9481

Technical Manual

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:

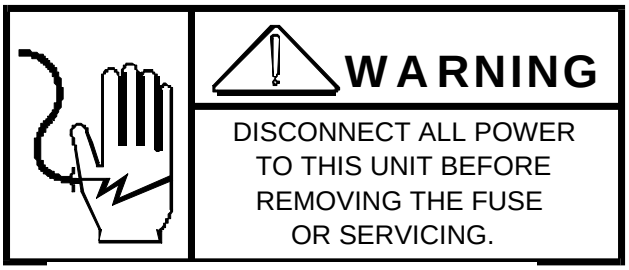
METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

WARNING

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications. I has been tested and found to comply with the limits for a class A computing device pursuant to subpart J or part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

PRECAUTIONS

READ this manual before operating or servicing this equipment.



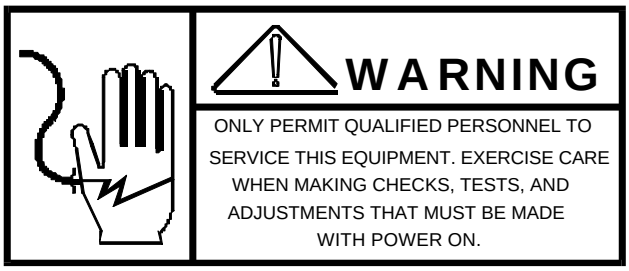
ALWAYS REMOVE POWER and wait at least 30 seconds **BEFORE** connecting or disconnecting any internal harnesses. Failure to observe these precautions may result in damage to, or destruction of the equipment.

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.

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

CALL METTLER TOLEDO for parts, information, and service.



SAVE this manual for future reference.

ALWAYS DISCONNECT this equipment from the power source before servicing.

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1.0 GENERAL DESCRIPTION

The Mettler Toledo Expresscheck System is designed to weigh products as they are conveyed in-motion across a scale, and check the weight tolerance against zones established for various product ID's. An optional Mettler Toledo printer can be connected to the Expresscheck Controller to record product weights.

The complete Expresscheck System, normally, includes the 9481 Expresscheck Controller, 9410 High Speed Junction Box, a Mettler Toledo load cell base (scale) with a Mettler Toledo Scale conveyor. Two photoeyes are mounted on the conveyor to sense when items are entering and exiting the conveyor. The scale is connected to a Mettler Toledo Model 9410 high speed junction box. The junction box and the photoeyes are interfaced to the 9481 Expresscheck Controller.

9481 Controller Features:

- User Interface, via an alpha / numeric keyboard, for setup configuration, and a local 19 character alpha / numeric display.
- Scale Interface, via RS422 communication for access to scale setup and weighing data.
- Multidrop Host device Interface via RS232 or RS422.
- An optional printer or remote display, via 20 Ma. current loop or RS232, user selectable data transmission.
- An optional Remote data input device, via RS232 or 20 mA. current loop at 4800 baud.
- Packaged in a Painted Mild Steel enclosure or Stainless Steel enclosure.
- Isolated 120 V.A.C. inputs and outputs for high level interface to user equipment.

9410 Features:

- Supports the use of a 1, 2, or 4 load cell strain gauge scale system.
- Serial Port operating at RS422 four wire for full control of the 9410.
- Powered from a single 24 VDC power supply from the Controller.
- Packaged in a Stainless Steel water resistant enclosure with cord grip connectors for cable entry.
- Power up zero capture selectable from 0, 2, or 20% of scale capacity.
- Auto zero capture through a command from the Serial port to allow capturing 6, 14, 24, 54, or 104 minor increments at a time up to 0, 2, or 20% of capacity.
- Digital filtering selectable through the Serial port allowing adjustable corner frequencies from 10 HZ(0.1 sec. setting) to 0.5 HZ(1.0sec. setting).
- Digital shift adjust and calibration performed through the Controller.
- The initial can range up to 80% of full scale with a span resolution of 100,000 minor increments.

- 15 Volt excitation for up to 4-350 Ohm load cells. 5 Volt reduced excitation for use with the Mettler Toledo HAP module in hazardous applications.

2.0 SPECIFICATIONS:

2.1 9481 CONTROLLER:

2.1.1 Environment

The model 9481 will operate over a temperature range from -10 C (14 F) to 40 C (104 F) at 10 to 95% relative humidity, non-condensing.

2.1.2 Power Requirements

The 9481 RAM 0001 & 0002 operate at 120VAC(+10% -15%) at a line frequency of 49 to 61.5 Hz. The 9481 RAM 0011 & 0012 operate at 220VAC(+10% -15%).

Power consumption is 360 VA maximum(combined of controls and I/O) and 50 VA minimum for controls only.

2.1.3 Appearance and Dimensions

The 9481 is available in two wall mount versions that are both 14" high, 16" wide and 9.5" deep. They are, a painted, charcoal black mild steel version and an unpainted, brushed stainless steel version(See Figure 2.1 for the general dimension detail).

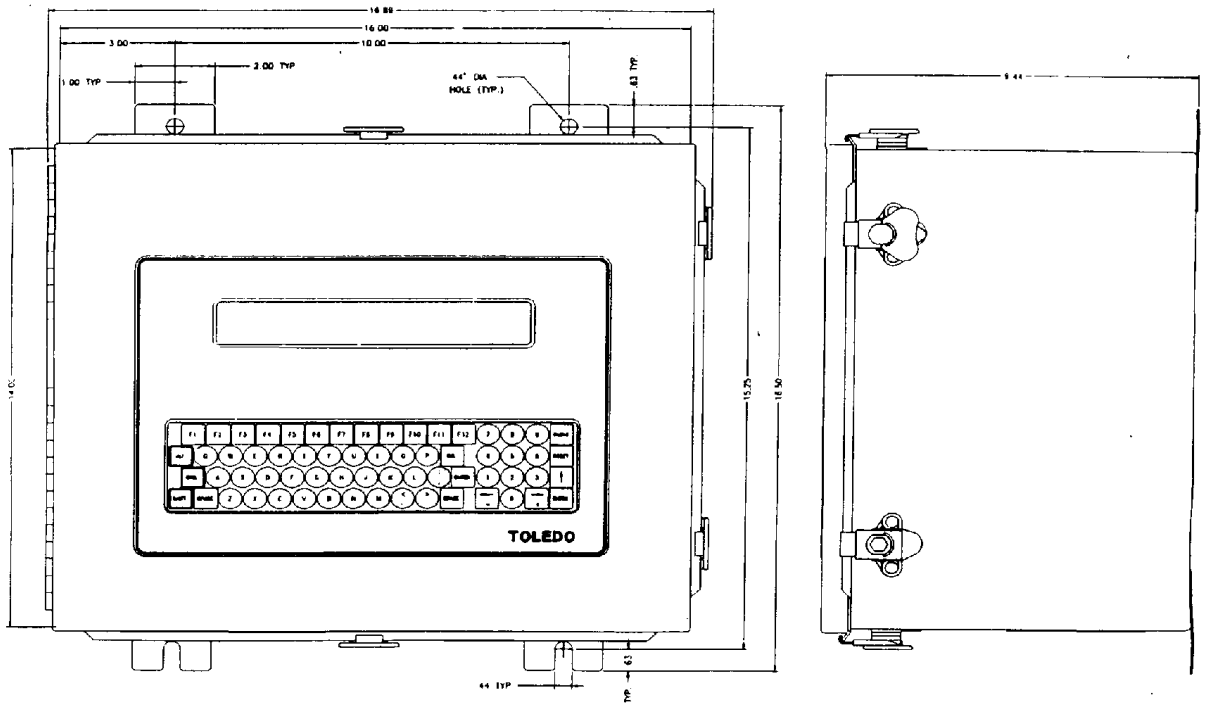


Figure 2.1

2.1.4 Data Interface

2.1.4.1 Host I/F

Allows configuration of the baud rate from the keyboard and drop address from DIP Switches. Communication is RS232 or RS422 with 7 bits, even parity and 1 stop bit. Standard X3.28 (multidrop using RS422) protocol is available with commands for sending and receiving product data, system status and alarm conditions. The selectable baud rates are 1200, 2400, 4800, 9600, and 19.2K.

2.1.4.2 Printer I/F

Allows selection in/out and configuration of the baud rate, bits per character, parity, and enabling of error logging. Formatting of the output string where each selected field (CN, ID, Date, Time, weight, etc.) may be positioned in the output string by specification of the starting character position. Fixed characters may be utilized to format the output for printer control, multiple print lines, or multiple line feeds between prints. Output is 20 mA. current loop or RS232. The selectable baud rates are 300, 1200, 2400, 4800, and 9600.

2.1.4.3 Display

Allows formatting of the Run (time) Display where each (Local) selected field (CN, ID, Date, Time, weight, etc.) may be positioned in the display by specifying the starting character position.

2.1.4.4 Remote Output

The output string is standard Toledo Continuous format data, fixed at 4800 baud. Optional selection of continuous data output of last item weighed or one transmission output per item weighed. Optional selection of Error Logging and CheckSum Character. See Section 9.0 for other details.

2.1.4.5 Remote Input

Allows selection of a new run ID and/or Tare while in Run mode. The input string is standard ASCII RS232 fixed at 4800 baud. See Section 10.0 for other details.

2.1.5 Test

The system provides for running seven diagnostic tests.

Display - writes a test pattern to the local display.

Keyboard - displays the key pressed.

Printer - outputs a test print line.

Remote Input - displays the ID and Tare received from the remote input device.

Inputs - displays on/off condition of inputs on the local display as [INPUTS 00000100] where the status of each of the 8 inputs are displayed. A standard unit only uses 4 of the 8 inputs (inputs #0, #1, #2 and #3).

Outputs - Selectively turns on/off the 8 output bits. During the output test observe the status lights on the output opto isolator P.C. board to confirm that outputs are being activated.

Caution: If external devices are connected during the output testing the devices will be energized.

Scale - Updates and displays the scale reading in minor increments every second, in the calibrated units. Also, allows zeroing of the scale.

2.1.6 Run Mode

The system Run mode is entered from the Standby mode. A "RUN PERMISSIVE" input must be ON and a product ID selected to operate. The system allows for operator input of the optional variables (Product ID's , Operator ID's, CN) while in the Run mode. All other modes and data entry must be selected from the Standby mode.

2.1.7 I/O Interface

120 V.A.C. Isolated inputs and outputs are provided to interface to other devices outside of the controller.

2.1.7.1 INPUTS

There are three required inputs to the Expresscheck Controller for normal operation.

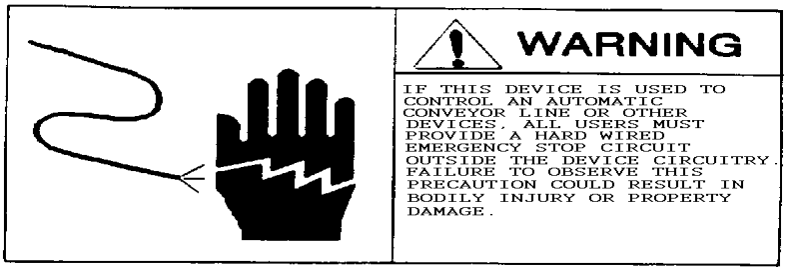
ENTRANCE and EXIT, Photo-eye contact inputs. These two required inputs allow the Controller to detect when a product has moved onto the scale and then detect when the product leaves the scale.

RUN PERMISSIVE, contact input. This required input to the Controller must be "CLOSED" to place the Controller in the "Run Mode". This input may be connected to any user device that provides a dry contact closure. When this contact is "OPEN"; (1) the Controller is placed into a standby mode, (2) any error is cleared (see Section 11.0 Error Conditions for more details), and (3) the Controller becomes an inactive part of the conveyor line.

SILENCE, contact input. This optional input may be used to turn off the Alarm output after an abnormal condition has been sensed.

2.1.7.2 OUTPUTS

Eight isolated 120 V.A.C. at 1 Amp. continuous, non-inductive, outputs are provided. Use of these outputs is optional. All output types are available for 3-zone operation. Eight of nine possible output types are available for 5-zone operation. Their functions are selected by DIP Switch, chosen from the following:



ALARM, this output comes ON when an Error Condition occurs. This output is OFF when no Error Condition exist.

RUNNING, this output is normally ON in RUN mode, this output will be OFF when any of the following conditions occur; (1) An Error occurs, (2) The RUN PERMISSIVE input is removed (Opened), (3) Power has been

removed from the Controller, (4) A component failure has occurred within the controller, or (5) The controller leaves RUN mode.

CONVEYOR EMPTY, this output will be ON in the RUN mode when the scale is ready to receive an object and will turn OFF when the new object is in position or the 9481 leaves the RUN mode.

ZONE OUTPUTS, these outputs turn ON after each weighment for a period of time (same period of time display shows classified weight) to identify the weight zone for each object. These outputs also power the zone lights on the front panel and will be used in groups of 3 or 5.

REJECT OUTPUTS, these outputs turn ON after any weighment whose weight zone has been selected for reject. There are 2 Rejects available. Separate delay and duration timers for each can be set on a per product ID basis.

2.2 9410 HIGH SPEED JUNCTION BOX

2.2.1 Environment

The model 9410 will operate over a temperature range from -10 C (14 F) to 40 C (104 F) at 10 to 95% relative humidity, non-condensing. Zero temperature coefficient is 0.5 uV/degree C maximum. Span temperature coefficient is 12 PPM/degree C maximum.

2.2.2 Power Requirements

The 9410 operates from a single 24VDC(+10% -15%) 600mA power supply. The power supply is supplied in the controller.

2.2.3 FCC Regulations

The 9410 meets or exceeds the FCC conducted and radiated emissions requirements.

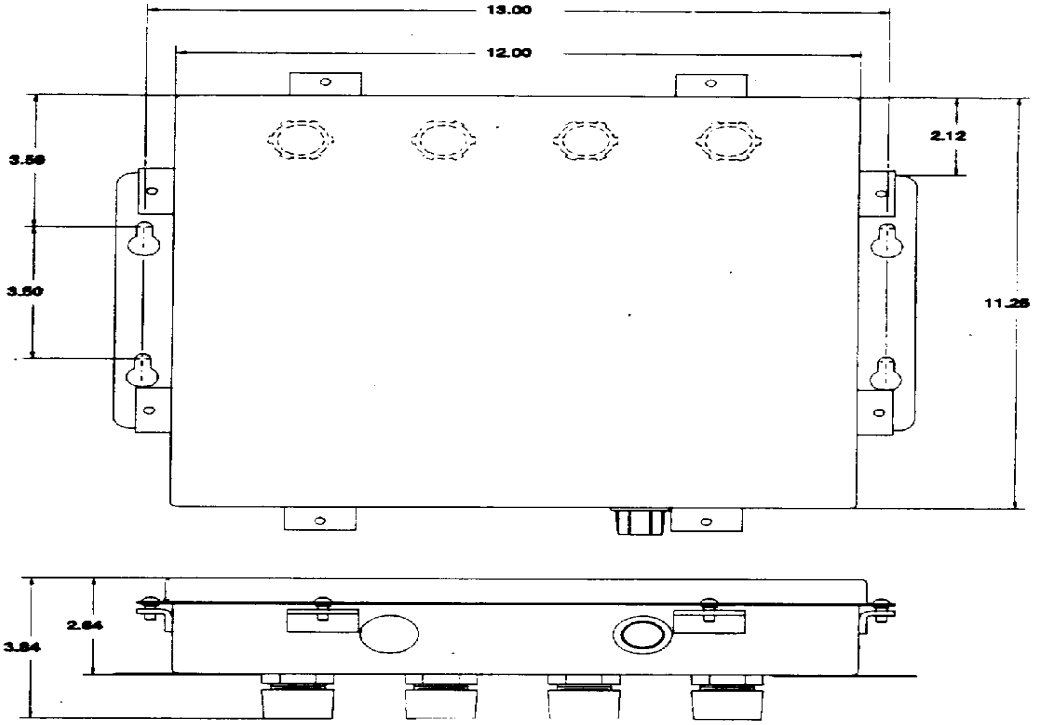
2.2.4 RFI Specifications

The 9410 has been designed to greatly reduce susceptibility to Radio Frequency Interference if installed per the drawings supplied with the equipment.

2.2.5 Appearance and Dimensions

The 9410 is packaged in a Stainless Steel Nema 4X enclosure. The enclosure is 2.64" deep, 12.00" wide, and 11.25" high. The unit weighs 5 lb.

Below are the general dimensions of the enclosure. Note the rear entry of the load cell cables that must be considered when mounting.



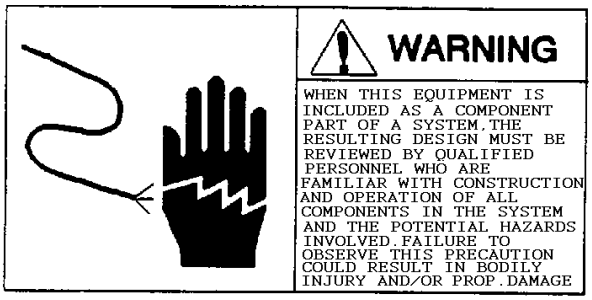
3.0 INSTALLATION

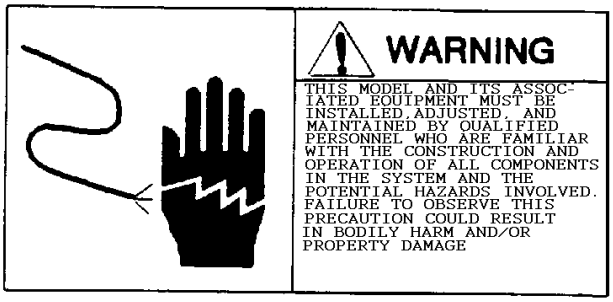
3.1 PRELIMINARY INSPECTION

Inspect the shipping container(s) and scale for loose or damaged parts. If any damage is found, immediatelynotify the freight carrier.

Open the enclosures and verify that all internal harnesses and components are securely fastened.

3.2 EXTERNAL WIRING INSTALLATION RECOMMENDATIONS





The following are general installation recommendations only, refer to the wiring diagrams supplied for detailed wiring(See Section 12.7).

1. 120 VAC, 60 Hertz or 230VAC, 50 Hertz, isolated, regulated power source to be furnished by others. Mettler Toledo recommends the use of a computer grade isolated transformer. The transformer shall be sized such that at least 50-70% of the VA rating will be drawn at minimum load.

2. Unless otherwise specified, all external wiring must be in steel conduit.

3. All external AC power and control lines must be in separate conduit from other external control and logic wiring.

4. All conduit shall enter the enclosure through insulated bushings.

5. Mettler Toledo recommends all wires and/or cables be tagged for future identification.

6. Mettler Toledo recommends two (2) spare wires be run in each conduit; maximum ten (10) wires - minimum two (2) wires. All spare wires entering the enclosure should be electrically terminated to the ground lug.

7. All electrical wiring to conform to appropriate national and local area electrical codes for this type of installation.

3.3 PRELIMINARY CALCULATIONS

The scale system as supplied by Mettler Toledo is designed for use at a specific scale build. If another build is desired or the 9481/9410 is being used with an existing system then the microvolts per increment must be calculated to verify that the scale build desired(increment size and total number of increments) is attainable with the scale base to be used.

