M 8141

Installation
and
Operation Manual

INTRODUCTION

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

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

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

IMPORTANT!!

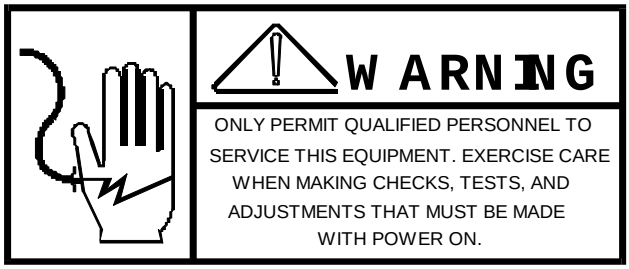
It is most important that the correct part number is used when ordering. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

PRECAUTIONS

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

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

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



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

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

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

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

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

CONTENTS

A. ADDENDUM TO M8141 INSTALLATION AND OPERATION MANUAL

WALL ENCLOSURE LOAD CELL CONNECTIONS

8141 wall enclosures built after January 1991 use a terminal strip assembly to terminate the load cell cable. The load cell cable may be terminated by removing the load cell cable termination assembly and connected the load cell cable to the appropriate terminals. Refer figure 3.7 for load cell termination location.

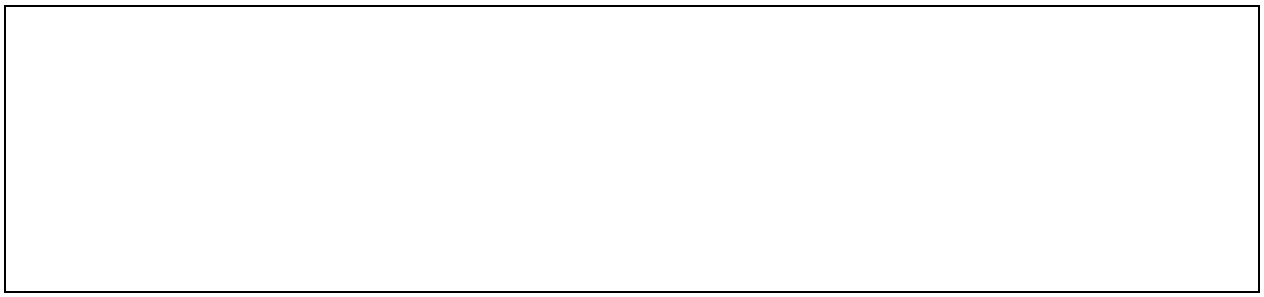


Figure 3.6 Wall Enclosure , Load Cell Assembly

Insert the load cell cable into the wall enclosure through the cable grip clamp on the bottom of the enclosure beneath the load cell termination assembly. Terminate the load cell cable to the terminal strip located inside the load cell termination assembly. Connect Load Cell cable shield to stud with eye lug provided. Refer to table 3-1 for load cell terminal function and cable color code.

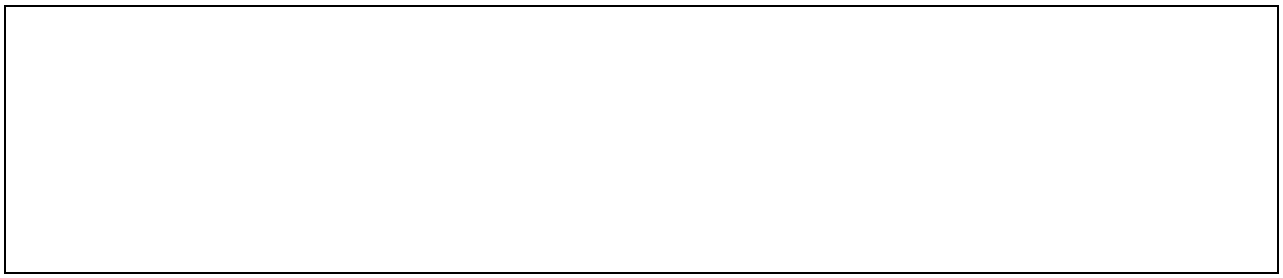


Figure 3.7 Load Cell, Terminal Assembly

Wall Enclosure		Function	Load Cell Termination			
Old Style Twist Lock Connector	New Style Terminal Strip		Toledo 6 Wire Cable		Masstron 6 Wire Cable	Masstron/Toledo 4 Wire Cable
			Wire Color	Pin	Wire Color	Wire Color
C	+EXC	+ Excitation	White	A	Green	Green
E	+SEN	+ Sense	Yellow	D	Brown	See Note 1
Shell	Stud	Shield	Orange		Yellow	Yellow or Orange
F	-SEN	- Sense	Red	F	Blue	See Note 1
D	-EXC	- Excitation	Blue	C	Black	Black
A	+SIG	+ Signal	Green	E	White	White
B	-SIG	- Signal	Black	B	Red	Red

Table 3-1: J1 Load Cell Connector Pinout for Wall Mount Enclosure Versions

Note 1: Jumper + Excitation to + Sense and - Excitation to - Sense at the load cell junction box. A sex wire cable should be run from the junction box to the indicator.

B. MODEL 8141 FIBER OPTICS ADDENDUM

As of March 1, 1991, all Fiber Optic equipped 8141'a will be supplied with upgraded Fiber Optics Assemblies. The old and new designs are interchangeable from an electrical interface viewpoint, but the fiber optics conversions themselves are not interchangeable. In addition, the available kit structures have also been re-defined.

In brief, the old and new structures reveal more combination flexibility with the new version but it takes three (3) items to make a complete system:

1.) Scale PCB KOP (for desk or wall indicator)
2.) Required cable length
3.) Required dual channel converter (120 or 240 V) (Optional-not required if used with models 9330, 9323, or 9325 which have integral fiber optic interfaces).

Specific installation instructions are setup are supplied with each individual KOP. If replacement scale KOP's or dual channel KOP's are to mate to existing fiber optics cables, a 0964-0053 connector/termination kit will be required to replace the existing plugs on each end.

1.0 GENERAL DESCRIPTION

The Toledo/Masstron Model 8141 and Model M8141 electronic digital indicators (listed in Table 1 below, hereafter referred to as M8141(s) in this manual) are intended for weighing applications in hazardous (classified) locations as shown below. The M8141 indicator is Factory Mutual approved as an intrinsically safe indicator when connected to the Masstron/Toledo battery pack or power supply. With the intrinsically safe design and its many features, the M8141 is an efficient replacement for mechanical/electronic scale indicators in hazardous environments. The 100% keyboard calibration and program setup makes the installation and operation of the M8141 indicator easy for the operator. Full keyboard tare allows direct digital tare input for known values for pushbutton tare from empty containers. The automatic "Sleep" mode may be used to conserve battery life in portable scale applications. The large one inch LCD weight display is specially designed for maximum viewing angle and distance. A sealed heavy duty rechargeable batter pack provides long life and reliable operation ... no corrosive material to leak. There is also a 120 VAC power supply with an intrinsically sage output designed to be installed in the hazardous area. An eight (8) setpoint problem with selectable dribble and preact for the control of external devices such as alarms, gates, valves, etc. is available through either the printer port or the host port. The setpoint outputs require a remote I/O module.

1.1 CONFIGURATIONS

The M8141 is available in two (2) basic configurations; a desk top metal die cast NEMA 1 enclosure and a wall mount stainless steel enclosure. The M8141 us approved for the hazardous (classified) locations shown below.

INDICATOR MODELS	APPROVED FOR USED IN HAZARDOUS LOCATIONS	APPROVED POWER SOURCE/ SUPPLY MODEL NUMBERS
Desk M8141-DG-0001 M8141-DG-0002 8141-0001-000 8141-0002-000 Wall M8141-WS-0001 M8141-WS-0002 8141-0011-000 8141-0012-000	Class I, II and III Division 1 Applicable Groups A, B, C, D, E, F and G	Toledo Scale Battery Pack -20 / M8141 -40 / M8141 900354 00A and 0964-0004
Desk 8141-0002-000 Wall 8141-0002-000	Class I, Division 1 Groups C and D only	Toledo Scale Power Supply 0964-0024 For New Applications Only

(Cont.)

INDICATOR MODELS	APPROVED FOR USED IN HAZARDOUS LOCATIONS	APPROVED POWER SOURCE/ SUPPLY MODEL NUMBERS
Desk M8141-DG-0001 M8141-DG-0002 8141-0001-000 8141-0002-000 Wall M8141-WS-0001 M8141-WS-0002 8141-0011-000 8141-0012-000	Class I, II and III Division 1 Applicable Groups C, D, E, F and G	Toledo Scale Power Supply 9064-0032 For new and retrofit applications in hazardous areas for which the power supply is approved.

Table 1-1

WARNING!!

The indicator models are Factory Mutual approved only for indoor hazardous locations and only with the approved power sources shown on Table 1-1. Indicators must be installed per Masstron/Toledo drawings TC000040, TC0000041, and TA 700001.

1.2 SPECIFICATIONS

Analog input
Sensitivity: .3uv/ grad minimum
Full Scale Range: 15mV

Load Cell Excitation
Voltage: 5 VDC, gated
Load: 4-35 ohm load cells maximum

Analog to Digital Conversion
Type: Triple slope ratiometric
Resolution: 50,000 Displayed graduations
10,000 Displayed NBS approved
Conversion Rate A/D: 8/Sec

Calibration
Digital: Access through keyboard

Accuracy
Span temperature coefficient: -12ppm/º C
Zero temperature coefficient: -0.1 uV/º C
Linearity: ± .01% Full Scale

Front Panel Display
Type: LCD, 1" high, 1/2" wide, 6 digit, 7 segment
Annunciators: LCD, for Gross, Tare, Net, lb., Kg., Setpoint, Zero, I.D., Time, Date, Battery Low, Setup
Power: Heavy duty intrinsically safe rechargeable battery pack or 120 VAC hazardous area power supply with an intrinsically safe output.

Environment
Operating Temperature: -10º to 40º
Humidify: 0-95% relative humidity, non-condensing

Physical

Construction:	Main PCB consisting of analog to digital processing, LCD display and keyboard interface
Enclosures:	NEMA I desk top or wall mount stainless steel
Dimensions:	Desk - 8.4” high x 12.6” wide x 6.5” deep Wall Mount - 11.25” high x 13.88” wide x 5.5” deep

1.2.1 BATTERY PACK

0964-0004 10 Amp hour -20/M8141, 8 Amp hour -40/M8141, 12.5 Amp hour, 900354 00A 12.5 Amp hour, 8 and 12.5 Amp hour batteries are obsolete February, 1989.

Construction:	6 cell battery with current limit circuits
Enclosure:	Housed in a stainless steel enclosure suitable for wall or desk mounting.
Dimensions:	2.4” high x 9.3” wide x 5.8” deep - 8 Amp hour 5.3” high x 9.8” wide x 5.8” deep - 12.5 Amp hour 4.4” high x 9.7” wide x 5.6” deep - 10 Amp hour
Specifications:	Cycle life 200 cycles

1.2.2 BATTERY CHARGER

Type:	Constant voltage
Construction:	Single PCB with internal transformer
Enclosure:	NEMA I desk top w/ stainless steel cover
Dimensions:	1.6” high x 4.3” wide x 3.8” deep

WARNING!!
BATTERY CHARGER IS NOT INTRINSICALLY SAFE. TO CHARGE BATTERY, BOTH BATTERY AND CHARGER MUST BE PLACES IN A NON-HAZARDOUS AREA.

2.0 UNPACKING AND INSPECTION.

Upon opening the M8141 shipping container, verify that all components shown on the packing list are present and undamaged. The package includes an M8141 unit, capacity labels, and an installation and operation manual. If any damage is found, immediately notify the freight carrier.

Open the instrument and continue the inspection, noting that all interconnecting harnesses are securely fastened.

A) The desk unit it opened by removing the four screws from the corners of the rear cover. Be careful not to damage the keyboard harness when removing the front cover. When reinstalling screws, ***DO NOT*** over tighten.

B) The wall unit is opened by flipping the wing type handle of each fastener up and turning them 180º counter clockwise. Loosen the hinge fasteners on the left end last. (Be sure to loosen both of them at the same time to prevent jamming.

3.0 INSTALLATION AND SETUP

DANGER!!
DO NOT PERFORM ANY INSTALLATION OR SERVICE BEFORE THE HAZARDOUS AREA HAS BEEN SECURED BY THE RESPONSIBLE CUSTOMER OR HIS AUTHORIZED PERSONNEL.

The installation of the M8141 scale indicator must be undertaken by competent personnel. The installation must be accordance with the National Electric Code, local electrical codes, the instructions given in this manual and drawings TC000040, TC000041, and TA700001.

Precautions shall be taken to ensure against intrusion of unsafe energy from other circuits. All wiring to the M8141 must be kept separate from non-intrinsically safe wiring. Reference the National Electrical Code and "Installation of Intrinsically safe instrument systems in Class I Hazardous Locations" (ANSI/ISA RP 12.6).

3.1 PRELIMINARY LOAD CELL CALCULATIONS

The M8141 indicator is Factory Mutual approved for use in hazardous (Classified) locations. The load cell (s) used with the M8141 must be selected from the list of Toledo/Masstron Factory Mutual approved load cell(s). These load cell(s) are listed on drawings TA700001 and 122502. The use of other manufactured load cell(s) that are not on the approved load cell list will void the Factory Mutual approval.

The maximum number of load cells that may be used with the M8141 indicator is (8) eight provided the bridge resistance of all the load cells in parallel exceeds 87 Ohms. The excitation voltage used by the M8141 is a gated 5V (+/- 2.5V). Minimum microvolt per increment value for the M8141 is 0.3 microvolt per increment. See drawings TC000040 and TC000041 for additional wiring and installation notes.

Before connecting the M8141 to a set of load cell(s) or scale base, it should be determined if the load cell(s) are of the capacity that will work correctly with the instrument and scale. Calculate the microvolt per increment ration using the formulas listed below. The microvolt per increment ratio must be greater than 0.3 microvolt per increment for the scale build.

To find the microvolt per increment build you must have the following information:

a) scale capacity
b) increment size
c) Number of load cell(s) or level ratio
d) Capacity of load cells
e) Load cell output rating in mV per V
f) The excitation voltage for the M8141 is 5V.

Scale capacity and graduation size must all be in lb or kg depending on how the scale is to be calibrated and used.

NOTE(S): The M8141 indicator may be setup for 2 or 3 mV per V load cells by using JU3 on the Main PCB. The JU3 jumper is installed for 2 mV per V from the factory. Remove jumper JU3 for 3 microvolt per V load cells. If mV per V of the load cell is less than 2mV per V jumper JU3 must be installed.

Use the following formulas to calculate the mV per increment ratio.

Total load cell millivolt output = (millivolt output of load cell) X (Instrument load cell excitation voltage)

Step 1)

Total load millivolt output= (millivolt output of load cell) x (Instrument load cell excitation voltage)

Step 2)

Find the mV per increment by using the following formula.

$$\text{Millivolt per increment} = \frac{\text{(Increment Size)}}{\text{(Single load cell cap)}} \times \frac{\text{(Total load cell millivolt output)(1000)}}{\text{(Number of load cells or lever ratio)}}$$

Example on finding microvolt per increment ratio:

Scale Capacity	2000lb
Increment Size	.2 lb
Number of Load Cells	4
Capacity of Load Cells	1000lb.
Load Cell Output Rating	2mV/V
M8141 Excitation Voltage	5V

Step 1) Find the total load cell millivolt output (mV)

2 mV/V x 5V = 10 mV

Step 2) Find the microvolt per increment.

Microvolt per increment = $\frac{.2 \text{ X } 10 \text{ mV X } 1000}{1000 \text{ X } 4}$ = 0.5 microvolt per increment

3.2 LOAD CELL CONNECTION (J1)

INPORTANT!!: The standard Toledo/Masstron load cell cables with factory-terminated connectors follow the Toledo 6- wire load cell cable color code. See Section 3.2.2 for details.

