350

Technical Manual
and
Parts Catalog

INTRODUCTION

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

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

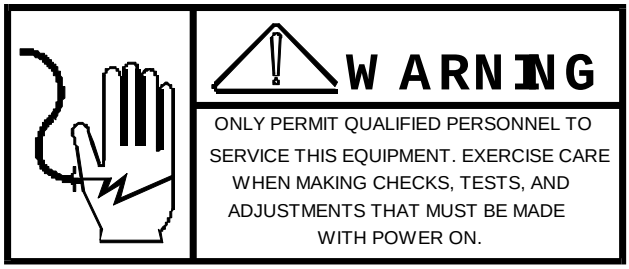
METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

PRECAUTIONS

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

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

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



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

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

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

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

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

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I. GENERAL DESCRIPTION

A. OVERVIEW

The Toledo Model 350 is a programmable thermal printer that provides the capability to generate labels containing UPC codes, weight and price data, store messages, commodity descriptions, ingredient text, cooking instructions and nutritional information for a variety of applications. The printer has the capability to provide by-count labels, standard pack labels, or random weight labels. The labels can be continuous strip or die cut.

The Model 350 prints up to 840 characters of ingredient text, plus the ability to print 10 lines of nutritional information, 2 lines of commodity description and 2 lines of store address data. The 256k memory allows programming of up to 490 PLU's, depending on the number of characters used per PLU.

The Model 350 will interface to the Model 8421 scale, providing random weight data for PLU's using the random weight pricing mode. Programming is accomplished using the standard Toledo Programming Keyboard. The input data can be visualized on the built-in LCD Display.

The thermal printer utilizes a pre-heated printhead which consists of a single row of dots at 6 dots-per-millimeter density. It is capable of printing human-readable and UPC bar code symbols on adhesive-back thermal label stock. By selectively heating the dots, and image is transferred to the label stock as it is pulled past the printhead. The thermal label stock can be delivered stripped and presented to the operator, un-stripped and re-wound on the take-up reel, or un-stripped and ejected at the front of the printer.

B. FEATURES

- 6 dot/mm thermal printhead
- Scale interface to the Model 8421 via 20ma current loop
- Compatible with full stroke 'QWERTY' keyboard (TS PN 127013 00a) for programming
- Compatible with Toledo digital tape recorder (TS PN A 108952 00A)
- A built-in tactile-feel membrane keyboard
- Single RS485 interface port for Host Computer Communications
- UPC, EAN Bar Code
- Back-lit Liquid Crystal (LCD) Alpha-numeric Display
- Pricing by weight, by count and standard pack
- Battery-backed clock and RAM
- VOID key for clearing previous transaction from accumulator
- 2 position keylock switch
- Keyboard selectable label formats, via softswitches
- Internal Label Counter to track label usage
- Three methods of label delivery
- 1.67mm, 2.3mm, 3.0mm enhanced, 4.67mm and 4.67mm enhanced character heights available.
- Totals by PLU, Group, Hourly and Grand Totals

C. PRINTER KEYBOARD

The printer keyboard is a sealed unit with tactile response. The embossed plastic overlay is printed on the reverse side. The functions of the individuals key are as follows:

0 thru 9 Used for numeric entry of PLU numbers, manual entry of price or tare, etc.
/ ''Slash'' indicates the entry of a function code and toggles softswitch selections
CLEAR Used to clear: entered digits, PLU numbers and error messages
PRINT This key is used to initiate the printing of the label
ENTER
LABEL FEED Causes printer to feed a label. This is used to position labels after installing a new roll. Pressing and holding this key will cause a test label to issue.

D. KEYSWITCH

A keylock switch, located on the front of the printer, can be used to limit access to the internal memory. Functions include:

1. RUN POSITION - Used for normal printing operations
2. LOAD POSITION - Used to access the internal memory for entering, editing or retrieving data.

E. POWER SWITCH

A rocker switch, located on the rear cover of the printer, controls AC power to the internal printer electronics. When the switch is set to the OFF position, all power is removed to the internal components beyond the switch.

F. MAIN FUSE

The Main Fuse is located on the rear of the printer directly below the Main Power Switch. The fuse is rated at 2A and must only be replaced with the exact equivalent replacement fuse. To remove the fuse, first disconnect the power cord, then unscrew the fuse cap counter-clockwise.

G. TAPE RECORDER

The Model 350 PLU files can be recorded for back-up on the standard Toledo Digital Data Tape Recorder, PN A10895200A (0916-0030). The recorder uses a binary, non-return to zero, asynchronous TTL signal transmitted at 2400 baud. The cable adapter 1186750A (0900-0100) will be needed to adapt the cannon type connector on the recorder to the 9-pin D-sub connector port on the scale. The connector is wired as follows:

Pin 1 - Data Output to Tape Recorder
Pin 2 - Data Input from Tape Recorder
Pin 3 - Ground

H. PROGRAMMING KEYBOARD

The standard 12701300A (0952-0024) Toledo Programming Keyboard, will connect to the 350 I/O port located below the keylock switch. The connector is a five pin DIN type connector. The keyboard is a full size 83 key, typewriter (QWERTY) style, low profile keyboard, using an RS422 type serial interface at 9600 baud.

II. SYSTEM DESCRIPTION

A. POWER SUPPLY

The 120 VAC line voltage is connected to the primary windings of the transformer through the main fuse, line filter and power switch. The OFF/ON Power Switch is wired between the line filter and the transformer and removes power to all internal components beyond the switch, when set to the OFF position.

Raw AC voltage is supplied from the transformer secondary windings to the Power Supply PCB, where it is rectified and regulated for distribution to the other components. An External Regulator Assembly consisting of IC1 and IC2 wired in a common harness is mounted to the base and connected to the Power Supply PCB at CN4. The Switching Regulator IC1 controls the +24VDC Printhead Supply Voltage and a +5VDC Regulator, IC2, supplies a stable +5VDC for distribution by the Power Supply PCB.

The transformer supplies the following raw AC voltages:

28 VAC (+/- 5%)
15 VAC (+/- 5%)
7.7 VAC (+/- 5%)

The Power Supply PCB rectifies and regulates the following DC voltages:

+ 12 VDC (11.4 - 12.6 VDC)
- 12 VDC (-11.4 - - 12.6 VDC)
+ 24 VDC (23.8 - 24.5 VDC)
+ 5 VDC (4.9 - 5.1 VDC)
+ 8 VDC (Bat. charging voltage)

B. MAIN LOGIC PCB

The Main Logic PCB performs the following functions:

1. Accepts data entry from the Printer Keyboard and Programming Keyboard
2. Contains and provides access to the RANDOM ACCESS MEMORY (RAM)
3. Charges the external battery used for maintaining PLU files when power is removed
4. Provides an I/O port for the tape recorder, scale and host
5. Drive the LCD Display
6. Controls printer operations
7. Generates Error Messages when a malfunction is detected.

C. PRINTER DRIVER PCB

The basic function of the Printer Driver PCB is to control the Label Gap / Label Taken Sensors, Label Stepping Motor and the Printhead. It receives and sends data to the Main Logic PCB.

D. THERMAL PRINTHEAD

The 350 uses a pre-heated thermal printhead. Printing is achieved by applying power to selected elements (dots) on the printhead. Applying power to the dots causes them to heat, producing images on the thermal (heat activated) paper passing below the printhead.

NOTE: Due to the pre-heating of the head, a warm-up time is required before maximum print quality is achieved. Depending upon the ambient temperature, the warm-up time will vary between 10 and 20 minutes from the time the unit is powered up.

