEED - 3.0 IPS RIBBON SAVE - Disabled</p> <p>IMAGE BANDS - 3 SELF STRIP - Disabled</p> <p>MAX LABEL LENGTH - 4 inches CUTTER - Disabled</p> <p>LABEL STOCK - Inter-label gap DARK ADJUST - 0</p> <p>MEDIA TYPE - Direct Thermal X FORMS ADJUST - 0</p> <p>MEDIA LENGTH - 0 inches Y FORMS ADJUST - 10</p> <p>CHARACTER SET - US ASCII LABEL REST POINT - 0</p> <p>TRANSLATION - Disabled SENSITIVITY - 420</p> <p>EMULATION - Disabled</p> <p>LABEL RETRACT - Enabled</p>	<p>BAUD RATE - 9600</p> <p>DATA BITS - 7</p> <p>MESSAGE LENGTH - 255</p> <p>PARITY - Even</p> <p>STOP BITS - 1</p> <p>PROTOCOL - Xon/Xoff No Status</p> <p>DEVICE ADDRESS - A</p> <p>INTERNAL OPTIONS - none</p> <p>EXTERNAL OPTIONS - Self Strip</p>	
--	---	---	--

3600M.024

Print Quality

This label contains bar codes and human readable fields that you can use to determine whether the printer you are testing is attaining the best print quality possible. If you notice problems with the print quality, check and perform the adjustment and alignment procedures provided in this chapter to achieve optimum printer performance.

<table border="1"> <tr> <td>MODEL 3600</td> <td>CODE 39 3.0 / 1</td> <td>CODE 39 3.0 / 1</td> <td>CODE 39 2.5 / 1</td> </tr> <tr> <td>Prog 062198 Version 1.1</td> <td>*SUPPLIER*</td> <td>INTERMEC Corporation Everett, VA 98203</td> <td>*PICKET FIELD*</td> </tr> <tr> <td>*PICKET FIELD*</td> <td>*PICKET FIELD*</td> <td></td> <td></td> </tr> <tr> <td>*PICKET FIELD*</td> <td></td> <td></td> <td></td> </tr> </table>	MODEL 3600	CODE 39 3.0 / 1	CODE 39 3.0 / 1	CODE 39 2.5 / 1	Prog 062198 Version 1.1	*SUPPLIER*	INTERMEC Corporation Everett, VA 98203	*PICKET FIELD*	*PICKET FIELD*	*PICKET FIELD*			*PICKET FIELD*				
MODEL 3600	CODE 39 3.0 / 1	CODE 39 3.0 / 1	CODE 39 2.5 / 1														
Prog 062198 Version 1.1	*SUPPLIER*	INTERMEC Corporation Everett, VA 98203	*PICKET FIELD*														
PICKET FIELD	*PICKET FIELD*																
PICKET FIELD																	

3600M.025

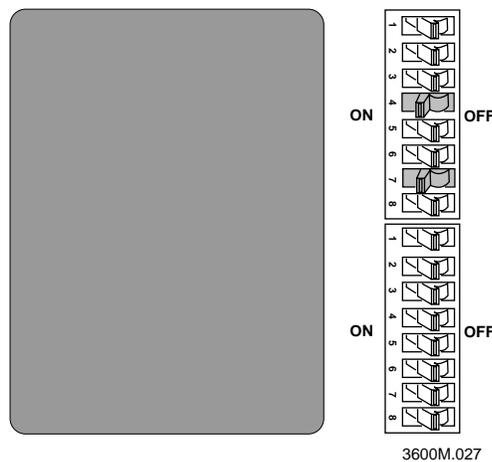
Format

This label, which can be a test of a single format or can provide a two-label sample of all the formats, has bar codes and human-readable fields that you can use to determine whether the printer you are testing is attaining the best print quality possible using a particular format.



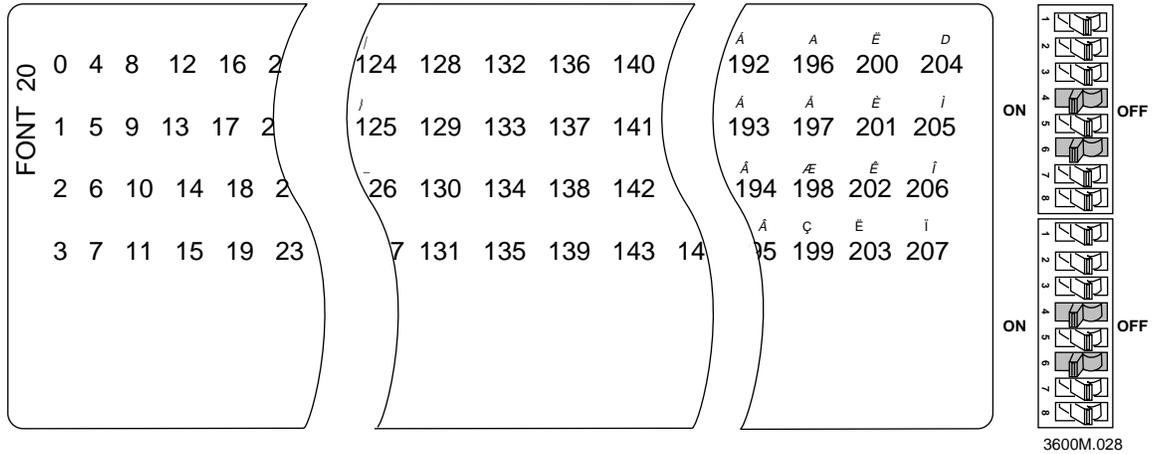
Pitch

This label is a gray scale printout of every third dot. The test label should present a regular pattern with dots that line up diagonally when held at an angle. Look for irregularities that may signal a problem with the platen roller or the media path. If the printhead is uneven or the print path is skewed, it will be reflected in this label. Use this label to determine whether the printhead is printing evenly, but use the actual customer format to pass/fail the printhead.



Font

This is a multiple-label test of the available fonts. You can test a single font (Font 20 shown) or all of the fonts. An all-font test will use a lot of media. It is better that you test one font at a time to make your determinations.



Page

These labels test the ability to download and correctly print single or multiple pages (a group of labels always printed together) of label data from a host. The data can be yours or the customer's, but you should include a test of the customer's labels to determine whether the printer you are testing is attaining the best print quality possible with the customer's data.

UDC

This label tests the ability to download and correctly print single or multiple user-defined characters (bitmap graphic) from a host. The data can be yours or the customer's, but you should include a test of the customer's labels to determine whether the printer you are testing is attaining the best print quality possible with the customer's data.

Running Test and Service Mode From a Host Computer

When conducting Test and Service mode functions from a computer, hardware diagnostic information is uploaded to the host from the printer.

The following table describes the commands you would issue from a host terminal to run the Test and Service mode. To select Test and Service mode from Print mode, send <ESC>T from the host terminal.

Note: All commands in Test and Service mode end with the command terminator (;), except the last command in a message.

Test and Service Mode Command Descriptions

Command Code	Test	Description
A	Transmit Ambient Temperature*	Transmits the ambient temperature sensor output back to the host. The value ranges from 00 to FF.
B	Printhead Resistance Test*	Causes the printer to begin the printhead resistance test. The printer will respond with the ASCII character string "pass" or "fail."
C	Print Pitch Label	Causes the printer to print the pitch label.
D	Reset Printer Configuration	Sets the printer configuration to the factory defaults.
G	Transmit Transmissive Sensor Value	Transmits the label gap output back to the host. Values range from 00 to FF.
K	Dark Adjust*	This command changes the darkness of the print on your labels. It is for fine-tuning only.
L	Transmit Paper Path Open Sensor Value*	Transmits the Paper Path Open switch value back to the host. A value of 0 indicates the paper path is open and a value of 1 means it is closed.
M	Transmit Reflective Sensor Value	Transmits the label mark reflective sensor output back to the host. The values range from 00 to FF.
P	Transmit Printhead Temperature Sensor Value	Transmits the Printhead Temperature Sensor output back to the host. Values range from 00 to FF.
Q	Print Quality Label	Causes the printer to print out the print quality program and model number label.
R	Exit Test and Service	Causes the printer to exit Test and Service mode.

* The printer ignores this command.

Test and Service Mode Command Descriptions (continued)

Command Code	Test	Description
S	Transmit Printhead Resistance Values*	Transmits the average, maximum, or minimum printhead dot resistance value back to the host. Each value is a numeric data string separated by a comma.
T	Transmit Label Taken Sensor Value	Transmits the label taken sensor output back to the host. Values can range from 00 to FF.
U	Transmit 40V Supply Value*	Transmits the 12V supply output back to the host. The values range from 00 to FF.
V	Transmit 24V Supply Value*	Transmits the 24V supply output back to the host. Values can range from 00 to FF.

* The printer ignores this command.

Testing Printer and Host Communications

This is a simple test of host-to-printer communications. If this test fails, there may be a problem with the printer serial port receiver circuitry or the setup.

To test host-to-printer communications

1. Switch the printer power off. Return the DIP switch settings to the standard configuration if they have been changed.
2. Press and hold the Feed/Pause button while powering on the printer. The printer presents the hardware configuration test label.
3. Release the Feed/Pause button after the hardware configuration label is printed. You are now in data line print mode within the Test and Service mode.
4. Send down some characters from the host. At this point the printer does not attempt to interpret any printer commands, but simply prints each character and its hexadecimal equivalent as it is received. If you are using a PC running DOS, send down the following strings of commands from the DOS prompt:

Note: ^Z is [Ctrl] [Z].

```
\MODE COM1: 96,E,7,1,N [Enter]  
(to configure the serial port)
```

```
\COPY CON COM1: [Enter]  
(tells the PC to copy the following text to the COM1 port)
```

```
ABCDEF^Z [Enter]  
(these characters are sent to the printer)
```

5. A good test will result in the following printout :

A B C D E F
41 42 43 44 45 46

3600M.029

6. To enter normal print mode again, switch the printer power off and then on again.

If this test does not work, recheck after you make sure that the DIP switches are set to the default configuration and that the printer cable is securely plugged into COM1 of your PC.

Note: If you are using a different platform to communicate with your printer, refer to your host computer user's manual and the 3600 Bar Code Printer User's Manual for more detailed information about downloading commands.

Adjusting the Printer

The following procedures provide instructions for adjusting the print bias, the print intensity (darkness), the label mark sensor, the label gap sensor, the label taken sensor, and the printhead fine adjustment lever on the 3600 printer.



Warning

Always disconnect the power cord before removing the electronics cover unless a procedure requires the unit to be energized. Failure to disconnect the power cord may result in injury or death due to electric shock.



Caution

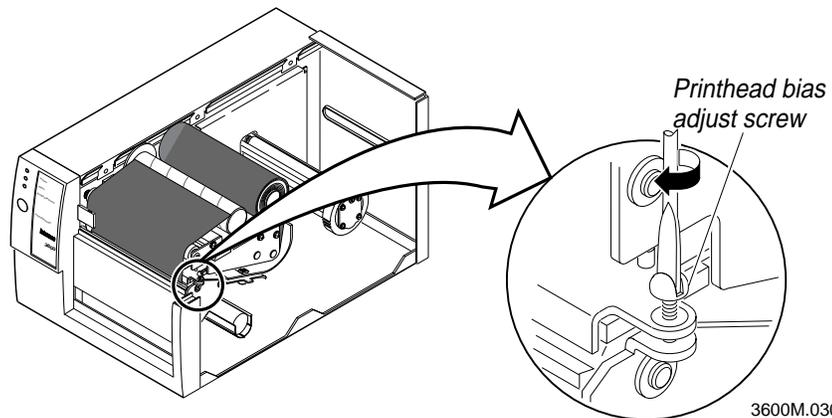
The printhead and integrated circuits on printer circuit boards in this equipment are sensitive to damage by electrostatic discharge (ESD). Prevent ESD by always wearing skin contact ground straps firmly attached to the equipment metal base assembly when working inside of the equipment housing. Failure to comply can result in damage to components or the printhead.

Adjusting the Print Bias for Print Quality

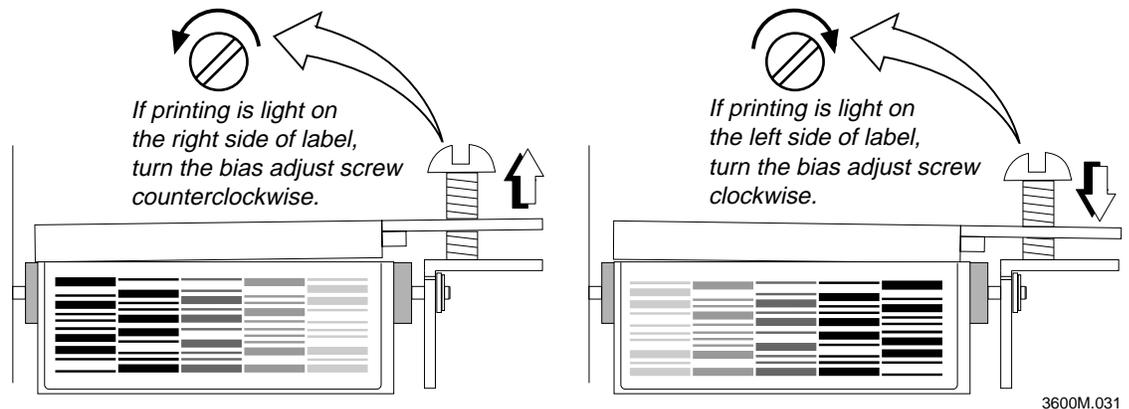
Adjust the bias with a straight-slot screwdriver if the printhead is not making even contact with the media. Using different width media, especially narrow media, can result in uneven contact or a spot where there is no media between the printhead and the platen roller. Extra wear and damage can occur if narrow media is used for extended periods with incorrect bias.

To adjust the bias adjust screw

1. Remove the media cover and locate the bias adjust screw.



2. Turn the bias adjust screw counterclockwise to compensate for light print on the right side of the label; turn the bias adjust screw clockwise to compensate for light print on the left side.



3. Install the media cover.

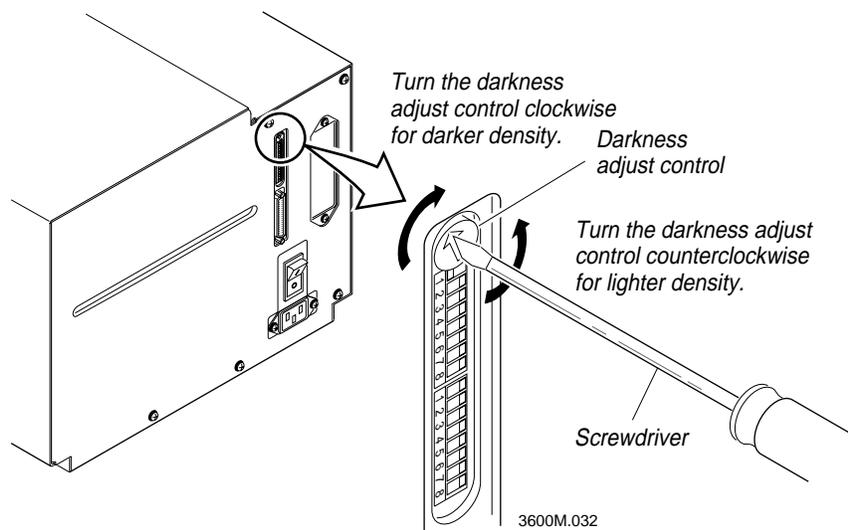
Adjusting the Print Intensity

Note: Before you adjust print intensity, verify the sensitivity rating for the media matches the rating set in the printer.

Use the darkness adjust control in combination with the darkness adjust command <SI>d to fine-tune the intensity of print on your customer's labels. The fine adjustments compensate for variations in the media ("lot to lot"), the printhead, or the printer. Set the darkness adjust control with a small straight-slot screwdriver after entering the proper sensitivity number.

To adjust the print darkness control

1. Locate the darkness adjust control on the back of the printer. Make adjustments with a small straight-slot screwdriver.

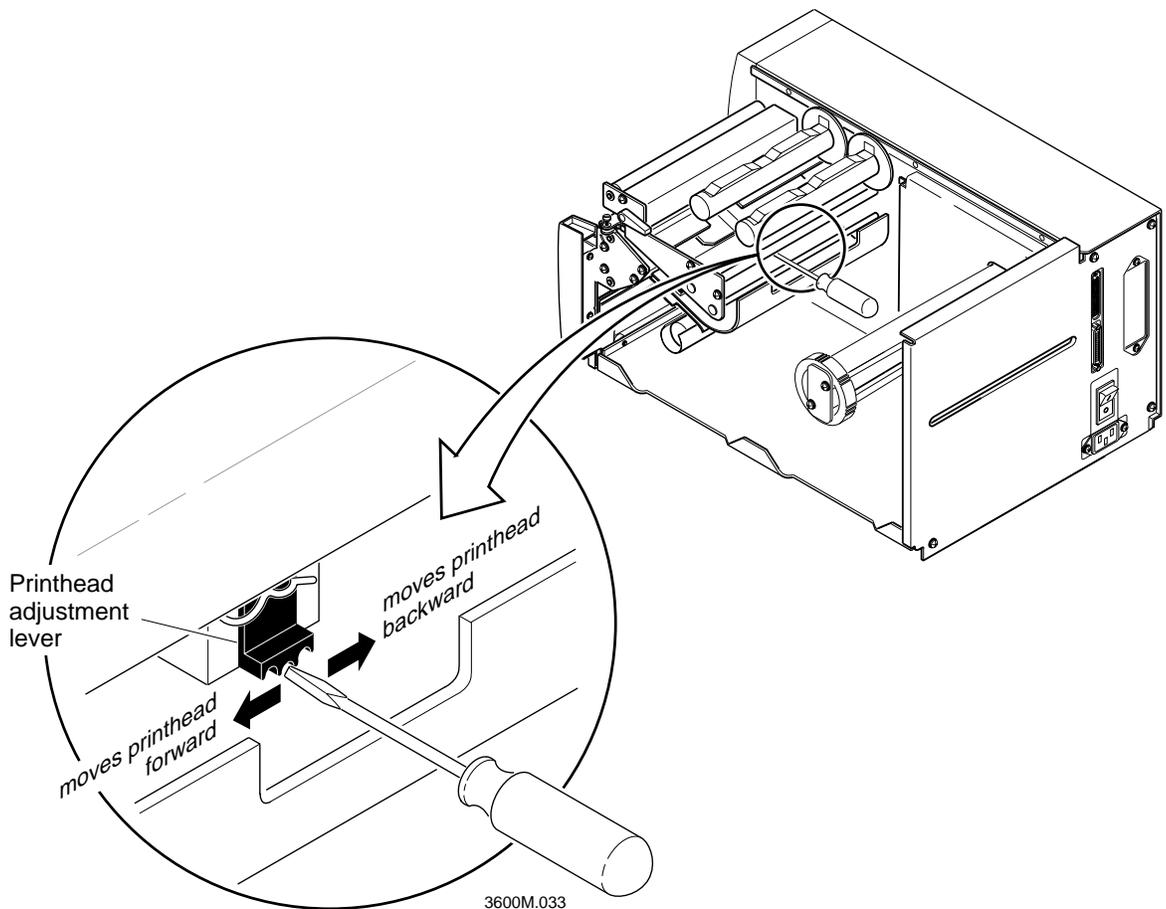


2. Increase the darkness by turning the darkness adjust control clockwise or decrease the darkness by turning the control counterclockwise. Run a test print to evaluate the print quality.

Adjusting the Printhead Adjustment Lever for Print Quality

The printhead adjustment lever is located at the end of the printhead pivot bracket. It allows fine-tuning of the printhead fore/aft position. The printhead adjustment lever provides three steps forward movement of the printhead and three steps backward movement from center position in 0.006-inch increments.

To achieve the best print quality, raise the printhead with the printhead lift lever and position the printhead adjustment lever as shown in the illustration: from the rear, adjust clockwise/left to move the printhead forward, or adjust counterclockwise/right to move the printhead backward.



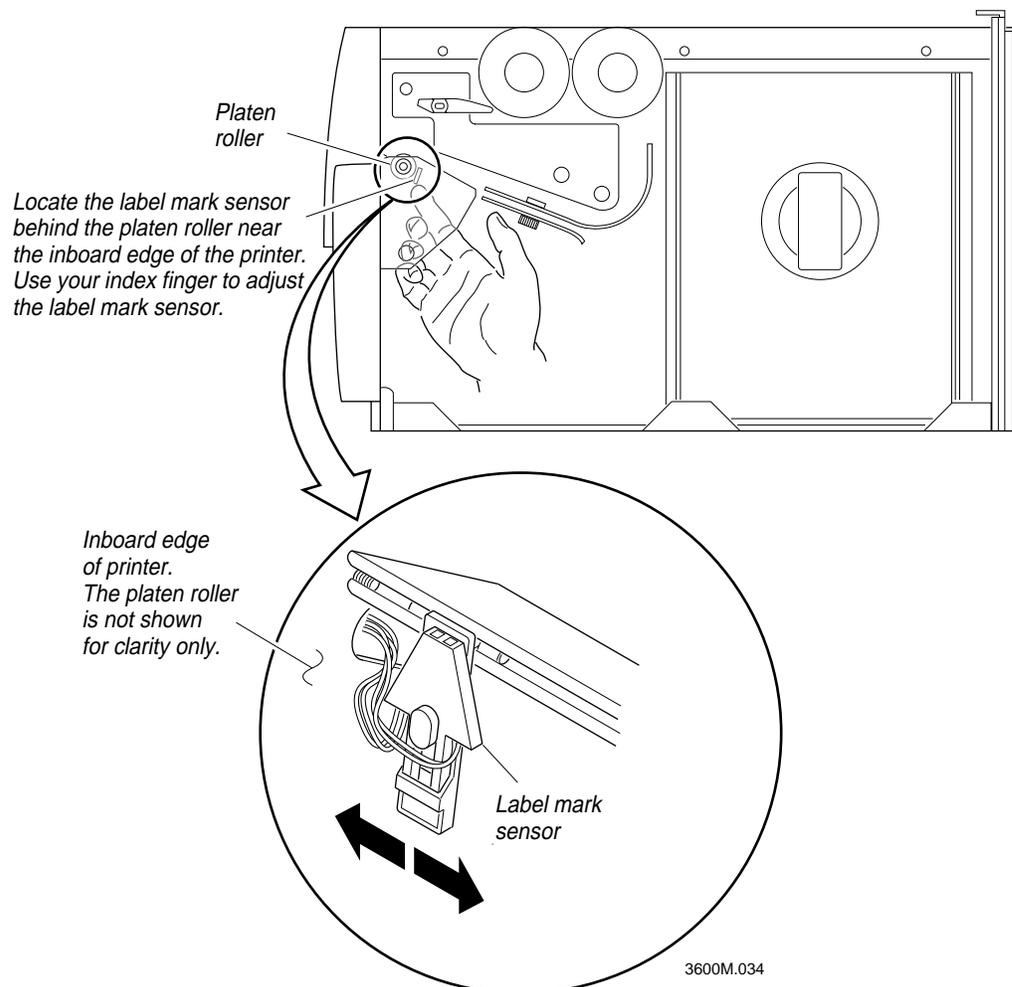
Adjusting the Label Mark Sensor

The mark sensor detects the mark on the back of continuous media stock. The output is then used to determine the start of print point. This sensor is located under the label pathway across from the platen roller. Two adjustments affect the performance of this sensor, its physical position and sensitivity. To perform this procedure, you need the following tools:

- Digital multimeter
- #2 Phillips screwdriver
- Small straight-slot screwdriver

To position the label mark sensor

1. Remove the media cover.
2. Use your finger to reach underneath the lower guide.

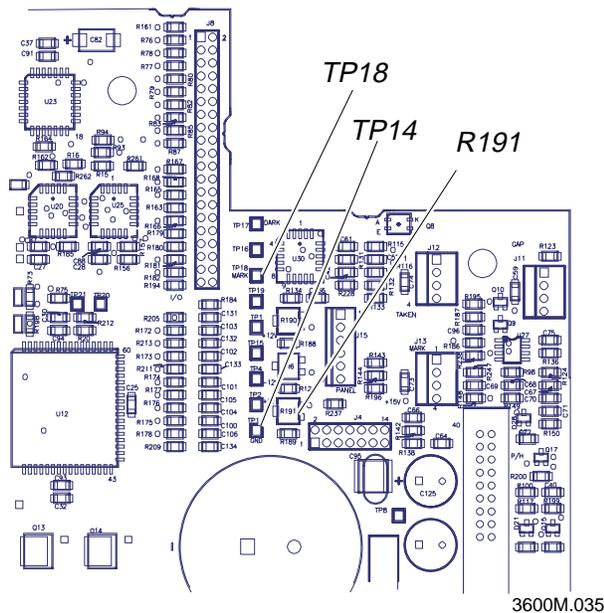


3600M.034

- Slide the mark sensor into a position that centers it over the label mark as the media passes by. It is adjustable from the inboard edge of the extrusion to one half of the paper path width toward the outboard edge.

To adjust the label mark sensor potentiometer sensitivity

- Remove the electronics cover
- Switch on the printer power.
- Enable the printer for mark sensing using the <SI>T{2} command.
- Connect the positive lead of a digital voltmeter to TP18 (MARK) and the negative end to TP14 (GND) on the main PCB.



- Place the white portion of a label under the mark sensor.
- Adjust R191 on the main PCB so the voltage at TP18 is $1V \pm 0.2V$.
- Place the black mark portion of the label under the mark sensor.
- The voltage at TP18 should now be greater than 2.5V.
- Install the printer electronics cover and the media cover.
- Check the printer for proper operation.

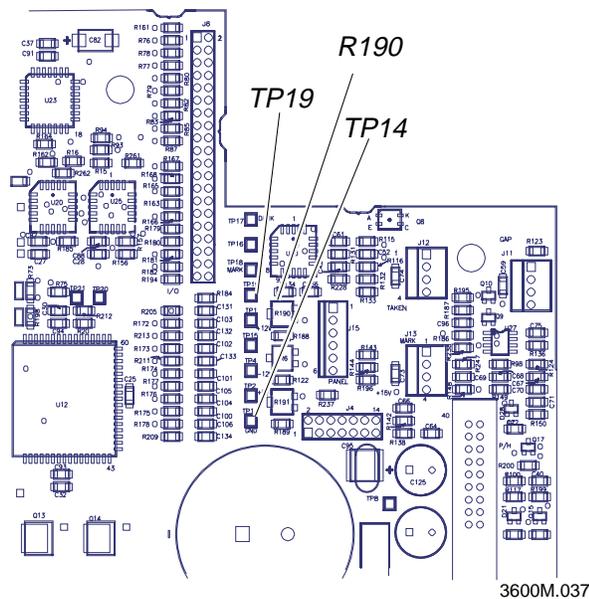
Adjusting the Label Taken Sensor

The label taken sensor output enables the software to determine that a label has been taken by detecting the label's presence. To perform this procedure, you need the following tools:

- Digital multimeter
- #2 Phillips screwdriver
- Small straight-slot screwdriver

To adjust the label taken sensor

1. Remove the media cover and the electronics cover.
2. Connect the positive lead of a multimeter to TP19 (TAKEN) and the negative lead to TP14 (GND) on the main PCB.



3. Switch on the printer power.
4. Feed one label out of the printer so that it rests under the label taken sensor in a correct orientation.
5. Adjust R190 on the main PCB until the voltage at TP19 is $1.2V \pm 0.2V$.
6. Remove the label from under the label taken sensor.
7. The multimeter reading at TP19 should now read above 4.5V.
8. Install the printer electronics cover and the media cover.
9. Check the printer for proper operation.

Aligning the Printer

The following procedures provide instructions for aligning the rollers, aligning the printhead, and aligning the ribbon supply hub on the 3600 printer.

Note: These alignments should be made in the sequence given. Performing them out of order can introduce and not solve printing problems.



Warning

Always disconnect the power cord before removing the electronics cover unless a procedure requires the unit be energized. Failure to disconnect the power cord may result in injury or death due to electric shock.



Caution

Integrated circuits on printer circuit boards in this equipment are sensitive to damage by electrostatic discharge (ESD). Prevent ESD by always wearing skin contact ground straps firmly attached to the equipment metal base assembly when working inside of the equipment housing. Failure to comply can result in damage to components.



Caution

Align only one outboard plate at a time (either upper or lower) to put the rollers back into factory alignment. If both plates are loosened, it may not be possible to align the rollers outside of the factory.

Aligning the Rollers

You should perform this procedure every time an outboard plate is removed or replaced. To perform this procedure, you need the following tools:

Note: If the printer you are servicing has upper outboard plate Intermec Part No. 062476-002 installed, you need to replace it with a new upper outboard plate Intermec Part No. 063225-001 before you can perform the following roller alignment.

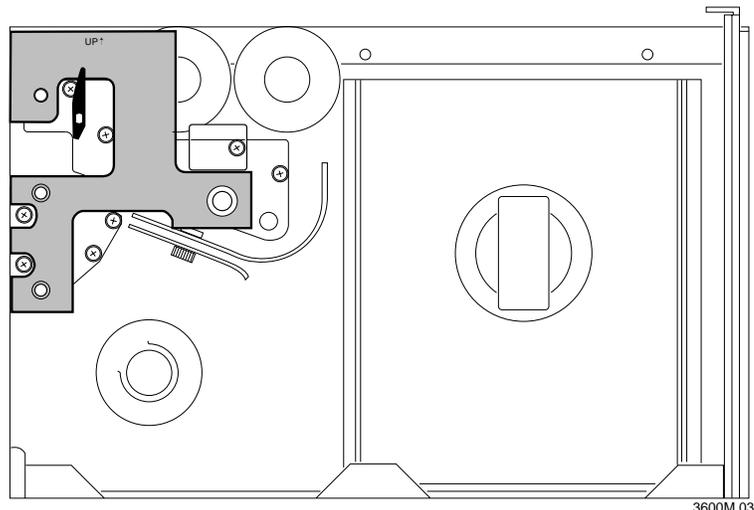
- Roller alignment tool, Intermec Part No. T43150
- #2 Phillips screwdriver

To align the rollers

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to Chapter 5, "Remove and Replace Procedures," for detailed instructions).
3. Raise the printhead with the printhead lift lever. Remove media and ribbon if loaded.
4. Loosen the Phillips screws on the outboard plate that you are aligning.