3.3.1 Microvolts per Increment Calculation

Use the following formula to calculate microvolts per increment.

$$\text{Microvolt/increment} = \frac{I * V * O * 1000}{C * R}$$

I - Increment size desired: Increment size, scale capacity and load cell capacity must all be measured in the same weight units, lb or kg. If units are different then multiply kg units by 0.45359 to convert to lb units for the purposes of this calculation.

V - Excitation Voltage: Normal 9410 excitation voltage is 15 VDC. Hazardous area applications will have an excitation voltage of 5 VDC.

O - Load cell output rating in mV/V (millivolts per volt of excitation): The load cell output is normally marked on the load cell. Mettler Toledo load cells are typically 2 mV/V. Other types can range from 1 mV/V to 4.5 mV/V.

C - Load cell capacity as marked on the load cell.

R - Total number of load cells.

3.3.2 Total Increments calculation

The total number of increments is calculated by dividing the desired scale capacity by the increment size.

3.3.3 Minimum Weigh Time Calculation

The minimum weigh time is the minimum amount of time a single product will be fully on the scale. The following will give the minimum weigh time in seconds.

$$\text{Min. Weigh Time} = \frac{(C - P) * 5}{F}$$

C - Conveyor length: Distance between the entrance photoeye and the exit photoeye of the weigh conveyor in inches.

P - Package length: The length of the longest package to be weighed on the scale in inches.

F - Conveyor speed: The speed the conveyor is conveying packages across the scale in feet per minute.

3.3.4 Microvolt Build Table

The microvolt build in the 9410 is based on the Weigh Time(Filter Settle Time) selected in scale setup.

Minimum Weigh Time (Filter Settle Time)	Minimum microvolt per increment
less than .5 sec.	0.64
.5 - .8 sec.	0.38
greater than .8 sec.	0.29

The following example refers to a normal scale conveyor installation:

Scale Capacity	150 lb
Increment Size	.05 lb
Load Cell Capacity	250 lb
Number of Cells	4
Cell Output	2 mV/V
Excitation Voltage	15 VDC
Conveyor Speed	240 ft./min.
Conveyor Length	48 in.
Max. Package Length	30 in.

First, divide the scale capacity by the increment size to determine the total number of increments.

$$\frac{150 \text{ lb}}{0.05 \text{ lb}} = 3000 \text{ increments}$$

If this value is 10,000 or less, the capacity and increment size is acceptable. The 9410 will not allow total increments of greater than 10,000.

Next, use the formula from section 3.3.3 to calculate our expected minimum weigh time(filter settle time).

$$\frac{(48 \text{ in} - 30 \text{ in}) * 5}{240 \text{ ft/min}} = .375 \text{ seconds}$$

With the calculated minimum weigh time we can look in the microvolt build table and find the minimum microvolt per increment is 0.64.

Next, use the formula in step 3.3.1 to calculate our microvolt per increment.

$$\frac{.05 \text{ lb} * 15 \text{ VDC} * 2 \text{ mV/V} * 1000}{250 \text{ lb} * 4 \text{ load cells}} = 1.5 \text{ Tv per incr.}$$

This build is greater than .64, so it is acceptable.

3.4 9481 CONTROLLER PCB CONFIGURATION

The below listed jumper and switch settings are for the 9481 controller board. See Figure 3.2 for board layout.

The jumpers must be installed as follows for proper operation:

W1 = OUT
W2 = OUT
W3 = Pins 2 to 3
W4 = Pins 1 to 2
W5 = Pins 1 to 2
W6 = OUT
W7 = IN
W8 = IN
W9 = IN
W10 = Pins 2 to 3
W11 = OUT
W12 = OUT
W13 = Pins 1 to 2, Pins 3 to 4
W14 = Pins 1 to 2, Pins 3 to 4

The standard Expresscheck Controller uses switch SW1 to control Output assignments , the cold start option, and the Host I/F drop address.

SW1- 1 = OFF - 5 Zone, ON - 3 Zone Operation
2 = OFF - Normal, ON - Alternate Outputs
3 = OFF (Spare)
4 = OFF - Normal, ON - Cold Start
5 = Host Drop Addr. (1)
6 = Host Drop Addr. (2)
7 = Host Drop Addr. (4)
8 = Host Drop Addr. (8)

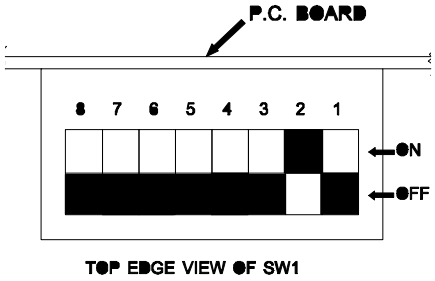


Figure 3.1

3.4.1 3-Zone Outputs

I/O 4 - Zone 1
I/O 5 - Zone 2
I/O 6 - Zone 3
I/O 7 - Running
I/O 12 - Conveyor Empty
I/O 13 - Reject 1
I/O 14 - Reject 2
I/O 15 - Alarm

3.4.2 3-Zone Outputs (Alternate)

Same as defined in Section 3.4.1

3.4.3 5-Zone Outputs

I/O 4 - Zone 1
I/O 5 - Zone 3
I/O 6 - Zone 5
I/O 7 - Zone 2
I/O 12 - Zone 4
I/O 13 - Reject 1
I/O 14 - Reject 2
I/O 15 - Alarm

3.4.4 5-Zone Outputs (Alternate)

I/O 4 - Zone 1
I/O 5 - Zone 3
I/O 6 - Zone 5
I/O 7 - Zone 2
I/O 12 - Zone 4
I/O 13 - Reject 1
I/O 14 - Conveyor Empty
I/O 15 - Alarm

3.4.5 Drop Address Selections

The serial port can be multidropped with other X3.28 devices and the following table defines the address of the 9481 as selected on DIP Switch 1:

	S1-8	S1-7	S1-6	S1-5	Address
	OFF	OFF	OFF	OFF	Point to point
	OFF	OFF	OFF	ON	Node address 1
	OFF	OFF	ON	OFF	Node address 2
	OFF	OFF	ON	ON	Node address 3
	OFF	ON	OFF	OFF	Node address 4
	OFF	ON	OFF	ON	Node address 5
	OFF	ON	ON	OFF	Node address 6
	OFF	ON	ON	ON	Node address 7
	ON	OFF	OFF	OFF	Node address 8
	ON	OFF	OFF	ON	Node address 9
	ON	OFF	ON	OFF	Node address 10
	ON	OFF	ON	ON	Node address 11
	ON	ON	OFF	OFF	Node address 12
	ON	ON	OFF	ON	Node address 13
	ON	ON	ON	OFF	Node address 14
	ON	ON	ON	ON	Node address 15

3.4.6 Controller PCB Layout

The drawing below shows the location of all PCB jumpers, connectors, and switches:

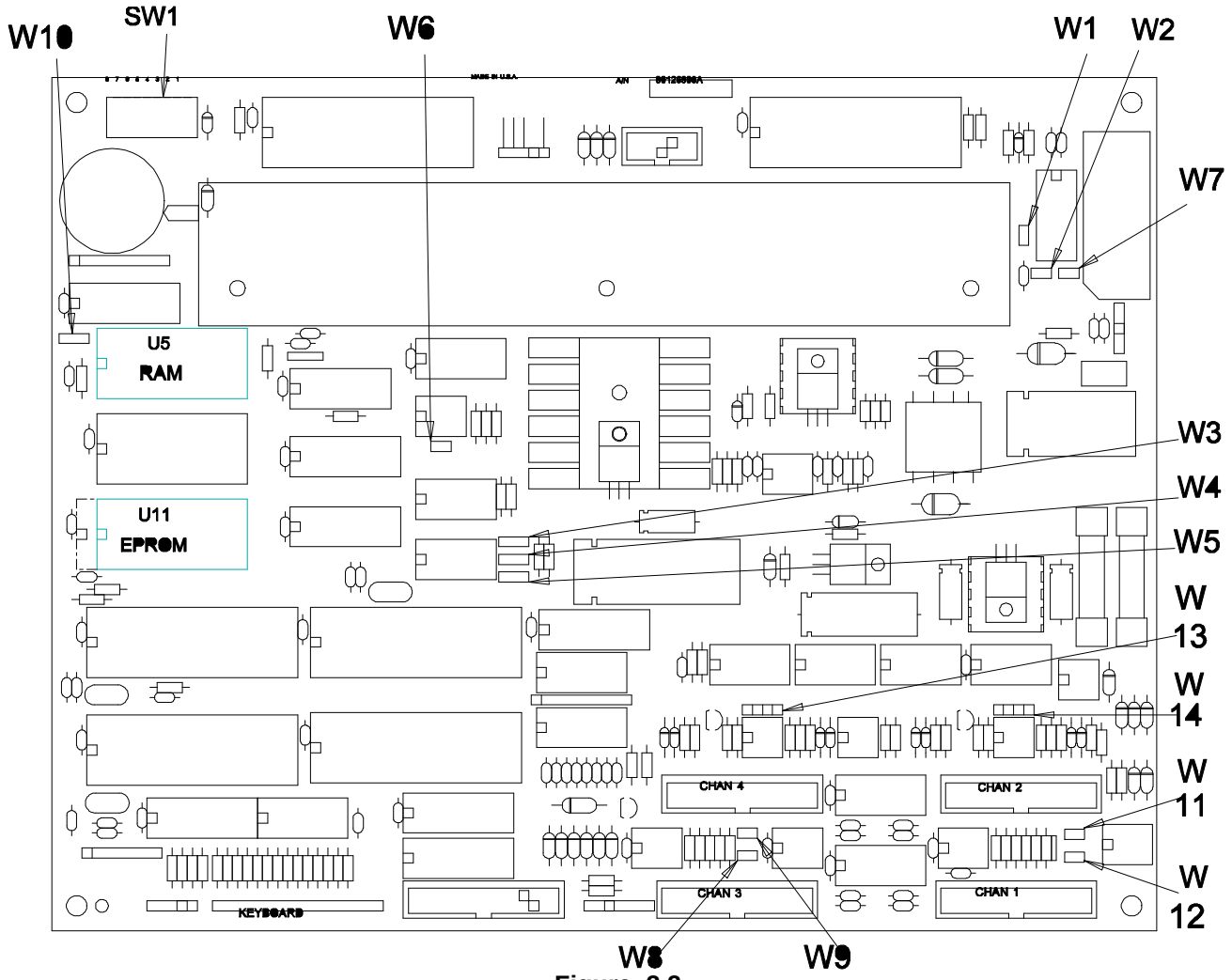

W10
SW1
W6
W1
W2
W7
U5
RAM
U11
EPROM
W3
W4
W5
W
13
W
14
W
11
W
12
CHAN 4
CHAN 2
CHAN 3
CHAN 1
KEYBOARD
W8
W9

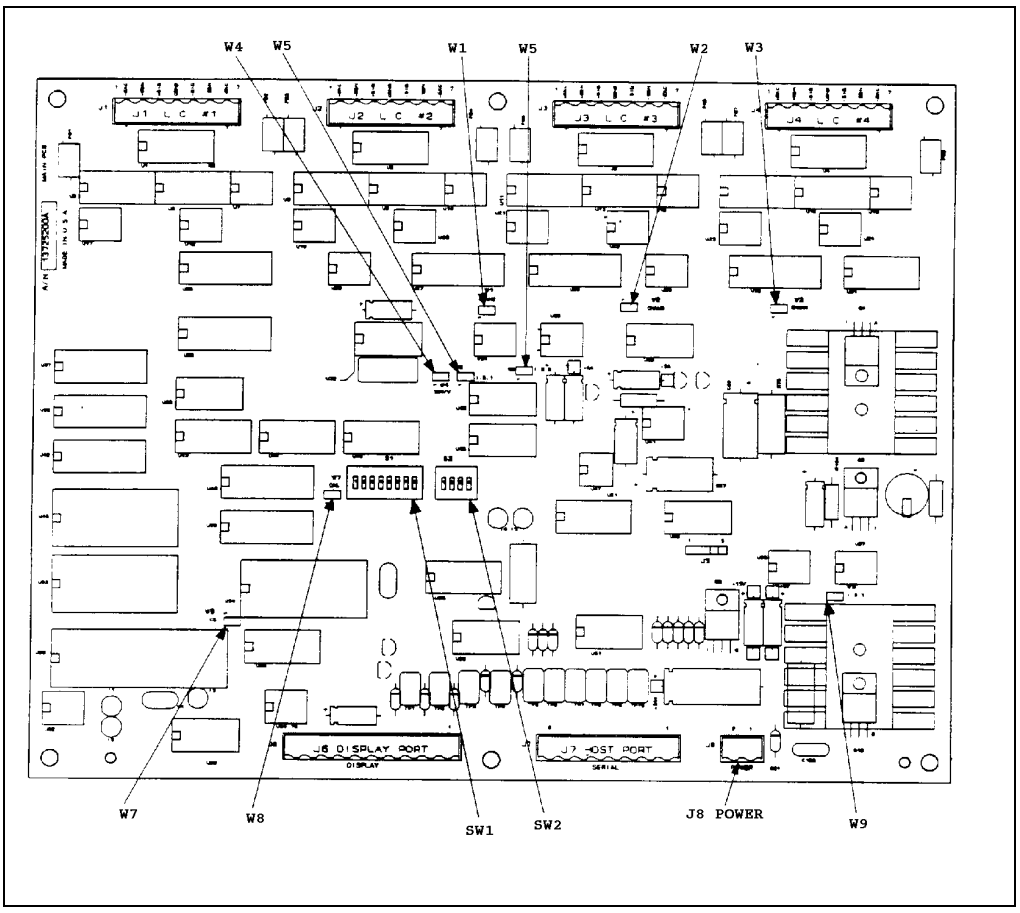
Figure 3.2

3.5 9410 CONFIGURATION AND SETUP

The following sections describe the hardware configuration and setup of the 9410.

3.5.1 Circuit Board Layout

The drawing below shows the location of all PCB jumpers, connectors, and switches. The jumper definitions are on the following page.



Switch Settings:

SW1	- 1 Off - 2 On	9600 Baud
SW1	- 3 Off	Use calibrated parameters
SW1	- 4 Off - 5 Off - 6 Off	No Display
SW1	- 7 Off - 8 Off	20mA display disabled 8132 Emulation Off
SW2	- 1 Off - 2 Off - 3 Off - 4 On	Drop Address 1

LED Indicators:

I1 - Processor Running

l2 - Transmitting data to Display I/F (not used)

I3 - Transmitting data to Host/9481

I4 - Receiving data from Display (not used)

15 - Receiving data from Host/9481

Jumper Definitions:

W1 - Load Cell 2 Enable - Must be installed.

W2 - Load Cell 3 Enable - Must be installed.

W3 - Load Cell 4 Enable - Must be installed.

W4 - for 3 mV/V Load Cell Output Enable - Remove for 2 mV/V load cell use. Install 3 mV/V load cell use.

W5,W6 - Intrinsically Safe Compensation
These jumpers are to be used in conjunction with W9 for the Toledo HAP module. Remove for normal use. Install if the HAP module is connected.

W7 - to Calibration Enable
This jumper allows access to the 9410 calibration by the host device. Install access calibration. Remove to not allow calibration. Must be removed for normal operation.

W8 - External ROM Enable - must be installed.

W9 - Reduced Excitation Enable

This jumper is used in conjunction with W5 and W6 for the Toledo HAP module. Remove for normal 15 Volt excitation. Install for reduced 5 Volt excitation.

Connector Definitions:

J1 - Load Cell 1 Connector
Pin 1 +Excitation
Pin 2 +Sense
Pin 3 +Signal
Pin 4 No connection
Pin 5 -Signal
Pin 6 -Sense
Pin 7 -Excitation

J2 - Load Cell 2 Connector See J1

J3 - Load Cell 3 Connector See J1

J4 - Load Cell 4 Connector See J1

J5 - Not Used

J6 - Not Used

J7 - Host Port Connector
Pin 1 Shield(Chassis GND)
Pin 2 RS422 RB
Pin 3 RS422 RA
Pin 4 RS422 TB
Pin 5 RS422 TA
Pin 6 Common
Pin 7 RS232 Rx
Pin 8 RS232 Tx

J8 - Power Supply connector
Pin 1 GND
Pin 2 +24 VDC

3.5.2 Load Cell Connection

The 9410 provides 15 volt excitation for four 350 ohm load cells(W5, W6, and W9 removed).

The 9410 can be used with 2 mV/V load cells(W4 removed) or 3mV/V load cells(W4 installed).

Connect the load cells to the 9410 in one of the configurations described following(See Section 12.7 for the drawings supplied with the equipment for further information):

3.5.2.1 Single Load Cell System

When using the 9410 in a single load cell application the load cell should be wired to the J1 connector. The +SIGNAL lead must be connected to the remaining load cell connectors(J2, 4) +SIGNAL terminals and the ,SIGNAL must be connected to the J2 , 4 load cell connectors ,SIGNAL terminals.

3.5.2.2 Two Load Cell System

When using the 9410 in a two load cell application, Load cell 1 connects to J1 and to the + and , Signal terminals of J2. Load cell 2 connects to J3 and the + and , signal terminals of J4.

3.5.2.3 Four Load Cell System

When using the 9410 in a four load cell application Load Cell 1 must be connected to J1, Load Cell 2 must be connected to J2, Load Cell 3 must be connected to J3 and Load Cell 4 must be connected to J4.

NOTE: For maximum RFI immunity, each load cell cable must be routed through the provided RFI Toroids with four (4) turns of each cable wire per the method defined in the next section.

3.5.3 RFI Protection Measures

The sensitive analog electronics contained within this enclosure requires that any externally generated electrical noise be stopped before entering the enclosure.

An RFI Toroid ($1^{1}/_{8}$² dia. Ferrite Ring) must be placed on each cable going to and from the enclosure. Each load cell cable wire and the communications cable to the host must wrap around a Toroid with four (4) turns before connecting to the respective terminal strip. DO NOT wrap the shield wire around the Toroid. Instead, it must terminate directly to the chassis ground lug provided.

Wind the toroid as follows: (also see illustration below)

1. Strip the cable jacket back four (8) inches from the end.

2. Wrap all wires (except the shield) through the toroid with at least four (4) complete turns. All wires may be wrapped together or individually as desired.

3. Connect the wire ends to the terminal strip.

4. Connect the shield wire directly to the ground lug on the enclosure. Keep the lead as short as possible. DO NOT pass the shield wire through the toroid.

