

820i[®]

Programmable HMI Indicator/Controller

Version 1.05

Installation Manual



REVOLUTION
SCALE SOFTWARE

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RICE LAKE[®]
WEIGHING SYSTEMS

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PN 93018 Rev B

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About This Manual

This manual is intended for use by service technicians responsible for installing and servicing 820i® digital weight indicators. This manual applies to Version 1.04 of the 820i indicator software.

Configuration and calibration of the indicator can be accomplished using the *Revolution*® configuration utility, serial commands, or the indicator front panel keys. See Section 3.1 on page 15 for information about configuration methods.



This manual can be viewed and downloaded from the Rice Lake Weighing Systems distributor site at www.ricelake.com.

The *Operator Card* included with this manual provides basic operating instructions for users of the 820i. Please leave the *Operator Card* with the indicator when installation and configuration are complete.

Safety Section

Safety Symbol Definitions:



CAUTION

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



WARNING

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



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 System dealer for replacement manuals. Proper care is your responsibility.

General Safety



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** allow minors (children) or inexperienced persons to operate this unit.*

***DO NOT** operate without all shields and guards in place.*

***DO NOT** step on the unit.*

***DO NOT** jump up and down on the scale.*

***DO NOT** use for purposes other than weight taking.*

***DO NOT** place fingers into slots or possible pinch points.*

***DO NOT** use any load bearing component that is worn beyond 5% of the original dimension.*

***DO NOT** use this product if any of the components are cracked.*

***DO NOT** exceed the rated load limit of the unit.*

***DO NOT** make alterations or modifications to the unit.*

***DO NOT** remove or obscure warning labels.*

***DO NOT** use near water.*

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

Keep hands, feet and loose clothing away from moving parts.

1.0 Introduction

The *820i* is a programmable, multi-channel digital weight indicator/controller. The configuration can be performed using the front panel, with an attached PS/2^{®1}-type keyboard, or using the *Revolution* utility.

Custom event-driven programs can be written with the *iRite-IDE*[®] language. These programs are compiled with an *iRite-IDE* compiler utility, which can only be downloaded into the indicator. The RLWS Web Update utility can be used to download *820i* firmware upgrades to a PC from the RLWS web site; *Revolution* provides functions for installing the new software into the *820i*.

Onboard Features

Features of the basic *820i* include:

- Support for two A/D or serial scale inputs, or total of all scales.
- Eight digital I/O channels on main board, each configurable as either input or output.
- Two serial ports on main board support duplex RS-232 up to 115200 bps. Port 2 supports RS-232 with hardware handshaking; Port 4 supports RS-232, 20mA output, and 2-wire RS-485 communications.
- Available in 115 VAC and 230 VAC North American and European versions.
- Configurable print formats can be defined for up to 1000 characters each. These formats are used to print gross or net weights, truck in/out weights, setpoint weights, accumulator weights, alert messages, and header information. Additional print formats can be created using twenty auxiliary print formats.
- Six truck modes to store and recall weights for gross, tare, and net printing. The truck register contains fields for ID number, weight, and the transaction time and date. Weights can be stored permanently or erased at the end of the transaction.
- The setpoint engine supports 31 configurable setpoint kinds. Setpoints can be arranged in a sequential batch routine of up to 100 steps. If setpoints are configured as free running setpoints, they can be tied to program control. This allows for simultaneous batching operations to be written with the *iRite-IDE* language.

The *820i* is NTEP-certified for Classes III and III L at 10,000 divisions. See Section 10.13 on page 103 for more information about additional certifications and approvals.

Option Cards

The CPU board provides one slot for installing other option cards. Available option cards include:

- Analog output card (dual or single) for 0–10 VDC or 0–20 mA tracking of gross or net weight values.
- Dual-channel serial expansion card provides one additional RS-485 port or two ports for either RS-232 or 20mA communications at up to 19200 bps.
- 24-channel digital I/O expansion card.
- 1MB memory expansion card for expanded database capability.
- Pulse input card for use with pulse count and pulse rate setpoints.
- Dual-channel analog input card supports 0–10 VDC, 0–20 mA, ambient temperature, and four types of thermocouple.
- Bus interface cards for Ethernet, EtherNet/IP^{™2}, DeviceNet^{™3}, Allen-Bradley Remote I/O⁴, and Profibus[®] DP networks⁵.

Part numbers of available option cards are listed in Section 1.4 on page 4.

1. PS/2[®] is a registered trademark of IBM Corporation.

2. EtherNet/IP[™] is a trademark of ControlNet International, Ltd., under license by the Open DeviceNet Vendor Association.

3. DeviceNet[™] is a trademark of the Open DeviceNet Vendor Association.

4. Allen-Bradley[®], PLC[®], and SLC[™] are trademarks of Allen-Bradley Company, Inc., a Rockwell International company.

5. Profibus[®] is a registered trademark of Profibus International.

Front Panel

The 820i front panel, shown in Figure 1-1, consists of a 28-button keypad with a large backlit LCD display. The keys are grouped as five configurable softkeys, five primary scale function keys, four navigation keys, and numeric entry keys.

Weight information is displayed with a graphical scale in two font sizes. Status areas on the display are used for operator prompts and entering data.

LCD display contrast and backlighting can be adjusted using the **Display** button on the front panel.

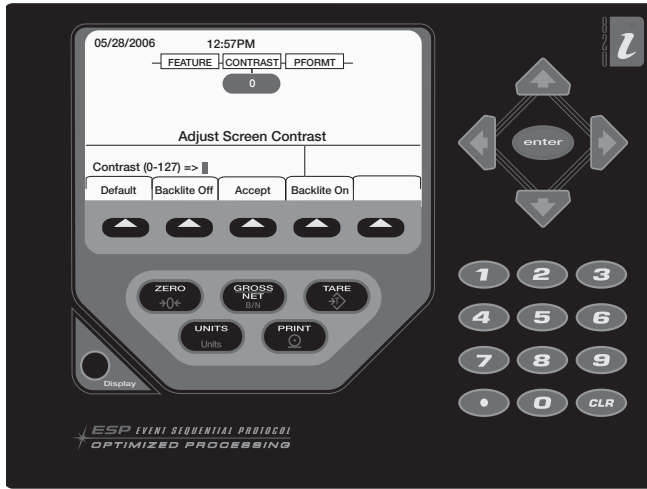


Figure 1-1. 820i Front Panel

Enclosures

The 820i is available in universal (tilt-stand) and panel mount enclosures. Stainless steel enclosures are rated for NEMA Type 4X/IP66. This manual provides assembly drawings and replacement parts lists for the universal model; supplemental documentation provides information specific to the panel mount model (Section 1.4 on page 4).

1.1 Operating Modes

The 820i has two modes of operation:

Normal mode

Normal mode is the weighing mode of the indicator. The indicator displays gross, net, or tare weights as required, using the secondary display to indicate scale status and the type of weight value displayed. Once configuration is complete and a legal seal is affixed to the large fillister-head screw on the indicator enclosure, this is the only mode in which the 820i can operate.

Setup mode

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

To enter setup mode, remove the large fillister head screw from the enclosure. Insert a screwdriver or a similar tool into the access hole and press the setup switch once. The indicator display changes to show scale configuration menus.

1.2 Indicator Operations

Basic 820i operations are summarized below:

Toggle Gross/Net Mode

Press the **GROSS/NET** key to switch the display mode from gross to net, or from net to gross. If a tare value has been entered or acquired, the net value is the gross weight minus the tare. If no tare has been entered or acquired, the display remains in gross mode.



Gross mode is indicated by the word *Gross* (or *Brutto* in OIML mode); net mode is indicated by the word *Net*.

To display audit trail information, press and hold the **Gross/Net** mode key for three seconds. Weighing functions continue while audit trail information is displayed. Press the **Gross/Net** or **CLR** key to exit the audit trail display.


Toggle Units

Press the **UNITS** key to switch between primary, secondary, and tertiary units.


Zero Scale

1. In gross mode, remove all weight from the scale and wait for the standstill annunciator ().
2. Press the **ZERO** key. The center of zero () annunciator lights to indicate the scale is zeroed.


Acquire Tare

1. Place container on scale and wait for the standstill annunciator ().
2. Press the **TARE** key to acquire the tare weight of the container.
3. Display shifts to net weight and shows the word *Net* on the display.

Remove Stored Tare Value

1. Remove all weight from the scale and wait for the standstill annunciator ().
2. Press the **TARE** key (or, in OIML mode, the **ZERO** key). Display shifts to gross weight and shows the word *Gross*.

Print Ticket

1. Wait for the standstill annunciator ().
2. Press the **PRINT** key to send data to the serial port.

Accumulator Functions

The accumulator must be enabled before use in either normal 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, or serial command. The scale must return to zero (net zero if a tare is in the system) before the next accumulation.

The **Display Accum** softkey can be configured to display the current accumulator value. Printing while the accumulator is displayed, or when the setpoint PSHACCUM function is active, uses the ACCFMT print format (see Section 6.0 on page 54).

Press the **CLEAR** key twice to clear the accumulator.

1.3 Softkey Operations

Softkeys can be defined to provide additional operator functions for specific applications. Softkey assignments are listed on the tabs shown at the bottom of the LCD display; softkey functions are activated by pressing the arrow keys below the softkey tabs (Figure 1-1 on page 3).

The particular set of softkeys shown on the display is determined by the indicator configuration and program.

Softkey	Description
Time/Date	Displays current time and date; allows time and date change.
Display Tare	Displays tare value for the current scale
Display Accum	Displays accumulator value, if enabled, for the current scale.
Display ROC	Displays rate-of-change value, if enabled, for the current scale.
Setpoint	Displays a menu of configured setpoints; allows display and change of some setpoint parameters.
Batch Start	Starts a configured batch.
Batch Stop	Stops a running batch and turns off all associated digital outputs. Requires a batch start to resume processing.
Batch Pause	Pauses a running batch. (Same as stop, but digital outputs, if on, are not turned off.)
Batch Reset	Stops a batch and resets it to the first batch step.
Weigh In	Allows truck ID entry; generates weigh-in ticket for truck weighing applications.
Weigh Out	Allows truck ID entry; generates weigh-out ticket for truck weighing applications.
Truck Regs	Displays truck register; allows deletion of individual or all entries. Truck register can be printed by pressing the PRINT key while the truck register is displayed.
Unit ID	Allows display or change of Unit ID.
Select Scale	For multi-scale applications, provides a prompt to enter the scale number to be displayed.
Diagnostics	Provides access to diagnostic displays for attached <i>iQUBE</i> junction boxes.
Alibi	Allows previous print transactions to be recalled and reprinted.
F1-F10	User-programmable keys; defined by application.
More...	For applications with more than five defined softkeys, the More... key is automatically assigned to the fifth softkey position. Press More... to toggle between groups of softkeys.

Table 1-1. Configurable Softkeys

1.4 System Configurations and Options

Table 1-2 lists the 820i system models and part numbers. All models include CPU board with one option card slot. Each model comes equipped with a single- or dual-channel A/D.

System Model	Model PNs	
	Single-Channel A/D	Dual-Channel A/D
Universal (tilt stand) model, 115 VAC	91995	93011
Universal (tilt stand) model, 230 VAC, North American, NEMA Type 15-5 power cord	91996	93012
Universal (tilt stand) model, 230 VAC, European, CEE 7/7 power cord	91997	93013
Panel mount model, 115/230 VAC (power cord sold separately)	93424	93425

Table 1-2. Part Numbers for 820i Models

Option Cards

Table 1-3 lists the available 820i option cards. Most of the listed option cards are installed in the expansion card slot, J6. USB, Ethernet, and fiber-optic interface cards are installed in connector J1.

Option Card	PN
Analog output card - Single	67602
Analog output card - Dual	103138
Dual serial port expansion card	67604
24-channel digital I/O expansion card	67601
1MB NV RAM memory expansion card	67600
Pulse input card	67603
Ethernet communications card	71986
EtherNet/IP communications card	87803
DeviceNet interface card	68541
Allen-Bradley Remote I/O interface card	68539
Profibus DP interface card	68540
Analog input card with thermocouple input	87697
USB interface card	93245
Ethernet interface card	77142
Fiber-optic interface card	77143
ControlNet interface card	103136

Table 1-3. Part Numbers for 820i Option Cards

Relay Options

8-, 16-, and 24-channel relay racks are available for all 820i systems. Relays require an external enclosure for the relays. Consult factory for details.

DC Power Supplies

Two DC power supplies are available for mobile 820i applications:

PN 97474, 9–36 VDC supply

PN 99480, 10–60 VDC supply

Outdoor Display

An optional display, PN 100758, is available for applications requiring use of the 820i in bright, sunlit environments. Consult factory for details.

1.5 Summary of Changes

Changes to recent editions of this manual are listed below:

Version 1.05

- Added TOKENS parameters to the SERIAL menu (see Section 3.2.2 on page 30).

Version 1.04

- Added new EDP command SF#n. See Section 9.1.5 for more information.
- Added <AN> print token for Alibi numbering. See Section 6.1 on page 52 for more information.
- Added front panel token selections for streaming. See Figure 3-9 for more information.
- Changed default PFORMAT port setting to the new NONE selection. See Figure 3-15 on page 40 for setting.

Version 1.02

- Support for local/remote indicator configurations provides function equivalent to a legal-for-trade remote display with keypad for truck scale and similar applications. See Section 10.4 on page 93 for more information.
- The description for setting rate of change (ROC) parameters has been changed. See Table 3-3 on page 24 for details.
- New values have been added to the STREAM parameter on the SERIAL menu to allow streaming of keypad events to another indicator (4KEYS, KEYPAD) and, for the local/remote function, to send the complete display image (DISPLAY). See Section 3.2.2 for more information.
- New IMAGE parameter on the FEATURE menu allows inversion of the display image (blue-on-white or white-on-blue) for support of the outdoor display option. See Section 3.2.3 for more information.
- Display and printing of audit trail information is described in Section 10.10 on page 100.

2.0 Installation

This section describes procedures for connecting load cell, digital I/O, and serial communications cables to the 820i indicator. Assembly drawings and replacement parts lists for the universal model are included for the service technician. See Section 10.11 on page 101 for dimension drawings.

CAUTION

- Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.
- This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicator must be performed by qualified service personnel only.
- The supply cord serves as the power disconnect for the 820i. The power outlet supplying the indicator must be installed near the unit and be easily accessible.

2.1 Unpacking and Assembly

Immediately after unpacking, visually inspect the 820i to ensure all components are included and undamaged. The shipping carton should contain the indicator, this manual, and a parts kit. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

See Section 2.9 on page 11 for parts kit contents.

2.2 Enclosure Disassembly

The indicator enclosure must be opened to install option cards and to connect cables for installed option cards.

WARNING

The 820i has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.

Ensure power to the indicator is disconnected, then place the indicator face-down on an anti static work mat. Remove the screws that hold the backplate to the enclosure body, then lift the backplate away from the enclosure and set it aside.

2.3 Cable Connections

The universal model of the 820i provides six cord grips for cabling into the indicator: one for the power cord, five to accommodate other cabling. Install plugs in all unused cord grips to prevent moisture from entering the enclosure.

2.3.1 Cable Grounding

Except for the power cord, all cables routed through the cord grips should be grounded against the indicator enclosure. Do the following to ground shielded cables:

- Use the lockwashers, clamps, and keps provided in the parts kit to install grounding clamps on the enclosure studs adjacent to cord grips. Install grounding clamps only for cord grips that will be used; do not tighten nuts.
- Route cables through cord grips and grounding clamps to determine cable lengths required to reach cable connectors. Mark cables to remove insulation and shield as described below:
 - For cables with foil shielding, strip insulation and foil from the cable half an inch (13 mm) past the grounding clamp (see Figure 2-1). Fold the foil shield back on the cable where the cable passes through the clamp. Ensure silver (conductive) side of foil is turned outward for contact with the grounding clamp.
 - For cables with braided shielding, strip cable insulation and braided shield from a point just past the grounding clamp. Strip another half inch (15 mm) of insulation *only* to expose the braid where the cable passes through the clamp (see Figure 2-1).

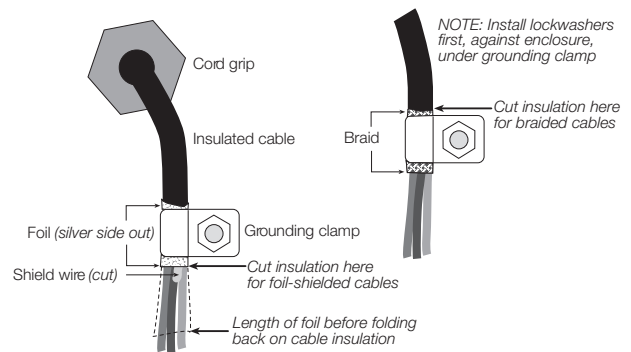


Figure 2-1. Grounding Clamp Attachment for Foil-Shielded and Braided Cabling

- For load cell cables, cut the shield wire just past the grounding clamp. Shield wire function is provided by contact between the cable shield and the grounding clamp.
- Route stripped cables through cord grips and clamps. Ensure shields contact grounding clamps as shown in Figure 2-1. Tighten grounding clamp nuts.
- Finish installation using cable ties to secure cables inside of indicator enclosure.

2.3.2 Load Cells

To attach cable from a load cell or junction box to the 820i, route the cable through the cord grip and ground the shield wire as described in Section 2.3.1 on page 6.

Next, remove load cell connector J7 or J8 from CPU board. Wire the load cell cable from the load cell or junction box to the connector as shown in Table 2-1.

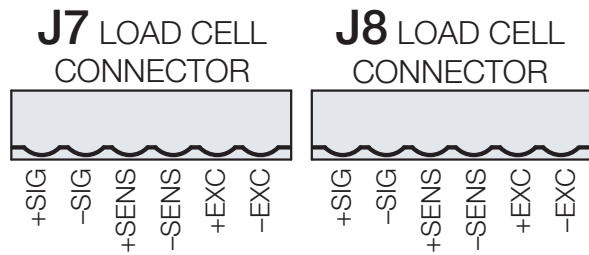


Figure 2-2. Load Cell Connectors

If using 6-wire load cell cable (with sense wires), remove jumpers JP1 and JP2 before reinstalling connector J7. For 4-wire installation, leave jumpers JP1 and JP2 on. For 6-wire load cell connections on dual-channel A/D cards, remove jumpers JP3 and JP4 for connections to J8.

When connections are complete, reinstall load cell connector on the CPU board header and use two cable ties to secure the load cell cable to the inside of the enclosure.

J7 or J8 Connector Pin	Function
1	+SIG
2	-SIG
3	+SENSE
4	-SENSE
5	+EXC
6	-EXC

- For 6-wire load cell connections to connector J7, remove jumpers JP1 and JP2.
- For 6-wire load cell connections to connector J8 (dual A/D boards), remove jumpers JP3 and JP4.

Table 2-1. Load Cell Connector Pin Assignments

2.3.3 Serial Communications

Communications ports on the 820i CPU board support PS/2-type remote keyboard, full duplex RS-232, 20 mA output, or RS-485 communications at up to 115200 bps. Optional communications cards support USB, Ethernet, and fiber-optic connections to the 820i.

To attach serial communications cables, route the cable through the cord grip and ground the shield wire as described in Section 2.3.1 on page 6. Remove the serial connector from the CPU board and wire to the connector. Once cables are attached, plug the connector into the header on the board. Use cable ties to secure serial cables to the inside of the enclosure.

Table 2-2 shows the pin assignments for Ports 1, 2, and 4. Port 1 supports remote keyboard attachment of PS/2-type personal computer keyboards (see Section 10.9 on page 99 for information about the PS/2 keyboard interface.)

Connector	Pin	Signal	Port
J9	1	CLK	1
	2	+5V	
	3	GND	
	4	DATA	
J10	1	GND	2
	2	RS-232 RxD	
	3	RS-232 TxD	
	4	RS-232 RTS	
	5	RS-232 CTS	
	6	GND	
J11	1	GND	4
	2	N/C	
	3	N/C	
	4	RS-485 A	
	5	RS-485 B	
	6	+20mA OUT	
	7	-20mA OUT	
	8	GND	
	9	RS-232 RxD	
	10	RS-232 TxD	

Table 2-2. Serial Port Pin Assignments

Serial ports are configured using the SERIAL menu. See Section 3.2.2 on page 30 for configuration information.

An optional dual-channel serial communications expansion card, PN 67604, is also available. The serial expansion card provides two additional serial ports, assigned as port numbers 7 and 8. One port on the serial expansion card supports four-wire RS-485 communications. Both ports on the expansion card can support RS-232 or 20mA connections.

Port 3 uses connector J1 to support USB, Ethernet, and fiber-optic interface cards.



Note Installation of option cards in connector J1 requires removal of the J1/J10 port selection jumper (see Figure 2-3 on page 9).

Removing the jumper disables RS-232 communications through connector J10. For the USB interface card only, connections for simultaneous RS-232 (configured as Port 3) and USB communications (Port 2) are provided on the USB interface card.

See the communications interface card installation instructions for more information.

2.3.4 Digital I/O

Digital inputs can be set to provide many indicator functions, including all keypad functions. Digital inputs are active low (0 VDC), inactive high (5 VDC).

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 wired to switch relays when the digital output is active (low, 0 VDC) with reference to a 5 VDC supply.

Table 2-3 shows the pin assignments for connector J5.

J5 Pin	J5 Signal
1	+5 VDC
2	GND
3	DIO 1
4	DIO 2
5	DIO 3
6	DIO 4
7	DIO 5
8	DIO 6
9	DIO 7
10	DIO 8

Table 2-3. J5 Pin Assignments (Digital I/O)

Digital inputs and outputs are configured using the DIG I/O menu. See Section 3.2.7 on page 44 for configuration information.

An optional 24-channel digital I/O expansion card, PN 67601, is available for applications requiring more digital I/O channels.



Note Digital I/O points can be configured to count active pulse inputs by setting them to PROGIN (DIGIN menu) and using the *iRite-IDE* DigInSsBbActivate handler with a timer to turn the handler on and off. However, the fastest pulse rate that can be counted using a digital input is 10Hz (10 pulses per second). More demanding applications can use the pulse input option card (PN 67603) to count pulses in the 4–4000Hz range.

2.4 Installing Option Cards

Each option card is shipped with installation instructions specific to that card. The general procedure for all option cards is as follows:



CAUTION *Option cards are not hot-pluggable. Disconnect power to the 820i before installing option cards.*

1. Disconnect power to the indicator. Remove backplate as described in Section 2.2 on page 6.
2. Carefully align the large option card connector with connector J6 on the CPU board (see Figure 2-3 on page 9) or J1. Press down to seat the option card in the CPU board connector.
3. Use the screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board (see Figure 2-3).
4. Make connections to the option card as required. Use cable ties to secure loose cables inside the enclosure. When installation is complete, reassemble the enclosure as described in Section 2.6 on page 10.

The 820i automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify the newly-installed card to the system.

J6 EXPANSION CARD SLOT

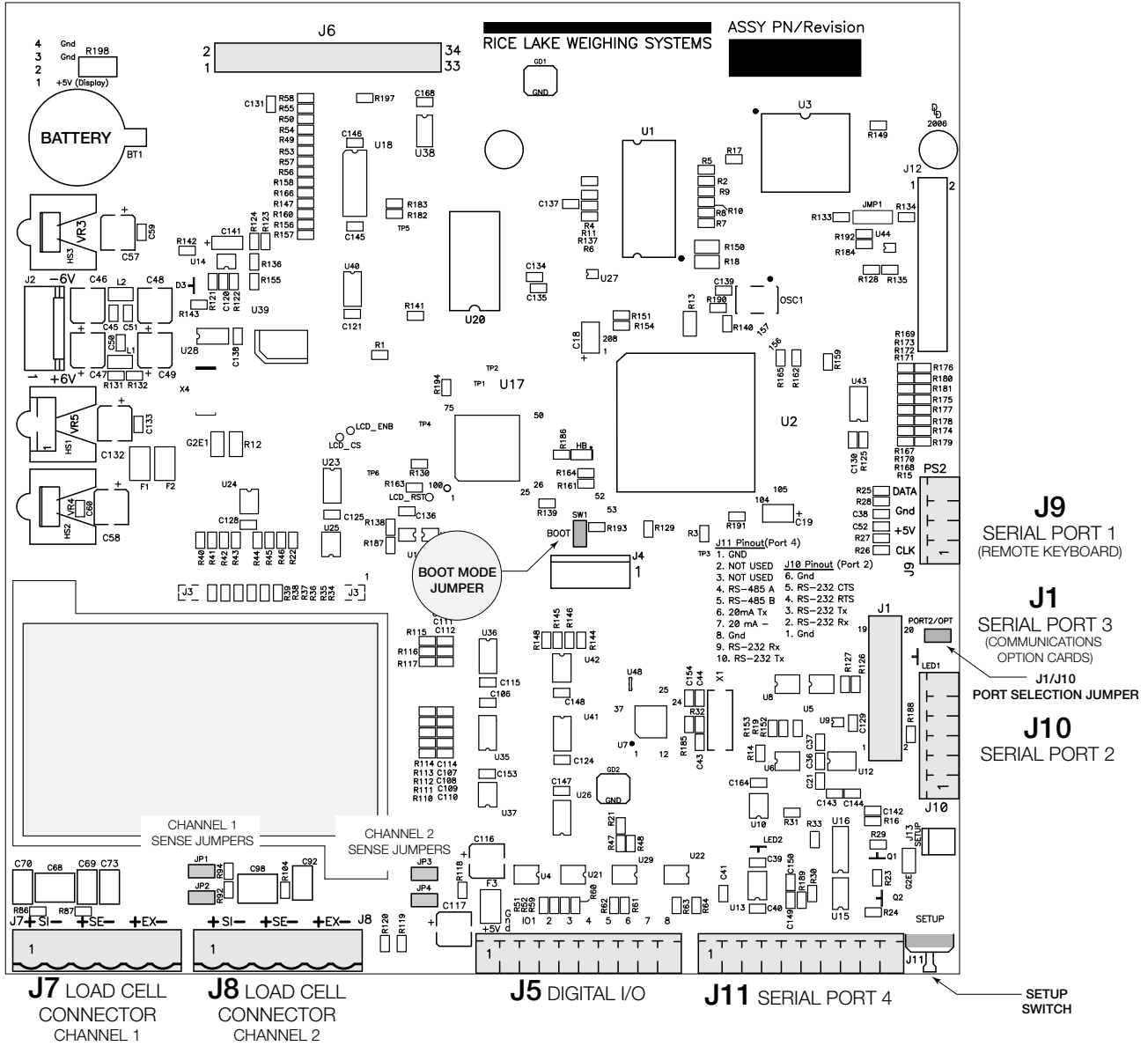


Figure 2-3. 820i CPU Board

2.5 Slot Assignments

Table 2-4 lists the slot numbers, CPU board connectors, and configuration assignments made for both onboard and expansion card functions in the 820i. See Figure 2-3 for connector locations.

Slot Number	Connector	Function	Configured As
0	Connector J5	Onboard digital I/O	Slot 0, bits 1–8
	Connectors J9, J1, J10, J11	Onboard serial communications	Ports 1–4
1	Connectors J7, J8	Onboard single- or dual-channel A/D	Channel 1, Channel 2
2	Connector J6 (option card slot)	Dual-channel serial expansion card	Ports 7–8
		Digital I/O expansion card	Slot 2, bits 1–24
		Analog input card	Slot 2, channels 1–2
		Analog output card	Analog 2
		Pulse input card	Pulse 2
		Memory expansion card	Memory 2
		Bus communications cards	Bus Option 2

Table 2-4. 820i Slot Assignments

2.6 Enclosure Reassembly

Once cabling is complete, position the backplate over the enclosure and reinstall the backplate screws. Use the torque pattern shown in Figure 2-4 to prevent distorting the backplate gasket. Torque screws to 15 in-lb (1.7 N-m).

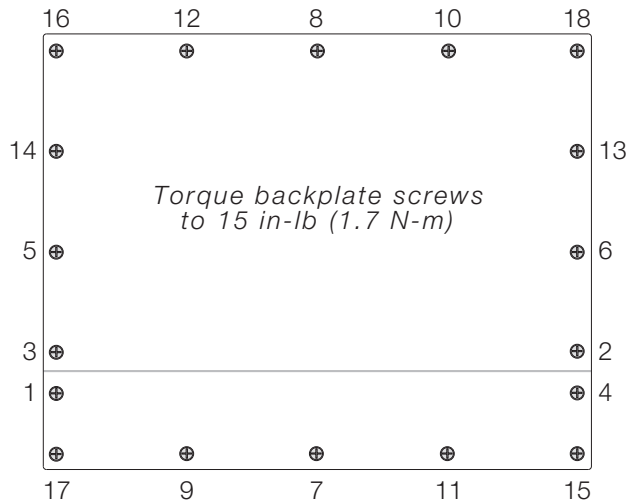


Figure 2-4. 820i Enclosure Backplate

Torqued screws may become less tight as the gasket is compressed during torque pattern, therefore a second torque is required using the same pattern and torque value.

2.7 CPU Board Removal

If you must remove the 820i CPU board, use the following procedure:

1. Disconnect power to the indicator. Remove backplate as described in Section 2.2 on page 6.
2. Unplug connectors for power to the board, serial communications, digital I/O, and any installed option cards.
3. Remove any installed option cards.
4. Remove the five phillips head screws and two kep nuts from the CPU board.
5. Gently lift up the CPU board, then disconnect bottom-side connectors for power to display, ribbon cable, and keypad connector.
6. Remove CPU board from the enclosure. If necessary, cut cable ties to shift cables out of the way.

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

2.8 Battery Replacement

The lithium battery on the CPU board maintains the real-time clock and protects data stored in the system RAM when the indicator is not connected to AC power.

Data protected by the CPU board battery includes time and date, truck and tare memory, onboard database information, and setpoint configuration.

Use *Revolution* 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.

Watch for the low battery warning on the LCD display and periodically check the battery voltage on both the CPU board and on any installed memory option cards. Batteries should be replaced when the indicator low battery warning comes on, or when battery voltage falls to 2.2 VDC. Life expectancy of the battery is ten years.

Replacement Procedure

For best results, replace the battery while in weigh mode and with AC power applied. Use care not to bend the battery retaining spring.

If the battery must be replaced with power removed, do the following immediately after restoring power:

1. Place indicator in setup mode.
2. Go to the Version Menu and press the **Reset Config** softkey. If connected using *Revolution*, configuration can be reset by using monitor mode to enter the RESETCONFIGURATION command followed by the RS command.

See Figure 2-3 on page 9 for CPU board battery location and orientation (positive side up).



Risk of explosion if battery is replaced with incorrect type. Dispose of batteries per manufacturer instruction.

2.9 Parts Kit Contents

Table 2-5 lists the parts kit contents for the universal model of the 820i.

PN	Description
14626	Keyp nuts, 8-32NC (3)
14862	Machine screws, 8-32NC x 3/8 (12)
75062	Sealing washers (14)
15133	Lock washers, No. 8, Type A (5)
30623	Machine screws, 8-32NC x 7/16 (2)
15631	Cable ties (8)
15665	Reducing gland for 1/2 NPT cord grip (1)
15887	6-position screw terminal for load cell connection (1–single A/D, 2–dual A/D)
19538	Cord grip plugs (4)
94422	Capacity label (1)
53075	Cable shield ground clamps (5)
76514	6-position screw terminal for J10 (1)
76513	4-position screw terminal (1) for J9
71344	10-position screw terminals for J5 and J11 (2)
42149	Rubber feet for tilt stand (4)
15144	Nylon washers for tilt stand, 1/4 x 1 x 1/16 (2)
68403	Wing knobs for tilt stand (2)
77925	Indicator/HMI Software Tool Kit CD

Table 2-5. Parts Kit Contents

2.10 Replacement Parts and Assembly Drawings

Table 2-6 lists replacement parts for the 820i universal enclosure model, including all parts referenced in Figures 2-5 through 2-7. For assembly drawings and replacement parts information for the panel mount enclosures, see the 820i Panel Mount Installation Instructions, PN 95304.

Ref Number	PN	Description (Quantity)	See Figure
1	93247	Switch panel membrane (1)	2-5
2	93618	Enclosure, universal (1)	
3	102331	CPU board with single-channel A/D (1)	2-6
	102333	CPU board with dual-channel A/D (1)	
4	67532	Backplate gasket, universal (1)	
5	68424	Enclosure backplate, universal (1)	
6	75062	Sealing washers (4)*	
7	14862	Machine screws, 8-32NC x 3/8 (4)*	
8	14839	Machine screws, 6-32NC x 1/4 (3)	
9	58248	Lock nuts, 6-32NC, nylon (2)	2-5
10	94392	Power supply bracket (1)	
11	15628	Cord grip, 1/2 NPT (1)	
12	15630	Lock nut for 1/2 NPT cord grip (1)	
13	15626	Cord grips, PG9 (4)	
14	15627	Lock nuts, PCN9 (4)	
15	85202	Power cord assembly, 115 VAC and 230 VAC North American units (1)	
	85203	Power cord assembly, 230 VAC European units (1)	
16	30375	Nylon seal rings for PG9 cord grips (4)	
17	14822	Machine screws, 4-40NC x 1/4 (4)	
18	67613	Power supply, ±6VDC, 25W (1)	
19	42640	Setup switch access screw, 1/4 x 28NF x 1/4 (1)	
20	44676	Sealing washer for setup switch access screw (1)	
24	16861	High voltage warning label (1)	
25	69291	3V Lithium coin battery	2-6
26	53308	Model/serial number label (1)	2-5
27	14626	Kep nuts, 8-32NC (3)*	
28	15134	Lock washers, No. 8, Type A (3)	
29	45043	Ground wire, 4 in w/ No. 8 eye connector (1)	2-7
30	67796	Power supply cable assembly, to CPU board (1)	2-5
31	53307	Label (1)	2-6
32	30376	Nylon seal ring for 1/2 NPT cord grip (1)	2-5
33	16892	Ground/Earth label (1)	2-7
—	67531	Tilt stand (1)	—
—	93246	Display board assembly (1)	—

* Additional parts included in parts kit.