Note: Align only one outboard plate at a time (either the upper or the lower) to put the rollers back into factory alignment. If both plates are loosened, it may not be possible to align the rollers outside of the factory.

5. Align the three holes in the roller alignment tool with the platen roller, the liner roller, and the TTR roller. The fourth hole in the roller alignment tool fits over the black plastic cap closest to the front of the printer.



- When the tool fits properly on all of the rollers and the bushing, tighten the screws on the outboard plate that you are aligning.
- Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
- Install the electronics cover.
- Reload media (and ribbon if used).
- Install the media cover and the power cord.
- Switch on printer power and check for proper operation.

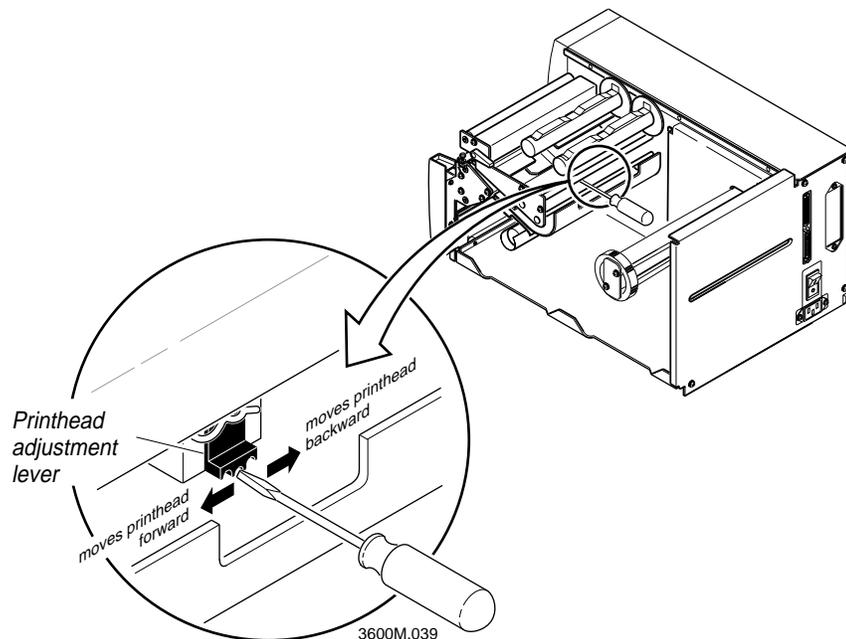
Aligning the Printhead

Align the printhead only if necessary. To perform this procedure, you need the following tools:

- Printhead alignment tool, Intermec Part No. T43099
- 9/64-inch Allen screwdriver

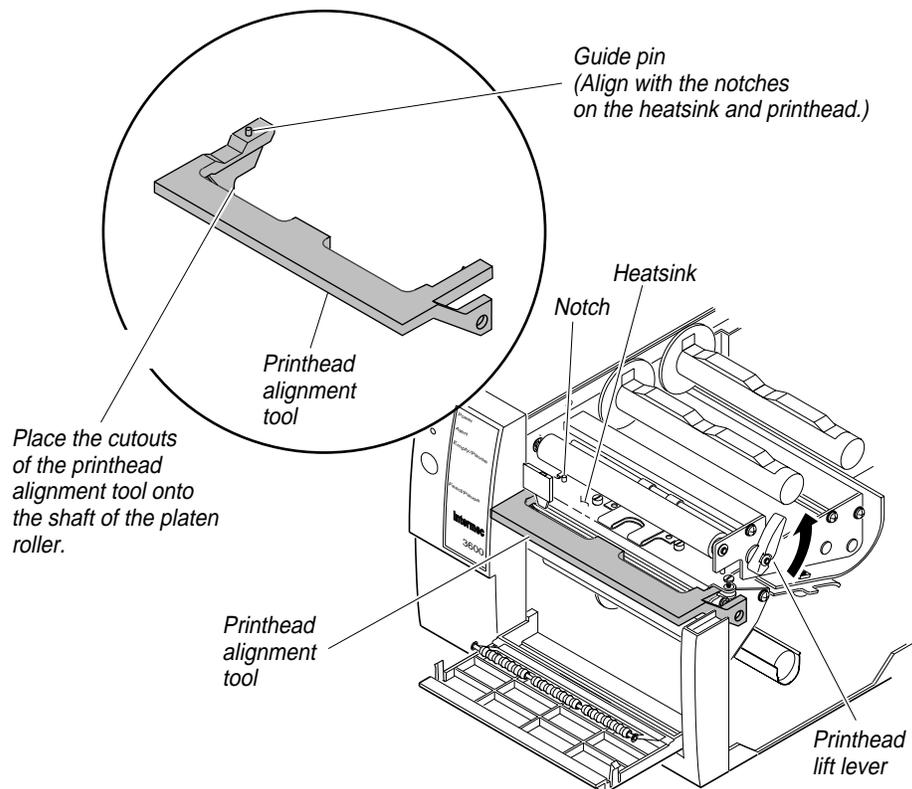
To align the printhead

- Switch off the printer power. Remove the power cord and the media cover.
- Raise the printhead with the printhead lift lever. Remove media and ribbon.
- Position the printhead adjustment lever clockwise/left two clicks during the printhead alignment. Loosen the two Allen screws located on the printhead yoke at the back of the printhead heatsink.



Note: This is a change in procedure from previous printhead alignment instructions that directed the printhead adjustment lever to be in the neutral/center position during alignment.

4. Install the printhead alignment tool and press the printhead assembly down on the platen roller. Align the tool with the notches in the heat sink and the printhead.
5. Alternately tighten the two 9/64 inch printhead yoke screws until secure.
6. Remove the printhead alignment tool.
7. Return the printhead adjustment lever to the neutral/center position.
8. Reload media (and ribbon if used).
9. Install the media cover and the power cord.
10. Switch on printer power and test for proper printhead alignment by printing out the print quality and pitch labels.



3600M.040

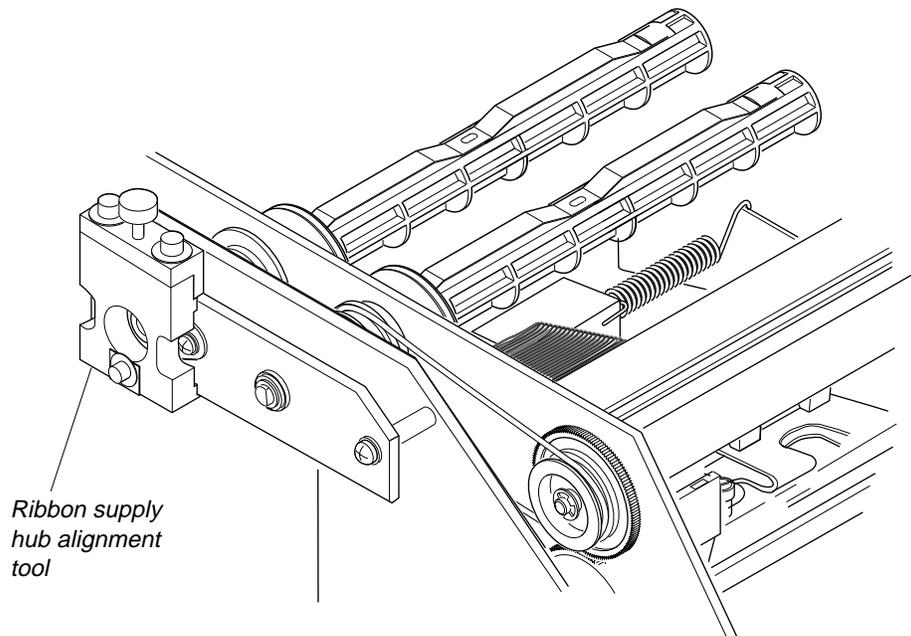
Aligning the TTR Supply Hub

You should align the TTR supply hub only if you are experiencing ribbon wrinkle on full width ribbon after the rollers and printhead have been aligned. To perform this procedure, you need the following tools:

- TTR supply hub alignment tool, Intermec Part No. T43149
- #2 Phillips screwdriver

To align the TTR supply hub

1. Switch off the printer power.
2. Remove the media cover and the electronics cover.
3. Install the TTR supply hub alignment tool as shown.



3600M.041

4. Tighten the alignment tool thumbscrew so the bushing tab is flush against the bushing on the hub adjustment plate.
5. Loosen the two screws securing the hub adjustment plate.
6. Switch on the printer power.
7. Print a series of the same kind of labels that were having the ribbon wrinkling problem. While they are printing, adjust the TTR supply hub up or down (with the thumbscrew on the tool) until ribbon wrinkling is eliminated.

Note: If this adjustment does not eliminate ribbon wrinkling, try readjusting the ribbon supply hub and realigning the printhead.

8. When an alignment is achieved that eliminates the ribbon wrinkling, tighten the two screws on the hub adjustment plate.
9. Remove the tool and retest for ribbon wrinkling.
10. After the printer is correctly adjusted, switch off the power and reattach the electronics and media covers.



Troubleshooting

This chapter provides you with information that will help you determine why a printer may not be working and how to get it working again.

About Troubleshooting and Repair

Use the information in this chapter to identify the cause of a failing printer. It is assumed that a printer is not working and that the troubleshooting actions referenced in the user's manual were not used, failed to clear the problem, or pointed to a printer malfunction.

Troubleshooting Tips

One of your first concerns is to duplicate and isolate the problem, to confirm if the problem is the printer or not. Usually the printer was already working at some point before you were called, so start with the last time it worked and move forward logically, considering what might have changed since then. Do not neglect to check simple things like, "Is the printer plugged in? Is there power at the outlet? Are all of the connections good?" Spend a minute visually examining the unit and considering the situation to see if anything obvious stands out.

Where to Start

If you have not already done so, review the user's troubleshooting information in this chapter and use tests from Chapter 3, "Testing and Adjusting," to determine if and how the printer performs offline. If you have a working installation at hand, consider the value and difficulties of trying the printer in a known good working location. If you take this kind of action, be careful not to cause additional problems or confuse your search.

If you decide you need to and can, carefully and logically swap known good printers, subassemblies, or components with failing or suspect items as a means of isolating the cause of the problem. Do not do this if you think any known good item can be damaged.

Repair

Repair is whatever action you take to eliminate the problem that you are on site to fix. If "repair" is the removal and replacement of a key printer component, refer to Chapter 5, "Remove and Replace Procedures."

Troubleshooting Checklist

If the host receives an error message or a functional problem with the printer is encountered, the user's manual starts with the following:

- Check whether the printer sends an error code to the host in response to a <BEL> command.
- If an error code is sent, find it in the "Error Codes" table in this chapter. Try the solution given for the respective error code to attempt to correct the problem.
- If the printer does not send an error message to the host, try to match the symptom of your failure in the "Printer Operation Problems" or "Print Quality Problems" tables in this chapter. Try the solution given for the respective symptom to attempt to correct the problem.
- Clean the printer components and check all connections.

Error Handling

This section describes how the 3600 printer handles certain error conditions it may encounter in printer or programming commands. Error codes sent to the host, the problem the code is reporting, and the usual solution are listed in a table at the end of this section.

Syntax Errors

The 3600 printer responds to syntax errors in the messages it receives from the host by attempting to execute the commands. It does not ignore a command with a syntax error. Instead, the printer produces output, even if it is erroneous, which gives you an indication of what went wrong and what should be done to correct the problem.

Parameter Errors

Certain commands require optional parameters. If these parameters are not supplied, default values are substituted. If a parameter is above its maximum range limit, the maximum value is used. If it falls below the minimum range, the minimum value is used. The range and the default value for each command are listed in Chapter 6 of the user's manual.

Image Overrun Errors

Image overrun occurs when a label is too complex to image for a given print speed. An overrun will cause the printer to abort the label being printed. This error is most common on labels over 5 inches long.

The printer automatically attempts to correct for this error condition by resetting to the lowest print speed and to the highest number of image bands, and then repeats printing the label. The printer remains at this setting until you reset it. If an image overrun still occurs, printing for that batch of labels stops and any following commands are executed.

Installing the optional 512K memory expansion prevents image overrun errors.

Invalid Numeric Character Errors

If non-numeric characters are included within a numeric data string in a command, the printer disregards them and continues to process the rest of the valid numeric characters. However, if a non-numeric character begins the numeric data string, the printer uses a default value for the affected command.

Here are two examples of valid numeric character strings and one example of an invalid string:

12a	valid
1a2	valid
a12	invalid

Insufficient Storage RAM Errors

Before storing new formats, graphics, or user-defined fonts in the static RAM, the printer checks to see if it has sufficient memory to store them. If there is insufficient memory, the last editing session is disregarded. The printer is designed to preserve the integrity of the existing data in the static RAM.

Error Codes

Most of the problems you may encounter cause the 3600 printer to send an error code to the host. When this happens, find the error code in the following table and try the solution given to attempt to correct the problem.

Printer Errors

Error Code	Problem	Solution
00	No error.	
01	Invalid bar code check character.	Verify the bar code check character modifier used in the bar code program command.
02	Invalid number of bar code characters (Code UPC/EAN).	Verify the number of bar code characters used in the bar code program command.
04	Bar code check character within numeric field marks.	Check the bar code program command for accuracy.
05	Supplemental delimiter within numeric field marks (Code UPC/EAN).	Check the bar code program command for accuracy.
06	Invalid supplemental character count (UPC/EAN).	Check the bar code program command for accuracy.
07	More than one supplemental delimiter (Code UPC/EAN).	Check the bar code program command for accuracy.
08	Invalid start/stop characters (Codabar).	Verify start and stop characters in the label format.
11	Invalid bar code data.	Verify data in the label format.
12	Data count exceeded.	Data count should not exceed what is specified for the field.
13	Entering data in non-data entry field.	Check the field for accuracy.
21	Quantity or batch count out of range.	Quantity of labels or number of batches should be between 1 and 9999.
22	Field increment/decrement out of range.	Quantity should be between 1 and 9999.
23	Intercharacter/message delay out of range.	Delay should be between 0 and 9999.
24	Missing preamble/postamble data.	Delete the setup for preamble or postamble data, or include the data.
25	Invalid format transmission syntax.	Check the format transmission syntax. The correct syntax is <ESC>x{n} with n ranging from 0 to 19.
26	Invalid page transmission syntax.	Check the page transmission syntax. The correct syntax is <ESC>y{n} with n ranging from 0 to 9.
27	Invalid font transmission syntax.	Check the font transmission syntax. The correct syntax is <ESC>v{n} with n ranging from 0 to 24.
28	Invalid UDC transmission syntax.	Check the UDC transmission syntax. The correct syntax is <ESC>u{n} with n ranging from 0 to 99.

Printer Errors (continued)

Error Code	Problem	Solution
32	Non-immediate command or data received after buffer full.	Allow the printer to empty the buffer contents before sending commands or data.
33	Invalid field delimiters.	Check for all pairs of field delimiters, and make sure both are numeric or both are alphanumeric.
34	Invalid escape command.	Correct the escape command syntax.
35	Invalid data shift command.	Correct the shift command syntax.
36	Invalid or undefined format number.	Verify that the format numbers are between 0 and 19.
37	Insufficient room in RAM to print format.	Reduce the number of data fields in the format.
38	Invalid or undefined field number.	Verify the field number in the label format.
41	Syntax error for program commands.	Check the program command for proper syntax.
42	Insufficient room in RAM to store format.	Empty the buffer contents. If the format still does not fit, delete some fields or other data from the format. You may have to remove or reduce the UDCs, formats, or fonts if necessary. <i>Note: Entering <ESC>m tells the host how much memory is installed and how much is available.</i>
43	Too many fields in label format.	You can use up to 200 fields in a format and each field can use up to 250 characters. Reduce field size or delete some fields.
46	Undefined statement.	Check the statement syntax.
52	Invalid UDC/UDF bitmap cell height/width or intercharacter space.	Verify that cell heights and widths are between 1 and 599, and that the intercharacter space is between 0 and 199.
53	Insufficient room in RAM to store UDC or UDF.	Remove or reduce formats, fonts, or UDCs.
54	Invalid UDC command syntax.	Correct the UDC command syntax.

Printer Operation Problems

If a printer is not operating correctly, try locating the problem and implementing the solution from the following table:

Symptom	Possible Causes	Solution
No power or loss of power.	AC power cable is damaged or disconnected.	Make sure the power cable is plugged into both the printer and an outlet or power strip. Replace the cable if it is damaged.
	Printer circuit breaker tripped.	Turn the printer off and then back on again (determine why it tripped). Replace circuit breaker if defective.
	Power supply function is failing.	Check the transformer and the main PCB. Replace whichever is defective.
Labels stop feeding through the printer.	Printer is out of media.	Load new media.
	Label stock is loaded incorrectly.	Check the media path.
	Media is sticking to the paper path.	Clean any extraneous material from the paper path and clean it thoroughly.
	Printer is set for continuous label stock.	Use the Transmit Configuration Parameters <ESC>p command to check the configuration setting. Select the correct setting with the Select Label Stock Type command (<SI>T).
Printer slows down.	Label sensor(s) dirty, out of adjustment, or failing.	Clean and adjust, or replace the sensor(s) as required.
	Image bands or print speed are incorrectly set.	Change the image bands or print speed settings.
Labels stick to door or fail to strip.	Printer has aborted and print speed and image bands were reset.	Change the image bands or print speed settings.
	The self-strip roller is dirty or the pinch roller is not contacting the strip roller.	Clean the self-strip roller.
The stepper motor stalls while printing media that is less than 6.6 inches wide.	The bias is not adjusted properly.	Adjust the bias adjust screw to the optimum printing position.
Configuration label does not print.	The media is loaded incorrectly.	Try reloading the media.

Print Quality Problems

If labels are not printing properly, try locating the problem and implementing the solution in the following table:

Symptom	Possible Causes	Solution
Blotches on labels.	Dirty printhead.	Clean the printhead.
	Dirty media path or rollers.	Clean the media path.
	Poor quality label or ribbon stock.	Use only Intermec label and ribbon stock to ensure superior print quality and product performance.
Printing is too light or too dark.	Darkness adjust control is set incorrectly.	Adjust the knob to achieve the best print quality.
	Poor quality label or ribbon stock.	Use only Intermec label and ribbon stock to ensure superior print quality and product performance.
	Sensitivity number is set incorrectly.	Change sensitivity setting to match the type of media being used. If sensitivity is set correctly, try changing the dark adjust command.
	Dirty printhead.	Clean the printhead.
Printing not aligned on label.	The printhead adjustment lever is not positioned as needed.	Reposition the printhead adjustment lever.
	Printer is misfeeding media.	Make sure that media is installed properly along the entire media path.
Labels are not stopping at the right point to be removed.	Platen roller and/or printhead out of alignment.	Perform roller alignment first and then printhead alignment.
	Label rest point command is incorrectly set.	Adjust the label rest point.
	Printer is set for continuous label stock.	Set the printer for proper label stock; either gaps or marks.

Symptom	Possible Causes	Solution
Print quality is poor.	Incorrect media sensitivity.	Change sensitivity setting to match the type of media you are using. If sensitivity is set correctly, try changing the dark adjust.
	The darkness of label print is too light or too dark.	Properly set the darkness adjust control.
	Printhead, platen roller, or label path are dirty.	Clean printhead, platen roller, and label path.
	Uneven print contrast (density).	Adjust the bias adjust screw.
	Incorrect label or ribbon stock is used to print labels.	Use only Intermec label and ribbon stock to ensure superior print quality and product performance.
	Ribbon wrinkling.	Check to make sure that the ribbon is installed correctly. Check the following alignments in the sequence given, testing for elimination of the problem before performing the next alignment. <i>Note: Making these adjustments out of order can introduce and not solve printing problems.</i> 1) Roller alignment 2) Printhead alignment 3) Ribbon supply hub alignment
	Ribbon installed upside down.	Install ribbon with shiny side facing the printhead.
	Direct thermal/thermal transfer switch set in the wrong position.	Set the switch for the type of media being used.
	Printhead or platen roller is severely worn.	Replace the platen roller or printhead.
	Media may be slipping against the platen roller causing the printing to compress.	Switch to approved media or clean the printhead and platen.

Communications Problems

If a printer is not receiving downloaded data, consider the causes and solutions in this section.

Symptom	Possible Causes	Solution
Printer does not communicate with the host.	Serial port is incorrectly configured.	Make sure the printer's serial port settings match those of the host. Print a software test configuration label to check the serial port settings.
	Disconnected, damaged, or incorrect I/O cable.	Check the connections at both ends. Replace the cable if necessary.

Any loss of data can cause printing errors or missing data. The 3600 printer is a serial ASCII device that communicates with the host through an ASCII serial communications port. The two devices communicate through the use of hardware and software protocols (handshaking). The printer utilizes both forms of handshaking simultaneously when the printer's input buffer is full. Consider this process when troubleshooting.

Hardware handshaking uses pins 11 or 20 of the RS-232 interface to control data flow. When the printer is using Intermec "Standard" protocol, pin 11 and 20 are held high when the printer is ready to receive data. The pins are held low when the printer is in one of the following conditions:

- Buffer full
- Ribbon fault
- No label stock
- Label at strip pin

The 3600 printer uses XON/XOFF protocol for software handshaking. When the input buffer is full, the printer transmits an XOFF character. This character alerts the host to the fact that the printer buffer is full and cannot receive any more data. When the printer is ready to receive more data, it sends the XON character.

To check for communications problems

1. Check the cabling from the printer to the host system.
2. Check the interfacing of the devices that are communicating with the printer.
3. Check the printer for proper electrical operation of the serial communications port.
4. Test to see that the host system is not overrunning the printer's input buffers.
5. Check to see that the data string being sent to the printer contains the correct information.

Environmental Problems

Symptoms associated with environmental problems are printing garbage, resetting, or total lockup. One way to discover if the problem is environmental is to see if the problem goes away when the printer is moved to a new location. If it shows up in a printer recently moved from another area, the problem is probably environmental. The following is a discussion of different types of environmental problems.

Electrostatic Discharge (ESD)

ESD can cause failure or weakening of affected components. Typically, ESD occurs when a person with a large electrical potential unintentionally discharges that potential by touching the conductive surfaces of the equipment. Static charge is created through friction from people walking, conveyor belts, paper moving through a printer, and wheelchairs. The solution is to reduce the charge by grounding and by employing prevention measures such as antistatic bags for ICs and PCBs, grounded antistatic mats, antistatic spray for carpeting, antistatic clothing (no wool), antistatic wax for tile floors, conductive floor materials, air ionizers, and antistatic cleaners for plastics. To further protect against ESD, use shielded cable for interface cables, and tie the shield to metal backshells at both ends of the cable. Do not connect the shield of the cable to the chassis ground or signal ground of the interface (metal backshells will be tied to the chassis).

Electromagnetic and Radio Frequency Interference

Noise induced in interface cables can result in the printer receiving false data. This condition may cause the printer to skip printing a label or lockup. Sources of electromagnetic interference (EMI) and radio frequency interference (RFI) are radio transmitters, ignition systems, and relays. To eliminate the effects of EMI and RFI, use low capacitance, twisted pair, shielded cables. Route cables away from sources of EMI and RFI such as large inductive motors or fluorescent lighting ballasts. Do not run cables near AC power lines. If communication cables must run near AC power lines, cross them at 90 degree angles. Eliminate ground loops; they act as receiving antennas for RFI. Limit the number of breaks (connectors) in the cable. It is possible to use a power line monitor, such as the BMI 4800, to test for noise on the interface cable.

Ground Loops Between Equipment

Ground loops pick up RFI as well as generate their own noise in interface cables. The recommended wiring of the interface cable calls for connecting chassis ground (pin 1) between the host computer and the printer to ensure that the chassis of both devices remains at the same electrical potential in the event of a faulty ground in either device. This safety precaution will save people from electric shock in the situation where they touch both the host computer and the printer at the same time while there is a faulty ground in either device. With this wiring, you would normally expect problems with ground loops, but the printer, chassis ground, and signal ground are connected to each other through a 10k Ω resistor, thus providing some ground loop immunity.

If connections in the interface cable described above are discovered to cause ground loop problems, disconnect the shield from the backshell at only the printer, and sever the chassis ground (pin 1) connection between the host computer and the printer. To ensure safety, double your efforts to guarantee that both the host computer and the printer make a solid electrical and physical connection to earth ground.

Inadequate Earth Ground

Poor grounds can cause fuses on equipment to blow and damage components. The ground in the AC power receptacle must be a good, solid earth ground. Do not rely on conduit for ground. The ground rod should penetrate the earth at least 8 feet below the frost line. The soil should contain clay minerals; dry, sandy soil does not provide a good ground. Ensure that all ground connections from the service panel to the AC receptacle are solid and secure.

AC Power Problems (Surges, Sags, Spikes, Noise, and Outages)

Most environmental problems involve the AC power line. In the 3600 printer, 115V supply voltages can range from 90 to 132 VAC. Outside the U.S., 230V supply voltages can range from 180 to 264 VAC. Voltage overages or underages can result from poor utility regulation to in-plant loading of the power service. Use a power line monitor, such as the BMI 4800, to look for power service problems. To eliminate the effects of voltage overages and underages, install an uninterruptible power supply (UPS) or install a dedicated circuit for the printer and the host computer.

Intermittent power outages can be caused by a combination of vibration and loose connections between the service panel and the AC receptacle. Check the wiring to ensure that all connections are solid and secure. Use a power line monitor to test for outages. To eliminate the effects of power outages, install a UPS.

Impulse noise on the power line can also cause the printer to lockup or reset. All Intermec products, including the 3600 printer, meet IEC 801, Surge and Burst specifications. Impulses can range from 200 to 5000V and are caused by lightning, switching operations, firing of SCRs, triacs, static discharge, and arc welders. Use a power line monitor to verify the presence of impulse noise, and use a spike suppressor to eliminate its effect.

Irregular sine waveforms on the AC power line can also affect printer performance. They are caused by switching power supplies. Use a power line monitor to verify the presence of irregular sine waveforms and use a power line conditioner to eliminate their effects.

High frequency noise and hash riding on the AC waveform can affect printer performance. They are caused by transmitters and ignition systems. Use an oscilloscope to verify the presence of noise and hash. Install EMI/RFI filters to eliminate their effects.

To troubleshoot environmental problems

1. Correlate an environmental event with the failure.
2. Check for static discharges.
3. Check for adequate grounding.
4. Check the AC power for proper level and purity.
5. Check for inductive motors, relays, or other spike inducing equipment on the power line.
6. Exercise good judgment and common sense.

Miscellaneous Problems

The following information identifies some possible printer problems and what might be their cause.

- Problems with printer-to-computer communications, motor control, or media advance may be caused by a faulty main PCB assembly.
- If information downloaded to the printer memory is lost after the printer is powered off (lost data includes configuration setting changes reverting to their factory defaults when power is cycled), the lithium battery may be bad.
- The appearance of long white streaks in printed labels indicates a dirty printhead or possible printhead failure.
- If you have problems with the bezel LEDs or the Feed/Pause button, you may need to replace the bezel PCB assembly.
- If the printer no longer registers the use of marked label stock, you may need to replace the label mark sensor.
- Light print on one side of a label can occur if the printhead is not making even contact with the media. This condition can happen with any size media, but is most common when using narrow labels where there is no media between the printhead and the platen roller. Uneven lateral print darkness may be eliminated by adjusting the bias screw.
- If the printer is no longer sensing when labels have been removed, you may need to adjust or replace the label taken sensor.
- If the TTR takeup hub fails to roll up ribbon, you may need to replace the upper drive belt and/or the TTR takeup clutch.
- If a ribbon fault occurs when the printer is in the TTR mode, you may need to replace the TTR encoder sensor.
- If the liner takeup hub discontinues rolling up liner, you may need to replace the liner takeup (lower) drive belt or clutch.
- If the platen roller does not turn but the liner drive roller does, you may need to replace the platen roller gear.
- If none of the rollers turn, you may need to replace the stepper motor.

5

Remove and Replace Procedures

This chapter contains illustrated instructions for removing and replacing key components of the 3600 printer.

Replacing Printer Components

When a printer component needs replacing, use the appropriate following procedure. See Chapter 7, "Replacement Parts," for a complete list of spare parts.

After replacing a component, refer to Chapters 2 and 3 for the procedures to complete the repair by ensuring that you leave the printer performing at its optimum level.

Prior to taking any action, review all warnings, cautions, and procedures associated with any component you intend to remove.

When performing any of the procedures in this chapter, heed the following warnings and cautions at all times to avoid the consequence identified.



Warning

Always disconnect the power cord before removing the electronics cover unless the procedure requires the unit be energized. Failure to disconnect the power cord may result in injury or death due to electric shock.



Caution

The printhead and integrated circuits on printer circuit boards in this equipment are sensitive to damage by electrostatic discharge (ESD). Prevent ESD by always wearing skin contact ground straps firmly attached to the equipment metal base assembly when working inside of the equipment housing. Failure to comply can result in damage to components or the printhead.



Caution

Do not remove the motor plate or subplates. Changing the position of the motor plate can alter factory alignment and cause ribbon wrinkling or liner-stripping problems.

