8522

Digital Indicator

Service Manual

A13946100A
(10/96)

INTRODUCTION

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

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

METTLER TOLEDO
350 W. Wilson Bridge Road
Worthington, Ohio 43085
(614) 438-4511

WARNING!

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, i.e., in accordance with the instructions manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of 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 which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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

PRECAUTIONS

READ this manual BEFORE operating or servicing this equipment.

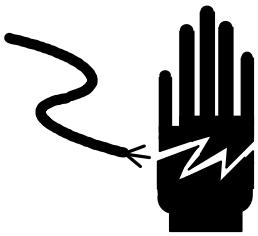
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

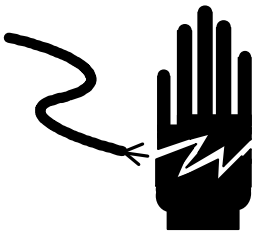
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



WARNING

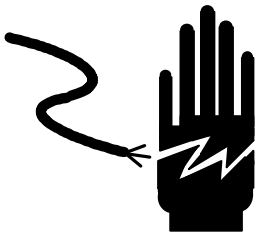
ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.



WARNING

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY.

DO NOT REMOVE THE GROUND PRONG.



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT OR BODILY HARM.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

CONTENTS

1 General Description

The METTLER TOLEDO Model 8522 is a multi-range, high performance indicator intended for use with METTLER TOLEDO DigiTOL® single load cell bases Models 1996, 1997, 2096, 2097, 2196, 2197 and the 2157 DigiTOL® Floor Scale. The optional analog load cell KOP allows the 8522 to operate with analog load cell scales containing up to four load cells.

The 8522 displays up to 60,000 increments with METTLER TOLEDO high accuracy DigiTOL® load cell bases, with scale builds from 1000 to 60,000. The 0.5" high, six digit, seven segment, blue-green vacuum fluorescent display has symbols for lb, kg, g, and t weight units. Keyboard and push-button tare, time and date, a bi-directional RS-232-C and 20 mA current loop serial communication port, and parts counting mode with sample enhancement are provided standard by the 8522 indicator.

Two enclosure styles for the 8522 are provided to permit use in virtually any non-hazardous industrial environment. The dust-tight and splash-proof metal desk enclosure meets IP-65 washdown standards. The stainless steel wall mount enclosure meets the NEMA 4X hosedown test. Both enclosure styles can be used for desk top, wall or column mounting applications.

Standard Features

- Bi-directional RS-232-C and 20 ma current loop (active transmit and selectable active or passive receive) data I/O.
- Accepts single character ASCII character commands from a host computer to print, tare, clear, and zero the scale.
- Accepts 20 ma current loop or contact closure input for remote print, tare, zero, clear or blank display functions.
- Fixed and variable sample counting modes. Allows keyboard entry of sample or average piece weight values. Includes auto sample acceptance, minimum sample requirements, and sample enhancement.
- Digital filtering for fast, stable weight display in the presence of vibration.
- Flexible data output formatting to provide customized printer and data output formats.
- 12 digit total and subtotal accumulators for weight or count data.
- 100 location memory file for tare weight and accumulation storage.
- Battery backed clock/calendar.

Optional Features

- Analog scale KOP (kit of parts) operates with up to four, 350 W excitation bridge resistance, load cells. The analog input is selectable for 2 mV/V or 3 mV/V output load cells. Displayed resolution up to 20,000 increments is possible with the analog scale KOP.
- The optional desk enclosure mounting bracket kit allows desk unit to be mounted to a desk top, wall, or column.

2 System Description

Power Supply

The Power Supply PCB is available in two versions to convert the AC power input to the 7 VAC display filament voltage and the +27 VDC, +52 VDC and +12.5 VDC unregulated supply voltages required by the Main PCB and the optional Analog Scale Input PCB.

Main PCB

The Main PCB contains the regulated DC power supplies, control logic, program EPROM, serial port, DigiTOL® load cell interface, programming jumpers and the vacuum fluorescent display.

The Main PCB handles scanning and decoding of keyboard entry, reading weight data from the DigiTOL® load cell or optional Analog Load Cell Input PCB, and bi-directional communication through the serial port.

The Main PCB converts the raw weight data from the load cell into the calibrated weight units or piece count with a display update rate of approximately ten updates per second.

The Main PCB performs a series of self-test routines at power-up to detect hardware failures or corrupted memory. Error codes are displayed to indicate an error, if detected. The Main PCB also performs display and analog verify tests on a periodic basis to detect hardware malfunctions that could effect weighing performance.

The Main PCB supplies battery backed RAM memory for file storage of up to 100 tare weights and or 6 digit accumulated weight or count data. The file memory can be used for temporary tare storage inbound/outbound operation) or for permanent tare weight storage as well as permitting accumulation in each of the 100 locations.

Keyboard

The 8522 contains a 4 by 5 matrix keyboard for operator input. The keyboard has domed keys with tactile feel and has an embossed polycarbonate overlay with ridges to separate active key areas.

Optional Analog Scale Input

The analog scale input option permits operation with up to four, 350 W excitation bridge resistance, load cells for both the desk and wall enclosure 8522. The analog scale input permits scale builds of from 1000 to 20,000 displayed increments.

A detachable terminal block or connector on the Analog PCB provides load cell termination. A jumper on the Analog PCB selects either 2 mV/V or 3 mV/V load cells to permit use with most types of analog scales.

3 Specifications

Environment

Temperature

The Model 8522 operates over a temperature range from -10 to 50 °C (14 to 122 °F) at 10 to 95% humidity, non-condensing.

Storage temperature range is from -40 to 60 °C (-40 to 140 °F) at 10 to 95% humidity, non-condensing.

The optional analog PCB zero temperature coefficient is 0.1 mV/°C. Span temperature coefficient is 6 ppm/°C maximum.

Water Penetration

The desk enclosure version of the 8522 meets IP-65 washdown requirements for a dust-tight and splash-proof enclosure.

The stainless steel wall mount enclosure version of the 8522 meets NEMA 4X requirements for hosedown applications.

Hazardous Areas

The 8522 is not intrinsically safe! The 8522 is not compatible with Hazardous Area Protection intrinsic safe modules or barriers. Contact your Authorized METTLER TOLEDO representative for information about hazardous area applications.

⚠ Warning

The Model 8522 Indicator Is NOT intrinsically safe! DO NOT use the 8522 Indicator in areas classified as HAZARDOUS by the National Electric Code (NEC) because of combustible or explosive atmospheres.

Power Requirements

The 8522 operates on either 100/120 VAC (+10%, -15%) 50/60 Hz or 220/240 VAC (+10%, -15%) 50/60 Hz. Power consumption is approximately 9 VA.

The 8522 requires a true earth ground for reliable operation. To test the quality of the earth ground, measure the AC voltage between neutral and ground at the AC outlet. If the neutral to ground voltage is greater then 0.3 VAC then the ground connection is inadequate and must be corrected before connecting the 8522.

THE POWER LINE FOR THE 8522 MUST NOT BE SHARED WITH EQUIPMENT THAT GENERATES LINE NOISE (SUCH AS MOTORS, RELAYS, HEATERS, ETC.). IF ADVERSE POWER CONDITIONS EXIST, A DEDICATED POWER CIRCUIT OR POWER LINE CONDITIONER MAY BE REQUIRED.

Standards Compliance

NTEP (Legal-for-trade) COC

The Model 8522A has received the NTEP (National Type Evaluation Program) Certificate of Conformance number 92-121 and may be used in legal-for-trade application as a Class III or III L device.

UL Listing

The Model 8522 is listed to meet UL specifications 114, Office Appliances and Equipment and 746, Polymeric Materials.

CSA Certification

The Model 8522 is CSA certified to meet standard C22.2 No. 143-1975, Office Machines.

Conducted and Radiated Emissions (RFI)

The Model 8522 meets or exceeds FCC docket 80-284 for conducted and radiated emissions requirements as a Class A digital device.

The Model 8522 meets or exceeds the VDE 0871 class B specification for conducted and radiated emissions.

Radio Frequency Interference (RFI) Susceptibility

The Model 8522 meets USA, Canadian, VDE 0871 Class B, and UK requirements for RFI susceptibility as listed in Table 3-1 with a maximum of one display increment of change when calibrated for recommended builds.

Radio Interference Frequency	USA Field Strength	Canadian Transmitted Power at Specified Distance	VDE 0871 Class B Field Strength	UK Field Strength
27 MHz	3 volts/meter	4 watts at 2 meters	3 volts/meter	10 volts/meter
144 MHz	NA	NA	3 volts/meter	NA
169 MHz	3 volts/meter	NA	3 volts/meter	10 volts/meter
464 MHz	3 volts/meter	4 watts at 2 meters	3 volts/meter	10 volts/meter

Radio Frequency Interference Susceptibility

(NA) Not Applicable

AC Power Line Voltage Variation

The Model 8522 meets NIST H-44, Canadian Gazette Part 1, and OIML-SP7/SP2 line voltage variation specifications as listed in Table 3-2.

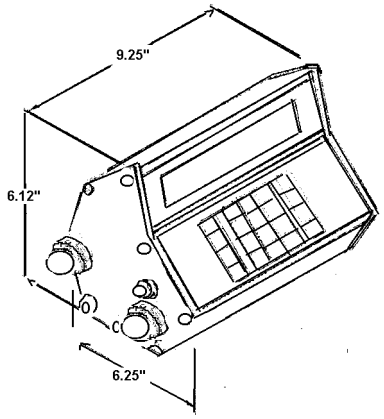
Line Voltage Variation Specification	AC Line Voltage			Line Frequency in Hz		
	Minimum	Nominal	Maximum	Minimum	Nominal	Maximum
NIST H-44	100	120	130	59.5	60	60.5
Canadian	108	120	132	58.8	60	61.2
OIML-SP7/SP2	102 187 204	120 220 240	132 242 264	58.8 49.0 49.0	60 50 50	61.2 51 51

AC Line Power Voltage Variation Specifications

Appearance, Construction and Dimensions

Indicator Desk Enclosure

The desk enclosure is constructed of charcoal black, anodized, extruded aluminum with painted cast aluminum end caps. The desk enclosure indicator weighs approximately 5 lb (2 kg). Refer to next figure for enclosure dimensions. Connections to the enclosure are through grip bushings on the left end cap to seal the unit from environmental effects. Allow an additional 2" (50 mm) for cable clearance the left end of the enclosure.



Desk Enclosure Dimensions

Indicator Wall Mount Enclosure

The wall mount enclosure is constructed from brushed finish, type 304L stainless steel that is solution annealed. The wall enclosure indicator weighs approximately 15 pounds (7 kg). Connections to the enclosure enter through nylon cable grip bushings on the bottom to seal the unit from environmental effects. Refer to Figure below for enclosure dimensions. Allow an additional 2" (50 mm) for cable clearance at the bottom of the enclosure.

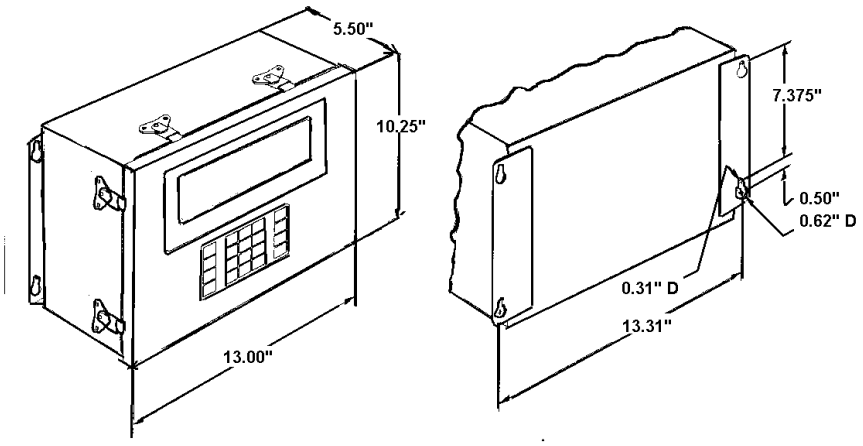


Figure 3-1 - Wall Mount Enclosure Front and Rear Dimensions

Shipping Information

The shipping carton for the desk unit is 18.5" (470 mm) wide, 15" (380 mm) deep and 8" (200 mm) high. The approximate shipping weight of the desk version is 7 pounds (3.2 kg).

Data Interface

The standard 8522 contains a bi-directional serial port providing 20 mA current loop and RS-232-C communications. Serial data is formatted as one start bit, seven data bits, one parity bit and 1 stop bit. The parity bit is selectable as even, odd or parity bit always a 0 (which is equivalent to 8 data bits, no parity). The baud rate is selectable from 300 to 9600 baud. Refer to Section 6.3 for further information about the serial interface.

The 8522 can be configured to output data when a print request occurs or to continuously output data every display update. A selectable checksum character can be included in the data transmission to detect transmission errors.

Demand Mode Data

The demand mode data output is intended for use with a ticket, strip or label printer and provides flexible formatting to satisfy custom ticket formatting requirements. The demand output format can include an ASCII <SO> character for larger print size for selected data fields when the 8522 is connected to the Models 307, 8806 or 8860 printers.

Demand mode data output is inhibited if weight on the scale is unstable, under zero or over capacity or if the 8522 is configured for expanded weight display mode. If data output is inhibited because of unstable weight the print request is stored and acted upon when the weight is stable. If the weight on the scale goes below gross zero or above scale capacity with a buffered print request pending, the buffered print request is canceled.

Continuous Mode Data

The continuous data output is a fixed format message of displayed weight, tare weight and status information that is transmitted every display update. The continuous output is intended for interfacing to devices that need real time weight and status information. The continuous mode is the recommended data output mode for interfacing the 8522 to computers.

Factory Number Reference

Factory Number	Enclosure Type	AC Power Input	Market Versions
8522-0001	IP-65, Desk	120 VAC, 50/60 Hz	USA & Canada
8522-1001	NEMA 4X, Wall Mount	120 VAC, 50/60 Hz	
8522-0011	IP-65, Desk	220 VAC, 50/60 Hz	General Export
8522-1011	NEMA 4X, Wall Mount	220 VAC, 50/60 Hz	
8522-0012	IP-65, Desk	240 VAC, 50/60 Hz	UK
8522-1012	NEMA 4X, Wall Mount	240 VAC, 50/60 Hz	

4

Installation Instructions

Follow the instructions detailed in this section to install and program the Model 8522 DigiTOL® Indicator. Refer to Chapter 3 and verify that all environmental requirements have been satisfied before proceeding any further. If any problems are encountered during the programming procedure, refer to Chapter 7 of this manual for troubleshooting assistance.

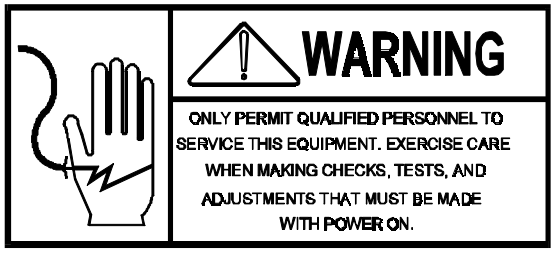
Setup Procedure

Unpacking

Examine the shipping carton for any signs of damage. **IF DAMAGE IS FOUND, MAKE A CLAIM WITH THE CARRIER IMMEDIATELY**. Open the carton and continue the inspection, checking for damaged or missing parts.

All versions of the 8522 are shipped with the following components:

Model 8522 Technical Manual, TM008522 I01
Quality Feedback Card
Capacity Label
Function Keys Label



Opening the Desk Enclosure

Remove the left end cap from the desk enclosure by unscrewing the eight phillips head screws. The Main PCB can be slid approximately one inch to the left without unplugging the keyboard. Be careful not to pull the left end cap too far or the keyboard may be damaged.

Opening the Wall Enclosure

Open the wall enclosure by flipping the wing-type handle of each fastener up and turning it 180° counter clockwise. The lower right latch does not have a wing-type handle. Use an 11/16" wrench to loosen this latch. Loosen the hinge fasteners on the RIGHT end last (be sure to loosen both of them at the same time to prevent jamming). Swing the door open from the left.

AC Power Voltage Selection

USA and Canadian versions (Factory Numbers 8522-0001, 1001) are shipped configured for 120 VAC operation. General export versions (factory numbers 8522-0011, 1011) are shipped configured for 220 VAC operation. UK export versions (factory numbers 8522-0002, 1012) are shipped configured for 240 VAC. Refer to the interconnect diagrams in Chapter 10. for alternate voltage selection procedure if alternate AC voltage operation is required.

Install Any Options Used

Install the optional analog scale KOP and/or optional printer interface cable, if used. Refer to Section 6.2 and the installation instructions included with the optional analog scale KOP. Refer to Chapter 6 for optional printer interface cable installation instructions.

Terminate the Load Cell

Make the appropriate load cell connections to either the Logic PCB (for DigiTOL® load cells) or the optional Analog PCB (for analog load cells). Refer to Chapter 6 for load cell interface cable installation instructions.

Connect AC Power

Connect the 8522 to an appropriate power source as described in Chapter 3. The Model 8522 indicator is now ready for setup. Refer to the following sections in Chapter 4 for setup instructions.

Scale Build Determination

If a standard, recommended build is desired then proceed to the section titled "Programming Procedure" to setup and install the scale. The 8522 is capable of displaying up to a maximum of 60,000 displayed increments when connected to a DigiTOL® load cell. The analog scale input KOP is limited to a maximum of 20,000 displayed increment.

If a nonstandard build is desired or if the scale base is a DigiTOL® J-Box connected to FlexMount® or Centerline® load cells or if the analog scale input is used with a mechanical lever system conversion, then the minimum increment size for the scale base must be determined before calibration. Refer to the appropriate following sections to determine scale base minimum increment size.

NOTE: Multi-range operation is also subject to the minimum increment size selection described in following sections.

Minimum Increment Size for Bench and Portable Single DLC Scale Bases

Table 4-1 lists the minimum increment size possible for the DigiTOL® Bench and portable single DLC scale base models listed by factory number. Find the base you are connecting to the 8522 in Table 4-2 and compare the desired increment size to the minimum increment size listed.

NOTE: The minimum increment size selections listed in Table 4-1 are not legal-for-trade. **Scales used in legal-for-trade applications MUST NOT BE SMALLER than the minimum increment size (e-min) listed on the load cell data plate.**

BASE FACTORY NUMBER	LOAD CELL CAPACITY	MINIMUM INCREMENT SIZE	
		LB	KG
1996-0001 1997-0001	30 kg	0.0005	0.0005
1996-0002 2096-0002	60 kg	0.001	0.0005
1997-0002 2096-0003 2097-0001	100 kg	0.005	0.002
1996-0003 2096-0001	140 kg	0.001	0.0005
2096-0002 2096-0004 2097-0002	300 kg	0.005	0.005
2196-0001 2196-0003 2197-0001	500 kg	0.01	0.005
2196-0002 2196-0004 2197-0002	1000 kg	0.02	0.01

Single DigiTOL® Load Cell, Minimum Increment Size
Table 4-1

Minimum Increment Size For Model 2157 DigiTOL® Floor Scale

Table 4-2 lists the minimum increment size possible for the Model 2157 DigiTOL® Floor scale. Find the rated capacity of the scale base you are interfacing to in Table 4-2 and compare the desired increment size to the minimum increment size listed.

Note: The minimum increment size selections listed in Table 4-2 are not legal-for-trade. Scales used in legal-for-trade applications MUST NOT BE SMALLER than the minimum increment size (e-min) listed on the scale base data plate.

Rated Scale Capacity in lb	Individual Load Cell Capacity in lb	Minimum Increment Size	
		lb	kg
2,000	1,000	0.2	0.1
5,000	3,000	0.5	0.2
10,000	5,000	1.0	0.5
20,000	10,000	2.0	1.0

Model 2157 DigiTOL® Floor Scale Minimum Increment Size
Table 4-2

Minimum Increment Size For DigiTOL® J-Box Applications

Table 4-3 lists the minimum increment size possible for the DigiTOL® J-Box when connected to the following Toledo/Masstron analog load cells. Find the individual capacity of the load cells you are connecting to the DigiTOL® J-Box in Table 4-3 and compare the desired increment size to the minimum increment size listed.

Note: The minimum increment size selections listed in Table 4-3 are not legal-for-trade. **Scales used in legal-for-trade applications MUST NOT BE SMALLER than the minimum increment size (e-min) listed on the load cell data plate.**

Rated Load Cell Capacity in lb	Load Cell Type	Minimum Increment Size	
		lb	kg
500	Bending Beam	0.1	0.05
1,000	Shear Beam	0.2	0.1
3,000	Shear Beam	0.5	0.2
5,000	Shear Beam	1.0	0.5
10,000	Shear Beam	2.0	1.0
20,000	Shear Beam	5.0	2.0
45,000	Shear Beam	20.0	10.0
50,000	Cap Check	10.0	5.0
75,000	Shear Beam	20.0	10.0
100,000	Cap Check	20.0	10.0
100,000	Dual Shear Beam	50.0	20.0

DigiTOL® J-Box Minimum Increment Size
Table 4-3

Minimum Increment Size For Optional Analog Scale Input KOP

The minimum increment size selection for the optional analog scale input KOP is determined by calculating the microvolts per increment for the desired build.

Microvolts per Increment Calculation

$$\mu V \text{ per Increment} = \frac{\text{Increment Size} \times \text{mV/V} \times \text{Excitation Voltage} \times 1000}{\text{Load Cell Capacity} \times \text{Ratio}}$$

Equation 4-1 Microvolts Per Increment Calculation

Calculate the microvolts per increment using equation 4-1. The increment size, scale capacity and load cell capacity must all be measured in the same weight units, lb or kg. If the weight units for any of these variables are listed in kg units, multiply by 0.45359 to convert to lb units for the purposes of this calculation.

Load cell output is rated in mV/V (millivolts per volt of excitation), marked on load cell data tag. METTLER TOLEDO load cells are typically 2 mV/V. Other load cells can range from 1 mV/V to 4.5 mV/V. The 8522 excitation voltage is 12.5 VDC.

The load cell capacity is the rated capacity marked on load cell data tag. The ratio is the total number of load cells in the system or the total lever ratio (if scale is a mechanical lever system conversion).

Total Increments Calculation
Calculate the total number of increments by dividing capacity by the increment size.

Microvolt Build Table
Use Table 4-4 to determine if the **µV** (microvolt) per increment calculated is within the range allowed for the total number of increments calculated..

Total Number of Increments	Minimum µV per Increment	Maximum µV per Increment	
		2 mV/V	3 mV/V
600	5.0	43.3	63.3
1,000	3.0	26.0	38.0
1,200	2.5	21.7	31.7
1,500	2.0	17.3	25.3
2,000	1.5	13.0	19.0
2,500	1.2	10.4	15.2
3,000	1.0	8.7	12.7
4,000	0.75	6.5	9.5
5,000	0.6	5.2	7.6
6,000	0.5	4.4	6.4
8,000	0.375	3.3	4.8
10,000	0.3	2.6	3.8
12,000	0.3	2.2	3.2
15,000	0.3	1.7	2.5
16,000	0.3	1.6	2.4
20,000	0.3	1.3	1.9

Microvolt Build
Table 4-4

Microvolt Build Table Notes:

1. The 8522 should never be programmed for less than 1.0 µV per increment when used with single load cell applications and never less than 0.3 µV per increment when used with multiple load cell applications.
2. The 8522 **CANNOT** be calibrated for builds that exceed the maximum µV per increment.

Millivolt per Volt Jumper Selection (Optional Analog Scale Input)
Jumper W1 on the analog scale input PCB selects 2 mV/V load cell input when shorting pins 1 and 2 together or selects 3 mV/V load cell input when shorting pins 2 and 3 together.

Refer to Figure 4-1 for Jumper W1 location. Refer to the 2 mV/V and 3 mV/V columns under Maximum mV per Increment in Table 4-4.

Example mV per Increment Calculation
Refer to the following example of mV per increment calculation for a Model 2158 floor scale installation.