Table 2-6. Replacement Parts

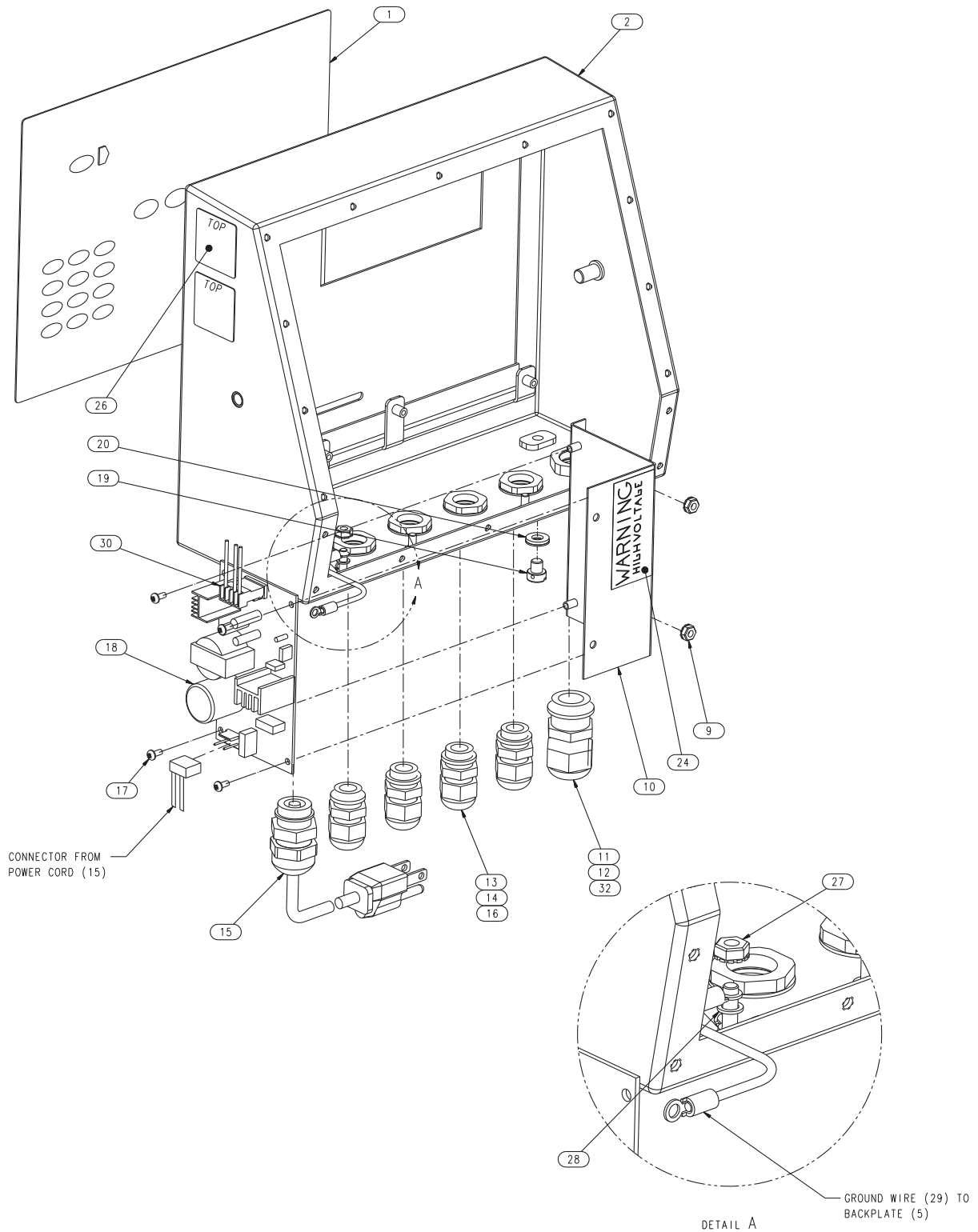


Figure 2-5. 820i Universal Model Assembly, Enclosure and Power Supply

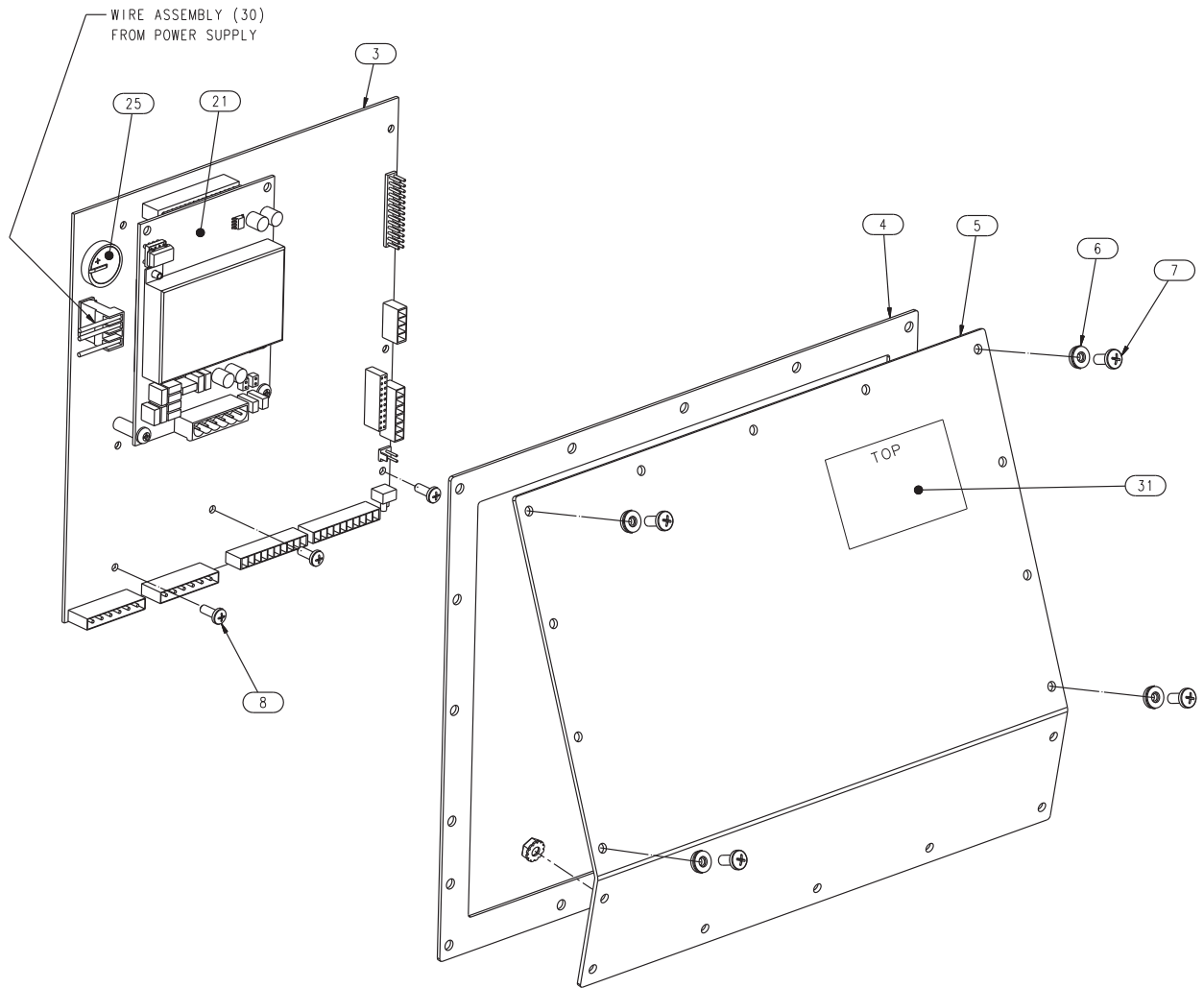


Figure 2-6. 820i Universal Model, CPU Board and Backplate

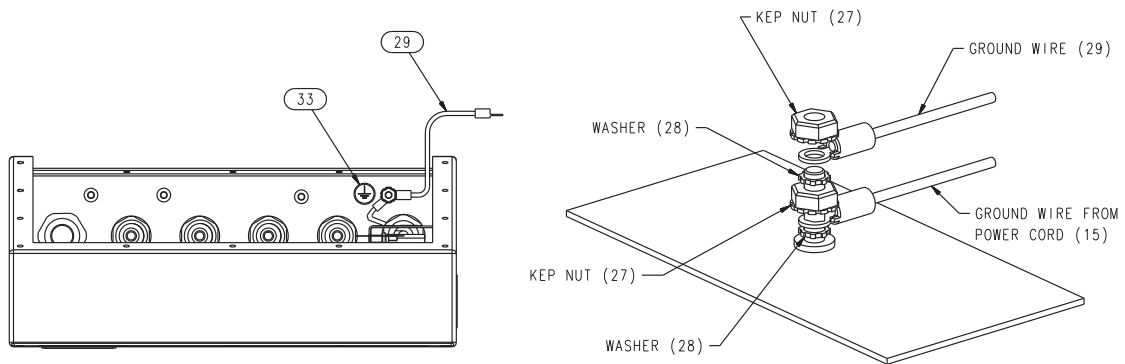


Figure 2-7. 820i Universal Model, Grounding Detail

3.0 Configuration


To configure the *820i* indicator, the indicator must be placed in setup mode. The setup switch is accessed by removing the large fillister head screw on the bottom of the enclosure. Switch position is changed by inserting a screwdriver into the access hole and pressing the switch.

When the indicator is placed in setup mode, a series of menus is shown across the top of the display, along with the words *Scale Configuration*. The SCALES menu is highlighted as the first used to configure the indicator. Detailed descriptions of these menus are provided in Section 3.2.

3.1 Configuration Methods

The *820i* 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 an indicator serial port. Configuration using the menus is described in Section 3.1.3.

Configuration using the serial port can be accomplished using either the serial command set described in Section 9.0 on page 79 or the *Revolution*® configuration utility.

 **Note** Some configuration parameters, such as those used to configure the *820i* display, cannot be accessed through the configuration menus. *Revolution* provides the most complete and efficient configuration interface for the *820i*.

3.1.1 Revolution Configuration

The *Revolution* configuration utility provides the preferred method for configuring the *820i* indicator. *Revolution* runs on a personal computer to set configuration parameters for the indicator. When *Revolution* configuration is complete, configuration data is downloaded to the indicator.

Revolution supports both uploading and downloading of indicator configuration data. This capability allows configuration data to be retrieved from one indicator, edited, then downloaded to another indicator with an identical hardware configuration.

To use *Revolution*, do the following:

1. Install *Revolution* on an IBM-compatible personal computer. See Section 5.0 on page 51 for detailed hardware and software requirements.
2. With both indicator and PC powered off, connect the PC serial port to the RS-232 pins on the indicator serial port or to the optional USB communications card.

When configuration is complete, press the **Exit** or **Save and Exit** softkey to exit setup mode, then replace the setup switch access screw.

- The **Exit** softkey exits setup mode without saving parameter changes to NV RAM. Changes made to the configuration remain in the system until indicator power is cycled.
- **Save and Exit** writes all parameter changes to NV RAM before returning to normal mode.

3. Power up the PC and the indicator. Use the setup switch to place the indicator in setup mode.
4. Start the *Revolution* program.

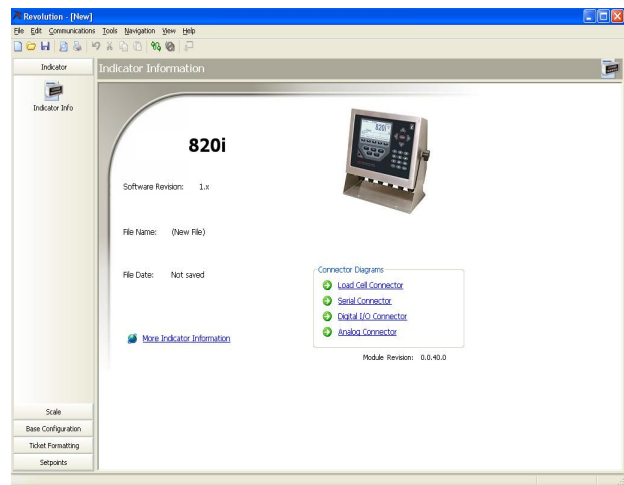


Figure 3-1. Revolution Display

Revolution provides online help for each of its configuration displays. Parameter descriptions provided in this manual for front panel configuration can also be used when configuring the indicator using *Revolution*: The interface is different, but the parameters set are the same.

See Section 5.0 on page 51 for more information about using *Revolution* to configure the *820i*.

3.1.2 Serial Command Configuration

The serial command set can be used to configure the 820i indicator using either a personal computer, terminal, or remote keyboard. Like *Revolution*, serial command configuration sends commands to the indicator serial port; unlike *Revolution*, serial commands can be sent using any external device capable of sending ASCII characters over a serial connection.

Serial commands duplicate the functions available using the indicator front panel and provide some functions not otherwise available. Serial commands can be used to simulate pressing front panel keys, to configure the indicator, or to dump lists of parameter settings. See Section 9.0 on page 79 for more information about using the serial command set.

3.1.3 Front Panel Configuration

Use the CONFIG submenu under the SCALES menu to configure A/D scales. For example, in an indicator with a single-channel A/D card installed in Slot 1, the Scale Configuration display will show the A/D listed (*Slot 1 Channel 1*) under the AVAILABLE A/D's column. Use the **left** navigation key to select the A/D, then press the center softkey, **Add**. The A/D is then moved to the Associated A/D's column. If no other A/D's are listed in the AVAILABLE A/D's column, the center softkey changes to **Done**, as shown in Figure 3-2. Press **Done** to exit the Scale Configuration display.

See Section 10.3 on page 93 for information about configuring serial scales.

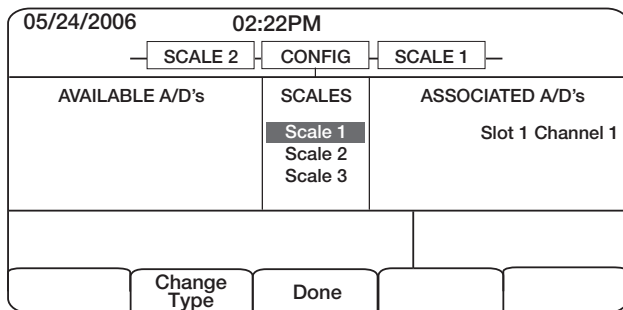


Figure 3-2. Scale Configuration Display

3.1.4 Multi-Range and Multi-Interval Scales

The 820i supports multi-range and multi-interval scales of either two or three ranges or intervals.

Multi-range scales provide two or three ranges, each extending from zero to the maximum capacity specified for the range, that can specify different scale intervals (graduations). The scale interval changes as the applied weight increases but does not reset to lower range intervals until the scale returns to zero.

Multi-interval scales divide the scale into two or three partial weighing ranges, each with different scale intervals. The scale interval changes with both increasing and decreasing loads applied.

To configure a multi-range or multi-interval scale, use the SPLIT parameter to select 2RNG or 3RNG (for multi-range scales), or 2INTVL or 3INTVL (for multi-interval scales). Selecting a SPLIT value other than OFF allows specification of decimal point, display divisions, and maximum capacity for each range or interval.

The SPLIT parameter is used to enable multi-range or multi-interval. The SPLIT parameter is in the SCALES menu, see Figure 3-4, and Table 3-2. After setting the SPLIT parameter, the **Format** menu selection will change as shown in Figure 3-6, and Table 3-4.

If using streaming with multi-range or multi-interval, the stream must be set to Custom in *Revolution*. The Tokens for Secondary and Tertiary Units must be set to L or K to match the Primary, refer to the Serial Menu, Tokens Parameter, in Section 3.2.2 on page 30. They can be set using *Revolution* or through the front panel.

In multi-range, each range has its own capacity and display division, extending from zero. The scale display division will increase at the entered range capacities, either two or three ranges. Once the range has increased to the next level, the display division will remain in new range until the scale returns to zero. The tare value can be taken in any range.

For example,

Range 1 is 0 - 3000 x 1 lb.

Range 2 is 0 - 10,000 x 5 lb.

In multi-interval, the scale has one capacity, which is segmented into weighing intervals, either two or three intervals, each with different display division sizes. As the weight value exceeds an interval or set interval, the display division will increase, as the weight falls below an interval or set interval, the display division will decrease. The tare can only be taken in the first interval.

For example,

Range 1 is 0-30 x 0.01 lb.

Range 2 is 30 - 60 x 0.02 lbs.

3.1.5 Total Scale Configuration

The output of A/D scales, serial scales, or *iQUBE* systems can be configured to function as a total scale. Once configured and calibrated, the total scale can be used as a source for other system functions, including streaming, setpoints, print formatting, and analog output.

To set up a total scale from the indicator front panel, use the scale configuration display (see Figure 3-2) to select the A/D scales or *iQUBE* systems to configure as a total scale. (Use the **Change Type** softkey to show available A/D scales or *iQUBE* systems; use the right navigation key to select the total scale sources.) In *Revolution*, assign the total scale to an unused position then select source scales from the existing A/D scales or *iQUBE* systems.

The FORMAT configuration of the total scale (see Figure 3-5 on page 23) should match that of the source scales. However, the value specified for the total scale GRADS parameter should be specified as the sum of the GRADS values for the source scales. For example: if SCALE 1 is set to GRADS=10000, SCALE 2 to GRADS=5000, SCALE 3 (the total scale) should be set to 15000 grads.

The total scale will show an overrange indication if the maximum capacity of any source scale is exceeded, and show dashes if any source scale reads a negative value. Source scales will respond to Tare and Zero operations performed on the total scale.



Note *Total scale function is not supported for multi-range or multi-interval scales at this time.*

3.2 Menu Structures and Parameter Descriptions

The 820i indicator can be configured using a series of menus accessed through the indicator front panel when the indicator is in setup mode. Table 3-1 summarizes the functions of each of the main menus.

Menu		Menu Function
SCALES	Configuration	Configure and calibrate scales.
SERIAL	Serial	Configure communications ports.
FEATURE	Feature	Set date and time formats, truck mode, passwords, keyboard locks, regulatory mode, and initial consecutive number value, define softkeys and setpoint prompts.
DISPLAY	Display Features	Adjust display contrast and set backlighting on or off; set number of scale widgets shown (1 or 2).
PFORMT	Print Format	Set print format used for header, gross, net, truck in/out, setpoint, and auxiliary ticket formats. See Section 6.0 on page 54 for more information.
SETPTS	Setpoints	Configure setpoints and batching mode.
DIG I/O	Digital I/O	Assign digital input/output functions.
ALGOUT	Analog Output	Configure analog output module. Used only if analog output option is installed.
VERSION	Version	Display installed software version number. The Reset Config softkey on the Version menu can be used to restore all configuration parameters to their default values.

Table 3-1. 820i Menu Summary

The following sections provide graphic representations of the 820i menu structures and tables describing the menu parameters. Default values are shown in **bold** type; numeric ranges and string values are shown in *italic* type. Parameters shown surrounded by a dotted-line box only appear under the special circumstances explained under each box.

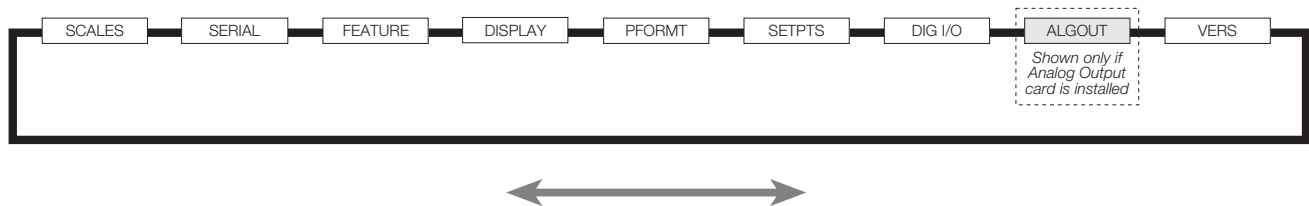


Figure 3-3. Configuration Menu Flow

3.2.1 SCALES Menu

The SCALES menu is shown in Figure 3-4. The FORMAT submenu is shown in Figure 3-5 on page 23; the CALIBR submenu is shown in Figure 3-7 on page 29. Parameters shown in each diagram are described in the table following that diagram.

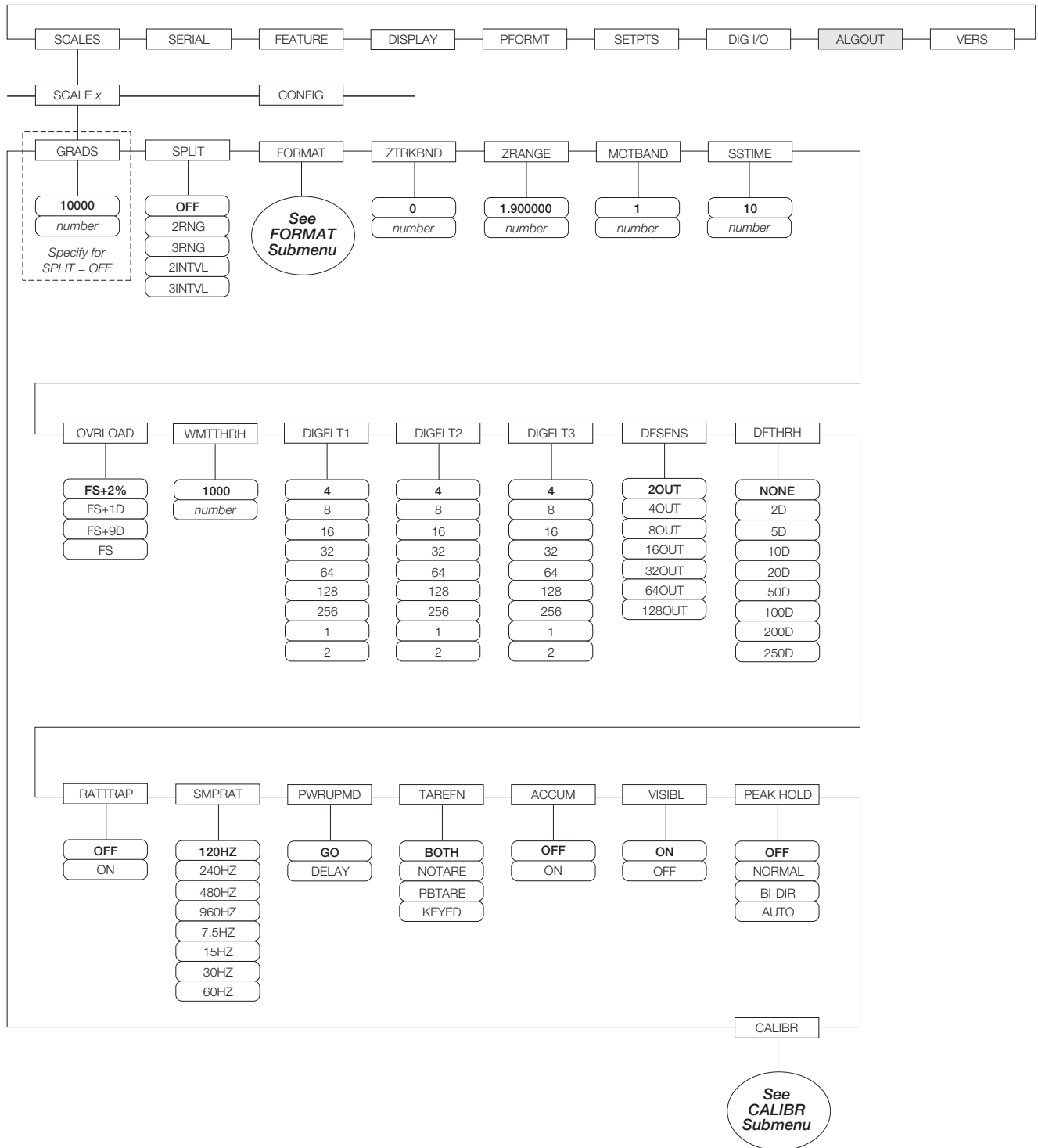


Figure 3-4. SCALES Menu


SCALES Menu		
Parameter	Choices	Description
<i>Level 2 submenus</i>		
SCALEx		Allows configuration and calibration of each scale
CONFIG		Lists available and associated A/Ds
<i>Level 3 submenus</i>		
GRADS	10000 1–9999999	Specifies the number of full scale graduations if SPLIT=OFF. (For multi-range and multi-interval scales (SPLIT ≠ 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 1–9999999 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	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 on page 27 and parameter descriptions in Table 3-4 on page 28.
FORMAT	PRIMAR SECNDR TERTIA ROC	For standard scales (SPLIT=OFF), see Level 4 submenu descriptions in Table 3-3 on page 24. For multi-range and multi-interval scales, see Table 3-4 on page 28.
ZTRKBND	0 <i>number</i>	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. Maximum legal value varies depending on local regulations.  Note For scales using linear calibration, do not set the zero tracking band to a value greater than that specified for the first linearization point.
ZRANGE	1.900000 <i>number</i>	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. Use the default value for legal-for-trade applications.
MOTBAND	1 <i>number</i>	Sets the level, in display divisions, at which scale motion is detected. If motion is not detected for 1 second or more, 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 does not light; operations normally requiring standstill (zero, tare, print) are performed regardless of scale motion. If 0 is selected, ZTRKBND must also be set to 0.
SSTIME	10 <i>number</i>	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. Values greater than 10 are not recommended.
OVRLOAD	FS+2% FS+1D FS+9D FS	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.
WMTTHR	1000 <i>number</i>	Specifies the minimum number of grads required for a weightment to be added to the recorded number of weightments.

Table 3-2. SCALES Menu Parameters



SCALES Menu		
Parameter	Choices	Description
DIGFLT1 DIGFLT2 DIGFLT3	4 8 16 32 64 128 256 1 2	<p>Selects the digital filtering rate used to reduce the effects of mechanical vibration from the immediate area of the scale.</p> <p>Choices indicate the number of A/D conversions per update that are averaged to obtain the displayed reading. A higher number gives a more accurate display by minimizing the effect of a few noisy readings, but slows down the settling rate of the indicator.</p> <p> Note When configuring non-A/D scales, set the DIGFLT_x parameters to 1 to disable filtering.</p> <p>See Section 10.7 on page 97 for more information about digital filtering.</p>
DFSENS	20OUT 40OUT 80OUT 160OUT 320OUT 640OUT 1280OUT	<p>Digital filter cutout sensitivity. Specifies the number of consecutive readings that must fall outside the filter threshold (DFTHR_H parameter) before digital filtering is suspended.</p> <p>See Section 10.7 on page 97 for more information about digital filtering.</p>
DFTHR _H	NONE 2D 5D 10D 20D 50D 100D 200D 250D	<p>Digital filter cutout threshold. Specifies the filter threshold, in display divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside of this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled.</p> <p>See Section 10.7 on page 97 for more information about digital filtering.</p>
RATTRAP	OFF ON	<p>Enables RATTLETRAP[®] digital filtering. RATTLETRAP is most effective at filtering repeating vibrations caused by mechanical noise from nearby machines but may increase settling times over standard digital filter selections.</p>
SMPRAT	120HZ 240HZ 480HZ 960HZ 7.5HZ 15HZ 30HZ 60HZ	<p>Sample rate. Selects measurement rate, in samples per second, of the analog-to-digital converter. Lower sample rate values provide greater signal noise immunity: the default 120 Hz value may be too fast to provide the desired stability in some static weighing applications.</p> <p> Note The maximum total sample rate for all configured A/D channels—the sum of the sample rates for all scales—is 1200 Hz.</p>
PWRUPMD	GO DELAY	<p>Power up mode. In GO mode, the indicator goes into operation immediately after a brief power up display test.</p> <p>In DELAY mode, 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.</p>
TAREFN	BOTH NOTARE PBTARE KEYED	<p>Enables or disables push-button and keyed tares. Possible values are:</p> <p>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</p>
ACCUM	OFF ON	<p>Accumulator. Specifies whether the scale accumulator is enabled. If enabled, accumulation occurs whenever a print operation is performed.</p>
VISIBL	ON OFF	<p>Scale visibility. Specifies whether scale data is displayed.</p>

Table 3-2. SCALES Menu Parameters (Continued)

<i>SCALES Menu</i>		
Parameter	Choices	Description
PEAK HOLD	OFF NORMAL BI-DIR AUTO	<p>Peak hold. Used to determine, display, and print the greatest net weight read during a weighing cycle. The weighing cycle ends when a print command is executed (AUTO setting) or when the peak weight is cleared by pressing ZERO or PRINT. Press GROSS/NET to display gross weight data when using the peak hold function.</p> <p>OFF Peak hold function is off.</p> <p>NORMAL Positive peak, manual reset. Greatest net weight is held in memory until the weight is removed from the scale and either the ZERO or PRINT key is pressed.</p> <p>BI-DIR Bi-directional peak, manual reset. Same as NORMAL, but peak value can be either positive or negative, determined by absolute value.</p> <p>AUTO Positive peak, auto print, auto reset. Automatic print occurs when scale load is 0 ± 10 display divisions and at standstill. Following the print command, the peak value is cleared and reset automatically.</p>
CALIBR	WZERO WVAL WSPAN WLIN REZERO	See Level 4 submenu descriptions in Table 3-5 on page 29.

Table 3-2. SCALES Menu Parameters (Continued)

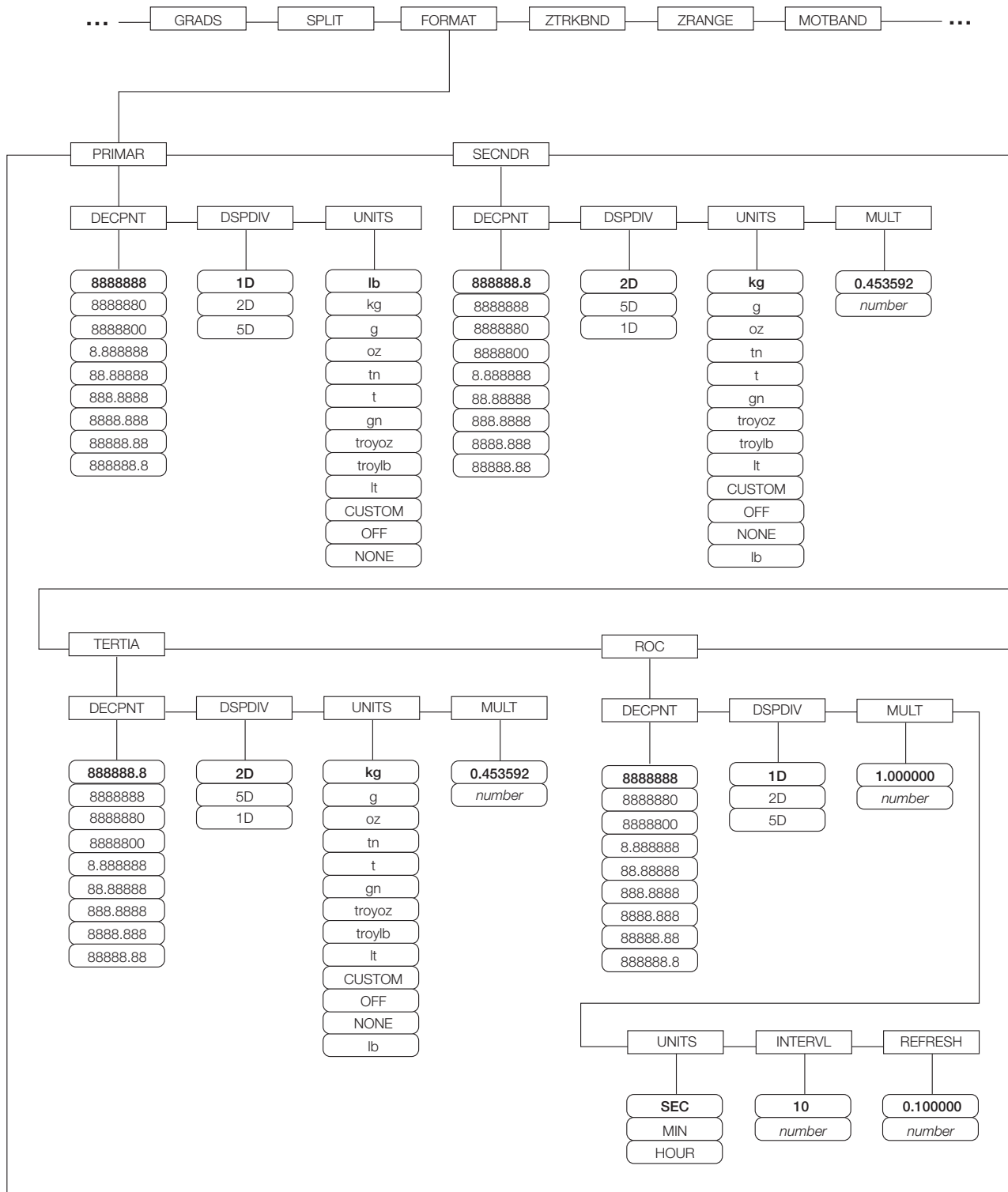


Figure 3-5. SCALES Menu, FORMAT Submenu, SPLIT = OFF

SCALES Menu, FORMAT Submenu, SPLIT = OFF		
Parameter	Choices	Description
Level 4, FORMAT submenu		
PRIMAR	DECPNT DSPDIV UNITS	Specifies the decimal position, display divisions, and units used for the primary units. See Level 5 submenu parameter descriptions.
SECNDR	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the secondary units. See Level 5 submenu parameter descriptions.
TERTIA	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the tertiary units. See Level 5 submenu parameter descriptions.
ROC	DECPNT DSPDIV MULT TIME INTERVL REFRESH	Specifies the decimal position, display divisions, conversion multiplier, time units, update interval, and refresh interval used for the rate of change units. See Level 5 submenu parameter descriptions.
Level 5 submenus		
Primary Units (PRIMAR) Parameters		
DECPNT	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
DSPDIV	1D 2D 5D	Display divisions. Selects the minimum division size for the primary units displayed weight.
UNITS	lb kg g oz tn t gn troyoz troylb lt CUSTOM NONE OFF	Specifies primary units for displayed and printed weight. Values are: lb=pound; kg=kilogram; g=gram; oz=ounce; tn=short ton; t=metric ton; gn=grain; troyoz=troy ounce; troylb=troy pound; lt=long ton.

Table 3-3. SCALES Menu, FORMAT Submenu Parameters, SPLIT = OFF


SCALES Menu, FORMAT Submenu, SPLIT = OFF		
Parameter	Choices	Description
Secondary Units (SECNDR) and Tertiary Units (TERTIA) Parameters		
DECPNT	888888.8 8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88	Decimal point location. Determines the location of the decimal point or dummy zeros in the secondary or tertiary units display.
DSPDIV	2D 5D 1D	Display divisions. Selects the value of minimum division size of the displayed weight for secondary or tertiary units display.
UNITS	kg g oz tn t gn troyoz troylb lt CUSTOM OFF NONE lb	Specifies secondary or tertiary units for displayed and printed weight. Values are: lb=pound; kg=kilogram; g=gram; oz=ounce; tn=short ton; t=metric ton; gn=grain; troyoz=troy ounce; troylb=troy pound; lt=long ton.
MULT	0.453592 0.000001– 9999999	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the secondary or tertiary units. The default is 0.453592, which is the conversion factor for changing pounds to kilograms. See Section 10.8 on page 98 for a list of multipliers. To shift between primary, secondary, and tertiary units, press the UNITS key.
Rate of Change (ROC) Units Parameters		
<p>For applications using the ROC function, the primary scale should be configured with a finer resolution than the rate of change (ROC) units to prevent a stepwise appearance in the ROC display. The ROC display step size (weight increment between displayed values) can be roughly calculated as follows:</p> $(updates_per_ROC_UNIT) * (PRIMARY_resolution / ROC_resolution)$ <p>For example, with INTERVL=30; REFRESH =0.1; UNITS=MIN; PRIMARY resolution at 0.1 LB and ROC resolution at 1.0 (LB/MIN):</p> <ul style="list-style-type: none"> - INTERVL * REFRESH = 30 * 0.1 = 3.0 seconds per update (ROC data is flushed every 3.0 seconds) - With UNITS = MIN, there are 20 ROC data updates per ROC time unit: 60 seconds / 3.0 seconds per update - The resolution ratio of PRIMARY to ROC units is 0.1 (0.1 / 1.0) - This configuration provides a step size in the ROC display of 2 LB (2 LB increments between displayed values): 20 * 0.1 = 2 <p> Note That setting both PRIMARY and ROC display resolutions to 1 LB would have resulted in a step size of 20 LB.</p>		

Table 3-3. SCALES Menu, FORMAT Submenu Parameters, SPLIT = OFF (Continued)

SCALES Menu, FORMAT Submenu, SPLIT = OFF

Parameter	Choices	Description
DECPNT	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location. Determines the location of the decimal point or dummy zeros in the display.
DSPDIV	1D 2D 5D	Display divisions. Selects the minimum division size for the ROC units displayed weight.
MULT	1.0 0.000001– 9999999	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the displayed rate of change units. See Section 10.8 on page 98 for information about conversion factors.
UNITS	SEC MIN HOUR	Rate-of-change units.
INTERVL	10 1–100	Update interval. Specifies the number of refreshes over which the rate-of-change is calculated. For example, with REFRESH set to 0.1 second and INTERVL at 60, each weight value takes 6 seconds (0.1 * 60) to be flushed from the ROC data.
REFRESH	0.1 0.1–60	Refresh interval. Specifies the number of seconds between rate-of-change samples.