Replacing the Lithium Battery

To replace the lithium battery, you will need the following parts and tools:

- 1.75AH 3.6V AA lithium battery, Intermec Part No. 586229
- ESD grounding strap
- #2 Phillips screwdriver



Warning

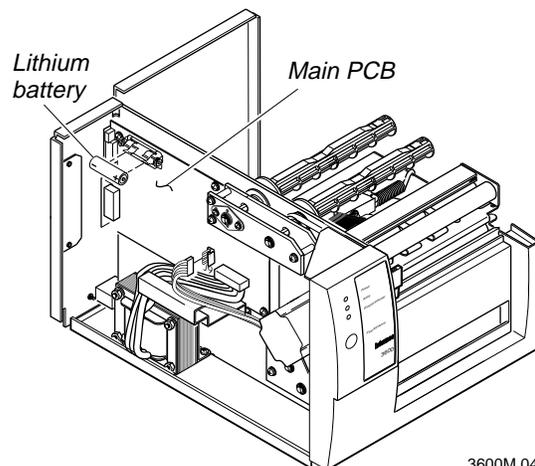
There is danger of explosion if the battery is incorrectly replaced. Replace it only with the same or equivalent type battery recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

To replace the lithium battery

Note: The printer will lose data if the battery fails or is removed. Before removing the battery, upload and save the fonts, formats, pages, graphics, and configuration settings.

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Remove the old battery and install the new battery, matching the (+) and (-) ends of the battery with the (+) and (-) signs on the main PCB.



3. Install the covers and power cord. Check the printer for proper operation.

Replacing the Printhead

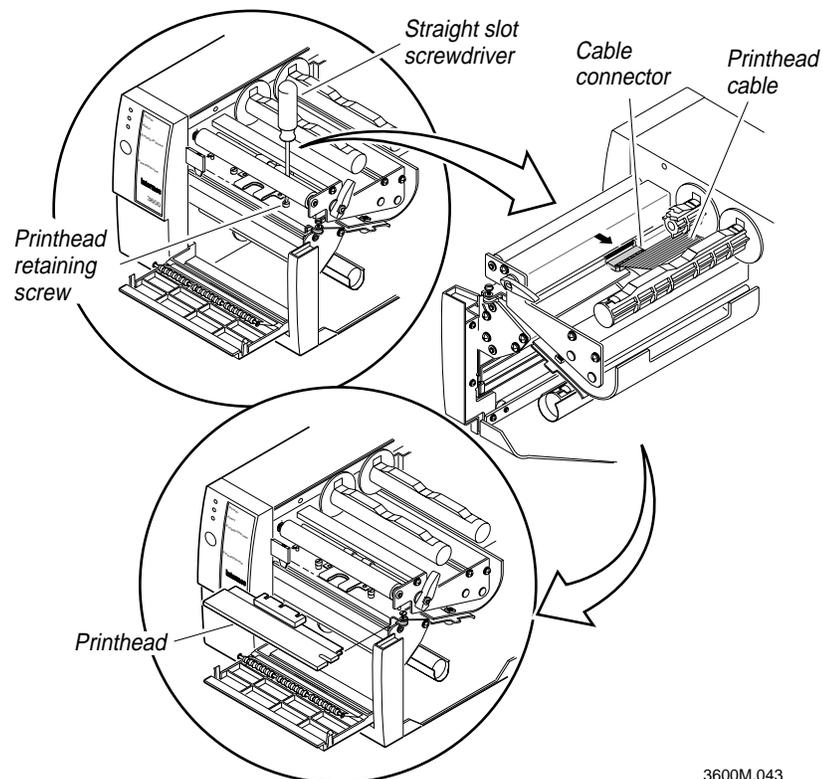
To replace the printhead, you will need the following parts and tools:

- 6.6-inch 5 mil printhead, Intermec Part No. 061611S-001
- ESD grounding strap
- Medium straight-slot screwdriver

To replace the printhead

1. Switch off the printer power and remove the power cord.
2. Remove the media cover.
3. Raise the printhead. Remove media and ribbon if loaded.
4. Release the locks on the printhead cable by pressing in on each side of the cable connector. Remove the printhead cable.

Note: If you need slack to separate the printhead and cable, unplug the cable from the main PCB and pull some of it through the cutout in the main deck plate.



3600M.043

5. Use a straight-slot screwdriver to loosen the printhead retaining screws, located in the center of the printhead heatsink. The screw is easier to loosen if you place one of your fingers underneath the printhead, between the printhead and the platen roller. Pull the printhead away from the printer (since it is a tight fit, you may need to pull it out from the outboard side rather than from the front).
6. Replace the printhead and cable and tighten the printhead retaining screws.
7. Reload media (and ribbon if used) and lower the printhead.
8. Install the media cover and the power cord and check the printer for proper operation.

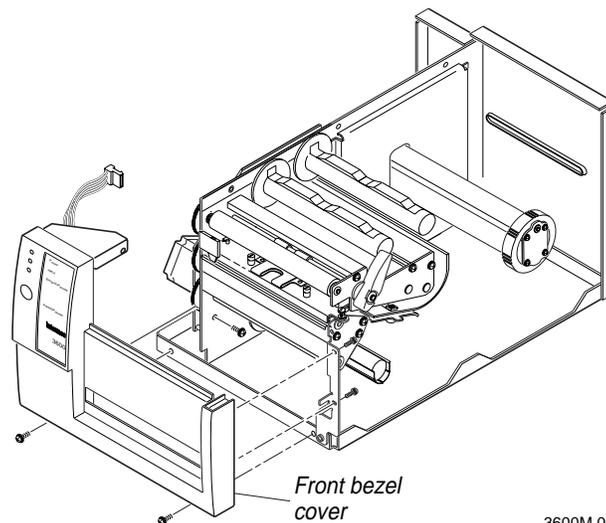
Replacing the Bezel PCB

To replace the bezel PCB, you will need the following parts and tools:

- Bezel PCB assembly, Intermec Part No. 059052S-001
- ESD grounding strap
- #1 and #2 Phillips screwdrivers

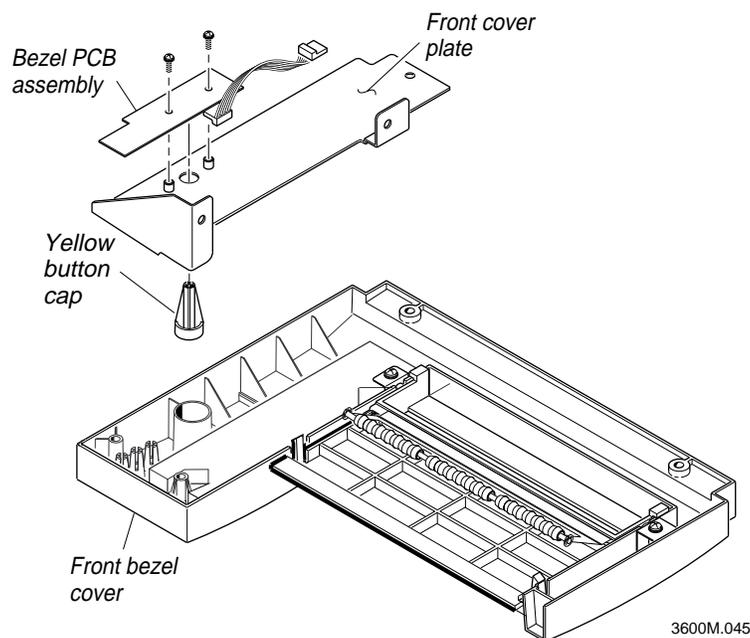
To replace the bezel PCB assembly

1. Switch off the printer power and remove the power cord.
2. Remove the media cover and the electronics cover.
3. Unplug the bezel PCB assembly from the main PCB and remove the five screws that hold the front bezel cover to the printer.



3600M.044

4. Lift the front bezel cover away from the printer and lay it on a flat surface.
5. Use the #2 Phillips screwdriver to remove the two screws that hold the bezel PCB/cover plate assembly to the front bezel cover.
6. Being careful not to break the switch stem or the button cap, pull the Feed/Pause button cap off of the switch on the bezel PCB. Retain the yellow button cap for installation onto the replacement bezel PCB.
7. Use the #1 Phillips screwdriver to remove the two screws securing the bezel PCB to the front cover plate.



8. Use the #1 Phillips screwdriver to attach the replacement bezel PCB to the front cover plate.
9. Carefully press the yellow button cap removed in Step 6 onto the switch on the replacement bezel PCB.
10. Attach the bezel PCB front cover plate assembly to the front bezel cover.
11. Reattach the front bezel cover to the printer. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed. Connect the cable.
12. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

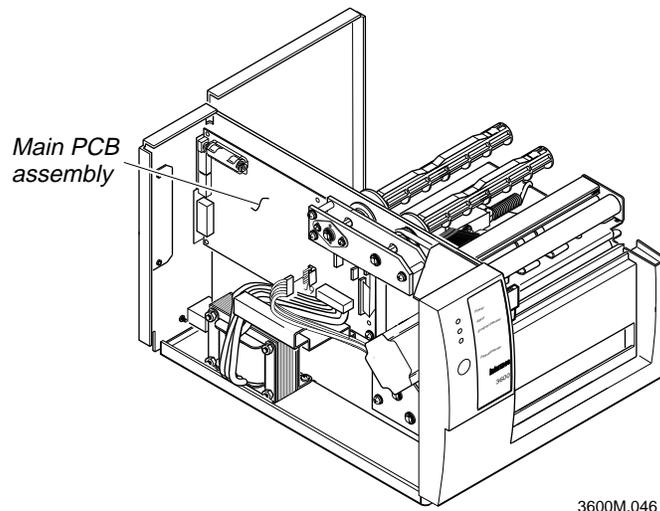
Replacing the Main PCB

To replace the main PCB, you will need the following parts and tools:

- 3600 main PCB assembly, Intermec Part No. 061591S-005 or 06159E-005
- ESD grounding strap
- #2 Phillips screwdriver

To replace the main PCB assembly

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Unplug all of the cables from the main PCB and remove the seven screws securing the main PCB to the printer to remove the main PCB. Do not place the printer on its side as this may disturb alignments.



3. If the main PCB you are replacing has the 512K SRAM memory expansion chip, verify that the new main PCB is similarly equipped. If it is not, carefully unplug the existing 512K chip and plug it into the new main PCB before installing it.
4. If the main PCB you are replacing has a Kanji/Katakana option PCB installed, use the next procedure to relocate the Kanji/Katakana option PCB to the new main PCB before installing it.
5. Install the new main PCB, securing it with the seven screws removed in Step 3, and connect all of the cables.
6. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

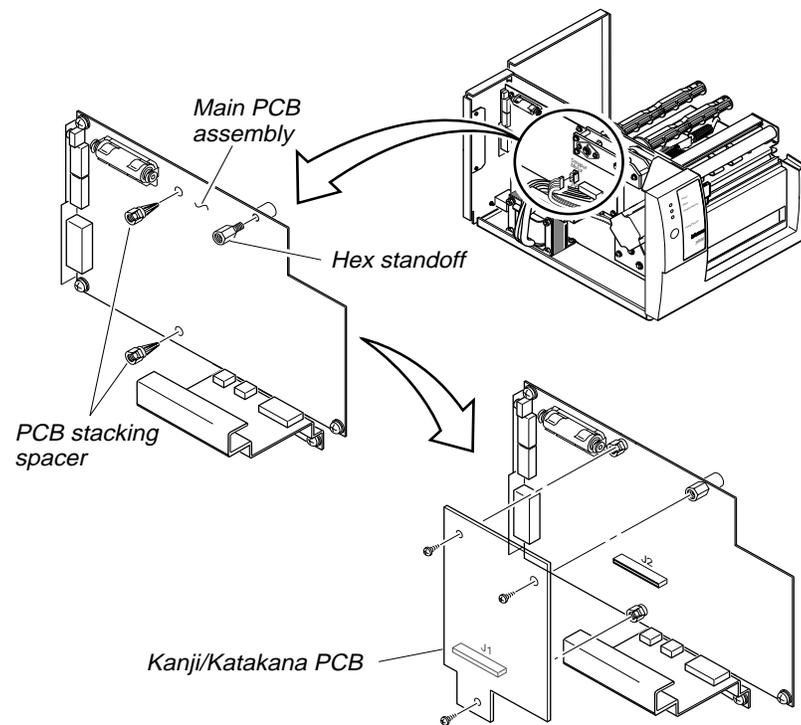
Replacing the Kanji/Katakana Option PCB

To replace a Kanji/Katakana PCB, you will need the following parts and tools:

- 3600 Kanji/Katakana PCB, bitmap font, Intermec Part No. 060689-001 or 3600 Kanji/Katakana PCB, outline font, Intermec Part No. 060690-001
- ESD grounding strap
- #2 Phillips screwdriver

To replace the Kanji/Katakana PCB

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Remove the screws that secure the Kanji/Katakana PCB to the main PCB.



3600M.047

3. Unplug the Kanji/Katakana PCB from the main PCB using a gentle rocking motion while pulling it away.
4. Install the new Kanji/Katakana PCB onto the main PCB, making sure the pins are properly aligned with the connector and that the Kanji/Katakana PCB is fully seated before tightening the screws.
5. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

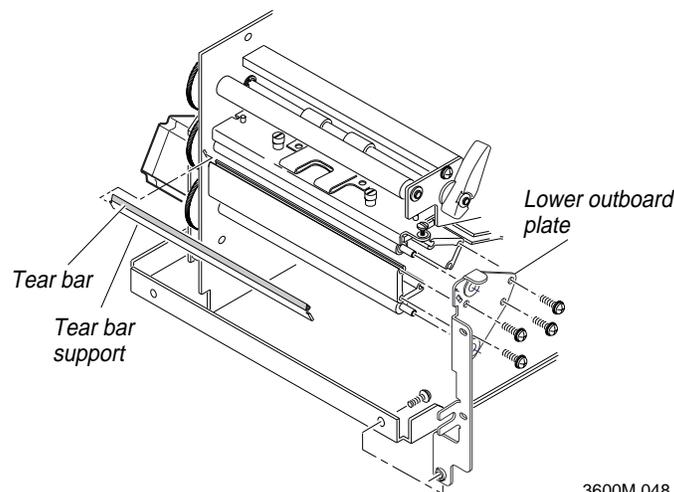
Replacing the Label Mark Sensor

To replace the label mark sensor, you will need the following parts and tools:

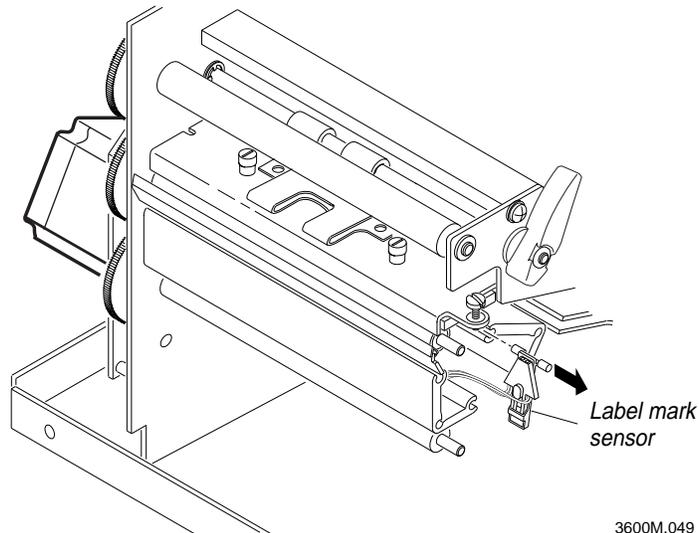
- Label mark sensor cable assembly, Intermec Part No. 061578-001
- Roller alignment tool, Intermec Part No. T43150
- ESD grounding strap
- #1 and #2 Phillips screwdriver

To replace the label mark sensor

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Remove the screws securing the lower outboard plate to the printer and pull it away from the printer. Retain the tear bar and tear bar support.



5. Disconnect the label mark sensor cable from the main PCB, remove the cable from the two plastic clips, and push it through the cutout in the main deck plate. Slide the sensor out from the extrusion. Remove the cable from the plastic cable clip on the extrusion.



6. Insert the new label mark sensor into the extrusion. Route the cable through the plastic cable clip on the extrusion and through the cutout in the main deck plate, and then plug it into the main PCB. Secure the cable in place by inserting it into the two cable clips. Any slack in the cable should be arranged between the sensor and the cable clip on the extrusion. There should be no slack cable on the electronics side of the printer. Make sure the cable is secure and not contacting any moving parts.
7. Reassemble the tear bar and bar support and install the lower outboard plate, capturing the tear bar, liner drive roller, and platen roller.

Note: Use the roller alignment tool during reassembly for proper alignment of the outboard plate.

8. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
9. Reload media (and ribbon if used) and lower the printhead.
10. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

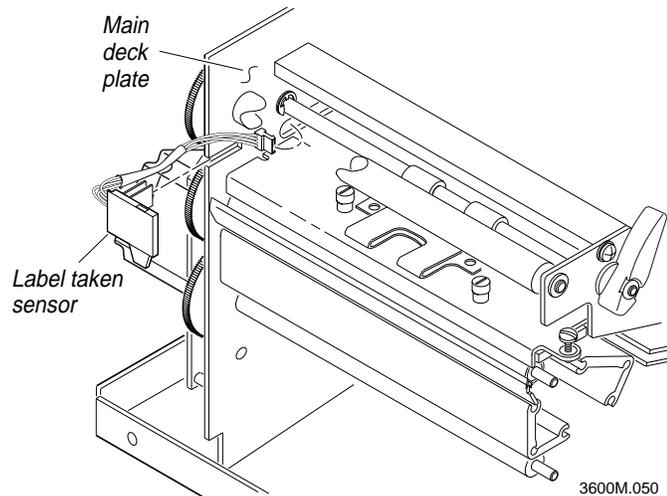
Replacing the Label Taken Sensor

To replace the label taken sensor, you will need the following parts and tools:

- Label taken sensor cable assembly, Intermec Part No. 059496-002
- ESD grounding strap
- #1 and #2 Phillips screwdriver

To replace the label taken sensor

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Disconnect the label taken sensor cable from the main PCB, remove the cable from the two plastic clips, and push it through the cutout in the main deck plate. Slide the sensor housing away from the main deck plate.



5. Install the new sensor, routing the cable through the cutout in the main deck plate and plugging it into the main PCB. Place the cable in the plastic clips with the black sleeve positioned as close as possible to the sensor end.
6. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
7. Reload media (and ribbon if used) and lower the printhead.
8. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

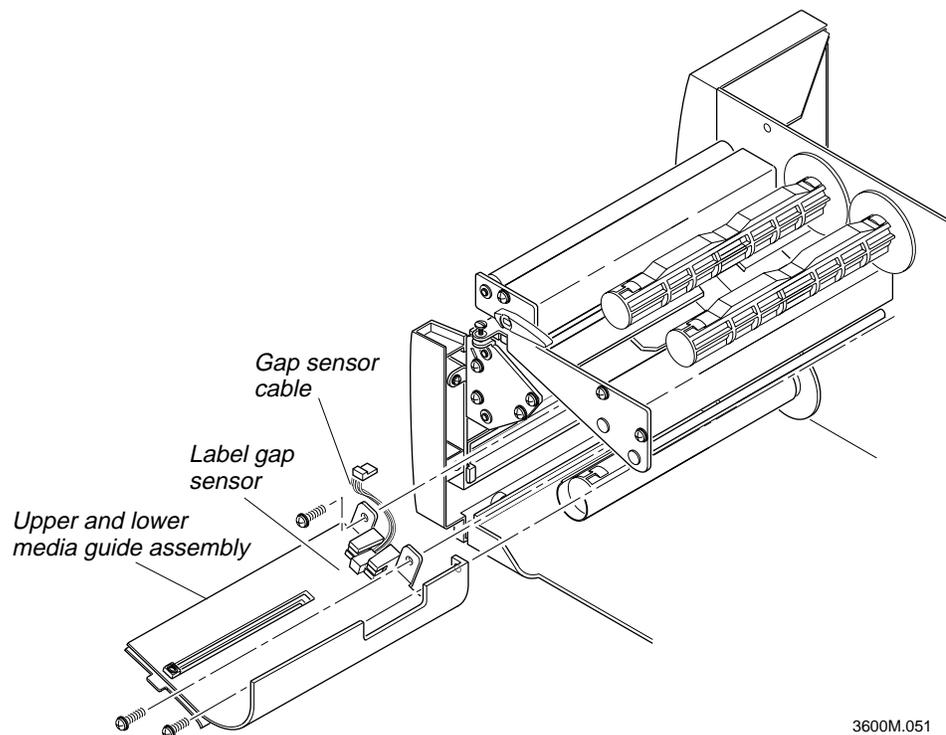
Replacing the Label Gap Sensor

To replace the label gap sensor, you will need the following parts and tools:

- Label gap cable assembly, Intermec Part No. 059495-001
- ESD grounding strap
- Small straight-slot screwdriver
- 12-inch shank #2 Phillips screwdriver

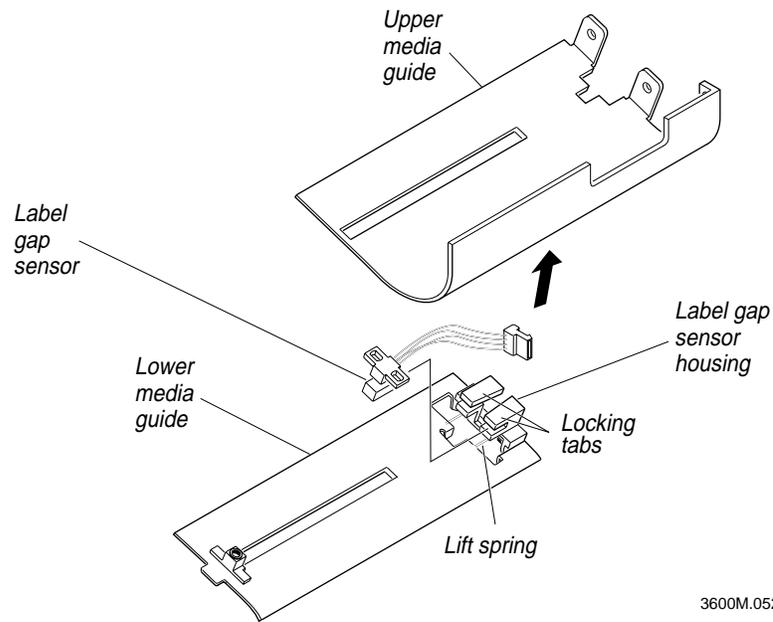
To replace the label gap sensor

1. Switch off the printer power and remove the power cord, the media cover and the electronics cover.
2. Raise the printhead. Remove media and ribbon if loaded.
3. Disconnect the label gap sensor cable from the main PCB.



3600M.051

4. Remove the three screws securing the upper/lower media guide assembly to the main deck plate.
5. Slide the upper media guide outward to separate it from the rest of the assembly.



3600M.052

6. Use a small straight-slot screwdriver to lift up on each of the two molded tabs that secure the label gap sensor. Slide the label gap sensor from its housing and replace it with the new label gap sensor. The label gap sensor should snap into place.
7. Slide the upper media guide plate back together with the lower media guide plate.
8. Route the label gap sensor cable through the cutout in the main deck plate and reattach the media guide assembly to the frame. Be sure that the media brake arm does not rub on the upper media guide and that the sensor cable is not contacting any moving parts.
9. Attach the label gap sensor cable to the main PCB.
10. Reload media (and ribbon if used) and lower the printhead.
11. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

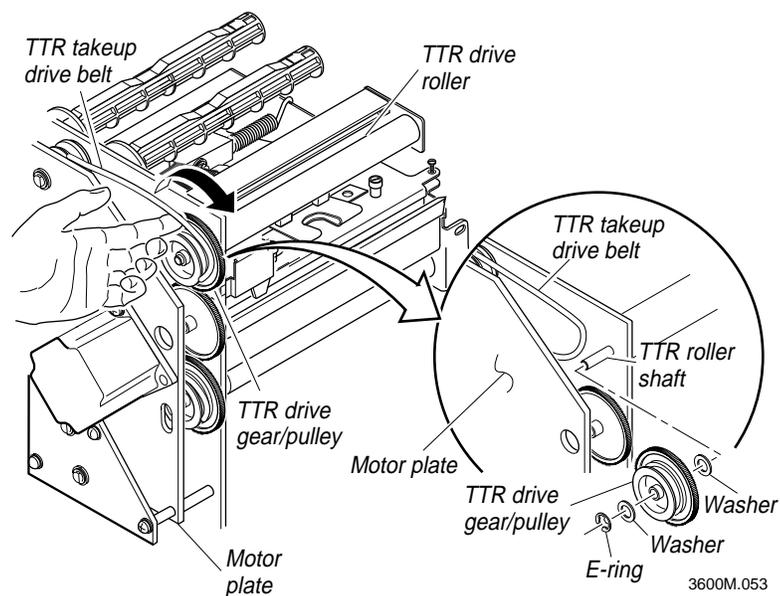
Replacing the TTR Drive Roller and Gear/Pulley

To replace the TTR drive roller or the TTR drive gear/pulley or both, you will need some or all of the following parts and tools:

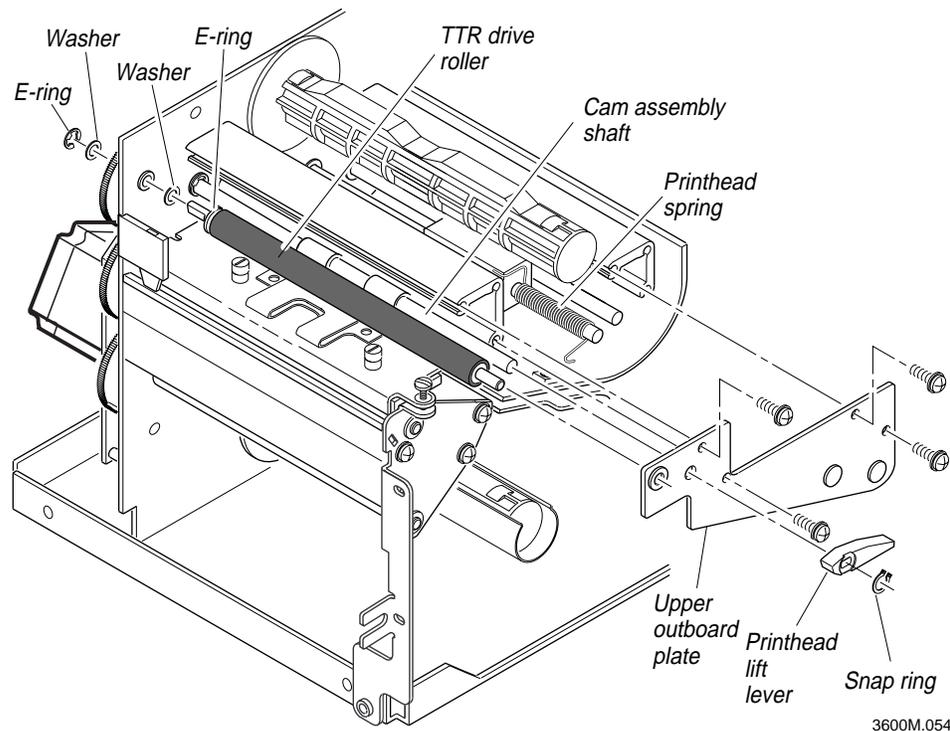
- TTR drive roller, Intermec Part No. 061543-002
- TTR drive gear/pulley, Intermec Part No. 061563-002 (white)
- Retaining E-rings, Intermec Part No. 501401
- Retaining snap ring, Intermec Part No. 501409
- Roller alignment tool, Intermec Part No. T43150
- ESD grounding strap
- Snap ring pliers
- Needlenose pliers
- #1 and #2 Phillips screwdriver

To remove the TTR drive roller and TTR drive gear/pulley

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to "Replacing the Bezel PCB" earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Unloop the drive belt (O-ring) from the TTR drive gear/pulley.



5. Remove the TTR drive gear/pulley retaining E-ring. Retain the washer located between the E-ring and the TTR drive gear/pulley. Discard the old E-ring.
6. Remove the retaining snap ring that secures the printhead lift lever to the cam assembly shaft. Pull the printhead lift lever off of the printhead lift shaft. Discard the old snap ring.



7. Unhook the printhead spring from the upper outboard plate and remove the screws securing the plate to the printer. Pull the plate away, freeing up the TTR drive roller (and the TTR shaft, printhead pressure cam assembly, and pivot block).
8. Remove the TTR drive roller, sliding the gear/pulley off of the roller shaft. Retain the washer located between the roller and the main deck plate and the washer located between the gear/pulley and the main deck plate.
9. You can now replace either the TTR drive roller, the TTR drive gear/pulley, or both.

To replace the TTR drive roller and TTR drive gear/pulley

1. Position the TTR drive gear/pulley with the correct washer installed between the gear/pulley and the main deck plate.
2. Insert the TTR drive roller with a new retaining E-ring and the other washer through the main deck plate and into the gear/pulley.
3. Install the upper outboard plate, making sure that the printhead spring is in place on the pivot block and that all four shafts are securely inserted into their correct positions in the plate.

Note: Use the roller alignment tool during reassembly for proper alignment of the outboard plate.

