880 Performance Series

Controller/Indicator
Version 2

Technical Manual

REVOLUTION® SCALE SOFTWARE

RICE LAKE® WEIGHING SYSTEMS

November 11, 2015

PN 158387 Rev A

An ISO 9001 registered company

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Version 2, November 24, 2015

1.0 Introduction

This manual is intended for use by service technicians responsible for installing and servicing *880* digital weight indicators.

This manual applies to indicators using Version 2 of the *880* firmware.

Configuration and calibration of the indicator can be accomplished using the indicator front panel keys, the EDP command set or *Revolution*® configuration utility. See Section 3.1 on page 33 for information about configuration methods.

Manuals can be viewed or downloaded the Rice Lake Weighing Systems website at **www.ricelake.com/manuals.**

Warranty information can be found on the website at **www.ricelake.com/warranties**

An *Operator's Manual (PN 152240)* is included with the indicator and provides basic operating instructions for users of the *880*, please leave it with the indicator when installation and configuration are complete.

1.1 Overview

The *880* is a programmable single-channel digital weight indicator, available in either a panel mount enclosure or universal enclosure. The front panel bezel can be sealed to a NEMA Type 4X/IP69K rating. The front panel consists of a 6-button keypad and a 6-digit, 14-segment LED display; the Universal front panel also includes a numeric key pad.

Features include:

- Drives up to 8 350Ω or 16 700Ω load cells
- Supports four and six wire load cell connections
- Four configurable digital inputs or outputs
- Full duplex RS-232 or half duplex RS-485 communications up to 115200 bps
- Ethernet TCP/IP interface for 10Base-T/100Base-TX network communications
- USB interface for host (type A connection) or device
- Expansion slot for one option card
- Optional DeviceNet™ interface for communications network with Allen-Bradley® controllers[1]
- Optional Ethernet/IP interface for Allen-Bradley PLC and other Ethernet/IP master devices[3]
- Optional Profibus® DP interface[2]
- Optional Modbus TCP interface
- Optional Profinet Interface
- Optional analog output module provides 0–10 VDC, 0-20mA or 4–20 mA tracking of gross or net weight values
- Optional four channel relay module, dry connect 3A @ 115VAC, 3A @ 30VDC
- Available in 110-240 VAC and 9-36 VDC versions
- 62 K of non-volatile RAM can be allocated to databases using the Revolution database editor
- Custom event-driven programs can be written with the iRite language up to 102 K in program size

1. DeviceNet™ is a trademark of the Open DeviceNet Vendor Association.
2. Profibus® is a registered trademark of Profibus International.
3. EtherNet/IP™ is a trademark of the Open DeviceNet Vendor Association.

1.2 Safety

Safety Symbol Definitions

WARNING *Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death, and includes hazards that are exposed when guards are removed.*

CAUTION *Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.*

Important *Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.*

Safety Precautions

Do not operate or work on this equipment unless you have read and understand the instructions and warnings in this manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals. Proper care is your responsibility.

General Safety

WARNING

Failure to heed may result in serious injury or death.

Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.

Do not open the indicator, all procedures that require work inside the indicator enclosure are to be performed by qualified service personnel only.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not operate without the enclosure completely assembled.

Do not use for purposes other than weight taking.

Do not place fingers into slots or possible pinch points.

Do not use this product if any of the components are cracked.

Do not exceed the rated specification of the unit.

Do not make alterations or modifications to the unit.

Do not remove or obscure warning labels.

Do not submerge.

Before opening the unit, ensure the power cord is disconnected from the outlet.

1.3 Operating Modes

The three modes of operation for the *880* are described in the following sections.

Weigh Mode

In this mode, the indicator displays gross or net weights to indicate the type of weight value displayed, and annunciators to indicate scale status.

Configuration Mode

Most of the procedures described in this manual, including configuration and calibration, require the indicator to be in configuration mode.

To enter configuration mode, remove the fillister head screw from the enclosure backplate. Insert a non-conductive tool into the access hole and press the setup switch once. The indicator display changes to show the word ***SCALE.***

Important **Breaking the seal to enter the configuration mode will void a Legal for Trade unit.**

The *880* also has an Audit Trail that can track changes to configuration and calibration, allowing the setup switch to be bypassed with Jumper J4 on the CPU board. If Audit Trail is enabled, configuration mode can then be accessed through the user setup mode.

User Setup Mode

User setup mode (accessed by pressing the **Menu** key) is used to:

- View the audit trail
- Set the time and date
- View or clear the accumulator value
- Change setpoint values
- View the current tare value
- Enter configuration mode (if audit trail is enabled)

See Section 1.6.8 for more information about entering user setup mode.

1.4 Front Panel Display

Figure 1-1 shows the *880* front panel keys and the key functions assigned in weigh mode.

The numeric display consists of six 14-segment LED digits. If a negative number is displayed, the first digit is used to display -, reducing the number of available digits to five.

The symbols on the keys in Figure 1-1 (representing up, down, enter, left, right) describe the key functions when in configuration mode. The keys are used to navigate through menus, select digits within numeric values, and increment/decrement values. See Section 3.2 on page 34 for information about using the front panel keys in configuration mode.

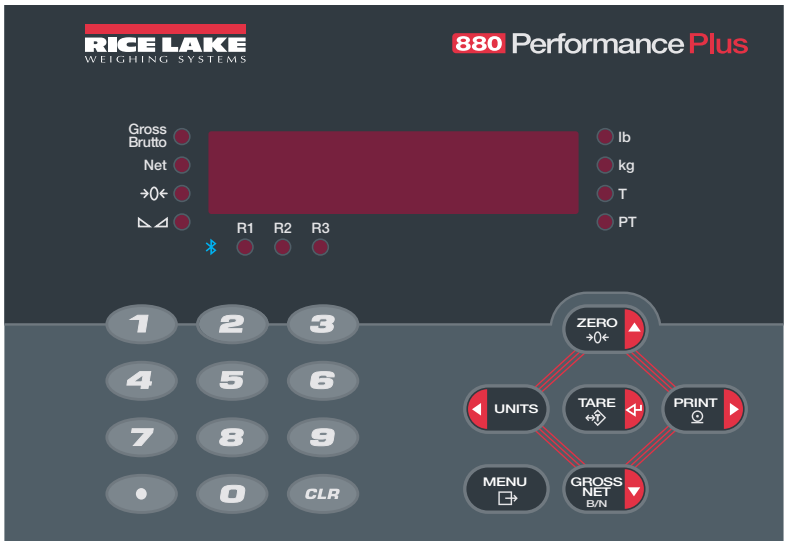

Figure 1-1. 880 Front Panel Display (Universal Model Shown)

Key	Function
ZERO	The **Zero** key sets the current gross weight to zero.*
PRINT	The **Print** key sends an on-demand print format out a communications port, provided the conditions for standstill are met. If enabled in configuration, ***Print*** may be displayed while the unit prints.*
GROSS NET B/N	The **Gross/Net** key toggles the weight display between gross and net mode. If a tare value has been entered or acquired, the net value is the gross weight minus the tare. Gross mode is indicated by the **Gross/Brutto** annunciator; net mode is indicated by the **Net** annunciator.*
MENU	The **Menu** key allows access the user setup menu. This key also acts as the cancel key when editing parameter values, or as an exit key when in the configuration or user setup menus.
UNITS	The **Units** key switches the weight display to an alternate unit, defined in the Format menu, see Figure 3-6 on Page 38.* Units Available: lb, kg, oz, metric ton, ton, gram
TARE	The **Tare** key performs one of several predetermined Tare functions dependent on the mode of operation selected in the ***TAREFN*** parameter. This key also acts as enter for numeric or parameter entry.
CLR	The **Clear** key clears a numeric entry from the LCD.
•	The **Decimal Point** key inserts a decimal point where necessary.
0-9	The Numeric Keypad can be used to enter values. Values may also be entered by scrolling through values with the arrow keys.
*This key is also used to navigate to different menus or to select another digit when editing a value.	

Table 1-1. Key Functions

Key	Function
	**Gross/Brutto LED** Gross weight mode (or Brutto in OIML mode) **Net LED** Net weight mode. **→0← Center of Zero LED** Indicates that the current gross weight reading is within +/- 0.25 display divisions of the acquired zero, or is within the center of zero band. A display division is the resolution of the displayed weight value, or the smallest incremental increase or decrease that can be displayed or printed. **Standstill LED** Scale is at standstill or within the specified motion band. Some operations, including Zero, Tare and Printing, can only be done when the standstill LED is on.
	**lb/kg LED** The lb and kg annunciators indicate the units associated with the displayed value. If the displayed value is pounds, lb will be lit. If the displayed value is kilograms, kg will be lit. **primary or secondary** If the other units value is neither lb or kg, then lb will be lit for the units assigned as primary, and kg will be lit for the units assigned as secondary. **lb/tn, t, oz, g, or none** Alternate conversions that can be displayed include short tons (tn), metric tons (t), ounces (oz), grams (g), or NONE (no units). If the displayed units is one of these alternate conversions, and the other unit value is lb, then kg will be lit. **tn, t, oz, g, or none** Alternate conversions that can be displayed include short tons (tn), metric tons (t), ounces (oz), grams (g), or NONE (no units). If the displayed units is one of these alternate conversions, and the other unit value is kg, then lb will be lit.
	**T LED** Indicates that a tare has been acquired and stored by the system. **PT LED** Indicates that a preset tare weight has been keyed in or entered via the EDP serial port.
	**Bluetooth** Not available at time of publication. **R1, R2 and R3** Currently displayed range for multi interval or multi range.

Table 1-2. Annunciator Functions

1.5 Menu Structures and Parameter Descriptions

The front panel keys are used to navigate through the menus in configuration mode (see Figure 1-2).

- UNITS and PRINT move left and right (horizontally) in a menu level.
- ZERO and GROSS NET B/N move up and down (vertically) to different menu levels.
- TARE serves as an enter key for selecting parameter values within the menus.

Navigating Through Levels

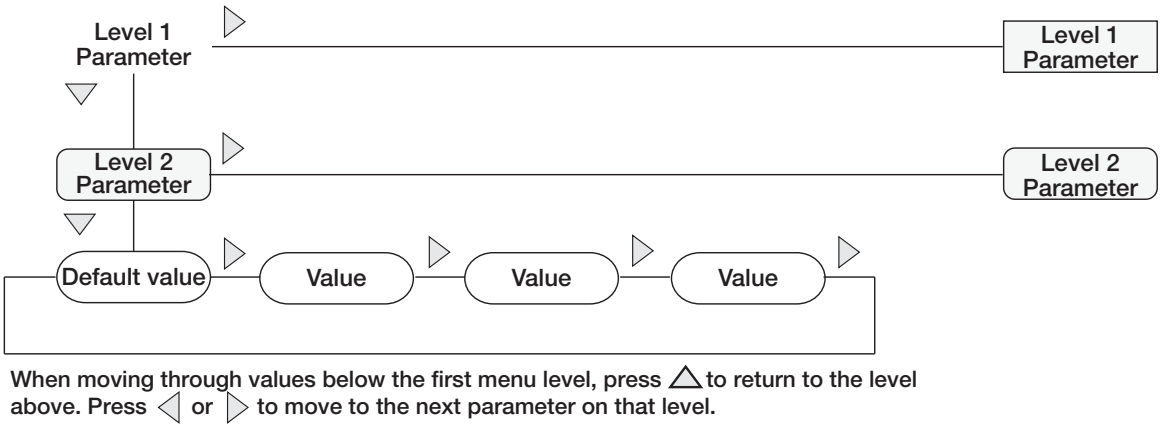

Figure 1-2. Configuration Mode Menu Navigation

To select a parameter, press UNITS or PRINT to scroll left or right until the desired menu group appears on the display, then press GROSS NET B/N to move down to the sub-menu or parameter to be edited. When moving through the menu parameters, the current selected value appears first on the display.

Edit Parameter Values

To change a parameter value, scroll left or right to view the values for that parameter. When the desired value appears on the display, press TARE to select the value and move back up one level. To edit numerical values, use the navigation keys to select the digit and to increment or decrement the value (see Section 1.5.1). Alternatively, use the numeric keypad to enter the digits (see Section 1.5.2). The decimal point will begin flashing if a decimal value is allowed. Use the navigation keys to move the decimal point left or right. Press TARE when done.

1.5.1 Alphanumeric Entry Procedure

Use the following scheme for alphanumeric entry when using the five button keypad.

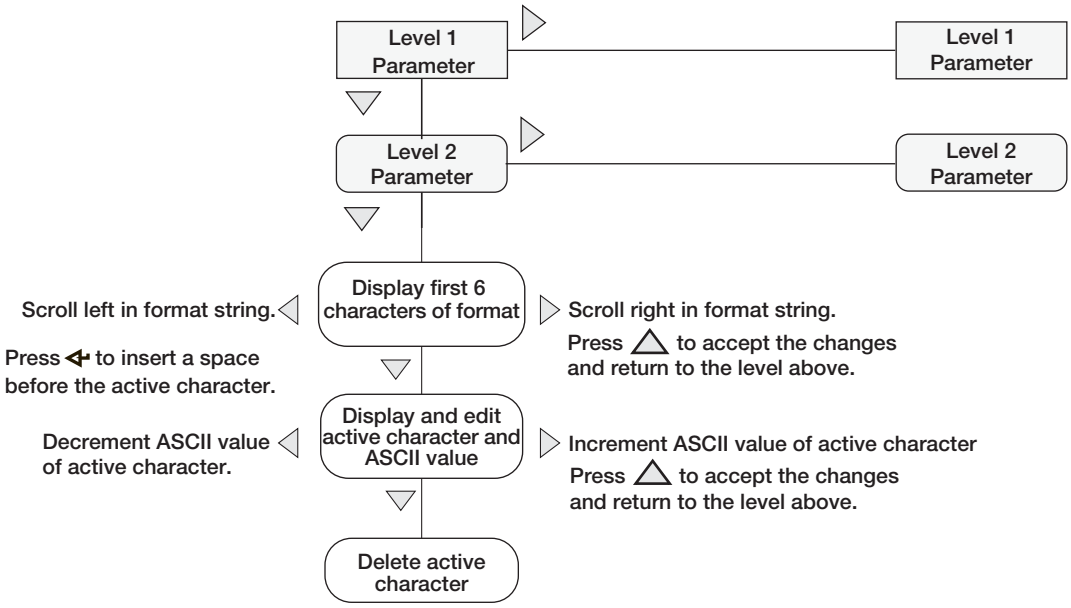

Table 1-3. Editing Procedure for Numeric Values

1.5.2 Numeric Values Editing Procedure (880Plus Only)

When using the numeric keypad option, the method for editing numeric values relies on the numbers which are embossed on the keypad (as opposed to using the arrows).

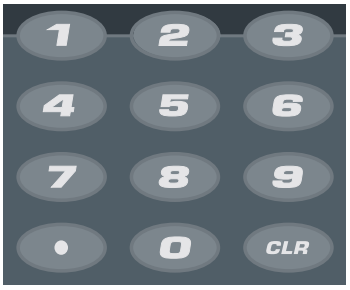

Figure 1-3. Numeric Keypad

1. Using the numeric keypad, insert the required value.
   - Press CLR to clear the currently selected digit.
   - Press • to enter a decimal point.
2. Press TARE to save the value entered and return to the level above.

Note ***When editing fractional numeric values, the decimal point must be positioned in accordance with the primary units formatting, otherwise the keyed number may be rejected by the software.***

1.6 Indicator Operations

Basic *880* operations are summarized below.

1.6.1 Toggle Gross/Net Mode

1. Press GROSS NET B/N to toggle the display mode between gross and net.

Note *Net mode is available when a tare value has been entered or acquired (Net = Gross minus Tare). If tare has not been entered or acquired, the display remains in gross mode. The LEDs next to Gross or Net indicate the current mode.*

1.6.2 Toggle Units

Press UNITS to switch between primary and secondary units. The current units LED will be lit.

1.6.3 Zero Scale

1. In gross mode, remove all weight from the scale and wait for the ◣ ◢ LED to light.
2. Press ZERO →0←. The →0← LED lights to indicate the scale is zeroed.

Note *The scale must be stable and within the configured zero range for the scale to be zeroed. If the scale cannot be zeroed, Nozero will display.*

1.6.4 Acquire Tare

1. Place a container on the scale and wait for the ◣ ◢ LED to light.
2. Press TARE to acquire the tare weight of the container. The Net weight is displayed and the **T** LED lights to show the tare value was entered.

1.6.5 Remove Stored Tare Value

1. Remove all weight from the scale and wait for the ◣ ◢ LED to light. The display should read zero and the →0← LED should be lit.
2. Press ZERO to zero the scale if needed.
3. Press TARE (or ZERO in OIML mode). Display shifts to gross weight and the Gross LED is lit.

Note *If keyed tares are allowed, press TARE to open the keyed tare prompt. To clear the tare, press TARE again.*

1.6.6 Preset Tare (Keyed Tare)

Note *Tare mode must be set to keyed or both for the preset tare feature to function.*

1. With the scale empty and zero weight on the display, press TARE. *000000* will display with the focused digit flashing.
2. Edit the value using the keypad on the *880Plus* (see Section 1.5.2 on page 7) or use the following method for the panel mount.
   - Press ◁ or ▷ to select the digit.
   - Press △ or ▽ to increment or decrement the value.
   - Press TARE to move to the decimal point entry.
   - Press ◁ or ▷ to adjust the decimal point placement.
   - Press TARE when the value is correct.

The display will change to the Net mode and the **PT** LED lights to show the preset tare was entered.

Note *Entering a keyed tare of zero will remove the stored tare value.*

1.6.7 Print Ticket

1. Wait for the ◣ ◢ LED to light.
2. Press PRINT to send data to the configured communications port.

1.6.8 Front Panel User Setup

Press MENU to enter user setup mode. Use User Setup to:

- View audit trail information
- Enter configuration mode if audit trail is enabled
- View or set time and date
- View or clear the accumulator
- Change setpoint values and enable/disable setpoints
- View the current tare value

1.6.9 Displaying Audit Trail Information

The Audit Trail Configuration and Calibration counters can be viewed through the User Menu.

1. Press MENU. ***Audit*** is displayed.
2. Press ▽ to display the Legally Relevant Firmware version.
3. Press ▷ to display ***Calib***.
4. Press ▽ to view the Calibration Counter.
5. Press MENU to return to ***Calib***.
6. Press ▷ to display ***CFG***.
7. Press ▽ to view the Configuration Counter.
8. Press MENU to return to ***CFG***.
9. Press MENU to return to the weigh mode.

1.6.10 Setpoints

Setpoints must be enabled in the configuration mode to be accessible in the user setup mode.

Important ***Breaking the seal to enter the configuration mode will void a Legal for Trade unit.***

To enter the configuration mode:

1. Remove the large fillister head screw from the back of the enclosure.
2. Insert a non-conductive tool into the access hole and press the setup switch. ***Scale*** displays.
3. Press ◁ or ▷ until ***Setpts*** is displayed.
4. Press ▽. ***SP CFG*** is displayed.
5. Press ▽. Press ◁ or ▷ to desired setpoint number.
6. Press ▽ to enter setpoint settings.
7. Select the type by pressing ◁ or ▷ to desired setting, then press ▽ to set the value. For complete list of choices see Section 3.2.13.
8. When all settings have been made, press MENU to return to weighing mode.

Note ***Setpoints are now accessible from the front panel menu.***

Display or Edit Setpoint Value

1. Press MENU. *Audit* is displayed.
2. Press ◁ or ▷ until *Setpts* is displayed.
3. Press ▽ and the first available setpoint number is displayed.
4. Press ◁ or ▷ to toggle through each setpoint that is operator accessible.
5. Press ▽. *Value* is displayed.
6. Press ▽ again to display or edit the value.
7. Edit the value using the keypad on the *880Plus* (see Section 1.5.2 on page 7) or use the following method for the panel mount.
   - Press △ or ▽ to increment or decrement the value of the flashing digit.
   - Press ◁ or ▷ to select the digit to edit.
   - Press TARE to move to the decimal point entry.
   - Press ◁ or ▷ to adjust the decimal point placement.
8. Press TARE to accept the displayed value.
9. Repeat the above steps to set *Preact*, if enabled.
10. When all settings have been made, press MENU to return to weigh mode.

Note *Setpoint Value and Preact Value may be accessible from the front panel in weigh mode.*

Some indicator configurations may not allow setpoint values to be changed through the front panel or may require a password to display or change the setpoint value.

Turn Setpoint On or Off

Turn a setpoint off at the front panel.

1. Press MENU. *Audit* is displayed.
2. Press ◁ or ▷ until *Setpts* is displayed.
3. Press ▽ and the first available setpoint number is displayed.
4. Press ◁ or ▷ to toggle through each setpoint that is operator accessible.
5. Press ▽, then press ◁ or ▷ to **Enable**.
6. Press ▽, then press ◁ or ▷ to turn setpoint **On/Off**.
7. Press TARE to accept the setting.
8. Press MENU to return to weigh mode.

Note *Some indicator configurations may not allow setpoints to be turned off through the front panel or may require a password to turn the setpoint on and off.*

1.6.11 Set Time and Date

1. Press MENU. *Audit* is displayed.
2. Press ◁ or ▷ until *T&D* is displayed.
3. Press ▽. *Time* is displayed.
4. Press ▽ to enter time.

5. Edit the value using the keypad on the *880Plus* (see Section 1.5.2 on page 7) or use the following method for the panel mount.
   - Press ◁ or ▷ to select the digit.
   - Press △ or ▽ to increment or decrement the value.
6. Press TARE when the value is correct. ***Date*** is displayed.
7. Press ▽ to enter date.
8. Edit the value in the specified format *MMDDYY*, *DDMMYY*, or *YYMMDD*. Press ◁ or ▷ to select the digit. Press △ or ▽ to increment or decrement the value.
9. Press TARE when the value is correct. ***Time*** is displayed.
10. Press MENU to return to weighing mode.

1.6.12 Display Accumulator

Enable the accumulator before use in either weigh mode or setpoint operations. Once enabled, weight (net weight if a tare is in the system) is accumulated whenever a print operation is performed using the **Print** key, digital input, setpoint ***PSHACC*** operation or ***KPRINT*** serial command. The scale must return to below the threshold value (except for the setpoint ***PSHACC*** operation) before the next accumulation.

1. Press MENU to enter the user setup mode, ***Audit*** is displayed.
2. Press ◁ or ▷ until ***Accum*** is displayed.

Note *Accum is only displayed if the accumulator is enabled. See Section 3.2.3 on page 36.*

3. Press ▽. ***View*** is displayed.
4. Press ▽ to view the current accumulator value.
5. While the accumulator value is displayed, press PRINT to print the value.

Note *The format of the print output can be configured using the accumulator print format. See Section 7.0.*

1.6.13 Clear the Accumulator

1. Press MENU to enter the user setup mode. ***Audit*** is displayed.
2. Press ◁ or ▷ until ***Accum*** is displayed.
3. Press ▽, then press ◁ or ▷ until ***CLR Y*** is displayed.
4. Press TARE to clear the accumulator. ***Clear*** will display briefly and display returns to ***CLR Y***.
5. Press MENU to return to the weigh mode.

Note *The Print key only performs one accumulation, and only if the weight is above the accumulator threshold. Weight must return to below the accumulator threshold value before another accumulation is allowed.*

Accumulator threshold is configured in the setup menu. See Section 3.2.2 on page 35.

1.6.14 Display Tare

When a stored Tare value is displayed, the Gross and Net LEDs will be off and →0← will be lit. To display a stored tare:

1. Press MENU.
2. Press ▷ to ***Tare*** and press ▽ to view the current tare value.
3. Press MENU twice to return to weigh mode.

If there is not a tare in the system, the value displayed will be zero and the Gross and Net LED will be turned off.

See Section 10.5 for more information pertaining to the regulatory mode of operation.

2.0 Installation

This section describes procedures for connecting power, load cells, digital I/O and data communications cables to the *880* indicator. Instructions for replacement of the circuit boards are included, along with assembly drawings and parts lists for the service technician.

CAUTION

- ***Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.***
- ***Procedures requiring work inside the indicator must be performed by qualified service personnel only.***
- ***The supply cord serves as the power disconnect for the 880. The power receptacle to the indicator must be easily accessible.***

2.1 Unpacking and Assembly

Immediately after unpacking, visually inspect the *880*/*880Plus* to ensure all components are included and undamaged. The shipping carton should contain the controller, display, CD, parts kit (see Table 2-7) and manuals. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

2.2 Panel Mount Installation

Note ***The controller can be mounted to the display DIN rail or mounted remotely up to 250 ft away from display.***

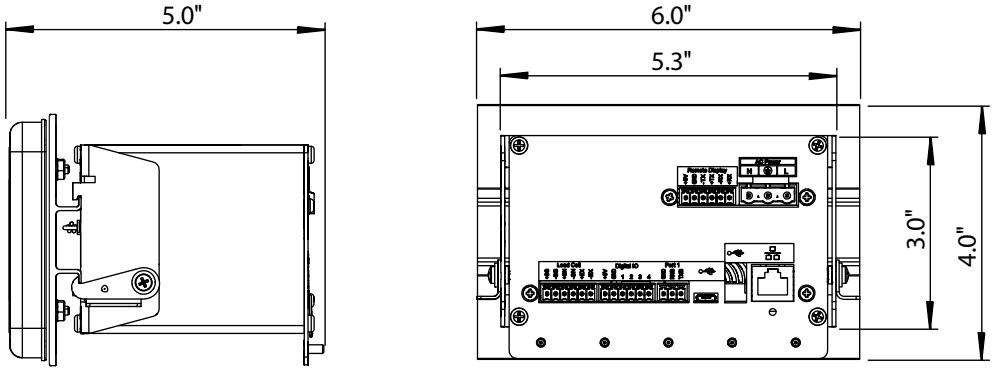

Figure 2-1. 880 Panel Mount Dimensions

Use the DIN rail mount plate as a template (see Figure 2-2) to drill the mounting holes in the panel for the stainless steel panel mount enclosure.

1. Mark panel for installation using the DIN rail mount plate and drill the five holes required for mounting.

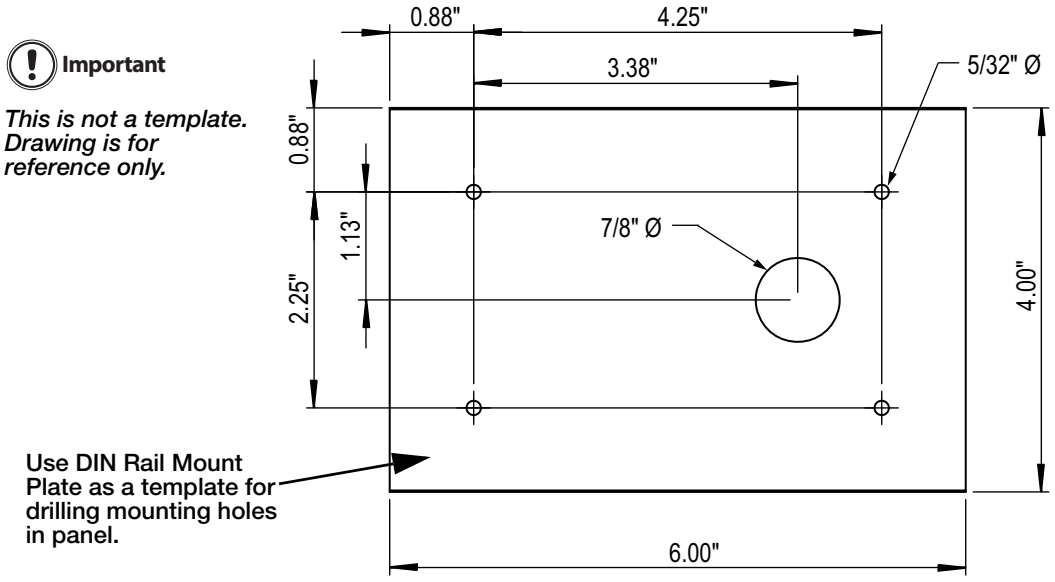

Figure 2-2. Pattern for Cutting Holes

2. Install the gasket on the display assembly. It must be seated correctly on display before mounting to ensure tight seal.
3. Align the display assembly to the front and the DIN rail mount plate to the back of the panel with the holes cut in step 1.
4. Secure the display and mounting plate to the panel using the four 6-32 Kep nuts (PN 14621) provided. Torque to 8 in-lb.

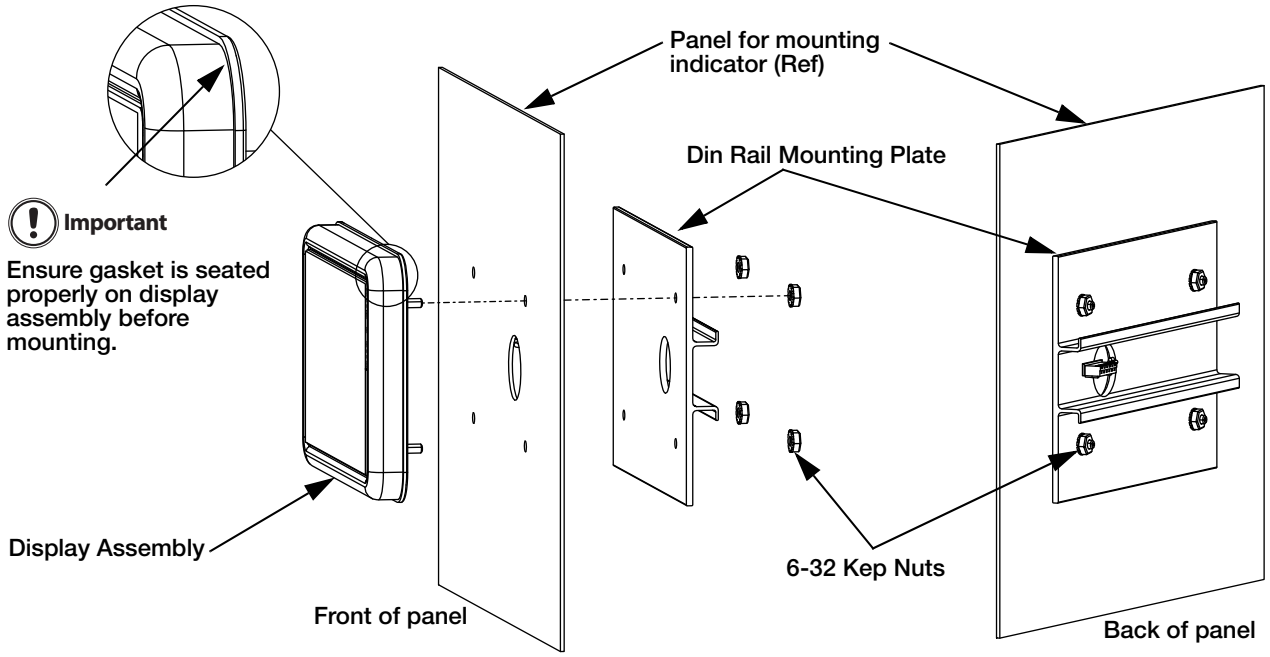

Figure 2-3. Mounting Display Assembly

5. Connect the cable assembly to the controller assembly.
6. Place the controller assembly on the DIN rail as shown in Figure 2-4.

7. Secure to DIN rail by rotating the left and right hooks up so they connect with the bottom rail.

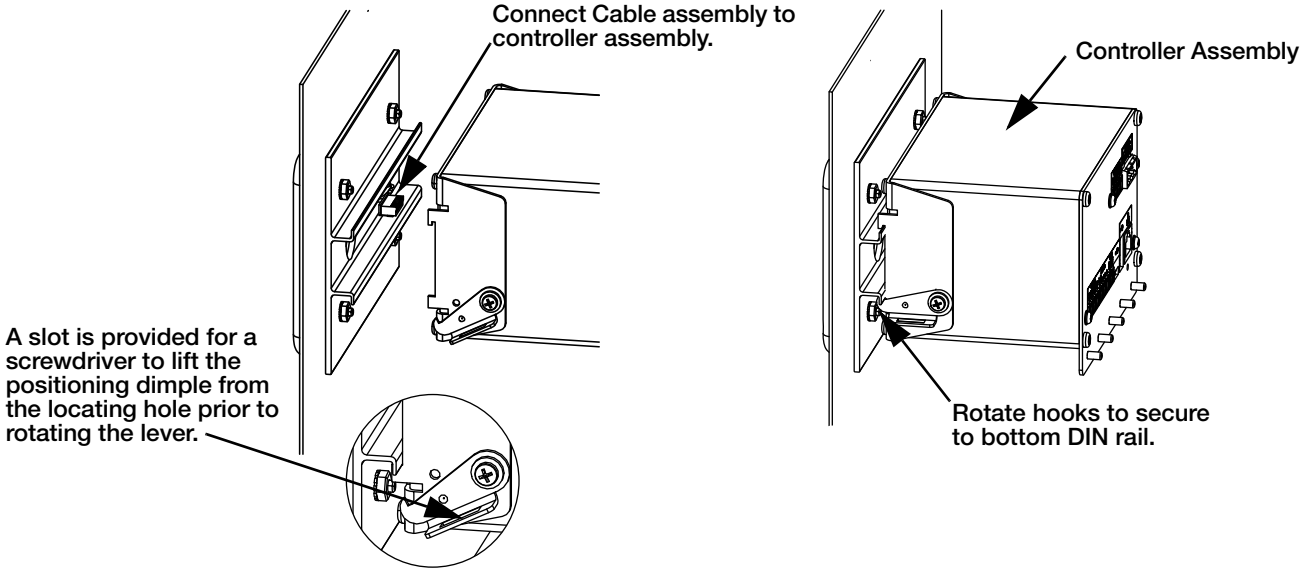

Figure 2-4. Install Controller Assembly

2.2.1 Mounting the Controller Assembly Remotely

A 6 pin connector (PN 153883) is required to mount the controller assembly remotely. See Figure 2-5 for terminal location and Table 2-1 for pin assignments.

Note *Controller assembly can be mounted remotely on a standard 35 mm DIN rail, up to 250 ft from display.*

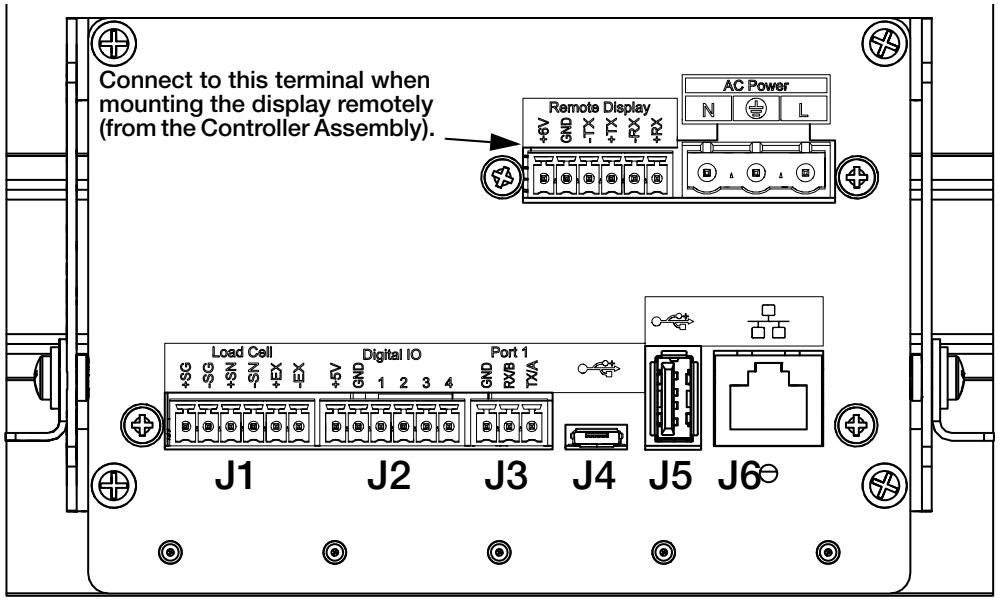

Figure 2-5. Mount Controller Assembly Remotely

Pin	Function
1	+6V
2	GND
3	-TX
4	+TX
5	-RX
6	+RX

Table 2-1. Pin Assignments

The connector on the display board is a cage clamp style, release by pressing on the connector tab.

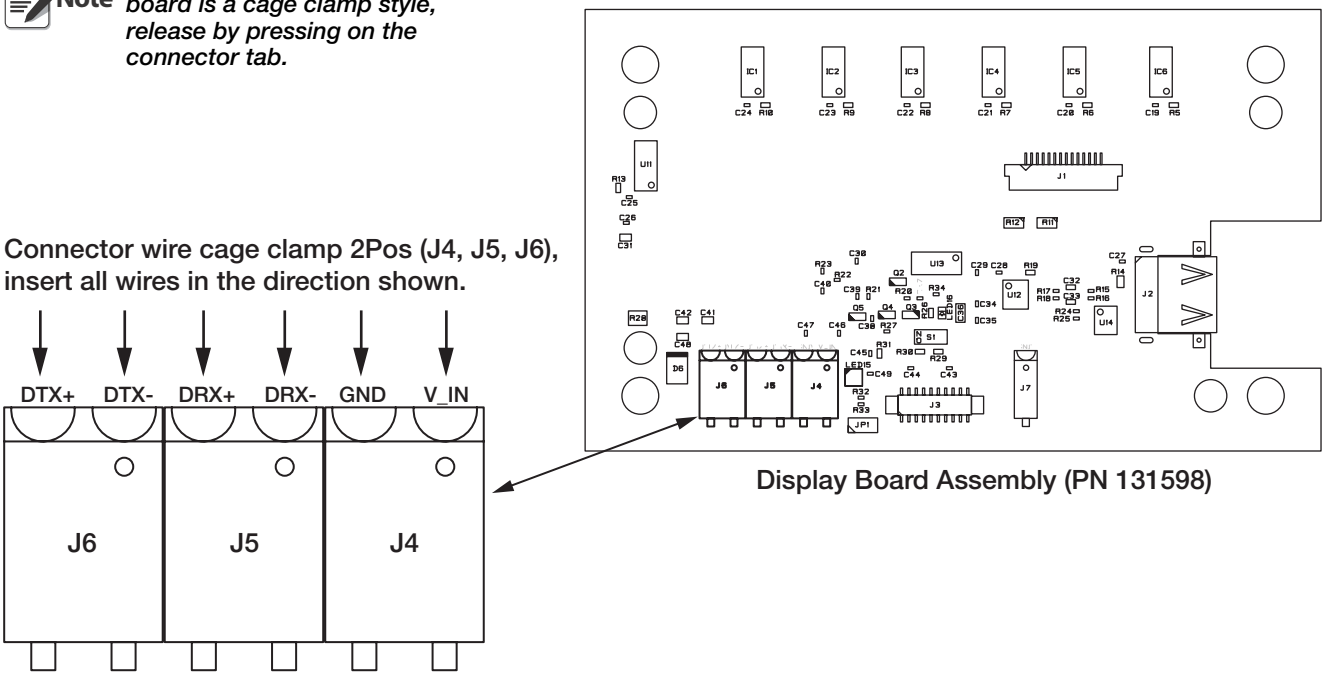

Figure 2-6. Wire connection to Display Board

2.2.2 Controller Box Disassembly

WARNING *The 880 does not have an on/off switch. Before opening the unit, ensure the power cord is disconnected from the power receptacle.*

Note *Enclosure disassembly is not required to make connections for power, load cells, data communications or digital I/O. These connectors are all externally mounted on the back of the controller.*

1. Disconnect power to the unit.
2. Unplug all connectors from the backplate. See Figure 2-19 on page 25 for connector locations.