Scale Capacity	5000 lb
Increment Size	0.5 lb
Load Cell Capacity	2500 lb
Number of Cells	4
Cell Output	2 mV/V
Excitation Voltage	12.5 VDC

First use the Equation 4-1 to calculate the mV per increment.

$$\frac{0.5\ lb\ x\ 2mV/V\ x\ 12.5V\ x\ 1000}{2500\ lb\ x\ 4\ load\ cells}$$

Equation 4-2 Example Microvolt Per Increment Calculation

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

$$\frac{5000\ lb}{.05\ lb} = 10{,}000\ Total\ Increments$$

Equation 4-3 Example Total Number of Increments Calculation

Check Table 4-4 to see that a microvolt build of 1.25 µV per increment build is within the acceptable range for 10,000 increments. It is, so this is an acceptable build.

Programming Procedure

This section of the technical manual describes the programming of the operating modes and features of the 8522 as well as calibration.

Keyboard Functions During Setup

The following front panel keys perform the specified functions when in the programming mode unless other instructions are given for a particular step.

PRINT - Press this key to accept the displayed selection and proceed to the next prompt.

ZERO - Press this key to back-up to the previous prompt.

CLEAR - Press this key to clear the displayed value to permit re-entry of data.

1 - Press this key to enable or "turn ON" the displayed programming selection. This key is also used with the numeric keys for entering values.

0 - Press this key to disable or "turn OFF" the displayed programming selection. This key is also used with the numeric keys for entering values.

Numeric Keys - Press these keys to select and program certain values. The **2** through **9** numeric digits are also used to access the setup steps.

Access the Setup Mode

Place the Main PCB setup jumper W1 into the IN position (shorting the two pins together) to enter the setup mode. Jumper W1 is located on the left edge of the Main PCB. Refer to Figure 4-2 for W1 jumper location.

When the setup jumper (W1 in Figure 4-2) is placed IN (shorting the two pins together), the Model 8522 will display **[- -]**. To access any group of setup steps, enter in the step number of that group using the numeric keys on the keyboard. To access an individual step, enter the setup step number instead of the group heading number.

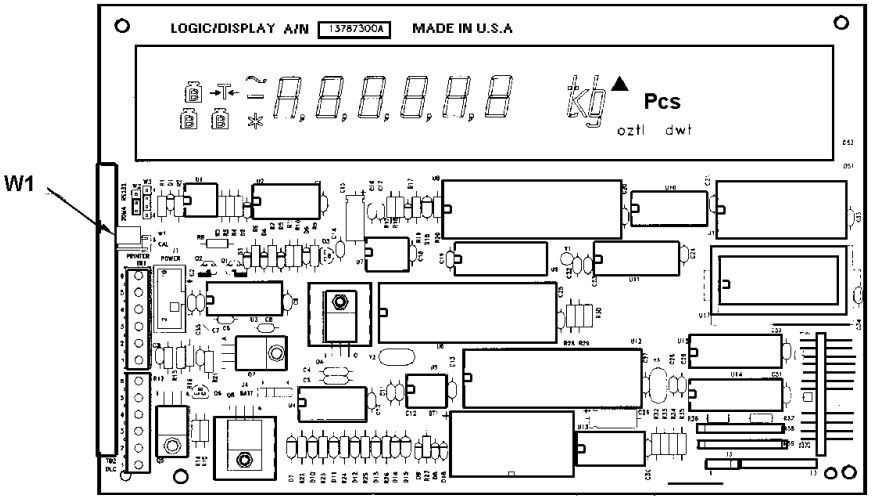


Figure 4-2 - 8522 Main PCB

Programming Explanation

The programming steps for the Model 8522 are divided into eight main groups of steps. The number of steps in a group will vary depending upon which group is selected. The complete group may be accessed to program each of the selections within the group or any one of the programming steps may be accessed individually.

All setup step options are listed in the Quick Reference Chart where a complete description of each setup step is given. Use the Quick Reference Chart as a beginning point for initial setup. The default selection for each step is indicated in **Bold**. Setup steps that effect legal-for-trade applications are marked with a (*). Verify scale type selection, calibration units, capacity and increment size before calibration.

SETUP QUICK REFERENCE CHART

STEP	DESCRIPTION	SELECTIONS
00	SCALE GROUP	
01	Scale Type	**0 = Digital Load Cell** 1 = Analog Load Cell 2 = Not Used 3 = Digital J-Box (Model 2157)
03	Number of Load Cells	Digital J-Box (Model 2157) only
05	Reset Shift Constants	Digital J-Box (Model 2157) only
06	Shift Error Compensation	Digital J-Box (Model 2157) only
10	CALIBRATION GROUP	
11	Calibration Units	**0 = pounds** 1 = kilograms 2 = grams 3 = tons 4 = oz 5 = ozt 6 = dwt
12	Linearity Compensation	0 = Linearity Disabled 1 = Linearity Enabled
13	Autorange Selection*	1 = Single Range Weighing Mode 2 = Double Range Weighing Mode 3 = Triple Range Weighing Mode
14	Scale Capacity*	100
15	High Range Increment*	0.02
16	Middle Range Increment	Dual and triple weight range only
17	Low Range Increment	Triple weight range only
18	Calibration Procedure	
20	ZERO AND FILTERING GROUP	
21	Zero Adjustment	
22	Span Adjustment	
23	AZM Range *	0 = Disable AZM **1 = AZM Within ± 0.5 d, Gross only** 2 = AZM Within + 1 d, Gross only 3 = AZM within ± 3 d, Gross only 4 = AZM within ± 0.5 d, Gross or net 5 = AZM within + 1 d, Gross or net 6 = AZM within + 3 d, Gross or net
24	Powerup Zero Capture*	0 = Disable Powerup Zero Capture **1 = Zero Capture ± 2% Capacity** 2 = Zero Capture ±10% Capacity
25	Pushbutton Zero Range*	0 = Disable Pushbutton Zero **1 = Zero within ± 2% of Capacity** 2 = Zero within ± 20% of Capacity
26	Motion Detection*	0 = Disable Motion Detect 1 = ± 0.5 Increment 2 = ± 2 Increments 3 = ± 2 Increments 4 = ± 3 Increments
27	Display Filtering	0 = Disable Filtering **1 = Light Filtering** 2 = Medium Filtering 3 = Heavy Filtering
27A	DigiTOL® L/C Filter	0 = Disable Internal Load Cell Filter **1 = Enable Internal Load Cell Filter**
28	Overcapacity Blanking*	100.10

STEP	DESCRIPTION	SELECTIONS
30	TARE GROUP	
31	Tare Mode Select	0 = Disable Tare 1 = Pushbutton Tare Only **2 = Pushbutton and Manual Tare**
32	Tare Interlock*	**0 = Disable Tare Interlocks** 1 = Enable Tare Interlocks
33	Manual Tare In	**0 = Manual Tare All Ranges** 1 = Manual Tare Low Range Only
34	Autoclear Tare	**0 = Disable Autoclear Tare** 1 = Enable Autoclear Tare
35	Center of Zero Cursor	0 = Disabled 1 = Gross Zero 2 = Gross and Net Zero
38	Accumulator	**0 = Disable Accumulation** 1 = Displayed Weight 2 = Gross Weight 3 = Net Weight 4 = Count
39	Memory Operation	0 = Disable Memory 1 = Temporary Store Tare 2 = Permanent Stored Tare 3 = Accumulator only 4 = Permanent Tare & Accumulator
40	DATA OUTPUT GROUP	
41	Output Data Format	0 = Continuous Output **1 = Demand Output** 2 = <ENQ> Continuous Output
42	Baud Rate	9600
43	Parity Selection	0 = Parity bit always a "0" 1 = Odd Parity **2 = Even Parity**
44	Checksum	0 = Disable Checksum 1 = Enable Checksum
45	Autoclear Tare After Print	0 = Disable Print Autoclear Tare 1 = Enable Print Autoclear Tare
46	Print Interlock/Autoprint	**0 = Normal Operation** 1 = Print Interlock 2 = Autoprint
47	Minimum Print	**0 = 0 Increments** 1 = 10 Increments 2 = 100 Increments 3 = 500 Increments
48	Net Sign Correction	0 = Disable Net Sign Correction 1 = Net Sign Corrected Print 2 = Net sign Corrected Print & Display NOTE: In "C" revision software and later, the absolute vale of net weight will be displayed when Net Sign Correction is enabled.

Recommended default selections are shown in **Bold**.

* = Requires specific selection for legal-for-trade applications.

STEP	DESCRIPTION	SELECTIONS
49	Leading STX Character	0 = Disable STX in Demand Output 1 = Enable STX In Demand Output
51	Multiple Line Output	0 = Single Line Output 1 = Multiple Line Output 2 = Flexible Demand Output
52	Print Fields	234 0 = Memory ID 1 = Displayed Weight 2 = Gross Weight 3 = Tare Weight 4 = Net Weight 5 = Average Piece Weight 6 = Count 7 = Scale ID 8 = Time and Date 9 = Blank Field or New Line
53	Print Weight Expanded	0 = Disable Expanded Printing 1 = Enable Expanded Printing
54	Print Weight Legend*	0 = No Weight Units Legend 1 = Print Weight Units Legend
55	Scale ID	01
56	Time and Date Format	0 = No Time or Date 1 = MM/DD/YY 2 = DD.MM.YY 3 = YY/MM/DD 4 = HH:MM PM MM/DD/YY 5 = DD.MM.YY HH:MM (24 Hour) 6 = YY/MM/DD HH:MM (24 Hour)
60	INTERNATIONAL GROUP	
61	Analog Verify	0 = Disable Analog Verify 1 = Enable Analog Verify
62	Enable lb/kg Switching	0 = Disable lb/kg key 1 = Enable lb/kg switching
63	Powerup Weight Units	0 = Powerup in kg units 1 = Powerup inlb units
64	Bracketed Printing	0 = Normal Weight Printing 1 = Bracketed Measured Weights
65	Print "PT" or "TRH"	0 = Keyboard Tare Legend "TRH" 1 = Keyboard Tare Legend "PT"
66	Remote Control Input	0 = Remote Print key 1 = Remote Tare key 2 = Remote Zero key 3 = Remote Clear key 4 = Remote Blank Display 5 = ASCII Character Input
68	Comma/Decimal Point	0 = Normal Decimal Point 1 = Comma Instead of Decimal
69	Eng/German Symbols	0 = English Symbols 1 = German Symbols
70	PARTS COUNTING GROUP	
71	Counting Mode	0 = Disable Parts Countiing Mode 1 = Enable Parts Counting Mode
72	Sampling Size and Mode	0 = Variable Sample Size 1 = 5 Piece Fixed Sample Size 2 = 10 Piece Fixed Sample Size 3 = 20 Piece Fixed Sample Size 4 = 50 Piece Fixed Sample Size 5 = 100 Piece Fixed Sample Size
73	Autoclear APW	0 = Disable Autoclear APw 1 = Enable Autoclear APW
74	Auto Sample Accept	0 = Disable Auto Sample Accept 1 = Enable Auto Sample Accept
75	Minimum Sample Weight	0 = 0.00% of Scale Capacity 1 = 0.02% of Scale Capacity 2 = 0.05% of Scale Capacity 3 = 0.10% of Scale Capacity
76	Sample Enhancement	0 = Disable Sample Enhancement 1 = Enable Sample Enhancement
78	Count Expanded Printing	0 = Print Count Normal Size 1 = Print Count Expanded
	DIAGNOSTICS	
81	Expanded Weight Display	0 = Disable Expanded Display 1 = Enable Expanded Display
98	Display Load Cell Counts	Digital J-Box (Model 2157) only
99	Reset Default Selections	0 = Skip Reset to Default Selections 1 = Reset To Default Selections

Recommended default selections are shown in Bold.
* = Requires specific selection for legal-for-trade applications.

Programming Setup Steps

[00] ACCESS SCALE CONFIGURATION GROUP

Enter the digits "0" then "0" to access the scale configuration group. The 8522 begins at step [01] and then returns to [--] display or advances through step [06] if digital j-box is selected.

[01 0] SCALE TYPE

Determine the scale base or cell used with the Model 8522 is analog (Models 1985, 2095, 2185, etc.), single DigiTOL® (Models 1996, 1997, 2096, 2097, 2196 and 2197) or the digital j-box (Model 2157 Floor Scale) used with analog load cells.

Selection	Type of Load Cell
0	Single DigiTOL© load cell
1	Analog load cell
2	Not Used
3	Digital J-Box (Model 2157 Floor Scale)

Note: Setup steps **[03]**, **[05]**, **[06]**, and **[98]** are only accessed in Digital J-Box mode, **[01 3]**.

[03 4] Number of Load Cells

Enter the number of load cells used with the digital j-box. Valid selections are from 2 to 4. The Model 2157 floor scale always uses 4 load cells.

[05 0] Reset Digital J-Box Shift Adjust Values

This step resets all shift adjust values to a 1. The load cell outputs are used directly without any corner trimming. This acts as if the load cells are wired in parallel as in a conventional analog j-box without any trim resistors. Use this selection instead of shift adjust, step [06], for applications where a shift test is not practical or needed, (example tank and hopper scales).

0 - Skip this step.
1 - Reset shift adjust values to a 1.

[06 0] Digital J-Box Shift Adjust

This step is used to compensate for shift (corner errors) in the 2157 floor scale or for digital j-box applications that require shift compensation. Calibrated test weights are not required for shift adjust. Use step [98] to verify that the load cells have been shimmed to equal loading before performing shift adjust for new installations.

0 - Skip this step.
1 - Access shift adjust procedure.

Shift Adjust Procedure:

[E SCL] Verify that the scale platform is empty and press the ENTER key.
[15 CAL] Display counts down from 15 to 0 as the zero weight reading is recorded.
[CELL 1] The 8522 is prompting the operator to place a test weight on load cell #1.
[15 CAL] Display counts down from 15 to 0 as the weight reading is recorded.
[CELL 2] The 8522 is prompting the operator to move the test weight to load cell #2.
[15 CAL] Display counts down from 15 to 0 as the weight reading is recorded.

Note: If more than 2 load cells were selected at step **[03]**, then the 8522 repeats the **[CELL X]** and **[15 CAL]** procedure for load cells 3 and 4.

[10] ACCESS CALIBRATION GROUP

Enter the digits "1" then "0" to access the calibration group. The 8522 begins at step **[11]** and advances through step **[18]**.

[11 0] WEIGHT UNITS

Select the weight units the 8522 will use for calibration and display of weight.

Selection	Weight Units
0	lb
1	kg
2	g
3	t
4	oz
5	ozt
6	dwt

[12 0] LINEARITY COMPENSATION

Linearity compensation corrects for nonlinearity in the weighing performance of the load cell. This is accomplished by taking a reading at zero, mid-range and at scale capacity. In order for linearity compensation to work correctly, it is important to use test weights that are as close to programmed full scale and half scale capacity as possible.

0 - Linearity compensation disabled.
1 - Linearity compensation enabled.

[13 1] AUTORANGE® SELECTION

The 8522 can be programmed for one, two or three display increment sizes. Enter the number of weight display ranges the 8522 is to use: **[1]**, **[2]**, or **[3]**. Refer to section 5.7. for a detailed description of Autorange® operation.

Selection	Autorange® Mode
1	Single Range
2	Dual Range
3	Triple Range

Notes:

1: Steps **[16]** and **[17]** are skipped when step **[13 1]** is selected.
2: Step **[17]** is skipped when step **[13 2]** is selected.

[14] [XXXXXX] SCALE CAPACITY

Enter the total scale capacity **[XXXXXX]** in the weight units selected in step **[11]**. Refer to the data plate and technical manual of the scale base to verify the capacity selection. Refer to Section 4.2 if a nonstandard capacity is desired. Enter the desired capacity using the digits on the numeric keyboard of the 8522 then press the **PRINT** key. Press the **CLEAR** key to clear the display if an error is made during entry.

[15 0.0X] HIGH RANGE INCREMENT SIZE

The 8522 displays the current increment size and decimal point selection of the high range increment size. If the displayed data is not correct, press the "0" key until the desired decimal point position is displayed then press the increment size digit (either "1", "2" or "5") on the keyboard to terminate the entry. This will select both the decimal position and increment size in one step. Refer to Section 4.2 for minimum increment size selection information.

0 - Toggles the display through all available decimal point positions.
1 - Selects an increment size of 1 after the decimal point has been selected.
2 - Selects an increment size of 2 after the decimal point has been selected.
5 - Selects an increment size of 5 after the decimal point has been selected.

NOTE: On "**C**" revision software and later, the displayed weight when the scale is at zero will show the leading zero. This was a change made to the "C" revision software, early revisions of software did not show the leading zero when the scale is at zero.

[16 0.00X] MID RANGE INCREMENT SIZE

The display will show the increment size and decimal point position of the mid range increment size used when the 8522 was last calibrated. If the displayed data is not correct, use the procedure described for setup step [15] to select a new mid range increment size. Refer to Chapter 4 Scale Build Determination for minimum increment size selection information.

[17 0.00X] LOW RANGE INCREMENT SIZE

The display will show the increment size and decimal point position of the low range increment size used when the 8522 was last calibrated. If the displayed data is not correct, use the procedure described for setup step **[15]** to select a new low range increment size. Refer to Chapter 4 Scale Build Determination for minimum increment size selection information.

[18] ACCESS CALIBRATION PROCEDURE

This step accesses scale calibration. Known test weights are required for this step.

0 - Skip calibration procedure.
1 - Access calibration procedure.

The 8522 will follow one of two possible calibration procedures depending on how linearity compensation, setup step **[12]**, is selected. If linearity compensation is disabled, the 8522 prompts **[Add Ld]** during the calibration procedure. If linearity compensation is enabled, the 8522 prompts **[Add FL]** for full capacity test weight and then **[Add LO]** for half capacity test weights during the calibration procedure.

[E SCL] EMPTY SCALE

Remove all weights from the scale platform then press the **PRINT** key. The display then counts down from 16 to 1 as a zero reference weight is recorded for the scale.

[Add Ld] ADD LOAD (Linearity Comp Disabled, Step [12 0])

Place known test weights on the scale platform. Use a value as close to full capacity y as possible. Press the **PRINT** key, after the test weights are placed on the scale.

or

[Add FL] ADD FULL LOAD (Linearity Comp Enabled, Step [12 1])

Place full capacity test weights on the scale platform. A value as close to full capacity as possible should be used. Linearity compensation, the test weight MUST be very close to full scale capacity or the linearity compensation may cause large errors at higher weights. After the test weights have been added to the scale, press the **PRINT** key.

[.] ENTER TEST WEIGHT VALUE

Enter the value of the test weight using the numeric keys on the 8522 keyboard, press the **PRINT** key to terminate entry. The test weight value entered must agree with the increment size used by the scale. The display then counts down from 16 to 1 while span is recorded.

NOTE: If an **[E38]** error code is displayed during calibration, the 8522 is notifying you that this is a poor build for parts counting. Press the **CLEAR** key to advance past the error.

[Add LO] ADD LOW LOAD (Linearity Compensation Enabled, Step [12 1])

Place half capacity test weights on the scale. Use a value as close to 50% of full capacity as possible. After the weight is placed on the scale, press the **PRINT** key.

[.] ENTER LOW TEST WEIGHT VALUE

Enter the value of the test weight using the numeric keys on the 8522 keyboard, press the **PRINT** key to terminate entry. The test weight value entered must agree with the increment size used by the scale. The display then counts down from 16 to 1 while span is recorded.

[CAL d] CALIBRATION DONE

This prompt is displayed for a few seconds to indicate that calibration was successful, then the display returns to the **[--]** prompts.

[20] ZERO MAINTENANCE AND FILTERING GROUP

Enter the digits "2" then "0" to access the zero maintenance and filtering group. The 8522 begins at step **[21]** and advances through step **[28]**.

[21] ZERO ADJUSTMENT

This step adjusts the powerup zero reference recorded in step **[18]**.

0 - Skip zero adjustment.
1 - Record the current weight as the new zero reference.

[22 0] SPAN ADJUSTMENT

This step adjusts the span reference recorded in step **[18]**. Place a known test weight on the scale platform before entering the setup mode. The standard calibration must have been completed to provide a reference point before using this feature.

0 - Skip span adjustment.
1 - Access span adjust. The display shows **[000000]**. Enter the value of the weight on the scale using and press the **PRINT** key. Span adjust value entered must agree with the increment size of the scale.

[23 1] AUTO ZERO MAINTENANCE (AZM)

AZM removes small changes in zero caused by temperature change or build up of material on the platform. This step selects the range of weight around zero that AZM operates in. AZM will adjust for zero changes at the rate of 0.03 increments per second when the weight is within the AZM range. AZM will operate up to total weight equal to the pushbutton zero range selected in setup step **[25]**, ±2% or ±20 of scale capacity.

Selection	AZM Range	Legal-For-Trade Applications	AZM Mode
0	AZM Disabled	Not Applicable	
1	±0.5 Increment	Animal, Food and Retail Scales	Gross weight mode
2	±1 Increment	All other Industrial Scales	at gross zero
3	±3 Increment	Vehicle Scales	
4	±0.5 Increment	Animal, Food and Retail Scales	Gross or net weight
5	±1 Increment	All other Industrial Scales	mode at gross zero
6	±3 Increment	Vehicle Scales	

[24 1] AUTO ZERO CAPTURE AT POWER UP

If enabled the 8522 will attempt to capture zero at power up. The 8522 will show a flashing [E E E] or [-E E E] display until zero is captured if power up zero capture is enabled.

Selection	Power up Auto Zero Capture Range
0	Disabled
1	± 2% of Scale Capacity
2	± 10% of Scale Capacity

Note: USA and Canadian legal-for-trade applications limit zero capture at power up to ±2%.

[25 2] PUSHBUTTON ZERO RANGE

Pushbutton zero recaptures the center of zero reference. This function is used to compensate for material build up on the scale. Zero capture is inhibited if the scale is in motion. Canadian legal-for-trade applications are limited to ±2% pushbutton zero operation.

Selection	Pushbutton Zero Range
0	Disabled
1	± 2% of Scale Capacity
2	± 20% of Scale Capacity

[26 2] MOTION DETECT WINDOW

The Model 8522 includes an stability detector (weight in motion) which requires three successive weight readings within the motion detect window for a "no motion" signal. Zero, tare and demand mode printing are inhibited during motion. Legal-for-trade applications require the specified selection for the type of scale in use.

Selection	Motion Detect Window	Legal-For-Trade Applications
0	Disabled	Not Applicable
1	± 0.5 Increment	Not Applicable
2	± 1 Increment	Scales < or = 5000 lb Capacity
3	± 2 Increment	Not Applicable
4	± 3 Increment	Scales > 5000 lb Capacity

[27 1] DISPLAY FILTERING RATE

The Model 8522 has a low pass, multi-pole vibration filter that is selectable for various conditions. The display settling time is slowed as heavier filtering is selected.

Selection	Filtering Rate
0	No Filtering
1	Low Filtering
2	Medium Filtering
3	High Filtering

[27A 1] DigiTOL© LOAD CELL INTERNAL FILTER

This step is skipped unless DigiTOL© Load cell is selected, step [01 0].

0 - Disable internal load cell filter for DigiTOL© load cells

1 - Enable internal load cell filter for DigiTOL© load cells

[28] [XXXXXX] OVERCAPACITY BLANKING VALUE

Enter the weight value [XXXXXX] at which the 8522 indication will blank over capacity. Press the ENTER key to accept entry. Legal-for-trade applications must not exceed 105% of scale capacity. Default selection is capacity plus five increments.

[30] TARE AND DISPLAY TIMER GROUP

Enter the digits "3" then "0" to access the tare and display group. The 8522 begins at step [31] and advances through step [36]. Steps [38] and [39] are only accessible directly.

[31 2] Tare Mode

Tare is used to subtract the empty weight of the container or vehicle from the gross weight on the scale. Tare is inhibited if the scale is in motion. Refer to Chapter 5 for tare explanation.