3.2.1 PIN CONFIGURATION

M8141 Desk Unit Connector located at rear (See Figure 3.1)

M8141 Wall Mount , Stainless unit connector located on bottom (See Figure 3.2)

Figure 3.1

Figure 3.2

3.2.2 PIN DESCRIPTION/FUNCTION

Function	Connector Pins		Load Cell Cable Color Code		
	M8141 DG J1	M8141 WS J1	Masstron/Toledo 4 Wire	Masstron 6 Wire	Toledo 6 Wire
+ Excitation	1	C	Green	Green	White
+ Sense	2	E	See Note (1)	Brown	Yellow
Shield	3	G	Yellow	Yellow	Orange
- Sense	4	F	See Note (1)	Blue	Red
- Excitation	5	D	Black	Black	Blue
+ Signal	7	A	White	White	Green
- Signal	8	B	Red	Red	Black

NOTES:

1. If the load cell cable contains 4 wires only, jumper + Excitation to +Sense and - Excitation to - Sense at the load cell connection
2. Standard load cell cables with factory-terminates connectors follow the Toledo 6-wire load cell color code.
3. See Masstron/Toledo Scale drawings TB000040 and TB000041 for further information and wiring instructions.
4. Do not modify the length of 4 conductor load cell cables under any circumstances - all cells must have equal cable length.

Connector Locations are shown below for the desk and wall enclosures

J1 - Load Cell Connector
J2 - Intrinsic Safe Power Connector
JY - No Connection
JN - Optional Fiber Optic Connection
JW - Optional Fiber Optic Connection

Figure 3.3 Desk Enclosure (Rear View)

J1 - Load Cell Connector
J2 - Intrinsic Safe Power Connector
JY - No Connection
JN - Optional Fiber Optic Connection
JW - Optional Fiber Optic Connection

Figure 3.4 Wall Enclosure (Bottom View)

3.3 JUMPER SET ON LOGIC PCB

Jumpers are in position for normal operation when shipped. Verify they are correct for your application.

JU1 - Calibrate Enable
Installed - Unit is in normal weight mode
Removed - Unit is in Setup/Calibration mode

JU2 - External memory
Must be installed for correct operation

JU3 - 2mV/V or 3mV/V cell selection
Installed - Setup for 2mV/V cell
Removes - Setup for 3mV/V cell

JU4 - EPROM selection
Factory use only

JU5 - Memory size selection
Factory use only

JU6 - Fiber Optics power (CH1)
1-2 Powered in sleep and wake modes
2-3 Powered in wake mode only

(See Note 1 below)

JU7 - Fiber Optics power (CH2)
1-2 Powered in sleep and wake mode
2-3 Powered in wake mode only

See Figure 3.3

NOTE 1: When the TN000012 harness is connected to J4, jumper JU6 must be in the 1-2 position and the JU1 jumper on the fiber optic PCB (Part # MN01935) must be installed.

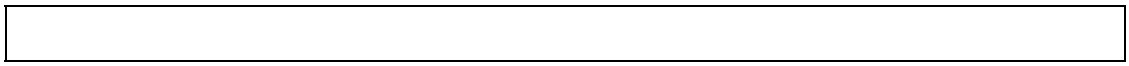


Figure 3.5 Jumper Set-up

3.4 POWER CONNECTION (J2)

Power for the M8141 indicator is supplied by two sources. One is an intrinsic safe rechargeable scaled lead acid battery pack. The second is a 120 VAC power supply with in intrinsically safe output suitable for installation in a hazardous (classified) area. The connection for both power sources are made to the J2 connector on the indicators. (Reference Figures 3.3 and 3.4) Further description of the power sources is found in Section 6.

WARNING!!
1) ONLY SPECIFIED COMPONENTS CAN BE USED IN THIS UNIT. DO NOT SUBSTITUTE COMPONENTS AS THIS WILL IMPAIR THE INTRNSIC SAFETY OF THE UNIT. 2) DO NOT OPERATRE UNTIL YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS IN THE M8141 MANUAL.

NOTE(S): USE ONLY MASSTRON/TOLEDO LISTED BATTERY PACKS AND POWER SUPPLIES AS POWER FOR THE M8141 DIGITAL INDICATOR. ANY SUBSTITUTION OR MODIFICATION WILL IMPAIT INTRINSIC SAFETY. REFERENCE TABLE 1 IN SECTION 1 FOR LISTED APPROVED POWER SOURCES.

4.0 OPERATOR MODES

4.1 POWER UP

Upon power up (connecting the power source) the M8141 will go through a verify routine where all segments and legends are displayed before entry to the weight mode (Refer to Section 5.2).

Restarts

The indicator will restart in one of two ways:

1. A warm restart occurs after startup from a sleep mode. In this case, all previous conditions are preserved. As an example. If the indicator was in the new mode going to sleep, it will be in the net mode on wakeup.
2. A cold restart occurs on exit from the calibration mode, or if power has been removed. The indicator will come up in the powerup units (parameter 8) and in gross mode. Tare, digital zero, and Auto zero maintenance will be retained if stored before power down. Time and date will have to be reset if enabled.

4.2 MODES

The M8141 operation is in one of two modes; Setup/Calibration , or Weigh. Internal jumper (JU1) defines the mode.

4.3 SETUP/CALIBRATION MODE

Performance of the M8141 is determined by the selection of values for all of the programmable scale parameters. Parameters one through sic only need to be set at initial installation. The remaining parameters have been factory set to acceptable values for most applications. These remaining parameter values can be changes for specific requirements.

The calibration of the M8141 is performed during the setup procedure. Parameters 4 and 5 establish the zero and span of the instrument respectively.

Access codes are assigned to each setup parameter and are used to access the instrument memory for entering new or changing a setup parameter. The 46 access codes and parameters are summarized in Table 4.3.1. A complete description is found in Section 4.6.

4.3.1 SETUP PARAMETERS - SEE SECTION 4.6 FOR DETAILED DESCRIPTIONS

Access Code	Parameter	Selectable Values	Factory Setting
01	Scale Capacity	1 to 999,999	1,000
02	Division Size	0.00001 to 200	.5
03	Print Motion Detect Band	0 to 3	3
04	Acquire Dead Load	Push ENTER	None
05	Scale Span	Enter Weight on Scale	None
06	Calibration Units	0 = kg, 1 = lb	1
07	Display Update Rate	1 to 255	4
08	Power Up Units	0 =kg, 1 = lb	1
09	Digital Zero/Tare Motion Band	0 to 3	3
10	Over Capacity Blanking	80 to 110%	105%
11	C0Z on Net or Gross	0 = Gross, 1 = Net	0
12	AZM Delta Band	0 to ,3	3
13	AZM Delta Band Time Delay	1 to 15	4
14	AZM Aperture	0 to 125	60
15	Digital Filter	0 to 3	2
16	Display Blanking on Screen	0 = No Blanking 1 = Display Blanking	0
17	Negative Gross Weight Printing	0 = Prints Below Zero 1 = No Printer Below Zero	1
18	lb/kg Switching	0 = Disable, 1 = Enable	1
19	Alternate Display Units	Enter Cal Units/ Alt. units	0
20	Time and Date	0 = Disable, 1 = Enable	1
21	Time and Date Format Select	0 = Disable Time and Date 1 = U.S., 2 = Canada	1
22	Printer Output Format	See Sect. 4.6,Parameter 22	
23	Channel 1 Baud Rate	0 = 300 1 = 1200 2 = 4800 3 = 9600	1
24	Channel 2 Baud Rate	0 = 300 1 = 1200 2 = 4800 3 = 9600	1

(cont.)

Access Code	Parameter	Selectable Values	Factory Setting
25	Tare Enable	0 = Disable, 1 = Enable	1
26	Keyboard Tare	0 = Disable, 1 = Enable	1
27	Tare Auto Clear	0 = Disable, 1 = Enable	1
28	Tare Interlock	0 = Disable, 1 = Enable	0
29	Tare Motion Interlock	0 = Disable, 1 = Enable	1
30	Printer Data Format	1 = Single Line Weight 2 = G-T-N on Single Line 3 = G-T-N on 3 Lines 4 = G-T-N on Single Line sign correct. 5 = G-T-N on 3 Lines sign correct	1
31	Minimum Print Threshold	0 = Disable, 1 to Scale Capacity	0
32	Double Width Print	0 = Disable, 1 = Enable	0
33	Scale ID	0 to 127	0
34	Print Scale ID	0 = Disable, 1 = Enable	0
35	Setpoints	0 = Disable 1 = Enable on Disp. Wgt. 2 = Enable on Gross Wgt.	1
36	Print Inhibit on Motion	0 = Disable, 1 = Enable	1
37	Zero Print Interlock	0 = Disable, 1 = Enable	0
38	Line Feed	0 to 10	0
39	Commodity ID Entry	0 = Disable 1 = Enable Fixed 2 = Enable Variable	1
40	Print Complete Time Out	0 to 5	0
41	Dribble/Preact Operation	0 = Disable 1 = Enable - Zero Tol. 2 = Enable - Wgt Tol.	0
42	CH 1 Configuration	See Sect 4.6, Para. 42	0
43	CH2 Configuration	See Sect 4.6, Para. 43	0
44	Auto Sleep Timer	0 to 255 Minutes	5
45	Printer Data Sent Indicator	0 = Disable, 1 = Enable	1
46	Printer Checksum Enable	0 = Disable, 1 = Enable	0
98	Parameter Setup Review	Print all Current Setup Values	N/A
99	Reset Parameters	To Factory Setting	N/A

4.4 DISPLAY IN SETUP MODE

Setup and Calibration Sequence

Remove calibration jumper (JU1).

The M8141 setup and calibration parameters can be changed when in setup and calibration mode. Table 4.3.1 lists all of the scale parameters along with access codes.

NOTE(S): Upon entering setup mode digital zero and AZM are reset.

4.4.1 ACCESSING AND CHANGING A PARAMETER

Procedure for accessing a parameter and disabling the function. IN the example that follows, we will disable parameter #26 (Keyboard Tare).

Example:

With the display reading “C00”:
Enter “26”
Press ENTER key
Press “0”
Press ENTER key

The following example and illustrations walks through a basic scale calibration sequence step by step. In this example, we are calibrating a floor scale, 5,000 lbs by 1 lb.

Enter “1”
Press ENTER key.
The display will now indicate the current scale capacity.
Enter “5000”
Press ENTER key
The display will indicate the current division size.
Enter “1”
Press ENTER key.

1 has been entered for the division size. When the division size is being entered, the decimal point may be used preceding the value, to enter division sizes less than “1”.

Enter “4”
Press ENTER key

The display will indicate a random number that corresponds to the initial dead load value in minor increments. For practical purposes, this number is meaningless. Ensure that only the required initial dead load is on the scale and wait twenty (20) seconds for the scale to stabilize.

Press the ENTER key.
The M8141 stored the initial dead load values as zero.
Enter “6”
Press ENTER key

The display now shows the last weight at which the M8141 was calibrated. Apply new calibration weights to the platform and enter that value. It is recommended that 20% of the scale capacity be used for calibration as a minimum. Wait Twenty (20) seconds before actually pressing ENTER.

Enter “1000”
Wait 20 seconds
Press ENTER key

4.4.2 SPECIAL CALIBRATION FEATURE

Selecting “00” (C00) and pressing ENTER twice will cause the calibration calculations to be performed. Normally this is done automatically on exiting the calibration mode, however this can be used in conjunction with the ZERO key during calibration to view the actual weight reading on the scale. After any parameter has been changed during calibration, the calibration calculations will have to be performed in order to view the weight. Otherwise an error “ --8--” will appear in the display.

As an example, assume the scale has been roughly calibrated on a windy day (the weight bobbles around), and now it is time for fine calibration. Enter the calibration mode, and zero the scale via parameter 4. In order for the new dead load to be incorporated into the span calculations select parameter 00, and press ENTER twice. Now of to parameter 5 and key in the weight on the

scale, but don't press ENTER. Press the ZERO button and the current calculated weight will be displayed. Using a mental average, press the ENTER button when the displayed weight is roughly in the module of the range it bobbles, and the scale will be calibrated.

Enter "6"
Press ENTER key

The display will indicate whether the calibration weight was pounds (=1) or kilograms (=2). Out example was pounds, so:

Enter 1
Press ENTER key
The M8141 was calibrated in pounds.

If any other scale parameter is to be changed, it must be accessed individually. (refer to Sections 4.3.1 and 4.6 for parameter list and descriptions). After all parameters are set, install the calibration jumper (JU1). This will acknowledge completion of setup/calibration. The unit will take approximately 2 seconds to calculate and store all data entered. It will then go though a display verifications mode before returning to the weigh mode.

4.5 PARAMETER REVIEW AND PRINTOUT

If the M8141 instrument is connect to a printer, a list of access codes and the current setting can be printer for quick review. This can be done in either the Setup or Weigh mode as follows:

In Setup Mode
Enter "98"
Press ENTER key twice

In Weigh Mode
Press Function Key
Press Decimal Point
Enter "98"
Press ENTER key twice

4.5.1 PARAMETER PRINTOUT

Masstron/ Toledo M8141	Manufacturer Model Number
01 1000.0	CAPACITY
02 000000.5	DIVISION SIZE
03 0000003.	PRINT MOTION
04 008053.	DEAD LOAD
05 0020000.	CALIBRATE WEIGHT
06 0000001.	CALIBRATE UNITS
07 0000004.	DISPLAY UPDATE
08 0000001.	POWER UP UNITS
09 0000003.	TARE MOTION
10 0000105.	OVER CAPACITY %
11 0000000.	C0Z ON NET/GROSS
•	•

(Cont.)

Masstron/ Toledo M8141	Manufacturer Model Number
•	•
•	•
•	•
•	•
44 0000005	AUTO SLEEP TIMER
45 0000001	PRINT SENT INDICATOR
46 0000000	PRINTER CHECKSUM

4.6 ACCESS CODES - PARAMTER DESCRIPTION

The following is a detailed list of all setup parameters. This list is in the following format:

-Parameter number and data to be entered.
- Allowable Range
- Factory Setting

The following list described to setup parameter definitions of the M8141 scale instrument.

1. SCALE CAPACITY - Rated capacity of the scale in calibration units (determine by parameter 6). This value is used only to determine the over capacity blanking point (parameter 10) and the digital zero capture range (+/- 2% of capacity).

RANGE: -1 to 999,999
FACTORY SETTING : - 1000

2. DIVISION SIZE - Smallest change in weight that the instrument will be able to indicate.

ENTER - Division size including decimal point
RANGE: - 0.000001 to 200 (In multiples of 1, 2 or 5)
FACTORY SETTING - .5

3. PRINT MOTION DETECT BAND - Number of division changes that must occur between two successive display updates for an in-motion condition to be registered. During an in-motion condition printing will be inhibitor (if selected via parameter 16). This parameter is also used to determine motion for auto zero maintenance.

ENTER: - Number of divisions (o will disable)
RANGE: - 0 to 3
FACTORY SETTING - 3

4. ACQUIRE DEAD LOAD - The current weight will be stored as the dead load or initial of the scale. Digital zero and auto zero maintenance will be cleared. Wait 20 seconds for the scale to settle before pushing NETER. Dead load must be acquired via this parameter prior to spanning the scale with parameter 5. Since digital zero and AZM get cleared during calibration, they cannot be used to zero the scale prior to spanning it. Note, however, that the zero and span do not interact. The scale ban be re-zeroed via parameter 4 without affecting the span. This allows calibration using combinations of known and unknown weights - useful for calibrating large scales at the top end of their capacity.

ENTER: - Press ENTER to acquire dead load - no entry needed
FACTORY SETTING - None

5. SCALE SPAN - Weight in calibration units (parameter 8) will be used to span the instrument. Wait 20 seconds for the scale to settle before pushing ENTER. Note that entering the calibration mode will clear any digital zero, or auto zero values. The span will be calculated by subtracting the dead load weight (acquired via parameter 4) from the current weight.. The result of this subtraction (in internal counts) will be set equal to

whatever weight is entered for parameter 5. If the scale has been zeroed via AZM or the digital zero button, an error will occur in the span. The scale must be at true zero (via parameter 4) before applying test weights.