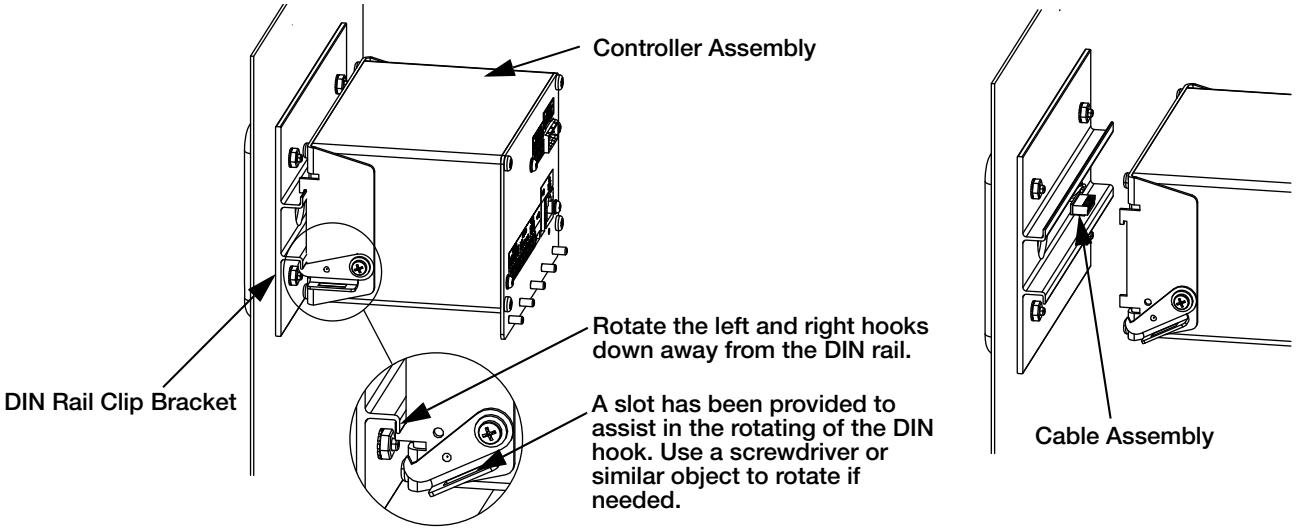

Figure 2-7. Remove Controller Assembly

3. Rotate left and right hooks away from the DIN rail clip.
4. Carefully remove the controller box from the DIN rail.
5. Disconnect the display cable harness.

2.2.3 Remove Backplate of Controller Assembly

Remove the backplate of the controller assembly to gain access to the CPU board, power supply board and installed option cards.

Note *The CompactCom option, if installed, must be removed prior to removal of the backplate.*

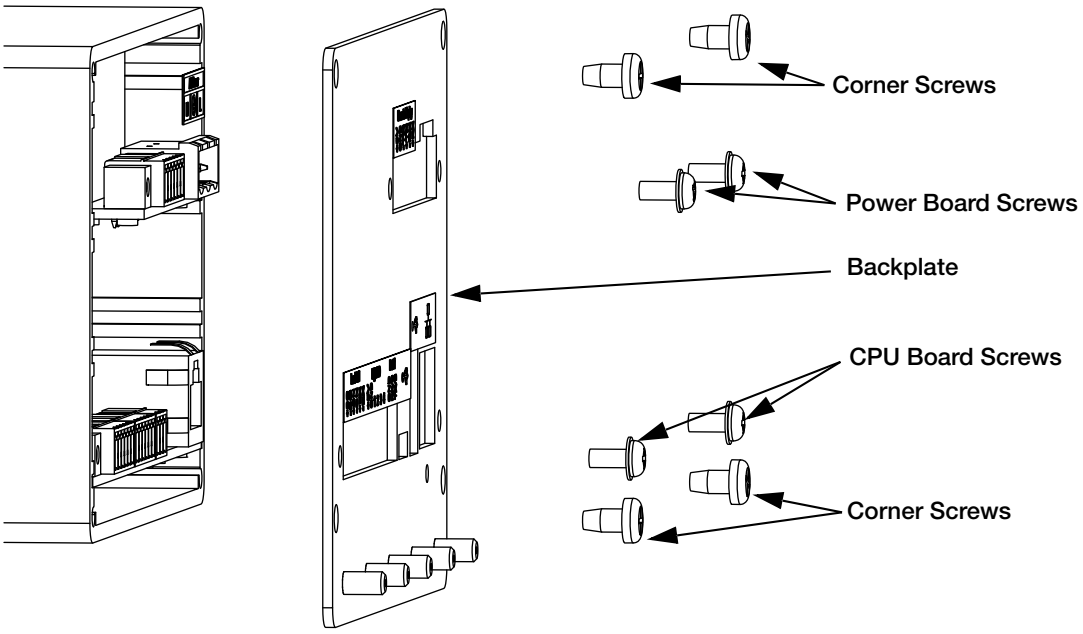

Figure 2-8. Remove Controller Assembly Backplate

1. Remove the four corner screws to detach the backplate from the enclosure.

Note *This leaves the CPU board and Power Supply attached to the backplate. If the display is not connected, the boards can be slid out of the enclosure, still attached to the backplate (see Section 2.9).*

2. Remove the power supply board and CPU board screws to detach the backplate from the boards.
3. Remove the backplate from the controller unit.
4. To reinstall, reverse the steps above.

Note *See Section 2.10 when sealing for Legal for Trade is required.*

2.2.4 Display Board Replacement

If the *880* display board must removed, use the following procedure:

1. Disconnect power to the unit.
2. Remove controller assembly (see Section 2.2.2).
3. Disconnect keypad cable assembly.
4. Loosen and remove the four kep nuts securing the DIN rail and display assembly to the panel (see Figure 2-3).

5. Remove four screws and pull display board from the display assembly.

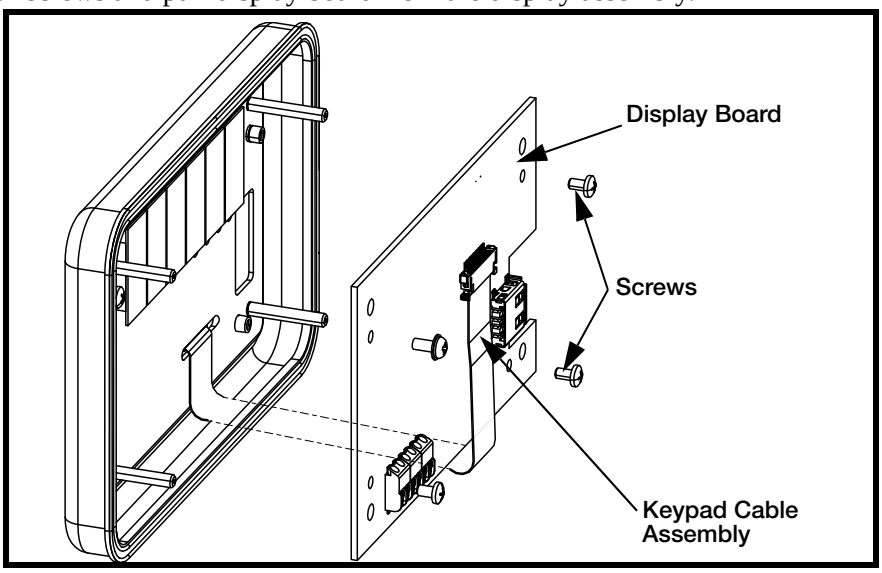

Figure 2-9. Display Board

6. To replace the display board, reverse the above procedure.

2.2.5 Board Replacement

If the *880* CPU board must be removed, use the following procedure:

1. Disconnect power to the indicator.
2. Unplug all connectors from the backplate. See Figure 2-19 for connector locations.
3. Remove the controller assembly from the DIN rail (see Section 2.2.2).
4. Loosen the four corner screws and carefully pull the backplate straight out from the enclosure. The boards are still connected to the backplate and will slide out of the enclosure.

Note ***Use caution when removing the boards, boards are fragile. All boards will slide out together; the power supply board and the CPU board are connected by a cable.***

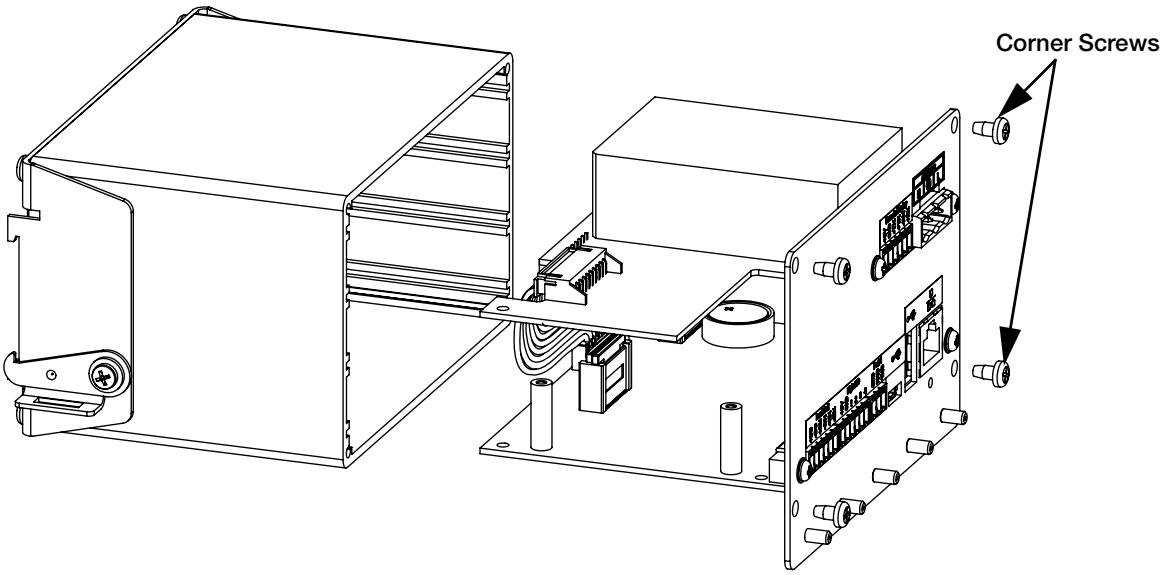

Figure 2-10. Remove Backplate With Boards

5. Remove the cable connecting the boards.
6. Remove the board to be replaced by loosening the screws holding it to the backplate.

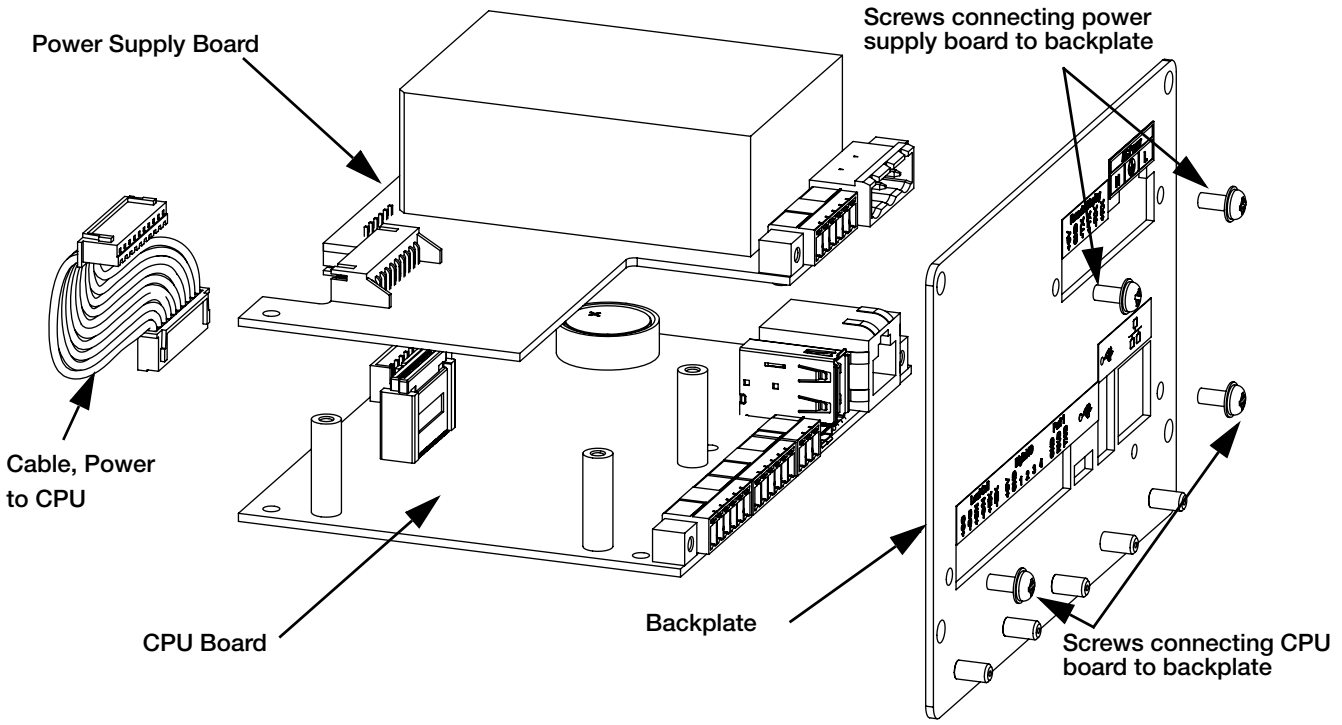

Figure 2-11. Boards Removed from Enclosure

7. Place the new board in position and secure using the existing screws.
8. Connect cable to boards.
9. Slide backplate, with boards, into the enclosure. Ensure that each board is seated correctly in the grooves of the enclosure.

Note ***Ensure the enclosure is in the upright position, otherwise the connector for the display will not align with the front cutout. Enclosure brackets should be at the bottom.***

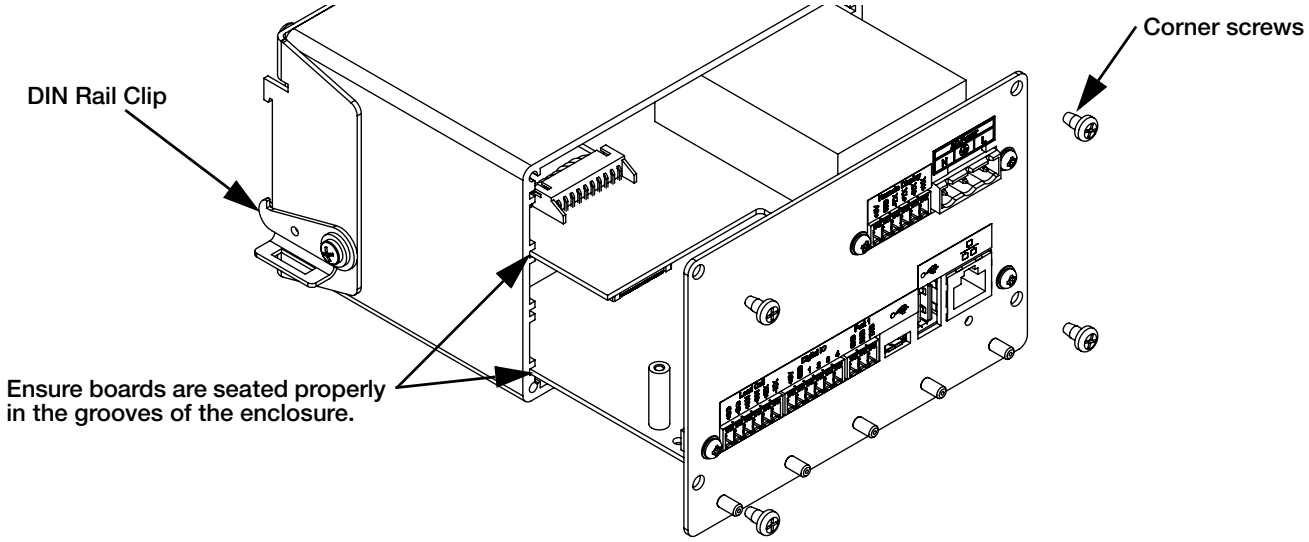

Figure 2-12. Boards Installed in Controller Assembly Enclosure

10. Secure backplate to the enclosure using the four existing corner screws.
11. Reinstall controller assembly (see Section 2.2 steps 4-6).
12. Reconnect all connectors to the backplate. See Figure 2-19 for connector locations.

2.3 Universal Mount Installation

The universal mount can be placed on a desk or counter, or mounted to a wall or panel using the stand included in with the indicator.

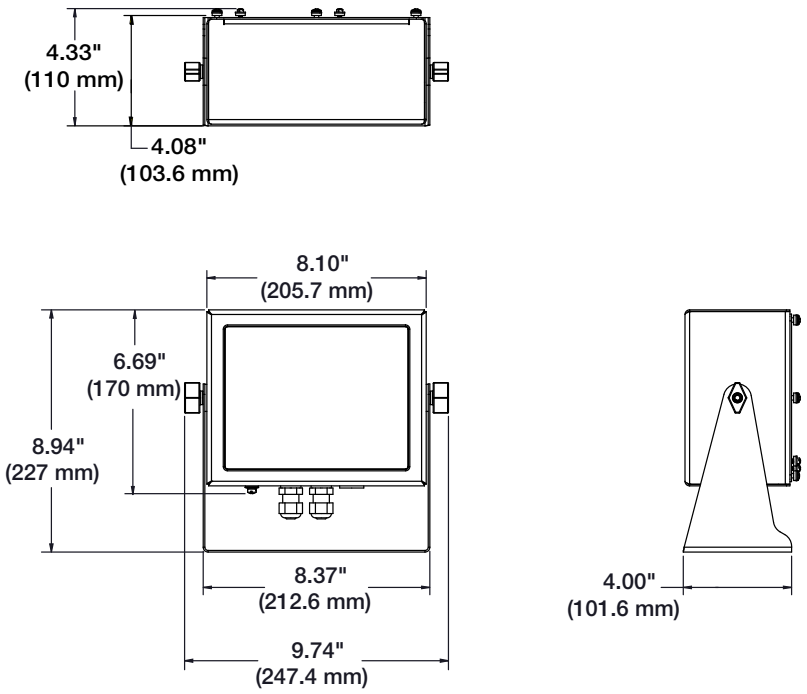

Figure 2-13. Universal Mount Dimensions

2.3.1 Remove Back Panel

Remove the backplate of the universal mount assembly to gain access to the display board, CPU board, power supply board, and any installed option card.

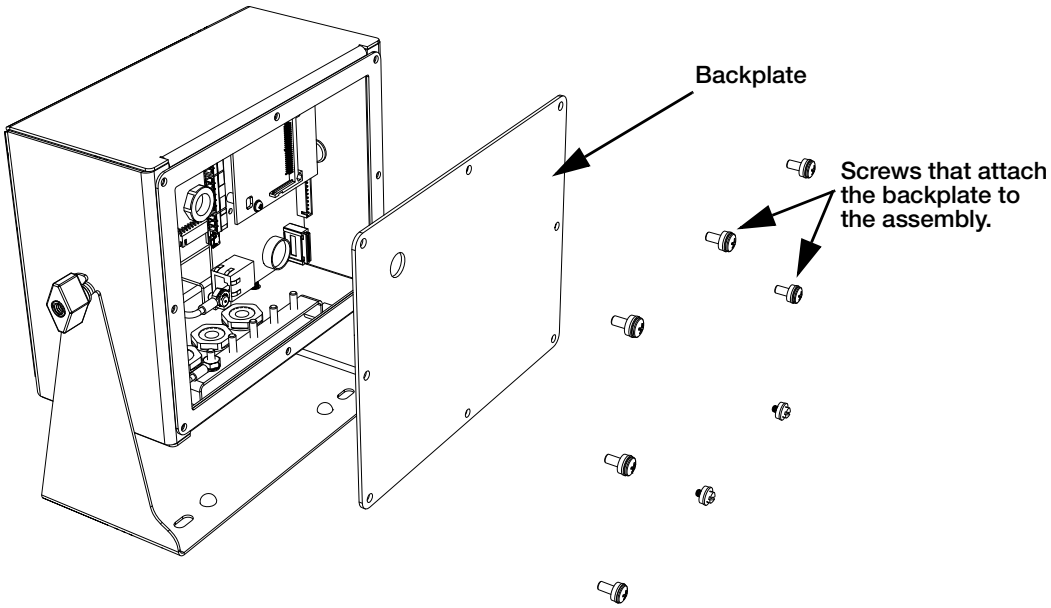

Figure 2-14. Remove Universal Mount Backplate

13. Remove the eight screws that attach the backplate to the enclosure.
14. Remove the backplate.

WARNING ***Disconnect power to the indicator prior to removing any boards from the 880.***

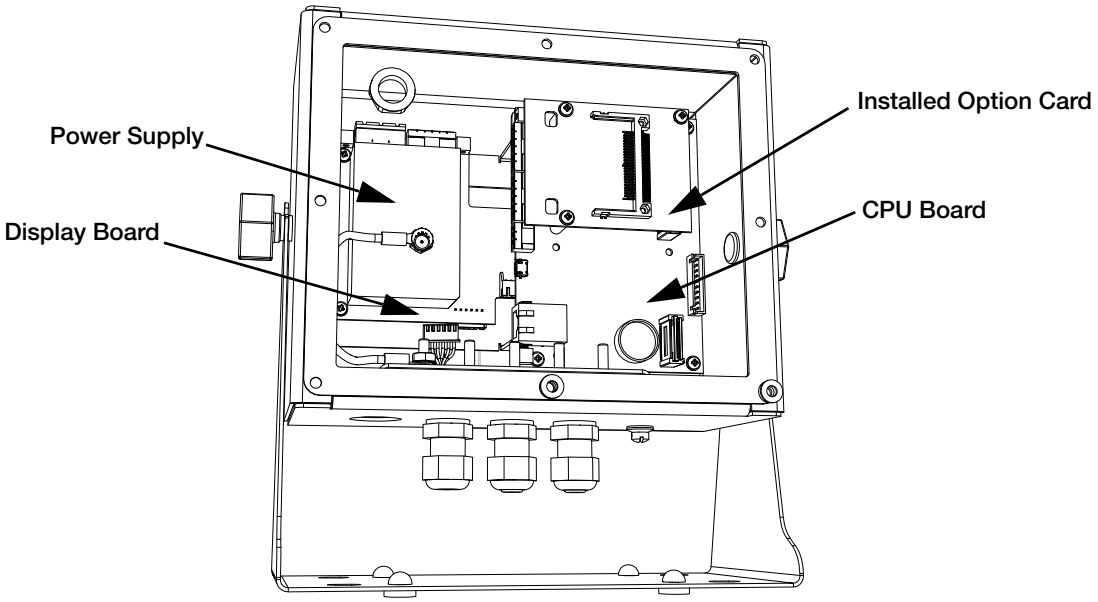

Figure 2-15. Board Locations in the Universal Mount

2.3.2 Board Replacement

1. Disconnect power to the indicator.
2. Remove the backplate from the enclosure. See Section 2.3.1.

Note *Label connections for re-installation of board.*

3. Remove installed option card (if applicable).
   - Disconnect all cables from the option card.
   - Remove the three screws that attach the option card to the CPU board.
   - Lift the card out of the enclosure.
4. Disconnect all cables from the CPU board.
5. Remove the four screws from the CPU board.
6. Lift the CPU board out of the enclosure.

Note *If only replacing CPU board, place the CPU board in place, secure with screws, reconnect all cables and reverse the above procedure to complete.*

If replacing other boards, continue with Step 7.

7. Disconnect all cables from the power supply.
8. Remove the three screws from the power supply.
9. Lift the power supply out of the enclosure.

Note *If only replacing power supply board, place the board in place, secure with screws, reconnect all cables and reverse the above procedure to complete.*

If replacing the display board, continue with Step 10.

10. Remove the four screws from the CPU mounting plate.
11. Lift the CPU mounting plate out of the enclosure.
12. Disconnect all cables from the display board.
13. Lift the board out of the enclosure.

To install the board, reverse the above procedure. Be sure to reinstall cable ties to secure all cables inside the indicator enclosure.

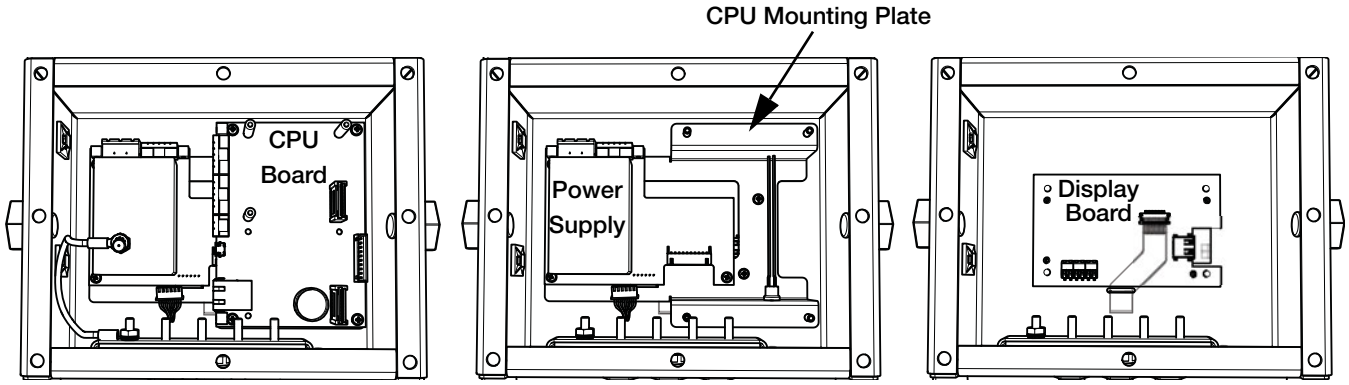

Figure 2-16. 880 Universal Mount Board Replacement

2.4 Cable Connections

The *880 Panel Mount* has six external connectors, a terminal connector for the power cord and a cutout for installed options. Enclosure disassembly is not required to make connections to load cells, communications, digital inputs or digital outputs. These connectors are all externally mounted on the back of the controller.

The *880* Universal Mount has four cord grips at the bottom of the indicator, one is used for the power supply. The back cover must be removed to make connections to load cells, communications, digital inputs, and digital outputs. See Section 2.3.1 on page 20.

2.4.1 Load Cells

To attach cable from a load cell or junction box, route the cable to the external J1 connector. Wire the load cell cable from the load cell or junction box to connector J1 as shown in Table 2-1. If using 6-wire load cell cable (with sense wires), open the unit (see Section 2.2) and remove jumpers JP5 and JP6.

Note ***For 4-wire installation, leave jumpers JP5 and JP6 on (see Figure 2-19).***

Connector	Pin	Function
J1	1	+SIG
	2	–SIG
	3	+SENSE
	4	–SENSE
	5	+EXC
	6	–EXC
For 6-wire load cell connections, remove jumpers JP5 and JP6.		

Table 2-1. J1 Pin Assignments

Note ***The shield wire will attach to the ground clamp on the backplate.***

2.4.2 Power Connections – 880 Panel Mount

Power connections to the *880* Panel Mount are shown below. A three pin plug is used to connect AC power (PN 152334) and DC power (PN 15888) to the power supply board. Attach the wires as shown in Figure 2-17.

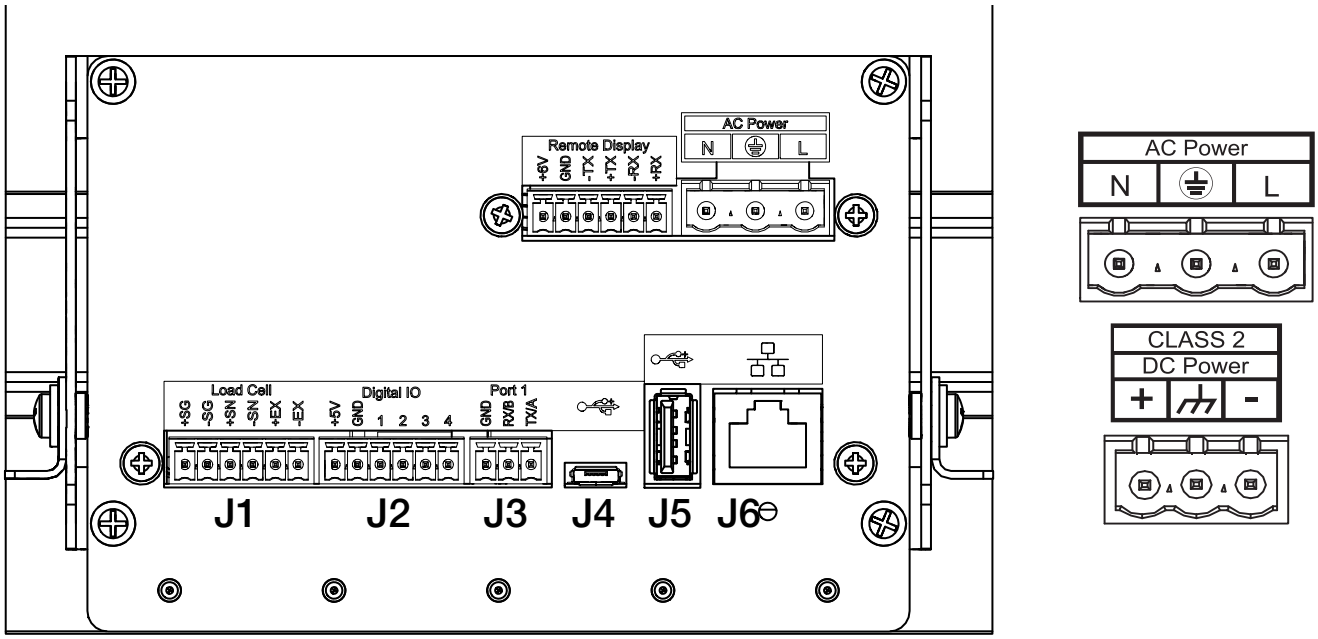

Figure 2-17. Power Connection Location

Pin	AC	DC
1	N	+
2	Chassis GND	Chassis GND
3	L	–

Table 2-2. Power Connection Pin Assignments

2.4.3 Serial Communications – Port 1 (COM)

Connector J3 (see Figure 2-17) provides connections for the RS-232 or the two-wire RS-485/RS-422 serial communications. Table 2-3 shows the pin assignments.

Pin	RS-232	RS-485/RS-422
1	GND	GND
2	RX	B
3	TX	A

Table 2-3. J3 Pin Assignments (Port 1 Serial Communications)

Note ***For RS-232, all four switches on SW3 (see Figure 2-19) must be in the OFF position. For RS-485/RS-422, all four switches on SW3 must be in the ON position.***

2.4.4 USB Device Communications – Port 2 (USBCOM)

The USB Device Port (J4 micro USB connector, see Figure 2-17) is intended to be connected to a PC only. It will appear as a Virtual Comm Port and be assigned a “COMx” designation. Applications will communicate through the port like a standard RS-232 communications port.

Before the USB Device Port can be used, drivers must be installed on the PC. With the PC and indicator powered on, connect a USB cable from the PC to the micro USB connector (J4) on the *880*. The PC will recognize that a device has been connected, and will attempt to install the drivers needed to make it work. The drivers are included on the CD that was supplied with the indicator. The drivers can also be downloaded from the Rice Lake website.

Note ***If using Windows 7 or later, and the PC is connected to the Internet, the operating system may be able to install the drivers without any interaction.***

When the individual drivers are installed, a new COM Port designation is assigned for each physical USB port the *880* is connected to on the PC.

For example, if the PC already has two physical RS-232 COM Ports, they most likely are designated COM1 and COM2. When connecting the indicator to a USB port on the PC, it will be assigned the next available port designation, or in this case, COM3. When plugging into the same physical USB port on the PC, the port designation will again be COM3. If plugging into another physical USB port on the PC, it will be assigned the next available designation, in this case COM4.

After the drivers are installed, use Windows Device Manager to determine the COM Port designation that was assigned to the USB port. Or open the application that is to be used with the *880*, such as *Revolution*, and see which ports are available.

Configuration of the USB Device Port is done in the USBCOM sub-menu under PORTS in configuration mode.

The port can be configured as either a demand port for EDP commands and printing, or a data streaming port. Other settings include the termination character(s); enabling echoes and responses; adjust the end-of-line delay; and whether or not the indicator displays a 'print' message when a print format sends data out the port.

Note ***If a computer application has an open communications connection through the USB Device Port, and the physical cable connection is interrupted, a soft reset is performed on the indicator or power is cycled to the indicator; the connection in the computer application must be disconnected and reconnected again before it will continue to communicate with the indicator.***

For the USB Device Port, it does not matter what the settings are for Baud, Data Bits, Parity and Stop Bits in the computer software. The port will communicate in the same way regardless of these settings.

This port is not a host port and is not intended to be connected to other devices such as keyboards, memory sticks or printers.

2.5 USB Host

The *880* can host a USB device through the Type A USB connection (J5), see Figure 2-17. Devices that are supported include USB keyboards and flash drives. See Section 3.2.11 on page 52 for configuration.

For further information see Section 9.2 on page 97.

2.6 Ethernet Communications

The *880* features Ethernet TCP/IP 10Base-T/100Base-TX communication using a standard RJ45 connector (J6 – see Figure 2-17). It can support two simultaneous connections, one as a server, the other as a client.

Through an Ethernet network, software applications are able to communicate with the *880* using the EDP command set (see Section 6.0 on page 70), or data can be streamed continuously from the indicator, or printed on demand.

The Ethernet port supports both DHCP and manual configuration of settings such as the IP and subnet. In addition, the TCP Port number, Primary and Secondary DNS, and the Default Gateway can be configured using the Ethernet sub-menu of the Ports setup menu. For more information on configuring the Ethernet port see Section 3.2.10 on page 50.

Physical connection to the *880* Ethernet port can be made directly from a PC to the *880* (AdHoc Network), or through a network router or switch. The port supports auto-sensing MDI/MDIX cable configuration, so either straight-through or crossover cables can be used.

The RJ45 Ethernet jack on the *880* houses two LEDs to indicate the status and speed of the connection.

Yellow LED (left) indicates the status of the connection:

- Off for no link
- On for a link
- Blinking if there is activity

Green LED (right) is:

- Off for a 10Base-T connection
- On for a 100Base-TX connection

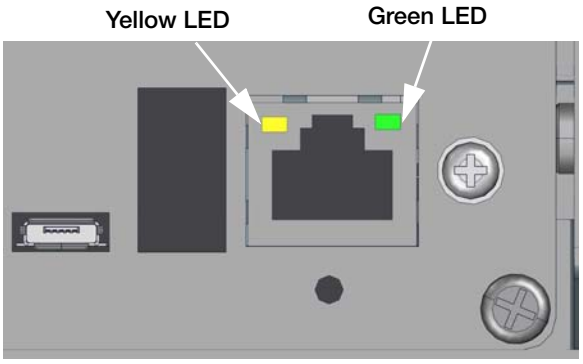

Figure 2-18. RJ45 Ethernet Jack – Panel Mount

Important ***The Ethernet port is not intended for use on Telecom Networks Circuits that are subject to lightning or power faults. For information on using the Ethernet port, see Section 9.1 on page 93.***

2.7 CPU Board

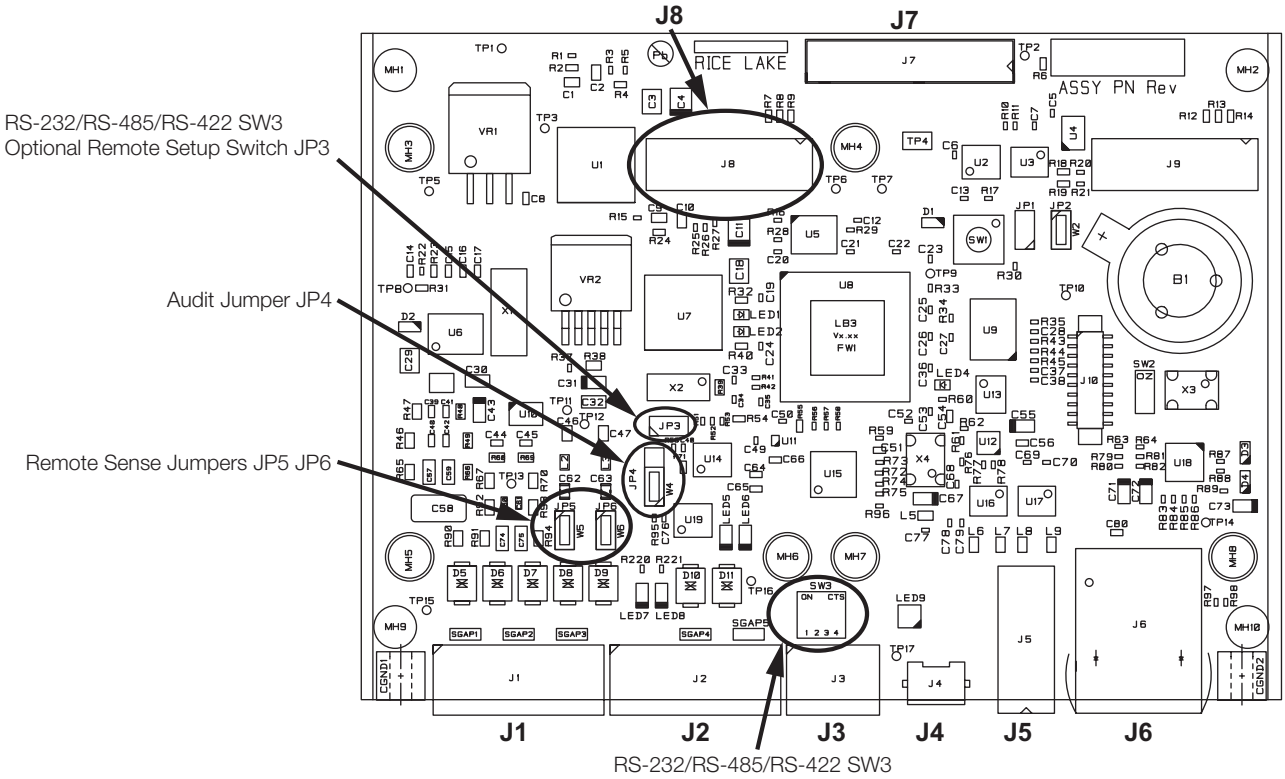

Figure 2-19. 880 CPU Board

Connectors

- Load cell (J1)
- DIO (J2)
- Comm 1 (J3)
- USB Micro Device (J4)
- USB Host (J5)
- Ethernet TCP/IP (J6)
- Opt Header (J8)
- Power Board (J7)

The COMM 1 port supports RS-232 or two-wire RS-485/RS-422 communications; selectable with switch SW3. The port is configured using the COM menu under Ports. See Section 3.0.

2.8 Audit Trail

The *880* includes an audit trail feature that keeps track of the number, the last date of calibrations and Legal for Trade configuration changes. It is possible to setup the *880* to allow entry to the configuration and calibration menus using only the front panel **Menu** key.

On the top of the CPU board is a 3-pin Jumper (JP4 - see Figure 2-19) that enables or disables this feature.

- To use the audit trail and allow the use of the **Menu** key to enter the configuration and calibration mode, place the jumper in the On position.
- To prevent the use of the **Menu** key to enter the configuration and calibration mode, instead requiring use of the externally seal-able setup switch located inside the enclosure (see Figure 3-1), place the jumper in the Off position.

The audit trail counters will operate in either position of the audit jumper.

2.9 Digital I/O

Digital inputs can be set to provide many indicator functions, including all keypad functions except MENU. Digital inputs are active low (0 VDC) and inactive high (5 VDC). Use the Digital I/O menu to configure the digital inputs.

Digital outputs are typically used to control relays that drive other equipment. Outputs are designed to sink, rather than source, switching current. Each output is a normally open collector circuit, capable of sinking 24 mA when active. Digital outputs are active when low or at 0 VDC, with reference to the 5 VDC supply.

Use the Digital I/O menu to set the function of the Digital I/O pins to OUTPUT, then use the Setpts menu to configure the digital outputs.

Table 2-4 shows the pin assignments for connector J2.

Connector	Pin	Signal
J2	1	5VDC, 500mA max
	2	GND
	3	DIO1
	4	DIO2
	5	DIO3
	6	DIO4

Table 2-4. J2 Pin Assignments (Digital I/O)

2.10 Legal for Trade Sealing

In certain Legal for Trade applications, it may be necessary to seal the indicator to restrict access from the setup switch.

880 Panel Mount Sealing

An optional sealing kit (PN 153660) is available for Legal for Trade units.

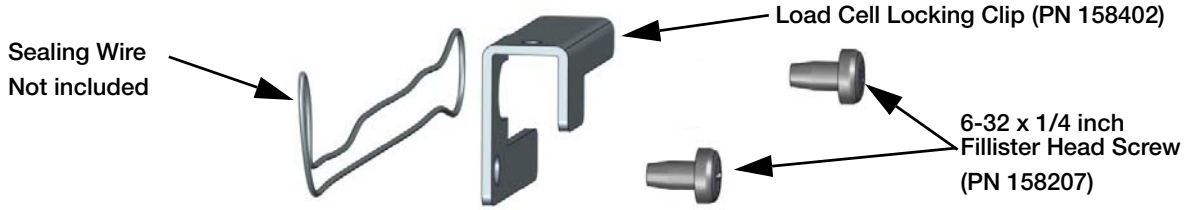

Figure 2-20. Sealing Components

1. Remove the left bottom screw from the backplate as shown in Figure 2-21.
2. Slide the load cell sealing clip over the load cell connector.

