SCITRONICS
INDUSTRIAL SYSTEMS

Conveyor Belt Scale
Model CS 1000

Product Manual
Version 3.2

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Table of Contents

Section 5 Maintenance and Troubleshooting

Section 6 System Specifications

Section 7 Custom Applications

List of Illustrations

Warranty

SciTronics warrants all products of its manufacture to be free from defects in material and workmanship. This warranty is effective for three years from the date of shipment to the original Purchaser.

Upon notification by the Purchaser, SciTronics will correct any defects in equipment of its manufacture either by repair in our plant or by supply of replacement parts to the Purchaser.

SciTronics must decide to its own satisfaction that the equipment is defective and has not developed malfunctions as a result of misuse, modification, abnormal conditions of operation, or attempted service not authorized by SciTronics.

SciTronics will not accept any product returned for refund or approve any backcharge for labor, materials, or other costs incurred by the Purchaser or others in modification, adjustment, service, or repair of SciTronics equipment unless such return or backcharge has been authorized in writing to the Purchaser.

Any special test or requirement placed upon SciTronics products or products of other manufacture used in SciTronics systems must be mutually agreed upon in writing by SciTronics and the Purchaser prior to the date of shipment.

SciTronics reserves the right to make changes in design or construction of its products at any time without incurring any obligation to make any changes whatsoever on units previously purchased.

This warranty is expressly made by SciTronics and accepted by the Purchaser in lieu of all other warranties, including warranties of merchantability and fitness for a particular purpose, whether written, oral, express, implied, or statutory. SciTronics shall not be liable for normal wear and tear nor for any contingent, incidental, or consequential damage or expense due to partial or complete inoperability of its products for any reason whatsoever. In no event shall SciTronics' liability exceed the original purchase price of the equipment.

WIRELESS SYSTEMS ONLY. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the use will be required to correct the interference at their own expense.

Section 1 Introduction

Using This Manual

This manual contains the installation, operation, and maintenance instructions for your SciTronics Model CS 1000 Belt Scale (belt scale system).

NOTE
The warranty for your belt scale system is on page 6 in this manual. Be sure to read it so you are aware of its provisions and exclusions.

This manual is arranged in the following sections so that you can find the information you need quickly and easily:

- ***Section 1 Introduction***
  describes the organization of this manual and provides a general description of the belt scale system.
- ***Section 2 Installation***
  provides instructions for mechanical and electrical installation of the belt scale system.
- ***Section 3 Programming the Processor***
  describes how to program the digital signal processor for initial setup and any time data needs to be changed.
- ***Section 4 Calibration***
  explains how to perform calibration of the belt scale using the digital signal processor.
- ***Section 5 Maintenance and Troubleshooting***
  provides the necessary information for routinely maintaining the belt scale system.
- ***Section 6 System Specifications***
  lists the specification data for the belt scale system.
- ***Section 7 Custom Applications***
  explains the features unique to your specific belt scale system.

Overview

The SciTronics belt scale system is installed on a conveyor and weighs material in transfer. It is designed for such applications as rock crushing plants, asphalt and concrete products batch plants, ore processing plants, coal preparation plants, recycling plants, paper and wood processing plants, food processing plants, and fertilizer plants.

The belt scale system consists of the following components:

- belt scale assembly with bridge transducer electronics
- speed sensor
- digital signal processor

The rigid steel construction of the belt scale assembly ensures permanent alignment with the conveyor. The precision NTEP-approved strain gauge load cell accurately weighs the material being conveyed. The weight signal from the load cell is converted to a digital computer signal in the bridge transducer and transmitted to the digital signal processor.

The speed sensor outputs the speed signal that is proportional to the velocity of the belt. This signal is converted to a digital computer signal in the bridge transducer and transmitted to the digital signal processor.

The digital signal processor receives the weight and speed signals, performs calculations, and displays values for rate, total weight, and belt speed in selectable standard engineering units (tons, pounds, tonnes, or kilograms). The processor screen display is an LCD, 4-line by 20-character alphanumeric display. Using the screen menus and processor keypad, the operator can easily step through programming of the setup data.

The multiple scale interface network allows connection of up to four scales to each digital signal processor.

Features

The belt scale system has the following features:

- Accurate to ±0.5% (approved installations).
- LCD 4-line, 20-character display.
- Easily programmable setup data.
- Full-time self-diagnostics.
- Real-time clock calendar.
- Multiple scale interface.
- Manufactured to CEMA standards.
- Optional printer or computer interface (plug-in PC board).
- Optional plug-in cards for relay outputs and 4-20 mA outputs.
- Optional speed sensor selection for variable speed belt.

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Section 2 Installation

Overview

This section provides instructions for mechanical and electrical installation of the belt scale system.

Unpacking the Belt Scale System

Unpack the belt scale system by doing the following:

1. Remove the belt scale assembly and speed sensor from the pallet.
2. Place the shipping container containing the digital signal processor on a stable surface and open it, being careful not to damage the contents.
3. Inspect the contents and report any shipping damage or missing parts to the carrier as soon as possible (most carriers will not consider a claim unless notified within 15 days of delivery).

NOTE
The bill of lading for this shipment is an acknowledgment by the carrier of the receipt of the equipment in good condition. SciTronics is not responsible for any loss or damage incurred during shipment. Note any damaged or missing parts on the carrier's delivery receipt. Sign the notation and have the carrier's driver also sign it. The consignee is responsible for initiating claims against the carrier.

Installing the Belt Scale System

WARNING
To prevent bodily injury, be sure that the conveyor is locked out before beginning installation.

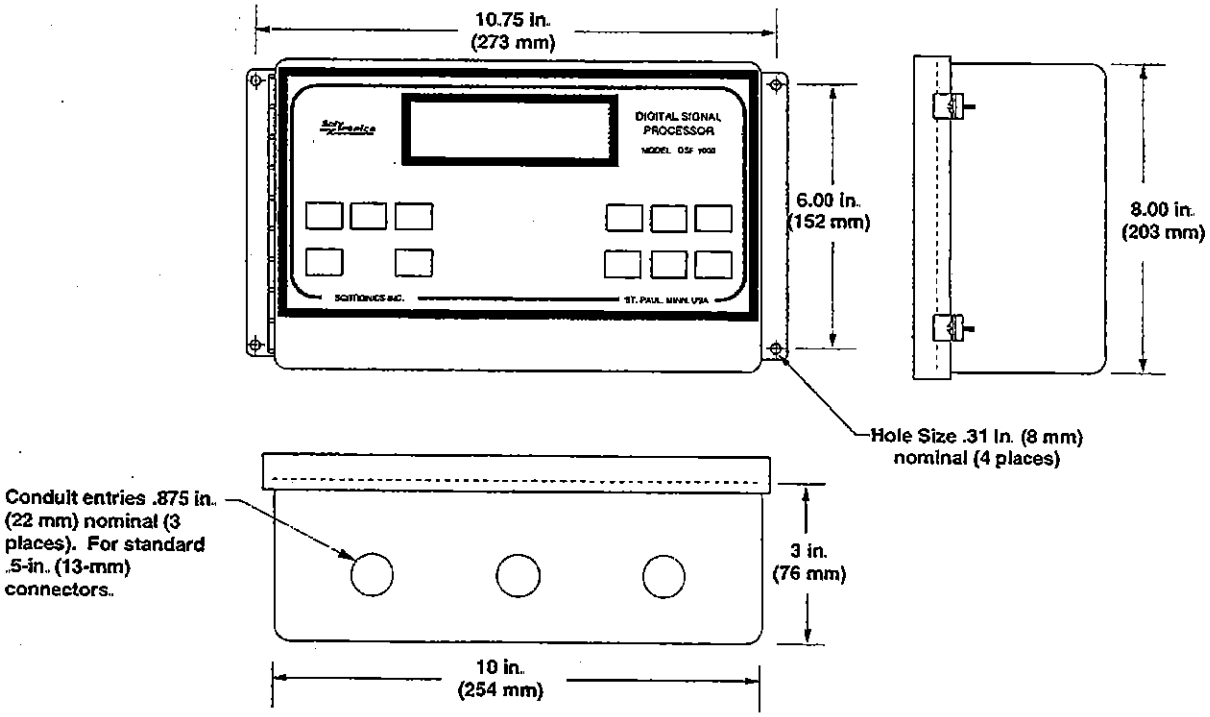
CAUTION

1. Whenever possible, be sure to install the belt scale on the conveyor in a location where it is protected from the weather. Wind can cause weighing errors.
2. Curvature or upturn in the conveyor is serious. Consult the factory before mounting the scale.

Mounting the Processor

1. Select a location close to a 115 V power source that is within 1,000 ft. (304.8 m) of the scale and where the processor will not be exposed to excessive vibration, heat, and moisture. If mounting the processor outside, be sure to place it in a vandalproof/weatherproof enclosure.
2. Secure the processor to a wall or support at a height where the screen display can be easily seen and the keypad is accessible. Be sure there is sufficient clearance to open the enclosure. Refer to Figure 2-1 for dimensional specifications.

Figure 2-1 Digital Signal Processor Dimensional Drawing



Modifying and Mounting the Weigh Idler to the Belt Scale

The weigh idler (the idler to mount to the scale) must be modified to fit the scale mounting pads and then mounted to the scale:

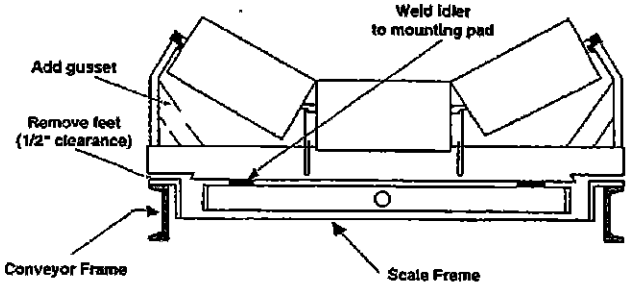
1. Select an idler identical to the idlers that will be in the weighing section of the conveyor. The idler must be in good condition — the rollers must turn freely and have good concentricity.
2. Saw cut or torch cut the existing mounting feet to remove them from the idler.
3. Sometimes it is necessary to remove material from the idler that may weaken the roller support. If so, reinforce the end brackets by welding a "gusset" between the vertical end bracket and the horizontal piece.
4. Place the idler on the new mounting pads, which are bolted to the scale assembly. Center the idler from side to side on the pads. Check for sufficient clearance — approximately 1/2 in. (13 mm) — between the bottom of the idler and the scale frame.
5. Center the idler exactly 18 in. (457 mm) from the rear pivot support (center is hole punched on the rear pivot bolt) and the center of the end idler rollers, typically to the grease fitting. Skip this step for low profile scales.
6. Clamp in place. Check for squareness from corner to corner and check the dimensions.

CAUTION

To prevent damage to the load cell, connect the negative ground clamp to the idler pad as described in step 7 below.

7. Weld the idler to the new mounting pads. Clamp the negative welding cable to the new mounting pad(s) provided with the scale system.

Figure 2-2 Modified Weigh Idler Mounted to Scale



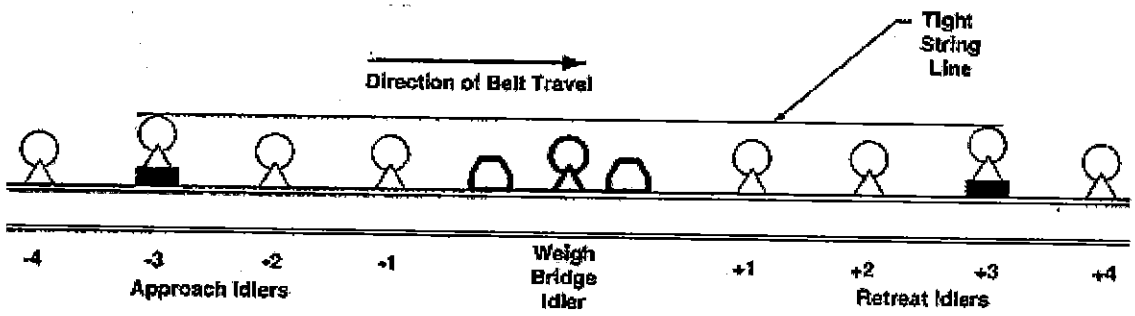
Mounting the Belt Scale Assembly on the Conveyor

Place the belt scale assembly where a minimum of belt stress or deformation may occur (away from the loading area and the head pulley). Referring to Figure 2-3, install the belt scale assembly by doing the following:

1. Raise the belt clear of the idlers in the weigh section.
2. Loosen three idlers on each side of the scale. If your conveyor is very short, reduce the scale section to two idlers on each side. Aligning longer sections can improve performance.

Figure 2-3 Mounting the Belt Scale on the Conveyor

NOTE: Shim +3 and -3 idlers to 1/4 in. (6.35 mm) high.



3. Mark the center of each roller.
4. Place two 1/8-in. (3 mm) shims (a total of 1/4 in. (6.35 mm) under the feet of both the +3 and -3 idlers.
5. Stretch three string lines over the center marks on the +3/-3 idlers. Bolt the idlers down exactly six spaces apart. For example, for a 36-in. (91-cm) weigh span, attach the +3/-3 idlers exactly 18 ft (5.49 m) center to center and square with the conveyor.
6. Shim the belt scale assembly to obtain a 1/32-in. (.8-mm) clearance below the string line.
7. Shim the +1/-1 idlers to 1/32-in. (.8 mm) clearance.

CAUTION
Poor alignment will affect scale accuracy.

8. Shim the remaining idlers according to step 7, aligning all center marks. Bolt the idlers down lightly. Check again after tightening the bolts.
9. When the belt scale and the idlers are securely attached, remove one of the 1/8-in. (3 mm) shims from the +3/-3 idlers and reattach the +3/-3 idlers into position. The entire belt scale section is now flat between the +2/-2 idlers and 1/16 in. (1.6 mm) higher than the+3/-3 idlers.
10. Tack weld 1/4 in. (6 mm) on each idler foot to prevent it from moving out of position. For extra stability and to minimize twisting on portable conveyors, tack weld all idlers.
11. Remove the string lines and lower the belt. Run the conveyor and adjust the tension until the belt runs true in the center of the idlers. Check that all the idlers in the scale area turn freely from the pressure of the empty moving belt.

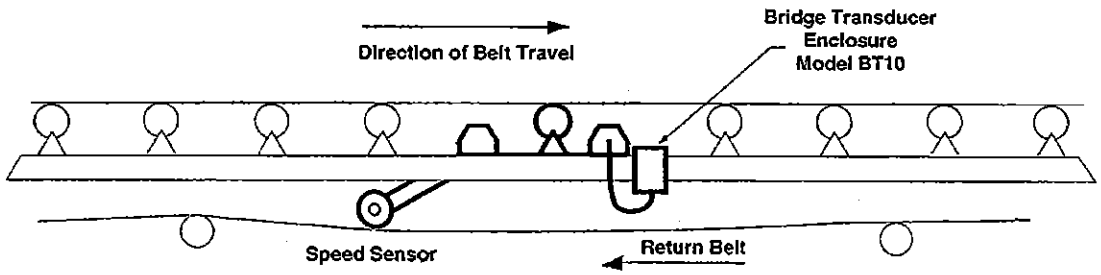
Mounting the Bridge Transducer Circuit Board Enclosure

Mount the bridge transducer circuit board enclosure between the processor and the belt scale so that it is within 4 ft (1.2 m) of the sealtite electrical fitting located at the belt scale assembly.