Selection	Tare Mode
0	Tare Disabled.
1	Pushbutton Tare Enabled, Keyboard Tare Disabled.
2	Pushbutton Tare Enabled, Keyboard Tare Enabled.

[32 0] TARE INTERLOCKS

Tare interlocks meet legal-for-trade requirements by including the **following** restrictions:

Tare weights can be cleared only at gross zero. Tare can only be entered when the scale is the gross mode. Keyboard tare can be entered only at gross zero. Previous tare values must be cleared before a new tare value can be entered. Multiple or chain tares are inhibited.

0 - Disable Tare interlocks.
1 - Tare interlock enabled.

[33 0] KEYBOARD TARE IN LOW RANGE ONLY

Keyboard entered tare can be enabled for use in either all weight ranges or only in the low weight range when Autorange® operation is selected. If keyboard tare is restricted to the low weight range any manual tare weight that is larger than the low range capacity will not be accepted. This step does not effect pushbutton tare which may be taken in any weight range.

0 - Keyboard tare is allowed up to total (high range) scale capacity.
1 - Keyboard tare may not exceed the low weight range capacity.

[34 0] AUTOCLEAR TARE

Tare is autocleared when the scale returns to the center of gross zero (within ±0.25 increments of zero) after settling to a no motion condition at least ten increments above net zero.

0 - Disable Autoclear Tare.
1 - Enable Autoclear Tare.

[35 1] CENTER OF ZERO LEGEND

The 8522 has a selectable center of zero indication. The center of zero legend is illuminated when the weight on the scale is within 0.25 increments of zero.

Selection	Zero Legend Mode
0	Disabled
1	Gross Zero
2	Gross and Net Zero

[38 0] ACCUMULATION

The 8522 provides two, 12 digit accumulators for total and subtotal accumulation of weight or count data. Accumulation occurs when a print request occurs. This selection also controls the accumulation mode of the 100 scale memory feature.

Selection	Accumulation Mode
0	Disabled
1	Displayed Weight
2	Gross Weight
3	Net Weight
4	Count

NOTE: lb/kg switching is disabled if accumulation is enabled.

[39 0] SCALE MEMORY MODE

The 8522 scale memory feature provides 100 memory locations that can be used to store up to 100 tare weights. Each memory location can also be used to accumulate six digits of accumulated weight or count data.

The tare memories can be used for temporary stored tare weights (stored tare is cleared when tare is recalled), or can be used for permanent stored tare weights (stored tare is retained until manually cleared). Data accumulation is controlled by step **[38]** selection.

Selection	Memory Mode
0	Memory Disabled
1	Temporary Stored Tare
2	Permanent Stored Tare
3	Accumulator Only / No Tare
4	Permanent Stored Tare & Accumulator

[40] DATA OUTPUT GROUP

Enter the digits "4" then "0" to access the data output group. The 8522 begins with step [41] and advances through step [56].

[41 1] OUTPUT DATA FORMAT

The 8522 supplies two modes of data output, demand and continuous. The demand output is variable in format and is output when a print request is made either by means of the PRINT key, autoprint function or by an external print request. The standard continuous format is output every A/D update. The <Enq> continuous mode is identical to the standard continuous format except that data is output only when requested by the external device sending an ACSII <Enq> character, (hex 05).

Selections	Data Output Mode
0	Continuous Format Output
1	Demand Mode Output
2	<Enq> Continuous Output

NOTE: ACSII character input MUST be enabled **[66 5]**, for <Enq> Continuous Mode to operate.

[42 300] Baud Rate

Select the desired baud rate for the output port by toggling through the available selections using the "0" key. When the desired baud rate is displayed, press the "1" key or the **PRINT** key to accept the selection. Baud rate selections are: 300, 1200, 2400, 4800 and 9600.

[43 2] PARITY BIT

Selection	Parity Selection
0	8 Data Bits, No Parity
1	7 Data Bits, Odd Parity
2	7 Data Bits, Even Parity

[44 0] CHECKSUM

Checksum is used to detect errors in the transmission of data. Checksum is defined as the 2's complement of the seven low order bits of the binary sum of all characters preceding the checksum character, including the <STX> and <CR> character. The checksum character for multiple lines of data includes the <LF> character from the previous line of data.

0 - Disable Checksum
1 - Enable Checksum

[45 0] AUTOCLEAR TARE AFTER PRINT

0 - Autoclear tare after printing is disabled.
1 - Tare is automatically cleared after printing.

[46 0] AUTOPRINT AND PRINT INTERLOCK

Print interlock prevents repeat printing. Print interlock requires that the weight on the scale return to zero (or less than the minimum print selection) and then settle to a weight greater than the minimum print selection before a subsequent print request is acted on. Autoprint causes a print request to occur every time the weight on the scale settles on a positive value larger than the minimum print selection.

Selection	Selection
0	Normal Print Operation
1	Print Interlock
2	Autoprint

Note: Autoprint will only operate in the count mode if parts counting is enabled, step **[71 1]**.

[47 0] MINIMUM PRINT

The displayed weight must exceed the minimum print selection to allow a print function to occur. Minimum print also controls resetting autoprint and print interlock. Minimum print must be set to a non-zero value for autoprint to operate properly.

Selection	Minimum Print
0	None
1	10 Increments
2	100 Increments
3	500 Increments

[48 0] NET SIGN CORRECTION

This step allows storage of a gross weight as well as a tare weight in the tare register. When the stored tare weight is larger than the weight currently on the scale, the printer output is rearranged so that the larger value is the gross weight, the smaller value is the tare weight and the net weight is positive. The 8522 weight display can be configured to display a negative net weight as either negative or positive weight.

NOTE: In "C" revision software and later the absolute vale of net weight will be displayed when Net Sign Correction is enabled.

Selection	Selection
0	Normal Operation
1	Negative net weights are printed as positive and displayed as negative.
2	Negative net weights are printed and displayed as positive.

[49 1] ENABLE STX CHARACTER

Normal demand mode output has an ASCII Start of Text <STX> character as the beginning of the data transmission. The leading <STX> character can be inhibited for application that are not compatible with the <STX> character. The <STX> character is required for use with METTLER TOLEDO Printers Models 307, 8806 or 8860.

0 - Do not sent <STX> character.
1 - Send the <STX> character.

[51 1] DEMAND FORMAT ENABLE

The 8522 has three versions of demand mode output, single line, multi-line and flexible format. Select the version of demand mode output required, refer to step **[52]** for further information about demand mode output formats.

Selection	Demand Format
0	Single Line Format
1	Multiple Line Format
2	Flexible Format

[52 0] ACCESS PRINT FIELDS

0 - Skip Demand Format Print Fields Entry
1 - Access Demand Format Print Fields Entry

The 8522 has three versions of demand mode output, single line, multi-line and flexible format. Single line format and multiple line format are the standard single line and multiple line demand format output. The flexible format is a new output mode that provides greatly expanded control over data output.

[234] PRINT FIELDS, SINGLE OR MULTIPLE LINE DEMAND FORMAT

Single line output sends all the data fields selected at step **[52]** as one line of data terminated by a new line (<CR>, optional checksum character, and a <LF>). A blank field/new line selection **[9]** results in 8 spaces.

Multiple line output sends each data field, selected at step **[52]**, as an individual line of data terminated by a new line (<CR>, optional checksum character, and a <LF>). A blank field/new line selection **[9]** results in a new line (<CR><CHK><LF>.

Enter desired print fields from Table 4-5 and press the **PRINT** key to accept entry. If six print fields are entered the 8522 will accept the entry without having to press the **PRINT** key. Print fields can be repeated as desired, print field entry is limited to 6 fields. The time and date field is printed in the format selected in step **[56]**. The blank or new line selection, is 8 spaces for single line mode, or a new line (<CR><CHK><LF>) for multi-line and flexible mode.

Selection	Variable Print Fields
0	Memory ID
1	Displayed weight
2	Gross weight
3	Tare weight
4	Net weight
5	Average piece weight
6	Piece count
7	Scale ID number
8	Time/Date (*)
9	Blank field or New Line

Table 4-5 - Variable Print Fields

FLEXIBLE FORMAT PRINT FIELDS

Flexible format output gives complete control over the data output format. From 1 to 150 data fields can be output, each data field can consist of either a variable print field or an ASCII character. The variable data fields are the same as the multiple line demand mode output print fields. Refer to Table 4-5 for variable print fields.

[52 001] Edit Field Location 1

Enter the field location to be edited. Valid field locations are from 001 to 150. If an error is made in location entry, continue entering numbers until the displayed value is correct, previously entered numbers will scroll off to left and are erased. Press the PRINT key to accept the field location displayed. Press the **ZERO** key to back up to the previous field location. Press the **CLEAR** key to exit step **[52].**

Once the field location has been entered the 8522 will then display the contents of the field location selected, either a variable print field or an ASCII character.

[dAtA X] Variable Print Field X
or
[AXXX N] ASCII Character XXX and Repeat Number N

[d -] Edit Variable print Field

If the field location contains a data field, the value [X] at the right of the display is the variable print field selection. Enter the value of the desired variable print field from Table 4-5. If an incorrect data field is selected then press the correct data field number. The previously entered selection is replaced. Press the PRINT key to accept the displayed value. A blank field/new line selection [9] results in a new line (<CR><CHK><LF>.

If the field location contains an ASCII character, the decimal value of the ASCII character **[XXX]** value, and the repeat value **[N]** for the character is displayed. Refer to Table 4-6 for ASCII Character decimal values. The repeat value **[N]** is the number of times, from 1 to 9, the ASCII character is to be output.

PRINT - Accepts the displayed value and advances to the select field location prompt **[52 XXX]**, where **[XXX]** is equal to the next field location.

ZERO - Back up to the previous field location.

CLEAR - Edits the displayed field. The 8522 will then display:

[d or A] Select Data field or ASCII Character

1 - Select Variable print Field

2 - Select ASCII Character

[A ---] Enter ASCII Character Decimal Value

Enter the decimal value of the desired ASCII character from Table 4-6. If an incorrect value is entered then continue entering data until the displayed value is correct. Press the **PRINT** key to accept the displayed value.

ASCII	DEC	ASCII	DEC	ASCII	DEC	ASCII	DEC	ASCII	DEC	ASCII	DEC	ASCII	DEC	ASCII	DEC
NUL	000	DLE	016	SP	032	0	048	@	064	P	080	`	096	p	112
SOH	001	DC1	017	!	033	1	049	A	065	Q	081	a	097	q	113
STX	002	DC2	018	"	034	2	050	B	066	R	082	b	098	r	114
ETX	003	DC3	019	#	035	3	051	C	067	S	083	c	099	s	115
EOT	004	DC4	020	$	036	4	052	D	068	T	084	d	100	t	116
ENQ	005	NAK	021	%	037	5	053	E	069	U	085	e	101	u	117
ACK	006	SYN	022	&	038	6	054	F	070	V	086	f	102	v	118
BEL	007	ETB	023	`	039	7	055	G	071	W	087	g	103	w	119
BS	008	CAN	024	(	040	8	056	H	072	X	088	h	104	x	120
HT	009	EM	025	)	041	9	057	I	073	Y	089	i	105	y	121
LF	010	SUB	026	*	042	:	058	J	074	Z	090	j	106	z	122
VT	011	ESC	027	+	043	;	059	K	075	[	091	k	107	{	123
FF	012	FS	028	'	044	<	060	L	076	\	092	l	108	|	124
CR	013	GS	029	-	045	=	061	M	077	]	093	m	109	}	125
SO	014	RS	030	.	046	>	062	N	078	^	094	n	110	~	126
SI	015	US	031	/	047	?	063	O	079	_	095	o	111	DEL	127

Table 4-6 - ASCII Character Chart

[no X] Enter Repeat Value for ASCII Character

Enter the number of times the ASCII character is to be repeated. If an incorrect repeat value is selected then press the correct number. The previously entered selection is replaced. Press the PRINT key to accept the displayed value.

[52 XXX] Edit Field Location XXX

Enter next field location to be edited. Press the PRINT key to accept the displayed field location. Press the CLEAR key to exit step [52]. Program an ASCII <NUL> character (decimal value 000) to terminate flexible format output. All field locations after a <NUL> character are deleted.

NOTE: All characters after a <NUL> character in the entire flexible Format are erased. Enter a <NUL> character in field 000 to totally erase your existing flexible format programming.

[53 0] PRINT WEIGHT EXPANDED

If enabled, an ASCII <SO> character is transmitted before the data field and an ASCII <SI> after the weight field to select expanded displayed weight printing with the Model 307, 8806 and 8860 printers.

0 - Disable Expanded Weight Printing.
1 - Enable Expanded Weight Printing.

[54 0] PRINTED WEIGHT UNIT LEGEND

0 - Disable Weight Unit Legend Printing
1 - Enable Weight Unit Legend Printing

[55 01] SCALE ID

Enter the scale ID number (from 00 to 99) that will be transmitted when selected to print in step [52]. A single digit can be entered by pressing the PRINT key after the single entry.

[56 4] Time and Date Format

Selection	Time and Date Output Format
0	Time and Date Disabled
1	MM/DD/YY
2	DD.MM.YY
3	YY/MM/DD
4	HH:MM PM MM/DD/YY
5	DD.MM.YY HH:MM (24 Hour)
6	YY/MM/DD HH:MM (24 Hour)

[60] INTERNATIONAL GROUP

Enter the digits "6" then "0" to access the international group. The 8522 begins with step **[61]** and advances through step **[69].**

[61 0] ANALOG VERIFY

Analog verify checks the output of the integrator section of the analog module to see if it matches the value stored during calibration. This check is made approximately every four hours. If the reading is within tolerance (±1 increment for capacities less than 2000 d or ±2 increments for capacities equal to or greater than 2000 d) the test passes. If the test fails, an error E6 is shown on the display and the scale can not be used until the 8522 is recalibrated.

0 - Disable Analog Verification.
1 - Enable Analog Verification.

[62 1] ENABLE LB/KG SWITCHING

0 - Disable lb/kg switching.
1 - Enable lb/kg switching

NOTE: Lb/kg switching is disabled under the following conditions: accumulation is enabled, setup step **[38]** not equal to a 0, scale memory in use, setup step **[39]** not equal to a 0, or calibration weight units selection other than lb or kg, setup step **[11]** other than a 0 or 1.

[63 1] POWER UP WEIGHT UNITS

0 - Power up in the kg weight units mode.
1 - Power up in the lb weight units mode.

Note: Calibration weight units selection other than lb or kg overrides this step, setup step **[11 0]** or **[11 1]**.

[64 0] MEASURED WEIGHT BRACKETED PRINTING

European legal-for-trade applications require a leading "<" and a trailing ">" bracket around printed weights if the weight is an actual measured value rather than a keyboard "hand" entered value. If both the gross and tare weight values are actual, measured values then the net weight field will also have brackets printed around it.

0 - Disable Measured Weight Brackets.
1 - Enable Measured Weight Brackets.

[65 0] PRINT "PT" FOR KEYBOARD ENTERED TARE

Certain export legal-for-trade applications require printing the abbreviation "TRH" after keyboard "hand" entered tare weights and the abbreviation "NETC" after net weights that result from keyboard entered tare. German legal-for-trade applications use the abbreviation "PT" to indicate hand (keyboard) entered tare. "THR", "PT" and "NETC" abbreviations are only printed if comma in place of decimal point is selected **[68 1].**

0 - Print "TRH" after hand entered tare.
1 - Print "PT" after hand entered tare.

[66 0] REMOTE CONTROL INPUT

The Model 8522 serial input port can be used for a contact closure input (acts as a remote key for the function listed) or to receive single ASCII characters C, P, T, and Z into the printer port to perform clear, print, tare and zero functions. Contact closure inputs use the 20 mA current loop input interface. ASCII character input use RS-232 or 20 mA input interfaces. All remote key inputs except remote blank are momentary inputs, contact must be maintained for remote blank input.

Selection	Function
0	Remote Print key
1	Remote Tare key
2	Remote Zero key
3	Remote Clear key
4	Remote Blank Display
5	ASCII Character Input

NOTE: <ENQ> Continuous mode **[41 2]** will not operate unless ASCII character input is enabled, step **[66 5]**.

[68 0] ENABLE COMMA

European applications use a comma in place of a decimal point for numeric data. This selection replaces the decimal point with a comma in the display and data output.

0 - Use Decimal Point.
1 - Use Comma.

[69 0] GERMAN WEIGHT SYMBOLS

German legal-for-trade applications require that gross weight be indicated by a "B" symbol instead of the "G" symbol normally used.

0 - Display "G" for gross weight mode.
1 - Display "B" for gross weight mode.

[70] PARTS COUNTING GROUP

Enter the digits "7" then "0" to access the data output group. The 8522 begins with step **[71]** and advances through step **[78].**

[71 1] ENABLE PARTS COUNTING MODE

0 - Disable Parts Counting Mode.
1 - Enable Parts Counting Mode.

[72 0] SAMPLING MODE

The 8522 can use fixed or variable sample size. Fixed sample mode simplifies the counting procedure and ensures that a certain minimum sample quantity is used. Variable sample size mode is the most flexible and lets the operator select the appropriate sample size for the part to be sampled. Variable sample mode is disabled if fixed sample mode is selected.

Selection	Sample Mode
0	Variable sample mode
1	5 Piece Fixed Sample Size
2	10 Piece Fixed Sample Size
3	20 Piece Fixed Sample Size
4	50 Piece Fixed Sample Size
5	100 Piece Fixed Sample Size

[73 0] AUTOCLEAR APW

0 - The average piece weight will not clear when the scale returns to zero. The APW must be cleared with the **CLEAR** key.
1 - The average piece weight will automatically clear after settling at a piece count then returning to zero. The scale must return to within ±0.25 increments of zero for autoclear to function.

[74 1] AUTO SAMPLE ACCEPTANCE

0 - Additional sample pieces required to reach the selected minimum sample requirement must be acknowledged by pressing the SAMPLE key. The exact number displayed ([Add 5]) must be added.
1 - Additional sample pieces required to reach the selected minimum sample requirement ([Add 5]) are automatically accepted.

[75 1] MINIMUM SAMPLE REQUIREMENT

This step selects the minimum percentage of scale capacity that the sample pieces must weigh.

Selection	Minimum Sample
0	0.00%
1	0.02%
2	0.05%
3	0.10%

[76 1] SAMPLE ENHANCEMENT

0 - The Model 8522 will operate in the normal sample mode.
1 - Enable sample enhancement mode. Refer to Section 5.6.

[78 0] PRINT COUNT EXPANDED

The Model 307, 8806 and 8860 printers can print the displayed weight as in a double width font by transmitting an ASCII <SO> character before the data field and an ASCII <SI> after the weight field.

0 - Disable Expanded Count Printing.
1 - Enable Expanded Count Printing.

DIAGNOSTICS

[81 0] EXPANDED WEIGHT DISPLAY

Expanded weight display is intended for evaluation of an installation or for troubleshooting purposes only. Expanded weight display is not intended for normal operation. The internal resolution of the scale is displayed. The expanded weight display is ten times the normal displayed resolution with an increment size of 1 and no decimal point.

0 - Disable Expanded Weight Display
1 - Enable Expanded Weight Display

[98 0] DISPLAY LOAD CELL COUNTS

This step allows the display of raw count output for each load cell connected to a DigiTOL® J-box or Model 2157 floor scale. Verify that there is no mechanical bind in the scale base and that the scale base is level and does not rock from side to side. Record the raw count output from each load cell before performing shift adjust to make sure that each load cell is carrying an even share of the load. If the raw count output from cell to cell varies by more than 2000 counts then shim the base to bring the variation within 2000 counts.

NOTE: Some tank and hopper scale applications may put uneven loading on the load cells due to the construction of the vessel. This uneven loading will be reflected in uneven raw count outputs than can't be shimmed out.

0 - Skip Load Cell Raw Count.
1 - Access Load Cell Raw Count.

[CELL X] Load Cell Number (Displayed for a second)

[XXXXXX] Raw Count Output For Load Cell #X

Press the **PRINT** key to display the next load cell raw count output. Each time the **PRINT** key is pressed the next load cell raw count output is displayed. Press the **CLEAR** key to exit the load cell raw output display mode and return to the **[--]** display.

NOTE: After calibration and shift adjustment is complete, record the raw count output readings for each load cell for future troubleshooting use.

[99 0] RESET SETUP TO DEFAULT SELECTIONS

0 - Skip resetting setup to default settings.
1 - Reset listed setup parameters to the default settings.

[SUrE] (Flashing)

0 - Skip resetting setup to default settings.
1 - Reset listed setup parameters to the default settings.

Default Setup Selections

STEP	DESCRIPTION	SELECTIONS
00	**SCALE GROUP**	
01	Scale Type	NA
03	Number of Load Cells	NA
05	Reset Shift Constants	NA
06	Shift Error Compensation	NA
10	**CALIBRATION GROUP**	
11	Calibration Units	0
12	Linearity Compensation	0
13	Autorange Selection	1
14	Scale Capacity	100
15	High Range Increment	0.02
16	Middle Range Increment	NA
17	Low Range Increment	NA
18	Calibration Procedure	NA
20	**ZERO AND FILTERING GROUP**	
21	Zero Adjustment	NA
22	Span Adjustment	NA
23	AZM Range	1
24	Powerup Zero Capture	1
25	Pushbutton Zero Range	1
26	Motion Detection	1
27	Display Filtering	1
27A	DigiTOL© Load Cell Filter	1
28	Overcapacity Blanking	100.10
30	**TARE GROUP**	
31	Tare Mode Select	2
32	Tare Interlock	0
33	Manual Tare Low Range	0
34	Autoclear Tare	0
35	Center of Zero Legend	01
38	Accumulator	0
39	Memory Operation	0
40	**DATA OUTPUT GROUP**	
41	Output Data Format	1
42	Baud Rate	9600
43	Parity Selection	2
44	Checksum	0
45	Autoclear Tare After Print	0
46	Print Interlock/Autoprint	0
47	Minimum Print	0
48	Net Sign Correction	0
49	Leading STX Character	1
51	Multiple Line Output	1
52	Print Fields	000234
53	Print Weight Expanded	0
54	Print Weight Legend	1
55	Scale Address	01
56	Time and Date Format	0
60	INTERNATIONAL GROUP	
61	Analog Verify	
62	Enable lb/kg Switching	0
63	Powerup Weight Units	0
64	Bracketed Printing	1
65	Print “PT” or “TRH”	0
66	Remote ASCII Input	0
68	Comma or Decimal Point	0
69	English/German Symbols	0
		0
70	PARTS COUNTING GROUP	
71	Counting Mode	000
72	Sampling Size and Mode	0
73	Autoclear APW	0
74	Auto Sample Accept	1
75	Minimum Sample Weight	1
76	Sample Enhancement	1
78	Count Expanded Printing	0
	DIAGNOSTICS	
81	Expanded Weight Display	0
98	Display Load Cell Counts	NA
99	Load Default Parameters	NA

Exiting the Setup Routine

The setup routine can be exited only when the display is showing the **[- -]** prompt. If a group heading (like [30]) was entered, all steps within that group must be stepped through before the **[- -]** will be shown again.

With the display showing **[- -]**, remove the shorting block from between the two pins of jumper W1. After the shorting block is removed the display will blank momentarily then show the weight on the scale platform. Place the shorting block on one of the pins of jumper W1 for future use.

Sealing the Enclosure

Remove AC power to the indicator by disconnecting the line cord.

Sealing the Desk Enclosure

Reinstall the left end cap of the desk unit, securing it with the eight screws. Be careful to avoid pinching any of the wiring harnesses between the end cap and the enclosure. Tighten the end cap retaining screws. **DO NOT OVERTIGHTEN THE END CAP SCREWS OR THE SCREWS MAY STRIP THE THREADS IN THE ENCLOSURE.**

If the desk enclosure requires a lead seal for a legal-for-trade application, replace two adjacent left end cap retaining screws with sealing screws included with the 8522. Apply AC power to the indicator. The scale is now ready to use.