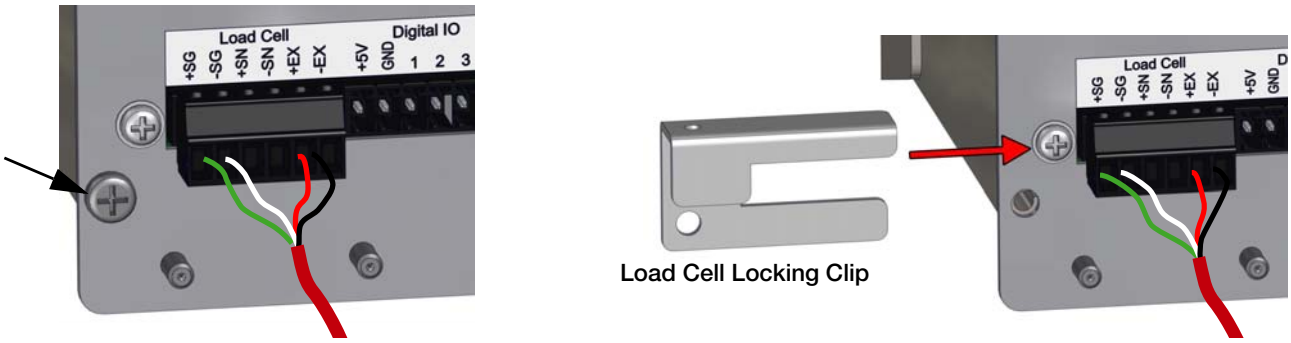

Figure 2-21. Remove Existing Screws

3. Secure with one of the fillister head screws provided in the kit.
4. Insert the other screw into the hole for the setup switch access.
5. Install the wire by threading through the two fillister head screws and the hole in the top of the load cell sealing clip. Seal the wire to secure.

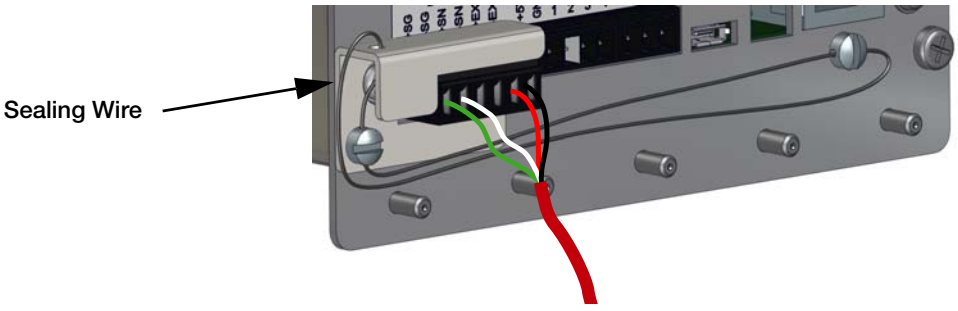

Figure 2-22. Install Sealing Wire

880 Universal Mount Sealing

1. Place the sealing wire through the fillister head screws on the back panel, then through the fillister head screw at the bottom of the indicator, as shown in Figure 2-22.
2. Seal the wire to secure.

Figure 2-23. Sealing the Universal Mount

2.11 Option Cards

Connector J8 is reserved for option cards. Table 2-5 lists the options available for the *880* Indicator. Each kit includes instructions for installing and setting up the option.

Option	Addendum Part Number
Analog Output Card	131601
Relay Board	131602
EtherNet/IP	156554
DeviceNet	156558
Profibus DP	156556
Modbus TCP	156557
ProfiNet	156555

Table 2-5. Available Option Cards

2.12 Battery Replacement

When battery voltage depletes to 2.9 VDC, the indicator display shows ***low bat***. Replace the battery when this warning is displayed to prevent data loss in the event of a power failure. The battery life will vary depending on use. It is recommended to replace the battery every three years, or sooner, if left powered off for extended periods of time.

- Use the *Revolution* configuration utility or EDP commands (see Section 6.1 on page 70) to store a copy of the indicator configuration on a PC before attempting battery replacement. If any data is lost, the indicator configuration can be restored from the PC.

WARNING ***Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.***

2.13 Replacement Parts

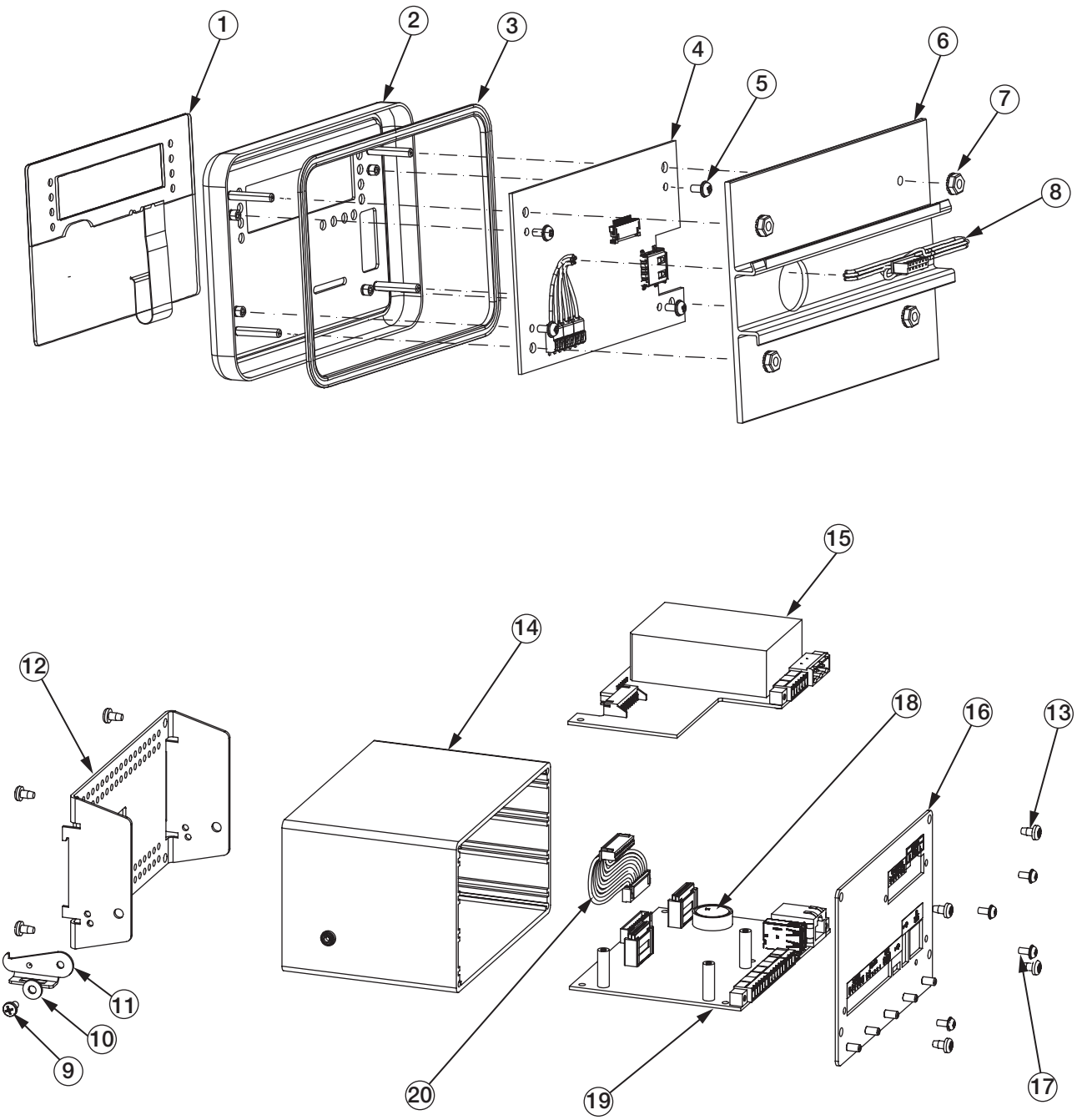

Figure 2-24. 880 Indicator Parts Illustration

Item No.	Part No.	Description (Quantity)	Qty
	151674	Display Assembly, 880 Panel Mount (Includes items 1-7)	Ref
1	131740	Overlay, Membrane Switch	1
2	151663	Faceplate, Display 880	1
3	151667	Gasket, Faceplate 880	1
4	131598	Board Assy, 880 LED Disp.	1
5	14822	Screw, Mach 4-40NC x 1/4	4
6	156439	Backer, Plate With DIN	1
7	14621	Nut, Kep 6-32NC HEX	4
8	151668	Cable Assy, Controller to Display	1
	151672	Controller, 880 Panel (Includes items 9-20)	Ref
9	14838	Screw, Mach 6-32NC x 1/4	2
10	65685	Washer, Flat .375OD .156ID	2
11	151664	Hook, Left DIN Rail Clip	1
	151665	Hook, Right DIN Rail Clip	1
12	131745	Bracket, DIN Rail Clip 880	1
	22091	Screw, Drive NO 6 x 3/8	4
13	153856	Screw, Mach 6-32NCx1/4	4
14	151661	Enclosure, CPU 880	1
15	131599	Board Assy, 880 Power, AC	1
	151675	Board Assy, 880 Power, DC	1
16	152666	BackPlate, CPU Relay	1
	152373	BackPlate, Relay Option	1
	156668	BackPlate, Analog Option	1
	156669	BackPlate, CompactCom Options	1
17	14822	Screw, Mach 4-40NC x 1/4	8
18	69291	Battery, 3V Coin Lithium	1
19	131597	Board Assy, CPU 880 PNL	1
20	154762	Cable Assy, CPU Board To	1

Table 2-6. Panel Mount Replacement Parts

Parts Kit, AC Power (PN 152235)			Parts Kit, DC Power (PN 153647)		
Part No	Description	Qty	Part No	Description	Qty
14621	Nut, Kep 6-32NC Hex	5	14621	Nut, Kep 6-32NC Hex	5
15130	Washer, Lock No 6 Type A	5	15130	Washer, Lock No 6 Type A	5
152334	Conn, 3 Pos Screw Terminal	1	15888	Terminal Block, 3 position	1
153873	Conn, 3 Pos Screw Terminal	1	153873	Conn, 3 Pos Screw Terminal	1
153883	Conn,6 Pos Screw Terminal	3	153883	Conn, 6 Pos Screw Terminal	3
157074	Ferrite, EMI/RFI Clamp-on	1	157074	Ferrite, EMI/RFI Clamp-on	1
53075	Clamp, Ground Cable Shield	4	53075	Clamp, Ground Cable Shield	4
67550	Clamp, Ground Cable Shield	1	67550	Clamp, Ground Cable Shield	1
94422	Label, Capacity .40 x 5.00	1	94422	Label, Capacity .40 x 5.00	1

Table 2-7. Parts Kits

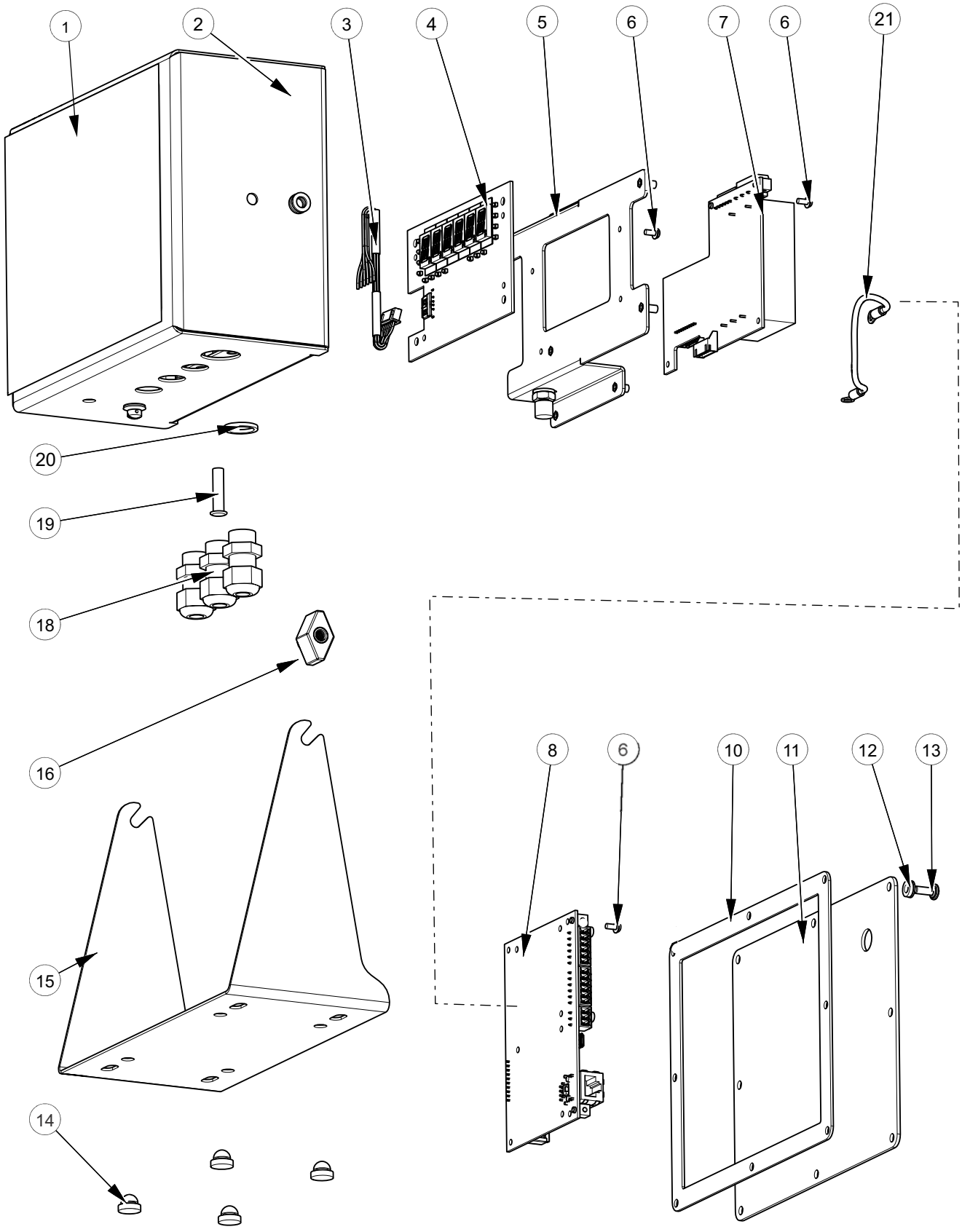

Figure 2-25. 880 Indicator Universal Mount Repair Parts Drawing

Item No.	Part No.	Description (Quantity)	Qty
1	163986	Overlay, 880 Universal	1
2	163752	Enclosure, 880 Desktop	1
3	151668	Cable Assembly	1
4	131598	Board Assembly, 880 LED Display	1
5	163987	Plate Mount, Circuit Board	1
6	14822	Screw, Machine 4-40NC X 1/4	11
7	131599	Board Assembly, 880 Power	1
8	131597	Board Assembly, CPU 880 PNL	1
10	163768	Gasket, 880 Indicator	1
11	164066	Backplate Assembly, 880 Desktop	1
12	45042	Washer, Bonded Sealing SST	8
13	126938	Screw, Machine 8-32 x 7/16	6
14	42149	Bumper, Rubber Grommet	4
15	163751	Tilt Stand, 880 Desktop	1
16	103610	Knob, Black 1/4 -20	2
18	15626	Cord Grip, Black PCN 9	3
19	19538	Post, Slotted Black Seal	2
20	30375	Seal Ring, Nylon Pg9	3
21	15601	Wire, Ground 6in W/NO 8	1

Table 2-8. Replacement Parts

3.0 Configuration

To configure the *880* indicator, the indicator must be placed in configuration mode. The setup switch is accessed through a small hole on the enclosure (see Figure 3-1). Insert a non-conductive tool into the access hole and press the setup switch. ***Scale*** displays.

Important ***Use caution when inserting the non-conductive tool into the backplate, press the tool in about 3/4 inch, using the board as a guide, until the switch is engaged. Do not use excessive force that may damage the switch.***

Note ***If the audit trail is enabled, configuration mode may be accessed by pressing*** MENU ***. Press ◁ or ▷ until Setup is displayed, then press ▽ to Scale. See Section 2.8.***

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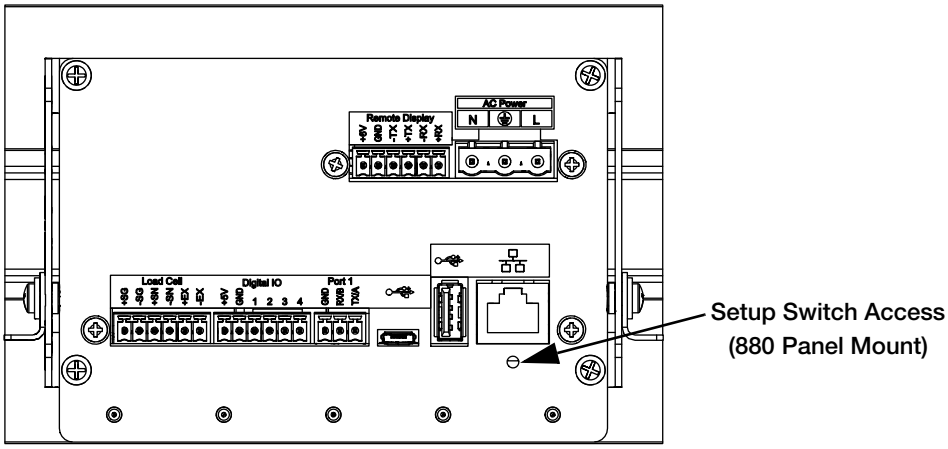


Figure 3-1. Back View – Setup Switch Access

When the indicator is placed in configuration mode, the word ***Scale*** displays. The SCALE menu is the first of eight top-level menus used for configuring the indicator. Detailed descriptions of these menus are given in Section 3.2.

When configuration is complete, press MENU to return to the weigh mode.

3.1 Configuration Methods

The *880* indicator can be configured by using the front panel keys to navigate through a series of configuration menus or by sending commands or configuration data to any data communication port. Configuration using the menus is described in Section 3.2.

Configuration using a data communication port can be accomplished using either the EDP command set (see Section 6.0) or the *Revolution* configuration utility (see Section 5.2 on page 68).

3.2 User Setup Menu

See Section 1.5 on page 6 for navigation methods.

The *880* indicator can be configured using a series of menus accessed through the indicator front panel when the indicator is in user setup mode or configuration mode. Table 3-1 summarizes the functions of the user setup menu.

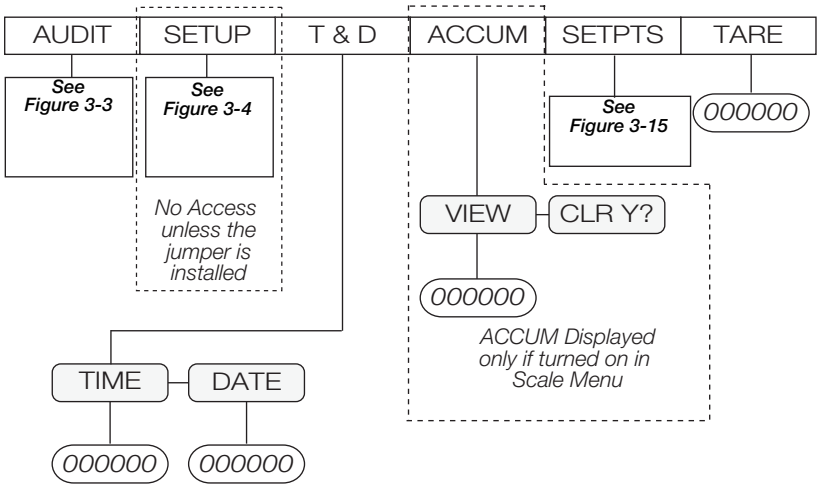


Figure 3-2. 880 Menu Layout

Menu		User Menu Function
AUDIT	Audit Trail	Displays the legally relevant (LR) firmware version, configuration count and calibration count.
SETUP	Setup	Used to enter configuration mode, if audit trail is enabled.
T&D	Time and Date	View and change time and date.
ACCUM	Accumulator	View, print or clear the current accumulator value, if enabled.
SETPTS	Setpoints	Configure setpoint values and Enable/Disable setpoints. Only configured setpoints will be available.
TARE	Tare	View the current tare value.

Table 3-1. 880 Menu Summary

The following sections provide graphic representations of the *880* menu structures. In the actual menu structure, the settings under each parameter are arranged horizontally. To save page space, menu choices are shown in vertical columns. The factory default setting appears at the top of each column in bold letters. Parameters shown surrounded by a dotted-line box only appear under the special circumstances explained under each box.

Most menu diagrams are accompanied by one or more tables that describe all parameters and parameter values associated with that menu option.

3.2.1 Audit Menu

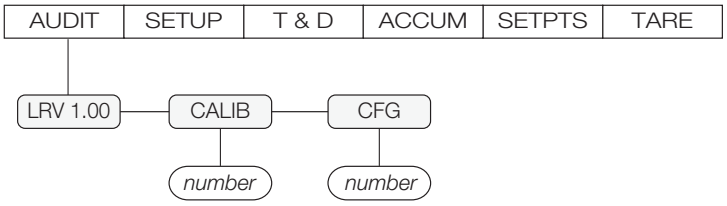


Figure 3-3. Audit Menu Structure

Parameter	Description
LRV	Legally relevant firmware version.
CALIB	Displays total calibration events (read only).
CFG	Displays total configuration events (read only).

Table 3-2. Audit Menu Parameters

3.2.2 Setup Menu

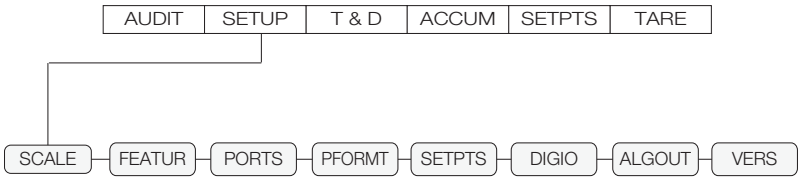


Figure 3-4. Setup Menu Structure

Menu	Description
SCALE	Use the Scale menu to configure and calibrate the scale. See Figure 3-5 for the Scale menu structure.
FEATUR	Use the Feature menu to set miscellaneous system attributes. See Figure 3-8 for the Feature menu structure.
PORTS	Use the Ports menu to configure communication ports. See Figure 3-10 for the Ports menu structure.
PFORMT	Use the Print Format menu to set the print format used for header, gross, net and setpoint ticket formats. See Figure 3-14 for the Print Format menu structure.
SETPTS	Use the Setpoints menu to configure setpoints and batching mode. See Figure 3-15 for the Setpoint menu structure.
DIGIO	Use the Digital I/O menu to assign digital input/output functions. See Figure 3-19 for the Digital I/O menu structure.
ALGOUT	Use the Analog Output menu to configure the analog output module (if installed). See Figure 3-20 for the Analog Output menu structure.
VERS	Use the Version menu to display the installed firmware version number. See Figure 3-21 for the Version menu structure.

Table 3-3. Setup Menu Parameters

3.2.3 Scale Menu

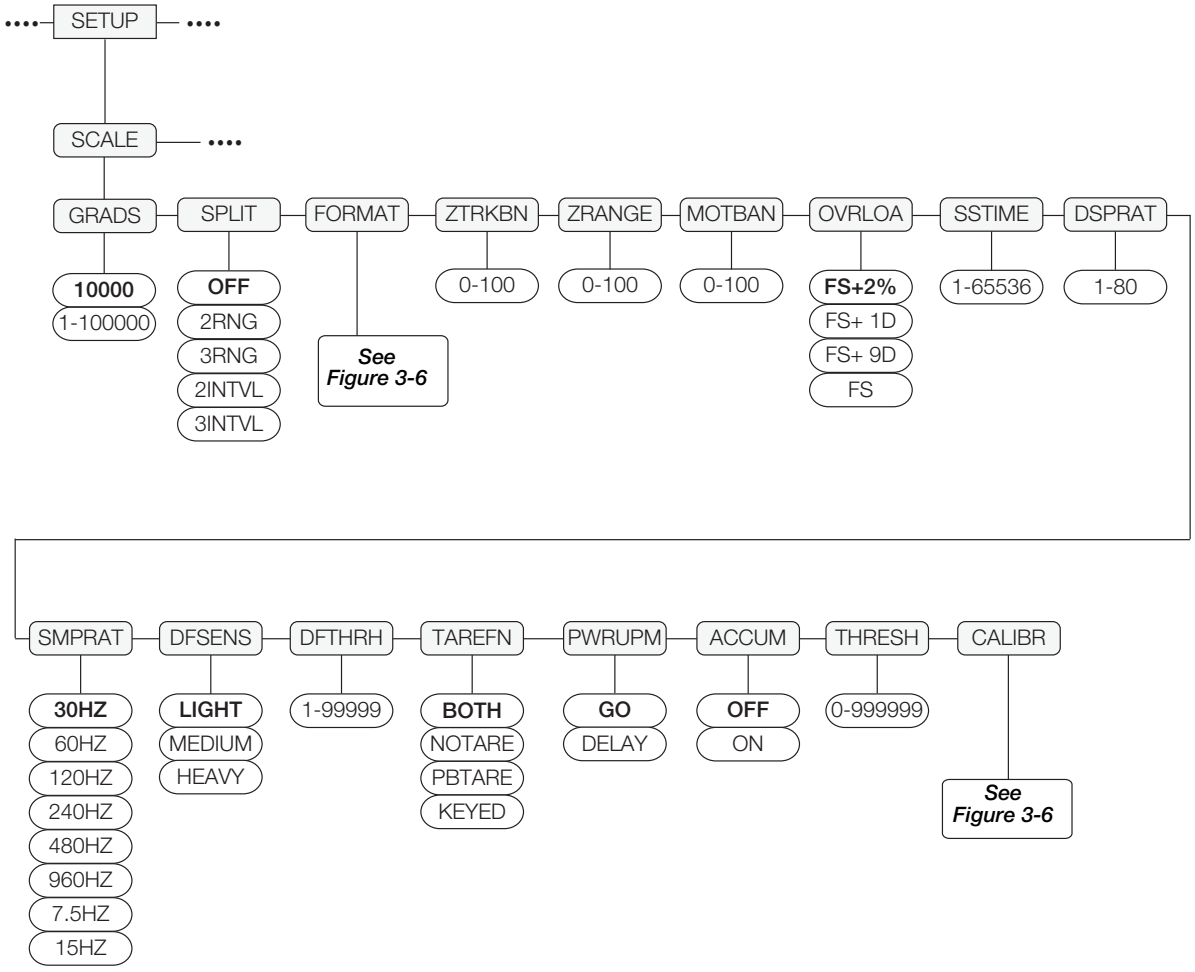


Figure 3-5. Scale Menu Structure

Parameter	Choices	Description
GRADS	**10000** 1-100000	Graduations – specifies the number of full scale graduations if SPLIT=OFF. (For multi-range and multi-interval scales (SPLIT is not Off), the GRADS value is derived from the capacity and display divisions specified for the range or interval.) The value entered must be in the range 1–100000 and should be consistent with legal requirements and environmental limits on system resolution. To calculate GRADS, use the formula: GRADS = *Capacity* / *Display Divisions*. Display divisions are specified under the FORMAT submenu.
SPLIT	**OFF** 2RNG 3RNG 2INTVL 3INTVL	Multi-range/Interval – specifies whether the scale is full-range (OFF), multi-range (2RNG, 3RNG), or multi-interval (2INTVL, 3INTVL). For multi-range and multi-interval scales, see the submenu shown in Figure 3-6 and parameter descriptions in Table 3-5.
FORMAT	Primary Format	See Figure 3-6 for menu structures. For standard scales see "***If SPLIT = OFF***", for multi-range/interval scales see "***If SPLIT = 2RNG, 3RNG, 2INTVL, or 3INTVL***".
ZTRBAN	**0** 0.0-100	Zero Track Band – automatically zeroes the scale when within the range specified, as long as the input is within the ZRANGE and scale is at standstill. Specify the zero tracking band in ± display divisions. The maximum legal value varies depending on local regulations.

Table 3-4. Scale Menu Parameters

Parameter	Choices	Description
ZRANGE	**1.900000** 0.0-100	Zero Range – selects the range within which the scale can be zeroed. The 1.900000 default value is ±1.9% around the calibrated zero point, for a total range of 3.8%. Indicator must be at standstill to zero the scale. Maximum legal value varies depending on local regulations.
MOTBAN	**1** 0-100	Motion Band – sets the level, in display divisions, at which scale motion is detected. If motion is not detected for the time defined by the standstill parameter, the standstill symbol lights. Some operations, including print, tare, and zero, require the scale to be at standstill. Maximum legal value varies depending on local regulations. If this parameter is set to 0 the standstill annunciator is always lit; operations normally requiring standstill (zero, tare, print) are performed regardless of scale motion. If 0 is selected, ZTRKBND must also be set to 0.
OVRLOA	**FS+2%** FS+1D FS+9D FS	Overload – Determines the point at which the display blanks and an out-of-range error message is displayed. Maximum legal value varies depending on local regulations.
SSTIME	**10** 1-65535	Standstill Time – specifies the length of time the scale must be out of motion, in 0.1-second intervals, before the scale is considered to be at standstill.
DSPRAT	**1** 1-80	Display update rate – Specifies the display update rate, in the number of 100-millisecond intervals between updates.
SMPRAT	**30HZ** 60HZ 120HZ 240HZ 480HZ 960HZ 7.5HZ 15HZ	Sample rate – Selects measurement rate, in samples per second, of the analog-to-digital converter. Lower sample rate values provide greater signal noise immunity. Settings of 120Hz or above may be too fast to provide the desired stability in some static weighing applications.
DFSENS	**LIGHT** MEDIUM HEAVY	Digital filtering sensitivity – the amount of influence the current A/D cycle has on the running averaged value. The Light setting will respond quicker to an applied weight to immediately impact the displayed value. Medium and Heavy settings are for applications where weighing times are longer and expected weight changes are larger.
DFTHRH	**0** 0-99999	Digital filter cutout threshold – controls the response of the filter and must be set above the noise disturbances in the system. Value is in grads. If set to zero there is no filtering, see Section 10.10 on page 113.
TAREFN	**BOTH** NOTARE PBTARE KEYED	Tare function – Enables or disables push-button and keyed tare. **BOTH** – Both push-button and keyed tares are enabled **NOTARE** – No tare allowed (gross mode only) **PBTARE** – Push-button tares enabled **KEYED** – Keyed tare enabled
PWRUPM	**GO** DELAY	Power up mode. **GO** - In GO mode, the indicator goes into operation immediately after a brief power up display test. **DELAY** - the indicator performs a power up display test, then enters a 30-second warm up period. If no motion is detected during the warm up period, the indicator becomes operational when the warm up period ends; if motion is detected, the delay timer is reset and the warm up period repeated.
ACCUM	**OFF** ON	Accumulator – specifies if the scale accumulator is enabled or disabled. If enabled, accumulation occurs every time a print operation is performed, while the weight is above the accumulator reset threshold, as long as the weight returns to a value lower than the threshold between print operations.
THRESH	**0** 0-999999	Accumulator Reset Theshold – when the weight falls below the value set, the accumulator is rearmed.

Table 3-4. Scale Menu Parameters (Continued)

Parameter	Choices	Description
CALIBR	WZERO WVAL WSPAN WLIN REZERO LAST TEMP	Calibration – See Figure 3-7 for descriptions, and see Section 4.0 for calibration procedures.

Table 3-4. Scale Menu Parameters (Continued)

3.2.4 FORMAT Menu

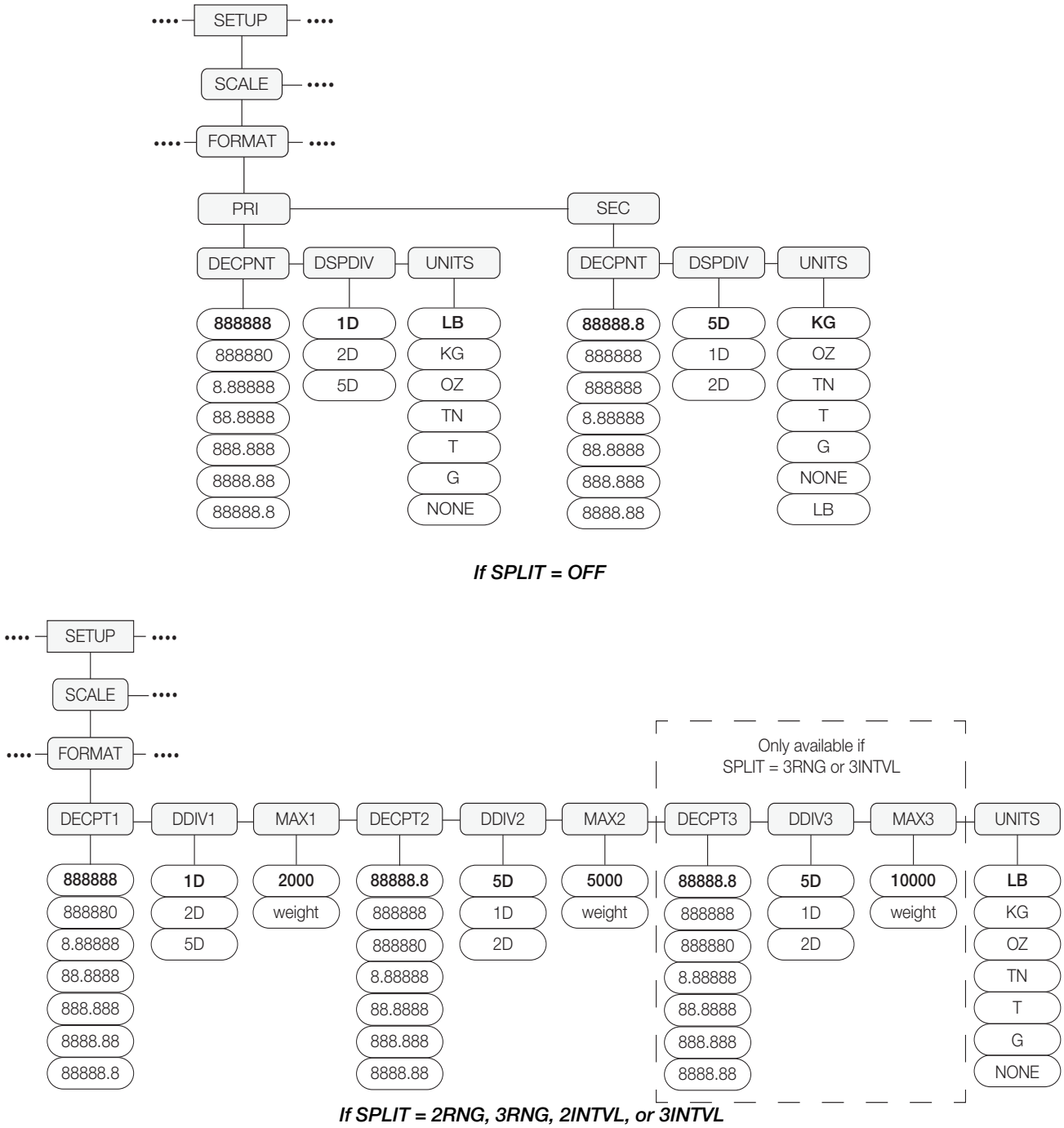


Figure 3-6. Format Menu Structure

Parameter	Choices	Description
If SPLIT = OFF		
PRI	DECPNT DSPDIV UNITS	Primary Units – Settings determine the scale capacity and specifies the decimal point, display division and units used. The primary units will display the lb annunciator unless secondary units is set to lb. See Table 1-2 on page 5 for details.
SEC	DECPNT DSPDIV UNITS	Secondary Units – Settings determine the Secondary, or Alternate, units value, decimal location, and display division size. The secondary units will display the kg annunciator unless primary units is set to kg. See Table 1-2 on page 5 for details.
If SPLIT = OFF submenu		
DECPNT	888888 888880 8.88888 88.8888 888.888 8888.88 88888.8	Decimal Point Location – when combined with the decimal point location, specifies the location of the decimal point or dummy zeroed in the unit display. Defaults: Primary – 888888 Secondary – 88888.8
DSPDIV	1D 2D 5D	Display Divisions – Selects the minimum division size for the displayed weight. Scale capacity is determined by display division x graduations. Defaults: Primary – 1D Secondary – 5D
UNITS	**LB** KG OZ TN T G NONE	Units – Specifies units for displayed and printed weight. LB = pound (lights lb LED) – Primary default KG = kilogram (lights kg LED) Secondary default OZ = ounces TN = short ton T = metric ton G = gram
If SPLIT = 2RNG, 3RNG, 2INTVL, or 3INTVL		
DECPT1 DECPT2 DECPT3	888888 888880 8.88888 88.8888 888.888 8888.88 88888.8	Decimal Point Location – Specifies the location of the decimal point or dummy zeroed in the unit display. Defaults: Primary – 888888 Secondary – 88888.8
DDIV1 DDIV2 DDIV3	1D 2D 5D	Display Divisions – when combined with the decimal point location, specifies the minimum division size for the displayed weight. Defaults: DDIV1 – 1D DDIV2 & DDIV3 – 5D
MAX1 MAX2 MAX3	1-999999	Maximum weight for first range or interval. Default 2000 Maximum weight for second range or interval. Default 5000 Maximum weight for third range or interval. Default 10000 **Note** ***Lights annunciators R1, R2 and R3 under the weight display.***
UNITS	**LB** KG OZ TN T G NONE	Units – Specifies units for displayed and printed weight. LB = pound KG = kilogram OZ = ounces TN = short ton T = metric ton G = gram

Table 3-5. Format Menu Parameters

3.2.5 Calibration Menu

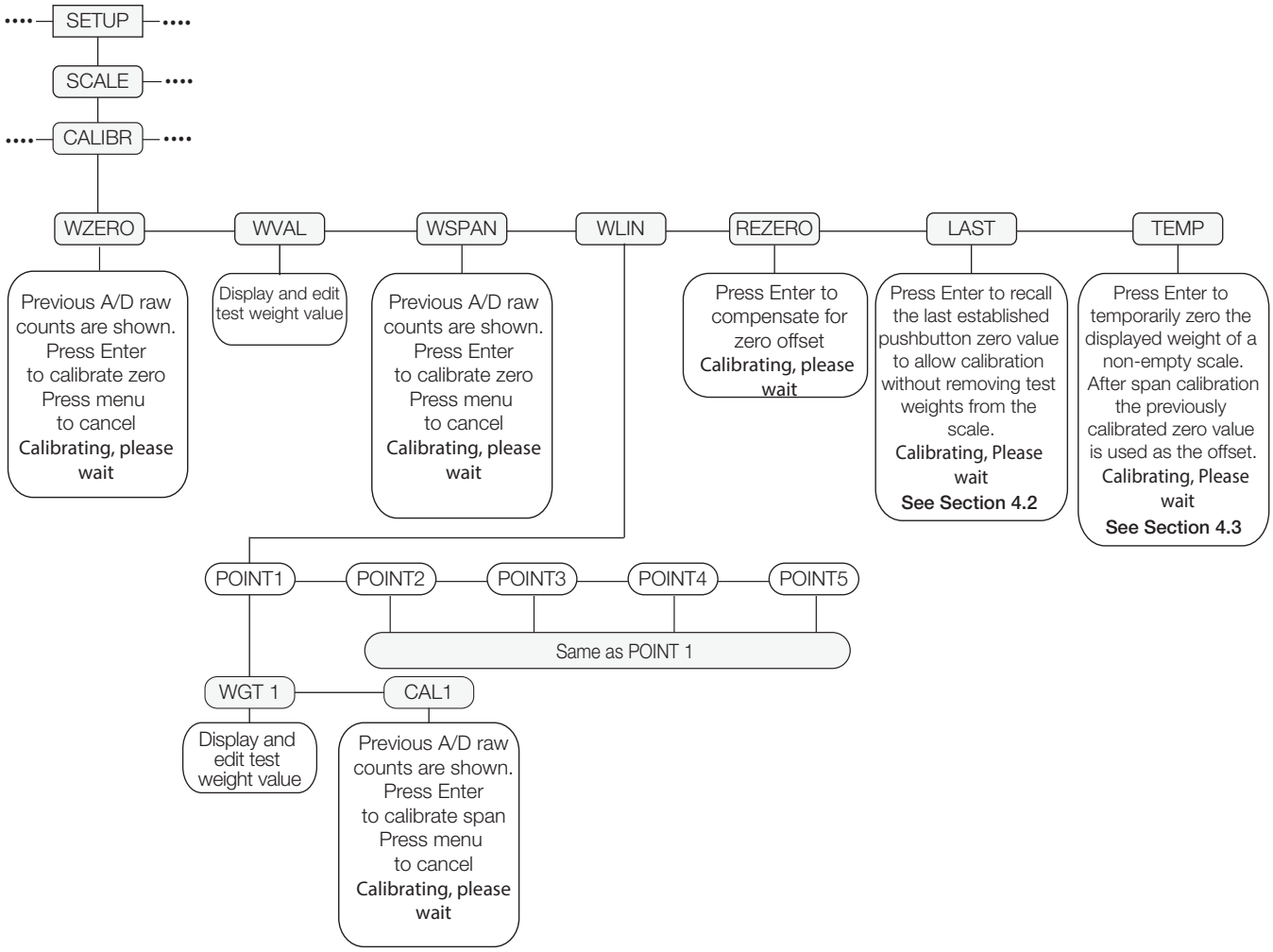


Figure 3-7. Calibration Menu Structure

Parameter	Choices	Description
WZERO	—	Press **Enter** to display previous A/D raw counts. Press **Enter** again to perform a zero calibration, press **Menu** to cancel.
WVAL	—	Press **Enter** to display and edit the test weight value.
WSPAN	—	Press **Enter** to display previous A/D raw counts. Press **Enter** again to perform a span calibration, press **Menu** to cancel.
WLIN	POINT 1 — POINT 5	Press **Enter** to display and edit test weight and calibration values for up to five linearization points. Perform linear calibration only after WZERO and WSPAN have been set.
REZERO	—	Press **Enter** to remove an offset value from the zero and span calibrations. Note ***Use REZERO only after WZERO and WSPAN have been set. See Section 4.1 for more information about using this REZERO.***
LAST	—	Press **Enter** to recall the last established push button zero to allow calibration without removing weight from scale. See Section 4.2.
TEMP	—	Press **Enter** to temporarily zero the displayed weight from a loaded scale. See Section 4.3.