Installing the Speed Sensor

The belt rider speed sensor is shipped assembled and ready for installation. For convenience, install the speed sensor at the rear of the scale in the mounting holes provided. Route the cable through the center of the speed sensor mounting pipe. Secure the speed sensor assembly to the belt scale using the three cotter pins provided. If possible, avoid placement of the speed sensor tire directly on top of a return roller.

Figure 2-4 Belt Scale System



Removing the Load Cell Shipping Bolt

A1/4-20 bolt is used to prevent damage to the load cell during shipping and installation. This bolt must be removed for proper operation. SciTronics recommends that the shipping bolt be reinstalled before transporting a portable system.

1. Locate the cover panel in the front center of the scale. The shipping bolt is located directly underneath the scale.

WARNING
Be sure that the power is off before wiring the belt scale system.

Wiring the Belt Scale System

Consider the following before making electrical connections:

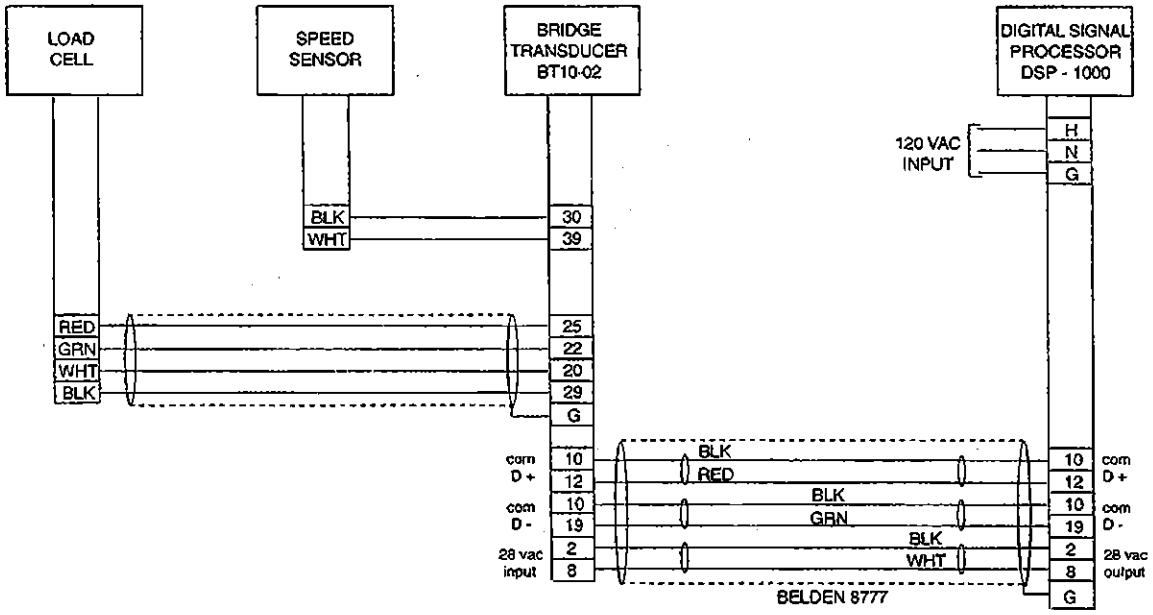
- Do not shorten the load cell cable. The wire length is critical to load cell temperature compensation. Leave the excess cable inside the scale assembly.
- Route the load cell cable in the flexible conduit/connectors provided.
- Do not route the signal cables in the same conduit as the power wires or any large source of electrical noise.
- Connect the shields **only** where shown.
- Check that all wires are tight in their connectors — this is especially important for load cell connections.
- Earth ground all enclosures and conduit.

Referring to the wiring diagram in Figure 2-5, wire the belt scale system:

1. Open the processor enclosure by releasing the two latches on the right side of the enclosure (when facing the front of the enclosure). Refer to Figure 2-1. Supply 120 V power to terminals H, N, and G on the processor circuit board. Using the 25-ft wire (7.6-m) provided by the factory, connect terminals 10, 12, 19, 2, and 8 on the processor circuit board to terminals 10, 12, 19, 2, and 8 on the bridge transducer circuit board. Terminate the shield to G at the processor. Close the processor enclosure and latch the door.

2. Using the 5-ft (1.3-m) flexible conduit provided by the factory, connect the load cell terminals to the bridge transducer circuit board terminals: RED to 25, GRN to 22, WHT to 20, BLK to 29, and the shield to G.
3. Using the 8-ft (2.4-m) cable provided by the factory, connect the speed sensor terminals to the bridge transducer circuit board terminals: BLK to 30 and WHT to 39.

Figure 2-5 Wiring Diagram for the Standard Belt Scale System



BT10 DIP SWITCH SETTINGS

BELT SCALE ADDRESS				
	(A)	(B)	(C)	(D)
SW1	OFF	ON	OFF	ON
SW2	OFF	OFF	ON	ON

ANGLE COMPENSATION		
SW3	ON	OFF
BELT SPEED SIMULATION		
SW4	ON	OFF
METRIC UNITS		
SW5	ON	OFF
SW6 SW7 SW8	FACTORY USE ONLY	

Figure 2-6 Wiring Diagram for the Belt Scale System with the Optional DR4200 Chart Recorder

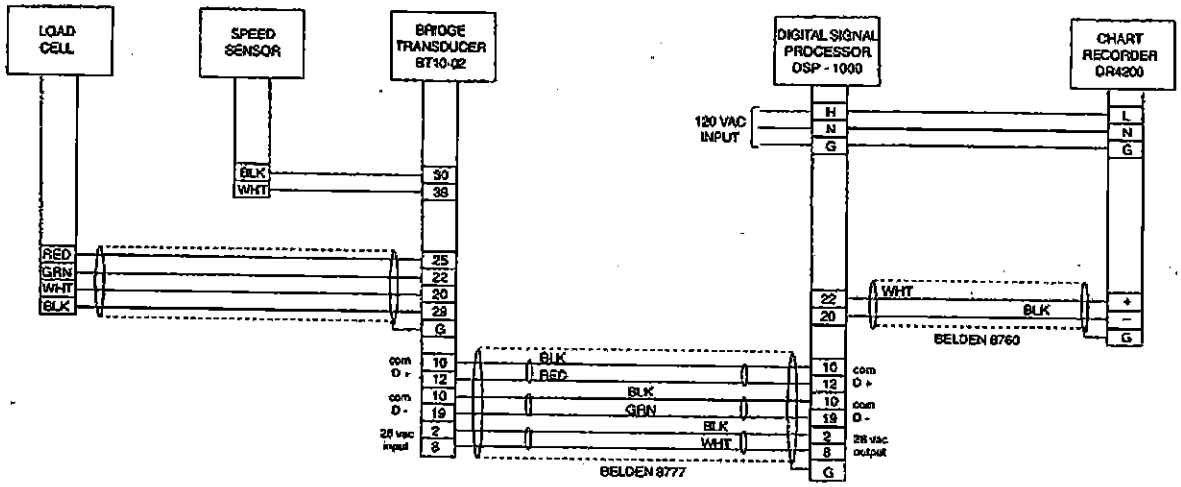


Figure 2-7 Wiring Diagram for the Multi-Belt Scale System

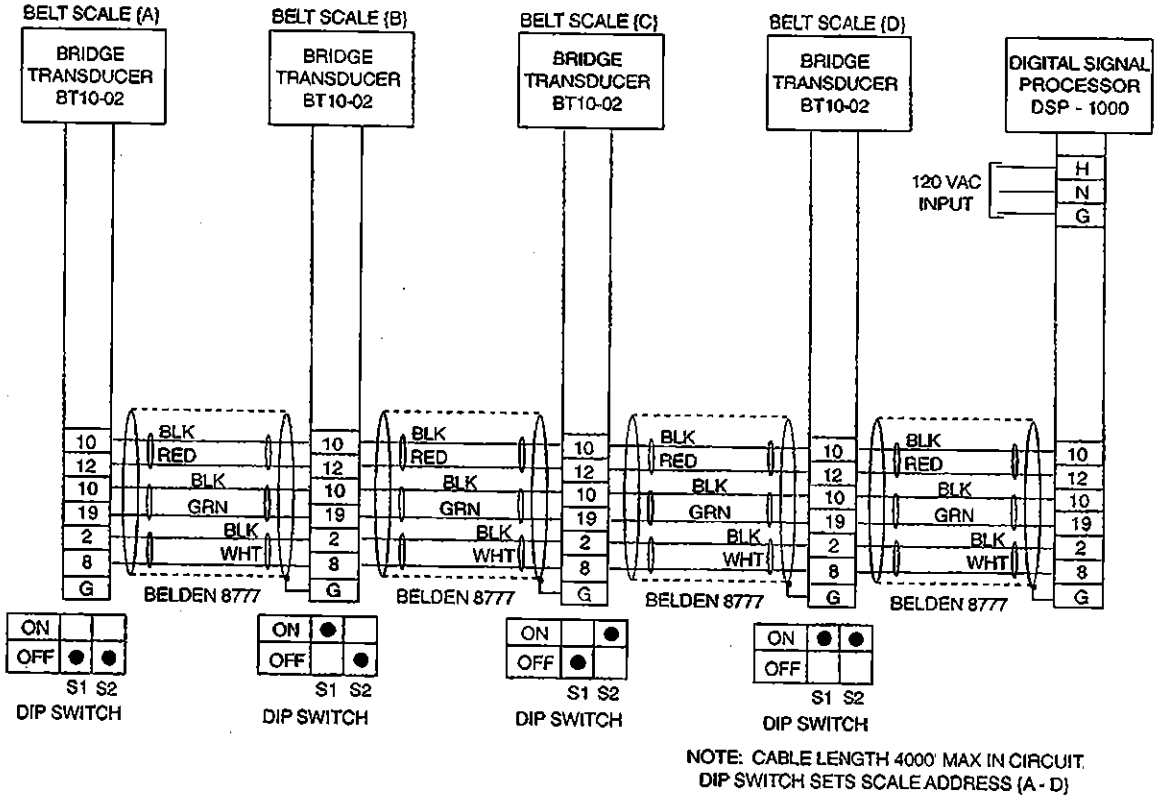


Figure 2-8 Wiring Diagram for Option Card Outputs

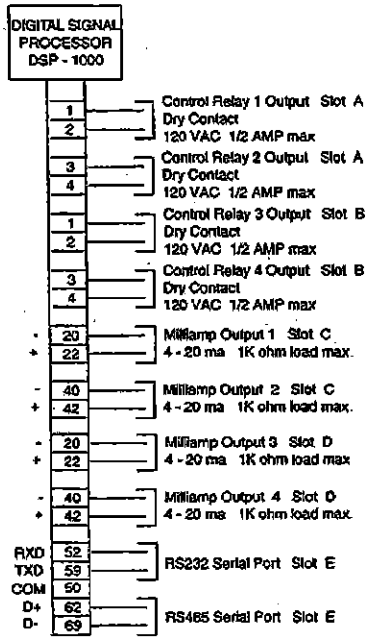
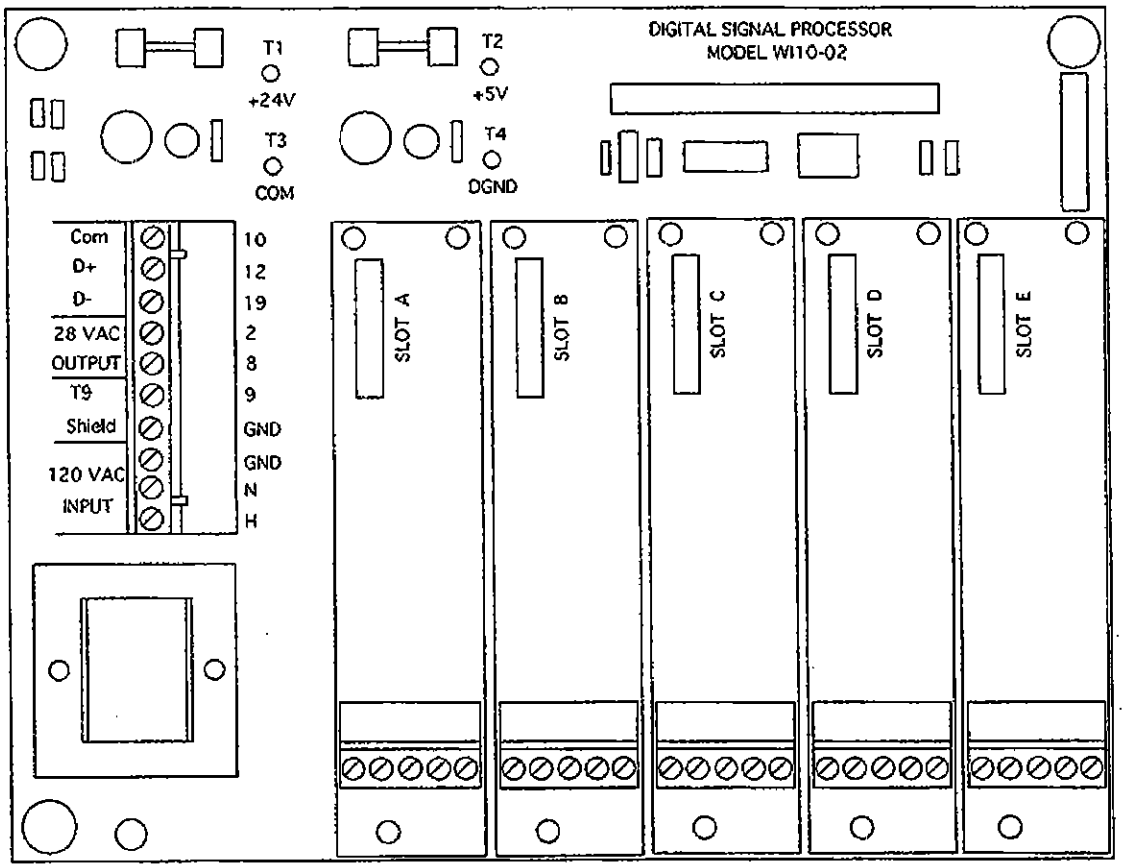