Sealing the Stainless Steel Wall Mount Enclosure

A small tube of sealant (*118251 00A) is included with the stainless steel wall mount enclosure version of the 8522. This sealant MUST be applied to the cover gasket before final closure of the wall mount enclosure to ensure a water tight seal.

Clean the gasket, located on the inside of the door of the enclosure, with a clean cloth to remove any debris. Apply an even bead of sealant to the gasket. Smooth out the sealant with the tip of a finger so it is applied in an even, thin coat completely covering the gasket.

Snap each of the fasteners over the lip of the front cover. Tighten the wing type handle of each fastener by turning 180° clockwise. The lower right latch does not have a wing-type handle. Use an 11/16" wrench to tighten this latch. Wipe off any excess sealant and snap the wing type handles down. Apply AC power to the indicator. The scale is now ready to use.

5 Operating Instructions

Display

The 8522 display is a blue-green, vacuum fluorescent, six numeric digits plus a decimal point or comma. All digits are 0.5" (13 cm) high. Over capacity is indicated by blanking of the display as selected in setup. Under zero is indicated by a minus sign to the left of the weight digits. Motion (unstable weight), count mode and center of zero (selectable by step **[35]**) are indicated by illuminating specific cursors on the display. Refer to Figure 5-1 for display example.

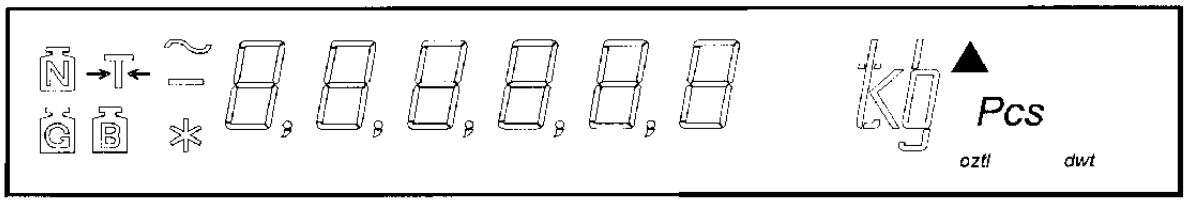


Figure 5-1 Display

Display Cursors

lb - When lit, indicates that the 8522 is displaying pound weight units.

kg - When lit, indicates that the 8522 is displaying kilogram weight units.

g - When lit, indicates that the 8522 is displaying gram weight units.

t - When lit, indicates that the 8522 is displaying ton weight units.

oz - When lit, indicates that the 8522 is displaying ounce weight units..

ozt - When lit, indicates that the 8522 is displaying troy ounce weight units.

dwt - When lit, indicates that the 8522 is displaying penny weight units.

Pcs - When lit, indicates that the 8522 is displaying a piece count.

G - When lit, indicates that the 8522 is displaying gross weight.

→T← - When lit, indicates that the 8522 is displaying tare weight.

- When lit, indicates that the 8522 is displaying net weight.

- When lit, indicates that the weight on the scale is within ± 0.25 increments of gross zero, if step **[35 1]**. The balance symbol also indicate that the weight on the scale is within ±0.25 increments of gross or net zero, if step **[35 2]**.

- When lit, indicates that the weight on the scale is unstable (in motion).

- When lit, indicates that the displayed value is an accumulated total.

Keyboard

The Model 8522 indicator contains a 4 X 5 matrix keyboard for operator interface. The keyboard has domed keys with tactile feel and has a multi-color, embossed polycarbonate overlay with active key areas separated by ridges.

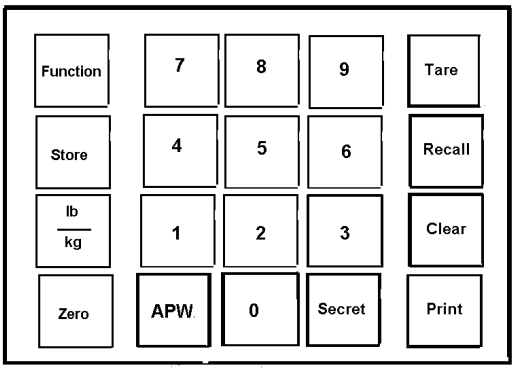


Figure 5-2 Keyboard

Key Definitions

Function The **FUNCTION** key is used in combination with the numeric keys to enter time and date and to access scale memory. Refer to next Section.

Store The **STORE** key is used to store tare weights in memory. Refer to following Section File Memory Operation for memory operation instructions.

lb/kg The **lb/kg** key toggles between lb and kg weight units mode if units switching is enabled, step **[62 1]**, and the 8522 has been calibrated in either lb or kg weight units, step **[11 0]** or **[11 1]**.

Zero The **ZERO** key is used to recapture a new center of zero reference. This permits the operator to compensate for changes in zero caused by material buildup on the scale platform. Pushbutton zero is inhibited if the weight on the scale is unstable (in motion), out of range, or if the weight on the scale is greater than the pushbutton zero range selected in setup, step **[25]**.

Numeric The numeric keys (digits 0 through 9) are used to enter numeric values and are used in combination with the special function keys.

APW The **APW** key can be used to access the count mode without sampling if the average piece weight (APW) of the part to be counted is known. The **APW** key is used with the **RECALL** key to display the current APW (average piece weight). Refer to Parts Counting Section for counting instructions.

Sample The **SAMPLE** key is used to count parts with an unknown APW and is also used with the **RECALL** key to display the current pieces per unit weight.

In variable sample mode, the **SAMPLE** key is used to terminate sample quantity entry. A variable sample entry can only be made in the net weight mode unless tare is disabled, step **[31 0]**.

In the fixed sample mode, pressing this key at gross zero

will show the fixed sample quantity on the display for two seconds then return to zero. If the **SAMPLE** key is pressed with weight on the scale the 8522 divides the sample quantity into the displayed weight on the scale to calculate the APW(average piece weight).

Tare Tare is the empty weight of a container or vehicle. The tare or empty weight is subtracted from the gross weight on the scale in order to calculate the net weight of the contents of the container or vehicle. Pushbutton tare occurs when the **TARE** key is pressed with a positive, stable (no motion) weight on the scale. If tare interlocks are enabled **[32 1]**, tare can only be taken in the gross mode. Once a tare has been taken, the difference between the recorded tare weight and the gross weight is displayed as a net weight.

Keyboard tare is the known empty weight of a container or vehicle, entered using the numeric keys on the keyboard followed by the **TARE** key. A keyboard tare of up to scale capacity can be entered (limited to the low range capacity if Autorange® operation in use and step **[33 1]**). The numbers are displayed as they are entered. The least significant digit (LSD) of tare entry must correspond to the displayed increment size or the tare entry is ignored. If tare interlock is enabled, step **[32 1]**, keyboard tare can only be entered when the scale at gross zero.

Recall The **RECALL** key is used to display the current tare weight when the 8522 is in the net weight or count mode. The **RECALL** key can also be used to display the current average piece weight (APW), or pieces per unit weight if the 8522 is in the count mode.

To display the current tare weight in the net weight mode, press the **RECALL** key and then press the **TARE** key. The current tare value is then displayed for approximately two seconds. After two seconds the 8522 reverts back to net weight display.

To display the current tare weight in the count mode, press the **RECALL** key and then press the **TARE** key. The current tare value is then displayed. Press the **RECALL** key to return to the count mode.

To display the average piece weight (APW) in the count mode, press the **RECALL** key and then press the **APW** key. The average weight of one piece on the scale is

then displayed. Press the **RECALL** key to return to the count mode. The demand mode data output APW print field will print APW value if APW is recalled. This is the default mode for APW print field.

To display pieces per unit weight in the count mode, press the **RECALL** key and then press the **SAMPLE** key. The total number of pieces that would be equal to one unit of weight (lb, kg, etc.) is then displayed. Press the **RECALL** key to return to the count mode. Demand mode data output APW print field will print pieces per unit weight instead of APW if pieces per unit weight is displayed by pressing the **RECALL** then **SAMPLE** key.

Clear The **CLEAR** key is used to exit the net weight or count mode and return to the gross mode.

The **CLEAR** key is also used to erase partially entered data and to exit data entry modes.

In the net weight mode, press the **CLEAR** key once to return to the gross weight mode. In the count mode, press the **CLEAR** key twice to return to the gross weight mode.

In a data entry mode, press the **CLEAR** key once to erase the partially entered data. Press the **CLEAR** key twice to exit the data entry mode.

Print The **PRINT** key is used to request serial data output. Data output is inhibited if the weight on the scale is unstable or out of range. If a print request occurs when the scale is unstable, the print request is stored and data output occurs when the scale becomes stable.

Function Keys

Function 4 - Clear All File Memories

Press the FUNCTION key, then the **4** key to clear the contents of all 100 file memory ID locations. The 8522 will then display the prompt **[SUrE ?]:**

Press the **0** key to skip clear memory function.

Press the **1** key to clear all 100 stored tare/accumulator registers.

If the **1** key is pressed, the 8522 then displays **[CLEArd]** to indicate that all file memories are cleared. The 8522 then returns to the weight display mode.

Function 5 - Display, Print or Clear Individual File Memories

Press the **FUNCTION** key, then the **5** key. The 8522 will then display the **[id]** prompt.

To recall a specific file memory, enter the two digit address of the file memory ID you wish to view (00 through 99), then press the RECALL key. The 8522 will then briefly display the stored tare weight for the file memory ID entered and then briefly display the accumulated data for the file memory ID entered. After displaying the accumulated data, the 8522 will return to the weight display mode.

To print the contents of a specific file memory location, enter the two digit address of the file memory ID you wish to print (00 through 99), then press the **PRINT** key. The contents of that location are then printed.

To clear a specific file memory location, enter the two digit address of the file memory ID you wish to clear (00 through 99), then press the **CLEAR** key. The contents of that location are then cleared.

Function 6 - Set Time

Press the **FUNCTION** key, then press the **6** key. The 8522 will then briefly display **[6]** then **[t]** followed by the current time in military, 24 hour format **[HH.MM.SS].** With the 8522 displaying time:

Press the RECALL key to return to the weight mode without changing time.
Press the CLEAR key to erase the current time and access new time entry.

NOTE: The 8522 won't accept an impossible time entry (example: hour = 28 or minute = 70). An invalid entry is cleared and the 8522 then waits for a valid entry.

With the 8522 displaying **[00.00.00],** enter four digits for the new time starting with hours then minutes. As the new time is entered, the numbers entered are displayed as entered from left to right. Press the **CLEAR** key to erase previously entered values and reenter data. The 8522 accepts the new time and returns to the weight mode after four digits have been entered.

Function 7 - Set Date

Press the **FUNCTION** key, then press the **7** key. The 8522 will then briefly display **[7]** then **[d]**, followed by the current date in the date format MM.DD.YY. With the 8522 displaying the date:

Press the **RECALL** key to return to the weight mode without changing the date.
Press the **CLEAR** key to erase the current date and access new date entry.

Enter six digits for the new date, in the date format MM.DD.YY. The numbers entered are displayed from left to right as it is entered. Press the **CLEAR** key to erase previously entered values and re-enter data. The 8522 accepts the new date and returns to the weight mode after the entire date (six digits) have been entered.

NOTE: The 8522 won't accept an impossible date entry (example month 15 or day 45). If an invalid value is entered for the month or day, the value entered is cleared and the 8522 will wait for a valid entry.

Function 8 - Print/Clear the 12 Digit Subtotal and Total Accumulator

Press the **FUNCTION** key, then the **8** key. The 8522 displays **[8]** then displays **[ACC]** for eight seconds. With **[ACC]** on the display:

Press the **PRINT** key to print the subtotal and total. After printing, the 8522 then displays **[SUBCLR]** prompting to erase the subtotal. With **[SUBCLR]** on the display, press the **1** key to erase subtotal, press any other key to exit without erasing subtotal.

Press the **CLEAR** key to erase the current subtotal and total.

Function 9 - Print/Clear File Memory Reports

Press the **FUNCTION** key, then the **9** key. The 8522 displays **[9]** then displays **[rePOrt]** for eight seconds. With **[rePOrt]** on the display:

Press the **PRINT** key to print a report of the contents of all file memory IDs' in use.

Press the **CLEAR** key to erase the accumulated data in the file memory.

Initial Power-Up Sequence

When power is first applied to the Model 8522, the following sequence of events occur:

The 8522 performs tests on all RAM and ROM memory devices. Any failures that are detected will result in an error message displayed at the end of the power-up sequence.

After the RAM and ROM tests, the 8522 displays the program number on the display. The standard program number is **[137890]**. If special software is used for a particular application, this number may be different.

The revision level of the software is shown next with the letter "L" in front of it. A sample display would be **[L00]** which indicates this is the original version of this software. This number will increase as modifications are made to the 8522 program.

Next, the complete display, with all segments lit, is shown for one second to permit verification that all segments and symbols are working. After the display verify, the 8522 will display all 8's **[888888 kg]**, with the decimal point and comma scrolling from left to right.

The 8522 then displays six minus signs as communication to the DigiTOL® load cell or optional Analog PCB is established.

IF POWERUP ZERO CAPTURE OR TARE INTERLOCK IS ENABLED, STEPS [24 1] OR [24 2] OR [32 1], THEN THE 8522 WILL NOT DISPLAY WEIGHT UNTIL ZERO IS CAPTURED. IF THE 8522 IS UNABLE TO CAPTURE ZERO, THE 8522 WILL DISPLAY [E E E] INDICATING THAT THE SCALE IS ABOVE THE ZERO CAPTURE RANGE OR WILL DISPLAY [-E E E] INDICATING THAT THE SCALE IS BELOW THE ZERO CAPTURE RANGE. IF AN [E E E] POWER DISPLAY OCCURS, REMOVE ALL ITEMS FROM THE SCALE PLATFORM AND PRESS THE ZERO KEY. IF ZERO CANNOT BE CAPTURED, THE SCALE PLATFORM MAY BE OBSTRUCTED OR THE 8522 MAY NEED TO BE RECALIBRATED.

File Memory Operation

The 8522 can store up to 100 tare weights and/or accumulated weight or count data in the file memory. The file memory locations are stored in battery backed RAM and the contents are saved during a power outage. The file memory can be used for inbound/outbound weighing (temporary stored tare weights) or can be used to perform one pass weighing using permanent stored tare weights. The file memory can also be used to accumulate up to six digits of accumulated weight or count data as selected in step **[38]**.

The temporary stored tare weight mode, selected by step **[39 1]**, is used for inbound/outbound operation to store a tare weight in file memory which is to be recalled once and then automatically cleared from file memory when recalled. File accumulation is disabled if temporary stored tare mode is selected.

The permanent stored tare weight mode, selected by step **[39 2]** or **[39 4]** is used for one pass weighing operations where a known tare weight stored in file memory and recalled as needed. Permanent stored tare weights are retained and can be used repeatedly until manually cleared from file memory either by means of Function 4 or Function 5. File accumulation is available in the permanent stored tare mode, step **[39 4]**.

File memory is accessed using the **STORE** and **RECALL** keys. Valid memory locations are from 00 to 99. File accumulation is accessed using two different methods depending on step **[39]** selection.

Storing a Tare Weight (Container or Vehicle on Scale)

Place the empty container or vehicle on the scale (can be a full if net sign correction is enabled, setup step **[48 1]**). With the 8522 in the gross weight mode displaying a positive, stable weight, press the **STORE** key. The 8522 will then display:

[id] Enter Memory ID

The 8522 is prompting the operator to enter the two digit memory location, (00 to 99) that the tare weight is to be stored in. The 8522 will display the two digit ID for one second after entry to indicate that the tare weight was stored in memory and then return to weight display mode.

NOTE: If two seconds pass without entering a memory location ID the 8522 will return to the weight display mode. If the memory location entered is already in use, the 8522 will display **[id in]** to indicate the tare weight was not stored and then return to the weight display mode. If an **[id in]** display occurs the current stored tare weight must be clear before a new tare weight can be stored in that location.

Storing a Tare Weight (Keyboard Entered Tare)

With the 8522 in the gross weight mode, enter the known tare weight value followed by the **STORE** key.

[id] Enter Memory ID

The 8522 is prompting for the operator to enter the 2 digit memory location, (00 to 99) that the tare weight is to be stored in.

NOTE: If two seconds pass without entering a memory location ID the 8522 will return to the weight display mode. If the memory location entered is already in use, the 8522 will display **[id in]** to indicate the tare weight was not stored and then return to the weight display mode. If an **[id in]** display occurs the current stored tare weight must be clear before a new tare weight can be stored in that location.

Recalling a Stored Tare Weight

Place the full container or vehicle on the scale (can also be an empty container or vehicle if net sign correction is enabled, setup step **[48 1]**). With the 8522 in the gross weight mode displaying a positive weight, press the **RECALL** key. The 8522 will then display:

[id] Enter Memory ID

The 8522 is prompting the operator to enter the two digit memory location, (00 to 99) that the tare weight was stored in. If a valid memory location is entered the 8522 will then display net weight using the tare weight stored in that memory location.

NOTE: If two seconds pass without entering a memory location ID the 8522 will return to the weight display mode. If the memory location entered is empty, the 8522 will display **[no id]** and then return to the weight display mode.

File Accumulation Without Stored Tare Weights

If file accumulation only mode is selected, step **[39 3]**, then weight or count data (as selected in step **[38]**) is accumulated in file memory only after a memory ID is selected and a print request occurs. The current memory ID is selected by pressing the **STORE** key. The 8522 will then display:

[id] Enter Memory ID

The 8522 is prompting the operator to enter a two digit memory ID, (00 to 99) that data is to be accumulated in. Subsequent print requests will accumulate data in the last memory ID selected. If the operator presses the **CLEAR** key or if autoclear after print is enabled **[45 1],** then the operator must select a memory ID before further file accumulation can occur.

File Accumulation With Stored Tare Weights

If permanent stored tare and file accumulation is selected, step **[39 4]**, then weight or count data (as selected in step **[38])** is accumulated in file memory after a stored tare weight has been recalled and a print request occurs. Data is accumulated under the memory ID of the last tare weight recalled. Subsequent print requests will accumulate data in the last memory ID recalled. If the operator presses the **CLEAR** key or if autoclear after print is enabled **[45 1]**, then the operator must recall a stored tare weight before further file accumulation can occur.

Parts Counting Operation

The 8522 supports keyboard or pushbutton tare entry, fixed or variable sampling, sample enhancement, and average piece weight entry to provide the maximum flexibility and accuracy in counting parts.

Sampling and Counting Accuracy

Sampling is the process of determining the average piece weight of the part to be counted. The 8522 calculates the average piece weight of a part by dividing the sample quantity into the absolute value of the displayed weight on the scale platform. Sampling can be performed by adding pieces to an empty container or by removing pieces from a full container.

The counting accuracy of the 8522 is dependent on the proper selection of scale capacity and sample quantity. The scale capacity should be adequate to weigh the largest weight required and no more. Excess scale capacity will reduce counting accuracy for lighter parts. The sample quantity needed to accurately count a particular part is determined by three factors:

- The ratio of the average piece weight of the part to scale capacity.
- Environmental conditions: vibration and air currents.
- The variation in weight from part to part.

The effects of first factor, the ratio of the average piece weight of the part to scale capacity, can be controlled by the minimum sample weight selection, step **[75]**. This step requires the operator to use a sample that weighs more than the specified percentage of scale capacity. In some cases where very light parts must be counted it may be more accurate to record the average piece weight (APW) for the part using a very large sample size. The recorded APW is then entered into the 8522 instead of sampling whenever this particular part is counted.

Vibration and air currents can cause counting inaccuracy by influencing the average piece weight calculation. The 8522 provides a display filter, step **[27]**, that will reduce the effects of vibration. If problems with air currents are noted, a wind shield may be required. Severe air current problems may require relocating the scale platform. Increasing the sample quantity will reduce the effects of vibration and air currents on the sample accuracy.

The second factor, variation in weight from part to part, is more difficult to control. Some parts, due to their construction, have a greater piece to piece variability than others. Cast parts often have larger piece to piece variations than machined parts. Determine an adequate sample size to count a particular part by experimentation. If repeated sampling and counting operation of the same parts do not agree within the accuracy tolerances of the scale base then the sample quantity should be increased. Highly variable parts will require that the sampling process be performed more often and with a larger sample size than parts that have a more consistent APW.

Sample Enhancement

Sample enhancement, step **[76 1]**, assists the operator to achieve more accurate counting results by permitting the operator to gain the benefits of a large sample quantity without having to hand count a large sample. Sample enhancement recalculates the APW each time more parts are placed on the scale up to 4% of scale capacity.

In order to ensure the initial APW has sufficient accuracy for sample enhancement, a minimum sample weight of 0.02% of scale capacity is required. Parts that are too light for practical sampling should have their APW accurately determined on a more sensitive scale. The APW for the part can then be entered instead of sampling.

Sample enhancement works because an inaccurate APW, while not able to accurately count large numbers of parts, can reliably count a small number of pieces. This count will then allow a new determination of APW based on a larger weight. Given enough enhancements, the APW for a part can be very accurately calculated. Enhancement occurs on a motion/no-motion sequence with the following two conditions satisfied:

- Piece count must have increased, that is the weight on the scale platform must have increased (or decreased in count out mode).
- The pieces added (or removed) must not exceed the amount which can be counted accurately with the current APW. A display of **[OVER]** (over enhancement range) results when this amount is exceeded. For best enhancement results, roughly double the number of pieces on the scale each enhancement. To permit continued sample enhancements, lower the piece count until a motion/no motion sequence results in a count display instead of the **[OVER]** display. If the piece count is increased or a print request occurs with a display of **[OVER]**, then further sample enhancement is disabled and the 8522 counts normally.

Fixed Sample Quantity Entry

The fixed sample mode provides one button access to the parts counting mode. The sample size s preset in setup, step **[72]**, for 5, 10, 20, 50 or 100 fixed sample quantity. To count using the fixed sample mode in either the gross or net weight mode, add or subtract the fixed sample quantity of parts to or from the scale platform and press the **SAMPLE** key. The 8522 will then display the sample quantity. The piece count is displayed as pieces are added or removed from the scale platform.

The fixed sample quantity can be displayed if desired, by pressing the **SAMPLE** key with the weight display at gross zero. The display shows the fixed sample quantity (**[SPL 10]** for example) for two seconds then returns to the normal weight display.

Variable Sample Quantity Entry

Variable sample mode can only be used in the net weight mode. To count using the variable sample mode in the net weight mode, add or subtract the desired sample quantity of parts to or from the scale platform.

Enter the sample quantity using the numeric section of the keyboard and press the **SAMPLE** key. The 8522 will then display the sample quantity. The piece count is displayed as pieces are added or removed from the scale.

Average Piece Weight Entry

The average piece weight of a part can be recalled and recorded in the count mode. This recorded APW can then be used to count the same type of parts at a later time. APW entry is normally used to count very light parts that have an average piece weight that can't be calculated without an impractical large sample quantity. APW entry is also used in applications where the parts to be counted are fairly consistent and where counting accuracy requirements are not as stringent.

To enter an APW press the **APW** key. The 8522 will then display **[0.00000]**. Enter the average piece weight for the selected parts using the numeric keys on the keyboard. Preceding zeroes in the value need not be entered. Press the **APW** key to accept the APW value entered. If you make a mistake entering the APW, press the **CLEAR** key to erase the APW and renter the APW. Once an APW has been entered, the piece count is displayed as pieces are added or removed from the scale platform.

Counting Parts Into an Empty Container

Place the empty container on the scale platform and press the **TARE** key.

Add the sample pieces on the scale platform and perform either a fixed or variable sample entry, as selected in step **[72]**, or else enter the average piece weight value.

Place the rest of the pieces on the scale platform, the piece count is displayed as parts are added to the scale. Press the **PRINT** key to print a ticket and accumulate data if accumulation is enabled.

Counting Parts Out of a Full Container

Place the full container on the scale platform and press the **TARE** key.