Table 3-6. Calibration Menu Parameters

3.2.6 Feature Menu

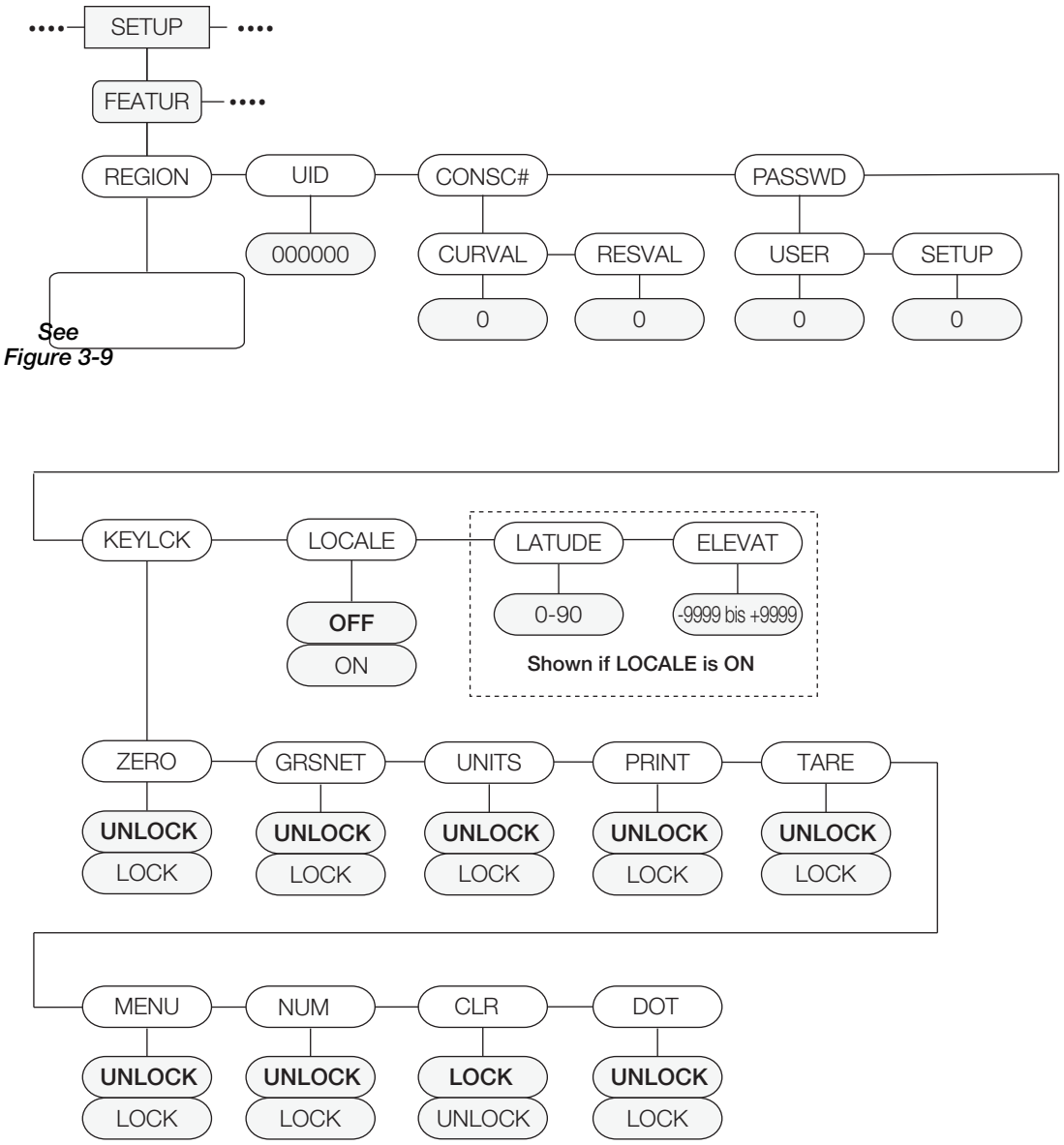


Figure 3-8. Feature Menu Structure

Parameter	Choices	Description
REGION	REGULA REGWRD DECFMT TIME DATE	Selects regional settings. See Level 3 sub menus.
UID	**000000**	Sets the unit ID, a string of up to 6 ASCII characters, which can be set via serial port or keypad. This will be used in place of the <UID> token in a print format. The default value is "1." The Unit ID is also used as part of the File Name for configuration storage and printing to USB Flash Drives.

Table 3-7. Feature Menu Parameters

Parameter	Choices	Description
CONSC#	CURVAL RESVAL	Allows sequential numbering for print operations (CURVAL is the current value and RESVAL is the reset value). The consecutive number value is incremented following each print operation that includes <CN> in the ticket format. When the consecutive number is reset, it is reset to the RESVAL specified in the parameter.
PASSWD	USER SETUP	Sets a password to access the Setup menu, or certain sub-menus in the User menu. Specify a non-zero value to enable the password. • The Setup password protects the entire Setup menu, and when set is required even when attempting entry into the Setup menu using the setup switch. • The User password restricts access to the Time/Date, Accumulator, and Setpoints sub-menus in the User menu. Passwords can be overridden by loading new firmware, or entering 999999. Note ***Overriding passwords will clear configuration and calibration settings. To preserve settings (i.e., ID information), use Revolution software to upload the data to a PC, then download it back to the 880 after the password override is performed.***
KEYLCK	ZERO GRSNET UNITS PRINT TARE MENU NUM CLR DOT	Disables the listed keys. Select Lock to disable the key, and Unlock to enable the key.
LOCALE	**OFF** ON	Gravity compensation enable/disable. Set this parameter *On* to enable the LATUDE and ELEVAT
LATUDE	**45** *0-90*	Press **Enter** to display and edit the latitude in degrees for gravity adjustment to calibration (LOCALE must be set to On).
ELEVAT	**345** *-9999 to +9999*	Press **Enter** to display and edit the elevation in meters for gravity adjustment to calibration (LOCALE must be set to On).

Table 3-7. Feature Menu Parameters (Continued)

3.2.7 Region Menu

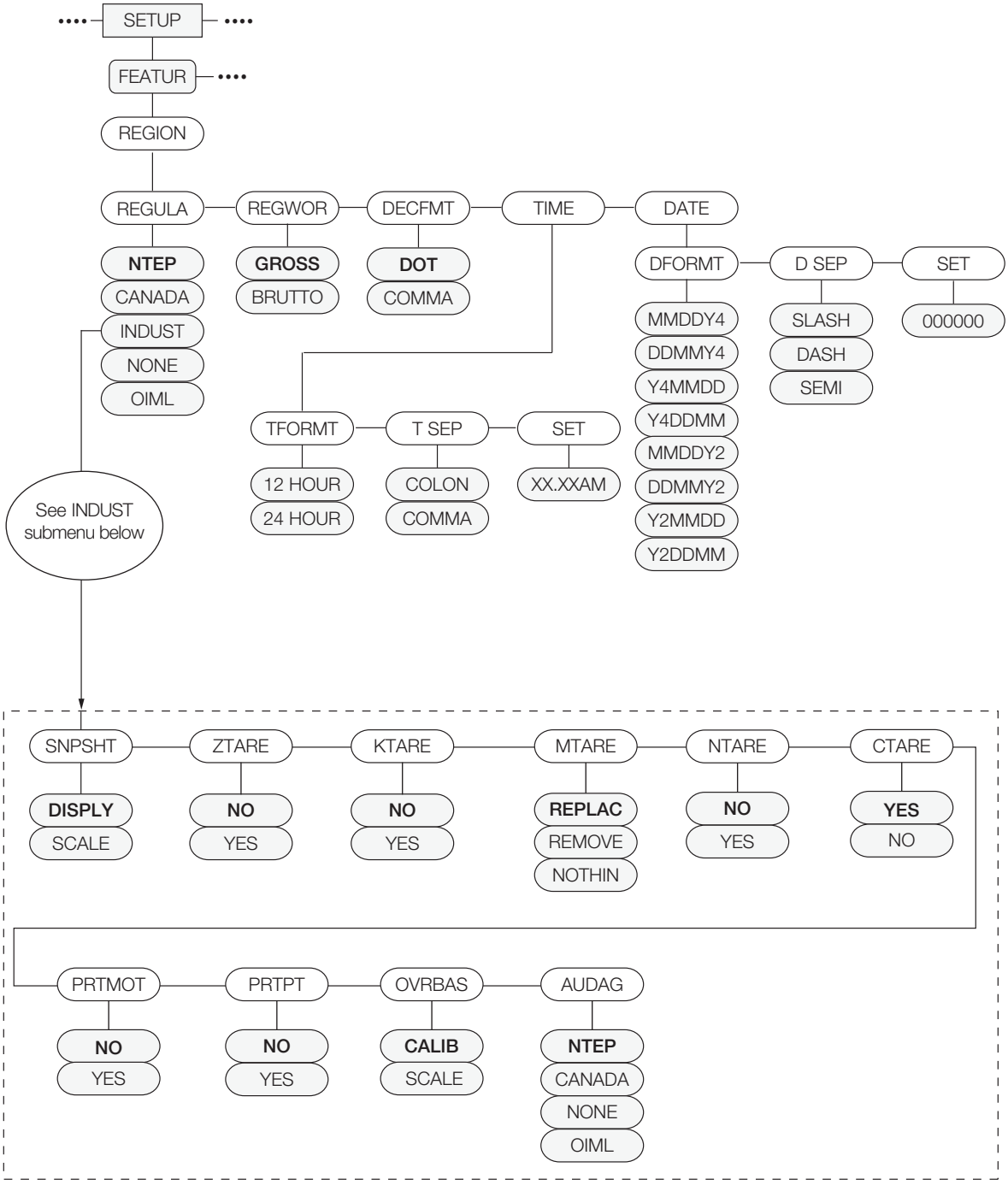


Figure 3-9. Region Menu Structure

Parameter	Choices	Description
REGULA	**NTEP** CANADA INDUST NONE OIML	Regulatory mode – Specifies the regulatory agency having jurisdiction over the scale site. ***The value specified for REGULA affects the function of the front panel* Tare *and* Zero *keys.*** • **OIML, NTEP, and CANADA modes allow a tare to be acquired at any weight greater than zero. NONE allows tares to be acquired at any weight value.** • **OIML, NTEP, and CANADA modes allow a tare to be cleared only if the gross weight is at no load. NONE allows tares to be cleared at any weight value.** • **NTEP and OIML modes allow a new tare to be acquired even if a tare is already present. In CANADA mode, the previous tare must be cleared before a new tare can be acquired.** • **NONE, NTEP and CANADA modes allow the scale to be zeroed in either gross or net mode as long as the current weight is within the specified ZRANGE. In OIML mode, the scale must be in gross mode before it can be zeroed; pressing the Zero key in net mode will zero the scale and clear the tare, if weight is within the specified ZRANGE.** • **INDUST provides a set of sub-parameters to allow customization of tare, clear, and print functions in non-legal-for-trade scale installations. See sub-menu below.**
REGWOR	**GROSS** BRUTTO	Sets the term displayed when weighing in gross mode. Selecting BRUTTO replaces the *Gross* annunciator with *Brutto*.
DECFMT	**DOT** COMMA	Specifies whether decimal numbers are displayed using a period (DOT) or a comma.
TIME	TFORMT TSEP SET	Allows setting of the current time, and the time format and separator character.
DATE	DFORMT D SEP SET	Allows setting of the current date, and date format and date separator character.
INDUST sub-menu		
SNPSHT	**DISPLY** SCALE	Snap Shot uses either the displayed weight or scale weight to determine restrictions. Allows a method where Industrial mode will take values from the display.
ZTARE	**NO** YES	Remove tare on **Zero**.
KTARE	**NO** YES	Always allow keyed tare.
MTARE	**REPLAC** REMOVE NOTHIN	Multiple tare action.
NTARE	**NO** YES	Allow negative or zero tare.
CTARE	**NO** YES	Allow **Clear** key to clear tare.
RTARE	**YES** NO	Round Push button tare value to nearest display division.
PRTMOT	**NO** YES	Allow print while in motion.
PRTPT	**NO** YES	Print PT (Preset Tare) for keyed tare entries.

Table 3-8. Region Menu Parameters

Parameter	Choices	Description
OVRBAS	**CALIB** SCALE	Overload Bases uses either the calibrated zero or the scale zero for overload calculation. CALIB = Calibrate Zero SCALE = Scale Zero
AUDAG	**NTEP** CANADA NONE OIML	Selects the Audit Agency having jurisdiction over the scale site. • OIML, NTEP, and CANADA modes allow a tare to be acquired at any weight greater than zero. NONE allows tares to be acquired at any weight value. A tare can be cleared only if the gross weight is at no load. NONE allows tares to be cleared at any weight value. • NTEP and OIML modes allow a new tare to be acquired even if a tare is already present. In OIML mode, printing is not allowed if the scale is more than -20dd. In CANADA mode, the previous tare must be cleared before a new tare can be acquired. • NONE, NTEP and CANADA modes allow the scale to be zeroed in either gross or net mode as long as the current weight is within the specified ZRANGE. In OIML mode, the scale must be in gross mode before it can be zeroed; pressing ZERO in net mode clears the tare. The value specified for this parameter affects the function of the front panel **Tare** and **Zero** keys. See Section 10.5 on page 102 for more information.

Table 3-8. Region Menu Parameters

3.2.8 Ports Menu

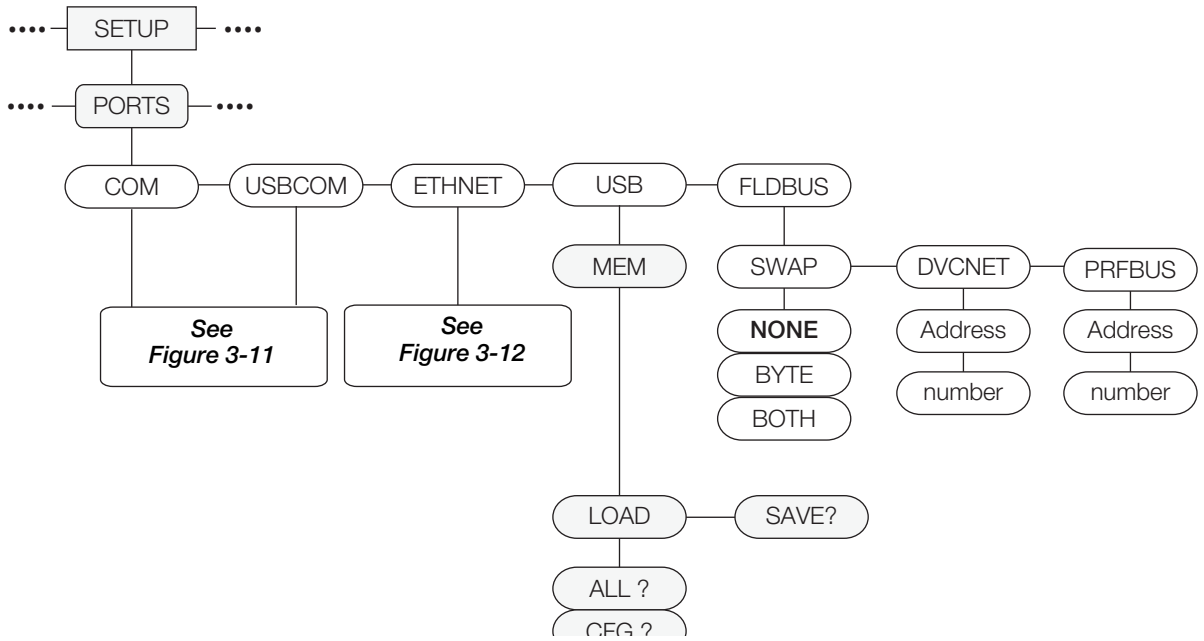


Figure 3-10. Ports Menu Structure

Parameter	Choices	Description
COM		RS-232 and RS-485 Communications Port – see Figure 3-11
USBCOM		USB Device Port – see Figure 3-11
ETHNET		Ethernet TCP/IP Port – see Figure 3-12.
USB	MEM	USB Host Memory Device functions.
FLDBUS		Field bus option card port when CompactCom board is installed – see FLDBUS Sublevel below.
FLDBUS Sublevel		
SWAP	NONE BYTE BOTH	Specifies byte-swapping used for the field bus card. For DeviceNet cards, this parameter defaults to BYTE; for all other cards the default value is None.
DVCNET	**63** 1-64	DeviceNet option address
PRFBUS	**126** 1-126	Profibus option address

Table 3-9. PORT Menu Parameters

3.2.9 Com Menu

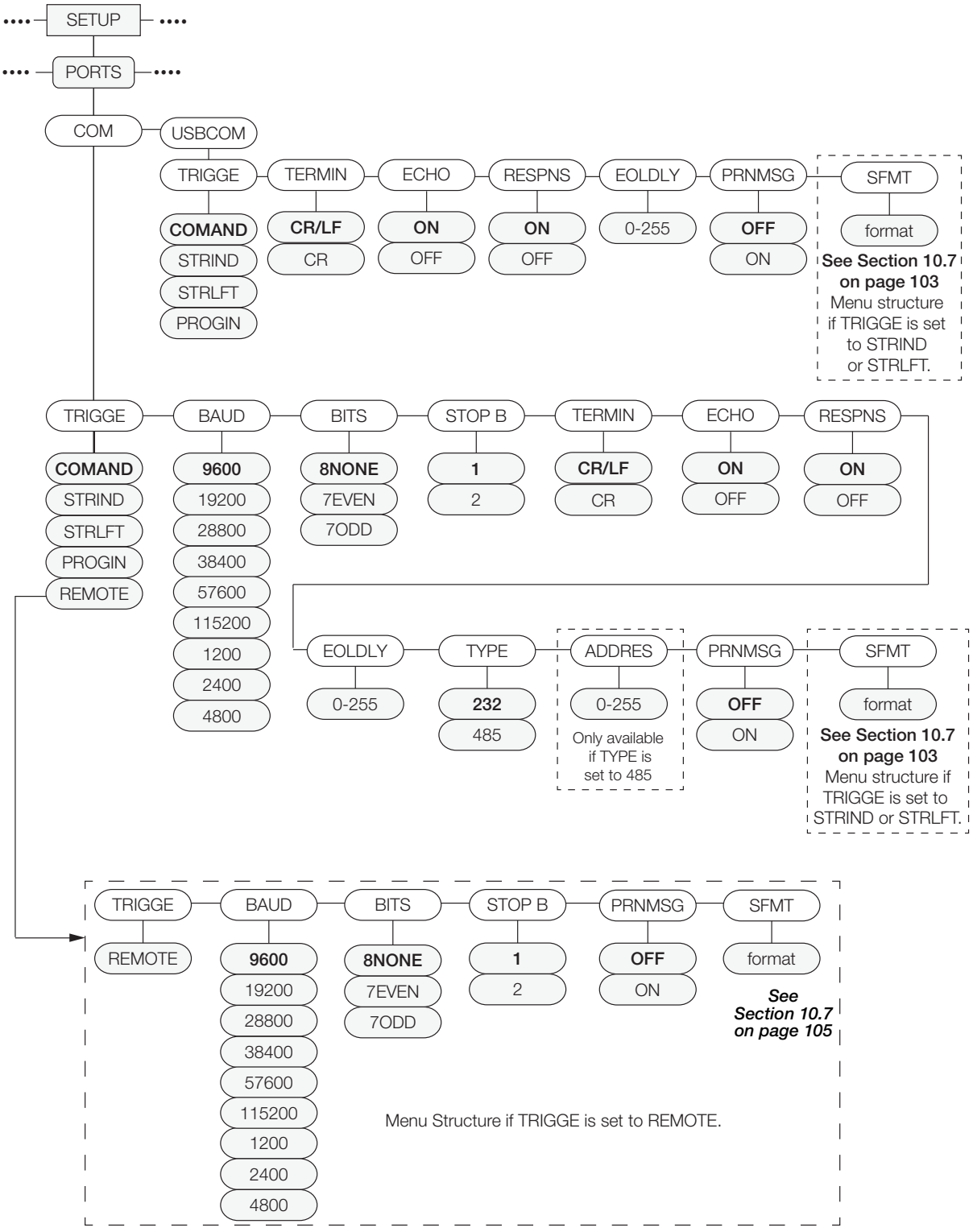


Figure 3-11. Com and USBCOM Menu Structure

Parameter	Choices	Description
TRIGGE	**COMAND**	Setting Trigger to command allows opration of EDP commands and can print.
	STRLFT	Stream Legal for Trade data – data is updated at the configured display update rate. Allows operation of EDP commands and printing.
	STRIND	Stream Industrial scale data – data is updated up to the configured sample rate. Allows operation of EDP commands and printing.
	PROGIN	Programmable input —for use wtih an iRite user program.
	REMOTE	Configures the port to operate as a serial scale input. See ***Menu Structure if TRIGGE is set to REMOTE*** *below. (Not available in USBCOM)*
	Note	***When in STRLFT, STRIND and REMOTE, if the COM port is set to TYPE = RS485, the port will not stream data, and cannot be used in a local/remote application. See Section 10.6.3.***
BAUD	**9600** 19200 28800 38400 57600 115200 1200 2400 4800	Port baud rate. *(Not available in USBCOM)*
BITS	**8NONE** 7EVEN 7ODD	Port data bits and parity. *(Not available in USBCOM)*
STOP B	**1** 2	Stop Bits – selects the number of stop bits transmitted and the number of stop bits expected to be received by the port. *(Not available in USBCOM)*
TERMIN	**CR/LF** CR	Termination – selects the termination character(s) for data sent from the port.
ECHO	**ON** OFF	Specifies whether characters received by the port are echoed back to the sending unit.
RESPNS	**ON** OFF	Response – specifies whether the port transmits replies to serial commands
EOLDLY	**0** 0-255	End of Line Delay - specifies, in 0.1 second intervals, the delay between transmitted lines of data.
TYPE	**232** 422 485	Specifies the protocol for the COM port. *(Not available in USBCOM)*
ADDRES	**0** 0-255	If TYPE is 485, specifies the RS-485 address. *(Not available in USBCOM)*
PRNMSG	**OFF** ON	Print message – displays a message when a print is transmitted on this port.
SFMT	**<2><P><W7.> <U><M><S> <CR><LF>**	Stream format – specifies the stream format used for streaming output of scale data (TRIGGE=STRLFT or STRIND) or specifies the expected input for a serial scale (TRIGGE=REMOTE).
Menu Structure if TRIGGE is set to REMOTE		
TRIGGE	REMOTE	Configures the port to operate as a serial scale input.

Table 3-10. COM and USBCOM Menu Parameters

Parameter	Choices	Description
BAUD	**9600** 19200 28800 38400 57600 115200 1200 2400 4800	Port baud rate.
BITS	**8NONE** 7EVEN 7ODD	Port data bits and parity.
STOP B	**1** 2	Stop Bits – selects the number of stop bits transmitted and the number of stop bits expected to be received by the port
PRNMSG	**OFF** ON	Print message – displays a message when a print is transmitted on this port.
SFMT	**<2><P><W7.> <U><M><S> <CR><LF>**	Stream format – specifies the expected input for the serial scale.

Table 3-10. COM and USBCOM Menu Parameters (Continued)

3.2.10 Ethernet Communications Menu

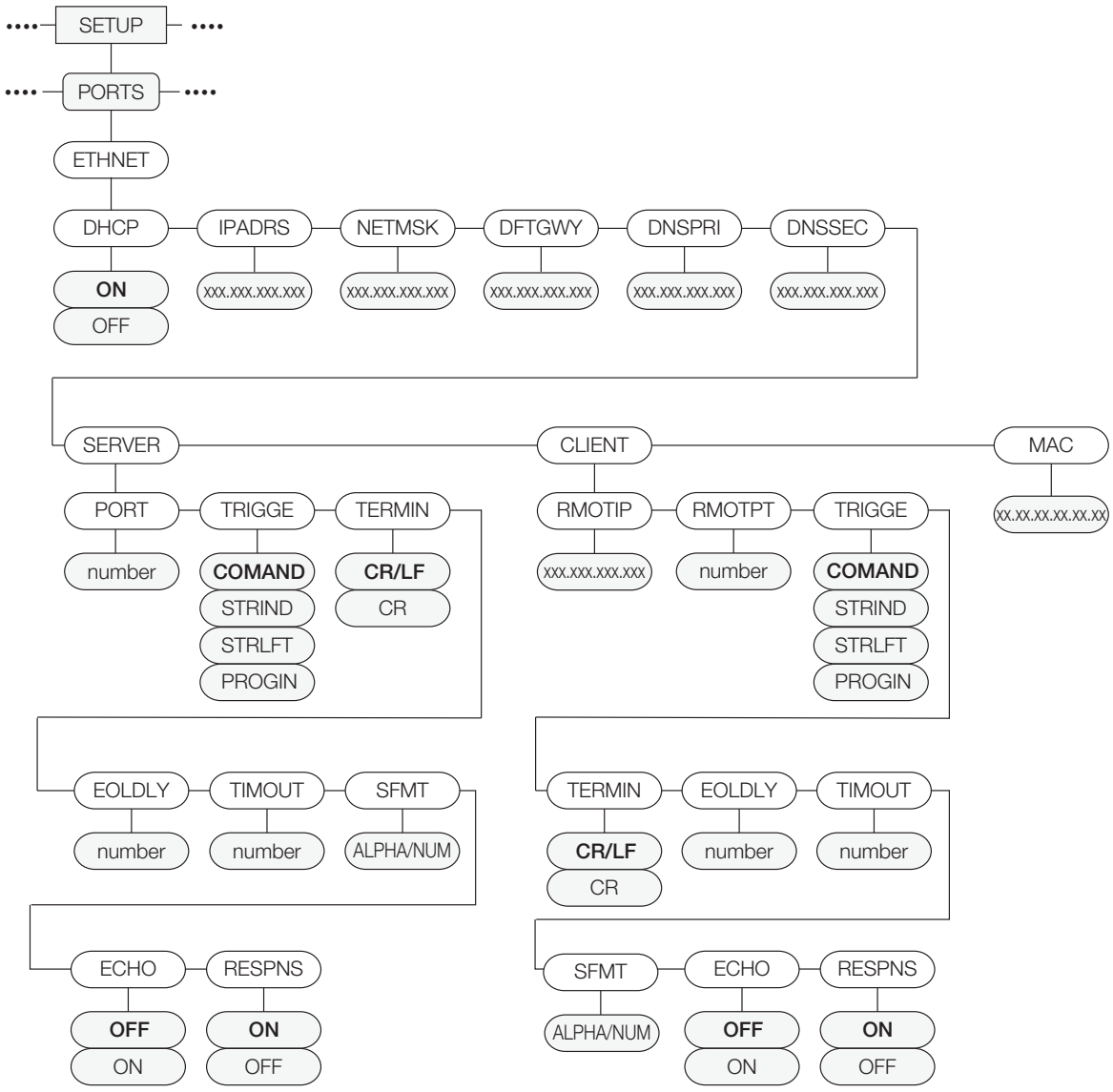


Figure 3-12. Ethernet Menu Structure

Parameter	Choices	Description
DHCP	**ON** OFF	Enables (ON) or disables (OFF) Dynamic Host Configuration Protocal.
IPADRS	**000.000.000.000** Valid IP Address	Configures the IP address for this device.
NETMSK	**000.000.000.000** Valid Net Mast	Specifies the subnet mask.
DFTGWY	**000.000.000.000** Valid IP Address	Default Gateway.
DNSPRI	**000.000.000.000** Valid IP Address	IP address for the primary DNS server.
DNSSEC	**000.000.000.000** Valid IP Address	IP address for the secondary DNS server.
SERVER		See SERVER Sublevel below
CLIENT		See CLIENT Sublevel below
MAC	00.00.00.00.00.00	The MAC address for this device, read only.
SERVER/CLIENT Sublevel		
RMOTIP	**000.000.000.000** Valid IP Address	Remote IP address – IP address of the remote unit the 880 will connect to. **Client level only.**
RMOTPT	**1** 1-65535	Remote port – TCP port number on the remote unit the 880 will connect to. **Client level only.**
PORT	**10001** 1-65535	The TCP port number of the 880 server. **Server level only.**
TRIGGE	**COMAND** STRIND STRLFT PROGIN	Selects the operation of the port. •COMAND – allows operation of EDP commands and will print •STRLFT – stream legal for trade scale data – data is transmitted at the configured display update rate. Will also accept EDP commands and printing. •STRIND – stream industrial scale data – data is transmitted up to the configured A/D sample rate. Will also accept EDP commands and printing. •PROGIN – programmable input for use with an iRite user program.
TERMIN	**CR/LF** CR	Termination. Selects the termination character(s) for data sent from the port.
EOLDLY	**0** 0-255	Port end-of-line delay – specifies, in 0.1 second intervals, the delay between transmitted lines of data.
TIMOUT	**0** 0-65535	Timeout – inactivity disconnect timeout. A connection (either client or server) is closed if there is no activity before the timeout expires. Time is in seconds. A timeout value of 0 disables the inactivity disconnect.
SFMT	**<2><P><W7.> <U><M><S> <CR><LF>**	Stream format – specifies the stream format used for streaming output of scale data (TRIGGE=STRLFT or STRIND). Alpha/numeric maximum length 200 characters.
ECHO	**OFF** ON	Specifies whether characters received by the port are echoed back to the sending unit.
RESPNS	**ON** OFF	Response – specifies whether the port transmits replies to serial commands. **Note** ***If an external device (such as a printer), that may transmit unexpected data (such as a paper low message), is connected to the indicator the response parameter should be set to OFF to prevent a reply from the indicator from confusing the external device.***

Table 3-11. Ethernet Menu Parameters

3.2.11 USB Host

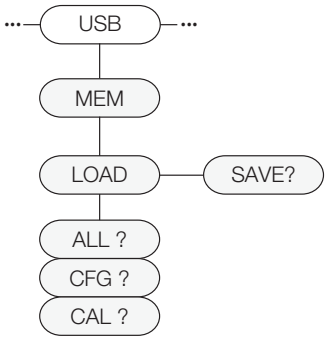


Figure 3-13. USB Host Menu Structure

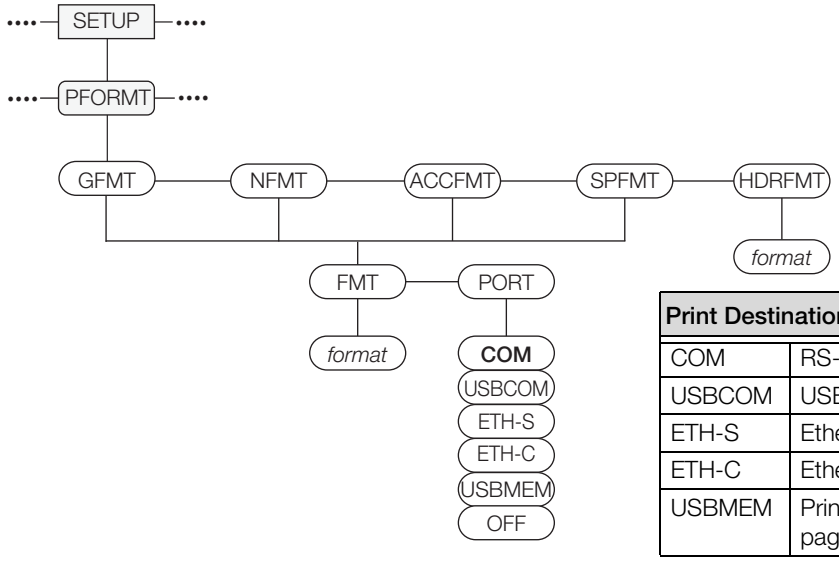
Parameter	Choices	Description
MEM	SAVE?	Save Configuration to a memory device.
	LOAD	Load Configuration from a memory device. ALL ? — Loads all data CFG ? — Loads only configuration CAL ? — Loads only calibration.

Table 3-12. USB HOST Menu Parameters

Note ***For more information on the use of the USB Host features, see Section 9.2 on page 97.***

3.2.12 Print Format Menu

See Section 7.0 for information about custom print formatting.