5. Tuck toroid and leads below cover area so it won't interfere with the cover.

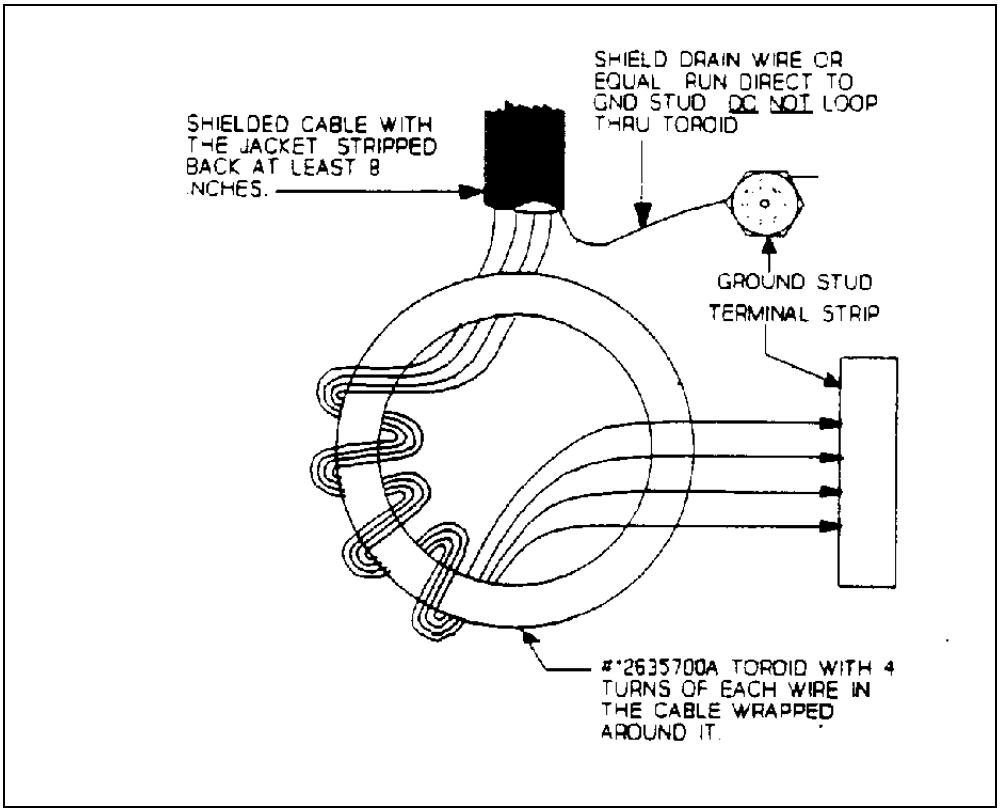


Figure 3.4

3.5.4 Communication/Power Cable

The wiring from J7 and J8 within the J-Box to the 9481 controller must be made with #20Ga shielded cable. Use 6 conductor shielded cable and limit the distance to 500 feet.

3.5.5 Conduit

A female ½² NPT fitting is provided on the bottom of the 9410 enclosure opposite J7 and J8. The installer must provide metal conduit from the host to the 9410 enclosure for the data cable and the 24 VDC power cable. No other wires are allowed in this conduit.

3.5.6 Cover Closure

After all wiring has been made and the system calibrated, the desiccant (moisture absorbent material) and moisture indicator must be removed from the sealed bag and placed inside the enclosure. Apply 1 small bead of sealing compound (grease tube provided) around the gasket of the enclosure lid. Install the lid on the enclosure and tighten the screws until the cover gasket meets the mounting flange.

4.0 START UP SEQUENCE

Statements 100 to 199

The following section describes the controller power-up sequence. A forced cold start may be done by; (1) removing power from the Controller; (2) turning SW1-4 on the TSM300 PCB ON; and (3) restoring power to the Controller.

Turn On Power On/Off Switch Inside Enclosure

PROGRAM
STATEMENT APPLICATION

100 [901505 901242]

The local display shows the version numbers for this particular program. This display will be shown briefly, while the memory is checked for data retention and the Configuration DIP Switch (SW1) is checked for a configuration change. If SW1-1 has been changed or its previously held value in memory has been lost, the 9481 will advance to Statement #101. If the data stored is valid and SW1-4 is OFF, the program will advance to Statement #110. If the data is not valid the program will advance to Statement #106 or if SW1-4 on the TSM300 PCB is ON, the program will advance to Statement #104.

101 [ZONE CONFIG ERR]

The 9481 is indicating that DIP Switch SW1-1 does not agree with its previously saved setting (3-Zone vs. 5-Zone).

Press any key to advance to Statement #102.

102 [FORCE COLD START? N]

At this point the Operator may correct an improper switch setting and try again or allow the cold start.

Press <Y> (Yes) to advance to Statement #105.

Press <N> (No) to advance to Statement #103.

Press <ENTER> to advance to Statement #103.

103 [CHK SW1, RESET]

The Operator should check the setting of SW1-1 and SW1-2 if alternate Output Configurations are used before restarting the controller with the <RESET> key.

Press <RESET> to return to Statement #100.

104 [FORCE COLD START? N]

The local display asks if a forced cold start is to be performed. Cold start will remove all custom setups and system passwords.

Press <Y> (Yes) to advance to Statement #105.

Press <N> (No) to advance to Statement #107.
Press <ENTER> to advance to Statement #107.

105 [ARE YOU SURE? N]

The local display asks if you are sure that a Cold Start is to be performed. Cold start will remove all custom setups and system passwords.

Press <Y> (Yes) to advance to Statement #106.

Press <N> (No) to advance to Statement #107.

Press <ENTER> to advance to Statement #107.

106 [COLD START]

The local display indicates that the stored data was not valid, or was forced to perform a Cold Start and default values were used to initialize the setup parameters. The system passwords and any custom parameter setups must be entered (or re-entered). This message is displayed as the cold start functions are performed and then will advance to Statement #107 if SW1-4 is ON or else Statement #110.

107 [FORCE SCALE COLD? N]

The display is asking (if SW1-4 is ON) if a forced cold start is to be performed on the scale. This can only be performed if the calibration jumper is installed on the 9410 PCB. Cold starting the scale resets the setup information in the scale's RAM memory and requires a normal calibration to be performed to store the information permanently in EEPROM.

Press <Y> (Yes) to advance to Statement #108.
Press <N> (No) to advance to Statement #110.

Press <ENTER> to advance to Statement #110.

108 [ARE YOU SURE? N]

The local display asks if you are sure that a Scale Cold Start is to be performed. Cold Start will reset all scale setup parameters to their default settings.

Press <Y> (Yes) to advance to Statement #109.

Press <N> (No) to advance to Statement #110.

Press <ENTER> to advance to Statement #110.

109 [SCALE COLD START]

The display indicates that the scale was forced to perform a Cold Start and default values were used to initialize the scale setup parameters. The scale

setup and calibration must be performed. This message is displayed as the cold start functions are performed and then will advance to Statement #110.

4.1 F12 - STANDBY MODE

Standby mode is the normal idle mode for the 9481. It provides a monitor for the current weight on the scale while waiting for a function key. The 9481 remains at Statement #110 until a function key is pressed. Some function keys (F1, F5, F6, and F7) will result in a mode change (RUN, TEST or SETUP) and can only be activated from the Standby mode. Other function keys (F2, F3, F4, and F8) provide instantaneous looks at or operator settings of various system parameters and are accessible from either Run or Standby mode. The 9481 will return to the Run or Standby mode, as appropriate, after 3 seconds if no additional key is pressed. A final class of function keys (F9, F10 and F11) request system utilities such as displaying files or printing files and are only accessible from the Standby mode.

Function Keys

F1 , RUN
F2 , SELECT PRODUCT ID
F3 , ENTER USER ID
F4 , SELECT PRINT FORMAT
F5 , TEST
F6 , SETUP SYSTEM
F7 , SETUP PRODUCT
F8 , OPTIONS
F9 , LIST ID
F10 , PRINT ID SETUP
F11 , PRINT ID SUMMARY
F12 , STANDBY

110 [STANDBY XXX.XX LB]

The local display indicates the controller is in Standby mode and is displaying the current weight on the scale. The CONVEYOR EMPTY output which controls upstream package handling into the conveyor is disabled. Photoeye activity is ignored. A small z will be displayed if ZERO INDICATION is enabled and the weight is within the COZ limits (only available with "B" revision or newer 9410).

Press <F1> to enter Run mode and advance to Statement #200.

Press <F2> to select a new Product ID from previously entered list. Control advances to Statement #300.

Press <F3> to set 3 User-entered ID's. Control advances to Statement #350.

Press <F4> to select printer weighment processing method. Control advances to Statement #400.

Press <F5> to enter Test mode and advance to Statement #700.

Press <F6> to enter Setup mode for system configuration and advance to Statement #800.

Press <F7> to enter Setup mode for Product ID definition and advance to Statement #950.

Press <F8> to display zone count data for ID selected by <F1>. Control advances to Statement #450.

Press <F9> to display list of currently available Product ID's. Control advances to Statement #500.

Press <F10> to select a setup record for printing from the list of currently available Product ID's. Control advances to Statement #550.

Press <F11> to select a summary record for printing from the list of currently available Product ID's. Control advances to Statement #600.

5.0 OPERATIONAL SEQUENCES

Statements 200 to 699

The 9481 supports an operational mode (Run) and several offline modes (Test and Setup) that can be entered from the Standby mode after the Power Up Sequence. Various operational sequences are shared by the Run and Standby modes that are initiated from the function keys.

5.1 F1 -- RUN MODE

The Run mode is defined as the mode of operation used to weigh and classify into zones, a package which crosses the scale. In this mode the HOME display will show the actual weight currently on the scale until an entry photoeye is broken. The display freezes during the weigh cycle. Once a package is weighed and classified the display will change to show the contents of the display buffer. After the Display timeout period, the system returns to the HOME display of the current weight on the scale. **NOTE:** If the display time is disabled, then the last data in the display buffer will remain on the display until the next package is classified or any operating function key is pressed.

While in the Run mode a CONVEYOR EMPTY output is managed. If configured for use by DIP switch selection, it is turned ON whenever the weighing conveyor is ready to receive a new package and OFF during the weigh cycle, during alarm conditions and upon leaving the Run mode.

The conveyor must be empty when entering the Run mode (zero weight) to activate the photoeye sequencing. Otherwise the display will show live weight but not classify any packages. This condition is also required to recover from alarms.

An Auto zero function is also performed whenever the scale is empty.

The following function keys are active when in the Run mode.

F2 , SELECT PRODUCT ID
F3 , ENTER USER ID
F4 , SELECT PRINT FORMAT
F8 , SELECT OPTIONS (Display Zone Counts, etc.)
F12 , STANDBY

The F12 key is active at all times and will return control to Statement #110 in Standby mode.

When selecting one of the other functions above, refer to the function key description paragraph for it's actual operation. There will be a three second time out after any of these function keys is selected. If more than three seconds expires after the function key before the operator responds to the first prompt, the function selected will be aborted and control will return to Statement #200.

200 [RUNNING XXX.XX LB]

This is the HOME position of the display as it is waiting for a package to enter the conveyor. It is displayed between packages whenever the run display timer as timed out and indicates that the system is ready to process packages. Certain conditions must have been met, including a properly selected product ID and the presence of the RUN PERMISSIVE input. If a valid ID does not exist the program advances to Statement #210. If the RUN PERMISSIVE is missing the program advances to Statement #220. A small z will be displayed if the ZERO INDICATION is enabled and the weight is within the COZ limits(only available with "B" revision or newer 9410).

Press <F2> to advance the program to Statement #300 to select the product ID.

Press <F3> to advance the program to Statement #350 to enter the user IDs.

Press <F4> to advance the program to Statement #400 to select the print format.

Press <F8> to advance the program to Statement #450 to select any keyboard options. At present this only contains the display of zone counts.

Press <F12> to return to STANDBY at Statement #110.

210 [NO VALID ID]

No valid product ID has been selected. This occurs at power up or whenever a previously valid ID has been deleted from storage, as might be done over the host link. A new ID can be selected from <F2>, over the host link, or by the bar code reader.

Press <F2> to advance the program to Statement #300 to select the product ID.

Press <F12> to return to STANDBY at Statement #110.

220 [NO RUN PERMISSIVE]

The RUN PERMISSIVE input is not active. This causes the 9481 to stop processing package data and to deactivate the CONVEYOR EMPTY output which is used to control upstream package handling into the weighing conveyor.Restoring this input will return control to Statement #200.

Press <F12> to return to STANDBY at Statement #110.

5.2 F2 , SELECT PRODUCT ID

This function key is used to enter the product ID for operation. After the F2 key is pressed there will be a three second time out in which if no data is entered the unit will return to the HOME position (Statement #110 or #200, as appropriate). Product IDs are typically first selected in STANDBY mode before entering RUN mode but may be selected at anytime. Valid ID selection is always required after power up. If no product IDs have been previously setup the program will skip Statement #300 and proceed to Statement #310 instead.

PROGRAM STATEMENT	APPLICATION
300	**[ID? XXXXXXXXXXXX]**

Enter the desired product ID (length determined by General Setup, 12 characters max.).

Press <ENTER> to advance to Statement #330 if consecutive numbering has been enabled. If the ID is not valid the program will advance to Statement #320.If the ID is valid and no consecutive numbering is required the program returns to Statement #110 or #200, as appropriate.

310 [NO ID AVAILABLE!]

This message indicates that no product IDs have been entered into the 9481. It will be displayed for 2 seconds before the program returns to Statement #110 or #200, as appropriate. The Operator should return to STANDBY if in the RUN mode and load IDs with <F7>, or load IDs from the host link.

320 [ID NOT FOUND!]

This message will be displayed for 2 seconds if an invalid ID was entered. If a previous valid ID was selected before entering the invalid ID, it will be retained.The program then returns to Statement #300.

330 [NEXT CNNO XXXXXX]

The next consecutive number is being displayed that will be used by the system. Enter a new value to be used if desired and/or press <ENTER> to return the program to Statement #110 or #200, as appropriate.

5.3 F3 , ENTER USER IDS

This function key is used by the operator to change the data stored in up to three variable User ID's. After this key is pressed there will be a three second time out between key strokes in which if no data is being entered the unit will return to the HOME position (Statement #110 or #200, as appropriate). Only the ID's which have prompt messages created in General Setup will be prompted, unused prompt messages will be skipped. If no ID prompts are previously setup, the program will skip Statement #350 and go to Statement #380.

PROGRAM STATEMENT	APPLICATION
350	**[PPPPPPPP? XXXXXXXXX]**

The Operator is prompted with a previously entered prompt message (PPPPPPPP) to select the first variable ID. Enter up to 9 characters.

Press <ENTER> to store the ID and advance the program to Statement #360 if another ID is needed. If not needed the program returns to Statement #110 or #200, as appropriate.

Press <RESET> to keep old ID and return the program to Statement #110 or #200, as appropriate.

360 [PPPPPPPP? XXXXXXXXX]

The Operator is prompted with a previously entered prompt message (PPPPPPPP) to select the second variable ID. Enter up to 9 characters.

Press <ENTER> to store the ID and advance the program to Statement #360 if another ID is needed. If not needed the program returns to Statement #110 or #200, as appropriate.

Press <RESET> to keep old ID and return the program to Statement #110 or #200, as appropriate.

370 [PPPPPPPP? XXXXXXXXX]

The Operator is prompted with a previously entered prompt message (PPPPPPPP) to select the third variable ID. Enter up to 9 characters.

Press <ENTER> to store the ID and return the program to Statement #110 or #200, as appropriate.

Press <RESET> to keep old ID and return the program to Statement #110 or #200, as appropriate.

380 [USER ID DISABLED]

This message is displayed for 2 seconds if no ID prompts are setup. The program returns to Statement #110 or #200, as appropriate.

5.4 F4 , SELECT PRINT FORMAT

This prompt allows the operator to change the printing functions at any time. After the <F4> key is pressed there will be a three second time out during which an additional key stroke is needed to keep the program from returning to the HOME position (Statement #110 or #200, as appropriate). **NOTE:** This function key will be disabled if the printer was disabled in setup.

PROGRAM
STATEMENT APPLICATION

400 [PRINT ALL ITEMS? Y]

If selected, all packages classified will be printed.

Press <Y> or <ENTER> to accept and return the program to Statement #110 or #200, as appropriate.

Press <N> to reject and advance the program to Statement #410.

Press <RESET> to abort and return the program to Statement #110 or #200, as appropriate.

410 [PRINT REJ ITEMS? Y]

This prompt allows the operator to enable printing of rejected packages.

Press <Y> or <ENTER> to accept and return the program to Statement #110 or #200, as appropriate.

Press <N> to reject and advance the program to Statement #420.

Press <RESET> to abort and return the program to Statement #110 or #200, as appropriate.

420 [PRINT NO ITEMS? N]

If selected, no printing will occur.

Press <Y> or <ENTER> to accept and return the program to Statement #110 or #200, as appropriate.

Press <N> to reject and advance the program to Statement #430.

Press <RESET> to abort and return the program to Statement #110 or #200, as appropriate.

430 [PRINT SEL ITEMS? N]

This allows the operator to select which package information is to be printed.

Press <Y> or <ENTER> to accept and advance the program to Statement #440.

Press <N> to reject and return the program to Statement #400.

Press <RESET> to abort and return the program to Statement #110 or #200, as appropriate.

440 [PRT ZONES XXXXX]

This prompt will permit the operator to enter in only the Zones he wants to print package information on.

Example:An entry of 1,5 tells the 9481 that the operator only wants to print information for the packages which were classified into Zones 1 and 5. Information for packages classified into Zones 2, 3 and 4 are not to be printed.

Enter the desired zone numbers and press <ENTER> to store the zones. If invalid zones are entered the program will advance to Statement #450. Otherwise control returns to Statement #110 or #200, as appropriate.

Press <UPARROW> to return to Statement #430.

Press <RESET> to abort and return the program to Statement #110 or #200, as appropriate.

450 [INVALID ZONES]

If an improper number is entered for the zones, the program will display this message for 2 seconds and return to Statement #440.

5.5 F8 , SELECT OPTIONS (DISPLAY ZONE COUNTS, ETC.)

The <F8> key is used to select secondary functions in the 9481. At present there is only one, the display of the current zone counts. After a 3 second timeout the program will return to Statement #110 or #200, as appropriate, if an additional key sequence is not entered.

PROGRAM STATEMENT	APPLICATION

450 [DISPLAY ZONE CNT? Y]

Press <Y> or <ENTER> to display the zone counts for the previously selected product ID. If the ID is found the program advances to Statement #460. Otherwise it advances to Statement #455.

Press <N> or <RESET> to return to Statement #110 or #200, as appropriate.

455 [ID NOT FOUND!]

The product ID previously selected by <F2> is not currently in the product ID file. This message will be displayed by the 9481 for 2 seconds before the program returns to Statement #110 or #200, as appropriate.

460 [P_ID XXXXXXXXXXXX]

The product ID is displayed to allow the Operator to confirm that the desired ID has been selected. Otherwise the operator should reset from Statement #470 and enter the desired ID with <F2>. If this is not the desired running ID the operator should perform this check in Standby mode and the restore the running ID before re-entering the Run mode.

Press any key to advance to Statement #470.

470 [UNDER XXXXXX]

The counts in the first zone are displayed. The prompt may be different if new zone descriptions were programmed in General Setup with <F6>.

Press <RESET> to return the program to Statement #110 or #200, as appropriate.

Press any other key to advance to Statement #475 for 5-zone operation or Statement #480 for 3-zone operation.

475 [OK LIGHT XXXXXX]

The counts in the second zone for 5-zone operation are displayed. The prompt may be different if new zone descriptions were programmed in General Setup with <F6>.

Press <RESET> to return the program to Statement #110 or #200, as appropriate.

Press any other key to advance to Statement #480.