Remove the sample pieces from the scale platform and perform either a fixed or variable sample entry, as selected in step **[72]**, or else enter the known average piece weight value. Remove the desired parts from the scale platform, the piece count is displayed as parts are removed from the scale. Press the **PRINT** key to print a ticket and accumulate data if accumulation is enabled.

Counting The Total Number of Parts in a Full Container, (Known Tare)

Place the full container on the scale platform and press the **TARE** key.

Remove the sample pieces from the scale platform and perform either a fixed or variable sample entry, as selected in step **[72]**, or else enter the average piece weight of the part.

Enter the known tare weight of the empty container using the numeric keys on the keyboard and press the **TARE** key. The piece count of all parts currently in the container is displayed. Return the sample pieces to the scale to display the total number of parts in the container. Press the **PRINT** key to print a ticket and accumulate data if enabled.

Operating Zones (Counting Mode)

Four distinct zones of counting exist in relation to the weight on the platter. These zones are shown in the following table and discussed more fully in the following four sections. Note that if sample enhancement is disabled zone 3 does not exist. Note also that if the minimum sample weight is chosen as 0.0% then zones 1 and 2 essentially do not exist and the APW computation may have a large error. A non-zero tare should be taken to disable AZM, before using small sample weights when 0.0% minimum sample is selected.

Zone 1: Zero To 0.02% of Scale Capacity

Average piece weight (APW) cannot be accurately computed for sample weights below 0.02% of scale capacity. Sample operations in this weight range result in the **[LO]** error message. The operator must repeat the sample with a larger sample size until the **[LO]** message is no longer displayed.

Zone 2: 0.02% of Scale Capacity to Minimum Sample Weight Selection

Zone 2 is the normal sampling range. Step **[75]**, selects the required minimum sample weight, 0.0%, 0.02%, 0.05% or 0.1% of scale capacity. If a sample smaller than the minimum sample weight is attempted, the 8522 will display **[Add X]**, where **X** is the number of additional sample pieces that must be added to the platform to reach the minimum sample requirement. If the **[Add X]** display occurs in sampling the 8522 will operate in one of two different ways depending on auto sample selection, step **[74]**.

Auto sample accept mode disabled, step **[74 0]**, requires that the exact number of additional sample pieces requested in the **[Add X]** be added to the scale platform and the **SAMPLE** key pressed to accept the new sample.

Auto sample accept mode enabled, step **[74 1]**, recalculates the APW when the operator places the number of pieces requested in the **[Add X]** display (or more) on the scale platter and the scale settles to a no motion weight greater than the minimum sample weight.

ZONE 3: Minimum Sample Weight to 4% of Scale Capacity

From the minimum sample weight to 4% of scale capacity the scale is in the count mode. Printing can occur. Sample enhancement, if enabled, can occur is this range, unless too many pieces are added to the scale platform. If the count of pieces added exceeds the number which can be reliably counted using the previous APW, the display shows **[OVER]** (over enhancement range) for 2 seconds, after which the count is again displayed. If the operator wishes to continue APW enhancement, then pieces must be removed from the scale platform until each motion/no-motion sequence no longer results in the **[OVER]** display. APW enhancement will then occur.

If the operator ignores the **[OVER]** display and adds more pieces to the scale platform or performs a print request, no further sample enhancement is possible for the current counting sequence. Once the counting weight reaches 4% of scale capacity, sample enhancement is discontinued.

ZONE 4: 4% to 100% of Scale Capacity

From 4% to 100% of scale capacity is the normal counting zone. Printing requests can be performed as desired. Sample enhancement is disabled.

Autorange® Operation

Range switching occurs when the total number of displayed increments for a range is equal to the total number of displayed increments of the high range. Refer to following example, the 8525 is programmed as follows:

[11 0] Calibrate in pounds

[13 3] Three range operation is selected.

[14] [5000] Capacity

[15] [2] High Range Increment Size

[16] [1] Mid Range Increment Size

[17] [0.5] Low Range Increment Size

To find the weights at which the 8522 will switch from range to range, by first determining the total number of increments that would result if the 8522 was programmed as a single range scale using the high increment range. The total number of increments is calculated by dividing the total capacity, step **[14]**, by the high range increment size, step **[15]**. The result, total number of increments, is then multiplied times the middle range increment size, step **[16]**, and the low range increment size, step **[17]**, to calculate the weight at which the 8522 will switch from one range to the next. Refer to equations 5-1 and 5-2 to calculate the largest weight that can be displayed in the lower ranges. Refer to Section 4.2. for minimum increment size.

$$\textbf{Low Range Capacity} = \frac{\textbf{Scale Capacity, Step [14] x Low Range Increment Size, Step [17]}}{\textbf{High Range Increment Size, Step [15]}}$$

Equation 5-1 Low Range Capacity Calculation

$$\textbf{Mid Range capacity} = \frac{\textbf{Scale Capacity, Step [14] x Low Range Increment Size, Step [16]}}{\textbf{High Range Increment Size, Step [15]}}$$

Equation 5-2 Mid Range Capacity Calculation

Display	Displayed Increment Size	Range Calculation Formula	Active Weight Range
High Increment Range	2 lb	Capacity ¸ high range increment = Total high range displayed increments 5,000 ¸ 2 = 2,500	5,000 lb to 2,502 lb
Middle Increment Range	1 lb	Total mid range displayed increments 2,500 X 1 = 2,500 lb	2,500 lb to 1,251 lb
Low Increment Range	0.5 lb	Total low range displayed increments 2,500 X 0.5 = 1,250 lb	1,250.0 lb to 0.0 lb

Table 5-1 Multi-Range Operation Example

6 Interfacing and I/O Connectors

PCB Connections and Jumpers

Main PCB

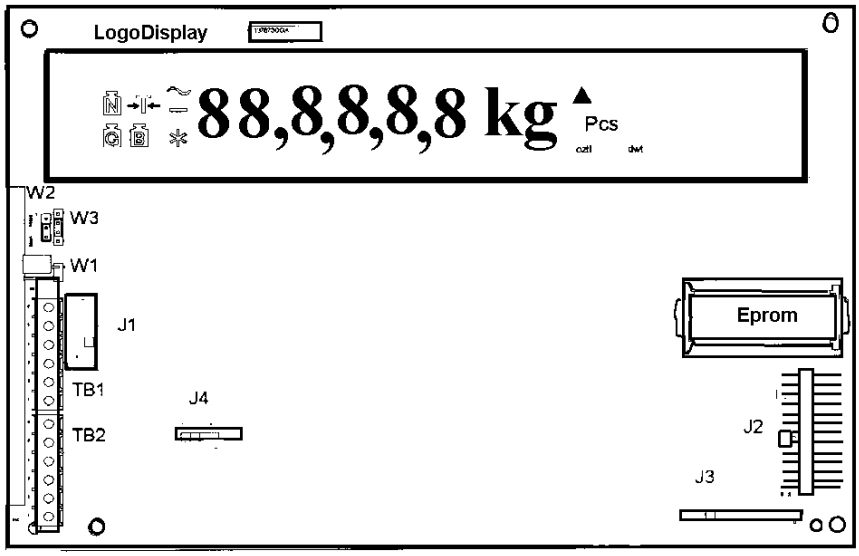


Figure 6-1 - Main PCB

Main PCB Jumpers

W1 - Setup Jumper (Out)
(OUT) = Normal Operation
(IN) = Access Setup Mode
W2 - Serial Input Interface Selection (2-3)
(1-2) = RS-232 Input
(2-3) = 20 mA Current Loop Input
W3 - Serial Input Interface Selection (3-4)
(1-2) = RS-232 Input
(2-3) = 20 mA Current Loop Passive Input
(3-4) = 20 mA Current Loop Active Input

Main PCB Connectors

J1 - DC Power In
J2 - Analog PCB Interface
J3 - Keyboard
J4 - External Battery Connector

Main PCB Terminal Strips

TB1 - Serial I/O Connector
TB2 - DigiTOL® Load Cell Connector

AC Power Supply PCB

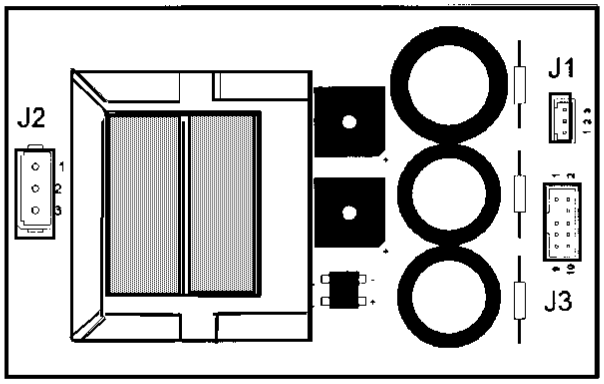
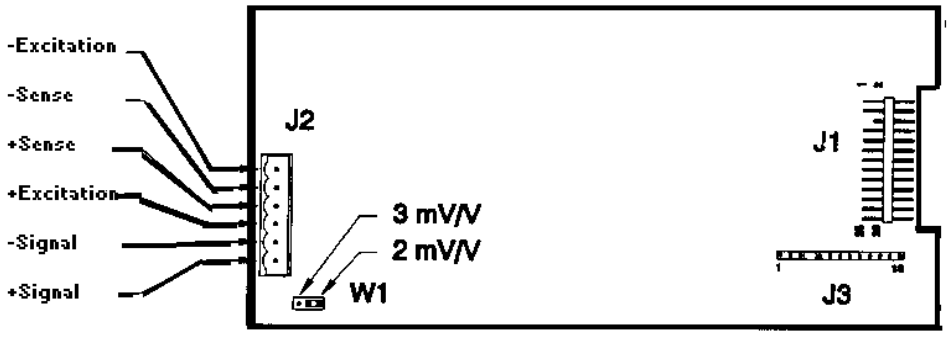


Figure 6-2 - Power Supply PCB

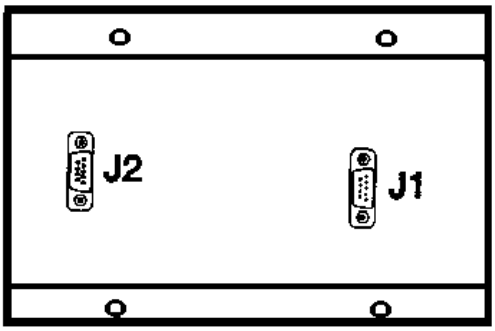
Power Supply PCB Connectors

J1 - Not Used
J2 - AC Power In
J3 - DC Power Out

Optional Analog Load Cell Input PCB



Optional Analog Load Cell Input PCB (Desk Enclosure Versions)
Figure 6-3



Optional Analog Load Cell Input Module (Wall Enclosure Versions)
Figure 6-4

Analog PCB Jumpers	**Analog PCB Connectors**
W1 - mV/V Rating of Load Cell (1-2)	J1 - Main PCB Interface
(1-2) = 2mV/V Load Cell Output	J2 - Load Cell Termination
(2-3) = 3mV/V Load Cell Output	J3 - Keyboard

Desk Enclosure Interior View

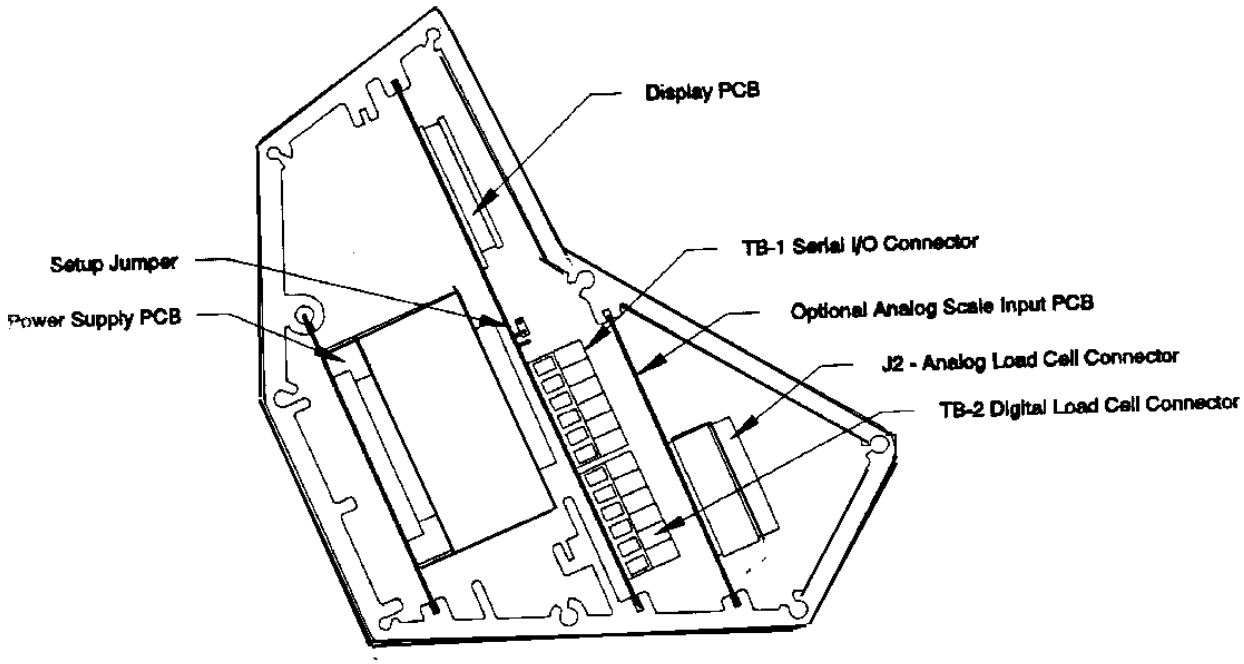


Figure 6-5 - Desk Enclosure Interior

Wall Enclosure Interior View

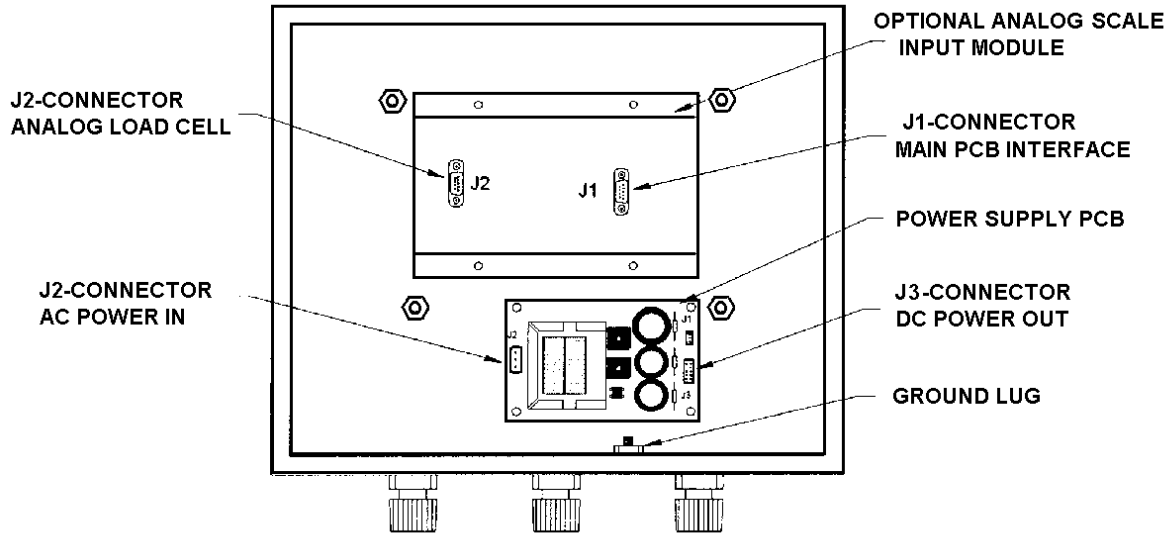


Figure 6-6 - Wall Enclosure Interior View

Load Cell Interconnect

CAUTION!
DO NOT ATTACH AN ANALOG LOAD CELL TO THE DigiTOL® SCALE INPUT, TB-2 ON THE MAIN PCB, OR A DigiTOL® LOAD CELL TO THE ANALOG LOAD CELL INPUT, J2 ON THE ANALOG SCALE INPUT PCB, AS DAMAGE TO THE LOAD CELL OR SCALE INPUT MAY RESULT.
REMOVE POWER FROM THE 8522 AND WAIT A MINIMUM OF 30 SECONDS BEFORE CONNECTING OR DISCONNECTING ANY HARNESSES FROM PCB'S OR LOAD CELLS AS DAMAGE MAY RESULT.

DigiTOL® Load Cell Termination

The 8522 provides a single DigiTOL® load cell interface to permit operation with the Models 1996, 1997, 2096, 2097, 2196, 2197 DigiTOL® Bench and Portable scale bases, and the Model 2157 Digital J-Box Floor Scale. The Models 1996, 2096, and 2196 bases include a 10' interface cable, part number 130115 00A. The Models 1997, 2097, and 2197 bases supply a 10' integral cable. The 8522 digital load cell input is compatible with up to four analog load cells when used with the digital j-box. The 8522 can be used with up to a 300' digital load cell home run cable, part number 510624-370, this cable is ordered by the foot.

Note: The 8522 DigiTOL® load cell interface is not compatible with the DigiTOL® Power Cells used in multiple cell DigiTOL® vehicle scale bases.

Load Cell Cable Preparation
Prepare the 8522 end of the interface cable as shown in Figure 6-7. Strip back the cable jacket and shield 3" for desk enclosure versions or 7" for wall enclosure versions.

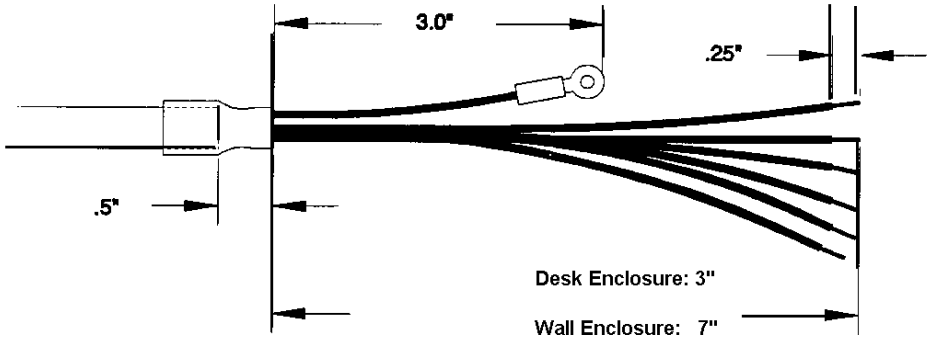


Figure 6-7 - DigiTOL® Load Cell Cable Preparation

Insert the prepared load cell cable through the largest grip bushing and grommet in the left end cap of the desk enclosure or through the grip bushing and grommet at the far left of the bottom of the wall mount enclosure. Insert the cable until the end of the outside jacket is flush with the inside edge of the grip bushing. Tighten the grip bushing cap securely.

Attach the shield ground wire ring terminal to the ground post on the inside of the left end cap of desk enclosure with the #8-32 X 5/16" screw supplied loose with the 8522, or to the ground stud on the inside bottom of the wall enclosure using the existing #8-32 nut.

Load Cell Cable Termination, Bench And Portable Scale Bases

Terminate the load cell interface cable to terminal strip TB2 on the Main PCB of the 8522 and to the DigiTOL® load cell base. Refer to Figure 6-8 for TB-2 location. Refer to Table 6-1 for load cell cable wiring information.

8522 DigiTOL® Load Cell Terminal Strip TB-2			DigiTOL® Scale Base Connector		
			1996 2096 2196	1997 2097 2197	Digital J-Box Model 2157
Pin	Color	Function	Pin	Color	TB-5
1	Black	TxD A	8	Black	1
2	Yellow	TxD B	6	Yellow	2
3	Red	RxD A	1	Red	3
4	White	RxD B	Not Used	Not Used	4
5	Blue	Ground	7	Blue	5
6	Green	+20 VDC	5	Green	6

Table 6-1 - DigiTOL® Scale Base Interconnect

Note: Do not connect the white wire to pin 4 of TB2 with Model 1996, 1997, 2096, 2097, 2196 or 2197 scale bases.

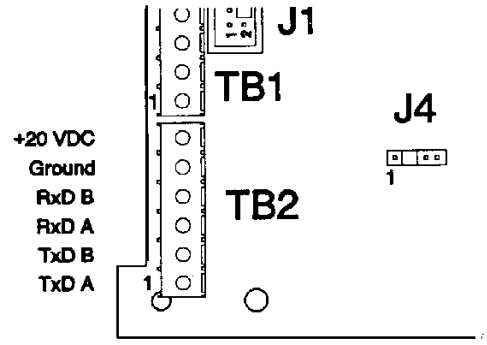


Figure 6-8 - 8522 Main PCB Terminal Strip TB2

Digital J-Box and Model 2157 Floor Scale Termination

Connect the open ended digital load cell cable between terminal strip TB2 on the Main PCB in the 8522 and terminal strip TB5 of the digital j-box. Refer to Figure 6-1 for TB-2 location. Refer to Figure 6-9 for TB-5 location. Refer to Table 6-1 for digital load cell interface cable wiring information.

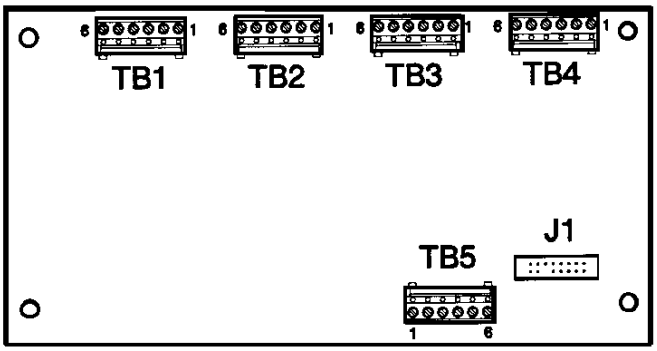


Figure 6-9 - Digital J-Box PCB

Connect from two to four analog load cells to Terminal strips TB1 through TB4 of the digital j-box PCB. If two load cells are used they must be connected to terminal strips TB1 and TB2. If three load cells are used they must be connected to terminal strips TB1, TB2 and TB3. Refer to Table 6-2 for analog load cell cable wiring information. Refer to following sections for load cell interconnect information.

Digital J-Box Analog Load Cell Connectors		**Analog Load Cell Cable Color Code**		
Pin Number	Function	Six Wire	Four Wire With Sense Jumpers	
1	- Excitation	Blue		Black
2	- Sense	Red		
3	- Signal	Black		Red
4	+ Signal	Green		White
5	+ Sense	Yellow		
6	+ Excitation	White		Green

Digital J-Box Analog Load Cell Connectors (TB1, TB2, TB3, and TB4)
Table 6-2

Note: Sense leads are connected at terminal strip TB1 only. Disconnect sense leads on all other six wire load cell cables. 4 wire load cell cable sense jumpers shown in Table 6-2 (+excitation to +sense and -excitation to -sense) are connected at TB1 only.

Optional Analog Scale Input Connections

The optional Analog Scale Input permits direct connection between the 8522 and analog load cells without using the digital j-box. The analog scale input provides excitation for up to 4, 350W analog load cells. The analog input is jumper selectable for 2 mV/V or 3 mV/V load cells. The 8522 can be used with up to a 300' analog load cell home run cable, part number 510620-370, this cable is ordered by the foot.

Analog Load Cell Cable Preparation

Prepare the 8522 end of the analog load cell interface cable as shown in Figure 6-10. Desk enclosure versions require an 8" shield ground wire, wall enclosure versions require a 2" shield ground wire.