4. Hook the printhead spring around the upper plate.
5. Install the printhead lift lever and secure it with a new retaining snap ring.
6. Secure the TTR drive gear/pulley on the roller shaft with a new retaining E-ring and the washer you removed in Step 5.
7. Fit the loose end of the TTR drive belt over the TTR drive gear/pulley.
8. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
9. Reload media (and ribbon if used) and lower the printhead.
10. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

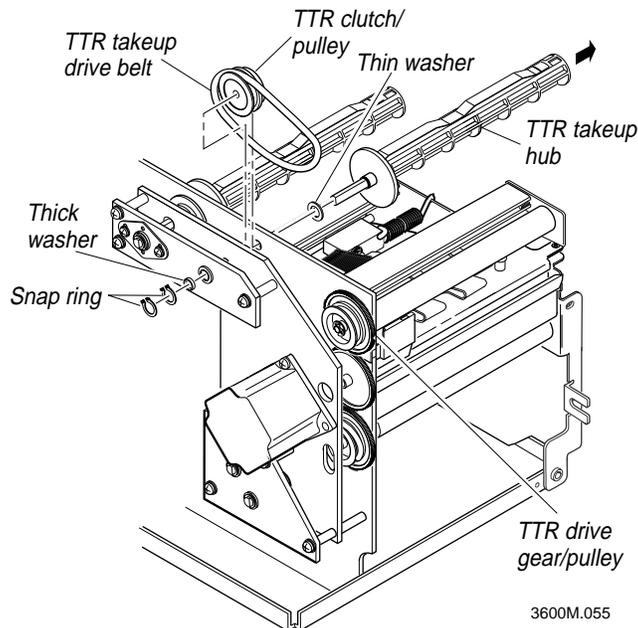
Replacing the TTR Takeup Hub, Clutch/Pulley, and Belt

To replace the TTR takeup hub, TTR takeup clutch/pulley, and TTR takeup drive, you will need some or all of the following parts and tools:

- TTR takeup hub, Intermec Part No. 061562-005
- TTR takeup clutch assembly, Intermec Part No. 062927S-001 (white)
- 2.800ID x .210 drive belt (O-ring), Intermec Part No. 501462-003
- Retaining snap rings, Intermec Part No. 501410
- ESD grounding strap
- Snap ring pliers
- #1 and #2 Phillips screwdriver

To remove the TTR takeup hub, TTR takeup clutch/pulley, and TTR drive belt

1. Switch off the printer power and remove the power cord.
2. Remove the media supply cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Remove the two TTR takeup clutch/pulley retaining snap rings and the thick washer from the end of the TTR takeup hub shaft. Retain the washer. Discard the old snap rings.



3600M.055

5. Pull out on the TTR takeup hub to release the clutch/pulley assembly. Retain the thin washer located between the TTR takeup hub and main deck plate.
6. Remove the TTR takeup clutch/pulley assembly and TTR drive belt.

Note: Do not remove the motor plate or subplates. Changing the position of these plates can alter factory alignment and cause ribbon wrinkling or self-strip problems.

7. Replace the TTR takeup hub, the TTR takeup clutch/pulley assembly, the TTR drive belt, or any combination of them now.

To replace the TTR takeup hub, TTR takeup clutch/pulley, and TTR drive belt

1. Wrap the TTR drive belt around the TTR takeup clutch/pulley, positioning the assembly so that the TTR takeup hub shaft can be inserted into the clutch/pulley.
2. Install the TTR takeup hub with the thin washer removed in Step 5 above.
3. Install the thick washer removed in Step 4 and the two new retaining snap rings to secure the TTR takeup components in place.
4. Loop the loose end of the TTR drive belt around the TTR drive gear/pulley.
5. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
6. Reload media (and ribbon if used) and lower the printhead.
7. Install the electronics cover and the media cover.
8. Install the power cord and check the printer for proper operation.

Replacing the TTR Supply Hub and Adjusting Plate

To replace the TTR supply hub, the TTR supply hub adjusting plate, or both parts, you will need some or all of the following parts and tools:

- TTR supply hub, Intermec Part No. 061562-004
- TTR supply hub adjusting plate, Intermec Part No. 062603-001
- Retaining snap rings, Intermec Part No. 501410
- Ribbon supply hub alignment tool, Intermec Part No. T43149
- ESD grounding strap
- Snap ring pliers
- #1 and #2 Phillips screwdriver

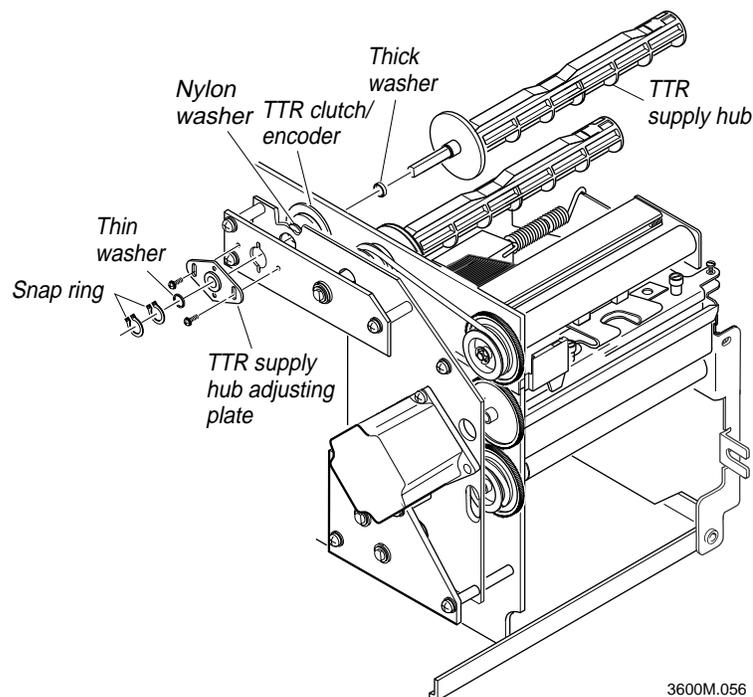
To remove the TTR supply hub and TTR supply hub adjusting plate

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Remove the two retaining snap rings and thin washer from the electronics side of the TTR supply hub shaft as shown on the next page. Retain the washer. Discard the old snap rings.
5. Pull the TTR supply hub away from the printer and remove the TTR supply clutch/encoder assembly. Retain the TTR supply clutch/encoder assembly (this assembly is not a spare part), the nylon washer, and the thick steel washer.
6. You can replace the TTR supply hub and TTR supply hub adjusting plate now.

To replace the TTR supply hub and TTR supply hub adjusting plate

1. Remove the two Phillips screws securing the TTR supply hub adjusting plate to the TTR subplate and install the new adjusting plate in its place.
2. Install the thick steel washer removed in Step 5 above. Align the TTR clutch encoder with the opening in the main deck plate and slide the TTR supply hub back through the TTR clutch/encoder, the nylon washer, the motor plate, and the TTR subplate.

Note: Do not remove the motor plate or subplates. Changing the position of these plates can alter factory alignment and cause ribbon wrinkling or self-strip problems.



3600M.056

3. Install the thin washer removed in Step 4 and the new retaining snap rings.
4. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
5. Align the ribbon supply hub as described in "Aligning the TTR Supply Hub" in Chapter 3.
6. Reload media (and ribbon if used) and lower the printhead.
7. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

Replacing the Platen Roller and Gear

The platen roller and platen roller gear can be replaced separately or at the same time. To replace the platen roller, the platen roller gear, or both parts, you will need some or all of the following parts and tools:

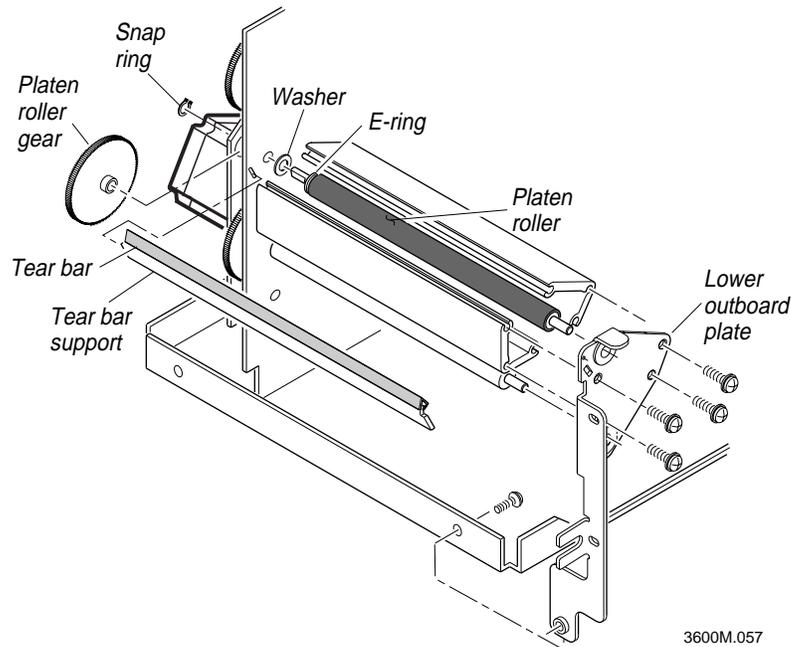
- Platen roller, Intermec Part No. 061542-003
- Retaining E-ring, Intermec Part No. 501401
- Platen roller gear, Intermec Part No. 061557-003
- Retaining snap ring, Intermec Part No. 501409
- Roller alignment tool, Intermec Part No. T43150
- ESD grounding strap
- #2 Phillips screwdriver
- Needlenose pliers
- Snap ring pliers

To remove the platen roller and platen roller gear

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Remove the retaining snap ring that holds the platen roller gear in place as shown on the next page. Retain the washer between the gear and the main deck plate. Discard the old snap ring.
5. Remove the five screws that secure the lower outboard plate to the main deck plate and pull the plate away from the rollers. The tear bar and tear bar support come loose when the outboard plate is removed. Retain them for reassembly.

Note: Now is a convenient time to replace the liner drive roller and liner drive gear/pulley as instructed in the next procedure.

6. Remove the platen roller and washer. Retain the washer.
7. The platen roller, the drive gear, or both parts can be replaced now.



To replace the platen roller and platen roller gear

1. Loosen the motor as necessary to mesh the platen roller gear with the motor pinion gear and TTR drive gear/pulley upon reassembly.
2. Install the washer removed in Step 6 and a new retaining E-ring on the platen roller and insert it through the main deck plate and into the washer removed in Step 4 and the platen drive gear.
3. Reassemble the tear bar and bar support, and then install the lower outboard plate, securing the tear bar assembly and the rollers.

Note: Use the roller alignment tool during reassembly to align the outboard plate.

4. Secure the platen drive gear with a new retaining ring and slide the motor forward to mesh the motor pinion gear with the platen drive gear and the liner drive gear/pulley. Turn the TTR roller drive gear to check for proper gear engagement and tighten the motor mounting screws.
5. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
6. Reload media (and ribbon if used) and lower the printhead.
7. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

Replacing the Liner Drive and Takeup Components

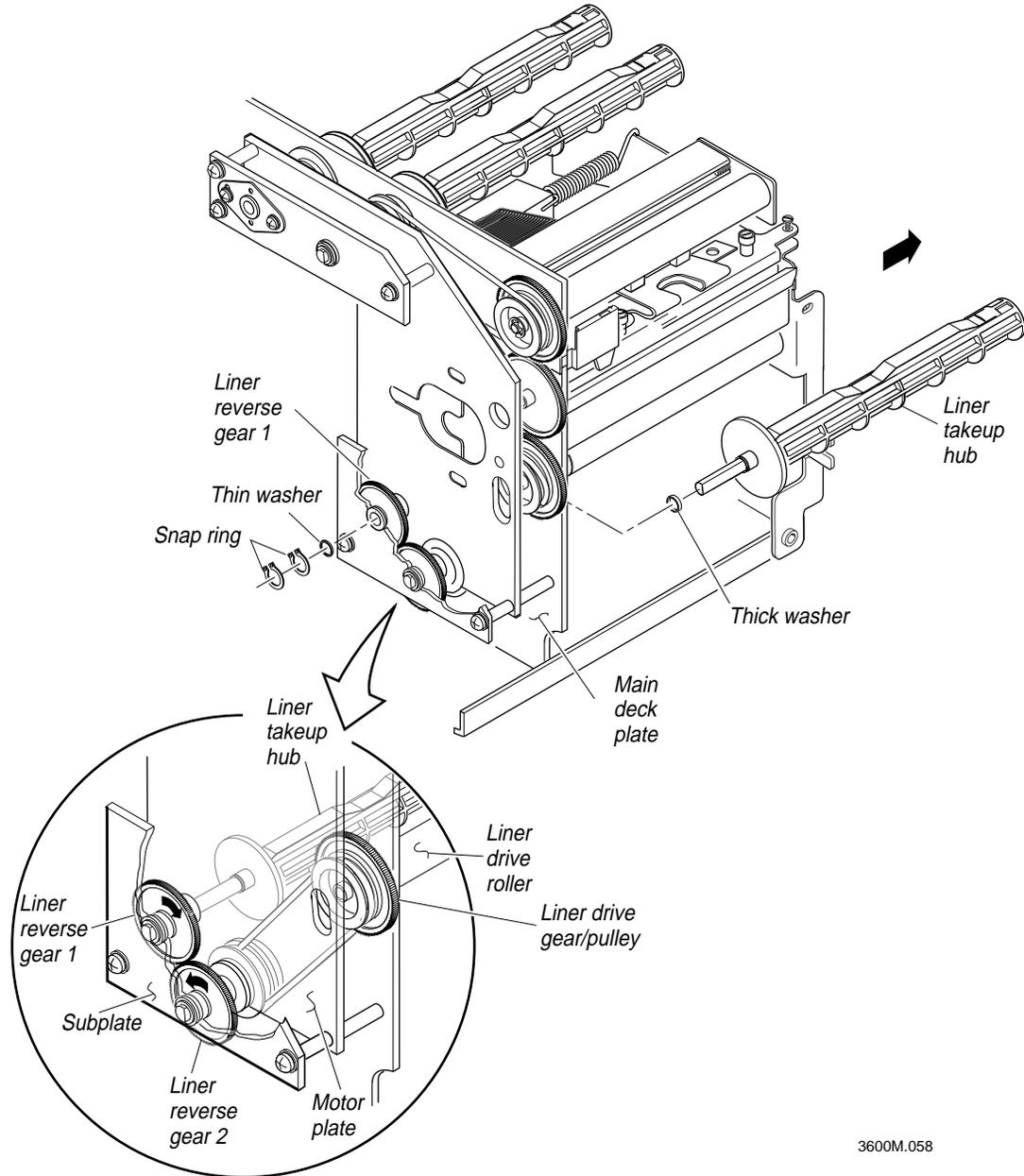
To replace any combination of the liner takeup hub, liner reverse gears, liner drive roller, liner takeup clutch/pulley, liner reverse shaft, liner drive gear/pulley, and liner drive belt, you will need some or all of the following parts and tools:

- Liner takeup hub, Intermec Part No. 061562-005
- Liner drive roller, Intermec Part No. 061568-002
- Liner reverse gears 1 and 2, Intermec Part No. 061588-002
- Liner takeup clutch/pulley, Intermec Part No. 061574S-001 (black)
- Liner reverse shaft, Intermec Part No. 061589-001
- 2.800ID x .210 drive belt (O-ring), Intermec Part No. 501462-003
- Liner drive gear/pulley, Intermec Part No. 061569-002 (black)
- Retaining E-rings, Intermec Part No. 501401
- Retaining snap rings, Intermec Part No. 501410
- Roller alignment tool, Intermec Part No. T43150
- ESD grounding strap
- #1 and #2 Phillips screwdriver
- Needlenose pliers
- Snap ring pliers

To replace the liner takeup hub and liner reverse gear 1

1. Switch off the printer power and remove the power cord.
2. Remove the media cover, the electronics cover, and the front bezel cover (refer to “Replacing the Bezel PCB” earlier in this chapter).
3. Raise the printhead. Remove media and ribbon if loaded.
4. Remove the retaining snap rings that hold the liner takeup hub and liner reverse gear 1 in place as shown on the next page. Retain the washer between the snap rings and the liner takeup subplate. Discard the old snap rings.
5. Pull the liner takeup hub away from the main deck plate to remove it. Retain the thick washer between the liner takeup hub and the main deck plate. Liner reverse gear 1 can now be removed from behind the liner takeup subplate.

Note: Now is a good time to replace other liner drive and takeup components according to the following procedures.

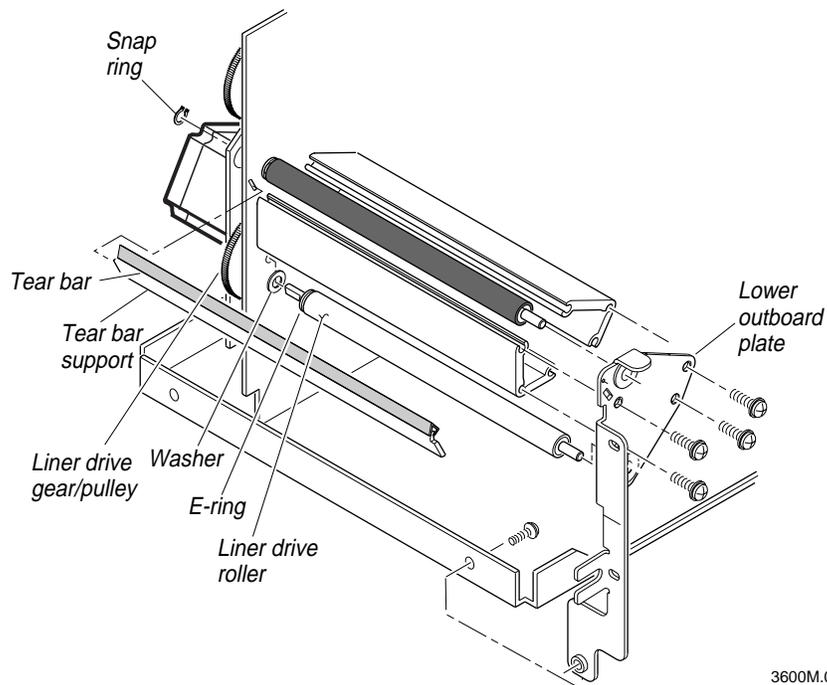


3600M.058

6. You can replace the liner takeup hub and/or liner reverse gear 1 now.
7. Install the thick washer removed in Step 5 between the liner takeup hub and the main deck plate. Position liner reverse gear 1 between the motor plate and the liner takeup subplate and check for proper engagement with liner reverse gear 2.
8. Insert the liner takeup hub through the main deck plate, reverse gear 1, and the subplate. Install the washer removed in Step 4 on the hub shaft extending through the subplate and secure with two new snap rings.
9. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
10. Reload media (and ribbon if used) and lower the printhead.
11. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

To replace the liner drive roller

1. If not already done, switch off the printer power and remove the power cord, media cover, electronics cover, and the front bezel cover. Raise the printhead and remove the media and ribbon if loaded.
2. Remove the five screws that secure the lower outboard plate to the main deck plate and pull the plate away from the rollers. The tear bar and tear bar support come loose when the outboard plate is removed. Retain them for reassembly.



3600M.059

3. Remove the liner drive gear/pulley retaining E-ring. Retain the washer located between the E-ring and the liner drive gear/pulley. Discard the old E-ring.
4. Loosen the motor as necessary to disengage the pinion gear from the liner drive gear/pulley to facilitate disassembly.
5. Remove the liner drive roller, sliding the liner drive gear/pulley off of the roller shaft. Retain the washer between the roller and main deck plate. The gear/pulley will remain trapped by the drive belt until the belt is removed as described in the following procedure. Be sure to retain the washer between the gear/pulley and the main deck plate when it comes loose.

Note: Now is a convenient time to replace other liner drive and takeup components according to the following procedures.

6. You can replace the liner drive roller now.
7. Install the first washer you removed in Step 5 and a new retaining E-ring on the liner drive roller shaft. Position the liner drive gear/pulley and the second washer you removed in Step 5 between the motor plate and the main deck plate. Then insert the liner drive roller through the main deck plate into the washer and gear/pulley.

Note: The gear/pulley will be under some tension from the drive belt.

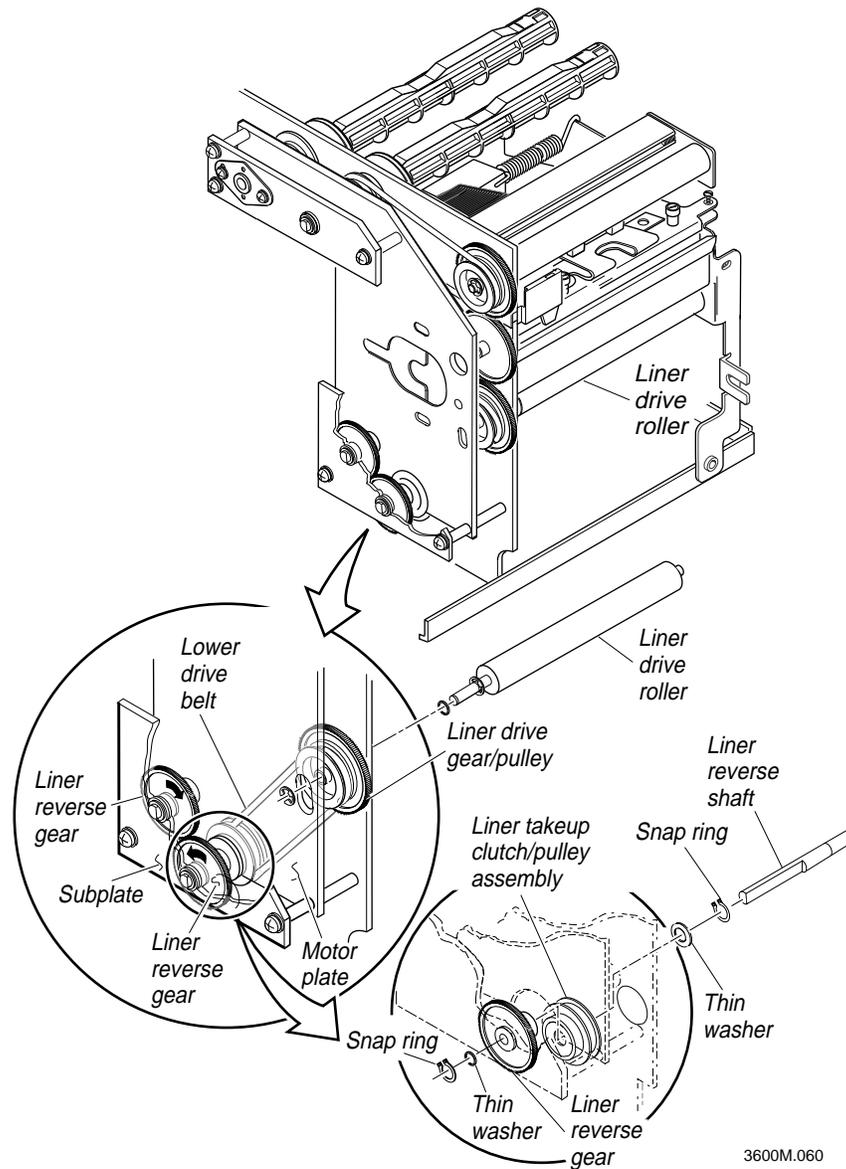
8. Reassemble the tear bar and bar support and install the lower outboard plate, securing the tear bar assembly and the rollers.

Note: Use the roller alignment tool during reassembly for proper alignment of the outboard plate.

9. Secure the liner drive gear/pulley with the washer removed in Step 3 and a new retaining E-ring.
10. Slide the motor forward and mesh the motor pinion gear with the liner drive gear/pulley and the platen roller gear. Turn the TTR roller drive gear to check for proper gear engagement and tighten the motor mounting screws.
11. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
12. Reload media (and ribbon if used) and lower the printhead.
13. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

To replace liner reverse gear 2, the liner takeup clutch/pulley, liner reverse shaft, liner drive gear/pulley, and liner drive belt

1. If not already done, perform Steps 1 through 5 of the preceding liner roller replacement procedure.
2. Remove the retaining snap ring that holds the liner reverse shaft, takeup clutch/pulley, and reverse gear 2 in place. Retain the washer located between the snap ring and subplate. Discard the old snap ring.



3. Remove the liner takeup hub and reverse gear 1 as described in Steps 4 and 5 of that procedure (page 5-24).
4. Push the liner reverse shaft through the main deck plate, sliding off the takeup clutch/pulley and reverse gear. Separate the drive belt from the drive gear/pulley and clutch/pulley.
5. You can replace the liner drive gear/pulley, liner drive belt, takeup clutch/pulley, liner reverse shaft, or reverse gear 2 now.

To reassemble the liner drive and takeup components

1. Install the first washer you removed in Step 5 of the previous liner roller replacement procedure and a new retaining E-ring on the liner drive roller shaft. Loop the drive belt around the liner drive gear/pulley and position the gear/pulley and the second washer you removed in Step 5, between the motor plate and the main deck plate.
2. Insert the liner drive roller through the main deck plate into the washer and gear/pulley. Secure the liner drive gear/pulley with a new retaining E-ring.
3. Reassemble the tear bar and bar support and install the lower outboard plate, capturing the tear bar assembly and the rollers.

Note: Use the roller alignment tool during reassembly for proper alignment of the outboard plate.

4. Fit the drive belt around the liner takeup clutch/pulley. Position the clutch/pulley and reverse gear 2 between the subplate and motor plate with the clutch/pulley located at the cutout in the motor plate.

Note: The clutch/pulley will be under some tension from the drive belt.

5. Insert the D-shaped end of the liner reverse shaft through outboard side of the main deck plate, the takeup clutch/pulley, reverse gear 2, and the liner takeup subplate. Install the washer removed in Step 2 and a new snap ring.
6. Install the liner takeup hub and liner reverse gear 1 as described in Steps 7 and 8 of that procedure.
7. Slide the motor forward and mesh the motor pinion gear with the liner drive gear/pulley and the platen roller gear. Turn the TTR roller drive gear to check for proper gear engagement and tighten the motor mounting screws.
8. Reattach the front bezel cover. Ensure that the media access door operates properly (snaps firmly shut) after the front bezel cover is installed.
9. Reload media (and ribbon if used) and lower the printhead.
10. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

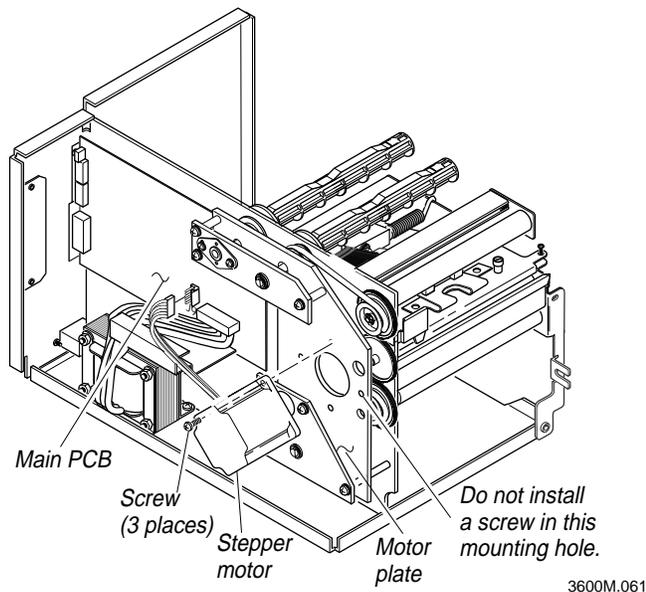
Replacing the Stepper Motor

To replace the stepper motor, you will need the following parts and tools:

- Main stepper motor and cable assembly, Intermec Part No. 061551-002
- ESD grounding strap
- #2 Phillips screwdriver

To replace the stepper motor

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Unplug the motor cable from the main PCB and remove the motor from the motor plate and motor mount bracket.



3. Mount the new motor loosely to the motor plate with the cable positioned at the bottom rear corner. Properly mesh the pinion gear with the platen drive gear and the liner drive gear before tightening the screws completely.
4. Plug the motor cable into the main PCB. Check that the motor cable-to-main PCB connection is correctly aligned before applying power to avoid damaging the main PCB.
5. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

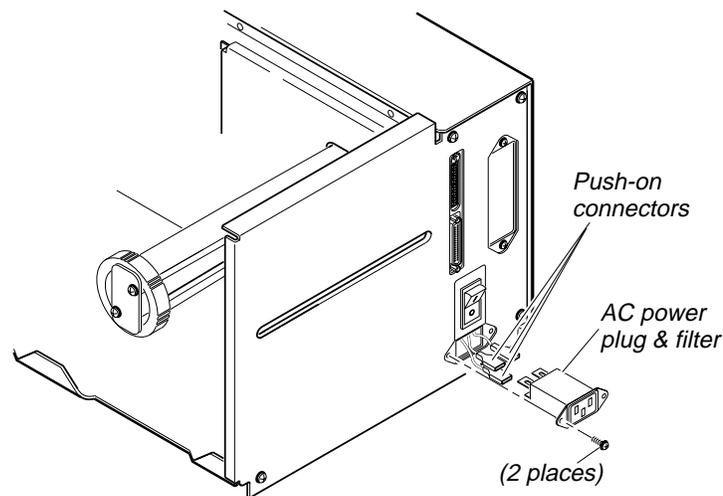
Replacing the AC Plug/Input Filter

To replace the AC plug and input filter assembly, you will need the following parts and tools:

- 3600 line AC plug and filter assembly, Intermec Part No. 060246-001
- ESD grounding strap
- #1 and #2 Phillips screwdriver
- Needlenose pliers

To replace the AC plug and input filter

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Disconnect the three push-on connectors attached to the back of the AC plug/input filter assembly.



3600M.062

3. Remove the two screws securing the AC plug/input filter assembly to the main deck plate and remove the assembly.
4. Install the new AC power plug and input filter assembly and secure it with the two screws removed in Step 3.
5. Reconnect the three push-on connectors removed in Step 2.
6. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

Replacing the Power Switch/Circuit Breaker

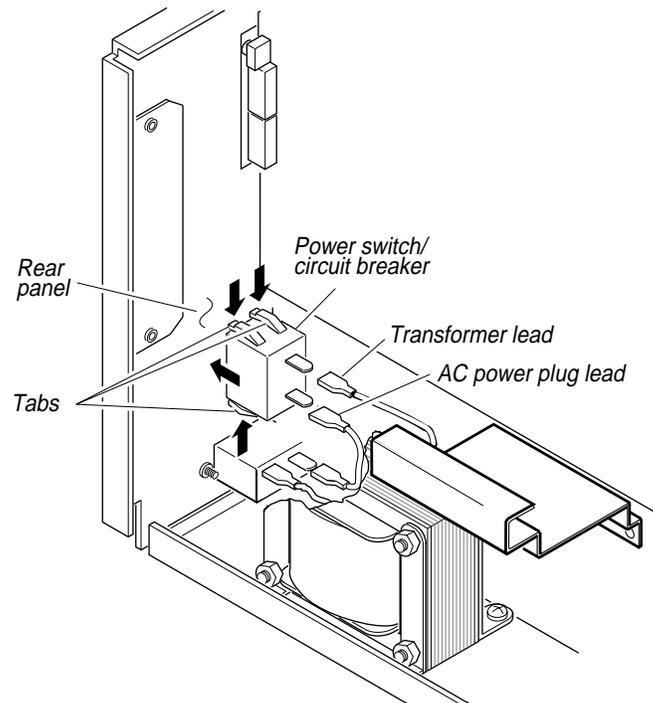
To replace the power switch and circuit breaker assembly, you will need the following parts and tools:

Note: The 220-volt printer uses a 1 amp power switch/circuit breaker and the 115-volt printer uses a 2 amp power switch/circuit breaker.