E. LABEL SENSORS

1. LABEL TAKEN SENSOR ASSEMBLY

The Label Taken Sensor detects the label (as the label breaks the beam of light), to prohibit printing until the label is taken. The Label Taken Sensor Assembly detects the label as it is ejected from under the printhead. The assembly consists of a Light Emitting Diode (transmitter) and a Photo-Transistor (Receiver). The LED emits light and the Photo-Transistor receives the light emitted. Both units are wired in common and connected to the CN4 on the Printer Driver PCB.

2. LOW STOCK SENSOR

The Low Stock Sensor detects the gap between the labels to control label positioning and to detect a no label stock condition. It consists of a Light Emitting Diode an a Photo-Transistor unit. The LED emits light and the Photo-Transistor receives the light emitted. The sensor connects to CN5 on the Printer Drive PCB.

F. LABEL STEPPING AND TAKE-UP MOTORS

The Label Stepping and the Liner Take-up Motors are connected to the Motor Driver PCB. The driving voltage is +24V. The rotation of the Label Stepping motor is accomplished by changing current direction in two windings. The direction is changed in one winding at a time, turning the motor one step. The Liner Take-up Motor is driven by +24 VDC and is active while the Label Stepping Motor is rotating.

G. LCD DISPLAY

The printer display uses a 16 character, dot matrix, liquid crystal. The display is backlit and has an electrical viewing angle adjustment. The characters are approximately 7mm wide by 12.5 mm high.

III. SPECIFICATIONS

A. CONSTRUCTION

The base is constructed of plated steel and is supported by four non-slip feet. The hinged side covers are made of stainless steel and the front and rear covers are fog white injection molded high impact plastic.

B. DIMENSIONS

The dimensions of the Model 350 are as follows:

Total Height:	8''
Total Width:	7.6''
Total Depth:	15.75''

C. ELECTRICAL

1. POWER REQUIREMENTS

The 350 printer is rated at 1.0 amps, and with the 8421 scale 1.5 amps. Power requirements for the Model 350 Printer are as follows:

a. Well regulated (stable / non-fluctuating)
b. Transient Free
c. Dedicated Grounded Circuit
d. Standard 15 amp line

2. LINE VOLTAGE

The 350 is designed to operate from 50 to 60 Hz @ +/- 2% frequency at the following voltage range:

NOMINAL	RANGE (+10%, -15%)
120	102-132

D. OPERATING TEMPERATURE

The Model 350 is designed to operate in a temperature range between +5 degrees C to +35 degrees C with non-condensing relative humidity between 10% to 95%.

The storage temperature range (excluding label stock) is from 0 degrees C to +70 degrees C.

E. PLU RECORDS

1. CAPACITY

The total number of PLU's will vary depending upon the average length of text. The RAM Memory capacity is 256K, allowing for a maximum of 490 PLU's and a minimum of 190 PLU's with all PLU options selected, 840 character description and the Nutritional Information enabled. The PLU record will consist of the following information:

DESCRIPTION	MAX. NO. OF CHARACTERS	BYTES USES	
PLU Number	4	2	
Item Number	12	6	
Group Number	2	1	
Shelf Life	3	1.5	
Label Format	2	1	
Unit Price	6	3	
Unit Price Modifier	3	1.5	
Package Code	2	1	
Tare	4	2	
Total Price	6	3	
PLU Totals	18	9	
Commodity Description	64	64	
Ingredient Text (42 char./ line, 30 line maximum)	840		840
Nutritional Text	420	120	

The maximum number of PLU's will vary according to the length of the ingredient text and whether the Nutritional text is used.

ESTIMATED NUMBER OF PLU's

NUMBER OF CHARACTERS IN INGREDIENT TEXT	W/O NUTRITIONAL TEXT	W/ NUTRITIONAL TEXT
840	220	190
630	290	255
420	370	323
224	490	472

2. PLU TOTALS

Totals are available by PLU, by item number, by group, by hour and by grand total. Maximum capacity* in each category is as follows:

TOTALS TYPE	TOTAL TRANS.	TOTAL WEIGHT	TOTAL DOLLARS
PLU	999999	9999.99	9999.99
Group	9999999	99999.99	99999.99
Hourly	999	9999.99	99999.99
Grand Total	99999999	999999.99	999999.99

*The weight and price decimal point locations may change, but the number of allowable digits remain the same. In addition, when accumulator values are in excess of these limits, totals roll-over to zero.

F. LABEL FORMATS

1. FORMAT CODES

The following Label Format Chart is used to select the length and character height of the Ingredient Text and if Nutritional Text will be printed according to the label size in use. The code numbers are entered when creating, copying or editing the PLU ingredient text.

INGREDIENT TEXT			**NUTRITIONAL TEXT**	
TOTAL # CHAR	NUMBER OF LINES	CHARACTERS PER LINE	WITHOUT FORMAT	WITH FORMAT SIZE
---	---	---	0	10
224	7	32	2.4''	3.3''
420	10	42	6	16
352	11	32	3.3''	4.2''
630	15	42	5	15
480	15	32	3.3''	4.2''
840	20	42	4	14
704	22	32	3.7''	4.7''
1260	30	42	3	13
			3.7''	4.7''
			2	12
			4.2''	5.1''
			1	11
			4.2''	5.1''
			8	
			5.1''	
			7	
			5.1''	

2. PACKAGE CODES

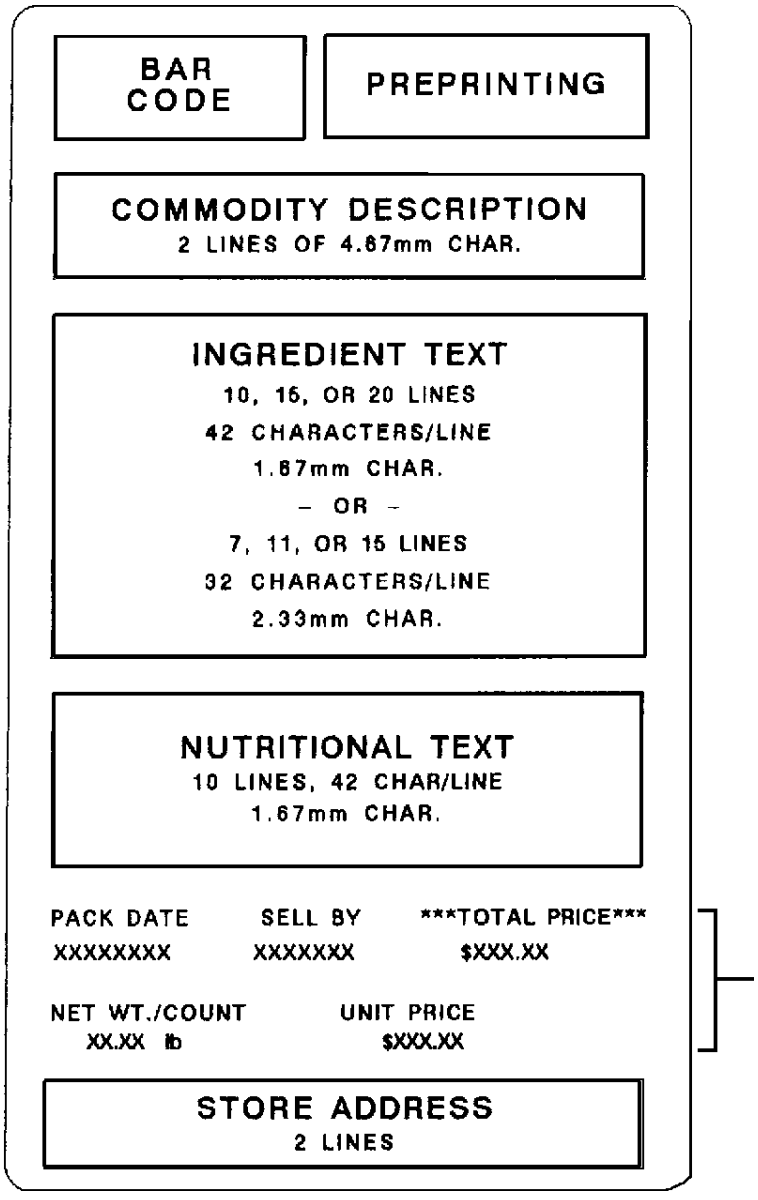
The Package Codes are used to select the pricing system used with the label type selected. Standard Pack and Random Weight type labels are available.