ENTER : - Weight on Scale
RANGE: - Up to scale capacity
FACTORY SETTING - None

6. CALIBRATION UNITS - The units the scale was calibrated in. That is the units parameter 5 will be in. This parameter needs to be correct before the scale is spanned with parameter 5.

ENTER: - 0 = kg ; 1 = lb
FACTORY SETTING - 1

7. Display UPDATE RATE - Controls how many A/D conversions are averaged together before being displayed. As an example, if this parameter was set to 5, then 5 A/D conversions would be added together, then divided by 5 before being displayed.

ENTER: - Number of A/D conversions per display update
RANGE: - 1 to 255
FACTORY SETTING - 4

8. POWER UP UNITS - Determines what units the scale will power up in. Typically this will be the same as the calibration units (parameter 6). In some cases it may be desirable to power up in different units other than that which the scale was calibrated in.

ENTER: - 0 = kg ; 1 = lb
FACTORY SETTING - 1

9. DIGITAL ZERO/TARE MOTION BAND - Number of division changes that must occur between two successive display updates for an in-motion condition to be registered. During an in-motion condition, tares will be inhibited (if selected via parameter 29), and digital zero will be inhibited. This parameter is also used to determine no motion for auto tare clear (paramenter 27), and zero print interlock (parameter 37).

ENTER: - Number of divisions (0 will disable)
RANGE: - 0 to 3
FACTORY SETTING - 3

10. OVER CAPACITY BLANKING % - This will determine where the display will indicate an overload condition. This percentage multiplied by the scale capacity (parameter 1) is the weight at which the condition will be indicated.

ENTER: - Percentage of scale capacity for overload condition.
RANGE: - 80 to 110%
FACTORY SETTING - 105%

11. C0Z ON NET OR GROSS - The center of zero indication will light when the scale is within +/- 0.25 divisions of net, or gross zero, depending on the setting of this parameter.

ENTER - 0 = Gross ; 1 = Net
FACTORY SETTING - 0

12. AZM DELTA BAND - This parameter defines the dead band in which auto zero maintenance will track changes. The auto zero logic is as follows: if no motion exists (via parameter 3 for a time delay determined by parameter 13, the current weight in divisions is less than or equal to parameter 12, and the total weight tracked off in divisions is less than parameter 14, then the scale will be zeroed.

ENTER: - Dead band in divisions
RANGE: - 0 = .5dd ; 1 = 1 dd, 2 = 2 dd; 3 = 3 dd
FACTORY SETTING - 3

13. AZM DELTA BAND TIME DELAY - This parameter determines the length of time the scale reading must stay within the delta band before it can be zeroed.

ENTER - TIME IN SECONDS
RANGE - 1 to 15
FACTORY SETTING - 4

14. AZM APERATURE - This parameter defines the total number of divisions that can be tracked off. The dead load taken via parameter 4 determines the starting point. If the difference between the current zero and the zero in parameter 4 is greater than this parameter, AZM will track no further in this direction. However, it will track in the other direction (reducing the difference between the parameter 4 zero and the current zero) if necessary. These values are not available for display to the operator directly, however entering the calibration mode will reset the auto zero track value, and the digital zero value (acquired via the digital zero button). The change in displayed weight after doing this will be equal to the sum of the auto zero track value and the digital zero value.

ENTER : - Number of divisions
RANGE: - 0 to 125 (0 disables AZM)
FACTORY SETTING - 60

15. DIGITAL FILTER - The setting of this parameter determines the cutoff frequency of the digital filter.

ENTER : - 0 = Least Filter; 3 = Most Filter
RANGE: - 0 to 3
FACTORY SETTING - 2

16. DISPLAY BLANKING DURING MOTION - This parameter will enable or disable blanking of the display when the scale is in motion (as determines by parameter 3).

ENTER: - 0 = no display blanking; 1 = display blanking during motion
FACTORY SETTING - 0

17. NEGATIVE GROSS WEIGHT PRINTING - This parameter inhibits printing when the scale goes below gross zero.

ENTER: - 0 = prints below gross zero ; 1 = np printing below zero.
FACTORY SETTING - 1

18. lb/kg BUTTON ENABLE - This allows the pounds/kilograms unit switching to be disabled via the keyboard or computer port.

ENTER: - 0 = disable ; 1 = enable
FACTORY SETTING - 1

19. ALTERNATE DISPLAY UNITS - This paramenter defines a display unit that will replace either pounds or kilograms - example :tons. If the instrument was calibrated in pounds (parameters 6 =1) then the alternate units will take the place of kilograms, and vice versa. Switching to the alternate units is done with the lb/kg button. When in alternate units, both the lb and kg legends will be off.

ENTER : - The number of calibrated unites per the new unit. As an example, if the instrument was calibrated in pounds (parameter 6) and the alternate display unit was to be tons, with 2000 pounds per ton, enter 2000. Entering 0 will disable the alternate units.

RANGE: - Limited by the display capacity and minimum/maximum graduation size. The instrument will attempt to calculate a comparable grad size for the new display unit, keeping the approximate resolution of the scale the same. If the conversion factor is such that a comparable grad size cannot be calculated, then the instrument will automatically disable the lb/kg button. This parameter can be less than 1.

FACTORY SETTING - 0

20. TIME AND DATE PRINT ENABLE - This parameter will enable or disable the printing of time and date.

ENTER : - 0 = disable; 1 = enable
FACTORY SETTING - 1

21. TIME AND DATE FORMAT - Different country formats of the time and date printing, display, and entry are available per this parameter .

ENTER: - 0 = Disable Time and Date; 1 = US (MM/DD/YY) , 2 = Canada (YY/MM/DD)
FACTORY SETTING - 1

22. PRINTER OUTPUT FORMAT - This parameter selected the format of the fields of data that will be printed. If the printing of the scale ID is enabled, the scale ID will always be printed preceding the first weight field.

ENTER - 1 = WT, COMMOD ID, Time and Date
- 2 = COMMOD ID
Time and Date
Weight
- 3 = Time and Date
COMMOD ID
Weight
-4 = COMMOD ID, Time and Date
Weight

RANGE - 1 to 4
FACTORY SETTING - 1

23. CHANNEL 1 BAUD RATE - Two serial channels are available, labeled CH1 and CH2. The transmit and receive baud rates for a channel are always the same. The baud rate for Channel 1 is set with this parameter.

ENTER : - 0 = 300, 1 = 1200, 2 = 4800, 3 = 9600
FACTORY SETTING - 1

NOTE(S) : Software program number 92077 (Rev. all) parameter 23 is fixed at 4800 baud if parameter 42 is set to 3, 4 or 5.

24. CHANNEL 2 BAUD RATE - Two serial channels are available, labeled CH1 and CH2. The transmit and receive baud rates for a channel are always the same. The baud rate for Channel 2 is set with this parameter.

ENTER : - 0 = 300, 1 = 1200, 2 = 4800, 3 = 9600

FACTORY SETTING - 1

NOTE(S) : Software program number 92077 (Rev. all) parameter 24 is fixed at 4800 baud if parameter 43 is set to 3, 4 or 5.

25. TARE ENABLE - This parameter allows the tare feature to be enabled.

ENTER: - 0 = disable all tares ; 1 = enable
FACTORY SETTING - 1

26. KEYBOARD TARE - This parameter allows only keyboard tares to be enabled/disabled (push button tares remain enabled per parameter 25).

ENTER: - 0 = disable kb tare entry; 1 = enable
FACTORY SETTING - 1

27. TARE AUTO CLEAR ENABLE - This parameter will enable or disable a feature whereby once the scale value has stabilized at a weight above 10 divisions (no motion per parameter 9), and then returns to the center of zero (zero legend illuminated), the existing tare will automatically be cleared, and the unit switched back to gross mode.

ENTER - 0 = disable, 1 = enable
FACTORY SETTING - 1

30. PRINTER DATA FORMAT - This parameter will allow selection of several print formats. This locations where this weight information will be printed is governed by the setting of parameter 22.

ENTER - 1 = Single line of displayed weight will be printed.
- 2 = Single line gross/tare/net printout. If the instrument is in the net mote the current gross/tare/net weights will be printed. If the unit is in gross mode, then only the gross weight will be printed.
- 3 = Same as above, but the weights will be printed on 3 lines.
- 4 = Single line G-T-N sign correct printout. Same as 2 above, but the unit will print the tare weight as the gross weight and the gross weight as the tare weight if the tare weight is greater than the gross weight. This will result in a positive net weight. This feature may not be legal for weights and measures approved applications.
- 5 = Same as 4 above, but the weights will be printed on 3 lines.

RANGE - 1 to 5
FACTORY SETTING - 1

31. MINIMUM PRINT THRESHOLD - ThIs parameter allows setting a value below which any print requests will be rejected.

ENTER: - Weight in lb or kg which print request will be rejected. Entering 0 will disable this feature.
RANGE: - 1 division to scale capacity
FACTORY SETTING - 1

32. DOUBLE WIDTH PRINT ENABLE - This parameter allows a feature which will cause the weight only of a printout to be printed in large figures on compatible printer. Characters S0 and S1 are sent to the printer to cause large printing.

ENTER - 0 = disable large printing; 1 = enable
FACTORY SETTING - 0

33. SCALE ID - This parameter assigns an ID number to the scale. This ID has two functions. First it serves as an address in all communications to the instrument over the computer port, which allows daisy chaining instruments on one communication channel. 0 is considered a global ID. Second, it can be printed (if enabled parameter 34) on all printouts. The number entered will be sent directly to the printer. The ASCII character corresponding to the ID number will be printed followed by a space. See Section 5.7.1 for applicable ASCII character table.

ENTER: - Desired scale ID number
RANGE: - 0 to 127 (decimal)
FACTORY SETTING - 0

34. PRINT SCALE ID ENABLE - This parameter allows the scale ID (if enabled via parameter 33) to be printed on the printer preceding the weight data.

ENTER: - 0 = disable ID printing; 1 = enable
FACTORY SETTING - 0

35 SETPOINTS ENABLE - This parameter allows enabling the setpoint program for use with the setpoint option modules. If setpoints are disabled, the instrument will reject all attempts to enter setpoint, and the setpoint will all be turned off. 8 setpoints are supported in the program, and their status is included in the accessory and computer port serial transmissions. This parameter must be enabled to use the dribble/preact program (parameter 41).

ENTER: - 0 = disable setpoints
- 1 = enable to operate on displayed weight
- 2 = enable to operation gross weight.
FACTORY SETTING - 1

36. PRINT INHIBT ON MOTION ENABLE - This parameter allows enabling a feature which will inhibit printing while the scale is in motion (as determines by parameter 3). If the scale is in motion when a print request occurs, the request will be latched. When motion stops, an attempt will be made to print. If any interlocks (negative print inhibit, minimum print threshold, etc.) are in effect when motion stops, the latched print command will be rejected.

ENTER: - 0 = printing can occur while the scale is in motion
- 1 = printing cannot occur while the scale is in motion
FACTORY SETTING - 1

37. ZERO PRINT INTERLOCK ENABLE - When enabled, only 1 print will be allowed when the scale weight is above 10 graduations. Another print will not be allowed until the scale weight stabilizes at not motion below 10 graduations. No motion is determined by parameter 9.

ENTER: - 0 = disable, 1 = enable
FACTORY SETTING - 0

38. LINE FEEDS BETWEEN PRINTED LINES - This parameter controls the number of line feeds that will be sent to the printer between each printed line. When combines with printer options such as auto line feed, and the number of lines/inch, custom formatting of tickets is possible. A minimum of 1 line feed is always sent to the printer. This parameter controls the number of additional line feeds.

ENTER: - Number of additional line feeds.
RANGE: - 0 to 10
FACTORY SETTING - 0

39. COMMODITY ID ENABLE - A 6 digit commodity ID can be entered if this parameter is enabled. This ID is entered via the keyboard, and will be printed with each weight printout. The locations of printing is determined by parameter 22. The ID can be fixed or variable. If fixed, it will remain in the instrument until changes. If variable, it will be cleared to all zeros after each print.

ENTER: - 0 = disable ; 1 = enabled fixed ; 2 = enabled variable
FACTORY SETTING - 1

40. PRINT COMPLETE TIME OUT - This parameter will enable a feature which allows printing large amount of multi-line information to dumb printers, without overflowing their buffer. The parameter specifies the time, in .5 seconds increments, that the instrument will wait between multi-line printouts. This gives slow printers time to cycle.

ENTER: - Time in .5 seconds increments (0 disables)
RANGE: - 0 to 5 (5 = 2.5 SECOND DELAY)
FACTORY SETTING - 0

41. DRIBBLE/PREACT SELECT - This feature selected whether the setpoints function in a coincidence mode or a 2-material batching mode. When this feature is disabled, there will be 8 user programmable coincidence setpoints. The setpoints may also be used to store tare weights or commodity ID's.

If this feature is enabled, then the setpoints will operate in a 2-material 2-speed batching mode with tolerance checking. The tolerance setpoints may be selected as zero tolerance or weight tolerance.

Parameter 35 must be enabled to use this feature.

ENTER: - 0 = disable
- 1 = enable w/zero tolerance
- 2 = enable w/weight tolerance

FACTORY SETTING - 0

42. CH1 CONFIGURATION - The two available serial ports, CH1 and CH2, can be configured to be a variety of functions. Each port can independently be set to one of the following:

a) **PRINTER** - On demand serial weight data will be transmitted in printable ASCII characters. The input side of the port will accept P,T,C, Z commands.

b) **COMPUTER** - The port will be bi-directional, and is intended to be hooked to another intelligent device. The connected device (Host) can issue commands to the indicator to duplicate any keyboard command, or request weight data.

c) **EXTERNAL KEYBOARD/DISPLAY** - The port will be configured bi-directional. The output side will continuously transmit weight data in the Masstron accessory port format. The input side will accept commands in the Masstron keyboard format. In this configuration, the port is intended to be hooked to a Masstron MD3046 fully functional remote keyboard/display. This allows full display and operation of the M8141 from a remote location.

d) **ACCESSORY PORT MASSTRON** - In this configuration, the output side will continuously transmit weight data in the Masstron format. The input side of the port will accept P, C, T, Z commands. This is intended for hookup to Masstron accessories.

e) **ACCESSORY PORT TOLEDO** - The output of the channel will transmit continuous weight data in the Toledo accessory format. The input side of the port will accept P, C, T, Z commands.

ENTER: - 0 = Disable Channel
- 1 = Printer
- 2 = Computer
- 3 = Keyboard/Display
- 4 = Accessory Port Masstron
- 5 = Accessory Port Toledo

FACTORY SETTING - 0

NOTE(S): Software program number 92077 (Rev. all) is channel 1 and 2 have the same features selected, channel 1 will not function and the data will only be transmitted from channel 2.

43. CH2 CONFIGURATION - This parameter configures channel 2. See the description for channel 1 above (P42).

ENTER: - 0 = Disable Channel
- 1 = Printer
- 2 = Computer
- 3 = Keyboard/Display
- 4 = Accessory Port Masstron
- 5 = Accessory Port Toledo

FACTORY SETTING - 0

44. AUTO SLEEP TIMER - The indicator will automatically enter the sleep mode after no motion is detected, or if no keyboard activity occurs, the for entered period of time.

ENTER : - The delay in minutes before entering sleep mode after no motion is detected. A “0” disables this function.
RANGE: - 0 to 255
FACTORY SETTING - 5

45. PRINT DATA SENT INDICATOR ENABLE - For installations where the printer is remote from the indicator, a visual feedback to the operator can be indicated when serial data is sent. If this feature is enabled, the net/gross legend will blink while the print data is being transmitted.

ENTER: - 0 = disable ; 1 = enable
FACTORY SETTING - 0

46. PRINTER CHECKSUM ENABLE - Enabling this parameter will cause a checksum to be transmitted at the end of each text line, between the carriage return and line feed. If multiple line feeds are enabled, then no checksum will be transmitted with the additional line feeds.