- AC power switch/circuit breaker, Intermec Part No. 501273-001 (2A) or AC power switch/circuit breaker, Intermec Part No. 501273-002 (1A)
- ESD grounding strap
- Needlenose pliers
- #2 Phillips screwdriver

To replace the power switch/circuit breaker

1. Switch off the printer power and remove the power cord.
2. Remove the media cover and the electronics cover.
3. Disconnect the two leads with push-on connectors attached to the power switch.



3600M.063

4. Compress the tabs that hold the power switch secured to the back plate and push it out of the main deck plate.
5. Install the power switch by pushing the new receptacle into the cutout in the main deck plate.
6. Reattach the two push-on connectors removed in Step 3.
7. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

Replacing the Transformer

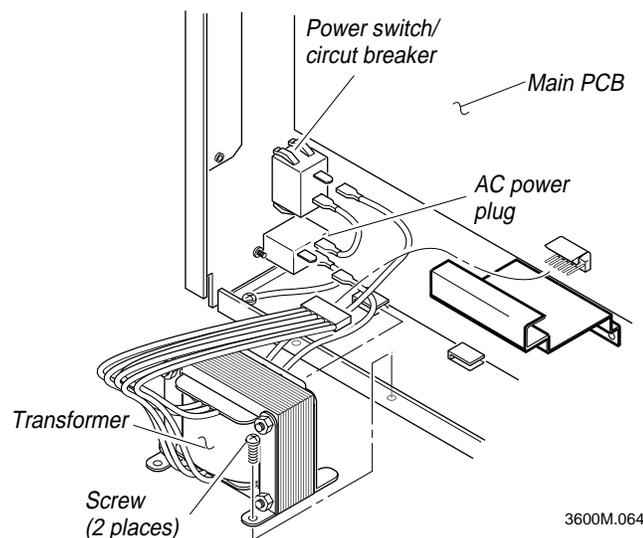
To replace the transformer, you will need the following parts and tools:

Note: The printer uses a different transformer for 220-volt and 115-volt printers.

- XFMR, 3600, 47-63HZ, 100V /120V, Intermec Part No. 585525-001 or XFMR, 3600, 47-63HZ, 200V /240V, Intermec Part No. 585525-002
- ESD grounding strap
- #2 Phillips screwdriver

To replace the transformer

1. Switch off the printer power and remove the power cord, the media cover, and the electronics cover.
2. Disconnect the transformer cable from the main PCB and the two leads with push-on connectors from the AC power plug and the power switch.



3. Remove the two screws holding the transformer to the base plate and slide the transformer toward the front of the printer to free it from the metal tabs, lifting it away from the printer.
4. Install the replacement transformer and push it toward the back of the printer securing it under the tabs in the printer main deck plate.
5. Secure the transformer to the printer main deck plate with the two screws removed in Step 3.
6. Reattach the transformer cables to the main PCB, the AC power receptacle, and the power switch.
7. Install the electronics cover, the media cover, and the power cord, and check the printer for proper operation.

6

PCB Drawings and Schematics

3600 Printer Maintenance Manual

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 2/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
"			R8		5.8	4.3	F
"			R9		4.7	5.9	F
"			R10		1.3	1.5	F
"			R12		4.0	4.5	F
"			R13		4.0	4.6	F
"			R14		3.3	5.8	F
"			R15		6.8	5.0	F
"			R16		6.6	5.0	F
"			R17		1.3	5.3	F
"			R19		4.5	4.0	F
"			R20		6.7	3.7	F
"			R23		5.3	4.0	F
"			R24		5.3	4.1	F
"			R25		2.2	1.7	F
"			R26		1.7	3.4	F
"			R27		3.7	5.2	F
"			R28		3.7	5.3	F
"			R29		4.0	5.2	F
"			R32		1.0	2.4	F
"			R33		1.2	1.8	F
"			R37		3.3	5.8	F
"			R38		4.0	5.3	F
"			R39		0.3	3.0	F
"			R40		0.3	3.1	F
"			R41		0.6	3.0	F
"			R42		0.5	3.0	F
"			R43		0.5	3.3	F
"			R44		0.6	3.3	F
"			R45		0.5	3.5	F
"			R46		0.6	3.5	F
"			R47		0.6	4.4	F
"			R48		0.6	4.6	F
"			R49		0.6	4.7	F
"			R50		0.6	4.8	F
"			R51		0.6	4.8	F
"			R52		0.6	4.9	F
"			R53		0.6	5.1	F
"			R54		0.6	5.2	F
"			R55		2.9	3.4	F
"			R56		2.4	5.2	F
"			R57		1.3	3.0	F
"			R58		1.3	3.1	F
"			R59		1.3	3.2	F
"			R60		1.3	3.3	F
"			R61		1.3	3.4	F
"			R62		1.3	3.5	F
"			R63		1.3	3.6	F
"			R64		1.3	3.7	F
"			R65		1.3	4.5	F
"			R66		1.3	4.6	F
"			R67		1.3	4.7	F
"			R68		1.3	4.8	F
"			R69		1.3	4.9	F
"			R70		1.3	5.0	F



PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 3/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	R71		1.3	5.1	F
		"	R72		1.3	5.2	F
		"	R95		4.3	3.3	F
		"	R110		4.4	1.2	F
		"	R118		3.7	1.3	F
		"	R131		8.9	4.3	F
		"	R133		9.2	4.0	F
		"	R134		8.5	4.0	F
		"	R145		3.7	1.0	F
		"	R146		3.5	0.8	F
		"	R153		3.2	0.9	F
		"	R155		4.0	5.8	F
		"	R156		7.1	4.3	F
		"	R158		1.2	2.2	F
		"	R183		2.8	0.7	F
		"	R187		10.0	3.8	F
		"	R193		4.7	4.0	F
		"	R194		7.5	4.1	F
		"	R195		10.0	3.9	F
		"	R201		4.0	5.8	F
		"	R203		4.0	5.6	F
		"	R204		4.0	5.7	F
		"	R206		3.3	5.7	F
		"	R222		2.5	2.8	F
19	3	556605	R121	RES,S/M,FILM,.12W,5%,47 KOHM	3.5	1.0	F
		"	R237		8.9	3.2	F
		"	R239		10.7	2.0	F
20	7	556607	R21	RES,S/M,FILM,.12W,5%,100 KOHM	4.7	1.2	F
		"	R96		5.0	1.0	F
		"	R116		9.2	4.2	F
		"	R120		5.0	0.2	F
		"	R141		4.7	0.3	F
		"	R238		10.0	3.5	F
		"	R247		10.1	3.4	F
21	3	556613	R117	RES,S/M,FILM,.12W,5%,10 OHM	10.5	2.3	F
		"	R218		10.6	1.9	F
		"	R229		10.5	0.1	F
22	70	556629	R76	RES,S/M,FILM,.12W,5%,47 OHM	7.5	6.0	F
		"	R77		7.5	5.8	F
		"	R78		7.5	5.9	F
		"	R79		7.5	5.6	F
		"	R80		7.5	5.7	F
		"	R81		1.7	3.3	F
		"	R82		7.5	5.5	F
		"	R83		7.5	5.4	F
		"	R84		1.7	3.1	F
		"	R85		7.5	5.3	F
		"	R86		1.7	3.0	F
		"	R87		7.5	5.2	F
		"	R88		1.7	3.2	F
		"	R89		2.0	3.2	F
		"	R90		2.0	3.0	F
		"	R91		2.0	2.9	F
		"	R92		2.0	3.1	F

3600 Printer Maintenance Manual

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 4/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	R93		2.0	1.6	F
		"	R94		3.7	5.4	F
		"	R102		5.9	0.9	F
		"	R103		5.9	0.1	F
		"	R109		5.9	1.1	F
		"	R111		5.9	0.3	F
		"	R112		9.7	3.8	F
		"	R130		3.2	0.2	F
		"	R139		4.5	0.2	F
		"	R140		5.9	1.5	F
		"	R154		3.2	0.7	F
		"	R159		2.0	1.7	F
		"	R161		7.5	6.1	F
		"	R162		6.3	5.0	F
		"	R163		7.5	4.7	F
		"	R165		7.5	4.8	F
		"	R166		7.5	4.6	F
		"	R167		7.5	5.0	F
		"	R168		7.5	4.9	F
		"	R169		2.2	1.6	F
		"	R170		2.0	1.9	F
		"	R171		2.0	1.8	F
		"	R172		7.5	3.7	F
		"	R173		7.5	3.5	F
		"	R174		7.5	3.3	F
		"	R175		7.5	3.0	F
		"	R176		7.5	3.1	F
		"	R177		7.5	3.2	F
		"	R178		7.5	2.9	F
		"	R179		7.5	4.5	F
		"	R180		7.5	4.4	F
		"	R181		7.5	4.3	F
		"	R182		7.5	4.2	F
		"	R184		7.8	3.9	F
		"	R197		6.1	4.7	F
		"	R205		7.5	3.8	F
		"	R209		7.5	2.8	F
		"	R211		7.5	3.4	F
		"	R213		7.5	3.6	F
		"	R215		5.9	0.7	F
		"	R220		5.9	1.3	F
		"	R221		5.9	0.5	F
		"	R227		5.0	1.1	F
		"	R232		5.0	1.2	F
		"	R233		5.0	0.3	F
		"	R235		5.0	0.4	F
		"	R236		4.7	0.5	F
		"	R242		5.5	5.6	F
		"	R243		3.2	0.4	F
		"	R244		3.5	0.1	F
		"	R245		3.2	0.3	F
		"	R246		3.2	0.5	F
		"	R248		2.0	1.0	F
23	1	556640	R198	RES,S/M,FILM,.12W,5%,150 OHM	6.2	3.8	F

PL# 061591-003

TITLE: PCB ASSY,MAIN,3600

PAGE 5/10

PL REV: D

02231995

RUN DATE: Feb 23 15:19:02

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
25	5	556648	R34	RES,S/M,FILM,.12W,5%,390 OHM	3.0	6.0	F
		"	R115		9.2	4.4	F
		"	R123		10.7	4.3	F
		"	R132		9.2	4.1	F
		"	R143		9.2	3.5	F
26	9	556650	R105	RES,S/M,FILM,.12W,5%,470 OHM	5.9	1.0	F
		"	R114		5.9	1.2	F
		"	R128		3.5	1.1	F
		"	R129		5.9	1.6	F
		"	R147		5.9	1.4	F
		"	R216		5.9	0.2	F
		"	R223		5.9	0.4	F
		"	R226		5.9	0.8	F
		"	R230		5.9	0.6	F
27	1	556651	R189	RES,S/M,FILM,.12W,5%,510 OHM	8.4	2.9	F
28	10	556658	R4	RES,S/M,FILM,.12W,5%,1.0 KOHM	1.5	0.3	F
		"	R98		10.4	3.4	F
		"	R122		8.4	3.3	F
		"	R126		0.6	5.2	F
		"	R127		4.0	0.7	F
		"	R137		4.0	0.6	F
		"	R148		10.1	3.2	F
		"	R150		10.7	3.0	F
		"	R199		10.7	2.3	F
		"	R200		10.6	2.6	F
29	1	556665	R136	RES,S/M,FILM,.12W,5%,2.0 KOHM	10.7	3.5	F
30	1	556670	R186	RES,S/M,FILM,.12W,5%,3.3 KOHM	10.0	3.6	F
31	2	556672	R149	RES,S/M,FILM,.12W,5%,3.9 KOHM	10.4	3.2	F
		"	R228		8.9	4.1	F
32	3	556674	R124	RES,S/M,FILM,.12W,5%,5.1 KOHM	10.7	3.4	F
		"	R217		4.4	0.9	F
		"	R234		4.0	0.9	F
33	1	556676	R106	RES,S/M,FILM,.12W,5%,6.2 KOHM	2.5	0.7	F
34	1	556687	R101	RES,S/M,FILM,.12W,5%,22 KOHM	2.5	0.3	F
35	1	556690	R138	RES,S/M,FILM,.12W,5%,30 KOHM	9.5	2.8	F
36	1	556692	R196	RES,S/M,FILM,.12W,5%,36 KOHM	9.2	3.3	F
37	2	556710	R30	RES,S/M,FILM,.12W,5%,330 KOHM	5.1	5.7	F
		"	R104		2.8	0.8	F
38	2	556721	R225	RES,S/M,FILM,.12W,5%,1.0 MOHM	4.4	1.0	F
		"	R231		4.0	1.3	F
39	2	556742	R31	RES,S/M,FILM,.12W,5%,9.1 MOHM	4.9	5.7	F
		"	R73		6.2	4.0	F
40	4	556837-301	R119	RES,S/M,FILM,1/8W,1%,1 OHM	6.2	0.3	F
		"	R135		5.0	1.4	F
		"	R151		4.7	1.1	F
		"	R152		4.7	0.6	F
41	2	556837-161	R7	RES,S/M,FILM,1/8W,1%,4.99KOHMS	10.6	1.7	F
		"	R100		10.5	2.5	F
42	4	556838-287	R18	RES,S/M,FILM,1/4W,1%,1.0 OHMS	7.3	1.6	F
		"	R22		7.3	1.8	F
		"	R97		7.3	1.7	F
		"	R99		7.3	1.9	F
43	4	561008	C65	CAP,ALUM,RDL LEAD,50VMIN,100UF	9.7	2.1	F
		"	C124		9.7	0.6	F

3600 Printer Maintenance Manual

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 6/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	C125		9.7	2.6	F
		"	C140		4.1	0.2	F
44	1	561018-001	C123	CAP,AL,ELCTLT,R/L,63V,12000UF	8.1	2.0	F
45	1	561908	C53	CAP.AL.R/L 16V 4700. UF	6.7	0.4	F
46	2	563602	C46	CAP.S/M,TANT,10V MIN+-20%,10UF	2.5	0.2	F
		"	C54		7.6	1.4	F
47	7	563605	C55	CAP.S/M,TANT.35V,20%,1UF	7.5	0.3	F
		"	C56		7.2	0.3	F
		"	C126		1.8	1.0	F
		"	C127		1.2	0.7	F
		"	C128		1.5	0.6	F
		"	C129		1.8	0.7	F
		"	C141		2.5	0.8	F
48	3	563606	C35	CAP,S/M,TANT,6VMIN,10%,68UF	2.9	2.9	F
		"	C81		2.5	1.0	F
		"	C82		6.8	6.0	F
49	61	563700	C1	CAP,S/M,CER,50VMIN,20%,.1 UF	1.0	1.2	F
		"	C2		1.6	0.3	F
		"	C3		5.8	5.8	F
		"	C4		5.4	5.1	F
		"	C5		4.2	4.3	F
		"	C6		4.2	5.6	F
		"	C7		4.1	5.1	F
		"	C8		4.7	4.2	F
		"	C10		1.0	1.8	F
		"	C12		4.7	5.8	F
		"	C13		3.7	6.0	F
		"	C15		4.7	5.7	F
		"	C16		0.9	2.9	F
		"	C17		2.0	5.2	F
		"	C18		0.9	4.6	F
		"	C19		2.2	1.9	F
		"	C20		2.4	3.3	F
		"	C21		3.2	3.3	F
		"	C23		1.5	1.5	F
		"	C25		7.1	3.2	F
		"	C26		5.9	3.1	F
		"	C27		6.3	4.3	F
		"	C28		6.8	4.3	F
		"	C29		3.7	2.1	F
		"	C30		6.5	3.8	F
		"	C31		5.6	4.3	F
		"	C32		6.5	2.4	F
		"	C33		4.0	2.8	F
		"	C34		4.4	1.1	F
		"	C36		5.0	0.5	F
		"	C37		6.4	5.9	F
		"	C38		3.6	2.8	F
		"	C39		3.7	0.8	F
		"	C41		4.4	0.8	F
		"	C42		8.9	4.2	F
		"	C43		5.3	0.8	F
		"	C45		10.5	2.0	F



PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 7/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	C48		5.0	1.3	F
		"	C50		5.5	0.8	F
		"	C51		4.7	1.0	F
		"	C58		4.9	5.7	F
		"	C60		4.4	1.3	F
		"	C61		8.9	4.4	F
		"	C62		5.4	0.1	F
		"	C64		9.8	2.8	F
		"	C67		10.7	3.3	F
		"	C70		10.7	3.2	F
		"	C72		10.5	2.9	F
		"	C75		10.7	3.7	F
		"	C76		3.2	2.1	F
		"	C107		3.5	0.9	F
		"	C108		3.7	0.9	F
		"	C109		4.0	0.8	F
		"	C110		5.2	2.4	F
		"	C111		5.7	3.1	F
		"	C112		5.1	3.8	F
		"	C113		4.5	3.1	F
		"	C117		2.8	1.9	F
		"	C136		8.7	4.0	F
		"	C137		5.3	4.3	F
		"	C138		4.9	4.2	F
50	4	563701	C9	CAP,S/M,CER,50WVDC,5%,10 PF	5.1	5.8	F
		"	C11		4.9	5.8	F
		"	C22		6.1	4.0	F
		"	C24		6.1	3.8	F
51	15	563702	C40	CAP,S/M,CER,50WVDC,5%,100 PF	10.7	2.5	F
		"	C68		10.4	3.3	F
		"	C96		10.0	3.7	F
		"	C99		4.3	3.4	F
		"	C100		7.8	3.0	F
		"	C101		7.8	3.3	F
		"	C102		7.8	3.5	F
		"	C103		7.8	3.7	F
		"	C104		7.8	3.1	F
		"	C105		7.8	3.2	F
		"	C106		7.8	2.9	F
		"	C131		7.8	3.8	F
		"	C132		7.8	3.6	F
		"	C133		7.8	3.4	F
		"	C134		7.8	2.8	F
52	7	563705	C14	CAP,S/M,CER,50VMIN,10%,.01 UF	4.7	5.6	F
		"	C52		9.2	4.3	F
		"	C57		0.6	5.3	F
		"	C59		10.4	4.0	F
		"	C66		9.5	3.0	F
		"	C73		9.4	3.3	F
		"	C74		9.4	4.1	F
53	2	563715	C44	CAP,S/M,CER,50VMIN,20%,.22 UF	2.2	0.3	F
		"	C49		2.5	0.6	F
54	23	563720	C77	CAP,S/M,CER,50VMIN,5%,150 PF	5.3	4.8	F

3600 Printer Maintenance Manual

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 8/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	C78		4.1	4.8	F
		"	C79		5.3	5.4	F
		"	C80		4.5	4.2	F
		"	C83		2.4	3.4	F
		"	C84		3.2	3.4	F
		"	C85		2.0	5.3	F
		"	C86		5.8	5.7	F
		"	C87		6.3	4.4	F
		"	C88		6.8	4.4	F
		"	C89		5.6	4.4	F
		"	C90		4.0	2.9	F
		"	C91		6.4	5.8	F
		"	C92		3.5	2.9	F
		"	C93		6.5	2.5	F
		"	C94		6.5	3.7	F
		"	C114		5.2	2.5	F
		"	C116		5.1	3.7	F
		"	C130		1.0	0.7	F
		"	C135		3.7	0.7	F
		"	C139		2.8	1.8	F
		"	C143		4.9	5.6	F
		"	C144		5.7	5.2	F
55	4	563729	C47	CAP,S/M,CER,50VMIN,10%,1 UF	9.3	0.3	F
		"	C95		9.2	2.6	F
		"	C97		10.5	0.3	F
		"	C98		9.3	1.1	F
56	2	563731	C63	CAP,S/M,CERM,.001UF,200V,X7R	10.6	1.8	F
		"	C142		1.4	0.3	F
57	4	563736-001	C115	CAP,S/M,CER,0603,25V,.01UF	1.5	0.5	F
		"	C118		1.9	1.0	F
		"	C120		1.1	0.7	F
		"	C121		1.9	0.8	F
58	27	564202	D3	DIODE,S/M,TYPE BAS16	3.3	6.0	F
		"	D5		3.2	5.5	F
		"	D7		9.0	0.6	F
		"	D8		9.0	0.9	F
		"	D18		10.7	1.7	F
		"	D19		10.7	1.5	F
		"	D21		10.5	2.2	F
		"	D22		4.8	1.4	F
		"	D23		10.7	1.3	F
		"	D24		4.8	0.9	F
		"	D25		4.7	0.2	F
		"	D29		10.5	1.2	F
		"	D30		5.8	0.2	F
		"	D31		4.2	0.6	F
		"	D32		4.4	0.6	F
		"	D34		5.8	1.2	F
		"	D35		5.8	0.4	F
		"	D36		5.8	1.5	F
		"	D37		5.8	0.8	F
		"	D38		5.8	1.3	F
		"	D40		5.8	0.6	F

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 9/10
 02231995

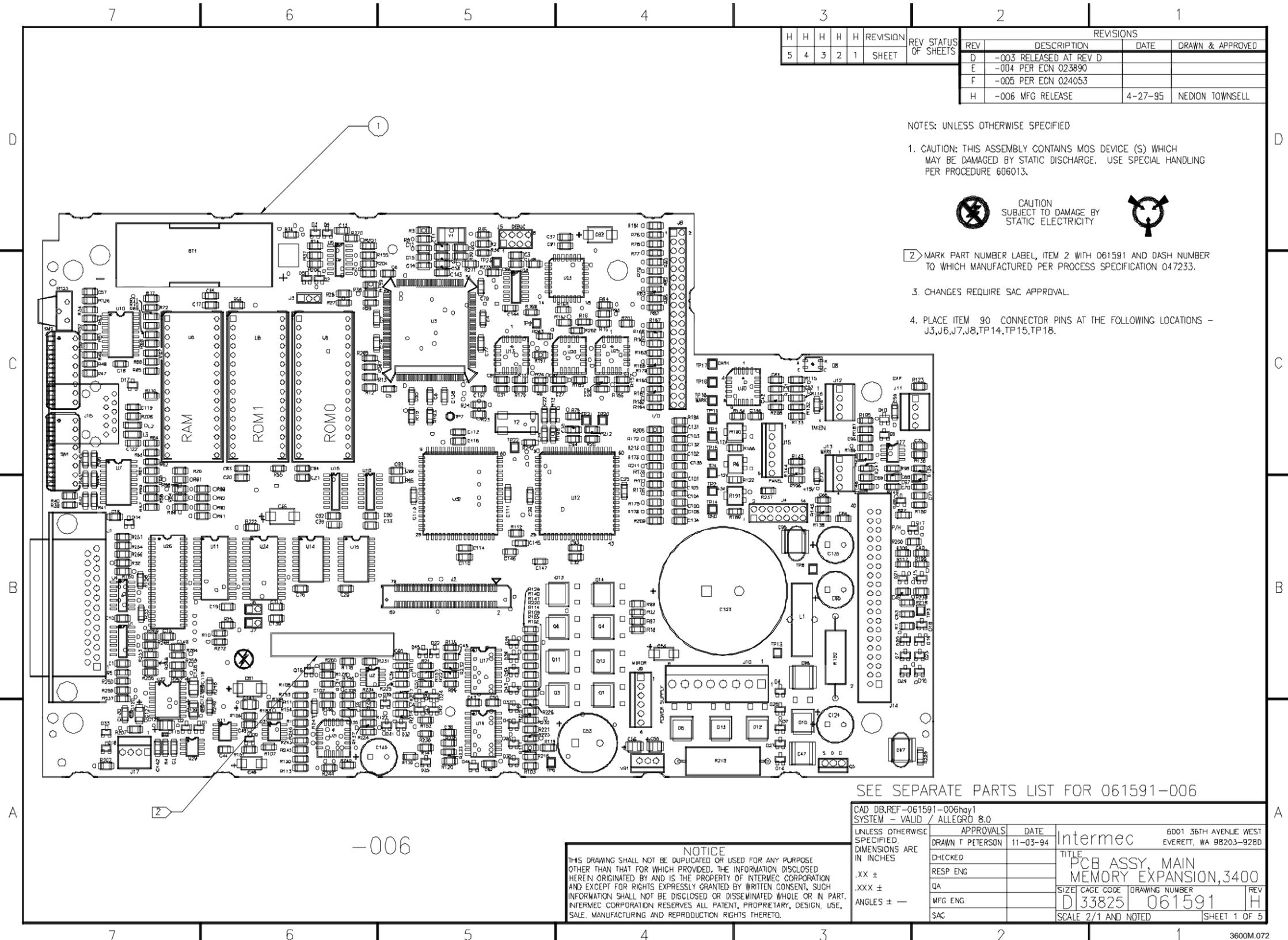
ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	D42		4.8	0.8	F
		"	D43		5.8	1.0	F
		"	D44		5.3	0.1	F
		"	D45		4.6	1.4	F
		"	D46		4.6	0.9	F
		"	D47		4.6	0.8	F
59	4	564206	D1	DIODE,S/M,TYPE MMBD301	1.9	0.6	F
		"	D2		1.8	0.6	F
		"	D4		3.5	6.0	F
		"	D14		1.1	2.8	F
60	1	564217	D28	DIODE,S/M TYPE 5231 ZENER,5V	10.5	3.0	F
61	3	564219	D15	DIODE,S/M TYPE 5245 ZENER,15V	10.7	1.2	F
		"	D16		9.0	0.2	F
		"	D20		10.5	1.5	F
62	1	564235	D9	DIODE,S/M,TYPE 5226,ZENER,3.3V	2.5	0.4	F
63	2	564238	D26	DIODE,S/M,TYPE BAS21,200VBR	9.0	0.8	F
		"	D27		9.0	0.4	F
64	4	564239-002	D6	DIODE,S/M,DUAL,6A,100V	7.8	0.6	F
		"	D10		9.3	0.7	F
		"	D12		8.7	0.6	F
		"	D13		8.3	0.6	F
65	1	565091-001	Q5	XSTR,FET,60V,30A	9.8	0.2	F
66	4	565101	Q2	TRANS,S/M,NPN,TYPE 4401	3.4	5.5	F
		"	Q9		10.3	3.8	F
		"	Q10		10.3	4.0	F
		"	Q16		3.2	1.2	F
67	1	565102	Q17	TRANS,S/M,TYPE 4403,PNP	10.6	2.7	F
68	1	565110	Q7	XSTR,S/M,TYPE 6427 DARLINGTON	10.5	1.3	F
69	1	565127-001	Q15	XSTR,S/M,T5551,NPN,160V	10.7	2.2	F
70	8	565130-001	Q1	XSTR,S/M,HEXFET,60V,7.7A	6.9	0.9	F
		"	Q3		6.3	0.9	F
		"	Q4		6.9	1.6	F
		"	Q6		6.3	1.6	F
		"	Q11		6.3	1.3	F
		"	Q12		6.9	1.3	F
		"	Q13		6.3	2.0	F
		"	Q14		6.9	2.0	F
71	1	567024	VR1	VOLTAGE REGULATOR,5V,1A	7.5	0.2	F
74	1	578020	U28	IC,S/M,TYPE 74HC04	5.8	5.4	F
75	1	578023	U5	IC,S/M,TYPE 74HC32	3.6	5.7	F
76	4	578081	U7	IC,S/M,TYPE 74HCT245	0.9	3.2	F
		"	U10		0.9	4.9	F
		"	U14		3.3	2.4	F
		"	U15		3.8	2.4	F
77	1	578087	U4	IC,S/M,TYPE 14C89,CMOS RCVR	1.0	2.0	F
78	2	578131	U11	IC,S/M,TYPE IDT72105,FIFO	2.1	2.3	F
		"	U24		2.7	2.3	F
79	1	578132	U30	IC,S/M,TYPE MC145041	8.6	4.3	F
80	1	578134	U1	IC,S/M,TYPE 75ALS180	1.0	1.5	F
81	1	578135	U29	IC,S/M,TYPE MC34064	1.8	0.3	F
82	1	578137	D11	IC,S/M,TYPE LM385-1.2	2.2	0.5	F
83	1	578145	Y2	CRYSTAL,S/M,24MHZ	5.8	3.9	F
84	2	578209-001	U16	IC,S/M,TYPE 74ALS257	3.6	3.2	F

3600 Printer Maintenance Manual

PL# 061591-003 TITLE: PCB ASSY,MAIN,3600
 PL REV: D
 RUN DATE: Feb 23 15:19:02

PAGE 10/10
 02231995

ITEM	QTY/UM	PART NO.	REFDES	DESCRIPTION	X	Y	F/B
		"	U18		4.0	3.2	F
85	1	578211-001	U3	IC,S/M,TYPE MC68332,MICPRCS	4.7	4.9	F
86	3	578245-001	U2	IC,S/M,LM293,DUAL VOLT COMPTR	4.0	1.1	F
		"	U27		10.4	3.6	F
		"	U31		2.8	0.5	F
87	1	578294-001	U26	IC,S/M,DRAM,256KX16,SOJ	1.5	2.2	F
88	1	578300-001	U22	IC,S/M,234,RS-232 DRVR	1.5	0.9	F
89	2	578301-001	U17	IC,S/M,HIP4081,HF DRVR,80V	5.4	1.2	F
		"	U19		5.4	0.5	F
90	2.610	580231		CONN,26-POSN.HDR.SNGL.ROW/.100			
91	1	580285	J10	CONN,8-POSN,HDR,.156,FRICTION	8.8	1.0	F
93	3	580359	J11	CONN.HDR.4-POSN.STRAIGHT THRO.	10.6	4.2	F
		"	J12		9.7	4.3	F
		"	J13		9.7	3.5	F
94	1	580434	J1	CONN.25-POSN.D/SUB W/SNAP	0.7	1.2	F
95	1	581976	J14	CONN,40-POSN,HDR,.1 DBL ROW	10.2	1.0	F
96	2	581978	J9	CONN,6-POSN,HDR,.100,FRIC LOCK	7.3	0.6	F
		"	J15		8.9	3.3	F
97	2	582065	SW1	SW,8-POSN.DIP,SIDE ACTUATED	0.1	3.9	F
		"	SW2		0.1	4.8	F
98	1	582282-012	J2	CONN,S/M,PIN,.8MMX6MM,80-POSN	5.5	2.1	F
99	1	585636-001	L1	INDUCTOR,10 UH	9.1	1.7	F
100	1	586298	BT1	HLDR.BATTERY,AA SIZE	1.9	5.8	F
101	1	586548-001	Q8	SENSOR,S/M,REFLECTIVE	9.4	4.6	F
102	1	588000	Y1	CRYSTAL,S/M 32.768 KHZ	5.0	6.0	F
103	2	580213		CONN.2-POSN.SHORTING,.10 CTRS.			