Figure 2-9 Digital Signal Processor
Lower PCB Model: WI10-02



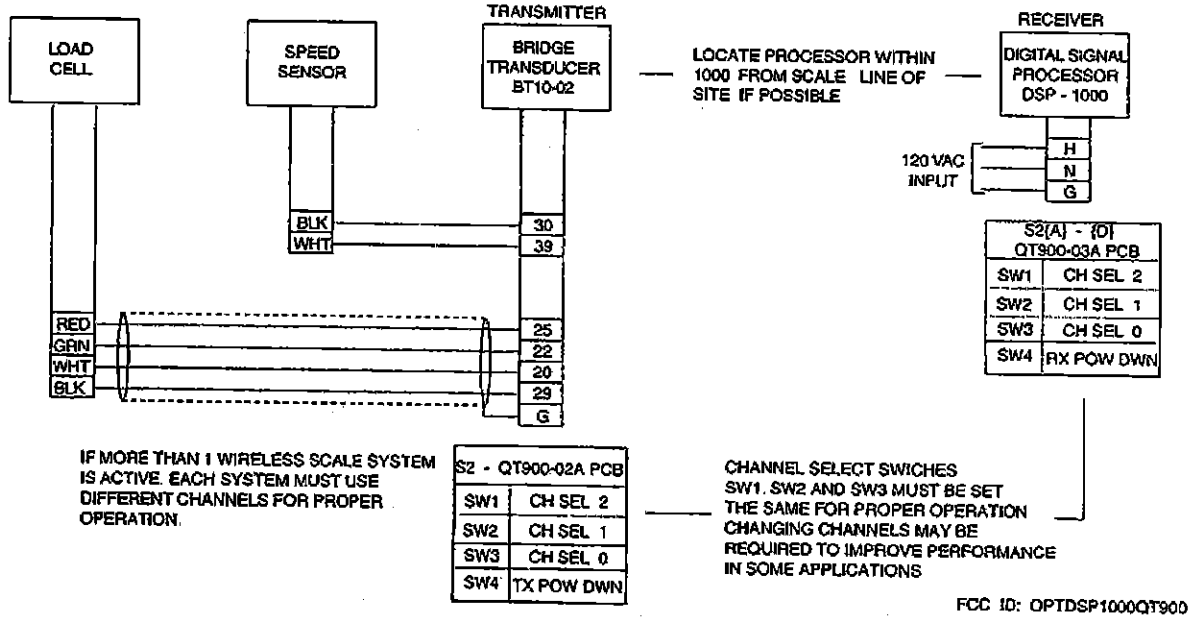
Wireless Interface QT900 (optional)

Sci-Tronics offers a wireless communication interface between the belt scale and the DSP1000 Digital Signal Processor. This option is ideal for portable plants that require the processor to be located in a control tower or other remote locations, which eliminates running power and signal cable to the scale at every new job site. Other applications may have difficult or impossible cable runs.

The transmission length is limited to 1000 feet (304.8 m), line of site. At closer ranges, line of site should not be necessary. When mounting the BT10-02 transmitter, locate it within 4 feet (1.2 m) from the scale on the side of the conveyor that will normally be facing the DSP1000 Processor. Increasing the height of the transmitter increases transmission quality. When mounting the QT900-03A receiver, it may be required to place it near a window or an outdoor location, depending on transmission distance and the type of building or trailer in which it is mounted. Increasing the height of the receiver increases reception quality.

Be sure that the transmitter and receiver are set to the same channel. If more than one wireless system is active, they must use different channels. Switching channels may also increase signal strength.

Figure 2-10 Wireless Belt Scale System



Section 3 Programming the Processor

Overview

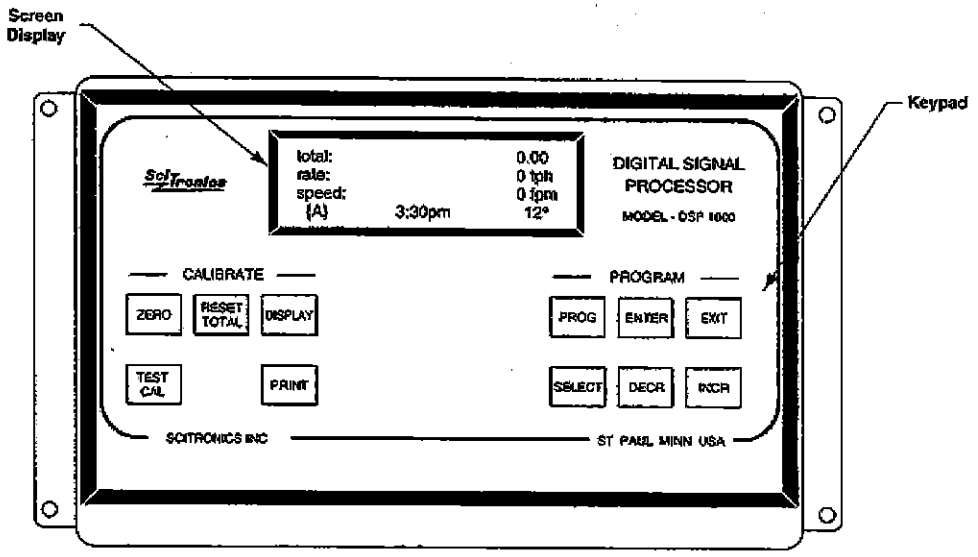
This section describes how to program the digital signal processor for your specific application. Refer to **Normal Operation** for viewing specific processor information, **Initial Programming** for initial setup of the processor, and **Changing the Setup Data** any time the data needs to be changed.

Becoming Familiar with the Processor

The screen display is a 4-line, 20-character liquid crystal display. This type of display will provide excellent viewing in low light or in direct sunlight. Use the **DISPLAY** key to view up to four belt scales: A, B, C, and D. During normal operation of the belt scale, values for total weight, rate, and belt speed are shown in the screen display. The lower line indicates the scale being viewed, the current time, conveyor angle, and other status information. When pressing the **INCR** key, a Scale Loading and Master Weight Total may also be viewed for each scale. The **All Rates** and **All Totals** screens are also available for viewing.

The processor (as shown in Figure 3-1) also uses the screen display to access the **Main Menu** and each submenu as the operator steps through the screens during programming. The operator can view the changes made to each selection before saving the change. Values are entered and selections are made using the pressure-sensitive keypad. When the operator leaves a field after making a change, the change is automatically saved.

Figure 3-1 Model CS1000 Digital Signal Processor



Processor Keypad

The pressure-sensitive keypad (shown in Figure 3-1) consists of 11 dedicated function keys:

ZERO
zeroes out the tare weight during initial and routine calibration. Refer to **Section 4 – Calibration** for more information on calibration.

RESET TOTAL
resets the totals being displayed.

DISPLAY
allows the operator to select the screens in the **DISPLAY** function.

TEST CAL
checks calibration of the belt scale. Refer to **Section 4 – Calibration** for more information on calibration.

PRINT
initiates printing of a report showing either hourly totals or grand totals as preprogrammed at the factory.

PROG
selects the **PROGRAM** function and allows the operator to scroll through the **Main Menu** submenus and submenu fields.

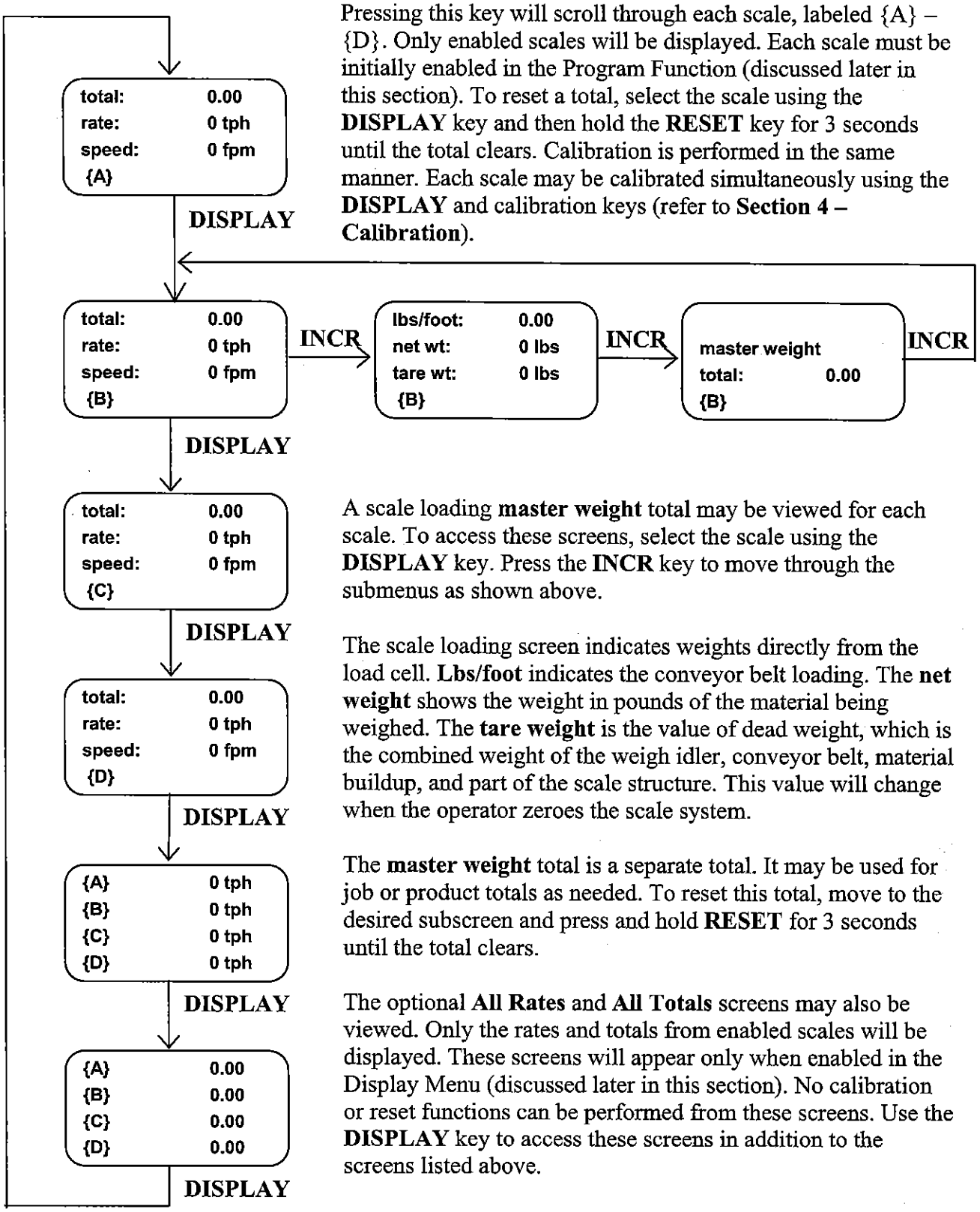
ENTER
accesses a submenu in the **PROGRAM** function.

EXIT
closes a submenu and returns the operator to the **Main Menu** in the **PROGRAM** function. At the **Main Menu**, pressing this key returns the operator to the **DISPLAY** function. This key may also be used to cancel the calibration functions.

SELECT
activates a selection or value in a parameter for making a change to it in the **PROGRAM** function. When changing a numeric value, use this key to move to each digit.

DECR/INCR
changes a numeric value in a field or scrolls through the selections in a field in the **PROGRAM** function. Press the **INCR** key to increase the value of a specific digit. The **INCR** key may also be used to display scale loading and master weight totals in the normal **DISPLAY** function.

Normal Operation



The digital signal processor may operate up to four scales. The data for each scale is accessed using the **DISPLAY** key. Pressing this key will scroll through each scale, labeled {A} – {D}. Only enabled scales will be displayed. Each scale must be initially enabled in the Program Function (discussed later in this section). To reset a total, select the scale using the **DISPLAY** key and then hold the **RESET** key for 3 seconds until the total clears. Calibration is performed in the same manner. Each scale may be calibrated simultaneously using the **DISPLAY** and calibration keys (refer to **Section 4 – Calibration**).

A scale loading **master weight** total may be viewed for each scale. To access these screens, select the scale using the **DISPLAY** key. Press the **INCR** key to move through the submenus as shown above.

The scale loading screen indicates weights directly from the load cell. **Lbs/foot** indicates the conveyor belt loading. The **net weight** shows the weight in pounds of the material being weighed. The **tare weight** is the value of dead weight, which is the combined weight of the weigh idler, conveyor belt, material buildup, and part of the scale structure. This value will change when the operator zeroes the scale system.

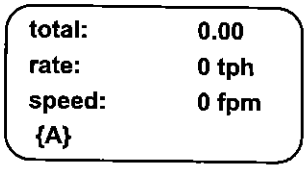
The **master weight** total is a separate total. It may be used for job or product totals as needed. To reset this total, move to the desired subscreen and press and hold **RESET** for 3 seconds until the total clears.

The optional **All Rates** and **All Totals** screens may also be viewed. Only the rates and totals from enabled scales will be displayed. These screens will appear only when enabled in the Display Menu (discussed later in this section). No calibration or reset functions can be performed from these screens. Use the **DISPLAY** key to access these screens in addition to the screens listed above.

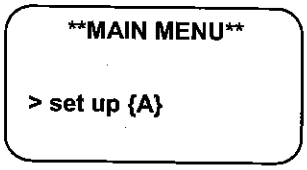
Programming the Setup Data

Initial Programming

NOTE
The processor screens shown are examples only. The units of measure displayed will depend on the operator's selection in **Mode 14: units of measurement** in the **Set Up** submenus.

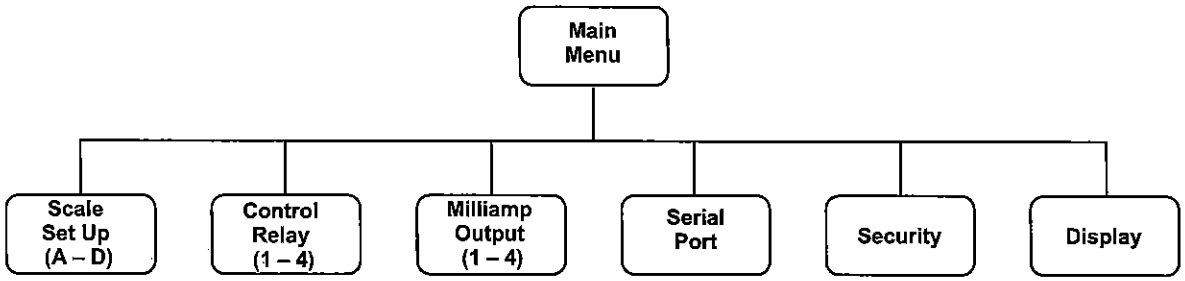


1. Apply power to the processor by plugging it into an outlet. The first screen in the **DISPLAY** function appears in the screen display.
2. Press the **PROG** key for approximately 3 seconds until the **Main Menu** of the **PROGRAM** function appears on the screen.



NOTE
The menu tree in Figure 3-2 shows the submenus and fields within each submenu. Table 3-1 lists the fields in each submenu and valid entries for each field in a submenu. Refer to these as necessary during programming.