480 [OK XXXXXX]

The counts in the second zone for 3-zone operation or the third zone for 5-zone operation are displayed. The prompt may be different if new zone descriptions were programmed in General Setup with <F6>.

Press <RESET> to return the program to Statement #110 or #200, as appropriate.

Press any other key to advance to Statement #485 for 5-zone operation or Statement #480 for 3-zone operation.

485 [OK HEAVY XXXXXX]

The counts in the fourth zone for 5-zone operation are displayed. The prompt may be different if new zone descriptions were programmed in General Setup with <F6>.

Press <RESET> to return the program to Statement #110 or #200, as appropriate.

Press any other key to advance to Statement #490.

490 [OVER XXXXXX]

The counts in the final zone are displayed. The prompt may be different if new zone descriptions were programmed in General Setup with <F6>.

Press any key to return to Statement #110 or #200, as appropriate.

5.6 F9 , LIST ID

When in Standby mode the Operator has the opportunity to list to the display or to the printer the available product IDs stored in the 9481. If more information is desired on a particular ID when it is displayed the Operator can press <F10> or <F11> to print out the additional information.

PROGRAM
STATEMENT APPLICATION

500 [NUMBER OF IDS XXX]

The number of ID's currently entered in memory is displayed. This message will be displayed for 2 seconds and then the program will advance to Statement #510 if the printer is enabled. If the printer is disabled the program advances to Statement #530.

510 [PRINT ALL IDS? N]

Press <Y> to cause the system to print out all of the ID's currently stored in memory. The program advances to Statement #520.

Press <N> or <ENTER> to advance the program to Statement #530.

Press <RESET> to return to Statement #110.

520 [PRINTING]

This prompt will be displayed while the ID list is being printed. Upon completion the program will return to Statement #110.

530 [L_ID XXXXXXXXXXXX]

This message is used to display the stored product IDs, one at a time.

Press <ENTER> to display the next product ID. When all IDs have been viewed this key will return the program to Statement #110.

Press <F10> to print the setup information for the displayed ID. The program advances to Statement #540.

Press <F11> to print the summary information for the displayed ID. The program advances to Statement #540.

540 [PRINTING]

This prompt will be displayed during the printing of the product ID information. Upon completion the program will return to Statement #110.

5.7 F10 , PRINT ID SETUP

When in Standby mode the Operator may print out any or all of the product ID setups stored in the 9481. If the printer is disabled the program will skip Statement #550 and go to Statement #555. If there are no stored product IDs the program will skip Statement #550 and go to Statement #560.

PROGRAM
STATEMENT APPLICATION

550 [PRINT ALL IDS? N]

Press <Y> to print out the setup information for all of the ID's currently stored in memory. The program will advance to Statement #565.

Press <N> or <ENTER> to advance to Statement #570.

Press <RESET> to return to Statement #110.

555 [PRINTER DISABLED]

This message will be displayed for 2 seconds before the program returns to Statement #110.

560 [NO ID AVAILABLE!]

This message will be displayed for 2 seconds before the program returns to Statement #110.

565 [PRINTING]

This message will be displayed while the setup information for all product IDs is being printed. The program will return to Statement #110 upon completion.

Press <RESET> to abort the printout at the end of the ID currently being printed and to return to Statement #110.

Following is a typical 3 Zone ID printout:

PRODUCT ID SETUP

TIME	11:37
DATE	03/16/93
PRODUCT ID	111111111111
TARE WEIGHT	0.000
TARGET WEIGHT	10.000
CALCULATED ZONES	Y
TOL. %	7.0
UNDER ZONE LIMIT	9.300
OVER ZONE LIMIT	10.700
FIRST REJECT ZONES	
FIRST REJECT TIME DLY	0.0
FIRST REJECT TIME DUR	0.0

570 [P_ID? XXXXXXXXXXXX]

Enter the Product ID which is to be printed.

Press <ENTER> to advance to Statement #580. If the ID is not found the program advances to Statement #575.

575 [ID NOT FOUND!]

This message will be displayed for two seconds, then the system will return to Statement #570.

580 [PRINTING]

This prompt will be displayed while the ID information for the selected product ID is being printed. The program will return to Statement #110 upon completion.

5.8 F11 , PRINT ID SUMMARY

When in Standby mode the Operator may print out any or all of the product ID summaries stored in the 9481. If the printer is disabled the program will skip Statement #600 and go to Statement #605. If there are no stored product IDs the program will skip Statement #600 and go to Statement #610.

PROGRAM
STATEMENT APPLICATION

600 [PRINT ALL IDS? N]

Press <Y> to print out the setup information for all of the ID's currently stored in memory. The program will advance to Statement #615.

Press <N> or <ENTER> to advance to Statement #650.

Press <RESET> to return to Statement #110.

605 [PRINTER DISABLED]

This message will be displayed for 2 seconds before the program returns to Statement #110.

610 [NO ID AVAILABLE!]

This message will be displayed for 2 seconds before the program returns to Statement #110.

615 [PRINTING]

This prompt will be displayed while the ID summary information for all product IDs is being printed. Upon completion the program will advance to Statement #620.

Press <RESET> to abort the printout at the end of the ID currently being printed. The program will return to Statement #110. No summary data is cleared when aborting.

620 [CLR ALL SUMMRIES? N]

Press <N>, <RESET> or <ENTER> to return the program to Statement #110.

Press <Y> to advance the program to Statement #625.

625 [ARE YOU SURE? N]

Press <N>, <RESET> or <ENTER> to return the program to Statement #110.

Press <Y> to advance the program to Statement #630 if the supervisor password is enabled or to Statement #635 if the password is disabled.

630 [SUPERVSR PW XXXXXX]

This prompt is asking for the supervisor's password to be entered before continuing.

Key in the password and press <ENTER> to advance to Statement #635. If an invalid password is entered the program returns to Statement #620.

Press <RESET> to return to Statement #620.

635 [CLRING ALL SUMMRIES]

This message will be displayed during the clearing process. Upon completion the program returns to Statement #110.

650 [P_ID? XXXXXXXXXXXX]

Enter the Product ID which is to be printed.

Press <ENTER> to advance to Statement #660. If the ID is not found the program advances to Statement #655.

Press <RESET> to return to Statement #110.

655 [ID NOT FOUND!]

This prompt will be displayed for two seconds, then the system will return to Statement #650.

660 [PRINTING]

This message will be displayed while the ID summary information for the selected product ID is being printed. Upon completion the program will advance to Statement #665.

Following is a typical 3 Zone ID printout:

PRODUCT ID SUMMARY

TIME 11:37

DATE	03/16/93
PRODUCT ID	111111111111
TARE WEIGHT	0.000
TARGET WEIGHT	10.000
CALCULATED ZONES	Y
TOL. %	7.0
UNDER ZONE LIMIT	9.300
OVER ZONE LIMIT	10.700
FIRST REJECT ZONES	
FIRST REJECT TIME DLY	0.0
FIRST REJECT TIME DUR	0.0
AVERAGE WEIGHT	0.523
STANDARD DEVIATION	1.741

CLASSIFICATIONS	COUNT	NET WEIGHT
UNDER	79416	8207.440
OK	11131	38999.045
OVER	9	198.005
TOTALS	90556	47404.490

TARGET TOTAL NET WEIGHT	177228.000
ACTUAL % OF TARGET	26.7

SHIPPING SUMMARY

UNITS SHIPPED	90556
WEIGHT SHIPPED	47404.490
SHIPPED % OF TOTAL WGT	100.0

665 [CLEAR SUMMARY? N]

Press <N>, <RESET> or <ENTER> to return the program to Statement #110.

Press <Y> to advance the program to Statement #670 if the supervisor password is enabled or to Statement #675 if the password is disabled.

670 [SUPERVSR PW XXXXXX]

This prompt is asking for the supervisor's password to be entered before continuing.

Key in the password and press <ENTER> to advance to Statement #675. If a invalid password is entered the program returns to Statement #665.

Press <RESET> to return to Statement #665.

675 [CLEARING SUMMARY]

This message will be displayed during the clearing process. Upon completion the program returns to Statement #110.

6.0 TEST SEQUENCE

Statements 700 to 799

The 9481 provides for offline testing of the hardware. The Test Mode may be selected from the Standby mode.

6.1 F5 - TEST MODE

The test mode of the 9481 allows the Operator to check out the display, keyboard, parallel inputs and outputs, and the scale. It is entered from the Standby mode by pressing <F5>.

PROGRAM
STATEMENT APPLICATION

700 [SUPERVSR PW XXXXXX]

This prompt is asking for the supervisor's password to be entered before continuing. This prompt only appears if a password was entered in Setup.

Key in the password and press <ENTER> to advance to Statement #705. If a invalid password is entered the program returns to Statement #110.

Press <RESET> to return to Statement #110.

705 [DISPLAY TEST? Y]

Press <Y> or <ENTER> to test all display bits.

Press <N> to advance to Statement #720.

Press <RESET> or <UPARROW> to return to Statement #110.

710 [**********]

All segments of the 19 -character display are lighted.

Press <ENTER> to advance to Statement # 720.

Press <UPARROW> to return to Statement #700.

Press <RESET> to return to Statement #110.

720 [KEYBOARD TEST? Y]

Press <Y> or <ENTER> to advance to Statement # 725.

Press <N> to advance to Statement #740 if the printer is enabled or Statement #750 otherwise.

Press <UPARROW> to return to Statement #705.

Press <RESET> to return to Statement #110.

725 [KEY TEST X]

Press any key to display it at X. Function keys will display a 3-character abbreviation of their name.

Press <RESET> to advance to Statement #740 if the printer is enabled or to Statement #755 otherwise.

740 [PRINTER TEST? Y]

Press <Y> or <ENTER> to advance to Statement # 745.

Press <N> to advance to Statement #750.

Press <UPARROW> to return to Statement #720.

Press <RESET> to return to Statement #110.

745 [PRINTER TEST]

This message is displayed while a test line of all alphanumeric characters is printed on the printer. Upon completion the program returns to Statement #740.

The test output string is:
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 .

750 [REMOTE IN TEST? Y]

Press <Y> or <ENTER> to advance to the next Statement.

Press <N> to advance to Statement #755.

Press <UPARROW> to return to Statement #740 if printer is enabled or to Statement #720 otherwise.

Press <RESET> to return to Statement #110.

752 [REMOTE IN TEST]

A live display of the ID and Tare received in the Remote Input port will be display as the values change: **[iiiiiiiiiii ttttt]**

Press <ENTER> to advance to Statement # 755.

Press <UPARROW> to return to Statement #740.

Press <RESET> to return to Statement #110.

755 [TEST INPUTS? Y]

Press <Y> or <ENTER> to advance to Statement # 757.

Press <N> to advance to Statement #760.

Press <UPARROW> to return to Statement #750 if Remote Input is enabled,Statement #740 if printer is enabled, or to Statement #720 otherwise.

Press <RESET> to return to Statement #110.

757 [INPUTS 00001110]

A live display of the values of the eight parallel inputs is presented and updated as the values change.

Press <ENTER> to advance to Statement # 760.

Press <UPARROW> to return to Statement #755.

Press <RESET> to return to Statement #110.

INPUT TEST DISPLAY LAYOUT:

The following is a representation of what could be expected.

```
0   0   0   0   0   1   0   0
|   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |-- I/O 0 = Entry Photo-Eye
|   |   |   |   |   |   |       input.
|   |   |   |   |   |   |
|   |   |   |   |   |   |-- I/O 1 = Exit Photo-Eye
|   |   |   |   |   |       input.
|   |   |   |   |   |
|   |   |   |   |   |-- I/O 2 = RUN PERMISSIVE input.
|   |   |   |   |
|   |   |   |   |-- I/O 3 = Silence Alarm input.
|   |   |   |
|   |   |   |-- I/O 8 = Not used in standard units.
|   |   |
|   |   |-- I/O 9 = Not used in standard units.
|   |
|   |-- I/O 10 = Not used in standard units.
|
|-- I/O 11 = Not used in standard units.
```

760 [TEST OUTPUTS? Y]

CAUTION: External devices will be energized during this test.

Press <Y> or <ENTER> to advance to Statement # 765.

Press <N> to advance to Statement #780.

Press <UPARROW> to return to Statement #755.

Press <RESET> to return to Statement #110.

765 [OUTPUT TEST X]

The test begins by shutting OFF all eight outputs.

Press <0> to <7> to turn ON the respective output. Any previous output ON will be turned OFF. See Section 3.4 for I/O definitions. The following table shows the I/O numbers and how they correspond to output numbers entered for the output test.

Output	I/O Module
0	4
1	5
2	6
3	7
4	12
5	13
6	14
7	15

Press <CLEAR> to turn OFF an output while remaining at Statement #765.

Press <RESET> to turn OFF an output and to advance the program to Statement #780.

780 [TEST SCALE? Y]

If the Remote Output is enabled and Statement #886 is a "Y", the Remote Output will transmit continuous scale weight data during testing of the scale. This feature can be useful when the Controller is connected to an Analog Module (9325), as it provides a means to calibrate the Analog Module.

Press <Y> or <ENTER> to advance to Statement # 785.

Press <N> to return to Statement #790.

Press <UPARROW> to return to Statement #760.

Press <RESET> to return to Statement #110.

785 [WEIGHT XXXX.X LB]

The live scale weight is displayed along with the scale units. A small z will be displayed if ZERO INDICATION is enable and the weight is within the COZ limits(only available with "B" revision or newer 9410).

Press <ENTER> to continue to Statement #790.

Press <UPARROW> to return to Statement #780.

Press <RESET> to return to Statement #110.

790 [ZERO SCALE? Y]

The display prompts the operator for a zeroing of the scale. The scale can only be zeroed to the range specified in setup by statement #902 [ZERO RANGE].

Press <Y> or <ENTER> to advance to Statement #795.

Press <N> to return to Statement #705.

Press <UPARROW> to return to Statement #785.

Press <RESET> to return to Statement #110.

795 [ZEROING]

This message is displayed as the scale processes the zero request. The program then returns to Statement #785.

7.0 SETUP SEQUENCES

Statements 800 to 999

Access to any of the Setup functions will require a password if it has been enabled. This function is disabled at cold start and is activated at the end of the General Setup. Password protection is disabled by entering a blank password.

In the Setup mode the following keys will have a fixed operation.

RESET , This key will cause the program to return to the next higher level of menu headings. If pressed during a prompted field (and before pressing the ENTER key) this entry will be ignored and the program will return the original data in to the field.

CLEAR , When pressed the current data in the prompted field will be cleared.

DEL , This key will backup the cursor one character in the current field.

ENTER , This key will accept the entered or current data in the field.

Y , This key will serve as the YES in all Yes/No prompts.

N , This key will serve as the NO in all Yes/No prompts.

7.1 F6 - SETUP SYSTEM

System setup allows the Operator to configure all aspects of the system other than loading the Product IDs. These are controlled with the function key <F7> at Statement #950. When <F6> is selected the program will skip Statement #800 and go to Statement #810 if the password has been disabled.

PROGRAM STATEMENT	APPLICATION
800	**[SUPERVSR PW XXXXXX]**
	This prompt is asking for the supervisor's password to be entered before continuing.
a	Key in the password and press <ENTER> to advance to Statement #810. If invalid password is entered the program returns to Statement #110.
	Press <RESET> to return to Statement #110.

7.1.1 General Parameter Setup

The General Parameters are those associated with the configuration of the system operation rather than the formatting of data. They include photoeye timing, time and date setting and various operator prompts.

PROGRAM
STATEMENT APPLICATION

810 [GENERAL SETUP? Y]

Press <Y> or <ENTER> to advance to Statement #811.

Press <N> to advance to Statement #835.

Press <UPARROW> to return to Statement #110.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

811 [ENTER TIME/DATE? N]

Press <N> or <ENTER> to advance to Statement #814.

Press <Y> to advance to Statement #812.

Press <UPARROW> to return to Statement #810.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

812 [TIME XX:XX:XX]

Enter the time. Separate the HH, MM, and SS fields with a <SPACE> or < .> when entering a new time.

Press <CLEAR> to clear the entry field.

Press <ENTER> to advance to Statement #813.

Press <UPARROW> to return to Statement #811.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

813 [DATE XX/XX/XX]

Enter the date. Separate the MM, DD, and YY fields with a <SPACE> or <.> when entering a new date.

Press <CLEAR> to clear the entry field.

Press <ENTER> to complete field entry and advance to the next statement.

Press <UPARROW> to return to Statement #812.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

814 [ENTER PE TIMERS? N]

Press <N> or <ENTER> to advance to Statement #818.

Press <Y> to advance to Statement #815.

Press <UPARROW> to return to Statement #811.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

815 [PE 1 TIMER 150]

Enter the PE 1(Entrance photoeye) timer setting in milliseconds(0-250). This timer is typically set for 150 milliseconds which will prevent most false photoeye trips due to flaps on products or products entering the scale with a rocking motion. This timer is in addition to a 25 millisecond fixed debounce timer that must be considered for calculation purposes. The setting for a particular installation is a function of conveyor speed and product length.

For example: A conveyor running at 120 feet per minute (2 FT/SEC) with a product length of 6 inches will be blocking the photoeye for 250 milliseconds (the length of time it will require for the 6 inch product to pass the photoeye). Thus a PE 1 Timer of less than 225 milliseconds could be selected(250 milliseconds minus the 25 millisecond debounce timer). When selecting this value care must be taken to select a value less than the time the photoeye is blocked. In this example a setting of 125 to 200 would be acceptable.

Press <ENTER> to advance to Statement #816.

Press <UPARROW> to return to Statement #814.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

816 [PE 2 TIMER 50]

Enter the PE 2 timer setting in milliseconds(0-250). This timer is typically set for 50 milliseconds. It should be noted that this timer should be set to the minimum setting which will provide accurate sensing of exiting products since this timer will lengthen the product minimum weight time. The purpose of this timer is to prevent false weighing or auto zero maintenance starts due to false sensing of exiting products.

Press <ENTER> to advance to Statement #817.

Press <UPARROW> to return to Statement #815.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

817 [PE 1-2 TIME X.X]

Enter the time, in seconds, that it takes after the leading edge of a package breaks the entrance photoeye and until the leading edge of the package breaks the exit photoeye. The value entered will be adjusted and that value timer will be used to generate a Maximum Weigh Time alarm if the controller detects a box(es) on the scale without any photoeye activity for this time. Valid entries are 0.1 through 9.9 seconds. Below is a method of calculating this value:

$$\text{PE1 - PE2 Time} = \frac{C * 5}{F}$$

C - Conveyor length: Distance between the entrance photoeye and the exit photoeye of the weigh conveyor in inches.

F - Conveyor speed: The speed the conveyor is conveying packages across the scale in feet per minute.

The actual value entered should be slightly higher than that calculated. Add .5 sec to the result of the above calculation.

Press <ENTER> to advance to Statement #818.

Press <UPARROW> to return to Statement #816.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

818 [ENTER ID PROMPT? N]

This section of the setup is used to enter the user variable prompts. These are used to define the prompts for the three variable IDs set with <F3>. Prompts left blank will not appear when <F3> is used.

Example of what user defined prompts could be used for:

[LOT#] [SHIFT#] [OPERATOR]

Press <N> or <ENTER> to advance to Statement #823.

Press <Y> to advance to Statement #820.