Table 3-3. SCALES Menu, FORMAT Submenu Parameters, SPLIT = OFF (Continued)

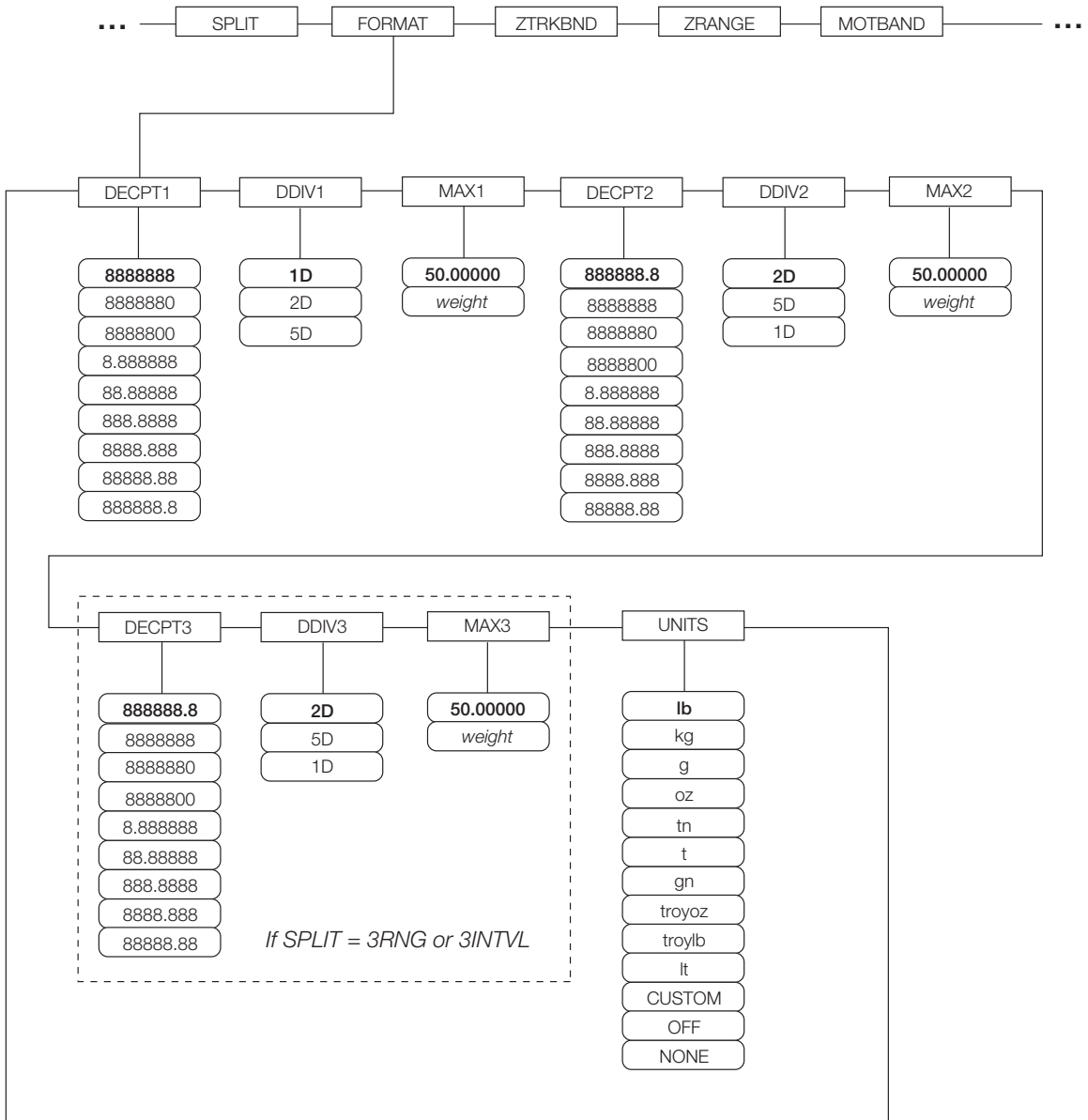


Figure 3-6. *FORMAT* Submenu, *SPLIT* ≠ *OFF* (Multi-range and Multi-interval Scales)

<i>SCALES Menu, FORMAT Submenu, SPLIT ≠ OFF</i>		
Parameter	Choices	Description
Level 4, FORMAT submenu		
DECPT1	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location for first range or interval. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
DDIV1	1D 2D 5D	Display divisions for first range or interval. Selects the minimum division size for the primary units displayed weight.
MAX1	50.00000 <i>weight</i>	Maximum weight for first range or interval.
DECPT2	888888.8 8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88	Decimal point location for second range or interval. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
DDIV2	2D 5D 1D	Display divisions for second range or interval. Selects the minimum division size for the primary units displayed weight.
MAX2	50.00000 <i>weight</i>	Maximum weight for second range or interval.
DECPT3	888888.8 8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88	Decimal point location for third range or interval (SPLIT = 3RNG or 3INTVL only). Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
DDIV3	2D 5D 1D	Display divisions for third range or interval (SPLIT = 3RNG or 3INTVL only). Selects the minimum division size for the primary units displayed weight.
MAX3	50.00000 <i>weight</i>	Maximum weight for third range or interval (SPLIT = 3RNG or 3INTVL only).

Table 3-4. SCALES Menu, FORMAT Submenu Parameters, SPLIT ≠ OFF

SCALES Menu, FORMAT Submenu, SPLIT ≠ OFF		
Parameter	Choices	Description
UNITS	lb kg g oz tn t gn troyoz troylb lt CUSTOM NONE OFF	Specifies primary units for displayed and printed weight. Values are: lb=pound; kg=kilogram; g=gram; oz=ounce; tn=short ton; t=metric ton; gn=grain; troyoz=troy ounce; troylb=troy pound; lt=long ton.

Table 3-4. SCALES Menu, FORMAT Submenu Parameters, SPLIT ≠ OFF (Continued)

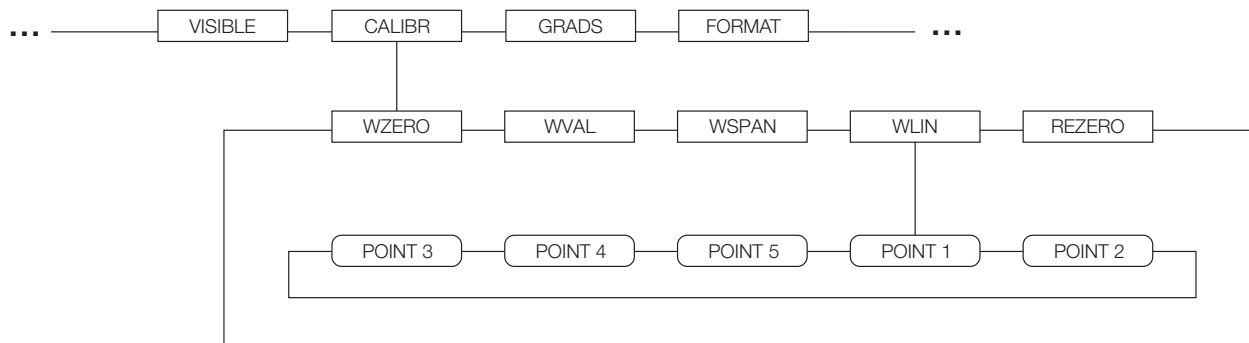


Figure 3-7. SCALES Menu, CALIBR Submenu

See the *iQUBE Installation Manual*, PN 77224, for information about configuring *iQUBE* scales.


SCALES Menu, CALIBR Submenu		
Parameter	Choices	Description
Level 4, CALIBR submenu		
WZERO	—	Press ENTER to display and edit the zero calibration A/D count or millivolts value.
WWAL	—	Press ENTER to display and edit the test weight value.
WSPAN	—	Press ENTER to display and edit the span calibration A/D count or millivolts value.
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 this parameter only after WZERO and WSPAN have been set. See Section 4.2 on page 48 for more information about using this parameter.

Table 3-5. SCALES Menu, CALIBR Submenu Parameters

3.2.2 SERIAL Menu

See Section 10.5 on page 94 for information about 820i serial data formats.

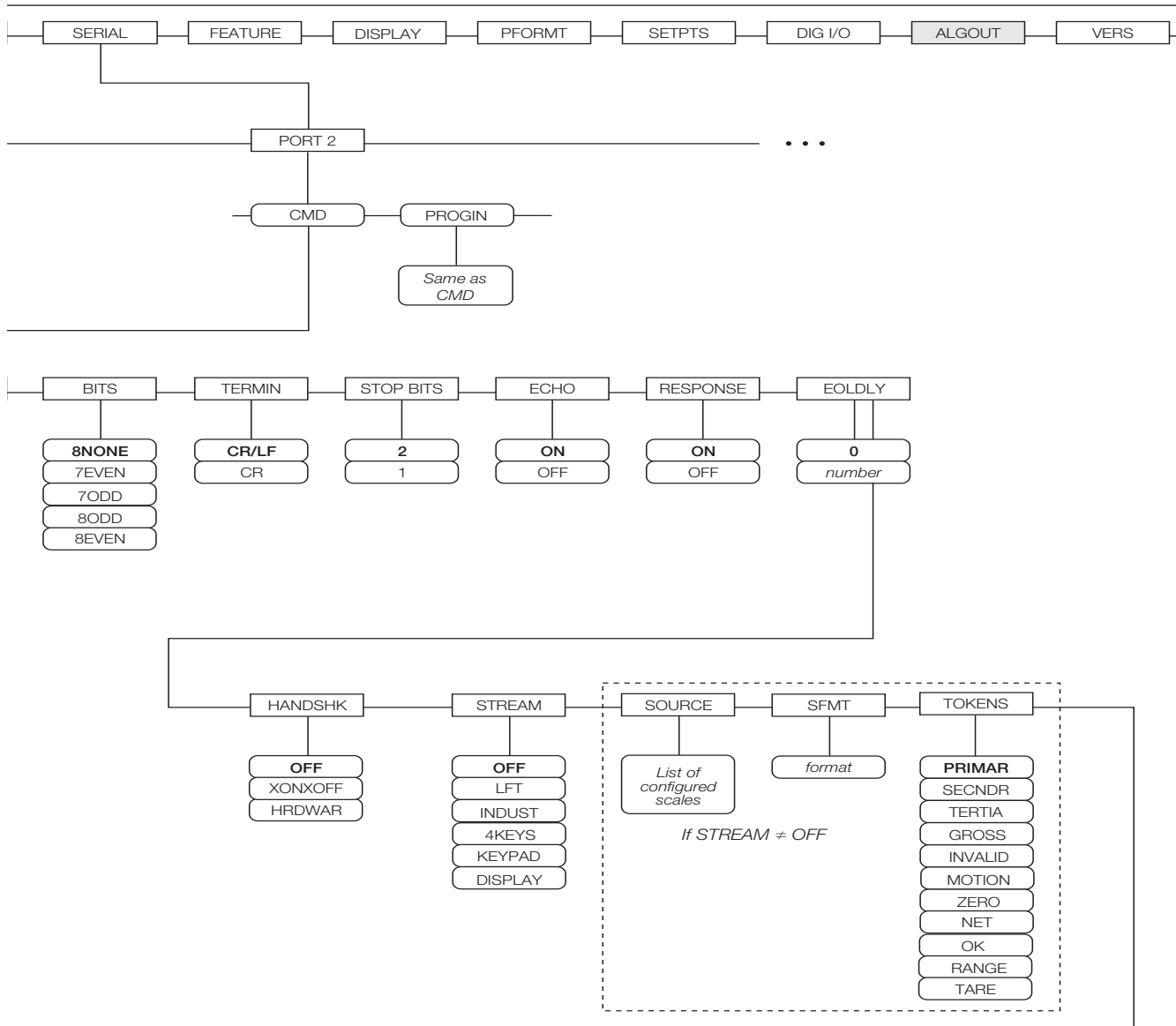


Figure 3-8. SERIAL Menu, Port 2

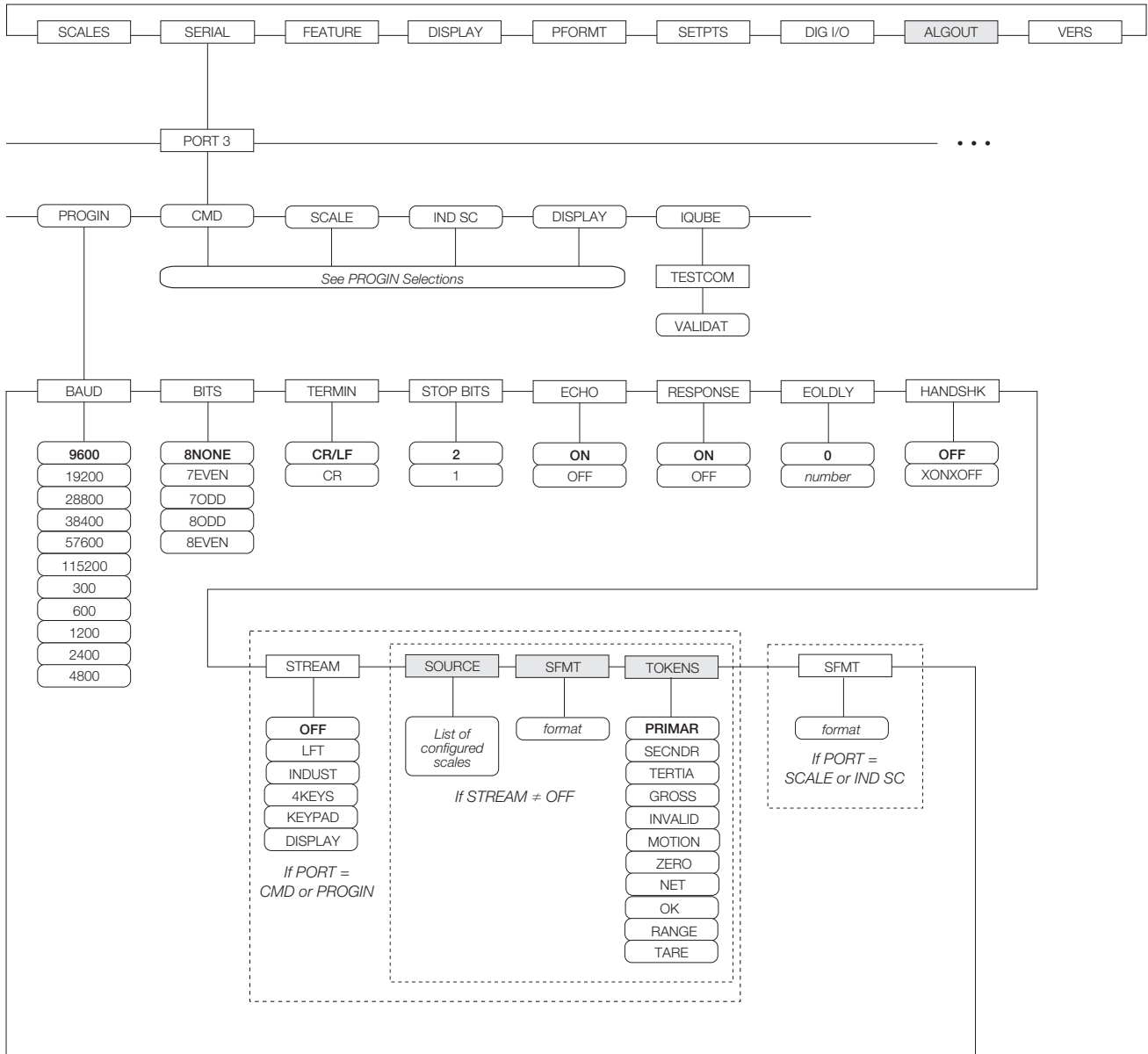


Figure 3-9. SERIAL Menu, Port 3

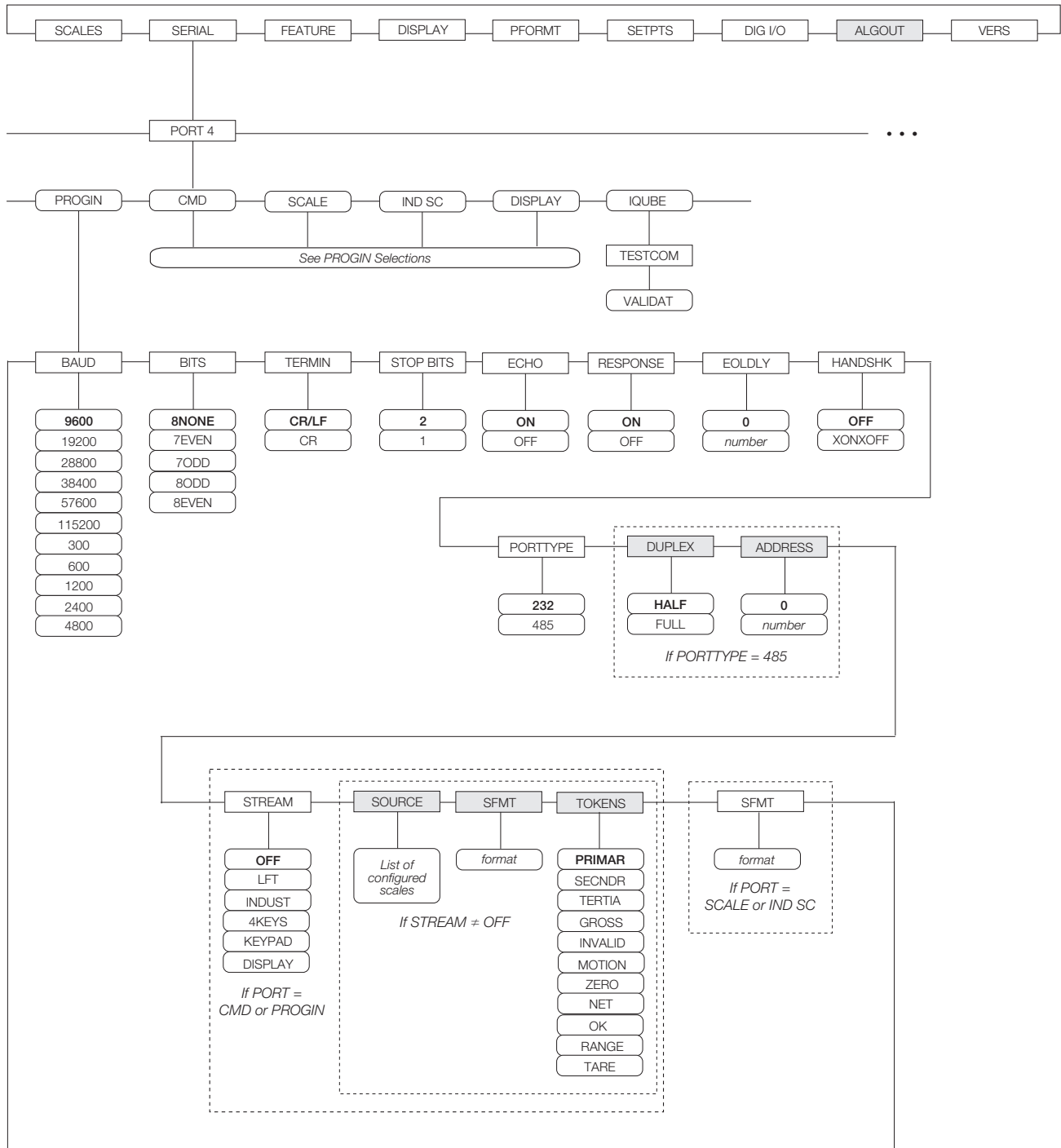


Figure 3-10. SERIAL Menu, Port 4 and Expansion Ports



SERIAL Menu		
Parameter	Choices	Description
Level 2 submenus		
PORT 1 PORT 2 PORT 3 PORT 4	CMD PROGIN KEYBD SCALE IND SC DISPLAY IQUBE	<p>Specifies the type of data received by the port:</p> <p>KEYBD: Remote keyboard input CMD: Remote command input PROGIN: Programmable input SCALE: Legal-for-trade serial scale input IND SC: Industrial (non-legal-for-trade) scale input DISPLAY: Display data input for remote units in local/remote configurations IQUBE: <i>iQUBE</i> serial scale input</p> <p>KEYBD is available only on Port 1; SCALE, IND SC, and IQUBE are available only on Ports 3 and 4 and higher (expansion ports).</p> <p> Note</p> <ul style="list-style-type: none"> • The keyboard interface is not hot-pluggable. Power-off the 820i before attaching keyboard cable to the Port 1 connector. • Port 3 is used only for the USB interface card • For <i>iQUBE</i> configuration, set the port type to IQUBE then configure using <i>Revolution</i> • Print format outputs default to Port 4; if using Port 4 for <i>iQUBE</i> or other scale connections, reassign needed print formats to another port before configuring.
Level 3 Submenus		Port 1–Port 4
BAUD	9600 19200 28800 38400 57600 115200 300 600 1200 2400 4800	<p>Baud rate. Selects the transmission speed for the port.</p> <p> Note The maximum baud rate for ports on serial expansion cards (port number greater than 4) is 19200.</p>
BITS	8NONE 7EVEN 7ODD 8ODD 8EVEN	Selects number of data bits and parity of data transmitted or received by the port.
STOP BITS	2 1	Selects number of stop bits transmitted or received by the port.
ECHO	ON OFF	Specifies whether characters received by the port are echoed back to the sending unit.
RESPONSE	ON OFF	Specifies whether the port transmits replies to serial commands.
TERMIN	CR/LF CR	Termination character. Selects termination character for data sent from the port.
EOLDLY	0 0–255	End-of-line delay. Sets the delay period, in 0.01-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output. Value specified must be in the range 0-255, in tenths of a second (10 = 1 second).

Table 3-6. Serial Menu Parameters



SERIAL Menu		
Parameter	Choices	Description
HANDSHK	OFF XONOFF HRDWAR	Specifies whether XON/XOFF flow control characters or hardware handshaking is used. Hardware handshaking is available only on Port 2.
PORTTYPE	232 485	Specifies whether Port 4 is used for RS-232 or RS-485 communications. If 485 is selected, additional prompts are shown to specify half- or full-duplex operation and RS-485 address.  Note RS-485 communications can be specified for Ports 4 and 7.
DUPLEX	HALF FULL	Specifies whether the RS-485 communications is half- or full-duplex.
ADDRESS	0 0–255	Specifies the decimal indicator address for RS-485 connections. RS-232 communications is disabled if an address other than zero is specified for this parameter. RS-485 addresses must be in the range 01–255.
STREAM	OFF LFT INDUST 4KEYS KEYPAD DISPLAY	Specifies what data, if any, is streamed from the port. 4KEYS and KEYPAD stream keypad events to a receiving indicator. KEYPAD transmits all keypad events; 4KEYS transmits keypresses of the ZERO, GROSS/NET, TARE, and UNITS keys only. DISPLAY streams the complete display image to the receiving indicator in local/remote indicator configurations. See Section 10.4 on page 93 for more information.  Note Streaming is not supported for RS-485 connections.
SOURCE	<i>source_scale</i>	If STREAM is set to a value other than OFF, SOURCE specifies the source scale for data streamed from the port.
SFMT	<i>format</i>	Specifies the stream format used for the streamed data (SCALE or IND SC scale types). The default format is the Consolidated Controls format (see Section 10.6 on page 96). See Section 10.5 on page 94 for information about custom stream formatting.
TOKENS	PRIMAR SECNDR TERTIA GROSS INVALID MOTION ZERO NET OK RANGE TARE	If STREAM is set to OFF, the TOKENS parameter can be used to replace tokens used in the data stream from the indicator front panel. See Section 10.5 on page 94 for more information about custom stream formatting.
TESTCOM	—	<i>iQUBE</i> communications tests.
Level 4 Submenus		<i>iQUBE</i> only
VALIDAT	—	Use Upload softkey to retrieve serial numbers of attached <i>iQUBE</i> units.

Table 3-6. Serial Menu Parameters (Continued)

3.2.3 FEATURE Menu

The FEATURE menu is used to set miscellaneous system attributes, including time and date, truck mode, softkey definitions, and parameters relating to the regulatory environment. See Table 3-7 on page 36 for parameter descriptions.

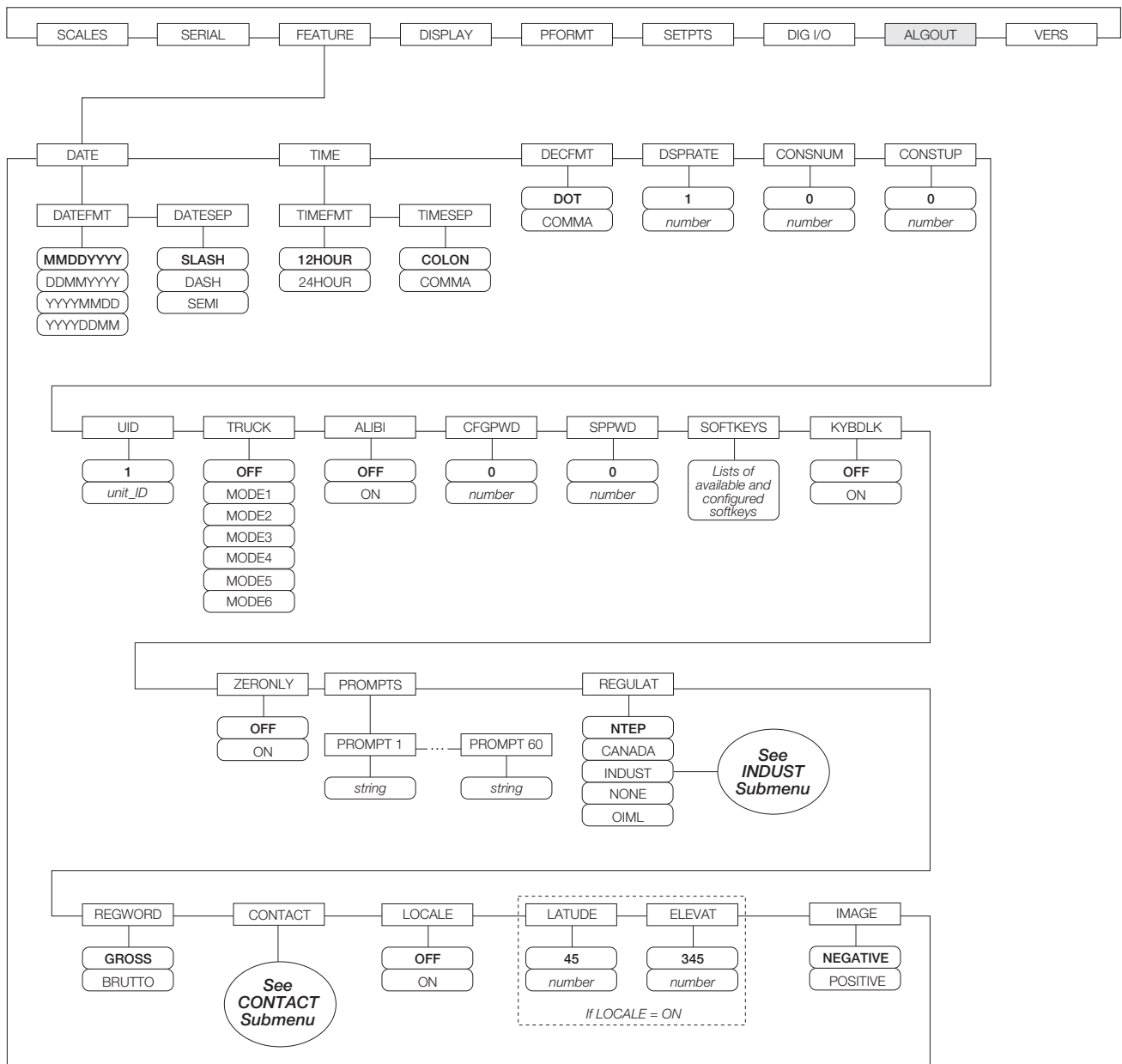


Figure 3-11. FEATURE Menu


FEATURE Menu		
Parameter	Choices	Description
Level 2 submenus		
DATE	DATEFMT DATESEP	Allows selection of date format and date separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE softkey or the SD serial command to set the date. See Section 9.0 on page 79 for information about using the serial commands.
TIME	TIMEFMT TIMESEP	Allows selection of time format and separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE softkey or the ST serial command to set the time. See Section 9.0 on page 79 for information about using the serial commands.
DECfmt	DOT COMMA	Specifies whether decimal numbers are displayed using a period (DOT) or comma as the decimal symbol.
DSPRATE	1 1–80	Display update rate. Specifies the display update rate, in the number of 100-millisecond intervals between updates. The default value, 1, provides about 10 updates per second. The maximum value updates the display every 8 seconds.
CONSNUM	0 0–9999999	Consecutive numbering. Allows sequential numbering for print operations. 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 value specified on the CONSTUP parameter.
CONSTUP	0 0–9999999	Specifies the consecutive number start-up value used when the consecutive number is reset by sending the KCLRCN serial command or a CLRCN digital input. Value specified must be in the range 0–9 999 999.
UID	1 <i>unit-ID</i>	Specifies the unit identification number. Value specified can be any alphanumeric value, up to eight characters.
TRUCK	OFF MODE1 MODE2 MODE3 MODE4 MODE5 MODE6	Specifies the truck mode used. If selected, the indicator switches from normal mode to the selected truck mode. See Section 7.0 on page 59 for more information about using the truck modes. MODE1: Auto clear ID, keyed tares, value swapping MODE2: Auto clear ID, no keyed tares, value swapping MODE3: Stored ID, keyed tares, value swapping MODE4: Stored ID, no keyed tares, value swapping MODE5: Stored ID, keyed tares, no value swapping MODE6: Stored ID, no keyed tares, no value swapping
ALIBI	OFF ON	Specifies whether data storage is used by the alibi feature to allow reprinting any transaction. Use the SOFTKEYS parameter to enable a softkey for recalling alibi print transactions.
CFGPWD	0 0–9999999 reset=999999	Configuration password. Specify a non-zero value to restrict access to all configuration menus.  Note <i>If a configuration password is specified, be sure to record the password and keep it in a safe place. If the configuration password is lost or unavailable, the indicator must be cleared (reset configuration and calibration parameters) to continue use.</i> <i>To clear the indicator, press the setup switch, then enter 999999 (six nines) at the configuration password prompt. The unit performs a RESETCONFIGURATION then returns to the setup mode configuration display.</i>
SPPWD	0 0–9999999	Setpoint password. Specify a non-zero value to restrict access to the setpoint menu. The SPPWD is also shared by, and can be used to protect, the truck register. If a non-zero setpoint password is specified, the password must be entered before deleting any entries from the truck register.

Table 3-7. FEATURE Menu Parameters


FEATURE Menu		
Parameter	Choices	Description
SOFTKEYS	<blank> Time/Date Display Tare Display Accum Display ROC Setpoint Batch Start Batch Stop Batch Pause Batch Reset Weigh In Weigh Out Truck Regs Unit ID Select Scale Diagnostics Alibi F1–F10	Use the Add and Remove softkeys to select softkeys to be displayed in weighing mode.
KYBDLK	OFF ON	Keyboard lock. Specify ON to disable the keypad in normal mode.
ZERONLY	OFF ON	Zero key only. Specify ON to disable all front panel keys except ZERO in normal mode.
PROMPTS	PROMPT1– PROMPT60	Specify prompts for use in setpoint names. Prompts are referenced by the NAME parameter under the SETPTS submenu; prompts can be shown on the display during setpoint execution.
REGULAT	NTEP CANADA INDUST NONE OIML	Regulatory mode. Specifies the regulatory agency having jurisdiction over the scale site. <ul style="list-style-type: none"> • 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 clears the tare. • INDUST provides a set of subparameters to allow customization of tare, clear, and print functions in non-legal-for-trade scale installations. See Level 4 parameter descriptions in Table 3-9 on page 40. <p>The value specified for this parameter affects the function of the front panel TARE and ZERO keys. See Section 10.2 on page 92 for a complete description of TARE and ZERO key functions for each of the regulatory modes.</p>
REGWORD	GROSS BRUTTO	Sets the term displayed when weighing in gross mode. Selecting BRUTTO replaces the <i>Gross</i> annunciator with <i>Brutto</i> .
CONTACT	—	Allows specification of contact information for use in <i>iQUBE</i> alert messages. See Level 3 submenu descriptions in Table 3-8 on page 39.
LOCALE	OFF ON	Locale. Set this parameter ON to enable the LATUDE and ELEVAT parameters. Specifying latitude and elevation of the scale site provides compensation for gravitational effects. Attached scales must be recalibrated after changing this parameter from OFF to ON. <p> Note Gravitational compensation settings do not affect <i>iQUBE</i> scales.</p>

Table 3-7. FEATURE Menu Parameters (Continued)

<i>FEATURE Menu</i>		
Parameter	Choices	Description
LATUDE	45 0–90	Latitude. Specify the latitude of the scale site in degrees. This parameter is shown only if LOCALE=ON.
ELEVAT	345 ±0–9999	Elevation. Specify the elevation of the scale site in meters. Valid values are –9999 through 9999. This parameter is shown only if LOCALE=ON.
IMAGE	NEGATIVE POSITIVE	Specifies whether the indicator display is presented as blue-on-white or white-on-blue. The default value, NEGATIVE, shows the standard blue-on-white image when using the stock LCD display; the optional outdoor display shows white-on-blue. When using the outdoor display, set this value to POSITIVE to show the standard, blue-on-white display image, then use the CONTRAST parameter on the DISPLAY menu to adjust for optimal viewing.
Level 3 submenus		
DATEFMT	MMDDYYYY DDMMYYYY YYYYMMDD YYYYDDMM	Specifies the format used to display or print the date.
DATESEP	SLASH DASH SEMI	Specifies the date separator character.
TIMEFMT	12HOUR 24HOUR	Specifies the format used to display or print the time.
TIMESEP	COLON COMMA	Specifies the time separator character.

Table 3-7. FEATURE Menu Parameters (Continued)

FEATURE Menu, CONTACT Submenu

The CONTACT submenu allows entry of contact information for a contact company or scale dealer. Contact information can be displayed by pressing the **Contacts** softkey on the Version menu in setup mode or the **Diagnostics** softkey when in weigh mode. Contact information may be used in print formats (see Section 6.0 on page 54).

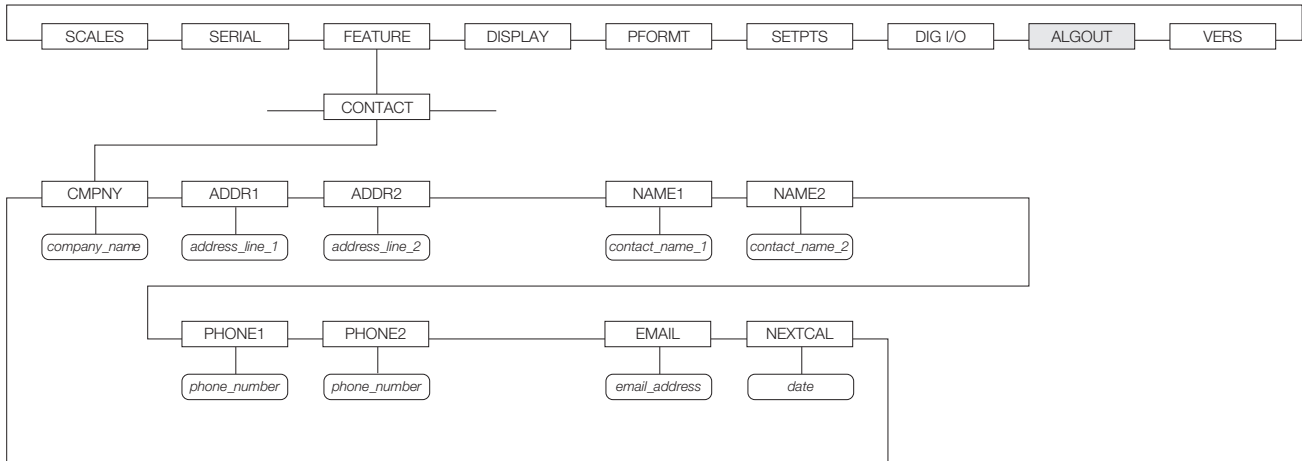


Figure 3-12. CONTACT Submenu

FEATURE Menu, CONTACT Submenu		
Parameter	Choices	Description
Level 3, CONTACT submenu		
CMPNY	<i>company_name</i>	Enter the name of the contact company or dealer.
ADDR1–ADDR2	<i>address</i>	Enter up to three lines of address information for the contact company.
NAME1–NAME2	<i>contact_name</i>	Enter names of up to three contact persons.
PHONE1–PHONE2	<i>phone_number</i>	Enter phone numbers for each of the contact persons specified for the NAME _x parameter.
EMAIL	<i>email_address</i>	Enter the e-mail address of the contact company or dealer. If the <i>iQUBE</i> alert support is used to send automated alert e-mail messages, enter the e-mail address to which the alert messages will be sent. See the <i>iQUBE Installation Manual</i> , PN 77224 for more information about <i>iQUBE</i> alerts.
NEXTCAL*	<i>date</i>	Enter the next scheduled calibration date using the month/day/year format on the DATEFMT parameter. Separator characters are not required.

Table 3-8. CONTACT Submenu Parameters

*If value is not changed, date will reflect 6 months out from last calibration.

FEATURE Menu, REGULAT/INDUST Submenu

The INDUST setting of the REGULAT parameter allows customization of several tare, clear, and print functions for use in *non-legal-for-trade* scale installations. See Section 10.2 on page 92 for more information about regulatory mode functions.