CHECKSUM IS DEFINED AS THE 2’S COMPLIMENT OF SEVEN (7) LOW ORDER BITS OF THE BINARY SUM OF THE 7 LOW ORDER BITS OF ALL CHARACTERS PRECEDDING THE CHECKSUM INCLUDING STX AND CR. BIT 8 OF CHECKSUM IS PARITY OF THE 7 LOW ORDER BITS OF CHECKSUM.

ENTER: - 0 = disable, 1 = enable
FACTORY SETTING - 0

Other miscellaneous control parameters are as follows:

Upon exiting the calibration mode, all parameters will be stored in EPROM.

00. Selecting this parameter and pressing ENTER twice will cause the calibration calculations to be performed. Normally, this is done automatically on exiting the calibration mode, however, this can be used in conjunction with the ZERO key during calibration to view the actual weight reading on the scale. After any parameter has been changed during calibration, the calibration calculations will have to be performed in order to view the weight. Otherwise an error "---8---" will appear in the display. As an example, assume the scale has been rough calibrated on a windy day (the weight bobbles around), and now is it time for fine calibration. Entering the calibration mode, and zero the scale via parameter 4. In order for the new dead load to be incorporated into the span calculations, select parameter 0, and press ENTER twice. No go to parameter 5 and key in the weight on the scale, but don't press ENTER. Press the ZERO key and the current calculated weight will be displayed. Using a mental average, press the ENTER button hen the displayed weight is roughly in the middle of the range it bobbles, and the scale will be calibrated.

98. Selecting this parameter and pressing ENTER twice will cause all parameter values to be printed. The software number and , version, along with the time and date will be printed.

99. Selecting this parameter and pressing ENTER twice will cause all parameters to be reset to their factory values (except 4 and 5).

4.7 MODEL 8141 SOFTWARE ADDENDUM

Date: August 4, 1994

The **H13319400A** Software has a new feature not available in previous versions.

The SLEEP PUSHBUTTON can now be Disabled via a new setup parameter #47.

This feature does not disable the sleep time out period. It only disables the **<SLEEP>** pushbuton. If you have the timer set for 30 seconds, the Model 8141 will still go to sleep after 30 seconds of inactivity. You will not be able to put the Model 8141 to sleep by pressing **<SLEEP>.**

PARAMETER # 47 - ENABLE/DISABLE SLEEP PUSHBUTTON

0 = Disable SLEEP pushbutton
1 = Enable SLEEP pushbutton

Default = 1

5.0 OPERATION PROCEDURE (WEIGHT MODE)

Operation of the M8141 is made simple through clearly defined keyboard function and status identification legends.

5.1 KEYBOARD FUNCTIONS:

0-9	Used to enter setpoint values, commodity ID, time and date, calibration/setup parameters, and tare weight.
FUNCTION	Used in conjunction with time, date, setpoint, zero and decimal point for viewing and entering data.
ID	Used to enter an I.D. (Up to 6 digits)
ENTER/SLEEP	Enter: Inputs keyboard entered data for setpoints, time and date, setup and I.D. after data entry. Sleep: With no preceding data entered, this key will put instrument in sleep mode to conserve battery life.
ZERO/WAKEUP	Zero: Digitally zeros scale Wakeup: If already asleep, used to re-initialize unit.
PRINT	Initiates data outputs to a printer or other compatible device.
LB/KG	Mode selection - Selects weight units to be used, pounds, kilograms, or other pre-programmed units.
NET/GROSS	Mode selection - Selects weighing mode.
TARE	Enters the displayed weight as tare or is used with keys 0-9 to enter a keyboard tare.
CLEAR	Erases erroneous keyboard entries.

5.2 DISPLAY

DISPLAY VERIFY: The display verify sequence will be executed upon power up, on exit from the setup mode, or on exit from the sleep mode.

DISPLAY LEGENDS:

GROSS	Gross weight displayed -----
TARE	Tare weight displayed | ---- These legends will flash during print data transmission if
NET	Net weight displayed ----- parameter 45 is set to 1.
KG	Weight units; kilograms (Metric)
LB	Weight unites; pounds (Avoirdupois)
SETPOINT	Setpoint value displayed
ZERO	Center of zero indication
ID	Current commodity ID displayed
TIME	Time displayed (Time needs to be set if blinking)
DATE	Date displayed (Date needs to be set if blinking)
BATT LOW	Warning legend to charge battery (NOTE: Battery low will not be displayed in sleep mode)
SET UP	Set up mode

5.3 DETAILED KEYBOARD FUNCTIONS

NOTE(S): Pressing the function key during any entry sequence will exit the current sequence without changing the current value for that entry.

TARE

1. Pressing the TARE key alone will take an auto tare, provided it is not disabled or the scale is not in motion. The unit will switch to the net mode if not already in it. No tare will be taken at zero.
2. Keyboard tares are entered as follows. Provided a weight is currently shown on the display, the numeric tare value is entered via the keyboard. The first digit entered will initiate the keyboard tare entry, The tare legend will be turned on. After the numeric tare is entered, the TARE key is depressed causing the number entered to be the tare. Normal tare interlocks apply. The tare entered will be rounded to the nearest division. Decimal points need not be entered.
3. To display current tare, press the FUNCTION key, followed by the TARE key. The tare legend will light, and the tare weight will be displayed.
4. To clear a tare, press the CLEAR key followed by the tare key.

PRINT

1. Pressing the PRINT key will cause the weight data to be transmitted provided interlocks are not in effect. If print is interlocked due to motion, the print command will be latched.

LB/KG

1. Pressing the LB/KG key will toggle between pounds and kilograms. If alternate units are selected, then the display will toggle between the calibration units, and alternate units. When in alternate units, both kg and lb legends will be OFF.

NET/GROSS

1. This key will toggle the display between net and gross if a tare weight has been entered.

ID

1. Provided the display is currently showing a weight, pressing this key will cause the display to show a previously entered six digit ID. The ID legend will be on.
2. If the ID is being displayed, it can be changed by entering a new one via the keyboard. Pressing ENTER will store the ID. Pressing the CLEAR key while in this mode will clear the display.

ENTER/SLEEP

1. ENTER is used to terminate a numeric entry in certain modes.
2. If weight is being shown in the display (no numeric entry in progress), pressing this key will cause the unit to go into the power down sleep mode. Sleep will show on the display. The unit will actually enter this mode when the key is released.

ZERO/AWAKE

1. If the weight indication is within +/- 2% gross capacity of actually zero. the display will zero.
2. If the unit is in the power down mode (Sleep in display), this will wake the unit up/ On wakeup. a display/memory verification will occur. The display will show all segments, decimal points, and legends. This is the only way to perform display verification.
3. If in the setup mode and a parameter value (not Cxx) is in the display, pressing the ZERO key will cause the display to show the current calculated weight on the scale. If error “---8---” appears instead, then it means a paramenter has been changed and the weight cannot be calculated. The internal calculations necessary to display the weight can be executed by selecting parameter 0 and pressing ENTER twice. (Normally these calculations are done automatically on exiting the setup mode). While the weight is displayed, pressing the ENTER key will cause the previously displayed parameter value to be entered.

5.4 FUNCTION

The FUNCTION key is used to access dual function keys such as time, date, setpoint, and save data; and is also used with the decimal point key to review parameter setups. See Entering Time, Date, Setpoint, Saving Data, and Parameter Review.

5.4.1 ENTERING TIME AND DATE

TIME

1. Pressing the FUNCTION key and then TIME will cause the display to show the current time (provided a weight was showing in the display). The format is "HH:MM X", where "X" is A for AM, P for PM. The TIME legend will be on. Pressing the ENTER key will return to the weight.
2. If time is showing in the display, it can be changed by entering the new time via the keyboard. The first digit entered will cause the time to be set to all zeros, except the rightmost digit which will be the number entered. Pressing the decimal point key will toggle between AM and PM. Pressing the CLEAR key will display the current time. The ENTER key must be pressed to enter the displayed time. Pressing the FUNCTION key will cause the display to return to the weigh mode, and the old time to be retained.
3. Date will be prompted for automatically if not already set.
4. Time and date will not be printed unless entered after a power loss. Time and date must be entered after leaving setup.

DATE

1. Depressing the FUNCTION key and then DATE will cause the display to show the current DATE (provided a weight was showing in the display). The format is dependent on whether US or Canadian format was selected. The DATE legend will be on. Pressing the FUNCTION key will return to the weight.
2. If the date is showing in the display, it can be changed by entering the new date via the keyboard. The first digit entered will cause the date to blank, except the rightmost digit which will be the number entered. Pressing the CLEAR key will display the current date. The ENTER key must be pressed to enter the displayed date. Pressing FUNCTION cause the display to return to the weigh mode, and the old date to be retained.
3. Time and date will not be printed unless entered after a power loss. Time and date must be entered after leaving setup.

5.4.2 SETPOINTS

The M8141 is a setpoint instrument with selectable 8 coincidence setpoints or 2 material batching setpoints with dribble/preact (Ref. parameter 41). The setpoint output is in a serial data string which may be interfaced to a setpoint controller or host computer through either channel 1 (printer port) or channel 2 **computer port) of the M8141 indicator.

NOTE(S): The M8141 indicator along with the appropriate battery pack pr power supply and scale system, is an intrinsically safe weighing system. The setpoint data must only be used through a fiber optic cable for setpoint applications.

Continuous setpoint data is available in the Masstron continuous data format (Ref. Section 5.11) ad the Toledo Scale continuous setpoint data format (Ref. Section 5.12) which may be connected to the applicable scale accessories. The setpoint data is also available in the host (computer) data (Ref. Section 5.9).

5.4.3 ENTERING SETPOINTS

WARNING!!
When this equipment is included as a component part of a system, the resulting design must be reviewed by qualified personnel who are familiar with the construction and operation of all components and operation of all components in the system and the potential hazards involved. Failure to observe this precaution could result in bodily injury.

The sequence for entering setpoints varies depending upon whether the DRIBBLE/PREACT feature (Parameter 4) is enabled or disabled. If it is disabled. The setpoints will function in a coincidence mode of operation, and may be used to store tare values or commodity ID's. Otherwise, the 2-material batching mode will be used and no storage of tare values or commodity ID's is available.

COINCIDENCE MODE

1. Depressing the FUNCTION key followed by the SETPOINT key will enter the setpoint mode. The setpoint legend will be on and the display will show "SP 01".
2. Pressing ENTER will cause the current value of the setpoint to be displayed. To return the current value, press the ENTER key again. To change the setpoint value, key in the new value followed by the ENTER key. If an error is made while entering a setpoint, press the CLEAR key and then re-enter to proper value.
3. The display will show the next setpoint number. To enter or view the setpoint, press the ENTER key. To exit the setpoint mode, press the FUNCTION key.
4. If a setpoint value is being displayed, it may be entered as a tare or a commodity ID by pressing the TARE or ID key. This is useful for remembering multiple tares or ID's of commonly used containers or commodities.

TWO MATERIAL BATCHING MODE

1. Depressing the FUNCTION key followed by the SETPOINT key will enter the setpoint mode. The setpoint legend will be on and the display will show "SP 01".
2. Pressing ENTER will cause the current value of SP1 to be displayed. This value is the final cutoff value for material 2. To retain the current value, press the ENTER key. To change the setpoint value, key in the new value followed by the ENTER key. If an error is mode while entering the setpoint, press the CLEAR key and re-enter the proper value.
3. The display will then show "DR 1". This is the DRIBBLE value for setpoint 1. This value will determine the point at which the fast feed cutoff occurs. Fast feed cutoff = SP 1 - DR 1. Retain or enter the value in the same manner as entering the setpoint.
4. The display will then show "PR 1". This is the preset value for setpoint 1. This value will determine the point at which the final cutoff occurs. Final; cutoff = SP 1 - PR 1. Retain or enter the value in the same manner as entering the setpoint.
5. The display will then show "TOL 1". This is the zero or weight tolerance for setpoint 1. This value defined the tolerance band at zero or at cutoff. Retain or enter the value in the same manner as entering the setpoint.
6. These steps will be repeated for material 2.

5.4.4 STORE DATA

The STORE DATA feature allowed the user to store digital zero, AZM, tare weight, commodity ID's and setpoint data in NOVRAM to prevent the loss of this data when changing the battery pack. This function is performed automatically if the processor data detects a battery dead condition. The data will be stored before the unit shuts down and displays the BA DEAD message. If the unit is asleep when the battery goes dead, the data will not be stored automatically.

1. Press the FUNCTION key followed by the ZERO key. The data will be stored and the message SAVED will be displayed. Press the FUNCTION key to return the display to the weight.
2. If the unit is displaying the message BA DEAD, press the ENTER key. The unit will wake up, detect a dead battery condition, store the data automatically, then shut back down.

5.5 PARAMETER REVIEW

The FUNCTION key is used to select dual function keys. The function mode is indicated by an "F" in the display. Pressing the function key again will return the display to the weight indication.

1. If the FUNCTION key is pressed, followed by the "." key, it will be assumed to be a setup parameter review request. The display will show "C 00". A two digit parameter number (XX) can be entered. The SETUP legend will be on. If ENTER is pressed after entering the parameter umber, the value of parameter XX will be shown in the display. Pressing the FUNCTION key with the parameter "00" entered, will return the display to weight.
2. If the setup mode has been selected via internal jumper, then the above sequence can be used to change parameters. If in the setup mode via jumper selection, the display will show "C00" automatically. The parameter can be changes by using the normal numeric entry method described above.
3. If the function key is depressed, followed by the ID key, the software program number will be displayed. If followed by another depression of the ID key, the display will show the software revision level.

5.6 ALTERNATE DISPLAY UNITS

SETUP (in setup mode)

Parameter 19 defines a display unit that will replace either pounds or kilograms in the instrument. If the instrument was calibrated in pounds, the factor will replace kilograms, and vice versa. The number that is entered for this parameter represents the number of calibrated units per the new unit,. That is, if the instrument was calibrated in points and an alternate display unit was to be used that was tons, with 2,000 pounds per ton, the number 2,000 would be entered for this parameter. The range of numbers that can be entered are limited only by the display capacity. This parameter can be less than 1. Entering a 0 will disable the alternate display units.

Common examples (scale calibrated in lbs)

Alternate Unit	Conversion Factor	Actual Weight on Scale	Display Reads
Gallons	1.8 lbs/gal	2,500 lbs	2,500 lbs or 1389
Drums	435 lbs.drum	1,740 lbs	1,740 lbs or 4
Tons	2000 lbs/ton	10,000 lbs	10,000 lbs or 5

Operation: Alternate action of the lb/kg switch toggles the weight display between the alternate display unit and either lb or kg, depending on what the scale was calibrated in. If calibrated in lbs., kg will be eliminated and vice versa.

When an alternate display unit is displayed, no legend will immluminate.

NOTE(S): Alternate display units may to be acceptable for legal-for-trade applications.

5.7 SCALE IDENTIFICATION CHARACTER

The M8141 is capable of transmitting a single ID character. A total of 127 different characters can be transmitted. The ID characters can be found on Table 5.7.1.

The scale ID, if desired, must be selected in the setup/calibrate mode with parameter #33, once the ID parameter (33) has been accessed a code of 000-127 can be entered for a specific identification character. For example:

CODE	ID CHARACTER TRANSMITTED
065	A
096	B

If printing of the scale ID is enabled, the ID will always be printed preceding the first weight field. A space will separate the ID from the weight data.