REVISIONS				
REV	DESCRIPTION	DATE	DRAWN & APPROVED	
D	-003 RELEASED AT REV D			
E	-004 PER ECN 023890			
F	-005 PER ECN 024053			
H	-006 MFG RELEASE	4-27-95	NEDION TOWNSELL	

NOTES: UNLESS OTHERWISE SPECIFIED

1. CAUTION: THIS ASSEMBLY CONTAINS MOS DEVICE (S) WHICH MAY BE DAMAGED BY STATIC DISCHARGE. USE SPECIAL HANDLING PER PROCEDURE 606013.



2. MARK PART NUMBER LABEL, ITEM 2 WITH 061591 AND DASH NUMBER TO WHICH MANUFACTURED PER PROCESS SPECIFICATION 047233.
3. CHANGES REQUIRE SAC APPROVAL.
4. PLACE ITEM 90 CONNECTOR PINS AT THE FOLLOWING LOCATIONS - J3, J6, J7, J8, TP14, TP15, TP18.

SEE SEPARATE PARTS LIST FOR 061591-006

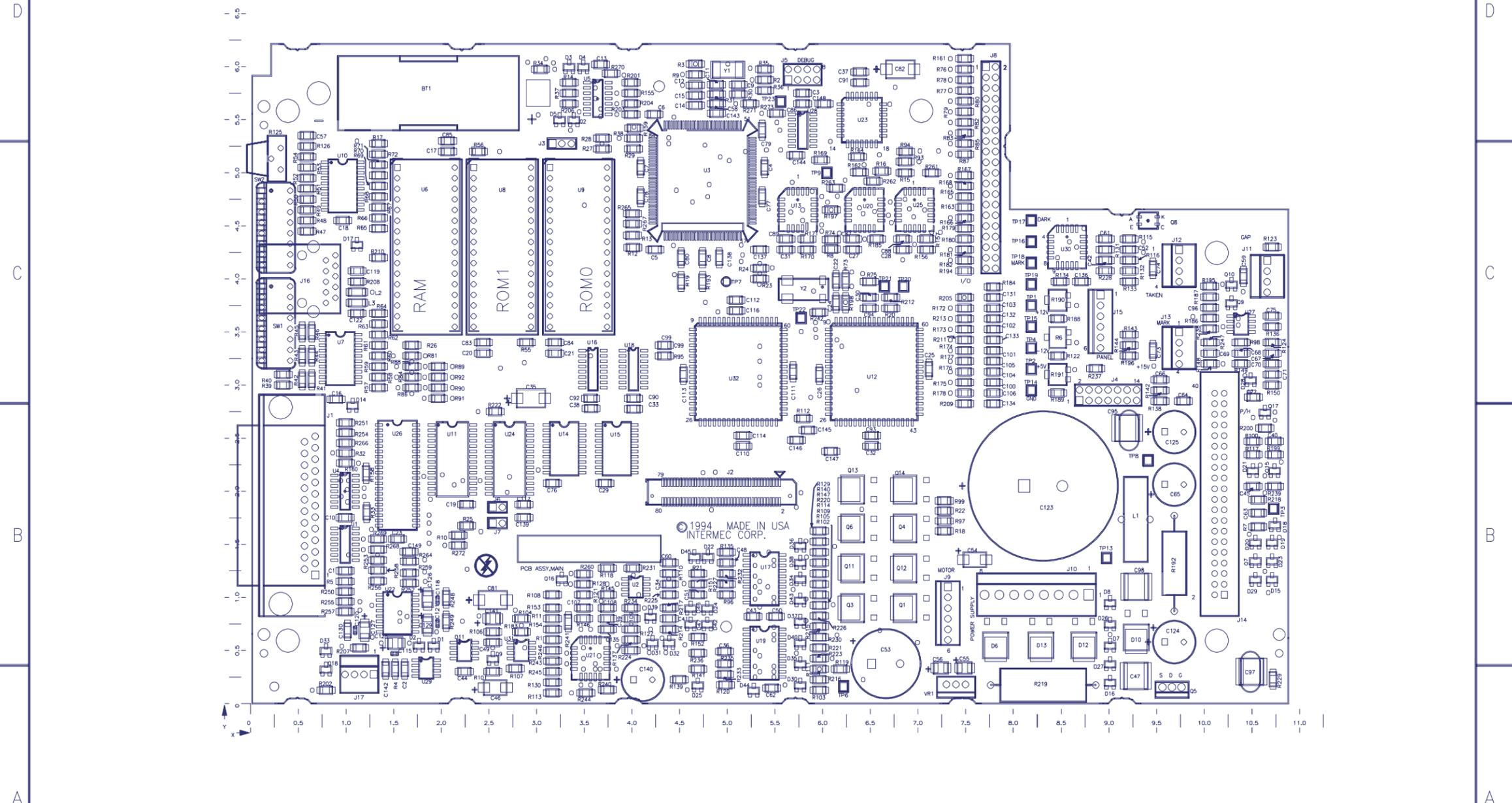
-006

NOTICE
 THIS DRAWING SHALL NOT BE DUPLICATED OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH PROVIDED. THE INFORMATION DISCLOSED HEREIN ORIGINATED BY AND IS THE PROPERTY OF INTERMEC CORPORATION AND EXCEPT FOR RIGHTS EXPRESSLY GRANTED BY WRITTEN CONSENT, SUCH INFORMATION SHALL NOT BE DISCLOSED OR DISSEMINATED WHOLE OR IN PART. INTERMEC CORPORATION RESERVES ALL PATENT, PROPRIETARY, DESIGN, USE, SALE, MANUFACTURING AND REPRODUCTION RIGHTS THERE TO.

CAD DB REF-061591-006hay1		SYSTEM - VALID / ALLEGRO 8.0	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES	APPROVALS	DATE	TITLE
.XX ±	DRAWN T PETERSON	11-03-94	Intermec
.XXX ±	CHECKED		6001 36TH AVENUE WEST
ANGLES ±	RESP ENG		EVERETT, WA 98203-928D
	QA		PCB ASSY, MAIN
	MFG ENG		MEMORY EXPANSION, 3400
	SAC		SIZE CAGE CODE DRAWING NUMBER
			D 33825 061591
			SCALE 2/1 AND NOTED SHEET 1 OF 5

7 6 5 4 3 2 1

REVISIONS			
REV	DESCRIPTION	DATE	DRAWN & APPROVED
H	-006 MFG RELEASE	4-27-95	NEDION TOWNSELL



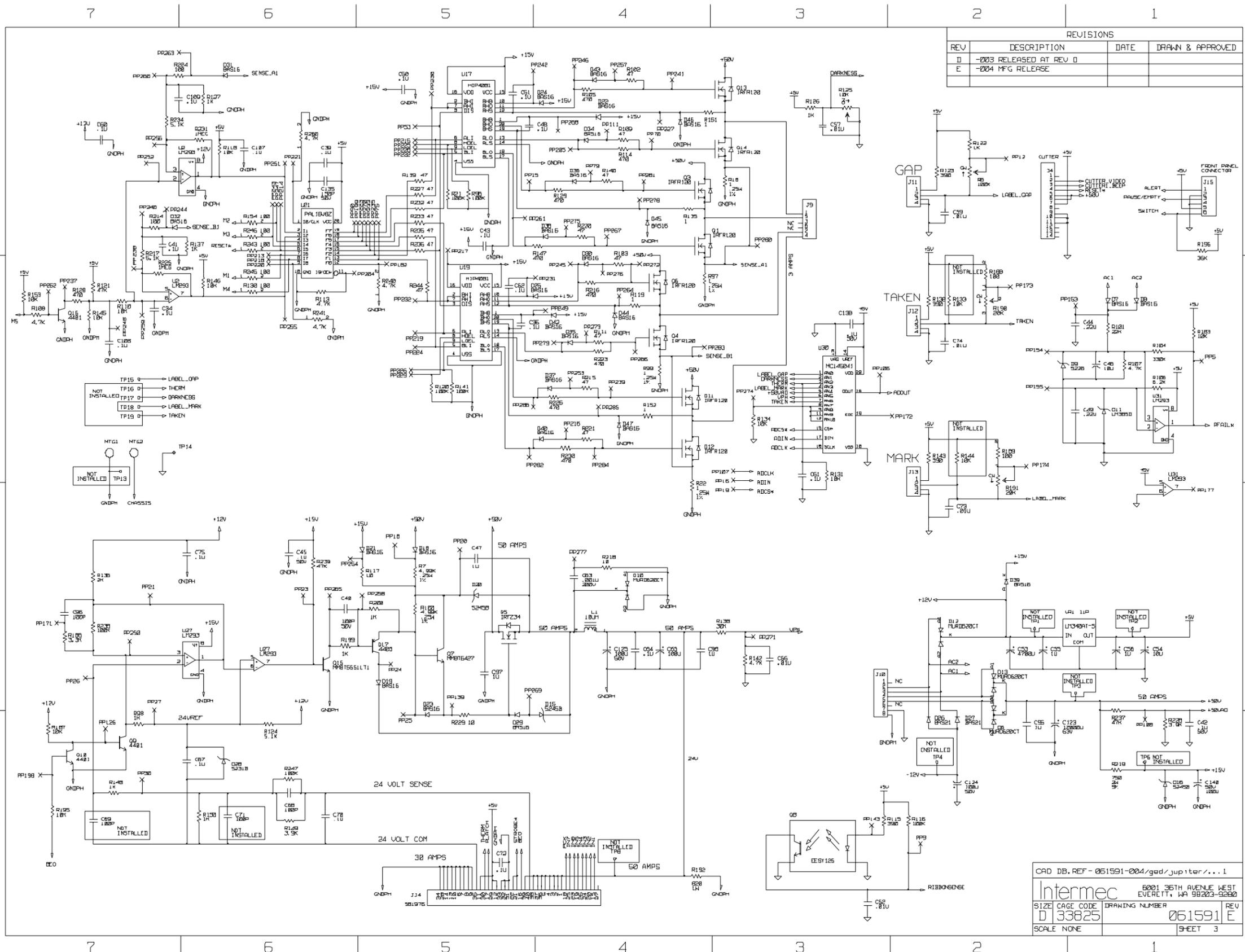
© 1994, MADE IN USA
INTERMEC CORP.

PCB ASSY:MAN

FOR REFERENCE ONLY

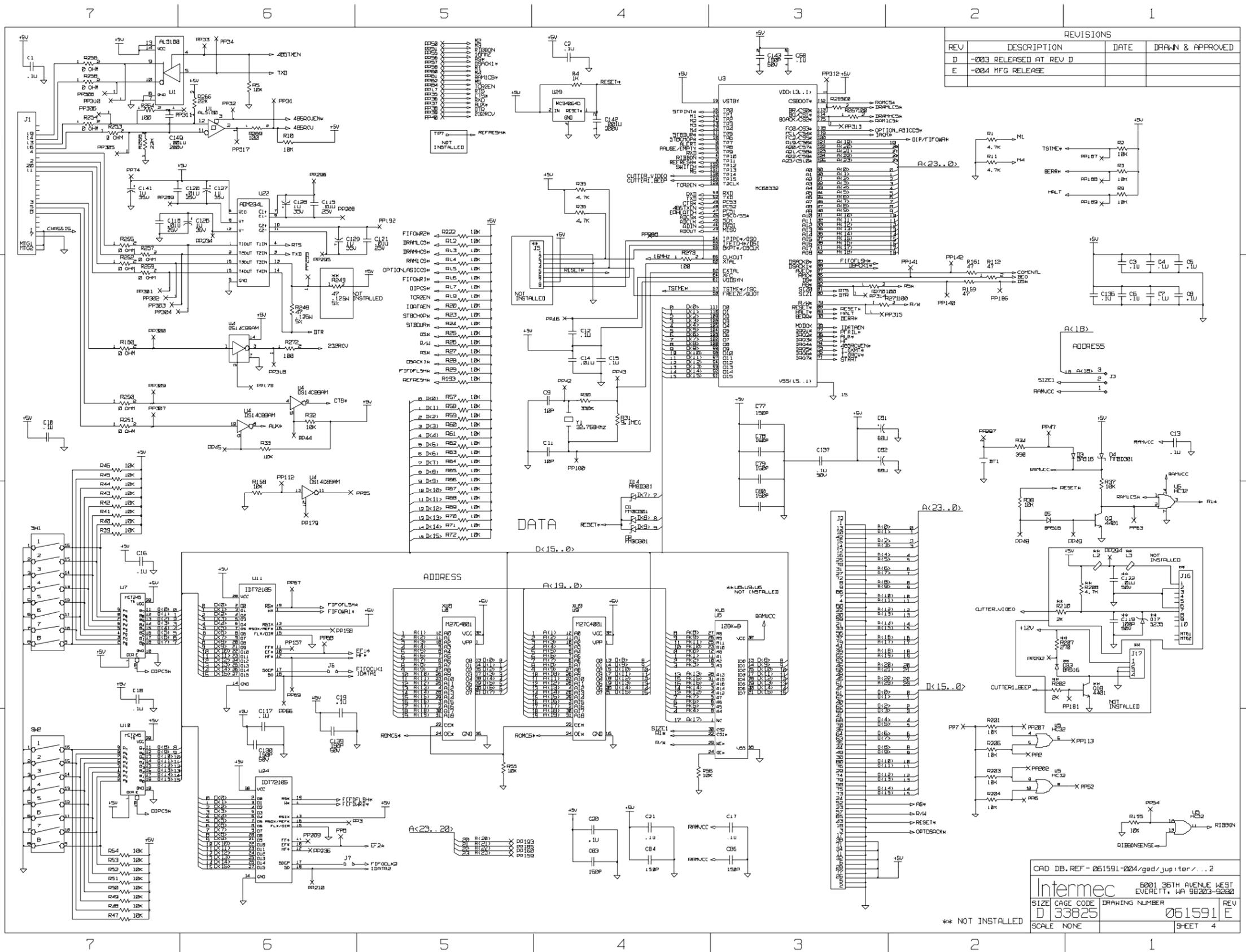
CAD DB:REF-061591-006hay2.brd			
Intermec		6001 36TH AVENUE WEST EVERETT, WA 98203-9280	
SIZE	CAGE CODE	DRAWING NUMBER	REV
D	33825	061591	H
SCALE 2/1		SHEET 2	

7 6 5 4 3 2 1



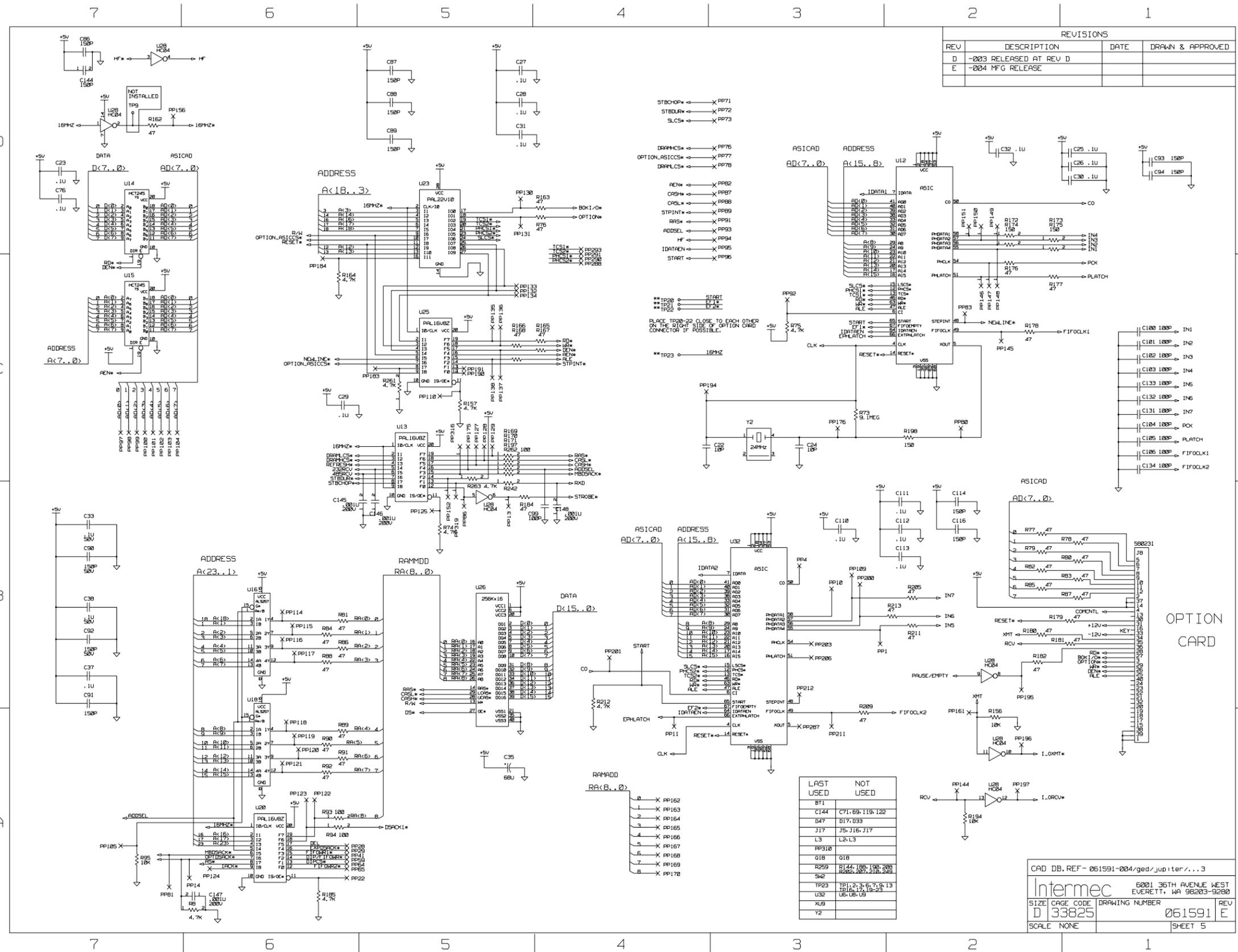
REVISIONS			
REV	DESCRIPTION	DATE	DRAWN & APPROVED
D	-003 RELEASED AT REV 0		
E	-004 MFG RELEASE		

CAD DB. REF - 061591-004/gad/jupiter/...1			
Intermec		8001 36TH AVENUE WEST EVERETT, WA 98203-9280	
SIZE D	CAGE CODE 33825	DRAWING NUMBER 061591	REV E
SCALE NONE			SHEET 3



REVISIONS			
REV	DESCRIPTION	DATE	DRAWN & APPROVED
D	-003 RELEASED AT REV D		
E	-004 MFG RELEASE		

CAD DB, REF - 061591-004/ged/jupiter/... 2			
Intermec		8001 35TH AVENUE WEST EVERETT, WA 98203-0280	
SIZE	CAGE CODE	DRAWING NUMBER	REV
D	33625	061591	E
SCALE	NONE		SHEET 4



REVISIONS			
REV	DESCRIPTION	DATE	DRAWN & APPROVED
D	-003 RELEASED AT REV D		
E	-004 MFG RELEASE		

- STBOHOP* ← PP71
- STBDUR* ← PP72
- SLCS* ← PP73

- DRAMCS* ← PP76
- OPTION_ASICCS* ← PP77
- DRAMCS* ← PP78

- REN* ← PP82
- CASH* ← PP87
- CASH* ← PP88
- STPINT* ← PP89
- RAS* ← PP91
- ADDSEL* ← PP93
- HF* ← PP94
- IDATAEN* ← PP95
- START* ← PP96

**TP28 ← START

**TP21 ← EPHLATCH

**TP22 ← CLK

**TP23 ← 16MHz

PLACE TP28-29 CLOSE TO EACH OTHER ON THE RIGHT SIDE OF OPTION CARD CONNECTOR IF POSSIBLE.

LAST USED	NOT USED
B1	X PP162
C144	X PP163
D47	X PP164
J17	X PP165
L3	X PP166
PP310	X PP167
G18	X PP168
R259	X PP169
Sk2	X PP170
TP23	X PP171
U32	X PP172
XL9	X PP173
Y2	X PP174

CAD DB, REF - 061591-004/ged/jupiter/...3

Intermec 6001 36TH AVENUE WEST
EVERETT, WA 98203-9280

SIZE CAGE CODE DRAWING NUMBER REV
D 33825 061591 E

SCALE NONE SHEET 5



Replacement Parts

This chapter contains a list of 3600 printer replacement parts referenced to illustrations.

Replacement Parts

The following table is a copy of the 3600 service parts matrix with illustration references added. It lists the 3600 printer parts that can be ordered for replacement by the part number indicated. Each part on the list has an ID number corresponding to a callout on the illustration showing its location. Multiple ID numbers occur when parts are used more than once or when another view of the part is called out for clarification. A list of documentation part numbers you can order is also provided.

To order replacement parts, contact Intermec:

Intermec Corporation
6001 36th Avenue West
P.O. Box 4280
Everett, WA 98203-9280

Note: Only the listed printer parts are spares available for purchase.

3600 Printer Spare Parts List

ID No.	Part Number	Description
01, 07	061564-001	BEZEL, TOP COVER
02, 99	061550-007	PLATE, MAIN DECK
03, 05, 06, 08, 42, 43, 45, 70, 83, 86, 119, 146	522690	SCREW, THD ROLL W/CONE
04	059101-009	COVER, ELECTRONICS
09	521528-001	TAPE, TRANSFER, ADH, .010 T
10	059710-001	MAGNET, DOOR LATCH
11	059013-002	LENS, MEDIA INSPECTION
12	060622-001	LBL, INTL LOADING INSTRUC
13	061547S-006	COVER, REAR
14, 34	061544-004	PLATE, BASE
15	061545S-002	COVER, MEDIA ACCESS
16, 46	061546S-004	BEZEL, FRONT COVER

3600 Printer Maintenance Manual

ID No.	Part Number	Description
17, 27	059012-009	PLATE, FRONT COVER
18, 20, 21, 40, 66, 155	526036	SCREW, PHP, W/INT STAR 6-32 X .375
19, 54	059052S-001	PCB ASSY, BEZEL
22	059387-003	BRACKET, HINGE
23	060315-002	ROLLER, PINCH
24	061581-001	SHAFT, PINCH ROLLER
25	501445	RING.RTN. .125 DIA. E-RING, ZINC
26, 44	061579S-003	DOOR ASSY, MEDIA ACCESS
28, 95	061555-001	EXTRUSION, PRINTED SPAN
29, 116	521118-001	WASHER, SPRING, CONL .175 X .50
30	505613	SCREW, SOC HD CAP 8-32
31, 56	061548-001	CABLE ASSY, RIBBON PRINTHEAD
32, 73	059032-002	BRACKET, PRINTHEAD PIVOT
33, 76	061559-003	BLOCK, PIVOT
35	501272-001	FEET, RUBBER, ADHESIVE BACKED
36	061570-003	HEATSINK ASSY, PRINTHEAD
37	505767	SCREW, PHM, 8-32X .375
38	061611S-001	PRINTHEAD, 6.6 INCH, 5 MIL, 3600
39	062862-002	CAP, BIAS SCREW
41, 87	061556-004	PLATE, LOWER MODULE, OUTBD
47	059103-002	BUTTON, CAP
48	058776-004	LIGHT PIPE, DOCK/CHARG
49	061591S-005/061591E-005*	PCB ASSY, MAIN (*exchange part no.)
50, 55	059727-001	CABLE ASSEMBLY, BEZEL
51, 98	059496-004	CABLE ASSY., LABEL TAKEN SENSOR
52	061578-001	CABLE ASSY, LBL MARK SENSOR
53, 123	059495-001	CABLE ASSY, LABEL GAP
57	586142	INS. SHIM
58	507846	SPACER, .235 RD. NY. SHOULDER
59	505312	SCREW, PHM, PHIL 4-40X.25
60	061549-003	HEATSINK, PCB DRIVERS

ID No.	Part Number	Description
61	585525-001 585525-002	XFMR, 3600, 47-63HZ, 100V/120V XFMR, 3600, 47-63HZ, 200V/240V
62	041776	JUMPER AY, .25 TERM. LUGS, 4-IN
63	060246-001	FILTER ASSY, LINE AC
64	506103	WASHER, LOCK, EXT. STAR, NO.
65	501273-001	CIRCUIT BREAKER, SWITCH, 2 AMP
65	501273-002	CIRCUIT BREAKER, SWITCH, 1 AMP
67	506111	WASH. LOCK. SPLIT, NO. 4
68	060544-001	GASKET, ESD, RS232 CONNECT
69	507659-001	SCREW, JACK, 4-40X .312
71	586229	BATTERY, LITHIUM 3.6V, 1.75AH
72, 145	525034-001	SCREW, THD ROLL W/CONE, 8-
74, 93, 106, 108, 132	506013	WASHER, SST, .255ID X .407OD
75	506827-001	SPRING, COMP. 360 OD .44F
77	059122-001	LEVER, PRINthead ADJUSTMENT
78	507717	FASTENER, COTTER PIN 25
79	061561-001	SPRING, TORSION, PRINthead RETURN
80	061560-001	SHAFT, TTR RIBBON
81, 100, 136	501409	RETAINING RING .250 DIA BASIC
82	059039-011	HANDLE, PRINthead PRESSURE
84	063225-001	PLATE, UPPER MODULE, OUTBD
85	061576S-002	CAM ASSEMBLY, HEAD PRESSURE
88	061568-002	ROLLER, LINER DRIVE
89	061542-003	ROLLER, PLATEN
90	061543-002	ROLLER, DRIVE
91	061558-002	BAR, STRIP SUPPORT
92, 109, 134	501401	RTN RING .250 DIA 8610/2
94	061541-001	BAR, TEAR
96, 131	501394-001	MOUNT, WIRE ROUTING, ADH B
97	059423-002	MOUNT, MARK SENSOR