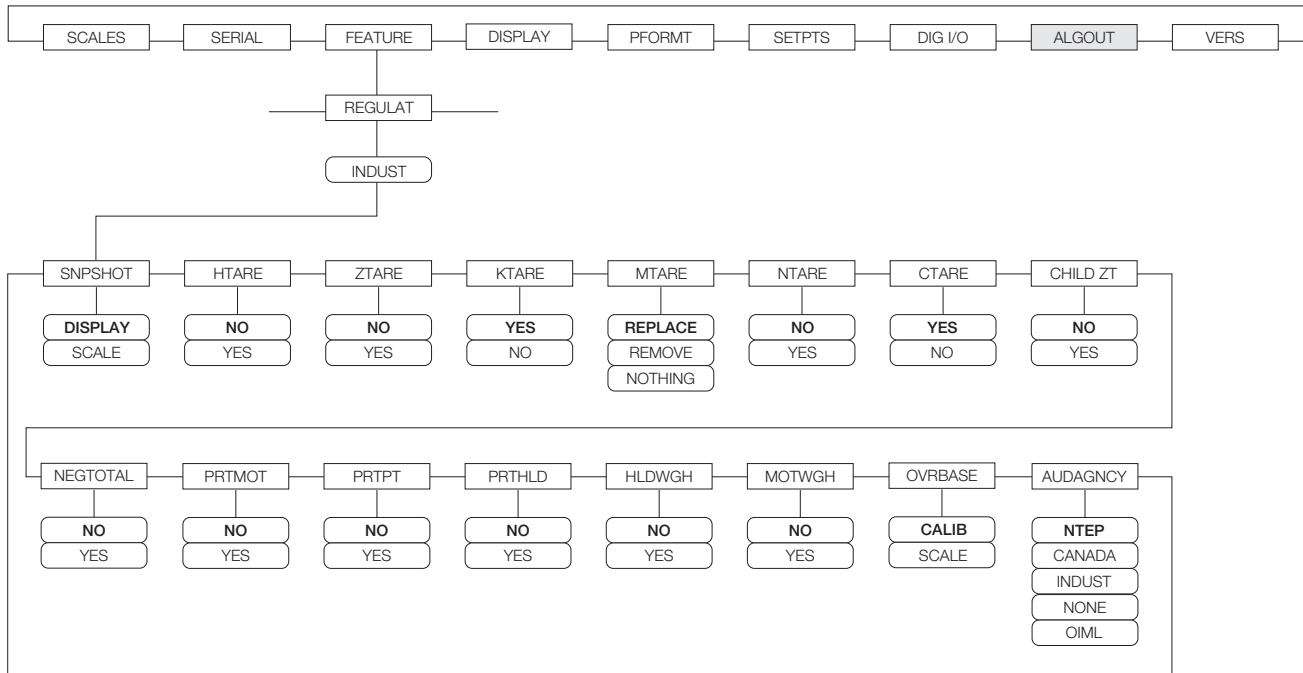


Figure 3-13. REGULAT / INDUST Submenu

FEATURE Menu, REGULAT / INDUST Submenu		
Parameter	Choices	Description
Level 4, REGULAT / INDUST submenu		
SNPSHOT	DISPLAY, SCALE	Display or Scale weight source.
HTARE	NO, YES	Allow tare in display hold
ZTARE	NO, YES	Remove tare on ZERO
KTARE	YES, NO	Always allow keyed tare
MTARE	REPLACE REMOVE NOTHING	Multiple tare action
NTARE	NO, YES	Allow negative or zero tare
CTARE	YES, NO	Allow CLEAR key to clear tare/accumulator
CHILD ZT	NO, YES	Clear child scales individually
NEGTOTAL	NO, YES	Allow total scale to display negative value
PRTMOT	NO, YES	Allow print while in motion
PRTPT	NO, YES	Add PT to keyed tare print
PRTHLD	NO, YES	Print during display hold
HLDWGH	NO, YES	Allow truck weighment during display hold
MOTWGH	NO, YES	Allow truck weighment in motion
OVRBASE	CALIB SCALE	Sets an industrial scale to function like an OIML or NTEP scale (see Section 10.2 on page 92).

Table 3-9. REGULAT / INDUST Submenu Parameters

FEATURE Menu, REGULAT / INDUST Submenu		
Parameter	Choices	Description
AUDAGNCY	NTEP CANADA INDUST NONE OIML	Audit trail display agency format.

Table 3-9. REGULAT / INDUST Submenu Parameters (Continued)

3.2.4 DISPLAY Menu

The DISPLAY menu provides the same function as the **Display** front panel key while in setup mode. Screen contrast can be set to values 0–127; softkeys allow the screen backlight to be turned on or off. The DISPLAY menu also allows the number of screen widgets to be set (1 or 2) to allow simultaneous viewing of two scales.

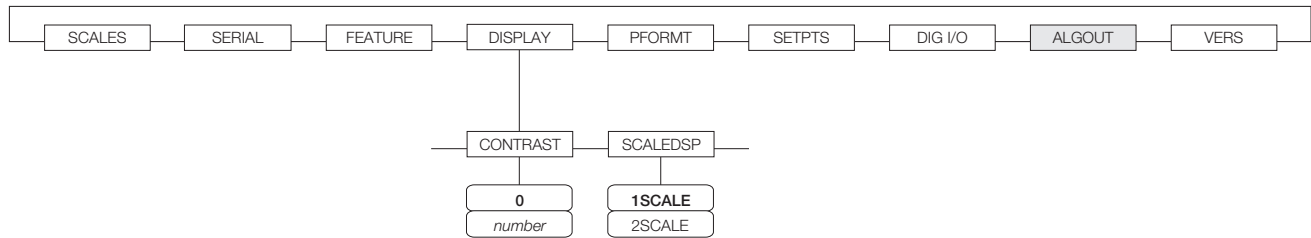


Figure 3-14. DISPLAY Menu

3.2.5 PFORMT Menu

See Section 6.0 on page 54 for information about custom print formatting.

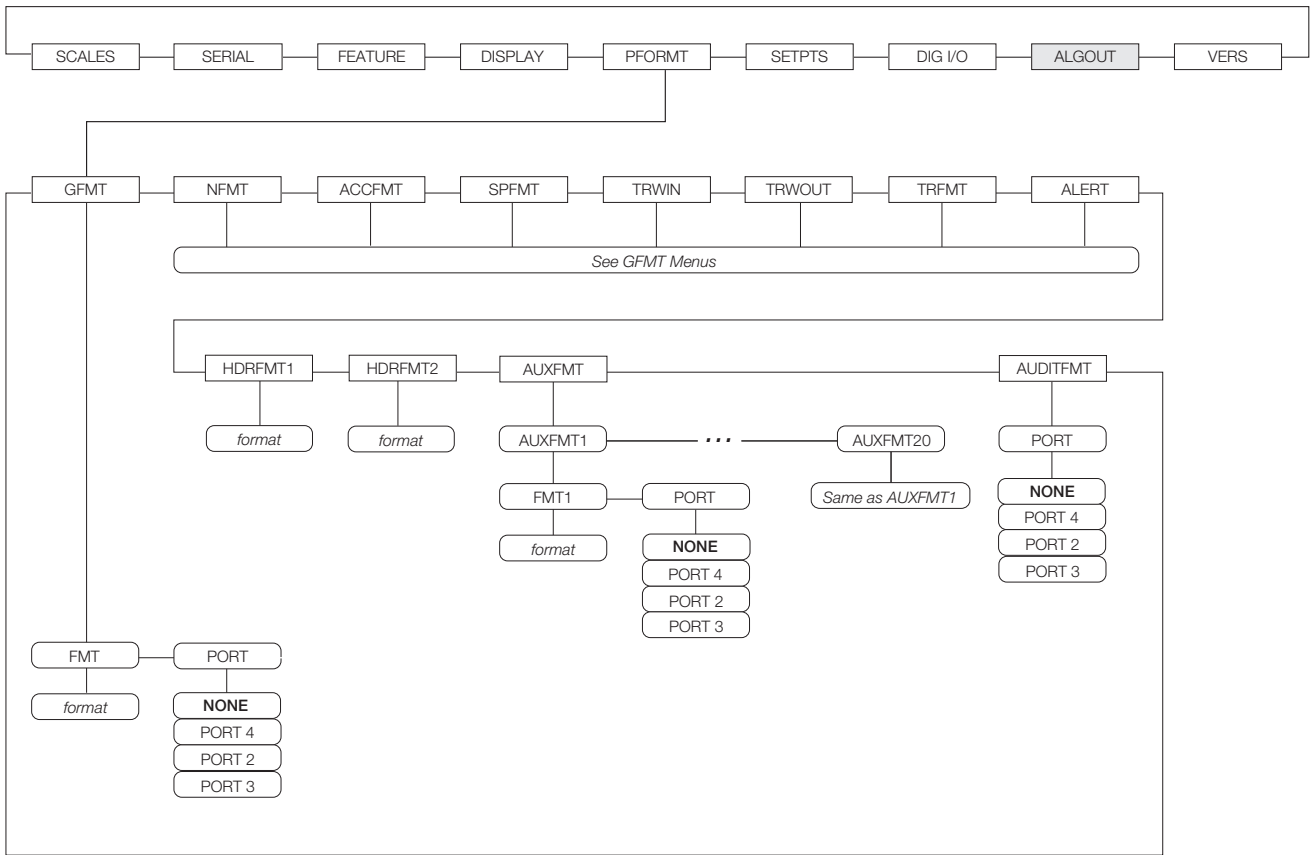


Figure 3-15. PFORMT Menu

3.2.6 SETPTS Menu

See Section 8.0 on page 61 for more information about configuring and using setpoints. Submenus for the various setpoint kinds (shown as *Go to X* in Figure 3-16) are described in Figures 8-2 through 8-9, beginning on page 65.

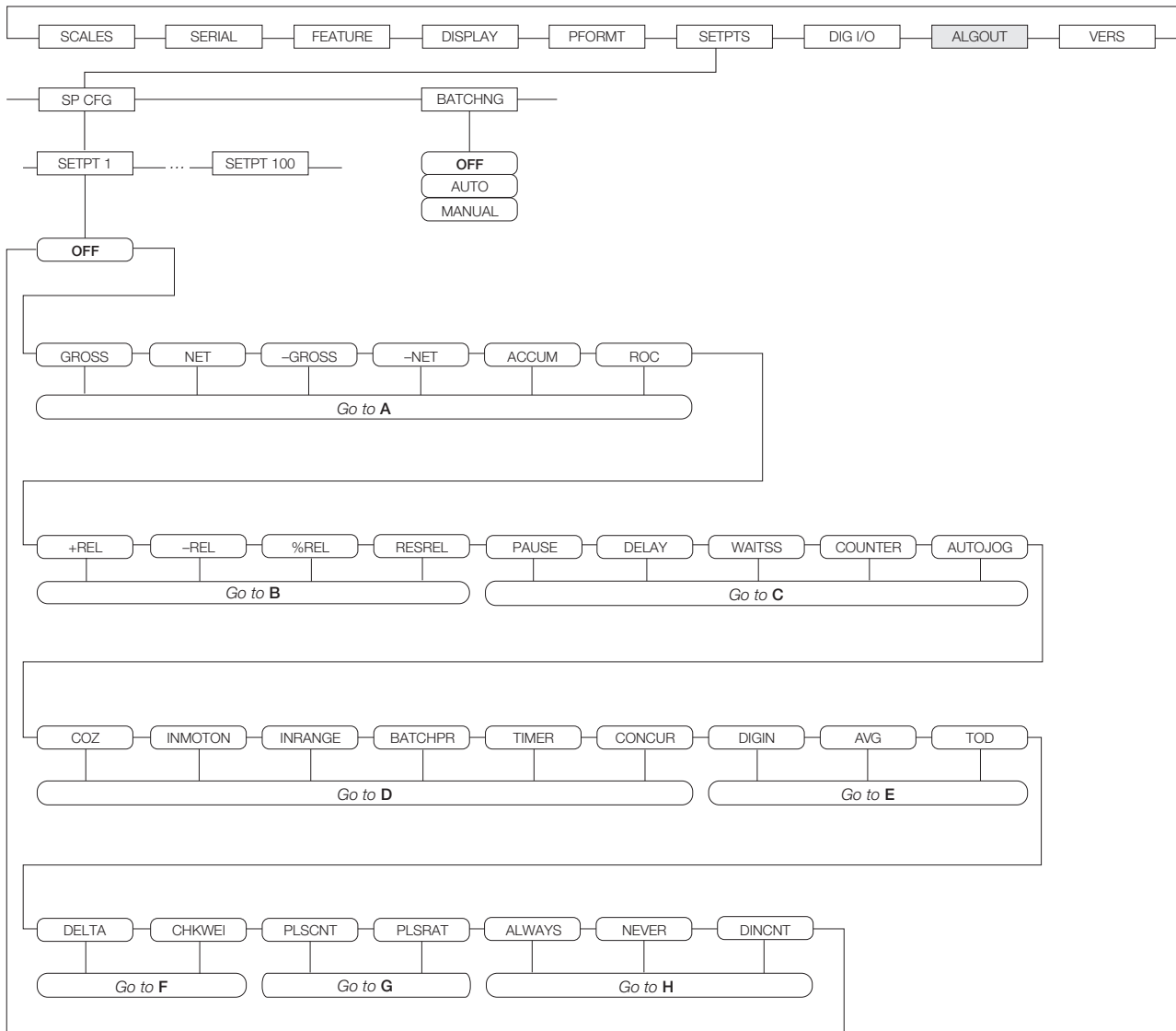


Figure 3-16. SETPTS Menu

3.2.7 DIG I/O Menu

The DIG I/O menu shown in Figure 3-17 is used to assign functions to digital inputs and outputs. SLOT 0 represents the eight I/O bits available on the CPU board (connector J5). The additional slot, with 24 I/O bits, is shown only if the digital I/O expansion card is installed.

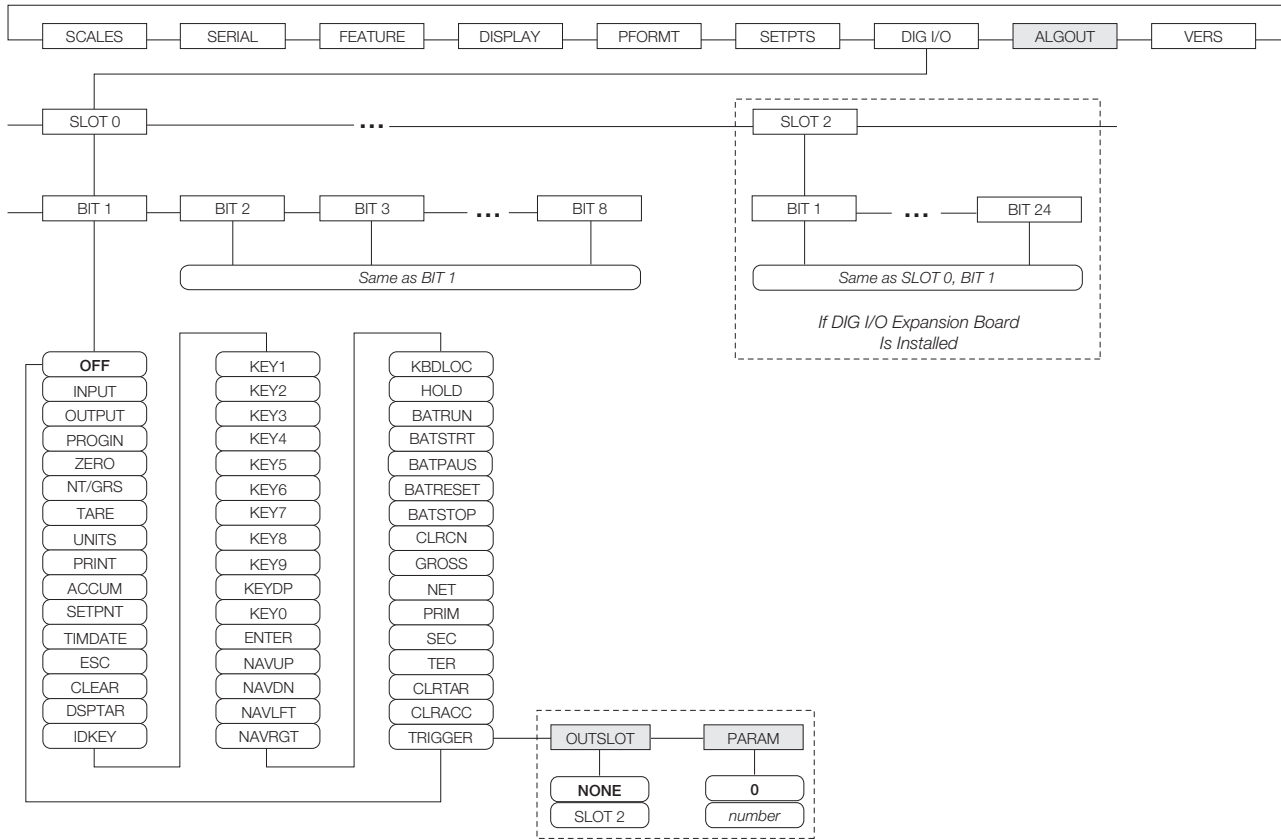


Figure 3-17. DIG I/O Menu

DIG I/O Menu		
Parameter	Choices	Description
Level 2 submenus		
SLOTx	BIT y	Lists available digital I/O slots.
Level 3 submenus		
BIT y	OFF INPUT OUTPUT PROGIN ZERO NT/GRS TARE UNITS PRINT ACCUM SETPNT TIMDATE ESC CLEAR DSPTAR IDKEY KEY0—KEY9 KEYDP ENTER NAVUP NAVDN NAVLFT NAVRGT KBDLOC HOLD BATRUN BATSTRT BATPAUS BATRESET BATSTOP CLRCN GROSS NET PRIM SEC TER CLRTAR CLRACC TRIGGER	Specifies the function of the digital I/O bit. <ul style="list-style-type: none"> • OFF indicates that the bit is not configured. • INPUT assigns the bit as a digital input used for DIGIN setpoints. • OUTPUT assigns the bit as a digital output for setpoint or program use. • PROGIN assigns the bit as a digital input used to generate a program event. • ZERO, NT/GRS (net/gross mode toggle), TARE, UNITS, and PRINT provide the same functions as the five major front panel keys. • ACCUM adds the current scale weight to the accumulator, if the scale accumulator is enabled. • SETPNT, and TIMDATE provide the same functions as the Setpoint and Time/Date softkeys. • ESC provides a function equivalent to the Cancel softkey. • CLEAR simulates pressing the front panel CLR key. • DSPTAR displays the current tare; equivalent to pressing the Display Tare softkey. • IDKEY displays a prompt to enter a new unit ID; equivalent to pressing the Unit ID softkey. • KEY0—KEY9 and KEYDP (decimal point) simulate pressing keys on the numeric keypad. • ENTER simulates pressing the front panel ENTER key. • NAVUP, NAVDN, NAVLFT, and NAVRGT simulate pressing the navigation keys. • KBDLOC locks the keyboard (indicator front panel) when held low. • HOLD holds the current display. Releasing this input clears the running average filter. • BATRUN allows a batch routine to be started and run. With BATRUN active (low), the BATSTRT input starts the batch; if BATRUN is inactive (high), BATSTRT resets the batch. • BATSTRT starts or resets a batch routine, depending on the state of the BATRUN input. • BATPAUS pauses a batch routine when held low. • BATRESET stops the batch sequence and resets to the first batch step. • BATSTOP stops the batch routine. • CLRCN resets the consecutive number to the value specified on the CONSTUP parameter (FEATURE menu). • GROSS, NET, PRIM, SEC, and TER select gross or net weight display, and primary, secondary, or tertiary units display modes. • CLRTAR clears the current tare for the active scale. • CLRACC clears the active accumulator. • TRIGGER is used for custom applications only.
Level 4 submenus		TRIGGER subparameters
OUTSLOT	NONE SLOT 2	Specifies the card slot receiving the trigger output.
PARAM	0 <i>number</i>	Specifies the value passed as a parameter to the option card in the specified slot.

Table 3-10. DIG I/O Menu Parameters

3.2.8 Analog Output Menu

The ALGOUT menu is shown only if the analog output option is installed. If the analog output option is installed, configure all other indicator functions and calibrate the indicator itself before configuring the analog output. See the *Analog Output Card Installation Instructions*, PN 69089, for more information.

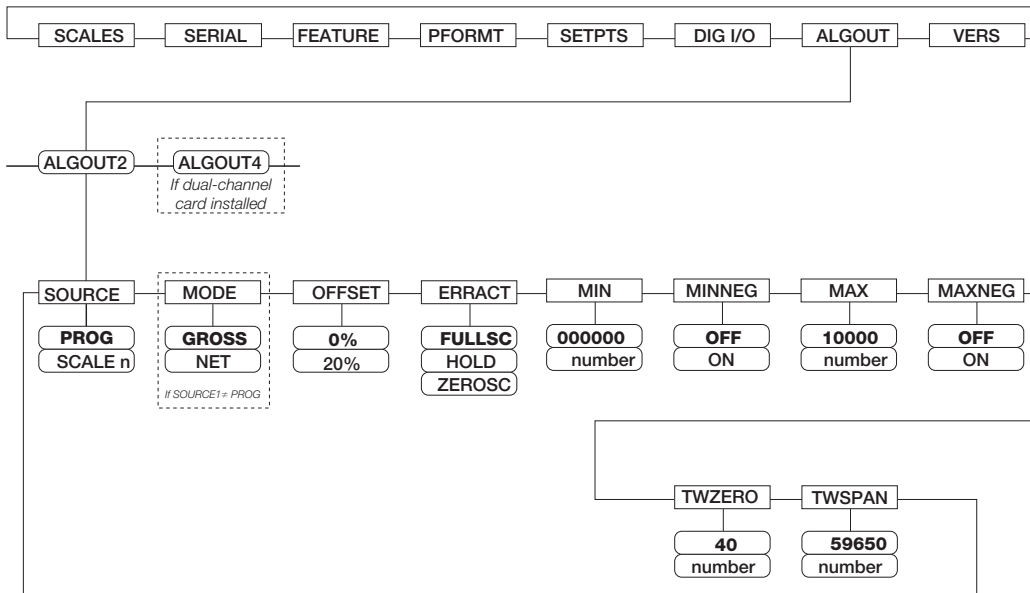


Figure 3-18. Analog Output Menu

ALG OUT Menu		
Parameter	Choices	Description
Level 2 submenus		
SOURCE1	PROG SCALE _n	Specifies the scale tracked by the analog output. PROG indicates that the analog output is under program control.
MODE1	GROSS NET	Specifies the weight data, gross or net, tracked by the analog output.
OFFSET	0% 20%	Zero offset. Select 0% for 0–10 V or 0–20 mA output; select 20% for 4–20 mA output. This parameter must be set before calibrating the analog output.
ERRACT	FULLSC HOLD ZERO SC	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) HOLD: Hold current value ZERO SC: Set to zero value (0 V or 4 mA)
MIN	000000 0–9999999	Specifies the minimum weight value tracked by the analog output. Specify a value in the range 0–9999999.
MINNEG	OFF ON	Specify ON if the minimum weight (MIN parameter) is a negative value.
MAX	10000 0–9999999	Specifies the maximum weight value tracked by the analog output. Specify a value in the range 0–9999999
MAXNEG	OFF ON	Specify ON if the maximum weight (MAX parameter) is a negative value.
TWZERO	40 0–65535	Tweak zero. Enter tweak value to adjust the analog output zero calibration. Use a multimeter to monitor the analog output value.
TWSPAN	59650 0–65535	Tweak span. Enter tweak value to adjust the analog output span calibration. Use a multimeter to monitor the analog output value.

Table 3-11. Analog Output Menu Parameters

3.2.9 Version Menu

The VERS menu can be used to check the installed software version or, by using the **Reset Config** softkey, to restore all configuration parameters to their factory default values. There are no parameters associated with the Version menu: when selected, the indicator displays the installed software version number.

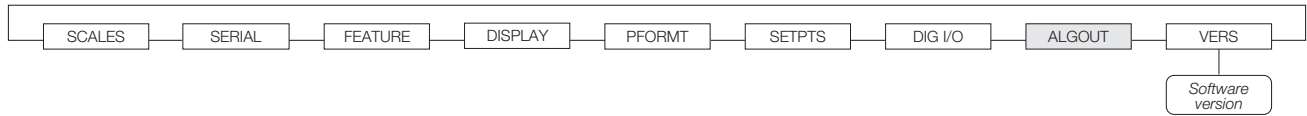


Figure 3-19. Version Menu

If an *iQUBE* scale is configured, a **Diagnostics** softkey provides access to *iQUBE* diagnostic information.

4.0 Calibration

The 820i can be calibrated using the front panel, serial commands, or *Revolution*®. Each method 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

The following sections describe the calibration procedure for each of the calibration methods. See the *iQUBE Installation Manual*, PN 77224, for information about configuring *iQUBE*-attached scales.

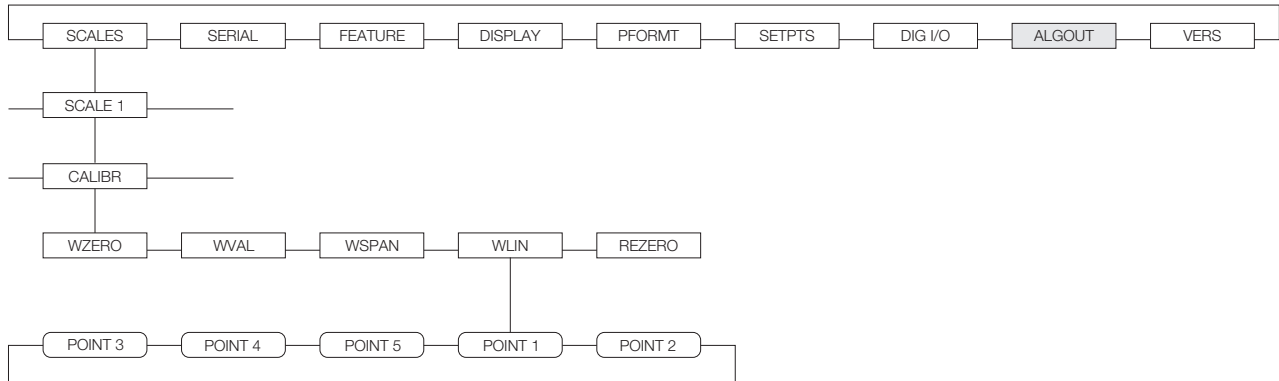


Figure 4-1. Calibration (CALIBR) Submenu

4.1 Gravity Compensation

Gravity compensation for latitude and elevation is available for the 820i. To calibrate with gravity compensation, the LOCALE parameter under the FEATURE menu must be set ON, and the LATUDE (latitude) and ELEVAT (elevation, in meters) parameters set before calibrating the indicator (see Figure 3-11 on page 35).

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.

4.2 Front Panel Calibration

The CALIBR submenu (under the SCALES menu, see Figure 4-2) is used to calibrate the 820i.

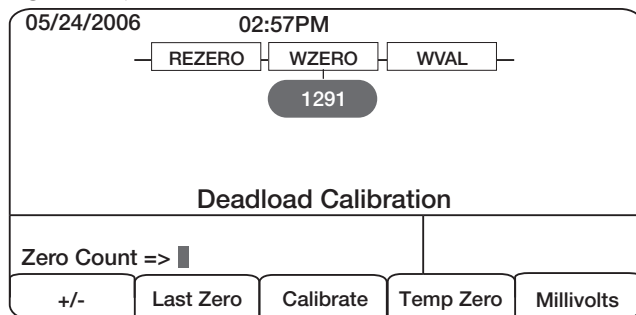


Figure 4-2. WZERO Calibration Display

The zero, span, and linear calibration point displays provide a set of softkeys used specifically for calibration procedures:

+/- Toggles to allow entry of negative or positive values

Last Zero Recalls the last established zero value to allow calibration without removing tests weights or product from scale.

Calibrate Performs calibration for the selected point

Temp Zero Temporarily zeroes the displayed weight of a non-empty scale. After span calibration, the difference between the temp zero and the previously calibrated zero value is used as an offset.

Millivolts (or Counts)

Toggles between display of captured A/D counts and captured millivolts values; allows entry of calibration values in mV or counts

To calibrate the indicator using the front panel, do the following:

1. Place the indicator in setup mode (display reads *Scale Configuration*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. With the *SCALES* menu highlighted, press the **down** key, then select the scale to be calibrated. Press **down** again (*GRADS* parameter highlighted), then press **left** to highlight the *CALIBR* submenu (see Figure 4-1). Press **down** to go to zero calibration (*WZERO*). See Figure 4-2 on page 48.
3. Ensure scale is empty, then press **down** again to show the current *WZERO* value, then press the **Calibrate** softkey to calibrate zero. When complete, the new A/D count for the zero calibration is displayed. Press **enter** to save the zero calibration value and go to the next prompt (*WVAL*).
4. With *WVAL* displayed, press **down** to show the stored calibration weight value. Use the numeric keypad to enter the actual value of the calibration test weights, then press **enter** to save the value and go to span calibration (*WSPAN*).
5. Place test weights on scale. Press **down** again to show the current *WSPAN* value, then press the **Calibrate** softkey to calibrate span. When complete, the new A/D count for the span calibration is displayed. Press **enter** again to save the span calibration value and go to the next prompt (*WLIN*).
6. 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 you choose not to perform linearization, skip the *WLIN* parameter; if linearization values have previously been entered, these values are reset to zero during calibration. To perform linearization, follow the procedure below:

With *WLIN* displayed, Press **down** to go to the first linearization point (*POINT 1*). Press **down** again to show the weight value prompt (*WGT 1*), then **down** once more to show the weight value. Place test weights on the scale, then use the numeric keypad to enter the actual test weight value. Press **enter** to save the value and move to the calibration (*CAL 1*) prompt. Press **down** to show the current calibration value, then press the **Calibrate** softkey to calibrate the linearization point. When complete, the A/D count for the linear calibration is displayed. Press **enter** again to save the calibration value and go to the next prompt (*POINT 2*).

Repeat for up to five linearization points. To exit the linearization parameters, press the **up** key to return to *WLIN*.

7. The optional rezero function is used to remove a calibration offset when hooks or chains are used to hang the test weights.



Note *The rezero function cannot be used with five-point linear calibration.*

- If no other apparatus was used to hang the test weights during calibration, remove the test weights and press **up** to return to the *CALIBR* submenu.
 - If hooks or chains were used during calibration, remove these and the test weights from the scale. With all weight removed, go to the *REZERO* parameter, then press **down** to show the current zero value. Press the **Calibrate** softkey to adjust the zero and span calibration values. Press **enter** or **up** to return to the *CALIBR* submenu.
8. Press **up** to return to the *SCALES* menu, or press the **Save and Exit** softkey to exit setup mode.

4.3 Serial Command Calibration

To calibrate the indicator using serial commands, the indicator serial port must be connected to a terminal or personal computer. See Section 2.3.3 on page 7 for serial port pin assignments; see Section 9.0 on page 79 for more information about using serial commands.

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

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Send the *SC.WZERO#n* serial command (where *n* is the number of the scale) to calibrate zero.
3. Place test weights on the scale and use the *SC.WVAL* command to enter the test weight value in the following format:
`SC.WVAL#n=vvvvv<CR>`
4. Send the *SC.WSPAN#n* serial command to calibrate span.