Print Destination Ports	
COM	RS-232/422 port – J3 (Section 2.4.3 on page 23)
USBCOM	USB Device Port – J4 (Section 2.4.4 on page 24)
ETH-S	Ethernet Server – J6 (Section 9.1 on page 93)
ETH-C	Ethernet Client – J6 (Section 9.1 on page 93)
USBMEM	Print to file on USB flash drive (Section 9.2.2 on page 98)

Figure 3-14. Print Format Menu Structure

Parameter	Choices	Description
GFMT		Alphanumeric, Max Length: 1000
	FMT	Weigh mode, no tare in system GROSS<G><NL2><TD><NL>
	PORT	The communications port the print data will be sent to: COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF.
NFMT		Alphanumeric, Max Length: 1000
	FMT	Weigh mode, tare in system. GROSS<G><NL>TARE<SP><T><NL>NET<SP2><N><NL2><TD><NL>
	PORT	The communications port the print data will be sent to: COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF.
ACCFMT		Alphanumeric, Max Length: 1000
	FMT	Accumulator enabled and displayed, or setpoint print operation with PSHACC=ON. ACCUM<A><NL><DA><TI><NL>
	PORT	The communications port the print data will be sent to: COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF.
SPFMT		Alphanumeric, Max Length: 1000
	FMT	Setpoint print operation with PSHPRNT=ON. <SCV><SP><SPM><NL>
	PORT	The communications port the print data will be sent to: COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF.
HDRFMT		Must be inserted into other print format. Alphanumeric, maximum length 300. COMPANY NAME<NL>STREET ADDRESS<NL>CITY, ST ZIP<NL2>
Note		***For all PORT choices, if the COM port is set to TYPE = RS485, the port will not perform a demand print. See Section 10.6.3.***

Table 3-13. Print Format Menu Parameters

3.2.13 Setpoints Menu

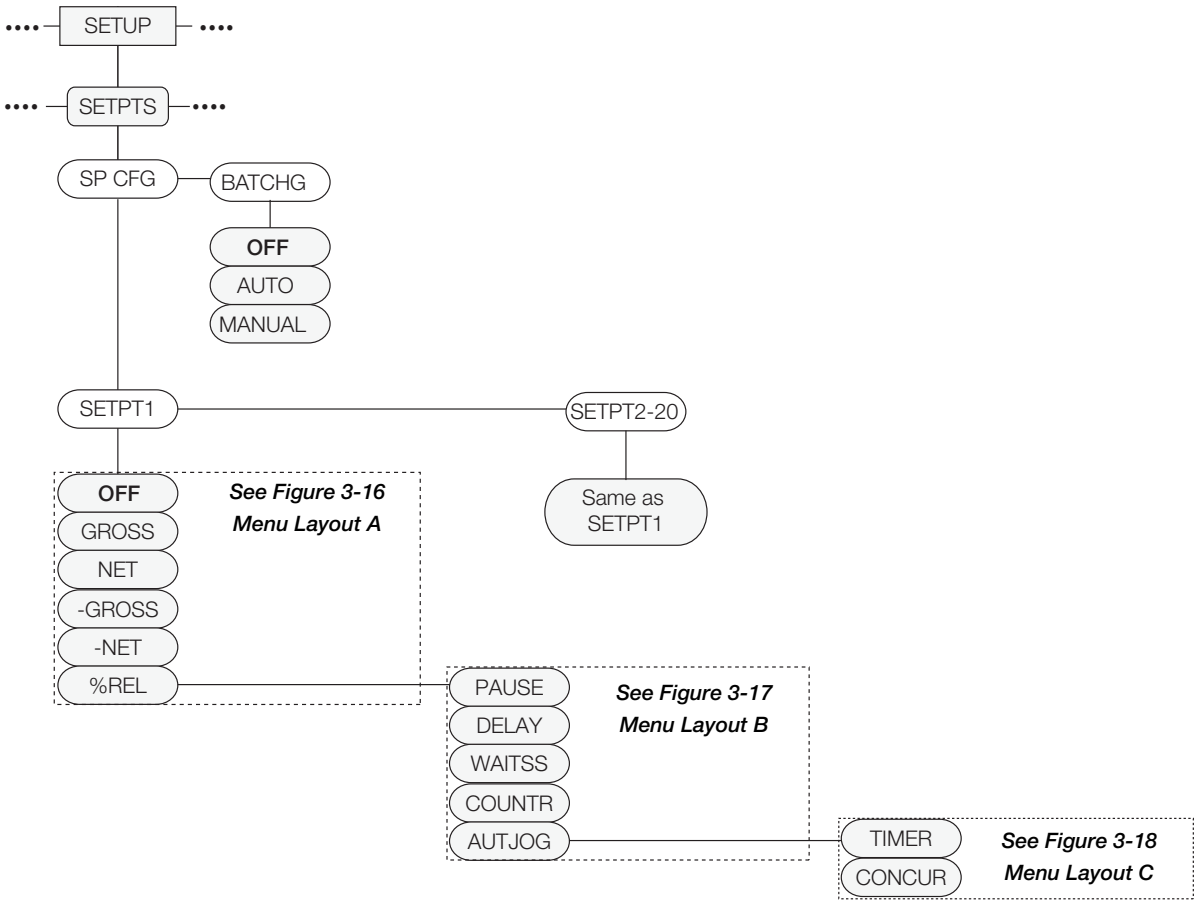


Figure 3-15. Setpoint Menu Structure

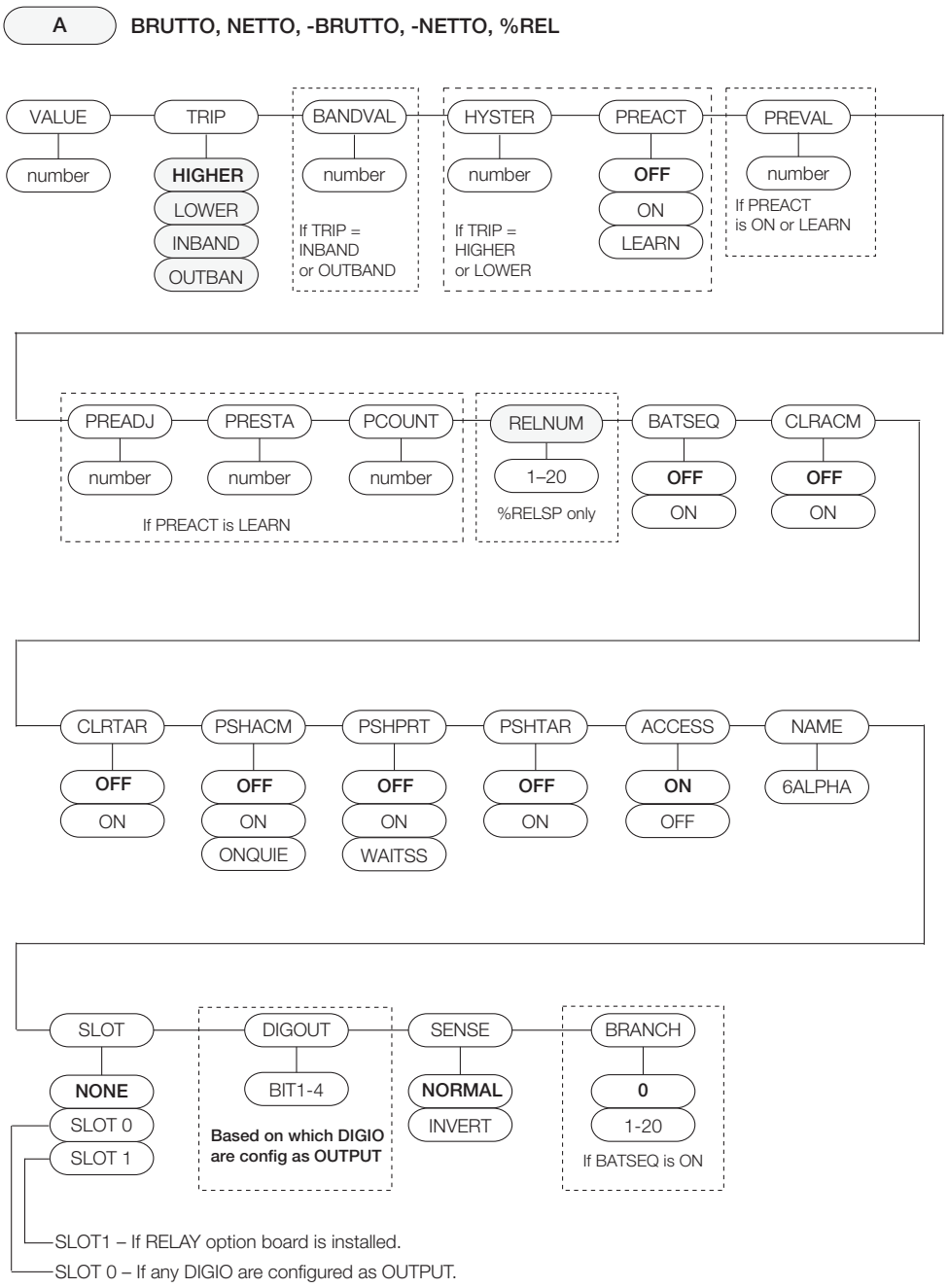


Figure 3-16. Setpoint Menu Structure – Layout A

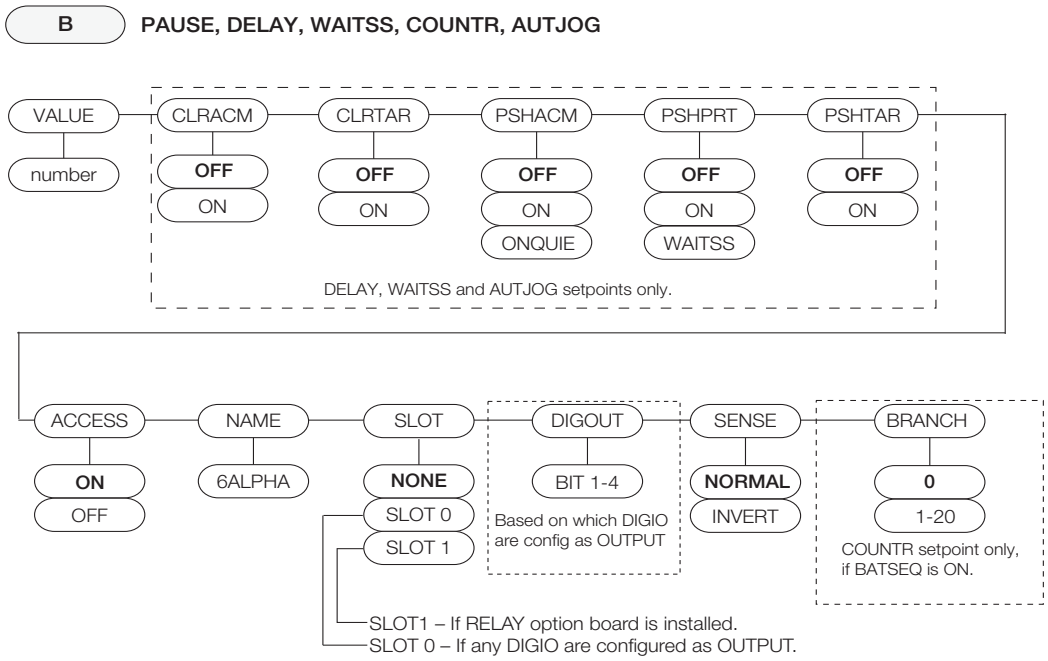


Figure 3-17. Setpoint Menu Structure – Layout B

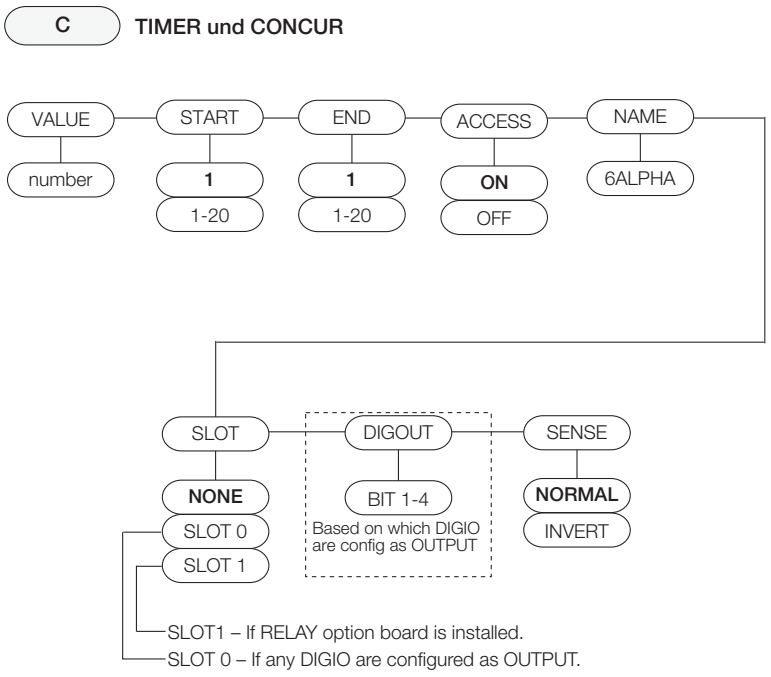


Figure 3-18. Setpoint Menu Structure – Layout C

Parameter	Choices	Description
Level 2 submenus		
SETPT 1– SETPT 20	**OFF** GROSS NET –GROSS –NET %REL PAUSE DELAY WAITSS COUNTR AUTJOG TIMER CONCUR	Specifies the setpoint kind. GROSS, NET, –GROSS, –NET, %REL setpoint kinds can be used as either batch or continuous setpoints. PAUSE, DELAY, WAITSS, COUNTR and AUTJOG setpoint kinds can only be used in batch sequences. TIMER and CONCUR setpoint kinds can only be used as continuous setpoints. See Table 8-1 on page 88 for more information about setpoint kinds. ***Note*** ***The digital output assigned to the Concur setpoint should not be used by another Concur setpoint, this could cause a conflict in setting the output state.***
BATCHG	**OFF** AUTO MANUAL	Batching mode – set to AUTO or MANUAL to allow a batch sequence to run. MANUAL requires a BATSTR digital input or BATSTART serial command before the batch sequence can run. AUTO allows batch sequences to repeat continuously after receiving a single batch start signal. See Section 8.2 on page 90.
Level 3 submenus		
VALUE	*number*	Setpoint value. •For weight-based setpoints: Specifies the target weight value, 0–999999. •For time-based setpoints: Specifies, in 0.1-second intervals, a time value in the range 0–65535. •For COUNTR setpoints: Specifies the number of consecutive batches to be run, 0–65535.
TRIP	**HIGHER** LOWER INBAND OUTBAND	Specifies whether the setpoint is satisfied when the weight is higher or lower than the setpoint value, within a band established around the value, or outside of that band. In a batch sequence with TRIP=HIGHER, the associated digital output is active until the setpoint value is reached or exceeded; with TRIP=LOWER, the output is active until the weight goes below the setpoint value.
BNDVAL	***0*** *0–999999*	For setpoints with TRIP=INBAND or OUTBAND, specifies a weight equal to half the band width. The band established around the setpoint value is VALUE ±BNDVAL.
HYSTER	***0*** *0–999999*	Specifies a band around the setpoint value that must be exceeded before the setpoint, once off, can trip on again.
PREACT	**OFF** ON LEARN	Allows the digital output associated with a setpoint to shut off before the setpoint is satisfied to allow for material in suspension. The ON value adjusts the setpoint trip value up or down (depending on the TRIP parameter setting) from the setpoint value using a fixed value specified on the PREVAL parameter. The LEARN value can be used to automatically adjust the preact value after each batch. LEARN compares the actual weight at standstill to the target setpoint value, then adjusts the preact PREVAL by the PREADJ value times the difference after each batch.
PREVAL	***0*** *0–999999*	Specifies the preact value for setpoints with PREACT set to ON or LEARN. Depending on the TRIP setting specified for the setpoint, the setpoint trip value is adjusted up or down by the PREVAL value.
PREADJ	**50.0** *0.0–100.0*	Preact adjustment factor. For setpoints with PREACT set to LEARN, specifies a decimal representation of the percentage of error correction applied (50 = 50%, 100 = 100%) each time a PREACT adjustment is made.

Table 3-14. Setpoint Menu Parameters

Parameter	Choices	Description
PRESTAB	**0** *0–65535*	Preact stabilization time-out. For setpoints with PREACT set to LEARN, specifies the time, in 0.1-second intervals, to wait for standstill before adjusting the PREACT value.
PCOUNT	**1** *1–65535*	Preact learn interval. For setpoints with PREACT set to LEARN, specifies the number of batches after which the preact value is recalculated. The default value, 1, recalculates the preact value after every batch cycle.
RELNUM	***1*** *1–20*	For %REL setpoints, specifies the number of the relative setpoint. The target weight for this setpoint is the percentage (specified on the VALUE parameter of the %REL setpoint) of the target value of the relative setpoint
BATSEQ	**OFF** ON	Specifies whether the setpoint is used as a batch (ON) or continuous (OFF) setpoint.
CLRACM	**OFF** ON	Specify ON to clear the accumulator when the setpoint is satisfied
CLRTAR	**OFF** ON	Specify ON to clear the tare when the setpoint is satisfied
PSHACM	**OFF** ON ONQUIE	Specify ON to update the accumulator and perform a print operation when the setpoint is satisfied (uses the accumulator print format). Specify ONQUIE to update the accumulator without printing.
PSHPRT	**OFF** ON WAITSS	Specify ON to perform a print operation when the setpoint is satisfied; specify WAITSS to wait for standstill after setpoint is satisfied before printing. Uses the setpoint print format. **Note** For AUTJOG setpoints, it will print only once the previous setpoint is satisfied. Instead of printing the setpoint print format, it will print the GROSS or NET print format (depends on the type of the previous setpoint).
PSHTAR	**OFF** ON	Specify ON to perform an acquire tare operation when the setpoint is satisfied. **Note** ***PSHTAR acquires the tare regardless of the value specified for the REGULA parameter in the FEATUR menu, and regardless of the stability.***
Note ***If two or more of the CLR*xxx *and PSH*xxx *parameters are set on, the actions specified by those parameters are performed in the following order when the setpoint is satisfied: 1) clear accumulator; 2) clear tare; 3) accumulate; 4) print; 5) acquire tare.***		
ACCESS	**ON** OFF	Specifies the access allowed to setpoint parameters shown in the user menu. ON: Values can be displayed and changed OFF: Values can be displayed but not changed
NAME	6ALPHA	A six character alphanumeric name for the setpoint.
SLOT	***NONE*** *SLOT 0* *SLOT 1*	Lists all available digital I/O slots. SLOT 0 – onboard DIO SLOT 1 – Option card (if installed) **Note** A slot will only appear if one or more of its individual bits are configured as an output.
DIGOUT	*BIT 1-4*	Lists all digital output bits available for the specified SLOT. This parameter is used to specify the digital output bit associated with this setpoint. Use the DIGITAL I/O menu to assign bit function to OUTPUT. For continuous setpoints, the digital output becomes active (low) when the condition is met; for batch setpoints, the digital output is active *until* the setpoint condition is met.
SENSE	**NORMAL** INVERT	Specifies whether the state of the digital output associated with this setpoint is inverted when the setpoint is satisfied.
BRANCH	**0** *0-20*	Specifies the setpoint number to which the batch sequence is to branch if the current setpoint is not satisfied upon initial evaluation. The special value zero indicates that no branch is taken.

Table 3-14. Setpoint Menu Parameters

Parameter	Choices	Description
START	***1*** *1–20*	Specifies the starting setpoint number. *Do not* specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint begins when the starting setpoint begins.
END	***1*** *1–20*	Specifies the ending setpoint number. *Do not* specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint stops when the ending setpoint begins.

Table 3-14. Setpoint Menu Parameters

3.2.14 Digital Input Menu

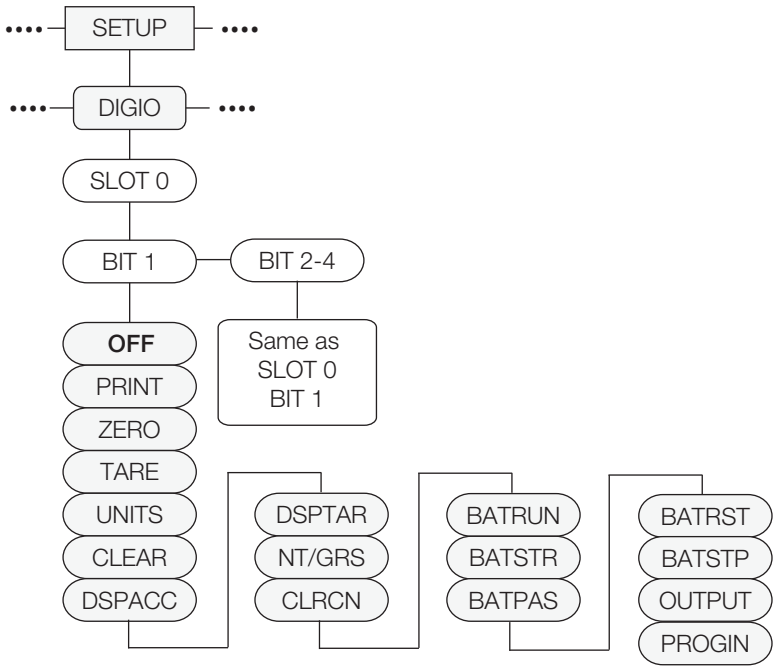


Figure 3-19. Digital I/O Menu

Parameter	Choices	Description
Level 2 submenus		
SLOT 0	BIT 1 – BIT 4	Select the bit to set the function.
SLOT 0 submenu		

Table 3-15. Digital I/O Menu Parameters

Parameter	Choices	Description
BIT 1 BIT 2 BIT 3 BIT 4	**OFF** PRINT ZERO TARE UNITS CLEAR DSPACC DSPTAR NT/GRS CLRCN BATRUN BATSTR BATPAS BATRST BATSTP OUTPUT KBDLOC GROSS NET PRIM SEC CLRTAR CLRACC PROGIN	Specifies the function activated by Bits 1–4. • PRINT, ZERO, TARE, UNITS, NT/GRS provide the same functions as the five front panel keys. • DSPACC displays the current accumulator value. • DSPTAR displays the tare. • CLRCN resets the consecutive number to the value specified on the RESVAL parameter (FEATUR menu). • BATRUN allows a batch routine to be started and run. With BATRUN active (low), the BATSTR input starts the batch; if BATRUN is inactive (high), BATSTR resets the batch. • BATSTR starts or resets a batch routine, depending on the state of the BATRUN input. • BATPAS pauses a batch routine while held active (low). • BATRST resets a batch to first batch setpoint. • BATSTP stops a batch at the current step. • OUTPUT defines a bit as an output to be used by the setpoint. • KBDLOC locks the keyboard • GROSS, NET, PRIM and SEC select gross or net weight display, and primary or secondary units display modes. • CLRTAR clears the current tare. • CLRACC clears the accumulator. • PROGIN assigns the bit as a digital input used to generate a program event.

Table 3-15. Digital I/O Menu Parameters

3.2.15 Analog Output Menu

The ALGOUT menu is used only if the analog output option is installed. If the analog output option is installed, configure all other indicator functions and calibrate the indicator before configuring the analog output. See Section 10.11 on page 114 for analog output calibration procedures.

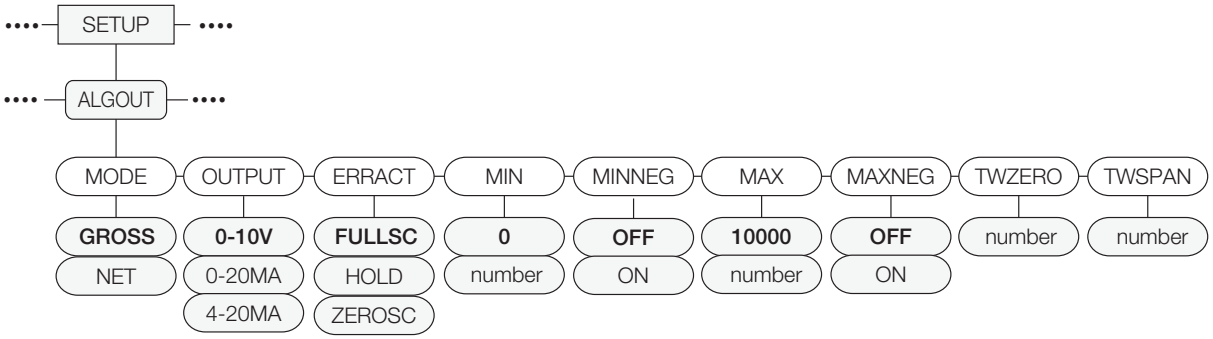


Figure 3-20. Analog Output Menu

Parameter	Choices	Description
Level 2 submenus		
MODE	**GROSS** NET	Defines if the output follows the Gross or Net weight.
OUTPUT	**0-10V** 0-20MA 4-20MA	Selects whether the analog output supplies voltage (0–10 V), current (0-20mA), or current (4-20mA).

Table 3-16. Analog Output Menu Parameters

Parameter	Choices	Description
ERRACT	**FULLSC** HOLD ZEROSC	Error action. Specifies how the analog output responds to system error conditions. Possible values are: FULLSC: Set to full value (10 V or 20 mA, depending on output setting) HOLD: Hold current value ZEROSC: Set to zero value (0 V, 0mA or 4 mA, depending on output setting)
MIN	**0.000000** *number*	Specifies the minimum weight value tracked by the analog output. Specify a value in the range 0–999999.
MIN NEG	**OFF** ON	Set to ON if the MIN value is negative.
MAX	**10000.00** *number*	Specifies the maximum weight value tracked by the analog output. Specify a value in the range 0–999999.
MAX NEG	**OFF** ON	Set to ON if the MAX value is negative.
TWZERO	**000000** *number*	Calibrate zero. Adjust the analog output zero calibration. See Section 10.11 on page 114. Edit the value to match reading on multimeter to perform calibration.
TWSPAN	**000000** *number*	Calibrate span. Adjust the analog output span calibration. See Section 10.11 on page 114 Edit the value to match reading on multimeter to perform calibration.

Table 3-16. Analog Output Menu Parameters

3.2.16 Version Menu

The VERS menu is used to check the firmware version installed in the indicator and to set the indicator configuration to factory defaults.

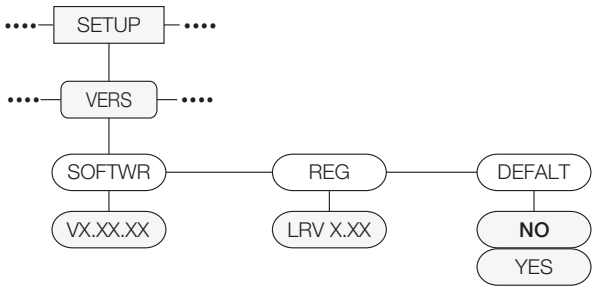


Figure 3-21. Version Menu Structure

Parameter	Choices	Description
SOFTWR	**VX.XX.XX**	Displays firmware version number.
REG	**LVR X.XX**	Displays the Legally Relevant firmware version number.
DEFALT	**NO** YES	Performs a reset of all the indicator parameters to factory default settings. **Important** ***All configuration and load cell calibration data will be lost.***

Table 3-17. Version Menu Parameters

4.0 Calibration

The *880* can be calibrated using the front panel, EDP commands, or *Revolution*.

Calibration consists of the following steps:

- Zero calibration
- Entering the test weight value
- Span calibration
- Optional five-point linearization
- Optional rezero calibration for test weights using hooks or chains
- Optional last zero calibration
- Optional temporary zero calibration

Note ***The 880 requires the WZERO and WSPAN points to be calibrated. The linearity points are optional; they must fall between zero and span, but must not duplicate zero or span. During calibration, TARE acts as a data entry confirmation key. It also acts as an Execute key, and accepts the value if calibration was successful.***

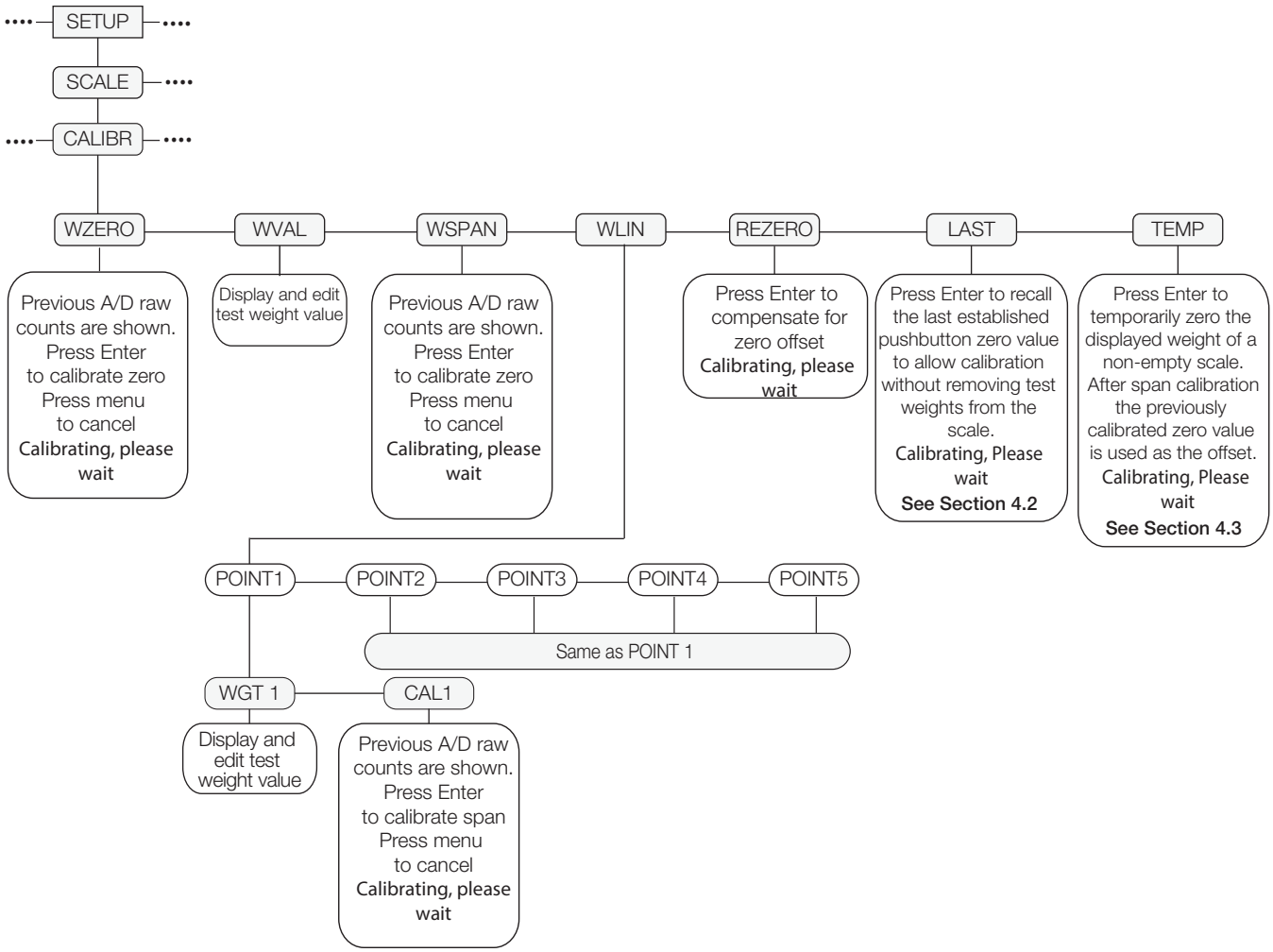


Figure 4-1. Calibration (CALIBR) Menu

4.1 Front Panel Calibration

1. Put the indicator in configuration mode using the setup switch on the back of the unit, see Figure 3-1, (or use MENU if audit trail is enabled), and navigate to CALIBR (see Figure 4-1).
2. Press TARE or ▽ to go to the ***WZERO*** parameter.

Note ***WZERO is used for most normal calibrations with an empty scale. If a special situation exists, where a LAST or TEMP zero may be used, refer to Section 4.2 or Section 4.3 for more information before performing a WZERO calibration.***

3. Press TARE or ▽ to view the previously captured A/D count value for zero.
4. Remove all weight from the scale platform. If the test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
5. Press TARE to Calibrate WZERO.

Note ***If calibration of zero is not required, press*** MENU ***to exit.***

6. The indicator displays ***Calibrating, Please Wait*** while calibration is in progress. When complete, ***WVAL*** is displayed.

Note ***To view the new zero A/D count, repeat Step 3, but instead of pressing Enter while viewing the value, press Menu to exit.***

7. With ***WVAL*** displayed, press TARE to display the stored calibration weight value.
8. Edit the value using the keypad on the 880Plus (see Section 1.5.2 on page 7) or the following method for the panel mount.
   - Press ◁ or ▷ to select the digit.
   - Press △ or ▽ to increment or decrement the value.
   - press TARE when the value is correct.
   - Press ◁ or ▷ to move the decimal point position.
9. Press TARE to store the ***WVAL*** value and advance to ***WSPAN***.
10. With ***WSPAN*** displayed, press TARE or ▽ to view the previously captured A/D count value for span.
11. Place test weights on the scale equal to WVAL.
12. Press TARE to calibrate ***WSPAN***.

Note ***If calibration of span is not required, press*** MENU ***to exit.***

13. After TARE is pressed, the indicator displays ***Calibrating, Please Wait***. When complete ***WLIN*** is displayed.

Note ***To view the new span A/D count, repeat Step 9, but instead of pressing Enter while viewing the value, press Menu to exit.***

14. When calibration is complete press MENU to return to the weigh mode.

4.1.1 Five-point linearization

Five-point linearization (using the WLIN parameter) provides increased scale accuracy by calibrating the indicator at up to five additional points between the zero and span calibrations.
Linearization is optional: if choosing not to perform linearization, skip the ***WLIN*** parameter; if linearization values have previously been entered, these values are reset to zero during calibration of ***WZERO***. To perform linearization, follow the procedure below.

Note *The linearity points must be less than the WSPAN point.*

1. With ***WLIN*** displayed, press TARE to go to the first linearization point (***POINT1***).
2. Press ▽ again, ***WGT1*** is displayed.
3. Press ▽ to display the value.
4. Edit the value using the keypad on the 880Plus (see Section 1.5.2 on page 7) or the following method for the panel mount.
   - Press ◁ or ▷ to select the digit.
   - Press △ or ▽ to increment or decrement the value.
   - Press TARE when the value is correct (the decimal point will be set in the following step).
   - Press ◁ or ▷ to move the decimal point position.
   - Press TARE when the value is correct. The indicator will display ***CAL1***.
5. Place test weights on the scale and press TARE. The indicator will display the previously captured A/D counts for the linearization point.
6. Press TARE again to calibrate. The indicator displays ***Calibrating, Please Wait*** while calibration is in progress. When complete, ***WGT1*** is displayed.
7. Press △ to ***POINT1***, then press ▷ to ***POINT2***.
8. Repeat for up to five linearization points. To exit the linearization parameters, press △ to return to ***WLIN***.

4.1.2 Rezero

The rezero function is used to remove a calibration offset when an apparatus is used to hang the test weights. If no other apparatus was used to hang the test weights during calibration, remove the test weights and press △ to return to the **Calibr** menu.

1. With ***Rezero*** displayed, press TARE or ▽ to access the rezero function.
2. If an apparatus is used during calibration, remove it and the test weights from the scale. The indicator will display the AD count from the previous zero (***WZERO***) calibration.
3. With all weight removed, press TARE to rezero the scale. This function acquires a new ZERO calibration value. The indicator displays ***Calibrating, Please Wait*** while the zero and span calibrations are adjusted. When complete, ***Last***is displayed.

Note *For more information on LAST or TEMP see Section 4.2 or Section 4.3.*

4. Press MENU to return to weigh mode.

4.2 LAST – Calibrating Zero Without Removing Test Weights

Last zero (typically platform scales) replaces the original captured zero with the last push button zero prior to a calibration.

To use this feature a pushbutton zero must have been taken while the scale was empty while in the weigh mode.

Perform a normal calibration, except instead of using WZERO to capture the zero point of an empty scale, select **Last** to use the last pushbutton zero. The test weight does not need to be removed from the scale.

4.3 TEMP – Establishing a Temporary Zero for Calibrating a Loaded Scale

Temporary zero (typically tank scales) is only a reference for a span calibration, and allows the original zero to be retained after a span adjustment has been done.

This procedure assumes the previously calibrated zero point is still accurate.

Perform a normal calibration, except instead of using **WZERO** to capture the zero point of an empty scale, select **Temp**. After calibrating the temporary zero, enter the **WVAL** of the test weights added to the scale (just the test weights, not the product loaded on the scale). Then perform the span calibration.

4.4 Adjusting Final Calibration (Trimming)

Calibration may be affected by environmental factors including wind, vibration, and angular loading. For example, if the scale is calibrated with 1000 lb, a strain test may determine that at 2000 lb the calibration is 3 lb high. In this case, final calibration can be adjusted by changing the WVAL to 998.5 lb. This adjustment provides a linear correction of 1.5 lb per 1000 lb.

4.5 Gravity Compensation

This feature is used to compensate for the variance in gravitational pull from one location to another. To calibrate with gravity compensation, the LOCALE parameter under the ***FEATUR*** menu must be set to ON (see Section 3.2.6), and the LATUDE (latitude) and ELEVAT (elevation in meters, relative to sea level) parameters set before calibrating the indicator.

If the indicator is later installed at a different location, gravity compensation can be applied to a pre-calibrated indicator by adjusting the LATUDE and ELEVAT parameters.

4.6 EDP Command Calibration

To calibrate the indicator using EDP commands, the indicator COM, USBCOM or Ethernet port must be connected to a terminal or personal computer. See Section 2.4 on page 22 for cable connections.

Note ***The indicator will respond with 'OK' if the value of the parameter was valid, or the command executed properly. If the indicator responds with '??', then either the value for the parameter was invalid, or the command could not be executed***

Once the indicator is connected to the sending device, do the following:

1. Place the indicator in configuration mode and remove all weight from the scale platform. If the test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Send the SC.WZERO#1 command to calibrate zero. The indicator displays ***Calibrating, Please Wait*** while calibration is in progress.
3. Place test weights on the scale and use the SC.WVAL#1 command to enter the test weight value in the following format:

   SC.WVAL#1=*nnnnnn*<CR>
4. Send the SC.WSPAN#1 command to calibrate span. The indicator displays ***Calibrating, Please Wait*** while calibration is in progress.
5. Up to five linearization points can be calibrated between the zero and span calibration values. Use the following commands to set and calibrate a single linearization point:

   SC.WLIN.V1#1=*nnnnn*<CR>
   SC.WLIN.C1#1<CR>

   The SC.WLIN.V1#1 command sets the test weight value (*nnnnn*) for linearization point 1. The SC.WLIN.C1#1 command calibrates the point. Repeat using the SC.WLIN.Vn#1 and SC.WLIN.Cn#1 (where 'n' is the linearity point number) commands as required for additional linearization points.
6. To remove an offset value, clear all weight from the scale, including hooks or chains used to hang test weights, then send the SC.REZERO#1 command. The indicator displays ***Calibrating, Please Wait*** while the zero and span calibrations are adjusted.
7. Send the KMENU or KEXIT EDP command to return to weigh mode.

4.7 Revolution® Calibration

To calibrate the indicator using *Revolution*, the indicator serial port must be connected to a PC running the *Revolution* configuration utility.

1. Place the indicator in configuration mode (display reads ***CONFIG***) and remove all weight from the scale platform.
2. From *Revolution*, select **File » New**.
   The *Select Indicator* dialog box appears.
3. Select *880* and click OK.
4. From the *Communications* menu, select **Connect**.
5. From the left pane, expand the *Scale* selection and select the Scale button.
6. From the *Tools* menu, select ***Calibration Wizard***.
7. Select ***NEXT*** to begin the Calibration Wizard.
8. Select whether or not to perform a standard calibration or a standard with multi-point linearization and select ***Next***.
9. In the text box, enter the test weight value be to used for span calibration.
10. Select the check box if using chains or hooks during the calibration, then select ***Next***.
11. Remove all weight from the scale and select ***Click to Calibrate Zero*** to begin zero calibration. If the test weights require an apparatus to hang, place it on the scale for zero calibration.
12. When zero calibration is complete, the Calibration Wizard prompts to place test weights on the scale. Place the test weights on the scale, then select ***Click to Calibrate Span***.
13. If choosing to perform linear calibration, the Calibration Wizard now displays prompts (1–5). Enter the weight value for Linear Point #1, place test weights on scale and select ***Measure***. Repeat for additional linearization points, then select ***Next***.
14. If the check box for using chains or hooks is selected, the Calibration Wizard prompts to perform a Re-zero. Remove the apparatus used to hang the weights, and select ***Click to Calibrate Re-Zero***.
15. The new and old calibration settings are displayed. To accept the new values, select **Finish**. To exit and restore the old values, select **Cancel**.

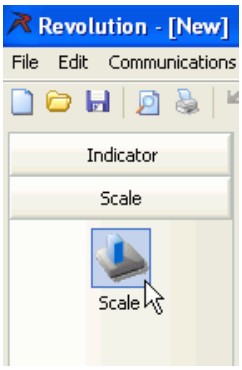


Figure 4-2. Scale Button

5.0 Using Revolution®

The *Revolution* utility provides functions used to support database management, iRite program editing, configuration, calibration, customizing and backup of the *880* configuration settings using a PC.

Calibration values, scale configuration, batch routines, and print ticket formatting can be configured, saved and restored to the *880* using *Revolution*.

The indicator's operating firmware can also be updated using *Revolution*. See Section 5.3 for more details on firmware updating.

Minimum system requirements:

- 1.0 GHz Intel compatible processor
- 1 GB of RAM
- 850 MB hard drive space (32 bit)
  2 GB hard drive space (64 bit)
- Microsoft Windows® XP SP3 (32 bit)
  Windows Vista™ (32 bit or 64 bit) or newer 32 bit or 64 bit Windows operating system
- A RS-232 port, RS-485 port, USB Port, or TCP/IP connection for communications to the indicator

Recommended System Requirements:

- 1.0+ GHz Intel compatible processor
- 2 GB of RAM
- 4 GB hard drive space

5.1 Connecting to the Indicator

Communicating to the *880* can be accomplished a couple ways - using a serial connection to the indicator serial (COM) port through J3; using a USB connection and Virtual Comm Port to the indicator's USB Micro Device (USBCOM) port through J4; or using a TCP/IP connection through the Ethernet Port (J6).

After making the physical connection to a PC, select the Options in the Tools menu and configure the communications settings as needed to match the communications method that is being used:

- RS-232 and RS-485 – select the COM port that it will be connected to. Settings can be configured manually to match the indicator's current settings, or check the box for "Auto Detect Settings" to have *Revolution* automatically detect the settings.
- USB – select RS-232 as the communication mode, the USB connection appears as a standard COM port to *Revolution*. Note that the comm port for the USB connection will only show in the list of available ports if the indicator is physically connected, and powered on. The settings for baud rate, data and stop bits, and parity do not apply for a USB connection, and do not need to be set to any specific value.
- TCP/IP – requires the IP address and TCP Port of the indicator. Enter the IP Address and Port during the communications connection.

To open the communication connection, click on CONNECT under the COMMUNICATIONS menu, or the CONNECT button in the Toolbar. *Revolution* will attempt to establish communications with the indicator.

If Revolution does not detect the indicator, check the:

- ***Physical connections***
- ***Communications settings in Revolution***
- ***Current settings of the communications port in the indicator***
- ***Indicator communications port TRIGGE parameter is set to COMAND***

If Revolution displays a Version Error, the indicator version of firmware does not match the module used in Revolution. A connection can be forced, but some parameters may not be enabled if they were not originally supported in that module.

5.2 Configuration

The *Revolution* configuration utility provides the preferred method for configuring the *880* indicator. *Revolution* runs on a PC to set configuration parameters for the indicator. When *Revolution* configuration is complete, configuration data is downloaded to the indicator.

5.2.1 New Configuration File

1. Select **New File** on the tool bar (**NEW** under the file menu can also be used).
2. Select the icon for the indicator with the appropriate firmware version for which the configuration file is to be created.
3. *Revolution* will create a default configuration file. Edit the settings, upload the indicator's current settings, or download the default settings to the indicator.

5.2.2 Open an Existing Configuration File

1. Select **Open File** on the tool bar (**Open** under the file menu can also be used).
2. Navigate to the *.rev file to open then click the **OK** button.
3. *Revolution* opens the file, selecting the correct indicator module to use with it. Edit the settings, or download the settings to the indicator.

5.2.3 Saving a Configuration File

1. Select **Save File** on the tool bar (**Save** under the file menu can also be used).
   - If the file is new, enter a name when requested.
   - If the file already exists, confirm to overwrite the previous file.
   - Select cancel to exit the save process without saving.
   - Select **Save As** under the file menu if saving to a different file name.

Downloading to the Indicator

The ***Download Configuration*** function on the *Revolution* Communications menu allows a *Revolution* configuration file (with or without scale calibration data), database tables, an iRite program file, ticket formats or setpoints to be downloaded to a connected indicator in configuration mode.

The ***Download Section*** function on the Communications menu allows download of only the currently displayed section, such as the communications port configuration.

Because less data is transferred using ***Download Current Display***, it is typically faster than a full configuration download, but there is an increased possibility that the download may fail due to dependencies on other objects. If the download fails, try performing a complete download using the ***Download Configuration*** function.

Uploading Configuration to Revolution

The ***Upload Configuration*** function on the *Revolution* Communications menu allows the existing configuration of a connected indicator to be saved to a file on the PC. Once saved, the configuration file provides a backup that can be quickly restored to the indicator if needed. Or, the file can be edited within *Revolution* and downloaded back to the indicator.

5.3 Updating the Indicator CPU or Display Module Firmware

The firmware for the *880* CPU and/or the *880* Display Module can be updated using a PC with a RS232 serial port, and the *Revolution* Indicator configuration software package. Firmware can be updated for just the CPU, just the Display Module, or both.

If updating the CPU Firmware, ALL configuration data, including calibration, will be lost. Use Revolution to upload and save a copy of the current configuration before continuing. After updating, use Revolution to restore the configuration and calibration.