Press <UPARROW> to return to Statement #814.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

820 [ID #1 = XXXXXXXX]

Enter/change the first ID prompt. Enter up to eight characters.

Press <ENTER> to advance to Statement #821.

Press <UPARROW> to return to Statement #818.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

821 [ID #2 = XXXXXXXX]

Enter/change the second ID prompt. Enter up to eight characters.

Press <ENTER> to advance to Statement #822.

Press <UPARROW> to return to Statement #820.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

822 [ID #3 = XXXXXXXX]

Enter/change the third ID prompt. Enter up to eight characters.

Press <ENTER> to advance to Statement #823.

Press <UPARROW> to return to Statement #821.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

823 [ENTER ZONE DESC? N]

These prompts allow the customer to change the name of the zone description. When changed, these descriptions will be used through out the entire system operation (such as displaying, printing,etc...) The actual number of selections will be determined by the zone selection switch. Example: If a three zone operation is selected, only three zones will be prompted. If five zone operation, than ask for all five prompts. The default values given at cold start are:

5	ZONE	3
UNDER	1	UNDER
OK LIGHT	2	OK
OK	3	OVER
OK HEAVY	4	
OVER	5	

Press <N> or <ENTER> to advance to Statement #829.

Press <Y> to advance to Statement #824.

Press <UPARROW> to return to Statement #818.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

824 [ZONE 1 = XXXXXXXX]

Enter/change the first zone description.

Press <ENTER> to advance to Statement #825.

Press <UPARROW> to return to Statement #823.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

825 [ZONE 2 = XXXXXXXX]

Enter/change the second zone description.

Press <ENTER> to advance to Statement #826.

Press <UPARROW> to return to Statement #824.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

826 [ZONE 3 = XXXXXXXX]

Enter/change the third zone description.

Press <ENTER> to advance to Statement #829 for 3-zone operation or to Statement #827 for 5-zone operation.

Press <UPARROW> to return to Statement #825.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

827 [ZONE 4 = XXXXXXXX]

Enter/change the fourth zone description.

Press <ENTER> to advance to Statement #828.

Press <UPARROW> to return to Statement #826.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

828 [ZONE 5 = XXXXXXXX]

Enter/change the fifth zone description.

Press <ENTER> to advance to Statement #829.

Press <UPARROW> to return to Statement #827.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

829 [ID LENGTH 12]

Enter the desired ID length (between 1 and 12) for specifying product IDs.

Press <ENTER> to advance to Statement #830 if the length is to be changed. Otherwise the program advances to Statement #831.

Press <UPARROW> to return to Statement #823.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

830 [OK TO CLR ALL IDS?N]

It is necessary to clear out the existing product ID file if the ID length is to be changed. This message gives the Operator a chance to verify a proper decision.

Press <N>, <UPARROW> or <ENTER> to return to Statement #829.

Press <Y> to clear the ID file and store the ID length selected in Statement #829 and to advance to Statement #831.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

831 [ENABLE CONSEC #? N]

Press <N> or <ENTER> to disable consecutive numbering and to advance to Statement #832. The consecutive numbering register is set to 0.

Press <Y> to enable consecutive numbering and to advance to Statement #832.

Press <UPARROW> to return to Statement #829.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

832 [DEVICE ID: XXXXX]

This prompt is asking the operator to enter a Device ID. This ID may be used to identify this unit from other units in the printed reports and host communications. Enter up to 5 characters.

Press <ENTER> to advance to Statement #833.

Press <UPARROW> to return to Statement #831.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

833 [CHANGE PASSWORD? N]

If left blank, password protection will be disabled. This sequence allows the supervisor to activate protection by entering a password. Similarly, protection can be disabled by entering blanks for a password.

Press <N> or <ENTER> to maintain the current password status and to advance the program to Statement #835.

Press <Y> to advance to Statement #834.

Press <UPARROW> to return to Statement #832.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

834 [SUPERVSR PW? XXXXXX]

Enter the blank or non-blank password, as appropriate.

Press <ENTER> to advance to Statement #835.

Press <UPARROW> to return to Statement #833.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

The following functions will be password protected whenever a non-blank password is entered: F5 - Test, F6 - Setup System, F7 - Setup Product, and Clear Summary in F11 - Print ID Summary.

7.1.2 Host Interface Setup

The host interface of the 9481 is designed to be a slave station in a master/slave protocol. It supports the Mettler Toledo multidrop standard derived from the ANSI Standard X3.28. Up to 16 slave stations can be supported in the Mettler Toledo implementation. All communications are handled via RS232 or RS422 with 1 start bit, 7 data bits, even parity and 1 stop bit. The baud rate is user selectable with a default setting of 9600 baud.

PROGRAM
STATEMENT APPLICATION

835 [HOST SETUP? Y]

Press <Y> or <ENTER> to advance to Statement #837.

Press <N> to advance to Statement #840.

Press <UPARROW> to return to Statement #810.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

837 [HOST BAUD RATE 9600]

The Operator has 5 possible selections for the host link baud rate. They are 1200, 2400, 4800, 9600 or 19.2K baud.

Press <RIGHT ARROW> to scroll through the baud rate selections.

Press <ENTER> to load the selected baud rate and to advance the program to Statement #840.

Press <UPARROW> to return to Statement #835.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

7.1.3 Printer Interface Setup

The following section describes the operator interface which allows setup of the printer interface. The "calibration" jumper (W7) must be in place on the 9410 circuit board to enter this section. If this jumper is not in place the program will not permit entry into this sequence. Printer output is 20 Ma. current loop, or RS-232. In addition to configuring the operating parameters of the serial port the Operator may also select the output format for individual weighments. The baud rate, data bits, and parity are user selectable with default settings of 300 baud, 7 data bits, even parity(1 start bit and 1 stop bit is not selectable).

PROGRAM STATEMENT	APPLICATION

840 [PRINTER SETUP? Y]

The display asks if the printer setup parameters are to be set.

Press <Y> or <ENTER> to advance to Statement #841.

Press <N> to advance to Statement #865.

Press <UPARROW> to return to Statement #835.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

841 [ENABLE PRINTER? Y]

The display asks whether the printer is to be enabled.

Press <Y> to advance to Statement #842.

Press <N> to advance to Statement #865.

Press <ENTER> to advance to Statement #842 if the printer is enabled or to Statement #865 if it is not.

Press <UPARROW> to return to Statement #840.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

842 [PNTR BAUD RATE 300]

The Operator has 5 possible selections for the printer baud rate. They are 300, 1200, 2400, 4800, or 9600 baud.

Press <RIGHT ARROW> to scroll through the baud rate selections.

Press <ENTER> to load the selected baud rate and to advance the program to Statement #843.

Press <UPARROW> to return to Statement #841.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

843 [PNTR DATA BITS 7]

Enter the number of data bits for the printer port. Allowable settings are 7 or 8.

Press <ENTER> to load the data size and to advance the program to Statement #844.

Press <UPARROW> to return to Statement #842.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

844 [PNTR PARITY (EON) E]

Enter the parity setting for the printer port. Allowable values are <E> for even parity, <O> for odd parity, or <N> for no parity.

Press <ENTER> to advance the program to Statement #845.

Press <UPARROW> to return to Statement #843.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

845 [PNTR ERROR LOG? N]

Enter whether or not error logging to the printer is to be enabled.

Press <Y> to enable error logging and to advance to Statement #846.

Press <N> to disable error logging and to advance to Statement #846.

Press <ENTER> to maintain the current error logging setting and to advance to Statement #846.

Press <UPARROW> to return to Statement #844.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

846 [PRINTER FIELDS? N]

This prompt is asking if the Operator wishes to configure print fields for the output buffer. A 150 character string buffer is provided for the printer output string transmission. Fields within this string may be freely formatted. Each FIELD to be included in the string is assigned a starting position number. The starting POSition may be from 1 to 150. The string will be initialized to spaces prior to loading so unoccupied positions will be printed as spaces. Field overlaps will not be checked. In such cases the latter field will overwrite the earlier fields. NOTE: **nn** in the prompt is a system assigned consecutive number which starts at 01 and increments with each new entry.

Press <N> or <ENTER> to skip printer field setup and to advance the program to Statement # 853.

Press <Y> to advance to Statement #847.

Press <UPARROW> to return to Statement #845.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

847 [nn FIELD XX POS XXX]

This message shows the print fields in sequential order, beginning with the first field.

Press <ENTER> to scroll through the list at Statement #847. Upon completion of the list the program will advance to Statement #853.

Press <UPARROW> to scroll backwards through the list at Statement #847. When the first record is displayed the program will go to Statement #846 instead.

Press <DEL> to advance to Statement #848.

Press <RIGHT ARROW> to advance to Statement #849. Pressing <RIGHT ARROW> on the last field with blanks for FIELD and POSition will allow adding a new field.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

848 [DELETE ENTRY? N]

The Operator is given a chance to confirm the delete request before execution.

Press <N>, <UPARROW> or <ENTER> to return to Statement #847 without deleting the entry.

Press <Y> to delete entry and to return to Statement #847 for the next entry.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

849 [nn FIELD # XX]

This prompt is asking the operator to enter the field number which is to be printed. Refer to the following table for field selections.

Field Number	Description	Length
01	Time	5
02	Date	8
03	Product ID	12
04	Weight, including DP *	6
05	Weight Units (lb/kg)	2
06	Zone Description	8
07	Zone Number	1
08	Consecutive Number	6
09	Variable ID # 1	9
10	Variable ID # 2	9
11	Variable ID # 3	9
12	Gross Weight *	6
13	Tare Weight *	6
14	Target Weight *	6
15	Deviation Weight *	6
16	Gross Net Indicator	1

* - indicates leading zeroes are suppressed for these fields (replaced with spaces).

Press <ENTER> to select the field number and to advance the program to Statement #851. If the number is chosen outside this range the program will advance to Statement #850 instead.

Press <UPARROW> to return to Statement #847.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

850 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #849.

851 [nn POS # XXX]

This prompt is asking the operator to enter the starting position number for the leftmost character of the selected field.

Press <ENTER> to select the field position and to return the program to Statement #847. If the number is chosen outside the allowable range (1 - 150) the program will advance to Statement #852 instead.

Press <UPARROW> to return to Statement #849.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

852 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #851.

853 [NEW PNTR LITERAL? N]

The display asks if the printer literal constants are to be changed.This prompt is asking if you wish to define a special literal to be used in the printer output string.

Printer literals are ASCII characters that can be added to the data string transmitted to the printer. The printer literals can be either printable or non-printable (control) characters.

Press <N> or <ENTER> to skip printer literal setup and to advance the program to Statement #859.

Press <Y> to advance to Statement #854.

Press <UPARROW> to return to Statement #846.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

854 [CLR PNTR LITRLS? N]

The display asks if the existing printer literal constants are to be cleared before proceeding.

Press <N> or <ENTER> to advance the program directly to Statement # 856.

Press <Y> to clear the existing literals and to advance to Statement #855.

Press <UPARROW> to return to Statement #853.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

855 [PNTR LITERALS CLRD]

This message is displayed for 2 seconds to indicate that all previously entered printer literals have been cleared. The program then advances to Statement #856.

856 [PNTR LITRL POS XXX]

Enter the string position desired for placing a literal.

Press <ENTER> to select the field position and to advance the program to Statement #857. If the number is chosen outside the allowable range (1 - 150) the program will remain at Statement #856 instead.

Press <UPARROW> to return to Statement #854.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

857 [PNTR LITERAL CHAR X]

Enter the desired literal to be inserted into the printer transmission string. **NOTE:** See Appendix 11.2 for a list of control code sequences.

Press <ENTER> to select the character and to advance the program to Statement #858.

Press <UPARROW> to return to Statement #856.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

858 [ANOTHER LITERAL? Y]

The Operator is prompted for an additional entry.

Press <Y> or <ENTER> to return to Statement #856.

Press <N> to advance to Statement #859.

Press <UPARROW> to return to Statement #854.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

859 [ENABL PNTR BC CHR?N]

The Operator is prompted to set up a block check character for the printer. See Section 12.3 for Block Check Character definition.

Press <N> or <ENTER> to skip printer block check character setup and to advance the program to Statement #865.

Press <Y> to advance to Statement #860.

Press <UPARROW> to return to Statement #853.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

860 [PNTR BC CHR POS XXX]

Select the location of the block check character.

Press <ENTER> to select the block check character position and to advance the program to Statement #861. If the number is chosen outside the allowable range (1 - 150) the program will advance to Statement #861.

Press <UPARROW> to return to Statement #859.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

861 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #860.

862 [PNTR BC BGN POS XXX]

Select the starting position for computing the block check character.

Press <ENTER> to select the beginning character position to compute the block check character and to advance the program to Statement #865. If the number chosen is not less than the block check character position the program will advance to Statement #863.

Press <UPARROW> to return to Statement #860.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

863 [VALUE TOO LARGE!]
This message is displayed for 2 seconds and then the program returns to Statement #862.

7.1.4 Run Display Setup

The Run mode display for presenting package weighments can be configured for content and duration of the message displayed. The "calibration" jumper (W7) must be in place on the 9410 circuit board to enter this section. If this jumper is not in place the program will not permit entry into this sequence.

PROGRAM
STATEMENT APPLICATION

865 [DISPLAY SETUP? Y]

This prompt is asking if the Operator wishes to configure the display buffer. A 19 character string buffer is provided for the display. Fields within this buffer may be freely formatted. Each FIELD to be included in the buffer is assigned a starting position number. The starting POSition may be from 1 to 19. The string will be initialized to spaces prior to loading so unoccupied positions will be displayed as spaces. Field overlaps will not be checked. In such cases the latter field will overwrite the earlier fields. NOTE: **nn** in the in the following prompts are a system assigned number which starts at 01 and increments with each new entry.

Press <Y> or <ENTER> to advance to Statement #866.

Press <N> to skip display field setup and to advance the program to Statement # 875.

Press <UPARROW> to return to Statement #840.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

866 [RUN DISP TIMER 9]

This timer is used to select the amount of time, in seconds, the information from the last classified package is to remain on the display. When selected, after the time out occurs the display will return to the HOME position displaying the current weight on the scale. A value of 0 inhibits the return to the HOME position until Standby mode is entered. NOTE: When a new package is classified it will be displayed and this timer will be restarted.

Press <ENTER> to select the timer value and to advance the program to Statement #867.

Press <UPARROW> to return to Statement #865.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

866A [DISPLAY FIELDS? N]

This prompt is asking if the Operator wishes to configure the display fields. A 19 character string buffer is provided for the display. Fields within this string may be freely formatted. Each FIELD to be included in the string is assigned a starting position number. The starting POSition may be from 1 to 19. The string will be initialized to spaces prior to loading so unoccupied positions will be printed as spaces. Field overlaps will not be checked. In such cases the latter field will overwrite the earlier fields. NOTE: **nn** in the prompt is a system assigned consecutive number which starts at 01 and increments with each new entry.

Press <N> or <ENTER> to skip display field setup and to advance the program to Statement # 875.

Press <Y> to advance to Statement #867.

Press <UPARROW> to return to Statement #866.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

867 [nn FIELD XX POS XX]

This message shows the display fields in sequential order, beginning with the first field.

Press <ENTER> to scroll through the list at Statement #869. Upon completion of the list the program will advance to Statement #875.

Press <UPARROW> to scroll backwards through the list at Statement #867. When the first record is displayed the program will go to Statement #866 instead.

Press <DEL> to advance to Statement #868.

Press <RIGHT ARROW> to advance to Statement #869. Pressing <RIGHT ARROW> on the last field with blanks for FIELD and POSition will allow adding a new field.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

868 [DELETE ENTRY? N]

The Operator is given a chance to confirm the delete request before execution.

Press <N>, <UPARROW> or <ENTER> to return to Statement #867 without deleting the entry.

Press <Y> to delete entry and to return to Statement #867 for the next entry.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

869 [nn FIELD # XX]

This prompt is asking the operator to enter the field number which is to be displayed. Refer to the following table for field selections.

Field Number	Description	Length
01	Time	5
02	Date	8
03	Product ID	12
04	Weight, including DP *	6
05	Weight Units (lb/kg)	2
06	Zone Description	8
07	Zone Number	1
08	Consecutive Number	6
09	Variable ID # 1	9
10	Variable ID # 2	9
11	Variable ID # 3	9
12	Gross Weight *	6
13	Tare Weight *	6
14	Target Weight *	6
15	Deviation Weight *	6
16	Gross Net Indicator	1

* - indicates leading zeroes are suppressed for these fields.

Press <ENTER> to select the field number and to advance the program to Statement #871. If the number is chosen outside this range the program will advance to Statement #870 instead.

Press <UPARROW> to return to Statement #867.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

870 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #869.

871 [nn POS # XX]

This prompt is asking the operator to enter the starting position number at which the previously selected field will be displayed.

Press <ENTER> to select the field position and to return the program to Statement #867. If the number is chosen outside the allowable range (1 - 19) the program will advance to Statement #872 instead.

Press <UPARROW> to return to Statement #869.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

872 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #871.

7.1.5 Remote Input Setup

The Remote Input is a serial port with a user configured message format for receiving the Run ID selection and/or package tare weight. It operates at 4800 baud with 1 start bit, 7 data bits, 2 stop bits and even parity.

PROGRAM
STATEMENT APPLICATION

875 [REMOTE IN SETUP? Y]

The setup of this input port enables the extraction of data from a received string.

Press <Y> or <ENTER> to advance to Statement #876.

Press <N> to skip remote input setup and to advance the program to Statement # 885.

Press <UPARROW> to return to Statement #865.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

876 [ENABLE REMOTE IN? X]

This prompt asks if the Remote Input Port is to be used.

Press <Y> to enable the remote input and to advance to Statement #877.

Press <N> to disable the remote input and to advance to Statement #885.

Press <ENTER> to maintain the current remote input setting and to advance to Statement #877 if enabled or to Statement #885 otherwise.

Press <UPARROW> to return to Statement #875.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

877 [ID STARTING? XX]

This prompt is asking for the starting character number for the ID field. This number must be with in the range of 1 to 49.

Press <ENTER> to select the ID starting position and to advance the program to Statement #878. If the number is chosen outside the allowable range (1 - 49) the program will advance to Statement #878 instead.

Press <UPARROW> to return to Statement #876.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

878 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #877.

879 [ID LENGTH? XX]

This prompt is asking for the number of characters in the ID field. **NOTE:** The ID length for the 9481 is determined in General Setup (1 - 12 characters). If the length selected here is shorter than the length selected in General Setup, the system will pad the ID from the remote port with trailing spaces.

Press <ENTER> to select the ID length and to advance the program to Statement #881. If the length chosen is greater than the system ID length the program will advance to Statement #880 instead.

Press <UPARROW> to return to Statement #877.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

880 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #879.

881 [TARE STARTING? XX]

This prompt is asking for the starting character number for the TARE field. This number must be with in the range of 1 to 49.

Press <ENTER> to select the tare starting position and to advance the program to Statement #883. If the number is chosen outside the allowable range (1 - 49) the program will advance to Statement #882 instead.

Press <UPARROW> to return to Statement #879.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

882 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #881.