- 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#n.V1=vvvv<CR>
SC.WLIN#n.C1<CR>
```

The SC.WLIN#n.V1 command sets the test weight value (vvvv) for linearization point 1. The SC.WLIN#n.C1 command calibrates the point. Repeat using the SC.WLIN#n.Vx and SC.WLIN#n.Cx commands as required for additional linearization points.

- 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#n serial command.
- Send the KSAVE serial command to save the calibration changes; send KEXIT to exit setup mode.

- Apply the test weights to the scale. Press the *Calibrate Span* button to perform the span calibration. A message box appears when the process is complete.

- If the option for chains or hooks was selected in step 2, the Rezero display is shown. Remove all weights from the scale, including chains or hooks. Press the *Re-Zero* button to calibrate the zero offset.

- If performing a multi-point linear calibration, up to five other calibration weight values can be entered on the display. The weights must be in ascending order and must not include zero or the span weight. Enter the weight values and click the *Go* button to calibrate each point.

- Review the new calibration values then click *Finish* to close the Calibration Wizard. To restore the current calibration values, click *Cancel*.

4.4 Revolution Calibration

The *Revolution* Calibration Wizard provides step-by-step scale calibration. With the 820i connected to the PC, select the Calibration Wizard from the Tools menu on the *Revolution* Scales display, then follow the steps listed below to calibrate the scale. See Section 5.0 on page 51 for a general overview of the *Revolution* utility.

- On the first Calibration Wizard display (see Figure 4-3), select whether you are performing a standard (zero and span) calibration or a multi-point linear calibration. Click the *Next* button to continue.

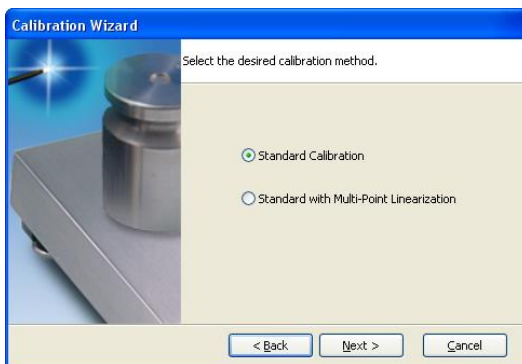


Figure 4-3. Revolution Calibration Wizard Display

- Enter the test weight used to calibrate the scale. If chains or hooks are used to hold the weights, check the box below the test weight value entry. This adds a rezero step to the calibration sequence.
- Remove all weights from the scale. If chains or hooks are used, place them on the scale. Press the *Calibrate Zero* button to perform the zero calibration. A message box appears when the process is complete.

5.0 Using Revolution®

The *Revolution* utility provides a suite of functions used to support configuration, calibration, customization, and backup of the *820i* software. Hardware and software configuration, stream and ticket formatting, setpoint configuration, database management, and *iRite-IDE* program editing are all supported by *Revolution*.

Calibration values, scale, setpoint, and display configuration, database tables, and user programs, can be both saved and restored to the *820i* using *Revolution*. (See Section 4.4 on page 50 for *Revolution* calibration procedures.)

Other supporting applications provided with *Revolution* include:

- The *iRite-IDE* Editor provides a basic editor and a compiler for writing *iRite-IDE* applications.
- The Rice Lake Web Update utility uses your internet connection to check for and download updates to the *Revolution* and *820i* software.
- The *iLaunch* utility can be installed to display a set of icons used for convenient startup of *Revolution* and its supporting applications, including the Help system.

Hardware and Software Requirements

Minimum system requirements: 166 MHz, x86-compatible, with 32MB RAM (64MB for NT4/2000/XP), 40MB disk space. Recommended system: 233 MHz, x86-compatible or greater, with 64MB RAM, 40 MB disk space.

Revolution runs on most Windows® operating systems, including Windows 98, Windows 98 SE, Windows ME, Windows NT 4.0 (SP4 or greater), Windows 2000, Windows XP (Home or Professional), and Windows Vista™.

Internet Explorer® (IE) 4.0 or greater is required to use the *Revolution* help system. Explorer is included on the *Revolution* installation CD or is available from Microsoft Corporation.

5.1 Installing and Starting the Program

Revolution is installed using a standard Windows installation procedure. *Revolution* applications and support files are installed in a directory named RevIII; icons for the *Revolution* application, the *Revolution* Editor, Uninstall and the Rice Lake Web Update utility are placed in the Windows Start menu.

5.2 Configuring Scales

To configure the *820i* using *Revolution*, start the program, then select New from the File menu. The Select Indicator display, shown in Figure 5-1, prompts you to select the indicator type. To open a new configuration file, select the icon for the *820i* and click OK.

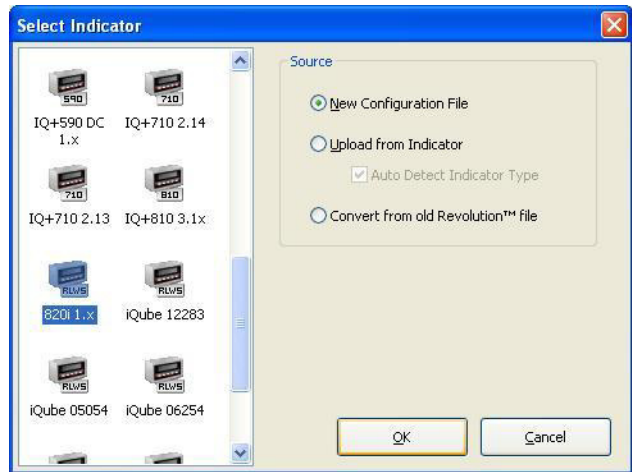


Figure 5-1. Revolution Select Indicator Display

Next, the Indicator Information display for the *820i* is shown. To begin configuring the indicator, click on the Scales tab (bottom left of display), then on the Scales icon (see Figure 5-2).

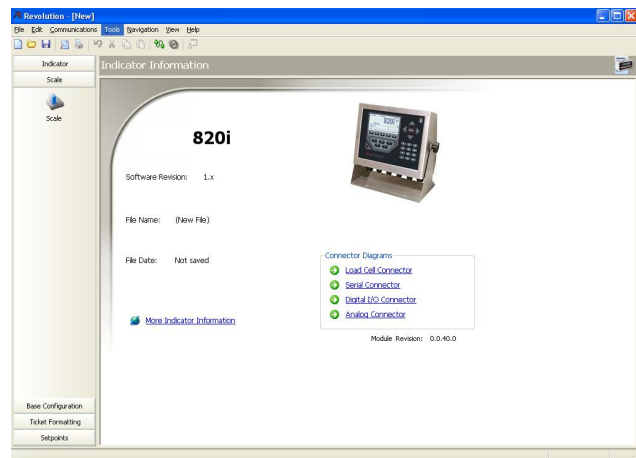


Figure 5-2. Revolution Indicator Information Display

Next, a blank Scale display is shown, with scale entries listed for Scale #1, Scale #2, and Scale #3. Double-click on one of the listed scales, then select the type of scale being configured in the Scale Configuration pop-window (see Figure 5-3 on page 52). For A/D scales, select *Load Cell A/D Channel* as the Source Type, then click the arrow button to move the A/D from the Source list to the Selected list. Click

OK to return to the Scales display.

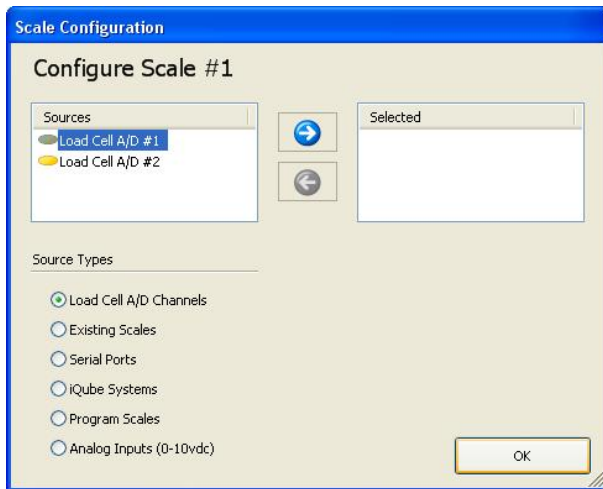


Figure 5-3. Revolution Scale Configuration Display

Once the scale type is established, the default values are supplied for the Scale display fields and the Scale Wizard button is enabled (see Figure 5-4).

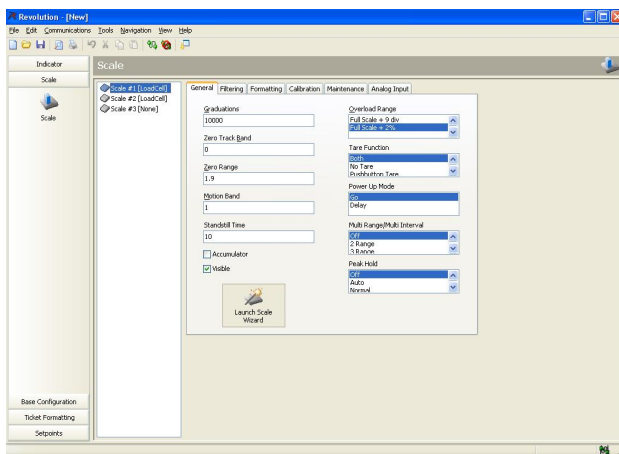


Figure 5-4. Revolution Scales Display

You can continue configuring the scale using the other tabs shown on the *Revolution* displays, or you can use the Scale Wizard (shown as a button on the Scales menu; also available under the Tools menu) to create a basic configuration based on your application type.

5.3 Connecting to the Indicator

Connect the PC serial port to port 2 of the *820i*, then click on the *Connect* icon in the toolbar. *Revolution* attempts to establish communications to the indicator. If communications settings need to be adjusted, select *Options...* from the Tools menu.

5.3.1 Downloading to the Indicator

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

The *Download Section* function on the Communications menu allows you to download only the currently displayed object, such as the setpoint data or contact information for a scale 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.

5.3.2 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*, then downloaded back to the indicator.



Note The indicator must be in setup mode before uploading or downloading data.

5.4 Installing Software Upgrades

New releases of the *820i* system software can be downloaded and installed using an internet connection and the Rice Lake Web Update application. To use the Web Update application, install *iRev* from the Tool Kit CD.



Note Before upgrading to a new version of *820i* system software, ensure that a copy of the current indicator configuration has been saved using *Revolution*. Reloading the system software requires a RESETCONFIGURATION function and resets all configuration and calibration values to their factory defaults.

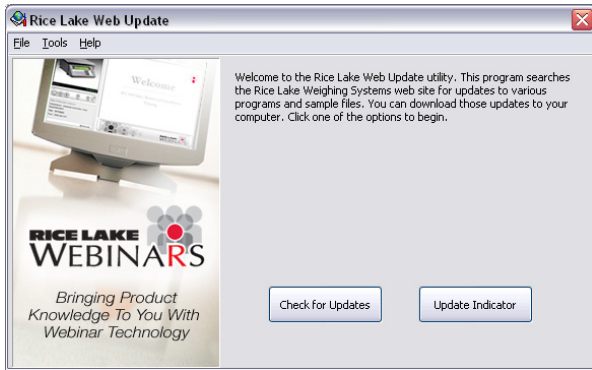


Figure 5-5. Rice Lake Web Update Display

Click on the *Check for Updates* button in the Rice Lake Web Update application to check if a new version of the *820i* software is available. To download a new software version, select the new software version and click on **Get Selection**. Once the new software is downloaded to the PC, do the following:

1. Disconnect power to the *820i*.
2. Open the indicator enclosure and place a jumper across the SW1 boot mode pins (see Figure 2-3 on page 9).
3. Connect the PC serial port to port 2 of the *820i*.
4. Power up the *820i*. The indicator will stall at the diagnostic monitor.
5. Click on the **Update Indicator** button to download the new software. When the download begins, the following messages are shown:

```

Loading...
System Diagnostic Monitor v1.0
$
?
$
?
$KNIX
$SYSLOAD

```

6. When the download is complete, the indicator display shows the following messages:

```

$DONE
$BOOT
Loading...

```
7. The indicator resets and goes to weigh mode.
8. Disconnect power to the indicator. Remove the jumper from across the SW1 boot mode pins and place it on a single pin.
9. Power up the indicator and reload *Revolution* and *iRite-IDE* files as necessary.

6.0 Print Formatting

The 820i provides print formats that determine the format of the printed output when the **PRINT** key is pressed, a KPRINT serial command is received, or when setpoint push-print or truck weigh-in or weigh-out operations are performed. Supported print formats are: GFMT, NFMT, ACCFMT, SPFMT, TRWIN, TRWOUT, ALERT, AUXFMT1—AUXFMT20, and AUDITFMT. Additionally, two header formats, HDRFMT1 and HDRFMT2, can be inserted into any of the other ticket formats using the <H1> and <H2> formatting commands. The particular ticket format used for a given print operation depends on the indicator configuration (see Table 6-2 on page 56) and the particular operation performed.

Each print format can be customized to include up to 1000 characters of information, such as company name and address, on printed tickets. You can use the *Revolution*[®] configuration utility, serial commands, or the indicator front panel (PFORMT menu) to customize the print formats.

6.1 Print Formatting Commands

Table 6-1 lists commands you can use to format the 820i print formats. Commands included in the format strings must be enclosed between < and > delimiters. Any characters outside of the delimiters are printed as text on the ticket. Text characters can include any ASCII character that can be printed by the output device.


Command	Description	Supported Ticket Formats
<i>General Weight Data Commands</i>		
<G>	Gross weight, current scale	GFMT, NFMT, TRWIN, TRWOUT, ACCFMT, AUXFMTxx, ALERT
<G#n>	Gross weight, scale <i>n</i>	
<N>	Net weight, current scale	
<N#n>	Net weight, scale <i>n</i>	
<T>	Tare weight, current scale	
<T#n>	Tare weight, scale <i>n</i>	
<S>	Current scale number	
 Note	Gross, net, tare, accumulator, truck, and setpoint weights can be printed in any configured weight units by adding the following modifiers to the gross, net, and tare 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 for Scale #3 in secondary units, use the following command: <N#3/S>	
Formatted weight strings contain a 10-digit weight field (including sign and decimal point, with leading zeroes suppressed), followed by a space and a two-digit units identifier. Total field length with units identifier is 12 (or 13) characters.		
<i>Accumulator Commands</i>		
<A>	Accumulated weight, current scale	GFMT, NFMT, ACCFMT, AUXFMTxx
<A#n>	Accumulated weight, scale <i>n</i>	
<AA>	Average accumulation, current scale	
<AA#n>	Average accumulation, scale <i>n</i>	
<AC>	Number of accumulations, current scale	
<AC#n>	Number of accumulations, scale <i>n</i>	
<AT>	Time of last accumulation, current scale	
<AT#n>	Time of last accumulation, scale <i>n</i>	
<AD>	Date of last accumulation, current scale	
<AD#n>	Date of last accumulation, scale <i>n</i>	
<AN#n>	Number of alibi print token	
<i>Truck Mode Commands</i>		

Table 6-1. Print Format Commands




Command	Description	Supported Ticket Formats
<TID>	Truck ID number	TRWIN, TRWOUT
<TR1>	Gross weight for current ticket in displayed units	
<TR2>	Tare weight for current ticket in displayed units	
<TR3>	Net weight for current ticket in displayed units	
 Note	TR1, TR2, and TR3 truck ticket weight data includes keywords INBOUND, KEYED, RECALLED, as necessary.	
<i>Setpoint Commands</i>		
<SCV>	Setpoint captured value	SPFMT
<SN>	Setpoint number	
<SNA>	Setpoint name	
<SPM>	Setpoint mode (gross or net label)	
<SPV>	Setpoint preact value	
<STV>	Setpoint target value	
<i>Auditing Commands</i>		
<CD>	Last calibration date	All
<NOC>	Number of calibrations	
<NOW>	Number of weighments since last calibration	
 Note	Last calibration date (<CD>) and number of calibrations (<NOC>) are updated whenever WZERO, WVAL, WSPAN, or REZERO are changed. Number of weighments (<NOW> command) is incremented whenever the scale weight exceeds 10% of scale capacity. Scale must return to gross or net zero before the value can be incremented again.	
<i>Formatting and General-Purpose Commands</i>		
<nnn>	ASCII character (<i>nnn</i> = decimal value of ASCII character). Used for inserting control characters (STX, for example) in the print stream.	All
<TI>	Time	
<DA>	Date	
<TD>	Time and date	
<UID>	Unit ID number (up to 8 alphanumeric characters)	
<CN>	Consecutive number (up to 7 digits)	
<H1>	Insert header format 1 (HDRFMT1); see Table 6-2 on page 56	
<H2>	Insert header format 2 (HDRFMT2); see Table 6-2 on page 56	
<CR>	Carriage return character	
<LF>	Line feed character	
<NLnn>	New line (<i>nn</i> = number of termination (<CR/LF> or <CR>) characters)*	
<SPnn>	Space (<i>nn</i> = number of spaces)*	
<SU>	Toggle weight data format (formatted/unformatted)	
<USnn>	Insert user print text string (from user program, SetPrintText API)	
 Note	* If <i>nn</i> is not specified, 1 is assumed. Value must be in the range 1-99.	
<i>User Program-dependent Commands</i>		
<USnn>	Insert user print text string (from user program, SetPrintText API)	All
<EV>	Invoke user program print handler <i>x</i> (PrintFmt <i>x</i>)	AUXFMT <i>x</i>

Table 6-1. Print Format Commands (Continued)

Command	Description	Supported Ticket Formats
<i>Alert Format Commands</i>		
<COMP>	Company name (up to 30 characters)	All
<COAR1> <COAR2>	Contact company address, lines 1–3 (up to 30 characters)	
<CONM1> <CONM2>	Contact names (up to 20 characters)	
<COPH1> <COPH2>	Contact phone numbers (up to 20 characters)	
<COML>	Contact e-mail address (up to 30 characters)	
<ERR>	Alert error message (system-generated)	ALERT
See the <i>iQUBE Installation Manual</i> , PN 77224, for more information about using alerts.		

Table 6-1. Print Format Commands (Continued)

6.2 Default Print Formats

Table 6-2 shows the default print formats for the 820i and lists the conditions under which each print format is used. The HDRFMT1 and HDRFMT2 formats are used to specify header information that can be used by the other ticket formats. The contents of the HDRFMTx format can be inserted into any other ticket format using the <H1> and <H2> formatting commands.


Format	Default Format String	Used When
GFMT	GROSS<G><NL2><TD><NL>	Normal mode, no tare in system
NFMT	GROSS<G><NL>TARE<SP><T><NL>NET<SP2><N> <NL2><TD><NL>	Normal mode, tare in system
ACCFMT	ACCUM<A><NL><DA><TI><NL>	Accumulator enabled and displayed, or setpoint print operation with PSHACCM=ON
SPFMT	<SCV><SP><SPM><NL>	Setpoint print operation with PSHPRINT=ON
TRWIN	<NL>ID<SP><TID><NL2>GROSS<TR1> <NL2><DA><SP><TI><NL>	Press the Weigh In softkey, enter truck ID number, and press enter .
TRWOUT	<NL6>ID<SP><TID><NL2>GROSS<TR1><NL>TARE<SP> <TR2><NL>NET<SP2><TR3><NL2><DA><SP><TI><NL>	Press the Weigh Out softkey, enter truck ID number, and press enter .
TRFMT	REG ID: <TID>: <TR2> SCALE<S> <TD><NL>	Truck register currently displayed
ALERT	<COMP><NL><COAR1><NL><COAR2><NL> <CONM1><NL><COPH1><NL> <CONM2><NL><COPH2><NL> <COML><NL><ERR><NL>	Alert message is sent to specified port when error indication is generated by an attached <i>iQUBE</i> . See the <i>iQUBE Installation Manual</i> , PN 77224, for more information.
HDRFMT1 HDRFMT2	COMPANY NAME<NL>STREET ADDRESS<NL> CITY, ST ZIP<NL2>	Must be inserted into other print format
AUXFMTxx	GROSS<G><NL2><TD><NL>	Formats AUX1FMT –AUX20FMT
AUDITFMT	<i>Fixed format; cannot be edited</i>	Press PRINT when audit trail is displayed, or in response to a DUMPAUDIT serial command.
 Note	In OIML and CANADA modes, the letters PT (preset tare) are automatically inserted after the printed tare weight.	

Table 6-2. Default Print Formats

6.3 Customizing Print Formats

The following sections describe procedures for customizing print formats using the *Revolution*® configuration utility, serial commands, or the front panel (PFORMAT menu. See Section 10.5 on page 94 for information about custom stream formatting.

6.3.1 Using Revolution

The *Revolution* configuration utility provides a ticket formatting grid with a tool bar. The grid allows you to construct the ticket format without using the formatting commands (<NL> and <SP>) required by the front panel or serial command methods. Using *Revolution*, you can type text directly into the grid, then select weight value fields from the tool bar and place them where you want them to appear on the printed ticket.

Figure 6-1 shows an example of the *Revolution* print formatting display.

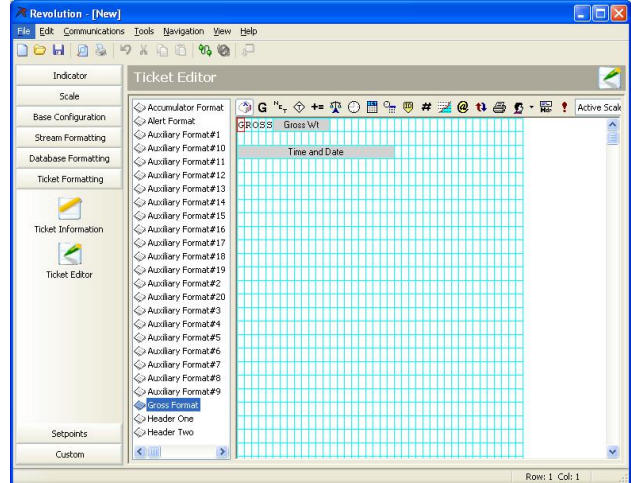


Figure 6-1. Revolution Print Formatting Display

6.3.2 Using the Front Panel

If you have no access to equipment for communication through a serial port or are working at a site where such equipment cannot be used, you can use the PFORMAT menu (see Figure 6-2 on page 57) to customize the print formats.

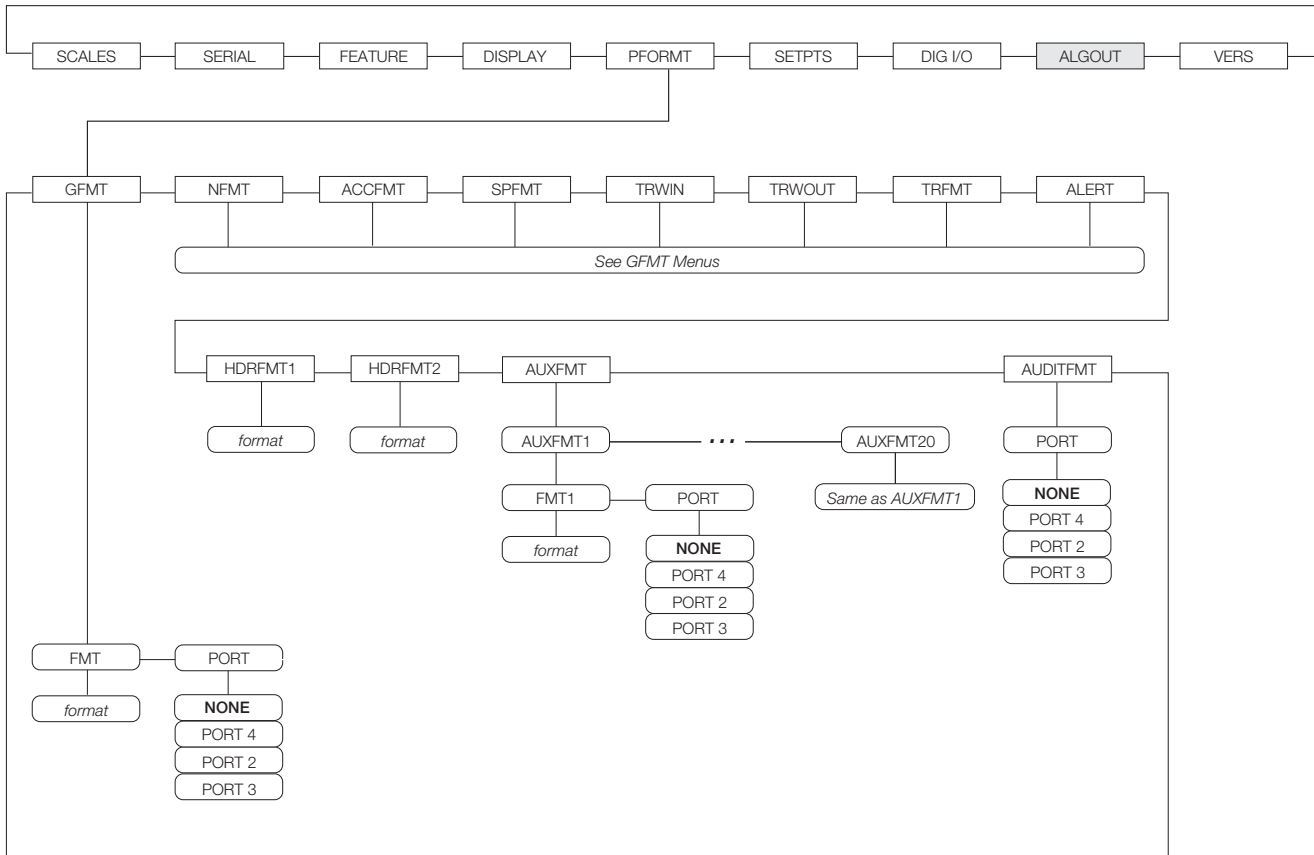


Figure 6-2. PFORMAT Menu

Each print format can be edited from the front panel using a character selection like that shown in Figure 6-3. Use the navigation keys (**up**, **down**, **left**, **right**) to move around and between the format command line and the character selection list.

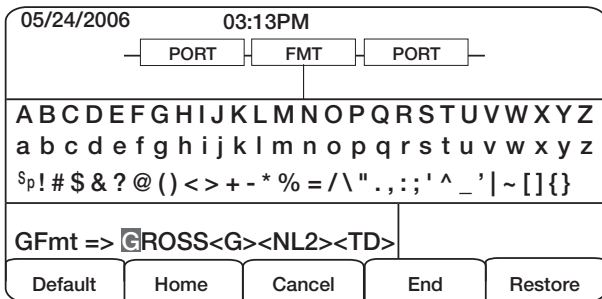


Figure 6-3. Print Formatting Character Selection Display

- To add a character: position the cursor in the format where you want to add the character. Use the **up** key to return to the character selection list, use the navigation keys to highlight the character to add, then press **enter**. The new character is added to the left of the current cursor location in the format string.
- To add a blank space to a string, position the cursor to the right of where the space is to be inserted in the format string, highlight the *SP* character in the selection list, and press **enter**.
- To delete a character, position the cursor to the right of the character to be deleted from the format string, then press the **CLR** key.

- To add a special character, insert the **<** and **>** delimiter characters from the selection list. Use the numeric keypad to insert the decimal ASCII value (1–255) of the character between the delimiters. For example, insert **<2>** to add the STX character to the print format.

To save the edited format string, position the cursor in the format string and press **enter**. Softkeys shown on the character selection display provide additional functions:

- Default** Restores the string to its default value.
- Home** Positions cursor at the beginning of the format string.
- Cancel** Exits without saving changes to the format string.
- End** Positions cursor at the end of the format string.
- Restore** Restores the string to its previously saved value.

A **Print Test** softkey is shown under the *FMT* parameter after exiting the character selection display. If a printer is attached, this key can be used to verify the edited string format before exiting setup mode.



Note *The Print Test softkey is not available for the HDRFMTx formats. These formats can be output only when inserted into one of the printable ticket formats by using the <H1> or <H2> print format commands.*

6.3.3 Using Serial Commands

With a personal computer, terminal, or remote keyboard attached to one of the 820i serial ports, you can use the serial command set described in Table 6-1 on page 54 to customize the print format strings.

To view the current setting of a format string, type the name of the print format and press the **enter** key. 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:

```
GFMT.FMT=<G> GROSS<NL>
```

To change the format, use the GFMT.FMT or NFMT.FMT serial 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, you could send the following serial command:

```
GFMT.FMT=MOE'S DUMP<NL>2356 EAST HIGHWAY ROAD<NL>SMALLTOWN<NL2><G> GROSS<NL>
```

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

```
MOE'S DUMP
2356 EAST HIGHWAY ROAD
SMALLTOWN
```

```
1345 LB GROSS
```

The ticket above could also be formatted by specifying the company address information in the HDRFMT1 ticket format, then substituting the **<H1>** command for the address in the GFMT ticket format:

```
HDRFMT1=MOE'S DUMP<NL>2356 EAST HIGHWAY ROAD<NL>SMALLTOWN<NL2>
```

```
GFMT.FMT=<H1><G> GROSS<NL>
```

7.0 Truck Modes

The truck in/out modes are used to handle multiple truck ID numbers and weights. Truck IDs can be up to 16 alphanumeric characters in length.

Six truck modes combine stored ID, keyed tare, and value swapping features in various ways:

Mode	Stored IDs	Keyed Tares	Value Swapping
MODE1	NO	YES	YES
MODE2	NO	NO	YES
MODE3	YES	YES	YES
MODE4	YES	NO	YES
MODE5	YES	YES	NO
MODE6	YES	NO	NO
OFF			

Table 7-1. Truck Mode Features

Stored IDs let you keep a database of truck IDs and weigh-in weights in the indicator's memory. The indicator can automatically store up to 1000 truck IDs and tares; or it can clear the information after printing a weigh-out ticket. For example, if the same truck seldom crosses the scale, it may not be practical to save its ID number and weigh-in weight. However, if that same truck crosses the scale many times each day, it's more convenient to store the information in the indicator memory and recall it when needed. Stored IDs and weights are available in modes 3, 4, 5, and 6.

Keyed tares allow you to manually enter the tare weight using the numeric keypad and the **TARE** key. Keyed tares are available in modes 1, 3, and 5. To use keyed tares, an incoming truck must be empty at weigh-in, full at weigh-out.



Note Some local regulations require the tare weight to be read from the scale. If so, don't use the keyed tares feature.

Value swapping ensures that the lowest of two weight values associated with a particular ID number is used as the tare weight. For example, if a truck crosses the scale fully loaded at weigh-in, then unloads and crosses the scale empty at weigh-out, the indicator automatically assigns the lesser (empty truck) weight as the tare. Value swapping is available in modes 1, 2, 3, and 4.

7.1 Using the Truck Modes

To select a truck in/out mode, press the setup switch to enter setup mode. Use the navigation keys to go to the FEATURE menu, then to the TRUCK submenu to select the mode.

Next, go **right** to the SOFTKEYS submenu and configure the **Weigh In**, **Weigh Out**, and **Truck Regs** softkeys. These keys are required when using the truck modes.

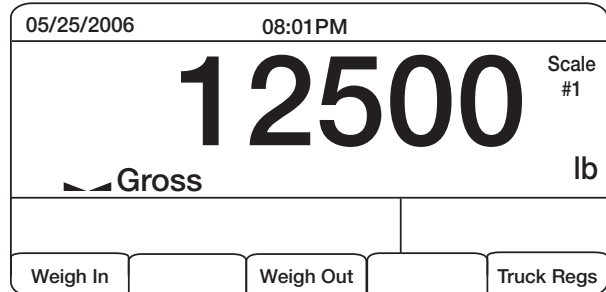


Figure 7-1. 820i Display, showing Truck Mode Softkeys

7.2 Using the Truck Regs Display

The Truck Regs display is shown by pressing the Truck Regs softkey in weighing mode. The display contains an alphabetical list of stored truck IDs, weigh-in weights (in primary units), and the time and date of the weigh-in transaction (see Figure 7-2).

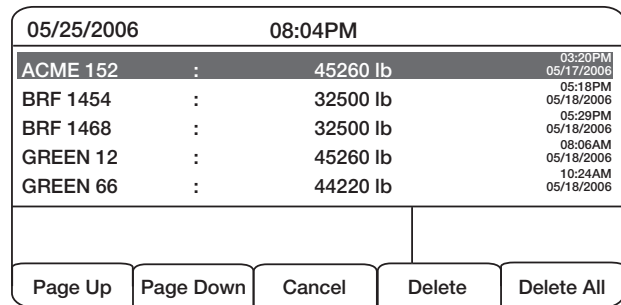


Figure 7-2. Truck Register Display

Softkeys shown at the bottom of the Truck Regs display are described below.

- Page Up** Shows previous page of the truck register.
- Page Down** Shows next page of the truck register.
- Cancel** Exits to weighing mode.
- Delete** Deletes the highlighted truck ID from the truck register.
- Delete All** Deletes all truck IDs from the truck register.

The truck register can be printed to an attached printer by pressing the **PRINT** key while the Truck Regs display is shown. The printed register uses the TRFMT print format (see Section 6.2 on page 56).



Note *If a non-zero setpoint password is configured (SPPWD parameter on the FEATURE menu), you must enter the password before any truck register entries can be deleted.*

7.3 Weigh-In Procedure

In modes 1 and 2, the indicator erases truck ID numbers and tare weights from memory after the transaction. In modes 3–6, the truck ID and weigh-in weight values are saved after the weigh-out ticket has been processed.

The general weigh-in procedure is as follows:

1. The empty truck moves onto the scale for weigh-in.
2. Press the **Weigh In** softkey.
3. A prompt is shown to enter the truck ID (up to eight alphanumeric characters). Enter the ID, then press the **enter** key.
4. Indicator generates the weigh-in ticket:

```
ID 304812
GROSS 15000. LB INBOUND
01/14/2002 10:24 AM
```

5. Truck leaves the scale.

7.4 Weigh-Out Procedure

The general weigh-out procedure is as follows:

1. The loaded truck moves onto the scale for weigh-out.
2. If truck ID is known, press the **Weigh Out** softkey, enter the ID, and press the **enter** key.

If ID is not known, press the **Truck Regs** softkey to view list of stored IDs (see Figure 7-2 on page 59). Scroll to the correct truck ID, note the ID number, then press the **Cancel** softkey to return to the weight display. From the weight display, press **Weigh Out**, key in the ID, then press the **enter** key.

3. Indicator generates the weigh-out ticket. In modes 1 and 2, the ID is deleted once the weigh-out ticket is processed.

7.5 Single-Transaction Tare Weights and IDs

One-time transactions are supported in all modes that can be configured to use stored IDs (modes 3–6). This function allows one-time weighing of trucks without adding the truck ID and weigh-in weight to the permanent truck register.

To use this function, press the **Weigh In** or **Weigh Out** softkey, then enter a truck ID containing a decimal point. IDs entered with a decimal point as part of the ID are erased from the truck register when the transaction is complete.

8.0 Setpoints

The 820i indicator provides 100 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 controlling indicator or external equipment functions, or to make conditional decisions.



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

8.1 Batch and Continuous Setpoints

820i 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 820i can use setpoints to control up to 100 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, you must activate the BATCHNG parameter on the SETPTS menu. This parameter defines whether a batch sequence is automatic or manual. AUTO sequences repeat continuously, while MANUAL sequences require a BATSTRT signal. The BATSTRT signal can be initiated by a digital input, serial command, **Batch Start** softkey, or the StartBatch function in an *iRite-IDE* program.

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



Note 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
ACCUM	Accumulate setpoint. Compares the value of the setpoint to the source scale accumulator. The accumulator setpoint is satisfied when the value of the source scale accumulator meets the value and conditions of the accumulator setpoint.	X	X
ROC	Rate-of-change setpoint. Performs functions based on the rate-of-change (ROC) value.	X	X
+REL	Positive relative setpoint. Performs functions based on a specified value above a referenced setpoint, using the same weight mode as the referenced setpoint.	X	X

Table 8-1. Setpoint Kinds


Kind	Description	Batch	Continuous
-REL	Negative relative setpoint. Performs functions based on a specified value below a referenced setpoint, using the same weight mode as the referenced setpoint.	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
RESREL	Relative to a result setpoint. Performs functions based on a specified percentage of the captured value of a referenced setpoint, using the same weight mode as the referenced setpoint. The actual target value of the RESREL setpoint is calculated as a percentage of the captured value of the referenced setpoint, rather than the target value.	X	X
PAUSE	Pauses the batch sequence indefinitely. A BATSTRT signal must be initiated to continue the batch process.	X	
DELAY	Delays the batch sequence for a specified time. The length of the delay (in tenths of a second) is specified on the VALUE parameter.	X	
WAITSS	Wait for standstill. Suspends the batch sequence until the scale is at standstill.	X	
COUNTER	Specifies the number of consecutive batch sequences to perform. Counter setpoints should be placed at the beginning of a batch routine.	X	
AUTOJOG	<p>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 AUTOJOG setpoint activates the digital output of the previous weight-based setpoint for a period of time, specified on the VALUE parameter. The autojog process repeats until the previous weight-based setpoint is satisfied when the scale is at standstill.</p> <p> Note : The AUTOJOG digital output is typically used to signify that an autojog operation is being performed. AUTOJOG should not be assigned to the same digital output as the related weight-based setpoint.</p>	X	
COZ	Center of zero. Monitors for a gross zero condition. The digital output associated with this setpoint kind is activated when the referenced scale is a center of zero. No value is required for this setpoint.		X
INMOTON	In motion. Monitors for an in-motion condition. The digital output associated with this setpoint is activated when the scale is not at standstill. No value is required for this setpoint.		X
INRANGE	In range. Monitors for an in-range condition. The digital output associated with this setpoint is activated when the scale is within capacity range. No value is required for this setpoint.		X
BATCHPR	Batch processing signal. The digital output associated with this setpoint is activated whenever a batch sequence is in progress. No value is required for this setpoint.		X
TIMER	<p>Tracks the progress of a batch sequence based on a timer.</p> <p>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.</p>		X

Table 8-1. Setpoint Kinds (Continued)


Kind	Description	Batch	Continuous
CONCUR	<p>Allows a digital output to remain active over a specified portion of the batch sequence. Two types of concur setpoints can be configured:</p> <p>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.</p> <p>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.</p>		X
DIGIN	Digital input setpoint. Requires a specific group of digital inputs to be in low (0 VDC) state to satisfy the setpoint. The digital output associated with this setpoint is held in a low (0 VDC) state until the inputs selected for the digital input mask are all in a low state.	X	X
AVG	<p>Average setpoint. Performs functions based on the calculated average weight over a specified number of A/D samples.</p> <p> Note This setpoint is based on the <i>raw</i> A/D weight value, rather than the rounded value shown on the indicator display. For example, if the display shows 50.0 but the actual raw A/D value is 49.99, the setpoint will not be satisfied.</p>	X	
TOD	Time of day setpoint. Performs functions when the internal clock time of the indicator matches the specified setpoint time.	X	X
DELTA	Delta weight setpoint. Satisfied when the change in weight on the scale is equal to or exceeds the absolute value specified for the setpoint.	X	
CHKWEI	Checkweigher setpoint. Allows specification of over- and under-weight values. Up to three digital outputs can be configured to represent overweight, underweight, and accept conditions.		X
PLSCNT	Pulse counter setpoint. Performs functions based on pulse counts received by a pulse input card.	X	X
PLSRAT	Pulse rate setpoint. Performs functions based on the pulse rate received by a pulse input card.		X
ALWAYS	Always setpoint. This setpoint is always satisfied. It is typically used to provide an endpoint for true/false branching batch routines.	X	
NEVER	Never setpoint. This setpoint is never satisfied. It is used to branch to a designated setpoint in true/false branching batch routines in which the batch will not continue through the normal sequence of batch setpoints.	X	
DINCNT	Digital input count setpoint. Counts pulses received at the specified digital input.	X	X

Table 8-1. Setpoint Kinds (Continued)

8.2 Setpoint Menu Parameters

Figure 8-1 shows the general structure of the SETPTS menu. Submenus (indicated by *Go to X* in Figure 8-1) for various groups of setpoint kinds are shown on the following pages (Figures 8-3 through 8-9); parameter descriptions for the submenus are provided in Table 8-2 on page 73.

See Table 8-1 on page 61 for descriptions of each of the setpoint kinds.

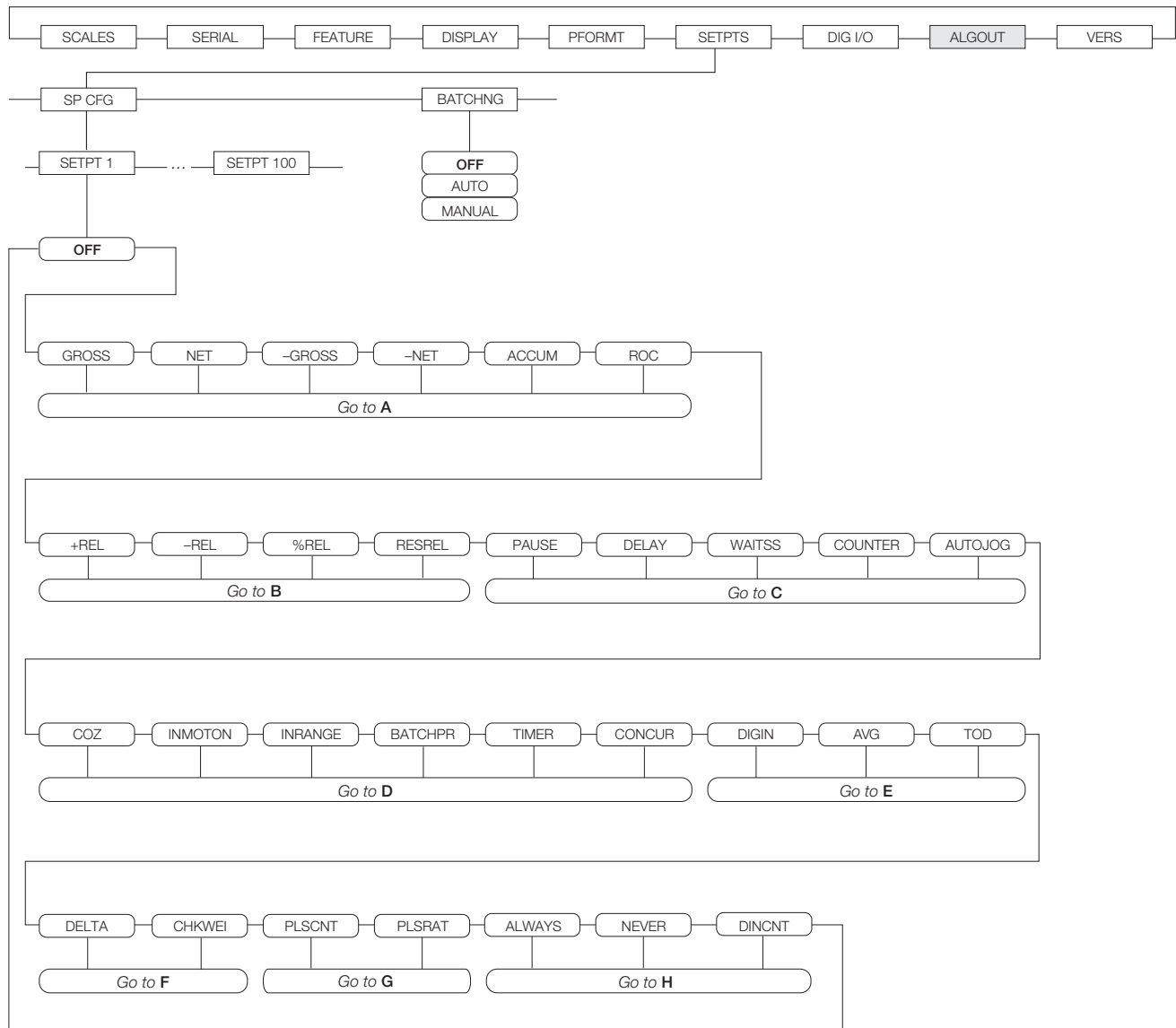


Figure 8-1. SETPTS Menu

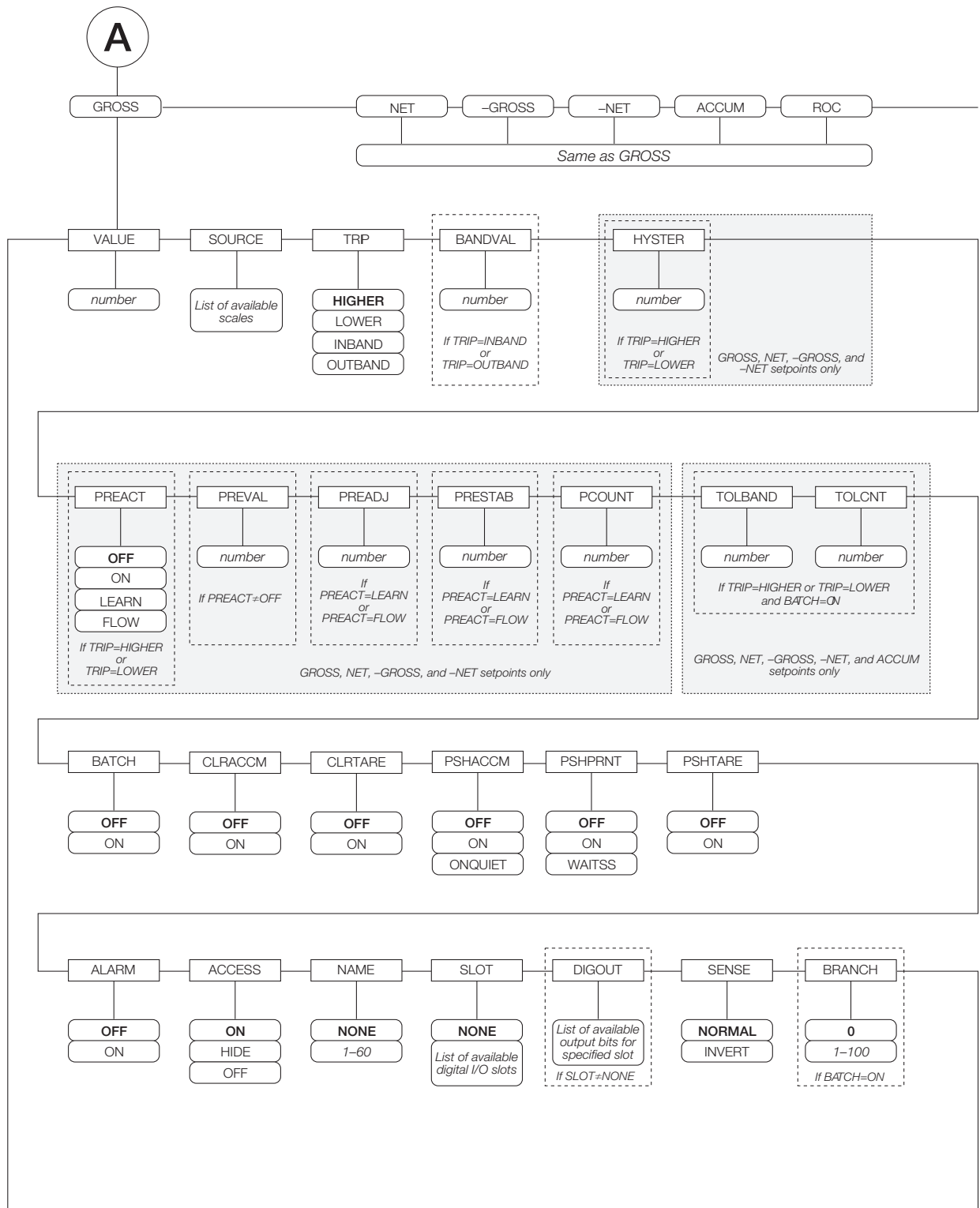


Figure 8-2. GROSS, NET, -GROSS, -NET, ACCUM, and ROC Setpoint Parameters

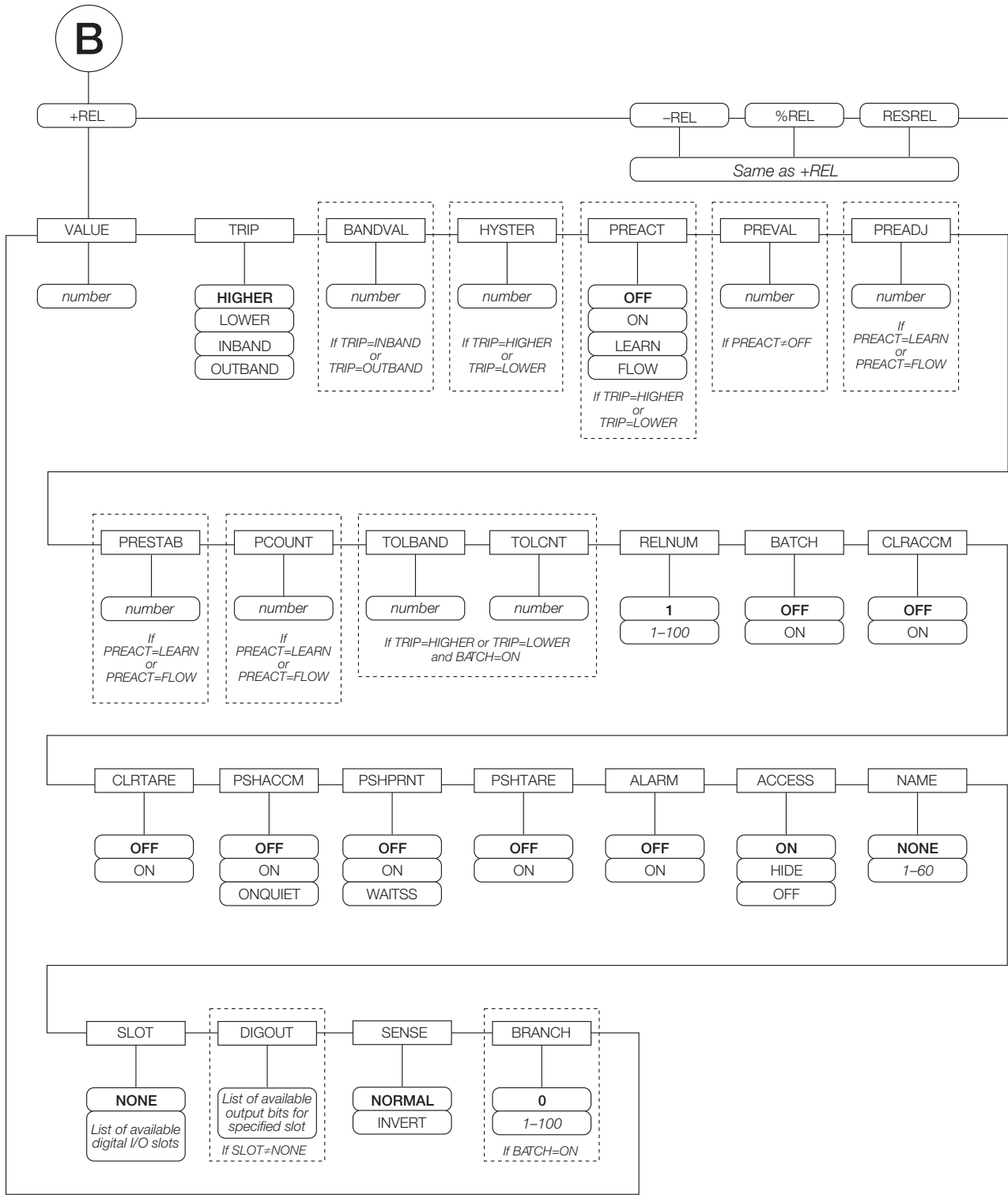


Figure 8-3. +REL, -REL, %RELS and RESREL Setpoint Parameters

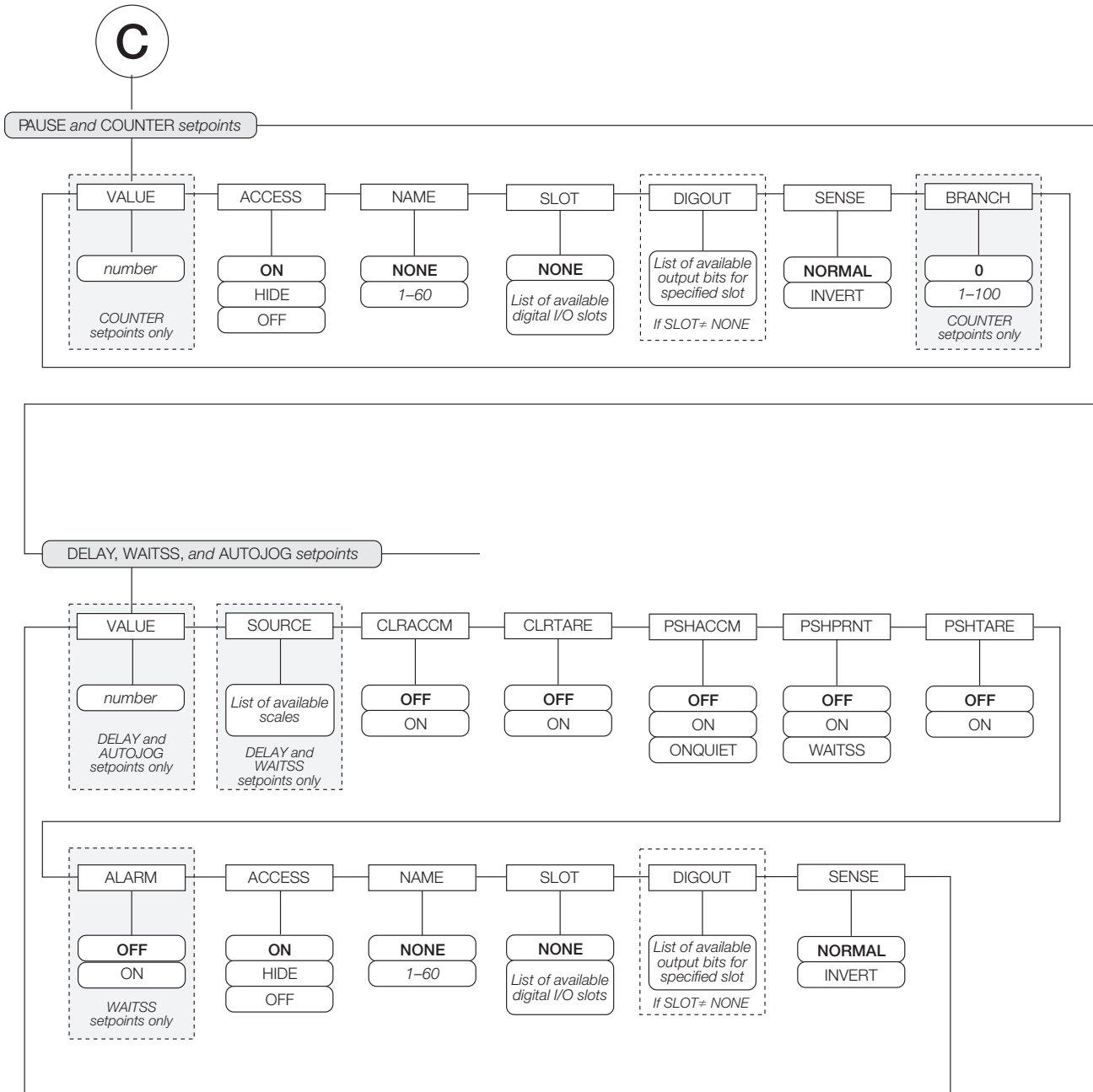


Figure 8-4. PAUSE, COUNTER, DELAY, WAITSS, and AUTOJOG Setpoint Parameters

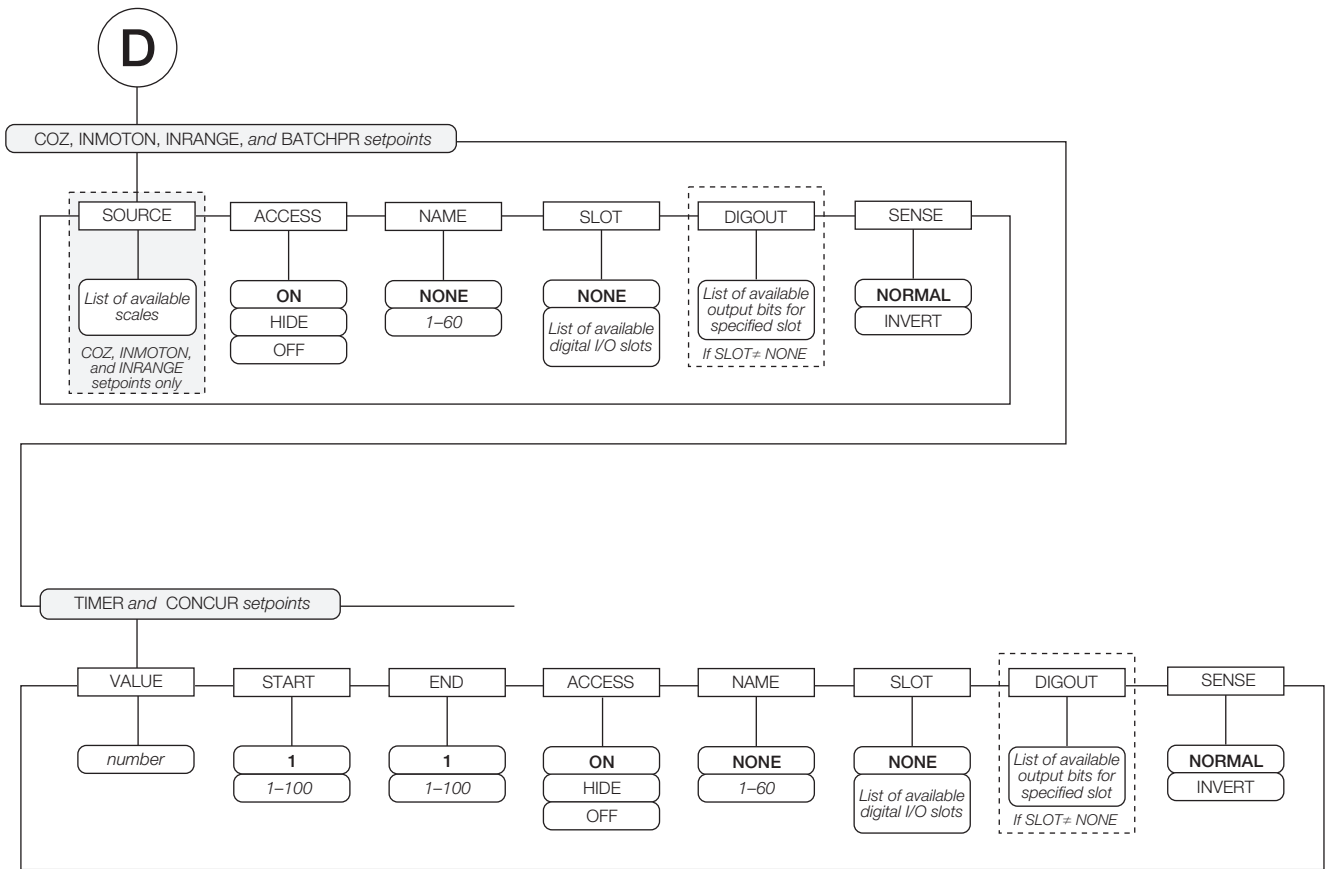


Figure 8-5. COZ, INMOTON, INRANGE, and BATCHPR Setpoint Parameters

E

DIGIN, AVG, and TOD setpoints

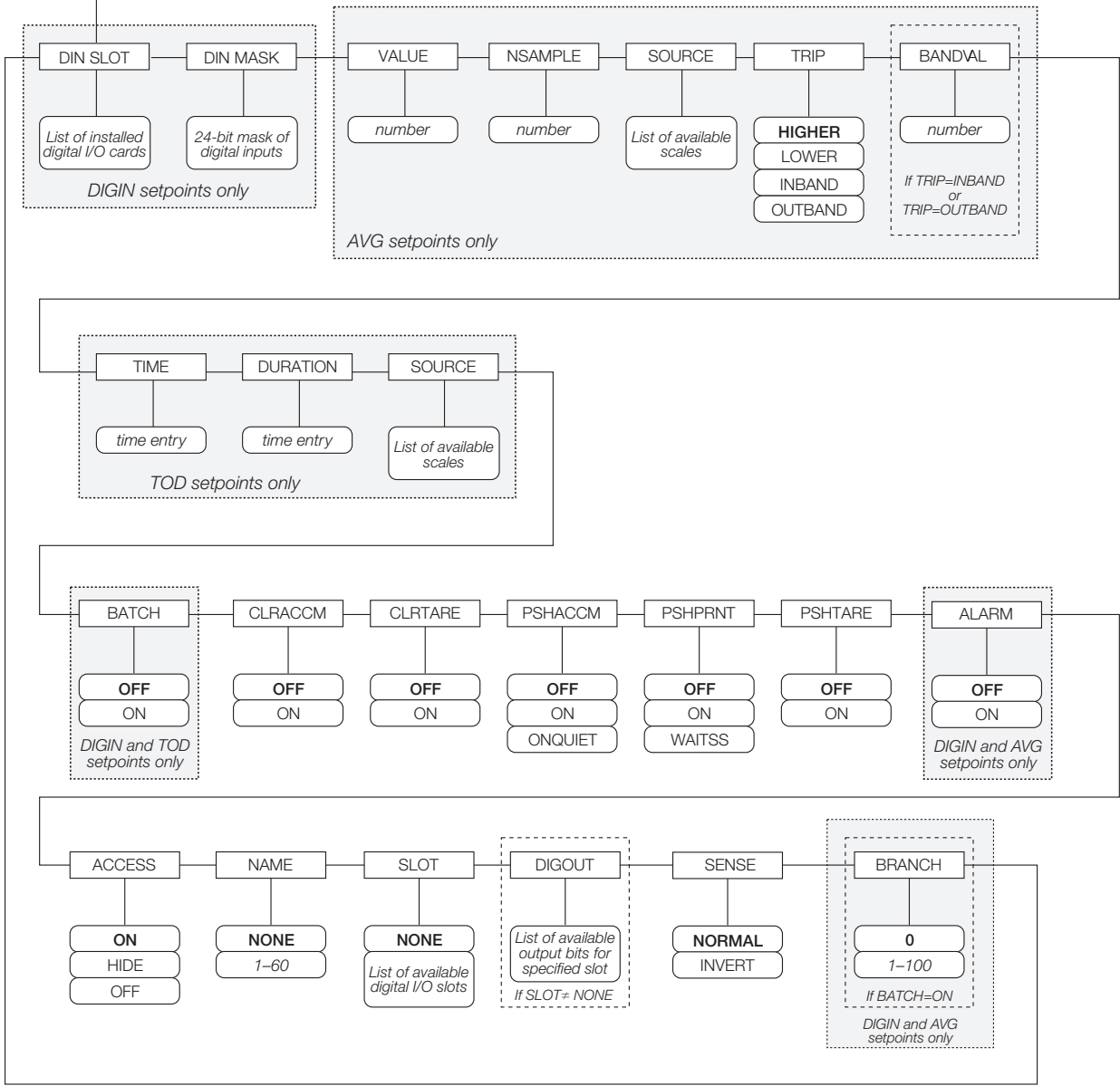


Figure 8-6. DIGIN, AVG, and TOD Setpoint Parameters

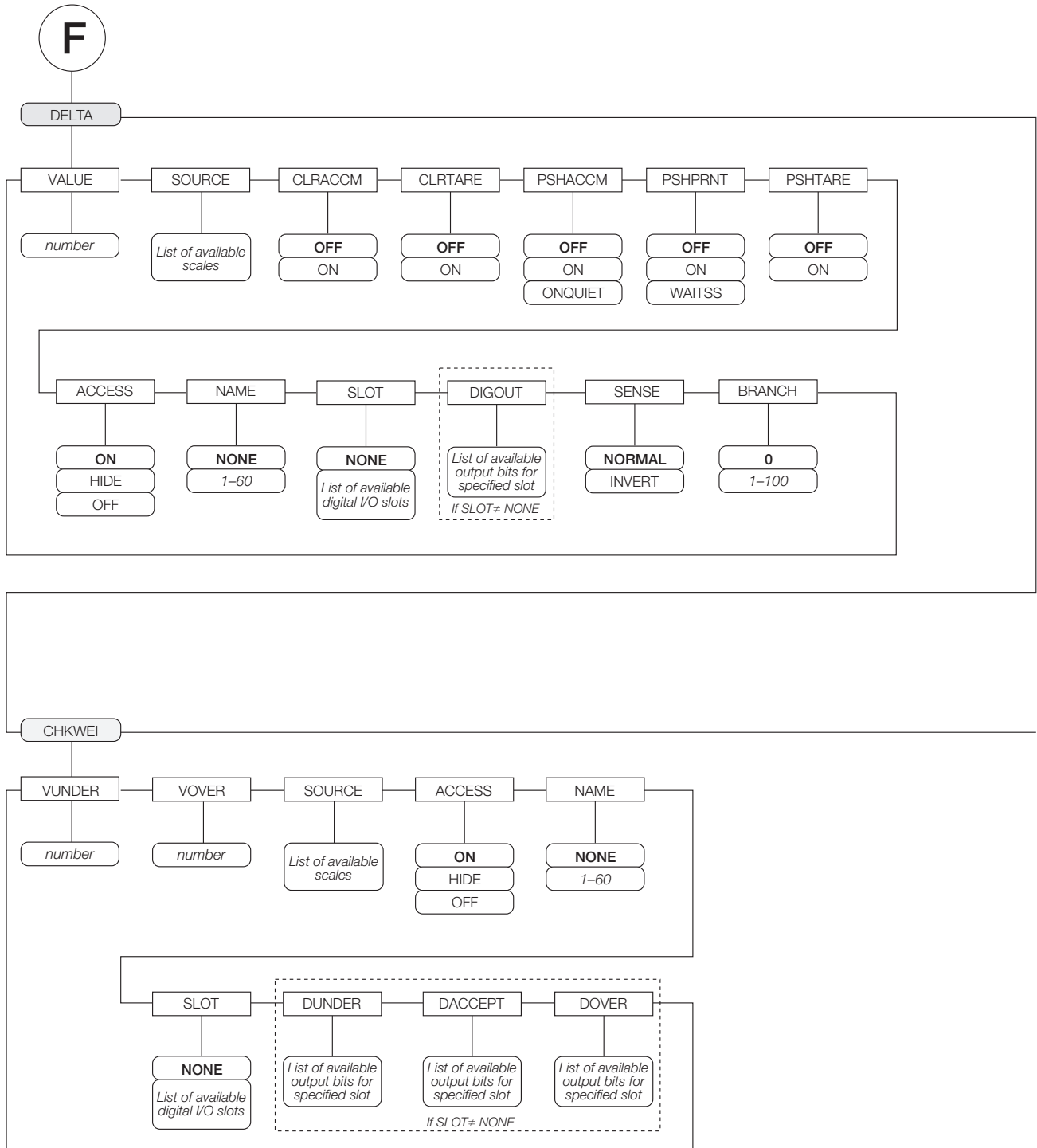


Figure 8-7. DELTA and CHKWEI Setpoint Parameters

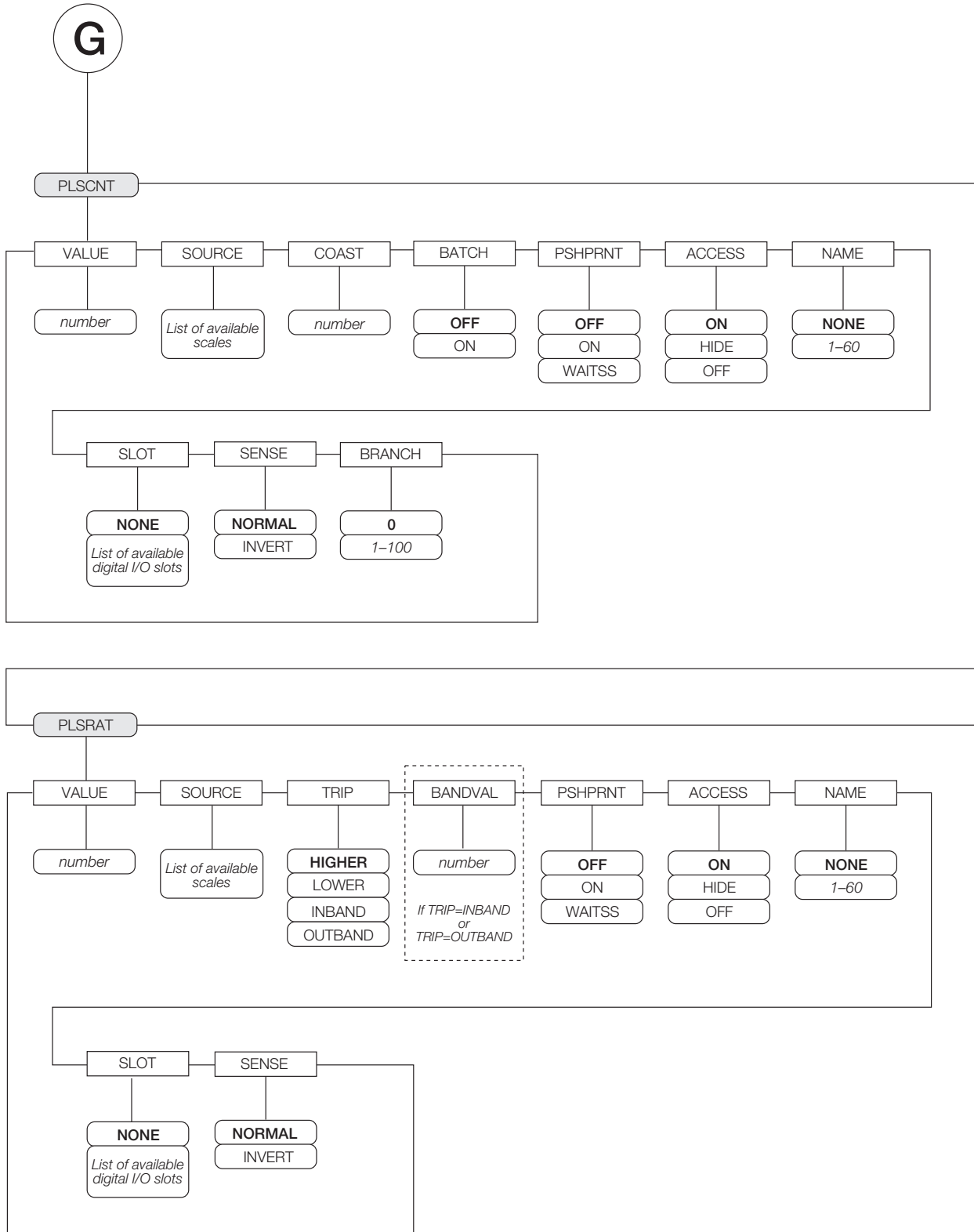


Figure 8-8. PLSCNT and PLSRAT Setpoint Parameters

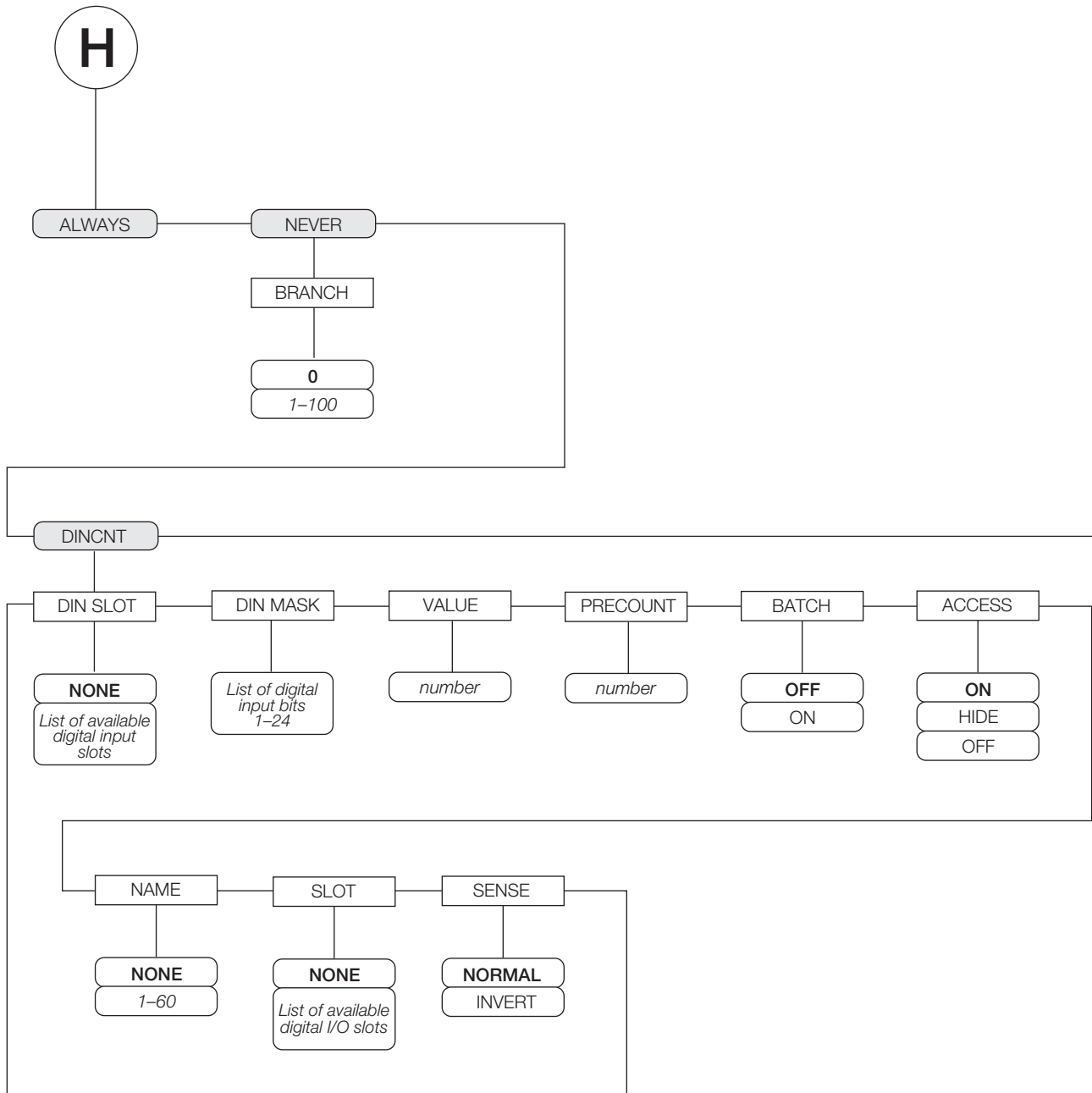


Figure 8-9. ALWAYS, NEVER, and DINCNT Setpoint Parameters

SETPTS Menu		
Parameter	Choices	Description
Level 2 submenus		
SETPT 1– SETPT 100	OFF GROSS NET –GROSS –NET ACCUM ROC +REL –REL %REL RESREL PAUSE DELAY WAITSS COUNTER AUTOJOG COZ INMOTON INRANGE BATCHPR TIMER CONCUR DGIN AVG TOD DELTA CHKWEI PLSCNT PLSRAT ALWAYS NEVER DINCNT	<p>Specifies the setpoint kind.</p> <p>GROSS, NET, –GROSS, –NET, ACCUM, ROC, +REL, –REL, %REL, RESREL. DGIN, DINCNT, AVG, and TOD setpoint kinds can be used as either batch or continuous setpoints.</p> <p>PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, DELTA, PLSCNT, ALWAYS, and NEVER setpoint kinds can only be used in batch sequences.</p> <p>COZ, INMOTON, INRANGE, BATCHPR, TIMER, CONCUR, PLSRAT, and CHKWEI setpoint kinds can only be used as continuous setpoints.</p> <p>See Table 8-1 on page 61 for more information about setpoint kinds.</p>
BATCHNG	OFF AUTO MANUAL	<p>Batching enable. Set to AUTO or MANUAL to allow a batch sequence to run. MANUAL requires a BATSTRT digital input, BATSTART serial command, Batch Start softkey, or the StartBatch function in an <i>iRite-IDE</i> program before the batch sequence can run. AUTO allows batch sequences to repeat continuously.</p>

Table 8-2. Setpoint Menu Parameters

SETPTS Menu		
Parameter	Choices	Description
Level 4 submenus		
VALUE	<i>number</i>	<p>Setpoint value.</p> <ul style="list-style-type: none"> For weight-based setpoints: Specifies the target weight value, 0–9999999. For time-based setpoints: Specifies, in 0.1-second intervals, a time value in the range 0–65535. For COUNTER setpoints: Specifies the number of consecutive batches to be run, 0–65535. For PLSCNT setpoints, specifies a number of pulses, 0–9999999, received by a pulse input card. For PLSRAT setpoints, specifies a pulse rate in Hz, 0–65535, received by a pulse input card.
TRIP	HIGHER LOWER INBAND OUTBAND	<p>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.</p> <p>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.</p>
BANDVAL	0.500000 0–9999999	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 ±BANDVAL.
HYSTER	0 0–9999999	Specifies a band around the setpoint value that must be exceeded before the setpoint, once off, can trip on again.
PREACT	OFF ON LEARN FLOW	<p>Allows the digital output associated with a setpoint to shut off before the setpoint is satisfied to allow for material in suspension.</p> <p>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.</p> <p>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.</p> <p>FLOW preact provides dynamic compensation for material flow rate in determining when to shut off the digital output. Rather than waiting for the specified weight to be reached, FLOW preact uses the change in weight over time to anticipate when the TRIP minus PREACT weight value will be reached.</p>
PREVAL	0 0–9999999	Specifies the preact value for setpoints with PREACT set to ON, LEARN, or FLOW. Depending on the TRIP setting specified for the setpoint, the setpoint trip value is adjusted up or down by the PREVAL value.
PREADJ	0.500000 0–9999999	Preact adjustment factor. For setpoints with PREACT set to LEARN, specifies a decimal representation of the percentage of error correction applied (0.5 = 50%, 1.0 = 100%) each time a PREACT adjustment is made.
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. Setting this parameter to a value greater than zero disables the learn process if standstill is not achieved in the specified interval.
PCOUNT	1 0–65535	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.
TOLBAND	0 0–9999999	Tolerance band. For setpoints with TRIP set to HIGHER or LOWER, specifies a tolerance band around the target weight. If the captured weight is not within the specified tolerance band, the preact learn function is not applied and the batch is paused (based on the value of the TOLCNT parameter, below) until restarted or reset.

Table 8-2. Setpoint Menu Parameters (Continued)



SETPTS Menu		
Parameter	Choices	Description
TOLCNT	1 0–65535	Tolerance count. For setpoints with TRIP set to HIGHER or LOWER, specifies the number of consecutive batch cycles in which the tolerance band (TOLBAND parameter) must be exceeded before the batch process is paused. When the specified value is met, the batch is paused and an error message is displayed. The batch must be restarted or reset to clear the error message. The special value of zero means that the batch is never paused for an out-of-tolerance condition.
RELNUM	1 1–100	For relative setpoints, specifies the number of the relative setpoint. The target weight for this setpoint is determined as follows: <ul style="list-style-type: none"> • For +REL setpoints, the value of the relative setpoint plus the value (VALUE parameter) of the +REL setpoint • For –REL setpoints, the value of the relative setpoint minus the value of the –REL setpoint • For %REL setpoints, the percentage (specified on the VALUE parameter of the %REL setpoint) of the target value of the relative setpoint • For RESREL setpoints, the percentage (specified on the VALUE parameter of the RESREL setpoint) of the <i>captured</i> value of the relative setpoint
BATCH	OFF ON	Specifies whether the setpoint is used as a batch (ON) or continuous (OFF) setpoint.
CLRACCM	OFF ON	Specify ON to clear the accumulator when the setpoint is satisfied
CLRTARE	OFF ON	Specify ON to clear the tare when the setpoint is satisfied
PSHACCM	OFF ON ONQUIET	Specify ON to update the accumulator and perform a print operation when the setpoint is satisfied. Specify ONQUIET to update the accumulator without printing.
PSHPRINT	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.
PSHTARE	OFF ON	Specify ON to perform an acquire tare operation when the setpoint is satisfied.  Note PSHTARE acquires the tare regardless of the value specified for the REGULAT parameter on the FEATURE menu.
 Note If two or more of the CLRxxxx and PSHxxxx 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.		
ALARM	OFF ON	Specify ON to display the word <i>ALARM</i> on the primary display while the setpoint is active (batch setpoints) or while the setpoint is not tripped (continuous setpoints).
START	1 1–100	Specifies the starting setpoint number. <i>Do not</i> specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint begins when the starting setpoint begins.
END	1 1–100	Specifies the ending setpoint number. <i>Do not</i> specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint stops when the ending setpoint begins.
ACCESS	ON HIDE OFF	Specifies the access allowed to setpoint parameters shown by pressing the Setpoint softkey in normal mode. ON: Values can be displayed and changed HIDE: Values cannot be displayed or changed OFF: Values can be displayed but not changed
NAME	NONE, 1–60	Specify the number of an assigned prompt. Up to 60 prompt names can be specified on the PROMPTS submenu of the FEATURE menu.

Table 8-2. Setpoint Menu Parameters (Continued)

<i>SETPTS Menu</i>		
Parameter	Choices	Description
SLOT	NONE <i>slot_number</i>	Lists all available digital I/O slots. This parameter specifies the slot number of the digital I/O card referenced by the DIGOUT parameter.
DIGOUT	<i>bit_number</i>	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 DIG 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 <i>until</i> the setpoint condition is met.
BRANCH	0 1-100	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.
TIME	<i>time</i>	For TOD setpoints, specifies the time at which the setpoint becomes active. The format used to enter the time (12-hour or 24-hour) is based on the value specified for the TIMEFMT parameter on the FEATURE menu.
DURATION	<i>hh:mm:ss</i>	For TOD setpoints, specifies the length of time that the digital output associated with this setpoint changes state. The value is entered in hours, minutes, and seconds (<i>hh:mm:ss</i>). All other operations associated with this setpoint (print, tare, or accumulate) are performed at the end of the specified duration.
NSAMPLE	1-65535	For AVG setpoints, specify the number of A/D samples used to calculate the average weight.
SOURCE	<i>source_scale</i>	Specify the scale number used as the source for the setpoint.
DIN SLOT	NONE <i>slot_number</i>	For DIGIN and DINCNT setpoints, specify the slot number from which digital inputs will be read.
DIN MASK	<i>digital_input_mask</i>	For DIGIN and DINCNT setpoints, specify the bits used as inputs to the setpoint. Use the Select softkey to select bits.
VUNDER	0-9999999	For CHKWEI setpoints, specifies the lower weight limit.
VOVER	0-9999999	For CHKWEI setpoints, specifies the upper weight limit.
DUNDER	<i>digital_output</i>	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight is less than the VUNDER value specified.
DACCEPT	<i>digital_output</i>	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight between the VUNDER and VOVER values specified.
DOVER	<i>digital_output</i>	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight is greater than the VOVER value specified.
COAST	0-65535	For PLSCNT setpoints, specifies the time delay (in 0.1-second intervals) inserted between reaching the setpoint target value and capture of the actual pulse count.
SENSE	NORMAL INVERT	Specifies whether the value of the digital output associated with this setpoint is inverted when the setpoint is satisfied.

Table 8-2. Setpoint Menu Parameters (Continued)

8.3 Batch Operations

Softkeys can be configured to allow operator control of batch operations from the 820i front panel (see Figure 8-10), Softkeys can be configured using *Revolution*, serial commands, or the FEATURE menu (see Section 3.2.3 on page 35).

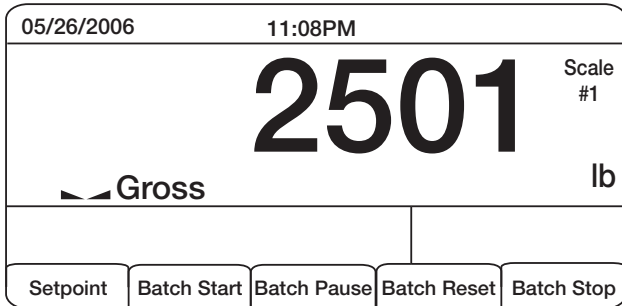


Figure 8-10. Batching Softkeys

- Setpoint** Display or change assigned setpoints.
- Batch Start** Starts batch process.
- Batch Pause** Pauses an active batch and turns off all digital outputs except those associated with concurrent and timer setpoints. Processing is suspended until **Batch Start** is pressed again. Pressing **Batch Start** resumes the batch and re-energizes all digital outputs turned off by the **Batch Pause**.
- Batch Reset** Stops and resets an active batch to the beginning of the process.
- Batch Stop** Stops an active batch and turns off all associated digital outputs.



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 8-12. Each switch uses a separate digital input.

Once cables and switches have been connected to the indicator, use the setup switch to place the indicator in setup mode. Use the DIG I/O menu (see Section 3.2.7 on page 44) to configure digital input and output functions.

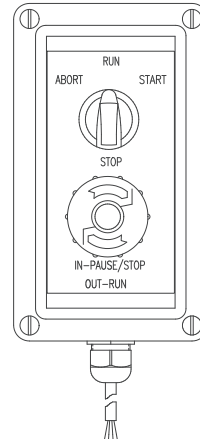


Figure 8-11. Batching Switch

When configuration is complete, exit setup 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.

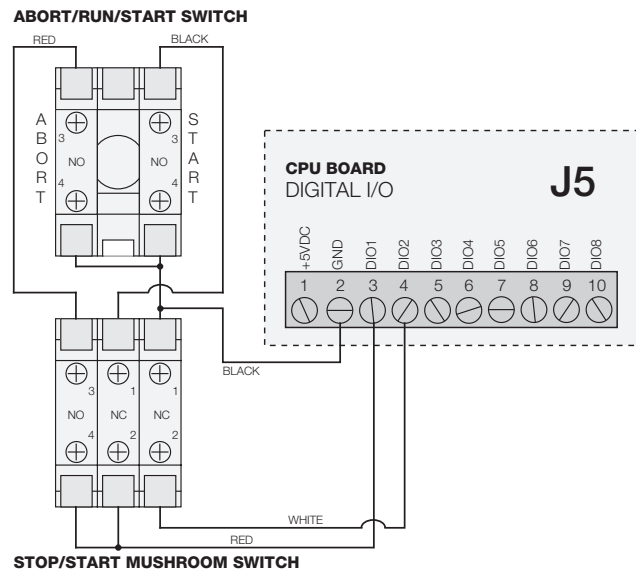


Figure 8-12. Batching Switch Wiring Diagram Example

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.

9.0 Serial Commands

The 820i indicator can be controlled by a personal computer or remote keyboard connected to an indicator serial port. Control is provided by a set of serial commands that can simulate front panel key press functions, display and change setup parameters, and perform reporting functions. The serial commands provide the capability to print configuration data or to save that data to an attached personal computer. This section describes the serial command set and procedures for saving and transferring data using the serial ports.

9.1 The Serial Command Set

The serial command set can be divided into five groups: key press commands, reporting commands, the RESETCONFIGURATION special function command, parameter setting commands, and transmit weight data commands.

When the indicator processes a serial 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.

9.1.1 Key Press Commands

Key press serial commands (see Table 9-1) simulate pressing the keys on the front panel of the indicator. These commands can be used in both setup and normal (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 serial commands:

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

Command	Function
KBASE	Select current scale (Example: KBASE, K2, KENTER to select Scale #2)
KZERO	In normal mode, press the ZERO key
KGROSSNET	In normal mode, press the GROSS/NET key
KGROSS	Go to gross mode (pseudo key)
KNET	Go to net mode (pseudo key)
KTARE	Press the TARE key
KUNITS	In weighing mode, press the UNITS key
KPRIM	Go to primary units (pseudo key)
KSEC	Go to secondary units (pseudo key)

Table 9-1. Serial Key Press Commands

Command	Function
KTER	Go to tertiary units (pseudo key)
KPRINT	In normal mode, press the PRINT key
KDISPACCUM	Press the ACCUM key
KDISPTARE	Display tare (pseudo key)
KCLR	Press the CLEAR key
KCLRCN	Reset consecutive number (pseudo key)
KCLRTAR	Clear tare from system (pseudo key)
KLEFT	In setup mode, move left in the menu
KRIGHT	In setup mode, move right in the menu
KUP	In setup mode, move up in the menu; in normal mode, scroll up to previous configured scale.
KDOWN	In setup mode, move down in the menu; in normal mode, scroll down to the next configured scale.
KEXIT	In setup mode, exits to normal mode
KSAVE	In setup mode, saves the current configuration
KCLRNV	In setup mode, clears non-volatile RAM
K0-K9	Press number 0 (zero) through 9
KDOT	Press the decimal point (.)
KENTER	Press the ENTER key
KSOFTx	Press softkey number x
KLOCK	Lock specified front panel key. For example, to lock the ZERO key, enter KLOCK=KZERO.
KUNLOCK	Unlock specified front panel key. For example, to unlock the PRINT key, enter KUNLOCK=KPRINT.
KID	Display Unit ID entry screen
KTREG	Display truck register
KWIN	Process truck weigh-in transaction Example: KWIN, K2, K3, KENTER to select ID #23)
KWOUT	Process truck weigh-out transaction
KDEL	While truck register is displayed, delete truck register
KSETPOINT	Display setpoint configuration (pseudo key)
KDATE	Display date (pseudo key)
KTIME	Display time (pseudo key)
KTIMEDATE	Display time and date (pseudo key)

Table 9-1. Serial Key Press Commands (Continued)

9.1.2 Reporting Commands

Reporting commands send specific information to the serial port. The commands listed in Table 9-2 can be used in either setup mode and normal mode.

Command	Function
DUMPALL	List all parameter values
DUMPAUDIT	List audit trail information
SPDUMP	Print setpoint configuration
VERSION	Write 820i software version
HARDWARE	Lists installed option cards. See Section 10.1.2 on page 90 for more information about using the HARDWARE command.
XE	Returns a 10-digit code representing any error conditions currently shown on the front panel. See Section 10.1.4 on page 91 for more information.

Table 9-2. Reporting Commands

9.1.3 Clear and Reset Commands

The following commands can be used to clear and reset the 820i:

PCLR: Program clear. Erases the loaded user program (setup mode only).

RS: Reset system. Resets the indicator without resetting the configuration.

RESETCONFIGURATION: Restores all configuration parameters to their default values (setup mode only). The RESETCONFIGURATION function can also be initiated by pressing the **Reset Config** softkey under the VERSION menu. Use the **up** key to select *Clear entire indicator configuration*, then press **ENTER** to reset the indicator.



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

9.1.4 Parameter Setting Commands

Parameter setting commands allow you to display or change the current value for a particular configuration parameter (Tables 9-3 through 9-11).

Current configuration parameter settings can be displayed in either setup mode or normal mode using the following syntax: *command*<ENTER>

Most parameter values can be changed in setup mode only; setpoint parameters listed in Table 9-6 on page 84 can be changed when in normal weighing mode.

Use the following command syntax when changing parameter values: *command=value*<ENTER>, where *value* is either a number or a parameter value. Use no spaces before or after the equal (=) sign. If you type an incorrect command, the display reads ??.

For example, to set the motion band parameter on Scale #1 to 5 divisions, type the following:

```
SC.MOTBAND#1=5<ENTER>
```

For parameters with selectable values, enter the command and equal sign followed by a question mark: *command=?*<ENTER> to see a list of those values. The indicator must be in setup mode to use this function.



Note Some parameters are valid only if other parameters or parameter values are specified. See the configuration menu in Section 3.2 on page 18 for information about parameter dependencies. Restrictions for front-panel configuration also apply to serial command configuration.

Command	Description	Values
SC.GRADS# <i>n</i>	Graduations	1–9999999
SC.SPLIT# <i>n</i>	Multi-range or multi-interval scale type	OFF, 2RNG, 3RNG, 2INTVL, 3INTVL
SC.ZTRKBND# <i>n</i>	Zero track band	0, 0–100
SC.ZRANGE# <i>n</i>	Zero range	1.900000, 0–100
SC.MOTBAND# <i>n</i>	Motion band	1, 0–100
SC.SSTIME# <i>n</i>	Standstill time	1–65535
SC.OVRLOAD# <i>n</i>	Overload	FS+2%, FS+1D, FS+9D, FS
SC.WMTTHR# <i>n</i>	Weighment threshold	grads
SC.NUMWEIGH# <i>n</i>	Number of weighments	–
SC.MAX_WEIGHT# <i>n</i>	Maximum weight	–

Table 9-3. SCALES Serial Commands

Command	Description	Values
SC.DIGFLTR1#n SC.DIGFLTR2#n SC.DIGFLTR3#n	Digital filtering	1, 2, 4, 8, 16, 32, 64, 128, 256
SC.DFSENS#n	Digital filter cutout sensitivity	2OUT, 4OUT, 8OUT, 16OUT, 32OUT, 64OUT, 128OUT
SC.DFTHRH#n	Digital filter cutout threshold	NONE, 2D, 5D, 10D, 20D, 50D, 100D, 200D, 250D
SC.RATLTRAP#n	Rattletrap filtering	OFF, ON
SC.SMPRAT#n	Sample rate	30HZ, 60HZ, 120HZ, 240HZ, 480HZ, 960HZ
SC.PWRUPMD#n	Power up mode	GO, DELAY
SC.TAREFN#n	Tare function	BOTH, NOTARE, PBTARE, KEYED
SC.PRI.DECPNT#n	Primary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.PRI.DSPDIV#n	Primary units display divisions	1D, 2D, 5D
SC.PRI.UNITS#n	Primary units	lb, kg, g, oz, tn, t, gn, troyoz, troylb, lt, CUSTOM, NONE, OFF
SC.PRI.CUNITS#n	Primary custom units	Specify units if SC.PRI.UNITS=CUSTOM
SC.SEC.DECPNT#n	Secondary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.SEC.DSPDIV#n	Secondary units display divisions	1D, 2D, 5D
SC.SEC.UNITS#n	Secondary units	lb, kg, g, oz, tn, t, gn, troyoz, troylb, lt, CUSTOM, NONE, OFF
SC.SEC.CUNITS#n	Secondary custom units	Specify units if SC.SEC.UNITS=CUSTOM
SC.SEC.MULT#n	Secondary units multiplier	0.00000–9999999
SC.TER.UNITS#n	Tertiary units	lb, kg, g, oz, tn, t, gn, troyoz, troylb, lt, CUSTOM, NONE, OFF
SC.TER.CUNITS#n	Tertiary custom units	Specify units if SC.TER.UNITS=CUSTOM
SC.TER.DECPNT#n	Tertiary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.TER.DSPDIV#n	Tertiary units display divisions	1D, 2D, 5D
SC.TER.MULT#n	Tertiary units multiplier	0.000001–9999999
SC.ROC.DECPNT#n	Tertiary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.ROC.DSPDIV#n	Rate-of-change units display divisions	1D, 2D, 5D
SC.ROC.MULT#n	Rate-of-change units multiplier	0.000001–9999999
SC.ROC.UNITS#n	Rate-of-change units	SEC, MIN, HOUR
SC.ROC.INTERVL#n	Rate-of-change interval	1–100
SC.ROC.REFRESH#n	Rate-of-change refresh interval	0.1–60
SC.RANGE1.MAX#n	Weight maximum for first range or interval	<i>weight</i>
SC.RANGE2.MAX#n	Weight maximum for second range or interval	<i>weight</i>
SC.RANGE3.MAX#n	Weight maximum for third range or interval	<i>weight</i>
SC.ACCUM#n	Accumulator enable	ON, OFF
SC.VISIBLE#n	Scale visibility	ON, OFF
SC.PEAKHOLD#n	Peak hold	OFF, NORMAL, BI-DIR, AUTO
SC.WZERO#n	Zero calibration	—
SC.WVAL#n	Test weight value	<i>test_weight_value</i>

Table 9-3. SCALES Serial Commands (Continued)

Command	Description	Values
SC.WSPAN# <i>n</i>	Span calibration	—
SC.WLIN.F1# <i>n</i> – SC.WLIN.F5# <i>n</i>	Actual raw count value for linearization points 1–5	0–16777215
SC.WLIN.V1# <i>n</i> – SC.WLIN.V5# <i>n</i>	Test weight value for linearization points 1–5	0.000001–9999999
SC.WLIN.C1# <i>n</i> – SC.WLIN.C5# <i>n</i>	Calibrate linearization points 1–5	—
SC.LC.CD# <i>n</i>	Deadload coefficient	—
SC.LC.CW# <i>n</i>	Span coefficient	—
SC.LC.CZ# <i>n</i>	Temporary zero	—
SC.REZERO# <i>n</i>	Rezero	—

For commands ending with “#*n*”, *n* is the scale number.

Table 9-3. SCALES Serial Commands (Continued)

Command	Description	Values
EDP.PORT	Active serial port	Returns number of port being used for serial command input
EDP.INPUT# <i>p</i>	Port serial input function	CMD, KEYBD, SCALE, IND SC, DISPLAY, IQUBE See the <i>iQUBE Installation Manual</i> , PN 77224, for more information about configuring <i>iQUBE</i> serial scales.
EDP.BAUD# <i>p</i>	Port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200
EDP.BITS# <i>p</i>	Port data bits/parity	8NONE, 7EVEN, 7ODD, 8ODD, 8EVEN
EDP.TERMIN# <i>p</i>	Port termination character	CR/LF, CR
EDP.STOPBITS# <i>p</i>	Port stop bits	2, 1
EDP.ECHO# <i>p</i>	Port echo	ON, OFF
EDP.RESPONSE# <i>p</i>	Port response	ON, OFF
EDP.EOLDLY# <i>p</i>	Port end-of-line delay	0–255 (0.1-second intervals)
EDP.HANDSHK# <i>p</i>	Port handshaking	OFF, XONXOFF, HRDWAR
EDP.PORTTYPE# <i>p</i>	Port type	232, 485
EDP.DUPLEX# <i>p</i>	Port RS-485 duplex	HALF, FULL
EDP.ADDRESS# <i>p</i>	Port RS-485 address	0, 1–255
EDP.STREAM# <i>p</i>	Port streaming	OFF, LFT, INDUST, 4KEYS, KEYPAD, DISPLAY
EDP.SOURCE# <i>p</i>	Port source scale for output	<i>scale_number</i>
EDP.SFMT# <i>p</i>	Port custom stream format	0-50 characters

Table 9-4. SERIAL Port Serial Commands

Command	Description	Values
STR.POS# <i>p</i>	Custom stream identifiers	Specify replacement text for token Example: STR.PRI#1=L See Section 10.5 on page 94 for more information about custom stream formatting.
STR.NEG# <i>p</i>		
STR.PRI# <i>p</i>		
STR.SEC# <i>p</i>		
STR.TER# <i>p</i>		
STR.GROSS# <i>p</i>		
STR.NET# <i>p</i>		
STR.TARE# <i>p</i>		
STR.MOTION# <i>p</i>		
STR.RANGE# <i>p</i>		
STR.OK# <i>p</i>		
STR.INVALID# <i>p</i>		

For commands including “#*p*”, *p* is the serial port number.

Table 9-4. SERIAL Port Serial Commands (Continued)

Command	Description	Values
SD	Set date	MMDDYY, DDMMYY, YMMMDD, or YYDDMM. 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 time	hhmm (enter using 24-hour format)
DATEFMT	Date format	MMDDYYYY, DDMMYYYY, YYYYMMDD, YYYYDDMM
DATESEP	Date separator	SLASH, DASH, SEMI
TIMEFMT	Time format	12HOUR, 24HOUR
TIMESEP	Time separator	COLON, COMMA
DECFMT	Decimal format	DOT, COMMA
DSPRATE	Display rate	1–80, in100-ms intervals
CONSNUM	Consecutive numbering	0–9999999
CONSTUP	Consecutive number start-up value	0–9999999
UID	Unit identifier	aaaaaaaa (up to 8 alphanumeric characters)
TRUCK	Truck in/out mode	OFF, MODE1, MODE2, MODE3, MODE4, MODE5, MODE6
ALIBI	Alibi data storage enable	OFF, ON
CFGPWD	Configuration password	0, 1–9999999
SPPWD	Setpoint password	0, 1–9999999
SK#1–SK#10	Softkey assignment	Blank, TimeDate, DspTar, DspAcc, DspROC, SetPt, BatStrt, BatStop, BatPause, BatRst, WeighIn, WeighOut, TrkReg, UID, Diagnostics, Alibi, SclSel, SKUD1–SKUD10
SKT#1–SKT#10	User-defined softkey text	—
KYBDLK	Keyboard lock (disable keypad)	OFF, ON
ZERONLY	Disable all keys except ZERO	OFF, ON
PROMPT#1–PROMPT#60	Prompts/setpoint names	—
REGULAT	Regulatory compliance	NONE, OIML, NTEP, CANADA, INDUST
REG.SNPSHOT	Display or Scale weight source	DISPLAY, SCALE
REG.HTARE	Allow tare in display hold	NO, YES

Table 9-5. FEATURE Serial Commands

Command	Description	Values
REG.ZTARE	Remove tare on ZERO	NO, YES
REG.KTARE	Always allow keyed tare	NO, YES
REG.MTARE	Multiple tare action	REPLACE, REMOVE, NOTHING
REG.NTARE	Allow negative tare	NO, YES
REG.CTARE	Allow clear keyed tare	NO, YES
REG.CHILDZT	Clear child scales individually	NO, YES
REG.NEGTOTAL	Allow total scale to display negative value	NO, YES
REG.PRTMOT	Allow print while in motion	NO, YES
REG.PRINTPT	Add PT to keyed tare print	NO, YES
REG.PRTHLD	Print during display hold	NO, YES
REG.HLDWGH	Allow weighment during display hold	NO, YES
REG.MOTWGH	Allow weighment in motion	NO, YES
REGWORD	Regulatory word	GROSS, BRUTTO
CONTACT.COMPANY	Contact company name	<i>company_name</i> (up to 30 characters)
CONTACT.ADDR1 CONTACT.ADDR2	Contact company address	<i>company_address</i> (up to 30 characters for each line)
CONTACT.NAME1 CONTACT.NAME2	Contact names	<i>contact_names</i> (up to 20 characters each)
CONTACT.PHONE1 CONTACT.PHONE2	Contact phone numbers	<i>contact_phone_numbers</i> (up to 20 characters each)
CONTACT.EMAIL	Contact e-mail address	<i>contact_e-mail_address</i> (up to 30 characters)
NEXTCAL	Next calibration date	<i>calibration_date</i>
GRAVADJ	Gravitational adjustment	OFF, ON
LAT.LOC	Latitude	0–90 (to nearest degree of latitude)
ELEV.LOC	Elevation	±0–9999 (in meters)
IMAGE	Display image	NEGATIVE, POSITIVE

Table 9-5. FEATURE Serial Commands (Continued)

Command	Description	Values
SP.KIND# <i>n</i>	Setpoint kind	OFF, GROSS, NET, –GROSS, –NET, ACCUM, ROC, +REL, –REL, %REL, RESREL, PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, BATCHPR, TIMER, CONCUR, DIGIN, AVG, TOD, DELTA, CHWEI, PLSCNT, PLSRAT, ALWAYS, NEVER, DINCNT
SP.VALUE# <i>n</i>	Setpoint value	<i>number</i>
SP.SOURCE# <i>n</i>	Source scale	SCALE1, SCALE2, SCALE3
SP.COAST# <i>n</i>	Pulse counter coast	<i>number</i>
SP.TRIP# <i>n</i>	Trip	HIGHER, LOWER, INBAND, OUTBAND
SP.BANDVAL# <i>n</i>	Band value	<i>number</i>
SP.HYSTER# <i>n</i>	Hysteresis	<i>number</i>
SP.PREACT# <i>n</i>	Preact type	OFF, ON, LEARN, FLOW
SP.PREVAL# <i>n</i>	Preact value	<i>number</i>
SP.PREADJ# <i>n</i>	Preact adjustment percentage	<i>number</i>

Table 9-6. SETPNTS Serial Commands

Command	Description	Values
SP.PRESTAB# <i>n</i>	Preact learn stability	<i>number</i>
SP.PCOUNT# <i>n</i>	Preact learn interval	<i>number</i>
SP.TOLBAND# <i>n</i>	Target tolerance	<i>number</i>
SP.TOLCNT# <i>n</i>	Tolerance count	<i>number</i>
SP.BATCH# <i>n</i>	Batch step enable	OFF, ON
SP.CLRACCM# <i>n</i>	Clear accumulator enable	OFF, ON
SP.CLRTARE# <i>n</i>	Clear tare enable	OFF, ON
SP.PSHACCM# <i>n</i>	Push accumulate	OFF, ON, ONQUIET
SP.PSHPRINT# <i>n</i>	Push print	OFF, ON, WAITSS
SP.PSHTARE# <i>n</i>	Push tare	OFF, ON
SP.ALARM# <i>n</i>	Alarm enable	OFF, ON
SP.NAME# <i>n</i>	Setpoint name number	NONE, 1–60
SP.ACCESS# <i>n</i>	Setpoint access	OFF, ON, HIDE
SP.DSLOT# <i>n</i>	Digital output slot	NONE, SLOT <i>x</i>
SP.DIGOUT# <i>n</i>	Digital output	BIT <i>x</i>
SP.SENSE# <i>n</i>	Digital output sense	NORMAL, INVERT
SP.BRANCH# <i>n</i>	Branch destination	0, 1-100
SP.RELNUM# <i>n</i>	Relative setpoint number	1–100
SP.START# <i>n</i>	Starting setpoint	1–100
SP.END# <i>n</i>	Ending setpoint	1–100
SP.DISLOT# <i>n</i>	Digital input slot	NONE, SLOT <i>x</i>
SP.MASK# <i>n</i>	Digital input mask	<i>number</i>
SP.NSAMPLE# <i>n</i>	Number of samples	<i>number</i>
SP.TIME# <i>n</i>	Trip time	<i>hhmm</i>
SP.DURATION# <i>n</i>	Trip duration	<i>hhmmss</i>
SP.VUNDER# <i>n</i>	Underrange value	<i>number</i>
SP.VOVER# <i>n</i>	Overrange value	<i>number</i>
SP.DUNDER# <i>n</i>	Underrange digital output	BIT <i>x</i>
SP.DACCEPT# <i>n</i>	Accept digital output	BIT <i>x</i>
SP.DOVER# <i>n</i>	Overrange digital output	BIT <i>x</i>
BATCHNG	Batching mode	OFF, AUTO, MANUAL
SP.ENABLE# <i>n</i>	Setpoint enable	ON, OFF

For setpoint commands ending with “#*n*”, *n* is the setpoint number.

Table 9-6. SETPNTS Serial Commands (Continued)

Command	Description	Values					
GFMT.FMT GFMT.PORT	Gross demand print format string	<p>For .PORT commands, specify the port number as PORTxx (no leading zero). For example: GFMT.PORT=PORT3.</p> <p>For AUXFMT.FMT commands, specify the auxiliary format number (1–20) as AUXFMTxx (no leading zero). For example: AUX8FMT=GROSS<G><NL2>...</p> <p>See Section 6.0 on page 54 for information about demand print format strings.</p> <p>See the <i>iQUBE Installation Manual</i>, PN 77224, for more information about alert formats.</p>					
NFMT.FMT NFMT.PORT	Net demand print format string						
ACC.FMT ACC.PORT	Accumulator print format string						
SPFMT.FMT SPFMT.PORT	Setpoint print format string						
TRWIN.FMT TRWIN.PORT	Truck weigh-in print format string						
TRWOUT.FMT TRWOUT.PORT	Truck weigh-out print format string						
TR.FMT TR.PORT	Truck register print format string						
ALERT.FMT ALERT.PORT	Alert format string						
HDRFMT1 HDRFMT2	Ticket header format strings						
AUXFMTxx.FMT AUXFMTxx.PORT	Auxiliary ticket format						
AUD.PORT	Audit trail port						
WDGT#1= <i>n,f,d,s</i>	Widget display		<p>Sets scale display characteristics, where: <i>n</i> = widget number; <i>f</i> = font; <i>d</i> = number of scale displays; <i>s</i> = screen number.</p> <p>The 820i supports the following widget display configurations:</p> <table> <tr> <td>WDGT#1=1,3,1,1</td> <td>Single scale display, larger font</td> </tr> <tr> <td>WDGT#1=1,2,2,1</td> <td>Dual scale display, smaller font</td> </tr> </table>	WDGT#1=1,3,1,1	Single scale display, larger font	WDGT#1=1,2,2,1	Dual scale display, smaller font
WDGT#1=1,3,1,1	Single scale display, larger font						
WDGT#1=1,2,2,1	Dual scale display, smaller font						

Table 9-7. PFORMT Serial Commands

Command	Description	Values
DON. <i>b#s</i>	Set digital output on (active) at bit <i>b</i> , slot <i>s</i> .	–
DOFF. <i>b#s</i>	Set digital output off (inactive) at bit <i>b</i> , slot <i>s</i> .	–
DIO. <i>b#s</i>	Digital input function	OFF, INPUT, OUTPUT, PROGIN, ZERO, NT/GRS, TARE, UNITS, PRINT, ACCUM, SETPNT, TIMDATE, ESC, CLEAR, DSPTAR, IDKEY, KEY0–KEY9, KEYDP, ENTER, NAVUP, NAVDN, NAVLFT, NAVRGT, KBDLOC, HOLD, BATRUN, BATSTRT, BATPAUS, BATRESET, BATSTOP, CLRCN, GROSS, NET, PRIM, SEC, CLRTAR, CLRACC, TRIGGER
DIO.TRIG_SLOT. <i>b#s</i>	Trigger output slot	NONE, SLOT3
DIO.TRIG_PARAM. <i>b#s</i>	Trigger output parameter	<i>value</i>
Digital inputs and outputs are specified by bit number (<i>b</i>) and slot number (<i>s</i>)		

Table 9-8. DIG I/O Serial Commands

Command	Description	Values
ALG.ALIAS# <i>s</i>	Analog output alias	<i>name</i>
ALG.SOURCE# <i>s</i>	Analog output source	PROG, SCALE _{<i>n</i>}

Table 9-9. ALGOUT Serial Commands (Valid Only If Analog Output Card Is Installed)

Command	Description	Values
ALG.MODE#s	Mode	GROSS, NET
ALG.OFFSET#s	Zero offset	0%, 20%
ALG.ERRACT#s	Error action	FULLSC, HOLD, ZEROSC
ALG.MIN#s	Minimum value tracked	0-9999999
ALG.MAX#s	Maximum value tracked	0-9999999
ALG.ZERO#s	Zero calibration	0-65535
ALG.SPAN#s	Span calibration	0-65535

For commands ending with "#s", s is the slot number.

Table 9-9. ALGOUT Serial Commands (Valid Only If Analog Output Card Is Installed)

Command	Description	Values
XP#s	Extract probe temperature	—
XPP#s	Extract probe primary temperature	
XPS#s	Extract probe secondary temperature	
XPT#s	Extract probe tertiary temperature	
XI#s	Extract 0-20 mA value	
XV#s	Extract 0-10 V value	

For commands ending with "#s", s is the slot number.

Table 9-10. Analog Input Serial Commands (Valid Only If Analog Input Card Is Installed)

9.15 Normal Mode Commands

The normal mode print commands (see Table 9-11) transmit data to the serial port on demand in either setup or normal mode.

Command	Description	Values
CONSNUM	Set consecutive number	0–9 999 999
UID	Set unit ID	nnnnnnn
SD	Set date	MMDDYY, DDMMYY, YYMMDD, or YYDDMM. 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 time	hhmm (enter using 24-hour format)
CONTRAST	Set display contrast	0–127
BACKLITE	Set display backlighting	ON, OFF
SX#n	Start serial port streaming	OK or ??
EX#n	Stop serial port streaming	The port streaming parameter (EDP.STREAM#p) for the streaming port must be set to LFT or INDUST before using these commands. An EX command sent while in setup mode does not take effect until the indicator is returned to normal mode.
SF#n	Transmit single frame of stream	Sends a single frame from scale <i>n</i> to the streaming port
RS	Reset system	Soft reset. Used to reset the indicator without resetting the configuration to the factory defaults.
XA#n	Transmit accumulator value in displayed units	nnnnnn UU
XAP#n	Transmit accumulator value in primary units	
XAS#n	Transmit accumulator value in secondary units	
XAT#n	Transmit accumulator value in tertiary units	
XG#n	Transmit gross weight in displayed units	nnnnnn UU
XGP#n	Transmit gross weight in primary units	
XGS#n	Transmit gross weight in secondary units	
XGT#n	Transmit gross weight in tertiary units	
XN#n	Transmit net weight in displayed units	nnnnnn UU
XNP#n	Transmit net weight in primary units	
XNS#n	Transmit net weight in secondary units	
XNT#n	Transmit net weight in tertiary units	
XT#n	Transmit tare weight in displayed units	nnnnnn UU
XTP#n	Transmit tare weight in primary units	
XTS#n	Transmit tare weight in secondary units	
XTT#n	Transmit tare weight in tertiary units	
XE	Query system error conditions	nnnnn See Section 10.1.4 on page 91 for detailed information about the XE command response format.

Table 9-11. Normal Mode Serial Commands

9.1.6 Batching Control Commands

The commands listed in Table 9-12 provide batching control through the serial port

Command	Description	Values
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.
BATSTOP	Batch stop	Stops the batch program 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 BATSTRT DIGIN, BATSTART serial command, Batch Start softkey, or the StartBatch function in an <i>iRite-IDE</i> program 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 9-12. Batching Control Commands

10.0 Appendix

10.1 Troubleshooting

Table 10-1 lists general troubleshooting tips for various hardware and software error conditions. See the following pages for additional information about specific diagnostic tools.


Symptom	Cause/Remedy
Indicator does not power up	Possible blown fuse or bad power supply. Check all voltages on CPU board. Power supply should output both +6V and -6V levels to the CPU board (see Figure 2-3 on page 9). If power supply appears bad, check the small glass fuse (2.5A, 5x20mm) on the power supply board.
Front panel power indicator blinking 	Power supply overloaded. Check for shorts in A/D card regulators or in the DC-to-DC converter of any installed analog output or pulse input cards.
"Blue screen"	Press front panel Display key, press down key, enter <i>100</i> using the numeric keypad, then press Enter . Possible corrupt core software; reset or reload software.
Hangs in "888" display	Corrupt core software. Reset or reload software.
<i>Tare and truck data pointers are corrupt, Tare storage is corrupt</i> error messages at startup	Possible dead battery. Perform configuration reset then check for low battery warning on display. If battery is low, replace battery, perform another configuration reset, then reload files.
<i>Divide by zero</i> error message at startup	User program error. See Section 10.1.3 on page 90
<i>ERROR</i> message in weight display	Excitation voltage too low or off.
Dashes in weight display	Overrange or underrange scale condition. Check scale. For out-of-range conditions in total scale display, check all scale inputs for positive weight values.
Display reads <i>0.000000</i>	Scale not updating. Check for bad option card hanging the bus.
Cannot enter setup mode	Possible bad switch. Test switch; replace interface board if necessary.
Serial port not responding	Possible configuration error. For command input, ensure port INPUT parameter is set to CMD.
A/D scale out of range	Check source scale for proper mechanical operation. Check load cell and cable connection. Possible bad load cell: check indicator operation with load cell simulator.
Locked — Scale in use	Scale is assigned as an input to a total scale or is the source for a serial scale, analog output, or setpoint. If not correct, deconfigure this scale assignment and reconfigure as required.
Serial scale out of range	Check source scale for proper mechanical operation. Check cable connection. Possible format mismatch between serial scale and <i>820i</i> : Check SFMT specification under SERIAL menu.
Option x Error	Field bus card (Profibus, DeviceNet, or Remote I/O) in slot x failed to initialize.
Option card failure	Possible defective card or slot.
Option card hardware diagnostic error	Required option card not found. See Section 10.1.1 on page 90.

Table 10-1. Basic Troubleshooting



Note *Always save copies of the indicator configuration, calibration, Revolution® and iRite-IDE files on a local PC so that these are available when a software reload or upgrade is required.*

10.1.1 Option Card Diagnostic Errors

Option cards are detected by the 820i at power-up. If the current indicator configuration requires an option card but that card is not detected at power-up, an error similar to the following is displayed:

HARDWARE CRITICAL TO PROPER OPERATION
WITH CURRENT CONFIGURATION
CANNOT BE FOUND

INSTALL HARDWARE OR RECONFIGURE

To recover from this error you can do the following:

- If the option is required, ensure that the card is properly seated in its slot and cycle the power. If the card is still not recognized, replace the card.
- Enter setup mode and reconfigure to eliminate the requirement for the option.
- Go to the VERSION menu and use the **Reset Config** softkey (or RESETCONFIGURATION command) to perform a configuration reset. Configuration reset returns all configuration values to their factory defaults.

See Section 10.1.2 below, for information about using the HARDWARE serial command to verify that installed cards are recognized.

10.1.2 Using the HARDWARE Command

The HARDWARE serial command can be issued to verify that all installed cards are recognized by the system. The HARDWARE command returns a string of card type codes. The first digit represents the single- or dual-A/D of the 820i; the second digit represents the card, if any, installed in the expansion slot:

HARDWARE=3,4

10.1.3 User Program Diagnostic Errors

Faulty user programs can cause critical errors that are detected by the 820i at power-up. The following error message is caused by a user program attempting to divide by zero:

A CRITICAL USER PROGRAM ERROR
HAS BEEN DETECTED

DIVIDE BY ZERO

SYSTEM RESET IS REQUIRED

To recover from this error you can do the following:

- Cycle the indicator power to reset the user program.
- Correct the *iRite-IDE* program to eliminate the divide by zero operation. Recompile the program, then download the corrected program to the indicator.

If technical assistance is required, contact RLWS technical support.

Diagnostic Boot Procedure

If a user program causes an error in the start-up handler, press and hold the setup switch while cycling power to the 820i to place the indicator in setup mode. Use *Revolution* monitor mode to send the PCLR command erase clear the user program.

Table 10-2 lists the card codes returned by the HARDWARE command.

Code	Card Type
0	No card installed
1	Dual-Channel Serial Expansion Card
2	Dual-Channel A/D Card
3	Single-Channel A/D Card
4	Analog Output Card
5	24-Channel Digital I/O Expansion Card
6	Pulse Input Card
7	1 MB Memory Expansion Card
9	DeviceNet Card
10	Profibus Card
11	EtherNet/IP Card
12	Remote I/O Card
14	Custom Card
15	Analog Input Card



Note Code 1 is returned only by the EtherNet/IP card. The standard 10M/100Mbps Ethernet card does not return a card type code. The standard Ethernet card returns a value of 0 on the HARDWARE command.

Table 10-2. HARDWARE Command Option Card Codes

If an installed card is not recognized (HARDWARE command returns a code of 0 for that slot), ensure that the card is seated properly. Reinstall the card, if necessary, then cycle the indicator power to read the configuration again.

If the error is still not cleared, perform the following diagnostic boot procedure.

1. Disconnect power to the 820i.
2. Connect the serial port of a PC with *Revolution* installed to port 2 of the 820i.
3. Open the indicator enclosure and place a jumper across the boot mode pins (see Figure 2-3 on page 9).
4. Power up the 820i. The indicator will stall at the diagnostic monitor.
5. Start *Revolution* and enter monitor mode, then type BOOT.
6. Use the indicator setup switch to enter setup mode.
7. Remove the jumper from SW1.
8. From monitor mode, enter the RESETCONFIGURATION command.

Determine the cause of the startup handler error, make program corrections, then reload the corrected user program and test.

10.1.4 Using the XE Serial Command

The XE serial command can be used to remotely query the 820i for the error conditions shown on the front panel. The XE command returns a decimal number representing any existing error conditions. For multi-scale applications, the value returned by the XE command represents all error conditions, if any, present on all configured scales.

If more than one error condition exists, the number returned is the sum of the values representing the error conditions (see Table 10-3 on page 91). For example, if both a tare error (TAREERR, 65536) and a truck database checksum error (ETRUCKERR, 8192) have occurred, the XE command returns the value 73728, representing the sum of those two error conditions.

Error Code	Value	Description
VIRGERR	1	Virgin error
PARMCHKERR	2	Configuration checksum error
LOADCHKERR	4	Calibration checksum error
PRINTCHKERR	8	Print format checksum error
ENVRAMERR	16	General NVRAM error
ENVCRC1ERR	32	Setpoint NVRAM data error
ENVCRC2ERR	64	
ENVCRC3ERR	128	
ENVCRC4ERR	256	
ENVCRC5ERR	512	
ENVCRC6ERR	1024	
ENVCRC7ERR	2056	
ENVCRC8ERR	4096	
ETRUCKERR	8192	
GRAVERR	16384	Gravity calibration error
ADPHYSICALERR	32768	A/D physical error
TAREERR	65536	Tare checksum error
STRINGERR	262144	String program error
POWER_FAIL	524288	Power failure
RTCERR	1048576	Real time clock error

Table 10-3. Error Codes Returned on XE Command

10.2 Regulatory Mode Functions

The function of the front panel **TARE** and **ZERO** keys depends on the value specified for the REGULAT parameter on the FEATURE menu. Table 10-4 describes the function of these keys for the NTEP, CANADA, OIML, and NONE regulatory modes. **TARE** and **ZERO** key functions are configurable when the REGULAT mode is set to INDUST (see Table 10-5 on page 92).

REGULAT Parameter Value	Weight on Scale	Tare in System	Front Panel Key Function	
			TARE	ZERO
NTEP	zero or negative	no	<i>no action</i>	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	TARE	
CANADA	zero or negative	no	<i>no action</i>	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	<i>no action</i>	
OIML	zero or negative	no	<i>no action</i>	ZERO
		yes	CLEAR TARE	ZERO and CLEAR TARE
	positive	no	TARE	ZERO
		yes	TARE	ZERO and CLEAR TARE if weight is within ZRANGE. <i>No action</i> if weight is outside of ZRANGE
NONE	zero or negative	no	TARE	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	CLEAR TARE	

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

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

REGULAT / INDUST Parameter		REGULAT Mode				
Parameter Name	Text Prompt	INDUST	NTEP	CANADA	OIML	NONE
SNPSHOT	Display or Scale weight source	DISPLAY	DISPLAY	DISPLAY	DISPLAY	SCALE
HTARE	Allow tare in display hold	NO	NO	NO	NO	YES
ZTARE	Remove tare on ZERO	NO	NO	NO	YES	NO
KTARE	Always allow keyed tare	YES	YES	NO	YES	YES
MTARE	Multiple tare action	REPLACE	REPLACE	NOTHING	REPLACE	REMOVE
NTARE	Allow negative tare	NO	NO	NO	NO	YES
CTARE	Allow CLEAR key to clear tare/accumulator	YES	YES	NO	NO	YES
CHILDZT	Clear child scales individually	NO	NO	NO	NO	NO
NEGTOTAL	Allow total scale to display negative value	NO	NO	NO	NO	NO
PRTMOT	Allow print while in motion	NO	NO	NO	NO	YES
PRTPT	Add PT to keyed tare print	NO	NO	YES	YES	NO
PRTHLD	Print during display hold	NO	NO	NO	NO	YES
HLDWGH	Allow weigh during display hold	NO	NO	NO	NO	YES
MOTWGH	Allow weighment in motion	NO	NO	NO	NO	NO

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

10.3 Serial Scale Interface

Serial ports 3, 4 and any expansion ports can be configured for serial scale input. The serial scale function allows other scale indicators to send gross, net, or tare weight data to the 820i. Once a serial port has been configured to accept scale data, the data format can be customized to match the data stream sent by that indicator.

To configure a serial scale, do the following:

1. Under the SERIAL menu, set the INPUT parameter for the selected port to SCALE (legal-for-trade serial scale) or INDUST (industrial serial scale).
2. Return to the SCALES menu. Under CONFIG, drop down and select the serial port. If the serial scale is not shown, press the **Change Type** softkey to select available serial scales, then use the navigational keys to select the serial scale. Press **Add** to move the scale to the righthand column, the press **Done**.
3. Under the SERIAL menu, return to the selected port and set the format under the SFMT parameter to match the format sent by the serial scale.

The default serial scale format is:

```
<2><P><W7.><U><M><S><CR><LF>
```

where:

- <2> STX character
- <P> Polarity
- <W7.> Seven characters of net data with decimal point
- <M> Mode
- <U> Units
- <S> Status
- <CR> Carriage return
- <LF> Line feed



Note Industrial serial scales (INDUST) do not require the <M>, <U>, and <S> identifiers. However, the units and number of decimal places must be specified. Units can be selected from the FORMAT menu; decimal places should be indicated on the w-spec identifier. For example, a seven-digit weight requiring two decimal places should be specified as <W7.2> rather than <W7.>.

See Section 10.5 for more information about stream formatting and format identifiers.

10.4 Local/Remote Operation

For truck scale and similar applications, local/remote support provides function equivalent to that of a legal-for-trade remote display with keypad. Scale data from the local indicator is also displayed at the remote unit, and keypad input from the remote allows transactions to be initiated from either the local or remote unit.

To configure for local/remote operation, first set up the local scale (including softkey assignments, truck mode, and database information, as required). Use the SERIAL menu, serial commands, or *Revolution* to set the Local Unit serial parameters shown in Table 10-6. Configure the remote indicator using the serial parameters listed for the Remote Unit.

Serial Configuration Parameter	Parameter Value	
	Local Unit	Remote Unit
EDP.INPUT# <i>p</i>	CMD	DISPLAY
EDP.STREAM# <i>p</i>	DISPLAY	KEYPAD
EDP.BAUD# <i>p</i>	115200 preferred; local and remote values must match	
EDP.ECHO# <i>p</i>	OFF	OFF
EDP.RESPONSE# <i>p</i>	ON	ON
<i>In the listed serial commands, p represents the serial port number.</i>		

Table 10-6. Local/Remote Configuration Parameters

10.5 Custom Stream Formatting

Each port can be independently configured to stream a default frame format or can be customized to stream a user-defined format. Custom formatting is very similar to the standard print formatting described in Section 6.0.

Table 10-7 on page 94 lists the format identifiers used to configure a custom stream format.

Format Identifier	Defined By	Description
<P[G N T]>	STR.POS#n STR.NEG#n	Polarity. Specifies positive or negative polarity for the current or specified (Gross/Net/Tare) weight on the source scale. Possible values are SPACE, NONE, + (for STR.POS#n), or - (for STR.NEG#n)
<U[P S T]>	STR.PRI#n STR.SEC#n STR.TER#n	Units. Specifies primary, secondary, or tertiary units for the current or specified weight on the source scale.
<M[G N T]>	STR.GROSS#n STR.NET#n STR.TARE#n	Mode. Specifies gross, net, or tare weight for the current or specified weight on the source scale.
<S>	STR.MOTION#n STR.RANGE#n STR.OK#n STR.INVALID#n	Status for the source scale. Default values and meanings for each status: STR.MOTION#n M In motion STR.RANGE#n O Out of range STR.OK#n <space> OK STR.INVALID#n I Invalid
<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
B5	Dynamic	=1 if standstill
B6	Dynamic	=1 if gross 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 MODE=TARE =11 (not used)
B12	Dynamic	=00 if UNITS=PRIMARY =01 if UNITS=SECONDARY =10 if UNITS=TERTIARY =11 (not 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

Table 10-7. Custom Stream Format Identifiers

Format Identifier	Defined By	Description
B16	Configuration	=00 (<i>not used</i>) =01 if tertiary DSPDIV=1 =10 if tertiary DSPDIV=2 =11 if tertiary DSPDIV=5
B17	Configuration	=000 if current DECPNT=8888800 =001 if current DECPNT=8888880 =010 if current DECPNT=8888888 =011 if current DECPNT=888888.8 =100 if current DECPNT=88888.88 =101 if current DECPNT=8888.888 =110 if current DECPNT=888.8888 =111 if current DECPNT=88.88888
B18	Configuration	=000 if primary DECPNT=8888800 =001 if primary DECPNT=8888880 =010 if primary DECPNT=8888888 =011 if primary DECPNT=888888.8 =100 if primary DECPNT=88888.88 =101 if primary DECPNT=8888.888 =110 if primary DECPNT=888.8888 =111 if primary DECPNT=88.88888
B19	Configuration	=000 if secondary DECPNT=8888800 =001 if secondary DECPNT=8888880 =010 if secondary DECPNT=8888888 =011 if secondary DECPNT=888888.8 =100 if secondary DECPNT=88888.88 =101 if secondary DECPNT=8888.888 =110 if secondary DECPNT=888.8888 =111 if secondary DECPNT=88.88888
B20	Configuration	=000 if tertiary DECPNT=8888800 =001 if tertiary DECPNT=8888880 =010 if tertiary DECPNT=8888888 =011 if tertiary DECPNT=888888.8 =100 if tertiary DECPNT=88888.88 =101 if tertiary DECPNT=8888.888 =110 if tertiary DECPNT=888.8888 =111 if tertiary DECPNT=88.88888
<wspec [-] [0] digit[.][digit]>	Scale weight	Weight for the source scale. <i>wspec</i> is defined as follows: <i>wspec</i> 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. <i>digit[.][digit]</i> The first digit indicates the field width in characters. Decimal point only indicates floating decimal; decimal point with following digit indicates fixed decimal with <i>n</i> 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
<LF>	—	Line feed

Table 10-7. Custom Stream Format Identifiers

10.6 Data Formats

Continuous Output Serial Data Format

If continuous transmission is configured for a serial port (STREAM parameter set to LFT or INDUST on the SERIAL menu), the 820i sends data using the Consolidated Controls serial data format shown in Figure 10-1:

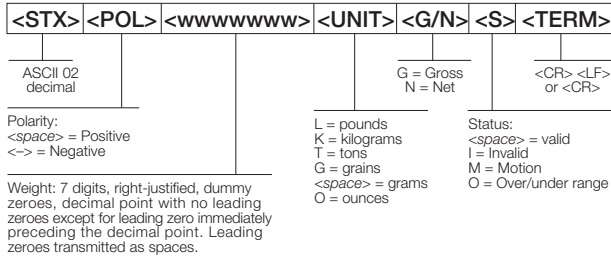


Figure 10-1. Continuous Output Serial Data Format

Demand Output Serial Data Format

When demand mode is configured for the serial port (STREAM parameter set to OFF), the 820i uses a data string formatted for a basic ticket printout. The particular ticket format printed depends on the indicator configuration.

You can customize the ticket to work with a wide variety of printers, scoreboard displays, and other remote equipment. See Section 6.0 on page 54 for more information on custom print formats.

RS-485 Data Formats

Two-wire RS-485 communications is available on port 4 of the CPU board; four-wire RS-485 communications is supported on the "A" ports of any installed serial expansion cards.

The 820i has a built-in RS-485 software protocol which is enabled when you assign a non-zero address to the indicator. Valid RS-485 addresses must be in the range 1–255; the address is specified on the ADDRESS parameter on the SERIAL menu.

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

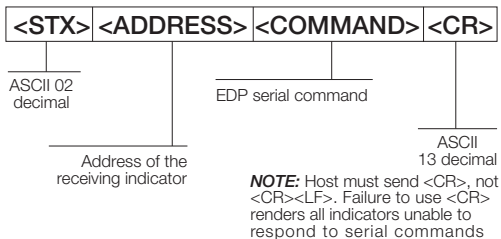


Figure 10-2. RS-485 Send Data Format

If the initiating device address matches the port address of an 820i on the RS-485 network, that indicator responds. For example, with demand outputs, or in response to a KPRINT command, the responding indicator uses the format shown in Figure 10-3:

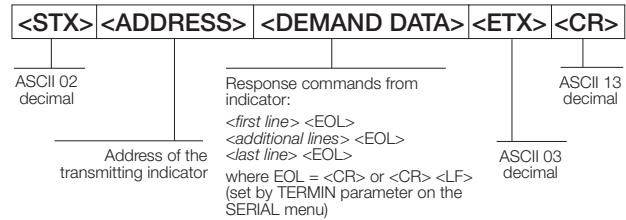


Figure 10-3. RS-485 Respond Data Format

Example: To send the KPRINT 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.
- 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 KPRINT command to the indicator at address 65, enter the following at the terminal: CONTROL-B, A, K, P, R, I, N, T, **ENTER**.

The indicator responds with the format shown in Figure 10-3:

```
<STX> A SCALE #1 <EOL>
      GROSS 1699 LB<EOL>
      08/20/1998 10:05 AM<EOL>
<ETX> <CR>
```

If continuous transmission is configured for the serial port, the 820i sends data using the data format shown in Figure 10-4:

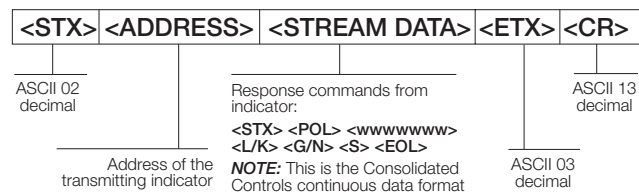


Figure 10-4. RS-485 Continuous Data Format

10.7 Digital Filtering

Standard digital filtering uses mathematical averaging to eliminate the variant digital readings that the A/D converter sends periodically because of external vibration. Digital filtering does not affect the indicator measurement rate, but does affect the settling time. The selections from 1 to 256 reflect the number of readings averaged per update period. When a reading is encountered that is outside a predetermined band, the averaging is overridden, and the display jumps directly to the new value.

DIGFLT_x Parameters

The first three digital filtering parameters, DIGFLT1, DIGFLT2, and DIGFLT3, are configurable filter stages that control the effect of a single A/D reading on the displayed weight. The value assigned to each parameter sets the number of readings received from the preceding filter stage before averaging.

A rolling average is passed to successive filters for an overall filtering effect that is effectively a weighted average of the product of the values assigned to the filter stages ($DIGFLT1 \times DIGFLT2 \times DIGFLT3$) within a time frame corresponding to the sum of the values ($DIGFLT1 + DIGFLT2 + DIGFLT3$).

Setting the filters to 1 effectively disables digital filtering.

RATTLETRAP® Filtering

RATTLETRAP digital filtering (RATTRAP parameter set ON) uses a vibration-dampening algorithm to provide a combination of the best features of analog and digital filtering. The RATTLETRAP algorithm evaluates the frequency of a repeating vibration then derives a composite displayed weight equal to the actual weight on the scale less the vibration-induced flaws. It is particularly effective for eliminating vibration effects or mechanical interference from nearby machinery. Using RATTLETRAP filtering can eliminate much more mechanical vibration than standard digital filtering, but will usually increase settling time over standard digital filtering.

DFSENS and DFTHR Parameters

The digital filter can be used by itself to eliminate vibration effects, but heavy filtering also increases settling time. The DFSENS (digital filter sensitivity) and DFTHR (digital filter threshold) parameters can be used to temporarily override filter averaging and improve settling time:

- DFSENS specifies the number of consecutive scale readings that must fall outside the filter threshold (DFTHR) before digital filtering is suspended.
- DFTHR sets a threshold value, in display divisions. When a specified number of consecutive scale readings (DFSENS) fall outside of this threshold, digital filtering is suspended. Set DFTHR to NONE to turn off the filter override.

Setting the Digital Filter Parameters

Fine-tuning the digital filter parameters greatly improves indicator performance in heavy-vibration environments. Use the following procedure to determine vibration effects on the scale and optimize the digital filtering configuration.

1. In setup mode, set the digital filter parameters (DIGFLT1–DIGFLT3) to 1. Set DFTHR to NONE. Return indicator to normal mode.
2. Remove all weight from the scale, then watch the indicator display to determine the magnitude of vibration effects on the scale. Record the weight below which all but a few readings fall. This value is used to calculate the DFTHR parameter value in Step 4.

For example, if a heavy-capacity scale (10000 x 5 lb) produces vibration-related readings of up to 50 lb, with occasional spikes to 75 lb, record 50 lb as the threshold weight value.

3. Place the indicator in setup mode and set the DIGFLT_x parameters to eliminate the vibration effects on the scale. (Leave DFTHR set to NONE.) Find the lowest effective value for the DIGFLT_x parameters.
4. Calculate the DFTHR parameter value by converting the weight value recorded in Step 2 to display divisions:

$$\text{threshold_weight_value} / \text{display_divisions}$$

In the example in Step 2, with a threshold weight value of 50 lb and a display divisions value of 5 lb: $50 / 5 = 10$. DFTHR should be set to 10D for this example.

5. Finally, set the DFSENS parameter high enough to ignore transient peaks. Longer transients (typically caused by lower vibration frequencies) will cause more consecutive out-of-band readings, so DFSENS should be set higher to counter low frequency transients.

Reconfigure as necessary to find the lowest effective value for the DFSENS parameter.

10.8 Conversion Factors for Secondary Units

The 820i has the capability to mathematically convert a weight into many different types of units and instantly display those results with a press of the **UNITS** key.

Secondary and tertiary units can be specified on the FORMAT menu using the SECNDR and TERTIA parameters, or by using serial commands.

- To configure secondary or tertiary units using the front panel menus, use the Table 10-8 to find the conversion multiplier for the MULT parameter. For example, if the primary unit is pounds and the secondary unit is short tons, set the MULT parameter to 0.000500.
- To configure secondary or tertiary units using serial commands, use the Table 10-8 to find the conversion multiplier for the SC.SEC.MULT or SC.TER.MULT command. For example, if the primary unit is pounds and the secondary unit is short tons, send the serial command SC.SEC.MULT= 0.0005<CR> to set the multiplier for the secondary units.



Note Ensure that the secondary decimal point position is set appropriately for the scale capacity in the secondary units. If the converted value requires more digits than are available, the indicator displays an overflow message (*OVERFL*).

For example, if the primary units are short tons, secondary units are pounds, and the secondary decimal point is set to 8888.888, the indicator will overflow if 5 tons or more are applied to the scale. With 5 tons applied, and a conversion factor of 2000, the secondary units display needs five digits to the left of the decimal point to display the 10000 lb secondary units value.

Primary Unit	x Multiplier	Secondary/ Tertiary Unit
grains	0.064799	grams
	0.002286	ounces
	0.000143	pounds
	0.000065	kilograms
	0.002083	troy ounces
	0.000174	troy pounds
	ounces	437.500
28.3495		grams
0.06250		pounds
0.02835		kilograms
0.911458		troy ounces
0.075955		troy pounds
pounds	7000.00	grains
	453.592	grams
	16.0000	ounces
	0.453592	kilograms
	14.58333	troy ounces
	1.215278	troy pounds
	0.000500	short tons
	0.000446	long tons
0.000453	metric tons	

Table 10-8. Conversion Factors

Primary Unit	x Multiplier	Secondary/ Tertiary Unit
grams	15.4324	grains
	0.035274	ounces
	0.002205	pounds
	0.001000	kilograms
	0.032151	troy ounces
	0.002679	troy pounds
kilograms	15432.4	grains
	35.2740	ounces
	1000.00	grams
	2.20462	pounds
	32.15075	troy ounces
	2.679229	troy pounds
	0.001102	short tons
	0.000984	long tons
	0.001000	metric tons
short tons	2000.00	pounds
	907.185	kilograms
	0.892857	long tons
	0.907185	metric tons
metric tons	2204.62	pounds
	1000.00	kilograms
	1.10231	short tons
	0.984207	long tons

Table 10-8. Conversion Factors (Continued)

Primary Unit	x Multiplier	Secondary/ Tertiary Unit
long tons	2240.00	pounds
	1016.05	kilograms
	1.12000	short tons
	1.01605	metric tons
troy ounces	480	grains
	31.10348	grams
	0.031103	kilograms
	1.09714	ounces
	0.068571	pounds
	0.083333	troy pounds
troy pounds	5760	grains
	373.2417	grams
	0.373242	kilograms
	13.16571	ounces
	0.822857	pounds
	12	troy ounces

Table 10-8. Conversion Factors (Continued)

10.9 PS/2 Keyboard Interface

Serial port 1 (connector J9) on the 820i CPU board provides a PS/2-type keyboard interface (Scan Code Set 1 only) for use with a remote keyboard. Table 10-9 shows the pin assignments for a PS/2 keyboard cable.

Pin	Signal	Male Connector
1	DATA	
2	(reserved)	
3	GND	
4	+5V	
5	CLOCK	
6	(reserved)	

Table 10-9. PS/2 Keyboard Connector Pin Assignments

Table 10-10 summarizes the 820i-specific functions provided by the keyboard interface; most other alphanumeric and navigational keys provide functions equivalent to those typical for PC operation. Menu parameters and serial commands that affect indicator keypad operation (including the KBDLCK, ZERONLY, and KLOCK serial commands) also affect the remote keyboard.



Note *The keyboard interface is not hot-pluggable. Disconnect power to the 820i before connecting the keyboard cable to the Port 1 connector.*

Key	Function
F1	Softkey 1
F2	Softkey 2
F3	Softkey 3
F4	Softkey 4
F5	Softkey 5
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	Not used
F12	
Print Screen	Same as PRINT key, in both normal and setup modes

Table 10-10. PS/2 Keyboard Functions

10.10 Audit Trail Support

Audit trail support provides tracking information for configuration and calibration events. A separate calibration counter is provided for each scale; a single configuration counter tracks all configuration changes.

To prevent potential misuse, unsaved configuration or calibration changes (those followed by an **Exit**, rather than **Save and Exit**) are counted as change events; restoration of the previous saved configuration or calibration is also counted.

10.10.1 Displaying Audit Trail Information

To display audit trail information, press and hold the **Gross/Net** key for several seconds. Various audit trail information screens can then be accessed by pressing the front panel number keys (**1–5** and **0**). The exact format of each screen depends on the regulatory agency specified for the REGULAT (FEATURE menu) parameter.

The initial screen shown when entering the audit trail display (or whenever the **1** key is pressed while showing audit trail information) shows the legally relevant (LR) version number (software version for the code that provides audit trail information), a calibration count and, if REGULAT=NTEP, a configuration count.

Press **2** to show the configuration count display. This display shows the number of times the system has been configured, the date and time of the last configuration event, and the before and after information for the most recent change of the system date and time.

Press the **Down** key to show the number of weighments, number of configuration events, number of calibrations, and the date and time of the most recent calibration for the first configured scale. Continue pressing the **Down** key to cycle through the information for all configured scales.

Press **3** to show the number and the most recent date and time of power-on events, power-on configuration changes, and user program loads. (Power-on configuration changes are those that restore a previous configuration after reconfiguring or recalibrating then pressing **Exit**, rather than **Save and Exit**.)

Use the **Down** key to show the number of power-on calibration events for all configured scales.

Press **4** to show the number of times the OEM version number has been changed, and the date and time of the most recent change.

Press **5** to show the number of times the configuration has been reset, the date and time of the most recent reset, and the indicator EIN number.

Press **0** to show the indicator and LR software versions.

When done, press the **Gross/Net** key to exit the audit trail displays.

10.10.2 Printing Audit Trail Information

Audit trail information can be printed by pressing the **PRINT** key while displaying the audit trail or by sending the DUMPAUDIT serial command. Audit trail information is sent to the port specified on the AUD.PORT serial command or by the AUDFMT parameter (PFORMAT menu).



Note

Printed audit trail information contains data for all scales, whether configured or not, that can be supported by the indicator. Displayed audit trail information shows data only for currently configured scales.

10.11 Dimension Drawings

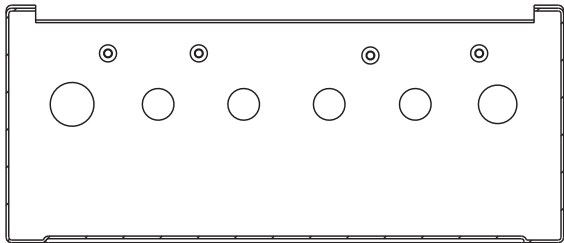
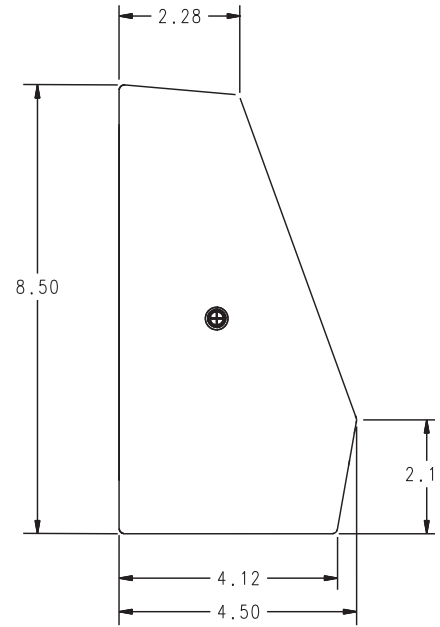
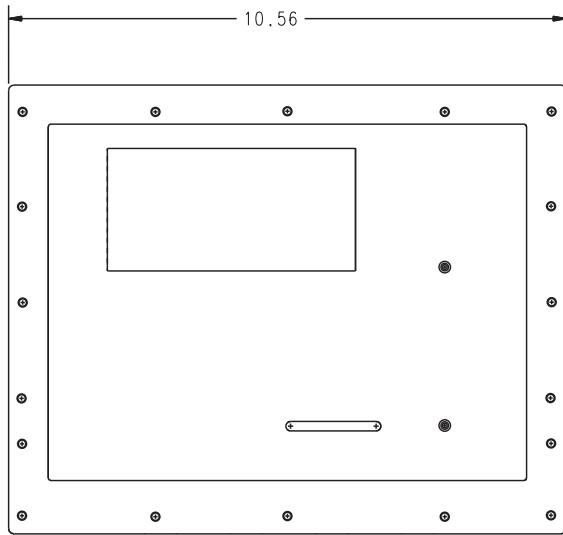


Figure 10-5. Universal Model Dimensions

10.12 Printed Information

System Manuals

- *820i Installation Manual*, PN 93018

Enclosures

- *820i Panel Mount Installation Instructions*, PN 95304

Option Cards (820i/920i)

- *Analog Output Card Installation Instructions*, PN 69089
- *24-Channel Digital I/O Expansion Card Installation Instructions*, PN 69087
- *Dual-Channel Serial Expansion Card Installation Instructions*, PN 69088
- *Pulse Input Card Installation Instructions*, PN 69086
- *Memory Expansion Card Installation Instructions*, PN 69085
- *Analog Input Card with Thermocouple Input Installation Instructions*, PN 88110

Communications Options (520/820i/920i)

- *DeviceNet™ Interface Installation and Programming Manual*, PN 69949
- *Profibus® DP Interface Installation and Programming Manual*, PN 69948
- *Allen-Bradley® Remote I/O Interface Installation and Programming Manual*, PN 69950
- *Ethernet Communications Card Installation Instructions*, PN 72117
- *EtherNet/IP Communications Card Installation Instructions*, PN 88537
- *USB Interface Card Installation Instructions*, PN 95490

iQUBE Digital Diagnostic Junction Box

- *iQUBE Installation Manual*, PN 77224

White Papers

- *Using Ferrite Cores to Suppress Electromagnetic Interference - For Digital Weight Indicators*, PN 117085

10.13 Specifications

Power

Line Voltages	115 or 230 VAC
Frequency	50 or 60 Hz
Power Consumption	25 watts maximum

A/D Specifications

Excitation Voltage	10 ± 0.5 VDC, 16 x 350Ω or 32 x 700Ω load cells per A/D card
Sense Amplifier	Differential amplifier with 4- and 6-wire sensing
Analog Signal Input Range	-6 mV to +40 mV
Analog Signal Sensitivity	0.3 μV/grad minimum @ 7.5 Hz 1.0 μV/grad typical @ 120 Hz 4.0 μV/grad typical @ 960 Hz
A/D Sample Rate	7.5–960 Hz, software selectable
Input Impedance	>35 MΩ typical
Internal Resolution	8 000 000 counts
Wt Display Resolution	9,999,999
Input Sensitivity	10 nV per internal count
System Linearity	±0.01% of full scale
Zero Stability	±150 nV/°C, maximum
Span Stability	± 3.5 ppm/°C, maximum
Input Voltage Differential	±800 mV referenced to earth ground
Input Overload	Load cell signal lines ±10 V continuous, ESD protected
RFI/EMI Protection	Communications, signal, excitation, and sense lines protected

Digital Specifications

Microcomputer	Motorola ColdFire® MCF5307 main processor @ 90 MHz
Digital I/O	8 I/O channels on CPU board; optional 24-channel I/O expansion card available
Digital Filter	Software selectable: 1–256, enhanced Rattletrap® hybrid digital filtering

Serial Communications

Serial Ports	Ports on CPU board support up to 115200 bps; optional dual-channel serial expansion card available
Port 2	Full duplex RS-232 with CTS/RTS
Port 4	Full duplex RS-232; 2-wire RS-485, 20mA

Operator Interface

Display	320x156 pixel VGA LCD display module with adjustable contrast, 75Hz scan rate
Keyboard	28-key membrane panel, PS/2 port for external keyboard connection


Environmental


Operating Temperature	
Legal	-10 to +40°C (14 to 104°F)
Industrial	-10 to +40°C (14 to 104°F)
Storage Temperature	-10 to +70°C (14 to 158°F)
Humidity	0–95% relative humidity


Enclosure


Enclosure Dimensions	
Universal enclosure (without tilt stand)	10.56 in x 8.5 in x 4.5 in 268 mm x 216 mm x 114 mm
Panel mount enclosure	11.6 in x 9.2 in x 5.2 in 294 mm x 231 mm x 127 mm
Weight	
Universal enclosure	9.5 lb (4.3 Kg)
Panel mount enclosure	8.5 lb (3.9 Kg)
Rating/Material	NEMA Type 4X/IP66, stainless steel


Certifications and Approvals

	NTEP CoC Number 01-088 Accuracy Class III/IIIL n_{max} : 10 000
---	---

	Measurement Canada Approval AM-5426 Accuracy Class III n_{max} : 10 000
---	---

UL	Universal model
	File Number: E151461

	Panel mount model File Number: E151461, Vol 2
---	--

	OIML GB-1140 n_{max} : 6 000 GB-1135 n_{max} : 10 000
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820i Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF RLWS AND THE BUYER.

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