Figure 3-2 Processor Menu Tree



Scale Set Up (A – D)

- Mode 1: belt scale enable
- Mode 2: effective weigh span
- Mode 3: belt length
- Mode 4: load span adjustment
- Mode 5: effective calibration weight
- Mode 6: moisture content
- Mode 7: azt setpoint
- Mode 8: tracking time interval
- Mode 9: auto zero time interval
- Mode 10: test cal function
- Mode 11: conveyor angle
- Mode 12: test cal time interval
- Mode 13: belt speed span adjustment
- Mode 14: units of measurement
- Mode 15: damping
- Mode 16: total decimal point
- Mode 17: rate decimal point
- Mode 18: belt speed decimal point

Control Relay (1 – 4)

- Mode 1: signal source
- Mode 2: function
- Mode 3: logic
- Mode 4: pulse width
- Mode 5: pulse scan
- Mode 6: alarm delay
- Mode 7: low rate alarm setpoint
- Mode 8: high rate alarm setpoint
- Mode 9: low speed alarm setpoint
- Mode 10: high speed alarm setpoint

Milliamp Output (1 – 4)

- Mode 1: signal source
- Mode 2: function
- Mode 3: offset
- Mode 4: full scale

Serial Port

- Mode 1: station I.D.
- Mode 2: baud rate
- Mode 3: time
- Mode 4: date
- Mode 5: clock mode
- Mode 6: reset totals on on print command
- Mode 7: print net totals
- Mode 8: print on the hour
- Mode 9: reset totals at midnight

Security

- Mode 1: lock zero
- Mode 2: lock reset
- Mode 3: lock test cal
- Mode 4: lock print
- Mode 5: lock code

Display

- Mode 1; demo mode
- Mode 2: display conveyor angle
- Mode 3: terminal 9 input function
- Mode 4: enable rates display
- Mode 5: enable totals display
- Mode 6: scale A mode label
- Mode 7: scale B mode label
- Mode 8: scale C mode label
- Mode 9: scale D mode label
- Mode 10: digital signal filter
- Model 11: display error messages

Table 3-1 Programming Data Table

Submenu	Item	Valid Entries
Set Up {A – D}	*Mode 1: belt scale enable*	YES/NO
	Mode 2: effective weigh span	00.0000 to 99.999*
	Mode 3: belt length	0000.00 to 9999.99
	Mode 4: load span adjustment	0000.00 to 9999.99 reference
	Mode 5: effective calibration weight	0000.00 to 9999.99*
	Mode 6: moisture content	00.00 to 99.99%
	Mode 7: azt (auto zero tracking) setpoint	00.00 to 99.99*
	Mode 8: tracking time interval	01 to 99 belt revs
	Mode 9: auto zero time interval	01 to 99 belt revs
	Mode 10: test call function	ELECTRONIC CAL WEIGHTS
	Mode 11: conveyor angle	00 TO 29 degrees
	Mode 12: test cal time interval	01 to 99 belt revs
	Mode 13: belt speed span adjustment	0000.00 to 9999.99 reference
	Mode 14: units of measurement	TONS PER HOUR TONS PER MINUTE POUNDS PER HOUR POUNDS PER MINUTE TONNES PER HOUR TONNES PER MINUTE KILOGRAMS PER HOUR KILOGRAMS PER MIN
	Mode 15: damping	00.00 TO 99.99 reference
	Mode 16: total decimal point	ONES, TENTHS, HUNDREDTHS
	Mode 17: rate decimal point	ONES, TENTHS, HUNDREDTHS
	Mode 18: belt speed decimal point	ONES, TENTHS, HUNDREDTHS
Control Relay {1 – 4}	*Mode 1: signal source*	OFF, A – D
	Mode 2: function	PULSE REPEATER HIGH/LOW ALARM DIAGNOSTIC ALARM
	Mode 3: logic	NORMALLY OPEN NORMALLY CLOSED
	Mode 4: pulse width	.00 to .99 seconds
	Mode 5: pulse scale	0000.00 to 9999.99*
	Mode 6: alarm delay	.00 to .99 seconds
	Mode 7: low rate alarm setpoint	0000.00 to 9999.99*
	Mode 8: high rate alarm setpoint	0000.00 to 9999.99*
	Mode 9: low speed alarm setpoint	0000.00 to 9999.99*
	Mode 10: high speed alarm setpoint	0000.00 to 9999.99*

*The units displayed depend on the operator's selection of Mode 1 **Signal Source** and its **Units of Measurement** mode (Mode 14) of the **Set Up** submenu.

Submenu	Item	Valid Entries
Milliamp Output {1 – 4}	*Mode 1: signal source*	OFF, A - D
	Mode 2: function	RATE OUTPUT
		BELT SPEED OUTPUT
		LBS/FOOT OUTPUT
	Mode 3: offset	0.000 to 9.000 milliamps
	Mode 4: full scale	0000.00 to 9999.99*
Serial Port	*Mode 1: Station I.D.*	A – P
	Mode 2: baud rate	1200
		2400
		4800
		9600
		19.2K
	Mode 3: time	Format – hour:min:sec (Example: 11:52:09)
	Mode 4: date	Format – month-day-year (Example: 08-26-2007)
	Mode 5: clock mode	AM
		PM
	Mode 6: reset totals on print command	NO/YES
	Mode 7: print net totals	NO/YES
	Mode 8: print on the hour	NO/YES
	Mode 9: reset totals at midnight	NO/YES
Security	*Mode 1: lock zero*	NO/YES
	Mode 2: lock reset	NO/YES
	Mode 3: lock test cal	NO/YES
	Mode 4: lock print	NO/YES
	Mode 5: lock code	000000 to 999999
Display	*Mode 1: demo mode*	OFF/ON
	Mode 2: display conveyor angles	YES/NO
	Mode 3; terminal 9 input function	PRINT COMMAND/RESET ALARM
	Mode 4: enable rates display	NO/YES
	Mode 5: enable totals display	NO/YES
	Mode 6: scale A: node label	XXXXXXX
	Mode 7: scale B: node label	XXXXXXX
	Mode 8: scale C: node label	XXXXXXX
	Mode 9: scale D: node label	XXXXXXX
	Mode 10: digital signal filter	00 – 99 reference
	Mode 11: display error messages	YES/NO

** MAIN MENU**

> SET UP {A}

NOTE

The procedure for **Initial Programming** is organized so that the operator can access the first submenu in the **Main Menu** and continue in order through each submenu until all data has been programmed.

Program each submenu as appropriate for your application:

Set Up Submenu {A - D}

In the **Set Up** submenu, the operator enters the belt scale system parameters that will be used by the processor in its internal calculations during calibration and normal operation. There are four **Set Up** submenus (labeled A – D), one for each scale in the system. Program each submenu only if required. The following describes the modes in each of the **Set Up** menus.

*To program the **Set Up** submenu —*

SET UP {A}
mode 1:
belt scale enable
> YES

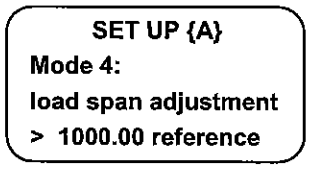
1. At the **Main Menu,** press the **ENTER** key. The **Set Up** submenu appears on the screen displaying **Mode 1: belt scale enable.** Selections are **YES** or **NO**. When set to **YES,** the belt scale is activated and its rate and total information will appear on the display making it ready for normal operation. Setting it to **NO** will disable the scale. Press the **PROG** key to move to Mode 2.

SET UP {A}
mode 2: effective
weigh span
> 04.000 feet

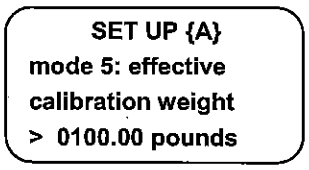
2. **Mode 2: effective weigh span**. The weigh span of the belt scale is the distance between the first advance and the first retreat idler from the scale carriage, divided by two. Enter this value (**00.000 to 99.999**) into the **effective weigh span** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 3. This parameter is also used to compensate differences achieved during material test calibrations.

SET UP {A}
mode 3:
belt length
> 0100.00 feet

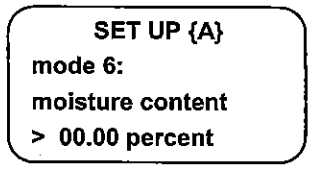
3. **Mode 3: belt length** appears on the screen. Belt length is the length of one complete revolution of the belt. Enter this value (**0000.00 to 9999.99**) into the **belt length** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 4.



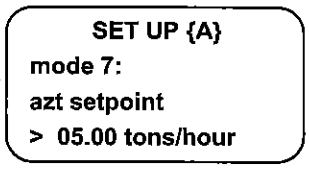
4. **Mode 4: load span adjustment** appears on the screen. Load span adjustment is the value used by the processor during calibration to manually adjust the scale system. This field has been set by the factory but it can be changed as necessary. It may be necessary to change this field during the calibration process. Enter this value (**0000.00** to **9999.99**) into the **load span adjustment** field using the **SELECT** key to move each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 5.



5. **Mode 5: effective calibration weight** appears on the screen. It is factory set with the ECAL constant for electronic calibration. When using cal weights, enter the total weight of the cal weights provided, note mode 10. Enter a value (**0000.00** to **9999.99**) into the **calibration weight** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 6.



6. **Mode 6: moisture content** appears on the screen. Enter the moisture content of the material being weighed. Enter a value (**00.00%** to **99.99%**) into the **moisture content** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 7.



7. **Mode 7: azt setpoint** appears on the screen. When the rate falls below the value set in this field, the processor starts to track for the length of time indicated in the **tracking** and **auto zero time interval** fields. Do not enter a value above the lowest normal material flow rate. Setting the tracking time interval to 00 (Mode 8) disables auto zero tracking. Enter a value (**00.00** to **99.99**) into the **azt setpoint** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 8.

SET UP {A}
mode 8: tracking
time interval
> 03 belt revs

8. **Mode 8: tracking time interval** appears on the screen. Tracking time interval is the number of belt revolutions to be used by the processor during a zero tracking cycle. Enter a value that allows for a 5-minute to 6-minute zero tracking cycle so that the auto zero cycle does not start before the conveyor belt has emptied. Enter a value (**00** to **99** belt revolutions) into the **tracking time interval** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. An entry of 00 disables the auto zero tracking function. Press the **PROG** key to move to Mode 9.

SET UP {A}
mode 9: auto zero
time interval
> 02 belt revs

9. **Mode 9: auto zero time interval** appears on the screen. Auto zero time interval is the number of belt revolutions during an auto zero cycle. Although valid entries in this field range from **01** to **99** belt revolutions, typically, a value of **2** to **3** belt revolutions is recommended. Enter a value into the **auto zero time interval** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 10.

SET UP {A}
mode10:
test cal function
> ELECTRONIC

10. **Mode 10: test cal function** appears on the screen. Valid selections in this field are **ELECTRONIC** or **CAL WEIGHTS.** If the operator selects **ELECTRONIC**, the processor calibrates the scale system electronically. If the operator selects **CAL WEIGHTS,** the calibration weights are used for system calibration. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 11.

SET UP {A}
mode 11: conveyor
angle
> 00

11. **Mode 11: conveyor angle** appears on the screen. Valid selections in this field are **00 – 29** degrees. Enter the actual angle of the conveyor. If the automatic angle compensation is active, this mode will be automatically updated by the scale system. Make your selection using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 12.

SET UP {A}
mode 12: test cal
time interval
> 02 belt revs

12. **Mode 12: test cal time interval** appears on the screen. Calibration test time interval is the number of belt revolutions used by the processor during the calibration test. Enter a value into the **cal test time interval** field (**01** to **99**) using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 13.

SET UP {A}
mode 13: belt speed
span adjustment
> 1000.00 reference

13. **Mode 13: belt speed span adjustment** appears on the screen. This field can be manually changed when necessary to compensate for an inaccurate belt speed indication due to sensor buildup or wear. It also can be used to simulate an actual belt speed by entering a desired belt speed.

> **NOTE**
> SW4 on the bridge transducer must be on to perform the simulation function.

Enter the value (**0000.00** to **9999.99**) into the **belt speed span adjustment** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 14.

SET UP {A}
mode 14:
units of measurement
> TONS PER HOUR

14. **Mode 14: units of measurement** appear on the screen. This field allows the operator to choose English or metric units of measure (**TONS PER HOUR, TONS PER MINUTE, POUNDS PER HOUR, POUNDS PER MINUTE, TONNES PER HOUR, TONNES PER MINUTE, KILOGRAMS PER HOUR,** or **KILOGRAMS PER MIN**). The selection in this field is used for the rate, speed, and totals in the **RUN** function and for values as appropriate in the **PROGRAM** function. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 15.

SET UP {A}
mode 15:
damping
> 10.00 reference

15. **Mode 15: damping** appears on the screen. The value entered in this field indicates the amount of weight change (typically in pounds) to smooth the rate display when there are rapid input variations. Enter the value (**00.00** to **99.99**) into the **damping** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 16.

SET UP {A}
mode 16:
total decimal point
> TENTHS

16. **Mode 16: total decimal point** appears on the screen. In this field, the operator determines how many decimal places will be used in the total displayed on the screen in the **DISPLAY** function. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**ONES, TENTHS,** and **HUNDREDTHS**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 17.

SET UP {A}
mode 17:
rate decimal point
> ONES

17. **Mode 17: rate decimal point** appears on the screen. In this field, the operator determines how many decimal places will be used in the rated displayed on the screen in the **DISPLAY** function. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**ONES, TENTHS,** and **HUNDREDTHS**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 18.

SET UP {A}
mode 18: belt speed
decimal point
> ONES

18. **Mode 18: belt speed decimal point** appears on the screen. This field allows the operator to determine how many decimal places will be used in the belt speed displayed on the screen in the **DISPLAY** function. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**ONES, TENTHS,** and **HUNDREDTHS**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **EXIT** key to leave the **Set Up** submenu.

NOTE
If you are using only one scale, you have completed the procedure for programming the **Set Up {A}** submenu. Press the **PROG** key four times to advance to the **control relay** submenus, or press the **EXIT** key again to leave the **PROGRAM** function. If you are using more than one scale, follow step 19 to program the **Set Up {b}, {C}, {D}** submenus as required.

MAIN MENU
> set up {A}

MAIN MENU
> set up {B}

MAIN MENU
> set up {C}

MAIN MENU
> set up {D}

19. Press the **PROG** key to move to the **Set Up {B}** menu. Follow steps 1-18 above to complete the procedure for scale B. Repeat as required for scale C and scale D.

MAIN MENU

> control relay 1

Control Relay {1 - 4} Submenus

The control relays 1 – 4 allow the operator to program the processor for more than one function. For example, the operator may want each control relay programmed for a different alarm or one control relay programmed for pulse repeater and one for an alarm.

*To program the **control relay** submenu —*

Press the **PROG** key to locate the **control relay 1** submenu. Press the **ENTER** key to display Mode 1.

CONTROL RELAY 1
mode 1:
signal source
> OFF

1. **Mode 1: signal source** appears on the screen. Valid selections in this field are **OFF, scale {A}, {B}, {C},** or **{D}**. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 2.