883 [TARE LENGTH? XX]

This prompt is asking for the number of characters in the TARE field. A value of 0 will disable the Tare being used. **NOTE:** The 9481 is limited to a 6- character Tare weight (the tare must be numeric ASCII characters with an optional decimal point).

Press <ENTER> to select the tare length and to advance the program to Statement #885. If the length chosen is greater than 6 the program will advance to Statement #884 instead.

Press <UPARROW> to return to Statement #881.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

884 [VALUE TOO LARGE!]

This message is displayed for 2 seconds and then the program returns to Statement #883.

7.1.6 Remote Output Setup

PROGRAM
STATEMENT APPLICATION

885 [REMOTE OUT SETUP? Y]

The following describes the operator interface to setup the Remote Output. There are two modes of operation selectable for this port. The first is to continuously send the information for each package weighed. The second is used to transmit one string of data per item.

Continuous means the data transmitted is a continuous stream of standard Toledo Continuous format data at 4800 baud. The Indicated Weight Value field will have the weight value of the last item weighed, the field will be updated on the next item to cross the scale. The print bit of Status Word "C" will be 1 (one) for the first string after the item is weighed, for subsequent strings the print bit will be zero (0).

Per Item means the data transmitted will be a single string of standard Toledo Continuous format data at 4800 baud. The Indicated Weight Value

field will have the weight value of the item just weighed across the scale. The print bit of Status Word "C" will be 1 (one). There will not be another string of data until another item crosses the scale.

Press <Y> or <ENTER> to advance to Statement #886 if continuous mode was previously selected or to Statement #887.

Press <N> to skip remote output setup and to advance the program to Statement #900 if the scale jumper is in place or else to Statement #810.

Press <UPARROW> to return to Statement #865.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

886 [CONTINUOUS? Y]

Press <Y> or <ENTER> to select the continuous mode and to advance the program to Statement #888.

Press <N> to advance the program to Statement #887.

Press <UPARROW> to return to Statement #885.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

887 [PER ITEM? Y]

Press <Y> or <ENTER> to select the per item mode and to advance the program to Statement #888.

Press <N> to return the program to Statement #886.

Press <UPARROW> to return to Statement #885.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

888 [REMOTE ALARM LOG? X]

The display asks if the Remote Output Error Logging is to be enabled.

Press <Y> to enable the remote alarm logging and to advance to Statement #889.

Press <N> to disable remote alarm logging and to advance the program to Statement #889.

Press <ENTER> to maintain the current remote alarm logging setting and to advance to Statement #889.

Press <UPARROW> to return to Statement #886 for continuous mode or to Statement #887 for per item mode.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

889 [REMOTE CKSM ENBL? X]

The display asks if the CHECKSUM in the Remote Output string is to be enabled. Checksum is defined in Section 9.0.

Press <Y> to enable the checksum and to advance to Statement #900 if the scale jumper is in place or to Statement #947 otherwise.

Press <N> to disable the checksum and to advance the program to Statement #900 if the scale jumper is in place or to Statement #947 otherwise.

Press <ENTER> to maintain the current checksum setting and to advance to Statement #900 if the scale jumper is in place or to Statement #947 otherwise.

Press <UPARROW> to return to Statement #888.

Press <RESET> to got to Statement #947 if the printer was previously enabled at Statement #841 or else to return to Statement #110.

7.1.7 Scale Setup

The following sections describe the setup of the scale for normal operation. The "calibration" jumper (W7) must be in place on the 9410 circuit board to enter this section. If this jumper is not in place the program will not permit entry into this sequence.

900 [SCALE SETUP? Y]

The display is asking if the Scale setup parameters are to be accessed at this time.

Press <Y> or <ENTER> to advance to Statement #901.

Press <N>, <UPARROW> or <RESET> to advance the program to Statement #946.

7.1.7.1 Zero parameters

PROGRAM
STATEMENT APPLICATION

901 [ZERO PARAMETERS? Y]

The display is asking if the scale zero parameters are to be changed at this time.

Press <Y> or <ENTER> to advance to Statement #902.

Press <N> to advance the program to Statement #905.

Press <UPARROW> to advance program to Statement #930.

Press <RESET> to advance the program to Statement #946.

902 [ZERO RANGE _2]

The display is asking for the maximum weight that can be zeroed. This is the limit of weight that the scale can zero off including push button zero and zero capture range. Allowable entries are 0%, 2%, or 20% where 0% disables zero maintenance and zeroing in Scale Test.

Press <CLEAR> to scroll through the allowable selections at Statement #902.

Press <ENTER> to save the displayed value and advance the program to Statement #903.

Press <UPARROW> to return the program to Statement #901.

Press <RESET> to advance the program to Statement #946.

903 [POWER UP ZRO RNG _2]

The display is asking for the maximum weight that can be zeroed at power up. The scale will attempt to zero up to this amount at power up. Allowable entries are 0%, 2%, or 20% where 0% disables power up zero.

Press <CLEAR> to scroll through the allowable selections at Statement #903.

Press <ENTER> to save the displayed value and advance the program to Statement #904.

Press <UPARROW> to return the program to Statement #902.

Press <RESET> to advance the program to Statement #946.

904 [ZERO CAP RANGE 104]

The display is asking for the zero capture range. This range is used for push button zero and AZM. This is the amount of weight(in 1/10 divisions) that can be zeroed off at any one time. Allowable values are 6, 14, 24, 54 or 104 minor divisions.

Press <CLEAR> to scroll through the allowable selections at Statement #904.

Press <ENTER> to save the displayed value and advance the program to the next statement.

Press <UPARROW> to return the program to Statement #903.

Press <RESET> to advance the program to Statement #946.

904A [ZERO INDICATION? X]

The display is asking if the center of zero indication is to be displayed if the scale is within .25 divisions of zero. This feature is only available with "B" revision or later 9410's.

Press <Y> to enable the center of zero indication.

Press <N> to disable the center of zero indication.

Press <ENTER> to accept the displayed value and advance to the next statement.

Press <UPARROW> to return to statement #904.

Press <RESET> to advance to statement #946.

7.1.7.2 Calibrate scale

PROGRAM
STATEMENT APPLICATION

905 [CALIBRATE SCALE? Y]

The following section describes the operator interface which allows calibration of the scale attached to the 9410 High Speed Junction Box. The cold start default settings are shown for each parameter. The display asks if the scale setup parameters and/or calibration is to be changed.

Press <Y> or <ENTER> to advance to Statement #906.

Press <N> to advance the program to Statement #921.

Press <UPARROW> to return program to Statement #901.

Press <RESET> to advance the program to Statement #946.

906 [CAL. UNITS? LB]

The display indicates the unit of measure that will be used to calibrate the scale. This will also be the unit of measure that the scale will use for weight displaying and reporting.

Press <CLEAR> to toggle the units between LB and Kg at Statement #906.

Press <ENTER> to save the displayed unit and advance the program to Statement #907.

Press <UPARROW> to return the program to Statement #905.

Press <RESET> to advance the program to Statement #946.

907 [CAPACITY? ___120]

The display indicates the scale capacity in the units selected. Enter the scale capacity as a whole number.

Press <ENTER> to save the capacity and advance the program to Statement #908.

Press <UPARROW> to return the program to Statement #906.

Press <RESET> to advance the program to Statement #946.

908 [INCRMNT SIZE? _0.01]

The display indicates the scale increment size. Available increment size settings are: 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5

Press <CLEAR> to scroll through the available settings.

Press <ENTER> to save the displayed size and advance the program to Statement #909.

Press <UPARROW> to return the program to Statement #907.

Press <RESET> to advance the program to Statement #946.

909 [SHIFT ADJUST? Y]

The display asks if the scale is to be shift adjusted.

NOTE: In multiple loadcell systems a shift adjust should be performed before the scale is calibrated.

Press <Y> or <ENTER> to advance the program to Statement #910.

Press <N> to advance the program to Statement #922.

Press <UPARROW> to return the program to Statement #908.

Press <RESET> to advance the program to Statement #946.

910 [# OF LOAD CELLS? 4]

The display indicates the number of load cells connected to the 9410. Allowable entries are 1, 2, or 4.

Press <ENTER> to advance the program to Statement #911 unless '1' is entered, for which the program will advance to Statement #922.

Press <UPARROW> to return the program to Statement #909.

Press <RESET> to advance the program to Statement #946.

911 [EMPTY SCALE]

The display directs the operator to empty the scale.

Press <Y> or <ENTER> to allow the 9410 to take an initial reading and advance to Statement #912.

Press <N> to advance the program to Statement #922.

Press <UPARROW> to return the program to Statement #910.

Press <RESET> to advance the program to Statement #946.

912 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the reading and then the program advances to Statement #913.

913 [LOAD CELL NUMBER 1]

The display directs the operator to add the test weight above load cell number 1 of the scale.

Press <Y> or <ENTER> to allow the 9410 to take a sample shift adjust reading and advance the program to Statement #914.

914 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the reading and then the program advances to Statement #915.

915 [LOAD CELL NUMBER 2]

The display directs the operator to add the test weight above load cell number 2 of the scale.

Press <Y> or <ENTER> to allow the 9410 to take a sample shift adjust reading and advance the program to Statement #916.

916 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the reading, then the program advances to Statement #917 for 4-cell operation or to Statement #921 for 2-cell operation.

917 [LOAD CELL NUMBER 3]

The display directs the operator to add the test weight above load cell number 3 of the scale.

Press <ENTER> to allow the 9410 to take a sample shift adjust reading and advance the program to Statement #918.

918 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the reading, then the program advances to Statement #919.

919 [LOAD CELL NUMBER 4]

The display directs the operator to add the test weight above load cell number 4 of the scale.

Press <ENTER> to allow the 9410 to take a sample shift adjust reading and advance the program to Statement #920.

920 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the reading, then the program advances to Statement #921.

921 [SHIFT ADJUST DONE]

The display indicates that the shift adjust of the 9410 has been completed. his message will be displayed for 2 seconds, then the program will advance to Statement #922.

922 [CALIBRATE? Y]

The display asks if the scale is to calibrated. If a shift adjust has just been completed it is recommended that the scale be calibrated.

Press <Y> or <ENTER> to advance the program to Statement #923.

Press <N> to advance the program to Statement #928.

Press <UPARROW> to return the program to Statement #909.

Press <RESET> to advance the program to Statement #946.

923 [EMPTY SCALE]

The display directs the operator to empty the scale.

Press <Y> or <ENTER> to allow the 9410 to take an initial reading and advance to Statement #924.

Press <N> to advance the program to Statement #928.

Press <UPARROW> to return the program to Statement #922.

Press <RESET> to advance the program to Statement #946.

924 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the initial reading, then the program advances to Statement #925.

925 [ADD LOAD XXXXXX]

The display directs the operator to place the calibration test weight on the scale, then enter the known test weight value.

Press <ENTER> to allow the 9410 to take a span adjust reading and advance the program to Statement #926.

926 [SCALE PROCESSING]

This message is displayed as the 9481 waits for the 9410 to complete the test, then the program advances to Statement #927.

927 [CALIBRATION DONE]

The display indicates that the calibration of the 9410 has been completed. This message will be displayed for 2 seconds, then the program will advance to Statement #928.

7.1.7.3 Filter parameters

The following section describes the operator interface which allows setup of the filter parameters in the 9410 High Speed Junction Box. This sequence describes the filter selection for the weigh time at which the Controller can set the proper filter.

PROGRAM STATEMENT	APPLICATION

928 [FILTER SELECT? Y]

The display asks if the scale filter setup parameters are to be changed.

Press <Y> or <ENTER> to advance to Statement #922.

Press <N> to advance the program to Statement #921.

Press <UPARROW> to return program to Statement #905.

Press <RESET> to advance program to Statement #946.

929 [AUTO FILTER ADJ? Y]

The display asks if the filter parameters are to be automatically selected by the controller.

Press <Y> or <ENTER> to advance to Statement #930.

Press <N> to advance the program to Statement #932.

Press <UPARROW> to return program to Statement #928.

Press <RESET> to advance program to Statement #946.

930 [RUN BOX ACROSS SCL]

The display is requesting the longest container to be run across the weigh conveyor. The controller will calculate the best filter for weighing based on the box length and speed. Upon completion the program will advance to Statement #932.

Press <RESET> to abort run and to advance program to Statement #932.

931 [FILTER SEL COMPLETE]

Press <ENTER> to advance to Statement #932.

932 [F1 SETTLE TIME? X.X]

The display indicates the settling time for the F1 filter. This value is either the value selected by the controller during the auto filter select or the previous manually entered setting. This is the amount of time that the filter requires to stabilize at a final output. This parameter should be selected to be a value less than the minimum amount of time, in seconds, that the product will be on the scale. (See section 3.3.3 for calculation.) The valid selections are from 0.1 to 1.0 seconds. Press <CLEAR> to scroll through the valid selections.

Press <ENTER> accept and save the filter selection and advance the program to Statement #946.

Press <UPARROW> to return the program to Statement #929.

Press <RESET> to advance the program to Statement #946.

7.1.7.4 Scale parameter storage

Scale setup parameters are stored in EEPROM in the 9410. Normally, exiting the scale setup mode will result in a storing of the parameters. However, if certain parameters have been changed without calibrating the scale, the storage will be rejected.

PROGRAM STATEMENT	APPLICATION

945 [Params. Not Stored!]

If the Scale Capacity, Units, or Digital Increments are changed without calibration this message will be displayed instead of Statement #946. Any changes made will not be stored permanently until a complete calibration is performed.

Press any key to advance to Statement #947.

946 [STORE PARAMETERS? Y]

The display asks if the scale parameters should be permanently stored is EEPROM. The settings selected will be lost when power is removed from the scale unless the parameters have been stored.

Press <Y> or <ENTER> to store the setup parameters and to advance the program to Statement #947.

Press <N> to discard the new setup parameters and to advance the program to Statement #947.

Press <UPARROW> to return the program to Statement #934.

Press <RESET> to advance the program to Statement #946.

7.1.8 Setup Parameter Exit

The setup jumper must be removed before exitting setup. If the jumper was not installed the program will advance to Statement #948 if the printer is enabled or returns to Statement #110 if the printer is disabled.

947 [REMOVE CAL JUMPER]

Remove the calibration jumper on the 9410 junction box PCB. Upon removal, the program advances to Statement #948 if the printer is enabled or returns to Statement #110 if the printer is disabled.

7.1.9 Setup Parameter Printout

When the printer has been enabled the system offers to print a listing of the setup parameters upon exiting the Setup mode.

PROGRAM
STATEMENT APPLICATION

948 [PRINT SETUP? N]

The display asks if it is desired to cause a print out of ALL setup parameters.

Press <Y> to advance to Statement #949.

Press <N>, <ENTER> or <RESET> to skip the printing of setup parameter and to return the program to Statement #110.

Press <UPARROW> to return to Statement #900 if the scale jumper is in place or else to Statement #885.

949 [PRINTING]

The display indicates that the printer is in the process of printing out the setup parameters. The system parameter setup printout is formatted for a 40 column printer. Upon completion the program returns to Statement #110.

```
GENERAL PARAMETER SETUP
----------------------------------------
PE1 TIMER                          150
PE2 TIMER                           50
PE1-2 TIMER                        3.0
VARIABLE ID PROMPT 1           PRODUCT
```

VARIABLE ID PROMPT 2	SHIFT
VARIABLE ID PROMPT 3	LOT
ZONE 1 DESC.	UNDER
ZONE 2 DESC.	OK LIGHT
ZONE 3 DESC.	OK
ZONE 4 DESC.	OK HEAVY
ZONE 5 DESC.	OVER
ID LENGTH	12
CONSECUTIVE NUMBERING	ENABLED
DEVICE ID	12345
SUPERVISOR PASSWORD USED	YES

HOST PARAMETER SETUP

BAUD RATE	9600

PRINTER PARAMETER SETUP

PRINTER ENABLED	YES
BAUD RATE	300
CHARACTER DATA BITS	7
CHARACTER PARITY	EVEN
ERROR LOGGING	ENABLED

PRINTER FORMAT TABLE

01 FIELD 06 COL 002
02 FIELD 04 COL 011
03 FIELD 05 COL 018
04 FIELD 07 COL 022
LITERAL CHARACTER 0DH POSITION 027
LITERAL CHARACTER 0AH POSITION 028
BLOCK CHECK CHARACTER START POSITION 001
BLOCK CHECK CHARACTER POSITION 029
TOTAL STRING LENGTH 029

DISPLAY PARAMETER SETUP

RUN DISPLAY TIMER	0

DISPLAY FORMAT TABLE

01 FIELD 06 COL 02
02 FIELD 04 COL 11
03 FIELD 05 COL 18

REMOTE INPUT PARAMETER SETUP

REMOTE INPUT	ENABLED
PRODUCT ID POSITION	01
PRODUCT ID LENGTH	12
TARE ID POSITION	13
TARE ID LENGTH	6

REMOTE OUTPUT PARAMETER SETUP

DATA OUTPUT MODE	CONTINUOUS
ERROR LOGGING	ENABLED
CHECKSUM	ENABLED

SCALE PARAMETER SETUP

ZERO RANGE	2
POWER UP ZERO CAPTURE RANGE	2
ZERO CAPTURE RANGE	104
SCALE UNITS	LB
SCALE CAPACITY	50.000
SCALE INCREMENT SIZE	0.005
NUMBER OF LOAD CELLS	4
FILTER 1 SETTLE TIME	0.5

7.2 F7 - SETUP PRODUCT

The 9481 will support 150 product IDs at one time. This section describes the setup procedure for defining the product IDs from the keyboard.

PROGRAM STATEMENT **APPLICATION**

950 **[SUPERVSR PW XXXXXX]**

This prompt is asking for the supervisor's password to be entered before continuing.

Key in the password and press <ENTER> to advance to Statement #951. If a invalid password is entered the program returns to Statement #110.

Press <RESET> to return to Statement #110.

951 **[S_ID? XXXXXXXXXXX]**

Enter the Product ID which is to be setup.

Press <ENTER>. If the ID exists the program will advance to Statement #955. If the ID does not exist the program will check if there is sufficient room for a new ID and advance to Statement #960, otherwise the program will advance to Statement #952.

Press <RESET> or <UPARROW> to return to Statement #110.

952 **[ID FILE FULL!]**

This message is displayed for 2 seconds and then the program returns to Statement #951.

955 **[DELETE ID? N]**

This prompt is asking if the ID is to be deleted from memory.

Press <N> or <ENTER> to advance to Statement #957 if packages have been previously classified and accumulated with this ID, or to Statement #960 if the ID is unused.

Press <Y> to delete ID and return to Statement #951.

Press <RESET> to return to Statement #110.

957 [OK TO CLR SUMMRY? N]

Press <N> or <ENTER> to return to Statement #951.

Press <Y> to clear ID summary and advance to Statement #960.

Press <RESET> to return to Statement #110.

960 [TARE WEIGHT? XX.XX]

Enter the Tare Weight value of the container for this Product ID.

Press <ENTER> to advance to Statement #965.

Press <UPARROW> to return to Statement #951.

Press <RESET> to return to Statement #110.

965 [TARGET WT? XX.XX]

Enter the Target Weight for this Product ID.

Press <ENTER> to advance the program to Statement #970.

Press <UPARROW> to return to Statement #965.

Press <RESET> to return to Statement #110.