PACKAGE CODE	PRICING SYSTEM DESCRIPTION
0	BY-WEIGHT PRICING
1	BY-COUNT PRICING
2	FRACTIONAL PRICING
3	STANDARD PACK PRICING

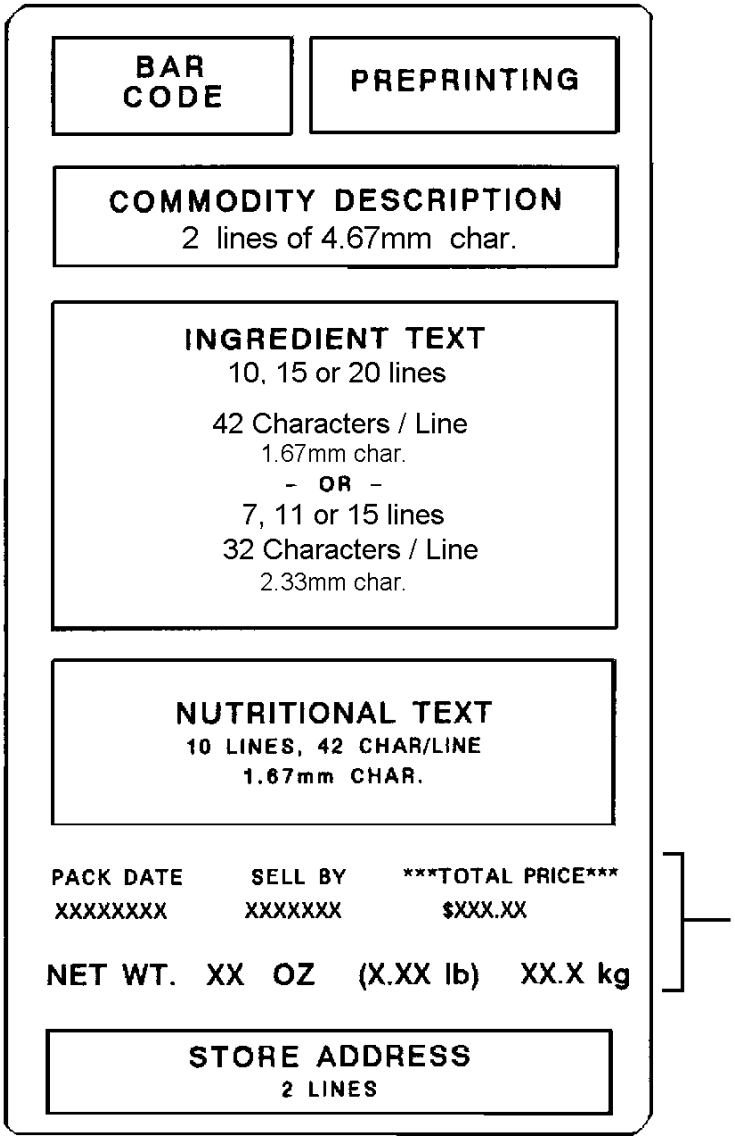
3. LABEL DIAGRAMS

Following are diagrams of a Random Weight / By-Count label and a Standard Pack label showing where the printed information will appear on the label:

RANDOM WEIGHT / BY-COUNT LABEL



STANDARD PACK LABEL



HEADINGS ARE PRINTED BY THE 350

IV. INTERNAL FUNCTIONS

A. PROGRAM SWITCHES

1. MAIN LOGIC PCB SWITCH FUNCTIONS

SWITCH NUMBER	FUNCTION

SW1-1	FRACTIONAL PRICING ENABLE ON 1/4 and 1/2 lb. pricing is enabled OFF 1/4 and 1/2 lb. pricing is disabled
SW1-2	CANADIAN KEYBOARD CLEAR OF TARE ON Entering <0>,<TARE> will clear the tare OFF Tare cannot be cleared by entering <0>,<TARE>
SW1-3	RAM MEMORY INITIALIZATION ON Initialize Memory OFF (Normal position)
SW1-4	(NOT USED)
SW2	BATTERY SWITCH ON Connect battery for RAM memory backup OFF Disconnect battery

2. PRINTER DRIVER PCB SWITCH FUNCTIONS

Switch -SW1- on the Printer Driver PCB is used to select the burn time of the thermal printhead according to the resistance rating assigned to each head. The resistance rating of the head, in ohm's, is printed on the ID Label, located on the bottom of the print head. The resistance must be matched whenever the head or Printer Driver PCB is replaced.

Thermal Print Head Resistance Select Chart for SW1 on Printer Driver.

SW1-1	SW1-2	SW1-3	SW1-4	THERMAL HEAD'S RESISTANCE (IN OHM'S)
ON	OFF	OFF	OFF	500
OFF	ON	OFF	OFF	510
ON	ON	OFF	OFF	520
OFF	OFF	ON	OFF	530
ON	OFF	ON	OFF	540
OFF	ON	ON	OFF	550
ON	ON	ON	OFF	560
OFF	OFF	OFF	ON	570
ON	OFF	OFF	ON	580
OFF	ON	OFF	ON	590
ON	ON	OFF	ON	600

B. SOFTSWITCH MENU

A menu of keyboard selectable options of available to the user to enable or disable internal functions. Access to the menu is gained by entering the numerical code <63>, using the printer keyboard. After pressing <6> <3> <ENTER>, the printer will then display the switch number, description and current setting of the first Softswitch.

The user may then alter the setting by entering the digit for the selected format or by pressing the < / > key to toggle the selections until the <ENTER> key is pressed. To advance to the next softswitch, press the <ENTER> key.

NOTE: Bold print indicates default setting at initial power-up.

SOFTSWITCH NUMBER	DESCRIPTION
1	SELECT ''$'' or ''L'' (pound sterling)
2	PRINT BAR CODE INTERPRETATION
	ON The BC Values will be printed
	OFF The BC Values will not be printed
3	EAN FLAG 1
	ON EAN Flag will be printed
	OFF EAN Flag will not be printed

4 ITEM NUMBER ENTRY / PRINT UPC BAR CODE

ON Item numbers and UPC numbers can be programmed into the PLU files, and the Bar Code symbol will be printed

OFF Item numbers and UPC numbers cannot be programmed into the PLU files, and the Bar Code symbol will not be printed

5 UPC PRICE CHECK DIGIT*

ON Print Price Check Digit

OFF Price Check Digit will not be printed

*Item number limited to 5 digits max. when using a Price Check Digit

6 GROUP NUMBER

ON Group number can be programmed into the PLU files

OFF Group number is not used

7 PRINT AUTOMATIC VERIFICATION LABEL

ON A verification label will automatically be printed after programming or editing the PLU files

OFF No label will be printed

8 TOTAL ACCUMULATOR

ON PLU, Item, Group, Hourly and Grand Totals are enabled

OFF Totals accumulators are disabled

9 MANUAL PRICE OVER-RIDE

ON A manual price can be entered, over-riding the programmed unit price

OFF Manual price entry is not allowed

10 TRAILING ZERO IN ITEM NUMBER / 5-DIGIT ITEM NUMBER

ON A zero will be automatically added as the LSD of the Item Number

OFF Trailing zero will not be used

11 SHELF LIFE

ON Shelf Life can be programmed in PLU file

OFF Shelf Life is not used

12 (NOT USED)