5.7.1 ASCII CHARACTER TABLE FOR M8141 SCALE ID

ID		ID		ID		ID	
Decimal	**ASCII**	**Decimal**	**ASCII**	**Decimal**	**ASCII**	**Decimal**	**ASCII**
000	NUL	032	sp	064	@	096	/
001	SOL	033	!	065	A	097	a
002	STX	034	“	066	B	098	b
003	ETX	035	#	067	C	099	c
004	EQT	036	$	068	D	100	d
005	ENQ	037	%	069	E	101	e
006	ACK	038	&	070	F	102	f
007	BEL	039	‘	071	G	103	g
008	BS	040	(	072	H	104	h
009	HT	041	)	073	I	105	i
010	LF	042	*	074	J	106	j
011	BT	043	+	075	K	107	k
012	FF	044	‘	076	L	108	l
013	CR	045	-	077	M	109	m
014	SO	046	.	078	N	110	n
015	SI	047	/	079	O	111	o
016	DLE	048	0	080	P	112	p
017	DC1	049	1	081	Q	113	q
018	DC2	050	2	082	R	114	r
019	DC3	051	3	083	S	115	s
020	DC4	052	4	084	T	116	t
021	NAK	053	5	085	U	117	u
022	SYN	054	6	086	V	118	v
023	ETB	055	7	087	W	119	w
024	CAN	056	8	088	X	120	x
025	EM	057	9	089	Y	121	y
026	SUB	058	:	090	Z	122	z
027	ESC	059	;	091	{	123	{
028	FS	060	<	092	`	124	|
029	GS	061	=	093	}	125	}
030	RS	062	>	094	^	126	
031	us	063	?	095	_	127	DEL

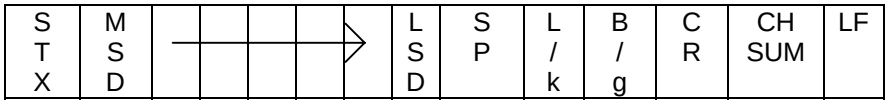
127 SELECTABLE CODES FOR PARAMETER #33

5.8 PRINTER OUTPUT

All printer output data is sent as 11-bit ASCII (1 start, 7 data bits, 1 even parity bit, 1 stop bit). All lines of data are preceded by a “STX” character/

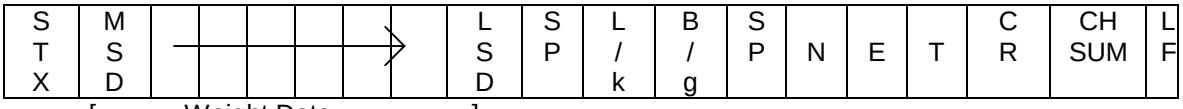
5.8.1 PRINTER FORMATS

Gross Weight Only



OR

Net Weight Only

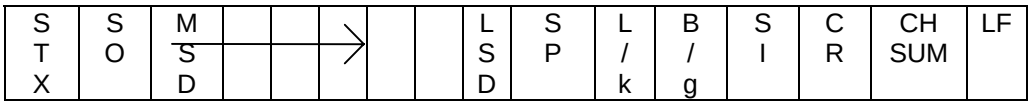


[.....Weight Data.....]

Optional Checksum Character

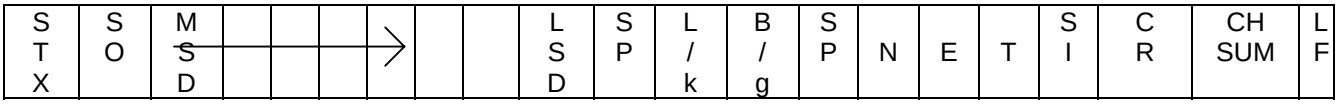
DISPLAYED WEIGHT ONLY - SINGLE WIDTH

Gross Weight Only



OR

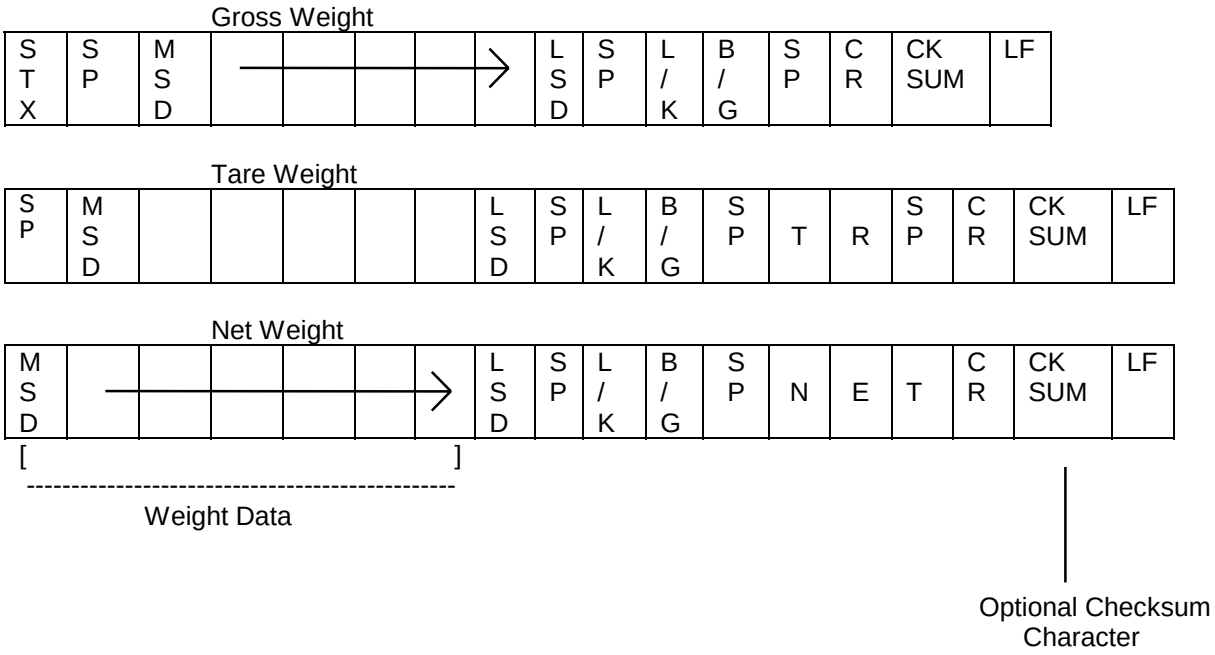
Net Weight Only



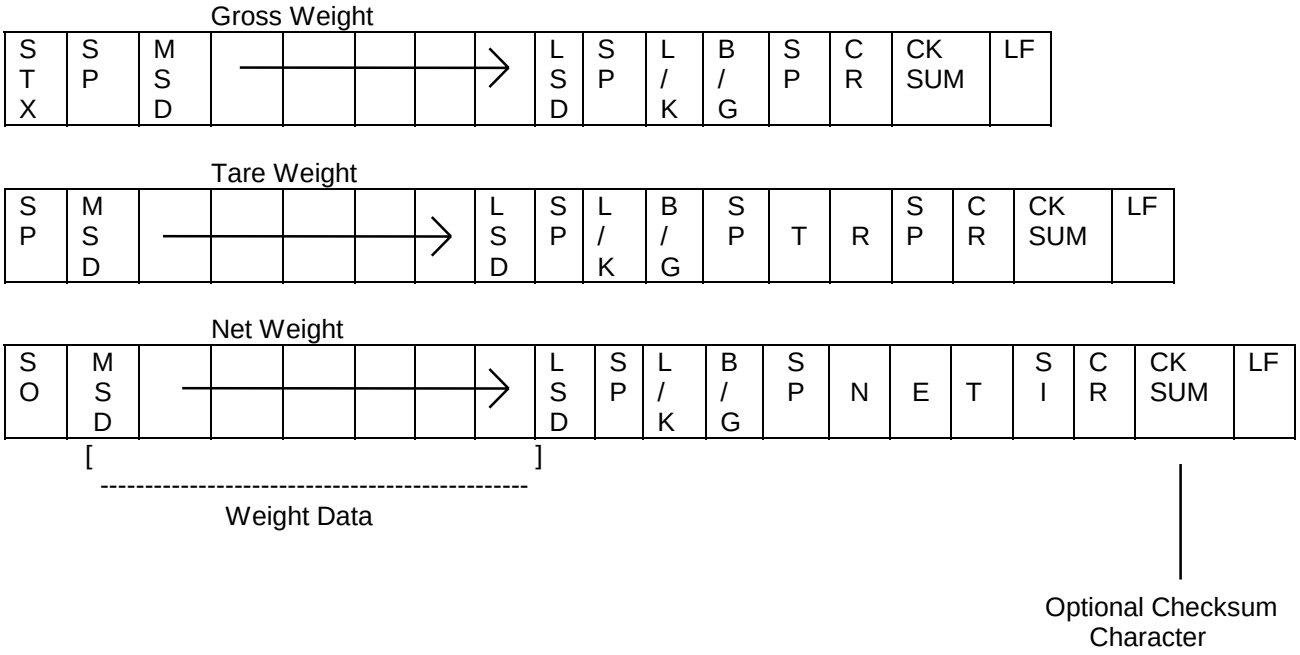
[.....Weight Data.....]

Optional Checksum Character

DISPLAYED WEIGHT ONLY - DOUBLE WIDTH (see note 2)



GROSS, TARE, NET - MULTIPLE LINE - SINGLE WIDTH (See Note 1)



GROSS, TARE, NET - MULTIPLE LINE - NET SOUBLE WIDTH (See Note 1 & 2)

5.8.2 SINGLE ASCII CHARACTER INPUT

The printer port will accept single character input without any leading or trailing ASCII characters. The baud rate will be the same as the printer port baud rate selected. The character must be in an 11-bit format with 1 start bit, 8 data bits, no parity bit, and 1 stop bit (The parity bit is ignored).

Single characters and functions controlled are as follows:

P - Print
C - Clear to Gross Mode
T - Tare off the displayed weight
Z - Zero the scale
* These characters MUST be upper case ASCII characters.

5.9 HOST INTERFACE

The host interface is a bi-directional serial port intended to be connected to an intelligent device. The host device can then perform most of the keyboard functions as well as request weight and status information from the unit. The data format is one start bit, 8 data bits, no parity, and one stop bit.

The LRC character is defined as the exclusive OR of all previous bytes sent including the "STX". The LRC character is optional. If it is sent, it will be tested. If no LRC is sent, the command will be executed whether a data error occurred or not. The LRC character is always sent in the reply from the instrument.

Following is a list of the various commands that are allowed over the host port/. With each command character is shown the typical message formats that will occur, what is required for the various options, and what type of reply can be expected from the instrument.

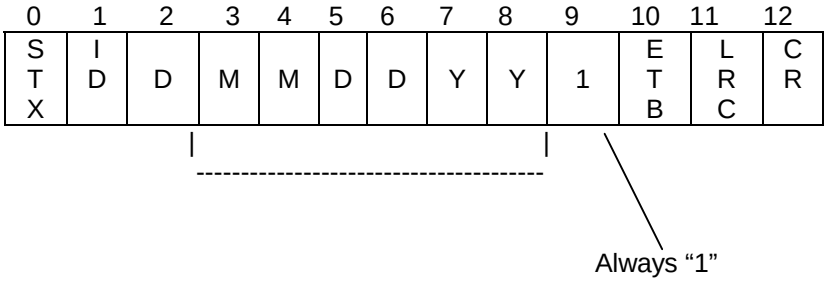
The host port may also be setup to receive print (P), clear to gross mode (C), tare off display weight (T), and zero the scale (Z), if setup as a printer port to Toledo/Masstron accessory port. The host port will not accept P,C, T or Z if setup in the host port (computer) or Masstron remote display keyboard configurations.

Command Character	Option #1	Option #2	Description	Reply
D	ASCII Date MMDDYY or YYMMDD or DDMMYY	N/A	Read/Write Date	ASCII date (if no Option #1) in setup formal, ACK/NAK
F	ASCII Time : HHMM	N/A	Read/Write Time	ASCII Time (if no Opt.#1, ACK/NAK)
T	N/A	N/A	Auto Tare Command	ACK/NAK
K	ASCII Tare (will auto convert to display grad size)	N/A	Write Tare	ACK/NAK
Z	N/A	N/A	Digital Zero Command	ACK/NAK
P	N/A	N/A	Print Command	ACK/NAK
S	ASCII setpoint # (1-8)	ASCII setpoint auto convert to display grad size	Read/Write Setpoints	ASCII setpoint value if no Option #2; ACK/NAK
M	0 - lb mode 1 - kg mode 2 - Net mode 3 - Gross mode	N/A	Modify Mode	ACK/NAK
W	0 - Net 1 - Gross 2 - Tare 3 - Displayed	N/A	Read Weight	ACK/NAK + Weight Data
Command Character	Option #1	Option #2	Description	Reply
Q	N/A	N/A	Return binary status info in binary	6 bytes of binary status data; NAK/ACK
C	ASCII Cal Data #	ASCII Cal Data	Read/Write calibration data (must be in Cal mode)	ASCII Cal Data if no Option #2; ACK/NAK
L	0 - KB Unlock 1 - KB Lock	N/A	Keyboard lockout	ACK/NAK

I	ID Entry	N/A	Commodity ID	Commodity ID (If No Option #1); ACK/NAK
B	N/A	N/A	Stores Setpoints, zero, AZM, ID, and tare to NOVRAM	ACK/NAK

Table 5-1
Host Port Command Summary

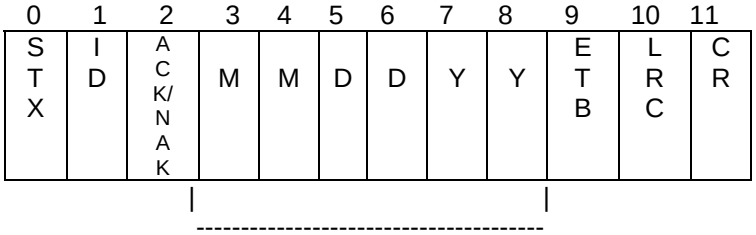
"DATE" COMMAND FORMAT



Character String for Date.
Order Depends on Setup
(U.S or Canada)

NOTE(S): If the date is not sent (bytes 3-8 omitted), then the current date will be returned in the reply. If it is sent, current date will be set to what is sent.

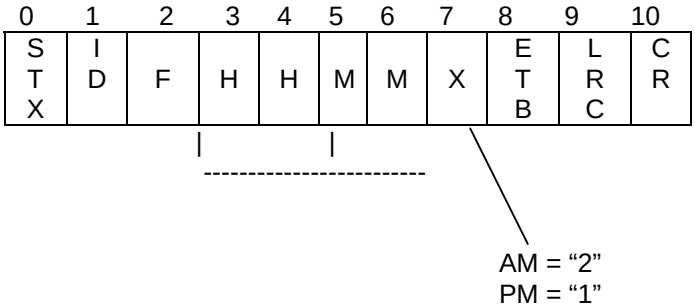
FORMAT OF REPLY TO "DATE" COMMAND



Date order depends on Setup. (U.S. or Canada)

NOTE(S): Bytes 3-8 will not be sent if input command was to set the date. A "NAK" will be sent in byte #2 if an attempt is made to set an invalid date.

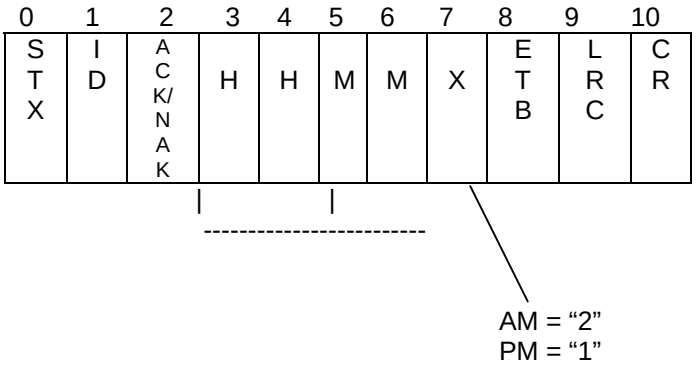
"TIME" COMMAND FORMAT



Time Character String

NOTE(S): If bytes 3-7 are omitted, the current time will be sent in the reply. Otherwise, the contents of bytes 3-7 will become the new time.