CONTROL RELAY 1
mode 2:
function
> PULSE REPEATER

2. **Mode 2: function** appears on the screen. Valid selections in this field are **PULSE REPEATER, HIGH/LOW ALARM,** and **DIAGNOSTIC ALARM.** Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 3.

CONTROL RELAY 1
mode 3:
logic
> NORMALLY OPEN

3. **Mode 3: logic** appears on the screen. Valid selections in the field are **NORMALLY OPEN** or **NORMALLY CLOSED.** Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 4.

CONTROL RELAY 1
mode 4:
pulse width
> .10 seconds

4. **Mode 4: pulse width** appears on the screen. Enter the value desired (**.00** to **.99** seconds) into the **pulse width** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 5.

CONTROL RELAY 1
mode 5:
pulse scale
> 0000.00 tons

5. **Mode 5: pulse scale** appears on the screen. The pulse output is scaled at the value entered in this field. Enter the value desired (**0000.00 to 9999.99**) into the **pulse scale** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 6.

CONTROL RELAY 1
mode 6:
alarm delay
> 00 seconds

6. **Mode 6: alarm delay** appears on the screen. Enter the value desired (**00** to **99** seconds) into the **alarm delay** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. The value entered in this field indicates the length of time in seconds during an alarm condition before the operator is alerted. Press the **PROG** key to move to Mode 7.

CONTROL RELAY 1
mode 7: low rate
alarm setpoint
> 0000.00 tons/hour

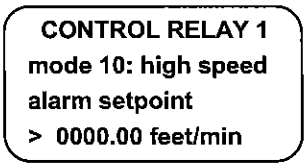
7. **Mode 7: low rate alarm setpoint** appears on the screen. When the rate falls below the value set in this field, the processor alerts the operator to an alarm condition. Enter the value desired (**0000.00** to **9999.99**) into the **low rate alarm setpoint** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 8.

CONTROL RELAY 1
mode 8: high rate
alarm setpoint
> 0000.00 tons/hour

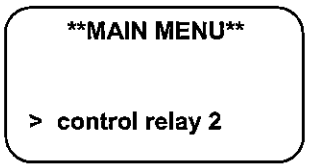
8. **Mode 8: high rate alarm setpoint** appears on the screen. When the rate moves above the value set in this field, the processor alerts the operator to an alarm condition. Enter the value desired (**0000.00** to **9999.99**) into the **high rate alarm setpoint** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 9.

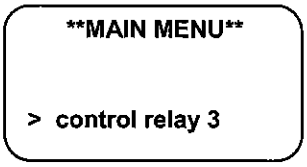
CONTROL RELAY 1
mode 9: low speed
alarm setpoint
> 0000.00 feet/min

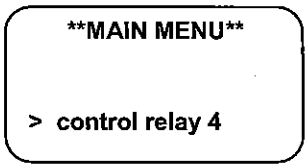
9. **Mode 9: low speed alarm setpoint** appears on the screen. When the speed moves below the value set in this field, the processor alerts the operator to an alarm condition. Enter the value desired (**0000.00** to **9999.99**) into the **low speed alarm setpoint** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 10.



10. **Mode: high speed alarm setpoint** appears on the screen. When the speed moves above the value set in this field, the processor alerts the operator to an alarm condition. Enter the value desired (**0000.00** to **9999.99**) into the **high speed alarm setpoint** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **EXIT** key to leave this submenu and return to the **Main Menu.**







NOTE

If you are using only one control relay, you have completed the procedure for programming the **control relay 1** submenu. Press the **PROG** key four times to advance to the **milliamp output** submenus or press the **EXIT** key again to leave the **PROGRAM** function. If you are using more than one control relay, follow step 11 to program the **control relay 2, 3,** or **4** submenus as required.

11. Press the **PROG** key to move to the **control relay 2** submenu. Press the **ENTER** key to display the first field in the submenu. Follow steps 1-10 above to complete the procedure for control relay 2. Repeat as required for **control relay 3** and **control relay 4.**

****MAIN MENU****

> milliamp output 1

Milliamp Output {1 - 4} Submenus

The **milliamp output** submenus allow the operator to program the processor for transmitting the output signal to auxiliary equipment.

*To program the **milliamp output {1 – 4}** submenus —*

Press the **PROG** key to locate the **milliamp output 1** submenu. Press the **ENTER** key to display the first field in the submenu.

MILLIAMP OUTPUT 1
mode 1:
signal source
> OFF

1. **Mode 1: signal source** appears on the screen. Valid selections in this field are **OFF** or **scale {A}, {B}, {C},** or **{D}.** Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 2.

MILLIAMP OUTPUT 1
mode 2:
function
> RATE OUTPUT

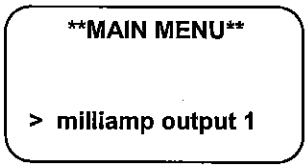
2. **Mode 2: function** appears on the screen. Valid selections in this field are **RATE OUTPUT, BELT SPEED,** and **LBS/FOOT OUTPUT.** Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 3.

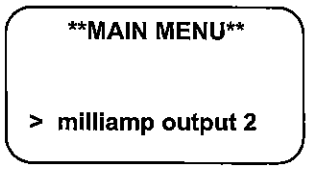
MILLIAMP OUTPUT 1
mode 3:
offset
> 4.000 milliamps

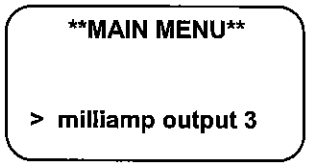
3. **Mode 3: offset** appears on the screen. The value entered in this field is the minimum value that represents 0 condition. Typically, entering a value of **4** in this field is acceptable for most applications. Enter the value desired (**0.000** to **9.999** milliamps) into the **offset** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **PROG** key to move to Mode 4.

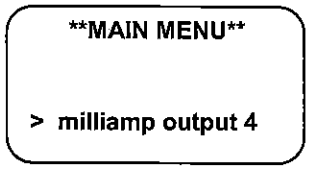
MILLIAMP OUTPUT 1
mode 4:
full scale
> 1000.00 tons/hour

4. **Mode 4: full scale** appears on the screen. Enter the maximum value in this field, which will equal 20 mA (for example, an entry of 500 tons/hr as the maximum value will equal 20 mA). Enter the value desired (**0000.00** to **9999.99**) into the **full scale** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the appropriate value appears in the field. Press the **EXIT** key to leave the **milliamp output 1** submenu.









NOTE

If you are using only one milliamp output, you have completed the procedure for programming the **milliamp output 1** submenu. Press the **PROG** key four times to advance to the **serial port** submenu or press the **EXIT** key again to leave the **PROGRAM** function. If you are using more than one milliamp ouput, follow step 5 to program the **milliamp output 2, 3,** or **4** submenus as required.

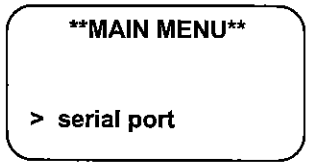
5. Press the **PROG** key to move to the **milliamp output** 2 submenu. Press the **ENTER** key to display the first field in the submenu. Follow steps 1-4 above to complete the procedure for **milliamp output 2.** Repeat as required for **milliamp output 3** and **milliamp output 4.**

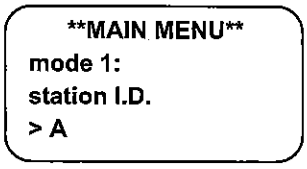
Serial Port Submenu

The **serial port** submenu is used to enter the settings required for connection to a remote computer.

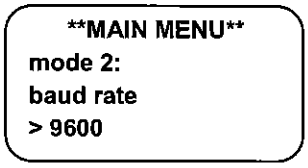
*To program the **serial port** submenu —*

Press the **PROG** key to locate the **serial port** submenu. Press the **ENTER** key to display the first field in the submenu.

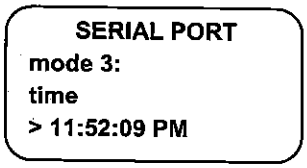




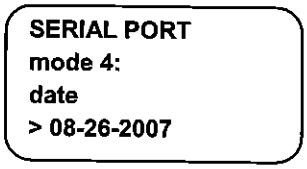
1. **Mode 1: station I.D.** appears on the screen. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**A-P**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. **B-P** are used for multiple hookups of the processor. Press the **PROG** key to move to Mode 2.



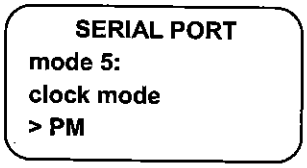
2. **Mode 2: baud rate** appears on the screen. The baud rate is the speed in bits per second at which data is transmitted between the processor and the remote computer. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**1200, 2400, 4800, 9600,** and **19.2 K**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 3.



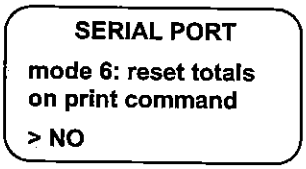
3. **Mode 3: time** appears on the screen. The operator enters the current time in this field. When a report is printed, the time the report was generated is printed on the report. Enter the current time in hours, minutes, and seconds (for example: 11:52:09) using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the number until the complete time appears in the fields. Press the **PROG** key to move to Mode 4.



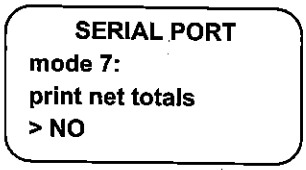
4. **Mode 4: date** appears on the screen. The operator enters the current date in this field. When a report is printed, the date the report was generated is printed on the report. Enter the current date in month-day-year format (for example: 07-26-2007) using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the complete date appears in the field. Press the **PROG** key to move to Mode 5.



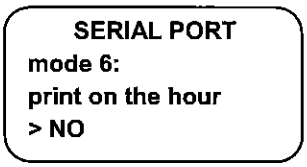
5. **Mode 5: clock** mode appears on the screen. The operator selects **AM** if the current time is before noon or **PM** if the current time is after noon. Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 6.



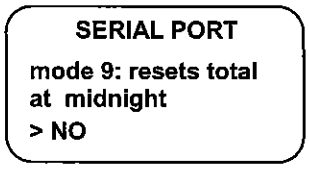
6. **Mode 6: reset totals on print command** appears on the screen. The operator indicates in this field if the total should be automatically reset after printing by using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**NO** and **YES**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 7.



7. **Mode 7: print net totals** appears on the screen. The operator indicates in this field if net totals should be printed along with the main totals by using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**NO** and **YES**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 8.



8. **Mode 8: print on the hour** appears on the screen. The operator indicates in this field if printing on the hour is desired by using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**NO** and **YES**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 9.

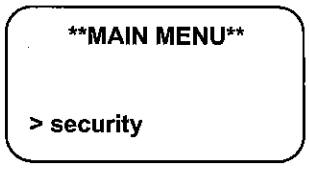


9. **Mode 9: reset totals at midnight** appears on the screen. The operator indicates in this field if the totals are to be reset at midnight (the master weight totals will not be reset by this function). Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**NO** and **YES**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **EXIT** key to leave this submenu and return to the **Main Menu.**

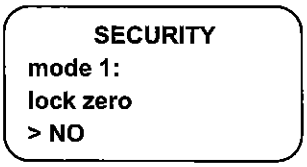
Security Submenu

*To program the **security** submenu —*

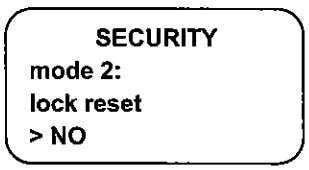
Press the **PROG** key to locate the **security** submenu. Press the **ENTER** key to display the first field in the submenu.



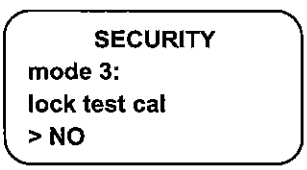
1. **Mode 1: lock zero** appears on the screen. The selections in this field are **YES** and **NO**. Selecting **YES** prevents the operator from zeroing out the reading when the belt is running empty. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 2.



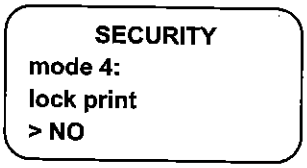
2. **Mode 2: lock reset** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** prevents the operator from resetting the total. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 3.



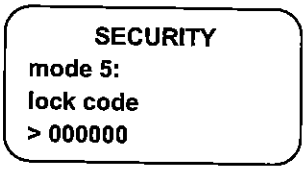
3. **Mode 3: lock test cal** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** prevents the operator from calibrating the belt scale. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and



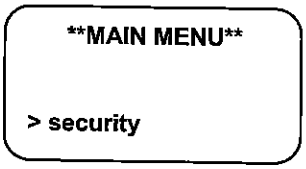
DECR keys to scroll through the selections. Press the **PROG** key to move to Mode 4.



4. **Mode 4: lock print** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** prevents the operator from printing a report. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 5.



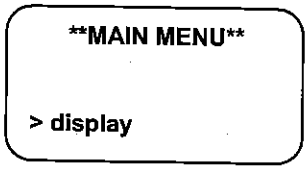
5. **Mode 5: lock code** appears on the screen. Enter a six-digit code to be used by the operator for obtaining access to the programming mode to change the setup data. Enter the code into the **lock code** field using the **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers. Record your code and keep it in a safe place so that you will have it when you need it. Press the **EXIT** key to leave the **security** submenu.



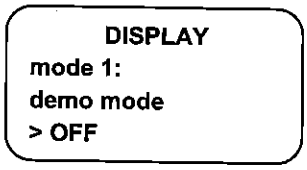
Display Submenu

The **display** submenu is used to program the display options.

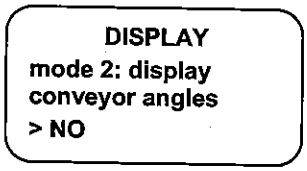
*To program the **display** submenu —*



Press the **PROG** key to locate the **display** submenu. Press the **ENTER** key to display the first field in the submenu.



1. **Mode 1: demo mode** appears on the screen. The selections in this field are **OFF** and **ON**. Selecting **ON** activates the demo mode, which simulates material flow for demonstration or test purposes. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 2.



2. **Mode 2: display conveyor angles** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** enables the conveyor angle to be displayed on the bottom line of the display during the normal run function. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 3.

DISPLAY
mode 3: terminal 9 input function
> PRINT COMMAND

3. **Mode 3: terminal 9 input function** appears on the screen. This field allows the operator to jumper terminal 9 to an outside circuit. If this terminal is not needed, leave it at the default setting (**PRINT COMMAND**). Use the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections (**PRINT COMMAND** and **RESET ALARM**). When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking. Press the **PROG** key to move to Mode 4.

DISPLAY
mode 4: enable rates display
> NO

4. **Mode 4: enable rates display** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** enables the rates of each enabled scale to be displayed on one screen at the same time. During the normal Display function, press the **DISPLAY** key to locate the rates display. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 5.