Firmware updates can only be done through the RS-232 port. Updates through the USB and Ethernet ports are not supported

1. Download the new CPU and/or Display Module firmware from www.ricelake.com.
   - CPU firmware file – **156650-880CPUFirmwareVx-xx-xx.S19**
   - Display Module firmware file – **156651-880DisplayFirmwareVx-xx-xx.S19**.

Note *File names are subject to change, but always contain some designation of the device they are intended for.*

2. Connect the RS-232 Port (J3) from the CPU board (see Figure 2-17 on page 23) to a PC.
3. Press and hold the SETUP switch (located under the Ethernet jack) while applying power to put the *880* into BOOT mode. The display will be black for several seconds, then display ". . . . . ".
4. Release the setup switch.
5. Start the *Revolution* software on the PC.
6. Under file, select **NEW**.
7. Select the *880* module applicable for the current version of firmware.
8. Under Tools select **Options/Communications/AutoDetect**.
9. Select the *Auto Detect Settings* check box and click OK.
10. Under Communications, select **Connect**. *Revolution* will establish communications with the *880* indicator.

Note *If it fails to connect, check the connections.*

11. Once connected, select *Update CPU Firmware* or *Update Display Firmware* in the main indicator information screen.
12. Select the file for the Firmware being updated, CPU or Display.

The program will proceed to load the new firmware. This may take several minutes, while in progress do not leave the *Revolution* window or interrupt the power to the indicator. The progress of the download will be indicated on the Indicator Information screen.

When the download is complete, the program indicates if it was successful or not.

Note *If it was not successful, turn off the power to the indicator, return to step 3, and try the entire procedure again. If problems persist, contact Rice Lake Weighing Systems for technical assistance.*

If loading both the CPU and Display Module firmware, after one is complete, turn off the power and start again at step 3 before loading the other.

5.4 Revolution Help

The menu bar in *Revolution* contains a Help system for further assistance in using *Revolution* software.

The Help system contains an index of help topics and a search function. The search function allows the user to search with a keyword. When a keyword is typed into the search text box, Help searches its Index and finds the closest related topic in the help system.

6.0 EDP Commands

The *880* indicator can be controlled by a personal computer or terminal using the EDP commands, which can simulate front panel key press functions, display and change setup parameters, and perform reporting functions.

6.1 The EDP Command Set

The EDP command set can be divided into seven groups: key press commands, reporting commands, the **RESETCONFIGURATION** special function command, parameter setting commands, weigh mode commands, error conditions and batching control commands.

When the indicator processes an EDP command, it responds with the message ***OK***. The ***OK*** response verifies that the command was received and has been executed. If the command is unrecognized or cannot be executed, the indicator responds with ***??***.

The following sections list the commands and command syntax used for each of these groups.

6.1.1 Key Press Commands

Key press EDP commands (see Table 6-1) simulate pressing the keys on the front panel of the indicator. These commands can be used in both setup and weighing mode. Several of the commands serve as "pseudo" keys, providing functions that are not represented by a key on the front panel.

For example, to enter a 15-pound tare weight using EDP commands:

1. Type K1 and press **Enter** (or **RETURN**).
2. Type K5 and press **Enter**.
3. Type KTARE and press **Enter**.

Command	Function
KMENU	Press the Menu key
KZERO	Press the Zero key
KUNITS	Press the Units key
KPRINT	Press the Print key
KTARE	Press the Tare key
KGROSSNET	Press the Gross/Net key
KGROSS	Go to gross mode (pseudo key)
KNET	Go to net mode (pseudo key)
KDISPACCUM	Display ACCUM (pseudo key)
KDISPTARE	Display tare (pseudo key)
KCLR	Press the Clear key (pseudo key)
KCLRCN	Reset consecutive number (pseudo key)
KCLRTAR	Clear tare from system (pseudo key)
KLEFT	In menu mode, move left in the menu
KRIGHT	In menu mode, move right in the menu
KUP	In menu mode, move up in the menu
KDOWN	In menu mode, move down in the menu
KSAVE	In menu mode, saves the current configuration (pseudo key)
KEXIT	In menu mode, saves the current configuration then exits to weigh mode (pseudo key)
K0–K9	Press number 0 (zero) through 9 (pseudo keys)
KDOT	Press the decimal point (.) (pseudo key)
KENTER	Press the Enter key (pseudo key)
KLOCK	Lock specified front panel key. For example, to lock the Zero key, enter KLOCK=KZERO. (pseudo key)
KUNLOCK	Unlock specified front panel key. For example, to unlock the Print key, enter KUNLOCK=KPRINT. (pseudo key)
KDATE	Display date (pseudo key)
KTIME	Display time (pseudo key)
KESCAPE	Exits the selected parameter. Returns to weigh mode if a parameter is not selected (functions identical to the Menu key in menu mode) (pseudo key)
KPRIM	Change to primary units (pseudo key)
KSEC	Change to secondary units (pseudo key)

Table 6-1. EDP Key Press Commands

6.1.2 Reporting Commands

Reporting commands (see Table 6-2) send specific information to the EDP port. These commands can be used in both configuration mode and weigh mode.

Command	Function
AUDITJUMPER	Returns the state of the audit jumper. A response of ***OK*** indicates the jumper is in the **On** position. A response of "??" indicates the jumper is in the **Off** position.
BUILD	Returns the date and time of the software build.
DUMPALL	Returns a list of all parameter values
DUMPAUDIT	Returns a list of audit trail information
DUMPCONFIG	Returns a list of all parameter values except for setpoint data
DUMPETH	Returns a list of all Ethernet parameter values
DUMPSP	Returns a list of all setpoint parameter values
HARDWARE	Returns a value that indicates which option card is installed in the option slot Possible values: 000=none, 085=relay card, 153=analog output card, 170=CompactCom card Example response with a relay card installed: HARDWARE=085
VERSION	Returns the 880 firmware version
DISPLAYBUILD	Returns the date and time of the display module software build. ***None*** is returned if no display is connected.
DISPLAYVERSION	Returns the display module software version. ***None*** is returned if no display is connected
P	Returns the current displayed weight with units identifier, see Section 10.4
OPTVERSION#1	Returns the software version of an installed option card, if supported. Returns ***UNSUPPORTED*** if not supported. Returns ***NOCARD*** if no option card is installed.
FBTEST	Returns the type of Field Bus module that is connected to the Field Bus Option Card, if installed. Returns ***No Module*** if no module is installed. Returns ***Not Found*** if no Field Bus Option Card is installed.

Table 6-2. EDP Reporting Commands

6.1.3 The RESETCONFIGURATION Command

The RESETCONFIGURATION command can be used in configuration mode to restore all configuration parameters to their default values.

This command is equivalent to using the DEFALT function in CONFIG mode.

Note ***All load cell calibration settings are lost when the RESETCONFIGURATION command is run.***

6.1.4 Parameter Setting Commands

Parameter setting commands allow the display or change of the current value for a particular configuration parameter (Tables 6-3 through 6-22).

Current configuration parameter settings can be displayed in either configuration mode or weigh mode using the following syntax:

command<CR>

Most parameter values can be changed in configuration mode only; setpoint parameters listed in Table 6-16 can be changed when in normal weighing mode.

Use the following command syntax when changing parameter values:

command=value<CR>

where ***value*** is the new value you want to assign to the parameter. Use no spaces before or after the equal (=) sign. If an incorrect command has been typed in, the response will be ***??***.

For example, to set the motion band parameter to 5, type the following:

SC.MOTBAND#1=5D<CR>

For parameters with selectable values, enter the command and equal sign followed by a question mark:

command=?<CR>

to see a list of those values. The indicator must be in configuration mode to use this function.

Scales Menu

Command	Menu	Description	Choices / Range
SC.ACCUM#1	ACCUM	Accumulator	OFF, ON
SC.DFTHRH#1	DFTHRH	Digital filter cutout threshold	0-99999
SC.DSPRATE#1	DSPRAT	Display Update Rate (in 0.1 sec intervals)	1-80
SC.DFSENS#1	DFSENS	Digital filter cutout sensitivity	LIGHT,MEDIUM,HEAVY
SC.GRADS#1	GRADS	Graduations	1 - 100000
SC.MOTBAND#1	MOTBAN	Motion Band (in divisions)	0-100
SC.OVRLOAD#1	OVRLOA	Overload	FS+2%, FS+1D, FS+9D, FS
SC.PWRUPMD#1	PWRUPM	Power Up Mode	GO, DELAY
SC.RANGE1.MAX#1	MAX1	Maximum weight for first range or interval	0.0 - 999999.0
SC.RANGE2.MAX#1	MAX2	Maximum weight for second range or interval	0.0 - 999999.0
SC.RANGE3.MAX#1	MAX3	Maximum weight for third range or interval	0.0 - 999999.0
SC.SMPRAT#1	SMPRAT	Sample Rate	7.5HZ, 15HZ, 30HZ, 60HZ, 120HZ, 240HZ, 480HZ, 960HZ
SC.SPLIT#1	SPLIT	Specifies full range, multi-range, or multi-interval	OFF, 2RNG, 3RNG, 2INTVL, 3INTVL
SC.SSTIME#1	SSTIME	Stand still time (in 0.1 sec intervals)	1 - 65535
SC.TAREFN#1	TAREFN	Tare Function	BOTH, NOTARE, PBTARE, KEYED
SC.THRESH#1	THRESH	Accumulator Zero Threshold	0-999999
SC.ZRANGE#1	ZRANGE	Zero range (in %)	0.0 - 100.0
SC.ZTRKBND#1	ZTRKBN	Zero track band (in divisions)	0.0 - 100.0

Table 6-3. Scales EDP Commands

Format Menu

Command	Menu	Description	Choices / Range
If SPLIT = 2RNG, 3RNG, 2INTVL, 3INTVL			
SC.PRI.DECPNT#1	DECPNT1	Decimal point location for first range or interval	888888, 888880, 8.88888, 88.8888, 888.888, 8888.88, 88888.8
SC.SEC.DECPNT#1	DECPNT2	Decimal point location for second range or interval	888888, 888880, 8.88888, 88.8888, 888.888, 8888.88, 88888.8
SC.TER.DECPNT#1	DECPNT3	Decimal point location for third range or interval. Only available in 3RNG or 3INTVL	888888, 888880, 8.88888, 88.8888, 888.888, 8888.88, 88888.8
SC.PRI.DSPDIV#1	DDIV1	Range/Interval (1 division size)	1D, 2D, 5D
SC.SEC.DSPDIV#1	DDIV2	Range/Interval (2 division size)	1D, 2D, 5D
SC.TER.DSPDIV#1	DDIV3	Range/Interval (3 division size) Only available in 3RNG or 3INTVL.	1D, 2D, 5D
If SPLIT = OFF			
SC.PRI.DECPNT#1	DECPNT	Decimal point location (for primary units)	888888, 888880, 8.88888, 88.8888, 888.888, 8888.88, 88888.8
SC.PRI.DSPDIV#1	DSPDIV	Display divisions	1D, 2D, 5D
SC.PRI.UNITS#1	UNITS	Specifies primary units for displayed and printed weight	LB, KG, OZ, TN, T, G, NONE
SC.SEC.DECPNT#1	DECPNT	Decimal point location (for secondary units)	888888, 888880, 8.88888, 88.8888, 888.888, 8888.88, 88888.8
SC.SEC.DSPDIV#1	DSPDIV	Display divisions (for secondary units)	1D, 2D, 5D
SC.SEC.UNITS#1	UNITS	Specifies secondary units for displayed and printed weight	LB, KG, OZ, TN, T, G, NONE

Table 6-4. FORMAT EDP Commands

Calibration Menu

Command	Menu	Description	Choices / Range
SC.WZERO#1	WZERO	Perform zero calibration	n/a
SC.WSPAN#1	WSPAN	Perform span calibration	n/a
SC.LC.CD#1	n/a	Raw count at zero	-2147483646 to 2147483647
SC.LC.CW#1	n/a	Raw count at span	-2147483646 to 2147483647
SC.LC.CZ#1	n/a		-2147483646 to 2147483647
SC.REZERO#1	REZERO	Perform zero caibration	n/a
SC.WLIN.C1#1	n/a	Calibrate linearization point 1	n/a
SC.WLIN.C2#1	n/a	Calibrate linearization point 2	n/a
SC.WLIN.C3#1	n/a	Calibrate linearization point 3	n/a
SC.WLIN.C4#1	n/a	Calibrate linearization point 4	n/a
SC.WLIN.C5#1	n/a	Calibrate linearization point 5	n/a
SC.WLIN.F1#1	CAL 1	Raw count value for linearization point 1	-2147483646 to 2147483647
SC.WLIN.F2#1	CAL 2	Raw count value for linearization point 2	-2147483646 to 2147483647
SC.WLIN.F3#1	CAL 3	Raw count value for linearization point 3	-2147483646 to 2147483647
SC.WLIN.F4#1	CAL 4	Raw count value for linearization point 4	-2147483646 to 2147483647
SC.WLIN.F5#1	CAL 5	Raw count value for linearization point 5	-2147483646 to 2147483647
SC.WLIN.V1#1	WGT 1	Test weight value for linearization point 1	0.0 - 999999.0
SC.WLIN.V2#1	WGT 2	Test weight value for linearization point 2	0.0 - 999999.0
SC.WLIN.V3#1	WGT 3	Test weight value for linearization point 3	0.0 - 999999.0
SC.WLIN.V4#1	WGT 4	Test weight value for linearization point 4	0.0 - 999999.0
SC.WLIN.V5#1	WGT 5	Test weight value for linearization point 5	0.0 - 999999.0
SC.WVAL#1	WVAL	Test weight value	0.00001 - 999999.0

Table 6-5. CALIBR EDP Commands

The menu items, CAL1 – CAL5 are used to do the calibration. A value cannot be keyed in. The SC.WLIN.Fx#1 EDP commands can be used to view and edit the value but they do not perform the calibration. Use the SC.WLIN.Cx#1 commands to perform the calibration.

Ports COM Menu

Command	Menu	Description	Choices / Range
EDP.BAUD#1	BAUD	Port baud rate	1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200
EDP.BITS#1	BITS	Port data bits and parity	8NONE, 7EVEN, 7ODD
EDP.ECHO#1	ECHO	Specifies whether characters received by the port are echoed back to the sending unit	OFF, ON
EDP.EOLDLY#1	EOLDLY	Port end-of-line delay in 0.1 sec intervals	Range: 0 - 255
EDP.TYPE#1	TYPE	Specifies RS-232, RS-485 or RS-422 communication	232, 485, 422
EDP.ADDRESS#1	ADDRES	RS-485 address	Range: 0 - 255
EDP.PRNMSG#1	PRNMSG	Print message	OFF, ON
EDP.RESPONSE#1	RESPNS	Response	OFF, ON
EDP.SFMT#1	SFMT	Stream format	Alphanumeric, max Length: 200
EDP.STOPBITS#1	STOP B	Stop Bits	1, 2
EDP.TERMIN#1	TERMIN	Termination character	CR/LF, CR
EDP.TRIGGER#1	TRIGGE	Selects the operation of the port	COMAND, STRLFT, STRIND, REMOTE

Table 6-6. PORTS (COM) EDP Commands

Ports – Field Bus Menu

Command	Menu	Description	Choices / Range
FB.BYTESWAP#1	SWAP	Specify byte swap for FB card	NONE, BYTE, BOTH
FB.DEVICENETADDRESS#1	DVCNET	Address for DeviceNet option	1-64
FB.PROFIBUSADDRESS#1	PRFBUS	Address for Profibus option	1-126

Table 6-7. PORTS – Field Bus EDP Commands

Ports – Ethernet Menu

Command	Menu	Description	Choices / Range
ETH.DEFAULTGATEWAY	DFTGWY	Default gateway	valid IP address
ETH.DHCP	DHCP	Dynamic Host Configuration Protocal	OFF, ON
ETH.DNSPRIMARY	DNSPRI	Primary DNS server address	valid IP address
ETH.DNSSECONDARY	DNSSEC	Secondary DNS server address	valid IP address
ETH.IPADDRESS	IPADRS	IP address for the indicator	valid IP address
ETH.MACADDRESS	MAC	MAC address (read only)	n/a – read only
ETH.NETMASK	NETMSK	Subnet mask	valid IP address
ETH.CLIENT.ECHO	CLIENT | ECHO	Specifies whether characters received by the port are echoed back to the sending unit.	OFF, ON
ETH.CLIENT.EOLDLY	CLIENT | EOLDLY	Port end-of-line delay, in 0.1 second intervals.	Range: 0 - 255
ETH.CLIENT.RESPONSE	CLIENT | RESPNS	Response – specifies whether the port transmits replies to serial commands. Parameter should be set to OFF to prevent a reply from the indicator confusing an external device (such as a printer)	OFF, ON
ETH.CLIENT.REMOTESERVERIP	CLIENT | RMOTIP	Remote IP address of the remote machine that the 880 will connect to	valid IP address
ETH.CLIENT.REMOTESERVERPORT	CLIENT | RMOTPT	Remote port number of the remote machine that the 880 will connect to	Range: 1 - 65535
ETH.CLIENT.SFMT	CLIENT | SFMT	Stream format – specifies the stream format used for streaming output of scale data (TRIGGE=STRLFT or STRIND)	Alphanumeric, max Length: 200
ETH.CLIENT.TERMIN	CLIENT | TERMIN	Termination – selects the termination character(s) for data sent from the port	CR/LF, CR
ETH.CLIENT.TIMEOUT	CLIENT | TIMOUT	Inactivity disconnect timeout – connection is closed after a specified period (in seconds) of inactivity. Setting the value to 0 disables the parameter	Range 0-65535
ETH.CLIENT.TRIGGER	CLIENT | TRIGGE	Selects the operation of the Client Ethernet port	COMAND, STRLFT, STRIND
ETH.SERVER.ECHO	SERVER | ECHO	Specifies whether characters received by the port are echoed back to the sending unit.	OFF, ON
ETH.SERVER.EOLDLY	SERVER | EOLDLY	Port end-of-line delay, in 0.1 second intervals.	Range: 0 - 255
ETH.SERVER.PORT	SERVER | PORT	Port that the 880 uses for its server	Range: 1 - 65535
ETH.SERVER.RESPONSE	SERVER | RESPNS	Response – specifies whether the port transmits replies to serial commands. Parameter should be set to OFF to prevent a reply from the indicator confusing an external device (such as a printer)	OFF, ON
ETH.SERVER.SFMT	SERVER | SFMT	Stream format – specifies the stream format used for streaming output of scale data (TRIGGE=STRLFT or STRIND)	Alphanumeric, max Length: 200
ETH.SERVER.TERMIN	SERVER | TERMIN	Termination – selects the termination character(s) for data sent from the port	CR/LF, CR

Table 6-8. PORTS – Ethernet EDP Commands

Command	Menu	Description	Choices / Range
ETH.SERVER.TIMEOUT	SERVER | TIMOUT	Inactivity disconnect timeout – connection is closed after a specified period (in seconds) of inactivity. Setting the value to 0 disables the parameter	Range 0-65535
ETH.SERVER.TRIGGER	SERVER | TRIGGE	Selects the operation of the Server Ethernet port	COMAND, STRLFT, STRIND

Table 6-8. PORTS – Ethernet EDP Commands (Continued)

Ports – USBCOM Menu

Command	Menu	Description	Choices / Range
EDP.ECHO#2	ECHO	Specifies whether characters received by the port are echoed back to the sending unit.	OFF, ON
EDP.EOLDLY#2	EOLDLY	Port end-of-line delay, in 0.1 second intervals.	Range: 0 - 255
EDP.PRNMSG#2	PRNMSG	Displays print message	OFF, ON
EDP.RESPONSE#2	RESPNS	Specifies whether the port transmits replies to serial commands.	OFF, ON
EDP.SFMT#2	SFMT	Stream format	Alphanumeric, max Length: 200
EDP.TERMIN#2	TERMIN	Termination character	CR/LF, CR
EDP.TRIGGER#2	TRIGGE	Selects the operation of the port	COMAND, STRLFT, STRIND

Table 6-9. PORTS – USBCOM EDP Commands

Stream Tokens Menu

Command	Description	Default	Choices / Range
STR.GROSS	String transmitted for the <M> token for gross weight	G	Alphanumeric, Max Length: 8
STR.INVALID	String transmitted for the <S> token when weight is invalid	I	Alphanumeric, Max Length: 2
STR.MOTION	String transmitted for the <S> token when scale is in motion	M	Alphanumeric, Max Length: 2
STR.NEG	Character transmitted for the <P> token when the weight is negative	-	NONE, SPACE, -
STR.NET	String transmitted for the <M> token for net weight	N	Alphanumeric, Max Length: 8
STR.OK	String transmitted for the <S> token when the scale is ok	“ “	Alphanumeric, Max Length: 2
STR.POS	Character transmitted for the <P> token when the weight is positive	SPACE	NONE, SPACE, +
STR.PRI	String transmitted for the <U> token for primary units	L	Alphanumeric, Max Length: 8
STR.RANGE	String transmitted for the <S> token when the scale is out of range	O	Alphanumeric, Max Length: 2
STR.SEC	String transmitted for the <U> token for secondary units	K	Alphanumeric, Max Length: 8
STR.TARE	String transmitted for the <M> token for tare weight	T	Alphanumeric, Max Length: 8
STR.ZERO	String transmitted for the <S> token when the scale is at center of zero	Z	Alphanumeric, Max Length: 2

Table 6-10. Stream Tokens EDP Commands

Feature Menu

Command	Menu	Description	Choices / Range
CONSNUM	CURVAL	Consecutive numbering	0 – 999999
CONSTUP	RESVAL	Consecutive number startup value	0 – 999999
DECFMT	DECFMT	Decimal format	DOT, COMMA
GRAVADJ	LOCALE	Locale - must be enabled for latitude and elevation	OFF, ON
LAT.LOC	LATUDE	Latitude (Locale must be set to ON)	0-90
ELEV.LOC	ELEVAT	Elevation (Locale must be set to ON)	-9999-9999
UID	UID	Unit ID	Alphanumeric, Max Length: 6

Table 6-11. Feature EDP Commands

Regulatory Menu

Command	Menu	Description	Choices / Range
REGWORD	REGWRD	Term printed when weighing in gross mode	GROSS, BRUTTO
REGULAT	REGULA	Regulatory agency having jurisdiction over the scale site	NONE, OIML, NTEP, CANADA, INDUST
REG.AGENCY	AUDAG	Audit trail agency format	NONE, OIML, NTEP, CANADA
REG.BASE	OVRBASE	Zero preference for overload calculation CALIB - Calibrated zero SCALE - Pushbutton zero	CALIB, SCALE
REG.CTARE	CTARE	CLEAR key – clear tare/accumulator while viewing	NO, YES
REG.RTARE	RTARE	Round push button tare to nearest Display Division.	YES,NO
REG.KTARE	KTARE	Keyed tare	NO, YES
REG.MTARE	MTARE	Multiple tare action	NOTHIN, REPLAC, REMOVE
REG.NTARE	NTARE	Negative or zero tare	NO, YES
REG.PRTMOT	PRTMOT	Print while in motion	NO, YES
REG.PRINTPT	PRTPT	Add “PT” to keyed tare print	NO, YES
REG.SNPSHOT	SNPSHT	Selects display or scale weight source	DISPLAY, SCALE
REG.ZTARE	ZTARE	Remove tare on ZERO	NO, YES

Table 6-12. Regulatory EDP Commands

Time and Date Menu

Command	Menu	Description	Choices / Range
DATEFMT	DFORMT	Date format	MMDDY2, DDMMY2, Y2MMDD, Y2DDMM, MMDDY4, DDMMY4, Y4MMDD, Y4DDMM
DATESEP	D SEP	Date separator character	SLASH, DASH, SEMI
TIMEFMT	TFORMT	Time format	12HOUR, 24HOUR
TIMESEP	T SEP	Time separator character	COLON, COMMA

Table 6-13. Time and Date EDP Commands

Passwords Menu

Command	Menu	Description	Choices / Range
PWD.USER	USER	Used to protect items in the top level menu	Range: 0 - 999999
PWD.SETUP	SETUP	Used to protect items in the setup menu	Range: 0 - 999999

Table 6-14. Password EDP commands

Note ***The EDP commands can be used to set the passwords but they will not return the current password setting.***

Keypad Lock Menu

Command	Menu	Description	Choices / Range
KEYLCK.GROSSNET	GRSNET	Locks or unlocks the Gross/Net Key	LOCK, UNLOCK
KEYLCK.MENU	MENU	Locks or unlocks the Menu Key	LOCK, UNLOCK
KEYLCK.PRINT	PRINT	Locks or unlocks the Print Key	LOCK, UNLOCK
KEYLCK.TARE	TARE	Locks or unlocks the Tare Key	LOCK, UNLOCK
KEYLCK.UNITS	UNITS	Locks or unlocks the Units Key	LOCK, UNLOCK
KEYLCK.ZERO	ZERO	Locks or unlocks the Zero Key	LOCK, UNLOCK

Table 6-15. Keypad Lock EDP Commands

Setpoints Menu

Note *For setpoint commands the "n" symbolizes the setpoint number, 1-20.*

Command	Menu	Description	Choices / Range
SP.ACCESS#n	ACCESS	Setpoint access in top level menu (user)	OFF, ON
SP.BANDVAL#n	BNDVAL	Band value	0 - 999999
SP.BRANCH#n	BRANCH	Branch destination	0,1-20
SP.CLRACCM#n	CLRACM	Clear accumulator	OFF, ON
SP.CLRTAR#n	CLRTAR	Clear tare	OFF, ON
SP.DIGOUT#n	DIGOUT	Lists all digital output bits available for the specified SLOT	NONE, BIT1 – BIT4
SP.END#n	END	Ending setpoint number for TIMER and CONCUR	1- 20
SP.HYSTER#n	HYSTER	Hysteresis	Range: 0 - 65535 (for the COUNTR and DELAY setpoints) 0 - 999999 (for the GROSS, NET, and %REL setpoints)
SP.KIND#n	Selection made directly after dropping down from SETPT x	Supported setpoint kinds	OFF, GROSS, NET, -GROSS, -NET, %REL, PAUSE, DELAY, WAITSS, COUNTR, AUTJOG, TIMER, CONCUR
SP.BATSEQ#n	BATSEQ	Specifies whether the setpoint is a batch step	OFF, ON
SP.NAME#n	NAME	Setpoint name string	Alphanumeric, Max Length: 6
SP.PCOUNT#n	PCOUNT	Preact learn interval (number of cycles before it learns)	Range: 0 - 65535
SP.PREACT#n	PREACT	Preact type	OFF, ON, LEARN
SP.PREADJ#n	PREADJ	Preact adjustment percentage	Range: 0 – 999999
SP.PRESTAB#n	PRESTB	Preact learn stability	Range: 0 - 65535
SP.PREVAL#n	PREVAL	Preact value	Range: 0 - 999999
SP.PSHACCM#n	PSHACM	Push accumulate	OFF, ON, ONQUIET
SP.PSHPRINT#n	PSHPRT	Push print	OFF, ON, WAITSS
SP.PSHTARE#n	PSHTAR	Push tare	OFF, ON
SP.RELNUM#n	RELNUM	Relative setpoint number	1- 20
SP.SENSE#n	SENSE	Digital output sense	NORMAL, INVERT
SP.DSLOT#n	SLOT	Digital output slot	NONE, SLOT0, SLOT1
SP.START#n	START	Starting setpoint number for TIMER and CONCUR	1- 20
SP.TRIP#n	TRIP	Specifies when the setpoint is satisfied when compared to value	HIGHER, LOWER, INBAND, OUTBAND
SP.VALUE#n	VALUE	Setpoint value	Range: 0 - 65535 (for the COUNTR and DELAY setpoints) 0 - 999999 (for the GROSS, NET, and %REL setpoints)
BATCHNG	BATCHG	Batching mode	OFF, AUTO, MANUAL

Table 6-16. Setpoints EDP Commands

Note ***Different setpoint parameters are available and accepted depending on KIND, TRIP, and PREACT. These restrictions are listed below by the EDP command name but the same applies to access by menu.***

GROSS, NET, -GROSS, -NET, and %REL type setpoints

SP.KIND#n=GROSS, NET, -GROSS, -NET, or %REL
SP.ACCESS#n
SP.BNDVAL#n (if TRIP INBAND or OUTBAND only)
SP.BRANCH#n (if BATSEQ is ON)
SP.CLRACCM#n
SP.CLRTARE#n
SP.DIGOUT#n
SP.HYSTER#n (if TRIP HIGHER or LOWER only)
SP.BATSEQ#n
SP.NAME#n
SP.PCOUNT#n (if PREACT is LEARN only)
SP.PREACT#n (if TRIP HIGHER or LOWER only)
SP.PREADJ#n (if PREACT is LEARN only)
SP.PRESTAB#n (if PREACT is LEARN only)
SP.PREVAL#n (if PREACT is ON or LEARN only)
SP.PSHACM#n
SP.PSHPRT#n
SP.PSHTAR#n
SP.RELNUM#n (for %REL setpoints only)
SP.SENSE#n
SP.SLOT#n
SP.TRIP#n
SP.VALUE#n

PAUSE type setpoints

SP.KIND#n=PAUSE
SP.ACCESS#n
SP.DIGOUT#n
SP.NAME#n
SP.SENSE#n
SP.SLOT#n

DELAY type setpoints

SP.KIND#n=DELAY and AUTJOG
SP.ACCESS#n
SP.CLRACCM#n
SP.CLRTARE#n
SP.DIGOUT#n
SP.NAME#n
SP.PSHACM#n
SP.PSHPRT#n
SP.PSHTAR#n
SP.SENSE#n
SP.SLOT#n
SP.VALUE#n

WAITSS type setpoints

SP.KIND#n=WAITSS
SP.ACCESS#n
SP.CLRACCM#n
SP.CLRTARE#n
SP.DIGOUT#n
SP.NAME#n
SP.PSHACCM#n
SP.PSHPRINT#n
SP.PSHTARE#n
SP.SENSE#n
SP.SLOT#n

COUNTR type setpoints

SP.KIND#n=COUNTR
SP.ACCESS#n
SP.BRANCH#n
SP.DIGOUT#n
SP.NAME#n
SP.SENSE#n
SP.SLOT#n
SP.VALUE#n

TIMER and CONCUR setpoints

SP.KIND#n=TIMER and CONCUR
SP.ACCESS#n
SP.DIGOUT#n
SP.END#n
SP.NAME#n
SP.SLOT#n
SP.START#n
SP.SENSE#n
SP.VALUE#n

Print Format Menu

The Menu items (except for HDRFMT) are listed by the format and the sub-parameters.

Command	Menu	Description	Choices / Range
ACC.FMT	ACCFMT | FMT	Accumulator enabled and displayed, or setpoint print operation with PSHACCM=ON	Alphanumeric, Max Length: 1000
ACC.PORT	ACCFMT | PORT	Accumulator print port	COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF
GFMT.FMT	GFMT | FMT	Weigh mode, no tare in system	Alphanumeric, Max Length: 1000
GFMT.PORT	GFMT | PORT	Weigh mode, no tare in system, print port	COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF
HDRFMT1	HDRFMT	Must be inserted into other print format	Alphanumeric, Max Length: 300
NFMT.FMT	NFMT | FMT	Weigh mode, tare in system	Alphanumeric, Max Length: 1000
NFMT.PORT	NFMT | PORT	Weigh mode, tare in system, print port	COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF
SPFMT.FMT	SPFMT | FMT	Setpoint print operation with PSHPRT=ON	Alphanumeric, Max Length: 1000
SPFMT.PORT	SPFMT | PORT	Setpoint print port	COM, USBCOM, ETH-S, ETH-C, USBMEM, OFF

Table 6-17. Print Format EDP Commands

Note *See Section 7.2 on page 85 for detailed information.*

Digital I/O Configuration Menu

Command	Menu	Choices / Range
DIO.b#s	BIT x	OFF, PRINT, ZERO, TARE, UNITS, CLEAR, DSPACC, DSPTAR, NT/GRS, CLRCN, BATRUN, BATSTR, BATPAS, BATRST, BATSTP, OUTPUT, KBDLOC, GROSS, NET, PRIM, SEC, CLRTAR, CLRACC

Table 6-18. Digital I/O Configuration EDP Commands

Note ***Digital inputs and outputs are specified by bit number (b = 1, 2, 3 or 4) and slot number (s = 0 or 1).***

Analog Out Menu

Command	Menu	Description	Choices / Range
ALG.MODE#1	MODE	Specifies the weight data, gross or net, tracked by the analog output	GROSS, NET
ALG.OUTPUT#1	OUTPUT	Specifies the output type	0-10V, 0-20MA, 4-20MA
ALG.ERRACT#1	ERRACT	Error action	FULLSC, HOLD, ZEROSC
ALG.MIN#1	MIN	Minimum value tracked	Range: 0 - 999999
ALG.MINNEG#1	MINNEG	Specify ON if the minimum weight is a negative value	OFF, ON
ALG.MAX#1	MAX	Maximum value tracked	Range: 0 - 999999
ALG.MAXNEG#1	MAXNEG	Specify ON if the maximum weight is a negative value	OFF, ON

Table 6-19. ALGOUT EDP Commands

6.1.5 Weigh Mode Commands

The weigh mode commands (see Table 6-20) transmit data to a data communications port on demand. The SX, EX, and all the "X" weight retrieval commands are valid only in normal operating mode; all other commands are valid in either setup or weigh mode.

Command	Function
CONSNUM	Set or query the consecutive number
UID	Set or query the unit ID
SD	Set or query the date. Enter six-digit date using the year-month-day order specified for the DATEFMT parameter, using only the last two digits of the year.
ST	Set or query the time. Enter the time using 24-hour format
SX#n	Start serial port streaming. If port is configured to stream on port #1 - 4. (1=COM, 2=USBCOM, 3=Ethernet Server, 4=Ethernet Client)
SX	Start serial port streaming for the port receiving the command, if port is configured to stream.
EX#n	Stop serial port streaming. If port is configured to stream on port #1 - 4. (1=COM, 2=USBCOM, 3=Ethernet Server, 4=Ethernet Client)
EX	Stop serial port streaming for the port receiving the command, if port is configured to stream.
RS	Reset system. This is a soft reset. Used to reset the indicator without resetting the configuration to the factory defaults.
S	Sends a single stream frame from the scale to the port in the format defined by the Stream Format parameter of the port receiving the command.
XA#n	Transmit accumulator value in displayed units for scale n
XA	Transmit accumulator value in displayed units for selected scale
XAP#n	Transmit accumulator value in primary units for scale n
XAS#n	Transmit accumulator value in secondary units for scale n
XG#n	Transmit gross weight in displayed units for scale n
XG	Transmit gross weight in displayed units for selected scale
XG2	Transmit gross weight in non-displayed units for selected scale
XGP#n	Transmit gross weight in primary units for scale n
XGS#n	Transmit gross weight in secondary units for scale n
XN#n	Transmit net weight in displayed units for scale n
XN	Transmit net weight in displayed units for selected scale
XN2	Transmit net weight in non-displayed units for selected scale
XNP#n	Transmit net weight in primary units for scale n
XNS#n	Transmit net weight in secondary units for scale n
XT#n	Transmit tare weight in displayed units for scale n
XT	Transmit tare weight in displayed units for selected scale
XT2	Transmit tare weight in non-displayed units for selected scale
XTP#n	Transmit tare weight in primary units for scale n
XTS#n	Transmit tare weight in secondary units for scale n
XE	Returns a decimal representation of any error conditions
XEH	Returns a hexadecimal representation of any error conditions

Table 6-20. Weigh Mode EDP Commands

Note ***The 880 only supports one scale.***

Digital I/O Control Menu

Command	Function
DON.b#s	Set digital output on (active) at bit b, slot s
DOFF.b#s	Set digital output off (inactive) at bit b, slot s

Table 6-21. Digital I/O Control EDP Commands

Digital inputs and outputs are specified by bit number (b = 1, 2, 3 or 4) and slot number (s = 0 or 1).

The DON/DOFF commands will only control the state of the a slot/bit that is defined as an OUTPUT in the configuration menu.

6.1.6 ERROR Commands Output

The XE and XEH commands return a representation of any existing error conditions as described Table 10-3 on page 101.

6.1.7 Batching Control Commands

Command	Function
BATSTART	Batch start. If the BATRUN digital input is active (low) or not assigned, the BATSTART command can be used to start the batch program. If the BATRUN is inactive (high), the BATSART command will reset the batch program to the first batch step.
BATSTOP	Batch stop. Stops the batch program at the current batch step and turns off all associated digital outputs.
BATPAUSE	Batch pause. Stops the batch program at the current step. All digital outputs set on by the current step (except for those set by concur setpoints) are set off. The BATSTR digital input or BATSTART serial command can be used to restart the batch program at the current step.
BATRESET	Batch reset. Stops the program and resets the batch program to the first batch step. Run the BATRESET command after making changes to the batch configuration.

Table 6-22. Batching Control Commands

6.1.8 Database Commands

The commands listed in Table 6-23 can be used to create and maintain databases in the *880*. Except for the DB.DELALL command, all of the database commands require an extension to identify the database number.

Command	Description
DB.ALIAS.*n#x*	Get or set database name
DB.CLEAR.*n#x*	Clear database contents
DB.DATA.*n#x*	Get or set database contents
DB.SCHEMA.*n#x*	Get or set database structure
DB.DELALL	Delete all databases and database contents
• *n* represents the database number, x is 0 • Each command must be terminated with a carriage return character (<CR>, ASCII 13) • The *880* only supports onboard databases - slot 0 • Onboard database number 1 is reserved for future use on the *880*; database numbers 2-9 are available	

Table 6-23. Database Commands

DB.ALIAS

The DB.ALIAS command is used to get or set the alias used by *iRite* programs to reference the specified database. Each database alias must be unique among all databases and adhere to the following rules: 8 character maximum; must begin with an alpha character or an underscore; can only contain A–Z, a–z, 0–9, or an underscore (_).

Example. The following command assigns an alias of TRUCKS_2 to the second database in the onboard memory:

DB.ALIAS.2#0=TRUCKS_2<CR>

Sending the DB.ALIAS command alone, without assigned data, returns the current database alias.

DB.CLEAR

To clear the contents of a database, send the following command:

DB.CLEAR.*n*#*x*<CR>

Where:

n is the database number within the memory

x is the slot number 0

The *880* responds with OK<CR> if the command is successful, ??<CR> if unsuccessful.

DB.DATA

The DB.DATA command can be used to send data to or retrieve data from the *880*.

Data can be sent to the indicator using the following command:

DB.DATA.*n*#*x* = *data*{|}<CR>

Where:

n is the database number within the memory

x is the slot number 0

data represents a single cell of a row of data

{|} is an ASCII pipe character (decimal 124), used to delimit cell data. If the data being sent is not the last cell of the row, append the pipe character to the data to indicate that more data is coming for that particular row. If the data being sent is the last cell of the row, do not append the pipe character.

If the command is accepted, the *880* responds with OK<CR>; if not, it responds with ??<CR>.

Example: The following commands place the data shown in Table 6-24 into the second database in the onboard memory:

DB.DATA.2#0=this|<CR>
DB.DATA.2#0=is|<CR>
DB.DATA.2#0=a|<CR>
DB.DATA.2#0=test<CR>

DB.DATA.2#0=aaa|<CR>
DB.DATA.2#0=bbb|<CR>
DB.DATA.2#0=ccc|<CR>
DB.DATA.2#0=ddd<CR>

Record	Cell			
	1	2	3	4
first	this	is	a	test
second	aaa	bbb	ccc	ddd

Table 6-24. Sample Database Contents

Sending the DB.DATA command alone, without assigned data, returns the database contents:

DB.DATA.*n*#*x*<CR>

The *880* responds with the entire contents of the database. Returned data is cell-delimited with the pipe character (decimal 124) and row-delimited with carriage returns (decimal 13).

For example, the following command could be used to return the contents of database 2 in the onboard memory:

DB.DATA.2#0<CR>

If the database contents are the records shown in Table 6-24, the indicator responds with the following data, using pipe characters and carriage returns to delimit the database cells and rows, respectively:

this|is|a|test<CR>aaa|bbb|ccc|ddd<CR>

Note ***There is not an* end of database *notification at the end of the* DB.DATA *command transmission. Use a receive time-out to determine command completion. The time-out value will vary based on baud rate.***

Determine the number of records currently in the database both prior to and after sending the DB.DATA command to verify that the correct number of records are received. The number of records can be determined with the DB.SCHEMA command.