970 [CAL ZONE RANGE? N]

This prompt is asking if the system should calculate the Zone Range for this Product ID. The Operator may respond with <Y> if computed, symmetrical zones are desired or with <N> to hand enter specific zone boundaries.

Press <N> or <ENTER> to advance the program to Statement #972.

Press <Y> to advance the program to Statement #980.

Press <UPARROW> to return the program to Statement #965.

Press <RESET> to return to Statement #110.

972 [UNDER? XXXX.X]

Enter the weight value which defines the UNDER zone edge. Items weighing less than this value will be classified as UNDER.

Press <ENTER> to advance the program to Statement #974 for 5-zone operation or to Statement #978 for 3-zone operation.

Press <UPARROW> to return the program to Statement #970.

Press <RESET> to return to Statement #110.

974 [OK LIGHT? XXXX.X]

Enter the weight value which defines the OK LIGHT zone edge. Items with weights that fall between the OK LIGHT and under zone edges will be classified as OK LIGHT.

Press <ENTER> to advance the program to Statement #976.

Press <UPARROW> to return the program to Statement #972.

Press <RESET> to return to Statement #110.

976 [OK HEAVY? XXXX.X]

Enter the weight value which defines the OK HEAVY zone edge. Items with weights that fall between the OK HEAVY and OVER ZONE edge will be classifed as OK HEAVY.

Press <ENTER> to advance the program to Statement #978.

Press <UPARROW> to return the program to Statement #974.

Press <RESET> to return to Statement #110.

978 [OVER? XXXX.X]

Enter the weight value which defines the OVER zone edge. Items weighing greater than this value will be classified as OVER.

Press <ENTER> to advance the program to Statement #989.

Press <UPARROW> to return the program to Statement #972 for 3-zone operation or to Statement #976 for 5-zone operation.

Press <RESET> to return to Statement #110.

980 [PCT OF TARGET X.X]

Enter the percent value of the target weight which is to be used to calculate the zone ranges for the 3 or 5 zones. This value is used to compute outer zone boundaries. For 5-zone operation, one third of this value is used to compute the inner zone boundaries.

Press <ENTER> to display the computed zone boundaries. The program advances to Statement #981.

981 [UNDER XXXX.X]

The boundary of the lower zone is displayed. Items weighing less than this value will be classified as UNDER.

Press any key to advance the program to Statement #983 for 5-zone operation or to Statement #987 for 3-zone operation.

983 [OK LIGHT XXXX.X]

The upper boundary of the lower inner zone is displayed. Items with weights that fall between the OK LIGHT and UNDER zone edges willb e classified as OK LIGHT.

Press any key to advance the program to Statement #985.

985 [OK HEAVY XXXX.X]

The lower boundary of the upper inner zone is displayed. Items with weights that fall between the OK HEAVY and OVER zone edge will be classified as OK HEAVY.

Press any key to advance the program to Statement #987.

987 [OVER XXXX.X]

The boundary of the upper zone is displayed. Items weighing greater that this value will be classified as OVER.

Press any key to advance the program to Statement #989.

989 [NO. OF REJECTS? 0]

This prompt is asking for the number of rejects that are installed with this system. The maximum number is 2. Select the correct number of rejects from the following list.

0 = Rejects Not Used. Press <ENTER> to return to Statement #951.

1 = One Reject Output used. Press <ENTER> to advance to Statement #990.

2 = Two Reject Outputs used. Press <ENTER> to advance to Statement #990.

Press <UPARROW> to return to Statement #970.

Press <RESET> to return to Statement #110.

990 [REJ 1 ZONES? _____]

This prompt will permit the operator to enter in only the Zones he wants active to reject a package.

Example: An entry of 1,5 tells the 9481 that the operator only wants to reject the packages which were classified into Zones 1 and 5. Packages classified into Zones 2, 3 and 4 are not to be rejected.

Press <ENTER> to advance the program to Statement #992. If an invalid zone number is entered the program will advance to Statement #991.

Press <UPARROW> to return to Statement #989.

Press <RESET> to return to Statement #110.

991 [INVALID ZONE!]

This message is displayed for 2 seconds and then the program returns to Statement #990.

992 [REJ 1 T. D.? X.X]

Enter the time, in seconds, for which the system should wait, after classification, before turning ON the Reject #1 output.

Press <ENTER> to advance the program to Statement #993.

Press <UPARROW> to return to Statement #990.

Press <RESET> to return to Statement #110.

993 [REJ 1 DUR.? X.X]

Enter the time duration, in seconds, for which the Reject #1 signal should remain ON.

Press <ENTER> to advance the program to Statement #995 for two-reject operation otherwise return to Statement #951.

Press <UPARROW> to return to Statement #992.

Press <RESET> to return to Statement #110.

995 [REJ 2 ZONES? _____]

This prompt will permit the operator to enter in the Zones he wishes to assign to Reject #2.

Press <ENTER> to advance the program to Statement #997. If an invalid zone number is entered the program will advance to Statement #996.

Press <UPARROW> to return to Statement #990.

Press <RESET> to return to Statement #110.

996 [INVALID ZONE!]

This message is displayed for 2 seconds and then the program returns to Statement #995.

997 [REJ 2 T. D.? X.X]

Enter the time, in seconds, for which the system should wait, after classification, before turning ON the Reject #2 output.

Press <ENTER> to advance the program to Statement #999.

Press <UPARROW> to return to Statement #995.

Press <RESET> to return to Statement #110.

999 [REJ 2 DUR.? X.X]

Enter the time duration, in seconds, for which the Reject #2 signal should remain ON.

Press <ENTER> to return the program to Statement #951.

Press <UPARROW> to return to Statement #997.

Press <RESET> to return to Statement #110.

8.0 HOST DATA TRANSMISSION

The 9481 supports a host interface based on the ANSI Standard X3.28. Up to 16 9481s can be simultaneously connected to the host using the RS422 hardware interface. Drop addresses are determined by the DIP switch settings as outlined on page 18. The protocol requires a three-step procedure to exchange data. First, the host must send a logon query to the drop address of the selected 9481 which requires an acknowledgement to assure both ends of the link are ready to communicate. Second, a dialogue is initiated by the host to exchange data. Third, the host sends a logoff command to the selected 9481 so that it is free to talk to another.

Communication dialogues will take one of two forms, depending on whether data is moving to or from the 9481. Both begin with a host transmission that includes a Start-of-Text character, a block ID for synchronization and error recovery purposes, a two-character alphanumeric command, an ASCII string of data when appropriate, an End-of-Text character and a checksum. In the simplest dialogue, where data is moving to the 9481, an ASCII acknowledgement character is all that is required in response. The host is then free to send additional blocks of data in the same manner or to initiate the logoff. The second type of response involves sending data back to the host. In this case the 9481 sends data back to the host. The message block is structured with the same elements as the host used for its query. The block ID and the command characters are identical to those in the host's query. After the 9481 sends the message block it waits for the ASCII acknowledgement character from the host to assure receipt. The 9481 may then send any additional message blocks or return control to the host by sending the ASCII acknowledgement character. The host may then initiate a new transfer or a logoff.

Examples of the dialogue:

Type I

Host: 01<ENQ>	(logon to drop address 01)
9481: <ACK>	(9481 ready)
Host: <STX>01<message><ETX><BCC>	(send data starting with block ID 01)
9481: <ACK>	
Host: <STX>02<message><ETX><BCC>	(send additional data)
9481: <ACK>	
Host: <EOT>	(logoff)

Type II

Host: 01<ENQ>	(logon to drop address 01)
9481: <ACK>	(9481 ready)

Host: <STX>01<message><ETX><BCC>	(send request for data using block ID 01)
9481: <STX>01<message><ETX><BCC>	(send reply to block ID 01)
Host: <ACK>	
9481: <STX>02<message><ETX><BCC>	(send additional data)
Host: <ACK>	
9481: <STX>03<message><ETX><BCC>	(send additional data)
Host: <ACK>	
9481: <ACK>	(return flow control to host)
Host: <EOT>	(logoff)

Note that all block IDs after a logon start at 01. These are ASCII decimal numbers. At 99 the protocol rolls over to 00, 01, 02, etc. The block check characters are computed as the 7-bit exclusive-OR checksum of all characters following the <STX>, including the <ETX>.

The following error codes may be sent by the 9481 in response to commands from the Host controller. The response message will be replaced by these.

E0 -Data Unavailable
The requested data is not available.
E1 -Unrecognized command
The command issued is not a valid command.
E2 -Improper Data Length
The data sent with the command was not of the expected length.
E3 -Invalid Data
E4 -In Use
E5 -Block ID mismatch
The block ID is not in sequence with the last one received.
E6 -Pointer out of range
E7 -Invalid Configuration
E8 -Data Table Full
The data requested to be added to a table could not be added due to the table being full.
E9 -Access Denied

The available commands fall into a control group or a data group as follows:

Control Commands	Possible Error Codes
C0 -- SELECT STANDBY	2, 4
C1 -- SELECT RUN	4
C2 -- SELECT RUN ID	2, 3, 4, 9
C3 -- SET CONSECUTIVE NUMBER	2, 3
C4 -- SET USER ID'S	2, 3, 9
C5 -- READ STATUS	
C6 -- CLEAR ALARMS	
C7 -- READ ALARMS	0

Data Commands	
D0 -- CLEAR ALL WEIGHMENTS	
D1 -- READ WEIGHMENT	0
D2 -- READ PRODUCT ID LIST	4
D3 -- DELETE PRODUCT ID	2, 3, 4
D4 -- READ PRODUCT ID SETUP	3, 4
D5 -- SET PRODUCT ID SETUP	2, 4, 8
D6 -- CLEAR PRODUCT ID SUMMARY	3, 4

D7 -- READ PRODUCT ID SUMMARY 3, 4
D8 -- SET PRODUCT ID SUMMARY 3, 4

The format of the commands and their responses are as follows:

8.1 CONTROL COMMANDS

C0 -- SELECT STANDBY
Select Standby mode.

Host: C0x where x = 0 for normal shutdown allowing rejects and packages in process to be completed.
= 1 for forced shutdown, aborts all in process packages including rejects pending.
9481: <ACK>

EXAMPLE:
Host: "01",<ENQ>
9481: <ACK>
Host: <STX>,"C00",<ETX>,"@" Request normal shutdown
9481: <ACK>
Host: <EOT>

C1 -- SELECT RUN
Select Run mode operation.

Host: C1
9481: <ACK>

C2 -- SELECT RUN ID
Select a new ID for Run Mode operation.

Host: C2xxxxxxxxxxxx where xxxxxxxxxxxx = ID
9481: <ACK>

C3 -- SET CONSECUTIVE NUMBER

Host: C3nnnnnn where nnnnnn = consecutive number
9481: <ACK>

C4 -- SET USER ID'S

Host: C4nxxxxxxxxx where n = 1, 2 or 3
and xxxxxxxxx = user ID
9481: <ACK>

C5 -- READ STATUS
Read current status of the controller.

Host: C5
9481: C5abcdeffffffffffffghhhhhh
where a = control mode
1 = Standby
2 = Test
3 = Setup
4 = Run
5 = Shutdown (going to standby)
b = run status
0 = Need Valid ID
1 = Valid ID, No Permissive
2 = Permitted to Run

3 = Running, Scale Empty.
4 = Running, Scale Empty, Do AZM
5 = Running, Scale Empty, AZM in process
6 = Running, Processing Packages
15 = Running, Fatal alarm.

c = entry photoeye
d = exit photoeye
e = number of boxes on scale
fffffffffff = current ID
g = Current Alarm
hhhhhh = Current scale weight

C6 -- CLEAR ALARMS
Clear all alarms in buffer.

Host: C6
9481: <ACK>

C7 -- READ ALARM
Read next alarm from buffer.

Host: C7
9481: C7mm/dd/yy hh:mm:ss aaaaaaaaaaaaaaaaaaa

where mm/dd/yy = date
hh:mm:ss = time
aaaaaaaaaaaaaaaaaaa = alarm message

8.2 DATA COMMANDS

D0 -- CLEAR ALL WEIGHMENTS
Clear all weighments in weigh buffer.

Host: D0
9481: <ACK>

D1 -- READ WEIGHMENT
Read next weighment from buffer.

Host: D1
9481:

D1wwwwwwuuzliiiiiiiiiiinnnnnnmm/dd/yyhh:mmuuuuuuuuuvvvvvvvvvwww
wwwwwwzzzzzzzzddddddddeeeeeeeeffffffffggggggttttttrrrrrrssssssccccc

where wwwwww = net weight
uu = scale units(lb or kg)
z = zone (0 - 6)
l = ID length (in hexadecimal)
iiiiiiiiiii = ID
nnnnnn = consecutive number
mm/dd/yy = date
hh:mm = time
uuuuuuuuu, vvvvvvvvv and wwwwwwwww = user Ids
zzzzzzzz = zone description
ddddddddd, eeeeeeee and ffffffff = user ID prompts
ggggggg = gross weight

ttttt = tare weight
rrrrrr = target weight
ssssss = deviation weight
ccccc = device ID

D2 -- READ PRODUCT ID LIST
Read ID's currently set up in system.

Host: D2
9481: D2aaaaaaaaaaaabbbbbbbbbbbb . . . ttttttttttt
where aaaaaaaaaaaa,bbbbbbbbbbbb, etc. are up to 20 IDs, repeating reply as needed for additional IDs

D3 -- DELETE PRODUCT ID
Delete a selected ID from the system.

Host: D3xxxxxxxxxxxx where xxxxxxxxxxxx = ID and spaces or underscores indicate delete all IDs
9481: <ACK>

D4 -- READ PRODUCT ID SETUP
Read a selected ID's Setup information.

Host: D4xxxxxxxxxxxx where xxxxxxxxxxxx = ID
9481:
D4xxxxxxxxxxxxiiiiiiiiiiittttttzclllllllmmmmmmmnnnnnnnooooooorrrrrrt.tfffffx.xy.y sssssu.uv.v

where xxxxxxxxxxxx = ID
iiiiiiiiiii = ID (right justified)
ttttt = tare weight
z = number of zones (3 or 5)
c = zone boundary calculation flag (Y or N)
llllll, . . ., oooooo = zone limits (if 3 zone last 2 fields are zeros)
rrrrrr = target weight
t.t = tolerance percent
fffff = first set of reject zones
x.x = first reject time delay (in seconds)
y.y = first reject time duration (in seconds)
sssss = second set of reject zones
u.u = second reject time delay (in seconds)
v.v = second reject time duration (in seconds)

D5 -- SET PRODUCT ID SETUP
Replace or add a new ID to the system. If one is being replaced all summary information will be cleared.

Host:
D5xxxxxxxxxxxxiiiiiiiiiiittttttzclllllllmmmmmmmnnnnnnnooooooorrrrrrt.tfffffx.xy.y sssssu.uv.v

where xxxxxxxxxxxx = ID
iiiiiiiiiii = ID (right justified)
ttttt = tare weight
z = number of zones (3 or 5)
c = zone boundary calculation flag (Y or N)

llllll, . . ., oooooo = zone limits (if 3 zone last 2 fields are zeros)
rrrrrr = target weight
t.t = tolerance percent
fffff = first set of reject zones
x.x = first reject time delay (in seconds)
y.y = first reject time duration (in seconds)
sssss = second set of reject zones
u.u = second reject time delay (in seconds)
v.v = second reject time duration (in seconds)

9481: <ACK>

D6 -- CLEAR PRODUCT ID SUMMARY
Clear a selected ID's summary information.

Host: D6xxxxxxxxxxxx where xxxxxxxxxxxx = ID
where xxxxxxxxxxxx = ID

9481: <ACK>

D7 -- READ PRODUCT ID SUMMARY
Read a selected ID's summary information.

Host: D7xxxxxxxxxxx where xxxxxxxxxxx = ID

9481:
D7xxxxxxxxxxxaaaaaabbbbbbccccccddddddeeeeeeuuuuuuuuuvvvvvvvv
vwwwwwwwwwxxxxxxxxxyyyyyyyyyssssssszzzzzzzzzzqqqqqqqqqfnnnnnn

where xxxxxxxxxxx = ID
aaaaaa, . . ., eeeeee = zone counts
uuuuuuu. . .yyyyyyy = zone net wgts
sssssss = no. of shipped units
zzzzzzzzzz = shipped weight
qqqqqqqqq = deviation squared
f = deviation squared active flag (Y or N)
and nnnnnn = number of samples

D8 -- SET PRODUCT ID SUMMARY
Replace an ID's Summary information.

Host:
D8xxxxxxxxxxxaaaaaabbbbbbccccccddddddeeeeeeuuuuuuuuuvvvvvvvv
vwwwwwwwwwxxxxxxxxxyyyyyyyyyssssssszzzzzzzzzzqqqqqqqqqfnnnnnn

where xxxxxxxxxxx = ID
aaaaaa, . . ., eeeeee = zone counts
uuuuuuuuu. . .yyyyyyyyy = zone net wgts
sssssss = no. of shipped units
zzzzzzzzzz = shipped weight
qqqqqqqqq = deviation squared
f = deviation squared active flag (Y or N)
and nnnnnn = number of samples

9481: <ACK>

9.0 REMOTE OUTPUT DATA FORMAT

The data provided will be the standard Toledo continuous format data at 4800 baud. The output data may optionally include CheckSum, and may optionally transmit Error Codes. See Section 7.1.6 on Remote Output Setup and Section 11.0 Error Conditions. Decimal point location data will be coded in Status Word "A".Error Codes will be transmitted in the Indicated Weight Value field.

The remote output is transmitted every .5 seconds if configured for continuous and only in "STANDBY", "RUNNING", or "SCALE TEST". In the per item mode the remote output only transmits the weight once when a package is classified.

Each data string transmitted will be 17 (no CheckSum character) or 18 (with CheckSum character) characters of ASCII coded data. Data is 1 start bit, 7 (seven) bits, even parity, and two (2) stop bits.

Character number 1 - Start of Text (02H)
Character number 2 - Status Word "A"
Character number 3 - Status Word "B"
Character number 4 - Status Word "C"
Character number 5 - Classified Weight Value (hundred-thousands digit)
Character number 6 - Classified Weight Value (ten-thousands digit)
Character number 7 - Classified Weight Value (thousands digit)
Character number 8 - Classified Weight Value (hundreds digit)
Character number 9 - Classified Weight Value (tens digit)
Character number 10 - Classified Weight Value (units digit)
Character number 11 - Tare Weight Value (hundred-thousands digit)
Character number 12 - Tare Weight Value (ten-thousands digit)
Character number 13 - Tare Weight Value (thousands digit)
Character number 14 - Tare Weight Value (hundreds digit)
Character number 15 - Tare Weight Value (tens digit)
Character number 16 - Tare Weight Value (units digit)
Character number 17 - Carriage Return (0DH)

Optional:
Character number 18 - CheckSum character

CheckSum is defined as the 2's complement of the binary sum of the 7 low order bits of all characters preceding the CheckSum character including STX and CR. Bit 8 of the CheckSum character is parity of the 7 low order bits of the CheckSum character.