13 SELECT HOST COMPUTER BAUD RATE

300, 1200, 2400, 4800 or 9600 Baud selected by using the </> key

14 SELECT METRIC OR AVOIRDUPOIS

Select **LB.** or KG by using the </>

15 SELECT METRIC OR AVOIRDUPOIS FOR STANDARD PACK WEIGHT

ON Metric in use for standard pack items

OFF Avoirdupois in use for standard pack items

16 DATE FORMAT

Enter digits of 1 - 4 of format selected:

1 - mm dd yy

2 - yy mm dd (Canada)

3 - dd mm yy (European)

4 - yy mm dd

17 DATE PRINTING

Enter digits 1 - 4 for the format selected

1 - No dates will be printed

2 - Pack date printed on the left

3 - Sell-by date printed on the right

4 - Pack date printed on the left and Sell-by date printed on the right

18 MANUAL PACK AND SELL-BY DATE OVER-RIDE

ON A manual date can be entered to over-ride the programmed date

OFF No manual entry of date is allowed

19 MANUAL TARE OVER-RIDE

ON Manual tare can be entered over-riding the programmed tare

OFF No manual entry of tare is allowed

20 (NOT USED)

21 PLU TARE (RANDOM WEIGHT PLU's ONLY)

ON A tare can be programmed in random weight PLU files

OFF Tare is not used

22 SELECT BY-COUNT PLU BAR CODE NUMBER SYSTEM

Select by entry of digits 0, 2 or 4:

0 - Number System 0 (Standard Pack / By-Count)

2 - Number System 2 (Random Weight)

4 - Number System 4 (Non Random Weight w/price)

23 SELECT STANDARD PACK PLU BAR CODE NUMBER SYSTEM

0 - Number System 0

2 - Number System 2

4 - Number System 4

24/25 (NOT USED)

26 BY WGT ZERO

Yes=Print Weight Only if Total Price Is Zero

No =Print All Information

27 BY COUNT ZERO

Yes=Print Only Number of Items if Total price is Zero.

No =Print All Information

28 STANDARD PACK ZERO

Yes=Print Net Weight Only if Total Price Is Zero

No =Print All Information

C. FUNCTION CODES

The following list of Function Codes can be accessed with the Printer Keyboard or Programming Keyboard by turning the keyswitch to the LOAD position, and then entering the numerical code number. When using the Printer Keyboard, the </> key is pressed prior to entering the function code number. When using the Programming keyboard, the function code number, then the <ENTER> key is pressed.

FUNCTION CODE	DESCRIPTION
11	DISPLAY THE NUMBER OF AVAILABLE PLU's
12	CREATE A NEW PLU
13	DELETE A PLU
14	EDIT A PLU (CHANGE?) 1 - DESCRIPTION, 2 - GROUP NO., 3 - PRICE, 4 - PRICE MODE, 5 - TARE, 6 - SHELF LIFE, 7 - ITEM NO., 8 - ING./NUT. TEXT, 9 - (NOT USED), 10 - CHANGE ALL
15	DELETE ALL PLU FILES AND TOTALS
16	RAM SIZE CHECK
17	PRINT VERIFICATION LABEL
21	PRINT GRAND TOTALS LABEL
22	PRINT GROUP TOTALS
23	PRINT PLU TOTALS
24	PRINT ITEM TOTALS
25	PRINT HOURLY TOTALS
31	DISPLAY GRAND TOTALS
32	DISPLAY GROUP TOTALS
33	DISPLAY PLU TOTALS
34	DISPLAY ITEM TOTALS
35	DISPLAY HOURLY TOTALS
41	CLEAR ALL TOTALS EXCEPT HOURLY
45	CLEAR ONE PLU TOTAL
47	CLEAR HOURLY TOTALS
52	WRITE PLU FILES, STORE ADDRESS AND SOFTSWITCHES TO TAPE
54	READ PLU FILES, STORE ADDRESS AND SOFTSWITCHES FROM TAPE
55	TAPE VERIFY - <1> = YES
61	SET TIME AND DATE
62	SET ADDRESS NUMBER FOR HOST COMPUTER
63	SET SOFTSWITCHES
64	SET PAPER MODE AND SIZE The < / > key will toggle ''SET STRIPPED'' or ''SET NOT STRIPPED'' on the display until the <ENTER> key is pressed. If ''WET NOT STRIPPED'' is selected, < / > will toggle ''TAKE UP INSIDE'' or ''EJECT OUT FRONT'' until the <ENTER> key is pressed Next, ''Label Size xx'' will show on the display. Press the < / > to toggle the following label sizes, the press <ENTER> to accept the displayed label size. 2.4'' (350HC) 4.7'' (350UB) 3.3'' (350HB) 5.1'' (350UA) 3.7'' (350HA) ROLL STOCK 4.2'' (350UC)
65	ENTER STORE ADDRESS / MESSAGE

The following list of Function Codes are accessed by the Operator on the Printer Keyboard, with the keyswitch in the RUN position. The appropriate softswitch must be enabled to access these functions or the display will show ''ILLEGAL FUNCTION''. To access these functions press the </> key, enter the code number then press <ENTER>.

RUN MODE
FUNCTION

CODE	DESCRIPTION
1	MANUAL OVER-RIDE PACK DATE
2	MANUAL OVER-RIDE SHELF LIFE
3	MANUAL OVER-RIDE UNIT PRICE
4	MANUAL OVER-RIDE TARE
8	PRE-PACK MODE ENABLE (TO EXIT FROM MODE PRESS <CLEAR>)
64	SET LABEL FORMAT AND SIZE

D. ERROR MESSAGES

The following error messages will be displayed whenever an error is detected by the Main Logic PCB.

ERROR MESSAGE	DESCRIPTION OF ERROR
ILLEGAL FUNCTION	Incorrect entry or Function Code entry that is not enabled
NO SCALE COMMA	350 is not communicating with the scale
BAD SCALE COMM	Non-acknowledgment from the scale
COVER OPEN	Front or Side cover is open
RAM ERROR	The 350 has detected an error in the working RAM after a power reset. This is non-fatal to the PLU file. Press <CLEAR> to continue.
ALREADY EXISTS	Operator is using a PLU number that already exists when trying to create a new PLU in FC12.
ENTRY ERROR	Operator is entering wrong or incomplete data
TAPE READ ERROR	The 350 detected an error in reading a PLU file from the tape
PLU NOT FOUND	Operator has selected a PLU that does not exist
MEMORY ERROR	The 350 has detected an error in the look-up table for the PLU file after a power reset. This is fatal to the PLU file. All PLU’s will be cleared. Press <CLEAR> to continue
LOW STOCK	Add more labels
CHK SCALE SET-UP	The 350 data sent to the 8421 does not match the softswitch settings in the 8421. Check C4 and C5 fractional pricing, and C21 tare enable.

V. INSTALLATION INSTRUCTIONS

A. SET-UP PROCEDURE

1. Unpack the 350 and inspect for visual damage. Report any damage to the carrier.
2. Load label supply. (Refer to Section V-B)
3. Using a small screwdriver, slide the battery switch (SW2) down to the ON position, as shown in figure 1. Access to SW2 is through the small slot in the rear cover adjacent to the power switch.
4. Connect the 130870 00A Scale Interface Cable to the 8421 scale (if used). Refer to the 8421 Technical Manual for set-up instructions for the scale. Refer to Section VI for operation with the 8421.
5. Connect the AC Power Cord to a properly grounded outlet, then place the Power Switch to the ON position.
6. After all the hardware is connected, perform the following steps BEFORE PROGRAMMING THE PLU FILES:
   a. Enter function code 15. This function is necessary to completely clear the memory after initial power-up. (Refer to function code list, section C).
   b. Enter time and date. (Refer to function code list, section C).
   c. Set softswitches. (Refer to softswitch menu, section IV-B)
   d. Enter the store address lines. (Refer to function code list, section C)
7. The 350 is now ready for operation. (Refer to the 350 Operators Manual for detailed programming and operating instructions.)