***Note** The 62K of onboard (slot 0) memory can be allocated to up to eight auxiliary databases. However, the size of any one database may limit the size and number of other databases.*

DB.SCHEMA

The DB.SCHEMA command is used to get or set the structure of a database.

DB.SCHEMA.*n*#*x*<CR>

The *880* responds to the command above by returning the following:

<Max Records>,<Current Record Count>,
<Column Name>,<Data Type>,<Data Size>,...<CR>

The *<Column Name>*, *<Data Type>*, and *<Data Size>* elements repeat for each column in the database.

The *<Column Name>* follows the rules for alias names: 8 character maximum; must begin with an alpha character or an underscore; can only contain A–Z, a–z, 0–9, or an underscore (_).

The *<Data Type>* is represented by a numeric field:

Value	Type
1	Byte
2	Short (16-bit integer)
3	Long (32-bit integer)
4	Single (32-bit floating point)
5	Double (64-bit floating point)
6	Fixed string
7	Variable string
8	Date and time

Table 6-25. Data Type Field Codes

The *<Data Size>* value must match the data type. A range of data size values is allowed only for the string data types. The maximum number of characters allowed for the string field are listed below.

Size	Value
Byte	1
Short	2
Long	4
Single	4
Double	8
Fixed string	*1–255*
Variable string	*1–255*
Date and time	8

Table 6-26. Data Size Field Codes

The DB.SCHEMA command can also be used to modify the schema, but only when the indicator is in setup mode and only if the database does not contain any data.

7.0 Print Formatting

The *880* provides five print formats. Formats **GFMT** and **NFMT** will be printed based on the current mode of operation when the **Print** key is pressed (see Table 7-2 on page 85). **HDRFMT** can be inserted into any other print format using the <H1> formatting token. **SPFMT** is printed when a setpoint is satisfied if **PSHPRT** is set to **ON** or **WAITSS** in the setpoint configuration. The **ACCFMT** is printed if the accumulator is embedded and the print key is pressed while viewing the accumulator value, or if a setpoint **PSHACM** is set to ON. If **PSHACM** is set to **ONQUIE**, it will accumulate, but not print.

Each print format can be customized to include up to 1000 characters of information (300 for **HDRFMT**), such as company name and address. Use the indicator front panel (**PFORMT** menu), EDP commands, or the *Revolution*® configuration utility to customize the print formats.

7.1 Print Formatting Tokens

Table 7-1 lists tokens that can be used to format the *880* print formats. Tokens included in the format strings must be enclosed between < and > delimiters. Any characters outside of the delimiters are printed as text. Text characters can include any ASCII character that can be printed by the output device.

Tokens	Description	Ticket Format	
		GFMT/NFMT/ ACCFMT	SPFMT
<G>	Gross weight in displayed units (See notes 1 and 2 below)	√	√
<N>	Net weight in displayed units (See notes 1 and 2)	√	√
<T>	Tare weight in displayed units (See notes 1 and 2)	√	√
<A>	Accumulated weight in displayed units	√	√
<AC>	Number of accumulator event (5-digit counter)	√	√
<AT>	Time of last accumulator event	√	√
<AD>	Date of last accumulator event	√	√
<SCV>	Setpoint captured value		√
<STV>	Setpoint target value		√
<SPM>	Setpoint mode (gross or net label)		√
<SNA>	Setpoint name		√
<SN>	Setpoint number		√
<SPV>	Setpoint preact value		√
<TI>	Time	√	√
<DA>	Date	√	√
<TD>	Time and date	√	√
<UID>	Unit ID number (See note 3)	√	√
<CN>	Consecutive number (See note 3)	√	√
<H1>	Ticket header (HDRFMT)	√	√
<NL*nn*>	New line (*nn* = number of termination (<CR/LF> or <CR>) characters) (See note 4)	√	√
<SP*nn*>	Space (*nn* = number of spaces) (See note 4)	√	√
<SU>	Toggle weight data format (formatted/unformatted) (See note 5)	√	√
<AN>	Alibi Ticket Number	√	√

Table 7-1. Print Format Tokens

Tokens	Description	Ticket Format	
		GFMT/NFMT/ ACCFMT	SPFMT
<USnn>	Insert user print text string (from iRite user program, SetPrintText API)	√	√
(EVx)	Invoke iRite user program print handler x (PrintFmtx)	√	√
<CR>	Carriage return character	√	√
<LF>	Line feed character	√	√

Note

1. *Gross, net, and tare weights are 8 digits in length, including sign and decimal point, followed by a space and a one-to five-digit units identifier. Total field length with units identifier is 10-14 characters. Depending on what units are configured, the units identifier will be lb, kg, oz, tn, t, or g.*
2. *Gross, net, tare, and accumulator weights can be printed in any configured weight units by adding the following modifiers to the gross, net, tare, and accumulator weight commands: /P (primary units), /D (displayed units), /S (secondary units), /T (tertiary units). If not specified, the current displayed units (/D) is assumed. Example: To format a ticket to show net weight in secondary units, use the following command: <N/S>.*
3. *Unit ID and consecutive number (CN) fields are 1–6 characters in length, as required.*
4. *If nn is not specified, 1 is assumed. Value must be in the range 1–99.*
5. *After receiving an SU token, the indicator sends unformatted data until the next SU token is received. Unformatted data omits decimal points, leading and trailing characters.*

Table 7-1. Print Format Tokens

7.2 Default Print Formats

Table 7-2 shows the default print formats for the *880* and lists the conditions under which each print format is used. The **HDRFMT** format is used to specify header information that can be used by the other print formats. The contents of the **HDRFMT** format can be inserted into any other print format using the <H1> formatting token.

Format	Default Format String	Used When
GFMT | FMT	GROSS<G><NL2><TD><NL>	Weigh mode, no tare in system
GFMT | PORT		Defines the communication port that the format will be sent to.
NFMT | FMT	GROSS<G><NL>TARE<SP><T><NL>NET <SP2><N><NL2><TD><NL>	Weigh mode, tare in system
NFMT | PORT		Defines the communication port that the format will be sent to.
ACCFMT | FMT	ACCUM<A><NL><DA> <TI><NL>	Accumulator enabled and displayed, or setpoint print operation with PSHACCM=ON
ACCFMT | PORT		Defines the communication port that the format will be sent to.
SPFMT | FMT	<SCV><SP><SPM><NL>	Setpoint push print operation (PSHPRNT=ON or WAITSS)
SPFMT | PORT		Defines the communication port that the format will be sent to.

Note *In OIML and CANADA modes, the letters* **PT** *(preset tare) are automatically inserted after the printed tare weight.*

If the COM port is set to TYPE = RS485, the port will not perform a demand print. See Section 10.6.3.

Table 7-2. Default Print Formats

7.3 Customizing Print Formats

The following sections describe procedures for customizing print formats using the EDP commands, the front panel (**PFORMT** menu), and the *Revolution*® configuration utility.

7.3.1 Using the EDP Commands

With a personal computer, terminal, or remote keyboard attached to the *880*, the EDP command set can be used to customize the print format strings.

To view the current setting of a format string, type the name of the print format, followed by .FMT, and press **ENTER**. For example, to check the current configuration of the **GFMT** format, type **GFMT.FMT** and press **ENTER**. The indicator responds by sending the current configuration for the gross format:

GROSS<G><NL2><TD><NL>

To change the format, use the format EDP command followed by an equals sign (=) and the modified print format string. For example, to add the name and address of a company to the gross format, send the following EDP command:

GFMT.FMT=RICE LAKE WEIGHING SYSTEMS<NL>230 W COLEMAN ST<NL>RICE LAKE WI 54868<NL2><G>
GROSS<NL>

A ticket printed using this format might look like the following:

RICE LAKE WEIGHING SYSTEMS
230 W COLEMAN ST
RICE LAKE WI 54868

1345 LB GROSS

The ticket above could also be formatted by specifying the company address information in the **HDRFMT** ticket format, then substituting the <H1> token for the address in the **GFMT** ticket format:

HDRFMT1=RICE LAKE WEIGHING SYSTEMS<NL>230 W COLEMAN ST<NL>RICE LAKE WI 54868<NL2>GFMT=<AE><G>
GROSS<NL>

Note *The HDRFMT1 command does not require the .FMT.*

7.3.2 Using the Front Panel

If there is no access to equipment for communication through the communication ports or when working at a site where such equipment cannot be used, the **PFORMT** menu (see Section 3.2.12 on page 53) can be used to customize the print formats. Using the **PFORMT** menu, edit the print format strings by changing the decimal values of the ASCII characters in the format string.

Note *Edit the format using the Alphanumeric Entry Procedure, see Section 1.5.1.*

Note *Some special characters cannot be displayed on the 880 front panel (see the ASCII character chart on page 111) and are shown as blanks. The 880 can send or receive any ASCII character; the character printed depends on the particular ASCII character set implemented for the receiving device.*

7.3.3 Using Revolution®

The *Revolution* configuration utility provides a print formatting grid with a tool bar. The grid allows the construction of the print format without the formatting tokens (<NL> and <SP>) required by the front panel or EDP command methods. Using *Revolution*, type text directly into the grid, then select weight value fields from the tool bar and place them where they are to appear on the printed ticket.

Figure 7-1 shows an example of the *Revolution* print formatting grid.

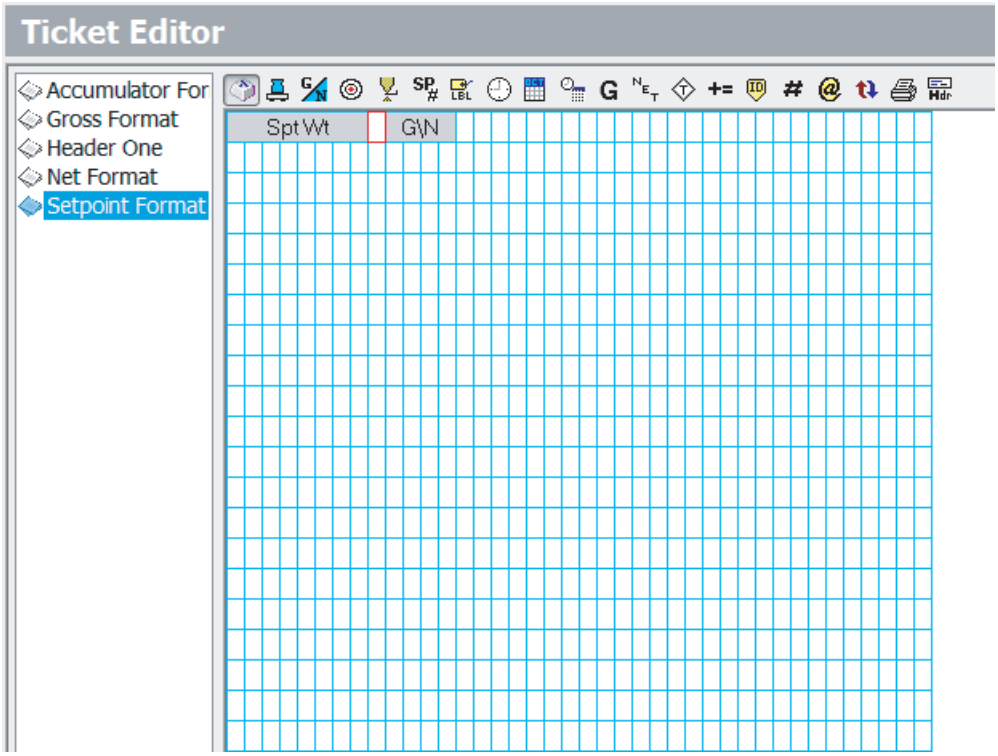


Figure 7-1. Revolution Print Format Grid

8.0 Setpoints

The *880* indicator provides 20 configurable setpoints for control of both indicator and external equipment functions. Setpoints can be configured to perform actions or functions based on specified parameter conditions. Parameters associated with various setpoint kinds can, for example, be configured to perform functions (print, tare, accumulate), to change the state of a digital output to control external equipment functions, or to make conditional decisions.

See Section 3.2.13 on page 54 for setpoint menu layout.

Weight-based setpoints are tripped by values specified in primary units only.

8.1 Batch and Continuous Setpoints

880 setpoints can be either continuous or batch setpoints.

Continuous setpoints are free-running; the indicator constantly monitors the condition of free-running setpoints at each A/D update. The specified setpoint action or function is performed when the designated setpoint parameter conditions are met. A digital output or function assigned to a free-running setpoint continuously changes state, becoming active or inactive, as defined by the setpoint parameters.

Batch setpoints are active one at a time, in an ordered sequence. The *880* can use setpoints to control up to 20 separate batch processing steps.

A digital output associated with a batch setpoint is active until the setpoint condition is met, then latched for the remainder of the batch sequence.

To use batch setpoints, the BATCHG parameter in the SETPTS menu must be set to auto or manual. AUTO sequences repeat continuously after receiving a single initial BATSTR signal. MANUAL sequences require a BATSTR signal each time a single batch is run. The BATSTR signal can be initiated by a digital input, serial command or the StartBatch function in an iRite program. Set the BATCHG parameter to OFF to disable batch setpoints.

For setpoint kinds that can be used as either continuous or batch setpoints, the BATSEQ parameter must also be set ON. (Setpoint kinds that can only be used as batch setpoints do not require the BATSEQ parameter.) If the setpoint is defined but the BATSEQ parameter is off, the setpoint operates as a continuous setpoint, even during batch sequences.

In applications that contain both batch setpoint routines and continuous setpoints, continuous setpoints should be kept separate from the batch sequence. This is especially true when using CONCUR or TIMER setpoints to perform actions or functions based on the batch sequence. CONCUR and TIMER setpoints should not be included in the referenced START and END setpoint sequence.

Kind	Description	Batch	Continuous
OFF	Setpoint turned off/ignored.		
GROSS	Gross setpoint. Performs functions based on the gross weight. The target weight entered is considered a positive gross weight.	X	X
NET	Net setpoint. Performs functions based on the net weight. The target weight entered is considered a positive net weight value.	X	X
–GROSS	Negative gross weight. Performs functions based on the gross weight. The target weight entered is considered a negative gross weight.	X	X
–NET	Negative net weight. Performs functions based on the net weight. The target weight entered is considered a negative net weight value.	X	X
%REL	Percent relative setpoint. Performs functions based on a specified percentage of the target value of a referenced setpoint, using the same weight mode as the referenced setpoint. The actual target value of the %REL setpoint is calculated as a percentage of the target value of the referenced setpoint.	X	X
PAUSE	Pauses the batch sequence indefinitely. A BATSTR signal must be initiated to continue the batch process.	X	

Table 8-1. Setpoint Kinds

Kind	Description	Batch	Continuous
DELAY	Delays the batch sequence for a specified time. The length of the delay (in tenths of a second) is specified by the VALUE parameter.	X	
WAITSS	Wait for standstill. Suspends the batch sequence until the scale is at standstill.	X	
COUNTR	Specifies the number of consecutive batch sequences to perform. Counter setpoints should be placed at the beginning of a batch routine.	X	
AUTJOG	Auto Jog – Automatically checks the previous weight-based setpoint to verify the setpoint weight value is satisfied in a standstill condition. If the previous setpoint is not satisfied when at standstill, the AUTJOG setpoint activates the digital output of the previous weight-based setpoint for a period of time, specified by the VALUE parameter. The autjog process repeats until the previous weight-based setpoint is satisfied when the scale is at standstill.  ***The AUTJOG digital output is typically used to signify that an autjog operation is being performed. AUTJOG should not be assigned to the same digital output as the related weight-based setpoint.***	X	
TIMER	Tracks the progress of a batch sequence based on a timer. The timer value, specified in tenths of a second on the VALUE parameter, determines the length of time allowed between start and end setpoints. The indicator START and END parameters are used to specify the start and end setpoints. If the END setpoint is not reached before the timer expires, the digital output associated with this setpoint is activated.		X
CONCUR	Allows a digital output to remain active over a specified portion of the batch sequence. Two types of concur setpoints can be configured: Type 1 (VALUE=0): The digital output associated with this setpoint becomes active when the START setpoint becomes the current batch step and remains active until the END setpoint becomes the current batch step. Type 2 (VALUE > 0): If a non-zero value is specified for the VALUE parameter, that value represents the timer, in tenths of a second, for this setpoint. The digital output associated with this setpoint becomes active when the START setpoint becomes the current batch step and remains active until the timer expires.		X

Table 8-1. Setpoint Kinds (Continued)

8.2 Batch Operations

Batches are controlled by digital inputs or EDP commands.

Batch Run (BATRUN digital input) If a BATRUN digital input is configured, it must be active (low) for a batch to be started, and for it to continue to run. If a batch is running and the input becomes inactive (high), it will stop the batch at the current batch setpoint and turn off all associated digital outputs.

Batch Start (BATSTR digital input or BATSTART EDP command) If the BATRUN digital input is active (low), or is not assigned, batch start will start a batch, resume a paused batch or resume a stopped batch. If the BATRUN digital input is inactive (high), batch start will reset the current batch.

Batch Pause (BATPAS digital input or BATPAUSE EDP command) The BATPAS digital input will pause an active batch, turning off all associated digital outputs EXCEPT those associated with CONCUR and TIMER setpoints, while the input is active (low). As soon as the BATPAS digital input is made inactive (high), the batch will resume.
BATPAUSE EDP command works the same, except the batch will not resume until a batch start signal is received.

Batch Stop (BATSTP digital input or BATSTOP EDP command) Stops an active batch at the current setpoint and turns off all associated digital outputs.

Batch Reset (BATRST digital input or BATRESET EDP command) Stops and resets an active batch to the beginning of the process.

WARNING *To prevent personal injury and equipment damage, software-based interrupts must always be supplemented by emergency stop switches and other safety devices necessary for the application.*

Batching Switch

The batching switch option, PN 19369, comes as a complete unit in an FRP enclosure, with legend plate, locking stop switch (mushroom button), and a run/start/abort 3-way switch.

Both switches are wired into the indicator's digital I/O terminal strip as shown in Figure 8-1. Each switch uses a separate digital input. Digital input #1 must be set to **BATSTR** and #2 must be set to **BATRUN**.

Once cables and switches have been connected to the indicator, use the setup switch to place the indicator in configuration mode. Use the Digital I/O menu (see Section 3.2.14 on page 59) to configure digital input and output functions.

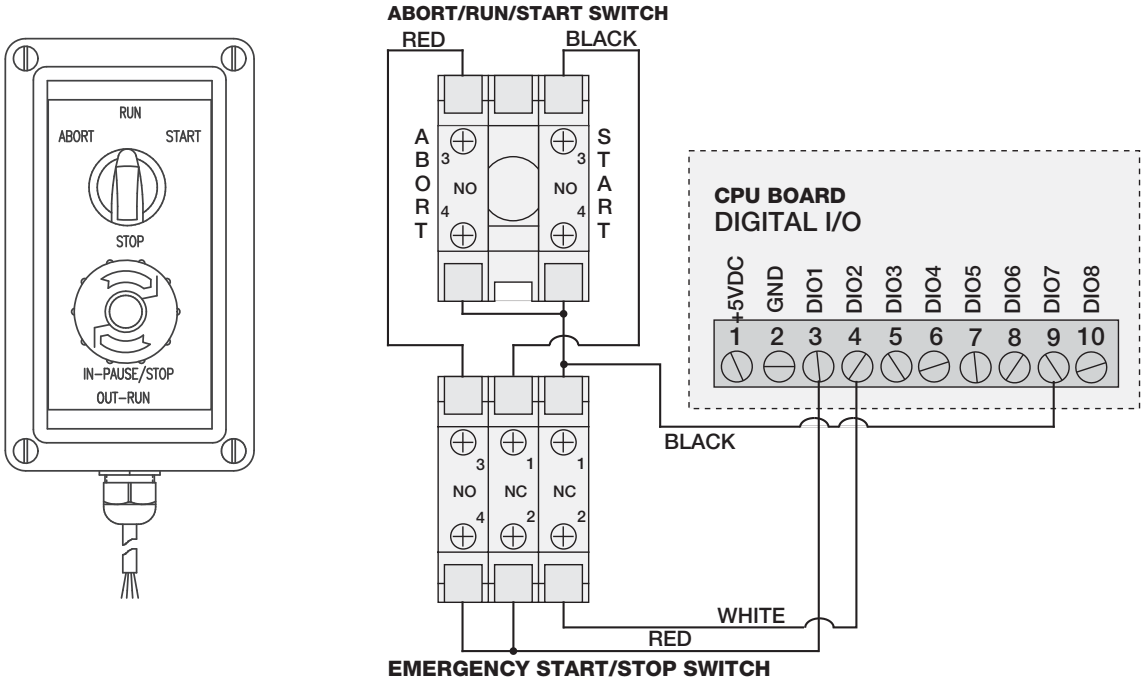


Figure 8-1. Batching Switch and Wiring Diagram Example

When configuration is complete, exit configuration mode. Initialize the batch by turning the 3-way switch to ***ABORT***, then unlock the STOP button (the STOP button must be in the OUT position to allow the batch process to run). The batching switch is now ready to use.

WARNING ***If no digital input is assigned to BATRUN, batching proceeds as if BATRUN were always on: the batch will start when the 3-way switch is turned to RUN, but the STOP mushroom button will not function.***

To begin a batch process, turn the 3-way switch to ***START*** momentarily. If the STOP button is pushed during the batch process, the process halts and the button locks in the IN position.

The ***START*** switch is ignored while the STOP button is locked in the IN position. The STOP button must be turned counterclockwise to unlock it, then released into the OUT position to enable the 3-way switch.

To restart an interrupted batch from the step where it left off, do the following:

1. Unlock STOP button (OUT position).
2. Turn 3-way switch to ***START.***

To restart an interrupted batch from the first batch step, do the following:

1. Turn 3-way switch to ***ABORT.***
2. Unlock STOP button (OUT position).
3. Turn 3-way switch to ***START.***

Note ***Use this procedure (or the BATRESET serial command) to initialize the new batch routine following any change to the setpoint configuration.***

8.3 Batching Examples

Note ***DIGIO, SLOT 0, BIT 1 = BATSTR***

DIGIO, SLOT 0, BIT 2, 3 and 4 = OUTPUT

Example 1

The following example is used to dispense 100-lb drafts, automatically refilling a hopper to 1000 lb gross weight once the gross weight has dropped below 300 lb.

Setpoint 1 ensures that the hopper has enough material to start the batch. If the hopper weight is 100 lb or higher, setpoint 1 is tripped.

KIND=GROSS
VALUE=100
TRIP=HIGHER
BATSEQ=ON

Setpoint 2 waits for standstill, performs a tare, and puts the indicator into net mode.

KIND=WAITSS
PSHTAR=ON

Setpoint 3 is used to dispense material from the hopper. When the hopper weight goes below 100 lb net the setpoint is tripped.

KIND=–NET
VALUE=100
TRIP=LOWER
BATSEQ=ON
SLOT = SLOT 0
DIGOUT=2

Setpoint 4 is used to evaluate the gross weight of material in the hopper after dispensing. When the hopper weight falls below 300 lb, digital output slot 0, bit 3, becomes active and the hopper is refilled to 1000 lb.

KIND=GROSS
VALUE=300
TRIP=HIGHER
HYSTER=700
BATSEQ=ON
SLOT = SLOT 0
DIGOUT=3

Setpoint 5 is used as a “no flow alarm”. If the process in setpoint 5 is not completed in 10 seconds, digital output slot 0, bit 4, becomes active to signify a problem.

KIND=TIMER
VALUE=100
START=3
END=4
SLOT = SLOT 0
DIGOUT=4

Example 2

The following example uses a CONCUR setpoint to provide a two-speed simultaneous fill of a hopper to a net weight of 1000 lb.

Setpoint 1 ensures that the gross weight is within 50 lb of gross zero.

KIND=GROSS
VALUE=0
TRIP=INBAND
BNDVAL=50
BATSEQ=ON

Setpoint 2 performs a tare once the scale is at standstill.

KIND=WAITSS
PSHTARE=ON

Setpoint 3 uses digital output slot 0, bit 2, to fill a hopper to a net weight of 800 lb.

KIND=NET
VALUE=800
TRIP=HIGHER
BATSEQ=ON
SLOT = SLOT 0
DIGOUT=2

Setpoint 4 uses digital output slot 0, bit 3, to fill the hopper to a net weight of 1000 lb.

KIND=NET
VALUE=1000
TRIP=HIGHER
BATSEQ=ON
SLOT = SLOT 0
DIGOUT=3

Setpoint 5 operates digital output slot 0, bit 3, while Setpoint 3 is active, providing simultaneous two-speed filling.

KIND=CONCUR
VALUE=0
START=3
END=4
SLOT = SLOT 0
DIGOUT=3

9.0 Ethernet and USB

9.1 Ethernet Server/Client Connections

The *880* supports two simultaneous TCP connections, one as a server and the other as a client. This section details the functions of the Server and Client connections, including some examples on how they may be used. Refer to Section 3.2.10 on page 50 for configuration.

Ethernet Server

The Server features a configurable TCP Port number. It also has settings for echo, response, End-of-Line delay, trigger function, timeout, and stream data format.

A typical application may connect a PC Application (a *terminal program such as Telnet, or Revolution*) to the *880*.

The *880* listens for a connection request from an external client device.

Ethernet Client

The Client features the ability to open a TCP connection to a configurable Remote Server IP and TCP Port.

If a connection has not been made and the *880* attempts to send data through the client connection, it will attempt to establish a connection to the remote server. It will continue trying indefinitely until a connection is made.

Typical applications for the Client include connecting to a:

- Ethernet printer or Remote Display
- Remote TCP to Serial device server
- PC application that is listening for the connection

The Client also has settings for echo, response, End-of- Line delay, trigger function, timeout, and stream data format.

Note

- *Only a single connection each to the Server and Client is allowed at one time. If a connection is already established, other connection attempts will fail.*
- *The Server and Client ports are independent of each other, and both can have a connection at the same time. This means it can be streaming out one port, while using a PC to poll data from the other. Data can be streamed out both ports if desired (for best results, set the End-of-Line Delay on both ports to at least 2).*
- *Establishing connections - a client must establish a connection to a server. Therefore, the 880 cannot connect to a Remote Client, and a Remote Server cannot connect to the 880*
- *Both the Server and Client connections have a Timeout parameter, allowing the 880 to terminate either connection after the set number of seconds has passed with no activity (0 = no disconnect).*
- *When connecting to a DHCP network, it may take several seconds before the 880 is assigned an IP address. When a new IP address is assigned through DHCP, it is stored in the 880 configuration and will remain the IP address used until reconfigured manually; the indicator settings are reset to default; or a new address is assigned by DHCP.*

9.1.1 Direct Connection from a PC to the 880 Ethernet Server without a network (Ad-Hoc)

1. The PC must be configured with a Static IP address. Using the computer's network configuration tools, configure the network adapter to have a static IP address and appropriate subnet mask.

   Example: 192.168.0.100.

2. The *880* must also be configured with a static IP address, different from the computer's, but in the same subnet.

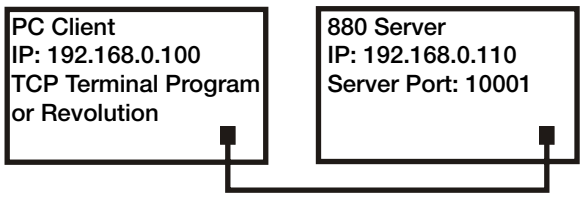


Figure 9-1. Direct Connection from PC to 880 Ethernet

   - Enter the configuration mode using the setup switch on the back of the *880* (see Figure 3-1).
   - Navigate to the Ethernet sub-menu under the Ports menu (see Figure 3-10).
   - Set Dynamic Host Configuration Protocal (**DHCP**) to **OFF**, then configure the IP address and Subnet Address.

     Example: 192.168.0.110. Also set the Server Ethernet TCP Port number, if needed (default is 10001).

3. Connect an Ethernet straight-through or crossover cable (the port is auto-sensing, so either will work) between the *880* and the Ethernet connector on the PC.
4. Open the PC application that will be used.
5. To establish the connection, enter the indicator's IP address and Server TCP Port number (*192.168.0.110 and 10001 in this example*). The application will now be able to communicate to the *880* using any of its EDP commands.

9.1.2 PC Connection to the 880 Ethernet Server Through a Network Switch or Router

Note ***In some cases, devices cannot be connected to an existing network without the network administrator's approval. When connecting to a network, ensure there is permission to do so. If there is any doubt as to what needs to be done, seek help from the networks administrator.***

1. The PC should already be connected to the network, and either assigned an IP address using DHCP, or have a static address.
   - If not, use the computer's network configuration tools to connect to the network.
   - If it is not a **DHCP** network, make note of the PC's IP address and subnet mask.
2. The *880* can either be configured to obtain its IP address automatically using **DHCP** (if supported on the network), or it can be configured manually with a Static IP. It is recommended to use **DHCP**, if available.
   - To configure the settings, go into the configuration mode using the setup switch on the back of the unit (see Figure 3-1).
   - Navigate to the Ethernet sub-menu under the Ports menu (see Figure 3-10).
     - **Dynamic Host Configuration Protocal (DHCP): Set the DHCP Setting to ON. Set the Ethernet Server TCP Port to the desired Port number (default is 10001). The IP, Subnet, Primary and Secondary DNS, and Default Gateway will be configured automatically when the 880 is connected to the DHCP-enabled network.**
     - **Manual (static) IP (IPADRS): Set DHCP to OFF, then configure the IP address and Subnet Address. *For example, 192.168.0.110.* Also set the Ethernet Server TCP Port number, if needed (default is 10001). The Primary and Secondary DNS, and Default Gateway, can be set if needed.**

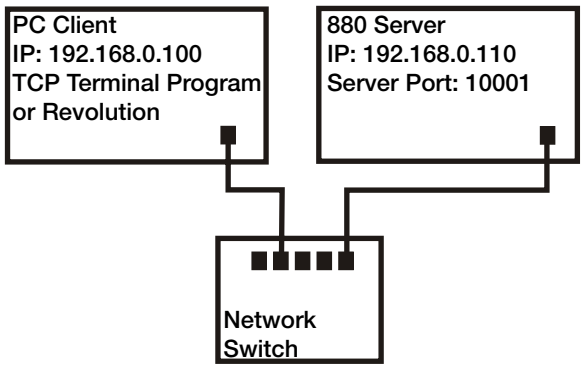


Figure 9-2. Connection from PC to 880 Ethernet Through a Network Switch or Router

3. Using a straight-through or crossover cable (the port is auto-sensing, so either will work) connect the Ethernet connector on the *880* to an available connector on the network.
4. If connected to a DHCP-enabled network and **DHCP** is enabled, go back into the configuration mode and navigate to the IP setting to get the IP address the network assigned to the *880*. Make note of the current IP address, being careful not to change any of the numbers. Return to weigh mode.
5. Open the PC application to be used. To establish the connection, enter the indicator's IP address and Server TCP Port number (*192.168.0.110 - or the DHCP-assigned IP address - and 10001 in this example*). The application will now be able to communicate to the *880* using any of its EDP commands.

9.1.3 Connection to a Remote Host - Demand Print to an Ethernet Printer

1. Connect the *880* and printer either directly to each other (each with a Static IP on the same subnet), or through a network.
2. Configure the Client Remote Server IP and port to the IP address and TCP port of the printer.
3. Configure the port destination of the Print Format(s) being used to Ethernet Client (ETH-C).
4. Set the Ethernet Client Trigger to Command (COMAND) mode.
5. If the client has not been connected and a demand print is called for, the Client will attempt connection to the Printer. This may take several seconds. Once the connection is made, the print data will be sent to the printer.

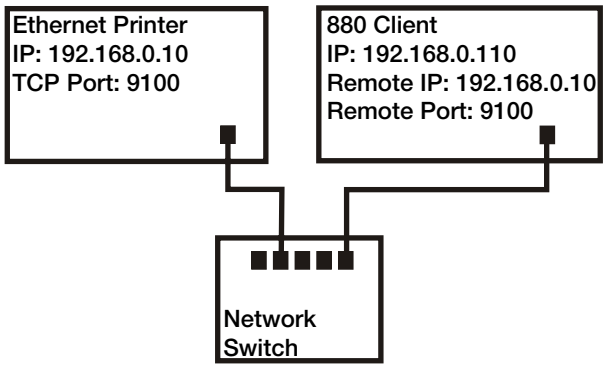


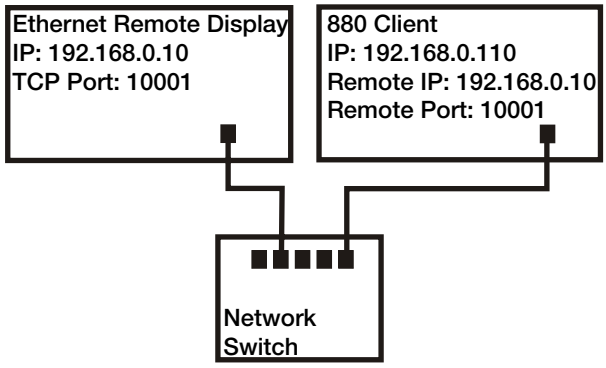
Figure 9-3. Connection to Remote Host

6. The connection will remain intact unless the *880* or the printer terminates the connection. The *880* has a timeout setting for the Client connection.
   - When set to 0, the connection will not be terminated by the *880*.
   - When set to a value other than zero, the connection will be terminated after inactivity for the specified period of time, in seconds.

   The timeout feature is useful when several indicators want to print to the same printer.

9.1.4 Connecting to a Remote Host - Stream weight data to an Ethernet Remote Display

1. Connect the *880* and Remote Display either directly to each other (each with a Static IP on the same subnet), or through a network.
2. Configure the Client Remote Server IP and port to the IP address and TCP port of the remote display.
3. Configure the trigger setting for the Client to either Stream Industrial (STRIND), or Stream Legal-for-Trade (STRLFT).
4. To prevent data overrun on the receiving device (*the 880 will stream data at up to 50 frames per second*), it is recommended the Client's End-of-Line Delay be set to 1 (10 frames per second) or 2 (5 frames per second), or higher. This is also a good way to help reduce network traffic if speed is not a concern. If data at the remote display appears to lag, or get behind the data on the indicator, the End-of-Line Delay may need to be increased even more.



5. Shortly after returning to weigh mode, the *880* will start to stream data to the Ethernet Client port. The *880* will then attempt to make the connection. The data will be sent to the Remote Host once connected. This may take several seconds.

Note *There may be several seconds worth of buffered data sent at the moment of connection.*

9.1.5 Connecting to a Remote Host, Stream/Demand Data to Remote Ethernet-to-RS-232 Device Server

1. Connect the *880* and device server either directly to each other (each with a static IP on the same subnet), or through a network.
2. Configure the Client Remote Server IP and port to the IP address and TCP port of the device server.
3. Configure the trigger setting for the client to either command mode (COMAND), stream industrial (STRIND), or stream Legal-for-Trade (STRLFT), depending on the application.

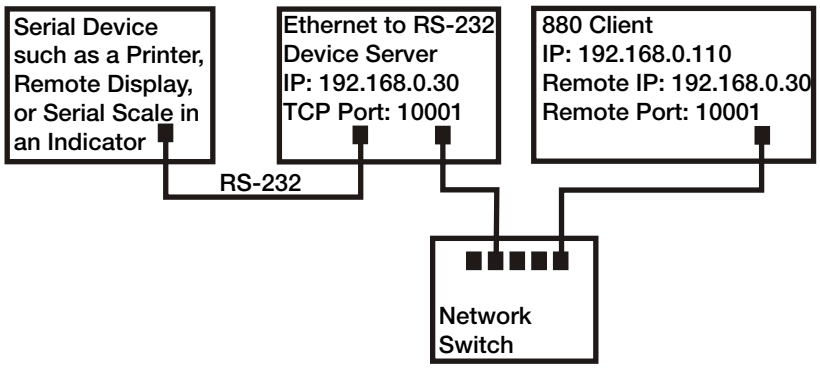


Figure 9-4. Stream or Demand Data to a Remote Ethernet to RS232 Device Server

4. Connect the serial output of the device server to the serial device set to send or receive data through the Ethernet connection.

Note *In this configuration, the 880 has to initiate the connection*

Using Revolution® with Ethernet

1. Use one of the methods shown in Section 9.1.1 or 9.1.2 to connect the *880* to the PC with *Revolution* installed.
2. In *Revolution*, after opening the *880* module, select ***Tools***, then ***Options***.
3. Set the default communications to TCP/IP and click OK.
4. Under the ***Communications*** menu, select ***Connect***.
5. *Revolution* will request the IP address and port number. Enter them and click **OK**.
6. *Revolution* will attempt to establish communications with the indicator. If the connection is successful, *Revolution* is ready to use to upload and download configuration settings.

Note ***When using Revolution with Ethernet, the Timeout setting for the 880 Ethernet Server should be set to 0 to prevent the 880 from terminating the connection.***

If the connection was unsuccessful, re-check all network settings, both on the computer and in the *880*. Also try to 'ping' the IP address of the *880* to verify the computer and *880* are both able to communicate on the network.

9.2 USB Host

9.2.1 Using a USB Keyboard

A USB keyboard will be detected when it is connected, no configuration is required.

Key	Options	Description
Caps Lock	**Off** On	Press key to toggle between On/Off. When on, alpha keys will display in upper case. Not user configurable. **Note** ***Holding a Shift key and then pressing an alpha key with caps lock on, will give that key's lower case version***
Num Lock	**On** Off	Press key to toggle between On/Off. When on, numeric keypad will be available. Not user configurable.
Arrows	--	Used to navigate through the menu.
Alphanumeric	--	Available when a string prompt is open.
Numeric	--	Available when a numeric prompt is open.
Modifiers	Ctrl Alt Shift	Modify another key press. There is no difference between the left and right modifier keys. Example: Shift + a displays an "A" to the application.

Table 9-1. USB Keyboard Key Descriptions

Key	Alt Key	Function
F1	n/a	No base function
F2	n/a	No base function
F3	n/a	No base function
F4	n/a	No base function
F5	n/a	No base function
F6	Alt+z	Zero key
F7	Alt+g	Gross/Net key
F8	Alt+t	Tare key
F9	Alt+u	Units key
F10	Alt+p	Print key
F11	n/a	Not used
F12	n/a	Menu key
Esc	n/a	Cancel key
Print Screen	n/a	Print key
Home	n/a	Home key (move to the start of a string entry)
End	n/a	End key (move to the end of a string entry)
Delete	n/a	Delete key (delete the current character and move any trailing characters left one character. If it was the last character in a string then move the character highlight left one position)
Backspace	n/a	Clear key (if not at the first character in a string, move left one character and then remove that character)

Figure 9-5. USB Keyboard Function Keys

Note

- ***In weigh mode, with no prompt open, enter a numeric value and press*** **Tare** ***on the 880 to perform a keyed tare. On a keyboard press F8 or Alt + t.***
- ***When editing a string, a keyboard can be used to directly edit the string while at the top level. Pressing any alphanumeric key will insert the appropriate character in the current position. If the down arrow key is pressed (either on the 880 or the keyboard) then the left/right arrow keys will be used move through the characters.***
- ***In weigh mode, the keyboard*** **enter** ***key and arrow keys do not perform like the*** **Tare/Enter key or the arrows** ***880 keypad.***
- ***Except for the Alt+ key combinations listed in the Key Functions table and support for Shift+ key, no other key combinations are supported - some common Windows key combinations as examples: Ctrl+C does not perform a copy, Ctrl+V does not perform a paste, etc.***

- *When a USB keyboard is connected - Indicator front panel key operations can be performed on both the 880 keypad and the USB keyboard.*
- *These keyboard keys will have no function within the 880:*

  Scroll Lock
  Page Up
  Page Down
  Insert
  Tab
  Windows Key
  Application Key

9.2.2 USB Memory storage

A USB memory storage device can be used to save the *880* configuration to a file or to load configuration from a file. Saving or loading configuration is done in the configuration mode using the Load and Save menu items located in the Ports menu under the Setup Menu. (see Figure 3-13).

Saving Configuration

1. Connect the ***USB*** memory device to the indicator.
2. Press the setup switch (Figure 3-1 on page 33) to enter configuration mode.
3. Press ◁ or ▷ until ***PORTS*** is displayed.
4. Press ▽, ***COM*** is displayed.
5. Press ◁ or ▷ until ***USB*** is displayed.
6. Press ▽, ***LOAD*** is displayed.
7. Press ▷ ***SAVE?*** is displayed.
8. Press TARE to save configuration. The display will say ***Busy***. When save is complete, ***Saved*** will be displayed momentarily, then display will return to ***Save?***.