DISPLAY
mode 5: enable totals display
>NO

5. **Mode 5: enable totals display** appears on the screen. The selections in this field are **NO** and **YES**. Selecting **YES** enables the totals of each enabled scale to be displayed on one screen at the same time. During the normal Display function, press the **DISPLAY** key to locate the totals display. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 6.

DISPLAY
mode 6: scale A node label
> {A}

6. **Mode 6: scale A node label** appears on the screen. Seven characters are available in this field to label scale A. For example, the normal mode label here is {A} but it can be changed to name the conveyor or line that the scale is on, C23, or the plant name, PLANT 1. This text is displayed in place of the normal scale A node label {A} throughout the Display and Program functions, making it easier to view and program the system. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 7.

DISPLAY
mode 7: scale B
node label
> {B}

7. **Mode 7: scale B node label** appears on the screen. Seven characters are available in this field to label scale B. For example, the normal node label here is {B} but it can be changed to name the conveyor or line that the scale is on, C23, or the plant name, PLANT 1. This text is displayed in place of the normal scale B node label {B} throughout the Display and Program functions, making it easier to view and program the system. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 8.

DISPLAY
mode 8: scale C
node label
> {C}

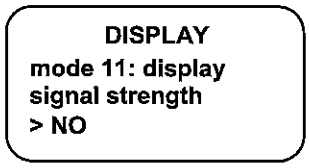
8. **Mode 8: scale C node label** appears on the screen. Seven characters are available in this field to label scale C. For example, the normal node label here is{C} but it can be changed to name the conveyor or line that the scale is on, C23, or the plant name, PLANT 1. This text is displayed in place of the normal scale C node label {C} throughout the Display and Program functions, making it easier to view and program the system. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 9.

DISPLAY
mode 9: scale D
node label
> {D}

9. **Mode 9: scale D node label** appears on the screen. Seven characters are available in this field to label scale D. For example, the normal node label here is {D} but it can be changed to name the conveyor or line that the scale is on C23, or the plant name, PLANT 1. This text is displayed in place of the normal scale D node label {D} throughout the Display and Program functions, making it easier to view and program the system. Make your selections using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **PROG** key to move to Mode 10.

DISPLAY
mode 10: digital
signal filter
> 05 reference

10. **Mode 10: digital signal filter** appears on the screen. The selection in this field is **00** to **99 reference**. This field is used to strengthen communications to each belt scale in the system. It is most helpful during long cable runs and extreme electrical noise. Consult the factory for more information. Press the **PROG** key to move to Mode 11.



11. **Mode 11: display error messages** appears on the screen. The selections in this field are **NO** and **YES.** Selecting **YES** displays the diagnostic messages on the screen. Make your selection using the **SELECT** key to activate the current selection (it will blink) and the **INCR** and **DECR** keys to scroll through the selections. Press the **EXIT** key to leave the **display** submenu. Press the **EXIT** key again to leave the **PROGRAM** function. This concludes the initial programming of the processor.

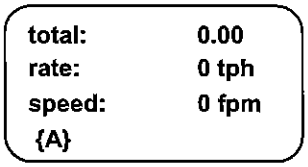
NOTE
Mode 11 is replaced with **display signal strength** on wireless systems only. When it is set to **YES**, a bar graph will appear on the lower line of the display during the normal run function. This graph represents the quality and strength of data received from the belt scale.

Changing the Setup Data

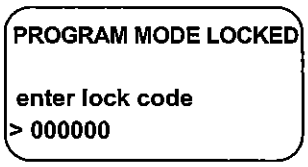
To change the setup data once scale system operation has begun, do the following:

NOTE
The menu tree in Figure 3-2 shows the submenus and fields within each submenu. Table 3-1 lists the fields in each submenu and valid entries for each field in a submenu. Refer to these as necessary during programming.

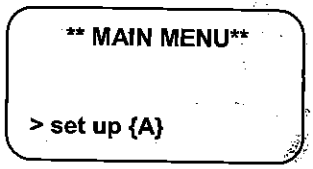
1. Apply power to the processor.

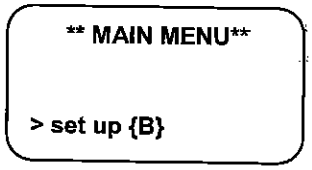


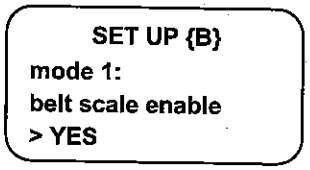
2. Press the **PROG** key for approximately 3 seconds until the **Main Menu** of the **PROGRAM** function appears on the screen. A message may appear in the screen display requesting your security code to prevent unauthorized changes to the setup data. Type the six-digit code and press **ENTER**. The **Main Menu** appears in the screen display.

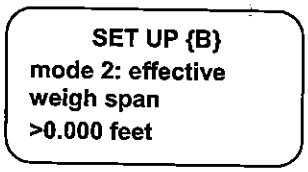


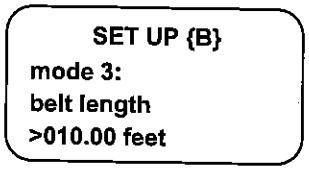
NOTE
If the security code is lost or forgotten, the factory will give an authorized person from your company a bypass code that will allow changes to the setup data.

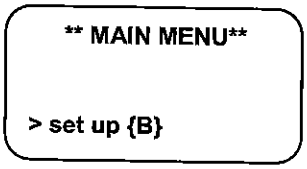


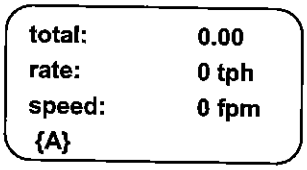












3. Use the **PROG** key to move through the **Main Menu** to select the desired submenu. The **DECR** key is used to back up.
4. Press the **ENTER** key. The first field in the submenu appears on the screen.
5. Press the **PROG** key to move through the fields in the submenu to select the desired field to change. The **DECR** key is used to back up when a field variable is not flashing.
6. Change a field containing a numeric value using the **INCR** and **DECR** keys to scroll through the numbers until the desired value appears on the screen. Change a selection in a field using the **SELECT** key to activate the current selection (it will blink) and then use the **INCR** and **DECR** keys to scroll through the selections. When the desired selection appears on the screen, press the **SELECT** key and the selection will stop blinking.
7. Press the **PROG** key to move to another field on the submenu if necessary.
8. When all the changes have been made to a submenu, press the **EXIT** key to return to the **Main Menu.**
9. Follow steps 3-8 until all the necessary changes have been made to fields in the submenu.
10. Press the **EXIT** key at the **Main Menu** to return to the **DISPLAY** function

NOTE
Depending on the changes made to the setup data, calibration may be necessary before routine operation of the belt scale may resume.

RS485 Interface

The RS485 serial interface port may be used to communicate with remote devices such as PLCs, computers, remote displays, or other SciTronics signal processors. RS485 is an industry standard hardware interface that provides communication distances of up to 4,000 feet (1,219 m). Up to 16 signal processors may be connected in series being slaves to one host computer or PLC. Total, rate, and belt speed may be requested individually by the host computer. Totalizer values may also be reset.

Introduction

Communication must have the appropriate station identifier characters. Station identifiers are ASCII characters A-P for the signal processor. Since each signal processor may monitor up to four belt scales, a second station identifier is required, A-D. For example, to request data from Station C belt scale A, the station identifier characters would be CA. The character format is 1 start bit, 8 data bits, and 1 stop bit. Baud rates are selectable up to 19.2k. Setup parameters are located in the **Serial Port Menu** in the program function of the signal processor.

Request Data

Serial commands have the following format: A Start of Text [STX] and two station ID characters are required to select the signal processor and belt scale. The command characters are used to select the data or function. A carriage return is used to terminate the message. The signal processor will not process any commands that do not follow this format exactly.

Commands

[STX]	hex 02	Resets serial port receiver data buffer
[station ID]	ASCII A-P	Selects signal processor
[station ID]	ASCII A-D	Selects belt scale
[command]	ASCII 0-9	Selects command (2 characters)
[carriage return]	hex 0D	Terminates message string

for a total of 6

Command Chart:

Station ID	Belt Scale ID	Command	Carriage Return	Data Returned
[STX] ASCII A-P	ASCII A-D	01	Hex $0D	None, Resets Total
[STX] ASCII A-P	ASCII A-D	09	Hex $0D	None, Resets All Totals
[STX] ASCII A-P	ASCII A-D	10	Hex $0D	Total
[STX] ASCII A-P	ASCII A-D	11	Hex $0D	Rate
[STX] ASCII A-P	ASCII A-D	12	Hex $0D	Belt Speed
[STX] ASCII A-P	ASCII A-D	13	Hex $0D	Total and Rate
[STX] ASCII A-P	ASCII A-D	14	Hex $0D	Total, Rate, and Belt Speed
[STX] ASCII A-P	ASCII A-D	20	Hex $0D	All Totals
[STX] ASCII A-P	ASCII A-D	21	Hex $0D	All Rates
[STX] ASCII A-P	ASCII A-D	22	Hex $0D	All Belt Speeds
[STX] ASCII A-P	ASCII A-D	23	Hex $0D	All Totals and Rates
[STX] ASCII A-P	ASCII A-D	24	Hex $0D	All Totals, Rates, and Belt Speeds

NOTE
For commands 09 and 20 – 24, the belt scale ID character is ignored but still must sent. Select any character A-D.

Data Format

All data transmitted from the signal processor will begin with a start of text character [STX], then two station ID characters, followed by the corresponding data, and then terminated by a carriage return. The total, rate, and belt speed are always transmitted in units of hundredths regardless of any decimal point settings on the displays. Decimal points are not transmitted.

Requesting Total
Data will be returned as follows:
[STX] [2 station ID characters] [10 totalizer digits] [CR]

Example: To request the total from the signal processor B scale A, send data: [STX] BA10 [CR]
Returned data: [STX] BA0002390560 [CR]

Requesting All Totals:
Data will be returned as follows:
[STX] [2 station ID characters] [10 totalizer digits]
[STX] [2 station ID characters] [10 totalizer digits]
[STX] [2 station ID characters] [10 totalizer digits]
[STX] [2 station ID characters] [10 totalizer digits] [CR]

Example: To request the totals from signal processor D, send data: [STX] DD20 [CR]
Returned data:
[STX] DA0002390560 [STX] DB0001500980
[STX] DC0102350590 [STX] DD0606390991[CR]

Requesting Rate
Data will be returned as follows:
[STX] [2 station ID characters] [6 rate digits] [CR]

Example: To request the rate from the signal processor A scale A, send data: [STX] AA11 [CR]
Returned data: [STX] AA035600 [CR]

If the rate is negative, the most significant will be a minus sign.

Requesting All Rates
Data will be returned as follows:
[STX] [2 station ID characters] [6 rate digits]
[STX] [2 station ID characters] [6 rate digits]
[STX] [2 station ID characters] [6 rate digits]
[STX] [2 station ID characters] [6 rate digits] [CR]

Example: To request the rates from signal processor B, send data: [STX] BB21 [CR]
Returned data:
[STX] BA 100900 [STX] BB005567 [STX] BC010240
[STX] BD042500 [CR]

Requesting Belt Speed
Data will be returned as follows:
[STX] [2 station ID characters] [6 belt speed digits] [CR]

Example: To request the belt speed from signal processor C scale A, send data: [STX] CA12 [CR]
Returned data: [STX] AA024500 [CR]

Requesting All Belt Speeds
Data will be returned as follows:
[STX] [2 station ID characters] [6 belt speed digits]
[STX] [2 station ID characters] [6 belt speed digits]
[STX] [2 station ID characters] [6 belt speed digits]
[STX] [2 station ID characters] [6 belt speed digits] [CR]

Example: To request the belt speeds from signal processor C, send data: [STX] CC22 [CR]
Returned data:
[STX] CA024500 [STX] CB010067
[STX] CC035740 [STX] CD035740 [CR]

Requesting Total and Rate
Data will be returned as follows:
[STX] [2 station ID characters] [10 totalizer digits]
[6 rate digits] [CR]

Example: To request the total and rate from signal processor C scale C, send data: [STX] CC13 [CR]
Returned data: [STX] CC0002390560035600 [CR]

Requesting All Totals and Rates
Data will be returned as follows:
[STX] [2 station ID characters] [10 total digits] [6 rate digits] [STX] [2 station ID characters] [10 total digits] [6 rate digits] [STX] [2 station ID characters] [10 total digits] [6 rate digits] [STX] [2 station ID characters] [10 total digits] [6 rate digits] [CR]

Example: To request the belt speeds from signal processor A, send data: [STX] AA23 [CR]
Returned data:
[STX] AA0002390560100900 [STX] AB0001500980005567
[STX] AC0102350590010240 [STX] AD0606390991042500 [CR]

Requesting Total, Rate, and Belt Speed
Data will be returned as follows:
[STX] [2 station ID characters] [10 totalizer digits]
[6 rate digits] [6 belt speed digits] [CR]

Example: To request the total, rate, and belt speed from signal processor A scale A, send data: [STX] AA14 [CR]
Returned data:
[STX] AA00023905600356000024500 [CR]

Requesting All Totals, Rates, and Belt Speeds
Data will be returned as follows:
[STX] [2 station ID characters] [10 Total digits]
[6 rate digits] [6 belt speed digits]
[STX] [2 station ID characters] [10 Total digits]
[6 rate digits] [6 belt speed digits]
[STX] [2 station ID characters] [10 Total digits]
[6 rate digits] [6 belt speed digits]
[STX] [2 station ID characters] [10 Total digits]
[6 rate digits] [6 belt speed digits] [CR]

Example: To request the totals, rates, and belt speeds from signal processor A, send data: [STX] AA24 [CR]
Returned data:
[STX] AA000239056010090002450 0
[STX] AB000150098000556701006 7
[STX] AC010235059001024003574 0
[STX] AD060639099104250003574 0 [CR]

When requesting All Totals, Rates, and Belt Speeds (commands 20 – 24) from the signal processor, only station ID characters and data from enabled belt scales will be transmitted. This function is located in the **Scale Set Up** menus in the Program Mode. For example, if only two belt scales are being monitored by the signal processor, it is not necessary to transmit data from all four scales.