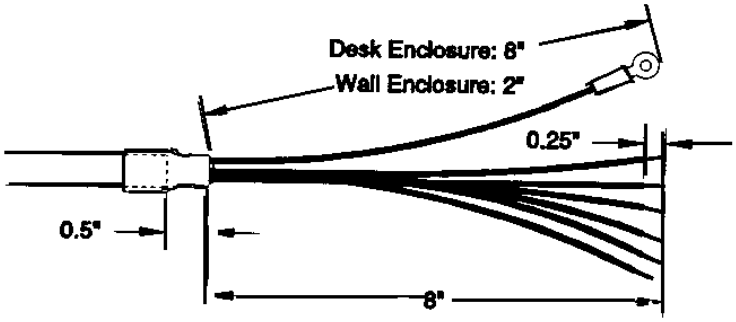


Figure 6-10 Cable Preparation

Insert the cable through the largest grip bushing and grommet on the left end cap for desk enclosure versions or through the grip bushing and grommet at the far left of the bottom for wall enclosure versions. Insert the cable until the end of the outside cable jacket is flush with the inside edge of the grip bushing. Tighten the grip bushing cap securely.

Desk Enclosure Versions Load Cell Cable Termination

Wrap four turns of the load cell cable conductors (including the shield ground wire) through the ferrite ring included in the analog kit. Keep the ferrite ring as close to the cable grip bushing as possible. Attach the shield ground wire ring terminal to the ground post on the inside of the left end cap with the #8-32 screw supplied in the kit. Refer to Figure 6-11.

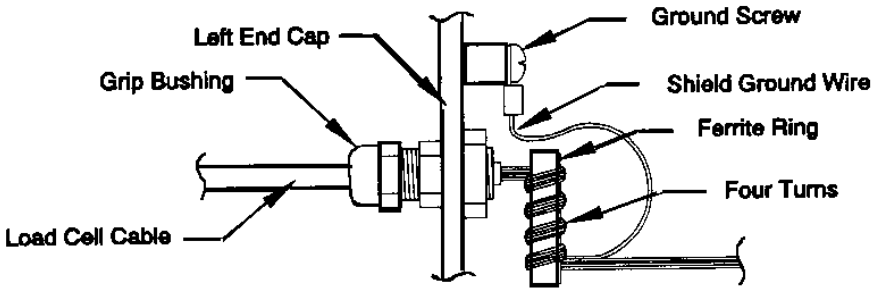


Figure 6-11 - Ferrite Ring Installation

Terminate the load cell cable to the six position terminal block connector J2 on the optional Analog PCB. Refer to Figure 6-3 for Connector J2 location. Refer to Table 6-3 for analog load cell cable wiring information. Refer to following sections for further load cell interconnect information.

Analog Scale PCB Load Cell Connector J2		**Analog Load Cell Cable Color Code**		
Location	**Function**	**Six Wire**	**Four Wire With Sense Jumpers**	
Top	- Excitation	Blue		Black
	- Sense	Red		
	+ Sense	Yellow		
	+ Excitation	White		Green
	- Signal	Black		Red
Bottom	+ Signal	Green		White

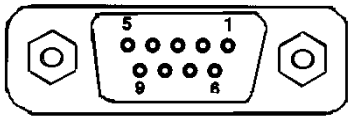
Terminal Block J2, Desk Enclosure Analog Scale Input Option
Table 6-3

Wall Enclosure Versions Load Cell Cable Termination

Solder the male, DE-9-P connector supplied with Analog Scale Input KOP to the load cell cable installed through the cable grip bushing. Refer to Table 6-4 for analog load cell cable wiring information. Secure the DE-9-P connector to the female DB-9 connector on the Analog Scale input module using the two #4-40 screws provided with the scale input KOP.

Analog Scale Module DE-9 Load Cell Connector		Analog Load Cell Cable Color Code		
Pin Number	**Function**	**Six Wire**	**Four Wire With Sense Jumpers**	
1	+ Excitation	White		Green
2	+ Sense	Yellow		
3	Not Used	N.C.		N.C.
4	- Sense	Red		
5	- Excitation	Blue		Black
6	Not Used	N.C.		N.C.
7	+ Signal	Green		White
8	- Signal	Black		Red
9	Not Used	N.C.		N.C.

Terminal Block J2, Desk Enclosure Analog Scale Input Option
Table 6-4



J2 Load Cell Connector, Wall Enclosure Analog Module
Figure 6-12

Notes:

- +Excitation to +Sense and -Excitation to -Sense jumpers shown in 4 wire load cell cable column of Tables 6-3 and 6-4 are required for analog scale operation.
- METTLER TOLEDO home run cable (part number 510620370) uses the same color code as 6 wire load cell connection shown in Tables 6-3 and 6-4.
- When using a Model 951 load cell in tension, reverse the signal wires from that which is shown in Tables 6-2, 6-3 and 6-4, (red = +Signal, white = -Signal).
- When adding additional cable to a four wire load cell, use a six wire home run cable and jumper the +Excitation to the +Sense and jumper the -Excitation to the -Sense at the six wire to four wire termination.

Analog J-Box Termination

The Models 2156, 2157 and 2158 floor scales and FlexMount® and Centerline® load cells use the analog j-box. The analog j-box sums the signal from up to 4 analog load cells and provides individual potentiometer for each load cell to trim shift errors. The analog j-box is not compatible the DigiTOL® load cell input, TB2 on the 8522 Main PCB.

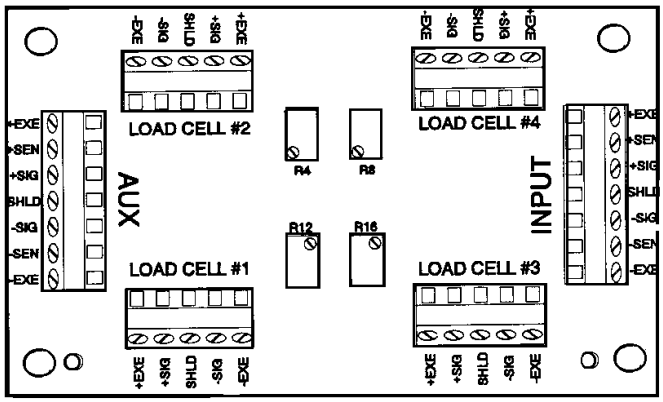


Figure 6-13 - Analog J-Box PCB

The INPUT terminal strip connects to the 8522. The AUX terminal strip is used for applications that use more multiple j-boxes.

Resistor R12 adjusts shift errors for load cell #1, R4 adjusts load cell #2, R16 adjusts load cell #3 and R8 adjusts load cell #4.

Serial I/O Port Interface

The 8522 provides bi-directional serial communication using an RS-232 compatible interface or an optically isolated, 20 mA current loop interface. Serial data transmitted is formatted as: 1 start bit, 7 data bits, 1 parity bit and 1 stop bit. The baud rate is selectable in setup from 300 to 9600 baud. The 8522 supports even, odd or space parity bit. Space parity bit or parity bit always a "0" is equivalent to 8 data bits, no parity bit.

The 20mA active current loop and RS-232 serial data outputs are available simultaneously at terminal strip TB1 of the Main PCB. Serial input is selectable between RS-232, passive 20 ma current loop or active 20 ma current loop by jumper selections on the Main PCB.

The serial port is capable of receiving certain ASCII control characters when configured for bi-directional operation. Clear, print, tare and zero functions can be remotely requested by means of the single ASCII characters "C", "P", "T" and "Z" which permits remote operation of the scale. The serial port input can also be used for a "contact closure" input to permit remote clear, print, tare, zero or blank display functions be means of an external input.

Printer Interface Cable Installation

CAUTION

REMOVE POWER FROM THE 8522 AND WAIT A MINIMUM OF 30 SECONDS BEFORE CONNECTING OR DISCONNECTING ANY HARNESSES FROM PCB'S OR LOAD CELLS AS DAMAGE MAY RESULT.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

METTLER TOLEDO printers Models 8806, 8843, 8855, 8856 and 8860 desk enclosure version, use the Printer Interface Cable option (0900-0258) which consists of a 15 foot (4.6m) cable with a DB-25-P connector at the printer end and open wires for termination to the 8522 TB1 terminal strip at the other end. Refer to Table 6-5 for printer interface cable wiring color

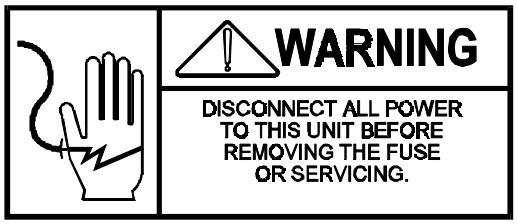
code. This cable is designed for use with the METTLER TOLEDO's Model 8806 ticket printer, Model 8843 document printer, Model 8860 thermal label printer and Model 8855 and 8856 strip printer. The printer interface cable may also be used for RS-232 output only to a host computer, bi-directional RS-232 communication will require a custom made interface cable which is available from your METTLER TOLEDO distributor.

DB-25 Pin Number	Wire Color
3	Blue
7	Black
11	Brown
12	Yellow
16	Violet
18	Orange
22	Green

Printer Interface Cable Wiring Color Code
Table 6-5

Note: The cable shield is terminated by a 2" green wire with a crimped on ring terminal.

Printer Cable Installation Instructions (Desk Enclosure Versions)



Remove power to the 8522 by unplugging the line cord from AC power.

Loosen the nut for the small grip bushing on the left end cap near the front of the 8522, remove and discard the short nylon plug inside the bushing. Unscrew the left end cap mounting screws and remove the left end cap.

Gently pull the left end cap away from the enclosure until the attached wires prevent further movement, this will normally be two or three inches. The Logic PCB must move to the left approximately one inch to access the TB1 terminal strip. **DO NOT FORCE THE LOGIC PCB ANY FURTHER LEFT OR THE KEYBOARD TAIL MAY BE DAMAGED.** Insert the printer cable through the grip bushing until the heat shrink tubing on the end of the cable is flush with the inside edge of the grip bushing. Firmly tighten the nut on the outside of the grip bushing.

Secure the ground loop terminal of the printer cable shield to the ground screw on the inside of the left end cap beside the grip bushing.

Refer to previous sections for wire termination instructions to the TB1 terminal strip on the Logic PCB of the 8522. Connect the other end of the printer interface cable to the printer. Refer to Chapter 4 for programming information.

Reinstall the left end cap onto the enclosure. Verify that the gasket is intact and no wires are pinched by the end cap. Refer to Chapter 4 for enclosure sealing information.

Printer Cable Installation Instructions (Wall Enclosure Versions)

Remove power to the 8522 by unplugging the line cord from AC power.

Open the wall enclosure by flipping the wing-type handle of each fastener up and turning it 180° counter clockwise. The lower right latch does not have a wing-type handle. Use an 11/16" wrench to loosen this latch. Loosen the hinge fasteners on the RIGHT end last (be sure to loosen both of them at the same time to prevent jamming).

Loosen the right grip bushing on the bottom of the stainless steel enclosure then remove and discard the small nylon plug inside the bushing.

Insert the printer cable through the grip bushing until the heat shrink tubing on the end of the cable is flush with the inside edge of the grip bushing. Firmly tighten the nut on the outside of the grip bushing.

Secure the loop terminal of the printer cable shield to the ground stud on the bottom of the enclosure near the grip bushing.

Refer to previous sections for wire termination instructions to the TB1 terminal strip on the Logic PCB of the 8522. Connect the other end of the cable to the printer or other device. Refer to Chapter 4 for programming information.

Close the enclosure door and latch securely. Refer to Chapter 4 for enclosure sealing information.

Serial I/O Port Interconnect

METTLER TOLEDO printers Models 8806, 8844, 8856 and 8865 use the Printer Interface Cable option (0900-0258). Refer to previous sections for printer interface cable option installation instructions.

The are no standard interface cables available for direct connection from the 8522 to the Model 307 Label Printer or the Model 8860-0005 Wash Down Label Printer. An interface cable can be constructed by removing the connector from the indicator end of a indicator to printer interface cable or by ordering the printer mating connector and fabricating your own custom cable.

To make a Model 8522 to Model 307 interface cable, order the 8140 to 307 printer cable, factory number 0900-0191 or part number A119714 00A, and remove the DB-25 connector from the 8140 end of the cable. The Model 307 mating connector, part number 095113 00A, is available if you wish to fabricate your own cable.

To make a Model 8522 to Model 8860-0005 Wash Down Label Printer interface cable, order the 3026 to 8860-0005 printer cable, factory number 0900-0261 or part number 132383 00A, and remove the connector from the 3026 end of the cable. The Model 8860-0005 mating connector, part number 123482 00A, is available if you wish to fabricate your own cable.

The maximum recommended interface cable length is 50' for RS-232 and 1000' for 20 mA current loop. The 20 mA current loop interface has superior electrical noise immunity than the RS-232 interface and is recommended for applications in industrial (factory floor) environments or where long cable runs are required.

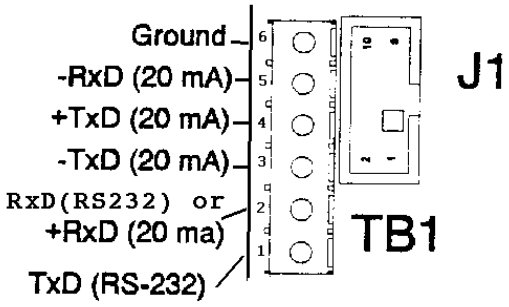


Figure 6-14 - 8522 Main PCB Terminal Strip TB1

Note: Pin 1 of terminal strip TB1 is located at the bottom of terminal strip TB1.

8522 TB1		307	8806	8860	8844	8855	8856
Pin	Description		8860 Desk	WD			8865
1	TxD RS-232	N.C.	N.C.	N.C.	Blue-(3)	N.C.	Blue-(3)
2	RxD RS-232/+20 mA	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
3	-TxD 20mA	7	Orange-(18)	K	N.C.	Green-(22)	N.C.
4	+TxD 20mA	6	Violet-(16)	H	N.C.	Blue-(3)	N.C.
5	-RxD 20mA	N.C.	Yellow-(12)	N.C.	N.C.	N.C.	N.C.
6	Logic Ground	N.C.	Brown-(11)	N.C.	Black-(7)	N.C.	Black-(7)

Table 6-6 - Serial I/O Port Interconnect Cabling

Notes: Set the 8522 Main PCB jumpers W2 (2-3) and W3 (3-4) to enable the 8806 print button.

8522 TB1		PC Compatible Computer	
Pin	Description	DB-25-S	DB-9-S
1	TxD RS-232	3	2
2	RxD RS-232/+20	2	3
3	mA	N.C.	N.C.
4	-TxD 20mA	N.C.	N.C.
5	+TxD 20mA	N.C.	N.C.
6	-RxD 20mA	7	5
	Logic Ground		
PC Interface Cable Jumpers		4 5 6 8 20	1 4 6 7 8

Table 6-7 - PC Compatible Interface Cable

Note: Set the 8522 Main PCB jumpers W2 to position 1-2 and jumper W3 to position 1-2 for bi-directional RS-232 applications. The PC interface cable jumpers shown in Table 6-7 are installed in the cable connector on the PC end of the interface cable.

Serial I/O Port Data Output Description

The 8522 data output can be configured to one of three demand output modes or to the continuous mode. The demand modes will output stable weight data when a print request occurs and are used for printing tickets, and also for simple, static weight computer interfacing applications. The continuous mode, outputs weight and status data every display update and is used for remote displays, METTLER TOLEDO analog and BCD converter modules, and computer interfacing applications that require real time, dynamic weight data.

Demand Mode Output

In the demand mode, the 8522 outputs data every time a print request occurs (either by pressing the PRINT key, an autoprint function, or by a remote print request). Demand mode output is inhibited if the weight reading is unstable, if the 8522 is in the expanded weight display mode, or out of range (below gross zero or over capacity). If a print request is inhibited because an unstable weight, then the print request is stored and acted upon when the scale returns to a stable weight reading.

The demand mode output can include any of data fields listed in Table 4-5. Several of the data fields are output only when the 8522 is in a specific mode. The tare and net weight fields are not output unless the 8522 is in the net weight mode. The APW and piece count fields are not output unless the 8522 is in the count mode. The memory ID field is not included in the data output unless a memory location is in active use, (current tare in use was recalled from memory location, or accumulator store function has been used).

Print interlock and net sign correction are available in demand mode only. Autoprint is available in demand or continuous output mode. Print interlock, autoprint and net sign correction are inhibited in the weight mode if parts counting is enabled.

Demand Mode Output Print Fields

Data fields can be repeated as desired in the data output. Refer to single line and multi line demand format tables for data formats. The flexible format can be in any order desired and a format table is not provided. The flexible format will include an ASCII STX Start of Text character at the beginning of the transmission, if enabled at step **[49 1]**, and a checksum character with each new line field, if enabled at step **[44 1].**

Data	STX	DF1	UF1	SP	DF2	UF2	SP	DF3	UF3	SP	DF4	UF4	SP	DF5	UF5	SP	DF6	UF6	CR	CHK	LF
Note	A	B	C	D	B	C	D	B	C	D	B	C	D	B	C	D	B	C	E	F	G

Table 6-8 Single Line Demand Format

Data	Line 1	STX	DF1	UF1	CR	CHK	LF
	Line 2		DF2	UF2	CR	CHK	LF
	Line 3		DF3	UF3	CR	CHK	LF
	Line 4		DF4	UF4	CR	CHK	LF
	Line 5		DF5	UF5	CR	CHK	LF
	Line 6		DF6	UF6	CR	CHK	LF
Notes		A	B	C	E	F	G

Table 6-9 Multiple Line Demand Format

Demand Format Data Field Notes:

A: All data transmissions begin with a ASCII STX start of text character, hex value 02, if leading STX character is enabled in setup, step **[49 1]**. The leading <STX> character is required for proper operation of the Model 8806 and 8860 printers.

B: DFX: Numeric value for data field "X". The data field can be a weight data field or an APW value, piece count, scale ID, memory ID, time and date, or a new line field.

- Weight Data Fields: Nonsignificant leading zeroes in a weight data field are normally replaced with spaces except when the 8522 is setup to display and print a comma in place of the decimal point, setup step **[68 1]**. Kg weight units printing with a comma are output with leading zeroes.

  All weight data fields are padded with leading spaces to nine characters in length. A negative weight is indicated by a minus character before the most significant digit of the weight value. For example a weight of -34.5 is output with four leading spaces: $^{S}_{P}\,^{S}_{P}\,^{S}_{P}\,^{S}_{P}$-34.5 ($^{S}_{P}$ = Space).

  Tare and net weight fields are not output if the 8522 is in the gross weight mode. If bracketed printing is enabled, then all truly measured weight values (as opposed to a hand entered values) are preceded by an ASCII < character.

If print weight expanded is enabled, setup step **[53 1]**, an ASCII <SO> character, hex value 0E, is output before the net weight data field, or gross weight field if the 8522 is in the gross mode.

- APW Field: The APW field is not printed if the 8522 is not in the count mode. The APW field is padded with leading spaces to nine characters in length. Nonsignificant leading zeros are replaced with spaces.

  If the pieces per unit weight value has been recalled, the pieces per unit weight value is printed in place of the APW value. To return to printing the APW value, recall the APW value while in the count mode.

- Piece Count: The count field is not printed if the 8522 is not in the count mode. The count field is padded with leading spaces to eight characters in length. Leading zeroes are replaced with spaces. A $^{S}{}_{P}$PCS legend is output after the count field to indicate that this is the count field.

- Scale ID: The scale ID format is: $^{S}{}_{P}$SCALE$^{S}{}_{P}$ID$^{S}{}_{P}$XX, where XX is the two digit scale ID entered in setup step **[55]**.

- Memory ID: The memory ID format: $^{S}{}_{P}$MEMID$^{S}{}_{P}$XX, where XX is the current memory location in use. The memory ID field is not printed if a memory location is not currently in use.

- Time And Date Field: The time and date format is selectable in setup step **[56]** as listed in Table 6-10.

Step [56] Selection	Time and Date Output Format
1	MM/DD/YY
2	DD.MM.YY
3	YY/MM/DD
4	HH:MM$^{S}{}_{P}$PM$^{S}{}_{P}$MM/DD/YY
5	DD.MM.YY$^{S}{}_{P}$HH:MM
6	YY/MM/DD$^{S}{}_{P}$HH:MM

Table 6-10 Time and Date Format

- Blank or New Line Field:

  A blank or new line print field is output as eight spaces in the single line demand output mode or as ASCII <CR><LF> characters in the multiple line or flexible demand output modes. A checksum character, if enabled, is inserted between the <CR><LF> new line characters in the multiple line or flexible demand output modes.

C: UFX: Weight units/descriptions for data field. Weight units are selected at step **[11]** and weight units output can be disabled by setup step **[54]**. The data fields listed are followed by a units legend (such as "lb" to indicate pounds), if enabled in setup. Refer to Table 6-11.

If print weight expanded is enabled, setup step **[53 1]**, an ASCII <SI> character, hex value 0F, is transmitted after each unit or description field in the data transmission.

If bracketed printing is enabled, then all field descriptions for truly measured weight values (as apposed to hand entered values) will be followed by a an ASCII > character.

Weight Field	Weight Units and Descriptions ($^{S}_{P}$ indicates a space)
Gross	$^{S}_{P}$lb $^{S}_{P}$kg $^{S}_{P}$g $^{S}_{P}$oz $^{S}_{P}$oz$^{S}_{P}$t $^{S}_{P}$t $^{S}_{P}$dwt
Net	$^{S}_{P}$lb$^{S}_{P}$NET $^{S}_{P}$kg$^{S}_{P}$NET $^{S}_{P}$kg$^{S}_{P}$NETC $^{S}_{P}$g$^{S}_{P}$NET $^{S}_{P}$oz$^{S}_{P}$NET $^{S}_{P}$oz$^{S}_{P}$t$^{S}_{P}$NET $^{S}_{P}$t$^{S}_{P}$NET $^{S}_{P}$dwt$^{S}_{P}$NET
Tare	$^{S}_{P}$lb$^{S}_{P}$TR $^{S}_{P}$kg$^{S}_{P}$TR $^{S}_{P}$kg$^{S}_{P}$TRH $^{S}_{P}$kg$^{S}_{P}$PT $^{S}_{P}$g$^{S}_{P}$TR $^{S}_{P}$oz$^{S}_{P}$TR $^{S}_{P}$oz$^{S}_{P}$t$^{S}_{P}$TR $^{S}_{P}$t$^{S}_{P}$TR $^{S}_{P}$dwt$^{S}_{P}$TR
APW	$^{S}_{P}$lb$^{S}_{P}$APW $^{S}_{P}$kg$^{S}_{P}$APW $^{S}_{P}$g$^{S}_{P}$APW $^{S}_{P}$PCS/lb $^{S}_{P}$PCS/kg $^{S}_{P}$PCS/g

Table 6-11 - Demand Output Weight Units and Description

D: CR: ASCII carriage return, hex value 0D.

E: CHK: Optional Checksum character is defined as the 2's complement of the 7 low order bits of the binary sum of all characters on a line, preceding the checksum. Multiple line checksum includes the line feed <LF> character from the previous line.

F: LF: ASCII line feed character, hex value 0A.

Print Interlock
When print interlock is enabled, only one print of a weight or count is permitted. The weight on the scale must return to a net weight less than the value selected as the minimum print in step [47] to reset the interlock. After the interlock has been reset, a single print of another weight or piece count greater than the minimum print value is possible.

Autoprint
Autoprint enables the 8522 to automatically transmit data when the weight or piece count on the scale settles to no motion. The weight on the scale must be greater than the value selected as the minimum print in step **[47]**. After an autoprint, the net weight on the scale must return to a weight value less than the minimum print selection to reset the autoprint feature. The **PRINT** key is disabled when autoprint is enabled.

Net Sign Correction
Net sign correction enables the Model 8522 to store a tare value which is greater than the gross weight on the scale and print a positive net weight. This is done by swapping the gross and tare weight values so that the larger value is the gross weight and the smaller value is the tare weight. Net sign correction only effects demand mode data output.

Net sign correction example:	**Data output is:**
Tare weight entered = 12000 lb	12000 lb
Gross weight on the scale =3000 lb	3000 lb TR
Displayed weight = -9000 lb Net	9000 lb NET

Continuous Output Mode
The continuous output format is output every A/D update (approximately 10 per second). The <ENQ> continuous mode is output as requested. The continuous format is fixed except for baud rate, parity and the selectable checksum character. The continuous output mode provides compatibility with METTLER TOLEDO products that require real time weight data such as the Model 8623 remote display or the Model 8614 and 8616 scoreboards.