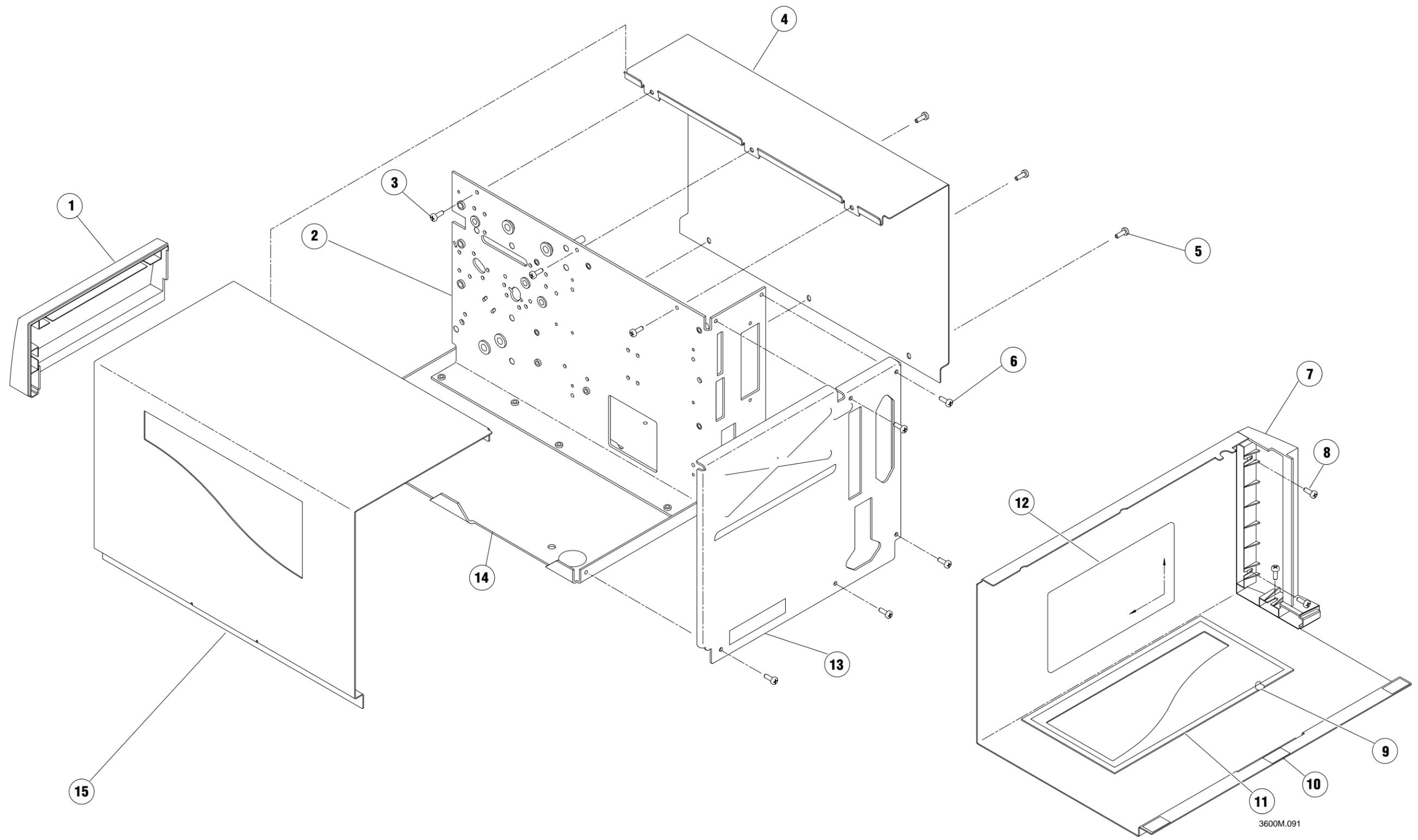
3600 Printer Maintenance Manual

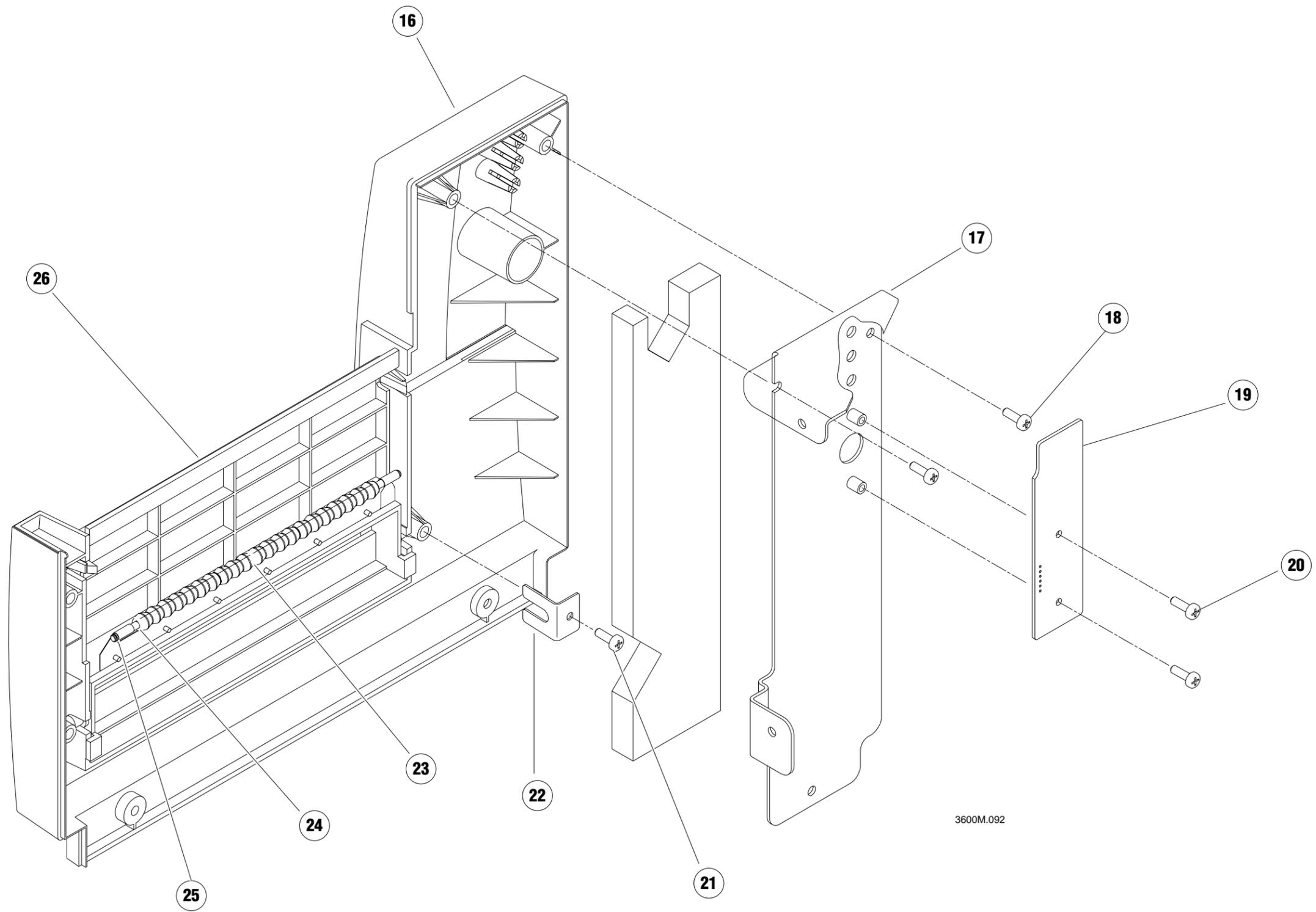
ID No.	Part Number	Description
101	061902-001	ARM, MEDIA BRAKE
102	062352-002	BELT, FLAT POLYURETHANE, 1.75 ID
103	061900-003	DRUM, MEDIA BRAKE
104	062746-002	BUSHING, MEDIA ARM
105	506022	WASHER, NYLON, .257ID X .5
107	061587-005	PLATE, INBOARD MEDIA SUPPLY
110	061903-001	POST, MEDIA SUPPLY
111	061586-003	ROLLER, MEDIA SUPPLY
112	059718-002	RING, LABEL SUPPLY
113	061904-002	CAP, MEDIA SUPPLY
114	061552-003	BRACKET, MEDIA PATH, UPPER
115	059030-005	EDGEGUIDE, OUTER
117	059781-001	THUMBSCREW, ASSEMBLY
118	061553-003	BRACKET, MEDIA PATH, LOWER
120	061567-002	SPRING, TORSION, PAPER PATH
121	059509-002	SHAFT, PAPER PATH
122	062396-001	MOUNT, LBL GAP SENSOR
124	061901-001	PEDAL, MEDIA BRAKE
125, 127, 165	061562-005	HUB ASSY
128	061566-003	BRACKET, CORE LOCKING
129, 142, 150	506040-005	WASHER, FLAT SST .327 X .50 X .30
130	060214-001	FLAP, PRINTHEAD CBL RESTR
133	061563-002	GEAR/PULLEY, CLUSTER, L/H
135	061557-003	GEAR, PLATEN, D SHAFT
137	061569-002	GEAR/PULLEY CLUSTER, RH
138	506040-004	WASHER, FLAT SST, .817 X 1.0
139	062927S-001	CLUTCH, ASSY, RIBBON TRANSPORT TAKE-UP, 3600 SPARE
140	506049-001	WASHER, FLAT, NYLON .320ID
141, 160	501461-001	RETAINING RING EXTERNAL .395
143, 152	501410	RETAINING RING .310 DIA, GRIPPING

ID No.	Part Number	Description
144	061551-002	CABLE ASSY, MOTOR MAIN STEPPER
147	059102-002	BRACKET, MOTOR MOUNT
148	061554-004	PLATE, MOTOR
149	061584-002	SUBPLATE, LINER TAKEUP
151, 154	505359-001	SCREW, W/CONE WASH, 8-32X1
153	061588-002	GEAR, LINER REVERSE
156	062603-001	PLATE, HUB ADJUST
157	061583-002	SUBPLATE, TTR
158	061574S-001	CLUTCH, ASSY, SELF STRIP LINER TAKE-UP, 3600 SPARE
159	506040-007	WASHER, FLAT SST 446 X .56
161	061589-001	SHAFT, LINER REVERSE
162, 163	501462-003	O-RING, 2.800ID X .210THK
164	506040-006	WASHER, FLAT SST .327 X .500 X .080
166	061565-002	CLAMP, LINER HUB
not shown	061605-001	CORE, RIBBON, 3600, CDBD, 6.7 IN.
not shown	062197S-003	FIRMWARE, 3600, VER 1.1, SPARE

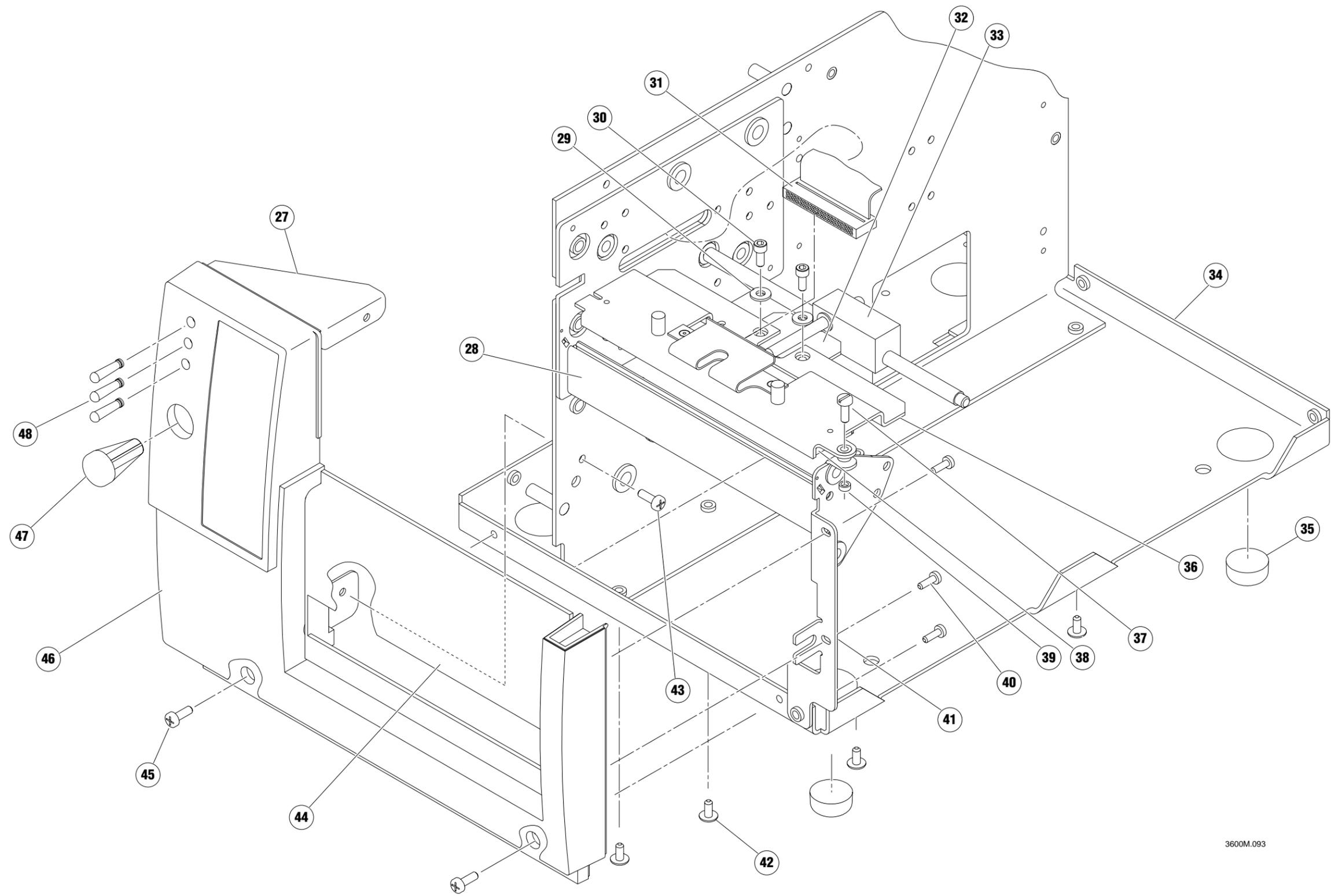
3600 Manuals

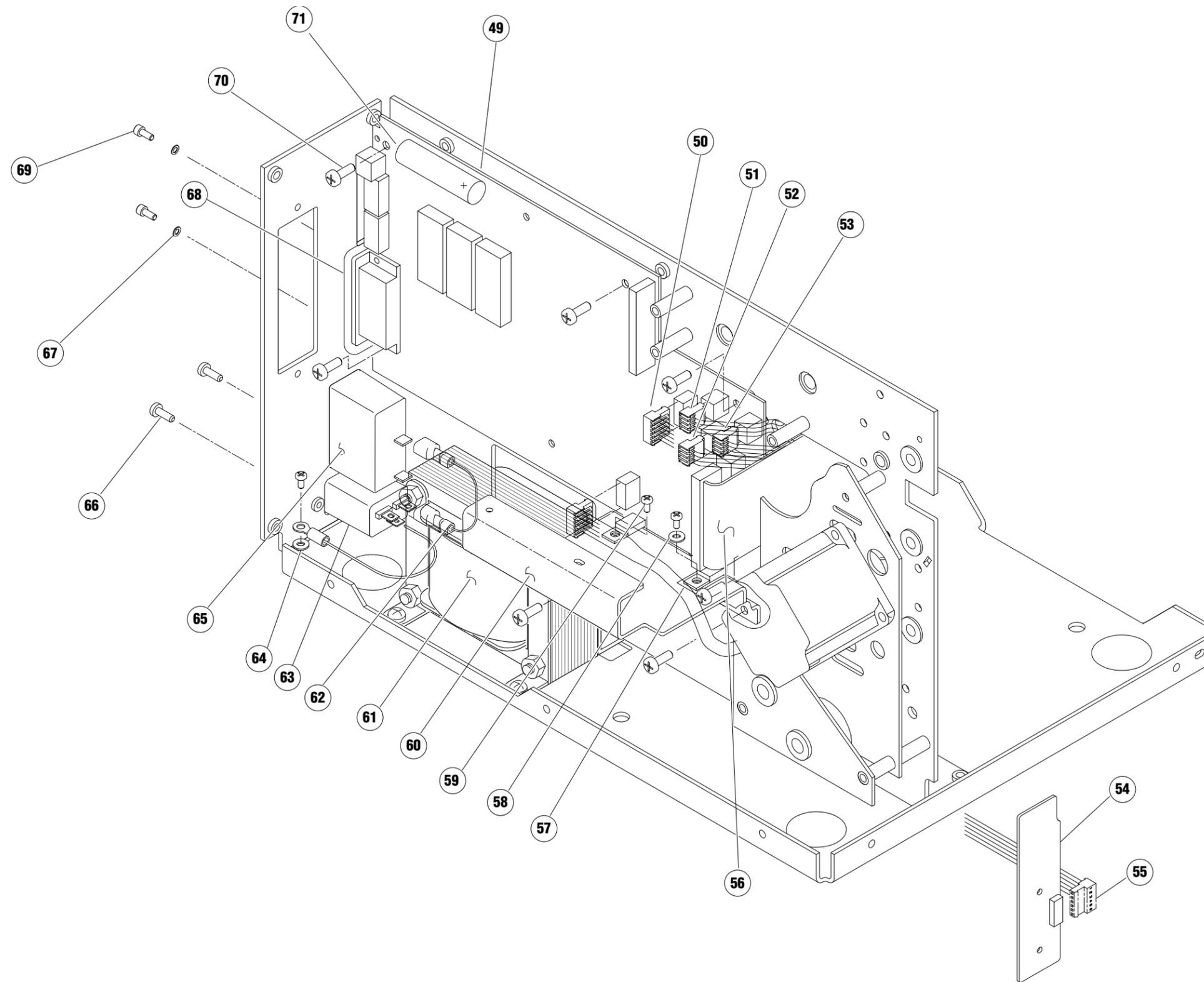
Part No.	Description
062732-001	<i>3600 Bar Code Label Printer User's Manual</i>
062733-001	<i>3600 Bar Code Label Printer Getting Started Guide</i>

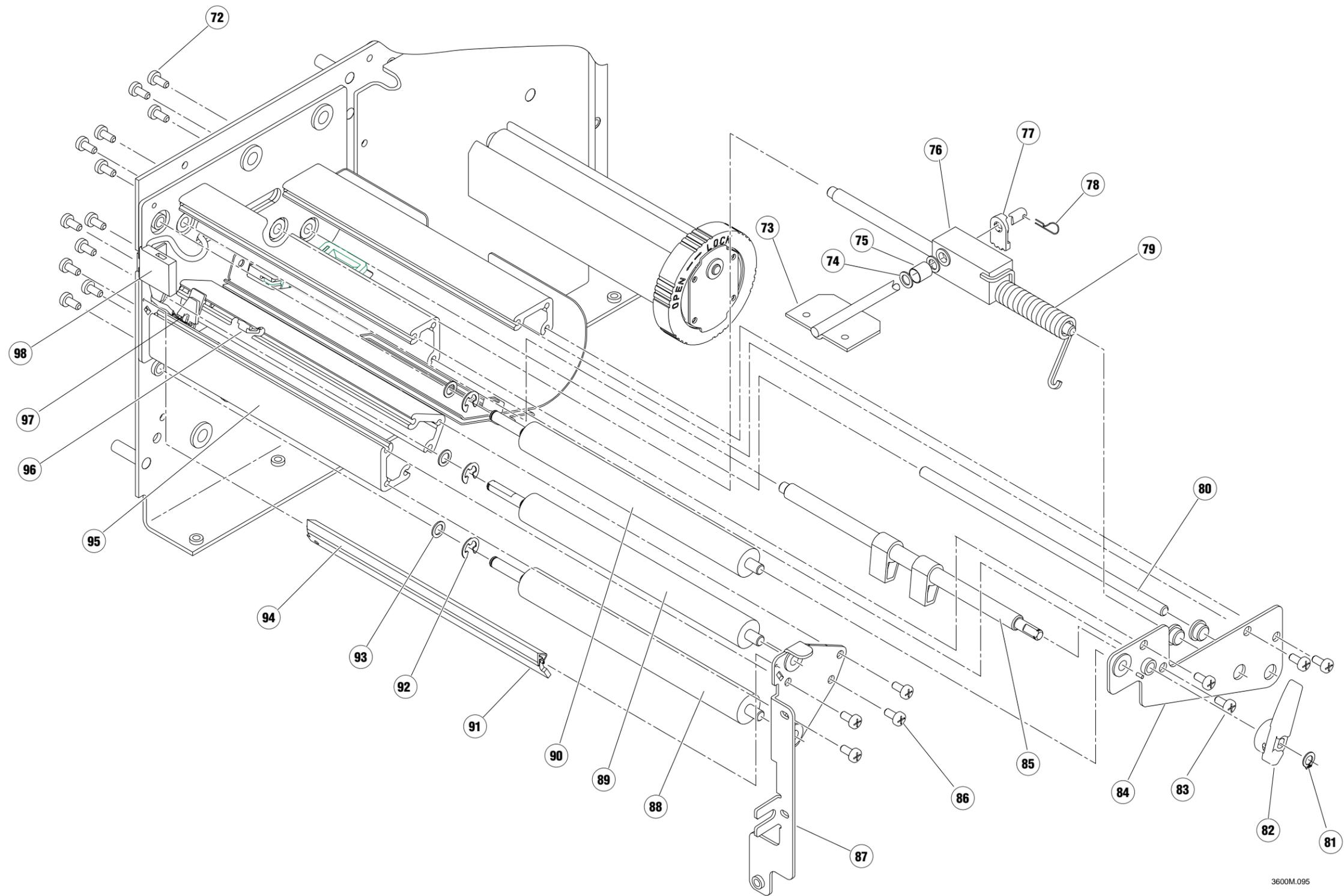


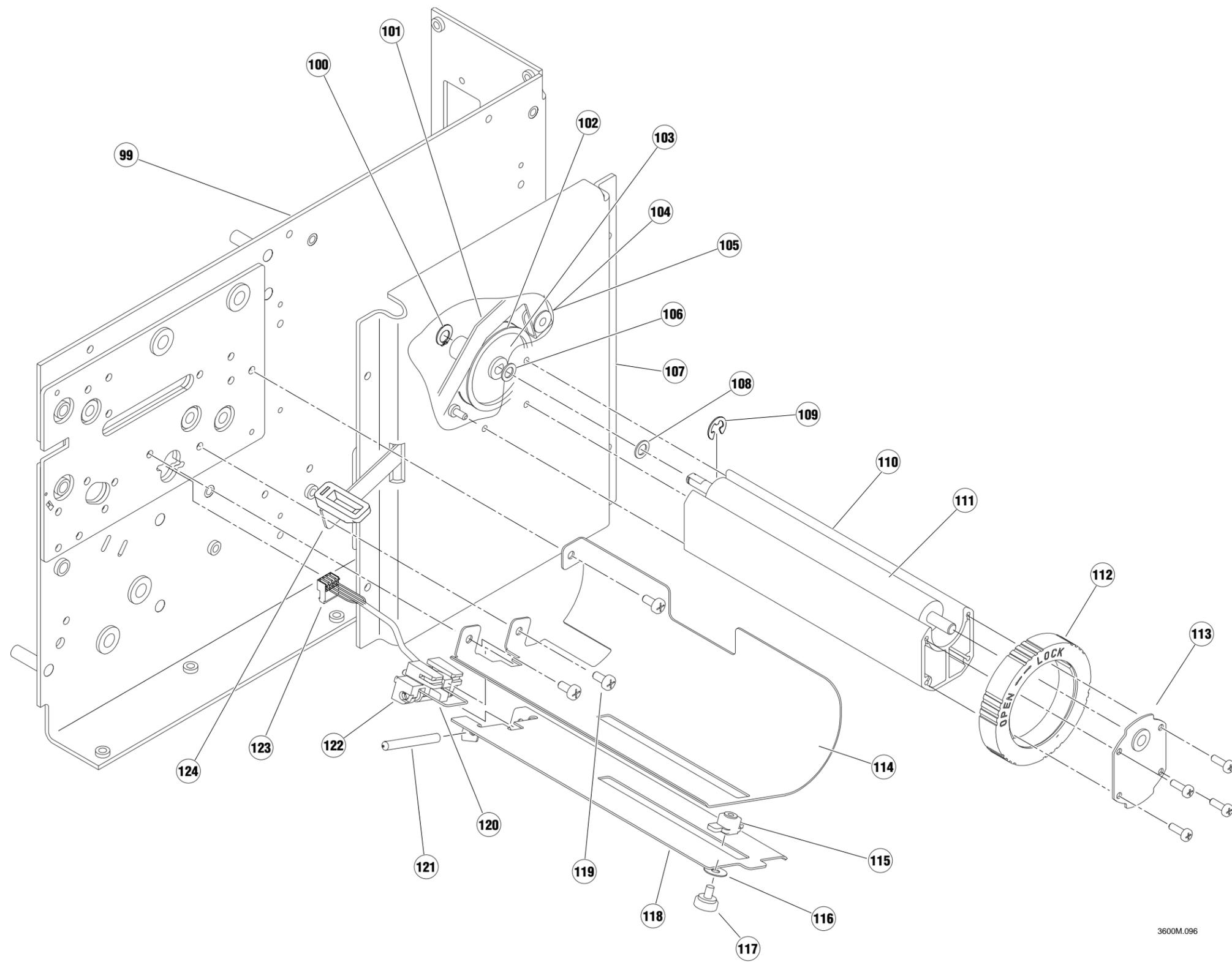


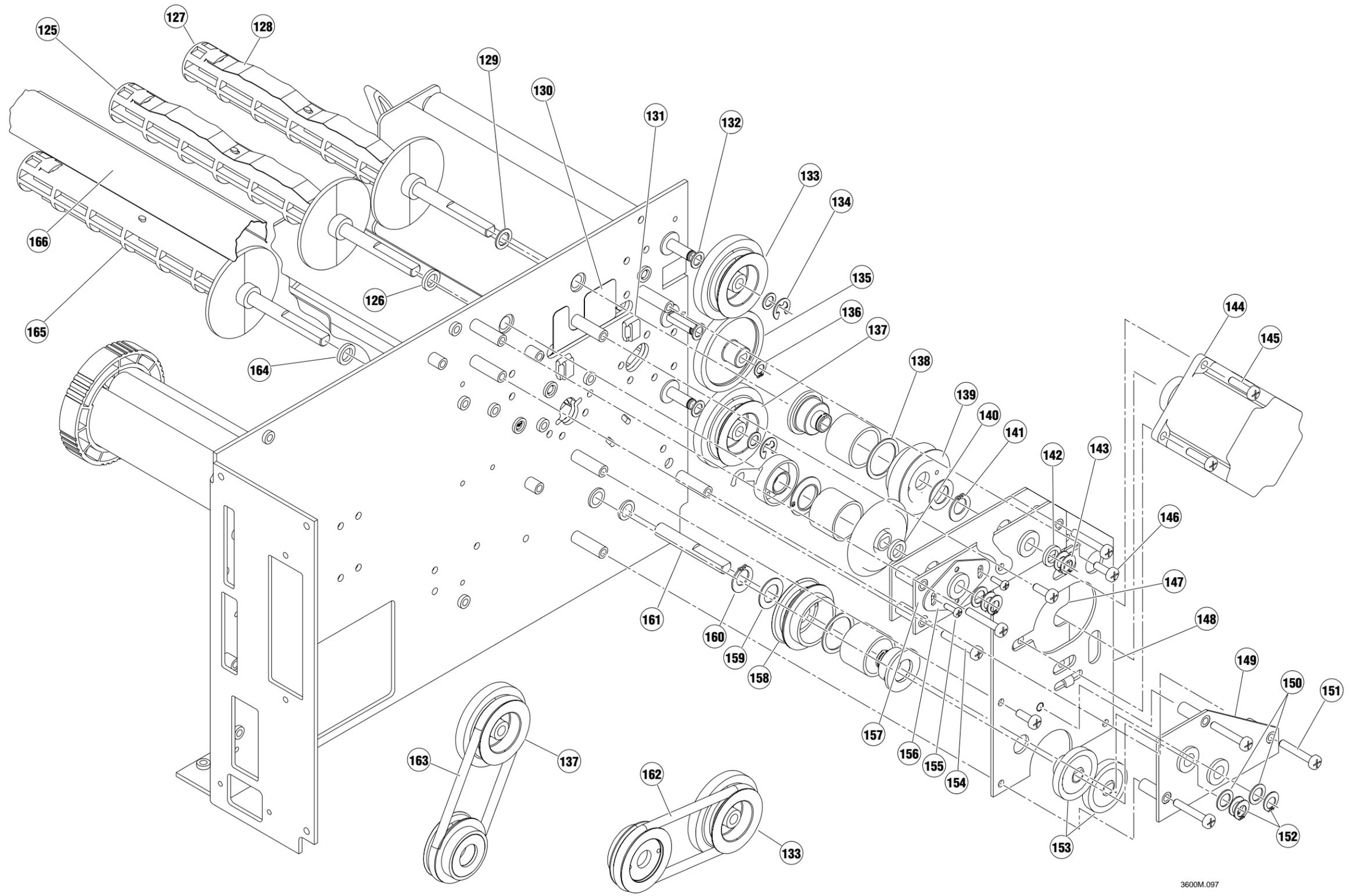
3600M.092













Appendix

This appendix describes the theory of operation for the 3600 printer.

Functional Description of the 3600 Mechanics

This section describes the basic mechanical functionality of the 3600 printer.

The 3600 printer has a sheet metal frame (base plate and main deck plate) to which mechanical and electrical components are attached. The printer holds, moves, routes for contact by the printhead, and stores label stock and ribbon by electronically controlled mechanical means. Sheet metal covers protect media and components.

The printer has one electrically powered motor that is the source of simultaneous movement for all of the driven parts. The motor shaft uses a pinion gear to impart drive force to the rotating parts, producing ribbon and liner movement.

The motor pinion gear drives the platen roller by meshing with the 96-tooth gear mounted on the end of the roller. The platen roller gear contacts a 96-tooth gear/pulley assembly on the TTR drive roller, assisting ribbon movement and providing drive to the TTR takeup hub by means of the drive belt (O-ring) between the TTR drive gear/pulley and the TTR takeup clutch/pulley.

The motor pinion gear also meshes with a 96-tooth gear/pulley on the liner drive roller, assisting liner movement and providing drive to the liner takeup hub by means of another drive belt between the liner drive gear/pulley and the liner takeup clutch/pulley.

The liner takeup clutch/pulley rotates an idler shaft and gear that meshes with an identical gear on the liner takeup hub shaft to produce reverse rotation of the liner takeup hub.

The TTR drive function and the liner drive function each use one-way clutches to facilitate label retract. A one-way clutch is part of each roller drive gear. The TTR drive roller gear is white, while the liner drive roller gear is black. This makes it easy to distinguish between the two gears, which is necessary because the clutches are one-way in opposite directions and would not work if interchanged.

The clutch/pulley assemblies on the TTR takeup hub and liner reverse shaft are similarly color coded because they have different torque values. The springs inside are color coded as well: TTR = white gear, white pulley/clutch, white spring (inside); liner = black gear, black pulley/clutch, black spring.

The belt driven TTR takeup (16 in-oz) hub and liner reverse (34 in-oz) idler shaft use one-way clutches that manage takeup force and prevent slackening during retract. Reversed liner takeup rotation produces less slippage.

The TTR supply hub uses an 18 in-oz slip clutch. The hub has a TTR encoder sense label attached to it that is used for ribbon motion sensing.

A media supply assist roller and brake assembly are part of the media supply post function. The free spinning roller reduces the drag of the media core over the stationary supply post, allowing the media to turn smoothly during printing. When printing stops, the media slackens under the upper media guide, causing the media brake pedal and brake arm to lower onto the rubber contact strip on the brake drum, which inhibits media roll momentum by stopping the assist roller.

Functional Description of the 3600 Electronics

This section describes the basic electronic functionality of the 3600 printer. Components are identified by the reference designators used on the schematic diagrams (provided in Chapter 6).

Power Supply

The power supply for the 3600 is primarily a linear supply with a switching buck converter for the 24V printhead supply. The switching buck converter takes the unregulated +50V and uses a switching transistor to reduce the output voltage to +24V. The base mechanism is equipped with an AC input filter and a transformer that supplies the board 12 VAC and 50 VAC.

+5V

The +5V supply is generated from the 12 VAC inputs on connector J10. Diode bridge D12 rectifies the AC voltage and regulator VR1 regulates the DC voltage to +5V. Capacitors C53 through C56 are used for filtering and storing energy for hold time at power down or blackout. VR1 is rated at 1.5A and is sufficiently heatsinked to handle this amount of current. The typical +5V load is approximately 1A.