Figure 3-3 Setup Menu
Scales {A} – {D}

Setup Records Processing Plant RMT

Date 8-22-11 By SL City _____ State _____

Mode	Function	Factory Defaults	{A}_____	{B}_____	{C}_____	{D}_____
1	belt scale enable	NO	YES			
2	effective weigh span	04.000	1.219			
3	belt length	0100.00	30.48			
4	load span adjustment	1000.00	531.37			
5	effective calibration weight	0100.00	27.21			
6	moisture content	00.00				
7	azt setpoint	05.00				
8	tracking time interval	00				
9	auto zero time interval	02				
10	test cal function	ELECTRONIC	CAL WTS			
11	conveyor angle	00				
12	test cal time interval	02				
13	belt speed span adjustment	1000.00				
14	units of measurement	TONS/HOUR	TONNES/HR			
15	damping	10.00				
16	total decimal point	TENTHS				
17	rate decimal point	ONES				
18	belt speed decimal point	ONES				

Figure 3-4 Control Relay Menus
Control Relays 1 – 4

Control Relay Records

Processing Plant _____

Date _____ By _____ City _____ State _____

Mode	Function	Factory Defaults	1 _____	2 _____	3 _____	4 _____
1	signal source	OFF				
2	function	PULSE REPEATER				
3	logic	NORMALLY OPEN				
4	pulse width	.10				
5	pulse scale	0000.00				
6	alarm delay	00				
7	low rate alarm setpoint	0000.00				
8	high rate alarm setpoint	0000.00				
9	low speed alarm setpoint	0000.00				
10	high speed alarm setpoint	0000.00				

Figure 3-5 Milliamp Output Menus
Milliamp Outputs 1 – 4

Milliamp Output Records

Processing Plant _____

Date _____ By _____ City _____ State _____

Mode	Function	Factory Defaults	1 _____	2 _____	3 _____	4 _____
1	signal source	OFF				
2	function	RATE OUTPUT				
3	offset	4.000				
4	full scale	1000.00				

Figure 3-6 Serial Port Menu

Serial Port Records Processing Plant _____

Date _____ By _____ City _____ State _____

Mode	Function	Factory Defaults			
1	station ID	A			
2	baud rate	9600			
3	time				
4	date				
5	clock mode				
6	reset totals on print command	NO			
7	print net totals	NO			
8	print on the hour	NO			
9	reset totals at midnight	NO			

Figure 3-7 Security Menu

Security Records Processing Plant _____

Date _____ By _____ City _____ State _____

Mode	Function	Factory Defaults			
1	lock zero	NO			
2	lock reset	NO			
3	lock test cal	NO			
4	lock print	NO			
5	lock code	000000			

Figure 3-8 Display Menu

Display Records

Processing Plant RMT

Date 8-22-11 By SL City _____ State _____

Mode	Function	Factory Defaults				
1	demo mode	OFF				
2	display conveyor angle	NO	YES			
3	terminal 9 input function	PRINT COMMAND				
4	enable rates display	NO				
5	enable totals display	NO				
6	scale A node label	{A}				
7	scale B node label	{B}				
8	scale C node label	{C}				
9	scale D node label	{D}				
10	digital signal filter	05				
11	display error messages	YES				

Figure 3-9 Digital Signal Processor Technical Data

Digital Signal Processor

Model: DSP 1000 S/N: 11-229

Software: V4.0 PCB Model: WI10-02A

Power: 120 VAC Power Source: _____

Wireless: _____ Local Receiver: _____

S2: SW1 ____ SW2 ____ SW3 ____ SW4 ____

Remote Receivers: _____ Model: _____

S1: SW1 ____ SW2 ____ SW3 ____ SW4 ____

{A} SW5 ____ SW6 ____ SW7 ____ SW8 ____

S1: SW1 ____ SW2 ____ SW3 ____ SW4 ____

{B} SW5 ____ SW6 ____ SW7 ____ SW8 ____

Option Slots

Slot A: _____

Slot B: _____

Slot C: _____

Slot D: _____

Slot E: _____

S1: SW1 ____ SW2 ____ SW3 ____ SW4 ____

{C} SW5 ____ SW6 ____ SW7 ____ SW8 ____

S1: SW1 ____ SW2 ____ SW3 ____ SW4 ____

{D} SW5 ____ SW6 ____ SW7 ____ SW8 ____

Section 4 Calibration

Overview

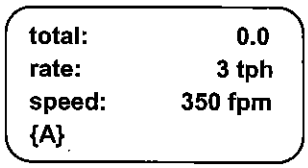
This section explains how to perform calibration of the belt scale using the digital signal processor. This procedure must be followed after the processor has been programmed with the setup data before starting to operate the belt scale and routinely to ensure that the belt scale maintains calibration.

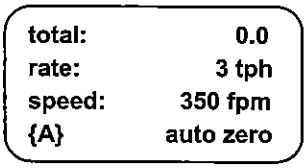
Scale Calibration

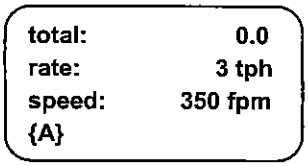
After the operator has completed the procedure explained in **Programming the Setup Data** in **Section 3 – Programming the Processor,** the belt scale must be calibrated for weight.

Zero the belt scale by doing the following:

1. Apply power to the signal processor.
2. Apply power to the conveyor and run it empty for a minimum of 10 minutes. After 10 minutes, continue to run the conveyor empty.
3. Locate the scale to calibrate using the **DISPLAY** key. Up to four scales {A – D} may be connected to each digital signal processor. Press the **ZERO** key for approximately 3 seconds until the message **auto zero** blinks. The message **auto zero** will remain on the screen until the processor has completed the auto zero cycle. (Typically, two belt revolutions.)

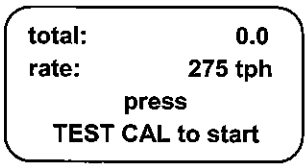


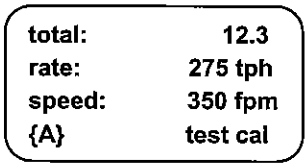


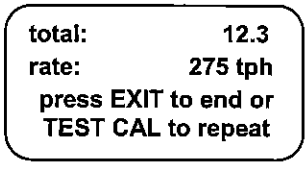


Calibrate the belt scale by doing the following:

1. With the belt running empty, press the **TEST CAL** key. Press the **TEST CAL** key again to start the electronic calibration.
2. The message **test cal** will remain on the screen until the processor has completed the **test cal** cycle (typically two belt revolutions).
3. At the end of the test cal cycle, either press the **TEST CAL** key to repeat the test, if desired, or press the **EXIT** key to return to normal operation.





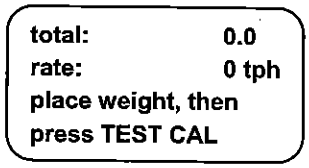


The scale is now calibrated and ready for use.

NOTE
The factory strongly recommends that you perform a material test to ensure accuracy.

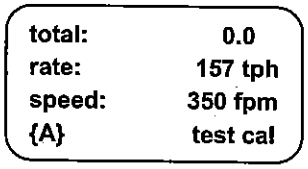
Cal Weight Calibration (optional)

WARNING
Be sure to stop the conveyor before hanging the test weights on the scale or bodily injury could result.

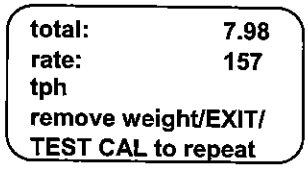


Calibrate the belt scale by doing the following:

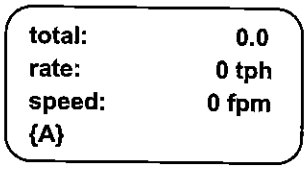
1. Shut off the conveyor belt and place the calibration weights provided by the factory underneath the weigh idler on the hanger rod. If insufficient weight is placed on the scale, the message **Check Weight** appears on the screen. The proper amount of weight ±7.5 lb (3.5 kg) of the value programmed in the scale setup submenu (mode 5).



2. Start the conveyor belt and press the **TEST CAL** button twice. The message **test cal** will remain on the screen until the process has completed the test cal cycle.



3. When the calibration process is complete, the display will read **remove weight/EXIT/TEST CAL to repeat.** If necessary, press the **TEST CAL** key to repeat the test. Otherwise, stop the conveyor and remove the weights from the scale.

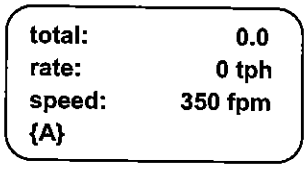


The scale is now calibrated and ready for use.

NOTE
The factory strongly recommends that you perform a material test to ensure accuracy.

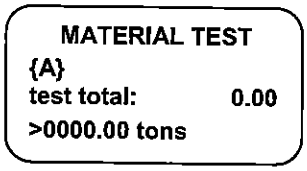
Material Test

Perform a material test by doing the following:

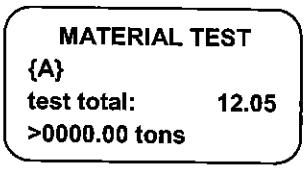


NOTE
Be sure the scale has been zeroed via the **auto zero** cycle.

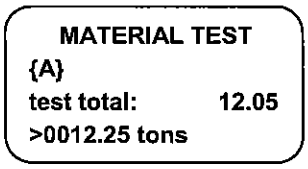
1. Record the tare weight of the truck.
2. Position the truck under the conveyor
3. Use the **DISPLAY** to locate the scale to be calibrated.

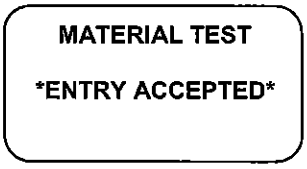


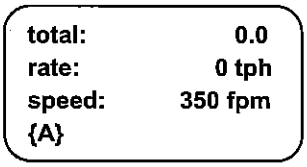
4. Press and hold the **TEST CAL key** on the processor for approximately 3 seconds to enter the **MATERIAL TEST** function.



NOTE
The units displayed depend on the operator's selection in **Mode 14: units of measurement** in the **scale setup** submenu.

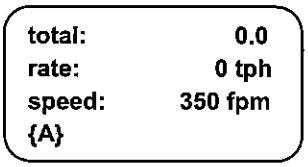






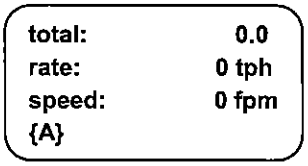
5. Transfer a known amount of material (a minimum of 10 tons) over the belt scale and into the truck. Be sure the belt scale is empty when you have finished. The amount transferred is indicated in the **test total** field. Weigh the material in the truck on a platform scale, noting the net weight (not the gross).
6. Compare the weight indicated by the platform scale to the weight shown in the **test total** field. If the values are different, enter the weight indicated by the platform scale into the tons field using **SELECT** key to move to each digit and the **INCR** and **DECR** keys to scroll through the numbers until the correct weight appears in the field. Press the **ENTER** key. The processor will automatically adjust to the correct value.
7. Press the **EXIT** key to return to normal operation.

Manual Calibration

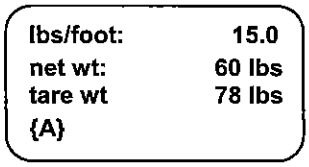


Perform a manual calibration using static weights (optional method) by doing the following:

1. Run the belt scale empty and zero the scale as described in **Scale Calibration** in this section of the manual.
2. Stop the conveyor and place test weights on the 1-in. (25.4 mm) round bar directly under the weigh idler on the carriage assembly. Use certified weights and note the total weight of the test weights being used.



WARNING
Be sure to stop the conveyor before hanging the test weights on the scale or bodily injury could result.



3. Press the **INCR** key to display the **Scale Loading** screen. Check that the value shown in the **net wt** field is the same as the total weights placed on the scale. If it is not the same, move to step 4 to adjust the **Load Span Adjustment** field in the **scale setup** submenu.
4. Press the **PROG** key (for approximately 3 seconds) to move to the **PROGRAM** function. Press the **PROG** key to move to the corresponding **setup** menu {A – D}. Press the **ENTER** key to access the **setup** submenu. Press the **PROG** key to move to **Mode 4: Load Span Adjustment.** Adjust the value accordingly. Press the **EXIT** key to move to the **Main Menu** and again to return to the **DISPLAY** function. Repeat steps 3 and 4 until the **net wt** field shows the same value as the total weights.

Figure 4-1 Calibration Record {A}

Model CS 1000 Calibration Record Processing Plant RMT

Scale {A} _____ Date 8-22-11 City _____ State ____

Calibration		Scale Capacity	Belt Speed	Calibration Constant		Tare Weight		Effective Weigh Span		Load Span Adjustment	
Date	By			ECAL	Test Weights	As Found	As Left	As Found	As Left	As Found	As Left
				—	27.21						

Calculated Rate = $\frac{.03 \text{ (Cal. Constant Lbs) (Belt Speed FPM)}}{\text{Effective Weigh Span feet}}$ = _____TPH

Bridge Transducer

Power: 28 VAC Power Source: DSP 1000

Dip Switch Settings S1

SW1 ___ SW5 ON Model BT10-03

SW2 ___ SW6 ___ S/N 1108-13

SW3 ON SW7 ___ Software V4.0

SW4 ___ SW8 ___ PCB S/N 11-229

Belt Scale

Model: CS 1036 S/N: 13-0811-1000

Speed Sensor: SS50 Load Cell: 995385

RFA Module – Model: QT900-02B

Angle Compensation: YES Wireless: NO

S2: SW1 ____ SW2 ____ SW3 ____ SW4 ____

Figure 4-2 Calibration Record {B}

Model CS 1000 Calibration Record **Processing Plant** _____

Scale {B} _____ **Date** _____ **City** _____ **State** _____

Calibration		Scale Capacity	Belt Speed	Calibration Constant		Tare Weight		Effective Weigh Span		Load Span Adjustment	
Date	By			ECAL	Test Weights	As Found	As Left	As Found	As Left	As Found	As Left

Calculated Rate = $\frac{\text{.03 (Cal. Constant Lbs) (Belt Speed FPM)}}{\text{Effective Weigh Span feet}}$ = _____TPH

Bridge Transducer

Power: _____ **Power Source:** _____

Dip Switch Settings S1

SW1 ____ **SW5** ____ **Model** _____

SW2 ____ **SW6** ____ **S/N** _____

SW3 ____ **SW7** ____ **Software** _____

SW4 ____ **SW8** ____ **PCB S/N** _____

Belt Scale

Model: _____ **S/N:** _____

Speed Sensor: _____ **Load Cell:** _____

RFA Module – Model: _____

Angle Compensation: _____ **Wireless:** _____

S2: **SW1** ____ **SW2** ____ **SW3** ____ **SW4** ____

Figure 4-3 Calibration Record {C}

Model CS 1000 Calibration Record **Processing Plant** _____

Scale {C} _____ **Date** _____ **City** _____ **State** _____

Calibration		Scale Capacity	Belt Speed	Calibration Constant		Tare Weight		Effective Weigh Span		Load Span Adjustment	
Date	By			ECAL	Test Weights	As Found	As Left	As Found	As Left	As Found	As Left

Calculated Rate = $\frac{\text{.03 (Cal. Constant Lbs) (Belt Speed FPM)}}{\text{Effective Weigh Span feet}}$ = _____ TPH

Bridge Transducer

Power: _____ **Power Source:** _____

Dip Switch Settings S1

SW1 ____ **SW5** ____ **Model** _____

SW2 ____ **SW6** ____ **S/N** _____

SW3 ____ **SW7** ____ **Software** _____

SW4 ____ **SW8** ____ **PCB S/N** _____

Belt Scale

Model: _____ **S/N:** _____

Speed Sensor: _____ **Load Cell:** _____

RFA Module – Model: _____

Angle Compensation: _____ **Wireless:** _____

S2: SW1 ____ **SW2** ____ **SW3** ____ **SW4** ____

Figure 4-4 Calibration Record {D}

Model CS 1000 Calibration Record **Processing Plant** _____

Scale {D} _____ **Date** _____ **City** _____ **State** _____

Calibration		Scale Capacity	Belt Speed	Calibration Constant		Tare Weight		Effective Weigh Span		Load Span Adjustment	
Date	By			ECAL	Test Weights	As Found	As Left	As Found	As Left	As Found	As Left

Calculated Rate = $\frac{.03 \text{ (Cal. Constant Lbs) (Belt Speed FPM)}}{\text{Effective Weigh Span feet}}$ = _____TPH

Bridge Transducer

Power: _____ **Power Source:** _____

Dip Switch Settings S1

SW1 ____ **SW5** ____ **Model** _____

SW2 ____ **SW6** ____ **S/N** _____

SW3 ____ **SW7** ____ **Software** _____

SW4 ____ **SW8** ____ **PCB S/N** _____

Belt Scale

Model: _____ **S/N:** _____

Speed Sensor: _____ **Load Cell:** _____

RFA Module – Model: _____

Angle Compensation: _____ **Wireless:** _____

S2: SW1 _____ **SW2** _____ **SW3** _____ **SW4** _____

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Section 5 Maintenance and Troubleshooting

Overview

This section provides the necessary information for routinely maintaining your belt scale system.