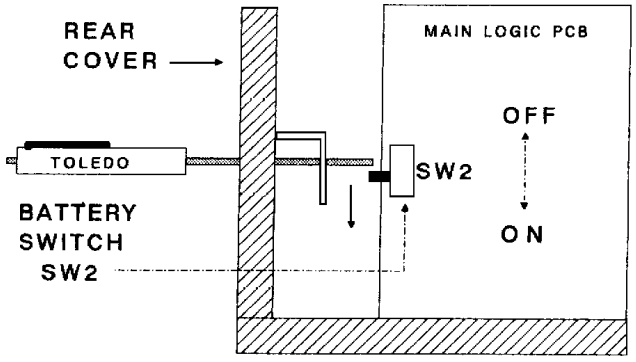


FIGURE 1

B. LOADING LABEL STOCK

1. MODE AND SIZE SELECTION

Labels can be installed three different ways:
- Stripped and presented to the operator
- Un-stripped and rewound onto the take-up reel
- Un-stripped and ejected out the front of the printer

The printer is told which threading method is in use by making the correct selection using function code 64 as follows:
- Press </> <6> <4> on the printer keyboard
- The </> key will toggle ‘‘‘SET STRIPPED’’ or ‘‘SET NOT STRIPPED’’ on the display until
  the <ENTER> key is pressed.
- If ‘‘SET NOT STRIPPED’’ is selected, </> will toggle ‘‘TAKE UP INSIDE’’ or ‘‘EJECT OUT
  FRONT’’ until the <ENTER> key is pressed
- Next, ‘‘Label Size xx’’ will show on the display. Press the < / > to toggle the following
  label sizes, the press <ENTER> to accept the displayed label size.

2.4’’ (350HC)	4.7’’ (350UB)
3.3’’ (350HB)	5.1’’ (350UA)
3.7’’ (350HA)	ROLL STOCK
4.2’’ (350UC)	

2. LABEL THREADING

> **WARNING:** Turn OFF power to the 350 before cleaning and before loading labels. Power is turned off by switching the ON / OFF switch on the rear cover to the OFF position.

NOTE: Refer to figure 2, Label Threading Diagram.

a. Turn the power switch to OFF; remove the front bezel; open the top cover

b. Unlock and lift printhead

c. Place the roll of labels on the supply post and thread through Low Stock Sensor
and through label guides. Wind the liner on take-up spool and secure with clip,
if windup is selected.

d. Lower and lock the printhead, replace the front bezel and close the top cover. Place
the power switch to ON.

e. Depress <LABEL FEED> to advance and index labels to proper position.
(Not necessary when using roll stock)

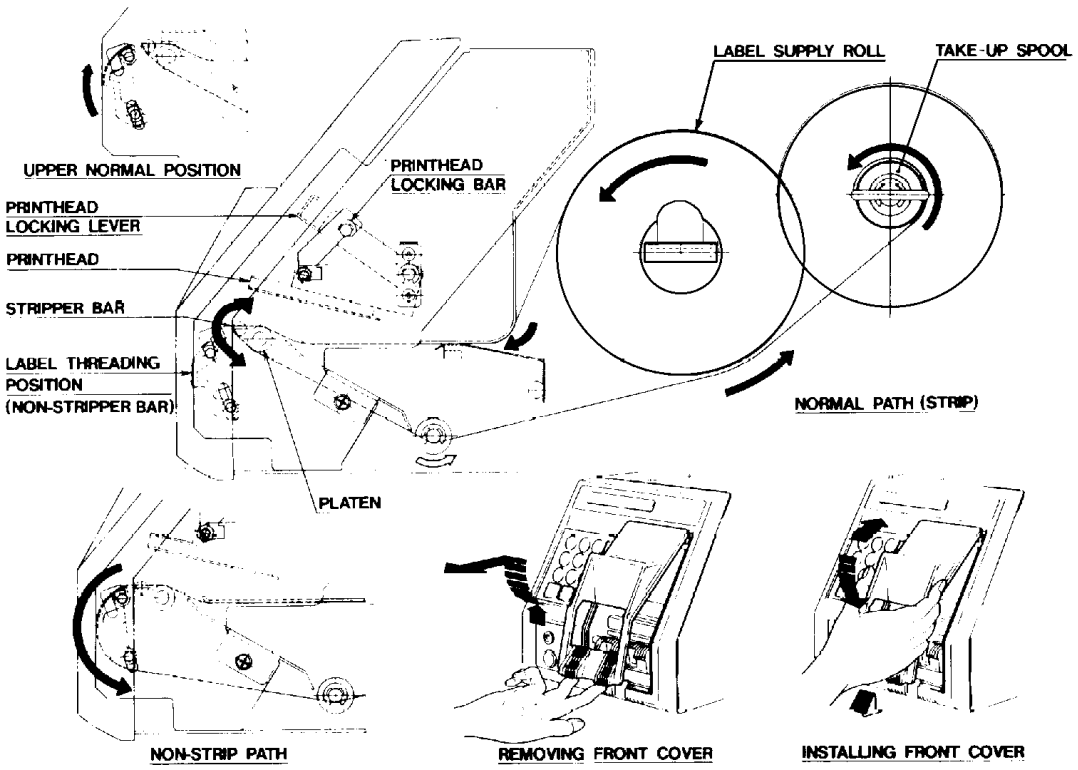


FIGURE 2

VI. SCALE INTERFACE

The Model 350 can receive weight and total price information from the Model 8421 Scale (RAMS 1001, 1002, 1003 and 1004) for Random Weight applications. The Model 8421 RAMS 1, 2, 3 and 4 can be updated to interface with the Model 350 by installing the 8421 Conversion Kit 0952-0058. This kit consists of one 8032 microprocessor and one EPROM for 30 lb. capacity scales, and one EPROM for 50 lb. capacity scales.

All communication to and from the 350 is achieved with a 9600 Baud, optically isolated 20ma current loop interface, employing standard 7-bit ASCII characters with even parity and one stop bit. The current is provided by the transmitting device. The interface connector is a 9-pin D-sub connector located on the rear of the unit. The connector is wired as follows:

350 Scale Interface Connector	**Color Code**	**Connection to 8421**
Pin 1 - N/C		
Pin 2 - N/C		
Pin 3 - (+)Printer Transmit	White	9 (R+)
Pin 4 - (-) Printer Receive	Green	6 (R-)
Pin 5 - (+)Printer Receive	Red	7 (T+)
Pin 6 - (-) Printer Receive	Black	8 (T-)
Pin 7-9 - N/C		

The 8421 may be used with the 350 in two modes, normal and pre-pack operation. In the normal mode, the 8421 receives the tare and price information from the 350 and returns the weight, Unit Price, and Total Price to the 350 for one

weighing. The tare and price information are cleared in the 8421 after the weight is removed.

In the pre-pack mode, the 8421 receives the tare and unit price information from the 350 and returns the weight, unit price, and total price for multiple weightings, until the 350 tells the 8421 to clear the tare and price information. The sequence of operation in the pre-pack mode is as follows:

1. With the keyswitch in the RUN position, enter </> <8> <ENTER>. This display will now show ''PLU No. ? PP''. The Pre-Pack indicator LED on the 8421 will also light up.