Important *If Failed is displayed, the configuration file was not saved. Leave configuration, cycle power, and try again.*

The file is saved as 880_<UID>.txt (UID is the Unit ID of the indicator). If the file already exists, it is overwritten without warning.

Loading Configuration

To load a configuration file, use a USB memory device with an appropriate configuration file on it.

The file will either be a 880_<UID>.txt or 880_<UID>.rev file (UID matches the Units ID of the Indicator).

Note *If the Unit ID does not match, the indicator will not load the file.*

1. Connect the USB memory device to the indicator.
2. Press the setup switch (Figure 3-1 on page 33) to enter configuration mode.
3. Press ◁ or ▷ until ***Ports*** is displayed.
4. Press ▽, ***COM*** is displayed.
5. Press ◁ or ▷ until USB is displayed.
6. Press ▽, ***Load*** is displayed.
7. Press ▽, ***All?*** is displayed.
8. Press ◁ or ▷ to the desired parameter.
   - ***All?*** to load all parameters
   - ***Cfg?*** to load all except calibration
   - ***Cal?*** to load just calibration.
9. Press TARE to load the selected configuration. The display will say ***Busy***. When load is complete, ***Loaded*** will be displayed momentarily, then display will return to the previous selection.

Important *If Failed is displayed, the configuration file was not loaded. Leave configuration, cycle power, and try again.*

Printing to a Text File on a USB Flash Drive

Demand prints can be sent to a file on a USB flash drive installed in the USB host port.

1. Set the ***PORT*** setting to ***USBMEM*** for each of the print formats to be sent to the flash drive.
2. Insert a USB flash drive in the USB host port (J5).

Whenever a print format is called to print, a file will be created on the USB flash drive named PRINT_<UID>.txt, where UID is the unit ID of the indicator. If the file already exists, the data will be appended to the current file.

If there is an error writing data to the flash drive, ***USBERR*** will display momentarily each time a print is attempted. Remove and reinstall the USB flash drive to restore operation.

If a USB flash drive is not installed, nothing will be printed.

10.0 Appendix

10.1 Error Messages

The *880* indicator provides a number of error messages. When an error occurs, the message is shown on the indicator display. Error conditions can also be checked remotely by using the XE EDP command as described in Section 10.3.

10.1.1 Displayed Error Messages

The *880* provides a number of front panel error messages to assist in problem diagnosis. Table 10-1 lists these messages and their meanings.

Error Message	Description	Solution
– – – – – –	Over range	Check for improper load cell wiring, configuration, calibration, scale hardware problems.
_ — — — — _	Under range	
_ — — — — _ (center dashes)	A/D out of range Or if using local/remote (serial scale) - loss of serial scale data.	
CFGERR	Configuration error on power up if there was an error loading configuration	Press the **Enter** key to reboot the indicator.
ERROR	Internal program error	Check configuration.
HWFERR	Hardware failure error • on failure to write to the EEPROM • any error (except for a battery error or an accumulation over range error) when exiting the menu	Press the **Enter** key to reboot the indicator.
LOBATT	The low battery error flashes every 30 seconds when the battery is low.	Replace the battery.
NOTARE	Tare is prevented because of regulatory mode settings, the configuration of the TAREFN parameter, motion on the scale, etc.	Change regulatory mode settings or the TAREFN parameter.
RANGE	A numeric value entered in configuration is out of the acceptable range. The error is displayed momentarily – then parameter being edited is displayed so the value can be corrected.	Re-enter a value that is in range for the parameter being edited.
NO ZERO	Zero is prevented (due to regulatory mode settings, motion on the scale, zero range settings)	Check zero settings and for motion.

Table 10-1. 880 Error Messages

10.2 Using the HARDWARE Command

The HARDWARE serial command can be used to verify that installed option cards are recognized by the system. The HARDWARE command returns a three-digit card code, representing the card installed:

Code	Card Type
000	No card installed
085	Relay Card
153	Analog Output Card
170	CompactCom Card

Table 10-2. HARDWARE Command Option Card Type Codes

If an installed card is not recognized (HARDWARE command returns code of 000), ensure that the card is seated properly. Reinstall the card, if necessary, then cycle the power to read the configuration again. If the card is still not recognized, try a different option card.

10.3 ERROR Commands Output

The XE and XEH commands return a representation of any existing error conditions as described in the following table. If more than one error condition exists, the number returned is the sum of the values representing the error conditions. The XE command returns the value as a decimal representation and the XEH command returns the value as a hexadecimal representation.

XE Error Code (decimal)	Description	XEH Error Code (hexadecimal)
0	no errors	0x00000000
1	VIRGERR	0x00000001
2	PARMCHKERR	0x00000002
4	LOADCHKERR	0x00000004
8	PRINTCHKERR	0x00000008
16	ENVRAMERR	0x00000010
32	ENVCRCERR	0x00000020
64	BATTERYERR	0x00000040
128	TCPERR	0x00000080
32768	GRAVERR	0x00008000
65536	ADPHYSICALERR	0x00010000
131072	TAREERR	0x00020000
262144	EACCOVER	0x00040000
524288	STRINGERR	0x00080000
1048576	RESERVED_PF	0x00100000
2097152	RTCERR	0x00200000
4194304	MISSINGHWERR	0x00400000
8388608	CFGCONFLICTERR	0x00800000
16777216	UNRECOVERABLEERR	0x01000000

Table 10-3. Error Commands Output

10.4 Status Messages

The EDP command **P** can be used to provide status about the indicator.

- The **P** EDP command returns whatever is currently shown in the indicator's primary display area.
  PPPPPPP uu
  where:
  - ***PPPPPPP*** is the information shown on the primary display
  - ***uu*** is the 2-digit units annunciator

If the indicator is in an underrange or overload condition, the weight value is replaced with ***&&&&&&*** (overload) or ***::::::*** (underrange).

10.5 TARE and ZERO Key Functions

The function of the front panel **Tare** and **Zero** keys depend on the value specified for the REGULA parameter in the FEATUR menu, see Figure 3-8 on page 41.

Table 9-4 describes the function of these keys for each of the regulatory modes.

REGULAT Parameter Value	Weight on Scale	Tare in System	Front Panel TARE Key or KTARE command (TAREFN – tare function setting)			Front panel ZERO key or KZERO command
			KEYED	PBONLY	BOTH	
NTEP	zero or negative	No	Keyed prompt (1)	No Action	Keyed prompt (1)	Zero
		Yes	Keyed prompt (2)	Clear tare	Keyed prompt (2)	Zero
	positive	No	Keyed prompt (1)	Tare	Tare	Zero
		Yes	Keyed prompt (2)	Tare	Tare	Zero
CANADA	zero or negative	No	Keyed prompt (1)	No Action	Keyed prompt (1)	Zero
		Yes	Keyed prompt (2)	Clear tare	Keyed prompt (2)	Zero
	positive	No	No Action	Tare	Tare	Zero
		Yes	No Action	No Action	No Action	Zero
OIML	zero or negative	No	Keyed prompt (1)	No Action	Keyed prompt (1)	Zero
		Yes	Keyed prompt (2)	Clear tare	Keyed prompt (2)	Zero and clear Tare (3)
	positive	No	Keyed prompt (1)	Tare	Tare	Zero
		Yes	Keyed prompt (2)	Tare	Tare	Zero and clear Tare (3)
NONE	zero or negative	No	Keyed prompt (1)	Tare	Keyed prompt (1)	Zero
		Yes	Keyed prompt (2)	Clear tare	Keyed prompt (2)	Zero
	positive	No	Keyed prompt (1)	Tare	Tare	Zero
		Yes	Keyed prompt (2)	Clear tare	Clear tare	Zero

Note

1. Entering a Zero tare will cancel the entry. Any other value will be accepted as a Keyed Tare.
2. Entering a Zero tare will clear the current Tare. Any other value will be accepted as a Keyed Tare.
3. The indicator will Zero and Clear the Tare only if the gross weight is within ZRANGE. No action is taken if the weight is outside of ZRANGE

Table 10-4. TARE and ZERO Key Functions for REGULA Parameter Settings

Table 10-5 lists the sub-parameters available when configuring a scale using INDUST mode. The table includes the default values of the INDUST sub-parameters and the effective (not configurable) values used by NTEP, CANADA, OIML and NONE regulatory modes

REGULA/INDUST Parameter		REGULA Mode				
Parameter	**Description**	**INDUST**	**NTEP**	**CANADA**	**OIML**	**NONE**
SNPSHT	Display or Scale weight source	DISPLAY	DISPLAY	DISPLAY	DISPLAY	SCALE
ZTARE	Remove tare on ZERO	NO	NO	NO	YES	YES
KTARE	Always allow keyed tare	YES	YES	NO	YES	YES
MTARE	Multiple Tare Action	REPLAC	REPLAC	NOTHIN	REPLAC	REMOVE
NTARE	Allow negative tare	NO	NO	NO	NO	YES
CTARE	Allow CLEAR tare to clear tare	YES	YES	YES	NO	YES
RTARE	Round push button tare to nearest Display Division.	YES	YES	YES	NO	YES
PRTMOT	Allow print while in motion	NO	NO	NO	NO	YES
PRTPT	Add PT to keyed tare print	NO	NO	YES	YES	NO
OVRBAS	Zero base for overload calculation	CALIB	CALIB	CALIB	SCALE	CALIB

Table 10-5. REGULA/INDUST Mode Parameters, Comparison with Effective Values of Regulatory Modes

10.6 Data Formats

10.6.1 Stream Serial Data Format

If stream data transmission is configured for the communication ports (**STRLFT** or **STRIND**), by default the *880* sends data using the Rice Lake Weighing Systems serial data format (RS-232) shown in Figure 10-1. RS-422 is also available and uses the same serial data format.

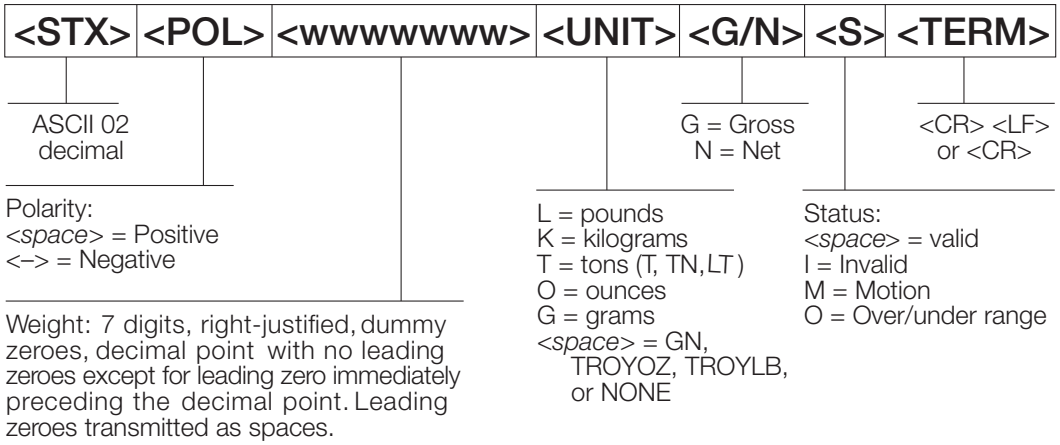


Figure 10-1. Stream Serial Data Format – RS-232 and RS-422

SFMT parameter default – <2><P><W7.><U><M><S><CR><LF>

Format can be changed, see Section 10.7.

The character values can be changed for the stream format tokens, see Table 6-10 on page 75.

If the COM port is set to TYPE = RS485, the port will not stream data, and cannot be used in a local/remote application. See Section 10.6.3.

10.6.2 Print Output Serial Data Format

The *880* uses a data string format for a basic ticket printout. The print format is configured in the setup menu for the demand (print) port, and depends on the indicator configuration and mode. See Section 7.0 for print formatting.

Use the EDP commands, *Revolution*® or the front panel to fully customize the print to work with a wide variety of printers, and other remote equipment.

10.6.3 RS-485 Data Formats

The *880* has a built-in RS-485 software protocol which is enabled when configuring a port's TYPE as 485. On the *880* only the COM port has hardware support for RS-485 communication.

All RS-485 communication with the *880* is via command and response. An external host must send a command and wait for a response.

All remote commands are initiated using the data format shown in Figure 10-2:

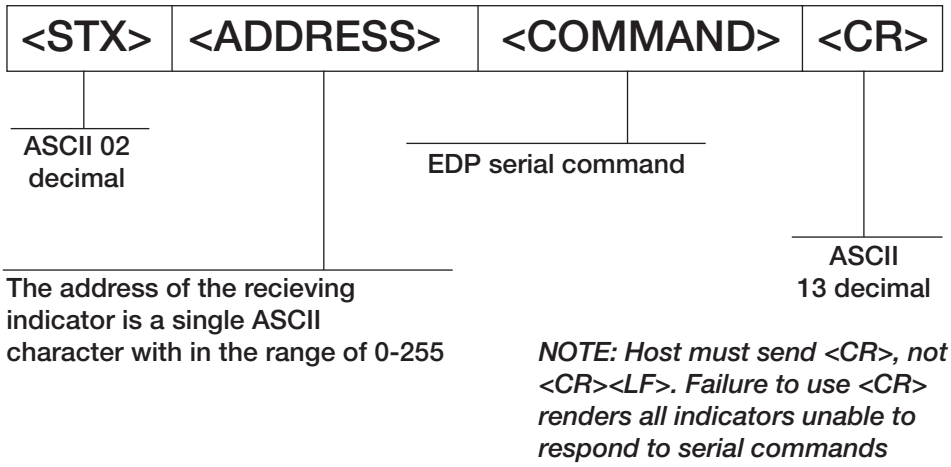


Figure 10-2. RS-485 Send Data Format

If the initiating device address matches the port address of a *880* on the RS-485 network, that indicator responds. The responding indicator uses the format shown in Figure 10-3:

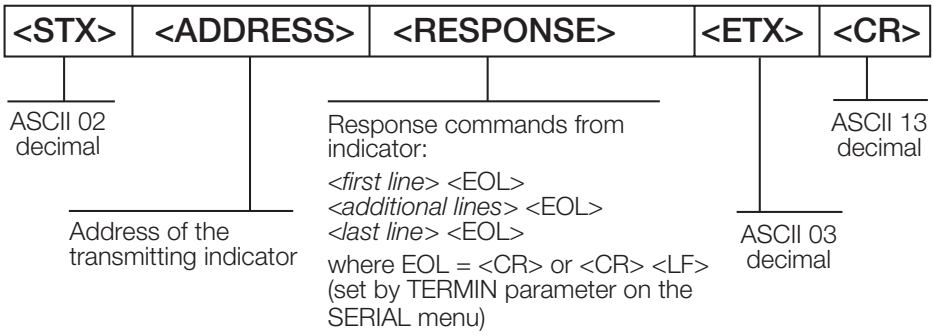


Figure 10-3. RS-485 Respond Data Format

- Communication with an RS-485 880 is command / response only. An 880 configured for RS-485 cannot print a ticket or stream continuous data.
- Any valid EDP command can be sent to the 880 when in RS-485 mode.
- If a command is unrecognized or cannot be executed, the 880 responds with ?? wrapped in the RS-485 protocol. For example: <STX><ADDRESS>??<ETX><CR>
- Depending on the command, the <RESPONSE> may include its own termination characters that are sent before the <ETX><CR>, see the example for the XG command shown below.
- A multi-line response, for example from a DUMPALL command, is wrapped in the header and footer as a total but each individual line is not.

  <STX><ADDRESS><first line> <EOL>
  <additional lines> <EOL>
  <last line> <EOL><ETX><CR>

  Where:

  EOL - <CR> or <CR><LF> (set by the TERMIN parameter for the port)

Example: To send the XG#1 command from an ASCII terminal to an indicator at address 65 (decimal) on the RS-485 network, use the format shown in Figure 10-2.

- The keyboard equivalent for the start-of-text (STX) character is CONTROL-B (see Table 10-10 on page 111).
- The indicator address (65) is represented by an upper case “A”.
- The carriage return (CR) character is generated by pressing the **Enter** key.

Therefore, to send the XG#1 command to the indicator at address 65, enter the following at the terminal:
<CONTROL-B>AXG#1<CR>

The indicator will respond with <STX>A 1234.00 lb<CR><LF><ETX><CR>. See Section 6.0, for other commands that can be used.

10.7 Custom Stream Formatting – Input/Output

The format of the streamed data can be configured for the COM, USBCOM, Ethernet Server and Ethernet Client ports individually using the front panel, EDP commands or *Revolution* using the tokens in Table 10-6. Configuration is available for stream input/output tokens through EDP commands only; no front panel access is provided.

Format Identifier	Defined By	Description
<P[G | N | T]>	STR.POS STR.NEG	Polarity. Outputs the positive or negative polarity label for the current or specified (Gross/Net/Tare) weight on the source scale. Possible values are SPACE, NONE, + (for STR.POS), or – (for STR.NEG)
<U[P | S | T]>	STR.PRI STR.SEC STR.TER	Units. Outputs the primary, secondary, or tertiary* units label for the current or specified (Primary/Secondary/Tertiary*) weight on the source scale.
<M[G | N | T]>	STR.GROSS STR.NET STR.TARE	Mode. Outputs the gross, net, or tare label for the current or specified weight (Gross/Net/Tare) on the source scale.
<S>	STR.MOTION STR.RANGE STR.OK STR.INVALID STR.ZERO	Outputs the status for the source scale. Default values and meanings for each status: STR.MOTION M In motion STR.RANGE O Out of range STR.OK <space> OK STR.INVALID I Invalid STR.ZERO Z COZ
<B [–]n,…>	See descriptions below	Bit fields. Comma-separated sequence of bit field specifiers. Must be exactly 8 bits. Minus sign ([–]) inverts the bit.
B0	-	Always 0
B1	-	Always 1
B2	Configuration	=1 if even parity
B3	Dynamic	=1 if MODE=NET
B4	Dynamic	=1 if COZ (center of zero)
B5	Dynamic	=1 if motion
B6	Dynamic	=1 if displayed gross or net weight is negative
B7	Dynamic	=1 if out of range
B8	Dynamic	=1 if secondary/tertiary*
B9	Dynamic	=1 if tare in system
B10	Dynamic	=1 if tare is keyed
B11	Dynamic	=00 if MODE=GROSS =01 if MODE=NET =10 if UNITS=TERTIARY* =11 (not used)

Table 10-6. Custom Stream Format Identifiers

Format Identifier	Defined By	Description
B12	Dynamic	=00 if UNITS=PRIMARY =01 if UNITS=PRIMARY =10 if UNITS=PRIMARY =11 (note used)
B13	Configuration	=00 (not used) =01 if current DSPDIV=1 =10 if current DSPDIV=2 =11 if current DSPDIV=5
B14	Configuration	=00 (not used) =01 if primary DSPDIV=1 =10 if primary DSPDIV=2 =11 if primary DSPDIV=5
B15	Configuration	=00 (not used) =01 if secondary DSPDIV=1 =10 if secondary DSPDIV=2 =11 if secondary DSPDIV=5
B16	Configuration	=00 (not used) =01 if tertiary* DSPDIV=1 =10 if tertiary* DSPDIV=2 =11 if tertiary* DSPDIV=5
B17	Configuration	=000 (not used) =001 if current DECPNT=888880 =010 if current DECPNT=888888 =011 if current DECPNT=88888.8 =100 if current DECPNT=8888.88 =101 if current DECPNT=888.888 =110 if current DECPNT=88.8888 =111 if current DECPNT=8.88888
B18	Configuration	=000 (not used) =001 if primary DECPNT=888880 =010 if primary DECPNT=888888 =011 if primary DECPNT=88888.8 =100 if primary DECPNT=8888.88 =101 if primary DECPNT=888.888 =110 if primary DECPNT=88.8888 =111 if primary DECPNT=8.88888
B19	Configuration	=000 (not used) =001 if secondary DECPNT=888880 =010 if secondary DECPNT=888888 =011 if secondary DECPNT=88888.8 =100 if secondary DECPNT=8888.88 =101 if secondary DECPNT=888.888 =110 if secondary DECPNT=88.8888 =111 if secondary DECPNT=8.88888
B20	Configuration	=000 (not used) =001 if tertiary* DECPNT=888880 =010 if tertiary* DECPNT=888888 =011 if tertiary* DECPNT=88888.8 =100 if tertiary* DECPNT=8888.88 =101 if tertiary* DECPNT=888.888 =110 if tertiary* DECPNT=88.8888 =111 if tertiary* DECPNT=8.88888

Table 10-6. Custom Stream Format Identifiers (Continued)

Format Identifier	Defined By	Description
<wspec [–] [0] digit[[.]digit]>	Scale weight	Weight for the source scale. wspec is defined as follows: wspec Indicates whether the weight is the current displayed weight (W, w), gross (G, g), net (N, n), or tare (T, t) weight. Upper-case letters specify right-justified weights; lower-case are left-justified. Optional /P, /S, or /T suffixes can be added before the ending delimiter (>) to specify weight display in primary (/P), secondary (/S), or tertiary* (/T) units. [–] Enter a minus sign (–) to include sign for negative values. [0] Enter a zero (0) to display leading zeroes. digit[[.][.]digit] The first digit indicates the field width in characters – range is 1-7. Decimal point only indicates floating decimal; decimal point with following digit (range is 1-5) indicates fixed decimal with n digits to the right of the decimal. Two consecutive decimals send the decimal point even if it falls at the end of the transmitted weight field.
<CR>	-	Carriage return, hex 0x0D, ASCII decimal 13
<LF>	-	Line feed, hex 0x0A, ASCII decimal 10
<SPnn>	-	Space, nn = number of spaces. If nn is not specified, 1 is assumed. Value must be in the range 1-99.
<NLnn>	TERMIN setting of the port	New line, nn = number of termination (<CR/LF> or <CR>) characters. If nn is not specified, 1 is assumed. Value must be in the range 1-99. Note: when streaming data, a configured End-of-Line Delay is performed after each New Line.
<nnn>	-	ASCII character (nnn = decimal value of ASCII character). Used for inserting control characters (<002> for an STX, for example) in the output.
* Tertiary (Range/Interval 3)		

Table 10-6. Custom Stream Format Identifiers (Continued)

10.8 Stream Formatting Examples

10.8.1 Toledo 8142 Indicator

Sample string for Toledo 8142 indicator (with no checksum):

<STX><*Status Word A*><*Status Word B*><*Status Word C*><*wwwwww*><*tttttt*><EOL>

880 stream format configuration:

<02><B2, B0, B1, B13, B17><B2, B0, B1, B8, B5, B7, B6, B3><B2, B0, B1, B0, B0, B0, B0, B0><W6><T6><CR>

Identifier	Description
<STX>	The STX character is entered into the string using the <02> hex value.
<*Status Word A*>	Toledo status words are made up of various bit fields. NOTE: Identifiers must be entered beginning with the high-order bit (bit 7–bit 0) of the Toledo status word. Status Word A contains the following fields. Equivalent 880 format identifiers are shown in parentheses. Bit 7: parity (B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bits 3–4: display divisions (B13) Bits 0–2: decimal format (B17)
<*Status Word B*>	Status Word B contains the following fields. Equivalent 880 format identifiers are shown in parentheses. Bit 7: parity (B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bit 4: lb/kg units (B8) Bit 3: stable/motion (B5) Bit 2: in/out-of-range (B7) Bit 1: pos/neg (B6) Bit 0: gross/net (B3)
<*Status Word C*>	Status Word C contains the following fields. Equivalent 880 format identifiers are shown in parentheses. Bit 7: parity (B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bits 0–4: always 0 (B0)
<*wwwwww*>	The <W6> and <T6> indicate six digits of indicated weight and tare weight. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G gross weight, N net weight, and T tare weight. /P and /S can be used to specify primary or secondary. Minus indicates sign inclusion, and (0) indicates leading zeros. First digit indicates field width in characters. Decimal indicates floating decimal point. Decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<*tttttt*>	Tare weight. See description above.
<EOL>	<CR> is entered at the end of the string as the end of line character in this example.

Table 10-7. Toledo Sample String Identifiers

10.8.2 Cardinal 738 Indicator

Sample string for the Cardinal 738 indicator:

<CR><POL><*wwwwww*><S><SP><*units*><SP><G/N><SP><SP><EOL>

880 stream format configuration:

<CR><P><W07..><S><SP><U><SP><M><SP2><03>

Identifier	Description
<CR>	Carriage Return
<POL>	Cardinal uses + for positive and – for negative, so the stream polarity tokens need to reflect this. The EDP commands for the 880 are STR.POS=+ and STR.NEG= –.
<*wwwwwww*>	The <W07..> identifier that the 880 recognizes indicates seven digits of weight with a decimal and leading zeroes, with the decimal being sent at the end of the weight. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G gross weight, N net weight, T tare weight. /P and /S can be used to specify primary or secondary. Minus indicates sign inclusion, while (0) indicates leading zeros. First digit indicates field width in characters. Decimal indicates floating decimal point. Decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<S>	There are four possible tokens for status bits that can be used: motion, out-of-range, valid, and invalid. In the Cardinal, m indicates motion, o indicates out-of-range, and a space is used for valid or invalid weights. The commands to set these tokens in the 880 are STR.MOTION=m, STR.RANGE=o, STR.OK= , STR.INVALID= . **Note** Although it appears that there are no commands for OK and INVALID, there is a space entered with the keyboard before pressing the Enter key.
<SP>	Space
<*units*>	The Cardinal uses two-character, lower-case units identifiers. The commands to set these tokens in the 880 include: STR.PRI=lb (options: kg, g, tn, t , gr, oz, or sp), STR.SEC=kg (options: lb, g, tn, t , gr, oz, or sp).
<SP>	Space
<G/N>	The mode used for Cardinal is *g* for gross and *n* for net. These tokens are set using the STR.GROSS=g and STR.NET=n tokens.
<SP>	Space
<SP>	Space
<EOL>	The end of line character is an ETX in this case so the hex value of <03> is entered in the string.

Table 10-8. Cardinal Sample String Identifiers

10.8.3 Weightronix WI 120 Indicator

Sample string for the Weightronix WI120 indicator:

<SP><G/N><POL><*wwwwww*><SP><*units*><EOL>

880 stream format configuration:

<SP><M><P><W06.><SP><U><CR><LF>

Identifier	Description
<SP>	Space
<G/N>	The mode used for Weightronix is *G* for gross and *N* for net. These tokens are set using the STR.GROSS=G and STR.NET=N tokens.
<POL>	Since the Weightronix uses + for positive and – for negative, the polarity tokens need to reflect this. The EDP commands for the 880 are STR.POS=+ and STR.NEG= –.
<*wwwwww*>	The <W06.> that the 880 recognizes indicates six digits of weight with a decimal and leading zeroes. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G gross weight, N net weight, and T tare weight. /P and /S can be used to specify primary or secondary. Minus indicates sign inclusion, while (0) indicates leading zeros. First digit indicates field width in characters. Decimal indicates floating decimal point. Decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<SP>	Space
<*units*>	The Weightronix uses two-character, lower-case units identifiers. The commands to set these tokens in the 880 include: STR.PRI=lb (options: kg, g, tn, t , gr, oz, or sp), STR.SEC=kg (options: lb, g, tn, t , gr, oz, or sp).
<EOL>	<CR> or <CR> and <LF>

Table 10-9. Weightronix Sample String Identifiers

10.9 ASCII Character Chart

Use the decimal values for ASCII characters listed in Tables 10-10 and 10-11 when specifying print format strings in the *880* PFORMT menu or serial stream formats. The actual character printed depends on the character mapping used by the output device.

The *880* can send or receive any ASCII character value (decimal 0–255). Due to limitations of the indicator display, some characters cannot be shown.

Control	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ctrl-@	NUL	00	00	space	32	20	@	64	40	`	96	60
Ctrl-A	SOH	01	01	!	33	21	A	65	41	a	97	61
Ctrl-B	STX	02	02	“	34	22	B	66	42	b	98	62
Ctrl-C	ETX	03	03	#	35	23	C	67	43	c	99	63
Ctrl-D	EOT	04	04	$	36	24	D	68	44	d	100	64
Ctrl-E	ENQ	05	05	%	37	25	E	69	45	e	101	65
Ctrl-F	ACK	06	06	&	38	26	F	70	46	f	102	66
Ctrl-G	BEL	07	07	’	39	27	G	71	47	g	103	67
Ctrl-H	BS	08	08	(	40	28	H	72	48	h	104	68
Ctrl-I	HT	09	09	)	41	29	I	73	49	i	105	69
Ctrl-J	LF	10	0A	*	42	2A	J	74	4A	j	106	6A
Ctrl-K	VT	11	0B	+	43	2B	K	75	4B	k	107	6B
Ctrl-L	FF	12	0C	,	44	2C	L	76	4C	l	108	6C
Ctrl-M	CR	13	0D	-	45	2D	M	77	4D	m	109	6D
Ctrl-N	SO	14	0E	.	46	2E	N	78	4E	n	110	6E
Ctrl-O	SI	15	0F	/	47	2F	O	79	4F	o	111	6F
Ctrl-P	DLE	16	10	0	48	30	P	80	50	p	112	70
Ctrl-Q	DC1	17	11	1	49	31	Q	81	51	q	113	71
Ctrl-R	DC2	18	12	2	50	32	R	82	52	r	114	72
Ctrl-S	DC3	19	13	3	51	33	S	83	53	s	115	73
Ctrl-T	DC4	20	14	4	52	34	T	84	54	t	116	74
Ctrl-U	NAK	21	15	5	53	35	U	85	55	u	117	75
Ctrl-V	SYN	22	16	6	54	36	V	86	56	v	118	76
Ctrl-W	ETB	23	17	7	55	37	W	87	57	w	119	77
Ctrl-X	CAN	24	18	8	56	38	X	88	58	x	120	78
Ctrl-Y	EM	25	19	9	57	39	Y	89	59	y	121	79
Ctrl-Z	SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
Ctrl-[	ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
Ctrl-\	FS	28	1C	<	60	3C	\	92	5C	|	124	7C
Ctrl-]	GS	29	1D	=	61	3D	]	93	5D	}	125	7D
Ctrl-^	RS	30	1E	>	62	3E	^	94	5E	~	126	7E
Ctrl-_	US	31	1F	?	63	3F	_	95	5F	DEL	127	7F

Table 10-10. ASCII Character Chart (Part 1)

ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ç	128	80	á	160	A0		192	C0	α	224	E0
ü	129	81	í	161	A1		193	C1	β	225	E1
é	130	82	ó	162	A2		194	C2	Γ	226	E2
â	131	83	ú	163	A3		195	C3	π	227	E3
ä	132	84	ñ	164	A4		196	C4	Σ	228	E4
à	133	85	Ñ	165	A5		197	C5	σ	229	E5
å	134	86	ª	166	A6		198	C6	µ	230	E6
ç	135	87	º	167	A7		199	C7	τ	231	E7
ê	136	88	¿	168	A8		200	C8	Φ	232	E8
ë	137	89		169	A9		201	C9	Θ	233	E9
è	138	8A	¬	170	AA		202	CA	Ω	234	EA
ï	139	8B	1/2	171	AB		203	CB	δ	235	EB
î	140	8C	1/4	172	AC		204	CC	∞	236	EC
ì	141	8D	¡	173	AD		205	CD	ϕ	237	ED
Ä	142	8E	«	174	AE		206	CE	∈	238	EE
Å	143	8F	»	175	AF		207	CF	∩	239	EF
É	144	90		176	B0		208	D0	≡	240	F0
æ	145	91		177	B1		209	D1	±	241	F1
Æ	146	92		178	B2		210	D2	≥	242	F2
ô	147	93		179	B3		211	D3	≤	243	F3
ö	148	94		180	B4		212	D4	⌠	244	F4
ò	149	95		181	B5		213	D5	⌡	245	F5
û	150	96		182	B6		214	D6	÷	246	F6
ù	151	97		183	B7		215	D7	≈	247	F7
ÿ	152	98		184	B8		216	D8	°	248	F8
Ö	153	99		185	B9		217	D9	•	249	F9
Ü	154	9A		186	BA		218	DA		250	FA
¢	155	9B		187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
¥	157	9D		189	BD		221	DD	2	253	FD
Pts	158	9E		190	BE		222	DE		254	FE
f	159	9F		191	BF		223	DF		255	FF

Table 10-11. ASCII Character Chart (Part 2)

10.10 Digital Filtering

Digital filtering can be used to create a stable scale reading in challenging environments. The *880* has two filtering methods that can be set; Sample rate and Digital filter.

10.10.1 Sample Rate:

The Sample rate should be set first. Better stability is achieved with a lower sample rate setting, so 7.5 Hz is more stable than 960 Hz.

10.10.2 Digital Filter:

The digital filter is an adaptive filter that has two parameters to set the filter settling and response times: sensitivity and threshold.

Digital Filtering Sensitivity

Digital filtering sensitivity (**DFSENS**) controls the stability and settling time of the scale. The sensitivity parameter can be set to heavy, medium, or light. A heavy setting will result in an output that is more stable and will settle more slowly than that of light. However, small changes in weight data (a few grads) on the scale base will not be seen as quickly.

If the difference in typical subsequent weight values on the scale will be only a few grads, use a light setting. If using a truck scale where the changes in subsequent weight values will be 100s of grads, a heavy setting will be more appropriate.

Digital Filtering Threshold

With the digital filter threshold set at zero, determine the amount of instability that is present. Convert this instability to display divisions. The number of display divisions of instability will be used to set the threshold of the digital filter. The digital filter can be set to **Off** by entering 0 in the **DFTHRH** parameter.

Digital filtering threshold (**DFTHRH**) should be set for the amount of observed noise in the system. This parameter can be set in the range of 0 to 99999 display divisions. When a new sampled weight value is acquired, the adaptive filter compares the new value to the previous (filtered) output value. If the difference between the new value and the previous output value is greater than the **DFTHRH** parameter (displayed division) the adaptive filter output is reset. The newly acquired sample value replaces the filtered output. If the difference between the new value and the previous output value is less than the **DFTHRH** parameter, the two values are averaged together using a weighted average. The weighed average is based on the amount of the difference, time the system has been stable, and selected **DFSENS** value.

10.11 Analog Output Calibration

See Section 3.0, Table 3-16 for ANALOG OUTPUT parameters.

The following calibration procedure requires a multimeter to measure voltage or current output from the analog output module. If the option is not already installed, install it in according to the instructions included with the option.

Note **The analog output must be calibrated after the indicator itself has been configured (Section 3.0) and calibrated (Section 4.0).**

1. Enter configuration mode and go to the ALGOUT menu (see Figure 3-20):
   - Set OUTPUT as desired for 0-10V, 0-20mA, or 4-20mA output.
   - Set MIN to lowest weight value to be tracked by the analog output
   - Set MAX to highest weight value to be tracked by the analog output
2. Connect multimeter to connector J1 on the analog output board:
   - For voltage output, connect voltmeter leads to pins 3 and 4 (-V, +V)
   - For current output, connect ammeter leads to pins 1 and 2 (-mA, +mA)
3. Adjust zero calibration:
   - Scroll to the TWZERO parameter.
   - Press ▽, 000000 will display
   - Check voltage or current reading on multimeter.
   - Set the parameter to match the reading from the multimeter.
     - Press ◁ or ▷ to select the digit.
     - Press △ or ▽ to increment or decrement the value.
     - Press TARE to move to the decimal point entry.
     - Press ◁ or ▷ to adjust the decimal point placement.
   - Press TARE to accept the displayed value.
   - CAL will be displayed while the calibration is being performed.
4. Adjust span calibration:
   - Scroll to the TWSPAN parameter.
   - Press ▽, 000000 will display.
   - Set the parameter to match the reading from the multimeter.
     - Press ◁ or ▷ to select the digit.
     - Press △ or ▽ to increment or decrement the value.
     - Press TARE to move to the decimal point entry.
     - Press ◁ or ▷ to adjust the decimal point placement.
   - Press TARE to accept the displayed value.
   - ***CAL*** will be displayed while the calibration is being performed.
5. Verify calibration:
   - Return to the TWZERO/TWSPAN parameter and verify that the calibration has not drifted.
   - Repeat calibration if needed.
6. Return to weigh mode. Analog output function can be verified using test weights.

10.12 Specifications

Power

Line Voltages	Input Voltage – 100-240VAC, 9-36VDC Input Frequency – 47-63Hz
Power Consumption	AC: 15 watts DC: 20 watts

Analog Specifications

Full Scale Input Signal	-45 mV to +45 mV
Excitation Voltage	10 VDC ±, 8 x 350Ω or 16 x 700Ω load cells
Sense Amplifier	Differential amplifier with 4- and 6-wire sensing
Analog Signal Input Range	-45 mV to 45mV
Analog Signal Sensitivity:	
	0.3 µV/graduation minimum @ 7.5 Hz 1.0 µV/graduation typical @ 120 Hz 4.0 µV/graduation typical @ 960 Hz
A/D Sample Rate:	7.5 – 960Hz, software selectable
Input Impedance	200 MΩ, typical
Noise (Usable Minimum LSB)	0.3 µV p-p
Internal Resolution	8 000 000 counts @ 23 usable bits, approximate
Display Resolution	100 000 dd
Input Sensitivity	10 nV per internal count
System Linearity	±0.01% of full scale
Temperature	
Zero	±150 nV/°C, maximum
Span	±3.5 ppm/°C, maximum
Calibration Method	Software, constants stored in EEPROM
Common Mode	Voltage ±0.8V in unbalanced condition
Common Mode	Rejection120 dB minimum @ 50 or 60 Hz
Input Overload	± 12 V continuous, static discharge protected
EMI/RFI Protection	Signal, excitation, and sense lines protected by capacitor bypass and filtering elements
Optional Analog Output	Fully isolated, voltage or current output Voltage output: 0 –10 VDC Load resistance:1kΩ minimum Current output: 0-20 mA or 4–20 mA External loop resistance: 500Ω maximum

Digital I/O

I/O Channels	Up to 4, 5V/TTL, Active Low (0V), each software configurable as input or output
Relay Supply Voltage	5 VDC, 500mA maximum
Input Voltage	0–5.5V maximum
Digital Outputs	Active low, sink up to 24mA per output.
Optional	Four channel relay module, dry connect 3A @ 115VAC, 3A @ 30VDC

Serial Communications

RS-232	Full Duplex
RS-485/RS-422	Half Duplex
USB	USB Type A Connector 2.0 USB Micro A/B Connector 2.0
EtherNet	EtherNet TCP/IP

Operator Interface

Display	LED, Six 0.56 inch (14 mm), 14 Segment with Decimal or Comma
Panel Mount	
Keyboard	6-key membrane panel

Universal Mount
Keyboard 18-key membrane panel with a numerical keypad

Environmental

Operating Temperature	14°F to 104°F (–10 to +40°C) (legal-for-trade applications); 14°F to 122°F (–10 to +50°C) (industrial applications)
Storage Temperature	–25 to +70°C
Humidity	0–95% relative humidity

Enclosure

Panel Mount

Enclosure Dimensions	6.0 in x 4.0 in x 4.95 in (152 mm x 102 mm x 126 mm)
Weight	2.5 lb (1.2 kg)
Rating/Material	Display Bezel NEMA Type 4X, IP69K

Universal Mount

Enclosure Dimensions	6.7 in x 8.1 in x 4.3 in (170 mm x 206 mm x 110 mm)
Weight	lb (kg)
Rating/Material	Display Bezel NEMA Type 4X, IP69K

Certifications and Approvals

NTEP
CoC Number: 13-080
Accuracy Class III/IIIL n_{max}: 10 000

EU Approvals:
EU Test Certificate: TC8463
EU Type Approval Number: T8464

Measurement Canada
Approval: AM-5931C
Accuracy Class III/IIIHD n_{max}: 10 000

File Number: R76/2006-NL1-14.24
Panel Mount only. Universal pending.

File Number: E151461
Panel Mount only. Universal pending.

The 880 DC indicator must be connected to a class 2 power source in accordance with the NEC (National Electrical Code) and local regulations. See equipment data plate for power requirements.

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230 W. Coleman St. • Rice Lake, WI 54868 • USA
U.S. 800-472-6703 • Canada/Mexico 800-321-6703 • International 715-234-9171 • Europe +31 (0)26 472 1319