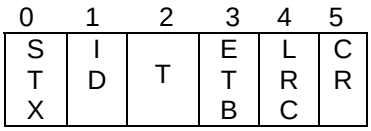
FORMAT OF REPLY TO "TIME" COMMAND



Time Character String

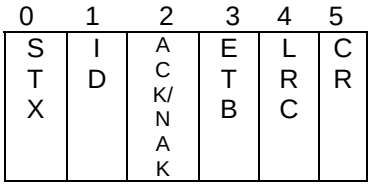
NOTE(S): Bytes 3-7 will not be sent if the input command set the time. Byte 2 will contain a "NAK" if an attempt is made to set an invalid time.

'AUTO TARE" COMMAND FORMAT



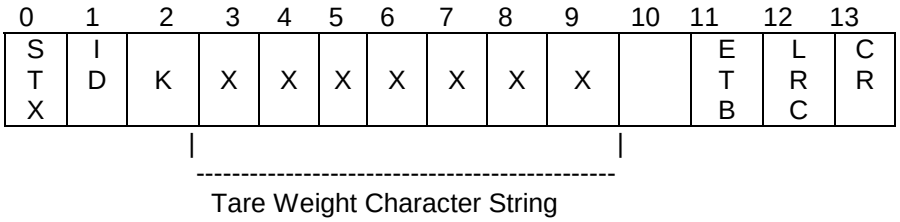
NOTE(S): This command causes an auto tare to be taken,provided no interlocks are in effect.

FORMAT OF REPLY TO "AUTO TARE" COMMAND



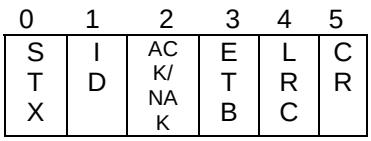
NOTE(S): Byte 2 will contain "ACK" if tare command was successful, "NAK" if not.

"KEYBOARD TARE" COMMAND FORMAT



NOTE(S): Entered tares will be rounded to nearest division size.

FORMAT OF REPLY FROM "KEYBOARD TARE" COMMAND



NOTE(S): Byte 2 will contain "ACK" if the tare was entered successfully, "NAK" if not.

“DIGITAL ZERO” COMMAND

0	1	2	3	4	5
STX	ID	Z	ETB	LRC	CR

NOTE(S): If not interlocked out, this command will re-zero the instrument (± 2% capacity only).

FORMAT OF REPLY FROM “DIGITAL ZERO” COMMAND

0	1	2	3	4	5
STX	ID	ACK/ NAK	ETB	LRC	CR

NOTE(S): Byte 2 will be an “ACK” if the zero command was successful, and “NAK” is not.

“PRINT” COMMAND

0	1	2	3	4	5
STX	ID	P	ETB	LRC	CR

NOTE(S): If no interlocked out, this command will start a print cycle. If interlocked out due to motion, “ACK” will be returned and the command latched until motion stops.

FORMAT OF REPLY FROM “PRINT” COMMAND

0	1	2	3	4	5
STX	ID	ACK/ NAK	ETB	LRC	CR

NOTE(S): Byte 2 will contain “ACK” if print command was accepted, “NAK” if not.

“SETPOINT” COMMAND

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STX	ID	S	Y	,	X	X	X	X	X	X	X	.	ETB	LRC	CR

Setpoint Value Character String

SETPOINT #(ASCII)

NOTE(S): If bytes 5-12 are not sent, then the current value for setpoint “Y” will be returned in the reply.

FORMAT OF REPLY FROM “SETPOINT COMMAND”

0	1	2	3	4	5	6	7	8	9	10	11	12	13
STX	ID	ACK/NAK	X	X	X	X	X	X	X	.	ETB	LRC	CR

Current Setpoint Value

NOTE(S): Bytes 3-10 will not be sent if a setpoint was entered in the command.

"MODE" COMMAND FORMAT

0	1	2	3	4	5	6
STX	ID	M	Y	ETB	LRC	CR

ASCII
Char. 0 - Switch to lb
1 - Switch to kg
2 - Switch to net
3 - Switch to gross

NOTE(S): This command will alter the mode of the instrument.

FORMAT REPLY FROM "MODE" COMMAND

0	1	2	3	4	5
STX	ID	ACK/NAK	ETB	LRC	CR

NOTE(S): Byte 2 will contain an "ACK" if the mode was successfully switched and "NAK" if not.

"**WEIGHT" COMMAND FORMAT**

0	1	2	3	4	5	6
STX	ID	W	Y	ETB	LRC	CR

ASCII
Char. 0 - Net Weight
1 - Gross Weight
2 - Tare Weight
3 - Display Weight

NOTE(S): This command will cause the specified weight to be returned in the reply.

FORMAT OF REPLY FROM "WEIGHT" COMMAND

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STX	ID	ACK / NAK	Z	Y	X	X	x	x	x	x	x	.	ETB	LRC	CR

Weight Character String

Z is ASCII Character identifying the weight:

G - Gross
T - Tare
N - Net
O - Over Capacity
E - Instrument Error
H - Hand Entered Tare

Y is ASCII character Identifying units:

L - Pounds
K - KG
A - Alternate Units (User Defined)

"STATUS" COMMAND FORMAT

0	1	2	3	4	5
STX	ID	Q	ETB	LRC	CR

NOTE(S): This command requests a return of instrument status information.

FORMAT OF REPLY FROM "STATUS" COMMAND

0	1	2	3	4	5	6	7	8	9	10	11
STX	ID	ACK / NAK	STB1	STB2	STB3	STB4	STB5	STB6	ETB	LRC	CR

Status Bytes
(See table for content)

STATUS BYTE RETURN FORMAT

Status Byte #1
(Printer State)
(STB1)

Bit	Function

0	
1	
2	
3	
4	
5	
6	1 = Waiting for print complete
7	

Status Byte #2
(STB2)

Bit	Function
0	1 = Net Mode; 0 = Gross Mode
1	1 = lb; 0 = kg
2	1 = Alternate conversion factor in use
3	1 = Printer Error
4	1 = A/D conversion error
5	1 = Time and Date disabled.
6	1 = Tare Disabled
7	1 = A/D failure

Status Byte #3
(STB3)

Bit	Function
0	1 = DPU Digital Check Error
1	1 = Time and Date need to be set
2	1 = Scale in motion
3	1 = Scale at center of zero
4	1 = Scale in calibrate mode
5	1 = Over Capacity
6	1 = lb/kg switching disabled.
7	1 = Setpoints off.

Status Byte #4
(STB4)

Bit	Function
0	Spare
1	1 = Cal calibrations not performed
2	1 = Tare is kb entered
3	1 = Blank display
4	1 = EEPROM write error
5	1 = Keyboard lockout
6	Spare
7	Spare

Status Byte #5
(STB5)

Bit	Function

0	1 = Print interlocked out
1	1 = System error (logical or of all error bits)
2	1 = Digital zero interlocked out (motion)
3	1 = Power Up
4	Spare
5	Spare
6	1 = Scale stabilized above 10 grads
7	

Status Byte #6
(STB6)

Bit	Function
0	1 = Setpoint #1 tripped
1	1 = Setpoint #2 tripped
2	1 = Setpoint #3 tripped
3	1 = Setpoint #4 tripped
4	1 = Setpoint #5 tripped
5	1 = Setpoint #6 tripped
6	1 = Setpoint #7 tripped
7	1 = Setpoint #8 tripped

Comments: Setpoint coincidence

"CALIBRATE" COMMAND FORMAT

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
STX	ID	C	Y	Y	,	X	X	X	X	X	X	X	.	ETB	LRC	CR

[ ] [|

Cal Parameter Number — Cal Parameter Data Character String

NOTE(S): Commands to ENTER data will only be accepted if the instrument is in the calibrate mode. CAL data can be READ at any time.

If Bytes 5-13 are not sent, then the current value for parameter "YY" will be returned in the reply.

FORMAT OF REPLY FROM "CALIBRATE" COMMAND

0	1	2	3	4	5	6	7	8	9	10	11	12	13
STX	ID	ACK / NAK	X	X	X	X	X	X	X	.	ETB	LRC	CR

| |

Value of Parameter

NOTE(S): Bytes 3-10 will not be transmitted if a parameter value was entered in the command.
Byte 2 will contain "ACK" of the command was successful, "NAK" if not.

"**KB LOCK" COMMAND FORMAT"**

0	1	2	3	4	5	6
STX	ID	L	Y	ETB	LRC	CR

ASCII Char. 0- Unlock KB
1- Lock KB

NOTE(S): This command will disable (lock) or enable (unlock) the front panel KB.

FORMAT OF REPLY FROM "KB LOCK" COMMAND

0	1	2	3	4	5
STX	ID	ACK/NAK	ETB	LRC	CR

NOTE(S): Byte 2 will contain "ACK" if the command was successful, "NAK" if it was not.

"ID" COMMAND FORMAT

0	1	2	3	4	5	6	7	8	9	10	11
STX	ID	I	x	x	x	x	x	x	ETB	LRC	CR

NOTE(S): If bytes 3-8 are not sent, then the current value for the ID will be returned in the reply.

FORMAT OF REPLY FROM "ID" COMMAND

0	1	2	3	4	5	6	7	8	9	10	11
STX	ID	ACK/NAK	X	X	X	X	X	X	ETB	LRC	CR

NOTE(S) bytes 3-8 will not be sent if the input commands was to enter a new ID. Byte 2 will contain a "NAK" if an attempt is made to enter an invalid ID.

"STORE DATA" COMMAND FORMAT

0	1	2	3	4	5
STX	ID	B	ETB	LRC	CR

NOTE(S): This command will cause the current tare weight, digital zero, AZM, commodity ID, and setpoints to be stored in EEPROM.

FORMAT OF REPLY TO "STORE DATA" COMMAND

0 1 2 3 4 5

STX	ID	ACK / NAK	ETB	LRC	CR

NOTE(S) Byte 2 will contain a “NAK” if an EEPROM Read/Write error occurs.

5.10 EXTERNAL KEYBOARD DISPLAY PORT

The port will be configured bi-directional. The output side will continuously transmit weight data in the Masstron accessory port format. The input side will accept commands in the Masstron keyboard format. In this configuration , the port is intended to be hooked to a Masstron MD3046 fully functional remote keyboard display. This allows full display and operation of the M8141 from a remote location.

5.11 MASSTRON ACCESSORY PORT

The Masstron accessory port will continuously transmit data in the Masstron accessory format. This is intended for hookup to Masstron accessories.

The accessory port will acept single character input without any leading or trailing ASCII characters. The baud rate will be the same as the printer port baud rate selected. The character must be in a 10-bit format with 1 start but, 8 data bits, no parity, and 1 stop bit. (The parity but is ignored).

Single characters and functions controlled here are as follows:

P - Print
C - Clear to Gross Mode
T - Tare off the display weight
Z - Zero the scale
* These characters MUST be upper case ASCII characters.

The format of the data sent is:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ØØ	FF	ØØ	MSB	NSB	LSB	MSB	NSB	LSB	SETPT	STS1	STS2	STS3	ID	LRC
			[		]	[		]						
			Main Dsp. Weight			Tare Weight								

Status Byte #1
(STS1)

Bit	Function
0	1 = Net Mode; 0 = Gross Mode
1	1 = lb; 0 = kg
2	1 = Alternate conversion factor in use; 0 = Normal Units
3	1 = Printer Error
4	1 = A/D conversion error
5	1 = Time and Date enabled.
6	1 = Tare Disabled at setup
7	1 = A/D Hardware failure

Status Byte #2
(STS2)

Bit	Function

0	1 = DPU Digital Check Error
1	1 = Time and Date need to be set (power up)
2	1 = Scale in motion
3	1 = Scale at center of zero
4	1 = Scale in calibrate mode
5	1 = Over Capacity
6	1 = lb/kg switching disabled at setup
7	1 = Setpoints disabled at setup

Status Byte #3
(STS3)

Bit	Function
0	Spare
1	1 = Cal calibrations not performed
2	1 = Tare is kb entered
3	1 = Blank display
4	1 = EEPROM write error
5	1 = Keyboard lockout
6	Spare
7	Spare

The standard message format transmitted is a 15-byte packed data type of message. These data transmissions will occur once per display update, or any time there is a change in any of the data.

The continuous transmit message format has several main portions:

A. SYNC BYTES

Message bytes 0 and 1 are synchronization bytes. The receiver of this data must look for HEX 00, followed by a HEX FF to indicate the start of the continuous transit message.

B. MESSAGE FORMAT INDICATOR

Byte 2 indicates the format of the message the followed. FI this byte is 0, then the following message is of the continuous transmit format. If the byte is non-zero, then the remaining message should be ignored.

C. MAIN DISPLAY WEIGHT

Bytes 3 through 5 contain the current displayed weight in decimal floating point formula.

D. TARE DISPLAY WEIGHT

Bytes 6 through 8 contain the current tare weight in decimal floating point format.

E. SETPOINT COICIDENCE

Byte 9 contains the current status of the 8 internal setpoints. The last significant but of this byte corresponds to setpoint number 1, and will be set to a 1 if the current displayed weight is equal to or above the entered setpoint..

F. STATUS BYTES

Bytes 10 through 12 contain various status information concerning the current state of the scale. Refer to the status byte formats for a detailed diagram.

G. ASCII SCALE ID CHARACTER

Byte 13 contains a single ASCII character which represents the ID of the scale transmitting the data. This character is entered into the instrument at setup time.

H. ERROR CHECK

Byte 14 contains an LRC error check character, which is the exclusive OR of bytes 0 through 13.

DECIMAL FLOATING POINT FORMAT

In most cases, numeric data is transmitted serially using ASCII encoded numbers. The only exception to the rule is numeric data that is transmitted on the option/accessory port. Due to serial transmission time constraints, the main display weight, and tare weight data (the only two numeric values transmitted on the option port) are transmitted in a decimal floating point format. Using this format, any number can be transmitted in 3 bytes,

whereas using an ASCII encoded format would take 8 bytes. Refer to the diagram below for the decimal floating point format.

MSB	FP FORMAT		Bit 16, 17 of Data
Sign 1 Bit = NEG	5 Bits DP Location + DP moves right - DP moves left		
NSB			
8 Bits Data			
LSB			
8 Bits Data			

A decimal floating point format number consists of three main parts:

A. MANTISSA
The mantissa is the main part of the number and occupies 18 of the 24 available bits (3 bytes x 8 bits per byte). The 18 bits used are the two least significant bytes, and the two least significant bits of the most significant byte.

B. EXPONENT
The exponent is a times 10 multiplier for the mantissa. IT occupies bits 2 through 6 in the most significant byte of the number. The exponent is equivalent to the scientific notation scheme found on most calculators.

If the exponent is positive, then multiply the mantissa by 10 the number of times indicated by the value of the exponent to get the final number (or move the decimal point to the right the number of places as indicated by the exponent.

If the exponent is negative (in two's compliment) then divide the mantissa by 10 the number of times as the absolute value of the exponent.

As an example, the number 300 would be encoded with a mantissa of 3 and an exponent of 2. The number .05 would be encoded with a mantissa of 5 and an exponent of -2. Note that the 5 bits used to encode the exponent is a 2's compliment number. That is -2 would be encoded in binary as 11110.

C. SIGN BIT
The most significant bit of the most significant byte indicated the sign of the mantissa. If the number is negative, then this bit is set to equal 1, and if the number is positive, this bit is set to equal 0.

In actual practice in the M8141 , the exponent is always determined when the instrument is calibrated. If the instrument was calibrated say to count by 100, then the exponent would always be 2. Conversely, the instrument was set up to count by .1, then the exponent would always be -1.

In operation, the exponent is not modified to optimize the transmission of a particular number, but rather always reflects the times 10 multiplier that was set up at calibration time.

5.12 TOLEDO ACCESSORY PORT

The Toledo accessory output will continuously transmit data in the Toledo setpoint accessory format. It is intended for hookup to Toledo accessories.

The accessory port will accept single character input without any leading or trailing ASCII characters. The baud rate will be the same as the printer port baud rate selected. The character must be in a 10-bit format with 1 start bit, 7 data bits, even parity bit, and 1 stop bit. (The parity bit is ignored).