2. Enter the PLU number. The 350 and 8421 are now set up for pre-pack operation.

3. To exit from the pre-pack mode, press the <CLEAR> key on the 350.

VII. HOST INTERFACE

Communication system characteristics for the Model 350 Printer include:

- RS422 Signals/RS485
- Multi-drop capability
- Asynchronous Transmission
- ASCII Data, 7-bits plus Even Parity, 1 stop bit
- Longitudinal Parity (BCC)
- Software selectable Baud rates of 300, 1200, 2400, 4800 or 9600
- Polling Protocol with the Host as Master

The interface connector is a 9-pin D-sub connector located on the rear of the unit. The RS422 Host connector is wired as follows:

PIN NO.	DESCRIPTION
1	Chassis Ground
2-21	(Not Used)
22	R+ Receive Loop
23	R- Receive Loop
24	T+ Transmit Loop
25	T- Transmit Loop

VIII. PART REPLACEMENT AND ADJUSTMENTS

A. ACCESS TO THE MAIN LOGIC AND PRINTER DRIVER PCB's

1. Remove the top cover assembly
2. The Main Logic PCB is retained by five Phillips-head screws
3. The Printer Driver PCB is retained by two spacer screws and one Phillips head screw

B. ACCESS TO THE POWER SUPPLY PCB AND TRANSFORMER

1. Access to the Power Supply PCB is gained by removing the Main Logic PCB, Printer Driver PCB, and the front PCB support plate
2. The Power Supply PCB is retained by four Phillips head screws and the Switching
   Regulator (soldered to the PCB) is retained to the vertical frame by two Philips head screws
3. The Transformer is retained by four Phillips head screws

C. MAIN DRIVE BELT REPLACEMENT

Access to the Main Drive Belt and pulleys is gained by removing the top and front covers

1. Remove the drive belt by holding and pulling the belt away from 32 tooth pulley while
   rotating the pulley (figure 3)
2. Install a new belt over the 20 tooth pulley
3. Next push the new belt on the 32 tooth pulley, reversing the above steps

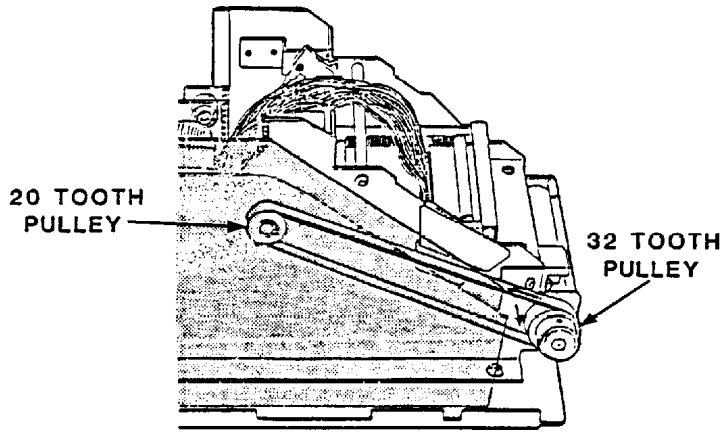


FIGURE 3

CAUTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTRO-STATIC SENSITIVE DEVICES

D. LABEL STEPPING MOTOR REPLACEMENT

Access to the Label Stepping Motor is gained by removing the top and front covers. The label stepping motor is retained by three Phillips head screws. Remove the screws through the access holes in the side plate. Disconnect the interconnecting harness at CN3 on the Motor Drive PCB. Remove the motor from the front.

E. LINER TAKE-UP MOTOR REPLACEMENT

The Liner Take-up Motor can be replaced from the label side of the printer by lifting the side cover up. The take-up assemble is held to the vertical support plate with four Phillips head screws. Rotate the take-up pulley until the four screws are visible through the four access holes in the round positioning guide.

To replace the motor, remove the take-up pulley by loosening the set-screw, then slide the pulley off of the motor shaft. The motor is held to the mounting plate with three Phillips head screws. Remove the red(+) and black(-) wires from the spade connectors. Reverse the above steps to install the new motor. When installing a new motor, the red (+) wire is connected to the positive marked (+) terminal, and the black (-) wire is connected to the unmarked terminal.

F. PRINTHEAD REPLACEMENT

1. Disconnect the printer power cord from the outlet
2. Disconnect the printhead harness from the printhead and disconnect the Preheat Harness from the Printer Driver PCB at CN7
3. Raise the printhead by releasing the printhead locking bar
4. Remove the four Phillips screws which retain the printhead
5. Reverse procedure to install a new printhead

NOTE: Repositioning the printhead will affect printhead alignment. Printhead resistor elements should be centered over the platen roller. Refer to Printhead Adjustment, Section VIII-G.

G. PRINTHEAD ADJUSTMENT

Maximum print quality is achieved when the resistor line is centered on top of the platen roller. Clean the black resistor line before proceeding to adjust the printhead as described in the Care and Maintenance section.

1. To align the printer or to correct light print across the width of the label, loosen the four (4)
   crews (figure 4) holding the printhead and position the printhead so the resistor line is
   entered over the platen roller.

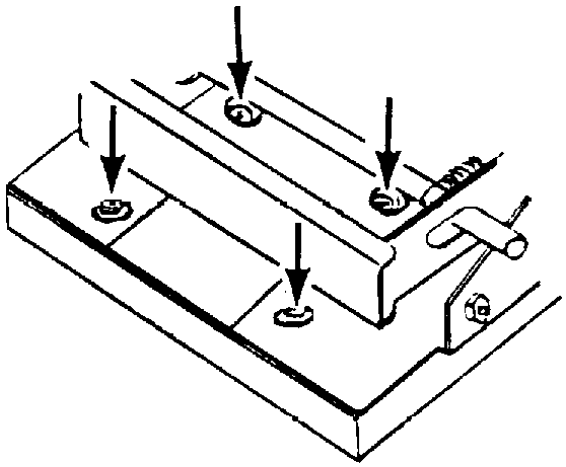


FIGURE 4

2. When a difference in the density across the width of the label exists, loosen the two (2)
   screws holding the shaft retaining plate. Move the retaining plate vertically until even
   density is gained. (Figure 5)

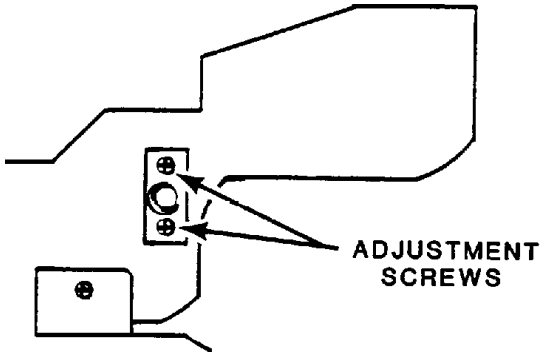


FIGURE 5

3. Print a test label and check the quality. Re-adjust the head, if necessary, until the print
   quality is acceptable.

4. If the print quality is inadequate, check the following:
   a. Has the proper burn time been selected for the head?

CAUTION
Do not over burn-time the printhead to darken the print. This will drastically reduce printhead lift.

   b. Are the printhead compression springs damaged? Replace if necessary
   c. Check that the head support pivots freely on the bearing shaft
   d. Is the head pre-heat functioning properly? The printhead block should be warm to the touch. (40º C typically) If poor print quality still exists, the printhead may be bad. Install a new printhead and check the print quality after the adjustment.

H. PRINTHEAD BURN TIME ADJUSTMENT

When a new printhead is installed, program switches on the Printer Driver PCB MUST BE SET to select the correct burn time of the thermal head. The burn time will be set correctly by matching the resistance value printed on the new head, with the values listed in the Thermal Head Resistance Selection Chart.

REFER TO THE PROGRAM SWITCH SUMMARY FOR SWITCH SETTINGS (SECTION IV-A-2). SELECT THE SETTING EQUAL TO THE RATING INDICATED ON THE HEAD.