Character		**Status**			**Indicated Weight**						**Tare Weight**						**17**	**18**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**		
Data	STX	SWA	SWB	SWC	MSD	-	-	-	-	LSD	MSD	-	-	-	-	LSD	CR	CHK
Notes	A	B			C						D						E	F

Table 6-12 - Continuous Format Output

Continuous Format Output Notes:

A - STX: ASCII start of text character, hex value 02.

B - SWA, SWB and SWC: Status Words A, B and C. Tables 6-13, 6-14 and 6-15.

Function	Selection	Status Bit						
		6	5	4	3	2	1	0
Decimal Point or Dummy Zero	X00 X0 X 0.X 0.0X 0.00X 0.000X 0.0000X	ALWAYS A	ALWAYS A	N.A.		0 0 0 0 1 1 1 1	0 0 1 1 0 0 1 1	0 1 0 1 0 1 0 1
DISPLAY Increment Size	X1 X2 X5	0	1	0 1 1	1 0 1	N.A.		

Table 6-13 - Status Word A Bit Definitions (N.A.) Not applicable

Function	Bit
GROSS/NET: NET = 1	0
NEGATIVE = 1	1
OVERCAPACITY = 1	2
MOTION = 1	3
LB/KG: KG = 1	4
ALWAYS A 1	5
POWERUP = 1	6

Table 6-14 Status Word B Bit Definitions

Function	Bit
ALWAYS A 0	0
ALWAYS A 0	1
ALWAYS A 0	2
PRINT REQUEST = 1	3
EXPANDED WEIGHT MODE = 1	4
ALWAYS A 1	5
MANUAL TARE IN kg ONLY MODE = 1	6

Table 6-15 Status Word C Bit Definitions

C - Displayed Weight: Six digits of displayed weight. No decimal point in field.

D - Tare Weight: Six digits of tare weight data. No decimal point in field.

E - CR: ASCII carriage return, hex value 0D.

F - CHK: Optional Checksum character, 2's complement of the 7 low order bits of the binary sum of all characters preceding the checksum.

Remote ASCII Control Character Input

The Model 8525 Indicator is capable of performing clear tare, print request, pushbutton tare and zero functions equivalent to pressing the **CLEAR**, **PRINT**, **TARE** and **ZERO** keys, when specific ASCII uppercase characters are received. These functions are subject to the same restrictions as their keyboard equivalents. ASCII character input is only available if remote ASCII control input is selected, step **[66 5]**.

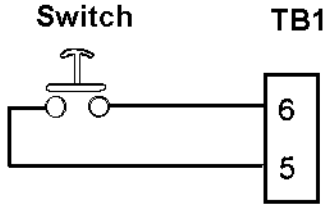
The parity and baud rate of the data input are the same as selected for data output. A Carriage Return character <CR> may be used to terminate a control character command but is not required.

The external commands that are recognized by the 8525 are described next. The brackets <> are for clarity only and are not transmitted. All letters sent must be upper case. <CR> represents the ASCII Carriage Return character, hex value 0D. <Enq> represents the ASCII Enquire character, hex value 05.

<C> <CR>	**CLEAR** key: Clears count mode and tare weight.
<P> <CR>	**PRINT** key: Print request. If scale is in motion when a print request occurs, data is output when the scale is in a no motion condition.
<T> <CR>	**TARE** key: The scale must be in a no motion condition for an autotare to occur.
<Z> <CR>	**ZERO** key: The scale must be in the gross mode with no motion and within the zero capture range.
<Enq>	Requests one continuous format transmission. <Enq> continuous output mode must be selected, step **[41 2]**.

Remote Contact Closure Input

Pins 5 and 6 of terminal strip TB1 of the 8522 Main PCB can be used for a normally open, contact closure input to permit remote clear, print, tare, zero or blank display functions to be accessed by means of an external pushbutton or relay contact. The contact closure input mode is controlled by step **[66]**. The 8522 Main PCB receive data jumpers must be set for 20 mA active current loop: W2 across pins 2-3 and W3 across pins 3-4. Refer to figure 6-15.



Serial I/O Remote Pushbutton "Contact Closure" Input
Figure 6-15

7 Preventative Maintenance

This section provides instructions and procedures for maintenance of the 8522, as well as a troubleshooting guide to aid correction of malfunctions.

Required Tools and Supplies

The following items and common hand tools are recommended for maintenance and repairs.

- Volt-Ohm Meter
- Single DigiTOL® Load Cell Simulator 0917-0178
- Analog Load Cell Simulator (for analog option)
- Soft, Lint Free, Cleaning Cloth
- Static Protection Bags for PCB's
- Static Wrist Strap

Cleaning

Clean the keyboard and covers with a clean, soft cloth that has been dampened with a mild glass cleaner.

Do not use any type of industrial solvent or the finish of the unit may be damaged. Do not spray cleaner directly onto the unit.

Trouble Shooting Procedure

If problems occur, record as much information as possible about the symptoms the 8522 is exhibiting before attempting to repair the scale. If the 8522 is malfunctioning perform the troubleshooting tests described next in order to determine the malfunction. Always check the DC power supply voltages before replacing components in the 8522. If the 8522 is displaying an error code, record the error code and refer to Error Codes Section.

AC Power and Ground Tests

First check the AC input power. The input power must be within +10%, -15% of the nominal AC line voltage.

If the AC line voltage is correct then check for excessive voltage between neutral and ground on the AC input. Neutral to ground voltages greater than 0.2 VAC indicate that the 8522 does not have an adequate ground. The 8522 may suffer from intermittent lockups or unstable weight readings if there is excessive neutral to ground voltage.

If the AC line voltage is incorrect or if there is excessive neutral to ground voltage then have a qualified electrician correct the AC power. In some cases a power line conditioner may be required to correct an adverse power condition.

Cabling and External Equipment Tests

Visually inspect all interconnect cables for signs of damage. If an abraded or pinched cable is found, replace the damaged cable and retest the scale.

Disconnect all nonessential external equipment (printers, computers, remote displays, remote contact closure input) and retest the scale. If the problem is corrected then try reconnecting the external equipment one piece at a time to determine the source of the problem. If the analog scale input option is in use then connect an analog load cell simulator to the analog scale input option. Verify that the +sense is connected to the +excitation and that the -sense is connected to the - excitation. The 8522 will not operate correctly without the sense to excitation jumpers.

Weighing Problems (DigiTOL© Load Cell)

If there is a problem with a DigiTOL© load cell that is unstable, changing weight readings, or displaying a load cell error code, first check the load cell excitation voltage on terminal strip TB2 of the 8522 Main PCB. Refer to the following Section titled Power Supply Voltage Checks. If the load cell excitation voltage is correct then the problem is most likely either a mechanical problem in the scale base or a defective load cell.

To verify that the problem is in the base replace the scale base with a load cell simulator. The 8522 DigiTOL© load cell interface will only work with the single DLC simulator, factory number 0917-0178. The multiple load cell simulator, factory number 0964-0033, will not work with the 8522.

If the 8522 operates correctly with the load cell simulator then the problem most likely is either a defective or incorrectly wired load cell cable or a malfunction in the DigiTOL© load cell. If the 8522 has the same weighing problem when connected to a load cell simulator then the problem is most likely due to a defective Main PCB.

Weighing Problems (Analog Scale Input Option)

If there is a problem with an analog scale base that is unstable, changing weight readings, or displaying a load cell error code, first check the load cell excitation voltage at the load cell connector on the analog input PCB. Refer to the following Section titled Power Supply Voltage Checks. If the load cell excitation voltage is incorrect then the problem is in the 8522.

If the excitation voltage is correct, determine if the problem is in the 8522 or the base by replacing the scale base with an analog load cell simulator. If the 8522 operates correctly with the load cell simulator then the problem most likely is either a defective or incorrectly wired load cell cable, a mechanical problem with the scale base, or a defective load cell. If the 8522 has the same weighing problem when connected to a load cell simulator then the problem is most likely due to a defective analog PCB.

Other Problems

Operational or data output problems may be due to incorrect setup. Verify setup parameters, jumper selections and operating procedures as described in Sections 4 and 5. If the problem is with data output, verify that the interconnect cable is wired correctly. Refer to Chapter 6.

Malfunctions in the 8522 can often be located most quickly by parts substitution. Verify all power supply voltages before replacing any components in the 8522. Refer to the Interconnect Diagram in Chapter 10 for additional troubleshooting information. A printed circuit board believed to be defective can be checked by replacing it with a known good PCB, and then observing whether the problem is corrected. Do not automatically program the replacement PCB like the suspect PCB as the problem could be caused by a programming error. Refer to Chapter 4 for PCB programming.

Use a properly grounded static wrist strap when handling PCBs. Use an antistatic bag to store both the new and the suspect PCB. Once the problem is corrected, reinstall all replaced PCBs, one at a time and retest. This will eliminate replacing good PCBs.

Exchange PCBs or sub-assemblies are available from your authorized METTLER TOLEDO representative.

Power Supply Voltage Tests

The Power Supply PCB provides four, unregulated power supply voltages: +12 VDC, +27 VDC , +52 VDC and 7 VAC. The +12, +27 and +52 VDC supply voltages are measured with respect to ground, located at TB2-Pin 5 on the Main PCB. Measure the 7 VAC filament voltage from pins J1-Pin 8 to J1-Pin 10. Refer to Table 7-1 for power supply voltages. Refer to Figure 7-1 for test point locations.

Power Supply Voltage	Voltage Reading			+ Meter Lead		Function
	Min	Max	Ripple			
+12 VDC	10.5	16	0.2	J1-Pin 6		+5 VDC Power Supply 20 mA Current Loop
+27 VDC	20	35	0.5	J1-Pin 1		+18 VDC Power Supply
+52 VDC	40	60	0.5	J1-Pin 4		+42 VDC Power Supply
7 VAC	5.5	8.5	N.A.	J1-8	J1-10	Display Filament Supply

Table 7-1 - Main PCB Unregulated DC Power Supply Voltage Checks

Note: If any of the voltages listed in Table 7-1 are missing or incorrect, then verify the AC input power. If the AC input power is OK then replace the power supply PCB.

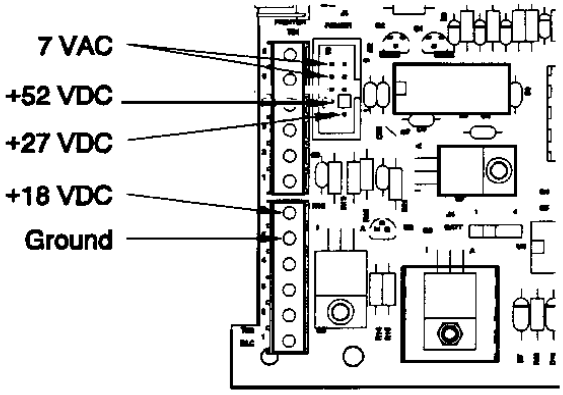


Figure 7-1 - Main PCB Voltage Test Points

The 8522 Main PCB uses the three DC power supply voltages from the Power Supply PCB to generate the regulated +5 VDC logic supply, +18 VDC load cell supply, and the +42 VDC display supply. Refer to Table 7-2 for power supply voltages. Refer to Figures 7-1 and 7-2 for test point locations.

Regulated Power Supply	Voltage Reading			+ Meter Lead	Function
Voltage	Min	Max	AC Ripple		
+5	4.75	5.25	0.01	J2-Pin 7	Logic Circuitry Supply
+18	17.5	20	0.01	TB2-Pin 6	Load Cell Supply
+42	40	45	0.05	U8-Pin 1	Display Supply Voltage

Table 7-2 - Main PCB Regulated DC Power Supply Voltage Checks

Note: If any of these voltages are missing or incorrect, verify the unregulated power supplies listed in Table 7-1, if these are OK then replace the Main PCB.

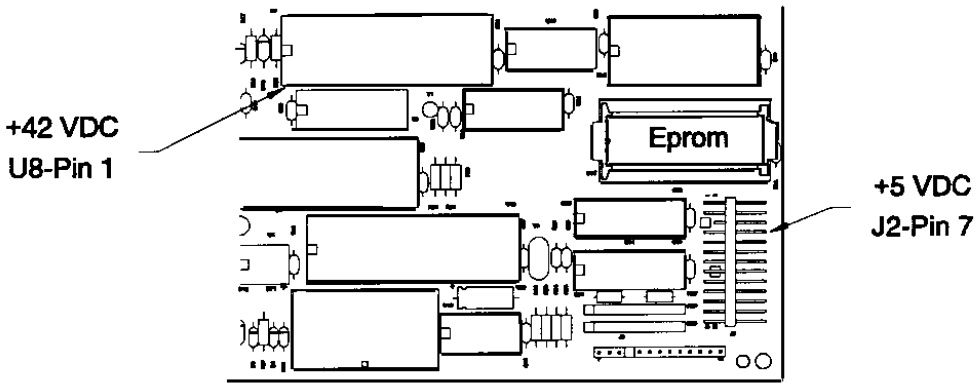


Figure 7-2 - Main PCB, Voltage Test Points

The Analog Scale Input Option uses the +18 VDC and +5 VDC supplies. The analog PCB regulates the +18 VDC down to +15 VDC and +12.5 VDC.

The +15 VDC is used by the analog circuitry on the analog PCB and the +12.5 VDC is the analog load cell excitation. Refer to Table 7-3 for power supply voltages. Refer to Figure 7-3 for test point locations.

Analog Option Power Supply Voltage	Voltage Reading			+ Meter Lead	Function
	Min	Max	AC Ripple		
+15	14.7	15.3	0.01	C14 (+)	Analog Circuitry
+12.5	12.3	12.7	0.01	J3-Pin 3	Load Cell Excitation

Table 7-3 - Main PCB Regulated DC Power Supply Voltage Checks

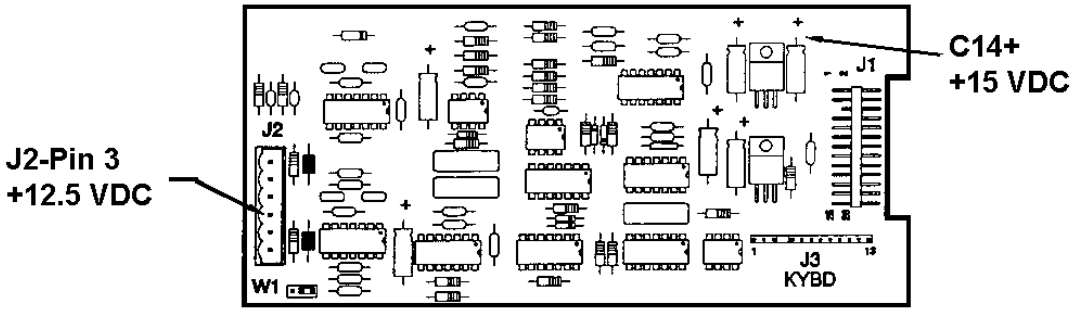


Figure 7-3 - Analog PCB, Voltage Test Point Locations

Error Codes

If an error code is displayed steps should be taken before performing the corrective measures recommended in Table 7-4:

- Power down. Wait 15 seconds then power back up.
- Verify all power supply voltages and harness connections.

The suggested corrective measures assume these two steps have not resolved the error. Perform the corrective measures in the order listed and retest between measures, if more than one measure is listed for an error.

Table 7-4

Error	Error Description	Corrective Measures
E1	Fatal ROM memory error	1. Replace EPROM and Chip Carrier. 2. Replace Main PCB.
E2	Fatal internal RAM error	Replace Main PCB.
E3	Setup memory corrupt	1. Enter setup and reprogram. 2. Replace Main PCB.
E4	Fatal external RAM memory error	Replace Main PCB.
E6	Analog verify failure	1. Recalibrate scale. 2. Replace Analog Module. 3. Replace Main PCB.
E7	DigiTOL© load cell, format error	1. Recalibrate scale. 2. Replace load cell. 3. Replace Main PCB.
E8	DigiTOL© load cell, no data	1. Check load cell cable wiring. 2. Check load cell excitation voltage. 3. Check 8522 with DigiTOL© load cell simulator. 4. Replace load cell. 5. Replace Main PCB.
E9	Load cell out of range	1. Check base for obstructions. 2. Verify load cell wiring and voltage. 3. Replace Analog Module. 4. Replace load cell.
E10	DigiTOL© load cell, RAM error	1. Recalibrate scale. 2. Replace load cell. 3. Replace Main PCB.
E11	DigiTOL© load cell, ROM error	1. Replace load cell. 2. Replace Main PCB.
E16	Math Overflow	1. Recalibrate scale. 2. Replace Main PCB.
E21	Incorrect scale capacity	Press CLEAR key, then enter correct capacity.
E24	Illegal high range division	Press CLEAR key, then enter correct division size.
E25	Illegal mid range division	Press CLEAR key, then enter correct division size.
E26	Illegal low range division	Press CLEAR key, then enter correct division size.
E27	Illegal Overcapacity Entry	Press CLEAR key, enter legal overcapacity value.
E32	Insufficient test weight or insufficient signal from load cell	1. Press **CLEAR** key to clear. 2. Check base for obstructions. 3. Verify scale capacity programming. 3. Verify load cell wiring. 4. Replace Analog Module. 5. Replace load cell.
E34	Test weight to large	Press **CLEAR** key, test weight must be less than 105% of capacity.
E35	Incorrect Test Weight Increment	Press **CLEAR** key, reenter test weight value with correct increment size (X1, X2, or X5).
E36	Build to small for load cell capacity	Press **CLEAR** key, recalibrate with larger capacity.
E38	Poor build for counting	1. Press **CLEAR** key to accept current build 2. Or recalibrate with larger capacity.
E40 XX	Bad Record, ID=XX	Press **CLEAR** key, bad record is automatically erased.
E E E or -E E E	Scale not zeroed	1. Press **ZERO** key. 2. Check base for obstructions. 3. Recalibrate scale. 4. Verify load cell wiring.

Main PCB Replacement

⚠ CAUTION!

Remove power from the 8522 and wait a minimum of 30 seconds before connecting or disconnecting any harnesses from PCB's or load cells as damage may result.

CAUTION!

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

After removing the Logic PCB from the Model 8522, the EPROM and carrier assembly MUST be removed from the PCB before returning it to METTLER TOLEDO for repair.

Near the center of the Logic PCB, there is an EPROM and carrier. It is designated by a red adhesive label on top of the IC (integrated circuit) with the part number *13789000A on it. Grasp the ends of the carrier assembly and lift the carrier and EPROM from the mating socket on the PCB.

Note: There may be a letter prefix to the part number on the EPROM.

Retain the EPROM and carrier assembly and install them into the replacement Logic PCB before applying power to the 8522.

Battery Backed Ram

Time and date, stored tare weights and accumulation data are retained in battery backed RAM to prevent loss of data in the event of a power outage. The nicad battery backup for this memory is located on the Main PCB and is not replaceable.

If the 8522 no longer retains time and date, stored tare weights or accumulated data when the AC power is removed then the onboard battery has failed. If the onboard battery fails, an external battery, part number 133937 00A, can be plugged into connector J4 on the Main PCB to maintain the battery backed RAM.

8 General Information

Recommended Spare Parts

It is recommended that these spare parts be kept in stock in order to keep downtime to a minimum. The items are available through your local authorized METTLER TOLEDO service representative.

Part Number	Description	Qty.
137873 00A	Main PCB	1
137890 00A	EPROM and Carrier	1
137882 00A	100/120 VAC Power Supply PCB	1
139460 00A	220/240 VAC Power Supply PCB	1
140187 00A	Keyboard Assembly (Desk)	1
140598 00A	Keyboard Assembly (Wall)	1
130009 00A	Analog PCB (if analog option installed)	1
133937 00A	External Battery (RAM memory backup)	1

Part Numbers listed may have a letter prefix

Optional Accessories

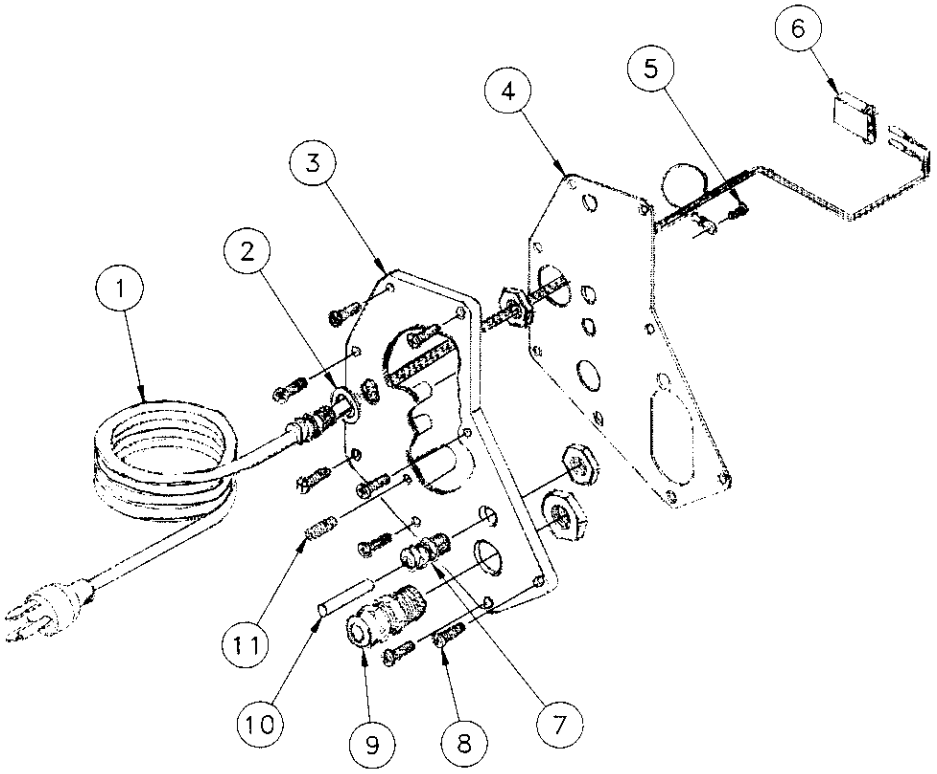
The following accessories and kits are available for use with the Model 8522 digital indicator.