P - Print
C - Clear to Gross Mode
T - Tare off the display weight
Z - Zero the scale
* These characters MUST be upper case ASCII characters.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
				INDICATED WEIGHT VALUE						TARE WEIGHT VALUE							
START OF TEXT (*)	STATUS WORD A	STATUS WORD B	STATUS WORD C	MSD					LSD	MSD					LSD	CARRIAGE RETURN (!)	CHECKSUM (#)

(*) Start text character is always the FIRST character sent (See Note Below).

(!) Carriage return character always follows the least significant digit of the tare weight.

(#) Selectable checksum character.

*** NOTE: Definitions of the three status words follow.**

STATUS WORD A DEFINITION

Bit No.	DECIMAL POINT OR DUMMY ZERO LOCATION							
	X00	X0	X	.X	.XX	.XXX	.XXXX.	.XXXXX
0	0	1	0	1	0	1	0	1
1	0	0	1	1	0	0	1	1
2	0	0	0	0	1	1	1	1
3	SP1 FEEDING - ON = 0/OFF = 1							
4	SP2 FEEDING - ON = 0/OFF = 1							
5	ALWAYS A 1							
6	SP1 FAST FEED OR SP3 FEED - ON = 0/OFF = 1							
7	PARITY BIT							

STATUS WORD B DEFINITION

Bit No.	OPERATING PARAMETERS
0	GROSS MODE = O/NET MODE = 1
1	POSITIVE WEIGHT = O/NEGATIVE WEIGHT = 1
2	IN RANGE = 0/OVERCAPACITY = 1
3	NO MOTION = 0/IN MOTION = 1
4	LB MODE = 0/KG MODE = 1
5	ALWAYS A 1
6	SP1 - IN TOLERANCE = 0/OUT OF TOLERANCE = 1
7	PARITY BIT

STATUS WORD C DEFINITION

Bit No.	OPERATING PARAMETERS
0	ALWAYS A 0
1	ALWAYS A 0
2	ALWAYS A 0
3	NORMAL = 0/PRINT BUTTON PUSHED = 1
4	SP2 FAST FEED OR SP4 FEED - ON = 0/OFF = 1
5	ALWAYS A 1
6	SP2 - IN TOLERANCE = 0/OUT OF TOLERANCE = 1
7	PARITY BIT

6.0 INSTRUMENT POWER

The M8141 indicator has two Factory Mutual approved power sources. The indicator may be used either with an intrinsically safe rechargeable battery pack or a 120 V AC power supply with an intrinsically safe output. Both the battery pack and power supplies are only Factory Mutual approved with the Masstron/ Toledo M8141 indicators.

6.1 BATTERY SPECIFICATIONS

- Power 12 V DC, 8 Amp hour, 10 Amp hour, and 12.5 Amp hour. (8 and 12.5 Amp hour batteries are no longer available after February, 1989).

- Recharge time 12-16 hours depending on depth of discharge.

- Operating temperature range -10 to 40º C (14º to 140º F) includes storage and charging.

- The maximum operating temperature of all batter packs is less than 100º C, therefore, there is not a temperature code identification required by the National Electrical Code.

- Typical single charge life for an M8141 indicator and single load cell with a 10 Amp hour battery is 120 hours, using logic boards MB11419-E or A128859 00A or later revisions. Cycle time may vary with indicator load and Amp hour rating of the battery.

NOTICE!!

AVOID PERMANENT DAMAGE TO THE BATTERY PACK, RECHARGE BATTERY IMMEDIATELY WHEN BATTERY LOW IS INDICATED.

DANGER!!

DO NOT ATTEMPT TO OPEN OR REPAIR BATTERY PACK. BATTERY IS DESIGNED FOR INTRINSICALLY SAFE OPERATION.

6.2 INTRINSICALLY SAFE BATTERY PACKS

6.2.1 - The -20/M8141 battery pack is as intrinsically safe for Class I and II, Division 1 applicable Groups A, B, C, D, E, F, and G hazardous (classified) locations. The 12 V DC intrinsically safe output allows safe disconnection of the battery pack from the M8141 indicator in the hazardous area. A 14 inch long cable is permanently connected to the battery pack for connection to the M8141WS (wall mount) and M8141DG (desk mount) indicators. To connect the -20/M8141 battery pack to M8141 Ram 0001, 0002, 0011 and 0012 indicators, a five foot long 0960-0030-000 cable is required.

The battery pack is enclosed in a stainless steel enclosure suitable for wall mounting in indoor locations. To connect the -20/M8141 battery pack to M8141 RAM 001, 002, 0011, and 0012 indicators, a five foot long 0960-0030-000 cable is required. The -20/M8141 battery pack

consists of an 8 Amp hour rechargeable sealed lead acid battery. Battery charger model number 30/M8141 is used to recharge the -20/M8141 battery pack in a **SAFE AREA ONLY**. Battery pack output pins - Pin 5 + instruments; Pin 7 - instrument. Reference Section 6.2.3.1 for voltage levels. Reference Figure 6.1 for dimensions.

The model -20/M8141 was obsolete after February, 1989.

6.2.2 - The -40/M8141 battery pack and battery pack part number 900354 00A are intrinsically safe for Class I and II, Division 1 application Groups A,B,C,D,E,F and G hazardous (classified) locations. The 12 V DC intrinsically safe output allows safe disconnection of the battery packs from the battery pack connection to the M8141 WS (wall mount) and M8141 DG (desk mount) indicators. For connection between the -40/M8141 battery pack and battery pack part number 900354 00A to a M8141 RAM 0001, 0002, 0011 and 0012 indicator a five foot long 0960-0030-000 cable is required/ The battery packs are enclosed in a stainless steel enclosure suitable for mounting in indoor locations. Reference Figure 6.2 for battery pack dimensions and mounting holes locations on model -40/M8141 and battery pack part number 900354 00A. The -40/M8141 and 900354 00A battery packs consist of 12.5 Amp hour rechargeable sealed lead acid battery. Battery charger model number 30/M8141 must be used to recharge both the -40/M8141 and 900354 00A battery packs in the **SAFE AREA ONLY**. Battery pack output pins - Pin 5 + instrument; Pin 7 - instrument . Reference Section 6.2.3.1 for voltage levels. Reference Figure 6.1 for dimensions.

Both the -40/M8141 and battery pack part number 900345 00A were obsolete after February, 1989.

6.2.3 - The model 0964-0004 battery pack is intrinsically safe for Class I and II, Division 1, applicable Groups A,B,C,D,E,F,and G hazardous (classified) locations. The 12 V DC intrinsically safe output allows safe disconnection of the battery pack from the M8141 indicator in the hazardous area. The battery pack has an 8 pin circular connector for the output connection. For connection of the 0964-0004 battery to the M8141 WS and M8141 DG indicators required a five foot line 0960-0030-000 cable. The M8141 RAM 0001,0002,0011 and 0012 indicators have a 5 foot power cable attached to the indicators. The battery pack is enclosed in a stainless steel enclosure suitable for wall mounting in indoor locations. Reference Figure 6.3 for battery pack dimensions and mounting hole locations on model 0964-004 battery pack. The 0964-0004-000 battery pack consists of a 10 Amp hour rechargeable sealed lead acid battery. Battery chargers 0964-0005 (115 VC) and 0964-0006 (220 V AC) must be used to recharge the battery pack in the **SAFE AREA ONLY.**

6.2.3.1

The Toledo Scale 12 V 10 Amp hour battery pack has been designed to be intrinsically safe. TESTING THE BATTERY VOLTAGE OUTPUT MUST ONLY BE DONE IN THE SAFE AREA ONLY. The voltage reading of a fully charged battery will be in the 12 to 13 volt range.

Battery test pins are Pin 5 for battery plus and Pin 7 for battery minus. Reference battery connector in Figure 6.5

If the battery has been discharged below 9.6V the batteries may be discharged too low to accept a charge. Chances are batteries below 9.6 V will not be rechargeable. If the battery is frequently discharged down to the 9.6 V range, battery life will be severally reduced. Leaving the battery on charge for 24 hours will determine whether the battery is rechargeable or must be replaced. If the battery does not take a change after 24 hours and the voltage reading on the battery was in the 9.6 V range before charging the battery must be replaced.

WARNING!!

DISCONNECT AND REMOVE BATTERY PACK FROM HAZARDOUS AREA BEFORE TESTING BATTERY VOLTAGE IN HAZARDOUS AREA.

Figure 6.1 -20/M8141 8 Amp hour Battery

Figure 6.2 -40/M8141 Battery and 900354 00A 12.5 Amp hour Batteries

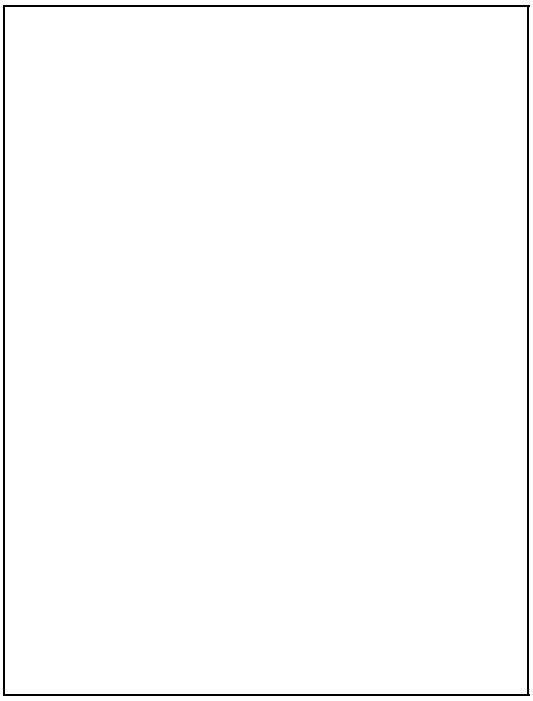
Figure 6.3 Model 9064-0004 10 Amp hour Battery Pack

6.3 POWER SUPPLIES

The M8141 indicator has two optional power supplies Model 0964-0024 and 0964-0032 that have been designed to provide intrinsically safe power for the M8141 . Both power supplies are Factory Mutual approved for installation in the Hazardous area. Descriptions of both power supplies are listed below.

WARNING!!

DISPOSAL OF SEPNT BATTERY PACKS MUST BE DONE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGUALTIONS. DO NOT INCINERATORE



PIN	DESCRIPTION
1	N/C
2	N/C
3	N/C
4	Chassis (GND)
5	+ Instrument
6	N/C
7	0 Volts
8	N/C

Output pins for Model 0964-0032 Power Supply

PIN	DESCRIPTION
1	N/C
2	+ Instrument
3	N/C
4	Chassis GND
5	N/C
6	0 Volts
7	N/C
8	N/C

Output pins for Model 0964-0024 Power Supply.

Figure 6.4 Power Supply Connector Pin Location

Figure 6.5 Hazardous Area Scale System with Power Supply

6.3.1 - The Toledo/Masstron model 0964-0024 power supply has been designed to provide intrinsic safe power for the Toledo Masstron M8141 indicator when installed in Hazardous (classified) locations. The power supply is Factory Mutual approved as suitable for installation only in an in for hazardous (Classified) location with a classification of Class 1 and II, Division 1, Groups C and D only, when installed per Toledo/ Masstron drawings TC000040, TC 000041 and with approved load cells per TA700001.

The M8141 Power Supply number 0964-0024 is approved for use only with the M8141 indicator model numbers 8141-0002 (desk mount) and 8141-0012 (wall mount) in NEW APPLICATIONS only. The power cable attached to the indicator will plug directly into the power supply at a maximum distance of 5 feet away. There are no extension cables available fir the Model 0964-0024. Reference manual number 0965-0050 for mote information on the Model 0964-0024 power supply. Reference Figure 6.6 for dimensions of the 0964-0024 power supply.

6.3.2 - The Toledo/Masstron model 0964-0032 power supply has been designed to provide intrinsic safe power for the Toledo/Masstron M8141 indicator when it is installed in Hazardous (classified) locations. The power supply is Factory Mutual approved as suitable for installation only in an indoor hazardous (classified) location with a classification of Class I and II, Division 1, applicable Groups C,D,E,F and G only, when installed per Toledo/Masstron drawings TC000040. TC00041 and with approved load cells per TB700001. The power supply is a direct replacement for batteries used in Class I and II, Division 1, applicable in Groups C,D,E,F and G hazardous locations with M8141 indicators in non-portable applications.

6.3.3 - When using the Toledo/Masstron model 0964-0032 power supply a revision in the software may be required.

The following section has been written to assist the customer in making the determination if a software upgrade is required for the M8141 indicator when using the Model 0964-0031 power supply. The problem corrected by the software upgrade (113193 Rev. D or later) is to prevent

corruption of the calibration data in the even of an AC power brown out of power failure. The problem exists only in indicators that have software number 113193 and revisions A, B, C (software number). If the indicator has software number 92077 revision 1.0,1.1, 1.2, 1.3, 1.4, the indicator is not effected by the use of the power supply.

There are two ways to determine the revision of software in the M8141 indicator. The software number and revision is printed on a label on the EPROM located near the lower right hand corner of the indicator logic board in IC location Z30. The software number may also be determined by pressing the “Function” key and “ID”, which will display the software number. Press the “ID” key again and the revision of software will be displayed. Press the “ID” again and the display will return to the weight display. The kit of parts to order for the software upgrade is model umber 0961-0042.

6.3.4 - Power connection from the model 0964-0032 power supply to the M8141 indicator will use the cable attached to the M8141 for TAM 0001, 0002, 0011 and 0012. The intrinsically safe output of the power supply may be extended 50 feet by using extension cable model number 0960-0040.

6.3.5 - Power connection to M8141WS and M8141DG indicators require either a 5 ft extension cable model number 0960-0030 or the 50 ft extension cable 0960-0039. Both 50 ft extension cables model number 0960-0039 and model number 0960-0040 references in paragraph 6.3.4 are Neoprene Jacketed type SO cables. Reference manual number 0965-0053 for more information on model 0964-0032 power supply and dimensions see Figure 6.6.

Figure 6.6 Model 0964-0024 Power Supply
Factory Mutual approved for Class I, Division 1, Groups C and D only.

Figure 6.7 Model 0964-0032 Power Supply
Factory Mutual approved for Class 1, Division 1, Groups C & D.
Class II, Division 1, Groups E, F, & G only.

7.0 TROUBLESHOOTING

7.1 ERROR CONDITIONS

Several system errors are displayed via numeric or alpha/numeric symbols in the display.

Operator entry errors, or invalid entries (as an example - attempting to tare a negative weight) are indicated by the main display blinking for two (2) seconds.

A message in the display indicates the instrument is not operable until the condition is corrected. The following are messages:

“--OL--” - Overload, the scale is above it’s rated capacity as determines by parameters 1 and 10.

"SLEEP" - The instrument is in the low power sleep mode. This mode was entered by the operator pressing the SLEEP key, or by the auto sleep timer (parameter 44). The auto sleep timer works like this: If set to zero (0) the unit will never enter the sleep mode on its own. If a non-zero number is entered, then the unit will go to sleep after that many minutes of no motion. (Determined by parameter 19). The times always resets, and stays reset while the scale is in motion. The indicator will not automatically go to sleep during keyboard entry or during setup.

The sleep mode can be exited by pressing the WAKEUP key.

"BADEAD" - Battery is dead. This is identical to the sleep mode above, except the indicator will enter it when the battery voltage drops below an operable level, and display the "BADEAD" message. The WAKEUP key will restart the indicator, although it may immediately enter this mode again.

This mode will not be entered during keyboard entry or the setup mode.

7.2 ERROR CODES

"--1--" -A/D conversion error. The software detected an auto range condition during conversion. This can be caused by no load cell hooked up, load cell polarity reverse, or A/D hardware failure.

"--2--" - Digital check error. The indicator has detected an internal error, most likely a calibration data check error. Putting the indicator to sleep, and waking it up will cause the calibration data to be read back in from EEPROM. If the error still persists, then the EEPROM may be bad.