I. LABEL SENSOR REPLACEMENT AND ADJUSTMENT

1. LOW STOCK SENSOR

Access to the Low Stock Sensor is gained by removing the top cover, the Main Logic PCB, the Printer Driver PCB, and the Power Supply PCB and support plate.

a. Remove the two (2) Phillips head screws mounting the Low Stock Sensor bracket to the vertical plate.
b. Disconnect Low Stock Harness from the Printer Driver PCB.
c. Remove the Low Stock Sensor through the round access hole in the vertical frame.
d. Reverse the procedure to install a new Low Stock Sensor assembly.
e. Adjust the position of Low Stock Sensor bracket so the head of the label appears at approximately 3.5mm beyond the printhead assembly. (Figure 6)

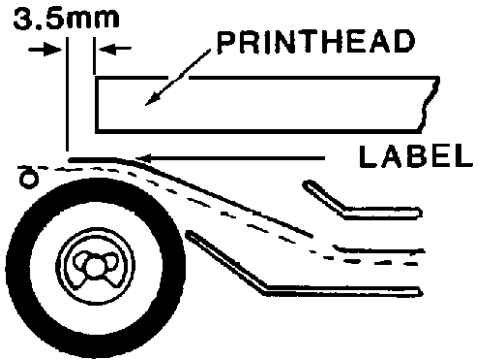
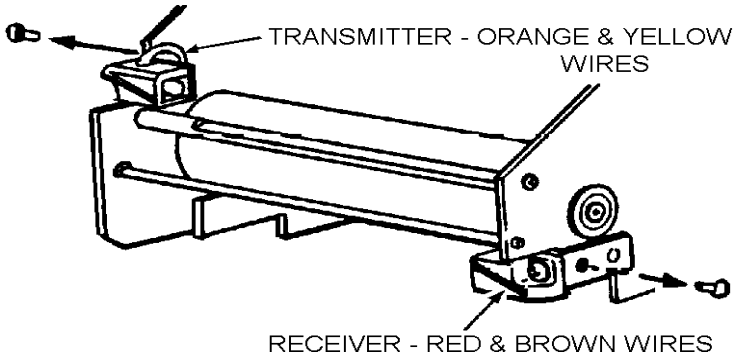


FIGURE 6

2. LABEL TAKEN SENSOR

Access to the Label Taken Sensor is gained by removing the top and front covers.

a. Remove the two (2) screws (one on each side) mounting the label taken sensor brackets to the vertical plates. (Figure 7)
b. Disconnect label taken sensor harness from the Printer Driver PCB.
c. Reverse the procedure to install a new label taken sensor assembly.



J. LABEL STRIPPER BAR ADJUSTMENT

Access to the Label Stripper Bar is gained by removing the top and front covers.

1. Loosen the two (2) screws retaining Label Stripper Bar. (Figure 8)
2. Adjust the inclination of flat surface of the Stripper Bar, to 5 degrees. (Figure 9)

NOTE: Stripped Label discharges upward proportionally to the angle of flat surface of the Stripper Bar.

3. Re-tighten the two screws.

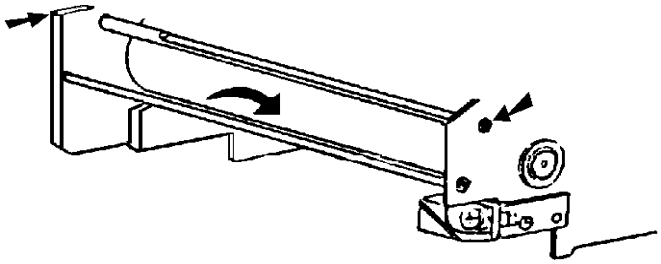


FIGURE 8

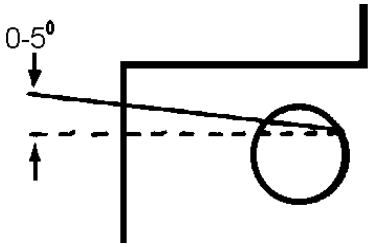


FIGURE 9

K. LUBRICATION

The recommended grease is silicon grease. The following areas will require lubrication:
(See figure 10)

1. The slide cam surfaces that guide the printhead locking shaft.
2. The slot on the printhead locking lever that guide the printhead locking shaft. Only a small amount of lubrication, enough to create a film, is required in each location.

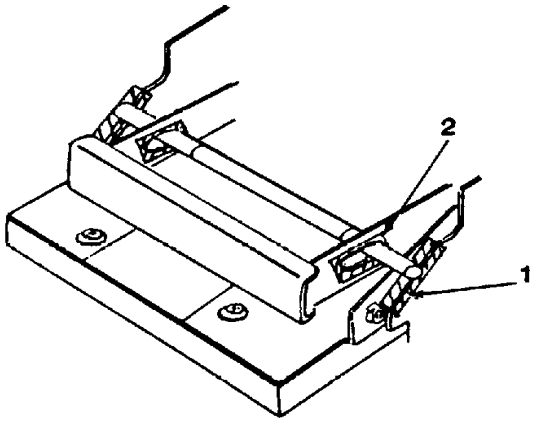


FIGURE 10

CAUTION
DO NOT USE A METAL DEVICE TO REMOVE LABEL JAMS AS THIS CAN CAUSE SEVERE DAMAGE TO ELECTRONIC PARTS.

IX. TROUBLESHOOTING

A. MECHANICAL

SYMPTOM	CORRECTIVE ACTION
1. LABEL STAGING PROBLEMS	Insufficient drive function: a. Loose timing belt. Replace faulty belt b. Platen Roller slipping. Clean or replace c. Check platen roller bearings
2. LABEL TRACKING PROBLEMS	Improperly threaded take-up roll. Thread roll properly Improperly positioned label roll. Reposition roll Improper positioning of removable label guide
3. LABELS STRIPPING IMPROPERLY	Adjust Low Stock Sensor assembly Adjust flat surface of stripper bar Check take-up motor
4. SPENT LINER TEARS & BREAKS	Glue adhering to stripping edge. Clean the stripper bar. Improper positioning of removable label guide. Reposition the guide

B. ELECTRICAL

SYMPTOM	CORRECTIVE ACTION
1. Blank display with Power Switch ON	Check for Power at AC outlet Check fuse Check transformer and Power Supply PCB voltages Check interconnecting harness If above check good, suspect faulty Main Logic PCB
2. All Display Segments are dim	Test Power Supply PCB Faulty Display PCB Bad connection on Display Harness
3. Keyboard Inoperative	Check for proper connection keyboard on the Main Logic PCB Replace keyboard
4. Specific dots on LCD blank	Check or replace Display Harness Replace faulty LCD
5. Memory is lost when Power Switch is set OFF.	SW1-3 on Logic MUST BE

to off or Power Source is disconnected. Check battery & Switch on Main Logic PCB.

Check battery voltage
Faulty Main Logic PCB

6. Bar Code does not print. Totals do not accumulate. No verification label printed — Check softswitch settings

7. Printer Delivers Black Labels are excessively dark, — If printed correctly but

check the Printer Driver PCB
IF streaked by lines (print elements do NOT turn off), the thermal head is defective. Replace the thermal head

8. Missing Print (Dots missing) adhesive build-up, a — Check the printhead for

piece of label adhering to the printhead, label dust, etc. Clean as directed in Section XI. If the printhead is clean and elements still fail to print, refer to Section VIII-F & G on Printhead Adjustment and Replacement

X. FAULT ISOLATION

A. TRANSFORMER

1. Remove the Main Logic PCB and disconnect the printhead harness from the Printer Driver PCB.

2. Disconnect CN1 on the Power Supply PCB. Check the following voltage levels on CN1:

TEST POINT	ACCEPTABLE VOLTAGE RANGE
CN1-1 to CN1-2	15.0 VAC (+/- 5%)
CN1-1 to CN1-3	15.0 VAC (+/- 5%)
CN1-4 to CN1-5	28.0 VAC (+/- 5%)
CN1-6 to CN1-7	7.7 VAC (+/- 5%)

If all the AC voltage levels are 0 VAC, check the fuse. If the AC voltage levels are not within the acceptable range, replace the transformer.