STATUS WORD A DEFINITION

	Decimal Point Location					
Bit No.	X	.X	.XX	.XXX	.XXXX	.XXXXX
0	0	1	0	1	0	1
1	1	1	0	0	1	1
2	0	0	1	1	1	1

(X10 and X100 are illegal setups)

Increment Size

Bit No.	Count by 1	Count by 2	Count by 5
3	1	0	1
4	0	1	1

General

5	Always = 1
6	Always = 0
7	Even Parity Bit

STATUS WORD B DEFINITION

Operating Parameters

Bit No.

0	Gross Weight = 0 / Net Weight = 1
1	Positive Weight = 0 / Negative Weight = 1
2	In Range = 0 / Over Capacity = 1
3	Always = 0
4	LB Mode = 0 / KG = 1
5	Always = 1
6	Normal = 0 / Power up = 1
7	Even Parity Bit

STATUS WORD C DEFINITION

Operating Parameters

Bit No.

0	Always = 0
1	Always = 0
2	Always = 0
3*	Normal = 0 / Print = 1
4	Always = 0
5	Always = 1
6	Always = 0
7	Even Parity Bit

* - Bit 3 will equal 1 on the first data transmission, after the item is weighed in the continuous mode. Bit 3 will be set to 1 on every transmission in the per item mode. This would cause a data transmission to a printer (or other data receiving device) that may optional connected to most Mettler Toledo remote devices. Refer to the manual provided with remote device for this feature.

10.0 REMOTE INPUT DATA FORMAT

A Remote RS232 input port is provided to receive a new ID and/or Tare for the next package(s) to use for classification. This data must be received by the controller before the package to be weighed with the ID information has cleared the Entrance Photo Eye.

Each data string received must be RS232 at 4800 Baud, Data is 7 (seven) bit, even parity, with one (1) start bit and two (2) stop bits.

First Character - Start of Text (02H)
Data Characters - Up to 48 ASCII characters with the ID and/or Tare.
End Character - Carriage Return (0DH) or Line Feed (0AH)

Data Characters include the ID which is limited to 12 characters determined by entry at Statement #829 and the optional Tare which is limited to 6 characters with the optional decimal point.

See Section 7.1.5 for configuration of the Remote input port.

11.0 ERROR CONDITIONS

Several conditions are recognized as errors. When an error occurs the alarm output is turned ON and remains ON until the alarm is RESET. The local display will show the correct alarm message. Error codes will be sent as weight data if Remote Output Error Logging is enabled or printed in text form to the Host alarm buffer if Host Error Logging is enabled, and to a printer if used and Printer Error Logging is enabled.

ERROR CODE	ERROR [DISPLAY MESSAGE]	DEFINITION
999.91	NEGATIVE WEIGHT [ALARM 1]	The current item was weighed as a negative weight. This is not a "real world" condition and indicates a serious problem with the scale system that must be investigated and corrected before additional items are weighed.
999.92	SHORT WEIGH TIME [ALARM 2]	The current item broke the Exit photo eye before the "MINIMUM WEIGH TIME" is over. Minimum weigh time is approximately .8 of the filter time selected.
999.93	SPACING FAULT [ALARM 3]	More than two boxes are fully on the scale.
999.94	LESS THAN TARE [ALARM 4]	The item weighed had a weight less the zero net.
999.95	SCALE FAULT [ALARM 5]	Scale Weight not received or the scale data checksum doesn't match.
999.96	MAXIMUM WEIGH TIME [ALARM 6]	A box was on the scale for a time period that exceeded the PE 1-2 time plus 10 percent. Box on scale too long.
999.97	OVER CAPACITY [ALARM 7]	Current item exceeded the Over Capacity value entered in General Setup.

Note that the decimal point location in the "Error Codes" will be in the same position as the weight indication.

To RESET runtime errors the RUN PERMISSIVE signal must be removed, or the error will automatically RESET when both photoeyes are clear and scale weight is zero.

The scale faults listed below are all of the possible scale faults sent by the 9410 to the 9481 controller. The ones that could normally appear during calibration are 51-53. The others will not occur unless there is a serious problem in the system.

Following is the list of all possible scale errors:

ERROR CODE **DEFINITION**

Scale Communication errors

SCALE FAULT 01 Unrecognized command.
SCALE FAULT 02 Access denied(Calibration jumper not in place).
SCALE FAULT 03 Invalid data.
SCALE FAULT 04 Can not process command at this time.

Scale weighing errors

SCALE FAULT 11 Scale outside zero range for analog verify.
SCALE FAULT 12 Scale over capacity.
SCALE FAULT 13 Scale under zero.
SCALE FAULT 14 Scale outside zeroing range.
SCALE FAULT 15 Can not process command due to motion.
SCALE FAULT 16 Can not process command due to insufficient weigh time.

Scale calibration errors

SCALE FAULT 51 Occurs during shift adjust. The 9410 cannot complete a shift adjustment because it cannot compensate for a large deviation in loadcell loading. This error is normally caused by a loadcell disconnected or faulty, or the conveyor weight not evenly distributed over each loadcell. This error can also occur during the [EMPTY SCALE] routine when there is excessive scale motion.

SCALE FAULT 52 Not enough resolution for selected scale build. The 9410 cannot calibrate the scale because it does not have enough internal counts for the selected grad size and capacity. Check for binding in the scale and verify the scale build(See Section 3.3).

SCALE FAULT 53 Calibration command not in sequence. Do complete calibration from the beginning.

Scale hardware failure errors

SCALE FAULT 70 A/D conversion error.
SCALE FAULT 71 Analog verification error.
SCALE FAULT 72 EPROM memory failure.
SCALE FAULT 73 RAM memory failure.
SCALE FAULT 74 EEPROM checksum error(invalid parameters). Performing a scale cold start may correct this error.

12.0 APPENDICES

12.1 CONTROL AND SPECIAL CHARACTER ENTRY

When setting up string literals it is sometimes necessary to use control characters and other characters not available on the Controller keyboard. Special characters are entered on the Controller keyboard by pressing SHIFT, ALT, or CTRL followed by the key. The following charts define the special characters.

Note: The Controller's local display, will display ASCII Control Characters using the CTRL with a bar over the character entered. All other characters will be displayed as shown in the ASCII Control Character column.

ASCII CONTROL CHARACTER	HEX EQUIV.	ENTRY
NUL	00H	Press CTRL then F4
SOH	01H	Press CTRL then A
STX	02H	Press CTRL then B
ETX	03H	Press CTRL then C
EOT	04H	Press CTRL then D
ENQ	05H	Press CTRL then E
ACK	06H	Press CTRL then F
BEL	07H	Press CTRL then G
BS	08H	Press CTRL then H
HT	09H	Press CTRL then I
LF	0AH	Press CTRL then J
VT	0BH	Press CTRL then K
FF	0CH	Press CTRL then L
CR	0DH	Press CTRL then M
SO	0EH	Press CTRL then N
SI	0FH	Press CTRL then O
DLE	10H	Press CTRL then P
DC1(XOn)	11H	Press CTRL then Q
DC2	12H	Press CTRL then R
DC3(XOff)	13H	Press CTRL then S
DC4	14H	Press CTRL then T
NAK	15H	Press CTRL then U
SYN	16H	Press CTRL then V
ETB	17H	Press CTRL then W
CAN	18H	Press CTRL then X
EM	19H	Press CTRL then Y
SUB	1AH	Press CTRL then Z
ESC	1BH	Press CTRL then F7
FS	1CH	Press CTRL then F8
GS	1DH	Press CTRL then F9
RS	1EH	Press CTRL then F10
US	1FH	Press CTRL then F11
DEL	7FH	Press CTRL then F12

CHARACTER	HEX EQUIV.	ENTRY
* (asterisk)	2AH	Press SHIFT then F1
/ (slash)	2FH	Press SHIFT then F2
= (equal sign)	3DH	Press SHIFT then F3
<> (not equal)	n/a	Press SHIFT then F4
<= (less than or equal to)	n/a	Press SHIFT then F5
>= (greater than or equal to)	n/a	Press SHIFT then F6
! (exclamation mark)	21H	Press SHIFT then F7
" (double quotation mark)	22H	Press SHIFT then F8
# (number sign)	23H	Press SHIFT then F9
$ (dollar sign)	24H	Press SHIFT then F10
% (percent sign)	25H	Press SHIFT then F11
& (ampersand)	26H	Press SHIFT then F12
` (single quotation mark)	60H	Press ALT then F1
' (apostrophe)	27H	Press ALT then F2
^	5EH	Press ALT then F3
@ (at sign)	40H	Press ALT then F4
((opening parentheses)	28H	Press ALT then F5
) (closing parentheses)	29H	Press ALT then F6

[(opening bracket)	5BH	Press ALT then F7
\ (backslash)	5CH	Press ALT then F8
] (closing bracket)	5DH	Press ALT then F9
~	7EH	Press ALT then F10
? (question mark)	3FH	Press ALT then F11
_ (underscore)	5FH	Press ALT then F12
{	7BH	Press CTRL then F5
}	7DH	Press CTRL then F6
|	7CH	Press CTRL then ;

12.2 ASCII Control Code Chart

ASCII CHARACTER	DEC. EQUIV.	OCTAL EQUIV.	HEX EQUIV.
NUL	0	000	00
SOH	1	001	01
STX	2	002	02
ETX	3	003	03
EOT	4	004	04
ENQ	5	005	05
ACK	6	006	06
BEL	7	007	07
BS	8	010	08
HT	9	011	09
LF	10	012	0A
VT	11	013	0B
FF	12	014	0C
CR	13	015	0D
SO	14	016	0E
SI	15	017	0F
DLE	16	020	10
DC1 (XOn)	17	021	11
DC2	18	022	12
DC3 (XOff)	19	023	13
DC4	20	024	14
NAK	21	025	15
SYN	22	026	16
ETB	23	027	17
CAN	24	030	18
EM	25	031	19
SUB	26	032	1A
ESC	27	033	1B
FS	28	034	1C
GS	29	035	1D
RS	30	036	1E
US	31	037	1F
SP	32	040	20

12.2 ASCII Code Chart (continued)

ASCII EQUIV.	DEC EQUIV.	OCTAL EQUIV.	HEX EQUIV.	ASCII EQUIV.	DEC EQUIV.	OCTAL EQUIV.	HEX EQUIV.
!	33	041	21	Q	81	121	51
“	34	042	22	R	82	122	52
#	35	043	23	S	83	123	53
$	36	044	24	T	84	124	54
%	37	045	25	U	85	125	55
&	38	046	26	V	86	126	56
,	39	047	27	W	87	127	57
(	40	050	28	X	88	130	58
)	41	051	29	Y	89	131	59
*	42	052	2A	Z	90	132	5A
+	43	053	2B	[	91	133	5B
‘	44	054	2C	\	92	134	5C
-	45	055	2D	]	93	135	5D
.	46	056	2E	^	94	136	5E
/	47	057	2F	_	95	137	5F
0	48	060	30	`	96	140	60
1	49	061	31	a	97	141	61
2	50	062	32	b	98	142	62
3	51	063	33	c	99	143	63
4	52	064	34	d	100	144	64
5	53	065	35	e	101	145	65
6	54	066	36	f	102	146	66
7	55	067	37	g	103	147	67
8	56	070	38	h	104	150	68
9	57	071	39	i	105	151	69
:	58	072	3A	j	106	152	6A
;	59	073	3B	k	107	153	6B
<	60	074	3C	l	108	154	6C
=	61	075	3D	m	109	155	6D
>	62	076	3E	n	110	156	6E
?	63	077	3F	o	111	157	6F
@	64	100	40	p	112	160	70
A	65	101	41	q	113	161	71
B	66	102	42	r	114	162	72
C	67	103	43	s	115	163	73
D	68	104	44	t	116	164	74
E	69	105	45	u	117	165	75
F	70	106	46	v	118	166	76
G	71	107	47	w	119	167	77
H	72	110	48	x	120	170	78
I	73	111	49	y	121	171	79
J	74	112	4A	z	122	172	7A
K	75	113	4B	{	123	173	7B
L	76	114	4C	|	124	174	7C
M	77	115	4D	}	125	175	7D
N	78	116	4E	~	126	176	7E
O	79	117	4F	DEL	127	177	7F
P	80	120	50				

12.3 DATA FIELD DEFINITIONS

The available data fields are defined below. Each data field may be selected in or out and may be selected to be sent to the host, printed, and/or displayed.

Weight - 6 characters including the decimal point. Error Codes will be sent in the weight field as defined in the Section 11.0 Error Conditions if the Host Error Logging is enabled or printed in text form if a printer is used and Printer Error Logging is enabled. Leading zeros are transmitted as spaces (20H).

*** Units** - LB or KG as received from the 9410.

*** Consecutive Number** - 6 digits incremented by each valid weight. Rolls over to 000001 on next valid weight after 999999.

*** ID string** - 9 alpha-numeric characters for variable ID input and an 8 character user definable prompt.

Date - 8 character date field updated in setup.

Time - 5 character time field updated in setup.

Block Check Character - a single character that is computed as the XOR(of the seven lower bits) of all characters beginning at a specified starting character position and up to but not including the Block Check Character itself.

Fixed Characters - a single alpha-numeric or control character that is specified to be sent, displayed, or printed in a character position within the string. Control characters will be specified in accordance with the key strokes specified in the Appendix labeled "Control and Special Character Entry". This will allow specification of start and/or termination characters or fixed characters needed to emulate an existing protocol or host language requirement. Fixed characters are also useful for formatting the output to printers to allow multiple line print or special printer control such as expanded or condensed printing or bar code printing.

***** - These fields are transmitted as spaces (20H) if Weight Field is an Error Code. See Section 11.0 Error Conditions.

12.4 COMMUNICATION STANDARDS

This section of the manual contains various items of interest when dealing with communication circuit types, signal identification, and data formats.

Communication Circuit Types

RS-232

- 50 feet maximum cable length. RS-232 has a medium amount of noise immunity. Long lengths of successful communications are highly dependent on the electrical environment. Performance of the RS-232 communication link can be improved by avoiding bundling the cables with other wiring and routing the cable away from devices which produce electrical noise.

RS-422

- 4000 feet maximum cable length. RS-422 has a medium amount of noise immunity. Long lengths of successful communications are highly dependent on the electrical environment.

Performance of the RS-422 communication link can be improved by avoiding bundling the cables with other wiring and routing the cable away from devices which produce electrical noise.

20 Milliamp Current Loop

- 1000 feet maximum cable length, up to 1500 feet if routed in separate conduit. 20mA current loop offers good electrical noise immunity. Distance to 1500 feet are possible when the cable is placed in separate conduit.

12.5 CONNECTING STANDARD DEVICES TO REMOTE OUTPUT

B.C.D. Module (9323) APPLICATION NOTES:

CheckSum must be enabled for proper B.C.D. Module operation.

The ExpressCheck Controller will recognize the item weight being an Over Capacity weight or under zero (gross weight), there-for the B.C.D. module will provide an Over Capacity or Under Zero output condition. Refer to the manual on the B.C.D. Module for details.

If Error Logging is enable on the Remote Output, the B.C.D. Module will provide B.C.D. data equal to the Error Code, except Over Capacity (99997). This will include 99991 for a negative weight. A negative weight reading will cause the Under Zero output of the B.C.D. Module to go to ground.

When the error is cleared the B.C.D. output data will remain the Error Code until the next item crosses the scale.

If Error Logging is disabled on the Remote Output, no Error Code is transmitted, if continuous output is enabled, the B.C.D. Module output data will remain the last item weight, before the error occurred.

A negative weight reading will cause the Under Zero output of the B.C.D. Module to go to ground.

An item weight that exceeds the entered Scale Capacity will cause the Over Capacity output of the B.C.D. module to go to ground and all B.C.D. data to 0's.

ANALOG MODULE (9325) APPLICATION NOTES:
CheckSum must be enabled for proper Analog Module operation.

Use the Scale Test routine in the System Test Sequence to aid in calibrating the Analog Module.

The ExpressCheck Controller will recognize the item weight being an Over Capacity weight or under zero (gross weight), therefor the Analog module will provide an Over Capacity output condition (full scale analog output) or Under Zero output condition (output equal to zero indicator value).

If Error Logging is enable on the Remote output, the Analog Module will provide a full scale analog output on an Error Condition. This will not include 99991 for a negative weight, a negative weight reading will cause the Analog module output to be equal to zero indicator value.

If Error Logging is disabled on the Remote Output, no Error Code is transmitted, if continuous output is enabled, the Analog Module output will remain at the level of the last item weight, before the error occurred.

A negative weight reading will cause the Analog module output to be equal to zero indicator value.

A item weight that exceeds the entered Scale Capacity will cause an Over Capacity output condition (full scale analog output).

REMOTE DISPLAY APPLICATION NOTES:

Most Mettler Toledo remote displays ignore the CheckSum character, check the manual provided with the remote display to see if CheckSum is required.

Most Mettler Toledo remote displays will display a special condition for Under Zero or Over Capacity, refer to the manual provided with the remote display for error codes or other special display conditions.

12.6 RECOMMENDED SPARE PARTS

The composition of spare parts kept on hand are dependant upon the critical nature of the installation and the down time that may be tolerated while a repair is being made. Mettler Toledo recommends that at least the following items be kept on hand. They are all available through an authorized Mettler Toledo representative. Refer to the drawings supplied for identification of items not listed here.

Common parts for 120 and 240 VAC units

Qty	P/N	Description
1	C90150700A	Main PCB (9481 Controller)
1	C13725200A	Main PCB (9410 Junction box)
1	KT665013EAB	Power Supply, 24VDC (in units shipped before 4/94)
1	90179000A	Power Supply, 24VDC (in units shipped 4/94 and later)
1	13362500A	Keyboard Assembly
2	13636700A	AC Output Module (24 - 280 VAC)
3	KT665005EBH *	Pilot Light Lamp (6.3 V)

Added Parts specifically for 120VAC Units

Qty	P/N	Description
1	13636300A	AC Input Module (90 - 140 VAC)
1	90147300A	Power Supply, 12 VDC
3	09595700A	Fuse, 3.0 Amp, Slo-Blo
1	KT665005AET *	Pilot Light Base (120 VAC)

Added Parts specifically for 240VAC Units

Qty	P/N	Description
1	13636400A	AC Input Module (180 - 280 VAC)
1	90148800A	Power Supply, 12 VDC
3	12665400A	Fuse, 1.5 Amp, Slo-Blo
1	KT665005AEU *	Pilot Light Base (240 VAC)

* Used in Zone Light Add-On option only.

12.7 REFERENCE DRAWINGS

The following list includes all schematics, external diagrams, and major assemblies for the 120 VAC and 240 VAC 9481 Controller.

901508	Internal Schematic (120 VAC)
901509	Internal Schematic (240 VAC)
901510	External Wiring Diagram (120 VAC)
901511	External Wiring Diagram (240 VAC)
90151200A	Dimension Diagram
90149900A	Minor Assembly (120 VAC)
90150000A	Minor Assembly (240 VAC)
90148000A	Major Assembly (120 VAC)

90149000A	Major Assembly(240 VAC)
90147400A	Side Panel Assembly
90147900A	Rear Panel Assembly (120 VAC)
90148900A	Rear Panel Assembly (240 VAC)
90150100A	3 Zone Light Option (120 VAC)
90150200A	3 Zone Light Option (240 VAC)
90150300A	5 Zone Light Option (120 VAC)
90150400A	5 Zone Light Option (240 VAC)