"--3--" - EEPROM read/write error. The indicator has detected a hardware error during read or write to the EEPROM. Putting the indicator to sleep and waking it up will cause a read re-try. Putting the indicator in and out of the setup mode will cause a write re-try. If the error persists, the EEPTOM may be bad.

"--7--" - A/D failure. The A/D conversion did not occur within 70ms. This is most likely a hardware failure in the A/D section.

"--8--' - Setup calibrations not performed. This indicates that a parameter was changed, but the necessary calculations were not performed to make the indicator operate. Since the calculations are automatically performed on exit form the setup mode, this error does not normally occur. However, see documentation on the ZERO button for a description of when it might. (Reference Section 5.3).

Errors 4, 5, and 6 are reserved for future use. If they occur, contact the factory.

WARNING!!
1) ONLY THE SPECIFIED COMPONENTS CAN BE USED IN THIS UNIT. DO NOT SUBSTITUTE COMPONENTS AS THIS WILL IMPAIR THE INTRINSIC SAFETY OF THE UNIT. 2) DO NOT OPERATE UNTIL YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS IN THE M8141 MANUAL.

7.3 M8141 PARTS LIST

PART NUMBER	DESCRIPTION
MB11419	Main Logic PCB (Obsolete after 11/89)
(*)12885900A	Main Logic PCB (*) Board may have letter revision change.
90087400A	Keypad replacement - includes keypad overlay, keypad RFI shield metal backer plate.
0917-0117-000	Load Cell connector K.O.P. - M8141DG (Desk)
017-0018-00	Load Cell connector K.O.P. - M8141WS (Wall)
-20/M8141	8 Amp hour battery - This battery no longer produced. Must use 10 Amp hour battery
-40/M8141	12.5 Amp hour battery - This battery no longer produced. Must use 10 Amp hour battery

90035400A	12.5 Amp hour battery - This battery no longer produced. Must use 10 Amp hour battery
MA01930	120 V AC battery charger assembly (for 8 and 12.5 Amp hour batteries only)
0964-0004-000	10 Amp hour battery pack (check interconnecting cable for use with M8141WS and M8141DG indicators).
0960-0030-000	Interconnecting cable (required when using 10 Amp hour battery with M8141DG and M8141WS type indicators).
0964-0005-000	10 Amp hour Battery Charger (112 V)
0964-0006-000	10 Amp hour Battery Charger (220 V)
90036200A	8 Pin battery power supply connector for M8141 indicator, RAM 001,002,0011, and 0012. Connector requires five (10718800A pins) and one (MZ0503000088) heat shrinkable cable clamp.
0964-0032-000	Power supply for Class I and II, Division 1, Group C,D,E,F and G. Use for replacement of 0964-0021-000 power supply (check interconnecting cable for use with M814WS and M8141DG indicators).
12018500A	.1 Amp, Slo-Blo fuse, type 3 AG.
0960-0030-000	Interconnecting cable for M8141DG and M8141WS type indicator to power supply model 0964-0024-000 or 0964-0032-000.
0960-0039-000	50 foot extension cable for M8141WS-0001, 0002, 0011 and 0012 indicators with 0964-0032 power supply only.
0960-0040-000	50 foot extension cable for M8141-0001, 0002, 0011 and 0012 indicators with 0964-0032 power supply only.
0964-0042-000	M8141 software upgrade kit of parts (Ref. Section 6.2.3)

WARNING!!

ONLY USE PARTS LISTED ABOVE. ANY SUBSTITUTION OR MODIFICATION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

8.0 FIBER OPTICS INTERFACE - OPTIONAL

8.1 FIBER OPTIC INSTALLATION INSTRUCTIONS

The MN01935 transmitter/receiver board is to be mounted inside the M8141 indicator using two 4-40 screws to mount the PCB on stand-offs. The M8141 desk unit requires a bracket which is provided with the interface kit of parts The wall unit stand-offs are provided standard with all wall indicators. Part numbers for the fiber optics kits of parts and spare parts are provided in the fiber optic spare parts list.

The fiber optic cable is a plastic super low loss cable with PVC jacket. Fiber optic cable comes in standard cut lengths of 50, 100, 150, and 200 ft lengths. Custom lengths are available (see Figure optics parts lists).

8.1.1 FIBER OPTIC TRANSMITTER/RECEIVER PCB INSTALLATION IN WALL ENCLOSURE

NOTE(S): If a Dual Channel KOP is used remove JU1 from PCB #1.

- Remove the main PCB from the M8141 enclosure. Disconnecting all harnesses and noting their locations.

- Install the fiber optic PCB(s) (Part # MN01935) on the stand-offs located on the main PCB support bracket, on the left hand side of the M8141 enclosure. Use the 4-40 screws provided with fiber optic K.O.P (ref. Figure 8.1).

- Connect the interconnecting harness (Part # TN000012 or TN000082 in Dual Channel KOP) between J1 on the fiber optic receiver/transmitter PCB and J4 on the M8141logic board (CH1).

- Connect the interconnecting harness (Part # TN000013) between J1 on the second fiber optic receiver/transmitter PCB and J2 onto M8141 logic board (CH2) (Dual Channel KOP Only).

- Install the box connector(s) in the enclosure after removing hole plug(s) (Ref. Figure 8).

- Install the fiber optic cable in rigid metal conduit. Maximum length of exposed fiber cable at both ends of the conduit run it ten (10) ft.

- Install fiber optic cable through box connectors and make fiber optic cable termination (Ref. Section 8.1.2).

8.1.2 FIBER OPTIC CABLE TERMINATION

The fiber optic plug connector has an internal blade for quick installation and termination of the fiber optic cable. The connecting plug is packaged to use with no fiber preparation necessary. For connection installation procedure reference Figure 8.2. Connect fiber optic cable to red (j2) connector for transmitting data from the M8141 indicator to an external device. Each channel must be setup for the desired type configuration (Ref. Section 4.6 Access Codes - Parameter Description) Access code 42 is for channel 1 and access code 43 is for channel 2.

8.1.3 FIBER OPTIC TRANSMITTER/RECIEVER PCB INSTALLATION IN DESK ENCLOSURE

- Remove the main PCB from the M8141 enclosure. Disconnecting all harnesses and noting their locations.

- Install the fiber optic PCB(s) (Part # MN01935) on the bracket provided with fiber optic kit of parts. (Ref. Figure 8.3) remove cover plate on JY (and JN) if installing two MN01935 PCB(s)) and install bracket on rear part of enclosure with fiber optic PCB(s) using mounting hardware removed from cover plate.

- Connect the interconnecting harness (Part # TN000012 or TN0000082 if Dual Channel KOP) between J1 on the fiber optic receiver/transmitter PCB and J4 on the xM8141 indicator logic board (CH1).

- Connect the interconnecting harness (Part # TN000013) between J1 on the second fiber optic receiver/transmitter PCB and J2 on the M8141 indicator logic board (CH2) (If required).

- Replace the M8141 main PCB. Reconnect all harnesses and replace all hardware.

- Install the fiber optic cable in rigid metal conduit. Maximum length of exposed fiber optic cable at both ends of the conduit is ten (10) ft.

- Fiber optic cable termination are made per instructions in Section 8.1.2.

Connect the fiber optic cable to the red J2 connector for transmitting data from the M8141 to an external device. Connect fiber optic cable to the black (J3) connector to receive data from an external device. Each channel must be setup for the desired type configuration (Ref. Section 4.6 Access Codes - Parameter Description). Access code 42 is for channel 1 and access code 43 is for channel 2.

Figure 8.4 Board Layout Transmitter/ Receiver

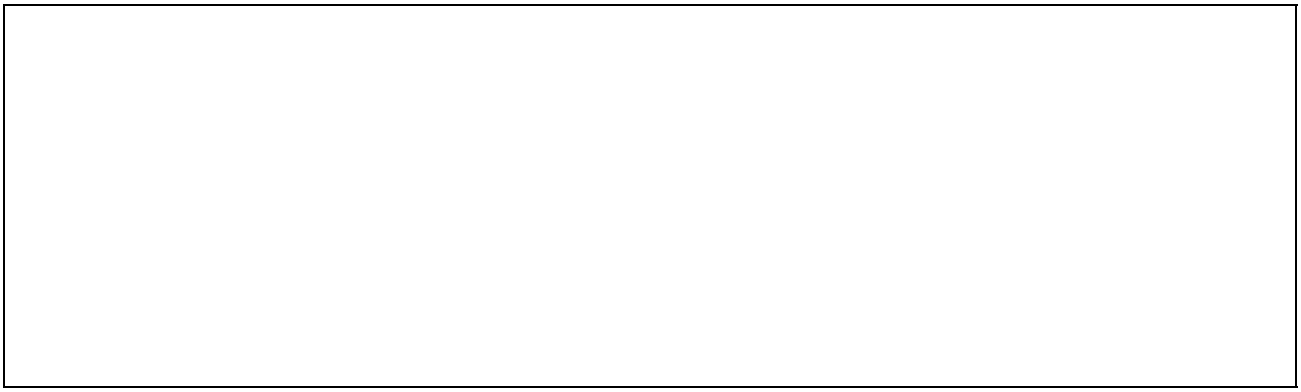


Figure 8.5 Harness

8.2 DUAL CHANNEL RS232/20MA CONVERTER

The dual channel fiber optic converter is designed to convert the fiber optic link to either RS232 or 20mA current loop. The separate channels are provided to allow connecting two bi-directional serial ports or two separate remote devices.

Several jumpers on the PC board are used to configure the converter for different applications. Remove the cover and set the jumpers as required, Refer to Figures 8.3 and 8.5.

Channel 1

JU1 selects RS232 or 20mA current loop to receive operation. Place the jumper in the required position.

JU3 is used to configure the 20mA receive port as active or passive. If RS232 interface is being used, JU3 does not need to be configured in any special way. Refer to Figure 8.3 for 20mA jumper configurations. If using 20mA current loop and you are configuring the converter active, use the “9V Active” configuration when the unit is being powered by the 9V power pack.

JU4 is used to configure the 20mA transit port as active or passive. If RS232 interface is being used, JU4 does not need to be configured in any special way. Refer to Figure 8.3 for 20mA jumper configurations. If using 20mA current loop and you are configuring the converter active, use the “9V Active” configuration when the unit is being powered by the 9V power pack.

JU7 is used to select the polarity of the fiber optic light pulse. For serial communications to the M8141 , the jumper should be in the “Data” position. If the converter is being used to pulse the M8141’s remote command inputs (Tare, Print, Etc.) place a single jumper in the “Remote” position.

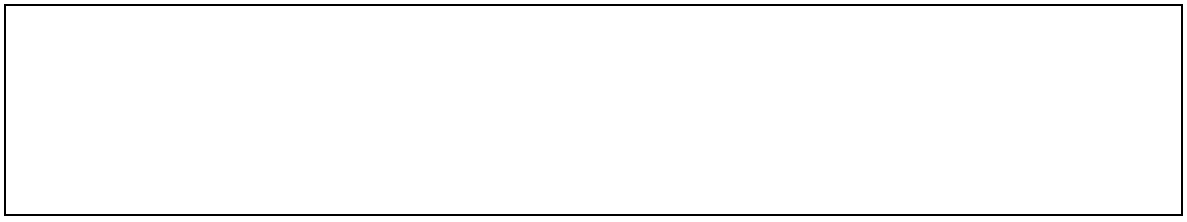


Figure 8.6 - JU3 through JU6 Jumper Configurations

Channel 2

JU2 selects RS232 or 20mA current loop to receive operation. Place the jumper in the required position.

JU5 is used to configure the 20mA receive port as active or passive. If RS232 interface is being used, JU5 does not need to be configured in any special way. Refer to Figure 8.3 for 20mA jumper configurations. If using 20mA current loop and you are configuring the converter active, use the “9V Active” configuration when the unit is being powered by the 9V power pack.

JU6 is used to configure the 20mA transit port as active or passive. If RS232 interface is being used, JU6 does not need to be configured in any special way. Refer to Figure 8.3 for 20mA jumper configurations. If using 20mA current loop and you are configuring the converter active, use the "9V Active" configuration when the unit is being powered by the 9V power pack.

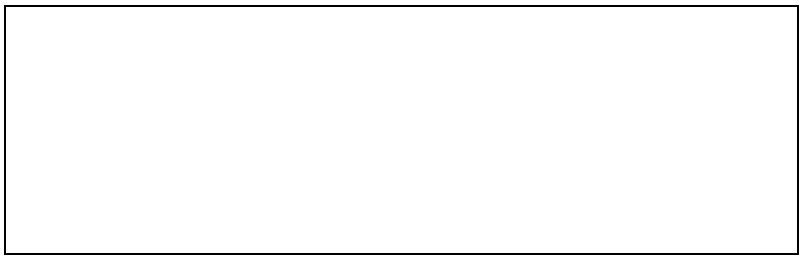
JU8 is used to select the polarity of the fiber optic light pulse. For serial communications to the M8141 , the jumper should be in the "Data" position. If the converter is being used to pulse the M8141's remote command inputs (Tare, Print, Etc.) place a single jumper in the "Remote" position.

Serial Interface

Serial interface to the printer or other remote device is made via connector J1 if using channel 1, and connector J2 if using channel 2. Refer to Figure 8.7 for pin assignments. For connecting to standard Toledo/Masstron printers or other accessories, standard cables may be available.

1 Shield
2 RS232 TxD (Output)
3 RS232 RxD (Input)
7 Signal Ground
8 20mA Recv (Sink)
9 20mA Xmit (Source)
20 20mA Recv (Source)
22 20mA Xmit (Sink)

J1 and J2 Pin Assignments



Printer Wiring Remote Push Button Wiring

Figure 8.7 Pin Assignments

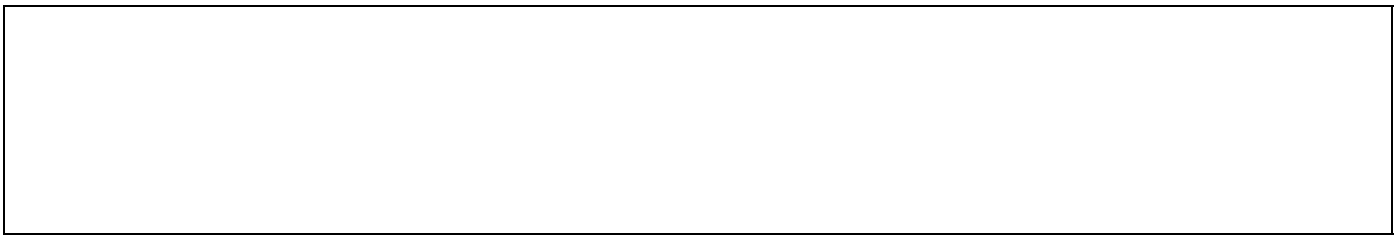


Figure 8.8 - Board Layout Dual Channel Converter

8.3 SPARE PARTS LIST - FIBER OPTICS

PART NUMBER	DESCRIPTION
MN01935	Fiber Optic Receiver/ Transmitter PCB
MA01919	Fiber Optic - RS232, 20mA Converter PCB, Bi-Directional, Two channels Maximum.
MZ0503000188	Fiber Optic Cable Connector
TN000012	Harness, Printer Port Interconnecting Cable
TN000013	Host Port Interconnecting Cable
TA100182	Power Supply for Dual Channel RS232/20mA Converter (For safe areas only).
0960-0033	50 ft Fiber Optic Cable
0960-0034	100 ft Fiber Optic Cable
0960-0035	150 ft. Fiber Optic Cable
0960-0036	200 ft/ Fiber Optic Cable
KN770594020	Fiber Optic Cable (length per spec.) - not to exceed 200 ft after installation.

WARNING!!

1) ONLY THE SPECIFIED COMPONENTS CAN BE USED IN THIS UNIT. DO NOT SUBSTITUTE COMPONENTS AS THIS WILL IMPAIR THE INTRINSIC SAFETY OF THE UNIT.

2) DO NOT OPERATE UNTIL YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS IN THE M8141 MANUAL.

(Four pages of diagrams followed.)