B. POWER SUPPLY PCB

1. Remove the Main Logic PCB and disconnect the printhead harness from the Printer Driver PCB.

2. Check the following voltage levels on the Power Supply PCB:

NOTE: The door interlock switches must be closed when checking the +24VDC supply voltage

TEST POINT		ACCEPTABLE VOLTAGE RANGE		
POS+	NEG-			
CN5-1 to	CN5-2	23.8	to	24.5 VDC
CN5-3 to	CN5-4	4.9	to	5.1 VDC
CN6-7 to	CN6-4	11.4	to	12.6 VDC
CN6-8 to	CN6-4	-11.4	to	-12.6 VDC

If the voltage levels are not within the acceptable range, and the Transformer voltages are acceptable, replace the Power Supply PCB.

C. PRINTER DRIVER PCB

1. To check Label Gap Sensor Circuit, install a strip of liner paper in Label Gap Sensor slot. With the liner in place, the voltage at TP4 to TP2 (Ground) should be 1.0 VDC (+/- 0.1 VDC).

If voltage is different, adjust VR1 (Variable Resistor) until +1.0 VDC is obtained. (Refer to Figure 11 for TP and VR1 locations).

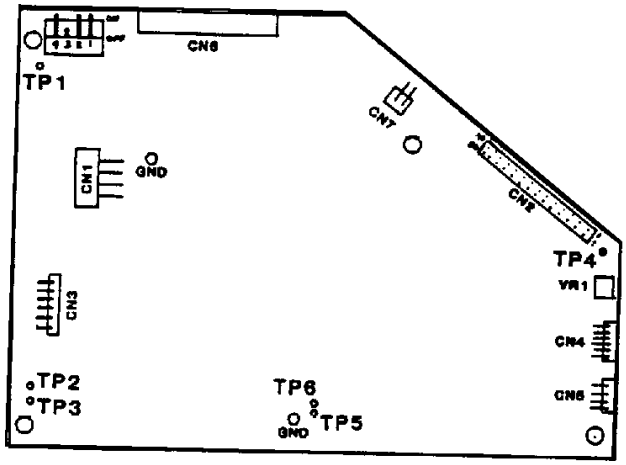


FIGURE 11

2. After adjusting VR1, check TP4 to TP2 with the liner and a label in the sensor slot. The voltage should now read 2.0 VDC or higher. If the voltage at TP4 is 0 V, or different than the listed operating voltage, proceed to Section 3.

3. Check the following voltages on the Printer Driver PCB connectors:

TEST POINT	ACCEPTABLE VOLTAGE RANGE
CN1-3 to CN1-4	4.9 to 5.1 VDC
CN1-1 to CN1-2	23.8 to 24.5 VDC

If either voltage is out of the acceptable range, or 0V, suspect interconnecting harness, or the Printer Driver PCB.

TEST POINT	ACCEPTABLE VOLTAGE RANGE
TP5 to TP2	3.38 to 3.58 VDC
TP6 to TP2	1.94 to 2.06 VDC

If either test point voltage is 0 V, or out of range, replace the Printer Driver PCB.

4. With the thermal Printhead disconnected at CN6, check the following voltages at TP1 to TP2 (Ground), with SW1 set as shown.

SW1 1	2	3	4	ACCEPTABLE VOLTAGE LEVEL AT TP1
ON	OFF	OFF	OFF	0.198 VDC (+/- 0.009)
OFF	ON	OFF	OFF	0.291 VDC (+/- 0.012)
OFF	OFF	ON	OFF	0.541 VDC (+/- 0.021)
OFF	OFF	OFF	ON	1.094 VDC (+/- 0.040)

If the voltage levels at TP1 are not within the acceptable range, replace the Printer Driver PCB.

D. MAIN LOGIC PCB

1. PRESSING AND HOLDING the <LABEL FEED> button will initiate printing a diagnostic test label. If a test label is not issued, or is different from the one shown in figure 12, proceed to step-2, Voltage Checks.

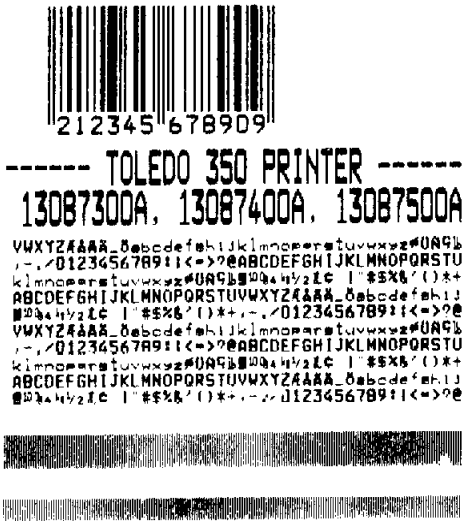


FIGURE 12

2. Check the following voltage levels on the Main Logic PCB:

TEST POINT			ACCEPTABLE VOLTAGE RANGE
POS+		NEG-	
TP1	to	TP 0 (gnd)	4.9 to 5.1 VDC
TP2	to	TP 0	11.4 to 12.6 VDC
TP3	to	TP 0	11.4 to 12.6 VDC

If the voltage levels are 0 VDC, check the interconnecting harnesses. If the voltage levels are not within the acceptable range, and the Transformer and Power Supply PCB voltage levels are acceptable, replace the Main Logic PCB.

E. INTERLOCK SWITCH CIRCUIT

If COVER OPEN is not displayed when either the front or side covers are removed, check the switches. If both switches check good, replace the Main Logic PCB. If the Main Logic PCB doesn't correct the problem, suspect the Power Supply PCB.

F. THERMAL PRINTHEAD PRE-HEAT MEASUREMENT

When plugged into the Printer Driver PCB, +24 VDC can be measured between ground and either pin of CN7 on the Printer Driver PCB. This voltage will fluctuate slightly when a label is being printed. With the POWER DISCONNECTED, approximately 30 ohms should be measured between the two pins on the pre-heat harness.

G. STEPPER MOTOR RESISTANCE

The Stepper Motor resistance can be measured with the POWER DISCONNECTED on the motor connector by checking the resistance between the following pin connections on the connector:

CN3 PINS	APPROXIMATE MEASUREMENT
2 and 3	68 ohms
2 and 4	68 ohms
2 and 5	68 ohms
2 and 6	68 ohms

XI. CARE AND MAINTENANCE

A. TURN OFF POWER TO THE PRINTER BEFORE CLEANING

Power is turned off by pressing the rocker switch on the rear cover to the OFF position.

WARNING:
ELECTRICAL SHOCK HAZARD. DO NOT SPRAY OR WASH DOWN. DISCONNECT POWER BEFORE SERVICING.

B. EXTERIOR CLEANING

Use only a clean damp cloth to wipe the exterior surfaces. DO NOT use solvents or chemicals. These may harm the surfaces of the unit.

C. RECOMMENDED CLEANING

Clean the printhead and drive mechanism after approximately 200,000 labels.

1. PRINTHEAD AND PLATEN ROLLER

CAUTION
DO NOT USE A METAL DEVICE TO REMOVE LABEL JAMS AS THIS CAN CAUSE SEVERE DAMAGE TO ELECTRONIC PARTS.

a. Lift the printhead. The printhead may be raised further by lifting the head locking lever.
b. Remove the label stock.
c. Clean the black resistor line with Toledo Cleaning Fluid, PN 125875 00A, using a cotton tipped swab. Never scrape the printhead with any object.
d. Clean all built-up adhesive or debris from the platen roller. NEVER use a metal object to remove jammed labels. This may cause severe damage to electronic parts.
e. Reload the labels.
f. Lower the printhead.

2. LABEL SENSORS

Dust off with a soft brush

3. LABEL GUIDE STRIP

Remove the removable Label Guide with the jammed label attached. Clean off any built-up adhesive or labels.