Diagnostic Messages

Upon startup, the processor automatically runs an internal test and will indicate a problem by displaying the following diagnostic messages:

- **Overload** – indicates that the rating on the load cell has been exceeded.
- **Signal Error** – the signal is missing between the digital signal processor board and the bridge transducer circuit board. A broken wire, a shorted wire, or a defective bridge transducer or signal processor circuit board may prompt this message. If you suspect a defective circuit board, call the factory for assistance.

Spare Parts

For critical applications only, the factory recommends to have on hand the following spare parts:

- Load cell
- Bridge transducer circuit board
- Optional printer or computer interface circuit boards

A speed sensor tachometer is also necessary.

Routine Maintenance

- Wipe the front of the processor to keep it clean. Use a soft, damp cloth to clean the screen window. Do not use abrasive cleaners; they will scratch the screen window.
- Check that the wires, plugs, and integrators are tight in their connectors.
- Calibrate the scale weekly (or as necessary for your application), following the procedure in **Section 4 – Calibration.**

- Clean the scale area as necessary to keep it free from rocks, dust, and material buildup.
- Grease the weigh idler one to two times yearly. Do not use excessive grease; it could change the tare weight, causing the scale to go out of calibration. Calibrate the scale after greasing, following the procedure in **Section 4 – Calibration.**
- Be sure the load cell can move freely on its mounting; otherwise, weighing will not be accurate.
- Be sure the belt is trained to run centered on all scale idlers. Prevent off-center loads because scale calibration can be affected by a change in belt tension. Check belt tension and tracking regularly.
- If you are weighing material that sticks to the belt, use a belt scraper to remove the material. If you cannot remove the material, adjust zero.

Section 6 System Specifications

Belt Scale System

Accuracy	±0.5% on approved applications.
Weight	Based on a 30-in. (76.2-cm) scale: Without idler: 170 lb (77.11 kg). With idler: 210 lb (95.25 kg).
Dimensions	Length: 36 in. (91.44 cm). Width: conforms to CEMA standards belt width +11 in. (27.94 cm)
Construction	Rigid steel construction Carriage assembly. Three-point (delta) assembly. Isolated from conveyor. Bearingless pivots.

Digital Signal Processor

Power	120 VAC; 50/60 Hz.
Input Signals	RS485 from bridge transducer circuit.
Output Signals	(Optional PC board cards). Dual 4-20 mA, dual contact closure, and RS232 serial. Custom outputs available — consult the factory.

Load Cell

Type	NTEP-approved S cell design.
Rated Output	3 mV/v 350 ohm
Nonlinearity	<.015% of full scale.
Hysteresis	<.015% of full scale.
Nonrepeatability	<.01% of full scale.

Speed Sensor

Type	Belt Rider.
Drive	Positive contact AC tachometer.
Enclosure	Weatherproof steel housing.

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Section 7 Custom Applications

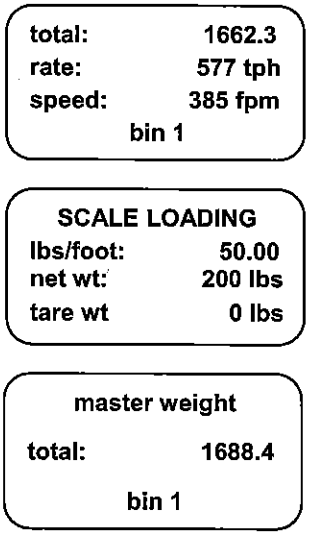
Overview

SciTronics can program the digital signal process for specific customer-requested applications as well as provide specific options for the processor, such as a built-in dot matrix printer. This section provides information on any features unique to your belt scale system.

Totals per Bin

Your processor has been programmed to display individual totals of material removed from five bins. Each bin is identified on the processor screen by a consecutive number: bin 1, bin 2, bin 3, bin 4, and bin 5. The processor automatically accumulates and stores the totals for each bin. Your belt scale has been equipped with a ticket printer to print these totals.

The operator can view three different screens in the **DISPLAY** function as shown at the left: the normal run screen (showing total, rate, and speed), the **scale loading** screen, and the master weight screen. Press the **DISPLAY** key to scroll through each screen. The normal run screen and the **master weight** screen can be displayed for bins 1-5. After selecting the screen to view, press the **INCR** and **DECR** keys to scroll through the screen for each bin.



When transferring material from a bin, first select the bin on the control panel and then press the **DISPLAY** key to select the screen and the **INCR** and **DECR** keys to select the bin.

Press the **PRINT** key to print the current screen total on the belt scale ticket printer. Upon printing, the total will be reset automatically if the operator selected **YES** in **Mode 8: reset total on print command** in the **serial port** submenu in the **PROGRAM** function. Only the total in the normal run screen is reset; the master weight total is not. To reset the **master weight total,** in the **DISPLAY** function, select the **master weight total** screen for each bin and press the **RESET TOTAL** key for approximately 3 seconds.

Replacing Paper

The printer uses a paper roll (Model PT-225) that is 2.75 in. (69.8 mm) wide and 1.6 in. (40.6 mm) in diameter and is available from the factory.

Replace the paper in the printer by doing the following:

1. Referring to Figure 7-1, remove the printer cover from the front of the printer by sliding it down and then lifting it off.
2. Remove the paper spindle and any remaining paper.
3. Place the new paper roll on the spindle.
4. Insert the spindle into the printer.
5. Replace the printer cover.

Replacing the Ribbon

When the ink appears very light when printing, replace the printer ribbon cartridge. The printer ribbon cartridge (Model ERC-09) is available from the factory.

Replace the printer ribbon cartridge (shown in Figure 7-2) by doing the following:

1. Referring to Figure 7-1, remove the printer cover from the front of the printer by sliding it down and then lifting it off.
2. Push the printer ribbon cartridge to pop it out of the printer.
3. Insert the new ribbon cartridge into the slot until it clicks into place.
4. Replace the printer cover.

Figure 7-1 Printer Cover on the Digital Signal Processor

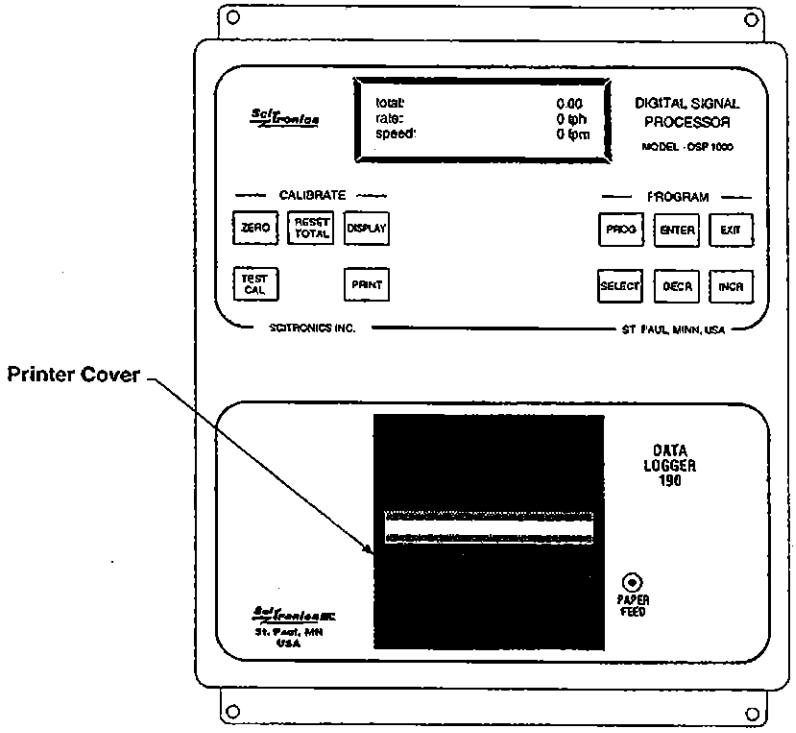
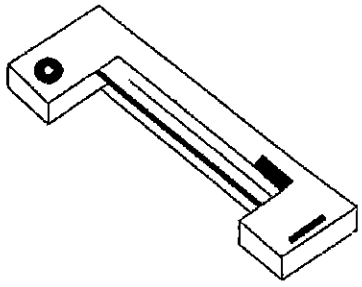


Figure 7-2 Printer Ribbon Cartridge



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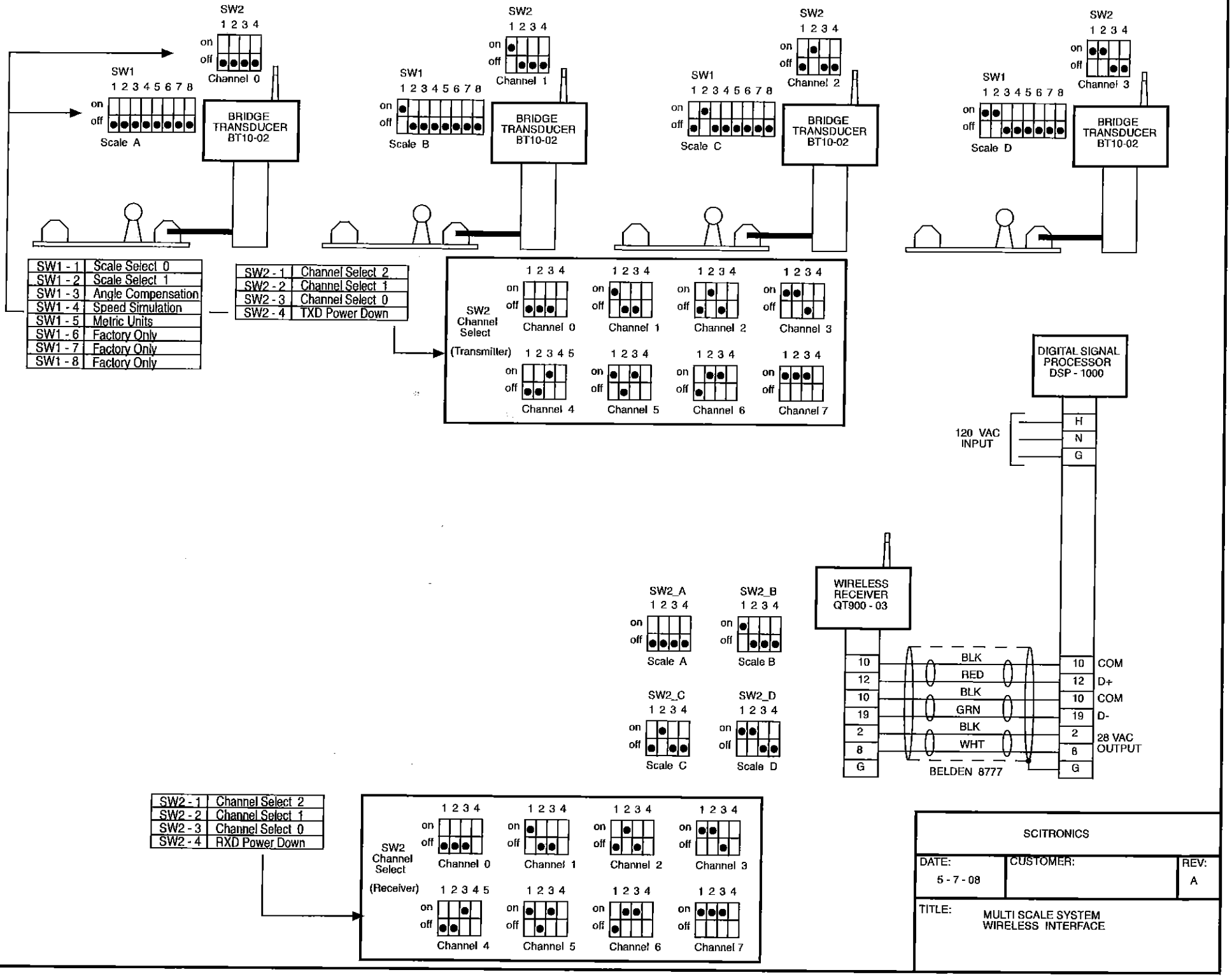
SW2
1 2 3 4
on
off
Channel 0
SW1
1 2 3 4 5 6 7 8
Scale A
BRIDGE TRANSDUCER BT10-02
Channel 1
Scale B
Channel 2
Scale C
Channel 3
Scale D
SW1 - 1 Scale Select 0
SW1 - 2 Scale Select 1
SW1 - 3 Angle Compensation
SW1 - 4 Speed Simulation
SW1 - 5 Metric Units
SW1 - 6 Factory Only
SW1 - 7 Factory Only
SW1 - 8 Factory Only
SW2 - 1 Channel Select 2
SW2 - 2 Channel Select 1
SW2 - 3 Channel Select 0
SW2 - 4 TXD Power Down
SW2 Channel Select
(Transmitter)
1 2 3 4 5
Channel 4
Channel 5
Channel 6
Channel 7
DIGITAL SIGNAL PROCESSOR DSP - 1000
120 VAC INPUT
H
N
G
SW2_A
SW2_B
SW2_C
SW2_D
WIRELESS RECEIVER QT900 - 03
10
12
19
2
8
BLK
RED
GRN
WHT
COM
D+
D-
28 VAC OUTPUT
BELDEN 8777
SW2 - 1 Channel Select 2
SW2 - 2 Channel Select 1
SW2 - 3 Channel Select 0
SW2 - 4 RXD Power Down
(Receiver)
SCITRONICS
DATE:
5 - 7 - 08
CUSTOMER:
REV:
A
TITLE:
MULTI SCALE SYSTEM
WIRELESS INTERFACE