Description	Part Number	Factory Number
Analog Scale Input KOP (Desk)	140285 00A	0917-0202
Analog Scale Input KOP (Wall)	140603 00A	0917-0203
Wall Mount Bracket (Desk)	133206 00A	0917-0159
Printer Cable (15')	133717 00A	0900-0258
DigiTOL© Load Cell Cable (10')	130115 00A	0917-0166
DigiTOL© Load Cell Simulator	134460 00A	0917-0178
Analog Load Cell Simulator	100865 00A	0917-0091

Part Numbers listed may have a letter prefix

9 Parts Catalog

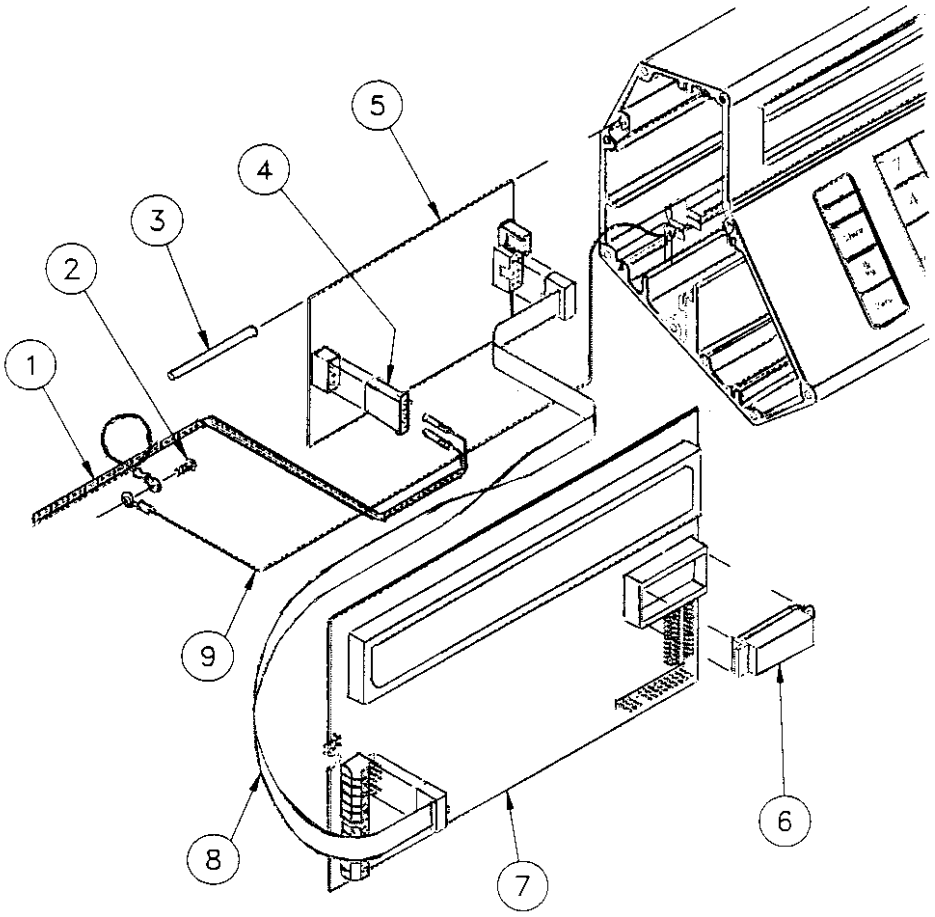
Left End Cap (Desk Enclosure)



Ref	Part Number	Description	Qty
1	133202 00A	120 VAC Line Cord	1
2	140501 00A	Grip Bushing Gasket	1
3	130017 00A	Left End Cap	1
4	130019 00A	End Cap Gasket	2
5	097518 00A	3 pin Plug	1
6	R03579 00A	#8-32 X 5/16 Ground Screw	1
7	129018 00A	Small Grip Bushing	1
8	R03868 00A	End Cap Screws	16
9	130023 00A	Large Grip Bushing	1
10	129038 00A	Plastic Plug	1
11	R03270 00A	1/4"-20 X 5/16" Setscrew	2

(*) Part number listed may have a letter prefix.

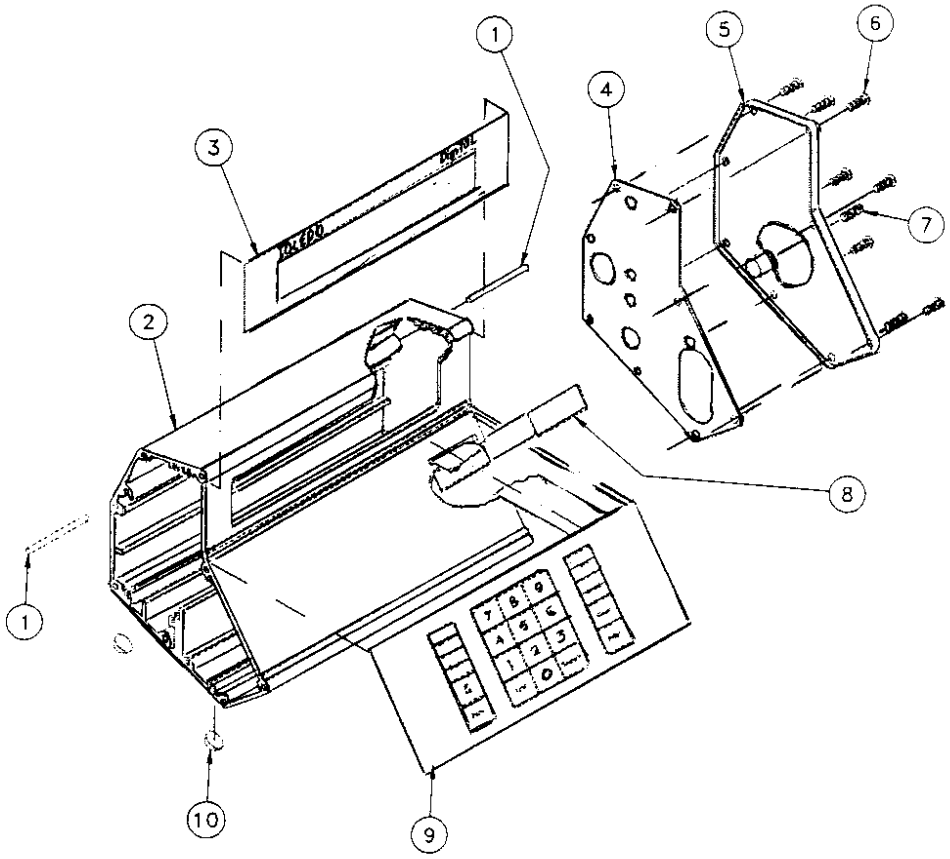
PCB'S and Harnesses (Desk Enclosure)



Ref	Part Number	Description	Qty
1	133202 00A	AC Line Cord	1
2	R03579 00A	#8-32 X 5/16 Ground Screw	1
3	139456 00A	PBC Retaining Rod	2
4	097518 00A	Three Pin Plug	1
5	137882 00A	100/110 VAC Power Supply PCB	1
	139460 00A	220/240 VAC Power Supply PCB	1
6	137890 00A	EPROM And Carrier	1
7	137873 00A	Main PCB	1
8	139457 00A	Power Harness	1
9	133219 00A	Ground Wire	1

(*) Part number listed may have a letter prefix.

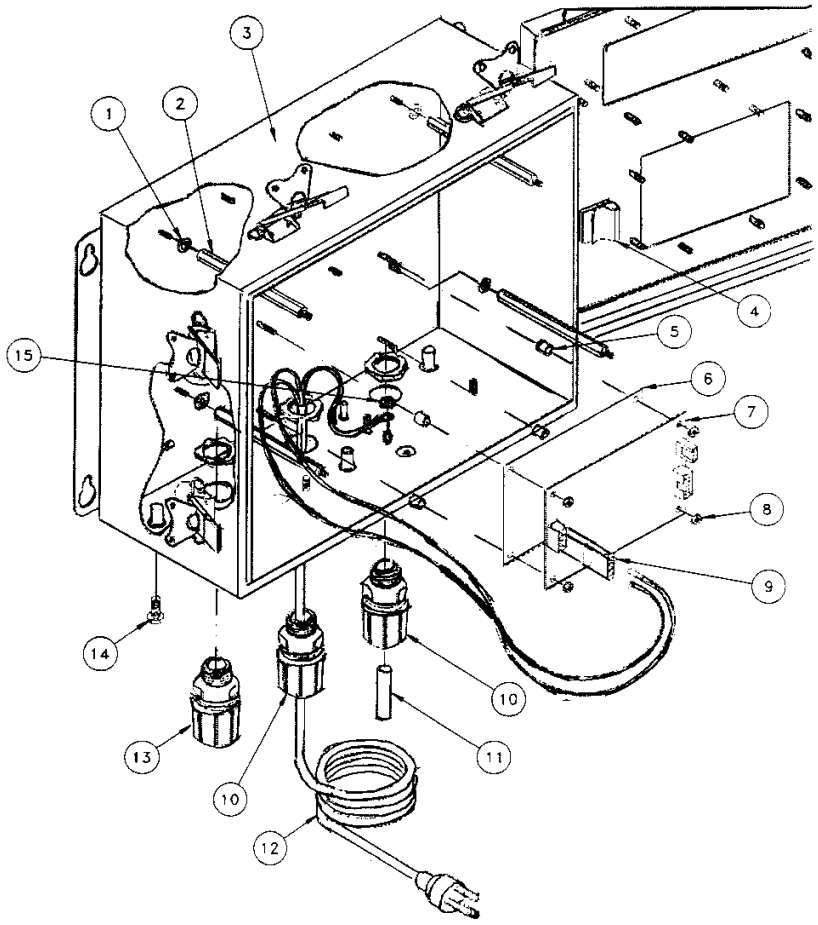
Keyboard, Enclosure and Right End Cap (Desk Enclosure



Ref	Part Number	Description	Qty
1	139456 00A	PBC Retaining Rod	2
2	141033 00A	Enclosure	1
3	138467 00A	Standard Display Lens (DigiTOL® Load Cell)	1
	140206 00A	Conductive Display Lens (Analog Load Cell Option)	2
4	130019 00A	End Cap Gasket	1
5	130018 00A	Right End Cap	16
6	R03868 00A	End Cap Screws	2
7	R03270 00A	1/4"-20 X 5/16" Setscrew	1
8	141619 00A	Foam Tape (Inside Enclosure)	1
9	130023 00A	Keyboard Assembly	4
10	126971 00A	Bumper Feet	

(*) Part number listed may have a letter prefix.

Enclosure and Hardware (Wall Enclosure)

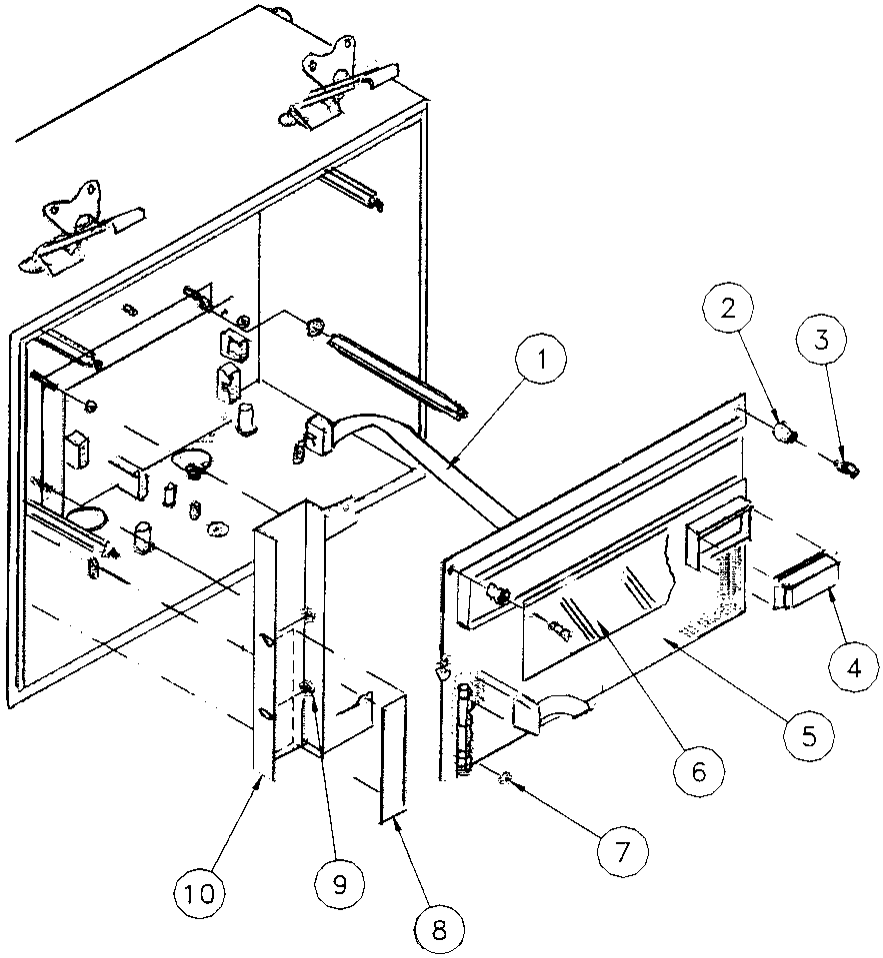


Ref	Part Number	Description	Qty
1	R02540 00A	#10 Flat Washer	4
2	132695 00A	#6-32 X 3.75" Standoff	4
3	132517 00A	Enclosure	1
4	107502 00A	PCB Spacer	4
5	132699 00A	PCB Insulator	1
6	137882 00A	100/110 VAC Supply PCB	1
	139460 00A	220/240 VAC Supply PCB	1
7	112855 00A	Plastic Wire Clamp	1

Ref	Part Number	Description	Qty
8	R00813 050	#6-32 Nut	6
9	097518 00A	Three Pin Plug	2
10	137853 00A	Cable Grip .312 -.375	1
11	131606 00A	Plastic Plug	1
12	130110 00A	120 VAC Line Cord	1
13	137851 00A	Cable Grip .187 -.250	1
14	R03562 00A	1/4"-20 X 3/8" Screw	3
15	R03298 00A	#8-32 Locknut	21

(*) Part number listed may have a letter prefix.

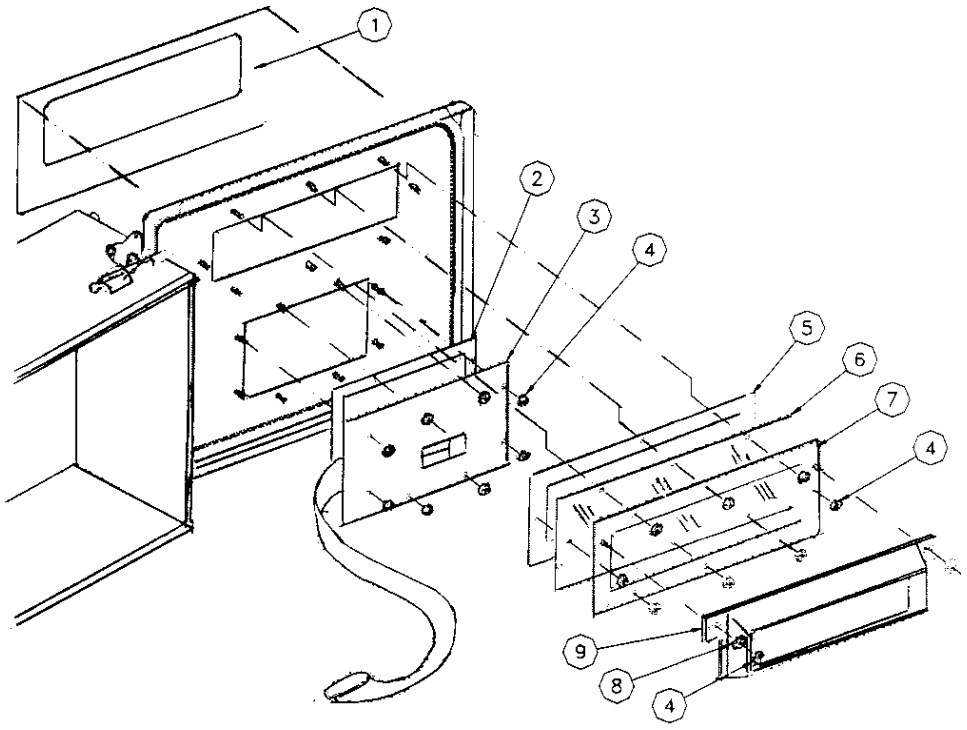
Main PCB and Mounting Hardware (Wall Enclosure)



Ref	Part Number	Description	Qty
1	139457 00A	Power Supply Harness	1
2	137880 00A	#6-32 X 3/8" Standoff	2
3	R02865 00A	#6-32 X 1/4" Screw	2
4	137890 00A	EPROM and Chip Carrier	1
5	137873 00A	Main PCB	1
6	137981 00A	Display Filter Lens	1
7	R00813 050	#6-32 Nut	6
8	139468 00A	Terminal Strip Label	1
9	R03298 00A	#8-32 Locknut	21
10	140134 00A	Bracket	1

(*) Part number listed may have a letter prefix.

Keyboard/Display, Front Cover (Wall Enclosure)

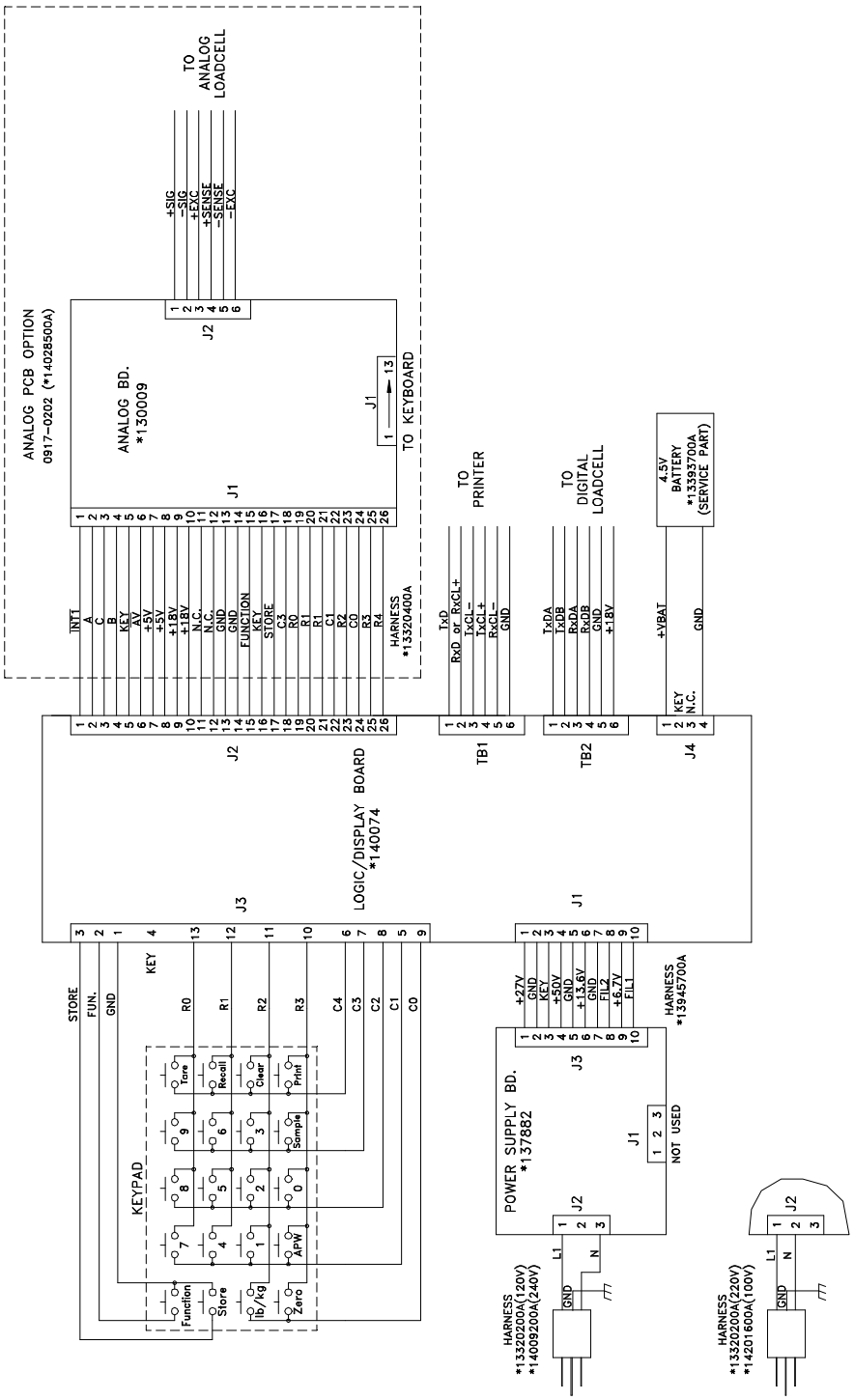


Ref	Part Number	Description	Qty
1	132532 00A	Decorative Bezel	1
2	132525 00A	Keyboard Gasket	1
3	140598 00A	Keyboard Assembly	1
4	R03298 00A	#8-32, Locknut	21
5	132522 00A	Display Lens Gasket	1
6	132521 00A	Display Lens	1
7	139464 00A	Lens Clamp Plate	1
8	R02539 00A	#8 Flat Washer	2
9	138468 00A	Display Bezel	1

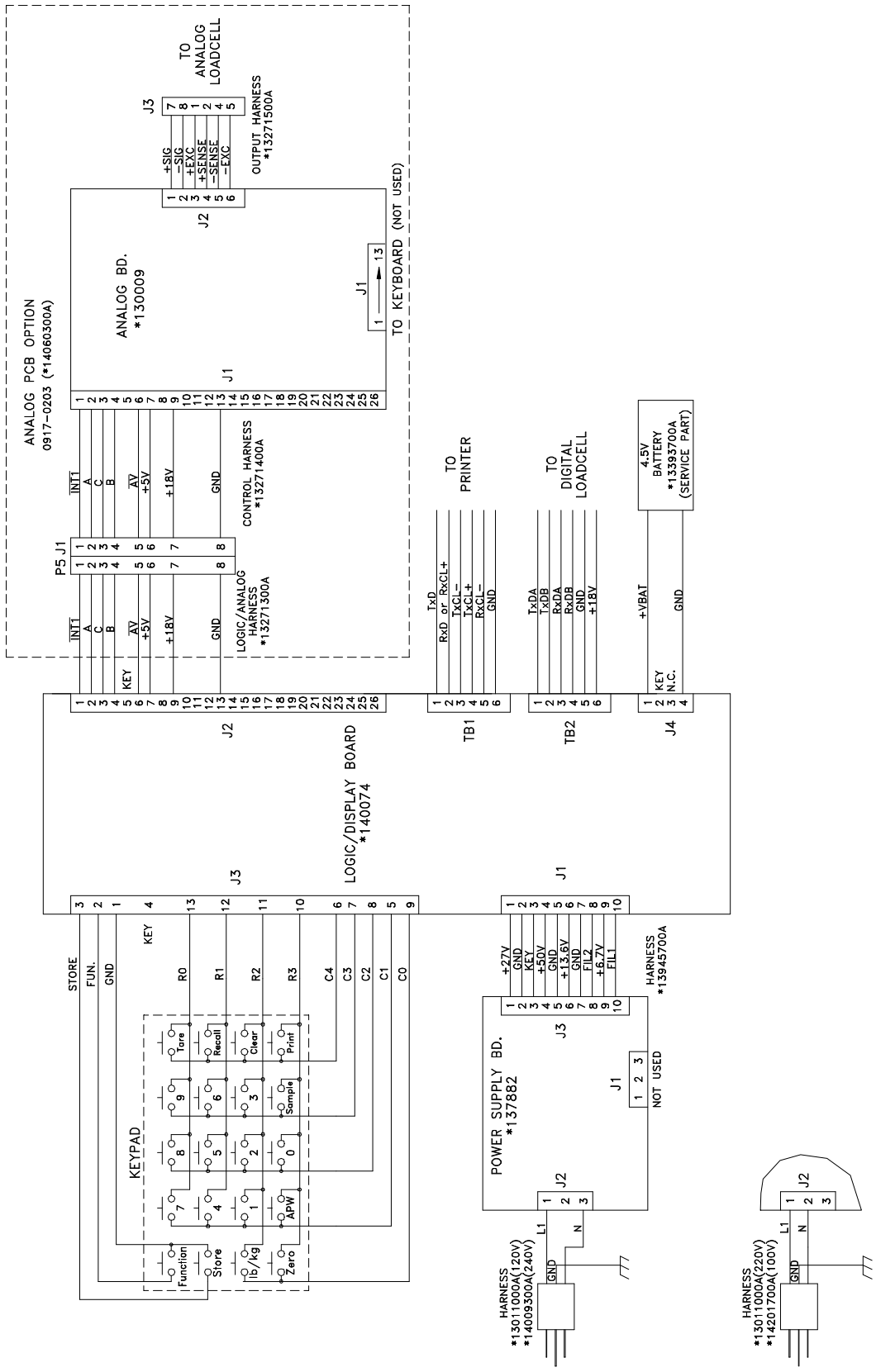
(*) Part number listed may have a letter prefix.

10 Interconnecting Diagrams

Desk Version



Wall Enclosure



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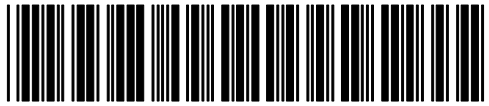

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