+40V

The +40V supply is generated from the 40 VAC inputs on connector J10. Diode bridge D13 rectifies the AC voltage capacitors C95 and C58 that are used as filters. 40 VAC is unregulated and used for the stepper motor voltage. The +40V supply is also zenered down to 5.1V to supply the motor logic. This prevents excessive motor currents on power up. Another zener diode is used to supply 15V that is used by the +24V buck converter.

+24V

The +24V supply is generated by a switching buck converter.

Power Fail Detection

The power fail detection circuitry consists of IC U31, diodes D7, D8, D9, and D11 and various resistors and capacitors. Diodes D7 and D8 rectify the incoming 12 VAC, and R101 and R107 act as a divider. D9 is a zener diode used to prevent the input on U31 from exceeding +5V. D11 is a 1.235V reference. When the voltage at pin 3 of U31 exceeds 1.235V, the output is pulled up by a 10K resistor, R183. R104 adds some hysteresis to help filter out noise or brownouts. C44 and C49 are also for filtering. C46 and R107 set up a time constant of 1.5 60 Hz cycles to filter out brownouts. The hold time of the +5V varies with line voltage and the state of the printer. The printer exceeds 20 ms at low line and when not printing.

Battery

The battery is used to back up the static RAM for font, format, and UDC storage. R34 limits the reverse current into the battery, a safety requirement for lithium batteries. The battery itself is a 3.6V lithium battery with 1.75 Ah. Diode D4 is a low leakage schottky diode used to isolate the battery voltage from VCC of the circuit card when the power is off, but it has minimal voltage drop to RAMVCC when power is on. Transistor Q2 and IC U5 cause the RAM chip select to be held in a high (inactive) state when /RESET is low to prevent inadvertent writes to RAM during power up or power down.

Battery Life Calculations

Battery capacity = 1.75 Ah

RAM Data Retention current = 20 μ A maximum, 1 μ A typical

With printer off all the time and worse case scenario:

Battery life = 1.75 Ah / 20 μ A = 87,500 hours = 10 years

With printer off all the time and typical case:

Battery life = 1.75 Ah / 1 μ A = 1,750,000 hours = 200 years

Reset

/RESET is generated by MKC34064 under voltage sensing circuit, U29. The output of U29 is low for any supply voltage less than 4.6V.

Motor Driver

The motor driver circuit of the 3600 consists of ICs U2, U21, U17, and U19; discrete parts Q16, Q1, Q3, Q4, Q6, Q11, Q12, Q13, Q14; and associated diodes, resistors, and capacitors. The eight D-MOS FETs make up a dual full-bridge motor driver. There are four FETs to drive each motor phase. There are two FETs at each end of each motor phase.

When a phase is driven or turned on, one FET on each end of a phase is turned on. One of the FETs will be a high side FET putting 50 volts on one end of the winding. The other FET will be a low side FET putting zero volts on that end of the winding.

When the motor is running the windings are being excited first with 50 volts on one end, and then the 50 volts on the other end. At no time are both FETs on the same end of a winding on at the same time.

When a winding is turned on, the current is first monitored and then controlled by turning the FETs on and off at a high rate. This is called pulse width modulation. The current in the winding is monitored measuring the voltage across the sense resistors R18, R22, R97, and R99. These voltages are called sense_A1 and sense_B1. These voltages are inputs to U2. U2 is a comparator that compares a reference voltage (voltage at U2 pins 2 and 6) to the voltages sense_A1 and sense_B1. When these voltages become greater than the sense voltage the associated out put of U2 switches from low to high. This voltage is fed into the GAL U21 and then to the appropriate driver IC U17 or U19 which turns the associate FET off. The off time during this pulse width modulation cycle is constant and controlled by the C109, R127 for sense_A1 or C42, R137 for sense_B1.

The reference voltage on pins 2 and 6 of U2 is established by the pulse width modulation input M5. This is an input from the microprocessor to Q15 through R108. The duty cycle of this signal controls the reference voltage input to U2. The magnitude of this voltage establishes the magnitude of the current in motor windings.

Other inputs from the microprocessor to the GAL U21 circuit are M1, M2, M3, and M4. These inputs control the stepping of the motor. They go into the GAL where they are decoded and fed into the driver ICs U17, U19 which turn the FETs on and off.

Reset is the last input to the motor driver circuit. U19 pin 3 is high when reset is applied to the DISABLE input of U17. This action ensures that all the FETs are held in the off condition to control start up and shut down transients.

Processor

The processor used in the 3600 is a MMC68332 32-bit integrated microcontroller. Based on the MC68020, the MC68332 contains four peripheral modules: CPU32, a 32-bit central processing unit; TPU, a complex, programmable time processor unit; QSM, a queued serial module; and SIM, a system integration module. The MC68332 was chosen for its 32-bit processing power along with its high level of integration.

Chip Selects

The SIM of the MC68332 allows up to 12 chip selects to be programmed by the software for use in the system. We use seven of these chip selects. /CSBOOT is used to access the EPROM of the system. It can handle up to 1M of EPROM organized as 512K x 16. /CS0 and CS1 are used for accessing DRAM, which is configured as 512K x 16. /CS2 is used to access the static RAM, which is used for font, format, and UDC storage. /CS3 is used to access the ASIC and I/O option port. U23 then decodes these chip selects using address lines. /CS4 is used for interrupt acknowledge. /CS5 combines the chip selects for both loading the FIFO with image data and also for reading the DIP switches. U20 decodes these chip selects using address lines A16 and A17. /CS6 is used as A19. /CS7, /CS8, and /CS9 are reserved to be used as A20, A21, and A22 for possible memory expansion.

TPU

The TPU is the time processor unit of the MC68332. It has 16 programmable channels that can be used to generate output waveforms or capture input signals. All of the 16 channels are used in the 3600 printer design. The TPU contains built-in functions, but it is also possible to override these functions by downloading new functions into the MC68332 standby RAM. The 3600 design uses custom TPU functions to perform the following tasks:

Channel 0 This input captures the /STPINT signal. When /STPINT goes active, channel 0 interrupts the CPU to indicate a step, links to channels 1 through 6 and 10, and sets up a match for the half-step time.

Channels 1 to 4 These outputs control motor signals M1 to M4 respectively. After initialization to set up motor direction, each channel outputs the next bit of a programmable bit pattern whenever a link is received from channel 0. A fixed delay is set for each channel to ensure that all four channels switch simultaneously.

Channel 5 This output generates the duration portion of the strobe waveform. A pulse is generated after a link from channel 0. You can program the pulse delay and width.

Channel 6 This output generates the chopped portion of the strobe waveform. A continuous square wave is generated and synchronized with each link from channel 0. The square wave frequency and duty cycle are programmable.

Channels 7 and 8 These outputs control the front panel LEDs. They can be set to high, low, or square wave outputs. The square wave output frequency is programmable.

Channel 9 This output is reserved. It has RXD as an input for autodetection of the serial communications parameters.

Channel 10 This is an input for the ribbon sensor. The channel detects transitions on the input. If it does not receive a transition before it receives a programmable number of links from channel 0, it interrupts the CPU to indicate a ribbon failure.

Channel 11 This output generates the refresh requests for the DRAM. It generates a low pulse at a programmable frequency and duration.

Channel 12 This is an input for the front panel switch. It detects transitions on the input, debounces the switch, and interrupts the CPU.

Channel 13 This output generates a square wave of a programmable frequency. It is used to set the current level for the motor driver circuit.

Channel 14 and 15 These channels are reserved to support a cutter or a wand port.

QSM

The QSM consists of two modules, a serial peripheral interface (SPI) and serial communications interface (SCI). The SPI is used to communicate with the A/D converter. It takes continuous readings and stores the values in RAM for immediate access by the CPU. The SCI is used for RS-232/RS-485 communications. Other pins are used as general purpose I/O.

Interrupt Priority Levels

The SIM module has seven IRQ pins to help facilitate external interrupts in the 3600:

- /I/ORCV, /I/OXMT, /PFAIL, and HF are available as interrupts.
- /I/ORCV and /I/OXMT are used for communications with the I/O option interface.
- HF is used to indicate that the FIFO needs service.
- /PFAIL indicates a loss of power.
- The IRQ pins are used for general purpose I/O.

Crystal

The clock synthesizer of the MC68332 can operate from an on-chip, phase-locked loop using an external crystal. A 32.768KHz crystal provides a reference, allowing the processor to run at frequencies from 131KHz to 16.777MHz. The clock synthesizer is programmed to run at 16MHz in the 3600.

Memory

The MC68332 has separate address busses and data busses. All I/O is memory mapped and the SIM chip selects are used to select program space, data space, and I/O.

Static RAM

The 3600 comes with 128K of battery backed static RAM. The RAM is configured as 128Kx8. The chip select for accessing SRAM should be configured to at least one wait state. The RAM can also be upgraded to 512K x 8 by swapping the component at location U6. The jumper between pins 1 and 2 of J3 must be removed and placed across pins 2 and 3.

RAM Access Time

Processor access time \geq RAM access time

$3 \times \text{CLK} \geq T_{\text{cslow}} + T_{\text{ramaccess}} + T_{\text{setup}} + T_{\text{hc32}}$

$3 \times 1/16 \text{ MHz} \geq 30 \text{ ns} + 120 \text{ ns} + 5 \text{ ns} + 18 \text{ ns}$

187.5 ns \geq 173 ns

EPROM

The EPROM for the 3600 consists of two 512K x 8 EPROMs configured as 512K x 16, giving a total of 1M of EPROM space. The EPROMs have an access time of 150 ns and do not require wait states.

EPROM Access Time

Processor access time \geq EPROM access time

$2 \times \text{CLK} \geq T_{\text{cslow}} + T_{\text{epromaccess}} + T_{\text{setup}}$

$2 \times 1/16 \text{ MHz} \geq 30 \text{ ns} + 70 \text{ ns} + 5 \text{ ns}$

125 ns \geq 105 ns

DRAM

The main memory consists of 256K of dynamic RAM. The DRAM is configured as 256K x 16, IC U26. To support the DRAM interface, GAL U13 is used to handle refresh and control lines between the DRAM and the processor. See Part II, Appendix A for GAL listings of the current configuration. Multiplexors U16, U18, and U20 are used to generate the row and column addresses for the DRAM.

Communications Interface

The communications interface for the 3600 follows the Intermec Standard Data Connector standard. J1 is a 25 pin D-sub connector that supports both RS-232 and RS-485 interfaces. U1 is the RS-485 driver/receiver and U22 and U4 are the RS-232 driver and receivers. To further enhance the interface to support DTR/RTS flow control, the DTR pin is driven with the PIN 14 signal. This arrangement allows the use of standard cables for hardware flow control, which enables the user to use commands such as the DOS COPY command from any PC. Zero ohm resistors have been incorporated into the RS-232 driver outputs so that the previous configuration or other configurations are possible.

A/D Converter

The Motorola MC145041 A/D converter is an 11-channel, 8-bit, serial A/D converter. The reference is set to +5V. Seven of the eleven channels are used:

Channel	Function
0	Label gap sensor
1	Darkness adjust
2	Printhead thermistor
3	Label mark sensor
4	+40V
5	Printhead voltage, +24V
6	Label taken sensor

The A/D converter is continuously communicating with the MC68332 through the SPI. It receives conversion commands and channel addresses while sending back results from the previous command. The clock rate for the MC145041 is 1 MHz.

DIP Switches

The 3600 has 16 DIP switches to provide configuration and test and service operation.

ASIC and I/O Option Interface

The 3600 uses an Intermec designed thermal compensation ASIC. This ASIC handles the loading of the printhead to implement the dot-by-dot thermal management scheme.

Address/Data Multiplexor

Since both the ASIC and the I/O option interfaces are designed to interface with a processor that has multiplexed address and data, it is necessary to multiplex the address and data from the MC68332. ICs U14 and U15 are used to route address or data to the AD (0:7) bus.

Chip Select Generation

GALs U23 and U25 are designed to take the MC68332 bus control signals and convert them into ASIC and I/O option control signals. A state machine governs the timing of the signals and also dictates that the /OPTION_ASICCS from the processor be programmed for two wait states.

I/O Option Connector

The I/O option connector J8 is a 40-position pin field. Two chip selects, /OPTION* and /BOKI/O*, are used to select either the board identification number or the data port. XMT and RCV are outputs from the I/O option cards that are inverted and go to the processor to generate communications interrupts.

FIFO

The FIFOs U11 and U24 are the same part as used in the Intermecc 3400 and 4400 printers. The IDT 72105 is a 256 x 16 FIFO with parallel inputs and serial output. The processor loads image data into the FIFO with word writes. At the beginning of a line, the MC68332 loads three lines of data into the FIFO. This causes the HF flag to go high. The ASIC then begins clocking data out of the FIFO. The processor checks each line of the HF flag and loads the next line of data if there is still more image to load. If the image has been completely loaded, the FIFO empties and the /EF flag goes low. The low /EF flag tells the ASIC to stop clocking data from the FIFO.

Front Panel Interface

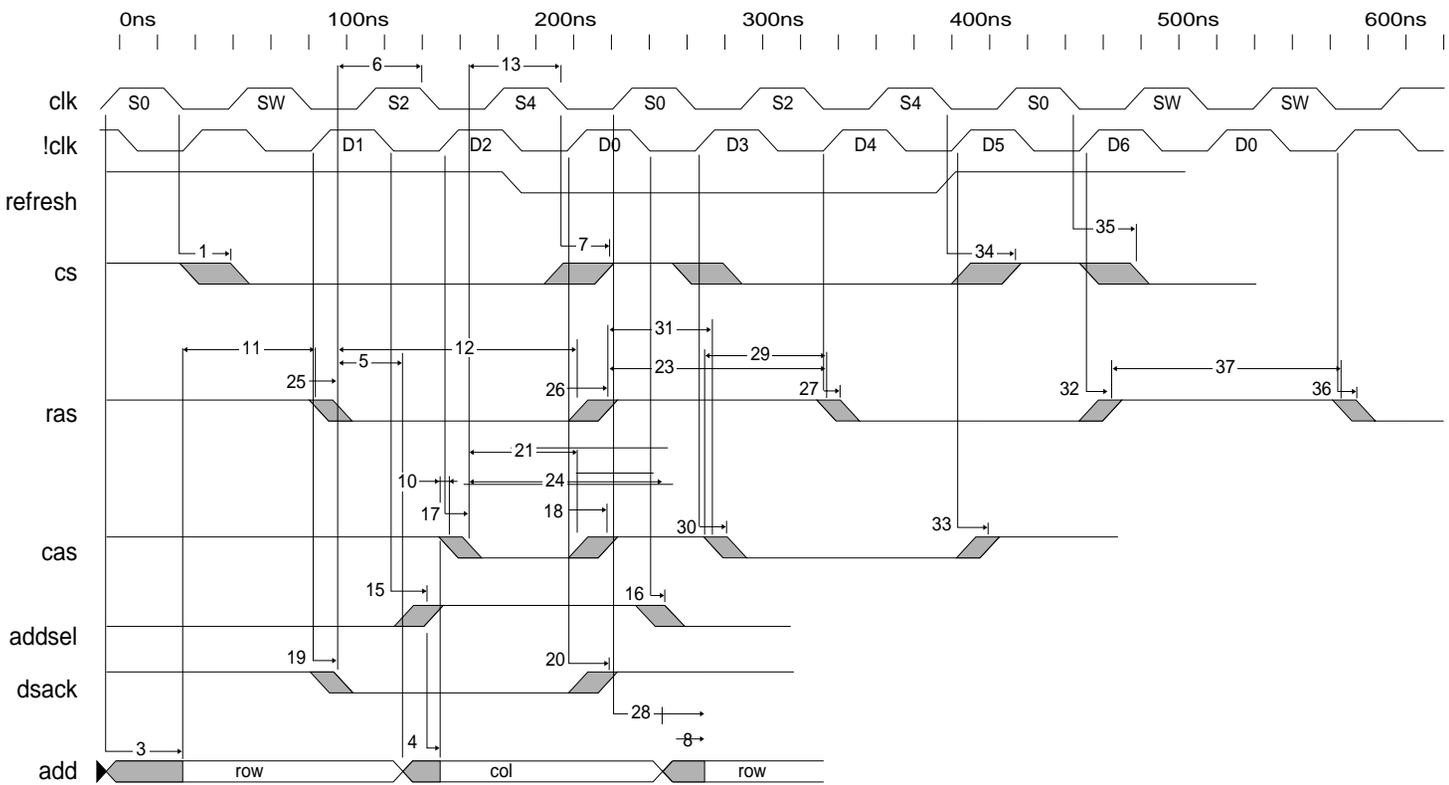
Connector J15 connects to the front panel board. Inputs consist of one button (Feed/Pause) and three LEDs (Power, Alert, and Empty/Pause). The Alert LED indicates system errors or printhead over-temperature. The Empty/Pause LED indicates a paused state or a media fault.

Debug Interface

J5 provides a debug interface to the processor, which allows for troubleshooting of the main PCB. This interface can be used to put the processor into background mode and then send commands to read or write memory or register locations. This interface is used for in-house functional testing and is used for engineering development.

Timing

Row	Name	Formula	Min	Max	Margin	Comment
1D	Tclsa	[3,30]	3	30		332 Clk low to sel asserted
2V	Tco	[2,10]	2	10		GAL Clk to output delay
3D	Tchav	[2,39]	2	39		332 Clk hi to add valid
4D	Tsy	[Tsy	4	12		
5C	Trah	[15,]	15		<13.25>	DRAM row add hold time
6C	Taist	[5,]	5		<38.50>	332 DSACK setup time
7D	Tclsn	[3,30]	3	30		332 Clk low to sel negated
8D	Tsy	Tsy	4	12		
9V	Tpd	[3,15]	3	15		GAL Tpd
10C	Tasc	[0,]	0		<6.25>	DRAM col add setup
11C	Tasr	[0,]	0		<65.75>	DRAM row add setup
12C	Tras	[80,]	80		<38>	DRAM ras low time
13C	Tds	[25,]	25		<18.50>	DRAM
14V	Tsy	[4,12]	4	12		Sel to output HC257
15D	Tpd	Tpd	3	15		
16D	Tpd	Tpd	3	15		
17D	Tco	Tco	2	10		
18D	Tpd	Tpd	3	15		
19D	Tco	Tco	2	10		
20D	Tpd	Tpd	3	15		
21C	Tcas	[20,]	20		<35.50>	
22D	Tclsa	[3,30]	3	30		Same as 1
23C	Trp	[60,]	60		<52>	
24C	Tcah	[20,]	20		<70.75>	
25D	Tco	Tco	2	10		
26D	Tpd	Tpd	3	15		
27D	Tco	Tco	2	10		
28D	Tchav	[2,39]	2	39		
29C	Tasr	[0,]	0		<65.75>	
30D	Tco	Tco	2	10		
31C	Trpc	[10,]	10		<39.50>	
32D	Tco	Tco	2	10		
33D	Tco	Tco	2	10		
34D	Tclsn	[3,30]	3	30		
35D	Tclsa	[3,30]	3	30		
36D	Tco	Tco	2	10		
37C	Trp	[60,]	60		<57>	



3600M.100

Functional Description of the 3600 Software

This section describes the basic software functionality of the 3600 printer.

Band Buffering and Font Caching

Image band buffering and font caching allow Intermecc printers to image and print labels at the same time. Virtually any label length can be accommodated due to the circular system of using image memory. After an image band has printed, it is reused to image the next part of the label, which means the printer can print labels using less memory.

Image Band Buffering

Printer throughput is affected by the number of image bands and the print speed. If imaging is fast enough, throughput will be maximized by using the least number of image bands with the fastest speed (assuming the fastest speed delivers the desired print quality).

Some printers use a fixed size, contiguous portion of RAM for imaging. In these cases, a label is imaged in its entirety before printing commences. During printing, there is no contention with imaging, so the print speed can remain constant. However, if the label is fairly complex, the delay before printing becomes very noticeable. In addition, printing of the label must finish before a second label is imaged. The combination of these delays impede total printer throughput. Another drawback is that the maximum length of a label is limited by the size of the RAM.

With the use of image band buffers (1 band = 1 inch), labels are divided up and imaged band by band. Printing begins after the selected number of image bands is imaged, minimizing the delay before printing. Imaging of a second label can begin while a first is still printing. In addition, the length of a label is virtually unlimited.

With image band buffering, time becomes a critical resource since printing and imaging take place simultaneously. Sometimes, a label cannot be imaged fast enough to keep up with the print speed. The 3600 printer maintains a constant print speed regardless of label complexity.

Label throughput can be fine-tuned by selecting the number of image bands and print speed for a specific label format. Selecting image bands determines how much of a label is preimaged before printing starts.

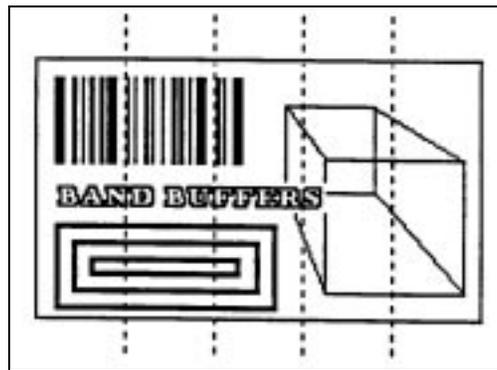
Selecting too many image bands can lead to print delay. If too few image bands are selected, imaging falls behind the print speed. If imaging falls behind printing, the printer stops printing the label, sets the speed to 2 ips, sets the number of image bands to the maximum, and then reprints the label. This condition is known as an image rate error or an image overrun error.

The ideal setting keeps imaging just ahead of printing. This ideal setting can be found by the proper selection of image bands and print speed for the label format being printed.

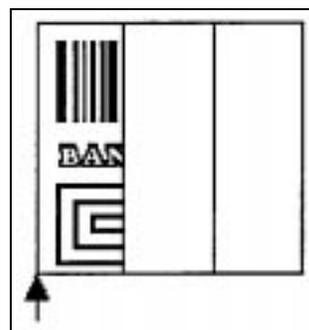
Image Band Example

The following example shows a format print using image bands. The label is 5 inches long and is divided into five image bands. The printer is configured for three image bands, which means that three bands will be imaged before printing begins.

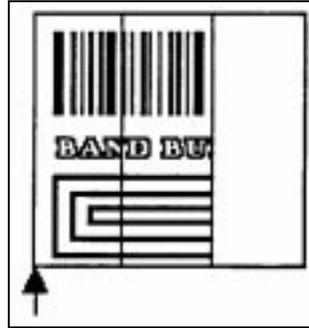
The dashed lines represent the divisions between the five image bands and the arrow (↑) represents the portion of the image band that is being printed at that time.



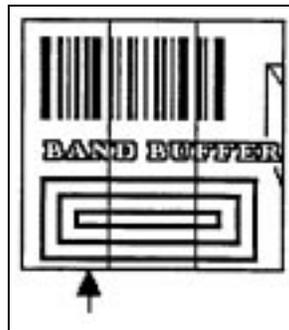
The first diagram shows the first 1 inch of the label imaged into the first image band. The other two image bands are still empty. Printing has not begun.



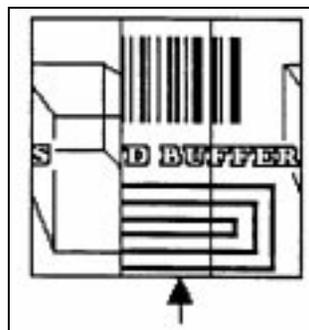
The second 1 inch of label is imaged into the second image band. Printing has still not begun.



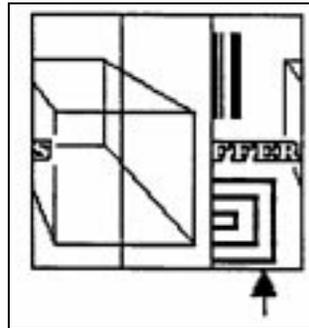
The third 1 inch of the label is imaged into the third image band. Printing begins from the first image band, as indicated by the arrow. At this point, all three available image bands have been filled. The first band will be reused after it has been completely printed.



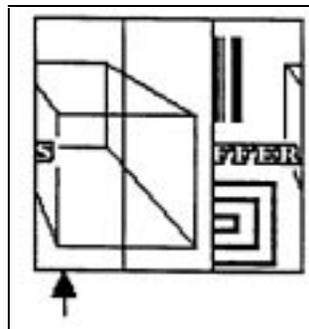
When the first image band is emptied (printed), the fourth band is imaged into it. Printing continues from the second image band. As before, this band must be emptied before the final band can be imaged into it.



The final 1 inch of the label is imaged into the second image band. Printing continues from the third band. At this point, the label has been completely imaged but printing has not finished.



After the third image band is emptied, printing continues from the first image band.



Imaging of a second label could begin in the third image band while the first label is still printing. The second label could begin printing immediately after the first with no delay, which suggests that the only print delay encountered would be during the time when the first bands of the first label were imaged.

As labels become more complex, the influence that print speed and the number of buffers has on throughput is limited by imaging speed. New considerations come in to play, such as delay between printing and perceived printer performance. Unfortunately, there is no formula to use to calculate an ideal configuration. Instead, it will have to be found through trial and error by the user.

Font Caching

Most of the imaging time during text creation is spent converting character description data into character images. The remainder of the time is used to copy the character images into image RAM. Font caching helps to eliminate the reimaging of characters that have already been used.

With font caching, a character is imaged into the cache the first time it is requested. It is then copied from the cache into the appropriate area of image RAM. The next time that same character is needed, it only has to be copied from the font cache. The illustration on the following page shows the process of generating and caching a specified character.

When used with band buffering, even if there are no repeated characters in a label, font caching may still enhance imaging. If a character is large or is positioned near a band boundary, portions of its image may fall into multiple bands. The character's image will be referenced repeatedly as each of the bands is imaged. As before, if the character is cached, it will only need to be imaged a single time.

Print Energy Compensation

The digital thermal compensation system and the global compensation system combine to provide the printer with maximum printhead energy control to optimize print quality.

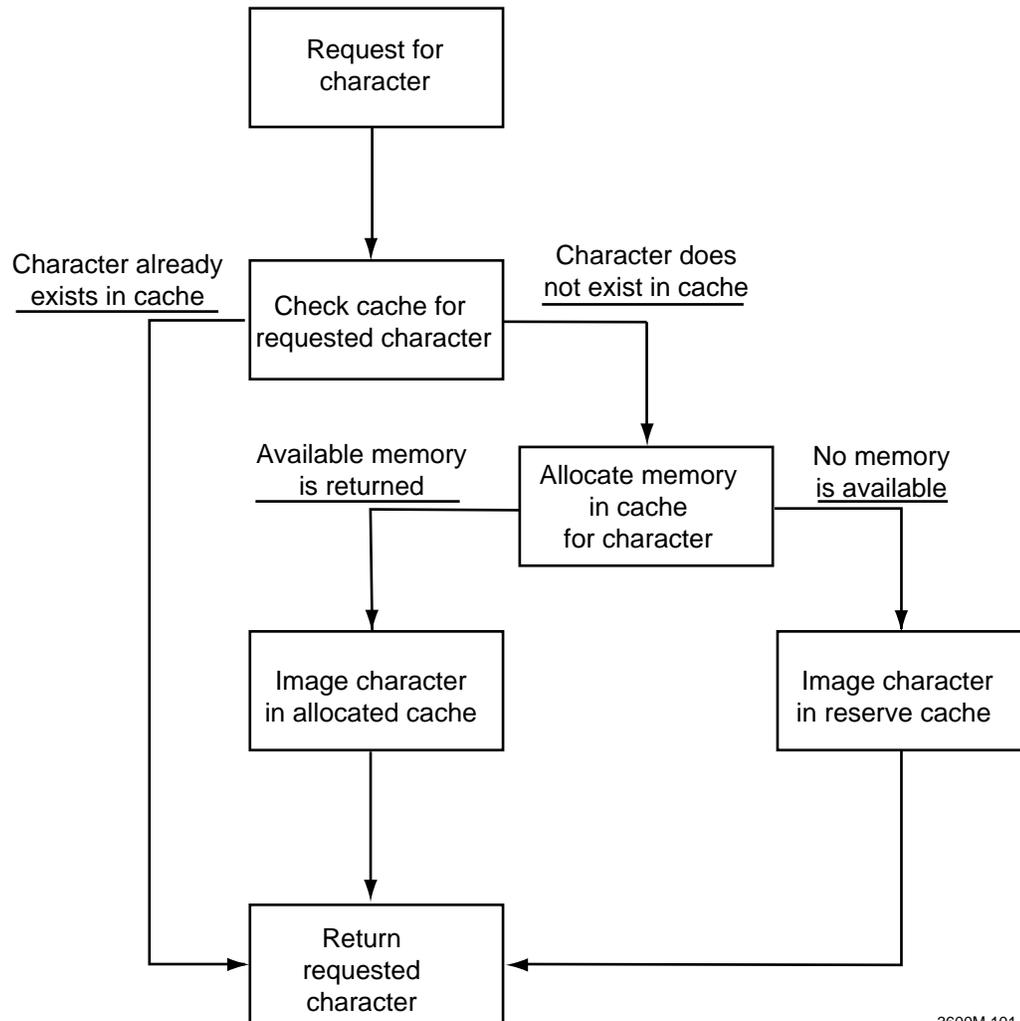
Digital Thermal Compensation

Each dot on the printhead has its own history RAM. This RAM contains a dot's previous burn history, what the current burn will be, and what adjacent dots are doing. This data, along with the media sensitivity information, is used to determine the proper amount of energy for that dot.

For example, if the dot history showed that the dot had been turned on most of the time, this profile would indicate that the energy built up in the dot area was sufficient enough for the task and the dot would be turned off for a period of time. Using this method provides for a specific amount of energy for the task that dot is performing.

Global Compensation

Global compensation is the energy management to the printhead that affects all of the dots on the printhead. External inputs to this system are the darkness adjust control and the online darkness command. Other inputs include the ambient temperature, the printhead resistance, and printhead temperature.

Font Caching Flow Chart

3600M.101

